Hewlett Packard
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CTF Bridge Service Primitives
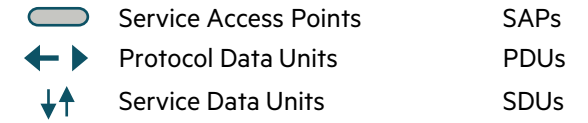
Paul Bottorff

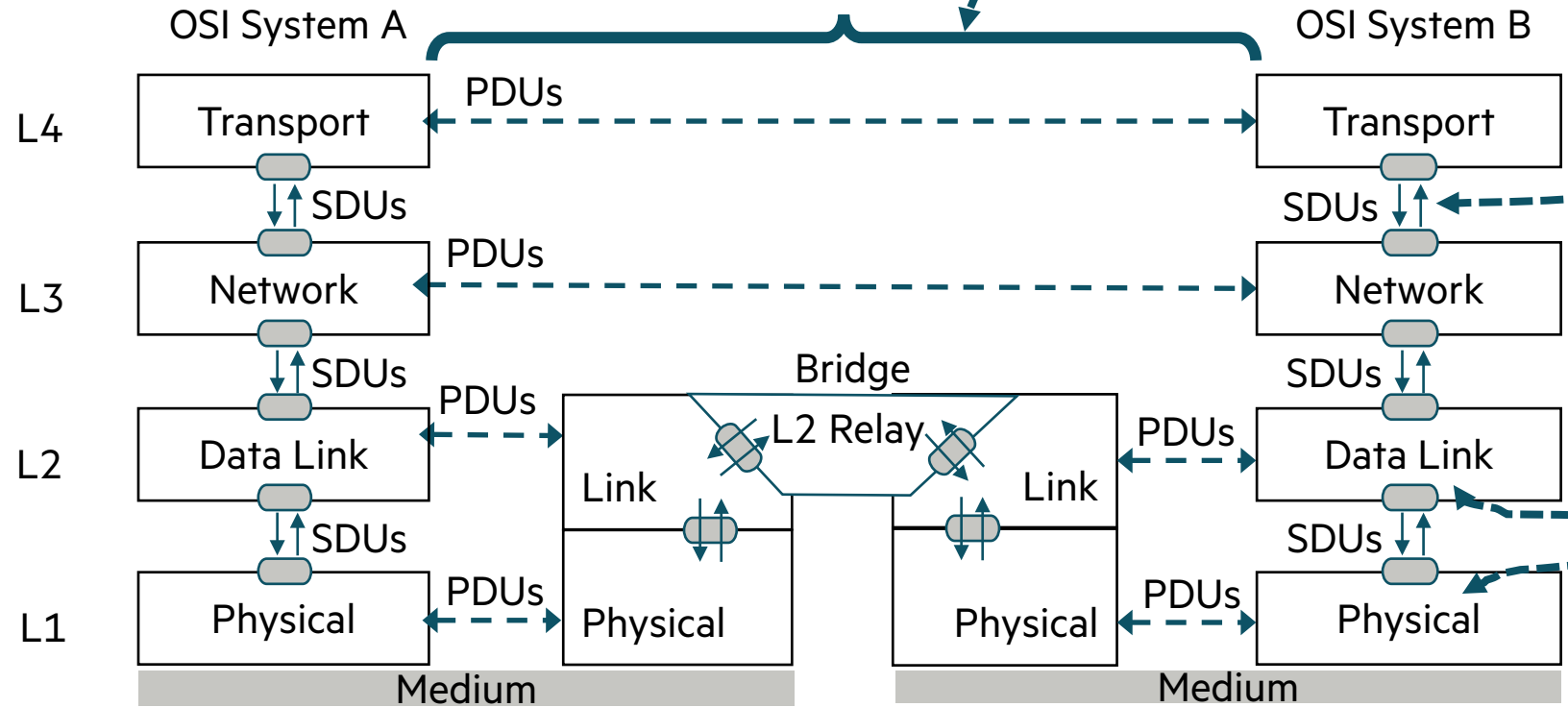Paul.Bottorff@hpe.com

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OSI Model (ISO 7498) Used for 802 Modeling

Peer Dialog Extended Through L1 and L2 Relays

Service Access Points — SAPs
Protocol Data Units — PDUs
Service Data Units — SDUs

