



## Notification Services

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## Email Notifications

### Configure Notifications

CPS supports sending email notifications to one primary and one secondary email server, or alternatively to a pool of email servers (See [Multiple Email Notification Configuration](#)).

When configured for one primary and one secondary email server, CPS will send all email notifications to the primary server. If the primary fails, CPS will retry the notification to the secondary server, if configured. If the secondary server notification fails, CPS will log that the notification was unable to be delivered.

To configure the primary and secondary email server connections that CPS will use to send email notifications to subscribers:

- 
- Step 1** Login to Policy Builder.
  - Step 2** Go to **Reference Data > Systems > a system or a cluster > Plugin Configurations > Notification Configuration**.
  - Step 3** Click the check box next to **Email Notification Configuration**.
  - Step 4** View the **Notification Configuration** screen that drops down.  
The following parameters can be configured under Email Notification Configuration:

**Table 1: Email Notification Configuration Parameters**

Parameter	Description
Mail Server Address	IP address or host name of the mail server to which the notification emails will be sent. Only IMAP email is supported at this time.
Login/Password	Enter any login and password information needed.
Enable TLS	Enables transport layer security. This option is used for connecting to services other than basic IMAP services, such as Google's Gmail.
SmtP Port	Specifies the SMTP port. This option is used for connecting to services other than basic IMAP services, such as Google's Gmail.

The following screen shows an example configuration using smtp.gmail.com.

**Figure 1: Notification Configuration**

**Step 5** (Optional) To configure a secondary (backup) email server, click the check box next to **Secondary Email Server** and configure the parameters for the secondary server.

**Step 6** Go to [Configure Messages](#), on page 3 to configure the message to be sent for the notification configuration.

# Configure Messages

Substitution value can be set from SPR, Balance, or the session and placed in the email body using \$[variable].

In the following example, we are using a subscriber AVP code for email. The value "\$email" is used in the body of the text and replaced then the email is sent.

We are also using \$timeStamp to add the Date/Time.

**Figure 2: Email Notification**

**Systems**

**Account Balance Templates**

**Custom Reference Data Tables**

**Diameter Agents**

**Diameter Clients**

**Diameter Defaults**

**Fault List**

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**Notifications**

- Summary
- Apple Push Notifications
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- Real Time Notifications
- GCM Notifications

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**Tariff Times**

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**Email Notification**

**\*Name**  **Message Encoding (DCS)**

Send Once Per Session

**Subject**

**From Email Address**

**Reply To Email Address**

**Body (Text/Plain)**

Date/Time: \$timeStamp  
Dear \$email, your new session has started

**Body (Text/HTML)**

```
<br/><br/>
Date/Time: $timeStamp

<br/><br/>
<b>Dear $email, your new session has started. </b>
```

**Actions**

**Copy:** [Current Email Notification](#)

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The following parameters can be configured under Email Notifications:

**Table 2: Email Notification Message Configuration Parameters**

Parameter	Description
Name	Name of the message.
Message Encoding (DCS)	Select the required message coding from drop-down list. Valid values are ISO-8859-1, US-ASCII, UTF-16 (UCS-2) and UTF-8. Default value is UTF-8.
Subject	This is the subject line of the email to the subscriber.
From Email Address	The From field in the email.
Reply To Email Address	Who the subscriber may reply to.
Body (Text/Plain)	The text of the email the subscriber receives in plain format
Body (Text/HTML)	The text of the email the subscriber receives in HTML format.

To pull the values from SPR and replace in the email, we use the service option setting from the notification:

**Figure 3: Service Option**

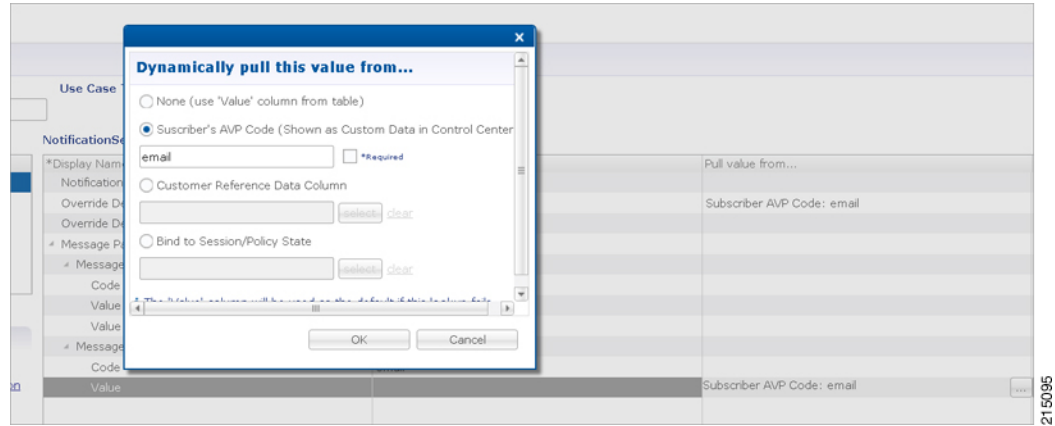
The screenshot shows the configuration for a Service Option named 'Email'. The 'Use Case Template' is set to 'NotificationsAll'. Under 'Service Configurations', 'NotificationService' is selected. The 'NotificationService Parameters' table is as follows:

Name	Display Name	Value	Pull value from...
Notification To Send	Notification To Send	Email 1	
Override Destination	Override Destination		Subscriber AVP Code: email
Override Destination Retriever	Override Destination Retriever		
Message Parameters (List)	Message Parameters (List)		
MessageParameter	Code	timestamp	
	Value	Timestamp Retriever	
MessageParameter	Code	email	Subscriber AVP Code: email
	Value		

For the timestamp, use the Value Retriever.

