802.1ABdh – Multi-Frame LLDP

Multiple Agents

Version 0

Stephen Haddock

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802.1AB-2016 assumes a distinct MSAP per LLDP Agent

- 6.7 Systems with multiple LLDP agents
  - "Each LLDP agent ... is associated with the MSAP that supports the LLC entity that the agent uses .... each LLC entity provides service to one and only one protocol entity at each of its LSAPs that it supports, using the service provided by a single MSAP. It follows that each LLDP agent makes use of a unique MSAP, and that the agent can be uniquely identified by the receiving agent using the MSAP's identifier."
  - The last statement assumes that while the LLC entity can support multiple LSAPs, only one of those supports an LLDP agent. This is problematic when a single port has multiple LLDP agents, each using a different address scope (and therefore may have different sets of peers).

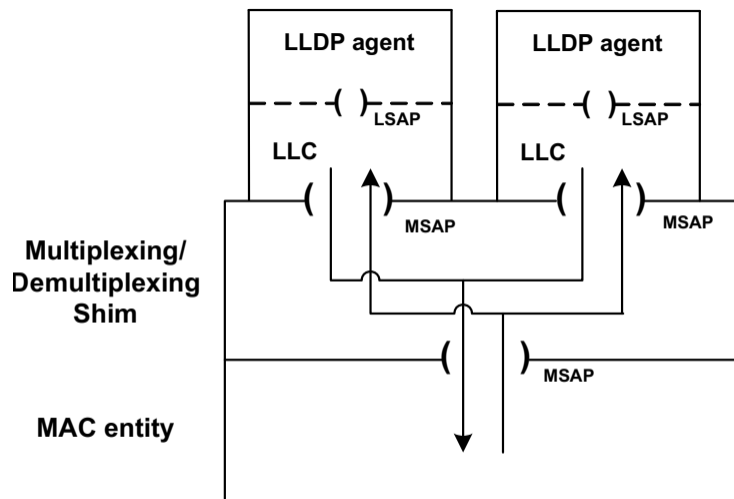# 802.1AB-2016 port with multiple LLDP agents (with different address scopes)

Figure 6-7—Multiplexing and demultiplexing using shims

"More than one LLDP agent, each using a different address scope, can be instantiated for a given system port by adding a simple shim that provides the necessary distinct MSAPs by multiplexing and demultiplexing between those MSAPs and a common MSAP for the port, as illustrated in Figure 6-7."

Figure 6-7 shows three MSAPs.

- How many MSAP Identifiers are represented? Should the MSAP Identifiers of the upper MSAPs be the same, or different?

- How many individual MAC addresses are represented? Can one of the upper MSAPs share a MAC address with the common MSAP? Can both?

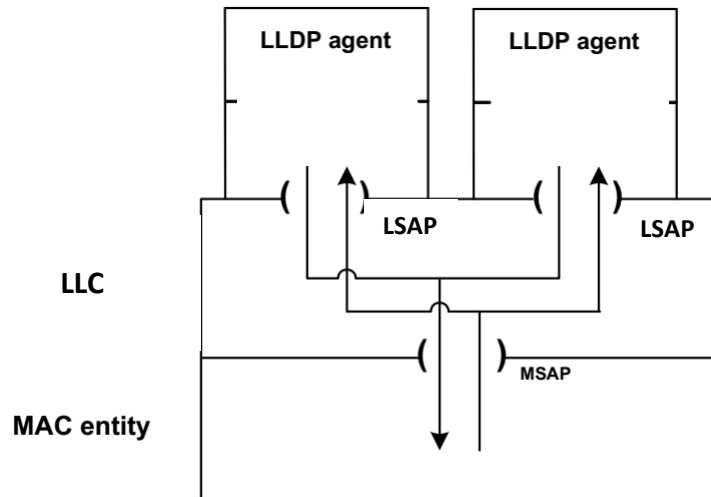# 1ˢᵗ Alternative model for multiple LLDP agents (with different address scopes)

An alternative model would be a single MSAP supporting an LLC entity with multiple LSAPs.

- Each LSAP gets a copy of all LLDP frames.

- The LLDP agent receiver already uses the Destination Address to validate received LLDP frames, so only one of the LLDP agents would receive any given LLDPDU.

