

Data Sheet

Virtuora[®] Network Management Suite

A Unified System for Optimal Service Delivery and Network Performance

Effective network management demands multiple methods to ensure that traffic is handled with the speed, reliability, and capacity appropriate to the applications and services that traverse it. Key factors, such as cost constraints and different blends of capacity, latency, and reliability, must be controlled to ensure delivery of the right amount of bandwidth for the right purposes.

At a time when technology is advancing rapidly and becoming more complex, a unified network fabric is essential to satisfying your customers' growing demands for new, more flexible, faster communications service.

With Virtuora solutions, network architects can build this unified fabric and create networks that deliver services to market faster, more efficiently, and more profitably. Virtuora can also enable you to automatically tune and optimize the network elements (NEs) in the network to proactively prepare for, and even prevent performance degradations. Powerful element, fault, and performance management capabilities, combined with advanced analytics, optimize service delivery in a complex, multilayered network.

The Virtuora Network Management Suite provides the following:

- Element Management
- Fault Management
- Fault Correlation
- Performance Management
- Network Analytics

Element Management

Element management provides a view of the network element configuration inventory and manages NEs and their operations.

Fault Management and Correlation

The Fault Management and Correlation application detects and isolates network element problems. The application monitors performance data from multiple NEs, providing information that can be used to initiate corrective actions. When a fault occurs, the Fault Management and Correlation application identifies the root cause and then creates an alarm that can be cleared by launching a script automatically, or by notifying technicians to intervene manually.



The Virtuora Network Management Suite uses Apache Hadoop for high-rate transactions like performance management and alarm collection. Hadoop's ability to store and analyze large data sets in parallel on a large cluster of computers yields exceptional performance, while taking advantage of low-cost commodity hardware.

Performance Management

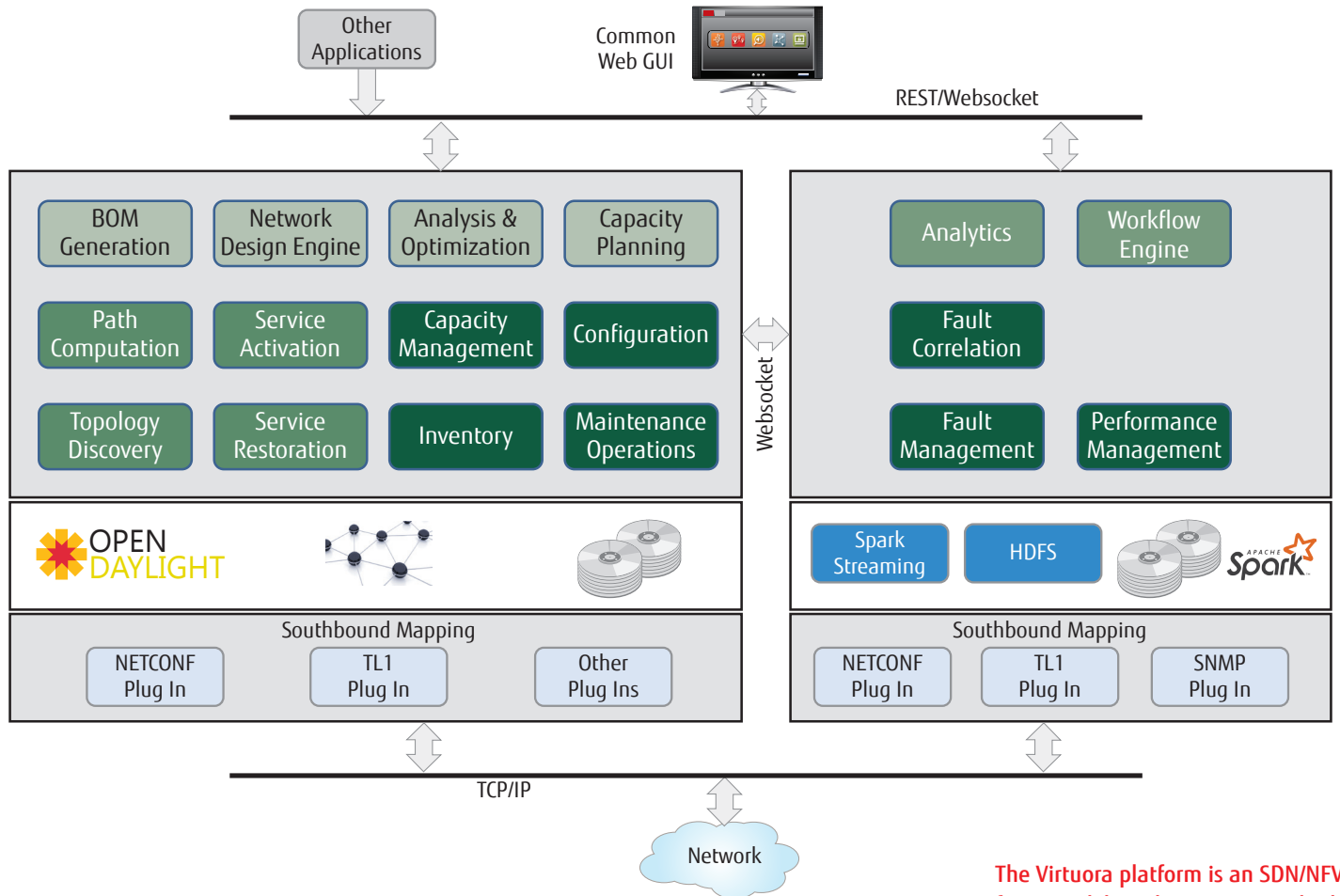
The Performance Management application optimizes NE performance and efficiency. Variables such as throughput, load, service demands, and demand elasticity are collected and analyzed by the compute engine.

