JUNIPER NETWORKS

Junos® OS

Event Policy and Event Automation

Release
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13.1

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Supported Platforms

For the features described in this document, the following platforms are supported:

- ACX Series
- EX Series
- J Series
- M Series
- MX Series
- QFX Series
- SRX Series
- T Series
- PTX Series

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl; }
   ```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

   ```
   [edit]
   user@host# edit system scripts
   [edit system scripts]
   ```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

   ```
   [edit system scripts]
   user@host# load merge relative /var/tmp/ex-script-snippet.conf
   load complete
   ```

For more information about the **load** command, see the CLI User Guide.

Documentation Conventions

Table 1 on page xiii defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 2 on page xiv defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the**configure** command: user@host> **configure**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies book names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS System Basics Configuration Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the**[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Enclose optional keywords or variables.	**stub <default-metric** ***metric*****>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identify a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

J-Web GUI Conventions

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
Bold text like this	Represents J-Web graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.
> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at https://www.juniper.net/cgi-bin/docbugreport/ . If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

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Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

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- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/

- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://tools.juniper.net/SerialNumberEntitlementSearch/

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html.

PART 1

Overview

CHAPTER 1

Event Policy Overview

Event Notifications and Policies Overview

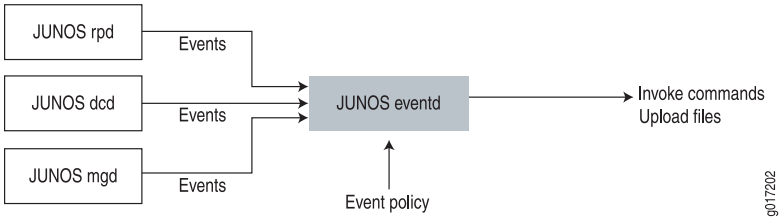
To diagnose a fault or error condition on a device, you need relevant information about the state of the platform. You can derive state information from *event notifications*. Event notifications are system log messages and SNMP traps. A Junos OS process called the *event process* (eventd) receives event notifications—henceforth simply called *events*—from other Junos OS processes.

Timely diagnosis and intervention can correct error conditions and keep the device in operation. After the eventd process receives events, *event policies* instruct the eventd process to select specific events, correlate the events, and perform a set of actions. These actions can either help you diagnose a fault or take corrective action. For example, the eventd process can upload device files to a given destination and issue operational mode commands.

Events can originate as SNMP traps or system log messages. The event process receives event messages from other Junos OS processes, such as the routing protocol process (rpd) and the management process (mgd). Depending on the custom event policy you configure, eventd listens for specific events and in response to these events might create a log file, invoke a Junos command, or invoke an event script. When an event script is invoked, event details are passed to the event script in the form of XML inputs.

Figure 1 on page 3 shows how the event process (eventd) interacts with other Junos OS processes.

Figure 1: Interaction of eventd Process with Other Junos OS Processes



How Event Policies Work

An event policy is an if-then-else construct. It defines actions to be executed by the eventd process on receipt of an event. You can configure multiple policies to be processed for an event. The policies are executed in the order in which they appear in the configuration. For each policy, you can configure multiple actions. The actions are also executed in the order in which they appear in the configuration.

To view a list of the events that can be referenced in an event policy, issue the **help syslog ?** command:

```
user@host> help syslog ?
Possible completions:
  <syslog-tag>         System log tag
  ACCT_ACCOUNTING_FERROR  Error occurred during file processing
  ACCT_ACCOUNTING_FOPEN_ERROR  Open operation failed on file
  ...
```

You can filter the output of a search by using the pipe (**|**) symbol. The following example lists the filters that can be used with the pipe symbol:

```
user@host> help syslog | ?
Possible completions:
  count                Count occurrences
  display              Show additional kinds of information
  except               Show only text that does not match a pattern
  find                 Search for first occurrence of pattern
  hold                 Hold text without exiting the --More-- prompt
  last                 Display end of output only
  match                Show only text that matches a pattern
  no-more              Don't paginate output
  request              Make system-level requests
  resolve              Resolve IP addresses
  save                 Save output text to file
  trim                 Trim specified number of columns from start of line
```

For more information about using the pipe symbol, see the CLI User Guide.

You can also list multiple events as you configure the event policy. To view a partial list of the events that can be referenced in an event policy, issue the **set event-options policy *policy-name* events ?** configuration mode command:

```
[edit]
user@host# set event-options policy policy-name events ?
Possible completions:
 <event>
 [            Open a set of values
 acct_accounting_ferror
 acct_accounting_fopen_error
 ...
```

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. For information about referencing these system log messages in your event policies, see "Using Nonstandard System Log Messages to Trigger Event Policies" on page 17.

In addition, you can reference internally generated events, which are discussed in "Generating Internal Events to Trigger Event Policies" on page 16.

In response to events, the eventd process can correlate two or more events based on a policy, and execute the following actions:

- Ignore the event—Do not generate a system log message for this event and do not process any further policy instructions for this event.
- Upload a file—Upload a file to a specified destination. You can specify a transfer delay, so that, on receipt of an event, the upload of the file begins after the configured transfer delay. For example, to upload a core file, a transfer delay can ensure that the core file has been completely generated before the upload begins.
- Execute Junos OS operational mode commands—Execute commands on receipt of an event. The XML or text output of these commands is stored in a file, which is then uploaded to a specified URL. You can include variables in the command that allow data from the triggering event to be automatically included in the command syntax.
- Execute Junos OS configuration mode commands—Execute commands to modify the configuration on receipt of an event. Starting with Junos OS Release 12.1, you can configure an event policy to modify the configuration using Junos OS configuration mode commands and then commit the updated configuration.
- Execute Junos OS event scripts—Execute event scripts on receipt of an event. Event scripts are Extensible Stylesheet Transformation (XSLT) or Stylesheet Language Alternative Syntax (SLAX) scripts that you write to perform any function available through Junos XML or Junos XML protocol remote procedure calls (RPCs). Additionally, you can pass to an event script a set of arguments that you define. A script can build and run an operational mode command, receive the command output, inspect the output, and determine the next appropriate action. This process can be repeated until the source of the problem is determined. The output of the scripts is stored in a file, which is then uploaded to a specified URL. You can include variables in the arguments to the scripts that allow data from the triggering event to be incorporated into the script.
- Raise an SNMP trap.

CHAPTER 2

Event Scripts Overview

Event Scripts Overview

Event Script Programming Overview

Junos OS event scripts are triggered automatically by defined event policies in response to a system event and can instruct Junos OS to take immediate action. Event scripts automate network and device management and troubleshooting. Event scripts can perform functions available through the remote procedure calls (RPCs) supported by either Junos XML management protocol or the Junos Extensible Markup Language (XML) API. Event scripts are executed by the event process (eventd).

Event scripts allow you to do the following:

- Automatically diagnose and fix problems in the network
- Monitor the overall status of a device.
- Run automatically as part of an event policy that detects periodic error conditions
- Change the configuration in response to a problem

Event scripts are based on the Junos XML management protocol and the Junos XML API, which are discussed in Junos XML API and Junos XML Management Protocol Overview. Event scripts can be written in either the Extensible Stylesheet Language Transformations (XSLT) or Stylesheet Language Alternative Syntax (SLAX) scripting language. Event scripts use XPath to locate the operational objects to be inspected and XSLT constructs to specify the actions to perform on the located operational objects. The actions can change the output or execute additional commands based on the output. For more information about XPath and XSLT, see XPath Overview.

How Event Scripts Work

Event scripts initiate operational commands when triggered by an event policy. When an event policy is triggered, this policy forwards event details to the event script. You enable event scripts by listing the names of one or more event script files within the **[edit**

event-options event-script] hierarchy level. These scripts contain instructions that execute operational mode commands and inspect the output automatically. Event scripts are invoked within an event policy. For information about event policies, see "Event Notifications and Policies Overview" on page 3 and "Executing Event Scripts in an Event Policy" on page 37.

You can use event scripts to generate changes to the device configuration by including the **<load-configuration>** tag element. Because the changes are loaded before the standard validation checks are performed, they are validated for correct syntax, just like statements already present in the configuration before the script is applied. If the syntax is correct, the configuration is activated and becomes the active, operational device configuration.

Related Documentation

- XSLT Overview
- SLAX Overview

PART 2

Configuration

CHAPTER 3

Triggering an Event Policy

Using Correlated Events to Trigger an Event Policy

You can configure a policy that correlates two or more events. If the correlated events occur as specified, they cause particular actions to be taken. For example, you might want to issue certain operational mode commands when a **UI_CONFIGURATION_ERROR** event is generated within five minutes (300 seconds) after a **UI_COMMIT_PROGRESS** event. As another example, you might want to upload a particular file if a **DCD_INTERFACE_DOWN** event is generated two times within a 60-second interval.

To configure a policy that correlates events, include the following statements at the **[edit event-options]** hierarchy level:

```
[edit event-options]
policy policy-name {
   events [ events ];
   within seconds {
      events [ events ];
      not events [ events ];
      trigger (on | after | until) event-count;
   }
   attributes-match {
      event1.attribute-name equals event2.attribute-name;
      event.attribute-name matches regular-expression;
      event1.attribute-name starts-with event2.attribute-name;
   }
   then {
      ...
   }
}
```

In the **events** statement, you can list multiple events. To view a list of the events that can be referenced in an event policy, issue the **set event-options policy *policy-name* events ?** configuration mode command:

```
user@host# set event-options policy policy-name events ?
Possible completions:
 <event>
 [               Open a set of values
 acct_accounting_ferror
 acct_accounting_fopen_error
 ...
```

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. For information about referencing these system log messages in your event policies, see "Using Nonstandard System Log Messages to Trigger Event Policies" on page 17.

In addition, you can reference internally generated events, which are discussed in "Generating Internal Events to Trigger Event Policies" on page 16.

The actions configured in the **then** statement are executed only if certain conditions are met, which you specify in the **within** and **attributes-match** statements.

You can configure a policy that is executed only if a specified event occurs within a specified time interval after another event. You do this by including the **within *seconds* events** statement. The policy is executed only if one or more of the events in the first **events** statement occur within a configured number of seconds after one or more of the events in the **within *seconds* events** statement. The number of seconds can be from 60 through 604,800. The **not** statement causes the policy to be executed only if the events do not occur within the configured time interval.

For example, the following policy is executed if ***event3***, ***event4***, or ***event5*** occurs within 60 seconds after ***event1*** or ***event2*** occurs:

```
[edit event-options]
policy 1 {
   events [ event3 event4 event5 ];
   within 60 events [ event1 event2 ];
   then {
      ...
   }
}
```

The **attributes-match** statement correlates two events as follows:

- ***event1.attribute-name* equals *event2.attribute-name***—Execute the policy only if the specified attribute of ***event1*** equals the specified attribute of ***event2***.
- ***event.attribute-name* matches *regular-expression***—Execute the policy only if the specified attribute of ***event*** matches a regular expression. For more information, see "Using Regular Expressions to Refine the Set of Events That Trigger a Policy" on page 15.
- ***event1.attribute-name* starts-with *event2.attribute-name***—Execute the policy only if the specified attribute of ***event1*** starts with the specified attribute of ***event2***.

If the **attributes-match** statement includes the **equals** or **starts-with** options, or if it includes a **matches** option that includes a clause for an event that is not specified at the **[edit event-options policy *policy-name* events]** hierarchy level, you must include one or more **within** statements in the same policy configuration.

Starting with Junos OS Release 11.1, you can use event policy variables within the **attributes-match** statement to differentiate between a trigger event attribute and a correlated event attribute. The double dollar sign (**$$**) notation represents the event that is triggering a policy, and **{$$.*attribute-name*}** resolves to the value of the attribute of the triggering event. Triggering events are those that you configure at the **[edit event-options policy *policy-name* events]** hierarchy level. For correlating events, the single dollar sign with the event name (**$*event***) notation represents the most recent event that matches the event name, and **{$*event.attribute-name*}** resolves to the value of the attribute of the correlated event.

In the following example, the policy will execute the actions under the **then** statement if four or more commits are performed within a 5-minute period, and the username of one or more of the correlated events is the same as the username of the trigger event.

```
policy multiple-commits {
  events ui_commit;
  attributes-match {
    {$$.user-name} equals {$ui_commit.user-name};
  }
  within 300 {
    trigger after 3;
    events ui_commit;
  }
  then ...
}
```

To view a list of all event attributes that you can reference, issue the **help syslog *event*** operational mode command. The output of this command shows the event attributes in angle brackets (< >). The following output shows that three attributes can be referenced for the **ACCT_ACCOUNTING_SMALL_FILE_SIZE** event: **filename**, **file-size**, and **record-size**.

```
user@host> help syslog ACCT_ACCOUNTING_SMALL_FILE_SIZE
Name:           ACCT_ACCOUNTING_SMALL_FILE_SIZE
Message:       File <filename> size (<file-size>) is smaller than record size
(<record-size>)
```

You can filter the output of a search by using the pipe (**|**) symbol. The following example lists the filters that can be used with the pipe symbol:

```
user@host> help syslog | ?
Possible completions:
  count                Count occurrences
  display              Show additional kinds of information
  except               Show only text that does not match a pattern
  find                 Search for first occurrence of pattern
  hold                 Hold text without exiting the --More-- prompt
  last                 Display end of output only
  match                Show only text that matches a pattern
  no-more              Don't paginate output
  request              Make system-level requests
  resolve              Resolve IP addresses
```

```
save                Save output text to file
trim                Trim specified number of columns from start of line
```

For more information about using the pipe symbol, see the CLI User Guide.

Another way to view the attributes you can reference is by issuing the **set attributes-match *event*?** command at the **[edit event-options policy *policy-name*]** hierarchy level, as shown in the following example:

```
[edit event-options policy p1]
user@host# set attributes-match acct_accounting_small_file_size?
Possible completions:
 <from-event-attribute>  First attribute to compare
 acct_accounting_small_file_size.filename
 acct_accounting_small_file_size.filesize
 acct_accounting_small_file_size.record-size
```

NOTE: In this set command, there is no space between the event name and the question mark (?).

Related Documentation

- Representing the Correlating Event in an Event Policy on page 14
- Triggering an Event Policy Based on Event Count on page 15
- Using Regular Expressions to Refine the Set of Events That Trigger a Policy on page 15
- attributes-match on page 101
- policy (Event Policy) on page 118
- not on page 116
- then on page 125
- within on page 132

Representing the Correlating Event in an Event Policy

As described in "Configuring an Event Policy to Execute Operational Mode Commands" on page 19, the double dollar sign ($$) notation represents the event that is triggering a policy. Triggering events are those that you configure at the **[edit event-options policy *policy-name* events]** hierarchy level.

As described in "Using Correlated Events to Trigger an Event Policy" on page 11, you can configure a policy that is executed only if a specified event occurs within a specified time interval after another event. You do this by including the **within *seconds* events** statement at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name ]
events [ events ];
within seconds events [ events ];
```

The policy is executed only if one or more of the events at the **[edit event-options policy *policy-name* events]** hierarchy level occur within a configured number of seconds after one or more of the events in the **within *seconds* events** statement.

For correlating events, the single dollar sign with the event name (**$*event***) notation represents the most recent event that matches the event name. The dollar sign with the asterisk (**$***) notation represents the most recent event that matches any of the correlating events.

For a configuration example, see "Example: Representing the Correlating Event in an Event Policy" on page 94.

Triggering an Event Policy Based on Event Count

You can configure an event policy to be triggered if an event or set of events occurs a specified number of times within a specified time period.

To do this, include the optional **trigger** statement at the **[edit event-options policy *policy-name* within *seconds*]** hierarchy level:

```
[edit event-options policy policy-name within seconds]
trigger (after | on | until) event-count;
```

The software counts the number of times the triggering event occurs. A triggering event can be any event configured at the **[edit event-options policy *policy-name* events]** hierarchy level. You can configure the following options:

- **after *event-count***—The policy is executed when the number of matching events received equals ***event-count*** plus one.
- **on *event-count***—The policy is executed when the number of matching events received equals ***event-count***.
- **until *event-count***—The policy is executed each time a matching event is received and stops being executed when the number of matching events received equals ***event-count***.

For a configuration example, see "Example: Triggering a Policy Based on Event Count" on page 96.

Using Regular Expressions to Refine the Set of Events That Trigger a Policy

You can use regular expression matching to specify more exactly which events cause a policy to be executed.

To specify the text string that must appear in an event attribute for the policy to be executed, include the **matches** statement at the **[edit event-options policy *policy-name* attributes-match]** hierarchy level, and specify the regular expression which the event attribute must match:

```
[edit event-options policy policy-name attributes-match]
event.attribute-name matches regular-expression;
```

When you specify the regular expression, use the notation defined in POSIX Standard 1003.2 for extended (modern) UNIX regular expressions. Explaining regular expression syntax is beyond the scope of this document. Table 3 on page 16 specifies which character or characters are matched by some of the regular expression operators that you can use in the **matches** statement. In the descriptions, the term *term* refers to

either a single alphanumeric character or a set of characters enclosed in square brackets, parentheses, or braces.

NOTE: The matches statement is not case-sensitive.

Table 3: Regular Expression Operators for the matches Statement

Operator	Matches
. (period)	One instance of any character except the space.
* (asterisk)	Zero or more instances of the immediately preceding term.
+ (plus sign)	One or more instances of the immediately preceding term.
? (question mark)	Zero or one instance of the immediately preceding term.
| (pipe)	One of the terms that appear on either side of the pipe operator.
! (exclamation point)	Any string except the one specified by the expression, when the exclamation point appears at the start of the expression. Use of the exclamation point is specific to Junos OS.
^ (caret)	The start of a line, when the caret appears outside square brackets. One instance of any character that does not follow it within square brackets, when the caret is the first character inside square brackets.
$ (dollar sign)	The end of a line.
[ ] (paired square brackets)	One instance of one of the enclosed alphanumeric characters. To indicate a range of characters, use a hyphen (-) to separate the beginning and ending characters of the range. For example, **[a-z0-9]** matches any letter or number.
( ) (paired parentheses)	One instance of the evaluated value of the enclosed term. Parentheses are used to indicate the order of evaluation in the regular expression.

For a configuration example, see "Example: Controlling Event Policy Using a Regular Expression" on page 90.

Generating Internal Events to Trigger Event Policies

Internal events are events that you create to trigger a policy to be executed. They are not generated by Junos OS processes, and they do not have any associated system log messages. You can generate an internal event based on a time interval or the time of day.

To generate an event, include the following statements at the **[edit event-options]** hierarchy level:

```
[edit event-options]
generate-event event-name {
    time-interval seconds;
    time-of-day hh:mm:ss;
}
```

In the **time-interval** statement, configure a frequency, in seconds, with which to repeatedly generate an event. The time interval can range from 60 through 2,592,000 seconds.

In the **time-of-day** statement, configure a time of day for the event to occur. Use the format ***hh*:*mm*:*ss***.

NOTE: If you modify the system time by issuing the **set date** operational mode command, we recommend that you also issue the **commit full** or the **restart event-process** command. Otherwise, an internal event based on the time of day might not be generated at the configured time.

For example, if you configure an internal event to be generated at 15:55:00, and then you modify the system time from 15:47:17 to 15:53:00, the event is generated when the system time is approximately 16:00 instead of at the configured time, 15:55:00. You can correct this problem by issuing the **commit full** or the **restart event-process** command.

You can configure up to 10 internal events. If you attempt to commit a configuration with more than 10 internal events, Junos OS generates an error, and the commit fails.

For configuration examples, see "Example: Generating an Internal Event" on page 92.

Using Nonstandard System Log Messages to Trigger Event Policies

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. These system log messages have an event ID and a **message** attribute. Event IDs are based on the origin of the message, as shown in Table 4 on page 17.

Table 4: Event ID by System Log Message Origin

Event IDs	Origin
SYSTEM	Messages from Junos daemons and utilities
KERNEL	Messages from the Junos kernel
PIC	Messages from physical interface cards (PICs)
PFE	Messages from the Packet Forwarding Engine
LCC	On a TX Matrix router, messages from a line-card chassis (LCC)

Table 4: Event ID by System Log Message Origin *(continued)*

Event IDs	Origin
SCC	On a TX Matrix router, messages from a switch-card chassis (SCC)

To base your event policy on the event types shown in Table 4 on page 17, include the **events *event-id*** statement and the **attributes-match** statement with the ***event-id*.message matches "*message*"** attribute at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
events event-id;
attributes-match {
  event-id.message matches "message";
}
```

For a configuration example, see "Example: Using Nonstandard System Log Messages to Trigger an Event Policy" on page 98.

CHAPTER 4

Configuring Event Policy Actions

Configuring an Event Policy to Execute Operational Mode Commands

Operational mode commands request that the device running Junos OS perform an operation or provide diagnostic output. They allow you to view statistics and information about a device's current operating status. They also allow you to take corrective actions, such as restarting software processes, taking a PIC offline and back online, switching to redundant interfaces, and adjusting Label Switching Protocol (LSP) bandwidth. For more information about operational mode commands, see the following references:

- Junos OS Operational Mode Commands
- Junos OS Operational Mode Commands
- Junos OS Operational Mode Commands

You can configure a policy that causes operational mode commands to be issued and the output of those commands to be uploaded to a specified location for analysis.

To configure such a policy, include the following statements at the **[edit event-options]** hierarchy level:

```
[edit event-options]
policy policy-name {
  events [ events ];
  then {
    execute-commands {
      commands {
        "command";
      }
      output-filename filename;
```

```
        output-format (text | xml);
        destination destination-name;
      }
    }
}
```

In the **events** statement, you can list multiple events. If one or more of the listed events occurs, the operational mode commands are issued. To view a list of the events that can be referenced in an event policy, issue the **set event-options policy *policy-name* events ?** configuration mode command:

```
[edit]
user@host# set event-options policy policy-name events ?
Possible completions:
 <event>
 [              Open a set of values
 acct_accounting_ferror
 acct_accounting_fopen_error
 ...
```

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. For information about referencing these system log messages in your event policies, see "Using Nonstandard System Log Messages to Trigger Event Policies" on page 17.

In addition, you can reference internally generated events, which are discussed in "Generating Internal Events to Trigger Event Policies" on page 16.

In the **commands** statement, you can issue multiple operational mode commands upon receipt of a specific event. Enclose each command in quotation marks (" "). The eventd process issues the commands in the order in which they appear in the configuration. For example, in the following configuration, the execution of **policy1** causes the **show interfaces** command to be issued first, followed by the **show chassis alarms** command:

```
[edit event-options policy policy1 then execute-commands]
user@host# show
commands {
   "show interfaces";
   "show chassis alarms";
}
```

You can include variables in the command to allow data from the triggering event to be automatically included in the command syntax. The eventd process replaces each variable with values contained in the event that triggers the policy. You can use command variables of the following forms:

- **{$$.*attribute-name*}**—The double dollar sign ($$) notation represents the event that is triggering a policy. When combined with an attribute name, the variable is replaced by the value of the attribute name in the triggering event. For example, **{$$.interface-name}** stands for the value of the **interface-name** attribute in the triggering event.
- **{$*event*.*attribute-name*}**—The **{$*event*.*attribute-name*}** notation represents the most recent event that matches the specified event. The variable is replaced by the value of the attribute name of the most recent event that matches ***event***. For example, when

a policy issues the **show interfaces {$COSD_CHAS_SCHED_MAP_INVALID.interface-name}** command, the **{$COSD_CHAS_SCHED_MAP_INVALID.interface-name}** variable is substituted by the **interface-name** attribute of the most recent **COSD_CHAS_SCHED_MAP_INVALID** event cached by the event process.

For a given event, you can view a list of event attributes that you can reference in an operational mode command by issuing the **help syslog *event-name*** command:

```
user@host> help syslog event-name
```

For example, in the following command output, text in angle brackets (< >) shows that **classifier-type** is an attribute of the **cosd_unknown_classifier** event:

```
user@host> help syslog cosd_unknown_classifier
Name:          COSD_UNKNOWN_CLASSIFIER
Message:       rtsock classifier type <classifier-type> is invalid
...
```

You can filter the output of a search by using the pipe (|) symbol. The following example lists the filters that can be used with the pipe symbol:

```
user@host# help syslog | ?
Possible completions:
  count                Count occurrences
  display              Show additional kinds of information
  except               Show only text that does not match a pattern
  find                 Search for first occurrence of pattern
  hold                 Hold text without exiting the --More-- prompt
  last                 Display end of output only
  match                Show only text that matches a pattern
  no-more              Don't paginate output
  request              Make system-level requests
  resolve              Resolve IP addresses
  save                 Save output text to file
  trim                 Trim specified number of columns from start of line
```

For more information about using the pipe symbol, see the CLI User Guide.

Another way to view a list of event attributes is to issue the **set attributes-match *event*?** configuration mode command at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
user@host# set attributes-match event ?
```

For example, in the following command output, the ***event.attribute*** list shows that **classifier-type** is an attribute of the **cosd_unknown_classifier** event:

```
[edit event-options policy policy-name]
user@host# set attributes-match cosd_unknown_classifier?
Possible completions:
 <from-event-attribute>  First attribute to compare
 cosd_unknown_classifier.classifier-type
```

NOTE: In this set command, there is no space between the event name and the question mark (?).

