

Internet Draft
<[draft-ietf-ips-ifcp-mib-05.txt](#)>
Expires: September 2003

Kevin Gibbons
Charles Monia
Josh Tseng
Nishan Systems

Franco Travostino
Nortel

March 2003

Definitions of Managed Objects For iFCP

Status of this Memo

This document is an Internet-Draft and is subject to all provisions of [Section 10 of RFC2026](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at
<http://www.ietf.org/1id-abstracts.html>

The list of Internet-Draft Shadow Directories can be accessed at
<http://www.ietf.org/shadow.html>.

Copyright Notice

Copyright (C) The Internet Society (2003). All Rights Reserved.

Abstract

The iFCP protocol provides Fibre Channel fabric functionality on an IP network in which TCP/IP switching and routing elements replace Fibre Channel components. The iFCP protocol is used between iFCP Gateways. This draft provides a mechanism to monitor and control iFCP Gateway instances, and their associated sessions, using SNMP.

This memo is a product of the IP Storage (IPS) working group within the Internet Engineering Task Force. Comments are solicited and should be addressed to the working group's mailing list at ips@ece.cmu.edu and/or the authors.

Table of Contents

Status of this Memo.....	1
Copyright Notice.....	1
Abstract.....	1
Table of Contents.....	2
1. The Internet-Standard Management Framework.....	3
2. Introduction.....	3
3. Technical Description.....	3
4. MIB Definition.....	4
5. Intellectual Property.....	20
6. Security Considerations.....	20
7. Normative References.....	21
8. Informative References.....	22
9. Authors' Addresses.....	22
10. Full Copyright Statement.....	23

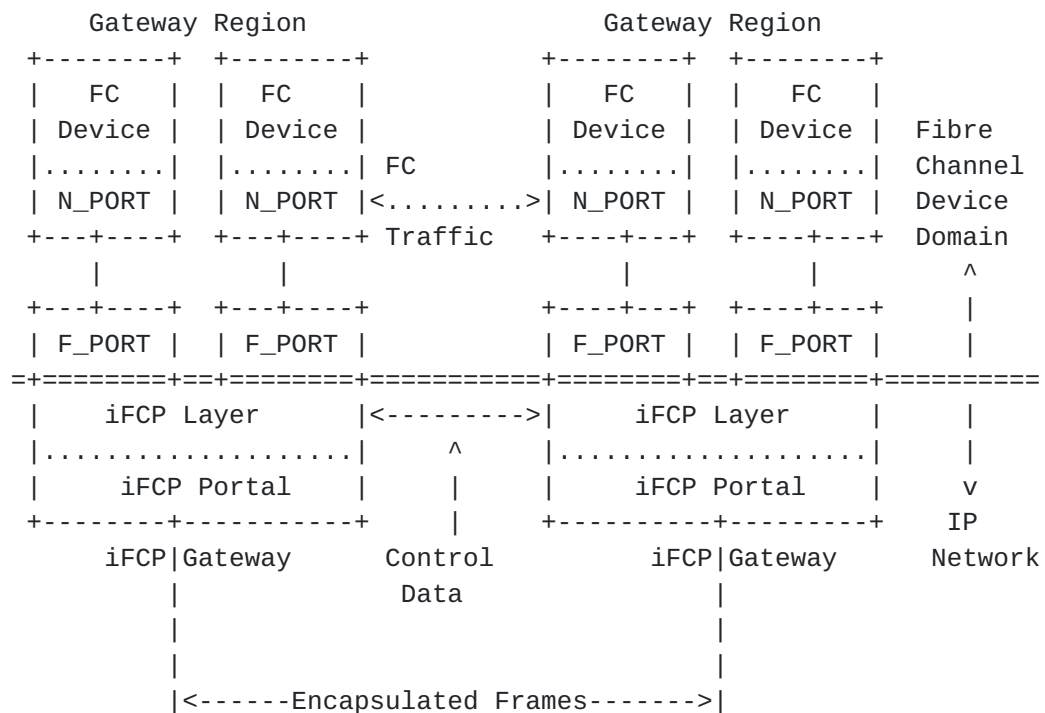
1. The Internet-Standard Management Framework

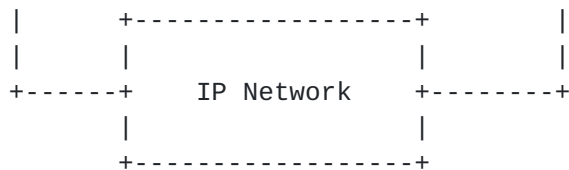
For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

2. Introduction

The iFCP protocol can be used by FC to IP based storage gateways for FCP storage interconnects. Figure 1 provides an example interconnect between iFCP gateways.





