IEEE 1904.2 Universal Management Tunnel

Development of the Layering Diagram

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IEEE 1904.2 PAR

This standard describes a management channel for devices used in Ethernet-based subscriber access networks. The key characteristics of the specified management channel are:

- The ability to transit MAC bridges in a single IEEE 802 MAC domain to allow remote device management;

- Extensibility to accommodate new management protocols and new types of devices;

- The ability to simultaneously send messages to multiple UMT stations using broadcast or multicast addressing.

The standard describes the message format as well as processing operations at the stations participating in the UMT protocol.

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Scope of the Current Project

- From the PAR (summary of past and present):

  – Describe a Management Channel

  – That can transit MAC Bridges in a single MAC domain

  – Enables remote device management (via encapsulated management protocols)

  – Is extensible to allow new management protocols and management of new device types

  – has the ability to multicast/broadcast messages

- From general discussion:

  – Little or no desire to add discovery

  – Minimize state to enable lightweight implementations

  – Need to support OAM

  – Want to finish quickly

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What is the Function of UMT?

- Is UMT a management protocol?

- NO:
  - UMT is a transport; It is a Tunnel

  - UMT is responsible for encapsulating client protocols

  - UMT is responsible for transferring a client protocol's SDU [†] between UMT peers

  - UMT is NOT responsible for how a client protocol interacts with other entities once the client exits the tunnel

† SDU = PDU minus the MAC Layer fields

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Implications of Scope on Layering Diagram

- Enables remote device management (via encapsulated management protocols)

  – Layering Diagram needs to show an interface to client protocols

- Is extensible to allow new management protocols and management of new device types

  – Layering Diagram needs to show an interface to client protocols

- Has the ability to multicast/broadcast messages

  – Does the Layering Diagram need to show anything for Unicast/Multicast/Broadcast addressing? (NO?)

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Implications of Scope on Layering Diagram

- Little or no desire to add discovery

  - Layering Diagram doesn't need to depict advanced functionality

- Minimize state to enable lightweight implementations

  - Layering Diagram doesn't need to depict advanced functionality

- Want to finish quickly

  - Layering Diagram doesn't need to depict advanced functionality

- Need to support OAM

  - Layering Diagram needs to show an interface to client protocols

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Implications of Scope on Layering Diagram

- Transit MAC Bridges in a Single MAC Domain

  – Layering Diagram might need to show UMT in relation to the MAC Layer / MAC Service Definition (802.1AC)

  – Layering Diagram might need to show UMT in the context of Bridge Entity (as defined in 802.1Q)
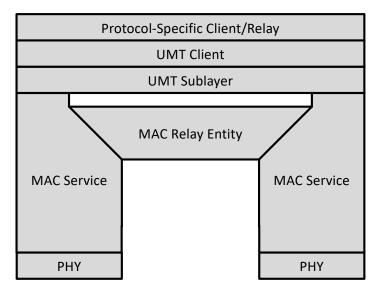
Requirements for Layering Diagram

- Layering Diagram needs to show an interface, that supports encapsulation, to client protocols

- Layering Diagram doesn't need to depict advanced functionality

- Layering Diagram might need to show UMT in relation to the MAC Layer / MAC Service Definition (802.1AC)

- Layering Diagram might need to show UMT in the context of Bridge Entity (as defined in 802.1Q)

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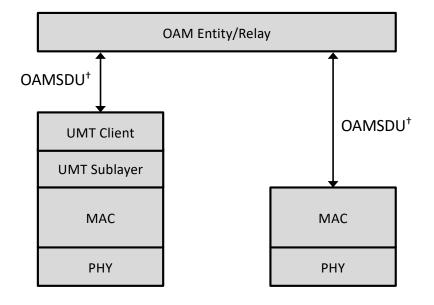# UMT Layering Diagram – MAC bridged and VLAN bridged networks

- Is it necessary to specify in IEEE 1904.2 how to interoperate with MAC Bridged and VLAN Bridged Networks?

  – No – Since UMT is a MAC Client, then this is well specified by IEEE 802.1AC, IEEEE 802.1Q

  – There is no need, then, to include MAC Relay in the UMT Layering Diagram

UMT Layering Diagram – Interaction with OAM

- Is it necessary to specify in IEEE 1904.2 how to relay OAM to a UMT-unaware station?

  - Not really – UMT should simply see an OAM entity as a client.

  - If that entity is relaying OAMSDUs, that is not UMT's problem. UMT just needs to encapsulate and deliver the OAMSDUs.
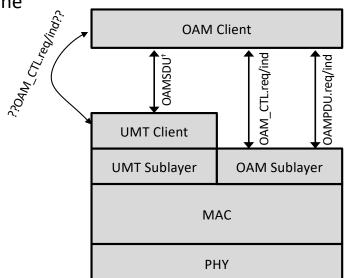
† OAMSDU = OAMPDU minus the MAC Layer fields

UMT Layering Diagram – Interaction with OAM

- How will OAM Client and/or OAM Sublayer operate when OAMPDUs arrive over UMT?