To view a list of all event attributes that you can reference, issue the **set attributes-match ?** configuration mode command at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
user@host# set attributes-match ?
Possible completions:
  <from-event-attribute>  First attribute to compare
  acct_accounting_ferror
  acct_accounting_fopen_error
  ...
```

In the **output-filename** statement, assign the name of the file to which to write command output for the specified commands. The filename format is ***hostname_filename_YYYYMMDD_HHMMSS_index-number***.

For each uploaded file, a hostname and timestamp ensure that the uploaded files have unique filenames. If a policy is triggered multiple times in a 1-second period, an index number is added to ensure the filenames are unique. The index number range is 001 through 999.

For example, on a device named **r1**, if you configure the output filename to be **ifl-events**, and this event policy is triggered three times in 1 second, the files are named:

- **r1_ifl-events_20060623_132333**
- **r1_ifl-events_20060623_132333_001**
- **r1_ifl-events_20060623_132333_002**

By default, the command output format is Junos Extensible Markup Language (XML). To change this, include the **output-format text** statement. This causes the command output to be in formatted ASCII text.

In the **destination** statement, include the destination name that you configured at the **[edit event-options destinations]** hierarchy level. For more information, see "Example: Defining Destinations for File Archiving by Event Policies" on page 54.

For a configuration example, see "Example: Correlating Events Based on Receipt of Other Events Within a Specified Time Interval" on page 91.

Configuring an Event Policy to Change the Configuration

Configuring an Event Policy to Change the Configuration Overview

An event policy performs actions in response to specific events. You can configure custom event policies in the Junos OS configuration that listen for a specific event or correlated events and then execute an action, which might include creating a log file, invoking Junos OS commands, or executing an event script.

At times, it might be necessary to modify the configuration in response to a particular event. Prior to Junos OS Release 12.1, an event policy invoked an event script to execute configuration changes. Starting with Junos OS Release 12.1, you can configure an event policy to modify the configuration using Junos OS configuration mode commands and then commit the updated configuration. For example, for an SNMP_TRAP_LINK_DOWN or SNMP_TRAP_LINK_UP event for a given interface, the event policy action might modify the configuration of a static route to adjust its metric or modify its next hop.

You configure event policy actions at the **[edit event-options policy *policy-name* then]** hierarchy level. To modify the configuration through an event policy, configure the **change-configuration** statement and specify the configuration mode commands that are executed upon receipt of the configured event or events. Enclose each command in quotation marks (**" "**), and specify the complete statement path to the element, identifier, or value as you do in configuration mode when issuing commands at the **[edit]** hierarchy level.

The event process (eventd) executes the configuration commands in the order in which they appear in the event policy configuration. The commands update the candidate configuration, which is then committed, provided that no commit errors occur.

You can configure the **commit-options** child statement to customize the event policy commit operation. You can commit the changes on a single Routing Engine or configure the **synchronize** option to synchronize the commit on both Routing Engines. The Routing Engine on which you execute this command copies and loads its candidate configuration to the other Routing Engine. Both Routing Engines perform a syntax check on the candidate configuration file. If no errors are found, the configuration is activated and becomes the current operational configuration on both Routing Engines. By default, the **synchronize** option does not work if the responding Routing Engine has uncommitted configuration changes. However, you can enforce commit synchronization on the Routing Engines and ignore any warnings by configuring the **force** option.

Additionally, if you are testing or troubleshooting an event policy, you can configure the **check** commit option to verify the candidate configuration syntax without committing the changes. On dual control plane systems, when the **check synchronize** statement is configured, the candidate configuration on one control plane is copied to the other control plane, and the system verifies that both candidate configurations are syntactically correct. The **check** statement and the other **commit-options** statements are mutually exclusive.

The change configuration action might fail while acquiring a lock on the configuration. Configure the **retry** statement to have the system attempt the change configuration event policy action a specified number of times if the first attempt fails. Configure the **user-name** statement to execute the configuration changes and commit under the

privileges of a specific user. If you do not specify a username, the action is executed as user **root**.

Example: Changing the Configuration Using an Event Policy

It might be necessary to modify the configuration in response to a particular event. Starting with Junos OS Release 12.1, you can configure an event policy to make and commit configuration changes when the event policy is triggered by one or more specific events.

This example simulates an SNMP_TRAP_LINK_DOWN event for a specific interface. Upon receipt of the event, the event policy modifies the configuration of a static route to use a new next-hop IP address through a different exit interface.

Requirements

- Routing, switching, or security device running Junos OS Release 12.1 or later.

Overview

You can configure an event policy action to modify the configuration when the policy is triggered by a single event or correlated events. Suppose you have a static route to the 10.1.10.0/24 network with a next-hop IP address of 10.1.2.1 through the exit interface ge-0/3/1. At some point, this interface goes down, triggering an SNMP_TRAP_LINK_DOWN event.

This example creates an event policy named update-on-snmp-trap-link-down. The event policy is configured so that the eventd process listens for an SNMP_TRAP_LINK_DOWN event associated with the interface ge-0/3/1.0. If the interface goes down, the event policy executes a change configuration action. Commands are executed in the order in which they appear in the event policy. The event policy configuration commands remove the static route through the ge-0/3/1 exit interface and create a new static route to the same target network with a next-hop IP address of 10.1.3.1 through the exit interface ge-0/2/1.

The event policy change configuration commit operation is executed under the username bsmith with a commit comment specifying that the change was made through the associated event policy. The retry count is set to 5 and the retry interval is set to 4 seconds. If the initial attempt to issue the configuration change fails, the system attempts the configuration change 5 additional times and waits 4 seconds between each attempt.

Although not presented here, you might have a second, similar event policy that executes a change configuration action to update the static route when the interface comes back up. In that case the policy would trigger on the SNMP_TRAP_LINK_UP event for the same interface.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set event-options policy update-on-snmp-trap-link-down events snmp_trap_link_down
set event-options policy update-on-snmp-trap-link-down attributes-match
  snmp_trap_link_down.interface-name matches ge-0/3/1.0
set event-options policy update-on-snmp-trap-link-down then change-configuration
  retry count 5
set event-options policy update-on-snmp-trap-link-down then change-configuration
  retry interval 4
set event-options policy update-on-snmp-trap-link-down then change-configuration
  commands "delete routing-options static route 10.1.10.0/24 next-hop"
set event-options policy update-on-snmp-trap-link-down then change-configuration
  commands "set routing-options static route 10.1.10.0/24 next-hop 10.1.3.1"
set event-options policy update-on-snmp-trap-link-down then change-configuration
  user-name bsmith
set event-options policy update-on-snmp-trap-link-down then change-configuration
  commit-options log "updating configuration from event policy
  update-on-snmp-trap-link-down"
set routing-options static route 10.1.10.0/24 next-hop 10.1.2.1
set system syslog file syslog-event-daemon-warning daemon warning
```

Configuring the Event Policy

Step-by-Step Procedure

1. Create and name the event policy.

   ```
   [edit]
   bsmith@R1# edit event-options policy update-on-snmp-trap-link-down
   ```

2. Configure the **events** statement so that the event policy triggers on the SNMP_TRAP_LINK_DOWN event.

   Set the **attributes-match** statement so that the policy triggers only if the SNMP_TRAP_LINK_DOWN event occurs for the ge-0/3/1.0 interface.

   ```
   [edit event-options policy update-on-snmp-trap-link-down]
   bsmith@R1# set events snmp_trap_link_down
   bsmith@R1# set attributes-match snmp_trap_link_down.interface-name matches
     ge-0/3/1.0
   ```

3. Specify the configuration mode commands that are executed if the ge-0/3/1 interface goes down.

   Configure each command on a single line, enclose the command string in quotes, and specify the complete statement path.

   ```
   [edit event-options policy update-on-snmp-trap-link-down then
     change-configuration]
   bsmith@R1# set commands "delete routing-options static route 10.1.10.0/24
     next-hop"
   bsmith@R1# set commands "set routing-options static route 10.1.10.0/24 next-hop
     10.1.3.1"
   ```

4. Configure the commit options.

   Configure the **log** option with a comment describing the configuration changes. The comment is added to the commit logs after a successful commit operation is made through the associated event policy.

   ```
   [edit event-options policy update-on-snmp-trap-link-down then
     change-configuration]
   bsmith@R1# set commit-options log "updating configuration from event policy
     update-on-snmp-trap-link-down"
   ```

   If you have dual Routing Engines, configure the **synchronize** option to commit the configuration on both Routing Engines. Include the **force** option to force the commit on the other Routing Engine, ignoring any warnings. This example does not configure the **synchronize** and **force** options.

5. (Optional) Configure the retry count and retry interval.

   In this example, **count** is set to 5 and the **interval** is 4 seconds.

   ```
   [edit event-options policy update-on-snmp-trap-link-down then
     change-configuration]
   bsmith@R1# set retry count 5 interval 4
   ```

6. (Optional) Configure the username under whose privileges the configuration changes and commit are made.

   If you do not specify a username, the action is executed as user **root**.

   ```
   [edit event-options policy update-on-snmp-trap-link-down then
     change-configuration]
   bsmith@R1# set user-name bsmith
   ```

7. Configure a new log file at the **[edit system syslog]** hierarchy level to record syslog events of facility **daemon** and severity **warning**.

   This captures the SNMP_TRAP_LINK_DOWN events.

   ```
   [edit system syslog]
   bsmith@R1# set file syslog-event-daemon-warning daemon warning
   ```

8. To test this example, configure a static route to the 10.1.10.0/24 network with a next hop IP address of 10.1.2.1.

   ```
   [edit]
   bsmith@R1# set routing-options static route 10.1.10.0/24 next-hop 10.1.2.1
   ```

9. Commit the configuration.

   ```
   bsmith@R1# commit
   ```

10. Review the **[edit routing-options static]** hierarchy level of the configuration before disabling the ge-0/3/1 interface, and note the next hop IP address.

    ```
    bsmith@R1> show configuration routing-options static
    ...
    route 10.1.10.0/24 next-hop 10.1.2.1;
    ...
    ```

11. To manually test the event policy, take the ge-0/3/1 interface temporarily offline to generate the SNMP_TRAP_LINK_DOWN event.

```
[edit]
bsmith@R1# set interfaces ge-0/3/1 disable
bsmith@R1# commit
```

Results

```
[edit]
event-options {
    policy update-on-snmp-trap-link-down {
        events snmp_trap_link_down;
        attributes-match {
            snmp_trap_link_down.interface-name matches ge-0/3/1.0;
        }
        then {
            change-configuration {
                retry count 5 interval 4;
                commands {
                    "delete routing-options static route 10.1.10.0/24 next-hop";
                    "set routing-options static route 10.1.10.0/24 next-hop 10.1.3.1";
                }
                user-name bsmith;
                commit-options {
                    log "updating configuration from event policy update-on-snmp-trap-link-down";
                }
            }
        }
    }
}
routing-options {
    static {
        route 10.1.10.0/24 next-hop 10.1.2.1;
    }
}
system {
    syslog {
        file syslog-event-daemon-warning {
            daemon warning;
        }
    }
}
```

Verification

Confirm that the configuration is working properly.

- Verifying the Status of the Interface on page 28
- Verifying the Commit on page 28
- Verifying the Configuration Changes on page 29

Verifying the Status of the Interface

Purpose Verify that the ge-0/3/1 interface is down and that it triggered the SNMP_TRAP_LINK_DOWN event.

Action Issue the **show interfaces ge-0/3/1** operational mode command. The command output shows that the interface is administratively offline.

```
bsmith@R1> show interfaces ge-0/3/1
Physical interface: ge-0/3/1, Administratively down, Physical link is Down
<output omitted>
```

Review the contents of the system log file configured in Step 7. The output shows that the ge-0/3/1.0 interface went down and generated an SNMP_TRAP_LINK_DOWN event.

```
bsmith@R1> show log syslog-event-daemon-warning
Oct 10 18:00:57  R1 mib2d[1371]: SNMP_TRAP_LINK_DOWN: ifIndex 531, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
```

Verifying the Commit

Purpose Verify that the event policy commit operation was successful by reviewing the commit log and the messages log file.

Action Issue the **show system commit** operational mode command to view the commit log. In this example, the log confirms that the configuration was committed through the event policy under the privileges of user bsmith at the given date and time.

```
bsmith@R1> show system commit
0   2011-10-10 18:01:03 PDT by bsmith via junoscript
    updating configuration from event policy update-on-snmp-trap-link-down
1   2011-09-02 14:16:44 PDT by admin via netconf
2   2011-07-08 14:33:46 PDT by root via other
```

Review the **messages** log file. Upon receipt of the SNMP_TRAP_LINK_DOWN event, Junos OS executed the configured event policy action to modify and commit the configuration. The commit operation occurred under the privileges of user bsmith.

```
bsmith@R1> show log messages | last 20
...
Oct 10 18:00:57  R1 mib2d[1371]: SNMP_TRAP_LINK_DOWN: ifIndex 531, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
Oct 10 18:00:59  R1 file[17575]: UI_COMMIT: User 'bsmith' requested 'commit'
operation (comment: updating configuration from event policy
update-on-snmp-trap-link-down)
Oct 10 18:01:03  R1 eventd: EVENTD_CONFIG_CHANGE_SUCCESS: Configuration change
successful: while executing policy update-on-snmp-trap-link-down with user bsmith
 privileges
```

NOTE: If you configure a different log file, review the file specific to your configuration.

Meaning The output from the **show system commit** operational mode command and the **messages** log file verify that the commit operation, which was made through the event policy under the privileges of the user bsmith, was successful. The **show system commit** output and **messages** log file reference the commit comment specified in the **log** statement at the **[edit event-options policy update-on-snmp-trap-link-down then change-configuration commit-options]** hierarchy level.

Verifying the Configuration Changes

Purpose Verify the configuration changes by reviewing the **[edit routing-options static]** hierarchy level of the configuration after disabling the ge-0/3/1 interface.

Action Issue the following operational mode command:

```
bsmith@R1> show configuration routing-options static
...
route 10.1.10.0/24 next-hop 10.1.3.1;
...
```

Meaning The configured next hop has been modified by the event policy to the new IP address 10.1.3.1, which has its route through the exit interface ge-0/2/1.

Troubleshooting

Troubleshooting Commit Errors

Problem The triggered event policy does not make the specified configuration changes, and the logs verify that the commit was unsuccessful.

```
bsmith@R1> show log messages | last 20
...
Oct 10 17:48:59  R1 mib2d[1371]: SNMP_TRAP_LINK_DOWN: ifIndex 531, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
Oct 10 17:49:01  R1 file[17142]: UI_LOAD_EVENT: User 'bsmith' is performing a
'rollback'
Oct 10 17:49:01  R1 eventd: EVENTD_CONFIG_CHANGE_FAILED: Configuration change
failed: rpc to management daemon failed while executing policy
update-on-snmp-trap-link-down with user bsmith privileges
```

A failed commit might occur if the configuration is locked or if the configuration mode commands have the incorrect syntax or order.

Solution Check the configuration mode commands at the **[edit event-options policy update-on-snmp-trap-link-down then change-configuration commands]** hierarchy level, and verify that the syntax and the order of execution are correct.

Additionally, increase the retry count and interval options so that if the configuration is locked, the event policy attempts the configuration changes a specified number of times after the first failed instance.

Example: Changing the Interface Configuration in Response to an Event

It might be necessary to modify the configuration in response to a particular event. Starting with Junos OS Release 12.1, you can configure an event policy to make and commit configuration changes when the event policy is triggered by one or more specific events.

This example uses a real-time performance monitoring (RPM) probe to generate PING_TEST_FAILED events for a given interface. Upon receipt of the first instance of two PING_TEST_FAILED events within a 5-minute period from the configured RPM probe, the event policy executes a change configuration event policy action that modifies the configuration to administratively disable the specified interface. This type of action might be necessary if you have an unstable, flapping interface that is consistently affecting network performance.

Requirements

- Routing, switching, or security device running Junos OS Release 12.1 or later.

Overview

This example creates an event policy named disable-interface-on-ping-failure. The event policy is configured so that the eventd process listens for PING_TEST_FAILED events generated by a specific RPM probe and associated with the ge-0/3/1 interface . If two PING_TEST_FAILED events occur for the given interface within a 5-minute interval, the event policy executes a change configuration action. The event policy configuration commands administratively disable the interface.

To test the event policy, the example configures an RPM probe that pings the IP address associated with the ge-0/3/1 interface every 60 seconds. In this example, the ge-0/3/1.0 inteface is configured with the IPv4 address 10.1.4.1/26. If the ping fails, the RPM probe generates a PING_TEST_FAILED event. Because multiple RPM tests could be running simultaneously, the event policy matches the owner-name and test-name attributes of the received PING_TEST_FAILED events to the RPM probe owner name and test name. When the RPM probe generates two PING_TEST_FAILED events, it triggers the event policy, which disables the interface.

This policy also demonstrates how to restrict the execution of the same configuration change multiple times because of occurrences of the same event or correlated events. In this example, the **trigger on 1** statement specifies that only the first occurrence of two correlated PING_TEST_FAILED events triggers the configuration change. The PING_TEST_FAILED events must occur within a 5-minute interval (300 seconds) to trigger the event policy.

Configuration

Configuring the RPM Probe

CLI Quick Configuration

To quickly configure this section of the example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set services rpm probe icmp-ping-probe test ping-probe-test
set services rpm probe-type icmp-ping test-interval 60 target address 10.1.4.1
set system syslog file syslog-event-daemon-info daemon info
```

Step-by-Step Procedure

To configure the RPM probe, which creates the PING_TEST_FAILED events for this example:

1. Create an RPM probe named ping-probe-test at the **[edit services rpm]** hierarchy level to ping the ge-0/3/1 interface.

```
[edit services rpm]
bsmith@R1# set probe icmp-ping-probe test ping-probe-test
```

2. Configure the RPM probe to send ICMP echo requests to the ge-0/3/1 interface at IP address 10.1.4.1, and set **test-interval** to 60 to issue the test every 60 seconds.

   ```
   [edit services rpm probe icmp-ping-probe test ping-probe-test]
   bsmith@R1# set probe-type icmp-ping test-interval 60 target address 10.1.4.1
   ```

3. Configure a new log file at the **[edit system syslog]** hierarchy level to record syslog events of facility **daemon** and severity **info**.

   This captures the events sent during the probe tests.

   ```
   [edit system syslog]
   bsmith@R1# set file syslog-event-daemon-info daemon info
   ```

4. Commit the configuration.

   ```
   bsmith@R1# commit
   ```

Results

```
[edit]
services {
  rpm {
    probe icmp-ping-probe {
      test ping-probe-test {
        probe-type icmp-ping;
        target address 10.1.4.1;
        test-interval 60;
      }
    }
  }
}
system {
  syslog {
    file syslog-event-daemon-info {
      daemon info;
    }
  }
}
```

Configuring the Event Policy

CLI Quick Configuration

To quickly configure this section of the example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set event-options policy disable-interface-on-ping-failure events ping_test_failed
set event-options policy disable-interface-on-ping-failure within 300 trigger on
set event-options policy disable-interface-on-ping-failure within 300 trigger 1
set event-options policy disable-interface-on-ping-failure attributes-match
  ping_test_failed.test-owner matches icmp-ping-probe
set event-options policy disable-interface-on-ping-failure attributes-match
  ping_test_failed.test-name matches ping-probe-test
set event-options policy disable-interface-on-ping-failure then change-configuration
  retry count 5
set event-options policy disable-interface-on-ping-failure then change-configuration
  retry interval 4
```

```
set event-options policy disable-interface-on-ping-failure then change-configuration
  commands "set interfaces ge-0/3/1 disable"
set event-options policy disable-interface-on-ping-failure then change-configuration
  user-name bsmith
set event-options policy disable-interface-on-ping-failure then change-configuration
  commit-options log "updating configuration from event policy
  disable-interface-on-ping-failure"
```

Step-by-Step Procedure

1. Create and name the event-policy.

   ```
   [edit]
   bsmith@R1# edit event-options policy disable-interface-on-ping-failure
   ```

2. Configure the event policy to match on the PING_TEST_FAILED event if it occurs twice within 5 minutes (300 seconds).

   The **trigger on 1** statement specifies that only the first set of correlated PING_TEST_FAILED events triggers this policy.

   The **attributes-match** statement is set so that the policy triggers only on the PING_TEST_FAILED events generated by the associated RPM probe.

   ```
   [edit event-options policy disable-interface-on-ping-failure]
   bsmith@R1# set events ping_test_failed
   bsmith@R1# set within 300 trigger on 1
   bsmith@R1# set attributes-match ping_test_failed.test-owner matches
     icmp-ping-probe
   bsmith@R1# set attributes-match ping_test_failed.test-name matches
     ping-probe-test
   ```

3. Specify the configuration mode commands that are executed if the event policy triggers.

   Configure each command on a single line, enclose the command string in quotes, and specify the complete statement path.

   ```
   [edit event-options policy disable-interface-on-ping-failure then
     change-configuration]
   bsmith@R1# set commands "set interfaces ge-0/3/1 disable"
   ```

4. (Optional) Configure the retry count and retry interval.

   In this example, **count** is set to 5, and the **interval** is 4 seconds.

   ```
   [edit event-options policy disable-interface-on-ping-failure then
     change-configuration]
   bsmith@R1# set retry count 5 interval 4
   ```

5. Configure the commit options.

   Configure the **log** option with a comment describing the configuration changes. The comment is added to the commit logs after a successful commit operation is made through the associated event policy.

   ```
   [edit event-options policy disable-interface-on-ping-failure then
     change-configuration]
   bsmith@R1# set commit-options log "updating configuration from event policy
     disable-interface-on-ping-failure"
   ```

If you have dual Routing Engines, configure the **synchronize** option to commit the configuration on both Routing Engines. Include the **force** option to force the commit on the other Routing Engine, ignoring any warnings. This example does not configure the **synchronize** and **force** options.

6. (Optional) Configure the username under whose privileges the configuration changes and commit are made.

   If you do not specify a username, the action is executed as user **root**.

   ```
   [edit event-options policy disable-interface-on-ping-failure then
     change-configuration]
   bsmith@R1# set user-name bsmith
   ```

7. Commit the configuration.

   ```
   bsmith@R1# commit
   ```

8. Review the output of the **show interfaces ge-0/3/1** operational mode command before the configuration change takes place.

   The interface should be enabled.

   ```
   bsmith@R1> show interfaces ge-0/3/1
   Physical interface: ge-0/3/1, Enabled, Physical link is Up
     Interface index: 142, SNMP ifIndex: 531
   ...
   ```

Results

```
[edit event-options]
policy disable-interface-on-ping-failure {
  events ping_test_failed;
  within 300 {
    trigger on 1;
  }
  attributes-match {
    ping_test_failed.test-owner matches icmp-ping-probe;
    ping_test_failed.test-name matches ping-probe-test;
  }
  then {
    change-configuration {
      retry count 5 interval 4;
      commands {
        "set interfaces ge-0/3/1 disable";
      }
      user-name bsmith;
      commit-options log "updating configuration from event policy
        disable-interface-on-ping-failure";
    }
  }
}
```

Verification

Confirm that the configuration is working properly.

