                      Definitions of Managed Objects
               for the Internet Fibre Channel Protocol (iFCP)

Abstract

   This document defines Management Information Base (MIB) objects to
   monitor and control the Internet Fibre Channel Protocol (iFCP)
   gateway instances and their associated sessions, for use with network
   management protocols.

   This document obsoletes RFC 4369.

Status of This Memo

   This is an Internet Standards Track document.

   This document is a product of the Internet Engineering Task Force
   (IETF). It represents the consensus of the IETF community. It has
   received public review and has been approved for publication by the
   Internet Engineering Steering Group (IESG). Further information on
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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].

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in [RFC2119].

2. Introduction

   iFCP (RFC 4172 [RFC4172]) provides Fibre Channel fabric functionality
   on an IP network in which TCP/IP switching and routing elements
   replace Fibre Channel components. iFCP is used between iFCP
   gateways. This protocol can be used by FC-to-IP-based storage
   gateways for Fibre Channel Protocol (FCP) storage interconnects.

   Figure 1 provides an example of an interconnect between iFCP
   gateways.

```
          Gateway Region                     Gateway Region
     +--------+  +--------+            +--------+  +--------+
     |   FC   |  |   FC   |            |   FC   |  |   FC   |
     | Device |  | Device |            | Device |  | Device |  Fibre
     |........|  |........|  FC        |........|  |........|  Channel
     | N_PORT |  | N_PORT |<.........>| N_PORT |  | N_PORT |  Device
     +---+----+  +---+----+  Traffic   +----+---+  +----+---+  Domain
         |           |                      |           |        ^
     +---+----+  +---+----+            +----+---+  +----+---+     |
     | F_PORT |  | F_PORT |            | F_PORT |  | F_PORT |     |
     =+=======+==+========+==========+========+==+========+==========
      |   iFCP Layer      |<--------->|   iFCP Layer      |     |
      |...................|     ^     |...................|     |
      |   iFCP Portal     |     |     |   iFCP Portal     |     v
     +--------+----------+      |     +----------+--------+     IP
       iFCP|Gateway          Control       iFCP|Gateway     Network
          |                   Data            |
          |                                   |
          |                                   |
          |<------Encapsulated Frames------->|
          |       +----------------+          |
          |       |                |          |
       +------+   IP Network    +-------+
          |       |                |
          +----------------+
```
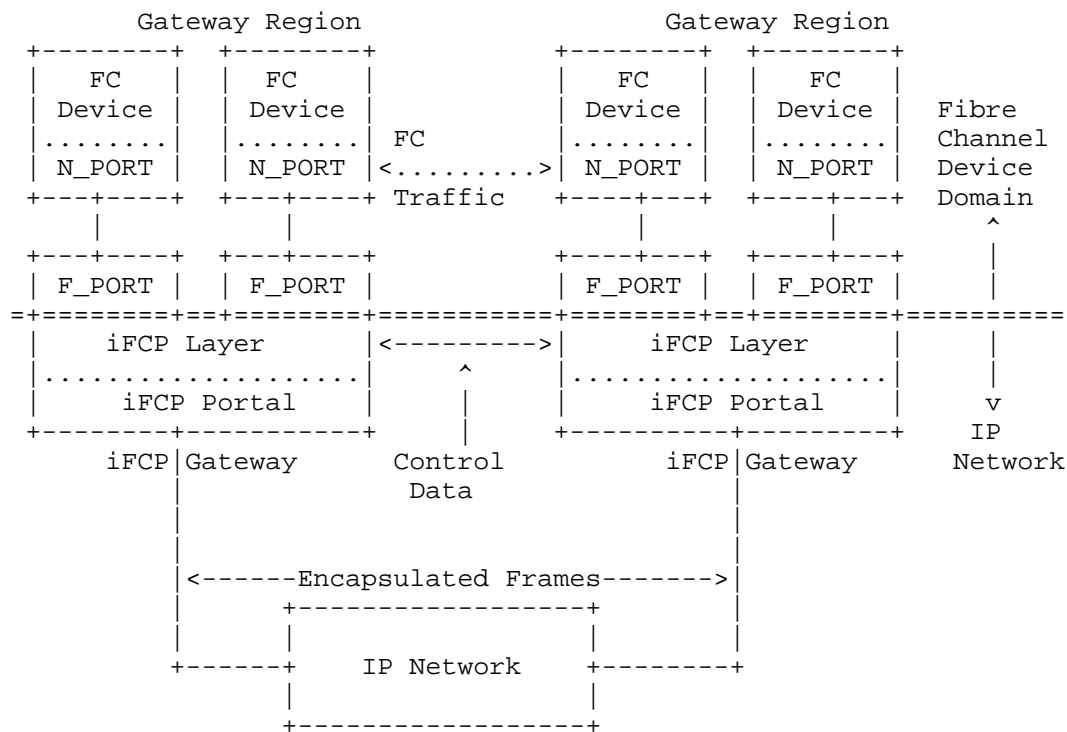
                Figure 1: Interconnect between iFCP Gateways

   The iFCP MIB module is designed to allow a network management
   protocol such as SNMP to be used to monitor and manage local iFCP
   gateway instances, including the configuration of iFCP sessions
   between gateways.

