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Junos® OS

Application Aware Services Interfaces User Guide for Routing Devices

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junos

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About the Documentation

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Use this guide to configure and monitor the identification of applications being used in TCP, UDP, and ICMP traffic, and to filter traffic based on the application type. Starting with Junos OS Release 16.1R1, the features described in this guide are no longer supported. See the Broadband Subscriber Services User Guide for information about the new application identification features.

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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 CLI Explorer.

Documentation Conventions

Table 1 on page xiv 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.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

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 guide names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS CLI User Guide* • RFC 1997, *BGP Communities Attribute*

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

Convention	Description	Examples
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)	Encloses 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)	Encloses a variable for which you can substitute one or more values.	**community name members [*community-ids*]**

Indention and braces ({ })	Identifies 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.	
GUI Conventions		

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

Convention	Description	Examples
Bold text like this	Represents 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 menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

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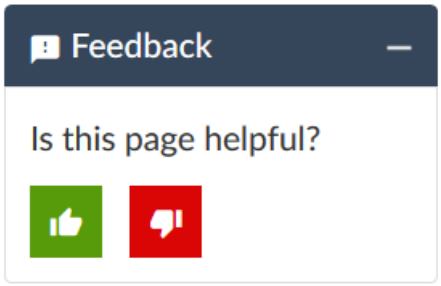
- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the Juniper Networks TechLibrary site, and do one of the following:



  - Click the thumbs-up icon if the information on the page was helpful to you.
  - Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
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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 https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit https://www.juniper.net/support/warranty/.
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- Download the latest versions of software and review release notes: https://www.juniper.net/customers/csc/software/
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- Create a service request online: https://myjuniper.juniper.net

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

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You can create a service request with JTAC on the Web or by telephone.

- Visit https://myjuniper.juniper.net.
- 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 https://support.juniper.net/support/requesting-support/.

CHAPTER 1

Configuring Stateless, Rule-Based Services Using Application-Aware Access Lists

AACL Overview

> **NOTE:** Starting with Junos OS Release 12.1, all interface-style services are supported for dynamic Point-to-Point Protocol over Ethernet (PPPoE) subscribers on all MX Series routers with modular Modular Port Concentrators (MPCs).

The application-aware access list (AACL) service adds support for a new service that uses application names and groups as matching criteria for filtering traffic. AACL is a stateless, rules-based service that must be combined with application identification to enable policies to be applied to flows based on application and application group membership in addition to traditional packet matching rules. It is supported on MX Series routers equipped with Multiservices DPCs and on M120 or M320 routers equipped with Multiservices 400 PICs. Starting with Junos OS Release 11.3, AACL is supported on T320, T640, and T1600 routers also.

AACL is configured in a similar way to other rules-based services such as Network Address Translation (NAT), class of service (CoS), and stateful firewall. To configure AACL, include rule specifications for match criteria and actions at the **[edit services aacl]** hierarchy level. You can chain AACL rules along with other service rules by including them in a service-set definition at the **[edit services service-set]** hierarchy level, as previously documented.

There is one pair of related operational commands, **show/clear application-aware-access-list statistics**.

For more information on the CLI configuration, see the *Application Aware Services Interfaces User Guide for Routing Devices*. For more information on the operational command, see the CLI Explorer.

> **NOTE:** Because the Junos OS extension-provider package framework lacks aggressive constraint checks, you should not set the **policy-db-size** statement at the **[edit chassis fpc *slot-number* pic *pic-number* adaptive-services service-package extension-provider]** hierarchy level to a high value. For Junos Application Aware (previously known as dynamic application awareness) configurations, the recommended values for the extension-provider options at this hierarchy level are as follows:
>
> - **control-cores** = **1**
> - **data-cores** = **7**
> - **object-cache-size** = **1280** (for Multiservices 400 PIC and Multiservices DPC)
> - **policy-db-size** = **200**
> - Include these **package** values: **jservices-idp**, **jservices-appid**, **jservices-llpdf**, **jservices-aacl**

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Best-Effort Application Identification of DPI-Serviced Flows

IN THIS SECTION

This topic describes the following information:

Features That Support Application-Level Filtering

The application-aware access list (AACL) service uses application names and groups as matching criteria for filtering traffic. The service defines the applications and application groups for which statistics are collected for a specific user or interface.

The local policy decision function (L-PDF) enables you to configure properties for statistics output. L-PDF supports a process that regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.

Best-Effort Application Determination

Typically, APPID conclusively determines the Layer 7 application associated with a given DPI-serviced flow. In these cases, the application identification is final. Occasionally, APPID is only able to make an initial, inconclusive determination of the Layer 7 application associated with a given flow. This is referred to as a *best-effort* application identification. In such cases, the APPID process continues processing packets on that flow and might subsequently make a conclusive determination of the application associated with that flow. In some cases of best-effort application identification, the flow ends before a final application determination can be made.

APPID, AACL, and L-PDF Processing in Preconvergence Scenarios

IN THIS SECTION

The following sections describe APPID, AACL, and L-PDF processing in various stages of application identification for a DPI-serviced flow of TCP/UDP/ICMP traffic.

Prior to a Final or Best-Effort Application Identification

During the time that APPID has not yet made either a final or best-effort determination of the application associated with a given flow, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has not yet made either a final or best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has not yet made either a final or best-effort determination of the associated application.

Upon Best-Effort Application Identification

When a best-effort application determination is made, AACL does not apply any AACL term actions configured for that flow. There are a number of reasons for this, one being that the action itself (such as **discard**) can make a final application determination impossible. Instead, AACL or L-PDF tracks the flow and accepts all packets for that flow until a final determination is made, at which time the normal AACL or L-PDFL actions are fully applied to the flow.

While Application Identification Is on a Best-Effort Basis

During the time that APPID identification of the application associated with a given flow is on a best-effort basis, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has only made a best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has only made a best-effort determination of the associated application.

If a Flow Ends Before an Application Identification Is Made

If a flow ends before APPID has made either a final or a best-effort application identification, AACL or L-PDF uses the **unknown** application ID as a final determination and performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for the **application-group-any** application, then the statistics for that flow are collected and aggregated against the count bucket type, and reported as such.

If a Flow Ends While Application Identification on a Best-Effort Basis

If a flow ends while the application identification is on a best-effort basis, AACL or L-PDF uses that best-effort determination as a final determination. AACL or L-PDF performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for that Layer 7 application, then the statistics for the flow are collected and aggregated against the AACL or L-PDF statistics. However, in the case of nested applications, AACL and

L-PDF do not consider the best-effort determination as final and the nested application is reported as an unknown application.

RELATED DOCUMENTATION

Configuring AACL Rules

IN THIS SECTION

To configure an AACL rule, include the **rule *rule-name*** statement at the **[edit services aacl]** hierarchy level:

```
rule rule-name {
    match-direction (input | output | input-output);
    term term-name {
        from {
            application-group-any;
            application-groups [ application-group-names ];
            applications [ application-names ];
            destination-address address <any-unicast>;
```

```
            destination-address-range low minimum-value high maximum-value;
            destination-prefix-list list-name;
            nested-applications [ nested-application-names ];
            nested-application-unknown
            source-address address <any-unicast>;
            source-address-range low minimum-value high maximum-value;
            source-prefix-list list-name;
        }
        then {
            (accept | discard);
            count (application | application-group | application-group-any | nested-application | none);
            forwarding-class class-name;
            policer policer-name;
        }
    }
}
```

Each AACL rule consists of a set of terms, similar to a filter configured at the **[edit firewall]** hierarchy level. A term consists of the following:

- **from** statement—Specifies the match conditions and applications that are included and excluded.
- **then** statement—Specifies the actions and action modifiers to be performed by the router software.

The following sections explain how to configure the components of AACL rules:

Configuring Match Direction for AACL Rules

Each rule must include a **match-direction** statement that specifies the direction in which the rule match is applied. To configure where the match is applied, include the **match-direction** statement at the **[edit services aacl rule *rule-name*]** hierarchy level:

```
match-direction (input | output | input-output);
```

If you configure **match-direction input-output**, bidirectional rule creation is allowed.

The match direction is used with respect to the traffic flow through the services PIC or DPC. When a packet is sent to the PIC or DPC, direction information is carried along with it.

With an interface service set, packet direction is determined by whether a packet is entering or leaving the interface on which the service set is applied.

With a next-hop service set, packet direction is determined by the interface used to route the packet to the services PIC or DPC. If the inside interface is used to route the packet, the packet direction is input. If the outside interface is used to direct the packet to the PIC or DPC, the packet direction is output. For more information on inside and outside interfaces, see *Configuring Service Sets to be Applied to Services Interfaces*.

On the PIC or DPC, a flow lookup is performed. If no flow is found, rule processing is performed. All rules in the service set are considered. During rule processing, the packet direction is compared against rule directions. Only rules with direction information that matches the packet direction are considered.

Configuring Match Conditions in AACL Rules

To configure AACL match conditions, include the **from** statement at the **[edit services aacl rule *rule-name* term *term-name*]** hierarchy level:

```
from {
    application-group-any;
    application-groups [ application-group-names ];
    applications [ application-names ];
    destination-address address <any-unicast>;
    destination-address-range low minimum-value high maximum-value;
    destination-prefix-list list-name;
    nested-applications [ nested-application-names ];
    nested-application-unknown
    source-address address <any-unicast>;
    source-address-range low minimum-value high maximum-value;
    source-prefix-list list-name;
}
```

IPv4 and IPv6 source and destination addresses are supported. You can use either the source address or the destination address as a match condition, in the same way that you configure a firewall filter; for more information, see the *Routing Policies, Firewall Filters, and Traffic Policers User Guide*.

Alternatively, you can specify a list of source or destination prefixes by configuring the **prefix-list** statement at the **[edit policy-options]** hierarchy level and then including either the **destination-prefix-list** or the **source-prefix-list** statement in the AACL rule. For an example, see "Example: Configuring AACL Rules" on page 28.

If you omit the **from** term, the AACL rule accepts all traffic and the default protocol handlers take effect:

- User Datagram Protocol (UDP), Transmission Control Protocol (TCP), and Internet Control Message Protocol (ICMP) create a bidirectional flow with a predicted reverse flow.

- IP creates a unidirectional flow.

You can also include application and application group definitions you have configured at the **[edit services application-identification]** hierarchy level; for more information, see the topics in "APPID Overview" on page 35.

- To apply one or more specific application protocol definitions, include the **applications** statement at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level.
- To apply one or more sets of application group definitions you have defined, include the **application-groups** statement at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level.

  > **NOTE:** If you include one of the statements that specifies application protocols, the router derives port and protocol information from the corresponding configuration at the **[edit services application-identification]** hierarchy level; you cannot specify these properties as match conditions.

- To consider any application group defined in the database as a match, include the **application-group-any** statement at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level.
- To consider any nested application defined in the database a match, include the **nested-applications** statement at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level. Nested applications are protocols that run on a parent application. For example, if the Facebook application runs on the parent application junos:http, the nested application is junos:http:facebook.

Configuring Actions in AACL Rules

To configure AACL actions, include the **then** statement at the **[edit services aacl rule *rule-name* term *term-name*]** hierarchy level:

```
then {
    (accept | discard);
    (count (application | application-group | application-group-any | nested-application | none) | forwarding-class
        class-name);
}
```

You must include one of the following actions:

- **accept**—The packet is accepted and sent on to its destination.
- **discard**—The packet is not accepted and is not processed further.

When you select **accept** as the action, you can optionally configure one or both of the following action modifiers. No action modifiers are allowed with the **discard** action.

- **count (application | application-group | application-group-any | nested-application | none)**—For all accepted packets that match the rules, record a packet count using AACL statistics practices. You can specify one of the following options; there is no default setting:
  - **application**—Count the application that matched in the **from** clause.
  - **application-group**—Count the application group that matched in the **from** clause.
  - **application-group-any**—Count all application groups that match **from application-group-any** under the **any** group name.
  - **nested-application**—Count all nested applications that matched in the **from** clause.
  - **none**—Same as not specifying **count** as an action.

    NOTE:
    - When a session closes before APPID has identified nested applications, the session is treated as a best-effort session and AACL does not get the nested application information. In such cases, nested applications are reported as unknown applications.
    - During the time that the application identification (APPID) feature has not yet made a final determination of the application associated with a given flow, the flow does not contribute to any per-subscriber or per-application statistics collection. For more information, see "Best-Effort Application Identification of DPI-Serviced Flows" on page 20.

- **forwarding-class *class-name***—Specify the packets' forwarding-class name.

You can optionally include a **policer** that has been specified at the **[edit firewall]** hierarchy level. Only the bit-rate and burst-size properties specified for the policer are applied in the AACL rule set. The only action application when a policer is configured is **discard**. For more information on policer definitions, see the *Routing Policies, Firewall Filters, and Traffic Policers User Guide*.

Logging AACL Flows Based on Application

You can now log AACL flows based on application. You can select a specific application or request information on unknown applications.

You can now configure AACL rules to match unknown applications. All existing actions that can apply to recognized applications can also apply to unknown applications. You can use the following statements at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level:

- application-group-any
- application-groups
- application-unknown
- applications
- nested-application-unknown
- nested-applications

The addition of matching **application-unknown** enables the specific logging of the input flows associated with applications that cannot be identified. Because logging is triggered by an input event, you must specify **match-direction** as **input-output** or **input**.

To configure logging of flows for AACL, include the **match-direction input** or **match-direction input-output** statement at the **[edit services aacl rule *rule-name*]** hierarchy level, include an **applications** or **application-unknown** statement at the **[edit services aacl rule *rule-name* term *term-name* from]** hierarchy level, and include only one **log** statement at the **[edit services aacl rule *rule-name* term *term-name* then]** hierarchy level. The log statements can include any of the following options:

- **session-start**
- **session-end**
- **session-start-end-no-stats**
- **session-start-interim-end**
- **session-interim-end**
- **session-end**

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Example: Configuring AACL Rules

The following example shows an AACL configuration containing a rule with three terms using a variety of match conditions and actions:

```
[edit services aacl]
rule aacl-test {
    match-direction input;
    term term1 {
        from {
            source-address 10.0.1.1
            application test1;
        }
        then {
            accept;
        }
    }
    term term2 {
        from {
            source-address {
                any-unicast;
            }
            application test1;
        }
        then {
            discard;
        }
    }
    term term3 {
        from {
            source-address {
                any-unicast;
            }
            application test1 test2;
        }
        then {
            accept;
            count application;
        }
    }
}
```

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Configuring AACL Rule Sets

The **rule-set** statement defines a collection of AACL rules that determine what actions the router software performs on packets in the data stream. You define each rule by specifying a rule name and configuring terms. Then, you specify the order of the rules by including the **rule-set** statement at the **[edit services aacl]** hierarchy level with a **rule** statement for each rule:

```
rule-set rule-set-name {
    rule rule-name;
}
```

The router software processes the rules in the order in which you specify them in the configuration. If a term in a rule matches the packet, the router performs the corresponding action and the rule processing stops. If no term in a rule matches the packet, processing continues to the next rule in the rule set. If none of the rules matches the packet, the packet is dropped by default.

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Configuring Logging of AACL Flows

You can configure logging of AACL flows for a given application or for all unknown applications using AACL rules. You must set **match-direction** to **input** or **input-output** for logging to occur.

1. Create a rule and term.

   ```
   user@host# edit services aacl rule rule-name term term-name
   ```

2. Specify selection of an application.

   ```
   [edit services aacl rule rule-name term term-name]
   ```

```
user@host# set from applications application-name]
```

OR

Specify selection of all unknown applications.

```
[edit services aacl rule <variable>rule-name</variable > term <variable>term-name</variable>]
set from application-unknown
```

3. In the **then** statement, specify logging of input flow.

```
[edit services aacl rule rule-name term term-name]
user@host# set then log input-flows]
```

Example—Configuration of Logging of Input Flows for Unknown Applications

```
[edit services aacl rule aacl_rule5]
match-direction input-output;
   term t0 {
      from {
         application-unknown;
      }
      then {
         count application;
         log input-flow;
         accept;
      }
   }
```

Example—Setup of a Specific Log File

The following example shows how to direct the aacl flow log to a file other than the default syslog file on the Routing Engine file system.

```
[edit system syslog]
file aacl_log {
   external any;
```

```
        match aacl-flow-log;
    }
```

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2

CHAPTER

Grouping Applications Together Using APPID

APPID Overview

> **NOTE:** Starting with Junos OS Release 12.1, all interface-style services are supported for dynamic Point-to-Point Protocol over Ethernet (PPPoE) subscribers on all MX Series routers with modular Modular Port Concentrators (MPCs).

The APPID feature identifies applications as constituents of application groups in TCP/UDP/ICMP traffic. It is supported on MX Series routers equipped with Multiservices DPCs and on M120 or M320 routers equipped with Multiservices 400 PICs and Aggregated Multiservices (AMS) PICs. Aggregated Multiservices PICs (ams- interfaces) enable multiple ms- interfaces to be grouped together in a single bundle and cause the traffic destined for this AMS group to be distributed over the member services PICs of the group. Junos OS Trio chipsets enable the calculation of a symmetric hash for the forward and reverse flows, and support a microcode map in the forwarding plane. This capability enables load-balancing of traffic across various services PICs in an AMS group. Starting with Junos OS Release 12.1, ams- interfaces enable an N:1 redundancy mechanism to cluster together N number of ms- interfaces in an AMS group that supports load sharing.

> **NOTE:** For ams- interfaces and rms- interfaces, the statistics data in the bulk statistics file is collected using the reports received from the MS PICs. For the ams- interfaces, the retrieval and storage of statistics is not possible because of multiple PICs containing statistics data for the same subscriber. For interfaces in an AMS group, statistics data from different MS PICs in the AMS group are collected and aggregated on the Routing Engine where a timer control is activated and the data is saved in the bulkstats file based on this timer. This method of collection causes the statistics data in the bulkstats file to be displayed with a small delay period.

To configure APPID, include statements at the **[edit services application-identification]** hierarchy level to specify parameter values for defining applications, enable or disable application rules, and gather the applications and rules into groups.

The following are related operational commands:

- **show/clear application-identification application-system-cache**
- **show/clear application-identification counters**

For more information on the CLI configuration, see the "Configuring APPID Rules" on page 42. For more information on the operational commands, see the CLI Explorer.

NOTE: Because the extension-provider package framework lacks aggressive constraint checks, you should not set the **policy-db-size** statement at the **[edit chassis fpc *slot-number* pic *pic-number* adaptive-services service-package extension-provider]** hierarchy level to a high value. For Junos Application Aware (previously known as Dynamic Application Awareness) configurations, the recommended values for the extension-provider package options at this hierarchy level are as follows:

- **control-cores** = **1**
- **data-cores** = **7**
- **object-cache-size** = **1280** (for Multiservices 400 PIC and Multiservices DPC)
- **policy-db-size** = **200**
- Include these **package** values: **jservices-idp**, **jservices-appid**, **jservices-llpdf**, **jservices-aacl**

NOTE: In the export version of Junos OS, signature download is not expected to work for the AppID feature in Junos Application Aware. In order to make it work, you must additionally install the Crypto Software Suite.

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Best-Effort Application Identification of DPI-Serviced Flows

IN THIS SECTION

This topic describes the following information:

Features That Support Application-Level Filtering

The application-aware access list (AACL) service uses application names and groups as matching criteria for filtering traffic. The service defines the applications and application groups for which statistics are collected for a specific user or interface.

The local policy decision function (L-PDF) enables you to configure properties for statistics output. L-PDF supports a process that regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.

Best-Effort Application Determination

Typically, APPID conclusively determines the Layer 7 application associated with a given DPI-serviced flow. In these cases, the application identification is final. Occasionally, APPID is only able to make an initial, inconclusive determination of the Layer 7 application associated with a given flow. This is referred to as a *best-effort* application identification. In such cases, the APPID process continues processing packets on that flow and might subsequently make a conclusive determination of the application associated with that flow. In some cases of best-effort application identification, the flow ends before a final application determination can be made.

APPID, AACL, and L-PDF Processing in Preconvergence Scenarios

IN THIS SECTION

The following sections describe APPID, AACL, and L-PDF processing in various stages of application identification for a DPI-serviced flow of TCP/UDP/ICMP traffic.

Prior to a Final or Best-Effort Application Identification

During the time that APPID has not yet made either a final or best-effort determination of the application associated with a given flow, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has not yet made either a final or best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has not yet made either a final or best-effort determination of the associated application.

Upon Best-Effort Application Identification

When a best-effort application determination is made, AACL does not apply any AACL term actions configured for that flow. There are a number of reasons for this, one being that the action itself (such as **discard**) can make a final application determination impossible. Instead, AACL or L-PDF tracks the flow and accepts all packets for that flow until a final determination is made, at which time the normal AACL or L-PDFL actions are fully applied to the flow.

While Application Identification Is on a Best-Effort Basis

During the time that APPID identification of the application associated with a given flow is on a best-effort basis, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has only made a best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has only made a best-effort determination of the associated application.

If a Flow Ends Before an Application Identification Is Made

If a flow ends before APPID has made either a final or a best-effort application identification, AACL or L-PDF uses the **unknown** application ID as a final determination and performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for the **application-group-any** application, then the statistics for that flow are collected and aggregated against the count bucket type, and reported as such.

