

## Enea Element On-Device Management: VNF Management Agent

VNF management with NETCONF and YANG - Enea Element On-Device Management is a model driven management agent for Virtual Network Functions (VNF)s, providing the foundation for management automation.

### Key Features and Benefits

- ▶ **Model driven** - Devices are modeled in YANG and standardized northbound interfaces are rendered automatically from the models,
- ▶ **Automate** - Integrates with EMS and orchestration using NETCONF and REST,
- ▶ **Transactions** - Network-wide transactions enable robust VNF management,
- ▶ **NETCONF/YANG** - NETCONF and YANG enables device automation and programmability by design,
- ▶ **Simple programming model** - Speeds up development of management interfaces,
- ▶ **Source code** - Enea Element On-Device Management is available with full source code for maximum transparency and future-proofing,
- ▶ **ZTP** - Call home functionality enables Zero Touch Provisioning
- ▶ **Proven** - A reliable framework proven in use with leading Network Equipment Manufacturers,
- ▶ **AAA** - Authentication, Authorization and Auditing for strong device security.

Software defined networking (SDN) and network functions virtualization (NFV) are all about making networks programmable. Rethinking virtual network functions (VNFs) as programmable software elements instead of configurable (but mostly static) devices, allows their management to be automated by an element management system (EMS) or orchestration. Centralized and automated management is a cornerstone to leverage the flexibility and agility offered by SDN and NFV technologies.

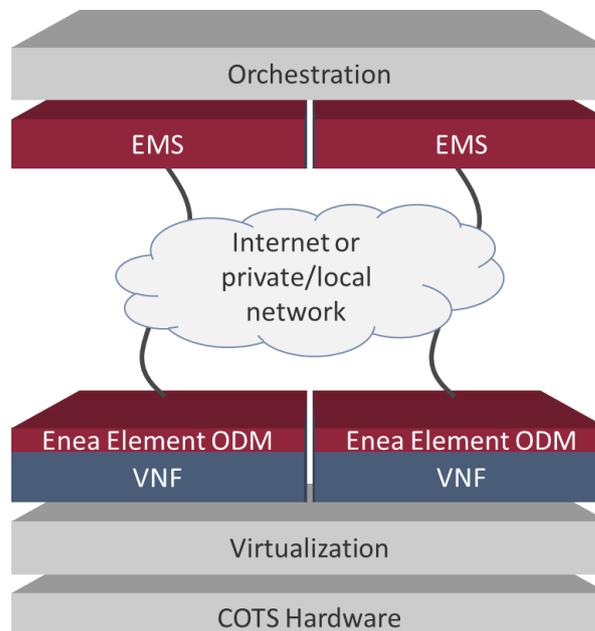
Through a standardized and transactional protocol like NETCONF, the interface can support automated orchestration and management of VNFs.

### Enea Element On-Device Management in a VNF

Enea Element On-Device Management is a data-model driven management framework for VNFs. It extends VNFs with transactional, standardized northbound interfaces, including NETCONF and REST, for integration with management systems and orchestration, enabling automation of elastic network services deployed as VNFs.

### Develop VNF Interfaces Faster

Using Enea Element On-Device Management eliminates the time and resources needed to develop a framework that can provide interfaces for the major management protocols (e.g. NETCONF, SNMP) and modeling languages



*Enea Element On-Device Management in a network with centralized management, interfacing the EMS.*

(e.g. YANG). A commercial VNF needs to support an array of protocols to allow integration with various EMS and orchestrators. Using Enea Element On-Device Management you will already have this done so that you can focus on what you do best – building your NFV product/service.

## Simplify VNF Management.

Providing VNFs with a consistent and powerful set of management capabilities simplifies the complexity of the overall management solution. Features like reliable transactions with validation maintain consistent and correct configuration state, and full-featured alarm and notification capabilities streamline monitoring of VNF health.

### Key Features

- **Northbound Interfaces:** NETCONF, REST, SNMP, XML-RPC and CLI interfaces provide access to Alarm, Performance, Inventory, Provisioning, Configuration and Security related information; including features such as session/transaction/rollback support.
- **Data Modeling:** The YANG data modeling language is used by the framework to model configuration and state data manipulated by Northbound Agents.
- **Southbound Interface and Messaging Layer:** XML object message passing layer that provides data-model mapping to northbound agents and southbound clients. Operational data, configuration updates, commit validation, etc.
- **Zero Touch Provisioning:** Enea Element On-Device Management supports secure NETCONF call home defined in RFC 8071. This enables secure Zero Touch Provisioning for VNFs.

- **Security:** Access Control Levels (ACL) provide security at the User/Managed device level. Security at the transport level is provided through Secure Shell (SSH).
- **Logging/Audit Trail:** Feature rich set of logging capabilities for developing distributed applications which includes features such as dynamic filtering.
- Separate plug-ins can be added:
  - -Life Software Upgrade
  - -Advanced Application Lifecycle Management
  - -High Availability

Further expand your management scope and VNF reliability and availability.

### EMS/NMS

*Enea ElementCenter* is an Element Management System/Network Management System (EMS/NMS), a generic solution that provides a simple interface to all managed network devices, applications and services. Enea ElementCenter can be integrated with an orchestrator or provide a web GUI for stand alone deployments.

### VNF High Availability

*Enea Element High Availability* is a carrier grade middleware framework that integrates seamlessly with Enea Element On-Device Management. It allows simple addition of features such as Live Software Upgrade and Advanced Application Lifecycle Management.

Find out more on the  
Enea website!



Enea develops the software foundation for the connected society with a special emphasis on reducing cost and complexity at the network edge. We supply open-source based NFVI software platforms, embedded DPI software, Linux and Real-Time Operating Systems, and professional services. Solution vendors, Systems Integrators, and Service Providers use Enea to create new networking products and services faster, better and at a lower cost. More than 3 billion people around the globe already rely on Enea technologies in their daily lives. For more information: [www.enea.com](http://www.enea.com)