Basic Systems Configuration

Overview

The Cisco Policy Suite provides the Policy Builder as an interface for policy management. Policies translate a Service Provider's business rules into actionable, logical processing methods that the Cisco Policy Suite enforces on the network.

The Cisco Policy Suite ships with some standard base policies that serve as a starting point for customization to suit a Service Provider's specific business rules.

Policy Builder Repository Configuration

This section covers the following topics:

• Reverting Changes, on page 15

The Policy Builder uses a Subversion version control repository to store the configuration data created in the UI. The data entered in the UI is translated into XML (Eclipse Modeling Framework xmi files) when saved.

As work is done in the UI, changes are saved to a temporary directory on the pcrfclient01. (The directory is specified in the Repository configuration dialog.) Therefore, you can log out and back in and the latest changes will remain. However, if someone else makes a change and commits, then your local changes are lost.

There are two options for saving configuration changes:

- Publish to Runtime
- Save to Client Repository

When saving to the client repository, the configuration is pushed to Subversion, but it is saved in a client only repository and not copied over to the runtime environment repository. If you 'Publish to Runtime', the configuration is saved to the client repository and also copied to the runtime environment repository. The CPS servers check the runtime environment repository for changes and will update automatically when changes are committed.

Best Practices

Typically, publishing configuration changes to a lab environment to run tests is best. And then when satisfied with the test results, you can publish the new configuration to a production environment.

Revert

As Subversion is a source code tracking repository, each version of a configuration is numbered and stored in the Subversion repository history. Therefore, it is also possible to revert to any version of a configuration. The Policy Builder does not have a way to do this via the GUI, but using the Subversion command line tools, any version of the configuration can be made the current revision. For more information, refer to Subversion documentation for how to use the command line tools.

Default Repositories

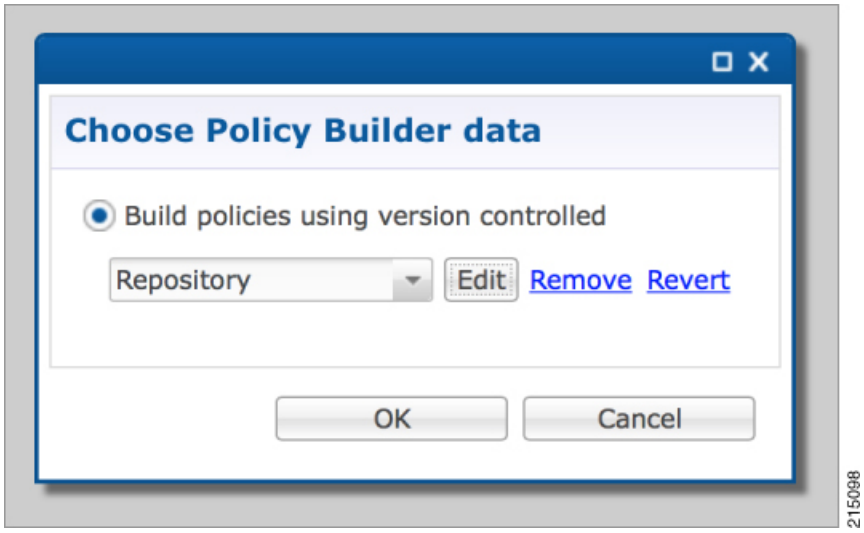
The CPS deployment installs Subversion and creates a default client and runtime repository. The Subversion repositories are synced using Subversion's Master/Slave replication between the pcrfclient01 and pcrfclient02 nodes.

- Client - http://pcrfclient01/repos/configuration
- Runtime - http://pcrfclient01/repos/run

The Policy Builder start screen shows a dialog that lets you define repositories and choose a repository to check out for editing. A repository definition named “Repository” is installed by default and uses the default

client repository (http://pcrfclient01/repos/configuration). The default PB user (qns-svn) with the default password is also setup.

Figure 1: Choose Policy Builder Data

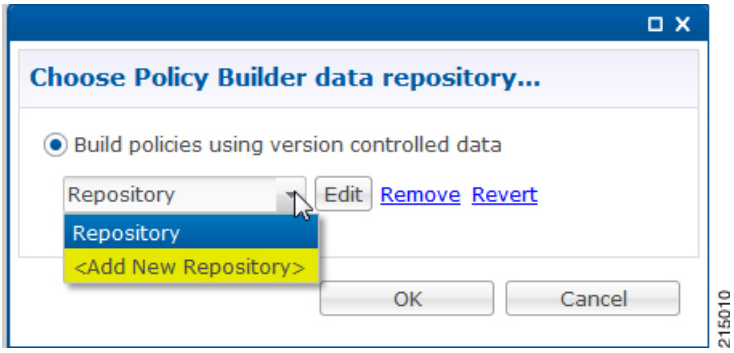


Adding a Client Repository Definition

Step 1 Start Cisco Policy Builder.

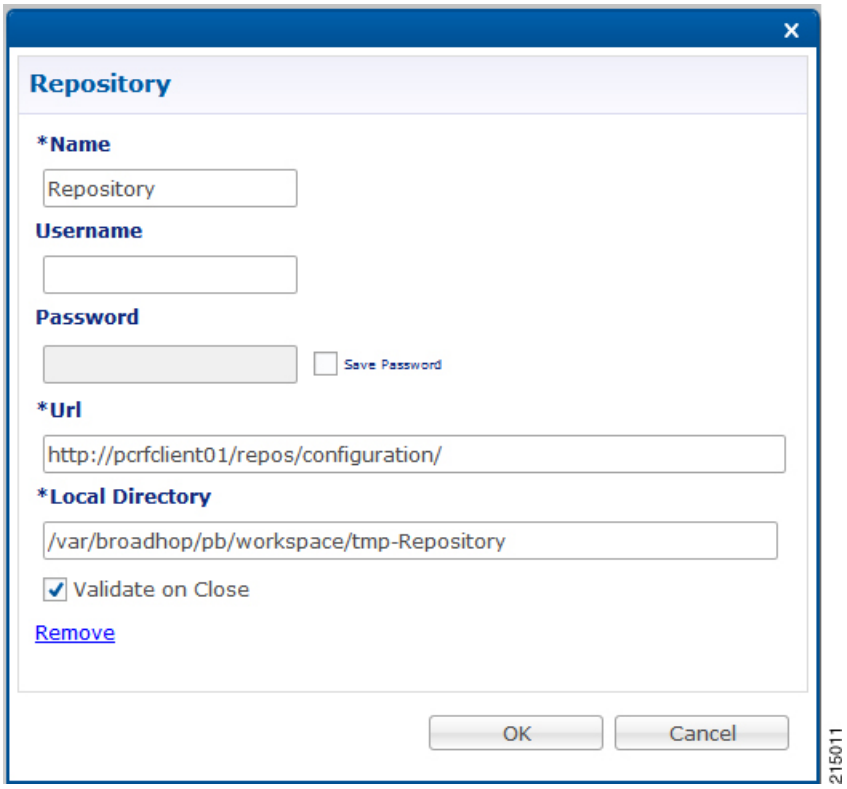
Step 2 In the **Choose Policy Builder data repository** dialog box, select **Add New Repository** from the drop-down list.

Figure 2: Adding a New Repository Definition



The **Repository** dialog box appears.