Figure 6-7—Multiplexing and demultiplexing using shims

Then all LLDP agents on a single port share the same MSAP Identifier and individual MAC address.

- The LLDP agents are uniquely identified by the combination of the MSAP Identifier and the LLDP Destination Address for that agent.

- Means the local LLDP MIB manager must support two or more LLDP agents with the same MSAP Identifier but different LLDP Destination Addresses, each possibly with distinct sets of TLVs selected to be transmitted in LLDPDUs.

- Means the remote MIB manager may see two or more neighbors that have the same MSAP Identifier but different LLDP Destination Addresses, each possibly with distinct sets of TLVs.

- Is this a problem?

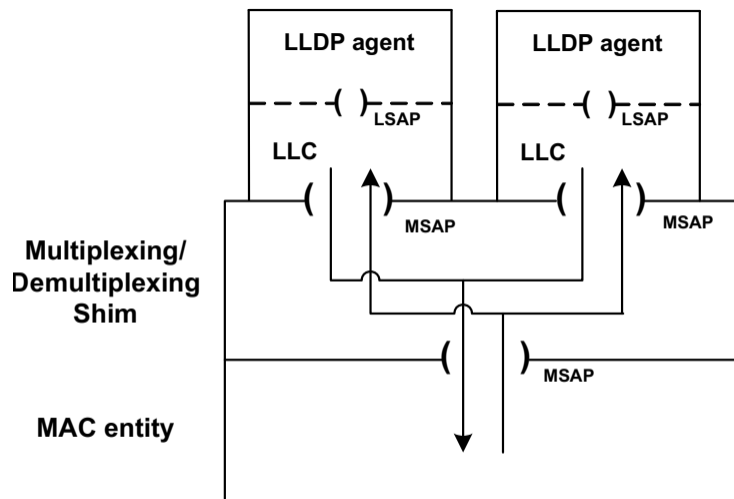# 1ˢᵗ Alternative model for multiple LLDP agents (with different address scopes)

Figure 6-7—Multiplexing and demultiplexing using shims

Keep the model where the shim multiplexes MSAPs, but:

- The upper "MSAPs" have distinct MSAP Identifiers (one of which can be shared with the lower MSAP)

- All MSAPs share the same individual MAC address.

Impact on XLLDP

- MAC Address:
  - When have multiple XLLDP agents on the same port with different reaches, really want them to have the same individual MAC address.
    - Avoid assigning multiple MAC addresses for virtual components.
    - Traditional LLDP doesn't use the individual MAC address, so no backwards compatibility issues.
    - If all agents receive all XLLDPDs, they can use MSAP Identifier, possibly in combination with the LLDP Protocol Address, to validate the XLLDPDU.
- MSAP Identifier:
  - If each agent has the same MSAP Identifier:
    - Need XLLDPDUs to contain the LLDP Protocol Address to determine which agent considers the XLLDPDUs valid.
    - Possible problem with indexing in the management data base structure?
  - If each agent has different MSAP Identifiers:
    - When a receiving agents on a single port see neighbors with different address scopes, it is difficult to determine whether they are on the same port or different ports. (True for traditional LLDP and XLLDP.) Is this an issue?

XLLDP AND LINK AGGREGATION

Two LLDP Agents on a LAG

- By the conventional architectural placement of "higher layer entities", the LLDP agents are supported by the Link Aggregation Group.
  - This example shows two LLDP agents, with different address scopes, on the LAG Port.
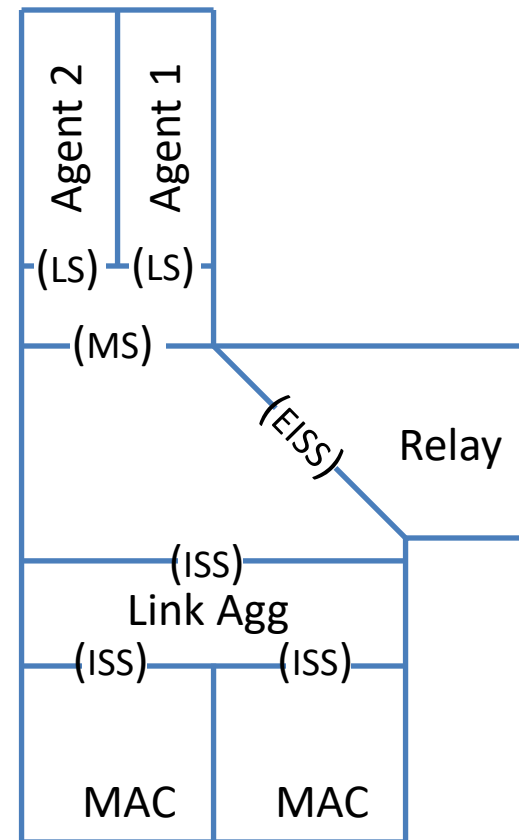
LLDP Parser/Multiplexer

