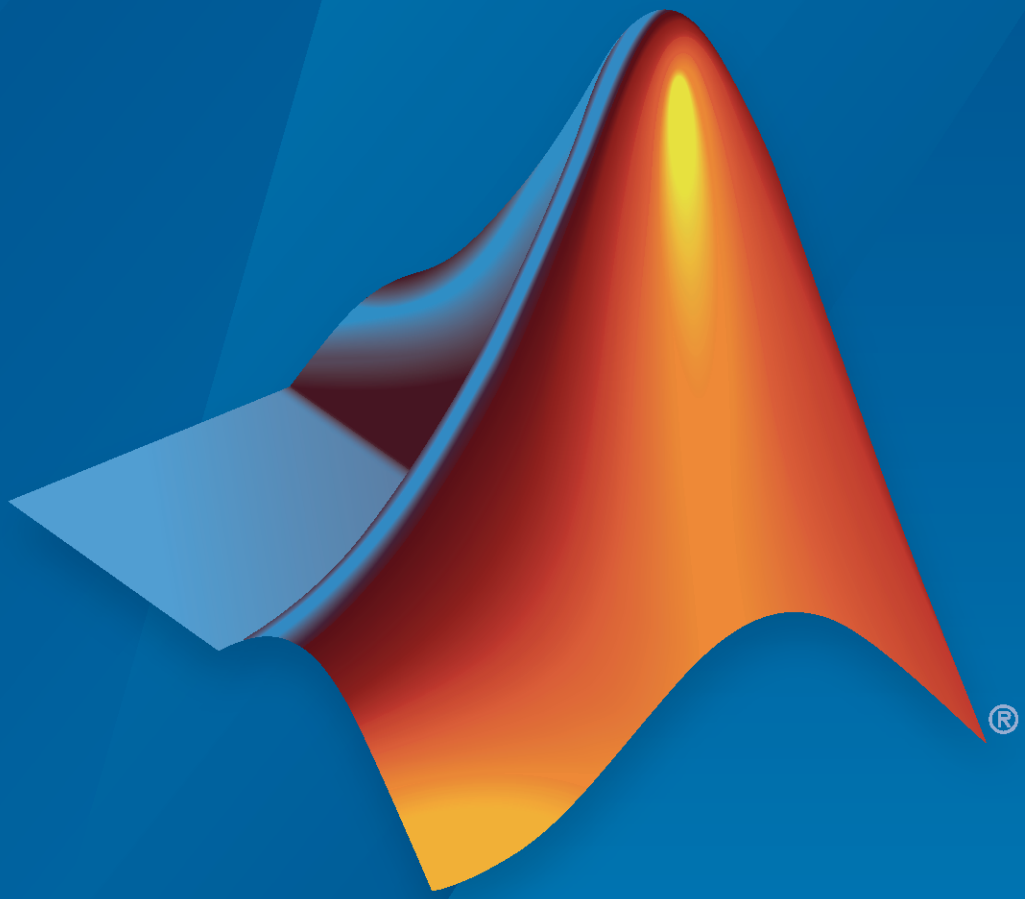
MATLAB® Production Server™

Server Management Guide



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MATLAB® Production Server™ Management Guide

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Server Management

Server Overview

In this section...

What Is a Server?

You can create any number of server instances using MATLAB Production Server software. Each server instance can host any number of deployable archives containing MATLAB code. You may find it helpful to create one server for all archives relating to a particular application. You can also create one server to host code strictly for testing, and so on.

A server instance is considered to be one unique configuration of the MATLAB Production Server product. Each configuration has its own options file (`main_config`) and diagnostic files (`log` files, Process Identification (`pid`) files, and `endpoint` files).

In addition, each server has its own `auto_deploy` folder, which contains the deployable archives you want the server to host for clients.

The server also manages the MATLAB Runtime (MATLAB Compiler), which enables MATLAB code to execute. The settings in `main_config` determine how each server interacts with the MATLAB Runtime to process clients requests. You can set these parameters according to your performance requirements and other variables in your IT environment.

How Does a Server Manage Work?

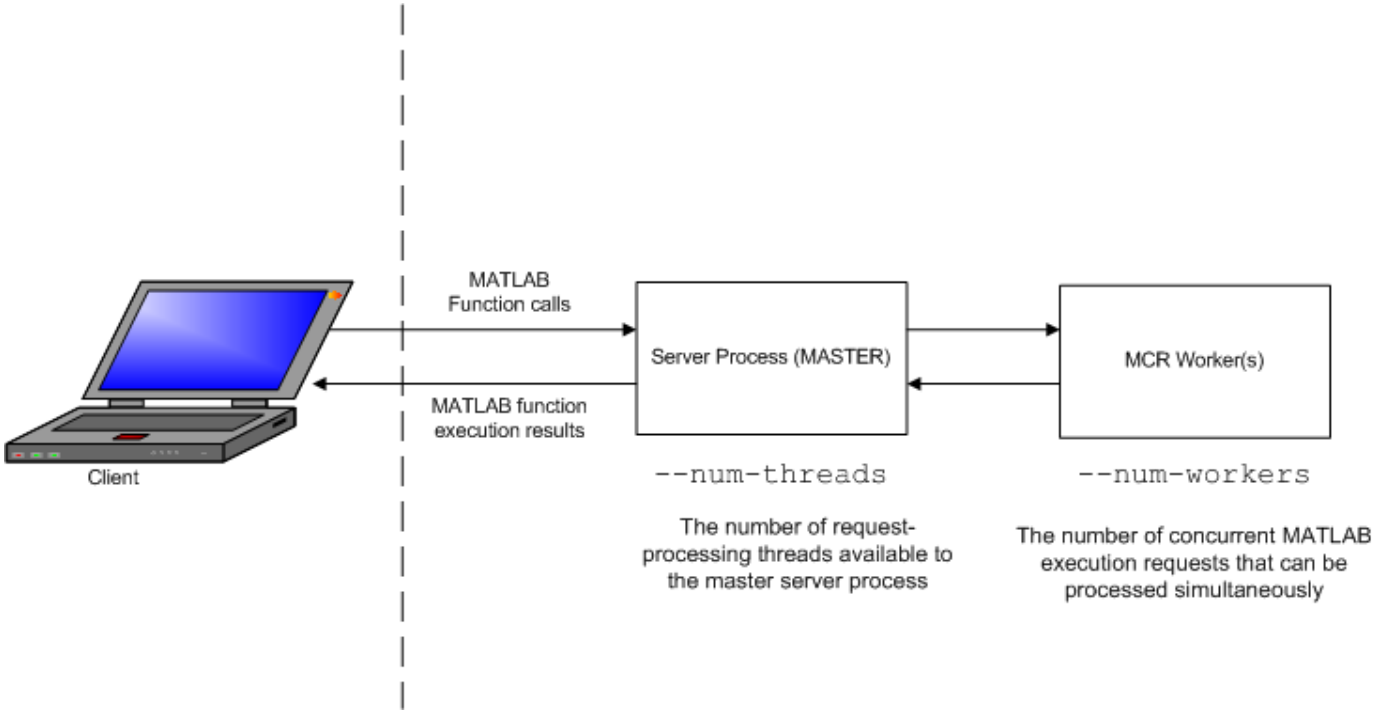
A server processes a transaction using these steps:

1. The client sends MATLAB function calls to the master server process (the main process on the server).
2. MATLAB function calls are passed to one or more MATLAB Runtime workers.
3. MATLAB functions are executed by the MATLAB Runtime worker.
4. Results of MATLAB function execution are passed back to the master server process.
5. Results of MATLAB function execution are passed back for processing by the client.

The server is the middleman in the MATLAB Production Server environment. It simultaneously accepts connections from clients, and then dispatches MATLAB Runtime workers—MATLAB sessions —to process client requests to the MATLAB Runtime. By defining and adjusting the number of workers and threads available to a server, you tune capacity and throughput respectively.

- Workers (capacity management) (num-workers) — The number of MATLAB Runtime workers available to a server.

  Each worker dispatches one MATLAB execution request to the MATLAB Runtime, interacting with one client at a time. By defining and tuning the number of workers available to a server, you set the number of concurrent MATLAB execution requests that can be processed simultaneously. `num-workers` should roughly correspond to the number of cores available on the local host.
- Threads (throughput management) (num-threads) — The number of threads (units of processing) available to the master server process.



MATLAB Production Server Data Flow from Client to Server and Back

The server does not allocate a unique thread to each client connection. Rather, when data is available on a connection, the required processing is scheduled on a pool of threads. `--num-threads` sets the size of that pool (the number of available request-processing threads) in the master server process. The threads in the pool do not execute MATLAB code directly. Instead, there is a single thread within each MATLAB Runtime worker process that executes MATLAB code on the client's behalf.

See Also

mcr-root | mps-setup

More About

- “Create a Server” on page 1-4
- “Support Multiple MATLAB Runtime Versions” on page 1-11

Create a Server

Before you can deploy your MATLAB code with MATLAB Production Server, you must create a server to host your deployable archive. A server instance is one unique configuration of the MATLAB Production Server product. Each configuration has its own parameter settings file (`main_config`), as well as its own set of diagnostic files.

Prerequisites

Before creating a server, ensure you have:

- installed MATLAB Production Server on your machine. For more information, see “Install MATLAB Production Server”.
- added the `script` folder to your system `PATH` environment variable. Doing so enables you to run server commands such as `mps-new` from any folder on your system.

You can run server commands from the *`$MPS_INSTALL`*`\script` folder, where *`$MPS_INSTALL`* is the location where MATLAB Production Server is installed. For example, on Windows, the default location is `C:\Program Files\MATLAB\MATLAB Production Server\`*`ver`*`\script`. *`ver`* is the version of MATLAB Production Server.

Procedure

To create a server configuration or instance from the command-line in an on-premise installation, enter the `mps-new` command from the system prompt. Specify the name of the server that you want to create as an argument to the `mps-new` command.

```
mps-new [path/]server_name [-v]
```

- *`path`* — path to the server instance and configuration that you want to create for use with the MATLAB Production Server product.

  If you are creating a server instance in the current folder, you do not need to specify a full path. Only specify the server name.
- *`server_name`* — name of the server instance and configuration that you want to create.
- `-v` — enable verbose output to get the information and status about each folder created in the server configuration.

For example, to create a server instance with the name `prod_server_1` located in `C:\tmp` and using the verbose mode, run the following on your system command prompt.

```
C:\tmp>mps-new prod_server_1 -v
```

The command generates the following output.

```
prod_server_1/.mps_version...ok
prod_server_1/config/main_config...ok
prod_server_1/auto_deploy...ok
prod_server_1/x509...ok
prod_server_1/endpoint...ok
prod_server_1/log...ok
prod_server_1/old_logs...ok
prod_server_1/.mps_socket...ok
```

```
prod_server_1/pid...ok
The UUID of the newly created instance is 4876f876-56a6-40ef-a4e3-96a69b39cb49
```

For more information on the folders created in a server configuration, see “Server Diagnostic Tools” on page 4-6.

See Also

`mps-new` | `mps-service`

More About

- “Install a Server Instance as a Windows Service” on page 1-15
- “Start a Server Instance”

Edit the Configuration File

In this section...

About the Server Configuration File

To change server properties for an on-premises installation of MATLAB Production Server, edit the `main_config` configuration file that corresponds to your specific server instance. The server configuration file is located at

`server_name``/config/main_config`

For a server deployment on the cloud, use the dashboard to edit the server properties.

When editing the server configuration, remember these coding considerations:

- Each server has its own server configuration file.
- Enter only one configuration property and its options per line. Each configuration property entry starts with two dashes (`--`).
- The server ignores any line beginning with a pound sign (`#`) and considers it as a comment.
- The server ignores lines of white space.

Common Customizations

Setting Default Port Number for Client Requests

Use the `http` property to set the default port number on which the server listens for client requests.

Setting Number of Available Workers

Use the `num-workers` property to set the number of concurrent MATLAB execution requests that can be processed simultaneously.

Setting Number of Available Threads

Use the `num-threads` property to set the number of request-processing threads available to the master server process.

Note For .NET Clients, the HTTP 1.1 protocol restricts the maximum number of concurrent connections between a client and a server to two.

This restriction only applies when the client and server are connected remotely. A local client/server connection has no such restriction.

To specify a higher number of connections than two for remote connection, use the NET classes `System.Net.ServicePoint` and `System.Net.ServicePointManager` to modify maximum concurrent connections.

For example, to specify four concurrent connections, code the following:

```
ServicePointManager.DefaultConnectionLimit = 4;
MWClient client = new MWHttpClient(new MyConfig());
MPSClient mpsExample = client.CreateProxy(
            new Uri("http://user01:9910/mpsexample"));
```

See Also

https

More About

- “Create a Server” on page 1-4
- “Control Worker Restarts” on page 1-13

Specify the Default MATLAB Runtime for New Server Instances

Each server instance that you create with MATLAB Production Server has its own configuration file that defines various server management criteria. Use the `mps-setup` command to set the default MATLAB Runtime for all on-premise server instances that you create. The `mps-setup` command line wizard searches your machine for installed MATLAB Runtime instances and sets the default path to the MATLAB Runtime for all server instances.

If you do not have MATLAB Runtime installed on your machine, you must install it first. For more information, see “Supported MATLAB Runtime Versions”.

To set the default MATLAB Runtime:

1. Open a system command prompt with `administrator` privileges.
2. From the command prompt, navigate to the MATLAB Production Server `script` folder and run `mps-setup`.

   Alternatively, add the `script` folder to your system `PATH` environment variable to run `mps-setup` from any folder on your system. The `script` folder is located at *`$MPS_INSTALL`*`\script`, where *`$MPS_INSTALL`* is the location in which MATLAB Production Server is installed. For example, on Windows®, the default location for the `script` folder is `C:\Program Files \MATLAB\MATLAB Production Server\`*`ver`*`\script\mps-setup`, where *`ver`* is the version of MATLAB Production Server.
3. Follow the instructions in the command line wizard.

   The wizard searches your system for installed MATLAB Runtime instances and displays them.
4. Enter `y` to confirm or `n` to specify a default MATLAB Runtime for all server instances.

   If `mps-setup` cannot locate an installed MATLAB Runtime on your system, the wizard prompts you to enter a path name to a valid instance.

Run mps-setup in Non-Interactive Mode for Silent Install

You can also run `mps-setup` without interactive command input for silent installations. To do so, specify the path name of the MATLAB Runtime as a command line argument.

For example, on Windows, run the following at the system command prompt.

```
C:\>mps-setup "C:\Program Files\MATLAB\MATLAB Runtime\mcrver"
```

`mcrver` is the version of the MATLAB Runtime to use.

See Also

mcr-root | `mps-setup`

More About

- “Specify the MATLAB Runtime for a Server Instance” on page 1-9
- “Support Multiple MATLAB Runtime Versions” on page 1-11

Specify the MATLAB Runtime for a Server Instance

You can use the `main_config` server configuration file to specify the MATLAB Runtime location for an on-premise installation of MATLAB Production Server. For a server environment deployed in the Cloud, the deployment specifies the MATLAB Runtime locations for you.

For an on-premise server installation, set the mcr-root property in the server configuration file to specify the MATLAB Runtime locations for the server to use.

1. If the server instance is running, stop it.
2. Open the configuration file for the instance in a text editor. The configuration file is located at *`instanceRoot`*`/config/main_config`.
3. Locate the entry for the mcr-root property.

   ```
   --mcr-root mCRuNsETtOKEN
   ```
4. Modify the `mcr_root` property to point to the installed MATLAB Runtime you want to work with.

   For example:

   ```
   --mcr-root C:\Program Files\MATLAB\MATLAB Runtime\vnnn
   ```

   Note You *must* specify the MATLAB Runtimeversion number (v*nnn*). The MATLAB Runtime versions that you specify must be compatible with MATLAB Production Server.
5. Restart the server instance.

See Also

mcr-root | `mps-setup` | mps-start

More About

- “Specify the Default MATLAB Runtime for New Server Instances” on page 1-8
- “Edit the Configuration File” on page 1-6
- “Support Multiple MATLAB Runtime Versions” on page 1-11

Start a Server Instance

In this section...

Follow the procedure below to start a server instance in an on-premise installation of MATLAB Production Server.

Prerequisites

Before attempting to start a server, verify that you have:

- Installed the MATLAB Runtime
- Created a server instance on page 1-4
- Specified the default MATLAB Runtime for the instance on page 1-8

Procedure

To start a server instance, complete the following steps:

1. Open a system command prompt.
2. Enter the `mps-start` command:

   ```
   mps-start [-C path/]server_name [-f]
   ```

   where:

   - `-C` *`path/`* — Path to the server instance you want to create. *`path`* should end with the server name.
   - *`server_name`* — Name of the server instance you want to start or stop.
   - `-f` — Forces command to succeed, regardless or whether the server is already started or stopped.

   Note If needed, use the `mps-status` command to verify the server is running.

See Also

mps-new | mps-service

More About

- “Install a Server Instance as a Windows Service” on page 1-15
- “Share the Deployable Archive”

Support Multiple MATLAB Runtime Versions

MATLAB Production Server instances can host deployable archives compiled using multiple versions of MATLAB Compiler SDK™. To do so, add multiple mcr-root properties to the configuration file for on-premise server instances. For a server environment deployed in the Cloud, the deployment sets the `mcr-root` property to support multiple MATLAB Runtime versions.

1. If you do not have a MATLAB Runtime installation on your on-premise server, you must install it first. For more information on the MATLAB Runtime, see `https://www.mathworks.com/products/compiler/matlab-runtime.html`.

   Note

   - Configure a server instance to use MATLAB Runtime roots on a local file system. Otherwise, a network partition might cause worker processes to fail.
   - All values for `mcr-root` must be for the same operating system and hardware combination.

2. If the server instance is running, stop it.
3. Open the configuration file for the instance in a text editor.

   The configuration file is at *`instanceRoot`*`/config/main_config`.
4. Locate the entry for the `mcr-root` property in the configuration file.

   ```
   --mcr-root mCRuNsETtOKEN
   ```
5. For each version of MATLAB Runtime that the instance supports, add an instance of the `mcr-root` property. Order the versions from the latest to the oldest.

   For example, to configure the instance to use the v98 and v97 versions of the MATLAB Runtime, specify the following.

   ```
   --mcr-root C:\Program Files\MATLAB\MATLAB Runtime\v98
   --mcr-root C:\Program Files\MATLAB\MATLAB Compiler Runtime\v97
   ```
6. Restart the server instance.

How the Server Instance Selects the MATLAB Runtime to Use

After you configure the server instance to use multiple versions of MATLAB Runtime, to process a server request, the server scans the list of MATLAB Runtime versions in the configuration file in order from first to last, and chooses the first MATLAB Runtime installation capable of processing the request. A MATLAB Runtime installation can process a request if it is compatible with the version of MATLAB used to create the deployable archive containing the function being evaluated.

Note Since the server instance always chooses the first compatible version of MATLAB Runtime, configuring the server instance with multiple instances of the same MATLAB Runtime version has no effect on performance.

Changes to Worker Management

Configuring a server instance to use multiple MATLAB Runtime versions changes management of the workers that process requests.

When using a single MATLAB Runtime installation, the server instance starts the workers as needed until a number of workers specified by the `num-workers` property are running. Once running, workers can restart depending on the `worker-restart-interval` property or the `worker-restart-memory-limit` property. Workers are never fully stopped.

Once a server instance starts using multiple MATLAB Runtime versions, it dynamically manages the worker pool. The server instance starts new workers as needed until `num-workers` workers are running. The worker instances are spread out over the different MATLAB Runtime versions. Once `num-workers` workers are running, the server instance returns workers to the pool of available workers based on the `worker-memory-trigger` property and the `queue-time-trigger` property. Once a worker returns to the pool, the server can allocate it to process new requests using any of the configured MATLAB Runtime versions.

See Also

More About

- “Specify the Default MATLAB Runtime for New Server Instances” on page 1-8
- “Specify the MATLAB Runtime for a Server Instance” on page 1-9
- “Edit the Configuration File” on page 1-6
- “Start a Server Instance” on page 1-10

Control Worker Restarts

In this section...

Restart Workers Based on Up Time

As worker processes evaluate MATLAB functions, the MATLAB workspace accumulates saved state and other data. This accumulated data can occasionally cause a worker process to fail. One way to avoid random worker failures is to configure the server instances to restart worker processes when they have been running for set period.

1. If the server instance is running, stop it.
2. Open the configuration file for the instance in a text editor.

   The configuration file is at *`instanceRoot`*`/config/main_config`.
3. Locate the entry for the `worker-restart-interval` property.

   ```
   --worker-restart-interval 12:00:00
   ```
4. Change the value to the desired restart interval.

   For example, restart workers at intervals of 1 hour, 29 minutes, 5 seconds.

   ```
   --worker-restart-interval 1:29:05
   ```
5. Restart the server instance.

Restart Workers Based on Amount of Memory in Use

As worker processes evaluate MATLAB functions, the MATLAB workspace accumulates saved state and other data. This accumulated data can occasionally cause a worker process to fail. One way to avoid random worker failures is to configure the server instances to restart worker processes when they begin consuming a predefined amount of memory.

This is done by adjusting three configuration properties:

- worker-memory-check-interval— Interval at which workers are polled for memory usage
- worker-restart-memory-limit — Size threshold at which to consider restarting a worker
- worker-restart-memory-limit-interval — Interval for which a worker can exceed its memory limit before restart

To adjust memory-based restart thresholds:

1. If the server instance is running, stop it.
2. Open the configuration file for the instance in a text editor.

   The configuration file is at *`instanceRoot`*`/config/main_config`.
3. Locate the entry for the `worker-memory-check-interval` property.

   ```
   --worker-memory-check-interval 0:00:30
   ```
4. Change the value to the desired restart interval.

For example, restart workers at intervals of 1 hour, 29 minutes, 5 seconds.

```
--worker-memory-check-interval 1:29:05
```

5. Add an entry for the `worker-restart-memory-limit` property.

   For example, consider restarting workers when they consume 1 GB of memory.

   ```
   --worker-restart-memory-limit 1GB
   ```

6. Add an entry for the `worker-restart-memory-limit-interval` property.

   For example, restart workers when they exceed the memory limit for 1 hour.

   ```
   worker-restart-memory-limit-interval 1:00:00
   ```

7. Restart the server instance.

See Also

num-workers

More About

- “Edit the Configuration File” on page 1-6
- “Support Multiple MATLAB Runtime Versions” on page 1-11

Install a Server Instance as a Windows Service

In this section...

Create a New Server Instance as a Windows Service

To create a new on-premise MATLAB Production Server instance and register it as a Windows service, use the `mps-new` command with the `--service` option.

```
mps-new /tmp/server_1 --service
```

You can change the name, description, and user for the Windows service from the defaults using optional flags to the `mps-new` command.

The Windows service created for the server instance does not start automatically. You can edit the configuration for the instance before starting it using the `mps-start` command.

The Windows service created for the server instance is configured to start when the machine starts. When the host machine is restarted, the server instance restarts with it.

This feature is available only for an on-premise installation of MATLAB Production Server.

Make an Existing Server Instance a Windows Service

To create a new Windows service for an existing on-premise MATLAB Production Server instance, use the `mps-service` command with the `create` option.

```
mps-service -C /tmp/server_1 create
```

You can change the name, description, and user for the Windows service from the defaults using optional flags to the `mps-service` command.

The Windows service created for the server instance is configured to start when the machine starts. When the host machine is restarted, the server instance restarts with it.

See Also

More About

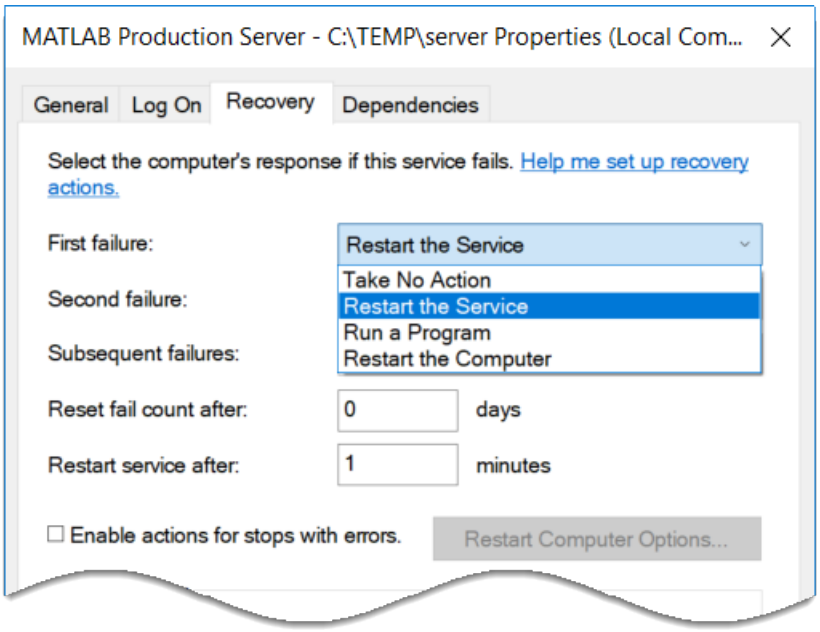
- “Recovery Options for a Server Instance Running as a Windows Service” on page 1-16

Recovery Options for a Server Instance Running as a Windows Service

You can install a MATLAB Production Server instance in an on-premise installation to run as a Windows service. For more information on how to set this up, see “Install a Server Instance as a Windows Service” on page 1-15.

You can specify how your system responds if the server instance running as a Windows service fails.

1. Open Service Control Manager in Windows.
2. Locate and double-click the server instance service that you want to configure for failure recovery.
3. Specify recovery options in the **Recovery** tab.



See Also

`mps-service`

More About

- “Server Overview” on page 1-2
- “Enable HTTPS” on page 3-2

Manage Licenses for MATLAB Production Server

Specify or Verify License Server Options in Server Configuration File

Specify or verify values for License Server options in the server configuration file (`main_config`). You create a server by using the `mps-new` command.

Edit the configuration file for the server. Open the file *`server_name`*`/config/main_config` and specify or verify parameter values for the following options. See the comments in the server configuration file for complete instructions and default values.

- `license` — Configuration option to specify the license servers and/or the license files. You can specify multiple license servers including port numbers (*`port_number`*`@`*`license_server_name`*), as well as license files, with one entry in `main_config`. List where you want the product to search, in order of precedence, using semi-colons (;) as separators on Windows or colons (:) as separators on Linux.

  For example, on a Linux system, you specify this value for `license`:

  ```
  --license 27000@hostA:/opt/license/license.dat:27001@hostB:./license.dat
  ```

  The system searches these resources in this order:

  1. `27000@hostA:` (`hostA` configured on port `27000`)
  2. `/opt/license/license.dat` (local license data file)
  3. `27001@hostB:` (`hostB` configured on port `27001`)
  4. `./license.dat` (local license data file)
- `license-grace-period` — The maximum length of time MATLAB Production Server responds to HTTP requests, after license server heartbeat has been lost. See the network license manager documentation for more on heartbeats and related license terminology.
- `license-poll-interval` — The interval of time that must pass, after license server heartbeat has been lost and MATLAB Production Server stops responding to HTTP requests, before license server is polled, to verify and checkout a valid license. Polling occurs at the interval specified by `license-poll-interval` until license has been successfully checked-out. See the network license manager documentation for more on heartbeats and related license terminology.

Verify Status of License Server using mps-status

When you enter an `mps-status` command, the status of the server *and* the associated license is returned.

For detailed descriptions of these status messages, see “License Server Status Information”.

Force a License Checkout Using mps-license-reset

Use the `mps-license-reset`command to force MATLAB Production Server to checkout a license. You can use this command at any time, providing you do not want to wait for MATLAB Production Server to verify and checkout a license at an interval established by a server configuration option such as `license-grace-period` or `license-poll-interval`.

Secure a Server

Enable HTTPS

MATLAB Production Server uses HTTPS to establish secure connections between server instances and clients. HTTPS provides certificate-based authentication for the client to validate the connection to the server. Optionally, you can configure HTTPS such that the server can provide certificate-based authentication of the client. For more information on configuring client authentication, see “Configure Client Authentication” on page 3-4. HTTPS also provides an encrypted data path between the clients and server instances.

To configure HTTPS, specify the following properties in the `main_config` configuration file of the server instance:

- https: HTTPS port
- x509-cert-chain: Valid certificate stored in a PEM-format certificate chain
- x509-private-key: Valid private key stored in PEM format

For more information about the server configuration file, see “Edit the Configuration File” on page 1-6.

The following configuration excerpt configures a server instance to accept secure connections on port *port*, using the certificate stored in `./x509/my-cert.pem` and the unencrypted private key stored in `./x509/my-key.pem`.

```
...
--https port
--x509-cert-chain ./x509/my-cert.pem
--x509-private-key ./x509/my-key.pem
...
```

Starting in R2019b, if `https` is enabled on the server, you must set both the `x509-cert-chain` and `x509-private-key` properties; otherwise, the server fails to start.

In production settings that require greater security than that provided by an unencrypted private key, use an encrypted private key. You specify the passphrase for decrypting the private key in a file with owner-read-only access, and use the x509-passphrase property to tell the server instance about it.

```
...
--https port
--x509-cert-chain ./x509/my-cert.pem
--x509-private-key ./x509/my-key.pem
--x509-passphrase ./x509/my-passphrase
...
```

You must set either the http property, the `https` property or both properties for the server to start. To ensure that clients communicate with the server using only HTTPS and not HTTP, you must disable the `http` property. If both the `https` and `http` properties are enabled, clients can communicate with the server using both HTTPS and HTTP. It is recommended that you enable the `https` property unless HTTP support is required.

See Also

client-credential-delegation | ssl-protocols | ssl-tmp-ec-param

More About

- “Configure Client Authentication” on page 3-4
- “Specify Access to MATLAB Programs” on page 3-5
- “Adjust Security Protocols” on page 3-6

Configure Client Authentication

To ensure that only trusted client applications have access to a server instance, configure the server instance to require client authentication:

1. Set the ssl-verify-peer-mode configuration property to `verify-peer-require-peer-cert`.
2. Configure the server instance to use the system provided certificate authority (CA) store, a server specific CA store, or both.

   Use these configuration properties to control the CA stores used by the server instance:

   - x509-ca-file-store specifies a PEM-format CA store to authenticate clients.
   - x509-use-system-store directs the server instance to use the system CA store to authenticate clients.

   Note `x509-use-system-store` does not work on Windows.
3. Optionally configure the server instance to respect any certificate revocation lists (CRLs) in the CA store.

   Specify this behavior by adding the x509-use-crl property to the server's configuration. If this property is not specified, the server instance ignores the CRLs and may authenticate clients using revoked credentials.

   Caution You must add a CRL list to the server's CA store before adding the `x509-use-crl` property. If the CA store does not include a CRL list, the server crashes.

This configuration excerpt configures a server instance to authenticate clients using the system CA store and to respect CRLs:

```
...
--https port
--x509-cert-chain ./x509/my-cert.pem
--x509-private-key ./x509/my-key.pem
--x509-passphrase ./x509/my-passphrase
--ssl-verify-peer-mode verify-peer-require-cert
--x509-use-system-store
--x509-use-crl
...
```

The server must be configured to use HTTPS in order to configure client authentication.

See Also

https | x509-cert-chain | x509-private-key

More About

- "Enable HTTPS" on page 3-2
- "Adjust Security Protocols" on page 3-6
- "Specify Access to MATLAB Programs" on page 3-5

Specify Access to MATLAB Programs

By default, server instances allow all clients to access all hosted MATLAB programs. MATLAB Production Server provides a certificate-based authorization mechanism for restricting access to specific programs. The ssl-allowed-client property uses this mechanism to specify the MATLAB programs that a client can access. The property specifies a comma-separated list of clients, identified by their certificate's common name, that are allowed to access MATLAB programs. You also use the property to list specific MATLAB programs that a client is allowed to access.

If you do not specify the `ssl-allowed-client` property, the server instance does not restrict access to the hosted MATLAB programs. After you add an entry for the `ssl-allowed-client` property, the server instance authorizes only the listed clients to access the hosted MATLAB programs.

For example, to only authorize clients with the common names `jim`, `judy`, and `ash` to use the MATLAB programs hosted on a server instance, add this configuration excerpt:

```
--ssl-allowed-client jim,judy,ash
```

You can restrict access further by only authorizing specific clients to have access to specific MATLAB programs. Do this by adding `:`*`allowedPrograms`* to the value of the `ssl-allowed-client` property. *`allowedPrograms`* is a comma-separated list of program names.

For example, to allow clients with the common name `jim` access to all hosted programs, allow clients with the common name `judy` access to the programs `tail` and `zap`, and allow clients with the common name `ash` or `joe` access to the programs `saw` and `travel`, add this configuration excerpt:

```
--ssl-allowed-client jim
--ssl-allowed-client judy:tail,zap
--ssl-allowed-client ash,joe:saw,travel
```

The server must be configured to use HTTPS in order to use the property.

See Also

https | x509-cert-chain | x509-private-key

More About

- "Enable HTTPS" on page 3-2
- "Configure Client Authentication" on page 3-4
- "Adjust Security Protocols" on page 3-6

Adjust Security Protocols

The default security settings for MATLAB Production Server enable all security protocols and cipher suites, except for the eNULL cipher suite. Use the ssl-protocols and ssl-ciphers properties to adjust the level of security.

By default, MATLAB Production Server instances try to use TLSv1.2 to secure connections between client and server. The server supports connections using TLSv1, TLSv1.1, and TLSv1.2. Use the `ssl-protocols` property to specify a list of allowed SSL protocols.

For example, to disable the TLSv1.1 and TLSv1.2 protocols, add this configuration excerpt:

```
--ssl-protocols TLSv1
```

Because TLSv1.1 and TLSv1.2 are not included in the list, the server instance does not enable the protocols.

Set the `ssl-ciphers` property in the server instance configuration to restrict the cipher suites used by the server instance.

For example, to enable only high-strength cipher suites, add this configuration excerpt:

```
--ssl-ciphers HIGH
```

See Also

ssl-tmp-ec-param | x509-private-key

More About

- “Enable HTTPS” on page 3-2
- “Configure Client Authentication” on page 3-4
- “Specify Access to MATLAB Programs” on page 3-5

Improve Startup Time When Security Is Activated

When a server instance is configured to use HTTPS, it generates an ephemeral DH key at startup. Generating the DH key at startup provides more security than reading it from a file on disk. However, this can add a couple of minutes to a server instance's startup time.

If you need the server instance to start up without delay and are not concerned about the loss of security, you can configure the server instance to read the ephemeral DH key from a file using the ssl-tmp-dh-param configuration property. The `ssl-tmp-dh-param` property specifies the file storing the DH key in PEM format.

See Also

https | ssl-ciphers | ssl-tmp-ec-param

More About

- "Enable HTTPS" on page 3-2
- "Configure Client Authentication" on page 3-4
- "Specify Access to MATLAB Programs" on page 3-5
- "Adjust Security Protocols" on page 3-6

Access Control

Access Control Configuration File

To provide an identity to each user, you define an access control configuration file in JSON format. Each identity provider has a different configuration file to enable authorization. The default name for the JSON file for Azure® Active Directory is `azure_ad.json`.

Azure Active Directory configuration parameters are as follows:

- `tenantId` (Required): Azure Active Directory tenant ID. To locate your tenant ID, go to https://portal.azure.com. On the left panel, select **Azure Active Directory**, then on the **Overview** panel, select **Properties**. The hexadecimal code under **Directory ID** is your tenant ID.
- `serverAppId` (Required): MATLAB Production Server application ID as registered in Azure Active Directory. To locate your `serverAppID`, go to https://portal.azure.com. On the left panel, select **Azure Active Directory**, then on the **Overview** panel, select **App registrations**. Then select **MPS server** to find the **Application ID**, which is your `serverAppID`.
- `jwksUri` (Optional): Used to get Azure Active Directory JSON Web Key Set that is used to verify token signature. Default is https://login.microsoftonline.com/common/discovery/keys.
- `issuerBaseUri` (Optional): Used with `tenantId` to validate issuer of the token. For Azure Active Directory, default is https://sts.windows.net/.
- `jwksTimeOut` (Optional): Maximum time the `jwks` request is allowed to take. Default is 120 seconds.

