

Definitions of Managed Objects for an Information Retrieval Service

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1. Abstract

This memo defines a MIB for use with managing information services. The term "information services" is construed to mean any information providing application, such as World Wide Web (WWW), File Transfer Protocol (FTP), and Gopher. The retrieval service is an abstraction for the information transport protocol. The retrieval service which is a connection-less service can be instantiated by, for instance, the Hyper Text Transfer Protocol, or the File Transfer Protocol.

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2. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework consists of four major components. They are:

- o STD 17, [RFC 1213](#) [2] defines MIB-II, the core set of managed objects for the Internet suite of protocols.
- o [RFC 1901](#) Introduction to Community-based SNMPv2
- o [RFC 1902](#) Structure of Management Information for Version 2 of the Simple Network Management Protocol (SNMPv2)
- o [RFC 1903](#) Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)
- o [RFC 1904](#) Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2)
- o [RFC 1907](#) Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)
- o [RFC 1908](#) Coexistence between Version 1 and Version 2 of the Internet-standard Network Management Framework

The Framework permits new objects to be defined for the purpose of experimentation and evaluation.

2.1. Object Definitions

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI[1]. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the object descriptor, to refer to the object type.

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3. Introduction.

The Retrieval Service is a connection-less service providing transport of information between a client and a server. The service is an abstraction of the information transport protocol used. The Retrieval Service MIB module contains network management information about a provided service. Because the Retrieval Service is an abstraction of the information transport service used in, for instance, the World Wide Web, details of the transport protocol providing this service are of no importance to the users of the Retrieval Service.

The work performed for this MIB is a result of a project executed for the Centre of Earth Observations. It is not seen as complete, but it should be a first step in an effort to manage the WWW application. An implementation of this MIB already exists. Due to the use of a commercial development package it cannot be distributed. However, a public domain version is now developed.

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4. Retrieval Service MIB structure

The Retrieval Service module contains the following groups:

1. service primitives/ statistics,
2. quality of service.

4.1. Statistics group

Communication via the Retrieval Service takes place by means of service primitives used by the connection-less service. The statistics group contains statistical information concerning the service primitives passed over the Service Access Point (SAP). The variables of this group count the number of service primitives executed on the retrieval service.

Two possible solutions were seen to define these counters:

1. The total numbers of service primitives are counted by type. For each service primitive type used by the retrieval service a managed object has to be defined.
2. The total number of service primitives related to a remote host and service primitive-type are counted. This results in a conceptual table; for each service primitive type used by the retrieval service a table has to be defined, indexed with the IpAddress of the remote host. The remote host is a parameter of the service primitive.

It was decided that the simplicity of the first solution outweighed the increased information present in the second.

4.2. Quality of Service group

The Quality of Service QoS group contains network management information about the quality of the retrieval service. The information in this group provides the network manager with visibility of the performance of the underlying network.

The recognized QoS parameters are:

- The transport delay is defined as a table. The table is indexed with the source and destination addresses of the delay.

The total round trip delay can be computed by the Network Management System user.

- The number of errors variable provides information on errors which have occurred in the retrieval service.
- The number of timeouts variable provides information on timeouts which have occurred in the retrieval service.
- The throughput table provides information on the speed of the network with a given client. The address of the client is used

to index the table.

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5. Retrieval Service MIB definition

```
RS-MIB DEFINITIONS ::=
BEGIN
```

```
IMPORTS
```

```
    enterprises, MODULE-IDENTITY, OBJECT-TYPE, Counter32, TimeTicks,
    IPAddress
        FROM SNMPv2-SMI
    MODULE-COMPLIANCE, OBJECT-GROUP
        FROM SNMPv2-CONF;
```

```
rsMIB MODULE-IDENTITY
```

```
    LAST-UPDATED      "9601251800Z"
    ORGANIZATION      "University Of Twente"
    CONTACT-INFO
        "              Harrie Hazewinkel
        Postal: Centre of Telematics and
                    Information Technology
        University Of Twente
        POBox 217
        7500 AE Enschede
        The Netherlands
        phone : +31 53 8943746
        E-mail: H.Hazewinkel@cs.utwente.nl
```

```
    This document benefited greatly from the comments of
    all participants in the CEO project for management of
    World Wide Web Servers."
```

```
DESCRIPTION
```

```
    "A MIB module for the retrieval service. The retrieval
    service is a service providing the capability of
    information transport via a network.
```

```
    It provides management information about an
    information transport, which is exactly describing
    what the transport provider is doing for the user,
    without showing detailed information from inside
    the transport provider, HTTP."
```

```
 ::= { enterprises universityOfTwente(785) 3 }
```

```
rsMIBObjects OBJECT IDENTIFIER ::= { rsMIB 1 }
```

```
rsMIBConformance OBJECT IDENTIFIER ::= { rsMIB 2 }
```

```
rsMIBCompliances OBJECT IDENTIFIER ::= { rsMIBConformance 1 }
```

```
rsMIBGroups OBJECT IDENTIFIER ::= { rsMIBConformance 2 }
```

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--

-- The service statistics provides management
-- information about the service primitives that are
-- executed on the HTTP Service Provider.

