

Chapter 17

Summary of Link Services Configuration Statements

The following sections explain each of the link services statements. The statements are organized alphabetically.

acknowledge-retries

Syntax	<code>acknowledge-retries <i>number</i>;</code>
Hierarchy Level	[edit interfaces <i>ls-fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	For link services interfaces only, configure the number of retransmission attempts to be made for consecutive hello or remove link messages following the expiration of the acknowledgement timer.
Options	<i>number</i> —Number of retransmission attempts to be made following the expiration of the acknowledgement timer. Range: 1 through 5 Default: 2
Usage Guidelines	See “Configure Link Services Acknowledgment Timers” on page 189.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	action-red-differential-delay on page 208, hello-timer on page 214

acknowledge-timer

- Syntax** acknowledge-timer *milliseconds*;
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, configure the maximum time, in milliseconds, to wait for an add link acknowledgement, hello acknowledgement, or remove link acknowledgement message.
- Options** *milliseconds*—Time, in milliseconds, to wait for an add link acknowledgement, hello acknowledgement, or remove link acknowledgement message.
Range: 1 through 10 milliseconds
Default: 4 milliseconds
- Usage Guidelines** See “Configure Link Services Acknowledgment Timers” on page 189.
- Required Privilege Level** interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.
- See Also** address on page 209, hello-timer on page 214

action-red-differential-delay

- Syntax** action-red-differential-delay (disable-tx | remove-link);
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, configure the action to be taken when the differential delay exceeds the red limit.
- Options** disable-tx—Disable transmission on the bundle link.
 remove-link—Remove bundle link from service.
Default: disable-tx
- Usage Guidelines** See “Configure Link Services Differential Delay” on page 189.
- Required Privilege Level** interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.
- See Also** yellow-differential-delay on page 222

address

Syntax	address <i>address</i> { destination <i>address</i> ; } }
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i>]
Description	Configure the interface address.
Options	<i>address</i> —Address of the interface. The remaining statements are explained separately.
Usage Guidelines	See “Configure Multilink and Link Services Logical Interface Properties” on page 181; for general discussion of address statement options, see <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	<i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> for other statements that do not affect services interfaces.

bundle

Syntax	bundle (<i>ml-fpc/pic/port</i> <i>ls-fpc/pic/port</i>);
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>mlfr-end-to-end</i>], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>mlfr-uni-nni</i>]
Description	Associate the multilink interface with the logical interface it is joining.
Options	<i>ml-fpc/pic/port</i> —Name of the multilink interface you are linking. <i>ls-fpc/pic/port</i> —Name of the link services interface you are linking.
Usage Guidelines	See “Configure Multilink and Link Services Bundles” on page 192.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

destination

Syntax	destination <i>destination-address</i> ;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i>]
Description	For point-to-point interfaces only, specify the address of the interface at the remote end of the connection.
Options	<i>destination-address</i> —Address of the remote side of the connection.
Usage Guidelines	See “Configure Multilink and Link Services Logical Interface Properties” on page 181.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

dlci

Syntax	dlci <i>dlci-identifier</i> ;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]
Description	For Frame Relay and Multilink Frame Relay UNI NNI encapsulation only, and for link services and point-to-point interfaces only, configure the data-link connection identifier (DLCI) for a permanent virtual circuit (PVC) or an switched virtual circuit (SVC). To configure a DLCI for a point-to-multipoint interface, use the multipoint-destination statement to specify the DLCI.
Options	<i>dlci-identifier</i> —Data-link connection identifier. Range: 16 through 1022
Usage Guidelines	See “Configure a Link Services Multicast-Capable DLCI” on page 183; for general information about Frame Relay DLCIs, see <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

drop-timeout

Syntax	drop-timeout <i>milliseconds</i> ;
Hierarchy Level	[edit interfaces (ml-fpc/pic/port ls-fpc/pic/port) unit logical-unit-number], [edit interfaces ls-fpc/pic/port:channel mlfr-uni-nni-bundle-options]
Description	For multilink and link services interfaces only, configure the drop timeout period, in milliseconds.
Options	<i>milliseconds</i> —Drop timeout period. Range: 0 through 2000 milliseconds Default: 0 ms (disabled)
Usage Guidelines	See “Configure a Multilink and Link Services Drop Timeout Period” on page 183.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

encapsulation

encapsulation (logical interface)

