



IT infrastructure manageability for telco networks

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Introduction

Communications service providers (CSPs) have historically sourced their network equipment from network equipment providers (NEPs). However, these systems were closed and proprietary forcing vendor lock-in for CSPs. New paradigm shift technologies, such as Network Functions Virtualization (NFV) where software is disaggregated from hardware and telecommunication workloads are deployed on industry-standard servers, promise lower costs and flexibility in vendor choices.

The industry-standard servers and their manageability frameworks evolved to be deployed in homogeneous enterprise data centers. The same industry servers are used to deploy telecom workload such as Virtual Evolved Packet Core (vEPC) and Virtual IP Multimedia Subsystem (vIMS) in telco data centers.

Most existing data center infrastructure manageability solutions are closed, monolithic, and do not scale. Hewlett Packard Enterprise has developed an open, scalable, hierarchical infrastructure manageability architecture to support the current and future needs of CSPs for emerging use cases such as 5G and Mobile Edge Computing (MEC).

This architecture will:

- Enable interchange of standards compliant and nonstandards hardware from any vendor, thereby removing vendor lock-in across compute, storage, and the DC switch fabric
- Enable efficient intersite and intrasite resource pooling by extending beyond the equipment rack
- Enable automated service deployment and optimized workload placement based on both application requirements and infrastructure availability

CSPs will benefit from this approach by the efficiency gains of larger resource domains and higher overall infrastructure utilization.

HPE approach to IT infrastructure manageability

HPE approach is an infrastructure manageability hierarchical framework using resource aggregation (RA) layer and resource composition (RC) layer that communicates via open RESTful interfaces based on DMTF standards. DMTF's Redfish is a standard API designed to deliver simple and secure management for converged, hybrid cloud, and software-defined data center (SDDC). Both human readable and machine capable, Redfish uses RESTful interface semantics to access a schema-based data model to conduct management operations.

The RA layer includes one or more RA instances and the RC layer includes one or more RC instances, each of which is deployed off-platform from the heterogeneous software-defined infrastructure being managed. See Figure 1.

