# Next Generation OSS Automation & Orchestration Platform For Live Video
## *White Paper*

**CSP Challenges**
Because of new emerging market and technology demands such as 5G, Over-The-Top (OTT) streaming video and Internet-of-Things (IoT), Communications Service Providers (CSPs) are being challenged to become more agile in service delivery, provide higher levels of bandwidth, tighten their Service Level Agreement (SLA) requirements, while simultaneously maintaining profitability. This is not an easy challenge to overcome but newer technologies such as Network Functions Virtualization (NFV) are significantly helping.

## Network Functions Virtualization
This NFV technology virtualizes network applications that would traditionally run on proprietary, dedicated hardware. Individual Virtual Network Functions, or VNFs, are an essential component of a NFV architecture. For instance, instead of running a standalone proprietary router, a CSP could run NFV router software on a commercial off-the-shelf (COTS) server. This enables the CSP flexibility to turn functions and services on and off as needed, instead of requiring hardware upgrades or configurations. The promise of NFV is also cost reduction to deliver services, much more agility and flexibility in what types of services can be delivered, and a much lower initial capital expenditure (CapEx). Software-defined networking (SDN) technology is another technology that holds much promise to allow CSPs to reduce their expenses in the delivery of services by centralizing control plane functions.

NFV and SDN bring much potential to the CSPs, but both are intricate solutions. A large challenge for a CSP is coordinating and automating the initial configuration, onboarding of functions and services, interconnections between vendors and VNFs, dynamic licensing management, and much of the monitoring and management (previously done by the EMS/NMS).

## Orchestration
These challenges can be addressed using NFV/SDN OSS Orchestration. Orchestration is a high level of automation and resource management on network-wide scale, and is used to coordinate the required OSS resources to set up networks, services and applications. Orchestration can be used in physical-based, virtualized NFV/SDN, or hybrid systems. OSS orchestration can provide service and network agility, assurance, self-healing, monitoring, reporting and scale to the CSP's business.

## Dimetis OpsNGN OSS Orchestration
OpsNGN is a technology and protocol agnostic Service Orchestration Platform that supports a wide range of features and functionality including flexible product offerings in multi-layer, multi-vendor, and multi-technology networks. OpsNGN allows for context-aware multi-layer orchestration via user-defined GUI, operation automation, network programmability and service activation logic defined by custom workflows.
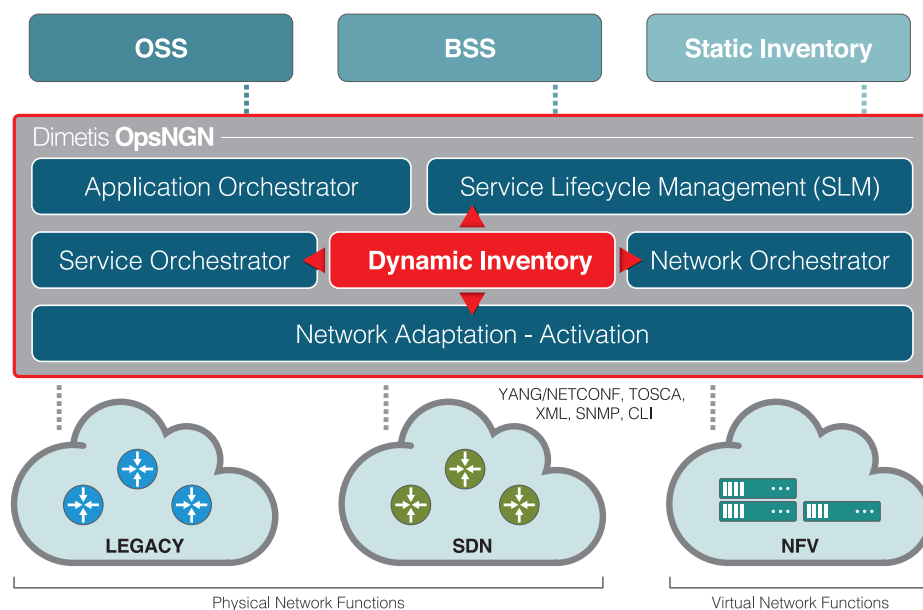


*Dimetis OpsNGN High Level Diagram*

OpsNGN can leverage and protect current investments by integrating any existing management or monitoring system such as OSS, billing, fault management and order management. Legacy and new network domains/architectures can be supported as OpsNGN embraces them under the umbrella of its Dynamic Inventory and unified service inventory management. Fast migration of network and services is possible from any technology and any vendor to the next physical, logical, or virtual network equipment and function (PNF/VNF).