The format of the configuration file is as follows:

```
{
  "tenantId": "54ss4lk1-8428-7256-5fvh-d5785gfhkjh6",
  "serverAppId": "j21n12bg-3758-3r78-v25j-35yj4c47vhmt",
  "jwksUri": "https://login.microsoftonline.com/common/discovery/keys",
  "issuerBaseUri": "https://sts.windows.net/",
  "jwksTimeOut": 120
}
```

Access Control Policy File

To use access control for MATLAB Production Server, the server admin should define an access control policy file in JSON format. The default name for the JSON file is `ac_policy.json`.

The policy file is read on server startup. If it does not exist or contains errors, the server does not start, and an error message is written to `main.log` file found in the log-root directory.

Once the server has started, the policy file is scanned every five seconds for changes. If the policy file is deleted or contains errors, the server continues to run, but all requests are denied. Again, an error message is written to the `main.log` file.

The JSON file has a single JSON object that defines the schema version and a *Policy Block*. The *Policy Block* consists of a list of policies. Each policy contains a *Rule Block* that defines a set of rules and consists of a *Subject Block*, a *Resource Block, and* an *Action Block*.

The schema version has a value that is a JSON string in the format `<major#>.<minor#>.<patch#>`, with each number specified as a nonnegative integer.

Policy Block

The policy block contains a list of policies required for access control. Currently, only a single policy can be specified in a policy file.

```
"policy" : [
   {
     "id": "<policy_id>",
     "description": "<policy_description>",
     <rule_block>
   }
]
```

An ID is required for each policy. <policy_id> must be unique for each policy. Any leading or trailing white space is removed.

The description is optional for a policy.

Rule Block

The rule block contains a list of rule objects.

```
"rule":[
  {
    "id": "<rule_id>",
    "description": "<rule_description>",
    <subject_block>,
    <resource_block>,
    <action_block>
  }
]
```

Multiple rules can exist in a rule block, for example: "rule": [<rule>, <rule>, ...].

An ID is required for each rule. <rule_id> must be unique for each rule. Any leading or trailing white space is removed.

The description is optional for a rule.

Subject Block

The subject block of a rule defines who can access the resources. Currently, only the *groups* attribute is supported.

```
"subject" : {"groups": ["<group_id>", "<group_id>", ...]}
```

For Azure Active Directory, a list of group IDs can be specified to control which groups can access the resources defined in the rule.

Get Group ID from Azure Active Directory Based on Group Display Name

1. Open Azure Active Directory graph explorer on https://graphexplorer.azurewebsites.net, and login.
2. Use query https://graph.windows.net/<tenant>/groups?$filter=startswith(displayName,'<groupname>') where <tenant> is the tenant name, and <groupname> is the name of a specific group.
3. Search for objectId of the specific group in the response.

Get All Group IDs for a Certain User from Azure Active Directory

1. Open Azure Active Directory graph explorer on https://graphexplorer.azurewebsites.net, and login.
2. Use query https://graph.windows.net/<tenant>/users/<username>@<tenant>/memberOf where <tenant> is the tenant name, and <username> is the name of a specific user.
3. For all groups where **securityEnabled** is true, search for objectId in the response.

Resource Block

The resource block of a rule describes the object being accessed. Currently, only a ctf file can be accessed.

```
"resource" : {"ctf": ["<ctf_name>", "<ctf_name>", ...]}
```

You can use `ctf_name` to access multiple `ctf` files by using the wildcard character *. For example, if you want to access all `ctf` files whose names start or end with 'test', you would specify `<ctf_name>` as `test*` or `*test`, respectively. If you use * as the `<ctf_name>`, you can access all the `ctf` files.

Action Block

The action block of a rule describes the action being attempted on the resource. Currently, only the action `execute` is supported.

```
"action" : ["execute"]
```

Example of a JSON Policy File

The following example defines an access control policy with three rules.

- All users belonging to a group with ID `aaaaaaaa-aaaa-aaaa-aaaa-aaaaaaaaaaaa` can execute the `ctf` file `magic`.
- All users belong to groups with id `aaaaaaaa-aaaa-aaaa-aaaa-aaaaaaaaaaaa` and `bbbbbbbb-bbbb-bbbb-bbbb-bbbbbbbbbbbb` can execute the `ctf` files `monteCarlo` and `fastFourier`.
- All users belong to Quality Engineering group `cccccccc-cccc-cccc-cccc-cccccccccccc` can execute all `ctf`s starting with test.

Access is denied for all other requests.

```
{
  "version": "1.0.0",
  "policy" : [
    {
      "id": "policy1",
      "description": "MPS Access Control policy for XYZ Corp.",
      "rule": [
        {
          "id": "rule1",
          "description": "group A can execute ctf magic",
          "subject": { "groups": ["aaaaaaaa-aaaa-aaaa-aaaa-aaaaaaaaaaaa"] },
          "resource": { "ctf": ["magic"] },
          "action": ["execute"]
        },
        {
          "id": "rule2",
          "description": "group A and group B can execute ctf monteCarlo and fastFourier",
          "subject": { "groups": ["aaaaaaaa-aaaa-aaaa-aaaa-aaaaaaaaaaaa", "bbbbbbbb-bbbb-bbbb-bbl
          "resource": { "ctf": ["monteCarlo", "fastFourier"] },
          "action": ["execute"]
        },
        {
          "id": "rule3",
          "description": "QE group C can execute any ctf starts with test",
          "subject": { "groups": ["cccccccc-cccc-cccc-cccc-cccccccccccc"] },
          "resource": { "ctf": ["test*"] },
          "action": ["execute"]
        }
      ]
    }
```

```
  ]
}
```

See Also

access-control-policy

External Websites

- https://docs.microsoft.com/en-us/azure/active-directory/develop/active-directory-graph-api-quickstart

Use Kerberos and Kerberos Delegation

To authenticate user access to a MATLAB Production Server instance, you need to configure Kerberos. To delegate a client's credential to a next hop web server or a database server that is protected by Kerberos, you need to configure Kerberos Delegation. Configuring Kerberos and Kerberos Delegation requires domain administrator privileges. Currently, you can use Kerberos and Kerberos Delegation with MATLAB Production Server instances running on Windows Server® operating systems with a Windows Key Distribution Center. To configure Kerberos and Kerberos delegation, consult your IT / Windows System Administrator, and follow these steps:

- Set up a service account for the MATLAB Production Server and register a *service principal name* for MATLAB Production Server service instance.
- Configure constrained delegation without protocol transition for the service account.
- Configure the local security privilege for the MATLAB Production Server service account.
- Enable Kerberos and Kerberos Delegation in the MATLAB Production Server configuration file (`main_config`). For more information, see http-authentication-method and client-credential-delegation.

Only the following MATLAB functions within a deployable archive (`.ctf`) support using Kerberos Delegation:

- `webread`
- `webwrite`
- "HTTP Interface" (MATLAB) functions
- Database Toolbox™ functions (requires an ODBC driver)

All other functions within a deployable archive (`.ctf`) are executed using the credential of the MATLAB Production Server instance.

Supported Environment

Option	Requirement
Operating system	Windows Server
Kerberos Delegation	Constrained delegation without protocol transition
Key distribution center	Windows Server 2003 or later
Client	• RESTful client over HTTP/HTTPS (HTTP 1.1) with JSON payload • The RESTful client must be one that supports SPNEGO/Kerberos—for example, `curl` with the `--negotiate` option or .NET HttpClient
MATLAB Runtime	MATLAB Runtime R2019b or later.
Deployable archive packaging	MATLAB Compiler SDK R2019b or later
Database server	Microsoft® SQL Server® 2012 or later
Database driver	Microsoft SQL Server ODBC driver version 11 or later

See Also

client-credential-delegation | http-authentication-method

Troubleshooting

Verify Server Status

In this section...

Use the `mps-status` command to verify the status of a server in an on-premise MATLAB Production Server installation.

Procedure

1. Open a system command prompt.
2. Enter the following command:

   ```
   mps-status [-C path/]server_name
   ```

   where:

   - `-C` *`path/`* — Path to the server instance. *`path`* should end with the name of the server to be queried for status.
   - *`server_name`* — Name of the server to be queried for status.

Example

To verify the status of a server instance `prod_server_1` located at `\tmp\prod_server_1`, type at the system command prompt

```
mps-status -C \tmp\prod_server_1
```

Output:

- If `prod_server_1` is running and operating with a valid license.

  ```
  \tmp\prod_server_1 STARTED
  License checked out
  ```

- If `prod_server_1` is unable to check out valid license.

  ```
  \tmp\prod_server_1 STARTED
  WARNING: lost connection to license server -
  request processing will be disabled at 2019-Jun-27
  15:40:31.002137 Eastern Daylight Time unless
  connection to license server is restored.
  ```

  or

  ```
  \tmp\prod_server_1 STARTED
  ERROR: lost connection to license server -
  request processing disabled.
  ```

To verify whether the server has started or stopped after issuing `mps-restart` and `mps-stop` commands, use `mps-status`.

License Server Status Information

In addition to the status of the server, `mps-status` also displays the status of the license server associated with the server you are querying.

License Server Status Message	Message Description
`License checked out`	The server is operating with a valid license. The server is communicating with the License Manager, and the required number of license keys are checked out.
`WARNING: lost connection to license server - request processing will be disabled at` *`time`* `unless connection to license server is restored`	The server has lost communication with the License Manager, but the server is still fully operational and will remain operational until the specified *`time`*. At *`time`*, if connectivity to the license server has not been restored, request processing will be disabled until licensing is reestablished.
`ERROR: lost connection to license server - request processing disabled`	The server has lost communication with the License Manager for a period of time exceeding the grace period. Request processing has been suspended, but the server is actively attempting to reestablish communication with the License Manager. Request processing resumes if the sever is able to reestablish communication with the License Manager.

See Also

`mps-restart` | `mps-stop`

More About

- “Health Check”

Diagnose a Server Instance

To diagnose a problem with a server instance or configuration of MATLAB Production Server, do the following, as needed:

- Check the logs for warnings, errors, or other informational messages.
- Check Process Identification Files (PID files) for information relating to problems with MATLAB Runtime worker processes.
- Check Endpoint Files for information relating to problems relating to the server's bound external interfaces — for example, a problem connecting a client to a server.
- Use server diagnostic tools, such as `mps-which`, as needed.

Diagnose a Corrupted MATLAB Runtime

This example shows a typical diagnostic procedure you might follow to solve a problem starting server `prod_server_x`.

After you issue the command:

```
mps-start prod_server_x
```

from within the server instance folder (`prod_server_x`), you get the following error:

```
Server process exited with return code: 4
(check logs for more information)
Error while waiting for server to start: The I/O operation
has been aborted because of either a thread exit
or an application request
```

To solve this issue, you might check the `log` files for more detailed messages, as follows:

1. Navigate to the server instance folder (`prod_server_x`) and open the `log` folder.
2. Open `main.err` with any text editor. Note the following message listed under `Server startup error:`

   ```
   Dynamic exception type: class std::runtime_error
   std::exception::what: bad MATLAB Runtime installation:
   C:\Program Files\MATLAB\MATLAB Runtime\v82
   (C:\Program Files\MATLAB\MATLAB Runtime\v82\bin\
   win64\mps_worker_app could not be found)
   ```
3. The message indicates the installation of the MATLAB Runtime is incomplete or has been corrupted. To solve this problem, reinstall the MATLAB Runtime.

Server Diagnostic Tools

In this section...

Log Files

Each server writes a log file containing data from both the main server process, as well as the workers, named *`server_name`*`/log/main.log`. You can change the primary log folder name from the default value (`log`) by setting the option log-root in the `main_config` server configuration file.

The primary log folder contains the `main.log` file, as well as a symbolic link to this file with the auto-generated name of `main_`*`date_fileID`*`.log`.

The `stdout` stream of the main server process is captured as `log/main.out`.

The `stderr` stream of the main server process is captured as `log/main.err`.

For information on viewing logs for a server deployment in the cloud, see “View Logs” on page 9-32.

Process Identification Files (PID Files)

In an on-premise MATLAB Production Server installation, each process that the server runs generates a Process Identification File (PID File) in the folder identified as pid-root in `main_config`.

The main server PID file is `main.pid`; for each MATLAB Runtime worker process, it is `worker-`*`n`*`.pid`, where *`n`* is the unique identifier of the worker.

PID files are automatically deleted when a process exits.

Endpoint Files

In an on-premise MATLAB Production Server installation, endpoint files are generated to capture information about the server’s bound external interfaces. The files are created when you start a server instance and deleted when you stop it.

`server_name``/endpoint/http` contains the IP address and port of the clients connecting to the server. This information can be useful in the event that zero is specified in `main_config`, indicating that the server bind to a free port.

See Also

`mps-profile` | profile

More About

- “Edit the Configuration File” on page 1-6

Manage Log Files

In this section...

Best Practices for Log Management

Use these recommendations as a guide when defining values for the options listed in “Log Retention and Archive Settings” on page 4-7.

- Avoid placing `log-root` and `log-archive-root` on different physical file systems.
- Place log files on local drives, not on network drives.
- Send MATLAB output to `stdout`. Develop an appropriate, consistent logging strategy following best MATLAB coding practices. See *MATLAB Programming Fundamentals* for guidelines.

Log Retention and Archive Settings

Log data is written to the server’s `main.log` file for as long as a specific server instance is active, or until midnight. When the server is restarted, log data is written to an archive log, located in the archive log folder specified by `log-archive-root`.

You can set parameters that define when `main.log` is archived using the following options in each server’s `main_config` file.

- `log-rotation-size` — When `main.log` reaches this size, the active log is written to an archive log (located in the folder specified by `log-archive-root`).
- `log-archive-max-size` — When the combined size of all files in the archive folder (location defined by `log-archive-root`) reaches this limit, archive logs are purged until the combined size of all files in the archive folder is less than `log-archive-max-size`. Oldest archive logs are deleted first.

Specify values for these options using the following units and notations:

Represent these units of measure...	Using this notation...	Example
Byte	`b`	`900b`
Kilobyte (1024 bytes)	`k`	`700k`
Megabytes (1024 kilobytes)	`m`	`40m`
Gigabytes (1024 megabytes)	`g`	`10g`
Terabytes (1024 gigabytes)	`t`	`2t`
Petabytes (1024 terabytes)	`p`	`1p`

Note The minimum value you can specify for `log-rotation-size` is 1 megabyte.

On Windows 32-bit systems, values larger than 2^{32} bytes are not supported. For example, specifying `5g` is not valid on Windows 32-bit systems.

Setting Log File Detail Levels

The log level provides different levels of information for troubleshooting:

- `error` — Notification of problems or unexpected results.
- `warning` — Events that could lead to problems if unaddressed.
- `information` — High-level information about major server events.
- `trace` — Detailed information about the internal state of the server.

The log level is set using the `log-severity` configuration property.

Before you call support, you should set logging levels to `trace`.

Common Error Messages and Resolutions

In this section...

(404) Not Found

Commonly caused by requesting a component that is not deployed on the server, or trying to call a function that is not exported by the given component.

Verify that the name of the deployable archive specified in your `Uri` is the same as the name of the deployable archive hosted in your `auto_deploy` folder.

Error: Bad MATLAB Runtime Instance

Common causes of this message include:

- You are not properly qualifying the path to the MATLAB Runtime. You must include the version number. For example, you need to specify:

  `C:\Program Files\MATLAB\MATLAB Runtime\v`*`n.n`*

  not

  `C:\Program Files\MATLAB\MATLAB Runtime`

Error: Server Instance not Specified

MATLAB Production Server can’t find the server you are specifying.

Ensure you are either entering commands from the folder containing the server instance, or are using the `-C` command argument to specify a precise location of the server instance.

For example, if you created `server_1` in `C:\tmp\server_1`, you would issue the `mps-start` command from within that folder to avoid specifying a path with the `-C` argument:

```
cd c:\tmp\server_1
mps-start server_1
```

For more information, see “Start a Server Instance” on page 1-10.

Error: invalid target host or port

The port number specified has not been properly defined to your computer. Define a valid port and retry the command.

Error: HTTP error: HTTP/x.x 404 Component not found

This error can be caused by a number of reasons. Consult the “Log Files” on page 4-6 for further details on the precise cause of the problem.

5

Impact of Server Configurations on Processing Asynchronous Requests

Impact of Server Configurations on Processing Asynchronous Requests

MATLAB Production Server supports asynchronous execution of client requests. The following configurations in the server's `main_config` file impact the how the server supports this functionality:

- request-timeout
- server-memory-threshold
- server-memory-threshold-overflow-action

The `request-timeout` configuration parameter specifies the duration after which a request in a terminal states times out and gets deleted.

The `server-memory-threshold` configuration parameter specifies the size threshold of the server process at which point action needs to be taken to manage the responses. The size threshold includes both the size of the base server process plus any growth in the server process resulting from processing a client request.

The `server-memory-threshold-overflow-action` configuration parameter specifies the action to be taken when the memory size threshold of server process has been breached. The possible actions are that the responses be archived to disk or the request be purged.

Setting too small a `request-timeout` can lead to a request being timed out before a client fetches the response.

Since the `server-memory-threshold` includes both the size of the base server process plus any growth in the server process resulting from processing client requests, setting too small a `server-memory-threshold` can lead to responses being archived or purged before being retrieved.

Since the operating system governs memory management, the memory footprint size of the base server process may not return to its original size even after a response has been archived or purged. The size of the base server process in most cases ends up being larger than its original size. As a result, subsequent requests to the server may have a much smaller range of memory to work with before reaching the `server-memory-threshold`.

Setting the `server-memory-threshold` to be too large will result in a large server process footprint which may not be required.

These configuration parameters need to be set appropriately and carefully balanced in order to provide a suitable contract between a client and a server.

See Also

cors-allowed-origins | response-archive-limit | response-archive-root

More About

- "Edit the Configuration File" on page 1-6

Set Up MATLAB Production Server Dashboard

Set Up and Log In to MATLAB Production Server Dashboard

In this section...

Follow these instructions to set up the dashboard for an on-premises installation of MATLAB Production Server.

Set Up the Dashboard

Warning You must have admin privileges on Windows to complete setup.

To set up an instance of the MATLAB Production Server dashboard:

1. Open a Terminal or Command Window with administrator privileges, and navigate to the `dashboard` folder in the MATLAB Production Server installation directory.

Platform	Default Directory Where the MATLAB Production Server dashboard is Installed
Windows *(Administrator)*	`C:\Program Files\MATLAB\MATLAB Production Server\R2020b\dashboard`
Linux®	`/usr/local/MATLAB/MATLAB_Production_Server/R2020b/dashboard`

2. Execute the script `mps-dashboard` with the `setup` option, and when prompted, specify the directory for dashboard setup. You must have write privileges to the directory from where you are running the `mps-dashboard` script, and to the directory where the dashboard is going to be set up.

Platform	Script for Dashboard Setup

Windows *(Administrator)*	`> mps-dashboard.bat setup`
	
	For example:
	
	`> mps-dashboard.bat setup`
	`Specify a workspace directory for MATLAB Production Server Dashboard: C:\mp`

Linux	`$ ./mps-dashboard.sh setup`
	
	For example:
	
	`$ ./mps-dashboard.sh setup`
	`Specify a workspace directory for MATLAB Production Server Dashboard: /opt/mps/dashboard`

   You receive a message acknowledging that the dashboard has been successfully setup.

   Tip To directly specify a directory when setting up the dashboard, use the `-C` option after the `setup` option and provide a directory name.

For example, in Windows: `> mps-dashboard.bat setup -C D:\mps\dashboard`

For example, in Linux: `$ ./mps-dashboard.sh setup -C /opt/mps/dashboard`

Note For a complete list of options that can be passed to the `mps-dashboard` script, pass a `?` as an option to the `mps-dashboard` script.

For example, in Windows type:

```
> mps-dashboard.bat ?
```

In Linux, type:

```
$ ./mps-dashboard.sh ?
```

The complete list of options are as follows.

```
setup | start | stop | remove | reset_admin_password
```

Tip Troubleshooting (Windows only): If the `mps-dashboard.bat setup` command fails with an error message that mentions a missing `MSVCR` DLL, add `$MPS_ROOT\bin\win64` to your system `PATH`, where `$MPS_ROOT` is the directory where you have MATLAB Production Server installed. The `$MPS_ROOT\bin\win64` folder contains DLLs that MATLAB Production Server uses.

3 Execute the `mps-dashboard` script with the `start` option to start the dashboard.

Platform	Script to Start Dashboard
Windows *(Administrator)*	`> mps-dashboard.bat start`
Linux	`$ ./mps-dashboard.sh start`

You will get a message indicating the host and port where the dashboard is running. The default host and port are `localhost` and `9090`, respectively.

Tip Windows only: To run the dashboard instance as a background process in Windows, precede the `mps-dashboard` script with command `start /B`.

For example: `> start /B mps-dashboard.bat start`

Note You can change the default port used by dashboard by editing the `--node_server_port` option in `config.txt` file. You can find the `config.txt` file here:

Platform	Location of `config.txt` File
Windows	`C:\Program Files\MATLAB\MATLAB Production Server\R2020b\dashboard\config\config.txt`
Linux	`/usr/local/MATLAB/MATLAB_Production_Server/R2020b/dashboard/config/config.txt`

Other customizations to the setup process can be made by editing relevant parts of the `config.txt` file.

4 Open a web browser, and type the host and port number that were displayed in the previous step.

   For example:

   ```
   http://localhost:9090
   ```

Tip If you see garbled text in the dashboard logs, verify that the server machine uses UTF-8 encoding. You must execute `mps-dashboard.bat setup` again after setting the locale.

For information about setting the locale, see “Set Locale on Microsoft Windows Platforms” (MATLAB) and “Set Locale on Linux Platforms” (MATLAB).

Log In to the Dashboard

To log in to MATLAB Production Server Dashboard follow this procedure:

1 Open a web browser, and type the host and port number that were displayed at the end of the install process.

   For example:

   ```
   http://localhost:9090
   ```

2 Type the following information at the login screen for the username and password:

   Username: `admin`

   Password: `admin`

You are now logged into the MATLAB Production Server Dashboard.

Reset the Admin Password

You can use the `mps-dashboard` script with the option `reset_admin_password` to change the admin password.

Platform	Script to Reset the Admin Password
Windows *(Administrator)*	`> mps-dashboard.bat reset_admin_password`
Linux	`$ ./mps-dashboard.sh reset_admin_password`

Warning The `reset_admin_password` option should not be executed while dashboard is still running. First, stop dashboard execution using the `mps-dashboard` script with the `stop` option and then reset the admin password.

See Also

Related Examples

- “Remove MATLAB Production Server Dashboard” on page 6-5

Remove MATLAB Production Server Dashboard

Follow these steps to remove the MATLAB Production Server dashboard in an on-premise server installation.

1. Open a Terminal or Command Window, and navigate to the `dashboard` folder in the MATLAB Production Server installation directory.

Platform	Default Directory Where MATLAB Production Server Dashboard is Installed
Windows *(Administrator)*	`C:\Program Files\MATLAB\MATLAB Production Server\R2017b\dashboard`
Linux	`/usr/local/MATLAB/MATLAB_Production_Server/R2017b/dashboard`

2. Execute the `mps-dashboard` script with the `stop` option.

Platform	Script to Stop Dashboard
Windows *(Administrator)*	`> mps-dashboard.bat stop`
Linux	`$ ./mps-dashboard.sh stop`

Note You need to complete this step only if dashboard is running.

3. Execute the `mps-dashboard` script with the `remove` option.

Platform	Script to Remove Dashboard
Windows *(Administrator)*	`> mps-dashboard.bat remove`
Linux	`$ ./mps-dashboard.sh remove`

You receive a message acknowledging that dashboard was successfully removed.

Note Attempting to remove the dashboard while it is still running will result in an error.

The procedure will remove the following directories and files from the directory where dashboard was set up:

```
data
mps_workspace
.pid
```

If you run into any issues while removing dashboard, manually delete the `.pid` file and re-run the `mps-dashboard` script with the `remove` option.

Note In Linux, if you started the dashboard using the & control operator, you don't need to open a new Terminal. The & control operator makes command run in the background.

In Windows, if dashboard is running, you will not have access to the command prompt. Therefore, you need to open a new Command Window to stop any running dashboard instances.

Note Removing dashboard does not uninstall it from the system. It removes the instance that was set up. The dashboard remains installed as part of MATLAB Production Server. If you want to set up the dashboard again, use the `mps-dashboard` script with the `setup` option.

See Also

Related Examples

- “Set Up and Log In to MATLAB Production Server Dashboard” on page 6-2

Commands

mps-check

Test and diagnose a MATLAB Production Server instance for problems

Syntax

```
mps-check host:port [--verbose|-v] [--timeout seconds] [--help]
```

Description

`mps-check` sends a request to a MATLAB Production Server instance and receives a status report that you can use to identify issues that cause the product to run less than optimally.

Information reported by `mps-check` to `stdout` includes:

- Status of the server instance
- Port the HTTP interface is listening on
- Deployed archives for a server instance

Input Arguments

host*:*port

The host name of the machine running the server instance. The port number on which the server instance listens for requests.

`--verbose | -v`

Displays detailed system messages related to server status report.

`--timeout` *`seconds`*

The time in *`seconds`* to wait for a response from the server before timing out. The default is two minutes.

`--help`

Displays list of options for using the command. Specifying the host name and port number is optional for this option.

Examples

Display diagnostic information for the server instance running on port 9910 of the local computer.

```
mps-check localhost:9910
```

```
Checking the MATLAB Runtime version 9.9.0 at C:\Program Files\MATLAB\
Check completed successfully
```

Display diagnostic information for the server instance running on port 9910 of the local computer with the verbose option.

```
mps-check -v localhost:9910

-- Resolve the hostname
-- Start the mps-check client
-- Retrieving the list of installed MATLAB Runtimes from the MATLAB Production Server
-- start timer 00:02:00
-- Connecting to the peer server
-- Conncted. Start receiving TCP data
-- Send HTTP request
-- Send TCP data
-- TCP data sent succeeded
-- HTTP request sent
-- TCP data received
-- HTTP/1.1 200 OK
-- HTTP response completed
-- Cancel timer
-- HTTP/1.1 200 OK
Content-Length: 126
Connection: Keep-Alive


-- Retrieving the MATLAB Runtime list succeeded
-- Shutdown TCP client
-- Socket closed
Checking the MATLAB Runtime version 9.9.0 at C:\Program Files\MATLAB\
-- start timer 00:02:00
-- Connecting to the peer server
-- Conncted. Start receiving TCP data
-- Send HTTP request
-- Send TCP data
-- TCP data sent succeeded
-- HTTP request sent
-- TCP data received
-- HTTP/1.1 200 OK
-- HTTP response completed
-- Cancel timer
-- Verify http response against the input
-- Input = 25921
-- Output = 161
-- Verification succeeded
Check completed successfully
-- Shutdown TCP client
-- Socket closed

-- Terminated
```

More About

Server Instance

Server instance is an instance of the MATLAB Production Server. The files contained in the folder created by `mps-new`, defined by *`path/`*, comprise one configuration of the MATLAB Production Server product.

See Also

`mps-profile` | `mps-status` | `mps-support-info` | `mps-which`

Introduced in R2012b

mps-license-reset

Force a server instance to immediately attempt license checkout

Syntax

```
mps-license-reset [-C path/]server_name
```

Description

`mps-license-reset [-C path/]server_name` triggers the server to checkout a license immediately, regardless of the current license status. License keys that are currently checked out are checked in first.

Input Arguments

`-C path/`

Specify a path to the server instance. If this option is omitted, the current working folder and its parents are searched to find the server instance.

`server_name`

Server checking out license

Examples

Create a new server instance and display the status of each folder in the file hierarchy, as the server instance is created:

```
mps-license-reset -C /tmp/server_2
```

See Also

`mps-status`

Topics

“Force a License Checkout Using mps-license-reset” on page 2-4

Introduced in R2012b

mps-new

Create a server instance

Syntax

```
mps-new [path/]server_name [-v] [--service] [--service-name name] [--service-description description] [--service-user user] [--service-password password] [--noprompt]
```

Description

`mps-new [path/]server_name [-v] [--service] [--service-name name] [--service-description description] [--service-user user] [--service-password password] [--noprompt]` makes a new folder at *`path`* and populates it with the default folder hierarchy for a server instance.

Input Arguments

`path`

Path to server instance.

`server_name`

Name of the server instance to create.

If you are creating a server instance in the current working folder, you do not need to specify a full path; specify only the server name.

`-v`

Display the status of each folder in the file hierarchy created to form a server instance

`--service`

On Windows, register the server instance as a Windows service.

The Windows service default settings are:

- Service Display Name: MATLAB Production Server – *`path\server_name`*
- Service Description: MATLAB Production Server running instance *`path\server_name`*
- Service User: LocalSystem

The Windows service is configured to start when the machine starts, not at creation of the service. After you have made configuration changes, start the server instance using `mps-start`.

`--service-name` ***`name`***

Display name for the Windows service associated with the server instance

`--service-description` *`description`*

Informational statement describing the Windows service associated with the server instance

`--service-user` *`user`*

Windows account under which the service associated with the server instance should run. The user account must have read, write, and, delete permissions for the instance directory as well read and execute permissions for the MATLAB Production Server installation directory.

`--service-password` *`password`*

Password for the service user account

`--noprompt`

Indicates that no prompts are generated

Examples

Create a Server Instance

Create a new server instance, and display the status of each folder in the file hierarchy, as the server instance is created:

```
mps-new /tmp/server_1 -v
```

```
server_1/.mps-version...ok
server_1/config/...ok
server_1/config/main_config...ok
server_1/endpoint/...ok
server_1/auto_deploy/...ok
server_1/.mps-socket/...ok
server_1/log/...ok
server_1/pid/...ok
```

Create a Windows Service

Create a new server instance, and register it as a Windows service:

```
mps-new /tmp/server_1 --service
```

Tips

- Before creating a server instance, ensure that no file or folder with the specified *`path`* currently exists on your system.
- After issuing `mps-new`, issue `mps-start` to start the server instance.

See Also

`mps-start` | `mps-status`

Topics

“Create a Server” on page 1-4
“Install a Server Instance as a Windows Service” on page 1-15

“Server Overview” on page 1-2

Introduced in R2012b

mps-profile

Log profile information for server instance

Syntax

```
mps-profile [-C [path/]server_name] [state] [object...]
```

Description

`mps-profile` starts or stops the logging of server profile information in the main log based on *`state`*. *`object`* specifies the information to log. You can specify multiple objects. You can log information about server requests, such as the IP address of the client, the archives requested by the client, and the worker pool.

To set up or update the profiling options for an already running server without restarting the server, use the `mps-profile` command. To set up profiling options when you configure a server, specify the profile property. Running `mps-profile` overrides any profiling options set using the `profile` property.

Note Activating profiling has a negative impact on performance.

Input Arguments

`path`

Path to server instance. If you omit this option, the current working folder and its parents are searched to find the server instance.

`server_name`

Name of the server instance to profile.

`state`

Flag to control whether the server writes profile information to the main log. Valid states are:

- `on` — Log profile information.
- `off` — Do not log profile information.

`object`

Information to log. Valid objects are:

- `server` — Information about server requests and workers.
- `server.request` — Information about server requests, which includes information about requested archives and clients that make the requests
- `server.request.archive` — Information about archives in the request

- `server.request.client` — Information about clients that make the request
- `server.worker` and `server.worker.pool` — Information about workers

The objects are hierarchical. For example, specifying `server.request` implies specifying `server.request.archive` and `server.request.client`.

If you do not specify an object, the server logs profile messages for all objects.

Examples

Log profile information for server requests and the worker pool.

```
mps-profile on
```

Or:

```
mps-profile on server
```

Log profile information for server requests without turning on worker pool profiling.

```
mps-profile on server.request
```

Log profile information about archives in the server requests and worker pool.

```
mps-profile on server.request.archives server.worker.pool
```

Stop the logging of all profile information.

```
mps-profile off
```

Stop the logging of worker pool information only.

```
mps-profile off server.worker.pool
```

The following is an excerpt of the main log that contains profiling information for all objects.

```
93 [2020.03.19 13:05:56.554236] [profile] [client:[::1]:62736] [component:mymagic] [connection_id
[function:magic] [mode:sync] [request_id:0:1:1][service:http-connection] [type:request_arrive]
Request arrived and was placed in the queue.
94 [2020.03.19 13:05:56.554236] [profile]
Request to allocate next available worker
95 [2020.03.19 13:05:56.555240] [profile]
Lease created for worker-1
96 [2020.03.19 13:05:56.555240] [profile] [client:[::1]:62736] [request_id:0:1:1] [type:request_s
Request started executing on worker 1
...
99 [2020.03.19 13:05:56.558233] [profile] [client:[::1]:62736] [request_id:0:1:1] [type:request_t
Request completed with HTTP status 200
100 [2020.03.19 13:05:56.558233] [profile]
Lease terminated for worker-1
101 [2020.03.19 13:05:56.558233] [profile]
worker-1 PASSED health check; returning to the pool
```

Compatibility Considerations

`requests` and `worker_pool` objects will be removed
Not recommended starting in R2020b

The objects `requests` and `worker_pool` will be removed in a future release. Use `server.request` instead of `requests` and `server.worker.pool` instead of `worker_pool` when running this command.

See Also

profile

Topics

“Log Files” on page 4-6

Introduced in R2015b

mps-restart

Stop and start a server instance

Syntax

`mps-restart [-C [path/]server_name] [-f]`

Description

`mps-restart [-C [path/]server_name] [-f]` stops a server instance, then restarts the same server instance. Issuing `mps-restart` is equivalent to issuing the `mps-stop` and `mps-start` commands in succession.

Input Arguments

`-C path/`

Specify a path to the server instance. If this option is omitted, the current working folder and its parents are searched to find the server instance. If you are restarting a server instance in the current working folder, you do not need to specify a full path. Only specify the server name.

`server_name`

Name of the server to be restarted.

`-f`

Force success even if the server instance is stopped. Restarting a stopped instance returns an error.

Examples

Restart a server instance named `server_1`, located in folder `tmp`. Force successful completion of `mps-restart`.

```
mps-restart -f -C /tmp/server_1
```

Tips

- After issuing `mps-restart`, issue the `mps-status` command to verify the server instance has started.
- If you are restarting a server instance in the current working folder, you do not need to specify a full path. Only specify the server name.

See Also

`mps-start` | `mps-status` | `mps-stop`

Introduced in R2012b

mps-service

Create or modify a Windows service for a server instance

Syntax

```
mps-service [-C [path/]server_name] create [--name name] [--description
description] [--user user] [--password password] [--noprompt]

mps-service [-C [path/]server_name] update [--name name] [--description
description] [--user user] [--password password] [--instance-root new_path]
[--noprompt]

mps-service [-C [path/]server_name] delete
mps-service delete service_name [[--force]|[-f]]
mps-service clean [[--force]|[-f]][[--verbose]|[-v]]

mps-service [-C [path/]server_name] undelete

mps-service [-C [path/]server_name]
mps-service list
```

Description

`mps-service [-C [path/]server_name] create [--name name] [--description description] [--user user] [--password password] [--noprompt]` creates a Windows service for the server instance.

The Windows service default settings are:

- Service Display Name: MATLAB Production Server – *`path\server_name`*
- Service Description: MATLAB Production Server running instance *`path\server_name`*
- Service User: LocalSystem

The Windows service is configured to start when the machine starts, not at creation of the service. After you have made configuration changes, start the server instance using `mps-start`.

`mps-service [-C [path/]server_name] update [--name name] [--description description] [--user user] [--password password] [--instance-root new_path] [--noprompt]` updates the Windows service entry for the server instance.

`mps-service [-C [path/]server_name] delete` deletes the Windows service entry for the server instance.

`mps-service delete service_name [[--force]|[-f]]` deletes the Windows service entry by name.

`mps-service clean [[--force]|[-f]][[--verbose]|[-v]]` deletes invalid Windows service entries.

Invalid Windows service entries are entries where either the target version of MATLAB Production Server is not present or the associated server instance no longer exists.

`mps-service [-C [path/]server_name] undelete` restores the deleted Windows service entry for the server instance.

`mps-service [-C [path/]server_name]` displays the Windows service entry for the server instance.

`mps-service list` lists the Windows service entries for all server instances.

Input Arguments

`-C` *`path/`*

Path to server instance

`server_name`

Name of the server instance

`--name` *`name`*

Display name for the Windows service associated with the server instance

`--description` *`description`*

Informational statement describing the Windows service associated with the server instance

`--user` *`user`*

Windows account under which the service associated with the server instance should run. The user account must have read, write, and, delete permissions for the instance directory as well read and execute permissions for the MATLAB Production Server installation directory.