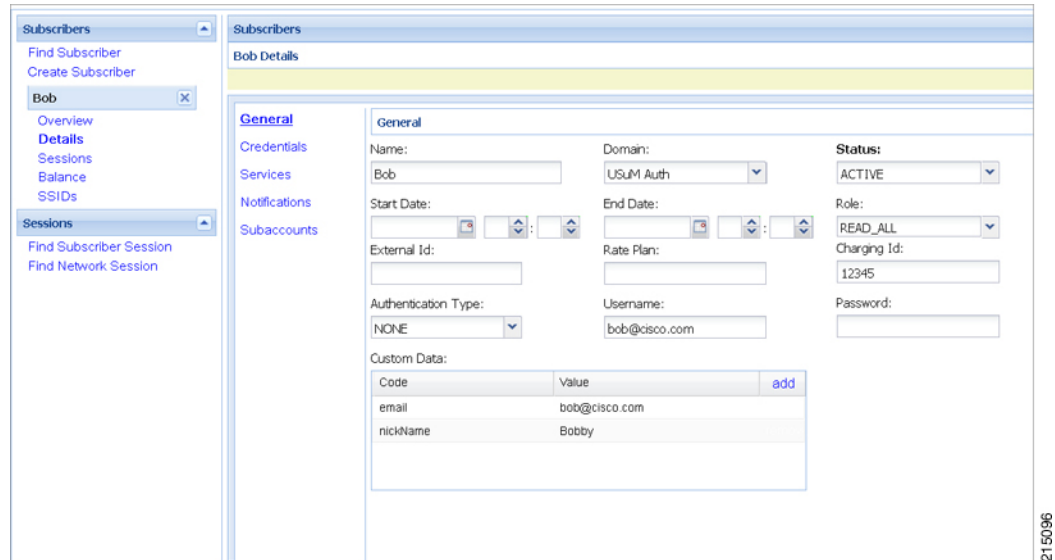
For the email, select from the “Pull value from...” column.

**Figure 4: Subscriber AVP code Email Values**



For reference, our subscriber has a Custom Data AVP set in the details of his subscriber record. This is where the value is being pulled from in Control Center:

**Figure 5: Subscriber General Details**



**Logging**

```

2015-05-01 14:34:46,345 [pool-2-thread-1] DEBUG c.b.n.impl.NotificationsManager.? - Email
encoding : UTF8
2015-05-01 14:34:46,345 [pool-2-thread-1] DEBUG c.b.n.impl.NotificationsManager.? - Email
Text body : Date/Time: 1430512486305
Dear bob@cisco.com, your new session has started
2015-05-01 14:34:46,345 [pool-2-thread-1] DEBUG c.b.n.impl.NotificationsManager.? - Email
HTML body : <br/><br/>
Date/Time: 1430512486305
<br/><br/>
<b>Dear bob@cisco.com, your new session has started.</b>
    
```

To use Email Notifications, we need to configure Service Options. For more information on the configuration, refer to [Service Option Configuration](#), on page 25.

# Multiple Email Notification Configuration

## Configure Notifications

This section describes how to configure CPS to send email notifications to multiple email servers.

When multiple email servers are configured, CPS utilizes a round-robin selection scheme to distribute the email notifications to subscribers. No weighting is used when selecting the email servers from the configured pool.

If CPS detects that the running status of an email server is DOWN, CPS will automatically skip this server and send the notifications to the next email server. If a message cannot be delivered by an email server, CPS will retry the same message to the next email server.



### Note

In a CPS High Availability deployment, where two Policy Director (load balancer) VMs (lb01 and lb02) are used, each Policy Director operates a separate notification service. As a result, email notifications are first balanced across each Policy Director, and then each Policy Director delivers the message to an email server in a round robin fashion. This can result in concurrent messages being delivered to the same email server.

The following SNMP Notifications (Alarms) are used to monitor these email server connections. Refer to *CPS SNMP and Alarms Guide*, Release 9.1.0 and prior releases or *CPS SNMP, Alarms and Clearing Procedures Guide*, Release 10.0.0 and later releases for more information.

- AllEmailNotificationServerDown
- AtLeastOneEmailNotificationServerUp
- EmailNotificationServerDown
- EmailNotificationServerUp

To generate the SNMP Notifications (alarms), you need to configure

`-dnotification.interface.monitor.emailserver=true` in `/etc/broadhop/qns.conf` file. After configuring the parameter, run the following commands:

```
/var/qps/install/current/scripts/build_all.sh
```

```
/var/qps/install/current/scripts/upgrade/reinit.sh
```



### Note

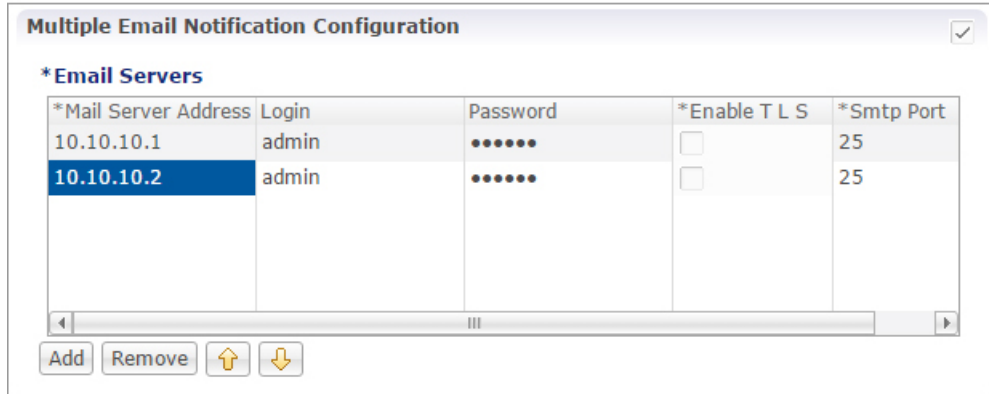
Before continuing with these steps to add a pool of email servers, first remove the Primary and Secondary servers configured under the Email Notification section of Policy Builder.