The iFCP MIB is designed to allow SNMP to be used to monitor and manage local iFCP gateway instances, including the configuration of iFCP sessions between gateways.

3. Technical Description

Gibbons	Expires September 2003	3
Internet Draft	iFCP MIB	March 2003

The MIB is divided into sections for iFCP local gateway instance management, iFCP session management, and iFCP session statistics.

The section for iFCP gateway management provides default settings and information about each local instance. A single management entity can monitor multiple local gateway instances. Each local gateway is conceptually an independent gateway that has both Fibre Channel and IP interfaces. Other standard MIBs, such as the Fibre Management MIB [[FCMGT01](#)], the Interfaces Group MIB [[RFC2863](#)] and MIB II [[RFC1213](#)] can be used to manage non-iFCP specific gateway parameters. The local gateway instance section provides iFCP specific information as well as optional links to other standard management MIBs.

The iFCP session management section provides information on iFCP sessions that are using one of the local iFCP gateway instances. This section allows the management of specific iFCP parameters.

The iFCP session statistics section provides statistical information on the iFCP sessions that are using one of the local iFCP gateways. These tables augment the session management table. Additional statistical information for an iFCP gateway or session, that is not iFCP specific, can be obtained using other standard MIBs. The iFCP statistics are provided in both standard and low-capacity (counter32) methods.

4. MIB Definition

```

IFCP-MGMT-MIB DEFINITIONS ::= BEGIN
--
--  IETF iFCP Management Information Base (MIB)
--
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
  
```

Counter32,
Counter64,
Integer32,
Unsigned32,
experimental
FROM SNMPv2-SMI

OBJECT-GROUP,
MODULE-COMPLIANCE
FROM SNMPv2-CONF

TEXTUAL-CONVENTION,
TruthValue
FROM SNMPv2-TC

-- From [RFC 2571](#)
SnmpAdminString
FROM SNMP-FRAMEWORK-MIB

Gibbons Expires September 2003 4

Internet Draft iFCP MIB March 2003

-- From [RFC 2851](#)
InetAddressType,
InetAddress
FROM INET-ADDRESS-MIB

-- From IETF Fibre Channel Management MIB, RFC TBD
-- <[draft-ietf-ips-fcmgmt-mib-03.txt](#)> to be included
-- after RFC assigned
-- FcNameIdOrZero,
-- FcAddressId
-- FROM FC-MGMT-MIB
;

ifcpMgmtMIB MODULE-IDENTITY
LAST-UPDATED "200303010000Z"
ORGANIZATION "IETF IPS Working Group"
CONTACT-INFO "
Attn: Kevin Gibbons
Nishan Systems
3850 North First Street
San Jose, CA 95134
USA
Tel : +1 408 519-3700
email : kgibbons@nishansystems.com

Charles Monia
Nishan Systems
3850 North First Street

San Jose, CA 95134
USA
Tel : +1 408 519-3700
email : cmonia@nishansystems.com

Josh Tseng
Nishan Systems
3850 North First Street
San Jose, CA 95134
USA
Tel : +1 408 519-3700
email : jtseng@nishansystems.com

Franco Travostino
Nortel Networks
3 Federal Street
Billerica, MA 01821
USA
Tel : +1 978 288-7708
email : travos@nortelnetworks.com

DESCRIPTION "The MIB for internet Fibre Channel Protocol
(iFCP) management."
REVISION "200303010000Z"
DESCRIPTION "Initial version of iFCP Management Module.
This MIB published as RFC nnnn."

Gibbons	Expires September 2003	5
Internet Draft	iFCP MIB	March 2003

-- (to be assigned by RFC Editor)
::= {experimental 4371}
-- an IETF number has not yet been assigned

--
-- The following two Textual Conventions are from
-- [<draft-ietf-ips-fcmgmt-mib-03.txt>](#), and are to
-- be included when RFC assigned
--

FcNameIdOrZero ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"The World Wide Name (WWN) associated with a Fibre Channel
(FC) entity. WWNs were initially defined as 64-bits in
length. The latest definition (for future use) is 128-bits
long. The zero-length string value is used in circumstances
where the WWN is unassigned/unknown."
SYNTAX OCTET STRING (SIZE(0 | 8 | 16))

```

FcAddressId ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
    "A Fibre Channel Address ID, a 24-bit value unique within
    the address space of a Fabric."
    SYNTAX OCTET STRING (SIZE(0 | 3))

-- end of <draft-ietf-ips-fcmgmt-mib-03.txt> TC's to be included

--
-- Textual Conventions
--

```

```

IfIndexType ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
    "Represents possible interface indexes that
    can be used on the iFCP gateway. This can
    be used as an index for the IF-MIB ifTable,
    if supported by the system, or other
    interface table, to obtain additional
    information about the interface."
    REFERENCE "RFC 2863, The Interfaces Group MIB (IF-MIB)"
    SYNTAX Integer32 (1..2147483647)

```

```

IfcpVersionType ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION "Represents the iFCP version supported."
    SYNTAX Unsigned32 (0..255)

```

```

PortType ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION "The value for a TCP Port being used for
    an iFCP session. The canonical port for
    iFCP is 3420."