Verifying the Events

Purpose To manually test the event policy, take the ge-0/3/1 interface offline until two PING_TEST_FAILED events are generated.

Action Review the configured syslog file. Verify that when the RPM probe ping tests fail, the probe generates a PING_TEST_FAILED event.

```
bsmith@R1> show log syslog-event-daemon-info
Oct  7 15:48:54  R1 rmopd[1345]: PING_TEST_COMPLETED: pingCtlOwnerIndex =
icmp-ping-probe, pingCtlTestName = ping-probe-test
Oct  7 15:49:54  R1 rmopd[1345]: PING_TEST_COMPLETED: pingCtlOwnerIndex =
icmp-ping-probe, pingCtlTestName = ping-probe-test
...
Oct  7 15:52:54  R1 rmopd[1345]: RMOPD_ICMP_SENDMSG_FAILURE: sendmsg(ICMP): No
route to host
Oct  7 15:52:54  R1 rmopd[1345]: PING_PROBE_FAILED: pingCtlOwnerIndex =
icmp-ping-probe, pingCtlTestName = ping-probe-test
Oct  7 15:52:54  R1 rmopd[1345]: PING_TEST_FAILED: pingCtlOwnerIndex =
icmp-ping-probe, pingCtlTestName = ping-probe-test
Oct  7 15:52:57  R1 rmopd[1345]: PING_TEST_FAILED: pingCtlOwnerIndex =
icmp-ping-probe, pingCtlTestName = ping-probe-test
```

Verifying the Commit

Purpose Verify that the event policy commit operation was successful by reviewing the commit log and the messages log file.

Action Issue the **show system commit** operational mode command to view the commit log. In this example, the log confirms that the configuration was committed through the event policy under the privileges of user bsmith at the given date and time.

```
bsmith@R1> show system commit
0   2011-10-07 15:52:58 PDT by bsmith via junoscript
    updating configuration from event policy disable-interface-on-ping-failure
1   2011-09-02 14:16:44 PDT by admin via netconf
2   2011-07-08 14:33:46 PDT by root via other
```

Review the messages log file. Upon receipt of the PING_TEST_FAILED event, Junos OS executed the configured event policy action to modify and commit the configuration. The commit operation occurred under the privileges of user bsmith.

```
bsmith@R1> show log messages | last 20
Oct  7 15:52:54  R1 rmopd[1345]: RMOPD_ICMP_SENDMSG_FAILURE: sendmsg(ICMP): No
route to host
Oct  7 15:52:55  R1 file[9972]: UI_COMMIT: User 'bsmith' requested 'commit'
operation (comment: updating configuration from event policy
disable-interface-on-ping-failure)
Oct  7 15:52:59  R1 eventd: EVENTD_CONFIG_CHANGE_SUCCESS: Configuration change
successful: while executing policy disable-interface-on-ping-failure with user
bsmith privileges
```

Meaning The output from the **show system commit** operational mode command and the **messages** log file verify that the commit operation, which was made through the event policy under the privileges of the user bsmith, was successful. The **show system commit** output and **messages** log file reference the commit comment specified in the **log** statement at the **[edit event-options policy disable-interface-on-ping-failure then change-configuration commit-options]** hierarchy level.

Verifying the Configuration Changes

Purpose Verify the configuration changes by reviewing the **[edit interfaces ge-0/3/1]** hierarchy level of the configuration.

Action

```
bsmith@R1> show configuration interfaces ge-0/3/1
disable;
unit 0 {
    family inet {
        address 10.1.4.1/26;
    }
}
```

Meaning The ge-0/3/1 configuration hierarchy was modified through the event policy to add the **disable** statement.

Verifying the Status of the Interface

Purpose Review the output of the **show interfaces ge-0/3/1** operational mode command after the configuration change takes place.

Action Issue the **show interfaces ge-0/3/1** operational mode command. After the event policy configuration change action disables the interface, the output changes from "Enabled" to "Administratively down".

```
bsmith@R1> show interfaces ge-0/3/1
Physical interface: ge-0/3/1, Administratively down, Physical link is Down
  Interface index: 142, SNMP ifIndex: 531
```

Related Documentation

- change-configuration on page 102
- commands (Event Policy Change Configuration) on page 103
- commit-options on page 105
- retry (Event Policy) on page 121
- user-name on page 134

Executing Event Scripts in an Event Policy

Event scripts are Extensible Stylesheet Transformation (XSLT) or Stylesheet Language Alternative Syntax (SLAX) scripts that you write and that are run when triggered by an event policy. Event scripts can perform any function available through Junos XML or Junos XML protocol remote procedure calls (RPCs). Additionally, you can pass to an event script a set of arguments that you define.

A script can change the device configuration, build and run an operational mode command, receive the command output, inspect the output, and determine the next appropriate action. This process can be repeated until the source of the problem is determined. The script can then report the source of the problem to you on the CLI.

You can configure an event policy that causes event scripts to be run and the output of those scripts to be uploaded to a specified location for analysis.

To configure such a policy, include the following statements at the **[edit event-options]** hierarchy level:

```
[edit event-options]
policy policy-name {
  events [ events ];
  then {
    event-script filename {
      arguments {
        argument-name argument-value;
      }
      output-filename filename;
      output-format (text | xml);
      destination destination-name;
    }
  }
}
```

In the **events** statement, you can list multiple events. If one or more of the listed events occurs, the event script is executed. To view a list of the events that can be referenced in an event policy, issue the **set event-options policy *policy-name* events ?** configuration mode command:

```
[edit]
user@host# set event-options policy policy-name events ?
Possible completions:
 <event>
 [              Open a set of values
 acct_accounting_ferror
 acct_accounting_fopen_error
 ...
```

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. For information about referencing these system log messages in your event policies, see "Using Nonstandard System Log Messages to Trigger Event Policies" on page 17.

In addition, you can reference internally generated events, which are discussed in "Generating Internal Events to Trigger Event Policies" on page 16.

In the **event-script** statement, you can specify a script to be executed on receipt of an event. The eventd process runs the scripts in the order in which they appear in the configuration. The scripts that you reference in the **event-script** statement must be located in the **/var/db/scripts/event** directory on the device's hard drive or the **/config/scripts/event/** directory on the flash drive. Furthermore, the event scripts must be enabled at the **[edit event-options event-script file]** hierarchy level. For more information, see Storing and Enabling Scripts.

You can include arguments to the script as name/value pairs. You can include variables in the argument values to allow data from the triggering event to be automatically included in the argument. The eventd process replaces each variable with values contained in the event that triggers the policy. You can use variables of the following forms:

- **{$$.*attribute-name*}**—The double dollar sign (**$$**) notation represents the event that is triggering a policy. When combined with an attribute name, the variable is replaced by the value of the attribute name in the triggering event. For example, **{$$.interface-name}** stands for the value of the **interface-name** attribute in the triggering event.
- **{$*event*.*attribute-name*}**—The **{$*event*.*attribute-name*}** notation represents the most recent event that matches the specified event. The variable is replaced by the value of the attribute name of the most recent event that matches ***event***. For example, when you include an argument called **interface** and define the value as **{$COSD_CHAS_SCHED_MAP_INVALID.interface-name},** the **{$COSD_CHAS_SCHED_MAP_INVALID.interface-name}** variable is replaced by the **interface-name** attribute of the most recent **COSD_CHAS_SCHED_MAP_INVALID** event cached by the eventd process.

For a given event, you can view a list of event attributes that you can reference by issuing the **help syslog *event*** command:


```
user@host> help syslog event-name
```

For example, in the following command output, text in angle brackets (< >) shows attributes of the **COSD_CHASSIS_SCHEDULER_MAP_INVALID** event:

```
user@host> help syslog COSD_CHASSIS_SCHEDULER_MAP_INVALID
Name:        COSD_CHASSIS_SCHEDULER_MAP_INVALID
Message:     Chassis scheduler map incorrectly applied to interface
<interface-name>: <error-message>
...
```

You can filter the output of a search by using the pipe (|) symbol. The following example lists the filters that can be used with the pipe symbol:

```
user@host> help syslog | ?
Possible completions:
 count               Count occurrences
 display             Show additional kinds of information
 except              Show only text that does not match a pattern
 find                Search for first occurrence of pattern
 hold                Hold text without exiting the --More-- prompt
 last                Display end of output only
 match               Show only text that matches a pattern
 no-more             Don't paginate output
 request             Make system-level requests
 resolve             Resolve IP addresses
 save                Save output text to file
 trim                Trim specified number of columns from start of line
```

For more information about using the pipe symbol, see the CLI User Guide.

Another way to view a list of event attributes is to issue the **set attributes-match *event* ?** configuration mode command at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
user@host# set attributes-match event ?
```

For example, in the following command output, the ***event.attribute*** list shows that **error-message** and **interface-name** are attributes of the **cosd_chassis_scheduler_map_invalid** event:

```
[edit event-options policy p1]
user@host# set attributes-match cosd_chassis_scheduler_map_invalid?
Possible completions:
  <from-event-attribute>  First attribute to compare
  cosd_chassis_scheduler_map_invalid.error-message
  cosd_chassis_scheduler_map_invalid.interface-name
```

In this **set** command, there is no space between the event name and the question mark (**?**).

To view a list of all event attributes that you can reference, issue the **set attributes-match ?** configuration mode command at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
user@host# set attributes-match ?
Possible completions:
```

```
<from-event-attribute>  First attribute to compare
acct_accounting_ferror
acct_accounting_fopen_error
...
```

By default, the command output format is text. To change this, include the **output-format xml** statement.

In the optional **output-filename** statement, assign the name of the file to which to write script output for the specified script.

The filename format is ***hostname_filename_YYYYMMDD_HHMMSS_index-number***.

For each uploaded file, a hostname and timestamp are automatically added to the filename to ensure that the uploaded files have unique filenames. If a policy is triggered multiple times in a 1-second period, an index number is added to ensure the filenames are unique. The index number range is 001 through 999.

For example, on a device named **r1**, if you configure the output filename to be **ifl-events**, and this event policy is triggered three times in 1 second, the files are named:

- **r1_ifl-events_20060623_132333**
- **r1_ifl-events_20060623_132333_001**
- **r1_ifl-events_20060623_132333_002**

In the optional **destination** statement, include the destination name that you configured at the **[edit event-options destinations]** hierarchy level. For more information, see "Example: Defining Destinations for File Archiving by Event Policies" on page 54.

For the **output-filename** and **destination** statements, there are four configuration scenarios:

- You can omit the **output-filename** and **destination** statements. This option makes sense when the event script has no output. For example, the event script might execute only **request** commands, which have no output.
- You can include the **destination** statement in the configuration. You omit the **output-filename** statement in the configuration and specify an output filename in the event script instead. The script output is sent to the destination specified in the configuration. If you do not include the **destination** statement in the configuration, the script output is not uploaded.

  In this scenario, the event policy extracts the filename from the event script. The event script writes the output filename as **STDOUT**. The XML syntax to use in the event script is:

  ```
  <output>
    <event-script-output-filename>filename</event-script-output-filename>
  </output>
  ```

  The **<event-script-output-filename>** element must be the first child tag within the **<output>** parent tag.

On a device named **device2**, configure an event script action with a destination **host**, and omit the **output-filename** statement. Define the destination **host** as ftp://user@device1//tmp.

In the **script1.xsl** event script, write the following output to **STDOUT**:

```
<event-script-output-filename>/var/cmd.txt</event-script-output-filename>
```

Configure the **policy1** event policy as follows:

```
[edit event-options]
policy policy1 {
  then {
    event-script script1.xsl {
      destination host;
    }
  }
}
destinations {
  host {
    archive-sites {
      "ftp://user@device1//tmp" password "$9$xkJNbYg4ZDH.oJ.fQnpuSyl";  ##
        SECRET-DATA***
    }
  }
}
```

In this example, the **/var/cmd.txt** file resides on device **device2**. The event policy uses the File Transfer Protocol (FTP) to upload this file to the **/tmp** directory on device **device1**.

The event policy reads the output filename **/var/cmd.txt** from **STDOUT**. Then the event policy uploads the **/var/cmd.txt** file to the configured destination, which is the **/tmp** directory on device **device1**. The event policy renames the **/var/cmd.txt** file as **device2_cmd.txt_*YYYYMMDD_HHMMSS_range***.

- You can include the **output-filename** and **destination** statements. If you include the **output-filename** statement in the configuration, you must also include the **destination** statement in the configuration. In this case, the script output is redirected to the output filename specified in the configuration and is sent to the destination specified in the configuration.
- You can include the **output-filename** and **destination** statements, and also specify an output filename directly within the event script. If you do this, the output filename specified in the configuration overrides the output filename specified in the event script.

Configuring Event Policies to Ignore an Event

You can modify a policy to cause particular events to be ignored or to cause all events to be ignored during a particular time interval, to allow for maintenance for example. To configure such a policy, include the following statements at the **[edit event-options]** hierarchy level:

```
[edit event-options]
policy policy-name {
```

```
    events [ events ];
    then {
      ignore;
    }
  }
```

In the **events** statement, you can list multiple events. To view a list of the events that can be referenced in an event policy, issue the **set event-options policy *policy-name* events ?** configuration mode command:

```
[edit]
user@host# set event-options policy policy-name events ?
Possible completions:
 <event>
 [              Open a set of values
 acct_accounting_ferror
 acct_accounting_fopen_error
 ...
```

Some of the system log messages that you can reference in an event policy are not listed in the output of the **set event-options policy *policy-name* events ?** command. For information about referencing these system log messages in your event policies, see "Using Nonstandard System Log Messages to Trigger Event Policies" on page 17.

In addition, you can reference internally generated events, which are discussed in "Generating Internal Events to Trigger Event Policies" on page 16.

If one or more of the listed events occur, a system log message for the event is not generated, and no further policies associated with this event are processed. If you include the **ignore** statement in a policy configuration, you cannot configure any other actions in the policy.

Changing the User Privilege Level for an Event Policy Action

Only superusers can configure event policies. Event policy actions—such as executing event scripts, uploading files, and executing operational mode commands—are by default executed by user **root**, because the event process (eventd) runs with **root** privileges.

In some cases, you might want an event policy action to be executed with restricted privileges. For example, suppose you configure an event policy that executes a script if an interface goes down. The script includes remote procedure calls (RPCs) to change the device configuration if certain conditions are present. If you do not want the script to change the configuration, you can execute the script with a restricted user profile. When the script is executed with a user profile that disallows configuration changes, the RPCs to change the configuration fail.

You can associate a user with each action in an event policy. If a user is not associated with an event policy action, then the action is executed as user **root** by default.

To specify the user under whose privileges an action is executed, include the **user-name** statement:

```
user-name username;
```

You can include this statement at the following hierarchy levels:

- **[edit** event-options policy ***policy-name*** then event-script ***filename*****]**
- **[edit** event-options policy ***policy-name*** then execute-commands**]**
- **[edit** event-options policy ***policy-name*** then upload **filename (*filename* | committed) destination *destination-name*]**

NOTE: **The username that you specify must be configured at the [edit system login] hierarchy level. For more information, see the Junos OS System Basics Configuration Guide.**

For a configuration example, see "Example: Associating an Optional User with an Event Policy Action" on page 89.

Example: Configuring Event Policies to Raise SNMP Traps

Overview of Using Event Policies to Raise SNMP Traps

SNMP *traps* enable an agent to notify a network management system (NMS) of significant events by way of an unsolicited SNMP message. You can configure an event policy action that raises traps for events based on system log messages. If one or more of the listed events occur, the system log message for the event is converted into a trap. This enables notification of an SNMP trap-based application when an important system log message occurs. You can convert any system log message (for which there are no corresponding traps) into a trap. This is helpful if you use NMS traps rather than system log messages to monitor your network.

To configure an event policy that raises a trap on receipt of an event, include the following statements at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
events [ events ];
then {
   raise-trap;
}
```

The Juniper Networks enterprise-specific System Log MIB, whose object identifier is {jnxMibs 35}, provides support for this feature.

Example: Raising an SNMP Trap in Response to an Event

This example configures an event policy to raise a trap and to execute an event script in response to an event:

Requirements

A device running Junos OS, which is configured for SNMP.

Overview

The following example configures the event policy **raise-trap-on-ospf-nbrdown** to trigger on the **RPD_OSPF_NBRDOWN** event, which indicates a terminated OSPF adjacency with a neighboring router. The event policy action raises a trap in response to the event. The device sends a notification to the SNMP manager, if one is configured under the **[edit snmp]** hierarchy level.

Additionally, the event policy executes the event script **ospf.xsl** in response to this event and provides the affected interface as an argument to the script. The **$$rpd_ospf_nbrdown.interface-name** argument resolves to the interface name associated with the triggering event.

The event script output is recorded in the file **ospf-out**, and the output file is uploaded to the destination **mgmt-archives**, which is configured at the **[edit event-options destinations]** hierarchy level. To invoke an event script in an event policy, the event script must be present in the **/var/db/scripts/event** directory on the hard drive, and it must be enabled in the configuration.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set event-options policy raise-trap-on-ospf-nbrdown events rpd_ospf_nbrdown
set event-options policy raise-trap-on-ospf-nbrdown then raise-trap
set event-options policy raise-trap-on-ospf-nbrdown then event-script ospf.xsl arguments
    interface "{$$rpd_ospf_nbrdown.interface-name}"
set event-options policy raise-trap-on-ospf-nbrdown then event-script ospf.xsl
    output-filename ospf-out
set event-options policy raise-trap-on-ospf-nbrdown then event-script ospf.xsl destination
    mgmt-archives
```

Configuring the Event Policy

Step-by-Step Procedure

To configure an event policy that raises a trap on receipt of an event and optionally executes an event script:

1. Create and name the event-policy.

```
[edit]
user@R1# edit event-options policy raise-trap-on-ospf-nbrdown
```

2. Configure the event policy to match on the desired event, which in this example is the **RPD_OSPF_NBRDOWN** event.

```
[edit event-options policy raise-trap-on-ospf-nbrdown]
user@R1# set events rpd_ospf_nbrdown
```

3. Configure the event policy action to raise an SNMP trap in response to the event.

```
[edit event-options policy raise-trap-on-ospf-nbrdown]
user@R1# set then raise-trap
```

4. (Optional) Configure additional actions to take in response to the event.

   This example executes an event script and uploads the associated output file to a predefined destination.

```
[edit event-options policy raise-trap-on-ospf-nbrdown]
user@R1# set then event-script ospf.xsl arguments interface
  {$$rpd_ospf_nbrdown.interface-name}
user@R1# set then event-script ospf.xsl output-filename ospf-out destination
  mgmt-archives
```

5. Commit the configuration.

```
user@R1# commit
```

Results

```
[edit event-options]
policy raise-trap-on-ospf-nbrdown {
  events rpd_ospf_nbrdown;
  then {
    event-script ospf.xsl {
      arguments {
        interface "{$$rpd_ospf_nbrdown.interface-name}";
      }
      output-filename ospf-out;
      destination mgmt-archives;
    }
    raise-trap;
  }
}
```

Related Documentation

- Configuring SNMP on a Device Running Junos OS
- Interpreting the Enterprise-Specific System Log MIB

Configuring the System Log Priority of the Triggering Event in an Event Policy

Understanding the Event System Log Priority in an Event Policy

Starting with Junos OS Release 12.1, you can configure an event policy to override the default system log priority of a triggering event so that the system logs the event with a different facility type, severity level, or both. To override the priority of the triggering event, configure the **priority-override** statement at the **[edit** event-options policy ***policy-name*** then**]** hierarchy level. To override the facility type with which the triggering event is logged, include the **facility** statement and the new facility type. To override the severity level with which the triggering event is logged, include the **severity** statement and the new severity level.

Junos OS processes generate system log messages, or event notifications, to record the events that occur on a routing, switching, or security platform. Each system log message identifies the Junos OS process that generated the message and describes the operation or error that occurred. The Junos OS event process (eventd) receives the event notifications, and configured event policies instruct the eventd process to perform a set of actions upon receipt of specific events or correlated events.

Each system log message belongs to a facility, which groups messages that either are generated by the same source (such as a software process) or concern a similar condition or activity (such as authentication attempts). Each message is also preassigned a severity level, which indicates how seriously the triggering event affects the functions of the routing, switching, or security platform. A message's facility and severity level are together referred to as its priority. For more information about facility and severity levels, see Junos OS System Logging Facilities and Message Severity Levels.

When you configure logging on a device for a specific facility and destination, you also specify a severity level. Messages from that facility that are rated at the configured severity level or higher are logged. To log related events with different severity levels in the same log file, you must filter events using the lowest severity level of any of the events from that facility to be logged. This can result in unwieldy log files that are difficult and time-consuming to parse.

For example, Junos OS logs the protocol UP and DOWN events with different severity levels. Both the SNMP_TRAP_LINK_DOWN and SNMP_TRAP_LINK_UP events have a facility of 'daemon', but the SNMP_TRAP_LINK_DOWN event has a severity level of 'warning', and the SNMP_TRAP_LINK_UP event has a severity level of 'info'. Normally, when you configure a system log file, you must filter events to that file using the lower severity level of 'info' in order to log both of the events.

The event policy **priority-override** statement enables you to customize the priority of the triggering event so that it is logged using a different facility type and severity level. Suppose you configure a system log file to filter events of facility 'daemon' and severity 'notice', and you have event policies that trigger on the RPD_ISIS_ADJDOWN and RPD_ISIS_ADJUP events. When the system generates an RPD_ISIS_ADJDOWN message reporting that the

IS-IS adjacency with a neighboring router was terminated, this message is logged. However, if the system subsequently generates an RPD_ISIS_ADJUP event notification reporting that the IS-IS adjacency has been restored, by default, the message is not logged, because it has a lower severity level of 'info'. In the event policy that triggers on the RPD_ISIS_ADJUP event, you can configure the associated priority so that the triggering RPD_ISIS_ADJUP event is logged with a severity level of 'notice' and is captured in the configured log file.

NOTE: Event policies are executed in the order in which they appear in the configuration. When you configure multiple event policies to override the priority of the same event, the event is logged based on the priority set by the last executed event policy to change it.

Example: Configuring the Event System Log Priority in an Event Policy

It is necessary to log events when monitoring, managing, and troubleshooting routing, switching, and security devices. Starting with Junos OS Release 12.1, you can configure an event policy to override the priority of its triggering event so that it is logged based on a different facility type and severity level. This enables the event to be logged even if the system filters events to the destination log file using a different facility type or a higher severity level.

This example simulates an SNMP_TRAP_LINK_UP event for a specific interface. Upon receipt of the event, the event policy overrides the severity level of the event so that it is captured in the configured log file.

Requirements

- Routing, switching, or security device running Junos OS Release 12.1 or later.
- Interface is configured and active. This example uses the ge-0/3/1.0 interface.

Overview

This example configures two log files to capture events of facility 'daemon'. One log file is configured to filter for events of severity 'warning' or higher, and the second log file is configured to filter for events of severity 'info' or higher.

