IETF Network Slice Topology YANG Data Model

draft-liu-teas-transport-network-slice-yang-09

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Updates since IETF-118 (1)

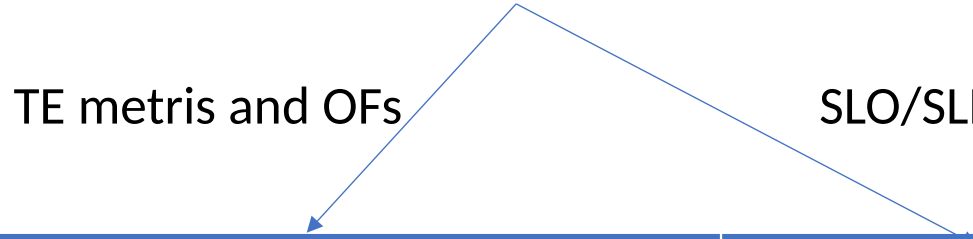
- Changed customized topologies into customer intent topology
  - Represent a better way to express resource reservation preference
  - The topology intent is provided by customer not exposed by service provider
- Clarified relationship with TE-based Topology
  - Using multi-inheritance the model can be combined with other TE topology models even technology-specific, allowing the creation of customer intent topology tailored to specific requirement
- Clarified relationship with SAP Topology 2 distinct purposes
  - SAP model is exposing to customer an abstract view of the provider NW including a list of Service Attachment Point(SAP) where customer service can be connected.
  - In contrast customer intent topology captures a customer's intentions and provider act as the recipient of these intents

Updates since IETF-118 (2)

- Described relationship with ACTN VN (see next slide)
  - [I-D.ietf-teas-ietf-network-slices] defining IETF NS as collection of connectivity-constructs strictly recall the VN type 1 definition of VN
  - [I-D.ietf-teas-ietf-network-slice-nbi-yang] adding a reference to a customer intent topology strictly recall the VN type 2 but without specifying the explicit use of the underlay topology
  - This model is complementing what described in [I-D.ietf-teas-ietf-network-slice-nbi-yang] adding the possibility to customer to define intent topology tailored for their network slices

Relationship between VN and NS

Approaches to express customer intent



Requirements	VN Solution Set	NS Solution Set
Connectivity Intent	VN Type 1 Model	NS Service Model
Connectivity Constraints	VN Type 2 Model	GAPs
Topology Intent	TE Topology Model (underlay)	

See Appendix D of draft-ietf-teas-ietf-network-slice-nbi-yang-09

Open Issue: how many models/drafts?

Requirements	Option 1 (Current status)	Option 2	Option 3	Option 4	Option 5
Connectivity Intent	NS Service Model (NS NBI I-D)	NS Service Model (NS NBI I-D)	NS Service Model (NS NBI I-D)	NS Service Model (NS NBI I-D)	NS Service Model (NS NBI I-D)
Connectivity Constraints (*)	NS Topology Model (This I-D)		NS Path Constraints (NS NBI I-D)	NS Path Constraints (This I-D)	NS Path Constraints (New I-D)
Topology Intent		NS Topology Model (This I-D)	NS Topology Model (This I-D)	NS Topology Model (This I-D)	NS Topology Model (This I-D)
	Two models Two I-Ds	Two models Two I-Ds	Three models Two I-Ds	Three models Two I-Ds	Three models Three I-Ds

