P802.1AB/D2

Changes, Recommendations, and Discussion items

Bill Lane
CSU, Chico
January, 2003

The differences between Draft 2 and Draft 1 fall into two categories:

- Changes that were recommended at the November plenary

- Changes that were not previously discussed

Clause 1 - Overview

- An opening paragraph was added soften the harshness of jumping immediately to "Scope"

Each time a station or device is powered up, network management has no way of knowing whether the connection will be to the same managed entity or to a completely unknown device. The connectivity discovery protocol defined here will allow rapid transfer of the information necessary for network management to know the capabilities of the connected peer, and to do so without having to interrogate a number of separate MIBs to find the information.

Clause 3 - Definitions:

The following terms corresponding to the PTOPO MIB were added:

- chassis
- connection
- connection endpoint
- connection endpoint identifier
- port
- port identifier

Clause 3 - Recommendations

- Add references in all definitions that appear elsewhere.

- If a term is defined in another 802 document, _try_ to maintain consistency between definitions

Clause 6 - Architectural overview:

Changes recommended at the November plenary:

- Revised figure 6.1 to show LLDP over individual port MACs but below link aggregation.
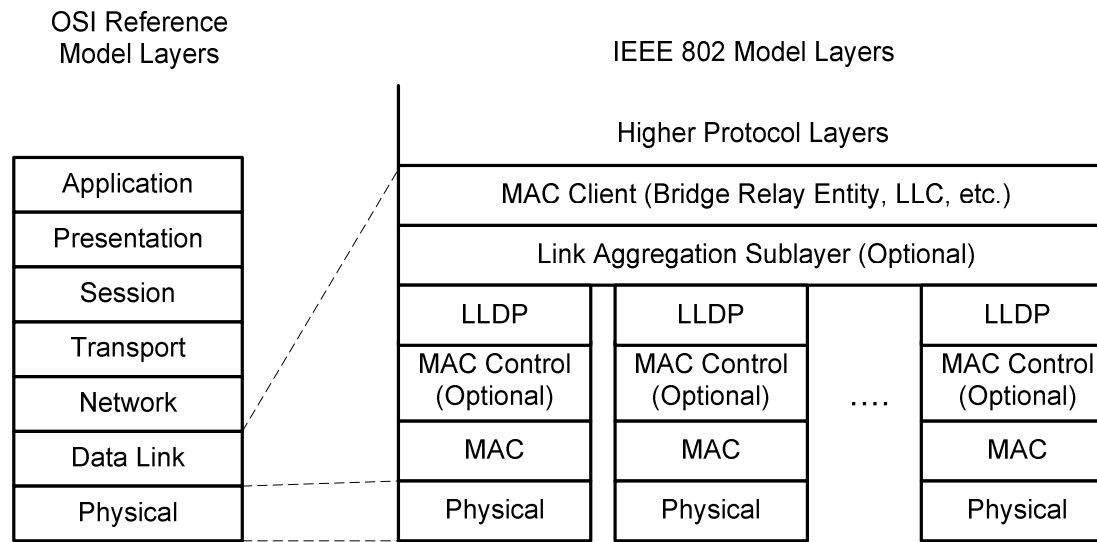
OSI Reference
Model Layers

IEEE 802 Model Layers

Higher Protocol Layers

OSI Reference Model Layers		IEEE 802 Model Layers			
Application		MAC Client (Bridge Relay Entity, LLC, etc.)			
Presentation		Link Aggregation Sublayer (Optional)			
Session		LLDP	LLDP		LLDP
Transport		MAC Control (Optional)	MAC Control (Optional)	....	MAC Control (Optional)
Network					
Data Link		MAC	MAC		MAC
Physical		Physical	Physical		Physical

Figure 6.1 Architectural positioning of LLDP

Clause 7 - Principles of operation

Changes recommended at the November plenary:

- Added new figure 7.1 showing parser/MUX

- Renumbered and revised figure 7.2 (old 7.1), the protocol block diagram
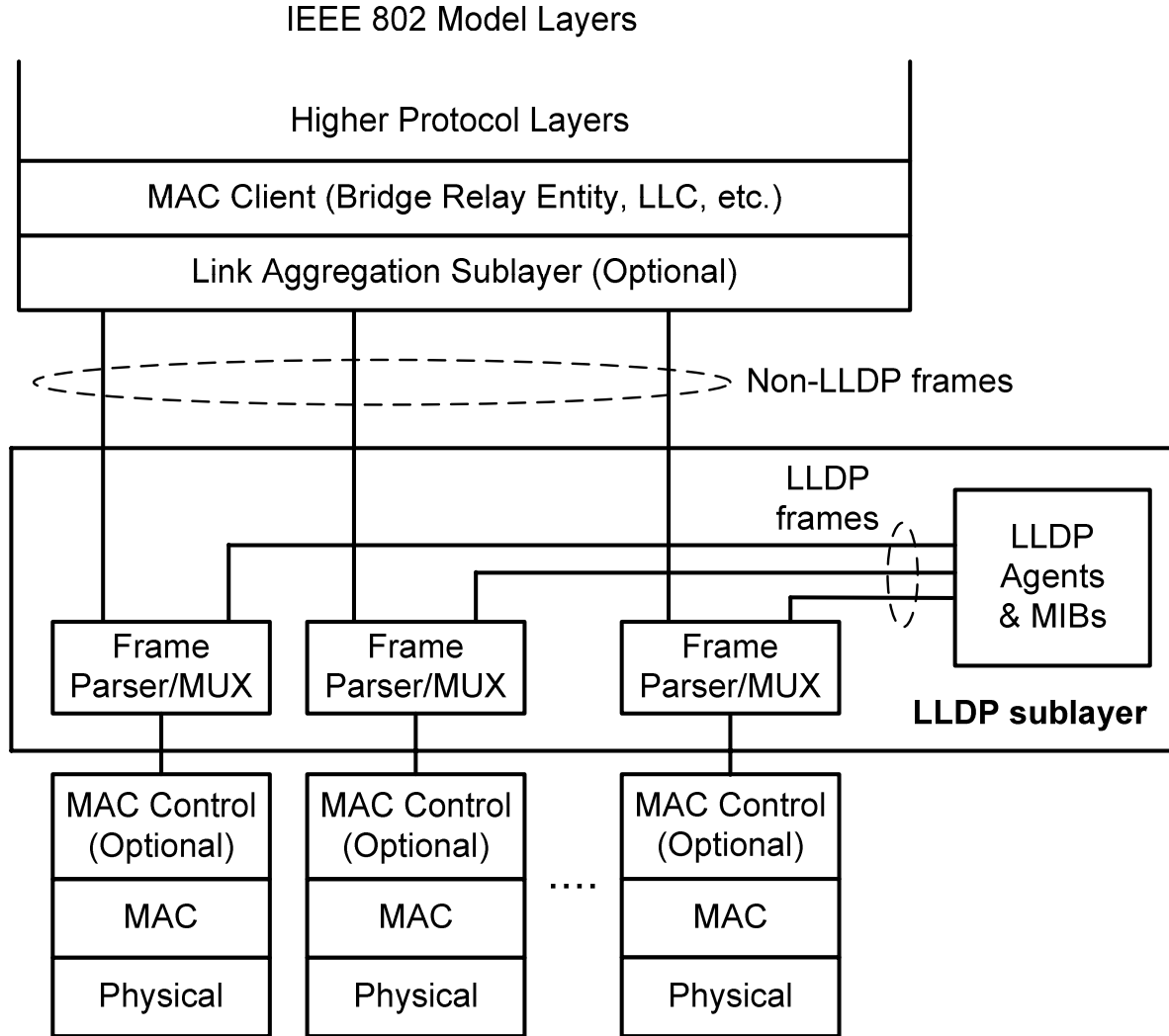
- Expanded the text description of LLDP operation.

IEEE 802 Model Layers

Higher Protocol Layers

MAC Client (Bridge Relay Entity, LLC, etc.)

Link Aggregation Sublayer (Optional)

Non-LLDP frames

LLDP frames

LLDP Agents & MIBs

Frame Parser/MUX

Frame Parser/MUX

Frame Parser/MUX

LLDP sublayer

MAC Control (Optional)

MAC Control (Optional)

....

MAC Control (Optional)

