

Network Working Group  
Request for Comments: 2788  
Category: Standards Track  
Obsoletes: 2248

N. Freed  
Innosoft  
S. Kille  
MessagingDirect Ltd.  
March 2000

## Network Services Monitoring MIB

### Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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### Introduction

A networked application is a realization of some well-defined service on one or more host computers that is accessible via some network, uses some network for its internal operations, or both.

There are a wide range of networked applications for which it is appropriate to provide SNMP monitoring of their network usage. This includes applications using both TCP/IP and OSI networking. This document defines a MIB which contains the elements common to the monitoring of any network service application. This information includes a table of all monitorable network service applications, a count of the associations (connections) to each application, and basic information about the parameters and status of each application-related association.

This MIB may be used on its own for any application, and for most simple applications this will suffice. This MIB is also designed to serve as a building block which can be used in conjunction with application-specific monitoring and management. Two examples of this are MIBs defining additional variables for monitoring a Message Transfer Agent (MTA) service or a Directory Service Agent (DSA) service. It is expected that further MIBs of this nature will be specified.

This MIB does not attempt to provide facilities for management of the host or hosts the network service application runs on, nor does it provide facilities for monitoring applications that provide something other than a network service. Host resource and general application monitoring is handled by either the Host Resources MIB [1] or the application MIB [2].

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## 1. The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in RFC 2571 [3].
- o 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 [4], STD 16, RFC 1212 [5] and RFC 1215 [6]. The second version, called SMIV2, is described in STD 58, RFC 2578 [7], STD 58, RFC 2579 [8] and STD 58, RFC 2580 [9].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, RFC 1157 [10]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [11] and RFC 1906 [12]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [12], RFC 2572 [13] and RFC 2574 [14].

- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [10]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [15].
- o A set of fundamental applications described in RFC 2573 [16] and the view-based access control mechanism described in RFC 2575 [17].

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.

## 2. Rationale for having a Network Services Monitoring MIB

Much effort has been expended in developing tools to manage lower layer network facilities. However, relatively little work has been done on managing application layer entities. It is neither efficient nor reasonable to manage all aspects of application layer entities using only lower layer information. Moreover, the difficulty of managing application entities in this way increases dramatically as application entities become more complex.

This leads to a substantial need to monitor applications which provide network services, particularly distributed components such as MTAs and DSAs, by monitoring specific aspects of the application itself. Reasons to monitor such components include but are not limited to measuring load, detecting broken connectivity, isolating system failures, and locating congestion.

In order to manage network service applications effectively two requirements must be met:

- (1) It must be possible to monitor a large number of components (typical for a large organization).

- (2) Application monitoring must be integrated into general network management.

This specification defines simple read-only access; this is sufficient to determine up/down status and provide an indication of a broad class of operational problems.

## 2.1. General Relationship to Other MIBs

This MIB is intended to only provide facilities common to the monitoring of any network service application. It does not provide all the facilities necessary to monitor any specific application. Each specific type of network service application is expected to have a MIB of its own that makes use of these common facilities.

## 2.2. Restriction of Scope

The framework provided here is very minimal; there is a lot more that could be done. For example:

- (1) General network service application configuration monitoring and control.
- (2) Detailed examination and modification of individual entries in service-specific request queues.
- (3) Probing to determine the status of a specific request (e.g., the location of a mail message with a specific message-id).
- (4) Requesting that certain actions be performed (e.g., forcing an immediate connection and transfer of pending messages to some specific system).

All these capabilities are both impressive and useful. However, these capabilities would require provisions for strict security checking. These capabilities would also mandate a much more complex design, with many characteristics likely to be fairly implementation-specific. As a result such facilities are likely to be both contentious and difficult to implement.

This document religiously keeps things simple and focuses on the basic monitoring aspect of managing applications providing network services. The goal here is to provide a framework which is simple, useful, and widely implementable.

