

Infinera Transcend Maestro

Multi-domain Orchestrator and Automation Platform

As services migrate to the cloud, mobile networks evolve to 5G, and IoT adoption accelerates, the demand for bandwidth continues to grow strongly and traffic patterns are increasingly hard to predict. Additional challenges include the need to control costs, speed service delivery, enhance customer satisfaction, and grow revenues. To address all these challenges, network operators are adopting new software-driven architectures based on virtualization, openness, and disaggregation, with SDN replacing traditional network management and control plane functions.

SIMPLIFY OPERATIONS WITH MULTI-DOMAIN, MULTI-VENDOR, MULTI-LAYER ORCHESTRATION

Infinera Transcend Maestro, a key component of the SDN-enabled Infinera Transcend Software Suite, provides multi-domain network and service orchestration. It covers the full network and service lifecycle: planning and simulation, deployment and configuration, service provisioning, monitoring, and optimization. Multi-layer support includes Layer 3 (IP/MPLS), Layer 2 (Ethernet), Layer 1 (OTN, legacy TDM), and Layer 0 (optical), as well as microwave, fixed access, and mobile domains.

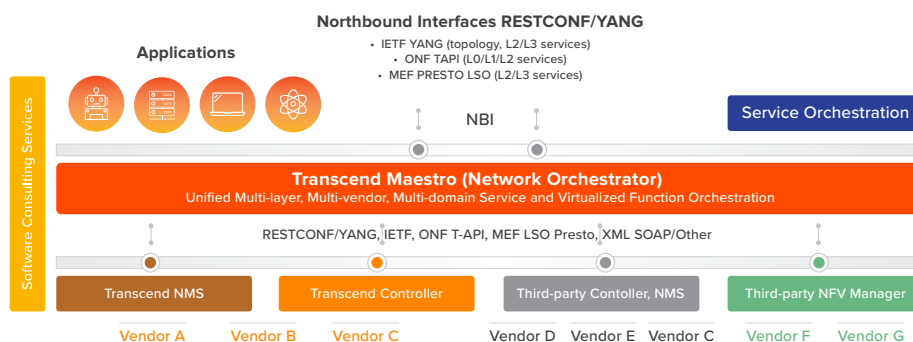


Figure 1: Infinera Transcend Software Suite

Southbound, Transcend Maestro interfaces with Infinera Transcend Controller, Infinera's multi-vendor SDN domain controller for transport and packet; ETSI Open Source MANO NFV managers for VNF management and orchestration; and third-party SDN domain controllers, including off-the-shelf support for Nokia (NSP), Intracom (UniIMS), ADTRAN (Mosaic), SIAE Microelettronica, and the open source ONOS curated by ONLAB. Northbound, it can interface with the Infinera Analytics Dashboard, Infinera Transcend Portal, existing OSS/BSS infrastructure, or service lifecycle orchestrators and third-party applications.

MINIMIZE OPEX AND SPEED SERVICE DELIVERY THROUGH AUTOMATION

Transcend Maestro provides a platform for automation that reduces operational costs, speeds service delivery, and enhances customer satisfaction. This includes both intent-based automation that translates service requests into optimized multi-layer network configurations and closed loop automation that proactively monitors network state and service performance and, when appropriate, takes actions to assure service quality.

BENEFITS OF THE INFINERA TRANSCEND MAESTRO MULTI-DOMAIN ORCHESTRATOR

- **Minimize** OpEx and assure service quality with a multi-domain orchestrator that enables intent-based and closed loop automation
- **Speed** time to revenue with multi-layer service provisioning and an easy-to-use GUI-based multi-domain portal
- **Break** vendor lock-in with REST and RESTCONF open interfaces that support IETF, ONF T-API, and MEF LSO standards, with off-the-shelf support for multiple third-party domain controllers
- **Innovate** with DevOps-style capabilities, including feature-rich programming languages (macro, Python), a comprehensive SDK tool kit, a macro/script recorder, and a scheduling center
- **Reduce** CapEx by optimizing the use of network resources with Transcend Maestro's planning and simulation capabilities, and with intelligent multi-layer path computation and dynamic re-optimization
- **Implement** large-scale technology and vendor migrations leveraging Transcend Maestro's ability to retrieve data from any source, its abstracted network model, and its extensive automation capabilities

Examples of the type of closed loop automation enabled by Transcend Maestro's ADAPT optimization engine include rerouting services if the latency requirements of an SLA are exceeded, avoiding a router with high CPU utilization, and avoiding routing new services over links that are approaching congestion. OpEx and time to revenue are further reduced by the Transcend Portal, which enables point-and-click service provisioning, template-driven configuration, and visualized network monitoring, without the need for expert-level understanding of the underlying technologies.

