Net-Net® ASC
Web Services
SOAP/REST API

Release Version E3.6.0m5

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Contents

About This Guide

Overview

Net-Net ASC Web Service is a WSDL/REST Application Programming Interface (API) enabling enterprises, service providers, and third-party developers to streamline business processes by integrating their applications with IP communications services.

Audience

This guide is written for application developers and network administrators, and provides information about the Net-Net ASC WSDL/REST-based Web Services implementation.

For information about Net-Net system training, contact your Acme Packet sales representative directly or email support@acmepacket.com

Who is Acme Packet?

Acme Packet enables service providers to deliver trusted, first class interactive communications-voice, video and multimedia sessions-across IP network borders. Our family of Multiservice Security Gateways satisfy critical security, service assurance and regulatory requirements in cable and wireless networks.

Acme Packet, located in Bedford, MA, was established by networking industry veterans in August 2000. Acme Packet is public company that is traded on the NASDAQ stock exchange.

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About Net-Net OS-E Documentation

The Net-Net OS-E references in this documentation apply to the Net-Net OS-E operating system software that is used for the following Acme Packet and third-party SBC products:

- Net-Net Application Session Controller (ASC)
- Net-Net OS-E Session Director (SD) Session Border Controller (SBC)
- Net-Net 2600 Session Director (SD) Session Border Controller (SBC)
- Third-party products that license and use Net-Net OS-E software on an OEM basis

Unless otherwise stated, references to Net-Net OS-E in this document apply to all of the Acme Packet and third-party vendor products that use Net-Net OS-E software.

The following documentation set supports the current release of the OS-E software.

- *Net-Net OS-E – USB Creation and Commissioning Instructions*
- *Net-Net OS-E – Virtual Machine Information Guide*
- *Net-Net OS-E – System Installation and Commissioning Guide*
- *Net-Net OS-E – Management Tools*
- *Net-Net OS-E – System Administration Guide*
- *Net-Net OS-E – Session Services Configuration Guide*
- *Net-Net OS-E – Objects and Properties Reference*
- *Net-Net OS-E – System Operations and Troubleshooting*
- *Net-Net ASC — Web Services Samples Guide*
- *Net-Net OS-E – Release Notes*

Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
August 3, 2012	Revision 1.00	Initial release of the OS-E 3.6.0m5 software.

1 About the Web Service Interface

Introduction

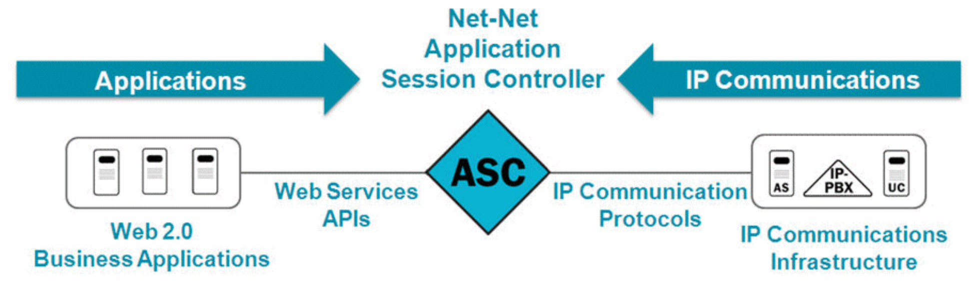
The Net-Net ASC Web Service is a SOAP/REST Application Programming Interface (API) which enables enterprises, service providers, and third-party developers to streamline business processes by integrating their applications with IP communications services.

A web service is a software system that supports interoperable machine-to-machine interaction over a network using HTTP/HTTPS transport.

This document provides a full description of the individual interface definitions that make up the ASC API.

What is the ASC?

The Net-Net ASC is a programming platform that enables enterprises, service providers, and third-party developers to streamline business processes by integrating their applications with IP communications services. The ASC implements both a SOAP-based web service interface, as well as a RESTful web service interface for invoking remote web services.



What Are SOAP-Based Web Services?

SOAP is a protocol that uses XML for exchanging structured information in the implementation of web services. A SOAP message consists of three parts:

- An envelope that defines what is included in the message and how to process it.
- A set of encoding rules which define data objects and types.
- The convention that is used to represent call and response procedures.

What is WSDL?

For SOAP-based web service, the ASC uses Web Service Description Language (WSDL) to define its available actions and types.

What is REST?

The ASC also supports REST for its web service API. REST is another API style for the ASC web service and implements a URI using HTTP and a collection of resources with three defined aspects:

- The base URI for the web service.
- The format of the data returned by the REST URL. This is usually either XML or JavaScript Object Notation (JSON).
- A set of ASC web service operations.

There are two action and status report request formats available when using RESTful web service, flat and hierarchical. When possible, Acme Packet recommends using the hierarchical format, which is a simpler way to encode REST requests.

What is WADL?

For RESTful web service, the ASC uses Web Application Description Language (WADL) to define its available actions and types.

Specifying Output and Callback

When using REST, the default format returned by the REST URL is XML. However, you can request the output format to be JavaScript Notation (JSON) instead.

To change the output to JSON, include **output=json** in the URI.

The ASC supports JavaScript callbacks when using REST. If you specify a JavaScript function name in a callback, the ASC calls the JavaScript function with the string as its parameter.

To configure a callback, include **callback=xxx** in the URI, where *xxx* is the name of the JavaScript function to call back with the output.

Accessing the ASC

The ASC web service interfaces are platform-agnostic. Any application environment, programming language, or development environment capable of sending HTTP requests may be used, including:

- Programming languages (ie., C#, Java)
- Mobile platforms (ie., iOS, Android)
- Purely web-based languages (ie., JavaScript, PHP, Python)

To access the web services homepage, the default is

```
http://x.x.x.x:8080
```

where x.x.x.x is the IP static-address where the **web-services** configuration is enabled.

The ASC web services homepage is where all user documentation and samples are located.

Supported ASC Functionality

The ASC API supports retrieving and setting all configuration objects, invoking all actions, and retrieving all status reports available on the Net-Net OS-E. Configuration, action, and status objects are referred to in this document and in the API as objects and sub-objects.

Terminology

The following terms are used throughout the document:

- *Object* – Configuration, status, or action data.
- *Property* – Attribute of an object

- *Alias* – Display name of an object or property

Authentication

The ASC requires authentication of client endpoints for security purposes. When a request is sent by a web services application to the ASC, a session cannot be established without authentication being performed.

The ASC can perform either basic authentication, which requires HTTP basic authentication for client connections, or it can perform certificate-based authentication. This requires an HTTPS certificate for authentication of client connections. Upload a unique certificate via the **vsp > tls** object.

> NOTE: In order for authentication information to be encrypted, you must be using HTTPS.

When SOAP-based messages are used to send requests to the ASC and access permissions have been configured, the SOAP client endpoint sending the request must also send the username and password with the request. Basic HTTP authentication is supported, as well as certificate-based HTTPS authentication.

REST requests can be authenticated using basic HTTP authentication, or can use the REST-specific login action, defined in all WADLs published by the ASC.

The ASC communicates with web services applications in “sessions”. A session timeout is not configurable and is hard-coded to 30 minutes.

Configuring Access

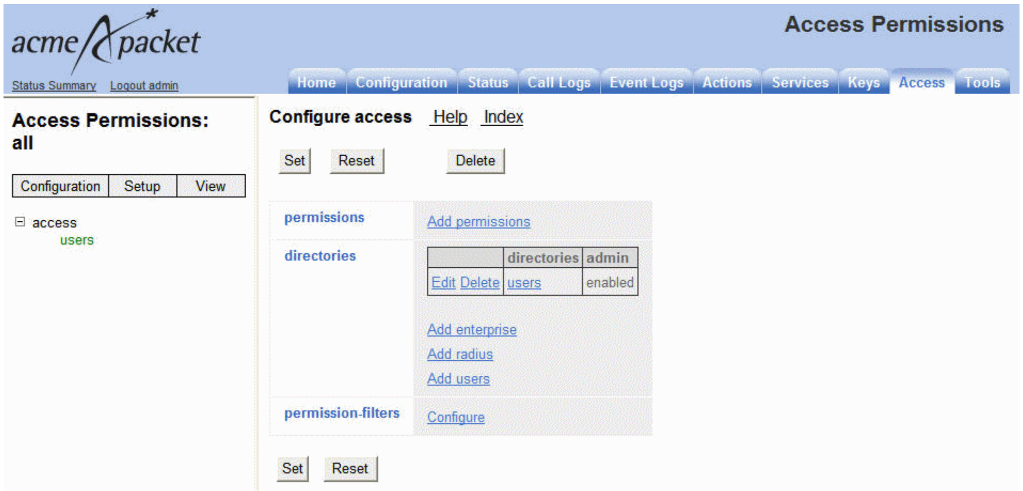
For authentication to work, you must have at least one user configured under the **access** object, with **access > permissions > web-services** set to **enabled**.

> NOTE: Users with the web-services permission enabled have access to the entire ASC system (all configuration objects, statuses, and actions).

The first step is to create a permission set with **web-services** enabled. Once this has been done, create a user and assign that user the web-services enabled permission set.

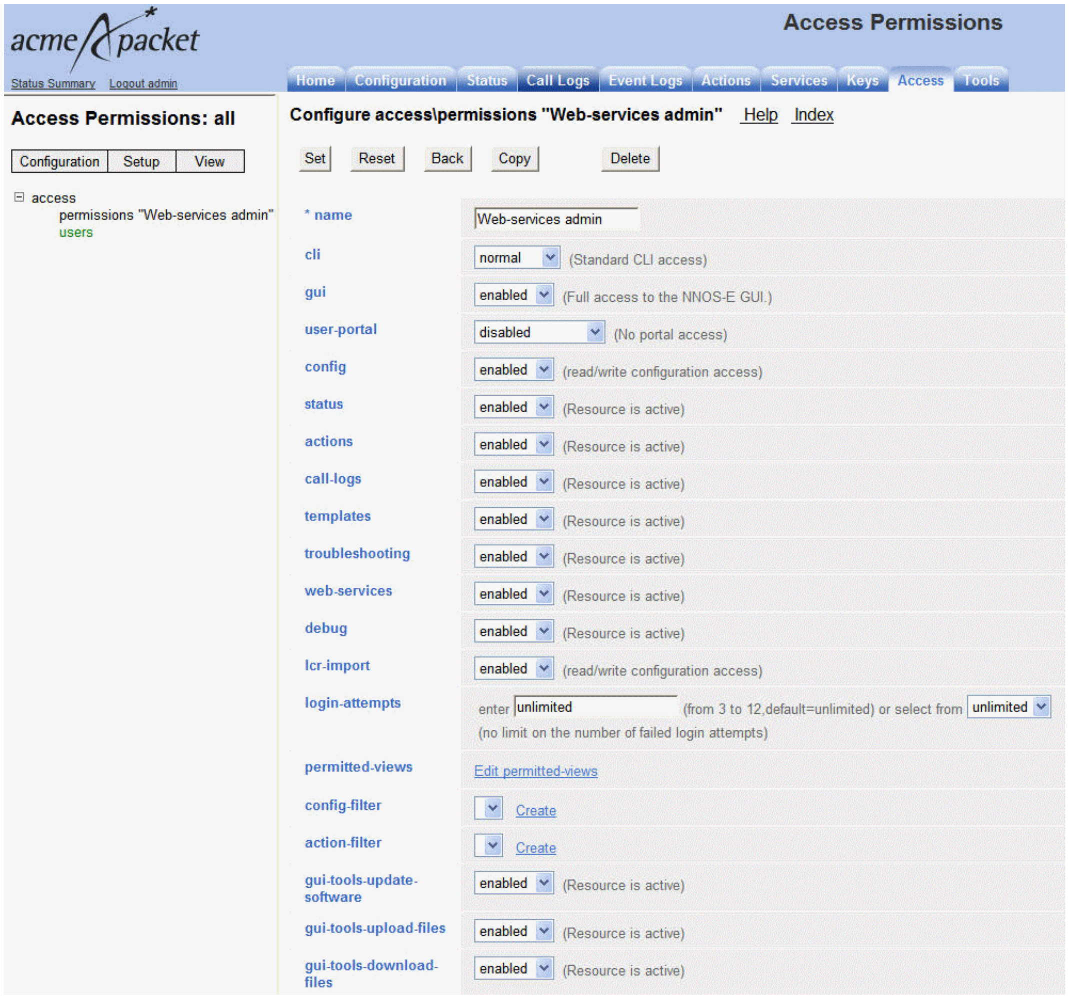
To create a web-services permission set:

1. Click the **Access** tab and select **access**.
2. Click **Add permissions**.



	directories	admin
Edit Delete	users	enabled

3. Name the permission set and click **Create**. The page listing all available permissions appears. This example shows a permission set named "Web-services admin."



Access Permissions: all

access
permissions "Web-services admin"
users

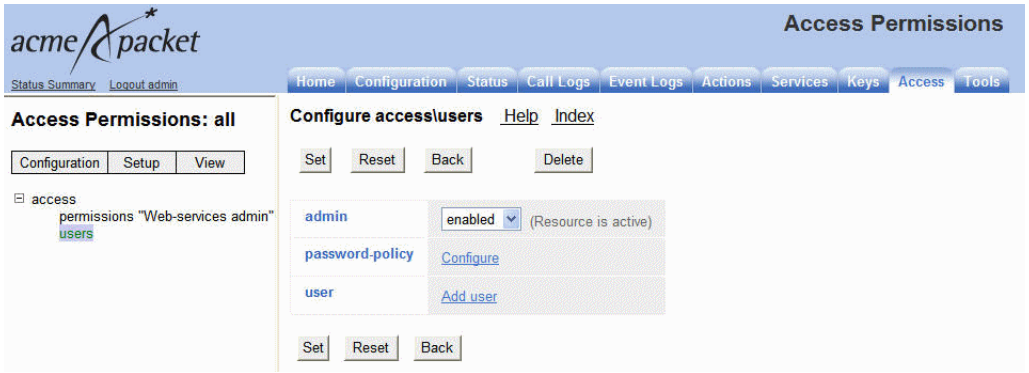
Configure access\permissions "Web-services admin" Help Index

* name	Web-services admin
cli	normal (Standard CLI access)
gui	enabled (Full access to the NNOS-E GUI.)
user-portal	disabled (No portal access)
config	enabled (read/write configuration access)
status	enabled (Resource is active)
actions	enabled (Resource is active)
call-logs	enabled (Resource is active)
templates	enabled (Resource is active)
troubleshooting	enabled (Resource is active)
web-services	enabled (Resource is active)
debug	enabled (Resource is active)
lcr-import	enabled (read/write configuration access)
login-attempts	enter unlimited (from 3 to 12,default=unlimited) or select from unlimited (no limit on the number of failed login attempts)
permitted-views	Edit permitted-views
config-filter	Create
action-filter	Create
gui-tools-update-software	enabled (Resource is active)
gui-tools-upload-files	enabled (Resource is active)
gui-tools-download-files	enabled (Resource is active)

4. Enable **web-services** and click **Set**. The permission set is created.

5. Update and save the running configuration.

6. Click **users** and select **Add user**.



Access Permissions: all

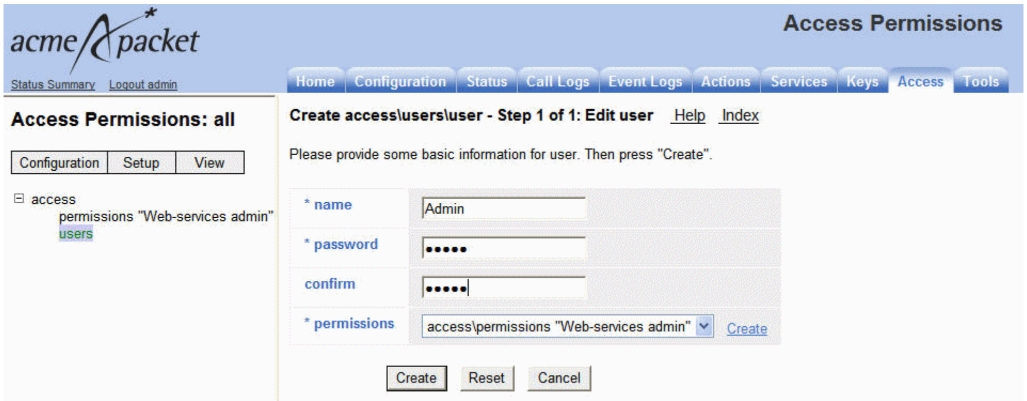
access
permissions "Web-services admin"
users

Configure access\users Help Index

admin	enabled (Resource is active)
password-policy	Configure
user	Add user

7. Enter the user **name** and **password**.

8. Select the permission set just created with **web-services** enabled. This example shows a user named Admin.



Create access\users\user - Step 1 of 1: Edit user

Please provide some basic information for user. Then press "Create".

* name	Admin
* password	•••••
confirm	•••••
* permissions	access\permissions "Web-services admin"

9. Click **Create**.
10. Click **Set**. The user is created.
11. Save and update the configuration.

Legacy and New Schema

There are two types of schema the ASC supports, legacy and new. The schema is the WSDL's .xsd file's specification of all configuration, status, action, and event objects on the ASC. These schemas are equivalent and support the same functionality. The ASC supports the existing legacy format for backwards compatibility and in the cxc.wsdl file, generates verbose Java and C# code.

The new format is much more compact and concise than the legacy. The file name for the new format is AcmePacketASCManagement.wsdl.

> **NOTE:** Acme Packet recommends you use the new schema, particularly if you are implementing a new ASC application. Existing ASC applications may continue to use the legacy format for backwards compatibility purposes only.

Legacy and Custom Event Messages

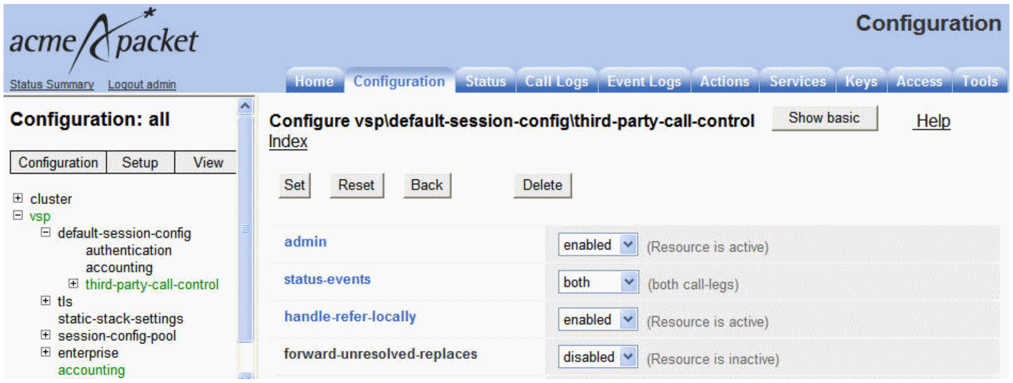
The ASC includes certain standard information in the event messages it sends. However, you can choose to include new information not included in the standard format. You can configure the ASC to include custom content in these event messages.

See Appendix B: Event Message Examples for examples of both legacy and new format and legacy and custom content event messages.

