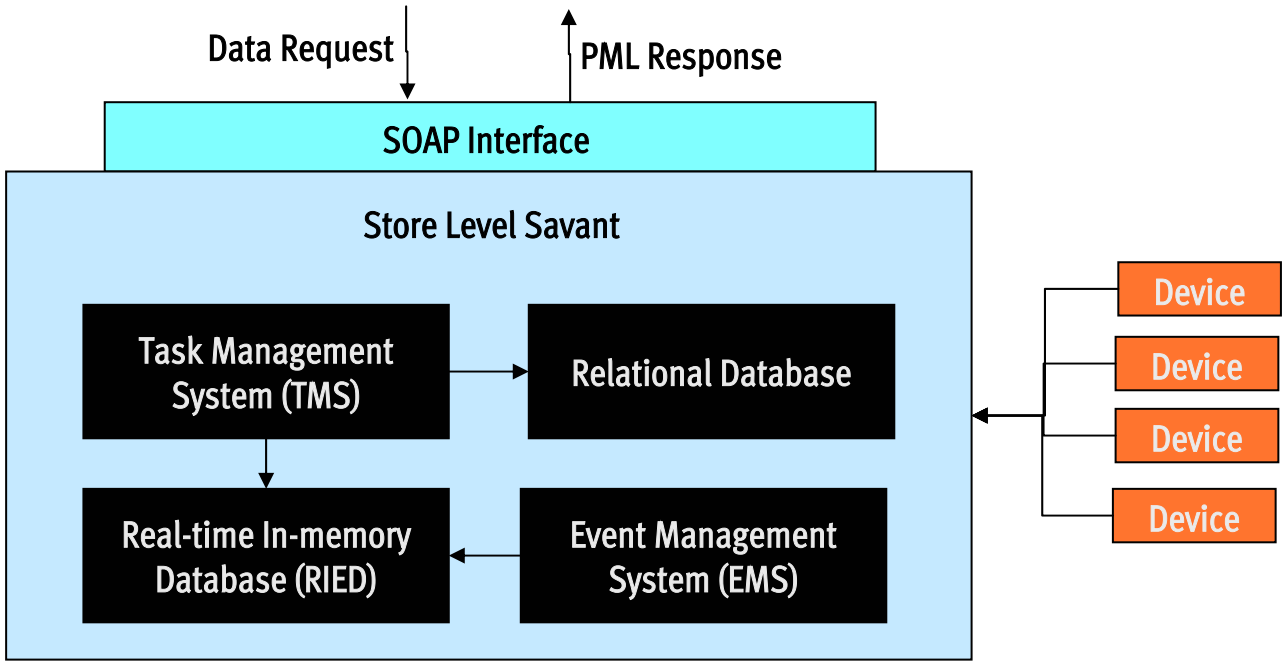
EMS Specification

Components of the Savant



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Event Management System (EMS)

- Event Management System captures, filters, broadcasts & logs EPC data
- Event Management System is implemented on Edge Savants (ES) since the EPC data enters the Savant network only through the Edge Nodes

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Requirements of EMS

- EMS should be a high-performance system
- Support multiple EPC readers or devices that communicate using different Auto-ID center protocols
- Support event filters with one input stream and multiple output streams for:

  Smoothing, Coordination, Forwarding
- Support for multiple loggers

  Database, Memory model, remote server (HTTP, SOAP, JMS)
- Ability to handle spikes in the event volume

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Components of EMS

- Adapter

  Communicates with the readers to capture EPC events
- Event Queues

  Asynchronous/Synchronous queuing system that captures EPC data from various reader adapters and broadcasts the data to multiple event loggers
- Event Filters

  Gets data from one or more input event streams and posts the data to multiple output streams, after filtering the data.
- Event Loggers

  Logs data to a database, memory model or a remote server (HTTP, SOAP, JMS)

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EMS Adapter

- EMSAdapter is a producer of events
- Implements the interface `org.autoidcenter.ems.EMSAdapter`
  - EMSAdpater just implements a shutdown() method
- Implements a `constructor` taking a `String` argument, followed by an `EMSHandle` argument. The first argument is the initialization string, and will be supplied by the EMS Manager. The second argument is the object to which events have to be logged.