(*) Constraints to be provided for each connectivity-construct

Next Steps

- Address comments / questions
- Request for WG adoption

* GitHub Repo
  https://github.com/aguoietf/ietf-network-slice-topology

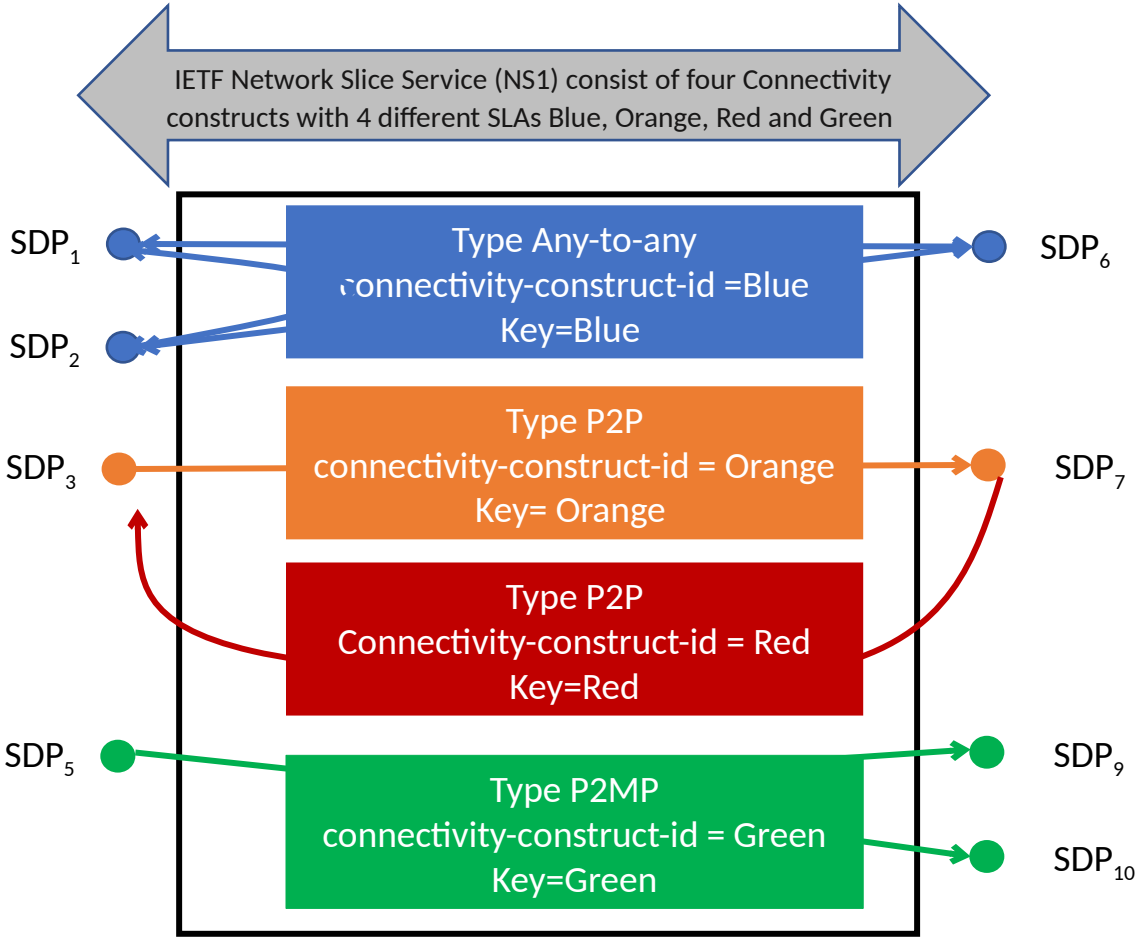
Thank You!

Backup Slides

Motivation of a customer for expressing topology intents

- Build the logical view of the desired slice service (and its parts)
  - Impact on realization -> hints for the NSC on how to instantiate the slice service
- Operate the slice service according to the expressed topology
  - Impact on control of the slice -> out of scope

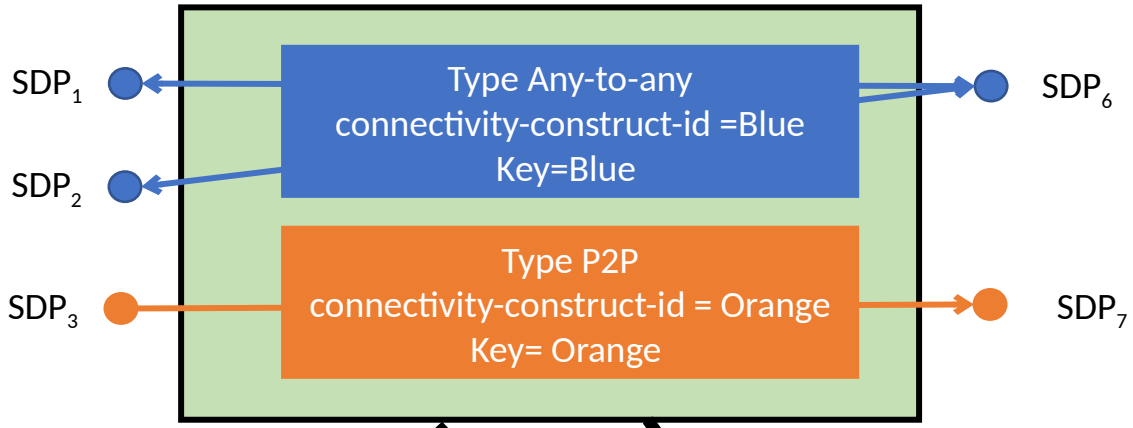
RFC9543 Network Slice Connectivity Constructs