`--password` *`password`*

Password for the service user account

`--instance-root` *`new_path`*

Updated path to server instance

`--noprompt`

Indicate that no prompts are generated

`--force`, `-f`

Force deletion without prompting

`--verbose`, `-v`

Include details about why the service is not valid.

Examples

Create a Windows Service

Create a default Windows service for the server instance `server_1`:

```
mps-service -C tmp/server_1 create
```

Delete a Windows Service

Delete the Windows service entry for the server instance `server_1`:

```
mps-service -C tmp/server_1 delete
```

List Existing Windows Services

List the Windows service entries for all the server instances installed on the local machine:

```
mps-service list
```

```
Service Name:  MATLAB Production Server {01234567-89ab-cdef-0123-456789abcdef}
Display Name:  MATLAB Production Server - My Custom Name
Description:   My Description
Instance Root: C:\instances\instance1
MPS Root:      C:\Program Files\MATLAB\MATLAB Production Server\R2014b
Status:        Started

Service Name:  MATLAB Production Server {01234567-89ab-cdef-0123-456789abcdef}
Display Name:  MATLAB Production Server - c:\instances\instance2
Description:   MATLAB Production Server running instance C:\instances\instance2
Instance Root: C:\instances\instance2
MPS Root:      C:\Program Files\MATLAB\MATLAB Production Server\R2015a
Status:        Stopped
```

See Also

`mps-new`

Topics

“Install a Server Instance as a Windows Service” on page 1-15

Introduced in R2015a

mps-setup

Set up a server environment

Syntax

`mps-setup [`*`mcrroot`*`]`

Description

`mps-setup [`*`mcrroot`*`]` sets location of MATLAB Runtime and other start-up options.

The `mps-setup` command sets the default path to the MATLAB Runtime for all server instances you create with the product. This is equivalent to presetting the `--mcr-root` option in each server's `main_config` configuration file.

If a default value already exists in *`server_name`*`/config/mcrroot`, it is updated with the value specified when you run the command line wizard.

Tips

- Run `mps-setup` from the script folder. Alternatively, add the `script` folder to your system `PATH` environment variable to run `mps-setup` from any folder on your system.
- Run `mps-setup` without arguments and it will search your system for MATLAB Runtime instances you may want to use with MATLAB Production Server.
- Run `mps-setup` by passing the path to the MATLAB Runtime as an argument. This method is ideal for non-interactive (silent) installations.

Input Arguments

`mcrroot`

Specify a path to the MATLAB Runtime if running `mps-setup` in non-interactive, or silent, mode.

Examples

Run `mps-setup` non-interactively, by passing in a path to the MATLAB Runtime instance that you want MATLAB Production Server to use.

`mps-setup "C:\Program Files\MATLAB\MATLAB Runtime\`*`mcrver`*`"`

`mcrver` is the version of the MATLAB Runtime to use.

See Also

`mps-new` | `mps-start` | `mps-status`

Introduced in R2012b

mps-start

Start a server instance

Syntax

`mps-start [-C [path/]server_name] [-f]`

Description

`mps-start [-C [path/]server_name] [-f]` starts a server instance

Input Arguments

`-C path/`

Specify a path to the server instance. If this option is omitted, the current working folder and its parents are searched to find the server instance.

`server_name`

Name of the server to be started.

`-f`

Force success even if the server instance is currently running. Starting a running server instance is considered an error.

Examples

Start a server instance named `server_1`, located in folder `tmp`. Force successful completion of `mps-start`.

```
mps-start -f -C /tmp/server_1
```

Tips

- After issuing `mps-start`, issue the `mps-status` command to verify the server instance has `STARTED`.
- If you are starting a server instance in the current working folder, you do not need to specify a full path. Only specify the server name.

See Also

`mps-new` | `mps-restart` | `mps-status` | `mps-stop`

Topics

“Start a Server Instance” on page 1-10
“Server Overview” on page 1-2

Introduced in R2012b

mps-status

Display status of a server instance

Syntax

```
mps-status [-C [path/]server_name][--statistics|-s [sample_interval]] [--
json|-j]
```

Description

`mps-status [-C [path/]server_name][--statistics|-s [sample_interval]] [--json|-j]` displays the status of the server (`STARTED`, `STOPPED`), along with a full path to the server instance. Additionally, it can display performance statistics about the server including:

- sample interval in milliseconds
- CPU utilization
- number of active worker processes
- number of requests in queue
- memory usage
- request throughput per second
- total queue time in milliseconds

Input Arguments

`-C path/`

Specify a path to the server instance. If this option is omitted, the current working folder and its parents are searched to find the server instance.

`server_name`

Server to be queried for status

`--statistics [sample_interval], -s [sample_interval]`

Specify that statistics are to be collected and displayed.

The optional *`sample_interval`* allows you to specify the interval, in milliseconds, over which statistics are collected. The default is 500.

Note If you specify a sample interval of 0, only one sample is taken. Two samples are required to compute some statistics such as CPU utilization and throughput.

`--json, -j`

Specify that statistics are output in JSON format:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "title": "Instance Status",
    "description": "Status and Statistics for a MATLAB Production
                    Server Instance",
    "type": "object",
    "properties": {
        "instancePath": {
            "description": "Filesystem path for the server
                            instance",
            "type": "string"
        },
        "started": {
            "type": "boolean"
        },
        "license": {
            "type": "object",
            "properties": {
                "status": {
                    "enum": [ "CHECKED_OUT", "IN_GRACE_PERIOD",
                              "GRACE_PERIOD_EXPIRED" ]
                },
                "type": {
                    "enum": [ "INVALID", "UNKNOWN", "COMPILED",
                              "TRIAL", "EDU", "COMM" ]
                },
                "number": {"type": "string"}
            },
            "required": ["status"]
        },
        "statistics": {
            "type": "object",
            "properties": {
                "sampleIntervalMS": {
                    "description": "The difference in upTime
                                    between the two samples, 0 if
                                    only a single sample was
                                    taken",
                    "type": "number"
                },
                "localTime": {
                    "description": "Local Time at server in format
                                    YYYY.MM.DD HH.MM.SS.SSSSSS",
                    "type": "string"
                },
                "upTime": {
                    "description": "Time since server start in
                                    fractional seconds",
                    "type": "number"
                },
                "cpuTime": {
                    "description": "CPU time consumed by all server
                                    processes in fractional
                                    seconds",
                    "type": "number"
                },
                "cpuPercentage": {
                    "description": "CPU utilzation, computed using
```

```
                                change in cpuTime and upTime
                                between two samples",
                        "type": "number"
                    },
                    "totalRequestsReceived": {
                        "description": "The number of valid requests
                                received",
                        "type": "integer"
                    },
                    "totalRequestsStarted": {"type": "integer"},
                    "totalRequestsFailedToStart": {
                        "description": "The number of requests that
                                could not be started",
                        "type": "integer"
                    },
                    "totalRequestsFinishedHttpSuccess": {
                        "type": "integer"
                    },
                    "totalRequestsFinishedHttpError": {
                        "description": "Note: does not includes
                                requests that failed to start",
                        "type": "integer"
                    },
                    "memoryWorkingSet": {
                        "description": "Amount of memory resident in
                                physical memory for all
                                processes (KiB)",
                        "type": "number"
                    },
                    "throughput": {
                        "description": "Requests retired per second,
                                computed using the number of
                                requests finished or failed to
                                start over two samples",
                        "type": "number"
                    },
                    "totalQueueTimeMS": {
                        "description": "Sum of the wait times for
                                currently queued requests",
                        "type": "number"
                    }
                }
            }
        },
        "required": ["instancePath", "started"]
}
```

Examples

Check if a Server is Running

Display status of server instance `server_1`, residing in `tmp` folder.

```
mps-status -C /tmp/server_1
```

If server is running and running with a valid license:

```
'/tmp/server_1' STARTED
license checked out
```

If server is not running:

```
'/tmp/server_1' STOPPED
```

Report Statistics in a Human Readable Format

Display statistics for the server instance `server_1`, residing in `tmp` folder.

```
mps-status -C /tmp/server_1 -s
```

If server is running and running with a valid license:

```
'/tmp/server_1' STARTED
license checked out
Statistics:
Sample Interval (ms):     500
CPU Utilization (%):      40
Active Worker Processes:  2
Requests in Queue:        1
Memory Usage (KiB):       1024
Throughput (requests/s):  10
Total Queue Time (ms):    100
```

Report Statistics in JSON Format

Display statistics for the server instance `server_1`, residing in `tmp` folder.

```
mps-status -C /tmp/server_1 -s -j
```

If server is running and running with a valid license:

```
{
    "instancePath":"L:\\MPS\\stats",
    "license":{
        "number":"unknown",
        "status":"CHECKED_OUT",
        "type":"COMM"
    },
    "started":true,
    "statistics":{
        "cpuPercentage":0,
        "cpuTime":1.7628113000000001,
        "localTime":"2015.04.28 16:52:49.874483",
        "memoryWorkingSet":393468,
        "sampleIntervalMS":500.31748899999951,
        "throughput":0,
        "totalQueueTimeMS":0,
        "totalRequestsFailedToStart":0,
        "totalRequestsFinishedHttpError":0,
        "totalRequestsFinishedHttpSuccess":0,
        "totalRequestsReceived":0,
        "totalRequestsStarted":0,
        "upTime":6.9780032949999997
    }
}
```

See Also

`mps-restart` | `mps-start` | `mps-stop` | `mps-which`

Topics

“Start a Server Instance” on page 1-10
“Server Overview” on page 1-2
“License Server Status Information” on page 4-3

Introduced in R2012b

mps-stop

Stop a server instance

Syntax

```
mps-stop [-C [path/]server_name] [-f] [-p | --purge] [-k | --kill] [-v] [--
timeout hh:mm:ss]
```

Description

`mps-stop [-C [path/]server_name] [-f] [-p | --purge] [-k | --kill] [-v] [--timeout hh:mm:ss]` closes the HTTP server socket and all open client connections immediately. All function requests that were executing when the command was issued are allowed to complete before the server shuts down.

Input Arguments

`-C path/`

Specify a path to the server instance.

If you are stopping a server instance in the current working folder, you do not need to specify a full path; only specify the server name. If you omit this option, the current working folder and its parents are searched to find the server instance.

`server_name`

Name of the server to be stopped.

`-f`

Force success even if the server instance is not currently stopped. Stopping a stopped instance is considered an error.

`-p | --purge`

Remove working files in the instance directory. These files are usually removed during a graceful shutdown.

`-k | --kill`

Immediately and forcibly terminate any running processes for this instance. Use this option if a graceful shutdown has failed.

Starting in R2020a, if you specify both `-k|--kill` and `--timeout` *`hh`*`:`*`mm`*`:`*`ss`* options, all running server instance processes are forcibly terminated at *`hh`*`:`*`mm`*`:`*`ss`*; if they have not already stopped.

To forcibly terminate server instance processes within the duration specified by the `server-termination-grace-period` property, do not specify the `-k` option.

`-v`

Display system messages.

`--timeout` *`hh`*`:`*`mm`*`:`*`ss`*

Set a limit on how long `mps-stop` runs before returning either success or failure. If you specify the `--timeout` option, the server tries to gracefully shut down and release any checked out licenses.

For example, if you specify `--timeout 00:02:00`, then `mps-stop` exits with a message if the server takes longer than two minutes to shut down. The server instance continues to attempt to terminate even if `mps-stop` times out. If you do not specify this option, the default behavior is to wait as long as necessary (infinity) for the instance to stop.

Starting in R2020a, if you specify both `-k|--kill` and `--timeout` *`hh`*`:`*`mm`*`:`*`ss`* options, all running server instance processes are forcibly terminated at *`hh`*`:`*`mm`*`:`*`ss`*; if they have not already stopped.

Examples

Stop a server instance `server_1` located in the `tmp` folder.

- Force successful completion of `mps-stop` using `-f` option. Use `--timeout` option to return with a message, if `mps-stop` takes longer than three minutes to complete. Specify the verbose `-v` option to produce an output status message.

  ```
  mps-stop -f -v -C /tmp/server_1 --timeout 00:03:00
  ```

  Example Output

  ```
  waiting for stop... (timeout = 00:03:00)
  ```

- Immediately terminate all running server instance processes by force using the `-k` option.

  ```
  mps-stop -k /tmp/server_1
  ```

- To wait as long as necessary to stop server instance processes, do not specify the `--timeout` option or set the server-termination-grace-period property in the `main_config` server configuration file.

  ```
  mps-stop /tmp/server_1
  ```

Tips

- After issuing `mps-stop`, issue the `mps-status` command to verify that the server instance has stopped.

See Also

`mps-new` | `mps-restart` | `mps-start` | `mps-status` | server-termination-grace-period

Introduced in R2012b

mps-support-info

Display licensing and configuration information of a MATLAB Production Server instance

Syntax

`mps-support-info [-C [`*`path`*`/]`*`server_name`*`]`

Description

`mps-support-info` displays licensing and configuration information of a MATLAB Production Server instance.

Input Arguments

- *`path`* — The path to where the server instance is installed.
- *`server_name`* — The name of the server instance to locate in the current folder.

Examples

Display licensing and configuration information of server instance `fred`, residing in `/` folder.

```
mps-support-info -C /fred
```

```
Instance Version:           1.0
License Number:             UNKNOWN -- MPS stopped
MPS Version:                UNKNOWN -- MPS stopped
Available License Number:   857812
Client Version:             1.0.1 R2013a
Operating System:           Microsoft Windows 7 Enterprise Edition (build 7601), 64-bit
Number of CPU cores:        8
CPU Info:                   Intel(R) Xeon(R) CPU           W3550  @ 3.07GHz 64-bit Compatible
Memory:                     11.9915 GB ( 1.2574e+007 KB )
```

Introduced in R2012b

mps-which

Display path to server instance that is currently using the configured port

Syntax

`mps-which [-C [path/]server_name]`

Description

`mps-which [-C [path/]server_name]` is useful when running multiple server instances on the same machine. If you attempt to start two server instance on the same port, the latter server instance will fail to start, displaying an `address-in-use` error. `mps-which` identifies which server instance is using the port.

Input Arguments

`-C path/`

Specify a path to the server instance. If this option is omitted, the current working folder and its parents are searched to find the server instance.

`server_name`

Server to be queried for path.

Examples

`server_1` and `server_2`, both residing in folder `tmp`, are configured to use to same port, defined by the `http` configuration property.

Run `mps-which` for both servers:

```
mps-which -C /tmp/server_1
```

```
mps-which -C /tmp/server_2
```

Example Output

In both cases, the server that has allocated the configured port displays (`server_1`):

```
/tmp/server_1
```

Tips

- If you are creating a server instance in the current working folder, you do not need to specify a full path. Only specify the server name.

See Also

`mps-status`

Introduced in R2012b

mps-cache

Control persistence service

Syntax

```
mps-cache [operation] [-C server_path] [--connection connection_name] [--all]
[--configFile provider_config_file_path] [--key cache_access_key_string] [--
timeout seconds] [--verbose | -v] [--help |-h]
```

Description

`mps-cache [operation] [-C server_path] [--connection connection_name] [--all] [--configFile provider_config_file_path] [--key cache_access_key_string] [--timeout seconds] [--verbose | -v] [--help |-h]` controls the persistence service based on the specified *operation*. The supported operations are `start`, `stop`, `restart`, `ping`, `attach`, and `detach`.

The option *connection_name* is obtained from the JSON file `mps_cache_config`. This file must be created by an administrator and placed in the `config` folder of the server instance. The JSON structure of the `mps_cache_config` file is:

```
{
  "Connections": {
    "<connection_name>": {
      "Provider": "Redis",
      "Host": "<hostname>",
      "Port": <port_number>
    }
  }
}
```

<connection_name>, *<host_name>* and *<port_number>* are the only fields that can be set by the administrator and *<port_number>* has to be a non-SSL port. Currently, Redis™ is the only supported persistence service provider. You can have multiple connections to the persistence provider.

Input Arguments

operation

`start | stop | restart | ping | attach | detach`

- `start` — Start a persistence service.
- `stop` — Stop a persistence service.
- `restart` — Restart a persistence service.
- `ping` — Test whether the persistence service is reachable.
- `attach` — Connect persistence service to server instance process.
- `detach` — Disconnect persistence service from server instance process.

Note You cannot start, stop, or restart a remote persistence service.

`-C server_path`

Path to the server instance.

`--connection connection_name`

Name of connection to persistence service. Specify either `--all` or `--connection` *`connection_name`*, not both.

`--all`

Connect to all the persistence services specified in `mps_cache_config` file. Specify either `--all` or `--connection` *`connection_name`*, not both.

`--configFile provider_config_file_path`

Path to the persistence provider configuration file.

`--key cache_access_key_string`

Access key string to connect to an Azure Redis Cache instance obtained from the Azure portal. For an example, see “Ping a Remote Persistence Service” on page 7-31.

`--timeout ss`

Set a limit on how long `mps-cache` will run before returning either success or failure. The default duration is `30` seconds. For example, specifying `--timeout 15` indicates that `mps-cache` should exit with an error status if it takes longer than `15` seconds to access the service.

`--verbose | -v`

Displays system messages relating to controlling the persistence service.

`--help | -h`

Displays options for using the `mps-cache` command.

Examples

Start a Persistence Service

Start a persistence service on Windows assuming a connection name `myConnection` has been defined in the file `mps_cache_config`.

```
mps-cache start -C "h:\server\mps_instance" --connection myRedisConnection
mps-cache ping -C "h:\server\mps_instance" --connection myRedisConnection
```

```
Sending ping to Redis on localhost:9710.
Redis service running on localhost:9710.
```

The corresponding `mps_cache_config` file for the example is:

```
{
  "Connections": {
```

```
    "myRedisConnection": {
      "Provider": "Redis",
      "Host": "localhost",
      "Port": 9710
    }
  }
}
```

Ping a Remote Persistence Service

Assuming an Azure Redis Cache instance has been setup in the Azure portal and a connection name `myRemoteAzureRedisCacheConnection` has been defined in the file `mps_cache_config`.

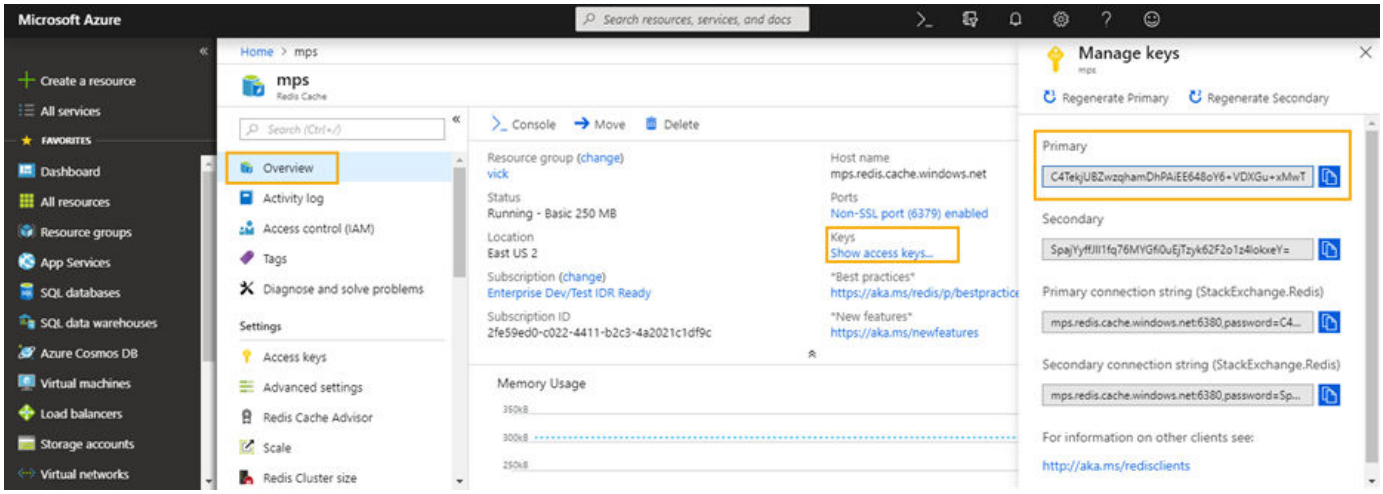
```
mps-cache ping -C "h:\server\mps_instance"
               --connection myRemoteAzureRedisCacheConnection
               --key +WcI8pU0YodDMsw1LLC7gInkjtrjamLBRoq9rQQdMTU=

Sending ping to Redis on azure.redis.cache.windows.net:6379.
Redis service running on azure.redis.cache.windows.net:6379.
```

The corresponding `mps_cache_config` file for the example is:

```
{
  "Connections": {
    "myRedisConnection": {
      "Provider": "Redis",
      "Host": "localhost",
      "Port": 9710
    },
    "myRemoteAzureRedisCacheConnection": {
      "Provider": "Redis",
      "Host": "azure.redis.cache.windows.net",
      "Port": 6379
    }
  }
}
```

Tips

- To retrieve an access key to connect to an Azure Redis Cache instance:
  - Log in to your Azure portal and select your Azure Redis Cache instance.
  - Select **Overview** and under **Keys** click **Show access keys**.
  - In the resulting blade, copy the access key string listed under **Primary**.



See Also

Topics

“Use a Data Cache to Persist Data”

Introduced in R2018b

Configuration Properties

access-control-provider

Identity management service provider name

Syntax

`--access-control-provider` *`provider`*

Description

`--access-control-provider` *`provider`* enables access control by identity provider.

`ssl-allowed-clients` and `--access-control-provider` are incompatible flags, and only one of them can be enabled. If both are enabled, MATLAB Production Server fails to start.

Parameters

`provider` specifies the identity provider that is used by the MATLAB Production Server instance for access control. Supported values for *`provider`* include: `AzureAD`.

Examples

Enable Access Control Using Azure Active Directory

```
--access-control-provider AzureAD
```

See Also

access-control-config | access-control-policy

Introduced in R2018b

access-control-config

Path to the identity management service provider configuration file

Syntax

```
--access-control-config path
```

Description

`--access-control-config` *`path`* specifies the path to the identity provider specific configuration file. This syntax is optional. The default path for `AzureAD` is ./config/azure_ad.json. If access control is enabled by specifying access-control-provider, the access control configuration file must exist in *`path`*, otherwise MATLAB Production Server fails to start.

Parameters

`path` specifies the path to access the configuration file.

Examples

Specify Path to `AzureAD`.

```
--access-control-config ./config/azure_ad.json
```

See Also

access-control-policy | access-control-provider

Topics

“Access Control Configuration File” on page 3-8

Introduced in R2018b

access-control-policy

Path to the access control policy file

Syntax

`--access-control-policy` *`path`*

Description

`--access-control-policy` *`path`* specifies the path to the access control policy file. This syntax is optional. The default path is ./config/ac_policy.json. If access control is enabled by specifying access-control-provider, the access control policy file must exist in *`path`*, otherwise MATLAB Production Server fails to start.

Once the server has started, the policy file is scanned every five seconds for changes. If the policy file is deleted or contains errors, the server continues to run, but all requests are denied. An error message is written to the `main.log` file.

Parameters

`path` specifies the path to access the policy file.

Examples

Specify Path to the JSON Access Control Policy File.

```
--access-control-policy ./config/ac_policy.json
```

See Also

access-control-config | access-control-provider

Topics

“Access Control Policy File” on page 3-8

Introduced in R2018b

async-deploy-on-startup

Deploy archives after the server starts

Syntax

```
--async-deploy-on-startup
```

Description

`async-deploy-on-startup` delays deployment of the deployable archives until after the server starts. After starting, the server scans the folder specified by the auto-deploy-root property for archives to deploy, then deploys them. Due to this delayed deployment, the archives are accessible only after the server finishes deploying them and are not accessible immediately after the server starts. If you have several archives or large archives to deploy, then set this property to avoid server timeout on startup.

If you do not set this property, the server instance automatically unpacks and deploys the archives placed in the folder specified by the `auto-deploy-root` property when it starts.

Examples

Deploy archives after the server starts.

```
--async-deploy-on-startup
```

See Also

auto-deploy-root | `mps-start`

Topics

“Server Overview” on page 1-2
“Share the Deployable Archive”
“Modifying Deployed Functions”

Introduced in R2020a

auto-deploy-root

Folder that the server instance scans for deployable archives

Syntax

`--auto-deploy-root` *`path`*

Description

`--auto-deploy-root` *`path`* specifies the folder that the server instance scans for deployable archives.

The server instance automatically unpacks and deploys archives placed in this folder when it starts. Starting in R2020a, if you set the async-deploy-on-startup, the server instance deploys the archives only after it starts.

You do not need to restart the server after a deployable archive is added, updated, or removed. Multiple server instances can share a single `auto-deploy-root` folder. Using this folder allows near-simultaneous hot deployment to multiple instances. The server scans the folder every five seconds for any changes.

Parameters

`path`

Path to the folder that the server instance scans for deployable archives. The path is relative to the server instance root folder.

Examples

Scan the `auto_deploy` folder for deployable archives to hot deploy.

```
--auto-deploy-root ./auto_deploy
```

See Also

async-deploy-on-startup | `mps-start`

Topics

“Server Overview” on page 1-2
“Share the Deployable Archive”

client-credential-delegation

Client credential delegation method name

Syntax

`--client-credential-delegation` *`method`*

Description

`--client-credential-delegation` *`method`* specifies the client credential delegation method that the server uses. Currently, `kerberos-without-protocol-transition` is the only supported method. If you set `client-credential-delegation` to `kerberos-without-protocol-transition`, then you must set http-authentication-method to `spnego`; otherwise, the server fails to start.

Parameters

`method`

Name of the client credential delegation method. `kerberos-without-protocol-transition` is the only supported method.

Examples

Use `kerberos-without-protocol-transition` as the client credential delegation method.

```
--client-credential-delegation kerberos-without-protocol-transition
```

See Also

http-authentication-method

Topics

“Use Kerberos and Kerberos Delegation” on page 3-13

Introduced in R2019b

cors-allowed-origins

Specify the domain origins from which clients are allowed to make requests to the server

Syntax

```
--cors-allowed-origins [ LIST | * ]
```

Description

`cors-allowed-origins` specifies the set of domain origins from which clients are allowed to make requests to a MATLAB Production Server instance. Cross-Origin Resource Sharing or CORS defines a way in which client-side web applications and a server can interact to safely determine whether or not to allow a cross-origin request. Most clients such as browsers use the `XMLHttpRequest` object to make a cross-domain request. This is especially true for client code written using JavaScript®. For MATLAB Production Server to support such requests, you must enable `cors-allowed-origins` on the server.

Parameters

*

Requests from any domain origin are allowed access to the sever.

LIST

Requests from a list of comma-separated domain origins are allowed access to the server.

Examples

Requests from any domain origin are allowed access to the sever.

```
--cors-allowed-origins *
```

Requests from a specific list of domain origins are allowed access to the server.

```
--cors-allowed-origins http://www.w3.org, https://www.apache.org
```

See Also

`http`

disable-control-c

Disable keyboard interruptions for the server instance

Syntax

```
--disbable-control-c
```

Description

`disable-control-c` disables keyboard interruption for the server instance. The server instance does not respond to **Ctrl+C**.

If you set both `disable-control-c` and enable-graceful-shutdown properties, then the server ignores the terminal interrupt event **Ctrl+C**. The server gracefully shuts down only on receiving the program termination signal or when the system shuts down or restarts.

Examples

Disable the **Ctrl+C** keys.

```
--disable-control-c
```

See Also

enable-graceful-shutdown | `mps-stop`

Topics

“Edit the Configuration File” on page 1-6

enable-graceful-shutdown

Gracefully shut down server processes after receiving a terminal interrupt signal or program termination signal

Syntax

```
--enable-graceful-shutdown
```

Description

`enable-graceful-shutdown` gracefully shuts down server processes if they are interrupted by a terminal interrupt signal or terminated by the program termination signal. When you set this property, the server releases any checked out licenses when the system that runs the server shuts down or restarts.

If you set both the disable-control-c and `enable-graceful-shutdown` properties, then the server ignores the terminal interrupt event **Ctrl+C**. The server gracefully shuts down only on receiving the program termination signal or when the system shuts down or restarts.

Examples

Enable graceful server shutdown.

```
--enable-graceful-shutdown
```

See Also

disable-control-c | `mps-stop`

Topics

“Edit the Configuration File” on page 1-6

Introduced in R2020a

endpoint-root

Folder used to store server named endpoints

Syntax

`--endpoint-root` *`path`*

Description

`--endpoint-root` *`path`* specifies the location for storing server named endpoints. Each interface used to communicate with the outside world generates an endpoint file in this folder. Normally that means:

- http - The HTTP function execution interface.
- control - The local control interface used by the scripting commands.

These files contain the `host:post` portion of the URL used to communicate with the named service.

Note While modifying this location is allowed, each instance must have a unique endpoint directory; otherwise behavior is undefined.

Parameters

`path`

Path to the folder used to store endpoint files relative to the server instance's root folder.

Examples

Store endpoint files in the `endpt` folder.

```
--endpoint-root ./endpt
```

extract-root

Root folder used to store contents of deployed archives

Syntax

`--extract-root` *`path`*

Description

`--extract-root` *`path`* specifies the root folder used to store the expanded contents of the deployable archives deployed on the server instance. Deployable archives are unpacked to a hidden subdirectory of `extract-root`.

Parameters

`path`

Path to the root folder used to store contents of deployable archives relative to the server instance's root folder.

Examples

Extract deployable archives into the `archives` folder.

```
--extract-root ./archives
```

hide-matlab-error-stack

Hide the MATLAB stack from the clients

Syntax

```
--hide-matlab-error-stack
```

Description

`hide-matlab-error-stack` controls whether the MATLAB stack is exposed to the client. The stack can be sent to the client during development and debug phase, but can be turned off in production.

Examples

Do not transmit the error stack to clients.

```
--hide-matlab-error-stack
```

http

URL for insecure connections

Syntax

`--http` *`host`*`:`*`port`*

Description

`http` specifies the interface port and optional address or host name.

Parameters

`host`

Host name or IP address of the machine running the server instance. If you do not specify the host, the server binds to any available interface.

`port`

Port number used by the server instance to accept connections. Bind to any available port by specifying `0`.

Examples

Restrict access to the HTTP interface for local clients only on port 9910.

```
--http localhost:9910
```

Bind to any free port. The bound address is written to `$INSTANCE/endpoint/https`.

```
--http 0
```

Bind to a specific IP address and port.

```
--http 234.27.101.3:9920
```

Bind to a specific host name on any free port

```
--http my.hostname.com:0
```

http-authentication-method

HTTP authentication method name

Syntax

`--http-authentication-method` *`method`*

Description

`--http-authentication-method` *`method`* specifies the HTTP authentication method that the server uses to authenticate the client.

If you do not specify this property, the server does not perform HTTP authentication. You can still authenticate using an HTTPS client certificate. For more information on configuring client authentication, see “Configure Client Authentication” on page 3-4.

Parameters

`method`

Name of HTTP authentication method. `spnego` (Simple and Protected Negotiation Mechanism) is the only supported method.

Examples

Specify `spnego` as the HTTP authentication method.

```
--http-authentication-method spnego
```

See Also

client-credential-delegation

Topics

“Use Kerberos and Kerberos Delegation” on page 3-13

Introduced in R2019b

http-linger-threshold

Amount of data the server instance discards after an HTTP error and before the server instance closes the TCP connection

Syntax

```
--http-linger-threshold size
```

Description

`http-linger-threshold` sets the amount of data a server instance reads after an error. If an HTTP request is rejected and the server instance sends back an HTTP error response such as HTTP 404/413, the server instance does not close the TCP connection immediately. Instead it waits for the client to shut down the TCP connection. This ensures that the client receives the HTTP error response sent by the server instance. During this time, the server instance receives, and discards, data from the client, until the amount of data received equals `http-linger-threshold`. After that, the server instance resets the TCP connection.

By default, the threshold is unlimited and the server instance waits to receive the whole HTTP request.

Parameters

size

Amount of data received before the TCP connection is reset.

Examples

Set the linger threshold to be 64 MB.

```
--http-linger-threshold 64MB
```

Set the linger threshold to be 32 KB.

```
--http-linger-threshold 32KB
```

Set the linger threshold to be 1024 B.

```
--http-linger-threshold 1024
```

https

URL for secure connections

Syntax

```
--https host:port
```

Description

`https` specifies the interface port and the optional address or host name to use for secure client-server communication.

Starting in R2019b, if you set the `https` property, you must set the x509-private-key and x509-cert-chain properties; otherwise, the server fails to start.

Parameters

`host`

Host name or IP address of the machine running the server instance. If you do not specify the host, the server binds to any available interface.

`port`

Port number used by the server instance to accept connections. Bind to any available port by specifying `0`.

Examples

Restrict access to the HTTPS interface for local clients only on port 9920.

```
--https localhost:9920
```

Bind to any free port. The bound address is written to `$INSTANCE/endpoint/https`.

```
--https 0
```

Bind to a specific IP address and port.

```
--https 234.27.101.3:9920
```

Bind to a specific host name on any free port.

```
--https my.hostname.com:0
```

See Also

x509-cert-chain | x509-private-key

Topics

“Enable HTTPS” on page 3-2

license

Locations for valid licenses

Syntax

```
--license pathList
```

Description

`license` specifies the address of the license servers or the path to the license files that a server instance uses. You can specify multiple license sources with this option.

If this option is not specified, the server searches for the license files in *`$MPS_INSTALL`*`/licenses`, where *`$MPS_INSTALL`* is the location in which MATLAB Production Server is installed.

Parameters

`pathList`

Path to one or more license servers or license files. Separate multiple entries by the appropriate path separator for the platform. Use a colon (`:`) as the path separator for Linux and semi-colon (`;`) as the path separator for Windows.

Examples

A Linux server looks for licenses using a license server hosted on port 27000 of `hostA` and in `/opt/license/license.dat`.

```
--license 27000@hostA
--license /opt/license/license.dat
```

The same configuration in one line.

```
--license 27000@hostA:/opt/license/license.dat
```

A Windows server looks for licenses using a license server hosted on port 27000 of `hostA` and in `c:\license\license.dat`.

```
--license 27000@hostA
--license c:\license\license.dat
```

The same configuration in one line.

```
--license 27000@hostA;c:\license\license.dat
```

See Also

license-grace-period | license-poll-interval | mps-license-reset

Topics

“Specify or Verify License Server Options in Server Configuration File” on page 2-2

“Force a License Checkout Using mps-license-reset” on page 2-4

license-grace-period

Maximum length of time the server instance responds to HTTP requests after license server heartbeat has been lost

Syntax

`--license-grace-period` *hr*:*min*:*sec*.*fractSec*

Description

`license-grace-period` specifies the grace period, which starts at the first heartbeat loss event. Once the grace period expires, the server instance rejects any new incoming HTTP requests.

The default grace period is 2 hours 30 minutes. The maximum value is 2 hours 30 minutes. The minimum value is 10 minutes.

Parameters

hr
: Hours in interval.

min
: Minutes in interval.

sec
: Seconds in interval.

fractSec
: Fractional seconds in interval.

Examples

The grace period lasts for 1 hour, 29 minutes, 5 seconds.

```
--license-grace-period 1:29:05
```

The grace period lasts for 10 minutes and 250 ms.

```
--license-grace-period 00:10:00.25
```

license-poll-interval

Interval of time before license server is polled to verify and check out a valid license after the grace period expires

Syntax

`--license-poll-interval` *`hr`*`:`*`min`*`:`*`sec`*`.`*`fractSec`*

Description

`license-poll-interval` specifies interval at which the server instance polls the license server after the license server has timed out or after the grace period has expired.

The default poll interval is 10 minutes. The minimum value is 10 minutes.

Parameters

`hr`

Hours in interval.

`min`

Minutes in interval.

`sec`

Seconds in interval.

`fractSec`

Fractional seconds in interval.

Examples

Poll for licenses at intervals of 1 hour, 29 minutes, 5 seconds.

```
--license-poll-interval 1:29:05
```

Poll for licenses at intervals of 10 minutes and 250 ms.

```
--license-poll-interval 00:10:00.25
```

log-archive-max-size

Maximum size of the log archive folder

Syntax

`--log-archive-max-size` *size*

Description

`log-archive-max-size` specifies the maximum size to which the log archive folder can grow before old log files are deleted.

If this property is not specified, then the log archive grows without limit.

Parameters

size

Size, in bytes, of the archive folder.

Examples

Reap log archives when they reach 5 MB.

