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Generalized Multiprotocol Label Switching (GMPLS) Label  
Management Information Base

[draft-nadeau-ccamp-gmpls-label-mib-01.txt](#)

Status of this Memo

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Abstract

This memo defines an experimental portion of the Management Information Base (MIB) for use with network

management protocols in the Internet community. In particular, it describes managed objects defining label

for Multiprotocol Label Switching (MPLS) [[RFC3031](#)] and Generalized Multiprotocol Label Switching (GMPLS) [[GMPLSArch](#)] Label Switching Routers (LSRs).

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### [1.](#) Changes and Pending Work

This section must be removed before the draft progresses to RFC.

#### [1.1.](#) Changes Since the Last Version

Aligned with the other GMPLS MIBs. References updated.

## [1.2.](#) Pending Work

The following work items have been identified for this version of the draft to be addressed in a future version.

- Clarify which objects can be modified when row-status and admin-status are set to active.
- Expand conformance statements to give one for monitoring only, and one for monitoring and control.
- Provide examples.

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- Provide objects for tables to support the get-next-index operation for all arbitrary indexes.

## [2.](#) Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling and managing labels within Generalized MPLS systems. For an introduction to the concepts of GMPLS, see [[GMPLSArch](#)]. Note that this portion of the MIB is optional within a managed GMPLS system. In particular, if the labels used within the system are 'simple' labels that may be encoded within a 32 bit quantity, and if the encoding of the labels is implicit from the context within which they are used, then the table defined within this MIB is not required. Refer to the other MIB definitions ([[GMPLSTEMIB](#)] and [[GMPLSLSRMIB](#)]) for further details.

Comments should be made directly to the CCAMP mailing list at [ccamp@ops.ietf.org](mailto:ccamp@ops.ietf.org).

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be

interpreted as described in [RFC 2119](#), reference [\[RFC2119\]](#).

### 3. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in [RFC 2571](#) [\[RFC2571\]](#).
- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [\[RFC1155\]](#), STD 16, [RFC 1212](#) [\[RFC1212\]](#) and STD 16, [RFC 1215](#) [\[RFC1215\]](#). The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [\[RFC2578\]](#), STD 58, [RFC 2579](#) [\[RFC2579\]](#) and STD 58, [RFC 2580](#) [\[RFC2580\]](#).
- Message protocols for transferring management

information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [\[RFC1157\]](#). A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [\[RFC1901\]](#) and [RFC 1906](#) [\[RFC1906\]](#). The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [\[RFC1906\]](#), [RFC 2572](#) [\[RFC2572\]](#) and [RFC 2574](#) [\[RFC2574\]](#).

- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [\[RFC1157\]](#). A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [\[RFC1905\]](#).
- A set of fundamental applications described in [RFC](#)

[2573](#) [[RFC2573](#)] and the view-based access control mechanism described in [RFC 2575](#) [[RFC2575](#)].

A more detailed introduction to the current SNMP Management Framework can be found in [RFC 2570](#) [[RFC2570](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

#### [4.](#) Brief Description of MIB Objects

The tables support both manually configured and signaled tunnels as described in [TBD].

##### [4.1.](#) gmplsLabelTable

The gmplsLabelTable allows Generalized Labels to be defined and managed in a central location. Generalized Labels can be of variable length and have distinct bit-by-bit interpretations according to the use that is made of them.

It is useful to configure and inspect Generalized Labels using the sub-fields of the labels - and this table makes

that feature possible. At the same time, some labels may be of unknown construction and must be exposed as octet strings. Similarly, some implementations may choose not to expose the construction of some or all labels, and can show them as octet strings.

It is possible that some implementations will choose to construct and fully populate this table with all valid labels at start of day. Other implementations may choose to create entries on-demand. This table is indexed using an arbitrary index value that is not related to the label value in use. This means that it is possible to create two row entries with the same label values. This may be convenient when creating table entries on-demand.

#### [4.1.1](#) Concatenated Labels

In some environments such as TDM, it is useful to be able to build a single GMPLS label from a concatenation of sub-labels. This facilitates, for example, concatenation of timeslots to support a data flow.

This concatenation is achieved through a secondary index into the Label Table.