Syntax	encapsulation (atm-mlppp-llc multilink-frame-relay-end-to-end multilink-ppp ...);
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]
Description	Logical link-layer encapsulation type.
Options	<p>atm-mlppp-llc—For ATM 2 interfaces, use Multilink Point-to-Point Protocol (MLPPP) over ATM Adaptation Layer 5 (AAL5) logical link control (LLC) encapsulation, as described in RFC 2364.</p> <p>multilink-frame-relay-end-to-end—Use Multilink Frame Relay (MLFR) FRF.15 encapsulation. This encapsulation is used only on multilink and link services interfaces and their constituent T1 or E1 interfaces.</p> <p>multilink-ppp—Use Multilink Point-to-Point Protocol (MLPPP) encapsulation. This encapsulation is used only on multilink and link services interfaces and their constituent T1 or E1 interfaces.</p>
Usage Guidelines	See “Configure Multilink and Link Services Logical Interface Encapsulation” on page 184; for information about encapsulation statement options not used with services interfaces, see <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

encapsulation (physical interface)

Syntax	encapsulation (multilink-frame-relay-uni-nni ...);
Hierarchy Level	[edit interfaces <i>interface-name</i>]
Description	Physical link-layer encapsulation type.
Options	multilink-frame-relay-uni-nni—Use Multilink Frame Relay (MLFR) UNI NNI encapsulation. This encapsulation is used only on link services interfaces functioning as FRF.16 bundles and their constituent T1 or E1 interfaces.
Default	MLFR UNI NNI encapsulation (on link services interfaces).
Usage Guidelines	See “Configure Link Services Physical Interface Encapsulation” on page 188; for information about encapsulation statement options not used with services interfaces, see <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

family

Syntax	<pre>family inet { address <i>address</i> { destination <i>address</i>; } }</pre>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]
Description	Configure protocol family information for the logical interface.
Options	<p><i>family</i>—Protocol family:</p> <ul style="list-style-type: none"> ccc—Circuit cross-connect protocol suite inet—Internet Protocol version 4 suite inet6—Internet Protocol version 6 suite iso—OSI ISO protocol suite mlfr-end-to-end—Multilink Frame Relay FRF.15 mlfr-uni-nni—Multilink Frame Relay FRF.16 multilink-ppp—Multilink Point-to-Point Protocol mpls—Multiprotocol Label Switching tcc—Translational Cross Connect protocol suite tnp—Trivial Network Protocol vpls—Virtual Private LAN Service <p>The remaining statements are explained separately.</p>
Usage Guidelines	See “Configure Multilink and Link Services Interfaces” on page 179; for general discussion of family statement options, see <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
See Also	<i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> for other statements that do not affect services interfaces.

fragment-threshold

Syntax	fragment-threshold <i>bytes</i> ;
Hierarchy Level	[edit interfaces (ml-fpc/pic/port ls-fpc/pic/port) unit logical-unit-number], [edit interfaces ls-fpc/pic/port:channel mlfr-uni-nni-bundle-options]
Description	For multilink and link services interfaces only, set the fragmentation threshold, in bytes.
Options	<i>bytes</i> —Maximum size, in bytes, for multilink packet fragments. Any non-zero value must be a multiple of 64 bytes. Range: 128 through 16,320 bytes Default: 0 bytes (no fragmentation)
Usage Guidelines	See “Configure a Multilink and Link Services Fragmentation Threshold” on page 185.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

hello-timer

Syntax	hello-timer <i>milliseconds</i> ;
Hierarchy Level	[edit interfaces ls-fpc/pic/port:channel mlfr-uni-nni-bundle-options]
Description	For link services interfaces only, configure the rate at which hello messages are sent. A hello message is transmitted after a period defined in milliseconds has elapsed.
Options	<i>milliseconds</i> —The rate at which hello messages are sent. Range: 1 through 180 milliseconds Default: 10 milliseconds
Usage Guidelines	See “Configure Link Services Acknowledgment Timers” on page 189.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	address on page 209, acknowledge-timer on page 208