```
--log-archive-max-size 5MB
```

log-archive-root

Path to the folder containing archived log files

Syntax

`--log-archive-root` *`path`*

Description

`--log-archive-root` *`path`* specifies the path to directory that stores rotated log files.

Note If you omit this property, rotated logs remain in the log root directory, which grows unbounded as logs are rotated.

Parameters

`path`

Path to the folder where log files are archived relative to the server instance's root folder.

Examples

Archive logs to *`server_root`*`/old_logs`.

```
--log-archive-root ./old_logs
```

log-handler

Add custom log handler

Syntax

`--log-handler` *`format command`*

Description

`--log-handler` *`format command`* adds a log handler that writes log data to the application specified by *`command`* in the format specified by *`format`*.

The server instance launches an instance of the log handler at startup. All log events are sent to the `STDIN` stream of the log handler. The `STDOUT` and `STDERR` streams of the log handler are captured and written to *`INSTANCE_ROOT`*`/log/custom_logger_`*`N`*`.out` and *`INSTANCE_ROOT`*`/log/custom_logger_`*`N`*`.err`.

Parameters

`format`

Format used to write log events. Valid values are:

- `text/plain`
- `text/json`
- `text/xml`

`command`

Application launched to process log events.

Examples

Send log events to a custom JSON parser that prepares performance graphs.

```
--log-handler text/json perf_grapher
```

log-root

Path to the folder containing log files

Syntax

`--log-root` *`path`*

Description

`--log-root` *`path`* specifies the location of the folder where a server instance writes log files. This property is available only for an on-premises server installation.

The server creates the following log files when it starts.

- `main.log` — Most recent log file.
- `main.out` — Captures standard output from the main process.
- `main.err` — Captures standard error output from the main process.
- `main__`*`DATE`*`__`*`SERIAL`*`.log` — Main process log. When a server instance restarts or the size of `main.log` reaches the limit set by the log-rotation-size property, the server renames `main.log` to `main__`*`DATE`*`__`*`SERIAL`*`.log` and archives it in the folder set by the log-archive-root property. The default archive location is the `old_logs` folder of a server instance.

Note Omitting this property disables all logging.

Parameters

`path`

Path to the folder containing log files for a server instance.

Examples

Store server logs in the `log` folder of a server instance. This is the default location.

```
--log-root ./log
```

See Also

log-archive-root | log-rotation-size | log-severity | main-log-format

Topics

“Manage Log Files” on page 4-7
“Server Diagnostic Tools” on page 4-6

log-rotation-size

Size at which the log is archived

Syntax

`--log-rotation-size` *size*

Description

`log-rotation-size` specifies the maximum size to which the log can grow before it is rotated into the archive area. If specified as less than 1 MB, a warning is issued and the effective size is increased to 1 MB.

No entry signifies that logs are never archived.

Parameters

size

Size, in bytes, of the log file.

Examples

Rotate logs when they reach 5 MB.

```
--log-rotation-size 5MB
```

log-severity

Severity at which messages are logged

Syntax

`--log-severity` *`level`*

Description

`log-severity` specifies the level of detail at which to add information to the main log.

Parameters

`level`

Severity threshold at which messages are logged. Valid values are:

- `error` — Notification of problems or unexpected results.
- `warning` — Events that could lead to problems if not addressed.
- `information` — High-level information about major server events.
- `trace` — Detailed information about the internal state of the server.

The levels are cumulative; specifying `information` implies `warning` and `error`.

Examples

Enable all log messages.

```
--log-severity trace
```

main-log-format

Text format for the main log file

Syntax

```
--main-log-format format
```

Description

`main-log-format` specifies the text format for logging events in the `main.log` file. If you do not set this property, the server writes the log data as plain text.

Parameters

`format`

Format for writing log events. Valid values are:

- `text/plain` — Log the data in plain text.
- `text/json` — Log the data in JSON format.
- `text/xml` — Log the data in XML format.

Examples

Log events in JSON format.

```
--main-log-format text/json
```

See Also

log-handler | log-root

Topics

“Log Files” on page 4-6
“Manage Log Files” on page 4-7

Introduced in R2020a

mcr-root

Location of a MATLAB Runtime installation

Syntax

`--mcr-root` *`path`*

Description

`mcr-root` specifies the path to a MATLAB Runtime installation on a system that has a MATLAB Production Server installed.

You can configure a server instance to use multiple MATLAB Runtime versions by specifying multiple `mcr-root` properties. To do so, specify the `mcr-root` property with the path to each MATLAB Runtime installation on a separate line, starting from the latest version to the oldest. The server instance scans the list of specified `mcr-root` properties in order from first to last, then chooses the first MATLAB Runtime installation capable of processing a server request. A MATLAB Runtime installation can process a server request if it is compatible with the deployable archive containing the MATLAB function being evaluated. When you configure the server to use multiple MATLAB Runtime versions, the server uses dynamic worker pool management, where it starts the worker processes in response to demand, and stops them in response to system resource utilization. Specifying multiple MATLAB Runtime installations of the same version has no effect on server performance.

Note An installation of MATLAB Production Server supports MATLAB Runtime versions up to six releases back.

Note

- Specify the path to a MATLAB Runtime installation on a local file system when configuring a server instance. Specifying a path on network partition might cause worker processes to fail.
- All values for `mcr-root` must be for the same operating system and hardware combination.

For a server environment deployed in the Cloud, the deployment sets the `mcr-root` property to support multiple MATLAB Runtime versions.

Parameters

`path`

Path to the root folder of the MATLAB Runtime installation.

Note The special value `mCRuNsETtOKEN` indicates to the `mps-start` command that a server is not configured to use a MATLAB Runtime. Running the `mps-start` command without configuring MATLAB Runtime results in an error.

Examples

Use the v98 version of the MATLAB Runtime.

```
--mcr-root /usr/local/MCR/v98
```

Use the v98 and v97 versions of the MATLAB Runtime.

```
--mcr-root /usr/local/MCR/v98
--mcr-root /usr/local/MCR/v97
```

See Also

Topics

“Specify the MATLAB Runtime for a Server Instance” on page 1-9
“Support Multiple MATLAB Runtime Versions” on page 1-11
“Supported MATLAB Runtime Versions”

num-threads

Number of request-processing threads within the server instance

Syntax

```
--num-threads count
```

Description

`num-threads` sets the size of the thread pool available to process requests. Server instances do not allocate a unique thread to each client connection. Rather, when data is available on a connection, the required processing is scheduled on the pool of threads in the server main process.

The threads in this pool do not directly evaluate MATLAB functions. There is a single thread within each worker process that executes MATLAB code on behalf of the client.

Set this parameter to 1, and increase it only if the expected load consists of a high volume of short-running requests. This strategy ensures that the available processor resources are balanced between MATLAB function evaluation and processing client-server requests. There is usually no benefit to increasing this parameter to more than the number of available cores.

Parameters

`count`

Number of threads available in the thread pool.

This value must be one or greater.

Examples

Create a pool of 10 threads for processing requests.

```
--num-threads 10
```

See Also

`request-size-limit`

num-workers

Maximum number of workers allowed to process work simultaneously

Syntax

```
--num-workers count
```

Description

`num-workers` defines the number of concurrent MATLAB execution requests that a server instance can simultaneously process. It should correspond to the number of hardware threads available on the local host.

If you specify a single value for the mcr-root property, the `num-workers` property determines the fixed size of the worker pool.

If you specify more than one value for the `mcr-root` property, `num-workers` specifies a maximum limit on the size of each subpool specific to a MATLAB Runtime version. There can be more than specified number of worker processes at a time, but at a maximum only the specified number of workers are allowed to process a request.

Parameters

`count`

Number of workers available to evaluate functions.

This value must be one or greater.

The maximum value is determined by the number of license keys available for MATLAB Production Server.

Examples

Allow 10 workers to process requests at a time.

```
--num-workers 10
```

See Also

mcr-root

Topics

“Support Multiple MATLAB Runtime Versions” on page 1-11

pid-root

Folder used to store PID files

Syntax

`--pid-root` *`path`*

Description

`--pid-root` *`path`* specifies the folder used to store PID files. PID files record the system-specific process identifiers for all processes associated with the server instance. This includes:

- `main.pid` — The process identifiers of the server's head process.
- `worker_`*`N`*`.pid` — The process identifiers of each worker process *`N`*.

In some circumstances, `worker_2.pid` may be present when `worker_1.pid` is not. This is a strong indication that `worker_1` crashed and was restarted automatically. You can confirm this by checking the main log file.

The format of these files is a single decimal integer, the process identifier.

Parameters

`path`

Path to the folder used to store PID files relative to the server instance's root folder.

Examples

Store PID files in the `pid` folder.

```
--pid-root ./pid
```

profile

Log server profile information

Syntax

```
--profile state object
```

Description

`profile` logs server profile information in the main log for an *`object`* when the *`state`* is `on`. The default *`state`* is `off`, where the server does not log any profile information. You can log profile information for multiple objects by specifying multiple profile properties.

To set up profiling options when you configure a server, specify the `profile` property. If you update the `profile` property for a server that is already running, you must restart the server for the update to take effect. To set or update the profiling options for an already running server without having to restart the server, use the `mps-profile` command. Running `mps-profile` overrides any profiling options set using the `profile` property.

Note Activating profiling has a negative impact on performance.

Parameters

`state`

Flag to control whether the server writes profile information to the main log. Valid states are:

- `on` — Log profile information.
- `off` — Do not log profile information.

`object`

Information to log. Valid objects are:

- `server` — Information about requests that the server receives and worker pool
- `server.request` — Information about server requests, which includes information about the requested archives and clients that make the requests
- `server.request.archive` — Information about archives in the request
- `server.request.client` — Information about clients that make the request
- `server.worker` and `server.worker.pool` — Information about the worker pool

The objects are hierarchical. For example, specifying `server.request` implies specifying `server.request.archive` and `server.request.client`.

If you do not specify an object, the server logs information for all the objects.

Examples

Log profile information for all the objects.

```
--profile on
```

Log profile information for all server requests only.

```
--profile on server.request
```

Log profile information for the clients in a request and workers.

```
--profile on server.request.client
--profile on server.worker
```

The following is an excerpt of the main log that contains profiling information for all objects.

```
93 [2020.03.19 13:05:56.554236] [profile] [client:[::1]:62736] [component:mymagic] [connection_id
[function:magic] [mode:sync] [request_id:0:1:1][service:http-connection] [type:request_arrive]
Request arrived and was placed in the queue.
94 [2020.03.19 13:05:56.554236] [profile]
Request to allocate next available worker
95 [2020.03.19 13:05:56.555240] [profile]
Lease created for worker-1
96 [2020.03.19 13:05:56.555240] [profile] [client:[::1]:62736] [request_id:0:1:1] [type:request_s
Request started executing on worker 1
...
99 [2020.03.19 13:05:56.558233] [profile] [client:[::1]:62736] [request_id:0:1:1] [type:request_t
Request completed with HTTP status 200
100 [2020.03.19 13:05:56.558233] [profile]
Lease terminated for worker-1
101 [2020.03.19 13:05:56.558233] [profile]
worker-1 PASSED health check; returning to the pool
```

Compatibility Considerations

`requests` and `worker_pool` objects will be removed
Not recommended starting in R2020b

The objects `requests` and `worker_pool` will be removed in a future release. Use `server.request` instead of `requests` and `server.worker.pool` instead of `worker_pool` when specifying this property.

See Also

`mps-profile`

Topics

“Edit the Configuration File” on page 1-6
“Log Files” on page 4-6
“View Logs” on page 9-32

request-size-limit

Set the maximum size of a request

Syntax

```
--request-size-limit  size
```

Description

`request-size-limit` specifies the maximum size of a request specified by *`size`*. The default request size is 64MB.

Parameters

`size`

Size, in bytes, of the request.

Examples

Set the request size to 128MB.

```
--request-size-limit 128MB
```

See Also

`num-threads`

ssl-allowed-client

MATLAB programs a client can access

Syntax

`--ssl-allowed-client` *`client1`*`,...,`*`clientN`*`:`*`archive1`*`,...,`*`archiveN`*

Description

`ssl-allowed-client` authorizes clients based on the client certificate common name. Only authorized clients can request the evaluation of MATLAB functions.

If there are no archive names following the common name, the client can access all of the deployed archives. Otherwise, the client can access only the specified archives.

Parameters

`client`

Common name of the client.

`archive`

Name of an archive the clients can access.

Examples

Allow `client1` and `client2` to access `magic.ctf` and `helloworld.ctf`. Allow `client3` access to all deployed archives.

```
--ssl-allowed-client client1,client2:magic,helloworld
--ssl-allowed-client client3
```

ssl-ciphers

List of cipher suites used for encryption

Syntax

`--ssl-ciphers` *`ciphers`*

Description

`ssl-ciphers` provides a list of cipher suites that the server uses for encryption.

Parameters

`ciphers`

Cipher suites the server instance uses for encryption. Valid values are:

- `ALL` — Use all available cipher suites except eNULL.
- `HIGH` — Use all available high encryption cipher suites.
- *`list`* — Comma-separated list of cipher suites to use.

All OpenSSL configuration strings can be passed with the ciphers. This provides finer control over the selected cipher.

Examples

Use only high encryption cipher suites.

```
--ssl-ciphers HIGH
```

Disable the use of ADH ciphers.

```
--ssl-ciphers ALL:!ADH
```

Use the strongest available ECDHE ciphers.

```
--ssl-ciphers ALL:@STRENGTH
```

Disable the use of ADH ciphers and use the strongest available ECDHE ciphers.

```
--ssl-ciphers ALL:!ADH@STRENGTH
```

See Also

https | ssl-protocols

Topics

“Enable HTTPS” on page 3-2
“Adjust Security Protocols” on page 3-6

ssl-protocols

List of allowed SSL protocols

Syntax

`--ssl-protocols` *`protocols`*

Description

`ssl-protocols` lists the allowed SSL protocols. If you do not set this property, the server allows the use of all supported SSL protocols. Supported protocols are TLSv1, TLSv1.1, and TLSv1.2. The default server behavior is to attempt to use TLSv1.2.

Starting in R2019b, SSLv3 is no longer supported.

Parameters

`protocols`

Comma-separated list of allowed protocols. Valid entries are:

- `TLSv1`
- `TLSv1.1`
- `TLSv1.2`

Examples

Allow only TLSv1.

```
--ssl-protocols TLSv1
```

See Also

https | ssl-ciphers

Topics

“Enable HTTPS” on page 3-2
“Adjust Security Protocols” on page 3-6

ssl-tmp-ec-param

Elliptic curve used for the ECDHE ciphers

Syntax

`--ssl-tmp-ec-param` *`elliptic_curve_name`*

Description

`--ssl-tmp-ec-param` *`elliptic_curve_name`* specifies the name of the elliptic curve used for the ECDHE ciphers.

Starting in R2019b, ECDHE ciphers are enabled by default. If you do not specify the elliptic curve name, ECDHE ciphers use a default elliptic curve. The default elliptic curves are in the following order: x25519, secp256r1, x448, secp521r1, secp384r1. During the SSL/TLS handshake, the client advertises the curves that it supports. Based on this client-server negotiation, one of the default curves is used to establish a secure connection for the subsequent data exchange.

For earlier releases, if this property is not specified, all ECDHE ciphers are disabled.

Parameters

`elliptic_curve_name`

Name of curve. All curves supported by OpenSSL are supported.

Examples

Use the prime256v1 curve.

```
--ssl-tmp-ec-param prime256v1
```

ssl-tmp-dh-param

File containing a pregenerated ephemeral DH key

Syntax

`--ssl-tmp-dh-param` *`path`*

Description

`ssl-tmp-dh-param` specifies the path to the pre-generated ephemeral DH key. If this parameter is not provided, the server instance automatically generates the DH key at start-up. Providing a pre-generated DH key can decrease instance start time.

Parameters

`path`

Path to the pre-generated DH key. Relative and absolute paths are valid.

Examples

The instance loads the DH key from `dh_param.pem` which is located at *`instance_root`*`/x509`.

```
--ssl-tmp-dh-param ./x509/dh_param.pem
```

ssl-verify-peer-mode

Level of client verification required by the server instance

Syntax

```
--ssl-verify-peer-mode mode
```

Description

`ssl-verify-peer-mode` specifies whether the server requires clients to present a valid certificate to connect to it. Server instances allow clients to connect to it with or without providing a valid certificate. All requests will still require authorization.

If you set `ssl-verify-peer-mode` to `verify-peer-require-peer-cert`, you must set either the x509-ca-file-store or x509-use-system-store property.

Parameters

mode

Mode used to authenticate clients. Valid values are:

- `no-verify-peer` — No peer certificate verification. The client side does not need to provide a certificate.
- `verify-peer-require-peer-cert` — The client must provide a certificate and the certificate will be verified.

The default is `no-verify-peer`.

Examples

Require clients to provide a certificate.

```
--ssl-verify-peer-mode verify-peer-require-peer-cert
```

See Also

https | x509-ca-file-store | x509-use-crl | x509-use-system-store

Topics

“Configure Client Authentication” on page 3-4

use-single-comp-thread

Start MATLAB Runtime with a single computational thread

Syntax

```
--use-single-comp-thread
```

Description

`--use-single-comp-thread` specifies that workers start the MATLAB Runtime with a single computational thread.

Examples

Start the MATLAB Runtime with a single computational thread.

```
--use-single-comp-thread
```

worker-memory-check-interval

Interval at which workers are polled for memory usage

Syntax

```
--worker-memory-check-interval hr:min:sec.fractSec
```

Description

`worker-memory-check-interval` specifies how often to poll the memory usage of a worker process. This setting affects the behavior of all other settings that act based on worker memory usage such as `worker-memory-trigger`, `worker-memory-target`, and `worker-restart-memory-limit`.

Parameters

hr

Hours in interval.

min

Minutes in interval.

sec

Seconds in interval.

fractSec

Fractional seconds in interval.

Examples

Check memory usage every one and a half minutes.

```
--worker-memory-check-interval 0:01:30
```

See Also

`worker-restart-memory-limit` | `worker-restart-memory-limit-interval`

Topics

“Control Worker Restarts” on page 1-13

worker-restart-interval

Time interval at which a server instance stops and restarts its workers

Syntax

```
--worker-restart-interval hr:min:sec.fractSec
```

Description

`worker-restart-interval` specifies the interval at which the server instance stops and restarts its worker processes. If this setting is not given, the workers are not restarted in response to time.

Parameters

`hr`

Hours in interval.

`min`

Minutes in interval.

`sec`

Seconds in interval.

`fractSec`

Fractional seconds in interval.

Examples

Restart workers at intervals of 1 hour, 29 minutes, 5 seconds.

```
--worker-restart-interval 1:29:05
```

Restart workers at intervals of 10 minutes and 250 ms.

```
--worker-restart-interval 00:10:00.25
```

See Also

Topics

“Control Worker Restarts” on page 1-13

worker-restart-memory-limit

Size threshold at which to consider restarting a worker

Syntax

```
--worker-restart-memory-limit size
```

Description

`worker-restart-memory-limit` sets the memory usage limit of a worker process. If a worker's working set size exceeds `worker-restart-memory-limit` for an interval of time greater than `worker-restart-memory-limit-interval`, then that worker is restarted.

Parameters

size

Amount of memory used by worker.

Examples

Restart any worker whose working set size exceeds 1 GB for more than 1 hour.

```
--worker-restart-memory-limit 1GB
--worker-restart-memory-limit-interval 1:00:00
```

See Also

`worker-memory-check-interval` | `worker-restart-memory-limit-interval`

Topics

“Control Worker Restarts” on page 1-13

worker-restart-memory-limit-interval

Interval for which a worker can exceed its memory limit before restart

Syntax

```
--worker-restart-memory-limit-interval hr:min:sec.fractSec
```

Description

`worker-restart-memory-limit-interval` sets the interval for which a worker process can exceed its memory limit before restart. If a worker's working set size exceeds `worker-restart-memory-limit` for an interval of time greater than `worker-restart-memory-limit-interval`, then that worker is restarted.

Parameters

hr

Hours in interval.

min

Minutes in interval.

sec

Seconds in interval.

fractSec

Fractional seconds in interval.

Examples

Restart any worker whose working set size exceeds 1 GB for more than 1 hour.

```
--worker-restart-memory-limit 1GB
--worker-restart-memory-limit-interval 1:00:00
```

See Also

`worker-memory-check-interval` | `worker-restart-memory-limit`

Topics

“Control Worker Restarts” on page 1-13

x509-ca-file-store

File containing the server certificate authority file

Syntax

`--x509-ca-file-store` *`path`*

Description

`x509-ca-file-store` specifies the certificate authority (CA) file to verify peer certificates. This file contains trusted certificates and certificate revocation lists.

You can also put intermediate certificates into the CA file. An intermediate certificate in the CA file becomes a trusted certificate.

Parameters

`path`

Path to the certificate CA file store. Relative and absolute paths are valid.

Examples

The instance loads the CA store from `ca_file.pem` which is located at *`instance_root`*`/x509`.

```
--x509-ca-file-store ./x509/ca_file.pem
```

See Also

https | ssl-verify-peer-mode | x509-use-crl | x509-use-system-store

Topics

“Configure Client Authentication” on page 3-4

x509-cert-chain

File containing the server certificate chain

Syntax

`--x509-cert-chain` *`path`*

Description

`x509-cert-chain` specifies the server certificate chain file. It contains one or more PEM-format certificates. The chain begins with the server certificate. The server certificate is followed by a chain of untrusted certificates. To use the certificate chain file, specify the x509-private-key.

Starting in R2019b, if https is enabled on the server, you must set the `x509-cert-chain` and `x509-cert-chain` properties; otherwise, the server fails to start.

Note Do not specify trusted certificates in the certificate chain file.

Parameters

`path`

Path to the certificate chain file. Relative and absolute paths are valid.

Examples

The instance loads the certificate chain from `cert_chain.pem` which is located at *`instance_root`*`/x509`.

```
--x509-cert-chain ./x509/cert_chain.pem
```

See Also

https | x509-private-key

Topics

“Enable HTTPS” on page 3-2

x509-passphrase

File containing the passphrase that decodes the private key

Syntax

`--x509-passphrase` *`path`*

Description

`x509-passphrase` specifies the path to the file containing the passphrase of the encrypted private-key. This is required if `x509-private-key` is specified and the private key file is encrypted. Otherwise, the private key fails to load.

Note This file must be owner read-only.

Parameters

`path`

Path to the passphrase file. Relative and absolute paths are valid.

Examples

The instance loads the passphrase from `key_passphrase.pem` which is located at *`instance_root`*`/x509`.

```
--x509-passphrase ./x509/key_passphrase.pem
```

x509-private-key

File containing the private key in PEM format

Syntax

```
--x509-private-key path
```

Description

`x509-private-key` specifies the path to the private key. The key must be in PEM format.

If you do not set this property, the server instance does not load the private key or the server-side certificates.

Starting in R2019b, if https is enabled on the server, you must set the `x509-private-key` and `x509-cert-chain` properties; otherwise, the server fails to start.

Parameters

`path`

Path to the PEM-format private key file. Relative and absolute paths are valid.

Examples

The instance loads the private key from `private_key.pem`, which is located at *`instance_root`*`/x509`.

```
--x509-private-key ./x509/private_key.pem
```

See Also

https | x509-cert-chain

Topics

“Enable HTTPS” on page 3-2

x509-use-crl

Use the certificate revocation list

Syntax

```
--x509-use-crl
```

Description

`x509-use-crl` specifies that the server instance uses the certificate revocation list (CRL). By default, instances do not use any CRLs. In this case, the CRLs in the certificate authority store are ignored.

If `x509-use-crl` is added, the CRLs are loaded and participate in the client certificate verification. If the CRL has expired, the SSL handshake is rejected.

Examples

The instance uses certificate revocation list when authenticating clients.

```
--x509-use-crl
```

See Also

https | ssl-verify-peer-mode | x509-ca-file-store | x509-use-system-store

Topics

“Configure Client Authentication” on page 3-4

x509-use-system-store

Use the certificate authority store provided by the system

Syntax

```
--x509-use-system-store
```

Description

`x509-use-system-store` specifies that the server instance uses the system provided certificate authority (CA) store. By default, the server uses the file `/etc/ssl/certs/ca-certificates.crt` as trusted CA store and searches for trusted certificates under the folder `/etc/ssl/certs`. You can override these locations by setting the environment variables `SSL_CERT_FILE` and `SSL_CERT_DIR`.

Examples

The instance uses the system CA store.

```
--x509-use-system-store
```

See Also

https | ssl-verify-peer-mode | x509-ca-file-store | x509-use-crl

Topics

“Configure Client Authentication” on page 3-4

request-timeout

Duration after which the request times out and gets deleted after reaching a terminal state

Syntax

```
--request-timeout hr:min:sec.fractSec
```

Description

`request-timeout` specifies the duration after which the request times out upon reaching a terminal state. At this point, the request gets deleted unless a client process has already deleted the request.

Parameters

hr
: Hours in interval.

min
: Minutes in interval.

sec
: Seconds in interval.

fractSec
: Fractional seconds in interval.

Examples

Set the request to time-out after 2 hours.

```
--request-timeout 2:00:00
```

See Also

`server-memory-threshold`

Introduced in R2016b

server-memory-threshold

Size threshold of server process at which action needs to be taken to manage responses

Syntax

```
--server-memory-threshold SIZE
```

Description

`server-memory-threshold` sets the memory size limit of a server process. If a server process's size exceeds `SIZE` set by `server-memory-threshold`, then responses need to be either archived or purged by setting `server-memory-threshold-overflow-action` to `archive_responses` or `purge_responses` respectively. If `server-memory-threshold` is not set, then the responses will be bound to the server process causing the memory footprint of the server process to keep increasing. As a best practice, it is recommended that a client process delete a request after usage in order to prevent the memory of the server process from growing.

Parameters

size

Threshold size of the server process.

Examples

Archive responses if the size of the server process in memory exceeds 500 MB.

```
--server-memory-threshold 500MB
--server-memory-threshold-overflow-action archive_responses
```

Purge responses if the size of the server process in memory exceeds 2 GB.

```
--server-memory-threshold 2GB
--server-memory-threshold-overflow-action purge_responses
```

See Also

`server-memory-threshold-overflow-action`

server-memory-threshold-overflow-action

Action taken when the memory size threshold of server process is breached

Syntax

```
--server-memory-threshold-overflow-action ACTION
```

Description

`server-memory-threshold-overflow-action` acts by either archiving responses or purging them when the size of the server process in memory set by `server-memory-threshold` is breached.

Parameters

ACTION

`archive_responses`

`purge_responses`

Examples

Archive responses if the size of the server process in memory exceeds 500 MB.

```
--server-memory-threshold 500MB
--server-memory-threshold-overflow-action archive_responses
```

Purge responses if the size of the server process in memory exceeds 2 GB.

```
--server-memory-threshold 2GB
--server-memory-threshold-overflow-action purge_responses
```

See Also

`server-memory-threshold`

server-termination-grace-period

Duration after which all server instance processes are forcibly terminated

Syntax

```
--server-termination-grace-period hr:min:sec.fractSec
```

Description

`server-termination-grace-period` *`hr`*:*`min`*:*`sec`*.*`fractSec`* specifies the time interval after which all running server and worker processes are forcibly terminated on receipt of the `mps-stop` command, if they have not already stopped within *`hr`*:*`min`*:*`sec`*.*`fractSec`*.

If you specify the `--timeout` option when running the `mps-stop` command and have also set the `server-termination-grace-period` *`hr`*:*`min`*:*`sec`* property, server instance processes are forcibly terminated at *`hr`*:*`min`*:*`sec`*.

If you specify the both the `-k` and `--timeout` options when running the `mps-stop` command and have also set the `server-termination-grace-period` *`hr`*:*`min`*:*`sec`* property, server instance processes are forcibly terminated within the duration specified by the `--timeout` value.

Parameters

`hr`

Hours.

`min`

Minutes.

`sec`

Seconds.

`fractSec`

Fractional seconds.

Examples

Forcibly terminate server instance processes after 1 hour, 29 minutes, and 5 seconds.

```
--server-termination-grace-period 1:29:05
```

Forcibly terminate server instance processes after 10 minutes and 250 ms.

```
--server-termination-grace-period 00:10:00.25
```

See Also

`mps-stop`

Introduced in R2020a

response-archive-root

Path to the location where responses are archived

Syntax

```
--response-archive-root PATH
```

Description

`response-archive-root` shows the location where responses specified by *PATH* are archived. This option must be set if the server-memory-threshold-overflow-action option is set to `archive_responses`. The server process must have read & write permissions to the *PATH*.

Parameters

PATH

Location specified as a string.

Examples

Set the archive root.

```
--response-archive-root ./.response_archive
```

See Also

`response-archive-limit`

response-archive-limit

Maximum disk space available to the server process for archiving

Syntax

```
--response-archive-limit SIZE
```

Description

`response-archive-limit` specifies the maximum disk space available to the server process for archiving. If the limit set by *`SIZE`* is reached, the archives will be deleted in a 'First-In First-Out' order until the space for the server process fall below *`SIZE`*. If this limit is not specified, the server process will assume there is no limit to disk usage for archiving.

Parameters

`size`

Size of the server process.

Examples

Set the size of the archive to be 5GB

```
--response-archive-limit 5GB
```

See Also

`response-archive-root`

Introduced in R2016b

user-data

Associate MATLAB data value with string key

Syntax

`--user-data` *`KEY VALUE`*

Description

`user-data` associates MATLAB data value with key string. *`KEY`* and *`VALUE`* are strings. Use the double quotes (") character around strings with spaces. The backslash (\) character is the escape character and is used to insert double quotes or backslash characters: `\"` `\\`. The application can retrieve the data value by using `getmcruserdata(key)`.

Parameters

`KEY VALUE`

MATLAB *`value`* to be associated with *`key`*.

Examples

Set user data with parallel profile settings.

```
--user-data ParallelProfile c:\\MPS\\myprofile.settings
```

Use quotes.