3. Technical Description

   The iFCP MIB module 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. The default IP Time Out Value (IP_TOV) is
   configurable for each gateway. Other standard MIBs, such as the
   Fibre Management MIB [RFC4044] or Interfaces Group MIB [RFC2863], 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 use one of the local iFCP gateway instances. This
   section allows the management of specific iFCP parameters, including
   changing the IP_TOV from the default setting of the gateway.

   The iFCP session statistics section provides statistical information
   on the iFCP sessions that use 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 high-capacity (Counter64) and low-
   capacity (Counter32) methods.

   The following MIB module imports from SNMPv2-SMI [RFC2578], SNMPv2-TC
   [RFC2579], SNMPv2-CONF [RFC2580], HCNUM-TC [RFC2856], IF-MIB
   [RFC2863], SNMP-FRAMEWORK-MIB [RFC3411], INET-ADDRESS-MIB [RFC4001],
   FC-MGMT-MIB [RFC4044], ENTITY-MIB (v3) [RFC4133], and RMON2-MIB
   [RFC4502].

4. Differences from RFC 4369

   As explained in [RFC6172], the iFCP address translation mode is
   deprecated. This document obsoletes the iFCP MIB module [RFC4369]
   for this change.

5. MIB Definition

     IFCP-MGMT-MIB DEFINITIONS ::= BEGIN

     IMPORTS
         MODULE-IDENTITY,
         OBJECT-TYPE,
         Gauge32,
         Integer32,
         Unsigned32,
         transmission
              FROM SNMPv2-SMI

         OBJECT-GROUP,
         MODULE-COMPLIANCE
              FROM SNMPv2-CONF

         TEXTUAL-CONVENTION,
         TimeStamp,
         TruthValue,
         StorageType
              FROM SNMPv2-TC

     -- From RFC 4502
         ZeroBasedCounter32
              FROM RMON2-MIB

     -- From RFC 2856
         ZeroBasedCounter64
              FROM HCNUM-TC

     -- From RFC 2863
         InterfaceIndexOrZero
              FROM IF-MIB

     -- From RFC 3411
         SnmpAdminString
              FROM SNMP-FRAMEWORK-MIB

     -- From RFC 4001
         InetAddressType,
         InetAddress,
         InetPortNumber
              FROM INET-ADDRESS-MIB

```
     -- From RFC 4044
        FcNameIdOrZero,
        FcAddressIdOrZero
              FROM FC-MGMT-MIB

     -- From RFC 4133
        PhysicalIndexOrZero
              FROM ENTITY-MIB
          ;

   ifcpMgmtMIB    MODULE-IDENTITY
          LAST-UPDATED "201103090000Z"
          ORGANIZATION "IETF STORage Maintenance (STORM) Working Group"
          CONTACT-INFO "
            Working Group Email : storm@ietf.org
            Attn: Prakash Venkatesen
                  HCL Technologies
                  Email: prakashvn@hcl.com"

          DESCRIPTION
                  "This module defines management information specific
                   to Internet Fibre Channel Protocol (iFCP) gateway
                   management.

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                   Simplified BSD License set forth in Section 4.c of the
                   IETF Trust's Legal Provisions Relating to IETF
                   Documents (http://trustee.ietf.org/license-info)."
          REVISION     "201103090000Z"
        DESCRIPTION
                  "Second version of iFCP Management Module.  The iFCP
                   address translation mode is deprecated.
                   This MIB module published as RFC 6173."
          REVISION     "200601170000Z"
        DESCRIPTION
                  "Initial version of iFCP Management Module.
                   This MIB module published as RFC 4369."
          ::=  { transmission 230 }

   --
   -- Textual Conventions
   --
```

```
     IfcpIpTOVorZero ::= TEXTUAL-CONVENTION
       DISPLAY-HINT    "d"
       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       "RFC 4172, iFCP Protocol Specification"
       SYNTAX          Unsigned32 (0..3600)

     IfcpLTIorZero ::= TEXTUAL-CONVENTION
       DISPLAY-HINT    "d"
       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       "RFC 4172, iFCP Protocol Specification"
       SYNTAX          Unsigned32 (0..65535)

     IfcpSessionStates ::= TEXTUAL-CONVENTION
       STATUS          current
       DESCRIPTION     "The value for an iFCP session state."
       SYNTAX          INTEGER {down(1), openPending(2), open(3)}

     IfcpAddressMode ::= TEXTUAL-CONVENTION
       STATUS          current
       DESCRIPTION     "The values for iFCP Address Translation
                        Mode."
       REFERENCE       "RFC 6172, Deprecation of iFCP Address
                        Translation Mode"
       SYNTAX          INTEGER {addressTransparent(1),
                               addressTranslation(2)}

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

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

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

