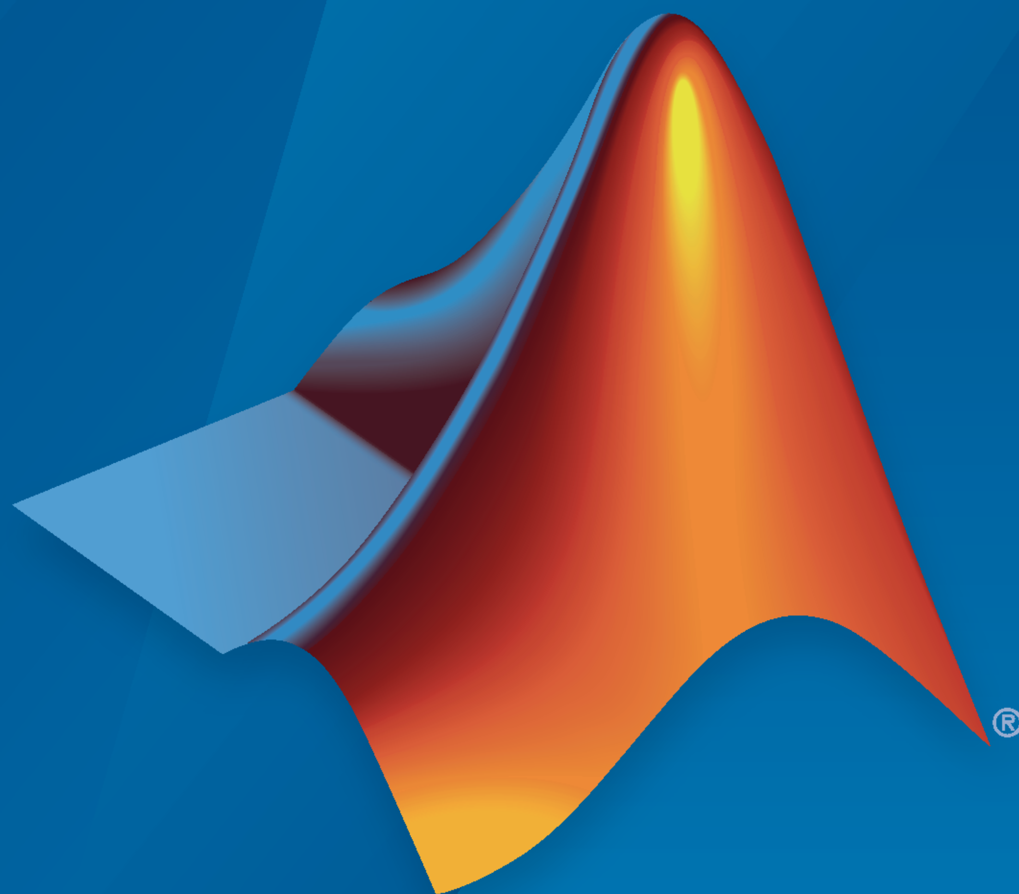
AUTOSAR Blockset

Reference



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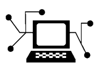

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AUTOSAR Blockset Reference

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September 2019	Online only	Revised for Version 2.1 (Release 2019b)
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Functions

add

Package: autosar.api

Add property to AUTOSAR element

Syntax

```
add(arProps,parentPath,property,name)
add(arProps,parentPath,property,name,childproperty,value)
```

Description

`add(arProps,parentPath,property,name)` adds a composite child element with the specified `name` to the AUTOSAR element at `parentPath`, under the specified `property`.

`add(arProps,parentPath,property,name,childproperty,value)` sets the value of a specified property of the added child property element.

Examples

Add Data Element to Sender Interface

Add data element `DE3` to sender interface `Interface1`.

```
hModel = 'autosar_swc_expfcns';
open_system(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
add(arProps,'Interface1','DataElements','DE3');
get(arProps,'Interface1','DataElements')
```

```
ans = 1x3 cell
    {'Interface1/DE1'}    {'Interface1/DE2'}    {'Interface1/DE3'}
```

Add Mode Group to Mode-Switch Interface

Using a fully qualified path, add a mode-switch interface and set the `IsService` property to `true`. Add mode group `mgModes` to the mode-switch interface using the composite property `ModeGroup`.

```
hModel = 'mAutosarMsConfigAfter';
open_system(hModel);
arProps=autosar.api.getAUTOSARProperties(hModel);
addPackageableElement(arProps,'ModeSwitchInterface','/pkg/if','Interface3',...
  'IsService',true);
ifPaths = find(arProps,[],'ModeSwitchInterface','PathType','FullyQualified')
```

```
ifPaths = 1x3 cell
    {'/pkg/if/myMsIf'}    {'/pkg/if/MsIf2'}    {'/pkg/if/Interface3'}
```

```
add(arProps,'/pkg/if/Interface3','ModeGroup','mgModes');
get(arProps,'Interface3','ModeGroup')

ans =
'Interface3/mgModes'
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`parentPath` — Path to a parent AUTOSAR element
character vector | string scalar

Path to a parent AUTOSAR element to which to add a specified child property element.

Example: `'Input'`

`property` — Type of property
character vector | string scalar

Type of property to add, among valid properties for the AUTOSAR element.

Example: `'DataElements'`

`name` — Name of child property element
character vector | string scalar

Name of the child property element to add.

Example: `'DE1'`

`childproperty,value` — Child property and value
name (character vector or string scalar), value

Child property to set, and its value. Table “Properties of AUTOSAR Elements” lists properties that are associated with AUTOSAR elements.

Example: `'Name','event1'`

Version History

Introduced in R2013b

See Also

`autosar.api.getAUTOSARProperties` | `delete`

Topics

“AUTOSAR Property and Map Function Examples”

"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

addBSWService

Package: `autosar.arch`

Add Basic Software component to AUTOSAR classic architecture model

Syntax

`bswBlock = addBSWService(archCM,bswKind)`

Description

`bswBlock = addBSWService(archCM,bswKind)` adds a Basic Software (BSW) service component block of type `bswKind` to a classic composition or architecture model `archCM`. Valid values for `bswKind` are `'dem'` for Diagnostic Event Manager and `'nvm'` for NVRAM Manager (not case-sensitive). The `archCM` argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`. The `bswBlock` output argument returns a block handle.

Examples

Add BSW Service Component Blocks to AUTOSAR Classic Architecture Model Top Level

Add NVRAM Service Component and Diagnostic Service Component blocks to the top level of an AUTOSAR architecture model.

```
% Create AUTOSAR classic architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add components inside the architecture model
addComponent(archModel,'Controller1');
actuator = addComponent(archModel,'Actuator');
set(actuator,'Kind','SensorActuator');

% Add Basic Software service component blocks
addBSWService(archModel,'nvm');
addBSWService(archModel,'dem');
layout(archModel);  % Auto-arrange layout
```

Input Arguments

`archCM` — Classic composition or architecture model
handle

AUTOSAR composition or architecture model to which to add a BSW component. The argument is a classic composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

`bswKind` — BSW service component block type
`'dem'` | `'nvm'`

Type of AUTOSAR BSW service component block to add to the specified classic composition or architecture model. Valid values are `'dem'` for Diagnostic Event Manager and `'nvm'` for NVRAM Manager (not case-sensitive).

Example: `'dem'`

Output Arguments

`bswBlock` — BSW block
handle

Returns an AUTOSAR BSW block handle.

Version History

Introduced in R2020a

See Also

Diagnostic Service Component | NVRAM Service Component | `layout`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Configure AUTOSAR Scheduling and Simulation"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

addComponent

Package: autosar.arch

Add component to AUTOSAR architecture model

Syntax

```
components = addComponent(archCM,compNames)
components = addComponent(archCM,compNames,'Kind',value)
```

Description

`components = addComponent(archCM,compNames)` adds one or more components specified in the `compNames` argument to composition or architecture model `archCM`.

The `archCM` argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`. The `components` output argument returns one or more component handles, which are `autosar.arch.Component` objects.

`components = addComponent(archCM,compNames,'Kind',value)` allows you to specify the component type for all added components. Valid classic component types are `Application` (the default for classic modeling), `SensorActuator`, `ComplexDeviceDriver`, `EcuAbstraction`, and `ServiceProxy`. The valid adaptive component type is `AdaptiveApplication`.

Examples

Add Components to AUTOSAR Classic Architecture Model

In an AUTOSAR classic architecture model:

1. Add a composition named `Sensors` and, inside the composition, add AUTOSAR sensor-actuator components named `PedalSnsr` and `ThrottleSnsr`.
2. At the top level of the model, add an application component named `Controller1` and a sensor-actuator component named `Actuator`.

```
% Create AUTOSAR classic architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add 2 components inside Sensors
names = {'PedalSnsr','ThrottleSnsr'};
sensorSWCs = addComponent(composition,names,'Kind','SensorActuator');
layout(composition); % auto-arrange layout

% Add components at architecture model top level
addComponent(archModel,'Controller1');
actuator = addComponent(archModel,'Actuator');
set(actuator,'Kind','SensorActuator');
layout(archModel);  % Auto-arrange layout
```

By default, `autosar.arch.createModel` creates an AUTOSAR architecture model for the Classic Platform. Mixing classic and adaptive components in the same architecture model is not supported.

Add Components to AUTOSAR Adaptive Architecture Model

In an AUTOSAR adaptive architecture model:

1. Add a composition named `Sensors` and, inside the composition, add two sensor adaptive application components named `Sensor1` and `Sensor2`.
2. At the top level of the model, add an adaptive application component named `Filter`.

```
% Create AUTOSAR adaptive architecture model
modelName = 'myArchAdaptive';
archModel = autosar.arch.createModel(modelName,'platform','Adaptive');

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add 2 components inside Sensors
names = {'Sensor1','Sensor2'};
sensorSWCs = addComponent(composition,names,'Kind','AdaptiveApplication');
layout(composition); % auto-arrange layout

% Add a component at architecture model top level
filterSWC = addComponent(archModel,'Filter'); % defaults to AdaptiveApplication

% Or explicitly set the component kind to AdaptiveApplication
set(filterSWC,'Kind','AdaptiveApplication');
layout(archModel);  % Auto-arrange layout
```

Mixing classic and adaptive architecture modeling components is not supported.

Input Arguments

`archCM` — Composition or architecture model
handle

AUTOSAR composition or architecture model to which to add one or more components. The argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

`compNames` — Component names
character vector | string scalar | cell array of character vectors | string array

Names of the components to add to the specified composition or architecture model.

Example: `{'PedalSnsr','ThrottleSnsr'}`

`'Kind',value` — Specify component type
`'Application'` | `'SensorActuator'` | `'ComplexDeviceDriver'` | `'EcuAbstraction'` | `'ServiceProxy'` | `'AdaptiveApplication'`

Type of AUTOSAR components to add to the specified composition or architecture model. The specified type applies to all added components.

Valid classic component types are `Application` (the default for classic modeling), `SensorActuator`, `ComplexDeviceDriver`, `EcuAbstraction`, and `ServiceProxy`. The valid adaptive component type is `AdaptiveApplication` (the default for adaptive modeling).

Example: `'Kind','SensorActuator'`

Output Arguments

`components` — Added components
handle | array of handles

Returns one or more AUTOSAR component handles, which are `autosar.arch.Component` objects, with component properties.

Version History

Introduced in R2020a

R2023a: Support for AUTOSAR Adaptive Architecture Modeling

R2023a introduces AUTOSAR architecture modeling for the Adaptive Platform and `AdaptiveApplication` components for modeling adaptive architectures.

See Also

Classic Component | Adaptive Component | `addComposition` | `addPort` | `connect` | `destroy` | `importFromARXML` | `layout`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Add and Connect AUTOSAR Classic Components and Compositions"
"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

addComposition

Package: `autosar.arch`

Add composition to AUTOSAR architecture model

Syntax

`compositions = addComposition(archCM,compNames)`

Description

`compositions = addComposition(archCM,compNames)` adds one or more compositions specified in the `compNames` argument to composition or architecture model `archCM`.

The `archCM` argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`. The `compositions` output argument returns one or more composition handles, which are `autosar.arch.Composition` objects.

Examples

Add Composition with Classic Components to AUTOSAR Architecture Model

In an AUTOSAR classic architecture model, add a composition named `Sensors`. Inside the composition, add AUTOSAR sensor-actuator components named `PedalSnsr` and `ThrottleSnsr`.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add 2 components inside Sensors
names = {'PedalSnsr','ThrottleSnsr'};
sensorSWCs = addComponent(composition,names,'Kind','SensorActuator');
layout(composition); % Auto-arrange layout
```

By default, `autosar.arch.createModel` creates an AUTOSAR architecture model for the Classic Platform, and compositions added to a classic architecture model support classic modeling components. Mixing classic and adaptive components in the same architecture model is not supported.

Add Composition with Adaptive Components to AUTOSAR Architecture Model

In an AUTOSAR adaptive architecture model, add a composition named `Sensors`. Inside the composition, add two AUTOSAR adaptive application components named `Sensor1` and `Sensor2`.

```
% Create AUTOSAR adaptive architecture model
modelName = 'myArchAdaptive';
archModel = autosar.arch.createModel(modelName,'platform','Adaptive');
```

```
% Add a composition
composition = addComposition(archModel,'Sensors');

% Add 2 components inside Sensors
names = {'Sensor1','Sensor2'};
sensorSWCs = addComponent(composition,names,'Kind','AdaptiveApplication');
layout(composition); % auto-arrange layout
```

Compositions added to an adaptive architecture model support adaptive modeling components. Mixing classic and adaptive components in the same architecture model is not supported.

Input Arguments

`archCM` — Composition or architecture model

handle

AUTOSAR composition or architecture model to which to add one or more compositions. The argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

`compNames` — Composition names

character vector | string scalar | cell array of character vectors | string array

Names of the compositions to add to the specified composition or architecture model.

Example: `{'Sensors','Actuators'}`

Output Arguments

`compositions` — Added compositions

handle | array of handles

Returns one or more AUTOSAR composition handles, which are `autosar.arch.Composition` objects, with composition properties.

Version History

Introduced in R2020a

R2023a: Support for AUTOSAR Adaptive Architecture Modeling

R2023a introduces AUTOSAR architecture modeling for the Adaptive Platform and `AdaptiveApplication` components for modeling adaptive architectures.

See Also

Software Composition | `addComponent` | `addPort` | `connect` | `destroy` | `importFromARXML` | `layout`

Topics

“Configure AUTOSAR Architecture Model Programmatically”
“Add and Connect AUTOSAR Classic Components and Compositions”

“Add and Connect AUTOSAR Adaptive Components and Compositions”
“Author AUTOSAR Classic Compositions and Components in Architecture Model”

addPackageableElement

Package: `autosar.api`

Add element to AUTOSAR package in model

Syntax

```
addPackageableElement(arProps,category,package,name)
addPackageableElement(arProps,category,package,name,property,value)
```

Description

`addPackageableElement(arProps,category,package,name)` adds element `name` of the specified `category` to the specified AUTOSAR `package` in a model configured for AUTOSAR.

`addPackageableElement(arProps,category,package,name,property,value)` sets the value of a specified property of the added element.

Examples

Add Sender-Receiver Interface to Package and Set IsService Property

Using a fully qualified path, add a sender-receiver interface to an interface package and set the `IsService` property to `true`.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
addPackageableElement(arProps,'SenderReceiverInterface','/pkg/if','Interface3',...
  'IsService',true);
ifPaths = find(arProps,[],'SenderReceiverInterface',...
  'IsService',true,'PathType','FullyQualified')
```

```
ifPaths =
  1×1 cell array
    {'/pkg/if/Interface3'}
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`category` — Element category
character vector | string scalar

Category of element to add. Valid category values are `'ClientServerInterface'`, `'DataTypeMappingSet'`, `'ModeDeclarationGroup'`, `'ModeSwitchInterface'`, `'Package'`,

`'ParameterComponent'`, `'ParameterInterface'`, `'SenderReceiverInterface'`, `'SwAddrMethod'`, and `'SystemConst'`.

Example: `'SenderReceiverInterface'`

package — Package path
character vector | string scalar

Fully-qualified path to the element package.

Example: `'/pkg/if'`

name — Element name
character vector | string scalar

Name of the element to add.

Example: `'Interface3'`

`property,value` — Element property and value
name (character vector or string scalar), value

Property/value pairs for setting values of element properties. Table “Properties of AUTOSAR Elements” lists properties that are associated with AUTOSAR elements.

Example: `'IsService',true`

Version History

Introduced in R2014b

See Also

`autosar.api.getAUTOSARProperties` | `delete`

Topics

“AUTOSAR Property and Map Function Examples”
“Configure and Map AUTOSAR Component Programmatically”
“AUTOSAR Component Configuration”

addPort

Package: autosar.arch

Add port to AUTOSAR component, composition, or architecture model

Syntax

ports = addPort(archCCM,portKind,portNames)

Description

ports = addPort(archCCM,portKind,portNames) adds one or more ports of type portKind to component, composition, or architecture model archCCM.

For classic architectures, valid values for portKind are 'Receiver' and 'Sender'. For adaptive architectures, valid values for portKind are 'Receiver', 'Sender', 'Client', and 'Server'. The portNames argument specifies the names of one or more ports to add.

The archCCM argument is a component, composition, or architecture model handle returned by a previous call to addComponent, addComposition, autosar.arch.createModel, or autosar.arch.loadModel. The ports output argument returns one or more port handles, which are autosar.arch.CompPort or autosar.arch.ArchPort objects.

Examples

Add Ports to AUTOSAR Classic Architecture Model, Composition, and Components

In an AUTOSAR classic architecture model:

1. Add a composition named Sensors.
2. At the top level of the model, add an application component named Controller1 and a sensor-actuator component named Actuator.
3. For the architecture model, add two receiver (input) ports and a sender (output) port. The ports appear at the architecture model boundary.
4. For the composition block, add two receiver ports and two sender ports. The composition receiver port names match the names of the architecture model receiver ports to which they connect.
5. For the component blocks, add receiver and sender ports. The component receiver and sender port names match the names of the component, composition, or architecture model ports to which they connect.

```
% Create AUTOSAR classic architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add components at architecture model top level
```

```
addComponent(archModel,'Controller1');
actuator = addComponent(archModel,'Actuator');
set(actuator,'Kind','SensorActuator');

% Add architecture ports
addPort(archModel,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(archModel,'Sender','ThrCmd_Hw');

% Add composition ports
addPort(composition,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(composition,'Sender',{'TPS_Perc','APP_Perc'});

% Add component ports
controller = find(archModel,'Component','Name','Controller1');
addPort(controller,'Receiver',{'TPS_Perc','APP_Perc'});
addPort(controller,'Sender','ThrCmd_Perc');
addPort(actuator,'Receiver','ThrCmd_Perc');
addPort(actuator,'Sender','ThrCmd_Hw');

layout(archModel);  % Auto-arrange layout
```

By default, `autosar.arch.createModel` creates an AUTOSAR architecture model for the Classic Platform. To explicitly specify the Classic Platform, use the `platform` name-value argument when calling `autosar.arch.createModel`. Mixing classic and adaptive components in the same architecture model is not supported.

Add Ports to AUTOSAR Adaptive Architecture Model, Composition, and Components

In an AUTOSAR adaptive architecture model:

1. Add a composition named `Sensors`.
2. At the top level of the model, add an adaptive application component named `Filter`.
3. For the architecture model, add two receiver (input) ports and two sender (output) ports. The ports appear at the architecture model boundary.
4. For the composition block, add two receiver ports and two sender ports. The composition receiver port names match the names of the architecture model receiver ports to which they connect.
5. Also on the composition block, add a client port.
6. For the component block, add a server port. The component server port name matches the name of the component, composition, or architecture model ports to which it connects.

```
% Create AUTOSAR adaptive architecture model
modelName = 'myArchAdaptive';
archModel = autosar.arch.createModel(modelName,'platform','Adaptive');

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add component at architecture model top level
addComponent(archModel,'Filter'); % defaults to AdaptiveApplication

% Add architecture ports
addPort(archModel,'Receiver',{'Data_Snsr1','Data_Snsr2'});
addPort(archModel,'Sender',{'FilteredData_Snsr1','FilteredData_Snsr2'});

% Add composition ports
addPort(composition,'Receiver',{'Data_Snsr1','Data_Snsr2'});
addPort(composition,'Sender',{'FilteredData_Snsr1','FilteredData_Snsr2'});
addPort(composition,'Client','Filter_CSPort');

% Add component ports
```

```
filter = find(archModel,'Component','Name','Filter');
addPort(filter,'Server','Filter_CSPort');
layout(archModel);  % Auto-arrange layout
```

Mixing classic and adaptive components in the same architecture model is not supported.

Input Arguments

`archCCM` — Component, composition, or architecture model

handle

AUTOSAR component, composition, or architecture model to which to add one or more ports. The argument is a component, composition, or architecture model handle returned by a previous call to `addComponent`, `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

`portKind` — Port type

`'Receiver'` | `'Sender'` | `'Client'` | `'Server'`

Type of AUTOSAR ports to add to the specified component, composition, or architecture model. The specified type applies to all added ports.

For classic architectures, valid values for `portKind` are `'Receiver'` and `'Sender'`.

For adaptive architectures, valid values for `portKind` are `'Receiver'`, `'Sender'`, `'Client'`, and `'Server'`.

Example: `'Receiver'`

`portNames` — Port names

character vector | string scalar | cell array of character vectors | string array

Names of the ports to add to the specified component, composition, or architecture model.

Example: `{'TPS_Hw','APP_Hw'}`

Output Arguments

`ports` — Added ports

handle | array of handles

Returns one or more AUTOSAR port handles, which are `autosar.arch.CompPort` or `autosar.arch.ArchPort` objects, with port properties.

Version History

Introduced in R2020a

R2023a: Client and Server ports for modeling method communication in AUTOSAR Adaptive Architectures

R2023a introduces AUTOSAR architecture modeling for the Adaptive Platform. Client and Server ports are added to the available `portKind` ports and supported for modeling method communication in an AUTOSAR adaptive architecture.

See Also

`addComponent` | `addComposition` | `connect` | `destroy` | `importFromARXML` | `layout`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Add and Connect AUTOSAR Classic Components and Compositions"
"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

addSignal

Package: autosar.api

Add Simulink block signal to AUTOSAR mapping

Syntax

addSignal(slMap,slPortHandle)

Description

addSignal(slMap,slPortHandle) adds the Simulink® block signal associated with outport port handle slPortHandle to AUTOSAR mapping. The signal then can be mapped to an AUTOSAR variable, for example, by using the mapSignal function.

Examples

Add and Map Simulink Block Signal

In example model autosar_swc_counter:

1. Create a new default AUTOSAR mapping.
2. Add Simulink signal equal_to_count, which originates in the RelOpt block, to the AUTOSAR component signal mapping.
3. Map the signal to AUTOSAR static memory and set ReadWrite calibration access.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
autosar.api.create(hModel,'default'); % Create default AUTOSAR mapping
slMap = autosar.api.getSimulinkMapping(hModel);

portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
addSignal(slMap,outportHandle)

mapSignal(slMap,outportHandle,'StaticMemory',...
  'SwCalibrationAccess','ReadWrite');
```

Input Arguments

slMap — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *slMap* = autosar.api.getSimulinkMapping(*model*). *model* is a handle, character vector, or string scalar representing the model name.

Example: slMap

slPortHandle — Simulink outport port handle for a block signal

handle

Outport port handle for a Simulink block signal to add to AUTOSAR mapping. Use MATLAB® commands to construct the outport port handle. For example, for a Relational Operator block named `RelOpt`:

```
portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
```

Example: `outportHandle`

Version History

Introduced in R2020b

See Also

`autosar.api.getSimulinkMapping` | `getSignal` | `mapSignal` | `removeSignal`

Topics

"Map Block Signals and States to AUTOSAR Variables"
"Map Submodel Signals and States to AUTOSAR Variables"
"Configure AUTOSAR Per-Instance Memory"
"Configure AUTOSAR Static Memory"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

arxml.importer

Import AUTOSAR XML descriptions of software components, compositions, or packages

Description

Use `arxml.importer` functions to import AUTOSAR software components, compositions, or packages of shared elements from ARXML files into Simulink. For example, you can parse an AUTOSAR software component description XML file exported by an AUTOSAR authoring tool, and then import the component into a Simulink model. After importing the component, you can use the Simulink representation of the component for further configuration, algorithm development, C/C++ code generation, and ARXML export.

For a list of schema versions supported for ARXML import and export, see "Select AUTOSAR Classic Schema" or "Select AUTOSAR Adaptive Schema".

Creation

Syntax

```
ar = arxml.importer(filename)
ar = arxml.importer({filename1,filename2,...,filenameN})
```

Description

`ar = arxml.importer(filename)` creates object `ar`, which represents the AUTOSAR information in XML file `filename`.

`ar = arxml.importer({filename1,filename2,...,filenameN})` creates object `ar`, which represents the AUTOSAR information in the specified XML files.

Tip If you enter the `arxml.importer` function call without a terminating semicolon (;), the importer lists the AUTOSAR content of the specified XML file or files. The information includes paths to software components in the AUTOSAR package structure, which you can specify in calls to `createComponentAsModel` and `createCompositionAsModel`.

Input Arguments

`filename` — AUTOSAR XML filename
character vector | string scalar

Name of XML file containing AUTOSAR information.

Example: `'mySWC.arxml'`

`filename1,filename2,...,filenameN` — AUTOSAR XML filenames
cell array of character vectors | string array

Cell array of names of XML files containing AUTOSAR information.

Example: `{'mySWC.arxml','DataTypes.arxml','MiscDefs.arxml'}`

Object Functions

createComponentAsModel	Create Simulink representation of AUTOSAR ARXML atomic software component
createCompositionAsModel	Create Simulink representation of AUTOSAR ARXML software composition
getComponentNames	Get AUTOSAR software component names from ARXML files
updateAUTOSARProperties	Update model with ARXML definitions from AUTOSAR element packages
updateModel	Update AUTOSAR model with ARXML changes

Examples

Create `arxml.importer` Object from AUTOSAR XML File

Call the `arxml.importer` function to create object `ar`, which represents the AUTOSAR information in XML file `mySWC.arxml`. Use the returned object to import AUTOSAR software component `/pkg/swc` and create an initial Simulink representation of the component.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem')
```

Create `arxml.importer` Object from Multiple AUTOSAR XML Files

Call the `arxml.importer` function to create object `ar`, which represents the AUTOSAR information in XML files `mySWC.arxml`, `DataTypes.arxml`, and `MiscDefs.arxml`. Use the returned object to import AUTOSAR software component `/pkg/swc` and create an initial Simulink representation of the component.

```
ar = arxml.importer({'mySWC.arxml','DataTypes.arxml','MiscDefs.arxml'})
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem')
```

Version History

Introduced in R2008a

See Also

Topics

“Import AUTOSAR XML Descriptions Into Simulink”
“Import AUTOSAR Component to Simulink”
“Import AUTOSAR Composition to Simulink”
“Import AUTOSAR Software Component Updates”
“Import and Reference Shared AUTOSAR Element Definitions”
“Import AUTOSAR Package into Component Model”
“Import AUTOSAR Adaptive Software Descriptions”
“Import AUTOSAR Adaptive Components to Simulink”

“Import AUTOSAR Package into Adaptive Component Model”
“AUTOSAR ARXML Importer”
“Round-Trip Preservation of AUTOSAR XML File Structure and Element Information”

autosar.api.create

Create or update mapped AUTOSAR component model

Syntax

```
autosar.api.create(model)
autosar.api.create(model,mode)
autosar.api.create(model,mode,Name,Value)
```

Description

`autosar.api.create(model)` creates or updates mapped AUTOSAR software component model `model`. The default function behavior depends on the mapping state of the model.

- If the model is not mapped to an AUTOSAR software component, the function creates a Simulink to AUTOSAR mapping in `default` mode. In this mapping, Simulink inports and outports are mapped to AUTOSAR ports with default AUTOSAR properties.
- If the model is already mapped to an AUTOSAR software component, the function updates the existing mapping in `incremental` mode. The function finds and maps unmapped model elements, and updates the AUTOSAR Dictionary for deleted model elements.

`autosar.api.create(model,mode)` additionally specifies a mapping `mode` — `default`, `init`, or `incremental`.

`autosar.api.create(model,mode,Name,Value)` specifies additional options for mapping with one or more `Name,Value` pair arguments.

Examples

Create Default AUTOSAR Properties and Mapping

Create AUTOSAR properties and Simulink to AUTOSAR mapping for an Embedded Coder® model in which the model configuration parameter **System target file** has been changed from `ert.tlc` to `autosar.tlc` or `autosar_adaptive.tlc`. Map model inports and outports to AUTOSAR ports with default AUTOSAR properties.

```
open_system('rtwdemo_counter');
set_param('rtwdemo_counter','SystemTargetFile','autosar.tlc');
autosar.api.create('rtwdemo_counter');
```

Incrementally Update Mapped AUTOSAR Component for Model Changes

For a mapped AUTOSAR software component model, update the mapping to account for incremental model changes. Find and map unmapped model elements and update the AUTOSAR Dictionary for deleted model elements.

```
open_system('my_autosar_swc');
autosar.api.create('my_autosar_swc','incremental');
```

Map Submodel Referenced From AUTOSAR Component Model

Create AUTOSAR properties and Simulink to AUTOSAR mapping for a submodel referenced from an AUTOSAR component model.

```
openExample('autosar_subcomponent');
autosar.api.create('autosar_subcomponent','default','ReferencedFromComponentModel',true);
```

Input Arguments

`model` — Model for which to create or update AUTOSAR properties and mapping
handle | character vector | string scalar

Model for which to create or update AUTOSAR properties and Simulink to AUTOSAR mapping, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

`mode` — Mode in which to map model elements
`default` | `init` | `incremental`

The default mode value depends on the mapping state of the model — `default` for an unmapped model or `incremental` for a mapped model.

Specify `default` to create AUTOSAR properties and Simulink to AUTOSAR mapping for a model. As part of the mapping, the function maps model inports and outports to AUTOSAR ports with default AUTOSAR properties. If the model is already mapped, the function overwrites the existing mapping.

Specify `init` to create AUTOSAR properties and Simulink to AUTOSAR mapping for a model. As part of the mapping, the function does *not* map model inports and outports. If the model is already mapped, the function overwrites the existing mapping.

Specify `incremental` to update the existing mapping in a mapped AUTOSAR software component model. The function finds and maps unmapped model elements and updates the AUTOSAR Dictionary for deleted model elements.

Example: `'default'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'ReferencedFromComponentModel',true` maps a model as a referenced submodel.

`ReferencedFromComponentModel` — Designate whether the model is referenced from a component model
`false` (default) | `true`

Specify whether the model is a submodel referenced from an AUTOSAR software component model. In a mapped submodel, you can use the Code Mappings editor to configure the submodel internal data for calibration.

Example: `'ReferencedFromComponentModel',true`

Version History

Introduced in R2013b

See Also

`autosar_ui_launch` | `autosar.api.delete` | `updateAUTOSARProperties`

Topics

“Incrementally Update AUTOSAR Mapping After Model Changes”
“Map Calibration Data for Submodels Referenced from AUTOSAR Component Models”
“Configure and Map AUTOSAR Component Programmatically”
“AUTOSAR Component Configuration”

autosar.api.delete

Delete AUTOSAR properties and mapping for Simulink model

Syntax

`autosar.api.delete(model)`

Description

`autosar.api.delete(model)` deletes AUTOSAR properties and Simulink to AUTOSAR mapping for `model`. The resulting model does not represent and map an AUTOSAR software component.

Examples

Remove AUTOSAR Component Representation from Model

Delete AUTOSAR properties and Simulink to AUTOSAR mapping for a model.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
autosar.api.delete(hModel);
```

Input Arguments

`model` — Model for which to delete AUTOSAR properties and mapping
handle | character vector | string scalar

Model for which to delete AUTOSAR properties and Simulink to AUTOSAR mapping, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

Version History

Introduced in R2017b

See Also

`autosar.api.create`

Topics

"AUTOSAR Component Configuration"

autosar.api.getAUTOSARProperties

Configure AUTOSAR software component elements and properties

Description

In an AUTOSAR software component model, use AUTOSAR property functions to configure AUTOSAR elements from an AUTOSAR component perspective. You can add AUTOSAR elements, find elements, get and set properties of elements, delete elements, and define ARXML packaging of elements.

Creation

Syntax

```
arProps = autosar.api.getAUTOSARProperties(model)
```

Description

`arProps = autosar.api.getAUTOSARProperties(model)` creates object `arProps`, which represents AUTOSAR properties information for `model`. The specified model must be open.

Input Arguments

`model` — AUTOSAR model
handle | character vector | string scalar

Model for which to create AUTOSAR properties object, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

Object Functions

add	Add property to AUTOSAR element
addPackageableElement	Add element to AUTOSAR package in model
createEnumeration	Create Simulink enumeration data type definition from imported AUTOSAR data elements
createManifest	Create manifest file for AUTOSAR adaptive model
createNumericType	Create Simulink numeric data type definition from imported AUTOSAR data elements
delete	Delete AUTOSAR element
deleteUnmappedComponents	Delete unmapped AUTOSAR components from model
find	Find AUTOSAR elements
get	Get property of AUTOSAR element
set	Set property of AUTOSAR element

Examples

Create AUTOSAR Properties Object and Set IsService Property

Call the `autosar.api.getAUTOSARProperties` function to create object `arProps`, which represents AUTOSAR properties information for model `autosar_swc_slfcns`. Use the returned object to set the `IsService` property for client-server interface `CSIf` to `true` (1), indicating that the port interface is used for AUTOSAR services.

```
hModel = 'autosar_swc_slfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
set(arProps,'CSIf','IsService',true);
isService = get(arProps,'CSIf','IsService')
```

```
isService =
  logical
   1
```

Version History

Introduced in R2013b

See Also

Topics

"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

autosar.api.getSimulinkMapping

Map Simulink elements to AUTOSAR elements

Description

In an AUTOSAR software component model, use AUTOSAR map functions to map model elements to AUTOSAR component elements from a Simulink model perspective. In an AUTOSAR adaptive model, use AUTOSAR map functions to configure generated C++ class names and namespaces for your adaptive application. For example, you can:

- Map a Simulink entry-point function to an AUTOSAR runnable and optional software address methods.
- Map a Simulink inport or outport to an AUTOSAR receiver or sender port and a sender-receiver data element.
- Map a Simulink model workspace parameter to an AUTOSAR component parameter.
- Map a Simulink data store to an AUTOSAR variable.
- Add or remove Simulink block signals from AUTOSAR component mapping.
- Map a Simulink block signal or state to an AUTOSAR variable.
- Set the default data packaging for Simulink internal data stores, signals, and states in AUTOSAR generated code.
- Map a Simulink data transfer line to an AUTOSAR inter-runnable variable (IRV).
- Map a Simulink function caller to an AUTOSAR client port and a client-server operation.
- Control generated C++ class name or namespace for adaptive applications.

Creation

Syntax

```
slMap = autosar.api.getSimulinkMapping(model)
```

Description

`slMap = autosar.api.getSimulinkMapping(model)` creates object `slMap`, which represents AUTOSAR mapping information for `model`. The specified model must be open.

Input Arguments

`model` — AUTOSAR model
handle | character vector | string scalar

Model for which to create AUTOSAR mapping object, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

Object Functions

addSignal	Add Simulink block signal to AUTOSAR mapping
find	Find AUTOSAR elements
getClassName	Get class name of model
getClassNamespace	Get class namespace for a model
getDataStore	Get AUTOSAR mapping information for Simulink data store
getDataTransfer	Get AUTOSAR mapping information for Simulink data transfer
getFunction	Get AUTOSAR mapping information for Simulink entry-point function
getFunctionCaller	Get AUTOSAR mapping information for Simulink function-caller block
getInport	Get AUTOSAR mapping information for Simulink inport
getInternalDataPackaging	Get default internal data packaging for AUTOSAR component model
getOutport	Get AUTOSAR mapping information for Simulink outport
getParameter	Get AUTOSAR mapping information for Simulink model workspace parameter
getSignal	Get AUTOSAR mapping information for Simulink block signal
getState	Get AUTOSAR mapping information for Simulink block state
mapDataStore	Map Simulink data store to AUTOSAR variable
mapDataTransfer	Map Simulink data transfer to AUTOSAR inter-runnable variable
mapFunction	Map Simulink entry-point function to AUTOSAR runnable and software address methods
mapFunctionCaller	Map Simulink function-caller block to AUTOSAR client port and operation
mapInport	Map Simulink inport to AUTOSAR port
mapOutport	Map Simulink outport to AUTOSAR port
mapParameter	Map Simulink model workspace parameter to AUTOSAR component parameter
mapSignal	Map Simulink block signal to AUTOSAR variable
mapState	Map Simulink block state to AUTOSAR variable
removeSignal	Remove Simulink block signal from AUTOSAR mapping
setClassName	Set class name of model
setClassNamespace	Set class namespace of model
setInternalDataPackaging	Set default internal data packaging for AUTOSAR component model

Examples

Create AUTOSAR Mapping Object and Map Entry-Point Function to AUTOSAR Runnable

Call the `autosar.api.getSimulinkMapping` function to create object `slMap`, which represents AUTOSAR mapping information for model `autosar_swc`. Use the returned object to map the Simulink initialize entry-point function to AUTOSAR runnable `Runnable_Init`.

```
hModel = 'autosar_swc';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);
mapFunction(slMap,'Initialize','Runnable_Init');
arRunnableName = getFunction(slMap,'Initialize')
```

```
arRunnableName =
    'Runnable_Init'
```

Version History

Introduced in R2013b

See Also

Topics

“Configure and Map AUTOSAR Component Programmatically”
“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

autosar.api.syncModel

Update Simulink to AUTOSAR mapping of model with Simulink modifications

Syntax

```
autosar.api.syncModel(model)
```

Description

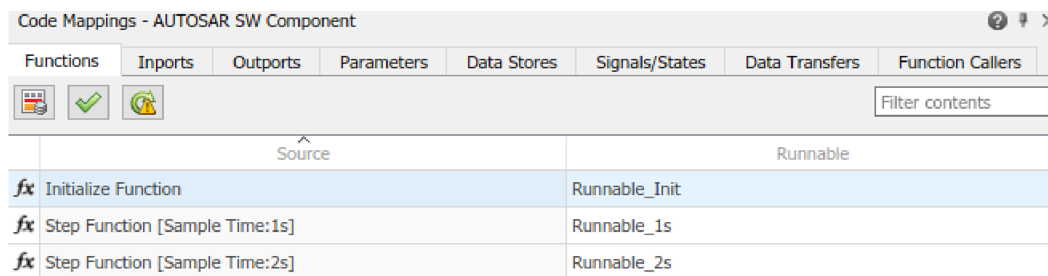
`autosar.api.syncModel(model)` updates the Simulink to AUTOSAR mapping of `model` with modifications made to Simulink elements, such as data transfers, entry-point functions, and function callers.

This function is equivalent to using the **Update** button in the Code Mappings editor view of an AUTOSAR component model.

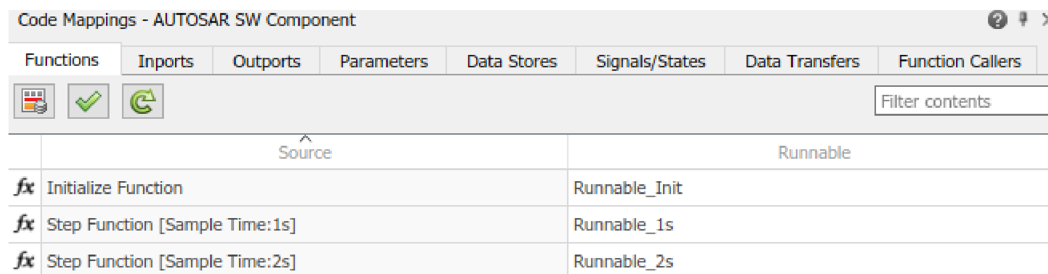
Examples

Update Simulink to AUTOSAR Mapping of Model

When you create or modify an AUTOSAR model, Simulink to AUTOSAR mapping potentially is not current with the model content. For example, the **Update** button in this Code Mappings editor display indicates that Simulink elements need loading or updating.



This example opens and updates a model. After calling `autosar.api.syncModel`, the Simulink to AUTOSAR mapping reflects the current model content.



```
hModel = 'autosar_swc';
openExample(hModel);
autosar.api.syncModel(hModel)
```

Input Arguments

`model` — Model to update

handle | character vector | string scalar

Loaded or open model for which to update Simulink to AUTOSAR mapping with model changes, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

Version History

Introduced in R2016a

See Also

`autosar.api.validateModel`

Topics

"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

autosar.api.validateModel

Validate AUTOSAR properties and mapping of Simulink model

Syntax

`autosar.api.validateModel(model)`

Description

`autosar.api.validateModel(model)` validates the AUTOSAR properties and Simulink to AUTOSAR mapping of `model`.

If Simulink Coder™ and Embedded Coder are not licensed on your system, the function validates only the Simulink to AUTOSAR mapping of `model`.

This function is equivalent to using the **Validate** button in the Code Mappings editor view of an AUTOSAR component model.

Examples

Validate AUTOSAR Properties and Mapping of Model

This example opens a model in which a Simulink inport is not mapped to an AUTOSAR port and data element. Initial validation reports the error and fails. After the inport is mapped, validation succeeds.

```
hModel = 'autosar_model_with_unmapped_port';
load_system(hModel);

% Initial validation fails
try
    autosar.api.validateModel(hModel)
catch validationErr
    throw(validationErr)
end
```

```
Block 'autosar_model_with_unmapped_port/Input' is not mapped to an AUTOSAR port element.
```

```
% Map the unmapped port
slMap=autosar.api.getSimulinkMapping(hModel);
mapInport(slMap,'Input','Input','Input','ImplicitReceive');

% Second validation succeeds
autosar.api.validateModel(hModel)
```

Input Arguments

`model` — Model to validate
handle | character vector | string scalar

Loaded or open model for which to validate AUTOSAR properties and Simulink to AUTOSAR mapping, specified as a handle, character vector, or string scalar representing the model name.

Example: `'my_model'`

Version History

Introduced in R2016a

See Also

`autosar.api.syncModel`

Topics

"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

autosar.arch.createModel

Create AUTOSAR architecture model

Syntax

```
archModel = autosar.arch.createModel(modelName)
archModel = autosar.arch.createModel(modelName,openFlag)
archModel = autosar.arch.createModel(modelName,"platform",platformKind)
```

Description

`archModel = autosar.arch.createModel(modelName)` creates and opens AUTOSAR architecture model `modelName` in the editor. The output argument `archModel` returns a model handle, which is an `autosar.arch.Model` object. The platform kind when using this syntax is set to the AUTOSAR Classic Platform by default.

`archModel = autosar.arch.createModel(modelName,openFlag)` allows you to control whether the created AUTOSAR architecture model opens in the editor. Specify `openFlag` as `false` to create an architecture model without opening it in the editor.

`archModel = autosar.arch.createModel(modelName,"platform",platformKind)` allows you to specify the platform `platformKind` as `Adaptive` or `Classic` for the created AUTOSAR architecture model. Use this option with any of the input argument combinations in the previous syntaxes.

Examples

Create and Open AUTOSAR Architecture Model

Create an AUTOSAR classic architecture model named `myArchModel`, open the model in the editor, and return model properties.

By default, `autosar.arch.createModel` without the `platform` name-value argument creates an architecture model for the Classic Platform.

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName)
```

```
archModel = 

  Model with properties:

              Name: 'myArchModel'
    SimulinkHandle: 1.2207e-04
        Components: [0×0 autosar.arch.Component]
      Compositions: [0×0 autosar.arch.Composition]
             Ports: [0×0 autosar.arch.PortBase]
        Connectors: [0×0 autosar.arch.Connector]
        Interfaces: [0×0 Simulink.interface.dictionary.PortInterface]
```

Create AUTOSAR Architecture Model without Opening

Create an AUTOSAR classic architecture model without opening it in the editor, and return model properties. By default, `autosar.arch.createModel` creates an architecture model for the Classic Platform.

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName,false)
```

```
archModel = 

  Model with properties:

              Name: 'myArchModel'
    SimulinkHandle: 2.4414e-04
        Components: [0×0 autosar.arch.Component]
      Compositions: [0×0 autosar.arch.Composition]
             Ports: [0×0 autosar.arch.PortBase]
        Connectors: [0×0 autosar.arch.Connector]
        Interfaces: [0×0 Simulink.interface.dictionary.PortInterface]
```

Create AUTOSAR Architecture Model for Adaptive Platform

Create an AUTOSAR adaptive architecture model, and return model properties.

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName,"platform","Adaptive")
```

```
archModel = 

  Model with properties:

              Name: 'myArchModel'
    SimulinkHandle: 3.6621e-04
        Components: [0×0 autosar.arch.Component]
      Compositions: [0×0 autosar.arch.Composition]
             Ports: [0×0 autosar.arch.PortBase]
        Connectors: [0×0 autosar.arch.Connector]
        Interfaces: [0×0 Simulink.interface.dictionary.PortInterface]
```

Input Arguments

`modelName` — Architecture model name

character vector | string scalar

Name of the AUTOSAR architecture model to create, specified as a character vector or string scalar.

Example: `'myArchModel'`

`openFlag` — Open flag

true (default) | false

Flag to indicate whether the model is opened in the editor when created, specified as a Boolean. Specify `false` to create an architecture model without opening it in the editor.

Example: `false`

`platformKind` — AUTOSAR platform kind

`"Classic"` (default) | character vector | string scalar

Specify `"Adaptive"` to create an architecture model for the Adaptive Platform. Specify `"Classic"` to create an architecture model for the Classic Platform.

Mixing classic and adaptive architecture modeling is not supported.

Example: `'platform','Adaptive'`

Output Arguments

`archModel` — Architecture model
handle

An AUTOSAR architecture model handle, returned as an `autosar.arch.Model` object.

Version History

Introduced in R2020a

R2023a: New platform argument for specifying classic or adaptive architectures

R2023a introduced modeling adaptive architectures. `autosar.arch.createModel` accepts a new `platform` argument, allowing you to specify whether the created model uses the Adaptive Platform or Classic Platform.

See Also

`autosar.arch.loadModel` | `close` | `open` | `save`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

linkDictionary

Package: autosar.arch

Link interface dictionary to AUTOSAR architecture model

Syntax

```
linkDictionary(archModel,dictionaryName)
```

Description

`linkDictionary(archModel,dictionaryName)` links a Simulink interface dictionary, `dictionaryName`, to an AUTOSAR architecture model, specified as `autosar.arch.Model` object `archModel`.

Examples

Link an Interface Dictionary to an Architecture Model

Link dictionary `MyInterfaces.sldd` to architecture model `myTopComposition.slx`.

```
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% create AUTOSAR arch model and link interface dictionary
archModel = autosar.arch.createModel('myTopComposition');
linkDictionary(archModel,dictName);
```

Input Arguments

archModel — AUTOSAR architecture model handle
autosar.arch.Model object

AUTOSAR architecture model handle, specified as an `autosar.arch.Model` object.

dictionaryName — Name of interface dictionary
character vector | string scalar

Name of interface dictionary, specified as a character vector or string scalar. The name must include the `.sldd` extension and must be a valid MATLAB identifier.

Example: "new_dictionary.sldd"

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open` | `autosar.arch.createModel`

autosar.arch.loadModel

Load AUTOSAR architecture model

Syntax

```
archModel = autosar.arch.loadModel(modelName)
```

Description

`archModel = autosar.arch.loadModel(modelName)` loads AUTOSAR architecture model `modelName` into memory without opening the model in the editor. The output argument `archModel` returns a model handle, which is an `autosar.arch.Model` object. After you load a model into memory, you can work with it by using architecture functions or open the model in the editor by using the `open` function. Save changes by using the `save` function.

Examples

Load AUTOSAR Architecture Model

Load an AUTOSAR architecture model into memory without opening the model in the editor, and return model properties.

```
modelName = 'autosar_tpc_composition';
archModel = autosar.arch.loadModel(modelName)
```

```
archModel = 
  Model with properties:

              Name: 'autosar_tpc_composition'
    SimulinkHandle: 0.0055
        Components: [2x1 autosar.arch.Component]
      Compositions: [1x1 autosar.arch.Composition]
             Ports: [4x1 autosar.arch.ArchPort]
        Connectors: [7x1 autosar.arch.Connector]
        Interfaces: [0x0 Simulink.interface.dictionary.PortInterface]
          Platform: 'Classic'
```

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Input Arguments

`modelName` — Architecture model name
character vector | string scalar

Name of the AUTOSAR architecture model to load into memory.

Example: `'myArchModel'`

Output Arguments

`archModel` — Architecture model
handle

Returns an AUTOSAR architecture model handle, which is an `autosar.arch.Model` object.

Version History

Introduced in R2020a

See Also

`autosar.arch.createModel` | `close` | `open` | `save`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

autosar_ui_close

Close AUTOSAR Dictionary dialog box

Syntax

autosar_ui_close(model)

Description

autosar_ui_close(model) closes the AUTOSAR Dictionary dialog box for the specified open model.

Examples

Close AUTOSAR Dictionary Dialog Box for Example Model

Open the AUTOSAR Dictionary dialog box with settings for an AUTOSAR example model, and then close the dialog box.

```
hModel = 'autosar_swc';
openExample(hModel)
autosar_ui_launch(hModel)
autosar_ui_close(hModel)
```

Input Arguments

model — Model for which to close the AUTOSAR Dictionary dialog box
handle | character vector | string scalar

Model for which to close the AUTOSAR Dictionary dialog box, specified as a handle, character vector, or string scalar representing the model name.

Example: 'autosar_swc'

Version History

Introduced in R2014b

See Also

autosar_ui_launch | autosar.api.create

Topics
"AUTOSAR Component Configuration"

autosar_ui_launch

Open AUTOSAR Dictionary dialog box

Syntax

`autosar_ui_launch(model)`

Description

`autosar_ui_launch(model)` opens the AUTOSAR Dictionary dialog box with settings for the specified open model.

Examples

Open AUTOSAR Dictionary Dialog Box for Example Model

Open the AUTOSAR Dictionary dialog box with settings for an AUTOSAR example model.

```
hModel = 'autosar_swc';
openExample(hModel)
autosar_ui_launch(hModel)
```

Input Arguments

`model` — Model for which to open the AUTOSAR Dictionary dialog box
handle | character vector | string scalar

Model for which to open the AUTOSAR Dictionary dialog box, specified as a handle, character vector, or string scalar representing the model name.

Example: `'autosar_swc'`

Version History

Introduced in R2013b

See Also

`autosar.api.create` | `autosar_ui_close`

Topics

"AUTOSAR Component Configuration"

close

Package: `autosar.arch`

Close AUTOSAR architecture model

Syntax

```
close(archModel)
close(archModel,'Force')
```

Description

`close(archModel)` closes architecture model `archModel`. The `archModel` argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be open or loaded with no unsaved changes.

`close(archModel,'Force')` closes the model without saving any unsaved changes.

Examples

Close AUTOSAR Architecture Model After Saving Change

Create an AUTOSAR architecture model, add a composition, save the change, and close the model.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors2');

% Save the model
save(archModel);

% Close the model
close(archModel);
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model to close. The argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be open or loaded with no unsaved changes.

Example: `archModel`

Version History

Introduced in R2020a

See Also

`autosar.arch.createModel` | `autosar.arch.loadModel` | `open` | `save`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

connect

Package: `autosar.arch`

Connect AUTOSAR architecture components and compositions

Syntax

```
connectors = connect(archModel,comp1,comp2)
connectors = connect(archCM,[],comp2)
connectors = connect(archCM,comp1,[])
connectors = connect(archModel,port1,port2)
```

Description

`connectors = connect(archModel,comp1,comp2)` connects the output ports of component or composition `comp1` to the input ports of component or composition `comp2`, based on matching port names. The `archModel` argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The `comp1` and `comp2` arguments are component or composition handles returned by previous calls to `addComponent`, `addComposition`, or `find`. The `connectors` output argument returns one or more connector handles, which are `autosar.arch.Connector` objects.

`connectors = connect(archCM,[],comp2)` connects the root input ports of parent composition or architecture model `archCM` to the input ports of child component or composition `comp2`, based on matching port names.

`connectors = connect(archCM,comp1,[])` connects the output ports of child component or composition `comp1` to the root output ports of parent composition or architecture model `archCM`, based on matching port names.

`connectors = connect(archModel,port1,port2)` connects component, composition, or root architecture port `port1` to component, composition or root architecture port `port2`. The `port1` and `port2` arguments are port handles returned by previous calls to `addPort` or `find`.

Examples

Connect AUTOSAR Architecture Classic Components and Compositions Based On Matching or Specified Ports

This example shows how to connect ports in an AUTOSAR classic architecture model.

Create AUTOSAR classic architecture model.

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);
```

By default, `autosar.arch.createModel` creates an AUTOSAR architecture model for the Classic Platform. Mixing classic and adaptive components in the same architecture model is not supported.

At the top level of the model, add a composition, an application component, and a sensor-actuator component.

```
composition = addComposition(archModel,'Sensors');

addComponent(archModel,'Controller1');
actuator = addComponent(archModel,'Actuator');
set(actuator,'Kind','SensorActuator');
```

For the architecture model, add two receiver (input) ports and a sender (output) port. The ports appear at the architecture model boundary.

```
addPort(archModel,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(archModel,'Sender','ThrCmd_Hw');
```

For the composition block, add two receiver ports and two sender ports. The composition receiver port names match the names of the architecture model receiver ports to which they connect.

```
addPort(composition,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(composition,'Sender',{'TPS_Perc','APP_Perc'});
```

For the component blocks, add receiver and sender ports. The component receiver and sender port names match the names of the component, composition, or architecture model ports to which they connect.

```
controller = find(archModel,'Component','Name','Controller1');
addPort(controller,'Receiver',{'TPS_Perc','APP_Perc'});
addPort(controller,'Sender','ThrCmd_Perc');
addPort(actuator,'Receiver','ThrCmd_Perc');
addPort(actuator,'Sender','ThrCmd_Hw');
```

At the top level of the model, connect the composition and the components based on matching port names.

```
connect(archModel,composition,controller);
connect(archModel,controller,actuator);
% Connect specified arch root ports to specified composition and component ports
connect(archModel,archModel.Ports(1),composition.Ports(1));
```

Connect the architecture root ports to composition and component ports. Rather than relying on matching port names to make connections, use port handles to identify specific architecture, composition, and component ports.

```
connect(archModel,...
    find(archModel,'Port','Name','APP_Hw'),...
    find(composition,'Port','Name','APP_Hw'));
connect(archModel,actuator.Ports(2),archModel.Ports(3));
% ALTERNATIVELY, connect architecture root ports based on matching port names
% connect(archModel,[],composition);
% connect(archModel,actuator,[]);

layout(archModel);  % Auto-arrange architecture model layout
```

Inside the `Sensors` composition, add sensor-actuator components named `PedalSnsr` and `ThrottleSnsr`.

```
names = {'PedalSnsr','ThrottleSnsr'};
sensorSWCs = addComponent(composition,names,'Kind','SensorActuator');
```

For the component blocks, add receiver and sender ports. The component receiver and sender port names match the names of the composition root ports to which they connect.

```
pSnsr = find(composition,'Component','Name','PedalSnsr');
tSnsr = find(composition,'Component','Name','ThrottleSnsr');
addPort(pSnsr,'Receiver','APP_Hw');
addPort(pSnsr,'Sender','APP_Perc');
addPort(tSnsr,'Receiver','TPS_Hw');
addPort(tSnsr,'Sender','TPS_Perc');
```

Connect the `Sensors` composition root ports to component ports based on matching port names.

```
connect(composition,[],pSnsr);
connect(composition,pSnsr,[]);
connect(composition,[],tSnsr);
connect(composition,tSnsr,[]);

layout(composition);  % Auto-arrange composition layout
```

Connect AUTOSAR Architecture Adaptive Components and Compositions Based On Matching or Specified Ports

This example shows how to connect ports in an AUTOSAR adaptive architecture model.

Create AUTOSAR adaptive architecture model.

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName,'platform','Adaptive');
```

At the top level of the model, add a composition and an adaptive application component.

```
composition = addComposition(archModel,'Sensors');
addComponent(archModel,'Filter');
```

For the architecture model, add two receiver (input) ports and two sender (output) ports. The ports appear at the architecture model boundary.

```
addPort(archModel,'Receiver',{'Data_Snsr1','Data_Snsr2'});
addPort(archModel,'Sender',{'FilteredData_Snsr1','unFilteredData_Snsr2'});
```

For the composition block, add two receiver ports and two sender ports. The composition receiver and sender port names match the names of the architecture model receiver and sender ports to which they connect.

```
addPort(composition,'Receiver',{'Data_Snsr1','Data_Snsr2'});
addPort(composition,'Sender',{'FilteredData_Snsr1','unFilteredData_Snsr2'});
```

At the top level of the model, connect the architecture root input ports to composition ports, relying on matching port names to make connections.

```
connect(archModel,[],composition);
```

Connect the architecture root output ports to composition ports, relying on matching port names to make connections.

```
connect(archModel,composition,[]);
```

For the composition block, add a client port.

```
addPort(composition,'Client','Filter_RPort');
```

For the component block, add a server port.

```
filter = find(archModel,'Component','Name','Filter');
addPort(filter,'Server','Filter_PPort');
layout(archModel);
```

Connect the composition and the component client-server ports. Use port handles to identify specific composition and component ports.

```
connect(archModel,...
    find(filter,'Port','Name','Filter_PPort'),...
    find(composition,'Port','Name','Filter_RPort'));
```

Input Arguments

archModel — Architecture model
handle

AUTOSAR architecture model in which to connect ports. The argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`.

Example: `archModel`

archCM — Composition or architecture model
handle

AUTOSAR composition or architecture model in which to connect parent and child ports based on matching port names. The argument is a composition or architecture model handle returned by a previous call to `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

comp1 — Component or composition
handle

Component or composition for which to connect output ports based on matching port names. The argument is a component or composition handle returned by a previous call to `addComponent`, `addComposition`, or `find`.

Example: `composition`

comp2 — Component or composition
handle

Component or composition for which to connect input ports based on matching port names. The argument is a component or composition handle returned by a previous call to `addComponent`, `addComposition`, or `find`.

Example: `controller`

port1 — Component, composition, or root architecture port
handle

Component, composition, or root architecture port to connect to another specified port. The argument is a port handle returned by a previous call to `addPort` or `find`.

Example: `archModel.Ports(1)`

`port2` — Component, composition, or root architecture port
handle

Component, composition, or root architecture port to connect to another specified port. The argument is a port handle returned by a previous call to `addPort` or `find`.

Example: `composition.Ports(1)`

Output Arguments

`connectors` — Added connectors
handle | array of handles

Returns one or more AUTOSAR connector handles, which are `autosar.arch.Connector` objects, with connector properties.

Version History

Introduced in R2020a

See Also

`addComponent` | `addComposition` | `addPort` | `destroy` | `find` | `importFromARXML` | `layout`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Add and Connect AUTOSAR Classic Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

createComponentAsModel

Package: `arxml`

Create Simulink representation of AUTOSAR ARXML atomic software component

Syntax

```
createComponentAsModel(ar,ComponentName)
[mdl, sts] = createComponentAsModel(ar,ComponentName,Name,Value)
```

Description

`createComponentAsModel(ar,ComponentName)` creates a Simulink model corresponding to AUTOSAR atomic software component `ComponentName`. The component description is part of AUTOSAR information previously imported from AUTOSAR XML files, which is represented by `arxml.importer` object `ar`.The importer creates an initial Simulink representation of the imported AUTOSAR component, with an initial, default mapping of Simulink model elements to AUTOSAR component elements. The initial representation provides a starting point for further AUTOSAR configuration and Model-Based Design. For more information, see "AUTOSAR ARXML Importer".

The initial representation of AUTOSAR component behavior in the created model depends on the XML description:

- If the XML description of the component does not describe component behavior, the importer creates a model with a default representation of AUTOSAR runnables and ports.
- If the XML description of the component describes component behavior, the importer creates a model based on AUTOSAR elements that are accessed in the component.

  For example, AUTOSAR ports must be accessed by runnables in order to generate the corresponding Simulink elements. If a sender-receiver or client-server port in XML code is not accessed by a runnable, the importer does not create the corresponding inports, outports, or Simulink functions.

`[mdl, sts] = createComponentAsModel(ar,ComponentName,Name,Value)` specifies additional options for Simulink model creation with one or more `Name,Value` pair arguments.

Examples

Import AUTOSAR Component and Model Periodic Runnables as Atomic Subsystems

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Model AUTOSAR periodic runnables as atomic subsystems with periodic rates.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem')
```

Import AUTOSAR Component and Model Periodic Runnables as Function-Call Subsystems

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Model AUTOSAR periodic runnables as function-call subsystems with periodic rates.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','FunctionCallSubsystem')
```

Import AUTOSAR Component and Use Data Dictionary

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Place Simulink data objects corresponding to AUTOSAR data types into data dictionary `ardata.sldd`.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem',...
  'DataDictionary','ardata.sldd')
```

Import AUTOSAR Component and Designate Initialization Runnable

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Configure AUTOSAR runnable `Runnable_Init` as the initialization runnable for the component.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem',...
  'InitializationRunnable','Runnable_Init')
```

Import AUTOSAR Component and Use `PredefinedVariant` to Resolve Variation Points

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Use `PredefinedVariant` Senior to resolve variation points in the component at model creation time.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem',...
  'PredefinedVariant','/pkg/body/Variants/Senior');
```

Import AUTOSAR Component and Use `SwSystemconstantValueSets` to Resolve Variation Points

Import AUTOSAR software component `/pkg/swc` from XML file `mySWC.arxml` and create an initial Simulink representation of the component. Use `SwSystemconstantValueSets` A and B to resolve variation points in the component at model creation time.

