Solution brief

Virtuora® Cloud Solutions

Unified orchestration, control, and management of the multilayer, multivendor network stack
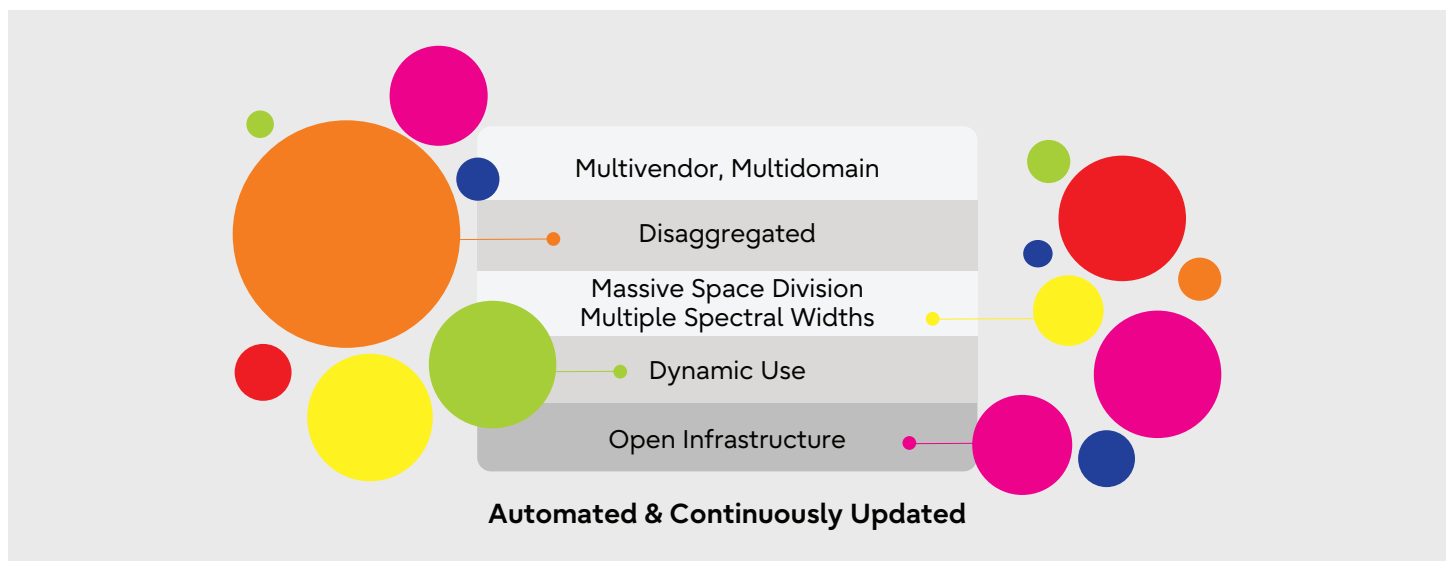
FUJITSU

As digital technologies transform communications networks, a growing number of connectivity-aware applications now generate and exchange vast quantities of data securely, freely, and continuously among numerous endpoints. In this hyper-connected environment, digital technology can be focused on individual preference, where new types of offerings that run the complete cycle of value creation replace standardized, generic services. That value is the foundation of the digital co-creation economy.
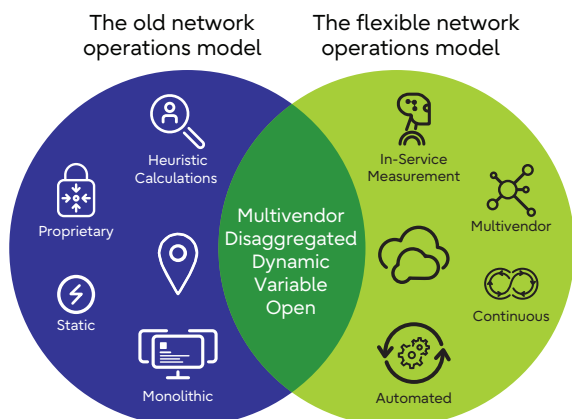
Modern consumers expect more options from operators and service providers, and they want to customize those options to their lifestyle and budget. Examples include personalized products and services, customized payment and delivery models, or a seamless experience between devices using the same service. As service providers reimagine their offerings in terms of value, there is a clear need to extend extreme flexibility into the physical layers of the network, but getting there without virtualization and automation is impossible.