```
   ifcpLclGatewayInfo OBJECT IDENTIFIER ::= {ifcpGatewayObjects 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 controlled.  This table contains an entry
    for each local iFCP gateway instance that is being managed."
       ::= {ifcpLclGatewayInfo 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           PhysicalIndexOrZero,
       ifcpLclGtwyInstVersionMin         Unsigned32,
       ifcpLclGtwyInstVersionMax         Unsigned32,
       ifcpLclGtwyInstAddrTransMode      IfcpAddressMode,
       ifcpLclGtwyInstFcBrdcstSupport    TruthValue,
       ifcpLclGtwyInstDefaultIpTOV       IfcpIpTOVorZero,
       ifcpLclGtwyInstDefaultLTInterval  IfcpLTIorZero,
       ifcpLclGtwyInstDescr              SnmpAdminString,
       ifcpLclGtwyInstNumActiveSessions  Gauge32,
       ifcpLclGtwyInstStorageType        StorageType
                                }

   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              PhysicalIndexOrZero
       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 3), for this
    iFCP gateway.  If not supported, or if not related to a
    physical entity, then the value of this object is 0."
       REFERENCE       "Entity MIB (Version 3)"
       ::= {ifcpLclGtwyInstEntry     2}

   ifcpLclGtwyInstVersionMin OBJECT-TYPE
       SYNTAX              Unsigned32 (0..255)
       MAX-ACCESS          read-only
       STATUS              current
       DESCRIPTION
   "The minimum iFCP protocol version supported by the local iFCP
    gateway instance."
       REFERENCE       "RFC 4172, iFCP Protocol Specification"
       ::= {ifcpLclGtwyInstEntry     3}

   ifcpLclGtwyInstVersionMax OBJECT-TYPE
       SYNTAX              Unsigned32 (0..255)
       MAX-ACCESS          read-only
       STATUS              current
       DESCRIPTION
   "The maximum iFCP protocol version supported by the local iFCP
    gateway instance."
       REFERENCE       "RFC 4172, iFCP Protocol Specification"
       ::= {ifcpLclGtwyInstEntry     4}

   ifcpLclGtwyInstAddrTransMode OBJECT-TYPE
       SYNTAX              IfcpAddressMode
       MAX-ACCESS          read-write
       STATUS              current
       DESCRIPTION
   "The local iFCP gateway operating mode.  Changing this value
    may cause existing sessions to be disrupted."
       REFERENCE       "RFC 4172, iFCP Protocol Specification;
                        RFC 6172, Deprecation of iFCP Address
                        Translation Mode"
       DEFVAL              { addressTransparent }
       ::= {ifcpLclGtwyInstEntry     5}
```

    ifcpLclGtwyInstFcBrdcstSupport OBJECT-TYPE
        SYNTAX   TruthValue
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
    "This value indicates whether the local iFCP gateway supports
     FC Broadcast. Changing this value may cause existing sessions
     to be disrupted."
        REFERENCE   "RFC 4172, iFCP Protocol Specification"
        DEFVAL   { false }
        ::= {ifcpLclGtwyInstEntry   6}

    ifcpLclGtwyInstDefaultIpTOV OBJECT-TYPE
        SYNTAX   IfcpIpTOVorZero
        UNITS   "seconds"
        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."
        REFERENCE   "RFC 4172, iFCP Protocol Specification"
        DEFVAL   { 6 }
        ::= {ifcpLclGtwyInstEntry   7}

    ifcpLclGtwyInstDefaultLTInterval OBJECT-TYPE
        SYNTAX   IfcpLTIorZero
        UNITS   "seconds"
        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."
        REFERENCE   "RFC 4172, iFCP Protocol Specification"
        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             Gauge32 (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}


    ifcpLclGtwyInstStorageType OBJECT-TYPE
        SYNTAX             StorageType
        MAX-ACCESS         read-only
        STATUS             current
        DESCRIPTION
    "The storage type for this row.  Parameter values defined
     for a gateway are usually non-volatile, but may be volatile
     or permanent in some configurations.  If permanent, then
     the following parameters must have read-write access:
     ifcpLclGtwyInstAddrTransMode, ifcpLclGtwyInstDefaultIpTOV,
     and ifcpLclGtwyInstDefaultLTInterval."
        DEFVAL             { nonVolatile }
        ::= {ifcpLclGtwyInstEntry      11}

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

    ifcpNportSessionInfo
            OBJECT IDENTIFIER ::= {ifcpGatewayObjects 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
"Each entry contains information about one iFCP session consisting
 of a pair of N_PORTs joined by a single TCP/IP connection. This
 table's INDEX includes ifcpLclGtwyInstIndex, which identifies the
 local iFCP gateway instance that created the session for the
 entry.

 Soon after an entry is created in this table for an iFCP session, it
 will correspond to an entry in the tcpConnectionTable of the TCP-MIB
 (RFC 4022). The corresponding entry might represent a preexisting
 TCP connection, or it might be a newly created entry. (Note that if
 IPv4 is being used, an entry in RFC 2012's tcpConnTable may also
 correspond.) The values of ifcpSessionLclPrtlAddrType and
 ifcpSessionRmtPrtlIfAddrType in this table and the values of
 tcpConnectionLocalAddressType and tcpConnectionRemAddressType used
 as INDEX values for the corresponding entry in the
 tcpConnectionTable should be the same; this makes it simpler to
 locate a session's TCP connection in the TCP-MIB. (Of course, all
 four values need to be 'ipv4' if there's a corresponding entry in
 the tcpConnTable.)

 If an entry is created in this table for a session, prior to
 knowing which local and/or remote port numbers will be used for
 the TCP connection, then ifcpSessionLclPrtlTcpPort and/or
 ifcpSessionRmtPrtlTcpPort have the value zero until such time as
 they can be updated to the port numbers (to be) used for the
 connection. (Thus, a port value of zero should not be used to
 locate a session's TCP connection in the TCP-MIB.)

 When the TCP connection terminates, the entry in the
 tcpConnectionTable and the entry in this table both get deleted
 (and, if applicable, so does the entry in the tcpConnTable)."
     INDEX { ifcpLclGtwyInstIndex, ifcpSessionIndex }
     ::= {ifcpSessionAttributesTable 1}

IfcpSessionAttributesEntry ::= SEQUENCE {
    ifcpSessionIndex   Integer32,
    ifcpSessionLclPrtlIfIndex   InterfaceIndexOrZero,
    ifcpSessionLclPrtlAddrType   InetAddressType,