```

Gibbons	Expires September 2003	6
---------	------------------------	---

Internet Draft	iFCP MIB	March 2003
----------------	----------	------------

```

REFERENCE "iFCP Protocol Specification, RFC XXXX"
SYNTAX Unsigned32 (0..65535)

```

```

IpTOVor0Type ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION "The maximum propagation delay, in seconds,
    for an encapsulated FC frame to traverse the
    IP network. A value of 0 implies fibre
    channel frame lifetime limits will not be
    enforced."
    REFERENCE "iFCP Protocol Specification, RFC XXXX"
    SYNTAX Unsigned32 (0..3600)

```

```

LTior0Type ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION  "The value for the Liveness Test Interval
                  (LTI) being used in an iFCP connection, in
                  seconds. A value of 0 implies no Liveness
                  Test Interval will be used."
    REFERENCE   "iFCP Protocol Specification, RFC XXXX"
    SYNTAX      Unsigned32 (0..65535)

IfcpSessionStateType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION  "The value for an iFCP session state."
    SYNTAX      INTEGER {down(0), openPending(1), open(2)}

IfcpAddressModeType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION  "The values for iFCP Address Translation
                  Mode."
    REFERENCE   "iFCP Protocol Specification, RFC XXXX"
    SYNTAX      INTEGER {addressTransparent(0),
                        addressTranslation(1)}

--
-- Internet Fibre Channel Protocol (iFCP)
--

ifcpGatewayObj          OBJECT IDENTIFIER ::= {ifcpMgmtMIB 1}
ifcpGatewayConformance OBJECT IDENTIFIER ::= {ifcpMgmtMIB 2}

--
-- Local iFCP Gateway Instance Information =====
--

ifcpLclGatewayObjInfo OBJECT IDENTIFIER ::= {ifcpGatewayObj 1}

ifcpLclGtwyInstTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IfcpLclGtwyInstEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION  "Information about all local iFCP Gateway instances that can be
                  monitored and controled. This table contains an entry for each
                  local iFCP Gateway instance that is being managed."
    ::= {ifcpLclGatewayObjInfo 1}

ifcpLclGtwyInstEntry OBJECT-TYPE
    SYNTAX      IfcpLclGtwyInstEntry

```

Gibbons Expires September 2003 7

Internet Draft iFCP MIB March 2003

```

MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
"An entry in the local iFCP Gateway Instance table.
Parameters and settings for the gateway are found here."
INDEX { ifcpLclGtwyInstIndex }
::= {ifcpLclGtwyInstTable 1}

IfcpLclGtwyInstEntry ::= SEQUENCE {
    ifcpLclGtwyInstIndex      Unsigned32,
    ifcpLclGtwyInstPhyIndex   Unsigned32,
    ifcpLclGtwyInstVersionMin IfcpVersionType,
    ifcpLclGtwyInstVersionMax IfcpVersionType,
    ifcpLclGtwyInstAddrTransMode IfcpAddressModeType,
    ifcpLclGtwyInstFcBrdcstSupport TruthValue,
    ifcpLclGtwyInstDefaultIpTOV IpTOVor0Type,
    ifcpLclGtwyInstDefaultLTInterval LTIor0Type,
    ifcpLclGtwyInstDescr      SnmpAdminString,
    ifcpLclGtwyInstNumActiveSessions Unsigned32
}

ifcpLclGtwyInstIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..2147483647)
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
    "An arbitrary integer value to uniquely identify this iFCP
    Gateway from other local Gateway instances."
    ::= {ifcpLclGtwyInstEntry      1}

ifcpLclGtwyInstPhyIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (0..2147483647)
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
    "An index indicating the location of this local gateway within
    a larger entity, if one exists. If supported, this is the
    entPhysicalIndex from the Entity MIB (Version 2), for this iFCP
    Gateway. If not supported it is either an index into a chassis
    MIB, as supported by the system, or 0."
    REFERENCE    "RFC 2737, Entity MIB (Version 2)"
    ::= {ifcpLclGtwyInstEntry      2}

ifcpLclGtwyInstVersionMin OBJECT-TYPE
    SYNTAX      IfcpVersionType
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION

```

"The minimum iFCP protocol version supported by the local iFCP gateway instance."

REFERENCE "iFCP Protocol Specification, RFC XXXX"
::= {ifcpLclGtwyInstEntry 3}

ifcpLclGtwyInstVersionMax OBJECT-TYPE

SYNTAX IfcpVersionType
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The maximum iFCP protocol version supported by the local iFCP gateway instance."