OSI System A

L4 — Transport
SDUs
L3 — Network
SDUs
L2 — Data Link
SDUs
L1 — Physical

PDUs

Bridge

L2 Relay
Link
Physical

Link
Physical

OSI System B

Transport
SDUs
Network
SDUs
Data Link
SDUs
Physical

PDUs

Medium

Medium

- Peer dialog between same layers
- Client server dialog between layers N and N-1 is executed using service primitives

System A   System B

N Layer | N-1 Layer | N-1 Layer | N Layer

Request → Indicate →
Confirm ← Response
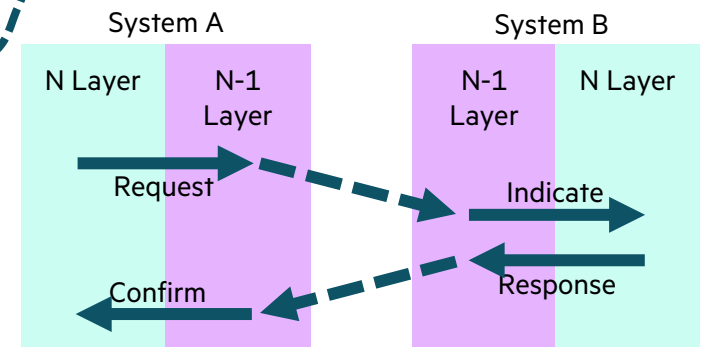
- Service interface provides an abstraction of the external box behavior.
- Most IEEE 802 services are un-confirmed and therefore only use request and indicate primitives to represent service interfaces
- N Layer client (or service user)
- N-1 Layer server (or service provider)

- ISO relays are used to model network devices. A bridge is an L2 relay, and a router is an L3 relay.
- The relay is the method for interconnecting two or more OSI stacks. Relay diagrams only show two stacks, however this is understood to represent as many stack as supported by the relay.
- As shown on the left each Request generates a layer PDU which causes an Indication at the peer layer
- IEEE divides the OSI layers in smaller sublayers using OSI modelling to interconnect these sublayers

# Proposed CTF Internal Sublayer Service (CISS)

CISS Data Primative

CM_UNITDATA.indication   (

        destination_address,
        source_address,
        mac_service_data_unit,
        priority,
        drop_eligible,
        frame_check_sequence,
        service_access_point_identifier,
        connection_identifier,
        frame_position,
        marked_error
)

CM_UNITDATA.request   (

        destination_address,
        source_address,
        mac_service_data_unit,
        priority,
        drop_eligible,
        frame_check_sequence,
        service_access_point_identifier,
        connection_identifier,
        frame_position,
        marked_error
)

CISS Control Primatives

CM_CONTROL.request   (

        destination_address,
        opcode,
        request_operand_list
)

CM_CONTROL.indication   (

        opcode,
        indication_operand_list
)
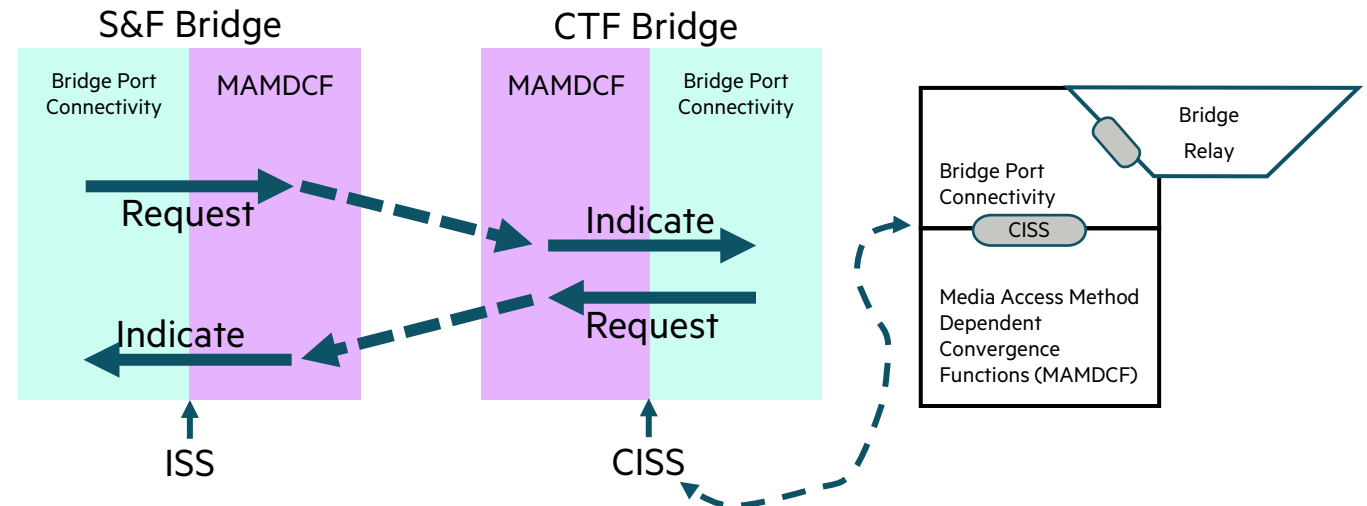
CISS Description

