

# Infinera Virtualized Control Plane for Automatically Switched Optical Network (vASON)

*Resilience for Hyperscale Carrier Networks Powered by the Infinera Transcend Network Automation Suite*

The importance of network resilience is growing, driven substantially by cloud, data center, and video applications critical to the infrastructure and activities of our modern world. Even more significantly, the introduction of new network technologies such as 5G mobile continues to place increasing real-time video bandwidth demands on metro and long-haul networks. This evolving technology compounds the requirement for very high service resilience in optical transport networks for service bandwidths that range from low speeds up to terabit-per-second super-channels. In addition to finding cost-effective solutions for managing this traffic growth, network operators also need to reduce operational costs, including power consumption and footprint; maximize unregenerated wavelength distances in long-haul networks; extend the life of fiber assets and existing optical layer investments; and maximize network availability. To address these requirements, the Infinera vASON control plane uses a combination of advanced software technologies across the Infinera optical transport portfolio and incorporates an open architecture for disaggregated and multi-vendor networks.

## Combining the Benefits of Service Provisioning, Network Supervision, and Optimized Multi-layer Path Computation

vASON combines the provisioning of services with various protection and restoration options, performance and alarm monitoring, and route computation, including optical performance validation, to achieve dynamic traffic restoration. In the event of a failure, traffic is rerouted on the lowest-cost layer possible. The vASON control plane not only enables high service availability, but it also brings further benefits to the operator. Beyond the standard functionalities of a distributed GMPLS control plane, vASON provides multi-layer coordination for the DWDM and OTN layers, ensures optimal utilization of network resources, and significantly improves user experience. The use of open communication protocols and APIs (e.g., ONF TAPI) leads to simplified operation, shorter time to market, and cost savings through support for network disaggregation and multi-vendor environments, even in protected networks.

## BENEFITS OF INFINERA VASON CONTROL PLANE

- **Provides** multi-failure service resilience for packet optical transport networks
- **Offers** coordinated Layer 0 and Layer 1 protection and restoration
- **Ensures** service resilience in open networks with disaggregated network elements
- **Supports** bandwidth control in flexible-grid optical networks
- **Features** service resilience across different vendor domains with service orchestration
- **Delivers** fast introduction of new switching functionalities through software upgrades
- **Enables** operator-defined and programmable service resilience

*Infinera's vASON engine is supported by the 7300 Series Multi-Haul Transport Platform, mTera Universal Transport Platform, 7100 Nano/US\$ Packet Optical Transport Solutions, and GX Compact Modular Platforms (G30 and G40 Series).*

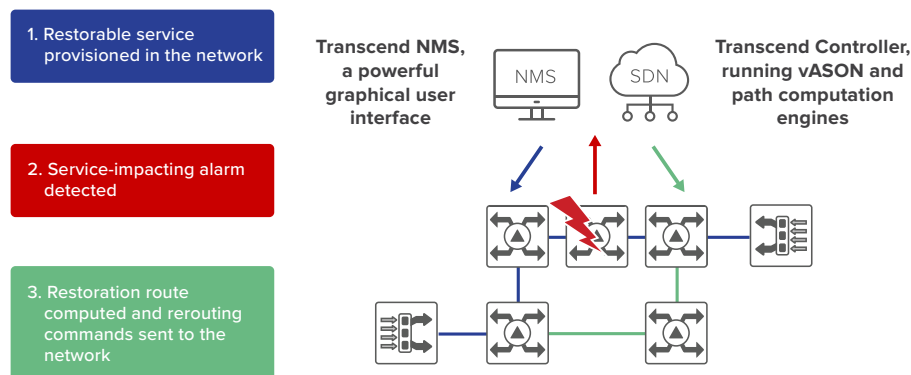


Figure 1: Basic concept of Infinera vASON control plane

## Providing Powerful User Interface Options

Infinera's vASON engine offers powerful and easy-to-operate user interfaces, including via the Infinera Transcend Network Management System (Transcend NMS), which provides a fully integrated workflow of service provisioning, alarm and performance monitoring, and service restoration management.