### 2.3. Configuration Information

This MIB attempts to provide information about the operational aspects of an application. Further information about the actual configuration of a given application may be kept in other places; the `applDirectoryName` or `applURL` may be used to point to places where such information is kept.

### 3. Application Objects

This MIB defines a set of general purpose attributes which would be appropriate for a range of applications that provide network services. Both OSI and non-OSI services can be accommodated. Additional tables defined in extensions to this MIB provide attributes specific to specific network services.

A table is defined which will have one row for each operational network service application on the system. The only static information held on the application is its name. All other static information should be obtained from various directory services. The `applDirectoryName` is an external key, which allows an SNMP MIB entry to be cleanly related to the X.500 Directory. In SNMP terms, the applications are grouped in a table called `applTable`, which is indexed by an integer key `applIndex`.

The type of the application will be determined by one or both of:

- (1) Additional MIB variables specific to the applications.
- (2) An association to the application of a specific protocol.

### 4. Definitions

```
NETWORK-SERVICES-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-TYPE, Counter32, Gauge32, MODULE-IDENTITY, mib-2
    FROM SNMPv2-SMI
    TimeStamp, TEXTUAL-CONVENTION
    FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
    SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB;
```

```
application MODULE-IDENTITY
```

```
    LAST-UPDATED "200003030000Z"
```

```
    ORGANIZATION "IETF Mail and Directory Management Working Group"
```

## CONTACT-INFO

" Ned Freed

Postal: Innosoft International, Inc.  
1050 Lakes Drive  
West Covina, CA 91790  
US

Tel: +1 626 919 3600

Fax: +1 626 919 3614

E-Mail: ned.freed@innosoft.com"

## DESCRIPTION

"The MIB module describing network service applications"

REVISION "200003030000Z"

## DESCRIPTION

"This revision, published in RFC 2788, changes a number of DisplayStrings to SnmpAdminStrings. Note that this change is not strictly supported by SMIV2. However, the alternative of deprecating the old objects and defining new objects would have a more adverse impact on backward compatibility and interoperability, given the particular semantics of these objects. The defining reference for distinguished names has also been updated from RFC 1779 to RFC 2253."

REVISION "199905120000Z"

## DESCRIPTION

"This revision fixes a few small technical problems found in previous versions, mostly in regards to the conformance groups for different versions of this MIB. No changes have been made to the objects this MIB defines since RFC 2248."

REVISION "199708170000Z"

## DESCRIPTION

"This revision, published in RFC 2248, adds the applDescription and applURL objects, adds the quiescing state to the applOperStatus object and renames the MIB from the APPLICATION-MIB to the NETWORK-SERVICE-MIB."

REVISION "199311280000Z"

## DESCRIPTION

"The original version of this MIB was published in RFC 1565"  
::= {mib-2 27}

-- Textual conventions

-- DistinguishedName is used to refer to objects in the  
-- directory.

DistinguishedName ::= TEXTUAL-CONVENTION  
DISPLAY-HINT "255a"

```
STATUS current
DESCRIPTION
    "A Distinguished Name represented in accordance with
    RFC 2253, presented in the UTF-8 charset defined in
    RFC 2279."
SYNTAX OCTET STRING (SIZE (0..255))

-- Uniform Resource Locators are stored in URLStrings.

URLString ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "255a"
    STATUS current
    DESCRIPTION
        "A Uniform Resource Locator represented in accordance
        with RFCs 1738 and 2368, presented in the NVT ASCII
        charset defined in RFC 854."
    SYNTAX OCTET STRING (SIZE (0..255))

-- The basic applTable contains a list of the application
-- entities.

applTable OBJECT-TYPE
    SYNTAX SEQUENCE OF ApplEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The table holding objects which apply to all different
        kinds of applications providing network services.
        Each network service application capable of being
        monitored should have a single entry in this table."
    ::= {application 1}

applEntry OBJECT-TYPE
    SYNTAX ApplEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An entry associated with a single network service
        application."
    INDEX {applIndex}
    ::= {applTable 1}

ApplEntry ::= SEQUENCE {
    applIndex
        INTEGER,
    applName
        SnmpAdminString,
    applDirectoryName
```

```

        DistinguishedName,
    applVersion
        SnmpAdminString,
    applUptime
        TimeStamp,
    applOperStatus
        INTEGER,
    applLastChange
        TimeStamp,
    applInboundAssociations
        Gauge32,
    applOutboundAssociations
        Gauge32,
    applAccumulatedInboundAssociations
        Counter32,
    applAccumulatedOutboundAssociations
        Counter32,
    applLastInboundActivity
        TimeStamp,
    applLastOutboundActivity
        TimeStamp,
    applRejectedInboundAssociations
        Counter32,
    applFailedOutboundAssociations
        Counter32,
    applDescription
        SnmpAdminString,
    applURL
        URLString
}

