



LPTS Commands

This chapter describes the Cisco IOS XR software commands used to monitor Local Packet Transport Services on NCS 5000 routers.

For detailed information about LPTS concepts, configuration tasks, and examples, refer to the *IP Addresses and Services Configuration Guide for Cisco NCS 5000 Series Routers*.

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clear lpts ifib statistics

To clear the Internal Forwarding Information Base (IFIB) statistics, use the **clear lpts ifib statistics** command in XR EXEC mode.

clear lpts ifib statistics [**location** *node-id*]

Syntax Description	location <i>node-id</i> Clears the IFIB statistics for the designated node. The <i>node-id</i> argument is entered in standard <i>rack/slot/module</i> notation.
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Command Default	No default behavior or values
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
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Task ID	Task ID	Operations
		lpts

Examples The following example shows how to clear the IFIB statistics for the RP:

```
RP/0/RP0/CPU0:router# clear lpts ifib statistics
```

clear lpts pifib statistics

To clear the Pre-Internal Forwarding Information Base (Pre-IFIB) statistics, use the **clear lpts pifib statistics** command in XR EXEC mode.

```
clear lpts pifib statistics [location node-id]
```

Syntax Description	location node-id Clears the Pre-IFIB statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
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Command Default	No default behavior or values
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID	Operations
	lpts	execute

Examples The following example shows how to clear the Pre-IFIB statistics for the RP:

```
RP/0/RP0/CPU0:router# clear lpts pifib statistics location 0/RP0/CPU0
```

show lpts bindings

To display the binding information in the Port Arbitrator, use the **show lpts bindings** command in XR EXEC mode.

```
show lpts bindings [location node-id] [client-id {cnl|ipsec|ipv4-io|ipv6-io|mpa|tcp|test|udp|raw}]
[brief] [vrf vrf-name]
```

Syntax Description

location <i>node-id</i>	(Optional) Displays information for the specified node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
client-id	(Optional) Type of client. It can be one of the following values: <ul style="list-style-type: none"> • cnl —ISO connectionless protocol (used by IS-IS) • ipsec —Secure IP • ipv4-io —Traffic processed by the IPv4 stack • ipv6-io —Traffic processed by the IPv6 stack • mpa —Multicast Port Arbitrator (multicast group joins) • tcp —Transmission Control Protocol • test —Test applications • udp —User Datagram Protocol • raw —Raw IP
brief	(Optional) Displays summary output.
vrf <i>vrf-name</i>	(Optional) Name of assigned VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **show lpts bindings** command displays the Local Packet Transport Services (LPTS) bindings (requests to receive traffic of a particular type). Bindings are aggregated into flows by the LPTS Port Arbitrator; flows are then programmed into the Internal Forwarding Information Base (IFIB) and Pre-IFIB to direct packets to applications.

If you specify the optional **client-id** keyword and type of client, only bindings from that client are shown. If you specify the optional **location** keyword and *node-id* argument, only bindings from clients on that node are displayed.

Task ID	Task ID	Operations
	lpts	read

Examples

The following sample output is from the **show lpts bindings** command, displaying bindings for all client ID types:

```
RP/0/RP0/CPU0:router# show lpts bindings

@ - Indirect binding; Sc - Scope

-----
Location   :0/1/CPU0
Client ID  :IPV4_IO
Cookie     :0x00000001
Clnt Flags :
Layer 3    :IPV4
Layer 4    :ICMP
Local Addr :any
Remote Addr: any
Local Port :any
Remote Port: any
Filters    :Type / Intf or Pkt Type / Source Addr / Location
           INCLUDE_TYPE / type 8
           INCLUDE_TYPE / type 13
           INCLUDE_TYPE / type 17
-----

Location   :0/2/CPU0
Client ID  :IPV4_IO
Cookie     :0x00000001
Clnt Flags :
Layer 3    :IPV4
Layer 4    :ICMP
Local Addr :any
Remote Addr: any
Local Port :any
Remote Port: any
Filters    :Type / Intf or Pkt Type / Source Addr / Location
           INCLUDE_TYPE / type 8
           INCLUDE_TYPE / type 13
           INCLUDE_TYPE / type 17
-----

Location   :0/RP1/CPU0
Client ID  :TCP
Cookie     :0x4826f1f8
Clnt Flags :REUSEPORT
Layer 3    :IPV4
Layer 4    :TCP
Local Addr :any
Remote Addr: any
Local Port :7
Remote Port: any
-----

Location   :0/RP1/CPU0
Client ID  :TCP
Cookie     :0x4826fa0c
Clnt Flags :REUSEPORT
Layer 3    :IPV4
Layer 4    :TCP
```

```

Local Addr :any
Remote Addr:any
Local Port :9
Remote Port:any
-----
Location    :0/RP1/CPU0
Client ID   :TCP
Cookie      :0x482700d0
Clnt Flags  :REUSEPORT
Layer 3     :IPV4
Layer 4     :TCP
Local Addr  :any
Remote Addr:any
Local Port  :19
Remote Port:any
-----
Location    :0/RP1/CPU0
Client ID   :IPV4_IO
Cookie      :0x00000001
Clnt Flags  :
Layer 3     :IPV4
Layer 4     :ICMP
Local Addr  :any
Remote Addr:any
Local Port  :any
Remote Port:any
Filters     :Type / Intf or Pkt Type / Source Addr / Location
INCLUDE_TYPE / type 8
INCLUDE_TYPE / type 13
INCLUDE_TYPE / type 17

```

This table describes the significant fields shown in the display.

Table 1: show lpts bindings Command Field Descriptions

Field	Description
Location	Node location, in the format of <i>rack/slot/module</i> .
Client ID	LPTS client type.
Cookie	Client's unique tag for the binding.
Clnt Flags	REUSEPORT -- client has set the SO_REUSEPORT or SO_REUSEADDR socket option.
Layer 3	Layer 3 protocol (IPv4, IPv6, CLNL).
Layer 4	Layer 4 protocol (TCP, UDP).
Local Addr	Local (destination) address.
Remote Addr	Remote (source) address.
Local Port	Local (destination) TCP or UDP port, or ICMP/IGMP packet type, or IPsec SPI.
Remote Port	Remote (source) TCP or UDP port.