```
        ifcpSessionLclPrtlAddr           InetAddress,
        ifcpSessionLclPrtlTcpPort        InetPortNumber,
        ifcpSessionLclNpWwun             FcNameIdOrZero,
        ifcpSessionLclNpFcid             FcAddressIdOrZero,
        ifcpSessionRmtNpWwun             FcNameIdOrZero,
        ifcpSessionRmtPrtlIfAddrType     InetAddressType,
        ifcpSessionRmtPrtlIfAddr         InetAddress,
        ifcpSessionRmtPrtlTcpPort        InetPortNumber,
        ifcpSessionRmtNpFcid             FcAddressIdOrZero,
        ifcpSessionRmtNpFcidAlias        FcAddressIdOrZero,
        ifcpSessionIpTOV                 IfcpIpTOVorZero,
        ifcpSessionLclLTIntvl            IfcpLTIorZero,
        ifcpSessionRmtLTIntvl            IfcpLTIorZero,
        ifcpSessionBound                 TruthValue,
        ifcpSessionStorageType           StorageType
                                       }

   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                        InterfaceIndexOrZero
       MAX-ACCESS                    read-only
       STATUS                        current
       DESCRIPTION
   "This is the interface index in the IF-MIB ifTable being used
    as the local portal in this session, as described in the
    IF-MIB.  If the local portal is not associated with an entry
    in the ifTable, then the value is 0.  The ifType of the
    interface will generally be a type that supports IP, but an
    implementation may support iFCP using other protocols.  This
    object can be used 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.  The address type
   is defined in ifcpSessionLclPrtlAddrType.  If the value is a
   DNS name, then the name is resolved once, during the initial
   session instantiation."
     ::= {ifcpSessionAttributesEntry 4}

  ifcpSessionLclPrtlTcpPort        OBJECT-TYPE
     SYNTAX                       InetPortNumber
     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.  The value may be 0
   during an initial setup period."
     ::= {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 a zero-length string."
     REFERENCE       "RFC 4172, iFCP Protocol Specification"
     DEFVAL                       { "" }
     ::= {ifcpSessionAttributesEntry 6}

  ifcpSessionLclNpFcid             OBJECT-TYPE
     SYNTAX                       FcAddressIdOrZero
     MAX-ACCESS                   read-only
     STATUS                       current
```

```
      DESCRIPTION
   "Fibre Channel Identifier of the local N Port.  For an unbound
    session, this variable will be a zero-length string."
      REFERENCE        "RFC 4172, iFCP Protocol Specification"
      ::= {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 a zero-length string."
      REFERENCE        "RFC 4172, iFCP Protocol Specification"
      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.  The address type is
    defined in ifcpSessionRmtPrtlIfAddrType.  If the value is a
    DNS name, then the name is resolved once, during the initial
    session instantiation."
      ::= {ifcpSessionAttributesEntry 10}

   ifcpSessionRmtPrtlTcpPort          OBJECT-TYPE
      SYNTAX                          InetPortNumber
      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.  The value may be 0 during an initial setup
    period."
      DEFVAL                          { 3420 }
      ::= {ifcpSessionAttributesEntry 11}
```