```
ar = arxml.importer('mySWC.arxml')
createComponentAsModel(ar,'/pkg/swc','ModelPeriodicRunnablesAs','AtomicSubsystem',...
  'SystemConstValueSets',{'/pkg/body/SystemConstantValues/A','/pkg/body/SystemConstantValues/B'});
```

Input Arguments

`ar` — `arxml.importer` object

handle

AUTOSAR information previously imported from XML files, specified as an `arxml.importer` object handle.

`ComponentName` — Component path
character vector | string scalar

Absolute short-name path of the atomic software component.

Example: `'/Company/Powertrain/Components/ASWC'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'ModelPeriodicRunnablesAs','AtomicSubsystem'` directs the importer to model AUTOSAR periodic runnables as atomic subsystems with periodic rates.

`DataDictionary` — Simulink data dictionary
character vector | string scalar

Simulink data dictionary into which to import data objects corresponding to AUTOSAR data types in the XML file. If the specified dictionary does not already exist, the importer creates it. The model is then associated with that data dictionary.

Example: `'DataDictionary','ardata.sldd'`

`InitializationRunnable` — Initialization runnable
character vector | string scalar

Name of an existing AUTOSAR runnable to select as the initialization runnable for the component.

Example: `'InitializationRunnable','Runnable_Init'`

`ModelPeriodicRunnablesAs` — Subsystem type for periodic runnables
`'AtomicSubsystem'` (default) | `'FunctionCallSubsystem'` | `'Auto'`

By default, `createComponentAsModel` imports AUTOSAR periodic runnables found in ARXML files and models them as atomic subsystems with periodic rates. If conditions prevent use of atomic subsystems, the importer throws an error.

To model periodic runnables as function-call subsystems with periodic rates, specify `'FunctionCallSubsystem'`.

If you specify `Auto`, the importer attempts to model periodic runnables as atomic subsystems. If conditions prevent use of atomic subsystems, the importer models periodic runnables as function-call subsystems.

For more information, see “Import AUTOSAR Software Component with Multiple Runnables”.

Example: `'ModelPeriodicRunnablesAs','AtomicSubsystem'`

`PredefinedVariant` — Path to AUTOSAR predefined variant
character vector | string scalar

Path to a `PredefinedVariant` defined in the AUTOSAR XML file. A `PredefinedVariant` describes a combination of system constant values among potentially multiple valid combinations to apply to an

AUTOSAR software component. Use this argument to resolve variation points in the AUTOSAR software component at model creation time. If specified, the importer uses the `PredefinedVariant` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see "Control AUTOSAR Variants with Predefined Value Combinations".

Example: `'PredefinedVariant','/pkg/body/Variants/Senior'`

`SystemConstValueSets` — Paths to one or more AUTOSAR system constant value sets
cell array of character vectors | string array

Paths to one or more `SystemConstValueSets` defined in the AUTOSAR XML file. A `SystemConstValueSet` specifies a set of system constant values to apply to an AUTOSAR software component. Use this argument to resolve variation points in the AUTOSAR software component at model creation time. If specified, the importer uses the `SystemConstValueSets` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see "Control AUTOSAR Variants with Predefined Value Combinations".

Example: `'SystemConstValueSets','{'/pkg/body/SystemConstantValues/A','/pkg/body/SystemConstantValues/B'}'`

Output Arguments

`mdl` — Model handle
handle

Variable that returns a handle to created model.

`sts` — Success or failure
true or false

Variable that returns true if the import is successful. Otherwise, returns false.

Tips

- If you enter the `arxml.importer` object function call without a terminating semicolon (;), the importer lists the AUTOSAR content of the specified XML file or files. The information includes paths to software components in the AUTOSAR package structure, which you can specify in calls to `createComponentAsModel` and `createCompositionAsModel`.
- When importing an AUTOSAR software component into a model, it is recommended that you explicitly specify the `'ModelPeriodicRunnablesAs'` argument. This argument determines how the importer models AUTOSAR periodic runnables in the created model. See the argument description under "Name-Value Pair Arguments" on page 1-55.

Version History

Introduced in R2008a

R2022b: Import for Basic Software blocks

`createComponentAsModel` supports creating AUTOSAR Basic Software (BSW) caller blocks for ARXML-imported software components that access Diagnostic Event Manager (Dem), NVRAM Manager (NvM), or Function Inhibition Manager (FiM) services through client-server calls.

See Also

`arxml.importer` | `getComponentNames`

Topics

"Import AUTOSAR XML Descriptions Into Simulink"
"Import AUTOSAR Component to Simulink"
"Import AUTOSAR Adaptive Software Descriptions"
"Import AUTOSAR Adaptive Components to Simulink"
"AUTOSAR ARXML Importer"
"Control AUTOSAR Variants with Predefined Value Combinations"

createCompositionAsModel

Package: `arxml`

Create Simulink representation of AUTOSAR ARXML software composition

Syntax

```
createCompositionAsModel(ar,CompositionName)
[mdl, sts] = createCompositionAsModel(ar,CompositionName,Name,Value)
```

Description

`createCompositionAsModel(ar,CompositionName)` creates a Simulink model corresponding to AUTOSAR software composition `CompositionName`. The composition description is part of AUTOSAR information previously imported from AUTOSAR XML files, which is represented by `arxml.importer` object `ar`.The importer creates an initial Simulink representation of the imported AUTOSAR composition. The initial representation provides a starting point for further AUTOSAR configuration and Model-Based Design. For more information, see “AUTOSAR ARXML Importer”.

`[mdl, sts] = createCompositionAsModel(ar,CompositionName,Name,Value)` specifies additional options for Simulink model creation with one or more `Name,Value` pair arguments.

Examples

Import AUTOSAR Composition

Import AUTOSAR software composition `/Company/Components/ThrottlePositionControlComposition` from the file `ThrottlePositionControlComposition.arxml`. The ARXML file is located at `*matlabroot*/examples/autosarblockset/data`, which is on the default MATLAB path. Create an initial Simulink representation of the composition.

```
ar = arxml.importer('ThrottlePositionControlComposition.arxml');
names = getComponentNames(ar,'Composition')

names =
  1×1 cell array
    {'/Company/Components/ThrottlePositionControlComposition'}

createCompositionAsModel(ar,'/Company/Components/ThrottlePositionControlComposition');
```

Import AUTOSAR Composition and Include Existing Component Models

Import AUTOSAR software composition `/pkg/rootComposition` from XML file `mySWCs.arxml` and create an initial Simulink representation of the composition. For components `mySwc1` and `mySwc2` contained within the composition, use existing Simulink component models rather than creating new ones.

```
ar = arxml.importer('mySWCs.arxml')
createCompositionAsModel(ar,'/pkg/rootComposition','ComponentModels',{'mySwc1','mySwc2'})
```

Import AUTOSAR Composition and Use Data Dictionary

Import AUTOSAR software composition `/pkg/rootComposition` from XML file `mySWCs.arxml` and create an initial Simulink representation of the composition. Place Simulink data objects corresponding to AUTOSAR data types into data dictionary `ardata.sldd`.

```
ar = arxml.importer('mySWCs.arxml')
createCompositionAsModel(ar,'/pkg/rootComposition','DataDictionary','ardata.sldd')
```

Import AUTOSAR Composition and Share AUTOSAR Dictionary

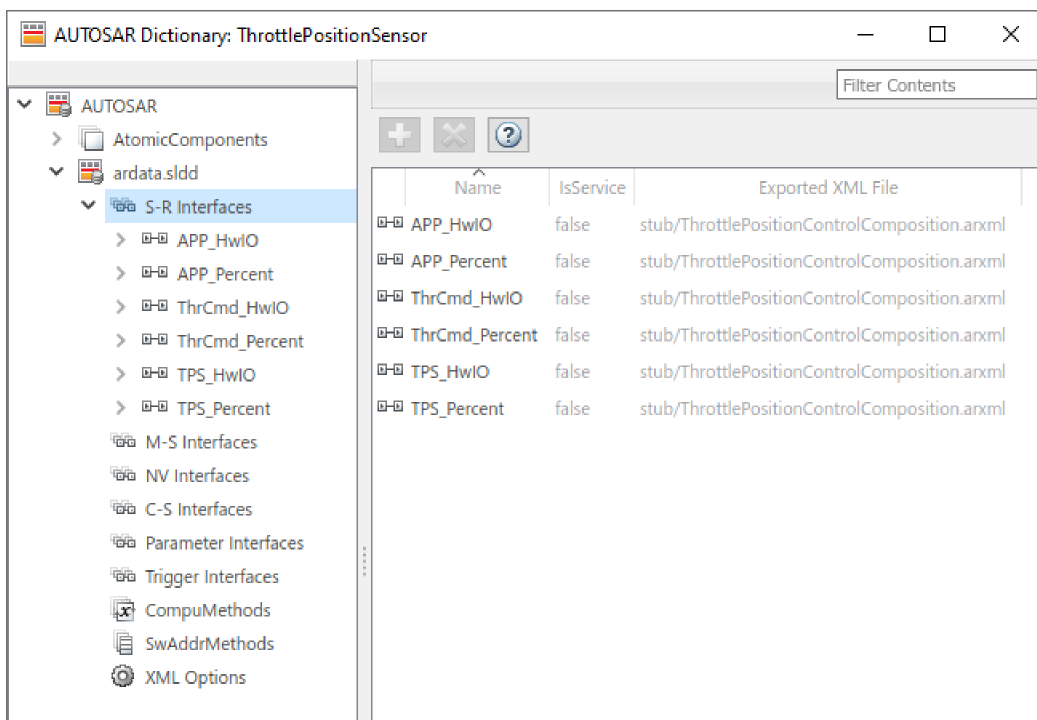
Import AUTOSAR software composition `/Company/Components/ThrottlePositionControlComposition` from the file `ThrottlePositionControlComposition.arxml`. The ARXML file is located at *`matlabroot`*`/examples/autosarblockset/data`, which is on the default MATLAB path. Create an initial Simulink representation of the composition.

For each imported component, the importer stores sharable AUTOSAR properties, such as interfaces and data types, in data dictionary `ardata.sldd`. Components within the composition can then share the stored properties.

```
ar = arxml.importer('ThrottlePositionControlComposition.arxml')
createCompositionAsModel(ar,'/Company/Components/ThrottlePositionControlComposition',...
    'ModelPeriodicRunnablesAs','Auto',...
    'DataDictionary','ardata.sldd','ShareAUTOSARProperties',true);
```

To view the shared properties, open the AUTOSAR dictionary for a component model. This example opens `ThrottlePositionSensor`. Expand the AUTOSAR dictionary node **ardata.sldd**. You can view read-only properties, such as shared component interfaces, and modify XML options for composition and component export.

```
autosar_ui_launch('ThrottlePositionSensor')
```



Import AUTOSAR Composition and Model Periodic Runnables as Function-Call Subsystems

Import AUTOSAR software composition `/pkg/rootComposition` from XML file `mySWCs.arxml` and create an initial Simulink representation of the composition. Model AUTOSAR periodic runnables as function-call subsystems with periodic rates.

```
ar = arxml.importer('mySWCs.arxml')
createCompositionAsModel(ar,'/pkg/rootComposition',...
  'ModelPeriodicRunnablesAs','FunctionCallSubsystem')
```

Import AUTOSAR Composition and Use `PredefinedVariant` to Resolve Variation Points

Import AUTOSAR software composition `/pkg/rootComposition` from XML file `mySWCs.arxml` and create an initial Simulink representation of the composition. Use `PredefinedVariant` Senior to resolve variation points in components at model creation time.

```
ar = arxml.importer('mySWCs.arxml')
createCompositionAsModel(ar,'/pkg/rootComposition',...
  'PredefinedVariant','/pkg/body/Variants/Senior');
```

Import AUTOSAR Composition and Use `SwSystemconstantValueSets` to Resolve Variation Points

Import AUTOSAR software composition `/pkg/rootComposition` from XML file `mySWCs.arxml` and create an initial Simulink representation of the composition. Use `SwSystemconstantValueSets` A and B to resolve variation points in components at model creation time.

```
ar = arxml.importer('mySWCs.arxml')
createCompositionAsModel(ar,'/pkg/rootComposition',...
  'SystemConstValueSets',{'/pkg/body/SystemConstantValues/A','/pkg/body/SystemConstantValues/B'});
```

Input Arguments

ar — arxml.importer object
handle

AUTOSAR information previously imported from XML files, specified as an `arxml.importer` object handle.

CompositionName — Composition path
character vector | string scalar

Absolute short-name path of the software composition.

Example: `'/Company/Powertrain/Components/RootComposition'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'ModelPeriodicRunnablesAs','AtomicSubsystem'` directs the importer to model AUTOSAR periodic runnables as atomic subsystems with periodic rates.

ComponentModels — Simulink component models
cell array of character vectors | string array

Names of existing atomic software component models to use when creating a Simulink representation of the composition. The function incorporates the specified existing component models in the composition model instead of creating new ones.

Example: `'ComponentModels',{'mySwc1','mySwc2'}`

DataDictionary — Simulink data dictionary
character vector | string scalar

Simulink data dictionary into which to import data objects corresponding to AUTOSAR data types in the XML file. If the specified dictionary does not already exist, the importer creates it. The model is then associated with that data dictionary.

If you specify `true` for the `'ShareAUTOSARProperties'` argument, the specified data dictionary also stores sharable AUTOSAR properties, such as interfaces and data types, for sharing among components in the composition.

Example: `'DataDictionary','ardata.sldd'`

ModelPeriodicRunnablesAs — Subsystem type for periodic runnables
`'Auto'` (default) | `'AtomicSubsystem'` | `'FunctionCallSubsystem'`

By default, `createCompositionAsModel` imports AUTOSAR periodic runnables found in ARXML files and attempts to model them as atomic subsystems with periodic rates. If conditions prevent use

of atomic subsystems, the function models the periodic runnables as function-call subsystems with periodic rates.

To model periodic runnables only as atomic subsystems, specify `'AtomicSubsystem'`. If conditions prevent use of atomic subsystems, the function throws an error.

To model periodic runnables only as function-call subsystems, specify `'FunctionCallSubsystem'`.

For more information, see “Import AUTOSAR Software Component with Multiple Runnables”.

Example: `'ModelPeriodicRunnablesAs','AtomicSubsystem'`

`PredefinedVariant` — Path to AUTOSAR predefined variant
character vector | string scalar

Path to a `PredefinedVariant` defined in the AUTOSAR XML file. A `PredefinedVariant` describes a combination of system constant values among potentially multiple valid combinations to apply to AUTOSAR software components. Use this argument to resolve variation points in AUTOSAR software components at model creation time. If specified, the importer uses the `PredefinedVariant` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see “Control AUTOSAR Variants with Predefined Value Combinations”.

Example: `'PredefinedVariant','/pkg/body/Variants/Senior'`

`ShareAUTOSARProperties` — Add AUTOSAR component properties to shared dictionary
`false` (default) | `true`

To improve the performance of common tasks in AUTOSAR composition modeling, composition import can store sharable component properties, such as interfaces and data types, into a Simulink data dictionary. Components within the composition can then share the stored properties.

For compositions containing more than 20 software components, sharing AUTOSAR properties among components can significantly improve performance for composition workflows, including import, dictionary navigation, AUTOSAR validation, and code generation. Limiting property replication among components can reduce component model file sizes.

The shared AUTOSAR dictionary provides a central location for viewing and configuring AUTOSAR composition and component properties. You can view read-only properties, such as shared component interfaces, and modify XML options for composition and component export.

To share AUTOSAR properties, specify `true`. For each imported component, the function stores sharable AUTOSAR properties, such as interfaces and data types, in the Simulink data dictionary specified by the `'DataDictionary'` argument. The `'DataDictionary'` argument must be specified.

For more information, see “Import AUTOSAR Composition and Share AUTOSAR Dictionary” on page 1-59.

Example: `'ShareAUTOSARProperties',true`

`SystemConstValueSets` — Paths to one or more AUTOSAR system constant value sets
cell array of character vectors | string array

Paths to one or more `SystemConstValueSets` defined in the AUTOSAR XML file. A `SystemConstValueSet` specifies a set of system constant values to apply to AUTOSAR software

components. Use this argument to resolve variation points in AUTOSAR software components at model creation time. If specified, the importer uses the `SystemConstValueSets` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see “Control AUTOSAR Variants with Predefined Value Combinations”.

Example: `'SystemConstValueSets','{'/pkg/body/SystemConstantValues/A','/pkg/body/SystemConstantValues/B'}'`

Output Arguments

`mdl` — Model handle
handle

Variable that returns a handle to created model.

`sts` — Success or failure
true or false

Variable that returns true if the import is successful. Otherwise, returns false.

Tip

If you enter the `arxml.importer` object function call without a terminating semicolon (;), the importer lists the AUTOSAR content of the specified XML file or files. The information includes paths to software components in the AUTOSAR package structure, which you can specify in calls to `createCompositionAsModel` and `createComponentAsModel`.

Version History

Introduced in R2017b

See Also

`arxml.importer` | `getComponentNames`

Topics

“Import AUTOSAR XML Descriptions Into Simulink”
“Import AUTOSAR Composition to Simulink”
“AUTOSAR ARXML Importer”
“Control AUTOSAR Variants with Predefined Value Combinations”

createEnumeration

Package: `autosar.api`

Create Simulink enumeration data type definition from imported AUTOSAR data elements

Syntax

```
createEnumeration(arProps,name,applicationDataTypePath)
createEnumeration(arProps,name,compuMethodPath,implementationDataTypePath)
createEnumeration(arProps,compuMethodPath)
```

Description

`createEnumeration(arProps,name,applicationDataTypePath)` creates a Simulink enumeration type from an AUTOSAR application data type. The function can be used to work with AUTOSAR elements that you imported by using `updateAUTOSARProperties`.

`createEnumeration(arProps,name,compuMethodPath,implementationDataTypePath)` creates a Simulink enumeration type from an AUTOSAR implementation data type and CompuMethod.

`createEnumeration(arProps,compuMethodPath)` creates a family of Simulink enumeration types from an AUTOSAR CompuMethod.

Examples

Create Enumeration Data Type from AUTOSAR Application Data Type

Create a Simulink enumeration data type definition with the name `myEnum` from the AUTOSAR application data type at path `/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType`.

```
dataObj = autosar.api.getAUTOSARProperties(mdlName);
createEnumeration(dataObj,'myEnum',...
  '/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType');
```

Create Enumeration Data Type from AUTOSAR Implementation Data Type and CompuMethod

Create a Simulink enumeration data type definition with the name `myEnum` from the AUTOSAR implementation data type at path `/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint16` by using the computation method from path `/a/b/myCM`.

```
dataObj = autosar.api.getAUTOSARProperties(mdlName);
createEnumeration(dataObj,'myEnum','/a/b/myCM',...
  '/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint16');
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle (default)

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. The parameter *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

Data Types: `function_handle`

`name` — Name of Simulink enumeration data type
character vector (default) | string scalar

Name of enumeration data type created for Simulink representation of an AUTOSAR element.

In the Simulink environment, this enumeration data type is mapped to both an application data type and an implementation data type. The application data type for the enumeration provides application-level physical attributes such as real-world range of values, data structure, and physical semantics. The implementation data type provides implementation-level attributes, such as stored-integer minimum and maximum specifications and primitive type (for example, integer).

Example: `'myEnum'`

Data Types: `char` | `string`

`applicationDataTypePath` — Path to enumeration application data type
character vector (default) | string scalar

Path to AUTOSAR application data type for created Simulink enumeration data type. The application data type provides application-level physical attributes such as real-world range of values, data structure, and physical semantics. The application data type is used in simulation.

Example: `'/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType'`

Data Types: `char` | `string`

`compuMethodPath` — Path to CompuMethod used to convert enumeration data types
character vector (default) | string scalar

Path to the AUTOSAR CompuMethod, which is used to translate between the enumeration implementation data type and the enumeration application data type.

Example: `'/a/b/myCM'`

Data Types: `char` | `string`

`implementationDataTypePath` — Path to enumeration implementation data type
character vector (default) | string scalar

Path to AUTOSAR implementation data type for created Simulink enumeration data type. The implementation data type provides implementation-level attributes, such as stored-integer minimum

and maximum specifications and primitive type (for example, integer). Implementation data types are used in code generation.

Example: `'/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint16'`

Data Types: `char` | `string`

Version History

Introduced in R2019a

See Also

`autosar.api.getAUTOSARProperties` | `updateAUTOSARProperties` | `createNumericType`

Topics

"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"
"Model AUTOSAR Data Types"

createManifest

Package: autosar.api

Create manifest file for AUTOSAR adaptive model

Syntax

createManifest(arProps)

Description

createManifest(arProps) creates an execution manifest JSON file for the adaptive application. The manifest file modifies the default logging behavior of the adaptive application Linux® executable, providing properties such as the logging mode and verbosity level.

Examples

Create AUTOSAR Properties Object and Create Manifest File

Call the autosar.api.getAUTOSARProperties function to create object arProps, which represents AUTOSAR properties information for the model autosar_LaneGuidance. Use the returned object to create an execution manifest JSON file for the specified adaptive model.

```
hModel = 'autosar_LaneGuidance';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
createManifest(arProps);
```

Input Arguments

arProps — AUTOSAR properties information for a model
handle (default)

AUTOSAR properties information for a model, previously returned by *arProps = autosar.api.getAUTOSARProperties(model)*. The parameter *model* is a handle, character vector, or string scalar representing the model name.

Example: arProps

Data Types: function_handle

Version History

Introduced in R2021a

See Also

autosar.api.getAUTOSARProperties

Topics

“Configure Run-Time Logging for AUTOSAR Adaptive Executables”

createModel

Package: `autosar.arch`

Create Simulink implementation model for AUTOSAR architecture component

Syntax

`createModel(component,modelName)`

Description

`createModel(component,modelName)` creates Simulink implementation model `modelName` with the same interface as the specified AUTOSAR architecture component and links the component to the implementation model. The `component` argument is a component handle returned by a previous call to `addComponent`. If not specified, `modelName` defaults to the name of the component.

Examples

Create Implementation Model for AUTOSAR Architecture Component

For an AUTOSAR component in an architecture model, create a Simulink implementation model with a matching interface. The function call links the component to the implementation model. By default, the implementation model has the same name as the component.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add component inside the architecture model
component = addComponent(archModel,'SWC1');
addPort(component,'Sender',{'PPort1','PPort2'});

% Create and link matching Simulink implementation model
createModel(component);
```

Input Arguments

`component` — Architecture component
handle

AUTOSAR architecture component from which to create a matching Simulink implementation model. The argument is a component handle returned by a previous call to `addComponent`.

Example: `component`

`modelName` — Implementation model name
character vector | string scalar

Name of the Simulink implementation model to create, based on the specified AUTOSAR architecture component. If not specified, `modelName` defaults to the name of the component.

Example: `'SWC1'`

Version History

Introduced in R2020a

See Also

`linkToModel`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Define AUTOSAR Component Behavior by Creating or Linking Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

createNumericType

Package: `autosar.api`

Create Simulink numeric data type definition from imported AUTOSAR data elements

Syntax

```
createNumericType(arProps,name,applicationDataTypePath)
createNumericType(arProps,name,compuMethodPath,implementationDataTypePath)
```

Description

`createNumericType(arProps,name,applicationDataTypePath)` creates a `Simulink.NumericType` object from an AUTOSAR application data type. The function can be used to work with AUTOSAR elements that you imported by using `updateAUTOSARProperties`.

`createNumericType(arProps,name,compuMethodPath,implementationDataTypePath)` creates a `Simulink.NumericType` object from an AUTOSAR implementation data type and CompuMethod.

Examples

Create Numeric Data Type from AUTOSAR Application Data Type

Create a Simulink numeric data type with the name `myDataType` from the AUTOSAR application data type at path `/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType`.

```
dataObj = autosar.api.getAUTOSARProperties(mdlName);
createNumericType(dataObj,'myDataType',...
  '/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType');
```

Create Numeric Data Type from AUTOSAR Implementation Data Type and CompuMethod

Create a Simulink numeric data type with the name `myDataType` from the AUTOSAR implementation data type at path `/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint32` by using the computation method from path `/a/b/myCM`.

```
dataObj = autosar.api.getAUTOSARProperties(mdlName);
createNumericType(dataObj,'myDataType','/a/b/myCM', ...
  '/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint32');
```

Input Arguments

arProps — AUTOSAR properties information for a model
handle (default)

AUTOSAR properties information for a model, previously returned by `arProps = autosar.api.getAUTOSARProperties(model)`.The parameter `model` is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

Data Types: `function_handle`

name — Name of Simulink numeric data type
character vector (default) | string scalar

Name of numeric data type created for Simulink representation of an AUTOSAR element.

In the Simulink environment, this numeric data type is mapped to both an application data type and an implementation data type. The application data type provides application-level physical attributes such as real-world range of values, data structure, and physical semantics. The implementation data type provides implementation-level attributes, such as stored-integer minimum and maximum specifications and primitive type (for example, integer).

Example: `'myDataType'`

Data Types: `char` | `string`

`applicationDataTypePath` — Path to numeric application data type
character vector (default) | string scalar

Path to AUTOSAR application data type for created Simulink numeric data type. The application data type provides application-level physical attributes such as real-world range of values, data structure, and physical semantics. The application data type is used in simulation.

Example: `'/AUTOSAR_PlatformTypes/ApplicationDataTypes/MyAppType'`

Data Types: `char` | `string`

`compuMethodPath` — Path to CompuMethod used to convert numeric data types
character vector (default) | string scalar

Path to the AUTOSAR CompuMethod, which is used to translate between the numeric implementation data type and the numeric application data type.

Example: `'/a/b/myCM'`

Data Types: `char` | `string`

`implementationDataTypePath` — Path to numeric implementation data type
character vector (default) | string scalar

Path to AUTOSAR implementation data type for created Simulink numeric data type. The implementation data type provides implementation-level attributes, such as stored-integer minimum and maximum specifications and primitive type (for example, integer). Implementation data types are used in code generation.

Example: `'/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint32'`

Data Types: `char` | `string`

Version History

Introduced in R2019a

See Also

`autosar.api.getAUTOSARProperties` | `updateAUTOSARProperties` | `createEnumeration`

Topics

“AUTOSAR Property and Map Function Examples”
“Configure and Map AUTOSAR Component Programmatically”
“AUTOSAR Component Configuration”
“Model AUTOSAR Data Types”

delete

Package: `autosar.api`

Delete AUTOSAR element

Syntax

`delete(arProps,elementPath)`

Description

`delete(arProps,elementPath)` deletes the AUTOSAR element at `elementPath`.

Examples

Delete Sender-Receiver Interface

Delete the sender-receiver interface `Interface1` from the AUTOSAR configuration for a model.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);

% Add Interface3
addPackageableElement(arProps,'SenderReceiverInterface','/pkg/if','Interface3');
ifPaths = find(arProps,[],'SenderReceiverInterface','PathType','FullyQualified')

ifPaths =
  1×3 cell array
    {'/pkg/if/Interface1'}    {'/pkg/if/Interface2'}    {'/pkg/if/Interface3'}

% Find AUTOSAR DataReceiverPort and change its interface from Interface1 to Interface3
arPortType = 'DataReceiverPort';
aswcPath = find(arProps,[],'AtomicComponent','PathType','FullyQualified');
rPorts = find(arProps,aswcPath{1},arPortType,'PathType','FullyQualified');
rPort = rPorts{1};
set(arProps,rPort,'Interface','Interface3')

% Delete Interface1
delete(arProps,'Interface1');
ifPaths = find(arProps,[],'SenderReceiverInterface','PathType','FullyQualified')

ifPaths =
  1×2 cell array
    {'/pkg/if/Interface2'}    {'/pkg/if/Interface3'}
```

Input Arguments

`arProps` — AUTOSAR properties information for a model

handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`elementPath` — Path to AUTOSAR element
character vector | string scalar

Path to the AUTOSAR element to delete.

Example: `'Input'`

Version History

Introduced in R2013b

See Also

`autosar.api.getAUTOSARProperties` | `add`

Topics
"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

deleteUnmappedComponents

Package: `autosar.api`

Delete unmapped AUTOSAR components from model

Syntax

`deleteUnmappedComponents(arProps)`

Description

`deleteUnmappedComponents(arProps)` deletes atomic software components that are not mapped to the model. Use this to remove unused imported components that you do not want preserved in the model and exported in ARXML code. This function does not remove calibration components.

Examples

Remove Unmapped Atomic Software Components From AUTOSAR Model

After importing AUTOSAR information from ARXML files and configuring a model for AUTOSAR, remove atomic software components that were imported but are not mapped to the model. This prevents unmapped components from being exported back to ARXML.

```
arProps = autosar.api.getAUTOSARProperties('my_autosar_model');
deleteUnmappedComponents(arProps);
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `=` `autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

Version History

Introduced in R2014b

See Also

`autosar.api.getAUTOSARProperties` | `arxml.importer`

Topics
"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"Import AUTOSAR XML Descriptions Into Simulink"

“AUTOSAR Component Configuration”

destroy

Package: autosar.arch

Remove and delete AUTOSAR architecture element

Syntax

destroy(archElement)

Description

destroy(archElement) removes and deletes architecture element archElement from an architecture model. The archElement argument is a component, composition, port, or connector handle returned by a previous call to addComponent, addComposition, addPort, connect, or find.

Examples

Remove and Delete Composition from AUTOSAR Architecture Model

In an AUTOSAR architecture model, find, remove, and delete a software composition.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
addComposition(archModel,'Sensors2');

% Find and destroy the composition
composition = find(archModel,'Composition');
destroy(composition);
```

Input Arguments

archElement — Architecture element

handle

Component, composition, port, or connector element to remove and delete. The argument is a component, composition, port, or connector handle returned by a previous call to addComponent, addComposition, addPort, connect, or find.

Example: composition

Version History

Introduced in R2020a

See Also

addComponent | addComposition | addPort | connect | find | importFromARXML | layout

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Add and Connect AUTOSAR Classic Components and Compositions"
"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

export

Package: `autosar.arch`

Export AUTOSAR architecture model ARXML and generate component code

Syntax

```
export(archCCM)
export(archCCM,Name,Value)
```

Description

`export(archCCM)` exports ARXML descriptions from AUTOSAR component, composition, or architecture model `archCCM`. The function also generates code for Simulink implementation models linked by AUTOSAR components within the export scope. The containing architecture model must be open or loaded. The `archCCM` argument is a component, composition, or architecture model handle returned by a previous call to `addComponent`, `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

`export(archCCM,Name,Value)` specifies additional export options with one or more `Name,Value` pair arguments. For example, you can specify a ZIP file in which generated files are packaged.

Examples

Generate ARXML Descriptions and Code for Architecture Model

Export composition XML descriptions and generate component code for an AUTOSAR architecture model.

Load AUTOSAR architecture model

```
modelName = 'autosar_tpc_composition';
archModel = autosar.arch.loadModel(modelName);
```

Export composition XML descriptions and generate component code

```
export(archModel);
```

```
Building component: autosar_tpc_actuator (1 out of 6)
### Starting build procedure for: autosar_tpc_actuator
### Generating XML files description for: autosar_tpc_actuator
### Successful completion of code generation for: autosar_tpc_actuator

Build Summary

Top model targets built:

Model                   Action           Rebuild Reason
=========================================================================================
```

```
autosar_tpc_actuator  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 17.318s

Building component: autosar_tpc_controller (2 out of 6)
### Starting build procedure for: autosar_tpc_controller
### Generating XML files description for: autosar_tpc_controller
### Successful completion of code generation for: autosar_tpc_controller

Build Summary

Top model targets built:

Model                   Action           Rebuild Reason
===========================================================================================
autosar_tpc_controller  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 15.753s

Building component: autosar_tpc_throttle_sensor_monitor (3 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor_monitor
### Generating XML files description for: autosar_tpc_throttle_sensor_monitor
### Successful completion of code generation for: autosar_tpc_throttle_sensor_monitor

Build Summary

Top model targets built:

Model                                Action           Rebuild Reason
================================================================================================
autosar_tpc_throttle_sensor_monitor  Code generated.  Code generation information file does not e

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 17.065s

Building component: autosar_tpc_pedal_sensor (4 out of 6)
### Starting build procedure for: autosar_tpc_pedal_sensor
### Generating XML files description for: autosar_tpc_pedal_sensor
### Successful completion of code generation for: autosar_tpc_pedal_sensor

Build Summary

Top model targets built:

Model                     Action           Rebuild Reason
=============================================================================================
autosar_tpc_pedal_sensor  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 16.053s

Building component: autosar_tpc_throttle_sensor1 (5 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor1

Model "autosar_tpc_throttle_sensor1" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
```

```
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor1
### Successful completion of code generation for: autosar_tpc_throttle_sensor1

Build Summary

Top model targets built:

Model                         Action          Rebuild Reason
================================================================================================
autosar_tpc_throttle_sensor1  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 14.863s

Building component: autosar_tpc_throttle_sensor2 (6 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor2

Model "autosar_tpc_throttle_sensor2" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor2
### Successful completion of code generation for: autosar_tpc_throttle_sensor2

Build Summary

Top model targets built:

Model                         Action          Rebuild Reason
================================================================================================
autosar_tpc_throttle_sensor2  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 13.956s

Exporting composition: autosar_tpc_composition
### Generating XML description files for: autosar_tpc_composition
### Successful completion of export for: autosar_tpc_composition
```

Generate ARXML Descriptions and Code for Nested Composition

Export XML descriptions and generate component code for a composition nested in an AUTOSAR architecture model.

Load AUTOSAR architecture model

```
modelName = 'autosar_tpc_composition';
archModel = autosar.arch.loadModel(modelName);
```

Export nested Sensors composition

```
export(archModel.Compositions(1));
```

```
Building component: autosar_tpc_throttle_sensor_monitor (1 out of 4)
### Starting build procedure for: autosar_tpc_throttle_sensor_monitor
### Generating XML files description for: autosar_tpc_throttle_sensor_monitor
### Successful completion of code generation for: autosar_tpc_throttle_sensor_monitor

Build Summary

Top model targets built:

Model                                Action           Rebuild Reason
==============================================================================================
autosar_tpc_throttle_sensor_monitor  Code generated.  Code generation information file does not e

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 15.454s

Building component: autosar_tpc_pedal_sensor (2 out of 4)
### Starting build procedure for: autosar_tpc_pedal_sensor
### Generating XML files description for: autosar_tpc_pedal_sensor
### Successful completion of code generation for: autosar_tpc_pedal_sensor

Build Summary

Top model targets built:

Model                     Action           Rebuild Reason
=========================================================================================
autosar_tpc_pedal_sensor  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 10.624s

Building component: autosar_tpc_throttle_sensor1 (3 out of 4)
### Starting build procedure for: autosar_tpc_throttle_sensor1

Model "autosar_tpc_throttle_sensor1" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor1
### Successful completion of code generation for: autosar_tpc_throttle_sensor1

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
==============================================================================================
autosar_tpc_throttle_sensor1  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.567s
```

```
Building component: autosar_tpc_throttle_sensor2 (4 out of 4)
### Starting build procedure for: autosar_tpc_throttle_sensor2

Model "autosar_tpc_throttle_sensor2" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor2
### Successful completion of code generation for: autosar_tpc_throttle_sensor2

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
===================================================================================================
autosar_tpc_throttle_sensor2  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.755s

Exporting composition: autosar_tpc_composition/Sensors
### Generating XML description files for: autosar_tpc_composition/Sensors
### Successful completion of export for: autosar_tpc_composition/Sensors
```

Generate ARXML Descriptions and Code In ZIP File

Export XML descriptions and generate component code for an AUTOSAR architecture model. In the `PackageCodeAndArxml` value argument, specify the name of a ZIP file in which to package the generated files.

Load AUTOSAR architecture model

```
modelName = 'autosar_tpc_composition';
archModel = autosar.arch.loadModel(modelName);
```

Export ARXML descriptions and code into ZIP file

```
export(archModel,'PackageCodeAndARXML','myArchModel.zip');
```

```
Building component: autosar_tpc_actuator (1 out of 6)
### Starting build procedure for: autosar_tpc_actuator
### Generating XML files description for: autosar_tpc_actuator
### Successful completion of code generation for: autosar_tpc_actuator

Build Summary

Top model targets built:

Model                 Action           Rebuild Reason
=========================================================================================
autosar_tpc_actuator  Code generated.  Code generation information file does not exist.
```

```
1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 13.084s

Building component: autosar_tpc_controller (2 out of 6)
### Starting build procedure for: autosar_tpc_controller
### Generating XML files description for: autosar_tpc_controller
### Successful completion of code generation for: autosar_tpc_controller

Build Summary

Top model targets built:

Model                   Action           Rebuild Reason
============================================================================================
autosar_tpc_controller  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 13.25s

Building component: autosar_tpc_throttle_sensor_monitor (3 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor_monitor
### Generating XML files description for: autosar_tpc_throttle_sensor_monitor
### Successful completion of code generation for: autosar_tpc_throttle_sensor_monitor

Build Summary

Top model targets built:

Model                                Action           Rebuild Reason
=========================================================================================================
autosar_tpc_throttle_sensor_monitor  Code generated.  Code generation information file does not e

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.711s

Building component: autosar_tpc_pedal_sensor (4 out of 6)
### Starting build procedure for: autosar_tpc_pedal_sensor
### Generating XML files description for: autosar_tpc_pedal_sensor
### Successful completion of code generation for: autosar_tpc_pedal_sensor

Build Summary

Top model targets built:

Model                     Action           Rebuild Reason
==============================================================================================
autosar_tpc_pedal_sensor  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.933s

Building component: autosar_tpc_throttle_sensor1 (5 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor1

Model "autosar_tpc_throttle_sensor1" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
```

```
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor1
### Successful completion of code generation for: autosar_tpc_throttle_sensor1

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
==============================================================================================
autosar_tpc_throttle_sensor1  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 13.686s

Building component: autosar_tpc_throttle_sensor2 (6 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor2

Model "autosar_tpc_throttle_sensor2" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor2
### Successful completion of code generation for: autosar_tpc_throttle_sensor2

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
==============================================================================================
autosar_tpc_throttle_sensor2  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.493s

Exporting composition: autosar_tpc_composition
### Generating XML description files for: autosar_tpc_composition
### Successful completion of export for: autosar_tpc_composition
```

Generate ECU Extract for Architecture Model

Export composition XML descriptions and generate component code for an AUTOSAR architecture model. As part of composition XML export, generate an ECU extract into the file **System.arxml**, which is located in the composition folder. The ECU extract for example model **autosar_tpc_composition** maps software components from both the top-level composition and a nested **Sensors** composition to one ECU.

Load AUTOSAR architecture model

```
modelName = 'autosar_tpc_composition';
archModel = autosar.arch.loadModel(modelName);
```

Export ECU extract into composition folder

```
export(archModel,'ExportECUExtract',true);
```

```
Building component: autosar_tpc_actuator (1 out of 6)
### Starting build procedure for: autosar_tpc_actuator
### Generating XML files description for: autosar_tpc_actuator
### Successful completion of code generation for: autosar_tpc_actuator

Build Summary

Top model targets built:

Model                 Action           Rebuild Reason
========================================================================================
autosar_tpc_actuator  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 14.913s

Building component: autosar_tpc_controller (2 out of 6)
### Starting build procedure for: autosar_tpc_controller
### Generating XML files description for: autosar_tpc_controller
### Successful completion of code generation for: autosar_tpc_controller

Build Summary

Top model targets built:

Model                   Action           Rebuild Reason
==========================================================================================
autosar_tpc_controller  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.933s

Building component: autosar_tpc_throttle_sensor_monitor (3 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor_monitor
### Generating XML files description for: autosar_tpc_throttle_sensor_monitor
### Successful completion of code generation for: autosar_tpc_throttle_sensor_monitor

Build Summary

Top model targets built:

Model                                Action           Rebuild Reason
=============================================================================================
autosar_tpc_throttle_sensor_monitor  Code generated.  Code generation information file does not e

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 14.64s

Building component: autosar_tpc_pedal_sensor (4 out of 6)
### Starting build procedure for: autosar_tpc_pedal_sensor
```

```
### Generating XML files description for: autosar_tpc_pedal_sensor
### Successful completion of code generation for: autosar_tpc_pedal_sensor

Build Summary

Top model targets built:

Model                     Action           Rebuild Reason
============================================================================================
autosar_tpc_pedal_sensor  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 12.437s

Building component: autosar_tpc_throttle_sensor1 (5 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor1

Model "autosar_tpc_throttle_sensor1" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor1
### Successful completion of code generation for: autosar_tpc_throttle_sensor1

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
================================================================================================
autosar_tpc_throttle_sensor1  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
Build duration: 0h 0m 13.799s

Building component: autosar_tpc_throttle_sensor2 (6 out of 6)
### Starting build procedure for: autosar_tpc_throttle_sensor2

Model "autosar_tpc_throttle_sensor2" contains deprecated AUTOSAR 3.x platform
types that will be automatically converted to AUTOSAR 4.x platform type names in
future releases.
To convert from AUTOSAR 3.x names to AUTOSAR 4.x platform type names directly,
use the 'PlatformTypeNames' XML Option.

### Generating XML files description for: autosar_tpc_throttle_sensor2
### Successful completion of code generation for: autosar_tpc_throttle_sensor2

Build Summary

Top model targets built:

Model                         Action           Rebuild Reason
================================================================================================
autosar_tpc_throttle_sensor2  Code generated.  Code generation information file does not exist.

1 of 1 models built (0 models already up to date)
```

```
Build duration: 0h 0m 15.595s

Exporting composition: autosar_tpc_composition
### Generating XML description files for: autosar_tpc_composition
### Successful completion of export for: autosar_tpc_composition
```

Input Arguments

`archCCM` — Component, composition, or architecture model
handle

AUTOSAR component, composition, or architecture model for which to export ARXML descriptions and generate component code. The argument is a component, composition, or architecture model handle returned by a previous call to `addComponent`, `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'PackageCodeAndARXML','SensorsComposition.zip'` specifies the name of a ZIP file that packages the generated files.

`ExportECUExtract` — Export ECU extract
`false` (default) | `true`

As part of XML export, generate an ECU extract into the file `System.arxml`, which is located in the composition folder. The ECU extract for a classic composition or architecture model maps software components from the top composition and any nested compositions to one ECU. For more information, see “Export Composition ECU Extract”.

Example: `'ExportECUExtract',true`

`ExportedARXMLFolder` — Folder location for exported ARXML files
character vector | string scalar

Full path to a folder in which to place exported ARXML description files.

Example: `'ExportedARXMLFolder','C:\temp\arxml'`

`PackageCodeAndARXML` — Name of ZIP file in which to package generated files
character vector | string scalar

Name of a ZIP file in which to package the generated files, including generated code and exported ARXML descriptions.

Example: `'PackageCodeAndARXML','SensorsComposition.zip'`

Version History

Introduced in R2020a

See Also

`getXmlOptions` | `setXmlOptions`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Generate and Package AUTOSAR Composition XML Descriptions and Component Code"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

find

Package: `autosar.api`

Find AUTOSAR elements

Syntax

```
paths = find(arProps,rootPath,category)
paths = find(arProps,rootPath,category,'PathType',value)
paths = find(arProps,rootPath,category,property,value)
```

Description

`paths = find(arProps,rootPath,category)` returns `paths` to AUTOSAR elements matching `category`, starting at path `rootPath`.

`paths = find(arProps,rootPath,category,'PathType',value)` specifies whether the returned `paths` are fully qualified or partially qualified.

`paths = find(arProps,rootPath,category,property,value)` specifies a constraining value on a property of the specified `category` of elements, narrowing the search.

Examples

Find Sender-Receiver Interfaces That Are Not Services

For a model, find sender-receiver interfaces for which the property `IsService` is `false` and return fully qualified paths.

```
hModel = 'autosar_swc_expfcns';
open_system(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
ifPaths = find(arProps,[],'SenderReceiverInterface',...
  'IsService',false,'PathType','FullyQualified')
```

```
ifPaths = 1x2 cell
    {'/pkg/if/Interface1'}    {'/pkg/if/Interface2'}
```

Find Mode-Switch Interface Paths

For a model, add a mode-switch interface and then use `find` to list paths for mode-switch interfaces in the model.

```
hModel = 'mAutosarMsConfigAfter';
open_system(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
addPackageableElement(arProps,'ModeSwitchInterface','/pkg/if','Interface3',...
```

```
  'IsService',true);
ifPaths = find(arProps,[],'ModeSwitchInterface','PathType','FullyQualified')

ifPaths = 1x3 cell
    {'/pkg/if/myMsIf'}    {'/pkg/if/MsIf2'}    {'/pkg/if/Interface3'}
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `=` `autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`rootPath` — Starting point of the search
character vector | string scalar | `[]`

Path specifying the starting point at which to look for the specified type of AUTOSAR elements. `[]` indicates the root of the component.

Example: `[]`

`category` — Type of AUTOSAR element
character vector | string scalar

Type of AUTOSAR element for which to return paths.

Example: `'SenderReceiverInterface'`

`'PathType',value` — Whether the returned paths are fully qualified or partially qualified
`'PartiallyQualified'` (default) | `'FullyQualified'`

Specify `FullyQualified` to return fully qualified paths.

Example: `'PathType','FullyQualified'`

`property,value` — Property and value
name (character vector or string scalar), value

Valid property of the specified category of elements, and a value to match for that property in the search. Table “Properties of AUTOSAR Elements” lists properties that are associated with AUTOSAR elements.

Example: `'IsService',true`

Output Arguments

`paths` — Paths to AUTOSAR elements
cell array of character vectors

Variable that returns paths to AUTOSAR elements.

Example: `ifPaths`

Version History

Introduced in R2013b

See Also

`autosar.api.getAUTOSARProperties` | `add` | `delete` | `get` | `set`

Topics

"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

find

Package: `autosar.arch`

Find AUTOSAR architecture elements

Syntax

```
archElements = find(archCCM,category)
archElements = find(archCCM,category,'AllLevels',value)
archElements = find(archCCM,category,property,value)
```

Description

`archElements = find(archCCM,category)` searches AUTOSAR component, composition, or architecture model `archCCM` for architecture elements that match the specified category. The `archElements` output argument returns handles for the architecture elements found. Valid values for `category` are `Component`, `Composition`, `Port`, or `Connector`. The `archCCM` argument is a component, composition, or architecture model handle returned by a previous call to `addComponent`, `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`. The default scope of `find` is the top level of the specified composition or architecture model, not all levels of the model hierarchy.

`archElements = find(archCCM,category,'AllLevels',value)` allows you to extend the search for AUTOSAR architecture elements to all levels of an AUTOSAR composition or architecture model hierarchy. To search all levels, specify `value` as `true`.

`archElements = find(archCCM,category,property,value)` specifies a constraining value on a property of the specified category of elements, narrowing the search.

Examples

Find Elements at Different Levels of AUTOSAR Architecture Model

In AUTOSAR architecture model `myArchModel`:

- Find components that are located only in the architecture model top level.
- Find components located in all levels of the model hierarchy.
- Find composition block ports and list their `Kind` and `Name` values.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors');

% Add 2 components inside Sensors composition
names = {'PedalSnsr','ThrottleSnsr'};
sensorSWCs = addComponent(composition,names,'Kind','SensorActuator');
layout(composition); % Auto-arrange layout
```

```
% Add components at architecture model top level
addComponent(archModel,'Controller1');
actuator = addComponent(archModel,'Actuator');
set(actuator,'Kind','SensorActuator');

% Add architecture ports
addPort(archModel,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(archModel,'Sender','ThrCmd_Hw');

% Add composition ports
addPort(composition,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(composition,'Sender',{'TPS_Perc','APP_Perc'});

% Add component ports
controller = find(archModel,'Component','Name','Controller1');
addPort(controller,'Receiver',{'TPS_Perc','APP_Perc'});
addPort(controller,'Sender','ThrCmd_Perc');
addPort(actuator,'Receiver','ThrCmd_Perc');
addPort(actuator,'Sender','ThrCmd_Hw');

% At top level, connect composition and components based on matching port names
connect(archModel,composition,controller);
connect(archModel,controller,actuator);

% Connect specified arch root ports to specified composition and component ports
connect(archModel,archModel.Ports(1),composition.Ports(1));
% Use find to construct port specifications
connect(archModel,...
    find(archModel,'Port','Name','APP_Hw'),...
    find(composition,'Port','Name','APP_Hw'));
connect(archModel,actuator.Ports(2),archModel.Ports(3));

layout(archModel);  % Auto-arrange layout

% Find components in architecture model top level only
components_in_arch_top_level = find(archModel,'Component')
% Find components in all hierarchy
components_in_all_hierarchy = find(archModel,'Component','AllLevels',true)
% Find ports for composition block only
composition_ports = find(composition,'Port')

% List Kind and Name property values for composition ports
for ii=1:length(composition_ports)
    Port = composition_ports(ii);
    portName = get(Port,'Name');
    portKind = get(Port,'Kind');
    fprintf('%s port %s\n',portKind,portName);
end
```

```
components_in_arch_top_level =
  2×1 Component array with properties:
    Name
    Kind
    Ports
    ReferenceName
    Parent
    SimulinkHandle

components_in_all_hierarchy =
  4×1 Component array with properties:
    Name
    Kind
    Ports
    ReferenceName
    Parent
    SimulinkHandle

composition_ports =
  4×1 CompPort array with properties:
    Kind
    Connected
    Name
```

```
    Parent
    SimulinkHandle

Receiver port TPS_Hw
Receiver port APP_Hw
Sender port TPS_Perc
Sender port APP_Perc
```

Input Arguments

archCCM — Component, composition, or architecture model

handle

AUTOSAR component, composition, or architecture model in which to search for specified architecture elements. The argument is a component, composition, or architecture model handle returned by a previous call to `addComponent`, `addComposition`, `autosar.arch.createModel`, or `autosar.arch.loadModel`.

Example: `archModel`

category — Type of architecture element

character vector | string scalar

Type of AUTOSAR architecture element to find. Valid categories are `Component`, `Composition`, `Port`, or `Connector`.

Example: `'Component'`

'AllLevels',value — Whether to search all levels of model hierarchy

`false` (default) | `true`

Specify `true` to search all levels of an AUTOSAR composition or architecture model hierarchy for the specified architecture elements. The default scope of `find` is the top level of the specified composition or architecture model, not all levels of the model hierarchy.

Example: `'AllLevels',true`

property,value — Property and value

name (character vector or string scalar), value

Valid property of the specified category of architecture elements, and a value to match for that property in the search.

Example: `'Name','APP_Hw'`

Output Arguments

archElements — Elements found

handle | array of handles

Returns one or more handles for the architecture elements found.

Version History

Introduced in R2020a

See Also
`get` | `set`

Topics
"Configure AUTOSAR Architecture Model Programmatically"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

find

Package: autosar.api

Find AUTOSAR elements

Syntax

```
modelElementsFound = find(slMap,category)
```

Description

`modelElementsFound = find(slMap,category)` returns an array of handles, paths, or names of model elements of type `category`.

Examples

Find Model States in Simulink Mappings

In the Simulink® code mappings of the model `autosar_swc`, find model workspace parameters.

```
open_system("autosar_swc");
mapObj = autosar.api.getSimulinkMapping("autosar_swc");
states = find(mapObj,"States")
```

```
states =
"autosar_swc/Integrator"
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
`SimulinkMapping` object

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`-*`model`* is a handle, character vector, or string scalar representing the model.

Example: `mapObj`

`category` — Model element category
`"DataStores"` | `"DataTransfers"` | `"Inports"` | `"ModelParameters"` | `"ModelParameterArguments"` | `"Outports"` | `"Signals"` | `"States"`

Category of model elements that you search for in the model code mappings, as specified as one of the values listed in this table:

Category	Description
"Inports"	An array of block handles of Inports present within the specified model
"Outports"	An array of block handles of Outports present within the specified model
"Signals"	An array of block handles of Signals present within the specified model
"States"	A cell array containing the path handle(s) of all States present in the specified model
"DataStores"	An array containing the path handle(s) of all Data Stores present in the specified model
"DataTransfers"	A cell array containing the block handles of all Data Transfers present in the specified model
"Functions"	A string array of the Function names present in the specified model
"FunctionCallers"	A cell array containing the block handle(s) of all Function Caller blocks present in the specified model
"ModelParameterArguments"	A cell array containing the model parameter argument names present in the specified model

Output Arguments

`modelElementsFound` — Model elements found
array | string vector

Model elements found, returned as an array of objects, or string vector of object paths or names. Each object or string identifies a model element of the specified category.

Category	Type of Object Returned
Inports, Outports, and Signals	Block handle
States	Path handle
DataStores	Block handle
DataTransfers	Block handle
Functions	Function
FunctionCallers	Block handle of Function Caller block
ModelParameterArguments	Model parameter argument name

Version History

Introduced in R2023a

See Also

`autosar.api.getSimulinkMapping`

get

Package: autosar.api

Get property of AUTOSAR element

Syntax

pValue = get(arProps,elementPath,property)

Description

pValue = get(arProps,elementPath,property) returns the value of the specified property of the AUTOSAR element at elementPath.

Examples

Get Value of IsService Property of Sender-Receiver Interface

For a model, get the value of the IsService property for the sender-receiver interface Interface1. The variable IsService returns false (0), indicating that the sender-receiver interface is not a service.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
isService = get(arProps,'Interface1','IsService')
```

```
isService =
  logical
   0
```

Get Component Qualified Name and Runnable Symbol Name

For an AUTOSAR model, to prepare for setting the symbol property for runnable Runnable1 to test_symbol, get the AUTOSAR component qualified name and the existing runnable symbol name.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
compQName = get(arProps,'XmlOptions','ComponentQualifiedName');
runnables = find(arProps,compQName,'Runnable','PathType','FullyQualified');
runnables(2)
```

```
ans =
  1×1 cell array
    {'/pkg/swc/ASWC/IB/Runnable1'}
```

```
get(arProps,runnables{2},'symbol')
```

```
ans =
    'Runnable1'
```

```
set(arProps,runnables{2},'symbol','test_symbol')
get(arProps,runnables{2},'symbol')
```

```
ans =
    'test_symbol'
```

Input Arguments

`arProps` — AUTOSAR properties information for a model

handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`elementPath` — Path to AUTOSAR element

character vector | string scalar

Path to the AUTOSAR element for which to return the value of a property.

Example: `'Input'`

`property` — Element property

character vector | string scalar

Property for which to return a value, among valid properties of the AUTOSAR element.

Example: `'IsService'`

Output Arguments

`pValue` — Property value or path

value of property | path to composite property or property that references other properties

Variable that returns the value of the specified AUTOSAR property. For composite properties or properties that reference other properties, the return value is the path to the property.

Example: `ifPaths`

Version History

Introduced in R2013b

See Also

`autosar.api.getAUTOSARProperties` | `set`

Topics

"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

get

Package: autosar.arch

Get property of AUTOSAR architecture element

Syntax

pValue = get(archElement,property)

Description

pValue = get(archElement,property) returns the current value pValue of the specified property for AUTOSAR architecture element archElement. The archElement argument is a component, composition, port, or connector handle returned by a previous call to addComponent, addComposition, addPort, connect, or find.

Examples

Get and List Properties of AUTOSAR Architecture Elements

In an AUTOSAR architecture model, find ports located in all levels of the model hierarchy. Get and list their Kind and Name property values.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add composition and component at architecture model top level
composition = addComposition(archModel,'Sensors');
addComponent(archModel,'Controller1');

% Add composition ports
addPort(composition,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(composition,'Sender',{'TPS_Perc','APP_Perc'});

% Add component ports
controller = find(archModel,'Component','Name','Controller1');
addPort(controller,'Receiver',{'TPS_Perc','APP_Perc'});
addPort(controller,'Sender','ThrCmd_Perc');

% Connect composition and component based on matching port names
connect(archModel,composition,controller);

% Create implementation model for component
createModel(controller);

layout(archModel);  % Auto-arrange layout

% Set properties
set(composition.Ports(1),'Name','NewPortName1');  % Rename 2 composition ports
set(composition.Ports(3),'Name','NewPortName2');
set(find(controller,'Port','Name','TPS_Perc'),...
    'Name','NewPortName3');  % Rename port for Controller1 component & implementation
set(controller,'Kind','ServiceProxy');  % Component type for Controller1 component
set(controller,'Name','Instance1');     % Name for Controller1 component

% Find ports in architecture model hierarchy
ports_in_hierarchy = find(archModel,'Port','AllLevels',true)
```

```
% List Kind and Name property values for each port
for ii=1:length(ports_in_hierarchy)
    port = ports_in_hierarchy(ii);
    portName = get(port,'Name');
    portKind = get(port,'Kind');
    fprintf('%s port %s\n',portKind,portName);
end
```

```
ports_in_hierarchy = 
  7×1 CompPort array with properties:
    Kind
    Connected
    Name
    Parent
    SimulinkHandle

Receiver port NewPortName1
Receiver port APP_Hw
Sender port NewPortName2
Sender port APP_Perc
Sender port ThrCmd_Perc
Receiver port NewPortName3
Receiver port APP_Perc
```

Input Arguments

`archElement` — Architecture element

handle

AUTOSAR architecture element for which to return the current value of a property. The argument is a component, composition, port, or connector handle returned by a previous call to `addComponent`, `addComposition`, `addPort`, `connect`, or `find`.

Example: `port`

`property` — Element property

character vector | string scalar

Property for which to return a value, among valid properties of the AUTOSAR architecture element.

Example: `'Name'`

Output Arguments

`pValue` — Property value

value of property

Returns the value of the specified property of the specified AUTOSAR architecture element.

Version History

Introduced in R2020a

See Also

`find` | `set`

Topics

"Configure AUTOSAR Architecture Model Programmatically"

"Author AUTOSAR Classic Compositions and Components in Architecture Model"

getClassName

Get class name of model

Syntax

`name = getClassName(slMap)`

Description

`name = getClassName(slMap)` returns the class name of the model.

Examples

Get Class Name of Model

Open the model. To access the mapping information associated with the model, `slMap`, use the `autosar.api.getSimulinkMapping` function.

```
%% Open an adaptive AUTOSAR model
hModel = 'autosar_LaneGuidance';
openExample(hModel);

%% Access the mapping information
slMap = autosar.api.getSimulinkMapping(hModel);
```

To access the class name of the model, use the `getClassName` function. If you did not specify a class name for the model, the `getClassName` function returns an empty character vector and the class name in the generated code uses the model name as the default class name.

```
name = getClassName(slMap)
```

```
name =

    0x0 empty char array
```

Specify a class name for the model by using the `setClassName` function.

```
setClassName(slMap, 'myClassName');
```

The `getClassName` function now returns the specified class name.

```
name = getClassName(slMap)
```

```
name =

    'myClassName'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *slMap* = autosar.api.getSimulinkMapping(*model*). *model* is a handle, character vector, or string scalar representing the model name.

Example: slMap

Output Arguments

name — Class name of model

character vector

Class name of model returned as a character vector. If you do not specify a class name, the class name in the generated code uses the model name as the default class name.

Version History

Introduced in R2021a

See Also

autosar.api.getSimulinkMapping | setClassName | getClassNamespace | setClassName

Topics

"Configure AUTOSAR Adaptive Code Generation"

getClassNamespace

Get class namespace for a model

Syntax

`namespace = getClassNamespace(slMap)`

Description

`namespace = getClassNamespace(slMap)` returns the class namespace specified for the model. Class namespaces can help to prevent name conflicts in large projects.

Examples

Access Class Namespace for Model

Open the model. To access the mapping information associated with the model, `slMap`, use the `autosar.api.getSimulinkMapping` function.

```
%% Open an adaptive AUTOSAR model
hModel = 'autosar_LaneGuidance';
openExample(hModel);

%% Access the mapping information
slMap = autosar.api.getSimulinkMapping(hModel);
```

To access the namespace of the model, use the `getClassNamespace` function. If you did not specify a namespace for the model, the `getClassNamespace` function returns an empty character vector.

```
name = getClassNamespace(slMap)
```

```
name =

  0x0 empty char array
```

Specify a namespace for the model by using the `setClassNamespace` function.

```
setClassNamespace(slMap, 'myClassNamespace');
```

The `getClassNamespace` function now returns the specified class namespace.

```
name = getClassNamespace(slMap)
```

```
name =

    'myClassNamespace'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. *model* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

Output Arguments

namespace — Class namespace of model
character vector

Class namespace of model returned as a character vector. If you did not specify a namespace for the model, the `getClassNamespace` function returns an empty character vector.

Version History

Introduced in R2021a

See Also

`autosar.api.getSimulinkMapping` | `setClassNamespace` | `getClassName` | `setClassName`

Topics

"Configure AUTOSAR Adaptive Code Generation"

getComponentNames

Package: arxml

Get AUTOSAR software component names from ARXML files

Syntax

```
names = getComponentNames(ar)
names = getComponentNames(ar,compKind)
```

Description

names = getComponentNames(ar) returns the names of AUTOSAR software components found in the XML files associated with arxml.importer object ar. By default, the function returns the names of atomic software components, including application, sensor/actuator, complex device driver, ECU abstraction, and service proxy software components.

names = getComponentNames(ar,compKind) uses the compKind argument to specify the type of software component to return. You can narrow the search to a specific type of atomic software component, such as 'Application' or 'SensorActuator', or specify a nonatomic component, such as 'Composition' or 'Parameter'.

Examples

Get AUTOSAR Atomic Software Component Names from ARXML File

Get the names of AUTOSAR atomic software components present in an ARXML file. The ARXML file is located at *matlabroot*/examples/autosarblockset/data, which is on the default MATLAB search path.

Create an initial Simulink representation of the Controller composition.

```
ar = arxml.importer('ThrottlePositionControlComposition.arxml');
names = getComponentNames(ar)

names =
  5×1 cell array
    {'/Company/Components/Controller'                 }
    {'/Company/Components/ThrottlePositionMonitor'    }
    {'/Company/Components/AccelerationPedalPositionSensor'}
    {'/Company/Components/ThrottlePositionActuator'   }
    {'/Company/Components/ThrottlePositionSensor'     }

createComponentAsModel(ar,'/Company/Components/Controller',...
    'ModelPeriodicRunnablesAs','AtomicSubsystem');
```

Get AUTOSAR Sensor-Actuator Software Component Names from ARXML File

Get the names of AUTOSAR sensor-actuator software components present in an ARXML file. The ARXML file is located at *matlabroot*/examples/autosarblockset/data, which is on the default MATLAB search path.

```
ar = arxml.importer('ThrottlePositionControlComposition.arxml');
names = getComponentNames(ar,'SensorActuator')

names =
  3×1 cell array
    {'/Company/Components/AccelerationPedalPositionSensor'}
    {'/Company/Components/ThrottlePositionActuator'       }
    {'/Company/Components/ThrottlePositionSensor'         }
```

Get AUTOSAR Software Composition Names from ARXML File

Get the names of AUTOSAR software compositions present in an ARXML file. The ARXML file is located at `matlabroot/examples/autosarblockset/data`, which is on the default MATLAB search path.

Create an initial Simulink representation of the listed composition.

```
ar = arxml.importer('ThrottlePositionControlComposition.arxml');
names = getComponentNames(ar,'Composition')

names =
  1×1 cell array
    {'/Company/Components/ThrottlePositionControlComposition'}

createCompositionAsModel(ar,'/Company/Components/ThrottlePositionControlComposition');
```

Input Arguments

ar — `arxml.importer` object

handle

AUTOSAR information previously imported from XML files, specified as an `arxml.importer` object handle.

compKind — Component type

`'Atomic'` (default) | `'Application'` | `'ComplexDeviceDriver'` | `'Composition'` | `'EcuAbstraction'` | `'Parameter'` | `'SensorActuator'` | `'ServiceProxy'`

Type of software component to return.

Output Argument

names — Names array

cell array of character vectors

Variable that returns an array of component names. Each array element is the absolute short-name path of an AUTOSAR software component.

Example: `{'/pkg/swc/tpSensor','/pkg/swc/tpActuator'}`

Version History

Introduced in R2008a

See Also

`arxml.importer` | `createComponentAsModel` | `createCompositionAsModel`

Topics

“Import AUTOSAR XML Descriptions Into Simulink”
“AUTOSAR ARXML Importer”

getDataDefaults

Get default end-to-end (E2E) protection method for AUTOSAR component model

Syntax

`e2eMethod = getDataDefaults(slMap,elementCategory,property)`

Description

`e2eMethod = getDataDefaults(slMap,elementCategory,property)` returns the default setting for the end-to-end (E2E) protection method property in the modeling element category inports and outports of an AUTOSAR component model.

Use E2E protection to optionally configure sender and receiver ports to securely transmit data between AUTOSAR components. The default end-to-end protection method sets which end-to-end protection method is used for root-level inports and outports in the generated code.

Supported protection methods are E2E Transformer and E2E Protection Wrapper.

The protection method is applied to AUTOSAR inports that are configured in the code mappings as `EndToEndRead` and AUTOSAR outports that are configured as `EndToEndWrite`.

Examples

Get Default E2E Protection Setting for Root-Level Inports and Outports

Return the default end-to-end protection method setting for the AUTOSAR component model.

Get the default E2E protection method.

```
hModel = 'autosar_swc';
openExample(hModel);

slMap = autosar.api.getSimulinkMapping(hModel);
e2eMethod = getDataDefaults(slMap, ...
   'InportsOutports', 'EndToEndProtectionMethod');
```

```
e2eMethod =
    'ProtectionWrapper'
```

Set and then read back the default E2E protection method.

```
setDataDefaults(slMap,'InportsOutports', ...
   'EndToEndProtectionMethod', 'TransformerError');
e2eMethod = getDataDefaults(slMap,...
   'InportsOutports', 'EndToEndProtectionMethod');
```

```
e2eMethod =
    'TransformerError'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, specified as a function handle. Obtain this information using `autosar.api.getSimulinkMapping(model)`, where *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`elementCategory` — Model data element category
`'InportsOutports'`

Category of model data elements that apply the end-to-end protection property, specified as `'InportsExports'`. The only supported modeling element is inports and outports.

`property` — Default protection method property value to return
`'EndToEndProtectionMethod'`

Default end-to-end protection method property that you return a value for, specified as `'EndToEndProtectionMethod'`. The only supported property is E2E protection method.

Output Arguments

`e2eMethod` — Name of the default E2E protection method parameter
'ProtectionWrapper' | 'TransformerError'

Name of the default E2E protection method parameter, returned as one of the following:

- `'ProtectionWrapper'`:

  E2E Protection Wrapper, which uses an E2E protection wrapper in the generated code in support of end-to-end data consistency checks.

  E2E protection wrapper is the default setting.
- `'TransformerError'`:

  E2E Transformer, which configures RTE calls to use a transformer error argument in the generated code.

  Supported when using AUTOSAR schema version 4.2 or later.

Data Types: `character vector`

Version History
Introduced in R2022b

See Also
`autosar.api.getSimulinkMapping` | `setDataDefaults`

Topics
“Configure AUTOSAR S-R Interface Port for End-To-End Protection”

getDataStore

Package: `autosar.api`

Get AUTOSAR mapping information for Simulink data store

Syntax

```
arValue = getDataStore(slMap,slBlockHandle)
arValue = getDataStore(slMap,slBlockHandle,arProperty)
```

Description

`arValue = getDataStore(slMap,slBlockHandle)`returns the type of AUTOSAR variable mapped to Simulink data store memory block `slBlockHandle`. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory` for classic models and `Persistency` for adaptive models.

`arValue = getDataStore(slMap,slBlockHandle,arProperty)` returns the value of property `arProperty` for the AUTOSAR variable that the Simulink data store is mapped to.

Examples

Get AUTOSAR Mapping Information for Simulink Data Stores

Get AUTOSAR mapping and property information for the Simulink data store memory block `Data Store Memory` in example model `autosar_bsw_sensor1`.

