

Configuring the Media MTU

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO). Table 1 through Table 7 list the media and protocol MTU sizes by interface type, and Table 10 lists the encapsulation overhead by encapsulation type.

Table 1: Media MTU Sizes by Interface Type for M5, M7i with CFEB, M10, M10i with CFEB, M20, and M40 Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	9192	1500
E3/T3	4474	9192	4470
Fast Ethernet	1514	9192 (4-port) 1532 (8-port) 1532 (12-port)	1500 (IPv4) 1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4) 1497 (ISO)
Serial	1504	9192	1500 (IPv4) 1497 (ISO)
SONET/SDH	4474	9192	4470

Table 2: Media MTU Sizes by Interface Type for M40e Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	4500	1500
E3/T3	4474	4500	4470
		9192 (4-port)	

Table 2: Media MTU Sizes by Interface Type for M40e Routers *(continued)*

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
E3/DS3 IQ	4474	9192	4470
Fast Ethernet	1514	4500	1500 (IPv4) 1497 (ISO)
Gigabit Ethernet	1514	9192 (1- or 2-port) 9192 (4-port)	1500 (IPv4) 1497 (ISO)
Serial	1504	9192	1500 (IPv4) 1497 (ISO)
SONET/SDH	4474	4500 (1-port nonconcatenated) 9192 (4-port OC3) 9192 (4-port OC3c) 4500 (1-port OC12) 4500 (4-port OC12) 4500 (4-port OC12c) 4500 (1-port OC48) 9192 (2-port OC3) 9192 (2-port OC3c) 9192 (1-port OC12c) 9192 (1-port OC48c) 4500 (1-port OC192) 9192 (1-port OC192c)	4470

Table 3: Media MTU Sizes by Interface Type for M160 Routers

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Adaptive Services (MTU size not configurable)	9192	N/A	N/A
ATM	4482	9192	4470
E1/T1	1504	4500	1500
E3/T3	4474	4500	4470

Table 3: Media MTU Sizes by Interface Type for M160 Routers *(continued)*

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
E3/DS3 IQ	4474	9192	4470
Fast Ethernet	1514	4500	1500 (IPv4) 1497 (ISO)
Gigabit Ethernet	1514	9192 (1- or 2-port) 4500 (4-port)	1500 (IPv4) 1497 (ISO)
Serial	1504	9192	1500 (IPv4) 1497 (ISO)
SONET/SDH	4474	4500 (1-port nonconcatenated) 9192 (1- or 2-port) 4500 (4-port)	4470

Table 4: Media MTU Sizes by Interface Type for M7i with CFEB-E, M10i with CFEB-E, M320 and M120 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM2 IQ	4482	9192	4470
Channelized DS3 IQ	4471	4500	4470
Channelized E1 IQ	1504	4500	1500
Channelized OC12 IQ	4474	9192	4470
Channelized STM1 IQ	4474	9192	4470
DS3	4471	4500	4470
E1	1504	4500	1500
E3 IQ	4471	4500	4470
Fast Ethernet	1514	9192 (4-port) 1532 (8-, 12- and 48-port)	1500 (IPv4) 1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4) 1497 (ISO)
SONET/SDH	4474	9192	4470
T1	1504	4500	1500

Table 5: Media MTU Sizes by Interface Type for T320 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM	4482	9192	4470
ATM2 IQ	4482	9192	4470
Channelized OC12 IQ	4474	9192	4470
Channelized STM1 IQ	4474	9192	4470
DS3	4471	4500	4470
Fast Ethernet	1514	4500 (4-port) 1532 (12- and 48-port)	1500 (IPv4)1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4)1497 (ISO)
SONET/SDH	4474	9192	4470

Table 6: Media MTU Sizes by Interface Type for T640 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ATM2 IQ	4482	9192	4470
48-port Fast Ethernet	1514	1532	1500 (IPv4)1497 (ISO)
Gigabit Ethernet	1514	9192	1500 (IPv4)1497 (ISO)
SONET/SDH	4474	9192	4470

Table 7: Media MTU Sizes by Interface Type for J2300 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Fast Ethernet (10/100)	1514	9192	1500
G.SHDSL	4482	9150	4470
ISDN BRI	1504	4092	1500
Serial	1504	9150	1500
T1 or E1	1504	9150	1500