```
   ifcpSessionRmtNpFcid                 OBJECT-TYPE
       SYNTAX                           FcAddressIdOrZero
       MAX-ACCESS                       read-only
       STATUS                           current
       DESCRIPTION
   "Fibre Channel Identifier of the remote N Port.  For an
    unbound session, this variable will be a zero-length string."
       REFERENCE        "RFC 4172, iFCP Protocol Specification"
       ::= {ifcpSessionAttributesEntry 12}


   ifcpSessionRmtNpFcidAlias            OBJECT-TYPE
       SYNTAX                           FcAddressIdOrZero
       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 a zero-length string."
       REFERENCE        "RFC 4172, iFCP Protocol Specification"
       ::= {ifcpSessionAttributesEntry 13}


   ifcpSessionIpTOV                     OBJECT-TYPE
       SYNTAX                           IfcpIpTOVorZero
       UNITS                            "seconds"
       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."
       REFERENCE        "RFC 4172, iFCP Protocol Specification"
       ::= {ifcpSessionAttributesEntry 14}

   ifcpSessionLclLTIntvl                OBJECT-TYPE
       SYNTAX                           IfcpLTIorZero
       UNITS                            "seconds"
       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."
         REFERENCE   "RFC 4172, iFCP Protocol Specification"
         ::= {ifcpSessionAttributesEntry 15}

    ifcpSessionRmtLTIntvl   OBJECT-TYPE
        SYNTAX   IfcpLTIorZero
        UNITS   "seconds"
        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."
         REFERENCE   "RFC 4172, iFCP Protocol Specification"
         ::= {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."
         REFERENCE   "RFC 4172, iFCP Protocol Specification"
         ::= {ifcpSessionAttributesEntry 17}

    ifcpSessionStorageType   OBJECT-TYPE
        SYNTAX   StorageType
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
    "The storage type for this row. Parameter values defined
     for a session are usually non-volatile, but may be volatile
     or permanent in some configurations. If permanent, then
     ifcpSessionIpTOV must have read-write access."
         DEFVAL   { nonVolatile }
         ::= {ifcpSessionAttributesEntry 18}

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

    IfcpSessionStatsEntry ::= SEQUENCE {
        ifcpSessionState                IfcpSessionStates,
        ifcpSessionDuration             Unsigned32,
        ifcpSessionTxOctets             ZeroBasedCounter64,
        ifcpSessionRxOctets             ZeroBasedCounter64,
        ifcpSessionTxFrames             ZeroBasedCounter64,
        ifcpSessionRxFrames             ZeroBasedCounter64,
        ifcpSessionStaleFrames          ZeroBasedCounter64,
        ifcpSessionHeaderCRCErrors      ZeroBasedCounter64,
        ifcpSessionFcPayloadCRCErrors   ZeroBasedCounter64,
        ifcpSessionOtherErrors          ZeroBasedCounter64,
        ifcpSessionDiscontinuityTime    TimeStamp
                                        }

    ifcpSessionState                    OBJECT-TYPE
        SYNTAX                          IfcpSessionStates
        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}

ifcpSessionTxOctets                OBJECT-TYPE
    SYNTAX                         ZeroBasedCounter64
    MAX-ACCESS                     read-only
    STATUS                         current
    DESCRIPTION
"The total number of octets transmitted by the iFCP gateway
 for this session.  Discontinuities in the value of this
 counter can occur at reinitialization of the management
 system, and at other times as indicated by the value of
 ifcpSessionDiscontinuityTime."
    ::= {ifcpSessionStatsEntry 3}

ifcpSessionRxOctets                OBJECT-TYPE
    SYNTAX                         ZeroBasedCounter64
    MAX-ACCESS                     read-only
    STATUS                         current
    DESCRIPTION
"The total number of octets received by the iFCP gateway for
 this session.  Discontinuities in the value of this
 counter can occur at reinitialization of the management
 system, and at other times as indicated by the value of
 ifcpSessionDiscontinuityTime."
    ::= {ifcpSessionStatsEntry 4}

ifcpSessionTxFrames                OBJECT-TYPE
    SYNTAX                         ZeroBasedCounter64
    MAX-ACCESS                     read-only
    STATUS                         current
    DESCRIPTION
"The total number of iFCP frames transmitted by the gateway
 for this session.  Discontinuities in the value of this
 counter can occur at reinitialization of the management
 system, and at other times as indicated by the value of
 ifcpSessionDiscontinuityTime."
    ::= {ifcpSessionStatsEntry 5}

ifcpSessionRxFrames                OBJECT-TYPE
    SYNTAX                         ZeroBasedCounter64
    MAX-ACCESS                     read-only
    STATUS                         current
    DESCRIPTION
"The total number of iFCP frames received by the gateway
 for this session.  Discontinuities in the value of this
 counter can occur at reinitialization of the management
 system, and at other times as indicated by the value of
 ifcpSessionDiscontinuityTime."
```