```
hModel = 'autosar_bsw_sensor1';
hBlock = 'autosar_bsw_sensor1/Data Store Memory';

openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);
mapDataStore(slMap,hBlock,'ArTypedPerInstanceMemory','NeedsNVRAMAccess','true');
arMappedTo = getDataStore(slMap,hBlock)
arNvram = getDataStore(slMap,hBlock,'NeedsNVRAMAccess')
```

```
arMappedTo =
    'ArTypedPerInstanceMemory'

arNvram =
    'true'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slBlockHandle` — Simulink data store memory block handle

handle

Name or handle of Simulink data store memory block for which to return AUTOSAR mapping information.

Example: `'autosar_bsw_sensor1/Data Store Memory'`

`arProperty` — AUTOSAR property

character vector | string scalar

Name of AUTOSAR variable property.

For AUTOSAR classic models, valid property names include `ShortName`, `SwAddrMethod`, `SwCalibrationAccess`, `DisplayFormat`, and `LongName`. For `ArTypedPerInstancememory`, you can specify `NeedsNVRAMAccess`. For `StaticMemory`, you can specify C type qualifier properties `IsVolatile` or `Qualifier` (AUTOSAR additional native type qualifier).

For AUTOSAR adaptive models, valid property names include `Port` and `DataElement`.

For property descriptions, see `mapDataStore`.

Example: `'SwCalibrationAccess'`

Output Arguments

`arValue` — Value of AUTOSAR variable type or property

character vector

Variable that returns either the type of the mapped AUTOSAR variable or the value of a variable property.

Example: `arValue`

Version History

Introduced in R2019a

See Also

`autosar.api.getSimulinkMapping` | `mapDataStore` | Data Store Memory

Topics

"Map Data Stores to AUTOSAR Variables"
"Map Submodel Data Stores to AUTOSAR Variables"
"Map Data Stores to AUTOSAR Persistent Memory Ports and Data Elements"
"Configure AUTOSAR Per-Instance Memory"
"Configure AUTOSAR Static Memory"
"Model AUTOSAR Adaptive Persistent Memory"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getDataTransfer

Package: autosar.api

Get AUTOSAR mapping information for Simulink data transfer

Syntax

```
[arIrvName,arDataAccessMode] = getDataTransfer(slMap,slDataTransfer)
```

Description

[arIrvName,arDataAccessMode] = getDataTransfer(slMap,slDataTransfer) returns the values of the AUTOSAR inter-runnable variable arIrvName and AUTOSAR data access mode arDataAccessMode that are mapped to Simulink data transfer line or Rate Transition block slDataTransfer.

Examples

Get AUTOSAR Mapping Information for Simulink® Data Transfer Line

Get AUTOSAR mapping information for a data transfer line in the example model autosar_swc_expfcns. The model has data transfer lines named irv1, irv2, irv3, and irv4.

```
hModel = 'autosar_swc_expfcns';
open_system(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
[arIrvName,arDataAccessMode]=getDataTransfer(slMap,'irv4')
```

```
arIrvName =
'IRV4'

arDataAccessMode =
'Implicit'
```

Get AUTOSAR Mapping Information for Rate Transition Block

Get AUTOSAR mapping information for a Rate Transition block in the example model mMultitasking_4rates. The model has Rate Transition blocks named RateTransition, RateTransition1, and RateTransition2, which are located at the top level of the model.

```
hModel = 'mMultitasking_4rates';
open_system(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
[arIrvName,arDataAccessMode]=getDataTransfer(slMap,'mMultitasking_4rates/RateTransition')
```

```
arIrvName =
'IRV1'
```

```
arDataAccessMode =
'Implicit'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slDataTransfer` — Simulink data transfer line name or Rate Transition full block path
character vector | string scalar

Name of the Simulink data transfer line or full block path to the Rate Transition block for which to return AUTOSAR mapping information.

Example: `'irv4'`

Example: `'myModel/RateTransition2'`

Output Arguments

`arIrvName` — Name of AUTOSAR inter-runnable variable
character vector

Variable that returns the name of AUTOSAR inter-runnable variable mapped to the specified Simulink data transfer.

Example: `arIrvName`

`arDataAccessMode` — Value of AUTOSAR data access mode
character vector

Variable that returns the value of the AUTOSAR data access mode mapped to the specified Simulink data transfer. The value is `Implicit` or `Explicit`.

Example: `arDataAcessMode`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `mapDataTransfer`

Topics
"Map Data Transfers to AUTOSAR Inter-Runnable Variables"
"Model AUTOSAR Component Behavior"
"AUTOSAR Property and Map Function Examples"

"AUTOSAR Component Configuration"

getFunction

Package: autosar.api

Get AUTOSAR mapping information for Simulink entry-point function

Syntax

arRunnableName = getFunction(slMap,slEntryPointFunction)
[arRunnableName,arRunnableSwAddrMethod,arInternalDataSwAddrMethod] = getFunction(slMap,slEntryPointFunction)

Description

arRunnableName = getFunction(slMap,slEntryPointFunction) returns the name of the AUTOSAR runnable arRunnableName mapped to Simulink entry-point function slEntryPointFunction.

[arRunnableName,arRunnableSwAddrMethod,arInternalDataSwAddrMethod] = getFunction(slMap,slEntryPointFunction) returns the names of function and internal data software address methods (SwAddrMethods) defined for the mapped AUTOSAR runnable. If a SwAddrMethod is not defined, the function returns '<None>'.

Examples

Get AUTOSAR Runnable Name for Simulink Entry-Point Function

Get the name of the AUTOSAR runnable mapped to a Simulink entry-point function in the example model autosar_swc. The model has an initialize entry-point function named Runnable_Init and periodic entry-point functions named Runnable_1s and Runnable_2s.

```
hModel = 'autosar_swc';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
arRunnableName=getFunction(slMap,'Initialize')
```

```
arRunnableName =
    'Runnable_Init'
```

Get AUTOSAR SwAddrMethod Names for Simulink Entry-Point Function

Get AUTOSAR SwAddrMethod names for a Simulink entry-point function in the example model autosar_swc_counter. The model has a single-tasking periodic entry-point function.

```
hModel = 'autosar_swc_counter';
openExample(hModel);

% Add SwAddrMethods myCODE and myVAR to the AUTOSAR component
arProps = autosar.api.getAUTOSARProperties(hModel);
addPackageableElement(arProps,'SwAddrMethod',...
    '/Company/Powertrain/DataTypes/SwAddrMethods','myCODE',...
    'SectionType','Code')
```

```
swAddrPaths = find(arProps,[],'SwAddrMethod','PathType','FullyQualified',...
    'SectionType','Code')
addPackageableElement(arProps,'SwAddrMethod',...
    '/Company/Powertrain/DataTypes/SwAddrMethods','myVAR',...
    'SectionType','Var')
swAddrPaths = find(arProps,[],'SwAddrMethod','PathType','FullyQualified',...
    'SectionType','Var')

% Set code generation parameter for runnable internal data SwAddrMethods
set_param(hModel,'GroupInternalDataByFunction','on')

% Map periodic function and internal data to myCODE and myVAR SwAddrMethods
slMap = autosar.api.getSimulinkMapping(hModel);
mapFunction(slMap,'Periodic','Runnable_Step',...
    'SwAddrMethod','myCODE','SwAddrMethodForInternalData','myVAR')

% Return AUTOSAR mapping information for periodic function
[arRunnableName,arRunnableSwAddrMethod,arInternalDataSwAddrMethod] = ...
    getFunction(slMap,'Periodic')

swAddrPaths =
  1×2 cell array
    {'/Company/Powertrain/DataTypes/SwAddrMethods/CODE'}
    {'/Company/Powertrain/DataTypes/SwAddrMethods/myCODE'}

swAddrPaths =
  1×2 cell array
    {'/Company/Powertrain/DataTypes/SwAddrMethods/VAR'}
    {'/Company/Powertrain/DataTypes/SwAddrMethods/myVAR'}

arRunnableName =
    'Runnable_Step'

arRunnableSwAddrMethod =
    'myCODE'

arInternalDataSwAddrMethod =
    'myVAR'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slEntryPointFunction` — Simulink entry-point function

character vector | string scalar

Simulink entry-point function for which to return AUTOSAR mapping information. The value format is based on the function type.

Function Type	Value
Initialize	`'Initialize'`.
Reset	`'Reset:slIdentifier'`, where `slIdentifier` is the name of a reset function in the model.
Terminate	`'Terminate'`.

Function Type	Value
Single-tasking periodic	`'Periodic'`.
Periodic (implicit task)	`'Periodic:`*`slIdentifier`*`'`, where *`slIdentifier`* is the corresponding period annotation, as displayed in the Timing Legend. For example, `'Periodic:D1'`.
Partition (explicit task)	`'Partition:`*`slIdentifier`*`'`, where *`slIdentifier`* is the partition name, as displayed in the Schedule Editor. For example, `'Partition:P1'`.
Exported	`'ExportedFunction:`*`slIdentifier`*`'`, where *`slIdentifier`* is the name of the Inport block that drives the control port of the function-call subsystem. For example: • `'ExportedFunction:Trigger_1s'` in example model `autosar_swc_slfcns` • `'ExportedFunction:FunctionTrigger'` in example model `autosar_swc_fcncalls`
Simulink function in client-server configuration	`'SimulinkFunction:`*`slIdentifier`*`'`, where *`slIdentifier`* is the name of a global Simulink function in the model. For example, `'SimulinkFunction:readData'` in the example model in “Configure AUTOSAR Server”.

Example: `'Periodic:D1'`

Output Arguments

`arRunnableName` — Name of AUTOSAR runnable
character vector

Variable that returns the name of the AUTOSAR runnable mapped to the specified Simulink entry-point function object.

Example: `arRunnableName`

`arRunnableSwAddrMethod` — Name of function `SwAddrMethod`
character vector

Variable that returns the name of the `SwAddrMethod` defined for the AUTOSAR runnable function.

Example: `arRunnableSwAddrMethod`

`arInternalDataSwAddrMethod` — Name of internal data `SwAddrMethod`
character vector

Variable that returns the name of the `SwAddrMethod` defined for the AUTOSAR runnable internal data.

Example: `arInternalDataSwAddrMethod`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `mapFunction`

Topics

"Map Entry-Point Functions to AUTOSAR Runnables"
"Configure AUTOSAR Runnables and Events"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getFunctionCaller

Package: `autosar.api`

Get AUTOSAR mapping information for Simulink function-caller block

Syntax

`[arPortName,arOperationName] = getFunctionCaller(slMap,slFcnName)`

Description

`[arPortName,arOperationName] = getFunctionCaller(slMap,slFcnName)` returns the value of the AUTOSAR client port `arPortName` and AUTOSAR operation `arOperationName` mapped to the Simulink function caller block for Simulink function `slFcnName`.

Examples

Get AUTOSAR Mapping Information for Function Caller Block

Get AUTOSAR mapping information for a function-caller block in a model in which AUTOSAR client function invocation is being modeled. The model has a function-caller block for Simulink® function `readData`.

```
hModel = 'mControllerWithInterface_client';
open_system(hModel);
slMapC = autosar.api.getSimulinkMapping(hModel);
mapFunctionCaller(slMapC,'readData','cPort','readData');
[arPort,arOp] = getFunctionCaller(slMapC,'readData')
```

```
arPort =
'cPort'

arOp =
'readData'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slFcnName` — Name of Simulink function
character vector | string scalar

Name of the Simulink function for the function-caller block for which to return AUTOSAR mapping information.

Example: `'readData'`

Output Arguments

`arPortName` — Name of AUTOSAR client port
character vector

Variable that returns the name of the AUTOSAR client port mapped to the specified function-caller block.

Example: `arPort`

`arOperationName` — Name of AUTOSAR operation
character vector

Variable that returns the name of the AUTOSAR operation mapped to the specified function-caller block.

Example: `arOp`

Version History

Introduced in R2014b

See Also

`autosar.api.getSimulinkMapping` | `mapFunctionCaller`

Topics

"Map Function Callers to AUTOSAR Client-Server Ports and Operations"
"Configure AUTOSAR Client-Server Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getInport

Package: `autosar.api`

Get AUTOSAR mapping information for Simulink inport

Syntax

`[arPortName,arDataElementName,arDataAccessMode] = getInport(slMap,slPortName)`

Description

`[arPortName,arDataElementName,arDataAccessMode] = getInport(slMap,slPortName)` returns the values of the AUTOSAR port `arPortName`, AUTOSAR data element `arDataElementName`, and AUTOSAR data access mode `arDataAccessMode` mapped to Simulink inport `slPortName`.

Examples

Get AUTOSAR Mapping Information for Model Inport

Get AUTOSAR mapping information for a model inport in the example model `autosar_swc_expfcns`. The model has an inport named `RPort_DE1`.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
[arPortName,arDataElementName,arDataAccessMode]=getInport(slMap,'RPort_DE1')
```

```
arPortName =
RPort

arDataElementName =
DE1

arDataAccessMode =
ImplicitReceive
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortName` — Name of model inport
character vector | string scalar

Name of the model inport for which to return AUTOSAR mapping information.

Example: `'Input'`

Output Arguments

`arPortName` — Name of AUTOSAR port
character vector

Variable that returns the name of the AUTOSAR port mapped to the specified Simulink inport.

Example: `arPortName`

`arDataElementName` — Name of AUTOSAR data element
character vector

Variable that returns the name of the AUTOSAR data element mapped to the specified Simulink inport.

Example: `arDataElementName`

`arDataAccessMode` — Value of AUTOSAR data access mode
character vector

Variable that returns the value of the AUTOSAR data access mode mapped to the specified Simulink inport. The value can be `ImplicitReceive`, `ExplicitReceive`, `QueuedExplicitReceive`, `ErrorStatus`, `ModeReceive`, `IsUpdated`, `EndToEndRead`, or `ExplicitReceiveByVal`

Example: `arDataAccessMode`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `mapInport`

Topics

"Map Inports and Outports to AUTOSAR Sender-Receiver Ports and Data Elements"
"Configure AUTOSAR Sender-Receiver Communication"
"Configure AUTOSAR Queued Sender-Receiver Communication"
"Map Inports and Outports to AUTOSAR Service Ports and Events"
"Model AUTOSAR Adaptive Service Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getInternalDataPackaging

Package: `autosar.api`

Get default internal data packaging for AUTOSAR component model

Syntax

```
pkgSetting = getInternalDataPackaging(slMap)
```

Description

`pkgSetting = getInternalDataPackaging(slMap)` returns the default data packaging setting used for internal data stores, signals, and states in the generated code for an AUTOSAR component model.

Default packaging options differ depending on whether the component model instantiates an AUTOSAR software component once or multiple times. Multi-instance software components can generate reentrant, reusable functions. See "Multi-Instance Components" for more information.

Setting values are:

- For single-instance models:
  - `Default` — Accept the default internal data packaging provided by the software. Use `Default` for submodels referenced from AUTOSAR component models.
  - `PrivateGlobal` — Package internal variable data without a `struct` object and make it private (visible only to *`model`*`.c`).
  - `PrivateStructure` — Package internal variable data in a `struct` object and make it private (visible only to *`model`*`.c`).
  - `PublicGlobal` — Package internal variable data without a `struct` object and make it public (`extern` declaration in *`model`*`.h`).
  - `PublicStructure` — Package internal variable data in a `struct` object and make it public (`extern` declaration in *`model`*`.h`).
- For multi-instance models:
  - `Default` — Accept the default internal data packaging provided by the software. Use `Default` for submodels referenced from AUTOSAR component models.
  - `CTypedPerInstanceMemory` — Package internal variable data for each instance of an AUTOSAR software component to use C-typed per-instance memory in a `struct` object and make it public (declaration in *`model`*`.h`).

If the data packaging setting is `PrivateGlobal` or `PrivateStructure`, building the model generates the header file *`model`*`_private.h`, even when the model configuration parameter **File packaging format** is set to `Compact`.

If the model configuration option **Generate separate internal data per entry-point function** is set for the AUTOSAR model, task-based internal data grouping overrides the AUTOSAR internal data packaging setting. However, the AUTOSAR setting determines the public or private visibility of the generated internal data groups.

Examples

Get Default Internal Packaging Setting for AUTOSAR Model

Return and modify the default data packaging setting used for internal variables in the generated code for the AUTOSAR component model.

```
hModel = 'autosar_swc';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);
pkgSetting1 = getInternalDataPackaging(slMap)
setInternalDataPackaging(slMap,'PrivateStructure')
pkgSetting2 = getInternalDataPackaging(slMap)
```

```
pkgSetting1 =
    'Default'

pkgSetting2 =
    'PrivateStructure'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`, where `model` is a handle, character vector, or string scalar representing the model name.

Output Arguments

`pkgSetting` — Default internal data packaging setting

character vector

Default internal data packaging setting used for internal variables in the generated code for the AUTOSAR component model, returned as character vector. Setting values for single-instance models can be `Default`, `PrivateGlobal`, `PrivateStructure`, `PublicGlobal`, or `PublicStructure`. Setting values for multi-instance models can be `Default` or `CTypedPerInstanceMemory`.

Version History

Introduced in R2021a

See Also

`setInternalDataPackaging` | `autosar.api.getSimulinkMapping`

Topics

"Map AUTOSAR Elements for Code Generation"
"AUTOSAR Component Configuration"

getOutport

Package: autosar.api

Get AUTOSAR mapping information for Simulink outport

Syntax

[arPortName,arDataElementName,arDataAccessMode] = getOutport(slMap, slPortName)

Description

[arPortName,arDataElementName,arDataAccessMode] = getOutport(slMap, slPortName) returns the values of the AUTOSAR provider port arPortName, AUTOSAR data element arDataElementName, and AUTOSAR data access mode arDataAccessMode mapped to Simulink outport slPortName.

Examples

Get AUTOSAR Mapping Information for Model Outport

Get AUTOSAR mapping information for a model outport in the example model autosar_swc_expfcns. The model has an outport named PPort_DE1.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
[arPortName,arDataElementName,arDataAccessMode]=getOutport(slMap,'PPort_DE1')
```

```
arPortName =
PPort

arDataElementName =
DE1

arDataAccessMode =
ImplicitSend
```

Input Arguments

slMap — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *slMap* = autosar.api.getSimulinkMapping(*model*). *model* is a handle, character vector, or string scalar representing the model name.

Example: slMap

slPortName — Name of model outport

character vector | string scalar

Name of the model outport for which to return AUTOSAR mapping information.

Example: `'Output'`

Output Arguments

`arPortName` — Name of AUTOSAR port
character vector

Variable that returns the name of the AUTOSAR port mapped to the specified Simulink outport.

Example: `arPortName`

`arDataElementName` — Name of AUTOSAR data element
character vector

Variable that returns the name of the AUTOSAR data element mapped to the specified Simulink outport.

Example: `arDataElementName`

`arDataAccessMode` — Value of AUTOSAR data access mode
character vector

Variable that returns the value of the AUTOSAR data access mode mapped to the specified Simulink outport. The value can be `ImplicitSend`, `ImplicitSendByRef`, `ExplicitSend`, `EndToEndWrite`, `ModeSend`, or `QueuedExplicitSend`.

Example: `arDataAcessMode`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `mapOutport`

Topics

"Map Inports and Outports to AUTOSAR Sender-Receiver Ports and Data Elements"
"Configure AUTOSAR Sender-Receiver Communication"
"Configure AUTOSAR Queued Sender-Receiver Communication"
"Map Inports and Outports to AUTOSAR Service Ports and Events"
"Model AUTOSAR Adaptive Service Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getParameter

Package: `autosar.api`

Get AUTOSAR mapping information for Simulink model workspace parameter

Syntax

```
arValue = getParameter(slMap,slParameter)
arValue = getParameter(slMap,slParameter,arProperty)
```

Description

`arValue = getParameter(slMap,slParameter)` returns the type of AUTOSAR parameter mapped to Simulink model workspace parameter `slParameter`. AUTOSAR parameter types include `SharedParameter`, `PerInstanceParameter`, `ConstantMemory`, and `PortParameter`.

`arValue = getParameter(slMap,slParameter,arProperty)` returns the value of property `arProperty` for the AUTOSAR parameter to which model workspace parameter `slParameter` is mapped.

Examples

Get AUTOSAR Mapping Information for Simulink Model Workspace Parameters

Get AUTOSAR mapping and property information for Simulink model workspace parameters K and INC in example model `autosar_swc_counter`.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

mapParameter(slMap,'K','SharedParameter')
arMappedTo = getParameter(slMap,'K')
arValue = getParameter(slMap,'K','SwCalibrationAccess')

mapParameter(slMap,'INC','ConstantMemory','SwCalibrationAccess','ReadOnly')
arMappedTo = getParameter(slMap,'INC')
arValue = getParameter(slMap,'INC','SwCalibrationAccess')
```

```
arMappedTo =
    'SharedParameter'

arValue =
    'ReadWrite'

arMappedTo =
    'ConstantMemory'

arValue =
    'ReadOnly'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *slMap* = autosar.api.getSimulinkMapping(*model*). *model* is a handle, character vector, or string scalar representing the model name.

Example: slMap

slParameter — Simulink model workspace parameter
character vector | string scalar

Name of Simulink model workspace parameter for which to return AUTOSAR mapping information.

Example: 'INC'

arProperty — AUTOSAR property
character vector | string scalar

Name of AUTOSAR parameter property. Valid property names include SwAddrMethod, SwCalibrationAccess, DisplayFormat, and LongName. For ConstantMemory, you can also specify C type qualifier properties IsConst, IsVolatile, or Qualifier (AUTOSAR additional native type qualifier). For PortParameter, you can also specify Port or DataElement. For property descriptions, see mapParameter.

Example: 'SwCalibrationAccess'

Output Arguments

arValue — Value of AUTOSAR parameter type or property
character vector

Variable that returns either the type of the mapped AUTOSAR component parameter or the value of a parameter property.

Example: arValue

Version History

Introduced in R2018b

See Also

autosar.api.getSimulinkMapping | mapParameter

Topics

"Map Model Workspace Parameters to AUTOSAR Component Parameters"
"Map Submodel Parameters to AUTOSAR Component Parameters"
"Configure AUTOSAR Constant Memory"
"Configure AUTOSAR Shared or Per-Instance Parameters"
"Configure AUTOSAR Port Parameters for Communication with Parameter Component"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

getSignal

Package: autosar.api

Get AUTOSAR mapping information for Simulink block signal

Syntax

```
arValue = getSignal(slMap,slPortHandle)
arValue = getSignal(slMap,slPortHandle,arProperty)
```

Description

`arValue = getSignal(slMap,slPortHandle)` returns the type of AUTOSAR variable mapped to the named or test-pointed Simulink block signal associated with outport port handle `slPortHandle`. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory`.

`arValue = getSignal(slMap,slPortHandle,arProperty)` returns the value of property `arProperty` for the AUTOSAR variable to which the Simulink block signal is mapped.

Examples

Get AUTOSAR Mapping Information for Simulink Block Signals

Get AUTOSAR mapping and property information for the Simulink block signals for blocks `RelOpt` and `Sum` in example model `autosar_swc_counter`.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
mapSignal(slMap,outportHandle,'StaticMemory')
arMappedTo = getSignal(slMap,outportHandle)
arValue = getSignal(slMap,outportHandle,'SwCalibrationAccess')

portHandles = get_param('autosar_swc_counter/Sum','portHandles');
outportHandle = portHandles.Outport;
mapSignal(slMap,outportHandle,'ArTypedPerInstanceMemory',...
    'SwCalibrationAccess','ReadWrite')
arMappedTo = getSignal(slMap,outportHandle)
arValue = getSignal(slMap,outportHandle,'SwCalibrationAccess')
```

```
arMappedTo =
    'StaticMemory'

arValue =
    'ReadOnly'

arMappedTo =
    'ArTypedPerInstanceMemory'
```

```
arValue =
    'ReadWrite'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap =`* `autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortHandle` — Simulink outport port handle for a block signal

handle

Outport port handle for a named or test-pointed Simulink block signal to return AUTOSAR mapping information for. Use MATLAB commands to construct the outport port handle. For example, for a Relational Operator block named `RelOpt`:

```
portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
```

Example: `outportHandle`

`arProperty` — AUTOSAR property

character vector | string scalar

Name of AUTOSAR variable property. Valid property names include `ShortName`, `SwAddrMethod`, `SwCalibrationAccess`, `DisplayFormat`, and `LongName`. For `StaticMemory`, you can also specify C type qualifier properties `IsVolatile` or `Qualifier` (AUTOSAR additional native type qualifier). For property descriptions, see `mapSignal`.

Example: `'SwCalibrationAccess'`

Output Arguments

`arValue` — Value of AUTOSAR variable type or property

character vector

Variable that returns either the type of the mapped AUTOSAR variable or the value of a variable property.

Example: `arValue`

Version History

Introduced in R2018b

See Also

`autosar.api.getSimulinkMapping` | `addSignal` | `mapSignal` | `removeSignal`

Topics

"Map Block Signals and States to AUTOSAR Variables"

“Map Submodel Signals and States to AUTOSAR Variables”
“Configure AUTOSAR Per-Instance Memory”
“Configure AUTOSAR Static Memory”
“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

getState

Package: `autosar.api`

Get AUTOSAR mapping information for Simulink block state

Syntax

```
arValue = getState(slMap,slStateOwnerBlock)
arValue = getState(slMap,slStateOwnerBlock,slState)
arValue = getState(slMap,slStateOwnerBlock,slState,arProperty)
```

Description

`arValue = getState(slMap,slStateOwnerBlock)` returns the type of AUTOSAR variable mapped to the Simulink block state associated with state owner block `slStateOwnerBlock`. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory`.

`arValue = getState(slMap,slStateOwnerBlock,slState)` returns the type of AUTOSAR variable mapped to Simulink state `slState` associated with state owner block `slStateOwnerBlock`. Specify a nonempty `slState` argument only for blocks with multiple states.

`arValue = getState(slMap,slStateOwnerBlock,slState,arProperty)` returns the value of property `arProperty` for the AUTOSAR variable to which the Simulink block state is mapped.

Examples

Get AUTOSAR Mapping Information for Simulink Block State

Get AUTOSAR mapping and property information for the Simulink block state for Unit Delay block `X` in example model `autosar_swc_counter`. The state owner block has one state.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

mapState(slMap,'autosar_swc_counter/X','','ArTypedPerInstanceMemory',...
    'SwCalibrationAccess','ReadWrite')
arMappedTo = getState(slMap,'autosar_swc_counter/X')
arValue = getState(slMap,'autosar_swc_counter/X','','SwCalibrationAccess')

arMappedTo =
    'ArTypedPerInstanceMemory'

arValue =
    'ReadWrite'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `=` `autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slStateOwnerBlock` — Simulink state owner block handle or path
handle | character vector | string scalar

Handle or path to Simulink state owner block to return AUTOSAR mapping information for.

Example: `'autosar_swc_counter/X'`

`slState` — Simulink state
character vector | string scalar

Name of Simulink state associated with state owner block `slStateOwnerBlock`. Specify a nonempty state name only for blocks with multiple states. If `slState` is empty, the function returns mapping information for the first state in the block.

Example: `''`

`arProperty` — AUTOSAR property
character vector | string scalar

Name of AUTOSAR variable property. Valid property names include `ShortName`, `SwAddrMethod`, `SwCalibrationAccess`, `DisplayFormat`, and `LongName`. For `StaticMemory`, you can also specify C type qualifier properties `IsVolatile` or `Qualifier` (AUTOSAR additional native type qualifier). For property descriptions, see `mapState`.

Example: `'SwCalibrationAccess'`

Output Arguments

`arValue` — Value of AUTOSAR variable type or property
character vector

Variable that returns either the type of the mapped AUTOSAR variable or the value of a variable property.

Example: `arValue`

Version History

Introduced in R2018b

See Also

`autosar.api.getSimulinkMapping` | `mapState`

Topics

“Map Block Signals and States to AUTOSAR Variables”
“Map Submodel Signals and States to AUTOSAR Variables”
“Configure AUTOSAR Per-Instance Memory”
“Configure AUTOSAR Static Memory”
“AUTOSAR Property and Map Function Examples”

“AUTOSAR Component Configuration”

getXmlOptions

Package: `autosar.arch`

Get XML option for AUTOSAR architecture model

Syntax

`pValue = getXmlOptions(archModel,property)`

Description

`pValue = getXmlOptions(archModel,property)` returns the current value `pValue` of XML option `property` in architecture model `archModel`. The `archModel` argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. For more information about XML options, see "Configure AUTOSAR XML Options" for classic architecture modeling and "Configure AUTOSAR Adaptive XML Options" for adaptive architecture modeling.

Examples

Get Value of XML Option `DataTypePackage` for AUTOSAR Architecture Model

For a new AUTOSAR architecture model, get the initial value of the AUTOSAR XML data type package path.

```
archModel = autosar.arch.createModel('MyArchModel');
pValue = getXmlOptions(archModel,'DataTypePackage')
```

```
pValue =
    '/DataTypes'
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model for which to return the current value of an XML option value. The argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`.

Example: `archModel`

`property` — XML option
character vector | string scalar

XML option for which to return a value.

For more information about XML options, see "Configure AUTOSAR XML Options" for classic architecture modeling and "Configure AUTOSAR Adaptive XML Options" for adaptive architecture modeling..

Example: `'DataTypePackage'`

Output Arguments

`pValue` — XML option value
value of option

Returns the value of the specified XML option of the specified AUTOSAR architecture model.

Version History
Introduced in R2020a

See Also
`export` | `setXmlOptions`

Topics
"Configure AUTOSAR Architecture Model Programmatically"
"Generate and Package AUTOSAR Composition XML Descriptions and Component Code"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

importFromARXML

Package: `autosar.arch`

Import composition from ARXML files into AUTOSAR architecture model

Syntax

```
importFromARXML(archModel,arxmlInput,compQName)
importFromARXML(archModel,arxmlInput,compQName,Name,Value)
```

Description

`importFromARXML(archModel,arxmlInput,compQName)` imports composition `compQName` from `arxmlInput` into architecture model `archModel`. The `archModel` argument is an architecture model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. Composition import requires an open AUTOSAR architecture model with no functional content.

`importFromARXML(archModel,arxmlInput,compQName,Name,Value)` specifies additional import options with one or more `Name,Value` pair arguments. You can specify:

- Whether to include or exclude AUTOSAR software components, which define composition behavior. By default, the import includes components within the composition.
- Simulink data dictionary in which to place data objects for imported AUTOSAR data types.
- Names of existing Simulink behavior models to link to imported AUTOSAR software components.
- Component options to apply when creating Simulink behavior models for imported AUTOSAR software components. For example, how to model periodic runnables, or a `PredefinedVariant` or `SwSystemconstantValueSets` with which to resolve component variation points.

Examples

Import AUTOSAR Composition to Architecture Model

This example:

1. Creates AUTOSAR architecture model `myArchModel`.
2. Imports software composition `/Company/Components/ThrottlePositionControlComposition` from AUTOSAR example file `ThrottlePositionControlComposition.arxml` into the architecture model.

The ARXML file is located at `*matlabroot*/examples/autosarblockset/data`, which is on the default MATLAB search path.

```
% Create AUTOSAR architecture model
modelName = "myArchModel";
archModel = autosar.arch.createModel(modelName);

% Import composition from file ThrottlePositionControlComposition.arxml
importerObj = arxml.importer("ThrottlePositionControlComposition.arxml");  % Parse ARXML
```

```
importFromARXML(archModel,importerObj,...
  "/Company/Components/ThrottlePositionControlComposition");

Creating model 'ThrottlePositionSensor' for component 1 of 5:
  /Company/Components/ThrottlePositionSensor
Creating model 'ThrottlePositionMonitor' for component 2 of 5:
  /Company/Components/ThrottlePositionMonitor
Creating model 'Controller' for component 3 of 5:
  /Company/Components/Controller
Creating model 'AccelerationPedalPositionSensor' for component 4 of 5:
  /Company/Components/AccelerationPedalPositionSensor
Creating model 'ThrottlePositionActuator' for component 5 of 5:
  /Company/Components/ThrottlePositionActuator
Importing composition 1 of 1:
  /Company/Components/ThrottlePositionControlComposition
```

Import AUTOSAR Composition and Link Existing Component Models

This example shows the function call syntax to:

1. Create an AUTOSAR architecture model with no functional content.
2. Import AUTOSAR software composition `/pkg/rootComposition` from a file named `mySWCs.arxml` into the architecture model.
3. For software components `mySwc1` and `mySwc2` contained within the composition, link existing Simulink component models rather than creating new ones.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Import composition from ARXML file and link existing component models
importFromARXML(archModel,'mySWCs.arxml','/pkg/rootComposition',...
  'ComponentModels',{'mySwc1','mySwc2'})
```

Import AUTOSAR Composition and Use Component `PredefinedVariant`

This example shows the function call syntax to:

1. Create an AUTOSAR architecture model with no functional content.
2. Import AUTOSAR software composition `/CompositionType/myComposition` from a file named `myComposition.arxml` into the architecture model.
3. For each software component contained within the composition, at component model creation time, use `PredefinedVariant` Senior to resolve variation points in the component.

```
% Create AUTOSAR architecture model
modelName = "myArchModel";
archModel = autosar.arch.createModel(modelName);

% Import composition from ARXML file and use PredefinedVariant for components
importerObj = arxml.importer("MyComposition.arxml"); % Import AUTOSAR information
importFromARXML(archModel,importerObj,"/CompositionType/myComposition",...
  "PredefinedVariant","/pkg/body/Variants/Senior"););
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model into which to import the specified composition. The argument is an architecture model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`.

Example: `archModel`

`arxmlInput` — `arxml.importer` object or ARXML file names
handle | character vector | string scalar | cell array of character vectors | string array

ARXML files from which to import the specified composition, specified as one of the following:

- A handle to AUTOSAR information imported from ARXML files, previously returned by *`importerObj`* `= arxml.importer(`*`arxmlFiles`*`)`.
- One or more ARXML file names.

Example: `importerObj`, `"myComposition.arxml"`

`compQName` — Composition path
character vector | string scalar | cell array of character vectors | string array

Absolute short-name path (qualified name) of the composition to import into the specified composition or architecture model.

Example: `"/CompositionType/myComposition"`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'DataDictionary','ardata.sldd'` directs the importer to place data objects corresponding to imported AUTOSAR data types in the specified Simulink data dictionary.

`ComponentModels` — Simulink component models
cell array of character vectors | string array

Names of existing atomic software component models to link when creating a Simulink representation of the composition. For components contained within the composition, link the specified component behavior models instead of creating new ones.

Example: `'ComponentModels',{'mySwc1','mySwc2'}`

`DataDictionary` — Simulink data dictionary
character vector | string scalar

Simulink data dictionary in which to place data objects corresponding to imported AUTOSAR data types. If the specified dictionary does not exist, the importer creates it. The composition and its components are then associated with that data dictionary.

Example: `'DataDictionary','ardata.sldd'`

`ExcludeInternalBehavior` — Suppress component import
`false` (default) | `true`

Specify whether to allow (default) or suppress the import of software components that define the behavior of the composition. If component import is suppressed (`true`), the import still links models specified by the `ComponentModels` argument.

Example: `'ExcludeInternalBehavior',true`

`ModelPeriodicRunnablesAs` — For imported components, subsystem type for periodic runnables
`'AtomicSubsystem'` (default) | `'FunctionCallSubsystem'` | `'Auto'`

By default, when importing a software component contained within a composition, `importFromARXML` imports AUTOSAR periodic runnables found in the ARXML files and models them as atomic subsystems with periodic rates. If conditions prevent use of atomic subsystems, the importer throws an error.

To model periodic runnables as function-call subsystems with periodic rates, specify `FunctionCallSubsystem`.

If you specify `Auto`, the importer attempts to model periodic runnables as atomic subsystems. If conditions prevent use of atomic subsystems, the importer models periodic runnables as function-call subsystems.

For more information, see “Import AUTOSAR Software Component with Multiple Runnables”.

Example: `'ModelPeriodicRunnablesAs','AtomicSubsystem'`

`PredefinedVariant` — For imported components, path to AUTOSAR predefined variant
character vector | string scalar

Path to a `PredefinedVariant` defined in the ARXML files. A `PredefinedVariant` describes a combination of system constant values among potentially multiple valid combinations to apply to an AUTOSAR software component. Use this property to resolve variation points in the AUTOSAR software component at component model creation time. If specified, the importer uses the `PredefinedVariant` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see “Control AUTOSAR Variants with Predefined Value Combinations”.

Example: `'PredefinedVariant','/pkg/body/Variants/Senior'`

`SystemConstValueSets` — For imported components, paths to one or more AUTOSAR system constant value sets
cell array of character vectors | string array

Paths to one or more `SystemConstValueSets` defined in the ARXML files. A `SystemConstValueSet` specifies a set of system constant values to apply to an AUTOSAR software component. Use this property to resolve variation points in the AUTOSAR software component at component model creation time. If specified, the importer uses the `SystemConstValueSets` to initialize `SwSystemconst` data that serves as input to control variation points.

For more information, see “Control AUTOSAR Variants with Predefined Value Combinations”.

Example: `'SystemConstValueSets','{'/pkg/body/SystemConstantValues/A','/pkg/body/SystemConstantValues/B'}'`

Version History

Introduced in R2020b

See Also

`addComponent` | `addComposition` | `addPort` | `connect` | `destroy` | `layout`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Import AUTOSAR Composition from ARXML"
"Import AUTOSAR Composition into Architecture Model"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

layout

Package: autosar.arch

Arrange AUTOSAR composition or architecture model layout based on heuristics

Syntax

layout(archCM)

Description

layout(archCM) automatically arranges the modeling elements inside composition or architecture model archCM based on a set of heuristics. The archM argument is a composition or architecture model handle returned by a previous call to addComposition, autosar.arch.createModel, or autosar.arch.loadModel.

Examples

Arrange Layout After Adding Blocks to AUTOSAR Architecture Model

In an AUTOSAR architecture model, add AUTOSAR components, and then update the arrangement of elements in the model layout.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add components and auto-arrange layout
addComponent(archModel,{'SWC1','SWC2','SWC3'});
layout(archModel);
```

Input Arguments

archCM — Composition or architecture model

handle

AUTOSAR composition or architecture model in which to arrange modeling elements based on a set of heuristics. The argument is a composition or architecture model handle returned by a previous call to addComposition, autosar.arch.createModel, or autosar.arch.loadModel.

Example: archModel

Version History

Introduced in R2020a

See Also

addComponent | addComposition | addPort | connect | destroy | importFromARXML

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Add and Connect AUTOSAR Classic Components and Compositions"
"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

linkToModel

Package: `autosar.arch`

Link AUTOSAR architecture component to Simulink implementation model

Syntax

```
linkToModel(component,modelName)
```

Description

`linkToModel(component,modelName)` links the specified AUTOSAR architecture component to existing Simulink implementation model `modelName`. The component inherits the interface of the linked implementation model. The `component` argument is a component handle returned by a previous call to `addComponent`.

Examples

Link AUTOSAR Architecture Component to Implementation Model

In an architecture model, link an AUTOSAR component to a Simulink® implementation model. The component inherits the interface of the linked implementation model.

Create AUTOSAR architecture model and add component inside the architecture model

```
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);
component = addComponent(archModel,'SWC1');
```

Load 'autosar_tpc_controller' model and programmatically set the XML Options Source to 'Inherit'.

```
load_system('autosar_tpc_controller.slx');
arProps = autosar.api.getAUTOSARProperties('autosar_tpc_controller');
set(arProps,'XmlOptions','XmlOptionsSource','Inherit');
```

Link to Simulink implementation model and inherit its interface

```
linkToModel(component,'autosar_tpc_controller');
```

Input Arguments

`component` — Architecture component
handle

AUTOSAR architecture component to link to the specified Simulink implementation model. The argument is a component handle returned by a previous call to `addComponent`.

Example: `component`

`modelName` — Implementation model name
character vector | string scalar

Name of an existing Simulink implementation model to link from the specified AUTOSAR architecture component.

Example: `'autosar_tpc_controller'`

Version History

Introduced in R2020a

See Also

`createModel`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Define AUTOSAR Component Behavior by Creating or Linking Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

mapDataStore

Package: autosar.api

Map Simulink data store to AUTOSAR variable

Syntax

```
mapDataStore(slMap,slBlockHandle,arVarType)
mapDataStore(slMap,slBlockHandle,arVarType,Name,Value)
```

Description

`mapDataStore(slMap,slBlockHandle,arVarType)` maps Simulink data store memory block `slBlockHandle` to an AUTOSAR variable of type `arVarType` for AUTOSAR run-time calibration. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory` for classic models and `Persistency` for adaptive models.

`mapDataStore(slMap,slBlockHandle,arVarType,Name,Value)` specifies additional properties for an AUTOSAR `ArTypedPerInstanceMemory`, `StaticMemory`, or `Persistency` variable by using one or more `Name,Value` pair arguments.

Examples

Set AUTOSAR Mapping Information for Simulink Data Stores

Set AUTOSAR mapping and property information for the Simulink data store memory block `Data Store Memory` in example model `autosar_bsw_sensor1`.

```
hModel = 'autosar_bsw_sensor1';
hBlock = 'autosar_bsw_sensor1/Data Store Memory';

openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);
mapDataStore(slMap,hBlock,'ArTypedPerInstanceMemory','NeedsNVRAMAccess','true');
arMappedTo = getDataStore(slMap,hBlock)
arNvram = getDataStore(slMap,hBlock,'NeedsNVRAMAccess')
```

```
arMappedTo =
    'ArTypedPerInstanceMemory'

arNvram =
    'true'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* = `autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slBlockHandle` — Simulink data store memory block handle
handle

Name or handle of Simulink data store memory block that you set AUTOSAR mapping information for.

Example: `'autosar_bsw_sensor1/Data Store Memory'`

`arVarType` — Type of AUTOSAR variable
character vector | string scalar

Type of AUTOSAR variable that you want to map the specified Simulink data store to. Valid AUTOSAR variable types include `ArTypedPerInstanceMemory`, `StaticMemory`, and `Auto` for classic models. Valid AUTOSAR variable types include `Persistency` and `Auto` for adaptive models. To accept software mapping defaults, specify `Auto`.

Example: `'StaticMemory'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'SwCalibrationAccess','ReadWrite'` specifies read-write access to the variable for run-time calibration.

`DataElement` — Parameter interface data element (`Persistency` only)
character vector | string scalar

Specify the data element of the persistency port associated with the AUTOSAR adaptive variable. `DataElement` can be set with `Port` only.

Example: `'Port','Perport','DataElement','Delement1'`

`DisplayFormat` — Calibration display format
character vector | string scalar

Specify display format for the AUTOSAR variable. AUTOSAR display format specifications control the width and precision display for calibration and measurement data. For more information, see "Configure DisplayFormat".

Example: `'DisplayFormat','%2.6f'`

`IsVolatile` — C `volatile` type qualifier flag (`StaticMemory` only)
character vector | string scalar

Specify whether to include C type qualifier `volatile` in generated code for the AUTOSAR variable.

Example: `'IsVolatile','true'`

`NeedsNVRAMAccess` — `NeedsNVRAMAccess` flag (`ArTypedPerInstanceMemory` only)
character vector | string scalar

Specify whether the AUTOSAR variable requires access to nonvolatile RAM on a processor. Specify `true` to configure the per-instance memory to be a mirror block for a specific NVRAM block. Specify

RestoreAtStart to true to read data from memory at the beginning of a program. Specify StoreAtShutdown to true to write data to memory at the end of a program.

Example: 'NeedsNVRAMAccess','true', 'RestoreAtStart', 'true', 'StoreAtShutdown', 'true'

Port — Parameter receiver port (Persistency only)
character vector | string scalar

Specify the persistency port to associate with the AUTOSAR adaptive variable. Port can be set with DataElement only.

Example: 'Port','Perport','DataElement','Delement1'

Qualifier — C AdditionalNativeTypeQualifier flag (StaticMemory only)
character vector | string scalar

Optionally specify an AUTOSAR additional native type qualifier to include in generated code for the AUTOSAR variable.

Example: 'Qualifier','test_qualifier'

ShortName — Variable short name
character vector | string scalar

Specify short name for the AUTOSAR variable. If unspecified, ARXML export automatically generates a short name, which can differ from the data store name.

Example: 'ShortName','LowSetPoint'

SwAddrMethod — Name of variable SwAddrMethod
character vector | string scalar

Specify a SwAddrMethod name that is valid for the AUTOSAR variable. Code generation uses the SwAddrMethod name to group AUTOSAR variables in a memory section for access by calibration and measurement tools. For a list of valid SwAddrMethod values for the variable, see the Code Mappings editor, **Data Stores** tab. For more information, see “Configure SwAddrMethod”.

Example: 'SwAddrMethod','VAR'

SwCalibrationAccess — Calibration access mode
character vector | string scalar

Specify how calibration and measurement tools can access the AUTOSAR variable. Valid access values include ReadOnly, ReadWrite, and NotAccessible. For more information, see “Configure SwCalibrationAccess”.

Example: 'SwCalibrationAccess','ReadWrite'

LongName — Variable long name
character vector | string scalar

Specify a headline for the AUTOSAR variable.

Example: 'LongName','Position of Engine Throttle'

Version History

Introduced in R2019a

See Also

`autosar.api.getSimulinkMapping` | `getDataStore` | Data Store Memory

Topics

"Map Data Stores to AUTOSAR Variables"
"Map Submodel Data Stores to AUTOSAR Variables"
"Map Data Stores to AUTOSAR Persistent Memory Ports and Data Elements"
"Configure AUTOSAR Per-Instance Memory"
"Configure AUTOSAR Static Memory"
"Model AUTOSAR Adaptive Persistent Memory"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

mapDataTransfer

Package: `autosar.api`

Map Simulink data transfer to AUTOSAR inter-runnable variable

Syntax

`mapDataTransfer(slMap,slDataTransfer,arIrvName,arDataAccessMode)`

Description

`mapDataTransfer(slMap,slDataTransfer,arIrvName,arDataAccessMode)` maps the Simulink data transfer line or Rate Transition block `slDataTransfer` to AUTOSAR inter-runnable variable `arIrvName` and AUTOSAR data access mode `arDataAccessMode`.

Examples

Set AUTOSAR Mapping Information for Simulink® Data Transfer Line

Set AUTOSAR mapping information for a data transfer line in the example model `autosar_swc_expfcns`. The model has data transfer lines named `irv1`, `irv2`, `irv3`, and `irv4`. This example changes the AUTOSAR data access mode for `irv4` from `Implicit` to `Explicit`.

```
hModel = 'autosar_swc_expfcns';
open_system(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
mapDataTransfer(slMap,'irv4','IRV4','Explicit');
[arIrvName,arDataAccessMode]=getDataTransfer(slMap,'irv4')
```

```
arIrvName =
'IRV4'

arDataAccessMode =
'Explicit'
```

Set AUTOSAR Mapping Information for Rate Transition Block

Set AUTOSAR mapping information for a Rate Transition block in the example model `mMultitasking_4rates`. The model has Rate Transition blocks named `RateTransition`, `RateTransition1`, and `RateTransition2`, which are located at the top level of the model. This example changes the AUTOSAR data access mode for `RateTransition` from `Implicit` to `Explicit`.

```
hModel = 'mMultitasking_4rates';
open_system(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
mapDataTransfer(slMap,'mMultitasking_4rates/RateTransition','IRV1','Explicit');
[arIrvName,arDataAccessMode]=getDataTransfer(slMap,'mMultitasking_4rates/RateTransition')
```

```
arIrvName =
'IRV1'

arDataAccessMode =
'Explicit'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slDataTransfer` — Simulink data transfer line name or Rate Transition full block path

character vector | string scalar

Name of the Simulink data transfer line or full block path to the Rate Transition block for which to set AUTOSAR mapping information.

Example: `'irv4'`

Example: `'myModel/RateTransition2'`

`arIrvName` — Name of AUTOSAR inter-runnable variable

character vector | string scalar

Name of the AUTOSAR inter-runnable variable to which to map the specified Simulink data transfer.

Example: `'IRV4'`

`arDataAccessMode` — Value of AUTOSAR data access mode

character vector | string scalar

Value of the AUTOSAR data access mode to which to map the specified Simulink data transfer. The value can be `Implicit` or `Explicit`.

Example: `'Explicit'`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `getDataTransfer`

Topics

“Map Data Transfers to AUTOSAR Inter-Runnable Variables”
“Model AUTOSAR Component Behavior”
“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

mapFunction

Package: autosar.api

Map Simulink entry-point function to AUTOSAR runnable and software address methods

Syntax

mapFunction(slMap,slEntryPointFunction,arRunnableName)
mapFunction(slMap,slEntryPointFunction,arRunnableName,Name,Value)

Description

mapFunction(slMap,slEntryPointFunction,arRunnableName) maps Simulink entry-point function slEntryPointFunction to AUTOSAR runnable arRunnableName.

mapFunction(slMap,slEntryPointFunction,arRunnableName,Name,Value) specifies additional properties for the AUTOSAR runnable by using one or more Name,Value pair arguments. You can specify software address methods (SwAddrMethods) for runnable function code and internal data.

Examples

Set AUTOSAR Mapping Information for Simulink Entry-Point Function

Set AUTOSAR mapping information for a Simulink entry-point function in the example model autosar_swc. The model has an initialize entry-point function named Runnable_Init and periodic entry-point functions named Runnable_1s and Runnable_2s.

```
hModel = 'autosar_swc';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
mapFunction(slMap,'Initialize','Runnable_Init');
arRunnableName=getFunction(slMap,'Initialize')
```

```
arRunnableName =
    'Runnable_Init'
```

Set AUTOSAR SwAddrMethods for Simulink Entry-Point Function

Set AUTOSAR SwAddrMethods for a Simulink entry-point function in the example model autosar_swc_counter. The model has a single-tasking periodic entry-point step function.

```
hModel = 'autosar_swc_counter';
openExample(hModel);

% Add SwAddrMethods myCODE and myVAR to the AUTOSAR component
arProps = autosar.api.getAUTOSARProperties(hModel);
addPackageableElement(arProps,'SwAddrMethod',...
    '/Company/Powertrain/DataTypes/SwAddrMethods','myCODE',...
    'SectionType','Code')
swAddrPaths = find(arProps,[],'SwAddrMethod','PathType','FullyQualified',...
    'SectionType','Code')
```

```
addPackageableElement(arProps,'SwAddrMethod',...
    '/Company/Powertrain/DataTypes/SwAddrMethods','myVAR',...
    'SectionType','Var')
swAddrPaths = find(arProps,[],'SwAddrMethod','PathType','FullyQualified',...
    'SectionType','Var')

% Set code generation parameter for runnable internal data SwAddrMethods
set_param(hModel,'GroupInternalDataByFunction','on')

% Map periodic function and internal data to myCODE and myVAR SwAddrMethods
slMap = autosar.api.getSimulinkMapping(hModel);
mapFunction(slMap,'Periodic','Runnable_Step',...
    'SwAddrMethod','myCODE','SwAddrMethodForInternalData','myVAR')

% Return AUTOSAR mapping information for periodic function
[arRunnableName,arRunnableSwAddrMethod,arInternalDataSwAddrMethod] = ...
    getFunction(slMap,'Periodic')

swAddrPaths =
  1×2 cell array
    {'/Company/Powertrain/DataTypes/SwAddrMethods/CODE'}
    {'/Company/Powertrain/DataTypes/SwAddrMethods/myCODE'}

swAddrPaths =
  1×2 cell array
    {'/Company/Powertrain/DataTypes/SwAddrMethods/VAR'}
    {'/Company/Powertrain/DataTypes/SwAddrMethods/myVAR'}

arRunnableName =
    'Runnable_Step'

arRunnableSwAddrMethod =
    'myCODE'

arInternalDataSwAddrMethod =
    'myVAR'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slEntryPointFunction` — Simulink entry-point function

character vector | string scalar

Simulink entry-point function for which to set AUTOSAR mapping information. The value format is based on the function type.

Function Type	Value
Initialize	`'Initialize'`.
Reset	`'Reset:slIdentifier'`, where *`slIdentifier`* is the name of a reset function in the model.
Terminate	`'Terminate'`.
Single-tasking periodic	`'Periodic'`.

Function Type	Value
Periodic (implicit task)	`'Periodic:slIdentifier'`, where *slIdentifier* is the corresponding period annotation, as displayed in the Timing Legend. For example, `'Periodic:D1'`.
Partition (explicit task)	`'Partition:slIdentifier'`, where *slIdentifier* is the partition name, as displayed in the Schedule Editor. For example, `'Partition:P1'`.
Exported	`'ExportedFunction:slIdentifier'`, where *slIdentifier* is the name of the Inport block that drives the control port of the function-call subsystem. For example: • `'ExportedFunction:Trigger_1s'` in example model `autosar_swc_slfcns` • `'ExportedFunction:FunctionTrigger'` in example model `autosar_swc_fcncalls`
Simulink function in client-server configuration	`'SimulinkFunction:slIdentifier'`, where *slIdentifier* is the name of a global Simulink function in the model. For example, `'SimulinkFunction:readData'` in the example model in “Configure AUTOSAR Server”.

Example: `'Periodic:D1'`

`arRunnableName` — Name of AUTOSAR runnable
character vector | string scalar

Name of AUTOSAR runnable to which to map the specified Simulink entry-point function object.

Example: `'Runnable_2s'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'SwAddrMethod','CODE'` specifies `SwAddrMethod` `CODE` for an AUTOSAR runnable function.

`SwAddrMethod` — Name of function `SwAddrMethod`
character vector | string scalar

Specify a `SwAddrMethod` name that is valid for the AUTOSAR function. Code generation uses the `SwAddrMethod` name to group AUTOSAR runnable functions in a memory section. For a list of valid `SwAddrMethod` values for the function, see the Code Mappings editor, **Entry-Point Functions** tab. For more information, see “Configure SwAddrMethod”.

Example: `'SwAddrMethod','CODE'`

`SwAddrMethodForInternalData` — Name of internal data `SwAddrMethod`
character vector | string scalar

Specify a `SwAddrMethod` name that is valid for the AUTOSAR internal data. Code generation uses the `SwAddrMethod` name to group AUTOSAR runnable internal data in a memory section. For a list of

valid `SwAddrMethod` values for the internal data, see the Code Mappings editor, **Entry-Point Functions** tab. For more information, see “Configure SwAddrMethod”.

Code generation for runnable internal data `SwAddrMethod`s requires setting the model configuration option **Code Generation** > **Interface** > **Generate separate internal data per entry-point function** (`GroupInternalDataByFunction`) to `on`.

Example: `'SwAddrMethodForInternalData','VAR'`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `getFunction`

Topics

“Map Entry-Point Functions to AUTOSAR Runnables”
“Configure AUTOSAR Runnables and Events”
“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

mapFunctionCaller

Package: autosar.api

Map Simulink function-caller block to AUTOSAR client port and operation

Syntax

`mapFunctionCaller(slMap,slFcnName,arPortName,arOperationName)`

Description

`mapFunctionCaller(slMap,slFcnName,arPortName,arOperationName)` maps the Simulink function-caller block for Simulink function `slFcnName` to AUTOSAR client port `arPortName` and AUTOSAR operation `arOperationName`.

If your model has multiple callers of Simulink function `slFcnName`, this function maps all of them to the AUTOSAR client port and operation.