If a Flow Ends While Application Identification on a Best-Effort Basis

If a flow ends while the application identification is on a best-effort basis, AACL or L-PDF uses that best-effort determination as a final determination. AACL or L-PDF performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for that Layer 7 application, then the statistics for the flow are collected and aggregated against the AACL or L-PDF statistics. However, in the case of nested applications, AACL and L-PDF do not consider the best-effort determination as final and the nested application is reported as an unknown application.

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Defining an Application Identification

To configure a specific IP address or port-based application identification, include the **application *application-name*** statement at the **[edit services application-identification]** hierarchy level:

```
application application-name {
    disable;
    idle-timeout seconds;
    index number;
    session-timeout seconds;
    type type;
    type-of-service service-type;
    port-mapping {
        port-range {
            tcp [ ports-and-port-ranges ];
            udp [ ports-and-port-ranges ];
        }
        disable;
    }
}
```

You can include the following general properties in the configuration:

- **application**—Application name, a required statement; maximum 31 characters. Predefined applications have the prefix **junos-** to avoid conflict with user-defined ones.
- **idle-timeout**—Amount of time that a session remains idle before it is deleted.
- **index**—Application index number in the range from 1 through 65,534, with integers 1 through 1024 reserved for predefined applications.
- **session-timeout**—Lifetime of a session.
- **type**—Well known applications, such as HTTP or FTP.
- **type-of-service**—Type of service, defined by service objective. There is no default value; options are **maximize-reliability**, **maximize-throughput**, **minimize-delay**, and **minimize-monetary-cost**.
- **disable**—Disable this application definition in the APPID service.

NOTE: You can also specify session and idle timeout values globally for a Multiservices interface by including the following statements at the **[edit interfaces *interface-name* services-options]** hierarchy level:

- **inactivity-non-tcp-timeout**—Inactivity timeout period for non-TCP established sessions.
- **inactivity-tcp-timeout**—Inactivity timeout period for TCP established sessions.
- **session-timeout**—Lifetime of a session.
- **disable-global-timeout-override**—Disallow overriding a global inactivity or session timeout.

You can include the following port-mapping properties at the **[edit services application-identification port-mapping]** hierarchy level:

- **port-range**—TCP or UDP port number or numeric range, entered as **[*minimum-value* – *maximum-value*]**. For port-mapping configurations, this entry is required if the parent node exists.
- **disable**—Disable port-mapping properties for this application.

NOTE: For applications with signatures for both client-to-server and server-to-client directions, the APPID for Junos Application Aware (previously known as Dynamic Application Awareness) must accept the data packets in both directions on the same session to complete the identification process.

For a configuration example, see "Examples: Configuring Application Identification Properties" on page 58.

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Configuring APPID Rules

This configuration specifies the properties for identifying an application for which a source or destination IP address and port is used for a known application, without the requirement of an application signature. For example, the Session Initiation Protocol (SIP) server initiates a session from its identified port, 5060. You can therefore specify the SIP server IP address and port 5060 in the port mapping configuration for the SIP application. The advantage of using this method is to provide efficiency and accuracy of application identification for your network.

To configure application rule properties, include the **rule** statement at the **[edit services application-identification]** hierarchy level:

```
rule rule-name {
    address address-name {
        destination {
            ip address</prefix-length>;
            port-range {
                tcp [ ports-and-port-ranges ];
                udp [ ports-and-port-ranges ];
            }
        }
        source {
            ip address</prefix-length>;
            port-range {
                tcp [ ports-and-port-ranges ];
                udp [ ports-and-port-ranges ];
            }
        }
        order number;
    }
    application application-name;
    disable;
}
```

You can include the following application rule properties:

- **address**—Address properties for APPID rule processing. This statement is mandatory; you must specify either destination or source properties.
- **destination**—Destination address and port information. The **ip** statement defines the IP address and netmask (IPv4 only), and the **port-range** statement defines the TCP or UDP port number or numeric range, entered as **[*minimum-value* – *maximum-value*]**.

- **source**—Source address and port information. The **ip** statement defines the IP address and netmask (IPv4 only), and the **port-range** statement defines the TCP or UDP port number or numeric range, entered as **[*minimum-value* – *maximum-value*]**.
- **order**—Application matching priority. For address configurations, the order number resolves the conflict when multiple address entries are matched for a specific session; the lower the number, the higher the priority. This statement is mandatory and must contain a unique value.
- **application**—Name of the application to be included in the rule.
- **disable**—Disable processing for this application rule.

The **rule-set** statement defines a collection of APPID rules that determine what actions the router software performs on packets in the data stream. You define each rule by specifying a rule name and configuring terms. Then, you specify the order of the rules by including the **rule-set** statement at the **[edit services application-identification]** hierarchy level with a **rule** statement for each rule:

```
rule-set rule-set-name {
    rule application-rule-name;
}
```

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Using Stateful Firewall Rules to Identify Data Sessions

The APPID configuration properties enable the Junos OS to detect applications based on signatures, ports, and addresses. For signature-based detection, most of the protocol control sessions are identified, but data sessions are not identified. For example, APPID identifies FTP connections to port 21 (FTP control sessions); however, FTP can open child/data sessions to transfer files and data. These sessions are not identified by signature-based APPID because they do not have well-defined signatures.

Application-level gateways (ALGs) configured using stateful firewall rules can assist APPID in identifying these data sessions. These sessions include file and video transfers that are heavy consumers of bandwidth, so a mechanism for policing and classifying this traffic effectively is a useful tool. In addition to FTP, this mechanism applies to TFTP and RTSP traffic.

To incorporate the stateful firewall rules into Junos Application Aware (previously known as Dynamic Application Awareness for Junos OS) sessions, include the following configurations:

1. Include the stateful firewall package at the **[edit chassis fpc *slot-number* pic *pic-number* adaptive-services service-package extension-provider]** hierarchy level:

```
package jservices-sfw;
```

2. Define two stateful firewall rules as shown in the following example, one to identify the appropriate ALGs for FTP, TFTP, or RTSP traffic and the other to allow all traffic:

> **NOTE:** Session Initiation Protocol (SIP) is already covered by APPID and the SIP ALG is not supported by stateful firewall, hence a SIP configuration is not needed.

```
[edit services]
stateful-firewall {
    rule rule1 {
        match-direction input-output;
        term term1 {
            from {
                applications [ junos-ftp junos-tftp junos-rtsp ];
            }
            then {
                accept;
            }
        }
```

```
    }
    rule rule2 {
        match-direction input-output;
        term term1 {
            then {
                accept;
            }
        }
    }
    rule-set rs1 {
        rule rule1;
        rule rule2;
    }
}
```

NOTE: The existing AACL and L-PDF operational mode commands should report the new applications when they are identified.

3. Attach the stateful firewall rule set to a service set, as shown in the following example:

```
service-set test-chaining {
    application-identification-profile add-based;
    stateful-firewall-rule-sets rs1;
    idp-profile idp1;
    aacl-rules rule1;
    interface-service {
        service-interface ms-2/0/0.0;
    }
}
```

4. Include *no-drop* settings for stateful firewall and TCP, as needed.

   Stateful firewall processing drops packets in a number of scenarios:

   - TCP sessions do not start with a SYN flag. (This prevents sessions from resuming; otherwise, when the PIC starts for the first time, all existing TCP sessions in flight are dropped).
   - If the TCP tracker detects SYN but no SYN/ACK or only an ACK, then the ACK is dropped. There are a number of similar checks to verify the TCP connection, window checks, and so forth.

- TCP checks for stateful firewall are aggressive when ALGs are run. It is not possible to ignore TCP errors when an ALG is run on a session.
- If an ALG detects malformed packets (for example, if the FTP PORT command is not RFC-compliant), it drops packets. If an ALG is not able to allocate resources, it drops packets.

You can include the settings shown in the following example to assist in controlling these packet drops:

```
[edit interfaces]
ms-1/2/0 {
    services-options {
        ignore-errors {
            tcp;
            alg;
        }
    }
}
```

The **tcp** statement mediates the first two issues listed, with reference to TCP SYN detection. The **alg** statement handles the fourth issue. ALGs require strict TCP processing, which cannot be relaxed.

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Configuring Application Profiles

You can define an application profile for use in a service set. The profile consists of one or more rule sets, but only one profile can be included per service set.

To specify the application profile constituents, include the **profile** statement at the **[edit services application-identification]** hierarchy level:

```
profile profile-name {
```

```
    [ rule-set rule-set-name ];
}
```

You assign a profile name and include one or more predefined rule sets. For more information on rule sets, see "Configuring APPID Rules" on page 42. You can then include the profile in a service-set definition:

```
[edit services]
service-set service-set-name {
    profile profile-name;
}
```

The definitions specific to Junos Application Aware (previously known as Dynamic Application Awareness) include the APPID profile and the AACL rule set. For more information on service sets, see *Understanding Service Sets*.

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Configuring Application Groups

You can define an application group to process a number of applications or subgroups at the same time. To configure application group properties, include the **application-group** statement at the **[edit services application-identification]** hierarchy level:

```
application-group group-name {
    application-groups {
        application-group-name;
    }
    applications {
        application-name;
    }
    index number;
    disable;
```

```
}
```

You can include the following application group properties:

- **applications**—List of applications to include in this application group. The **name** statement is mandatory and must include at least one entry.
- **application-groups**—List of application groups to include in a larger application group. The **name** statement is mandatory and must include at least one entry.
- **index**—Application group index number in the range from 1 through 65,534. This mandatory value must be unique.
- **disable**—Disable processing for this application group.

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Application Identification for Nested Applications

Nested applications are protocols running over the parent application. For example, both Facebook and Yahoo Messenger can run over HTTP, but there is a need to identify them as two different applications. To do this, the application layer is split into two layers: Layer 7 applications and Layer 7 protocols.

The predefined application signatures included with Junos OS have been created to detect the Layer 7 nested applications. Predefined application signatures can be used in attack objects.

To configure nested application properties, include the **nested-application** statement at the **[edit services application-identification]** hierarchy level:

```
nested-application name {
    index number;
    protocol protocol;
    signature name {
```

```
        chain-order ;
        maximum-transactions number;
        member name {
            context (http-header-content-type | http-header-host | http-url-parsed | http-url-parsed-param-parsed);
            direction (any | client-to-server | server-to-client);
            pattern dfa-pattern;
        }
        order number;
    }
    type type;
}
```

You can include the following application rule properties:

- **chain-order**—Signatures can contain multiple members. If the chain order feature is on, those members are read in order. The default for this option is no chain order. If a signature contains only one member, this option is ignored.
- **context**—Define a service specific context. The options are **http-header-content-type** , **http-header-host** , **http-url-parsed**, **http-url-parsed-param-parsed**. This statement is mandatory.
- **direction**—The connection direction of the packets to apply pattern matching. The options are **client-to-server**, **server-to-client**, or **any**. This statement is mandatory.
- **index**—A number that is a one-to-one mapping to the application name that is used to ensure that each signature definition is unique. The index range for predefined applications is 1 through 32767. The index range for custom applications and custom nested applications is 32768 through 65534.
- **maximum transactions**—The maximum number of transactions that should occur before a match is made. This statement is mandatory.
- **member**—Define a member name for a custom nested application signature definition. Custom definitions can contain multiple members that define attributes for an application.
- **order**—Define application matching priority. For address configurations, the order number resolves the conflict when multiple address entries are matched for a specific session. The lower number has higher priority. This statement is mandatory.
- **pattern**—Define an attack pattern to be detected. This statement is mandatory.
- **protocol**—The protocol that is monitored to identify nested applications. The value **http** is supported. This statement is mandatory.
- **signature**—Name of the custom nested application signature definition. Must be a unique name with a maximum length of 32 characters. This statement is mandatory.
- **type**—Well-known application name for this application definition, such as Facebook or Kazza. This application name must be unique with a maximum length of 32 characters. This statement is mandatory.

RELATED DOCUMENTATION

Disabling Application Identification for Nested Applications

Sometimes there is a need to identify multiple different applications running on the same Layer 7 protocols. For example, both Facebook and Yahoo Messenger can run over HTTP, but there is a need to identify them as two different applications. To do this, the application layer is split into two layers: Layer 7 applications and Layer 7 protocols. Application identification for nested applications is turned on by default. You can manually turn it off by using the CLI.

To disable nested application identification:

- Set the **no-nested-application** statement.

```
[edit services application-identification nested-application-settings]
user@host# no-nested-application
```

To verify the configuration, issue the **show services application-identification nested-application-settings** command.

To reenable nested application identification:

- Delete the **no-nested-application** statement.

```
[edit services application-identification nested-application-settings]
user@host# delete services application-identification nested-application-settings no-nested-application
```

If you are finished configuring the device, commit the configuration.

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Configuring Global APPID Properties

You can define additional properties that apply on a global basis to APPID processing and are not part of a specific application, group, rule, or profile definition. To configure these global APPID properties, include the following statements at the **[edit services application-identification]** hierarchy level:

```
application-identification {
    application-system-cache-timeout seconds;
    max-checked-bytes bytes;
    min-checked-bytes bytes;
    nested-applicationname;
    nested-application-settings;
    no-application-identification;
    no-application-system-cache;
    no-clear-application-system-cache;
    no-protocol-method;
    no-signature-based;
    signature-method-all-ports;
}
```

The global application properties have the following effect:

- **application-system-cache-timeout**—Lifetime for system cache entries, in seconds.
- **max-checked-bytes**—The maximum number of bytes to be inspected in APPID processing, in the range from 0 through 100,000 bytes.
- **min-checked-bytes**—The minimum number of bytes to be inspected in APPID processing, in the range from 0 through 2000 bytes.
- **nested-application**—Configure a custom nested application definition for the desired application name that is used by the system to identify the nested application as it passes through the device. For more information see **nested-application**.
- **nested-application-settings**—Configure nested application options for application identification services. For more information see **nested-application-settings**.
- **no-application-identification**—Disable all application identification methods.
- **no-application-system-cache**—Disable storing application identification results in the application system cache.

- **no-clear-application-system-cache**—Disable clearing the application system cache.
- **no-protocol-method**—Disable the protocol-based application identification method, which is enabled by default.
- **no-signature-based**—Disable the signature-based application identification method.
- **signature-method-all-ports**—Run signature matching on all traffic.

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Configuring APPID Support for Heuristics

Heuristics methodology provides a mechanism for identifying encrypted data packets in point-to-point applications. These packets are not normally detected by the existing application signatures.

To enable APPID to employ heuristics in traffic identification:

1. Include the **enable-heuristics** statement:

```
[edit services application-identification]
user@host# set enable-heuristics
```

The **show services application-identification counter** operational command includes additional output fields that report the number of encrypted sessions.

NOTE: When you enable heuristics, performance and scaling values might be negatively affected. This mechanism assists the APPID module in identifying encrypted traffic, but only if the identifications are supported by the current signature package.

RELATED DOCUMENTATION

Configuring APPID Support for Unidirectional Traffic

With asymmetrical routing, a networking device sees only one side of the network sessions, either from client to server or from server to client. Additional functionality is required to support application identification with unidirectional traffic. This addition enables a session for a specified service set to support an asymmetrical routing environment, and allows complete application matches using existing application signatures for traffic in the client-to-server direction only.

To enable APPID to support application matching on unidirectional traffic:

1. Include the **support-uni-directional-traffic** statement:

   ```
   [edit services service-set service-set-name service-set-options]
   user@host# set support-uni-directional-traffic
   ```

   This enables the session belonging to the specified service set to support the asymmetrical routing environment. The APPID module then reports complete matches for the unidirectional traffic.

2. Include the **enable-asymmetric-traffic-processing** statement:

   ```
   [edit services service-set service-set-name service-set-options]
   user@host# set enable-asymmetric-traffic-processing
   ```

   This enables the framework and plug-in to handle unidirectional traffic at a service-set level.

When you enable these settings, APPID treats unidirectional TCP traffic like a UDP connection. UDP traffic itself does not receive any special treatment because the service PIC cannot determine whether UDP traffic is unidirectional or bidirectional. The settings do not affect processing of sessions created with bidirectional traffic.

If the traffic includes both unidirectional and bidirectional sessions, the APPID module uses heuristics to decide whether to change the reporting logic.

> **NOTE:** This feature does not change the processing for any services except APPID. However, other services, including stateful firewall and AACL, can process unidirectional traffic in a limited manner.

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Configuring Automatic Download of Application Package Updates

You can set up automatic downloading of application package updates. To configure downloads, include the **download** statement at the **[edit services application-identification]** hierarchy level:

```
download {
    automatic {
        interval hour;
        start-time time;
    }
    url url;
}
```

You can include the following download statements:

- **download**—Define download properties.

- **automatic**—Set **start-time** value and **interval** in hours for automatic downloads. The default **start-time** is **0:00** and the range is from 0:00 through 24:00. The default **interval** is **24** and the range is from 6 through 720.
- **url**—Specify the download URL.

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Tracing APPID Operations

IN THIS SECTION

Tracing operations track all adaptive services 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 services application-identification]** hierarchy level, the default tracing behavior is as follows:

- Important events are logged in a file called **serviced** located in the**/var/log** directory.
- When the file **serviced** reaches 128 kilobytes (KB), it is renamed **serviced.0**, then **serviced.1**, and so on, until there are three trace files. Then the oldest trace file (**serviced.2**) is overwritten. (For more information about how log files are created, see the System Log Explorer.)
- Only the user who configures the tracing operation can access the log files.
- To display the end of the log, issue the **show log serviced | last** operational mode command:

```
[edit]
user@host# run show log serviced | last
```

You cannot change the directory (**/var/log**) in which trace files are located. However, you can customize the other trace file settings by including the following statements:

```
file filename <files number> <match regex> <size size> <(world-readable | no-world-readable>;
flag {
    all;
}
```

You configure these statements at the **[edit services application-identification traceoptions]** hierarchy level.

These statements are described in the following sections:

Configuring the APPID Log Filename

By default, the name of the file that records trace output is **serviced**. You can specify a different name by including the **file** statement at the **[edit services application-identification traceoptions]** hierarchy level:

```
file filename;
```

Configuring the Number and Size of APPID 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 services application-identification traceoptions]** hierarchy level:

```
file 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 ***filename*.0**, and a new file called ***filename*** is created. When the new ***filename*** reaches 2 MB, ***filename*.0** is renamed ***filename*.1** and ***filename*** is renamed ***filename*.0**. This process repeats until there are 20 trace files. Then the oldest file (***filename*.19**) is overwritten by the newest file (***filename*.0**).

The number of files can be from 2 through 1000 files. The file size of each file can be from 10 KB through 1 gigabyte (GB).

Configuring Access to the Log File

By default, only the user who configures the tracing operation can access log files.

To specify that any user can read all log files, include the **file world-readable** statement at the **[edit services application-identification traceoptions]** hierarchy level:

```
file world-readable;
```

To explicitly set the default behavior, include the **file no-world-readable** statement at the **[edit services application-identification traceoptions]** hierarchy level:

```
file 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 services application-identification traceoptions file *filename*]** hierarchy level and specifying a regular expression (regex) to be matched:

```
file filename match regex;
```

Configuring the Tracing Flags

By default, if the **traceoptions** configuration is present, only important events are logged. You can configure the trace operations to be logged by including the following statements at the **[edit services application-identification traceoptions]** hierarchy level:

```
flag {
    all;
}
```

Currently, the only supported flag is **all**, which instructs the router to trace all operations.

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Examples: Configuring Application Identification Properties

The following examples show an address-based application identification configuration:

```
[edit services application-identification]
rule rule1 {
    application-name test2;
    address 1 {
        source {
            ip 10.110.1.1/16;
            port-range {
                tcp 1110-1150;
            }
        }
        destination {
            ip 10.11.1.1/16;
            port-range {
                tcp 111-1100;
            }
        }
        order 1;
    }
}
}
```

```
[edit services application-identification]
rule-set rs1 {
    rule rule1;
```

```
}
profile pf1 {
    rule-set rs1;
}
[edit services]
service-set sset1 {
    application-identification-profile pf1;
}
```

The following examples show application group configuration:

```
[edit services application-identification]
application-group junos:peer-to-peer {
    index 5;
    application-groups {
        junos:chat;
        junos:file-sharing;
        junos:voip;
    }
}
```

```
[edit services application-identification]
application-group junos:voip {
    index 14;
    applications {
        junos:h225ras;
        junos:h225sgn;
        junos:mgcp;
        junos:sip;
    }
}
```

The following examples show application identification for nested application configuration:

```
    nested-application nested1 {
        type nested1;
        index 65345;
    protocol HTTP;
        signature nestedcust001 {
            member m01 {
                context http-url-parsed;
                pattern .*nested.*;
```

```
        direction any;
      }
      maximum-transactions 2;
    order 3825;
```

3

CHAPTER

Collecting Statistics and Tracking Data Using L-PDF

L-PDF Overview

NOTE: Starting with Junos OS Release 16.1R1, the local policy decision function is not supported.

NOTE: Starting with Junos OS Release 12.1, all interface-style services are supported for dynamic Point-to-Point Protocol over Ethernet (PPPoE) subscribers on all MX Series routers with modular Modular Port Concentrators (MPCs).