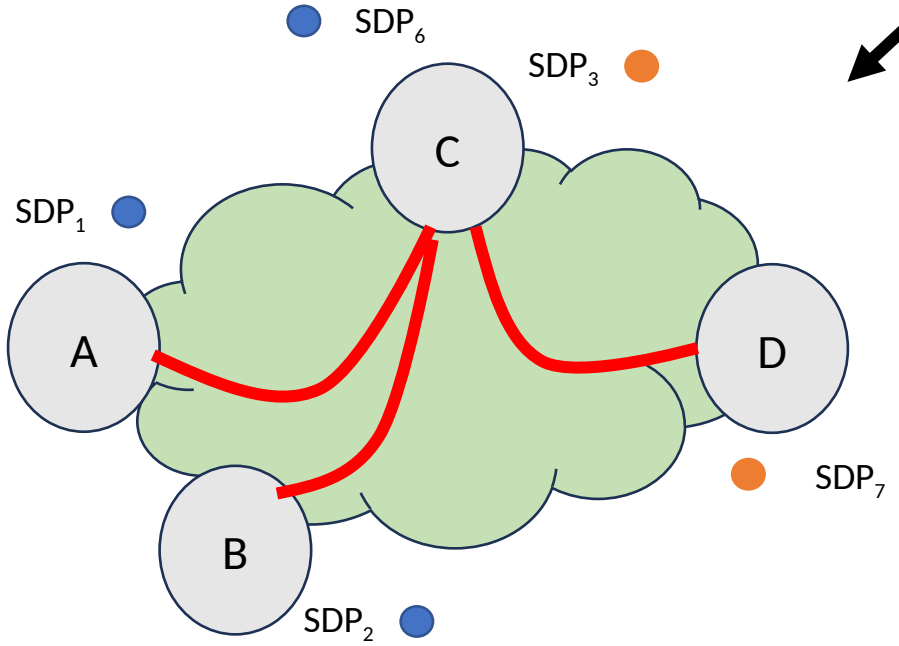
Modelling as NS framework definition

- This is what is currently in the framework draft!
- Multiple connectivity constructs
- SLO of each connection is different
- Each CC is one entry (i.e., connection)
  - CC Blue: Src{1,2,6} Dst{1,2,6} with SLO Blue
  - CC Orange: Src{3} Dst{7} with SLO Orange
  - CC Red: Src{7} Dst{6} with SLO Red
  - CC Green: Src{5} Dst {9,10} with SLO Green
- Connectivity construct Key = {new connectivity-construct-id} (i.e. Blue, Orange, Red, Green)
  - Note: connection type is not part of the key