Examples

Set AUTOSAR Mapping Information for Function Caller Block

Set AUTOSAR mapping information for a function-caller block in a model in which AUTOSAR client function invocation is being modeled. The model has a function-caller block for Simulink® function `readData`.

```
hModel = 'mControllerWithInterface_client';
open_system(hModel);
slMapC = autosar.api.getSimulinkMapping(hModel);
mapFunctionCaller(slMapC,'readData','cPort','readData');
[arPort,arOp] = getFunctionCaller(slMapC,'readData')
```

```
arPort =
'cPort'

arOp =
'readData'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slFcnName` — Name of Simulink function
character vector | string scalar

Name of the Simulink function for the function-caller block for which to set AUTOSAR mapping information.

Example: `'readData'`

`arPortName` — Name of AUTOSAR client port
character vector | string scalar

Name of the AUTOSAR client port to which to map the specified function-caller block.

Example: `'cPort'`

`arOperationName` — Name of AUTOSAR operation
character vector | string scalar

Name of the AUTOSAR operation to which to map the specified function-caller block.

Example: `'readData'`

Version History

Introduced in R2014b

See Also

`autosar.api.getSimulinkMapping` | `getFunctionCaller`

Topics

"Map Function Callers to AUTOSAR Client-Server Ports and Operations"
"Configure AUTOSAR Client-Server Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

mapInport

Package: `autosar.api`

Map Simulink inport to AUTOSAR port

Syntax

`mapInport(slMap,slPortName,arPortName,arDataElementName,arDataAccessMode)`

Description

`mapInport(slMap,slPortName,arPortName,arDataElementName,arDataAccessMode)` maps the Simulink inport `slPortName` to the AUTOSAR data element `arDataElementName` at AUTOSAR receiver port `arPortName`. The AUTOSAR data access mode for the receiver port is set to `arDataAccessMode`.

Examples

Set AUTOSAR Mapping Information for Model Inport

Set AUTOSAR mapping information for a model inport in the example model `autosar_swc_expfcns`. The model has an inport named `RPort_DE1`. This example changes the AUTOSAR data access mode for `RPort_DE1` from `ImplicitReceive` to `ExplicitReceive`.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
mapInport(slMap,'RPort_DE1','RPort','DE1','ExplicitReceive');
[arPortName,arDataElementName,arDataAccessMode]=getInport(slMap,'RPort_DE1')
```

```
arPortName =
RPort

arDataElementName =
DE1

arDataAccessMode =
ExplicitReceive
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortName` — Name of model inport
character vector | string scalar

Name of the model inport for which to set AUTOSAR mapping information.

Example: `'Input'`

`arPortName` — Name of AUTOSAR port
character vector | string scalar

Name of the AUTOSAR port to which to map the specified Simulink inport.

Example: `'Input'`

`arDataElementName` — Name of AUTOSAR data element
character vector | string scalar

Name of the AUTOSAR data element to which to map the specified Simulink inport.

Example: `'Input'`

`arDataAccessMode` — Value of AUTOSAR data access mode
character vector | string scalar

Value of the AUTOSAR data access mode to which to map the specified Simulink inport. The value can be `ImplicitReceive`, `ExplicitReceive`, `QueuedExplicitReceive`, `ErrorStatus`, `ModeReceive`, `IsUpdated`, `EndToEndRead`, or `ExplicitReceiveByVal`.

Example: `'ExplicitReceive'`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `getInport`

Topics

"Map Inports and Outports to AUTOSAR Sender-Receiver Ports and Data Elements"
"Configure AUTOSAR Sender-Receiver Communication"
"Configure AUTOSAR Queued Sender-Receiver Communication"
"Map Inports and Outports to AUTOSAR Service Ports and Events"
"Model AUTOSAR Adaptive Service Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

mapOutport

Package: `autosar.api`

Map Simulink outport to AUTOSAR port

Syntax

`mapOutport(slMap,slPortName,arPortName,arDataElementName,arDataAccessMode)`

Description

`mapOutport(slMap,slPortName,arPortName,arDataElementName,arDataAccessMode)` maps the Simulink outport `slPortName` to the AUTOSAR data element `arDataElementName` at AUTOSAR provider port `arPortName`. The AUTOSAR data access mode for the provider port is set to `arDataAccessMode`.

Examples

Set AUTOSAR Mapping Information for Model Outport

Set AUTOSAR mapping information for a model outport in the example model `autosar_swc_expfcns`. The model has an outport named `PPort_DE1`. This example changes the AUTOSAR data access mode for `PPort_DE1` from `ImplicitSend` to `ExplicitSend`.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
slMap=autosar.api.getSimulinkMapping(hModel);
mapOutport(slMap,'PPort_DE1','PPort','DE1','ExplicitSend');
[arPortName,arDataElementName,arDataAccessMode]=getOutport(slMap,'PPort_DE1')
```

```
arPortName =
PPort

arDataElementName =
DE1

arDataAccessMode =
ExplicitSend
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortName` — Name of model outport
character vector | string scalar

Name of the model outport for which to set AUTOSAR mapping information.

Example: `'Output'`

`arPortName` — Name of AUTOSAR port
character vector | string scalar

Name of the AUTOSAR port to which to map the specified Simulink outport.

Example: `'Output'`

`arDataElementName` — Name of AUTOSAR data element
character vector | string scalar

Name of the AUTOSAR data element to which to map the specified Simulink outport.

Example: `'Output'`

`arDataAccessMode` — Value of AUTOSAR data access mode
character vector | string scalar

Value of the AUTOSAR data access mode to which to map the specified Simulink outport. The value can be `ImplicitSend`, `ImplicitSendByRef`, `ExplicitSend`, `EndToEndWrite`, `ModeSend`, or `QueuedExplicitSend`.

Example: `'ExplicitSend'`

Version History

Introduced in R2013b

See Also

`autosar.api.getSimulinkMapping` | `getOutport`

Topics

"Map Inports and Outports to AUTOSAR Sender-Receiver Ports and Data Elements"
"Configure AUTOSAR Sender-Receiver Communication"
"Configure AUTOSAR Queued Sender-Receiver Communication"
"Map Inports and Outports to AUTOSAR Service Ports and Events"
"Model AUTOSAR Adaptive Service Communication"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

mapParameter

Package: autosar.api

Map Simulink model workspace parameter to AUTOSAR component parameter

Syntax

mapParameter(slMap,slParameter,arParamType)
mapParameter(slMap,slParameter,arParamType,Name,Value)

Description

mapParameter(slMap,slParameter,arParamType) maps the Simulink model workspace parameter slParameter to an AUTOSAR parameter of type arParamType for AUTOSAR run-time calibration. AUTOSAR parameter types include SharedParameter, PerInstanceParameter, ConstantMemory, and PortParameter.

mapParameter(slMap,slParameter,arParamType,Name,Value) specifies additional properties for an AUTOSAR SharedParameter, PerInstanceParameter, ConstantMemory, or PortParameter by using one or more Name,Value pair arguments.

Examples

Set AUTOSAR Mapping Information for Simulink Model Workspace Parameters

Set AUTOSAR mapping and property information for Simulink model workspace parameters K and INC in example model autosar_swc_counter.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

mapParameter(slMap,'K','SharedParameter')
arMappedTo = getParameter(slMap,'K')
arValue = getParameter(slMap,'K','SwCalibrationAccess')

mapParameter(slMap,'INC','ConstantMemory','SwCalibrationAccess','ReadOnly')
arMappedTo = getParameter(slMap,'INC')
arValue = getParameter(slMap,'INC','SwCalibrationAccess')
```

```
arMappedTo = 
    'SharedParameter'

arValue = 
    'ReadWrite'

arMappedTo = 
    'ConstantMemory'
```

```
arValue =
    'ReadOnly'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slParameter` — Name of Simulink model workspace parameter
character vector | string scalar

Name of the Simulink model workspace parameter for which to set AUTOSAR mapping information.

Example: `'INC'`

`arParamType` — Type of AUTOSAR parameter
character vector | string scalar

Type of AUTOSAR component parameter to which to map the specified Simulink model workspace parameter. Valid AUTOSAR parameter types include `SharedParameter`, `PerInstanceParameter`, `ConstantMemory`, `PortParameter`, and `Auto`. To accept software mapping defaults, specify `Auto`.

Example: `'SharedParameter'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'SwCalibrationAccess','ReadOnly'` specifies read-only access to the parameter for run-time calibration.

`DataElement` — Parameter interface data element (`PortParameter` only)
character vector | string scalar

Specify the name of a parameter interface data element configured in the AUTOSAR Dictionary.

Example: `'DataElement','ParamElement1'`

`DisplayFormat` — Calibration display format
character vector | string scalar

Specify display format for the AUTOSAR parameter. AUTOSAR display format specifications control the width and precision display for calibration and measurement data. For more information, see “Configure DisplayFormat”.

Example: `'DisplayFormat','%2.6f'`

`IsConst` — C `const` type qualifier flag (`ConstantMemory` only)
character vector | string scalar

Specify whether to include C type qualifier `const` in generated code for the AUTOSAR parameter.

Example: `'IsConst','true'`

`IsVolatile` — C `volatile` type qualifier flag (`ConstantMemory` only)
character vector | string scalar

Specify whether to include C type qualifier `volatile` in generated code for the AUTOSAR parameter.

Example: `'IsVolatile','true'`

`Port` — Parameter receiver port (`PortParameter` only)
character vector | string scalar

Specify the name of a parameter receiver port configured in the AUTOSAR Dictionary.

Example: `'Port','myParamPort'`

`Qualifier` — C `AdditionalNativeTypeQualifier` flag (`ConstantMemory` only)
character vector | string scalar

Optionally specify an AUTOSAR additional native type qualifier to include in generated code for the AUTOSAR parameter.

Example: `'Qualifier','test_qualifier'`

`SwAddrMethod` — Name of parameter `SwAddrMethod`
character vector | string scalar

Specify a `SwAddrMethod` name that is valid for the AUTOSAR parameter. Code generation uses the `SwAddrMethod` name to group AUTOSAR parameters in a memory section for access by calibration and measurement tools. For a list of valid `SwAddrMethod` values for the parameter, see the Code Mappings editor, **Parameters** tab. For more information, see “Configure SwAddrMethod”.

Example: `'SwAddrMethod','CONST'`

`SwCalibrationAccess` — Calibration access mode
character vector | string scalar

Specify how calibration and measurement tools can access the AUTOSAR parameter. Valid access values include `ReadOnly`, `ReadWrite`, and `NotAccessible`. For more information, see “Configure SwCalibrationAccess”.

Example: `'SwCalibrationAccess','ReadOnly'`

LongName — Parameter long name
character vector | string scalar

Specify a headline for the AUTOSAR parameter.

Example: `'LongName','Position of Engine Throttle'`

Version History

Introduced in R2018b

See Also

`autosar.api.getSimulinkMapping` | `getParameter`

Topics

"Map Model Workspace Parameters to AUTOSAR Component Parameters"
"Map Submodel Parameters to AUTOSAR Component Parameters"
"Configure AUTOSAR Constant Memory"
"Configure AUTOSAR Shared or Per-Instance Parameters"
"Configure AUTOSAR Port Parameters for Communication with Parameter Component"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

mapSignal

Package: autosar.api

Map Simulink block signal to AUTOSAR variable

Syntax

```
mapSignal(slMap,slPortHandle,arVarType)
mapSignal(slMap,slPortHandle,arVarType,Name,Value)
```

Description

`mapSignal(slMap,slPortHandle,arVarType)` maps the named or test-pointed Simulink block signal associated with outport port handle `slPortHandle` to an AUTOSAR variable of type `arVarType` for AUTOSAR run-time calibration. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory`.

`mapSignal(slMap,slPortHandle,arVarType,Name,Value)` specifies additional properties for an AUTOSAR `ArTypedPerInstanceMemory` or `StaticMemory` variable by using one or more `Name,Value` pair arguments.

Examples

Set AUTOSAR Mapping Information for Simulink Block Signals

Set AUTOSAR mapping and property information for the Simulink block signals for blocks `RelOpt` and `Sum` in example model `autosar_swc_counter`.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
mapSignal(slMap,outportHandle,'StaticMemory')
arMappedTo = getSignal(slMap,outportHandle)
arValue = getSignal(slMap,outportHandle,'SwCalibrationAccess')

portHandles = get_param('autosar_swc_counter/Sum','portHandles');
outportHandle = portHandles.Outport;
mapSignal(slMap,outportHandle,'ArTypedPerInstanceMemory',...
    'SwCalibrationAccess','ReadWrite')
arMappedTo = getSignal(slMap,outportHandle)
arValue = getSignal(slMap,outportHandle,'SwCalibrationAccess')

arMappedTo =
    'StaticMemory'

arValue =
    'ReadOnly'

arMappedTo =
    'ArTypedPerInstanceMemory'
```

```
arValue =
    'ReadWrite'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`. `model` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortHandle` — Simulink outport port handle for a block signal

handle

Outport port handle for a named or test-pointed Simulink block signal to set AUTOSAR mapping information for. Use MATLAB commands to construct the outport port handle. For example, for a Relational Operator block named `RelOpt`:

```
portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
```

Example: `outportHandle`

`arVarType` — Type of AUTOSAR variable

character vector | string scalar

Type of AUTOSAR variable to map the specified Simulink block signal to. Valid AUTOSAR variable types include `ArTypedPerInstanceMemory`, `StaticMemory`, and `Auto`. To accept software mapping defaults, specify `Auto`.

Example: `'StaticMemory'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'SwCalibrationAccess','ReadWrite'` specifies read-write access to the variable for run-time calibration.

`DisplayFormat` — Calibration display format

character vector | string scalar

Specify display format for the AUTOSAR variable. AUTOSAR display format specifications control the width and precision display for calibration and measurement data. For more information, see "Configure DisplayFormat".

Example: `'DisplayFormat','%2.6f'`

`IsVolatile` — C `volatile` type qualifier flag (`StaticMemory` only)

character vector | string scalar

Specify whether to include C type qualifier `volatile` in generated code for the AUTOSAR variable.

Example: `'IsVolatile','true'`

`Qualifier` — C `AdditionalNativeTypeQualifier` flag (`StaticMemory` only)
character vector | string scalar

Optionally specify an AUTOSAR additional native type qualifier to include in generated code for the AUTOSAR variable.

Example: `'Qualifier','test_qualifier'`

`ShortName` — Variable short name
character vector | string scalar

Specify a short name for the AUTOSAR variable. If unspecified, ARXML export generates a short name, which can differ from the signal name.

Example: `'ShortName','SM_equal_to_count'`

`SwAddrMethod` — Name of variable `SwAddrMethod`
character vector | string scalar

Specify a `SwAddrMethod` name that is valid for the AUTOSAR variable. Code generation uses the `SwAddrMethod` name to group AUTOSAR variables in a memory section for access by calibration and measurement tools. For a list of valid `SwAddrMethod` values for the variable, see the Code Mappings editor, **Signals/States** tab. For more information, see "Configure SwAddrMethod".

Example: `'SwAddrMethod','VAR'`

`SwCalibrationAccess` — Calibration access mode
character vector | string scalar

Specify how calibration and measurement tools can access the AUTOSAR variable. Valid access values include `ReadOnly`, `ReadWrite`, and `NotAccessible`. For more information, see "Configure SwCalibrationAccess".

Example: `'SwCalibrationAccess','ReadWrite'`

`LongName` — Measurement long name
character vector | string scalar

Specify a headline for the AUTOSAR variable.

Example: `'LongName','Position of Engine Throttle'`

Version History

Introduced in R2018b

See Also

`autosar.api.getSimulinkMapping` | `addSignal` | `getSignal` | `removeSignal`

Topics
"Map Block Signals and States to AUTOSAR Variables"
"Map Submodel Signals and States to AUTOSAR Variables"

“Configure AUTOSAR Per-Instance Memory”
“Configure AUTOSAR Static Memory”
“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

mapState

Package: autosar.api

Map Simulink block state to AUTOSAR variable

Syntax

```
mapState(slMap,slStateOwnerBlock,'',arVarType)
mapState(slMap,slStateOwnerBlock,slState,arVarType)
mapState(slMap,slStateOwnerBlock,slState,arVarType,Name,Value)
```

Description

`mapState(slMap,slStateOwnerBlock,'',arVarType)` maps the Simulink block state associated with state owner block `slStateOwnerBlock` to an AUTOSAR variable of type `arVarType` for AUTOSAR run-time calibration. AUTOSAR variable types include `ArTypedPerInstanceMemory` and `StaticMemory`.

`mapState(slMap,slStateOwnerBlock,slState,arVarType)` maps Simulink block state `slState` associated with state owner block `slStateOwnerBlock` to an AUTOSAR variable of type `arVarType`. Specify a nonempty `slState` argument only for blocks with multiple states.

`mapState(slMap,slStateOwnerBlock,slState,arVarType,Name,Value)` specifies additional properties for an AUTOSAR `ArTypedPerInstanceMemory` or `StaticMemory` variable by using one or more `Name,Value` pair arguments.

Examples

Set AUTOSAR Mapping Information for Simulink Block State

Set AUTOSAR mapping and property information for the Simulink block state for Unit Delay block X in example model `autosar_swc_counter`. The state owner block has one state.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

mapState(slMap,'autosar_swc_counter/X','','ArTypedPerInstanceMemory',...
    'SwCalibrationAccess','ReadWrite')
arMappedTo = getState(slMap,'autosar_swc_counter/X')
arValue = getState(slMap,'autosar_swc_counter/X','','SwCalibrationAccess')

arMappedTo =
    'ArTypedPerInstanceMemory'

arValue =
    'ReadWrite'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *slMap* = autosar.api.getSimulinkMapping(*model*). *model* is a handle, character vector, or string scalar representing the model name.

Example: slMap

slStateOwnerBlock — Simulink state owner block handle or path
handle | character vector | string scalar

Handle or path to Simulink state owner block to set AUTOSAR mapping information for.

Example: 'autosar_swc_counter/X'

slState — Simulink state
character vector | string scalar

Name of Simulink state associated with state owner block slStateOwnerBlock. Specify a nonempty state name only for blocks with multiple states. If slState is empty, the function sets mapping information for the first state in the block.

Example: ''

arVarType — Type of AUTOSAR variable
character vector | string scalar

Type of AUTOSAR variable to map the specified Simulink block state to. Valid AUTOSAR variable types include ArTypedPerInstanceMemory, StaticMemory, and Auto. To accept software mapping defaults, specify Auto.

Example: 'ArTypedPerInstanceMemory'

Name-Value Pair Arguments

Specify optional pairs of arguments as Name1=Value1,...,NameN=ValueN, where Name is the argument name and Value is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose Name *in quotes.*

Example: 'SwCalibrationAccess','ReadWrite' specifies read-write access to the variable for run-time calibration.

DisplayFormat — Calibration display format
character vector | string scalar

Specify display format for the AUTOSAR variable. AUTOSAR display format specifications control the width and precision display for calibration and measurement data. For more information, see “Configure DisplayFormat”.

Example: 'DisplayFormat','%2.6f'

IsVolatile — C volatile type qualifier flag (StaticMemory only)
character vector | string scalar

Specify whether to include C type qualifier volatile in generated code for the AUTOSAR variable.

Example: 'IsVolatile','true'

`Qualifier` — C `AdditionalNativeTypeQualifier` flag (`StaticMemory` only)
character vector | string scalar

Optionally specify an AUTOSAR additional native type qualifier to include in generated code for the AUTOSAR variable.

Example: `'Qualifier','test_qualifier'`

`ShortName` — Variable short name
character vector | string scalar

Specify a short name for the AUTOSAR variable. If unspecified, ARXML export generates a short name, which is based on the state name if one exists. If the state is unnamed, the generated short name can differ from the block name.

Example: `'ShortName','PIM_X'`

`SwAddrMethod` — Name of variable `SwAddrMethod`
character vector | string scalar

Specify a `SwAddrMethod` name that is valid for the AUTOSAR variable. Code generation uses the `SwAddrMethod` name to group AUTOSAR variables in a memory section for access by calibration and measurement tools. For a list of valid `SwAddrMethod` values for the variable, see the Code Mappings editor, **Signals/States** tab. For more information, see “Configure SwAddrMethod”.

Example: `'SwAddrMethod','VAR'`

`SwCalibrationAccess` — Calibration access mode
character vector | string scalar

Specify how calibration and measurement tools can access the AUTOSAR variable. Valid access values include `ReadOnly`, `ReadWrite`, and `NotAccessible`. For more information, see “Configure SwCalibrationAccess”.

Example: `'SwCalibrationAccess','ReadWrite'`

`LongName` — State long name
character vector | string scalar

Specify a headline for the AUTOSAR variable.

Example: `'LongName','Position of Engine Throttle'`

Version History

Introduced in R2018b

See Also

`autosar.api.getSimulinkMapping` | `getState`

Topics

“Map Block Signals and States to AUTOSAR Variables”
“Map Submodel Signals and States to AUTOSAR Variables”
“Configure AUTOSAR Per-Instance Memory”
“Configure AUTOSAR Static Memory”

“AUTOSAR Property and Map Function Examples”
“AUTOSAR Component Configuration”

open

Package: `autosar.arch`

Open AUTOSAR architecture model

Syntax

`open(archModel)`

Description

`open(archModel)` opens architecture model `archModel` in the editor. The `archModel` argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be loaded.

Examples

Open AUTOSAR Architecture Model in the Editor

Open a loaded AUTOSAR architecture model in the editor. Add a composition, save the change, and close the model.

```
% Load AUTOSAR architecture model located in current folder or on MATLAB path
modelName = 'myArchModel';
archModel = autosar.arch.loadModel(modelName);

% Open loaded model in the editor
open(archModel);

% Add a composition
composition = addComposition(archModel,'Sensors2');
layout(archModel);  % Auto-arrange model layout

% Save the model
save(archModel);

% Close the model
close(archModel);
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model to open in the editor. The argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be loaded.

Example: `archModel`

Version History

Introduced in R2020a

See Also
`autosar.arch.createModel` | `autosar.arch.loadModel` | `close` | `save`

Topics
"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

overflowed

Determine when a message queue overflows

Syntax

`overflowed(message_name)`

Description

`overflowed(message_name)` checks whether a message is lost because it was sent to a queue that was already full. In each time step, the value of this operator is set when a chart adds a message to, or removes a message from, a queue. It is invalid to use the `overflowed` operator before sending or retrieving a message in the same time step. To use the `overflowed` operator, set the model to an `autosar.tlc` target for both simulation and code generation and verify that the inport or outport message connects to an external queue.

- To check the overflow status of an input message queue, first remove a message from the queue.
- To check the overflow status of an output message queue, first add a message to the queue.
- To check the overflow status of a local message queue, first add a message to the queue or remove a message from the queue.

Examples

Check for Overflow in Transition

Check the input or local queue for message `M`. If a message is present and the queue has overflowed, transition occurs.

```
M[overflowed(M)]
```

Check for Overflow in State Action

Check the input or local queue for message `M`. If a message is present and the queue has overflowed, increment the value of `x`.

```
on M:
if overflowed(M) == true
    x = x+1;
end
```

Check for Overflow After Sending Message

Send message and check for overflow. If the queue overflows, increment the value of `x`.

```
entry:
M.data = 3;
```

```
send(M);
if overflowed(M) == true
    x = x+1;
end
```

Tips

- By default, when a message queue overflows, simulation stops with an error. To prevent a run-time error and allow the `overflowed` operator to dynamically react to dropped messages, set the value of the **Queue Overflow Diagnostic** property to `Warning` or `None`. For more information, see “Queue Overflow Diagnostic” (Stateflow).

Version History

Introduced in R2018b

See Also

length | receive | send

Topics

“Determine When a Queue Overflows”
“Control Message Activity in Stateflow Charts” (Stateflow)
“Set Properties for a Message” (Stateflow)

removeSignal

Package: autosar.api

Remove Simulink block signal from AUTOSAR mapping

Syntax

`removeSignal(slMap,slPortHandle)`

Description

`removeSignal(slMap,slPortHandle)` removes the Simulink block signal associated with outport port handle `slPortHandle` from AUTOSAR mapping.

Examples

Remove Simulink Block Signal from Mapping

In example model `autosar_swc_counter`, remove Simulink signal `equal_to_count`, which originates in the `RelOpt` block, from the AUTOSAR component signal mapping.

```
hModel = 'autosar_swc_counter';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);

portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
removeSignal(slMap,outportHandle);
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model

handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`slPortHandle` — Simulink outport port handle for a block signal

handle

Outport port handle for a Simulink block signal to remove from AUTOSAR mapping. Use MATLAB commands to construct the outport port handle. For example, for a Relational Operator block named `RelOpt`:

```
portHandles = get_param('autosar_swc_counter/RelOpt','portHandles');
outportHandle = portHandles.Outport;
```

Example: `outportHandle`

Version History

Introduced in R2020b

See Also

`autosar.api.getSimulinkMapping` | `addSignal` | `getSignal` | `mapSignal`

Topics

"Map Block Signals and States to AUTOSAR Variables"
"Map Submodel Signals and States to AUTOSAR Variables"
"Configure AUTOSAR Per-Instance Memory"
"Configure AUTOSAR Static Memory"
"AUTOSAR Property and Map Function Examples"
"AUTOSAR Component Configuration"

save

Package: `autosar.arch`

Save AUTOSAR architecture model

Syntax

`save(archModel)`

Description

`save(archModel)` saves architecture model `archModel`. The `archModel` argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be open or loaded.

Examples

Save AUTOSAR Architecture Model After Making Change

Create an AUTOSAR architecture model, add a composition, and save the model with the change. Close the model.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add a composition
composition = addComposition(archModel,'Sensors2');

% Save the model
save(archModel);

% Close the model
close(archModel);
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model to save. The argument is a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`. The model must be open or loaded.

Example: `archModel`

Version History

Introduced in R2020a

See Also

`autosar.arch.createModel` | `autosar.arch.loadModel` | `close` | `open`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

set

Package: autosar.api

Set property of AUTOSAR element

Syntax

set(arProps,elementPath,property,value)

Description

set(arProps,elementPath,property,value) sets the specified property of the AUTOSAR element at elementPath to value. For properties that reference other elements, value is a path. To set XML packaging options, specify elementPath as XmlOptions.

Examples

Set IsService Property for Sender-Receiver Interface

For an AUTOSAR model, set the IsService property for sender-receiver interface Interface1 to true (1), indicating that the port interface is used for AUTOSAR services.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
set(arProps,'Interface1','IsService',true);
isService = get(arProps,'Interface1','IsService')

isService =
  logical
   1
```

Set Runnable Symbol Name

For an AUTOSAR model, set the symbol property for runnable Runnable1 to test_symbol.

```
hModel = 'autosar_swc_expfcns';
openExample(hModel);
arProps = autosar.api.getAUTOSARProperties(hModel);
compQName = get(arProps,'XmlOptions','ComponentQualifiedName');
runnables = find(arProps,compQName,'Runnable','PathType','FullyQualified');
runnables(2)

ans =
  1×1 cell array
    {'/pkg/swc/ASWC/IB/Runnable1'}

get(arProps,runnables{2},'symbol')

ans =
    'Runnable1'

set(arProps,runnables{2},'symbol','test_symbol')
get(arProps,runnables{2},'symbol')
```

```
ans =
    'test_symbol'
```

Input Arguments

`arProps` — AUTOSAR properties information for a model
handle

AUTOSAR properties information for a model, previously returned by *`arProps`* `= autosar.api.getAUTOSARProperties(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `arProps`

`elementPath` — Path to an AUTOSAR element
character vector | string scalar

Path to an AUTOSAR element for which to set a property. To set XML packaging options, specify `XmlOptions`,

Example: `'Input'`

`property` — Element property
character vector | string scalar

Property for which to set a value, among valid properties of the AUTOSAR element.

Example: `'IsService'`

`value` — Value of property
value of property | path to composite property or property that references other properties

Value to set for the specified property. For properties that reference other elements, specify a path.

Example: `true`

Version History

Introduced in R2013b

See Also

`autosar.api.getAUTOSARProperties` | `get`

Topics

"AUTOSAR Property and Map Function Examples"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

set

Package: `autosar.arch`

Set property of AUTOSAR architecture element

Syntax

`set(archElement,property,value)`

Description

`set(archElement,property,value)` sets the specified property to `value` for AUTOSAR architecture element `archElement`. The `archElement` argument is a component, composition, port, or connector handle returned by a previous call to `addComponent`, `addComposition`, `addPort`, `connect`, or `find`.

Examples

Set and List Properties of AUTOSAR Architecture Elements

In an AUTOSAR architecture model, use the `set` function to:

- Modify the `Name` property for two AUTOSAR composition ports.
- Modify the `Name` property for an AUTOSAR component port, which also renames the corresponding Simulink implementation model port.
- Modify the `Kind` and `Name` properties for the AUTOSAR component.

Then list the model port `Name` values, which reflect the port renames.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName);

% Add composition and component at architecture model top level
composition = addComposition(archModel,'Sensors');
addComponent(archModel,'Controller1');

% Add composition ports
addPort(composition,'Receiver',{'TPS_Hw','APP_Hw'});
addPort(composition,'Sender',{'TPS_Perc','APP_Perc'});

% Add component ports
controller = find(archModel,'Component','Name','Controller1');
addPort(controller,'Receiver',{'TPS_Perc','APP_Perc'});
addPort(controller,'Sender','ThrCmd_Perc');

% Connect composition and component based on matching port names
connect(archModel,composition,controller);

% Create implementation model for component
createModel(controller);

layout(archModel);  % Auto-arrange layout

% Set properties
```

```
set(composition.Ports(1),'Name','NewPortName1');  % Rename 2 composition ports
set(composition.Ports(3),'Name','NewPortName2');
set(find(controller,'Port','Name','TPS_Perc'),...
    'Name','NewPortName3');  % Rename port for Controller1 component & implementation
set(controller,'Kind','ServiceProxy');  % Component type for Controller1 component
set(controller,'Name','Instance1');     % Name for Controller1 component

% Find ports in architecture model hierarchy
ports_in_hierarchy = find(archModel,'Port','AllLevels',true)
% List Kind and Name property values for each port
for ii=1:length(ports_in_hierarchy)
    port = ports_in_hierarchy(ii);
    portName = get(port,'Name');
    portKind = get(port,'Kind');
    fprintf('%s port %s\n',portKind,portName);
end

ports_in_hierarchy =
  7×1 CompPort array with properties:
    Kind
    Connected
    Name
    Parent
    SimulinkHandle

Receiver port NewPortName1
Receiver port APP_Hw
Sender port NewPortName2
Sender port APP_Perc
Sender port ThrCmd_Perc
Receiver port NewPortName3
Receiver port APP_Perc
```

Input Arguments

archElement — Architecture element

handle

AUTOSAR architecture element for which to set the value of a property. The argument is a component, composition, port, or connector handle returned by a previous call to `addComponent`, `addComposition`, `addPort`, `connect`, or `find`.

Example: `port`

property — Element property

character vector | string scalar

Property for which to set a value, among valid properties of the AUTOSAR architecture element.

Example: `'Name'`

value — Property value

value of property

Value to set for the specified property of the specified AUTOSAR architecture element.

Example: `'NewPortName1'`

Version History

Introduced in R2020a

See Also
`find` | `get`

Topics
"Configure AUTOSAR Architecture Model Programmatically"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

setClassName

Set class name of model

Syntax

`setClassName(slMap, name)`

Description

`setClassName(slMap, name)` sets the class name of the model in the generated code.

Examples

Set Class Name of Model

Open the model. To access the mapping information associated with the model, `slMap`, use the `autosar.api.getSimulinkMapping` function.

```
%% Open an adaptive AUTOSAR model
hModel = 'autosar_LaneGuidance';
openExample(hModel);

%% Access the mapping information
slMap = autosar.api.getSimulinkMapping(hModel);
```

Specify a class name for the model by using the `setClassName` function.

```
setClassName(slMap, 'myClassName');
```

The `getClassName` function now returns the specified class name.

```
name = getClassName(slMap)
```

```
name =

    'myClassName'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `*slMap* = autosar.api.getSimulinkMapping(*model*)`. `*model*` is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

name — Class name of model
character vector

Class name of model in the generated code specified as a character vector. If you do not specify a class name, the class name of the model in the generated code is set to the name of the model.

Data Types: `char` | `string`

Version History

Introduced in R2021b

See Also

`autosar.api.getSimulinkMapping` | `getClassName` | `getClassNamespace` | `setClassNamespace`

Topics

"Configure AUTOSAR Adaptive Code Generation"

setClassNamespace

Set class namespace of model

Syntax

`setClassNamespace(slMap, namespace)`

Description

`setClassNamespace(slMap, namespace)` sets the class namespace of the model in the generated code. Control the scope of the generated code by specifying a namespace for the generated class. In systems that use a model hierarchy, you can specify a different namespace for each model in the hierarchy.

Examples

Set Class Namespace for Model

Open the model. To access the mapping information associated with the model, `slMap`, use the `autosar.api.getSimulinkMapping` function.

```
%% Open an adaptive AUTOSAR model
hModel = 'autosar_LaneGuidance';
openExample(hModel);

%% Access the mapping information
slMap = autosar.api.getSimulinkMapping(hModel);
```

To specify a namespace for the model in the generated code, use the `setClassNamespace` function.

```
setClassNamespace(slMap, 'myClassNamespace');
```

To configure a nested namespace, use the scope resolution operator `::` to specify scope.

```
setClassNamespace(slMap, 'myNestedClassNamespace1::ns2::ns3');
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by *`slMap`* `= autosar.api.getSimulinkMapping(`*`model`*`)`. *`model`* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

namespace — Class namespace of model
character vector

Class namespace of model in the generated code specified as a character vector. If you do not specify a class namespace, the code generated for the model does not use a namespace.

Data Types: `char` | `string`

Version History

Introduced in R2021b

See Also

`autosar.api.getSimulinkMapping` | `getClassNamespace` | `setClassName` | `getClassName`

Topics

"Configure AUTOSAR Adaptive Code Generation"

setDataDefaults

Set default end-to-end (E2E) protection method for AUTOSAR component model

Syntax

`setDataDefaults(slMap,elementCategory,property,value)`

Description

`setDataDefaults(slMap,elementCategory,property,value)` sets the default setting for the end-to-end (E2E) protection method property in the modeling element category inports and outports of an AUTOSAR component model.

Use E2E protection to optionally configure sender and receiver ports to securely transmit data between AUTOSAR components. The default end-to-end protection method sets which end-to-end protection method is used for root-level inports and outports in the generated code.

Supported protection methods are E2E Transformer and E2E Protection Wrapper.

The protection method is applied to AUTOSAR inports that are configured in the code mappings as `EndToEndRead` and AUTOSAR outports that are configured as `EndToEndWrite`.

Examples

Set Default E2E Protection Setting for Root-Level Inports and Outports

Set the default end-to-end protection method for the AUTOSAR component model.

Get the default E2E protection method.

```
hModel = 'autosar_swc';
openExample(hModel);

slMap = autosar.api.getSimulinkMapping(hModel);
e2eMethod = getDataDefaults(slMap, ...
   'InportsOutports', 'EndToEndProtectionMethod');
```

```
e2eMethod =
    'ProtectionWrapper'
```

Set and then read back the default E2E protection method.

```
setDataDefaults(slMap,'InportsOutports', ...
   'EndToEndProtectionMethod', 'TransformerError');
e2eMethod = getDataDefaults(slMap,...
   'InportsOutports', 'EndToEndProtectionMethod');
```

```
e2eMethod =
    'TransformerError'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, specified as a function handle. Obtain this information using `autosar.api.getSimulinkMapping(model)`, where *model* is a handle, character vector, or string scalar representing the model name.

Example: `slMap`

`elementCategory` — Model data element category
`'InportsOutports'`

Category of model data elements that apply the end-to-end protection property, specified as `'InportsExports'`. The only supported modeling element is inports and outports.

`property` — Protection method property
`'EndToEndProtectionMethod'`

Default end-to-end protection method property that you set with the input parameter value, specified as `'EndToEndProtectionMethod'`. The only supported property is E2E protection method.

`value` — Default protection method parameter value to set
'ProtectionWrapper' | 'TransformerError'

Default protection method parameter value to set, specified as one of the following:

- `'ProtectionWrapper'`:

  E2E Protection Wrapper, which uses an E2E protection wrapper in the generated code in support of end-to-end data consistency checks.

  E2E protection wrapper is the default setting.
- `'TransformerError'`:

  E2E Transformer, which configures `RTE` calls to use a transformer error argument in the generated code.

  Supported when using AUTOSAR schema version 4.2 or later.

Example: `'TransformerError'`

Data Types: `character vector`

Version History
Introduced in R2022b

See Also
`autosar.api.getSimulinkMapping` | `getDataDefaults`

Topics
"Configure AUTOSAR S-R Interface Port for End-To-End Protection"

setInternalDataPackaging

Package: `autosar.api`

Set default internal data packaging for AUTOSAR component model

Syntax

```
setInternalDataPackaging(slMap,pkgSetting)
```

Description

`setInternalDataPackaging(slMap,pkgSetting)` sets the default data packaging setting to use for internal data stores, signals, and states in the generated code for an AUTOSAR component model.

Default packaging options differ depending on whether the component model instantiates an AUTOSAR software component once or multiple times. Multi-instance software components can generate reentrant, reusable functions. See "Multi-Instance Components" for more information.

Valid setting values are:

- For single-instance models:
  - `Default` — Accept the default internal data packaging provided by the software. Use `Default` for submodels referenced from AUTOSAR component models.
  - `PrivateGlobal` — Package internal variable data without a `struct` object and make it private (visible only to *`model`*`.c`).
  - `PrivateStructure` — Package internal variable data in a `struct` object and make it private (visible only to *`model`*`.c`).
  - `PublicGlobal` — Package internal variable data without a `struct` object and make it public (`extern` declaration in *`model`*`.h`).
  - `PublicStructure` — Package internal variable data in a `struct` object and make it public (`extern` declaration in *`model`*`.h`).
- For multi-instance models:
  - `Default` — Accept the default internal data packaging provided by the software. Use `Default` for submodels referenced from AUTOSAR component models.
  - `CTypedPerInstanceMemory` — Package internal variable data for each instance of an AUTOSAR software component to use C-typed per-instance memory in a `struct` object and make it public (declaration in *`model`*`.h`).

If the data packaging setting is `PrivateGlobal` or `PrivateStructure`, building the model generates the header file *`model`*`_private.h`, even when the model configuration parameter **File packaging format** is set to `Compact`.

If the model configuration option **Generate separate internal data per entry-point function** is set for the AUTOSAR model, task-based internal data grouping overrides the AUTOSAR internal data packaging setting. However, the AUTOSAR setting determines the public or private visibility of the generated task-based internal data groups.

Examples

Specify Private, Structure-Based Internal Data Packaging for AUTOSAR Model

Return and modify the default data packaging setting used for internal variables in the generated code for the AUTOSAR component model. The `PrivateStructure` setting packages the internal variable data in a `struct` object and makes it private.

```
hModel = 'autosar_swc';
openExample(hModel);
slMap = autosar.api.getSimulinkMapping(hModel);
pkgSetting1 = getInternalDataPackaging(slMap)
setInternalDataPackaging(slMap,'PrivateStructure')
pkgSetting2 = getInternalDataPackaging(slMap)
```

```
pkgSetting1 =
    'Default'

pkgSetting2 =
    'PrivateStructure'
```

Input Arguments

`slMap` — Simulink to AUTOSAR mapping information for a model
handle

Simulink to AUTOSAR mapping information for a model, previously returned by `slMap = autosar.api.getSimulinkMapping(model)`, where `model` is a handle, character vector, or string scalar representing the model name.

`pkgSetting` — Default internal data packaging setting
character vector | string scalar

Value specifying the default data packaging to use for internal variables in the generated code for the AUTOSAR component model. Valid setting values for single-instance models are `Default`, `PrivateGlobal`, `PrivateStructure`, `PublicGlobal`, and `PublicStructure`. Valid setting values for multi-instance models are `Default` and `CTypedPerInstanceMemory`.

Example: `'PrivateStructure'`

Version History

Introduced in R2021a

See Also

`getInternalDataPackaging` | `autosar.api.getSimulinkMapping`

Topics

"Map AUTOSAR Elements for Code Generation"
"AUTOSAR Component Configuration"

setPlatform

Set platform kind of architecture model to classic or adaptive

Syntax

`setPlatform(archModel,platformKind)`

Description

`setPlatform(archModel,platformKind)` sets the platform of the AUTOSAR architecture model `archModel` to `platformKind`.

Examples

Set Platform Kind of Architecture Model to Adaptive

Create an AUTOSAR architecture model using the default settings, read the platform, and set the platform kind to adaptive.

Create AUTOSAR architecture model, and read the platform setting.

```
% Create AUTOSAR architecture model
modelName = 'myArchModel';
archModel = autosar.arch.createModel(modelName); % Default platform kind is Classic
% Read the default platform kind
ptm = archModel.Platform
```

```
ptm =
    'Classic'
```

Specify the AUTOSAR Adaptive Platform for the architecture model.

```
setPlatform(archModel,"Adaptive");

% Read the updated platform kind
ptm = archModel.Platform
```

```
ptm =
    'Adaptive'
```

Input Arguments

`archModel` — Architecture model
handle

AUTOSAR architecture model, specified as a model handle returned by a previous call to `autosar.arch.createModel` or `autosar.arch.loadModel`.

`platformKind` — AUTOSAR platform kind
character vector | string scalar

AUTOSAR platform kind, specified as a character vector or string scalar.

Set "`Adaptive`" to specify an adaptive architecture model. Set "`Classic`" to specify a classic architecture model.

Mixing classic and adaptive architecture modeling is not supported.

Example: `'Adaptive'`

Version History

Introduced in R2023a

See Also

`autosar.arch.createModel` | `autosar.arch.loadModel`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Create AUTOSAR Architecture Models"

setXmlOptions

Package: autosar.arch

Set XML option for AUTOSAR architecture model

Syntax

setXmlOptions(archModel,property,value)

Description

setXmlOptions(archModel,property,value) sets XML option property to value in architecture model archModel. The archModel argument is a model handle returned by a previous call to autosar.arch.createModel or autosar.arch.loadModel.

For more information about XML options, see “Configure AUTOSAR XML Options” for classic architecture modeling and “Configure AUTOSAR Adaptive XML Options” for adaptive architecture modeling.

Examples

Set Value of XML Option DataTypePackage for AUTOSAR Architecture Model

For a new AUTOSAR architecture model, modify the value of the AUTOSAR XML data type package path from /DataTypes to /MyDataTypes.

```
archModel = autosar.arch.createModel('MyArchModel');
setXmlOptions(archModel,'DataTypePackage','/MyDataTypes');
pValue = getXmlOptions(archModel,'DataTypePackage')
```

```
pValue =
    '/MyDataTypes'
```

Input Arguments

archModel — Architecture model

handle

AUTOSAR architecture model for which to set the value of an XML option. The argument is a model handle returned by a previous call to autosar.arch.createModel or autosar.arch.loadModel.

Example: archModel

property — XML option

character vector | string scalar

XML option for which to set a value.

For more information about XML options, see “Configure AUTOSAR XML Options” for classic architecture modeling and “Configure AUTOSAR Adaptive XML Options” for adaptive architecture modeling.

Example: `'DataTypePackage'`

`value` — XML option value
value of option

Value to set for the specified XML option of the specified AUTOSAR architecture model.

Example: `'/MyDataTypes'`

Version History

Introduced in R2020a

See Also

`export` | `getXmlOptions`

Topics

"Configure AUTOSAR Architecture Model Programmatically"
"Generate and Package AUTOSAR Composition XML Descriptions and Component Code"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"

updateAUTOSARProperties

Package: `arxml`

Update model with ARXML definitions from AUTOSAR element packages

Syntax

```
updateAUTOSARProperties(ar,modelname)
updateAUTOSARProperties(ar,modelname,Name,Value)
```

Description

`updateAUTOSARProperties(ar,modelname)` updates the specified open model with AUTOSAR element definitions from packages in the XML files associated with `arxml.importer` object `ar`. The update generates a report that details the AUTOSAR elements added to the model. For `updateAUTOSARProperties`, the associated XML definition files are not required to contain the AUTOSAR software component mapped by the model. (Compare with `updateModel`, which requires the component.)

By default, the function imports AUTOSAR elements as read-only definitions, which prevents changes. To allow imported elements to be modified, set the `ReadOnly` property to `false`.

For each imported AUTOSAR element, the function also imports the element dependencies. For example, importing CompuMethod elements also imports Unit and PhysicalDimension elements.

If you import AUTOSAR numeric or enumeration data types, you can use the `createNumericType` and `createEnumeration` functions to create corresponding Simulink data type objects.

`updateAUTOSARProperties(ar,modelname,Name,Value)` updates the specified open model with AUTOSAR elements by using a `Name,Value` argument pair to specify a specific element category, package, or path.

Examples

Reuse AUTOSAR SwAddrMethod Elements in Component Model

Suppose that you are developing an AUTOSAR software component model into which you want to import predefined SwAddrMethod elements that are shared by multiple product lines and teams. This example shows how to import definitions from the example shared descriptions file `SwAddrMethods.arxml` into the example model `autosar_swc` and generate an update report.

```
modelName = 'autosar_swc';
openExample(modelName);
ar = arxml.importer('SwAddrMethods.arxml');
updateAUTOSARProperties(ar,modelName);
```

```
### Updating model autosar_swc
### Saving original model as autosar_swc_backup.slx
### Creating HTML report autosar_swc_update_report.html
```

AUTOSAR Update Report for autosar_swc

Software component: /Company/Powertrain/Components/ASWC
Original model saved as: autosar_swc_backup

This report details the updates applied to Simulink model autosar_swc based on differences between the imported arxml and the existing AUTOSAR configuration contained in the model. A backup of the original model has been saved to autosar_swc_backup (compare models). The report also recommends manual model changes.

Simulink

AUTOSAR

Automatic AUTOSAR Element Changes

Added	Package /Company/Powertrain/SwAddrMethods
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/CODE
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/CALIB
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/CONST
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/VAR_NO_INIT
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/VAR_INIT
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/VAR_POWER_ON_CLEARED
Added	SwAddrMethod /Company/Powertrain/SwAddrMethods/VAR_CLEARED

Update Model with Specific AUTOSAR Elements

This example shows the function call syntax to update a model with two AUTOSAR elements, specified by root paths `/ExternalElements/CompuMethods/RpmCm` and `/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint16`.

```
open_system('mySWC')
ar = arxml.importer('ExternalElements.arxml');
updateAUTOSARProperties(ar,'mySWC','RootPath',{'/ExternalElements/CompuMethods/RpmCm',...
                        '/AUTOSAR_PlatformTypes/ImplementationDataTypes/uint16'});
```

Allow Modification of Imported AUTOSAR Elements

This example shows the function call syntax to import XML definitions of AUTOSAR software address methods as read/write elements. By default, the function imports AUTOSAR elements as read-only definitions, which prevents changes.

```
open_system('mySWC')
ar = arxml.importer('SwAddressMethods.arxml');
updateAUTOSARProperties(ar,'mySWC','ReadOnly',false);
```

Update Model with AUTOSAR Elements From a Specific Package

This example shows the function call syntax to update a model with AUTOSAR elements from package `/AUTOSAR_PlatformTypes/CompuMethods`.

```
open_system('mySWC')
ar = arxml.importer('ExternalElements.arxml');
updateAUTOSARProperties(ar,'mySWC','Package',{'/AUTOSAR_PlatformTypes/CompuMethods'});
```

Update Model with AUTOSAR Elements From a Specific Category

This example shows the function call syntax to update a model with AUTOSAR elements of category `ImplementationDataType`. Importing `ImplementationDataType` elements also imports dependent elements, such as `SwBaseType` elements.

```
open_system('mySWC')
ar = arxml.importer('ExternalElements.arxml');
updateAUTOSARProperties(ar,'mySWC','Category',{'ImplementationDataType'});
```

Input Arguments

ar — `arxml.importer` object
handle

AUTOSAR information previously imported from XML files, specified as an `arxml.importer` object handle.

`modelname` — Model name
character vector | string scalar

Name of the open model to be updated with definitions of AUTOSAR elements in the XML files associated with an `arxml.importer` object.

Example: `'mySWC'`

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `'Category',{'ImplementationDataType'}` directs the importer to update a model with AUTOSAR elements of category `ImplementationDataType`.

`Category` — AUTOSAR element categories
cell array of character vectors | string array

One or more AUTOSAR element categories from which to import elements.

Example: `'Category',{'ImplementationDataType'}`

`Package` — AUTOSAR element packages
cell array of character vectors | string array

Paths to one or more AUTOSAR element packages from which to import elements.

Example: `'Package',{'/AUTOSAR_PlatformTypes/CompuMethods'}`

To refine a category or package import, you can specify both a category and a package from which to import elements. For example:

```
'Category',{'ImplementationDataType'}, ...
'Package',{'/AUTOSAR_PlatformTypes/ImplementationDataTypes'}
```

ReadOnly — Designate elements as read-only or read/write
`true` (default) | `false`

Specify whether to treat imported elements as read-only (the default), preventing definition changes, or read/write.

Example: `'ReadOnly',false`

RootPath — AUTOSAR elements
cell array of character vectors | string array

Root paths to one or more specific AUTOSAR elements to import.

Example: `'RootPath',{'/ExternalElements/CMs/RpmCm','/AUTOSAR_PlatformTypes/IDTs/uint16'}`

DataTypeMappingSet — AUTOSAR data type mapping sets
cell array of character vectors | string array

Paths to one or more AUTOSAR data type mapping sets associated with application data type elements.

Example: `{'/AUTOSAR_PlatformTypes/DataTypeMappingSets/MapSet1'}`

Version History

Introduced in R2019a

See Also

`arxml.importer` | `updateModel` | `createEnumeration` | `createNumericType`

Topics

"Import and Reference Shared AUTOSAR Element Definitions"
"Import AUTOSAR Package into Component Model"
"Import AUTOSAR Package into Adaptive Component Model"
"Import AUTOSAR XML Descriptions Into Simulink"
"AUTOSAR ARXML Importer"

updateModel

Package: `arxml`

Update AUTOSAR model with ARXML changes

Syntax

`updateModel(ar,modelname)`

Description

`updateModel(ar,modelname)` updates the specified open model with changes found in the XML files associated with `arxml.importer` object `ar`. The XML files must contain the AUTOSAR software component mapped by the model.

When comparing the current version of the XML file with the previous version, the comparison routine applies these rules in order:

1. If elements have the same UUID and type, the elements match. The function does not update the model.
2. If elements have different UUIDs, the elements do not match. The function updates the model with the ARXML change.
3. If elements have the same qualified name, the elements match. The function does not update the model.
4. Otherwise, elements do not match. The function updates the model with the ARXML changes.

The update generates and opens a report that details the changes made to the model, and required changes that were not made by the function.

AUTOSAR package structure updates affect the stored AR-PACKAGE structure and are applied to future exports. But imported package structure updates do not affect AUTOSAR Dictionary package path XML options. The XML package path options apply to AUTOSAR elements created in Simulink rather than to imported elements.

Examples

Update Model with AUTOSAR ARXML Changes

Update model `mySWC` with the AUTOSAR ARXML changes described in `updatedSWC.arxml` and open an update report.

```
open_system('mySWC')
ar = arxml.importer('updatedSWC.arxml');
updateModel(ar,'mySWC');
```

```
### Updating model mySWC
### Saving original model as mySWC_backup.slx
### Creating HTML report mySWC_update_report.html
```

Input Arguments

ar — arxml.importer object
handle

AUTOSAR information previously imported from XML files, specified as an `arxml.importer` object handle.

modelname — Model name
character vector | string scalar

Name of an open model to be updated with changes in the XML files associated with an `arxml.importer` object.

Example: `'mySWC'`

Version History

Introduced in R2014a

R2022b: Import for Basic Software blocks

`updateModel` supports generating AUTOSAR Basic Software (BSW) caller blocks when updating with ARXML-imported software components that access Diagnostic Event Manager (Dem), NVRAM Manager (NvM), or Function Inhibition Manager (FiM) services.

See Also

`arxml.importer` | `updateAUTOSARProperties`

Topics

"Import AUTOSAR Software Component Updates"
"Import AUTOSAR Component to Simulink"
"Import AUTOSAR Composition to Simulink"
"Import AUTOSAR XML Descriptions Into Simulink"
"AUTOSAR ARXML Importer"

exportDictionary

Package: autosar.dictionary

Export interface, data type, and platform-specific definitions from interface dictionary

Syntax

`exportedFolder = exportDictionary(platformMapping)`

Description

`exportedFolder = exportDictionary(platformMapping)` exports the content from an interface dictionary mapped to the AUTOSAR Classic Platform to ARXML files and RTE stub header files. This operation creates a folder in the current folder that contains the output files.

Examples

Export AUTOSAR Interface and Data Type Definitions from Interface Dictionary

To export the AUTOSAR content of the interface dictionary to ARXML and header files, use the `exportDictionary` function. For an example that shows more of the workflow for related functions, see "Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary" on page 1-275.

Export the interface dictionary.

```
platformMapping = addPlatformMapping(dictAPI,'AUTOSARClassic');
exportedFolder = exportDictionary(platformMapping)
```

```
Exporting dictionary, please wait...
Exported dictionary ARXML files are located in: C:\Users\myName\MyInterfaces.

exportedFolder =
    'C:\Users\myName\MyInterfaces'
```

View output folder.

```
dir(exportedFolder)
```

```
.
..
MyInterfaces_datatype.arxml
MyInterfaces_interface.arxml
stub
```

Input Arguments

`platformMapping` — Platform mapping object
`autosar.dictionary.ARClassicPlatformMapping` object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

Output Arguments

`exportedFolder` — Full path of folder containing exported files
string scalar | character vector

Full path of the folder containing the exported files from the interface dictionary, specified as a string scalar or a character vector.

Exported files contained in `exportedFolder` include ARXML files, which are named *`dictionaryname`*`_datatypes.arxml` and *`dictionaryname`*`_interfaces.arxml`, where *`dictionaryname`* is the name of the interface dictionary, and a stub folder containing RTE header files. If the files already exist, `exportDictionary` overwrites them.

Example: `'arxmlFolder'`

Version History

Introduced in R2022b

See Also

`autosar.dictionary.ARClassicPlatformMapping` | `getPlatformProperties` | `getPlatformProperty` | `setPlatformProperty`

Topics

"Deploy Interface Dictionary"

getPlatformProperties

Package: `autosar.dictionary`

Get AUTOSAR platform properties from interface dictionary

Syntax

```
[propNames,propVals] = getPlatformProperties(platformMapping,dictElementObj)
```

Description

`[propNames,propVals] = getPlatformProperties(platformMapping,dictElementObj)` returns AUTOSAR Classic platform-specific properties and their values for the specified dictionary element. Specified dictionary elements can be a data interface object or data element object.

Examples

Get AUTOSAR Data Interface Properties

To get the platform-specific properties for a data interface, such as what kind of AUTOSAR communication interface is defined and the path to the element package for the specified data interface, use the `getPlatformProperties` function. For an example that shows more of the workflow for related functions, see “Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary” on page 1-275.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
platformMapping = getPlatformMapping(dictAPI,'AUTOSARClassic');
interfaceObj = getInterface(dictAPI,'DataInterface');

[propNames,propValues] = ...
   getPlatformProperties(platformMapping,interfaceObj)
```

```
propNames =

  1×3 cell array

    {'IsService'}    {'Package'}    {'InterfaceKind'}


propValues =

  1×3 cell array

    {[0]}    {'/Interface2'}    {'NvDataInterface'}
```

Get AUTOSAR Data Element Properties

To get the platform-specific properties for a data element in the data interface, such as SwAddrMethod information for the specified data element, use the `getPlatformProperties`

function. For an example that shows more of the workflow for related functions, see “Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary” on page 1-275.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
platformMapping = getPlatformMapping(dictAPI,'AUTOSARClassic');
interfaceObj = getInterface(dictAPI,'DataInterface');
dataElementObj = getElement(interfaceObj,'DE1');

[propNames,propValues] = ...
   getPlatformProperties(platformMapping,dataElementObj)
```

```
propNames =

  1×3 cell array

    {'SwAddrMethod'}    {'SwCalibrationAccess'}    {'DisplayFormat'}


propValues =

  1×3 cell array

    {'VAR1'}    {'ReadWrite'}    {'%.3f'}
```

Input Arguments

platformMapping — Platform mapping object
autosar.dictionary.ARClassicPlatformMapping object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

dictElementObj — Element in dictionary object
Simulink.interface.dictionary.DataInterface object | Simulink.interface.dictionary.DataElement object

Element in a dictionary object from which you access the AUTOSAR platform-specific properties and values, specified as a `Simulink.interface.dictionary.DataInterface` object or `Simulink.interface.dictionary.DataElement` object.

The argument can be a data interface object, which is returned by a previous call to `addDataInterface` or `getInterface`, or a data element object, which is returned by a previous call to `addElement` or `getElement`.

Output Arguments

propNames — Property names
cell array of character vectors | string array

Property names in selected dictionary element and platform mapping, specified as a cell array of character vectors or a string array.

For data interface objects, AUTOSAR properties include `'IsService'`, `'Package'`, and `'InterfaceKind'`.

For data element objects, AUTOSAR properties include `'SwAddrMethod'`, `'SwCalibrationAccess'`, and `'DisplayFormat'`.

`propVals` — Property values
cell array of character vectors | string array

Property values in selected dictionary element and platform mapping, specified as a cell array of character vectors or a string array.

For data interface objects, returned properties include:

Property	Return Value
`IsService`	Set as `true` for service interfaces. Returned as a `Boolean`.
`Package`	Fully-qualified path to the element package. Returned as a `character vector`.
`InterfaceKind`	AUTOSAR communication interface. Returned as a `character vector`. Valid values are `'SenderReceiverInterface'`, `'NvDataInterface'`, and `'ModeSwitchInterface'`.

For data element objects, returned properties include:

Property	Return Value
`SwAddrMethod`	Name of previously defined software address method. Returned as a `character vector`.
`SwCalibrationAccess`	Calibration and measurement tool access to a data object. Returned as a `character vector`. Valid values are `'ReadOnly'`, `'ReadWrite'`, and `'NotAccessible'`.
`DisplayFormat`	AUTOSAR display format specification. Returned as a `character vector`.

Version History

Introduced in R2022b

See Also

`autosar.dictionary.ARClassicPlatformMapping` | `exportDictionary` | `getPlatformProperty` | `setPlatformProperty`

Topics

"Configure AUTOSAR Communication Interfaces"
"Configure AUTOSAR Data for Calibration and Measurement"
"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

getPlatformProperty

Package: `autosar.dictionary`

Get AUTOSAR platform property from interface dictionary

Syntax

```
propValue = getPlatformProperty(platformMapping,dictElementObj,propName)
```

Description

`propValue = getPlatformProperty(platformMapping,dictElementObj,propName)` gets the specified property for the specified dictionary element from an interface dictionary mapped to AUTOSAR Classic Platform. The specified dictionary element can be a data interface object or data element object.

Examples

Get AUTOSAR Interface Property InterfaceKind

To get the kind of AUTOSAR communication interface that is defined for the specified data interface, use the `getPlatformProperty` function with the `propName` argument `InterfaceKind`. For an example that shows more of the workflow for related functions, see “Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary” on page 1-275.

```
platformMapping = getPlatformMapping(dictAPI,'AUTOSARClassic');
interfaceObj = getInterface(dictAPI,'interfaceName');
propValue_Interface = ...
   getPlatformProperty(platformMapping,interfaceObj,'InterfaceKind')
```

```
propValue_Interface =

    'NvDataInterface'
```

Get AUTOSAR Data Element Property SwCalibrationAccess

To get the calibration and measurement tool access defined for the specified data element, use the `getPlatformProperty` function with the `propName` argument `SwCalibrationAccess`.

```
dataElemObj = userInterfaceObj.Elements(1);
propValue_Sw_CalAccess = ...
    getPlatformProperty(platformMapping,dataElemObj,'SwCalibrationAccess')
```

```
propValue_Sw_CalAccess =

    'ReadWrite'
```

Input Arguments

`platformMapping` — Platform mapping object
`autosar.dictionary.ARClassicPlatformMapping` object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

`dictElementObj` — Element in dictionary object
`Simulink.interface.dictionary.DataInterface` object | `Simulink.interface.dictionary.DataElement` object

Element in a dictionary object from which you access the AUTOSAR platform-specific properties and values, specified as a `Simulink.interface.dictionary.DataInterface` object or `Simulink.interface.dictionary.DataElement` object.

The argument can be a data interface object, which is returned by a previous call to `addDataInterface` or `getInterface`, or a data element object, which is returned by a previous call to `addElement` or `getElement`.

`propName` — Property name in dictionary element
character vector | string scalar

Property name of property in dictionary element.

For data interface objects, valid argument values are `'IsService'`, `'Package'`, and `'InterfaceKind'`.

For data element objects, valid argument values are `'SwAddrMethod'`, `'SwCalibrationAccess'`, and `'DisplayFormat'`.

Example: `'InterfaceKind'`

Output Arguments

`propValue` — Property value of dictionary element
character vector | string scalar

Property value of property in dictionary element.

For data interface objects, returned properties include:

Property	Return Value
`IsService`	Set as true for service interfaces. Returned as a `Boolean`.
`Package`	Fully-qualified path to the element package. Returned as a `character vector`.

Property	Return Value
`InterfaceKind`	AUTOSAR communication interface. Returned as a `character vector`. Valid values are `'SenderReceiverInterface'`, `'NvDataInterface'`, and `'ModeSwitchInterface'`.

For data element objects, returned properties include:

Property	Return Value
`SwAddrMethod`	Name of previously defined software address method. Returned as a `character vector`.
`SwCalibrationAccess`	Calibration and measurement tool access to a data object. Returned as a `character vector`. Valid values are `'ReadOnly'`, `'ReadWrite'`, and `'NotAccessible'`.
`DisplayFormat`	AUTOSAR display format specification. Returned as a `character vector`.

Version History

Introduced in R2022b

See Also

`autosar.dictionary.ARClassicPlatformMapping` | `exportDictionary` | `getPlatformProperties` | `setPlatformProperty`

Topics

"Configure AUTOSAR Data for Calibration and Measurement"
"Configure AUTOSAR Communication Interfaces"
"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

setPlatformProperty

Package: `autosar.dictionary`

Set AUTOSAR properties for data interface or element in interface dictionary

Syntax

`setPlatformProperty(platformMapping,dictElementObj,Name=Value)`

Description

`setPlatformProperty(platformMapping,dictElementObj,Name=Value)` sets the specified platform properties for the specified dictionary element in an interface dictionary mapped to the AUTOSAR Classic Platform. The specified dictionary element can be a data interface object or data element object.

Examples

Set AUTOSAR Property Values for Data Interface

To set AUTOSAR package and communication properties for the specified data interface, use the `setPlatformProperty` function. For an example that shows more of the workflow for related functions, see “Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary” on page 1-275.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
platformMapping = getPlatformMapping(dictAPI,'AUTOSARClassic');
interfaceObj = getInterface(dictAPI,'DataInterface');

setPlatformProperty(platformMapping,interfaceObj,IsService=false,...
    Package='/Interface3',InterfaceKind='SenderReceiverInterface');
```

Set AUTOSAR Property Values for Data Element

To set the AUTOSAR SwAddrMethod and calibration properties for the specified data element, use the `setPlatformProperty` function.

```
platformMapping = getPlatformMapping(dictAPI, 'AUTOSARClassic');
interfaceObj = getInterface(dictAPI, 'DataInterface');
dataElementObj = getElement(interfaceObj,'DE1');

setPlatformProperty(platformMapping,dataElementObj,SwAddrMethod='VAR1',...
    SwCalibrationAccess='ReadWrite',DisplayFormat='%.3f');
```

Input Arguments

`platformMapping` — Platform mapping object

`autosar.dictionary.ARClassicPlatformMapping` object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

`dictElementObj` — Element in dictionary object
`Simulink.interface.dictionary.DataInterface` object | `Simulink.interface.dictionary.DataElement` object

Element in a dictionary object from which you access the AUTOSAR platform-specific properties and values, specified as a `Simulink.interface.dictionary.DataInterface` object or `Simulink.interface.dictionary.DataElement` object.

The argument can be a data interface object, which is returned by a previous call to `addDataInterface` or `getInterface`, or a data element object, which is returned by a previous call to `addElement` or `getElement`.

Name-Value Pair Arguments

Specify optional pairs of arguments as `Name1=Value1,...,NameN=ValueN`, where `Name` is the argument name and `Value` is the corresponding value. Name-value arguments must appear after other arguments, but the order of the pairs does not matter.

Before R2021a, use commas to separate each name and value, and enclose `Name` *in quotes.*

Example: `SwAddrMethod='VAR1'`

`DisplayFormat` — Calibration display format
character vector | string scalar

Calibration display format for the specified AUTOSAR data element object, specified as a character vector or string scalar. AUTOSAR display format specifications control the width and precision display for calibration and measurement data.

Example: `DisplayFormat='%2.6f'`

`InterfaceKind` — AUTOSAR communication interface
`'SenderReceiverInterface'` | `'NvDataInterface'` | `'ModeSwitchInterface'`

Kind of AUTOSAR communication interface that is represented for the specified AUTOSAR interface object, specified as `'SenderReceiverInterface'`, `'NvDataInterface'`, and `'ModeSwitchInterface'`.

Example: `InterfaceKind='SenderReceiverInterface'`

`IsService` — Interface is a service interface
`true` | `false`

Whether an interface is a service interface, specified as `true` or `false`.

Example: `IsService=false`

`Package` — Package path
character vector | string scalar

The fully-qualified path to the element package for the specified AUTOSAR interface object, specified as a character vector or a string scalar.

Example: `Package='/Interface2'`

`SwAddrMethod` — Name of parameter `SwAddrMethod`
character vector | string scalar

`SwAddrMethod` name that is valid for the specified AUTOSAR data element object, specified as a character vector or a string scalar. Code generation uses the `SwAddrMethod` name to group AUTOSAR parameters in a memory section for access by calibration and measurement tools.

Example: `SwAddrMethod='VAR'`

`SwCalibrationAccess` — Calibration access mode
`'ReadOnly'` | `'ReadWrite'` | `'NotAccessible'`

How calibration and measurement tools access data for the specified AUTOSAR data element object, specified as `'ReadOnly'`, `'ReadWrite'`, and `'NotAccessible'`.

Example: `SwCalibrationAccess='ReadOnly'`

Version History

Introduced in R2022b

See Also

`autosar.dictionary.ARClassicPlatformMapping` | `exportDictionary` | `getPlatformProperties` | `getPlatformProperty`

Topics

"Configure AUTOSAR Data for Calibration and Measurement"
"Configure AUTOSAR Communication Interfaces"
"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addAliasType

Package: Simulink.interface

Add Simulink alias type to Simulink interface dictionary

Syntax

```
dataType = addAliasType(dictObj,dtName)
dataType = addAliasType(dictObj,dtName,BaseType=baseType)
```

Description

`dataType = addAliasType(dictObj,dtName)` adds a `Simulink.AliasType` with the specified name to the dictionary.

`dataType = addAliasType(dictObj,dtName,BaseType=baseType)` adds a `Simulink.AliasType` with the specified name using the specified base type to the dictionary.

Examples

Add Alias Type to Simulink Interface Dictionary

To add a `Simulink.AliasType` with the specified name to the dictionary, use the `addAliasType` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% add alias types
myAliasType1 = addAliasType(dictAPI,'aliasType',BaseType='single');
myAliasType1.Name = 'myAliasType1';
myAliasType1.BaseType = 'fixdt(1,32,16)';

myAliasType2 = addAliasType(dictAPI,'myAliasType2');
% can also use interface dict type objs
myAliasType2.BaseType = myAliasType1;
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`dtName` — DataType definition name
string scalar | character vector

DataType definition name in DataTypes property array of dictObj, specified as a character vector or a string scalar.

Example: "airSpeed"

baseType — Base type of the Simulink.AliasType
"double" (default) | string scalar | character vector

Name of the base data type that this alias renames, specified as a character vector or string scalar. You can specify the name of a standard data type, such as "uint32" or "single", or the name of a custom data type, such as the name of another Simulink.AliasType object, or the name of an enumeration.

Example: BaseType='uint32'

Output Arguments

dataType — Alias type object
AliasType object

Alias type, returned as a Simulink.interface.dictionary.AliasType object.

Version History

Introduced in R2022b

See Also

Simulink.interface.Dictionary | Simulink.AliasType | addEnumType | getDataType | getDataTypeNames

Topics
"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addDataInterface

Package: `Simulink.interface`

Add data interface to Simulink interface dictionary

Syntax

`interfaceObj = addDataInterface(dictObj,interfaceName)`

Description

`interfaceObj = addDataInterface(dictObj,interfaceName)` adds a data interface with the specified name in the dictionary. Returns the interface object that represents this interface.

Examples

Add AUTOSAR Data Interface

To add a data interface with the specified name that mirrors the specified bus object, use the `addDataInterface` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
dataInterface1 = addDataInterface(dictAPI,'DataInterface');

dataElm1 = addElement(dataInterface1,'DE1');
dataElm1.Type = myValueType1;

dataElm2 = addElement(dataInterface1,'DE2');
dataElm2.Type = myStructType2;
dataElm2.Dimensions = '4';
dataElm2.Description = 'I am a data element with DataType = array of struct type';

% data element with owned type
dataElm3 = addElement(dataInterface1,'DE3');
dataElm3.Type.DataType = 'single';
dataElm3.Type.Dimensions = '10';
dataElm3.Type.Minimum = '-5';

dataInterface2 = addDataInterface(dictAPI,'DataInterface2');
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`interfaceName` — Interfaces definition name
character vector | string scalar

`interfaceName` definition name in `Interfaces` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `'DataInterface'`

Output Arguments

`interfaceObj` — Interface object
`DataInterface` object

Data interface, returned as a `Simulink.interface.dictionary.DataInterface` object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement` | `addElement` | `getInterface` | `getInterfaceNames` | `removeInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addEnumType

Package: `Simulink.interface`

Add enumerated type to Simulink interface dictionary

Syntax

`dataType = addEnumType(dictObj,dtName)`

Description

`dataType = addEnumType(dictObj,dtName)` adds a Simulink enumeration with the specified name to the dictionary.

Examples

Add Enumeration to Simulink Interface Dictionary

To add a Simulink enumeration with the specified name to the dictionary, use the `addEnumType` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% add enumerated type
myEnumType1 = addEnumType(dictAPI,'myColor');
myEnumType1.addEnumeral('RED', '0', 'Solid Red');
myEnumType1.addEnumeral('BLUE', '1', 'Solid Blue');
myEnumType1.DefaultValue = 'BLUE';
myEnumType1.Description = 'I am a Simulink Enumeration';
myEnumType1.StorageType = 'int16';
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`dtName` — DataType definition name
string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `"airSpeed"`

Output Arguments

`dataType` — Enumerated type
`Simulink.interface.dictionary.EnumType` object

Enumerated type, returned as `Simulink.interface.dictionary.EnumType` object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `addAliasType` | `addStructType` | `getDataType` | `getDataTypeNames` | `removeDataType` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

addNumericType

Package: `Simulink.interface`

Add Simulink numeric type to Simulink interface dictionary

Syntax

```
dataType = addNumericType(dictObj,dtName)
dataType = addNumericType(dictObj,dtName,SimulinkNumericType=numericTypeObj)
```

Description

`dataType = addNumericType(dictObj,dtName)` adds a `Simulink.NumericType` with the specified name to the dictionary.

`dataType = addNumericType(dictObj,dtName,SimulinkNumericType=numericTypeObj)` adds a `Simulink.NumericType` with the specified name that has the same property values as the specified `Simulink.NumericType` object `numericTypeObj` to the dictionary.

.

Examples

Add Numeric Type to Interface Dictionary

To add a `Simulink.NumericType` with the specified name to the dictionary, use the `addNumericType` function.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
myNumericType = addNumericType(dictAPI,'myNumericType1')
```

```
myNumericType = 

  NumericType with properties:

                Name: 'myNumericType1'
        DataTypeMode: 'Double'
    DataTypeOverride: 'Inherit'
             IsAlias: 0
         Description: ''
               Owner: [1×1 Simulink.interface.Dictionary]
```

Add Numeric Type Based on Existing `Simulink.NumericType` to Interface Dictionary

To add a `Simulink.NumericType` that has the same property values as an existing `Simulink.NumericType` to the dictionary, use the `addNumericType` function with the `SimulinkNumericType` parameter.

```
exampleNumericTypeObj = Simulink.NumericType;
exampleNumericTypeObj.DataTypeMode = 'Single';
exampleNumericTypeObj.Description = 'This is my example numeric type';

dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
myNumericType2 = addNumericType(dictAPI,'myNumericType2',...
   SimulinkNumericType=exampleNumericTypeObj)
```

```
myNumericType2 = 

  NumericType with properties:

                Name: 'myNumericType2'
        DataTypeMode: 'Single'
    DataTypeOverride: 'Inherit'
             IsAlias: 0
         Description: 'This is my example numeric type'
               Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`dtName` — DataType definition name
string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `"airSpeed"`

`numericTypeObj` — Simulink numeric type
`Simulink.NumericType` object

Simulink numeric type, specified as a `Simulink.NumericType` object that has been previously defined.

Example: `SimulinkNumericType=exampleSimulinkNumericTypeObj`

Output Arguments

`dataType` — Numeric type
`Simulink.interface.dictionary.NumericType` object

Numeric type, returned as `Simulink.interface.dictionary.NumericType` object.

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `Simulink.NumericType` | `addEnumType` | `getDataType` | `getDataTypeNames`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addPlatformMapping

Package: `Simulink.interface`

Add AUTOSAR Classic mapping to Simulink interface dictionary

Syntax

`platformMapping = addPlatformMapping(dictObj,platformName)`

Description

`platformMapping = addPlatformMapping(dictObj,platformName)` adds mapping for the specified platform in the interface dictionary.

Examples

Add Platform Mapping for Simulink Interface Dictionary

To add AUTOSAR Classic mapping to an interface dictionary, use the `addPlatformMapping` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);
platformMapping = addPlatformMapping(dictAPI,'AUTOSARClassic');
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`platformName` — Platform mapping name
`'AUTOSARClassic'`

Platform mapping name selection, for example, `AUTOSARClassic` mapping.

Example: `'AUTOSARClassic'`

Output Arguments

`platformMapping` — Platform mapping object
`autosar.dictionary.ARClassicPlatformMapping` object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `autosar.dictionary.ARClassicPlatformMapping` | `getPlatformMapping` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addReference

Package: `Simulink.interface`

Add Simulink interface dictionary reference to another interface dictionary

Syntax

`addReference(dictObj,refDict)`

Description

`addReference(dictObj,refDict)` adds a referenced dictionary, specified by `refDict`, to the specified interface dictionary, `dictObj`. Dictionary referencing is supported for Simulink interface dictionaries that do not have applied platform mappings.

Examples

Add Referenced Dictionaries to a Simulink Interface Dictionary

Add referenced dictionaries `ReferenceInterfaces1.sldd` and `ReferenceInterfaces2.sldd` to the interface dictionary `MyInterfaces.sldd`.