REFERENCE "iFCP Protocol Specification, RFC XXXX"
::= {ifcpLclGtwyInstEntry 4}

ifcpLclGtwyInstAddrTransMode OBJECT-TYPE

SYNTAX IfcpAddressModeType
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"The local iFCP gateway operating mode. Changing this value may cause existing sessions to be disrupted."

DEFVAL { addressTranslation }
::= {ifcpLclGtwyInstEntry 5}

ifcpLclGtwyInstFcBrdcstSupport OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"Whether the local iFCP gateway supports FC Broadcast. Changing this value may cause existing sessions to be disrupted."

DEFVAL { false }
::= {ifcpLclGtwyInstEntry 6}

ifcpLclGtwyInstDefaultIpTOV OBJECT-TYPE

SYNTAX IpTOVor0Type
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"The default IP_TOV used for iFCP sessions at this gateway. This is the default maximum propagation delay that will be used for an iFCP session. The value can be changed on a per-session basis. The valid range is 0 - 3600 seconds. A value of 0 implies that fibre channel frame lifetime limits will not be enforced."

DEFVAL { 6 }
::= {ifcpLclGtwyInstEntry 7}

ifcpLclGtwyInstDefaultLTInterval OBJECT-TYPE

SYNTAX LTIor0Type
MAX-ACCESS read-write
STATUS current
DESCRIPTION

Gibbons

Expires September 2003

9

Internet Draft

iFCP MIB

March 2003

"The default Liveness Test Interval (LTI), in seconds, used for iFCP sessions at this gateway. This is the default value for an iFCP session and can be changed on a per-session basis. The valid range is 0 - 65535 seconds. A value of 0 implies no Liveness Test Interval will be performed on a session."

DEFVAL { 10 }
::= {ifcpLclGtwyInstEntry 8}

ifcpLclGtwyInstDescr OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0..64))
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"A user entered description for this iFCP Gateway."

DEFVAL { "" }
::= {ifcpLclGtwyInstEntry 9}

ifcpLclGtwyInstNumActiveSessions OBJECT-TYPE

SYNTAX Unsigned32 (0..4294967295)
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The current total number of iFCP sessions in the open or open-pending state."

::= {ifcpLclGtwyInstEntry 10}

--

-- iFCP N Port Session Information =====

--

ifcpNportSessionInfo OBJECT IDENTIFIER ::= {ifcpGatewayObj 2}

ifcpSessionAttributesTable OBJECT-TYPE

SYNTAX SEQUENCE OF
 IfcpSessionAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"An iFCP session consists of the pair of N_PORTS comprising the session endpoints joined by a single TCP/IP connection."

This table provides information on each iFCP session currently using a local iFCP Gateway instance. iFCP sessions are created and removed by the iFCP Gateway instances, which are reflected in this table."

::= {ifcpNportSessionInfo 1}

ifcpSessionAttributesEntry OBJECT-TYPE

SYNTAX	IfcpSessionAttributesEntry
MAX-ACCESS	not-accessible
STATUS	current
DESCRIPTION	

"An entry in the session table."

INDEX { ifcpLclGtwyInstIndex, ifcpSessionIndex }

Gibbons

Expires September 2003

10

Internet Draft

iFCP MIB

March 2003

::= {ifcpSessionAttributesTable 1}

IfcpSessionAttributesEntry ::= SEQUENCE {

ifcpSessionIndex	Integer32,
ifcpSessionLclPrtlIfIndex	IfIndexType,
ifcpSessionLclPrtlAddrType	InetAddressType,
ifcpSessionLclPrtlAddr	InetAddress,
ifcpSessionLclPrtlTcpPort	PortType,
ifcpSessionLclNpWwun	FcNameIdOrZero,
ifcpSessionLclNpFcId	FcAddressId,
ifcpSessionRmtNpWwun	FcNameIdOrZero,
ifcpSessionRmtPrtlIfAddrType	InetAddressType,
ifcpSessionRmtPrtlIfAddr	InetAddress,
ifcpSessionRmtPrtlTcpPort	PortType,
ifcpSessionRmtNpFcId	FcAddressId,
ifcpSessionRmtNpFcIdAlias	FcAddressId,
ifcpSessionIpTOV	IpTOVOr0Type,
ifcpSessionLclLTIntvl	LTIOR0Type,
ifcpSessionRmtLTIntvl	LTIOR0Type,
ifcpSessionBound	TruthValue

}

ifcpSessionIndex

OBJECT-TYPE

SYNTAX	Integer32 (1..2147483647)
MAX-ACCESS	not-accessible
STATUS	current
DESCRIPTION	

"The iFCP session index is a unique value used as an index to the table, along with a specific local iFCP Gateway instance. This index is used because the local N Port and remote N Port information would create a complex index that would be difficult to implement."