The following sample output is from the **show lpts bindings brief** command:

```
RP/0/RP0/CPU0:router# show lpts bindings brief
```

```
@ - Indirect binding; Sc - Scope
```

```

Location  Clnt Sc L3   L4   VRF-ID  Local,Remote Address.Port  Interface
-----  -
0/1/CPU0  IPV4 LO IPV4 ICMP *      any.ECHO any                any
0/1/CPU0  IPV4 LO IPV4 ICMP *      any.TSTAMP any               any
0/1/CPU0  IPV4 LO IPV4 ICMP *      any.MASKREQ any              any
0/1/CPU0  IPV6 LO IPV6 ICMP6 *     any.ECHOREQ any             any
0/3/CPU0  IPV4 LO IPV4 ICMP *      any.ECHO any                any
0/3/CPU0  IPV4 LO IPV4 ICMP *      any.TSTAMP any               any

```

This table describes the significant fields shown in the display.

Table 2: show lpts bindings brief Command Field Descriptions

Field	Description
Location	Node location, in the format of <i>rack/slot/module</i> .
Clnt ID	LPTS client type.
Sc	Scope (LR = Logical-Router, LO = Local).
Layer 3	Layer 3 protocol.
Layer 4	Layer 4 protocol.
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local,Remote Address.Port	Local (destination) and Remote (source) addresses and ports or packet types.
Interface	Inbound interface.

show lpts clients

To display the client information for the Port Arbitrator, use the **show lpts clients** command in XR EXEC mode.

show lpts clients [times]

Syntax Description	times (Optional) Displays information about binding request rates and service times.
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Command Default	No default behavior or values
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	The show lpts clients command displays the clients connected to the local packet transport services (LPTS) port arbitrator (PA).
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Task ID	Task ID	Operations
	lpts	read

Examples The following sample output is from the **show lpts clients** command:

```
RP/0/RP0/CPU0:router# show lpts clients

o_flg - open flags ; clid - client id
clid      loc      flags  o_flg
RAW(3)    0/RP1/CPU0    0x1   0x2
TCP(1)    0/RP1/CPU0    0x1   0x2
IPV4_IO(5) 0/1/CPU0      0x3   0x2
IPV4_IO(5) 0/2/CPU0      0x3   0x2
IPV4_IO(5) 0/RP1/CPU0    0x3   0x2
MPA(7)    0/RP1/CPU0    0x3   0x0
```

This table describes the significant fields shown in the display.

Table 3: show lpts clients Command Field Descriptions

Field	Description
Clid	LPTS client ID.
Loc	Node location, in the format <i>rack/slot/module</i> .

Field	Description
Flags	Client flags. Note The client flags are used only for debugging purposes.
o_flags	Open flags. Note The open flags are used only for debugging purposes.

The following sample output is from the **show lpts clients times** command. The output shows samples for the last 30 seconds, 1 minute, 5 minutes, 10 minutes, and a total (if nonzero). The number of transactions, number of updates, and the minimum/average/maximum time in milliseconds to process each transaction is shown.

```
RP/0/RP0/CPU0:router# show lpts clients times
```

```
o_flg - open flags ; clid - client id
clid      loc      flags  o_flg
RAW(3)    0/RP1/CPU0  0x1   0x2
 30s:2 tx 2 upd 2/2/3ms/tx
  1m:2 tx 2 upd 2/2/3ms/tx
  5m:2 tx 2 upd 2/2/3ms/tx
 10m:2 tx 2 upd 2/2/3ms/tx
total:2 tx 2 upd 2/-/3ms/tx
TCP(1)    0/RP1/CPU0    0x1   0x2
total:3 tx 3 upd 1/-/1ms/tx
IPV4_IO(5) 0/1/CPU0     0x3   0x2
total:1 tx 1 upd 0/-/0ms/tx
IPV4_IO(5) 0/2/CPU0     0x3   0x2
total:1 tx 1 upd 1/-/1ms/tx
IPV4_IO(5) 0/RP1/CPU0   0x3   0x2
total:1 tx 1 upd 3/-/3ms/tx
MPA(7)    0/RP1/CPU0   0x3   0x0
```

show lpts flows

To display information about Local Packet Transport Services (LPTS) flows, use the **show lpts flows** command in XR EXEC mode.

show lpts flows [brief]

Syntax Description	brief (Optional) Displays summary output.
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Command Default	No default behavior or values
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	The show lpts flows command is used to display LPTS flows, which are aggregations of identical binding requests from multiple clients and are used to program the LPTS Internal Forwarding Information Base (IFIB) and Pre-IFIB.
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Task ID	Task ID	Operations
	lpts	read

Examples	The following sample output is from the show lpts flows command:
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```
RP/0/RP0/CPU0:router# show lpts flows
```

```
-----
L3-proto      : IPV4(2)
L4-proto      : ICMP(1)
VRF-ID        : * (000000000)
Local-IP      : any
Remote-IP     : any
Pkt-Type      : 8
Remote-Port   : any
Interface     : any (0x0)
Flow-type     : ICMP-local
Min-TTL       : 0
Slice         : RAWIP4_FM
Flags         : 0x20 (in Pre-IFIB)
Location      : (drop)
Element References
location / count / scope
* / 3 / LOCAL
```

This table describes the significant fields shown in the display.

Table 4: show lpts flows Command Field Descriptions

Field	Description
L3-proto	Layer 3 protocol (IPv4, IPv6, CLNL).
L4-proto	Layer 4 protocol (TCP, UDP, and so on).
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local-IP	Local (destination) IP address.
Remote-IP	Remote (source) IP address.
Pkt-Type	ICMP or IGMP packet type.
Remote-Port	Remote (source) TCP or UDP port.
Interface	Ingress interface.
Flow-type	Flow classification for hardware packet policing.
Min-TTL	Minimum time-to-live value expected from in the incoming packet. Any packet received with a lower TTL value will be dropped.
Slice	IFIB slice.
Flags	<ul style="list-style-type: none"> • Has FGID: Delivered to multiple destinations. • No IFIB entry: IFIB entry suppressed. • Retrying FGID allocation. • In Pre-IFIB: Entry is in Pre-IFIB as well. • Deliver to one: If multiple bindings, will deliver to only one.
Location	<i>rack/slot/module</i> to deliver to.
Element References	<ul style="list-style-type: none"> • location: <i>rack/slot/module</i> of client. • count: number of clients at that location. • scope: binding scope (LR:Logical Router, LOCAL:Local).

The following sample output is from the **show lpts flows brief** command:

```
RP/0/RP0/CPU0:router# show lpts flows brief
+ - Additional delivery destination; L - Local interest; P - In Pre-IFIB

L3   L4   VRF-ID   Local, Remote Address.Port   Interface   Location   LP
-----
IPV4 ICMP *       any.ECHO any                           any         (drop)    LP
IPV4 ICMP *       any.TSTAMP any                           any         (drop)    LP
IPV4 ICMP *       any.MASKREQ any                           any         (drop)    LP
IPV6 ICMP6 *      any.ECHOREQ any                           any         (drop)    LP
IPV4 any  default  224.0.0.2 any                           Gi0/1/0/1   0/5/CPU0  P
```

This table describes the significant fields shown in the display.

Table 5: show lpts flows brief Command Field Descriptions

Field	Description
L3	Layer 3 protocol (IPv4, IPv6, CLNL).
L4	Layer 4 protocol.
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Local, Remote Address.Port	Local (destination) and remote (source) IP addresses and TCP or UDP ports, or ICMP/IGMP packet types, or IPsec Security Parameters Indices.
Interface	Ingress interface.
Location	Delivery location: <ul style="list-style-type: none"> • <i>rack/slot/module</i>—Individual location. • [0xNNNNN]—Multiple locations (platform-dependent value). • (drop)—Do not deliver to any application.
LP	Local interest (to be processed by IPv4 or IPv6 stack directly) or entry is resident in Pre-IFIB.

show lpts ifib

To display the entries in the Internal Forwarding Information Base (IFIB), use the **show lpts ifib** command in XR EXEC mode.

```
show lpts ifib [entry] [{type
{bgp4|bgp6|isis|mcast4|mcast6|ospf-mc4|ospf-mc6|ospf4|ospf6|raw4|raw6|tcp4|tcp6|udp4|udp6}|all}]
[brief [statistics]] [slices] [times] [location node-id]
```

Syntax Description	
entry	(Optional) Displays the IFIB entries.
type	(Optional) Displays the following protocol types. <ul style="list-style-type: none"> • bgp4 —IPv4 Border Gateway Protocol (BGP) slice • bgp6 —IPv6 BGP slice • isis —Intermediate System-to-Intermediate System (IS-IS) slice • mcast4 —IPv4 multicast slice • mcast6 —IPv6 multicast slice • ospf-mc4 —IPv4 Open Shortest Path First (OSPF) multicast slice • ospf-mc6 —IPv6 OSPF multicast slice • ospf4 —IPv4 OSPF slice • ospf6 —IPv6 OSPF slice • raw4 —IPv4 raw IP • raw6 —IPv6 raw IP • tcp4 —IPv4 Transmission Control Protocol (TCP) slice • tcp6 —IPv6 TCP slice • udp4 —IPv4 UDP slice • udp6 —IPv6 UDP slice
all	Displays all IFIB types.
brief	(Optional) Displays the IFIB entries in brief format.
statistics	(Optional) Displays the IFIB table with statistics information.
slices	(Optional) Displays IFIB slices.
times	(Optional) Displays the IFIB update transaction times.
location <i>node-id</i>	(Optional) Specifies the location of the Flow Manager. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History

Release	Modification
6.0	This command was introduced.

Usage Guidelines

Use this command to display detailed information about the entries in an IFIB slice. This command is useful for debugging problems with delivering packets to applications.

When the **statistics** keyword is used, detailed statistics are displayed for packet count, number of entries in each slice, and a total entries count.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib** command:

```
RP/0/RP0/CPU0:router# show lpts ifib

O - Opcode; A - Accept Counter; D - Drop Counter; F - Flow Type; L - Listener Tag;
I - Local Flag; Y - SYN; T - Min TTL; DV - Deliver; DP - Drop; RE - Reassemble; na - Not
Applicable
-----
VRF-ID          : default (0x60000000)
Port/Type       : any
Source Port     : any
Dest IP        : any
Source IP       : any
Layer 4        : 88 (88)
Interface      : any (0x0)
O/A/D/F/L/I/Y/T : DELIVER/0/0/IPv4_STACK/0/0/0
Deliver List   : 0/5/CPU0
-----
```

This table describes the significant fields shown in the display.

Table 6: show lpts ifib entries Command Field Descriptions

Field	Description
VRF-ID	VPN routing and forwarding (VRF) identification (vrfid) number.
Port/Type	Destination (local) TCP or UDP port number, or ICMP/IGMP packet type, or IPsec Security Parameters Index.t222
Source Port	Source (remote) TCP or UDP port.
Dest IP	Destination (local) IP address.
Source IP	Source (remote) IP address.
Layer 4	Layer 4 protocol number (6 = TCP). Note Only the common Layer 4 protocol names are displayed.

Field	Description
Interface	Ingress interface name.
O/S/P/R/L/I/Y	<ul style="list-style-type: none"> • O: Opcode (DELIVER, DROP, or REASSEMBLE) • S: Stats counter • P: Packet forwarding priority (LO, MED, or HIGH) • R: Rate limit (LO, MED, or HIGH) • L: Listener tag (IPv4_STACK, IPv6_STACK, or CLNL_STACK) • I: Local-interest flag (0 or 1) • Y: TCP SYN flag (0 or 1)
Deliver List	<ul style="list-style-type: none"> • (drop)—Drop packet • <i>rack/slot/module</i>—Deliver to single destination • [0xNNNN]—Deliver to multiple destinations (platform-dependent format)

The following sample output is from the **show lpts ifib brief** command:

