



International Telecommunication Union

Management of ASON-capable Network and its Control Plane

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Outline

- o Benefit of ASON-capable Network
- o Management Requirements
- o How these requirements are being addressed
- o Challenge and Issues



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ASON Capabilities

- Automatic route design
 - Path computation done by the network
- Automatic connection management
 - Setup / Modification / Release
 - Restoration / Protection
- Automated resource management
 - Transport topology & capacity discovery
 - Connectivity verification



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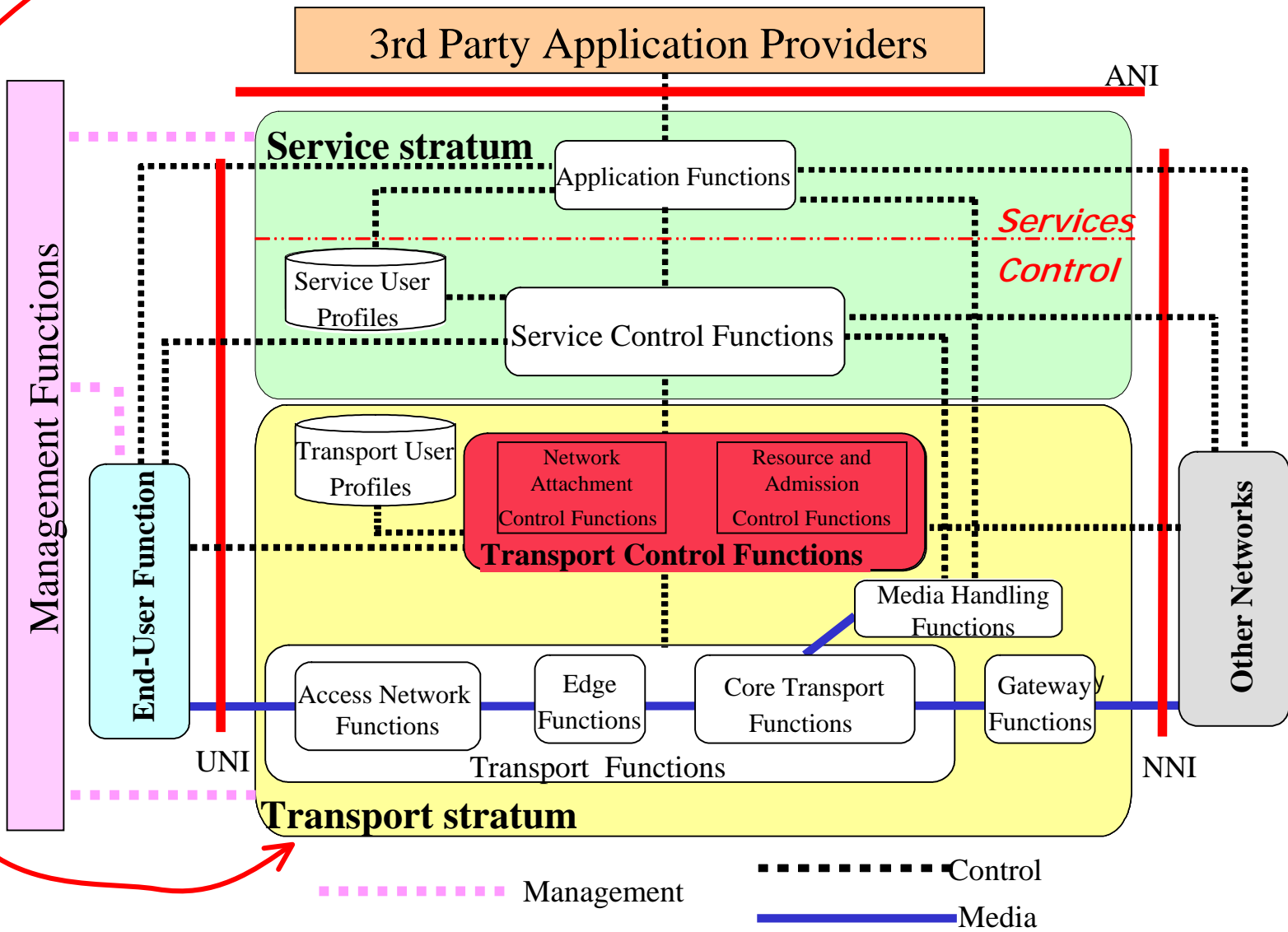
ASON Benefits

- Simplified connectivity provisioning ↓ OPEX
 - Path computation done by the network
 - Reduce complex planning and designs
 - Increase accuracy of the process
- Efficient network resource utilization ↓ CAPEX
 - Reduce static dedicated protection through dynamic shared restoration
- Rapid service turn-up ↑ Revenue
 - Timely support of bandwidth-on-demand services
 - Provide new revenue opportunities

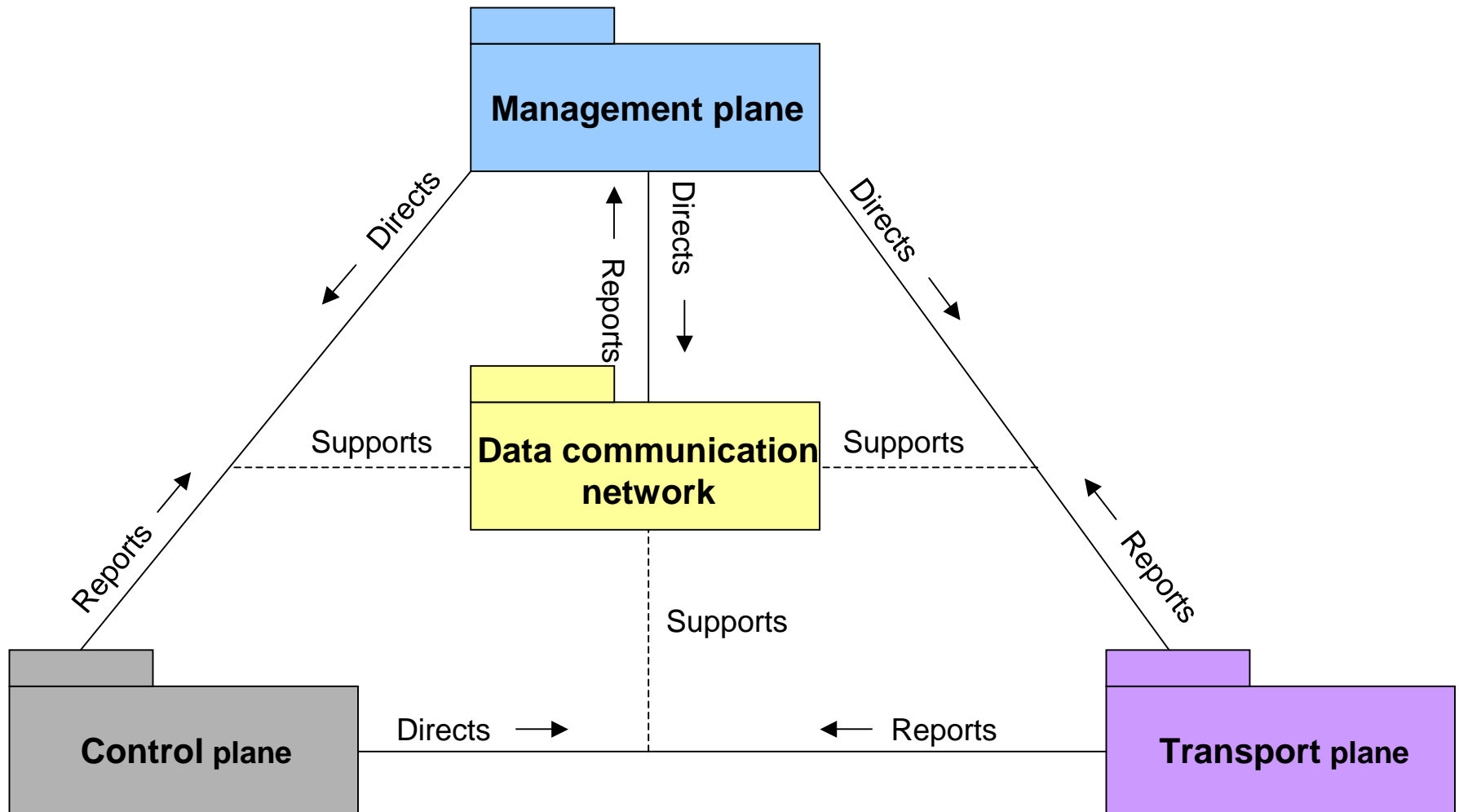


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ASON – An enabler for NGN realization