```
dictAPI1 = Simulink.interface.dictionary.open('MyInterfaces.sldd');
dictAPI2 = Simulink.interface.dictionary.open('ReferenceInterfaces1.sldd');
addReference(dictAPI1,dictAPI2);
addReference(dictAPI1,'ReferenceInterfaces2.sldd');

refDicts = getReferences(dictAPI1)
```

```
refDicts =

  2×1 cell array

    {'C:\work\ReferenceInterfaces1.sldd'}
    {'C:\work\ReferenceInterfaces2.sldd'}
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`refDict` — Referenced interface dictionary
character vector | string scalar | `Simulink.interface.Dictionary` object

Referenced interface dictionary, specified as a character vector, a string scalar, or a `Simulink.interface.Dictionary` object.

Example: `'ReferenceDictionary.sldd'`

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open` | `getReferences` | `removeReference`

addServiceInterface

Package: `Simulink.interface`

Add service interface to Simulink interface dictionary

Syntax

`serviceInterfaceObj = addServiceInterface(dictObj,serviceInterfaceName)`

Description

`serviceInterfaceObj = addServiceInterface(dictObj,serviceInterfaceName)` adds a service interface with the specified name in the dictionary and returns the service interface object that represents this interface.

Examples

Add Service Interface to Interface Dictionary

To add a service interface with the specified name to a native (unmapped) interface dictionary, use the `addServiceInterface` function.

```
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.create(dictName);

serviceInterfObj = addServiceInterface(dictAPI,'ServiceInterface1');
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`serviceInterfaceName` — Service interface name
character vector | string scalar

Service interface name in `Interfaces` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `'ServiceInterface1'`

Output Arguments

`serviceInterfaceObj` — Service interface
`Simulink.interface.dictionary.ServiceInterface` object

Service interface, returned as a `Simulink.interface.dictionary.ServiceInterface` object.

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `getInterface` | `getInterfaceNames` | `removeInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addStructType

Package: `Simulink.interface`

Add structure type represented by `Simulink.Bus` in Simulink interface dictionary

Syntax

```
dataType = addStructType(dictObj,dtName)
dataType = addStructType(dictObj,dtName, SimulinkBus=busObj)
```

Description

`dataType = addStructType(dictObj,dtName)` adds a `Simulink.Bus` type with the specified name to the dictionary.

`dataType = addStructType(dictObj,dtName, SimulinkBus=busObj)` adds a structure type with the specified name, `dtName`, that mirrors the specified `Simulink.Bus` object, `busObj`, to the dictionary.

Examples

Add Bus Type to Simulink Interface Dictionary

To add a `Simulink.Bus` type with the specified name to the dictionary, use the `addStructType` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% add an enumerated type
myEnumType1 = addEnumType(dictAPI,'myColor');
myEnumType1.addEnumeral('RED', '0', 'Solid Red');
myEnumType1.addEnumeral('BLUE', '1', 'Solid Blue');
myEnumType1.StorageType = 'int16';

% add a value type that uses the enum type as its data type
myValueType1 = addValueType(dictAPI, 'myValueType1');
myValueType1.DataType = 'int32';
myValueType1.Dimensions = '[2 3]';
myValueType1.DataType = myEnumType1;

%% add a structured type
myStructType1 = addStructType(dictAPI, 'myStructType1');
structElement1 = myStructType1.addElement('Element1');
structElement1.Type.DataType = 'single';
structElement1.Type.Dimensions = '3';
structElement2 = myStructType1.addElement('Element2');
structElement2.Type = myValueType1;
% or
structElement2.Type = 'ValueType: myValueType1';
```

Add Structure Type Based on a Simulink.Bus Type to Interface Dictionary

This example adds a `StructType` type that mirrors an existing Simulink.Bus object to the Simulink interface dictionary, `MyInterfaces.sldd`.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% create Simulink.Bus object and add elements
simBusObj = Simulink.Bus;
busElement1 = Simulink.BusElement;
busElement1.Name = 'MyBusElement1';
busElement1.DataType = 'single';
simBusObj.Elements(1) = busElement1;
busElement2 = Simulink.BusElement;
busElement2.Name = 'MyBusElement2';
simBusObj.Elements(2) = busElement2;

% add structure type based on simBusObj
myNewStructType = addStructType(dictAPI,'StructFromSimBus',SimulinkBus=simBusObj)
```

```
myNewStructType =
  StructType with properties:
           Name: 'StructFromSimBus'
    Description: ''
       Elements: [1×2 Simulink.interface.dictionary.StructElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

dictObj — Interface dictionary

`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

dtName — DataType definition name

string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `"airSpeed"`

busObj — Simulink bus type object

`Simulink.Bus` object

Bus type object, specified as a `Simulink.Bus` object.

Output Arguments

dataType — Structure type object

`StructType` object

Structure type object, returned as `Simulink.interface.dictionary.StructType` object containing elements, with `Simulink.Bus` as the underlying implementation.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.Bus` | `addAliasType` | `addEnumType` | `addValueType` | `getDataType` | `getDataTypeNames` | `removeDataType` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

addValueType

Package: Simulink.interface

Add value type to Simulink interface dictionary

Syntax

```
dataType = addValueType(dictObj,dtName)
dataType = addValueType(dictObj,dtName, SimulinkValueType=valueTypeObj)
```

Description

`dataType = addValueType(dictObj,dtName)` adds a `Simulink.ValueType` with the specified name to the interface dictionary.

`dataType = addValueType(dictObj,dtName, SimulinkValueType=valueTypeObj)` adds a value type, specified as `dataType`, with the specified name, `dtName`, based on the specified `Simulink.ValueType` `valueTypeObj` to the interface dictionary.

Examples

Add Value Type to Simulink Interface Dictionary

To add a `Simulink.ValueType` with the specified name to the dictionary, use the `addValueType` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% add an enumerated type to be used as data type of value type
myEnumType1 = addEnumType(dictAPI,'myColor');
myEnumType1.addEnumeral('RED', '0', 'Solid Red');
myEnumType1.addEnumeral('BLUE', '1', 'Solid Blue');
myEnumType1.StorageType = 'int16';

% add value type
myValueType1 = addValueType(dictAPI, 'myValueType1');
myValueType1.DataType = 'int32';
myValueType1.Dimensions = '[2 3]';
myValueType1.Description = 'I am a Simulink ValueType';
myValueType1.DataType = myEnumType1;
```

Add Value Type Based on Simulink.ValueType to Interface Dictionary

This example adds a value type that mirrors an existing `Simulink.ValueType` to the Simulink interface dictionary, `MyInterfaces.sldd`.

```
% open interface dictionary
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.open(dictName);

% create a Simulink value type
simValueType = Simulink.ValueType;
simValueType.DataType = 'single';
simValueType.Min = 11;
simValueType.Max = 17;
simValueType.Dimensions = [2 4 3];
simValueType.Description = 'Simulink value type';

% add value type based on Simulink value type
myNewValueType1 = addValueType(dictAPI, 'MyNewValueType',...
   SimulinkValueType=simValueType)
```

```
myNewValueType1 =
  ValueType with properties:
           Name: 'MyNewValueType'
       DataType: 'single'
        Minimum: '11'
        Maximum: '17'
           Unit: ''
     Complexity: 'real'
     Dimensions: '[2 4 3]'
    Description: 'Simulink value type'
          Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

`dictObj` — Interface dictionary

`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`dtName` — DataType definition name

string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `"airSpeed"`

`valueTypeObj` — Simulink value type object

`Simulink.Valuetype` object

Value type object, specified as a `Simulink.ValueType` object.

Output Arguments

`dataType` — Value type object

`Simulink.interface.dictionary.ValueType` object

Value type object, returned as `Simulink.interface.dictionary.ValueType` object.

Version History

Introduced in R2022b

See Also

Simulink.interface.Dictionary | Simulink.ValueType | addAliasType | addEnumType | addStructType | getDataType | getDataTypeNames | save | show | showChanges | Simulink.interface.dictionary.create | Simulink.interface.dictionary.open

close

Package: `Simulink.interface`

Close open connections to Simulink interface dictionary

Syntax

```
close(dictObj)
close(dictObj, 'DiscardChanges', true)
```

Description

`close(dictObj)` closes the open connections to the interface dictionary. If the dictionary has unsaved changes, an error is thrown.

`close(dictObj, 'DiscardChanges', true)` closes the connections to the interface dictionary and discards any unsaved changes.

Examples

Close Simulink Interface Dictionary

To close the open connections to the interface dictionary, use the `close` function.

```
close(dictObj);
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `isDirty` | `save` | `show` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

discardChanges

Package: `Simulink.interface`

Discard changes to interface dictionary

Syntax

```
discardChanges(dictObj)
```

Description

`discardChanges(dictObj)` discards any changes made to the interface dictionary `dictObj` since the last time the dictionary was saved.

Examples

Discard Changes to Simulink Interface Dictionary

Add a new enumeration type to an interface dictionary and then discard the changes.

Verify that the dictionary does not contain changes.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
isDirty(dictAPI)
```

```
ans =
  logical
   0
```

Add enumeration type, `MyEnum`.

```
addEnumType(dictAPI,'MyEnum');
getDataTypeNames(dictAPI)
```

```
ans =
  1×8 cell array
  Columns 1 through 5
    {'MyEnum'}    {'myAliasType1'}    {'myAliasType2'}    {'myAliasType3'}    {'myColor'}
  Columns 6 through 8
    {'myStructType1'}    {'myStructType2'}    {'myValueType1'}
```

Discard the change.

```
discardChanges(dictAPI);
getDataTypeNames(dictAPI)
```

```
ans =
  1×7 cell array
  Columns 1 through 4
    {'myAliasType1'}    {'myAliasType2'}    {'myAliasType3'}    {'myColor'}
```

```
  Columns 5 through 7
    {'myStructType1'}    {'myStructType2'}    {'myValueType1'}
```

Input Arguments

dictObj — Interface dictionary
Simulink.interface.Dictionary object

Interface dictionary, specified as a Simulink.interface.Dictionary object. Before you use this function, create or open dictObj by using Simulink.interface.dictionary.create or Simulink.interface.dictionary.open.

Version History

Introduced in R2023a

See Also

Simulink.interface.Dictionary | addEnumType | getDataTypeNames | isDirty | showChanges | Simulink.interface.dictionary.create | Simulink.interface.dictionary.open

findEntryByName

Package: Simulink.interface

Get corresponding object for specified entry name in interface dictionary

Syntax

entryObj = findEntryByName(dictObj,entryName)

Description

entryObj = findEntryByName(dictObj,entryName) returns the object that corresponds to the specified entry name, entryName, in the interface dictionary. If the entry does not exist in the dictionary, an empty value is returned.

Examples

Get Interface Object by Specified Name

Get object for structure type named myStructType1 from the interface dictionary MyInterfaces.sldd.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
structObj = findEntryByName(dictAPI,'myStructType1')
```

```
structObj = 
  StructType with properties:
           Name: 'myStructType1'
    Description: ''
       Elements: [1×2 Simulink.interface.dictionary.StructElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

dictObj — Interface dictionary
Simulink.interface.Dictionary object

Interface dictionary, specified as a Simulink.interface.Dictionary object. Before you use this function, create or open dictObj by using Simulink.interface.dictionary.create or Simulink.interface.dictionary.open.

entryName — Interface or data type name
character vector | string scalar

Interface or data type name, specified as a character vector or a string scalar.

Example: 'DataInterface'

Output Arguments

`entryObj` — Interface or data type object
`DataInterface` object | `ServiceInterface` object | `AliasType` object | `EnumType` object | `NumericType` object | `StructType` object | `ValueType` object

Interface or data type object, returned as the object type of the corresponding entry in the interface dictionary.

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `getInterface` | `getInterfaceNames` | `getDataTypeNames` | `getDataType` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getDataType

Package: `Simulink.interface`

Get data type in Simulink interface dictionary

Syntax

```
dataTypeObj = getDataType(dictObj,dtName)
```

Description

`dataTypeObj = getDataType(dictObj,dtName)` returns the data type object that represents the data type specified by `dtName`.

Examples

Get Data Type from Simulink Interface Dictionary

To get the data type object that represents the specified data type name, use the `getDataType` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

Get the `EnumType` object for `myColor` data type name in the `dictAPI` dictionary object.

```
myColorObj = getDataType(dictAPI,'myColor')
```

```
myColorObj = 

  EnumType with properties:

            Name: 'myColor'
     Description: 'I am a Simulink Enumeration'
    DefaultValue: 'BLUE'
     StorageType: 'int16'
       Enumerals: [1×3 Simulink.interface.dictionary.Enumeral]
           Owner: [1×1 Simulink.interface.Dictionary]
```

Get the `AliasType` object for `myAliasType1` data type name in the `dictAPI` dictionary object.

```
myAliasType1Obj = getDataType(dictAPI,'myAliasType1')
```

```
myAliasType1Obj = 

  AliasType with properties:

           Name: 'myAliasType1'
       BaseType: 'fixdt(1,32,16)'
```

```
    Description: ''
          Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

dictObj — Interface dictionary
Simulink.interface.Dictionary object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

dtName — DataType definition name
string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: "airSpeed"

Output Arguments

dataTypeObj — DataType object
AliasType object | EnumType object | NumericType object | StructType object | ValueType object

`DataType` object created from a `DataType` element in a `dictObj` dictionary object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `addAliasType` | `addEnumType` | `addNumericType` | `addStructType` | `addValueType` | `getDataTypeNames` | `removeDataType` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getDataTypeNames

Package: `Simulink.interface`

Get names of data types in Simulink interface dictionary

Syntax

```
dataTypeNames = getDataTypeNames(dictObj)
```

Description

`dataTypeNames = getDataTypeNames(dictObj)` returns a cell array of the data type names in the dictionary.

Examples

Get Data Type Names from Simulink Interface Dictionary

To get a cell array of the data type names in the dictionary, use the `getDataTypeNames` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
dataTypeNames = getDataTypeNames(dictAPI)
```

```
dataTypeNames =

  1×7 cell array

  Columns 1 through 3

    {'myAliasType1'}    {'myAliasType2'}    {'myAliasType3'}

  Columns 4 through 6

    {'myColor'}    {'myStructType1'}    {'myStructType2'}

  Column 7

    {'myValueType1'}
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Output Arguments

`dataTypeNames` — `DataType` definition names
`cell array of character vectors` | `string array`

`DataType` definition names in `DataTypes` property array of `dictObj`, specified as a cell array of character vectors or a string array.

Example: `{'myAliasType1'} {'myAliasType2'} {'myAliasType3'}`

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `getDataType` | `removeDataType` | `removeInterface` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getInterface

Package: `Simulink.interface`

Get interface object for interface in Simulink interface dictionary

Syntax

```
interfaceObj = getInterface(dictObj,interfaceName)
```

Description

`interfaceObj = getInterface(dictObj,interfaceName)` returns the interface object that represents the specified interface in the interface dictionary.

Examples

Get Interface Object from Simulink Interface Dictionary

To get the interface object that represents the specified interface, use the `getInterface` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
myInterfaceObj = getInterface(dictAPI,'DataInterface')
```

```
myInterfaceObj = 

  DataInterface with properties:

           Name: 'DataInterface'
    Description: ''
       Elements: [1×3 Simulink.interface.dictionary.DataElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`interfaceName` — Interfaces definition name
character vector | string scalar

`interfaceName` definition name in `Interfaces` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `'DataInterface'`

Output Arguments

`interfaceObj` — Interface object
`DataInterface` object | `ServiceInterface` object

Interface object, returned as a `Simulink.interface.dictionary.DataInterface` or `Simulink.interface.dictionary.ServiceInterface` object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement` | `addDataInterface` | `addServiceInterface` | `getInterfaceNames` | `removeInterface` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getInterfaceNames

Package: `Simulink.interface`

Get cell array of interface names in Simulink interface dictionary

Syntax

`interfaceNames = getInterfaceNames(dictObj)`

Description

`interfaceNames = getInterfaceNames(dictObj)` returns a cell array of the interface names in the interface dictionary.

Examples

Get Interface Names from Simulink Interface Dictionary

To get a cell array of the interface names in the dictionary, use the `getInterfaceNames` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
myInterfaceNames = getInterfaceNames(dictAPI)
```

```
myInterfaceNames =

  1×2 cell array

    {'DataInterface'}    {'DataInterface2'}
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Output Arguments

`interfaceNames` — Interfaces definition names
cell array of character vectors | string array

`interfaceNames` definition names in `Interfaces` property array of `dictObj`, specified as a cell array of character vectors or a string array.

Example: `{'DataInterface'} {'DataInterface2'}`

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement` | `addDataInterface` | `addServiceInterface` | `getInterface` | `removeInterface` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getPlatformMapping

Package: Simulink.interface

Get platform mapping object for platform in dictionary

Syntax

```
platformMapping = getPlatformMapping(dictObj,platformName)
```

Description

`platformMapping = getPlatformMapping(dictObj,platformName)` returns the mapping object for the specified platform in the dictionary. This allows configuration of platform-specific properties in the dictionary.

Examples

Get Platform Mapping from Simulink Interface Dictionary

To get the mapping object for the specified platform in the dictionary, use the `getPlatformMapping` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
myPlatformMapping = getPlatformMapping(dictAPI, 'AUTOSARClassic')
```

```
myPlatformMapping = 

  ARClassicPlatformMapping with no properties.
```

Input Arguments

dictObj — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

platformName — Platform mapping name
`'AUTOSARClassic'`

Platform mapping name selection, for example, `AUTOSARClassic` mapping.

Example: `'AUTOSARClassic'`

Output Arguments

platformMapping — Platform mapping object
`autosar.dictionary.ARClassicPlatformMapping` object

Platform mapping object, specified as an `autosar.dictionary.ARClassicPlatformMapping` object.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `addAliasType` | `addDataInterface` | `addEnumType` | `addPlatformMapping` | `addStructType` | `addValueType` | `close` | `getDataType` | `getDataTypeNames` | `getInterface` | `getInterfaceNames` | `importFromBaseWorkspace` | `importFromFile` | `isDirty` | `removeDataType` | `removeInterface` | `save` | `show` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

getReferences

Package: `Simulink.interface`

Get cell array of names of interface dictionaries that are referenced by another interface dictionary

Syntax

```
refDictNames = getReferences(dictObj)
```

Description

`refDictNames = getReferences(dictObj)` returns a cell array of the names of interface dictionaries that are referenced by the interface dictionary `dictObj`.

Examples

Get Names of Interface Dictionaries Referenced from a Simulink Interface Dictionary

Get names of interface dictionaries referenced from the interface dictionary `MyInterfaces.sldd`.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
refDicts = getReferences(dictAPI)
```

```
refDicts =

  2×1 cell array

    {'C:\work\ReferenceInterfaces1.sldd'}
    {'C:\work\ReferenceInterfaces2.sldd'}
```

Input Arguments

`dictObj` — Interface dictionary

`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Output Arguments

`refDictNames` — Names of interface dictionaries referenced

cell array of character vectors | string array

Names of referenced interface dictionaries represented using full paths, specified as a cell array of character vectors or a string array.

Example: `{'C:\work\ReferenceInterfaces1.sldd'}`

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open` | `addReference` | `removeReference`

importFromBaseWorkspace

Package: `Simulink.interface`

Import Simulink object definitions

Syntax

```
importFromBaseWorkspace(dictObj)
```

Description

`importFromBaseWorkspace(dictObj)` copies `Simulink.Bus`, `Simulink.ValueType`, and `Simulink.AliasType` objects from base workspace to the interface dictionary identified by `dictObj`. The `Simulink.Bus` objects are imported as data interfaces. For those objects that need to be used as a structure `DataType`, these objects can be cut and pasted into the interface dictionary after the import operation.

Examples

Import Buses, Value Types, and Alias Types to Simulink Interface Dictionary

To import `Simulink.Bus`, `Simulink.ValueType`, and `Simulink.AliasType` objects from base workspace to the interface dictionary, use the `importFromBaseWorkspace` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
importFromBaseWorkspace(dictAPI);
```

Input Arguments

`dictObj` — Interface dictionary

`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `addAliasType` | `addDataInterface` | `addEnumType` | `addPlatformMapping` | `addStructType` | `addValueType` | `close` | `getDataType` | `getDataTypeNames` | `getInterface` | `getInterfaceNames` | `getPlatformMapping` |

`importFromFile` | `isDirty` | `removeDataType` | `removeInterface` | `save` | `show` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

importFromFile

Package: `Simulink.interface`

Import Simulink object definitions

Syntax

```
importFromFile(dictObjmatFileName)
```

Description

`importFromFile(dictObjmatFileName)` copies `Simulink.Bus`, `Simulink.ValueType`, and `Simulink.AliasType` objects from the specified MAT file to the interface dictionary identified by `dictObj`. The `Simulink.Bus` objects are imported as data interfaces. For those objects that need to be used as structure `DataType`, these objects can be cut and pasted in the interface dictionary to the **Interfaces** tab after the import operation.

Examples

Import Buses, Value Types, and Alias Types to Simulink Interface Dictionary

To import `Simulink.Bus`, `Simulink.ValueType`, and `Simulink.AliasType` objects from the specified MAT file to the interface dictionary, use the `importFromFile` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
importFromFile(dictAPI,'myMatFile.mat');
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`matFileName` — MAT file name
character vector | string

Name of MAT file, specified as a character vector or string. The name must include the `.mat` extension and must be a valid MATLAB identifier.

Example: `'myMatFile.mat'`

Version History

Introduced in R2022b

See Also

Simulink.interface.Dictionary | addAliasType | addDataInterface | addEnumType | addPlatformMapping | addStructType | addValueType | close | getDataType | getDataTypeNames | getInterface | getInterfaceNames | getPlatformMapping | importFromBaseWorkspace | isDirty | removeDataType | removeInterface | save | show | showChanges | Simulink.interface.dictionary.create | Simulink.interface.dictionary.open

isDirty

Package: `Simulink.interface`

Check whether there are unsaved changes in Simulink interface dictionary

Syntax

```
hasUnsavedChanges = isDirty(dictObj)
```

Description

`hasUnsavedChanges = isDirty(dictObj)` returns a 1 (true) if the dictionary has unsaved changes.

Examples

Check for Unsaved Changes in Simulink Interface Dictionary

To determine whether the dictionary has unsaved changes, use the `isDirty` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
isDirty(dictAPI)
```

```
ans =

  logical

   1
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `close` | `save` | `show` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

removeDataType

Package: `Simulink.interface`

Remove data type from Simulink interface dictionary

Syntax

`removeDataType(dictObj,dataTypeName)`

Description

`removeDataType(dictObj,dataTypeName)` deletes the specified data type in the interface dictionary.

Examples

Remove Data Type from Simulink Interface Dictionary

To delete the specified `DataType` in the dictionary, use the `removeDataType` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
removeDataType(dictAPI,'myAliasType1')
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`dataTypeName` — DataType definition name
string scalar | character vector

`DataType` definition name in `DataTypes` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `'myAliasType1'`

Version History

Introduced in R2022b

See Also

Simulink.interface.Dictionary | addAliasType | addEnumType | addNumericType | addStructType | addValueType | getDataType | getDataTypeNames | Simulink.interface.dictionary.create | Simulink.interface.dictionary.open

removeInterface

Package: `Simulink.interface`

Remove interface from Simulink interface dictionary

Syntax

```
removeInterface(dictObj,interfaceName)
```

Description

`removeInterface(dictObj,interfaceName)` deletes the specified interface from the interface dictionary.

Examples

Remove Interface from Simulink Interface Dictionary

To delete the specified interface from the dictionary, use the `removeInterface` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
removeInterface(dictAPI,'DataInterface')
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`interfaceName` — `Interfaces` definition name
character vector | string scalar

`interfaceName` definition name in `Interfaces` property array of `dictObj`, specified as a character vector or a string scalar.

Example: `'DataInterface'`

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement` | `addDataInterface` |

`addServiceInterface` | `getInterface` | `getInterfaceNames` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

removeReference

Package: `Simulink.interface`

Remove Simulink interface dictionary reference from another interface dictionary

Syntax

`removeReference(dictObj,refDict)`

Description

`removeReference(dictObj,refDict)` removes an interface dictionary reference, specified by `refDict`, from the specified interface dictionary, `dictObj`.

Examples

Remove Referenced Dictionaries from a Simulink Interface Dictionary

Remove referenced dictionaries `ReferenceInterfaces1.sldd` and `ReferenceInterfaces2.sldd` from the interface dictionary `MyInterfaces.sldd`.

Get the names of the referenced dictionaries.

```
dictAPI1 = Simulink.interface.dictionary.open('MyInterfaces.sldd');
refDicts = getReferences(dictAPI1)
```

```
refDicts =

  2×1 cell array

    {'C:\work\ReferenceInterfaces1.sldd'}
    {'C:\work\ReferenceInterfaces2.sldd'}
```

Remove the referenced dictionaries, using a dictionary object and character vector.

```
dictAPI2 = Simulink.interface.dictionary.open('ReferenceInterfaces1.sldd');
removeReference(dictAPI1,dictAPI2);
removeReference(dictAPI1,'ReferenceInterfaces2.sldd');

refDicts = getReferences(dictAPI1)
```

```
refDicts =

  0×1 empty cell array
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

`refDict` — Referenced interface dictionary
character vector | string scalar | `Simulink.interface.Dictionary` object

Referenced interface dictionary, specified as a character vector, a string scalar, or a `Simulink.interface.Dictionary` object.

Example: `'ReferenceDictionary.sldd'`

Version History

Introduced in R2023a

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open` | `addReference` | `getReferences`

save

Package: `Simulink.interface`

Save changes to Simulink interface dictionary

Syntax

`save(dictObj)`

Description

`save(dictObj)` saves the interface dictionary.

Examples

Save Simulink Interface Dictionary

To save the interface dictionary, use the `save` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
save(dictAPI);
```

Input Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `close` | `isDirty` | `show` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

show

Package: `Simulink.interface`

View contents of Simulink interface dictionary in standalone viewer

Syntax

```
show(dictObj)
```

Description

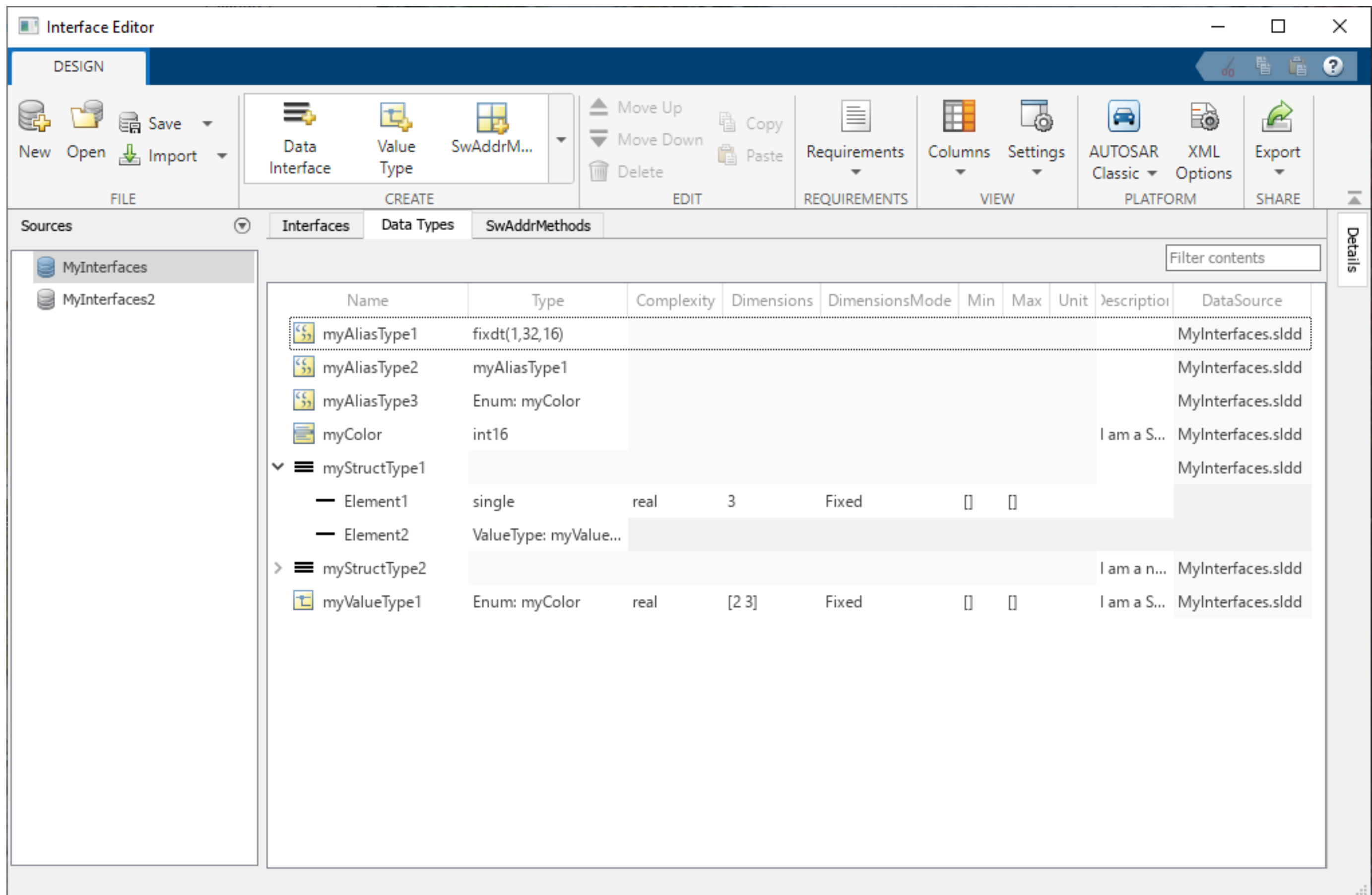
`show(dictObj)` displays the dictionary contents in the standalone interface editor.

Examples

View Simulink Interface Dictionary in Interface Editor

To display the dictionary contents in the standalone interface editor, use the `show` function. For an example that shows more of the workflow for related functions, see “Create and Configure Interface Dictionary” on page 1-279.

```
show(dictAPI);
```



Input Arguments

`dictObj` — Interface dictionary

`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `close` | `isDirty` | `save` | `showChanges` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

showChanges

Package: `Simulink.interface`

View changes to contents of Simulink interface dictionary in comparison viewer

Syntax

```
showChanges(dictObj)
```

Description

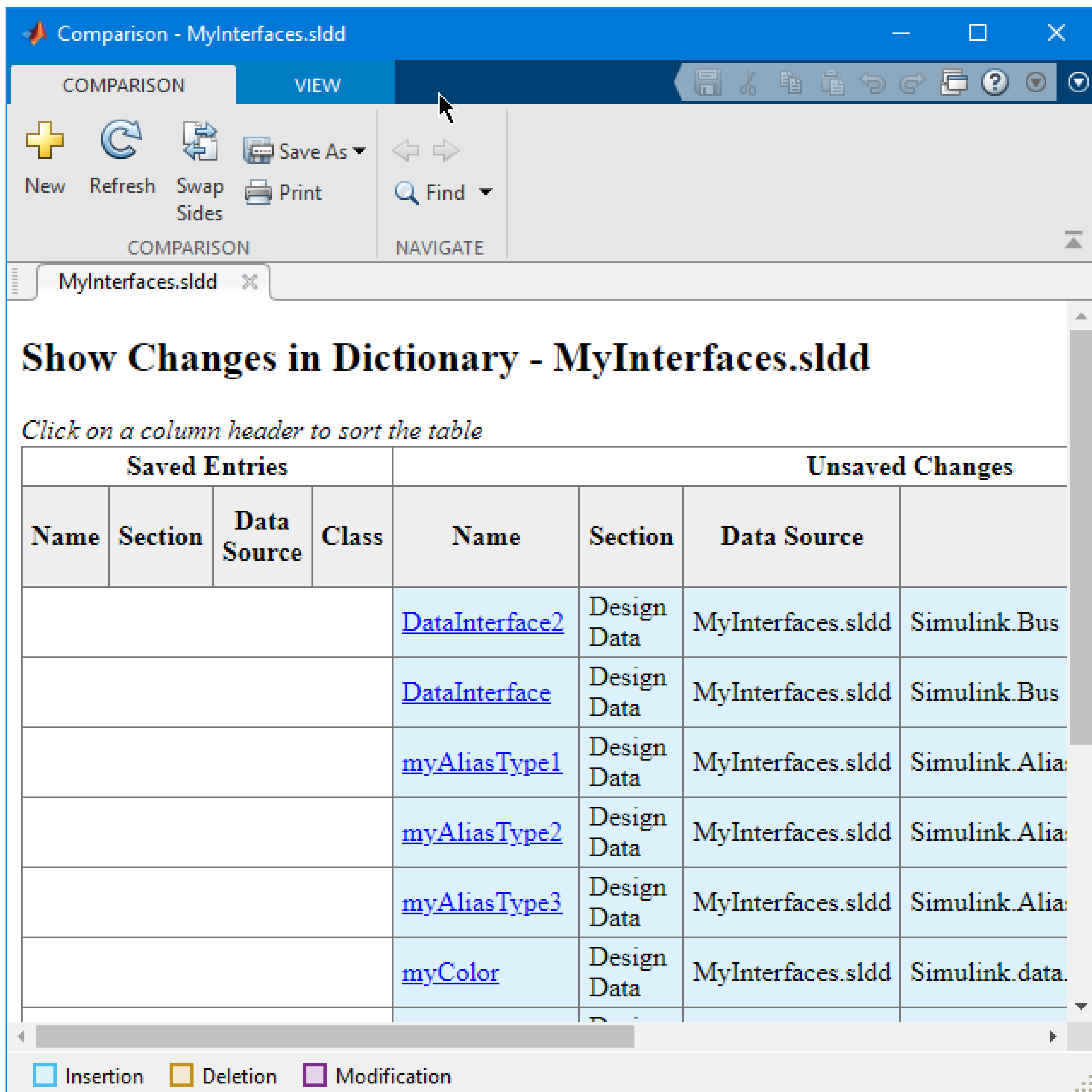
`showChanges(dictObj)` opens the Comparison Tool window and displays changes to the dictionary since it was last saved. The Comparison Tool shows the differences in the Simulink design data properties. Changes made to platform properties are not shown.

Examples

View Changes to Simulink Interface Dictionary in Comparison Tool

To open the Comparison Tool window and display changes to the dictionary since it was last saved, use the `showChanges` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
showChanges(dictAPI);
```



Input Arguments

dictObj — Interface dictionary
Simulink.interface.Dictionary object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `close` | `isDirty` | `save` | `show` | `Simulink.interface.dictionary.create` | `Simulink.interface.dictionary.open`

autosar.dictionary.ARClassicPlatformMapping

Manage platform-specific properties for elements in interface dictionary mapped to AUTOSAR Classic Platform

Description

The `autosar.dictionary.ARClassicPlatformMapping` object provides methods that help you manage the platform-specific properties in an interface dictionary mapped to the AUTOSAR Classic Platform.

Creation

To create an `autosar.dictionary.ARClassicPlatformMapping` object, use the `addPlatformMapping` function.

```
% after creating a Simulink.interface.dictionary object, dictAPI,
% you can create a platformMapping object
platformMapping = dictAPI.addPlatformMapping('AUTOSARClassic');
```

If you already have an interface dictionary mapped to the Classic Platform, you can represent an `autosar.dictionary.ARClassicPlatformMapping` object by using the `getPlatformMapping` function.

```
platformMapping = dictAPI.getPlatformMapping('AUTOSARClassic');
```

Object Functions

exportDictionary	Export interface, data type, and platform-specific definitions from interface dictionary
getPlatformProperties	Get AUTOSAR platform properties from interface dictionary
getPlatformProperty	Get AUTOSAR platform property from interface dictionary
setPlatformProperty	Set AUTOSAR properties for data interface or element in interface dictionary

Examples

Configure AUTOSAR Classic Data Interface and Properties in Interface Dictionary

This example creates a `Simulink.interface.dictionary` object, configures the dictionary contents, and then adds platform-specific elements.

Create interface dictionary.

```
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.create(dictName);
```

Add data types, including an enumeration, an alias type, a value type, and a structure.

```
% Enum Types
myEnumType1 = addEnumType(dictAPI,'myColor');
```

```
myEnumType1.addEnumeral('RED','0','Solid Red');
myEnumType1.addEnumeral('BLUE','1','Solid Blue');
myEnumType1.StorageType = 'int16';

% set base type of an alias type to enum object
myAliasType1 = addAliasType(dictAPI,'myAliasType1');
myAliasType1.BaseType = myEnumType1;

% ValueType
myValueType1 = addValueType(dictAPI,'myValueType1');
myValueType1.DataType = 'int32';
myValueType1.Dimensions = '[2 3]';
myValueType1.DataType = myEnumType1; % can also use interface dict type objs

% StructType
myStructType1 = addStructType(dictAPI,'myStructType1');
structElement1 = myStructType1.addElement('Element1');
structElement1.Type.DataType = 'single';
structElement1.Type.Dimensions = '3';
structElement2 = myStructType1.addElement('Element2');
structElement2.Type = myValueType1;
% or
structElement2.Type = 'ValueType: myValueType1';
```

Add data interfaces, and configure data elements.

```
dataInterface1 = addDataInterface(dictAPI,'DataInterface');

dataElm1 = addElement(dataInterface1,'DE1');
dataElm1.Type = myValueType1;

dataElm2 = addElement(dataInterface1,'DE2');
dataElm2.Type = myStructType1;
dataElm2.Dimensions = '4';
dataElm2.Description = 'I am a data element with datatype = array of struct type';

% data element with owned type
dataElm3 = addElement(dataInterface1,'DE3');
dataElm3.Type.DataType = 'single';
dataElm3.Type.Dimensions = '10';
dataElm3.Type.Minimum = '-5';

dataInterface2 = addDataInterface(dictAPI,'DataInterface2');
```

Add AUTOSAR Classic mapping.

```
platformMapping = addPlatformMapping(dictAPI,'AUTOSARClassic');
```

Configure interface properties for a classic component, including package path and nonvolatile data communication.

```
setPlatformProperty(platformMapping, dataInterface1,...
    'Package','/Interface2','InterfaceKind','NvDataInterface');
```

Get the platform properties.

```
[pNames, pValues] = getPlatformProperties(platformMapping,dataInterface1);
```

Add `VAR1` software address method to the dictionary and set AUTOSAR platform-specific properties for data element `DE1` in data interface `DataInterface`.

```
arObj = autosar.api.getAUTOSARProperties(dictName);
addPackageableElement(arObj,'SwAddrMethod', ...
    '/SwAddressMethods','VAR1','SectionType','Var');
setPlatformProperty(platformMapping,dataElm1, ...
```

```
    'SwAddrMethod','VAR1','SwCalibrationAccess', ...
    'ReadWrite','DisplayFormat','%.3f');
```

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement` | `addElement` | `addAliasType` | `addDataInterface` | `addEnumType` | `addPlatformMapping` | `addStructType` | `addValueType` | `autosar.api.getAUTOSARProperties` | `getDataType` | `getInterface` | `getInterfaceNames` | `getPlatformMapping`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

Simulink.interface.Dictionary

Manage interface dictionary

Description

The `Simulink.interface.Dictionary` object provides methods that help you manage the interface dictionary.

Creation

To create a Simulink interface dictionary and return an object representing the dictionary, use the `Simulink.interface.dictionary.create` function.

```
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.create(dictName);
```

If you already created an interface dictionary, you can create a `Simulink.interface.dictionary` object to represent the existing dictionary by using the `Simulink.interface.dictionary.open` function.

```
dictAPI = Simulink.interface.dictionary.open('MyInterfaces.sldd');
```

Properties

`DataTypes` — Data types defined in dictionary
array of `DataType` objects

Data types defined in dictionary, specified as an array of `DataType` objects with properties: `Name` and `Owner`.

`DictionaryFileName` — File name associated with dictionary
character vector

File name of SLDD file associated with the dictionary.

`Interfaces` — Interfaces defined in dictionary
array of interface objects

Interfaces defined in dictionary, specified as an array of `DataInterface` and `ServiceInterface` objects with properties: `Name`, `Description`, `Elements`, and `Owner`.

Object Functions

addAliasType	Add Simulink alias type to Simulink interface dictionary
addDataInterface	Add data interface to Simulink interface dictionary
addEnumType	Add enumerated type to Simulink interface dictionary
addNumericType	Add Simulink numeric type to Simulink interface dictionary
addPlatformMapping	Add AUTOSAR Classic mapping to Simulink interface dictionary

addReference	Add Simulink interface dictionary reference to another interface dictionary
addServiceInterface	Add service interface to Simulink interface dictionary
addStructType	Add structure type represented by Simulink.Bus in Simulink interface dictionary
addValueType	Add value type to Simulink interface dictionary
close	Close open connections to Simulink interface dictionary
discardChanges	Discard changes to interface dictionary
findEntryByName	Get corresponding object for specified entry name in interface dictionary
getDataType	Get data type in Simulink interface dictionary
getDataTypeNames	Get names of data types in Simulink interface dictionary
getInterface	Get interface object for interface in Simulink interface dictionary
getInterfaceNames	Get cell array of interface names in Simulink interface dictionary
getPlatformMapping	Get platform mapping object for platform in dictionary
getReferences	Get cell array of names of interface dictionaries that are referenced by another interface dictionary
importFromBaseWorkspace	Import Simulink object definitions
importFromFile	Import Simulink object definitions
isDirty	Check whether there are unsaved changes in Simulink interface dictionary
removeDataType	Remove data type from Simulink interface dictionary
removeInterface	Remove interface from Simulink interface dictionary
removeReference	Remove Simulink interface dictionary reference from another interface dictionary
save	Save changes to Simulink interface dictionary
show	View contents of Simulink interface dictionary in standalone viewer
showChanges	View changes to contents of Simulink interface dictionary in comparison viewer

Examples

Create and Configure Interface Dictionary

This example creates a `Simulink.interface.dictionary` object and configures the dictionary contents. This example also shows how to manage AUTOSAR Classic platform-related elements.

Create an interface dictionary.

```
dictName = 'MyInterfaces.sldd';
dictAPI = Simulink.interface.dictionary.create(dictName);
```

Add data types.

```
% Alias Types
myAliasType1 = addAliasType(dictAPI,'aliasType',BaseType='single');
myAliasType1.Name = 'myAliasType1';
myAliasType1.BaseType = 'fixdt(1,32,16)';

myAliasType2 = addAliasType(dictAPI,'myAliasType2');
% can also use interface dict type objs
myAliasType2.BaseType = myAliasType1;

% Enum Type
myEnumType1 = addEnumType(dictAPI,'myColor');
myEnumType1.addEnumeral('RED','0','Solid Red');
myEnumType1.addEnumeral('BLUE','1','Solid Blue');
```

```
myEnumType1.DefaultValue = 'BLUE';
myEnumType1.Description = 'I am a Simulink Enumeration';
myEnumType1.StorageType = 'int16';

% set base type of an alias type to be this enum object
myAliasType3 = addAliasType(dictAPI,'myAliasType3');
myAliasType3.BaseType = myEnumType1;

% Value Type
myValueType1 = addValueType(dictAPI,'myValueType1');
myValueType1.DataType = 'int32';
myValueType1.Dimensions = '[2 3]';
myValueType1.Description = 'I am a Simulink ValueType';
myValueType1.DataType = myEnumType1; % can also use interface dict type objs

% Struct Type
myStructType1 = addStructType(dictAPI,'myStructType1');
structElement1 = myStructType1.addElement('Element1');
structElement1.Type.DataType = 'single';
structElement1.Type.Dimensions = '3';
structElement2 = myStructType1.addElement('Element2');
structElement2.Type = myValueType1;
% or
structElement2.Type = 'ValueType: myValueType1';

% Nested Struct Type
myStructType2 = addStructType(dictAPI,'myStructType2');
myStructType2.Description = 'I am a nested structure';
structElement = myStructType2.addElement('Element');
structElement.Dimensions = '5';
structElement.Type = myStructType1;
% or
structElement.Type = 'Bus: myStructType1';
```

Add interfaces and configure design data on data elements.

```
dataInterface1 = addDataInterface(dictAPI,'DataInterface');

dataElm1 = addElement(dataInterface1,'DE1');
dataElm1.Type = myValueType1;

dataElm2 = addElement(dataInterface1,'DE2');
dataElm2.Type = myStructType2;
dataElm2.Dimensions = '4';
dataElm2.Description = 'I am a data element with datatype = array of struct type';

% data element with owned type
dataElm3 = addElement(dataInterface1,'DE3');
dataElm3.Type.DataType = 'single';
dataElm3.Type.Dimensions = '10';
dataElm3.Type.Minimum = '-5';

dataInterface2 = addDataInterface(dictAPI,'DataInterface2');
```

Add AUTOSAR Classic mapping.

```
platformMapping = addPlatformMapping(dictAPI,'AUTOSARClassic');
```

Set AUTOSAR communication interface and package properties.

```
setPlatformProperty(platformMapping,dataInterface1,...
    Package='/Interface2',InterfaceKind='NvDataInterface');
```

Get the platform-specific properties.

```
[pNames, pValues] = getPlatformProperties(platformMapping,dataInterface1);
```

Manage AUTOSAR Classic platform-related elements, SwAddrMethod and calibration properties. These elements do not have mapping to Simulink.

```
arObj = autosar.api.getAUTOSARProperties(dictName);
addPackageableElement(arObj,'SwAddrMethod', ...
```

```
    '/SwAddressMethods','VAR1','SectionType','Var');
setPlatformProperty(platformMapping,dataElm1, ...
    SwAddrMethod='VAR1',SwCalibrationAccess='ReadWrite',...
     DisplayFormat='%.3f');
```

Version History

Introduced in R2022b

See Also

autosar.dictionary.ARClassicPlatformMapping | Simulink.interface.dictionary.DataInterface | Simulink.interface.dictionary.DataElement | addElement | exportDictionary | getPlatformProperties | getPlatformProperty | setPlatformProperty | Simulink.interface.dictionary.create | Simulink.interface.dictionary.open

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

Simulink.interface.dictionary.create

Package: `Simulink.interface.dictionary`

Create a Simulink Interface Dictionary

Syntax

`dictObj = Simulink.interface.dictionary.create(dictionaryName)`

Description

`dictObj = Simulink.interface.dictionary.create(dictionaryName)` creates a Simulink Interface Dictionary and returns an object representing the dictionary.

Examples

Create Simulink Interface Dictionary

To create a Simulink Interface Dictionary and return an object representing the dictionary, use the `Simulink.interface.dictionary.create` function.

```
dictObj = Simulink.interface.dictionary.create(dictionaryName);
```

Input Arguments

`dictionaryName` — Name of interface dictionary
character vector | string scalar

Name of interface dictionary, specified as a character vector or string scalar. The name must include the `.sldd` extension and must be a valid MATLAB identifier.

Example: `"new_dictionary.sldd"`

Output Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `addAliasType` | `addDataInterface` | `addEnumType` | `addPlatformMapping` | `addStructType` | `addValueType` | `close` | `getDataType` | `getDataTypeNames` | `getInterface` | `getInterfaceNames` | `getPlatformMapping` | `importFromBaseWorkspace` | `importFromFile` | `isDirty` | `removeDataType` | `removeInterface` | `save` | `show` | `showChanges` | `Simulink.interface.dictionary.open`

Simulink.interface.dictionary.open

Package: Simulink.interface.dictionary

Open a Simulink Interface Dictionary

Syntax

```
dictObj = Simulink.interface.dictionary.open(dictionaryName)
```

Description

`dictObj = Simulink.interface.dictionary.open(dictionaryName)` opens the specified Interface Dictionary `dictionaryName` and returns an object representing the dictionary.

Examples

Open Simulink Interface Dictionary

To open the specified Interface Dictionary `dictionaryName` and return an object representing the dictionary, use the `open` function. For an example that shows more of the workflow for related functions, see "Create and Configure Interface Dictionary" on page 1-279.

```
dictAPI = Simulink.interface.dictionary.open("new_dictionary.sldd");
```

Input Arguments

`dictionaryName` — Name of interface dictionary
character vector | string scalar

Name of interface dictionary, specified as a character vector or string scalar. The name must include the `.sldd` extension and must be a valid MATLAB identifier.

Example: `"new_dictionary.sldd"`

Output Arguments

`dictObj` — Interface dictionary
`Simulink.interface.Dictionary` object

Interface dictionary, specified as a `Simulink.interface.Dictionary` object. Before you use this function, create or open `dictObj` by using `Simulink.interface.dictionary.create` or `Simulink.interface.dictionary.open`.

Version History

Introduced in R2022b

See Also

Simulink.interface.Dictionary | addAliasType | addDataInterface | addEnumType | addPlatformMapping | addStructType | addValueType | close | getDataType | getDataTypeNames | getInterface | getInterfaceNames | getPlatformMapping | importFromBaseWorkspace | importFromFile | isDirty | removeDataType | removeInterface | save | show | showChanges | Simulink.interface.dictionary.create

Migrator

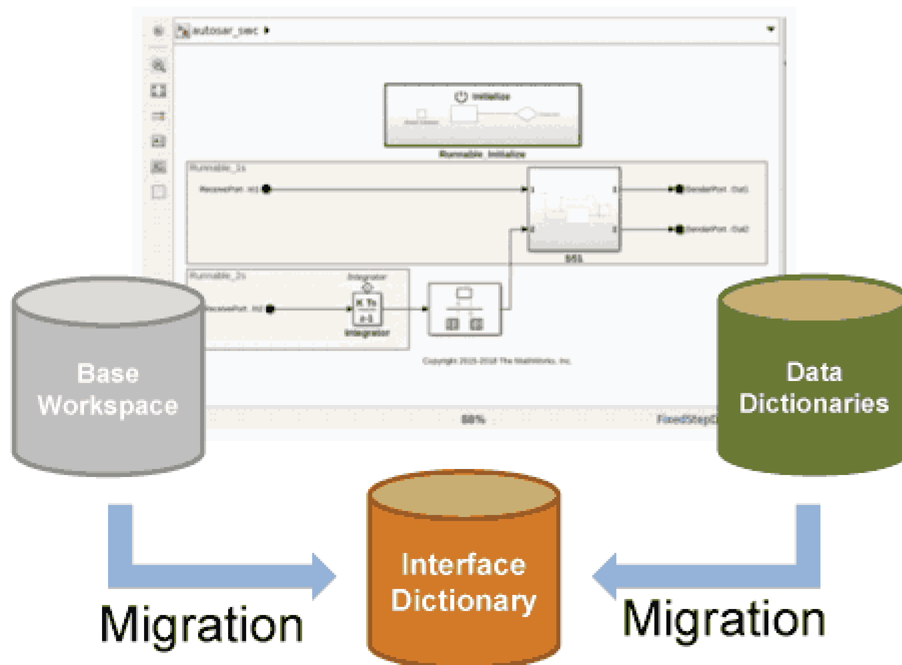
Migrate data types and interfaces from base workspace and data dictionaries to an interface dictionary

Description

The interface dictionary `Migrator` object lets you perform migration from a model or an architecture.

The object functions let you programmatically execute the steps in the migration workflow, including:

- Analyze the data types and interfaces to migrate
- Apply the migration analysis
- Revert the migration analysis
- Save the applied migration changes



Creation

`migratorObj = Simulink.interface.dictionary.Migrator(modelName, 'InterfaceDictionaryName', dictionaryName, 'DeleteFromOriginalSource', deleteFlag, 'ConflictResolutionPolicy', conflictResolutionPolicyFlag)` constructs

a `Migrator` object representing the data types and interfaces to migrate from the base workspace and data dictionaries to the interface dictionary. See “Create Interface Dictionary Migrator Object” on page 1-289

The `Migrator` function input arguments select the model, interface dictionary, whether to delete variables from the model, and the conflict resolution policy.

Input Arguments

- **modelName** — Name of the model

  character vector | string

  Name of source system architecture, specified as a character vector or string.
- **dictionaryName** — Name of interface dictionary

  character vector | string

  Name of interface dictionary, specified as a character vector or string. The name must include the `.sldd` extension and must be a valid MATLAB identifier.
- **deleteFlag** — Select variable deletion

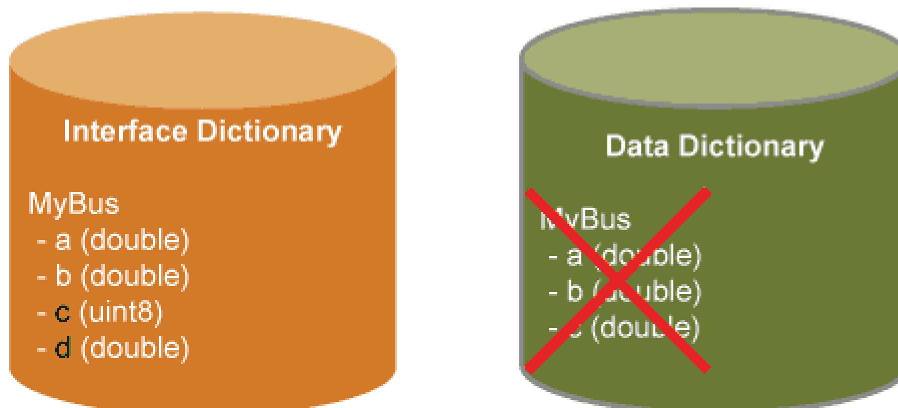
  `true` (default) | `false`

  Selects (if true) whether to delete variables (data types and interfaces) from the source base workspace and data dictionaries after these migrate to the interface dictionary.
- **conflictResolutionPolicyFlag** — Select conflict resolution

  `'Error'` (default) | `'OverwriteInterfaceDictionary'` | `'KeepInterfaceDictionary'`

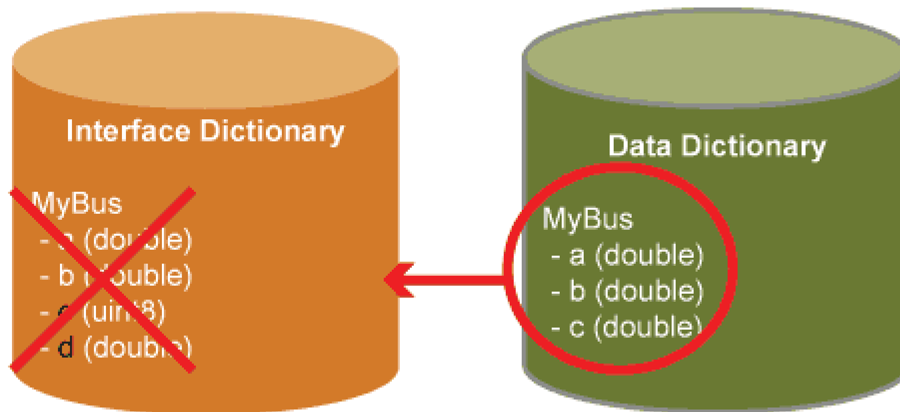
  Selects resolution policy for merge conflicts between data types and interfaces in the base workspace and the data dictionaries versus those already present in the interface dictionary.

Keep existing element in the Interface Dictionary



Keep Interface Dictionary

Overwrite the Interface Dictionary



Overwrite Interface Dictionary

Output Arguments

- **migratorObj** — `Migrator` object

  `Migrator` object

  `Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Properties

`DeleteFromOriginalSource` — Select variable deletion
`true` (default) | `false`

Selects (if true) whether to delete variables from the source base workspace and data dictionaries after these migrate to the interface dictionary.

`ConflictResolutionPolicy` — Select conflict resolution
`'Error'` (default) | `'OverwriteInterfaceDictionary'` | `'KeepInterfaceDictionary'`

Selects resolution policy for merge conflicts between data types and interfaces in source base workspace and data dictionaries versus those already present in the interface dictionary.

`DataTypesToMigrate` — List of data types to migrate
`cell array of character vectors` | `string array`

Analysis result from the `analyze` function listing data types and interfaces to migrate from the base workspace and data dictionaries to the interface dictionary. An interface is a Simulink.Bus used in a root IO. Other Simulink.Bus objects are considered as data types

`InterfacesToMigrate` — List of interfaces to migrate
`cell array of character vectors` | `string array`

Analysis result from the `analyze` function listing interfaces to migrate from the base workspace and data dictionaries to the interface dictionary.

`ConflictObjects` — List of objects that conflict with interface dictionary
`cell array of character vectors` | `string array`

Analysis result from the `analyze` function listing objects in conflict with the interface dictionary.

`UnusedObjects` — List of unused objects
`cell array of character vectors` | `string array`

Analysis result from the `analyze` function listing objects not used in the base workspace and data dictionaries.

`UnsupportedMigration` — List of unsupported objects
`cell array of character vectors` | `string array`

Analysis result from the `analyze` function listing unsupported objects to migrate.

Object Functions

analyze	Analyze a model or an architecture for migration to interface dictionary
analyzeAndApply	Analyze a model or an architecture and apply migration to interface dictionary
apply	Apply interface dictionary migration changes from analysis of a model or an architecture
revert	Revert interface dictionary migration changes applied from analysis of a model or an architecture
save	Save applied interface dictionary migration changes from analysis of a model or an architecture

Examples

Create Interface Dictionary Migrator Object

Create a `Migrator` object to migrate data types and interfaces from base workspace and data dictionaries to an interface dictionary.

To create a `Migrator` object, use the `Simulink.interface.dictionary.Migrator` function. After creating the object, you can use the `analyze` function to populate the object properties.

```
myMigratorObj= Simulink.interface.dictionary.Migrator('mySoftwareArch', ...
    'InterfaceDictionaryName','MyInterfaces.sldd')
```

```
myMigratorObj = 

  Migrator with properties:

    DeleteFromOriginalSource: 1
    ConflictResolutionPolicy: "Error"
          DataTypesToMigrate: []
         InterfacesToMigrate: []
             ConflictObjects: []
```

```
           UnusedObjects: []
    UnsupportedMigration: []
```

Version History

Introduced in R2022b

See Also

`analyze` | `analyzeAndApply` | `apply` | `revert` | `save` | **Interface Editor**

analyze

Package: `Simulink.interface.dictionary`

Analyze a model or an architecture for migration to interface dictionary

Syntax

```
analyze(migratorObj)
```

Description

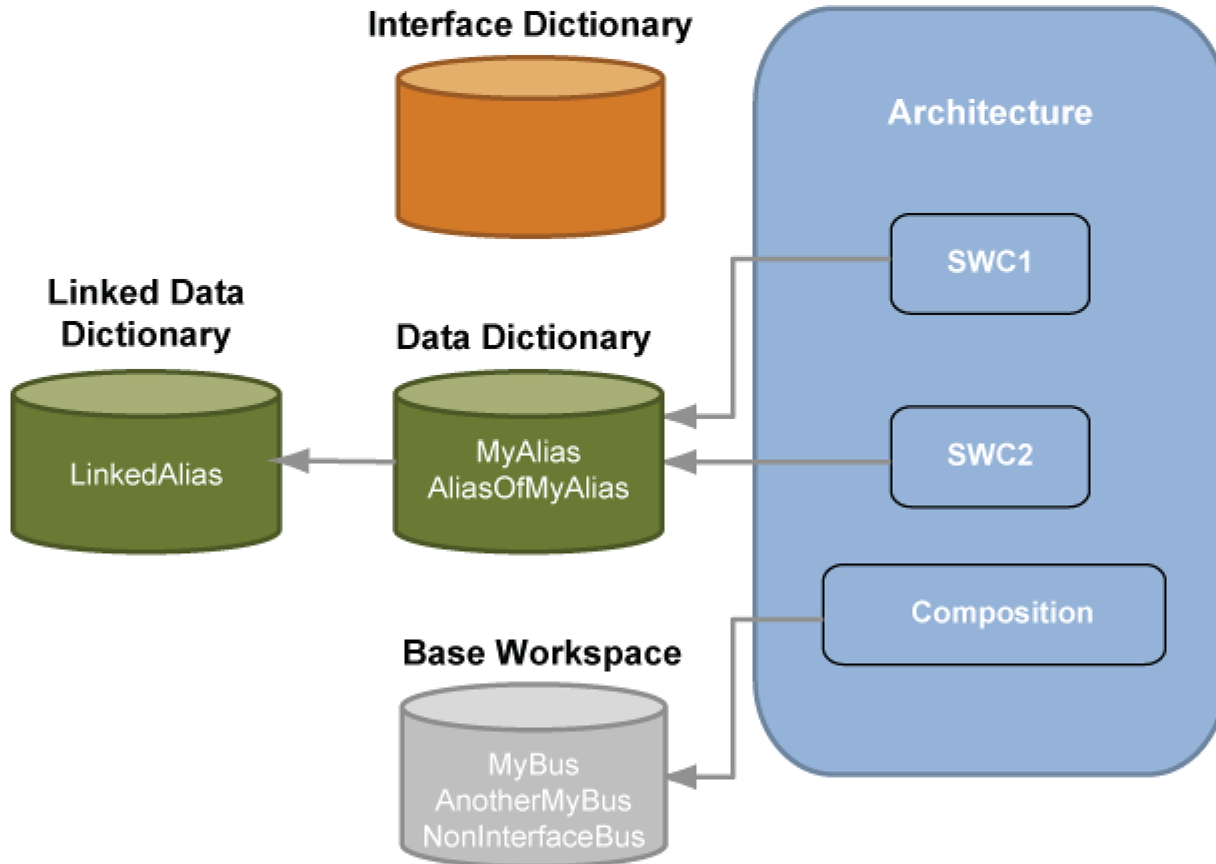
`analyze(migratorObj)` analyzes a model or an architecture for migration to an interface dictionary. The analysis identifies the data types and interfaces in the model and data dictionaries for migration to an interface dictionary. The analysis also identifies conflict issues that affect migration.

Examples

Analyze and Apply Interface Dictionary Migration

After creating a `Simulink.interface.dictionary.Migrator` object, you can analyze data type and interface content in the model for migration to the interface dictionary and apply the migration.

Select a model that is linked to a data dictionary or an architecture that is linked to an interface dictionary. See figure. The goal of the migration is to add content to the interface dictionary and link the models and dictionaries.



Before Linking Sources and Data Migration

In this example migration, there are no conflicting data types or interfaces. The analysis identifies:

- The data types to migrate are `MyAlias`, `AliasOfMyAlias`, `NonInterfaceBus`, and `LinkedAlias`.
- The interfaces to migrate are `MyBus` and `AnotherMyBus`.

The architecture consists of `SWC1`, `SWC2`, and `Composition`. The architecture uses a data dictionary hierarchy of `dDictionary.sldd --> dLinkedDictionary.sldd`.

Load the model and load the base workspace data.

