MIB-II Objects

This chapter covers the implementation details for the MIB-II on the Cisco MDS 9020 Fabric Switch. A MIB defines the properties of the managed object within the device to be managed. Every managed device keeps a database of values for each definition written in the MIB. It is not the actual database itself; it is implementation dependant. Definition of the MIB conforms to the SMI given in RFC 1155. The latest Internet MIB is given in RFC 1213, and is sometimes called MIB-II.

You can download MIB-II from the following website:
http://rfc.net/rfc1213.html.

Refer to Table 2-1 for the syntax for MIB-II Groups.

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<th>Syntax</th>
</tr>
</thead>
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</table>
System Group

Implementation of the System group is mandatory for all systems. If an agent is not configured to have a value for any of these variables, a string of length 0 is returned.

- sysDescr (1.3.6.1.2.1.1.1), page 2-3
- sysObjectID (1.3.6.1.2.1.1.2), page 2-4
- sysUpTime (1.3.6.1.2.1.1.3), page 2-5
- sysContact (1.3.6.1.2.1.1.4), page 2-6
- sysName (1.3.6.1.2.1.1.5), page 2-7
- sysLocation (1.3.6.1.2.1.1.6), page 2-8
- sysServices (1.3.6.1.2.1.1.7), page 2-9
**sysDescr (1.3.6.1.2.1.1.1)**

A textual description of the entity. This value should include the full name and version identification of the system’s hardware type, operating-system, and networking software. It is mandatory that this only contain printable American Standard Code for Information Interchange (ASCII) characters.

**Syntax Description**  DisplayString (SIZE (0..255))

**Access**  Read-only

**Status**  Mandatory

**Return Value**  MDS 9020 FC Switch
sysObjectID (1.3.6.1.2.1.1.2)

The vendor’s authoritative identification of the network management subsystem contained in the entity. This value is allocated within the SMI enterprise subtree (1.3.6.1.4.1) and provides an easy and unambiguous means for determining “what kind of box” is being managed. For example, if vendor “Company A.” was assigned the subtree 1.3.6.1.4.1.4242, it could assign the identifier 1.3.6.1.4.1.4242.1.1 to its “A Router”.

Syntax Description

OBJECT IDENTIFIER

Access

Read-only

Status

1.3.6.1.4.1.9.12.3.1.3.514
sysUpTime (1.3.6.1.2.1.1.3)

The time, in hundredths of a second, because the network management portion of the system was last reinitialized.

**Syntax Description**
TimeTicks

**Access**
Read-only

**Status**
Mandatory

**Return Value**
The time since the switch was powered on, or last reset (reset, hard reset, or hot reset) was executed. For example, 3 days 21 hours, 5 minutes, and 26.84 seconds. The value will roll over after approximately 497 days of continuous up time.
sysContact (1.3.6.1.2.1.1.4)

The textual identification of the contact person for this managed Node, together with information on how to contact this person.

**Syntax Description**
DisplayString (SIZE (0..255))

**Access**
Read-write

**Status**
Mandatory

**ReturnValue**
The default is <sysContact undefined>. The string size is limited to a maximum of 64.
sysName (1.3.6.1.2.1.1.5)

An administratively assigned name for this managed Node. By convention, this is the Node’s fully qualified domain name.

Syntax Description: DisplayString (SIZE (0..255))

Access: Read-write

Status: Mandatory

Return Value: The default is switch.
sysLocation (1.3.6.1.2.1.1.6)

The physical location of this Node, such as telephone closet and 3rd floor.

Syntax Description
DisplayString (SIZE (0..255))

Access
Read-write

Status
Mandatory

Return Value
The default is <sysLocation undefined>. The string size is limited to a maximum of 64.
sysServices (1.3.6.1.2.1.1.7)

A value that indicates the set of services that this entity primarily offers. The value is a sum. This sum initially takes the value zero. Then, for each layer \( L \) in the range 1 through 7 that this Node performs transactions for, \( 2^{(L - 1)} \) is added to the sum. For example, a Node that performs primarily routing functions would have a value of 4 \( (2^{(3-1)}) \). In contrast, a Node that is a host offering application services would have a value of 72 \( (2^{(4-1)} + 2^{(7-1)}) \).

**Syntax Description**

INTEGER (0..127)

**Access**

Read-only

**Status**

Mandatory

**Return Value**

The default is 2.
Interfaces Group

Implementation of the Interfaces group is mandatory for all systems.

- ifNumber (1.3.6.1.2.1.2.1.1), page 2-11
ifNumber (1.3.6.1.2.1.2.1)

The number of network interfaces (regardless of their current state) present on this system.

**Syntax Description**  INTEGER

**Access**  Read-only

**Status**  Mandatory

**Return Value**  The default is 2.
Interfaces Table

The Interfaces table contains information on the entity’s interfaces. Each interface is thought of as being attached to a “subnetwork”. This term should not be confused with “subnet” which refers to an addressing partitioning scheme used in the Internet suite of protocols.

- ifIndex (1.3.6.1.2.1.2.1.1), page 2-13
- ifDescr (1.3.6.1.2.1.2.1.2), page 2-14
- ifType (1.3.6.1.2.1.2.1.3), page 2-15
- ifMtu (1.3.6.1.2.1.2.1.4), page 2-16
- ifSpeed (1.3.6.1.2.1.2.1.5), page 2-17
- ifPhysAddress (1.3.6.1.2.1.2.1.6), page 2-18
- ifAdminStatus (1.3.6.1.2.1.2.1.7), page 2-19
- ifOperStatus (1.3.6.1.2.1.2.1.8), page 2-20
- ifLastChange (1.3.6.1.2.1.2.1.9), page 2-21
- ifInOctets (1.3.6.1.2.1.2.1.10), page 2-22
- ifInUcastPkts (1.3.6.1.2.1.2.1.11), page 2-23
- ifInNUcastPkts (1.3.6.1.2.1.2.1.12), page 2-24
- ifInDiscards (1.3.6.1.2.1.2.1.13), page 2-25
- ifInErrors (1.3.6.1.2.1.2.1.14), page 2-26
- ifInUnknownProtos (1.3.6.1.2.1.2.1.15), page 2-27
- ifOutOctets (1.3.6.1.2.1.2.1.16), page 2-28
- ifOutUcastPkts (1.3.6.1.2.1.2.1.17), page 2-29
- ifOutNUcastPkts (1.3.6.1.2.1.2.1.18), page 2-30
- ifOutDiscards (1.3.6.1.2.1.2.1.19), page 2-31
- ifOutErrors (1.3.6.1.2.1.2.1.20), page 2-32
- ifOutQLen (1.3.6.1.2.1.2.1.21), page 2-33
- ifSpecific (1.3.6.1.2.1.2.1.22), page 2-34
ifIndex (1.3.6.1.2.1.2.2.1.1)

A unique value for each interface. Its value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one reinitialization of the entity’s network management system to the next reinitialization.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
### ifDescr (1.3.6.1.2.1.2.2.1.2)

A textual string containing information about the interface. This string should include the name of the manufacturer, the product name, and the version of the hardware interface.