To include custom information in event messages:

1. Click the **Configuration** tab and select either **default-session-config** or **session-config-pool > entry**.
2. Click on the **third-party-call-control** object.

3. Set **admin** to **enabled**.

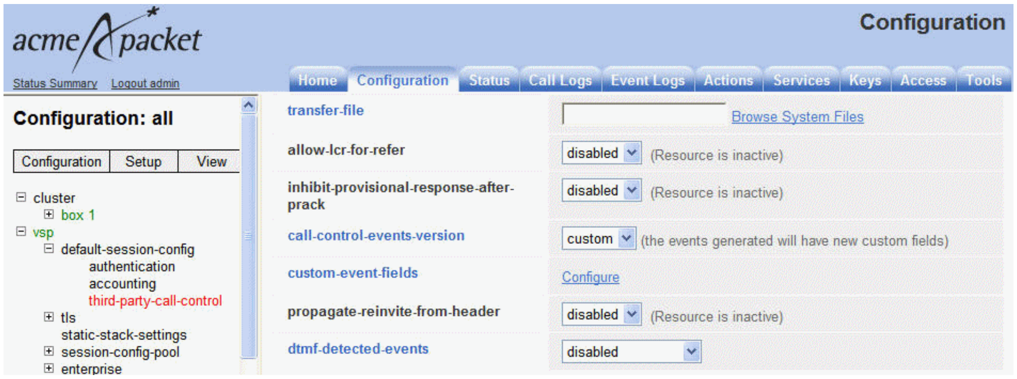


Configure vsp\default-session-config\third-party-call-control

admin	enabled	(Resource is active)
status-events	both	(both call-legs)
handle-refer-locally	enabled	(Resource is active)
forward-unresolved-replaces	disabled	(Resource is inactive)

4. Select **custom** from the **call-control-events-version** drop-down box. The default is **legacy**.

5. Click **Configure** next to **custom-event-fields** to set the custom event fields to include in the event messages.



transfer-file		Browse System Files
allow-lcr-for-refer	disabled	(Resource is inactive)
inhibit-provisional-response-after-prack	disabled	(Resource is inactive)
call-control-events-version	custom	(the events generated will have new custom fields)
custom-event-fields	Configure	
propagate-reinvite-from-header	disabled	(Resource is inactive)
dtmf-detected-events	disabled	

For more information on configuring named variables and regular expressions, see Using Regular Expressions in Chapter 1: How to Use the ACLI of the *Net-Net OS-E Objects and Properties Reference Guide*.

6. Click **Set**.

7. Update and save the configuration.

Web Services Requests

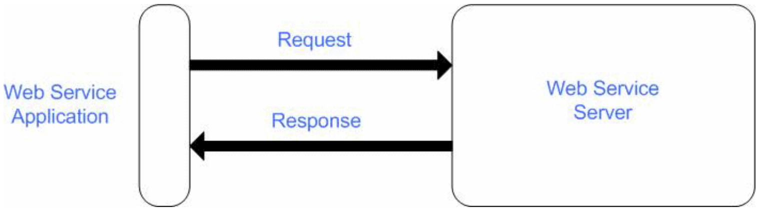
A web service request is a request made by a web services application sent via HTTP/HTTPS to the ASC web services server. When the server receives a request, it processes it and sends back a response.

The response that the ASC sends back contains a code number and a message. If the action was successful, the code is 0. If there is an error with the request, the code will be a value other than 0. The error message describes what error occurred.

When processed successfully, the response can contain:

- Information requested via the following top-level APIs
  - get configuration
  - get status

  - query status
- Status for an operation being performed via the following top-level APIs
  - set configuration
  - execute action



Get Configuration

The ASC "Get configuration" API is a request to the server to receive all or a portion of the configuration. Specify the configuration objects or properties you want returned. If you specify no parameters, the entire configuration is returned.

The internal names for the top level configuration objects are:

- cluster—Cluster
- services—Services
- master-services—MasterServices
- vsp—SCP
- external-services—ExternalServices
- preferences—Preferences
- access—CXCAccess
- features—Features
- box—Box

SOAP

The SOAP "Get configuration" request name is getConfig.

Response Content:

XML Format: The configuration. The schema is defined in cxc.xsd (legacy) or AcmePacketASCManagement.xsd (new).

REST

The REST "Get configuration" request resource path is

```
/cms/config
```

using the HTTP GET method.

If parameters are specified, include the path of the configuration under the top level object to be retrieved.

Response Content:

XML or JSON format (XML is the default if no format is specified): ExtPageList structure. This includes:

- objects—Configuration objects

- resultCode—0 if success; error code if error occurs
- resultStr—”Success” if success; error message if error occurs

Set Configuration

The ASC “Set configuration” API is a request to the server to change all or a portion of the configuration.

SOAP

The SOAP “Set configuration” name is setConfig. Specify the configuration parameters you want to set, then specify a mode. The valid modes are:

- merge—Merges the configuration in the request with the existing configuration on the ASC.
- replace-full—Replaces the entire existing configuration on the ASC with the configuration in the request.
- replace-partial—Replaces only top-level existing ASC configuration with top-level configuration objects in the request.

Response Content:

XML Format: setConfigResponse structure. This includes:

- Code—”Success” or “Error”
- Text—Error code if error occurs

REST

The REST “Set Configuration” API request resource path is

```
/cms/config
```

using the HTTP POST method.

Specify a mode. The valid modes are:

- merge—Merges the configuration in the request with the existing configuration on the ASC.
- replace-full—Replaces the entire existing configuration on the ASC with the configuration in the request.
- replace-partial—Replaces only top-level existing ASC configuration with top-level configuration objects in the request.

Specify an operation. The valid operations are:

- add—Add an object to the configuration.
- modify—Modify an existing object in the configuration.
- delete—Delete an object from the configuration.

Specify the configuration to be added or used to update the XML by entering the configuration path. If you specify no configuration parameters, the entire configuration is modified.

If applicable, specify the property of an object to which new configuration is being added.

Response Content:

XML or JSON format (XML is the default if no format is specified): structure

- Result code—0 if success; non-zero if error occurs
- Result string—”Success” if success; error message if error occurs

Get Status

The ASC “Get status” API is a request to the server to receive all or a portion of the statuses on the ASC. When working with SOAP, you cannot specify a filter and must receive the entire status report. When working with REST, you can specify a filter to return a subset of the status report. If no filter is specified, the entire status report is returned.

SOAP

The SOAP “Get status” request name is getStatus.

Response Content:

XML format: getStatusResponse structure

REST

The REST “Get status” request resource path is

```
/cms/status/<status alias>
```

using the HTTP GET method.

Specify the pageSize. This is the number of entries returned per page. This is only sent on the first request.

Specify the page. This is the page number to retrieve. This value always starts with 1.

Response Content:

XML or JSON format (XML is the default if no format is specified).

- objects—A list of status objects being returned.
- totalPages—The number of pages of status objects.
- pageSize—The number of entries on each page.
- currentPage—The page number for the current page. This number always starts with 1.
- resultCode—The result code. This number is 0 if the request is successful and a non-zero if an error occurs.
- resultStr—The result string. This string is “Success” if the request is successful and an error message if an error occurs.

Query Status

The ASC “Query status” API is a request to the server to retrieve the status report from the server.

SOAP

The SOAP “Query status” request name is queryStatus.

Specify the status you want to retrieve in XML format. The following example returns the entire **show processes** status report:

```
<status><Processstatus/>
```

You can also specify a property value in the status object to filter the results further. To do this, include

```
<condition>condition</condition>
```

in the request where *condition* is the status filter you want to use.

Response Content:

XML format: queryStatusResponse structure

REST

The REST "Query status" request source path is

```
/cms/status/<status alias>
```

using the HTTP GET method.

Specify the pageSize. This is the number of entries returned per page. This is only sent on the first request.

Specify the page. This is the page number to retrieve. This value always starts with 1.

You can further narrow the status results by using the **search.x** parameter, where *x* is the property used for filtering status results.

Response Content:

XML or JSON format (XML is the default if no format is specified).

- objects—A list of status objects being returned.
- totalPages—The number of pages of status objects.
- pageSize—The number of entries on each page.
- currentPage—The page number for the current page. This number always starts with 1.
- resultCode—The result code. This number is 0 if the process is a success and a non-zero if an error occurs.
- resultStr—The result string. This string is "Success" if the process is a success and an error code if an error occurs.

Execute Action

The ASC "Execute action" API is a request to the server to perform an action. The ASC can return action data in one of two ways, unstructured or structured. The majority of ASC actions only support unstructured data.

The following actions return structured data:

- arp request
- call-control-attach
- call-control call
- call-control connect
- call-control-create-session
- call-control disconnect
- call-control fork
- call-control hold

- call-control join
- call-control-monitor-session
- call-control park
- call-control annotate
- call-control-redirect
- call-control retrieve
- call-control terminate
- call-control transfer
- call-control-intercept
- call-control-send-message
- config validate
- file-info
- file-play
- ping
- dynamic-event-service

For information on the structured information returned by each of these actions, access the Actions > Response Structures in the web services on-line REST documentation.

SOAP

The ASC supports two SOAP APIs for “Execute action”, doAction and doActionEx. The doAction API is used for returning unstructured data and the doActionEx API is used for actions that return structured data.

Specify the action you want performed in XML format, including all properties.

Response Content:

XML format: doActionResponse structure. This includes:

- Code—”Success” or “Failure”
- Text—Error message if error occurs
- Message—Informational text
- Structured Content if a structured response is being provided.

REST

The REST “Execute action” request resource path is

```
/cms/action/<action alias>
```

using the HTTP GET method.

The parameters you must specify vary depending on the action. To view this information see the web services on-line REST documentation. To do this:

1. Type **http://*<ip:port>*** into the browser.
2. Click on **REST** in the left panel of the screen.
3. Click on the **Actions** link on the REST documentation page.

Response Content:

XML or JSON format (XML is the default if no format is specified): structure. This includes:

- resultCode—0 if success; non-zero if error occurs
- resultString—"Success" if success; error message if error occurs
- Info—Informational text
- Structured Content if a structured response is being provided.

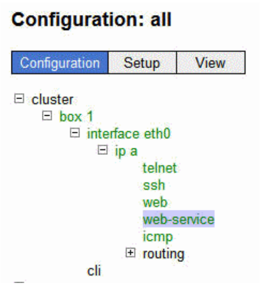
Configuring the ASC

This section describes how to configure the **web-service** object. This is necessary for the ASC to function properly.

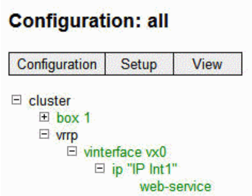
Instructions and Examples

To access web-service on the ASC:

1. Click on the **Configuration** tab and select **web-services**. This can be done via the **box** object using the following path.



Or it can also be done via the **vrrp** object using the following path.



2. **admin**—Set this property to **enabled** to start the ASC web services process. This property is **enabled** by default.
3. **protocol**—Select the protocol you want to use. After selecting the protocol, select the web services listening port (or accept the default). This is the port the server listens on for HTTP(S) requests. If HTTPS is specified, specify the **vsp > tls** certificate to use with encryption.

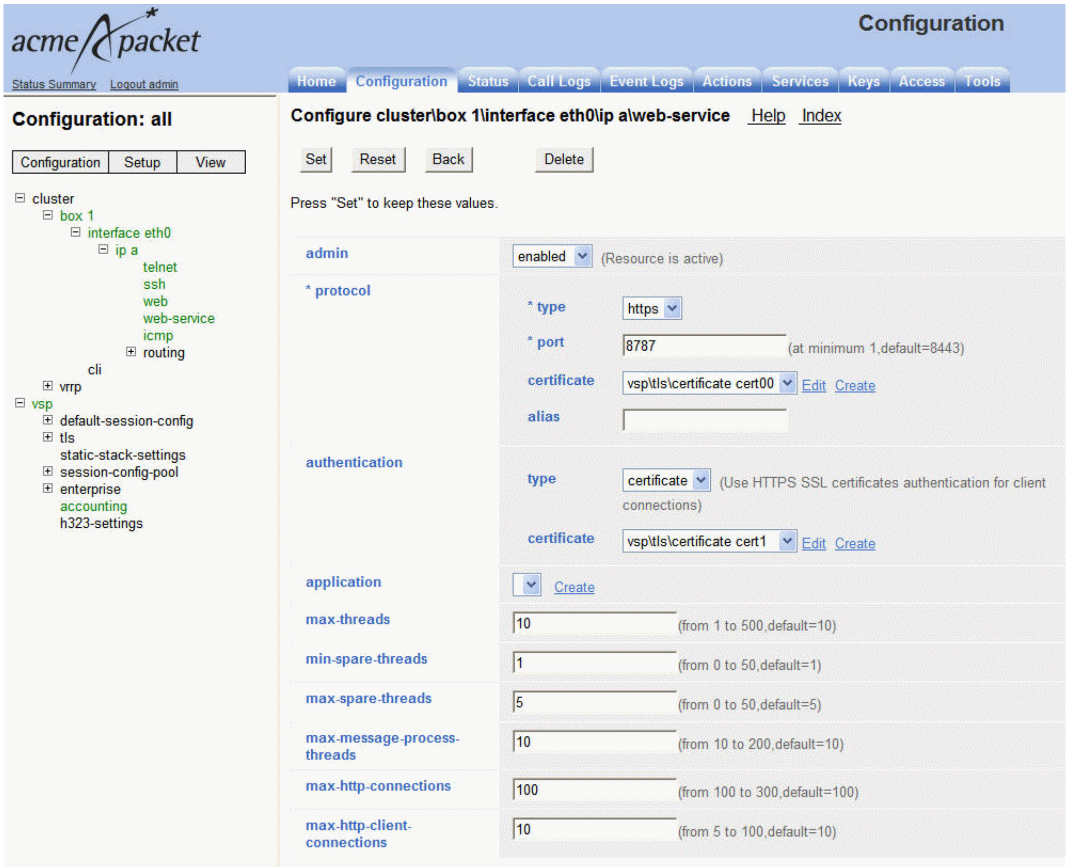
   The default values for this property are **http 8080** or **https 8443**. The valid values are:

   - http [port]—Sets an insecure (unencrypted) protocol for use in web transmission. Optionally, you can configure a listening port different than the default.
   - https [port] <certificate> [alias]—Sets a secure transmission of data by using HTTP over SSL. Optionally, you can configure a listening port different than

the default. Enter the vsp\tls certificate to use with encryption along with an optional alias value.

4. **max-threads**—Enter the number of threads available to process a request. This includes the number of simultaneous requests and users for your application. The default setting is **10**. The valid values are:
   - Minimum—1
   - Maximum—50
5. **min-spare-threads**—Leave this value at **1**, the default. This is the minimum number of idle threads for processing requests.
6. **max-spare-threads**—Leave this value at **5**, the default. This is the maximum number of idle threads for processing requests.
7. **max-message-process-threads**—Enter the maximum number of threads used by the web services process to receive messages from other ASC processes. The default setting is **10**. The valid values are:
   - Minimum—10
   - Maximum—200
8. **max-http-connections**—Enter the maximum number of outbound connections for callbacks from the ASC to the web services application for external event notification and external policy processing. The default value is **100**.
   - Minimum—100
   - Maximum—300
9. **max-http-client-connections**—Enter the maximum number of outbound connections to any single host running web services application for callbacks such as external event notification and external policy processing. The default value is **10**.
   - Minimum—5
   - Maximum—100
10. **authentication**—Select the type of authentication you want to use for the ASC web service. The default setting for this property is **certificate**.
    - Basic—This requires the ASC to use HTTP basic authentication for client connections.
    - Certificate—Uses HTTPS SSL certificates authentication for client connections.

    NOTE: You must have at least one user configured under the **access** object with **access > permission > web-services** set to **enabled** in order for authentication to work. Users with the web-services permission enabled have access to the entire system (all configuration, statuses, and actions).



Configure cluster\box 1\interface eth0\ip a\web-service

Press "Set" to keep these values.

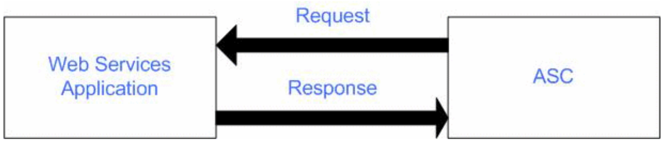
admin	enabled	(Resource is active)	
* protocol	* type	https	
	* port	8787	(at minimum 1,default=8443)
	certificate	vsp\tls\certificate cert00	Edit Create
	alias		
authentication	type	certificate	(Use HTTPS SSL certificates authentication for client connections)
	certificate	vsp\tls\certificate cert1	Edit Create
application			Create
max-threads	10	(from 1 to 500,default=10)	
min-spare-threads	1	(from 0 to 50,default=1)	
max-spare-threads	5	(from 0 to 50,default=5)	
max-message-process-threads	10	(from 10 to 200,default=10)	
max-http-connections	100	(from 100 to 300,default=100)	
max-http-client-connections	10	(from 5 to 100,default=10)	

11. Update and save the running configuration.

2 Using ASC Callouts

Web Service Callouts

The Net-Net ASC supports web service callouts. A callout is when the ASC initiates contact with the web service client. Web service callouts are only supported in WSDL.



The ASC API supports two uses of callouts.

- External policy service—Sends policies when the ASC processes SIP messages
- External event service—Sends event notifications

External Policy Service

The external policy service sends a request to the web services application whenever the ASC is processing a SIP message. The web services application examines information about the SIP message and based on that information, returns the policy that it wants applied to the SIP message.

The WSDL request name is getAuthSessionPolicy.

Policies are configured and applied on the ASC in a specific order. The following is the hierarchy of session-config and normalization application:

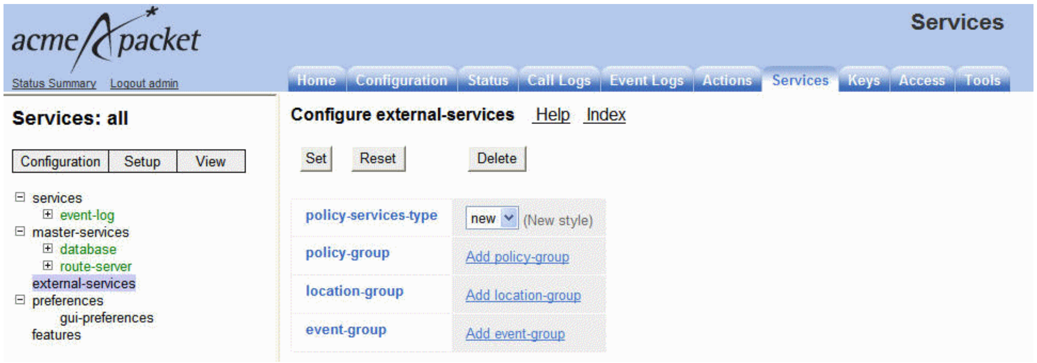
- default-session-config
- policy
- server inbound session-config
- server inbound normalization
- dial-plan/registration-plan > normalization
- dial-plan/registration-plan > arbiter > session-config
- dial-plan/registration-plan > route normalization
- dial-plan/registration-plan > route > session-config
- Policy sent from the web services application to the ASC via the getAuthSessionPolicy request
- server outbound session-config
- server outbound normalization
- server outbound normalization session-config

Configuring External Policy Service

To configure the ASC so that the external policy service works properly, you must configure a **policy-group** with a **policy-service**. Then, you must configure an **authorization** policy.

