IEEE P802.3at
DTE Power Enhancements
L2 (DLL) discovery hoc
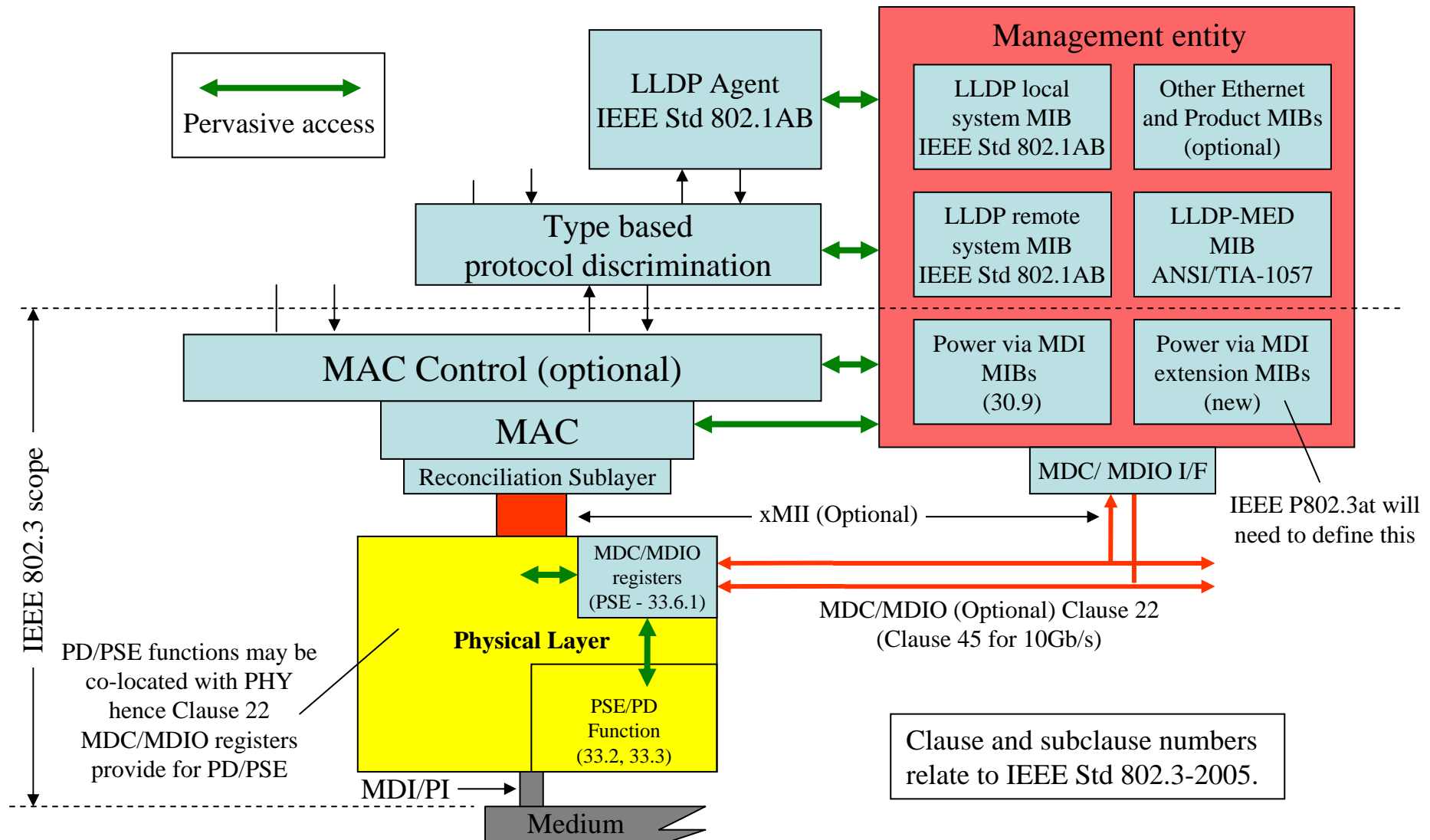
David Law
3Com

