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Kevin Gibbons  
Charles Monia  
Josh Tseng  
Nishan Systems

Franco Travostino  
Nortel

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## **Definitions of Managed Objects For iFCP**

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### 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. 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.

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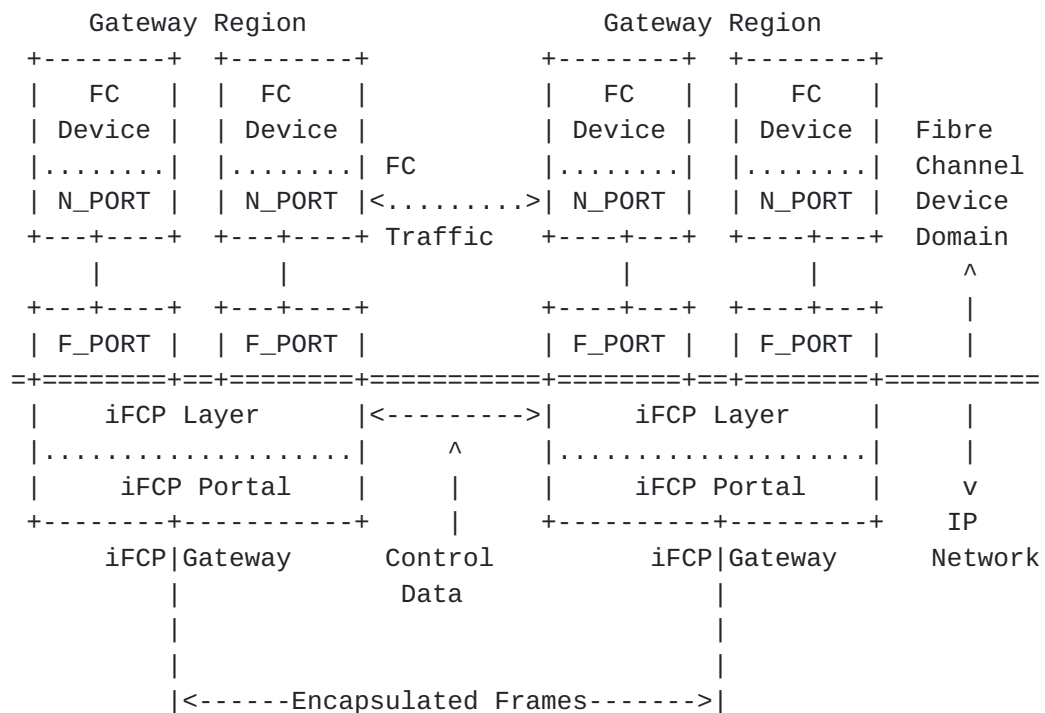
## 1. The Internet-Standard Management Framework

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. Overview

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

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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

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

-- From IETF Fibre Channel Management MIB, RFC TBD  
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."  
-- (to be assigned by RFC Editor)  
::= {experimental 4371}

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-- an IETF number has not yet been assigned

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."
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."

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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

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

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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