MAC

MAC

MAC

Physical

Physical

Physical

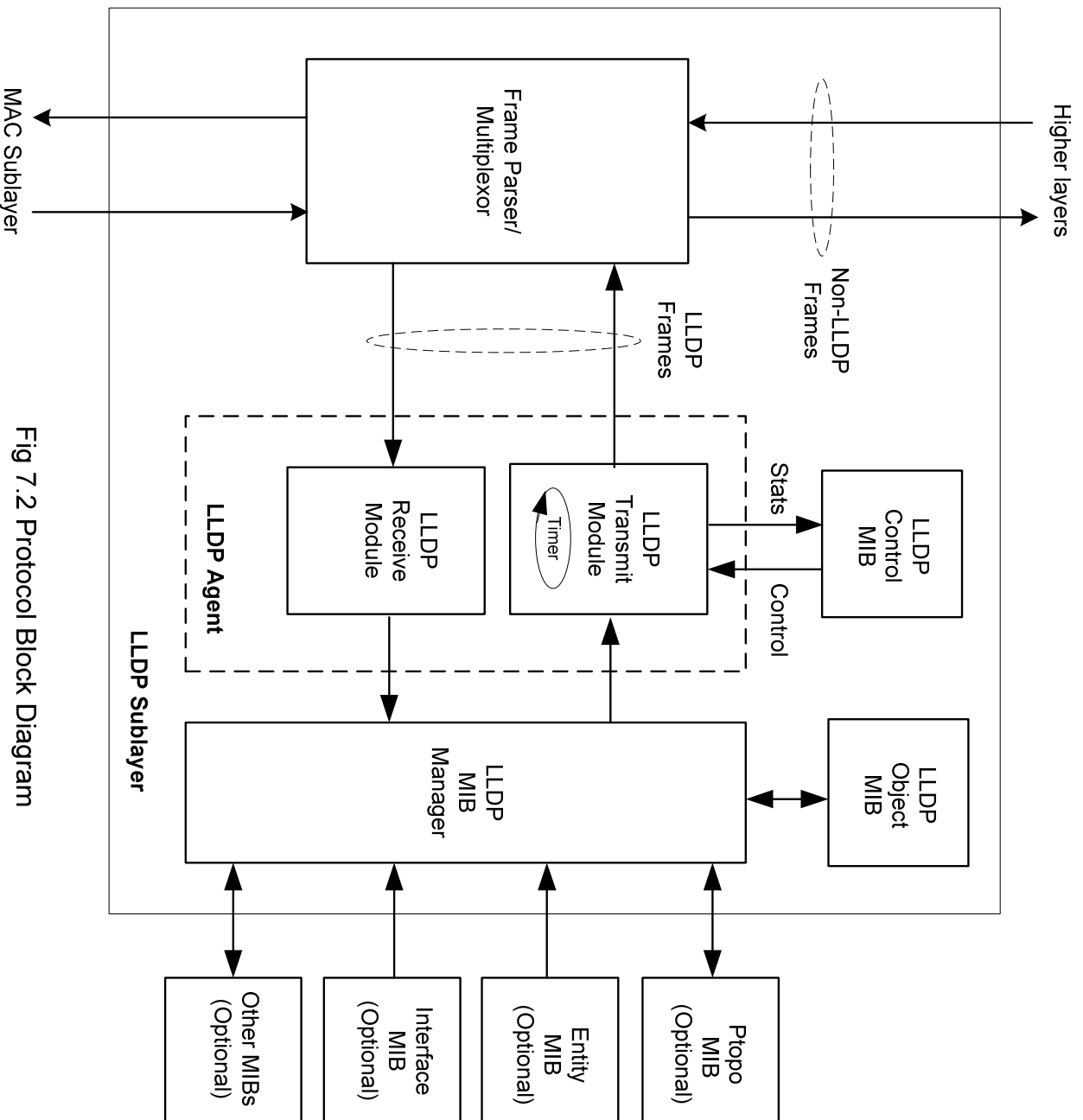Figure 7.1 LLDP frame multiplexing

Fig 7.2 Protocol Block Diagram

Clause 7 - Principles of operation

A change that was not previously discussed::

- Added an allowance for multi-frame transmission sequences for when the total length of the TLVs exceed the space available in a single frame.

Reasoning behind the change:

- Multiple instances of the same type of TLVs are already allowed through the use of subtyping (e.g., vendor specific, management address)

- New TLVs will likely be added in the future

- Both lead to the possibility that the space available in a single frame is insufficient

The tradeoff:

- Define use of multi-frame transmission sequences

- Allow un-correlated single-frame transmissions

The multi-frame problem:

- Detection of missing frames

- Correlation of MIB object time-to-live values
  with staggered frame reception times

Multi-frame transmission sequence specification:

- Allows single frame "sequences"

- Provides missing frame detection with a 2-digit frame count (e.g., frame 3 of 5) and a receive countdown timer (to detect missing last frame)

- Is easy to define (and implement)

- Avoids complications associated with single-but-different frame reception procedures

Clause 8 - Frame formats:

Changes recommended at the November plenary:

- Changed all figures from vertical to horizontal format.

- Added Ethertype SNAP-encoded format for Token-Ring use.