```
--user-data MyValue "Quoted string with escaped \"quotes\" and \\backslash."
```

See Also

Introduced in R2016a

Cloud Deployment

Azure Deployment for MATLAB Production Server (BYOL)

To deploy your MATLAB Production Server bring your own license (BYOL) environment on Azure, launch the MATLAB Production Server solution template from the Azure marketplace. After the deployment to Azure is complete, upload your license file using the Network License Manager for MATLAB dashboard, and configure and manage MATLAB Production Server using the MATLAB Production Server dashboard.

For information about deploying MATLAB Production Server on Azure without a license, see “Azure Deployment for MATLAB Production Server (PAYG)” on page 9-9.

Note You must have an Azure account to deploy resources on Azure and configure your server environment.

To use your solution, you need a MATLAB Production Server license. You can upload the MATLAB Production Server license file only after provisioning the cloud resources. For more information on licensing on the cloud, see “Choose an Option to Activate Your License” (Licensing on Cloud Platforms).

You are responsible for the cost of the Azure services and resources that the deployment uses.

Follow these steps to deploy your server environment on Azure.

1. In the Azure marketplace, on the MATLAB Production Server (BYOL) offering page, click **Create**. Doing so launches the solution template where you provide values to configure your server environment.
2. “Provision Cloud Resources” on page 9-2. Creating resources on Azure can take up to 30 minutes.
3. “Upload License File” on page 9-7.
4. “Connect and Log In to Dashboard” on page 9-8.

The deployment uses a self-signed SSL certificate for the Application Gateway. Changing the self-signed certificate is recommended. For information on changing the self-signed certificates, see “Change Self-Signed Certificate to Application Gateway” on page 9-31.

To run an application on MATLAB Production Server, you need to create the application using MATLAB Compiler SDK. For more information, see “Create a Deployable Archive for MATLAB Production Server”.

Provision Cloud Resources

You must have an Azure subscription before you can start deploying cloud resources for MATLAB Production Server on Azure. Launch the MATLAB Production Server solution template to configure and deploy cloud resources. The deployment process goes through the following steps. Click **OK** at the end of each step to proceed to the next step.

Basics

First, you must choose an Azure subscription, specify a resource group to hold the resources you provision, and specify a location to start your resources in.

Parameter Name	Value
Subscription	Choose an Azure subscription to use for purchasing resources.
Resource group	Choose a name for the resource group to hold the resources. Creating a new resource group for each deployment is recommended. Doing so enables you to delete all the resources for each deployment easily.
Location	Choose the location to start resources in. Select a location that supports your requested virtual machine (VM) instance types. For a list of resources that are supported, see Azure Region Services.

Server

Next, you configure the server VM and data persistence. Each MATLAB Production Server instance runs on a VM and each instance runs multiple MATLAB Production Server workers. To deploy a server instance, you must specify parameters for the VM, such as the size, number of VMs, and operating system.

Parameter Name	Value
Server VM Size	Specify the size of the VM to use for the server. It is recommended that you select a VM size where the number of vCPUs on your VM matches the number of MATLAB Production Server workers per VM that you plan on using. For example, if you select a `D8s V3` VM which has 8 vCPUs, use 8 MATLAB Production Server workers. You can change the number of workers by updating the **Number of Workers** in the **Settings** tab in the MATLAB Production Server (BYOL) dashboard. For more information about the property, see num-workers. The template defaults to `Standard_D4s_v3`. This configuration has 4 vCPUs and 16 GB of memory. For more information on Azure VMs, see Azure documentation.

Parameter Name	Value
Number of Server VMs	Specify the number of VMs to run MATLAB Production Server instances. The deployment template sets the default to 2 VMs for load balancing. Because the number of server instances is limited to 24, you can provision a maximum of 24 VMs. For example, if you have a standard 24 worker MATLAB Production Server license and select `Standard_D4s_v3 VM` (4 vCPUs) as the **Server VM Size**, you need 6 VMs to fully utilize the MATLAB Production Server workers in your license. You can always underprovision the number of VMs. If you do so, you can end up using fewer workers than you are licensed for. You can change the number of VMs after the initial deployment. For more information, see “Change the Number of Virtual Machines” on page 9-31.
Server VM Operating System	Choose the server VM operating system. Windows (Windows Server) and Linux (Ubuntu®) are the only available options. In most cases, choosing an operating system depends on your personal preference. Unless you add operating system-specific dependencies or content such as MEX files to your applications, the applications you deploy to the server do not depend on a specific operating system.
Create Azure Cache for Redis	Choose whether you want to create an Azure cache for Redis. Creating this service allows you to use the persistence functionality of the server. Persistence provides a mechanism to cache data between calls to MATLAB code running on a server instance. For more information, see “Use a Data Cache to Persist Data”. You can provision an Azure cache for Redis after the initial deployment. For setup instructions, see Azure documentation.

License Server

The network license manager manages the license files for MATLAB Production Server (BYOL). You can choose to deploy a license server for the Network License Manager for MATLAB or use an

existing license server. For information about the Network License Manager for MATLAB, see Network License Manager for MATLAB on Microsoft Azure.

If you use an existing license server, use the MATLAB Production Server dashboard to enter the port number and IP address of the license server. For more information, see “Upload License File” on page 9-7.

Parameter Name	Value
Create License Server	Specify whether you want to deploy the Network License Manager for MATLAB to upload and mange your license files. The license manager runs on a separate Windows VM. If you want to use an existing network license manager, choose `No`. If you do not have an existing license manager, choose `Yes`.

Dashboard Login

After you deploy the server VMs, you can manage the server using the MATLAB Production Server dashboard, which provides a web-based interface to configure and manage MATLAB Production Server in the cloud. Specify the login credentials for the dashboard.

If you deploy the license manager with this deployment, use these same credentials to log in to the Network License Manager for MATLAB dashboard.

Parameter Name	Value
Admin Username	Specify the administrator user name to log in to the MATLAB Production Server dashboard.
Admin Password	Specify the administrator password to log in to the MATLAB Production Server dashboard.

Network

You can specify which IP addresses can access the dashboard, whether your solution should use a public IP address, and configure a virtual network (VNet).

Parameter Name	Value
Allow Connections from IP address	Specify the range of IP addresses that are permitted to connect to the dashboard that manages the server. Use CIDR notation, which provides the IP address before the slash and mask after the slash, when specifying the IP address range. The mask determines the number of IP addresses to include. For example, 10.0.0.1/24. You can use a CIDR calculator to determine the CIDR notation for a range of IP addresses.

Parameter Name	Value
Make Solution Available over Internet	Make your solution available over the Internet by setting this parameter to `Yes`. This will use public IP addresses. If you set this parameter to `No`, the ARM template does not assign a public IP address for the VM that hosts the dashboard. To access the dashboard, you can use a different VM located in the same virtual network as the VM that hosts the dashboard.
Virtual Network	Create a new VNet or choose an existing one. The template defaults to a creating a new VNet with predefined values. These are the values that Azure defaults to while creating a new VNet. You can use the default values or enter new values based on your network setup. If you are using an existing VNet, you need to open the following ports. • `443` – Required for communicating with the dashboard. • `8000`, `8004`, `8080`, `9090`, and `9910` – Required for communication between the dashboard, MATLAB Production Server workers, and various microservices within the virtual network. These ports do not need to be accessible over the Internet. • `27000` – Required for communication between the network license manager and the MATLAB Production Server workers. • `65200–65535` – Required for the Azure application gateway health check to work. These ports need to be accessible over the Internet. For more information, see MSDN Community. • `22`, `3389` – Required for Remote Desktop functionality. Use remote login functionality for troubleshooting and debugging.

Parameter Name	Value
Subnets	Specify the subnet name and subnet address prefix for a new or existing subnet. The first subnet hosts the dashboard. The second subnet hosts the application gateway. The template defaults to creating new subnets with predefined values. You can use the default values or enter new values based on your network setup.

Upload License File

The network license manager manages the MATLAB Production Server license file. The MATLAB Production Server deployment template provides an option to deploy the Network License Manager for MATLAB or use an existing license manager. For information about the Network License Manager for MATLAB, see Network License Manager for MATLAB on Microsoft Azure.

If you want to use an existing license manager, the VM that hosts the license server must be in the same VNet as the VM that hosts MATLAB Production Server. Use the MATLAB Production Server dashboard to enter the port number and IP address of the license server. Enter the license server details in the **Advanced > License Server** field on the **Settings** tab of the dashboard. If you choose to deploy a new license server, you do not need to enter the license server details in the dashboard. The deployment template prepopulates default values for port number and IP address in the **License Server** field.

You need a fixed MAC address to get a license file from the MathWorks® License Center. If you choose to deploy the license server when deploying MATLAB Production Server, the license server MAC address is available only after you deploy the solution. For more information on configuring your license on the cloud, see “Choose an Option to Activate Your License” (Licensing on Cloud Platforms).

Follow these steps to upload the license file using the Network License Manager for MATLAB dashboard, if you have deployed the license manager during the MATLAB Production Server deployment process.

1. In the Azure Portal, click **Resource groups**. Doing so displays all your resource groups.
2. Select the resource group containing your cluster resources.
3. Select **Deployments** from the left pane. In the pane that opens, click the deployment name that has the text `mathworks-inc.matlabprodserver`.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **networkLicenseManagerURL** and paste it in a browser.
6. Log in using the administrator user name and password that you specified during the deployment process.
7. Follow the instructions in the Network License Manager for MATLAB dashboard to upload your MATLAB Production Server license.

Connect and Log In to Dashboard

The MATLAB Production Server dashboard is a web-based interface to configure and manage server instances in the cloud.

Note The Internet Explorer® web browser is not supported for interacting with the dashboard.

Complete these steps only after you successfully create your resource group. This workflow assumes that your solution uses public IP addresses. If your solution uses private IP addresses, you can connect to the dashboard from a VM located in the same virtual network as the VM that hosts the dashboard.

1. In the Azure Portal, click **Resource groups**. This displays all your resource groups.
2. Select the resource group containing your cluster resources.
3. Select **Deployments** from the left pane. In the pane that opens, click the deployment name that has the text `mathworks-inc.matlabprodserver`.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **dashboardURL** and paste it in a browser.
6. Log in using the administrator user name and password that you specified during the deployment process.

The dashboard uses a self-signed SSL certificate, which you can change. For information on changing the certificate, see “Change Self-Signed Certificate to Application Gateway” on page 9-31.

Configuring role-based access control for the dashboard is recommended. Role-based access control uses Azure AD to let you grant users the privileges to perform tasks on the dashboard and server, based on their role. For more information on how to configure role-based access control, see “Dashboard Access Control” on page 9-67.

See Also

More About

- “Architecture and Resources on Azure” on page 9-40
- “Manage MATLAB Production Server (BYOL)” on page 9-15
- “Manage Azure Resources for MATLAB Production Server (BYOL)” on page 9-31

Azure Deployment for MATLAB Production Server (PAYG)

To deploy your MATLAB Production Server (PAYG) environment on Azure, launch the MATLAB Production Server solution template from the Azure marketplace. After the deployment to Azure is complete, configure and manage MATLAB Production Server by logging in to the MATLAB Production Server (PAYG) dashboard.

For information about deploying MATLAB Production Server on Azure with a license, see “Azure Deployment for MATLAB Production Server (BYOL)” on page 9-2.

Note You must have an Azure account to deploy resources on Azure and configure your server environment.

You are responsible for the cost of the Azure services and resources that the deployment uses.

Follow these steps to deploy your server environment on Azure.

1. In the Azure marketplace, on the MATLAB Production Server (PAYG) offering page, click **Get It Now**. Doing so launches the solution template where you provide values to configure your server environment.
2. “Provision Cloud Resources” on page 9-9. Creating resources on Azure can take up to 30 minutes.
3. “Connect and Log In to Dashboard” on page 9-13.

The deployment uses a self-signed SSL certificate. Changing the self-signed certificate is recommended. For more information on how to change the certificate, see “Change Self-Signed Certificate to Application Gateway” on page 9-34.

To run an application on MATLAB Production Server, you need to create the application using MATLAB Compiler SDK. For more information, see “Create a Deployable Archive for MATLAB Production Server”.

Provision Cloud Resources

You must have an Azure subscription before you can start deploying cloud resources for MATLAB Production Server on Azure. Launch the MATLAB Production Server solution template to configure and deploy cloud resources. The deployment process goes through the following steps. Click **OK** at the end of each step to proceed to the next step.

Basics

First, you must choose an Azure subscription, specify a resource group to hold the resources you provision, and specify a location to start your resources in.

Parameter Name	Value
Subscription	Choose an Azure subscription to use for purchasing resources.

Parameter Name	Value
Resource group	Choose a name for the resource group to hold the resources. Creating a new resource group for each deployment is recommended. Doing so enables you to delete all the resources for each deployment easily.
Location	Choose the location to start resources in. Select a location that supports your requested virtual machine (VM) instance types. For a list of resources that are supported, see Azure Region Services.

Server

Next, you configure the server VM and data persistence. Each MATLAB Production Server instance runs on a VM and each instance runs multiple MATLAB Production Server workers. To deploy a server instance, you must specify parameters for the VM, such as the size, number of VMs, and operating system.

Parameter Name	Value
Server VM Size	Specify the size of the VM to use for the server. It is recommended that you select a VM size where the number of vCPUs on your VM matches the number of MATLAB Production Server workers per VM that you plan on using. For example, if you select a `D8s V3` VM which has 8 vCPUs, use 8 MATLAB Production Server workers. You can change the number of workers by updating the **Number of Workers** in the **Settings** tab in the MATLAB Production Server (PAYG) dashboard. For more information about the property, see num-workers.
Number of Server VMs	Specify the number of VMs to run MATLAB Production Server instances. The deployment template sets the default to 2 VMs for load balancing. You can change the number of VMs after the initial deployment. For more information, see “Change the Number of Virtual Machines” on page 9-34.

Parameter Name	Value
Server VM Operating System	Choose the server VM operating system. Windows (Windows Server) and Linux (Ubuntu) are the only available options. In most cases, choosing an operating system depends on your personal preference. Unless you add operating system-specific dependencies or content such as MEX files to your applications, the applications you deploy to the server do not depend on a specific operating system.
Create Azure Cache for Redis	Choose whether you want to create an Azure cache for Redis. Creating this service allows you to use the persistence functionality of the server. Persistence provides a mechanism to cache data between calls to MATLAB code running on a server instance. For more information, see “Use a Data Cache to Persist Data”. You can provision an Azure cache for Redis after the initial deployment. For setup instructions, see Azure documentation.

Dashboard Login

After you deploy the server VMs, you can manage the server using the MATLAB Production Server dashboard, which provides a web-based interface to configure and manage MATLAB Production Server in the cloud. Specify the login credentials for the dashboard.

Parameter Name	Value
Admin Username	Specify the administrator user name to log in to the MATLAB Production Server dashboard.
Admin Password	Specify the administrator password to log in to the MATLAB Production Server dashboard.

Network

You can specify which IP addresses can access the dashboard, whether your solution should use a public IP address, and configure a virtual network (VNet).

Parameter Name	Value
Allow Connections from IP Address	Specify the IP address or a range of IP addresses that is permitted to connect to the dashboard that manages the server. If you specify a range of IP addresses, use CIDR notation, which provides the IP address before the slash and mask after the slash. The mask determines the number of IP addresses to include. For example, 10.0.0.1/24. You can use a CIDR calculator to determine the CIDR notation for a range of IP addresses.
Make Solution Available over Internet	Make your solution available over the Internet by setting this parameter to `Yes`. This will use public IP addresses. If you set this parameter to `No`, the ARM template does not assign a public IP address for the VM that hosts the dashboard. To access the dashboard, you can use a different VM located in the same virtual network as the VM that hosts the dashboard.

Parameter Name	Value
Virtual Network	Create a new VNet or choose an existing one. The template defaults to a creating a new VNet with predefined values. These are the values that Azure defaults to while creating a new VNet. You can use the default values or enter new values based on your network setup. If you are using an existing VNet, you need to open the following ports. • `443` – Required for communicating with the dashboard and the MATLAB execution endpoint. • `8000`, `8004`, `880`, `9090`, and `9910` – Required for communication between the dashboard, MATLAB Production Server workers, and various microservices within the virtual network. These ports do not need to be accessible over the Internet. • `65200–65535` – Required for the Azure application gateway health check to work. These ports need to be accessible over the Internet. For more information, see MSDN Community. • `22`, `3389` – Required for Remote Desktop functionality for Windows or SSH for Linux respectively. Use remote login functionality for troubleshooting and debugging.
Subnets	Specify the subnet name and subnet address prefix for a new or existing subnet. The first subnet hosts the dashboard. The second subnet hosts the application gateway. The template defaults to creating new subnets with predefined values. You can use the default values or enter new values based on your network setup.

Connect and Log In to Dashboard

The MATLAB Production Server dashboard is a web-based interface to configure and manage MATLAB Production Server in the cloud.

Note The Internet Explorer web browser is not supported for interacting with the dashboard.

Complete these steps only after you successfully create your resource group. If your solution uses private IP addresses, you can connect to the dashboard from a VM located in the same virtual network as the VM that hosts the dashboard.

1. In the Azure portal, click **Resource groups**.
2. Select the resource group that you created for this deployment.
3. Select **Deployments** from the left pane. In the pane that opens, click **Microsoft.Template**.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **dashboardURL** and paste it in a browser.
6. Use the administrator user name and password that you specified in the “Dashboard Login” on page 9-11 step of the deployment process to log in.

Configuring role-based access control for the dashboard is recommended. Role-based access control uses Azure AD to let you grant users the privileges to perform tasks on the dashboard and server, based on their role. For more information on how to configure role-based access control, see “Dashboard Access Control” on page 9-72.

See Also

More About

- “Architecture and Resources on Azure” on page 9-43
- “Manage MATLAB Production Server (PAYG)” on page 9-20

Manage MATLAB Production Server (BYOL)

After you deploy a MATLAB Production Server bring your own license (BYOL) environment in Azure, and configure licensing in the cloud, use the MATLAB Production Server dashboard, which is a web-based interface to upload applications, edit server settings, and configure access control for the dashboard and applications.

Connect to Dashboard

Find the URL to connect to the dashboard in the Azure portal.

Note The Internet Explorer web browser is not supported for interacting with the dashboard.

Complete these steps only after you successfully create your resource group. If your solution uses private IP addresses, you can connect to the dashboard from a VM that belongs to the same virtual network as the VM that hosts the dashboard.

1. In the Azure portal, click **Resource groups**.
2. Select the resource group you created for this deployment.
3. Select **Deployments** from the left pane. In the pane that opens, click **Microsoft.Template**.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **dashboardURL** and paste it in a browser.

Log In to Dashboard

There are three roles for logging in to the dashboard depending on your role in your organization — global admin, manager, or application author.

Log In to Dashboard as Global Admin

If you are accessing the dashboard for the first time, or if you have not configured or not enabled dashboard access control, you must log in using the global admin credentials. These are the credentials that you entered for the dashboard during the deployment process. A global admin has access to all areas of the dashboard. A global admin can log in to server virtual machines (VMs), configure which users or groups of users can access the dashboard and applications, edit server settings, configure remote persistence services, view logs, and upload and delete applications. You cannot change the global admin credentials.

To grant access to only certain dashboard areas for specific users or groups of users, set up dashboard access control after you log in. For more information, see “Dashboard Access Control” on page 9-67.

Log In to Dashboard as Manager or Application Author

If the global admin has configured and enabled dashboard access control, you can log in to the dashboard as a manager or application author depending on your role in your organization. The login process supports single sign-on using Azure AD.

An application author has the privileges to upload and delete applications and view logs. A manager has the privileges to edit server settings, configure access control for applications, and configure

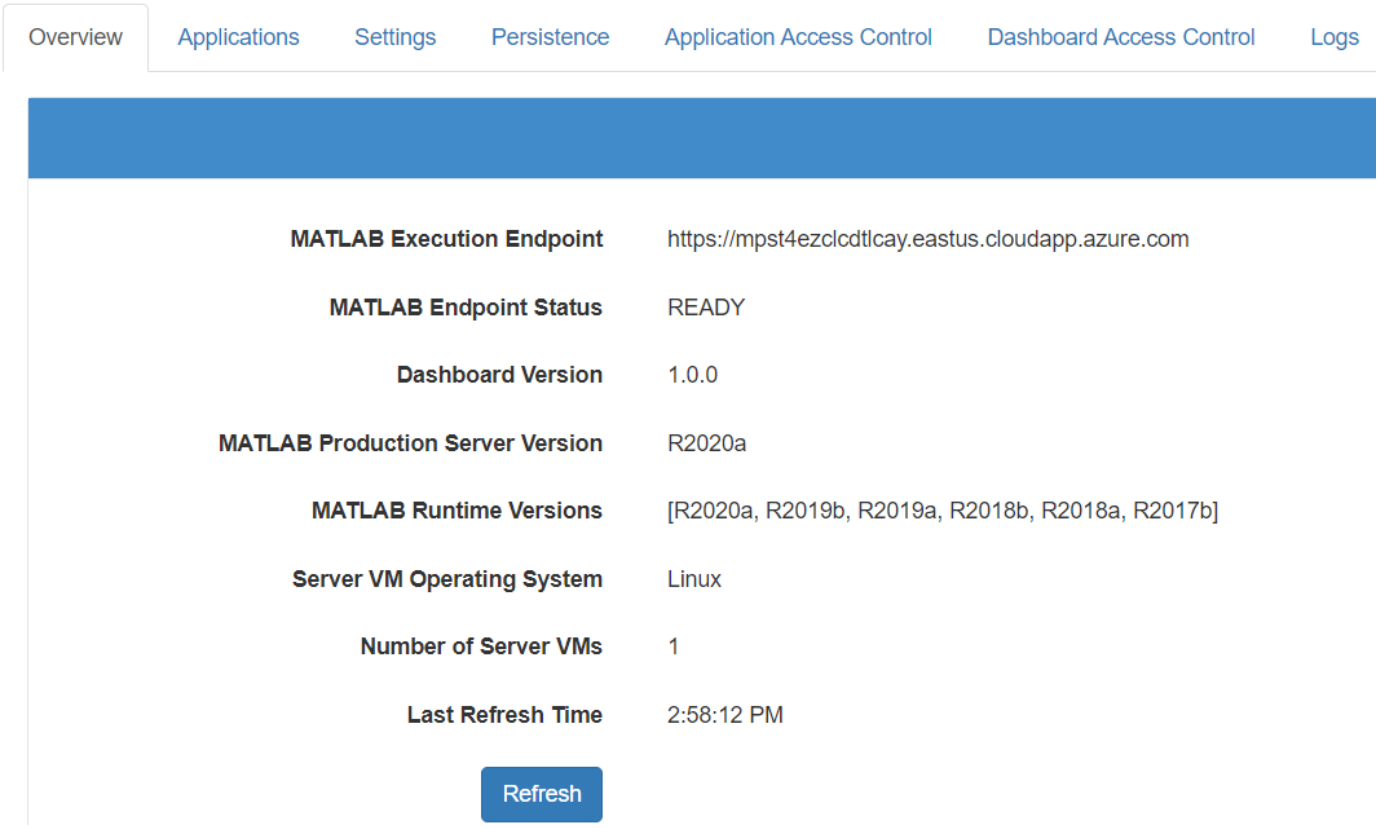
remote persistence services, as well as all the privileges of an application author, including for uploading and deleting applications and viewing logs.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	Applications	Settings	Persistence	Application Access Control	Dashboard Access Control	Logs
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

View Information About Server

To view information about the server instance VMs deployed on Azure, click **Overview** on the dashboard navigation menu.



Upload MATLAB Application

You can run an application on MATLAB Production Server that is created using MATLAB Compiler SDK. Upload the application using the dashboard.

1. Click **+Upload**.
2. Click **Choose File**, select the file, and click **Deploy**.

For information on how to upload multiple applications, see “Upload MATLAB Applications” on page 9-32.

For information on how to create an application, see “Create a Deployable Archive for MATLAB Production Server”.

View HTTPS Server Endpoint

The Azure application gateway in the MATLAB Production Server (BYOL) deployment provides an HTTPS endpoint URL to make requests to the server. The **HTTPS Server Endpoint** in the **Home** tab in the cloud console specifies the HTTPS endpoint. Use this endpoint to execute MATLAB functions deployed to the server. For example, if the HTTPS server endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, use the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

For more information on working with the self-signed SSL certificate and managing cookies set by the application gateway, see “Execute MATLAB Functions on MATLAB Production Server (BYOL)” on page 9-82.

Edit Server Configuration

Edit the MATLAB Production Server configuration properties by selecting the **Settings** tab in dashboard. After you update the properties, click **Save** to apply your changes.

Note The server restarts when you click **Save**.

Only the global admin and managers have the privilege to edit the server configuration.

Some examples of server configuration properties follow.

- To allow requests from specific domains, specify parameter values for the **CORS Allowed Origins** property.

  If you want to specify multiple domains, separate them with a comma, for example, `http://www.w3.org, https://www.apache.org`.
- To set the number of MATLAB Production Server workers, specify a parameter value for the **Number of Workers** property.

  When setting the **Number of Workers** property, carefully consider your cluster setup. Each VM in the cluster runs an instance of MATLAB Production Server and each instance runs multiple MATLAB Production Server workers. Using 1 vCPU per MATLAB Production Server worker is recommended. For example, if the server size is set to *Standard_D4s_v3 Server*, which specifies 4 vCPUs, set the number of workers to no more than 4 workers per instance.

Use the Azure Cache for Redis for Data Persistence

MATLAB Production Server uses Redis for data persistence. Persistence allows caching of data between calls to MATLAB code running on the servers. Only the global admin and managers have the privilege to configure remote persistence services.

To view a persistence service that your deployment creates or to create a new remote persistence service, select **Persistence** in the MATLAB Production Server dashboard navigation pane.

Click **+Add** to create a new remote persistence service. Specify the following parameter values, then click **Create**. Creating a persistence service takes 3 minutes on a Windows VM.

Value	Description
Connection Name	Specify a name for the connection to the persistence service. Use this name in MATLAB code to pass data to the cache.
Host and **Port**	Specify the host name and port number for Azure Cache for Redis from the Azure portal. The port number has to be a non-SSL port. To retrieve the host name and port number, follow these steps. • Log in to your Azure portal and select the resource group associated with the deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Overview** and copy the values listed under **Host name** and under **Ports**. You can also use an Azure Cache for Redis that you create outside of this deployment. The steps to retrieve the host name and port number are the same.
Access Key	If you use Azure Cache for Redis for persistence, you must specify an access key. To retrieve the access key, follow these steps. • Log in to your Azure portal and select the resource group associated with this deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Access keys** from the left pane. • In the resulting pane, copy the access key string listed under **Primary**.

For more information on using a data cache, see “Use a Data Cache to Persist Data”.

Set Up Access Control for Applications Using Azure Active Directory

MATLAB Production Server uses Azure AD for restricting access to deployed applications to only certain groups of users. Only the global admin and manager can configure access control for applications.

For more information on how to configure application access control using the **Application Access Control** tab, see “Application Access Control” on page 9-49.

Set Up Access Control for Dashboard Using Azure Active Directory

MATLAB Production Server uses Azure AD to provide role-based access control for accessing the dashboard. You can grant access to certain dashboard areas for specific users or groups of users based on the user role. Only the global admin can configure dashboard access control. For more information on how to configure dashboard access control using the **Dashboard Access Control** tab, see “Dashboard Access Control” on page 9-67.

See Also

More About

- “Azure Deployment for MATLAB Production Server (BYOL)” on page 9-2
- “Architecture and Resources on Azure” on page 9-40
- “Manage Azure Resources for MATLAB Production Server (BYOL)” on page 9-31

Manage MATLAB Production Server (PAYG)

After you deploy the MATLAB Production Server pay as you go (PAYG) environment in Azure, use the MATLAB Production Server dashboard, which is a web-based interface to upload applications, edit server settings, and configure access control for the dashboard and applications.

Connect to Dashboard

Find the URL to connect to the dashboard in the Azure portal.

Note The Internet Explorer web browser is not supported for interacting with the dashboard.

Complete these steps only after you successfully create your resource group. If your solution uses private IP addresses, you can connect to the dashboard from a VM that belongs to the same virtual network as the VM that hosts the dashboard.

1. In the Azure portal, click **Resource groups**.
2. Select the resource group you created for this deployment.
3. Select **Deployments** from the left pane. In the pane that opens, click **Microsoft.Template**.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **dashboardURL** and paste it in a browser.

Log In to Dashboard

There are three roles for logging in to the dashboard depending on your role in your organization — global admin, manager, or application author.

Log In to Dashboard as Global Admin

If you are accessing the dashboard for the first time, or if you have not configured or not enabled dashboard access control, you must log in using the global admin credentials. These are the credentials that you entered during the “Dashboard Login” on page 9-11 step of the deployment process. A global admin has access to all areas of the dashboard. A global admin can log in to server virtual machines (VMs), configure which users or groups of users can access the dashboard and applications, edit server settings, configure remote persistence services, view logs, and upload and delete applications. You cannot change the global admin credentials.

To grant access to only certain dashboard areas for specific users or groups of users, set up dashboard access control after you log in. For more information, see “Dashboard Access Control” on page 9-72.

Log In to Dashboard as Manager or Application Author

If the global admin has configured and enabled dashboard access control, you can log in to the dashboard as a manager or application author depending on your role in your organization. The login process supports single sign-on using Azure AD.

An application author has the privileges to upload and delete applications and view logs. A manager has the privileges to edit server settings, configure access control for applications, and configure

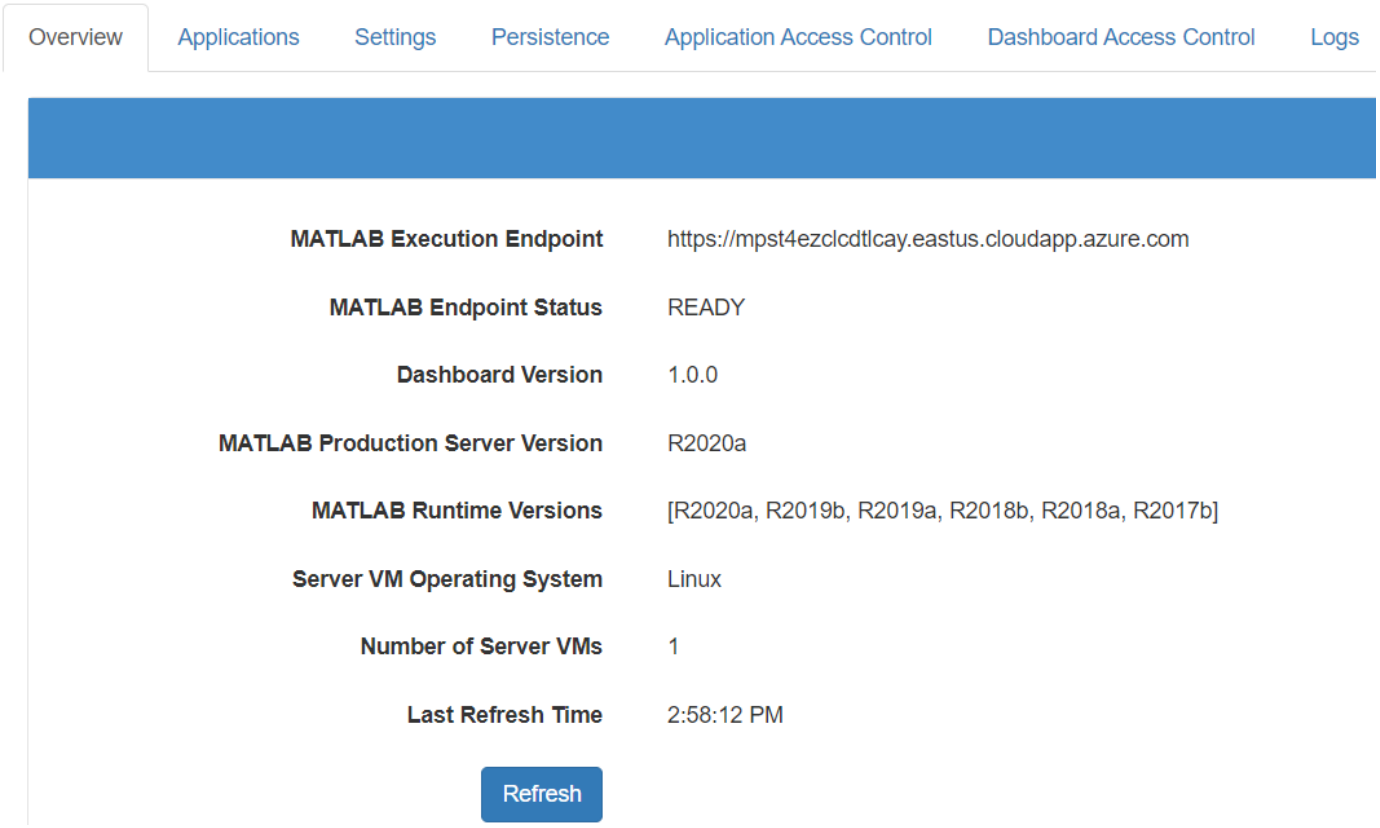
remote persistence services, as well as all the privileges of an application author, including for uploading and deleting applications and viewing logs.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	Applications	Settings	Persistence	Application Access Control	Dashboard Access Control	Logs
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

View Information About Server

To view information about the server instance VMs deployed on Azure, click **Overview** on the dashboard navigation menu.



Upload MATLAB Application

You can run an application on MATLAB Production Server that is created using MATLAB Compiler SDK. Upload and deploy applications using the **Applications** tab in the dashboard.

1. Click **+Upload**.
2. Click **Choose File**, select the file, and click **Deploy**.

For information on how to upload multiple applications, see “Upload MATLAB Applications” on page 9-35.

For information on how to create an application, see “Create a Deployable Archive for MATLAB Production Server”.

View MATLAB Execution Endpoint

The Azure application gateway in the deployment provides an HTTPS endpoint URL to make requests to the server. The **MATLAB Execution Endpoint** in the **Overview** tab in the dashboard specifies the HTTPS endpoint. Use this endpoint to execute MATLAB functions deployed to the server. For example, if the MATLAB execution endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, use the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

For more information on working with the self-signed certificate and managing cookies set by the application gateway, see “Execute MATLAB Functions on MATLAB Production Server (PAYG)” on page 9-84.

Edit Server Configuration

Edit the MATLAB Production Server configuration properties by selecting the **Settings** tab in dashboard. After you update the properties, click **Save** to apply your changes.

Note The server restarts when you click **Save**.

Only the global admin and managers have the privilege to edit the server configuration.

Some examples of server configuration properties follow.

- To allow requests from specific domains, specify parameter values for the **CORS Allowed Origins** property.

  If you want to specify multiple domains, separate them with a comma, for example, `http://www.w3.org, https://www.apache.org`.
- To set the number of MATLAB Production Server workers, specify a parameter value for the **Number of Workers** property.

  When setting the **Number of Workers** property, carefully consider your cluster setup. Each VM in the cluster runs an instance of MATLAB Production Server and each instance runs multiple MATLAB Production Server workers. Using 1 vCPU per MATLAB Production Server worker is recommended. For example, if the server size is set to *Standard_D4s_v3 Server*, which specifies 4 vCPUs, set the number of workers to 4 workers per instance.

Use the Azure Cache for Redis for Data Persistence

MATLAB Production Server uses Redis for data persistence. Persistence allows caching of data between calls to MATLAB code running on the servers. Only the global admin and managers have the privilege to configure remote persistence services.

To view a persistence service that your deployment creates or to create a new remote persistence service, select **Persistence** in the MATLAB Production Server dashboard navigation pane.

Click **+Add** to create a new remote persistence service. Specify the following parameter values, then click **Create**. Creating a persistence service takes 3 minutes on a Windows VM.

Value	Description
Connection Name	Specify a name for the connection to the persistence service. Use this name in MATLAB code to pass data to the cache.
Host and **Port**	Specify the host name and port number for Azure Cache for Redis from the Azure portal. The port number has to be a non-SSL port. To retrieve the host name and port number, follow these steps. • Log in to your Azure portal and select the resource group associated with the deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Overview** and copy the values listed under **Host name** and under **Ports**. You can also use an Azure Cache for Redis that you create outside of this deployment. The steps to retrieve the host name and port number are the same.
Access Key	If you use Azure Cache for Redis for persistence, you must specify an access key. To retrieve the access key, follow these steps. • Log in to your Azure portal and select the resource group associated with this deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Access keys** from the left pane. • In the resulting pane, copy the access key string listed under **Primary**.

For more information on using a data cache, see “Use a Data Cache to Persist Data”.

Set Up Access Control for Applications Using Azure Active Directory

MATLAB Production Server uses Azure AD for restricting access to deployed applications to only certain groups of users. Only the global admin and manager can configure access control for applications.

For more information on how to configure application access control using the **Application Access Control** tab, see “Application Access Control” on page 9-55.

Set Up Access Control for Dashboard Using Azure Active Directory

MATLAB Production Server uses Azure AD to provide role-based access control for accessing the dashboard. You can grant access to certain dashboard areas for specific users or groups of users based on the user role. Only the global admin can configure dashboard access control. For more information on how to configure dashboard access control using the **Dashboard Access Control** tab, see “Dashboard Access Control” on page 9-72.

See Also

More About

- “Dashboard Access Control” on page 9-72
- “Azure Deployment for MATLAB Production Server (PAYG)” on page 9-9
- “Manage Azure Resources for MATLAB Production Server (PAYG)” on page 9-34
- “Application Access Control” on page 9-55

Manage MATLAB Production Server Using the Dashboard

After you deploy the MATLAB Production Server reference architecture in Azure, and configure licensing in the cloud, use the MATLAB Production Server dashboard, which is a web-based interface to upload applications, edit server settings, and configure access control for the dashboard and applications.

For information on deploying the reference architecture, see MATLAB Production Server on Microsoft Azure. For information on setting up your MATLAB Production Server license for using in the cloud, see “Before You Begin” (Licensing on Cloud Platforms).

Connect to Dashboard

Find the URL to connect to the dashboard in the Azure portal.

Note The Internet Explorer web browser is not supported for interacting with the dashboard.

Complete these steps only after you successfully create your resource group. If your solution uses private IP addresses, you can connect to the dashboard from a VM that belongs to the same virtual network as the VM that hosts the dashboard.

1. In the Azure portal, click **Resource groups**.
2. Select the resource group you created for this deployment.
3. Select **Deployments** from the left pane. In the pane that opens, click **Microsoft.Template**.
4. Select **Outputs** from the left pane.
5. Copy the parameter value for **dashboardURL** and paste it in a browser.

Log In to Dashboard

There are three roles for logging in to the dashboard depending on your role in your organization — global admin, manager, or application author.

Log In to Dashboard as Global Admin

If you are accessing the dashboard for the first time, or if you have not configured or not enabled dashboard access control, you must log in using the global admin credentials. These are the credentials that you entered during the “Dashboard Login” on page 9-11 step of the deployment process. A global admin has access to all areas of the dashboard. A global admin can log in to server virtual machines (VMs), configure which users or groups of users can access the dashboard and applications, edit server settings, configure remote persistence services, view logs, and upload and delete applications. You cannot change the global admin credentials.

To grant access to only certain dashboard areas for specific users or groups of users, set up dashboard access control after you log in. For more information, see “Dashboard Access Control” on page 9-77.

Log In to Dashboard as Manager or Application Author

If the global admin has configured and enabled dashboard access control, you can log in to the dashboard as a manager or application author depending on your role in your organization. The login process supports single sign-on using Azure AD.

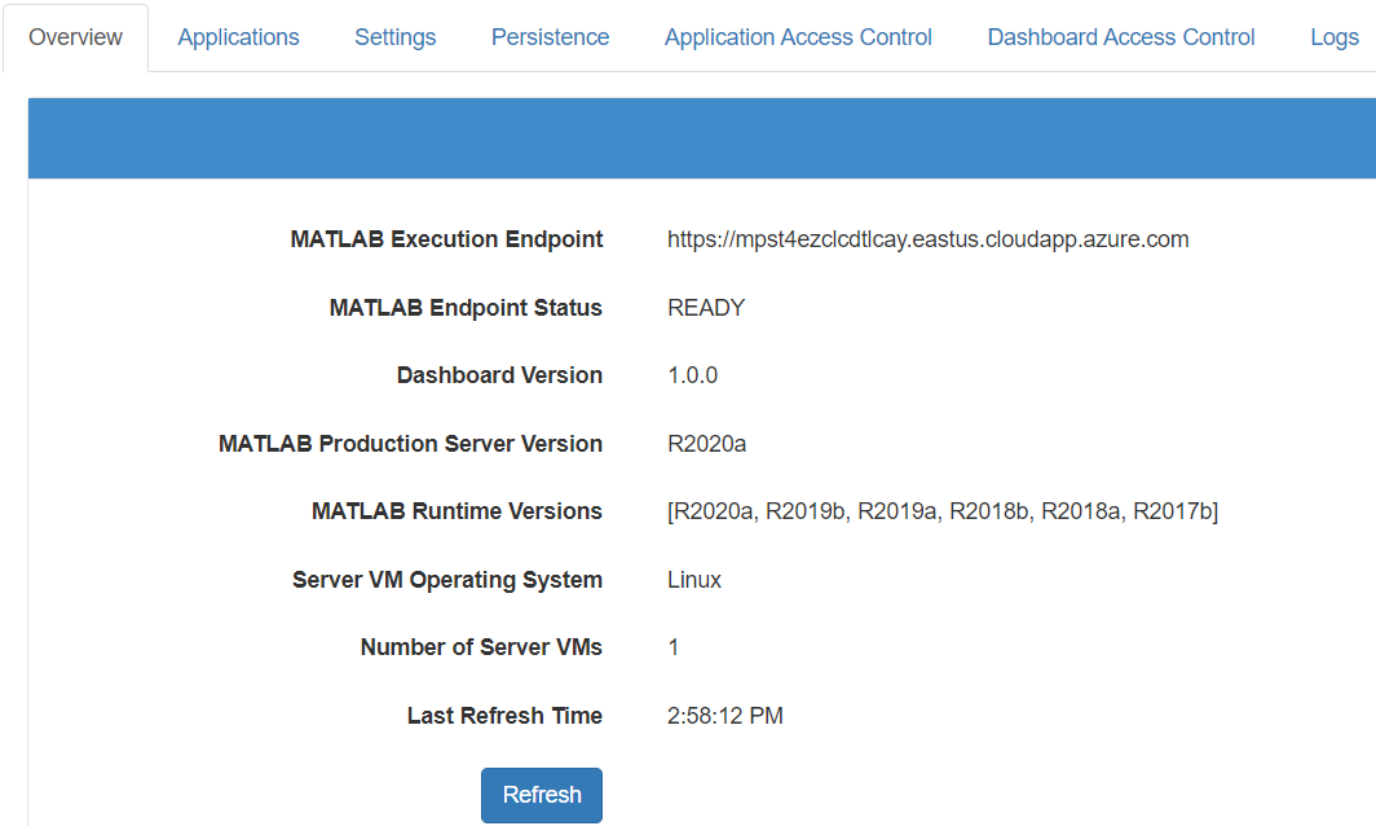
An application author has the privileges to upload and delete applications and view logs. A manager has the privileges to edit server settings, configure access control for applications, and configure remote persistence services, as well as all the privileges of an application author, including for uploading and deleting applications and viewing logs.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	Applications	Settings	Persistence	Application Access Control	Dashboard Access Control	Logs
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

View Information About Server

To view information about the server instance VMs deployed on Azure, click **Overview** on the dashboard navigation menu.



Upload MATLAB Application

You can run an application on MATLAB Production Server that is created using MATLAB Compiler SDK. Upload and deploy applications using the **Applications** tab in the dashboard.

1. Click **+Upload**.
2. Click **Choose File**, select the file, and click **Deploy**.

For information on how to upload multiple applications, see “Upload MATLAB Applications” on page 9-35.

For information on how to create an application, see “Create a Deployable Archive for MATLAB Production Server”.

View MATLAB Execution Endpoint

The Azure application gateway in the deployment provides an HTTPS endpoint URL to make requests to the server. The **MATLAB Execution Endpoint** in the **Overview** tab in the dashboard specifies the HTTPS endpoint. Use this endpoint to execute MATLAB functions deployed to the server. For example, if the MATLAB execution endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, use the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

For more information on working with the self-signed certificate and managing cookies set by the application gateway, see “Execute MATLAB Functions on MATLAB Production Server Reference Architecture” on page 9-86 .

Edit Server Configuration

Edit the MATLAB Production Server configuration properties by selecting the **Settings** tab in dashboard. After you update the properties, click **Save** to apply your changes.

Note The server restarts when you click **Save**.

Only the global admin and managers have the privilege to edit the server configuration.

Some examples of server configuration properties follow.

- To allow requests from specific domains, specify parameter values for the **CORS Allowed Origins** property.

  If you want to specify multiple domains, separate them with a comma, for example, `http://www.w3.org, https://www.apache.org`.
- To set the number of MATLAB Production Server workers, specify a parameter value for the **Number of Workers** property.

  When setting the **Number of Workers** property, carefully consider your cluster setup. Each VM in the cluster runs an instance of MATLAB Production Server and each instance runs multiple MATLAB Production Server workers. Using 1 vCPU per MATLAB Production Server worker is recommended. For example, if the server size is set to *Standard_D4s_v3 Server*, which specifies 4 vCPUs, set the number of workers to no more than 4 workers per instance.

Use the Azure Cache for Redis for Data Persistence

MATLAB Production Server uses Redis for data persistence. Persistence allows caching of data between calls to MATLAB code running on the servers. Only the global admin and managers have the privilege to configure remote persistence services.

To view a persistence service that your deployment creates or to create a new remote persistence service, select **Persistence** in the MATLAB Production Server dashboard navigation pane.

Click **+Add** to create a new remote persistence service. Specify the following parameter values, then click **Create**. Creating a persistence service takes 3 minutes on a Windows VM.

Value	Description
Connection Name	Specify a name for the connection to the persistence service. Use this name in MATLAB code to pass data to the cache.

Value	Description
Host and **Port**	Specify the host name and port number for Azure Cache for Redis from the Azure portal. The port number has to be a non-SSL port. To retrieve the host name and port number, follow these steps. • Log in to your Azure portal and select the resource group associated with the deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Overview** and copy the values listed under **Host name** and under **Ports**. You can also use an Azure Cache for Redis that you create outside of this deployment. The steps to retrieve the host name and port number are the same.
Access Key	If you use Azure Cache for Redis for persistence, you must specify an access key. To retrieve the access key, follow these steps. • Log in to your Azure portal and select the resource group associated with this deployment. • Select the Azure Cache for Redis resource within the resource group. This resource usually has the name `vmss<uniqueID>redis`. • Select **Access keys** from the left pane. • In the resulting pane, copy the access key string listed under **Primary**.

For more information on using a data cache, see “Use a Data Cache to Persist Data”.

Set Up Access Control for Applications Using Azure Active Directory

MATLAB Production Server uses Azure AD for restricting access to deployed applications to only certain groups of users. Only the global admin and manager can configure access control for applications.

For more information on how to configure application access control using the **Application Access Control** tab, see “Application Access Control” on page 9-61.

Set Up Access Control for Dashboard Using Azure Active Directory

MATLAB Production Server uses Azure AD to provide role-based access control for accessing the dashboard. You can grant access to certain dashboard areas for specific users or groups of users

based on the user role. Only the global admin can configure dashboard access control. For more information on how to configure dashboard access control using the **Dashboard Access Control** tab, see “Dashboard Access Control” on page 9-72.

See Also

More About

- MATLAB Production Server Reference Architecture on Azure
- “Before You Begin” (Licensing on Cloud Platforms)
- “Dashboard Access Control” on page 9-77
- “Application Access Control” on page 9-61

Manage Azure Resources for MATLAB Production Server (BYOL)

After you deploy the MATLAB Production Server bring your own license (BYOL) environment on Azure, use the Azure portal to manage resources that you provision for in the deployment.

Change the Number of Virtual Machines

Each MATLAB Production Server instance runs on a virtual machine (VM) and each instance can run multiple MATLAB Production Server workers. If you have a standard 24 worker MATLAB Production Server license, and you use 1 worker per VM, you can provision a maximum of 24 VMs. Using 1 vCPU per worker is recommended. For example, if you select the `Standard_D4s_v3 VM` (4 vCPUs) as the **Server VM Size**, you need 6 VMs to fully utilize the workers in your license. You can change the number of VMs after the initial deployment.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the VM scale set resource (`vmss<uniqueID>`).
3. Select **Scaling** from the left pane to change the number of VMs in the VM scale set.

In the Azure Resource Manager (ARM) template, the `overprovision` property is set to `true` by default. This means that Azure provisions more virtual machines than necessary initially to buffer against any machines that fail. If all VMs are healthy, Azure scales down to the specified the number of VMs.

Change Self-Signed Certificate to Application Gateway

When you deploy MATLAB Production Server (BYOL), you get an HTTPS endpoint to the Azure application gateway that uses a self-signed SSL certificate. Use this endpoint to connect to the server instances and the dashboard. To change the certificate to the application gateway, use the Azure portal to create a listener and add a rule.

Create a Listener

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Listeners** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Listener name	Enter a name for the listener.
Frontend IP	Choose `Public` if your solution uses public IPs; otherwise, choose `Private`.
Port	Enter any free port between `8001` and `10000`.
Protocol	Select `HTTPS`.

5. Select **Create New** in **Choose a Certificate** dropdown, then select **Upload a certificate**.
6. Upload a PFX certificate, give it a name, and create a password. Click **Add**.

Add a Rule

1. Log in to the Azure portal and select the resource group associated with this deployment.
2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Rules** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Name	Enter a name for the rule.
Listener	Select the listener you created.
Configure redirection	Select the box if appropriate.
Backend pool	Select the available value.
HTTP setting	Select the available value.

Upload MATLAB Applications

The Azure file share lets you upload and deploy multiple applications to the server.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the storage account resource within the resource group. This resource usually has the name `serverlog<uniqueID>`.
3. In the pane that opens, select **File Share** > **deployable-archives** > **auto_deploy**.
4. Select **Upload** to select the applications to upload, then click **Upload**.

View Logs

Application Insights lets you store and view logs related to the deployment.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the resource `logs-apmservice`.
3. Select **Logs** from the left pane of the resource.
4. Create a new query and click **Run**.

To view logs generated by all the server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
```