```
RP/0/RP0/CPU0:router# show lpts ifib brief
```

```

Slice      Local, Remote Address.Port      L4      Interface      Dlvr
-----
TCP4       any.7 any                          TCP     any             0/RP1/CPU0
TCP4       any.9 any                          TCP     any             0/RP1/CPU0

```

The following sample output is from the **show lpts ifib brief statistics** command:

```
RP/0/RP0/CPU0:router# show lpts ifib brief statistics
```

```

Slice      Local, Remote Address.Port      L4      Interface      Accept/Drop
-----
TCP4       any.7 any                          TCP     any             0/0
TCP4       any.9 any                          TCP     any             0/0
TCP4       any.19 any                         TCP     any             0/0

Slice      Num. Entries Accepts/Drops
-----
TCP4       3              0/0
Total     3              0/0

```

show lpts ifib slices

To display Internal Forwarding Information Base (IFIB) slice information, use the **show lpts ifib slices** command in XR EXEC mode.

```
show lpts ifib slices [type
{bgp4|bgp6|isis|mcast4|mcast6|ospf-mc4|ospf-mc6|ospf4|ospf6|raw4|raw6|tcp4|tcp6|udp4|udp6}] [all]
[statistics] [times]
```

Syntax Description	type	(Optional) Enter protocol types.
		<ul style="list-style-type: none"> • bgp4 —IPv4 Border Gateway Protocol (BGP) slice • bgp6 —IPv6 BGP slice • isis —Intermediate System-to-Intermediate System (IS-IS) slice • mcast4 —IPv4 multicast slice • mcast6 —IPv6 multicast slice • ospf-mc4 —IPv4 Open Shortest Path First (OSPF) multicast slice • ospf-mc6 —IPv6 OSPF multicast slice • ospf4 —IPv4 OSPF slice • ospf6 —IPv6 OSPF slice • raw4 —IPv4 raw IP • raw6 —IPv6 raw IP • tcp4 —IPv4 Transmission Control Protocol (TCP) slice • tcp6 —IPv6 TCP slice • udp4 —IPv4 UDP slice • udp6 —IPv6 UDP slice
	all	(Optional) Displays all entries.
	statistics	(Optional) Displays the statistics for slice lookups.
	times	(Optional) Displays the IFIB update transaction times.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show lpts ifib slices** command when troubleshooting IFIB entries and slice assignments. This command is especially useful when troubleshooting problems with delivering packets to applications.

Task ID	Task ID	Operations
	lpts	read

Examples

The following sample output is from the **show lpts ifib slices** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices
```

Slice	L3	L4	Port	Location
RAWIP4	IPV4	any	any	0/RP0/CPU0
RAWIP6	IPV6	any	any	0/RP0/CPU0
OSPF4	IPV4	OSPF	any	0/RP0/CPU0
OSPF6	IPV6	OSPF	any	0/RP0/CPU0
OSPF_MC4	IPV4	any	any	0/RP0/CPU0
OSPF_MC6	IPV6	any	any	0/RP0/CPU0
BGP4	IPV4	TCP	179	0/RP0/CPU0
BGP6	IPV6	TCP	179	0/RP0/CPU0
UDP4	IPV4	UDP	any	0/RP0/CPU0
UDP6	IPV6	UDP	any	0/RP0/CPU0
TCP4	IPV4	TCP	any	0/RP0/CPU0
TCP6	IPV6	TCP	any	0/RP0/CPU0
ISIS	CLNS	-	any	0/RP0/CPU0
MCAST4	IPV4	any	any	0/RP0/CPU0
MCAST6	IPV6	any	any	0/RP0/CPU0

The following sample output is from the **show lpts ifib slices times** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices times
```

Slice	L3	L4	Port	Location
RAWIP4	IPV4	any	any	0/RP0/CPU0
RAWIP6	IPV6	any	any	0/RP0/CPU0
OSPF4	IPV4	OSPF	any	0/RP0/CPU0
OSPF6	IPV6	OSPF	any	0/RP0/CPU0
OSPF_MC4	IPV4	any	any	0/RP0/CPU0
OSPF_MC6	IPV6	any	any	0/RP0/CPU0
BGP4	IPV4	TCP	179	0/RP0/CPU0
BGP6	IPV6	TCP	179	0/RP0/CPU0
UDP4	IPV4	UDP	any	0/RP0/CPU0
UDP6	IPV6	UDP	any	0/RP0/CPU0
TCP4	IPV4	TCP	any	0/RP0/CPU0
TCP6	IPV6	TCP	any	0/RP0/CPU0
ISIS	CLNS	-	any	0/RP0/CPU0
MCAST4	IPV4	any	any	0/RP0/CPU0
MCAST6	IPV6	any	any	0/RP0/CPU0

Flow Manager 0/RP0/CPU0:
total:5 tx 13 upd 1/-/1ms/tx

The following sample output is from the **show lpts ifib slices statistics** command:

```
RP/0/RP0/CPU0:router# show lpts ifib slices all statistics
```

Slice	L3	L4	Port	Location	Lookups	RmtDlvr	Rejects	RLDrops	NoEntry
-------	----	----	------	----------	---------	---------	---------	---------	---------