- The CISS extends the standard ISS service interface to provide the features needed for Cut-through Forwarding.
- The CISS retains the existing ISS parameters as specified in IEEE Std 802.1AC, however adds the two parameters frame_position and marked_error used to support delivering service primitives in chunks.
- The CISS supports delivering the CISS service primitives in chunks over the CISS Service Access Point (CISS-SAP). Each chunk of each service primitive instance is delivered with the service parameters instantiated at the time the CM_UNITDATA.indication chunk was delivered over the CISS-SAP.
  - The frame_position indicates the frame position of each chunk (begin, middle, end) of the service primitive instance.
    - The frame_position for S&F MAC indications is always marked begin+end while for CTF MACs the frame_position will change from begin to end as chuck of the indication is delivered over the CISS_SAP.
    - For S&F MACs the MAMDCF will collect all chunks before passing them to the S&F Media Access Method Specific Functions (MAMSF) while for CTF MACs the chunks will be passed to the MAMSF.
  - The marked_error indicates if any errors were detected on this or prior chunks of the service primitive.
    - For both S&F and CTF MACs marked_error can take the value error or no error. If the S&F MAC discards errored frames then it will always set marked_error to no error. For requests to S&F MACs with marked_error set to error the MAMCTF will not pass the request to the MAMSF, but instead will discard it.

Proposed CTF Enhanced Internal Sublayer Service (ECISS)

ECISS Data Primatives

ECM_UNITDATA.indication   (

      destination_address,
      source_address,
      mac_service_data_unit,
      priority,
      drop_eligible,
      vlan_identifier,
      frame_check_sequence,
      service_access_point_identifier,
      connection_identifier,
      flow_hash,
      time_to_live,
      frame_position,
      marked_error
   )

ECM_UNITDATA.request   (

      destination_address,
      source_address,
      mac_service_data_unit,
      priority,
      drop_eligible,
      vlan_identifier,
      frame_check_sequence,
      service_access_point_identifier,
      connection_identifier,
      flow_hash,
      time_to_live,
      frame_position,
   marked_error
)

ECISS Control Primatives

ECM_CONTROL.request   (

    destination_address,
    opcode,
    request_operand_list
)