Starting with Junos OS Release 12.1, the local policy decision function (L-PDF) plug-in can offload flows to the Packet Forwarding Engine. Offloading is supported only on MX Series routers with Modular Port Concentrators (MPCs) and accomplished using the Juniper Forwarding Mechanism (JFM). JFM allows services flows to be offloaded to the Packet Forwarding Engine. However, 5-tuple flows cannot be offloaded. Apart from the local L-PDF plug-in, offloading is supported on the packet-triggered subscribers and policy control (PTSP) plug-in. The **show services application-aware-access-list flows subscriber *subscriber-name*** command displays offload status.

Local policy decision functionality for application-related services adds support for a new process that regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces. This functionality is collectively named the local policy decision function (L-PDF). L-PDF is supported on:

- MX Series routers equipped with Multiservices DPCs.
- M120 or M320 routers equipped with Multiservices 400 PICs.
- Aggregated Multiservices (AMS) PICs.

Multiple ms- interfaces can be bundled together in an AMS PIC interface, which causes the traffic destined for this AMS group to be distributed over the member services PICs of the group. Junos OS Trio chipsets enable the calculation of a symmetric hash for the forward and reverse flows, and support a microcode map in the forwarding plane. This capability enables load-balancing of traffic across various services PICs in an AMS group. Starting with Junos OS Release 12.1, ams- interfaces enable an N:1 redundancy mechanism to cluster together N number of **ms- interfaces** in an AMS group that supports load sharing.

Starting with Junos OS Release 11.3, local L-PDF that resides on the services PIC is supported on T320, T640, and T1600 routers. The application identification (APPID) service defines the applications and how they are grouped. The application-aware access list (AACL) service defines the applications and application groups for which statistics are collected for a specific user or interface. The L-PDF configuration defines the way in which the statistics are output.

To configure properties for statistics output, include the **policy-decision-statistics-profile** statement at the **[edit accounting-options]** hierarchy level. A new **traceoptions** configuration is available at the **[edit system services local-policy-decision-function]** hierarchy level. To configure a dynamic profile to attach a specified service set to an interface, include the **service** statement at the **[edit dynamic-profiles *profile-name* interfaces *interface-name* unit *logical-unit-number* family inet]** hierarchy level. To attach a service set to a static interface, include the **service-set *service-set-name*** statement at the **[edit interfaces *interface-name* unit *logical-unit-number* family inet service (input | output)]** hierarchy level. For more information on service sets, see *Understanding Service Sets*.

The following related operational commands are supported:

- **show services local-policy-decision-function flows**
- **show/clear services local-policy-decision-function statistics**
- **show/clear services application-aware-access-list statistics**

For more information on the CLI configuration, see the "Best-Effort Application Identification of DPI-Serviced Flows" on page 20. For more information on the operational commands, see the CLI Explorer.

> **NOTE:** Because the Junos OS extension-provider package (variously known as JSF, MP-SDK, and eJunos in releases earlier than 12.3) lacks aggressive constraint checks, you should not set the **policy-db-size** statement at the **[edit chassis fpc *slot-number* pic *pic-number* adaptive-services service-package extension-provider]** hierarchy level to a high value. For Junos Application Aware (previously known as Dynamic Application Awareness) configurations, the recommended values for the extension-provider package options at this hierarchy level are as follows:
>
> - **control-cores** = **1**
> - **data-cores** = **7**
> - **object-cache-size** = **1280** (for Multiservices 400 PIC and Multiservices DPC)
> - **policy-db-size** = **200**
> - Include these **package** values: **jservices-idp**, **jservices-appid**, **jservices-llpdf**, **jservices-aacl**

Release History Table

Release	Description
16.1R1	Starting with Junos OS Release 16.1R1, the local policy decision function is not supported.

RELATED DOCUMENTATION

Best-Effort Application Identification of DPI-Serviced Flows

IN THIS SECTION

This topic describes the following information:

Features That Support Application-Level Filtering

The application-aware access list (AACL) service uses application names and groups as matching criteria for filtering traffic. The service defines the applications and application groups for which statistics are collected for a specific user or interface.

The local policy decision function (L-PDF) enables you to configure properties for statistics output. L-PDF supports a process that regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.

Best-Effort Application Determination

Typically, APPID conclusively determines the Layer 7 application associated with a given DPI-serviced flow. In these cases, the application identification is final. Occasionally, APPID is only able to make an initial, inconclusive determination of the Layer 7 application associated with a given flow. This is referred to as a *best-effort* application identification. In such cases, the APPID process continues processing packets on that flow and might subsequently make a conclusive determination of the application associated with that flow. In some cases of best-effort application identification, the flow ends before a final application determination can be made.

APPID, AACL, and L-PDF Processing in Preconvergence Scenarios

IN THIS SECTION

The following sections describe APPID, AACL, and L-PDF processing in various stages of application identification for a DPI-serviced flow of TCP/UDP/ICMP traffic.

Prior to a Final or Best-Effort Application Identification

During the time that APPID has not yet made either a final or best-effort determination of the application associated with a given flow, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has not yet made either a final or best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has not yet made either a final or best-effort determination of the associated application.

Upon Best-Effort Application Identification

When a best-effort application determination is made, AACL does not apply any AACL term actions configured for that flow. There are a number of reasons for this, one being that the action itself (such as **discard**) can make a final application determination impossible. Instead, AACL or L-PDF tracks the flow and accepts all packets for that flow until a final determination is made, at which time the normal AACL or L-PDFL actions are fully applied to the flow.

While Application Identification Is on a Best-Effort Basis

During the time that APPID identification of the application associated with a given flow is on a best-effort basis, the flow does not contribute to any per-subscriber or per-application statistics collection.

The output of the following operational mode commands includes flows for which APPID has only made a best-effort determination of the associated application:

- **show services local-policy-decision-function flows (interface *interface-name* | subscriber *subscriber-name*)**
- **show services application-aware-access-list flows (interface *interface-name* | subscriber *subscriber-name*)**

In the command output, the **Action** field displays **accept** and the **Application** or **Application group** field displays **unknown** for a flow for which APPID has only made a best-effort determination of the associated application.

If a Flow Ends Before an Application Identification Is Made

If a flow ends before APPID has made either a final or a best-effort application identification, AACL or L-PDF uses the **unknown** application ID as a final determination and performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for the **application-group-any** application, then the statistics for that flow are collected and aggregated against the count bucket type, and reported as such.

If a Flow Ends While Application Identification on a Best-Effort Basis

If a flow ends while the application identification is on a best-effort basis, AACL or L-PDF uses that best-effort determination as a final determination. AACL or L-PDF performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** AACL term action is configured for that Layer 7 application, then the statistics for the flow are collected and aggregated against the AACL or L-PDF statistics. However, in the case of nested applications, AACL and

L-PDF do not consider the best-effort determination as final and the nested application is reported as an unknown application.

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Configuring Statistics Profiles

IN THIS SECTION

The local policy decision function (L-PDF) enables you to configure properties for statistics output. To do this, you create a statistics profile, which configures the files to which statistics records are exported and the format that is exported. There are two configurations you can use to specify the profile, as described in the following subsections:

NOTE: You must use the same configuration stanza for specifying the profile and the file selection. If configurations are committed in both hierarchies, the one at the **[edit system services local-policy-decision-function]** hierarchy level takes precedence.

NOTE:

- When a session closes before APPID has identified nested applications, the session is treated as a best-effort session and L-PDF does not get the nested application information. In such cases, nested applications are reported as unknown applications.
- During the time that the application identification (APPID) feature has not yet made a final determination of the application associated with a given flow, the flow does not contribute to any per-subscriber or per-application statistics collection. For more information, see "Best-Effort Application Identification of DPI-Serviced Flows" on page 20.

NOTE: For rms- interfaces, the statistics received from the active Multiservices PICs in the RMS group are combined with the statistics of the reported ended flows kept on the Routing Engine. The aggregated value is written to the statistics file. In the case of AMS interfaces, all the Multiservices PICs consisting of the AMS group reports statistics independently. These statistics are aggregated on the Routing Engine. The Routing Engine runs an independent timer, which on expiry writes the aggregated entry in the statistics file. This method of collection causes the statistics data in the statistics file to be displayed with a small delay.

Configuring an L-PDF Statistics Profile

You can specify an L-PDF statistics profile by including the following configuration at the **[edit accounting-options]** hierarchy level:

```
[edit accounting-options]
policy-decision-statistics-profile profile-name {
    application-aware-access-list-fields [ field-name ];
    file filename;
    files number;
    size bytes;
}
```

> **NOTE:** This configuration method is not the preferred method for configuring Junos Application Aware (previously known as Dynamic Application Awareness) statistics. It is only maintained for backwards compatibility and may be deprecated in a future software release and does not support the use of IPv6 address and prefix length. The new, preferred configuration is found at the **[edit system services local-policy-decision-function]** hierarchy level, as described in "Configuring an AACL Statistics Profile" on page 70. We encourage you to migrate to the new configuration method.

You specify a profile name to identify the profile and other properties as needed by including the **policy-decision-statistics-profile** statement. The **aacl-fields** statement specifies which statistics to collect in an accounting-data log file. This log file is located on the **/var/log** directory on the router. You specify the log file by including the **file *filename*** statement. The filename is prefixed by the **aacl_statistics_** prefix; for example, if you specify the filename **lpdfd**, the log file is **/var/log/aacl_statistics_lpdfd**.

The **application-aware-access-list-fields** statement supports the following options:

- **address**—IP Address
- **application**—Application name
- **application-group**—Application group name
- **input-bytes**—Number of input bytes
- **input-interface**—Input interface name
- **input-packets**—Number of input packets
- **mask**—Netmask
- **output-bytes**—Number of output bytes
- **output-packets**—Number of output packets
- **subscriber-name**—Subscriber name
- **timestamp**—Timestamp
- **vrf-name**—VPN routing and forwarding (VRF) name

For more information on configuring profiles, see the *Network Management and Monitoring Guide*.

Configuring an AACL Statistics Profile

You can specify an AACL statistics profile by including the following configuration at the **[edit system services]** hierarchy level:

```
local-policy-decision-function {
    statistics {
        file filename {
            archive-sites [ url ];
            files number;
            size bytes;
            transfer-interval minutes;
        }
        aacl-statistics-profile profile-name {
            aacl-fields [ field-name ];
            file filename;
            report-interval minutes;
            record-mode (interim-active-only | interim-full);
        }
        record-type (delta | interim);
    }
}
```

To specify the file properties, include the **file** statement at the **[edit system services local-policy-decision-function statistics** hierarchy level with a unique filename:

- The **archive-sites** statement specifies one or more URLs for archiving the files. Archiving can be done by using FTP or SCP.
- The **files** statement specifies the maximum number of files that are maintained at one time.
- The **size** statement specifies the maximum size of each file.
- The **transfer-interval** statement specifies the interval between data transfers in minutes.

You specify a profile name to identify the profile and other properties as needed by including the **aacl-statistics-profile** statement. The **aacl-fields** statement specifies which statistics to collect in an accounting-data log file. This log file is located on the **/var/stats/aacl** directory on the router. You specify the log file by including the **file *filename*** statement.

The **aacl-fields** statement supports the following options:

- **address**—IP Address
- **all-fields**—All available fields
- **application**—Application name

- **application-group**—Application group name
- **input-bytes**—Number of input bytes
- **input-interface**—Input interface name
- **ipv6-address**—IPv6 address
- **ipv6-prefix-length**—Prefix length associated with the displayed IPv6 address
- **input-packets**—Number of input packets
- **mask**—Netmask
- **output-bytes**—Number of output bytes
- **output-packets**—Number of output packets
- **subscriber-name**—Subscriber name
- **timestamp**—Timestamp
- **vrf-name**—VPN routing and forwarding (VRF) name

The **record-type** statement specifies whether a record is **delta** or **interim**; **delta** is the default setting. The **report-interval** statement specifies the reporting interval in minutes; the default setting is 15 minutes and the range is 5 through 1440 minutes. The **record-mode** statement specifies how the statistics are reported for each reporting interval; the default setting is **interim-full** and reports all available statistics. To report only statistics that have changed for the reporting interval, use the **interim-active-only** setting.

> **NOTE:** The IPv6 fields (**ipv6-address** and **ipv6-prefix-length**) are not supported for **record-type delta**. The IPv6 fields are supported for **record-type interim** only,meaning that the fields are restricted to the S- (Login) record.

For more information on configuring profiles, see the *Network Management and Monitoring Guide*.

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Applying L-PDF Profiles to Service Sets

You can optionally apply policy decision statistics profiles as part of a service-set definition. To do this, you include the **policy-decision-statistics-profile** statement at the **[edit services service-set *service-set-name*]** hierarchy level:

```
policy-decision-statistics-profile profile-name;
```

> **NOTE:** To provide high availability for the policy decision statistics, associate the service-set definition with a redundant services PIC (rsp) interface.

You can include only one profile name in the specification for the **application-aware access-list** statement.

The following example shows a sample configuration for attachment of an L-PDF statistics profile:

```
services {
    service-set test_aacl_sset {
        aacl-rules aacl_rule;
        policy-decision-statistics-profile {
            pdf_stats_prof;
        }
        interface-service {
            service-interface ms-0/3/0.0;
        }
    }
}
```

> **NOTE:** Only one service set can be applied to a single interface when L-PDF functionality is used.

The following example shows a sample configuration for attachment of a service set to a static interface:

```
interfaces {
    fe-0/0/0 {
        vlan-tagging;
        unit 1 {
            vlan-id 1;
```

```
        family inet {
          service {
            input {
              service-set test_aacl_sset;
            }
            output {
              service-set test_aacl_sset;
            }
          }
          address 10.1.1.1/24;
        }
      }
    }
  }
```

NOTE: The **session-offload** statement at the [**edit chassis fpc *slot-number* pic *number* adaptive-services service-package extension-provider**] hierarchy level controls session offload behavior for Multiservices DPCs on MX Series routers. It controls session offload on a per-device basis, where a device is a Multiservices interface (**ms-*fpc*-*pic*-*port***). Currently, the session offload function is supported for at most one Multiservices interface. When the offload function is enabled, we recommended that you limit Junos Application Aware (previously known as Dynamic Application Awareness) features to that Multiservices interface.

The default is to not offload any sessions. For more information on chassis configuration, see the *Junos OS Administration Library*.

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Tracing L-PDF Operations

Tracing operations track L-PDF 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 system services local-policy-decision-function]** hierarchy level, you can customize the trace file settings:

```
traceoptions {
    file filename <files number> <size size>;
    flag flag;
}
```

The flags track the following information:

- **all**—Everything
- **configuration**—Configuration traces
- **database**—Database traces
- **general**—Miscellaneous traces
- **gres**—Graceful Routing Engine switchover (GRES) traces
- **ptsp-statistics**—PTSP statistics traces
- **rtsock**—Routing socket traces
- **statistics**—Statistics traces
- **subscriber**—Subscriber traces

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4

CHAPTER

Configuration Statements

aacl-fields

Syntax

```
aacl-fields {
    field-name;
}
```

Hierarchy Level

[edit system services local-policy-decision-function statistics aacl-statistics-profile *profile-name*]

Release Information
Statement introduced in Junos OS Release 10.0.
IPv6 support introduced in Junos OS Release 12.2.

Description
Define the statistics to collect in a data log file.

Options
field-name—Name of the field:

- **address**—IPv4 address
- **all-fields**—All available fields
- **application**—Application name
- **application-group**—Application group name
- **input-bytes**—Number of input bytes
- **input-interface**—Input interface name
- **input-packets**—Number of input packets
- **ipv6-address**—IPv6 address
- **ipv6-prefix-length**—Prefix length associated with the displayed IPv6 address
- **mask**—Netmask
- **output-bytes**—Number of output bytes
- **output-packets**—Number of output packets
- **subscriber-name**—Subscriber name
- **timestamp**—Timestamp
- **vrf-name**—VPN routing and forwarding (VRF) name

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

RELATED DOCUMENTATION

Configuring Statistics Profiles | 67

aacl-statistics-profile

Syntax

```
aacl-statistics-profile profile-name {
    aacl-fields {
        field-name;
    }
    file filename;
    record-mode (interim-active-only | interim-full);
    report-interval minutes;
}
```

Hierarchy Level

```
[edit services service-set service-set-name],
[edit system services local-policy-decision-function statistics]
```

Release Information

Statement introduced in Junos OS Release 10.0.
record-mode option introduced in Junos OS Release 10.2.

Description

Create an AACL statistics profile, which configures the files to which statistics records are exported and the format that is exported.

Options

file *filename*—Name of the file to receive the statistics data output. Enclose the name within quotation marks. All files are placed in the directory **/var/stats/aacl**.

profile-name—Identifier for the profile.

record-mode—Record mode for the reporting interval; possible values are **interim-active-only**, which reports only statistics that have changed, or **interim-full**, which reports all available statistics.

report-interval *minutes*—Frequency at which statistics are recorded, in minutes.

Default: 15 minutes

Range: 5 through 1440 minutes

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

For more information on profiles, see the *Network Management and Monitoring Guide*.

Configuring Statistics Profiles | 67

address

Syntax

```
address address-name {
    destination {
        ip address</prefix-length>;
        port-range {
            tcp [ ports-and-port-ranges ];
            udp [ ports-and-port-ranges ];
        }
    }
    source {
        ip address</prefix-length>;
        port-range {
            tcp [ ports-and-port-ranges ];
            udp [ ports-and-port-ranges ];
        }
    }
    order number;
}
```

Hierarchy Level

```
[edit services application-identification rule rule-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define address properties for application-identification rule processing. This statement is mandatory; you must specify either the destination or source properties.

Options

address-name—Identifier for address information.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

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application (Defining)

Syntax

```
application application-name {
    disable;
    idle-timeout seconds;
    index number;
    port-mapping {
        disable;
        port-range {
            tcp [ ports-and-port-ranges ];
            udp [ ports-and-port-ranges ];
        }
    }
    session-timeout seconds;
    type type;
    type-of-service service-type;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define the application and its properties.

The remaining statements are explained separately. See CLI Explorer.

Options

application-name—Identifier for the application. This is a mandatory value and has a maximum length of 32 characters.

Required Privilege Level

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

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application (Including in Rule)

Syntax

```
application application-name;
```

Hierarchy Level

```
[edit services application-identification rule rule-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Identify the application for inclusion in a rule.

Options
application-name—Identifier for the application.

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

application-aware-access-list-fields

Syntax

```
application-aware-access-list-fields {
    field-name;
}
```

Hierarchy Level

```
[edit accounting-options policy-decision-statistics-profile profile-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define the statistics to collect in a data log file.

Options

field-name—Name of the field:

- **address**—IP address
- **application**—Application name
- **application-group**—Application group name
- **input-bytes**—Number of input bytes
- **input-interface**—Input interface name
- **input-packets**—Number of input packets
- **mask**—Netmask
- **output-bytes**—Number of output bytes
- **output-packets**—Number of output packets
- **subscriber-name**—Subscriber name
- **timestamp**—Timestamp
- **vrf-name**—VPN routing and forwarding (VRF) name

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Statistics Profiles | 67

application-group

Syntax

```
application-group group-name {
    disable;
    application-groups {
        application-group-name;
    }
    applications {
        application-name;
    }
    index number;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.
Support added in Junos OS release 19.3R2 and 19.4r1 for Next Gen Services on MX240, MX480, and MX960.

> **NOTE:** The **disable** and **index** options are not supported for Next Gen Services.

Description

Define the properties and contents of the application group.

Options

group-name—Unique identifier for the group.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Application Groups | 47

application-group-any

Syntax

```
application-group-any;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Match any application group defined in the database.

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

application-groups (Services AACL)

Syntax

```
application-groups [ application-group-names ];
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Identify one or more application groups defined in the application identification configuration for inclusion as a match condition.

Options
application-group-names—Identifiers of the application groups.

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

application-groups (Services Application Identification)

Syntax

```
application-groups {
    application-group-name;
}
```

Hierarchy Level

```
[edit services application-identification application-group group-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.
Support added in Junos OS release 19.3R2 and 19.4r1 for Next Gen Services on MX240, MX480, and MX960.

Description

Identify the list of application groups for inclusion in a larger application group. An ***application-group-name*** statement is mandatory.

Options

application-group-name—Identifier for the application group. Maximum length is 32 characters.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Application Groups | 47

application-system-cache-timeout

Syntax

```
application-system-cache-timeout seconds;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.
Support added in Junos OS release 20.2R1 for Next Gen Services on MX240, MX480, and MX960 routers.

Description

Configure the lifetime for entries in the application system cache.

Specify the timeout value in seconds for the application system cache (ASC) entries.

ASC saves the mapping between an application type and the corresponding destination IP address, destination port, protocol type, and service. By default, the ASC saves the mapping information for 3600 seconds.

> **NOTE:** When you change the timeout value for the application system cache entries using the command **set services application-identification application-system-cache-timeout**, the cache entries need to be cleared to avoid inconsistency in timeout values of existing entries.

> **NOTE:** ASC is not cleared when the IDP policy is loaded. Users need to manually clear or wait for the cache entries to expire.

Options

seconds— Lifetime for system cache entries, in seconds.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

application-unknown

Syntax

```
application-unknown
```

Hierarchy Level

[edit services aacl **rule** *rule-name* **term** *term-name* **from**]

Release Information

Statement introduced in Junos OS Release 11.2.

Description

Enable AACL logging of flows for unknown applications.

RELATED DOCUMENTATION

See Configuring Logging of AACL Flows | 30.

applications (Services AACL)

Syntax

```
applications [ application-names ];
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Identify one or more applications defined in the application identification configuration for inclusion as a match condition.