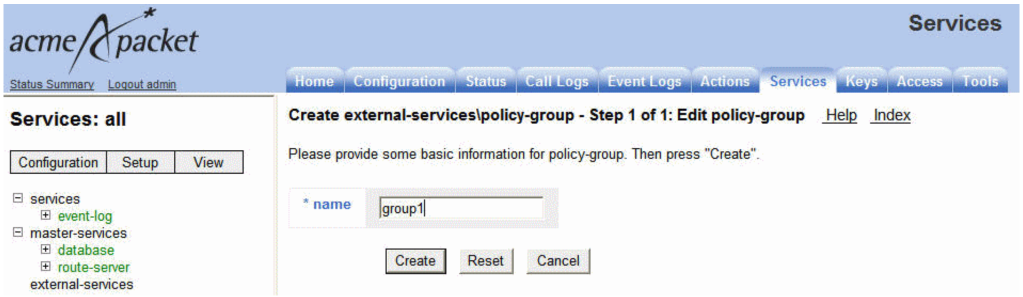
To configure policy-group and policy-service objects:

1. Click the **Services** tab and select **external-services**.
2. Select **new** from the **policy-services-type** drop-down box.



policy-services-type	new (New style)
policy-group	Add policy-group
location-group	Add location-group
event-group	Add event-group

3. Click **Set**.
4. Click **Add policy-group**.
5. Enter a **name** for the policy-group you are creating.



Create external-services\policy-group - Step 1 of 1: Edit policy-group

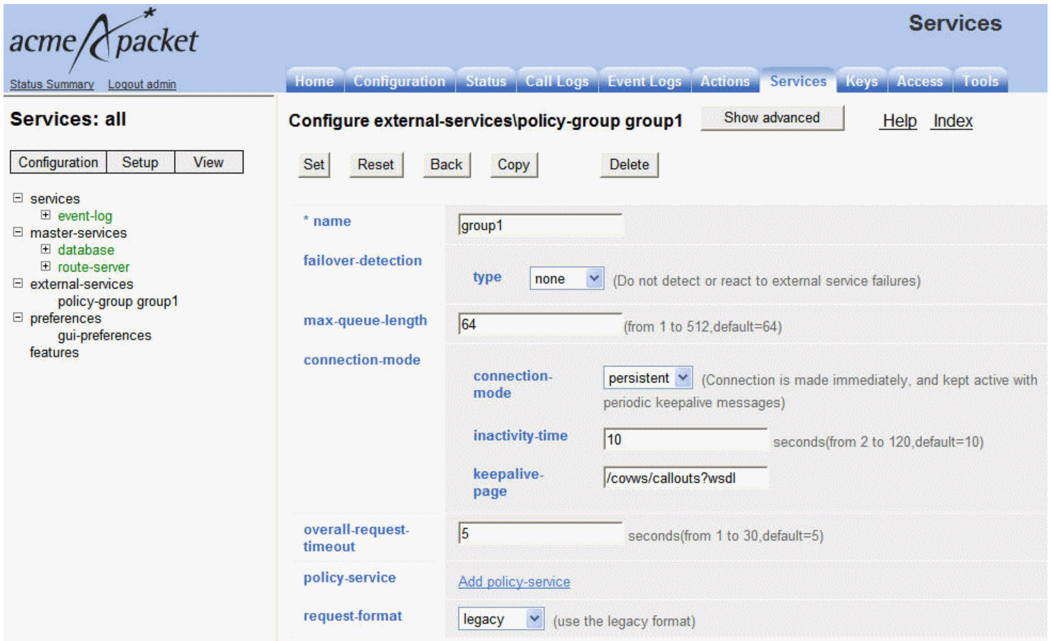
Please provide some basic information for policy-group. Then press "Create".

* name: group1

6. Click **Create**.
7. **failover-detection**—Leave this value at **none**, the default. The ASC performs no failover detection. If a request is not serviced, the system continues to send requests until a configured timeout value is reached or the request is manually withdrawn.
8. **max-queue-length**—Leave this value at **64**, the default. This is the maximum number of WSDL requests that can be queued for a policy group (awaiting assignment to a server). If the queue grows to this number, subsequent requests are rejected, with the result "queue-clipped," until the queue drops below this level.
9. **connection-mode**—Specify the manner in which connections between the ASC and WSDL client are established and maintained. The default value is persistent **10 /covws,callouts?wsdl**. The valid values are:
   - persistent [*seconds*] [*page*]—Connections are initiated at boot time, and maintained using periodic keepalives. Specify an inactivity timeout, between 2 and 120 seconds, and a keepalive page.
   - lingering—Connections are made on demand, then linger until broken by the remote server.

- transient—Connections are made on demand, then broken when a response is received.

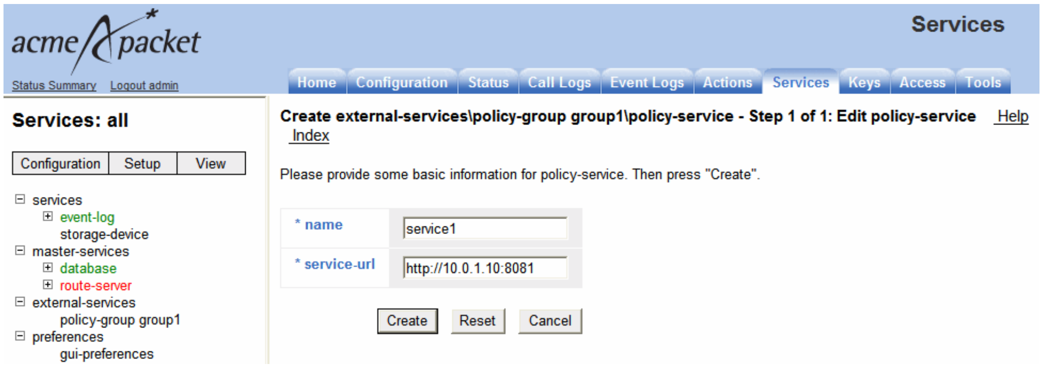
10. **overall-request-timeout**—Leave this value at **5**, the default. This specifies the number of seconds a request can remain in the queue for a policy server before it is timed out by the ASC.
11. Click **Set**.



Configure external-services\policy-group group1

* name	group1	
failover-detection	type: none	(Do not detect or react to external service failures)
max-queue-length	64	(from 1 to 512,default=64)
connection-mode	connection-mode: persistent	(Connection is made immediately, and kept active with periodic keepalive messages)
	inactivity-time: 10	seconds(from 2 to 120,default=10)
	keepalive-page: /cows/callouts?wsdl	
overall-request-timeout	5	seconds(from 1 to 30,default=5)
policy-service	Add policy-service	
request-format	legacy	(use the legacy format)

12. Click **Add policy-service**.
13. Enter a **name** for the policy-service.
14. Enter the **service-url**. This is the web service client's endpoint URL.



Create external-services\policy-group group1\policy-service - Step 1 of 1: Edit policy-service

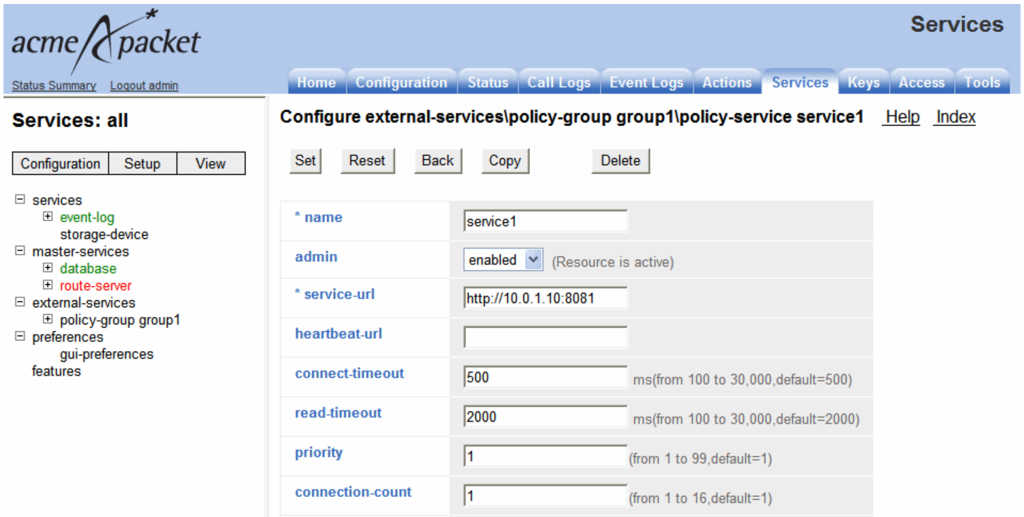
Please provide some basic information for policy-service. Then press "Create".

* name	service1
* service-url	http://10.0.1.10:8081

15. Click **Create**.
16. **admin**—Leave this **enabled**, the default. This enables this policy service for use.
17. **connect-timeout**—Leave this value at **500**, the default. This specifies the length of time, in milliseconds, that the ASC allows to complete a connection to the external policy service before cancelling the request.
18. **read-timeout**—Leave this value at **2000**, the default. This specifies the length of time, in milliseconds, that the ASC waits for a response from the external policy service before cancelling the request.

19. **priority**—Leave this value at **1**, the default. This specifies the priority of this server within the policy group. The lower the number, the higher the priority.

20. **connection-coun**t—Leave this value at **1**, the default. This specifies the number of simultaneous connections allowed to this server.



Configure external-services\policy-group group1\policy-service service1

* name	service1	
admin	enabled	(Resource is active)
* service-url	http://10.0.1.10:8081	
heartbeat-url		
connect-timeout	500	ms(from 100 to 30,000,default=500)
read-timeout	2000	ms(from 100 to 30,000,default=2000)
priority	1	(from 1 to 99,default=1)
connection-count	1	(from 1 to 16,default=1)

21. Click **Set**. Update and save the configuration.

To configure the authorization policy object:

1. Click the **Configuration** tab and select **vsp**.

2. Select either **default-session-config** or **session-config-pool > entry**. (If you configure **entry**, you must reference it.)

3. Click **Configure** beside the **authorization** property.

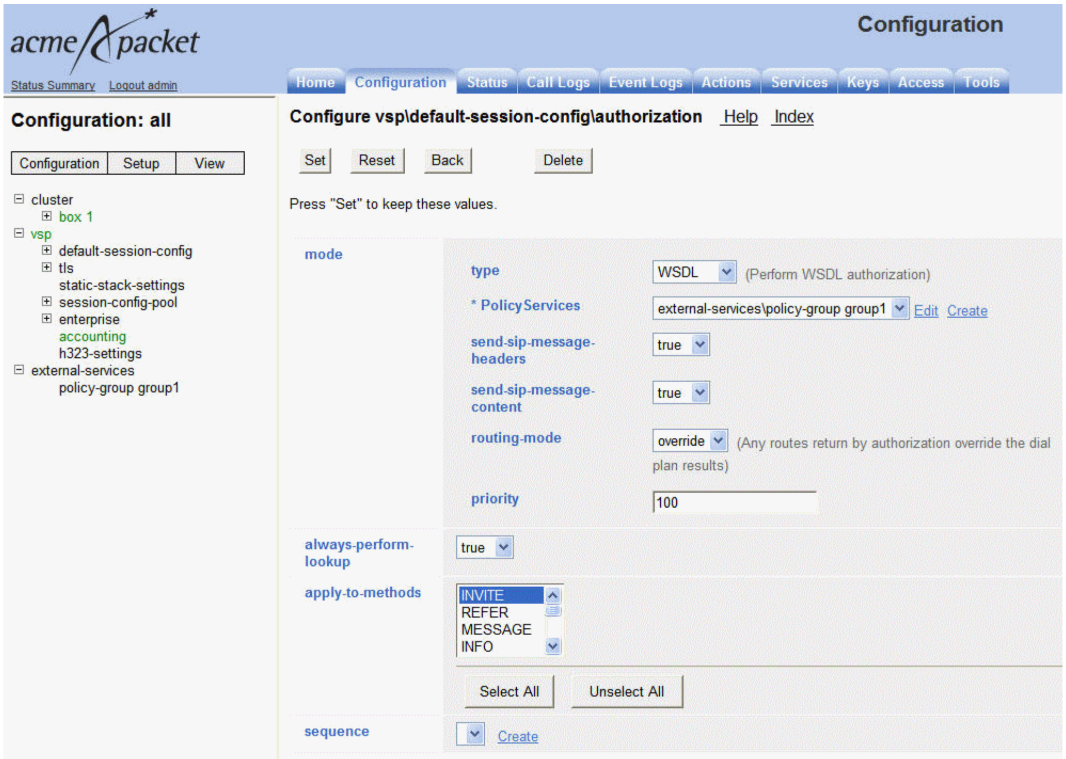
4. **mode**—Select **WSDL** from the drop-down box. The ASC sends the request for authorization data retrieval to the external services policy server specified in the policy-group object. The default is **None**.

   When you select WSDL, the following properties appear.

   - **PolicyServices**—Select the previously configured **policy-group** object from the drop-down box. If it is not there, you can create it by clicking **Create** and entering the path to the policy group.
   - **send-sip-message-headers**—Select **true**. This allows SIP message headers to be sent to the web services client.
   - **send-sip-message-content**—Select **true**. This allows SIP message content to be sent to the web services client.
   - **routing-mode**—Leave this set to **override**, the default. This means any routes returned by authorization override the dial plan results.
   - **Priority**—Leave this set to **100**, the default.

5. **always-perform-lookup**—Leave this set to **true**, the default. This means the ASC retrieves authorization data regardless of other configuration settings.

6. **apply-to-methods**—Select the SIP messages to which the ASC applies authorization processing. The default is INVITE.



Configure vsp\default-session-config\authorization

Press "Set" to keep these values.

mode
- type: WSDL (Perform WSDL authorization)
- * PolicyServices: external-services\policy-group group1
- send-sip-message-headers: true
- send-sip-message-content: true
- routing-mode: override (Any routes return by authorization override the dial plan results)
- priority: 100

always-perform-lookup: true

apply-to-methods: INVITE, REFER, MESSAGE, INFO

sequence

7. Click Set. Save and activate the configuration.

External Event Service

The external event service sends, or "pushes," notifications of all events generated by the ASC to a web services application. These events are all available as SNMP traps, however, this service allows you to receive events without having to use SNMP.

The WSDL request name for this service is processEvent.

Using Cometd 2.0, the OS-E supports channels, a dynamic, path-like hierarchy describing the topic of an event. Third-party applications can subscribe to events on specific channels and, thus, narrow the scope of events to process.

In releases prior to 36.0m5, users could subscribe only to specific, hard-coded, request-ID based channels. By default, the OS-E still emits the legacy channels, however, you can disable them if they are no longer used. To stop the OS-E from using the legacy channels, set the **eventpush-service > legacy-events** property to **disabled**.

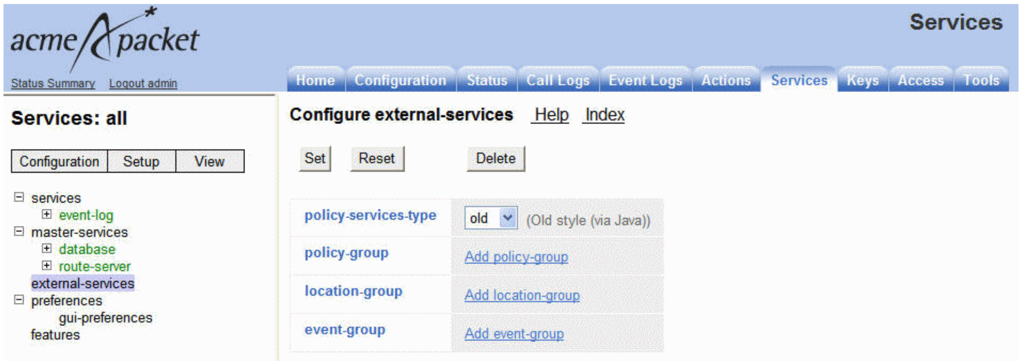
There are two ways to enable web services event processing, configuring **external-event-groups** or via the **dynamic-event-service** action.

Configuring External Event Service

To configure the ASC so that the external event service works properly, you must configure an **event-group** with an **event-service**. Then reference the **event-group** in the **vsp > external-event-group** object. You must also set the **third-party-call-control > status-events** property to both.

To configure event-group and event-service objects:

1. Click the **Services** tab and select **external-services**.
2. Click **Add event-group**.

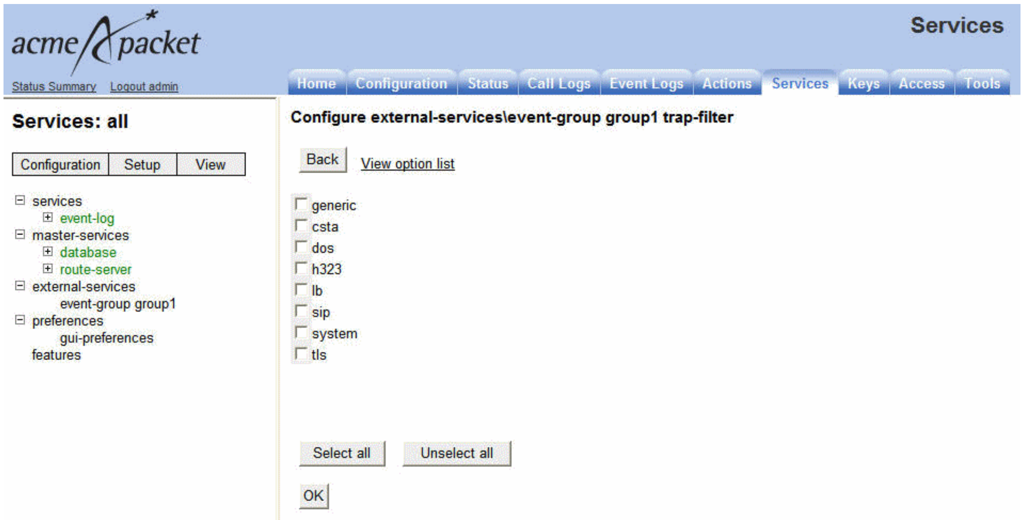


Configure external-services

policy-services-type	old (Old style (via Java))
policy-group	Add policy-group
location-group	Add location-group
event-group	Add event-group

3. Enter a **name** for the event-group and click **Create**.
4. Click **Edit trap-filter**. A list of categories appears. If you don't select any categories, all events are sent.

   To receive events only pertaining to calls, set **trap-filter** to **csta**.