```
        ::= {ifcpSessionStatsEntry 6}

    ifcpSessionStaleFrames              OBJECT-TYPE
        SYNTAX                          ZeroBasedCounter64
        MAX-ACCESS                      read-only
        STATUS                          current
        DESCRIPTION
    "The total number of received iFCP frames that were stale and
     discarded by the gateway for this session.  Discontinuities
     in the value of this counter can occur at reinitialization
     of the management system, and at other times as indicated by
     the value of ifcpSessionDiscontinuityTime."
        ::= {ifcpSessionStatsEntry 7}

    ifcpSessionHeaderCRCErrors          OBJECT-TYPE
        SYNTAX                          ZeroBasedCounter64
        MAX-ACCESS                      read-only
        STATUS                          current
        DESCRIPTION
    "The total number of Cyclic Redundancy Check (CRC) errors that
     occurred in the frame header, detected by the gateway for this
     session.  Usually, a single Header CRC error is sufficient to
     terminate an iFCP session.  Discontinuities in the value of this
     counter can occur at reinitialization of the management system,
     and at other times as indicated by the value of
     ifcpSessionDiscontinuityTime."
        ::= {ifcpSessionStatsEntry 8}

    ifcpSessionFcPayloadCRCErrors       OBJECT-TYPE
        SYNTAX                          ZeroBasedCounter64
        MAX-ACCESS                      read-only
        STATUS                          current
        DESCRIPTION
    "The total number of CRC errors that occurred in the Fibre
     Channel frame payload, detected by the gateway for this
     session.  Discontinuities in the value of this counter can
     occur at reinitialization of the management system, and
     at other times as indicated by the value of
     ifcpSessionDiscontinuityTime."
        ::= {ifcpSessionStatsEntry 9}

    ifcpSessionOtherErrors              OBJECT-TYPE
        SYNTAX                          ZeroBasedCounter64
        MAX-ACCESS                      read-only
        STATUS                          current
        DESCRIPTION
    "The total number of errors, other than errors explicitly
     measured, detected by the gateway for this session.
```

```
   Discontinuities in the value of this counter can occur at
   reinitialization of the management system, and at other
   times as indicated by the value of
   ifcpSessionDiscontinuityTime."
       ::= {ifcpSessionStatsEntry 10}

ifcpSessionDiscontinuityTime        OBJECT-TYPE
    SYNTAX                          TimeStamp
    MAX-ACCESS                      read-only
    STATUS                          current
    DESCRIPTION
"The value of sysUpTime on the most recent occasion at which
 any one (or more) of the ifcpSessionStatsTable counters
 suffered a discontinuity.  The relevant counters are the
 specific Counter64-based instances associated with the
 ifcpSessionStatsTable: ifcpSessionTxOctets,
 ifcpSessionRxOctets, ifcpSessionTxFrames,
 ifcpSessionRxFrames, ifcpSessionStaleFrames,
 ifcpSessionHeaderCRCErrors, ifcpSessionFcPayloadCRCErrors,
 and ifcpSessionOtherErrors.  If no such discontinuities have
 occurred since the last reinitialization of the local
 management subsystem, then this object contains a zero value."
       ::= {ifcpSessionStatsEntry 11}

--
-- Low-Capacity Statistics
--

ifcpSessionLcStatsTable             OBJECT-TYPE
    SYNTAX                          SEQUENCE OF
                                      IfcpSessionLcStatsEntry
    MAX-ACCESS                      not-accessible
    STATUS                          current
    DESCRIPTION
"This table provides low-capacity statistics for an iFCP
 session.  These are provided for backward compatibility with
 systems that do not support Counter64-based objects.  At
 1-Gbps rates, a Counter32-based object can wrap as often as
 every 34 seconds.  Counter32-based objects can be sufficient
 for many situations.  However, when possible, it is
 recommended to use the high-capacity statistics in
 ifcpSessionStatsTable based on Counter64 objects."
       ::= {ifcpNportSessionInfo 3}

