ACTN Information Model

draft-leebelotti-teas-actn-info-02

IETF 95 – Buenos Aires

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ACTN Model background

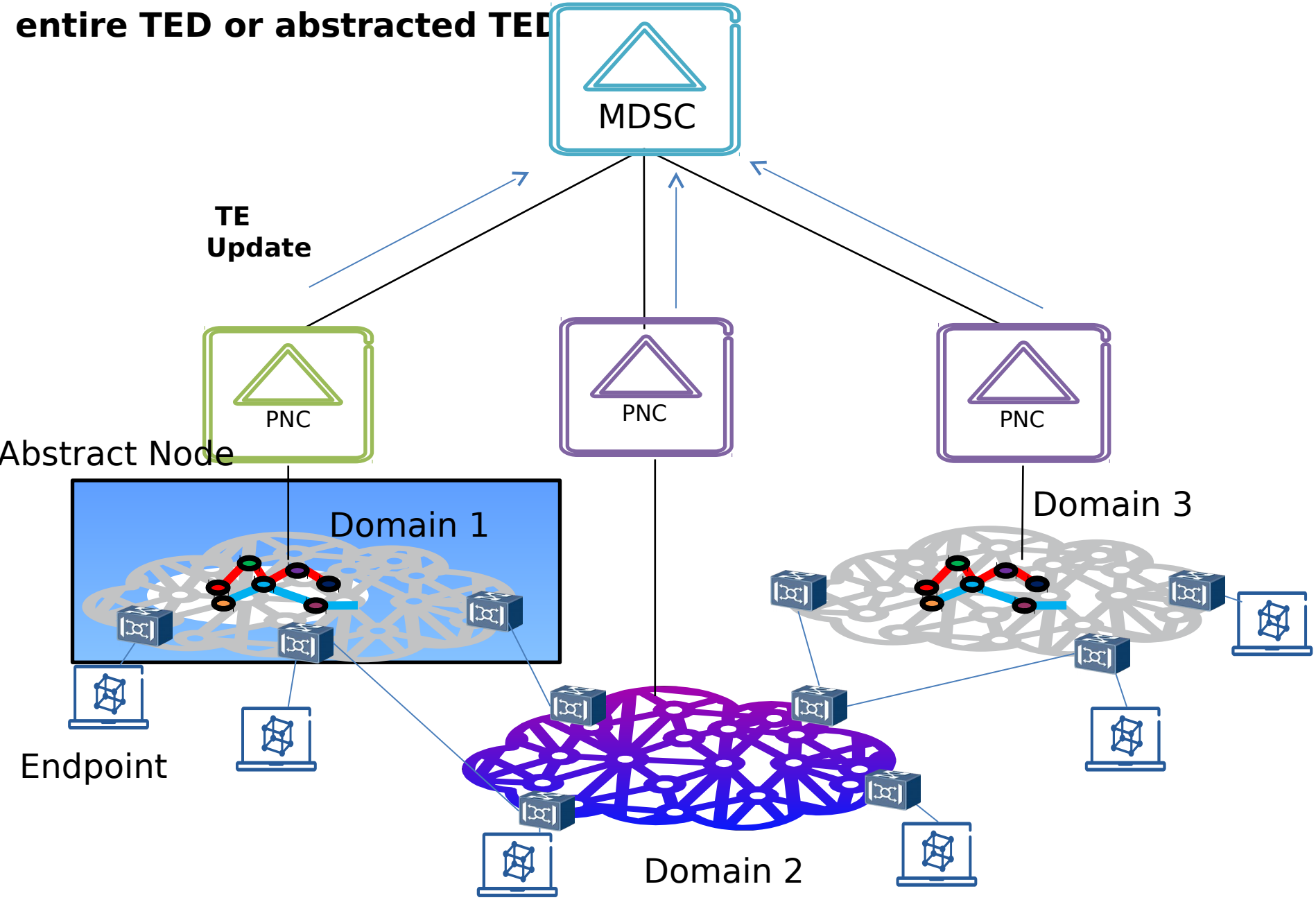
- The model is described in terms of
  - Action Primitives : they are basic actions needed to support different ACTN network control functions e.g. network topology request/query , VN service creation/deletion/modifications, path computation, VN service policy negotiation/enforcement
  - Objects and their properties (attributes) : the object represents ACTN resources needed to be exchanged along interfaces and used in the context of primitives.