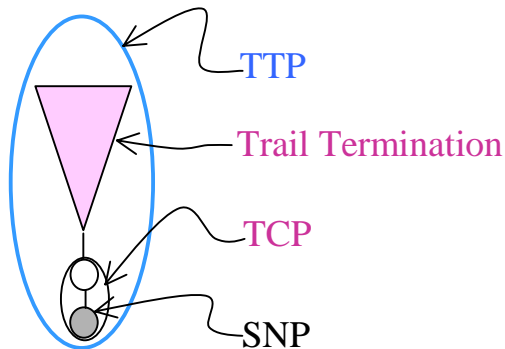
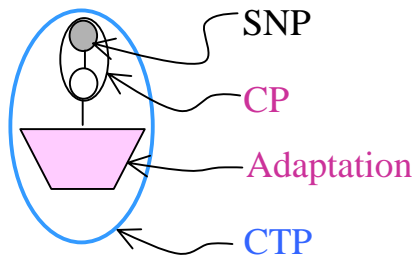
Context of ASON Management





Views of Transport resources

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Transport entities

Adaptation function

Trail Termination function

CP: Connection point

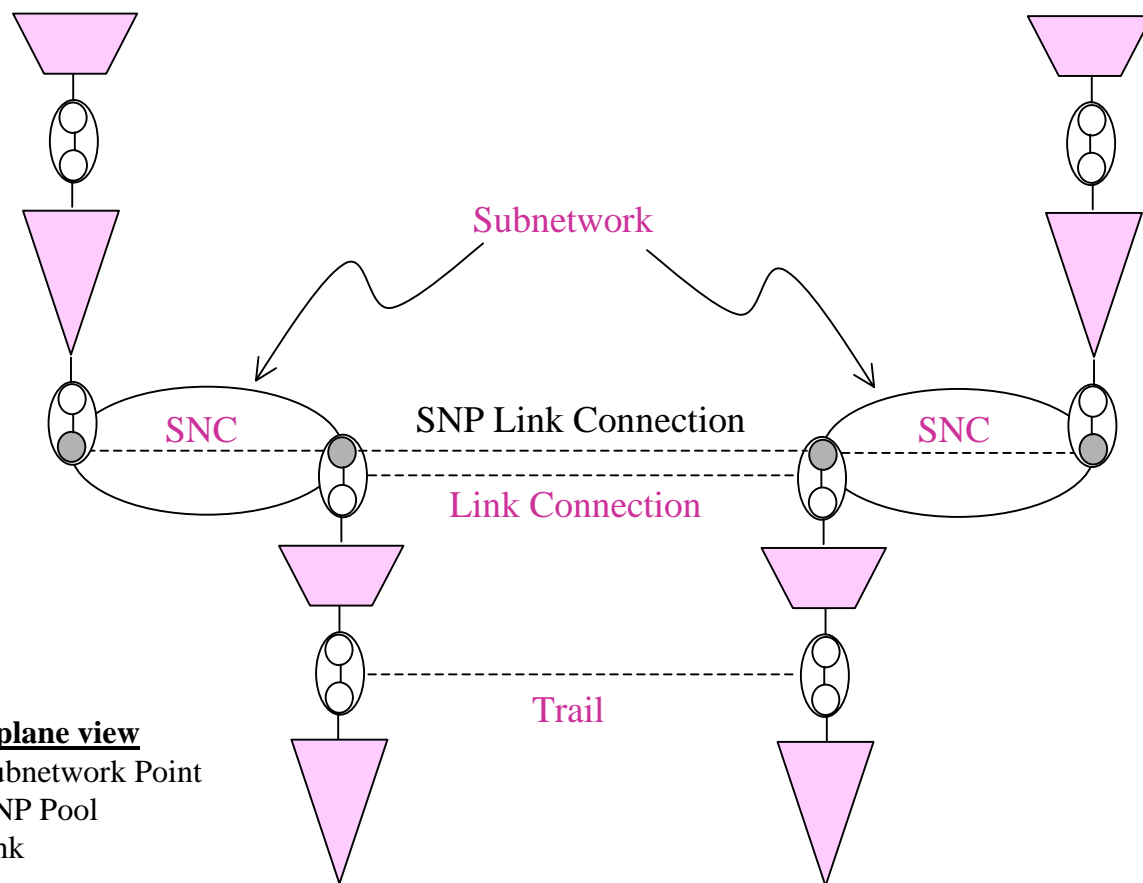
TCP: Termination connection point

Management plane view

TTP: Trail Termination Point

CTP: Connection Termination Point

Relationship between the architectural entities in **Transport plane**, **Management plane**, and **Control plane**