- Changed management address TLV from mandatory to optional.

- Added details for specific TLVs that were missing in D1.

- Revised subclause numbering to ensure that each TLV

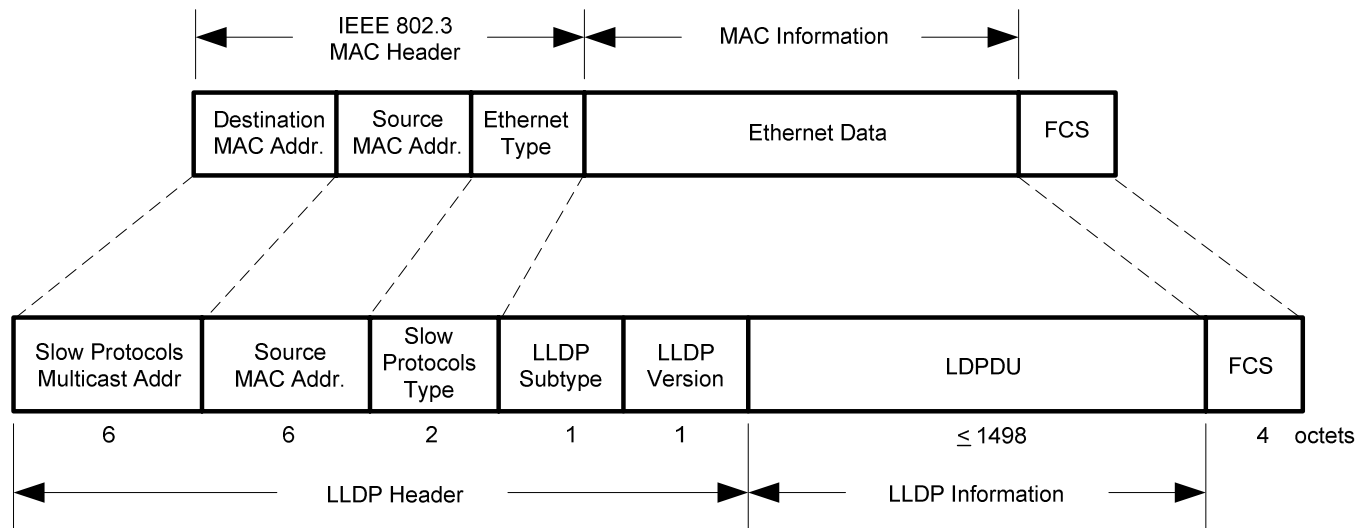 could be listed in the table of contents.