Options
application-names—Identifiers of the applications.

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

applications (Services Application Identification)

Syntax

```
applications {
    application-name;
}
```

Hierarchy Level

[edit services application-identification **application-group** *group-name*]

Release Information

Statement introduced in Junos OS Release 9.5.
Support added in Junos OS release 19.3R2 and 19.4r1 for Next Gen Services on MX240, MX480, and MX960.

Description

Identify the list of applications for inclusion in the application group.

Options

application-name—Identifier for the application. Maximum length is 32 characters.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Application Groups | 47

automatic

Syntax

```
automatic {
    interval hour;
    start-time time;
}
```

Hierarchy Level

[edit services application-identification **download**]

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Define automatic download properties.

Options
interval *hour*—Download interval in hours. The default is **24** and the range is from 1 through 168.

start-time *time*—Start-time value. The default is **0:00** and the range is from 0:00 through 24:00.

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

RELATED DOCUMENTATION

Configuring Automatic Download of Application Package Updates | 54

bypass-traffic-on-exceeding-flow-limits

Syntax

```
bypass-traffic-on-exceeding-flow-limits;
```

Hierarchy Level

```
[edit services service-set service-set-name service-set-options]
```

Release Information
Statement introduced in Junos OS Release 10.1.
Statement introduced in Junos OS Release 19.3R2 on MX240, MX480 and MX960 routers using the MX-SPC3 services card.

Description

Bypass traffic when exceeding the maximum flow limit.

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

RELATED DOCUMENTATION

Configuring Service Sets to be Applied to Services Interfaces

chain-order

Syntax

```
chain-order;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Signatures can contain multiple members. If the chain order feature is on, those members are read in order. By default, chain ordering is turned off. If a signature contains only one member, this option is ignored.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

context

Syntax

```
context value;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name member name]
```

Release Information
Statement introduced in Junos OS Release 10.2.

Description
Define a service-specific context, such as **http-url**.

Options
value—Use the specified service-specific context:

- **http-header-content-type**—Use the service context http-header-content-type.
- **http-header-host**—Use the service context http-header-host.
- **http-url-parsed**—Use the service context http-url-parsed.
- **http-url-parsed-param-parsed**—Use the service context http-url-parsed-param-parsed.

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

destination (Services)

Syntax

```
destination {
    ip address</prefix-length>;
    port-range {
        tcp [ ports-and-port-ranges ];
        udp [ ports-and-port-ranges ];
    }
}
```

Hierarchy Level

```
[edit services application-identification rule rule-name address address-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define destination properties for application-identification rule processing.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

destination-address

Syntax

```
destination-address address;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.
IPv6 support introduced in Junos OS Release 12.2.

Description

Specify the destination address for rule matching.

Options

address—Destination IPv4 or IPv6 address or prefix value.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

destination-address-range

Syntax

```
destination-address-range low minimum-value high maximum-value;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.
IPv6 support introduced in Junos OS Release 12.2.

Description

Specify the destination address range for rule matching.

Options

minimum-value—Lower boundary for the IPv4 or IPv6 address range.

maximum-value—Upper boundary for the IPv4 or IPv6 address range.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

destination-prefix-list (Services AACL)

Syntax

```
destination-prefix-list list-name;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the destination prefix list for rule matching. You configure the prefix list by including the **prefix-list** statement at the **[edit policy-options]** hierarchy level.

Options

list-name—Destination prefix list.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

direction

Syntax

```
direction (any | client-to-server | server-to-client) ;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name member name]
```

Release Information
Statement introduced in Junos OS Release 10.2.

Description
Specify the connection direction of the packets to apply pattern matching.

Options
any—Apply pattern matching to the packets from a client to a server and from a server to a client.

client-to-server—Apply pattern matching to the packets from a client to the server.

server-to-client—Apply pattern matching to the packets from a server to a client.

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48.

disable (APPID Application)

Syntax

```
disable;
```

Hierarchy Level

```
[edit services application-identification application application-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable this application definition.

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

disable (APPID Application Group)

Syntax

```
disable;
```

Hierarchy Level

```
[edit services application-identification application-group group-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable application group properties.

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

RELATED DOCUMENTATION

Configuring Application Groups | 47

disable (APPID Port Mapping)

Syntax

```
disable;
```

Hierarchy Level

[edit services application-identification **application** *application-name* **port-mapping**]

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable port-mapping properties for application identification.

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

disable-global-timeout-override

Syntax

```
disable-global-timeout-override;
```

Hierarchy Level

```
[edit interfaces interface-name services-options]
[services service-set service-set-name service-set-options
```

Release Information

Statement introduced in Junos OS Release 10.0.
Support added in Junos OS Release 20.3R1 for Next Gen Services on MX240, MX480, and MX960 routers.

Description

Disallow overriding a global inactivity or session timeout.

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

download

Syntax

```
download {
    automatic {
        interval hour;
        start-time time;
    }
    url url;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Define application download properties.

The remaining statements are explained separately. See CLI Explorer.

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

RELATED DOCUMENTATION

Configuring Automatic Download of Application Package Updates | 54

enable-asymmetric-traffic-processing

Syntax

```
enable-asymmetric-traffic-processing;
```

Hierarchy Level

```
[edit services service-set service-set-name service-set-options]
```

Release Information
Statement introduced in Junos OS Release 11.2.

Description
Enable APPID to perform application matching on unidirectional traffic.

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

RELATED DOCUMENTATION

Configuring APPID Support for Unidirectional Traffic | 53

enable-heuristics

Syntax

```
enable-heuristics;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 11.2.

Description
Enable APPID to identify encrypted data packets in point-to-point applications by using heuristics methodology.

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

RELATED DOCUMENTATION

Configuring APPID Support for Heuristics | 52

file

Syntax

```
file file-name {
    archive-sites url;
    files file-number;
    size bytes;
    transfer-interval minutes;
}
```

Hierarchy Level

```
[edit system services local-policy-decision-function statistics]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Specify a file to which statistics records are exported and the format that is exported.

Options

archive-sites [*url*]—Use one or more of the specified destinations for archiving data.

file-name—Name of the file to receive the statistics data output.

files *file-number*—(Optional) Use the specified maximum number of accounting files.

Range: 3 through 1000 files

Default: 3 files

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

size *bytes*—(Optional) Use the specified maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB).

Syntax: ***x*k** to specify KB, ***x*m** to specify MB, or ***x*g** to specify GB

Range: 262144 through 1073741824 or the maximum file size supported on your system

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

transfer-interval *minutes*—Use the specified frequency at which to transfer files to archive sites, in minutes.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

RELATED DOCUMENTATION

Configuring Statistics Profiles | 67

from

Syntax

```
from {
    application-group-any;
    application-groups [ application-group-names ];
    application-unknown;
    applications [ application-names ];
    destination-address address <any-unicast>;
    destination-address-range low minimum-value high maximum-value;
    destination-prefix-list list-name;
    nested-application-unknown;
    source-address address <any-unicast>;
    source-address-range low minimum-value high maximum-value;
    source-prefix-list list-name;
}
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name]
```

Release Information

Statement introduced before Junos OS Release 9.5.

Description

Specify match conditions for the AACL term.

Options

For information on match conditions, see the description of firewall filter match conditions in the *Routing Policies, Firewall Filters, and Traffic Policers User Guide*.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring AACL Rules | 23

idle-timeout

Syntax

```
idle-timeout seconds;
```

Hierarchy Level

```
[edit services application-identification application application-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define idle timeout for an application in seconds. When the timeout period expires, the session ends if no packets have been received.

Options

seconds—Idle timeout period.

Default: 30

Range: 1 through 604,800

Required Privilege Level

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

RELATED DOCUMENTATION

APPID Overview | 35

Defining an Application Identification | 40

ignore-errors

Syntax

```
ignore-errors <alg> <tcp>;
```

Hierarchy Level

```
[edit interfaces interface-name services-options]
```

Release Information

Statement introduced in Junos OS Release 10.1.

Description

Define settings for minimizing TCP packet drops during stateful firewall processing.

> **NOTE:** **ignore-errors** option is not supported on adaptive services interfaces (sp-x/y/z).

Options

alg—(Optional) Mediate ALG behavior that results in dropping malformed packets or random packets when the software is unable to allocate resources.

tcp—(Optional) Prevent software from dropping packets that fail TCP SYN checks.

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

index (Applications)

Syntax

```
index number;
```

Hierarchy Level

```
[edit services application-identification application application-name],
[edit services application-identification application-group group-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Assign an application or application-group index number. This is a mandatory value.

Options

number—Index number; must be a unique, unsigned value.

Range: 0 through 65,535

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40
Configuring Application Groups | 47

index (Nested Applications)

Syntax

```
index number;
```

Hierarchy Level

```
[edit services application-identification nested-application name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Set a number that is a one-to-one mapping to the application name. The application name is used to ensure that each signature definition is unique.

Options

number—Numeric value associated with an application name. The index range for predefined applications is from 1 through 32,767. The index range for custom applications and custom nested applications is from 32,768 through 65,534.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48.

inactivity-non-tcp-timeout

Syntax

```
inactivity-non-tcp-timeout seconds;
```

Hierarchy Level

```
[edit interfaces interface-name services-options]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Define the inactivity timeout period for non-TCP established sessions in seconds.

Options

seconds—Timeout period.

Range: 4 through 86,400

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

inactivity-tcp-timeout

Syntax

```
inactivity-tcp-timeout seconds;
```

Hierarchy Level

```
[edit interfaces interface-name services-options]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Define the inactivity timeout period for TCP established sessions in seconds.

Options

seconds—Timeout period.

Range: 4 through 86,400

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

ip

Syntax

```
ip address</prefix-length>;
```

Hierarchy Level

```
[edit services application-identification rule rule-name address destination],
[edit services application-identification rule rule-name address source]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define an IP address and netmask for identifying the traffic destination or source.

Options

address</prefix-length>—IP address and netmask.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

local-policy-decision-function

Syntax

```
local-policy-decision-function {
    statistics {
        aacl-statistics-profile profile-name {
            aacl-fields {
                field-name;
            }
            file filename;
            report-interval minutes;
        }
        file file-name {
            archive-sites url;
            files file-number;
            size bytes;
            transfer-interval minutes;
        }
        record-type (delta | interim);
    }
    traceoptions {
        file filename <files number> <size size>;
        flag flag;
        no-remote-trace;
    }
}
```

Hierarchy Level

```
[edit system services]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Specify L-PDF properties.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Statistics Profiles | 67

log (aacl)

Syntax

```
log event-type
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name then ]
```

Release Information
Statement introduced in Junos OS Release 11.2.

Description
Enable AACL logging of flows for known or unknown applications.

Options
event-type—Enable logging of the specified ***event-type***:

- **session-start**
- **session-end**
- **session-start-end-no-stats**
- **session-start-interim-end**
- **session-interim end**
- **session-end**

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

RELATED DOCUMENTATION

See Configuring Logging of AACL Flows | 30.

match-direction

Syntax

```
match-direction (input | output | input-output);
```

Hierarchy Level

```
[edit services aacl rule rule-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Specify the direction in which the rule match is applied.

Options
input—Apply the rule match on the input side of the interface.

output—Apply the rule match on the output side of the interface.

input-output—Apply the rule match bidirectionally.

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

RELATED DOCUMENTATION

Configuring Match Direction for AACL Rules | 24

max-checked-bytes

Syntax

```
max-checked-bytes bytes;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the maximum number of bytes to be inspected.

Options

bytes—Maximum number of bytes.

Range: 0 through 100,000

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

maximum-transactions

Syntax

```
maximum-transactions number;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name]
```

Release Information
Statement introduced in Junos OS Release 10.2.

Description
Set the maximum number of transactions required before a match is made.

Options
number—Maximum number of transactions.

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

member

Syntax

```
member name;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Define a member name for a custom nested application signature definition. Custom definitions can contain multiple members that define attributes for an application.

Options

name—Name of member for a custom nested application signature definition.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

min-checked-bytes

Syntax

```
min-checked-bytes bytes;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the minimum number of bytes to be inspected.

Options

bytes—Minimum number of bytes.

Range: 0 through 2000

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

nested-application

Syntax

```
nested-application name {
    index number;
    protocol protocol ;
    signature name {
        chain-order ;
        maximum-transactions number;
        member name {
            context (http-header-content-type | http-header-host | http-url-parsed | http-url-parsed-param-parsed);
            direction (any | client-to-server | server-to-client);
            pattern dfa-pattern;
        }
        order number;
    }
    type type;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Configure a custom nested application definition, which is used by the system to identify the nested application as it passes through the device. Custom nested application definitions can be used for nested applications that are not part of the Juniper Networks predefined nested application database.

Options

name—Name of nested application.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

nested-applications

Syntax

```
nested-applications [ nested-application-names ];
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 11.1.

Description

Identify one or more nested applications defined in the application identification configuration for inclusion as a match condition.

Options

nested-application-names—Identifiers of the nested applications.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

nested-application-settings

Syntax

```
nested-application-settings {
    no-application-system-cache;
    no-nested-application;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Configure nested application options for application identification services.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48.

nested-application-unknown

Syntax

```
nested-application-unknown
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 11.4.

Description

Enable AACL logging of flows for unknown nested applications.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

RELATED DOCUMENTATION

Configuring Logging of AACL Flows | 30.

no-application-identification

Syntax

```
no-application-identification;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable all application identification methods.

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

no-application-system-cache

Syntax

```
no-application-system-cache;
```

Hierarchy Level

```
[edit services application-identification],
[edit services application-identification nested-application-settings]
```

Release Information

Statement introduced in Junos OS Release 9.5.
Support for Next Gen Services introduced in Junos OS Release 19.3R2 and 19.4R1 on MX Series routers MX240, MX480 and MX960.

Description

Application identification information is saved in the application system cache to improve performance. This cache is updated when a different application is identified. This caching is turned on by default. Use the **no-application-system-cache** statement to turn it off.

ASC is enabled by default when a session is created. You can manually turn this caching off using the **set services application-identification no-application-system-cache** command. You can re-enable the ASC by using the **set services application-identification application-system-cache** command.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

Application Identification for Nested Applications | 48.

no-clear-application-system-cache

Syntax

```
no-clear-application-system-cache;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable clearing the application system cache.

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

no-nested-application

Syntax

```
no-nested-application;
```

Hierarchy Level

```
[edit services application-identification nested-application-settings]
```

Release Information
Statement introduced in Junos OS Release 10.2.

Description
Sometimes there is a need to identify multiple different applications running on the same Layer 7 protocols. For example, both Facebook and Yahoo Messenger can run over HTTP, but there is a need to identify them as two different applications. To do this, the application layer is split into two layers: Layer 7 applications and Layer 7 protocols. This function is turned on by default. Use the **no-nested-application** statement to turn it off.

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

no-protocol-method

Syntax

```
no-protocol-method;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 10.1.

Description

Disable the protocol-based application identification method.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

no-signature-based

Syntax

```
no-signature-based;
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Disable the signature-based application identification method.

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

order (Services Application Identification)

Syntax

```
order number;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name member name],
[edit services application-identification rule rule-name address]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define application matching priority. For address configurations, the order number resolves the conflict when multiple address entries are matched for a specific session. The lower number has higher priority.

Options

number—Order number. This value is mandatory and must be unique.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

Application Identification for Nested Applications | 48

pattern

Syntax

```
pattern dfa-pattern;
```

Hierarchy Level

```
[edit services application-identification nested-application name signature name member name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Define an attack pattern to be detected.

Options

dfa-pattern—Pattern of attack to match. Deterministic Finite Automata (DFA) is a powerful pattern matching engine.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

policy-decision-statistics-profile

Syntax

```
policy-decision-statistics-profile profile-name {
    aacl-fields {
        field-name;
    }
    file filename;
    files file-number;
    size bytes;
}
```

Hierarchy Level

```
[edit accounting-options],
[edit services service-set service-set-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Create a policy decision statistics profile, which configures the files to which statistics records are exported and the format that is exported.

Options

file *filename*—Use the specified file to receive the accounting-data output. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

files *number*—(Optional) Use the specified maximum number of accounting files.

Range: 2 through 1000 files

Default: 2 files

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

profile-name—Name of the policy decision statistics profile.

size *size*—(Optional) Use the specified maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB).

Syntax: ***x*k** to specify KB, ***x*m** to specify MB, or ***x*g** to specify GB

Range: 10,240 through 1,073,741,824 or the maximum file size supported on your system

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

The remaining statements are explained separately. See CLI Explorer.

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

RELATED DOCUMENTATION

> For more information on profiles, see the *Network Management and Monitoring Guide*.
>
> Configuring Statistics Profiles | **67**

port-mapping

Syntax

```
port-mapping {
    disable;
    port-range {
        tcp [ ports-and-port-ranges ];
        udp [ ports-and-port-ranges ];
    }
}
```

Hierarchy Level

```
[edit services application-identification application application-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define port-mapping properties for application identification.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

port-range

Syntax

```
port-range {
    tcp [ ports-and-port-ranges ];
    udp [ ports-and-port-ranges ];
}
```

Hierarchy Level

[edit services application-identification **application** *application-name* **port-mapping**],
[edit services application-identification **rule** *rule-name* **address destination**],
[edit services application-identification **rule** *rule-name* **address source**]

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define TCP and UDP port numbers or numeric ranges. For port-mapping configurations, this entry is required if the parent node exists.

Options

ports-and-port-ranges—Individual port numbers, numeric port ranges, or both. Separate the values with spaces. The format for numeric port ranges is ***minimum-value–maximum-value***.

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40
Configuring APPID Rules | 42

profile

Syntax

```
profile profile-name {
    rule-set rule-set-name;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.
Support added in Junos OS release 19.3R2 and 19.4R1 for Next Gen Services on MX240, MX480, and MX960.

Description

Define members of the application profile, which consists of one or more rule sets.

Options

profile-name—Identifier for the application profile.

The remaining statement is explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Application Profiles | 46

protocol

Syntax

```
protocol protocol;
```

Hierarchy Level

```
[edit services application-identification nested-application name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Identify the protocol that is monitored to identify nested applications. HTTP is supported.

Options

protocol—An agreed-upon or standardized method for transmitting data and establishing communications between different devices. The value **http** is supported.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

rule (AACL Rule Set)

Syntax

```
rule rule-name {
    match-direction (input | output | input-output);
    term term-name {
        from {
            application-group-any;
            application-groups [ application-group-names ];
            application-unknown;
            applications [ application-names ];
            destination-address address <any-unicast>;
            destination-address-range low minimum-value high maximum-value;
            destination-prefix-list list-name;
            nested-application-unknown;
            source-address address <any-unicast>;
            source-address-range low minimum-value high maximum-value;
            source-prefix-list list-name;
        }
        then {
            (accept | discard);
            count (application | application-group | application-group-any | nested-application | none);
            forwarding-class class-name;
            policer policer-name;
        }
    }
}
```

Hierarchy Level

```
[edit services aacl],
[edit services aacl rule-set rule-set-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the rule the router uses when applying this service.

Options

rule-name—Identifier for the collection of terms that constitute this rule.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

RELATED DOCUMENTATION

Configuring AACL Rules | 23

rule (Application Identification)

Syntax

```
rule rule-name {
    address {
        destination {
            ip address</prefix-length>;
            port-range {
                tcp [ ports-and-port-ranges ];
                udp [ ports-and-port-ranges ];
            }
        }
        source {
            ip address</prefix-length>;
            port-range {
                tcp [ ports-and-port-ranges ];
                udp [ ports-and-port-ranges ];
            }
        }
        order number;
    }
    application application-name;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define properties for application-identification rule processing.

Options

rule-name—Unique identifier for the rule.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

rule (Including in Rule Set)

Syntax

```
rule rule-name;
```

Hierarchy Level

```
[edit services application-identification rule-set rule-set-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Identify rules for inclusion in application rule set.

Options
rule-name—Unique identifier for the rule.

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

rule-set (Services AACL)

Syntax

```
rule-set rule-set-name {
    [rule rule-names ];
}
```

Hierarchy Level

```
[edit services aacl]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the rule set the router uses when applying this service.

Options

rule-set-name—Identifier for the collection of rules that constitute this rule set.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring AACL Rule Sets | 30

rule-set (Services Application Identification)

Syntax

```
rule-set rule-set-name {
    rule application-rule-name;
}
```

Hierarchy Level

```
[edit services application-identification],
[edit services application-identification profile profile-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define members of rule set.