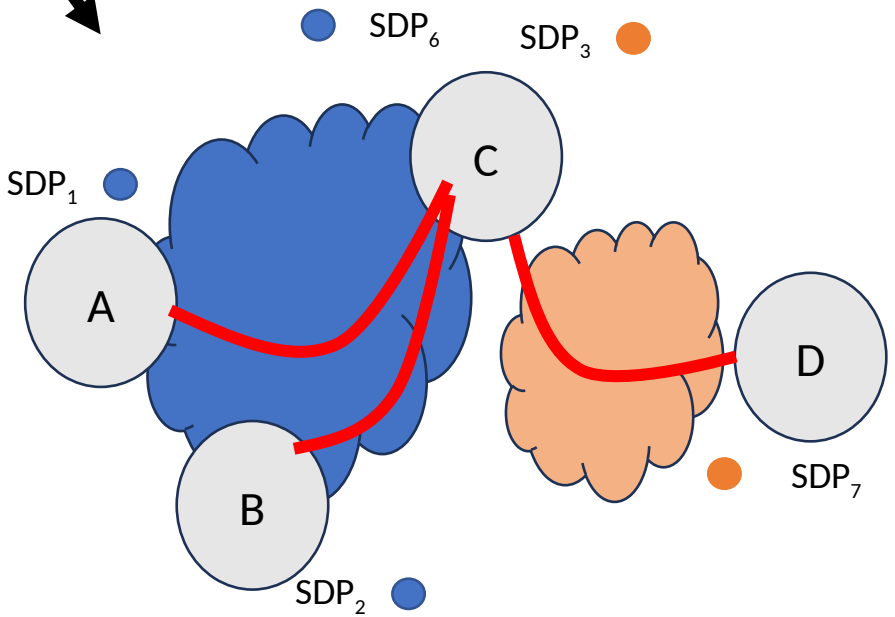
Example



w/o customer topo



With customer topo



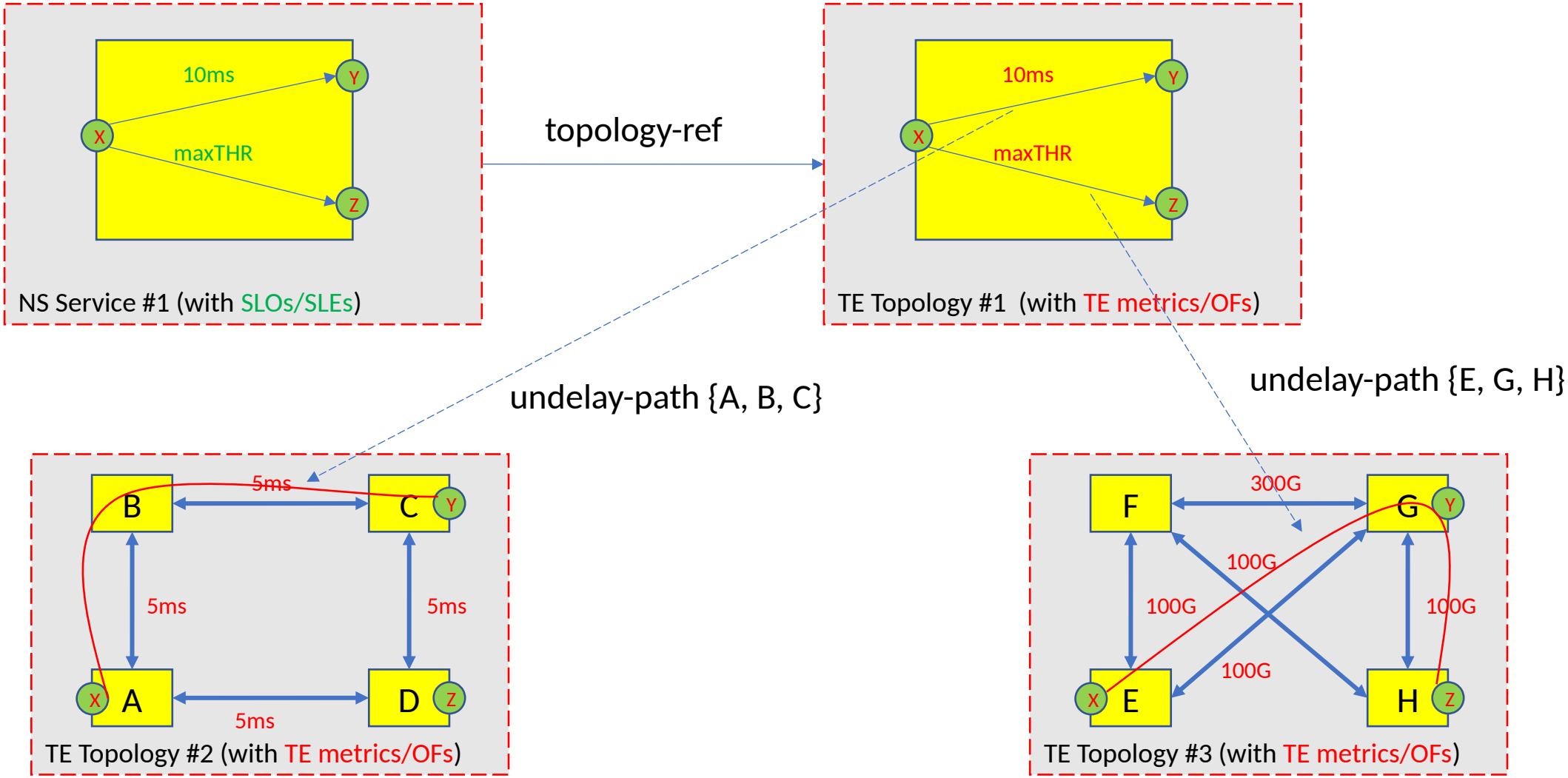
- Resources may be allocated in the same NRP w/o customer topology
- Adding DU nodes could affect the CU-UPF connections