Updates from version 1

- Added new primitive “TE Update” , MPI specific, to provide TE resource update between any PNC to MDSC
- VN Instantiate and VN Path Compute refinement
- Complete with new definitons
  - Virtual Network definition
  - Abstract topology
- VN Object section update
- Adding first proposed mapping between VN Primitives with VN objects (still on going)

E Update (for TE resource)

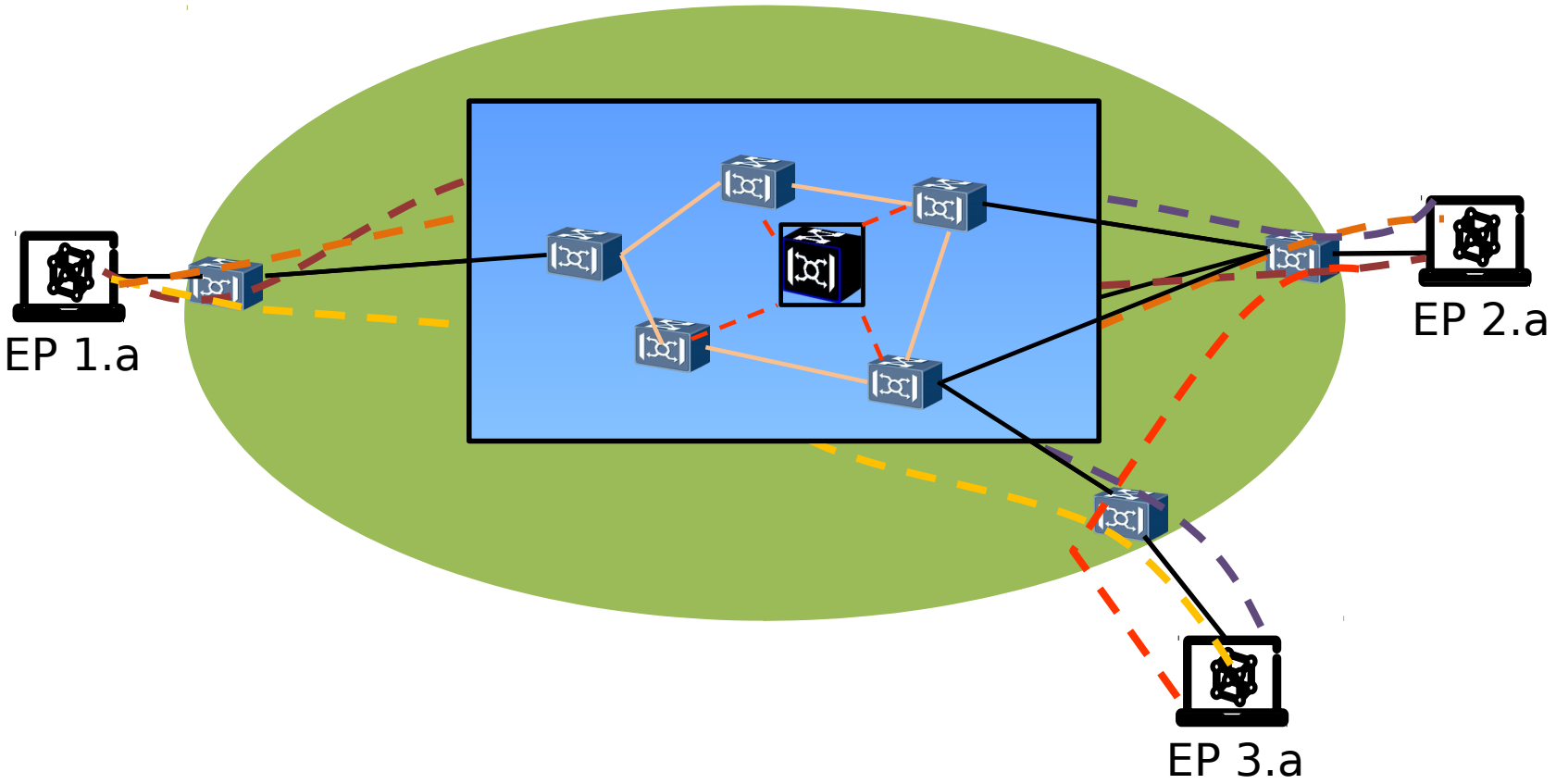
entire TED or abstracted TED



VN Definition

- A Virtual Network is a client view of the transport network. It is composed by a set of physical resources sliced in the provider network and presented to the customer as a set of abstract resources i.e. virtual nodes and virtual links. Depending on the agreement between client and provider a VN can be just represented by how the end points can be connected with given SLA attributes(e.g., re satisfying the customer's objectives), or a pre-configured set of physical resources or can be created as outcome of a dynamic request from customer.
  - In the first case can be seen as an (or set of) e2e connection(s) that can be formed by recursive aggregation of lower level connections at provider level. Such end to end connections include: customer end points, access links (physical or virtual), intra domain tunnels and inter-domain link (physical or virtual).
  - When VN is pre-configured is provided after a static negotiation between customer and provider while in the third case VN can be dynamically created, deleted, or modified in response to requests from the customer. This implies dynamic changes of network resources reserved for the customer.
  - In the second and third case, once that customer has obtained his VN, can act upon the virtual network resources to perform connection management (set-up/release/modify connections).

Virtual Network



Action Primitives

VN Action	Description
VN Instantiate	Customer/application (C/A) requires their VNs (1)
VN Modify	C/A request for modification of an VN (1)
VN Delete	C/A request to delete a VN (1)
VN Path Compute	C/A request for a priory exploration to estimate network resource availability before making a VN instantiate decision (1) (2)