Table 8: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ADSL2 + PIM	4482	9150	4470
Dual-Port Fast Ethernet (10/100) PIM	1514	9192	1500
Dual-Port Serial PIM	1504	9150	1500
Dual-Port T1 or E1 PIM	1504	9150	1500
Dual-Port Channelized T1/E1 PIM (channelized to DS0s)	1504	4500	1500
Dual-Port Channelized T1/E1 PIM (clear channel T1 or E1)	1504	9150	1500
Fast Ethernet (10/100) built-in interface	1514	9192	1500
G.SHDSL PIM	4482	9150	4470
4-Port ISDN BRI PIM	1504	4092	1500
T3 (DS3) or E3 PIM	4474	9192	4470

Table 9: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
4-Port ISDN BRI PIM	1504	4092	1500
ADSL2 + PIM	4482	9150	4470
Dual-Port Fast Ethernet (10/100) PIM	1514	9192	1500
Dual-Port Serial PIM	1504	9150	1500
Dual-Port T1 or E1 PIM	1504	9150	1500
Dual-Port Channelized T1/E1 PIM (channelized to DS0s)	1504	4500	1500
Dual-Port Channelized T1/E1 PIM (clear channel T1 or E1)	1504	9150	1500

Table 9: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms *(continued)*

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
4-Port Fast Ethernet (10/100) ePIM	1518	1518	1500
Gigabit Ethernet (10/100/1000) built-in interface	1514	9018	1500
Gigabit Ethernet (10/100/1000) Enhanced Physical Interface Module (ePIM)	1514	9018	1500
Gigabit Ethernet (10/100/1000) SFP ePIM	1514	9018	1500
G.SHDSL PIM	4482	9150	4470
T3 (DS3) or E3 PIM	4474	9192	4470



NOTE: On Gigabit Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 9018 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 9018 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

```
/kernel: ge-0/0/0: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 9018
```

On 4-port Fast Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 1518 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 1518 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

```
/kernel: fe-3/0/1: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 1518
```

Table 10: Encapsulation Overhead by Encapsulation Type

Interface Encapsulation	Encapsulation Overhead (Bytes)
802.1Q/Ethernet 802.3	21
802.1Q/Ethernet Subnetwork Access Protocol (SNAP)	26

Table 10: Encapsulation Overhead by Encapsulation Type *(continued)*

Interface Encapsulation	Encapsulation Overhead (Bytes)
802.1Q/Ethernet version 2	18
ATM Cell Relay	4
ATM permanent virtual connection (PVC)	12
Cisco HDLC	4
Ethernet 802.3	17
Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS)	4
Ethernet over ATM	32
Ethernet SNAP	22
Ethernet translational cross-connect (TCC)	18
Ethernet version 2	14
Extended virtual local area network (VLAN) CCC and VPLS	4
Extended VLAN TCC	22
Frame Relay	4
PPP	4
VLAN CCC	4
VLAN VPLS	4
VLAN TCC	22

The default media MTU is calculated as follows:

Default media MTU = Default IP MTU + encapsulation overhead

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size.



NOTE: The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

The physical MTU for Ethernet interfaces does not include the 4-byte frame check sequence (FCS) field of the Ethernet frame.

A SONET/SDH interface operating in concatenated mode has a “c” added to the rate descriptor. For example, a concatenated OC48 interface is referred to as OC48c.

If you do not configure an MPLS MTU, the JUNOS software derives the MPLS MTU from the physical interface MTU. From this value, the software subtracts the encapsulation-specific overhead and space for the maximum number of labels that might be pushed in the Packet Forwarding Engine. Currently, the software provides for three labels of four bytes each, for a total of 12 bytes.

In other words, the formula used to determine the MPLS MTU is the following:

$$\text{MPLS MTU} = \text{physical interface MTU} - \text{encapsulation overhead} - 12$$

If you configure an MTU value by including the `mtu` statement at the `[edit interfaces interface-name unit logical-unit-number family mpls]` hierarchy level, the configured value is used.

For information about configuring the encapsulation on an interface, see [Configuring Interface Encapsulation on Physical Interfaces](#).

To modify the default media MTU size for a physical interface, include the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]  
mtu bytes;
```

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead.



NOTE: Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

You configure the protocol MTU by including the `mtu` statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family family]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]`

Because tunnel services interfaces are considered logical interfaces, you cannot configure the MTU setting for the physical interface. This means you cannot include the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level for the following interface types: generic routing encapsulation (`gr-`), IP-IP (`ip-`), loopback (`lo-`), link services (`ls-`), multilink services (`ml-`), and multicast (`pe-`, `pd-`). You can, however, configure the protocol MTU on tunnel interfaces, as described in [Setting the Protocol MTU](#).