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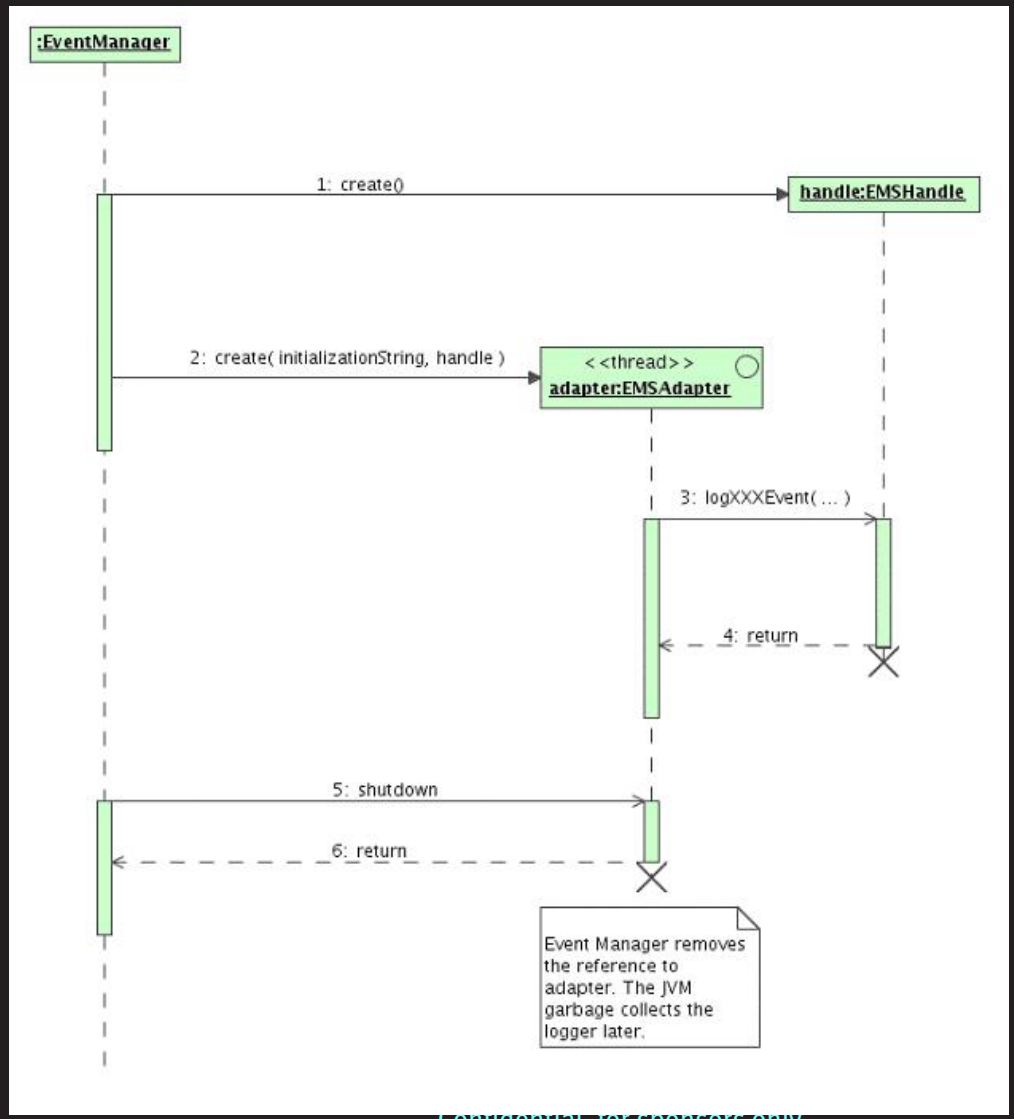
EMS Adapter Life Cycle



