

# Local Policy Decision Function



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Published: 2014-05-02

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# About the Documentation

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## Documentation and Release Notes

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To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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## Supported Platforms

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

- MX Series

## Using the Examples in This Manual

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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.xml;
    }
  }
}
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.xml; }
```

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



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

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

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

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

## Documentation Conventions

Table 1 on page ix 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 ix defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

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

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	<pre>user@host&gt; show chassis alarms</pre> <p>No alarms currently active</p>
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	<p>Configure the machine's domain name:</p> <pre>[edit] root@# set system domain-name domain-name</pre>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(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.	<b>broadcast</b>   <b>multicast</b> <i>(string1   string2   string3)</i>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [ community-ids ]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	<pre>[edit] routing-options {   static {     route default {       nexthop <i>address</i>;       retain;     }   } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>

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

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

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

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

## Requesting Technical Support

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

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

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- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>

- Search technical bulletins for relevant hardware and software notifications:  
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:  
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

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

## Opening a Case with JTAC

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

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

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

## PART 1

# Overview

- [Local Policy Decision Function on page 3](#)



## CHAPTER 1

# Local Policy Decision Function

- [L-PDF Overview on page 3](#)
- [Best-Effort Application Identification of DPI-Serviced Flows on page 5](#)

## L-PDF Overview

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**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 *Service Set Properties*.

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 *Local Policy Decision Function*. 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`
- *Configuring Control and Data Cores*
- *Configuring Memory Settings*
- *Configuring Packages on the PIC*

For more information about this configuration, see the following topics in the *SDK Applications Configuration Guide and Command Reference*:

#### Related Documentation

- [Best-Effort Application Identification of DPI-Serviced Flows on page 5](#)
- [Configuring Statistics Profiles on page 11](#)
- [Applying L-PDF Profiles to Service Sets on page 15](#)
- [Tracing L-PDF Operations on page 16](#)

## Best-Effort Application Identification of DPI-Serviced Flows

This topic describes the following information:

- [Features that Support Application-Level Filtering on page 5](#)
- [Best-Effort Application Determination on page 6](#)
- [APPID, AACL, and L-PDF Processing in Preconvergence Scenarios on page 6](#)

### Features that Support Application-Level Filtering

On MX Series routers equipped with Multiservices DPCs and M120 or M320 routers equipped with Multiservices 400 PICs, Intrusion Detection and Prevention (IDP) is accomplished by Deep Packet Inspection (DPI) of TCP, UDP, and ICMP flows. The application identification (APPID) feature defines applications as members of application

groups in TCP/UDP/ICMP traffic. IDP depends on APPID for identification and detection of some Layer 7 applications.

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

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 on page 6](#)
- [Upon Best-Effort Application Identification on page 7](#)
- [While Application Identification Is on a Best-Effort Basis on page 7](#)
- [If a Flow Ends Before an Application Identification Is Made on page 7](#)
- [If a Flow Ends While Application Identification on a Best-Effort Basis on page 7](#)

### Prior to a Final or Best-Effort Application Identification

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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

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When a best-effort application determination is made, ACL does not apply any ACL term actions configured for that flow. There are a number of reasons for this, one being that the action itself (such as "discard") could make a final application determination impossible. Instead, ACL or L-PDF tracks the flow and accepts all packets for that flow until a final determination is made, at which time the normal ACL or L-PDF 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, ACL 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** ACL term action is configured for the "application-group-any" application, then the statistics for that flow will be 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, ACL or L-PDF uses that best-effort determination as a final determination. ACL or L-PDF performs any necessary collection, aggregation, and reporting of statistics based on that Layer 7 application. In particular, if the **count** ACL term action is configured for that Layer 7 application, then the statistics for the flow will be collected and aggregated against the ACL or L-PDF statistics. However, in the case of nested applications, ACL and L-PDF will not consider the best-effort determination as final and the nested application will be reported as an unknown application.

#### Related Documentation

- [Configuring ACL Rules](#)