::= {ifcpSessionAttributesEntry 1}

ifcpSessionLclPrtlIfIndex	OBJECT-TYPE
SYNTAX	IfIndexType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
<p>"This is the local interface in the ifTable being used as the local portal in this session, as described in the IF-MIB. This can be used as an index for the ifTable to obtain additional information about the interface."</p>	
REFERENCE	" RFC 2863 , The Interfaces Group MIB (IF-MIB)"
::= {ifcpSessionAttributesEntry 2}	

ifcpSessionLclPrtlAddrType	OBJECT-TYPE
SYNTAX	InetAddressType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
<p>"The type of address in ifcpSessionLclIfAddr."</p>	
::= {ifcpSessionAttributesEntry 3}	

Gibbons	Expires September 2003	11
---------	------------------------	----

Internet Draft	iFCP MIB	March 2003
----------------	----------	------------

ifcpSessionLclPrtlAddr	OBJECT-TYPE
SYNTAX	InetAddress
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
<p>"This is the external IP address of the interface being used for the iFCP local portal in this session."</p>	
::= {ifcpSessionAttributesEntry 4}	

ifcpSessionLclPrtlTcpPort	OBJECT-TYPE
SYNTAX	PortType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
<p>"This is the TCP port number that is being used for the iFCP local portal in this session. This is normally an ephemeral port number selected by the gateway."</p>	
::= {ifcpSessionAttributesEntry 5}	

ifcpSessionLclNpwwun	OBJECT-TYPE
SYNTAX	FcNameIdOrZero
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
<p>"World Wide Unique Name of the local N Port. For an unbound</p>	

session this variable will be empty."

DEFVAL { "" }

::= {ifcpSessionAttributesEntry 6}

ifcpSessionLcLnPfcid OBJECT-TYPE

SYNTAX FcAddressId

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Fibre Channel Identifier of the local N Port. For an unbound session this variable will be empty"

::= {ifcpSessionAttributesEntry 7}

ifcpSessionRmtNpWwun OBJECT-TYPE

SYNTAX FcNameIdOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"World Wide Unique Name of the remote N Port. For an unbound session this variable will be empty."

DEFVAL { "" }

::= {ifcpSessionAttributesEntry 8}

ifcpSessionRmtPrtlIfAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The type of address in ifcpSessionRmtPrtlIfAddr."

Gibbons Expires September 2003

12

Internet Draft

iFCP MIB

March 2003

::= {ifcpSessionAttributesEntry 9}

ifcpSessionRmtPrtlIfAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the remote gateway IP address being used for the portal on the remote iFCP gateway."

::= {ifcpSessionAttributesEntry 10}

ifcpSessionRmtPrtlTcpPort OBJECT-TYPE

SYNTAX PortType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the TCP port number being used for the portal on the

remote iFCP gateway. Generally, this will be the iFCP canonical port."

DEFVAL { 3420 }
::= {ifcpSessionAttributesEntry 11}

ifcpSessionRmtNpFcid OBJECT-TYPE
SYNTAX FcAddressId
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"Fibre Channel Identifier of the remote N Port. For an unbound session this variable will be empty."

::= {ifcpSessionAttributesEntry 12}

ifcpSessionRmtNpFcidAlias OBJECT-TYPE
SYNTAX FcAddressId
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"Fibre Channel Identifier Alias assigned by the local gateway for the remote N Port. For an unbound session this variable will be empty."

::= {ifcpSessionAttributesEntry 13}

ifcpSessionIpTOV OBJECT-TYPE
SYNTAX IpTOVor0Type
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"The IP_TOV being used for this iFCP session. This is the maximum propagation delay that will be used for the iFCP session. The value can be changed on a per-session basis and initially defaults to ifcpLclGtwyInstDefaultIpTOV for the local gateway instance. The valid range is 0 - 3600 seconds. A value of 0 implies fibre channel frame lifetime limits will not be enforced."

::= {ifcpSessionAttributesEntry 14}

Gibbons Expires September 2003 13

Internet Draft iFCP MIB March 2003

ifcpSessionLclLTIntvl OBJECT-TYPE
SYNTAX LTIor0Type
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The Liveness Test Interval (LTI) used for this iFCP session. The value can be changed on a per-session basis and initially defaults to ifcpLclGtwyInstDefaultLTInterval for the local

gateway instance. The valid range is 0 - 65535 seconds.
 A value of 0 implies that the gateway will not originate
 Liveness Test messages for the session."
 ::= {ifcpSessionAttributesEntry 15}

ifcpSessionRmtLTIntvl	OBJECT-TYPE
SYNTAX	LTior0Type
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