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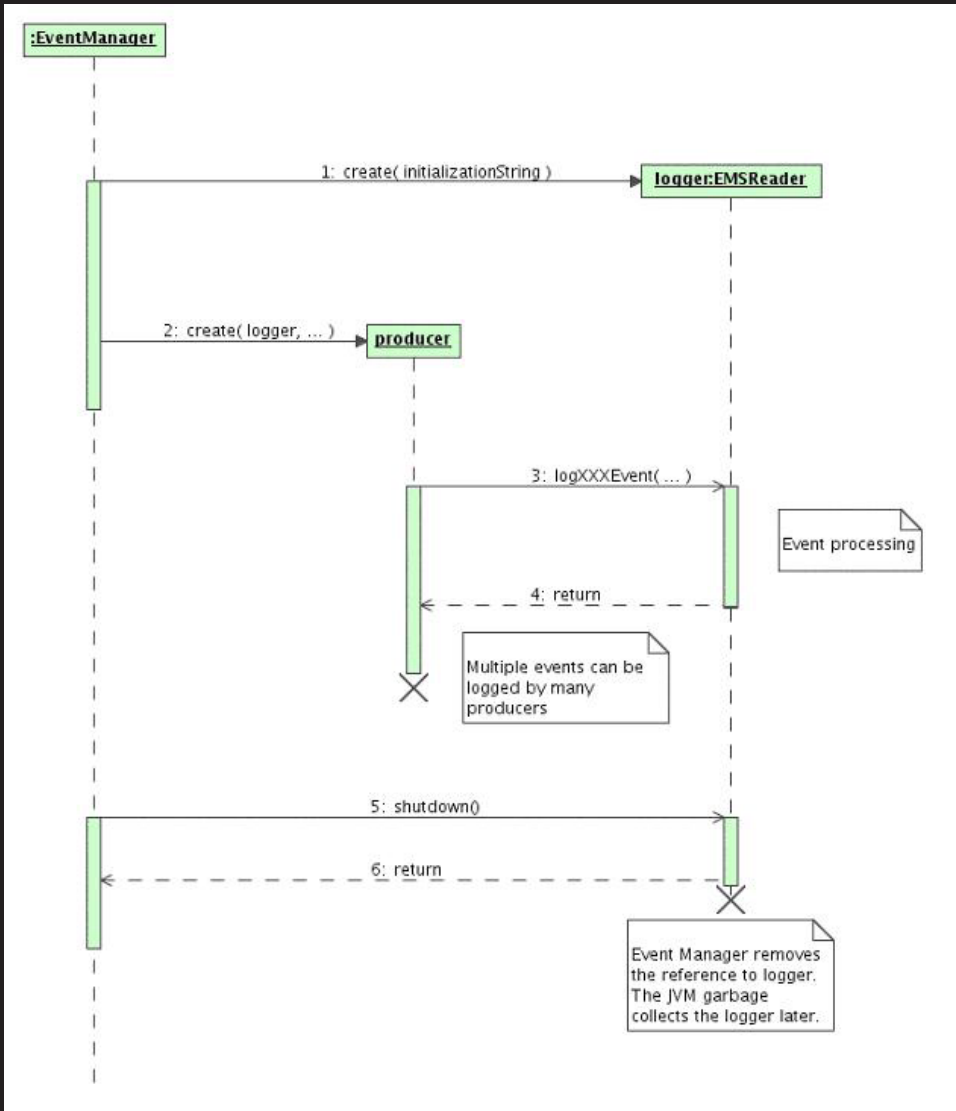
EMS Logger

- EMSLogger is a consumer of events
- Implements the interface `org.autoidcenter.ems.EMSReader`
- Implements a constructor taking a `String` argument. This argument, referred to as the initialization string will be supplied by the Event Manager.

EMS Logger Life Cycle



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EMS Filters

- EMSFilters is both a producer and consumer of events
- Implements the interface `org.autoidcenter.ems.EMSFilter` which extends `EMSReader`
- Implements a constructor taking a String argument. This argument is the initialization string, and will be supplied by the Event Manager.
- A filter can receive events from multiple event producers and can log events in multiple `EMSHandle` objects. The output handles are configured in the filter using the `setListeners` method, which accepts an array of `EMSHandle` objects wrapping EMS units