```
load_system("mArchitectureWithDataDictionary");
load('hWorkspaceData.mat',...
    'MyBus','AnotherMyBus','NonInterfaceBus');
```

Create a `Simulink.interface.dictionary.Migrator` object.

```
myMigratorObj = Simulink.interface.dictionary.Migrator( ...
    "mArchitectureWithDataDictionary", ...
    'InterfaceDictionaryName',"interfaceDictionary.sldd");
```

Perform migration analysis and display analysis results.

```
analyze(myMigratorObj);

disp('Imported interfaces')
cellfun(@(x) x.Name,myMigratorObj.InterfacesToMigrate, ...
    'UniformOutput',false)
disp('Imported datatypes')
cellfun(@(x) x.Name,myMigratorObj.DataTypesToMigrate, ...
    'UniformOutput',false)
disp('Objects in conflict')
cellfun(@(x) strcat(x{1}.Name,' -> ',x{1}.Source), ...
    myMigratorObj.ConflictObjects,'UniformOutput',false)
disp('Unused objects')
cellfun(@(x) x.Name,myMigratorObj.UnusedObjects, ...
    'UniformOutput',false)
```

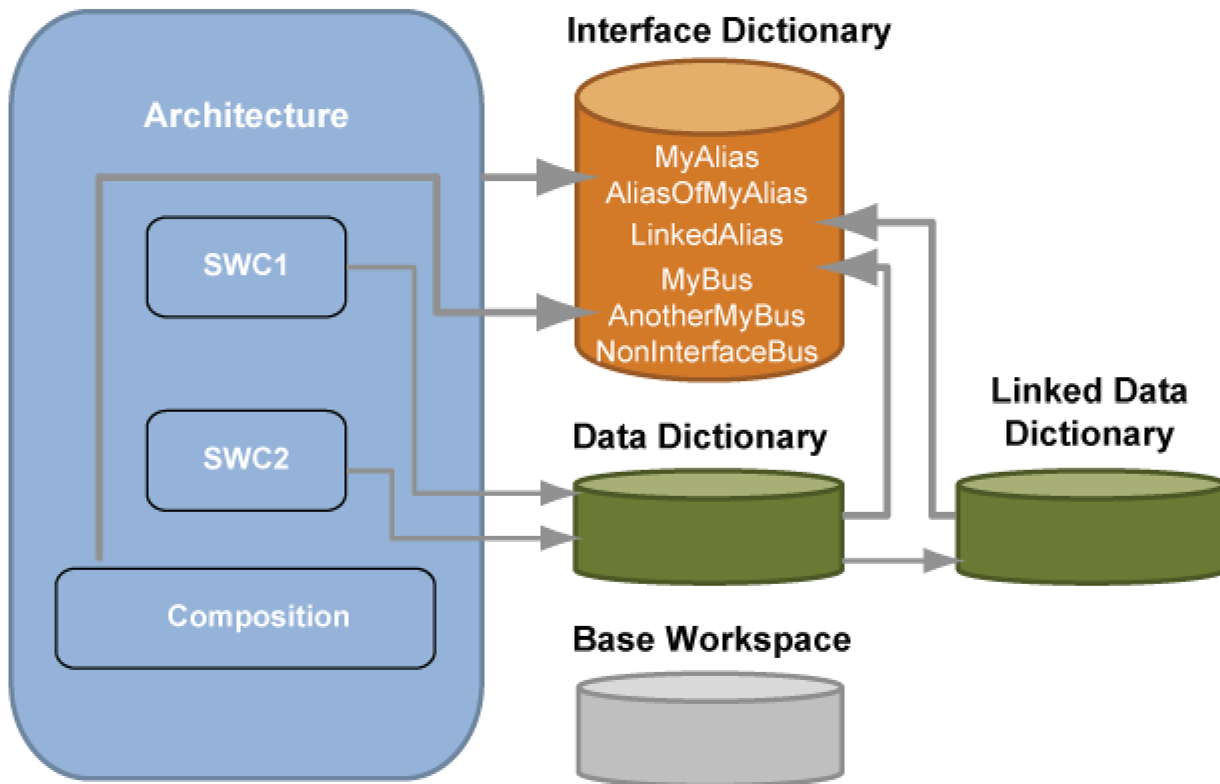
Apply migration analysis results.

```
apply(myMigratorObj);
```

To save the interface dictionary, use the `save` function. To revert applying the migration analysis, use the `revert` function.

```
save(myMigratorObj);
```

After migration (the apply step), the models and dictionaries are linked. See figure.



After Sources have been linked and data has been migrated

Input Arguments

`migratorObj` — Migrator object
`Migrator` object

`Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Version History

Introduced in R2022b

See Also

`Migrator` | `analyzeAndApply` | `apply` | `revert` | `save`

analyzeAndApply

Package: `Simulink.interface.dictionary`

Analyze a model or an architecture and apply migration to interface dictionary

Syntax

`analyzeAndApply(migratorObj)`

Description

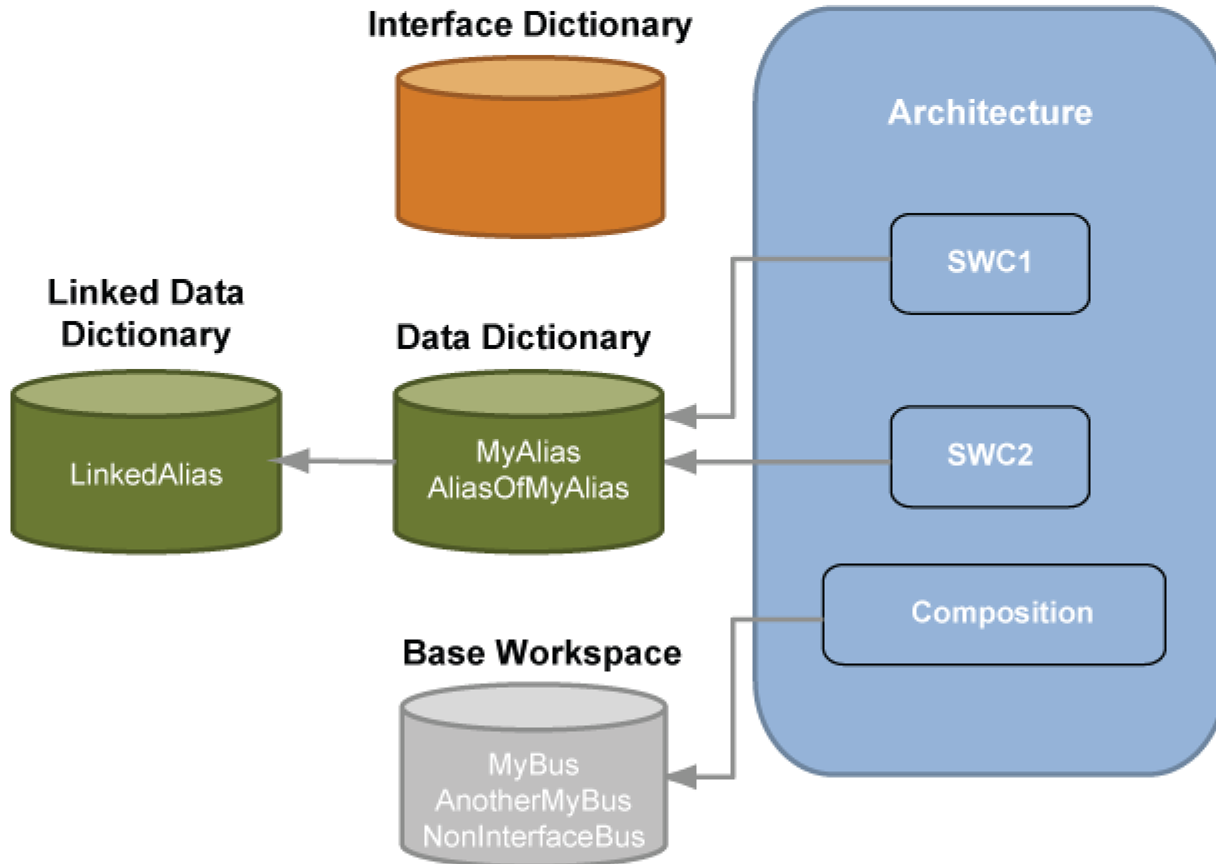
`analyzeAndApply(migratorObj)` analyzes a model or an architecture for migration to an interface dictionary. The analysis identifies the data types and interfaces in the model and data dictionaries for migration to an interface dictionary. The analysis also identifies conflict issues that affect migration. After analysis, the `analyzeAndApply` function applies the migration.

Examples

One-Step Analyze and Apply Interface Dictionary Migration

After creating a `Simulink.interface.dictionary.Migrator` object, you can analyze data type and interface content in the model for migration to the interface dictionary and apply the migration.

Select a model that is linked to a data dictionary or an architecture that is linked to an interface dictionary. See figure. The goal of the migration is to add content to the interface dictionary and link the models and dictionaries.



Before Linking Sources and Data Migration

In this example migration, there are no conflicting data types or interfaces. The analysis identifies:

- The data types to migrate are `MyAlias`, `AliasOfMyAlias`, `NonInterfaceBus`, and `LinkedAlias`.
- The interfaces to migrate are `MyBus` and `AnotherMyBus`.

The architecture consists of `SWC1`, `SWC2`, and `Composition`. The architecture uses a data dictionary hierarchy of `dDictionary.sldd --> dLinkedDictionary.sldd`.

Load the model and load the base workspace data.

```
load_system("mArchitectureWithDataDictionary");
load('hWorkspaceData.mat',...
    'MyBus','AnotherMyBus','NonInterfaceBus');
```

Create a `Simulink.interface.dictionary.Migrator` object.

```
myMigratorObj = Simulink.interface.dictionary.Migrator( ...
    "mArchitectureWithDataDictionary", ...
    'InterfaceDictionaryName',"interfaceDictionary.sldd");
```

Perform migration analysis and display analysis results.

```
analyze(myMigratorObj);

disp('Imported interfaces')
cellfun(@(x) x.Name,myMigratorObj.InterfacesToMigrate, ...
    'UniformOutput',false)
disp('Imported datatypes')
cellfun(@(x) x.Name,myMigratorObj.DataTypesToMigrate, ...
    'UniformOutput',false)
disp('Objects in conflict')
cellfun(@(x) strcat(x{1}.Name,' -> ',x{1}.Source), ...
    myMigratorObj.ConflictObjects,'UniformOutput',false)
disp('Unused objects')
cellfun(@(x) x.Name,myMigratorObj.UnusedObjects, ...
    'UniformOutput',false)
```

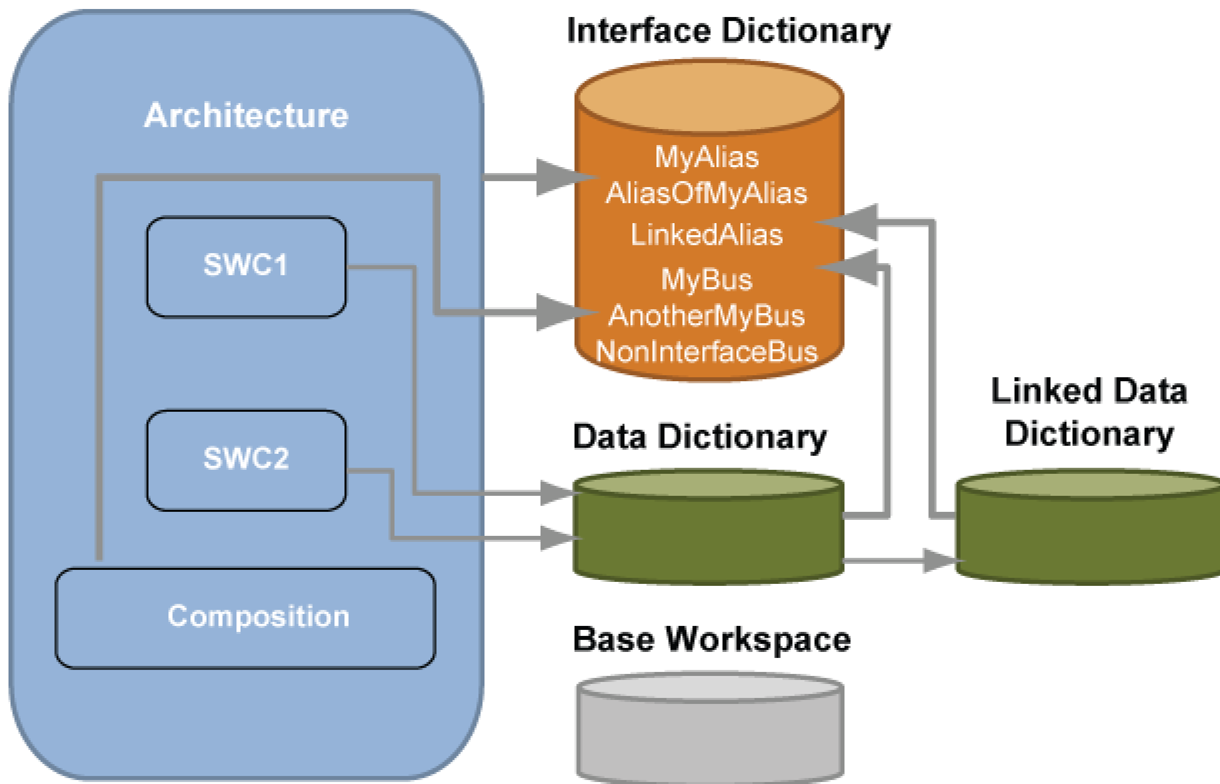
Analyze data type and interface content in the model for migration to the interface dictionary and apply the migration.

```
analyzeAndApply(myMigratorObj);
```

To save the interface dictionary, use the `save` function. To revert applying the migration analysis, use the `revert` function.

```
save(myMigratorObj);
```

After migration (the apply step), the models and dictionaries are linked. See figure.



After Sources have been linked and data has been migrated

Input Arguments

`migratorObj` — Migrator object
`Migrator` object

`Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Version History

Introduced in R2022b

See Also

`Migrator` | `analyze` | `apply` | `revert` | `save`

apply

Package: `Simulink.interface.dictionary`

Apply interface dictionary migration changes from analysis of a model or an architecture

Syntax

```
apply(migratorObj)
```

Description

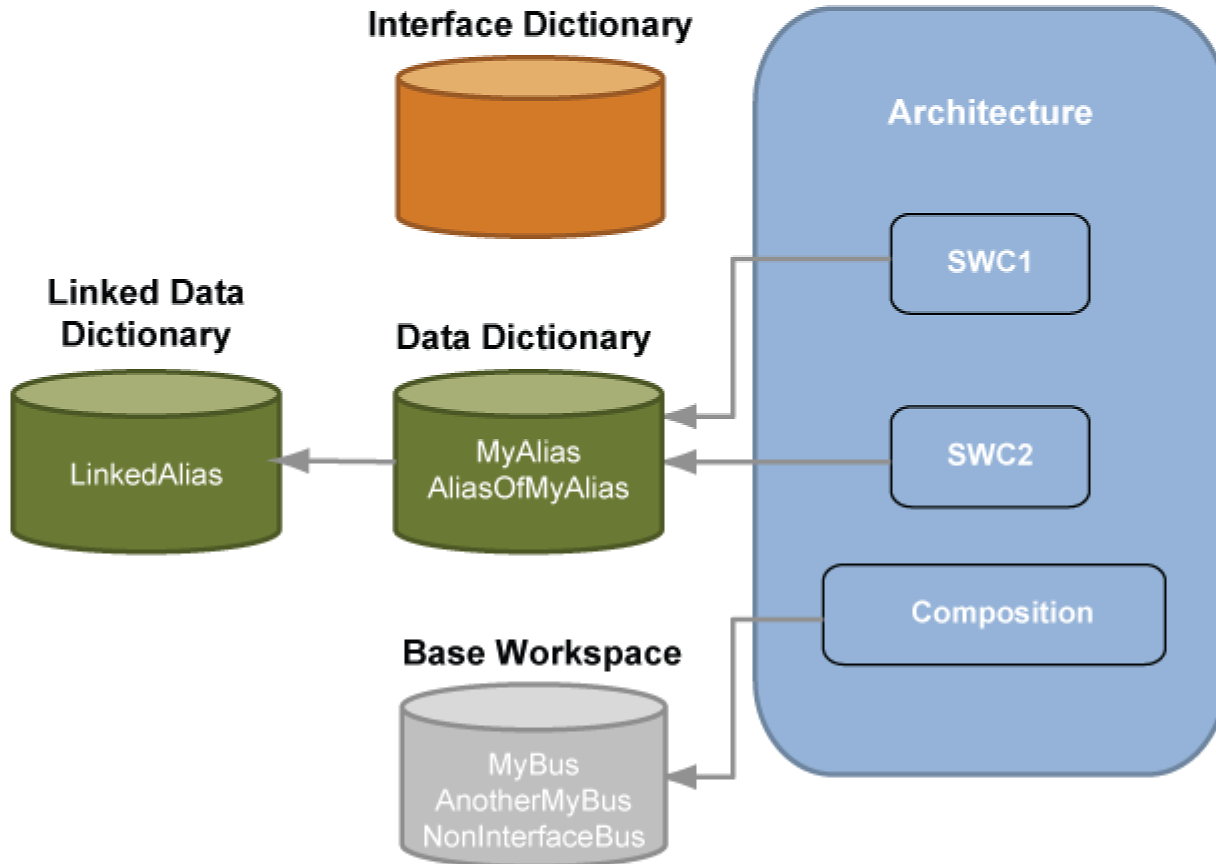
`apply(migratorObj)` applies migration to an interface dictionary from the analysis by the `analyze` function of a model or an architecture. The analysis identifies the data types and interfaces in the model and data dictionaries for migration to an interface dictionary. The analysis also identifies conflict issues that affect migration.

Examples

Analyze and Apply Interface Dictionary Migration

After creating a `Simulink.interface.dictionary.Migrator` object, you can analyze data type and interface content in the model for migration to the interface dictionary and apply the migration.

Select a model that is linked to a data dictionary or an architecture that is linked to an interface dictionary. See figure. The goal of the migration is to add content to the interface dictionary and link the models and dictionaries.



Before Linking Sources and Data Migration

In this example migration, there are no conflicting data types or interfaces. The analysis identifies:

- The data types to migrate are `MyAlias`, `AliasOfMyAlias`, `NonInterfaceBus`, and `LinkedAlias`.
- The interfaces to migrate are `MyBus` and `AnotherMyBus`.

The architecture consists of `SWC1`, `SWC2`, and `Composition`. The architecture uses a data dictionary hierarchy of `dDictionary.sldd --> dLinkedDictionary.sldd`.

Load the model and load the base workspace data.

```
load_system("mArchitectureWithDataDictionary");
load('hWorkspaceData.mat',...
    'MyBus','AnotherMyBus','NonInterfaceBus');
```

Create a `Simulink.interface.dictionary.Migrator` object.

```
myMigratorObj = Simulink.interface.dictionary.Migrator( ...
    "mArchitectureWithDataDictionary", ...
    'InterfaceDictionaryName',"interfaceDictionary.sldd");
```

Perform migration analysis and display analysis results.

```
analyze(myMigratorObj);

disp('Imported interfaces')
cellfun(@(x) x.Name,myMigratorObj.InterfacesToMigrate, ...
    'UniformOutput',false)
disp('Imported datatypes')
cellfun(@(x) x.Name,myMigratorObj.DataTypesToMigrate, ...
    'UniformOutput',false)
disp('Objects in conflict')
cellfun(@(x) strcat(x{1}.Name,' -> ',x{1}.Source), ...
    myMigratorObj.ConflictObjects,'UniformOutput',false)
disp('Unused objects')
cellfun(@(x) x.Name,myMigratorObj.UnusedObjects, ...
    'UniformOutput',false)
```

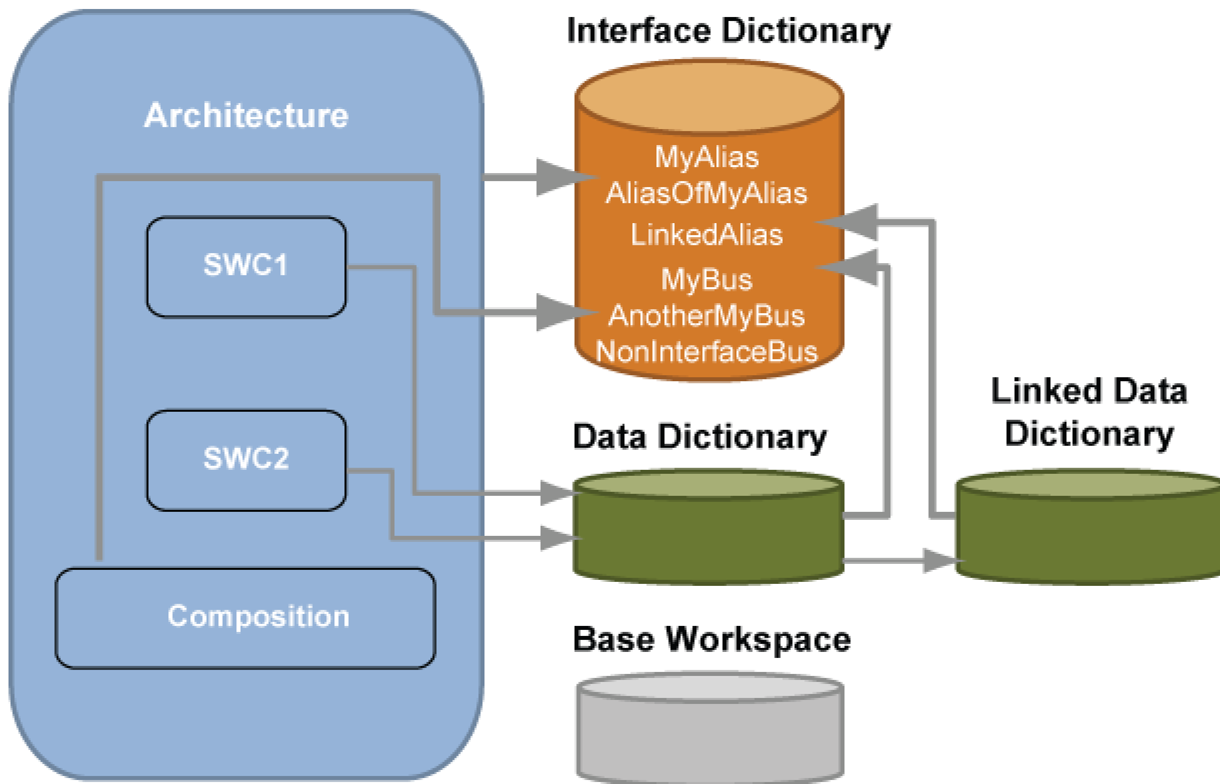
Apply migration analysis results.

```
apply(myMigratorObj);
```

To save the interface dictionary, use the `save` function. To revert applying the migration analysis, use the `revert` function.

```
save(myMigratorObj);
```

After migration (the apply step), the models and dictionaries are linked. See figure.



After Sources have been linked and data has been migrated

Input Arguments

`migratorObj` — Migrator object
`Migrator` object

`Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Version History

Introduced in R2022b

See Also

`Migrator` | `analyze` | `analyzeAndApply` | `revert` | `save`

revert

Package: `Simulink.interface.dictionary`

Revert interface dictionary migration changes applied from analysis of a model or an architecture

Syntax

```
revert(migratorObj)
```

Description

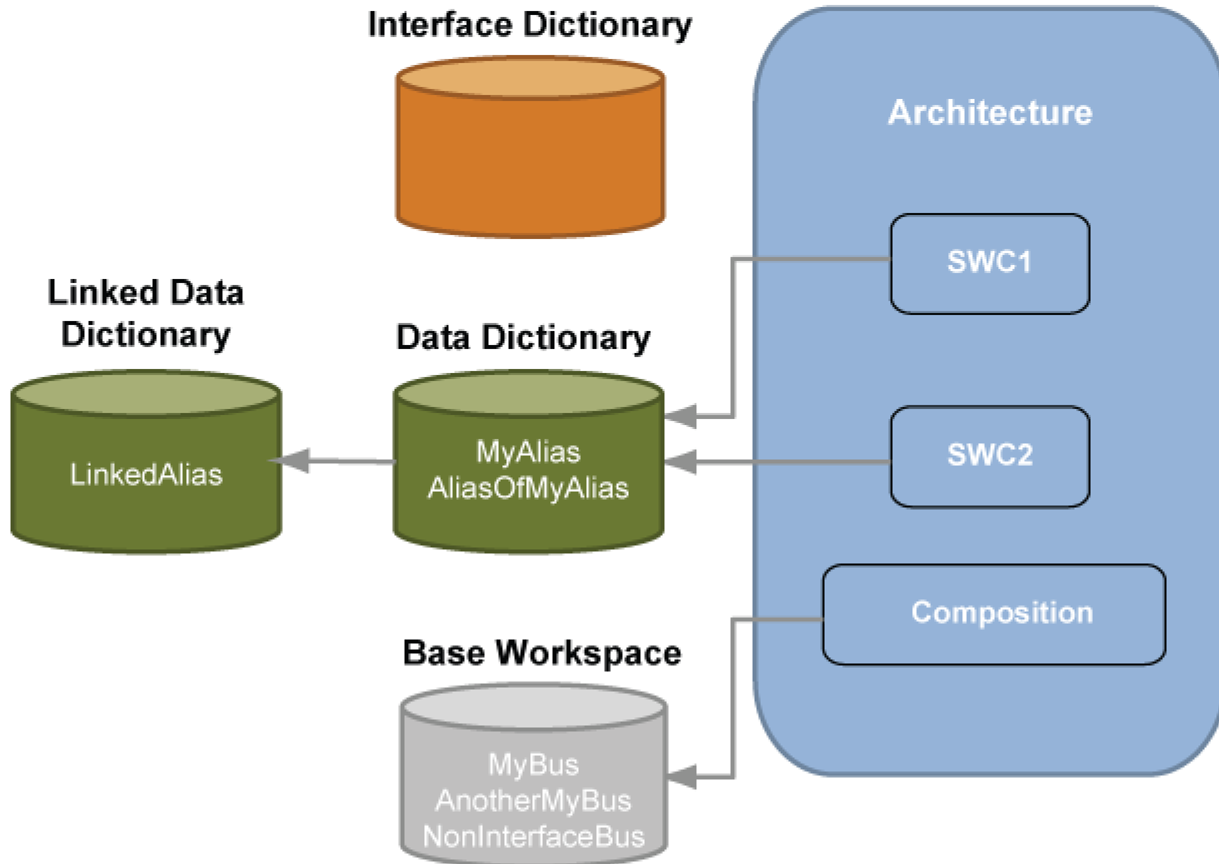
`revert(migratorObj)` reverts changes that resolve conflicts in data types and interfaces that were migrated to an interface dictionary. The migration analysis from the `analyze` function identifies these conflicts.

Examples

Revert Changes from Interface Dictionary Migration

After creating a `Simulink.interface.dictionary.Migrator` object, you can analyze data type and interface content in the model for migration to the interface dictionary and apply the migration.

Select a model that is linked to a data dictionary or an architecture that is linked to an interface dictionary. See figure. The goal of the migration is to add content to the interface dictionary and link the models and dictionaries.



Before Linking Sources and Data Migration

In this example migration, there are no conflicting data types or interfaces. The analysis identifies:

- The data types to migrate are `MyAlias`, `AliasOfMyAlias`, `NonInterfaceBus`, and `LinkedAlias`.
- The interfaces to migrate are `MyBus` and `AnotherMyBus`.

The architecture consists of `SWC1`, `SWC2`, and `Composition`. The architecture uses a data dictionary hierarchy of `dDictionary.sldd --> dLinkedDictionary.sldd`.

Load the model and load the base workspace data.

```
load_system("mArchitectureWithDataDictionary");
load('hWorkspaceData.mat',...
    'MyBus','AnotherMyBus','NonInterfaceBus');
```

Create a `Simulink.interface.dictionary.Migrator` object.

```
myMigratorObj = Simulink.interface.dictionary.Migrator( ...
    "mArchitectureWithDataDictionary", ...
    'InterfaceDictionaryName',"interfaceDictionary.sldd");
```

Perform migration analysis and display analysis results.

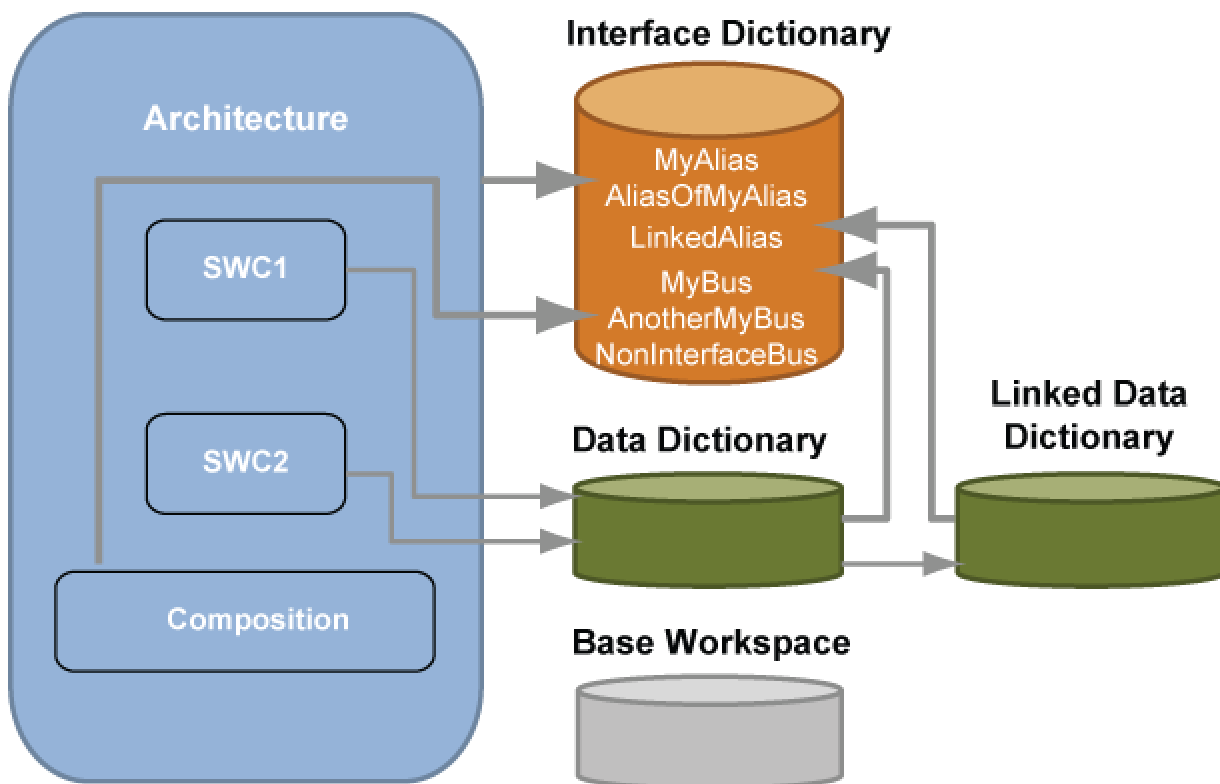
```
analyze(myMigratorObj);

disp('Imported interfaces')
cellfun(@(x) x.Name,myMigratorObj.InterfacesToMigrate, ...
    'UniformOutput',false)
disp('Imported datatypes')
cellfun(@(x) x.Name,myMigratorObj.DataTypesToMigrate, ...
    'UniformOutput',false)
disp('Objects in conflict')
cellfun(@(x) strcat(x{1}.Name,' -> ',x{1}.Source), ...
    myMigratorObj.ConflictObjects,'UniformOutput',false)
disp('Unused objects')
cellfun(@(x) x.Name,myMigratorObj.UnusedObjects, ...
    'UniformOutput',false)
```

Apply migration analysis results.

```
apply(myMigratorObj);
```

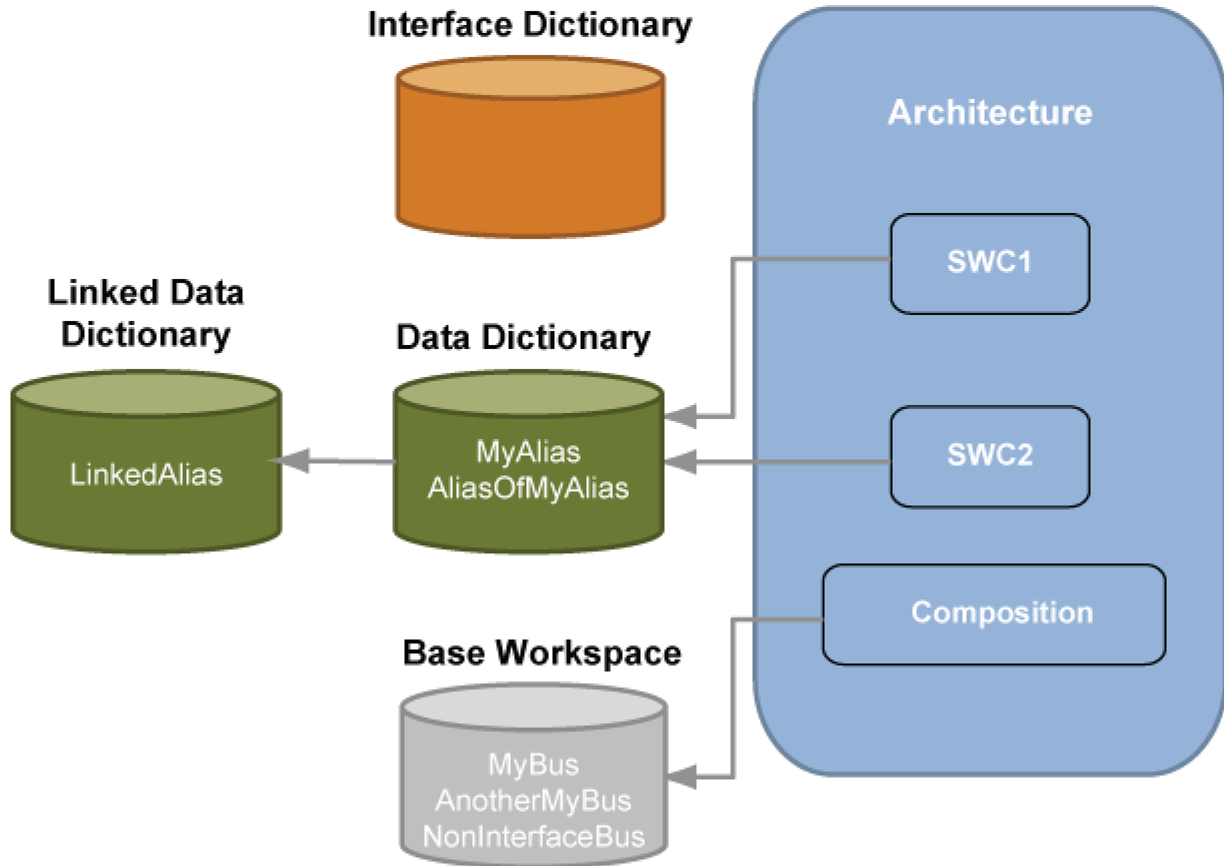
After migration (the apply step), the models and dictionaries are linked. See figure.



After sources have been linked and data has been migrated

To revert the migration to the interface dictionary and undo changes to sources, use the `revert` function. To keep the migration and changes, use the `save` function.

```
revert(myMigratorObj);
```



After reverting migration, unlinking sources, and undoing data migration

Input Arguments

`migratorObj` — Migrator object
`Migrator` object

`Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Version History

Introduced in R2022b

See Also

`Migrator` | `analyze` | `analyzeAndApply` | `apply` | `save`

save

Package: `Simulink.interface.dictionary`

Save applied interface dictionary migration changes from analysis of a model or an architecture

Syntax

```
save(migratorObj)
```

Description

`save(migratorObj)` save the applied migration to an interface dictionary from the analysis by the `analyze` function of a model or an architecture. The analysis identifies the data types and interfaces in the model and data dictionaries for migration to an interface dictionary. The analysis also identifies conflict issues that affect migration. The save operation makes changes persistent in:

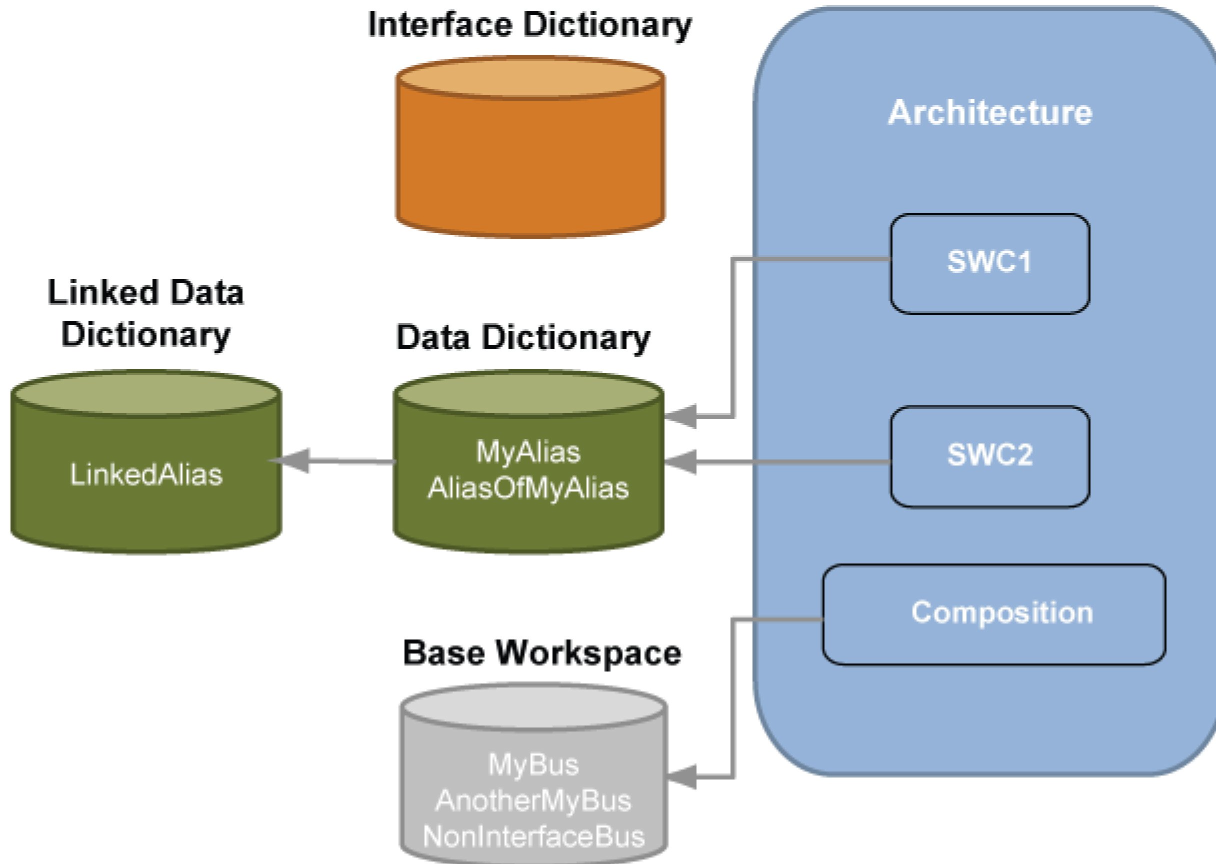
- The model
- Any data dictionary that is used by the model and their hierarchies
- The interface dictionary

Examples

Save Changes from Interface Dictionary Migration

After creating a `Simulink.interface.dictionary.Migrator` object, you can analyze data type and interface content in the model for migration to the interface dictionary and apply the migration. To save the changes to the interface dictionary, use the `save` function.

Select a model that is linked to a data dictionary or an architecture that is linked to an interface dictionary. See figure. The goal of the migration is to add content to the interface dictionary and link the models and dictionaries.



Before Linking Sources and Data Migration

In this example migration, there are no conflicting data types or interfaces. The analysis identifies:

- The data types to migrate are `MyAlias`, `AliasOfMyAlias`, `NonInterfaceBus`, and `LinkedAlias`.
- The interfaces to migrate are `MyBus` and `AnotherMyBus`.

The architecture consists of `SWC1`, `SWC2`, and `Composition`. The architecture uses a data dictionary hierarchy of `dDictionary.sldd --> dLinkedDictionary.sldd`.

Load the model and load the base workspace data.

```
load_system("mArchitectureWithDataDictionary");
load('hWorkspaceData.mat',...
    'MyBus','AnotherMyBus','NonInterfaceBus');
```

Create a `Simulink.interface.dictionary.Migrator` object.

```
myMigratorObj = Simulink.interface.dictionary.Migrator( ...
    "mArchitectureWithDataDictionary", ...
    'InterfaceDictionaryName',"interfaceDictionary.sldd");
```

Perform migration analysis and display analysis results.

```
analyze(myMigratorObj);

disp('Imported interfaces')
cellfun(@(x) x.Name,myMigratorObj.InterfacesToMigrate, ...
    'UniformOutput',false)
disp('Imported datatypes')
cellfun(@(x) x.Name,myMigratorObj.DataTypesToMigrate, ...
    'UniformOutput',false)
disp('Objects in conflict')
cellfun(@(x) strcat(x{1}.Name,' -> ',x{1}.Source), ...
    myMigratorObj.ConflictObjects,'UniformOutput',false)
disp('Unused objects')
cellfun(@(x) x.Name,myMigratorObj.UnusedObjects, ...
    'UniformOutput',false)
```

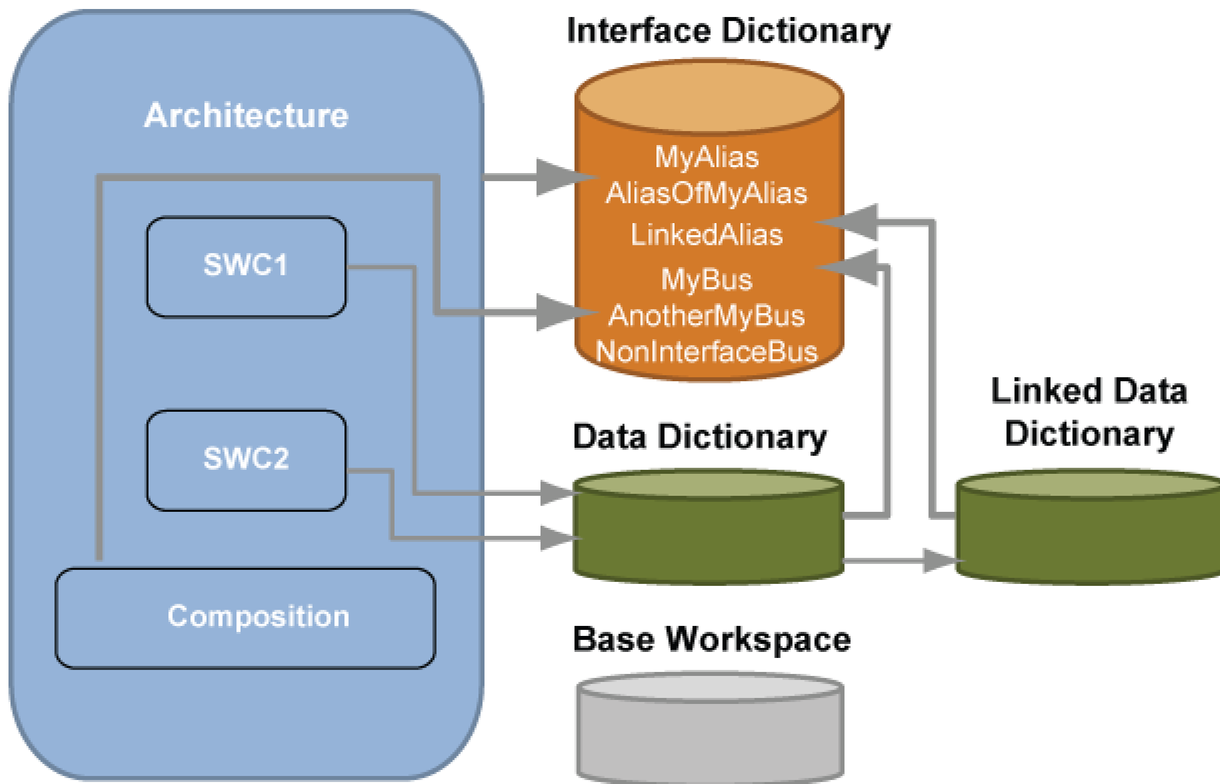
Apply migration analysis results.

```
apply(myMigratorObj);
```

To save the interface dictionary, use the `save` function. To revert applying the migration analysis, use the `revert` function.

```
save(myMigratorObj);
```

After migration (the apply step), the models and dictionaries are linked. See figure.



After Sources have been linked and data has been migrated

Input Arguments

`migratorObj` — Migrator object
`Migrator` object

`Migrator` object, specified by a `Simulink.interface.dictionary.Migrator`function.

Version History

Introduced in R2022b

See Also

`Migrator` | `analyze` | `analyzeAndApply` | `apply` | `revert`

Simulink.interface.dictionary.DataInterface

Data interface

Description

Data interfaces represent information that is shared through a connector and enters or exits a component through a port. Data interfaces are composed of data elements that describe the structure of the transmitted data. Data interfaces can be composite and can reference other data interfaces.

Creation

To create a `Simulink.interface.dictionary.DataInterface` object, add a data interface to an existing `Simulink.interface.Dictionary` object using the `addDataInterface` function.

```
dataInterfaceObj = addDataInterface(interfaceDictionaryObj,"interface1")
```

Properties

`Name` — Name of data interface
character vector | string scalar

Name of the data interface, specified as a character vector.

Data Types: `char` | `string`

`Description` — Description of data interface
`''` (default) | character vector | string scalar

Description of the data interface, specified as a character vector or a string scalar.

Data Types: `char` | `string`

`Elements` — Elements belonging to the data interface object
array of `Simulink.interface.dictionary.DataElement` objects

Elements belonging to the data interface object, specified as an array of `Simulink.interface.dictionary.DataElement` objects.

`Owner` — Interface dictionary containing the data interface
`Simulink.interface.Dictionary` object

Interface dictionary containing the data interface, specified as a `Simulink.interface.Dictionary` object.

Object Functions

addElement	Add data element to data interface
destroy	Destroy data interface and remove from interface dictionary
getElement	Get data element from data interface

removeElement	Remove data element from data interface
show	Show data interface in the Interface Editor

Examples

Add and Remove Data Elements From a Data Interface

This example shows how to access, add, and remove data elements from a data interface.

Open an existing interface dictionary. This creates a `Simulink.interface.Dictionary` object, `interfaceDictObj`.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1x1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0x0 Simulink.interface.dictionary.DataType]
```

This interface dictionary contains one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1x2 Simulink.interface.dictionary.DataElement]
          Owner: [1x1 Simulink.interface.Dictionary]
```

Data interfaces are composed of data elements which describe portions of a data interface. This interface definition contains two data elements.

```
interfaceObj.Elements(1)
```

```
ans = 
  DataElement with properties:

           Name: 'element1'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

```
interfaceObj.Elements(2)
```

```
ans = 
  DataElement with properties:

           Name: 'element2'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
```

```
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Use the `addElement` function to add a new data element to the data interface.

```
dataElem1 = addElement(interfaceObj, 'element3')
```

```
dataElem1 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

You can access an existing data element using the `getElement` function.

```
dataElem3 = getElement(interfaceObj, 'element3')
```

```
dataElem3 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Remove a data element from an interface using the `removeElement` function.

```
removeElement(interfaceObj, 'element3')
```

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataElement`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

addElement

Add data element to data interface

Syntax

```
dataElementObj = addElement(dataInterfaceObj,elementName)
```

Description

`dataElementObj = addElement(dataInterfaceObj,elementName)` creates a `Simulink.interface.dictionary.DataElement` object with the specified name and adds it to the `Simulink.interface.dictionary.DataInterface` object `dataInterfaceObj`.

Examples

Add and Remove Data Elements From a Data Interface

This example shows how to access, add, and remove data elements from a data interface.

Open an existing interface dictionary. This creates a `Simulink.interface.Dictionary` object, `interfaceDictObj`.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1x1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0x0 Simulink.interface.dictionary.DataType]
```

This interface dictionary contains one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1x2 Simulink.interface.dictionary.DataElement]
          Owner: [1x1 Simulink.interface.Dictionary]
```

Data interfaces are composed of data elements which describe portions of a data interface. This interface definition contains two data elements.

```
interfaceObj.Elements(1)
```

```
ans = 
  DataElement with properties:
```

```
           Name: 'element1'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

```
interfaceObj.Elements(2)
```

```
ans = 
  DataElement with properties:

           Name: 'element2'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Use the `addElement` function to add a new data element to the data interface.

```
dataElem1 = addElement(interfaceObj, 'element3')
```

```
dataElem1 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

You can access an existing data element using the `getElement` function.

```
dataElem3 = getElement(interfaceObj, 'element3')
```

```
dataElem3 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Remove a data element from an interface using the `removeElement` function.

```
removeElement(interfaceObj, 'element3')
```

Input Arguments

`dataInterfaceObj` — Data interface to add element to
`Simulink.interface.dictionary.DataInterface` object

Data interface to add element to, specified as a `Simulink.interface.dictionary.DataInterface` object.

`elementName` — Name of data element
character vector | string scalar

Name of data element to add to `dataInterfaceObj` object, specified as a character vector or string scalar.

Output Arguments

`dataElementObj` — Data element object
`Simulink.interface.dictionary.DataElement` object

Data element, returned as a `Simulink.interface.dictionary.DataElement` object with the specified name, and default property values.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

destroy

Destroy data interface and remove from interface dictionary

Syntax

`destroy(dataInterfaceObj)`

Description

`destroy(dataInterfaceObj)` destroys the data interface `dataInterfaceObj` and removes it from its parent interface dictionary.

Examples

Delete Data Interface from an Interface Dictionary

This example shows how to delete a data interface and remove it from an interface dictionary.

Create a `Simulink.interface.Dictionary` object by opening an existing interface dictionary.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj =
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1×1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0×0 Simulink.interface.dictionary.DataType]
```

This interface dictionary has one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj =
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1×2 Simulink.interface.dictionary.DataElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

Use the `destroy` function to delete the interface and remove it from the interface dictionary.

```
destroy(interfaceObj)
interfaceDictObj
```

```
interfaceDictObj =

  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
```

```
            Interfaces: [0×0 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0×0 Simulink.interface.dictionary.DataType]
```

The interface dictionary `interfaceDictObj` now has no interfaces.

Input Arguments

`dataInterfaceObj` — Data interface to delete
`Simulink.interface.dictionary.DataInterface` object

Data interface to delete, specified as a `Simulink.interface.dictionary.DataInterface` object.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

getElement

Get data element from data interface

Syntax

```
dataElementObj = getElement(dataInterfaceObj,elementName)
```

Description

`dataElementObj = getElement(dataInterfaceObj,elementName)` returns the `Simulink.interface.dictionary.DataElement` object with the name `elementName` contained in the `Simulink.interface.dictionary.DataInterface` object `dataInterfaceObj`.

Examples

Add and Remove Data Elements From a Data Interface

This example shows how to access, add, and remove data elements from a data interface.

Open an existing interface dictionary. This creates a `Simulink.interface.Dictionary` object, `interfaceDictObj`.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1x1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0x0 Simulink.interface.dictionary.DataType]
```

This interface dictionary contains one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1x2 Simulink.interface.dictionary.DataElement]
          Owner: [1x1 Simulink.interface.Dictionary]
```

Data interfaces are composed of data elements which describe portions of a data interface. This interface definition contains two data elements.

```
interfaceObj.Elements(1)
```

```
ans = 
  DataElement with properties:
```

```
           Name: 'element1'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

```
interfaceObj.Elements(2)
```

```
ans =
  DataElement with properties:

           Name: 'element2'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Use the `addElement` function to add a new data element to the data interface.

```
dataElem1 = addElement(interfaceObj, 'element3')
```

```
dataElem1 =
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

You can access an existing data element using the `getElement` function.

```
dataElem3 = getElement(interfaceObj, 'element3')
```

```
dataElem3 =
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Remove a data element from an interface using the `removeElement` function.

```
removeElement(interfaceObj, 'element3')
```

Input Arguments

`dataInterfaceObj` — Data interface containing the data element

`Simulink.interface.dictionary.DataInterface` object

Data interface containing the data element, specified as a `Simulink.interface.dictionary.DataInterface` object.

`elementName` — Name of data element
character vector | string scalar

Name of the data element to return from `dataInterfaceObj`, specified as a character vector or string scalar.

Output Arguments

`dataElementObj` — Data element object
`Simulink.interface.dictionary.DataElement` object

Data element, returned as a `Simulink.interface.dictionary.DataElement` object.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

removeElement

Remove data element from data interface

Syntax

```
removeElement(dataInterfaceObj,elementName)
```

Description

`removeElement(dataInterfaceObj,elementName)` removes the data element with the name `elementName` from the `Simulink.interface.dictionary.DataInterface` object `dataInterfaceObj`.

Examples

Add and Remove Data Elements From a Data Interface

This example shows how to access, add, and remove data elements from a data interface.

Open an existing interface dictionary. This creates a `Simulink.interface.Dictionary` object, `interfaceDictObj`.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1x1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0x0 Simulink.interface.dictionary.DataType]
```

This interface dictionary contains one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1x2 Simulink.interface.dictionary.DataElement]
          Owner: [1x1 Simulink.interface.Dictionary]
```

Data interfaces are composed of data elements which describe portions of a data interface. This interface definition contains two data elements.

```
interfaceObj.Elements(1)
```

```
ans = 
  DataElement with properties:
```

```
           Name: 'element1'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

```
interfaceObj.Elements(2)
```

```
ans = 
  DataElement with properties:

           Name: 'element2'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Use the `addElement` function to add a new data element to the data interface.

```
dataElem1 = addElement(interfaceObj, 'element3')
```

```
dataElem1 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

You can access an existing data element using the `getElement` function.

```
dataElem3 = getElement(interfaceObj, 'element3')
```

```
dataElem3 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Remove a data element from an interface using the `removeElement` function.

```
removeElement(interfaceObj, 'element3')
```

Input Arguments

`dataInterfaceObj` — Data interface to remove element from

`Simulink.interface.dictionary.DataInterface` object

Data interface to remove data element from, specified as a `Simulink.interface.dictionary.DataInterface` object.

`elementName` — Name of data element to remove
character vector | string scalar

Name of data element to remove from data interface, specified as a string scalar or character vector.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

show

Show data interface in the Interface Editor

Syntax

```
show(dataInterfaceObj)
```

Description

`show(dataInterfaceObj)` displays the data interface in the **Interface Editor**.

Examples

View a Data Interface in the Interface Editor

This example shows how to view a data interface in the **Interface Editor**.

Create a `Simulink.interface.Dictionary` object by opening an existing interface dictionary.

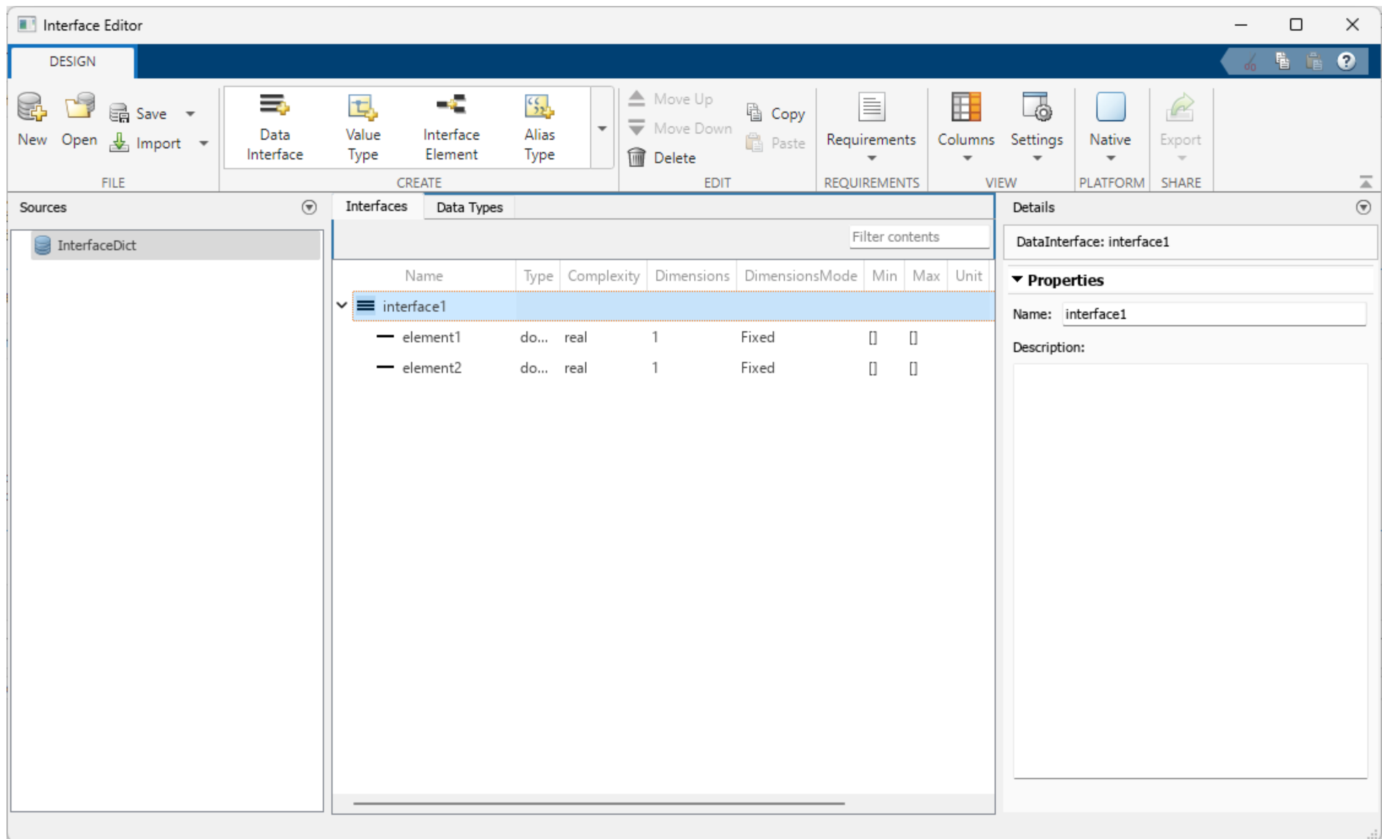
```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1×1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0×0 Simulink.interface.dictionary.DataType]
```

Use the `show` function to display the data interface in the **Interface Editor**.

```
show(interfaceObj)
```



Input Arguments

`dataInterfaceObj` — Data interface to display
`Simulink.interface.dictionary.DataInterface` object

Data interface to display in the **Interface Editor**, specified as a `Simulink.interface.dictionary.DataInterface` object.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

Simulink.interface.dictionary.DataElement

Data element of data interface

Description

A data element describes a portion of a data interface, such as the structure of the transmitted data or other decomposition of the interface.

Creation

To create a `Simulink.interface.dictionary.DataElement` object, add a data element to an existing `Simulink.interface.dictionary.DataInterface` object using the `addElement` function.

```
dataElementObj = addElement(dataInterfaceObj,"element")
```

You can access an existing data element using the `getElement` function.

Properties

Name — Name of data element
character vector | string scalar

Name of data element, specified as a character vector or string scalar.

Data Types: `char` | `string`

Type — Type of data element
`Simulink.interface.dictionary.ValueType` object

Type of the data element, specified as a `Simulink.interface.dictionary.ValueType` object.

`Description` — Description of data element
character vector | string scalar

Description of the data element, specified as a character vector or string scalar.

Data Types: `char` | `string`

`Dimensions` — Dimensions of data element
character vector

Dimensions of data element, specified as a character vector representing a two element vector containing the dimensions of the element.

Data Types: `char`

`Owner` — Data interface containing the data element
`Simulink.interface.dictionary.DataInterface` object

`Simulink.interface.dictionary.DataInterface` object that contains the data element.

Object Functions

destroy Destroy data element and remove from data interface
show Show data element in Interface Editor

Examples

Add and Remove Data Elements From a Data Interface

This example shows how to access, add, and remove data elements from a data interface.

Open an existing interface dictionary. This creates a `Simulink.interface.Dictionary` object, `interfaceDictObj`.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1x1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0x0 Simulink.interface.dictionary.DataType]
```

This interface dictionary contains one data interface definition.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1x2 Simulink.interface.dictionary.DataElement]
          Owner: [1x1 Simulink.interface.Dictionary]
```

Data interfaces are composed of data elements which describe portions of a data interface. This interface definition contains two data elements.

```
interfaceObj.Elements(1)
```

```
ans = 
  DataElement with properties:

           Name: 'element1'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

```
interfaceObj.Elements(2)
```

```
ans = 
  DataElement with properties:
```

```
           Name: 'element2'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Use the `addElement` function to add a new data element to the data interface.

```
dataElem1 = addElement(interfaceObj, 'element3')
```

```
dataElem1 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

You can access an existing data element using the `getElement` function.

```
dataElem3 = getElement(interfaceObj, 'element3')
```

```
dataElem3 = 
  DataElement with properties:

           Name: 'element3'
           Type: [1x1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1x1 Simulink.interface.dictionary.DataInterface]
```

Remove a data element from an interface using the `removeElement` function.

```
removeElement(interfaceObj, 'element3')
```

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

destroy

Destroy data element and remove from data interface

Syntax

```
destroy(dataElementObj)
```

Description

`destroy(dataElementObj)` destroys the data element `dataElementObj` and removes it from its parent `Simulink.interface.dictionary.DataInterface` object.

Examples

Delete Data Element from a Data Interface

This example shows how to delete a data element and remove it from a data interface.

Create a `Simulink.interface.Dictionary` object by opening an existing interface dictionary.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj = 
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1×1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0×0 Simulink.interface.dictionary.DataType]
```

This interface dictionary has one data interface definition. The data interface has two data elements.

```
interfaceObj = interfaceDictObj.Interfaces
```

```
interfaceObj = 
  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1×2 Simulink.interface.dictionary.DataElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

Use the `getElement` function to access a data element.

```
dataElem1 = getElement(interfaceObj,'element1')
```

```
dataElem1 = 

  DataElement with properties:

           Name: 'element1'
           Type: [1×1 Simulink.interface.dictionary.ValueType]
```

```
    Description: ''
     Dimensions: '1'
          Owner: [1×1 Simulink.interface.dictionary.DataInterface]
```

Use the `destroy` function to delete the data element and remove it from the data interface.

```
destroy(dataElem1)
interfaceObj
```

```
interfaceObj = 

  DataInterface with properties:

           Name: 'interface1'
    Description: ''
       Elements: [1×1 Simulink.interface.dictionary.DataElement]
          Owner: [1×1 Simulink.interface.Dictionary]
```

The data interface, `interfaceObj` now has only one data element.

Input Arguments

`dataElementObj` — Data element
`Simulink.interface.dictionary.DataElement` object

Data element to destroy, specified as a `Simulink.interface.dictionary.DataElement` object.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement`

Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

show

Show data element in Interface Editor

Syntax

```
show(dataElementObj)
```

Description

`show(dataElementObj)` displays the `DataElement` object in the **Interface Editor**.

Examples

View a Data Element in the Interface Editor

This example shows how to view a data element in the **Interface Editor**.

Create a `Simulink.interface.Dictionary` object by opening an existing interface dictionary.

```
interfaceDictObj = Simulink.interface.dictionary.open('myInterfaceDict.sldd')
```

```
interfaceDictObj =
  Dictionary with properties:

    DictionaryFileName: 'myInterfaceDict.sldd'
            Interfaces: [1×1 Simulink.interface.dictionary.DataInterface]
             DataTypes: [0×0 Simulink.interface.dictionary.DataType]
```

Use the `getElement` function to access a data element.

