DC aware TE topology model

draft-llc-teas-dc-aware-topo-model-04

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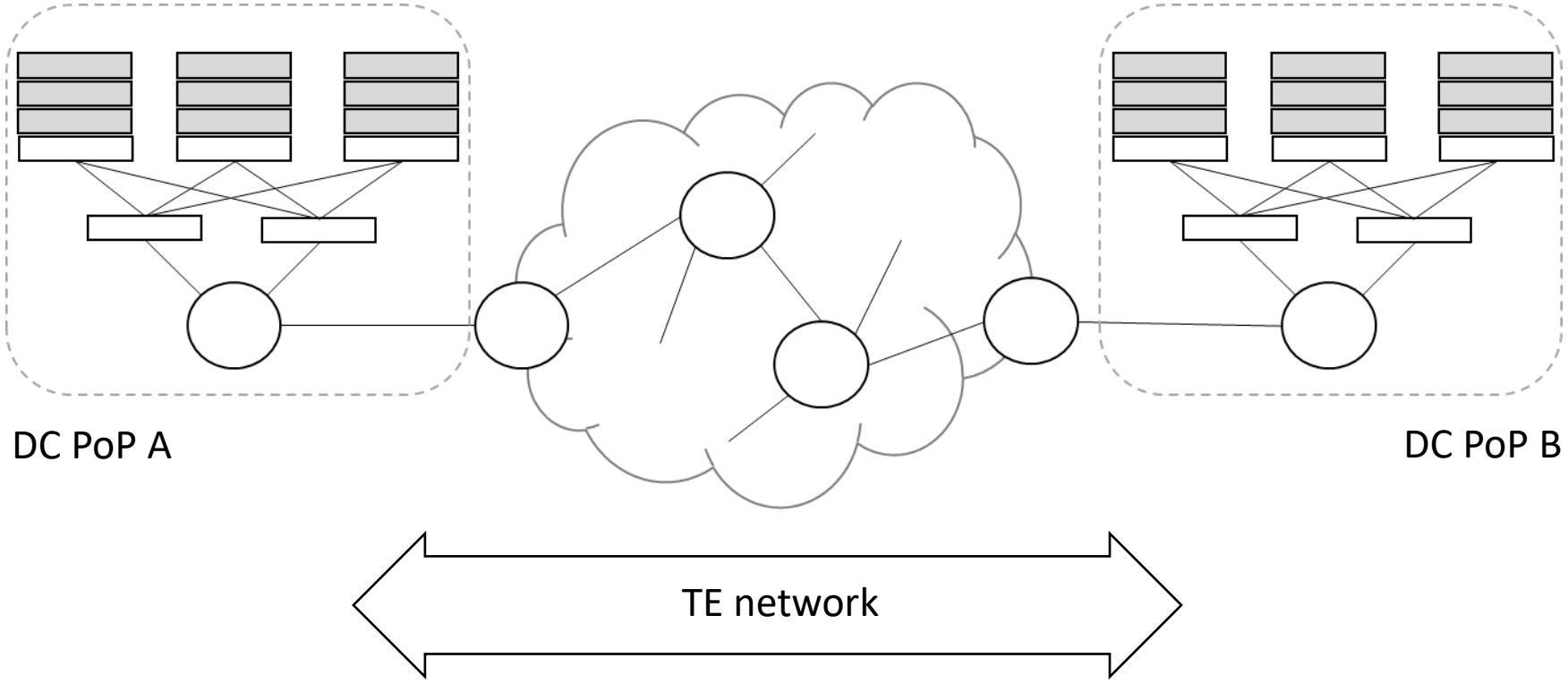
Problem statement

- Wide deployment of computing facilities across service provider's Networks, in the form of DC PoPs (as edge and/or central cloud)
- Interesting **to have joint topological view of both networking and computing resources** available to assist on **TE decisions that could require combined awareness of network and compute domains**
- Similar approach as the one followed in *draft-ietf-teas-sf-aware-topo-model* but concentrated on available DC resources instead of functions



- DC PoPs described in terms of resource capabilities such as CPU, memory, storage, etc
- Alternatively, they could be described in terms of resource bundles (quotas, flavors)

Flavor	vCPU	RAM	Storage	Bandwidth
.tiny	1	512 MB	1 GB	1 Gbps
.small	1	2 GB	20 GB	1 Gbps
.medium	2	4 GB	40 GB	1 Gbps
.large	4	8 GB	80 GB	1 Gbps
.2xlarge	8	16 GB	160 GB	1 Gbps
.4xlarge	16	32 GB	320 GB	1 Gbps
.8xlarge	32	64 GB	640 GB	1 Gbps

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- Attempt to provide a model for characterizing the resource-related information of a compute domain, in a per DC PoP basis
  - The goal is to integrate such compute information, integrated with the topological information of the network
- Cloud managers (Kubernetes, OpenStack) as means for collecting compute node information (via APIs)
- Different cloud solutions impose different ways of modelling the compute resources and assets
  - E.g., OpenStack, Kubernetes

Examples

```
module: ietf-kubernetes-info
       +--rw dcpop
          +--rw dcpop-id?   string
          +--rw dc* [id]
             +--rw kubernetes
                +--rw nodes
                |  +--rw node* [id]
                |     +--rw name                string
                |     +--rw cpu
                |     |  +--rw capacity         uint64
                |     |  +--rw allocatable      uint64
                |     |  +--rw usage            uint64
                |     +--rw memory
                |     |  +--rw capacity         uint64
                |     |  +--rw allocatable      uint64
                |     |  +--rw usage            uint64
                |     +--rw pods
                |        +--rw max-pods         uint32
                |        +--rw running-pods     uint32
                +--rw pods
                   +--rw pod* [id]
                      +--rw namespace         string
                      +--rw name              string
                      +--rw cpu
                      |  +--rw request        uint64
                      |  +--rw limit          uint64
                      |  +--rw usage          uint64
                      +--rw memory
                      |  +--rw request        uint64
                      |  +--rw limit          uint64
                      |  +--rw usage          uint64
                      +--rw status
                         +--rw phase          enumeration
                         +--rw conditions*    string
```

```
module: ietf-openstack-info
    +--rw dcpop
       +--rw dcpop-id?   string
       +--rw dc* [id]
          +--rw openstack
             +--rw compute-nodes
             |  +--rw node* [name]
             |     +--rw name                string
             |     +--rw vcpus
             |     |  +--rw total            uint64
             |     |  +--rw allocated        uint64
             |     |  +--rw used             uint64
             |     +--rw memory
             |     |  +--rw total            uint64
             |     |  +--rw allocated        uint64
             |     |  +--rw used             uint64
             |     +--rw instances
             |        +--rw max-instances    uint32
             |        +--rw running          uint32
             +--rw instances
                +--rw instance* [id]
                   +--rw id                 string
                   +--rw name               string
                   +--rw project-id         string
                   +--rw vcpus
                   |  +--rw allocated       uint64
                   |  +--rw limit           uint64
                   |  +--rw used            uint64
                   +--rw memory
                   |  +--rw allocated       uint64
                   |  +--rw limit           uint64
                   |  +--rw used            uint64
                   +--rw status
                      +--rw state           enumeration
                      +--rw conditions*     string
```

Need for the model

- Means for an optimal orchestration in the telecom-cloud network operation
- Facilitator of interoperability through proper resource abstraction
- Enabler seamless integration of cloud and network services
- Allows the exposure of combined network-cloud information
- Permits a more efficient dynamic resource allocation cross-domain (i.e., for cloud and network)