- A Protocol Parser/Multiplexer allows control protocol entities access to an individual Aggregation Port on a LAG
  - The Protocol Parser/Multiplexer separates control frames from data frames in the receive direction, and multiplexes them to a common "Down Port" in the transmit direction.
  - Identification of control frames is determined by the "isControl" function.

- The LLDP Parser/Multiplexer specifically identifies LLDP frames as control frames.
  - The "isControl" function returns TRUE when the Destination Address of a received frame matches the LLDP Destination Address and the msdu_type is the LLDP EtherType.
  - Allows an LLDP agent to receive and transmit on an individual Aggregation Port rather the LAG Port.

Control
Port

(ISS)

Data
Port

(ISS)

(ISS)

Down
Port
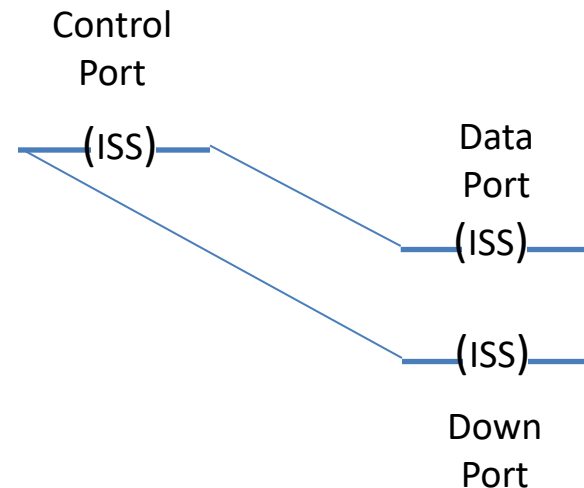
LLDP on Aggregation Ports

By current definition of the Parser/Multiplexer, a receive frame gets forwarded to either the control Port or the data Port, but not both.

- If an LLDP agent on the LAG Port and an LLDP agent on a Aggregation Port have the same address scope (e.g. Agent 1 and Agent 3), both can transmit frames but only the agent on the Aggregation Port will receive LLDP frames.