interfaces

Syntax	interfaces { ... }
Hierarchy Level	[edit]
Description	Configure interfaces on the router.
Default	The management and internal Ethernet interfaces are automatically configured. You must configure all other interfaces.
Usage Guidelines	See <i>JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

interleave-fragments

Syntax	interleave-fragments;
Hierarchy Level	[edit interfaces <i>ls-fpc/pic/port</i> unit <i>logical-unit-number</i>]
Description	For link services interfaces only, interleave long packets with high-priority packets. Allows small delay-sensitive packets, such as Voice over IP (VoIP) packets, to interleave with long fragmented packets. This minimizes the latency of delay-sensitive packets.
Usage Guidelines	See “Configure Link Services Delay-Sensitive Packet Interleaving” on page 185.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

lmi-type

Syntax	lmi-type (ansi itu);
Hierarchy Level	[edit interfaces <i>ls-fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	Set Frame Relay LMI type.
Options	ansi—Use ANSI T1.167 Annex D LMIs. itu—Use ITU Q933 Annex A LMIs. Default: itu
Usage Guidelines	See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

mlfr-uni-nni-bundle-options

Syntax mlfr-uni-nni-bundle-options {
 acknowledge-retries *number*;
 acknowledge-timer *milliseconds*;
 action-red-differential-delay (disable-tx | remove-link);
 drop-timeout *milliseconds*;
 fragment-threshold *bytes*;
 hello-timer *milliseconds*;
 lmi-type (ansi | itu);
 minimum-links *number*;
 mrru *bytes*;
 n391 *number*;
 n392 *number*;
 n393 *number*;
 red-differential-delay *milliseconds*;
 t391 *seconds*;
 t392 *number*;
 yellow-differential-delay *milliseconds*;
 }

Hierarchy Level [edit interfaces *ls-fpc/pic/port:channel*]

Description Configure link services interface management properties.

The statements are explained separately.

Usage Guidelines See “Configure Link Services Physical Interface Encapsulation” on page 188.

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

minimum-links

Syntax minimum-links *number*;

Hierarchy Level [edit interfaces (ml-fpc/pic/port | ml-fpc/pic/port) unit *logical-unit-number*],
 [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]

Description For multilink or link services interfaces only, set the minimum number of links that must be up for the bundle to be labeled up.

Options *number*—Number of links.
Range: 1 through 8
Default: 1

Usage Guidelines See “Configure Multilink and Link Services Minimum Links” on page 186.

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

mrru

Syntax	mrru <i>bytes</i> ;
Hierarchy Level	[edit interfaces (ml- <i>fpc/pic/port</i> ls- <i>fpc/pic/port</i>) unit <i>logical-unit-number</i>], [edit interfaces ls- <i>fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	For multilink or link services interfaces only, set the maximum received reconstructed unit (MRRU). The MRRU is similar to the MTU, but is specific to multilink interfaces.
Options	<i>bytes</i> —MRRU size. Range: 1500 through 4500 bytes Default: 1504 bytes
Usage Guidelines	See “Configure Multilink and Link Services MRRU” on page 186.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

multicast-dlci

Syntax	multicast-dlci <i>dlci-identifier</i> ;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]
Description	For point-to-multipoint link services interfaces only, enable multicast support on the interface. You can configure multicast support on the interface if the Frame Relay switch performs multicast replication.
Options	<i>dlci-identifier</i> —DLCI identifier, a number from 16 through 1022 that defines the Frame Relay DLCI over which the switch expects to receive multicast packets for replication.
Usage Guidelines	See “Configure a Link Services Multicast-Capable DLCI” on page 183.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

n391

Syntax	n391 <i>number</i> ;
Hierarchy Level	[edit interfaces ls- <i>fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	For link services interfaces only, set the Frame Relay full status polling interval.
Options	<i>number</i> —Number of polling interval. Range: 1 through 255 Default: 6
Usage Guidelines	See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	n392 on page 218, n393 on page 218, t391 on page 219, and t392 on page 220