- Resource isolation and resource reservation between DU-CU and CU-UPF based on network planning using forecast of demand traffic matrix
- On-demand addition of DU-CU connections based on planning

NS Current Solution (topology)

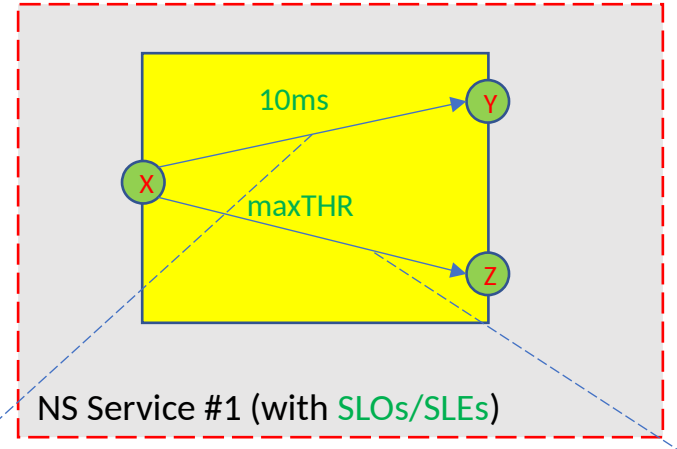
SDPs: {X, Y, Z}
connectivity-constucts: {X-Y, X-Z}

LTPs: {X, Y, Z}
CM entries: {X-Y, X-Z}



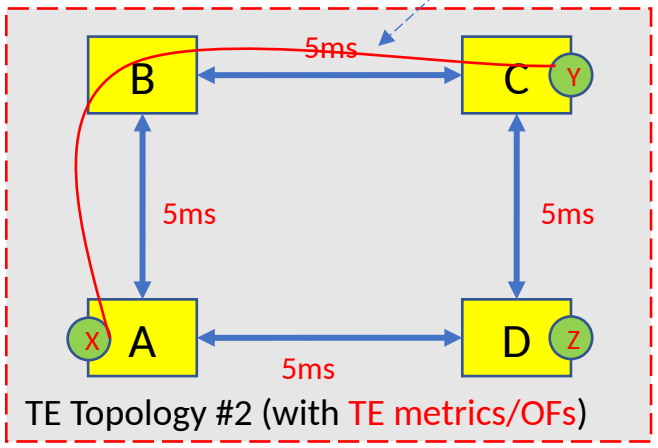
Alternative solution

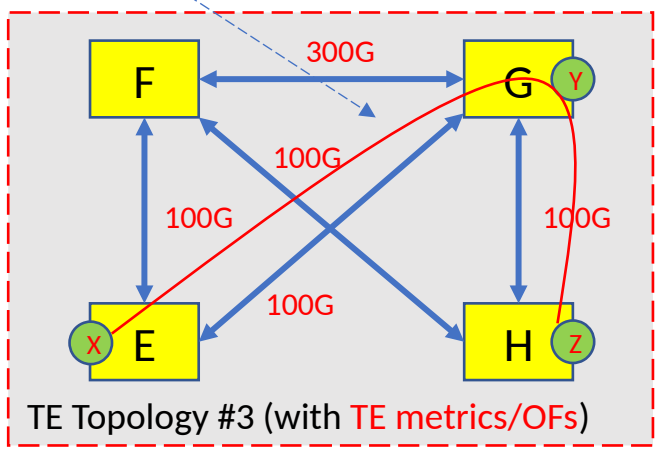
SDPs: {X, Y, Z}
connectivity-constucts: {X-Y, X-Z} with SLO/SLE