To configure a pool of email server connections that CPS uses to send email notifications to subscribers:

- 1 Login to Policy Builder.

- 2 Go to **Reference Data > Systems > a system or a cluster > Plugin Configurations > Notification Configuration**.
- 3 Click the check box next to **Multiple Email Notification Configuration**.
- 4 View the Notification Configuration screen that drops down.
- 5 Click **Add** to add an email server to the list.

**Figure 6: Multiple Email Notification Configuration**



**Note** Moving an entry up or down in the table reflects only the display order; it has no impact on the selection when processing email notifications.

The following parameters can be configured for each email server:

**Table 3: Email Notification Configuration Parameters**

Parameter	Description
Mail Server Address	IP address or host name of the mail server to which the notification emails will be sent. Only IMAP email is supported at this time.
Login/Password	Enter any login and password information needed.
Enable TLS	Enables transport layer security. This option is used for connecting to services other than basic IMAP services, such as Google’s Gmail.
SmtP Port	Specifies the SMTP port. This option is used for connecting to services other than basic IMAP services, such as Google’s Gmail.

- 6 Go to [Configure Messages](#), to configure the message to be sent for the notification configuration.

# SMS Notifications

## Configure Notifications

CPS supports sending Short Message Service (SMS) notifications to one primary and one secondary SMSC server, or alternatively to a pool of SMSC servers (See [Multiple SMSC Server Configuration](#)).

The following section describes how to configure CPS to send SMS notifications to a primary SMSC server and a secondary SMSC server.

- 
- Step 1** Login to Policy Builder.
  - Step 2** Go to **Reference Data > Systems > a system or a cluster > Plugin Configurations > Notification Configuration** .
  - Step 3** Click the check box next to **SMS Notification Configuration**.
  - Step 4** View the Notification Configuration screen that drops down.  
The following parameters can be configured under SMS Notification:

**Table 4: SMS Notification Parameters**

Parameter	Description
SMSC Host Address	The TCP/IP address or host name of the SMPP server, that is, the URL of the SMSC host that pushes the SMS message.
SMSC Port	The TCP/IP port on the SMPP server to which the gateway connects.
System ID	The user name for the gateway to use when connecting to the SMPP server
Password	The password for the gateway to use when connecting to the SMPP server.
System Type	An optional login parameter used only if required by the SMPP server. The SMPP system administrator provides this value, usually a short text string.
Registered Delivery	Optional field for some custom deployments.



Parameter	Description
DataCoding (Advanced Use Only)	Optional field for some custom deployments. Data Coding can be used instead of the Message Encoding and the other DCS fields on the Notification message definition screen, but should be used with care. <b>Note</b> If it is necessary to use a specific value in this field for data coding, then the message alphabet information should be included in the Data Coding value per the SMS specification as well as any other necessary data coding information. The result is a combination of the capabilities of the SMSC and is not totally controlled by CPS.
Priority Flag	Optional field for some custom deployments.
Binding Type	TX (transmit) or TRX (transceiver)
Enquire Link Time	Specifies the Enquire Link Timer value. The plug-in instance performs an Enquire Link operation to the SMSC to keep the connection alive. The time between inquiries is specified by this timer value. Default value is 5000 seconds.
Reconnect	If checked, CPS will check connection to the SMSC at the interval specified in the "Reconnect Smsc Time" field.
Reconnect Smsc Time	The interval to check the connection to the SMSC, and reconnect if lost. This will check the primary and secondary if the secondary properties are set.

Other than the parameters mentioned in [Table 4: SMS Notification Parameters](#), on page 8, the user can configure the following parameters after selecting **Retry Configuration** check box.

The following parameters can be configured under Retry.

**Table 5: Retry Parameters**

Parameter	Description
No. Of Retries	Number of retries allowed to resubmit the message.
Retry Interval	Interval in which message are resubmitted until success.

Go to [Configure Messages](#), to configure the SMS message to be sent for the notification configuration done above.

## Configure Messages

To create the SMS to be sent by CPS, perform the following steps:

- 1 Select **Reference Data > Notifications > SMS Notifications**.
- 2 From right side, click **SMS Notification** under **Create Child** to open the pane.

The following parameters can be configured under **SMS Notification**:

**Table 6: SMS Notification Parameters**

Parameter	Description
Name	Name of the notification message. This name is used later in the policy definition to send the SMS.
Source Address	Source address of the SMS message.
Callback Number	This is an optional field. This parameter is used to configure the callback number adhering to specification. The input format is a hexadecimal string. It will correspond to the exact hexadecimal sent in the stream.  Currently, only a single callback number is supported.  For more information, refer to <a href="#">SMS Notification Extension</a> .
Address TON	Type of Number for the source. It defines the format of the phone numbers.  Values: ABBREVIATED, ALPHANUMERIC, INTERNATIONAL, NATIONAL, NETWORK_SPECIFIC, SUBSCRIBER_NUMBER, UNKNOWN
Address NPI	Numbering Plan Indicator. It defines the format of the addresses.  Values: DATA, ERMES, INTERNET, ISDN, LAND_MOBILE, NATIONAL, PRIVATE, TELEX, UNKNOWN, WAP
Message Class (DCS)	The message class per the SMPP specification. Valid values are CLASS0, CLASS1, CLASS2. Default value is CLASS1.
Message Encoding (DCS)	Defines the alphabet and byte encoding used for the message. Valid values are US-ASCII (7 bit), ISO-8859-1 (8 bit), and UTF-16 (UCS-2) which is 16 bit. Default value is US-ASCII.