- [Configuring Statistics Profiles on page 11](#)
- [acl-fields on page 20](#)

- [aacl-statistics-profile on page 21](#)
- *rule*
- *services*
- *term*
- *then*

## PART 2

# Configuration

- [Configuration Tasks for L-PDF on page 11](#)
- [L-PDF Configuration Statements on page 19](#)



## CHAPTER 2

# Configuration Tasks for L-PDF

- [Configuring Statistics Profiles on page 11](#)
- [Applying L-PDF Profiles to Service Sets on page 15](#)
- [Tracing L-PDF Operations on page 16](#)

## Configuring Statistics Profiles

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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:

- [Configuring an L-PDF Statistics Profile on page 12](#)
- [Configuring an ACL Statistics Profile on page 13](#)



**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 will be 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 5](#).



**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 ACL Statistics Profile” on page 13](#). 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 will be **/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 Administration Guide for Routing Devices*.

## Configuring an ACL Statistics Profile

You can specify an ACL 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 **acl-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 Administration Guide for Routing Devices*.

**Related  
Documentation**

- [L-PDF Overview on page 3](#)
- [Best-Effort Application Identification of DPI-Serviced Flows on page 5](#)
- [Applying L-PDF Profiles to Service Sets on page 15](#)
- [Tracing L-PDF Operations on page 16](#)

## 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, it is strongly 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 for Routing Devices*.

**Related  
Documentation**

- [L-PDF Overview on page 3](#)
- [Best-Effort Application Identification of DPI-Serviced Flows on page 5](#)
- [Configuring Statistics Profiles on page 11](#)
- [Tracing L-PDF Operations on page 16](#)

---

## 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

**Related  
Documentation**

- [L-PDF Overview on page 3](#)
- [Best-Effort Application Identification of DPI-Serviced Flows on page 5](#)
- [Configuring Statistics Profiles on page 11](#)
- [Applying L-PDF Profiles to Service Sets on page 15](#)



## CHAPTER 3

# L-PDF Configuration Statements

- [aacl-fields on page 20](#)
- [aacl-statistics-profile on page 21](#)
- [application-aware-access-list-fields on page 22](#)
- [file on page 23](#)
- [local-policy-decision-function on page 24](#)
- [policy-decision-statistics-profile on page 25](#)
- [statistics \(System Services\) on page 26](#)
- [traceoptions \(Services Local Policy Decision Function\) on page 27](#)

## acl-fields

---

<b>Syntax</b>	<pre>acl-fields {     <i>field-name</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services local-policy-decision-function statistics aac1-statistics-profile <i>profile-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.0. IPv6 support introduced in Junos OS Release 12.2
<b>Description</b>	Define the statistics to collect in a data log file.
<b>Options</b>	<p><i>field-name</i>—Name of the field:</p> <ul style="list-style-type: none"><li>• <b>address</b>—IPv4 address</li><li>• <b>all-fields</b>—All available fields</li><li>• <b>application</b>—Application name</li><li>• <b>application-group</b>—Application group name</li><li>• <b>input-bytes</b>—Number of input bytes</li><li>• <b>input-interface</b>—Input interface name</li><li>• <b>input-packets</b>—Number of input packets</li><li>• <b>ipv6-address</b>—IPv6 address</li><li>• <b>ipv6-prefix-length</b>—Prefix length associated with the displayed IPv6 address</li><li>• <b>mask</b>—Netmask</li><li>• <b>output-bytes</b>—Number of output bytes</li><li>• <b>output-packets</b>—Number of output packets</li><li>• <b>subscriber-name</b>—Subscriber name</li><li>• <b>timestamp</b>—Timestamp</li><li>• <b>vrf-name</b>—VPN routing and forwarding (VRF) name</li></ul>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Statistics Profiles on page 11</a></li></ul>



## aac1-statistics-profile

<b>Syntax</b>	<pre> aac1-statistics-profile <i>profile-name</i> {     aac1-fields {         <i>field-name</i>;     }     file <i>filename</i>;     record-mode (interim-active-only   interim-full);     report-interval <i>minutes</i>; } </pre>
<b>Hierarchy Level</b>	<pre> [edit services service-set <i>service-set-name</i>], [edit system services local-policy-decision-function statistics] </pre>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 10.0.</p> <p><b>record-mode</b> option introduced in Junos OS Release 10.2.</p>
<b>Description</b>	Create an AAC1 statistics profile, which configures the files to which statistics records are exported and the format that is exported.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file to receive the statistics data output. Enclose the name within quotation marks. All files are placed in the directory <code>/var/stats/aac1</code>.</p> <p><b>record-mode</b>—Record mode for the reporting interval; possible values are <b>interim-active-only</b>, which reports only statistics that have changed, or <b>interim-full</b>, which reports all available statistics.</p> <p><b>report-interval <i>minutes</i></b>—Frequency at which statistics are recorded, in minutes.</p> <p><b>Default:</b> 15 minutes</p> <p><b>Range:</b> 5 through 1440 minutes</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>For more information on profiles, see the <i>Network Management Administration Guide for Routing Devices</i>.</li> <li><a href="#">Configuring Statistics Profiles on page 11</a></li> </ul>

## application-aware-access-list-fields

---

<b>Syntax</b>	<pre>application-aware-access-list-fields {     <i>field-name</i>; }</pre>
<b>Hierarchy Level</b>	[edit accounting-options policy-decision-statistics-profile <i>profile-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5.
<b>Description</b>	Define the statistics to collect in a data log file.
<b>Options</b>	<p><i>field-name</i>—Name of the field:</p> <ul style="list-style-type: none"><li>• <b>address</b>—IP address</li><li>• <b>application</b>—Application name</li><li>• <b>application-group</b>—Application group name</li><li>• <b>input-bytes</b>—Number of input bytes</li><li>• <b>input-interface</b>—Input interface name</li><li>• <b>input-packets</b>—Number of input packets</li><li>• <b>mask</b>—Netmask</li><li>• <b>output-bytes</b>—Number of output bytes</li><li>• <b>output-packets</b>—Number of output packets</li><li>• <b>subscriber-name</b>—Subscriber name</li><li>• <b>timestamp</b>—Timestamp</li><li>• <b>vrf-name</b>—VPN routing and forwarding (VRF) name</li></ul>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Statistics Profiles on page 11</a></li></ul>