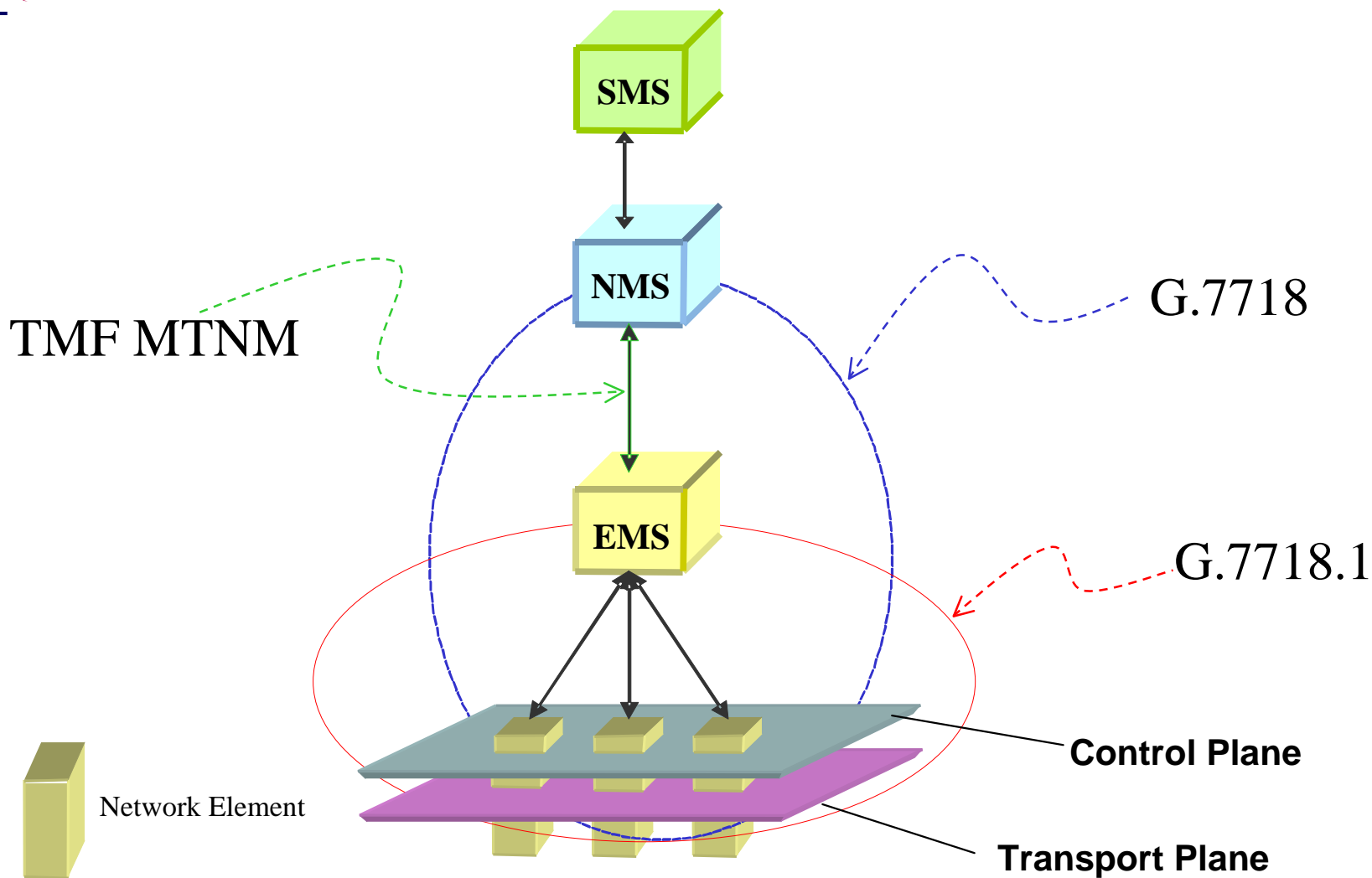
Control plane view

SNP: Subnetwork Point

SNPP: SNP Pool

SNPP Link

How ASON management is being addressed





G.7718 ASON Management requirements

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o Configuration management

- Control plane resources
 - Identifiers, addresses, protocol parameters (signaling & routing) ...
- Routing areas
 - RA hierarchies, (dis)aggregation, assignment of CP resources
- Transport resources (in control plane view)
 - (de)allocation, names and identifiers, discovery, topology, resource and capacity inventory
- Call and connection
 - setup(SPC)/modification/release
- Policy