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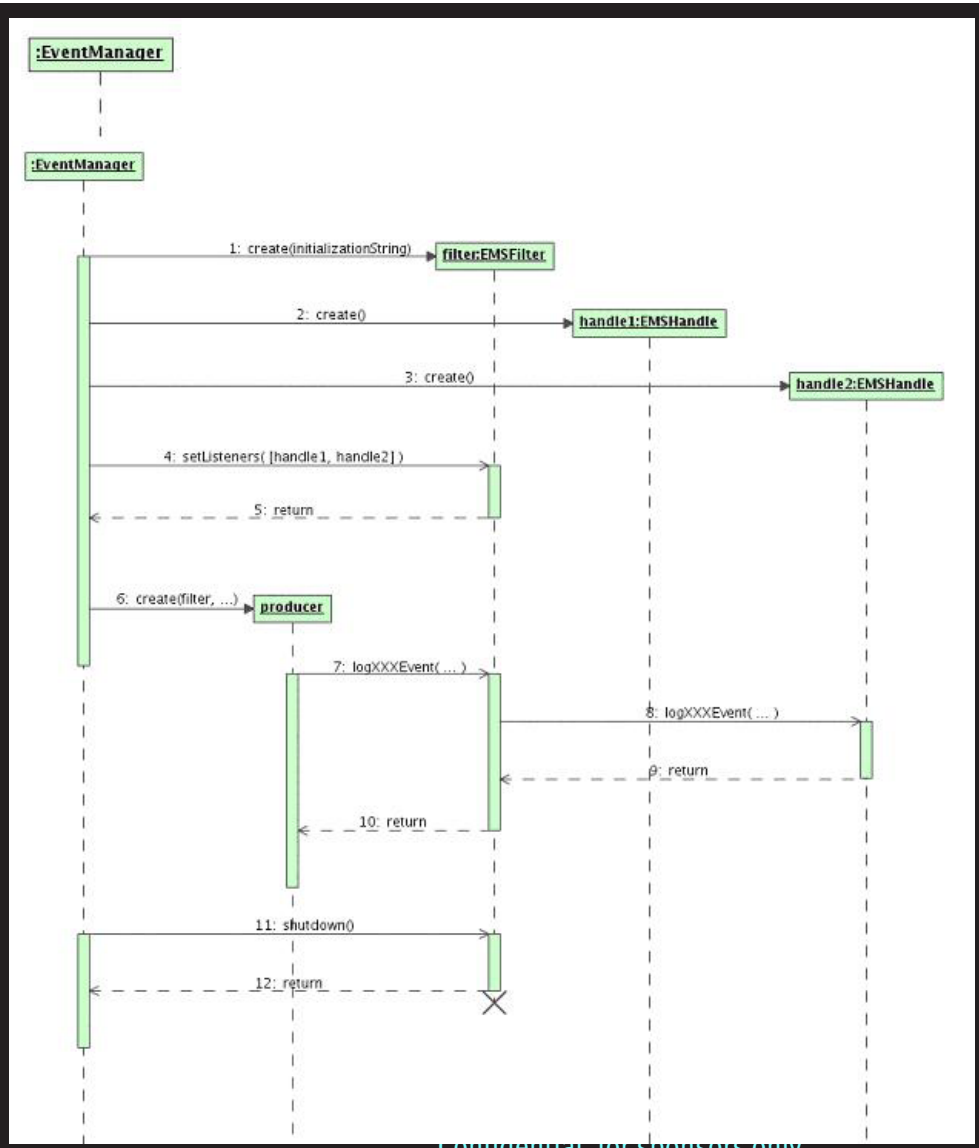
EMS Filter Life Cycle



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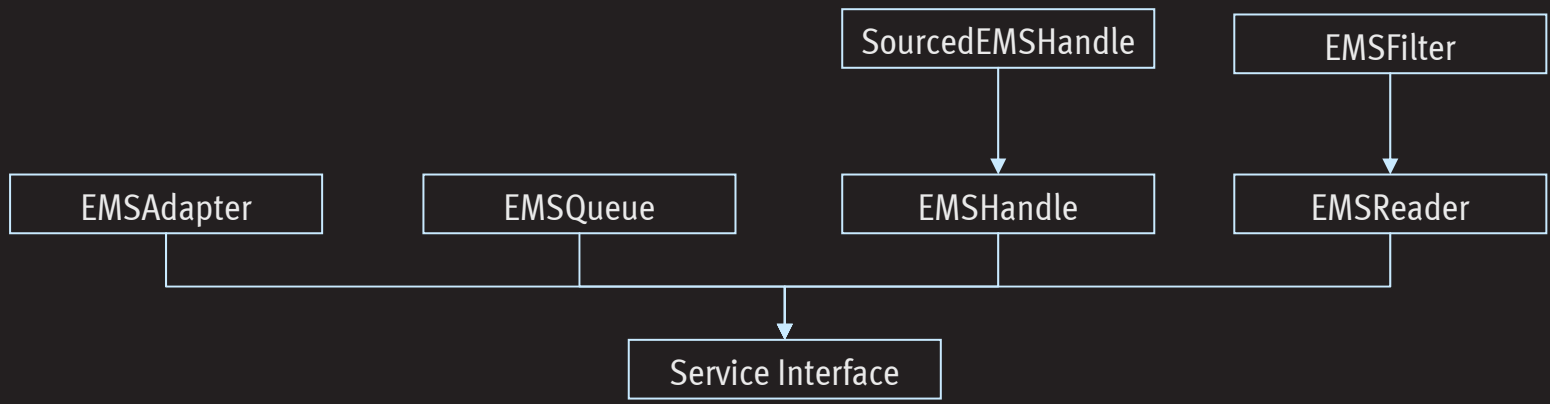
EMS Unit Interfaces