## file

<b>Syntax</b>	<pre>file <i>file-name</i> {     archive-sites <i>url</i>;     files <i>file-number</i>;     size <i>bytes</i>;     transfer-interval <i>minutes</i>; }</pre>
<b>Hierarchy Level</b>	[edit system services local-policy-decision-function statistics]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.0.
<b>Description</b>	Specify a file to which statistics records are exported and the format that is exported.
<b>Options</b>	<p><b>archive-sites</b> [<i>url</i>]<b>—</b>One or more destinations for archiving data.</p> <p><b>filename</b><b>—</b>Name of the file to receive the statistics data output.</p> <p><b>files</b> <i>number</i><b>—</b>(Optional) Maximum number of accounting files.  <b>Range:</b> 3 through 1000 files  <b>Default:</b> 3 files</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>size</b> <i>size</i><b>—</b>(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB).  <b>Syntax:</b> <i>xk</i> to specify KB, <i>xm</i> to specify MB, or <i>xg</i> to specify GB  <b>Range:</b> 262144 through 1073741824 or the maximum file size supported on your system</p> <p>If you specify a maximum file size, you also must specify a maximum number of trace files with the <b>files</b> option.</p> <p><b>transfer-interval</b> <i>minutes</i><b>—</b>Frequency at which to transfer files to archive sites, in minutes.</p>
<b>Required Privilege Level</b>	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring Statistics Profiles on page 11</a></li> </ul>

## local-policy-decision-function

---

**Syntax**    local-policy-decision-function {  
              statistics {  
                  aocl-statistics-profile *profile-name* {  
                      aocl-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.

**Options**    The remaining statements are explained separately.

**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 on page 11](#)

## policy-decision-statistics-profile

<b>Syntax</b>	<pre> policy-decision-statistics-profile <i>profile-name</i> {     aacl-fields {         <i>field-name</i>;     }     file <i>filename</i>;     files <i>file-number</i>;     size <i>bytes</i>; } </pre>
<b>Hierarchy Level</b>	[edit accounting-options], [edit services service-set <i>service-set-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5.
<b>Description</b>	Create a policy decision statistics profile, which configures the files to which statistics records are exported and the format that is exported.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file to receive the accounting-data output. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of accounting files.  <b>Range:</b> 2 through 1000 files  <b>Default:</b> 2 files</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b><i>profile-name</i></b>—Name of the policy decision statistics profile.</p> <p><b>size <i>size</i></b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB).  <b>Syntax:</b> <i>xk</i> to specify KB, <i>xm</i> to specify MB, or <i>xg</i> to specify GB  <b>Range:</b> 10240 through 1073741824 or the maximum file size supported on your system</p> <p>If you specify a maximum file size, you also must specify a maximum number of trace files with the <b>files</b> option.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>For more information on profiles, see the <i>Network Management Administration Guide for Routing Devices</i>.</li> <li><a href="#">Configuring Statistics Profiles on page 11</a></li> </ul>

## 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**—Record type; possible values are **delta** or **interim**.

The remaining statements are explained separately.

**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 on page 11](#)

## traceoptions (Services Local Policy Decision Function)

<b>Syntax</b>	<pre> traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt;;     flag <i>flag</i>;     no-remote-trace; } </pre>
<b>Hierarchy Level</b>	[edit services local-policy-decision-function], [edit system services local-policy-decision-function]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5.
<b>Description</b>	Configure local policy decision function (L-PDF) tracing options.
<b>Options</b>	<p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b><i>trace-file</i></b> reaches its maximum size, it is renamed <b><i>trace-file.0</i></b>, then <b><i>trace-file.1</i></b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p><b>Range:</b> 2 through 1000 files</p> <p><b>Default:</b> 2 files</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b><i>flag</i></b>—Tracing operation to perform. To specify more than one flag, include multiple <b>flag</b> statements.</p> <ul style="list-style-type: none"> <li>• <b>all</b>—Everything</li> <li>• <b>configuration</b>—Configuration traces</li> <li>• <b>database</b>—Database traces</li> <li>• <b>general</b>—Miscellaneous traces</li> <li>• <b>gres</b>—Graceful Routing Engine switchover (GRES) traces</li> <li>• <b>ptsp-statistics</b>—PTSP statistics traces</li> <li>• <b>rtsock</b>—Routing socket traces</li> <li>• <b>statistics</b>—Statistics traces</li> <li>• <b>subscriber</b>—Subscriber traces</li> </ul> <p><b>no-remote-trace</b>—Disable remote tracing.</p> <p><b>size <i>size</i></b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b><i>trace-file</i></b> reaches this size, it is renamed <b><i>trace-file.0</i></b>. When the <b><i>trace-file</i></b> again reaches its maximum size, <b><i>trace-file.0</i></b> is renamed</p>

*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:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10240 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.

<b>Required Privilege Level</b>	routing and trace—To view this statement in the configuration. routing-control and trace-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Tracing L-PDF Operations on page 16</a></li></ul>



## PART 3

# Administration

- [L-PDF Operational Mode Commands on page 31](#)



## CHAPTER 4

# L-PDF Operational Mode Commands

- `clear services flows ip-action`
- `clear services local-policy-decision-function statistics`
- `show services local-policy-decision-function flows`
- `show services local-policy-decision-function statistics`

## clear services flows ip-action

---

<b>Syntax</b>	clear services flows ip-action
<b>Release Information</b>	Command introduced in Junos OS Release 10.0.
<b>Description</b>	Clear <b>ip-action</b> entries generated by the router to log, drop, or block traffic based on previous matches. The IP action options and targets are configured at the <b>[edit security idp idp-policy <i>policy-name</i> rulebase-ips rule <i>rule-name</i> then]</b> hierarchy level.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	clear
<b>Output Fields</b>	When you issue this command, you are provided feedback on the status of your request.

### Sample Output

