

INFINERA MANAGEMENT SUITE

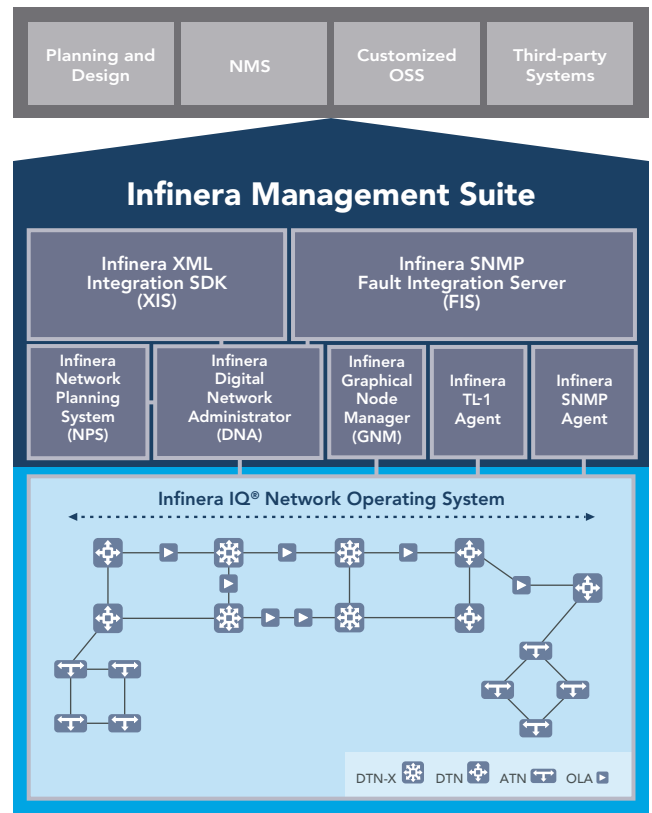
END-TO-END PROVISIONING, MONITORING, AND CONTROL

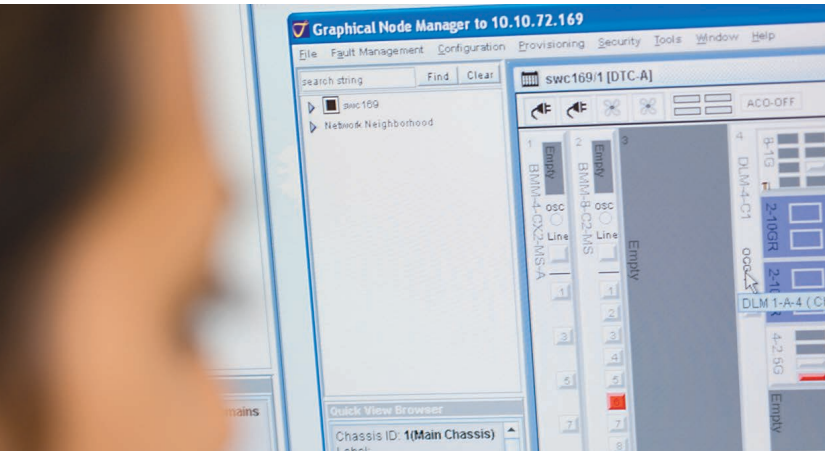
Infinera Management Suite makes it easy to take full advantage of the Infinera Intelligent Transport Network™ solution, delivering tremendous operational and financial benefits.

Infinera Management Suite is a full set of management applications and Operations Support Systems (OSS) integration interfaces that includes comprehensive support for real-time administration, maintenance, provisioning and monitoring as well as offline planning, modeling and pre-configuration activities.

Available individually or as a set, these customizable applications are designed for a broad range of operational environments, with redundancy, security and scalability options to address the needs of each service provider's unique situation. User-friendly graphical interfaces simplify and enhance access to nodal- and network-level administration functions, while the OSS integration interfaces and options enable flow-through processing for seamless service provisioning and maintenance.

Simple, fast, and flexible, Infinera Management Suite provides carrier-class reliability and availability while streamlining operations. These standards-based applications support open interfaces for easy integration into virtually any environment.





The Infinera Management Suite is comprised of robust carrier-class applications and toolsets, including:

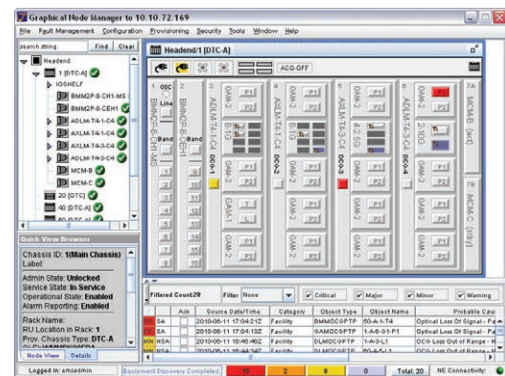
- The Infinera Graphical Node Manager (GNM), a full-featured graphical element manager for craft access to any Infinera Network Element (NE), local or remote.
- The Infinera Digital Network Administrator (DNA), a comprehensive integrated element and network management system that provides users with a graphical interface with the full fault, configuration, performance, provisioning and security management capabilities of the Infinera Intelligent Transport Network solution.
- The Infinera Network Planning System (NPS), an offline application for link engineering, capacity planning, what-if analysis and greenfield and brownfield network designs.
- The Infinera XML Integration SDK (XIS) and Infinera SNMP Fault Integration Server (FIS), standards-compliant interfaces and SDKs for facilitating the integration of customer Operations Support Systems (OSS) with the Infinera Intelligent Transport Network, automating back-office operations.

The Infinera Management Suite, along with the embedded software capabilities enabled by the Infinera IQ® Network Operating System, presents users with a number of operational benefits, including:

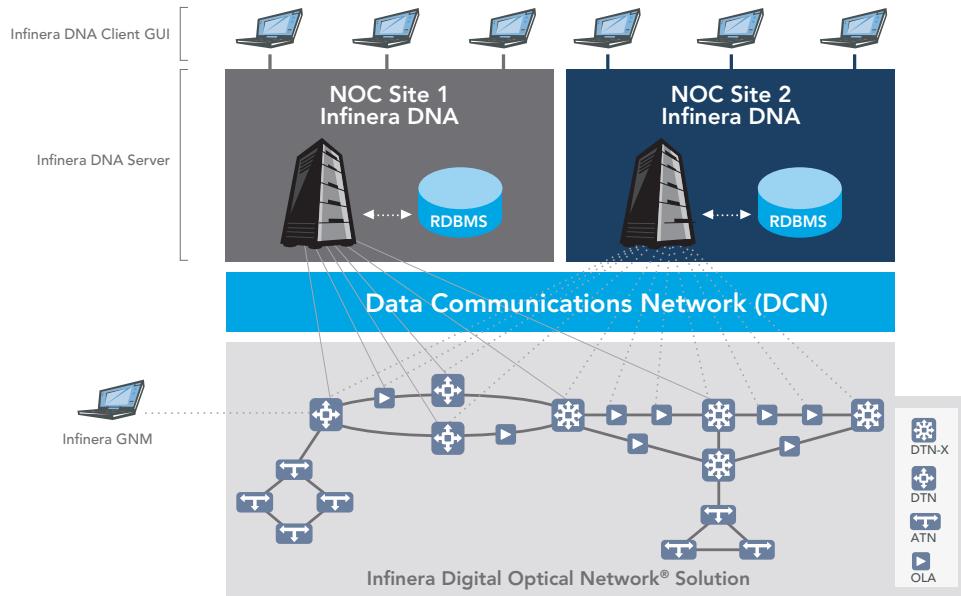
- Reduced operational expenses associated with system and service turn-up through low-touch, time-saving features such as fully automated inventory discovery, system configuration, and optical span performance tuning.
- Accelerated turn-up with automated network-wide topology discovery and end-to-end service provisioning, enabled by an intelligent GMPLS control plane.
- Simplified troubleshooting and fault isolation through comprehensive digital performance monitoring capabilities and integrated SONET/SDH-like network maintenance functions.
- Improved visibility with graphical interfaces for management functions and inventory data across multiple network elements.
- Minimized need for manual intervention due to automated flow-through operations via back-office integration interfaces and development kits.

Infinera Graphical Node Manager

The Infinera GNM provides real-time management access to the Infinera WDM network element. Each Infinera network element hosts an embedded HTTP server which serves up a graphical device-level management interface, maintaining full synchronicity with the system. Changes made to the system via any management interface or as a result of other network operations are automatically updated in any open Infinera GNM sessions.



The flexible Infinera GNM runs on standard user PC and desktop platforms without requiring a separate complex CD installation, making it easy to deploy and use.



All nodal-level Operations, Administration, Maintenance, and Provisioning (OAM&P) features are accessible from the Infinera GNM, including retrieval of network topology information auto-discovered through GMPLS. Users or administrators with appropriate credentials can provision end-to-end circuits without the presence of an Element/Network Management System (EMS/NMS).

The Infinera GNM can be launched through a number of management interfaces, including the local Ethernet-based craft interface, remotely over the Data Communications Network (DCN), or remotely via the in-band management channel carried by the Optical Supervisory Channel (OSC). The Infinera GNM is tested to run on a number of client platform operating systems.