```

#### applIndex OBJECT-TYPE

SYNTAX INTEGER (1..2147483647)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index to uniquely identify the network service application. This attribute is the index used for lexicographic ordering of the table."

::= {applEntry 1}

#### applName OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The name the network service application chooses to be known by."



```
 ::= {applEntry 2}

applDirectoryName OBJECT-TYPE
    SYNTAX DistinguishedName
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The Distinguished Name of the directory entry where
        static information about this application is stored.
        An empty string indicates that no information about
        the application is available in the directory."
    ::= {applEntry 3}

applVersion OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The version of network service application software.
        This field is usually defined by the vendor of the
        network service application software."
    ::= {applEntry 4}

applUptime OBJECT-TYPE
    SYNTAX TimeStamp
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The value of sysUpTime at the time the network service
        application was last initialized. If the application was
        last initialized prior to the last initialization of the
        network management subsystem, then this object contains
        a zero value."
    ::= {applEntry 5}

applOperStatus OBJECT-TYPE
    SYNTAX INTEGER {
        up(1),
        down(2),
        halted(3),
        congested(4),
        restarting(5),
        quiescing(6)
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Indicates the operational status of the network service
        application. 'down' indicates that the network service is
```

not available. 'up' indicates that the network service is operational and available. 'halted' indicates that the service is operational but not available. 'congested' indicates that the service is operational but no additional inbound associations can be accommodated. 'restarting' indicates that the service is currently unavailable but is in the process of restarting and will be available soon. 'quiescing' indicates that service is currently operational but is in the process of shutting down. Additional inbound associations may be rejected by applications in the 'quiescing' state."

::= {applEntry 6}

applLastChange OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= {applEntry 7}

applInboundAssociations OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of current associations to the network service application, where it is the responder. An inbound association occurs when another application successfully connects to this one."

::= {applEntry 8}

applOutboundAssociations OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of current associations to the network service application, where it is the initiator. An outbound association occurs when this application successfully connects to another one."

::= {applEntry 9}

applAccumulatedInboundAssociations OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The total number of associations to the application entity  
        since application initialization, where it was the responder."  
 ::= {applEntry 10}

applAccumulatedOutboundAssociations OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The total number of associations to the application entity  
        since application initialization, where it was the initiator."  
 ::= {applEntry 11}

applLastInboundActivity OBJECT-TYPE

SYNTAX TimeStamp  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The value of sysUpTime at the time this application last  
        had an inbound association. If the last association  
        occurred prior to the last initialization of the network  
        subsystem, then this object contains a zero value."  
 ::= {applEntry 12}

applLastOutboundActivity OBJECT-TYPE

SYNTAX TimeStamp  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The value of sysUpTime at the time this application last  
        had an outbound association. If the last association  
        occurred prior to the last initialization of the network  
        subsystem, then this object contains a zero value."  
 ::= {applEntry 13}