Parameter	Description
Override Character Limit (Advanced)	<p>Some SMSCs create multi-part messages for long SMS messages instead of having CPS create the multiple messages. This option provides such behavior by overriding the default single message size.</p> <p>This option is for advanced use only. The reason is that if space in the message submitted from CPS does not allow for header information, such as the User Data Header (UDH), then many SMSC are not accepted the messages at all.</p>
Compressed (DCS)	Select this check box to set whether compression is used per the SMPP specification. Default is false.
Use Plugin Config Data Coding Instead (DCS)	Select this check box when you want to use the value specified in Data Coding field in the Notifications Configuration screen instead of the Message Class, Message Encoding, Compressed, and Contain Message Class values on this screen.
Contain Message Class	Select this check box to set whether the contain message class options is used per the SMPP specification. Default is false.
Use Message Encoding with Plugin Config Data Coding	<p>Select this check box when the “Use Plugin Config Data Coding Instead” check box above is checked. The check box “Use Plugin Config Data Coding Instead” must be true to use this value.</p> <p>This check box allows the Message Encoding value on this screen to define the byte conversion method that is used in conjunction with the Data Coding value in the Notifications Configuration screen.</p> <p>By default, the byte conversion method is US-ASCII regardless of the Plugin Configuration’s Data Coding value. Other UTF-16 conversions may use Big Endian, Little Endian or Byte Order Mark (BOM).</p> <p>This field is also important for ensuring the proper division of messages, particularly for non-English languages, for multi-part SMS message support.</p>
Message	<p>The text that the subscriber receives.</p> <p>SMS messages have character limits dependent on the selected DCS values. Text in excess of this limit triggers the submission of the multi-part messages to the SMSC.</p>

## WAP Settings

WAP push over SMS has been added to facilitate another way of initiation of notification from ANDSF server to the client (UE).

**Figure 7: WAP Push Configuration**

The following parameters can be configured under **WAP Push Configuration**:

**Table 7: WAP Push Configuration Parameters**

Parameter	Description
Version	String, version of WAP message. This can be updated to reflect changes. For example, 1.0, 2.0, 2.1. No characters are allowed. Only numbers or '.' are allowed.

Parameter	Description
UI Mode	<p>(User Interactive Mode): This field specifies the server recommendations whether the server wants the management session to be executed in background or show a notification to the user.</p> <p>Values: NOT_SPECIFIED, INFORMATIVE, BACKGROUND, USER_INTERACTION</p> <p>Default is NOT_SPECIFIED.</p> <ul style="list-style-type: none"> <li>• NOT_SPECIFIED: Specifies that the server doesn't have a recommendation to this element.</li> <li>• INFORMATIVE: Specifies that the server recommends the client to display an informative notification or maybe emitting a beep sound announcing the beginning of the provisioning session to the device user.</li> <li>• BACKGROUND: Specifies that the server recommends the management action SHOULD be done as a background event.</li> <li>• USER_INTERACTION: Specifies that the server recommends the client to prompt the device user for acceptance of the offered management session before the management session takes place.</li> </ul>
Initiator	<p>Specifies how the server has interpreted the initiation of the management action, either because the end user requested it or because the server has management actions to perform. Value from drop down is added to the WAP message and does not trigger any action on the CPS side.</p> <ul style="list-style-type: none"> <li>• Client: Specifies that the end user caused the device management session to start.</li> <li>• Server: Specifies that the server (operator, enterprise) caused the device management session to start.</li> </ul>
Session Id Length	Integer - Up to 16
SessionID	<p>Session Id is 16 bits which is 2 ASCII character according to the specification. However, there is no restriction on ANDSF session-id size, it can be of any length. In PB, session-id length is made configurable per notification template (Shown in snapshot above). When actual session id length is greater than the configured size then the notification would not be sent and an error would be logged.</p> <p>However, if session is less than the configured size, then zero would be prefixed in order to make sure that it satisfies session-id length configured in PB. It is assumed that the client would strip off the prefix and send the server initiated policy pull.</p>
ServerID	<p>String - Up to 255 Characters</p> <p>The field specifies the Server Identifier of the management server. For example, "Server_1", "WAP_SERVER_2"</p>