The configured event policy triggers on the SNMP_TRAP_LINK_UP event for interface ge-0/3/1.0. The example generates an SNMP_TRAP_LINK_DOWN event followed by an SNMP_TRAP_LINK_UP event for the ge-0/3/1.0 interface. The SNMP_TRAP_LINK_DOWN event, which has a severity level of 'warning' is captured in both configured log files. Upon receipt of the SNMP_TRAP_LINK_UP event, the event policy overrides the severity level of the event to 'warning' so that it is also captured in the log file that filters for events of

severity 'warning'. By default, if the event policy does not override the severity level of this event, it is only captured in the log file that filters for the severity level 'info'.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set system syslog file syslog-event-daemon-info daemon info
set system syslog file syslog-event-daemon-warning daemon warning
set event-options policy log-on-snmp-trap-link-up events snmp_trap_link_up
set event-options policy log-on-snmp-trap-link-up attributes-match
  snmp_trap_link_down.interface-name matches ge-0/3/1.0
set event-options policy log-on-snmp-trap-link-up then priority-override severity warning
```

Configuring the Log Files

Step-by-Step Procedure

1. Configure two log files at the **[edit system syslog]** hierarchy level to record events of facility **daemon**.

   Configure one log to record events of severity 'info' or higher and one log file to record events of severity 'warning' or higher.

   ```
   [edit system syslog]
   bsmith@R1# set file syslog-event-daemon-info daemon info
   bsmith@R1# set file syslog-event-daemon-warning daemon warning
   ```

2. Commit the configuration.

   ```
   bsmith@R1# commit
   ```

3. To manually test the logging of the events, take the ge-0/3/1.0 logical interface temporarily offline, and then bring it back up.

   This generates an SNMP_TRAP_LINK_DOWN event followed by an SNMP_TRAP_LINK_UP event.

   ```
   [edit]
   bsmith@R1# set interfaces ge-0/3/1 unit 0 disable
   bsmith@R1# commit
   bsmith@R1# delete interfaces ge-0/3/1 unit 0 disable
   bsmith@R1# commit
   ```

Results

```
[edit]
system {
  syslog {
    file syslog-event-daemon-info {
      daemon info;
    }
    file syslog-event-daemon-warning {
      daemon warning;
```

```
    }
  }
}
```

Verifying the Default System Log Priority of the Events

Purpose Verify that the system generated the SNMP_TRAP_LINK_DOWN and SNMP_TRAP_LINK_UP events for the ge-0/3/1.0 interface, and note where each event is logged.

Action Review the contents of the **syslog-event-daemon-info** file configured in Step 1 of the previous procedure. The output shows that the ge-0/3/1.0 interface was brought down and back up and generated an SNMP_TRAP_LINK_DOWN event followed by an SNMP_TRAP_LINK_UP event.

```
bsmith@R1> show log syslog-event-daemon-info
Oct 24 13:22:17  R1 mib2d[1394]: SNMP_TRAP_LINK_DOWN: ifIndex 539, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
...
Oct 24 13:22:29  R1 mib2d[1394]: SNMP_TRAP_LINK_UP: ifIndex 539, ifAdminStatus
up(1), ifOperStatus up(1), ifName ge-0/3/1.0
```

Review the contents of the **syslog-event-daemon-warning** file configured in Step 1 of the previous procedure. Because the severity level of the SNMP_TRAP_LINK_UP event is 'info', it does not appear in a log file that is configured to only record events of severity 'warning' or higher. By default, this system log file captures the SNMP_TRAP_LINK_DOWN events, but does not capture the SNMP_TRAP_LINK_UP events.

```
bsmith@R1> show log syslog-event-daemon-warning
Oct 24 13:22:17  R1 mib2d[1394]: SNMP_TRAP_LINK_DOWN: ifIndex 539, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
```

Meaning Because the SNMP_TRAP_LINK_UP event has a default severity of 'info', it is not forwarded to log files that are configured to capture events of higher severity.

Configuring the Event Policy

Step-by-Step Procedure

1. Create and name the event-policy.

   ```
   [edit]
   bsmith@R1# edit event-options policy log-on-snmp-trap-link-up
   ```

2. Configure the **events** statement.

   For this example, the event policy triggers on the SNMP_TRAP_LINK_UP event. Set the **attributes-match** statement so that the policy triggers only if the SNMP_TRAP_LINK_UP event occurs for the ge-0/3/1.0 interface.

   ```
   [edit event-options policy log-on-snmp-trap-link-up]
   bsmith@R1# set events snmp_trap_link_up
   bsmith@R1# set attributes-match snmp_trap_link_down.interface-name matches
     ge-0/3/1.0
   ```

3. Configure the **priority-override** event policy action, and include the **severity** statement with a value of **warning**.

```
[edit event-options policy log-on-snmp-trap-link-up]
bsmith@R1# set then priority-override severity warning
```

4. Commit the configuration.

```
bsmith@R1# commit
```

5. To manually test the event policy, take the ge-0/3/1.0 logical interface temporarily offline, and then bring it back up. This generates an SNMP_TRAP_LINK_DOWN event followed by an SNMP_TRAP_LINK_UP event.

```
[edit]
bsmith@R1# set interfaces ge-0/3/1 unit 0 disable
bsmith@R1# commit
bsmith@R1# delete interfaces ge-0/3/1 unit 0 disable
bsmith@R1# commit
```

Results

```
[edit]
event-options {
   policy log-on-snmp-trap-link-up {
      events snmp_trap_link_up;
      attributes-match {
         snmp_trap_link_up.interface-name matches ge-0/3/1.0;
      }
      then {
         priority-override {
            severity warning;
         }
      }
   }
}
```

Verification

Confirm that the configuration is working properly.

Verifying the Configured System Log Priority of the Events

Purpose Verify that the system generated the SNMP_TRAP_LINK_DOWN and SNMP_TRAP_LINK_UP events for the ge-0/3/1.0 interface, and note where each event is logged.

Action Review the contents of the **syslog-event-daemon-warning** file. Because the event policy overrides the severity level of the SNMP_TRAP_LINK_UP event, it now appears in the log file that is configured to only record events of severity 'warning' or higher. By default, this system log file captures the SNMP_TRAP_LINK_DOWN events, but does not capture the SNMP_TRAP_LINK_UP events.

```
bsmith@R1> show log syslog-event-daemon-warning
Oct 24 13:29:48  R1 mib2d[1394]: SNMP_TRAP_LINK_DOWN: ifIndex 539, ifAdminStatus
 down(2), ifOperStatus down(2), ifName ge-0/3/1.0
Oct 24 13:30:02  R1 mib2d[1394]: SNMP_TRAP_LINK_UP: ifIndex 539, ifAdminStatus
up(1), ifOperStatus up(1), ifName ge-0/3/1.0
```

Meaning Although the SNMP_TRAP_LINK_UP event has a severity of 'info', configuring the **priority-override** statement with a severity of 'warning' causes the event to be forwarded to the system logs with the configured severity level. The event can be captured in logs that filter for a different facility type and a higher severity level.

Related Documentation

- Junos OS System Logging Facilities and Message Severity Levels
- Specifying the Facility and Severity of Messages to Include in the Log
- facility on page 113
- priority-override on page 120
- severity on page 123

CHAPTER 5

Configuring Event Policy File Archiving

Event Policy File Archiving Overview

Various types of files are useful in diagnosing events. When an event policy action generates output files, you can archive the files for later analysis. Similarly, you might want to archive system files, including system log files, core files, and configuration files, from the time an event occurs.

When an event occurs, you can upload relevant files to a specified location for analysis. To archive files from an event policy, configure one or more *destinations* specifying the archive sites to which the files are uploaded. You then reference the configured destinations within event policies.

A transfer delay allows you to specify the number of seconds the event process (eventd) waits before beginning to upload a file or multiple files. A transfer delay helps ensure that a large file, such as a core file, is completely generated before the upload begins.

You can associate transfer delays with a destination and with an event policy action. If you associate a transfer delay with a destination, the transfer delay applies to all file upload actions that use that destination. You can also assign a transfer delay to a single event policy action. For example, you might have multiple event policy actions that use the same destination, and for some of these event policy actions, you want a transfer delay, and for other event policy actions you want no transfer delay. If you configure a transfer delay for a destination, and you also configure a transfer delay for the event policy action, the resulting transfer delay is the sum of the two delays.

Transient network problems can cause a file upload operation to fail. By default, if the file upload operation fails for any reason, the event policy does not retry the upload operation. However, you can configure an event policy to retry the file upload operation a specified number of times if the initial upload fails. You can also configure the time interval between each retry attempt.

Related Documentation

- Example: Defining Destinations for File Archiving by Event Policies on page 54
- Example: Configuring an Event Policy to Upload Files on page 57
- Configuring the Delay Before Files Are Uploaded by an Event Policy on page 63
- Configuring an Event Policy to Retry the File Upload Action on page 65

Example: Defining Destinations for File Archiving by Event Policies

This example configures an archive site for event policies. Event policy actions that reference the configured destination upload specified files to that site.

Requirements

This example uses a device running Junos OS. No additional configuration beyond device initialization is required before configuring this example.

Overview

When an event policy action generates output files, you can archive the files for later analysis. Similarly, you might want to archive system files, including system log files, core files, and configuration files, from the time an event occurs.

When an event occurs, you can upload relevant files to a specified location for analysis. To archive files from an event policy, configure one or more *destinations* specifying the archive sites to which the files are uploaded. You then reference the configured destinations within event policies.

To define a destination archive site, include the **destinations** statement at the **[edit event-options]** hierarchy level.

```
[edit event-options]
destinations {
  destination-name {
    archive-sites {
      url <password password>;
    }
    transfer-delay seconds;
  }
}
```

The *destination-name* is a user-defined identifier, which is referenced by event policies. You can define multiple destinations with different archive sites.

For each destination, configure one or more archive site URIs, which are the actual sites to which the files are uploaded. If you specify multiple archive site URIs for a given destination, the device attempts to transfer to the first archive site in the list, moving to

the next site in the list only if the transfer fails. Optionally, you can specify a plain-text password for login into an archive site.

Specify the archive site URI as a file URI, an active or passive FTP URI, or a Secure Copy (SCP) URI. Local device directories are also supported (for example, **/var/tmp**). When you specify the archive site URI, do not add a forward slash (/) to the end of the URI.

file:<//host>/path

ftp://username@host:<port>url-path

pasvftp://username@host:<port>url-path

scp://username@host:<port>url-path

<path>/<filename>

The format for the destination filename is ***device-name_filename_YYYYMMDD_HHMMSS***.

The **transfer-delay** statement allows you to specify the number of seconds the event process (eventd) waits before beginning to upload a file or multiple files to that destination. A transfer delay allows you to ensure that a large file, such as a core file, is completely generated before the upload begins. For more information, see "Configuring the Delay Before Files Are Uploaded by an Event Policy" on page 63.

This example configures a new archive destination named mgmt-archives, which can be referenced in event policies for file archiving. The example configures two archive sites for this destination. The first site is the Secure Copy URI "scp://username@example.com/test" for which a password is configured. The second site is a directory on the local device. The device attempts to transfer to the first archive site in the list, moving to the next site only if the transfer to the first site fails. The example configures a transfer delay of five seconds for all files uploaded to the mgmt-archives archive site.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set event-options destinations mgmt-archives archive-sites
   "scp://username@example.com/test" password PaSsWoRd
set event-options destinations mgmt-archives archive-sites /var/log
set event-options destinations mgmt-archives transfer-delay 5
```

Step-by-Step Procedure

Configure a new archive destination named mgmt-archives that can be referenced by event-policies.

1. Configure the identifier and associated archive sites for each destination.

   The device transfers to the first archive site in the list, moving to the next site only if the transfer to the first site fails.

   ```
   [edit event-options destinations]
   user@host# set mgmt-archives archive-sites scp://username@example.com/test
   ```

```
user@host# set mgmt-archives archive-sites /var/log
```

2. If authentication is required to access any of the archive sites, configure the required plain-text password for that site.

```
[edit event-options destinations]
user@host# set mgmt-archives archive-sites scp://username@example.com/test
  password PaSsWoRd
```

3. (Optional) Configure the transfer delay associated with each destination. The mgmt-archives destination has a transfer delay of five seconds.

```
[edit event-options destinations]
user@host# set mgmt-archives transfer-delay 5
```

4. Commit the configuration.

```
user@host# commit
```

5. You can reference configured destinations in an event policy. For information about referencing destinations in event policies, see "Example: Configuring an Event Policy to Upload Files" on page 57 and "Configuring an Event Policy to Execute Operational Mode Commands" on page 19.

Verification

Verifying the Configuration

Purpose Issue the **show configuration event-options** operational mode command to review the resulting configuration.

Action

```
user@host> show configuration event-options
destinations {
  mgmt-archives {
    transfer-delay 5;
    archive-sites {
      "scp://username@example.com/test" password
        "$9$z3GRF9tu0IcrKO1bYoGq.0O1IEy"; ## SECRET-DATA
      /var/log;
    }
  }
}
```

Meaning In the sample output, the mgmt-archives destination has two archive sites and a transfer delay of five seconds. You can now reference this destination in event policies. When you reference the mgmt-archives destination in an event policy, specified files are uploaded to the first archive site after a five second delay. If the transfer to the first archive fails, the device attempts to upload the files to the **/var/log** archive site. For more information about referencing destinations in event policies, see "Example: Configuring an Event Policy to Upload Files" on page 57.

Note that although the plain-text password is visible when you configure it, the configuration displays the encrypted password.

Related Documentation

- Example: Configuring an Event Policy to Upload Files on page 57
- Configuring the Delay Before Files Are Uploaded by an Event Policy on page 63
- Configuring an Event Policy to Retry the File Upload Action on page 65
- **destinations on page 107**

Example: Configuring an Event Policy to Upload Files

This example configures event policy actions that upload relevant files to a specified location for analysis.

Requirements

Before you begin:

- Configure the destinations that you will reference in the event policy. See "Example: Defining Destinations for File Archiving by Event Policies" on page 54.
- Configure the general event policy and triggering events.

Overview

When an event policy action generates output files, you can archive the files for later analysis. Similarly, you might want to archive system files, including system log files, core files, and configuration files, from the time an event occurs. You can configure an event policy to upload existing system files or to upload the output files generated from an invoked event-script or command at the time an event occurs. This section outlines the configuration hierarchies for uploading each of these file types using an event policy.

When you configure an event policy to upload files, you reference configured destinations within the event policy. Specify a destination name that is configured at the **[edit event-options destinations]** hierarchy level. For more information, see "Example: Defining Destinations for File Archiving by Event Policies" on page 54.

To upload system files to a configured archive site, configure the **upload** statement at the **[edit event-options policy *policy-name* then]** hierarchy level. If the configured events occur, the eventd process executes the upload action.

```
[edit event-options policy policy-name then]
upload filename (filename | committed) destination destination-name {
  retry-count number retry-interval seconds;
  transfer-delay seconds;
  user-name username;
}
```

The **upload filename committed destination** *destination-name* statement uploads the committed configuration file.

If desired, you can include multiple **upload** statements, one for each type of file to be archived. In the **filename** statement, specify a file or multiple files to be uploaded. You can specify multiple files with one **filename** configuration statement (sometimes called *filename globbing*). For example, to upload all files that are located in the **/var/log** directory and that start with the **messages** string, include the following statement:

```
upload filename /var/log/messages* destination destination-name;
```

When an event policy executes commands in response to an event, you can write the command output to a file. To configure an event policy to upload the generated output file to a configured archive site, include the following statements at the **[edit event-options policy** *policy-name* **then]** hierarchy level:

```
[edit event-options policy policy-name then]
execute-commands {
    destination destination-name {
        retry-count count retry-interval seconds;
        transfer-delay seconds;
    }
    output-filename filename;
}
```

When an event policy executes an event script in response to an event, you can write the script output to a file. To configure an event policy to upload the generated output file to a configured archive site, include the following statements at the **[edit event-options policy** *policy-name* **then]** hierarchy level:

```
[edit event-options policy policy-name then]
event-script filename {
    destination destination-name {
        retry-count count retry-interval seconds;
        transfer-delay seconds;
    }
    output-filename filename;
}
```

The **transfer-delay** statement listed in each hierarchy defines the time interval that the system waits before uploading the files specified by that event policy action. If you have also configured a transfer delay for the destination at the **[edit event-options destinations** *destination-name***]** hierarchy level, the total transfer delay is the sum of the two delays. For more detailed information about transfer delays, see "Configuring the Delay Before Files Are Uploaded by an Event Policy" on page 63.

If the first upload attempt fails, **retry-count** specifies the number of additional times the system attempts to upload the file. The **retry-interval** specifies the time interval that the system waits between upload attempts. For more information, see "Configuring an Event Policy to Retry the File Upload Action" on page 65.

When an event policy uploads files, the files are named and time-stamped in the following format to ensure unique filenames:

device-name_filename_YYYYMMDD_HHMMSS

If a policy uploads multiple files within a 1-second period, the software gives each file a unique number as well, as follows:

device-name_filename_YYYYMMDD_HHMMSS_number

The number can be from 001 through 999. For example, if you have an event policy action with output filename **rpd-messages** on **device1**, and this event policy is executed three times in 1 second, the files are named as follows:

- **device1_rpd-messages_20070623_132333**
- **device1_rpd-messages_20070623_132333_001**
- **device1_rpd-messages_20070623_132333_002**

In this example, **policy1** consists of the following statements, where *e1* is the triggering event. The example then configures the event policy to upload a log file and the committed configuration file as well as the output files generated from the **execute-commands** and **event-script** actions.

```
[edit event-options policy policy1]
events e1;
then {
  execute-commands {
    commands {
      "show interfaces brief ge-*";
    }
  }
  event-script event-script1;
}
```

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set event-options policy policy1 then upload filename /var/log/messages destination
  mgmt-archives transfer-delay 4
set event-options policy policy1 then upload filename /var/log/messages destination
  mgmt-archives retry-count 5 retry-interval 4
set event-options policy policy1 then upload filename /var/log/messages destination
  mgmt-archives user-name admin
set event-options policy policy1 then upload filename /var/log/messages destination
  mgmt-server
set event-options policy policy1 then upload filename committed destination
  mgmt-archives
set event-options policy policy1 then execute-commands output-filename ge-interfaces
set event-options policy policy1 then execute-commands destination mgmt-archives
  transfer-delay 5
```

```
set event-options policy policy1 then execute-commands destination mgmt-archives
  retry-count 5 retry-interval 4
set event-options policy policy1 then event-script event-script1 output-filename
  policy1-script-output
set event-options policy policy1 then event-script event-script1 destination mgmt-archives
  transfer-delay 5
set event-options policy policy1 then event-script event-script1 destination mgmt-archives
  retry-count 5 retry-interval 4
```

Uploading System Files

Step-by-Step Procedure

Configure the event policy **policy1** to upload the system file **/var/log/messages** to the archive sites mgmt-archives and mgmt-server. Additionally, upload the committed configuration to the archive site mgmt-archives. The destination archive sites should already be configured at the **[edit event-options destinations]** hierarchy level

1. Configure the **upload** statement, and include the file to archive and the destination archive site.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set upload filename /var/log/messages destination mgmt-archives
   bsmith@R1# set upload filename /var/log/messages destination mgmt-server
   ```

2. To upload the committed configuration file, specify the filename value as **committed**.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set upload filename committed destination mgmt-archives
   ```

3. (Optional) Configure the transfer delay associated with each file and destination.

   The following configuration mode command sets the transfer delay for the **/var/log/messages** file to 4 seconds when uploaded to the mgmt-archives destination. If you have also configured a transfer delay for the destination, the total delay is the sum of the two delays.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set upload filename /var/log/messages destination mgmt-archives
     transfer-delay 4
   ```

4. (Optional) Configure the retry count and retry interval associated with a file and destination.

   In this example, if the **/var/log/messages** file fails to upload to the mgmt-archives site, the system attempts the upload up to 5 more times and waits 4 seconds in between each attempt.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1#set upload filename /var/log/messages destination mgmt-archives
     retry-count 5 retry-interval 4
   ```

5. (Optional) Configure the username associated with a file and destination. The system uploads the file using the privileges of the specified user.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1#set upload filename /var/log/messages destination mgmt-archives
     user-name admin
   ```

6. Commit the configuration.

```
[edit event-options policy policy1 then]
bsmith@R1# commit
```

Uploading Command Output Files

Step-by-Step Procedure

When the event policy invokes the **execute-commands** action, the command output can be written to a file. Configure the event policy **policy1** to write command output to a file and upload the generated file to the destination mgmt-archives, which is already configured at the **[edit event-options destinations]** hierarchy level.

1. Configure the filename of the generated output file.

```
[edit event-options policy policy1 then]
bsmith@R1# set execute-commands output-filename ge-interfaces
```

2. Configure the **destination** statement to upload the generated file to the desired archive site.

```
[edit event-options policy policy1 then]
bsmith@R1# set execute-commands destination mgmt-archives
```

3. (Optional) Configure the transfer delay for each destination.

   The following command sets the transfer delay for files uploaded to the mgmt-archives destination to 5 seconds.

```
[edit event-options policy policy1 then]
bsmith@R1# set execute-commands destination mgmt-archives transfer-delay 5
```

4. (Optional) Configure the retry count and retry interval associated with each destination.

   In this example, if the output file fails to upload to the mgmt-archives site, the system attempts the upload up to 5 more times and waits 4 seconds in between each attempt.

```
[edit event-options policy policy1 then]
bsmith@R1#set execute-commands destination mgmt-archives retry-count 5
  retry-interval 4
```

5. Commit the configuration.

```
[edit event-options policy policy1 then]
bsmith@R1# commit
```

Uploading Event Script Output Files

Step-by-Step Procedure

When the event policy invokes an event script, the script output can be written to a file. Configure the event policy **policy1** to write event-script output to a file and upload the generated file to the destination mgmt-archives, which is already configured at the **[edit event-options destinations]** hierarchy level. In this example, the event policy invokes an event script named **event-script1**.

1. Configure the filename of the generated output file.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set event-script event-script1 output-filename policy1-script-output
   ```

2. Configure the **destination** statement to upload the generated file to the desired archive site.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set event-script event-script1 destination mgmt-archives
   ```

3. (Optional) Configure the transfer delay for each destination.

   The following command sets the transfer delay for files uploaded to the mgmt-archives destination to 5 seconds.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# set event-script event-script1 destination mgmt-archives
     transfer-delay 5
   ```

4. (Optional) Configure the retry count and retry interval associated with each destination.

   In this example, if the output file fails to upload to the mgmt-archives site, the system attempts the upload up to 5 more times and waits 4 seconds in between each attempt.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1#set event-script event-script1 destination mgmt-archives retry-count 5
     retry-interval 4
   ```

5. Commit the configuration.

   ```
   [edit event-options policy policy1 then]
   bsmith@R1# commit
   ```

Results

```
[edit event-options policy policy1 then]
upload filename /var/log/messages destination mgmt-archives {
   user-name admin;
   transfer-delay 4;
   retry-count 5 retry-interval 4;
}
upload filename /var/log/messages destination mgmt-server
upload filename committed destination mgmt-archives;
execute-commands {
   commands {
```

```
        "show interfaces brief ge-*";
      }
      output-filename ge-interfaces;
      destination mgmt-archives {
        transfer-delay 5;
        retry-count 5 retry-interval 4;
      }
    }
    event-script event-script1 {
      output-filename policy1-script-output;
      destination mgmt-archives {
        transfer-delay 5;
        retry-count 5 retry-interval 4;
      }
    }
```

Verification

Verifying the Upload

Purpose When the configured event triggers the event policy, the system uploads the generated output files and the specified system files to the URL defined in the mgmt-archives destination. On the destination server, verify that all files have been uploaded.

Action On the destination server, verify that all uploaded files are present.

```
% ls
R1_ge-interfaces_20111209_213452
R1_juniper.conf.gz_20111209_213409
R1_messages_20111209_212941
R1_policy1-script-output_20111209_212619
```

Meaning Note that the filename format for each file includes the device name, the filename, and the date and time stamp.

If all of the uploaded files are present, the event policy and upload actions are working correctly. If none of the files are uploaded, verify that the destination is configured and that the archive site URL and any required password is entered correctly. For information about configuring destinations, see "Example: Defining Destinations for File Archiving by Event Policies" on page 54. If a portion of the files are missing, configure a longer transfer delay and increase the retry count and retry interval for those files.

Related Documentation

- Example: Defining Destinations for File Archiving by Event Policies on page 54
- Configuring the Delay Before Files Are Uploaded by an Event Policy on page 63
- Configuring an Event Policy to Retry the File Upload Action on page 65

Configuring the Delay Before Files Are Uploaded by an Event Policy

A transfer delay allows you to specify the number of seconds the event process (eventd) waits before beginning to upload a file or multiple files. A transfer delay allows you to

ensure that a large file, such as a core file, is completely generated before the upload begins.

