

# RemoteCache 1.2 - User Documentation

## Remote Cache Assertion

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## Overview

The API Management Gateway already has support for storing and retrieving messages from an internal cache. The Remote Cache Assertion provides support for storing and retrieving messages from Memcached, Coherence, Terracota, GemFire as well as Redis cache servers.

## Installation

### Pre-Requisites

- The API Management Gateway is correctly configured and in operation
- The API Management Gateway Policy Manager is installed

### How-To Install

#### 9.0 and above

1. In Policy Manager, go to **Tasks > Extensions and Add-ons > Manage Server Module Files**
2. Upload the **RemoteCacheAssertion-[version].saar**
3. Provide the assertion a name like `Remote Cache` and click OK. The name is used in the Manage Server Files dialog
4. The assertion will be uploaded and loaded onto the Gateway. For more information on managing Server Module Files, see *CA API Gateway - Manage Server Module Files*

#### Prior to 9.0

1. Copy the **RemoteCacheAssertion-[version].aar** to the following directory on the Gateway machine:

```
/opt/SecureSpan/Gateway/runtime/modules/assertions
```

2. Set the ownership and permission for the file:

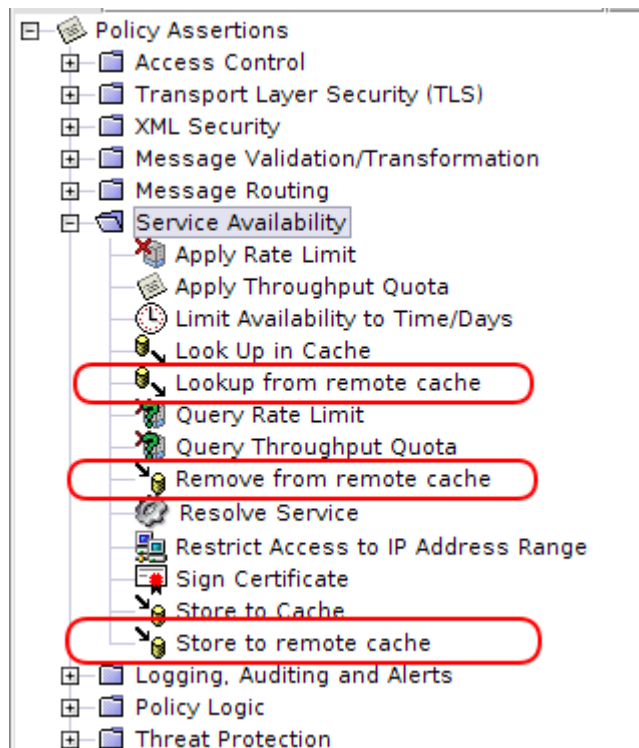
```
chown layer7:layer7 RemoteCacheAssertion-[version].aar  
chmod 444 RemoteCacheAssertion-[version].aar
```

3. Restart the Gateway

```
service ssg restart
```

Once Remote Cache assertion is enabled, you will see the following new items on the Policy Manager interface:

- The new assertions **Lookup from remote cache**, **Store to remote cache**, and **Remove from remote cache** in the Service Availability category



## Supported Remote Cache Servers

The following cache servers are supported:

- Memcached
  - Version 1.4.3 or above
- Gemfire
- Coherence
- Terracotta
- Redis

## Configuration

### Enabling Support for Coherence Cache - Optional

If you want to use Coherence cache, follow these steps:

1. Copy your **coherence.jar** to the following directory on the Gateway machine:

```
/opt/SecureSpan/Gateway/node/default/var/lib/coherence
```

2. Set the ownership and permissions for the file:

```
chown gateway:gateway coherence.jar  
chmod 444 coherence.jar
```

3. Restart the gateway

```
service ssg restart
```

### Enabling Support for GemFire Cache - Optional

If you want to use GemFire cache, follow these steps:

1. Copy your **gemfire.jar** to the following directory on the Gateway machine:

```
/opt/SecureSpan/Gateway/node/default/var/lib/gemfire
```