<table>
<thead>
<tr>
<th><strong>Syntax Description</strong></th>
<th>DisplayString (SIZE (0..255))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>Read-only</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
**ifType (1.3.6.1.2.1.2.2.1.3)**

The type of interface distinguished according to the physical/link protocol(s) immediately “below” the network layer in the protocol stack.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

ifMtu (1.3.6.1.2.1.2.2.1.4)

The size of the largest datagram which can be sent/received on the interface, specified in octets. For interfaces that are used for transmitting network datagrams, this is the size of the largest network datagram that can be sent on the interface.

Syntax Description: INTEGER

Access: Read-only

Status: Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

ifSpeed (1.3.6.1.2.1.2.2.1.5)

An estimate of the interface’s current bandwidth in bits per second. For interfaces that do not vary in bandwidth or for those where no accurate estimation can be made, this object should contain the nominal bandwidth.

Syntax Description: Gauge

Access: Read-only

Status: Mandatory
ifPhysAddress (1.3.6.1.2.1.2.2.1.6)

The interface’s address at the protocol layer immediately “below” the network layer in the protocol stack. For interfaces that do not have such an address, such as a serial line, this object should contain an octet string of zero length.

**Syntax Description**  
PhysAddress

**Access**  
Read-only

**Status**  
Mandatory
The desired state of the interface. The testing(3) state indicates that no operational packets can be passed.

**Syntax Description**
INTEGER

**Access**
Read-write

**Status**
Mandatory

**Return Value**
Writes are not supported.
The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
ifLastChange (1.3.6.1.2.1.2.2.1.9)

The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last reinitialization of the local network management subsystem, then this object contains a zero value.

Syntax Description: TimeTicks
Access: Read-only
Status: Mandatory
## ifInOctets (1.3.6.1.2.1.2.2.1.10)

The total number of octets received on the interface, including framing characters.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
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ifInUcastPkts (1.3.6.1.2.1.2.2.1.11)

The number of subnetwork-unicast packets delivered to a higher-layer protocol.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
The number of non-unicast (that is, subnetwork- broadcast or subnetwork-multicast) packets delivered to a higher-layer protocol.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
ifInDiscards (1.3.6.1.2.1.2.2.1.13)

The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
ifInUnknownProtos (1.3.6.1.2.1.2.2.1.15)

The number of packets received from the interface that were discarded because of an unknown or unsupported protocol.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
ifOutOctets (1.3.6.1.2.1.2.2.1.16)

The total number of octets transmitted out of the interface, including framing characters.

- **Syntax Description**: Counter
- **Access**: Read-only
- **Status**: Mandatory
ifOutUcastPkts (1.3.6.1.2.1.2.2.1.17)

The total number of packets that higher level protocols requested be transmitted to a subnetwork unicast address, including those that were discarded or not sent.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
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**ifOutNUcastPkts (1.3.6.1.2.1.2.2.1.18)**

The total number of packets that higher level protocols requested be transmitted to a non-unicast (subnetwork broadcast or subnetwork multicast) address, including those that were discarded or not sent.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>Read-only</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
ifOutDiscards (1.3.6.1.2.1.2.1.2.1.19)

The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.

Syntax Description  Counter
Access  Read-only
Status  Mandatory
### ifOutErrors (1.3.6.1.2.1.2.2.1.20)

The number of outbound packets that could not be transmitted because of errors.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
The length (in packets) of the output packet queue.

**Syntax Description**
Gauge

**Access**
Read-only

**Status**
Mandatory
A reference to MIB definitions specific to the particular media being used to realize the interface. For example, if the interface is realized by an Ethernet, then the value of this object refers to a document that defines objects specific to Ethernet. If this information is not present, its value should be set to the OBJECT IDENTIFIER { 0 0 }, which is a syntactically valid object identifier, and any conforming implementation of ASN.1 (Abstract Syntax Notation) and BER must be able to generate and recognize this value.

**Syntax Description**

OBJECT IDENTIFIER

**Access**

Read-only

**Status**

Mandatory
Address Translation Group

Implementation of the Address Translation group is mandatory for all systems. However, this group is deprecated by MIB-II. That is, it is being included solely for compatibility with MIB-I Nodes, and will most likely be excluded from MIB-III Nodes. From MIB-II and onwards, each network protocol group contains its own address translation tables.

The Address Translation group contains one table which is the union across all interfaces of the translation tables for converting a NetworkAddress (for example, an IP address) into a subnetwork-specific address. For lack of a better term, this document refers to such a subnetwork-specific address as a “physical” address.

Examples of such translation tables are for: broadcast media where ARP is in use, the translation table is equivalent to the ARP cache, or on an X.25 network where non-algorithmic translation to X.121 addresses is required. The translation table contains the NetworkAddress to X.121 address equivalences.

- `atIfIndex (1.3.6.1.2.1.3.1.1.1)`, page 2-36
- `atPhysAddress (1.3.6.1.2.1.3.1.1.2)`, page 2-37
- `atNetAddress (1.3.6.1.2.1.3.1.1.3)`, page 2-38
**atIfIndex (1.3.6.1.2.1.3.1.1.1)**

The interface on which this entry’s equivalence is effective. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Deprecated
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**atPhysAddress (1.3.6.1.2.1.3.1.1.2)**

The media-dependent “physical” address. Setting this object to a null string (one of zero length) has the effect of invalidating the corresponding entry in the atTable object. That is, it effectively disassociates the interface identified with the entry from the mapping identified with the entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management workstations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant atPhysAddress object.

**Syntax Description**

PhysAddress

**Access**

Read-write

**Status**

Deprecated
Send documentation comments to mdsfeedback-doc@cisco.com.

atNetAddress (1.3.6.1.2.1.3.1.1.3)

The NetworkAddress corresponding to the media-dependent “physical” address.

**Syntax Description**  
NetworkAddress

**Access**  
Read-write

**Status**  
Deprecated
Implementation of the IP group is mandatory for all systems.

- ipForwarding (1.3.6.1.2.1.4.1), page 2-40
- ipDefaultTTL (1.3.6.1.2.1.4.2), page 2-41
- ipInReceives (1.3.6.1.2.1.4.3), page 2-42
- ipInHdrErrors (1.3.6.1.2.1.4.4), page 2-43
- ipInAddrErrors (1.3.6.1.2.1.4.5), page 2-44
- ipForwDatagrams (1.3.6.1.2.1.4.6), page 2-45
- ipInUnknownProtos (1.3.6.1.2.1.4.7), page 2-46
- ipInDiscards (1.3.6.1.2.1.4.8), page 2-47
- ipInDelivers (1.3.6.1.2.1.4.9), page 2-48
- ipOutRequests (1.3.6.1.2.1.4.10), page 2-49
- ipOutDiscards (1.3.6.1.2.1.4.11), page 2-50
- ipOutNoRoutes (1.3.6.1.2.1.4.12), page 2-51
- ipReasmTimeout (1.3.6.1.2.1.4.13), page 2-52
- ipReasmReqds (1.3.6.1.2.1.4.14), page 2-53
- ipReasmOKs (1.3.6.1.2.1.4.15), page 2-54
- ipReasmFails (1.3.6.1.2.1.4.16), page 2-55
- ipFragOKs (1.3.6.1.2.1.4.17), page 2-56
- ipFragFails (1.3.6.1.2.1.4.18), page 2-57
- ipFragCreates (1.3.6.1.2.1.4.19), page 2-58
ipForwarding (1.3.6.1.2.1.4.1)

The indication of whether this entity is acting as an IP Gateway with respect to the forwarding of datagrams received by, but not addressed to, this entity. IP Gateways forward datagrams; IP hosts do not (except those source-routed from the host).