Figure 3: Repository Configuration Fields



The following parameters can be configured under **Repository**:

Table 1: Repository Parameters

Parameter	Description
Name	This required field uniquely identifies your repository's site with a name. **Note** We recommend the following format for naming repositories: customername_project_date, where underscores are used to separate customer name, project and date. Date can be entered in the format: MMDDYYYY.
Username and Password	Enter a username that is configured to view Policy Builder data. The password can be saved for faster access, but it is less secure. A password, used in conjunction with the Username, permits or denies access to make changes to the repository.
Save Password	Select this check box to save the password on the local hard drive. This password is encrypted and saved as a cookie on the server.

Parameter	Description
URL	You can have several branches in the version control software to save different versions of configuration data. Create a branch in the version control software before assigning it in this screen. Enter the URL of the branch of the version control software server that are used to check in this version of the data.
Local Directory	This value need not be changed. This is the location on the hard drive where the Policy Builder configuration objects are stored in version control. When you click either Publish or Save to Repository, the data is saved from this directory to the version control application specified by the URL above.
Validate on Close	Select this check box to see if the values for Username, Password, or the URL are legitimate and unique. If not, the screen displays an error message and provides a chance to correct the errors.
Remove	Removes the display of the repository in Cisco Policy Builder. **Note** The remove link here does not delete any data at that URL. The local directory is deleted.

Fill in the information according to your network requirements.

Step 3 Click **OK** to save your work to the local directory.

Note When your change screens, Cisco Policy Builder automatically saves your work. We recommend saving your work to the local directory by clicking on the diskette icon on the Policy Builder GUI or CTRL-S on the keyboard.

Step 4 If you are ready to commit these changes to the version control software, select **File** > **Save to Client Repository** on the Policy Builder home screen.

Editing a Client Repository Definition

Use this procedure to change any of the following details of your Client Repository:

- Client repository name
- Username, password, and password save mechanism
- Client repository temporary save URL

- Client repository local directory save file path

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.
Step 2 Use the drop-down list in the **Choose Policy Builder data** dialog box to select the desired repository.
Step 3 Click the **Edit** button.
Step 4 In the **Repository** dialog box, make your changes.
Step 5 Click **OK** to save the changes to the repository definition.

Removing a Client Repository Definition

This procedure removes a repository from Cisco Policy Builder. This procedure does not delete the actual Subversion repository, just the definition for access in the Policy Builder.

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.
Step 2 Use the drop-down list in the **Choose Policy Builder data** dialog box to select the desired repository.
Step 3 Click **Remove**. A confirmation dialog box appears.
Step 4 Click **OK** to delete the repository.

Saving Policy Builder Configuration Data to a Client Repository

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.
Step 2 Use the drop-down list on the **Choose Policy Builder data** screen to select the desired repository.
Step 3 Click **OK**.
Step 4 Make changes to Policy Configuration data as necessary.
Step 5 Select **File** > **Save to Client Repository...**or by clicking on the diskette icon on the Policy Builder GUI or CTRL-S on the keyboard.
Step 6 Enter a commit message.
Step 7 Click **OK**. The data will be saved to the client repository for later updating and publish to the runtime environment.

Auto Save Policy Builder Configuration Changes

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.

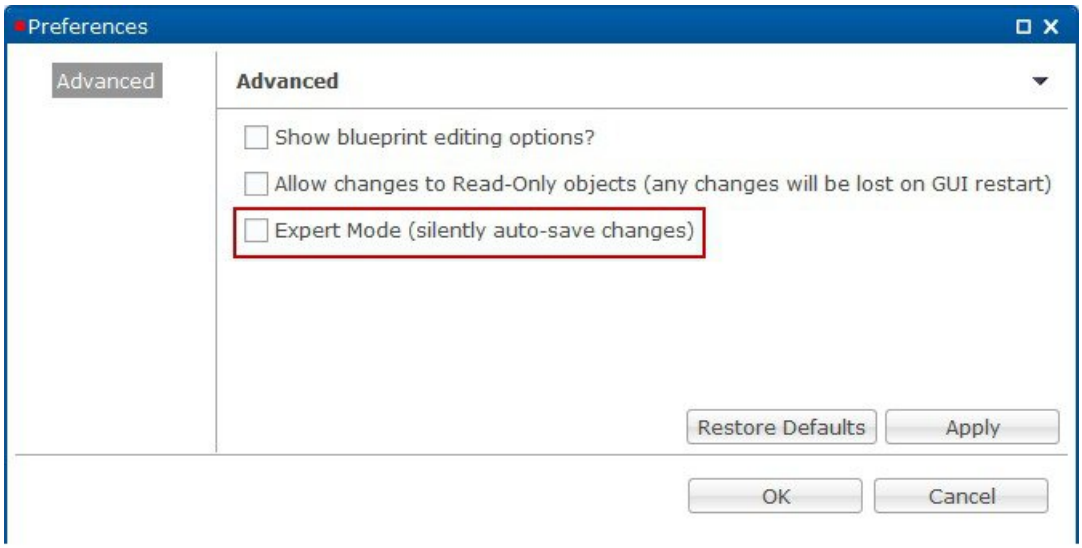
Step 2 Use the drop-down list on the **Choose Policy Builder data** screen to select the desired repository.

Step 3 Click **OK**.

Step 4 Make changes to Policy Configuration data as necessary. For example, if you move from configuration to another configuration without saving the changes, a pop-up dialog box **Are you sure?** for saving the changes is displayed.

Step 5 Click **Yes** to save the changes. If you want to disable this notification, click **Tools** > **Preferences**. This opens **Preferences** window.

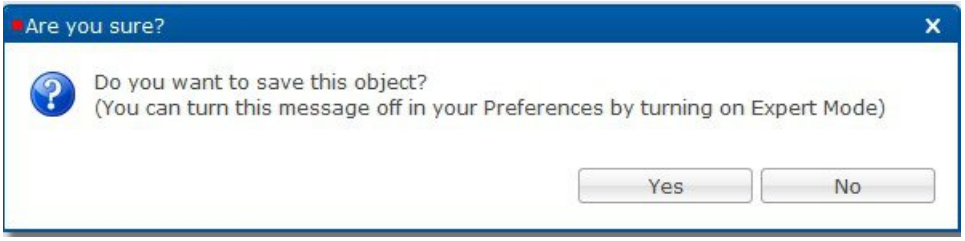
Figure 4: Preferences



Step 6 Check **Expert Mode (silently auto-save changes)** flag to enable auto-save option.

Note By default, the flag is not checked. You have to check it in order to turn off the **Are you sure?** save prompt.

Figure 5: Are you sure?



If the flag is not checked, the following options are displayed when updating/creating/copying an object:

- **Updating an Object**: While updating an object the PB asks **Do you want to save this object?** with option buttons as **OK** and **Cancel**. If you click **OK**, the data being worked on is saved and if you click **Cancel**, the data being worked on is not saved to the repository.
- **Creating an Object**: While creating an object the PB asks **Are you sure you want to create this object?** with option buttons as **OK** and **Cancel**. If you click **OK**, the new object is created with the default values and if you click **Cancel**, the object is not created.
- **Copying an Object**: While copying an object the PB asks **Are you sure you want to copy this object?** with option buttons as **OK** and **Cancel**. If you click **OK**, the object is copied and if you click **Cancel**, the object is not copied.
- This prompt is also displayed for **File** menu options when you use **Publish to Runtime Environment** or **Save to Client Repository...**.

Step 7 Once flag is checked, click **Apply** and **OK** to save the changes.