## [5.](#) GMPLS Label MIB Definitions

```
GMPLS-LABEL-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE, Integer32, Unsigned32
        FROM SNMPv2-SMI
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF
    RowStatus, StorageType
        FROM SNMPv2-TC
    MplsLabel
        FROM MPLS-TC-MIB
    gmplsMIB, GmplsGeneralizedLabelTypes,
    GmplsGeneralizedLabelSubtypes, GmplsFreeformLabel
```

FROM GMPLS-TC-MIB

;

gmplsLabelMIB MODULE-IDENTITY

LAST-UPDATED

"200201251200Z" -- 25 Jan 2002 12:00:00 GMT"

ORGANIZATION

"Common Control And Management Protocols  
(CCAMP) Working Group"

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at ccamp@ops.ietf.org."

DESCRIPTION

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"This MIB module contains managed object definitions of labels within GMPLS systems."

-- Revision history.

REVISION

"200111111100Z" -- 11 Nov 2001 11:00:00 GMT

DESCRIPTION

"Initial version."

REVISION

"200201251200Z" -- 25 Jan 2002 12:00:00 GMT

DESCRIPTION

"Revision for compilation and work in progress."

::= { gmplsMIB 3 }

-- Top level components of this MIB.

-- tables, scalars

gmplsLabelObjects

OBJECT IDENTIFIER ::= { gmplsLabelMIB 1 }

gmplsLabelConformance

OBJECT IDENTIFIER ::= { gmplsLabelMIB 2 }

-- GMPLS Label Table.

gmplsLabelTable OBJECT-TYPE

SYNTAX SEQUENCE OF GmplsLabelEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Table of GMPLS Labels. Each entry in this table represents an individual GMPLS label value. Labels in the tables in other MIBs are referred to using index entries into this table. In effect, the table provides an integer mapping for label values that may be more complex than simple integers."



```
::= { gmplsLabelObjects 1 }
```

```
gmplsLabelEntry OBJECT-TYPE  
SYNTAX          GmplsLabelEntry  
MAX-ACCESS      not-accessible  
STATUS          current  
DESCRIPTION  
    "An entry in this table defines a GMPLS  
    label."  
INDEX { gmplsLabelIndex, gmplsSublabelIndex }  
 ::= { gmplsLabelTable 1 }
```

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```
GmplsLabelEntry ::= SEQUENCE {  
    gmplsLabelIndex          Unsigned32,  
    gmplsSublabelIndex       Unsigned32,  
    gmplsLabelRowStatus      RowStatus,  
    gmplsLabelStorageType    StorageType,  
    gmplsLabelType           GmplsGeneralizedLabelTypes,  
    gmplsLabelSubtype        GmplsGeneralizedLabelSubtypes,  
    gmplsMplsLabel           MplsLabel,  
    gmplsPortWavelengthLabel Unsigned32,  
    gmplsFreeformLength      Integer32,  
    gmplsFreeformLabel       GmplsFreeformLabel,  
    gmplsSonetSdhSignalIndex Integer32,  
    gmplsSdhVc               Integer32,  
    gmplsSdhVcBranch         Integer32,  
    gmplsSonetSdhBranch      Integer32,  
    gmplsSonetSdhGroupBranch Integer32,  
    gmplsWavebandId         Unsigned32,  
    gmplsWavebandStartLabel Unsigned32,  
    gmplsWavebandEndLabel   Unsigned32  
}
```

```
gmplsLabelIndex OBJECT-TYPE  
SYNTAX          Unsigned32 (1..4294967295)  
MAX-ACCESS      not-accessible  
STATUS          current  
DESCRIPTION  
    "Uniquely identifies this label. In  
    conjunction with gmplsSublabelIndex this
```

uniquely identifies a row."  
 ::= { gmplsLabelEntry 1 }

gmplsSublabelIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"In conjunction with gmplsLabelIndex uniquely identifies this row. This sub-index allows a single GMPLS label to be defined as a concatenation of labels. This is particularly useful in TDM. The ordering of sub-labels is strict with the sub-label with lowest gmplsSublabelIndex appearing first. Note that all sub-labels of a single GMPLS label must share the same gmplsLabelIndex value. For labels that are not composed of concatenated sub-labels, this value should be set to zero."

::= { gmplsLabelEntry 2 }

gmplsLabelRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable is used to create, modify, and/or delete a row in this table."

::= { gmplsLabelEntry 3 }

gmplsLabelStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable indicates the storage type for this table entry. When set to 'permanent', the entire row is to be stored."