```
user@host> clear services flows ip-action
Interface  Service set
ms-4/0/0   idp-service
Flows removed
1
```

## [clear services local-policy-decision-function statistics](#)

---

<b>Syntax</b>	clear services local-policy-decision-function statistics
<b>Release Information</b>	Command introduced in Junos OS Release 9.5.
<b>Description</b>	Clear local policy decision function (L-PDF) statistics.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">show services local-policy-decision-function statistics on page 36</a></li></ul>

## show services local-policy-decision-function flows

<b>Syntax</b>	<b>show services local-policy-decision-function flows</b> (interface <i>interface-name</i>   subscriber <i>subscriber-name</i> )
<b>Release Information</b>	Command introduced in Junos OS Release 9.5.
<b>Description</b>	Display local policy decision function (L-PDF) flows.
<b>Options</b>	<p><b>interface <i>interface-name</i></b>—Display L-PDF flows for the specified interfaces only.</p> <p><b>subscribers <i>subscriber-name</i></b>—Display L-PDF flows for the specified subscribers only.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><a href="#">show services local-policy-decision-function flows by interface on page 35</a></p> <p><a href="#">show services local-policy-decision-function flows by subscriber on page 35</a></p>
<b>Output Fields</b>	<p><a href="#">Table 3 on page 34</a> lists the output fields for the <b>show services local-policy-decision-function flows</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 3: show services local-policy-decision-function flows Output Fields**

Field Name	Field Description
<b>Interface</b>	Interface name.
<b>service-set</b>	Service set name.
<b>service-set-interface</b>	Service set interface name.
<b>Currently active flows</b>	Number of currently active flows.
<b>High watermark flows</b>	Maximum number of flows.
<b>Protocol</b>	(With <b>interface</b> option) Protocol identifier.
<b>Source address</b>	(With <b>interface</b> option) Source address.
<b>Source port</b>	(With <b>interface</b> option) Source port.
<b>Destination address</b>	(With <b>interface</b> option) Destination address.
<b>Destination port</b>	(With <b>interface</b> option) Destination port.
<b>Application</b>	(With <b>interface</b> option) Application name.
<b>Application group</b>	(With <b>interface</b> option) Application group identifier.

## Sample Output

### show services local-policy- decision-function flows by interface