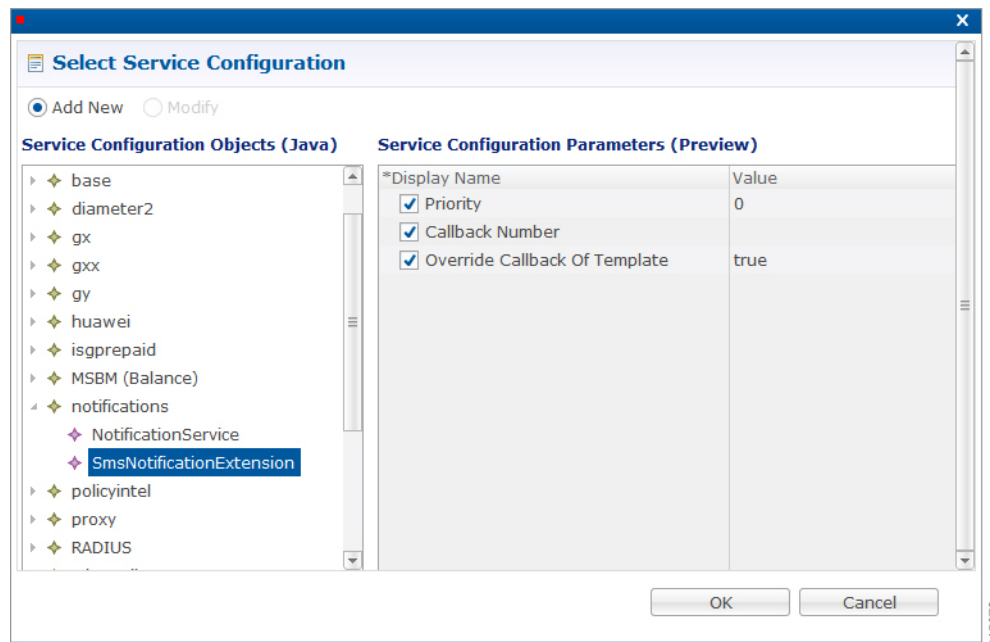
For more information on WAP fields, click [WAP Fields](#).

To use SMS Notifications, we need to configure **Service Options**. For more information on the configuration, refer to [Service Option Configuration](#), on page 25.

## SMS Notification Extension

A new Service Configuration named as SmsNotificationExtension has been added. Note that since its an extension, it needs the base NotificationService also configured as a part of the main service for it to fetch the base template details. For example, an operator can specify their call-center number for subscribers to call back.

**Figure 8: Select Service Configuration**



The following parameters are configured under **SmsNotificationExtension**:

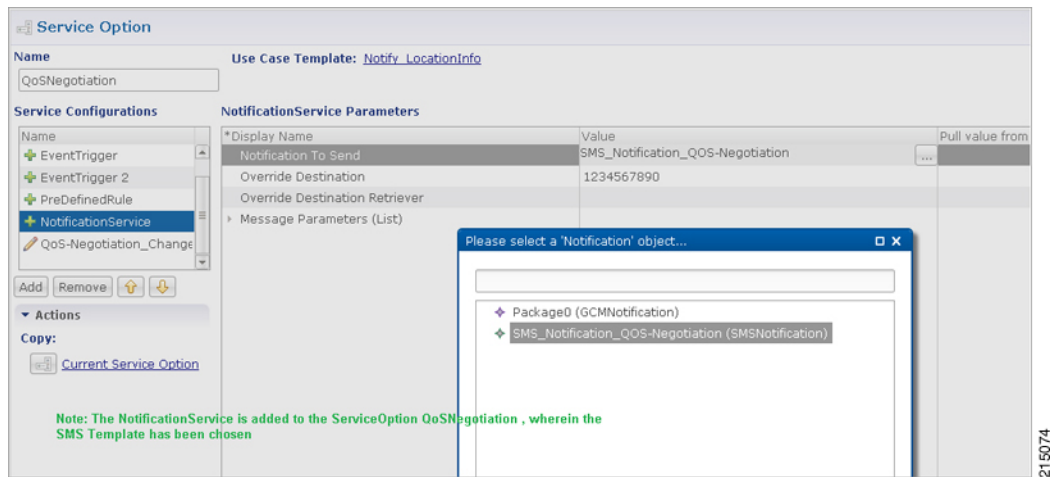
**Table 8: SmsNotificationExtension Parameters**

Parameter	Description
Priority	If there are multiple SMS Notification Extension configurations, this parameter will decide which Service configuration and corresponding parameter values to use. Higher the value, higher precedence it will have. For example, if there are two extension templates having priority as 1 and 2 each, the one with priority value 2 will be used. Default value is 0.

Parameter	Description
Callback Number	This is the service configuration level value for the callback number. This will satisfy the need of overriding the template value.  <b>Note</b> Callback Number must be the exact hexadecimal string converted value of the call back number sent in the stream. Currently, only a single callback number is supported.
Override Callback Of Template	This parameter helps to decide whether to use the service configuration callback number to override the template or not.  Default value is true.

Configure a service with the base Notification Service and select the SMS Notification Template.

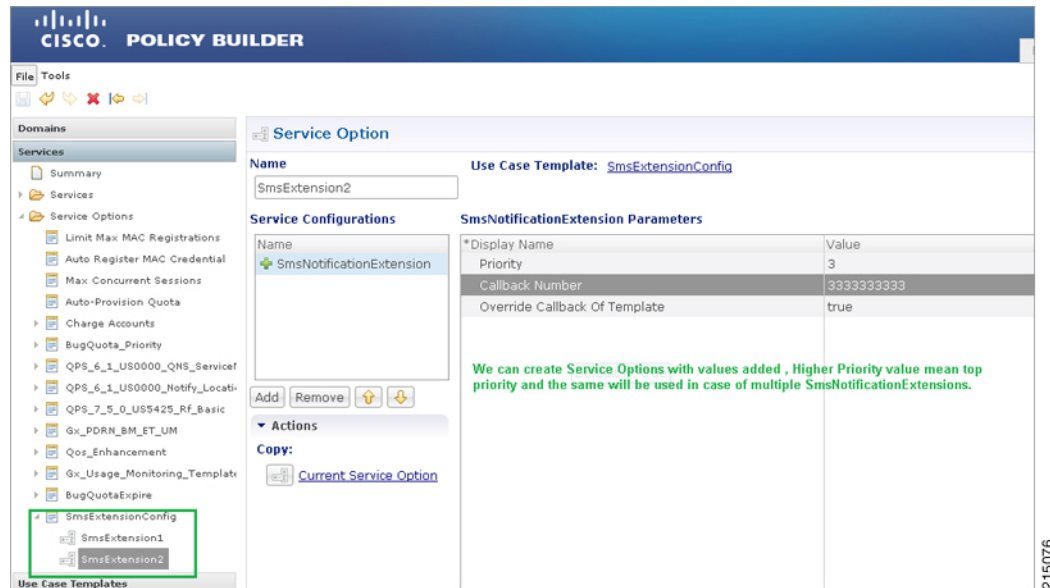
**Figure 9: Notification Object**



Create a Use Case Template using the new SMS Extension.