n392

- Syntax** n392 *number*;
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, set the Frame Relay error threshold, in number of errors.
- Options** *number*—Error threshold.
Range: 1 through 10
Default: 3
- Usage Guidelines** See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
- Required Privilege Level** interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.
- See Also** n391 on page 217, n393 on page 218, t391 on page 219, t392 on page 220

n393

- Syntax** n393 *number*;
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, set the Frame Relay monitored event count.
- Options** *number*—Number of event count.
Range: 1 through 255
Default: 6
- Usage Guidelines** See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
- Required Privilege Level** interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.
- See Also** n391 on page 217, n392 on page 218, t391 on page 219, and t392 on page 220

red-differential-delay

Syntax	red-differential-delay <i>milliseconds</i> ;
Hierarchy Level	[edit interfaces <i>ls-fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	For link services interfaces only, configure the red differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.
Options	<i>milliseconds</i> —Red differential delay threshold. Range: 1 through 2000 milliseconds Default: 10 milliseconds
Usage Guidelines	See “Configure Link Services Differential Delay” on page 189.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	action-red-differential-delay on page 208, yellow-differential-delay on page 222

short-sequence

Syntax	short-sequence;
Hierarchy Level	[edit interfaces (<i>ml-fpc/pic/port</i> <i>ls-fpc/pic/port</i>) unit <i>logical-unit-number</i>]
Description	For multilink interfaces only, set the length of the packet sequence identification number to 12 bits.
Default	If not included in the configuration, the length is set to 24 bits.
Usage Guidelines	See “Configure Multilink and Link Services Sequence Format” on page 187.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

t391

Syntax	t391 <i>seconds</i> ;
Hierarchy Level	[edit interfaces <i>ls-fpc/pic/port:channel</i> mlfr-uni-nni-bundle-options]
Description	For link services interfaces only, set Frame Relay link integrity polling interval.
Options	<i>number</i> —Number of link integrity polling interval. Range: 5 through 30 seconds Default: 10 seconds
Usage Guidelines	See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
See Also	n391 on page 217, n392 on page 218, n393 on page 218, t392 on page 220

t392

- Syntax** t392 *seconds*;
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, set Frame Relay polling verification interval.
- Options** *number*—Number of polling verification interval.
Range: 5 through 30 seconds
Default: 15 seconds
- Usage Guidelines** See “Configure Link Services Keepalive Settings on Frame Relay LMI” on page 190.
- Required Privilege Level** interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.
- See Also** n391 on page 217, n392 on page 218, n393 on page 218, t391 on page 219

unit

Syntax

```

unit logical-unit-number {
  dlc dlci-identifier;
  drop-timeout milliseconds;
  encapsulation type;
  fragment-threshold bytes;
  interleave-fragments;
  minimum-links number;
  mrru bytes;
  multicast-dlc dlci-identifier;
  short-sequence;
  family family {
    address address {
      destination address;
    }
    bundle (ml-fpc/pic/port | ls-fpc/pic/port);
  }
}

```

Hierarchy Level [edit interfaces *interface-name*]

Description Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

Options *logical-unit-number*—Number of the logical unit.
Range: 0 through 16384

The remaining statements are explained separately.

Usage Guidelines See “Configure Multilink and Link Services Interfaces” on page 179; for general discussion of logical interface properties, see *JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service* .

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

See Also *JUNOS Internet Software Configuration Guide: Network Interfaces and Class of Service* for other statements that do not affect services interfaces.

yellow-differential-delay

- Syntax** `yellow-differential-delay milliseconds;`
- Hierarchy Level** [edit interfaces *ls-fpc/pic/port:channel* mlfr-uni-nni-bundle-options]
- Description** For link services interfaces only, configure the yellow differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.
- Options** *milliseconds*—Yellow differential delay threshold.
Range: 1 through 2000 milliseconds
Default: 6 milliseconds
- Usage Guidelines** See “Configure Link Services Differential Delay” on page 189.
- Required Privilege Level** interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.
- See Also** action-red-differential-delay on page 208, red-differential-delay on page 219