--

rsStatistics OBJECT IDENTIFIER ::= { rsMIBObjects 1 }

rsTotalRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of requests that have been executed
on the HTTP service provider.

This field is only interesting when management
functions are implemented at the client side."

::= { rsStatistics 1 }

-- Instrumentation: client

rsTotalIndications OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of indications that have been executed
on the HTTP service provider."

::= { rsStatistics 2 }

-- Instrumentation: logfile

rsTotalResponses OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of responses that have been executed
on the HTTP service provider."

::= { rsStatistics 3 }

-- Instrumentation: logfile

rsTotalConfirmations OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of confirmations that have been
executed on the HTTP service provider.

```
    This field is only interesting when management
    functions are implemented at the client side."
::= { rsStatistics 4 }
-- Instrumentation: client
```

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```
--  
-- The provided QoS of the service provider.  
--
```

```
rsQoS OBJECT IDENTIFIER ::= { rsMIBObjects 2 }
```

```
rsDelayTable OBJECT-TYPE
```

```
    SYNTAX          SEQUENCE OF RsDelayEntry  
    MAX-ACCESS      not-accessible  
    STATUS          current  
    DESCRIPTION  
        "The table of the delay between source and destination."  
    ::= { rsQoS 1 }
```

```
rsDelayEntry OBJECT-TYPE
```

```
    SYNTAX          RsDelayEntry  
    MAX-ACCESS      not-accessible  
    STATUS          current  
    DESCRIPTION  
        "Details of a particular http Server or Client."  
    INDEX          { rsSource, rsDestination }  
    ::= { rsDelayTable 1 }
```

```
RsDelayEntry ::=
```

```
    SEQUENCE {  
    rsSource          DisplayString,  
    rsDestination    DisplayString,  
    rsDelay          TimeInterval  
    }
```

```
rsSource OBJECT-TYPE
```

```
    SYNTAX          DisplayString  
    MAX-ACCESS      read-only  
    STATUS          current  
    DESCRIPTION  
        "The DNS name of the source."  
    ::= { rsDelayEntry 1 }  
    -- Instrumentation: logfile / own system
```

```
rsDestination OBJECT-TYPE
```

```
    SYNTAX          DisplayString  
    MAX-ACCESS      read-only  
    STATUS          current  
    DESCRIPTION  
        "The DNSname of the destination."  
    ::= { rsDelayEntry 2 }  
    -- Instrumentation: logfile / own system
```

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rsDelay OBJECT-TYPE
SYNTAX TimeInterval
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The delay which occurred during transport of information
 from source to destination."
 ::= { rsDelayEntry 3 }
 -- Instrumentation: client / server

rsNumberOfErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of errors that have been occurred."
 ::= { rsQoS 2 }
 -- Instrumentation: client

rsNumberOfTimeouts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of time-outs that have been occurred."
 ::= { rsQoS 3 }
 -- Instrumentation: logfile

rsTroughputTable OBJECT-TYPE
SYNTAX SEQUENCE OF RsTroughputEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The table of the throughput with a certain client."
 ::= { rsQoS 4 }

rsTroughputEntry OBJECT-TYPE
SYNTAX RsTroughputEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "Details of a particular http Server or Client."
 INDEX { rsClient }
 ::= { rsTroughputTable 1 }

RsTroughputEntry ::=
SEQUENCE {
 rsClient DisplayString,
 rsThroughput INTEGER

}

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rsClient OBJECT-TYPE

SYNTAX DisplayString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The DNS name of the client."

::= { rsTroughputEntry 1 }

-- Instrumentation: logfile

rsThroughput OBJECT-TYPE

SYNTAX INTEGER (1..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The throughput of data with the client."

::= { rsTroughputEntry 2 }

-- Instrumentation: direct access

--

-- Conformance and compliance definitions.

--

rsMIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statements for http service
which implement the HTTP MIB"

MODULE

MANDATORY-GROUPS { rsGroup }

::= { rsMIBCompliances 1 }

rsMIBGroup OBJECT-GROUP

OBJECTS { rsTotalRequests, rsTotalIndications,
rsTotalResponses, rsTotalConfirmations,
rsSource, rsDestination, rsDelay,
rsNumberOfErrors,
rsNumberOfTimeouts,
rsClient,rsThroughput }

STATUS current

DESCRIPTION

"The rsGroup defines the objects
of the retrieval service."

::= { rsMIBGroups 1 }

END

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6. Acknowledgments

This document has been produced by the University of Twente (The Netherlands), together with ESYS Limited (The United Kingdom), as part of a 'proof of concept' study for the 'Centre of Earth Observation' (CEO) of the 'Joint Research Centre' (JRC) of the European Community. This document has benefited greatly to the comments of:

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- [7] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", [RFC 1901](#), January 1996.

8. Security Considerations

Security issues are not discussed in this memo.

9. Authors' Addresses

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