```
dataElem1 = getElement(interfaceObj,'element1')
```

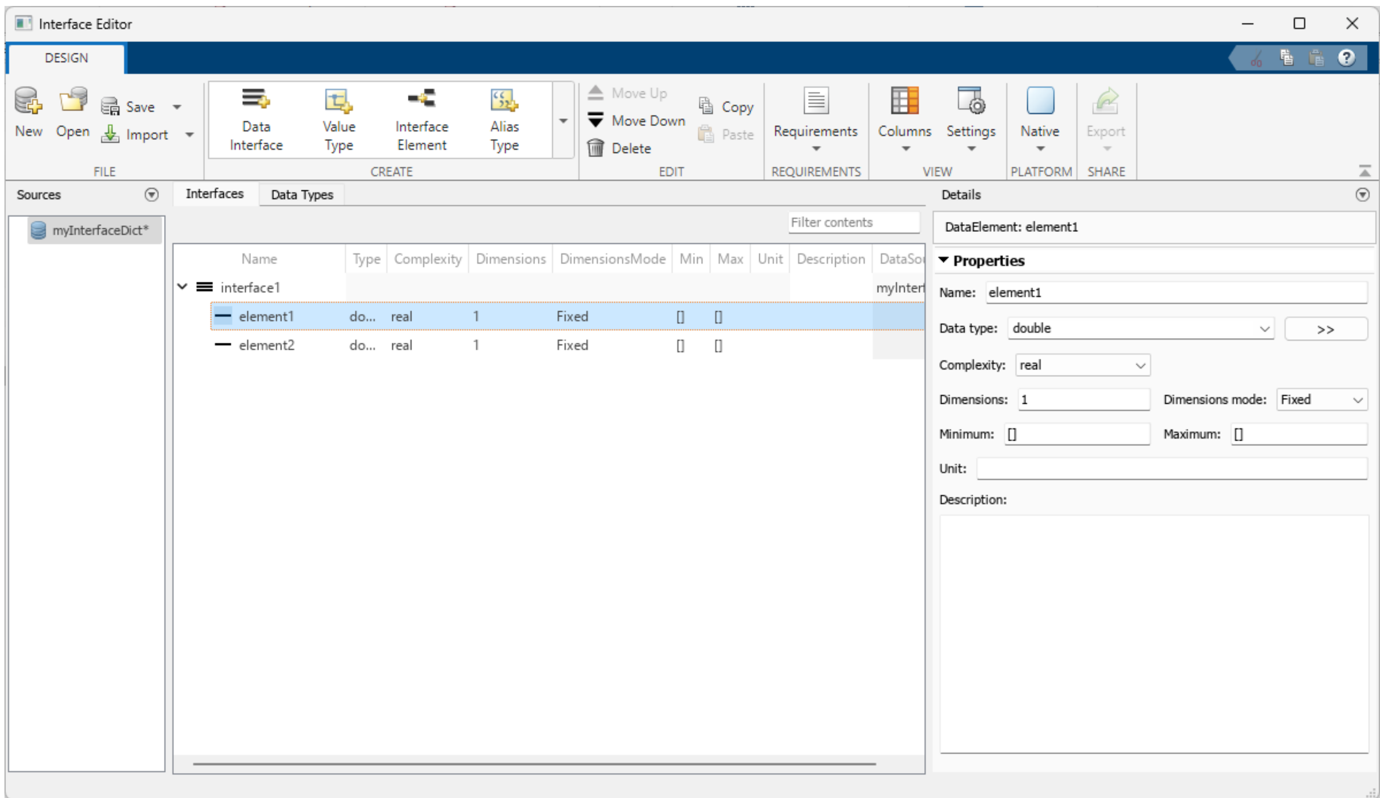
```
dataElem1 =

  DataElement with properties:

           Name: 'element1'
           Type: [1×1 Simulink.interface.dictionary.ValueType]
    Description: ''
     Dimensions: '1'
          Owner: [1×1 Simulink.interface.dictionary.DataInterface]
```

Use the `show` function to display the data element in the **Interface Editor**.

