Connecting to an Infiniband™ IO Device

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What this talk is about

Initiator

Consumer

IO Driver or Application

HCA or TCA

Port GID

Application protocol (service) name

Port GID

Port GID

Device identification

IO Unit

Target

Infiniband Fabric

SMgr

IOC

IOC GUID

Port GID

Port GID

Port GID

Port GID

IOC - IO Controller
GSA - General Service Agent
SMA - Subnet Management Agent

ROM - see Proprietary Boot presentation

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Identifying an IO Device

- **IO Unit port GID**
  - An IOC may be accessible with multiple port GIDs, either due to multiple ports or a port having multiple GIDs.
  - 128-bit IPv6 address format.

- **IOC GUID**
  - Uniquely identifies an IOC (IO Controller).
  - 64-bit EUI-64.
Identifying an IO Device

• Application protocol (service) name
  – Identifies the application protocol used to access the IOC and its devices. An IOC may support multiple application protocols.
  – Often a fixed property of a driver stack.
  – A text string.

• Device identification
  – Protocol dependent identification of a specific device accessible behind an IOC.
  – Example: a unit number.
Identifying an SRP device

- Port GID of an IO Unit.
- An IOC GUID on that IO Unit.
- Service name to use (e.g. “SRP.T10.NCITS”).
- Device identification: LUN.
- An index (small integer) to indicate which service entry to use, if we allow an IOC to have multiple service entries supporting SRP (multiple SRP targets per IOC).
Connecting to an IO Device

1: Obtain PathRecord(s) for the IO Unit.
2: Locate the IOC on the IO Unit.
3: Determine the protocol’s service ID.
4: Establish communication.
5: Exchange parameters and begin operation.
1: Obtain PathRecord(s)

- Choose target IO Unit’s port GID(s).
  - determines which IO Unit port(s) to use.
- Choose local initiator’s port GID(s).
  - determines which local port(s) to use.
- Query SA for matching PathRecord(s).
  - Each PathRecord contains information (e.g. DLID) about one path to the IO Unit.
- Choose primary path, optional alternate path(s) to IO Unit.

SA - Subnet Administration  
PathRecord - volume 1, clause 15.2.5.16
DGID - Destination GID, value is IO Unit’s port GID  
SGID - Source GID, value is local port GID

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2: Locate the IOC

- Access the IO Unit’s Device Management Agent using the well-known GSI QP and information from a PathRecord.
- Obtain list of valid IOC slot indices from the IOUnitInfo attribute.
- Search the IOControllerProfile attributes for one with a matching IOC GUID.
  - Determines IOC slot index of desired IOC.
3: Determine the service ID

- Still accessing the IO Unit’s Device Management Agent.
- Obtain list of the IOC’s ServiceEntries from IOControllerProfile attribute.
- Search ServiceEntries for one whose ServiceName field matches the desired application protocol name.
  - The corresponding ServiceID field contains the desired service ID.
4: Establish communication

• Invoke CM to send a communication request to the IOC.
  – Uses information from the primary and alternate PathRecords obtained in step 1.
  – Uses service ID determined in step 3.
  – Service type dictated by application protocol specification.
Exchange parameters and...

- Use of the communication channel dictated by the application protocol specification.
- Many application protocols will begin by exchanging parameters.
  - Select options, transfer lengths, etc.
  - Might use either PrivateData during connection establishment or separate messages.
- Device identification passed inside protocol-specific messages.