Add multiple extensions at service option level and configure the corresponding values.

**Figure 10: SMS Extension Configuration**



Configure a Service which has the NotificationService configured with corresponding SMS Template chosen and on top we can add the other SMSExtensions.

## Multiple SMSC Server Configuration

### Configure Notifications

This section describes how to configure CPS to send SMS notifications to multiple SMSC servers.

When multiple SMSC servers are configured, CPS utilizes a round-robin selection scheme to distribute the SMS notifications to subscribers. No weighting is used when selecting the SMSC servers from the configured pool.

If CPS detects that the running status of an SMSC server is DOWN, or if the SMSC server is marked disabled in the Policy Builder interface, CPS will automatically skip this server and send the messages to the next SMSC server. If a message cannot be sent to an SMSC server, CPS will retry to send it to the next SMSC server.

In the event that an SMSC server goes down, CPS can also be configured to reconnect to the server automatically. The frequency at which CPS will attempt to reconnect is also configurable.



**Note**

In a CPS High Availability deployment, where two Policy Director (load balancer) VMs (lb01 and lb02) are used, each Policy Director operates a separate notification service. As a result, SMS notifications are first balanced across each Policy Director, and then each Policy Director delivers the message to an SMSC server in a round robin fashion. This can result in concurrent SMS messages being delivered to the same SMSC server.

The following SNMP Notifications (Alarms) have been introduced to monitor the SMSC server connections. Refer to *CPS SNMP and Alarms Guide*, Release 9.1.0 and prior releases or *CPS SNMP, Alarms and Clearing Procedures Guide*, Release 10.0.0 and later releases for more information.

- AllSMSCNotificationServerDown
- AtLeastOneSMSCNotificationServerUp
- SMSCNotificationServerDown
- SMSCNotificationServerUp

**Note**

Before continuing with these steps to add a pool of SMSC servers, first remove the Primary and Secondary servers configured under the SMS Notification Configuration section of Policy Builder.

To configure CPS to send SMS notifications to a pool of SMSC servers:

- 1 Login to Policy Builder.
- 2 Go to **Reference Data > Systems > a system or a cluster > Plugin Configurations > Notification Configuration**.
- 3 Click the check box next to **Multiple SMSC Server Configuration**.
- 4 View the Notification Configuration screen that drops down.
- 5 Click **Add** to add an SMSC server to the list.

**Note**

Moving an entry up or down in the table reflects only the display order; it has no impact on the selection when processing SMS notifications.

The following parameters can be configured for each SMSC server:

**Table 9: SMSC Server Parameters**

Parameter	Description
Admin Status	This field allows the operator to disable a specific SMSC server without removing the configuration entirely. If a server is disabled, CPS will not send any SMS notifications to it.
SMSC Host Address	The TCP/IP address or host name of the SMPP server, that is, the URL of the SMSC host that pushes the SMS message.
SMSC Port	The TCP/IP port on the SMPP server to which the gateway connects.

Parameter	Description
Binding Type	TX (transmit) or TRX (transceiver)
System ID	The user name to use when connecting to the SMSC server
Password	The password to use when connecting to the SMSC server.
Enquire Link Time	Specifies the time between Enquiry Link operations in seconds. CPS performs an Enquire Link operation to the SMSC server to keep the connection alive. Default: 5000 seconds.
System Type	An optional login parameter used only if required by the SMSC server. The SMSC system administrator provides this value, usually a short text string.
Registered Delivery	Optional field for some custom deployments.
DataCoding	Optional field for some custom deployments.  Data Coding can be used instead of the Message Encoding and the other DCS fields on the Notification message definition screen, but should be used with care.  <b>Note</b> If it is necessary to use a specific value in this field for data coding, then the message alphabet information should be included in the Data Coding value per the SMS specification as well as any other necessary data coding information. The result is a combination of the capabilities of the SMSC and is not totally controlled by CPS.
Priority Flag	Optional field for some custom deployments.
Reconnect SMSC SMS	If checked, CPS will attempt to reconnect to an SMSC server if the connection was lost or server was down.
Reconnect SMSC Timer (seconds)	The interval in which CPS will attempt to reconnect to the SMSC server. Default: 300 seconds

Refer to [Configure Messages](#), to configure the SMS message to be sent for the notification configuration done above.