- Recommend a maintenance item for 802.1AX to add a flag to Parser/Multiplexer to allow sending frames matching the "isControl" function to both the control port and data port.
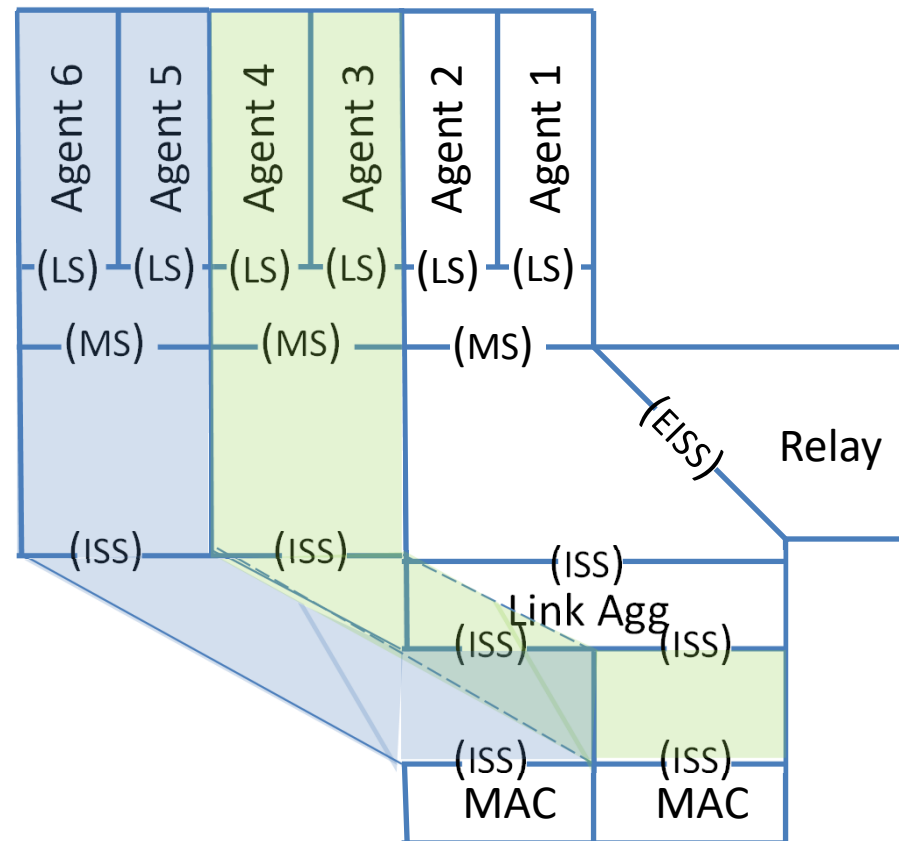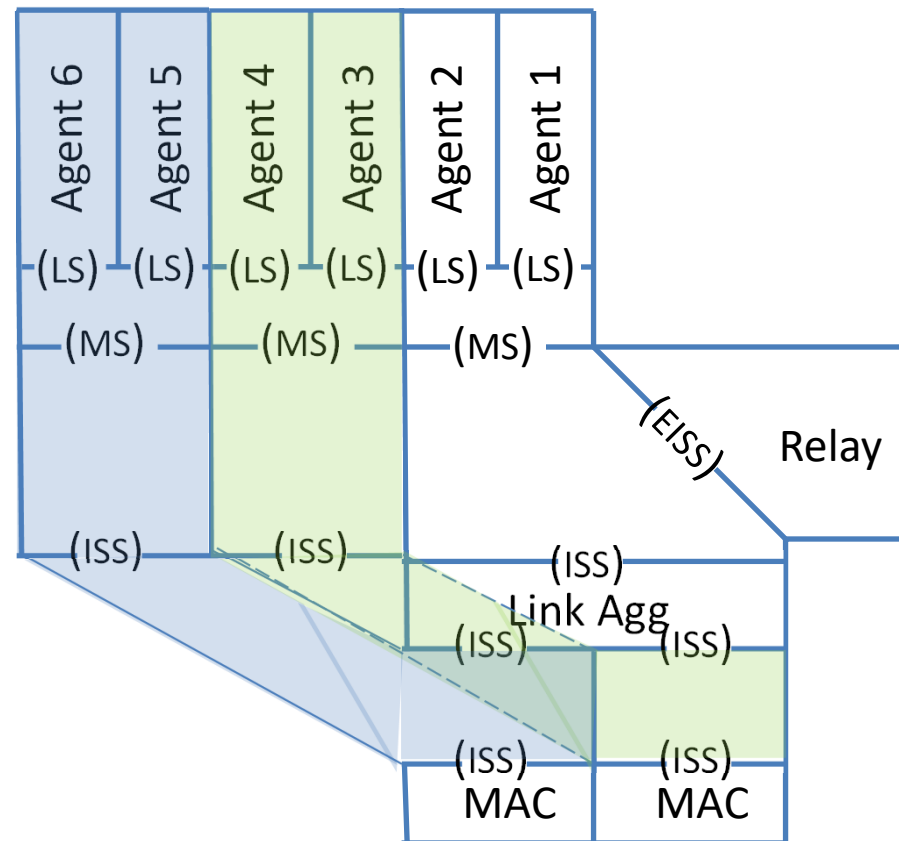
XLLDP on Aggregation Ports

MSAP Identification

- 802.1AX specifically allows the individual MAC address of the LAG Port to be shared with one of the Aggregation Ports on that LAG.

- Presumably the MSAP Identifier of the LAG Port is distinct from that of any of the Aggregation Ports.

Receiving XLLDP frames

- XLLDP needs to be able to receive frames with a destination address matching either the LLDP Destination Address or the individual MAC address.

- Recommend a maintenance item for 802.1AX to make the "isControl" function for an LLDP Parser/Multiplexer return TRUE when the msdu_type is the LLDP EtherType and the destination address is either the LLDP Destination Address or the individual MAC address.

Thank You