Network Analytics

The Network Analytics application uses data collection and analysis to ensure the most efficient use of network resources.

The Virtuora Network Management Suite uses Apache Spark's general compute engine to analyze Hadoop data. The Virtuora solution uses Hadoop and Spark to analyze and correlate alarms and performance data back to network elements, links, and circuits.

Scalable, Extensible Network Element Management

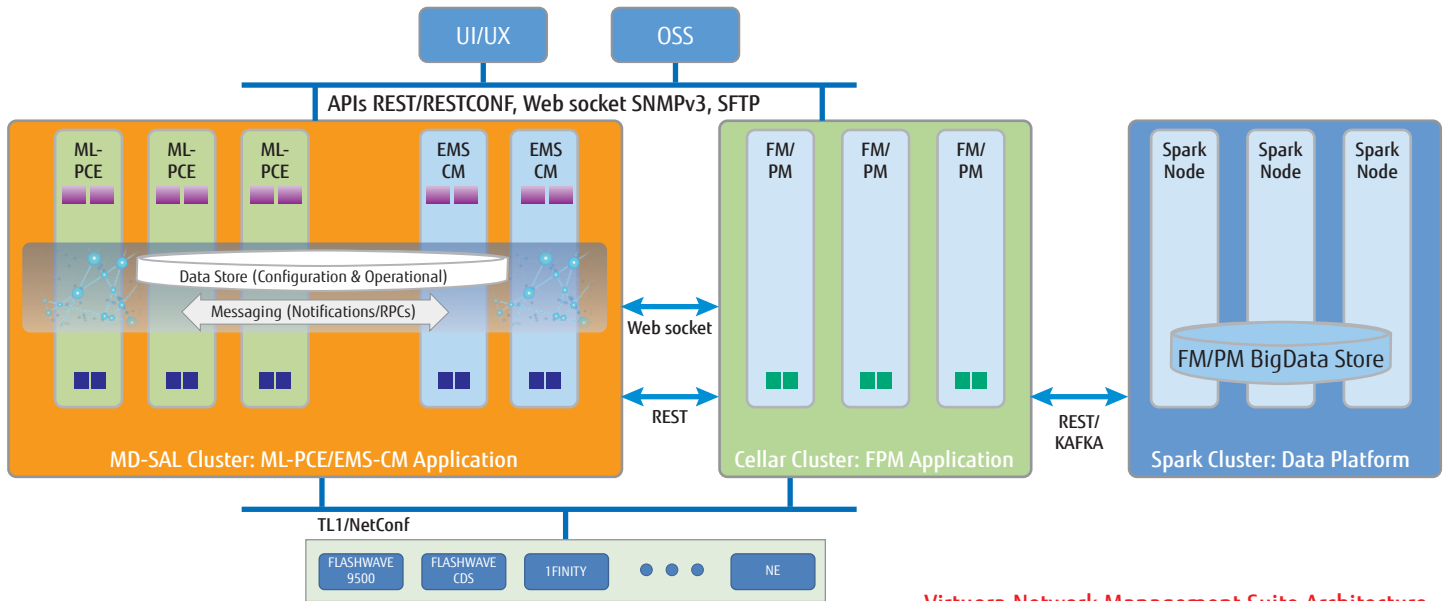


The Virtuora platform is an SDN/NFV framework based on open standards

Key Features and Functions

- View a high-level visualization of the entire network's topology:
 - Examine NE configuration, including properties and attributes
 - Discover neighboring NEs
 - Access realistic shelf views for clear communication with field techs
 - Expedite configuration with service templates
- Monitor NE performance:
 - Review comprehensive statistics, charts and reports
 - Identify problems proactively with "threshold crossing" alerts
 - View alarms by severity and distribution
 - Investigate alarm causes using intelligent, contextual detail
 - Correlate alarms to impacted circuit(s)
- Manage NEs:
 - Add, modify, and delete NEs and gateway network elements (GNEs.)
 - Communicate NE information clearly using graphical alarm correlation and realistic shelf views
 - Update equipment details and facilities using simple inline editing
 - Correlate performance management to selected objects
 - Use custom operations on a network element
 - Back up and restore NEs remotely
 - Perform scheduled or on-demand software upgrades and equipment backup
 - Suppress alarms to accommodate maintenance
- Optimize network utilization and efficiency:
 - Analyze and correlate alarms to NEs, links, and circuits
 - Analyze and correlate performance data to NEs, links, and circuits

Virtuora Network Management Architecture



Virtuora Network Management Suite Architecture, including Network Elements (NEs)

Beyond the Baseline: Value-Added SDN/NFV Services

Integration

Fujitsu offers expert support to assist with end-to-end automation and integration of all system elements, including network elements, management functions, controllers and orchestrators.

Verification

Validation testing in a multivendor environment presents complex challenges because of the unpredictable ways in which components from multiple vendors interact, as well as the need to engage different design and engineering groups to analyze issues. As new products are identified for deployment, Fujitsu can conduct validation testing in a secure, vendor neutral laboratory under your direction and control.

Fujitsu takes the lead in developing test plans based on customer requirements, executing the test program, and reviewing final reports with all parties involved. All interoperability testing is structured to ensure the combinations meet all customer requirements and planned deployment guidelines.