"The Liveness Test Interval (LTI) as requested by the remote
 gateway instance to use for this iFCP session. This value may
 change over the life of the session. The valid range is 0 -
 65535 seconds. A value of 0 implies that the remote gateway
 has not been requested to originate Liveness Test messages for
 the session."
 ::= {ifcpSessionAttributesEntry 16}

ifcpSessionBound	OBJECT-TYPE
SYNTAX	TruthValue
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

"This value indicates whether this session is bound to a
 specific local and remote N Port. Sessions by default are
 unbound and ready for future assignment to a local and remote
 N Port."
 ::= {ifcpSessionAttributesEntry 17}

--
 -- Local iFCP Gateway Instance Session Statistics =====
 --

ifcpSessionStatsTable	OBJECT-TYPE
SYNTAX	SEQUENCE OF
	IfcpSessionStatsEntry
MAX-ACCESS	not-accessible
STATUS	current
DESCRIPTION	

"This table provides statistics on an iFCP session."
 ::= {ifcpNportSessionInfo 2}

ifcpSessionStatsEntry	OBJECT-TYPE
SYNTAX	IfcpSessionStatsEntry
MAX-ACCESS	not-accessible

```

DESCRIPTION
"iFCP specific statistics per session."
AUGMENTS {ifcpSessionAttributesEntry}
::= {ifcpSessionStatsTable 1}

IfcpSessionStatsEntry ::= SEQUENCE {
    ifcpSessionState          IfcpSessionStateType,
    ifcpSessionDuration       Unsigned32,
    ifcpSessionTxFrames       Counter64,
    ifcpSessionRxFrames       Counter64,
    ifcpSessionStaleFrames    Counter64,
    ifcpSessionHeaderCRCErrors Counter64,
    ifcpSessionFcPayloadCRCErrors Counter64,
    ifcpSessionOtherErrors    Counter64
}

ifcpSessionState          OBJECT-TYPE
    SYNTAX                 IfcpSessionStateType
    MAX-ACCESS              read-only
    STATUS                  current
    DESCRIPTION
        "The current session operating state."
        ::= {ifcpSessionStatsEntry 1}

ifcpSessionDuration       OBJECT-TYPE
    SYNTAX                 Unsigned32 (0..4294967295)
    MAX-ACCESS              read-only
    STATUS                  current
    DESCRIPTION
        "This indicates, in seconds, how long the iFCP session has
        been in an open or open-pending state.  When a session is
        down the value is reset to 0."
        ::= {ifcpSessionStatsEntry 2}

ifcpSessionTxFrames       OBJECT-TYPE
    SYNTAX                 Counter64
    MAX-ACCESS              read-only
    STATUS                  current
    DESCRIPTION
        "The total number of iFCP frames transmitted since the
        connection was first established."
        ::= {ifcpSessionStatsEntry 3}

ifcpSessionRxFrames       OBJECT-TYPE
    SYNTAX                 Counter64
    MAX-ACCESS              read-only
    STATUS                  current
    DESCRIPTION
        "The total number of iFCP frames received since the
        connection was first established."
        ::= {ifcpSessionStatsEntry 4}

```

ifcpSessionStaleFrames	OBJECT-TYPE	
Gibbons	Expires September 2003	15
Internet Draft	iFCP MIB	March 2003

SYNTAX	Counter64
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"The total number of received iFCP frames that were stale and discarded since the connection was first established."	
::= {ifcpSessionStatsEntry 5}	

ifcpSessionHeaderCRCErrors	OBJECT-TYPE
SYNTAX	Counter64
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"The total number of CRC errors that occurred in the frame header, detected since the connection was first established. Usually, a single Header CRC error is sufficient to terminate an iFCP session."	
::= {ifcpSessionStatsEntry 6}	

ifcpSessionFcPayloadCRCErrors	OBJECT-TYPE
SYNTAX	Counter64
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"The total number of CRC errors that occurred in the Fibre Channel frame payload detected since the connection was first established."	
::= {ifcpSessionStatsEntry 7}	

ifcpSessionOtherErrors	OBJECT-TYPE
SYNTAX	Counter64
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"The total number of errors, other than errors explicitly measured, detected since the connection was first established."	
::= {ifcpSessionStatsEntry 8}	


```
--
-- Low Capacity Statistics
--
```