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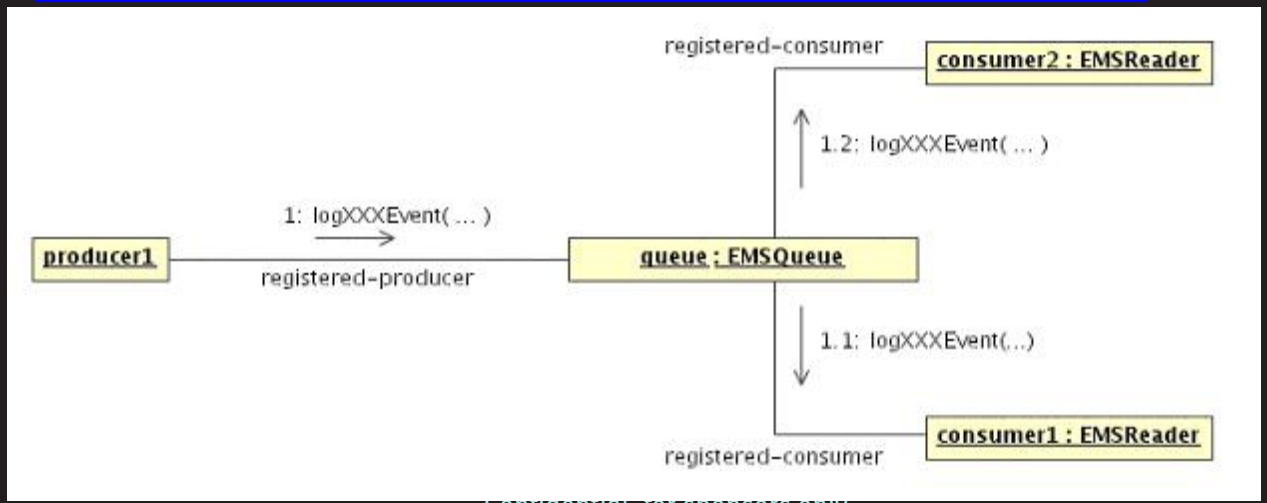
Queues

- Event producers and event consumers can register with event queues
- An event queue broadcasts every event it receives from a producer to all its consumers.
- Custom queues can be written by implementing `org.autoidcenter.ems.EMSQueue`



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Common Types of Queues

- **Synchronous queues.** Synchronous event queues are non-threaded queue implementations. When a producer logs an event to a synchronous event queue, it iterates over each consumer and logs the event to that consumer.
- **Asychronous queues.** Asynchronous event queues are threaded queue implementations. When a producer logs an event to an asynchronous event queue, it stores the event in a buffer. A worker thread is associated with each consumer. This worker thread submits unprocessed events from the queue to the consumer.
- **Categorized queues.** Categorized event queues are non-threaded queue implementations that allow producers and consumers to register for events belonging to a certain *event category*.