OpsNGN supports the best practices for Assurance over various technologies with a wide range of features and functionality. On the network assurance side, the OpsNGN Fault Management receives and interprets device traps and performs correlations to equipment and services to render a detailed Root-Cause-Analyze (RCA) and health status. On the service side, point-to-point, point-to-multipoint, scheduled, and bandwidth-on-demand services can be precisely configured end-to-end, bandwidth-managed, tracked, and protected, with automatic re-routing on path failures or conflicts. Service resilience is further assured by various backup-switching schemas for path protection such as full dual, partial dual, 1+1, and on-the-fly backup switching taking into account Shared Risk Link Groups (SRLG).

### Dynamic Inventory
OpsNGN relies on a Dynamic Inventory of equipment and services to manage and monitor all network resources in real-time. All the physical, logical or virtual resources are kept in the OpsNGN inventory which is the single source of truth in the network. The application is independent of any external inventory. The inventory integrated with the built-in adapter framework renders capabilities such as bandwidth reserve and release, discovery, service orchestration, provisioning and monitoring of all the controlled devices and trunks.

### Evolution from BOSS LINK Manager™
OpsNGN is the natural evolution of Dimetis BOSS LINK Manager, a hardware and protocol agnostic OSS platform for the monitoring and provisioning of video broadcast networks. With enhanced software architecture for enhanced scalability, a highly flexible, Dynamic Inventory model, a three-layer abstraction for end-to-end service activation, enhanced service lifecycle monitoring capabilities, and a HTML 5 design, BOSS LINK Manager is reborn as OpsNGN to drive the transformation of network and services into the NFV domain.
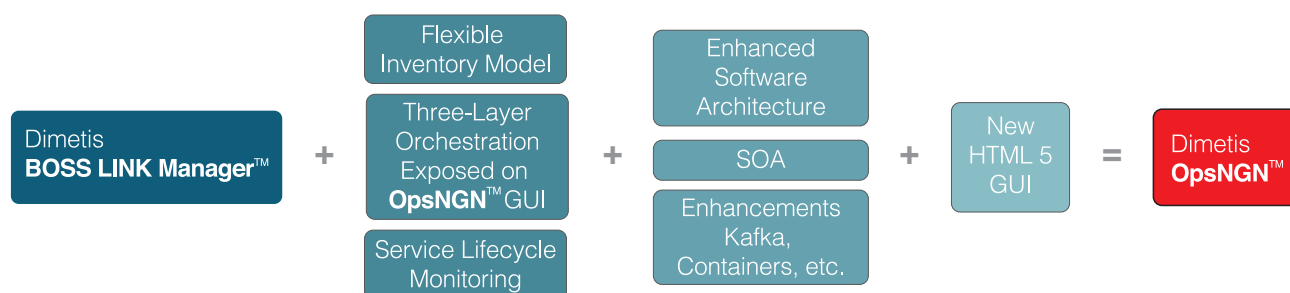


*Evolution from BOSS LINK Manager to OpsNGN*

The end platform combines the functionality of BOSS LINK Manager with the three-layer Orchestration and the new GUI to cover future network deployments with emphasis in:
- Real-time and state-full resource management
- Configuration, provisioning and monitoring of physical and virtual equipment
- Elastic integration with existing OSS
- Fast migration of network and services from any technology or vendor to the next PNF and VNF
- Unified network and service monitoring in real time
- Multi-vendor, multi-technology, multi-layer, hardware agnostic solution
- Scalable deployment

### Auto Provisioning
A high degree of service automation is achieved by the OpsNGN Auto Provisioning mechanism. Services such as telecom, video transport/contribution and digital content can be built before rollout, and their workflows executed at the right time. The activation engine performs the actual end-to-end equipment configuration across the entire multi-level and multi-domain network. The scheduling and activation facilities together with bandwidth allocation and reserve are the main tasks of Auto Provisioning and among the main strengths of OpsNGN.
OpsNGN provides time-based resource management (per-leg scheduling, disconnect and reconnect, and port sharing) as well as real-time fault management and service resilience mechanisms.

**Service Lifecycle Monitoring (SLM)**
The SLM displays the results of various operations and events on the connections and services. Monitoring occurs in real-time and the system can dictate the actions to be taken in order to rectify the affected services' status.

**Automatic Discovery**
To populate the OpsNGN Inventory with the managed equipment and potential existing connections, various discovery operations can be made available depending on the technology and the customer needs. An invaluable use of Discovery is towards maintaining data consistency and reconciling discrepancies between the network and the database. This delta/mismatch function has been proven to detect and rectify human error in building the inventory, misplacing or replacing cards in slots, or populating inventory data fields.

