
*Control Plane - Management Plane
Interworking*

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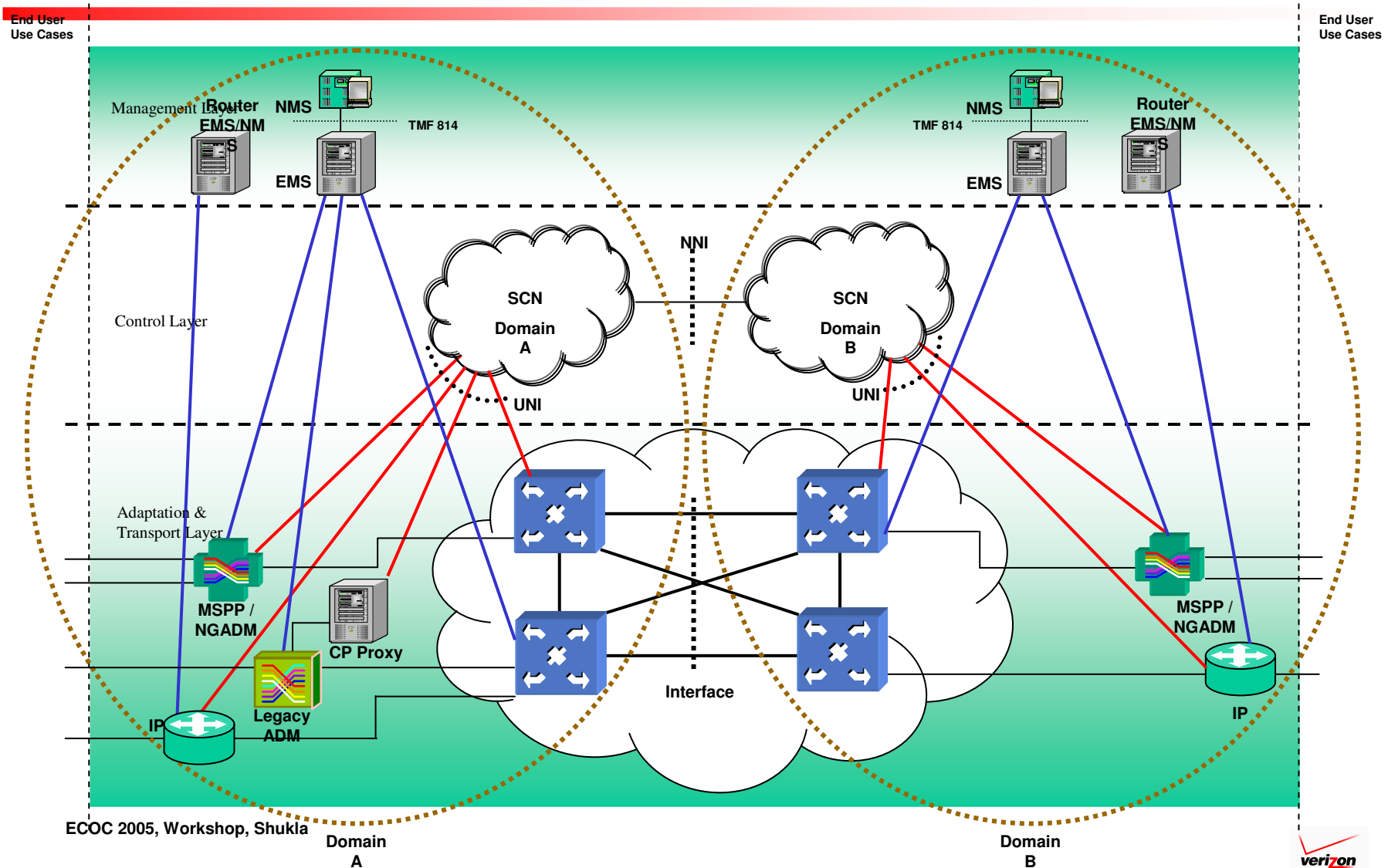
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Control Plane - Management Plane Interworking Outline

- ◆ **CP-MP interoperability**
 - Definition
 - Reference Architecture
- ◆ **Interoperability Requirements**
 - CP-MP interface
 - SCN
 - Transport & Adaptation
 - Signaling & control
- ◆ **Summary**