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

```
        DESCRIPTION
    "Provides iFCP-specific statistics per session."
        AUGMENTS {ifcpSessionAttributesEntry}
        ::= {ifcpSessionLcStatsTable 1}

    IfcpSessionLcStatsEntry ::= SEQUENCE {
        ifcpSessionLcTxOctets            ZeroBasedCounter32,
        ifcpSessionLcRxOctets            ZeroBasedCounter32,
        ifcpSessionLcTxFrames            ZeroBasedCounter32,
        ifcpSessionLcRxFrames            ZeroBasedCounter32,
        ifcpSessionLcStaleFrames         ZeroBasedCounter32,
        ifcpSessionLcHeaderCRCErrors     ZeroBasedCounter32,
        ifcpSessionLcFcPayloadCRCErrors  ZeroBasedCounter32,
        ifcpSessionLcOtherErrors         ZeroBasedCounter32
                                        }
    ifcpSessionLcTxOctets                OBJECT-TYPE
        SYNTAX                           ZeroBasedCounter32
        MAX-ACCESS                       read-only
        STATUS                           current
        DESCRIPTION
    "The total number of octets transmitted by the iFCP gateway
     for this session."
        ::= {ifcpSessionLcStatsEntry 1}

    ifcpSessionLcRxOctets                OBJECT-TYPE
        SYNTAX                           ZeroBasedCounter32
        MAX-ACCESS                       read-only
        STATUS                           current
        DESCRIPTION
    "The total number of octets received by the iFCP gateway for
     this session."
        ::= {ifcpSessionLcStatsEntry 2}

    ifcpSessionLcTxFrames                OBJECT-TYPE
        SYNTAX                           ZeroBasedCounter32
        MAX-ACCESS                       read-only
        STATUS                           current
        DESCRIPTION
    "The total number of iFCP frames transmitted by the gateway
     for this session."
        ::= {ifcpSessionLcStatsEntry 3}

    ifcpSessionLcRxFrames                OBJECT-TYPE
        SYNTAX                           ZeroBasedCounter32
        MAX-ACCESS                       read-only
        STATUS                           current
```

```
    DESCRIPTION
  "The total number of iFCP frames received by the gateway
   for this session."
      ::= {ifcpSessionLcStatsEntry 4}

  ifcpSessionLcStaleFrames            OBJECT-TYPE
      SYNTAX                          ZeroBasedCounter32
      MAX-ACCESS                      read-only
      STATUS                          current
      DESCRIPTION
  "The total number of received iFCP frames that were stale and
   discarded by the gateway for this session."
      ::= {ifcpSessionLcStatsEntry 5}

  ifcpSessionLcHeaderCRCErrors        OBJECT-TYPE
      SYNTAX                          ZeroBasedCounter32
      MAX-ACCESS                      read-only
      STATUS                          current
      DESCRIPTION
  "The total number of CRC errors that occurred in the frame
   header, detected by the gateway for this session.  Usually,
   a single Header CRC error is sufficient to terminate an
   iFCP session."
      ::= {ifcpSessionLcStatsEntry 6}

  ifcpSessionLcFcPayloadCRCErrors     OBJECT-TYPE
      SYNTAX                          ZeroBasedCounter32
      MAX-ACCESS                      read-only
      STATUS                          current
      DESCRIPTION
  "The total number of CRC errors that occurred in the Fibre
   Channel frame payload, detected by the gateway for this
   session."
      ::= {ifcpSessionLcStatsEntry 7}

  ifcpSessionLcOtherErrors            OBJECT-TYPE
      SYNTAX                          ZeroBasedCounter32
      MAX-ACCESS                      read-only
      STATUS                          current
      DESCRIPTION
  "The total number of errors, other than errors explicitly
   measured, detected by the gateway for this session."
      ::= {ifcpSessionLcStatsEntry 8}


  --==========================================================
```

```
   ifcpCompliances
           OBJECT IDENTIFIER ::= {ifcpGatewayConformance 1}


   ifcpGatewayCompliance MODULE-COMPLIANCE
       STATUS deprecated
       DESCRIPTION
   "This MODULE-COMPLIANCE has been deprecated because address
   translation mode has been deprecated in the iFCP standard.  It has
   the implementation requirements for iFCP MIB module compliance."
       MODULE        -- this module
       MANDATORY-GROUPS {
           ifcpLclGatewayGroup,
           ifcpLclGatewaySessionGroup,
           ifcpLclGatewaySessionStatsGroup,
           ifcpLclGatewaySessionLcStatsGroup
                         }

           OBJECT        ifcpSessionLclPrtlAddrType
           SYNTAX        InetAddressType { ipv4(1), ipv6(2) }
           DESCRIPTION
                   "Support is only required for global IPv4
                   and IPv6 address types."
           OBJECT        ifcpSessionRmtPrtlIfAddrType
           SYNTAX        InetAddressType { ipv4(1), ipv6(2) }
           DESCRIPTION
                   "Support is only required for global IPv4
                   and IPv6 address types."

           OBJECT        ifcpLclGtwyInstAddrTransMode
           SYNTAX        IfcpAddressMode {addressTransparent(1),