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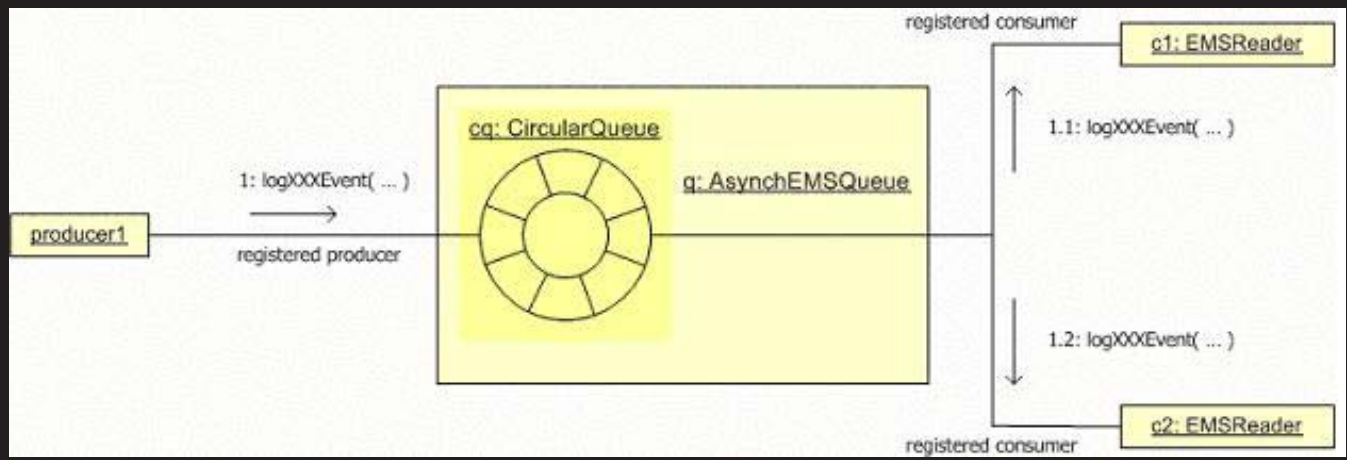
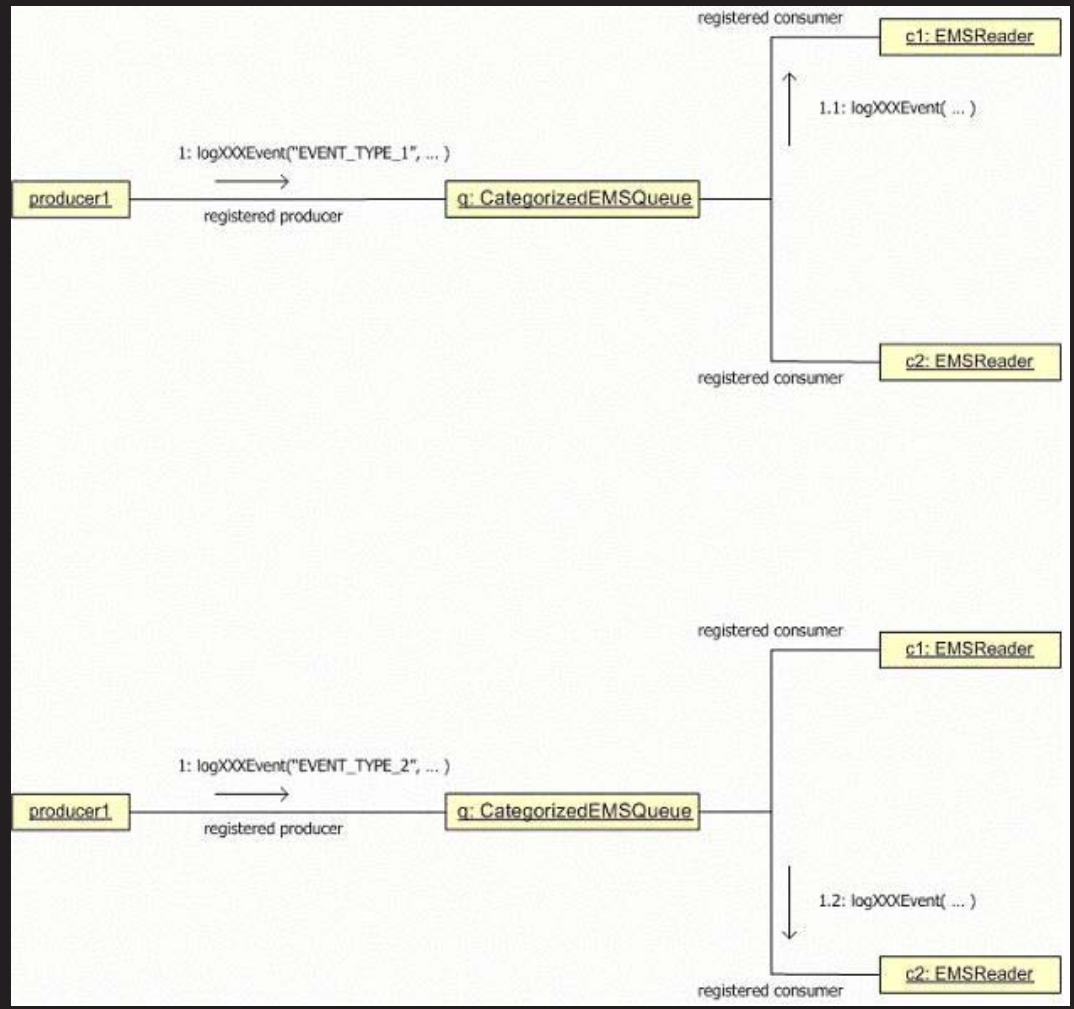
Asynchronous Queue

- Asynchronous queues are typically used whenever there is a need for multi-processing among consumers and its producers, or to prevent spikes in the arrival of events from affecting performance.