For some managed Nodes, this object may take on only a subset of the values possible. Accordingly, it is appropriate for an agent to return a “badValue” response if a management station attempts to change this object to an inappropriate value.

Syntax Description

INTEGER

Access

Read-write

Status

Mandatory

Return Value

Returns forwarding (1). Writes are not supported.
Send documentation comments to mdsfeedback-doc@cisco.com.

ipDefaultTTL (1.3.6.1.2.1.4.2)

The default value inserted into the Time-To-Live field of the IP header of datagrams originated at this entity whenever a TTL value is not supplied by the transport layer protocol.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Returns 64 (0x40). Writes are not supported.
ipInReceives (1.3.6.1.2.1.4.3)

The total number of input datagrams received from interfaces, including those received in error.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
The number of input datagrams discarded due to errors in their IP headers. These include bad checksums, version number mismatch, other format errors, time-to-live exceeded, and errors discovered in processing their IP options.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
ipaInAddrErrors (1.3.6.1.2.1.4.5)

The number of input datagrams discarded because the IP address in their IP header’s destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported Classes (for example, Class E). For entities which are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
ipForwDatagrams (1.3.6.1.2.1.4.6)

The number of input datagrams for which this entity was not their final IP destination. As a result, an attempt was made to find a route to forward them to that final destination. In entities that do not act as IP Gateways, this counter will include only those packets that were Source Routed from this entity, and the Source Route option processing was successful.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
ipInUnknownProtos (1.3.6.1.2.1.4.7)

The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
ipInDiscards (1.3.6.1.2.1.4.8)

The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). This counter does not include any datagrams discarded while awaiting reassembly.

Syntax Description: Counter
Access: Read-only
Status: Mandatory
ipInDelivers (1.3.6.1.2.1.4.9)

The total number of input datagrams successfully delivered to IP user protocols (including ICMP).

Syntax Description: Counter

Access: Read-only

Status: Mandatory
ipOutRequests (1.3.6.1.2.1.4.10)

The total number of IP datagrams that local IP user protocols (including ICMP) supplied to IP in requests for transmission. This counter does not include any datagrams counted in ipForwDatagrams.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
ipOutDiscards (1.3.6.1.2.1.4.11)

The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (for example, for lack of buffer space). This counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
The number of IP datagrams discarded because no route could be found to transmit them to their destination. This counter includes any packets counted in ipForwDatagrams which meet this “no-route” criterion. This includes any datagrams that a host cannot route because all of its default gateways are down.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
ipReasmTimeout (1.3.6.1.2.1.4.13)

The maximum number of seconds which received fragments are held while they are awaiting reassembly at this entity.

Syntax Description: INTEGER

Access: Read-only

Status: Mandatory
ipReasmReqds (1.3.6.1.2.1.4.14)

The number of IP fragments received that needed to be reassembled at this entity.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
ipReasmOKs (1.3.6.1.2.1.4.15)

The number of IP datagrams successfully reassembled.

**Syntax Description:** Counter

**Access:** Read-only

**Status:** Mandatory
ipReasmFails (1.3.6.1.2.1.4.16)

The number of failures detected by the IP reassembly algorithm for example, timed out, errors). This is not necessarily a count of discarded IP fragments, because some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

Syntax Description Counter

Access Read-only

Status Mandatory
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**ipFragOKs (1.3.6.1.2.1.4.17)**

The number of IP datagrams that have been successfully fragmented at this entity.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
The number of IP datagrams that have been discarded because they needed to be fragmented at this entity, but could not because their Don’t Fragment flag was set.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
ipFragCreates (1.3.6.1.2.1.4.19)

The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
IP Address Table

The IP address table contains this entity’s IP addressing information.

- ipAdEntAddr (1.3.6.1.2.1.4.20.1.1), page 2-60
- ipAdEntIfIndex (1.3.6.1.2.1.4.20.1.2), page 2-61
- ipAdEntNetMask (1.3.6.1.2.1.4.20.1.3), page 2-62
- ipAdEntBcastAddr (1.3.6.1.2.1.4.20.1.4), page 2-63
- ipAdEntReasmMaxSize (1.3.6.1.2.1.4.20.1.5), page 2-64
ipAdEntAddr (1.3.6.1.2.1.4.20.1.1)

The IP address to which this entry’s addressing information pertains.

- **Syntax Description**: IpAddress
- **Access**: Read-only
- **Status**: Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

ipAdEntIfIndex (1.3.6.1.2.1.4.20.1.2)

The index value which uniquely identifies the interface to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

Syntax Description: INTEGER

Access: Read-only

Status: Mandatory
ipAdEntMask (1.3.6.1.2.1.4.20.1.3)

The subnet mask associated with the IP address of this entry. The value of the mask is an IP address with all the network bits set to 1 and all the hosts bits set to 0.

Syntax Description: IpAddress

Access: Read-only

Status: Mandatory
The value of the least-significant bit in the IP broadcast address used for sending datagrams on the (logical) interface associated with the IP address of this entry. For example, when the Internet standard all-ones broadcast address is used, the value will be 1. This value applies to both the subnet and network broadcasts addresses used by the entity on this (logical) interface.

**Syntax Description**  INTEGER

**Access**  Read-only

**Status**  Mandatory
The size of the largest IP datagram which this entity can reassemble from incoming IP fragmented datagrams received on this interface.

**Syntax Description**

INTEGER (0..65535)

**Access**

Read-only

**Status**

Mandatory
IP Routing Table

The IP routing table contains an entry for each route presently known to this entity.