applRejectedInboundAssociations OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The total number of inbound associations the application  
        entity has rejected, since application initialization.  
        Rejected associations are not counted in the accumulated  
        association totals. Note that this only counts

```
    associations the application entity has rejected itself;
    it does not count rejections that occur at lower layers
    of the network.  Thus, this counter may not reflect the
    true number of failed inbound associations."
 ::= {applEntry 14}

applFailedOutboundAssociations OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The total number associations where the application entity
        is initiator and association establishment has failed,
        since application initialization.  Failed associations are
        not counted in the accumulated association totals."
 ::= {applEntry 15}

applDescription OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "A text description of the application.  This information
        is intended to identify and briefly describe the
        application in a status display."
 ::= {applEntry 16}

applURL OBJECT-TYPE
    SYNTAX URLString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "A URL pointing to a description of the application.
        This information is intended to identify and describe
        the application in a status display."
 ::= {applEntry 17}

-- The assocTable augments the information in the applTable
-- with information about associations.  Note that two levels
-- of compliance are specified below, depending on whether
-- association monitoring is mandated.

assocTable OBJECT-TYPE
    SYNTAX SEQUENCE OF AssocEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The table holding a set of all active application
```

```
        associations."
 ::= {application 2}

assocEntry OBJECT-TYPE
    SYNTAX AssocEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An entry associated with an association for a network
        service application."
    INDEX {applIndex, assocIndex}
    ::= {assocTable 1}

AssocEntry ::= SEQUENCE {
    assocIndex
        INTEGER,
    assocRemoteApplication
        SnmpAdminString,
    assocApplicationProtocol
        OBJECT IDENTIFIER,
    assocApplicationType
        INTEGER,
    assocDuration
        TimeStamp
}

assocIndex OBJECT-TYPE
    SYNTAX INTEGER (1..2147483647)
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An index to uniquely identify each association for a network
        service application. This attribute is the index that is
        used for lexicographic ordering of the table. Note that the
        table is also indexed by the applIndex."
    ::= {assocEntry 1}

assocRemoteApplication OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The name of the system running remote network service
        application. For an IP-based application this should be
        either a domain name or IP address. For an OSI application
        it should be the string encoded distinguished name of the
        managed object. For X.400(1984) MTAs which do not have a
        Distinguished Name, the RFC 2156 syntax 'mta in
```

globalid' used in X400-Received: fields can be used. Note, however, that not all connections an MTA makes are necessarily to another MTA."  
 ::= {assocEntry 2}

assocApplicationProtocol OBJECT-TYPE

SYNTAX OBJECT IDENTIFIER

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An identification of the protocol being used for the application. For an OSI Application, this will be the Application Context. For Internet applications, OID values of the form {applTCPProtoID port} or {applUDPPProtoID port} are used for TCP-based and UDP-based protocols, respectively. In either case 'port' corresponds to the primary port number being used by the protocol. The usual IANA procedures may be used to register ports for new protocols."

::= {assocEntry 3}

assocApplicationType OBJECT-TYPE

SYNTAX INTEGER {

    uainitiator(1),

    uaresponder(2),

    peerinitiator(3),

    peerresponder(4)}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This indicates whether the remote application is some type of client making use of this network service (e.g., a Mail User Agent) or a server acting as a peer. Also indicated is whether the remote end initiated an incoming connection to the network service or responded to an outgoing connection made by the local application. MTAs and messaging gateways are considered to be peers for the purposes of this variable."