```

-----
RAWIP4  IPV4  any   any   0/0/CPU0  5     0     0     0     0
RAWIP6  IPV6  any   any   0/0/CPU0  0     0     0     0     0
OSPF4   IPV4  OSPF  any   0/0/CPU0  0     0     0     0     0
OSPF6   IPV6  OSPF  any   0/0/CPU0  0     0     0     0     0
OSPF_MC4 IPV4  any   any   0/0/CPU0  0     0     0     0     0
OSPF_MC6 IPV6  any   any   0/0/CPU0  0     0     0     0     0
BGP4    IPV4  TCP   179   0/0/CPU0  0     0     0     0     0
BGP6    IPV6  TCP   179   0/0/CPU0  0     0     0     0     0

UDP4    IPV4  UDP   any   0/0/CPU0  3704  0     979   0     0
UDP6    IPV6  UDP   any   0/0/CPU0  0     0     0     0     0
TCP4    IPV4  TCP   any   0/0/CPU0  0     0     0     0     0
TCP6    IPV6  TCP   any   0/0/CPU0  0     0     0     0     0
ISIS    CLNS  -     any   0/0/CPU0  0     0     0     0     0
MCAST4  IPV4  any   any   0/0/CPU0  0     0     0     0     0
MCAST6  IPV6  any   any   0/0/CPU0  0     0     0     0     0
  Flow Manager 0/0/CPU0:
  Packets in: 3792
  Packets delivered locally without lookups: 83
  Slice lookups: 3709
  Rejects: 979

```

This table describes the significant fields shown in the display.

Table 7: show lpts ifib slices statistics Command Field Descriptions

Field	Description
Slice	Slice number.
L3-proto	Layer 3 protocol (IPv4, IPv6, CLNL).
L4-proto	Layer 4 protocol (TCP, UDP, and others).
Port	Local (destination) TCP or UDP port.
Location	Node location, in the format <i>rack/slot/module</i> .

show lpts ifib statistics

To display Internal Forwarding Information Base (IFIB) statistics, use the **show lpts ifib statistics** command in .

```
show lpts ifib statistics [location node-id]
```

Syntax Description

location node-id (Optional) Displays IFIB statistics for the designated node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts ifib statistics** command:

```
RP/0/# show lpts ifib statistics

Flow Manager 0/RP0/CPU0:
  Packets in:254
  Packets delivered locally without lookups:0
  Slice lookups:254
    Post-lookup error drops:
      Failed ipv4_netio_input:1
    Rejects:254
  Packets delivered locally:0
  Packets delivered remotely:0
```

This table describes the significant fields shown in the display.

Table 8: show lpts ifib statistics Command Field Descriptions

Field	Description
Packets in	Packets presented to the LPTS decaps node in netio.
Packets delivered locally without lookups	Packets previously resolved on a LC delivered directly to L3.
Slice lookups	Packets requiring slice lookups.

Field	Description
Post-lookup error drops	Packets dropped after a slice lookup.
Rejects	Packets that caused a TCP RST or ICMP Port/Protocol Unreachable.
Packets delivered locally	Packets delivered to local applications after slice lookups.
Packets delivered remotely	Packets delivered to applications on remote RPs.



Note The sample output is an example only and displays only those fields showing a value. No display exists for nonzero values. This command may show other values depending on your router configuration.

show lpts ifib times

To display Internal Forwarding Information Base (IFIB) update transaction times, use the **show lpts ifib times** command in XR EXEC mode.

```
show lpts ifib times [location node-id]
```

Syntax Description	location node-id (Optional) Displays IFIB update transaction times for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--

Command Modes	XR EXEC mode
----------------------	--------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID	Operations
	lpts	read

Examples The following sample output is from the **show lpts ifib times** command:

```
RP/0/RP0/CPU0:router# show lpts ifib times

Slice   L3   L4   Port  Location
-----
RAWIP4  IPV4 any   any   0/RP1/CPU0
RAWIP6  IPV6 any   any   0/RP1/CPU0
OSPF4   IPV4 OSPF  any   0/RP1/CPU0
OSPF6   IPV6 OSPF  any   0/RP1/CPU0
OSPF_MC4 IPV4 any   any   0/RP1/CPU0
OSPF_MC6 IPV6 any   any   0/RP1/CPU0
BGP4    IPV4 TCP   179   0/RP1/CPU0
BGP6    IPV6 TCP   179   0/RP1/CPU0
UDP4    IPV4 UDP   any   0/RP1/CPU0
UDP6    IPV6 UDP   any   0/RP1/CPU0
TCP4    IPV4 TCP   any   0/RP1/CPU0
TCP6    IPV6 TCP   any   0/RP1/CPU0
ISIS    CLNS -     any   0/RP1/CPU0
MCAST4  IPV4 any   any   0/RP1/CPU0
MCAST6  IPV6 any   any   0/RP1/CPU0
Flow Manager 0/RP0/CPU0:
total:5 tx 13 upd 1/-/lms/tx
```

This table describes the significant fields shown in the display.

Table 9: show lpts ifib times Command Field Descriptions

Field	Description
Slice	Slice number.
L3 Protocol	Layer 3 protocol (IPv4, IPV6, CLNL).
L4 Protocol	Layer 4 protocol (TCP, UDP, and so on).
Port	Local (destination) TCP or UDP port.
Location	Node location, in the format <i>rack/slot/module</i> .

show lpts pifib

To display Pre-Internal Forwarding Information Base (Pre-IFIB) entries, use the **show lpts pifib** command in XR EXEC mode.