o Fault management

- Control plane components, resource/connection/call (service),

o Performance management

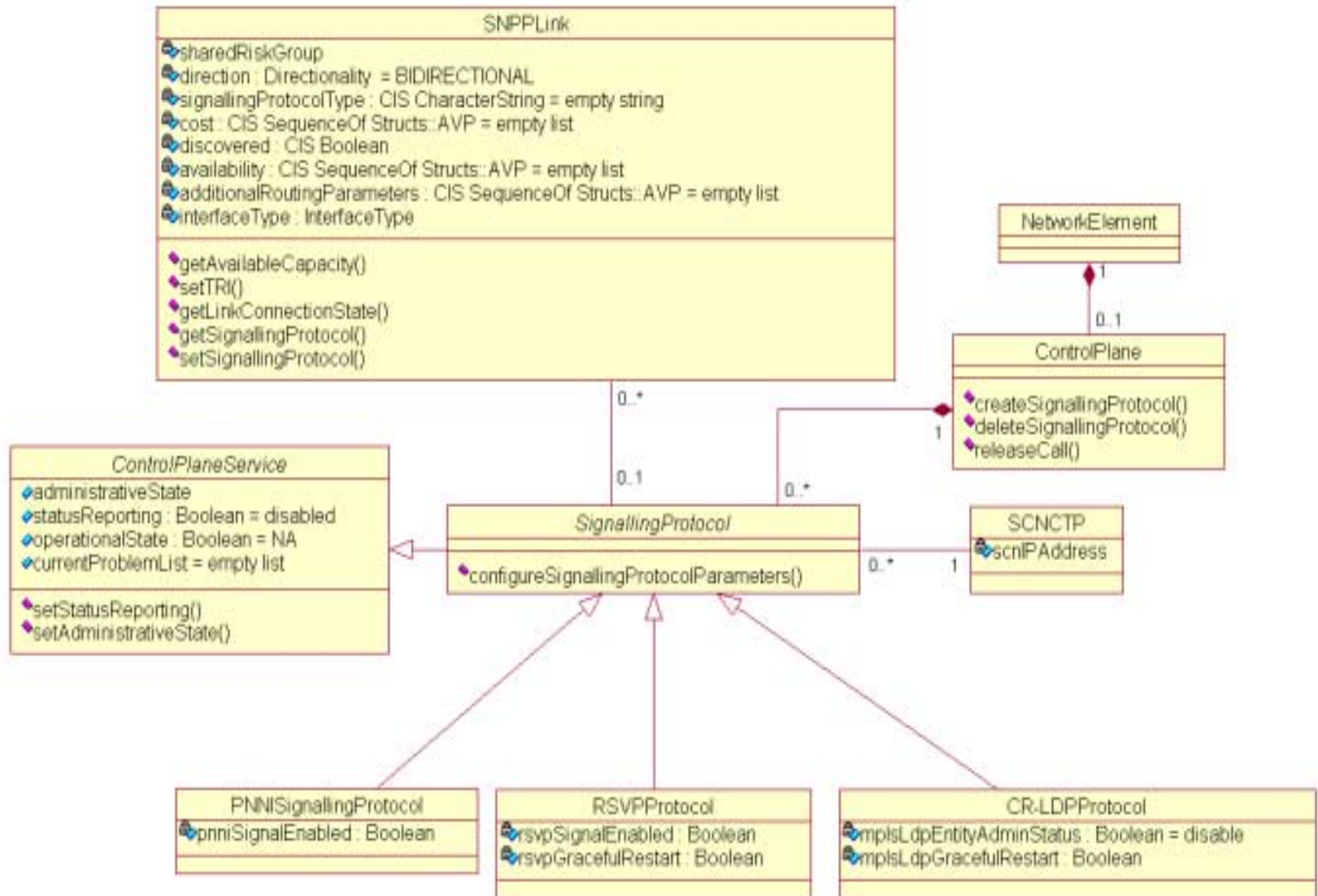
- Control plane components

o Accounting management

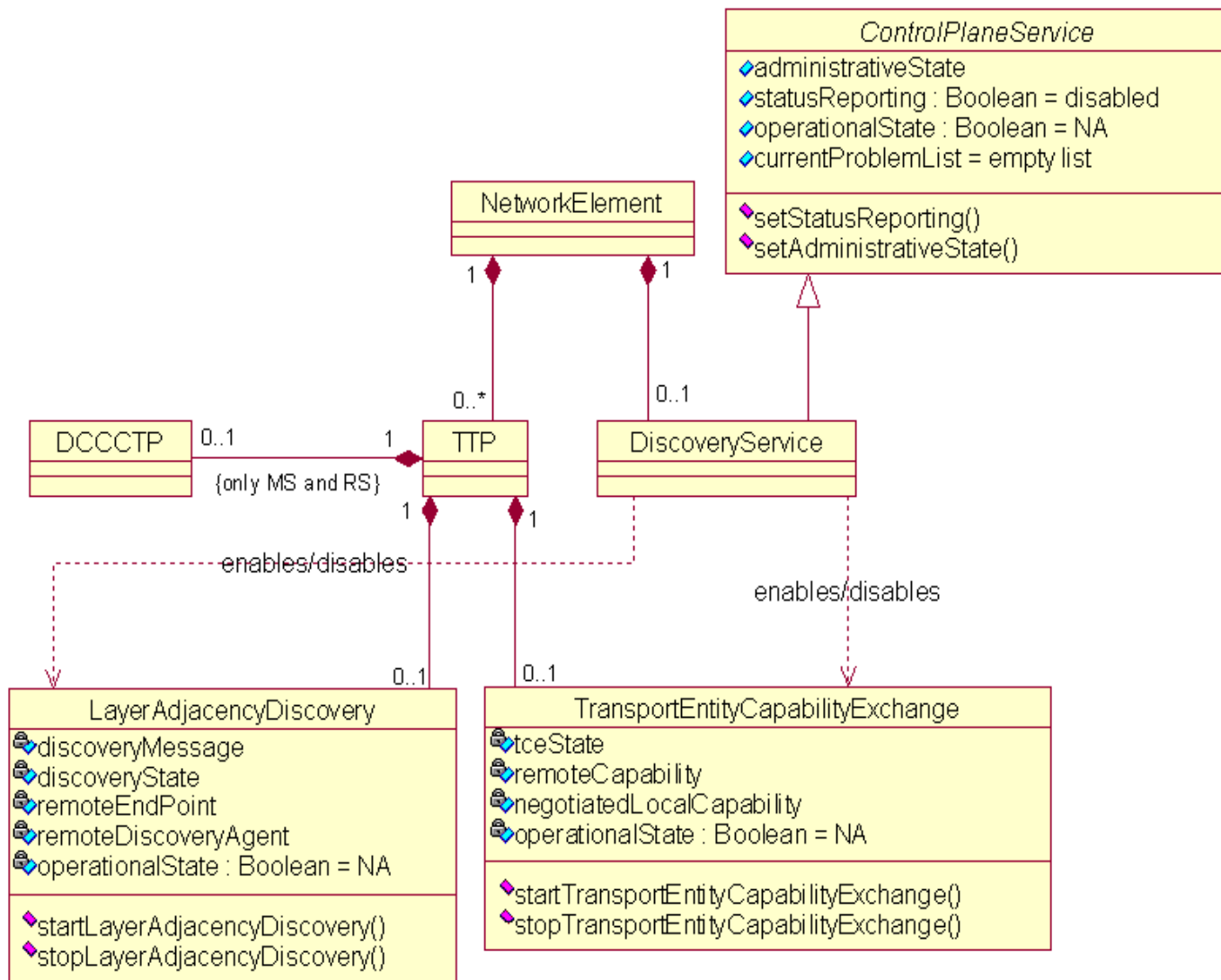
- Usage and call details record

o Security management

G.7718.1 (cont.) – Signaling service classes



G.7718.1 (cont.) – Discovery service classes



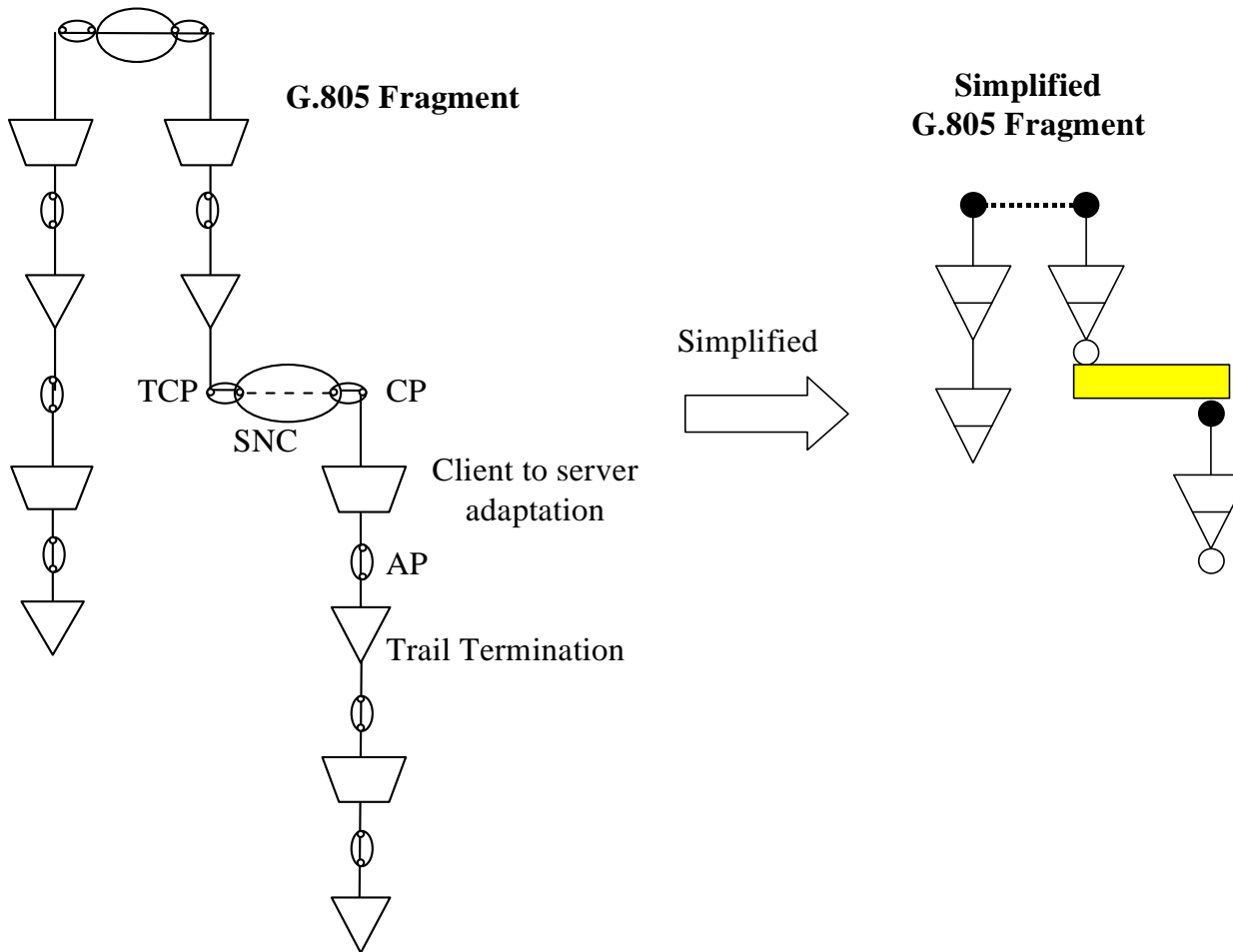


TMF 513/608/814 – CP Management

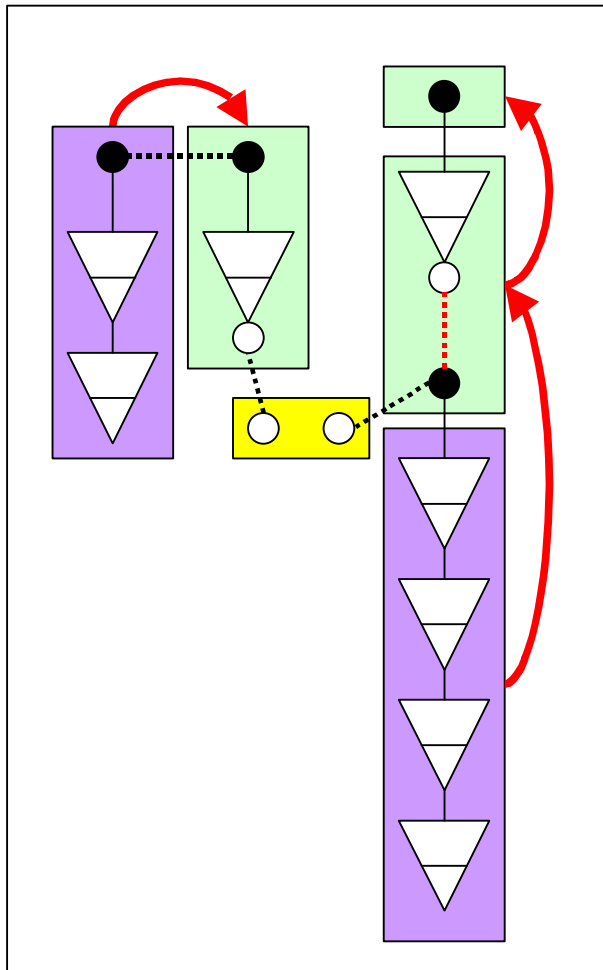
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- Version 3.5 – CP & Ethernet management
 - TMF 513 – Requirements & Use cases
 - TMF 608 – Protocol-neutral model (UML)
 - TMF 814 – CORBA solution
- Adopt the v3.0 approach
 - Multi-layer
 - ML-RA (*MLSM*), ML-SNPP, ML-SNPP Link, ...
 - Re-use of SNC
 - Connection
- Call – for ASON and Ethernet management