Options

rule-set-name—Unique identifier for the rule set.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

service-set-options

Syntax

```
service-set-options {
    bypass-traffic-on-exceeding-flow-limits;
    bypass-traffic-on-pic-failure;
    enable-asymmetric-traffic-processing;
    enable-descriptive-session-syslog;
    header-integrity-check;
    routing-engine-services;
    support-uni-directional-traffic;
    tcp-fast-open {
        disabled;
        drop;
    }
    tcp-non-syn {
        drop-flow;
        drop-flow-send-rst;
    }
}
```

Hierarchy Level

[edit services service-set *service-set-name*]

Release Information

Statement introduced in Junos OS Release 10.1.
enable-asymmetric-traffic-processing and **support-uni-directional-traffic** options added in Junos OS Release 11.2.
routing-engine-services option added in Junos OS Release 15.1.
enable-change-on-ams-redistribution option added in Junos OS Release 15.1.
tcp-fast-open option added in Junos OS Release 17.2.
enable-descriptive-session-syslog option added in Junos OS Release 20.3.

Description

Specify the service set options to apply to a service set.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Service Sets to be Applied to Services Interfaces

Configuring APPID Support for Unidirectional Traffic | 53

statistics (System Services)

Syntax

```
statistics {
    aacl-statistics-profile profile-name {
        aacl-fields {
            field-name;
        }
        file filename;
        report-interval minutes;
    }
    file file-name {
        archive-sites [ url ];
        files file-number;
        size bytes;
        transfer-interval minutes;
    }
    record-type (delta | interim);
}
```

Hierarchy Level

```
[edit system services local-policy-decision-function]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Configure file and data specifications for recording AACL statistics.

Options

record-type—Use the specified record type; possible values are **delta** or **interim**.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Statistics Profiles | 67

support-uni-directional-traffic

Syntax

```
support-uni-directional-traffic;
```

Hierarchy Level

```
[edit services service-set service-set-name service-set-options]
```

Release Information

Statement introduced in Junos OS Release 11.2.

Description

Enable APPID to perform application matching on unidirectional traffic.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Support for Unidirectional Traffic | 53

service-set (Services)

Syntax

```
service-set service-set-name {
    allow-multicast;
    captive-portal-content-delivery-profile;
    cos-options {
        match-rules-on-reverse-flow;
    }
    cos-rules [cos-rule-name];
    extension-service service-name {
        provider-specific-rules-configuration;
    }
    (ids-rules rule-name | ids-rule-sets rule-set-name);
    interface-service {
        load-balancing-options {
            hash-keys {
                egress-key (destination-ip | source-ip);
                ingress-key (destination-ip | source-ip);
            }
        }
        service-interface interface-name;
    }
    ipsec-vpn-options {
        anti-replay-window-size bits;
        clear-dont-fragment-bit;
        ike-access-profile profile-name;
        local-gateway address;
        no-anti-replay;
        no-certificate-chain-in-ike;
        passive-mode-tunneling;
        trusted-ca [ ca-profile-names ];
        tunnel-mtu bytes;
        udp-encapsulation {
            <udp-dest-port destination-port>;
        }
    }
    ip-reassembly-rules rule-name};
    (ipsec-vpn-rules rule-name | ipsec-vpn-rule-sets rule-set-name);
    max-flows number;
    max-drop-flows {
        ingress ingress-flows;
        egress egress-flows;
```

```
}
max-session-setup-rate max-setup-rate;
nat-options {
    land-attack-check (ip-only | ip-port);
    max-sessions-per-subscriber session-number;
    stateful-nat64 {
        clear-dont-fragment-bit;
    }
}
(nat-rules rule-name | nat-rule-sets rule-set-name);
next-hop-service {
    inside-service-interface interface-name.unit-number;
    outside-service-interface interface-name.unit-number;
    outside-service-interface-type local;
    service-interface-pool name;
}
pcp-rules rule-name;
(pgcp-rules rule-name | pgcp-rule-sets rule-set-name);
(ptsp-rules rule-name | ptsp-rule-sets rule-set-name);
service-set-options {
    bypass-traffic-on-exceeding-flow-limits;
    bypass-traffic-on-pic-failure;
    disable-session-open-syslog;
    enable-asymmetric-traffic-processing;
    header-integrity-check;
    routing-engine-services;
    support-uni-directional-traffic;
}
snmp-trap-thresholds {
    flows high high-threshold | low low-threshold;
    nat-address-port high-threshold | low low-threshold;
    }
}
softwire-options {
    dslite-ipv6-prefix-length dslite-ipv6-prefix-length;
}
(softwire-rules rule-name | softwire-rule-sets rule-set-name);
(stateful-firewall-rules rule-name | stateful-firewall-rule-sets rule-set-name);
```

```
    syslog {
        host hostname {
            class {
                alg-logs;
                deterministic-nat-configuration-log;
                ids-logs;
                nat-logs;
                packet-logs;
                pcp-logs;
                session-logs <open | close>;
                stateful-firewall-logs ;
            }
            services severity-level;
            facility-override facility-name;
            interface-service prefix-value;
            port port-number;
            services severity-level;
        }
    }
    (web-filter-profile | url-filter-profile) profile-name;
}
```

Hierarchy Level

```
[edit services]
```

Release Information

Statement introduced before Junos OS Release 7.4.
pgcp-rules and **pgcp-rule-sets** options added in Junos OS Release 8.4.
server-set-options option added in Junos OS Release 10.1.
ptsp-rules and **ptsp-rule-sets** options added in Junos OS Release 10.2.
softwire-rules and **clear-rule-sets** options added in Junos OS Release 10.4.
ip-reassembly-rules and **outside-service-interface-type** option added in Junos OS Release 13.1R1.
pcp-rules option added in Junos OS Release 13.2R1.
softwire-options option added in Junos OS Release 14.1.
url-filter-profile option added in Junos OS Release 17.2R1.
match-rules-on-reverse-flow option added in Junos OS Release 16.1R5 and 17.4R1.
no-certificate-chain-in-ike option added in Junos OS Release 18.2R1.
web-filter-profile option added in Junos OS Release 18.3R1, replacing the deprecated **url-filter-profile** option.
max-session-setup-rate option added in Junos OS Release 19.1R1, replacing the deprecated option **max-session-creation rate**, which was added in Junos OS Release 17.1R1.
Support added in Junos 20.2R1 for Next Gen Services NAT PT feature.

Description

Define the service set.

> **NOTE:** Use the **web-filter-profile** option starting in Junos OS Release 18.3R1 and use the **url-filter-profile** option in Junos OS Releases before 18.3R1.

Options

service-set-name—Name of the service set. You can include special characters, such as a forward slash (/), colon (:), or a period (.).

Range: Up to 64 alphanumeric characters.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

- *Understanding Service Sets*

services (AACL)

Syntax

```
services aacl { ... }
```

Hierarchy Level

```
[edit]
```

Release Information
aacl statement introduced in Junos OS Release 9.5.

Description
Define the services to be applied to traffic.

Options
aacl—Use the values configured for application-aware-access-list matching rules.

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

RELATED DOCUMENTATION

Application Aware Services Interfaces User Guide for Routing Devices

services (Application Identification)

Syntax

```
services application-identification { ... }
```

Hierarchy Level

```
[edit]
```

Release Information
services statement introduced before Junos OS Release 7.4.
application-identification statement introduced in Junos OS Release 9.5.

Description
Define the services to be applied to traffic.

Options
application-identification—Use the values configured for application-identification properties.

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

RELATED DOCUMENTATION

APPID Overview | 35

session-timeout (Application Identification)

Syntax

```
session-timeout seconds;
```

Hierarchy Level

```
[edit services application-identification application application-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define session lifetime for the specified application in seconds.

Options

seconds—Duration of session.

Default: 3600

Range: 1 through 604,800

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

session-timeout (Interfaces)

Syntax

```
session-timeout seconds;
```

Hierarchy Level

```
[edit interfaces interface-name services-options]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Description

Define session lifetime globally for the Multiservices interface in seconds.

Options

seconds—Duration of session.

Range: 4 through 86,400

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

signature

Syntax

```
signature name {
    chain-order;
    maximum-transactions number;
    member name {
        context value;
        direction (any | client-to-server | server-to-client);
        pattern dfa-pattern;
    }
    order number;
}
```

Hierarchy Level

```
[edit services application-identification nested-application name]
```

Release Information

Statement introduced in Junos OS Release 10.2.

Description

Identify the name of the custom nested application signature definition. The name must be unique with a maximum length of 32 characters.

Options

name—Name of the signature definition.

The remaining statements are described separately.

Required Privilege Level

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

RELATED DOCUMENTATION

Application Identification for Nested Applications | 48

signature-method-all-ports

Syntax

```
signature-method-all-ports
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 11.2.

Description
Run signature matching on all traffic in application-identification. This is called the signature-match mode.

In the default mode, or fast-port-match mode, all traffic destined to well-known ports (up to 1024) immediately returns the final port match. However, the device runs signature matching for all traffic destined for port 80,

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

RELATED DOCUMENTATION

Configuring Global APPID Properties | 51

source

Syntax

```
source {
   ip address</prefix-length>;
   port-range {
      tcp [ ports-and-port-ranges ];
      udp [ ports-and-port-ranges ];
   }
}
```

Hierarchy Level

[edit services application-identification **rule** *rule-name* **address** *address-name*]

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define source properties for application-identification rule processing.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring APPID Rules | 42

source-address (AACL)

Syntax

```
source-address address;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.
IPv6 support introduced in Junos OS Release 12.2.

Description

Specify the source address for rule matching.

Options

address—Source IPv4 or IPv6 address or prefix value.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

source-address-range

Syntax

```
source-address-range low minimum-value high maximum-value;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.
IPv6 support introduced in Junos OS Release 12.2.

Description

Specify the source address range for rule matching.

Options

minimum-value—Lower boundary for the IPv4 or IPv6 address range.

maximum-value—Upper boundary for the IPv4 or IPv6 address range.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

source-prefix-list (Services AACL)

Syntax

```
source-prefix-list list-name;
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name from]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Specify the source prefix list for rule matching. You configure the prefix list by including the **prefix-list** statement at the **[edit policy-options]** hierarchy level.

Options

list-name—Source prefix list.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Match Conditions in AACL Rules | 25

source-prefix-list (Services IDS)

Syntax

```
source-prefix-list list-name <except>;
```

Hierarchy Level

```
[edit services ids rule rule-name term term-name from]
```

Release Information
Statement introduced in Junos OS Release 8.2.

Description
Specify the source prefix list for rule matching. You configure the prefix list by including the **prefix-list** statement at the **[edit policy-options]** hierarchy level.

Options
list-name—Destination prefix list.

except—(Optional) Exclude the specified prefix list from rule matching.

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

RELATED DOCUMENTATION

- *Configuring Match Conditions in IDS Rules*
- *Routing Policies, Firewall Filters, and Traffic Policers User Guide*

term

Syntax

```
term term-name {
    from {
        application-group-any;
        application-groups [ application-group-names ];
        application-unknown;
        applications [ application-names ];
        destination-address address <any-unicast>;
        destination-address-range low minimum-value high maximum-value;
        destination-prefix-list list-name;
        nested-application-unknown;
        source-address address <any-unicast>;
        source-address-range low minimum-value high maximum-value;
        source-prefix-list list-name;
    }
    then {
        (accept | discard);
        count (application | application-group | application-group-any | nested-application | none);
        forwarding-class class-name;
        policer policer-name;
    }
}
```

Hierarchy Level

```
[edit services aacl rule rule-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define the AACL term properties.

Options

term-name—Identifier for the term.

The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring AACL Rules | 23

then

Syntax

```
then {
    (accept | discard);
    count (application | application-group | application-group-any | nested-application | none);
    forwarding-class class-name;
    log event-type;
    policer policer-name;
}
```

Hierarchy Level

```
[edit services aacl rule rule-name term term-name]
```

Release Information

Statement introduced in Junos OS Release 9.5.
policer statement added in Junos OS Release 9.6.
nested-application option for the **count** statement added in Junos OS Release 11.1.

Description

Define the AACL term actions. You can configure the router to accept or discard the targeted traffic. The action modifiers (count and forwarding-class) are optional.

Options

You can configure one of the following actions:

- **accept**—Accept the packets and all subsequent packets in flows that match the rules.
- **discard**—Discard the packet and all subsequent packets in flows that match the rules.

When you select **accept** as the action, you can optionally configure one or both of the following action modifiers. No action modifiers are allowed with the **discard** action.

- **count (application | application-group | application-group-any | nested-application | none)**—For all accepted packets that match the rules, record a packet count using AACL statistics practices. You can specify one of the following options; there is no default setting:
  - **application**—Count the application that matched in the **from** clause.
  - **application-group**—Count the application group that matched in the **from** clause.
  - **application-group-any**—Count all application groups that match **from application-group-any** under the **any** group name.

- **nested-application**—Count all nested applications that matched in the **from** clause.
- **none**—Same as not specifying **count** as an action.

- **forwarding-class *class-name***—Specify the packets' forwarding-class name.

policer *policer-name*—Apply rate-limiting properties to the traffic as configured at the **[edit firewall policer *policer-name*]** hierarchy level. This configuration allows bit-rate and burst-size attributes to be applied to the traffic that are not supported by AACL rules. When you include a policer, the only allowed action is **discard**. For more information on policers, see the *Routing Policies, Firewall Filters, and Traffic Policers User Guide*.

The remaining statements are explained separately. See CLI Explorer.

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

RELATED DOCUMENTATION

> Configuring AACL Rules | **23**
>
> *Routing Policies, Firewall Filters, and Traffic Policers User Guide*

traceoptions (Application Identification)

Syntax

```
traceoptions {
    file filename <files number> <match regex> <size size> <world-readable | no-world-readable>;
    flag flag;
    no-remote-trace;
}
```

Hierarchy Level

```
[edit services application-identification]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Configure application identification tracing options.

To specify more than one tracing operation, include multiple **flag** statements.

Options
file *filename*—Use the specified file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

files *number*—(Optional) Use the specified maximum number of trace files. When a trace file named ***trace-file*** reaches its maximum size, it is renamed ***trace-file*.0**, then ***trace-file*.1**, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

Range: 2 through 1000 files

Default: 2 files

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

flag—Tracing operation to perform. **all** is the only valid completion.

- **all**—Trace all events.

match *regex*—(Optional) Use the specified regular expression for lines to be logged.

no-world-readable—(Optional) Disallow any user to read the log file.

size *size*—(Optional) Use the specified 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 ***trace-file*.0**. When the ***trace-file*** again reaches its maximum size, ***trace-file*.0** is renamed ***trace-file*.1** and ***trace-file*** is renamed

***trace-file*.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

Syntax: ***x*k** to specify KB, ***x*m** to specify MB, or ***x*g** to specify GB

Range: 10,240 through 1,073,741,824 or the maximum file size supported on your system

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

world-readable—(Optional) Allow any user to read the log file.

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

RELATED DOCUMENTATION

Tracing APPID Operations | 55

traceoptions (Services Local Policy Decision Function)

Syntax

```
traceoptions {
    file filename <files number> <size size>;
    flag flag;
    no-remote-trace;
}
```

Hierarchy Level

```
[edit services local-policy-decision-function],
[edit system services local-policy-decision-function]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Configure local policy decision function (L-PDF) tracing options.

Options

file *filename*—Use the specified file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

files *number*—(Optional) Use the specified maximum number of trace files. When a trace file named ***trace-file*** reaches its maximum size, it is renamed ***trace-file*.0**, then ***trace-file*.1**, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

Range: 2 through 1000 files

Default: 2 files

If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

flag—Tracing operation to perform. To specify more than one flag, include multiple **flag** statements.

- **all**—Everything
- **configuration**—Configuration traces
- **database**—Database traces
- **general**—Miscellaneous traces
- **gres**—Graceful Routing Engine switchover (GRES) traces
- **ptsp-statistics**—PTSP statistics traces

- **rtsock**—Routing socket traces
- **statistics**—Statistics traces
- **subscriber**—Subscriber traces

no-remote-trace—Disable remote tracing.

size *size*—(Optional) Use the specified 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 ***trace-file*.0**. When the ***trace-file*** again reaches its maximum size, ***trace-file*.0** is renamed ***trace-file*.1** and ***trace-file*** is renamed ***trace-file*.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

Syntax: ***x*k** to specify KB, ***x*m** to specify MB, or ***x*g** to specify GB

Range: 10,240 through 1,073,741,824 or the maximum file size supported on your system

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

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

RELATED DOCUMENTATION

Tracing L-PDF Operations | 74

type

Syntax

type *type*;

Hierarchy Level

[edit services application-identification **application** *application-name*],
[edit services application-identification **nested-application** *name*]

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define type of application, such as HTTP or FTP.

Options

type—Application type. This is a mandatory value and has a maximum length of 32 characters.

Required Privilege Level

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

RELATED DOCUMENTATION

Defining an Application Identification | 40
Application Identification for Nested Applications | 48

type-of-service

Syntax

```
type-of-service service-type;
```

Hierarchy Level

```
[edit services application-identification application application-name]
```

Release Information
Statement introduced in Junos OS Release 9.5.

Description
Define the type of service by service objective. There is no default value.

Options
The following ***service-type*** options are available:

- **maximize-reliability**—Service designed for maximum reliability in packet transmission.
- **maximize-throughput**—Service designed for maximum throughput.
- **minimize-delay**—Service designed for minimum delay in packet transmission.
- **minimize-monetary-cost**—Service designed for minimum monetary cost.

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

RELATED DOCUMENTATION

Defining an Application Identification | 40

url

Syntax

```
url url;
```

Hierarchy Level

```
[edit services application-identification download]
```

Release Information

Statement introduced in Junos OS Release 9.5.

Description

Define the URL for application package downloads.

Options

url—Download URL.

Required Privilege Level

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

RELATED DOCUMENTATION

Configuring Automatic Download of Application Package Updates | 54

5
CHAPTER

Operational Commands

clear services application-aware-access-list statistics

Syntax

```
clear services application-aware-access-list statistics
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Clear application-aware access list (AACL) statistics.

Options

This command has no options.

Required Privilege Level

clear

RELATED DOCUMENTATION

show services application-aware-access-list statistics | 207

clear services application-identification application-system-cache

Syntax

```
clear services application-identification application-system-cache
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Clear entries from application system cache.

Options

This command has no options.

Required Privilege Level

clear

RELATED DOCUMENTATION

show services application-identification application-system-cache | 220

clear services application-identification counter

Syntax

```
clear services application-identification counter
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Clear application identification counters.

Options

This command has no options.

Required Privilege Level

clear

RELATED DOCUMENTATION

show services application-identification counter | 222

clear services flows

Syntax

```
clear services flows
<application-protocol protocol>
<destination-port destination-port>
<destination-prefix destination-prefix>
<interface interface-name>
<protocol protocol>
<service-set service-set>
<source-port source-port>
<source-prefix source-prefix>
```

Release Information

Command introduced in Junos OS Release 9.5.
application-protocol option introduced in Junos OS Release 11.1.

Description

Clear flow session table entries.

Options

none—Clear all flows.

application-protocol *protocol*—(Optional) Clear flows for one of the following application protocols:

- **bootp**—Bootstrap protocol
- **dce-rpc**—Distributed Computing Environment-Remote Procedure Call protocols
- **dce-rpc-portmap**—Distributed Computing Environment-Remote Procedure Call protocols portmap service
- **dns**—Domain Name System protocol
- **exec**—Exec
- **ftp**—File Transfer Protocol
- **h323**—H.323 standards
- **icmp**—Internet Control Message Protocol
- **iiop**—Internet Inter-ORB Protocol
- **login**—Login
- **netbios**—NetBIOS
- **netshow**—NetShow

- **pptp**—Point-to-Point Tunneling Protocol
- **realaudio**—RealAudio
- **rpc**—Remote Procedure Call protocol
- **rpc-portmap**—Remote Procedure Call protocol portmap service
- **rtsp**—Real-Time Streaming Protocol
- **shell**—Shell
- **sip**—Session Initiation Protocol
- **snmp**—Simple Network Management Protocol
- **sqlnet**—SQLNet
- **talk**—Talk Program
- **tftp**—Trivial File Transfer Protocol
- **traceroute**—Traceroute
- **winframe**—WinFrame

destination-port *destination-port*—(Optional) Clear flows for the specified destination port. The range of values is from 0 to 65535.

destination-prefix *destination-prefix*—(Optional) Clear flows for the specified destination prefix.

interface *interface-name*—(Optional) Clear flows for the specified interface. On M Series and T Series routers, the ***interface-name*** can be **ms-*fpc*/*pic*/*port*** or **rsp*number***. On J Series routers, the ***interface-name*** is **ms-*pim*/0/*port***.

protocol *protocol*—(Optional) Clear flows for one of the following IP types:

- ***number***—Numeric protocol value from **0** to **255**
- **ah**—IPsec Authentication Header protocol
- **egp**—An exterior gateway protocol
- **esp**—IPsec Encapsulating Security Payload protocol
- **gre**—A generic routing encapsulation protocol
- **icmp**—Internet Control Message Protocol
- **icmp6**—Internet Control Message Protocol version 6
- **igmp**—Internet Group Management Protocol
- **ipip**—IP-over-IP Encapsulation Protocol
- **ospf**—Open Shortest Path First protocol

- **pim**—Protocol Independent Multicast protocol
- **rsvp**—Resource Reservation Protocol
- **sctp**—Stream Control Transmission Protocol
- **tcp**—Transmission Control Protocol
- **udp**—User Datagram Protocol

service-set *service-set*—(Optional) Clear flows for the specified service set.

source-port *source-port*—(Optional) Clear flows for the specified source port. The range of values is from 0 through 65535.

source-prefix *source-prefix*—(Optional) Clear flows for the specified source prefix.

Required Privilege Level
clear

RELATED DOCUMENTATION

show services flows | 231

List of Sample Output
clear services flows on page 192
clear services flows ip-action on page 192

Output Fields
Table 3 on page 191 lists the output fields for the **clear services flows** command. Output fields are listed in the approximate order in which they appear.

Table 3: clear services flows Output Fields

Field Name	Field Description
Interface	Name of an interface.
Service set	Name of the service set from which flows are being cleared.
Flows removed	Number of flows removed.

Sample Output

clear services flows

```
user@host> clear services flows

Interface   Service set                                          Flows removed
ms-2/0/0    IDP                                                          1
```

clear services flows ip-action

```
user@host> clear services flows ip-action

Interface   Service set                                        Flows removed
ms-4/0/0    idp-service                                                1
```

clear services local-policy-decision-function statistics

Syntax

```
clear services local-policy-decision-function statistics
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Clear local policy decision function (L-PDF) statistics.