```
show lpts pifib [entry] [hardware {entry | police} [type {isis | ipv4 | ipv6} {any} ] [brief] [statistics]
[location node-id]
```

Syntax	Description
entry	(Optional) Pre-IFIB entry.
hardware	(Optional) Displays hardware for Pre-IFIB.
entry	(Optional) Displays the entries for Pre-IFIB.
police	(Optional) Displays the policer values that are being use.
type	(Optional) Protocol type.
isis	(Optional) Intermediate System-to-Intermediate System (IS-IS) sub Pre-IFIB type.
ipv4	(Optional) IPv4 sub Pre-IFIB type. Possible values include frag , ixmp , mcast , tcp , udp , ipsec , and raw .
ipv6	(Optional) IPv6 sub Pre-IFIB type. Possible values include frag , icmp , ixmp , mcast , tcp , udp , ipsec , and raw .
any	Any IPv4 or IPv6 protocol.
brief	(Optional) Pre-IFIB entries in brief format.
statistics	(Optional) Pre-IFIB table with statistics information.
location <i>node-id</i>	(Optional) The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation (for example, 0/7/CPU0).

Command Default By default, all entries are displayed.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show lpts pifib** command with the **brief** keyword to perform the following functions:

- Display entries of all or part of a Pre-IFIB.
- Display a short description of each entry in the LPTS Pre-IFIB, optionally displaying packet counts for each entry.



Note These statistics are used only for packets that are processed by a line card, route processor, or distributed route processor.

Pre-IFIB statistics for packets processed by line card hardware are counted separately.

By default, all the defaults are displayed.

Task ID	Task ID	Operations
	lpts	read

Examples

The following is sample output for the **show lpts pifib** command:

```
RP/0/RP0/CPU0:router# show lpts pifib

O - Opcode; F - Flow Type; L - Listener Tag; I - Local Flag; T - Min TTL;
na - Not Applicable
-----
L3 Protocol      : CLNS
L4 Protocol      : -
VRF-ID           : default (0x60000000)
Destination IP   : any
Source IP        : any
Port/Type        : any
Source Port      : any
Is Fragment      : 0
Is SYN           : 0
Interface        : any (0x0)
O/F/L/I/T       : DELIVER/ISIS-default/CLNS_STACK/0/0
Deliver List     : FGID 11935
Accepts/Drops    : 0/0
Is Stale         : 0
```

The following is sample output for the **show lpts pifib type** command using the **ipv4** and **tcp** keywords.

```
RP/0/RP0/CPU0:router# show lpts pifib type ipv4 tcp

O - Opcode; F - Flow Type; L - Listener Tag; I - Local Flag; T - Min TTL;
na - Not Applicable
-----
L3 Protocol      : IPV4
L4 Protocol      : TCP
VRF-ID           : default (0x60000000)
Destination IP   : any
Source IP        : any
Port/Type        : Port:23
Source Port      : any
Is Fragment      : 0
Is SYN           : 0
Interface        : any (0x0)
O/F/L/I/T       : DELIVER/TELNET-default/IPv4_LISTENER/0/0
Deliver List     : 0/RP0
```



```
/CPU0
Accepts/Drops      : 0/0
Is Stale           : 0
-----
```

The following is sample output from the **show lpts pifib** command with the **entry** and **brief** keywords added command:

```
RP/0/RP0/CPU0:router# show lpts pifib entry brief
```

```
* - Critical Flow; I - Local Interest;
X - Drop; R - Reassemble;
```

Type	VRF-ID	Local, Remote Address.Port	L4	Interface	Deliver
ISIS	*	- -	-	any	0/0/CPU0
IPv4_frag	*	any any	any	any	R
IPv4_IXMP	*	any.ECHO any	ICMP	any	XI
IPv4_IXMP	*	any.TSTAMP any	ICMP	any	XI
IPv4_IXMP	*	any.MASKREQ any	ICMP	any	XI
IPv4_IXMP	*	any any	ICMP	any	0/0/CPU0
IPv4_IXMP	*	any any	IGMP	any	0/0/CPU0
IPv4_mcast	*	224.0.0.5 any	any	any	0/0/CPU0
IPv4_mcast	*	224.0.0.6 any	any	any	0/0/CPU0
IPv4_mcast	*	224.0.0.0/4 any	any	any	0/0/CPU0
IPv4_TCP	*	any.179 any	TCP	any	0/0/CPU0
IPv4_TCP	*	any any.179	TCP	any	0/0/CPU0
IPv4_TCP	*	any any	TCP	any	0/0/CPU0
IPv4_UDP	*	any any	UDP	any	0/0/CPU0
IPv4_IPsec	*	any any	ESP	any	0/0/CPU0
IPv4_IPsec	*	any any	AH	any	0/0/CPU0
IPv4_rawIP	*	any any	OSPF	any	0/0/CPU0
IPv4_rawIP	*	any any	any	any	0/0/CPU0
IPv6_frag	*	any any	any	any	R
IPv6_ICMP	*	any.na any	ICMP6	any	XI
IPv6_ICMP	*	any any	ICMP6	any	0/0/CPU0
IPv6_mcast	*	ff02::5 any	any	any	0/0/CPU0
IPv6_mcast	*	ff02::6 any	any	any	0/0/CPU0
IPv6_mcast	*	ff00::/8 any	any	any	0/0/CPU0
IPv6_TCP	*	any.179 any	TCP	any	0/0/CPU0
IPv6_TCP	*	any any.179	TCP	any	0/0/CPU0
IPv6_TCP	*	any any	TCP	any	0/0/CPU0
IPv6_UDP	*	any any	UDP	any	0/0/CPU0
IPv6_IPsec	*	any any	ESP	any	0/0/CPU0
IPv6_IPsec	*	any any	AH	any	0/0/CPU0
IPv6_rawIP	*	any any	OSPF	any	0/0/CPU0
IPv6_rawIP	*	any any	any	any	0/0/CPU0

The following sample output is from the **show lpts pifib** command with the **entry**, **brief**, and **entry brief statistics** keywords added:

```
RP/0/RP0/CPU0:router# show lpts pifib entry brief statistics
```

```
* - Critical Flow; I - Local Interest;
X - Drop; R - Reassemble;
```

Type	VRF-ID	Local, Remote Address.Port	L4	Interface	Accepts/Drops
------	--------	----------------------------	----	-----------	---------------