G.805 Layered Model and MTNM Simplification








MTNM multi-layered Model



Basic ITU-T G.805 structures

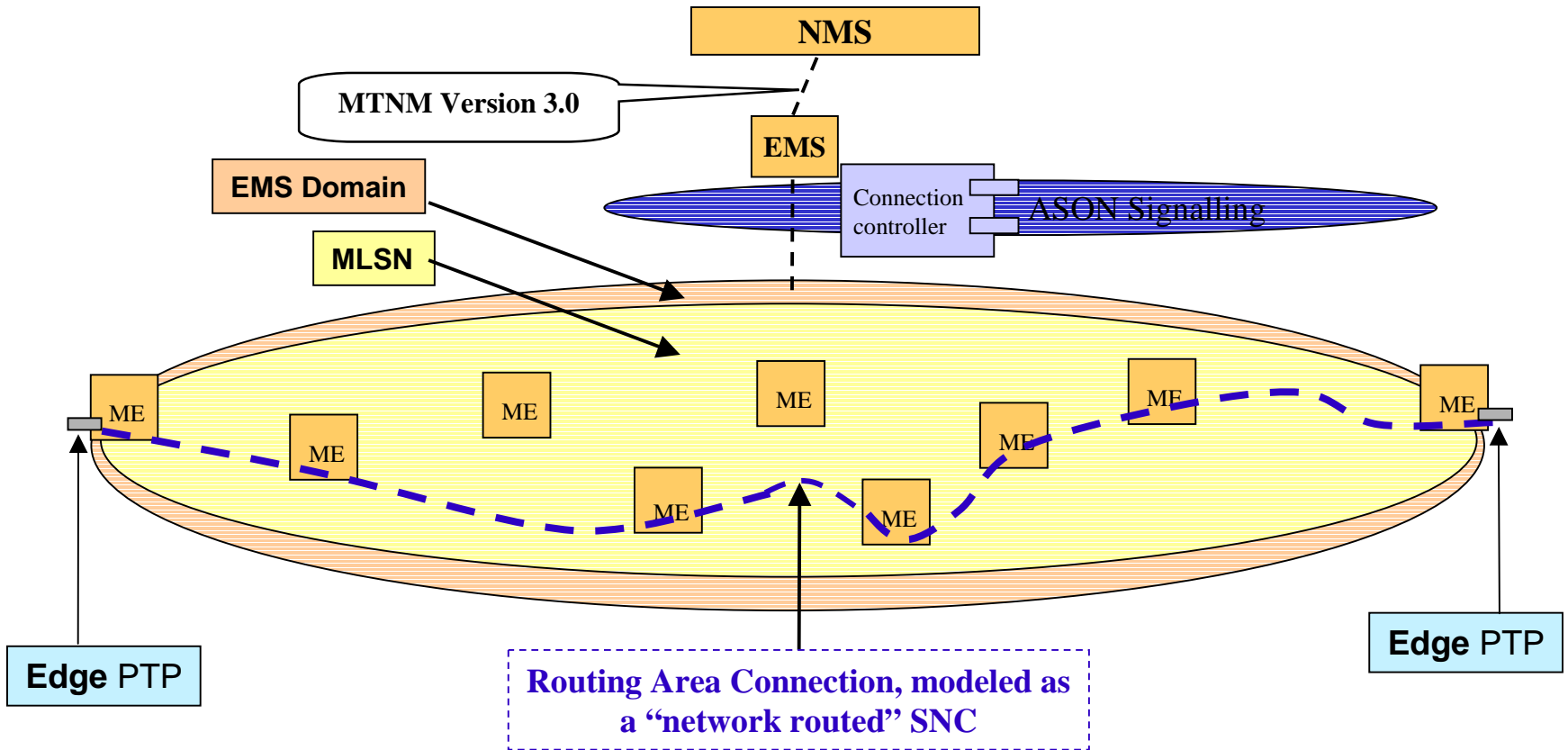
-  G.805 Adaptation
-  G.805 Trail Termination
-  G.805 Connection Point
-  G.805 Termination Connection Point
-  G.805 relationship
-  G.805 relationship
-  G.805 relationship (may be SNC)
-  G.805 SNC (may be relationship)

MTNM Model

-  PTP
-  CTP
-  SNC
-  TerminationMode
-  Naming/containment

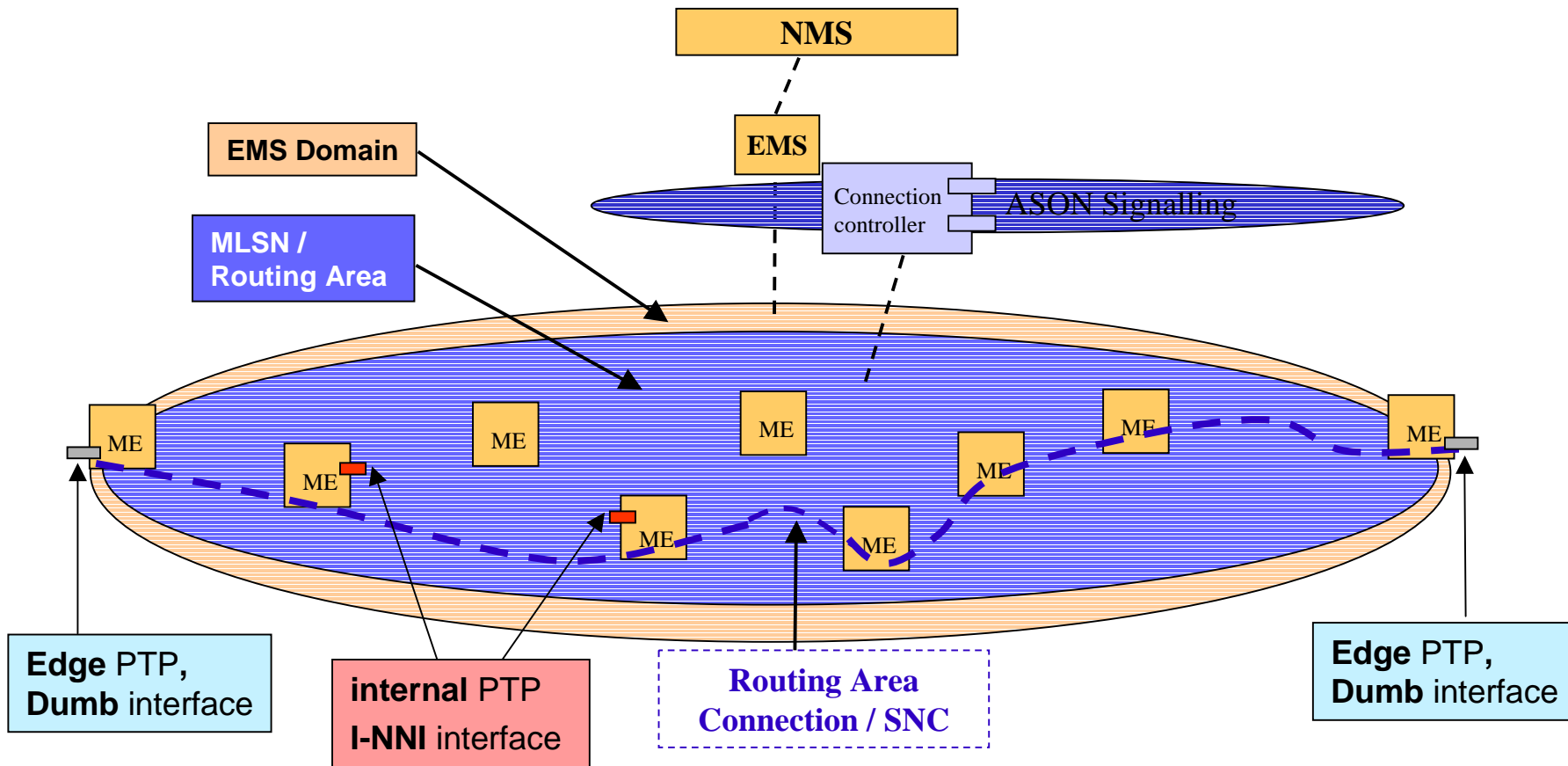
MTNM Control plane management: Scenario #0