Options

This command has no options.

Required Privilege Level

view

RELATED DOCUMENTATION

show services local-policy-decision-function statistics | 243

request services application-identification application

Syntax

```
request services application-identification application [disable | enable] predefined-application-name
```

Release Information
Command introduced in Junos OS Release 11.4.

Description
Disable, or enable a predefined application signature.

Options
disable—(Optional) Disable a predefined application signature, initiate signature recompilation, and commit all pending uncompiled signatures to the configuration.

The following conditions apply:

- You cannot disable a predefined application signature that is referenced by an active security policy or custom application signature. First modify or deactivate the policy or custom application signature.
- If you disable an application signature, for example, junos:HTTP, that has nested applications, the nested applications are not recognized.

enable—(Optional) Enable a predefined application signature, initiate signature recompilation, and commit all pending uncompiled signatures to the configuration.

Required Privilege Level
maintenance

RELATED DOCUMENTATION

show services application-identification application | 210

Output Fields
When you enter this command, the system provides feedback on the status of your request.

Sample Output

request services application-identification application disable

```
user@host> request services application-identification application disable junos:163
```

```
 Please wait while we are updating signatures ...
Please wait while we are updating signatures ...
Please wait while we are updating signatures ...
Please wait while we are updating signatures ...
Please wait while we are updating signatures ...
Please wait while we are updating signatures ...
 Disable application junos:163 succeed.
```

request services application-identification download

Syntax

```
request services application-identification download <version>;
```

Release Information
Statement introduced in Junos OS Release 10.2.
Statement modified in Junos OS Release 11.4.

Description

Manually download the application package for Junos OS application identification. The application package is extracted from the IDP signature database and contains signature definitions for known applications, such as: DNS, Facebook, FTP, Skype, and SNMP.

Options

version—(Optional) Download a specific version of the application package from the Juniper Networks security website. If you do not enter a version, the most recent version is downloaded.

Required Privilege Level
maintenance

RELATED DOCUMENTATION

request services application-identification download status | 198
request services application-identification install | 201

List of Sample Output
request services application-identification download on page 196

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

request services application-identification download

`user@host>` **request services application-identifications download**

```
Please use command "request services application-identification download status"
```

```
to check status
```

request services application-identification download status

Syntax

```
request services application-identification download status
```

Release Information

Statement introduced in Junos OS Release 10.2.
Statement modified in Junos OS Release 11.4.

Description

Check the download status of the application signature package. The downloaded application package is saved under **/var/db/appid/sec-download/**.

Required Privilege Level

maintenance

RELATED DOCUMENTATION

request services application-identification download | 196

List of Sample Output

request services application-identification download status on page 198

Output Fields

When you enter this command, the system provides feedback on the status of your request.

Sample Output

request services application-identification download status

```
user@host> request services application-identifications download status

Application package 1608 is downloaded successfully.
```

request services application-identification group

Syntax

```
request services application-identification group [copy | disable | enable] predefined-application-group-name
```

Release Information

Command introduced in Junos OS Release 11.4.

Description

Copy, disable, or enable a predefined application signature group.

Options

copy—(Optional) Copy a predefined application signature group from the database to the configuration and change the name (for example, my:FTP). The ID and order are generated automatically. Do not name your custom application signature group with the **junos** prefix; this prefix is reserved for predefined application signature groups. You can copy the same predefined application signature group only once; duplicate custom signature groups are not allowed.

NOTE: In configuration mode, if an uncommitted action is pending, the **request services application-identification group copy** command fails.

disable—(Optional) Disable a predefined application signature group.

NOTE: You cannot disable a predefined application signature group that is referenced by an active security policy or custom application signature group. First modify or deactivate the policy or custom application signature group.

enable—(Optional) Enable a predefined application signature group.

predefined-application-group-name—Name of the predefined application signature group.

Required Privilege Level

maintenance

RELATED DOCUMENTATION

show services application-identification group | 226

Output Fields

When you enter this command, the system provides feedback on the status of your request.

Sample Output

request services application-identification group

```
user@host> request services application-identification group disable junos:infrastructure:networking
```

```
Disable application group junos:infrastructure:networking succeed.
```

request services application-identification group

```
user@host> request services application-identification group enable junos:infrastructure:networking
```

```
Enable application group junos:infrastructure:networking succeed.
```

request services application-identification group

```
user@host> request services application-identification group copy junos:infrastructure:networking
```

```
Please wait while we are copying group ...
Copy application group junos:infrastructure:networking succeed.
```

request services application-identification install

Syntax

```
request services application-identification install
```

Release Information

Statement introduced in Junos OS Release 11.4.

Description

Install the downloaded predefined application signature package.

Required Privilege Level

maintenance

RELATED DOCUMENTATION

- request services application-identification install status | 202
- request services application-identification download | 196

Output Fields

When you enter this command, the system provides feedback on the status of your request.

Sample Output

`user@host>` **request services application-identification install**

```
Please use command "request services application-identification install status"
to check status and use command "request services application-identification
proto-bundle-status" to check protocol bundle status
```

request services application-identification install status

Syntax

```
request services application-identification install status
```

Release Information

Statement introduced in Junos OS Release 11.4.

Description

Display the status of the install operation.

Required Privilege Level

maintenance

RELATED DOCUMENTATION

request services application-identification install | 201

Output Fields

When you enter this command, the system provides feedback on the status of your request.

Sample Output

`user@host>` **request services application-identification install status**

```
Install application package version (1776) succeed.
```

show services application-aware-access-list flows

Syntax

```
show services application-aware-access-list flows
<interface interface-name>
<subscriber subscriber-name>
```

Release Information

Command introduced in Junos OS Release 10.1.
Offload status for flows using Juniper Forwarding Mechanism (JFM) added in Junos OS Release 12.1.

Description

Display application-aware-access-list (AACL) flows. Offloading using JFM is supported only on MX Series routers with Modular Port Concentrators (MPCs).

Options

interface *interface-name*—Displays AACL flows for the specified interfaces only. The keyword, **interface**, must be appended to the command.

subscriber *subscriber-name*—Displays AACL flows for the specified subscribers only. The keyword, **subscriber**, must be appended to the command.

Required Privilege Level

view

RELATED DOCUMENTATION

Application Aware Services Interfaces User Guide for Routing Devices

List of Sample Output

show services application-aware-access-list flows interface on page 205
show services application-aware-access-list flows subscriber on page 205
show services application-aware-access-list flows subscriber (Offloading Using JFM) on page 206

Output Fields

Table 4 on page 204 lists the output fields for the **show services application-aware-access-list flows** command. Output fields are listed in the approximate order in which they appear.

Table 4: show services application-aware-access-list flows Output Fields

Field Name	Field Description	Level of Output
5-tuple	This field comprises five components of the given flow. The components are: • Src IP • Dest IP • Src Port • Dest Port • Protocol	All levels
Application-ID	The identification number associated with the application.	All levels
Dir	The direction in terms of input or output. • Input (I) • Output (O)	All levels
Off	The status of offload to Packet Forwarding Engine. The various options are: • Not Offloaded (-) • Policer Offloaded, Flow Not Offloaded (P) • Policer Not Offloaded, Flow Offloaded (F) • Policer and Offloaded (P+F)	All levels
Off	The status of offload to Packet Forwarding Engine using JFM. The various options are: • Not Offloaded (-) • Offload requested but not completed (R) • Offload requested and completed (O)	All levels

Table 4: show services application-aware-access-list flows Output Fields *(continued)*

Field Name	Field Description	Level of Output
Actions	The types of actions displayed are: • discard: (D) • accept : A • accept, count [T]: C-A or C-G or C-T • accept, fwd-class [C]: FC • accept, policer [P]: P • accept, count [T], fwd-class [C]: C-T+FC • accept, count [T], policer [P]: C-T+P • accept, fwd-class [C], policer [P]: FC+P • accept, count[T],fwd-class[C],policer[P]: C-T+FC+P	All levels

Sample Output

show services application-aware-access-list flows interface

`user@host>` **show services application-aware-access-list flows interface ge-1/0/5.0**

```
Interface: ge-1/0/5.0
service-set: aacl-countApps
service-set interface: ms-0/0/0
Currently active flows: 2
High watermark flows: 2

5-tuple                                          Application-ID
Dir Off Action
------------------------------------------------ ------------------------------
--- --- --------
  198.51.100.2:47072->  10.10.254.116:80   ,6     junos:http [64]
I   -   C-T
  10.10.254.116:80   ->    198.51.100.2:47072,6   junos:http [64]
O   -   C-T
```

show services application-aware-access-list flows subscriber

`user@host>` **show services application-aware-access-list flows subscriber user@example.com**

```
Subscriber: user@example.com

Service-set: ss1
Service-set interface: ms-2/0/0
Currently active flows: 4
High watermark flows: 40


5–tuple              Application-ID   Dir Off Action

192.0.2.100:20109->160.200.200.200:80,17  junos:http [64]  I  -  C-T+FC+P
203.0.113.200:80->192.0.2..100:20109,17  junos:http [64]  O  -  C-T+FC+P
192.0.2.100:20108->203.0.113.100:80,17  junos:http [64]  I  P+F C-T+FC+P
203.0.113.100:80->192.0.2.100:20108,17  junos:http [64]  O  P+F C-T+FC+P
```

show services application-aware-access-list flows subscriber (Offloading Using JFM)

`user@host>` **show services application-aware-access-list flows subscriber user@example.com**

```
Subscriber: user@example.com

Service-set: ss1
Service-set interface: ms-2/0/0
Currently active flows: 4
High watermark flows: 40


5–tuple              Application-ID   Dir Off Action

192.0.2.100:20109->160.200.200.200:80,17     junos:http [64]              I   -
  C-T+FC+P
203.0.113.200:80   ->192.0.2.100:20109,17  junos:http [64]              O   -
C-T+FC+P
192.0.2..100:20108->203.0.113.100:80,17     junos:http [64]              I   R
 C-T+FC+P
203.0.113.100:80   ->192.0.2.100:20108,17  junos:http [64]              O   O
C-T+FC+P
```

show services application-aware-access-list statistics

Syntax

```
show services application-aware-access-list statistics
<interface interface-name>
<subscriber subscriber-name>
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Display application-aware access list (AACL) statistics.

Options

interface *interface-name*—(Optional) Display AACL statistics for the specified interface only.

subscriber *subscriber-name*—(Optional) Display AACL statistics for the specified subscriber only.

Required Privilege Level

view

List of Sample Output

show services application-aware-access-list statistics interface on page 208
show services application-aware-access-list statistics subscriber on page 208

Output Fields

Table 5 on page 207 lists the output fields for the **show services application-aware-access-list statistics** command. Output fields are listed in the approximate order in which they appear.

Table 5: show services application-aware-access-list statistics Output Fields

Field Name	Field Description	Level of Output
Interface	Interface name.	Subscriber option
Subscriber	Subscriber identifier.	Interface option
Service-set-interface	Service set interface name.	All levels
Service set	Service set name.	All levels
Application group	Application group identifier.	All levels
Packets in	Number of ingress packets.	All levels

Table 5: show services application-aware-access-list statistics Output Fields *(continued)*

Field Name	Field Description	Level of Output
Bytes in	Number of ingress bytes.	All levels
Packets out	Number of egress packets.	All levels
Bytes out	Number of egress bytes.	All levels

Sample Output

show services application-aware-access-list statistics interface

`user@host>` **show services application-aware-access-list statistics interface ge-0/0/0.100**

```
Subscriber: user@example.com

service-set: IDP
service-set interface: ms-2/0/0

Application group     Application           Packets in            Bytes in
       Packets out           Bytes out

                      junos:ftp [63]        5                     334
       6                     346
```

show services application-aware-access-list statistics subscriber

`user@host>` **show services application-aware-access-list statistics subscriber user@example.com**

```
Interface: ge-1/1/0.0

Service-set-interface: ms-1/3/0
Service set: aacl-svc-set

Application-aware-access-list statistics

Application group       Packets in       Bytes in         Packets out       Bytes
 out
```

```
P2P                                 400                  32025           200
                    16284
FTP                                 20000               5231000       100
               8700
```

show services application-identification application

Syntax

```
show services application-identification application (detail | summary)
```

Release Information

Command introduced in Junos OS Release 11.4.

Starting in Junos OS Release 15.1X49-D100, the options **Cacheable**, **Activation Date**, and **Last modified** are introduced for **show services application-identification application detail** command.

The **Underlying consolidated Protocols/ports application is dependent on** and **Layer-7 Immediate Protocol(s)** options are introduced in Junos OS Release 18.2R1.

Description

Display detailed information about a specified application signature, detailed information about all application signatures, or a summary of the existing application signatures.

Options

detail —Display detailed information for all application signatures.

summary—Display summary information for all application signatures.

Required Privilege Level

view

RELATED DOCUMENTATION

request services application-identification application | 194

List of Sample Output

Output Fields

Table 6 on page 211 shows the output details for the **show services application-identification application detail** command.

Table 6: show services application-identification application summary Output Fields

Field Name	Field Description
Application(s)	The number of applications present.
Application	Name of the custom application.
Disabled	The status of the application and whether the mapping method is currently used to identify this application.
ID	The unique ID number of an application. ID numbers 1 through 32,767 are automatically generated for applications; these IDs do not change. ID numbers for custom applications use 16,777,216 to 33,554,431.
Order	Number used to specify priority when multiple applications match the traffic. The lowest order number takes the highest priority.

Table 7 on page 211 lists the output fields for the **show services application-identification application** command. Output fields are listed in the approximate order in which they appear.

Table 7: show services application-identification application Output Fields

Field Name	Field Description
Application Name	Name of the application.
Application Type	The basic application type, such as HTTP.
Description	A description of the application.
Application ID	The unique ID number of an application signature. ID numbers 1 through 32,767 are automatically generated for application; these IDs do not change. ID numbers for custom applications use 16,777,216 to 33,554,431.
Priority	Priority over other signature applications.
Order	
Disabled	The status of the application and whether the mapping method is currently used to identify this application.

Table 7: show services application-identification application Output Fields *(continued)*

Field Name	Field Description
Cacheable	The status whether the application identification results caching is enabled or not for the application. When this option is enabled, you can cache the application detection result in an ASC table.
Configurable	The status whether application is configurable or not.
Activation Date	Date when the application was activated for the first time.
Last Modified	Date when the application was last updated.
Number of Parent Group(s)	Total number of parent groups in this application signature group or cluster.
Underlying consolidated Protocols/ports application is dependent on	List of default protocols and ports for dependent applications of the specified application. • **Protocols**—List of default protocols. • **TCP ports**—List of default TCP ports.
Layer-7 Immediate Protocol(s)	List of applications over which that dynamic application can be identified.
Application Specific Ports:	The default port for this application type.
Signature: **Protocol**	Signature mapping criteria for application identification Application protocol
Port range	Port range. This option is applicable for TCP or UDP-based applications only.
Member(s)	Member name for a custom application signature. • Depth–Maximum number of bytes to check for context match. Byte limit for AppID to identify custom application pattern for applications running over TCP or UDP or Layer 7 applications. • Context–Service-specific context, such as http-header-content-type. • Pattern–Deterministic finite automaton (DFA) pattern matched on the context. The DFA pattern specifies the pattern to be matched for the signature. • Direction–Connection direction of the packets to match pattern (example : CTS [client-to-server])

Sample Output

show services application-identification application summary

`user@host>` **show services application-identification application summary**

```
Application(s): 3616
  Applications                                Disabled         ID      Order
  junos:SLACKER                                No               1179    1

  junos:GOOGLE-TRUSTED-STORE                   No               2819    5

  junos:AMJILT                                 No               2272    4

  junos:DSI                                    No               2644    3

  junos:HLN                                    No               2096    2

  junos:ETSI-LI                                No               537     1

  junos:CRAZYSALOON                            No               1720    5

  junos:EKSISOZLUK                             No               2436    4

  junos:SABAH                                  No               2574    3

  junos:AFREECA                                No               2373    2

  junos:SENEWEB                                No               2068    1

  junos:DIINO                                  No               776     5

  junos:CARE2                                  No               376     4

  junos:MOBAGE                                 No               1456    3

  junos:CARTOONNETWORK                         No               982     2

  junos:AVATARS-UNITED                         No               363     1

  junos:CONVIVA                                No               2015    5

  junos:DREAMORA                               No               1725    4

  junos:ELWATANNEWS                            No               2381    3
```

```
  junos:REUTERS                                No              1044    2

  junos:BABYCENTER                             No              364     1

  junos:SOUTHWEST                              No              289     5

  junos:ONEDIO                                 No              2517    4

........
........
```

show services application-identification application detail

user@host> **show services application-identification application detail junos:FTP**

```
Application Name: junos:FTP
Application type: FTP
Description: This signature detects the File Transfer Protocol (FTP), which provides
 facilities for transferring files to and from remote computer systems. It usually
 runs on TCP port 21.
Application ID: 45
Priority: high
Order: 0
Disabled: Yes
Cacheable: Yes
Activation Date: 2003-05-05
Last Modified: 2016-04-11
Number of Parent Group(s): 1
Application Groups:
    junos:infrastructure:file-servers
Application Tags:
    characteristic        : Supports File Transfer
    characteristic        : Known Vulnerabilities
    characteristic        : Capable of Tunneling
    risk                  : 3
    subcategory           : File-Servers
    category              : Infrastructure
Layer-7 Protocol(s):
    Protocol: TCP         / 205
    Protocol: SPDY        / 1469
    Protocol: SOCKS5      / 193
    Protocol: SOCKS4      / 192
```

```
    Protocol: HTTPS       / 68
    Protocol: HTTP2       / 2553
    Protocol: HTTP        / 67
Port Mapping:
    Default ports: TCP/21
```

show services application-identification application detail (Custom Applications)

`user@host>` **show services application-identification application detail my-custom-app**

```
Application Name: my-custom-app
Application type: MY-CUSTOM-APP
Description: custom App
Application ID: 16777216
Priority: high
Order: 65500
Disabled: No
Cacheable: No
Activation Date: N/A
Last Modified: N/A
Layer-7 Protocol(s):
    Protocol: http        / http
    Port range: N/A
    Member(s): 1
        Member m01
            Context: http-header-host
            Pattern: MY-SERVER.COM
            Direction: CTS
```

Sample Output

show services application-identification application detail (Unified Policies)

`user@host>` **show services application-identification application detail**

```
Application Name: junos:GOOGLE
```

```
Application type: GOOGLE
Description: This signature detects SSL connections to Google.com. Google is a
             company best known for their search engine but offers many cloud
             based services.
Application ID: 54
Priority: high
Order: 0
Disabled: No
Cacheable: No
Activation Date: 2003-05-05
Last Modified: 2017-06-28
Number of Parent Group(s): 2
Application Groups:
    junos:web:applications
    junos:web:portal
Application Tags:
    characteristic        : Can Leak Information
    characteristic        : Loss of Productivity
    characteristic        : Supports File Transfer
    risk                  : 3
    subcategory           : Applications
    category              : Web
Underlying consolidated Protocols/ports application is dependent on:
    Protocols:
        Protocol: junos:GOOGLE-GEN / 943
        Protocol: junos:STUN  / 201
        Protocol: junos:UDP   / 216
        Protocol: junos:TCP   / 205
        Protocol: junos:HTTP-PROXY / 2956
        Protocol: junos:SSL   / 199
        Protocol: junos:SPDY  / 1469
        Protocol: junos:POSTGRESQL / 150
        Protocol: junos:HTTPS / 68
        Protocol: junos:HTTP  / 67
        Protocol: junos:NET-PROXY / 2629
        Protocol: junos:HTTP2 / 2553
        Protocol: junos:HTTP-TUNNEL / 750
        Protocol: junos:COTP  / 22
        Protocol: junos:RTSP  / 176
        Protocol: junos:RTP   / 175
        Protocol: junos:DTLS  / 1291
        Protocol: junos:RTMP  / 337
        Protocol: junos:QUIC  / 2521
        Protocol: junos:JABBER / 94
```