To view the last 200 logs generated by all server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| limit 200
```

To view only the error logs generated by all server instances, you can use the following query. For more information on log severity, see `log-severity`.

```
traces
| where customDimensions.source == "prodServerInstance"
| where parse_json(message).severity == "error"
```

To view logs generated by all the server instances within a certain time duration, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| where timestamp >= todatetime('2020-02-11T17:21:45.188659Z') and timestamp <= todatetime('2020
```

Delete Resource Group

A resource group contains all related resources for an Azure solution. You can remove the resource group and all associated cluster resources when you are no longer need them. You cannot undo this.

Note Your license file is tied to your MAC address. If you delete your resource group to delete your cluster, you will need to get a new license file. You can change your MAC address a maximum of 4 times per year.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Click **Delete resource group** to delete all resources deployed in the group.
3. Enter the name of the resource group to confirm the deletion.

See Also

More About

- “Azure Deployment for MATLAB Production Server (BYOL)” on page 9-2
- “Architecture and Resources on Azure” on page 9-40
- “Manage MATLAB Production Server (BYOL)” on page 9-15

Manage Azure Resources for MATLAB Production Server (PAYG)

After you deploy the MATLAB Production Server pay as you go (PAYG) environment on Azure, use the Azure portal to manage resources that you provision for in the deployment.

Change the Number of Virtual Machines

Each MATLAB Production Server instance runs on a virtual machine (VM) and each instance runs multiple MATLAB Production Server workers. You can change the number of VMs after the initial deployment.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the VM scale set resource `vmss<uniqueID>`.
3. Select **Scaling** from the left pane to change the number of VMs in the VM scale set.

In the Azure Resource Manager (ARM) template, the `overprovision` property is set to `true` by default. This means that Azure provisions more virtual machines than necessary initially to buffer against any machines that fail. If all VMs are healthy, Azure scales down to the specified the number of VMs.

Change Self-Signed Certificate to Application Gateway

When you deploy MATLAB Production Server (PAYG), you get an HTTPS endpoint to the Azure application gateway that uses a self-signed SSL certificate. This endpoint provides lets you connect to the server instances and the dashboard. To change the certificate to the application gateway, use the Azure portal to create a listener and add a rule.

Create a Listener

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Listeners** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Listener name	Enter a name for the listener.
Frontend IP	Choose `Public` if your solution uses public IPs; otherwise, choose `Private`.
Port	Enter any free port between `8001` and `10000`.
Protocol	Select `HTTPS`.

5. Select **Create New** in **Choose a Certificate** dropdown, then select **Upload a certificate**.
6. Upload a PFX certificate, give it a name, and create a password. Click **Add**.

Add a Rule

1. Log in to the Azure portal and select the resource group associated with this deployment.

2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Rules** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Name	Enter a name for the rule.
Listener	Select the listener you created.
Configure redirection	Select the box if appropriate.
Backend pool	Select the available value.
HTTP setting	Select the available value.

View Logs

View MATLAB Production Server logs using Azure Application Insights.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the resource `logs-apmservice`.
3. Select **Logs** from the left pane of the resource.
4. Create a new query and click **Run**.

To view logs generated by all the server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
```

To view the last 200 logs generated by all server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| limit 200
```

To view only the error logs generated by all server instances, you can use the following query. For more information on log severity, see `log-severity`.

```
traces
| where customDimensions.source == "prodServerInstance"
| where parse_json(message).severity == "error"
```

To view logs generated by all the server instances within a certain time duration, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| where timestamp >= todatetime('2020-02-11T17:21:45.188659Z')
| and timestamp <= todatetime('2020-02-11T19:22:46.881331Z')
```

Upload MATLAB Applications

The Azure file share lets you upload and deploy multiple applications to the server.

1. Log in to the Azure portal and select the resource group associated with the deployment.

2. Select the storage account resource within the resource group. This resource usually has the name `serverlog<uniqueID>`.
3. In the pane that opens, select **File Share** > **deployable-archives** > **auto_deploy**.
4. Select **Upload** to select the applications to upload, then click **Upload**.

Delete Resource Group

A resource group contains all related resources for an Azure solution. You can remove the resource group and all associated cluster resources when you are no longer need them. You cannot undo this.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Click **Delete resource group** to delete all resources deployed in the group.
3. Enter the name of the resource group to confirm the deletion.

See Also

More About

- “Manage MATLAB Production Server (PAYG)” on page 9-20
- “Architecture and Resources on Azure” on page 9-43
- “Azure Deployment for MATLAB Production Server (PAYG)” on page 9-9

Manage Azure Resources for MATLAB Production Server Reference Architecture

After you deploy the MATLAB Production Server reference architecture on Azure, use the Azure portal to manage resources that you provision for in the deployment.

Change the Number of Virtual Machines

Each MATLAB Production Server instance runs on a virtual machine (VM) and each instance runs multiple MATLAB Production Server workers. You can change the number of VMs after the initial deployment.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the VM scale set resource `vmss<uniqueID>`.
3. Select **Scaling** from the left pane to change the number of VMs in the VM scale set.

In the Azure Resource Manager (ARM) template, the `overprovision` property is set to `true` by default. This means that Azure provisions more virtual machines than necessary initially to buffer against any machines that fail. If all VMs are healthy, Azure scales down to the specified the number of VMs.

Change Self-Signed Certificate to Application Gateway

When you deploy the MATLAB Production Server reference architecture, you get an HTTPS endpoint to the Azure application gateway that uses a self-signed SSL certificate. This endpoint provides lets you connect to the server instances and the dashboard. To change the certificate to the application gateway, use the Azure portal to create a listener and add a rule.

Create a Listener

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Listeners** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Listener name	Enter a name for the listener.
Frontend IP	Choose `Public` if your solution uses public IPs; otherwise, choose `Private`.
Port	Enter any free port between `8001` and `10000`.
Protocol	Select `HTTPS`.

5. Select **Create New** in **Choose a Certificate** dropdown, then select **Upload a certificate**.
6. Upload a PFX certificate, give it a name, and create a password. Click **Add**.

Add a Rule

1. Log in to the Azure portal and select the resource group associated with this deployment.
2. Select the application gateway resource with the name `vmss<uniqueID>-agw`.
3. Select **Rules** from the left pane and click **+Basic** on the top pane.
4. Enter values for these parameters.

Name	Value
Name	Enter a name for the rule.
Listener	Select the listener you created.
Configure redirection	Select the box if appropriate.
Backend pool	Select the available value.
HTTP setting	Select the available value.

View Logs

View MATLAB Production Server logs using Azure Application Insights.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the resource `logs-apmservice`.
3. Select **Logs** from the left pane of the resource.
4. Create a new query and click **Run**.

To view logs generated by all the server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
```

To view the last 200 logs generated by all server instances, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| limit 200
```

To view only the error logs generated by all server instances, you can use the following query. For more information on log severity, see `log-severity`.

```
traces
| where customDimensions.source == "prodServerInstance"
| where parse_json(message).severity == "error"
```

To view logs generated by all the server instances within a certain time duration, you can use the following query.