As described in "Example: Defining Destinations for File Archiving by Event Policies" on page 54, you can associate a transfer delay with a destination. If you associate a transfer delay with a destination, the transfer delay applies to all file upload actions that use the destination.

In the following example, the ***some-dest*** destination is common for both event policies, **policy1** and **policy2**. A transfer delay of 2 seconds is associated with the **some-dest** destination and applies to uploading the output files to the destination for both event policies.

```
[edit event-options]
policy policy1 {
   events e1;
   then {
   execute-commands {
      commands {
         "show version";
      }
      output-filename command-output.txt;
      destination some-dest;
   }
}
policy policy2 {
   events e2;
   then {
      event-script bar.xsl {
         output-filename event-script-output.txt;
         destination some-dest;
      }
   }
}
destinations {
   some-dest {
      transfer-delay 2;
      archive-sites {
         "scp://robot@my.big.com/foo/moo" password "password";
         "scp://robot@my.little.com/foo/moo" password "password";
      }
   }
}
```

Suppose you have multiple event policy actions that use the same destination. For some of these event policy actions, you want a transfer delay, and for other event policy actions you want no transfer delay. To assign a transfer delay to a single event policy action, include the optional **transfer-delay** statement for each action:

```
transfer-delay seconds;
```

You can include this statement at the following hierarchy levels:

- **[edit** event-options policy *policy-name* then event-script *filename* destination *destination-name***]**

- [edit event-options policy *policy-name* then execute-commands destination *destination-name*]
- [edit event-options policy *policy-name* then upload filename (*filename* | committed) destination *destination-name*]

If you configure a transfer delay at the [edit event-options destinations *destination-name*] hierarchy level, and you also configure a transfer delay for the event policy action, the resulting transfer delay is the sum of the two:

```
Total transfer-delay =
transfer-delay (destination) + transfer-delay (event-policy-action)
```

For a configuration example, see "Example: Assigning a Transfer Delay to an Event Policy Action" on page 87.

Configuring an Event Policy to Retry the File Upload Action

Transient network problems can cause a file upload operation to fail. When this happens, you might want to retry the file upload operation. By default, if the file upload operation fails for any reason, the event policy does not retry the upload operation.

To configure the policy to retry a file upload operation, include the optional **retry-count** and **retry-interval** statements:

```
retry-count number retry-interval seconds;
```

You can include these statements at the following hierarchy levels:

- [edit event-options policy *policy-name* then event-script *filename* destination *destination-name*]
- [edit event-options policy *policy-name* then execute-commands destination *destination-name*]
- [edit event-options policy *policy-name* then upload filename (*filename* | committed) destination *destination-name*]

The **retry-count** statement sets the number of times the policy retries the upload operation if the upload fails. The default value for the **retry-count** statement is 0 and the maximum is 10.

If you include the **retry-count** statement, you can also include the **retry-interval** statement, which sets the time interval (in seconds) between each retry.

For a configuration example, see "Example: Retrying the File Upload Action" on page 95.

CHAPTER 6

Configuring Event Policy Privileges

Changing the User Privilege Level for an Event Policy Action

Only superusers can configure event policies. Event policy actions—such as executing event scripts, uploading files, and executing operational mode commands—are by default executed by user **root**, because the event process (eventd) runs with **root** privileges.

In some cases, you might want an event policy action to be executed with restricted privileges. For example, suppose you configure an event policy that executes a script if an interface goes down. The script includes remote procedure calls (RPCs) to change the device configuration if certain conditions are present. If you do not want the script to change the configuration, you can execute the script with a restricted user profile. When the script is executed with a user profile that disallows configuration changes, the RPCs to change the configuration fail.

You can associate a user with each action in an event policy. If a user is not associated with an event policy action, then the action is executed as user **root** by default.

To specify the user under whose privileges an action is executed, include the **user-name** statement:

```
user-name username;
```

You can include this statement at the following hierarchy levels:

- **[edit** event-options policy *policy-name* then event-script *filename***]**
- **[edit** event-options policy *policy-name* then execute-commands**]**
- **[edit** event-options policy *policy-name* then upload filename (*filename* | committed) destination *destination-name***]**

NOTE: The username that you specify must be configured at the **[edit system login]** hierarchy level. For more information, see the Junos OS System Basics Configuration Guide.

For a configuration example, see "Example: Associating an Optional User with an Event Policy Action" on page 89.

CHAPTER 7

Configuring Limits on the Number of Event Policies

Changing the User Privilege Level for an Event Policy Action

Only superusers can configure event policies. Event policy actions—such as executing event scripts, uploading files, and executing operational mode commands—are by default executed by user **root**, because the event process (eventd) runs with **root** privileges.

In some cases, you might want an event policy action to be executed with restricted privileges. For example, suppose you configure an event policy that executes a script if an interface goes down. The script includes remote procedure calls (RPCs) to change the device configuration if certain conditions are present. If you do not want the script to change the configuration, you can execute the script with a restricted user profile. When the script is executed with a user profile that disallows configuration changes, the RPCs to change the configuration fail.

You can associate a user with each action in an event policy. If a user is not associated with an event policy action, then the action is executed as user **root** by default.

To specify the user under whose privileges an action is executed, include the **user-name** statement:

```
user-name username;
```

You can include this statement at the following hierarchy levels:

- **[edit** event-options policy ***policy-name*** then event-script ***filename*****]**
- **[edit** event-options policy ***policy-name*** then execute-commands**]**
- **[edit** event-options policy ***policy-name*** then upload **filename (*filename* | committed) destination *destination-name*]**

NOTE: The username that you specify must be configured at the **[edit system login]** hierarchy level. For more information, see the Junos OS System Basics Configuration Guide.

For a configuration example, see "Example: Associating an Optional User with an Event Policy Action" on page 89.

Example: Configuring Limits on Executed Event Policies and Memory Allocation for Scripts

This example configures a maximum value for the number of event polices that the device can execute concurrently and a maximum memory limit for executed commit, event, and op scripts.

Requirements

A device running Junos OS Release 12.3 or later.

Overview

This example configures a device running Junos OS to limit the number of event policies that can run simultaneously on that device to a maximum of 12 policies. Additionally, the example configures each script type with a maximum amount of memory that the system can allocate to the data segment portion of a script of that type. The device is configured to allocate 192 MB for each executed commit script and event script and 100 MB for each executed op script.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set system scripts commit max-datasize 192m
set system scripts op max-datasize 100m
set event-options max-policies 12
set event-options event-script max-datasize 192m
```

Step-by-Step Procedure

1. Configure the maximum number of event policies that can execute concurrently.

```
[edit]
user@host# set event-options max-policies 12
```

2. Configure the maximum memory allocated for the data segment for each executed commit script.

```
[edit]
user@host# set system scripts commit max-datasize 192m
```

3. Configure the maximum memory allocated for the data segment for each executed op script.

```
[edit]
user@host# set system scripts op max-datasize 100m
```

4. Configure the maximum memory allocated for the data segment for each executed event script.

```
[edit]
user@host# set event-options event-script max-datasize 192m
```

5. Commit the configuration.

```
[edit]
user@host# commit
```

Results

```
[edit]
event-options {
    event-script {
        max-datasize 192m;
    }
    max-policies 12;
}
system {
    scripts {
        commit {
            max-datasize 192m;
        }
        op {
            max-datasize 100m;
        }
    }
}
```

Verification

Confirm that the configuration is working properly.

Verifying the Limit on Concurrently Executing Event Policies

Purpose If the system is running the maximum number of event policies, the system ignores any triggered event policy until such time that another policy finishes. The system logs the EVENTD_POLICY_LIMIT_EXCEEDED messsage for any triggered event policies that were not executed. By default, system log messages are recorded in the **messages** log file.

Action Review the configured log file to verify whether any policies were barred from execution, because the maximum limit was reached. You can narrow the output to include only the relevant error messages by appending **| match EVENTD_POLICY_LIMIT_EXCEEDED**.

```
user@R1> show log messages | match EVENTD_POLICY_LIMIT_EXCEEDED
Jun 11 17:02:42  R1 eventd[1177]: EVENTD_POLICY_LIMIT_EXCEEDED: Unable to execute
 policy 'raise-trap' because current number of policies (12) exceeds system limit
 (12)
[output omitted]
```

Related Documentation

- max-datasize on page 138
- max-policies on page 115

CHAPTER 8

Creating and Executing Event Scripts

Required Boilerplate for Event Scripts

When you write event scripts, you use Extensible Stylesheet Language Transformations (XSLT) or Stylesheet Language Alternative Syntax (SLAX) tools provided with Junos OS. These tools include basic boilerplate that you must include in all event scripts, optional extension functions that accomplish scripting tasks more easily, and named templates that make scripts easier to read and write, which you import from a file called **junos.xsl**. For more information about the extension functions and templates, see Junos Script Automation: Understanding Extension Functions in the jcs and slax Namespaces and Junos Script Automation: Named Templates in the jcs Namespace Overview.

Event scripts are based on Junos XML and Junos XML protocol tag elements. Like all XML elements, angle brackets enclose the name of a Junos XML or Junos XML protocol tag element in its opening and closing tags. This is an XML convention, and the brackets are a required part of the complete tag element name. They are not to be confused with the angle brackets used in the documentation to indicate optional parts of Junos OS CLI command strings.

You must include either XSLT or SLAX boilerplate as the starting point for all event scripts that you create. The XSLT boilerplate follows:

XSLT Boilerplate for Event Scripts

```
1  <?xml version="1.0" standalone="yes"?>
2  <xsl:stylesheet version="1.0"
3    xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
4    xmlns:junos="http://xml.juniper.net/junos/*/junos"
5    xmlns:xnm="http://xml.juniper.net/xnm/1.1/xnm"
6    xmlns:jcs="http://xml.juniper.net/junos/commit-scripts/1.0">
7    <xsl:import href="../import/junos.xsl"/>

8    <xsl:template match="configuration">
9      <event-script-results>
         <!-- ... Insert your code here ... -->
10     </event-script-results>
11   </xsl:template>
     <!-- ... insert additional template definitions here ... -->
12 </xsl:stylesheet>
```

Line 1 is the Extensible Markup Language (XML) processing instruction (PI). This PI specifies that the code is written in XML using version 1.0. The XML PI, if present, must be the first noncomment token in the script file.

```
1  <?xml version="1.0"?>
```

Line 2 opens the style sheet and specifies the XSLT version as 1.0.

```
2  <xsl:stylesheet version="1.0"
```

Lines 3 through 6 list all the namespace mappings commonly used in event scripts. Not all of these prefixes are used in this example, but it is not an error to list namespace mappings that are not referenced. Listing all namespace mappings prevents errors if the mappings are used in later versions of the script.

```
3    xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
4    xmlns:junos="http://xml.juniper.net/junos/*/junos"
5    xmlns:xnm="http://xml.juniper.net/xnm/1.1/xnm"
6    xmlns:jcs="http://xml.juniper.net/junos/commit-scripts/1.0">
```

Line 7 is an XSLT import statement. It loads the templates and variables from the file referenced as **../import/junos.xsl**, which ships as part of Junos OS (in the file **/usr/libdata/cscript/import/junos.xsl**). The **junos.xsl** file contains a set of named templates you can call in your scripts. These named templates are discussed in Junos Script Automation: Named Templates in the jcs Namespace Overview and Junos Named Templates in the jcs Namespace Summary.

```
7    <xsl:import href="../import/junos.xsl"/>
```

Line 8 defines a template that matches the **</>** element. The **<xsl:template match="/">** element is the root element and represents the top level of the XML hierarchy. All XML Path Language (XPath) expressions in the script must start at the top level. This allows the script to access all possible Junos XML and Junos XML protocol remote procedure calls (RPCs). For more information, see XPath Overview and xsl:template match="/" Template.

```
8    <xsl:template match="/">
```

After the **<xsl:template match="/">** tag element, the **<event-script-results>** and **</event-script-results>** container tags must be the top-level child tags, as shown in Lines 9 and 10.

```
9      <event-script-results>
```

```
        <!-- ... insert your code here ... -->
10      </event-script-results>
```

Line 11 closes the template.

```
11    </xsl:template>
```

Between Line 11 and Line 12, you can define additional XSLT templates that are called from within the **<xsl:template match="/">** template.

Line 12 closes the style sheet and the event script.

```
12  </xsl:stylesheet>
```

SLAX Boilerplate for Event Scripts

```
version 1.0;
ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
import "../import/junos.xsl";

match / {
  <event-script-results> {
    /*
    * Insert your code here
    */
  }
}
```

Capturing and Using Event Details and Remote Execution Details in Event Scripts

When an event script is triggered by an event policy, the initiating event policy forwards a set of event details to the triggered event script. These event details can be captured, evaluated, and sent to log files as required. In addition, any configured remote execution details are also forwarded to the event script. The remote execution details allow the event script to invoke remote procedure calls as detailed in "Using RPCs and Operational Mode Commands in Event Scripts" on page 77.

Two types of event details are returned: triggered events and received events. *Triggered events* record the details of the event that triggered the policy. *Received events* record the details of events that happened before the triggering event. Event details and remote execution details are forwarded to the event script as XML in the following format:

```
<event-script-input>
  <junos-context>
    ...
  </junos-context>
  <trigger-event>
    <id>event-id</id>
    <type>event-type</type>
    <generation-time>timestamp</generation-time>
    <process>
      <name>process-name</name>
      <pid>pid</pid>
    </process>
    <hostname>hostname</hostname>
    <facility>facility-string</facility>
```

```
    <severity>severity-string</severity>
    <attribute-list>
      <attribute>
        <name>attribute-name</name>
        <value>attribute-value</value>
      </attribute>
    </attribute-list>
  </trigger-event>
  <received-events>
    <received-event>
      <id>event-id</id>
      <type>event-type</type>
      <generation-time>timestamp</generation-time>
      <process>
        <name>process-name</name>
        <pid>pid</pid>
      </process>
      <hostname>hostname</hostname>
      <facility>facility-string</facility>
      <severity>severity-string</severity>
      <attribute-list>
        <attribute>
          <name>attribute-name</name>
          <<value>attribute-value</value>
        </attribute>
      </attribute-list>
    </received-event>
  </received-events>
  <remote-execution-details>
    <remote-execution-detail>
      <remote-hostname>hostname</remote-hostname>
      <username>username</username>
      <passphrase>passphrase</passphrase>
    </remote-execution-detail>
  </remote-execution-details>
</event-script-input>
```

For information about the **<junos-context>** element, see Junos Script Automation: Global Parameters and Variables in the junos.xsl File.

For information about one method for using event details, see "Example: Limiting Event Script Output Based on a Specific Event Type" on page 93.

Mapping Operational Mode Commands and Output Fields to Junos XML Notation

In event scripts, you use tag elements from the Junos XML API to represent operational mode commands and output fields. For the Junos XML equivalent of commands and output fields, consult the *Junos XML API Operational Reference*.

You can also display Junos XML by directing the output from the **show** command to the **| display xml** command:

```
user@host> operational-mode-command | display xml
```

For example:

```
user@host> show interfaces terse | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/10.0R1/junos">
    <interface-information
xmlns="http://xml.juniper.net/junos/10.0RI0/junos-interface" junos:style="terse">
        <physical-interface>
            <name>dsc</name>
            <admin-status>up</admin-status>
            <oper-status>up</oper-status>
        </physical-interface>
        <physical-interface>
            <name>fxp0</name>
            <admin-status>up</admin-status>
            <oper-status>up</oper-status>
            <logical-interface>
                <name>fxp0.0</name>
                <admin-status>up</admin-status>
                <oper-status>up</oper-status>
                ...
```

Using RPCs and Operational Mode Commands in Event Scripts

Most Junos operational mode commands have XML equivalents. These XML commands can be executed remotely using the *remote procedure call* (RPC) protocol. All operational mode commands that have XML equivalents are listed in the *Junos XML API Operational Reference*.

RPC and operational mode command use in event scripts is discussed in more detail in the following sections:

Using RPCs in Event Scripts

You can invoke remote procedure calls (RPCs) in event scripts. For each event script that invokes RPCs, you must include the **remote-execution** statement at the **[edit event-options event-script file *filename*]** hierarchy level. For each remote device where an RPC is executed, you must configure the SSH host key information for the that device on the local device where the event script is executed.

For each remote device where an RPC is executed, specify the device hostname and the corresponding username and passphrase at the **remote-execution** level of the configuration hierarchy.

```
[edit event-options event-script file filename]
remote-execution {
  remote-hostname {
    username username;
    passphrase passphrase;
  }
}
```

The remote hostnames and their corresponding username and passphrase, in addition to the event details, are passed as input to the event script when it is triggered by an event policy. For more information about the details that are forwarded to the event script, see "Capturing and Using Event Details and Remote Execution Details in Event Scripts" on page 75. A connection handle to the remote host is generated with the **jcs:open()** function using ***remote-hostname***, ***username***, and ***passphrase*** as arguments; for more information about this function, see open(). The following code obtains a connection handle for each remote host included in the configuration:

XSLT Syntax

```
<xsl:for-each select="event-script-input/remote-execution-details">
  <xsl:variable name="d" select="remote-execution-detail"/>
  <xsl:variable name="connection"
      select="jcs:open($d/remote-hostname,$d/username,$d/passphrase)"/>
  ...
</xsl:for-each>
```

SLAX Syntax

```
for-each (event-script-input/remote-execution-details) {
  var $d = remote-execution-detail;
  var $connection = jcs:open($d/remote-hostname,$d/username,$d/passphrase);
  ...
}
```

To execute an RPC on a remote device, an SSH session must be established. In order for the script to establish the connection, you must either configure the SSH host key information for the remote device on the local device where the script will be executed, or the SSH host key information for the remote device must exist in the known hosts file of the user executing the script. For each remote device where the RPC is executed, configure the SSH host key information with one of the following methods:

- To configure SSH known hosts on the local device, include the **host** statement, and specify hostname and host key options for the remote device at the **[edit security ssh-known-hosts]** hierarchy level of the configuration.
- To manually retrieve SSH host key information, issue the **set security ssh-known-hosts fetch-from-server *hostname*** configuration mode command to instruct Junos OS to connect to the remote device and add the key.

  ```
  user@host# set security ssh-known-hosts fetch-from-server router2
  The authenticity of host 'router2 (10.10.10.1)' can't be established.
  RSA key fingerprint is 30:18:99:7a:3c:ed:40:04:0f:fd:c1:57:7e:6b:f3:90.
  Are you sure you want to continue connecting (yes/no)? yes
  Warning: Permanently added 'router2,10.10.10.1' (RSA) to the list of known
  hosts.
  ```

- To manually import SSH host key information from a file, use the **set security ssh-known-hosts load-key-file *filename*** configuration mode command and specify the known-hosts file.

  ```
  user@host# set security ssh-known-hosts load-key-file /var/tmp/known_hosts
  Import SSH host keys from trusted source /var/tmp/known_hosts ? [yes,no] (no)
  yes
  ```

- Alternatively, the user executing the script can log in to the local device, SSH to the remote device, and then manually accept the host key, which is added to that user's known hosts file. In the following example, root is logged in to **router1**. In order to execute

a remote RPC on **router2**, root adds the host key of **router2** by issuing the **ssh router2** operational mode command and manually accepting the key.

```
root@router1> ssh router2
The authenticity of host 'router2 (10.10.10.1)' can't be established.
RSA key fingerprint is 30:18:99:7a:3c:ed:40:04:0f:fd:c1:57:7e:6b:f3:90.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'router2,10.10.10.1' (RSA) to the list of known
hosts.
```

After configuring the required SSH host key and obtaining a connection handle to the remote device, the event script can execute RPCs with the **jcs:execute()** extension function on that remote device. For more information about this function, see execute(). To use an RPC in the event script, include the RPC in a variable declaration and execute it with the **jcs:execute()** function; the connection handle and RPC variable declaration are provided as arguments to the **jcs:execute()** function.

XSLT Syntax

```
<xsl:variable name="rpc">
  <get-interface-information/> # Junos RPC for the show interfaces command
</xsl:variable>
<xsl:variable name="out" select="jcs:execute($connection, $rpc)"/>
```

SLAX Syntax

```
var $rpc = <get-interface-information>;
var $out = jcs:execute($connection, $rpc);
```

where **connection** is the connection handle to the remote host. Any number of RPCs can be executed within the context of this connection handle until it is closed with the **jcs:close()** function.

Displaying the RPC Tags for a Command

To display the remote procedure call (RPC) XML tags for an operational mode command, enter **display xml rpc** after the pipe symbol (|).

The following example displays the RPC tags for the **show route** command:

```
user@host> show route | display xml rpc
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/10.1I0/junos">
    <rpc>
        <get-route-information>
        </get-route-information>
    </rpc>
    <cli>
        <banner></banner>
    </cli>
</rpc-reply>
```

Using Operational Mode Commands in Event Scripts

Some operational mode commands do not have XML equivalents. If a command is not listed in the *Junos XML API Operational Reference*, it does not have an XML equivalent.

Another way to determine whether a command has an XML equivalent is to issue the command followed by the **| display xml** command:

```
user@host> operational-mode-command | display xml
```

If the output includes only tag elements like **<output>**, **<cli>**, and **<banner>**, the command might not have an XML equivalent. In the following example, the output indicates that the **show host** command has no XML equivalent:

```
user@host> show host hostname | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/10.0R1/junos">
   <output>
       ...
    </output>
    <cli>
        <banner></banner>
    </cli>
</rpc-reply>
```

NOTE: For some commands that have an XML equivalent, the output of the piped **| display xml** command does not include tag elements other than **<output>**, **<cli>**, and **<banner>** only because the relevant feature is not configured. For example, the **show services cos statistics forwarding-class** command has an XML equivalent that returns output in the **<service-cos-forwarding-class-statistics>** response tag, but if the configuration does not include include any statements at the **[edit class-of-service]** hierarchy level then there is no actual data for the **show services cos statistics forwarding-class | display xml** command to display. The output is something like this:

```
user@host> show services cos statistics forwarding-class | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/8.3I0/junos">

    <cli>

        <banner></banner>

    </cli>

</rpc-reply>
```

For this reason, the information in the *Junos XML API Operational Reference* is normally more reliable.

An event script can include commands that have no XML equivalent. Use the **<command>**, **<xsl:value-of>**, and **<output>** elements in the script, as shown in the following code snippet. This snippet is expanded and fully described in Example: Displaying DNS Hostname Information Using an Op Script.

```
<xsl:variable name="query">
  <command>
    <xsl:value-of select="concat('show host ', $hostname)"/>
  </command>
</xsl:variable>
<xsl:variable name="result" select="jcs:invoke($query)"/>
<xsl:variable name="host" select="$result"/>
<output>
  <xsl:value-of select="concat('Name: ', $host)"/>
</output>
...
```

Enabling an Event Script

Event scripts are stored on a device's hard drive in the **/var/db/scripts/event** directory or on the flash drive in the **/config/scripts/event** directory. Only users in the Junos OS **super-user** login class can access and edit files in these directories. For information about setting the storage location for scripts, see Storing Scripts in Flash Memory.

NOTE: If the device has dual Routing Engines and you want to enable an event script to execute on both Routing Engines, you must copy the script to the /var/db/scripts/event or /config/scripts/event directory on both Routing Engines. The commit synchronize command does not automatically copy scripts between Routing Engines.

You must enable an event op script before it can be executed. Include the **file *filename*** statement at the **[edit event-options events-script]** hierarchy level, specifying the name of an Extensible Stylesheet Language Transformations (XSLT) or Stylesheet Language Alternative Syntax (SLAX) file containing an event script. Only users who belong to the Junos **super-user** login class can enable event scripts.