Publishing the Client Repository

To put changes into effect and have the Cisco Policy Builder server recognize the configuration changes made in your client session, use the Publish option and save the changes to the server repository.

Note To save the practice version, publish the client repository to the server. This is the version the server uses for production.

Do not publish to the Cisco Policy Builder unless you are completely satisfied with the configuration data in your client repository.

- Use the Cisco Policy Builder interface to either commit or set up a commit repository.
- Verify your work either by going to a web browser or by looking at the config.properties file.
- Unpublish with an SVN delete and restore.

When you are ready to put your Cisco Policy Builder changes into production, you need to publish them to Subversion. This preserves version history.

CPS supports to save the unpublished commit messages in a property file into the file system. This file is saved in the user directory under the selected repository location. For different users, PB will generate different property files.

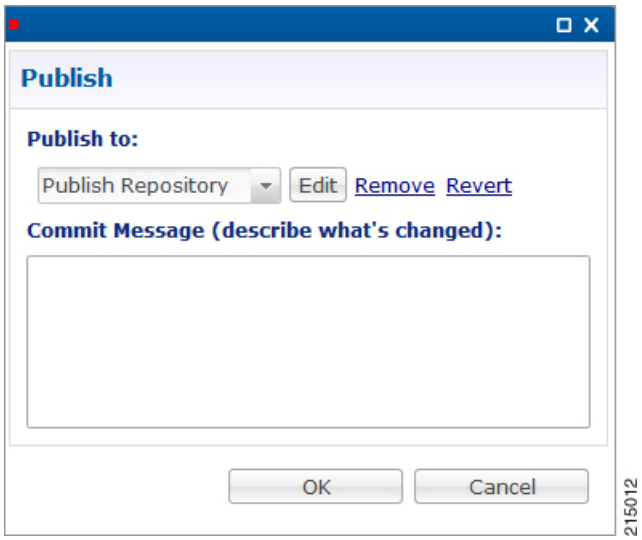
PB saves the unpublished commit messages into the file system for the following cases:

- When loading **Publish** dialog box (when selecting **File** > **Publish to Runtime Environment**…) then saved commit message, if any, appears for that user in **Commit Message** pane.
- While publishing the policy configuration, if publish fails then the entered commit message is saved into the file system.
- While publishing the policy configuration, if publish succeeds then remove the message from file for the logged in user.

- If you click **Cancel** on **Publish** dialog box then the entered commit message is saved into the file system.
- If you click **Cross (x)** on **Publish** dialog box then the entered commit message is saved into the file system.
- When loading **Saving to Repository** dialog box (when selecting **File** > **Save to Client Repository**…) then saved commit message, if any, appears for that user in **Commit Message** pane.
- While saving to client repository, if operation fails then the entered commit message is saved into the file system.
- While saving to client repository, if operation succeeds then remove the message from file for the logged in user.
- If you click **Cancel** on **Saving to Repository** dialog box then the entered commit message is saved into the file system.
- If you click **Cross (x)** on **Saving to Repository** dialog box then the entered commit message is saved into the file system.

Step 1 To publish in Cisco Policy Builder, select **File** > **Publish to Runtime Environment**. The **Publish** dialog box appears.

Figure 6: Publishing to the Runtime Environment



Step 2 If you have already set up the repository to publish to, just enter a commit message.

Note CPS supports to save the unpublished commit messages in a property file into the file system. This file is saved in the user directory under the selected repository location. For different users, PB will generate different property files.

PB saves the unpublished commit messages into the file system for the following cases:

- When loading **Publish** dialog box (when selecting **File** > **Publish to Runtime Environment**…) then saved commit message, if any, appears for that user in **Commit Message** pane.
- While publishing the policy configuration, if publish fails then the entered commit message is saved into the file system.
- While publishing the policy configuration, if publish succeeds then remove the message from file for the logged in user.
- If you click **Cancel** on **Publish** dialog box then the entered commit message is saved into the file system.
- If you click **Cross (x)** on **Publish** dialog box then the entered commit message is saved into the file system.
- When loading **Saving to Repository** dialog box (when selecting **File** > **Save to Client Repository**…) then saved commit message, if any, appears for that user in **Commit Message** pane.
- While saving to client repository, if operation fails then the entered commit message is saved into the file system.
- While saving to client repository, if operation succeeds then remove the message from file for the logged in user.
- If you click **Cancel** on **Saving to Repository** dialog box then the entered commit message is saved into the file system.
- If you click **Cross (x)** on **Saving to Repository** dialog box then the entered commit message is saved into the file system.

Step 3 If you have not set up the repository, select **Add New Repository** from the **Publish to:** drop-down list and enter the required details for the new repository. For more information, refer to Adding a Client Repository Definition, on page 3.

Step 4 Verify the changes to Production repository:

- All changes are published to Subversion, so they are version-controlled and can be rolled back.
- To verify a publish as part of a troubleshooting process, take the URL seen in the previous screen and put it into a web browser (you may need to substitute the IP). The password is the same as in Cisco Policy Builder.
- If a traditional web browser cannot access the system, you can use a command line browser from the CPS VM's URL.

Error Notification during Publishing

During publishing, if there are any errors, the **Publish** dialog box will display the list of unresolved errors.

Note Policy Builder does not report errors for read only objects.

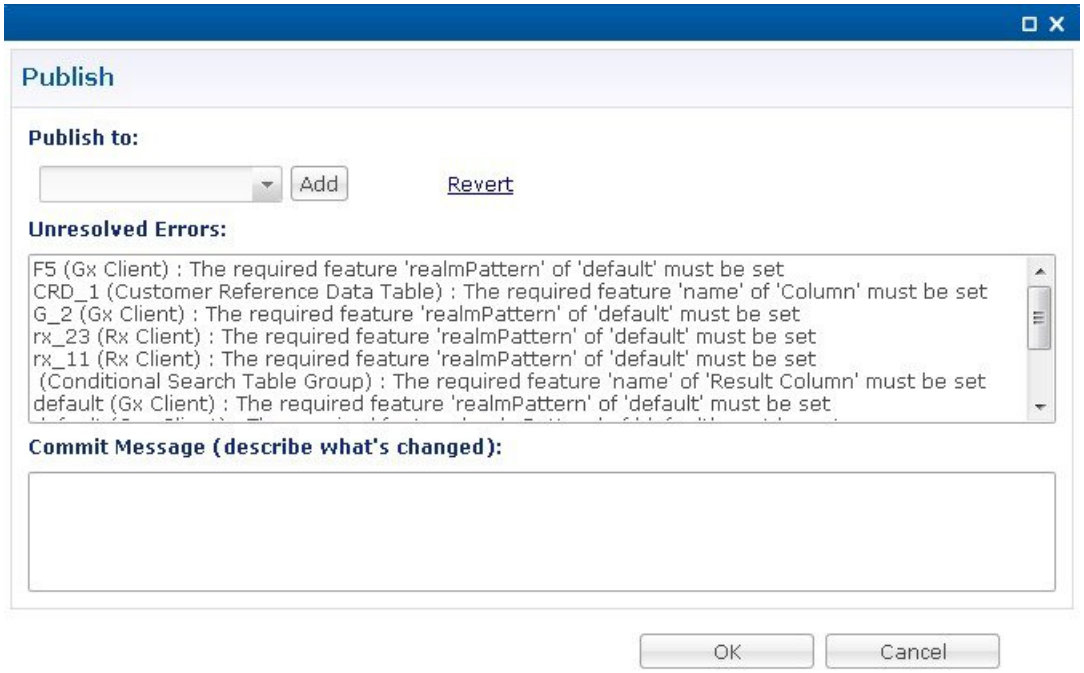
The errors are created in the session and is updated accordingly as the errors are resolved or are introduced newly with respect to their ID.