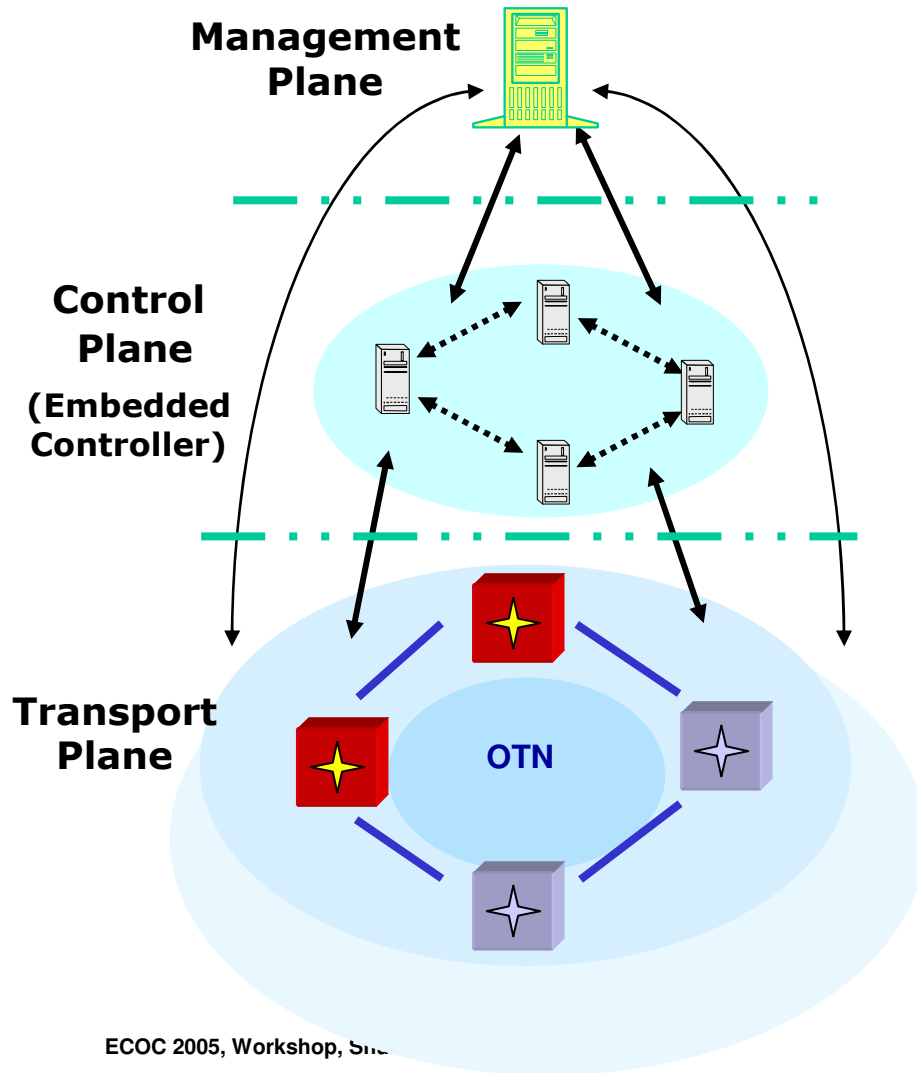
Interoperable Next-Generation Optical Network