Platform Integration

Virtuora NC provides a REST interface supporting all functionality available in a Fujitsu SDN solution. These REST interfaces can be used to integrate into other components within the SDN ecosystem. The Fujitsu team can analyze the systems to be integrated and develop interface mapping to support custom functionality beyond that of the Virtuora platform.

YANG Model Development and Maintenance

YANG modeling is utilized to model behavior between various layers of the SDN solution. As new services and components are added to the SDN architecture, the YANG models need to be updated to include support for these changes. Fujitsu can provide new or updated YANG models based on new service definitions, new or updated equipment, and other changes. The new YANG models can then be used in the SDN environment to provide the new or updated functionality.

A Complete Solution for Open, Agile Networks

Virtuora Network Management Suite Requirements

Hardware platform

- Standard x86 server
- 8 multi-threaded CPU cores (or 16 vCPU)
- 32 GB RAM
- 200 GB disk (CPU: Intel Xeon E5 series or higher)

Operating System

- Server: Red Hat Enterprise Linux version 7.2 or compatible
- Client: HTML5-compatible browsers such as Mozilla Firefox or Google Chrome

Platform Architecture

- OpenDaylight or ONOS SDN platform for configuration and provisioning
- Northbound APIs and southbound device drivers
- YANG models
- Apache HDFS (Hadoop) data store
- Apache Spark analytics engine
- Apache Karaf environment with Apache Karaf Cellar clustering
- Apache Kafka distributed streaming platform

Interfaces

- Northbound: Shared HTTPS port for GUI and REST API
- Southbound: TL1, NETCONF, SNMP, CLI

Clustering

- Supported

The Virtuora Product Suite

The Virtuora Product Suite is an adaptable, modular suite of software products that enable you to build and grow a virtualized, programmable network. Built on an open-source platform, the suite encompasses SDN control; NFV orchestration and infrastructure management; and network planning, design, management, service fulfillment and performance assurance functions. Virtuora products enable end-to-end operational automation, service orchestration and network programmability. The suite provides a foundation for resilient networks that make full use of resources, perform self-repair procedures, and respond moment-by-moment to customer needs.

By implementing a Fujitsu Virtuora solution, you can:

- Cut long-term operational and capital costs
- Speed up service launch and delivery
- Maintain support for current revenue-bearing services
- Preserve the useful life of existing network assets
- Choose equipment and technology without vendor dependence
- Improve quality of service and customer experience
- Quickly identify, anticipate and meet customer needs
- Open up a vibrant ecosystem of new revenue opportunities

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