The format of error string is as:

```
<Object_Name> <Feature_Name> :: <Error_String>
```

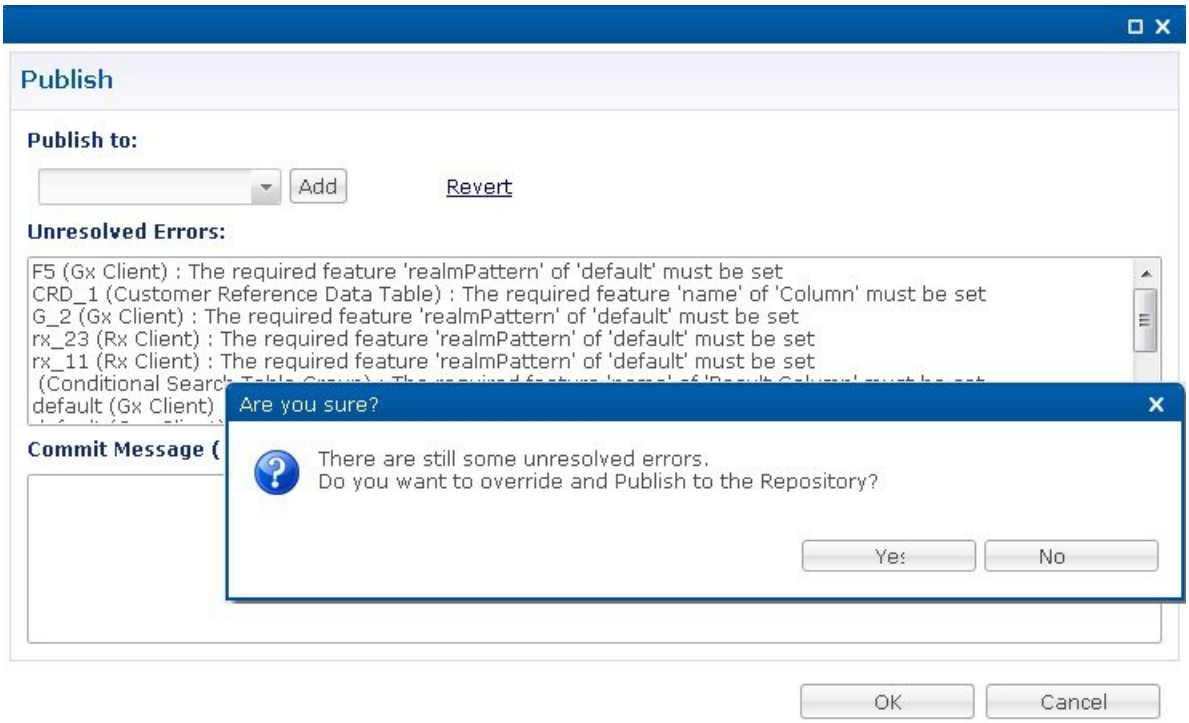
You can select and copy one or more of the errors in the list and paste them into another window (for example, in an email or in a file to mask the acceptable errors).

Figure 7: Publish - Unresolved Errors



If you click **OK** with any unresolved errors in the list then you are prompted with a confirmation asking if the unresolved errors should be published to the repository.

Figure 8: Publishing with Errors - Override



If you click **No**, then the publish does not happen.

If you click **Yes** then the commit message is amended to include a note that you have committed with **# errors**. For example, "`User forced the Publish with 3 unresolved errors: <user's commit message>`".

Masking Errors

You can mask the errors if needed for a situation where an error is reported by PB but can still be loaded by the Policy Server. This allows configuration of CPS so that the specified errors are not displayed and you do not ignore the list of unresolved errors and the real errors are not lost amongst a list of acceptable errors.

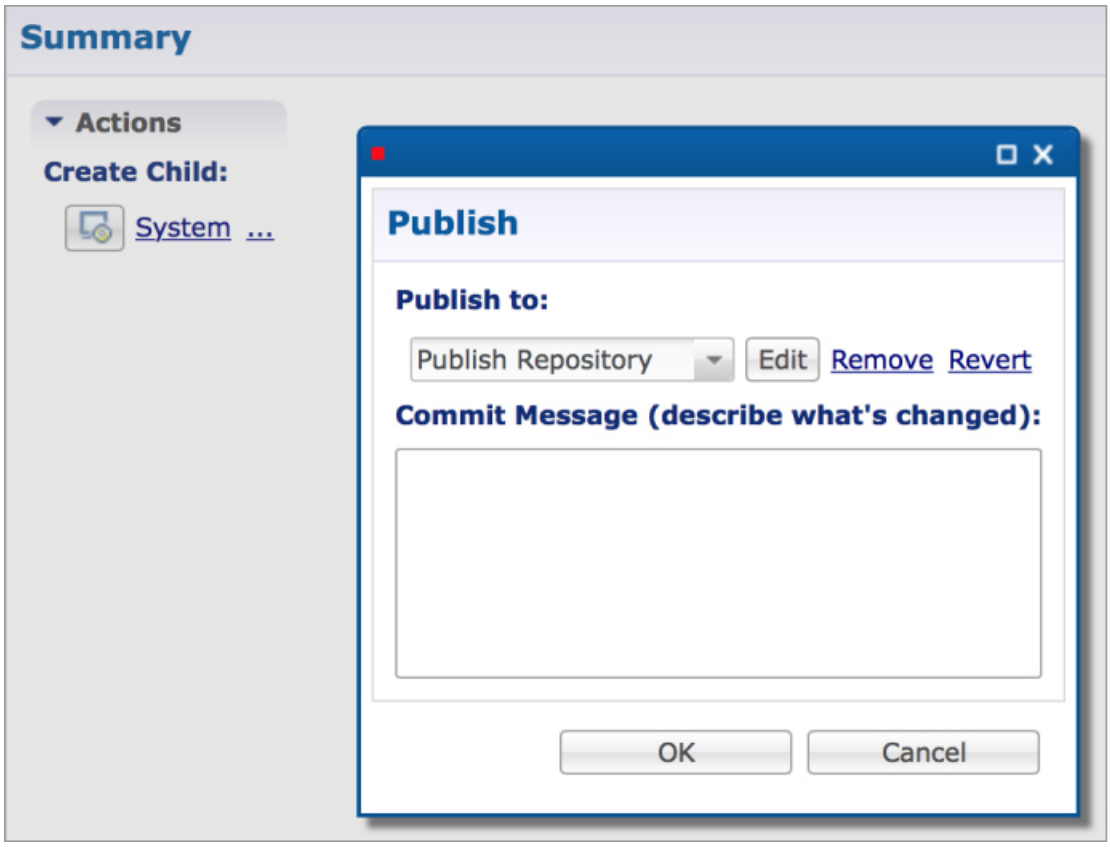
The file named `maskPublishErrors.txt` file is created in the folder `/etc/broadhop/pb` on Cluster Manager (CM). After creating the file, run build_all.sh from CM to rebuild CPS package and push the changes to each VM. The file is populated with the exact message displayed in the GUI. No wildcarding is allowed (so as to prevent accidentally filtering out important messages). The GUI does not display any messages that are in the `maskPublishErrors.txt` file. The GUI does not count any messages that are in the `maskPublishErrors.txt` file. If all of the errors in the list are masked because they are in the file then clicking `OK` in the **Publish** dialog will not cause the override dialog to be displayed.