```
[edit event-options event-script]
file filename;
```

The filename of an event script written in SLAX must include the **.slax** extension for the script to be enabled and executed. No particular filename extension is required for event scripts written in XSLT, but we strongly recommend that you append the **.xsl** extension.

To determine which event scripts are currently enabled on the device, use the **show** command to display the files included at the **[edit event-options event-script]** hierarchy level. To ensure that the enabled files are on the device, list the contents of the **/var/run/scripts/event/** directory using the **file list /var/run/scripts/event** operational mode command.

Executing an Event Script

When you issue the **commit** command, event scripts enabled at the **[edit event-options event-script]** hierarchy level are placed into system memory and enabled for execution. After the commit operation completes, an event script is executed in response to an event notification within an event policy. For more information, see "Executing Event Scripts in an Event Policy" on page 37.

Replacing an Event Script

You can update or replace an existing event script without changing the device's configuration or disrupting operations. Follow these steps:

1. Edit or write the new event script.
2. Copy the script to the **/var/db/scripts/event** directory on the hard drive or the **/config/scripts/event** directory on the flash drive; for information about setting the

storage location for scripts, see Storing Scripts in Flash Memory. Only users who belong to the Junos **super-user** login class can alter files in these directories.

NOTE: If the device has dual Routing Engines, remember to copy the script to the **/var/db/scripts/event** or **/config/scripts/event** directory on both Routing Engines. The **commit synchronize** command does not automatically copy scripts between Routing Engines.

3. Issue the **request system scripts event-scripts reload** operational mode command.

```
user@host> request system scripts event-scripts reload
```

All event scripts are reloaded into the eventd process' memory.

Configuring Checksum Hashes for an Event Script

You can configure one or more checksum hashes that can be used to verify the integrity of an event script before the script runs on the switch, router, or security device.

To configure a checksum hash:

1. Create the script.
2. Place the script in the **/var/db/scripts/even** directory on the device.
3. Run the script through one or more hash functions to calculate hash values.

   Junos OS supports MD5, SHA-1, and SHA-256 hash functions.

```
user@host> file checksum md5 /var/db/scripts/commit/script1.slax
  MD5 (/var/db/scripts/event/script1.slax) = 3af7884eb56e2d4489c2e49b26a39a97
user@host> file checksum sha1 /var/db/scripts/commit/script1.slax
  SHA1 (/var/db/scripts/event/script1.slax) =
  00dc690fb08fb049577d012486c9a6dad34212c0
user@host> file checksum sha-256 /var/db/scripts/commit/script1.slax
  SHA256 (/var/db/scripts/event/script1.slax) =
  150bf53383769f3bfedd41fe73320777f208d4fda81230cb27b8738
```

4. Configure the script.

```
[edit event-options event-script]
user@host# set file script1.slax checksum
  md5 3af7884eb56e2d4489c2e49b26a39a97
[edit event-options event-script]
user@host# set file script1.slax checksum
  sha-1 00dc690fb08fb049577d012486c9a6dad34212c0
[edit event-options event-script]
user@host# set file script1.slax checksum
  sha-256 150bf53383769f3bfedd41fe73320777f208d4fda81230cb27b8738
```

   During the execution of the script, Junos OS recalculates the checksum value using the configured hash and verifies that the calculated value matches the configured value. If the values differ, the execution of the script fails. When you configure multiple checksum values with different hash algorithms, all the configured values must match the calculated values; otherwise, the script execution fails and the event policy fails.

Related Documentation

- Configuring Checksum Hashes for a Commit Script
- Configuring Checksum Hashes for an Op Script
- file checksum md5 command in the *System Basics and Services Command Reference*
- file checksum sha-256 command in the *System Basics and Services Command Reference*
- file checksum sha1 command in the *System Basics and Services Command Reference*

Example: Configuring Limits on Executed Event Policies and Memory Allocation for Scripts

This example configures a maximum value for the number of event polices that the device can execute concurrently and a maximum memory limit for executed commit, event, and op scripts.

Requirements

A device running Junos OS Release 12.3 or later.

Overview

This example configures a device running Junos OS to limit the number of event policies that can run simultaneously on that device to a maximum of 12 policies. Additionally, the example configures each script type with a maximum amount of memory that the system can allocate to the data segment portion of a script of that type. The device is configured to allocate 192 MB for each executed commit script and event script and 100 MB for each executed op script.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them in a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level:

```
set system scripts commit max-datasize 192m
set system scripts op max-datasize 100m
set event-options max-policies 12
set event-options event-script max-datasize 192m
```

Step-by-Step Procedure

1. Configure the maximum number of event policies that can execute concurrently.

   ```
   [edit]
   user@host# set event-options max-policies 12
   ```

2. Configure the maximum memory allocated for the data segment for each executed commit script.

```
[edit]
user@host# set system scripts commit max-datasize 192m
```

3. Configure the maximum memory allocated for the data segment for each executed op script.

```
[edit]
user@host# set system scripts op max-datasize 100m
```

4. Configure the maximum memory allocated for the data segment for each executed event script.

```
[edit]
user@host# set event-options event-script max-datasize 192m
```

5. Commit the configuration.

```
[edit]
user@host# commit
```

Results

```
[edit]
event-options {
    event-script {
        max-datasize 192m;
    }
    max-policies 12;
}
system {
    scripts {
        commit {
            max-datasize 192m;
        }
        op {
            max-datasize 100m;
        }
    }
}
```

Verification

Confirm that the configuration is working properly.

Verifying the Limit on Concurrently Executing Event Policies

Purpose If the system is running the maximum number of event policies, the system ignores any triggered event policy until such time that another policy finishes. The system logs the EVENTD_POLICY_LIMIT_EXCEEDED messsage for any triggered event policies that were not executed. By default, system log messages are recorded in the **messages** log file.

Action Review the configured log file to verify whether any policies were barred from execution, because the maximum limit was reached. You can narrow the output to include only the relevant error messages by appending **| match EVENTD_POLICY_LIMIT_EXCEEDED**.

```
user@R1> show log messages | match EVENTD_POLICY_LIMIT_EXCEEDED
Jun 11 17:02:42  R1 eventd[1177]: EVENTD_POLICY_LIMIT_EXCEEDED: Unable to execute
 policy 'raise-trap' because current number of policies (12) exceeds system limit
 (12)
[output omitted]
```

Related Documentation

- max-datasize on page 138
- max-policies on page 115

CHAPTER 9

Examples

Example: Assigning a Transfer Delay to an Event Policy Action

This section discusses three examples.

Example 1 Configure two event policies, **policy1** and **policy2**. The **policy1** event policy has a 5-second transfer-delay when uploading the **process.core** file to the **some-dest** destination. The **policy2** event policy has no transfer delay when uploading the **process.core** file to the same destination.

```
[edit event-options]
policy policy1 {
   events e1;
   then {
      upload filename process.core destination some-dest {
         transfer-delay 5;
      }
   }
}
policy policy2 {
   events e2;
   then {
```

```
      upload filename process.core destination some-dest;
    }
  }
  destinations {
    some-dest {
      archive-sites {
        "scp://robot@my.little.com/foo/moo" password "password";
        "scp://robot@my.big.com/foo/moo" password "password";
      }
    }
  }
```

Example 2 The **policy1** event policy has a 7-second (5 seconds + 2 seconds) transfer delay when uploading the **process.core** file to the destination. The **policy2** event policy has a 2-second transfer delay when uploading the **process.core** file to the destination.

```
[edit event-options]
policy policy1 {
  events e1;
  then {
    upload filename process.core destination some-dest {
      transfer-delay 5;
    }
  }
}
policy policy2 {
  events e2;
  then {
    upload filename process.core destination some-dest;
  }
}
destinations {
  some-dest {
    transfer-delay 2;
    archive-sites {
      "scp://robot@my.little.com/foo/moo" password "password";
      "scp://robot@my.big.com/foo/moo" password "password";
    }
  }
}
```

Example 3 The **policy1** event-policy is executed with **user1** privileges and uploads the **process.core** file after a transfer delay of 7 seconds (5 seconds + 2 seconds). The **policy2** event policy is executed with **root** privileges and uploads the **process.core** file after a transfer delay of 6 seconds (4 seconds + 2 seconds).

```
[edit event-options]
policy policy1 {
  events e1;
  then {
    upload filename process.core destination some-dest {
      transfer-delay 5;
      user-name user1;
    }
  }
}
```



```
policy policy2 {
  events e2;
  then {
    upload filename process.core destination some-dest {
      transfer-delay 4;
    }
  }
}
destinations {
  some-dest {
    transfer-delay 2;
    archive-sites {
      "scp://robot@my.little.com/foo/moo" password "password";
      "scp://robot@my.big.com/foo/moo" password "password";
    }
  }
}
```

Example: Associating an Optional User with an Event Policy Action

Configure two event policies, **policy1** and **policy2**.

In **policy1**, associate user **user1** with the **execute-commands** action. The **execute-commands** action is executed with **user1** privileges.

In **policy2**, do not explicitly associate a user with the **event-script** action. The **event-script** action is executed with **root** privileges.

```
[edit system]
login {
  user user1 {
    class operator;
  }
}
[edit event-options]
policy p1 {
  events e1;
  then {
    execute-commands {
      commands {
        "show version";
      }
      user-name user1;
      output-filename command-output.txt;
      destination some-dest;
    }
  }
}
policy p2 {
  events e2;
  then {
    event-script script.xsl {
      output-filename event-script-output.txt;
      destination some-dest;
    }
```

```
    }
}
```

Example: Controlling Event Policy Using a Regular Expression

The following policy is executed only if the **interface-name** attribute in both traps (**SNMP_TRAP_LINK_DOWN** and **SNMP_TRAP_LINK_UP**) match each other and the **interface-name** attribute in the **SNMP_TRAP_LINK_DOWN** trap starts with letter *t*. This means the policy is executed only for T1 (**t1-**) and T3 (**t3-**) interfaces. The policy is not executed when the **eventd** process receives traps from other interfaces.

NOTE: In system log files, the message tags appear in all uppercase letters. In the command-line interface (CLI), the message tags appear in all lowercase letters.

```
[edit event-options]
policy pol6 {
    events snmp_trap_link_down;
    within 120 events snmp_trap_link_up;
    attributes-match {
        snmp_trap_link_up.interface-name equals snmp_trap_link_down.interface-name;
        snmp_trap_link_down.interface-name matches "^t";
    }
    then {
        execute-commands {
            commands {
                "show interfaces {$$.interface-name}";
                "show configuration interfaces {$$.interface-name}";
            }
            output-filename config.txt;
            destination bsd2;
            output-format text;
        }
    }
}
```

Example: Correlating Events Based on Event Attributes

In the following policy, the two events are correlated only if two of their parameter values match. Matching on attributes of both events ensures that the two events are related. In this case, the interface addresses must match and the physical interface (ifd) names must match.

The **RPD_KRT_IFDCHANGE** error occurs when the routing protocol process (rpd) sends a request to the kernel to change the state of an interface and the request fails. The **RPD_RDISC_NOMULTI** error occurs when an interface is configured for router discovery but the interface does not support IP multicast operations as required.

In this example, **RPD_RDISC_NOMULTI.interface-name** might be so-0/0/0.0, and **RPD_KRT_IFDCHANGE.ifd-index** might be so-0/0/0.

```
[edit event-options]
```

```
policy 1 {
  events rpd_rdisc_nomulti;
  within 500 events rpd_krt_ifdchange;
  attributes-match {
    rpd_rdisc_nomulti.interface-address equals rpd_krt_ifdchange.address;
    rpd_rdisc_nomulti.interface-name starts-with rpd_krt_ifdchange.ifd-index;
  }
  then {
    ... actions ...
  }
}
```

Example: Correlating Events Based on Receipt of Other Events Within a Specified Time Interval

In the following policy, a set of commands is issued and the output is logged and saved to a given location. The policy is executed if ***event3***, ***event4***, or ***event5*** occurs within 60 seconds after ***event1*** or ***event2*** occurs. The pseudocode for the policy is as follows:

```
if this event is (event3 or event4 or event5)
  and
  (event1 or event2 has been received within the last 60 seconds)
then {
  run a set of commands;
  log the output of these commands to a location;
}
```

Specify two archive sites in the configuration. The device attempts to transfer to the first archive site in the list, moving to the next site only if the transfer fails.

```
[edit event-options]
policy 1 {
  events [ event3 event4 event5 ];
  within 60 events [ event1 event2 ];
  then {
    execute-commands {
      commands {
        "command";
      }
      output-filename my_cmd_out;
      destination policy-1-command-dest;
    }
  }
}
destinations {
  policy-1-command-dest {
    archive-sites {
      scp://robot@my.big.com/a/b;
      scp://robot@my.little.com/a/b;
    }
  }
}
```

Example: Generating an Internal Event

The following two examples generate an internal event. In the first example, the configuration generates an internal event every hour. In the second example, the configuration generates an event every night at midnight.

In the following example, the internal event called **EVERY-ONE-HOUR** is generated every hour (3600 seconds). If 3601 seconds pass and the event has not been generated, certain actions are taken.

```
[edit event-options]
generate-event every-one-hour time-interval 3600;
policy check-heartbeat {
   events every-one-hour;
   within 3601 not events every-one-hour;
   then {
      ... actions ...
   }
}
```

In the following example, the internal event called **IT-IS-MIDNIGHT** is generated at 12:00 AM every night (00:00:00). When the eventd process receives the **IT-IS-MIDNIGHT** event, certain actions are taken.

```
[edit event-options]
generate-event it-is-midnight time-of-day 00:00:00;
policy midnight-chores {
   events it-is-midnight;
   then {
      ... actions ...
   }
}
```

Example: Ignoring Events Based on Receipt of Other Events

In the following policy, if any of ***event1***, ***event2***, or ***event3*** has occurred, and either ***event4*** or ***event5*** has occurred within the last 600 seconds, and ***event6*** has not occurred within the last 800 seconds, then the event that triggered the policy (***event1***, ***event2***, or ***event3***) is ignored, meaning system log messages are not created.

```
[edit event-options]
policy 1 {
   events [ event1 event2 event3 ];
   within 600 events [ event4 event5 ];
   within 800 not events event6;
   then {
      ignore;
   }
}
```

Sometimes events are generated repeatedly within a short period of time. In this case, it is redundant to execute a policy multiple times, once for each instance of the event. Event dampening allows you to slow down the execution of policies by ignoring instances of an event that occur within a specified time after another instance of the same event.

In the following example, an action is taken only if the eventd process has not received another instance of the event within the past 60 seconds. If an instance of the event has been received within the last 5 seconds, the policy is not executed and a system log message for the event is not created again.

```
[edit event-options]
policy dampen-policy {
   events event1;
   within 60 events event1;
   then {
      ignore;
   }
}
policy policy {
   events event1;
   then {
      ... actions ...
   }
}
```

Example: Limiting Event Script Output Based on a Specific Event Type

In situations where an event policy is triggered by multiple event types, you can limit the number of events that trigger the event script. For example, the following event policy triggers the **event-details.slax** event script whenever a **ui_login_event** or **ui_logout_event** occurs.

```
event-options {
   policy event-detail {
      events [ ui_login_event ui_logout_event ];
      then {
         event-script event-details.slax {
            output-filename systemlog;
            destination /tmp;
         }
      }
   }
}
```

The **event-details.slax** event script writes a log file only when the **ui_login_event** event occurs.

```
version 1.0;
ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
ns ext = "http://xmlsoft.org/XSLT/namespace";

var $event-definition = {
   <event-options> {
      <policy> {
```

```
        <namex> "event-detail";
        <eventsx> "ui_login_event";
        <thenx> {
          <event-scriptx> {
            <namex> "event_detail.slax";
            <output-filenamex> "foo";
            <destinationx> {
              <namex> "foo";
            }
          }
        }
      }
    }

    match / {
      <event-script-resultsx> {
        <event-triggered-this-policyx> {
          expr event-script-input/trigger-event/id;
        }
        <type-of-eventx> {
          expr event-script-input/trigger-event/type;
        }
        <process-namex> {
          expr event-script-input/trigger-event/attribute-list/attribute/name;
        }
      }
    }
```

Example: Representing the Correlating Event in an Event Policy

```
[edit event-options]
policy p1 {
  events [ e1 e2 e3 ];
  within 60 events [ e4 e5 e6 ];
  then {
    execute-commands {
      commands {
        "show interfaces {$$.interface-name}";
        "show interfaces {$e4.interface-name}";
        "show interfaces {$*.interface-name}";
      }
      output-filename command-output.txt;
      destination some-dest;
    }
  }
}
```

In the **show interfaces {$$.interface-name}** command, the value of the **interface-name** attribute of event **e1**, **e2**, or **e3** is substituted for the **{$$.interface-name}** variable.

In the **show interfaces {$e4.interface-name}** command, the value of the **interface-name** attribute of the most recent **e4** event is substituted for the **{$e4.interface-name}** variable.

In the **show interfaces {$*.interface-name}** command, the value of the **interface-name** attribute of the most recent **e4**, **e5**, or **e6** event is substituted for the **{$*.interface-name}** variable. If one of **e4**, **e5**, or **e6** occurs within 60 seconds of **e1**, **e2**, or **e3**, the value of the **interface-name** attribute for that correlating event (**e4**, **e5**, or **e6**) is substituted for the **{$*.interface-name}** variable. If the correlating event does not have an **interface-name** attribute, the software does not execute the **show interfaces {$*.interface-name}** command.

If both **e4** and **e5** occur within 60 seconds of **e1**, then the value of the **interface-name** attribute for **e4** is substituted for the **{$*.interface-name}** variable. This is because the event process (eventd) searches for correlating events in sequential order as configured in the **within** statement. In this case, the order is **e4** > **e5** > **e6**.

Example: Retrying the File Upload Action

This section discusses two examples.

Example 1 Configure a policy that retries the file upload operation two times with a time interval of 5 seconds between retries:

```
event-options {
  policy p1 {
    events e1;
    then {
      execute-commands {
        commands {
          command1;
        }
        output-filename command-output.txt;
        destination some-dest {
          retry-count 2 retry-interval 5;
        }
      }
    }
  }
}
```

Example 2 Configure a transfer delay of 10 seconds and retry the file upload operation two times with a time interval of 5 seconds between retries:

```
event-options {
  policy p2 {
    events e1;
    then {
      execute-commands {
        commands {
          command1;
        }
        output-filename command-output.txt;
        destination some-dest {
          retry-count 2 retry-interval 5;
          transfer-delay 10;
        }
      }
```

```
    }
  }
}
```

The transfer delay is in operation for the first upload attempt only. The policy uploads the **command-output.txt** file after a 10-second transfer delay. If the event process (eventd) detects failure of the upload operation, eventd retries the upload operation after 5 seconds. The failure detection time can be in the range from 60 to 90 seconds, depending on the transmission protocol, such as FTP.

The following sequence describes the file upload operation with two failed retransmissions:

1. Policy triggers upload operation.
2. Transmission delay of 10 seconds.
3. Policy tries to upload the output file.
4. Policy detects transmission failure.
5. Retry interval of 5 seconds.
6. Policy tries to upload the output file.
7. Policy detects transmission failure.
8. Retry interval of 5 seconds.
9. Policy tries to upload the output file.
10. Policy detects transmission failure.
11. Policy declares the failure of the file upload operation.

Example: Triggering a Policy Based on Event Count

This section discusses two examples.

NOTE: The RADIUS_LOGIN_FAIL, TELNET_LOGIN_FAIL, and SSH_LOGIN_FAIL events are not actual Junos OS events. They are illustrative for these examples.

Example 1 Configure an event policy called **login**. The **login** policy is executed if five login failure events (**RADIUS_LOGIN_FAIL**, **TELNET_LOGIN_FAIL**, or **SSH_LOGIN_FAIL**) are generated within 120 seconds. Take action by executing the **login-fail.xsl** event script, which disables the user account.

```
[edit event-options]
policy login {
  events [ RADIUS_LOGIN_FAIL TELNET_LOGIN_FAIL SSH_LOGIN_FAIL ];
  within 120 {
    trigger after 4;
  }
  then {
```

```
    event-script login-fail.xsl {
      destination some-dest;
    }
  }
}
```

Table 5 on page 97 shows how events add to the count.

Table 5: Event Count Triggers Policy

Event Number	Event	Time	Count	Order
1	RADIUS_LOGIN_FAIL	00:00:00	1	[1]
2	TELNET_LOGIN_FAIL	00:00:20	2	[1 2]
3	RADIUS_LOGIN_FAIL	00:02:05	2	[2 3]
4	SSH_LOGIN_FAIL	00:02:40	2	[3 4]
5	TELNET_LOGIN_FAIL	00:02:55	3	[3 4 5]
6	TELNET_LOGIN_FAIL	00:03:01	4	[3 4 5 6]
7	RADIUS_LOGIN_FAIL	00:03:55	5	[3 4 5 6 7]

The columns in Table 5 on page 97 mean the following:

- Event number—Event sequence number.
- Event—Policy login events received by the event process (eventd).
- Time—Time (in ***hh:mm:ss*** format) when eventd receives the event.
- Count—The number of events received by eventd within the last 120 seconds.
- Order—Order of events as received by eventd within the last 120 seconds.

At time 00:03:55, the value of count is more than 4; therefore, the **login** policy executes the **login-fail.xsl** script.

Example 2 Configure an event policy called **login**. The **login** policy is executed if five login failure events (**RADIUS_LOGIN_FAIL**, **TELNET_LOGIN_FAIL**, or **SSH_LOGIN_FAIL**) are generated within 120 seconds from username **roger**. Take action by executing the **login-fail.xsl** event script, which disables the **roger** user account.

```
[edit event-options]
policy p2 {
  events [ RADIUS_LOGIN_FAIL TELNET_LOGIN_FAIL SSH_LOGIN_FAIL ];
  within 120 {
    trigger after 4;
  }
  attributes-match {
    RADIUS_LOGIN_FAIL.username matches roger;
    TELNET_LOGIN_FAIL.username matches roger;
  }
```

```
    then {
      event-script login-fail.xsl {
        destination some-dest;
      }
    }
}
```

Example: Using Nonstandard System Log Messages to Trigger an Event Policy

Reference a **KERNEL** system log message in an event policy. The **raise-trap** action in the **then** statement is executed only if a **KERNEL** event containing a message that matches "exited on signal 11" occurs.

```
[edit event-options]
policy kernel-policy {
  events KERNEL;
  attributes-match {
    KERNEL.message matches "exited on signal 11";
  }
  then {
    raise-trap;
  }
}
```

CHAPTER 10

Summary of Event Policy Configuration Statements

archive-sites

Syntax

```
archive-sites {
  url <password password>;
}
```

Hierarchy Level [edit event-options destinations *destination-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Specify an archive site to which files are transferred. If you specify more than one archive site, the device attempts to transfer to the first archive site in the list, moving to the next site only if the transfer fails.

Options ***url***—The archive destination specified as a file URI, an active or passive FTP URI, or a Secure Copy (SCP) URI. Local device directories are also supported (for example, **/var/tmp/**).

file:<//host>/path

ftp://username@host:<port>url-path

pasvftp://username@host:<port>url-path

scp://username@host:<port>url-path

<path>/<filename>

password *password*—A plain-text password required for logging into the archive site.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Example: Defining Destinations for File Archiving by Event Policies on page 54
- destinations on page 107

arguments (Event Options)

Syntax

```
arguments {
  argument-name argument-value;
}
```

Hierarchy Level [edit event-options policy *policy-name* then event-script *filename*]

Release Information Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define command-line arguments for an event script that is invoked from an event policy.

Options ***argument-name***—Name of the argument.

argument-value—Value of the argument.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Executing Event Scripts in an Event Policy on page 37
- event-script (Event Policy) on page 111
- policy (Event Policy) on page 118

attributes-match

Syntax

```
attributes-match {
  event1.attribute-name equals event2.attribute-name;
  event.attribute-name matches regular-expression;
  event1.attribute-name starts-with event2.attribute-name;
}
```

Hierarchy Level [edit event-options policy *policy-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Execute the policy only if the attributes of two events are correlated or if the attribute of one event matches a regular expression.

If the **attributes-match** statement includes the **equals** or **starts-with** options, or if it includes a **matches** option that includes a clause for an event that is not specified at the **[edit event-options policy *policy-name* events]** hierarchy level, you must include one or more **within** statements in the same policy configuration.

Starting with Junos OS Release 11.1, you can include event policy variables within the statement to differentiate between a trigger event attribute and a correlated event attribute. You can use variables of the following forms:

- **{$$.*attribute-name*}**—The double dollar sign ($$) notation represents the event that is triggering a policy. When combined with an attribute name, the variable is replaced by the value of the attribute of the triggering event.
- **{$*event.attribute-name*}**—The dollar sign with the event name ($*event*) notation represents the most recent event that matches the specified event. The variable is replaced by the value of the attribute of the most recent event that matches ***event***.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using Correlated Events to Trigger an Event Policy on page 11
- Using Regular Expressions to Refine the Set of Events That Trigger a Policy on page 15
- equals (Event Policy) on page 108
- matches on page 115
- starts-with on page 124
- within on page 132

change-configuration

Syntax

```
change-configuration {
  commands {
    "command";
  }
  commit-options {
    check <synchronize>;
    force;
    log "comment-string";
    synchronize;
  }
  retry count number interval seconds;
  user-name username;
}
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 12.1.