2. Set the ownership and permissions for the file:

```
chown gateway:gateway gemfire.jar  
chmod 444 gemfire.jar
```

3. Restart the Gateway

```
service ssg restart
```

### Enabling Support for Terracotta Cache - Optional

If you want to use Terracotta cache, follow these steps:

1. Copy the following files to the `/opt/SecureSpan/Gateway/node/default/var/lib/terracotta` directory on the Gateway machine:
  - ehcache-ee.jar
  - terracotta-toolkit-runtime-ee.jar
  - terracotta-license.key
2. Set the ownership and permissions for the files:

```
chown gateway:gateway <filename>
chmod 444 <filename>
```

3. Modify the following file:

/opt/SecureSpan/Gateway/runtime/etc/ssg.policy

And add the following lines:

```
grant {
...
    permission java.lang.RuntimePermission "accessDeclaredMembers";
    permission java.lang.RuntimePermission "getenv.TC_INSTALL_DIR";
    permission java.lang.RuntimePermission "getClassLoader";
    permission java.lang.RuntimePermission "getProtectionDomain";
    permission java.lang.RuntimePermission "modifyThread";
    permission java.lang.RuntimePermission "setContextClassLoader";
    permission java.lang.RuntimePermission "shutdownHooks";
    permission java.lang.reflect.ReflectPermission "suppressAccessChecks";
    permission java.net.NetPermission "specifyStreamHandler";
    permission java.util.PropertyPermission "*", "read,write";
    permission javax.management.MBeanServerPermission "createMBeanServer";
    permission javax.management.MBeanPermission "*", "registerMBean";
    permission javax.management.MBeanPermission "*", "unregisterMBean";
    permission javax.management.MBeanTrustPermission "register";
    permission java.io.FilePermission "${user.home}/.tc.custom.log4j.properties",
"read";
    permission java.io.FilePermission "${user.home}/.tc.dev.log4j.properties",
"read";
    permission java.io.FilePermission "${user.dir}/.tc.custom.log4j.properties",
"read";
    permission java.io.FilePermission "${user.dir}/.tc.dev.log4j.properties",
"read";
    permission java.io.FilePermission
"/opt/SecureSpan/Gateway/runtime/modules/assertions/RemoteCacheAssertion-<replace_
with_version>.aar", "read";
```

4. Restart the Gateway

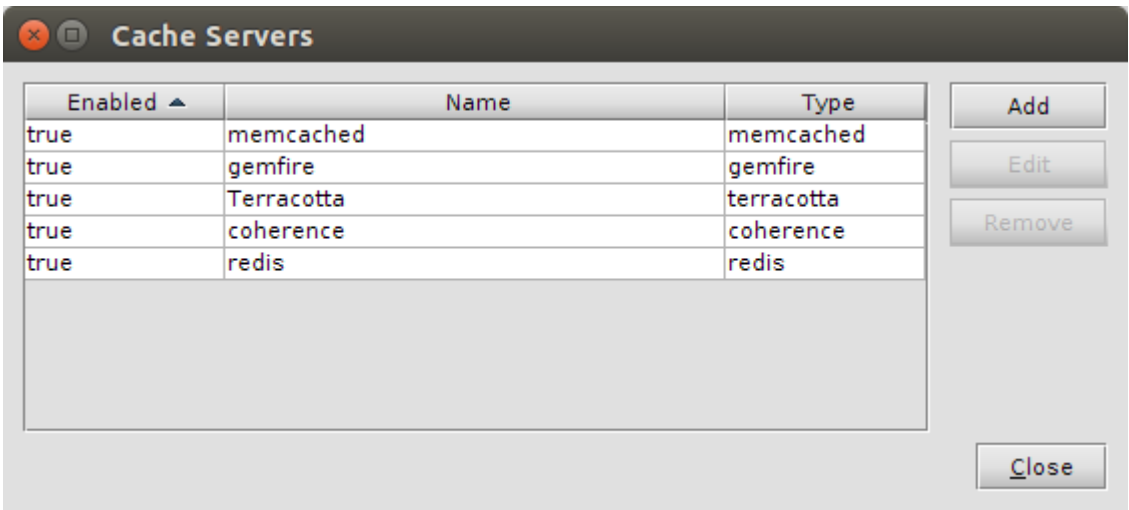
```
service ssg restart
```

# Usage

## Using the Manage Cache Server Dialog

From the API Management Policy Manager, select Tasks > Additional Actions > Manage Remote Caches. This displays the dialog to allow you to manage definitions of remote caches.