Whether it is adding to existing infrastructure in Layers 0–3; building a brand-new converged network; or dealing with a particularly meshy enterprise network, software must solve the unique challenges presented by the physical hardware and maintaining connections. These challenges arise because of several factors. The network layers are different; the technology they use is diverse; the interfaces vary; and manufacturers generally only support their own equipment. And yet it works well and, in many cases, is a long-term investment that is still depreciating, especially concerning line systems. Faced with the need to virtualize and disaggregate their networks in order to combine them with modern upper layer systems, operators must turn to software to deliver the security, reliability, and availability of vertically integrated network stacks.

Multivendor, Multidomain

Disaggregated

Massive Space Division
Multiple Spectral Widths

Dynamic Use

Open Infrastructure

Automated & Continuously Updated

Monetizing network flexibility in the physical layers

An operations model for transforming networks

Comparing the old network operations model with the new flexible network operations model

An operations model for the modern network

Network operators and service providers employ a complex mix of tools and systems to design, build, operate, and maintain their networks. Not all of these tools and systems are capable of interoperating or even exchanging data with each other. There is a widespread lack of optimization among network equipment and software vendors and layers, with resources inefficiently utilized. As-built networks do not necessarily conform to the original design plans, and complex processes bog down every stage of the network and service lifecycle. A holistic and integrated approach is needed to manage and monetize the flexibility of Layers 0-3.

Connect, control, collect, exchange

Connection-aware applications and microservices that control, collect, and analyze data also transform that data into valuable insights, going beyond anonymous transactions to personal digital experiences. Throughout this value creation cycle, network intelligence continuously informs connected services with finely-tuned business and customer outcomes. Underpinning this transformation are connected clouds, fully automated environments in which the IT cloud extends to the network cloud. Cooperative benefits and experiences can be co-created among service providers, their ecosystem partners, and their customers.

Total network automation, powered by Virtuora Cloud Solutions

The Virtuora cloud solutions unify orchestration, control, and management of the multilayer, multivendor network stack, unwinding complexity and enabling powerful functionality. Virtuora cloud solutions are part of the Fujitsu hybrid CT/IT infrastructure, expanding the reach, productivity, and value of the communications network within the enterprise.

Virtuora actualizes a total vision of a flexible, programmable, automated network that brings together service providers, network operators, vendors, and customers to co-create a connected environment that can be automated, controlled, and managed with machine learning and artificial intelligence. With Virtuora cloud solutions, anyone can build a network around offerings and services powered by software rather than the hardware-constrained approach of legacy networks.