"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 =====
```

```
--
```

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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 }  
::= {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 an complex index that

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would be difficult to implement."

::= {ifcpSessionAttributesEntry 1}

ifcpSessionLclPrtlIfIndex	OBJECT-TYPE
SYNTAX	IfIndexType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

"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."

REFERENCE       "[RFC 2863](#), The Interfaces Group MIB (IF-MIB)"  
 ::= {ifcpSessionAttributesEntry 2}

ifcpSessionLclPrtlAddrType	OBJECT-TYPE
SYNTAX	InetAddressType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

"The type of address in ifcpSessionLclIfAddr."  
 ::= {ifcpSessionAttributesEntry 3}

ifcpSessionLclPrtlAddr	OBJECT-TYPE
SYNTAX	InetAddress
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

"This is the external IP address of the interface being used for the iFCP local portal in this session."

::= {ifcpSessionAttributesEntry 4}

ifcpSessionLclPrtlTcpPort	OBJECT-TYPE
SYNTAX	PortType
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"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."	
::= {ifcpSessionAttributesEntry 5}	

ifcpSessionLclNpWwun	OBJECT-TYPE
SYNTAX	FcNameIdOrZero
MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	
"World Wide Unique Name of the local N Port. For an unbound session this variable will be empty."	
DEFVAL	{ "" }
::= {ifcpSessionAttributesEntry 6}	

ifcpSessionLclNpFcId	OBJECT-TYPE
SYNTAX	FcAddressId

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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."	
::= {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}	

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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}

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

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#### 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  
    STATUS                                current  
    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

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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
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

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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

"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}

ifcpSessionLcStatsEntry                      OBJECT-TYPE  
SYNTAX                                      IfcpSessionLcStatsEntry  
MAX-ACCESS                                  not-accessible  
STATUS                                      current  
DESCRIPTION

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

IfcpSessionLcStatsEntry ::= SEQUENCE {  
    ifcpSessionLcTxFrames                      Counter32,  
    ifcpSessionLcRxFrames                      Counter32,  
    ifcpSessionLcStaleFrames                   Counter32,  
    ifcpSessionLcHeaderCRCErrors               Counter32,  
    ifcpSessionLcFcPayloadCRCErrors           Counter32,  
    ifcpSessionLcOtherErrors                   Counter32  
}

ifcpSessionLcTxFrames                      OBJECT-TYPE  
SYNTAX                                      Counter32  
MAX-ACCESS                                  read-only

STATUS	current	
DESCRIPTION		
"The total number of iFCP frames transmitted since the connection was first established."		
::= {ifcpSessionLcStatsEntry 1}		
ifcpSessionLcRxFrames	OBJECT-TYPE	
SYNTAX	Counter32	
MAX-ACCESS	read-only	
STATUS	current	
DESCRIPTION		
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"The total number of iFCP frames received since the connection was first established."		
::= {ifcpSessionLcStatsEntry 2}		
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}		
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,

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  ifcpLclGtwyInstDefaultIpTOV,  
   ifcpLclGtwyInstDefaultLTInterval,  
   ifcpLclGtwyInstDescr,  
   ifcpLclGtwyInstNumActiveSessions  
   }  
 STATUS current  
 DESCRIPTION  
   "iFCP local device info group"  
 ::= {ifcpGroups 1}

ifcpLclGatewaySessionGroup OBJECT-GROUP  
 OBJECTS {  
   ifcpSessionLclPrtlIfIndex,  
   ifcpSessionLclPrtlAddrType,  
   ifcpSessionLclPrtlAddr,  
   ifcpSessionLclPrtlTcpPort,  
   ifcpSessionLclNpWwun,  
   ifcpSessionLclNpFcid,  
   ifcpSessionRmtNpWwun,  
   ifcpSessionRmtPrtlIfAddrType,  
   ifcpSessionRmtPrtlIfAddr,  
   ifcpSessionRmtPrtlTcpPort,  
   ifcpSessionRmtNpFcid,  
   ifcpSessionRmtNpFcidAlias,  
   ifcpSessionIpTOV,  
   ifcpSessionLclLTIntvl,  
   ifcpSessionRmtLTIntvl,

```

ifcpSessionBound
    }
STATUS current
DESCRIPTION
    "iFCP Session group"
::= {ifcpGroups 4}

```

```

ifcpLclGatewaySessionStatsGroup OBJECT-GROUP
    OBJECTS {
        ifcpSessionState,
        ifcpSessionDuration,
        ifcpSessionTxFrames,
        ifcpSessionRxFrames,
        ifcpSessionStaleFrames,
        ifcpSessionHeaderCRCErrors,
        ifcpSessionFcPayloadCRCErrors,
        ifcpSessionOtherErrors
    }
STATUS current
DESCRIPTION
    "iFCP Session Statistics group"
::= {ifcpGroups 5}

```

```

ifcpLclGatewaySessionLcStatsGroup OBJECT-GROUP
    OBJECTS {
        ifcpSessionLcTxFrames,
        ifcpSessionLcRxFrames,

```

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```

        ifcpSessionLcStaleFrames,
        ifcpSessionLcHeaderCRCErrors,
        ifcpSessionLcFcPayloadCRCErrors,
        ifcpSessionLcOtherErrors
    }
STATUS current
DESCRIPTION
    "iFCP Session Low Capacity Statistics group"
::= {ifcpGroups 6}

```

```

ifcpCompliances OBJECT IDENTIFIER ::= {ifcpGatewayConformance 2}

```

```

ifcpGatewayComplianceV1 MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Minimum implementation for iFCP MIB compliance."
    MODULE -- this module
    MANDATORY-GROUPS {
        ifcpLclGatewayGroup

```

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

END

## 5. 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
```

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:

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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.

## 6. Normative References

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- [RFC2863] McCloghrie, K., Kastenholz, F., "The Interfaces Group MIB (IF-MIB)", [RFC 2863](#), June 2000.
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- [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.

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- [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.

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- [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.

## **8. Authors' Addresses**

Kevin Gibbons  
E-mail: [kgibbons@NishanSystems.com](mailto:kgibbons@NishanSystems.com),  
Charles Monia  
E-mail: [cmonia@NishanSystems.com](mailto:cmonia@NishanSystems.com),  
Josh Tseng  
E-mail: [jtseng@NishanSystems.com](mailto: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  
Billerica, MA 01821  
USA

Tel: (978) 288-7708

E-mail: [travos@nortelnetworks.com](mailto:travos@nortelnetworks.com)

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