Adding a Runtime Repository Definition

A repository definition named Publish Repository is installed by default and uses the default Runtime repository (http://pcrfclient01/repos/run). The default PB user (qns-svn) with the default password is also setup. The Runtime repository matches the value setup in the `/etc/broadhop/qns.conf` file.

The `qns.conf` file is read by all of the active Policy Server and Policy Director nodes and when the policy server process starts up, it checks out the configuration from the Runtime repository.

Figure 9: Runtime Repository Definition



Step 1 Open a browser and enter the URL of the Cisco Policy Builder.

Step 2 Use the drop-down list on the **Choose Policy Builder data** dialog box to select the desired repository.

Step 3 Click **OK**.

Step 4 Make changes to Policy Configuration data as necessary.

Step 5 Select **File** > **Publish to Runtime**.

Step 6 Use the drop-down list to select **Add New Repository**.

The **Repository** dialog box appears.

Step 7 Enter the necessary values and click **OK** to save your work.

Step 8 Enter a commit message and click **OK** to publish to the new repository.

Editing a Runtime Repository Definition

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.

Step 2 Use the drop-down list on the **Choose Policy Builder data** dialog box to select the desired repository.

Step 3 Click **OK**.

Step 4 Make changes to Policy Configuration data as necessary.

Step 5 Select **File** > **Publish to Runtime**.

Step 6 Use the drop-down list to select the desired repository.

Step 7 In the **Repository** dialog box, make your changes.

Step 8 Click **OK** to save the changes to the repository definition.

Step 9 Enter a commit message and click **OK** to publish to the new repository.

Removing a Runtime Repository Definition

This procedure removes a runtime repository definition from the Cisco Policy Builder. This procedure does not delete the actual Subversion repository, just the definition for access in the Policy Builder.

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.

Step 2 Use the drop-down list on the **Choose Policy Builder data** dialog box to select the desired repository.

Step 3 Click **OK**.

Step 4 Make changes to Policy Configuration data as necessary.

Step 5 Select **File** > **Publish to Runtime**.

Step 6 Use the drop-down list to select the desired repository.

Step 7 Click **Remove**. A confirmation dialog appears.

Step 8 Click **OK** to delete the repository.

Step 9 Click **Cancel** to close the dialog box.

Saving Policy Builder Configuration Data to a Runtime Repository

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.
Step 2 Use the drop-down list in the **Choose Policy Builder data** dialog box to select the desired repository.
Step 3 Click **OK**.
Step 4 Make changes to Policy Configuration data as necessary.
Step 5 Select **File** > **Publish to Runtime**.
Step 6 Use the drop-down list to select the desired repository.
Step 7 Enter a commit message.
Step 8 Click **OK**. The data will be saved to the client repository for later updating and publish to the runtime environment.

Switching to a Different Client Repository

You may have several variations of your client repository. One may reflect the configuration currently published to the server. Another might be developed for test purposes.

There are two ways to switch to a different repository:

- **File** > **Switch Repository**
- **File** > **Exit**

Reverting Changes

There are two main SVN repositories (repos) in the system.

- Repository Policy Builder publish which contains ONLY the currently running set of policies.
- Runtime repository Policy Builder which contains a copy of the currently running set of policies along with copies of all previous sets.

To rollback Policy Builder changes, there are two methods:

- Rollback the configuration repository Policy Builder and then perform a publish as described in Unpublished Changes, on page 16.
- Rollback the runtime repository Policy Builder uses and the configuration repository Policy Builder uses. For more information, refer to Published Changes, on page 16.

Unpublished Changes

If you do not want to save the changes, click the **Revert** link on the Policy Builder start window. All changes that have not been committed to a repository will be removed.

Step 1 Open a browser and enter the URL of the Cisco Policy Builder.

Step 2 Use the drop-down list in the **Choose Policy Builder data** dialog box to select the desired repository.

Step 3 Click the **Revert** link. A confirmation dialog appears.
The **Revert** link is only available if there are uncommitted local changes.

Step 4 Click **OK** to revert changes to the repository definition.

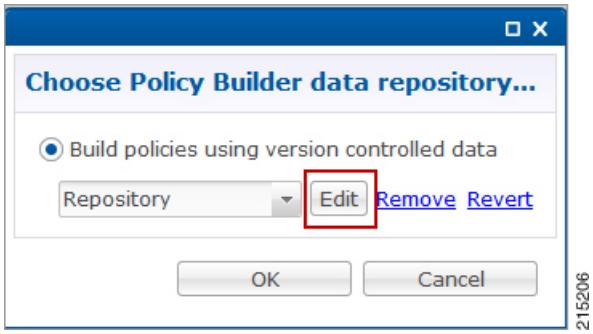
Published Changes

Step 1 Check the configuration repository name Policy Builder uses (config_repo). To check the name, use the following steps:

a) Open a browser and enter the URL of the Cisco Policy Builder.

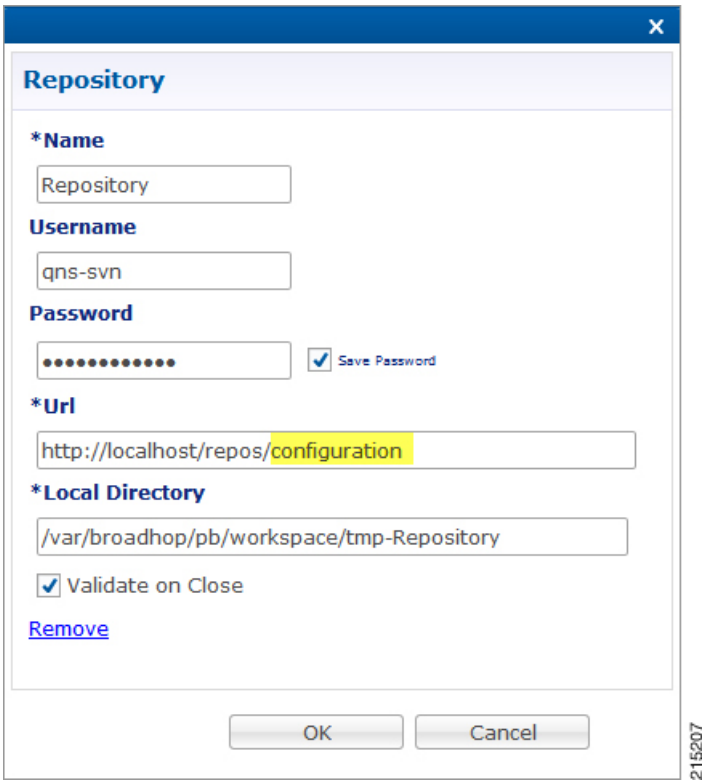
b) In the **Choose Policy Builder data repository** dialog box, click **Edit**.

Figure 10: Choose Policy Builder Data Repository



c) In the **Repository** dialog box, look at the contents of the **Url** field to see the repository name used by the Policy Builder. In this example, it is **configuration**.

Figure 11: Repository



d) Record the Policy Builder repository name (config_repo). In this example, it is **configuration**.

Step 2 To locate the 'r' number in the repository used by Policy Builder, execute the following command:

```
svn log http://pcrfclient01/repos/<config_repo> | more
```

The <*config_repo*> value comes from Step 1.d, on page 17.