EMS Domain = MLSN, *Routing Area* is not seen at NMS-EMS i/f, basic reference scenario #0



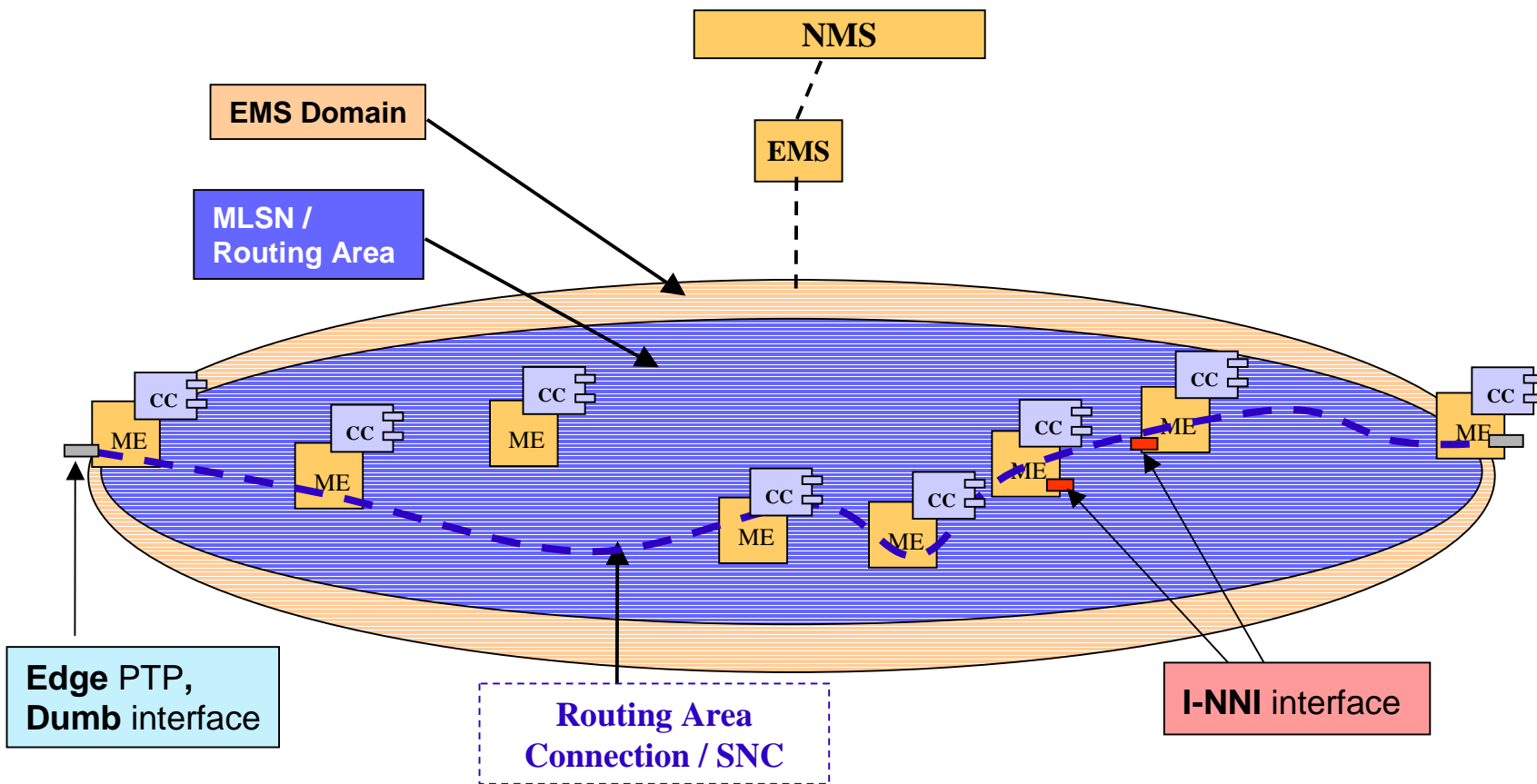
MTNM Control plane management: Scenario #1

EMS Domain = MLSN of *Routing Area* type, centralized CC, reference scenario #1



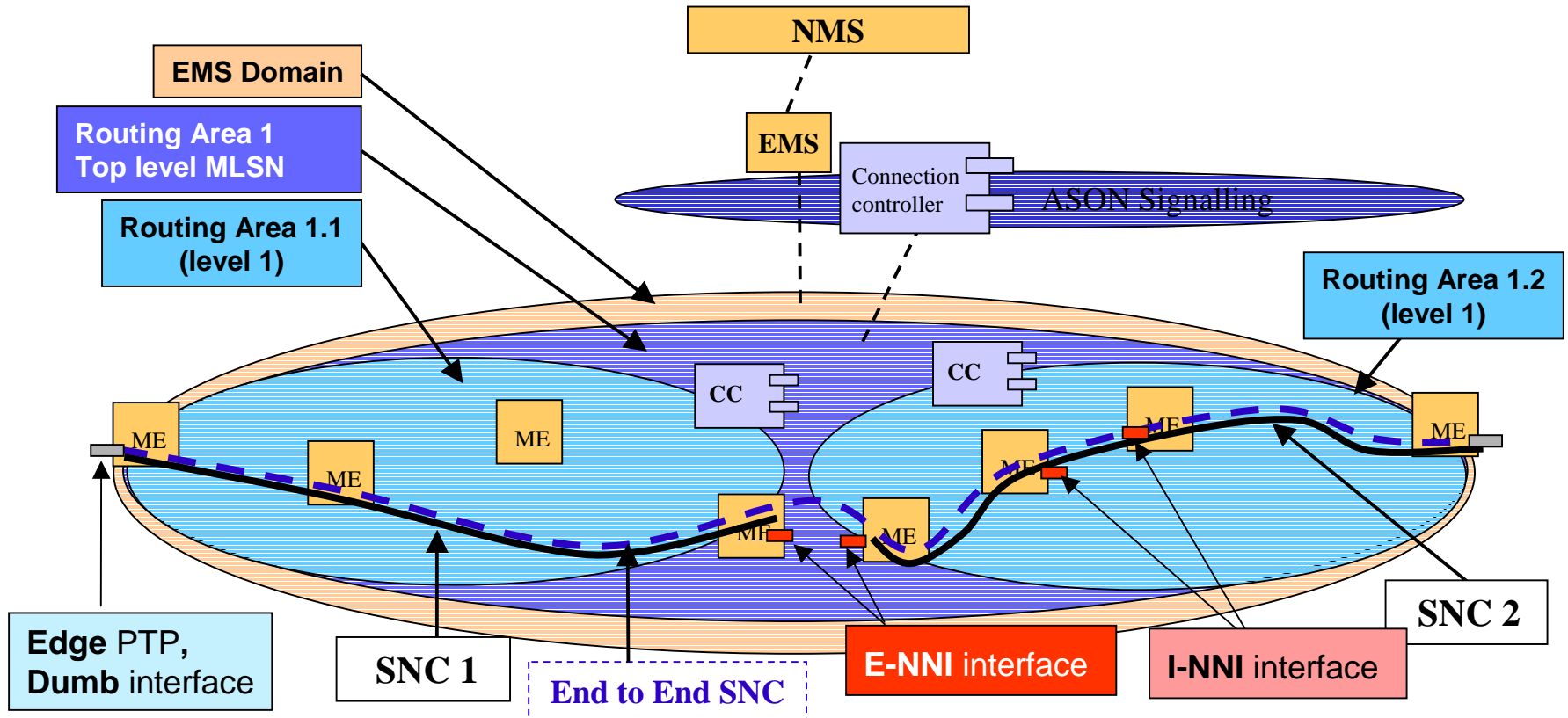
MTNM Control plane management: Scenario #2