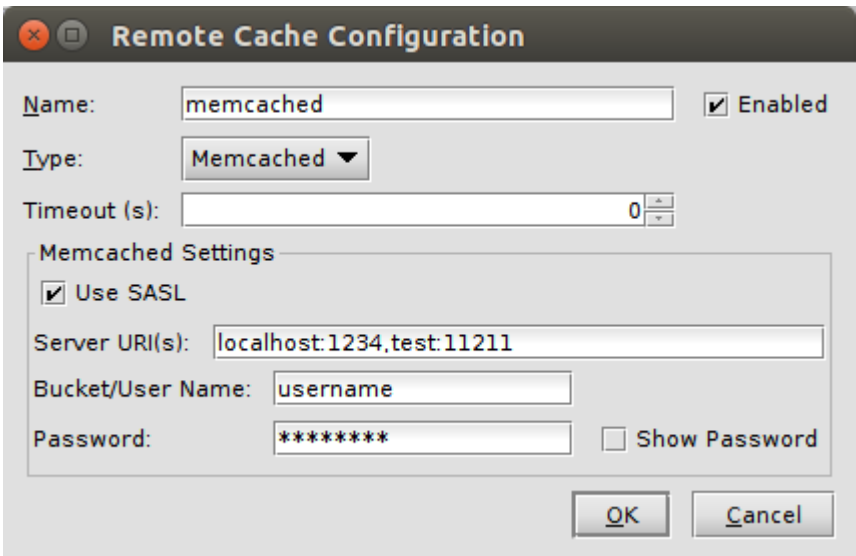
## Managing Cache Servers



The Manage Cache Servers dialog is used to enter the definitions for Cache Servers. Configure this dialog as follows:

Section	Description
Add	To add new definition for a cache server
Edit	To edit an existing definition for a cache server
Remove	To remove an existing definition for a cache server

## Memcached Cache Server Properties



The Memcached Server Properties dialog is used to set the parameters for a Memcached Server definition. Configure this dialog as follows:



Section	Description
<b>Name</b>	An arbitrary name for the Memcached Server definition
<b>Enabled</b>	Check this to enable the connection. If this is not checked, then no connection to the server is made.
<b>Type</b>	The type of the remote cache server. Can be <b>Memcached</b> , <b>Coherence</b> , <b>Terracotta</b> , <b>GemFire</b> , or <b>Redis</b> . In this case it is <b>Memcached</b> .
<b>Timeout(s)</b>	The amount of time to wait for a response from the cache server
<b>Use SASL</b>	Check this box to enable SASL PLAIN authentication
<b>Servers</b>	The list of coherence server URIs. The list must be of format <a href="#">hostname1:port1,hostname2:port2</a> .
<b>Bucket/User name</b>	Bucket name and User name for authentication. Field is only shown if SASL is enabled.
<b>Password</b>	Password for authentication. Field is only shown if SASL is enabled.

## Coherence Cache Server Properties

The screenshot shows a dialog box titled "Remote Cache Configuration". It contains the following fields and controls:

- Name:** A text field containing "coherence".
- Enabled:** A checked checkbox.
- Type:** A dropdown menu set to "Coherence".
- Timeout (s):** A text field with a spinner, showing the value "3".
- Coherence Settings:** A sub-section containing:
  - Cache Name:** A text field containing "tactical\_coherence".
  - Server URI(s):** A text field containing "tactical-caches.ca.com:9099".
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

Section	Description
<b>Name</b>	An arbitrary name for the Coherence Server definition
<b>Enabled</b>	Check this to enable the connection. If this is not checked, then no connection to the server is made.
<b>Type</b>	The type of the remote cache server. Can be <b>Memcached</b> , <b>Coherence</b> , <b>Terracotta</b> , <b>GemFire</b> , or <b>Redis</b> . In this case it is <b>Coherence</b> .
<b>Timeout(s)</b>	The amount of time to wait for a response from the cache server. Refer to Coherence
<b>Cache Name</b>	The name of the cache on the Coherence server.
<b>Server URI(s)</b>	The list of coherence server URIs. The list must be of format <a href="#">hostname1:port1,hostname2:port2</a> .