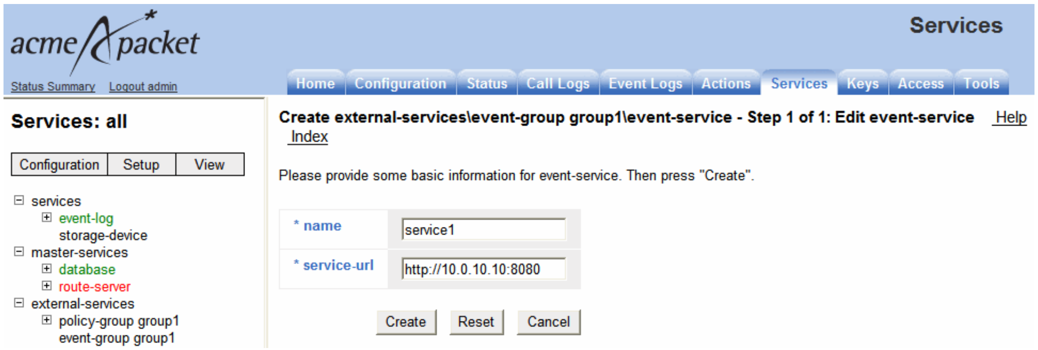


Configure external-services\event-group group1 trap-filter

☐ generic
☐ csta
☐ dos
☐ h323
☐ lb
☐ sip
☐ system
☐ tls

5. Click **OK**.
6. Click **Add event-service**.
7. Enter a **name** for the event-service.

8. Enter a **service-url** for this event-service. This is the web services client endpoint.



Create external-services\event-group group1\event-service - Step 1 of 1: Edit event-service

Please provide some basic information for event-service. Then press "Create".

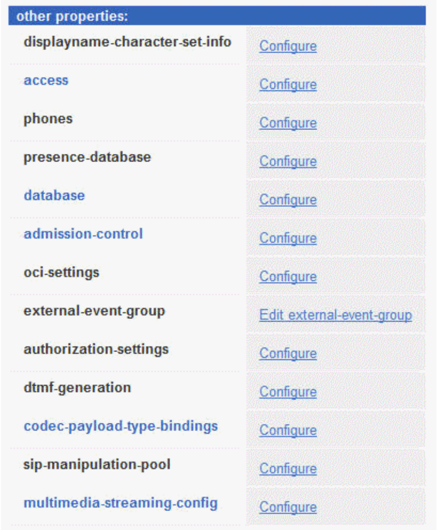
* name	service1
* service-url	http://10.0.10.10:8080

9. Click **Create**. Update and save the configuration.

To reference the event-group to the vsp > external-policy-group:

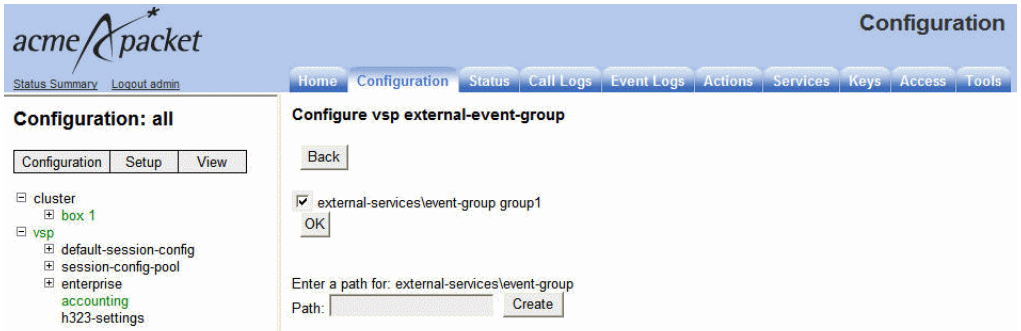
1. Click the **Configuration** tab and select **vsp**.
2. Click **Edit external-event-group** next to the **external-event-group** property.

   Note: This is an Advanced property. You must click the **Show advanced** button at the top of the page to see this property.



other properties:	
displayname-character-set-info	Configure
access	Configure
phones	Configure
presence-database	Configure
database	Configure
admission-control	Configure
oci-settings	Configure
external-event-group	Edit external-event-group
authorization-settings	Configure
dtmf-generation	Configure
codec-payload-type-bindings	Configure
sip-manipulation-pool	Configure
multimedia-streaming-config	Configure

3. Select the previously created **event-group** you are referencing. A list of all event-groups configured on the box appear. If no event-groups have been created you can create one.



Configure vsp external-event-group

☑ external-services\event-group group1

Enter a path for: external-services\event-group

Path:

4. Click **OK**. Update and save the configuration.

To receive call-control events:

1. Click the **Configuration** tab and select **vsp**.
2. Select either the **default-session-config** or the **session-config-pool > entry** property.
3. Click **Configure** next to **third-party-call-control**. The **third-party-call-control** object appears.
4. Select **both** from the **status-events** drop-down box.
5. Click **OK**. Update and save the configuration.

Executing dynamic-event-service

A web application can register itself by using the web service REST and SOAP clients to call the **dynamic-event-service register** action. Using the **dynamic-event-service keepalive** action you can keep current registrations alive, and via the **dynamic-event-service unregister** action, the web application can unregister itself. The action syntax is:

```
dynamic-event-service register <endpoint> [channels] [xml-format]
[time-to-live] [connect-timeout] [read-timeout] [character-set]
[request-style] [include-channels-in-events]
dynamic-event-service keepalive <registration-id>
dynamic-event-service unregister <registration-id>
```

Valid arguments for the **dynamic-event-service register** action are:

- <*endpoint*>—The application endpoint that receives events.
- [*channels*]—The channels for which the endpoint is getting events.
- [*xml-format*]—The XML format used by this server. This can be either **simplified** (the default) or **legacy**.
- [*time-to-live*]—The time to live, in minutes, for the keepalive on this registration. The default is untilRestart, meaning the registration stays alive until the system is restarted.
- [*connect-timeout*]—The connect timeout, in milliseconds, for the endpoint. The default is **1000**.
- [*read-timeout*]—The read timeout, in milliseconds, for the endpoint. The default is **1000**.
- [*character-set*]—The character set to use when forming requests to this endpoint. This can be **utf-8** (the default) or **iso-8859-1**.
- [*request-style*]—The style to use when sending events to this listener. This can be **SOAP** (the default), **XML**, or **JSON**.
- [*include-channels-in-events*]—Whether channels are included in events. This is **enabled** by default.

Once an application has registered itself to receive events, you can view information about the registration via the **show dynamic-event-services** status provider.

```
NNOS-E>show dynamic-event-services

       endpoint: 10.0.0.10
registration-id: d710c03c-70b3-454d-9ee2-c1b6f60dd5b7
        created: 12:10:20.857000 Thu 2012-03-01
   time-to-live: untilRestart seconds
 last-keepalive: 12:10:20.857000 Thu 2012-03-01
       channels:
connect-timeout: 1000 ms
   read-timeout: 1000 ms
  character-set: utf-8
  request-style: soap
       requests: 0
       failures: 0
```

Field	Description
endpoint	The application endpoint being called out.
registration-id	The registration identifier.
created	The date and time this registration was created.
time-to-live	The configured time to live, in minutes, on this registration.
last-keepalive	The date and time that the last keep alive was received.
channels	The channels for which the endpoint is getting events.
connect-timeout	The configured connect timeout, in milliseconds, for the endpoint.
read-timeout	The configured read timeout, in milliseconds, for the endpoint.
character-set	The character set used when forming requests to this endpoint. This can be either utf-8 or iso-8859-1.
request-style	The style used when sending events to this listener. This could be either XML, JSON, or SOAP.
requests	The number of requests that have been made to the endpoint.
failures	The number of requests that have failed to reach the endpoint.

The **session-config > event-settings** object configures events and user-specified event channels on the OS-E.

The **event-settings > channel** property configures user-specified channels on the OS-E. Each time the OS-E needs to emit an event for a session, the event configuration component dynamically regenerates all of the appropriate channels specified by the user based on the this property.

This property consists of an array of strings used to compose channel paths. These strings can contain named-variables that are replaced with a value extracted from the current state of the session. Named-variables must start and end with percent (%) characters.

Named variables can be added to sessions on the OS-E in multiple ways. They can be added via the **session-config > named-variables** object. For more information on configuring named-variables in the session-config, see Configuring Session Configuration Objects in the *Net-Net OS-E Objects and Properties Reference Guide*.

Named-variables can also be added via the **named-variable-add** action. For information on this action, see the Named Variable Actions section of this guide.

Under the **event-settings** object you can insert named-variables into events. This is done via the **named-variable-entry** property.

> NOTE: In order for named-variables to work in either the event-settings > channel or named-variable-entry properties, named-variables must be configured elsewhere on the OS-E, either within the session-config > named-variables object or via the named-variables-add action.

The following example shows adding one variable called **my-variable** with a value of **my-value** to the **default-session-config > named-variable** object.

```
NNOS-E>config vsp
config vsp>config default-session-config
config default-session-config>config named-variables
config named-variables>config named-variable my-variable
Creating 'named-variable my-variable'
config named-variable my-variable>set value my-value
config named-variable my-variable>return
config named-variables>return
```

This next example shows the **event-settings** object configured with a **channel** and **named-variable-entry** that correspond with the **session-config > named-variables** configuration in the above example.

Specific-channel-name is a static channel name and the OS-E does not attempt to look up the value of this string. Because it is enclosed in percentage signs, the **/%my-variable%** value signifies a named-variable channel name. The **named-variable-entry** property's **my-variable my-variable-name** value represents the inclusion of the named-variable configured in the first example in the contents of the events. **My-variable-name** is the name that is shown inside the events for this variable.

```
NNOS-E>config vsp
config vsp>config default-session-config
config default-session-config>config event-settings
config event-settings>set channel /specific-channel-name
config event-settings>set channel /%my-variable%
config event-settings>set named-variable-entry my-variable my-
variable-name
config event-settings>return
```

Here is an example of an event for a session that has the above configuration. Note the two channels: specific-channel-name and my-value. There is also an <nvpData> entry (which stands for named-value-pair) for my-variable-name and my-value.

```
<Event box="1" process="SIP" timestamp="16:41:26.000001 Wed 2012-03-
21" channel="">
<object>
  <CallCreatedEvent>
   <callEvent>
    <CallEvent>
     <requestID/>
     <handle>15217493</handle>
     <sessionID>343475565090092753</sessionID>
     <callID>1-11664@10.33.5.10</callID>
     <to>sip:service@10.33.80.65:5060</to>
     <from>sip:sipp@10.33.5.10:6021</from>
     <nvpData>
```

```
      <name>my-variable-name</name>
      <value>my-value</value>
     </nvpData>
    </CallEvent>
   </callEvent>
  </CallCreatedEvent>
</object>
<channels>/specific-channel-name</channels>
<channels>/my-value</channels>
<userData>0x00000000</userData>
</Event>
```

The same named variables can be used to configure both the **channel** and **named-variable-entry** properties.

> NOTE: Named variables used in the **channel** property must start and end with percentage (%) characters to work properly.

These variables can be broken down into three types: event, session, and call, in-leg, and out-leg.

Event named variables are derived from the current event being published. The object of these variables can be any of the events the OS-E can generate. To view the full list of OS-E events, see Events in the web services home page's REST documentation.

You can retrieve a property in the event object by specifying **$event.<*property*>** where <*property*> is the name or alias of a property in the event object being generated.

For example, for a call control event with a requestID of 123456, specifying **/req/%$event.requestID%** results in the channel **/req/123456** being created.

Specifying **/event-name/%$event._alias%** results in the channel **/event-name/call-terminated** being created for call-terminated events.

Available variables for the event class are:

- **$event**—Event-based named variables.
- **$event._alias**—Alias for a generated event.

Session named variables are derived from the current session for the events being published. Available variables for this class are:

- **$session-session-id**—Session ID for this session.
- **$session.request-id**—Request ID for this session.
- **$session.caller-id**—Caller ID for this session.
- **$session.diversion-header**—Diversion-header for this session.
- **$session.pcharging-vector**—P-charging-vector for this session.
- **$session.digest-realm**—Digest realm for this session.
- **$session.source-lnp**—Source-lnp for this session.
- **$session.destination-lnp**—Destination-lnp for this session.

Call, in-leg, and out-leg named variables are derived from the call legs of the current session for events being published. Call events are generated on a specific leg. Therefore the call variables provide access to the leg on which the event is being generated.

Each call session has one or two legs, deemed the in-leg and out-leg based on call direction. In-leg variables use the in-leg for the session that generated this event and out-leg variables use the out-leg for the session that generated this event.

Available variables for these classes are:

- **$call.request-id**—Request ID for this call.
- **$call.to**—To: URI for this call.
- **$call.to.user**—User portion of the To: URI for this call.
- **$call.to.host**—Host portion of the To: URI for this call.
- **$call.from**—From: URI for this call.
- **$call.from.user**—User portion of the From: URI for this call.
- **$call.from.host**—Host portion of the From: URI for this call.
- **$call.request**—Request: URI for this call.
- **$call.request.user—**User portion of the Request: URI for this call.
- **$call.request.host—**Host portion of the Request: URI for this call.
- **$call.call-id**—Call-id for this call.
- **$call.to-contact**—Local endpoint for this call.
- **$call.to-contact.user**—User portion of the local endpoint for this call.
- **$call.to-contact.host**—Host portion of the local endpoint for this call.
- **$call.from-contact**—Remote endpoint for this call.
- **$call.from-contact.user**—User portion of the remote endpoint for this call.
- **$call.from-contact.host—**Host portion of the remote endpoint for this call.
- **$call.p-assert**—P-asserted-identity header for this call.
- **$call.p-assert-user—**User portion of the p-asserted-identity header for this call.
- **$call.p-assert-host**—P-asserted-identity header for this call.
- **$in-leg.request-id**—Request-id for the in-leg.
- **$in-leg.to**—To: URI for the in-leg.
- **$in-leg.to.user**—User portion of the To: URI for the in-leg.
- **$in-leg.to.host**—Host portion of the To: URI for the in-leg.
- **$in-leg.from**—From: URI for the in-leg.
- **$in-leg.from.user**—User portion of the From: URI for the in-leg.
- **$in-leg.from.host**—Host portion of the From: URI for the in-leg.
- **$in-leg.request**—Request: URI for the in-leg.
- **$in-leg.request.user—**User portion of the Request: URI for the in-leg.
- **$in-leg.request.host—**Host portion of the Request: URI for the in-leg.
- **$in-leg.call-id**—Call-id for the in-leg.
- **$in-leg.to-contact**—Local endpoint for the in-leg.
- **$in-leg.to-contact.user**—User portion of the local endpoint for the in-leg.
- **$in-leg.to-contact.host—**Host portion of the local endpoint for the in-leg.

- **$in-leg.from-contact**—Remote endpoint for the in-leg.
- **$in-leg.from-contact.user**—User portion of the remote endpoint for the in-leg.
- **$in-leg.from-contact.host**—Host portion of the remote endpoint for the in-leg.
- **$in-leg.p-assert**—P-asserted-identity header for the in-leg.
- $in-leg.p-assert.user—User portion of the p-asserted-identity header for the in-leg.
- **$in-leg.p-assert.host**—Host portion of the p-asserted-identity header for the in-leg.
- **$out-leg.request-id**—Request ID for the out-leg.
- **$out-leg.to**—To: URI for the out-leg.
- **$out-leg.to.user**—User portion of the To: URI for the out-leg.
- **$out-leg.to.from**—Host portion of the To: URI for the out-leg.
- **$out-leg.from**—From: URI for the out-leg.
- **$out-leg.from.user**—User portion of the From: URI for the out-leg.
- **$out-leg.from.host**—Host portion of the From: URI for the out-leg.
- **$out-leg.request**—Request: URI for the out-leg.
- **$out-leg.request.user**—User portion of the Request: URI for the out-leg.
- **$out-leg.request.host**—Host portion of the Request: URI for the out-leg.
- **$out-leg.call-id**—Call-id for the out-leg.
- **$out-leg.to-contact**—Local endpoint for the out-leg.
- **$out-leg.to-contact.user**—User portion of the local endpoint for the out-leg.
- **$out-leg.to-contact.host**—Host portion of the local endpoint for the out-leg.
- **$out-leg.from-contact**—Remote endpoint for the out-leg.
- **$out-leg.from-contact.user**—User portion of the remote endpoint for the out-leg.
- **$out-leg.from-contact.host**—Host portion of the remote endpoint for the out-leg.
- **$out-leg.p-assert**—P-asserted-identity header for the out-leg.
- **$out-leg.p-assert.user**—User portion of the p-asserted-identity header for the out-leg.
- **$out-leg.p-assert.host**—Host portion of the p-asserted-identity header for the out-leg.

To configure channels on the OS-E:

1. Select the **Configuration** tab and click the **vsp > default-session-config** or **vsp > session-config-pool > entry** object.
2. Click the **event-settings** object.
3. Click **Edit channel**.
4. Enter the string to use to generate events for this session. Click **Add**. Click **OK**.
5. Click **Set**. Update and save the configuration.

To configure named-variable-entries on the OS-E.

1. Select the **Configuration** tab and click the **vsp > default-session-config** or **vsp > session-config-pool > entry** object.
2. Click the **event-settings** object.
3. Click **Add named-variable-entry**.
4. Enter a **variable** or select one from the drop-down list.
5. Click **Create**. You are returned to the **event-settings** object.
6. To give the variable a display-name, click **Edit** next to the variable name.
7. Enter the **display-name**. This is the name that will be displayed within the event instead of the actual named-variable name.
8. Click **Set**. Update and save the configuration.

Generating Event Messages

Two of the most common types of event messages that the ASC can generate are SIP event messages and call-control event messages. To enable the ASC to generate SIP event messages, see the following section. To work with call-control event messages, see Chapter 3, Configuring Events.

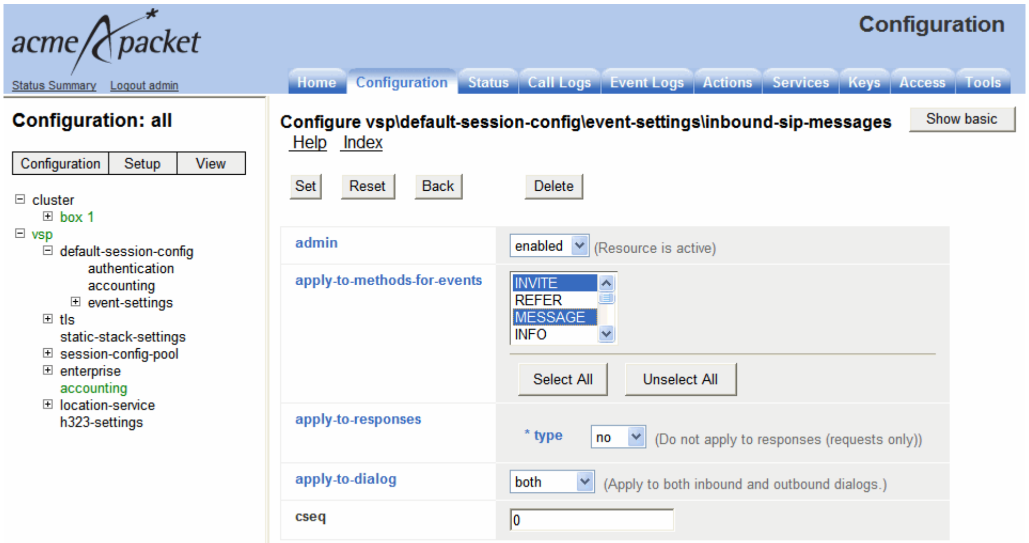
Sending SIP Event Messages

You can configure the ASC to send SIP message events when the ASC receives and transmits SIP messages. The **event-settings > inbound-sip-messages** and **outbound-sip-messages** objects configure the ASC to send SIP message events for incoming and outgoing SIP messages.