- ipRouteDest (1.3.6.1.2.1.4.21.1.1), page 2-66
- ipRouteIfIndex (1.3.6.1.2.1.4.21.1.2), page 2-67
- ipRouteMetric1 (1.3.6.1.2.1.4.21.1.3), page 2-68
- ipRouteMetric2 (1.3.6.1.2.1.4.21.1.4), page 2-69
- ipRouteMetric3 (1.3.6.1.2.1.4.21.1.5), page 2-70
- ipRouteMetric4 (1.3.6.1.2.1.4.21.1.6), page 2-71
- ipRouteNextHop (1.3.6.1.2.1.4.21.1.7), page 2-72
- ipRouteType (1.3.6.1.2.1.4.21.1.8), page 2-73
- ipRouteProto (1.3.6.1.2.1.4.21.1.9), page 2-74
- ipRouteAge (1.3.6.1.2.1.4.21.1.10), page 2-75
- ipRouteMask (1.3.6.1.2.1.4.21.1.11), page 2-76
- ipRouteMetric5 (1.3.6.1.2.1.4.21.1.12), page 2-77
- ipRouteInfo (1.3.6.1.2.1.4.21.1.13), page 2-78
The destination IP address of this route. An entry with a value of 0.0.0.0 is considered a default route. Multiple routes to a single destination can appear in the table, but access to such multiple entries is dependent on the table-access mechanisms defined by the network management protocol in use.

**Syntax Description**

IpAddress

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
The index value which uniquely identifies the local interface through which the next hop of this route should be reached. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

Syntax Description: INTEGER

Access: Read-write

Status: Mandatory

Return Value: Writes are not supported.
The primary routing metric for this route. The semantics of this metric are determined by the routing protocol specified in the route’s ipRouteProto value. If this metric is not used, its value should be set to -1.

**Syntax Description**

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>INTEGER</th>
</tr>
</thead>
</table>

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
An alternate routing metric for this route. The semantics of this metric are determined by the routing protocol specified in the route’s ipRouteProto value. If this metric is not used, its value should be set to -1.

Syntax Description  INTEGER

Access  Read-write

Status  Mandatory

Return Value  Writes are not supported.
**Send documentation comments to mdsfeedback-doc@cisco.com.**

### ipRouteMetric3 (1.3.6.1.2.1.4.21.1.5)

An alternate routing metric for this route. The semantics of this metric are determined by the routing protocol specified in the route’s ipRouteProto value. If this metric is not used, its value should be set to -1.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
ipRouteMetric4 (1.3.6.1.2.1.4.21.1.6)

An alternate routing metric for this route. The semantics of this metric are determined by the routing protocol specified in the route’s ipRouteProto value. If this metric is not used, its value should be set to -1.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
# ipRouteNextHop (1.3.6.1.2.1.4.21.1.7)

The IP address of the next hop of this route. In the case of a route bound to an interface which is realized from a broadcast media, the value of this field is the agent’s IP address on that interface.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>IpAddress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-write</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Return Value</td>
<td>Writes are not supported.</td>
</tr>
</tbody>
</table>
ipRouteType (1.3.6.1.2.1.4.21.1.8)

The type of route. The values direct(3) and indirect(4) refer to the notion of direct and indirect routing in the IP architecture. Setting this object to the value invalid(2) has the effect of invalidating the corresponding entry in the ipRouteTable object. That is, it effectively disassociates the destination identified with the entry from the route identified with the entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant ipRouteType object.

Syntax Description: INTEGER

Access: Read-write

Status: Mandatory

Return Value: Writes are not supported.
**ipRouteProto (1.3.6.1.2.1.4.21.1.9)**

The routing mechanism through which this route was learned. Inclusion of values for gateway routing protocols is not intended to imply that hosts should support those protocols.

**Syntax Description**

| INTEGER |

**Access**

Read-only

**Status**

Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

ipRouteAge (1.3.6.1.2.1.4.21.1.10)

The number of seconds since this route was last updated or otherwise determined to be correct. No semantics of “too old” can be implied except through knowledge of the routing protocol by which the route was learned.

Syntax Description  INTEGER

Access  Read-write

Status  Mandatory

Return Value  Writes are not supported.
Indicate the mask to be logical-ANDed with the destination address before being compared to the value in the ipRouteDest field.

**Syntax Description**

IpAddress

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
An alternate routing metric for this route. The semantics of this metric are determined by the routing-protocol specified in the route’s ipRouteProto value. If this metric is not used, its value should be set to -1.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
Send documentation comments to mdsfeedback-doc@cisco.com.

ipRouteInfo (1.3.6.1.2.1.4.21.1.13)

A reference to MIB definitions specific to the particular routing protocol which is responsible for this route, as determined by the value specified in the route’s ipRouteProto value. If this information is not present, its value should be set to the OBJECT IDENTIFIER { 0 0 }, which is a syntactically valid object identifier. Any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.

Syntax Description  OBJECT IDENTIFIER

Access  Read-only

Status  Mandatory
The IP Address Translation Table

The IP address translation table contain the IpAddress to “physical” address equivalences. Some interfaces do not use translation tables for determining address equivalences (for example, DDN-X.25 has an algorithmic method). If all interfaces are of this type, then the Address Translation table is empty, that is, has zero entries.

- ipNetToMediaIfIndex (1.3.6.1.2.1.4.22.1.1), page 2-80
- ipNetToMediaPhysAddress (1.3.6.1.2.1.4.22.1.2), page 2-81
- ipNetToMediaNetAddress (1.3.6.1.2.1.4.22.1.3), page 2-82
- ipNetToMediaType (1.3.6.1.2.1.4.22.1.4), page 2-83
The interface on which this entry’s equivalence is effective. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

**Syntax Description**

**INTEGER**

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
ipNetToMediaPhysAddress (1.3.6.1.2.1.4.22.1.2)

The media-dependent “physical” address.

Syntax Description: PhysAddress

Access: Read-write

Status: Mandatory

Return Value: Writes are not supported.
ipNetToMediaNetAddress (1.3.6.1.2.1.4.22.1.3)

The IpAddress corresponding to the media-dependent “physical” address.

**Syntax Description**

IpAddress

**Access**

read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
The type of mapping. Setting this object to the value invalid(2) has the effect of invalidating the corresponding entry in the ipNetToMediaTable. That is, it effectively disassociates the interface identified with the entry from the mapping identified with the entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant ipNetToMediaType object.

**Syntax Description**

INTEGER

**Access**

Read-write

**Status**

Mandatory

**Return Value**

Writes are not supported.
Additional IP Objects

Following are the additional IP objects.

- ipRoutingDiscards (1.3.6.1.2.1.4.23), page 2-85
Send documentation comments to mdsfeedback-doc@cisco.com.

ipRoutingDiscards (1.3.6.1.2.1.4.23)

The number of routing entries which were chosen to be discarded even though they are valid. One possible reason for discarding such an entry could be to free-up buffer space for other routing entries.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
ICMP Group

Implementation of the ICMP group is mandatory for all systems.