```
::= { gmplsLabelEntry 4 }
```

```
gmplsLabelType OBJECT-TYPE
```

```
SYNTAX          GmplsGeneralizedLabelTypes
```

```
MAX-ACCESS      read-create
```

```
STATUS          current
```

```
DESCRIPTION
```

```
    "Identifies the type of this label as it  
    appears in a Generalized Label."
```

```
::= { gmplsLabelEntry 5 }
```

```
gmplsLabelSubtype OBJECT-TYPE
```

```
SYNTAX          GmplsGeneralizedLabelSubtypes
```

```
MAX-ACCESS      read-create
```

```
STATUS          current
```

```
DESCRIPTION
```

```
    "Subtype to help determine which of the  
    subsequent fields should be used to form  
    the Generalized Label."
```

```
::= { gmplsLabelEntry 6 }
```

```
gmplsMplsLabel OBJECT-TYPE
```

```
SYNTAX          MplsLabel
```

```
MAX-ACCESS      read-create
```

```
STATUS          current
```

```
DESCRIPTION
```

```
    "The value of a conventional MPLS label when  
    carried as a Generalized Label. Only valid  
    if gmplsLabelType is set to mplsLabel(1),  
    and gmplsLabelSubtype is set to  
    mplsLabel(1)."
```

```
::= { gmplsLabelEntry 7 }
```

```
gmplsPortWavelengthLabel OBJECT-TYPE
```

```
SYNTAX          Unsigned32
```

```
MAX-ACCESS      read-create
```

```
STATUS          current
```

```
DESCRIPTION
```

```
    "The value of a Port or Wavelength Label  
    when carried as a Generalized Label. Only
```

valid if gmplsLabelType is set to  
generalizedLabel(2), and gmplsLabelSubtype  
is set to portWavelengthLabel(2)."  
 ::= { gmplsLabelEntry 8 }

gmplsFreeformLength OBJECT-TYPE

SYNTAX Integer32 (1..64)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The length of a freeform Generalized Label  
indicated in the gmplsFreeformLabel object.  
Only valid if gmplsLabelType is set to  
generalizedLabel(2), and gmplsLabelSubtype  
is set to freeformGeneralizedLabel(3)."

::= { gmplsLabelEntry 9 }

gmplsFreeformLabel OBJECT-TYPE

SYNTAX GmplsFreeformLabel

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The value of a freeform Generalized Label  
that does not conform to one of the  
standardized label encoding or that an  
implementation chooses to represent as an  
octet string without further decoding. The  
length of this object is given by the value  
of gmplsFreeformLength. Only valid if  
gmplsLabelType is set to  
generalizedLabel(2), and gmplsLabelSubtype  
is set to freeformGeneralizedLabel(3)."

::= { gmplsLabelEntry 10 }

gmplsSonetSdhSignalIndex OBJECT-TYPE

SYNTAX Integer32 (0..4095)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Signal Index value (S) of a Sonet or  
SDH Generalized Label. 0 indicates that

this field is non-significant. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to sonetLabel(4) or sdhLabel(5)."  
 ::= { gmplsLabelEntry 11 }

gmplsSdhVc OBJECT-TYPE

SYNTAX           Integer32 (0..15)  
MAX-ACCESS       read-create  
STATUS           current  
DESCRIPTION  
    "The VC Indicator (U) of an SDH Generalized Label. 0 indicates that this field is non-significant. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to sdhLabel(5)."  
 ::= { gmplsLabelEntry 12 }

gmplsSdhVcBranch OBJECT-TYPE

SYNTAX           Integer32 (0..15)  
MAX-ACCESS       read-create  
STATUS           current  
DESCRIPTION  
    "The VC Branch Indicator (K) of an SDH Generalized Label. 0 indicates that this field is non-significant. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to sdhLabel(5)."  
 ::= { gmplsLabelEntry 13 }

gmplsSonetSdhBranch OBJECT-TYPE

SYNTAX           Integer32 (0..15)  
MAX-ACCESS       read-create  
STATUS           current  
DESCRIPTION  
    "The Branch Indicator (L) of a Sonet or SDH Generalized Label. 0 indicates that this field is non-significant. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to sonetLabel(4) or SdhLabel(5)."  
 ::= { gmplsLabelEntry 14 }

gmplsSonetSdhGroupBranch OBJECT-TYPE

SYNTAX           Integer32 (0..15)  
MAX-ACCESS       read-create  
STATUS           current  
DESCRIPTION  
    "The Group Branch Indicator (M) of a Sonet

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or SDH Generalized Label. 0 indicates that this field is non-significant. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to sonetLabel(4) or sdhLabel(5)."