To configure the ASC to send SIP event messages:

1. Select the **Configuration** tab and click the **vsp > default- session-config** or **vsp > session-config-pool > entry** object.
2. Click the **event-settings** object.

3. Click **Configure** next to **inbound-sip-messages** to enable events for incoming SIP messages. Click **Configure** next to **outbound-sip-messages** to enable events for outgoing SIP messages.



Configure vsp\default-session-config\event-settings\inbound-sip-messages

admin: enabled (Resource is active)

apply-to-methods-for-events: INVITE, REFER, MESSAGE, INFO

apply-to-responses: * type no (Do not apply to responses (requests only))

apply-to-dialog: both (Apply to both inbound and outbound dialogs.)

cseq: 0

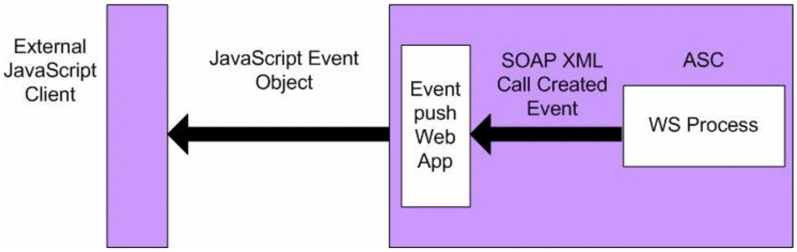
NOTE: **Inbound-sip-messages** and **outbound-sip-messages** are advanced properties. To see advanced properties, click the **Show advanced** button at the top of the window.

4. **admin**—Set to **enabled**.
5. **apply-to-methods-for-events**—Select the SIP methods you want the OS-E to create events for.
6. Click **Set**. Update and save the configuration.

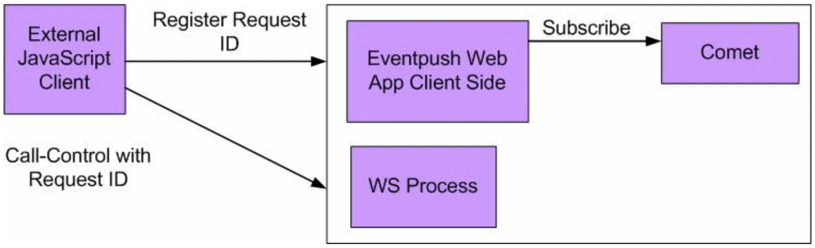
Eventpush Service

The ASC supports a web services application called eventpush service. Eventpush service is a solution which allows you to forward event information from the ASC to clients on external web applications which are unable to implement a SOAP/WSDL endpoint.

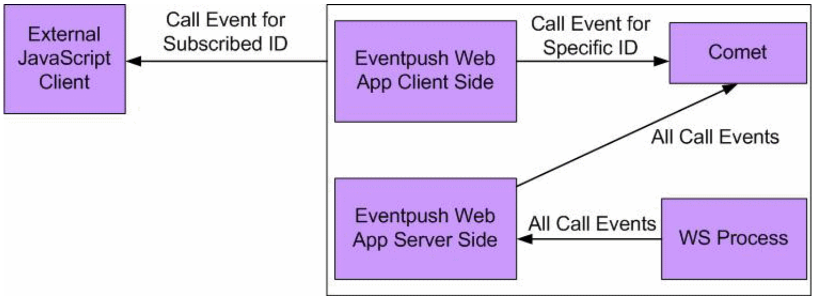
Eventpush service is configured as its own process within the ASC under the **eventpush-service** object.



Eventpush service supports a publish/subscribe interface using Cometd. There is a JavaScript API that wraps the Cometd technology. The customer application *subscribes* by indicating that it only wants to receive call events for calls with a specific requestID.


External JavaScript Client
Register Request ID
Call-Control with Request ID
Eventpush Web App Client Side
Subscribe
Comet
WS Process

The eventpush web application then *publishes*, or sends, only the events with that subscribed requestID.


External JavaScript Client
Call Event for Subscribed ID
Eventpush Web App Client Side
Call Event for Specific ID
Comet
All Call Events
Eventpush Web App Server Side
All Call Events
WS Process

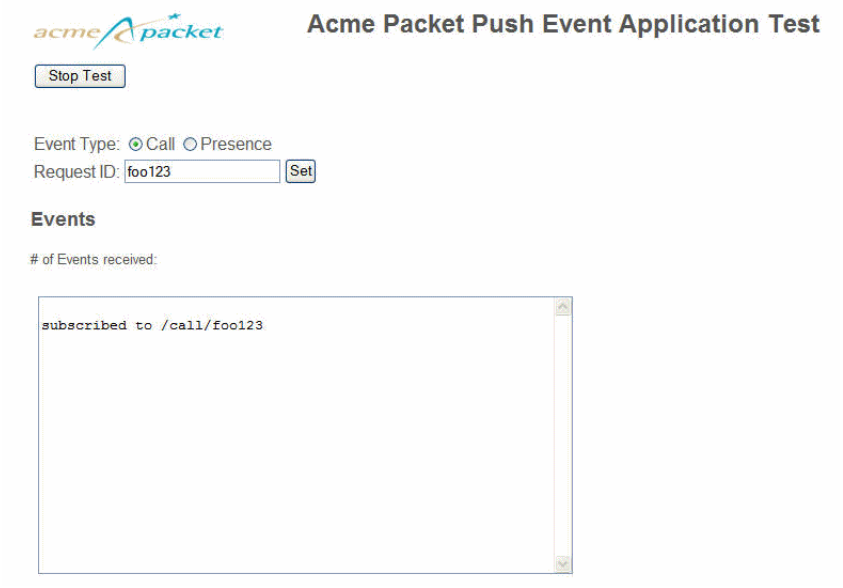
To enable cross-domain communication between the eventpush application and the customer web service application, the ASC's eventpush service DNS suffix must be the same as the customer web service application's.

To test the publish/subscribe interface, access the ASC eventpush service page. The URI for this page is:

`http(s)://ip:port/cometapp/comet_test.html`

Enter either **http** or **https**, the IP and port you have configured under the **eventpush-service** object.

Specify the requestID to which you are subscribing. This tells the ASC to publish only call events with that requestID.



Acme Packet Push Event Application Test

Event Type: ● Call ○ Presence

Request ID: foo123 Set

Events

# of Events received:

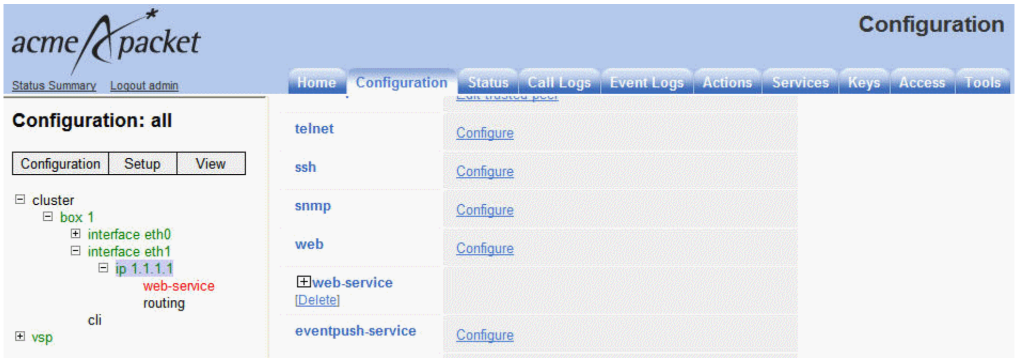
```
subscribed to /call/foo123
```

For more information on publish/subscribe technology, see http://en.wikipedia.org/wiki/Publish/subscribe.

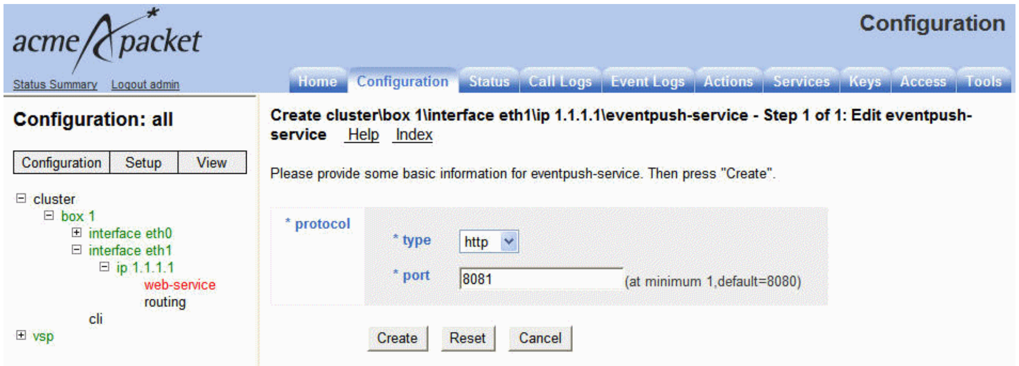
For more information on cometd technology, see http://cometdproject.dojotoolkit.org.

To configure eventpush-service:

1. Click the **Configuration** tab and select **Cluster**.
2. Select the **box**, **interface**, and **ip address** on which you want to configure the **eventpush-service**.
3. Click **Configure** next to **eventpush-service**.



4. Set the protocol **type** and **port** and click **Create**.

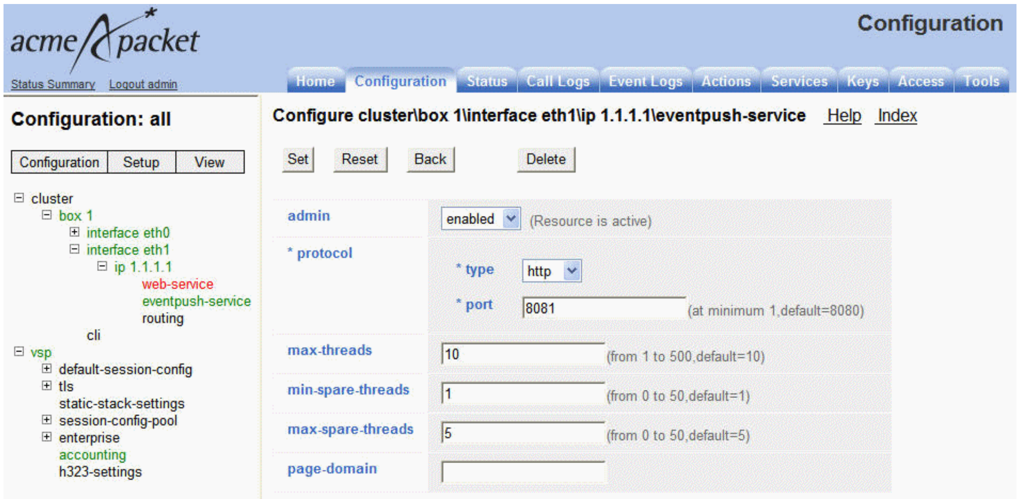


Create cluster\box 1\interface eth1\ip 1.1.1.1\eventpush-service - Step 1 of 1: Edit eventpush-service

Please provide some basic information for eventpush-service. Then press "Create".

* protocol
* type: http
* port: 8081 (at minimum 1,default=8080)

5. Set the **page-domain** to the domain name of the ASC.



Configure cluster\box 1\interface eth1\ip 1.1.1.1\eventpush-service

admin: enabled (Resource is active)

* protocol

* type: http

* port: 8081 (at minimum 1,default=8080)

max-threads: 10 (from 1 to 500,default=10)

min-spare-threads: 1 (from 0 to 50,default=1)

max-spare-threads: 5 (from 0 to 50,default=5)

page-domain:

6. Click **Set**. Update and save the configuration.

Two status providers provide information on the current set of active cometd channels.

The **show cometd-channel-summary** action provides a summary of channel information for the cometd server.

```
NNOS-E>show cometd-channel-summary

name                            subscriber-count
----                            ----------------
/**                             1
/call                           0
/call/to                        0
/call/to/019785551212           1
/cometd                         0
/cometd/meta                    1
/meta                           0
/meta/connect                   0
/meta/disconnect                0
/meta/handshake                 0
/meta/subscribe                 0
/meta/unsubscribe               0
```

Field	Description
name	The name of the channel.
subscriber-count	The number of subscribers on this channel.

The **show cometd-channel-detail** action provides more detailed channel information, specifically, on the subscribers to each of the channels.

Note that if a channel appears in the summary but not in the details, it means that the channel exists without any active cometd client subscriptions.

```
NNOS-E>show cometd-channel-details
```

```
name           remote-address  remote-port id             user-agent
----           --------------  ----------- --             ----------
/**             10.1.21.57     49804      372tj5ikmvga8ant2b6m2wcjs
Mozilla/5                                .0 (Windows NT 6.1; WOW64)
AppleWebKit/535.11 (KHTML, like Gecko) Chrome/17.0.96
3.79 Safari/535.11
/call/to/019785551212 10.1.21.57     49728
21sxpszu2lkikc1pnadt0mdfzvg Mo                               zilla/5.0
(Windows NT 6.1; WOW64) AppleWebKit/535.11 (KHTML, like Gecko) Chrome/
17.0.963.79 Safari/535.11
/cometd/meta     10.1.21.57     49804      372tj5ikmvga8ant2b6m2wcjs
Mozilla/5                                .0 (Windows NT 6.1; WOW64)
AppleWebKit/535.11 (KHTML, like Gecko) Chrome/17.0.96
3.79 Safari/535.11
```

Field	Description
name	The name of the channel.
remote-address	The remote address for this subscriber.
remote-port	The remote port for this subscriber.
id	The identifier assigned internally by the OS-E for this publisher.
user-agent	The user agent the subscriber used to establish the session.

Two status providers have been added to provide information on the current set of active cometd subscribers.

The **show cometd-subscriber-summary** action provides high-level information about the subscribers.

```
NNOS-E>show cometd-subscriber-summary

remote-address  remote-port id         channel-count message-count
user-agent
--------------  ----------- --         ------------- ------------- -
---------
10.1.21.57    49728     21sxpszu2lkikc1pnadt0mdfzvg 1        0
Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/535.11 (KHTML, like
Gecko) Chrome/17.0.963.79 Safari/535.11
10.1.21.57    49804     372tj5ikmvga8ant2b6m2wcjs 2        0
Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/535.11 (KHTML, like
Gecko) Chrome/17.0.963.79 Safari/535.11
```

Field	Description
remote-address	The remote address for the subscriber.
remote-port	The remote port for the subscriber.
id	The identifier assigned internally by the OS-E for this publisher.
channel-count	The number of channels to which the subscriber is currently subscribed.
message-count	The number of messages a subscriber has currently been sent.
user-agent	The user agent the subscriber used to establish the session.

The **show cometd-subscriber-details** action provides more detailed information, specifically on the channels subscribed to by each subscriber.

Note that if a subscriber appears in the summary but not the details, it means that the subscriber exists without any active cometd channel subscriptions.

```
NNOS-E>show cometd-subscriber-details

remote-address  remote-port channel
--------------  ----------- -------
10.1.21.57      49728       /call/to/019785551212
10.1.21.57      49804       /**
10.1.21.57      49804       /cometd/meta
```

Field	Description
remote-address	The remote address for the subscriber.
remote-port	The remote port for the subscriber.
channel	The name of the channel.

3 ASC Call Control Action

Web Service Call Control

Many of the applications you can create via the Net-Net ASC will use the **call-control** action. This chapter describes how to use **call-control**, its parameters, as well as the results and event messages that are subsequently generated.

Identifying Calls and Sessions

When the Net-Net ASC creates calls, it uses several elements to identify specific calls and portions of calls. These unique markers are request IDs, session IDs, call leg handles, and SIP call-IDs.

For more information on which elements appear in what event messages and which are parameters for **call-control** actions, see

Request IDs

When creating new calls, an application identifies the endpoints involved using their SIP URIs. An application may also supply a request ID to the ASC. If it does supply a request ID, the ASC labels the resulting session with that request ID. This ID is returned in the subsequent responses to the request and any events pertaining to that session. In actions which add new call legs mid-call, like **call-control fork** and **conference**, each new leg creates a new session between it and the originating leg. These new sessions inherit the original request ID.

The request ID is an obscure string as far as the ASC is concerned. Any interpretation of its contents is solely a matter for the application writer.

Session IDs

Each session in the ASC is given a session ID, internally represented as a 64-bit number, which functions as a globally unique ID (GUID). This means session IDs are not repeated even after the ASC reboots and are unique between multiple ASCs. The session ID is returned in response to all call creation, disconnection and manipulation actions, and in all events pertaining to the session.

Call Leg Handles

Each leg of a call is identified by a handle, internally represented as a 32-bit number. You must reference a call leg handle in all actions performed on calls after they have been created.

SIP Call-IDs

Within SIP, calls are identified by Call-IDs, which functions as a GUID. Every call leg has a unique call ID, and these are reported in the CallCreated, CallConnected, and CallTerminated events. The call-ID should be used when you need to correlate calls with other systems. If this is not sufficient, you can populate call events with custom parameters that can be obtained from arbitrary SIP headers.

Configuring To and From URIs

When you use the **call-control call** action, you need to include **to** and **from** properties. You can configure the ASC so that you don't have to include the SIP scheme and domain parts every time you place a call. By configuring a condition list and header normalization, then adding them to a policy rule, the ASC looks for the absence of a host portion in the To URI in a **call-control** action, and adds the necessary components to the To and From URIs.

The following example displays a configuration where the ASC applies the condition list to the **call-control** action. It creates four **header-normalization** rules which prepend **sip:** to the **call-control to** and **from** properties and append **@acmepacket.com** to these properties.

```
config rule check-for-host
     config condition-list
      set to-uri-condition host match ^$
      set action-condition call-control
     return
     config session-config
      config header-settings
       config header-normalization 1
        set destination To
        set value prepend sip:
       return
       config header-normalization 2
        set destination From
        set value prepend sip:
       return
       config header-normalization 3
        set destination To
        set value append @acmepacket.com
       return
       config header-normalization 4
        set destination From
        set value append @acmepacket.com
       return
      return
     return
    return
```

For more information about configuring condition lists and normalization, see the *Net-Net OS-E Object and Properties Reference Guide*.

Action Results

When the **call-control** action is executed, you receive an XML result containing information about whether the action was successful or not.

The following is an example of an XML result generated from a successful **call-control** action:

```
<ExtActionResponse>
  <resultCode>0</resultCode>
  <resultStr>Success</resultStr>
  <info>343196502737231705
```

```
14490500:14490499</info>
  <structure>
    <CallControlCallResult>
      <requestId>foo123</requestId>
      <sessionId>343196502737231705</sessionId>
      <inCallLegHandle>14490500</inCallLegHandle>
      <outCallLegHandle>14490499</outCallLegHandle>
    </CallControlCallResult>
  </structure>
</ExtActionResponse>
```

A <resultCode> of zero indicates the action was successful. Any other value indicates a failure, which is described by the <resultStr> object.

