YANG Data Model for SD-WAN VPN service model delivery

draft-sun-opsawg-sdwan-service-model-01

Qiong Sun
China Telecom

Bo Wu (presenter)
Qin Wu
Huawei Technologies

Status Update from IETF 102

- This draft defines a SD-WAN VPN service model
  - Deliver SD-WAN VPN services by provisioning the CE devices on behalf of the customer.
  - Provide multiple access, security and visibility for WAN traffic, management complexity simplification.

- Presented in IETF 102 Montreal and proposed by China telecom based on their deployment experience, got a few feedback from opsawg community
  - Agreed it was a good starting point and had synergy with ONUG.
- A dedicate slot in rtgwg session in IETF 102 for SD-WAN
  - ONUG Open SDWAN Exchange API progress was updated (Steve Wood)
  - An IETF work on Interconnecting Underlay with Cloud Overlay was discussed (Linda Dunbar)
- Changes since previous version
  - Reference Update
  - Model re-structure and security and QoS policy reclassification
  - Change segment network into subVPN

Motivation

- Functionality of **CE-based VPN** described in RFC 4110(Provider provisioned VPN Framework) provides foundation for SD-WAN technology
  - CE based VPN term (RFC4026)
  - CE based Model(RFC4110)

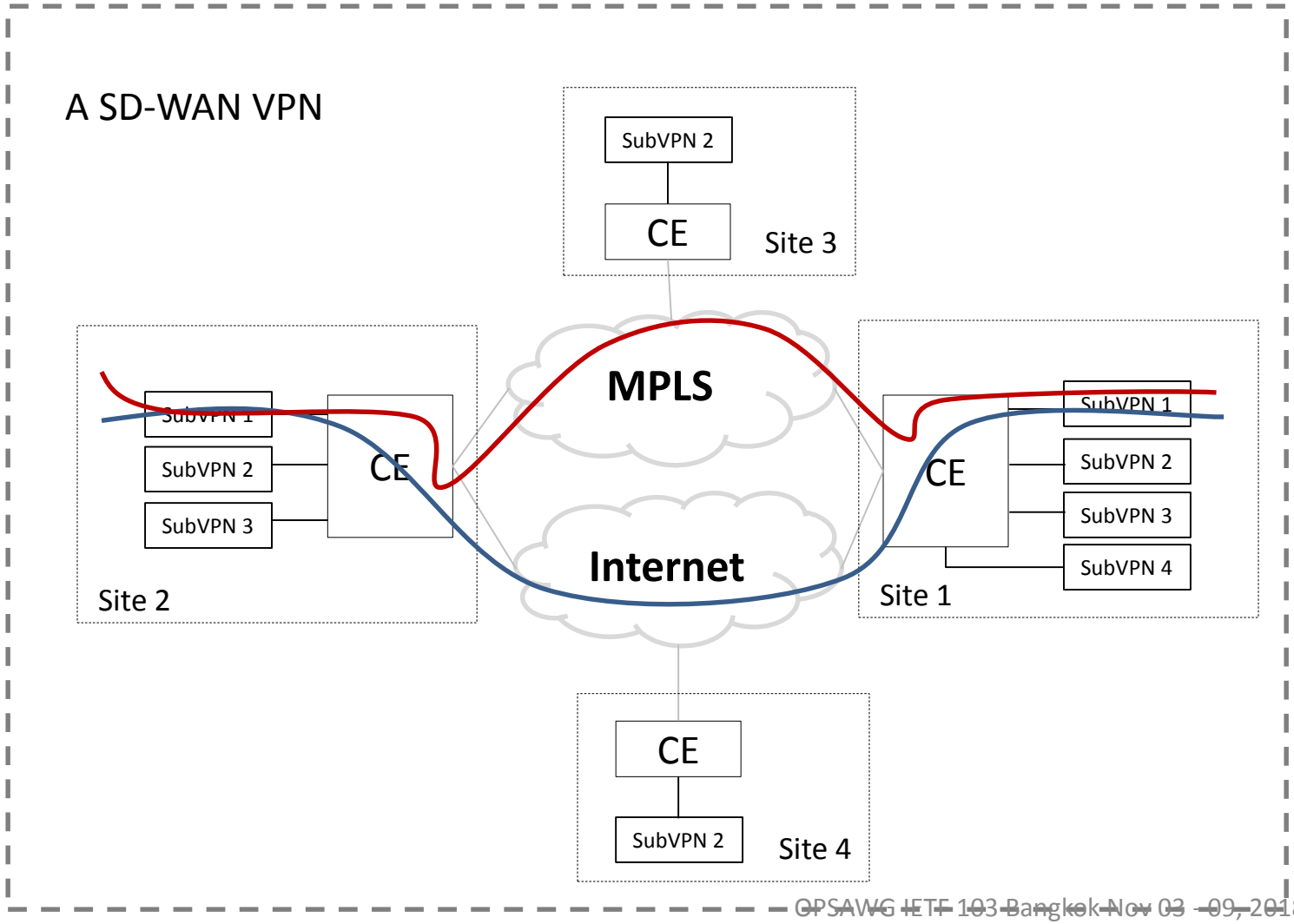
- A set of SD-WAN related work going on in different IETF WG and looking into various technology specific use cases and functionalities in the control plane and forwarding plane, there is no work to document common requirements:
  - **SR for SD-WAN**: draft-dukes-spring-sr-for-sdwan
    - CE of SD-WAN could be attached to **Internet or MPLS network**
    - CE can make **L3-L7 flow classification** and **steer the flow of different SLA to different path**.
  - **Secure L3VPN**: draft-rosen-bess-secure-l3vpn specifies a C-PE term, that CE can offer fine granularity virtual network separation, with BGP as control plane to advertise virtual network routing.
  - **controller based IPSEC VPN** ： Compared to conventional peer to peer model, controller based IPSEC VPN approaches are in study
    - draft-ietf-i2nsf-sdn-ipsec-flow-protection-02, Netconf central management
    - draft-carrel-ipsecme-controller-ike, BGP or Netconf both could be candidate controller