- icmpInMsgs (1.3.6.1.2.1.5.1), page 2-87
- icmpInErrors (1.3.6.1.2.1.5.2), page 2-88
- icmpInDestUnreachs (1.3.6.1.2.1.5.3), page 2-89
- icmpInTimeExcds (1.3.6.1.2.1.5.4), page 2-90
- icmpInParmProbs (1.3.6.1.2.1.5.5), page 2-91
- icmpInSrcQuenchs (1.3.6.1.2.1.5.6), page 2-92
- icmpInRedirects (1.3.6.1.2.1.5.7), page 2-93
- icmpInEchos (1.3.6.1.2.1.5.8), page 2-94
- icmpInEchoReps (1.3.6.1.2.1.5.9), page 2-95
- icmpInTimestamps (1.3.6.1.2.1.5.10), page 2-96
- icmpInTimestampReps (1.3.6.1.2.1.5.11), page 2-97
- icmpInAddrMasks (1.3.6.1.2.1.5.12), page 2-98
- icmpInAddrMaskReps (1.3.6.1.2.1.5.13), page 2-99
- icmpOutMsgs (1.3.6.1.2.1.5.14), page 2-100
- icmpOutErrors (1.3.6.1.2.1.5.15), page 2-101
- icmpOutDestUnreachs (1.3.6.1.2.1.5.16), page 2-102
- icmpOutTimeExcds (1.3.6.1.2.1.5.17), page 2-103
- icmpOutParmProbs (1.3.6.1.2.1.5.18), page 2-104
- icmpOutSrcQuenchs (1.3.6.1.2.1.5.19), page 2-105
- icmpOutRedirects (1.3.6.1.2.1.5.20), page 2-106
- icmpOutEchos (1.3.6.1.2.1.5.21), page 2-107
- icmpOutEchoReps (1.3.6.1.2.1.5.22), page 2-108
- icmpOutTimestamps (1.3.6.1.2.1.5.23), page 2-109
- icmpOutTimestampReps (1.3.6.1.2.1.5.24), page 2-110
- icmpOutAddrMasks (1.3.6.1.2.1.5.25), page 2-111
- icmpOutAddrMaskReps (1.3.6.1.2.1.5.26), page 2-112
**Chapter 2  MIB-II Objects**

**icmpInMsgs (1.3.6.1.2.1.5.1)**

The total number of ICMP messages received by the entity. This counter includes all those counted by icmpInErrors.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The number of ICMP messages received by the entity but were determined as having ICMP-specific errors (such as, bad ICMP checksums, bad length).

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

**icmpInDestUnreaches (1.3.6.1.2.1.5.3)**

The number of ICMP Destination Unreachable messages received.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The number of ICMP Time Exceeded messages received.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
icmpInParmProbs (1.3.6.1.2.1.5.5)

The number of ICMP Parameter Problem messages received.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
Send documentation comments to mdsfeedback-doc@cisco.com.

icmpInSrcQuenchs (1.3.6.1.2.1.5.6)

The number of ICMP Source Quench messages received.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
icmpltRedirects (1.3.6.1.2.1.5.7)

The number of ICMP Redirect messages received.

**Syntax Description**  
Counter

**Access**  
Read-only

**Status**  
Mandatory
icmpInEchos (1.3.6.1.2.1.5.8)

The number of ICMP Echo (request) messages received.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
icmpInEchoReps (1.3.6.1.2.1.5.9)

The number of ICMP Echo Reply messages received.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The number of ICMP Timestamp (request) messages received.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
### icmpInTimestampReps (1.3.6.1.2.1.5.11)

The number of ICMP Timestamp Reply messages received.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
icmpInAddrMasks (1.3.6.1.2.1.5.12)

The number of ICMP Address Mask Request messages received.

Syntax Description: Counter
Access: Read-only
Status: Mandatory
Send documentation comments to mdsfeedback-doc@cisco.com.

**icmpInAddrMaskReps (1.3.6.1.2.1.5.13)**

The number of ICMP Address Mask Reply messages received.

**Syntax Description**  Counter  

**Access**  Read-only  

**Status**  Mandatory
icmpOutMsgs (1.3.6.1.2.1.5.14)

The total number of ICMP messages which this entity attempted to send. This counter includes all those counted by icmpOutErrors.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
Chapter 2      MIB-II Objects

icmOutErrors (1.3.6.1.2.1.5.15)

The number of ICMP messages which this entity did not send due to problems discovered within ICMP, such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IP to route the resultant datagram. In some implementations, there may be no types of errors which contribute to this counter’s value.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
icmpOutDestUnreachs (1.3.6.1.2.1.5.16)

The number of ICMP Destination Unreachable messages sent.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
The number of ICMP Time Exceeded messages sent.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
 icmpOutParmProbs (1.3.6.1.2.1.5.18)

The number of ICMP Parameter Problem messages sent.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
icmprotSrcQuenches (1.3.6.1.2.1.5.19)

The number of ICMP Source Quench messages sent.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
icmpOutRedirects (1.3.6.1.2.1.5.20)

The number of ICMP Redirect messages sent. For a host, this object will always be zero, because hosts do not send redirects.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
**icmOutEchos (1.3.6.1.2.1.5.21)**

The number of ICMP Echo (request) messages sent.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
icmpOutEchoReps (1.3.6.1.2.1.5.22)

The number of ICMP Echo Reply messages sent.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
icmpOutTimestamps (1.3.6.1.2.1.5.23)

The number of ICMP Timestamp (request) messages sent.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The number of ICMP Timestamp Reply messages sent.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The number of ICMP Address Mask Request messages sent.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
### icmpOutAddrMaskReps (1.3.6.1.2.1.5.26)

The number of ICMP Address Mask Reply messages sent.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
TCP Group

Implementation of the TCP group is mandatory for all systems that implement the TCP. Instances of object types that represent information about a particular TCP connection are transient; they persist only as long as the connection is in question.

- \texttt{tcpRtoAlgorithm (1.3.6.1.2.1.6.1)}, page 2-114
- \texttt{tcpRtoMin (1.3.6.1.2.1.6.2)}, page 2-115
- \texttt{tcpRtoMax (1.3.6.1.2.1.6.3)}, page 2-116
- \texttt{tcpMaxConn (1.3.6.1.2.1.6.4)}, page 2-117
- \texttt{tcpActiveOpens (1.3.6.1.2.1.6.5)}, page 2-118
- \texttt{tcpPassiveOpens (1.3.6.1.2.1.6.6)}, page 2-119
- \texttt{tcpAttemptFails (1.3.6.1.2.1.6.7)}, page 2-120
- \texttt{tcpEstabResets (1.3.6.1.2.1.6.8)}, page 2-121
- \texttt{tcpCurrEstab (1.3.6.1.2.1.6.9)}, page 2-122
- \texttt{tcpInSegs (1.3.6.1.2.1.6.10)}, page 2-123
- \texttt{tcpOutSegs (1.3.6.1.2.1.6.11)}, page 2-124
- \texttt{tcpRetransSegs (1.3.6.1.2.1.6.12)}, page 2-125
The algorithm used to determine the timeout value used for retransmitting unacknowledged octets.