Description When the associated event policy is invoked, update the candidate configuration using Junos OS configuration mode commands, and commit the changes.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Change the Configuration on page 22
- commands (Event Policy Change Configuration) on page 103
- commit-options on page 105
- retry (Event Policy) on page 121
- user-name on page 134

commands (Event Policy Change Configuration)

Syntax

```
commands {
  "command";
}
```

Hierarchy Level [edit event-options policy *policy-name* then change-configuration]

Release Information Statement introduced in Junos OS Release 12.1.

Description Specify the configuration mode commands to be issued on receipt of an event. Within an event policy, on receipt of the specified event or events, the event process (eventd) invokes the configured commands to update the candidate configuration, which is then committed, provided that no commit errors occur. The eventd process executes the configuration commands in the order in which they appear in the event policy configuration.

Options *command*—Configuration mode command to be executed. Enclose each command in quotation marks (**" "**), and specify the complete statement path to the element, identifier, or value as you do in configuration mode when issuing commands at the **[edit]** hierarchy level.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Change the Configuration on page 22
- change-configuration on page 102
- commit-options on page 105
- retry (Event Policy) on page 121
- user-name on page 134

commands (Event Policy Execute Commands)

Syntax

```
commands {
  "command";
}
```

Hierarchy Level [edit event-options policy *policy-name* then execute-commands]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Specify an operational mode command to be issued on receipt of an event.

Options ***command***—Command to be issued. Enclose each command in quotation marks (“ ”). The event process (eventd) issues the commands in the order in which they appear in the configuration.

You can include variables in commands. The eventd process replaces each variable with values contained in the event that triggers the policy. You can use command variables of the following forms:

- **{$$.*attribute-name*}**—The double dollar sign (**$$**) notation represents the event that is triggering a policy. When combined with an attribute name, the command variable is replaced by the value of the attribute name of the triggering event.
- **{$*event*.*attribute-name*}**—The dollar sign with the event name (**$*event***) notation represents the most recent event that matches the specified event. The variable is replaced by the value of the attribute name of the most recent event that matches ***event***.
- **{$*.*attribute-name*}**—The dollar sign with the asterisk (**$***) notation represents the most recent event that matches any of the correlating events. The variable is replaced by the value of the attribute name of the most recent event that matches any of the events specified in the policy configuration.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Execute Operational Mode Commands on page 19
- Representing the Correlating Event in an Event Policy on page 14

commit-options

Syntax

```
commit-options {
  check <synchronize>;
  force;
  log "comment-string";
  synchronize;
}
```

Hierarchy Level [edit event-options policy *policy-name* then change-configuration]

Release Information Statement introduced in Junos OS Release 12.1.

Description Customize the commit options for configuration updates made through an event policy. The **check** statement and the other **commit-options** statements are mutually exclusive.

Options

check <synchronize>—Verify that the candidate configuration is syntactically correct, but do not commit the changes. On dual control plane systems, when the **check synchronize** statement is configured, the candidate configuration on one control plane is copied to the other control plane, and the system verifies that both candidate configurations are syntactically correct. The **check** statement and the other **commit-options** statements are mutually exclusive.

force—Force the commit on the other Routing Engine, ignoring any warnings. By default, the **synchronize** command does not work if the responding Routing Engine has uncommitted configuration changes. However, you can enforce commit synchronization on the Routing Engines by using the **force** option.

log "*comment-string*"—Include a comment describing changes to the committed configuration. Enclose the comment in quotation marks and include it on a single line. To view commit comments, issue the **show system commit** operational mode command.

synchronize—Synchronize the commit on both Routing Engines. The Routing Engine on which you execute this command copies and loads its candidate configuration to the other Routing Engine. Both Routing Engines perform a syntax check on the candidate configuration file. If no errors are found, the configuration is activated and becomes the current operational configuration on both Routing Engines.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Change the Configuration on page 22
- change-configuration on page 102
- commands (Event Policy Change Configuration) on page 103
- retry (Event Policy) on page 121
- user-name on page 134

destination (Event Policy)

Syntax

```
destination destination-name {
  retry-count count retry-interval seconds;
  transfer-delay seconds;
}
```

Hierarchy Level

[edit event-options policy *policy-name* then event-script *filename*],
[edit event-options policy *policy-name* then execute-commands]

Release Information

Statement introduced in Junos OS Release 7.5.Support extended to the **[edit event-options policy *policy-name* then event-script *filename*]** hierarchy level in Junos OS Release 7.6. Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description

Assign a location to which to upload command or script output for the specified policy.

Options

destination-name—Name of a destination defined in the **destinations** statement at the **[edit event-options]** hierarchy level.

The remaining statements are explained separately.

Required Privilege Level

maintenance—To view this statement in the configuration. maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Execute Operational Mode Commands on page 19
- Executing Event Scripts in an Event Policy on page 37
- **destinations on page 107**

destinations

Syntax

```
destinations {
  destination-name {
    archive-sites {
      url <password password>;
    }
    transfer-delay seconds;
  }
}
```

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define one or more destinations, each with a unique name and other attributes. You can use the destination as a storage location for command output and for various files, such as system log files and core files.

Options ***destination-name***—Name of a destination.

The remaining statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Example: Defining Destinations for File Archiving by Event Policies on page 54

equals (Event Policy)

Syntax *event1.attribute-name* equals *event2.attribute-name*;

Hierarchy Level [edit event-options policy *policy-name* attributes-match]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Execute the policy only if the specified attribute of ***event1*** equals the specified attribute of ***event2***.

Options ***event1.attribute-name***—Attribute of one event.

event2.attribute-name—Attribute of another event.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using Correlated Events to Trigger an Event Policy on page 11

event-options

Syntax

```
event-options {
    destinations {
        destination-name {
            archive-sites {
                url <password password>;
            }
            transfer-delay seconds;
        }
    }
    event-script {
        file filename {
            checksum (md5 | sha-256 | sha1) hash;
            refresh;
            refresh-from url;
            remote-execution {
                remote-hostname {
                    passphrase user-password;
                    username user-login;
                }
            }
            source url;
        }
        max-datasize
        refresh;
        refresh-from url;
        traceoptions {
            file <filename> <files number> <size size> <world-readable | no-world-readable>;
            flag flag;
            no-remote-trace;
        }
    }
    generate-event event-name {
        time-interval seconds;
        time-of-day hh:mm:ss;
    }
    max-policies
    policy policy-name {
        attributes-match {
            event1.attribute-name equals event2.attribute-name;
            event.attribute-name matches regular-expression;
            event1.attribute-name starts-with event2.attribute-name;
        }
        events [events];
        then {
            change-configuration {
                commands {
                    "command";
                }
                commit-options {
                    check <synchronize>;
                    force;
                    log "comment-string";
```

```
            synchronize;
          }
          retry count number interval seconds;
          user-name username;
        }
        event-script filename {
          arguments {
            argument-name argument-value;
          }
          destination destination-name {
            retry-count number retry-interval seconds;
            transfer-delay seconds;
          }
          output-filename filename;
          output-format (text | xml);
          user-name name;
        }
        execute-commands {
          commands {
            "command";
          }
          destination destination-name {
            retry-count count retry-interval seconds;
            transfer-delay seconds;
          }
          output-filename filename;
          output-format (text | xml);
          user-name username;
        }
        ignore;
        priority-override {
          facility facility-type;
          severity severity-level;
        }
        raise-trap;
        upload filename (filename | committed) destination destination-name {
          retry-count count retry-interval seconds;
          transfer-delay seconds;
          user-name username;
        }
      }
      within seconds {
        events [ events ];
        not events [ events ];
        trigger (after number | on number | until number);
      }
    }
    traceoptions {
      file filename <files number> <size size> <world-readable | no-world-readable>;
      flag flag;
    }
}
```

Hierarchy Level [edit]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure event policies.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

event-script (Event Policy)

Syntax

```
event-script filename {
  arguments {
    argument-name argument-value;
  }
  destination destination-name {
    retry-count count retry-interval seconds;
    transfer-delay seconds;
  }
  output-filename filename;
  output-format (text | xml);
  user-name username;
}
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description On receipt of an event, specify operational mode commands to be issued, the format of the command output, and a name and destination for the output file.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Executing Event Scripts in an Event Policy on page 37

events (Associating Events with a Policy)

Syntax events [*events*];

Hierarchy Level [edit event-options policy *policy-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Create a list of events that trigger this policy. If one or more of the listed events occurs, the policy is executed.

Options **[*events*]**—List of events. Events can be internally generated, or they can be generated by Junos OS processes.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Using Correlated Events to Trigger an Event Policy on page 11
- Example: Correlating Events Based on Event Attributes on page 90

events (Correlating Events with Each Other)

Syntax events [*events*];

Hierarchy Level [edit event-options policy *policy-name* within *seconds*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Create a list of events that must occur within a specified time interval for the policy to be triggered.

Options **[*events*]**—List of events. Events can be internally generated, or they can be generated by Junos OS processes.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Using Correlated Events to Trigger an Event Policy on page 11

execute-commands

Syntax

```
execute-commands {
  commands {
    "command";
  }
  destination destination-name {
    retry-count count retry-interval seconds;
    transfer-delay seconds;
  }
  output-filename filename;
  output-format (text | xml);
  user-name username;
}
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description On receipt of an event, specify operational mode commands to be issued, the format of the command output, and a name and destination for the output file.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Execute Operational Mode Commands on page 19

facility

Syntax facility *facility-type*;

Hierarchy Level [edit event-options policy *policy-name* then priority-override]

Release Information Statement introduced in Junos OS Release 12.1.

Description Within an event policy, override the default facility type of the triggering event so that the event is logged based on the configured facility type.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring the System Log Priority of the Triggering Event in an Event Policy on page 46
- Junos OS System Logging Facilities and Message Severity Levels
- priority-override on page 120
- severity on page 123

generate-event

Syntax

```
generate-event event-name {
  time-interval seconds;
  time-of-day hh:mm:ss;
}
```

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Generate an internal event, based on a time interval or the time of day. You can configure up to 10 internal events.

Options ***event-name***—Name of an internally generated event.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Generating Internal Events to Trigger Event Policies on page 16
- time-interval on page 126
- time-of-day on page 127

ignore

Syntax

```
ignore;
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define a policy that ignores particular events. If one or more of the listed events occur, a system log message for the event is not generated, and no further policies associated with this event are processed. If you include the **ignore** statement in a policy configuration, you cannot configure any other actions in the policy.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring Event Policies to Ignore an Event on page 41

matches

Syntax *event.attribute-name* matches *regular-expression*;

Hierarchy Level [edit event-options policy *policy-name* attributes-match]

Release Information Statement introduced in Junos OS Release 7.5.

Description Execute the policy only if the specified attribute of ***event*** matches a regular expression.

Options ***event.attribute-name***—Event attribute to compare to a regular expression.

regular-expression—Regular expression to compare.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using Correlated Events to Trigger an Event Policy on page 11
- Using Regular Expressions to Refine the Set of Events That Trigger a Policy on page 15

max-policies

Syntax max-policies *policies*;

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 12.3.

Description Maximum number of event policies that can run concurrently on the device.

Options ***policies***—Maximum number of event policies that can run concurrently.
Range: 0 through 20
Default: 15

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- max-datasize on page 138
- Example: Configuring Limits on Executed Event Policies and Memory Allocation for Scripts

not

Syntax not events [*events*];

Hierarchy Level [edit event-options policy *policy-name* within *seconds*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Create a list of events that must not occur within the specified time interval for the policy to be triggered.

Options **[*events*]**—List of events. Events can be internally generated, or they can be generated by Junos OS processes.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Using Correlated Events to Trigger an Event Policy on page 11

output-filename

Syntax output-filename *filename*;

Hierarchy Level [edit event-options policy *policy-name* then event-script *filename*],
[edit event-options policy *policy-name* then execute-commands]

Release Information Statement introduced in Junos OS Release 7.5.
Support at the **[edit event-options policy *policy-name* then event-script *filename*]** hierarchy level introduced in Junos OS Release 7.6.

Description Assign a filename to which to write command or script output for the specified commands or script. For op scripts, this statement is optional.

Options ***filename***—Name of a file in which to write command or script output.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Configuring an Event Policy to Execute Operational Mode Commands on page 19
- Executing Event Scripts in an Event Policy on page 37

output-format

Syntax output-format (text | xml);

Hierarchy Level [edit event-options policy *policy-name* then event-script *filename*],
[edit event-options policy *policy-name* then execute-commands]

Release Information Statement introduced in Junos OS Release 7.5.
Support at the **[edit event-options policy *policy-name* then event-script *filename*]** hierarchy level introduced in Junos OS Release 8.3.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Specify the format (ASCII text or XML) for the output of the specified commands or script.

Default The default output format is XML at the **[edit event-options policy *policy-name* then execute-commands]** hierarchy level and text at the **[edit event-options policy *policy-name* then event-script *filename*]** hierarchy level.

Options **text**—Formatted ASCII text.

xml—Junos Extensible Markup Language (XML) tags.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Execute Operational Mode Commands on page 19
- Executing Event Scripts in an Event Policy on page 37

policy (Event Policy)

Syntax

```
policy policy-name {
  attributes-match {
    event1.attribute-name equals event2.attribute-name;
    event.attribute-name matches regular-expression;
    event1.attribute-name starts-with event2.attribute-name;
  }
  events [ events ];
  then {
    ... the then subhierarchy appears at the end of the [edit event-options policy policy-name]
      hierarchy level ...
  }
  within seconds {
    events [ events ];
    not events [ events ];
    trigger (on | after | until) event-count;
  }

  then {
    change-configuration {
      commands {
        "command";
      }
      commit-options {
        check <synchronize>;
        force;
        log "comment-string";
        synchronize;
      }
      retry count number interval seconds;
      user-name username;
    }
    event-script filename {
      arguments {
        argument-name argument-value;
      }
      destination destination-name {
        retry-count count retry-interval seconds;
        transfer-delay seconds;
      }
      output-filename filename;
      output-format (text | xml);
      user-name username;
    }
    execute-commands {
      commands {
        "command";
      }
      destination destination-name {
        retry-count count retry-interval seconds;
        transfer-delay seconds;
      }
      output-filename filename;
```

```
        output-format (text | xml);
        user-name username;
      }
      ignore;
      priority-override {
        facility facility-type;
        severity severity-level;
      }
      raise-trap;
      upload filename (filename | committed) destination destination-name {
        retry-count count retry-interval seconds;
        transfer-delay seconds;
        user-name username;
      }
    }
}
```

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define an event policy to be processed by the eventd process. If you configure a policy, the **events** and **then** statements are mandatory.

You can configure multiple policies to be processed for an event. The policies are executed in the order in which they appear in the configuration. If you configure more than one policy for an event, and if one of the policies is to ignore the event, no policies that follow the **ignore** statement are executed.

Default If you do not configure a policy for an event, the event is recorded in the system log.

Options *policy-name*—Name of an event policy.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

priority-override

Syntax

```
priority-override {
  facility facility-type;
  severity severity-level;
}
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 12.1.

Description Within an event policy, override the default system log priority of the triggering event so that the system logs the event with a different facility type, severity level, or both. If you configure multiple event policies to override the priority of the same event, the event is logged based on the priority set by the last executed event policy to change it.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring the System Log Priority of the Triggering Event in an Event Policy on page 46
- Junos OS System Logging Facilities and Message Severity Levels
- facility on page 113
- severity on page 123

raise-trap

Syntax raise-trap;

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 8.1.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define a policy that raises an SNMP trap in response to an event. If one or more of the listed events occur, the system log message for the event is converted into a trap. This enables an agent to notify a trap-based network management system (NMS) of significant events.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Example: Configuring Event Policies to Raise SNMP Traps on page 43

retry (Event Policy)

Syntax retry count *number* interval *seconds*;

Hierarchy Level [edit event-options policy *policy-name* then change-configuration]

Release Information Statement introduced in Junos OS Release 12.1.

Description Specify the number of times that Junos OS attempts the **change-configuration** event policy action if the initial attempt fails while acquiring a lock on the configuration database. If you include the **retry** statement, you must configure both the **count** and **interval** statements.

Default If you do not include the **retry** statement, and the **change-configuration** event policy action fails, the configuration changes specified in the event policy are not implemented or committed.

Options

count *number*—The number of attempts to retry the **change-configuration** event policy action upon failure of the initial attempt.

Range: 0 through 10

Default: 0

interval *seconds*—The time interval specified in seconds between retry attempts.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring an Event Policy to Change the Configuration on page 22
- change-configuration on page 102
- commands (Event Policy Change Configuration) on page 103
- commit-options on page 105
- user-name on page 134

retry-count (Event Policy)

Syntax retry-count *number* retry-interval *seconds*;

Hierarchy Level
[edit event-options policy *policy-name* then event-script *filename*
destination *destination-name*],
[edit event-options policy *policy-name* then execute-commands
destination *destination-name*],
[edit event-options policy *policy-name* then upload filename (*filename* | committed)
destination *destination-name*]

Release Information
Statement introduced in Junos OS Release 8.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure an event policy to retry a file upload operation if the first attempt fails.

Default If you do not include this statement, the file upload operation is attempted one time only.

Options
number—Number of retries.

retry-interval *seconds*—Length of time to wait between retries.

Required Privilege Level
maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Configuring an Event Policy to Retry the File Upload Action on page 65

severity

Syntax severity *severity-level*;

Hierarchy Level [edit event-options policy *policy-name* then priority-override]

Release Information Statement introduced in Junos OS Release 12.1.

Description Within an event policy, override the preassigned severity level of a triggering event so that the event is logged based on the configured severity level.

Options ***severity-level***—Severity level logged for the triggering event. Table 6 on page 123 lists the possible severity levels.

Table 6: System Log Message Severity Levels

Severity Level	Description
emergency	System panic or other conditions that cause the routing platform to stop functioning
alert	Conditions that require immediate correction, such as a corrupted system database
critical	Critical conditions, such as hard drive errors
error	Error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels
warning	Conditions that warrant monitoring
notice	Conditions that are not errors but might warrant special handling
info	Events or non-error conditions of interest

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring the System Log Priority of the Triggering Event in an Event Policy on page 46
- Junos OS System Logging Facilities and Message Severity Levels
- facility on page 113
- priority-override on page 120

starts-with

Syntax *event1.attribute-name* starts-with *event2.attribute-name*;

Hierarchy Level [edit event-options policy *policy-name* attributes-match *event1.attribute-name*]

Release Information Statement introduced in Junos OS Release 7.5.

Description Execute the policy only if the specified attribute of ***event1*** starts with the specified attribute of ***event2***.

Options ***event1.attribute-name***—Attribute of one event.

event2.attribute-name—Attribute of another event.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using Correlated Events to Trigger an Event Policy on page 11

then

Syntax

```
then {
  change-configuration {
    commands {
      "command";
    }
    commit-options {
      check <synchronize>;
      force;
      log "comment-string";
      synchronize;
    }
    retry count number interval seconds;
    user-name username;
  }
  event-script filename {
    arguments {
      argument-name argument-value;
    }
    destination destination-name {
      retry-count count retry-interval seconds;
      transfer-delay seconds;
    }
    output-filename filename;
    output-format (text | xml);
    user-name username;
  }
  execute-commands {
    commands {
      "command";
    }
    destination destination-name {
      retry-count count retry-interval seconds;
      transfer-delay seconds;
    }
    output-filename filename;
    output-format (text | xml);
    user-name username;
  }
  ignore;
  priority-override {
    facility facility-type;
    severity severity-level;
  }
  raise-trap;
  upload filename (filename | committed) destination destination-name {
    retry-count count retry-interval seconds;
    transfer-delay seconds;
    user-name username;
  }
}
```

Hierarchy Level [edit event-options policy *policy-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define actions to take if an event occurs. For each policy, you can configure multiple actions.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Example: Configuring an Event Policy to Upload Files on page 57
- Configuring an Event Policy to Execute Operational Mode Commands on page 19
- Executing Event Scripts in an Event Policy on page 37
- Configuring Event Policies to Ignore an Event on page 41
- Example: Configuring Event Policies to Raise SNMP Traps on page 43

time-interval

Syntax time-interval *seconds*;

Hierarchy Level [edit event-options generate-event *event-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure a frequency at which to generate a particular event.

Options *seconds*—Time interval between internally generated events.
Range: 60 through 2,592,000 seconds

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Generating Internal Events to Trigger Event Policies on page 16
- generate-event on page 114
- time-of-day on page 127

time-of-day

Syntax time-of-day *hh*:*mm*:*ss*;

Hierarchy Level [edit event-options generate-event *event-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure a time of day at which to generate a particular event.

Options ***hh*:*mm*:*ss***—Time of day at which to generate an event.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Generating Internal Events to Trigger Event Policies on page 16
- generate-event on page 114
- time-interval on page 126

traceoptions (Event Options)

Syntax

```
traceoptions {
  file <filename> <files number> <match regular-expression> <size size> <world-readable |
    no-world-readable>;
  flag flag;
  no-remote-trace;
}
```

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 7.5.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define tracing operations for event policies.

Default If you do not include this statement, no event-policy-specific tracing operations are performed.

Options

file *filename*—Name of the file to receive the output of the tracing operation. All files are placed in the directory **/var/log**. By default, commit script process tracing output is placed in the file **eventd**. If you include the **file** statement, you must specify a filename. To retain the default, you can specify **eventd** as the filename.

Default: /var/log/eventd

files *number*—(Optional) Maximum number of trace files. When a trace file named ***trace-file*** reaches its maximum size, it is renamed and compressed to ***trace-file*.0.gz**. When ***trace-file*** again reaches its maximum size, ***trace-file*.0.gz** is renamed ***trace-file*.1.gz** and ***trace-file*** is renamed and compressed to ***trace-file*.0.gz**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option and a filename.

Range: 2 through 1000

Default: 3 files

flag *flag*—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all**—Log all operations
- **configuration**—Log reading of configuration at the **[edit event-options]** hierarchy level
- **events**—Log eventd processing
- **database**—Log events involving storage and retrieval in events database
- **server**—Log communication with processes that are generating events
- **timer-events**—Log internally generated events

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

no-world-readable—Restrict file access to owner. This is the default.

size *size*—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named ***trace-file*** reaches this size, it is renamed and compressed to ***trace-file*.0.gz**. When the ***trace-file*** again reaches its maximum size, ***trace-file*.0.gz** is renamed ***trace-file*.1.gz** and ***trace-file*** is renamed and compressed to ***trace-file*.0.gz**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

Syntax: *size* to specify bytes, *size*k to specify KB, *size*m to specify MB, or *size*g to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

Required Privilege Level

maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Tracing Event Policy Processing on page 153

transfer-delay

Syntax transfer-delay *seconds*;

Hierarchy Level [edit event-options destinations *destination-name*],
[edit event-options policy *policy-name* then event-script *filename* destination *destination-name*],
[edit event-options policy *policy-name* then execute-commands destination *destination-name*],
[edit event-options policy *policy-name* then upload filename (*filename* | committed) destination *destination-name*]

Release Information Statement introduced in Junos OS Release 7.5.
Support at the **[edit event-options policy *policy-name* then ...]** hierarchy levels introduced in Junos OS Release 8.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure a delay before transferring files. This allows the files to be completely generated before the upload starts. If you configure a transfer delay at the **[edit event-options destination *destination-name*]** hierarchy level and at one of the **[edit event-options policy *policy-name* then ...]** hierarchy levels, the resulting delay is the sum of the two delays.