```
    TCP Ports:
        Port: 443
        Port: 554
        Port: 80
    UDP Ports:
        Port: 554
Layer-7 Immediate Protocol(s):
    Protocol: GOOGLE-GEN  / 943
Alias List:
    junos:GOOGLE-SSL
Application Specific Ports:
    Default ports: N/A
Signature:
    Port range: N/A
    Client-to-server
    Order: 1
```

show services application-identification application detail (Junos OS Release 20.2R1)

`user@host>` **show services application-identification application detail**

```
Application Name: test
Application type: TEST
Description: N/A
Application ID: 16777221
Priority: high
Order: 65500
Disabled: No
Cacheable: No
Activation Date: N/A
Last Modified: N/A
Underlying consolidated Protocols/ports application is dependent on:
    Protocols:
        Protocol: junos:HTTP  / 67
        Protocol: junos:UDP   / 216
        Protocol: junos:TCP   / 205
        Protocol: junos:NET-PROXY / 2629
        Protocol: junos:SPDY  / 1469
        Protocol: junos:SSL   / 199
        Protocol: junos:LIBJINGLE-PSEUDOTCP / 3237
        Protocol: junos:STUN  / 201
        Protocol: junos:HTTPS / 68
```

```
        Protocol: junos:HTTP  / 67
        Protocol: junos:HTTP2 / 2553
        Protocol: junos:HTTP-TUNNEL / 750
        Protocol: junos:HTTP-PROXY / 2956
        Protocol: junos:HAPROXY / 3331
        Protocol: junos:COTP  / 22
    TCP Ports:
        Port: 80
        Port: 3128
        Port: 8000
        Port: 8080
Layer-7 Immediate Protocol(s):
    Protocol: HTTP        / 67
    Signature: fgnm
    Port range: N/A
    Member(s): 1
        Member m01
            Depth: 4
            Context: http-get-url-parsed-param-parsed
            Pattern: ads
            Direction: CTS
```

Sample Output

show services application-identification application detail (Junos OS Release 20.3 R1)

`user@host>` **show services application-identification application detail junos:PDF**

```
Application Name: junos:PDF
Application type: PDF
Description: This signature detects the download of PDF documents.
Application ID: 11046
Priority: high
Order: 0
Disabled: No
Cacheable: Yes
Configurable: No
Activation Date: 1999-12-31
Last Modified: 2019-12-31
Application Tags:
    characteristic        : Known Vulnerabilities
    characteristic        : Carrier of Malware
```

```
    characteristic        : Bandwidth Consumer
    risk                  : 4
    subcategory           : Multimedia
    category              : Web
Layer-7 Immediate Protocol(s):
    Protocol: SPDY        / 1469
    Protocol: HTTPS       / 68
    Protocol: HTTP2       / 2553
    Protocol: HTTP        / 67
Application Specific Ports:
    Default ports: N/A
Signature:
    Port range: N/A
    Client-to-server
    Order: 3
```

show services application-identification application-system-cache

Syntax

```
show application-identification application-system-cache
<interface interface-name>
```

Release Information

Command introduced in Junos OS Release 9.5.
interface option added in Junos OS Release 10.1.

Description

Display the database of cached values stored by the application identification (APPID) system.

> **NOTE:** The **show services application-identification application-system-cache** command gives the information only when the application identifier (AI) is matched with the signature.

Options

interface *interface-name*—Display the specified services interfaces to query.

Required Privilege Level

view

List of Sample Output

show application-identification application-system-cache on page 221

Output Fields

Table 8 on page 220 lists the output fields for the **show services application-identification application-system-cache** command. Output fields are listed in the approximate order in which they appear.

Table 8: show application-identification application-system-cache Output Fields

Field Name	Field Description	Level of Output
IP address	IP address.	All levels

Table 8: show application-identification application-system-cache Output Fields *(continued)*

Field Name	Field Description	Level of Output
Port	Port number.	All levels
Protocol	Protocol name.	All levels
Application	Application number.	All levels
CPU	CPU number	All levels

Sample Output

show application-identification application-system-cache

`user@host>` **show application-identification application-system-cache interface ms-1/0/0**

```
pic: 2/0

IP address         Port     Protocol   Application   CPU

10.1.1.2              81        TCP       63          18
```

show services application-identification counter

Syntax

```
show services application-identification counter
<interface interface-name>
```

Release Information

Command introduced in Junos OS Release 9.5.
interface option added in Junos OS Release 10.1.

Description

Display application identification (APPID) counter statistics.

Options

interface *interface-name*—Display the specified services interfaces to query.

Required Privilege Level

view

List of Sample Output

show services application-identification counter on page 223
show services application-identification counter on page 224

Output Fields

Table 9 on page 222 lists the output fields for the **show services application-identification counter** command. Output fields are listed in the approximate order in which they appear.

Table 9: show services application-identification counter Output Fields

Field Name	Field Description
pic	PIC number.
Total sessions	Total number of sessions.
Total identified sessions	Total number of identified sessions.
Total unidentified sessions	Total number of unidentified sessions.
Total identified-by-address sessions	Number of sessions identified by address.
Total unidentified-by-address sessions	Number of sessions not identified by address.

Table 9: show services application-identification counter Output Fields *(continued)*

Field Name	Field Description
Total identified-by-port sessions	Number of sessions identified by port.
Total unidentified-by-port sessions	Number of sessions not identified by port.
Total identified-by-icmp sessions	Number of sessions identified by ICMP.
Total unidentified-by-icmp sessions	Number of sessions not identified by ICMP.
Total identified-by-ip-protocol sessions	Number of sessions identified by IP protocol.
Total unidentified-by-ip-protocol sessions	Number of sessions not identified by IP protocol.
Total identified-by-signature sessions	Number of sessions identified by signature.
Total unidentified-by-signature sessions	Number of sessions not identified by signature.
Total unspecified encrypted sessions	Number of encrypted sessions not specified by normal processes.
Total encrypted P2P sessions	Number of encrypted point-to-point sessions.
Total application system cache hits	Number of sessions found in the application system cache.
Total application system cache misses	Number of sessions not found in the application system cache.
Total identified-by-protocol sessions	Number of sessions identified by protocol.
Total unidentified-by-protocol sessions	Number of sessions not identified by protocol.

Sample Output

show services application-identification counter

`user@host>` **show services application-identification counter interface ms-1/0/0**

```
Counter Statistics:
  pic: 1/1
  Total sessions: 11
  Total identified sessions: 11
  Total un-identified sessions: 0
```

```
Address Method
  Total identified-by-address sessions: 0
  Total unidentified-by-address sessions: 11
Port Method
  Total identified-by-port sessions: 1
  Total unidentified-by-port sessions: 0
  Total identified-by-icmp sessions: 0
  Total unidentified-by-icmp sessions: 0
  Total identified-by-ip-protocol sessions: 0
  Total unidentified-by-ip-protocol sessions: 0
Signature Method
  Total identified-by-signature sessions: 11
  Total unidentified-by-signature sessions: 0
  Total unspecified encrypted sessions: 2
  Total encrypted P2P sessions: 2
  Total application system cache hits: 10
  Total application system cache misses: 1
Protocol Method
  Total identified-by-protocol sessions: 0
  Total unidentified-by-protocol sessions: 0
```

show services application-identification counter

`user@host>` **show services application-identification counter interface ams0**

```
Counter Statistics:
   pic: ams0
   Total sessions: 20
   Total identified sessions:  20
   Total un-identified sessions: 0
   Protocol Method
     Total identified-by-protocol sessions: 0
     Total un-identified-by-protocol sessions: 0
   Address Method
     Total identified-by-address sessions: 0
     Total un-identified-by-address sessions: 0
   Port Method
     Total identified-by-port sessions: 0
     Total un-identified-by-port sessions: 0
     Total identified-by-icmp sessions: 0
     Total un-identified-by-icmp sessions: 0
     Total identified-by-ip-protocol sessions: 0
     Total un-identified-by-ip-protocol sessions: 0
   Signature Method
```

```
Total identified-by-signature sessions:  20
Total identified-by-signature uni-directional sessions: 0
Total un-identified-by-signature sessions: 0
Total application system cache hits: 0
Total application system cache misses: 0
```

show services application-identification group

Syntax

```
show services application-identification group [detail application-group name | summary]
```

Release Information

Command introduced in Junos OS Release 11.4.

Description

Display detailed or summary information about a specified application signature group or all application signature groups. Both custom and predefined application signature groups can be displayed.

Options

detail *application-group name*—(Optional) Display detailed information for the specified application signature group.

summary—(Optional) Display summary information for all application signature groups.

Required Privilege Level

view

RELATED DOCUMENTATION

request services application-identification group | 199

List of Sample Output

show services application-identification group summary on page 227
show services application-identification group detail on page 227

Output Fields

Table 10 on page 226 lists the output fields for the **show services application-identification group** command. Output fields are listed in the approximate order in which they appear.

Table 10: show services application-identification group Output Fields

Field Name	Field Description
Description	Description of the specified application in the detailed display.

Table 10: show services application-identification group Output Fields ***(continued)***

Field Name	Field Description
Group ID or **ID**	The unique ID number of an application signature or application signature group. ID numbers 1 through 32,767 are automatically generated for predefined application signatures and application signature groups; these IDs do not change. ID numbers for custom application signatures and application signature groups use ID numbers 32,768 to 65,534.
Disabled	The status of the application signature group and whether the signature method is currently used to identify this application. The default is No.
Application Group(s)	The application signature groups present.
Applications	The application signatures associated with this application signature group.

Sample Output

show services application-identification group summary

```
user@host> show services application-identification group summary
```

```
Application Group(s): 24
Application Groups                                  Disabled  ID
  my:enterprise                                      No        32770
  junos:enterprise:voip                              No        25
  junos:peer-to-peer:voip                            No        24
  junos:peer-to-peer:chat                            No        23
  junos:peer-to-peer:file-sharing                    No        22
...
```

show services application-identification group detail

```
user@host> show services application-identification group detail junos:social-networking
```

```
Group Name: junos:social-networking
Group ID: 36
Description: N/A
Disabled: No
Number of Applications: 0
Number of Sub-Groups: 2
```

```
Number of Parent-Groups: 1
Sub Groups:
    junos:social-networking:applications
    junos:social-networking:business
```

show services application-identification version

Syntax

```
show services application-identification version
```

Release Information

Command introduced in Junos OS Release 10.2.
Command introduced in Junos OS Release 18.3R1 for logical systems.

Description

Displays the application signature package version installed on your security device.

Required Privilege Level

view

RELATED DOCUMENTATION

request services application-identification download | **196**

List of Sample Output

Sample Output

show services application-identification version

The following output shows that the application package version is 1608.

`user@host>` **show services application-identification version**

```
Application package version: 1608
```

show services application-identification version (Logical Systems)

The following output shows that the application package version is 534.

`user@host>` **show services application-identification version**

```
Application package version: 534
```

show services flows

Syntax

```
show services flows
<all | brief | extensive | terse>
<application-protocol protocol>
<count>
<destination-port destination-port>
<destination-prefix destination-prefix>
<interface interface-name>
<limit number>
<protocol protocol>
<service-set service-set>
<source-port source-port>
<source-prefix source-prefix>
```

Release Information

Command introduced in Junos OS Release 9.5.
all option added in Junos OS Release 11.1.
application-protocol option added in Junos OS Release 11.1.

Description

Display flow session table entries.

Options

none—Display standard information about all flows.

all | brief | extensive | terse—(Optional) Display the specified level of output.

application-protocol *protocol*—(Optional) Display information about one of the following application protocols:

- **bootp**—Bootstrap protocol
- **dce-rpc**—Distributed Computing Environment-Remote Procedure Call protocols
- **dce-rpc-portmap**—Distributed Computing Environment-Remote Procedure Call protocols portmap service
- **dns**—Domain Name System protocol
- **exec**—Exec
- **ftp**—File Transfer Protocol
- **h323**—H.323 standards

- **icmp**—Internet Control Message Protocol
- **iiop**—Internet Inter-ORB Protocol
- **login**—Login
- **netbios**—NetBIOS
- **netshow**—NetShow
- **pptp**—Point-to-Point Tunneling Protocol
- **realaudio**—RealAudio
- **rpc**—Remote Procedure Call protocol
- **rpc-portmap**—Remote Procedure Call protocol portmap service
- **rtsp**—Real-Time Streaming Protocol
- **shell**—Shell
- **sip**—Session Initiation Protocol
- **snmp**—Simple Network Management Protocol
- **sqlnet**—SQLNet
- **talk**—Talk Program
- **tftp**—Trivial File Transfer Protocol
- **traceroute**—Traceroute
- **winframe**—WinFrame

NOTE: The flows for the DCE RPC ALG match the flows for the DCE RPC Portmap ALG. The flows for the RPC ALG match the flows for the RPC Portmap ALG.

count—(Optional) Display a count of the matching entries.

destination-port *destination-port*—(Optional) Display information for the specified destination port. The range of values is from 0 to 65535.

destination-prefix *destination-prefix*—(Optional) Display information for the specified destination prefix.

interface *interface-name*—(Optional) Display information about the specified interface. On M Series and T Series routers, ***interface-name*** can be **ms-*fpc/pic/port*** or **rsp*number***.

limit *number*—(Optional) Maximum number of entries to display.

protocol *protocol*—(Optional) Display information about one of the following IP types:

- ***number***—Numeric protocol value from 0 to 255
- **ah**—IPsec Authentication Header protocol
- **egp**—An exterior gateway protocol
- **esp**—IPsec Encapsulating Security Payload protocol
- **gre**—A generic routing encapsulation protocol
- **icmp**—Internet Control Message Protocol
- **icmp6**—Internet Control Message Protocol version 6
- **igmp**—Internet Group Management Protocol
- **ipip**—IP-within-IP Encapsulation Protocol
- **ospf**—Open Shortest Path First protocol
- **pim**—Protocol Independent Multicast protocol
- **rsvp**—Resource Reservation Protocol
- **sctp**—Stream Control Transmission Protocol
- **tcp**—Transmission Control Protocol
- **udp**—User Datagram Protocol

service-set *service-set*—(Optional) Display information for the specified service set.

source-port *source-port*—(Optional) Display information for the specified source port. The range of values is from 0 to 65535.

source-prefix *source-prefix*—(Optional) Display information for the specified source prefix.

Required Privilege Level
view

RELATED DOCUMENTATION

clear services flows | **189**

List of Sample Output

show services flows destination-port on page 237
show services flows destination-prefix on page 237
show services flows interface on page 237
show services flows protocol on page 238
show services flows service-set on page 238
show services flows source-port on page 238
show services flows source-prefix on page 238

Output Fields

Table 11 on page 234 lists the output fields for the **show services flows** command. Output fields are listed in the approximate order in which they appear.

Table 11: show services flows Output Fields

Field Name	Field Description	Level of Output
Interface	Name of the interface.	All levels
Service set	Name of a service set. Individual empty service sets are not displayed. If no service set has any flows, a flow table header is displayed for each service set.	All levels
Flow Count	Number of flows in a session.	**count** only
Flow or Flow Prot	Protocol used for this flow.	All levels
Source	Source prefix of the flow in the format ***source-prefix:port***. For ICMP flows, port information is not displayed.	All levels
Dest	Destination prefix of the flow. For ICMP flows, port information is not displayed.	All levels
State	Status of the flow: • **Drop**—Drop all packets in the flow without response. • **Forward**—Forward the packet in the flow without looking at it. • **Reject**—Drop all packets in the flow with response. • **Watch**—Inspect packets in the flow.	All levels
Dir	Direction of the flow: input **(I)** or output **(O)**.	All levels
Frm count	Number of frames in the flow.	All levels

Table 11: show services flows Output Fields *(continued)*

Field Name	Field Description	Level of Output
Byte count	Number of bytes in the flow.	**extensive**
Flow role	Flow role.	**extensive**
Timeout	Timeout value.	**extensive**
Flow path	Flow path: symmetric or asymmetric.	**extensive**

Sample Output

show services flows

`user@host>` **show services flows**

```
Interface: ms-2/0/0, Service set: IDP
Flow                                                State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O              5
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I            102
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O            102
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I             97
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O             97
```

show services flows all

`user@host>` **show services flows all**

```
Interface: ms-2/0/0, Service set: idp-1
Flow                                                State    Dir       Frm count
TCP           10.1.1.2:32769 ->       192.0.2.2:80    Forward  I          353431
TCP           192.0.2.2:80    ->       10.1.1.2:32769 Forward  O          353429
TCP           10.1.1.2:32771 ->       192.0.2.2:80    Forward  I          353562
TCP           192.0.2.2:80    ->       10.1.1.2:32771 Forward  O          353560
TCP           10.1.1.2:32770 ->       192.0.2.2:80    Forward  I          353577
TCP           192.0.2.2:80    ->       10.1.1.2:32770 Forward  O          353575
TCP           10.1.1.2:32768 ->       192.0.2.2:80    Forward  I          353610
TCP           192.0.2.2:80    ->       10.1.1.2:32768 Forward  O          353608
TCP           10.1.1.2:32777 ->       192.0.2.2:80    Forward  I          353625
```

```
TCP           192.0.2.2:80    ->       10.1.1.2:32777 Forward  O          353624
TCP           10.1.1.2:32776 ->       192.0.2.2:80    Forward  I          353643
TCP           192.0.2.2:80    ->       10.1.1.2:32776 Forward  O          353642
TCP           10.1.1.2:32775 ->       192.0.2.2:80    Forward  I          353658
TCP           192.0.2.2:80    ->       10.1.1.2:32775 Forward  O          353657
TCP           10.1.1.2:32774 ->       192.0.2.2:80    Forward  I          353676
TCP           192.0.2.2:80    ->       10.1.1.2:32774 Forward  O          353674
TCP           10.1.1.2:32773 ->       192.0.2.2:80    Forward  I          353692
TCP           192.0.2.2:80    ->       10.1.1.2:32773 Forward  O          353690
TCP           10.1.1.2:32772 ->       192.0.2.2:80    Forward  I          353704
TCP           192.0.2.2:80    ->       10.1.1.2:32772 Forward  O          353702
```

show services flows brief

The output for the **show services flows brief** command is identical to that for the **show services flows** command. For sample output, see show services flows.

show services flows extensive

`user@host>` **show services flows extensive**

```
Interface: ms-2/0/0, Service set: IDP
Flow                                                State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
  Byte count: 346
  Flow role: Unknown, Timeout: 0, Flow path: Asymmetric
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O              5
  Byte count: 334
  Flow role: Unknown, Timeout: 0, Flow path: Symmetric
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I            144
  Byte count: 12096
  Flow role: Unknown, Timeout: 0, Flow path: Symmetric
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O            144
  Byte count: 12096
  Flow role: Unknown, Timeout: 0, Flow path: Symmetric
```

show services flows application-protocol

`user@host>` **show services flows application-protocol dce-rpc**

```
Interface: ms-2/0/0, Service set: ss-1
Flow                                                State    Dir       Frm count
TCP     192.168.200.65:1260  -> 192.168.200.69:5315  Forward  I             14
```

```
TCP     192.168.200.69:5315  ->    198.51.100.16:1031  Forward  O              11
TCP     192.168.200.65:1251  -> 192.168.200.69:1026  Forward  I               7
TCP     192.168.200.69:1026  ->    198.51.100.16:1029  Forward  O               5
```

show services flows count

```
user@host> show services flows count
```

```
Interface   Service set                                          Flow count
ms-2/0/0    IDP                                                         6
```

show services flows destination-port

```
user@host> show services flows destination-port 80
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                            State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
```

show services flows destination-prefix

```
user@host> show services flows destination-prefix 10.1.1.2
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                            State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O            137
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I            132
```

show services flows interface

```
user@host> show services flows interface ms-2/0/0
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                            State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O              5
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I            162
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O            162
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I            157
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O            157
```

show services flows protocol

```
user@host> show services flows protocol icmp
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                                State    Dir       Frm count
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I             202
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O             202
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I             197
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O             197
```

show services flows service-set

```
user@host> show services flows service-set sample
```

```
Interface: ms-2/0/0, Service set: sample
Flow                                                State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I               6
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O               5
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I             220
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O             220
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I             215
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O             215
```

show services flows source-port

```
user@host> show services flows source-port 0
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                                State    Dir       Frm count
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I               6
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O               5
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I             235
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O             235
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I             230
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O             230
```

show services flows source-prefix

```
user@host> show services flows source-prefix 10.2.2.2
```

```
Interface: ms-2/0/0, Service set: IDP
Flow                                                State    Dir       Frm count
```

```
TCP           10.2.2.2:33656 ->       10.1.1.2:80    Forward  I              6
TCP           10.1.1.2:80    ->       10.2.2.2:33656 Forward  O              5
ICMP          10.1.1.2       ->       10.2.2.2       Forward  I            235
ICMP          10.2.2.2       ->       10.1.1.2       Forward  O            235
ICMP          10.2.2.2       ->       10.1.1.2       Forward  I            230
ICMP          10.1.1.2       ->       10.2.2.2       Forward  O            230
```

show services local-policy-decision-function flows

Syntax

```
show services local-policy-decision-function flows (interface interface-name | subscriber subscriber-name)
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Display local policy decision function (L-PDF) flows.