**Syntax Description**: INTEGER

**Access**: Read-only

**Status**: Mandatory
The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in RFC 793.

**Syntax Description**  
INTEGER

**Access**  
Read-only

**Status**  
Mandatory
tcpRtoMax (1.3.6.1.2.1.6.3)

The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the UBOUND quantity described in RFC 793.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
**tcpActiveOpens (1.3.6.1.2.1.6.5)**

The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
tcpPassiveOpens (1.3.6.1.2.1.6.6)

The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
The number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.

**Syntax Description**: Counter

**Access**: Read-only

**Status**: Mandatory
The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
The number of TCP connections for which the current state is either ESTABLISHED or CLOSE-WAIT.

**Syntax Description**  Gauge

**Access**  Read-only

**Status**  Mandatory
The total number of segments received, including those received in error. This count includes segments received on currently established connections.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
**tcpOutSegs (1.3.6.1.2.1.6.11)**

The total number of segments sent including those on current connections, but excluding those containing only retransmitted octets.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
The total number of segments retransmitted. That is, the number of TCP segments transmitted containing one or more previously transmitted octets.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
TCP Connection Table

The TCP connection table contains information about this entity’s existing TCP connections.

- tcpConnState (1.3.6.1.2.1.6.13.1.1), page 2-127
- tcpConnLocalAddress (1.3.6.1.2.1.6.13.1.2), page 2-128
- tcpConnLocalPort (1.3.6.1.2.1.6.13.1.3), page 2-129
- tcpConnRemAddress (1.3.6.1.2.1.6.13.1.4), page 2-130
- tcpConnRemPort (1.3.6.1.2.1.6.13.1.5), page 2-131
tcpConnState (1.3.6.1.2.1.6.13.1.1)

The state of this TCP connection. The only value which may be set by a management station is deleteTCB(12). Accordingly, it is appropriate for an agent to return a “badValue” response if a management station attempts to set this object to any other value.

If a management station sets this object to the value deleteTCB(12), then this has the effect of deleting the TCB (as defined in RFC 793) of the corresponding connection on the managed Node. The result is an immediate termination of the connection.

Syntax Description: INTEGER

Access: Read-write

Status: Mandatory

Return Value: Writes are not supported.
The local IP address for this TCP connection. In the case of a connection in the listen state which is willing to accept connections for any IP interface associated with the Node, the value 0.0.0.0 is used.

**Syntax Description**  
IpAddress

**Access**  
Read-only

**Status**  
Mandatory
tcpConnLocalPort (1.3.6.1.2.1.6.13.1.3)

The local port number for this TCP connection.

**Syntax Description**

INTEGER (0..65535)

**Access**

Read-only

**Status**

Mandatory
The remote IP address for this TCP connection.

**Syntax Description**

IpAddress

**Access**

Read-only

**Status**

Mandatory
The remote port number for this TCP connection.

**Syntax Description**

INTEGER (0..65535)

**Access**

Read-only

**Status**

Mandatory
Additional TCP Objects

Following are the additional TCP objects.

- tcpInErrs (1.3.6.1.2.1.6.14), page 2-133
- tcpOutRsts (1.3.6.1.2.1.6.15), page 2-134
The total number of segments received in error (for example, bad TCP checksums).

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
**tcpOutRsts (1.3.6.1.2.1.6.15)**

The number of TCP segments sent containing the RST flag.

<table>
<thead>
<tr>
<th><strong>Syntax Description</strong></th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>Read-only</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
UDP Group

Implementation of the UDP group is mandatory for all systems which implement the UDP.

- `udpInDatagrams (1.3.6.1.2.1.7.1)`, page 2-136
- `udpNoPorts (1.3.6.1.2.1.7.2)`, page 2-137
- `udpInErrors (1.3.6.1.2.1.7.3)`, page 2-138
- `udpOutDatagrams (1.3.6.1.2.1.7.4)`, page 2-139
udpInDatagrams (1.3.6.1.2.1.7.1)

The total number of UDP datagrams delivered to UDP users.

**Syntax Description**: Counter

**Access**: Read-only

**Status**: Mandatory
udpNoPorts (1.3.6.1.2.1.7.2)

The total number of received UDP datagrams for which there was no application at the destination port.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
udpInErrors (1.3.6.1.2.1.7.3)

The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.

### Syntax Description
Counter

### Access
Read-only

### Status
Mandatory
udpOutDatagrams (1.3.6.1.2.1.7.4)

The total number of UDP datagrams sent from this entity.

- **Syntax Description**: Counter
- **Access**: Read-only
- **Status**: Mandatory
UDP Listener Table

The UDP listener table contains information about this entity's UDP end-points on which a local application is currently accepting datagrams.

- `udpLocalAddress (1.3.6.1.2.1.7.5.1.1)`, page 2-141
- `udpLocalPort (1.3.6.1.2.1.7.5.1.2)`, page 2-142
udpLocalAddress (1.3.6.1.2.1.7.5.1.1)

The local IP address for this UDP listener. In the case of a UDP listener which is willing to accept datagrams for any IP interface associated with the Node, the value 0.0.0.0 is used.

Syntax Description: IpAddress

Access: Read-only

Status: Mandatory
udpLocalPort (1.3.6.1.2.1.7.5.1.2)

The local port number for this UDP listener.

**Syntax Description**
INTEGER (0..65535)

**Access**
Read-only

**Status**
Mandatory
EGP Group

Implementation of the EGP group is mandatory for all systems which implement the EGP.

- egpInMsgs (1.3.6.1.2.1.8.1), page 2-144
- egpInErrors (1.3.6.1.2.1.8.2), page 2-145
- egpOutMsgs (1.3.6.1.2.1.8.3), page 2-146
- egpOutErrors (1.3.6.1.2.1.8.4), page 2-147
egpInMsgs (1.3.6.1.2.1.8.1)

The number of EGP messages received without error.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
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egpInErrors (1.3.6.1.2.1.8.2)

The number of EGP messages received that proved to be in error.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
### egpOutMsgs (1.3.6.1.2.1.8.3)

The total number of locally generated EGP messages.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
### egpOutErrors (1.3.6.1.2.1.8.4)

The number of locally generated EGP messages not sent due to resource limitations within an EGP entity.

<table>
<thead>
<tr>
<th><strong>Syntax Description</strong></th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>Read-only</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
The EGP neighbor table contains information about this entity's EGP neighbors.