## Real Time Notifications

Real time Notifications allows you to send SOAP/XML and REST/JSON messages to a defined server when policy thresholds are breached. The information related to real time notification is provided in the following feature files:

- For AIO Setup:  
In `/etc/broadhop/pb/features`:
  - `com.broadhop.client.feature.notifications`
- In `/etc/broadhop/pcrf/features`:
  - `com.broadhop.notifications.local.feature`
  - `com.broadhop.notifications.realtime.service.feature`
  - `com.broadhop.notifications.service.feature`
- For HA Setup:  
In `/etc/broadhop/pb/features`:
  - `com.broadhop.client.feature.notifications`
- In `/etc/broadhop/pcrf/features`:
  - `com.broadhop.notifications.local.feature`
- In `/etc/broadhop/iomanager/features`:
  - `com.broadhop.notifications.realtime.service.feature`
  - `com.broadhop.notifications.service.feature`

## Configure Notifications

- Step 1** Log in to Policy Builder.
- Step 2** Go to **Reference Data > Systems > a system or a cluster > Plugin Configurations > Notification Configuration**.
- Step 3** Click the check box next to **Realtime Notification Configuration**.
- Step 4** View the Notification Configuration screen that drops down  
The following parameters can be configured under Realtime Notification Configuration.

**Table 10: Realtime Notification Configuration Parameters**

Parameter	Description
Failed Notifications Directory	File system path where failed notifications are stored. So when CPS is not able to send notification on both Server URL and Server Fallback URL then that notification is stored in this path.  The path to the failed notifications directory needs to be created manually on Policy Directors (load balancers) (lb01 and lb02).
Max Storage allowed for failed Notifications (in MB)	Maximum size up to which CPS can store failed notifications in the failed notifications directory.

Go to [Configure Messages](#), on page 20, to configure the realtime notification message to be sent for the notification configuration done above.

## Configure Messages

To create the realtime notification to be sent by CPS, perform the following steps:

- Step 1** Select **Reference Data > Notifications > Real Time Notifications**.
- Step 2** On the right-hand-side panel, click **Real Time Notification** under **Create Child** to open the Notifications pane.

**Figure 11: Real Time Notifications**

**Real Time Notification**

**\*Name** RealTime1 **No Of Retries** 3

**Retry Interval (secs)** 3 **Content Type** text/xml

**User Name** username **Password** \*\*\*\*\*

Send Once Per Session

**Server URL** http://172.31.0.1:7576/test

**Server Fallback URL**

**HTTP Post Parameter name (Keep this field blank if not applicable, Eg: SOAP/REST)**

**Payload Template (Text/XML/JSON)**

```
<?xml version="1.0" encoding="utf-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:ser="http://localhost:8080/dataTest/services/">
<soapenv:Header/>
<soapenv:Body>
<ser:NewServiceStartedRequest>
<UserId>$userId</UserId>
<Balance>$balance</Balance>
<Quota>$quota</Quota>
<Timestamp>$timeStamp</Timestamp>
</ser:NewServiceStartedRequest>
</soapenv:Body>
</soapenv:Envelope>
```

The following parameters can be configured under Real Time Notifications:

**Table 11: Real Time Notifications Parameters**

Parameter	Description
Name	Name of the real-time notification message.

Parameter	Description
No of Retries	When CPS sends real-time notification to the provided Server URL and if it is not reachable then this field specifies how many times CPS should send the notification. Same is true for Server Fallback URL.  Default value is 3.
Retry Interval (secs)	The time to wait between retries configured in the <b>No of Retries</b> field.  Default value is 3.
Content Type	The content type is set based on the type of the payload template (Text/XML/JSON). You can select the following: <ul style="list-style-type: none"> <li>• text/xml</li> <li>• application/json</li> <li>• application/x-www-form-urlencoded</li> </ul> The content type that you choose must match the template in the <b>Payload Template</b> field. The default value is text/xml.
User Name	The user name for accessing the endpoint specified in the <b>Server URL</b> and <b>Server Fallback URL</b> fields.  If no user name is required, leave this field blank.
Password	The password for accessing the endpoint specified in the <b>Server URL</b> and <b>Server Fallback URL</b> fields.  If no password is required, leave this field blank.
Send Once Per Session	If checked, real-time notifications are generated for each session and not for all messages within that session.  Default value is true.
Server URL	Primary URL where CPS sends real-time notifications.
Server Fallback URL	When the Primary URL is not reachable, CPS tries to send notification to this URL for the configured <b>No of Retries</b> . When the number of retries are exhausted, CPS tries to send notification to the Server Fallback URL.
HTTP Post Parameter name (Keep this field if not applicable, Eg: SOAP)	For SOAP this field is not applicable and hence should be blank. This field specifies the HTTP Post parameter name.

Parameter	Description
Payload Template (Text/XML/JSON)	<p>This field contains the payload template, so real-time notifications are generated using the configured template. CPS provides values to the fields specified in the template from the ongoing session. For all fields that are specified in the template with values found, the real-time notification is generated.</p> <p>The names of the variables/placeholders defined here must match with the notification service parameter codes defined in service parameters of the corresponding use case template.</p> <p>You should also ensure that the correct value retriever is selected for each notification service parameter code in the use case template.</p>

The following example shows a JSON payload template for reference only.

```
{
  "notifications": [
    {
      "ctn_id": "$msisdn",
      "eventType": "$eventType",
      "eventData": {
        "services": ["$service"]
      }
    }
  ]
}
```

The following figure shows the configuration of NotificationService parameters in a use case template that pertains to the JSON example above.

**Figure 12: NotificationService Parameter Configuration for JSON Example**

*Display Name	Value	Bind Field	Allow Override
Notification To Send	CNSNotifications		<input checked="" type="checkbox"/>
Override Destination			<input checked="" type="checkbox"/>
Override Destination Retriever			<input checked="" type="checkbox"/>
Message Parameters (List)			<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	msisdn		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Session MSISDN		<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	eventType		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Device Indicator Event Type		<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	service		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Device Indicator Service		<input checked="" type="checkbox"/>

- As you can see in the figure, the `msisdn`, `eventType`, and `service` notifications in the JSON example are added as **Code** values under **Message Parameters**.
- These values are pulled using the **Value Retriever** shown in the figure for each message parameter. Use the select box provided in each **Value Retriever** field to select the retrievers.
  - For *Code* type `eventType`, the **Value Retriever** is Device Indicator Event Type which allows the retrieval of event type. This is currently hard-coded to `QoS_Change`.
  - For *Code* type `service`, the **Value Retriever** is Device Indicator Service which allows retrieval of service status (ON or OFF).
- For the **Notification To Send** parameter, select the Real Time Notification you want from the list.