Following is an example of the **svn log** command, where <*config_repo*> is **configuration** as shown in Step 1.d, on page 17.

```
svn log http://pcrfclient01/repos/configuration | more
------------------------------------------------------------------------
r367 | qns-svn | 2015-06-18 12:15:34 -0600 (Thu, 18 Jun 2015) | 1 line
second try
------------------------------------------------------------------------
r364 | qns-svn | 2015-06-17 15:46:19 -0600 (Wed, 17 Jun 2015) | 1 line
corrected java issue
------------------------------------------------------------------------
r361 | qns-svn | 2015-06-16 15:38:28 -0600 (Tue, 16 Jun 2015) | 1 line

Added new Policies
------------------------------------------------------------------------
```

```
r358 | qns-svn | 2015-06-16 15:06:57 -0600 (Tue, 16 Jun 2015) | 1 line
""
------------------------------------------------------------------------
r355 | qns-svn | 2015-06-16 14:58:41 -0600 (Tue, 16 Jun 2015) | 1 line
""
------------------------------------------------------------------------
r352 | qns-svn | 2015-06-16 14:52:29 -0600 (Tue, 16 Jun 2015) | 1 line
```

a) In the example above, the comment we are looking for is in **r361** which is the 'r' number we want to rollback to.
b) Record the **config_repo** '**r_number**'. In this example, it is **r361**.

Step 3 Execute the following command to delete the current version from the configuration repository Policy Builder uses:
svn delete http://pcrfclient01/repos/<*config_repo*> -m '**deleting for rollback**'

Use the <*config_repo*> value from Step 1.d, on page 17.

Following is an example of the `svn delete` command where <*config_repo*> is **configuration**.

```
svn delete http://pcrfclient01/repos/configuration -m 'deleting for rollback'
```

Step 4 Execute the following command to restore the Policy Builder configuration repository to a previous version.
svn cp http://pcrfclient01/repos/<config_repo>@<r_number> http://pcrfclient01/repos/<config_repo> -m '**rolling back to <r_number>**'

The <*r_number*> value is from Step 2.a, on page 18 and the <*config_repo*> value is from Step 1.d, on page 17. The '-m' option should be used to add a comment indicating what is being done.

Following is an example of the `svn copy` command with the <*r_number*> set to **361** and the <*config_repo*> set to configuration:

```
svn cp http://pcrfclient01/repos/configuration@361 http://pcrfclient01/repos/configuration -m 'rolling
 back to 361'
```

Step 5 Execute the following command to verify if the rollback is successful:
svn log http://pcrfclient01/repos/<config_repo> | more

The <*config_repo*> value is from Step 1.d, on page 17.

Following is an example of the **svn copy** command:

```
svn log http://pcrfclient01/repos/configuration | more
------------------------------------------------------------------------
r367 | qns-svn | 2015-06-18 12:15:34 -0600 (Thu, 18 Jun 2015) | 1 line
rolling back to 361
------------------------------------------------------------------------
```

Note The output should have the '-m' option's text entered in Step 4, on page 18 as the comment.

Step 6 Open Policy Builder and verify the polices to which you have rolled back. Normally the customer should be able to verify the policies in Policy Builder.

Step 7 Perform a publish in Policy Builder and make sure to add a comment indicating that the publish is being done to complete the rollback. For example, "publishing to complete rollback to <*r_number*>".

System Configuration

The Systems node in the Reference Data tab represents the Cisco Policy Suite runtime environment as it exists in the network environment.

- System: There must always be at least one system defined in the Policy Builder. The system represents the customer deployment. In HA, the system represents a set of PCRF clusters that share the same session database. System is used to define any common things across the clusters, such as load balancing, and so on.
- Cluster: Each system contains one or more clusters - each of which represents a single High-Availability (HA) site environment. A cluster is used for define the configurations related to the blades. A cluster shares the same set of policy directors (that communicates as a group). A customer can take a fully installed PCRF and replicate it to a second cluster.

  Each cluster can contain node instances. A node instance corresponds to a physical node in a deployment cluster such as a session manager or load balancer. It is very rare that a deployed system needs to have node instances configured in the Policy Builder. Configurations flow downhill, meaning that if you define a Plugin Configuration for Unified API at the system level, each cluster and subsequently each instance gets that configuration by default.

  There are two types of clusters: HA and GR. This document discusses HA clusters. For information related to GR clusters, refer to *CPS Geographic Redundancy Guide* for this release.

Note In an HA environment you should not make any configuration in Cluster node.

Plug-in configuration done at cluster level overrides the same definition at system level. For example, if you configure Custom Reference Data at cluster level, it will override the Custom Reference Data configuration done at system level.

There is a default deployment configuration for mobile and WiFi deployments. **system-1** is the default system name and **cluster-1** is the default cluster name.

If a customer wants to change the system name, they need to change it in `qns.conf` (`/etc/broadhop/qns.conf`) file also to reflect it in Policy Builder:

`-Dcom.broadhop.run.systemId=<system name>`

This section covers the following sections:

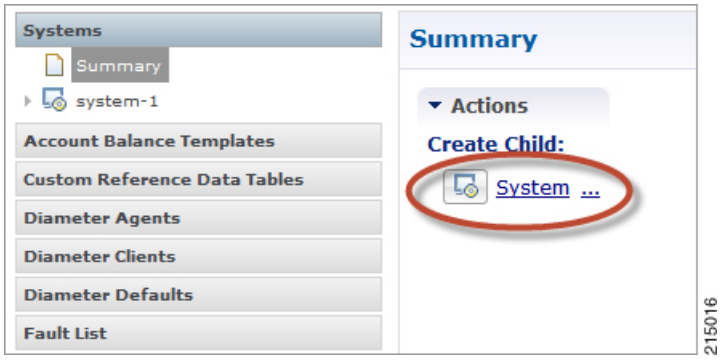
- Adding a System, on page 20
- Adding an HA Cluster, on page 22

Adding a System

After installation, use this procedure to set up your Cisco Policy Builder by using an example populated with default data. You can change anything that does not apply to your deployment.

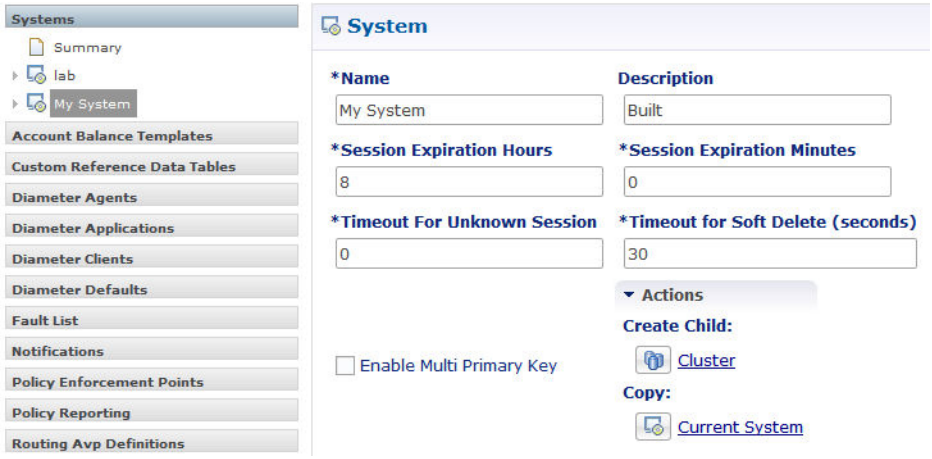
Step 1 Click the **Reference Data** tab, and then click the **Systems** node to display the **Systems** tree.