NG-OTN Interoperability model



Control Plane - Management Plane Interworking

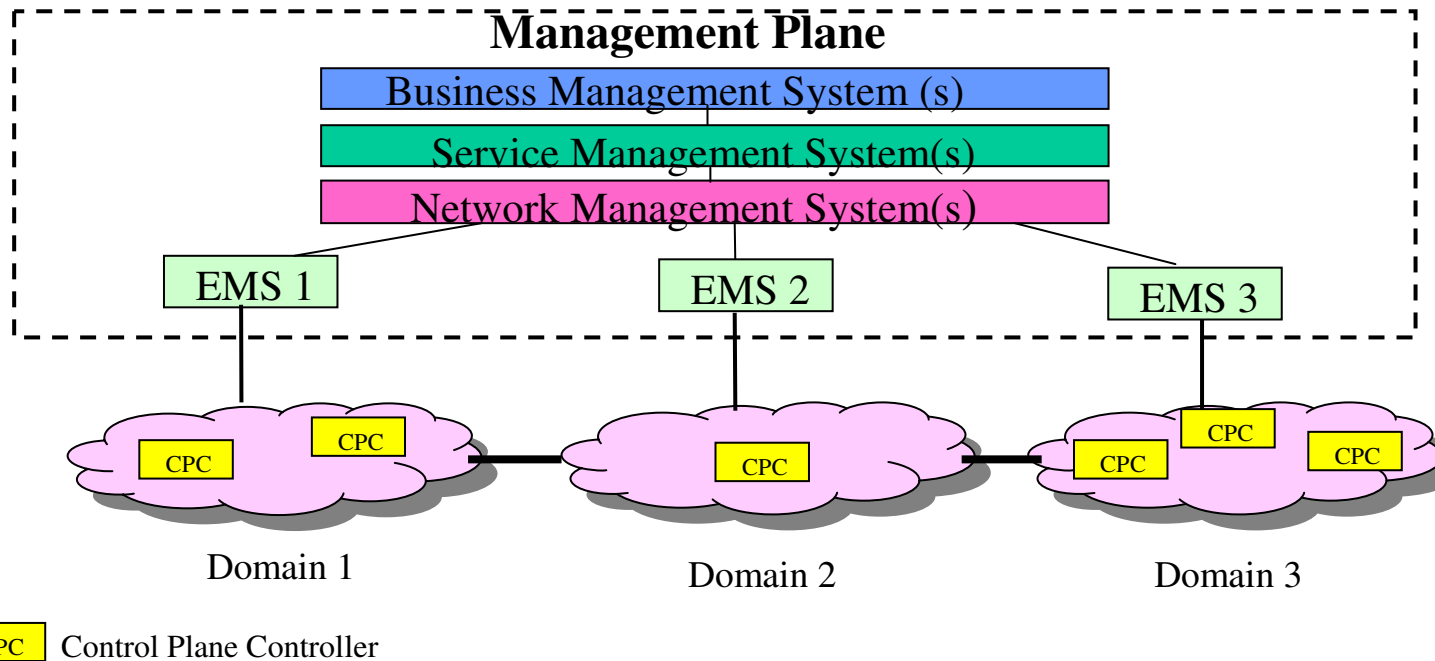
Management, Control, and Transport Hierarchy



- ❑ CP is positioned between transport and management planes.
- ❑ NEs are controlled either by CP or by both management plane and CP.
- ❑ Management plane, including the OSS, configures and supervises the CP.
- ❑ Management plane has ultimate control over all transport plane and control plane entities.

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Optical Network Management Plane



Assumptions:

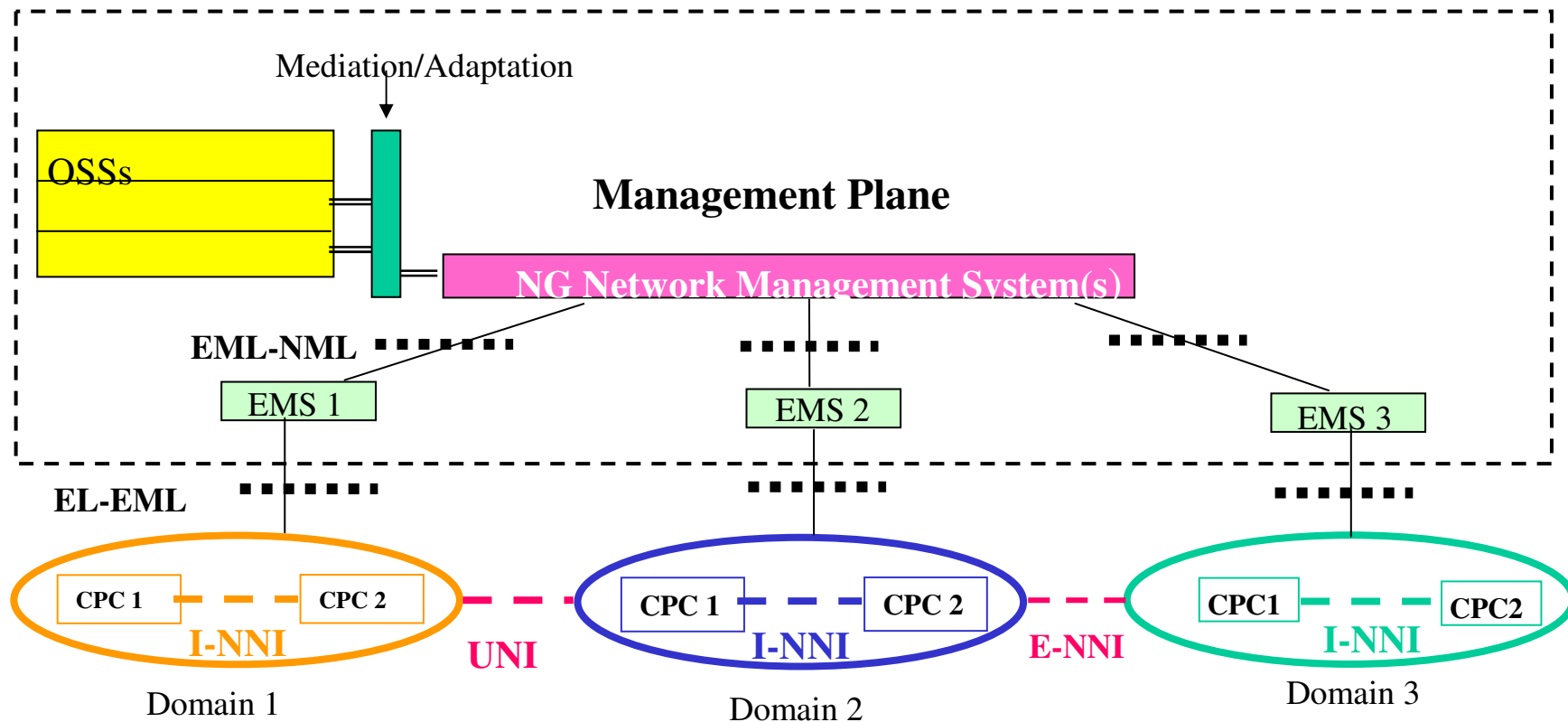
- ♦ Management Plane (MP) generically includes management plane functions in the NEs, EMSs, NMSs/OSSs.
- ♦ Domain refers to a logical grouping or subnetwork of managed NEs.
- ♦ CPC is internal to the NEs (except if a CPC proxy is used for legacy NEs).