- L3SM defines L3VPN service model between Customer and Service provider but focus on CE-PE connectivity in a site and site to site network connectivity rather than CE-CE WAN connectivity.

Proposal

- Based on CE-based VPN
  - Provide a common framework and understanding for SD-WAN
  - Document common requirements and functionalities applicable to various SD-WAN use case defined in various IETF drafts.
  - With Additional functionality of **CE-based VPN** described in RFC 4110(Provider provisioned VPN Framework)
    - Hybrid WAN connection
    - Different SLA path steering
    - Multi-tenant separation inside a VPN
  - Allow common and unified management and configuration with various different underlying technology in control plane and forwarding plane

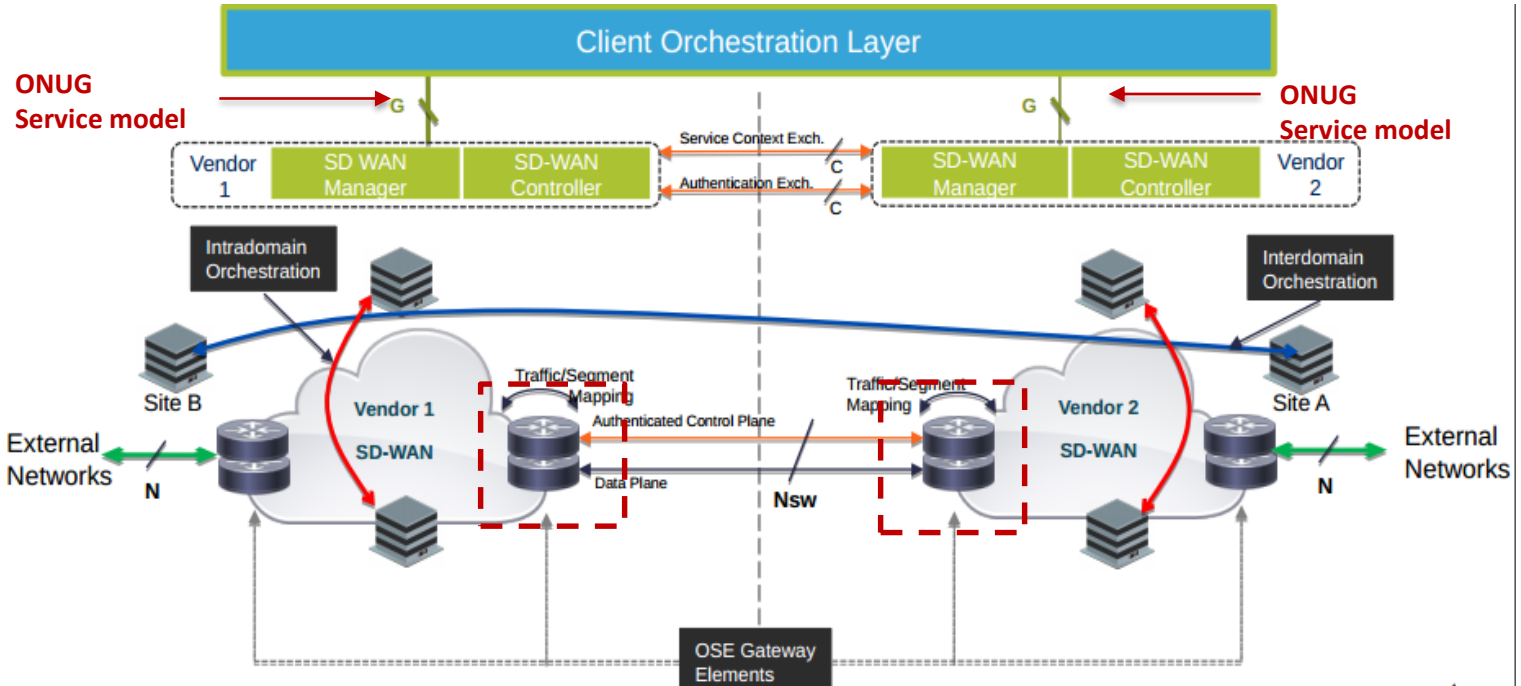
SD-WAN VPN Service overview

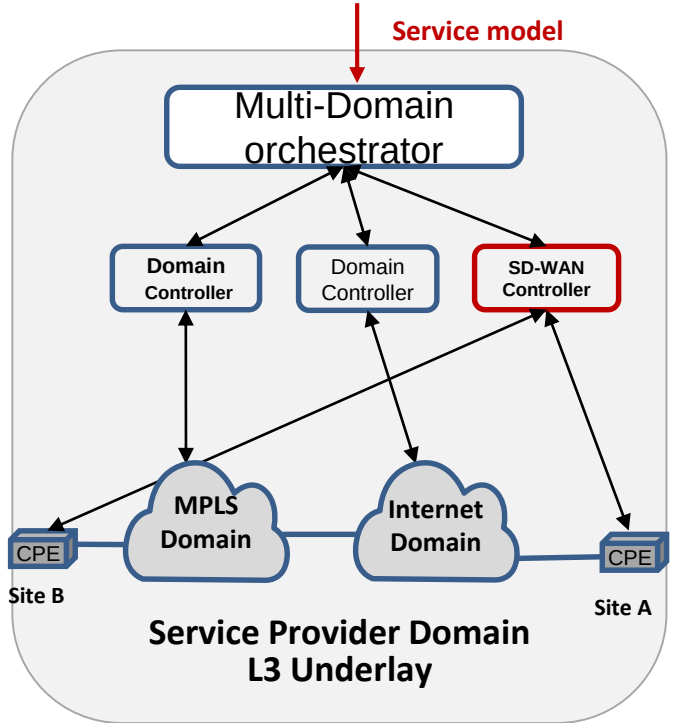


- A SD-WAN VPN includes
  - Two or more sites
    - Each site has one or more CE devices
      - Each device could connect to MPLS or Internet(SR-for-SD-WAN)
  - One ore more SubVPN
    - Each SubVPN has its own topology and policy(secure-L3VPN)
    - L3-L7 flow classification(SR-for-SDWAN)
    - Multi SLA path steering classification(SR-for-SDWAN)