path-constraints {A, B, C}

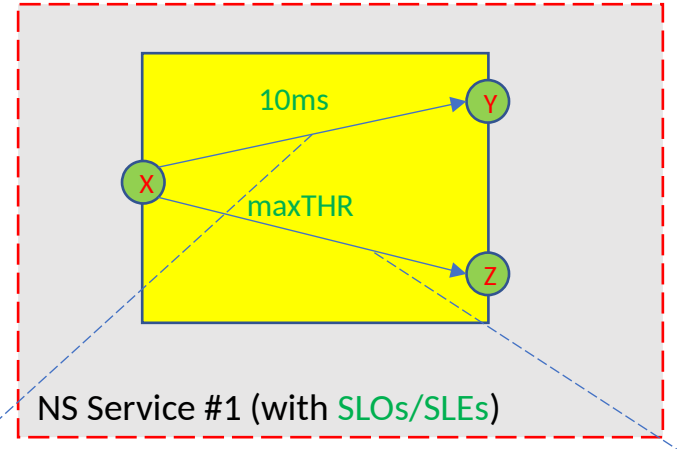
path-constraints {E, G, H}





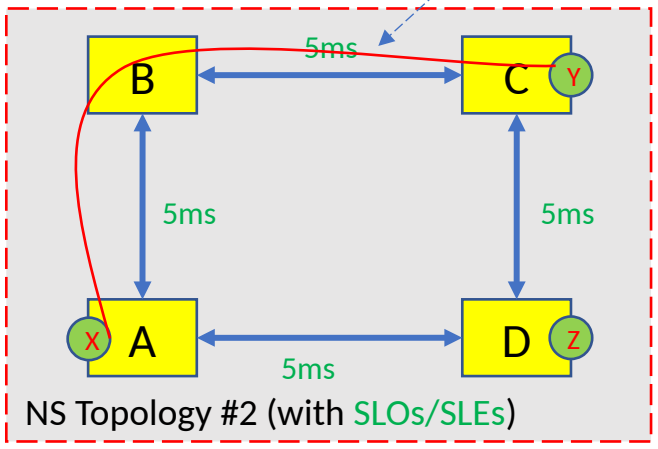
Proposed solution

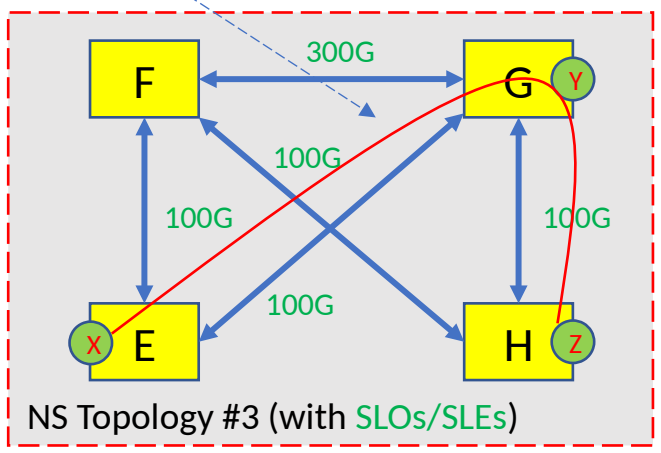
SDPs: {X, Y, Z}
connectivity-constucts: {X-Y, X-Z} with SLO/SLE