```

-----
ISIS          *          - -          -          any          0/0
IPv4_frag     *          any any          any any          0/0
IPv4_IXMP     *          any.ECHO any    ICMP any          0/0
IPv4_IXMP     *          any.TSTAMP any  ICMP any          0/0
IPv4_IXMP     *          any.MASKREQ any ICMP any          0/0
IPv4_IXMP     *          any any          ICMP any          5/0
IPv4_IXMP     *          any any          IGMP any          0/0
IPv4_mcast    *          224.0.0.5 any    any any          0/0
IPv4_mcast    *          224.0.0.6 any    any any          0/0
IPv4_mcast    *          224.0.0.0/4 any  any any          0/0
IPv4_TCP      *          any.179 any      TCP any          0/0
IPv4_TCP      *          any any.179      TCP any          0/0
IPv4_TCP      *          any any          TCP any          0/0
IPv4_UDP      *          any any          UDP any          4152/0
IPv4_IPsec    *          any any          ESP any          0/0
IPv4_IPsec    *          any any          AH  any          0/0
IPv4_rawIP    *          any any          OSPF any         0/0
-----

```

statistics:

Type	Num. Entries	Accepts/Drops
-----	-----	-----
ISIS	1	0/0
IPv4_frag	1	0/0
IPv4_IXMP	5	5/0
IPv4_mcast	3	0/0
IPv4_TCP	3	0/0
IPv4_UDP	1	4175/0
IPv4_IPsec	2	0/0
IPv4_rawIP	2	0/0
IPv6_frag	1	0/0
IPv6_ICMP	2	0/0
IPv6_mcast	3	0/0
IPv6_TCP	3	0/0
IPv6_UDP	1	0/0
IPv6_IPsec	2	0/0
IPv6_rawIP	2	0/0
Total	32	

```

Packets into Pre-IFIB: 4263
Lookups: 4263
Packets delivered locally: 4263
Packets delivered remotely: 0

```

This table describes the significant fields shown in the display for the **show lpts pifib** command with the **brief** and **statistics** keywords .

Table 10: show lpts pifib Command Field Descriptions

Field	Description
Type	Hardware entry type.
VRF ID	VPN routing and forwarding (VRF) identification (vrfid) number.

Field	Description
Local, Remote Address, Port	Indicates local address (in the form of local port and type) and remote address (remote port).
L4	Layer 4 protocol of the entry.
Interface	Interface for this entry.
Accepts/Drops	Number of packets sent to DestAddr/Number of packets dropped due to policing.
Num. Entries	Number of pre-ifib entries of the listed type.
Packets into Pre-IFIB	Packets presented for pre-IFIB lookups.
Lookups	Packets looked up.
Packets delivered locally	Packets delivered to local applications or the local stack (<i>n</i> duplicated) packets duplicated for delivery to applications and the local stack.
Packets delivered remotely	Packets delivered to applications or for lookup on other RPs.

show lpts pifib hardware police

To display the policer configuration value set, use the **show lpts pifib hardware police** command in XR EXEC mode.

show lpts pifib hardware police [**location** {*allnode-id*}]

Syntax Description	location	<i>node-id</i>	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
	all		Specifies all locations.

Command Default If no policer is configured, the default value is the configured rate.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	lpts	read

Examples This sample output is from the **show lpts pifib hardware police** command with the **location** keyword for 0/RP0/CPU0:

```
RP/0/RP0/CPU0:router#show lpts pifib hardware police location 0/RP0/CPU0
```

```
-----
Node 0/RP0/CPU0:
-----
Burst = 100ms for all flow types
-----
```

FlowType	Policer	Type	Cur. Rate	Def. Rate	Accepted	Dropped
unconfigured-default	100	Static	500	500	0	0
Fragment	106	Static	1000	1000	0	0
OSPF-mc-known	107	Static	20000	20000	0	0
OSPF-mc-default	111	Static	5000	5000	0	0
OSPF-uc-known	161	Static	5000	5000	0	0
OSPF-uc-default	162	Static	1000	1000	0	0
ISIS-known	108	Static	20000	20000	0	0
ISIS-default	112	Static	5000	5000	0	0
BFD-known	170	Static	8500	8500	0	0
BFD-default	171	Static	8500	8500	0	0

BFD-MP-known	177	Static	8400	8400	0	0
BFD-MP-0	178	Static	128	128	0	0
BGP-known	113	Static	25000	25000	0	0
BGP-cfg-peer	114	Static	10000	10000	0	0
BGP-default	115	Static	1500	1500	0	0
PIM-mcast-default	116	Static	23000	23000	0	0
PIM-mcast-known	176	Static	23000	23000	0	0
PIM-ucast	117	Static	10000	10000	0	0
IGMP	118	Static	3500	3500	0	0
ICMP-local	119	Static	2500	2500	0	0
ICMP-app	120	Static	2500	2500	0	0
ICMP-control	164	Static	2500	2500	0	0
ICMP-default	121	Static	2500	2500	0	0
LDP-TCP-known	122	Static	25000	25000	0	0
LDP-TCP-cfg-peer	152	Static	10000	10000	0	0
LDP-TCP-default	154	Static	10000	10000	0	0
LDP-UDP	158	Static	2500	2500	0	0
All-routers	160	Static	10000	10000	0	0
LMP-TCP-known	123	Static	25000	25000	0	0
LMP-TCP-cfg-peer	153	Static	10000	10000	0	0
LMP-TCP-default	155	Static	10000	10000	0	0
LMP-UDP	159	Static	2500	2500	0	0
RSVP-UDP	124	Static	7000	7000	0	0
RSVP-default	125	Static	500	500	0	0
RSVP-known	126	Static	7000	7000	0	0
IKE	127	Static	1000	1000	0	0
IPSEC-known	129	Static	3000	3000	0	0
IPSEC-default	128	Static	1000	1000	0	0
MSDP-known	130	Static	1000	1000	0	0
MSDP-cfg-peer	131	Static	1000	1000	0	0
MSDP-default	132	Static	1000	1000	0	0
SNMP	133	Static	2000	2000	0	0
SSH-known	135	Static	1000	1000	0	0
SSH-default	136	Static	1000	1000	0	0
HTTP-known	137	Static	1000	1000	0	0
HTTP-default	138	Static	1000	1000	0	0
SHTTP-known	139	Static	1000	1000	0	0
IFIB_FT_SHTTP_DEFAULT	140	Static	1000	1000	0	0
TELNET-known	141	Static	1000	1000	0	0
TELNET-default	142	Static	1000	1000	0	0
CSS-known	143	Static	1000	1000	0	0
CSS-default	144	Static	1000	1000	0	0
RSH-known	145	Static	1000	1000	0	0
RSH-default	146	Static	1000	1000	0	0
UDP-known	147	Static	25000	25000	0	0
UDP-listen	156	Static	4000	4000	0	0
UDP-cfg-peer	157	Static	4000	4000	0	0
UDP-default	101	Static	500	500	0	0
TCP-known	148	Static	25000	25000	0	0
TCP-listen	149	Static	25000	25000	0	0
TCP-cfg-peer	150	Static	25000	25000	0	0
TCP-default	102	Static	500	500	0	0
Mcast-known	151	Static	25000	25000	0	0
Mcast-default	103	Static	500	500	0	0
Raw-listen	104	Static	500	500	0	0
Raw-default	105	Static	500	500	0	0
Ip-Sla	163	Static	10000	10000	0	0
RIP	110	Static	20000	20000	0	0
L2TPv3	165	Static	25000	25000	0	0
PCEP	166	Static	100	100	0	0
GRE	167	Static	1000	1000	0	0
VRRP	168	Static	1000	1000	0	0
HSRP	169	Static	400	400	0	0
MPLS-oam	172	Static	100	100	0	0