David_Law@3Com.com

Motions

- **September 2006**
  - IEEE P802.3at intends to use LLDP for L2 classification. IEEE P802.3at uses LLDPMED as a starting point.
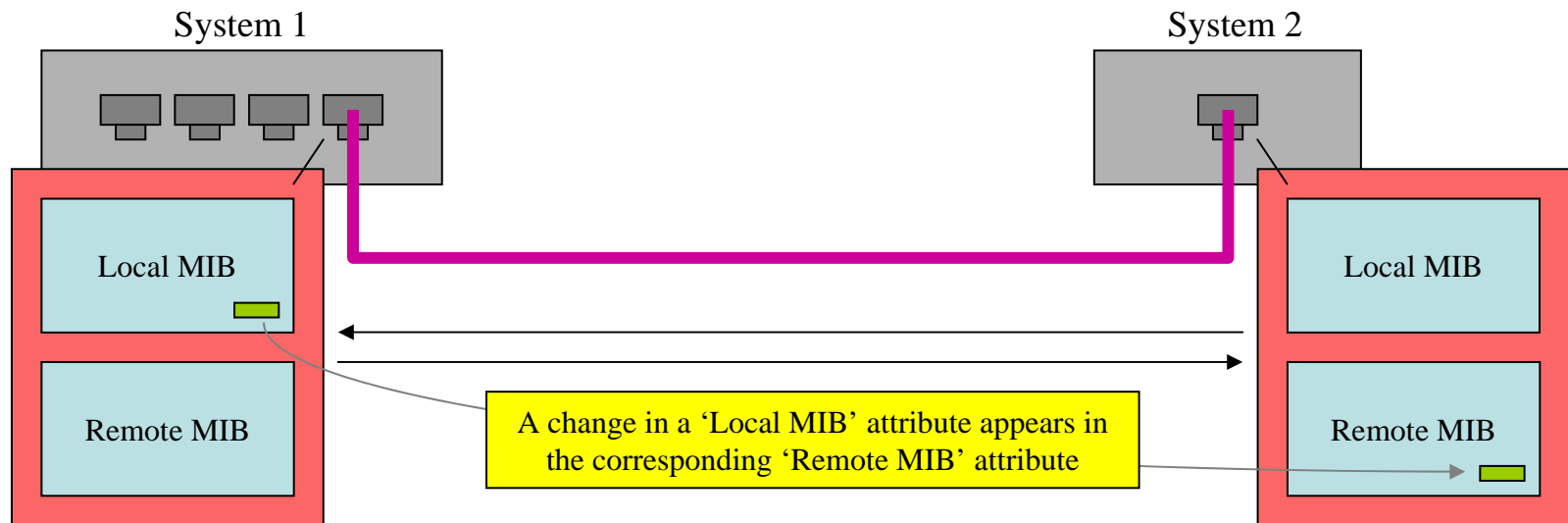
- **March 2007**
  - Move that the Task Force accept the proposal to reference ANSI/TIA-1057 PoE TLV (barrass_1_0307.pdf) as the minimal mandatory requirement for PD support for Layer 2 management as a baseline.

Management access

Pervasive access

Management entity

LLDP local system MIB IEEE Std 802.1AB	Other Ethernet and Product MIBs (optional)
LLDP remote system MIB IEEE Std 802.1AB	LLDP-MED MIB ANSI/TIA-1057
Power via MDI MIBs (30.9)	Power via MDI extension MIBs (new)

LLDP Agent IEEE Std 802.1AB

Type based protocol discrimination

MAC Control (optional)

MAC

Reconciliation Sublayer

MDC/ MDIO I/F

IEEE P802.3at will need to define this

xMII (Optional)

MDC/MDIO registers (PSE - 33.6.1)

Physical Layer

PSE/PD Function (33.2, 33.3)

MDC/MDIO (Optional) Clause 22 (Clause 45 for 10Gb/s)

IEEE 802.3 scope

PD/PSE functions may be co-located with PHY hence Clause 22 MDC/MDIO registers provide for PD/PSE