INNOVATE AND ADAPT WITH DEVOPS-STYLE PROGRAMMABILITY

DevOps enables network operators to innovate with new services and functionality, adapting to changing customer requirements while leveraging in-house resources rather than costly professional services. Transcend Maestro's DevOps capabilities comprise feature-rich programming languages, including Python, for automation and GUI customization and a comprehensive SDK tool kit that provides an information reference model, sample program generation, service catalog, and service model management. A recorder enables GUI actions to be turned into programs/scripts. A scheduling center for launching programs and scripts is also provided.

BREAK VENDOR LOCK-IN AND ENABLE DISAGGREGATION WITH OPEN INTERFACES

Recognizing that vendor lock-in hinders competitive pricing and slows innovation, the vast majority of network operators already deploy multi-vendor networks, and many network operators are taking the next step of disaggregating traditional network elements into best-in-class functional blocks. Transcend Maestro helps break vendor lock-in in the software domain while also enabling network element disaggregation with support for open interfaces based on REST and YANG-based RESTCONF that support IETF, ONF T-API (Transport API), and MEF LSO standards. Additional southbound interfaces include Kafka for alarms and statistics and gRPC for telemetry.

REDUCE CAPEX WITH PLANNING/ SIMULATION CAPABILITIES AND INTELLIGENT MULTI-LAYER PATH COMPUTATION

Transcend Maestro provides a number of tools that help minimize CapEx through the efficient use of network resources. These tools include planning and simulation capabilities that enable network resources to be optimized through what-if analysis before any equipment gets ordered or deployed. Transcend Maestro's multi-layer capabilities enable the most efficient combination of layers to be used for each service while also avoiding unnecessary duplication of protection resources across layers. This is enabled by Transcend Maestro's unified database, performance monitoring, and the Context-Oriented Routing Engine Path Computation Engine (CORE PCE), which uses an abstract link cost based on a weighted sum of parameters including latency, packet loss, cost, utilization, and impairments, together with other factors such as link state (up, down), Shared Risk Link Groups (SRLGs), and available link bandwidth, to make intelligent path selection decisions.

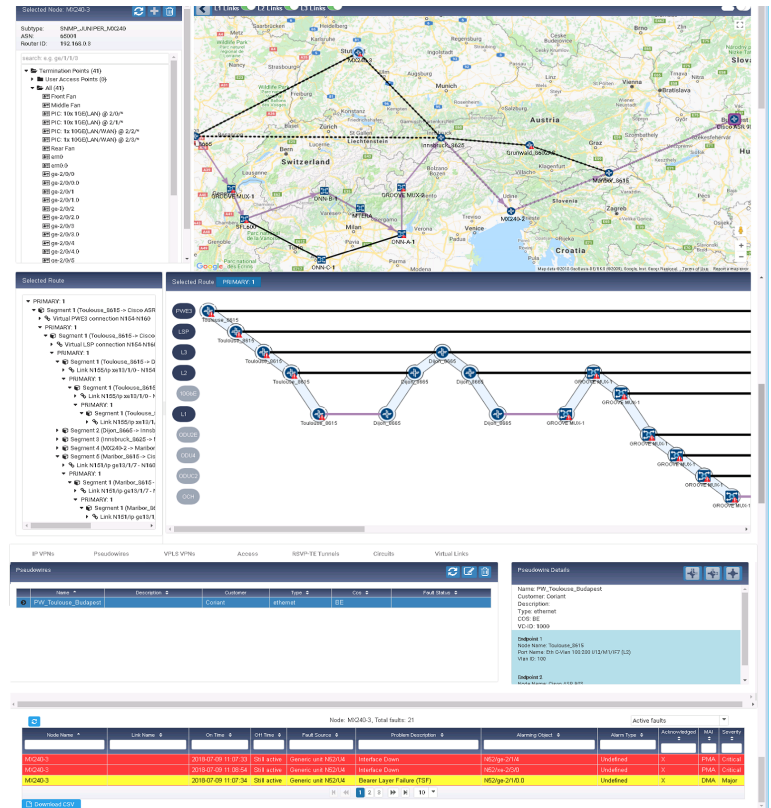


Figure 2: Transcend Multi-domain Portal