Figure 12: Systems Tree



Step 2 Click **System...** under **Create Child:** to open the **System** pane on the right side.

Figure 13: System Pane



Step 3 Fill in the **Name** field, and provide a description of this system. Enter the rest of the parameters based on your network requirements.

Table 2: System Parameters

Parameter	Description
Name	The name of the CPS system.
Description	Description of this entire system.
Session Expiration Hours	If no messages are received in x hours, the session will be removed. Default value is 8.
Session Expiration Minutes	If no messages are received in x minutes, the session will be removed. Default value is 0.
Timeout for Unknown Session	Time in minutes hat CPS keeps a session alive after the subscriber logs off. With this, other network entities involved in the session can let the session close gracefully. Default value is 0.
Timeout For Soft Delete	Determines the time in seconds during which a 'soft delete' session is maintained for a CPS session after session stop. Default value is 30.
Enable Multi Primary Key	Select this check box to allow two primary keys to be utilized by maintaining a map of each separate primary key and storing the 'true' multi-primary key as a UUID related to the two maps. Changing this setting has a negative performance impact and should only be done at the request of the BU. Recommendation is to keep Enable Multi Primary Key unchecked. Default is unchecked.
Cluster link	Click this link to create a cluster under this system.
Current System Link	Click this link to make a copy of this system, with its clusters and instances.

Step 4 If the created system needs to be used, then after publishing, the following property needs to be updated in the `qns.conf` configuration file:

```
-Dcom.broadhop.run.systemId=<system name>
```

where <*system name*> is the system name defined in the Step 3, on page 20.

Soft Delete Session

A soft delete session is an entry in the session database which maintains session data after session stop with an auto-generated unique primary key, but still maintains needed secondary keys. This allows messages which

come after session stop to still be processed while also allowing a session with the same primary key to be immediately created. The CPS code determines when soft delete sessions are required and what secondary keys are needed.

Soft Delete Example (Mobile)

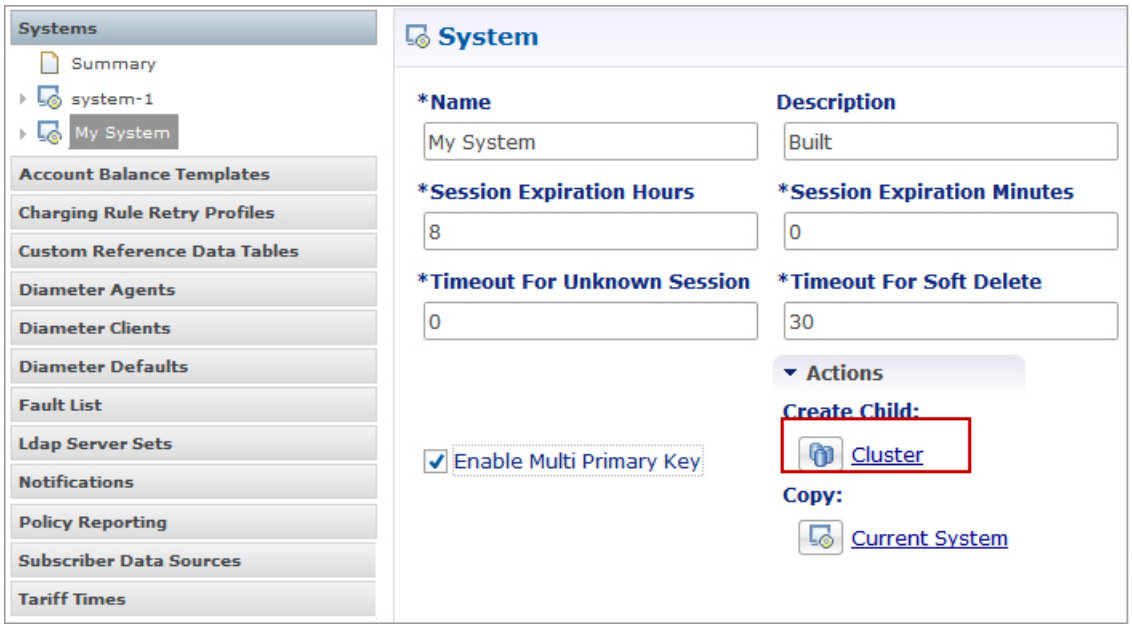
A Gx session with a Gy associated session exists. A Gx CCR-T is received that terminates the CPS session, resulting in a soft-delete session which contains Gy session information and associated Gy secondary keys. A Gy CCR-t is received and the soft-delete session is loaded and updated with the charging information through the end of the session. After the soft delete timeout, the soft delete session is removed.

Adding an HA Cluster

At install time, a system, cluster, and instance are set up. If you need to change the cluster definition, or want to add others, use these steps.

Step 1 Begin with a system at the **Systems** node in the **Reference Data** tab.

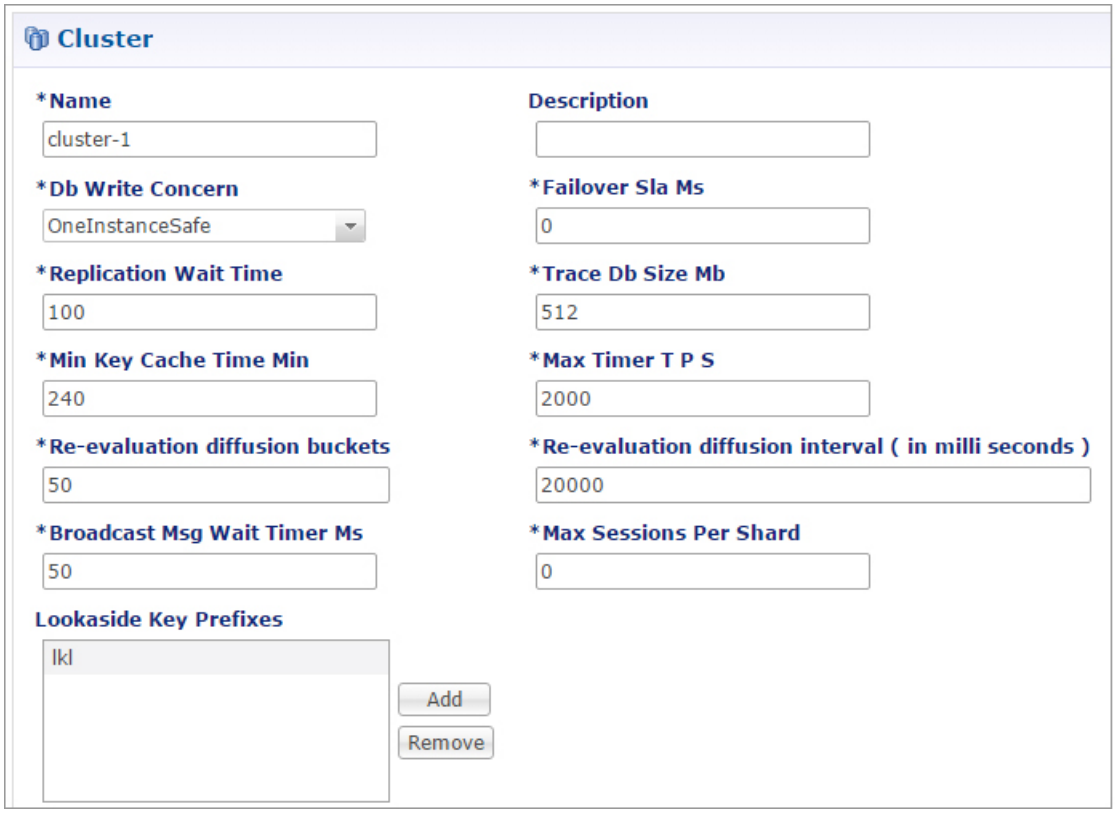
Figure 14: System Configuration



Step 2 Click the **Cluster** link to set up your first cluster.