MDI/PI

Medium

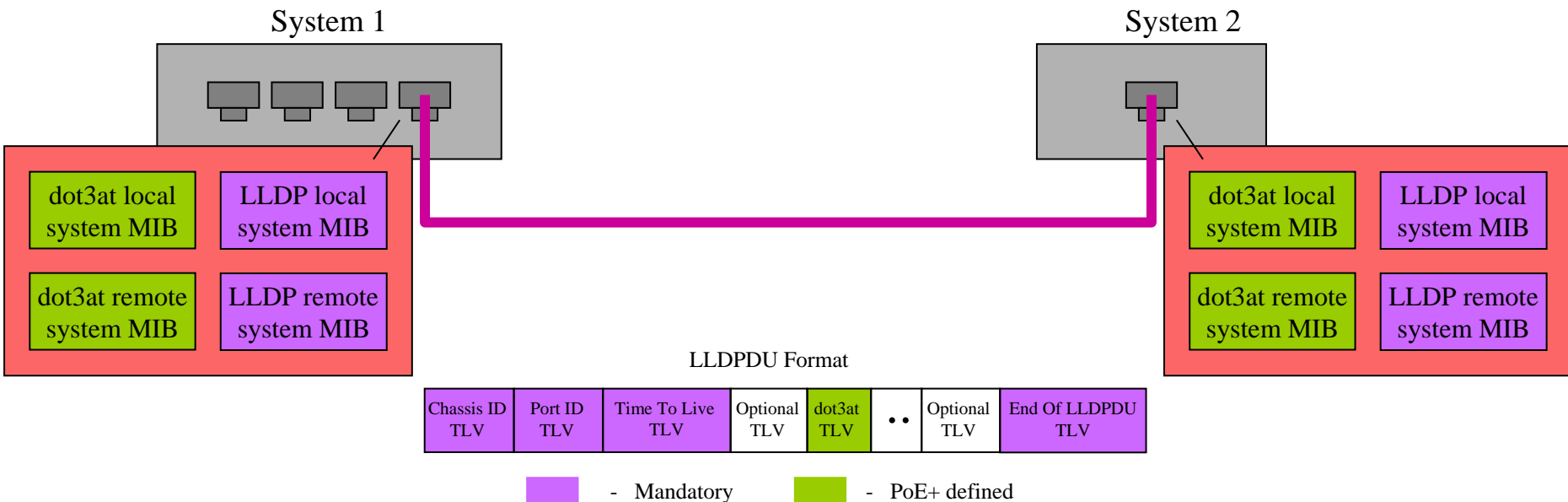Clause and subclause numbers relate to IEEE Std 802.3-2005.

LLDP

- Operates over point to point link
- Completely enclosed protocol
  - We define data, it gets transported for
    - Don't get to make changes to the protocol
- Data in 'Local MIB' transported to 'Remote MIB'
  - Transported by TLVs (type, length, value)