Difference with ONUG service model

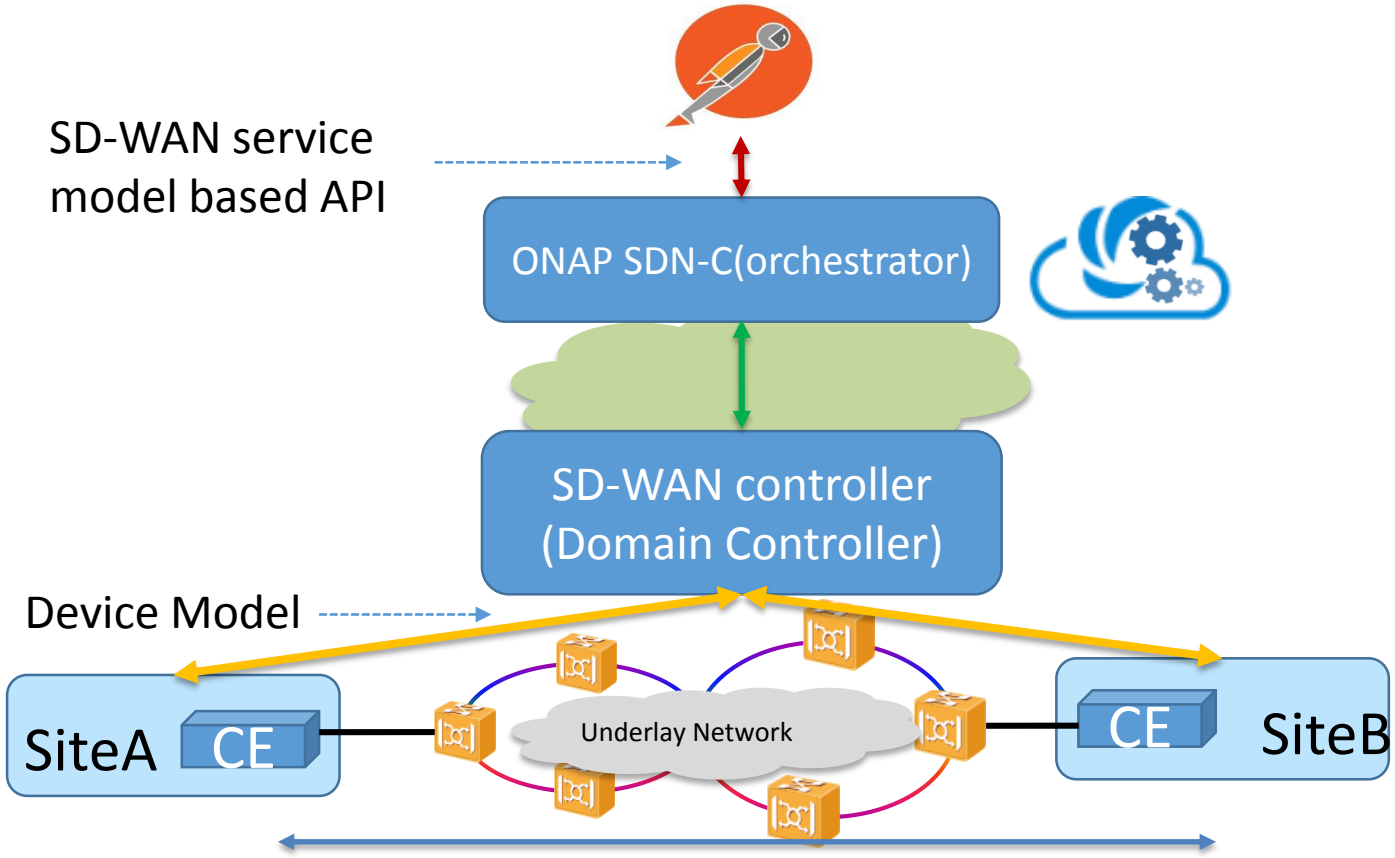
- ONUG service model(ONUG OSE API Interworking progress) is used for service interworking between SD-WAN vendor domains inside a enterprise network :
  - OSE Gateway Service API for reachability : Gateway Service creation, interface configuration, segmentation instance creation, cross-connect
  - OSE **Path Management** Service API: Flow classification, SLA definition, Preferred path selection
- The SD-WAN service model is used to define connectivity service and support multiple domain service orchestration (similar to L3SM) in a service provider network, which could provide abstraction of path management service and reachability service.
  - SD-WAN VPN management： site configuration, subVPN configuration and application aware **path selection policy**