## GemFire Cache Server Properties

Section	Description
<b>Name</b>	An arbitrary name for the GemFire Server definition
<b>Enabled</b>	Check this to enable the connection. If this is not checked, then no connection to the server is made.
<b>Type</b>	The type of the remote cache server. Can be <b>Memcached</b> , <b>Coherence</b> , <b>Terracotta</b> , <b>GemFire</b> , or <b>Redis</b> . In this case it is <b>Coherence</b> .
<b>Timeout(s)</b>	The amount of time that specific key is stored in the region in the client cache. Timeout is manage on the region level, but is applied for every entry. Refer to gemfire's documentation on the entry-time-to-live attribute for valid values.
<b>Cache Name</b>	The name of the region on the GemFire server. The same region must be configured on the server cache.
<b>Pool connection</b>	Type of the pool use when connection to the server is established. Client can use <b>Server</b> or <b>Locator</b> pool, but not both. This configuration depends on the server configuration.
<b>Server URI(s)</b>	The list of GemFire server or locator URIs. The list must be of format <a href="#">hostname1:port1,hostname2:port2</a> .

In the GemFire Properties tab, you can configure system member behavior. Gateway disallows using external log file because of the possible memory consumptions; therefore you can't use log-file property. All logs will be written to the Gateway.

**Remote Cache Configuration**

Name:  ☒ Enabled

Type:

Timeout (s):

GemFire Settings

Server Settings | GemFire Properties

Additional Properties

Name	Value
conserve-sockets	false
durable-client-timeout	3000

Add Edit Remove

OK Cancel

## Terracotta Cache Server Properties

**Remote Cache Configuration**

Name:  ☒ Enabled

Type:

Timeout (s):

Terracotta Settings

Cache Name:

Server URI(s):

OK Cancel

The Terracotta Server Properties dialog is used to set the parameters for a Terracotta Server definition. Configure this dialog as follows:

Section	Description
<b>Name</b>	An arbitrary name for the Terracotta Server definition
<b>Enabled</b>	Check this to enable the connection. If this is not checked, then no connection to the server is made.
<b>Type</b>	The type of the remote cache server. Can be <b>Memcached</b> , <b>Coherence</b> , <b>Terracotta</b> , <b>GemFire</b> , or <b>Redis</b> . In this case it is <b>Terracotta</b>
<b>Timeout(s)</b>	The amount of time to wait for a response from the cache server
<b>Cache Name</b>	The name of the Cache
<b>Server URI(s)</b>	The Terracotta server URI

## Redis Cache Server Properties

**Remote Cache Configuration**

Name:  ☒ Enabled

Type:

Timeout (s):

**Redis Settings**

Server URI(s):  ☐ Cluster

Password:

**Apache GenericObjectPool Properties**

Name	Value
numTestsPerEvictionRun	3
softMinEvictableIdleTimeMillis	-1
testWhileIdle	false
timeBetweenEvictionRunsMillis	-1