```
show(dataElem1)
```



Input Arguments

dataElementObj — Data element
`Simulink.interface.dictionary.DataElement` object

Data element to show in the **Interface Editor**, specified as a `Simulink.interface.dictionary.DataElement` object.

Version History

Introduced in R2022b

See Also

Interface Editor | `Simulink.interface.Dictionary` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement`

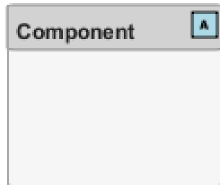
Topics

"Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models"

Blocks

Adaptive Component

Model adaptive software component in AUTOSAR architecture model



Libraries:
AUTOSAR Blockset

Description

In an AUTOSAR architecture model, you use the composition editor and the Simulink Toolstrip **Modeling** tab to add and connect compositions and components. Use the Adaptive Component block to add an adaptive software component to an AUTOSAR adaptive software design.

To add and connect AUTOSAR components:

- From the **Modeling** tab, configure the platform kind for the architecture model by setting **Platform** to `Adaptive`.
- For each component required by the design, from the **Modeling** tab or the palette to the left of the canvas, add an Adaptive Component block. You can view the component **Kind** in the Property Inspector. For adaptive components, the component kind is `AdaptiveApplication`.
- Add component require ports and provide ports. To add each component port, click an edge of a Adaptive Component block. When port controls appear, select **Input** or **Client** for a require port, or **Output** or **Server** for a provide port.
- To connect the Adaptive Component blocks to other blocks, connect the block ports with signal lines.
- To connect the Adaptive Component blocks to architecture or composition model root ports, drag a line from the component ports to the containing model boundary. Releasing the connection creates a root port at the boundary.
- Configure additional AUTOSAR properties using the Property Inspector.

After you add and connect AUTOSAR components, add Simulink behavior to the AUTOSAR components by creating, importing, or linking models.

If you have Requirements Toolbox™ software, you can link components in an AUTOSAR architecture model to Simulink requirements.

Each Adaptive Component block represents an adaptive application. Upon deployment, each adaptive component is treated as an executable.

Ports

Input

Input port — Component require port
scalar | vector | matrix

Require port in the AUTOSAR software component port interface.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Client port — Component client port on a service interface
scalar | vector | matrix

Client port on a service interface for AUTOSAR method communication, implementing a service consumer.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Output

Output port — Component provide port
scalar | vector | matrix

Provide port in the AUTOSAR software component port interface.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Server port — Component server port on a service interface
scalar | vector | matrix

Server port on a service interface for AUTOSAR method communication, implementing a service provider.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Version History

Introduced in R2023a

See Also

Software Composition

Topics

"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"
"Define AUTOSAR Component Behavior by Creating or Linking Models"
"Create Profiles Stereotypes and Views for AUTOSAR Architecture Analysis"
"Link AUTOSAR Components to Requirements"

Classic Component

Model classic software component in AUTOSAR architecture model

Libraries:
AUTOSAR Blockset

Description

In an AUTOSAR architecture model, you use the composition editor and the Simulink Toolstrip **Modeling** tab to add and connect compositions and components. Use the Classic Component block to add a classic software component to an AUTOSAR classic software design.

To add and connect AUTOSAR components:

- From the **Modeling** tab, configure the platform kind for the architecture model by setting **Platform** to `Classic`.
- For each component required by the design, from the **Modeling** tab or the palette to the left of the canvas, add a Classic Component block. You can use the Property Inspector to set the component **Kind** — `Application`, `ComplexDeviceDriver`, `EcuAbstraction`, `SensorActuator`, or `ServiceProxy`. (`Application` and `SensorActuator` are common.)
- Add component require ports and provide ports. To add each component port, click an edge of a Classic Component block. When port controls appear, select **Input** for a require port or **Output** for a provide port.
- To connect Classic Component blocks to other blocks, connect the block ports with signal lines.
- To connect Classic Component blocks to architecture or composition model root ports, drag a line from the component ports to the containing model boundary. Releasing the connection creates a root port at the boundary.
- Configure additional AUTOSAR properties using the Property Inspector.

After you add and connect AUTOSAR components, add Simulink behavior to the AUTOSAR components by creating, importing, or linking models.

If you have Requirements Toolbox software, you can link components in an AUTOSAR architecture model to Simulink requirements.

The Classic Component block was named Software Component. The block was renamed to differentiate it from the Adaptive Component block, which was introduced in R2023a.

Ports

Input

Input port — Component require port
scalar | vector | matrix

Require port in the AUTOSAR software component port interface.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Output

Output port — Component provide port
scalar | vector | matrix

Provide port in the AUTOSAR software component port interface.

If you link the component block to an implementation model, the port interfaces of the block and model, including the number of ports, match.

Version History

Introduced in R2019b

R2023a: Software Component block name changed to Classic Component

The Software Component block is renamed to the Classic Component block.

See Also

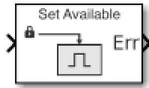
Software Composition | Diagnostic Service Component | NVRAM Service Component

Topics

"Add and Connect AUTOSAR Classic Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"
"Define AUTOSAR Component Behavior by Creating or Linking Models"
"Create Profiles Stereotypes and Views for AUTOSAR Architecture Analysis"
"Link AUTOSAR Components to Requirements"

Control Function Available Caller

Call AUTOSAR Function Inhibition Manager (FiM) service interface `ControlFunctionAvailable`



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Function Inhibition Manager (FiM)

Description

For the AUTOSAR Classic Platform, the AUTOSAR standard defines important services as part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). Examples include services provided by the Diagnostic Event Manager (Dem), the Function Inhibition Manager (FiM), and the NVRAM Manager (NvM). In the AUTOSAR RTE, AUTOSAR software components typically access BSW services using client-server communication.

To support system-level modeling and simulation of AUTOSAR components and services, AUTOSAR Blockset provides an AUTOSAR Basic Software block library. The library contains preconfigured blocks for modeling component calls to AUTOSAR BSW services and reference implementations of the BSW services.

As defined in the AUTOSAR specification, the Function Inhibition Manager provides a control mechanism for selectively inhibiting (deactivating) function execution in software component runnables based on function identifiers (FIDs) with inhibit conditions.

The Function Inhibition Manager is closely related to the Diagnostic Event Manager because inhibiting conditions can be based on the status of diagnostic events. The Control Function Available Caller block calls the FiM service interface `ControlFunctionAvailable` to initiate the `SetFunctionAvailable` operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call FiM service interface `ControlFunctionAvailable`
`FiM_ControlFunctionAvailable` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the FiM service interface `FiM_ControlFunctionAvailable`.

Operation — Specify operation defined in FiM service interface `ControlFunctionAvailable`
`SetFunctionAvailable` (default)

This block supports the FiM operation `SetFunctionAvailable` and generates inports and outports for the operation. Passing a true value marks the function associated with the client port as available, a false value marks the function as not available. A `GetPermission` operation (Function Inhibition Caller block) associated with a function that is not available returns false.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2020a

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

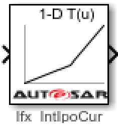
Function Inhibition Caller | DiagnosticOperationCycleCaller | Diagnostic Service Component

Topics

"Configure Calls to AUTOSAR Function Inhibition Manager Service"
"Model AUTOSAR Basic Software Service Calls"

Curve

Approximate one-dimensional function



Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Curve block performs one-dimensional interpolated table lookup, including index searches. The table is a sampled representation of a function. Breakpoint sets relate the input values to positions in the table. You can also use the Prelookup and Prelookup Using Curve blocks together to perform the same operations as this block.

If you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, code generated from this block is replaced with the AUTOSAR library routine that you configure in the block parameters dialog box.

Ports

Input

u1 — First-dimension inputs
scalar | vector | matrix

Real-valued inputs to the **u1** port, mapped to an output value by looking up or interpolating the table of values that you define.

Example: 0:10

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Output

Port_1 — Output computed by looking up or estimating table values
scalar | vector | matrix

Output generated by looking up or estimating table values based on the input values. If the inputs match the index values of breakpoint sets the curve block provides a table value as output. If the block inputs do not match index values in breakpoint sets, but are within range, the block performs the interpolation method you selected and provides an estimated value from the table values as output.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Parameters

Targeted Routine Library — Indicates the AUTOSAR routine library used for block code replacement
IFX(fixed-point) (default) | IFL(floating-point)

If you select the AUTOSAR 4.0 code replacement library (CRL) for your model, code generated from this block is replaced from the selected AUTOSAR routine library. This parameter enables you to choose either fixed-point (IFX) or floating-point (IFL) code replacement and validation checks.

Targeted Routine — AUTOSAR library routine used for code replacement
`Ifx_IntIpoMap` (default)

This parameter reflects the name of the AUTOSAR code replacement library (CRL) routine used to replace the code generated by this block. The naming convention includes the targeted routine library, interpolation method, and block type. This parameter is reference-only and must not be edited.

Table Specification

Data specification — Method of table and breakpoint specification
`Table and breakpoints` (default) | `Lookup table object`

From the list, select:

- `Table and breakpoints` — Specify the table data and breakpoints. Selecting this option enables these parameters:
  - **Table data**
  - **Breakpoints specification**
  - **Breakpoints**
  - **Edit table and breakpoints**
- `Lookup table object` — Use an existing lookup table (`Simulink.LookupTable`) object. Selecting this option enables the **Name** field and the **Edit table and breakpoints** button.

Programmatic Use
Block Parameter: `DataSpecification`
Type: character vector
Values: `'Table and breakpoints' | 'Lookup table object'`
Default: `'Table and breakpoints'`

Name — Name of the lookup table object
`[]` (default) | `Simulink.LookupTable` object

Enter the name of the lookup table (`Simulink.LookupTable`) object.

Dependencies

To enable this parameter, set **Data specification** to `Lookup table object`.

Programmatic Use
Block Parameter: `LookupTableObject`
Type: character vector
Values: name of a `Simulink.LookupTable` object
Default: `''`

Table data — Define the table of output values
`[1 2 4]` (default) | character vector

Enter the table of output values.

During simulation, the matrix must be one-dimensional. However, during block diagram editing, you can enter an empty matrix (specified as `[]`) or an undefined workspace variable. This technique lets you postpone specifying a correctly dimensioned matrix for the table data and continue editing the block diagram.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `Table`
Type: character vector
Values: matrix of table values
Default: `'[1 2 4]'`

Breakpoints specification — Method of breakpoint specification
`Explicit values` (default) | `Even spacing`

Specify whether to enter data as explicit breakpoints or as parameters that generate evenly spaced breakpoints.

- To explicitly specify breakpoint data, set this parameter to `Explicit values` and enter breakpoint data in the text box next to the **Breakpoints** parameters.
- To specify parameters that generate evenly spaced breakpoints, set this parameter to `Even spacing` and enter values for the **First point** and **Spacing** parameters for each dimension of breakpoint data. The block calculates the number of points to generate from the table data.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `BreakpointsSpecification`
Type: character vector
Values: `'Explicit values' | 'Even spacing'`
Default: `'Explicit values'`

Breakpoints — Explicit breakpoint values, or first point and spacing of breakpoints
`[10,22,31]` (default) | 1-by-n or n-by-1 vector of monotonically increasing values

Specify the breakpoint data explicitly or as evenly-spaced breakpoints, based on the value of the **Breakpoints specification** parameter.

- If you set **Breakpoints specification** to `Explicit values`, enter the breakpoint set that corresponds to each dimension of table data in each **Breakpoints** row. For each dimension, specify breakpoints as a 1-by-n or n-by-1 vector whose values are strictly monotonically increasing.
- If you set **Breakpoints specification** to `Even spacing`, enter the parameters **First point** and **Spacing** in each **Breakpoints** row to generate evenly-spaced breakpoints in the respective dimension. Your table data determines the number of evenly spaced points.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1`
Type: character vector
Values: 1-by-n or n-by-1 vector of monotonically increasing values
Default: `'[10, 22, 31]'`

First point — First point in evenly spaced breakpoint data
1 (default) | scalar

Specify the first point in your evenly spaced breakpoint data as a real-valued, finite, or scalar. This parameter is available when you set the **Breakpoints specification** to `Even spacing`.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints` and **Breakpoints specification** to `Even spacing`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1FirstPoint`
Type: character vector
Values: real-valued, finite, scalar
Default: `'1'`

Spacing — Spacing between evenly spaced breakpoints
1 (default) | scalar

Specify the spacing between points in your evenly-spaced breakpoint data.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints` and **Breakpoints specification** to `Even spacing`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1Spacing`
Type: character vector
Values: positive, real-valued, finite, scalar
Default: `'1'`

Edit table and breakpoints — Launch Lookup Table Editor dialog box
button

Click this button to open the Lookup Table Editor. You can then edit the object and save the new values for the object. For more information, see “Edit Lookup Tables” in the Simulink documentation.

Algorithm

Index search method — Method of calculating table indices
`Linear search` (default) | `Evenly spaced points` | `Binary search`

Select `Evenly spaced points`, `Linear search`, or `Binary search`. Each search method has speed advantages in different circumstances:

- For evenly spaced breakpoint sets (for example, 10, 20, 30, and so on), you achieve optimal speed by selecting `Evenly spaced points` to calculate table indices. This algorithm uses only the first two breakpoints of a set to determine the offset and spacing of the remaining points.

Note When using the `Simulink.LookupTable` object to specify table data and the **Breakpoints Specification** parameter of the referenced `Simulink.LookupTable` object is set to `Even spacing`, set the **Index search method** to `Evenly spaced points`.

- For unevenly spaced breakpoint sets, follow these guidelines:
  - If input signals do not vary significantly between time steps, selecting `Linear search` with **Begin index search using previous index result** produces the best performance.
  - If input signals jump more than one or two table intervals per time step, selecting `Binary search` produces the best performance.

A suboptimal choice of an index search method can lead to slow performance of models that rely heavily on lookup tables.

The generated code stores only the first breakpoint, the spacing, and the number of breakpoints when:

- The breakpoint data is not tunable.
- The index search method is `Evenly spaced points`.

Programmatic Use
Block Parameter: `IndexSearchMethod`
Type: character vector
Values: `'Binary search' | 'Evenly spaced points' | 'Linear search'`
Default: `'Linear search'`

Begin index search using previous index result — Start using the index from the previous time step
`off` (default) | `on`

Select this check box when you want the block to start its search using the index found at the previous time step. For inputs that change slowly with respect to the interval size, enabling this option can improve performance. Otherwise, the linear search and binary search methods can take longer, especially for large breakpoint sets.

Dependencies

To enable this parameter, set **Index search method** to `Linear search` or `Binary search`.

Programmatic Use
Block Parameter: `BeginIndexSearchUsing PreviousIndexResult`
Type: character vector
Values: `'off' | 'on'`
Default: `'off'`

Interpolation method — Method of interpolation between breakpoint values
`Linear point-slope` (default) | `Flat`

When an input falls between breakpoint values, the block interpolates the output value by using neighboring breakpoints. For more information, see “Interpolation Methods”.

Programmatic Use
Block Parameter: `InterpMethod`
Type: character vector
Values: `'Linear point-slope' | 'Flat'`

Default: 'Linear point-slope'

Integer rounding mode — Rounding mode for fixed-point operations
Round (default) | Zero

Specify the rounding mode for fixed-point lookup table calculations that occur during simulation or execution of code generated from the model.

This option does not affect rounding of block parameter values. Simulink rounds such values to the nearest representable integer value. To control the rounding of a block parameter, enter an expression using a MATLAB rounding function into the edit field on the block dialog box.

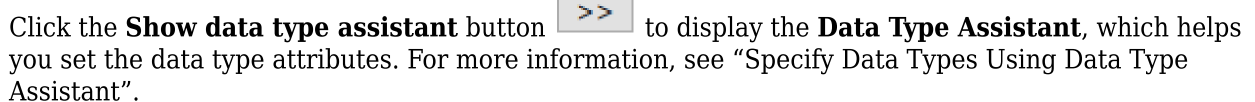
Programmatic Use
Block Parameter: RndMeth
Type: character vector
Values: 'Round' | 'Zero'
Default: 'Round'

Data Types

Table data — Data type of table data
Inherit: Same as output (default) | double | single | int8 | uint8 | int16 | uint16 | int32 | uint32 | fixdt(1,16) | fixdt(1,16,0) | fixdt(1,16,2^0,0) | <data type expression>

Specify the table data type. The block validates that the selected types are compatible with the specification of the targeted routine. You can set the table data type to:

- A rule that inherits a data type, for example, Inherit: Same as output
- The name of a built-in data type, for example, single
- The name of a data type object, for example, a Simulink.NumericType object
- An expression that evaluates to a data type, for example, fixdt(1,16,0)



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see “Specify Data Types Using Data Type Assistant”.

Tip Specify a table data type different from the output data type in these cases:

- Lower memory requirement for storing table data that uses a smaller type than the output signal.
- Sharing of prescaled table data between two Map blocks that have different output data types.
- Sharing of custom storage table data in the generated code for blocks that have different output data types.

Programmatic Use
Block Parameter: TableDataTypeStr
Type: character vector
Values: 'Inherit: Inherit from 'Table data'' | 'Inherit: Same as output' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' | 'uint16' | 'int32' |

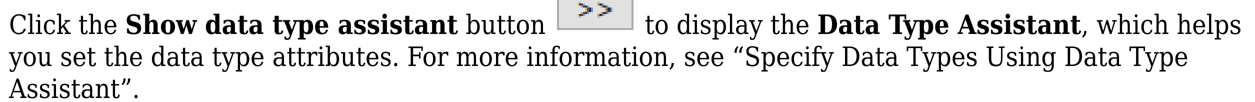
'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'
Default: 'Inherit: Same as output'

Breakpoints — Breakpoint data type
Inherit: Same as corresponding input (default) | double | single | int8 | uint8 | int16 | uint16 | int32 | uint32 | fixdt(1,16) | fixdt(1,16,0) | fixdt(1,16,2^0,0) | Enum: <class name> | <data type expression>

Specify the data type for a set of breakpoint data. You can set the breakpoint data type to:

- A rule that inherits a data type, for example, Inherit: Same as corresponding input
- The name of a built-in data type, for example, single
- The name of a data type class, for example, an enumerated data type class
- The name of a data type object, for example, a Simulink.NumericType object
- An expression that evaluates to a data type, for example, fixdt(1,16,0)

A limitation for using enumerated data with this block is that it does not support out-of-range input for enumerated date. When specifying enumerated data, include the entire enumeration set in the breakpoint data set.



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see "Specify Data Types Using Data Type Assistant".

Programmatic Use
Block Parameter: BreakpointsForDimension1DataTypeStr | BreakpointsForDimension2DataTypeStr
Type: character vector
Values: 'Inherit: Same as corresponding input' | 'Inherit: Inherit from 'Breakpoint data'' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' | 'uint16' | 'int32' | 'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'
Default: 'Inherit: Same as corresponding input'

Version History

Introduced in R2019a

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

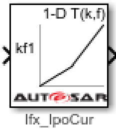
Curve Using Prelookup | Map | Map Using Prelookup | Prelookup

Topics

"Configure Lookup Tables for AUTOSAR Calibration and Measurement"
"Code Generation with AUTOSAR Code Replacement Library"

Curve Using Prelookup

Use previously calculated index and fraction values to accelerate approximation of one-dimensional function



Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Curve Using Prelookup block is intended for use with a Prelookup block. This block enables a prelookup result to drive multiple interpolation results. The Prelookup block computes the index and interval fraction that specify how its input value `u` relates to the breakpoint data set and feeds the resulting index and fraction values into the Curve Using Prelookup block to interpolate a one-dimensional table. The Prelookup and Curve Using Prelookup blocks have distributed algorithms that when used together perform the same algorithm operation as the Curve block but offer greater flexibility and more efficient simulation and code generation.

If you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, code generated from this block is replaced with the AUTOSAR library routine that you configure in the block parameters dialog box.

Ports

Input

kf1 — Input containing index `k` and fraction `f`
bus object

Inputs to the **kf1** port contain index `k` and fraction `f` specified as a bus object.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point` | `bus`

T — Table data
scalar | vector | matrix | 1-d array

Table data values provided as input to port **T**. These table values correspond to the breakpoint data sets specified in Prelookup blocks. The Interpolation Using Prelookup block generates output by looking up or estimating table values based on index (`k`) and interval fraction (`f`) values fed from Prelookup blocks.

Dependencies

To enable this port, set **Source** to `Input port`.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Output

Port 1 — Approximation of one-dimensional function
scalar | vector | matrix

Approximation of the one-dimensional function computed by interpolating table data that uses values from the input index, `k`, and the fraction, `f`.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Parameters

Targeted Routine Library — Indicates the AUTOSAR routine library used for block code replacement
IFX(fixed-point) (default) | IFL(floating-point)

If you select the AUTOSAR 4.0 code replacement library (CRL) for your model, code generated from this block is replaced from the selected AUTOSAR routine library. This parameter enables you to choose either fixed-point (IFX) or floating-point (IFL) code replacement and validation checks.

Targeted Routine — AUTOSAR library routine used for code replacement
`Ifx_IpoCur` (default)

This parameter reflects the name of the AUTOSAR code replacement library (CRL) routine used to replace the code generated by this block. The naming convention includes the targeted routine library, interpolation method, and block type. This parameter is reference-only and must not be edited.

Table Specification

Data Specification — Choose how to enter table data
`Explicit values` (default) | `Lookup table object`

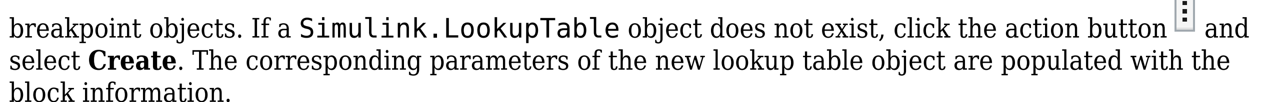
Specify whether to enter table data directly or use a lookup table object. If you set this parameter to:

- `Explicit values`, the **Table Data** parameter is visible in the dialog box.
- `Lookup table object`, the **Name** parameter is visible in the dialog box.

Programmatic Use
Block Parameter: `TableSpecification`
Type: character vector
Values: `'Explicit values' | 'Lookup table object'`
Default: `'Explicit values'`

Name — Name of a `Simulink.LookupTable` object
`Simulink.LookupTable object`

Specify the name of a `Simulink.LookupTable` object. A lookup table object references Simulink



breakpoint objects. If a `Simulink.LookupTable` object does not exist, click the action button ⋮ and select **Create**. The corresponding parameters of the new lookup table object are populated with the block information.

Dependencies

To enable this parameter, set **Data Specification** to `Lookup table object`.

Programmatic Use

Block Parameter: `LookupTableObject`
Type: character vector
Value: `Simulink.LookupTable object`
Default: `''`

Table data — Define the table of output values
`[1 2 4]` (default) | character vector

Enter the table of output values.

During simulation, the matrix size must be one-dimensional. However, during block diagram editing, you can enter an empty matrix (specified as `[]`) or an undefined workspace variable. This technique lets you postpone specifying a correctly dimensioned matrix for the table data and continue editing the block diagram.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `Table`
Type: character vector
Values: matrix of table values
Default: `'[1 2 4]'`

Edit table and breakpoints — Launch Lookup Table Editor dialog box
button

Click this button to open the Lookup Table Editor. For more information, see “Edit Lookup Tables” in the Simulink documentation.

Clicking this button for a lookup table object lets you edit the object and save the new values for the object.

Algorithm

Interpolation method — Select `Linear point-slope` or `Flat` interpolation methods
`Linear point-slope` (default) | `Flat`

Specify the method that the block uses to interpolate table data. You can select `Linear point-slope` or `Flat`. For more information, see “Interpolation Methods”.

Programmatic Use

Block Parameter: `InterpMethod`
Type: character vector
Values: `'Flat' | 'Linear point-slope'`
Default: `'Linear point-slope'`

Integer rounding mode — Rounding mode for fixed-point operations
`Round` (default) | `Zero`

Specify the rounding mode for fixed-point or floating-point lookup table calculations that occur during simulation or execution of code generated from the model.

This option does not affect rounding of values of block parameters. Simulink rounds such values to the nearest representable integer value. To control the rounding of a block parameter, enter an expression using a MATLAB rounding function into the edit field on the block dialog box.

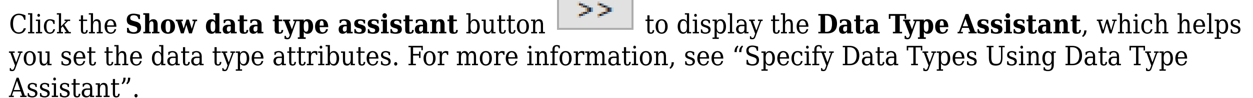
Programmatic Use
Block Parameter: `RndMeth`
Type: character vector
Values: `'Round' | 'Zero'`
Default: `'Round'`

Data Types

Table data — Data type of table data
`Inherit: Same as output` (default) | `double` | `single` | `int8` | `uint8` | `int16` | `uint16` | `int32` | `uint32` | `fixdt(1,16)` | `fixdt(1,16,0)` | `fixdt(1,16,2^0,0)` | `<data type expression>`

Specify the table data type. The block validates that the selected types are compatible with the specification of the targeted routine. You can set it to:

- A rule that inherits a data type, for example, `Inherit: Same as output`
- The name of a built-in data type, for example, `single`
- The name of a data type object, for example, a `Simulink.NumericType` object
- An expression that evaluates to a data type, for example, `fixdt(1,16,0)`



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see “Specify Data Types Using Data Type Assistant”.

Tip Specify a table data type different from the output data type for these cases:

- Lower memory requirement for storing table data that uses a smaller type than the output signal
- Sharing of prescaled table data between two Curve blocks with different output data types
- Sharing of custom storage table data in the generated code for blocks with different output data types

---

Programmatic Use
Block Parameter: `TableDataTypeStr`
Type: character vector
Values: `'Inherit: Inherit from 'Table data'' | 'Inherit: Same as output' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' | 'uint16' | 'int32' | 'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'`
Default: `'Inherit: Same as output'`

Version History

Introduced in R2019a

Extended Capabilities

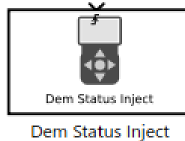
C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

See Also
Curve | Map | Map Using Prelookup | Prelookup

Topics
"Configure Lookup Tables for AUTOSAR Calibration and Measurement"
"Code Generation with AUTOSAR Code Replacement Library"

Dem Status Inject

Inject an event failure to test recovery



Dem Status Inject

Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

The Dem Status Inject block can be configured to instantaneously set the diagnostic status for an AUTOSAR event simulated in the Diagnostic Service Component block. This status value can be configured according to the Unified Diagnostic Services (UDS) standard. Specifically, you can use this block to inject a transient failure into a system to test its ability to recover. This block simulates and responds to other blocks affecting its status to show system recovery.

Parameters

EventID — Specify the event
0 (default) | integer

Specify the AUTOSAR event that you want to override by using this block.

Fault type — Specify the type of fault
Event Fail (default) | Event Pass | Operation Cycle Start | Operation Cycle End | Fault Record Overwritten | Fault Maturation | Clear Diagnostic | Aging | Healing | Indicator Conditions Met

Specify the type of diagnostic event that you want to inject into the system.

Trigger type — Specify the inject condition
rising (default) | falling | either | function-call | message

Specify when to inject the diagnostic event into the system.

Test Failed — Indicates the result of the most recently performed test
Clear (default) | Set

Test failed the last time it was checked.

This read-only property is set by the **Fault type**.

Test Failed this Operation Cycle — Indicates whether a diagnostic test has reported a failure during the current operation cycle
Clear (default) | Set

Test failed during the current operation cycle.

This read-only property is set by the **Fault type**.

Pending DTC — Indicates whether a diagnostic test has reported a failure during the current or last completed operation cycle
Clear (default) | Set

Test failed during the current or previous operation cycle.

This read-only property is set by the **Fault type**.

Confirmed DTC — Indicates whether a malfunction was detected enough times to warrant that the DTC should be stored in long-term memory
Clear (default) | Set

Test failure confirmed at the time of the request.

This read-only property is set by the **Fault type**.

Test Not Completed Since Last Clear — Indicates whether a test has run and completed since the last time a call was made to ClearDiagnosticInformation
Clear (default) | Set

Test not performed since the last code clear.

This read-only property is set by the **Fault type**.

Test Failed Since Last Clear — Indicates whether a test has failed since the last time a call was made to ClearDiagnosticInformation
Clear (default) | Set

Test failed at least once since last code clear.

This read-only property is set by the **Fault type**.

Test Not Completed This Operation Cycle — Test not performed during the current operation cycle
Clear (default) | Set

Test not completed during this operation cycle.

This read-only property is set by the **Fault type**.

Warning Indicator Requested — Indicates the status of any warning indicators associated with a particular DTC
Clear (default) | Set

Test failure so severe that it alerts the server.

This read-only property is set by the **Fault type**.

Version History

Introduced in R2022a

Extended Capabilities

C/C++ Code Generation

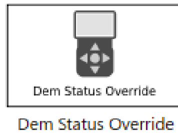
Generate C and C++ code using Simulink® Coder™.

See Also

Dem Status Override

Dem Status Override

Override an event to simulate and verify behavior



Dem Status Override

Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

The Dem Status Override block can be configured to set the diagnostic status for an AUTOSAR event simulated in the Diagnostic Service Component block. This status value can be configured according to the Unified Diagnostic Services (UDS) standard. Specifically, you can use this block to set the return value of `GetEventStatus` calls for a specific event regardless of the behavior of the other events in the model. Other blocks that attempt to modify the event status during simulation are ignored. This block allows a predictable entry-point for testing specific behavior that you can use as a low-cost method to quickly gain coverage of a component model.

Parameters

EventID — Specify the event
0 (default) | integer

Specify the AUTOSAR event that you want to override by using this block.

Test Failed — Indicates the result of the most recently performed test
Clear (default) | Set

Test failed the last time it was checked.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Test Failed this Operation Cycle — Indicates whether a diagnostic test has reported a failure during the current operation cycle
Clear (default) | Set

Test failed during the current operation cycle.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Pending DTC — Indicates whether a diagnostic test has reported a failure during the current or last completed operation cycle
Clear (default) | Set

Test failed during the current or previous operation cycle.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Confirmed DTC — Indicates whether a malfunction was detected enough times to warrant that the DTC should be stored in long-term memory
Clear (default) | Set

Test failure confirmed at the time of the request.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Test Not Completed Since Last Clear — Indicates whether a test has run and completed since the last time a call was made to ClearDiagnosticInformation
Clear (default) | Set

Test not performed since the last code clear.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Test Failed Since Last Clear — Indicates whether a test has failed since the last time a call was made to ClearDiagnosticInformation
Clear (default) | Set

Test failed at least once since last code clear.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Test Not Completed This Operation Cycle — Test not performed during the current operation cycle
Clear (default) | Set

Test not completed during this operation cycle.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Warning Indicator Requested — Indicates the status of any warning indicators associated with a particular DTC
Clear (default) | Set

Test failure so severe that it alerts the server.

To set this property, select `Dialog` to manually configure the status or `Input port` to have the status configured dynamically in response to the behavior of a connected input.

Version History

Introduced in R2022a

Extended Capabilities

C/C++ Code Generation

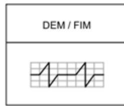
Generate C and C++ code using Simulink® Coder™.

See Also

Dem Status Inject

Diagnostic Service Component

Configure AUTOSAR Diagnostic Services and Runtime Environment (RTE) for emulation



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

The Diagnostic Service Component block provides reference implementations of Diagnostic Event Manager (Dem) and Function Inhibition Manager (FiM) services supported by AUTOSAR Basic Software (BSW) caller blocks. When coupled with Dem and FiM caller blocks, the reference implementations enable you to configure and run system-level or composition-level simulations of AUTOSAR Dem and FiM service calls.

The block has prepopulated parameters, including RTE service ID parameters, Dem **Counter-Based Debouncing** parameters, and FiM inhibition condition parameters. Examine the parameter settings and, if necessary, make modifications based on how you are using the Dem or FiM service operations.

The RTE tab lists component client ports and their mapping to Dem or FiM service IDs for events, operation cycles, or functions with inhibition conditions. Each row in the table represents a call into Dem or FiM services from a Basic Software caller block, for which you can modify an ID value.

The Dem tab **Counter-Based Debouncing** parameters control the counter-based debounce algorithm provided by the Dem service reference implementations. During multiple simulations, you can adjust event step size and threshold parameters and observe the effects.

Use the counter-based debouncing parameters to determine when a monitored event has passed or failed. For each event ID, the software maintains a counter. When PREFAIL events arrive, the event ID counter increments by the **Increment step size** (default 1). When PREPASS events arrive, the event ID counter decrements by the **Decrement step size** (default 1). To determine the event ID counter thresholds at which an event fails or passes, use block parameters **Failed threshold** (default 2) and **Passed threshold** (default -1).

In the Dem reference implementations, the step size and threshold parameters apply globally to event IDs, not to individual IDs.

The FIM tab lists function identifiers (FIDs) and their associated inhibition conditions and client ports. The tab provides graphical controls for adding or removing inhibition conditions for a selected FID. For each inhibition condition, select ID and mask values.

Parameters

ID (RTE tab) — ID that identifies service event, operation cycle, or function with inhibition condition
1 (default) | scalar

Each row in the RTE tab table represents a call into Dem or FiM services from a Basic Software caller block. Check the ID mappings for events, operation cycles, and functions with inhibition conditions. For events, calls that act on the same event use the same event ID. For an example of mapping Dem

client ports to shared event IDs, see “Simulate AUTOSAR Basic Software Services and Run-Time Environment”.

Increment step size — Fixed-step value to increment event ID counter when PREFAIL events arrive
1 (default) | scalar (1 to 32767)

Specify a fixed-step value that the Dem event ID counter increments by when PREFAIL events arrive.

Decrement step size — Fixed-step value to decrement the event ID counter when PREPASS events arrive
1 (default) | scalar (1 to 32767)

Specify a fixed-step value that the Dem event ID counter decrements by when PREPASS events arrive.

Failed threshold — Dem event ID counter threshold that represents a failed status
2 (default) | scalar (1 to 32767)

Specify a Dem event ID counter threshold value to represent failed status. Events that reach this threshold are considered to have failed.

Passed threshold — Dem event ID counter threshold that represents passed status
-1 (default) | scalar (-32768 to -1)

Specify a Dem event ID counter threshold value to represent passed status. Events that reach this threshold are considered to have passed.

ID (FiM tab) — Inhibition condition ID
1 (default) | scalar

In the FiM tab table, each row grouped under an FID represents an inhibition condition with an ID, one or more component client ports associated with the ID, and a mask. For each inhibition condition, you can modify the ID value. For examples of inhibition condition configuration, see “Configure and Simulate AUTOSAR Function Inhibition Service Calls”.

Mask — Inhibition condition mask
LAST_FAILED | NOT_TESTED | TESTED | TESTED_AND_FAILED

In the FiM tab table, each row grouped under an FID represents an inhibition condition with an ID, one or more component client ports associated with the ID, and a mask. For each inhibition condition, you can modify the mask value. For examples of inhibition condition configuration, see “Configure and Simulate AUTOSAR Function Inhibition Service Calls”.

Version History

Introduced in R2017b

See Also

DiagnosticInfoCaller | DiagnosticMonitorCaller | DiagnosticEventAvailableCaller | DiagnosticOperationCycleCaller | Function Inhibition Caller | Control Function Available Caller

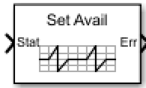
Topics

“Configure Calls to AUTOSAR Diagnostic Event Manager Service”

“Configure Calls to AUTOSAR Function Inhibition Manager Service”
“Configure AUTOSAR Basic Software Service Implementations for Simulation”

DiagnosticEventAvailableCaller

Call AUTOSAR Diagnostic Event Manager (Dem) service interface `EventAvailable`



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

For the AUTOSAR Classic Platform, the AUTOSAR standard defines important services as part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). Examples include services provided by the Diagnostic Event Manager (Dem), the Function Inhibition Manager (FiM), and the NVRAM Manager (NvM). In the AUTOSAR RTE, AUTOSAR software components typically access BSW services by using client-server communication.

To support system-level modeling and simulation of AUTOSAR components and services, AUTOSAR Blockset provides an AUTOSAR Basic Software block library. The library contains preconfigured blocks for modeling component calls to AUTOSAR BSW services and reference implementations of the BSW services.

The DiagnosticEventAvailableCaller block calls the Dem service interface `EventAvailable` to initiate the `SetEventAvailable` operation. A component uses `SetEventAvailable` to temporarily disable and enable a specific event, for example, an event of the same name associated with an existing Dem `SetEventStatus` caller block. Typically you connect a true/false Boolean constant block to the `SetEventAvailable` input, so that you can switch the event off (false) or on (true). When disabled, the event fired by the `SetEventStatus` block has no effect.

Parameters

Client port name — Name of client port AUTOSAR component uses to call Dem service interface `EventAvailable`
`EventAvailable` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the Dem service interface `EventAvailable`.

Operation — Specify operation defined in Dem service interface `EventAvailable`
`SetEventAvailable` (default)

This block supports the Dem operation `SetEventAvailable` and generates inports and outports for the operation. You can use this operation to configure events as unavailable. An unavailable event is treated as if it is not configured in the system and returns E_NOT_OK when accessed by other operations.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2020a

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

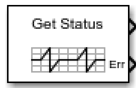
DiagnosticInfoCaller | DiagnosticMonitorCaller | DiagnosticOperationCycleCaller | Diagnostic Service Component

Topics

"Configure Calls to AUTOSAR Diagnostic Event Manager Service"
"Model AUTOSAR Basic Software Service Calls"

DiagnosticInfoCaller

Call AUTOSAR Diagnostic Event Manager (Dem) service interface `DiagnosticInfo`



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

The AUTOSAR standard defines a Diagnostic Event Manager (Dem) service as a part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). AUTOSAR software components access Dem services through client-server calls. The DiagnosticInfoCaller block calls the Dem service interface `DiagnosticInfo` to initiate a specified operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call Dem service interface `DiagnosticInfo`
`DiagnosticInfo` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the Dem service interface `DiagnosticInfo`.

Operation — Specify operation defined in Dem service interface `DiagnosticInfo`
`GetEventStatus` (default) | `GetEventFailed` | `GetEventTested` | `GetDTCOfEvent` | `GetFaultDetectionCounter` | `GetEventExtendedDataRecord` | `GetEventFreezeFrameData`

Select the operation that the AUTOSAR software component calls from the Dem service interface `DiagnosticInfo`. The AUTOSAR standard defines the operations. After you select the operation, the inports and outports for the block are generated to support the operation.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Data type for FormatStatus — Specify data type to represent a Dem format type
`Enum:Dem_DTCFormatType` (default)

Specify an enumerated data type to represent a Dem format type required for some operations. For more information, see the AUTOSAR standard *Specification of Diagnostic Event Manager*.

Dependencies

Specify this parameter when **Operation** is set to `GetDTCOfEvent`.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2016b

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

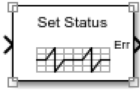
DiagnosticMonitorCaller | DiagnosticOperationCycleCaller | DiagnosticEventAvailableCaller | Diagnostic Service Component

Topics

"Configure Calls to AUTOSAR Diagnostic Event Manager Service"
"Configure AUTOSAR Basic Software Service Implementations for Simulation"

DiagnosticMonitorCaller

Call AUTOSAR Diagnostic Event Manager (Dem) service interface `DiagnosticMonitor`



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

The AUTOSAR standard defines a Diagnostic Event Manager (Dem) service as a part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). AUTOSAR software components access Dem services through client-server calls. The DiagnosticMonitorCaller block calls the Dem service interface `DiagnosticMonitor` to initiate a specified operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call Dem service interface `DiagnosticMonitor`
`DiagnosticMonitor` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the Dem service interface `DiagnosticMonitor`.

Operation — Specify operation defined in Dem service interface `DiagnosticMonitor`
`SetEventStatus` (default) | `ResetEventStatus` | `PrestoreFreezeFrame` | `ClearPrestoredFreezeFrame` | `SetEventDisabled`

Select the operation that the AUTOSAR software component calls from the Dem service interface `DiagnosticMonitor`. The operations are defined by the AUTOSAR standard. After the operation is selected, the inports and outports for the block are generated to support the operation.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Data type for EventStatus — Specify a data type to represent a Dem event type
`Enum: Dem_EventStatusType` (default)

Specify an enumerated data type to represent a Dem event type required for some operations. For more information, see the AUTOSAR standard *Specification of Diagnostic Event Manager*.

Dependencies

Specify this parameter when **Operation** is set to `SetEventStatus`.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2016b

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

See Also

DiagnosticInfoCaller | DiagnosticOperationCycleCaller | DiagnosticEventAvailableCaller | Diagnostic Service Component

Topics
"Configure Calls to AUTOSAR Diagnostic Event Manager Service"
"Configure AUTOSAR Basic Software Service Implementations for Simulation"

DiagnosticOperationCycleCaller

Call AUTOSAR Diagnostic Event Manager (Dem) service interface `OperationCycle`

Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Diagnostic Event Manager (Dem)

Description

For the AUTOSAR Classic Platform, the AUTOSAR standard defines important services as part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). Examples include services provided by the Diagnostic Event Manager (Dem), the Function Inhibition Manager (FiM), and the NVRAM Manager (NvM). In the AUTOSAR RTE, AUTOSAR software components typically access BSW services by using client-server communication.

To support system-level modeling and simulation of AUTOSAR components and services, AUTOSAR Blockset provides an AUTOSAR Basic Software block library. The library contains preconfigured blocks for modeling component calls to AUTOSAR BSW services and reference implementations of the BSW services.

As defined in the AUTOSAR specification, the Function Inhibition Manager provides a control mechanism for selectively inhibiting (deactivating) function execution in software component runnables based on function identifiers (FIDs) with inhibit conditions.

The Function Inhibition Manager is closely related to the Diagnostic Event Manager because inhibiting conditions can be based on the status of diagnostic events. An operation cycle affects events that share the same Diagnostic Service Component. The DiagnosticOperationCycleCaller block calls the Dem service interface `OperationCycle` to control operation cycles.

Parameters

Client port name — Name of client port AUTOSAR component uses to call Dem service interface `OperationCycle`
`OperationCycle` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the Dem service interface `OperationCycle`.

Operation — Specify operation defined in Dem service interface `OperationCycle`
`SetOperationCycleState` (default) | `GetOperationCycleState`

Select a Dem operation to control or monitor operation cycles. To start and stop operation cycles, select `SetOperationCycleState`. To query the current state of an operation cycle, select `GetOperationCycleState`. After you select an operation, the inports and outports for the block are generated to support that operation.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Data type for CycleState — Specify to start or stop operation cycles
`Enum:Dem_OperationCycleStateType.DEM_CYCLE_STATE_START` (default) |
`Enum:Dem_OperationCycleStateType.DEM_CYCLE_STATE_END`

Enter a value to control the start or stop of component operation cycles. To start operation cycles, enter the value `Enum:Dem_OperationCycleStateType.DEM_CYCLE_STATE_START`. To end operation cycles, enter the value `Enum:Dem_OperationCycleStateType.DEM_CYCLE_STATE_END`.

Dependencies

Specify this parameter when **Operation** is set to `SetOperationCycleState`.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2020a

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

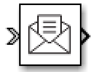
Function Inhibition Caller | Control Function Available Caller | Diagnostic Service Component

Topics

"Configure Calls to AUTOSAR Function Inhibition Manager Service"
"Model AUTOSAR Basic Software Service Calls"

Event Receive

Convert input event to signal



Libraries:
AUTOSAR Blockset / Adaptive Platform / Signal Routing

Description

At the top level of an AUTOSAR adaptive model, use the Event Receive and Event Send blocks to set up event-based communication.

- After each root inport, add an Event Receive block which converts an input event to a signal, while preserving the signal values and data type.
- Before each root outport, add an Event Send block which converts an input signal to an event, while preserving the signal values and data type.

Ports

Input

Port_1 — Input event
scalar | vector | matrix

The input port for the Event Receive block to accept an event.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `int64` | `uint8` | `uint16` | `uint32` | `uint64` | `Boolean` | `enumerated` | `bus`

Output

Port_1 — Output signal
scalar | vector | matrix

The output port for the Event Receive block to output a signal.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `int64` | `uint8` | `uint16` | `uint32` | `uint64` | `Boolean` | `enumerated` | `bus`

Version History

Introduced in R2019a

Extended Capabilities

C/C++ Code Generation

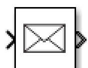
Generate C and C++ code using Simulink® Coder™.

See Also
Event Send

Topics
"Configure AUTOSAR Adaptive Software Components"
"Create and Configure AUTOSAR Adaptive Software Component"

Event Send

Convert input signal to event



Libraries:
AUTOSAR Blockset / Adaptive Platform / Signal Routing

Description

At the top level of an AUTOSAR adaptive model, use the Event Receive and Event Send blocks to set up event-based communication.

- After each root inport, add an Event Receive block which converts an input event to a signal, while preserving the signal values and data type.
- Before each root outport, add an Event Send block which converts an input signal to an event, while preserving the signal values and data type.

Ports

Input

Port_1 — Input signal
scalar | vector | matrix

The input port for the Event Send block to receive inputs of any type that AUTOSAR Blockset supports.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `int64` | `uint8` | `uint16` | `uint32` | `uint64` | `Boolean` | `enumerated` | `bus`

Output

Port_1 — Output event
scalar | vector | matrix

The output port for the Event Send block to output an event.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `int64` | `uint8` | `uint16` | `uint32` | `uint64` | `Boolean` | `enumerated` | `bus`

Version History

Introduced in R2019a

Extended Capabilities

C/C++ Code Generation

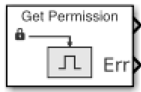
Generate C and C++ code using Simulink® Coder™.

See Also
Event Receive

Topics
"Configure AUTOSAR Adaptive Software Components"
"Create and Configure AUTOSAR Adaptive Software Component"

Function Inhibition Caller

Call AUTOSAR Function Inhibition Manager (FiM) service interface FunctionInhibition



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / Function Inhibition Manager (FiM)

Description

For the AUTOSAR Classic Platform, the AUTOSAR standard defines important services as part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). Examples include services provided by the Diagnostic Event Manager (Dem), the Function Inhibition Manager (FiM), and the NVRAM Manager (NvM). In the AUTOSAR RTE, AUTOSAR software components typically access BSW services by using client-server communication.

To support system-level modeling and simulation of AUTOSAR components and services, AUTOSAR Blockset provides an AUTOSAR Basic Software block library. The library contains preconfigured blocks for modeling component calls to AUTOSAR BSW services and reference implementations of the BSW services.

As defined in the AUTOSAR specification, the Function Inhibition Manager provides a control mechanism for selectively inhibiting (deactivating) function execution in software component runnables based on function identifiers (FIDs) with inhibit conditions.

The Function Inhibition Manager is closely related to the Diagnostic Event Manager because inhibiting conditions can be based on the status of diagnostic events. The Function Inhibition Caller block calls the FiM service interface FunctionInhibition to initiate the GetFunctionPermission operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call FiM service interface FunctionInhibition
FiM_FunctionInhibition (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the FiM service interface FiM_FunctionInhibition.

Operation — Specify operation defined in FiM service interface FunctionInhibition
GetFunctionPermission (default)

This block supports the FiM operation GetFunctionPermission and generates inports and outports for this operation. This operation queries the Function Inhibition Manager to check if it has permission to run associated functionality. Permissions are based on the inhibition configuration created by using the Diagnostic Service Component block. The operation returns true if the functionality has permission or false if the functionality is inhibited.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2020a

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

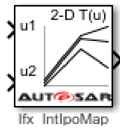
See Also

Control Function Available Caller | DiagnosticOperationCycleCaller | Diagnostic Service Component

Topics
“Configure Calls to AUTOSAR Function Inhibition Manager Service”
“Model AUTOSAR Basic Software Service Calls”

Map

Approximate two-dimensional function



Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Map block performs two-dimensional, interpolated table lookup, including index searches. The table is a sampled representation of a function in two variables. Breakpoint sets relate the input values to positions in the table. You can also use the Prelookup and Prelookup Using Map blocks together to perform the same operations as this block.

When you set the **Math and Data Types > Use algorithms optimized for row-major array layout** configuration parameter, the block behavior changes from column-major to row-major. For these blocks, the column-major and row-major algorithms might differ in the order of the output calculations, possibly resulting in slightly different numeric values. This capability requires Simulink Coder or Embedded Coder software. For more information on row-major support, see “Code Generation of Matrices and Arrays” (Simulink Coder).

If you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, code generated from this block is replaced with the AUTOSAR library routine that you configure in the block parameters dialog box.

Ports

Input

u1 — First dimension input values
scalar | vector | matrix

Real-valued inputs to the first port, mapped to an output value by looking up or interpolating the table of values that you define.

Example: 0:10

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

u2 — Second dimension input values
scalar | vector | matrix

Real-valued inputs to the second port, mapped to an output value by looking up or interpolating the table of values that you define.

Example: 0:10

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Output

y — Output computed by looking up or estimating table values
scalar | vector | matrix

Output generated by looking up or estimating table values based on input values. If the inputs match the index values of breakpoint sets, the map block provides a table value as output. If the block inputs do not match index values in breakpoint sets, but are within range, the block performs the configured interpolation method and provides an estimated value from the table as output.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Parameters

Targeted Routine Library — Indicates the AUTOSAR routine library used for block code replacement
IFX(fixed-point) (default) | IFL(floating-point)

If you select the AUTOSAR 4.0 code replacement library (CRL) for your model, code generated from this block is replaced from the selected AUTOSAR routine library. This parameter enables you to choose either fixed-point (IFX) or floating-point (IFL) code replacement and validation checks.

Targeted Routine — AUTOSAR library routine used for code replacement
`Ifx_IntIpoMap` (default)

This parameter reflects the name of the AUTOSAR code replacement library (CRL) routine used to replace the code generated by this block. The naming convention includes the targeted routine library, interpolation method, and block type. This parameter is reference-only and must not be edited.

Table Specification

Data specification — Method of table and breakpoint specification
`Table and breakpoints` (default) | `Lookup table object`

From the list, select:

- `Table and breakpoints` — Specify the table data and breakpoints. Selecting this option enables these parameters:
  - **Table data**
  - **Breakpoints specification**
  - **Breakpoints 1**
  - **Breakpoints 2**
  - **Edit table and breakpoints**
- `Lookup table object` — Use an existing lookup table (`Simulink.LookupTable`) object. Selecting this option enables the **Name** field and the **Edit table and breakpoints** button.

Programmatic Use
Block Parameter: `DataSpecification`
Type: character vector
Values: `'Table and breakpoints' | 'Lookup table object'`
Default: `'Table and breakpoints'`

Name — Name of the lookup table object
`[]` (default) | `Simulink.LookupTable` object

Enter the name of the lookup table (`Simulink.LookupTable`) object.

Dependencies

To enable this parameter, set **Data specification** to `Lookup table object`.

Programmatic Use
Block Parameter: `LookupTableObject`
Type: character vector
Values: name of a `Simulink.LookupTable` object
Default: `''`

Table data — Define the table of output values
`[4 5 6;16 19 20;10 18 23]` (default) | character vector

Enter the table of output values.

During simulation, the matrix size must be two dimensional. However, during block diagram editing, you can enter an empty matrix (specified as `[]`) or an undefined workspace variable. This technique lets you postpone specifying a correctly dimensioned matrix for the table data and continue editing the block diagram.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use
Block Parameter: `Table`
Type: character vector
Values: matrix of table values
Default: `'[4 5 6;16 19 20;10 18 23]'`

Breakpoints specification — Method of breakpoint specification
`Explicit values` (default) | `Even spacing`

Specify whether to enter data as explicit breakpoints or as parameters that generate evenly spaced breakpoints.

- To explicitly specify breakpoint data, set this parameter to `Explicit values` and enter breakpoint data in the text box next to the **Breakpoints** parameters.
- To specify parameters that generate evenly spaced breakpoints, set this parameter to `Even spacing` and enter values for the **First point** and **Spacing** parameters for each dimension of breakpoint data. The block calculates the number of points to generate from the table data.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use
Block Parameter: `BreakpointsSpecification`
Type: character vector
Values: `'Explicit values' | 'Even spacing'`
Default: `'Explicit values'`

Breakpoints — Explicit breakpoint values, or first point and spacing of breakpoints
`[10,22,31]` (default) | 1-by-n or n-by-1 vector of monotonically increasing values

Specify the breakpoint data explicitly or as evenly-spaced breakpoints, based on the value of the **Breakpoints specification** parameter.

- If you set **Breakpoints specification** to `Explicit values`, enter the breakpoint set that corresponds to each dimension of table data in each **Breakpoints** row. For each dimension, specify breakpoints as a 1-by-n or n-by-1 vector whose values are strictly monotonically increasing.
- If you set **Breakpoints specification** to `Even spacing`, enter the parameters **First point** and **Spacing** in each **Breakpoints** row to generate evenly-spaced breakpoints in the respective dimension. Your table data determines the number of evenly spaced points.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1 | BreakpointsForDimension2`
Type: character vector
Values: 1-by-n or n-by-1 vector of monotonically increasing values
Default: `'[10, 22, 31]'`

First point — First point in evenly spaced breakpoint data
`1` (default) | scalar

Specify the first point in your evenly spaced breakpoint data as a real-valued, finite, or scalar. This parameter is available when you set the **Breakpoints specification** to `Even spacing`.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints` and **Breakpoints specification** to `Even spacing`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1FirstPoint | BreakpointsForDimensionSecondPoint`
Type: character vector
Values: real-valued, finite, scalar
Default: `'1'`

Spacing — Spacing between evenly spaced breakpoints
`1` (default) | scalar

Specify the spacing between points in your evenly-spaced breakpoint data.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints` and **Breakpoints specification** to `Even spacing`.

Programmatic Use

Block Parameter: `BreakpointsForDimension1Spacing | BreakpointsForDimension2Spacing`
Type: character vector

Values: positive, real-valued, finite, scalar
Default: `'1'`

Edit table and breakpoints — Launch Lookup Table Editor dialog box
button

Click this button to open the Lookup Table Editor. You can then edit the object and save the new values for the object. For more information, see “Edit Lookup Tables” in the Simulink documentation.

Algorithm

Index search method — Method of calculating table indices
`Linear search` (default) | `Evenly spaced points` | `Binary search`

Select `Evenly spaced points`, `Linear search`, or `Binary search`. Each search method has speed advantages in different circumstances:

- For evenly spaced breakpoint sets (for example, 10, 20, 30, and so on), you achieve optimal speed by selecting `Evenly spaced points` to calculate table indices. This algorithm uses only the first two breakpoints of a set to determine the offset and spacing of the remaining points.

  Note When using the `Simulink.LookupTable` object to specify table data and the **Breakpoints Specification** parameter of the referenced `Simulink.LookupTable` object is set to `Even spacing`, set the **Index search method** to `Evenly spaced points`.

- For unevenly spaced breakpoint sets, follow these guidelines:
  - If input signals do not vary significantly between time steps, selecting `Linear search` with **Begin index search using previous index result** produces the best performance.
  - If input signals jump more than one or two table intervals per time step, selecting `Binary search` produces the best performance.

A suboptimal choice of an index search method can lead to slow performance of models that rely heavily on lookup tables.

The generated code stores only the first breakpoint, the spacing, and the number of breakpoints when:

- The breakpoint data is not tunable.
- The index search method is `Evenly spaced points`.

Programmatic Use

Block Parameter: `IndexSearchMethod`
Type: character vector
Values: `'Binary search' | 'Evenly spaced points' | 'Linear search'`
Default: `'Linear search'`

Begin index search using previous index result — Start using the index from the previous time step
`off` (default) | `on`

Select this check box when you want the block to start its search using the index found at the previous time step. For inputs that change slowly with respect to the interval size, enabling this option can improve performance. Otherwise, the linear search and binary search methods can take longer, especially for large breakpoint sets.

Dependencies

To enable this parameter, set **Index search method** to `Linear search` or `Binary search`.

Programmatic Use

Block Parameter: `BeginIndexSearchUsing PreviousIndexResult`
Type: character vector
Values: `'off' | 'on'`
Default: `'off'`

Interpolation method — Method of interpolation between breakpoint values
`Linear point-slope` (default) | `Flat`

When an input falls between breakpoint values, the block interpolates the output value by using neighboring breakpoints. For more information, see “Interpolation Methods”.

Programmatic Use

Block Parameter: `InterpMethod`
Type: character vector
Values: `'Linear point-slope' | 'Flat'`
Default: `'Linear point-slope'`

Integer rounding mode — Rounding mode for fixed-point operations
`Round` (default) | `Zero`

Specify the rounding mode for fixed-point or floating-point lookup table calculations that occur during simulation or execution of code generated from the model.

This option does not affect rounding of block parameter values. Simulink rounds such values to the nearest representable integer value. To control the rounding of a block parameter, enter an expression using a MATLAB rounding function into the edit field on the block dialog box.

Programmatic Use

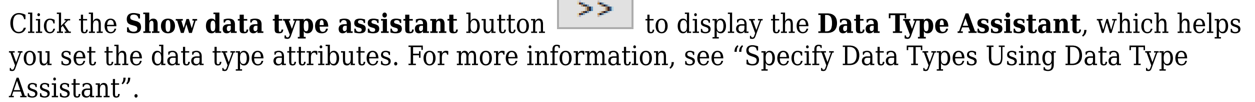
Block Parameter: `RndMeth`
Type: character vector
Values: `'Round' | 'Zero'`
Default: `'Round'`

Data Types

Table data — Data type of table data
`Inherit: Same as output` (default) | `double` | `single` | `int8` | `uint8` | `int16` | `uint16` | `int32` | `uint32` | `fixdt(1,16)` | `fixdt(1,16,0)` | `fixdt(1,16,2^0,0)` | `<data type expression>`

Specify the table data type. The block validates that the selected types are compatible with the specification of the targeted routine. You can set the table data type to:

- A rule that inherits a data type, for example, `Inherit: Same as output`
- The name of a built-in data type, for example, `single`
- The name of a data type object, for example, a `Simulink.NumericType` object
- An expression that evaluates to a data type, for example, `fixdt(1,16,0)`



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see “Specify Data Types Using Data Type Assistant”.

Tip Specify a table data type different from the output data type in these cases:

- Lower memory requirement for storing table data that uses a smaller type than the output signal.
- Sharing of prescaled table data between two Map blocks that have different output data types.
- Sharing of custom storage table data in the generated code for blocks that have different output data types.

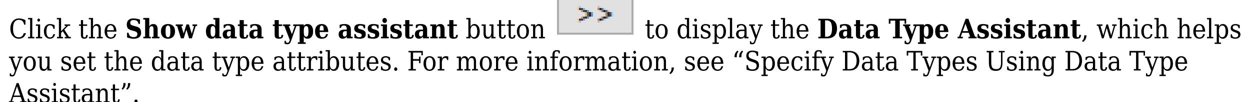
Programmatic Use
Block Parameter: `TableDataTypeStr`
Type: character vector
Values: `'Inherit: Inherit from 'Table data'' | 'Inherit: Same as output' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' | 'uint16' | 'int32' | 'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'`
Default: `'Inherit: Same as output'`

Breakpoints — Breakpoint data type
`Inherit: Same as corresponding input` (default) | `double` | `single` | `int8` | `uint8` | `int16` | `uint16` | `int32` | `uint32` | `fixdt(1,16)` | `fixdt(1,16,0)` | `fixdt(1,16,2^0,0)` | `Enum: <class name>` | `<data type expression>`

Specify the data type for a set of breakpoint data. You can set the breakpoint data type to:

- A rule that inherits a data type, for example, `Inherit: Same as corresponding input`
- The name of a built-in data type, for example, `single`
- The name of a data type class, for example, an enumerated data type class
- The name of a data type object, for example, a `Simulink.NumericType` object
- An expression that evaluates to a data type, for example, `fixdt(1,16,0)`

A limitation for using enumerated data with this block is that it does not support out-of-range input for enumerated date. When specifying enumerated data, include the entire enumeration set in the breakpoint data set.



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see “Specify Data Types Using Data Type Assistant”.

Programmatic Use
Block Parameter: `BreakpointsForDimension1DataTypeStr | BreakpointsForDimension2DataTypeStr`
Type: character vector
Values: `'Inherit: Same as corresponding input' | 'Inherit: Inherit from 'Breakpoint data'' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' |`

'uint16' | 'int32' | 'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'
Default: 'Inherit: Same as corresponding input'

Version History
Introduced in R2019a

Extended Capabilities

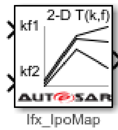
C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

See Also
Curve | Curve Using Prelookup | Map Using Prelookup | Prelookup

Topics
"Configure Lookup Tables for AUTOSAR Calibration and Measurement"
"Code Generation with AUTOSAR Code Replacement Library"

Map Using Prelookup

Use previously calculated index and fraction values to accelerate approximation of two-dimensional function



Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Map Using Prelookup block is intended for use with a Prelookup block. This block enables a prelookup result to drive multiple interpolation results. The Prelookup block calculates the index and interval fraction that specify how its input value `u` relates to the breakpoint data set and feeds the resulting index and fraction values into a Map Using Prelookup block to interpolate a two-dimensional table. The Prelookup and Map Using Prelookup blocks have distributed algorithms that when used together perform the same algorithm operation as the Map block but offer greater flexibility and more efficient simulation and code generation.

If you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, code generated from this block is replaced with the AUTOSAR library routine that you configure in the block parameters dialog box.

Ports

Input

kf1 — Input containing index `k` and fraction `f`
bus object

Inputs to the **kf1** port contain index `k` and fraction `f` specified as a bus object.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point` | `bus`

T — Table data
scalar | vector | matrix | 2-d array

Table data values provided as input to port **T**. These table values correspond to the breakpoint data sets specified in Prelookup blocks. The Interpolation Using Prelookup block generates output by looking up or estimating table values based on index (`k`) and interval fraction (`f`) values fed from a Prelookup block.

Dependencies

To enable this port, set **Source** to `Input port`.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Output

Port 1 — Approximation of two-dimensional function
scalar | vector | matrix

Approximation of the two-dimensional function computed by interpolating table data that uses values from the input index, `k`, and the fraction, `f`.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point`

Parameters

Targeted Routine Library — Indicates the AUTOSAR routine library used for block code replacement
IFX(fixed-point) (default) | IFL(floating-point)

If you select the AUTOSAR 4.0 code replacement library (CRL) for your model, code generated from this block is replaced from the selected AUTOSAR routine library. This parameter enables you to choose either fixed-point (IFX) or floating-point (IFL) code replacement and validation checks.

Targeted Routine — AUTOSAR library routine used for code replacement
`Ifx_IpoMap` (default)

This parameter reflects the name of the AUTOSAR code replacement library (CRL) routine used to replace the code generated by this block. The naming convention includes the targeted routine library, interpolation method, and block type. This parameter is reference-only and must not be edited.

Table Specification

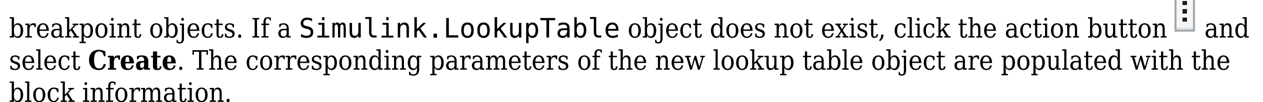
Data Specification — Choose how to enter table data
`Explicit values` (default) | `Lookup table object`

Specify whether to enter table data directly or use a lookup table object. If you set this parameter to:

- `Explicit values`, the **Table Data** parameter is visible in the dialog box.
- `Lookup table object`, the **Name** parameter is visible in the dialog box.

Programmatic Use
Block Parameter: `TableSpecification`
Type: character vector
Values: `'Explicit values' | 'Lookup table object'`
Default: `'Explicit values'`

Name — Name of a `Simulink.LookupTable` object
`Simulink.LookupTable object`

Specify the name of a `Simulink.LookupTable` object. A lookup table object references Simulink breakpoint objects. If a `Simulink.LookupTable` object does not exist, click the action button  and select **Create**. The corresponding parameters of the new lookup table object are populated with the block information.

Dependencies

To enable this parameter, set **Data Specification** to `Lookup table object`.

Programmatic Use

Block Parameter: `LookupTableObject`
Type: character vector
Value: `Simulink.LookupTable object`
Default: `''`

Table data — Define the table of output values
`[4 5 6;16 19 20;10 18 23]` (default) | character vector

Enter the table of output values.

During simulation, the matrix size must be two-dimensional. However, during block diagram editing, you can enter an empty matrix (specified as `[]`) or an undefined workspace variable. This technique lets you postpone specifying a correctly dimensioned matrix for the table data and continue editing the block diagram.

Dependencies

To enable this parameter, set **Data specification** to `Table and breakpoints`.

Programmatic Use

Block Parameter: `Table`
Type: character vector
Values: matrix of table values
Default: `[4 5 6;16 19 20;10 18 23]'`

Edit table and breakpoints — Launch Lookup Table Editor dialog box
button

Click this button to open the Lookup Table Editor. For more information, see “Edit Lookup Tables” in the Simulink documentation.

Clicking this button for a lookup table object lets you edit the object and save the new values for the object.

Algorithm

Interpolation method — Select `Linear point-slope` or `Flat` interpolation methods
`Linear point-slope` (default) | `Flat`

Specify the method that the block uses to interpolate table data. You can select `Linear point-slope` or `Flat`. For more information, see “Interpolation Methods”.

Programmatic Use

Block Parameter: `InterpMethod`
Type: character vector
Values: `'Flat' | 'Linear point-slope'`
Default: `'Linear point-slope'`

Integer rounding mode — Rounding mode for fixed-point operations
`Round` (default) | `Zero`

Specify the rounding mode for fixed-point or floating-point lookup table calculations that occur during simulation or execution of code generated from the model.

This option does not affect rounding of values of block parameters. Simulink rounds such values to the nearest representable integer value. To control the rounding of a block parameter, enter an expression using a MATLAB rounding function into the edit field on the block dialog box.

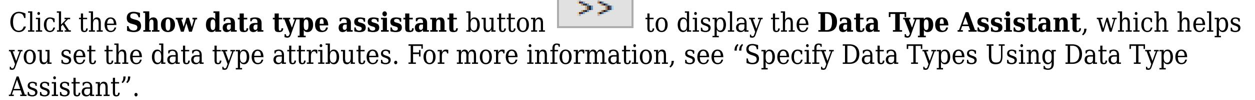
Programmatic Use
Block Parameter: RndMeth
Type: character vector
Values: 'Round' | 'Zero'
Default: 'Round'

Data Types

Table data — Data type of table data
Inherit: Same as output (default) | double | single | int8 | uint8 | int16 | uint16 | int32 | uint32 | fixdt(1,16) | fixdt(1,16,0) | fixdt(1,16,2^0,0) | <data type expression>

Specify the table data type. The block will validate that the selected types are compatible with the specification of the targeted routine. You can set it to:

- A rule that inherits a data type, for example, Inherit: Same as output
- The name of a built-in data type, for example, single
- The name of a data type object, for example, a Simulink.NumericType object
- An expression that evaluates to a data type, for example, fixdt(1,16,0)



Click the **Show data type assistant** button >> to display the **Data Type Assistant**, which helps you set the data type attributes. For more information, see “Specify Data Types Using Data Type Assistant”.

Tip Specify a table data type different from the output data type for these cases:

- Lower memory requirement for storing table data that uses a smaller type than the output signal
- Sharing of prescaled table data between two Curve blocks with different output data types
- Sharing of custom storage table data in the generated code for blocks with different output data types

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Programmatic Use
Block Parameter: TableDataTypeStr
Type: character vector
Values: 'Inherit: Inherit from 'Table data'' | 'Inherit: Same as output' | 'double' | 'single' | 'int8' | 'uint8' | 'int16' | 'uint16' | 'int32' | 'uint32' | 'fixdt(1,16)' | 'fixdt(1,16,0)' | 'fixdt(1,16,2^0,0)'|'<data type expression>'
Default: 'Inherit: Same as output'

Version History

Introduced in R2019a

Extended Capabilities

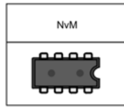
C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

See Also
Curve | Curve Using Prelookup | Map | Prelookup

Topics
“Configure Lookup Tables for AUTOSAR Calibration and Measurement”
“Code Generation with AUTOSAR Code Replacement Library”

NVRAM Service Component

Configure AUTOSAR NVRAM Services and Runtime Environment (RTE) for emulation



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / NVRAM Manager (NvM)

Description

The NVRAM Service Component block provides reference implementations of NVRAM Manager (NvM) services supported by AUTOSAR Basic Software (BSW) caller blocks. When coupled with NvM caller blocks, the reference implementations enable you to configure and run system-level or composition-level simulations of AUTOSAR NvM service calls.

The block has prepopulated parameters, including RTE block ID parameters and NvM **NVRAM Properties** parameters. Examine the parameter settings and consider if modifications are required based on how you are using the NvM service operations.

Parameters

Block ID — ID that identifies service block
1 (default) | scalar

The RTE tab table lists component client ports and their mapping to NvM service block IDs. Each row in the table represents a call into NvM services from a Basic Software caller block. Calls that act on the same NvM block use the same block ID. Check the block ID mappings. For examples of mapping NvM client ports to block IDs, see “Simulate AUTOSAR Basic Software Services and Run-Time Environment”.

Maximum number of memory blocks — Maximum number of memory blocks to use in NvM service operations
10 (default) | scalar

Specify maximum number of memory blocks to use in NvM service operations.

Initial Value — Initial values of NvM client ports
0 (default) | real, finite scalar or vector

Specify the initial values of the NvM client ports as finite, real-valued scalars or vectors. The values must be scalar, or have the same dimensions as the input signal.

Version History

Introduced in R2017b

R2022b: Initial values for NVRAM Service Component blocks

R2022b enables you to define initial values for NVRAM services that are accessed during simulation by basic software. To configure the initial values, you can open the NVRAM Service Component block parameters, click the **Initial Values** tab, and set an initial value for each NvM client port.

See Also

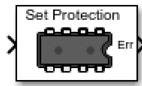
NvMAdminCaller | NvMServiceCaller

Topics

"Configure Calls to AUTOSAR NVRAM Manager Service"
"Configure AUTOSAR Basic Software Service Implementations for Simulation"

NvMAdminCaller

Call AUTOSAR NVRAM Manager (NvM) service interface NvMadmin



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / NVRAM Manager (NvM)

Description

The AUTOSAR standard defines a NVRAM Manager (NvM) service as a part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). AUTOSAR software components access NvM services through client-server calls. The NvMAdminCaller block calls the AUTOSAR NvM service interface NvMAdmin to initiate a specified operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call NvM service interface NvMAdmin
NvMAdmin (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the NvM service interface NvMAdmin.

Operation — Operation defined in NvM service interface NvMAdmin
SetBlockProtection (default)

Select the operation that the AUTOSAR software component calls from the NvM service interface NvMAdmin. The AUTOSAR standard defines the operations. After you select the operation, the inports and outports for the block are generated to support the operation. One operation is supported: SetBlockProtection.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2016b

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model.

Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

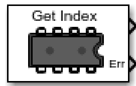
See Also

NvMServiceCaller | NVRAM Service Component

Topics
"Configure Calls to AUTOSAR NVRAM Manager Service"
"Configure AUTOSAR Basic Software Service Implementations for Simulation"

NvMServiceCaller

Call AUTOSAR NVRAM Manager (NvM) service interface `NvMService`



Libraries:
AUTOSAR Blockset / Classic Platform / Basic Software / NVRAM Manager (NvM)

Description

The AUTOSAR standard defines a NVRAM Manager (NvM) service as a part of Basic Software (BSW) that runs in the AUTOSAR Runtime Environment (RTE). AUTOSAR software components access NvM services through client-server calls. The NvMServiceCaller block calls the AUTOSAR NvM service interface `NvMService` by to initiate specified operation.

Parameters

Client port name — Name of client port AUTOSAR component uses to call NvM service interface `NvMService`
`NvMService` (default) | character vector

Enter the name of the client port the AUTOSAR software component uses to call the NvM service interface `NvMService`.

Operation — Specify operation defined in NvM service interface `NvMService`
`GetDataIndex` (default) | `GetErrorStatus` | `EraseNvBlock` | `InvalidateNvBlock` | `ReadBlock` | `RestoreBlockDefaults` | `SetDataIndex` | `SetRamBlockStatus` | `WriteBlock`

Select the operation that the AUTOSAR software component calls from the NvM service interface `NvMService`. The AUTOSAR standard defines the operations. After you select the operation, the inports and outports for the block are generated to support the operation.

The **Operation** parameter must be set to an operation supported by the schema currently specified by the model. The list of operations on the block parameters dialog reflects the operations supported by the current schema.

Argument specification — Specify data type and dimensions for operation read or write access
`uint8(1)` (default) | `single()` | `double()` | `int8()` | `int16()` | `int32()` | `int64()` | `uint16()` | `uint32()` | `uint64()` | `Boolean()` | `enumerated()` | `bus()`

A MATLAB expression that specifies data type and dimensions for data to be read or written by the operation.

- To specify a multidimensional data type, you can use array syntax, such as `int8([1 1; 1 1])`.
- To specify a structured data type, you can create a `Simulink.Parameter` data object, type it with a `Simulink.Bus` object, and reference the parameter name.

For examples, see "Argument Specification for Simulink Function Blocks".

Dependencies

Specify this parameter when **Operation** is set to `ReadBlock`, `RestoreBlockDefaults`, or `WriteBlock`.

Sample time — Block sample time
-1 (default) | scalar

Block sample time. The default sets the block to inherit its sample time from the model.

Version History

Introduced in R2016b

R2023a: Basic Software caller blocks support all AUTOSAR schema versions

Starting in 23a, Basic Software caller (BSW) blocks support all AUTOSAR schema versions supported by AUTOSAR Blockset. The BSW blocks inherit the same schema version specified by the model. Code and ARXML generated from the component reflect the schema version specified on the model. When you change the schema version specified by the model, the software automatically replaces software calls to the correct operation. In some cases, the software may prompt you to confirm a change when moving between schema versions.

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

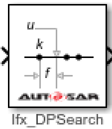
NvMAdminCaller | NVRAM Service Component

Topics

“Configure Calls to AUTOSAR NVRAM Manager Service”
“Configure AUTOSAR Basic Software Service Implementations for Simulation”

Prelookup

Compute index and fraction for a Curve Using Prelookup or Map Using Prelookup block



Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Prelookup block computes the index and fraction that specify how its input value u relates to the breakpoint dataset. The Prelookup block feeds the resulting output index and fraction values as a bus into a Curve Using Prelookup block to interpolate a one-dimensional table or a Map Using Prelookup block to interpolate a two-dimensional table. When a Prelookup block is used with either a Curve Using Prelookup or Map Using Prelookup block, they perform the same algorithm operation as the Curve or Map blocks. The use of the two blocks together offers greater flexibility and more efficient simulation and code generation.

If you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, code generated from this block is replaced with the AUTOSAR library routine that you configure in the block parameters dialog box.

Ports

Input

Port_1 — Input signal, u
scalar | vector | matrix

The Prelookup block accepts real-valued signals of any numeric data type that Simulink supports, except Boolean. The Prelookup block supports fixed-point data types for signals and breakpoint data.

Data Types: `single` | `double` | `int8` | `int16` | `int32` | `uint8` | `uint16` | `uint32` | `fixed point` | `bus`

Output

Port_2 — Bus containing output index and fraction
bus

Outputs the index and fraction as a bus, which specifies the interval containing the input and the normalized position of the input on the interval. The `bus` type is defined automatically based on if the **Targeted Routine Library** is set to fixed-point (IFX) or floating-point (IFL) code replacement.

Data Types: `bus`

Parameters

Targeted Routine Library — Indicates the AUTOSAR routine library used for block code replacement
IFX(fixed-point) (default) | IFL(floating-point)

If you select the AUTOSAR 4.0 code replacement library (CRL) for your model, code generated from this block is replaced from the selected AUTOSAR routine library. This parameter enables you to choose either fixed-point (IFX) or floating-point (IFL) code replacement and validation checks.

Targeted Routine — AUTOSAR library routine used for code replacement
`Ifx_DPSearch` (default)

This parameter reflects the name of the AUTOSAR code replacement library (CRL) routine used to replace the code generated by this block. The naming convention includes the targeted routine library, interpolation method, and block type. This parameter is reference-only and must not be edited.

Table Specification

Breakpoints Specification — Choose how to enter breakpoint data
`Explicit values` (default) | `Breakpoint object`

If you set this parameter to:

- `Explicit values`, the **Breakpoints** and parameter becomes visible in the dialog box.
- `Breakpoint object`, the **Name** parameter is visible in the dialog box.

Programmatic Use
Block Parameter: `BreakpointsSpecification`
Type: character vector
Values: `'Explicit values' | 'Breakpoint object'`
Default: `'Explicit values'`

Breakpoints — Breakpoint data values
`[1 2 3]` (default)

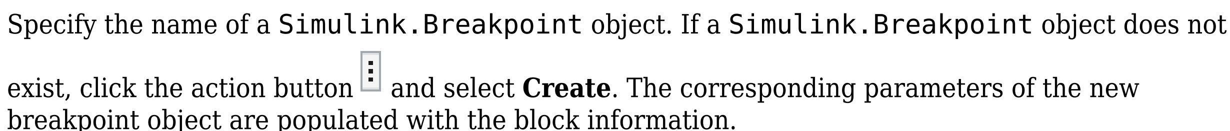
Explicitly specify the breakpoint data. Each breakpoint data set must be a strictly monotonically increasing vector that contains two or more elements.

Dependencies

To enable this parameter, set **Breakpoints Specification** to `Explicit values`.

Programmatic Use
Block Parameter: `BreakpointsData`
Type: character vector
Values: `'[1 2 3]'`
Default: `'[1 2 3]'`

Name — Name of a `Simulink.Breakpoint` object
`no default` | `Simulink.Breakpoint`

Specify the name of a `Simulink.Breakpoint` object. If a `Simulink.Breakpoint` object does not exist, click the action button  and select **Create**. The corresponding parameters of the new breakpoint object are populated with the block information.

Dependencies

To enable this parameter, set **Breakpoints Specification** to `Breakpoint object`.

Programmatic Use
Block Parameter: `BreakpointObject`
Type: character vector
Values: `Simulink.Breakpoint` object
Default: `''`

Algorithms

Index search method — Method for searching breakpoint data
`Linear search` (default) | `Binary search`

Each search method has speed advantages in different situations:

- If input values for u do not vary significantly between time steps, selecting `Linear search` with **Begin index search using previous index result** produces the best performance.
- If input values for u jump more than one or two table intervals per time step, selecting `Binary search` produces the best performance.

A suboptimal choice of index search method can lead to slow performance of models that rely heavily on lookup tables.

Begin index search using previous index result — Start search using the index found at the previous time step
`off` (default) | `on`

For input values of u that change slowly with respect to the interval size, enabling this option can improve performance. Otherwise, the linear search and binary search methods can take longer, especially for large breakpoint sets.

Programmatic Use
Block Parameter: `IndexSearchMethod`
Values: `'Binary search' | 'Linear search'`
Type: character vector
Default: `'Binary search'`

Integer rounding mode — Rounding mode for fixed-point operations
`Round` (default) | `Zero`

Specify the rounding mode for fixed-point or floating-point lookup table calculations that occur during simulation or execution of code generated from the model.

This option does not affect rounding of block parameter values. Simulink rounds such values to the nearest representable integer value. To control the rounding of a block parameter, enter an expression using a MATLAB rounding function into the edit field on the block dialog box.

Programmatic Use
Block Parameter: `RndMeth`
Type: character vector
Values: `'Round' | 'Zero'`
Default: `'Round'`

Version History

Introduced in R2019a

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

See Also

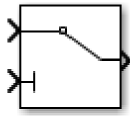
Curve | Curve Using Prelookup | Map | Map Using Prelookup

Topics

"Configure Lookup Tables for AUTOSAR Calibration and Measurement"
"Code Generation with AUTOSAR Code Replacement Library"

Signal Invalidation

Control AUTOSAR root outport data element invalidation



Libraries:
AUTOSAR Blockset / Classic Platform / Signal Routing

Description

Relay the first input, a data value, to the output, based on the value of the second input, an invalidation control flag.

If the input data value is valid (invalidation control flag is `false`), the software relays the input data value to the output.

If the input data value is invalid (invalidation control flag is `true`), the resulting action is determined by the value of the block parameter **Signal invalidation policy**:

- `Keep` - Replace the input data value with the last valid signal value.
- `Replace` - Replace the input data value with the value of the block parameter **Initial value**.
- `DontInvalidate` - Do not replace the input data value.

This block must be connected directly to a root outport block. It cannot be used within a reusable subsystem.

Ports

Input

Port_1 — Input data value
numeric value

Input data value to be relayed if valid.

Example: 4

Data Types: `single` | `double` | `base integer` | `Boolean` | `fixed point` | `enumerated` | `bus`

Port_2 — Invalidation control flag
`true` | `false`

The invalidation control flag determines whether the input data value is valid and can be relayed (`false`), or is invalid and must be handled based on an invalidation policy (`true`).

Example: `false`

Data Types: `Boolean`

Output

Port_1 — Output data value
numeric value

Output data value produced by the combination of the input data value and the invalidation control flag.

Data Types: `single` | `double` | `base integer` | `Boolean` | `fixed point` | `enumerated` | `bus`

Parameters

Signal invalidation policy — Invalidation policy
`Keep` (default) | `Replace` | `DontInvalidate`

Specify an AUTOSAR data element invalidation policy, which determines how an invalid data element is handled.

Initial value — Data element initial value
0 (default) | numeric value

Specify a data element initial value. If the input data value is flagged as invalid, and if the **Signal invalidation policy** is `Replace`, the software replaces the input data value with the specified initial value.

Version History

Introduced in R2015b

Extended Capabilities

C/C++ Code Generation

Generate C and C++ code using Simulink® Coder™.

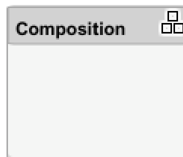
See Also

Topics

"Configure AUTOSAR Sender-Receiver Data Invalidation"

Software Composition

Model software composition in AUTOSAR architecture model



Libraries:
AUTOSAR Blockset

Description

In an AUTOSAR architecture model, you use the composition editor and the Simulink Toolstrip **Modeling** tab to add and connect compositions and components. Use the Software Composition block to add a nested software composition to an AUTOSAR software design. Compositions are supported for classic and adaptive modeling.

To add and connect a nested AUTOSAR composition:

- From the **Modeling** tab or the palette to the left of the canvas, add a Software Composition block.
- Add composition require ports and provide ports. To add each composition port, click an edge of the Software Composition block. When port controls appear:

  - For classic modeling, select **Input** for a require port or **Output** for a provide port.
  - For adaptive modeling, select **Input** or **Client** for a require port, or **Output** or **Server** for a provide port.

  Alternatively, open the Software Composition block. To add each composition port, click the boundary of the composition diagram and select require and provide ports as needed.
- To connect the Software Composition block to other blocks, connect the block ports with signal lines.
- To connect the Software Composition block to architecture or composition model root ports, drag a line from the composition ports to the containing model boundary. Releasing the connection creates a root port at the boundary.
- Configure additional AUTOSAR properties using the Property Inspector.

An AUTOSAR composition contains a set of AUTOSAR components and compositions with a shared purpose. To populate a composition, open the Software Composition block and begin adding more Software Composition blocks and Classic Component or Adaptive Component blocks. Mixing classic and adaptive components is not supported.

Ports

Input

Input port — Composition require port
scalar | vector | matrix

Require port in the AUTOSAR software composition port interface.

Client port — Composition client port on a service interface
scalar | vector | matrix

Client port in the AUTOSAR software composition port interface. Client ports are supported when you model method communication in an AUTOSAR adaptive architecture.

Output

Output port — Composition provide port
scalar | vector | matrix

Provide port in the AUTOSAR software composition port interface.

Server port — Composition server port on a service interface
scalar | vector | matrix

Server port in the AUTOSAR software composition port interface. Server ports are supported when you model method communication in an AUTOSAR adaptive architecture.

Version History

Introduced in R2019b

R2023a: Client and server ports for adaptive component modeling

Client and server ports are available and supported when you model method communication in an AUTOSAR adaptive architecture.

See Also

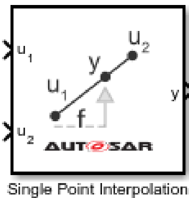
Classic Component | Adaptive Component | Diagnostic Service Component | NVRAM Service Component

Topics

"Add and Connect AUTOSAR Classic Components and Compositions"
"Add and Connect AUTOSAR Adaptive Components and Compositions"
"Author AUTOSAR Classic Compositions and Components in Architecture Model"
"Create Profiles Stereotypes and Views for AUTOSAR Architecture Analysis"

Single Point Interpolation

Perform single point interpolation



Single Point Interpolation

Libraries:
AUTOSAR Blockset / Classic Platform / Library Routines / Interpolation

Description

The Single Point Interpolation block performs linear interpolation using the AUTOSAR `Ifl_Interpolate_f32` routine. The Single Point Interpolation block performs interpolation using inputs u_1 and u_2 and a fraction source parameter f according to this equation: $y = u_1 + f(u_2 - u_1)$

You can specify the fraction source using the Block Parameters dialog box or an Input port. The Single Point Interpolation block supports simulation-in-the-loop (SIL) mode.

When you select the AUTOSAR 4.0 code replacement library (CRL) for your AUTOSAR model, your model replaces code that you generate for this block with a call to the `Ifl_Interpolate_f32` AUTOSAR library routine.

Ports

Input

u_1 — First input signal
scalar | vector

The Single Point Interpolation block accepts any scalar or vector in accordance with the Code Replacement Library requirements.

Data Types: `single`

u_2 — Second input signal
scalar | vector

The Single Point Interpolation block accepts any scalar or vector in accordance with the Code Replacement Library requirements.

Data Types: `single`

f — Fraction value
scalar

Coefficient for the `Ifl_Interpolate_f32` routine.

Dependencies

To enable this port, set the Source field of the “Fraction” on page 2-0 parameter to Input port.

Data Types: `single`

Output

y — Output signal
scalar | vector

Output signal, returned as a scalar or vector.

Data Types: `single`

Parameters

Fraction — Fraction source and value
`0` (default) | scalar

Source and value of the coefficient for the `Ifl_Interpolate_f32` routine.

Specify the Source field of this parameter as one of these values.

- `Dialog` –– Set the coefficient using the Value field of this parameter.
- `Input port` –– Specify the coefficient using the `f` port. The block uses the value of this port as the coefficient.

Programmatic Use
Block Parameter: `FractionValue`
Type: Character vector
Values: `real value`
Default: `'0'`

Version History

Introduced in R2023a

Extended Capabilities

C/C++ Code Generation
Generate C and C++ code using Simulink® Coder™.

See Also

Curve | Curve Using Prelookup | Map | Map Using Prelookup | Prelookup

Topics
"Code Generation with AUTOSAR Code Replacement Library"

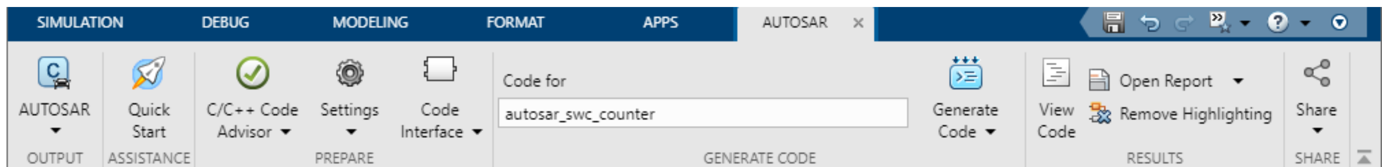
Apps

AUTOSAR Component Designer

Generate AUTOSAR compliant C or C++ code and export ARXML descriptions for processors used in automotive systems

Description

Use the **AUTOSAR Component Designer** app to generate C or C++ code and ARXML descriptions from an AUTOSAR component model. When you open the app, an **AUTOSAR** tab is added to the toolstrip. The **AUTOSAR** tab represents groups of tasks in the AUTOSAR Blockset workflow.



Use the app to perform these tasks:

- If you are new to AUTOSAR Blockset, use the Embedded Coder Quick Start to prepare your model for AUTOSAR code generation. The Quick Start chooses fundamental code generation settings based on your goals and application. Click **Quick Start**. For code generation output, select either **C code compliant with AUTOSAR** or **C++ code compliant with AUTOSAR Adaptive Platform**.
- Set code generation objectives and prepare your model for code generation. Click **C/C++ Code Advisor**.
- Configure model configuration parameters. Select **Settings > C/C++ Code generation settings** or **Settings > Hardware Implementation**.
- Opening the **AUTOSAR Component Designer** app opens the AUTOSAR Code perspective, which contains the Code Mappings editor. Use the Code Mappings editor to map model entry-point functions, data, and other elements to AUTOSAR elements and properties that are defined in the AUTOSAR standard. Select **Code Interface > Individual Element Code Mappings**.
- Configure AUTOSAR elements from an AUTOSAR component perspective by using the AUTOSAR Dictionary. Select **Code Interface > AUTOSAR Dictionary** or, from the Code Mappings editor, click . In the **XML Options** view, configure settings for ARXML export.
- Generate AUTOSAR code and ARXML descriptions for testing or integration. Click **Generate Code**.
- Open the Code view to view the generated code alongside your model. Click **View Code**. In the Code view, you can trace between model elements and the code by clicking hyperlinked lines of code. To remove traceability highlighting, click **Remove Highlighting**.
- Open the latest HTML code generation report by clicking **Open Report**. To configure HTML report generation options, from the **Open Report** menu, select **Report Options**.
- Create a protected model to share with a third party for simulation and code generation. Select **Share > Generate Protected Model**.
- Package the model code and build artifacts in a ZIP file, for example, for relocation and integration. Select **Share > Generate Code and Package**. Optionally, you can modify the name of the generated ZIP file.

Open the AUTOSAR Component Designer App

In the **Apps** gallery, under **Code Generation**, click **AUTOSAR Component Designer**. The **AUTOSAR** tab opens.

Examples

- "Create AUTOSAR Software Component in Simulink"
- "Design and Simulate AUTOSAR Components and Generate Code"
- Code Mappings Editor

Tips

- If you are working with a model hierarchy, open the **AUTOSAR Component Designer** app in the Simulink Editor window for the top model of the hierarchy that you are generating code for. On

the **AUTOSAR** tab, the functionalities apply to the top model of the hierarchy that is open in the editor.

- To configure and view code for a referenced model, navigate to the model in the hierarchy and use the AUTOSAR Dictionary, Code Mappings editor, and Code view. These views apply to the active model, which can be the top model or a referenced model.

Version History

Introduced in R2019b

See Also

Functions

`autosar.api.create` | `autosar_ui_launch`

Topics

"Create AUTOSAR Software Component in Simulink"
"Design and Simulate AUTOSAR Components and Generate Code"
Code Mappings Editor

Tools

Code Mappings Editor

Map AUTOSAR elements for code generation

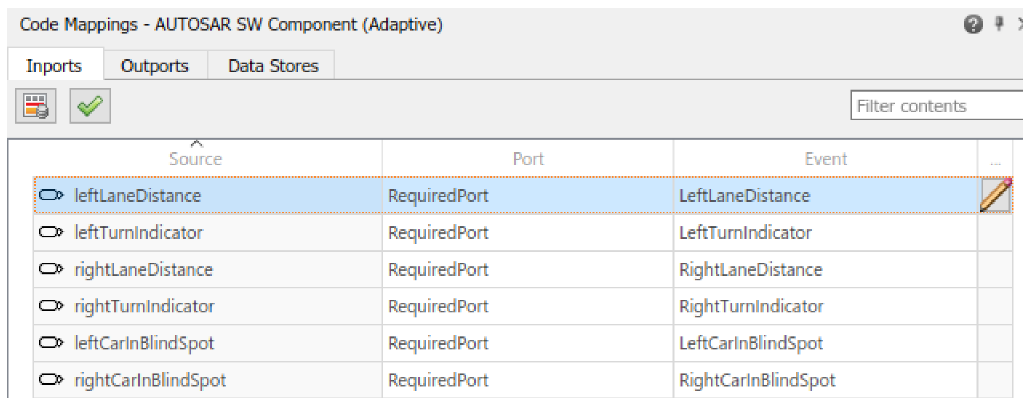
Description

The Code Mappings editor is a graphical interface for mapping AUTOSAR elements for code generation. Map Simulink model elements such as inports, outports, and entry-point functions to AUTOSAR component elements such as receiver ports, sender ports, and runnables.

Using a tabbed table format, the Code Mappings editor displays model inports, outports, and other model elements relevant to your AUTOSAR platform. Use this view to map model elements to AUTOSAR component elements from a Simulink model perspective. The mappings that you configure are reflected in generated AUTOSAR-compliant C or C++ code and exported ARXML descriptions.

For more information, see:

- “Map AUTOSAR Elements for Code Generation”
- “Map Calibration Data for Submodels Referenced from AUTOSAR Component Models”
- “Map AUTOSAR Adaptive Elements for Code Generation”



The Code Mappings editor provides in-canvas access to AUTOSAR mapping information, with batch editing, element filtering, easy navigation to model elements and AUTOSAR properties, and model element traceability. As you progressively configure the model representation of the AUTOSAR component, you can apply these Code Mappings editor controls:

- **Filter contents** field – Selectively display some elements, while omitting others, in the current view.
- **AUTOSAR Dictionary** button – Switch from the Code Mappings editor view of a Simulink element to the AUTOSAR Dictionary view of the corresponding AUTOSAR element.
- **Validate** button – Validate the AUTOSAR component configuration.
- **Update** button – Update the Simulink to AUTOSAR mapping of the model to reflect model changes, such as adding, changing, or removing Simulink entry-point functions, parameters, signals, data transfers, or function callers.
- **Edit** icon – Open a properties dialog box to view and modify additional AUTOSAR code and calibration attributes for the currently-selected element.

Open the Code Mappings Editor

- If your model already has a mapped AUTOSAR software component, in the model window, do one of the following:

  - From the **Apps** tab, open the AUTOSAR Component Designer app.
  - Click the perspective control in the lower-right corner and select **Code**.

  The model opens in the AUTOSAR code perspective, which includes the Code Mappings editor.
- If your model does not have a mapped AUTOSAR component, in the model window, do one of the following:

  - Use the AUTOSAR Component Quick Start.

    1. On the **Modeling** tab, select **Model Settings**. In the Configuration Parameters dialog box, **Code Generation** pane, set the system target file to either `autosar.tlc` or `autosar_adaptive.tlc`. Click **OK**.
    2. On the **Apps** tab, click **AUTOSAR Component Designer**. The AUTOSAR Component Quick Start opens.

3. Work through the component quick-start procedure and click **Finish**.

- For an Embedded Coder model, you can use the Embedded Coder Quick Start.

  1. With the Embedded Coder app open, on the **C Code** tab, select **Quick Start**. The Embedded Coder Quick Start opens.
  2. As you work through the quick-start procedure, in the Output window, select output option **C code compliant with AUTOSAR** or **C++ code compliant with AUTOSAR Adaptive Platform**.
  3. Click **Finish**.

The model opens in the AUTOSAR code perspective, which includes the Code Mappings editor.

Examples

Map Model Elements to AUTOSAR Component Elements

If you are modeling for the AUTOSAR Classic Platform, navigate Code Mappings editor tabs to perform these actions:

- “Map Entry-Point Functions to AUTOSAR Runnables”
- “Map Inports and Outports to AUTOSAR Sender-Receiver Ports and Data Elements”
- “Map Model Workspace Parameters to AUTOSAR Component Parameters”
- “Map Data Stores to AUTOSAR Variables”
- “Map Block Signals and States to AUTOSAR Variables”
- “Map Data Transfers to AUTOSAR Inter-Runnable Variables”
- “Map Function Callers to AUTOSAR Client-Server Ports and Operations”
- “Map Submodel Parameters to AUTOSAR Component Parameters”
- “Map Submodel Data Stores to AUTOSAR Variables”
- “Map Submodel Signals and States to AUTOSAR Variables”

If you are modeling for the AUTOSAR Adaptive Platform, navigate Code Mappings editor tabs to:

- “Map Inports and Outports to AUTOSAR Service Ports and Events”
- “Map Data Stores to AUTOSAR Persistent Memory Ports and Data Elements”

- “Map AUTOSAR Elements for Code Generation”
- “Map Calibration Data for Submodels Referenced from AUTOSAR Component Models”
- “Configure AUTOSAR Elements and Properties”
- “Map AUTOSAR Adaptive Elements for Code Generation”
- “Configure AUTOSAR Adaptive Elements and Properties”
- “Configure and Map AUTOSAR Component Programmatically”

Version History

Introduced in R2018a

See Also

Topics

"Map AUTOSAR Elements for Code Generation"
"Map Calibration Data for Submodels Referenced from AUTOSAR Component Models"
"Configure AUTOSAR Elements and Properties"
"Map AUTOSAR Adaptive Elements for Code Generation"
"Configure AUTOSAR Adaptive Elements and Properties"
"Configure and Map AUTOSAR Component Programmatically"
"AUTOSAR Component Configuration"

Interface Editor

Create and edit interface dictionaries

Description

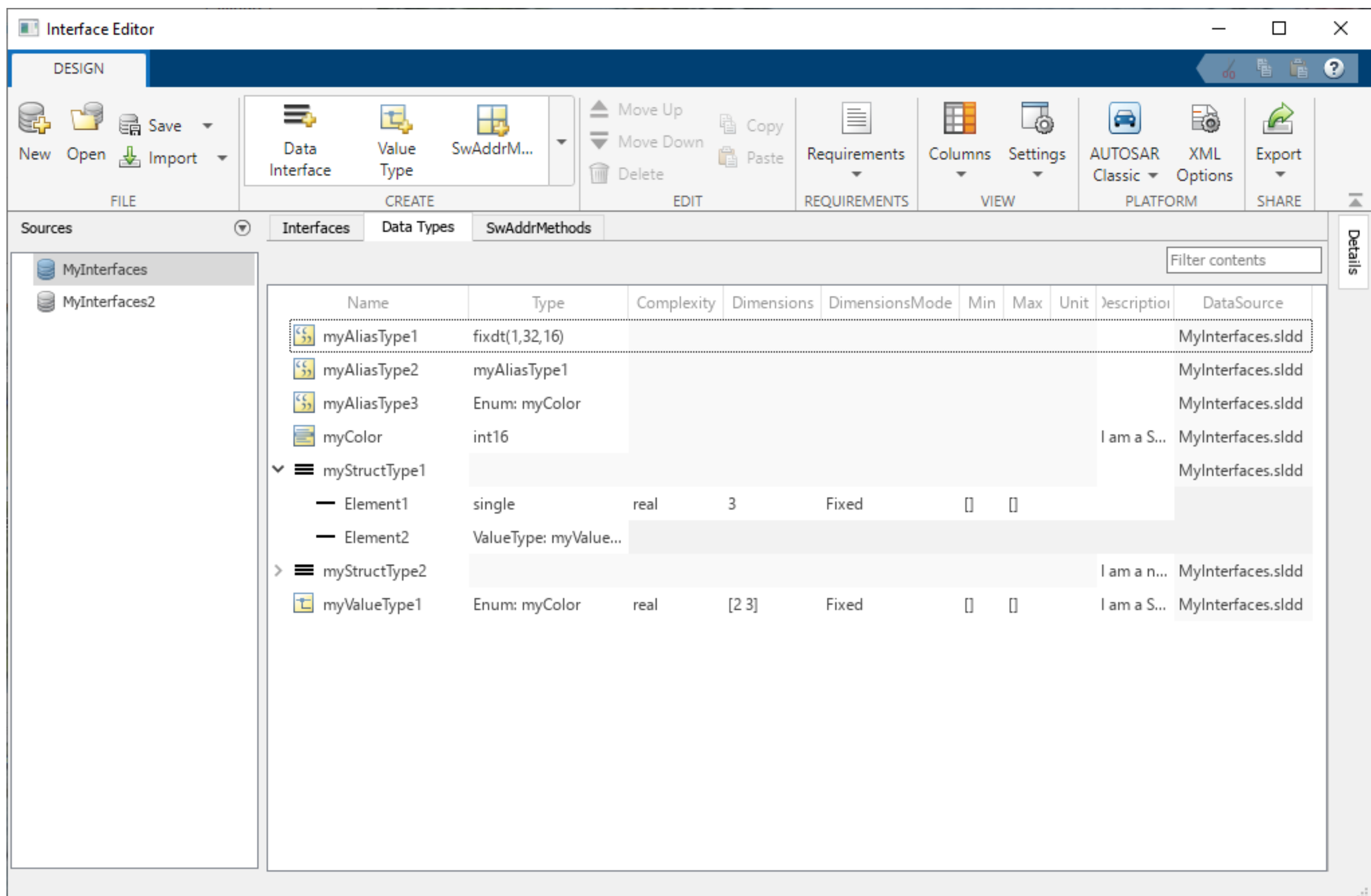
The Interface Editor lets you edit an interface dictionary through a `Simulink.interface.Dictionary` object. You can open the Interface Editor from a system architecture model in the Simulink Editor or from the MATLAB Command Window. By using the Interface Editor, you can create interface and data type definitions that can be shared among both Simulink and architecture models and saved to the interface dictionary `.sldd` file.

With the Interface Editor, you can:

- “Create, Open, and Save an Interface Dictionary” on page 4-7
- “Manage Multiple Interface Dictionaries” on page 4-8
- “Create and Configure Interface and Data Type Definitions” on page 4-9
- Support the AUTOSAR Classic Platform:
  - “Configure AUTOSAR Classic Platform Properties in Interface Dictionary” on page 4-10
  - “Configure AUTOSAR XML Options in Interface Dictionaries” on page 4-12
  - “Export AUTOSAR Definitions to ARXML and Support Files” on page 4-12

For more information, see “Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models”.

While working in the Interface Editor, you can filter, sort, and search design data in the main Contents pane to manage data. See “Filter and Manage Design Data in Contents Pane” on page 4-12.



Open the Interface Editor

You can open the Interface Editor using any of these methods.

- From the Simulink Editor for a system architecture, select **Modeling** > **Design** > **Interface Editor**.
- With the **Interface** tab open, click the **Open Interface Dictionary** button.
- From an existing interface dictionary file, double-click the `.sldd` file.
- At the MATLAB command prompt, type `interfaceeditor`.
- If you have opened an interface dictionary object (for example, `dictionaryObjectName`), at the MATLAB command prompt, type `show(dictionaryObjectname)`.

Examples

Create, Open, and Save an Interface Dictionary

You can create, open, and save an interface dictionary from the Interface Editor.

To create an interface dictionary, from the **File** section, click **New**. You can also create interface dictionaries from an architecture model or programmatically from the MATLAB Command Window.

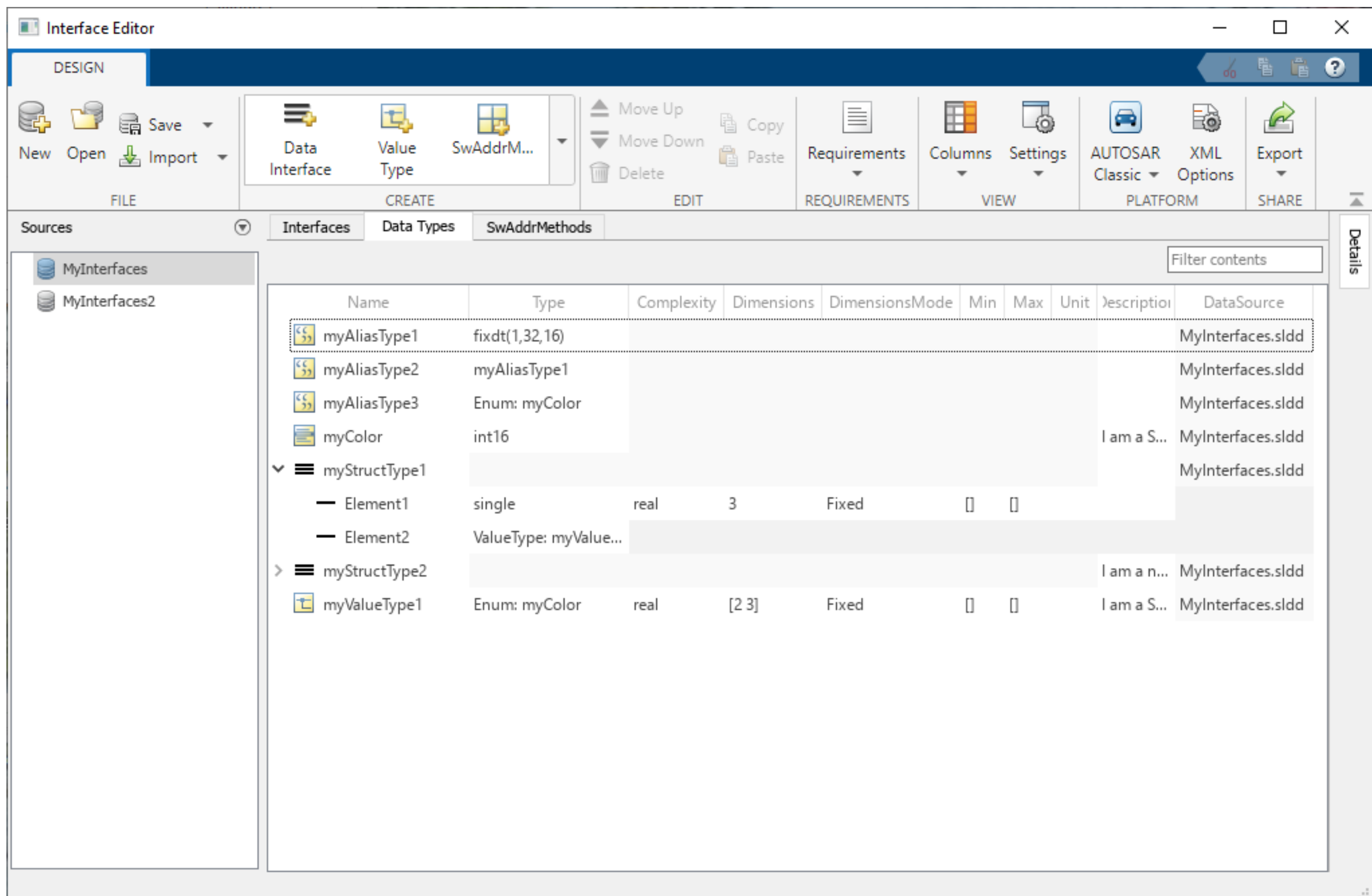
See “Create Interface Dictionary” for more information about creating interface dictionaries from architecture models. Use `Simulink.interface.dictionary.create` to create interface dictionaries programmatically.

To open one or more interface dictionaries in the Interface Editor, from the **File** section, click **Open**. The name of the open dictionary appears in the **Sources** pane. For information about managing multiple interface dictionaries, see “Manage Multiple Interface Dictionaries” on page 4-8.

You can also import a MAT file containing design data or import design data from the base workspace to an interface dictionary by using the controls under the **Files** section.

Manage Multiple Interface Dictionaries

You can open multiple interface dictionaries in a single editor window and switch between them by using the **Sources** pane.



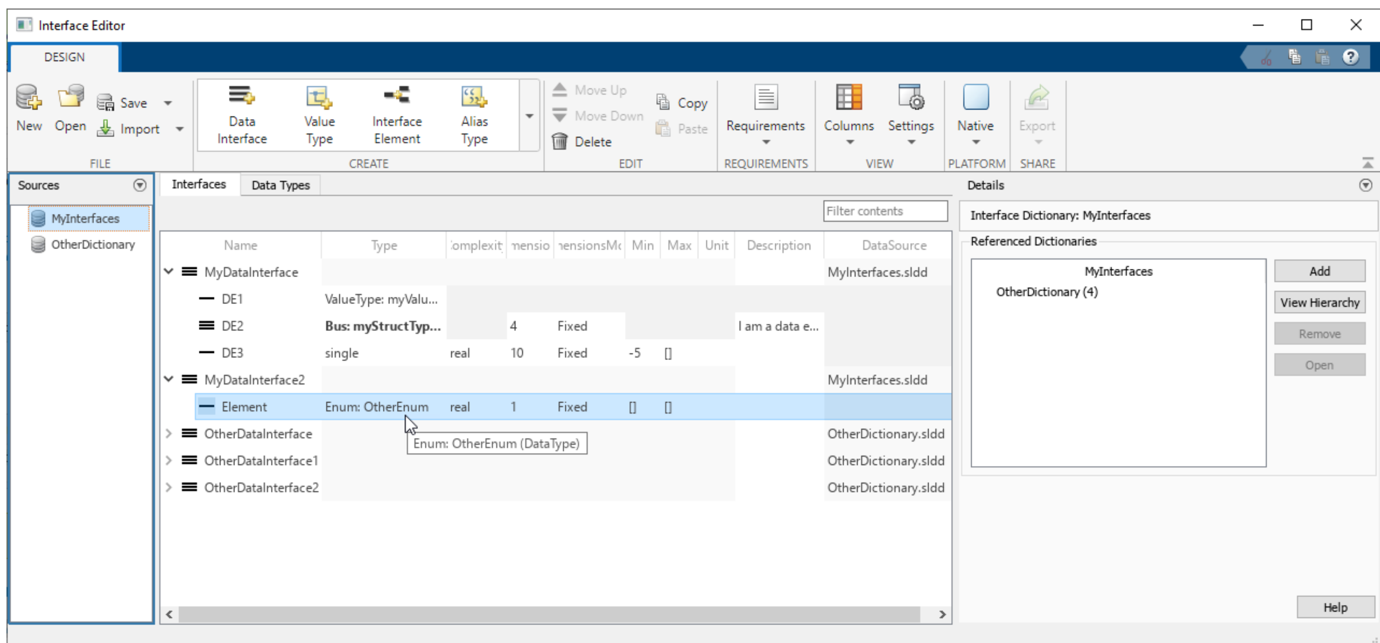
To manage multiple interface dictionaries:

1 From the **File** section, click **Open** to open existing interface dictionaries or click **New** to create a new interface dictionary.

2 From the **Sources** pane, select an interface dictionary.

3 Select the **Interfaces**, **Data Types**, or platform-specific tabs to view or edit design data. See “Create and Configure Interface and Data Type Definitions” on page 4-9.

On the **Interfaces** and **Data Types** tabs, the Interface Editor provides a **DataSource** column indicating the source interface dictionary for each interface or data type.



To reference an interface dictionary from another interface dictionary:

1 Open both interface dictionaries.

2 From the **Sources** pane, double-click the name of the interface dictionary to which you want to add a referenced interface dictionary. The **Details** pane displays the **Referenced Dictionaries** section.

3 In the **Details** pane, click **Add** to add a referenced dictionary. The design data in the referenced dictionary displays in the main Contents pane.

4 On the toolstrip, under **Settings**, select or clear **Include content from referenced dictionaries** to show or hide the data from referenced interface dictionaries.

Once an interface dictionary is referenced, design data from the referenced dictionary can be used by the open dictionary that references it. For example, the image shows that the data element in data interface `MyDataInterface2` hierarchically uses enumeration `OtherEnum` from referenced `OtherDictionary` for its data type.

From the **Referenced Dictionaries** section, you can add additional referenced interface dictionaries, view hierarchical information in the Dependency Analyzer, remove a reference, or open an already referenced interface dictionary.

You cannot add an interface dictionary reference for interface dictionaries mapped to the AUTOSAR Classic Platform. See “Configure AUTOSAR Classic Platform Properties in Interface Dictionary” on page 4-10 for more information about configuring an interface dictionary to support AUTOSAR classic architectures.

Create and Configure Interface and Data Type Definitions

You can create interfaces and data types to be shared among your architecture models and configure their associated properties.

On the toolstrip, in the **Create** section, add interface and data type definitions on the respective **Interfaces** and **Data Types** tabs by clicking the data type and interface icons.

Supported Data Types	Interface Editor Operations
Alias Type	Adds a `Simulink.AliasType` data type with the specified name to the interface dictionary. For information about performing this operation programmatically, see `addAliasType`.
Enumerated Type	Adds a Simulink enumeration data type `Simulink.data.dictionary.EnumTypeDefinition` with the specified name to the interface dictionary. For information about performing this operation programmatically, see `addEnumType`.
Numeric Type	Adds a `Simulink.NumericType` data type with the specified name to the interface dictionary. For information about performing this operation programmatically, see `addNumericType`.
Structured Type	Adds a `Simulink.Bus` type with the specified name to the interface dictionary. For information about performing this operation programmatically, see `addStructType`.
Value Type	Adds a `Simulink.ValueType` data type with the specified name to the interface dictionary. For information about performing this operation programmatically, see `addValueType`.

Supported Interface Elements	Interface Editor Operations
Data Interface	Adds a data interface object to the interface dictionary. For information about performing this operation programmatically, see `addDataInterface`.
Data Element	Adds a data element object to the selected data interface. For information about performing this operation programmatically, see `addElement`.

To configure interfaces and data types, on the **Interfaces** or **Data Types** tab, select an interface or data type object and edit its properties in the main Contents pane and in the **Details** pane. For more information about interface and data type object properties, use the links in the tables above.

On the **Interfaces** tab, you can view service interfaces previously created in System Composer or by using the method `addServiceInterface`.

To configure AUTOSAR properties, see “Configure AUTOSAR Classic Platform Properties in Interface Dictionary” on page 4-10.

When you save the interface dictionary, these properties are set in the interface dictionary `.sldd` file.

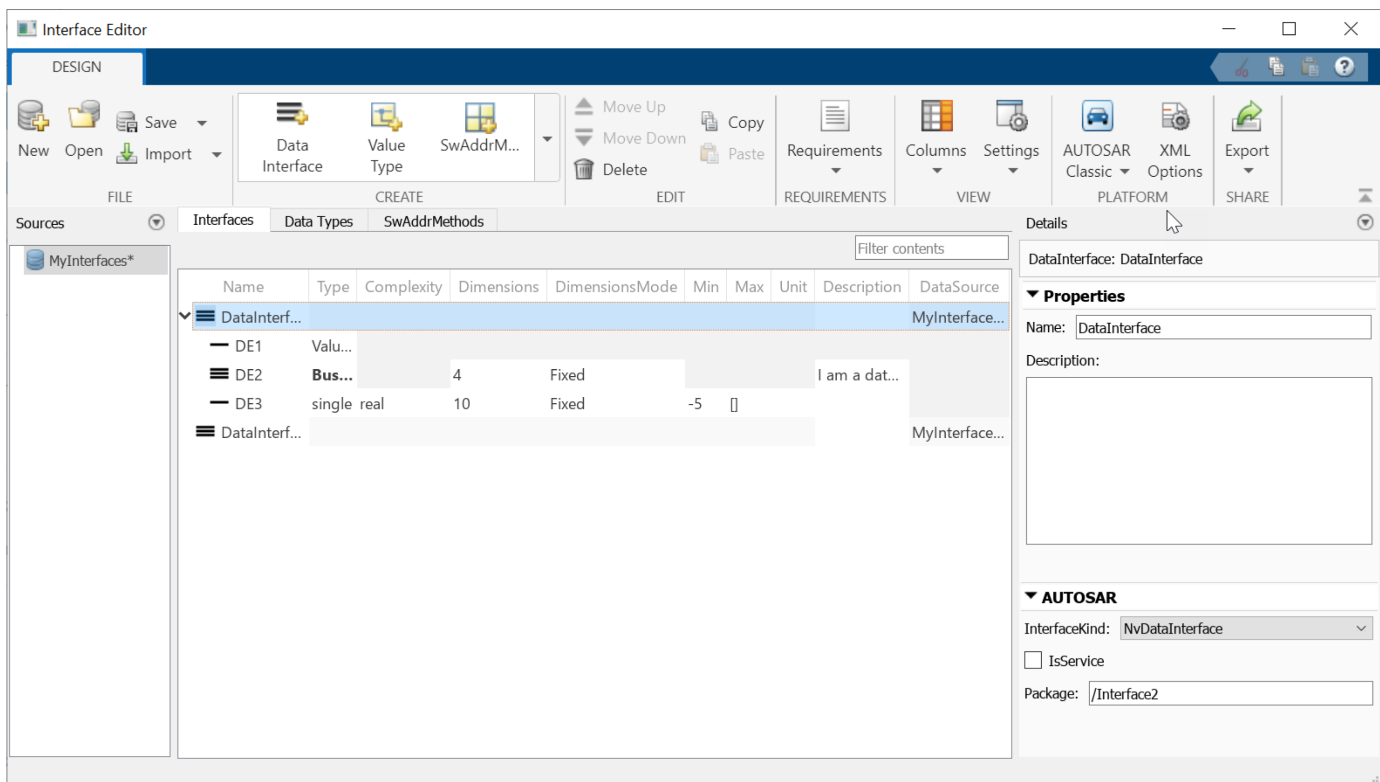
Configure AUTOSAR Classic Platform Properties in Interface Dictionary

Once you specify the platform as AUTOSAR Classic, you can:

- Define **SwAddrMethods** on the dedicated **SwAddrMethods** tab.
- Configure the AUTOSAR communication kind and calibration properties for data interfaces and interface elements.
- Set XML export options.
- Export an interface dictionary to ARXML.

To specify AUTOSAR Classic Platform:

- On the toolstrip, in the **Platform** section, select **AUTOSAR Classic**. The toolstrip, the main Contents pane, and the **Details** pane update to display platform-specific options.



To create and configure SwAddrMethods:

1. On the toolstrip, in the **Create** section, click **SwAddrMethod**. A software address method definition is added on the **SwAddrMethods** tab.
2. Under **SwAddrMethods**, set **SectionType**, **Exported XML File**, and **Package** as needed.

For more information about configuring SwAddrMethods, see “Configure AUTOSAR SwAddrMethods”.

To create and configure data interfaces and data elements:

1. On the toolstrip, in the **Create** section, click **Data Interface**. A data interface object is added under the **Interfaces** tab.
2. Under **Interfaces**, click a data interface and edit its name as needed.

3. While the interface is selected, configure the attributes of your interface in the main Contents pane and in the **Details** pane. Platform-specific interface properties **InterfaceKind**, **IsService**, and **Package** are located under the **AUTOSAR** section in the **Details** pane.
4. While the interface is selected, on the toolstrip, in the **Create** section, click **Data Element** to add elements to the interface.
5. Click a data element and edit its name as needed.
6. While the data element is selected, configure its attributes in the main Contents pane and in the **Details** pane.

   - For Type, supported data types include ones you have created, located on the **Data Types** tab. See "Create and Configure Interface and Data Type Definitions" on page 4-9.
   - Platform-specific calibration properties **DisplayFormat**, **SwAddrMethod**, **SwCalibrationAccess** are located under the **AUTOSAR** section in the **Details** pane.

When you save the interface dictionary, interface, data type, and platform-specific design data are saved in the `.sldd` file.

For more information about AUTOSAR interface and calibration properties, see "Configure AUTOSAR Communication Interfaces" and "Configure AUTOSAR Data for Calibration and Measurement". For more information about setting AUTOSAR properties programmatically, see `setPlatformProperty`.

Configure AUTOSAR XML Options in Interface Dictionaries

The **XML Options** button is available in the **Platform** section when the development platform is set to **AUTOSAR Classic**. Component and architecture models linked to the interface dictionary use the same XML export parameter values as defined in the interface dictionary.

On the toolstrip, under **Platform**, click the **XML Options** button to configure the export options.

Clicking the **XML Options** button opens the **View and Edit XML Options** dialog box and lets you set options for export to ARXML files.

For more information about XML options for classic architecture modeling, see "Configure AUTOSAR XML Options".

Export AUTOSAR Definitions to ARXML and Support Files

You can export AUTOSAR interface dictionary contents to ARXML.

On the toolstrip, under **Share**, click the **Export** button.

Clicking the **Export** button exports the interface dictionary contents to ARXML and RTE stub header files. This operation creates a folder in the current folder that contains the ARXML files. You can use `exportDictionary` to programmatically perform this operation.

Filter and Manage Design Data in Contents Pane

The main Contents pane provides an interactive table with information about the objects, such as hierarchy and properties. You can select which columns appear in the table by selecting **Columns** in the toolstrip.

Use the main Contents pane to:

- Filter objects — Enter a universal filter or a column-specific filter.
- Edit objects — Double-click a value in the table and enter a new value. When you enter a value that is not supported, a diagnostic message appears in the pane.
- Batch edit objects — Select objects of the same type that you want to edit. Double-click a value of one of the selected objects and enter a new value. The new value applies to all selected objects.
- Reorder interface and structure type element objects — Drag the element objects to a new position or click the **Move Up** and **Move Down** buttons in the toolstrip.
- Cut, copy, and paste objects — Use keyboard shortcuts or click the corresponding buttons in the toolstrip.
- Delete objects — Press the **Delete** key or click the **Delete** button in the toolstrip. When you delete an interface object, you also delete the interface element objects it contains.

For more information about using the Contents pane, see “Manage Interfaces with Data Dictionaries” (System Composer).

Version History

Introduced in R2022b

See Also

`Simulink.interface.Dictionary` | `autosar.dictionary.ARClassicPlatformMapping` | `Simulink.interface.dictionary.DataInterface` | `Simulink.interface.dictionary.DataElement`

Topics

“Create and Configure Interface Dictionary” on page 1-279
“Manage Shared Interfaces and Data Types for AUTOSAR Architecture Models”
“Manage Interfaces with Data Dictionaries” (System Composer)

Model Advisor Checks

AUTOSAR Blockset Checks

In this section...
“MathWorks Automotive Advisory Board Checks” on page 5-2
“Check model configuration parameters for AUTOSAR compliance” on page 5-2
“Check compatibility of AUTOSAR Interpolation Routines” on page 5-3

MathWorks Automotive Advisory Board Checks

Use AUTOSAR Blockset Model Advisor checks to configure your model for AUTOSAR standard compatibility.

See Also

- “Run Model Advisor Checks”
- “AUTOSAR Blockset Checks” on page 5-2
- “Embedded Coder Checks” (Embedded Coder)

Check model configuration parameters for AUTOSAR compliance

Check ID: `mathworks.autosar.autosar_configset`

Description

Check configuration settings in the model configuration that apply to AUTOSAR compatibility.

Available with AUTOSAR Blockset.

Results and Recommended Actions

Condition	Recommended Action
One or more of the model configuration parameters are not compatible with AUTOSAR.	Set the listed configuration parameters to the recommended values. Alternatively, you can automatically set the parameters by using the Auto-Fix option.

Following are the model parameters the check examines, provided that **AUTOSAR Compliance** is set to `on` by using a proper license (TLC file).

Parameter	Recommended Values	Auto Fix	Condition Dependencies
AutoInsertRateTranBlk	off	off	STC = STIndependent && SolverMode = SingleTasking
AutosarCompliant	On	On	

Parameter	Recommended Values	Auto Fix	Condition Dependencies
AutosarMaxShortNameLength	range(32,128)	128	~isAdaptiveAutosar
CombineOutputUpdateFcns	on	on	
ERTFilePackagingFormat	Modular	Modular	CodeInterfacePackaging = reusable function
InlineParams	On	On	CodeInterfacePackaging = reusable function
RateTransitionBlockCode	inline	inline	
SFInvalidInputDataAccessInChartInitDiag	warning error	warning	
SimulationMode	normal external SIL PIL	normal	
SupportComplex	off	off	~isAdaptiveAutosar
SupportContinuousTime	off	off	
SupportNonFinite	off	off	
SupportNonInlinedSFcns	off	off	

Capabilities and Limitations

- Runs on library models.
- Allows exclusions of blocks and charts.

See Also

- **AUTOSAR Component Designer**

Check compatibility of AUTOSAR Interpolation Routines

Check ID: `mathworks.autosar.lut_replacement_check`

Description

Identifies Simulink lookup table blocks that are incompatible with AUTOSAR Blockset Interpolation Routines.

Available with AUTOSAR Blockset.

Results and Recommended Actions

Condition	Recommended Action
Model configuration parameter `CodeReplacementLibrary` is set to `None`.	Model configuration parameter `CodeReplacementLibrary` should not be set to `None`.

BlockType	Condition	Recommended Action
Prelookup	Parameter `ExtrapMethod` is set to `Clip`.	Consider using AUTOSAR Blockset Prelookup block for better compatibility.
n-D Lookup Table	Parameter `NumberOfTableDimensions` is set to `1` and parameter `ExtrapMethod` is set to `Clip`.	Consider using AUTOSAR Blockset Curve block for better compatibility.
	Parameter `NumberOfTableDimensions` is set to `2` and parameter `ExtrapMethod` is set to `Clip`.	Consider using AUTOSAR Blockset Map block for better compatibility.
Interpolation Using Prelookup	Parameter `NumberOfTableDimensions` is set to `1` and parameter `ExtrapMethod` is set to `Clip`.	Consider using AUTOSAR Blockset Curve Using Prelookup block for better compatibility.
	Parameter `NumberOfTableDimensions` is set to `2` and parameter `ExtrapMethod` is set to `Clip`.	Consider using AUTOSAR Blockset Map Using Prelookup block for better compatibility.

Capabilities and Limitations

- Runs on library models.
- Analyzes content of library-linked blocks. By default, the input parameter **Follow links** is set to `on`.
- Analyzes content in masked subsystems. By default, the input parameter **Look under masks** is set to `graphical`.
- Allows exclusions of blocks and charts.

See Also

- “Code Generation with AUTOSAR Code Replacement Library”
- “Configure Lookup Tables for AUTOSAR Calibration and Measurement”