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Interfaces-Management Plane

- **Management plane interworking between the network element and the EMS (NE-EMS interface)**
- **Management plane interworking between the EMS and its northbound NMS/OSS (EMS-NMS interface)**
- **Management plane interworking between multiple OSSs (OSS-OSS)**

Control Plane - Management Plane Interworking Interfaces & Interoperability Framework



==== Points of Interworking (OSS to OSS)

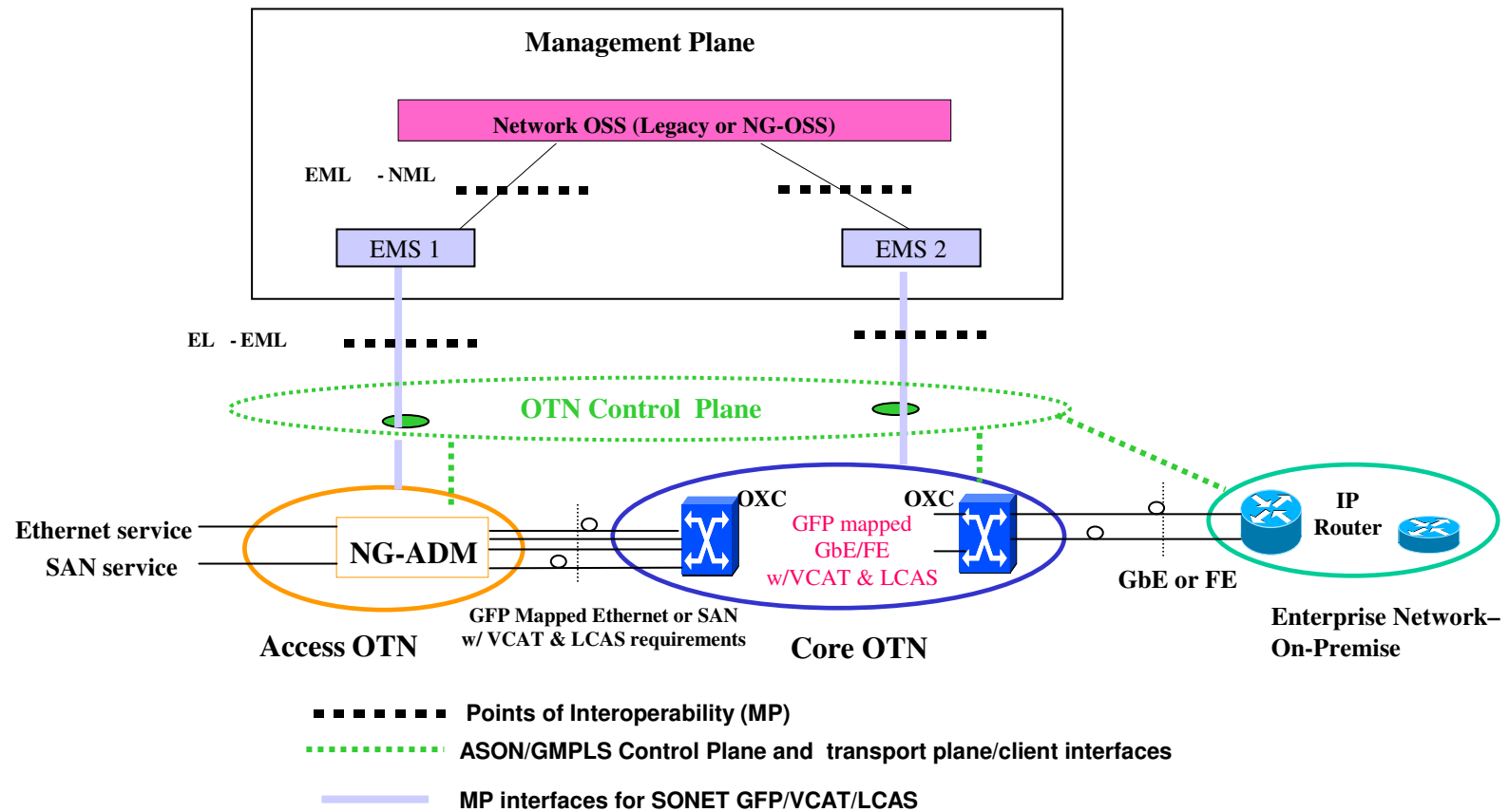
..... Points of Interoperability (MP)