ECM_CONTROL.indication   (

    opcode,
    indication_operand_list
)
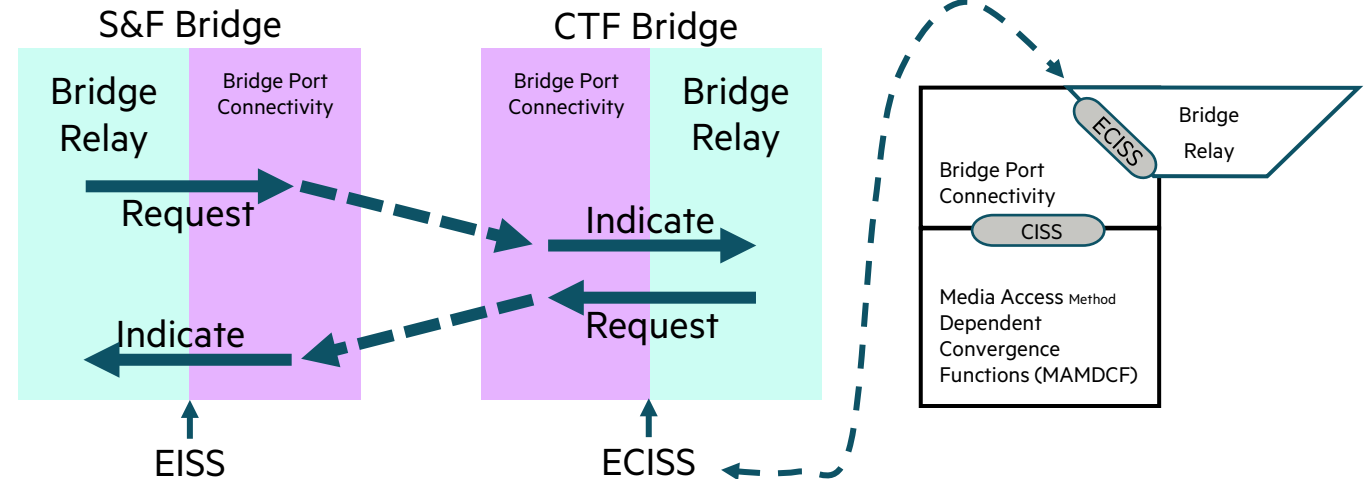
Replacement for 802.1DU figure 6-1