```
traces
| where customDimensions.source == "prodServerInstance"
| where timestamp >= todatetime('2020-02-11T17:21:45.188659Z')
| and timestamp <= todatetime('2020-02-11T19:22:46.881331Z')
```

Upload MATLAB Applications

The Azure file share lets you upload and deploy multiple applications to the server.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Select the storage account resource within the resource group. This resource usually has the name `serverlog<uniqueID>`.
3. In the pane that opens, select **File Share** > **deployable-archives** > **auto_deploy**.
4. Select **Upload** to select the applications to upload, then click **Upload**.

Delete Resource Group

A resource group contains all related resources for an Azure solution. You can remove the resource group and all associated cluster resources when you are no longer need them. You cannot undo this.

1. Log in to the Azure portal and select the resource group associated with the deployment.
2. Click **Delete resource group** to delete all resources deployed in the group.
3. Enter the name of the resource group to confirm the deletion.

See Also

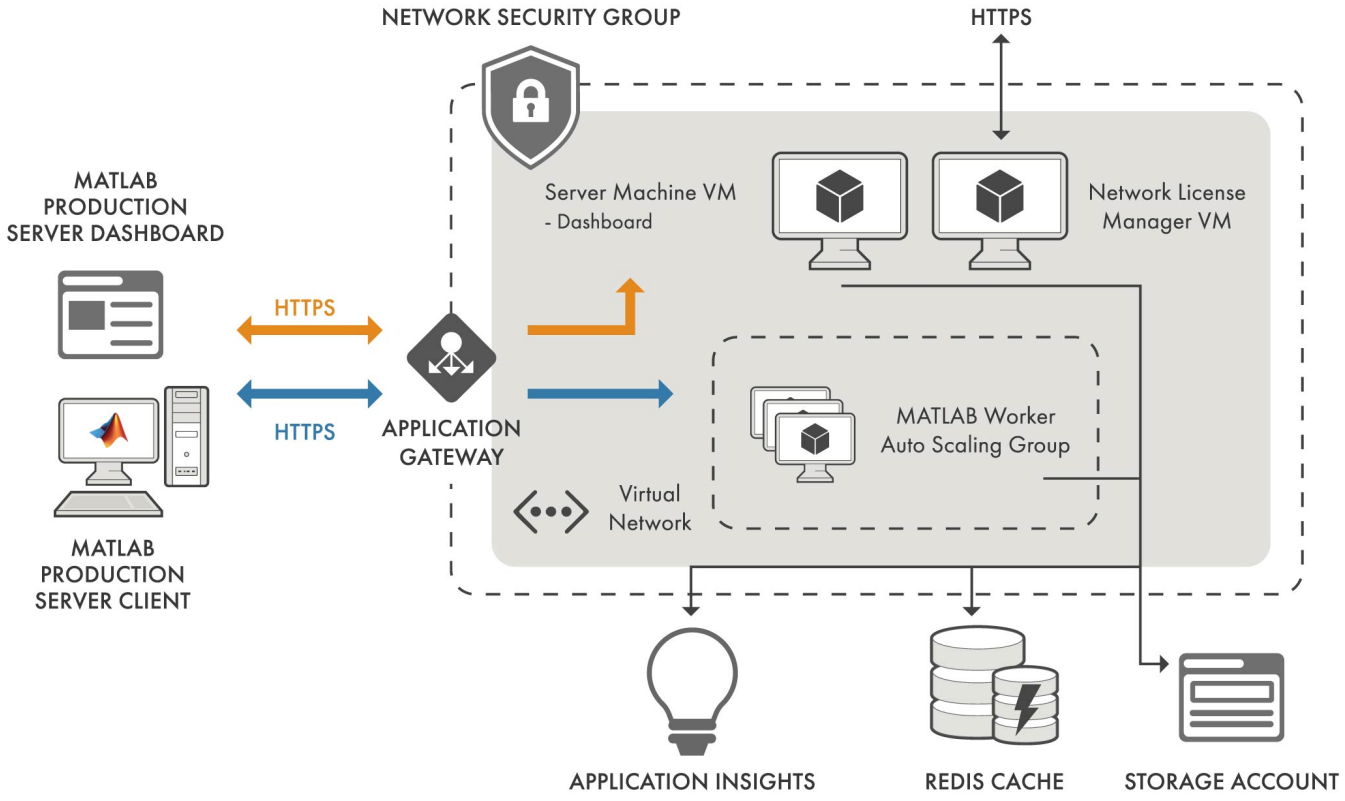
More About

- “Manage MATLAB Production Server Using the Dashboard” on page 9-25
- “Architecture and Resources on Azure” on page 9-46

Architecture and Resources on Azure

Deploying MATLAB Production Server bring your own license (BYOL) on Azure creates several resources in your resource group. The following sections describe the architecture of MATLAB Production Server and the Azure resources that the deployment provisions.

MATLAB Production Server (BYOL) Architecture on Azure



Azure Resources

The MATLAB Production Server deployment in Azure creates the following resources in your resource group.

Resource Name	Resource Name in Azure	Description
MATLAB Production Server dashboard virtual machine	`servermachine`	Virtual machine (VM) that hosts the MATLAB Production Server dashboard. Use the dashboard to: • Get the HTTPS endpoint to make requests. • Upload applications (CTF files) to the server. • Manage server configurations. • Configure access control for the dashboard and applications. For more information about the dashboard, see “Manage MATLAB Production Server (BYOL)” on page 9-15.
MATLAB Production Server dashboard public IP	`servermachine-public-ip`	Public IP address to connect to MATLAB Production Server dashboard. The address provides an HTTPS endpoint to the dashboard for managing server instances. If you choose to not use public IP addresses during deployment, the ARM template does not create this resource.
Virtual machine scale set	`vmss<uniqueID>`	Number of identical VMs to be deployed. Each VM runs an instance of MATLAB Production Server that in turn runs multiple MATLAB Production Server workers. For information on how to change the number of VMs, see “Change the Number of Virtual Machines” on page 9-31.

Resource Name	Resource Name in Azure	Description
Application gateway	`vmss<uniqueID>-agw`	Load balancer for routing traffic to MATLAB Production Server instances. The MATLAB Production Server dashboard retrieves the HTTPS endpoint for making requests to the server from the application gateway resource. Clients use the HTTPS endpoint for making requests to the server.
Storage account	`serverlog<uniqueID>`	Storage account where the deployable archives (CTF files) created by MATLAB Compiler SDK are stored. The deployable archives are stored in an Azure file share.
Virtual network	`vmss<uniqueID>-vnet`	Virtual network that consists of the deployed resources.
Azure Cache for Redis	`vmss<uniqueID>redis`	Redis cache that enables caching of data between calls to MATLAB code running on a server instance. For more information on using a data cache, see “Use a Data Cache to Persist Data”.
Application Insights	`logs-apmservice`	Application performance management service that enables storing and viewing of all logs associated with deployment. For information on how to view the logs, see “View Logs” on page 9-32.

See Also

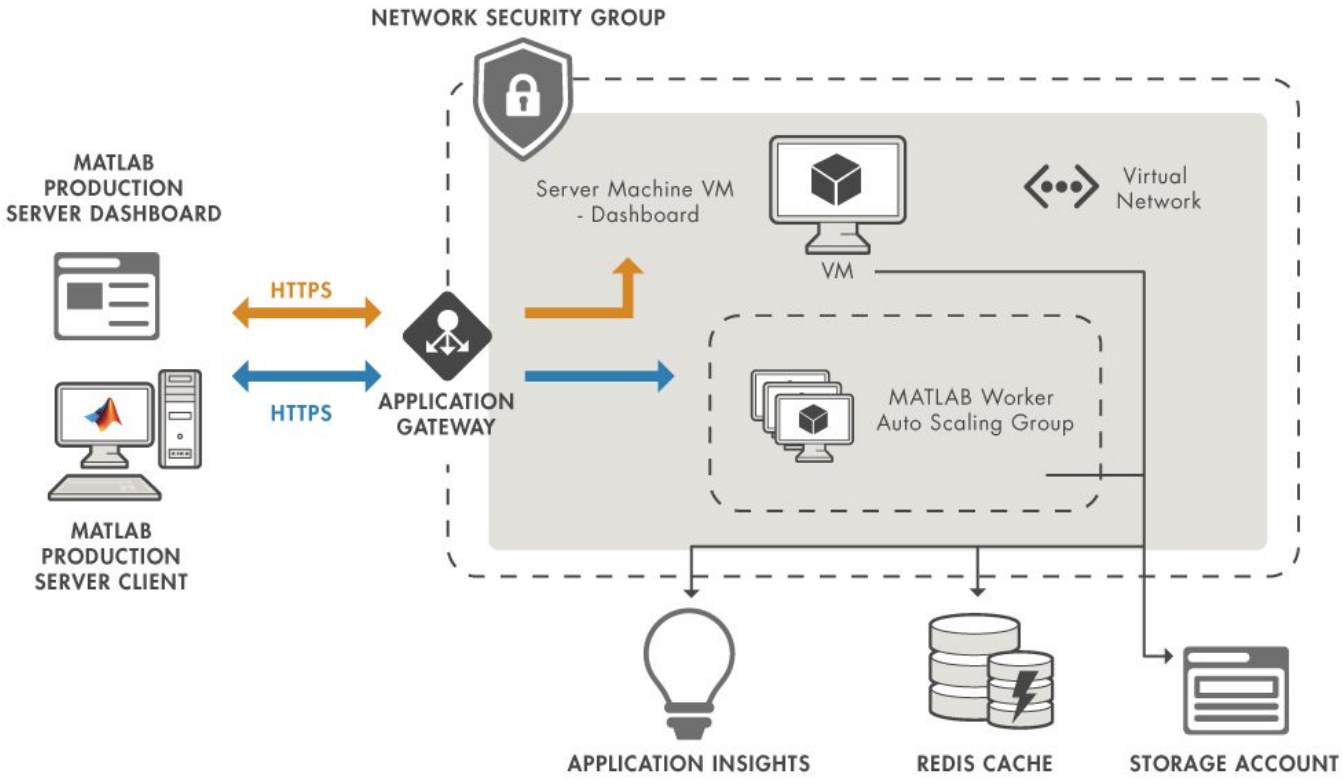
More About

- “Azure Deployment for MATLAB Production Server (BYOL)” on page 9-2
- “Manage MATLAB Production Server (BYOL)” on page 9-15
- “Manage Azure Resources for MATLAB Production Server (BYOL)” on page 9-31

Architecture and Resources on Azure

Deploying MATLAB Production Server pay as you go (PAYG) on Azure creates several resources in your resource group. The following sections describe the architecture of MATLAB Production Server (PAYG) and the Azure resources that the deployment provisions.

MATLAB Production Server (PAYG) Architecture on Azure



Azure Resources

The MATLAB Production Server (PAYG) deployment in Azure creates the following resources in your resource group.

Resource Name	Resource Name in Azure	Description
MATLAB Production Server dashboard virtual machine	`servermachine`	Virtual machine (VM) that hosts the MATLAB Production Server dashboard. Use the dashboard to: • Get the HTTPS endpoint to make requests. • Upload applications (CTF files) to the server. • Manage server configurations. • Configure access control for the dashboard and applications. For more information about the dashboard, see “Manage MATLAB Production Server (PAYG)” on page 9-20.
MATLAB Production Server public IP	`servermachine-public-ip`	Public IP address to connect to MATLAB Production Server dashboard. If you choose to not use public IP addresses during deployment, the ARM template does not create this resource.
Virtual machine scale set	`vmss<uniqueID>`	Number of identical VMs to be deployed. Each VM runs an instance of MATLAB Production Server that in turn runs multiple MATLAB Production Server workers. For information on how to change the number of VMs, see “Change the Number of Virtual Machines” on page 9-34.
Application gateway	`vmss<uniqueID>-agw`	Load balancer for routing traffic to MATLAB Production Server instances. The MATLAB Production Server dashboard retrieves the HTTPS endpoint for making requests to the server from the application gateway resource. Clients use the HTTPS endpoint for making requests to the server.

Resource Name	Resource Name in Azure	Description
Storage account	`serverlog<uniqueID>`	Storage account that stores applications (CTF files) created by MATLAB Compiler SDK. The deployable archives are stored in an Azure file share.
Virtual network	`vmss<uniqueID>-vnet`	Virtual network that consists of the deployed resources.
Azure Cache for Redis	`vmss<uniqueID>redis`	Redis cache that enables caching of data between calls to MATLAB code running on a server instance. For more information on using a data cache, see “Use a Data Cache to Persist Data”.
Application Insights	`logs-apmservice`	Application performance management service that enables storing and viewing of all logs associated with deployment. For information on how to view the logs, see “View Logs” on page 9-35.

See Also

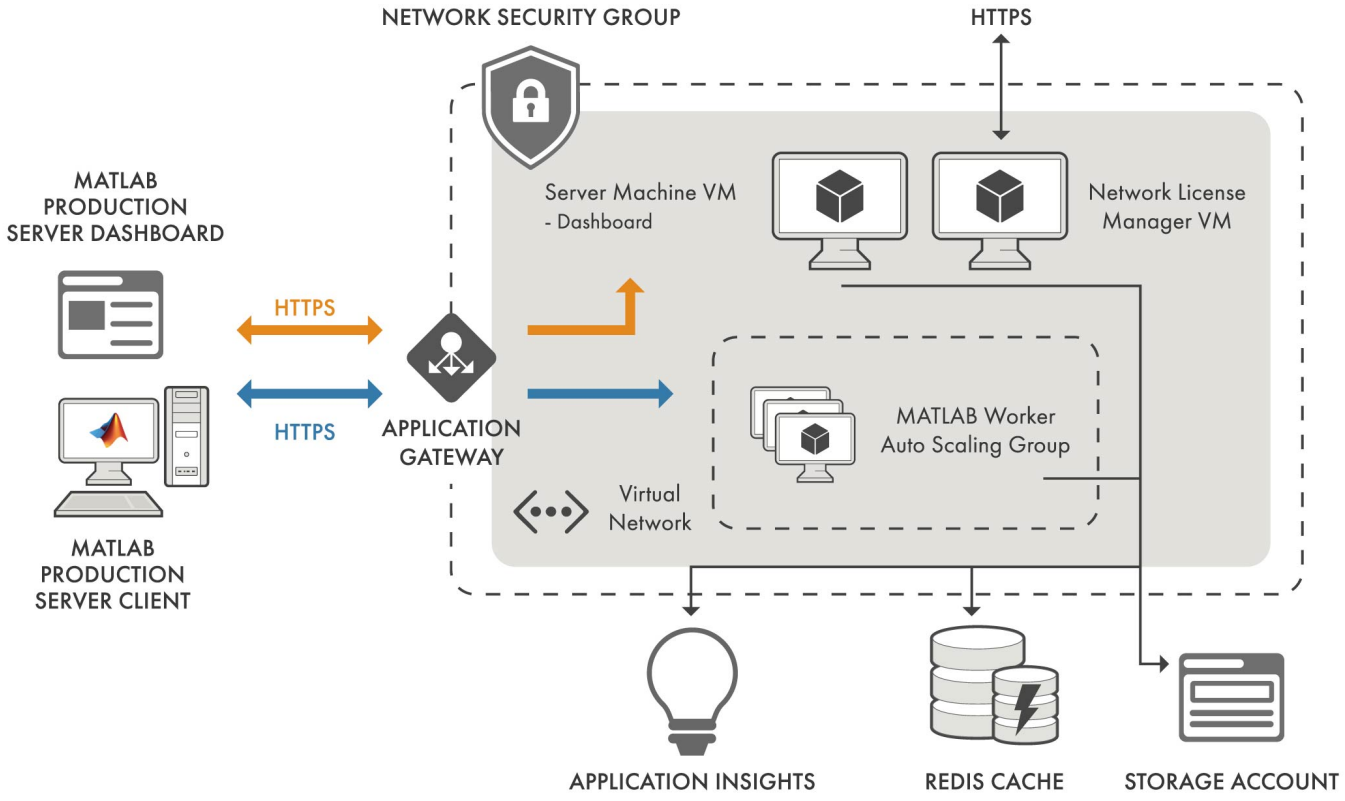
More About

- “Manage Azure Resources for MATLAB Production Server (PAYG)” on page 9-34
- “Manage MATLAB Production Server (PAYG)” on page 9-20
- “Azure Deployment for MATLAB Production Server (PAYG)” on page 9-9

Architecture and Resources on Azure

Deploying the MATLAB Production Server reference architecture on Azure creates several resources in your resource group. The following sections describe the architecture of MATLAB Production Server and the Azure resources that the deployment provisions.

MATLAB Production Server Reference Architecture on Azure



Azure Resources

The MATLAB Production Server deployment in Azure creates the following resources in your resource group.

Resource Name	Resource Name in Azure	Description
MATLAB Production Server dashboard virtual machine	`servermachine`	Virtual machine (VM) that hosts the MATLAB Production Server dashboard. Use the dashboard to: • Get the HTTPS endpoint to make requests. • Upload applications (CTF files) to the server. • Manage server configurations. • Configure access control for the dashboard and applications. For more information about the dashboard, see “Manage MATLAB Production Server Using the Dashboard” on page 9-25.
MATLAB Production Server public IP	`servermachine-public-ip`	Public IP address to connect to MATLAB Production Server dashboard. If you choose to not use public IP addresses during deployment, the ARM template does not create this resource.
Virtual machine scale set	`vmss<uniqueID>`	Number of identical VMs to be deployed. Each VM runs an instance of MATLAB Production Server that in turn runs multiple MATLAB Production Server workers. For information on how to change the number of VMs, see “Change the Number of Virtual Machines” on page 9-37 .

Resource Name	Resource Name in Azure	Description
Application gateway	`vmss<uniqueID>-agw`	Load balancer for routing traffic to MATLAB Production Server instances. The MATLAB Production Server dashboard retrieves the HTTPS endpoint for making requests to the server from the application gateway resource. Clients use the HTTPS endpoint for making requests to the server.
Storage account	`serverlog<uniqueID>`	Storage account that stores applications (CTF files) created by MATLAB Compiler SDK. The deployable archives are stored in an Azure file share.
Virtual network	`vmss<uniqueID>-vnet`	Virtual network that consists of the deployed resources.
Azure Cache for Redis	`vmss<uniqueID>redis`	Redis cache that enables caching of data between calls to MATLAB code running on a server instance. For more information on using a data cache, see “Use a Data Cache to Persist Data”.
Application Insights	`logs-apmservice`	Application performance management service that enables storing and viewing of all logs associated with deployment. For information on how to view the logs, see “View Logs” on page 9-38.

See Also

More About

- “Manage Azure Resources for MATLAB Production Server Reference Architecture” on page 9-37
- “Manage MATLAB Production Server Using the Dashboard” on page 9-25

Application Access Control

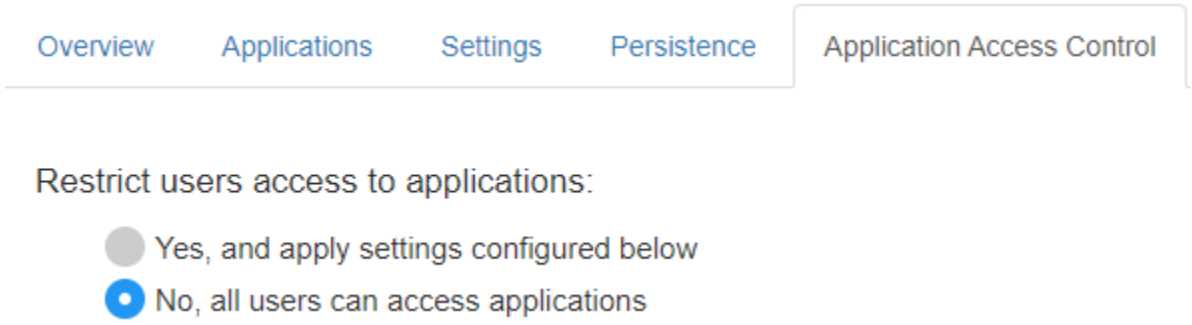
MATLAB Production Server (BYOL) uses Azure Active Directory (Azure AD) to restrict access to deployed applications to only certain groups of users.

Note Application access control is available only when you make server requests using the MATLAB Production Server RESTful API.

All users can access all applications by default.

To enable access control, configure Azure AD and define access control policy rules in the **Application Access Control** tab of the MATLAB Production Server dashboard. You can then generate an access token for the groups of users that you want to allow to access certain applications. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API.

You must log in to the dashboard as a global admin or manager to configure application access control.



Prerequisites

To use Azure AD for application access control, you must register a server application and a client application in the Azure portal using Azure App registrations. These applications are different from the application that you might have registered for dashboard access control. These applications are not related to the applications deployed to MATLAB Production Server or client applications written using the MATLAB Production Server client libraries.

Note The application registration process is determined by Azure and is subject to change.

Register Server Application in Azure

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server App`) then select **Register**.
4. In the application that you registered, select **Expose an API** in the left pane.

5 In the pane that opens, click **Add a scope**, and enter the scope information for your application. Click **Add Scope** to save the information. For more information on adding a scope, see Azure documentation. The following table lists the fields and values that you enter to add a scope.

Field	Value
Scope name	Enter a name, for example, `user_impersonation`.
Who can consent	Select `Admin and users`.
Admin consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
Admin consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
User consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
User consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
State	Select `Enabled`.

6 Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

Register Client Application in Azure

Register a client application in Azure to generate an access token to restrict the execution of deployed applications to only a certain group of users. You can register the client application as either a native app or a web app. If you register the client application as a native app, users have to log in using a user name and password to generate the access token. If you register the client application as a web app, users have to log in using the browser with single sign-on to generate the access token.

Registering client applications can require higher privileges in Azure based on your organization setup.

Register Client Application as Native Client

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > App registrations**. Select **New registration**.

3 In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Native Client`.
Redirect URI	Select `Public client/native (mobile & desktop)`.

4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the pane that opens, set the value for `allowPublicClient` to `true`. Click **Save**.
5. Click **API permissions** in the left navigation pane. Click **Add a permission**.
6. In the pane that opens, click **APIs my organization uses**.
7. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-49 step. In the pane that opens, select the scope name (for example, `user_impersonation`) then click **Add permissions.**

Register Client Application as Web Client

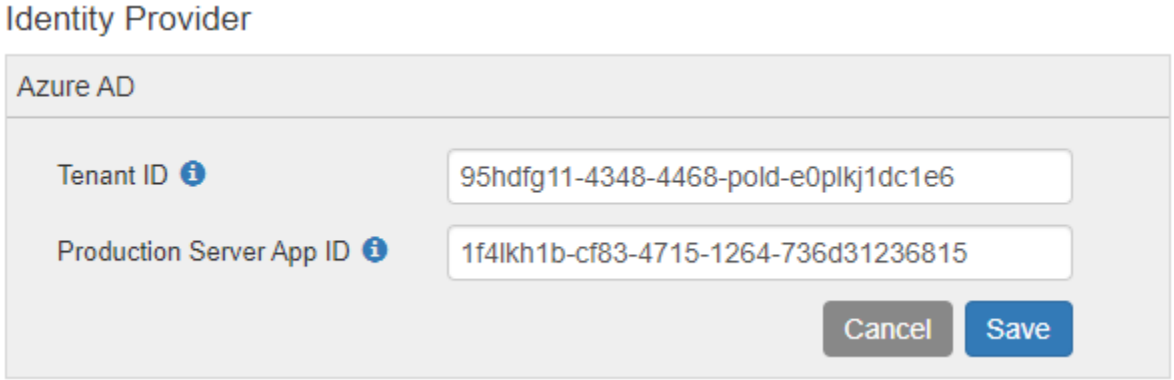
1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Web Client`.
Redirect URI	Select `Web`. Enter a valid redirect URI that will be used by your client application

4. Select **Certificates & secrets** in the left navigation pane.
5. Under **Client secrets**, create a new client secret, and save the value of the secret.
6. Click **API permissions** in the left navigation pane. Click **Add a permission**.
7. In the pane that opens, click **APIs my organization uses**.
8. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-49 step. In the pane that opens, select the scope name, for example, `user_impersonation`, then click **Add permissions.**

Configure Identity Provider

After you register the server application and client application in the Azure portal, configure Azure AD, which is the identity provider. To configure Azure AD, find the values for the tenant ID for your organization and the application ID for the server application that you created for application access control in the Azure portal. Enter these values in the **Identity Provider** section in the **Application Access Control** tab of the MATLAB Production Server dashboard, then click **Save**. Saving the values can take up to 30 seconds on aWindows VM.



Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to the **Tenant ID** in the dashboard.

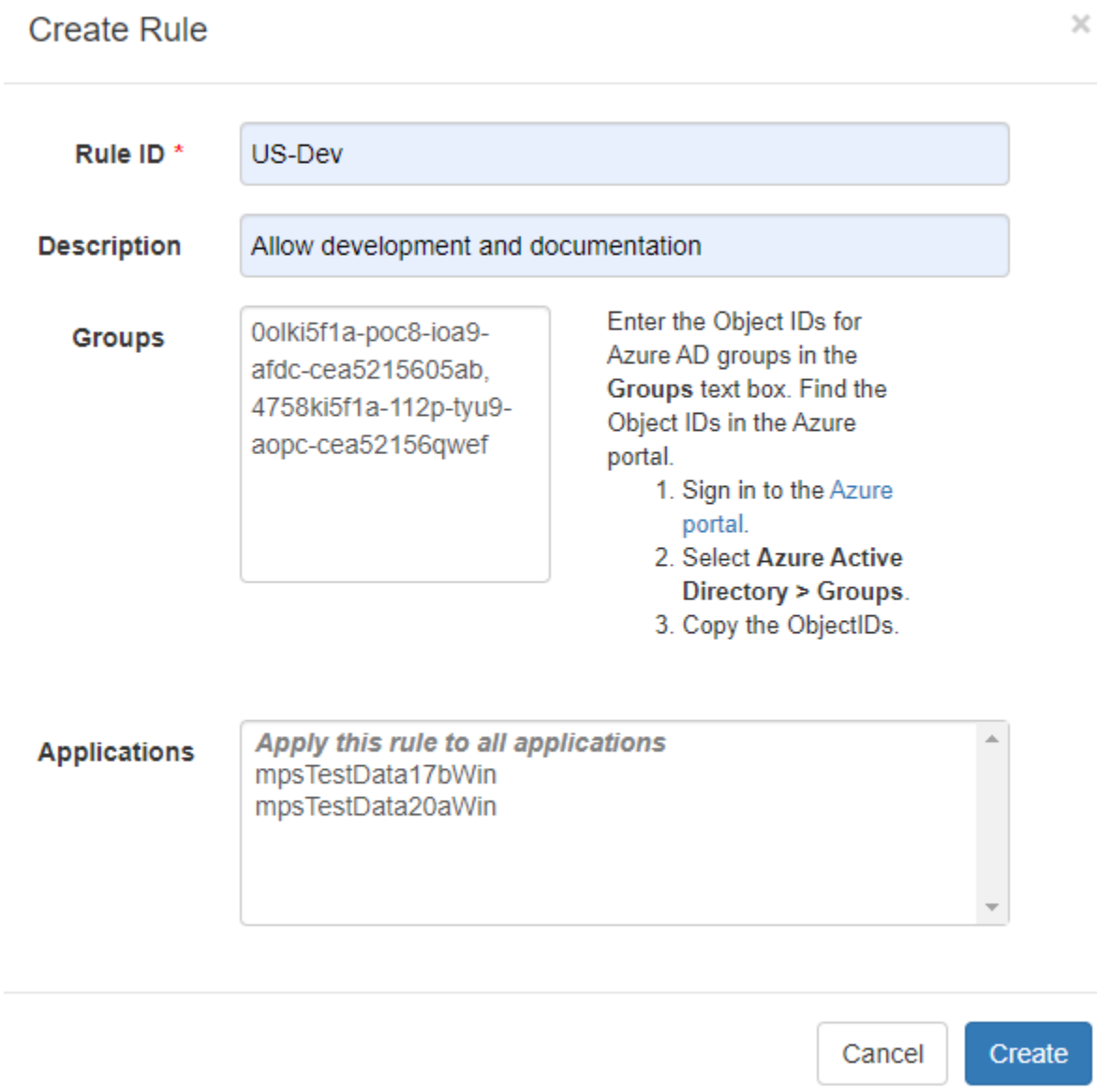
Configure Production Server App ID

Find the **Application (client) ID** of the server application in the Azure portal. This is the application that you registered in the “Register Server Application in Azure” on page 9-49 step.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server, for example, `MATLAB Production Server App`.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to the **Production Server App ID** in the dashboard.

Specify Access Control Policy Rules

Specify the applications that certain user groups can access by defining access control policy rules. To define the rule, click **Add Rule** in the **Access Control Policy** section in the **Application Access Control** tab of the MATLAB Production Server dashboard, and specify the following information.



Field	Value
Rule ID	Enter a name for the rule.
Description	Enter a description for your rule.
Groups	Enter the object IDs for the Azure AD groups. Follow the instructions shown to find object IDs in Azure.
Applications	Select specific applications that you want to allow the specified groups of users to access or select `Apply this rule to all applications` to select all applications.

Generate Access Token

Generate an access token for the groups of users that you want to allow to access the deployed applications. If the registered client application is a native app, users have to log in using a user name and password, or integrated Windows authentication to generate the access token. If the registered client application is a web app, users have to log in using the browser with single sign-on to generate the access token. You can use the Microsoft identity platform authentication libraries (Microsoft-supported client libraries or compatible client libraries in different programming languages) to generate the access token. For more information, see Microsoft documentation. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API. The format for this header is `Authorization:Bearer <access token>`.

See Also

More About

- “Manage Azure Resources for MATLAB Production Server (BYOL)” on page 9-31
- “Manage MATLAB Production Server (BYOL)” on page 9-15
- “Dashboard Access Control” on page 9-67
- “RESTful API”

Application Access Control

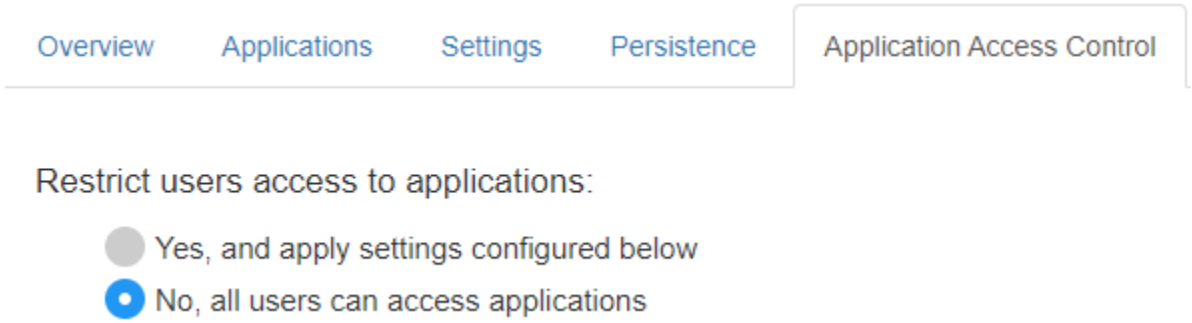
MATLAB Production Server pay as you go (PAYG) uses Azure Active Directory (Azure AD) to restrict access to deployed applications to only certain groups of users.

Note Application access control is available only when you make server requests using the MATLAB Production Server RESTful API.

All users can access all applications by default.

To enable access control, configure Azure AD and define access control policy rules in the **Application Access Control** tab of the MATLAB Production Server (PAYG) dashboard. You can then generate an access token for the groups of users that you want to allow to access certain applications. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API.

You must log in to the dashboard as a global admin or manager to configure application access control.



Prerequisites

To use Azure AD for application access control, you must register a server application and a client application in the Azure portal using Azure App registrations. These applications are different from the application that you might have registered for dashboard access control. These applications are not related to the applications deployed to MATLAB Production Server or client applications written using the MATLAB Production Server client libraries.

Note The application registration process is determined by Azure and is subject to change.

Register Server Application in Azure

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server App`) then select **Register**.
4. In the application that you registered, select **Expose an API** in the left pane.

5 In the pane that opens, click **Add a scope**, and enter the scope information for your application. Click **Add Scope** to save the information. For more information on adding a scope, see Azure documentation. The following table lists the fields and values that you enter to add a scope.

Field	Value
Scope name	Enter a name, for example, `user_impersonation`.
Who can consent	Select `Admin and users`.
Admin consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
Admin consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
User consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
User consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
State	Select `Enabled`.

6 Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

Register Client Application in Azure

Register a client application in Azure to generate an access token to restrict the execution of deployed applications to only a certain group of users. You can register the client application as either a native app or a web app. If you register the client application as a native app, users have to log in using a user name and password to generate the access token. If you register the client application as a web app, users have to log in using the browser with single sign-on to generate the access token.

Registering client applications can require higher privileges in Azure based on your organization setup.

Register Client Application as Native Client

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > App registrations**. Select **New registration**.

3 In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Native Client`.
Redirect URI	Select `Public client/native (mobile & desktop)`.

4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the pane that opens, set the value for `allowPublicClient` to `true`. Click **Save**.
5. Click **API permissions** in the left navigation pane. Click **Add a permission**.
6. In the pane that opens, click **APIs my organization uses**.
7. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-55 step. In the pane that opens, select the scope name (for example, `user_impersonation`) then click **Add permissions.**

Register Client Application as Web Client

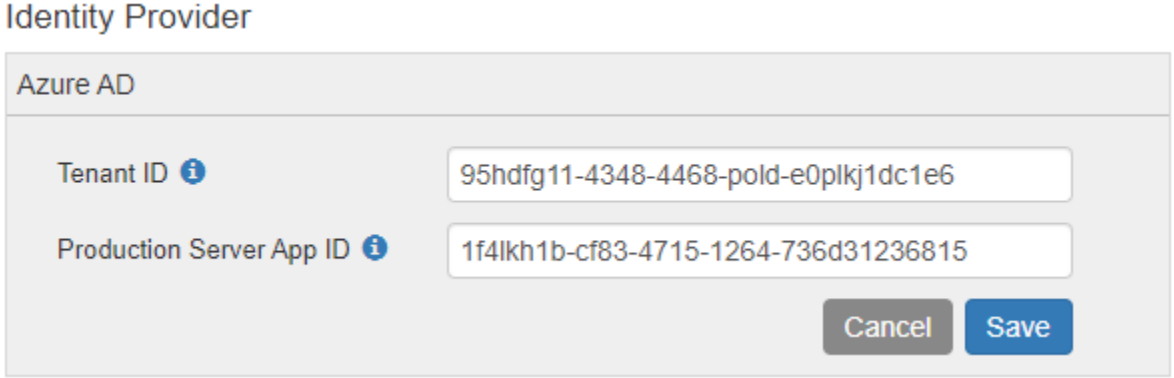
1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Web Client`.
Redirect URI	Select `Web`. Enter a valid redirect URI that will be used by your client application

4. Select **Certificates & secrets** in the left navigation pane.
5. Under **Client secrets**, create a new client secret, and save the value of the secret.
6. Click **API permissions** in the left navigation pane. Click **Add a permission**.
7. In the pane that opens, click **APIs my organization uses**.
8. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-55 step. In the pane that opens, select the scope name, for example, `user_impersonation`, then click **Add permissions.**

Configure Identity Provider

After you register the server application and client application in the Azure portal, configure Azure AD, which is the identity provider. To configure Azure AD, find the values for the tenant ID for your organization and the application ID for the server application that you created for application access control in the Azure portal. Enter these values in the **Identity Provider** section in the **Application Access Control** tab of the MATLAB Production Server (PAYG) dashboard, then click **Save**. Saving the values can take up to 30 seconds on aWindows VM.



Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to the **Tenant ID** in the dashboard.

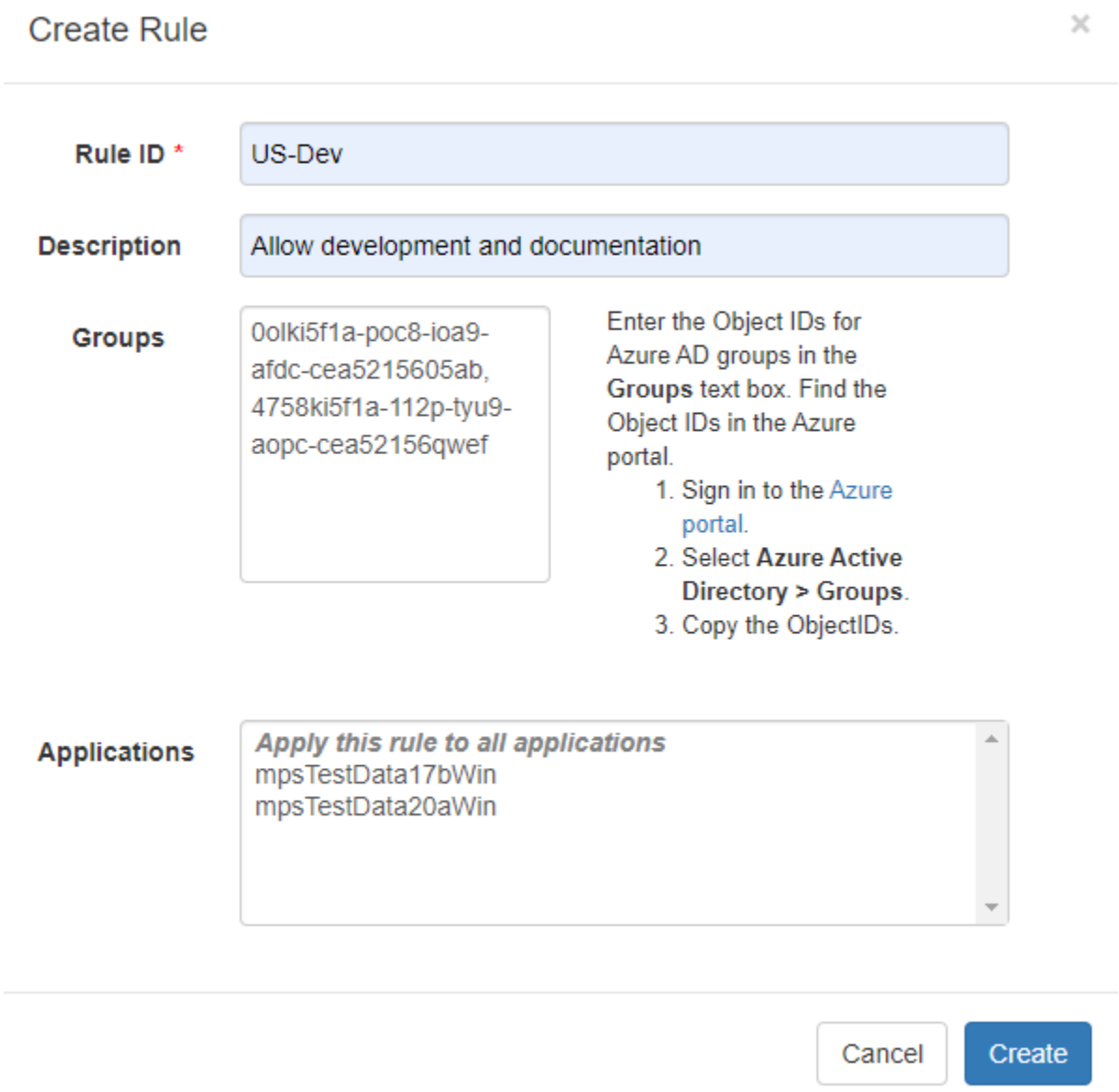
Configure Production Server App ID

Find the **Application (client) ID** of the server application in the Azure portal. This is the application that you registered in the “Register Server Application in Azure” on page 9-55 step.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server, for example, `MATLAB Production Server App`.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to the **Production Server App ID** in the dashboard.

Specify Access Control Policy Rules

Specify the applications that certain user groups can access by defining access control policy rules. To define the rule, click **Add Rule** in the **Access Control Policy** section in the **Application Access Control** tab of the MATLAB Production Server dashboard, and specify the following information.



Field	Value
Rule ID	Enter a name for the rule.
Description	Enter a description for your rule.
Groups	Enter the object IDs for the Azure AD groups. Follow the instructions shown to find object IDs in Azure.
Applications	Select specific applications that you want to allow the specified groups of users to access or select `Apply this rule to all applications` to select all applications.

Generate Access Token

Generate an access token for the groups of users that you want to allow to access the deployed applications. If the registered client application is a native app, users have to log in using a user name and password, or integrated Windows authentication to generate the access token. If the registered client application is a web app, users have to log in using the browser with single sign-on to generate the access token. You can use the Microsoft identity platform authentication libraries (Microsoft-supported client libraries or compatible client libraries in different programming languages) to generate the access token. For more information, see Microsoft documentation. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API. The format for this header is `Authorization:Bearer <access token>`.

See Also

More About

- “Manage MATLAB Production Server (PAYG)” on page 9-20
- “Dashboard Access Control” on page 9-72
- “RESTful API”

Application Access Control

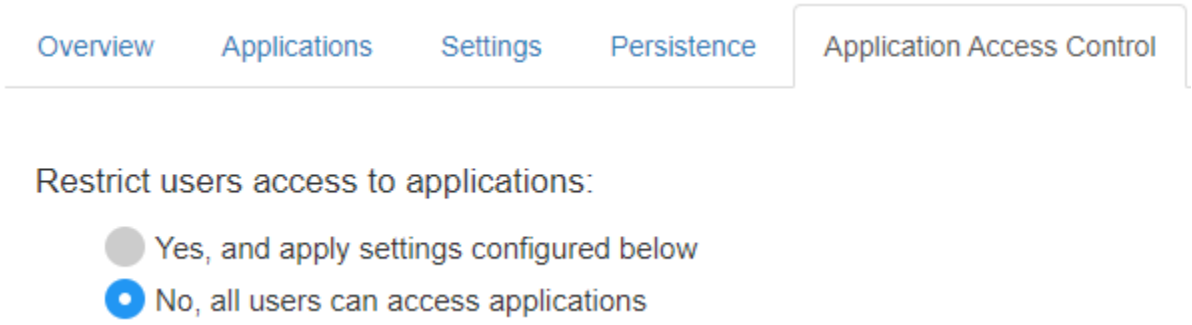
MATLAB Production Server reference architecture uses Azure Active Directory (Azure AD) to restrict access to deployed applications to only certain groups of users.

Note Application access control is available only when you make server requests using the MATLAB Production Server RESTful API.

All users can access all applications by default.

To enable access control, configure Azure AD and define access control policy rules in the **Application Access Control** tab of the MATLAB Production Server dashboard. You can then generate an access token for the groups of users that you want to allow to access certain applications. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API.

You must log in to the dashboard as a global admin or manager to configure application access control.



Prerequisites

To use Azure AD for application access control, you must register a server application and a client application in the Azure portal using Azure App registrations. These applications are different from the application that you might have registered for dashboard access control. These applications are not related to the applications deployed to MATLAB Production Server or client applications written using the MATLAB Production Server client libraries.

Note The application registration process is determined by Azure and is subject to change.

Register Server Application in Azure

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server App`) then select **Register**.
4. In the application that you registered, select **Expose an API** in the left pane.

5 In the pane that opens, click **Add a scope**, and enter the scope information for your application. Click **Add Scope** to save the information. For more information on adding a scope, see Azure documentation. The following table lists the fields and values that you enter to add a scope.

Field	Value
Scope name	Enter a name, for example, `user_impersonation`.
Who can consent	Select `Admin and users`.
Admin consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
Admin consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
User consent display name	Enter a name, for example, `Access MATLAB Production Server App`.
User consent description	Enter a description, for example, `Allow the application to access MATLAB Production Server App on behalf of the signed-in user`.
State	Select `Enabled`.

6 Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

Register Client Application in Azure

Register a client application in Azure to generate an access token to restrict the execution of deployed applications to only a certain group of users. You can register the client application as either a native app or a web app. If you register the client application as a native app, users have to log in using a user name and password to generate the access token. If you register the client application as a web app, users have to log in using the browser with single sign-on to generate the access token.

Registering client applications can require higher privileges in Azure based on your organization setup.

Register Client Application as Native Client

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > App registrations**. Select **New registration**.

3 In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Native Client`.
Redirect URI	Select `Public client/native (mobile & desktop)`.

4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the pane that opens, set the value for `allowPublicClient` to `true`. Click **Save**.
5. Click **API permissions** in the left navigation pane. Click **Add a permission**.
6. In the pane that opens, click **APIs my organization uses**.
7. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-61 step. In the pane that opens, select the scope name (for example, `user_impersonation`) then click **Add permissions.**

Register Client Application as Web Client

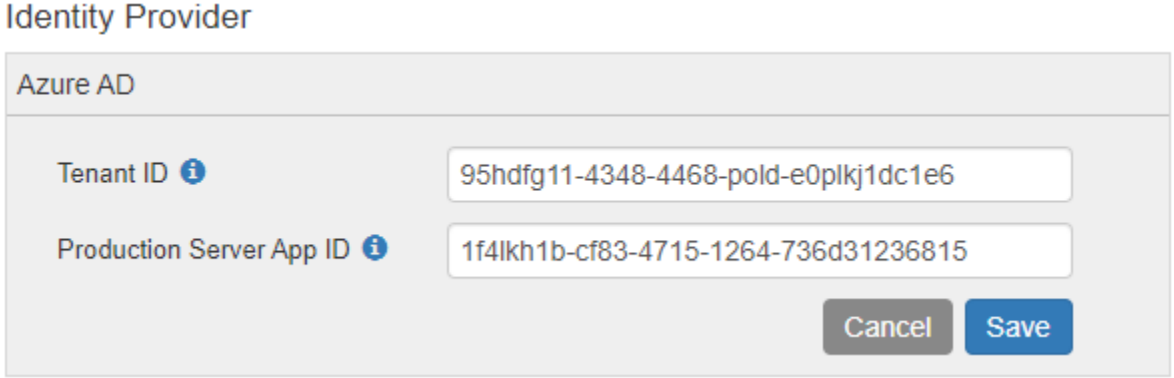
1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the pane that opens, enter the following registration information for your application, then click **Register**.

Field	Value
Name	Enter a name, for example, `MATLAB Production Server Web Client`.
Redirect URI	Select `Web`. Enter a valid redirect URI that will be used by your client application

4. Select **Certificates & secrets** in the left navigation pane.
5. Under **Client secrets**, create a new client secret, and save the value of the secret.
6. Click **API permissions** in the left navigation pane. Click **Add a permission**.
7. In the pane that opens, click **APIs my organization uses**.
8. Search for the `MATLAB Production Server App` server application that you registered in the "Register Server Application in Azure" on page 9-55 step. In the pane that opens, select the scope name, for example, `user_impersonation`, then click **Add permissions.**

Configure Identity Provider

After you register the server application and client application in the Azure portal, configure Azure AD, which is the identity provider. To configure Azure AD, find the values for the tenant ID for your organization and the application ID for the server application that you created for application access control in the Azure portal. Enter these values in the **Identity Provider** section in the **Application Access Control** tab of the MATLAB Production Server dashboard, then click **Save**. Saving the values can take up to 30 seconds on aWindows VM.



Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to the **Tenant ID** in the dashboard.

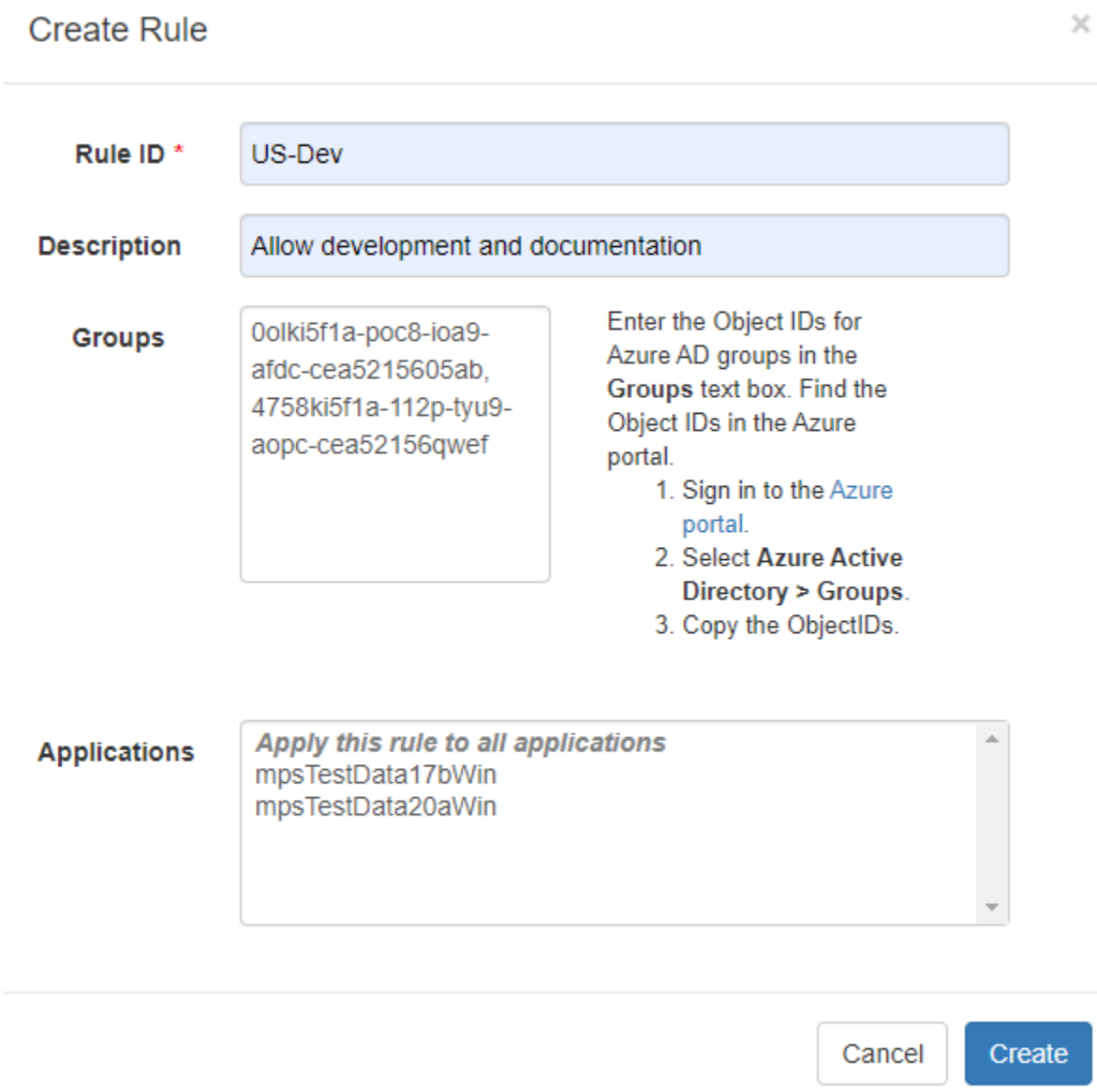
Configure Production Server App ID

Find the **Application (client) ID** of the server application in the Azure portal. This is the application that you registered in the “Register Server Application in Azure” on page 9-55 step.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server, for example, `MATLAB Production Server App`.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to the **Production Server App ID** in the dashboard.

Specify Access Control Policy Rules