Default If you do not include this statement, there is no transfer delay.

Options ***seconds***—Duration of the delay before files are uploaded.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Example: Defining Destinations for File Archiving by Event Policies on page 54
- Configuring the Delay Before Files Are Uploaded by an Event Policy on page 63

trigger

Syntax trigger (on | after | until) *event-count*;

Hierarchy Level [edit event-options policy *policy-name* within *seconds*]

Release Information Statement introduced in Junos OS Release 8.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure an event policy to be triggered if an event or set of events occurs ***event-count*** times within a specified time period.

Default If you do not include this statement, the policy is executed on receipt of the first configured event.

Options

after *event-count*—The policy is executed when the number of matching events received equals ***event-count*** + 1.

on *event-count*—The policy is executed when the number of matching events received equals ***event-count***.

until *event-count*—The policy is executed each time a matching event is received and stops being executed when the number of matching events received equals ***event-count***.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Triggering an Event Policy Based on Event Count on page 15

within

Syntax

```
within seconds {
  events [ events ];
  not events [ events ];
  trigger (after | on | until) event-count;
}
```

Hierarchy Level [edit event-options policy *policy-name*]

Release Information Statement introduced in Junos OS Release 7.5.

Description Create a list of events that must (or must not) occur within a specified time interval for the policy to be triggered.

The statements are explained separately.

Options *seconds*—Interval between events.

Range: 60 through 604,800 seconds

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using Correlated Events to Trigger an Event Policy on page 11

upload

Syntax

```
upload filename  (filename | committed) destination destination-name {
    retry-count count retry-interval seconds;
    transfer-delay seconds;
    user-name username;
}
```

Hierarchy Level [edit event-options policy *policy-name* then]

Release Information Statement introduced in Junos OS Release 7.5.
committed option for **filename** statement introduced in Junos OS Release 8.1.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description On receipt of an event, upload the committed configuration file to a destination.

Options

destination *destination-name*—Name of the destination for the uploaded file. It must be defined in the **destinations** statement at the **[edit event-options]** hierarchy level.

filename (*filename* | committed)—Name of the file to upload. Specify either the word **committed** to upload the most recently committed configuration file, or the filename of another file.

The remaining statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- destinations on page 107
- Example: Configuring an Event Policy to Upload Files on page 57

user-name

Syntax user-name *username*;

Hierarchy Level [edit event-options policy *policy-name* then change-configuration],
[edit event-options policy *policy-name* then event-script *filename*],
[edit event-options policy *policy-name* then execute-commands],
[edit event-options policy *policy-name* then upload filename (*filename* | committed) destination *destination-name*]

Release Information Statement introduced in Junos OS Release 8.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Support at the **[edit event-options policy *policy-name* then change-configuration]** hierarchy level introduced in Junos OS Release 12.1.

Description Associate a user with an action in an event policy. The event policy action is executed under the privileges of the associated user.

Default If you do not associate a user with an action, the action is executed as user **root**.

Options ***username***—Username that is configured at the **[edit system login]** hierarchy level.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Changing the User Privilege Level for an Event Policy Action on page 42

CHAPTER 11

Summary of Event Script Configuration Statements

checksum

Syntax checksum (md5 | sha-256 | sha1) *hash*;

Hierarchy Level [edit event-options event-script file *filename*],
[edit system scripts commit file *filename*],
[edit system scripts op file *filename*]

Release Information Statement introduced in Junos OS Release 9.5.
Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description For Junos OS commit scripts and op scripts, specify the MD5, SHA-1, or SHA-256 checksum hash. When it executes a local event, commit, or op script, Junos OS verifies the authenticity of the script by using the configured checksum hash.

Options

md5 *hash*—MD5 checksum of this script.

sha-256 *hash*—SHA-256 checksum of this script.

sha1 *hash*—SHA-1 checksum of this script.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Configuring Checksum Hashes for a Commit Script
- Configuring Checksum Hashes for an Event Script on page 82
- Configuring Checksum Hashes for an Op Script
- Executing an Op Script from a Remote Site
- file checksum md5 command in the *System Basics and Services Command Reference*
- file checksum sha-256 command in the *System Basics and Services Command Reference*
- file checksum sha1 command in the *System Basics and Services Command Reference*

event-script (Event Options)

Syntax

```
event-script {
  file filename {
    checksum (md5 | sha-256 | sha1) hash;
    refresh;
    refresh-from url;
    remote-execution {
      remote-hostname {
        passphrase user-password;
        username user-login;
      }
    }
    source url;
  }
  max-datasize
  refresh;
  refresh-from url;
  traceoptions {
    file <filename> <files number> <size size> <world-readable | no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}
```

Hierarchy Level [edit event-options]

Release Information Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description For Junos OS event scripts, configure scripting mechanisms.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Storing and Enabling Scripts

file

Syntax

```
file filename {
  checksum (md5 | sha-256 | sha1) hash;
  refresh;
  refresh-from url;
  remote-execution {
    remote-hostname {
      passphrase user-password;
      username user-login;
    }
  }
  source url;
}
```

Hierarchy Level [edit event-options event-script]

Release Information Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description For Junos OS event scripts, enable an event script that is located in the **/var/db/scripts/event** directory.

Options *filename*—The name of an Extensible Stylesheet Language Transformations (XSLT) or Stylesheet Language Alternative Syntax (SLAX) file containing an event script.

The statements are explained separately.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Enabling an Event Script on page 81

max-datasize

Syntax max-datasize *size*;

Hierarchy Level [edit event-options event-script],
[edit system scripts commit],
[edit system scripts op]

Release Information Statement introduced in Junos OS Release 12.3.

Description Maximum amount of memory allocated for the data segment during execution of a script of the given type. Junos OS sets the maximum memory limit for the executing script to the configured value irrespective of the total memory available on the system at the time of execution. If the executing script exceeds the specified maximum memory limit for that script type, it exits gracefully.

Default If you do not include the **max-datasize** statement, the system allocates half of the total available memory of the system up to a maximum value of 128 MB for the data segment portion of the executed script.

Options ***size***—Maximum amount of memory allocated for the data segment during execution of a script of the given type. If you do not specify a unit of measure, the default is bytes.

Syntax: ***size*** to specify bytes, ***size*****k** to specify KB, ***size*****m** to specify MB, or ***size*****g** to specify GB

Range: 2,3068,672 (22 MB) through 1,073,741,824 (1 GB)

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- max-policies on page 115
- Example: Configuring Limits on Executed Event Policies and Memory Allocation for Scripts

refresh (Event Scripts)

Syntax refresh;

Hierarchy Level [edit event-options event-script],
[edit event-options event-script file *filename*]

Release Information Statement introduced in Junos OS Release 9.6.
Statement introduced in Junos OS Release 9.6 for EX Series switches.

Description For Junos OS event scripts, overwrite the local copy of all enabled event scripts or a single enabled script located in the **/var/db/scripts/event** directory with the copy located at the source URL, specified in the **source** statement at the same hierarchy level.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Using a Master Source Location for a Script
- refresh-from (Event Scripts) on page 139
- source (Event Policy) on page 141

refresh-from (Event Scripts)

Syntax refresh-from *url*;

Hierarchy Level [edit event-options event-script],
[edit event-options event-script file *filename*]

Release Information Statement introduced in Junos OS Release 9.6.
Statement introduced in Junos OS Release 9.6 for EX Series switches.

Description For Junos OS event scripts, overwrite the local copy of all enabled event scripts or a single enabled script located in the **/var/db/scripts/event** directory with the copy located at a URL other than the URL specified in the **source** statement.

Options *url*—Source specified as a Hypertext Transfer Protocol (HTTP) URL, FTP URL, or secure copy (scp)-style remote file specification.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation
- Using an Alternate Source Location for a Script
- refresh (Event Scripts) on page 139
- source (Event Policy) on page 141

remote-execution

Syntax

```
remote-execution {
  remote-hostname {
    passphrase user-password;
    username user-login;
  }
}
```

Hierarchy Level [edit event-options event-script file *filename*]

Release Information Statement introduced in Junos OS Release 9.6.
Statement introduced in Junos OS Release 9.6 for EX Series switches.

Description For Junos OS event scripts, enable event scripts to invoke RPCs on a local or remote host.

Options

passphrase *user-password*—User's password for the remote host.

remote-hostname—Name of the remote host with which the event script will communicate.

username *username*—User's login name for the remote host.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Using RPCs and Operational Mode Commands in Event Scripts on page 77

source (Event Policy)

Syntax source *url*;

Hierarchy Level [edit event-options event-script file *filename*]

Release Information Statement introduced in Junos OS Release 9.6.
Statement introduced in Junos OS Release 9.6 for EX Series switches.

Description For Junos OS event scripts, specify the location of the source file for an enabled script located in the **/var/db/scripts/event** directory. When you include the **refresh** statement at the same hierarchy level, the local copy is overwritten by the version stored at the specified URL.

Options *url*—Master source file for an event script specified as an HTTP URL, FTP URL, or scp-style remote file specification.

Required Privilege Level maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- refresh (Event Scripts) on page 139
- refresh-from (Event Scripts) on page 139
- Using a Master Source Location for a Script

traceoptions (Event Scripts)

Syntax

```
traceoptions {
  file <filename> <files number> <size size> <world-readable | no-world-readable>;
  flag flag;
  no-remote-trace;
}
```

Hierarchy Level [edit event-options event-script]

Release Information Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define tracing operations for event scripts.

Default If you do not include this statement, no event script–specific tracing operations are performed.

Options

file *filename*—Name of the file to receive the output of the tracing operation. All files are placed in the directory **/var/log**. By default, event script process tracing output is placed in the file **escript.log**. If you include the **file** statement, you must specify a filename. To retain the default, you can specify **escript.log** as the filename.

Default: /var/log/escript.log

files *number*—(Optional) Maximum number of trace files. When a trace file named ***trace-file*** reaches its maximum size, it is renamed and compressed to ***trace-file*.0.gz**. When ***trace-file*** again reaches its maximum size, ***trace-file*.0.gz** is renamed ***trace-file*.1.gz** and ***trace-file*** is renamed and compressed to ***trace-file*.0.gz**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option and a filename.

Range: 2 through 1000

Default: 10 files

flag *flag*—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all**—Log all operations
- **events**—Log important events
- **input**—Log event script input data
- **offline**—Generate data for offline development
- **output**—Log event script output data
- **rpc**—Log event script RPCs
- **xslt**—Log the XSLT library

no-world-readable—Restrict file access to owner. This is the default.

size ***size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named ***trace-file*** reaches this size, it is renamed and compressed to ***trace-file*****.0.gz**. When ***trace-file*** again reaches its maximum size, ***trace-file*****.0.gz** is renamed ***trace-file*****.1.gz** and ***trace-file*** is renamed and compressed to ***trace-file*****.0.gz**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and a filename.

Syntax: *size* to specify bytes, *size*k to specify KB, *size*m to specify MB, or *size*g to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

world-readable—Enable unrestricted file access.

Required Privilege Level

maintenance—To view this statement in the configuration.
maintenance-control—To add this statement to the configuration.

Related Documentation

- Tracing Event Script Processing on page 156

PART 3

Administration

CHAPTER 12

Event Policy and Event Scripts Configuration Statements

Any Hierarchy Level

The following statement can be added at any level of the configuration:

```
apply-macro apply-macro-name {
  parameter-name parameter-value;
}
```

[edit event-options] Hierarchy Level

The following statements can be included at the **[edit]** hierarchy level:

```
[edit]
event-options {
  destinations {
    destination-name {
      archive-sites {
        url <password password>;
      }
      transfer-delay seconds;
    }
  }
  event-script {
    file filename {
      checksum (md5 | sha-256 | sha1) hash;
      refresh;
      refresh-from url;
      remote-execution {
        remote-hostname {
          passphrase user-password;
          username user-login;
        }
      }
      source url;
    }
```

```
    max-datasize
    refresh;
    refresh-from url;
    traceoptions {
      file <filename> <files number> <size size> <world-readable | no-world-readable>;
      flag flag;
      no-remote-trace;
    }
  }
  generate-event event-name {
    time-interval seconds;
    time-of-day hh:mm:ss;
  }
  max-policies
  policy policy-name {
    attributes-match {
      event1.attribute-name equals event2.attribute-name;
      event.attribute-name matches regular-expression;
      event1.attribute-name starts-with event2.attribute-name;
    }
    events [events];
    then {
      change-configuration {
        commands {
          "command";
        }
        commit-options {
          check <synchronize>;
          force;
          log "comment-string";
          synchronize;
        }
        retry count number interval seconds;
        user-name username;
      }
      event-script filename {
        arguments {
          argument-name argument-value;
        }
        destination destination-name {
          retry-count number retry-interval seconds;
          transfer-delay seconds;
        }
        output-filename filename;
        output-format (text | xml);
        user-name name;
      }
      execute-commands {
        commands {
          "command";
        }
        destination destination-name {
          retry-count count retry-interval seconds;
          transfer-delay seconds;
        }
        output-filename filename;
```

```
            output-format (text | xml);
            user-name username;
          }
          ignore;
          priority-override {
            facility facility-type;
            severity severity-level;
          }
          raise-trap;
          upload filename (filename | committed) destination destination-name {
            retry-count count retry-interval seconds;
            transfer-delay seconds;
            user-name username;
          }
        }
        within seconds {
          events [ events ];
          not events [ events ];
          trigger (after number | on number | until number);
        }
      }
      traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable>;
        flag flag;
      }
    }
```

PART 4

Troubleshooting

CHAPTER 13

Troubleshooting Event Policy and Event Scripts

Tracing Event Policy Processing

Event policy tracing operations track all event policy operations and record them in a log file. The logged error descriptions provide detailed information to help you solve problems faster.

By default, no events are traced. If you include the **traceoptions** statement at the **[edit event-options]** hierarchy level, the default tracing behavior is the following:

- Important events are logged in a file called **eventd** located in the **/var/log** directory.
- When the file **eventd** reaches 128 kilobytes (KB), it is renamed and compressed to **eventd.0.gz**, then **eventd.1.gz**, and so on, until there are three trace files. Then the oldest trace file (**eventd.2.gz**) is overwritten. (For more information about how log files are created, see the *Junos OS System Log Messages Reference*.)
- Log files can be accessed only by the user who configures the tracing operation.

You cannot change the directory (**/var/log**) to which trace files are written. However, you can customize the other trace file settings by including the following statements at the **[edit event-options traceoptions]** hierarchy level:

```
[edit event-options traceoptions]
file <filename> <files number> <match regular-expression> <size size> <world-readable |
   no-world-readable>;
flag all;
flag configuration;
flag database;
flag events;
flag policy;
flag server;
flag syslog
flag timer-events;
no-remote-trace;
```

These statements are described in the following sections:

Configuring the Event Policy Log Filename

By default, the name of the file that records trace output is **eventd**. You can specify a different name by including the **file** statement at the **[edit event-options traceoptions]** hierarchy level:

```
[edit event-options traceoptions]
file filename;
```

Configuring the Number and Size of Event Policy Log Files

By default, when the trace file reaches 128 kilobytes (KB) in size, it is renamed ***filename*.0**, then ***filename*.1**, and so on, until there are three trace files. Then the oldest trace file (***filename*.2**) is overwritten.

You can configure the limits on the number and size of trace files by including the following statements at the **[edit event-options traceoptions file <*filename*>]** hierarchy level:

```
[edit event-options traceoptions file <filename>]
files number size size;
```

For example, set the maximum file size to 2 MB and the maximum number of files to 20. When the file that receives the output of the tracing operation (***filename***) reaches 2 MB, ***filename*** is renamed and compressed to ***filename*.0.gz** and a new file called ***filename*** is created.

When ***filename*** reaches 2 MB, ***filename*.0.gz** is renamed ***filename*.1.gz** and ***filename*** is renamed and compressed to ***filename*.0.gz**. This process repeats until there are 20 trace files. Then the oldest file (***filename*.19.gz**) is overwritten.

The number of files can range from 2 through 1000 files. The file size can range from 10 KB through 1 gigabyte (GB).

Configuring Access to the Log File

By default, log files can be accessed only by the user who configures the tracing operation.

To specify that any user can read all log files, include the **world-readable** statement at the **[edit event-options traceoptions file <*filename*>]** hierarchy level:

```
[edit event-options traceoptions file <filename>]
world-readable;
```

To explicitly set the default behavior, include the **no-world-readable** statement at the **[edit event-options traceoptions file <*filename*>]** hierarchy level:

```
[edit event-options traceoptions file <filename>]
```

```
no-world-readable;
```

Configuring a Regular Expression for Lines to Be Logged

By default, the trace operation output includes all lines relevant to the logged events.

You can refine the output by including the **match** statement at the **[edit event-options traceoptions file <*filename*>]** hierarchy level and specifying a regular expression to be matched:

```
[edit event-options traceoptions file <filename>]
match regular-expression;
```

Configuring the Trace Operations

By default, only important events are logged. You can configure the trace operations to be logged by including the following statements at the **[edit event-options traceoptions]** hierarchy level:

```
[edit event-options traceoptions]
flag all;
flag configuration;
flag database;
flag events;
flag policy;
flag server;
flag syslog
flag timer-events;
```

Table 7 on page 155 describes the meaning of the event policy tracing flags.

Table 7: Event Policy Tracing Flags

Flag	Description	Default Setting
all	Trace all operations.	Off
configuration	Log reading of configuration at the **[edit event-options]** hierarchy level.	Off
events	Trace important events.	Off
database	Log events involving storage and retrieval in events database.	Off
policy	Log policy processing.	Off
server	Log communication with processes that are generating events.	Off
syslogd	Log syslog related traces	Off
timer-events	Log internally generated events.	Off

To display the end of the log, issue the **show log eventd | last** operational mode command:

```
[edit]
user@host# run show log eventd | last
```

Related Documentation

- Configuring the System Log Priority of the Triggering Event in an Event Policy on page 46

Tracing Event Script Processing

Event script tracing operations track all event script operations and record them in a log file. The logged error descriptions provide detailed information to help you solve problems faster.

The default operation of event script tracing is to log important events in a file called **escript.log** located in the **/var/log** directory. When the file **escript.log** reaches 128 kilobytes (KB), it is renamed with a number 0 through 9 (in ascending order) appended to the end of the file and then compressed. The resulting files are **escript.log.0.gz**, then **escript.log.1.gz**, until there are 10 trace files. Then the oldest trace file (**escript.log.9.gz**) is overwritten. (For more information about how log files are created, see the *Junos OS System Log Messages Reference*.)

This section discusses the following topics:

- Minimum Configuration for Enabling Traceoptions for Event Scripts on page 156
- Configuring Tracing of Event Scripts on page 157

Minimum Configuration for Enabling Traceoptions for Event Scripts

If no event script trace options are configured, the simplest way to view the trace output of an event script is to configure the **output** trace flag and issue the **show log escript.log | last** command. To do this, perform the following steps:

1. If you have not done so already, enable an event script by including the **file** statement at the **[edit event-options event-script]** hierarchy level:

   ```
   [edit event-options event-script]
   user@host# set file filename
   ```

2. Enable trace options by including the **traceoptions flag output** statement at the **[edit event-options event-script]** hierarchy level:

   ```
   [edit event-options event-script]
   user@host# set traceoptions flag output
   ```

3. Issue the **commit** command:

   ```
   [edit]
   user@host# commit
   ```

4. Display the resulting trace messages recorded in the **/var/log/escript.log** file. At the end of the log is the output generated by the event script you enabled in Step 1 after a configured event policy is triggered and invokes the script. To display the end of the log, issue the **show log escript.log | last** operational mode command:

   ```
   [edit]
   user@host# run show log escript.log | last
   ```

Table 8 on page 157 summarizes useful filtering commands that display selected portions of the **escript.log** file.

Table 8: Event Script Tracing Operational Mode Commands

Task	Command
Display logging data associated with all event script processing.	**show log escript.log**
Display processing for only the most recent operation.	**show log escript.log | last**
Display processing for script errors.	**show log escript.log | match error**
Display processing for a particular script.	**show log escript.log | match *filename***

Example: Minimum Configuration for Enabling Traceoptions for Event Scripts

Display the trace output of the event script file **source-route.xsl**:

```
[edit]
event-options {
   event-script {
      file source-route.xsl;
      traceoptions flag output;
   }
}
```

```
[edit]
user@host# commit
[edit]
user@host# run show log escript.log | last
```

Configuring Tracing of Event Scripts

You cannot change the directory (**/var/log**) to which trace files are written. However, you can customize other trace file settings by including the following statements at the **[edit event-options event-script traceoptions]** hierarchy level:

```
[edit event-options event-script traceoptions]
file <filename> <files number> <size size> <world-readable | no-world-readable>;
flag all;
flag events;
flag input;
flag offline;
```

```
flag output;
flag rpc;
flag xslt;
no-remote-trace;
```

These statements are described in the following sections:

Configuring the Event Script Log Filename

By default, the name of the file that records trace output is **escript.log**. You can specify a different name by including the **file** statement at the **[edit event-options event-script traceoptions]** hierarchy level:

```
[edit event-options event-script traceoptions]
file filename;
```

Configuring the Number and Size of Event Script Log Files

By default, when the trace file reaches 128 KB in size, it is renamed and compressed to ***filename*.0.gz**, then ***filename*.1.gz**, and so on, until there are 10 trace files. Then the oldest trace file (***filename*.9.gz**) is overwritten.

You can configure the limits on the number and size of trace files by including the following statements at the **[edit event-options event-script traceoptions file <*filename*>]** hierarchy level:

```
[edit event-options event-script traceoptions file <filename>]
files number size size;
```

For example, set the maximum file size to 640 KB and the maximum number of files to 20. When the file that receives the output of the tracing operation (***filename***) reaches 640 KB, it is renamed and compressed to ***filename*.0.gz**, and a new file called ***filename*** is created. When ***filename*** reaches 640 KB, ***filename*.0.gz** is renamed ***filename*.1.gz** and ***filename*** is renamed and compressed to ***filename*.0.gz**. This process repeats until there are 20 trace files. Then the oldest file (***filename*.19.gz**) is overwritten.

The number of files can range from 2 through 1000 files. The file size can range from 10 KB through 1 gigabyte (GB).

NOTE:

If you set either a maximum file size or a maximum number of trace files, you also must specify the other parameter and a filename.

Configuring Access to Event Script Log Files

By default, access to the event script log file is restricted to the owner. You can manually configure access by including the **world-readable** or **no-world-readable** statement at the **[edit event-options event-script traceoptions file <*filename*>]** hierarchy level.

```
[edit event-options event-script traceoptions file <filename>]
(world-readable | no-world-readable);
```

The **no-world-readable** statement restricts event script log access to the owner. The **world-readable** statement enables unrestricted access to the event script log file.

Configuring the Event Script Trace Operations

By default, only important events are logged. You can configure the trace operations to be logged by including the following statements at the **[edit event-options event-script traceoptions]** hierarchy level:

```
[edit event-options event-script traceoptions]
flag all;
flag events;
flag input;
flag offline;
flag output;
flag rpc;
flag xslt;
```

Table 9 on page 159 describes the meaning of the event script tracing flags.

Table 9: Event Script Tracing Flags

Flag	Description	Default Setting
all	Trace all operations.	Off
events	Trace important events.	On
input	Trace event script input data.	Off
offline	Generate data for offline development.	Off
output	Trace event script output data.	Off
rpc	Trace event script RPCs.	Off
xslt	Trace the Extensible Stylesheet Language Transformations (XSLT) library.	Off

PART 5

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