Categorized Queue

- A categorized queue is a synchronous implementation of EMSQueue.
- This queue implementation provides a generalized event type-based routing of events from producers to consumers. Each consumer registers with the queue using a specific category. Only events matching that category will be sent to that consumer.



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Event Categories

Event prefix	Event type	Successful match?
event_queue	event_queue	Yes
event_queue	event_queue.buffer_overflow	Yes
event_queue	event_queue_buffer_overflow	No
event_queue	event_queue.buffer_overflow.foo	Yes
event_queue	buffer_overflow	No
status.reader.1234	status.reader.1234.online	Yes
status.reader.1234	status.reader.1235.offline	No

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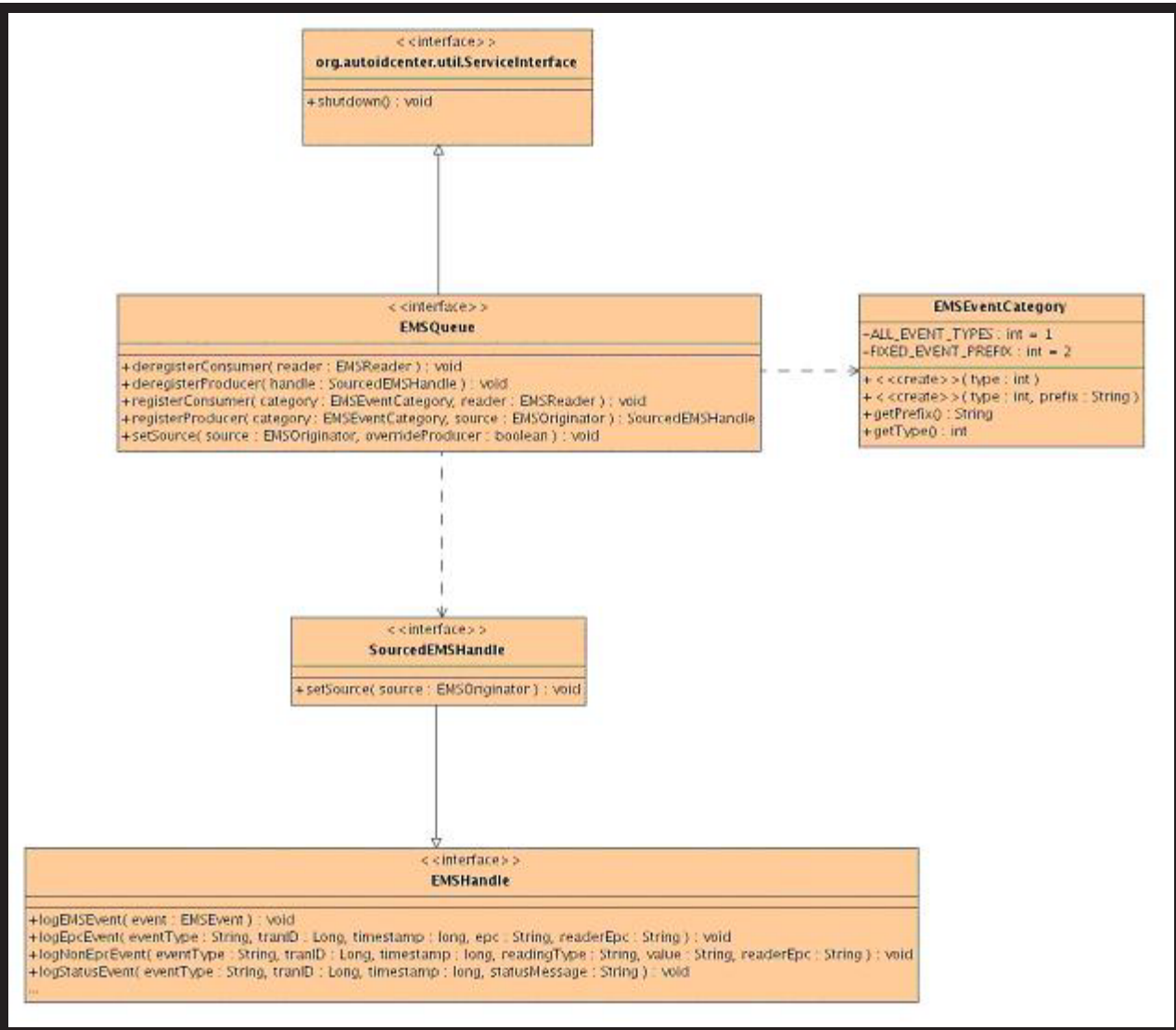
Queue Classes