Specify the applications that certain user groups can access by defining access control policy rules. To define the rule, click **Add Rule** in the **Access Control Policy** section in the **Application Access Control** tab of the MATLAB Production Server dashboard, and specify the following information.



Field	Value
Rule ID	Enter a name for the rule.
Description	Enter a description for your rule.
Groups	Enter the object IDs for the Azure AD groups. Follow the instructions shown to find object IDs in Azure.
Applications	Select specific applications that you want to allow the specified groups of users to access or select `Apply this rule to all applications` to select all applications.

Generate Access Token

Generate an access token for the groups of users that you want to allow to access the deployed applications. If the registered client application is a native app, users have to log in using a user name and password, or integrated Windows authentication to generate the access token. If the registered client application is a web app, users have to log in using the browser with single sign-on to generate the access token. You can use the Microsoft identity platform authentication libraries (Microsoft-supported client libraries or compatible client libraries in different programming languages) to generate the access token. For more information, see Microsoft documentation. Use this access token in the HTTP authorization header when you make a request to the server using the MATLAB Production Server RESTful API. The format for this header is `Authorization:Bearer <access token>`.

See Also

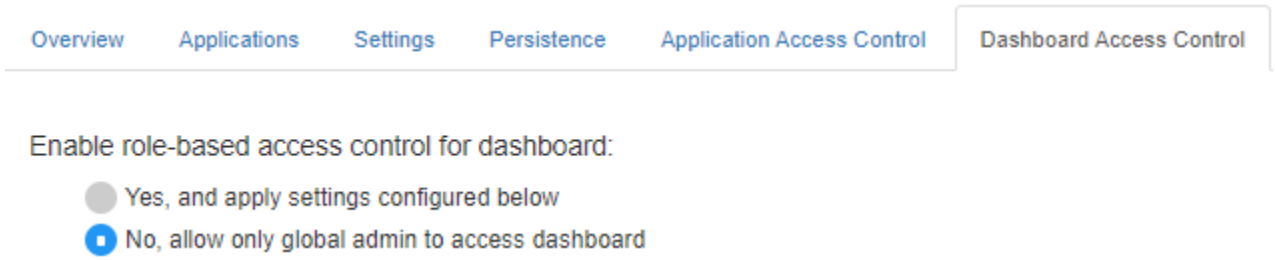
More About

- MATLAB Production Server Reference Architecture on Azure
- “Manage MATLAB Production Server Using the Dashboard” on page 9-25
- “Dashboard Access Control” on page 9-77
- “RESTful API”

Dashboard Access Control

MATLAB Production Server (BYOL) on Azure uses Azure Active Directory (Azure AD) for configuring role-based access control for the dashboard. Configure role-based access control in the operating **Dashboard Access Control** tab of the MATLAB Production Server dashboard. Role-based access control allows you to grant a user the privileges to perform tasks on the dashboard based on their role. To enable dashboard access control, you must configure the identity provider (Azure AD) and specify access control policies. The policies define the areas of the dashboard that the users or groups of users can access and the tasks that they can perform in these areas.

Only the global admin can log in to the dashboard when dashboard access control is disabled or not configured. Only the global admin has privileges to configure dashboard access control.



The dashboard access control feature supports the following roles.

- Application author: Application authors can upload and delete applications and view logs.
- Manager: Managers can edit server settings, configure access control for applications, manage persistence services, and have all the privileges of an application author, which include uploading and deleting applications and viewing logs.
- Global admin: Global admins can log in to server VMs and configure which users or groups of users can access the dashboard, and have all the privileges of a manager, which include editing server logs, configuring access control for applications, uploading and deleting applications, and viewing logs.

After you configure dashboard access control, the login page for the MATLAB Production Server dashboard gives you the option to log in as a global admin, manager, or application author. The log in process for manager and application author supports single sign-on using Azure AD.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	**Applications**	**Settings**	**Persistence**	**Application Access Control**	**Dashboard Access Control**	**Logs**
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

Prerequisites

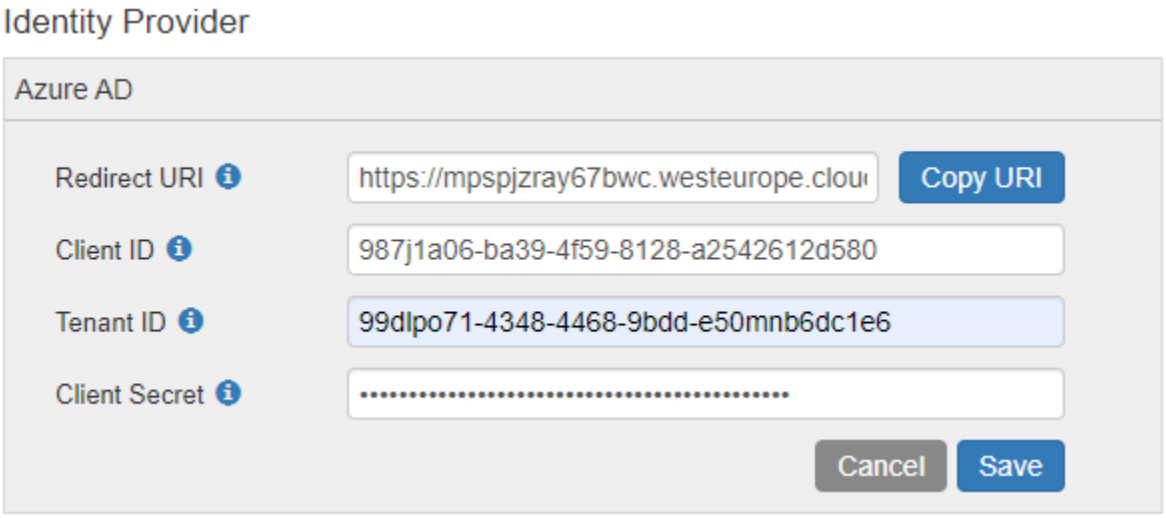
To use Azure AD for dashboard access control, you must register a *web* application for MATLAB Production Server *dashboard* using the Azure portal, if you do not already have one. This application is different from the applications that you might have registered for application access control.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server Dashboard App`) then select **Register**.
4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

For more information on how to register an application, see Azure documentation.

Configure Identity Provider

Configure Azure AD by populating the following fields. Click **Save** after you have entered the values for all the fields.



Configure Redirect URI

Copy the **Redirect URI** from the dashboard and paste it in the Azure portal in the **Redirect URIs** field of the MATLAB Production Server dashboard application.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server dashboard, then click **Redirect URIs**.
4. From the **Type** list, select **Web**.
5. Copy the **Redirect URI** from **MATLAB Production Server Dashboard > Dashboard Access Control** and paste it in the Azure **Redirect URI** text box.
6. Click **Save**.

Configure Client ID

Find the **Application (client) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to **Client ID** in the dashboard.

Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to **Tenant ID** in the dashboard.

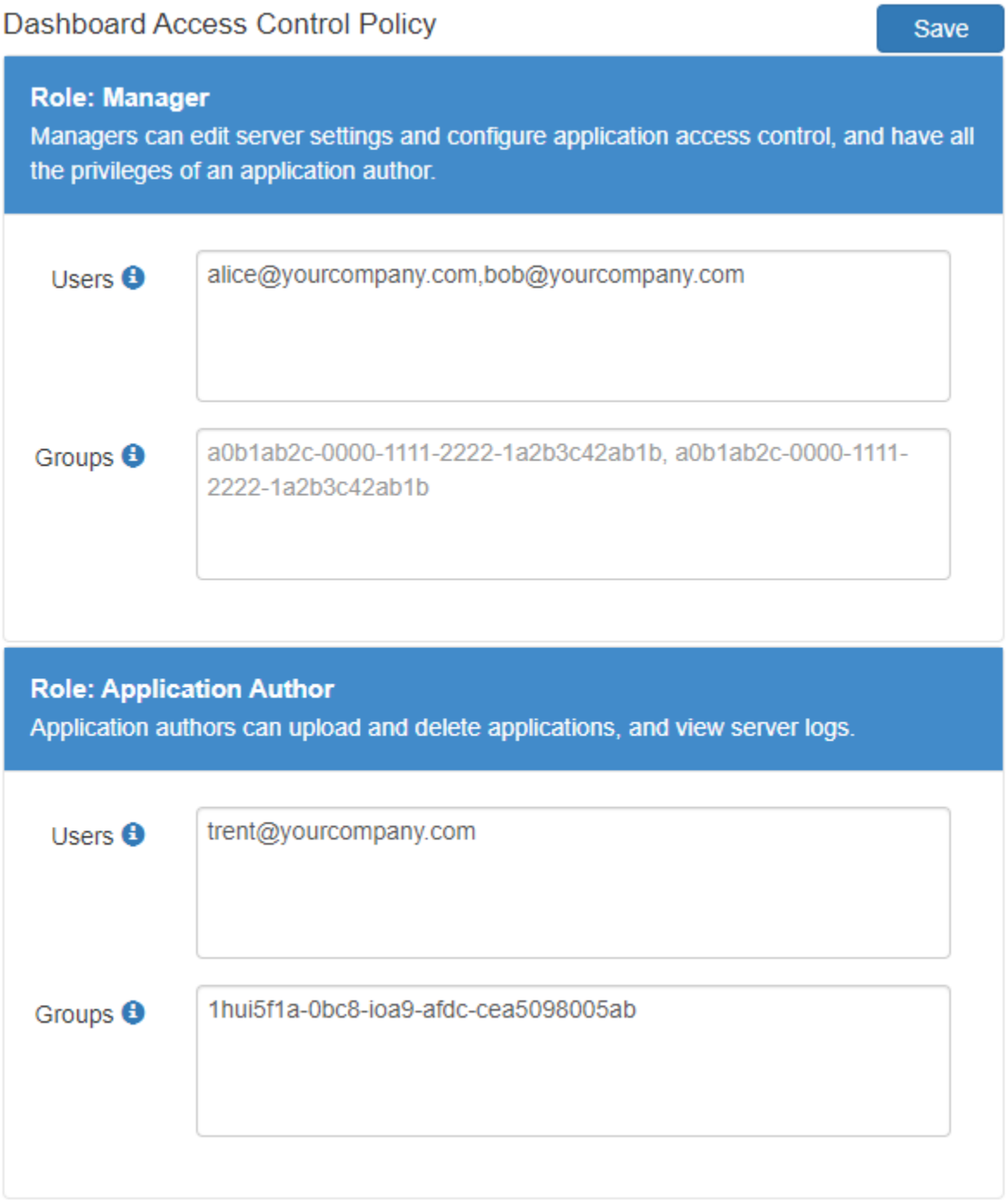
Configure Client Secret

Find the **Client Secret** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Select **Certificates & secrets**.
5. Under **Client secrets**, create a new client secret or use an existing one.
6. Copy the parameter value for the client secret and paste it into the text box corresponding to **Client Secret** in the dashboard.

Specify Dashboard Access Control Policy

Before you can specify dashboard access control policies, you must have users and groups set up in Azure AD. Use the policies to assign the manager and application author roles to users or groups of users in your organization by entering their Azure user names and group IDs. Click **Save** after you enter the values. These users can then access the dashboard using single sign-on. For example, in the following illustration, the users *`alice@yourcompany.com`* and *`bob@yourcompany.com`* have the manager role. The user *`trent@yourcompany.com`* and all users that belong to group ID *`1hui5f1a-0bc8-ioa9-afdc-cea5098005ab`* have the application author role.



Configure Users

Enter the Azure user names in the **Users** text box. Find the user names in the Azure portal.

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > Users**.

3 Copy the parameter values for the user names and paste them into the text box corresponding to **Users** in the dashboard. Use a comma to separate multiple user names.

Configure Groups

Enter the object IDs for Azure AD groups in the **Groups** text box. Find the object IDs in the Azure portal.

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > Groups**.

3 Copy the parameter values for the object IDs and paste them in the text box corresponding to **Groups** in the dashboard. Use a comma to separate multiple object IDs.

See Also

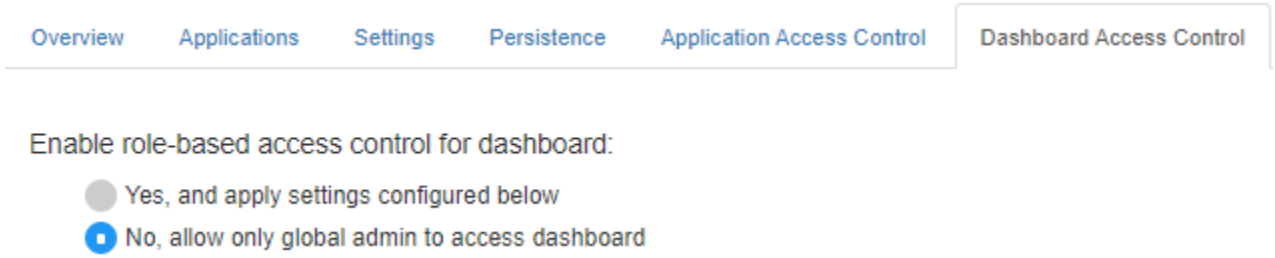
More About

- “Manage MATLAB Production Server (BYOL)” on page 9-15
- “Application Access Control” on page 9-49

Dashboard Access Control

MATLAB Production Server pay as you go (PAYG) uses Azure Active Directory (Azure AD) for configuring role-based access control for the dashboard. Configure role-based access control in the operating **Dashboard Access Control** tab of the MATLAB Production Server (PAYG) dashboard. Role-based access control allows you to grant a user the privileges to perform tasks on the dashboard based on their role. To enable dashboard access control, you must configure the identity provider (Azure AD) and specify access control policies. The policies define the areas of the dashboard that the users or groups of users can access and the tasks that they can perform in these areas.

Only the global admin can log in to the dashboard when dashboard access control is disabled or not configured. Only the global admin has privileges to configure dashboard access control.



The dashboard access control feature supports the following roles.

- Application author: Application authors can upload and delete applications and view logs.
- Manager: Managers can edit server settings, configure access control for applications, manage persistence services, and have all the privileges of an application author, which include uploading and deleting applications and viewing logs.
- Global admin: Global admins can log in to server VMs and configure which users or groups of users can access the dashboard, and have all the privileges of a manager, which include editing server logs, configuring access control for applications, uploading and deleting applications, and viewing logs.

After you configure dashboard access control, the login page for the MATLAB Production Server (PAYG) dashboard gives you the option to log in as a global admin, manager, or application author. The log in process for manager and application author supports single sign-on using Azure AD.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	Applications	Settings	Persistence	Application Access Control	Dashboard Access Control	Logs
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

Prerequisites

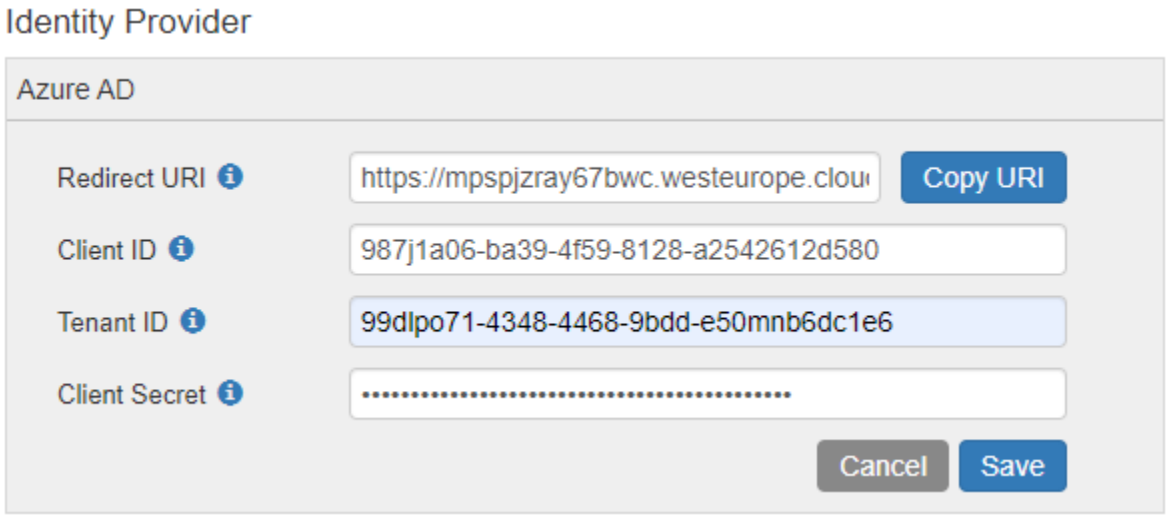
To use Azure AD for dashboard access control, you must register a *web* application for MATLAB Production Server *dashboard* using the Azure portal, if you do not already have one. This application is different from the applications that you might have registered for application access control.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server Dashboard App`) then select **Register**.
4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

For more information on how to register an application, see Azure documentation.

Configure Identity Provider

Configure Azure AD by populating the following fields. Click **Save** after you have entered the values for all the fields.



Configure Redirect URI

Copy the **Redirect URI** from the dashboard and paste it in the Azure portal in the **Redirect URIs** field of the MATLAB Production Server dashboard application.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server dashboard, then click **Redirect URIs**.
4. From the **Type** list, select **Web**.
5. Copy the **Redirect URI** from **MATLAB Production Server Dashboard > Dashboard Access Control** and paste it in the Azure **Redirect URI** text box.
6. Click **Save**.

Configure Client ID

Find the **Application (client) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to **Client ID** in the dashboard.

Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to **Tenant ID** in the dashboard.

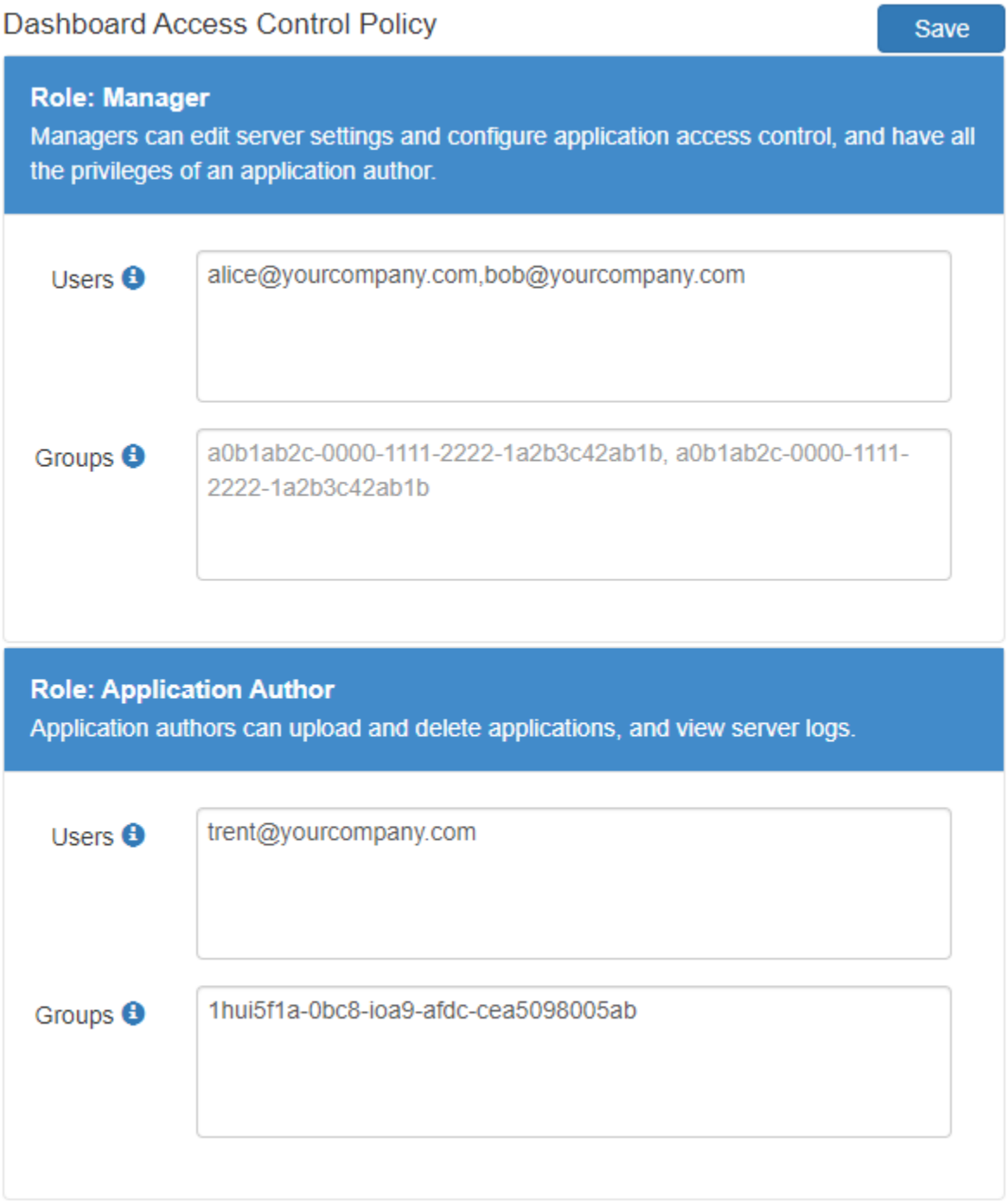
Configure Client Secret

Find the **Client Secret** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Select **Certificates & secrets**.
5. Under **Client secrets**, create a new client secret or use an existing one.
6. Copy the parameter value for the client secret and paste it into the text box corresponding to **Client Secret** in the dashboard.

Specify Dashboard Access Control Policy

Before you can specify dashboard access control policies, you must have users and groups set up in Azure AD. Use the policies to assign the manager and application author roles to users or groups of users in your organization by entering their Azure user names and group IDs. Click **Save** after you enter the values. These users can then access the dashboard using single sign-on. For example, in the following illustration, the users `alice@yourcompany.com` and `bob@yourcompany.com` have the manager role. The user `trent@yourcompany.com` and all users that belong to group ID `1hui5f1a-0bc8-ioa9-afdc-cea5098005ab` have the application author role.



Configure Users

Enter the Azure user names in the **Users** text box. Find the user names in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Users**.

3 Copy the parameter values for the user names and paste them into the text box corresponding to **Users** in the dashboard. Use a comma to separate multiple user names.

Configure Groups

Enter the object IDs for Azure AD groups in the **Groups** text box. Find the object IDs in the Azure portal.

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > Groups**.

3 Copy the parameter values for the object IDs and paste them in the text box corresponding to **Groups** in the dashboard. Use a comma to separate multiple object IDs.

See Also

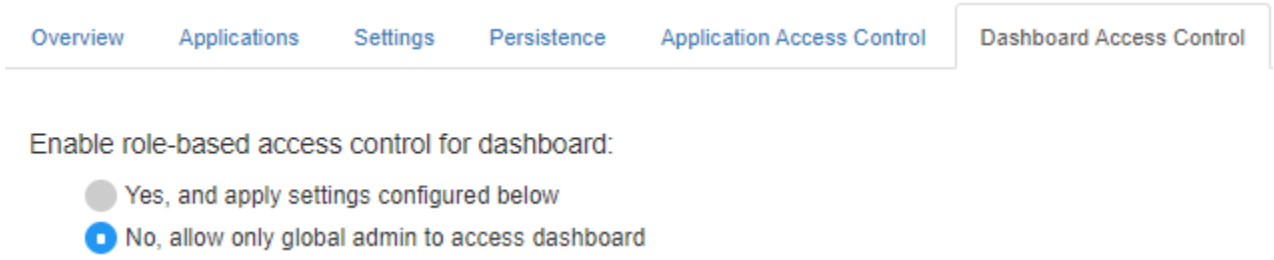
More About

- “Manage MATLAB Production Server (PAYG)” on page 9-20
- “Application Access Control” on page 9-55

Dashboard Access Control

The MATLAB Production Server reference architecture on Azure uses Azure Active Directory (Azure AD) for configuring role-based access control for the dashboard. Configure role-based access control in the operating **Dashboard Access Control** tab of the MATLAB Production Server dashboard. Role-based access control allows you to grant a user the privileges to perform tasks on the dashboard based on their role. To enable dashboard access control, you must configure the identity provider (Azure AD) and specify access control policies. The policies define the areas of the dashboard that the users or groups of users can access and the tasks that they can perform in these areas.

Only the global admin can log in to the dashboard when dashboard access control is disabled or not configured. Only the global admin has privileges to configure dashboard access control.



The dashboard access control feature supports the following roles.

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After you configure dashboard access control, the login page for the MATLAB Production Server dashboard gives you the option to log in as a global admin, manager, or application author. The log in process for manager and application author supports single sign-on using Azure AD.

The following table shows the dashboard tabs that users with these roles can access.

	Overview	**Applications**	**Settings**	**Persistence**	**Application Access Control**	**Dashboard Access Control**	**Logs**
Global Admin	✓	✓	✓	✓	✓	✓	✓
Manager	✓	✓	✓	✓	✓		✓
Application Author	✓	✓					✓

Prerequisites

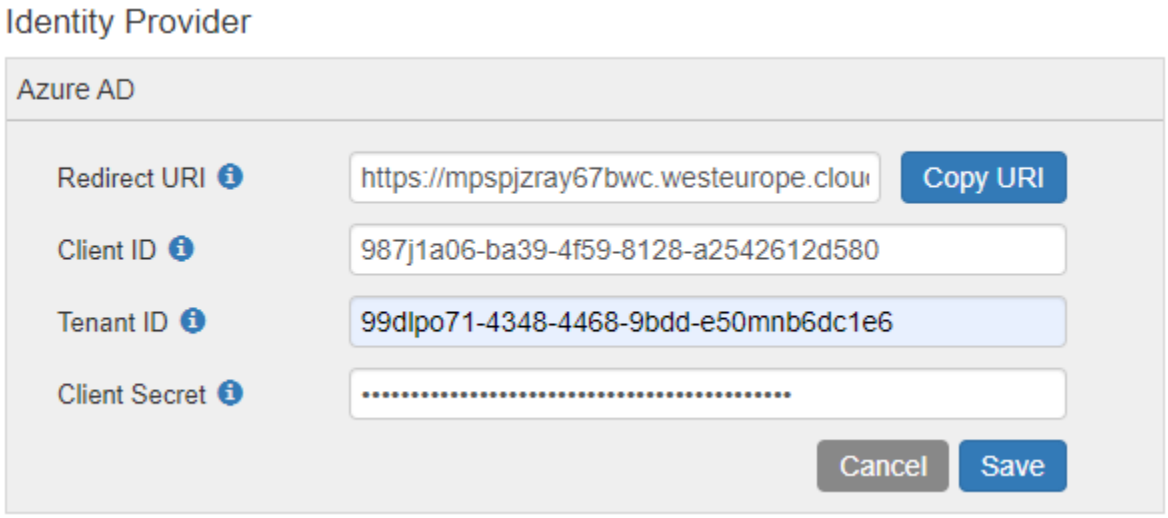
To use Azure AD for dashboard access control, you must register a *web* application for MATLAB Production Server *dashboard* using the Azure portal, if you do not already have one. This application is different from the applications that you might have registered for application access control.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**. Select **New registration**.
3. In the resulting pane, enter the name of the application (for example, `MATLAB Production Server Dashboard App`) then select **Register**.
4. Click **Manifest** in the left navigation pane. In the JSON that is displayed in the resulting pane, set the value for `groupMembershipClaims` to `"SecurityGroup"`. Click **Save**.

For more information on how to register an application, see Azure documentation.

Configure Identity Provider

Configure Azure AD by populating the following fields. Click **Save** after you have entered the values for all the fields.



Configure Redirect URI

Copy the **Redirect URI** from the dashboard and paste it in the Azure portal in the **Redirect URIs** field of the MATLAB Production Server dashboard application.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for MATLAB Production Server dashboard, then click **Redirect URIs**.
4. From the **Type** list, select **Web**.
5. Copy the **Redirect URI** from **MATLAB Production Server Dashboard > Dashboard Access Control** and paste it in the Azure **Redirect URI** text box.
6. Click **Save**.

Configure Client ID

Find the **Application (client) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Copy the parameter value for **Application (client) ID** and paste it into the text box corresponding to **Client ID** in the dashboard.

Configure Tenant ID

Find the **Directory (tenant) ID** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Properties**.
3. Copy the parameter value for **Directory (tenant) ID** and paste it into the text box corresponding to **Tenant ID** in the dashboard.

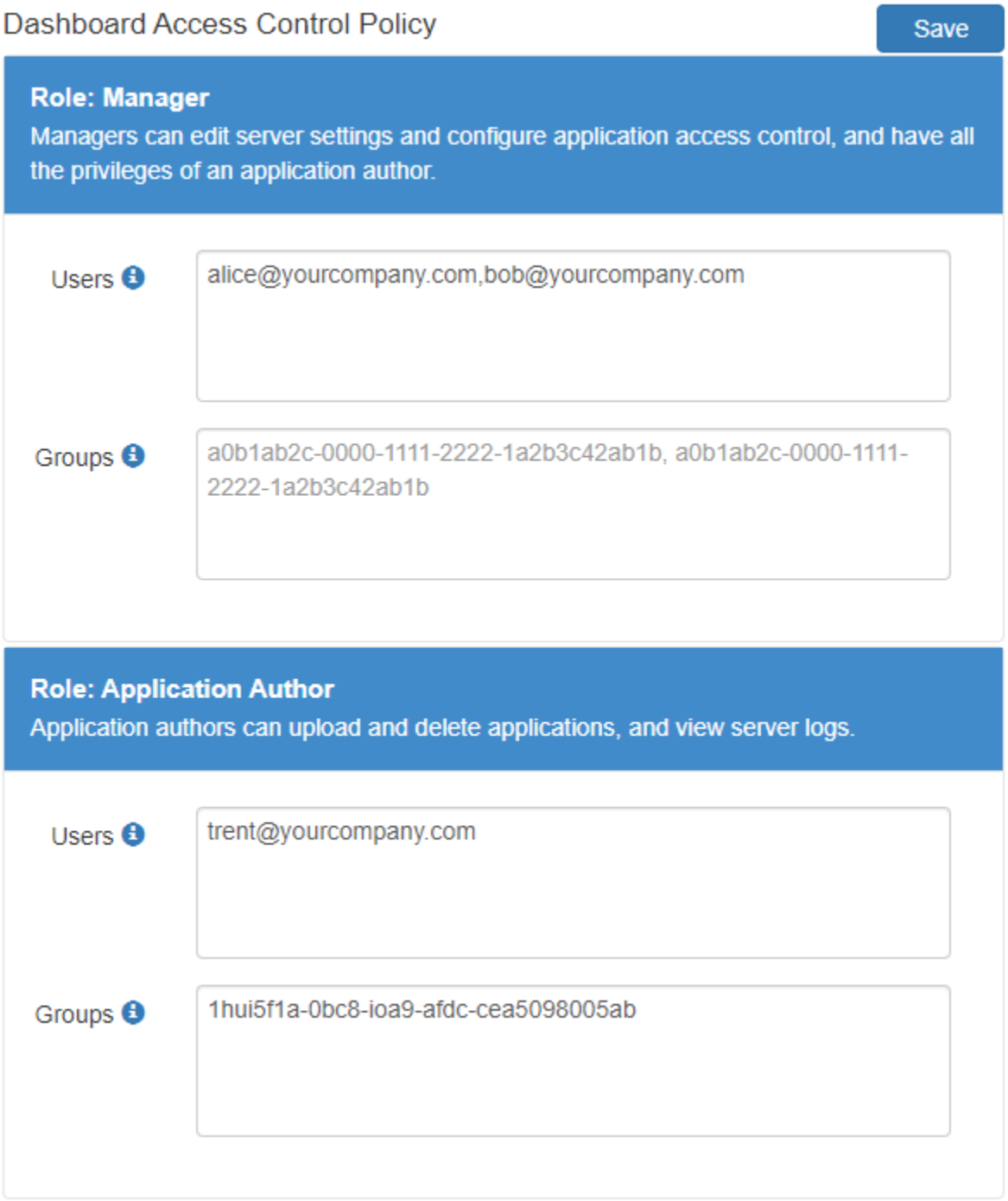
Configure Client Secret

Find the **Client Secret** in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > App registrations**.
3. Select the application used for the MATLAB Production Server dashboard.
4. Select **Certificates & secrets**.
5. Under **Client secrets**, create a new client secret or use an existing one.
6. Copy the parameter value for the client secret and paste it into the text box corresponding to **Client Secret** in the dashboard.

Specify Dashboard Access Control Policy

Before you can specify dashboard access control policies, you must have users and groups set up in Azure AD. Use the policies to assign the manager and application author roles to users or groups of users in your organization by entering their Azure user names and group IDs. Click **Save** after you enter the values. These users can then access the dashboard using single sign-on. For example, in the following illustration, the users `alice@yourcompany.com` and `bob@yourcompany.com` have the manager role. The user `trent@yourcompany.com` and all users that belong to group ID `1hui5f1a-0bc8-ioa9-afdc-cea5098005ab` have the application author role.



Configure Users

Enter the Azure user names in the **Users** text box. Find the user names in the Azure portal.

1. Sign in to the Azure portal.
2. Select **Azure Active Directory > Users**.

3 Copy the parameter values for the user names and paste them into the text box corresponding to **Users** in the dashboard. Use a comma to separate multiple user names.

Configure Groups

Enter the object IDs for Azure AD groups in the **Groups** text box. Find the object IDs in the Azure portal.

1 Sign in to the Azure portal.

2 Select **Azure Active Directory > Groups**.

3 Copy the parameter values for the object IDs and paste them in the text box corresponding to **Groups** in the dashboard. Use a comma to separate multiple object IDs.

See Also

More About

- MATLAB Production Server Reference Architecture on Azure
- “Manage MATLAB Production Server Using the Dashboard” on page 9-25
- “Application Access Control” on page 9-61

Execute MATLAB Functions on MATLAB Production Server (BYOL)

Client applications for MATLAB Production Server bring your own license (BYOL) are different from those for on-premises server instances in several ways. To execute MATLAB functions deployed on MATLAB Production Server (BYOL), you must use the MATLAB execution endpoint URL specified in the cloud console. Depending on the implementation of your client program, you might have to update your code to use the Azureapplication gateway self-signed SSL certificate and cookie-based session affinity.

Similar to client applications for on-premise server installations, you must use the MATLAB Production Server client libraries for client applications that you write using Java®, .NET, C, and Python®.

Use MATLAB Execution Endpoint URL

After your MATLAB Production Server (BYOL) deployment to Azure is complete, log in to the dashboard to retrieve the MATLAB execution endpoint. The **Overview** tab in the dashboard specifies the **MATLAB Execution Endpoint**. For information on accessing the dashboard, see “Connect to Dashboard” on page 9-15.

This endpoint is an HTTPS URL that client programs use to make requests to the server and execute MATLAB functions deployed to the server. For example, if the MATLAB execution endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, specify the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

Download Client Libraries

If you want to write client programs in Java, .NET, C, and Python for invoking MATLAB functions deployed on the server, you must use the MATLAB Production Server client libraries. Download the client libraries from MATLAB Production Server Client Libraries.

Work with Self-Signed Certificate

The Azure application gateway in the deployment provides theMATLAB execution endpoint, which is an HTTPS URL that client programs use to send requests to the server. The application gateway uses a self-signed SSL certificate. Replacing the self-signed certificate with a certificate signed by a certificate authority (CA) is recommended. For information on how to change the self-signed certificate, see “Change Self-Signed Certificate to Application Gateway” on page 9-31.

However, if you want to use the self-signed certificate and send HTTPS requests to the server, client programs must disable host name verification to avoid encountering an exception caused by a failure in host name verification. The verification fails due to a mismatch between the host names in the HTTPS URL for MATLAB function execution and the common name (CN) of the self-signed certificate. The host name for the HTTPS server endpoint has the value `<uniqueID>.<location>.cloudapp.azure.com`, but the CN has the value `azure.com`.

Depending on the implementation of your client program, you might also have to retrieve the self-signed certificate that the application gateway uses and add the certificate to your local truststore.

For more information on configuring the client environment, see “Configure Client Environment for SSL” for a Java client and “Configure the Client Environment for SSL” for a .NET client.

Asynchronous Request Execution Using RESTful API

The Azure application gateway provides cookie-based session affinity, where it uses cookies to keep a user session on the same server. On receiving a request from a client program, the application gateway sets the `Set-Cookie` HTTP response header with information about the server virtual machine (VM) that processes the request. A client program that uses asynchronous requests to execute a MATLAB function deployed to the server must set the `Cookie` HTTP request header with the value of the `Set-Cookie` header for all subsequent requests. This ensures that same server VM that processes the first request processes all subsequent requests for that session.

For information on writing client programs using the MATLAB Production Server RESTful API, see “RESTful API”.

See Also

More About

- “Manage MATLAB Production Server (BYOL)” on page 9-15
- “Manage Azure Resources for MATLAB Production Server (BYOL)” on page 9-31
- “RESTful API”

Execute MATLAB Functions on MATLAB Production Server (PAYG)

Client applications for MATLAB Production Server pay as you go (PAYG) are different from those for on-premises server instances in several ways. To execute MATLAB functions deployed on MATLAB Production Server (PAYG), you must use the MATLAB execution endpoint URL specified in the dashboard. Depending on the implementation of your client program, you might have to update your code to use the Azureapplication gateway self-signed SSL certificate and cookie-based session affinity.

Similar to client applications for on-premise server installations, you must use the MATLAB Production Server client libraries for client applications that you write using Java, .NET, C, and Python.

Use MATLAB Execution Endpoint URL

After your MATLAB Production Server (PAYG) deployment to Azure is complete, log in to the dashboard to retrieve the MATLAB execution endpoint. The **Overview** tab in the dashboard specifies the **MATLAB Execution Endpoint**. For information on accessing the dashboard, see “Connect to Dashboard” on page 9-20.

This endpoint is an HTTPS URL that client programs use to make requests to the server and execute MATLAB functions deployed to the server. For example, if the MATLAB execution endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, specify the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

Download Client Libraries

If you want to write client programs in Java, .NET, C, and Python for invoking MATLAB functions deployed on the server, you must use the MATLAB Production Server client libraries. Download the client libraries from `https://www.mathworks.com/products/matlab-production-server/client-libraries.html`.

Work with Self-Signed Certificate

The Azure application gateway in the deployment provides the MATLAB execution endpoint, which is an HTTPS URL that client programs use to send requests to the server. The application gateway uses a self-signed SSL certificate. Replacing the self-signed certificate with a certificate signed by a certificate authority (CA) is recommended. For information on how to change the self-signed certificate, see “Change Self-Signed Certificate to Application Gateway” on page 9-34.

However, if you want to use the self-signed certificate and send HTTPS requests to the server, client programs must disable host name verification to avoid encountering an exception caused by a failure in host name verification. The verification fails due to a mismatch between the host names in the HTTPS URL for MATLAB function execution and the common name (CN) of the self-signed certificate. The host name for the MATLAB execution endpoint has the value `<uniqueID>.<location>.cloudapp.azure.com`, but the CN has the value `azure.com`.

Depending on the implementation of your client program, you might also have to retrieve the self-signed certificate that the application gateway uses and add the certificate to your local truststore.

For more information on configuring the client environment, see “Configure Client Environment for SSL” for a Java client and “Configure the Client Environment for SSL” for a .NET client.

Asynchronous Request Execution Using RESTful API

The Azure application gateway provides cookie-based session affinity, where it uses cookies to keep a user session on the same server. On receiving a request from a client program, the application gateway sets the `Set-Cookie` HTTP response header with information about the server virtual machine (VM) that processes the request. A client program that uses asynchronous requests to execute a MATLAB function deployed to the server must set the `Cookie` HTTP request header with the value of the `Set-Cookie` header for all subsequent requests. This ensures that same server VM that processes the first request processes all subsequent requests for that session.
For information on writing client programs using the MATLAB Production Server RESTful API, see “RESTful API”.

See Also

More About

- “Manage MATLAB Production Server (PAYG)” on page 9-20
- “Manage Azure Resources for MATLAB Production Server (PAYG)” on page 9-34
- “RESTful API”

Execute MATLAB Functions on MATLAB Production Server Reference Architecture

Client applications for MATLAB Production Server on the cloud are different from those for on-premises server instances in several ways. To execute MATLAB functions deployed on MATLAB Production Server on the cloud, you must use the MATLAB execution endpoint URL specified in the dashboard. Depending on the implementation of your client program, you might have to update your code to use the Azureapplication gateway self-signed SSL certificate and cookie-based session affinity.

Similar to client applications for on-premise server installations, you must use the MATLAB Production Server client libraries for client applications that you write using Java, .NET, C, and Python.

Use MATLAB Execution Endpoint URL

After your MATLAB Production Server deployment to Azure is complete, log in to the dashboard to retrieve the MATLAB execution endpoint. The **Overview** tab in the dashboard specifies the **MATLAB Execution Endpoint**. For information on accessing the dashboard, see “Connect to Dashboard” on page 9-25.

This endpoint is an HTTPS URL that client programs use to make requests to the server and execute MATLAB functions deployed to the server. For example, if the MATLAB execution endpoint for your server is `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com`, to use the MATLAB Production Server RESTful API to execute a MATLAB function `mymagic` located in a deployed application `myapp`, specify the URL `https://mpst4ezclcdtlcay.eastus.cloudapp.azure.com/myapp/mymagic`.

Download Client Libraries

If you want to write client programs in Java, .NET, C, and Python for invoking MATLAB functions deployed on the server, you must use the MATLAB Production Server client libraries. To download the client libraries, see MATLAB Production Server Client Libraries.

Work with Self-Signed Certificate

The Azure application gateway in the deployment provides the MATLAB execution endpoint, which is an HTTPS URL that client programs use to send requests to the server. The application gateway uses a self-signed SSL certificate. Replacing the self-signed certificate with a certificate signed by a certificate authority (CA) is recommended. For information on how to change the self-signed certificate, see “Change Self-Signed Certificate to Application Gateway” on page 9-34.

However, if you want to use the self-signed certificate and send HTTPS requests to the server, client programs must disable host name verification to avoid encountering an exception caused by a failure in host name verification. The verification fails due to a mismatch between the host names in the HTTPS URL for MATLAB function execution and the common name (CN) of the self-signed certificate. The host name for the MATLAB execution endpoint has the value `<uniqueID>.<location>.cloudapp.azure.com`, but the CN has the value `azure.com`.

Depending on the implementation of your client program, you might also have to retrieve the self-signed certificate that the application gateway uses and add the certificate to your local truststore.

For more information on configuring the client environment, see “Configure Client Environment for SSL” for a Java client and “Configure the Client Environment for SSL” for a .NET client.

Asynchronous Request Execution Using RESTful API

The Azure application gateway provides cookie-based session affinity, where it uses cookies to keep a user session on the same server. On receiving a request from a client program, the application gateway sets the `Set-Cookie` HTTP response header with information about the server virtual machine (VM) that processes the request. A client program that uses asynchronous requests to execute a MATLAB function deployed to the server must set the `Cookie` HTTP request header with the value of the `Set-Cookie` header for all subsequent requests. This ensures that same server VM that processes the first request processes all subsequent requests for that session.
For information on writing client programs using the MATLAB Production Server RESTful API, see “RESTful API”.

See Also

More About

- MATLAB Production Server on Microsoft Azure
- “Manage MATLAB Production Server Using the Dashboard” on page 9-25
- “RESTful API”