VN Query	Permit to get topology view (pull model)
VN Update	Refers to any update to the VN that need to be reported to the subscribers (push model)
TE Update	TE update from any PNC to MSDC (complete or abstracted fileterd view of TEDB)

(1) This primitive can also be applied from an MDSC to a PNC requesting a VN (if the domain the PNC supports can instantiate the entire VN) or a part of VN elements

(2) This action is also necessary for an MDSC to PNCs in determining end-to-end multi-domain paths, in this case a double-stage PC is first on the abstracted end-to-end network view (happening at CNC-MDSC), and on the second stage it shall be expanded by each PNC.

Objects

Objects	Desctiption
VN Identifier	Unique VN identifier
VN Objective Function	Traffic matrix , type of service (p2p, P2mp..etc)
VN End-Point	VN's customer end point characteristics
VN Suvivability	VN protection attributes and suvivability policy enforced by C/A e.g. Local Reroute Allowed, Push Allowed, …
VN Action status	Result of a VN action
VN Associate LSP	LSPs associated per domain from PNC to MSDC in the context of VN Update . The parameter reports instantiated LSPs associated to a specific VN created in responce to a CNC request .
VN Service Preference	It refers to End Point Location's support for certain VNF (security, firewall) , client-specific preference enforcement to permit correct selection from the network of the destination related at the indicated VNF .

Mapping of Primitives with Objects(on going)

<VN Instantiate> ::= <VN Identifier>
[<VN Objective Function>]
<VN End-Point>
[<VN Survivability>]
[<VN Service Preference>]

<VN Modify> ::= <VN identifier>
[<VN Objective Function>]
<VN End-Point>
[<VN Survivability>]
[<VN Service Preference>]

<VN Delete> ::= <VN Identifier>

<VN Update> :: = <VN Identifier>
<VN Associated LSP>

<VN Path Compute Request> ::= <VN Identifier>
[<VN Objective Function>]
<VN End-Point>
[<VN Survivability>]
[<VN Service Preference>]

<VN Path Compute Reply> ::= <VN Identifier>
<VN Associated LSP>

<VN Query> ::= <VN Identifier>

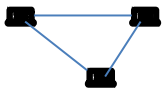
<VN Query Reply> ::= <VN Identifier>
<VN Associated LSP>

