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DC aware TE topology model
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Abstract

This document proposes the extension of the TE topology model for including information related to data center resource capabilities.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on January 12, 2023.

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1. Introduction

More and more service providers are deploying cloud computing facilities in order to host different kinds of services and applications. Such facilities can be generally referred as Datacenter Points of Presence (DC-PoPs). Those DCs will consist of a number of servers and networking elements for connecting all of them with the transport network. Depending on the number of servers in the data center, there will be distinct capabilities in terms of CPUs, memory and storage available for deploying and running the aforementioned services.

In such distributed and interconnected DC-PoPs, both computing and topological information are of interest for determining the optimal DC where to deploy a given service or application.

This document proposes a DC-aware extension for the topology model.

2. Datacenter information

The relevant information for datacenter capabilities can be described in different ways. One potential manner is to describe resource capabilities such as CPU, memory, storage, etc. This can be done in terms of total, used and free capacity for each of the parameters of interest. Another form of populating the information is by describing those resource capabilities as a bundled, usually referred as quota or flavor. In this respect, reference bundles such as for example the ones proposed by the Common Network Function Virtualisation Infrastructure Telecom Taskforce (CNTT), which is an initiative jointly promoted by GSMA and the Linux Foundation [CNTT], [GSMA].

For Instance, [CNTT] identifies a number of predefined compute flavors in terms of compute resources (as virtual CPUs), memory (in terms of RAM), storage (as local disk) and bandwidth (or expected maximum throughput). Table 1 reflects the predefined compute flavors by [CNTT].

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

Table 1: Predefined Compute Flavors

Besides the predefined flavors, it is also possible to use customized (i.e. parameterized) flavors.

Additional information can refer to the management capabilities of the compute infrastructure, such as hypervisor details or virtualization technologies available.

Finally, all can be complemented with information related to the networking details for reaching the aforementioned compute capabilities (IP addressed, bandwidth, etc).

3. Model structure

```
module: ietf-dcpop-dc
    +--rw dcpop
       +--rw dc* [id]
       |  +--rw hypervisor* [id]
       |  |  +--rw ram
       |  |  |  +--rw total?   uint32
       |  |  |  +--rw used?    uint32
       |  |  |  +--rw free?    uint32
       |  |  +--rw disk
       |  |  |  +--rw total?   uint32
       |  |  |  +--rw used?    uint32
       |  |  |  +--rw free?    uint32
       |  |  +--rw vcpu
       |  |  |  +--rw total?   uint16
       |  |  |  +--rw used?    uint16
       |  |  |  +--rw free?    uint16
       |  |  +--rw instance*   -> /dcpop/dc/instance/id
       |  |  +--rw id          string
       |  |  +--rw name?       string
       |  +--rw instance* [id]
       |  |  +--rw flavor
```

```
|  |  |  +--rw disk?    uint32
|  |  |  +--rw ram?     uint32
|  |  |  +--rw vcpus?   uint16
|  |  |  +--rw bandwidth?    string
|  |  |  +--rw id?      string
|  |  |  +--rw name?    string
|  |  +--rw image
|  |  |  +--rw checksum    string
|  |  |  +--rw size        uint32
|  |  |  +--rw format
|  |  |  |  +--rw container?   enumeration
|  |  |  |  +--rw disk?        enumeration
|  |  |  +--rw id?         string
|  |  |  +--rw name?       string
|  |  +--rw hypervisor?   -> /dcpop/dc/hypervisor/id
|  |  +--rw port*         -> /dcpop/dc/network/subnetwork/port/id
|  |  +--rw project?      string
|  |  +--rw status?       enumeration
|  |  +--rw id            string
|  |  +--rw name?         string
|  +--rw image* [id]
|  |  +--rw checksum    string
|  |  +--rw size        uint32
|  |  +--rw format
|  |  |  +--rw container?   enumeration
|  |  |  +--rw disk?        enumeration
|  |  +--rw id          string
|  |  +--rw name?       string
|  +--rw flavor* [id]
|  |  +--rw disk?    uint32
|  |  +--rw ram?     uint32
|  |  +--rw vcpus?   uint16
|  |  +--rw id       string
|  |  +--rw name?    string
|  +--rw dc-monitoring-param* [name]
|  |  +--rw name            string
|  |  +--rw value-string?   string
|  +--rw network* [id]
|  |  +--rw subnetwork* [id]
|  |  |  +--rw port* [id]
|  |  |  |  +--rw ip-address?   inet:ip-address
|  |  |  |  +--rw instance?     -> /dcpop/dc/instance/id
|  |  |  |  +--rw project?      string
|  |  |  |  +--rw status?       enumeration
|  |  |  |  +--rw id            string
|  |  |  |  +--rw name?         string
|  |  |  +--rw project?   string
|  |  |  +--rw status?    enumeration
```

```
          |  |  |  +--rw id          string
          |  |  |  +--rw name?       string
          |  |  +--rw dhcp-agent* [id]
          |  |  |  +--rw enabled?   boolean
          |  |  |  +--rw pools* [ip-address]
          |  |  |  |  +--rw ip-address    inet:ip-address
          |  |  |  +--rw project?   string
          |  |  |  +--rw status?    enumeration
          |  |  |  +--rw id         string
          |  |  |  +--rw name?      string
          |  |  +--rw project?      string
          |  |  +--rw status?       enumeration
          |  |  +--rw id            string
          |  |  +--rw name?         string
          |  |  +--rw dcpop-ref?      -> /dcpop/dcpop-id
          |  +--rw ap*                    -> /actn-vn:actn/ap
   /access-point-list/access-point-id
          |  +--rw dcpop-ref?               -> /dcpop/dcpop-id
          |  +--rw id                    string
          |  +--rw name?                 string
          +--rw dcpop-id?   string
```

4. Security Considerations

The data-model in this document does not have any security implications. The model is designed to be accessed via NETCONF [RFC6241], thus the security considerations for the NETCONF protocol are applicable here.

5. IANA Considerations

This draft does not include any IANA considerations

6. References

[CNTT] "Cloud iNfrastructure Telco Taskforce Reference Model, Reference Architectures", <https://cntt.readthedocs.io/en/stable-elbrus/ref_arch/README.html/>.

[GSMA] "Cloud Infrastructure Reference Model, Version 2.0", October 2021, <https://www.gsma.com/newsroom/wp-content/uploads//NG.126-v2.0-2.pdf>.

[RFC6241] Enns, R., Ed., Bjorklund, M., Ed., Schoenwaelder, J., Ed., and A. Bierman, Ed., "Network Configuration Protocol (NETCONF)", RFC 6241, DOI 10.17487/RFC6241, June 2011, <https://www.rfc-editor.org/info/rfc6241>.

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