Since some data is relevant at the cluster level, you always have at least one cluster, even if it is a cluster of one instance.

Figure 15: Cluster Configuration



Important From **Admin Database**, **End Point Database**, **Trace Database** drop-down lists, only **Shard Configuration** should be selected.

The following parameters can be configured for the Cluster:

Table 3: Cluster Parameters

Parameter	Description
Name	The name of the cluster. This name must correspond to the value stated in the `config.ini` file on the Cisco Policy Server.
Description	A brief description of the cluster.
Db Write Concern	Controls the write behavior of sessionMgr and for what errors exceptions are raised. Default option is OneInstanceSafe. For more information, refer to MongoDB documentation.
Failover Sla Ms	This parameter is used to enter the amount of time to wait before starting failover database handling. The time is in milliseconds.

Parameter	Description
Replication Wait Time	This option specifies a time limit, in milliseconds, for the write concern. This parameter is applicable only if you select TwoInstanceSafe in Db Write Concern. This parameter causes write operations to return with an error after the specified limit, even if the required write concern eventually succeeds. When these write operations return, MongoDB does not undo successful data modifications performed before the write concern exceeded the replication wait time limit. This time is in milliseconds.
Trace Db Size Mb	Determines the size in megabytes of the policy_trace database capped collection. Default value is 512.
Min Key Cache Time Min	The minimum amount of time in minutes to keep a secondary key for a session. Default value is 2000.
Max Timer T P S	This parameter controls the maximum number of internally generated transactions per second (TPS) the system will produce. For example, if the system needs to generate RAR messages to refresh quotas, the max TPS for the creation of the RAR messages will be limited by this value. Default value is 2000. System internally recalculates the TPS based on Number of Shards (excluding backup shards) and Number of Policy Servers (QNS). Timer Expired TPS = (Max Timer TPS / Number of shards) * Number of Policy Servers (QNS) For example, assuming "Number of Shards" are 8 and "Number of Policy Servers (QNS)" are 4 and Max Timer T P S is configured as 2000. Timer Expired TPS = (2000/8) * 4 Timer Expired TPS = 1000 Further this "Timer Expired TPS" would be throttled or diffused based on diffusion parameters. (Refer diffusion parameters for more details)
Re-evaluation diffusion buckets	This parameter is not used/configured for Wi-Fi deployments.
Re-evaluation diffusion interval (in milliseconds)	This parameter is not used/configured for Wi-Fi deployments.
Broadcast Msg Wait Timer Ms	The amount of time in milliseconds for the Policy Engine to wait between sending each Broadcast Policy Message. Default value is 50.
Max Sessions Per Shard	This is the maximum number of shard per session.

Parameter	Description
Lookaside Key Prefixes	To improve Gx/Rx lookup and caching performance, we can add the lookaside key prefixes. In order to identify the correct shard for subscriber lookup/query, the PCRF needs to know the secondary key (which is internally stored in secondary key cache) for mapping and the exact shard that will be queried for subscriber data. This helps prevent the system from scanning/querying all the available shards in the system to fetch the subscriber record. Reducing the data range for scanning/querying leads to enhanced system performance. The following four keys should be added so that the secondary keys for session binding are stored in the secondary key cache. • diameter • RxTGPPSessionKey • FramedIpKey • USuMSubscriberIdKey – This key should be added only when SPR is used. • MSBMSubscriberIdKey – This key should be added only when balance is used. This would prevent the system from scanning/querying all the available shards in the system to fetch the subscriber record which eventually leads to enhanced system performance.
Admin Database	• Primary Database IP Address: The IP address of the session manager database that holds session information for Cisco Policy Builder and Cisco Policy Server. • Secondary Database IP Address: The IP address of the database that provides fail over support for the primary database. This is the mirror of the database specified in the Primary IP Address field. Use this only for replication or replica pairs architecture. This field is present but deprecated to maintain downward compatibility. • Database Port: Port number of the database for session data. Default value is 27717.
Endpoint Database	• Primary Database IP Address: The IP address of the session manager database that holds session information for Cisco Policy Builder and Cisco Policy Server. • Secondary Database IP Address: The IP address of the database that provides fail over support for the primary database. This is the mirror of the database specified in the Primary IP Address field. Use this only for replication or replica pairs architecture. This field is present but deprecated to maintain downward compatibility. • Database Port: Port number of the database for Session data. Default value is 27717.

Parameter	Description
Trace Database	• Primary Database IP Address: The IP address of the sessionmgr node that holds trace information which allows for debugging of specific sessions and subscribers based on unique primary keys. • Secondary Database IP Address: The IP address of the database that provides fail over support for the primary database. This is the mirror of the database specified in the Primary IP Address field. Use this only for replication or replica pairs architecture. This field is present but deprecated to maintain downward compatibility. • Database Port: Port number of the database for Session data. Default value is 27717.
Data Centre Parameter	Deprecated
Common Time Changes	Deprecated

Step 3 From the Systems tree, open up the cluster that you just added and check the plug-in configurations.
Any of the configurations you specify here are used at the cluster level only and cascade down to the instance level if no configuration is set on the instance.

At this point, the plug-ins are available to the cluster but are not configured.

Click any one of them to open the detailed page in the right pane, and check and set your own configuration data. However, there is rarely a need to use the Threading Configuration or the Async Threading Configuration unless instructed to do so.

Step 4 If the created cluster needs to be used, then after publishing, following property needs to be updated in the `qns.conf` configuration file:

```
-Dcom.broadhop.run.clusterId=<cluster name>
```

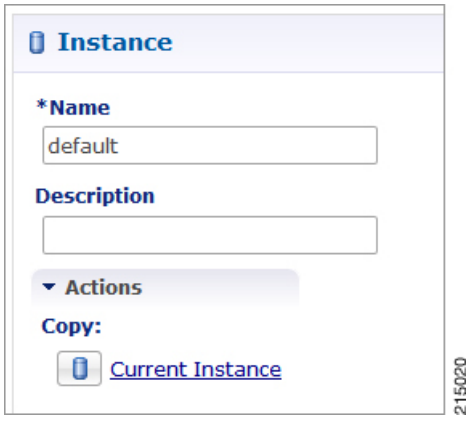
where, <*cluster name*> is the cluster name defined in Policy Builder.

Adding an Instance

Step 1 Begin with a Cluster at the **Systems** node in the **Reference Data** tab.

Step 2 Under **Create Child:**, click the **Instance** link to open the **Instance** pane.

Figure 16: Instance Configuration



Step 3 Type the **Name** and **Description**.

Step 4 From the **Systems** tree, open up the instance node that you just added and check the plug-in configurations.
At this point, plug-ins are available but not configured at the instance level.

Click any one of the plug-ins to open the detailed page in the right pane and check and set your own configuration data.

Any of the configuration data you have here are used at the instance level, overriding any plug-ins set at the system level or the cluster level.