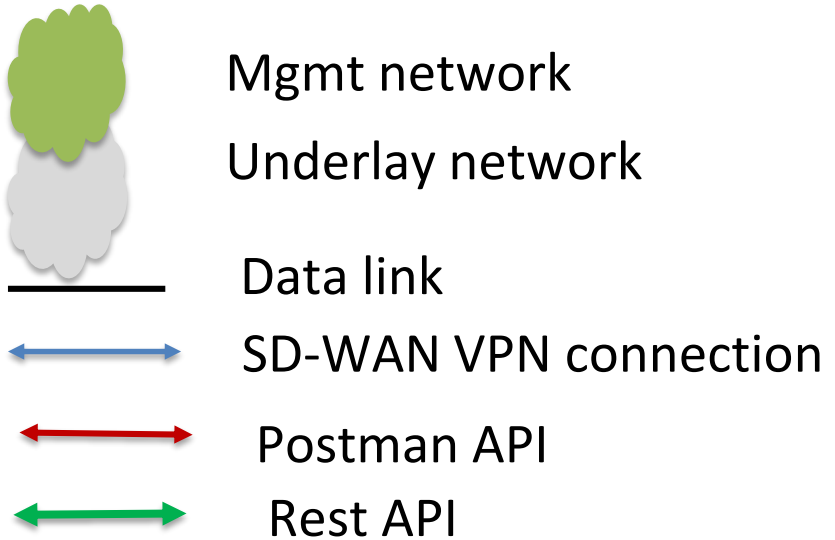


ONAP SD-WAN VPN service automation@ IETF 103 hackathon

- Verify SD-WAN service YANG to create a SD-WAN VPN service



- **Participating components**
  - **Service Configuration API**
  - **ONAP SDN-C**
  - **SD-WAN controller**
  - **Physical CE， virtual CE**