                                         addressTranslation(2)}
           DESCRIPTION
                   "This object must support addressTransparent(1) and
                     addressTranslation(2)."

       ::= {ifcpCompliances 1}

   ifcpGatewayComplianceNoTranslation MODULE-COMPLIANCE
       STATUS current
       DESCRIPTION
   "Implementation requirements for iFCP MIB module compliance.
    Address translation mode has been deprecated in the iFCP standard."
       REFERENCE         "RFC 4172, iFCP Protocol Specification;
                          RFC 6172, Deprecation of iFCP Address
                          Translation Mode"
       MODULE        -- this module
```

```
        MANDATORY-GROUPS {
            ifcpLclGatewayGroup,
            ifcpLclGatewaySessionGroupNoTranslation,
            ifcpLclGatewaySessionStatsGroup,
            ifcpLclGatewaySessionLcStatsGroup
                        }

        OBJECT        ifcpSessionLclPrtlAddrType
        SYNTAX        InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "Support is only required for global IPv4
              and IPv6 address types."

        OBJECT        ifcpSessionRmtPrtlIfAddrType
        SYNTAX        InetAddressType { ipv4(1), ipv6(2) }
        DESCRIPTION
                "Support is only required for global IPv4
              and IPv6 address types."

        OBJECT        ifcpLclGtwyInstAddrTransMode
        SYNTAX        IfcpAddressMode {addressTransparent(1)}
        DESCRIPTION
                "Support is only required for addressTransparent(1)."

       ::= {ifcpCompliances 2}

   ifcpGroups OBJECT IDENTIFIER ::= {ifcpGatewayConformance 2}

   ifcpLclGatewayGroup OBJECT-GROUP
       OBJECTS {
       ifcpLclGtwyInstPhyIndex,
       ifcpLclGtwyInstVersionMin,
       ifcpLclGtwyInstVersionMax,
       ifcpLclGtwyInstAddrTransMode,
       ifcpLclGtwyInstFcBrdcstSupport,
       ifcpLclGtwyInstDefaultIpTOV,
       ifcpLclGtwyInstDefaultLTInterval,
       ifcpLclGtwyInstDescr,
       ifcpLclGtwyInstNumActiveSessions,
       ifcpLclGtwyInstStorageType
             }
       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,
        ifcpSessionRmtNpFcid,
        ifcpSessionRmtNpFcidAlias,
        ifcpSessionIpTOV,
        ifcpSessionLclLTIntvl,
        ifcpSessionRmtLTIntvl,
        ifcpSessionBound,
        ifcpSessionStorageType
                }
        STATUS deprecated
        DESCRIPTION
    "This OBJECT-GROUP has been deprecated because address translation
    mode has been deprecated in the iFCP standard. iFCP Session group.
    This group provides information about each iFCP session currently
    active between iFCP gateways."
        ::= {ifcpGroups 4}

    ifcpLclGatewaySessionStatsGroup OBJECT-GROUP
        OBJECTS {
        ifcpSessionState,
        ifcpSessionDuration,
        ifcpSessionTxOctets,
        ifcpSessionRxOctets,
        ifcpSessionTxFrames,
        ifcpSessionRxFrames,
        ifcpSessionStaleFrames,
        ifcpSessionHeaderCRCErrors,
        ifcpSessionFcPayloadCRCErrors,
        ifcpSessionOtherErrors,
        ifcpSessionDiscontinuityTime
                }
        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-
       based data types."
         ::= {ifcpGroups 5}

    ifcpLclGatewaySessionLcStatsGroup OBJECT-GROUP
         OBJECTS {
         ifcpSessionLcTxOctets,
         ifcpSessionLcRxOctets,
         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 that
       do not support Counter64-based data types, or that need
       to support SNMPv1 applications."
         ::= {ifcpGroups 6}

    ifcpLclGatewaySessionGroupNoTranslation OBJECT-GROUP
         OBJECTS {
         ifcpSessionLclPrtlIfIndex,
         ifcpSessionLclPrtlAddrType,
         ifcpSessionLclPrtlAddr,
         ifcpSessionLclPrtlTcpPort,
         ifcpSessionLclNpWwun,
         ifcpSessionLclNpFcid,
         ifcpSessionRmtNpWwun,
         ifcpSessionRmtPrtlIfAddrType,
         ifcpSessionRmtPrtlIfAddr,
         ifcpSessionRmtPrtlTcpPort,
         ifcpSessionRmtNpFcid,
         ifcpSessionIpTOV,
         ifcpSessionLclLTIntvl,
         ifcpSessionRmtLTIntvl,
         ifcpSessionBound,
         ifcpSessionStorageType
                 }

```
      STATUS current
      DESCRIPTION
   "iFCP Session group.  This group provides information
    about each iFCP session currently active between iFCP
    gateways."
      ::= {ifcpGroups 7}

   END
```

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

   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.

   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. IANA Considerations

The MIB module in this document uses the following IANA-assigned
OBJECT IDENTIFIER value recorded in the SMI Numbers registry:

```
Descriptor          OBJECT IDENTIFIER value
----------          -----------------------
ifcpMgmtMIB         { transmission 230 }
```

8. References

8.1. Normative References

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8.2. Informative References

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9. Acknowledgments

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