Virtuora highlights

Virtuora cloud solutions are a versatile, modular collection of integrated software products for the virtualized, programmable, automated network. Virtuora is based on open-source technologies to facilitate comprehensive, customized, multivendor solutions. Virtuora enables end-to-end operational automation and is a foundation for resilient, self-healing networks that make full use of resources and support even the highest performance demands and latency-sensitive applications.
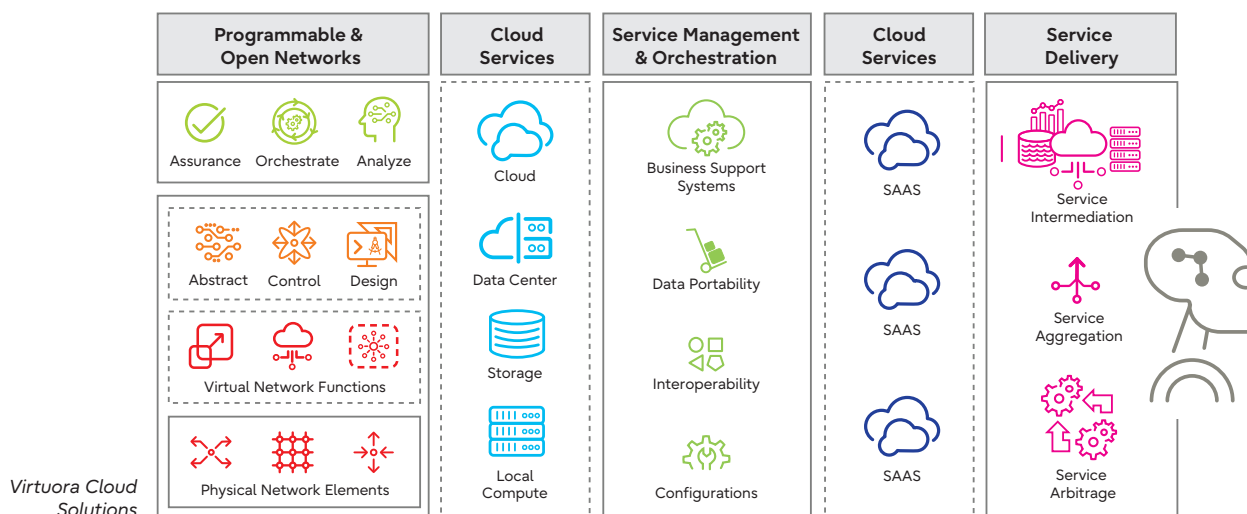
Extensible automation for digital infrastructure
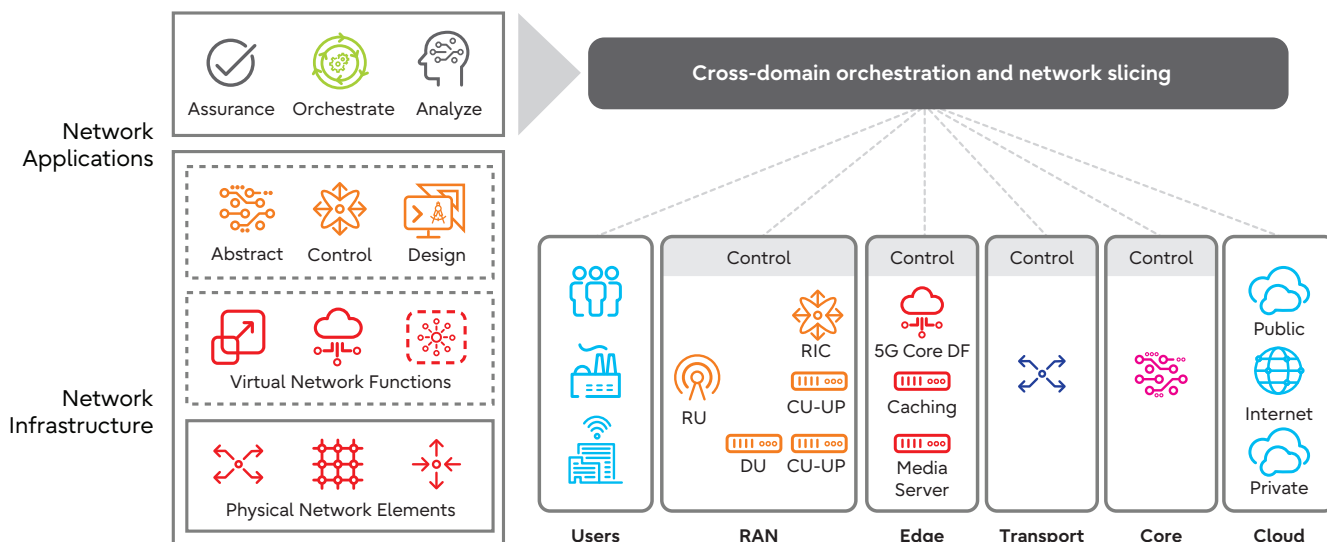
Virtuora Cloud Solutions portfolio

Virtuora Cloud Solutions portfolio

Virtuora cloud solutions deliver extensible network automation for digital infrastructure, including orchestration and control, monitoring and assurance, analytics and actions, and self-healing network services, all powered by artificial intelligence.

Network control and management

Virtuora Network Controller – Provides centralized SDN control, which connects and abstracts southbound network elements to northbound applications, and enables intelligent resource discovery; service provisioning; multilayer path computation; network management; planning and design; and API-driven network automation.

Virtuora WDM Control – Automates service activation, including wavelength design and provisioning, and dynamic optical reach verification.

Virtuora OTN Control – Automates wavelength partitioning and bandwidth virtualization within a wavelength, in addition to protection and restoration.

Virtuora Packet Control – Provides service lifecycle management, including automated Ethernet provisioning, foundational Layer 2/3 enablement, and drivers for critical packet devices.

Virtuora PD – Speeds up network design and planning processes and tracks multivendor network inventory using data analysis and reporting tools.

Virtuora Network Management – Tunes and optimizes network elements, and supports proactive preparation for network performance degradations:

- Management support for Fujitsu and other third-party network elements

- Automated performance optimization of network elements
- Optimized service delivery in complex networks
- Data-driven alarm and fault management and correlation
- Network-wide visualization of topology, network element configuration, and individual shelves

NetACE – Provides software-defined networking and real time multivendor service lifecycle management for legacy network elements, and quickly on-boards new services, vendors, and technologies.