- `egpNeighState (1.3.6.1.2.1.8.5.1.1)`, page 2-149
- `egpNeighAddr (1.3.6.1.2.1.8.5.1.2)`, page 2-150
- `egpNeighAs (1.3.6.1.2.1.8.5.1.3)`, page 2-151
- `egpNeighInMsgs (1.3.6.1.2.1.8.5.1.4)`, page 2-152
- `egpNeighInErrs (1.3.6.1.2.1.8.5.1.5)`, page 2-153
- `egpNeighOutMsgs (1.3.6.1.2.1.8.5.1.6)`, page 2-154
- `egpNeighOutErrs (1.3.6.1.2.1.8.5.1.7)`, page 2-155
- `egpNeighInErrMsgs (1.3.6.1.2.1.8.5.1.8)`, page 2-156
- `egpNeighOutErrMsgs (1.3.6.1.2.1.8.5.1.9)`, page 2-157
- `egpNeighStateUps (1.3.6.1.2.1.8.5.1.10)`, page 2-158
- `egpNeighStateDowns (1.3.6.1.2.1.8.5.1.11)`, page 2-159
- `egpNeighIntervalHello (1.3.6.1.2.1.8.5.1.12)`, page 2-160
- `egpNeighIntervalPoll (1.3.6.1.2.1.8.5.1.13)`, page 2-161
- `egpNeighMode (1.3.6.1.2.1.8.5.1.14)`, page 2-162
- `egpNeighEventTrigger (1.3.6.1.2.1.8.5.1.15)`, page 2-163
- `egpAs (1.3.6.1.2.1.8.6)`, page 2-164
The EGP state of the local system with respect to this entry’s EGP neighbor. Each EGP state is represented by a value that is one greater than the numerical value associated with the state in RFC 904.

Syntax Description: INTEGER

Access: Read-only

Status: Mandatory
egpNeighAddr (1.3.6.1.2.1.8.5.1.2)

The IP address of this entry’s EGP neighbor.

Syntax Description

IpAddress

Access

Read-only

Status

Mandatory
The autonomous system of this EGP peer. Zero should be specified if the autonomous system number of the neighbor is not yet known.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
egpNeighInMsgs (1.3.6.1.2.1.8.5.1.4)

The number of EGP messages received without error from this EGP peer.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
egpNeighInErrs (1.3.6.1.2.1.8.5.1.5)

The number of EGP messages received from this EGP peer that proved to be in error (for example, bad EGP checksum).

Syntax Description: Counter

Access: Read-only

Status: Mandatory
egpNeighOutMsgs (1.3.6.1.2.1.8.5.1.6)

The number of locally generated EGP messages to this EGP peer.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
egpNeighOutErrs (1.3.6.1.2.1.8.5.1.7)

The number of locally generated EGP messages not sent to this EGP peer due to resource limitations within an EGP entity.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
egpNeighInErrMsgs (1.3.6.1.2.1.8.5.1.8)

The number of EGP-defined error messages received from this EGP peer.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
The number of EGP-defined error messages sent to this EGP peer.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
egpNeighStateUps (1.3.6.1.2.1.8.5.1.10)

The number of EGP state transitions to the UP state with this EGP peer.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
egpNeighStateDowns (1.3.6.1.2.1.8.5.1.11)

The number of EGP state transitions from the UP state to any other state with this EGP peer.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
egpNeighborIntervalHello (1.3.6.1.2.1.8.5.1.12)

The interval between EGP Hello command retransmissions, in hundredths of a second. This represents the t1 timer as defined in RFC 904.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
egpNeighIntervalPoll (1.3.6.1.2.1.8.5.1.13)

The interval between EGP poll command retransmissions, in hundredths of a second. This represents the t3 timer as defined in RFC 904.

Syntax Description: INTEGER

Access: Read-only

Status: Mandatory
egpNeighMode (1.3.6.1.2.1.8.5.1.14)

The polling mode of this EGP entity, either passive or active.

Syntax Description
INTEGER { active(1), passive(2) }

Access
Read-only

Status
Mandatory
egpNeighEventTrigger (1.3.6.1.2.1.8.5.1.15)

A control variable used to trigger operator-initiated Start and Stop events. When read, this variable always returns the most recent value that egpNeighEventTrigger was set to. If it has not been set since the last initialization of the network management subsystem on the Node, it returns a value of “stop”.

When set, this variable causes a Start or Stop event on the specified neighbor, as specified on pages 8-10 of RFC 904. Briefly, a Start event causes an Idle peer to begin neighbor acquisition and a non-Idle peer to reinitiate neighbor acquisition. A stop event causes a non-Idle peer to return to the Idle state until a Start event occurs, either by egpNeighEventTrigger or otherwise.

Syntax Description

INTEGER { start(1), stop(2) }

Access

Read-write

Status

Mandatory
egpAs (1.3.6.1.2.1.8.6)

The autonomous system number of this EGP entity.

**Syntax Description**

INTEGER

**Access**

Read-only

**Status**

Mandatory
Transmission Group

Based on the transmission media underlying each interface on a system, the corresponding portion of the Transmission group is mandatory for that system.

When Internet-standard definitions for managing transmission media are defined, the transmission group is used to provide a prefix for the names of those objects.

Typically, such definitions reside in the experimental portion of the MIB until they are “proven”, then as a part of the Internet standardization process, the definitions are accordingly elevated and a new object identifier, under the transmission group is defined. By convention, the name assigned is:

\[
\text{type OBJECT IDENTIFIER ::= \{ transmission number \}.}
\]

Where “type” is the symbolic value used for the media in the ifType column of the ifTable object, and “number” is the actual integer value corresponding to the symbol.
Implementation of the SNMP group is mandatory for all systems which support an SNMP protocol entity. Some of the objects defined below will be zero-valued in those SNMP implementations that are optimized to support only those functions specific to either a management agent or a management station. In particular, it should be observed that the objects below refer to an SNMP entity, and there may be several SNMP entities residing on a managed Node.

- `snmpInPkts (1.3.6.1.2.1.11.1)`, page 2-167
- `snmpOutPkts (1.3.6.1.2.1.11.2)`, page 2-168
- `snmpInBadVersions (1.3.6.1.2.1.11.3)`, page 2-169
- `snmpInBadCommunityNames (1.3.6.1.2.1.11.4)`, page 2-170
- `snmpInBadCommunityUses (1.3.6.1.2.1.11.5)`, page 2-171
- `snmpInASNParseErrs (1.3.6.1.2.1.11.6)`, page 2-172
- `snmpInTooBigs (1.3.6.1.2.1.11.8)`, page 2-173
- `snmpInNoSuchNames (1.3.6.1.2.1.11.9)`, page 2-174
- `snmpInBadValues (1.3.6.1.2.1.11.10)`, page 2-175
- `snmpInReadOnlys (1.3.6.1.2.1.11.11)`, page 2-176
- `snmpInGenErrs (1.3.6.1.2.1.11.12)`, page 2-177
- `snmpInTotalReqVars (1.3.6.1.2.1.11.13)`, page 2-178
- `snmpInTotalSetVars (1.3.6.1.2.1.11.14)`, page 2-179
- `snmpInGetRequests (1.3.6.1.2.1.11.15)`, page 2-180
- `snmpInGetNexts (1.3.6.1.2.1.11.16)`, page 2-181
- `snmpInSetRequests (1.3.6.1.2.1.11.17)`, page 2-182
- `snmpInGetResponses (1.3.6.1.2.1.11.18)`, page 2-183
- `snmpInTraps (1.3.6.1.2.1.11.19)`, page 2-184
- `snmpOutTooBigs (1.3.6.1.2.1.11.20)`, page 2-185
- `snmpOutNoSuchNames (1.3.6.1.2.1.11.21)`, page 2-186
- `snmpOutBadValues (1.3.6.1.2.1.11.22)`, page 2-187
- `snmpOutGenErrs (1.3.6.1.2.1.11.24)`, page 2-188
- `snmpOutGetRequests (1.3.6.1.2.1.11.25)`, page 2-189
- `snmpOutGetNexts (1.3.6.1.2.1.11.26)`, page 2-190
- `snmpOutSetRequests (1.3.6.1.2.1.11.27)`, page 2-191
- `snmpOutGetResponses (1.3.6.1.2.1.11.28)`, page 2-192
- `snmpOutTraps (1.3.6.1.2.1.11.29)`, page 2-193
- `snmpEnableAuthenTraps (1.3.6.1.2.1.11.30)`, page 2-194
snmpInPkts (1.3.6.1.2.1.11.1)