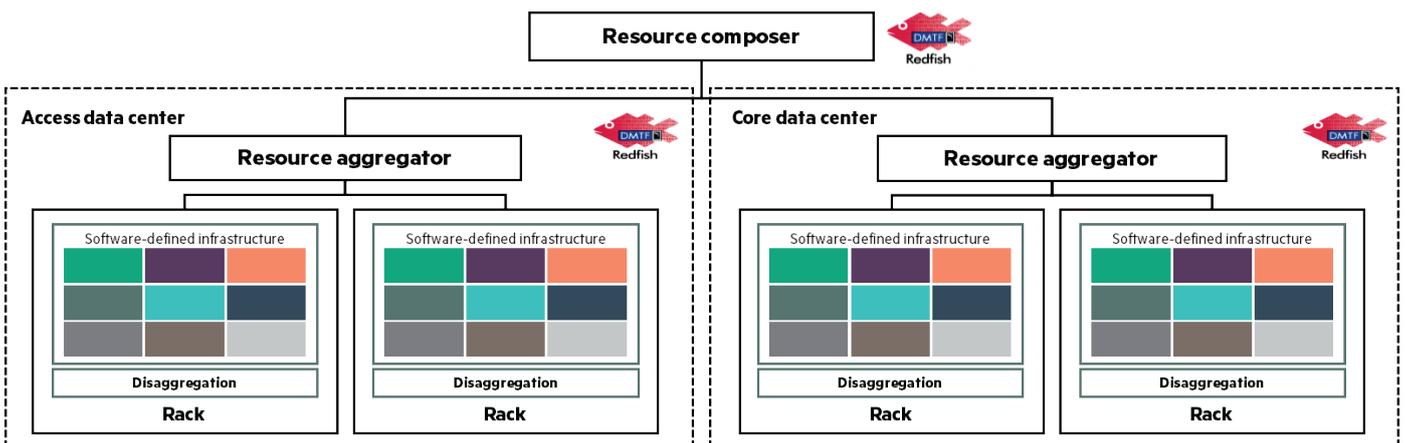


Figure 1. Hierarchical IT infrastructure manageability

Introduction of the RA layer allows for stateless management of event subscriptions to Redfish Event services (that are part of managed infrastructure elements) and exposes an aggregated northbound interface to the RC layer, hence creating a hierarchical infrastructure manageability framework. Additionally, on northbound interfaces RA acts as a proxy for batch actions on the managed infrastructure. This enables scaling, as the RC does not need to communicate with every infrastructure element it manages. Each RA provides resource visibility within and across the data centers it manages by using secure standards-based Redfish RESTful APIs.



Next-generation telecommunication networks bring unique challenges to the manageability of IT infrastructure. Some of these challenges are listed as follows:

- Manageability of infrastructure deployed across a large number of geographically distributed, diverse sites from core to network edge.
- Manageability of heterogeneous compute, storage, and networking equipment as environmental constraints such as lack of space, power, and cooling at the network edge sites require a small number of specialized, hardened infrastructure, in contrast with a large number of standardized scale-out infrastructure deployed at more environmentally conditioned core sites.

As IT infrastructure is deployed to support edge services further out in the network, multiple RCs manage resources within and across multiple edge data centers by querying one or more RAs as per Figure 2. The architecture also allows for headless deployments where the RA can manage resources that are geographically distant from its location. This is critical for environments with space and power constraints such as telecommunication cell towers.