Buttons: Add, Edit, Remove, OK, Cancel

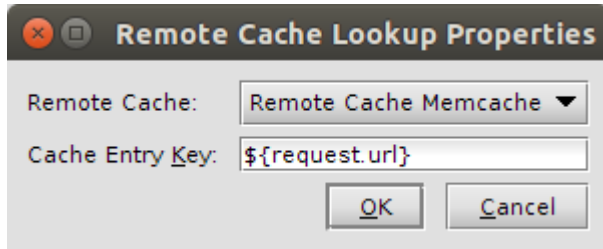
Section	Description
<b>Name</b>	An arbitrary name for the Redis Server
<b>Enabled</b>	Check this to enable the connection. If this is not checked, then no connection to the server is made.
<b>Type</b>	The type of the remote cache server. Can be <b>Memcached</b> , <b>Coherence</b> , <b>Terracotta</b> , <b>GemFire</b> , or <b>Redis</b> . In this case it is <b>Redis</b>
<b>Timeout(s)</b>	The amount of time to wait for a response from the cache server
<b>Cluster</b>	Check if the Redis server has been configured as a cluster
<b>Server URI(s)</b>	The Redis server URI. If this is a cluster, multiple server URIs can be provided in a comma separated list. If this is not a cluster and multiple server URIs are provided, only the first one will be used. The list must be of format <a href="#">hostname1:port1,hostname2:port2</a> .
<b>Password</b>	Password to authenticate against the Redis server. This field is only enabled if redis server is not configured as a cluster
<b>Apache GenericObjectPool Properties</b>	<p>Apache GenericObjectPool is used to manage the redis connections. Refer to <a href="#">Apache Commons Pool 2.4 - GenericObjectPool API</a> for more information. Valid properties to set are: <b>lifo</b>, <b>fairness</b>, <b>maxWaitMillis</b>, <b>minEvictableIdleTimeMillis</b>, <b>softMinEvictableIdleTimeMillis</b>, <b>numTestsPerEvictionRun</b>, <b>testOnCreate</b>, <b>testOnBorrow</b>, <b>testOnReturn</b>, <b>testWhileIdle</b>, <b>timeBetweenEvictionRunsMillis</b>, <b>blockWhenExhausted</b>, <b>jmxEnabled</b>, <b>jmxNamePrefix</b>, <b>jmxNameBase</b>, <b>evictionPolicyClassName</b>, <b>maxTotal</b>, <b>maxIdle</b>, <b>minIdle</b>.</p>

## Using the Lookup In Remote Cache Assertion

The *Lookup In Remote Cache Assertion* will lookup a message from a remote cache server. If no message is found, then the assertion will fail. Before using this assertion, ensure that at least one remote cache server has been defined. For more information, see *Using the Manage Cache Servers Dialog*.

## Using the Assertion

- Do one of the following:
  - To add the assertion to the Policy Development window, see *Adding an Assertion* in the Policy Authoring User Manual.
  - To change the configuration of an existing assertion, proceed to step 2 below.
- When adding the assertion, the Lookup In Remote Cache Properties will automatically appear; when modifying the assertion, right-click Lookup In Remote Cache Properties in the policy window and select Lookup In Remote Cache Properties or double click the assertion in the policy window. The assertion properties are displayed.



Option	Description
Remote Cache	The remote cache server to query.
Cache Entry Key	The key to use for looking up the message. Can contain context variables.

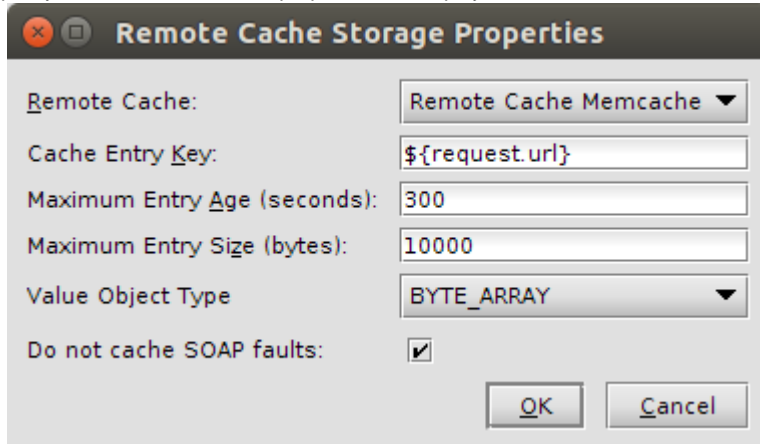
- This assertion is also message targetable. After it has been added to a policy, right-click Lookup From Remote Cache Properties in the policy window and select Select Target Message. The Message Target dialog will be displayed and the message that will hold the retrieved message can be selected from the request message, the response message or a previously declared message variable.