The <info> element provides supplementary information about the executed **call-control** action. In the case of a successful call the first line is the session ID. The second line consists of the two call-leg handles, separated by a colon.

Structured information equivalent to the content of the <info> element is also returned for some of the **call-control** actions, making the extraction of the required fields easier. If it was provided in the original request, the requestId is returned in the structured information.

NOTE: Not all **call-control** actions return structured data. This only happens when the <info> element contains useful information that needs parsing.

When using a RESTful API, you can request the result in a simplified XML format by adding **&_format=simplified** to the URL. The following is an example of a simplified XML result.

```
<object xsi:type="ExtActionResponseType">
  <resultCode>0</resultCode>
  <resultStr>Success</resultStr>
  <info>343196530540399894
14490520:14490519</info>
  <structure xsi:type="CallControlCallResultType">
    <request-id>foo123</request-id>
    <session-id>343196530540399894</session-id>
    <in-call-leg-handle>14490520</in-call-leg-handle>
    <out-call-leg-handle>14490519</out-call-leg-handle>
  </structure>
</object>
```

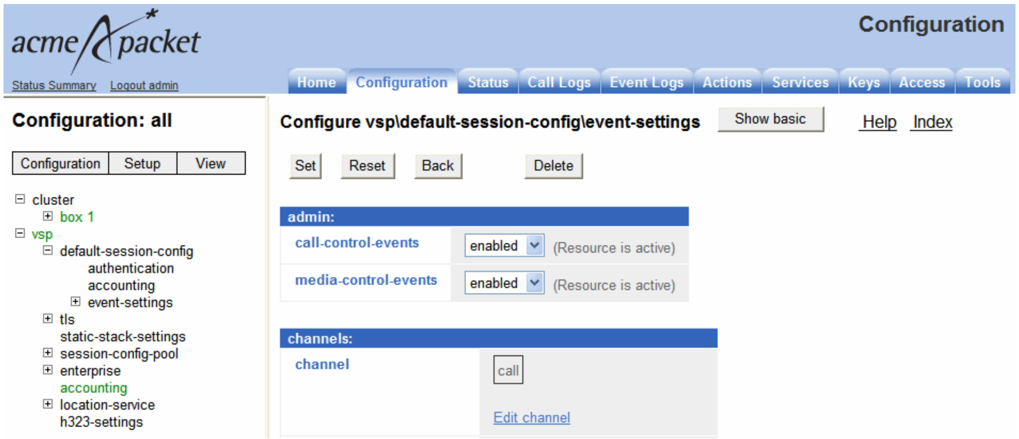
Configuring Call Events

When enabled to do so, the ASC can generate event messages, two of the most common types being call-control event messages and SIP event messages. To enable the ASC to generate call-control event messages, see the following section. To work with SIP event messages, see Chapter 2, Sending SIP Event Messages.

To generate call-control event messages:

1. Select the **Configuration** tab and click the **vsp > default- session-config** or **vsp > session-config-pool > entry** object.

2. Click the **event-settings** object.



Configure vsp\default-session-config\event-settings

admin:

call-control-events: enabled (Resource is active)

media-control-events: enabled (Resource is active)

channels:

channel: call

Edit channel

3. **call-control-events**—Set to **enabled** for the OS-E to send call-control events.

4. Click **Set.** Update and save the configuration.

The ASC includes certain standard information in the event messages it sends. However, if you want to include information not included in the standard format, you can configure the ASC to include custom content in the CallCreated, CallConnected, and CallTerminated event messages.

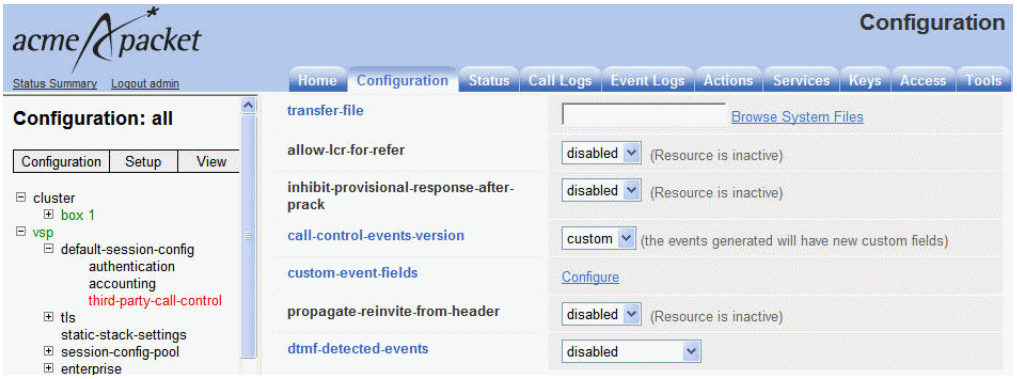
See Appendix B: Event Message Examples for examples of both legacy and new format and legacy and custom content event messages.

To include custom information in event messages:

1. Click the **Configuration** tab and select **third-party-call-control**.

2. Select **custom** from the **call-control-events-version** drop-down box. The default is **legacy**.

3. Click **Configure** next to **custom-event-fields** to set the custom event fields to include in the event messages.



transfer-file: Browse System Files

allow-lcr-for-refer: disabled (Resource is inactive)

inhibit-provisional-response-after-prack: disabled (Resource is inactive)

call-control-events-version: custom (the events generated will have new custom fields)

custom-event-fields: Configure

propagate-reinvite-from-header: disabled (Resource is inactive)

dtmf-detected-events: disabled

For more information on configuring named variables and regular expressions, see Using Regular Expressions in Chapter 1: How to Use the ACLI of the *Net-Net OS-E Objects and Properties Reference Guide*.

4. Click **Set**.

5. Update and save the configuration.

Common Call Events

The **call-control** actions create call events. The following table lists and describes common call events.

Event Name	Description	Parameters
CallCreated	Generated every time a call leg is created.	• [requestId] • handle • sessionID • callID • to • from • sessConfig (legacy schema only) • dtmfCapability (legacy schema only)
CallCreatedEventCustom	Generated every time a call leg is created and the ASC is configured to include custom event fields in event messages.	• [requestId] • handle • sessionID • callID • to • from • sessConfig (legacy schema only) • dtmfCapability (legacy schema only) • customField
CallConnected	Generated every time a call leg is connected.	• [requestId] • handle • sessionID • callID • to • from • content
CallConnectedEventCustom	Generated every time a call leg is connected and the ASC is configured to include custom event fields in event messages.	• [requestId • handle • sessionID • callID • to • from • content • customField
CallTerminated	Generated when a party hangs up and every time a call leg is terminated.	• [requestId] • handle • callDuration • reason • sessionID • callID
CallTerminatedEventCustom	Generated when a party hangs up and every time a call leg is terminated.	• [requestId] • handle • callDuration • reason • sessionID • callID • customField

Event Name	Description	Parameters
CallHeld	Generated every time a call leg is placed on hold.	• [requestID] • handle • heldByRemote—can be true or false
CallRetrieved	Generated every time a call leg is retrieved from being on hold.	• [requestID] • handle
PlayInitiated		• [requestID] • handle • scanTime
PlayComplete	Generated whenever an audio file has finished playing or when it has been stopped.	• [requestID] • handle • fileTime • playedTime
PlayPaused	Generated every time an audio message is paused.	• [requestID] • handle • fileTime • playedTime
PlayResumed	Generated every time you resume playing an audio message.	• [requestID] • handle • fileTime • playedTime
PlayStopped	Generated every time you stop playing an audio message.	• [requestID] • handle • fileTime • playedTime
PlayFailed		• [requestID] • handle • reason • scanTime
RecordComplete	Generated every time the recording of an audio message is finished.	• [requestID] • handle • fileName
FileInformation	Generated every time you request file information.	• [requestID] • fileTime
MessageSend	Generated every time you manually send a message.	• [requestID] • sessionID • responseCode—the SIP response code from the message recipient • responseString—the corresponding string • callID • to • from • ContentType • body

Event Name	Description	Parameters
MessageReceived	Generated every time SIP MESSAGE messages are received.	• [requestID] • sessionID • callID • to • from • contentType—normally has the value of text/plain • body—content of the message
IncomingDtmfDigitStart	Generated when the start of a DTMF digit is received on a call leg. Every digits receives its own event. You must set **session-config > in-dtmf-preferences** to detect DTMF methods of choice. For parked calls, you must set **nnos-call-policy > apply-policy-to-nnos-calls** to **enabled**.	• [requestID] • handle • method—identifies the method used to receive DTMF • digit • volume • duration—the initial duration in milliseconds; reflects how many milliseconds were are received in the first packet if received as an RFC 2833 event in the media stream
IncomingDtmfDigitUpdate	Generated when the end of a DTMF digit is detected on a call leg.	• [requestID] • handle • method • digit • volume • duration—reflects the duration of the entire DTMF tone.
OutgoingDtmfDigitStart	Generated when the start of a DTMF digit is sent on a call leg. You must set **session-config > out-dtmf-preferences** to detect DTMF methods of choice. The actual method used depends on the capabilities of the endpoint. Note that you cannot send DTMF digits to a parked endpoint.	• [requestID] • handle • method—identifies the method used to receive DTMF • digit • volume • duration—the initial duration in milliseconds; reflects how many milliseconds were are received in the first packet if received as an RFC 2833 event in the media stream
OutgoingDtmfDigitUpdate	Generated when the end of a DTMF digit is sent on a call leg.	• [requestID] • handle • method • digit • volume • duration—reflects the duration of the entire DTMF tone.

Event Name	Description	Parameters
CallRedirected	Generated when a party redirects a call leg.	• requestId • handle • sessionID • callID • to • from
AttachedEvent	Generated when a call leg is attached to a session.	• handle • sessionID • callID • to • from • requestID
DetachedEvent	Generated when a call leg is detached from a session.	• handle • sessionID • callID • to • from • requestID
MediaStartedEvent	Generated when a media event is started, such as playing a file.	• handle • sessionID • callID • to • from • requestID • capabilities • media-file-status
MediaCompleteEvent	Generated when a media event is complete.	• handle • sessionID • callID • to • from • requestID • media-file-status
MediaStoppedEvent	Generated when a media event is stopped.	• handle • sessionID • callID • to • from • requestID • media-file-status
MediaPausedEvent	Generated when media playback is paused.	• handle • sessionID • callID • to • from • requestID • media-file-status
MediaResumedEvent	Generated when a media playback is resumed.	• handle • sessionID • callID • to • from • requestID • media-file-status

Event Name	Description	Parameters
MediaSeekEvent	Generated when the location in a media source is changed.	• handle • sessionID • callID • to • from • requestID • media-file-status
RecordCompleteEvent	Generated when a recording event has completed.	• handle • sessionID • callID • to • from • requestID • filename
RecordingStartedEvent	Generated when on demand recording is started.	• handle • sessionID • callID • to • from • requestID • filename
RecordingStoppedEvent	Generated when on demand recording is stopped.	• handle • sessionID • callID • to • from • requestID • filename

The following is a list of elements commonly found in event messages:

- requestID—The ID provided by the call-control caller. This element only appears if it was originally provided.
- handle—The call leg handle, expressed as a decimal number.
- sessionID/session-id—The internally applied session ID, expressed as a decimal number.
- callID/call-id—The call-ID field from the SIP message. Each call leg should have distinct Call-IDs.
- to—The To URI.
- from—The From URI.
- sessConfig/session-config—The session configuration that was applied to the call.
- callDuration—The length of a call, expressed as an *ISO 8601-format* time duration. This may either look like P*n*DT*n*H*n*M*n*S (legacy format) or P*n*Y*n*M*n*DT*n*H*n*M*n*.*n*S (simplified format), where *n* represents the integer.
- reason—The reason a call was terminated, based on the SIP response message (200 for normal termination, 404 for not found, 500 for internal error, etc.)
- fileTime—The length of an audio file, in milliseconds.
- playTime—The number of milliseconds of an audio file that was played.
- fileName—The name of the file that was recorded.

Call-Control Actions

This section describes all of the **call-control** actions, their parameters, structure of their result XML, and events generated.

Parameters surrounded by brackets ([ ]) are optional.

call

Initiates a call using To and From SIP URIs you provide.

You can set the ASC to add post-dial digits to a **call-control call** action. Append the string **postd=*digits*** to the user portion of the **to** parameter. The following example shows the ASC adding post-dial digits **12345@acmepacket.com** to a call.

```
call-control call sip:2001;postd=12345@acmepacket.com
sip:1001@acmepacket.com
```

Parameters

- to—The destination SIP URI of the call.
- from—The originating SIP URI of the call.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- [originatorFirst]—When **enabled** (the default), the originating party is connected first. When **disabled**, the called party is connected first.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.
- [transport]—The transport method to use for the call. This can be set to **any**, **TCP**, **UDP**, or **TLS**.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlCallResult>
  <requestId />
  <sessionId />
  <inCallLegHandle />
  <outCallLegHandle />
 </CallControlCallResult>
</structure>
```

Events Generated

- CallCreated (originator)
- CallCreated (called party)
- CallConnected (originator)

- CallConnected (leg two)

If the **originatorFirst** parameter is **disabled**, the CallCreated (originator) event is omitted. If a call is terminated, there are two CallTerminated events, one for each leg.

disconnect

Disconnects both legs of a call. The **handle** parameter can be the handle of either call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlDisconnectResult>
  <requestId />
  <sessionId />
</CallControlDisconnectResult>
</structure>
```

Events Generated

- CallTerminated (disconnected party)
- CallTerminated (other party, if present)

park

Creates a call to an endpoint from a given SIP URI. If you specify a From URI, it is used as the From URI in the SIP message; if you specify no From URI, the From URI is that of the given endpoint.

Parameters

- endpoint—The URI of the call's destination.
- [from]—The originating SIP URI of the call.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
```

```
 <CallControlParkResult>
  <requestId />
  <sessionId />
  <parkedCallLegHandle />
</CallControlParkResult>
</structure>
```

Events Generated

- CallCreated
- CallConnected

connect

Connects an existing parked call leg to a given endpoint. If the called party ends the call, the original call reverts back to a parked state.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- endpoint—The URI of the call's destination.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlConnectResult>
  <requestId />
  <sessionId />
  <pakredCallLegHandle />
  <remoteCallLegHandle />
 </CallControlConnectResult>
</structure>
```

Events Generated

- CallCreated
- CallConnected

terminate

Terminates the call leg indicated by the handle you specify. This parameter is only available for calls with a parked status.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlTerminatedResult>
  <requestId />
  <sessionId />
  <parkedCallLegHandle />
</CallControlTerminatedResult>
</structure>
```

Events Generated

- CallTerminated

hold

Places the specified call leg on hold. This puts the media of that call leg into send-only mode. The media of the other call leg, if present, is put into receive-only mode.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlHoldResult>
  <requestId />
  <sessionId />
  <heldCallLegHandle />
  <remoteCallLegHandle />
 </CallControlHoldResult>
</structure>
```

Events Generated

- CallHeld (held party)
- CallHeld (other party, if present)

retrieve

Retrieves the held call leg you specify by call handle. This reconnects the call's media for that call leg and, if present, the other call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlRetrieveResult>
  <requestId />
  <sessionId />
  <retrieveCallLegHandle />
  <remoteCallLegHandle />
 </CallControlRetrieveResult>
</structure>
```

Events Generated

- CallRetrieved (held party)
- CallRetrieved (other party, if present)
- CallConnected (held party)
- CallConnected (other party, if present)

transfer

Transfers the specified call leg to the specified To SIP URI. The original call leg, referred to by its handle, is disconnected. Handle can be thought of as belonging to the party doing the transfer, even though the transfer is done via a third-party action.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- to—The destination SIP URI of the call.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlTransferResult>
  <requestId />
  <sessionId />
  <newCallLegHandle />
  <remoteCallLegHandle />
 </CallControlTransferResult>
</structure>
```

Events Generated

- CallCreated (new call leg)
- CallHeld (party to be transferred)
- CallHeld (party doing the transfer)
- CallConnected (transferred party)
- CallConnected (new call leg)
- CallTerminated (transferring party)

join

Connects the parties of two separate calls together. The original call legs, identified by handle1 and handle2, are disconnected.

Parameters

- handle1—Identifies the leg of the first call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- handle2—Identifies the leg of the second call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlJoinResult>
  <requestId />
  <sessionId />
  <inCallLegHandle />
  <outCallLegHandle />
 </CallControlJoinResult>
</structure>
```

Events Generated

- CallTerminated (party identified by handle2)
- CallConnected (party identified by handle3, correspondent of handle1)
- CallConnected (party identified by handle4, correspondent of handle2)
- CallTerminated (party identified by handle1)
-

memo-begin

Records a message from the parked party, identified by a call leg handle, and stores it in a file you specify.

Note: When **cluster** is **enabled**, **master-service > file-mirror** must be enabled for it to work properly.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- filename—The name of the audio file where a message is recorded or from where a message is played. Audio files must be .wav files in 44.1 kHz, 16-bit mono PCM format. If you give an invalid filename, it is placed in or taken from the /cxc directory.
- [greeting]—A greeting file that may be applied first as a prompt.
- [cluster]—When **enabled**, the file is available to all ASCs in the cluster. When **disabled** (the default), the file is only available on the local ASC.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayComplete (for greeting, if used)

memo-end

Ends a recording on the specified call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- RecordComplete

play

Plays a given audio file to the specified call leg. If two call legs are connected, the file is played to both parties.

If the **session-config > media-scanner-settings** is configured, the ASC waits until the recipient (or an answering machine) has finished speaking before delivering the message. If the media scanner times out waiting for the recipient to finish speaking, the file is not played.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- filename—The name of the audio file where a message is recorded or from where a message is played. Audio files must be .wav files in 44.1 kHz, 16-bit mono PCM format. If you give an invalid filename, it is placed in or taken from the /cxc directory.
- [startTime]—The number of milliseconds the ASC waits before playing the file.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayInitiated
- PlayComplete

drop-file

Plays the specified audio file to the party connected to the call leg. When finished, the ASC terminates the call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- filename—The name of the audio file where a message is recorded or from where a message is played. Audio files must be .wav files in 44.1 kHz, 16-bit mono PCM format. If you give an invalid filename, it is placed in or taken from the /cxc directory.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayComplete
- CallTerminated

message

Connects to a given endpoint, plays the file you specify, then disconnects the call. If you specify a From URI, that appears in the From header as the calling party; if no URI is specified, the To URI is used as the From header.

Parameters

- filename—The name of the audio file where a message is recorded or from where a message is played. Audio files must be .wav files in 44.1 kHz, 16-bit mono PCM format. If you give an invalid filename, it is placed in or taken from the /cxc directory.
- endpoint—The URI of the call's destination.
- [from]—The originating SIP URI of the call.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
```

Events Generated

- CallCreated
- CallConnected
- PlayComplete
- CallTerminated

insert-dtmf

Inserts DTMF digits into the call leg. DTMF is inserted only into the call leg specified; the other party does not hear it.