The total number of messages delivered to the SNMP entity from the transport service.

**Syntax Description**: Counter

**Access**: Read-only

**Status**: Mandatory
snmpOutPackets (1.3.6.1.2.1.11.2)

The total number of SNMP messages passed from the SNMP protocol entity to the transport service.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
The total number of SNMP messages delivered to the SNMP protocol entity and were for an unsupported SNMP version.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
The total number of SNMP messages delivered to the SNMP protocol entity which used an SNMP community name not known to the entity.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
The total number of SNMP messages delivered to the SNMP protocol entity which represented an SNMP operation which was not allowed by the SNMP community named in the message.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
snmpInASNParseErrs (1.3.6.1.2.1.11.6)

The total number of ASN.1 or BER errors encountered by the SNMP protocol entity when decoding received SNMP messages.

Syntax Description: Counter
Access: Read-only
Status: Mandatory
snmpInTooBigs (1.3.6.1.2.1.11.8)

The total number of SNMP PDUs delivered to the SNMP protocol entity and for which the value of the error-status field is “tooBig”.

Syntax Description: Counter
Access: Read-only
Status: Mandatory
The total number of SNMP PDUs delivered to the SNMP protocol entity and for which the value of the error-status field is “NoSuchName”.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
snmpInBadValues (1.3.6.1.2.1.11.10)

The total number of SNMP PDUs delivered to the SNMP protocol entity and for which the value of the error-status field is “badValue”.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
The total number valid SNMP PDUs delivered to the SNMP protocol entity and for which the value of the error-status field is “readOnly”. It should be noted that it is a protocol error to generate an SNMP PDU which contains the value “readOnly” in the error-status field, as such, this object is provided as a means of detecting incorrect implementations of the SNMP.

**Syntax Description**

Counter

**Access**

Read-only

**Status**

Mandatory
The total number of SNMP PDUs delivered to the SNMP protocol entity and for which the value of the error-status field is “genErr”.

**Syntax Description**
- Counter

**Access**
- Read-only

**Status**
- Mandatory
snmpInTotalReqVars (1.3.6.1.2.1.11.13)

The total number of MIB objects retrieved successfully by the SNMP protocol entity as the result of receiving valid SNMP Get-Request and Get-Next PDUs.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
The total number of MIB objects altered successfully by the SNMP protocol entity as the result of receiving valid SNMP Set-Request PDUs.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
snmpInGetRequests (1.3.6.1.2.1.11.15)

The total number of SNMP Get-Request PDUs accepted and processed by the SNMP protocol entity.

Syntax Description

<table>
<thead>
<tr>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read-only</td>
</tr>
</tbody>
</table>

Status

<table>
<thead>
<tr>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
</tr>
</tbody>
</table>
snmpInGetNexts (1.3.6.1.2.1.11.16)

The total number of SNMP Get-Next PDUs accepted and processed by the SNMP protocol entity.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
The total number of SNMP Set-Request PDUs accepted and processed by the SNMP protocol entity.

**Syntax Description**: Counter

**Access**: Read-only

**Status**: Mandatory
snmpInGetResponses (1.3.6.1.2.1.11.18)

The total number of SNMP Get-Response PDUs accepted and processed by the SNMP protocol entity.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
snmpInTraps (1.3.6.1.2.1.11.19)

The total number of SNMP Trap PDUs accepted and processed by the SNMP protocol entity.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
**snmpOutTooBigs (1.3.6.1.2.1.11.20)**

The total number of SNMP PDUs generated by the SNMP protocol entity and for which the value of the error-status field is “tooBig”.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
snmpOutNoSuchNames (1.3.6.1.2.1.11.21)

The total number of SNMP PDUs generated by the SNMP protocol entity and for which the value of the error-status is “NoSuchName”.

Syntax Description: Counter

Access: Read-only

Status: Mandatory
The total number of SNMP PDUs generated by the SNMP protocol entity and for which the value of the error-status field is “badValue”.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
snmpOutGenErrs (1.3.6.1.2.1.11.24)

The total number of SNMP PDUs generated by the SNMP protocol entity and for which the value of the error-status field is “genErr”.

Syntax Description  Counter

Access  Read-only

Status  Mandatory
snmpOutGetRequests (1.3.6.1.2.1.11.25)

The total number of SNMP Get-Request PDUs generated by the SNMP protocol entity.

Syntax Description: Counter

Access: Read-only

Status: mandatory
snmpOutGetNexts (1.3.6.1.2.1.11.26)

The total number of SNMP Get-Next PDUs generated by the SNMP protocol entity.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
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**snmpOutSetRequests (1.3.6.1.2.1.11.27)**

The total number of SNMP Set-Request PDUs generated by the SNMP protocol entity.

<table>
<thead>
<tr>
<th>Syntax Description</th>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Read-only</td>
</tr>
<tr>
<td>Status</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>
snmpOutGetResponses (1.3.6.1.2.1.11.28)

The total number of SNMP Get-Response PDUs generated by the SNMP protocol entity.

**Syntax Description**
Counter

**Access**
Read-only

**Status**
Mandatory
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**snmpOutTraps (1.3.6.1.2.1.11.29)**

The total number of SNMP Trap PDUs generated by the SNMP protocol entity.

**Syntax Description**  Counter

**Access**  Read-only

**Status**  Mandatory
**snmpEnableAuthenTraps (1.3.6.1.2.1.11.30)**

Indicates whether the SNMP agent process is permitted to generate authentication-failure traps. The value of this object overrides any configuration information; as such, it provides a means whereby all authentication-failure traps may be disabled.

It is strongly recommended that this object be stored in non-volatile memory so that it remains constant between reinitializations of the network management system.

**Syntax Description**  

INTEGER { enabled(1), disabled(2) }

**Access**  

Read-write

**Status**  

Mandatory

**Return Value**  

Read returns enabled (1) if AuthFailureTrap = True, otherwise disabled (2). Writes are not supported.