```
::= { gmplsLabelEntry 15 }
```

gmplsWavebandId OBJECT-TYPE

SYNTAX Unsigned32  
MAX-ACCESS read-create  
STATUS current

DESCRIPTION

"The waveband identifier component of a waveband label. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to wavebandLabel(6)."

```
::= { gmplsLabelEntry 16 }
```

gmplsWavebandStartLabel OBJECT-TYPE

SYNTAX Unsigned32  
MAX-ACCESS read-create  
STATUS current

DESCRIPTION

"The starting label component of a waveband label. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to wavebandLabel(6)."

```
::= { gmplsLabelEntry 17 }
```

gmplsWavebandEndLabel OBJECT-TYPE

SYNTAX Unsigned32  
MAX-ACCESS read-create  
STATUS current

DESCRIPTION

"The end label component of a waveband label. Only valid if gmplsLabelType is set to generalizedLabel(2), and gmplsLabelSubtype is set to

```
        wavebandLabel(6)."
 ::= { gmplsLabelEntry 18 }

-- End of GMPLS Label Table

-- Module compliance.

gmplsLabelGroups
  OBJECT IDENTIFIER ::= { gmplsLabelConformance 1 }
```

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```
gmplsLabelCompliances
  OBJECT IDENTIFIER ::= { gmplsLabelConformance 2 }
```

```
gmplsLabelModuleCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
    "Compliance statement for agents that
     support the GMPLS Label MIB."
```

```
MODULE -- this module
```

```
-- The mandatory groups have to be implemented by
-- LSRs claiming support for this MIB. This MIB itself,
-- however, is mandatory only on LSRs supporting GMPLS
```

```
MANDATORY-GROUPS {
  gmplsLabelTableGroup
}
```

```
-- Units of conformance.
```

```
GROUP gmplsLabelTableGroup
DESCRIPTION
  "This group is mandatory for devices which
   support the gmplsLabelTable."
```

```
GROUP gmplsMPLSLabelGroup
DESCRIPTION
  "This group extends gmplsLabelTableGroup for
```

implementations that support conventional MPLS labels."

GROUP gmplsPortWavelengthLabelGroup

DESCRIPTION

"This group extends gmplsLabelTableGroup for implementations that support port and wavelength labels."

GROUP gmplsFreeformLabelGroup

DESCRIPTION

"This group extends gmplsLabelTableGroup for implementations that support freeform labels."

GROUP gmplsSonetSdhLabelGroup

DESCRIPTION

"This group extends gmplsLabelTableGroup for implementations that support SonetSdh labels."

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GROUP gmplsWavebandLabelGroup

DESCRIPTION

"This group extends gmplsLabelTableGroup for implementations that support Waveband labels."

-- gmplsLabelTable

OBJECT gmplsLabelRowStatus

SYNTAX INTEGER {

active(1),  
notInService(2),  
createAndGo(4),  
destroy(6)

}

MIN-ACCESS read-only

DESCRIPTION

"The notReady(3) and createAndWait(5) states need not be supported. Write access is not



required."

OBJECT gmplsLabelStorageType  
SYNTAX INTEGER { other(1) }  
MIN-ACCESS read-only  
DESCRIPTION  
"Only other (1) needs to be supported."

OBJECT gmplsLabelType  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsLabelSubtype  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsMplsLabel  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsPortWavelengthLabel  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsFreeformLength  
MIN-ACCESS read-only

DESCRIPTION  
"Write access is not required."

OBJECT gmplsFreeformLabel  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsSonetSdhSignalIndex  
MIN-ACCESS read-only

DESCRIPTION  
"Write access is not required."

OBJECT gmplsSdhVc  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsSdhVcBranch  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsSonetSdhBranch  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsSonetSdhGroupBranch  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsWavebandId  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsWavebandStartLabel  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

OBJECT gmplsWavebandEndLabel  
MIN-ACCESS read-only  
DESCRIPTION  
"Write access is not required."

::= { gmplsLabelCompliances 1 }

-- Units of conformance.

gmplsLabelTableGroup OBJECT-GROUP

OBJECTS {

gmplsLabelRowStatus,  
gmplsLabelStorageType,  
gmplsLabelType,  
gmplsLabelSubtype

}

STATUS current

DESCRIPTION

"Necessary, but not sufficient, set of objects to implement label table support. In addition, depending on the type of labels supported (for example, wavelength labels), the following other groups defined below are mandatory: gmplsMPLSLabelGroup and/or gmplsPortWavelengthLabelGroup and/or gmplsFreeformLabelGroup and/or gmplsSonetSdhLabelGroup."