Note also that DTMF insertion is currently only supported for two-legged calls, not parked calls.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- digits—Specifies the digits inserted into the call leg.
- [volume]—The volume of the DTMF digits, in decimals from -36 to 0. The value **1** is the default.
- [duration]—The duration of each digit in milliseconds, from 100 to 10000. The value **0** is the default.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- OutgoingDtmfDigitStart
- OutgoingDtmfDigitUpdate

annotate

Annotates the text you specify to a call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- text—The text you specify to a call leg.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

None

get-annotation

Retrieves the annotated text given to the call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
<info />
```

Events Generated

None

identify

Associates the **requestId** you specify with a call whose leg is identified by the **handle**. The requestId subsequently appears in events associated with that call. Note that the **requestId** is associated with the entire call, not the individual leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- requestId—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

None

notify

Causes a SIP NOTIFY message to be sent to the party you specify in the **handle** parameter, with the value of the Event header set by the **event** parameter.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- event—The content of the Event header.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

None

call-control-fork

Adds a new endpoint’s SIP URI to the parked call. The endpoint can receive media but cannot send it. Multiple endpoints can be added using this action.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- endpoint—The URI of the call’s destination.
- [async]—When **enabled**, causes the ASC to return a response immediately without waiting for the action to complete. When **disabled** (the default), the ASC waits for the action to complete before returning a response.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.

- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlForkResult>
  <requestId />
  <sessionId />
  <forkedSessionId />
  <parkedCallLegHandle />
  <remoteCallLegHandle />
 </CallControlForkResult>
</structure>
```

Events Generated

- CallCreated
- CallConnected (new call leg)

call-control-redirect

Redirects an initiated call to a new endpoint, prior to the call being answered. This creates a new call leg and cancels the original one.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.
- endpoint—The URI of the call's destination.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
<structure>
 <CallControlRedirectResult>
  <requestId />
  <sessionId />
  <inCallLegHandle />
  <outCallLegHandle />
 </CallControlRedirectResult>
</structure>
```

Events Generated

- CallTerminated (abandoned call leg)

- CallCreated
- CallConnected (new call leg)

call-control-media-pause

Pauses the playing of an audio file on an active call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayPaused

call-control-media-resume

Resumes the playing of an audio file on an active call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayResumed

call-control-media-stop

Stops the playing of an audio file on an active call leg.

Parameters

- handle—Identifies the leg of a call. Handles are returned as part of the <info> element of **call-control** results and can be used to manipulate each leg of a call independently.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- PlayStopped
- PlayComplete

call-control-send-message

Sends a message to the endpoint specified by the To URI. If you specify a From URI, it is used for the From URI. If a From URI is not specified, the From URI is the same as the To URI.

Parameters

- to—The destination SIP URI of the call.

- [from]—The originating SIP URI of the call.
- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- [content-type]—Should be set to **text/plain.**
- [body]—The content of the message.
- [config]—The **session-config** on the ASC to use to process a call. Use the full path to the **session-config**. For example:

  ```
  vsp\session-config-pool\entry MyConfig
  ```

  Enclose the value in quotation marks when using the CLI.

Result XML

```
<resultCode />
<resultStr />
<info />
```

Events Generated

- CallConnected
- MessageSend
- CallTerminated

file-info

Causes an event to be generated containing information about the specified file.

Parameters

- [requestId]—A unique identifier provided by an external application. This value can be used to identify the call in subsequent events and actions. If a requestId is specified, there is a corresponding XML element in the event messages generated for the session.
- filename—The name of the audio file where a message is recorded or from where a message is played. Audio files must be .wav files in 44.1 kHz, 16-bit mono PCM format. If you give an invalid filename, it is placed in or taken from the /cxc directory.

Result XML

```
<resultCode />
<resultStr />
```

Events Generated

- FileInformation

On-Demand Three-Way Conferencing

The OS-E now supports on-demand three-way conferencing, meaning a third-party can selectively join a target session. A target session is an existing call between two parties and a third-party is a call-leg that can attach itself to a target session and participate in the ongoing conversation.

An on-demand three-way conference is initiated via the **call-control- attach** action. The action is syntax is:

```
call-control-attach <handle> [session-id]
```

Valid arguments for this action are:

- *<handle>*—The call-leg handle of the third-party to attach to an existing target session.
- *<session-id>*—The session-id of the target session to join.

Once the third-party is finished with the conference, it can detach itself from the target session and the two original parties can continue the call. To detach the third-party from the three-way conference, use the **call-control-detach** action. The action syntax is:

```
call-control-detach <handle> <session-id>
```

Valid arguments for this action are:

- *<handle>*—The call-leg handle of the third-party to detach from the target session.
- *<session-id>*—The rendezvous session-id that the detached call-leg becomes attached to.

Media Forking

The OS-E now supports audio and video media forking, meaning a source endpoint can fork media to one or more target endpoints. The source endpoint is a one-legged call which initiates a call to the OS-E. The OS-E then initiates a call to each forked target. In this type of media forking, the media flows in one direction only, from the source endpoint, through the OS-E, to each of the targets.

Media forking is initiated via the **call-control-fork** action. This action establishes a call from the source endpoint and replicates the media to the newly established target sessions. The action syntax is:

```
call-control-fork <handle> <endpoint> [async] [requestID] [config]
```

Valid arguments for this action are:

- *<handle>*—The call-leg handle of the source endpoint.
- *<endpoint>*—The URL of the target endpoint.
- [*async*]—When enabled, this action returns immediately as opposed to waiting for the action to complete the call.
- [*requestID*]—This call's request identifier. If included, this value is returned in all of this action's events.
- [*config*]—The **session-config** to use when calling the endpoint.

To end a media forking session, use the **call-control disconnect** action. If you disconnect a target endpoint, the call from the source and remaining targets is still active. If you disconnect the source endpoint, all call-legs to the target endpoints are disconnected. The action syntax is:

```
call-control disconnect <handle>
```

Valid arguments for this action are:

- *<handle>*—The handle of the call-leg to disconnect.

Attended Voice Insertion

This feature allows a caller to play a pre-recorded message that both the caller and callee can hear. The caller can start playing the message at any point, pause, resume, or stop playing the message.

The OS-E allows the caller to begin playing a file with the option of seeking to a specified point via the **call-control play** action. The action syntax is:

```
call-control play <handle> <filename> [startTime] [async]
```

Valid arguments for this action are:

- <*handle*>—The call-leg handle on which the file is played.
- <*filename*>—The .wav file being played.
- [*startTime*]—The optional start time in milliseconds. This is used if the caller does not want to begin playing the file right at the beginning. The default value is **0**.
- [async]—When enabled, this action completes immediately as opposed to waiting for the action to complete the call.

The OS-E stops the playing of a file via the **call-control media-stop** action. The action syntax is:

```
call-control-media-stop <handle>
```

Valid arguments for this action are:

- <*handle*>—The call-leg handle where the file is stopped.

The OS-E pauses the playing of a file via the **call-control media-pause** action. The action syntax is:

```
call-control-media-pause <handle>
```

Valid arguments for this action are:

- <*handle*>—The call-leg handle where the file is paused.

The OS-E resumes the playing of a file via the **call-control media-resume** action. The action syntax is:

```
call-control-media-resume <handle>
```

Valid arguments for this action are:

- <*handle*>—The call-leg handle where the file is resumed.

You can configure the OS-E to send events regarding the status of the file being played by the **call-control play** action. For more information on call-control events, see Chapter 3: ASC Call Control Action in the *Net-Net ASC Web Services SOAP/REST API Guide*.

When configured, the OS-E sends the following events:

- PlayInitiated—The file has begun to play.
- PlayPaused—The file has been paused.
- PlayResumed—The file has resumed playing.
- PlayStopped—The file has stopped playing.
- PlayCompleted—The file has completed playing.

On-Demand Call Monitoring and Recording

The OS-E now supports on-demand call monitoring, meaning an endpoint, known as the monitor session, has the ability to attach itself to either a live target session or recording file, for the purpose of listening.

When monitoring a live target session, you have the ability to start and stop monitoring. Any time a monitor session starts listening, it joins the session in-progress.

You can configure one or more locations to which the OS-E writes files for on-demand recording files via the **services > data-locations > rtp-on-demand-recorded** <*directory*> [*directory*] property. By default the OS-E writes on-demand recording files to the /cxc_common/rtp_on_demand_recorded directory.

Once you have the **rtp-on-demand-recorded** property configured, you can set a rotation scheme for writing on-demand recorded files to a directory using the **services > data-locations > rtp-on-demand-recorded-rotation** property. This property can be set to either **first-available** or **round-robin**. **First-available** means the OS-E writes to the first directory that has enough space to hold the recording listed under the **rtp-on-demand-recorded** property and continues to write to that directory until the disk is full and then moves onto the next directory on the list. **Round-robin** means the OS-E rotates through all configured directories in a round-robin manner. This allows for an increase in the volume of simultaneous on-demand recorded calls by spreading the load across multiple disks.

There are four types of monitoring you can perform when working with a recording file: a live target session currently being recorded, a previously recorded session, an on-demand recording session, and a memo actively being recorded. When monitoring a recording file, the monitor session does have the ability to pause, resume, and seek forward or backward to a particular point in the file.

The OS-E attaches a monitor session to a live target session via the **call-control-monitor-session** action. The monitor session must join the target session in-progress as it has no ability to seek forward or backward during a live recording. The action syntax is:

```
call-control-monitor-session <handle> <session-id>
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle to attach to a target session.
- <*session-id*>—The session-id of the target session to begin monitoring.

  NOTE: The session-config > nnos-call-policy > apply-policy-to-nnos-calls property must be enabled for this feature to work.

The **call-control-monitor-file** action attaches a monitor session to a recording file. A recording file can be a live session currently being recorded, an old session that was recorded, an on-demand recording of a session, or a memo actively being recorded. The action syntax is:

```
call-control-monitor-file <handle> <session-id> <monitor-target>
[seek-offset] [position]
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle to attach to a target session.
- <*session-id*>—The session-id of the recording file to begin monitoring.
- <*monitor-target*>—The type of recording file. This can be:

- session—A session recording file is going to be monitored.
- memo—A memo actively being recorded is going to be monitored.
- name—The on-demand <*filename*> specified in the **call-control-record-start <*session-id*> <*filename*>** action is being monitored.

- [*seek-offset*]—Indicates the offset, in milliseconds, to begin seeking. A negative seek value seeks backwards. The seeking starts at the spot specified by the **position** parameter. The default value is **0**.
- [*position*]—Indicates the position to begin seeking:
  - start—Seek from the start of the file. This is the default behavior.
  - current—Seek from the existing position being played.
  - end—Seek from the end of the file.

  NOTE: The **session-config > nnos-call-policy > apply-policy-to-nnos-calls** property must be **enabled** for this feature to work.

To stop monitoring a target session or a recording file, use the **call-control media-stop** file. The action syntax is:

```
call-control-media-stop <handle>
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle to stop listening.

The **call-control media-pause** action pauses the monitor of a recording file. The action syntax is:

```
call-control-media-pause <handle>
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle to pause listening.

To resume monitoring a stopped or paused recording file, use the **call-control media-resume** action. The monitoring resumes from the point at which the monitoring was stopped or paused. The action syntax is:

```
call-control-media-resume <handle>
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle to resume listening.

To seek to a specific point in a monitored recording file, use the **call-control media-seek** action. This action can also be used to seek to a certain point of a file when the **call-control play** action is used to play a file. The action syntax is:

```
call-control-media-seek <handle> <seek-offset> [position]
```

Valid arguments for this action are:

- <*handle*>—The monitor session handle seeking to a point in a monitored recording file or to a point in the file being played.
- <*seek-offset*>—The offset, in milliseconds, to begin seeking. A negative value seeks backwards. Seeking starts at the spot specified by the **position** parameter.
- [*position*]—Indicates the position to begin seeking:
  - start—Seek from the start of the file. This is the default behavior.
  - current—Seek from the current position of the file.
  - end—Seek from the end of the file.

The **call-control-record-start** action starts the on-demand recording of a target session to a specific <*filename*> file. This recording can then be monitored via the **call-control-monitor-file** action. You can execute this command one or more times for a given target session, provided you give it a different <*filename*> each time. If a <*filename*> already exists for a given target session, the existing <*filename*> is preserved and the action fails. The action syntax is:

```
call-control-record-start <session-id> <recording-name>
```

Valid arguments for this action are:

- <*session-id*>—The session-id of the target session to begin recording.
- <*filename*>— The name of the recording for this particular target session.

The **call-control-record-stop** action stops the on-demand recording of a target session to a specific <*filename*>. The action syntax is:

```
call-control-record-stop <session-id> <filename>
```

Valid arguments for this action are:

- <*session-id*>—The session-id of the target session to stop recording.
- <*filename*>—The name of the recording for this particular target session.

The **media-on-demand-delete** command deletes on-demand recording files by specifying a session-id and filename. The action syntax is:

```
media-on-demand-delete <session-id> <filename>
```

Valid arguments for this action are:

- <*session-id*>—The session-id of the on-demand recording file to delete.
- <*filename*>—The on-demand recording filename to delete.

The **media-on-demand-delete-old** action deletes all on-demand recording files that are older than the specified time. The time units can be specified in days or seconds. The default value in which to purg3e old on-demand recording files is 7 days. The action syntax is:

```
media-on-demand-delete-old <age> [units]
```

Valid arguments for this action are:

- <*age*>—The age at which to delete on-demand recordings. The default is 7 days.
- [*units*]—This optional parameter allows you to specify the units in which the age is measured. This can be either **days** or **seconds**. If you do not specify, the default is days.

You can archive on-demand recordings using the existing archiving support when the **session-config > media > recording-policy** object is configured. This existing archiver has been extended to support the archiving of one or more on-demand recordings per session. Note that multiple on-demand recordings can be created for the same session. The archiver also supports mixing the ras media files to a .wav file and archiving that file.

The **on-demand-mixed-media** command can be configured under either the **vsp > accounting > archive-local > path <*name*>** object or **vsp > accounting > archive-external > url <*url*>** object. It has been created to control whether the on-demand recordings associated with a session are mixed to a .wav file and included in the archive for a call. It also determines whether the raw on-demand recordings are included in the archive if the mixing of the on-demand recording fails.

The **on-demand-mixed-media** syntax is:

```
on-demand-mixed-media <include> <include-raw-media-on-mix-fail>
```

Valid arguments for this property are:

- *<include>*—Can be set to **true** or **false** and determines whether on-demand mixed media is included in the archive.
- <include-raw-media-on-mix-fail>—Can be set to **true** or **false** and determines whether on-demand raw media is included in the archive if the mixing fails.

To always include raw media in the archive use the **include-on-demand-raw-media** property configured under either the **vsp > accounting > archive-local > path <*name*>** object or **vsp > accounting > archive-external > url <*url*>** object. This property can be set to either **true** or **false**.

The **mix-session-threaded** action has been extended to support the mixing of on-demand recorded files. A new ***<recorded-filename>*** argument has been added to this action to indicate the on-demand recording filename that is being mixed. For more information on the mix-session-threaded action see the *Net-Net OS-E Objects and Properties Reference Guide*.

Two status show commands have been created to allow you to view on-demand call monitoring information.

The **show media-on-demand-recordings** status displays the on-demand recording files for a given session. This information displayed with this status provider can be used with the **call-control monitor-file** command to listen to these on-demand recording files.

```
NNOS-E>show media-on-demand-recordings

session-id          filename  start-time
----------          --------  ----------
0x4c42b6e0e5a6577   r9        15:57:30.798092 Tue 2011-12-06
0x4c42be1a934be68   r10       12:12:17.890681 Thu 2011-12-08
```

Field	Description
session-id	The session-id of the session that is recorded.
filename	The on-demand recording filename.
start-time	The date and time the on-demand recording was started.

The **show media-memo-recordings** status provider displays the sessions that are actively recording memos. The information displayed with this status provider can be used with the **call-control monitor-file** command to listen to these memos as they are being recorded.

```
NNOS-E>show media-memo-recordings

session-id          filename   start-time
----------          --------   ----------
0x4c43a6bb77329a3   frank.wav  15:00:04.295810 Mon 2012-02-06
```

Field	Description
session-id	The session-id of the session that is recording a memo.
filename	The filename of the memo recording

Field	Description
start-time	The date and time the memo recording file was started.

Rendezvous Session Support

The OS-E now supports rendezvous sessions. Rendezvous sessions are useful for accumulating information in named variables before attaching call legs. They have unique 64 bit session IDs as with other OS-E sessions but do not have any call-legs attached. Once a rendezvous session is created, you can add call-legs, remove call-legs, destroy the session, or add named-variables.

Using the **call-control-create-session** action, you can create a rendezvous session to which you can then add call-legs, add named-variables, or destroy the session. The OS-E automatically assigns the session a unique 64 bit session ID. The action syntax is:

```
call-control-create-session
```

To destroy a rendezvous session manually, use the **call-control-destroy-session** action. The action syntax is:

```
call-control-destroy-session <session-id>
```

Valid arguments for this action are:

- *<session-id>*—Specify the session-id for the rendezvous session you are destroying. This is the unique 64 bit session ID given to the session by the OS-E when it was created.

The OS-E also destroys a rendezvous session if you have the **session-config > sip-settings > session-duration-max** property set. This property specifies how many seconds the OS-E maintains a session after the session has been successfully established. It puts a timer on the session and forces it to close upon expiration. If set to **0** (the default), the session remains open until it is complete and does not timeout. This property applies to all sessions on the OS-E, including rendezvous sessions.

To add call-legs to a rendezvous session dynamically, use the **call-control park** and **call-control call** actions. These have been enhanced to include an optional [*session-id]* argument. Once a rendezvous session has a call-leg attached, it is “promoted” to a connected session. All subsequent interactions can be accomplished using the call control handles as you would with a normal session.

Manually Attaching and Detaching From an Endpoint

The OS-E supports functionality which provides control over managing session endpoints. The **call-control-attach** and **call-control-detach** actions allow you to attach and detach from rendezvous sessions and endpoints manually.

Rendezvous sessions can be created by one of two ways. Via the **call-control-create-session** action or by detaching an endpoint from a single endpoint session. For more information on rendezvous sessions, see the Rendezvous Session Support section in this guide.

Endpoints can be created in a few different ways. You can create an outbound call-leg via the **call-control park** action, enable the **third-party-call-control > park-**

incoming-calls property, or use the **call-control-detach** command during a rendezvous session.

You can manually attach an endpoints to either rendezvous sessions or sessions resulting from a SIP DIALOG. When attached to a rendezvous session, an endpoint remains in a PARKED state. When attached to a single endpoint session, the OS-E joins the two endpoints and two-way communication can take place. When the call is terminated, a previously PARKED endpoint reverts back to PARKED and the session remains active.

When you attach an endpoint to a session already containing two endpoints, a three-way conference call is created and three-way communication can take place. When one endpoint terminates the call, the remaining two endpoints remain joined and two-way communication commences.