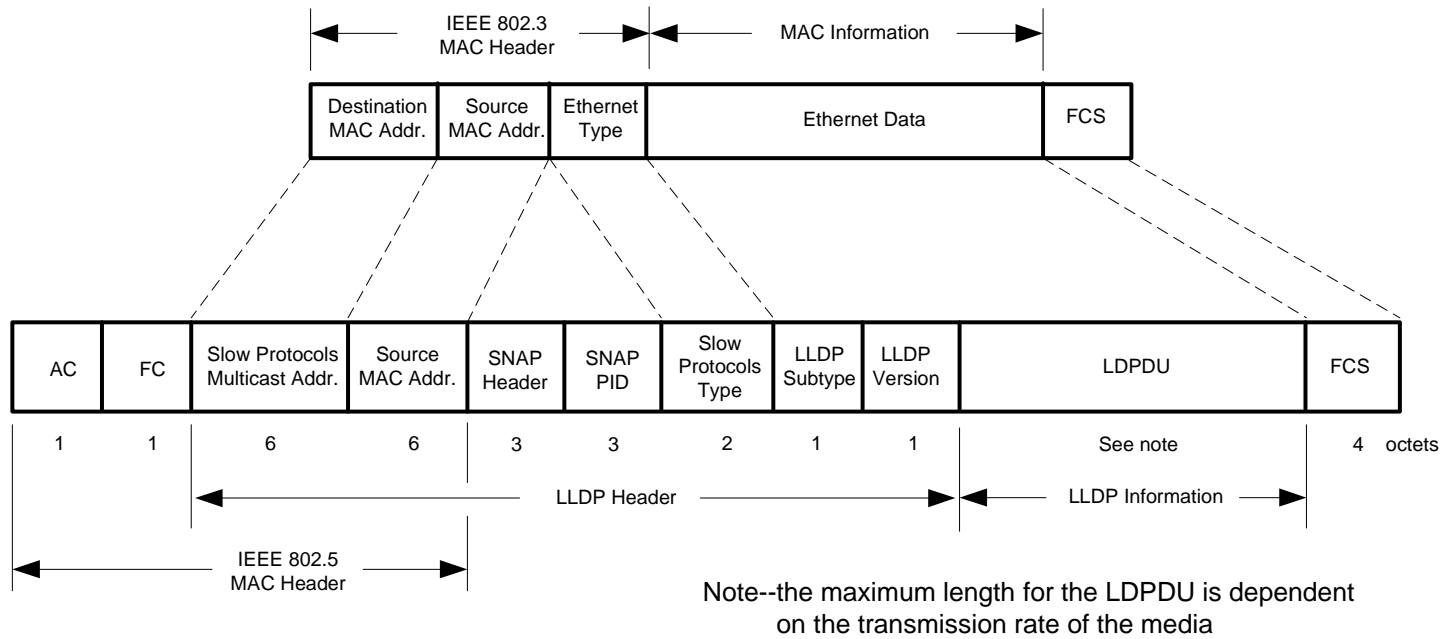Figure 8.1 802.3-based LLDP frame format

IEEE 802.3 MAC Header			MAC Information		
Destination MAC Addr.	Source MAC Addr.	Ethernet Type	Ethernet Data		FCS

AC	FC	Slow Protocols Multicast Addr.	Source MAC Addr.	SNAP Header	SNAP PID	Slow Protocols Type	LLDP Subtype	LLDP Version	LDPDU	FCS
1	1	6	6	3	3	2	1	1	See note	4 octets

LLDP Header

LLDP Information

IEEE 802.5 MAC Header

Note--the maximum length for the LDPDU is dependent on the transmission rate of the media

Figure 8.2 802.5-based frame format

Clause 8 - Frame formats:

Changes necessary to support multi-frame transmission sequences:

- Added a two digit, 1-octet frame-count field (frame # of total #) to the LDPDU header to ensure that a sequence is complete before MIB update.

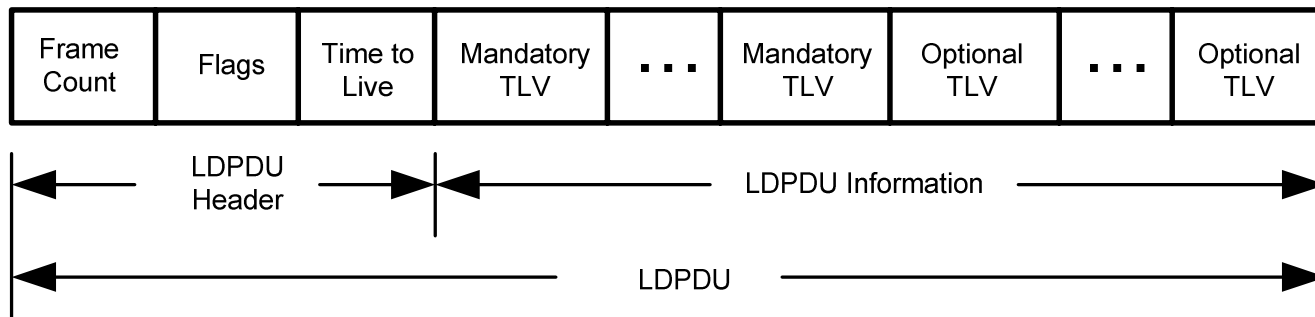Note: this limits the total number of frames in a sequence to 15

Frame Count	Flags	Time to Live	Mandatory TLV	. . .	Mandatory TLV	Optional TLV	. . .	Optional TLV

LDPDU Header ← → LDPDU Information

LDPDU

Figure 8.3 LDPDU header

Clause 9 - The protocol:

Changes recommended at the November plenary plus those necessary to support multi-frame sequences:

- Revised/expanded the text definitions transmission and reception.

- Added state diagram notation boilerplate

- Revised transmit and receive state machines and their associated variables/procedures,

- Added new rcvTimeOut timer for the case where the last frame of a sequence is lost

- Moved PTOPO MIB update to Annex C.

Other discussion items:

- Maximum LDPDU length in 802.5 SNAP-encoded frames (should this be dependent on media)

- The maximum limit for timer values (current limit of 65, 535 is ~ 18 hours)

- The current requirement for TLV to 4-octet word (affects format definition of all TLVs)

What's next?

- Incorporate recommendations from this meeting and go to a 30-day working group ballot.

- Propose responses to ballot comments for review at the March plenary.

- Continue work on the later clauses for presentation and discussion at the March plenary (e.g., LLDP MIB manager).