The following example shows an XML payload template for reference only.

```
<?xml version="1.0" encoding="utf-8"?>
  <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:ser="http://localhost:8080/dataTest/services/">
    <soapenv:Header/>
```

```

<soapenv:Body>
  <ser:NewServiceStartedRequest>
    <UserId>$userId</UserId>
    <Balance>$balance</Balance>
    <Quota>$quota</Quota>
    <Timestamp>$timeStamp</Timestamp>
  </ser:NewServiceStartedRequest>
</soapenv:Body>
</soapenv:Envelope>

```

The following figure shows the configuration of NotificationService parameters in a use case template that pertains to the XML example above.

**Figure 13: NotificationService Parameter Configuration for XML Example**

**Use Case Template**

Name:

Use Case Initiators **Actions** Documentation

**Service Configurations**

Name

- + NotificationService

Add Remove ↑ ↓

**Actions**

Create Child:

- Use Case Option

Copy:

- Current Use Case Template

**NotificationService Parameters**

*Display Name	Value	Bind Field	Allow Override
Notification To Send	default		<input checked="" type="checkbox"/>
Override Destination			<input checked="" type="checkbox"/>
Override Destination Retriever			<input checked="" type="checkbox"/>
Message Parameters (List)			<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	userId		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Session User Name		<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	balance		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Balance Code Retriever		<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	quota		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Quota Code Retriever		<input checked="" type="checkbox"/>
MessageParameter			<input checked="" type="checkbox"/>
Code	timeStamp		<input checked="" type="checkbox"/>
Value			<input checked="" type="checkbox"/>
Value Retriever	Timestamp Retriever		<input checked="" type="checkbox"/>

Add Remove Add Child ↑ ↓

- Adding substitute values into the message body.

To substitute any value into your message, add the character '\$' to the beginning of the variable name. For example, \$userName.

The XML Template example shown above contains the \$userId, \$balance, \$quota, and \$timeStamp variables, which we will replace with values from the session and post to the Server URL defined in the Notifications Plugin.



- The Server URL is the destination of the message, and this is not set as an attribute of the subscriber like the other notifications.
- **Notification To Send:** Select the Real Time Notification you want from the list.

**Message Parameters (using the example XML payload template):**

- **userId:** This value is pulled using the Session User Name Retriever. Use the select box from the Value Retriever field.
- **balance:** This value is pulled using the Balance Code Retriever. Use the select box from the Value Retriever field.
- **quota:** This value is pulled using the Balance Code Retriever. Use the select box from the Value Retriever field.
- **timestamp:** This value is pulled using the Timestamp Retriever. Use the select box from the Value Retriever field.

For more information on service options, refer to [Service Option Configuration](#), on page 25.

---

## Service Option Configuration

This section provides an example Service Options configuration which can be used for SMS, EMAIL, Apple Push, and GMC notifications. The bodies of the messages are identical to make the service options parameters simpler to follow.

### Adding substitute values into the message body

To substitute any value into your message, add the character '\$' to the beginning of the variable name. For example, Ex. \$userName.

This set of substitute variables are used as an example for SMS, EMAIL, Apple Push, and GCM.

- \$timeStamp
- \$userId
- \$nickName

You assign the variables their value using the Notification Service Parameters.

There are four values provide for the example configuration:

- **Notification To Send:** Select the Notification you want from the list.
- **Timestamp:** This value is pulled using Timestamp Retriever. Use the select box from the Value Retriever field.
- **userId:** This value is pulled using Session User Name Retriever. Use the select box from the Value Retriever field.
- **Nickname:** We are filling this value using the Subscriber AVP Code action, pulling from the Custom Data attached to the subscriber. You can see these values in the Control Center.

nickName example: Custom AVP in the Control Center

**Figure 14: nickName Configuration**

The screenshot shows the 'Subscribers' configuration page for a subscriber named 'Bob'. The 'General' tab is active, displaying various fields for configuration. The 'Custom Data' table is expanded, showing the following entries:

Code	Value
email	bob@cisco.com
nickName	Bobby
smsNumber	121222111111

The 'nickName' field is highlighted with a red box. Other fields visible include Name (Bob), Domain (USUM Auth), Status (ACTIVE), Start Date, End Date, External Id, Rate Plan, Authentication Type (NONE), Username (bob@cisco.com), Password, and Role (READ\_ALL).

### Apple Push Notification Destination

By default, this notification will go the Destination set in the Notifications section under the subscriber details for the type of Notification being sent.

For example, an Apple Push message will go to Apple Push Destination, and SMS to SMS, and so on.

**Figure 15: Notification Destinations**

The screenshot shows the 'Subscribers' configuration page for a subscriber named 'Bob'. The 'Notifications' tab is active, displaying a table of notification destinations. The table is as follows:

Type	Destination	Enabled	Custom Data
SMS	4445554444	Yes	No
GCM	3344556677	Yes	No
APPLE_PUSH	3033330099	Yes	No
EMAIL	bob@cisco.com	Yes	No

To override the destination set for the subscriber, you can use the **Override Destination** field in the Service Option.