Infinera Digital Network Administrator

The Infinera DNA helps simplify network operations, speed service provisioning and rapidly isolate problems on the network. This carrier-class EMS provides users with integrated node-level and network-level administrative, maintenance, and provisioning functions across multiple Infinera subnetworks. The Infinera DNA consolidates and centralizes all network management information from across the network for use within the Network Operations Center (NOC), including equipment inventory, alarms and events notifications, circuit and endpoint inventory and historical performance data. With a bird's-eye view of the network, the Infinera DNA facilitates the coordination of a number of administrative tasks across multiple network elements, presenting users with intuitive graphical interfaces to ease workflow activities, speed up fault isolation and root cause identification, and reduce overall operating expenses.

The highly scalable Infinera DNA architecture is based on a “Network is Master” model and ensures all network changes are reflected in its purview, irrespective of what triggers the change. With this approach, control plane functions are implemented directly in the network for optimal system performance. Any change introduced within the network is automatically reflected as an update to all Infinera DNA users, ensuring network synchronization and continuous operation.

For high availability of the management plane, the Infinera DNA maintains redundant communication sessions with gateway network elements, providing resiliency against DCN failures. Furthermore, multiple instantiations of the Infinera DNA can be deployed with overlapping management purviews, providing a vehicle for implementing management administrative boundaries as well as network scalability and Infinera DNA- and site-level redundancy.

The Infinera DNA employs a multi-tiered distributed processing architecture for operations that can scale to support several thousand network elements and hundreds of users. The Infinera DNA’s nodal-level partitioning capability aids administrators in organizing the network into hierarchical administrative domains. Context-sensitive help, powerful debugging tools, and service templates further simplify management tasks.

Infinera Network Planning System

The Infinera NPS provides users with offline graphical modeling, planning, and configuration capabilities for designing Infinera Intelligent Transport Network solutions. With the Infinera NPS, network planners can design switched WDM networks for greenfield and brownfield deployments and determine incremental equipment needs based on evolving traffic demands. The Infinera NPS can also aid in designing

new optical links for optimal performance, based on specified fiber plant and site locations. It generates nodal equipment configuration information as well as software and hardware bill-of-materials (BOMs), based on user-supplied traffic demand sets, and provides circuit pack slot assignments to aid in system installation, configuration, and turn-up. The Infinera NPS includes route optimization software and user-configurable network modeling and routing options. It is also designed to support what-if analysis across the network, and provide external network analysis and inventory reports. It integrates with the Infinera Digital Network Administrator to import network configurations for faster, automated, and accurate designs.

Infinera SNMP Fault Integration Server

The Infinera SNMP FIS enables the integration of real-time asynchronous network and element alarms with northbound SNMP management applications, providing a real-time view of network health so service providers can quickly issue trouble tickets and dispatch service personnel. It is based on SNMPv2c and supports multiple registered SNMP managers. For simplifying initialization of alarm views, it features an automated refresh of all outstanding network alarms upon initialization. The Infinera SNMP FIS has achieved integration with HP OpenView™ and IBM Tivoli Netcool™.

Infinera XML Integration SDK

The Infinera XIS enables flow-through of alarms and events as well as configuration of network equipment and network-wide circuit provisioning and inventory functions to the higher-layer NMS/OSS systems. The Infinera XIS is built on the standards-based MTNM and TMF 864 specifications. Alarms and events are supported by a high performance XML Notification Service that can effectively process thousands of events per second. The Infinera XIS includes a complete network and network equipment model for subnetwork, managed NE, chassis, equipment, circuit pack, and termination point object types. The Infinera XIS enables service activation capabilities via an automatically routed end-to-end Subnetwork Connection (SNC).

Infinera TL-1 Agent

Included with the Infinera IQ Network Operating System, the Infinera DTN TL-1 Agent reduces training costs and errors by eliminating the need to support vendor-specific interfaces. It utilizes Transaction Language 1, an industry-recognized common language protocol defined by Telcordia for messages exchanged between network elements and network operators, as well as TL-1-based OSS. The Infinera DTN TL-1 Agent supports the following functions per Telcordia specifications: fault management with autonomous alarm and event notifications as well as troubleshooting capabilities such as loopbacks and path-level trace; equipment and termination point management; service provisioning, including manual cross-connect and dynamically signaled subnetwork connection provisioning; performance monitoring, including access to real-time, current, and historical performance data as well as parameter threshold settings; and security and user access control.

Infinera SNMP Agent

The Infinera DTN SNMP Agent is an integral part of the IQ Network Operating System that provides through the standards-based IETF compliant SNMP protocol and MIBs for customers to perform remote network management integration with Infinera Intelligent Transport Networks. The DTN SNMP Agent supports real time asynchronous traps, on-demand alarms, and events retrieval. In addition, it provides inventory retrieval and settings of managed devices, equipment configuration, and facility performance monitoring capabilities. The Infinera DTN SNMP Agent has been tested with HP OpenView™ and IBM Tivoli Netcool™ for integration and interoperability.

For product specific implementation, please refer to the Infinera DTN and Infinera ATN product brochures.

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