System 1

System 2

Local MIB

Remote MIB

Local MIB

Remote MIB

A change in a 'Local MIB' attribute appears in the corresponding 'Remote MIB' attribute
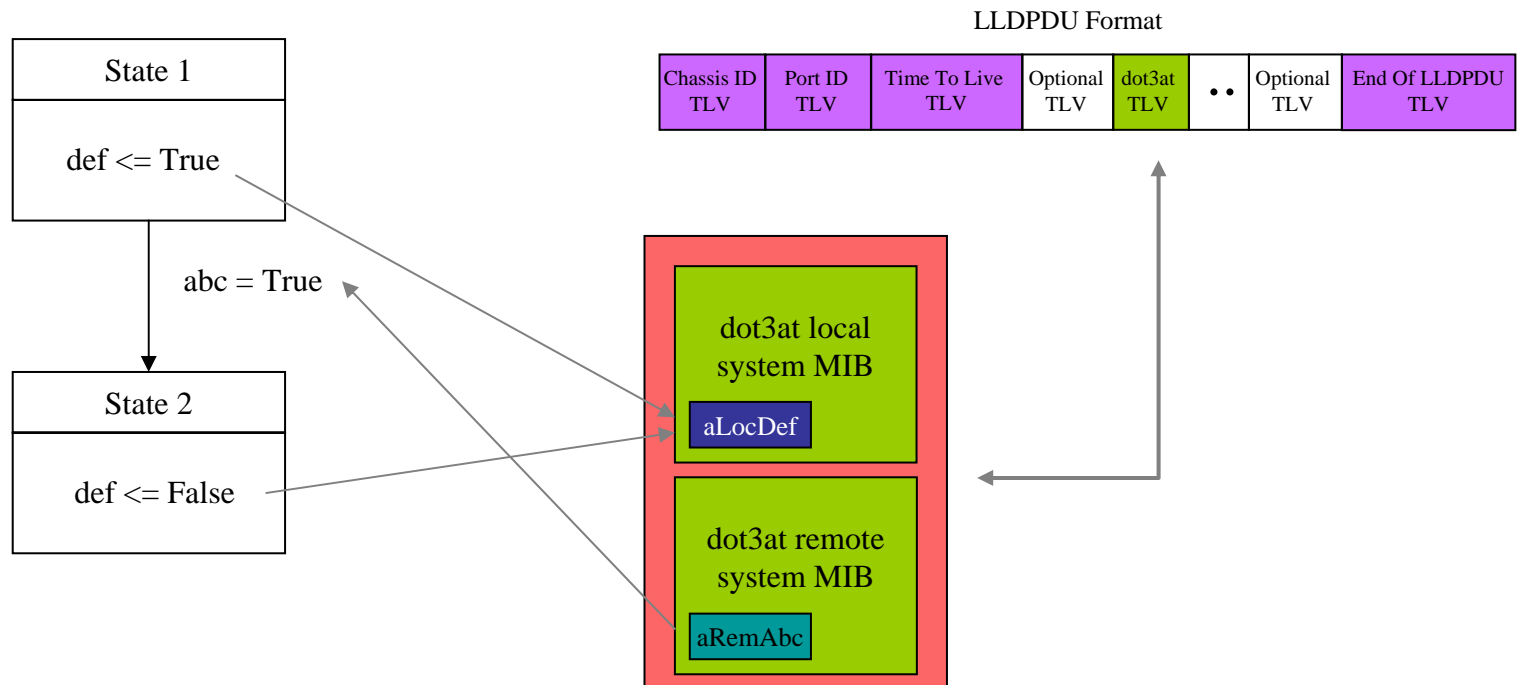
LLDP

- Two types of LLDP MIB
  - Mandatory basic LLDP MIB
    - Associated basic TLVs
  - Optional organizationally specific LLDP MIB extensions
    - Associated optional organizationally specific TLVs
- IEEE P802.3at needs to define LLDP MIB extension and TLVs
  - This is in addition to other POE MIB change

System 1

System 2

| dot3at local system MIB | LLDP local system MIB |
| dot3at remote system MIB | LLDP remote system MIB |

| dot3at local system MIB | LLDP local system MIB |
| dot3at remote system MIB | LLDP remote system MIB |

LLDPDU Format

| Chassis ID TLV | Port ID TLV | Time To Live TLV | Optional TLV | dot3at TLV | •• | Optional TLV | End Of LLDPDU TLV |

■ - Mandatory ■ - PoE+ defined

LLDP and State diagrams

- Can't map directly to TLV contents
  - Map through objects in dot3at local and remote MIB
  - Define MIB attribute to variable mapping

LLDPDU Format

Chassis ID TLV	Port ID TLV	Time To Live TLV	Optional TLV	dot3at TLV	••	Optional TLV	End Of LLDPDU TLV