ifcpSessionLcStatsTable	OBJECT-TYPE
SYNTAX	SEQUENCE OF

	IfcpSessionLcStatsEntry	
MAX-ACCESS	not-accessible	
STATUS	current	
DESCRIPTION		
<p>"This table provides low capacity statistics on an iFCP session. This is provided for backward compatibility with systems that do not support Counter64." ::= {ifcpNportSessionInfo 3}</p>		
ifcpSessionLcStatsEntry	OBJECT-TYPE	
Gibbons	Expires September 2003	16
Internet Draft	iFCP MIB	March 2003
SYNTAX	IfcpSessionLcStatsEntry	
MAX-ACCESS	not-accessible	
STATUS	current	
DESCRIPTION		
<p>"iFCP specific statistics per session." AUGMENTS {ifcpSessionAttributesEntry} ::= {ifcpSessionLcStatsTable 1}</p>		
<pre>IfcpSessionLcStatsEntry ::= SEQUENCE { ifcpSessionLcTxFrames Counter32, ifcpSessionLcRxFrames Counter32, ifcpSessionLcStaleFrames Counter32, ifcpSessionLcHeaderCRCErrors Counter32, ifcpSessionLcFcPayloadCRCErrors Counter32, ifcpSessionLcOtherErrors Counter32 }</pre>		
ifcpSessionLcTxFrames	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
<p>"The total number of iFCP frames transmitted since the connection was first established." ::= {ifcpSessionLcStatsEntry 1}</p>		
ifcpSessionLcRxFrames	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
<p>"The total number of iFCP frames received since the connection was first established." ::= {ifcpSessionLcStatsEntry 2}</p>		
ifcpSessionLcStaleFrames	OBJECT-TYPE	

SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
"The total number of received iFCP frames that were stale and discarded since the connection was first established."		
::= {ifcpSessionLcStatsEntry 3}		

ifcpSessionLcHeaderCRCErrors	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
"The total number of CRC errors that occurred in the frame header, detected since the connection was first established. Usually, a single Header CRC error is sufficient to terminate an iFCP session."		
::= {ifcpSessionLcStatsEntry 4}		

Gibbons	Expires September 2003	17
Internet Draft	iFCP MIB	March 2003

ifcpSessionLcFcPayloadCRCErrors	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
"The total number of CRC errors that occurred in the Fibre Channel frame payload detected since the connection was first established."		
::= {ifcpSessionLcStatsEntry 5}		

ifcpSessionLcOtherErrors	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
"The total number of errors, other than errors explicitly measured, detected since the connection was first established."		
::= {ifcpSessionLcStatsEntry 6}		

ifcpGroups OBJECT IDENTIFIER ::= {ifcpGatewayConformance 1}

ifcpLclGatewayGroup OBJECT-GROUP
 OBJECTS {
 ifcpLclGtwyInstPhyIndex,
 ifcpLclGtwyInstVersionMin,

```

    ifcpLclGtwyInstVersionMax,
    ifcpLclGtwyInstAddrTransMode,
    ifcpLclGtwyInstFcBrdcstSupport,
    ifcpLclGtwyInstDefaultIpTOV,
    ifcpLclGtwyInstDefaultLTInterval,
    ifcpLclGtwyInstDescr,
    ifcpLclGtwyInstNumActiveSessions
    }
    STATUS current
    DESCRIPTION
    "iFCP local device info group.  This group provides
    information about each gateway."
    ::= {ifcpGroups 1}

```

ifcpLclGatewaySessionGroup OBJECT-GROUP

```

    OBJECTS {
        ifcpSessionLclPrtlIfIndex,
        ifcpSessionLclPrtlAddrType,
        ifcpSessionLclPrtlAddr,
        ifcpSessionLclPrtlTcpPort,
        ifcpSessionLclNpWwun,
        ifcpSessionLclNpFcid,
        ifcpSessionRmtNpWwun,
        ifcpSessionRmtPrtlIfAddrType,
        ifcpSessionRmtPrtlIfAddr,
        ifcpSessionRmtPrtlTcpPort,
    }

```

Gibbons Expires September 2003 18

Internet Draft iFCP MIB March 2003

```

        ifcpSessionRmtNpFcid,
        ifcpSessionRmtNpFcidAlias,
        ifcpSessionIpTOV,
        ifcpSessionLclLTIntvl,
        ifcpSessionRmtLTIntvl,
        ifcpSessionBound
    }
    STATUS current
    DESCRIPTION
    "iFCP Session group.  This group provides information
    about each iFCP session currently active between iFCP
    gateways."
    ::= {ifcpGroups 4}

```

ifcpLclGatewaySessionStatsGroup OBJECT-GROUP

```

    OBJECTS {
        ifcpSessionState,
        ifcpSessionDuration,
        ifcpSessionTxFrames,
        ifcpSessionRxFrames,
    }

```

```

        ifcpSessionStaleFrames,
        ifcpSessionHeaderCRCErrors,
        ifcpSessionFcPayloadCRCErrors,
        ifcpSessionOtherErrors
    }
    STATUS current
    DESCRIPTION
    "iFCP Session Statistics group. This group provides
    statistics with 64 bit counters for each iFCP session
    currently active between iFCP gateways. This group
    is only required for agents that can support Counter64
    data types."
    ::= {ifcpGroups 5}