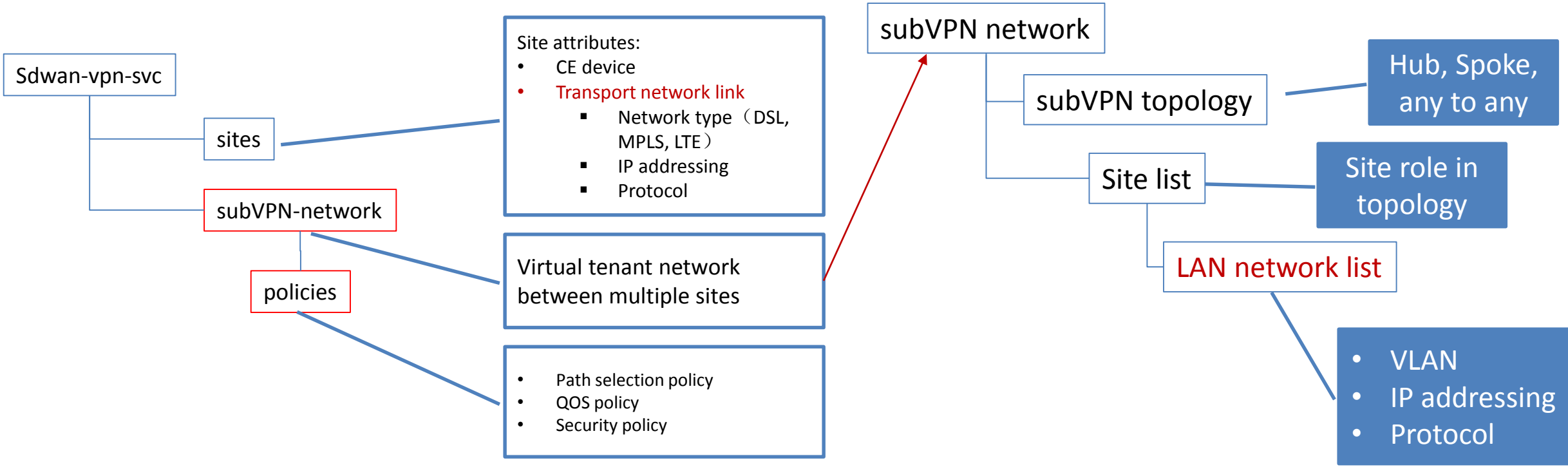
Next steps

- The authors appreciate thoughts, feedback, and text on the content of the documents.
- We have demonstrated SD-WAN model usage using ONAP open source in IETF 103 Hackathon.
- Adoption request?

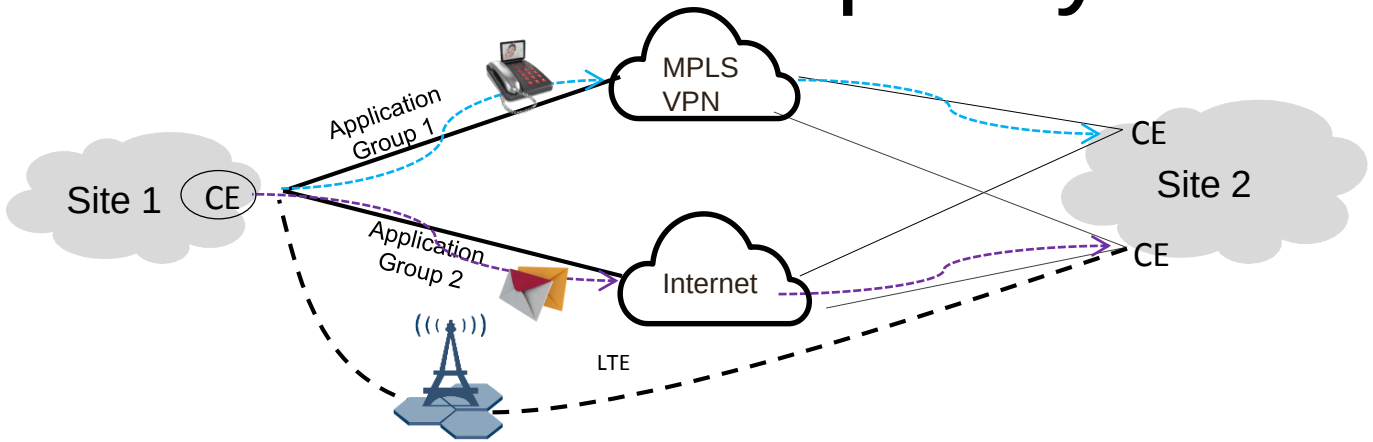
Backup slides

Model Design

- An abstraction of Service requirements to set up the service, no specific detail regarding protocol and element detailed configuration
- SD-WAN VPN model takes same path as L2SM and adopt a similar model structure as L3SM, but add two major components:
  - Site： extended with **multiple transport network links**
  - **subVPN network**: Customer could have multiple virtual network which are not allowed to communicate with each other
  - **Policies:** Policy could be applied per subVPN in application or flow granularity



Path selection policy



Application or flow classification → Path selection : Primary path Secondary path ← Path-selection-profile-> Application SLA Measurement

- Path selection policy main parameters
  - Customers define their own applications and flow classification
    - Voice, video, game, critical data
  - Application or flow SLA
    - monitor the delay, jitter or packet of application or flow
  - Path selection: based on the status, steer the traffic to appropriate transport network link