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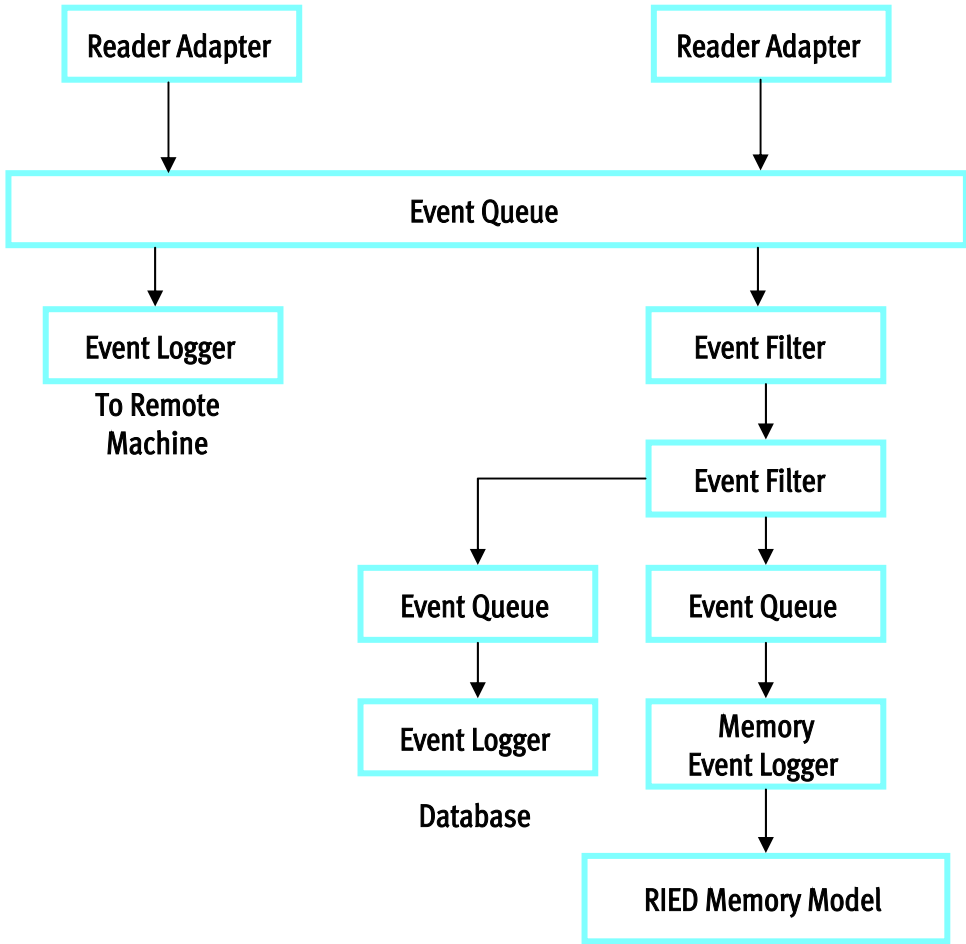
Event Manager

- The Event Manager is responsible for managing the Event Processing Network
- The Event Manager is defined by the interface `org.autoidcenter.ems.EventManagerProvider`

Configuration

- EMS configuration

Sample EMS


Reader Adapter
Reader Adapter
Event Queue
Event Logger
To Remote Machine
Event Filter
Event Filter
Event Queue
Event Queue
Event Logger
Database
Memory Event Logger
RIED Memory Model

EMS SOAP Interface

- **public static String startup**()
- **public static void shutdown**()
- **public static Vector listPublicListeners**()
- **public static String addPublicListener**
  (String listenerName, String queueName,
  String loggerClass, String loggerArgs)
- **public static String addPublicListener**
  (String listenerName, String queueName,
  String loggerClass, String loggerArgs,
  String filterClass, String filterArgs)
- **public static void removePublicListener**
  (String listenerName)

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Spec Roadmap

- By March 13th SAG we will be releasing
  - Spec for TMS
  - Spec for REID
  - Savant V2 with the new EMS components

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