::= { gmplsLabelGroups 1 }

gmplsMPLSLabelGroup OBJECT-GROUP

OBJECTS {

gmplsMplsLabel

}

STATUS current

DESCRIPTION

"Object needed to implement MPLS labels."

::= { gmplsLabelGroups 2 }

gmplsPortWavelengthLabelGroup OBJECT-GROUP

OBJECTS {

gmplsPortWavelengthLabel

}

STATUS current

DESCRIPTION

"Object needed to implement Port and Wavelength labels."

::= { gmplsLabelGroups 3 }

gmplsFreeformLabelGroup OBJECT-GROUP

OBJECTS {

gmplsFreeformLength,  
gmplsFreeformLabel

}

STATUS current

DESCRIPTION

"Object needed to implement Freeform labels."

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```
::= { gmplsLabelGroups 4 }
```

```
gmplsSonetSdhLabelGroup OBJECT-GROUP
```

```
OBJECTS {
```

```
    gmplsSonetSdhSignalIndex,  
    gmplsSdhVc,  
    gmplsSdhVcBranch,  
    gmplsSonetSdhBranch,  
    gmplsSonetSdhGroupBranch
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
    "Object needed to implement SONET and SDH  
    labels."
```

```
::= { gmplsLabelGroups 5 }
```

```
gmplsWavebandLabelGroup OBJECT-GROUP
```

```
OBJECTS {
```

```
    gmplsWavebandId,  
    gmplsWavebandStartLabel,  
    gmplsWavebandEndLabel
```

```
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
    "Object needed to implement Waveband  
    labels."
```