To attach an endpoint to an existing session, use the **call-control-attach** action. The action syntax is:

```
call-control-attach <handle> <session-id>
```

Valid arguments for this action are:

- <*handle*>—The handle of the endpoint to be attached.
- <*session-id*>—The session to which the endpoint is being attached.

Just as you can manually attach endpoints, you can also manually detach endpoints. If you detach a PARKED endpoint from a session that is not a rendezvous session, the endpoint is terminated. If you detach a CONNECTED endpoint, both endpoints from the two-way session are placed in a PARKED state. If you detach a CONFERENCED endpoint, the detached endpoint is placed in a PARKED state and the remaining two endpoints continue as a two-way call.

To detach an endpoint from a session, use the **call-control-detach** action. The action syntax is:

```
call-control-detach <handle> [session-id]
```

Valid arguments for this action are:

- <*handle*>—The handle of the endpoint to be detached.
- <*session-id*>—The rendezvous session ID with which the endpoint is associated after it is detached. If no <*session-id*> is provided, a new (non-rendezvous) session is created.

Appendix A ASC API Examples

This appendix provides examples for the ASC top-level APIs. Included are both SOAP and REST web services requests and responses. REST actions are broken down to include both flat and hierarchical request examples.

ASC top-level APIs are:

- getConfig
- setConfig
- doAction
- getStatus
- queryStatus

getConfig

The ASC getConfig API uses the HTTP GET Method.

The following examples display a getConfig API request from the server for the **cluster** object. The responses received from the client include the **cluster** configuration, including all of its subobject configurations.

SOAP

Request

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:mgmt="http://www.acmepacket.com/asc/ws/mgmt">
   <soapenv:Header/>
   <soapenv:Body>
      <mgmt:getConfig>
         <!--Zero or more repetitions:-->
         <config homogeneous="false">
            <!--Zero or more repetitions:-->

         <object xsi:type="MasterServicesType"
xmlns="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <!--Optional:-->

        </object></config>
         <!--Zero or more repetitions:-->
      </mgmt:getConfig>
   </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<cov:getConfigResponse
xmlns:cov="http://www.acmepacket.com/asc/ws/mgmt">
  <config>
```

```
    <object xsi:type="data:MasterServicesType" revision="1"
xmlns:data="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
      <cluster-master>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </cluster-master>
      <directory>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </directory>
      <accounting>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </accounting>
      <database>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <maintenance>
          <time-of-day>
            <time>2012-01-30T03:00:00.000-05:00</time>
          </time-of-day>
        </maintenance>
        <database-threads-max>4</database-threads-max>
        <sip-cache-size>30000</sip-cache-size>
        <performance>call-details</performance>
        <dos-tcp-connect-multiplier>5</dos-tcp-connect-multiplier>
        <dos-tls-connect-multiplier>10</dos-tls-connect-multiplier>
        <sip-registers>enabled</sip-registers>
        <max-queue-depth>4000</max-queue-depth>
        <caching-threshold>3500</caching-threshold>
        <media>enabled</media>
        <write-mode>copy</write-mode>
      </database>
      <registration>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <mirror-all-entries>enabled</mirror-all-entries>
        <mirror-location-cache>enabled</mirror-location-cache>
        <force-regdb-lookup>disabled</force-regdb-lookup>
        <cache-poll-interval>86400</cache-poll-interval>
        <max-poll-duration>1000</max-poll-duration>
        <max-entries-per-poll>100</max-entries-per-poll>
      </registration>
      <route-server>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <max-routes>automatic</max-routes>
        <client-request-sender>only-master</client-request-sender>
        <simple-updates>enabled</simple-updates>
      </route-server>
      <sampling>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <SamplingTarget xsi:type="data:SamplingDatabaseType">
          <admin>enabled</admin>
          <duration>7</duration>
          <status>
            <cpu-usage>
              <admin>enabled</admin>
              <interval>P0Y0M0DT0H5M0.000S</interval>
            </cpu-usage>
          </status>
        </SamplingTarget>
      </sampling>
      <jtapi>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </jtapi>
      <advertisement-interval>60</advertisement-interval>
      <boot-interval>30</boot-interval>
    </object>
  </config>
</cov:getConfigResponse>
```

REST

Request

```
http://172.30.80.24:8080/cms/config?name=MasterServices
```

Response

```
<?xml version="1.0"?>
<object xsi:type="ExtPageListType"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<version>E3.6.0.M5P0</version>
```

```
<resultCode>0</resultCode>
<resultStr>Success</resultStr>
<objects revision="1" xsi:type="MasterServicesType">
      <cluster-master>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </cluster-master>
      <directory>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </directory>
      <accounting>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </accounting>
      <database>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <maintenance>
          <time-of-day>
            <time>2012-01-30T03:00:00.000-05:00</time>
          </time-of-day>
        </maintenance>
        <database-threads-max>4</database-threads-max>
        <sip-cache-size>30000</sip-cache-size>
        <performance>call-details</performance>
        <dos-tcp-connect-multiplier>5</dos-tcp-connect-multiplier>
        <dos-tls-connect-multiplier>10</dos-tls-connect-multiplier>
        <sip-registers>enabled</sip-registers>
        <max-queue-depth>4000</max-queue-depth>
        <caching-threshold>3500</caching-threshold>
        <media>enabled</media>
        <write-mode>copy</write-mode>
      </database>
      <registration>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <mirror-all-entries>enabled</mirror-all-entries>
        <mirror-location-cache>enabled</mirror-location-cache>
        <force-regdb-lookup>disabled</force-regdb-lookup>
        <cache-poll-interval>86400</cache-poll-interval>
        <max-poll-duration>1000</max-poll-duration>
        <max-entries-per-poll>100</max-entries-per-poll>
      </registration>
      <route-server>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <max-routes>automatic</max-routes>
        <client-request-sender>only-master</client-request-sender>
        <simple-updates>enabled</simple-updates>
      </route-server>
      <sampling>
        <admin>enabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
        <SamplingTarget xsi:type="data:SamplingDatabaseType">
          <admin>enabled</admin>
          <duration>7</duration>
          <status>
            <cpu-usage>
              <admin>enabled</admin>
              <interval>P0Y0M0DT0H5M0.000S</interval>
            </cpu-usage>
          </status>
        </SamplingTarget>
      </sampling>
      <jtapi>
        <admin>disabled</admin>
        <host-box name="cluster\box 1"/>
        <group>0</group>
        <preempt>false</preempt>
        <takeover-timer-value>1000</takeover-timer-value>
      </jtapi>
      <advertisement-interval>60</advertisement-interval>
      <boot-interval>30</boot-interval>
</objects>
</object>
```

setConfig

This API uses the HTTP POST Method.

The following examples display a setConfig API request from the server, configuring a CLI banner via the **cli** object’s **banner** property. The responses received from the client indicate the action was successful.

SOAP

Request

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"

xmlns:cal="http://www.covergence.com/ws/callouts">
   <soapenv:Header/>
   <soapenv:Body>
      <cal:setConfig mode="merge">
         <config>
            <Cluster>
               <box>
                  <Box number="1">
                     <cli>
                        <CLI>
                         <banner>The Acme Packet Application Session
Controller sure has Web Service

interfaces!</banner>
                        </CLI>
                     </cli>
                  </Box>
               </box>
           </Cluster>
         </config>
      </cal:setConfig>
   </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Body>
     <setConfigResponse xmlns="http://www.covergence.com/ws/callouts">
         <Code>success</Code>
         <Text>Success</Text>
      </setConfigResponse>
   </soapenv:Body>
</soapenv:Envelope>
```

REST

Request

```
POST
http://172.44.10.59:8080/cms/config?operation=modify&output=xml&mode=
merge&_format=legacy HTTP/1.1
```

```
Accept-Encoding: gzip,deflate
Content-Type: application/xml
User-Agent: Jakarta Commons-HttpClient/3.1
Host: 172.44.10.59:8080
Content-Length: 34

<SCP><admin>disabled</admin></SCP>

HTTP/1.1 200 OK
Server: Apache-Coyote/1.1
Set-Cookie: JSESSIONID_WS=3C747DF0159B1E36714096B99FE2A7EA; Path=/; 
HttpOnly
Cache-Control: no-cache
Content-Type: text/xml
Transfer-Encoding: chunked
Date: Thu, 13 Oct 2011 16:50:35 GMT
```

Response

```
<ExtActionResponse>
   <resultCode>0</resultCode>
   <resultStr>Success</resultStr>
</ExtActionResponse>
```

doAction

This API uses the HTTP GET Method.

Included are two examples for each SOAP and REST, the first example includes an unstructured response and the second example is a structured example. These examples display an API request from the server, performing the PING action. The ASC is pinging host 169.55.3.5. The responses received from the client indicate the action is a success.

SOAP

Request

Unstructured:

```
<soapenv:Envelope 
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"

xmlns:cal="http://www.covergence.com/ws/callouts">
   <soapenv:Header/>
   <soapenv:Body>
      <cal:doAction>
         <action>
            <PingAction>
               <host>169.55.3.5</host>
            </PingAction>
         </action>
      </cal:doAction>
   </soapenv:Body>
</soapenv:Envelope>
```

Unstructured Response

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
   <soapenv:Body>
      <doActionResponse xmlns="http://www.covergence.com/ws/callouts">
         <Code>success</Code>
         <Text>Success</Text>
       <message>3 packets sent, 3 packets received, 0 packets lost (0%)
roundtrip minimum/average/maximum: 0.588/0.825/1.291 ms</message>
      </doActionResponse>
   </soapenv:Body>
</soapenv:Envelope>
```

Structured Response

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
   <env:Body>
      <cov:doActionExResponse xsi:type="data:ActionResultsType"
xmlns:cov="http://www.acmepacket.com/asc/ws/mgmt"
xmlns:data="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
         <result-code>0</result-code>
         <message>Success!</message>
         <info>28 bytes from 169.55.3.5: 0.134 milliseconds
28 bytes from 169.55.3.5: 0.107 milliseconds
28 bytes from 169.55.3.5: 0.102 milliseconds
3 packets sent, 3 packets received, 0 packets lost (0%)
Round trip minimum/average/maximum: 0.102/0.114/0.134
milliseconds</info>
         <structure xsi:type="data:ActionResultsPingType">
            <requests-sent>3</requests-sent>
            <replies-lost>0</replies-lost>
            <replies-received>3</replies-received>
            <round-trip-minimum>102</round-trip-minimum>
            <round-trip-average>114</round-trip-average>
            <round-trip-maximum>134</round-trip-maximum>
         </structure>
      </cov:doActionExResponse>
   </env:Body>
</env:Envelope>
```

REST

Flat Request

```
GET http://175.66.15.95:8080/cms?action=PingAction&Host=169.55.3.5
HTTP/1.1
```

Hierarchical Request

```
GET http://175.66.15.95:8080/cms/action/ping?host=169.55.3.5 HTTP/1.1
```

Unstructured Response

```
<ExtActionResponse>
   <Code>Success</Code>
   <Text>Success</Text>
   <message>3 packets sent, 3 packets received, 0 packets lost (0%)
roundtrip minimum/average/maximum: 0.588/0.825/1.291 ms</message>
</ExtActionResponse>
```

Structured Response

```
<?xml version="1.0"?>
<ExtActionResponse>
<resultCode>0</resultCode>
<resultStr>Success</resultStr>
<info>28 bytes from 169.55.3.5: 0.103 milliseconds 28 bytes from
169.55.3.5: 0.111 milliseconds 28 bytes from 169.55.3.5: 0.102
milliseconds 3 packets sent, 3 packets received, 0 packets lost (0%)
Round trip minimum/average/maximum: 0.102/0.105/0.111
milliseconds</info>
<structure>
<ActionResultsPing>
<RequestsSent>3</RequestsSent>
<RepliesLost>0</RepliesLost>
<RepliesReceived>3</RepliesReceived>
<RoundTripMinimum>102</RoundTripMinimum>
<RoundTripAverage>105</RoundTripAverage>
<RoundTripMaximum>111</RoundTripMaximum>
</ActionResultsPing>
</structure>
</ExtActionResponse>
```

getStatus

This ASC API uses the HTTP GET Method.

The following examples display a getStatus API request sent from the server, requesting the status of all current processes. The responses received from the client indicate the action was successful.

SOAP

Request

```
POST http://172.44.10.59:8080/ws HTTP/1.1
Accept-Encoding: gzip,deflate
Content-Type: text/xml;charset=UTF-8
SOAPAction: "getStatus"
User-Agent: Jakarta Commons-HttpClient/3.1
Host: 172.44.10.59:8080
Content-Length: 324

<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"

xmlns:cal="http://www.covergence.com/ws/callouts">
   <soapenv:Header/>
   <soapenv:Body>
      <cal:getStatus>
         <status>
            <ClusterStatus />
         </status>
      </cal:getStatus>
   </soapenv:Body>
</soapenv:Envelope>

HTTP/1.1 200 OK
```

```
Server: Apache-Coyote/1.1
Set-Cookie: JSESSIONID_WS=35AC602AAB7ADC597C9BAFD27653FB5F; Path=/;
HttpOnly
Content-Type: text/xml
Transfer-Encoding: chunked
Date: Thu, 13 Oct 2011 17:47:12 GMT
```

Response

```
<?xml version='1.0' encoding='UTF-8'?><env:Envelope

xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"><env:Body><cov:
getStatusResponse
xmlns:cov="http://www.covergence.com/ws/callouts"><status><ClusterSta
tus
IPAddress="0.0.0.0"><boxID>1</boxID><bGetsConfig>false</bGetsConfig><
bGotConfig>false</bGotConfig></ClusterStatus></status></cov:getStatus
Response></env:Body></env:Envelope>
```

REST

Flat Request

```
GET http://175.66.15.95:8080/cms?status=ProcessStatus HTTP/1.1
```

Hierarchical Request

```
GET http://175.66.15.95:8080/cms/status/processes HTTP/1.1
```

Response

```
<ExtPageList><version>E3.6.0.M5P0</version><resultCode>0</resultCode>
<resultStr>Success</resultStr><objects><ClusterStatusIPAddress="0.0.0
.0"><boxID>1</boxID><bGetsConfig>false</bGetsConfig><bGotConfig>false
</bGotConfig></ClusterStatus></objects><totalPages>1</totalPages><cur
rentPage>1</currentPage><pageSize>1</pageSize></ExtPageList>
```

queryStatus

This ASC API uses the HTTP GET Method.

The following examples display a queryStatus API request sent from the server for the status of all running processes. The responses from the client server indicate the action was successful.

SOAP

Request

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:mgmt="http://www.acmepacket.com/asc/ws/mgmt">
   <soapenv:Header/>
   <soapenv:Body>
      <mgmt:queryStatus>
         <!--1 or more repetitions:-->
         <status homogeneous="false">
            <!--Zero or more repetitions:-->

         <object xsi:type="ns574:ProcessStatusType"
xmlns:ns574="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" process="ws">
   <!--Optional:-->
   <!--Optional:-->

   <!--Optional:-->
</object></status>
      </mgmt:queryStatus>
   </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<cov:queryStatusResponse
xmlns:cov="http://www.acmepacket.com/asc/ws/mgmt">
  <status>
    <object xsi:type="data:ProcessStatusType" process="WS"
xmlns:data="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
      <id>14817</id>
      <condition>running</condition>
      <run-level>7</run-level>
      <state>sleeping</state>
      <starts>1</starts>
      <uptime>P0Y0M4DT18H5M32.000S</uptime>
     <fds>198</fds>
    </object>
  </status>
</cov:queryStatusResponse>
```

REST

Flat Request

```
http://172.30.80.24:8080/cms?status=ProcessStatus&_format=simplified&
search.process=WS
```

Hierarchical Request

```
http://172.30.80.24:8080/cms/status/processes?search.process=WS&_form
at=simplified
```

Response

```
<?xml version="1.0"?>
<object xsi:type="ExtPageListType"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<version>E3.6.0.M5P0</version>
<resultCode>0</resultCode>
<resultStr>Success</resultStr>
<objects xsi:type="ProcessStatusType" process="WS">
   <id>14817</id>
  <condition>running</condition>
  <run-level>7</run-level>
  <state>sleeping</state>
  <starts>1</starts>
  <uptime>P0Y0M4DT18H9M7.008S</uptime>
  <fds>195</fds>
  </objects>
<totalPages>1</totalPages>
<current-page>1</current-page>
<page-size>1</page-size>
```

```
                                        </object>
```

Appendix B Event Message Examples

This appendix provides examples of the different types of event messages that can be sent by the ASC. The following examples are given:

- New Schema / Legacy Content
- New Schema / Custom Content

For more information on the different types of event message formatting and content, see the Legacy and New Schemas section of Chapter 1.

New Schema / Legacy Content

The following example shows a CallConnected event message sent from an ASC that is using the new schema and is configured to include the legacy content.

With the new simplified format, some of the names of the event attributes are hyphenated, rather than using “camelCase”. The SOAP message use a different namespace, and the event name is an attribute of the <object> element.

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
  <env:Body>
    <cov:processEvent
xmlns:cov="http://www.acmepacket.com/asc/ws/mgmt">
      <cov:event>
        <object xmlns:data="http://www.acmepacket.com/asc/ws/common"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:type="data:CallConnectedType">
          <handle>14287669</handle>
          <session-id>343194204702856025</session-id>
         <call-id>ZDk2MTQwOGFkNTY0ZmMyMTViYmUyNGJmN2EzNmVkNTY.</call-
id>
          <to>sip:1001@acmepacket.com</to>
          <from>sip:2001@acmepacket.com</from>
          <content>v=0
o=3cxVCE 49342965 311118690 IN IP4 192.168.220.1
s=3cxVCE Audio Call
c=IN IP4 192.168.220.1
t=0 0
m=audio 40030 RTP/AVP 0 8 101
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15

          </content>
        </object>
      </cov:event>
    </cov:processEvent>
  </env:Body>
</env:Envelope>
```

New Schema / Custom Content

The following example shows a CallConnectedEventCustom event message sent from an ASC that is using the new schema and is configured to include custom content.

```
<env:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">
  <env:Body>
    <cov:processEvent 
xmlns:cov="http://www.acmepacket.com/asc/ws/mgmt">
      <cov:event>
        <object xmlns:data="http://www.acmepacket.com/asc/ws/common" 
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" 
xsi:type="data:CallConnectedEventCustomType">
          <handle>14287667</handle>
          <session-id>343194196653337756</session-id>
          <call-id>CXC-103-4b6001b8-8d14010a-13c4-4eaeffe4-c6764eb-
53ce4bcc</call-id>
          <cookie>3389006614</cookie>
          <to>sip:2001@acmepacket.com</to>
          <from>sip:1001@acmepacket.com</from>
          <customField>user-agent=X-Lite 4 release 4.1 stamp 
63214;</customField>
          <content>v=0
o=- 12964565220154654 1 IN IP4 192.168.220.1
s=CounterPath X-Lite 4.1
c=IN IP4 192.168.220.1
t=0 0
m=audio 51518 RTP/AVP 107 0 8 101
a=rtpmap:107 BV32/16000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv

          </content>
        </object>
      </cov:event>
    </cov:processEvent>
  </env:Body>
</env:Envelope>
```