

Network-Based Telemetry to Facilitate the Programmable Management Plane for Optical Transport Infrastructure

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ABSTRACT

Large network operator environments are composed of thousands of nodes and devices capable of performing multiple roles. This network infrastructure is multi-layered, multi-vendor and underpinned by a high capacity and complex optical transport network. Managing this network requires millions of lines of configuration files and hundreds of Operational Support Systems. Typically, the management data structure uses a hierarchical namespace containing tens of thousands of object identifiers (OID). Each OID identifies a variable that can be read, modified or set via management protocol. The British Telecom network collects many millions of OIDs every 10 minutes, and executes many thousands of configuration changes per month via many tools, and multiple generations of protocols, data models and software components. Blending Software Defined Network (SDN) model-driven management and Network Functions Virtualisation (NFV), for on-demand (scale-in and scale-out) virtual network functions (Big Data nodes, network heuristics and analytics), provides an exciting opportunity for significant operational savings: reduced outage impact, simplification of management stack, fault correlation and network healing, and network usage trending for efficient resource allocation and scaling. This paper and talk outlines the management plane challenges and use cases for complex tier-1 optical environments. It discusses how we need to rethink network analytics and embrace streaming telemetry for real-time resource adaptation. It outlines a guiding network telemetry framework being developed by leading operators and the enabling community-driven technologies, and how they may be used to facilitate the programmable management plane for optical transport infrastructure.