::= {assocEntry 4}

assocDuration OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time this association was started. If this association started prior to the last initialization of the network subsystem, then this object contains a zero value."

```
 ::= {assocEntry 5}

-- Conformance information

applConformance OBJECT IDENTIFIER ::= {application 3}

applGroups          OBJECT IDENTIFIER ::= {applConformance 1}
applCompliances OBJECT IDENTIFIER ::= {applConformance 2}

-- Compliance statements

applCompliance MODULE-COMPLIANCE
    STATUS obsolete
    DESCRIPTION
        "The compliance statement for RFC 1565 implementations
        which support the Network Services Monitoring MIB
        for basic monitoring of network service applications.
        This is the basic compliance statement for RFC 1565."
    MODULE
        MANDATORY-GROUPS {applRFC1565Group}
        ::= {applCompliances 1}

assocCompliance MODULE-COMPLIANCE
    STATUS obsolete
    DESCRIPTION
        "The compliance statement for RFC 1565 implementations
        which support the Network Services Monitoring MIB
        for basic monitoring of network service applications
        and their associations."
    MODULE
        MANDATORY-GROUPS {applRFC1565Group, assocRFC1565Group}
        ::= {applCompliances 2}

applRFC2248Compliance MODULE-COMPLIANCE
    STATUS deprecated
    DESCRIPTION
        "The compliance statement for RFC 2248 implementations
        which support the Network Services Monitoring MIB
        for basic monitoring of network service applications."
    MODULE
        MANDATORY-GROUPS {applRFC2248Group}
        ::= {applCompliances 3}

assocRFC2248Compliance MODULE-COMPLIANCE
    STATUS deprecated
    DESCRIPTION
        "The compliance statement for RFC 2248 implementations
```

which support the Network Services Monitoring MIB for basic monitoring of network service applications and their associations."

MODULE

MANDATORY-GROUPS {applRFC2248Group, assocRFC2248Group}  
::= {applCompliances 4}

applRFC2788Compliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for RFC 2788 implementations which support the Network Services Monitoring MIB for basic monitoring of network service applications."

MODULE

MANDATORY-GROUPS {applRFC2788Group}  
::= {applCompliances 5}

assocRFC2788Compliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for RFC 2788 implementations which support the Network Services Monitoring MIB for basic monitoring of network service applications and their associations."

MODULE

MANDATORY-GROUPS {applRFC2788Group, assocRFC2788Group}  
::= {applCompliances 6}

-- Units of conformance

applRFC1565Group OBJECT-GROUP

OBJECTS {

applName, applVersion, applUptime, applOperStatus,  
applLastChange, applInboundAssociations,  
applOutboundAssociations, applAccumulatedInboundAssociations,  
applAccumulatedOutboundAssociations, applLastInboundActivity,  
applLastOutboundActivity, applRejectedInboundAssociations,  
applFailedOutboundAssociations}

STATUS obsolete

DESCRIPTION

"A collection of objects providing basic monitoring of network service applications. This is the original set of such objects defined in RFC 1565."

::= {applGroups 7}

assocRFC1565Group OBJECT-GROUP

OBJECTS {



```
    assocRemoteApplication, assocApplicationProtocol,
    assocApplicationType, assocDuration}
STATUS obsolete
DESCRIPTION
    "A collection of objects providing basic monitoring of
    network service applications' associations. This is the
    original set of such objects defined in RFC 1565."
::= {applGroups 2}
```

applRFC2248Group OBJECT-GROUP

```
OBJECTS {
    applName, applVersion, applUptime, applOperStatus,
    applLastChange, applInboundAssociations,
    applOutboundAssociations, applAccumulatedInboundAssociations,
    applAccumulatedOutboundAssociations, applLastInboundActivity,
    applLastOutboundActivity, applRejectedInboundAssociations,
    applFailedOutboundAssociations, applDescription, applURL}
STATUS deprecated
DESCRIPTION
    "A collection of objects providing basic monitoring of
    network service applications. This group was originally
    defined in RFC 2248; note that applDirectoryName is
    missing."
::= {applGroups 3}
```

assocRFC2248Group OBJECT-GROUP

```
OBJECTS {
    assocRemoteApplication, assocApplicationProtocol,
    assocApplicationType, assocDuration}
STATUS deprecated
DESCRIPTION
    "A collection of objects providing basic monitoring of
    network service applications' associations. This group
    was originally defined by RFC 2248."
::= {applGroups 4}
```