```

L2TPv2                179      Static  25000   25000   0       0
DNS                    173      Static   500     500     0       0
RADIUS                 174      Static  7000    7000    0       0
TACACS                 175      Static   500     500     0       0
NTP-default            134      Static   500     500     0       0
NTP-known              180      Static   500     500     0       0

```

```

-----
statistics:
Packets accepted by deleted entries: 0
Packets dropped by deleted entries: 0
Run out of statistics counter errors: 0

```

This table describes the significant fields shown in the display.

Table 11: show lpts pifib hardware police Command Field Descriptions

Field	Description
FlowType	Type of flow that is binding between a tuple and a destination.
Policer	Policer Values in PPS
Rate (PPS)	Policer rate in packets per second (PPS).
Accept	Number of packets that are accepted by this policer.
Drop	Number of packets that are dropped by this policer.

show lpts pifib hardware usage

To display hardware table usage, use the **show lpts pifib hardware usage** command in XR EXEC mode.

```
show lpts pifib hardware usage [type {ipv4|ipv6|isis}] [location {node-id|all}]
```

Syntax Description

type	(Optional) Specifies the hardware entry type. Enter one of the following types: <ul style="list-style-type: none"> • ipv4 —Specifies IPv4 entries. • ipv6 —Specifies IPv6 entries. • isis —Specifies ISIS entries.
location node-id	(Optional) Displays pre-Internal Forwarding Information Base (IFIB) information for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
all	(Optional) Specifies all locations.

Command Default

Without the optional parameters, the **show lpts pifib hardware usage** command displays a brief summary of hardware entry information.

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
lpts	read

Examples

The following sample output is from the **show lpts pifib hardware usage** command with the **location** keyword:

```
RP/0/RP0/CPU0:router# show lpts pifib hardware usage location 0/RP0/cpu0
```

Type	Size	Used	Used (%)
ipv4	6000	21	0.35
ipv6	4000	15	0.38
isis	4000	1	0.03

This table describes the significant fields shown in the display.

Table 12: show lpts pifib hardware usage Command Field Descriptions

Field	Description
Type	Type of pre-IFIB entry.
Size	Maximum number of entries (72-bits) allowed for the type.
Used	Number of entries in use.
Used(%)	Percentage of total entries in use.

show lpts pifib statistics

To display Pre-Internal Forwarding Information Base (Pre-IFIB) statistics, use the **show lpts ifib statistics** command in XR EXEC mode.

```
show lpts pifib statistics [location node-id]
```

Syntax Description	location node-id (Optional) Displays Pre-IFIB statistics for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
---------------------------	--

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	XR EXEC mode
----------------------	--------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID	Operations
	lpts	read

Examples

The following sample output is from the **show lpts pifib statistics** command:

```
RP/0/RP0/CPU0:router# show lpts pifib statistics

Packets into Pre-IFIB:80
Lookups:80
Packets delivered locally:80
Packets delivered remotely:0
```

This table describes the significant fields shown in the display.

Table 13: show lpts pifib statistics Command Field Descriptions

Field	Description
Packets into Pre-IFIB	Packets presented for pre-IFIB lookups.
Lookups	Packets looked up.
Packets delivered locally	Packets delivered to local applications or the local stack (<i>n</i> duplicated) packets duplicated for delivery to applications and the local stack.
Packets delivered remotely	Packets delivered to applications or for lookup on other RPs.

show lpts port-arbitrator statistics

To display local packet transport services (LPTS) port arbitrator statistics, use the **show lpts port-arbitrator statistics** command in XR EXEC mode.

show lpts port-arbitrator statistics

Syntax Description This command has no keywords or arguments.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	lpts	read

Examples

The following sample output is from the **show lpts port-arbitrator statistics** command:

```
RP/0/RP0/CPU0:router# show lpts port-arbitrator statistics
```

```
LPTS Port Arbitrator statistics:
PA FGID-DB library statistics:
 0 FGIDs in use, 512 cached, 0 pending retries
 0 free allocation slots, 0 internal errors, 0 retry attempts
 1 FGID-DB notify callback, 0 FGID-DB errors returned
FGID-DB permit mask: 0x7 (alloc mark rack0)
PA API calls:
   1 init                1 realloc_done
   8 alloc                8 free
  16 join                16 leave
   8 detach
FGID-DB API calls:
   1 register            1 clear_old
   1 alloc                0 free
  16 join                16 leave
   0 mark                1 mark_done
```