Next Steps

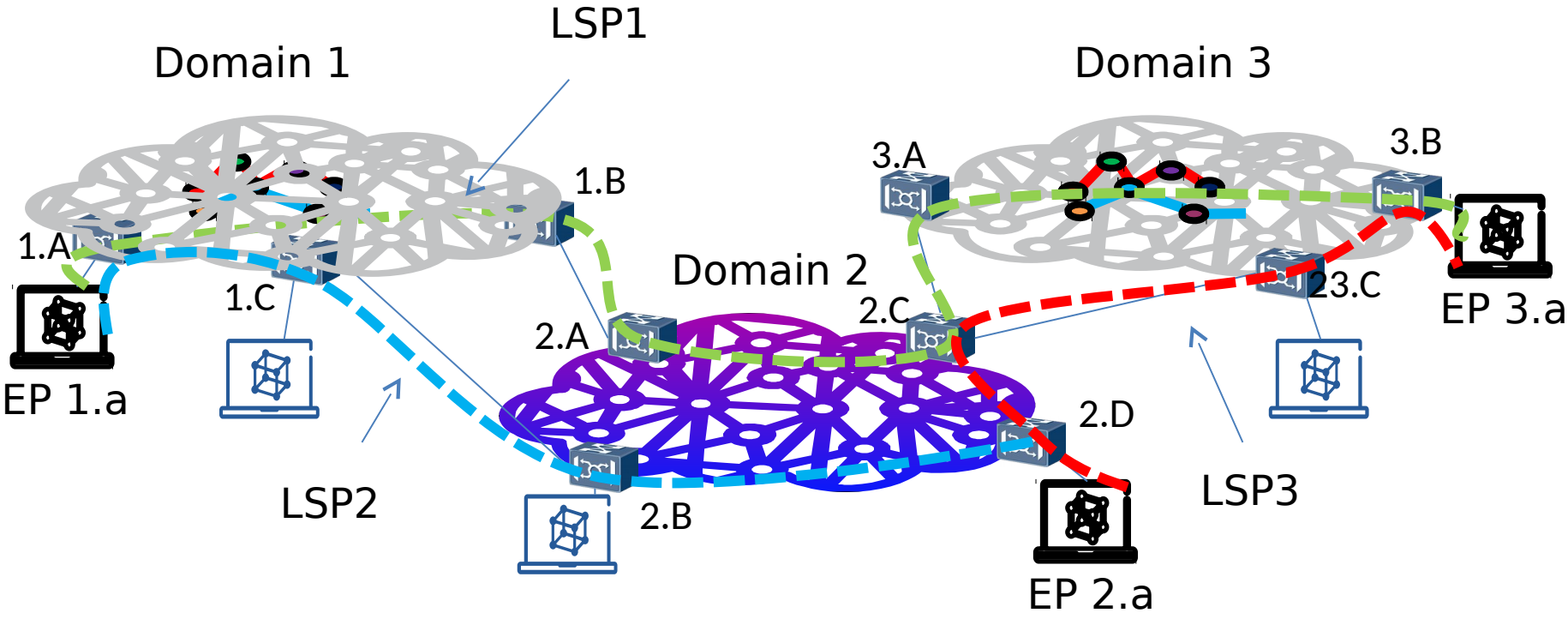
- Co-authors believe the base work is ready for WG adoption
- Continue to work on refinements, e.g. proposed mapping of objects to specific action primitives to check completeness against new primitives and definitions
- Begin to work on solution drafts based on the info model/requirements drafts.

BACKUP

How to represent a VN



VN Traffic Matrix is a set of E2E connectivity (in a simplest form)



- Need a unique VN ID to which three LSPs belong.
- Three End-to-End LSPs:
  - LSP1: {EP1.a- 1.A- 1.B- 2.A- 2.C- 3.A- 3.B- EP3.a}
  - LSP2: {EP1.a- 1.C- 2.B- 2.D – EP2.a}
  - LSP3: {EP2.a – 2.D- 2.C- 3.C – 3.B – EP3.a}

Why an information model?

- The aim of this draft is to provide a conceptual view of the information needed to be exchanged on the defined ACTN interface to cover the requirements contained in

  http://datatracker.ietf.org/doc/draft-ietf-teas-actn-requirements/
- This to prevent ambiguity when a specific data model/protocol will be used to implement the ACTN interfaces since interface implementation is derived from the same semantics.
  - All ACTN interfaces (e.g., MPI&CMI) and derivative thereof could be implemented with one common model