```

```

ifcpLclGatewaySessionLcStatsGroup OBJECT-GROUP
    OBJECTS {
        ifcpSessionLcTxFrames,
        ifcpSessionLcRxFrames,
        ifcpSessionLcStaleFrames,
        ifcpSessionLcHeaderCRCErrors,
        ifcpSessionLcFcPayloadCRCErrors,
        ifcpSessionLcOtherErrors
    }
    STATUS current
    DESCRIPTION
    "iFCP Session Low Capacity Statistics group. This group
    provides statistics with low capacity 32 bit counters
    for each iFCP session currently active between iFCP
    gateways. This group is only required for agents which
    do not support Counter64 data types, or need to support
    SNMPv1 applications."
    ::= {ifcpGroups 6}

```

```

ifcpCompliances OBJECT IDENTIFIER ::= {ifcpGatewayConformance 2}

```

Gibbons	Expires September 2003	19
---------	------------------------	----

Internet Draft	iFCP MIB	March 2003
----------------	----------	------------

```

ifcpGatewayCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
    "Implementation requirements for iFCP MIB compliance."
    MODULE      -- this module
    MANDATORY-GROUPS {
        ifcpLclGatewayGroup,
        ifcpLclGatewaySessionGroup,
        ifcpLclGatewaySessionStatsGroup,
        ifcpLclGatewaySessionLcStatsGroup
    }

```

```
::= {ifcpCompliances 1}
```

END

5. Intellectual Property

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and standards-related documentation can be found in [BCP-11](#). Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

6. Security Considerations

There are a number of management objects defined in this MIB module with 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.

Changing the following object values, with a MAX-ACCESS of read-write, may cause disruption in storage traffic:

- ifcpLclGtwyInstAddrTransMode
- ifcpLclGtwyInstFcBrdcstSupport
- ifcpLclGtwyInstDefaultIpTOV
- ifcpLclGtwyInstDefaultLTInterval
- ifcpSessionIpTOV

Gibbons	Expires September 2003	20
---------	------------------------	----

Internet Draft	iFCP MIB	March 2003
----------------	----------	------------

Changing the following object value, with a MAX-ACCESS of read-write, may cause a user to lose track of the iFCP gateway:

- ifcpLclGtwyInstDescr

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

The following object tables provide information about storage traffic sessions, and can indicate to a user who is communicating and exchanging storage data:

ifcpLclGtwyInstTable
ifcpSessionAttributesTable

SNMP versions prior to SNMPv3 did not include adequate security. 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 module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\]](#), [section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module 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.

7. Normative References

- [IFCP001] Charles Monia, Rod Mullendore, Franco Travostino, Wayland Jeong, Mark Edwards, "iFCP - A Protocol for Internet Fibre Channel Storage Networking", <[draft-ietf-ips-ifcp-13.txt](#)>, Expires February 2003
- [ISNS001] Josh Tseng, Kevin Gibbons, Franco Travostino, Curt Du Laney, Joe Souza "iSNS Internet Storage Name Service", <[draft-ietf-ips-isns-13.txt](#)>, Expires March 2003
- [FCMGT01] Keith McCloghrie, "Fibre Channel Management MIB", <[draft-ietf-ips-fcmgmt-mib-03.txt](#)>, Expires April 2003
- [RFC2863] McCloghrie, K., Kastenholz, F., "The Interfaces Group

MIB (IF-MIB)", [RFC 2863](#), June 2000.

- [RFC2737] McCloghrie, K., Bierman, A., "Entity MIB (Version 2)", [RFC 2737](#), December 1999.
- [RFC2851] M. Daniele, B. Haberman, S. Routhier, J. Schoenwaelder "Textual Conventions for Internet Network Addresses", [RFC 2851](#), June 2000.
- [RFC2571] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", [RFC 2571](#), April 1999.
- [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.
- [RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIV2", STD 58, [RFC 2579](#), 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.

8. Informative References

- [T11FCGS3] Fibre Channel - Generic Services 3, NCITS 348-2000.
- [RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.

9. Authors' Addresses

Kevin Gibbons
E-mail: kgibbons@NishanSystems.com,
Charles Monia
E-mail: cmonia@NishanSystems.com,
Josh Tseng
E-mail: jtseng@NishanSystems.com,
Postal: Nishan Systems
3850 North First Street
San Jose, CA 95134-1702
USA

Tel: (408) 519-3700
Fax: (408) 519-3705

Franco Travostino
Nortel Networks
3 Federal Street

Gibbons Expires September 2003 22

Internet Draft iFCP MIB March 2003

Billerica, MA 01821
USA

Tel: (978) 288-7708

E-mail: travos@nortelnetworks.com

10. Full Copyright Statement

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Gibbons

Expires September 2003

23