State 1

def <= True

abc = True

State 2

def <= False

dot3at local system MIB

aLocDef

dot3at remote system MIB

aRemAbc

Document structure

- IEEE Std 802.1AB subclause 9.6 Organizationally Specific TLVs
  - 'Each set of Organizationally Specific TLVs shall include associated LLDP MIB extensions and the associated TLV selection management variables and MIB/TLV cross reference tables (for example, see F.6 and G.6).'
- Hence to use LLDP IEEE P802.3at has to define
  - LLDP MIB extensions
    - Need to start work on this
  - LLDP TLV selection management variables
    - Provided in draft
  - MIB/TLV cross reference table
    - See suggestion
- IEEE P802.3at also needs to define
  - MIB to state diagram cross reference table
    - See suggestion
  - State diagram using MIB derived variables
    - See suggestion update to diagram in draft

Example TLV to MIB mapping

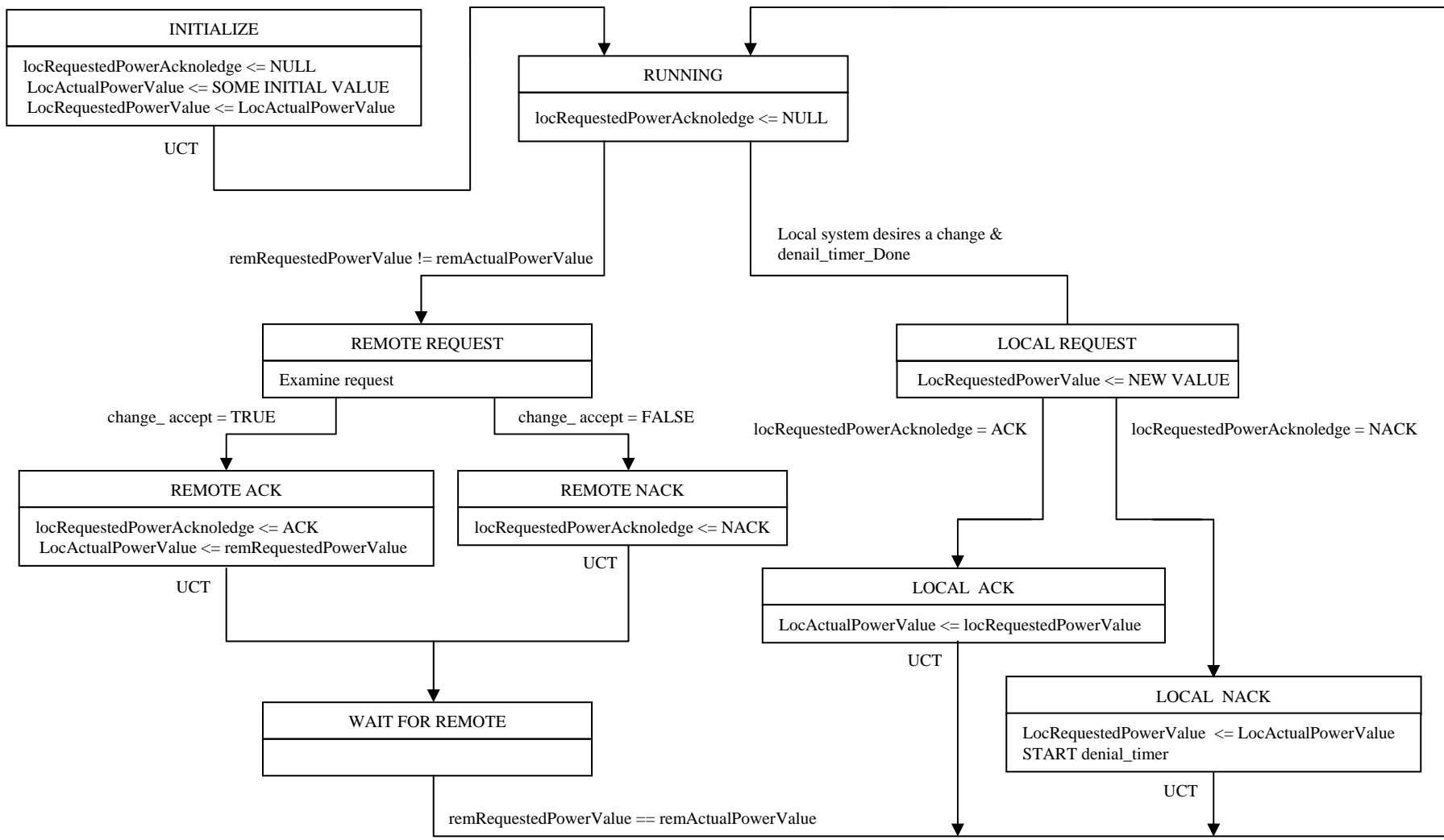**TLV variable / local-system MIB object cross-references**