  - Will UMT Client need to implement OAM_CTL.req/ind and OAMPDU.req/ind? Will UMT Client need to implement the OAM Sublayer functions? How will the OAM Client know whether the intended operation is for the tunnel or for the local-link?

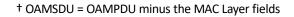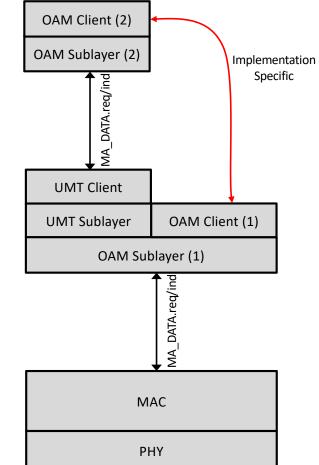 - As previously discussed, this will be complex

† OAMSDU = OAMPDU minus the MAC Layer fields

UMT Layering Diagram – Interaction with OAM

- Is it necessary to specify in IEEE 1904.2 how an OAM entity using UMT interacts with an OAM entity operating on the local link?

  – UMT should simply see an OAM entity as a client, and OAM would see UMT as a link

  – Why duplicate the OAM Sublayer functions in the UMT Client? Just call it what it is… a second OAM Sublayer and Client on top of UMT.

  – This would follow other tunnel models

  – This would follow the OAM model (OAM operates over a single link)

  – Defining the interaction between an OAM Client/Sublayer on top of UMT and another in the local MAC should be out of scope for UMT

  † OAMSDU = OAMPDU minus the MAC Layer fields
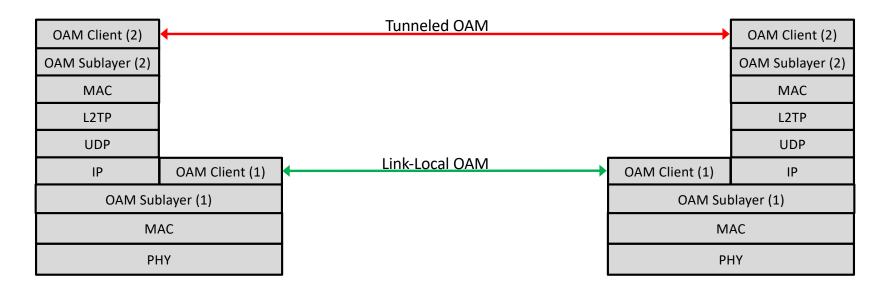
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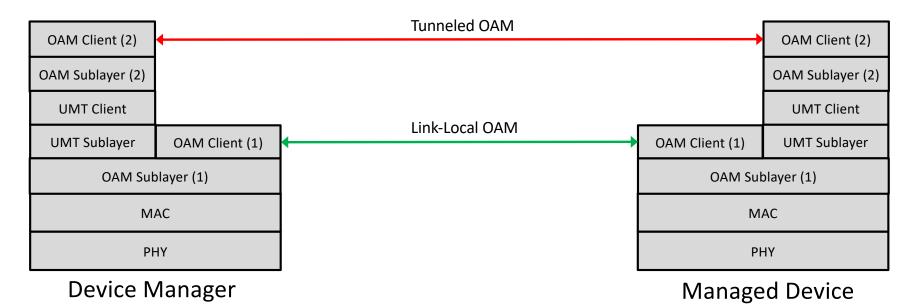
An Example of OAM Over Existing Tunnel Types

- Operation of OAM over an IP-based tunnel is not uncommon

- The link-local peers and the tunneled peers operate independently and as if there are two different links

  - even if they are adjacent (as depicted)

IEEE 1904.1 – Special Case of OAM Over UMT

- Manager Could send commands to Managed Device via the link-local OAM or UMT-link OAM
- How does the Managed Device reconcile these?
- This is not in scope: UMT is responsible for delivery, not conflict resolution
- It is not necessary to include the Link-Local OAM functions in the UMT layering model. Link Local OAM is invisible to UMT.
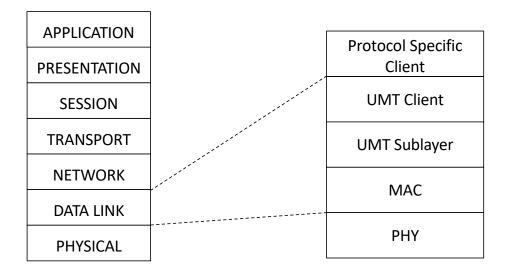
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Conclusions

UMT Stack in OSI Model

OSI Model
APPLICATION
PRESENTATION
SESSION
TRANSPORT
NETWORK
DATA LINK
PHYSICAL

UMT Stack
Protocol Specific Client
UMT Client
UMT Sublayer
MAC
PHY

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UMT Stack Can be Very Simple

Protocol-Specific Client
UMT Client
UMT Sublayer
MAC Service
PHY

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Thank You!
Additional Q&A

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