```
::= { gmplsLabelGroups 6 }
```

```
END
```

## 6. Security Considerations

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

There are a number of managed objects in this MIB that may contain information that may be sensitive from a business perspective, in that they represent a customer's interface to the GMPLS network. Allowing uncontrolled access to these objects could result in malicious and unwanted disruptions of network traffic or incorrect configurations for these customers. There are no objects that are particularly sensitive in their own right, such as passwords or monetary amounts.

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

At this writing, no security holes have been identified beyond those that SNMP Security [[RFC2571](#)] is itself intended to address. These relate to primarily controlled access to sensitive information and the ability to configure a device - or which might result from operator error, which is beyond the scope of any security architecture.

SNMPv1 or SNMPv2 are by themselves not a secure environment. Even if the network itself is secure (for example by using IPSec [IPSEC]), there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB. It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [[RFC2574](#)] and the View-based Access Control [[RFC2575](#)] is recommended. It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

There are a number of managed objects in this MIB that may contain information that may be sensitive from a business perspective, in that they represent a customer's interface to the GMPLS network. Allowing uncontrolled access to these objects could result in malicious and unwanted disruptions of network traffic or incorrect configurations for these customers. There are no objects that are particularly sensitive in their own right, such as passwords or monetary amounts.

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## 8. References

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### 8.1. Normative References

- [RFC1157] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", [RFC 1157](#), May 1990.
- [RFC1212] Rose, M., and K. McCloghrie, "Concise MIB Definitions", [RFC 1212](#), March 1991.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIV2", STD 58, [RFC 2579](#), April 1999.
- [RFC2863] McCloghrie, K. and F. Kastenholtz, "The

Interfaces Group MIB", [RFC 2863](#), June 2000.

[GMPLSArch] Ashwood-Smith, P., Awduche, D., Banerjee, A., Basak, D., Berger, L., Bernstein, G., Drake, J., Fan, Y., Fedyk, D., Grammel, D., Kompella, K., Kullberg, A., Lang, J., Liaw, F., Papadimitriou, D., Pendarakis, D., Rajagopalan, B., Rekhter, Y., Saha, D., Sandick, H., Sharma, V., Swallow, G., Tang, Z., Yu, J., Zinin, A., Nadeau, T., Mannie, E., Generalized Multiprotocol Label Switching (GMPLS) Architecture, Internet Draft <[draft-many-gmpls-architecture-01.txt](#)>, March 2001, work in progress.

[GMPLSSig] Ashwood-Smith, P., Awduche, D., Banerjee, A., Basak, D., Berger, L., Bernstein, G., Drake, J., Fan, Y., Fedyk, D., Grammel, D., Kompella, K., Kullberg, A., Lang, Rajagopalan, B., Rekhter, Y., Saha, D., Sharma, V., Swallow, G., Bo Tang, Z., Generalized MPLS - Signaling Functional Description, <[draft-ietf-mpls-generalized-signaling-04.txt](#)>, May 2001, work in progress.

[GMPLSCRLDP] Ashwood-Smith, P., Awduche, D., Banerjee, A., Basak, D., Berger, L., Bernstein, G., Drake, J., Fan, Y., Fedyk, D., Grammel, D.,

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---

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GMPLS Label MIB

January 2002

Kompella, K., Kullberg, A., Lang, Rajagopalan, B., Rekhter, Y., Saha, D., Sharma, V., Swallow, G., Bo Tang, Z., Generalized MPLS Signaling - CR-LDP Extensions, Internet Draft <[draft-ietf-mpls-generalized-cr-ldp-03.txt](#)>, May 2001, work in progress.

[GMPLSRVPTTE] Ashwood-Smith, P., Awduche, D., Banerjee, A., Basak, D., Berger, L., Bernstein, G., Drake, J., Fan, Y., Fedyk, D., Grammel, D.,

Kompella, K., Kullberg, A., Lang, Rajagopalan, B., Rekhter, Y., Saha, D., Sharma, V., Swallow, G., Bo Tang, Z., Generalized MPLS Signaling - RSVP-TE Extensions, Internet Draft <[draft-ietf-mpls-generalized-rsvp-te-03.txt](#)>, May 2001, work in progress.

[GMPLSSonetSDH] Mannie, E., Ansorge, S., Ashwood-Smith, P., Banerjee, A., Berger, L., Bernstein, G., Chiu, A., Drake, J., Fan, Y., Fontana, M., Grammel, G., Heiles, J., Katukam, S., Kompella, K., Lang, J. P., Liaw, F., Lin, Z., Mack-Crane, B., Papadimitriou, D., Pendarakis, D., Raftelis, M., Rajagopalan, B., Rekhter, Y., Saha, D., Sharma, V., Swallow, G., Bo Tang, Z., Varma, E., Vissers, M., Xu, Y., GMPLS Extensions for SONET and SDH Control, Internet Draft <[draft-ietf-ccamp-gmpls-sonet-sdh-00.txt](#)>, May 2001, work in progress.

[TCMIB] Nadeau, T., Cucchiara, J., Srinivasan, C, Viswanathan, A. and H. Sjostrand, "Definition of Textual Conventions and OBJECT-IDENTITIES for Multiprotocol Label Switching (MPLS) Management", Internet Draft <[draft-ietf-mpls-tc-mib-03.txt](#)>, January 2002, work in progress.

## [8.2.](#) Informational References

[RFC1155] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", [RFC 1155](#), May 1990.

[RFC1215] M. Rose, "A Convention for Defining Traps



1991.

- [RFC1901] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", [RFC 1901](#), January 1996.
- [RFC1905] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), January 1996.
- [RFC1906] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1906](#), January 1996.
- [RFC2514] Noto, et. al., "Definitions of Textual Conventions and OBJECT-IDENTITIES for ATM Management", [RFC 2514](#), Feb. 1999
- [RFC2570] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction to Version 3 of the Internet-standard Network Management Framework", [RFC 2570](#), April 1999.
- [RFC2571] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", [RFC 2571](#), April 1999.
- [RFC2572] Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", [RFC 2572](#), April 1999.
- [RFC2573] Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications", [RFC 2573](#), April 1999.
- [RFC2574] Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2574](#), April 1999.
- [RFC2575] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2575](#), April 1999.

Internet Draft

GMPLS Label MIB

January 2002

- [RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.
- [RFC2580] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, [RFC 2580](#), April 1999.
- [RFC3031] Rosen, E., Viswanathan, A., and R. Callon, "Multiprotocol Label Switching Architecture", [RFC 3031](#), August 1999.
- [RFC3032] Rosen, E., Rekhter, Y., Tappan, D., Farinacci, D., Federokow, G., Li, T., and A. Conta, "MPLS Label Stack Encoding", [RFC 3032](#), January 2001.
- [Assigned] Reynolds, J., and J. Postel, "Assigned Numbers", [RFC 1700](#), October 1994. See also: <http://www.isi.edu/in-notes/iana/assignments/smi-numbers>.

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