Options

interface *interface-name*—Display L-PDF flows for the specified interface only.

subscriber *subscriber-name*—Display L-PDF flows for the specified subscriber only.

Required Privilege Level

view

List of Sample Output

show services local-policy-decision-function flows subscriber on page 241
show services local-policy-decision-function flows interface on page 241

Output Fields

Table 12 on page 240 lists the output fields for the **show services local-policy-decision-function flows** command. Output fields are listed in the approximate order in which they appear.

Table 12: show services local-policy-decision-function flows Output Fields

Field Name	Field Description
Interface	Interface name.
service-set	Service set name.
service-set-interface	Service set interface name.
Currently active flows	Number of currently active flows.
High watermark flows	Maximum number of flows.
Protocol	(With **interface** option) Protocol identifier.
Source address	(With **interface** option) Source address.

Table 12: show services local-policy-decision-function flows Output Fields *(continued)*

Field Name	Field Description
Source port	(With **interface** option) Source port.
Destination address	(With **interface** option) Destination address.
Destination port	(With **interface** option) Destination port.
Application	(With **interface** option) Application name.
Application group	(With **interface** option) Application group identifier.

Sample Output

show services local-policy-decision-function flows subscriber

```
user@host> show services local-policy-decision-function flows subscriber user@example.com

Interface: ge-0/0/5.26

service-set: aacl_ms30
service-set interface: ms-3/0/0

Currently active flows: 0
High watermark flows: 0
```

show services local-policy-decision-function flows interface

```
user@host> show services local-policy-decision-function flows interface ge-1/1/0

Interface: ge-1/1/0.0

service-set: IDP
service-set interface: ms-2/0/0

Currently active flows: 2
High watermark flows: 2

Protocol    Source address   Source port   Destination address   Destination port
```

```
  Application           Application group

tcp         10.1.1.2         81            198.51.100.2              32813
      junos:ftp [63]        unknown [1023]

tcp         198.51.10.2         32813         10.1.1.2              81
     junos:ftp [63]        unknown [1023]
```

show services local-policy-decision-function statistics

Syntax

```
show services local-policy-decision-function statistics (interface interface-name | subscriber subscriber-name)
```

Release Information

Command introduced in Junos OS Release 9.5.

Description

Display local-policy-decision-function (L-PDF) statistics.

Options

interface *interface-name*—Display L-PDF statistics for the specified interface only.

subscriber *subscriber-name*—Display L-PDF statistics for the specified subscriber only.

Required Privilege Level

view

List of Sample Output

show services local-policy-decision-function statistics interface on page 244
show services local-policy-decision-function statistics subscriber on page 244

Output Fields

Table 13 on page 243 lists the output fields for the **show services local-policy-decision-function statistics** command. Output fields are listed in the approximate order in which they appear.

Table 13: show services local-policy-decision-function statistics Output Fields

Field Name	Field Description
Interface	Interface name.
service-set	Service set name.
service-set-interface	Service set interface name.
Application group	Application group identifier.
Application	Application name.
Packets in	Number of ingress packets.
Bytes in	Number of ingress bytes.

Table 13: show services local-policy-decision-function statistics Output Fields *(continued)*

Field Name	Field Description
Packets out	Number of egress packets.
Bytes out	Number of egress bytes.

Sample Output

show services local-policy-decision-function statistics interface

```
user@host> show services local-policy-decision-function statistics interface ge-1/1/0
```

```
Interface: ge-1/1/0.0

service-set: IDP
service-set interface: ms-2/0/0

Application group     Application           Packets in            Bytes in
       Packets out           Bytes out

                      junos:ftp [63]        5                     334
       6                     346
```

show services local-policy-decision-function statistics subscriber

```
user@host> show services local-policy-decision-function statistics subscriber user@example.com
```

```
Service-set-interface: ms-1/3/0
Service set: aacl-svc-set

Application-aware-access-list statistics

Application group       Packets in       Bytes in         Packets out       Bytes
 out
P2P                                 400                   32025            200
                   16284
FTP                                 20000               5231000       100
               8700
```

show services sessions

Syntax

```
show services sessions
<brief | extensive | terse>
<application-protocol protocol>
<count>
<destination-port destination-port>
<destination-prefix destination-prefix>
<interface interface-name>
<limit number>
<protocol protocol>
<service-set service-set>
<source-port source-port>
<source-prefix source-prefix>
<utilization>
```

Release Information

Command introduced in Junos OS Release 10.4.
Support added in Junos OS Release 19.3R2 for Next Gen Services on MX Series routers MX240, MX480 and MX960 with the MX-SPC3 services card.

Description

Display session information.

> **NOTE:** On MX Series routers (with interchassis redundancy configured), the idle timeout for every flow is displayed in the **show services session extensive** and **show services flows extensive** commands.

Options

none—Display standard information about all sessions.

brief | extensive | terse—(Optional) Display the specified level of output.

application-protocol *protocol*—(Optional) Display information about one of the following application protocols:

- **bootp**—Bootstrap protocols
- **dce-rpc**—Distributed Computing Environment-Remote Procedure Call protocols

- **dce-rpc-portmap**—Distributed Computing Environment-Remote Procedure Call protocols portmap service
- **dns**—Domain Name System protocol
- **exec**—Remote Execution Protocol
- **ftp**—File Transfer Protocol
- **h323**—H.323
- **icmp**—ICMP
- **icmpv6**—ICMPv6
- **iiop**—Internet Inter-ORB Protocol
- **ike-esp-nat**—IKE ALG
- **ip**—IP
- **login**—LOGIN
- **netbios**—NETBIOS
- **netshow**—NETSHOW
- **pptp**—Point-to-Point Tunneling Protocol
- **realaudio**—RealAudio
- **rpc**—Remote Procedure Call protocol
- **rpc-portmap**—Remote Procedure Call protocol portmap service
- **rtsp**—Real-Time Streaming Protocol
- **rsh**—Remote Shell
- **sip**—Session Initiation Protocol
- **shell**—Shell
- **snmp**—SNMP
- **sql**—SQLNet
- **talk**—Talk Program
- **tftp**—Trivial File Transfer Protocol
- **traceroute**—Traceroute
- **winframe**—WinFrame

NOTE: You can use the **none** option with the **show services sessions count application-protocol** command to display information about sessions other than ALG sessions.

count—(Optional) Display a count of the matching entries.

destination-port *destination-port*—(Optional) Display information for the specified destination port. The range of values is from 0 to 65,535.

destination-prefix *destination-prefix*—(Optional) Display information for the specified destination prefix.

interface *interface-name*—(Optional) Display information about the specified interface. On M Series and T Series routers, ***interface-name*** can be **ms-*fpc/pic/port*** or **rsp*number***. On J Series routers, ***interface-name*** is **ms-*pim*/0/*port***.

limit *number*—(Optional) Maximum number of entries to display.

protocol *protocol*—(Optional) Display information about one of the following IP types:

- ***number***—Numeric protocol value from 0 to 255
- **ah**—IPsec Authentication Header protocol
- **egp**—An exterior gateway protocol
- **esp**—IPsec Encapsulating Security Payload protocol
- **gre**—A generic routing encapsulation protocol
- **icmp**—Internet Control Message Protocol
- **icmp6**—Internet Control Message Protocol version 6
- **igmp**—Internet Group Management Protocol
- **ipip**—IP-within-IP Encapsulation Protocol
- **ospf**—Open Shortest Path First protocol
- **pim**—Protocol Independent Multicast protocol
- **rsvp**—Resource Reservation Protocol
- **sctp**—Stream Control Transmission Protocol
- **tcp**—Transmission Control Protocol
- **udp**—User Datagram Protocol

service-set *service-set*—(Optional) Display information for the specified service set.

source-port *source-port*—(Optional) Display information for the specified source port. The range of values is from 0 to 65,535.

source-prefix *source-prefix*—(Optional) Display information for the specified source prefix.

utilization—(Optional) Display statistical details about session utilization.

Required Privilege Level
view

List of Sample Output
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show services sessions brief on page 250
show services sessions extensive on page 250
show services sessions terse on page 250
show services sessions application-protocol on page 250
show services sessions count on page 254
show services sessions destination-port on page 254
show services sessions destination-prefix on page 254
show services sessions interface on page 255
show services sessions protocol on page 255
show services sessions service-set on page 255
show services sessions source-port on page 255
show services sessions source-prefix on page 255

Output Fields
Table 14 on page 248 lists the output fields for the **show services sessions** command. Output fields are listed in the approximate order in which they appear.

Table 14: show services sessions Output Fields

Field Name	Field Description	Level of Output
Interface	Name of the interface.	**application-protocol**
Session	Session ID that uniquely identifies the session.	All levels
ALG	Name of the application.	**terse**

Table 14: show services sessions Output Fields *(continued)*

Field Name	Field Description	Level of Output
Flags	Session flag for the ALG: • **0x1**—Found an existing session. • **0x2**—Reached session or flow limit. • **0x3**—No memory available for new sessions. • **0x4**—No free session ID available. • **0x0000**—No session ID found.	All levels
IP Action	Flag indicating whether IP action has been set for the session.	All levels
Offload	Flag indicating whether the session has been offloaded to the Packet Forwarding Engine.	All levels
Asymmetric	Flag indicating whether the session is uni-directional.	**terse** **application-protocol**
Service set	Name of a service set. Individual empty service sets are not displayed.	**count**
Sessions Count	Number of sessions.	**count**

Sample Output

show services sessions

`user@host>` **show services sessions**

```
ms-2/0/0
Session: 293, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     10.10.10.2:43677 ->    10.20.20.1:53    Forward  I        1
UDP    10.20.20.1:53    ->        192.0.2.1:43677 Forward  O        1
Session: 53, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     10.10.10.2:37494 ->    10.20.20.1:53    Forward  I        1
UDP    10.20.20.1:53    ->        10.11.11.11:37494 Forward  O        1
Session: 66, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     10.10.10.2:48161 ->    10.20.20.1:53    Forward  I        1
UDP    10.20.20.1:53    ->        10.11.11.11:48161 Forward  O        1
Session: 17, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     10.10.10.2:38908 ->    10.20.20.1:53    Forward  I        1
```

```
UDP    10.20.20.1:53    ->        10.11.11.11:38908 Forward  O        1
Session: 42, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     10.10.10.2:58189 ->    10.20.20.1:53    Forward  I        1
UDP    10.20.20.1:53    ->        10.11.11.11:58189 Forward  O        1
```

show services sessions brief

The output for the **show services flows brief** command is identical to that for the **show services sessions** command. For sample output, see show services sessions on page 249.

show services sessions extensive

`user@host>` **show services sessions extensive**

```
ms-0/1/0
Session: 2, ALG: 0, Flags: 0x0080, IP Action: no, Offload: no
NAT PLugin Data:
  NAT Action:   Translation Type - DYNAMIC NAT44
    NAT source         192.0.21.2         ->    10.10.10.127
TCP            192.0.2.2:52145 ->        198.51.100.2:23    Forward  I
   22
  Byte count: 1483
  Flow role: Unknown, Timeout: 0
TCP            198.51.100.2:23    ->   10.10.10.127:52145 Forward  O
 18
  Byte count: 2712
  Flow role: Unknown, Timeout: 0
```

show services sessions terse

`user@router>` **show services sessions terse**

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I              33
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O              31
```

show services sessions application-protocol

This command has the same output for the rpc, dce-rpc, rpc-portmap and dce-rpc-portmap ALGs.

`user@router>` **show services sessions application-protocol dce-rpc**

```
Interface name: ms-1/1/0
Session: 8, ALG: portmapper, Flags: 0x1800, IP Action: no, Offload: no
UDP    192.168.203.198:1019  ->192.168.203.194:2049  Forward  I              4
UDP    192.168.203.194:2049  ->192.168.203.198:1019  Forward  O              4
Session: 7, ALG: portmapper, Flags: 0x1800, IP Action: no, Offload: no
UDP    192.168.203.198:954   ->192.168.203.194:613   Forward  I              1
UDP    192.168.203.194:613   ->192.168.203.198:954   Forward  O              1
Session: 6, ALG: portmapper, Flags: 0x1800, IP Action: no, Offload: no
UDP    192.168.203.198:53836 ->192.168.203.194:613   Forward  I              1
UDP    192.168.203.194:613   ->192.168.203.198:53836 Forward  O              1
Session: 5, ALG: portmapper, Flags: 0x1000, IP Action: no, Offload: no
UDP    192.168.203.198:59813 ->192.168.203.194:111   Forward  I              1
UDP    192.168.203.194:111   ->192.168.203.198:59813 Forward  O              1
Session: 4, ALG: portmapper, Flags: 0x1800, IP Action: no, Offload: no
UDP    192.168.203.198:36595 ->192.168.203.194:2049  Forward  I              1
UDP    192.168.203.194:2049  ->192.168.203.198:36595 Forward  O              1
Session: 3, ALG: portmapper, Flags: 0x1000, IP Action: no, Offload: no
UDP    192.168.203.198:56050 ->192.168.203.194:111   Forward  I              1
UDP    192.168.203.194:111   ->192.168.203.198:56050 Forward  O              1
```

user@router> **show services sessions application-protocol dns**

```
Interface name: ms-2/0/0
Session: 293, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     198.51.100.2:43677 ->    203.0.113.10:53    Forward  I        1
UDP    203.0.113.10:53    ->        192.0.2.1:43677 Forward  O        1
Session: 53, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     198.51.100.2:37494 ->    203.0.113.10:53    Forward  I        1
UDP    203.0.113.10:53    ->        192.0.2.1:37494 Forward  O        1
Session: 66, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     198.51.100.2:48161 ->    203.0.113.10:53    Forward  I        1
UDP    203.0.113.10:53    ->        192.0.2.1:48161 Forward  O        1
Session: 17, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     198.51.100.2:38908 ->    203.0.113.10:53    Forward  I        1
UDP    203.0.113.10:53    ->        192.0.2.1:38908 Forward  O        1
Session: 42, ALG: 16, Flags: 0x0040, IP Action: no, Offload: no
UDP     198.51.100.2:58189 ->    203.0.113.10:53    Forward  I        1
UDP    203.0.113.10:53    ->        192.0.2.1:58189 Forward  O        1
```

user@router> **show services sessions application-protocol ftp**

```
Interface name: ms-4/1/0
Session: 1, ALG: 1, Flags: 0x0040, IP Action: no, Offload: no
```

```
TCP       192.0.2.129:32843 ->       198.51.100.129:21    Forward  I       26
TCP       198.51.100.129:21    ->        192.0.2.0:32843 Forward  O       30
```

user@router> **show services sessions application-protocol ike-esp-nat**

```
Service Set: ss_ipv4, Session: 33554435, ALG: ike-esp-nat, Flags: 0x0800, IP Action:
 no, Offload: no, Asymmetric: no
ESP 198.51.100.2:4689  ->        203.0.113.1:62108 Forward O 2199
ESP 192.0.2.2:62108  ->       198.51.100.2:4689 Forward I 0
Service Set: ss_ipv4, Session: 33554434, ALG: ike-esp-nat, Flags: 0x0800, IP Action:
 no, Offload: no, Asymmetric: no
ESP 192.0.2.2:44179  ->       198.51.100.2:43809 Forward I 2199
ESP 198.51.100.2:43809  ->       203.0.113.1:44179 Forward O 0
Service Set: ss_ipv4, Session: 33554433, ALG: ike-esp-nat, Flags: 0x0000, IP Action:
 no, Offload: no, Asymmetric: no
UDP 192.0.2.2:500  ->         198.51.100.2:500 Forward I 8
UDP 198.51.100.2:500  ->         203.0.113.1:57730 Forward O
```

user@router> **show services sessions application-protocol pptp**

```
Interface name: ms-2/0/0
Session: 3, ALG: pptp, Flags: 0x2800, IP Action: no, Offload: no, Asymmetric: no
GRE        203.0.113.138:0     ->    203.0.113.138:0     Forward  O
21
GRE        192.0.2.794:0     ->    203.0.113.138:0:65000 Forward  I
 0
Session: 2, ALG: pptp, Flags: 0x2800, IP Action: no, Offload: no, Asymmetric: no
GRE        192.0.2.794:0     ->    203.0.113.138:0:49913 Forward  I
88
GRE        203.0.113.138:0:49913 ->    192.0.2.794:65001 Forward  O
 0
Session: 1, ALG: pptp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP        192.0.2.794:1511  ->    203.0.113.138:0:1723  Forward  I
13
TCP        203.0.113.138:0:1723  ->    192.0.2.794:1511  Forward  O
12
```

user@router> **show services sessions application-protocol rtsp**

```
Interface name: ms-0/1/0
Session: 13, ALG: rtsp, Flags: 0x0800, IP Action: no, Offload: no
UDP        203.0.113.66:5004  ->        198.51.100.66:3989  Forward  O      152
```

```
UDP        198.51.100.66:3989  ->        192.0.2.161:5004  Forward  I        0
Session: 9, ALG: rtsp, Flags: 0x0800, IP Action: no, Offload: no
UDP        203.0.113.66:5004  ->        198.51.100.66:3986  Forward  O        3
UDP        198.51.100.66:3986  ->        192.0.2.161:5004  Forward  I        0
```

user@router> **show services sessions application-protocol rsh**

```
Interface name: ms-2/0/0
Session: 3, ALG: 2, Flags: 0x0840, IP Action: no, Offload: no
TCP    203.0.113.10:1023  ->     198.51.100.2:1020  Forward  O        4
TCP     198.51.100.2:1020  ->    203.0.113.10:1023  Forward  I        3
Session: 1, ALG: 2, Flags: 0x0040, IP Action: no, Offload: no
TCP     198.51.100.2:1021  ->    203.0.113.10:514   Forward  I     1331
TCP    203.0.113.10:514   ->     198.51.100.2:1021  Forward  O     2485
```

user@router> **show services sessions application-protocol sip**

```
Interface name: ms-2/0/0
Session: 4, ALG: sip, Flags: 0x0800, IP Action: no, Offload: no
UDP           198.51.100.130:6000  ->       192.0.2.129:12682 Forward  I
    246
UDP           192.0.2.129:12682 ->       198.51.100.162:6000  Forward  O
      0
Session: 1, ALG: sip, Flags: 0x0000, IP Action: no, Offload: no
UDP           198.51.100.130:5060  ->       192.0.2.130:5060  Forward  I
     10
UDP           192.0.2.130:5060  ->       198.51.100.162:5060  Forward  O
      9
```

user@router> **show services sessions application-protocol sql**

```
Interface name: ms-2/0/0
Session: 3934, ALG: sqlnet, Flags: 0x0800, IP Action: no, Offload: no
TCP     198.51.100.2:39754 ->    203.0.113.138:0:1408  Forward  I       26
TCP    203.0.113.138:0:1408  ->        192.0.2.1:39754 Forward  O       23
```

user@router> **show services sessions application-protocol talk**

```
Interface name: ms-0/2/0
Session: 4, ALG: 65, Flags: 0x0800, IP Action: no, Offload: no
TCP            203.0.113.162:36888 ->        192.0.2.2:33294 Forward  O
```

```
     4
TCP            192.0.2.1:33294 ->        203.0.113.162:36888 Forward  I
     3
Session: 7, ALG: 65, Flags: 0x0800, IP Action: no, Offload: no
UDP            203.0.113.162:1165  ->        192.0.2.2:518   Forward  O
     1
UDP            192.0.2.2:518   ->        203.0.113.162:1165  Forward  I
     1
Session: 8, ALG: 65, Flags: 0x0000, IP Action: no, Offload: no
UDP            192.0.2.2:1509  ->        203.0.113.162:518   Forward  I
     3
UDP            203.0.113.162:518   ->        192.0.2.2:1509  Forward  O
     3
Session: 6, ALG: 0, Flags: 0x0000, IP Action: no, Offload: no
UDP            192.0.2.1:123   ->        192.0.2.2:123   Forward  O
 4
```

show services sessions count

`user@host>` **show services sessions count**

```
Interface   Service set                                          Sessions count
ms-1/1/0    ss                                                              2
```

show services sessions destination-port

`user@router>` **show services sessions destination-port 21**

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I              25
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O              24
```

show services sessions destination-prefix

`user@router>` **show services sessions destination-prefix 10.1.1.2**

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I              25
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O              24
```

show services sessions interface

```
user@router> show services sessions interface ms-1/1/0
```

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I             30
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O             29
```

show services sessions protocol

```
user@router> show services sessions protocol tcp
```

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I             30
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O             29
```

show services sessions service-set

```
user@router> show services sessions service-set sample
```

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I             33
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O             31
```

show services sessions source-port

```
user@router> show services sessions source-port 21
```

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I             33
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O             31
```

show services sessions source-prefix

```
user@router> show services sessions source-prefix 10.2.2.2
```

```
ms-1/1/0
Session: 1, ALG: ftp, Flags: 0x2000, IP Action: no, Offload: no, Asymmetric: no
```

```
TCP           10.2.2.2:52138 ->       10.1.1.2:21    Forward  I             33
TCP           10.1.1.2:21    ->       10.2.2.2:52138 Forward  O             31
```