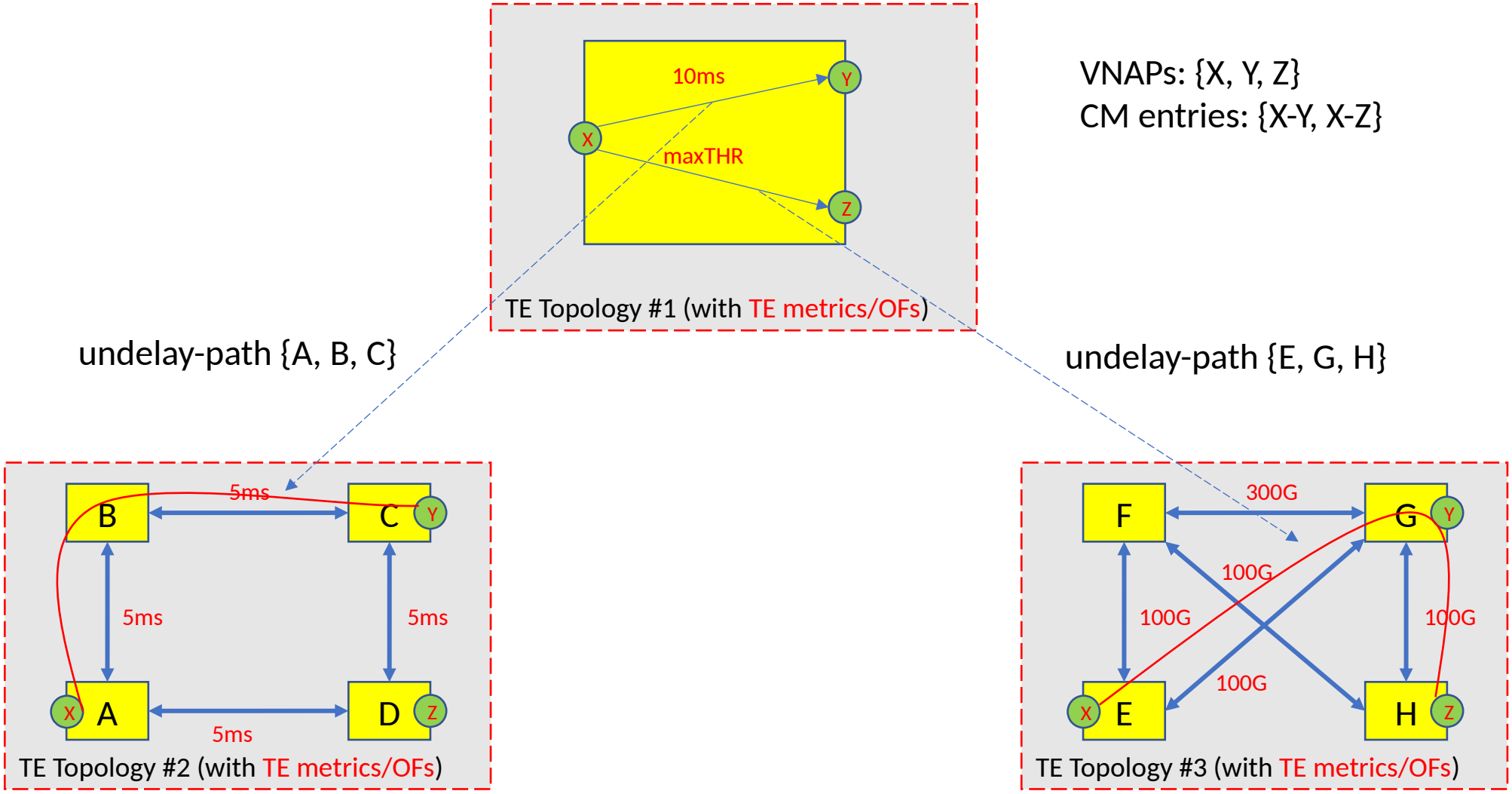
path-constraints {A, B, C}

path-constraints {E, G, H}





VN Solution


10ms
Y
X
maxTHR
Z
TE Topology #1 (with TE metrics/OFs)
VNAPs: {X, Y, Z}
CM entries: {X-Y, X-Z}
undelay-path {A, B, C}
undelay-path {E, G, H}
5ms
B
C
Y
5ms
5ms
X
A
D
Z
5ms
TE Topology #2 (with TE metrics/OFs)
300G
F
G
Y
100G
100G
100G
100G
X
E
H
Z
TE Topology #3 (with TE metrics/OFs)