applRFC2788Group OBJECT-GROUP

```
OBJECTS {
    applName, applDirectoryName, applVersion, applUptime,
    applOperStatus, applLastChange, applInboundAssociations,
    applOutboundAssociations, applAccumulatedInboundAssociations,
    applAccumulatedOutboundAssociations, applLastInboundActivity,
    applLastOutboundActivity, applRejectedInboundAssociations,
    applFailedOutboundAssociations, applDescription, applURL}
STATUS current
DESCRIPTION
    "A collection of objects providing basic monitoring of
    network service applications. This is the appropriate
```

```
    group for RFC 2788 -- it adds the applDirectoryName object
    missing in RFC 2248."
 ::= {applGroups 5}

assocRFC2788Group OBJECT-GROUP
  OBJECTS {
    assocRemoteApplication, assocApplicationProtocol,
    assocApplicationType, assocDuration}
  STATUS current
  DESCRIPTION
    "A collection of objects providing basic monitoring of
    network service applications' associations. This is
    the appropriate group for RFC 2788."
 ::= {applGroups 6}

-- OIDs of the form {applTCPProtoID port} are intended to be used
-- for TCP-based protocols that don't have OIDs assigned by other
-- means. {applUDPPProtoID port} serves the same purpose for
-- UDP-based protocols. In either case 'port' corresponds to
-- the primary port number being used by the protocol. For example,
-- assuming no other OID is assigned for SMTP, an OID of
-- {applTCPProtoID 25} could be used, since SMTP is a TCP-based
-- protocol that uses port 25 as its primary port.

applTCPProtoID OBJECT IDENTIFIER ::= {application 4}
applUDPPProtoID OBJECT IDENTIFIER ::= {application 5}
```

END

## 5. Changes made since RFC 2248

This revision corrects a few minor technical errors in the construction of the network services MIB in RFC 2248 [22]. In addition, the applName, applVersion, and applDescription fields have been changed from DisplayStrings to SnmpAdminStrings. The reference to RFC 1779 has also been updated to RFC 2253, which in turn adds the ability for distinguished names to be in the UTF-8 character set.

## 6. Acknowledgements

This document is a product of the Mail and Directory Management (MADMAN) Working Group. It is based on an earlier MIB designed by S. Kille, T. Lenggenhager, D. Partain, and W. Yeong. The Electronic Mail Association's TSC committee was instrumental in providing feedback on and suggesting enhancements to RFC 1565 [23] that have led to the present document.

## 9. References

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- [2] Krupczak, C. and J. Saperia, "Definitions of System-Level Managed Objects for Applications", RFC 2287, February 1998.
- [3] Wijnen, B., Harrington, D. and R. Presuhn, "An Architecture for Describing SNMP Management Frameworks", RFC 2571, April 1999.
- [4] Rose, M. and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990.
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## 8. Security Considerations

There are no management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. So, if this MIB is implemented correctly, then there is no risk that an intruder can alter or create any management objects of this MIB via direct SNMP SET operations.

However, this MIB does provide passive information about the existence, type, and configuration of applications on a given host that could potentially indicate some sort of vulnerability. Finally, the information MIB provides about network usage could be used to analyze network traffic patterns.

SNMPv1 by itself is not a secure environment. Even if the network itself is secure (for example by using IPSec), even then, 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 RFC 2574 [14] and the View-based Access Control Model RFC 2575 [17] 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.

## 9. Author and Chair Addresses

Ned Freed  
Innosoft International, Inc.  
1050 Lakes Drive  
West Covina, CA 91790  
USA

Phone: +1 626 919 3600  
Fax: +1 626 919 3614  
EMail: ned.freed@innosoft.com

Steve Kille, MADMAN WG Chair  
MessagingDirect Ltd.  
The Dome, The Square  
Richmond TW9 1DT  
UK

Phone: +44 20 8332 9091  
EMail: Steve.Kille@MessagingDirect.com

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## Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