**Fault Management**
Along with the Dynamic Inventory and the adapter library, the Fault Manager (FM) is one of the backbone OpsNGN modules assisting the system in all its operations. The main purpose of FM is to receive and process each and every trap from all the managed devices, correlate the trap with the appropriate resource, and take further action, e.g. raise an alarm, update the resource health status, or take corrective action on affected services.



*Dimetis OpsNGN Screens*

**Security / User Management**
OpsNGN supports a hierarchical user base and allows users to log into their own virtual domain based on their ACL rights.

**Resource Management**
Resource Management comprises of all functions related to building and maintaining the equipment Inventory, i.e. Inventory, Schedule Maintenance, Logical Resources, Discovery, and Audit Trail.
Notifications and Audit trail
The Notifications and Audit lists is where synchronous messages are posted. They are triggered as a result of user or system activities and offer a comprehensive log of what is happening in the system and in the network. .

**EasyConnector**
*EasyConnector* brings the most popular daily operations to the fingertips, most like a touch panel. The easy-to-use intuitive interface design minimizes the activation procedure to 3-clicks. The GUI itself is customizable to the equipment and ports of interest, so that the view is clear and the operations fast. Activating, disconnecting, deleting connections and sharing ports with other customers is the operations group mostly available from EasyConnector. It is meant to be lightweight and intuitive.

**Reports**
The Reports in OpsNGN are enabled with the use of the Business Intelligence and Reporting Tools (BIRT) engine. The reporting module is responsible for extracting data into meaningful template-informational graphs and documents.

**API to External Systems**
OpsNGN is equipped with an Application Program Interface (API) to external systems enabling it to send information and perform operations requested by external systems. Both synchronous and asynchronous API is available covering CRUD functions for the managed network and services.

**Configuration**
The OpsNGN user may configure the system accounting for naming rules, bandwidth types, and object types used in the organization. The various configuration tools act like a control panel for the OpsNGN system and cater for a customer-appropriate object, bandwidth, internal IDs, or state engine definition. Although OpsNGN comes properly configured from each customer deployment, the user is able to further edit these configurations.

**Bandwidth Management**
OpsNGN can support either channelized or dynamic bandwidth management to cater for segmentation of technology payloads. Typically, dynamic bandwidth is used. Bandwidth gets allocated and reserved exclusively for the duration of the service and for the path elements that traffic engineering has calculated. The bandwidth usage is optimized, e.g. for point to multi point services, the maximum possible common stem is used.

The bandwidth allocation is tracked; overbooking is not allowed and scheduled bandwidth is guaranteed, i.e. cannot be overwritten by ad hoc demand. When the service get de-provisioned, the bandwidth is released. Bandwidth utilization can be monitored both from the inventory as well as from the graphical network view.

**Service Creation Studio**
The Service Creation Studio integrates various tools to assist the customer in supporting future technologies. It contains modules such as Application Orchestrator, Service Orchestrator with technical workflow editor, Adapter Development Kit, Service Profile editor. Depending on the need for defining and provisioning future networks and services, one or more of these optional (separately licensed) tools might be in the delivered OpsNGN system.

**Summary**
As CSPs move to new sophisticated NFV/SDN technologies, much organization and management will be required. OSS Orchestration is a smart way to manage these complexities, become an agile and flexible service provider, and maintain profitability. Dimetis OpsNGN is a carrier-grade, next-gen OSS automation and orchestration platform for hybrid networks supporting physical and virtualized networks (SDN/NFV).

**About Dimetis**
Streamlining Operations – For over 18 years Dimetis has developed world-class tools for Media Workflow Automation, Video Workflow Orchestration, OTT/Streaming Video Monitoring & Analysis, Broadcast Resource Scheduling, NFV/SDN Orchestration and much more. Dimetis is a truly agnostic vendor, interfacing and working with all vendors, hardware or software.

The Dimetis global installed base of customers include such broadcasters as ARD and ZDF in Germany, as well as RAS and Rai Way in Italy and network operators AT&T, A1 Telekom Austria GlobeCast France, GTT (USA & Europe), Telstra Australia, and Telenor Norkring Norway.

Dimetis is a member of the SVG (Sport Video Group), Intel Network Builders, TMF, IETF, ETSI NFV, EBU, IABM, FKTG & SMPTE bodies, which are dedicated to defining functional requirements and standards for the next generation networks and emerging architectures.

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