Network intelligence

Virtuora AX is a collection of cloud-native microcomponents that apply actionable and automated network intelligence to extend traditional network monitoring. Virtuora AX includes a network model that is continuously updated by machine learning from distributed data sources, dynamic topologies, and dependencies between physical and virtual network elements.
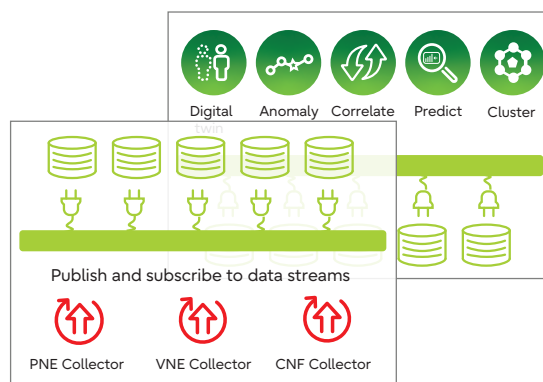
Virtuora AX architecture

A modular, open, cloud-capable architecture

The Virtuora AX Network Intelligence toolset ingests raw data and then extracts, translates, and loads normalized data into the selected network model. The Fujitsu Anomaly, Predict and Correlate Learning Engines consume in-service network measurements and continually update the network model with new information, details, and events.
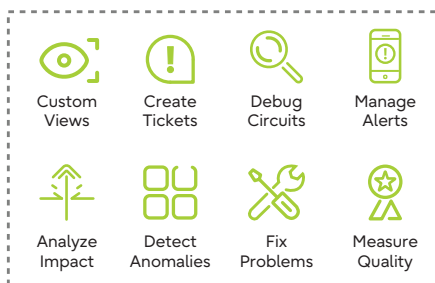
Combine any or all of the Virtuora AX Network Intelligence toolset and Virtuora AX MicroApplications to deliver targeted automated network control and management across domains, layers, and systems.

Digital infrastructure and OSS integration

Service Orchestration – Orchestrates and manages delivery and modification of hybrid networks and services; provides cross-domain orchestration to multivendor solution components; and provides flexible workflows and integration:

- Agile fulfillment for virtual devices
- Flexible framework for service automation
- Cloud security and automation
- Virtualized services overlay orchestration

Multivendor Service Assurance – Fujitsu maximizes service assurance by evaluating network performance requirements up-front, then configures and customizes solutions to deliver business value. The solution provides integrated fault and performance management; multilayer fault correlation; and customized dashboard views.

Custom Views   Create Tickets   Debug Circuits   Manage Alerts

Analyze Impact   Detect Anomalies   Fix Problems   Measure Quality

- Delivers complete visualization of physical, virtual, and service-level assets
- Visualizes multiple domains and network segments
- Includes comprehensive, multidiscipline device support
- Delivers real time visibility and provides complete, end-to-end, real-time views of network availability, performance, and utilization

By grouping KPIs into higher-level KQIs and processing and correlating metrics, operations teams can focus on managing SLAs and the customer experience in real time.
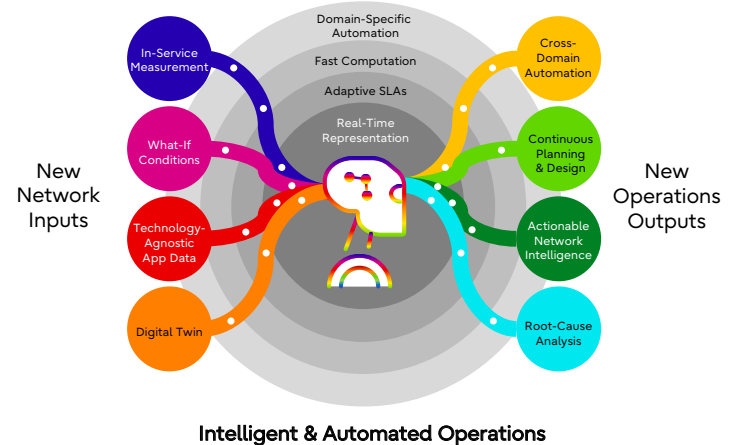
The flexible network operations model with zero CAPEX/OPEX waste

Virtuora and the flexible network operations center

With Virtuora, the modern NOC controls, orchestrates, and manages digital infrastructure at scale; aggregating the planning, design, and production functions that operate the network and the services it delivers. That means increasing service availability and quality with cloud-capable tools that rapidly design, deploy, and configure the network.

As deep learning matures, new technologies analyze metadata and leverage model-driven network programmability to learn network behaviors, delivering predictive analysis, and providing recommendations to network operations teams. Combined with artificial intelligence, these Virtuora capabilities autonomously take remedial action, delivering closed-loop resolution to service disruptions.

From business intent to service intent to network intent, service delivery in the digital age requires a new operations model enabled by digital infrastructure. Virtuora cloud-capable architecture with modular, open, and scalable interfaces maximizes service innovation, delivers zero CAPEX/OPEX waste, and preserves network investments.