- Here the port presents either the CISS or ECISS to the CTF Bridge relay. CISS and ECISS port types can not be mixed within a CTF Bridge.
- The 802.1DU needs to specify the operation of the CISS which characterizes the Cut-Through Forwarding Media Access Method.
- The 802.1DU standard must specify the operation of the ISS Convergence Function, however can reference 802.1Q for the Media Access Method Dependent Convergence Functions.
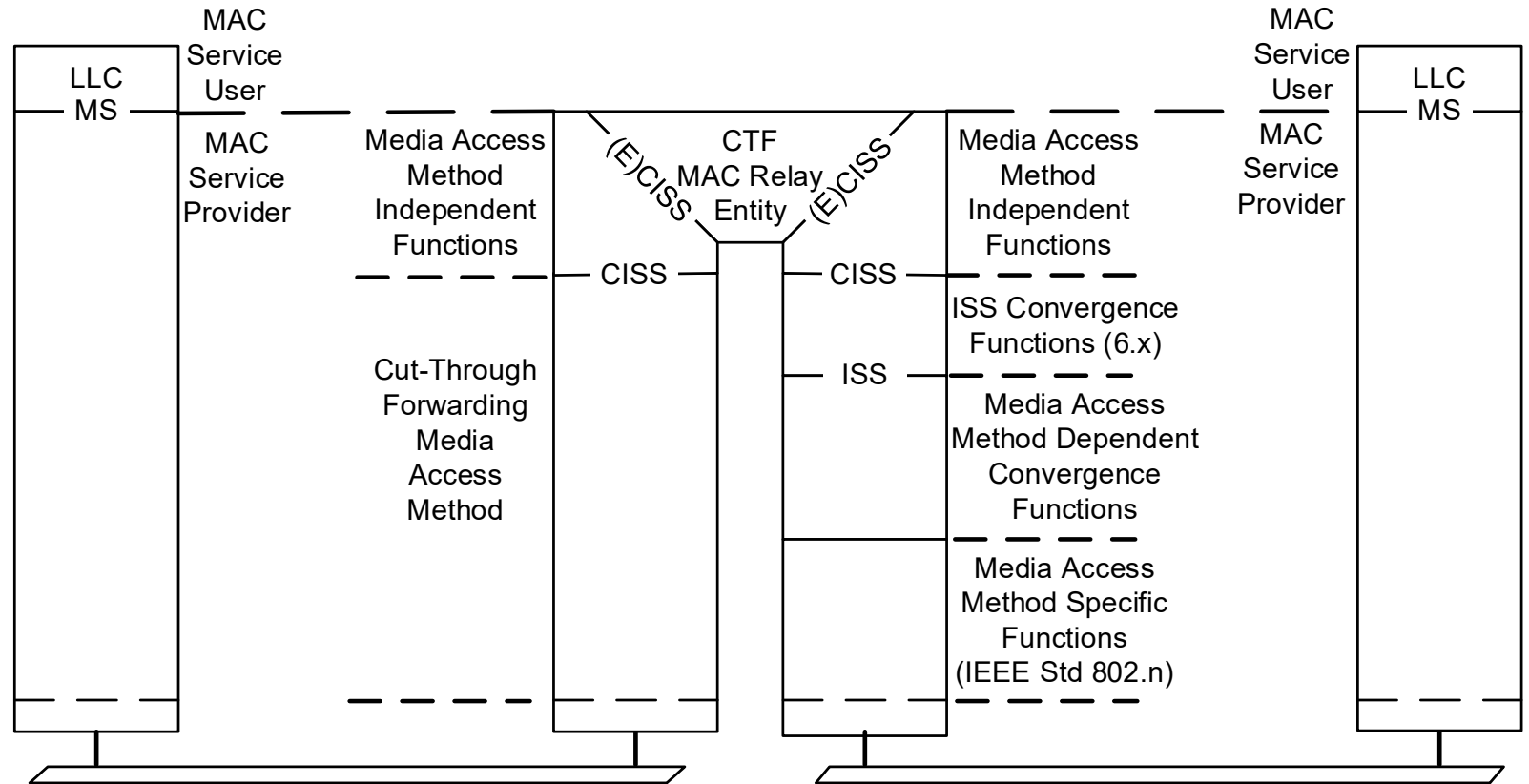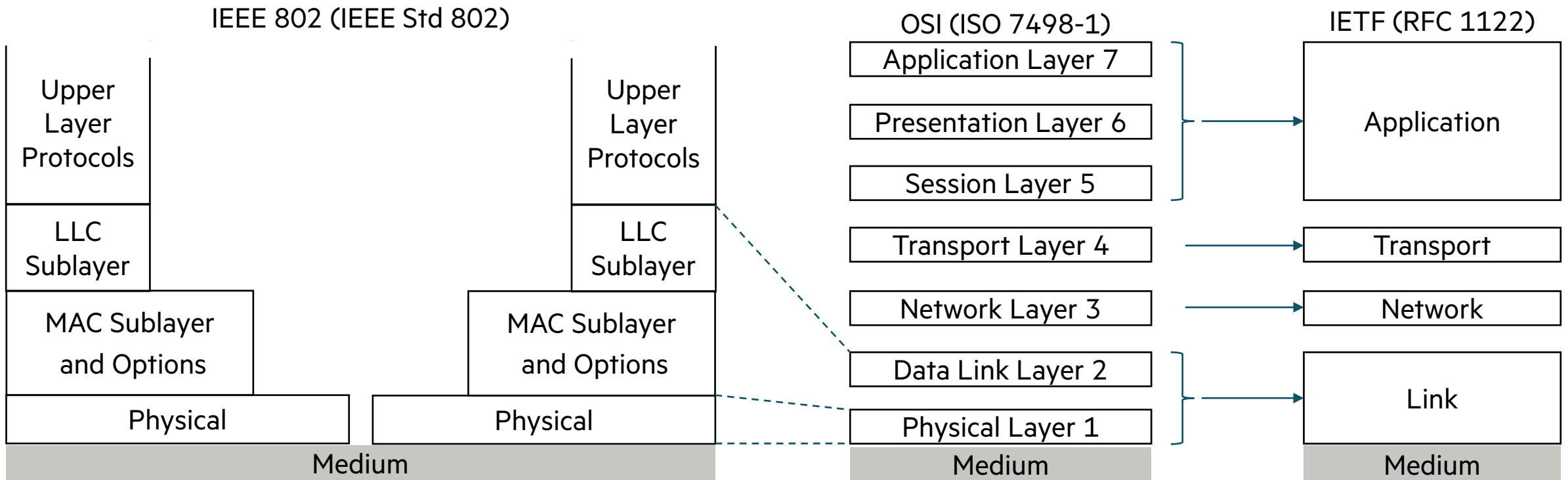
Thank you

IEEE 802 Layer Model, OSI 7 Layer Model and IETF Layer (End Stations)

- The IEEE 802 modeling is based on the OSI 7 layer model (ISO/IEC 7498-1)
- All IEEE 802 networking protocols are mapped to the OSI physical and data link layers 1 and 2
- Each IEEE 802 standard further subdivides the OSI layers 1 and 2 into sublayers
- IEEE 802 applies OSI modeling techniques to each of the sublayers within the standard