## Using the Store to Remote Cache Assertion

The *Store to Remote Cache Assertion* will store a message in a remote cache. Before using this assertion, ensure that at least one remote cache server has been defined. For more information, see [Using the Manage Cache Servers Dialog](#).

## Using the Assertion

- Do one of the following:
  - To add the assertion to the Policy Development window, see [Adding an Assertion](#) in the Policy Authoring User Manual.
  - To change the configuration of an existing assertion, proceed to step 2 below.
- When adding the assertion, the Store to Remote Cache Properties automatically appear; when modifying the assertion, right-click Store to Remote Cache Properties in the policy window and select Store to Remote Cache Properties or double click the assertion in the policy window. The assertion properties are displayed.



Option	Description
Remote Cache	The remote cache server to store the message to.
Cache Entry Key	The key to use for storing the message. Can contain context variables.
Maximum Entry Age	The maximum time that a stored message will be valid for. Can contain context variables. For Coherence, refer the the Coherence NamedCache API for special timeout values.
Maximum Entry Size	The maximum size of a message that can be stored in the remote cache. Can contain context variables.
Value Object Type	The type of value to be stored in the remote cache. BYTE_ARRAY or JSON
Do not cache SOAP faults	If checked, then this assertion will fail if the input message is a SOAP fault.

- This assertion is also message targetable. After it has been added to a policy, right-click Store to Remote Cache Properties in the policy window and select Select Target Message. The Message Target dialog will be displayed and the message to be stored can be selected

from the request message, the response message or a previously declared message variable.

4. For GemFire users Store to the Remote Cache Properties doesn't contain the Maximum Entry Age and Maximum Entry Size. Those properties are set on the region level during the GemFire configuration.

## Cluster-wide properties that can be set for Remote Cache Assertion

Cluster-Wide Property	Description
remote.cache.coherence.connectionTimeout	The maximum amount of time to wait in milliseconds to establish a connection with Coherence cache server. Default is 5 seconds.
remote.cache.terracotta.connectionTimeout	The maximum amount of time to wait in milliseconds to establish a connection with Terracotta cache server. Default is 5 seconds.

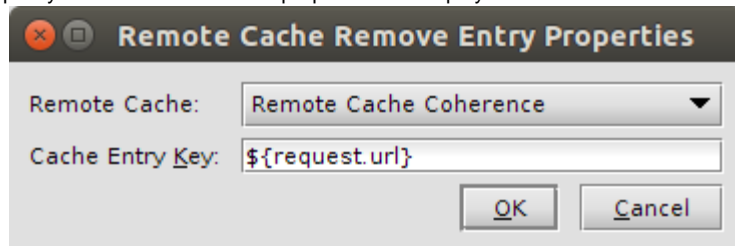
## Using the Remove from Remote Cache Assertion

The *Remove from Remote Cache Assertion* will remove an entry from a remote cache server.

Before using this assertion, ensure that at least one remote cache server has been defined. For more information, see [“Using the Manage Cache Servers Dialog”](#).

## Using the Assertion

1. Do one of the following:
  - To add the assertion to the Policy Development window, see *Adding an Assertion* in the Policy Authoring User Manual.
  - To change the configuration of an existing assertion, proceed to step 2 below.
2. When adding the assertion, the Remote Cache Remote Entry Properties will automatically appear; when modifying the assertion, right-click on Remove from Remote Cache in the policy window and select Remote Cache Remove Properties or double click the assertion in the policy window. The assertion properties are displayed.



Option	Description
Remote Cache	The remote cache server to query.
Cache Entry Key	The key to use for removing the cache entry. Can contain context variables.

## Known Issues

- Storing key/value in the cache does not work as expected when using version 1.4.4 of Memcached for Windows platform. It is recommended to use 1.4.5 version or higher for the Windows platform.
- Coherence versions after 3.7.1 (i.e 12.x) are not compatible with this assertion.
- Gemfire 7.0.2 is only version compatible with the gateway and any latest Gemfire server.

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