EMS Domain = MLSN of *Routing Area* type, distributed CC, reference scenario #2

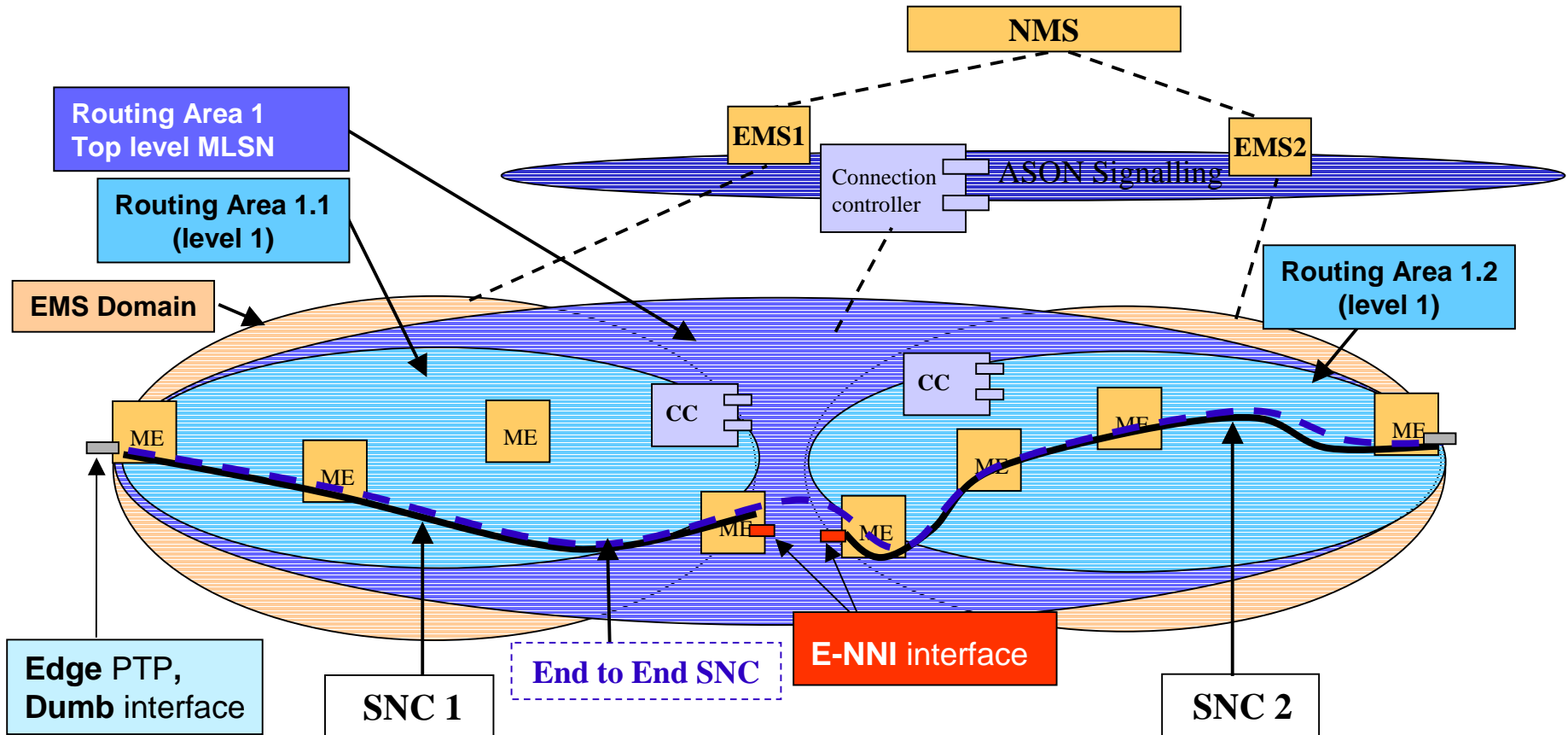


MTNM Control plane management: Scenario #3

Three levels routing hierarchy, EMS Domain = top level MLSN of *Routing Area* type, centralized CC per Routing Area, reference scenario #3

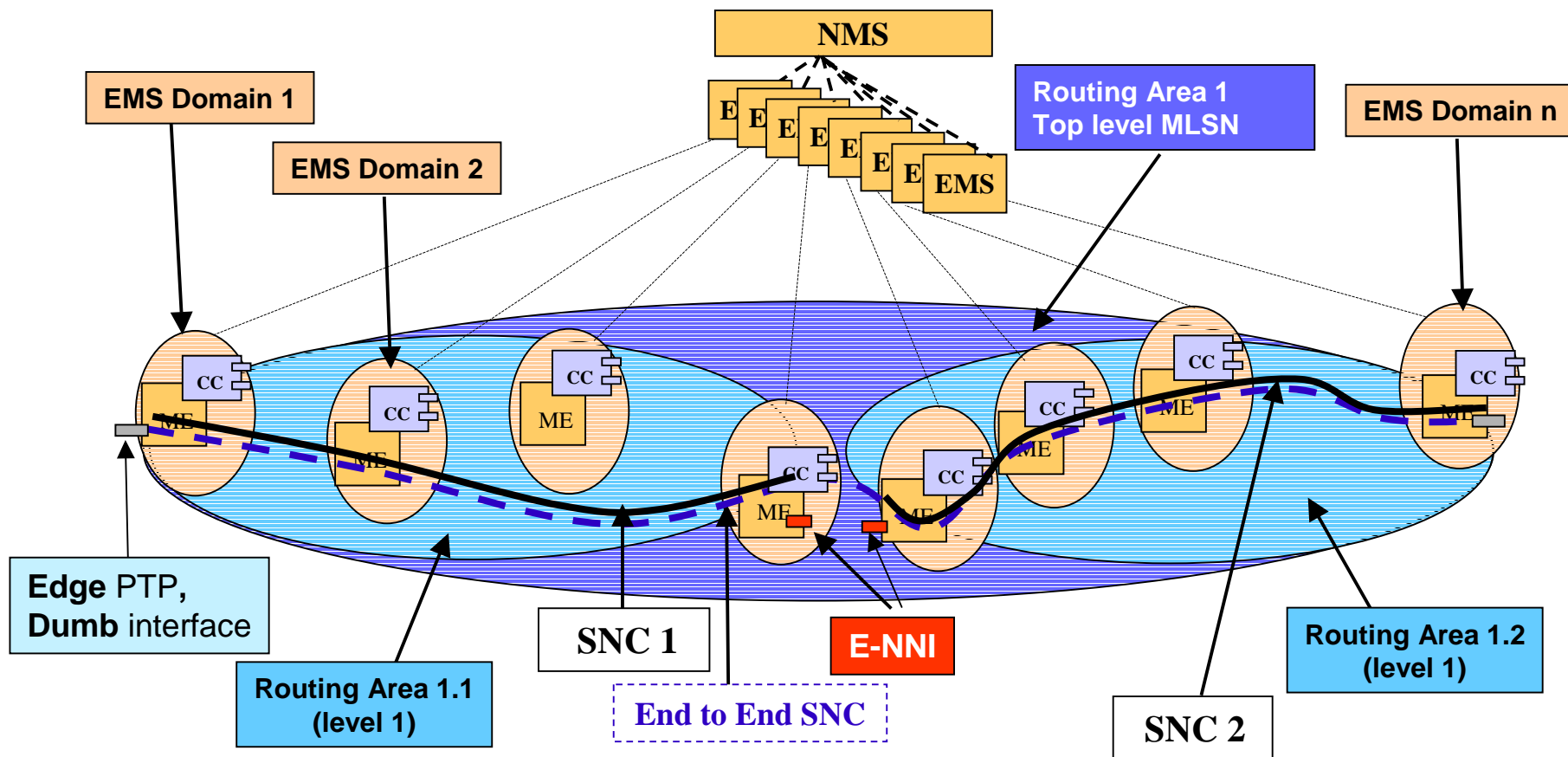


Three levels routing hierarchy, one EMS per *Routing Area* of intermediate level, reference scenario #4