Points of Interoperability (CP)

Control Plane Controller

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Network Mgmt Reference Architecture



Control Plane - Management Plane Interworking Interface Requirements

- ◆ **CP-MP**
- ◆ **SCN**
- ◆ **Transport and Adaptation Layer (GFP, VCAT, LCAS)**
- ◆ **Signaling & Control**

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CP-MP

- ◆ **MP must support ability to tear down connections established by the CP**
- ◆ **Failure in MP must not affect normal operation of a configured and operational CP or data plane**
- ◆ **MP must support ability to de-allocate resources from CP if resources are not supporting active connections**
- ◆ **MP must not be affected by failure in CP**

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Management of SCN

- **MP must support ability to receive a notification for a failure in a control channel**
- **MP must support the ability to correlate the failed control channel to the data channel it is associated with**
- **MP must support the ability to query the CP for the status of a specific control channel**

Control Plane - Management Plane Interworking Transport & Adaptation

- ◆ **MP must support the ability to initiate a Soft Permanent Connection (SPC) over a Virtual Concatenated Group where VCAT members traverse either the same or different paths.**
- ◆ **MP must accommodate Control Plane initiated Switched Connections (SC) that are set up over a Virtual Concatenated Group where VCAT members traverse either the same or different paths.**
- ◆ **MP must interwork with control plane whenever control plane is involved in carrying out VCAT and LCAS operations.**
- ◆ **Standardized interfaces (i.e., TMF814) are needed to address ability to manage CP functions in a GFP/VCAT/LCAS environment.**

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Control & Management

- **Management plane support for control plane-based neighbor discovery functions.**
- **Management plane support for Management Plane-initiated request for connection setup with or without constraints ('Soft Permanent Connections').**
- **Management plane support for Client Device-initiated or Control Plane-initiated call/connection setup ('Switched Connections').**

Control Plane - Management Plane Interworking Signaling & Control

- ◆ Inventory discovery
 - Network resource discovery (addition/deletion of inventory) must be handled by the MP.
 - MP must support auto-discovery of NE, shelf, module (port & slot details), and control plane components (routing controller, signaling controller).
- ◆ Topology discovery (neighbor discovery)
 - MP must accommodate the control plane's resource/neighbor discovery functions).
 - MP must accommodate support for intra-domain & inter-domain topology discovery.
 - Neighbor discovery helps in capacity creation & activation of new link.
 - MP must be notified of local port connectivity failure between UNI-C & UNI-N.
- ◆ Service discovery
 - MP must handle notifications resulting from service discovery (service attributes for UNI-C & UNI-N or failure notification).

Control Plane - Management Plane Interworking Standards Progress

Standards

- **TMF MTNM 814**
- **ITU**
- **OIF**
- **IETF**

Control Plane - Management Plane Interworking

Summary

- ◆ **MP support for CP functionality is crucial to successful deployment of Intelligent Transport Network**
- ◆ **Ability of the CP to provide the MP with all the information it requires is critical to the CP viability**
- ◆ **Standardized interworking between the CP and MP functionalities is needed to prioritize deployment of OTN control plane functions and establish evolution path**
- ◆ **Continued progress in standards area is needed**