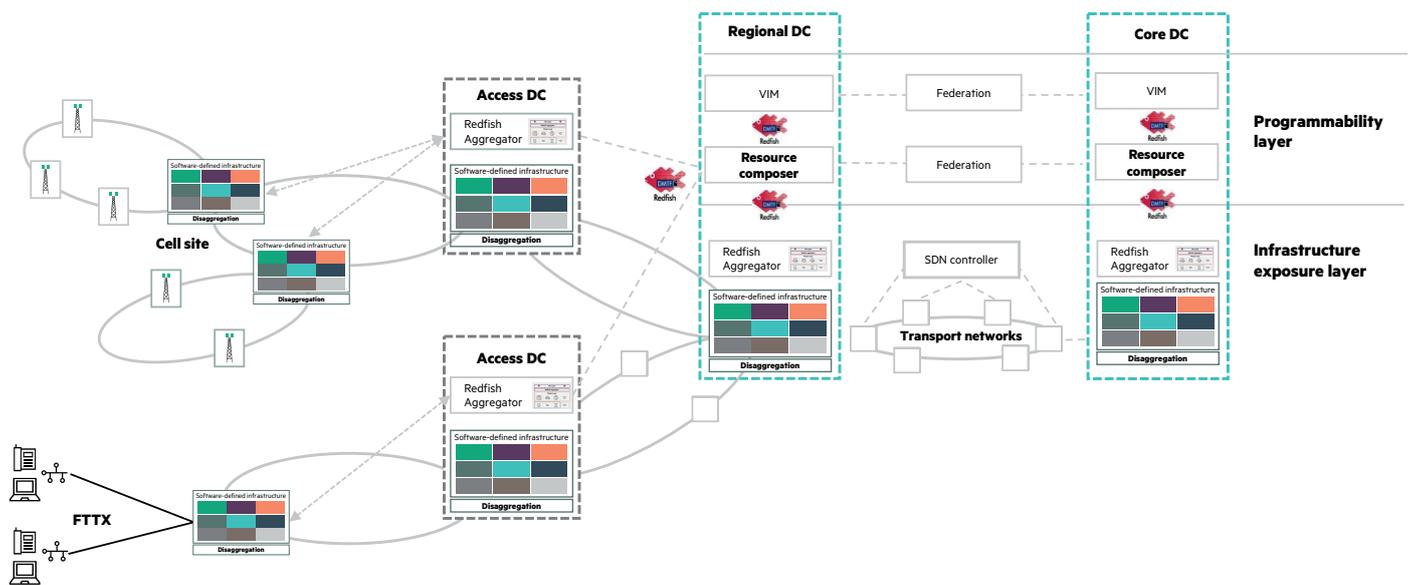


Figure 2. Hierarchical IT infrastructure manageability for distributed networks

HPE advantage

Most existing data center infrastructure manageability solutions are not open and do not scale. This is typically due to either the RC layer having to directly communicate with each infrastructure element, creating a single data center monolithic solution or the RC layer communicating with RAs that are embedded within the managed infrastructure itself. Most of these manageability solutions use vendor-specific interfaces to communicate with the managed infrastructure.

HPE approach is different from other infrastructure manageability solutions in following ways:

- HPE approach uses open, industry-standard Redfish.
- HPE approach scales as the RA layer is off-platform from the infrastructure it manages; hence, it can pool resource information across multiple racks and data centers.



Integration with virtual infrastructure managers

There are many different use cases that highlight the ability to integrate hierarchical infrastructure manageability with virtual infrastructure managers (VIMs). In this case, VIM integrates with RC layer and RC layer composes resources polled via one or more RA instances and presents those composed resources to VIM as shown in Figure 3.

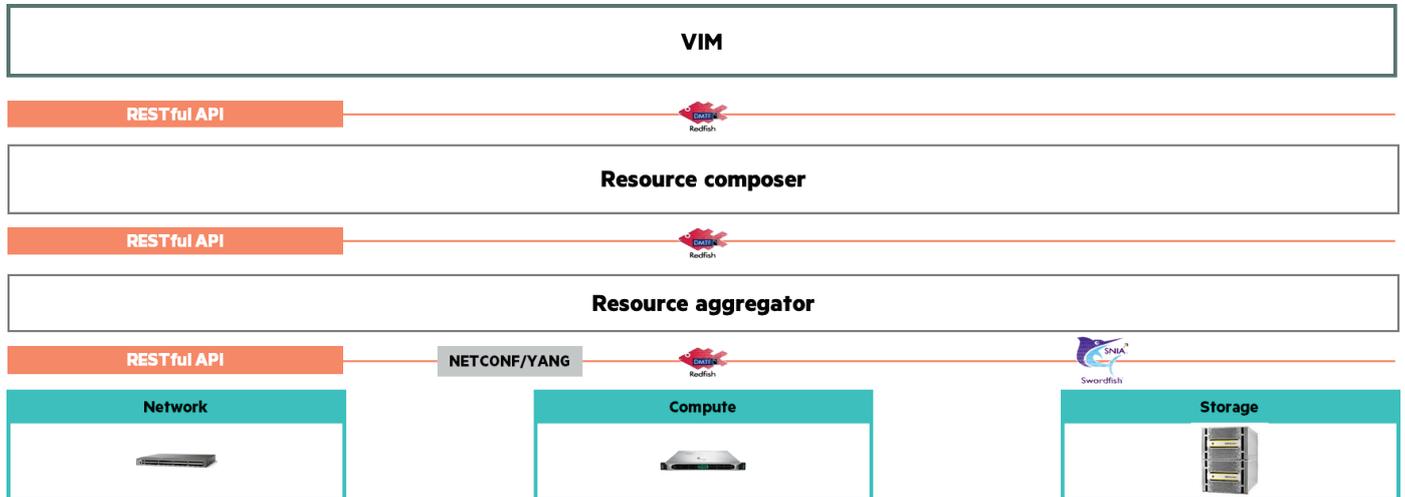


Figure 3. Integration of hierarchical IT infrastructure manageability with VIM

Conclusion

As CSPs embark on deploying new technologies such as 5G and edge computing, they face unique infrastructure manageability challenges such as those for heterogeneous, geographically distributed networks. In this transformation journey, CSPs need a trusted partner such as HPE that is promoting industry standards-based approach to hierarchical IT infrastructure manageability and has ability to deliver telco-ready infrastructure extending from core to network edge to addresses these challenges.

Learn more at

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