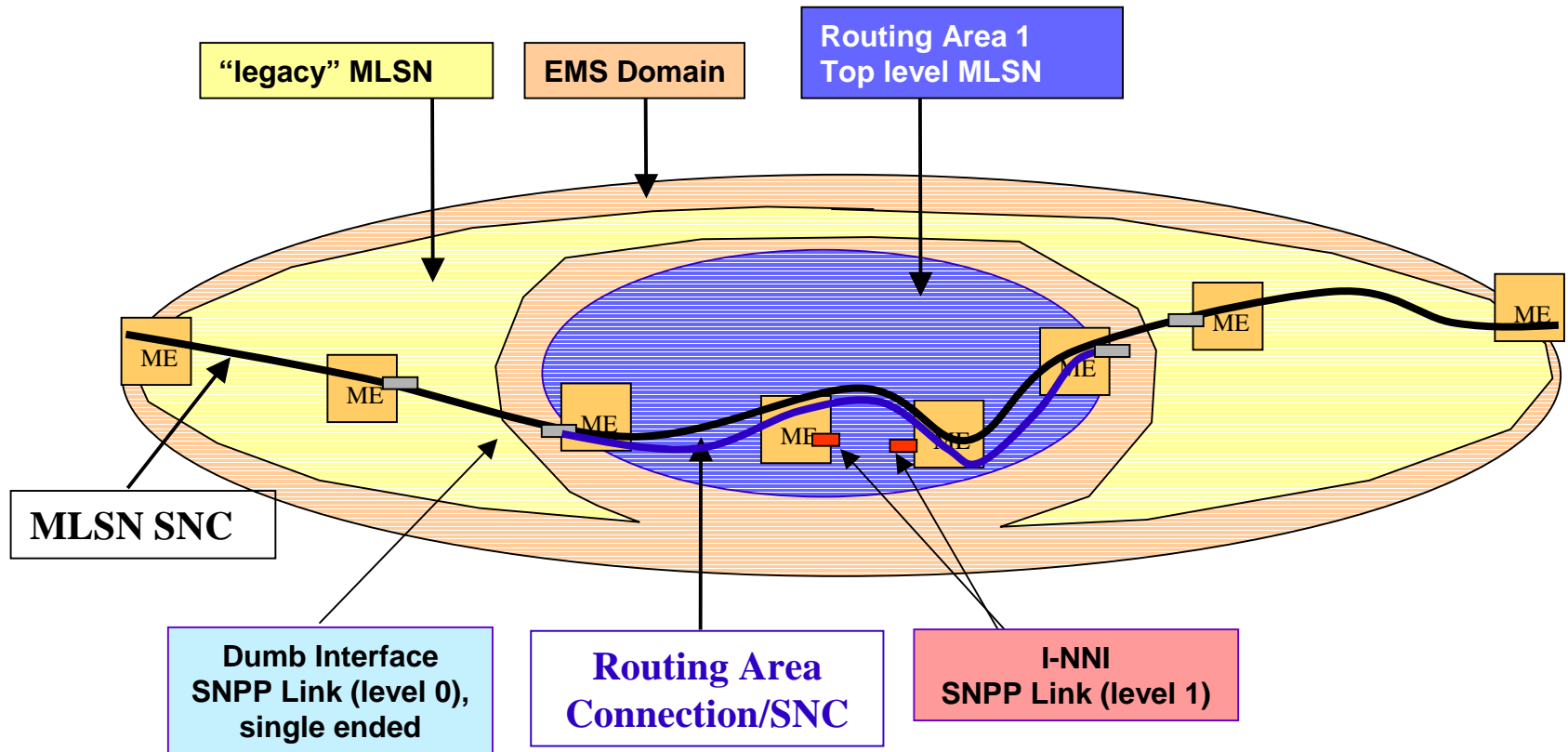
MTNM Control plane management: Scenario #5

Three levels hierarchy, all MLRAs are wider than EMS Domain, distributed CC, reference scenario #5



MTNM Control plane management: Scenario #6

Routing Area Island, reference scenario #6



- o MLRA Discovery and Inventory
 - Retrieve MLRA(s) (UC_4)
 - MLSN Mgr:: getMultiLayerSubnetwork () // given the name, return the object details
 - Ems Mgr:: getAllMLRAs () // get all MLSNs which are RA, including routing nodes
 - Ems Mgr:: getAllTopLevelSubnetworks () // both MLSN & MLRA
 - Retrieve MLRAs that are subordinate to a specified MLRA (UC_28)

Use cases (cont.)

- o MLSNPP Link Discovery and Inventory
 - Retrieve MLSNPP Links (UC_5)
 - Retrieve available MLSNPP Link capacity (UC_6)
- o MLSNPP Discovery and Inventory
 - Retrieve MLSNPPs (UC_27)
 - Notify change in capacity available to the Control Plane - resulting from commissioning / decommissioning of resources (UC_1)



Use cases (cont.)

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- o Call Discovery and Inventory
 - Retrieve Calls and top level Connections supporting each Call (UC_7)
 - Retrieve details of a Call (UC_35)
 - Notify new Calls and Connections (SPC and SC) (UC_8)
 - Notify deleted Calls and Connections (SPC and SC) (UC_9)



Use cases (cont.)

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- o Call management
 - Establish a Call (UC_20)
 - Release a Call (UC_21)
 - Add connection(s) to an existing call (UC_22)
 - Remove connection(s) from with a call (UC_23)
 - Retrieve Calls and their top level Connections (UC_7)
 - Retrieve subordinate MLRA involved in the route of a Connection (UC_24)
 - Retrieve route details of a specified Call within a specified RA (UC_25)
 - Retrieve the ID/Name of the Call supported by a specified TP/SNPP/TNA (UC_26)
 - Set diversity and co-routing parameters of an existing call (UC_33)



Use cases (cont.)

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- o Provisioning
 - Assign UNI MLSNPP Link to a Signaling Controller (UC_10)
 - Set UNI signaling protocol and parameters (UC_11)
 - Modify signaling parameters (UC_11b)
 - Enable the UNI signaling for a MLSNPP Link (UC_12)
 - Disable the UNI signaling for a MLSNPP Link (UC_13)
 - De-assign a UNI MLSNPP Link from a Signaling Controller (UC_14)
 - Assign TNA Names to components of an MLSNPP (UC_15)
 - Assign TNA Names to components of an MLSNPP Link (UC_32)



Challenge

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- o Issues for further study
 - Management plane (MP) and Control plane (CP) inter-working and integration
 - Transport resource allocation and migration
 - Maintenance of transport resources that are CP-allocated
 - Call & connection migration
 - ...
- o collaboration among forums (SG15, TMF, OIF, IETF)
 - SG15 & TMF: role and responsibility
 - SG15 & OIF: ASON architecture and requirements
 - SG15 & IETF: Protocols MIBs and info models