```
user@host> show services local-policy-decision-function flows subscriber user@juniper.net
Interface: ge-0/0/5.26
```

```
service-set: aac1_ms30
service-set interface: ms-3/0/0
```

```
Currently active flows: 0
High watermark flows: 0
```

### show services local-policy- decision-function flows by subscriber

```
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	20.1.1.2	32813
junos:ftp [63]		unknown [1023]		
tcp	20.1.1.2	32813	10.1.1.2	81
junos:ftp [63]		unknown [1023]		

## show services local-policy-decision-function statistics

<b>Syntax</b>	<code>show services local-policy-decision-function statistics (interface <i>interface-name</i>   subscriber <i>subscriber-name</i>)</code>
<b>Release Information</b>	Command introduced in Junos OS Release 9.5.
<b>Description</b>	Display local-policy-decision-function (L-PDF) statistics.
<b>Options</b>	<p><code>interface <i>interface-name</i></code>—Display L-PDF statistics for the specified interface(s) only.</p> <p><code>subscribersubscriber-name</code>—Display L-PDF statistics for the specified subscriber(s) only.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><a href="#">show services local-policy-decision-function statistics by interface on page 36</a></p> <p><a href="#">show services local-policy-decision-function statistics by subscriber on page 37</a></p>
<b>Output Fields</b>	<p><a href="#">Table 4 on page 36</a> lists the output fields for the <b>show services local-policy-decision-function statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 4: 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.
Packets out	Number of egress packets.
Bytes out	Number of egress bytes.

## Sample Output

### show services local-policy-decision-function statistics by 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 by subscriber

user@host> show services local-policy-decision-function statistics subscriber user@juniper.net

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			



## PART 4

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