MIB object category	LLDP variable	LLDP MIB object
Stateful control	Requested power type	lldpPoepLocStatefulReqPowerType
	Source	lldpPoepLocStatefulSource
	Priority	lldpPoepLocStatefulPriority
	Requested power value	lldpPoepLocStatefulReqPowerValue
	Acknoledge	lldpPoepLocStatefulAcknoledge
	TBD1	lldpPoepLocStatefulTBD1
Additional Status	TBD2	lldpPoepLocAdditionalTBD2
	TDB3	lldpPoepLocAdditionalTBD3
	TDB4	lldpPoepLocAdditionalTBD4

Example MIB to variable mapping

local-system MIB object to state diagram variable cross-reference

MIB	MIB object	State diagram variable	State diagram and direction
LLDP-MED	lldpXMedLocXPoEPSEPortPowerAv	locActualPowerValue	PSE output
	lldpXMedRemXPoEPSEPortPowerAv	remActualPowerValue	PD input
	lldpXMedLocXPoEPDPowerReq	locActualPowerValue	PD output
	lldpXMedRemXPoEPDPowerReq	remActualPowerValue	PSE input
LLDP-POEP	lldpPoepLocStatefulReqPowerValue	locRequestedPowerValue	PSE and PD Output
	lldpPoepLocStatefulAcknoledge	locRequestedPowerAcknoledge	PSE and PD Output
	lldpPoepRemStatefulReqPowerValue	remRequestedPowerValue	PSE and PD Input
	lldpPoepRemStatefulAcknoledge	remRequestedPowerAcknoledge	PSE and PD Input

Initial redraw of Figure 33-20

INITIALIZE

locRequestedPowerAcknoledge <= NULL
LocActualPowerValue <= SOME INITIAL VALUE
LocRequestedPowerValue <= LocActualPowerValue

UCT

RUNNING

locRequestedPowerAcknoledge <= NULL

remRequestedPowerValue != remActualPowerValue

Local system desires a change &
denail_timer_Done

REMOTE REQUEST

Examine request

change_ accept = TRUE   change_ accept = FALSE

LOCAL REQUEST

LocRequestedPowerValue <= NEW VALUE

locRequestedPowerAcknoledge = ACK   locRequestedPowerAcknoledge = NACK

REMOTE ACK

locRequestedPowerAcknoledge <= ACK
LocActualPowerValue <= remRequestedPowerValue

UCT

REMOTE NACK

locRequestedPowerAcknoledge <= NACK

UCT

LOCAL ACK

LocActualPowerValue <= locRequestedPowerValue

UCT

WAIT FOR REMOTE

LOCAL NACK

LocRequestedPowerValue <= LocActualPowerValue
START denial_timer

UCT

remRequestedPowerValue == remActualPowerValue

LLDP-MED

- LLDP-MED motion

  Move that the Task Force accept the proposal to reference ANSI/TIA-1057 PoE TLV (barrass_1_0307.pdf) as the minimal mandatory requirement for PD support for Layer 2 management as a baseline.

- How much of TIA-1057 does this require
  - TIA 1057 defines device type
    - Network Connectivity Device (PSE) and 3 Classes of Endpoint (PD)
    - LLDP-MED TLVs supported dependant on device type
  - What is required
    - Only Extended Power-via-MDI TLV (TIA 1057 subclause 10.2.5)
      - Associated LLDP-MED System MIB
    - Incorporate by reference
      - Same approach as Clause 25 and 62 (for example)