## Enabling Easy Migration from ASON/GMPLS to vASON

In order to take advantage of vASON's benefits, existing networks that use ASON/GMPLS control plane must be seamlessly migrated to vASON control plane. Infinera offers an automated in-service migration that avoids any traffic interruption. Through this process, the restoration control function is transferred from the GMPLS control plane to the vASON control plane. The restoration profile can be changed during the migration.

## Ensuring Minimal Service Recovery Time and Maximum End-to-End Service Protection with Multi-failure Resilience

vASON provides high resilience for both wavelength- and OTN-switched multi-service networks by combining network restoration with fast traffic protection switching of the network elements, such as line-side, client-side, SNC, OMS, or OTS protection. Taking advantage of these rapid protection mechanisms, the vASON engine minimizes service recovery times and protects end-to-end services against multiple failures. Moreover, the vASON control plane enables cost-efficient service resilience in IP-optical networks when vASON optical restoration and path diversity are combined with IP/MPLS fast protection for Layer 3 router services.

## Featuring Versatile Restoration Management

The operator must be able to select the preferred protection and restoration parameters in order to ensure optimized restoration behavior in the network. vASON control plane empowers the operator by providing a wide variety of configuration options, such as priorities per service/per connection, routing constraints, and detailed behavior for resilience control functions (e.g., revertive switching).

## Offering Programmable Multi-layer and Multi-domain Resilience

vASON provides a comprehensive set of interfaces for management and control through the Infinera Transcend Network Automation Suite, including the Transcend NMS and Transcend Controller. vASON enables the user to implement the highest levels of resilience, efficiency, and transparency in the network. When deployed in conjunction with a multi-domain/multi-layer orchestrator, vASON allows for application-defined restoration behavior and vendor-agnostic network resilience.

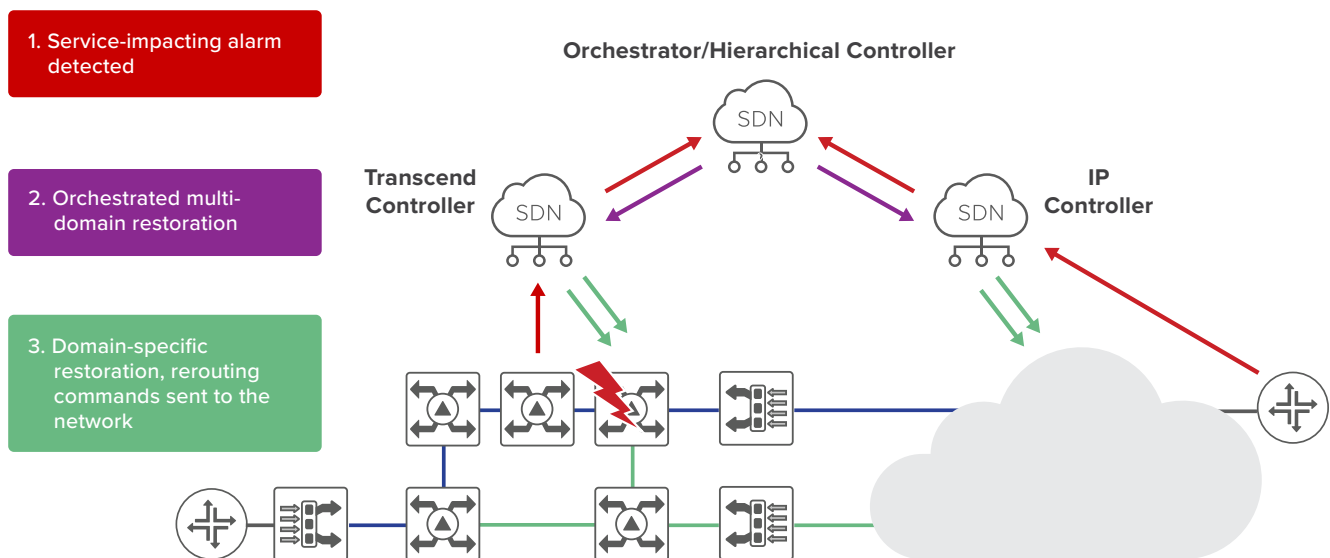


Figure 2: vASON multi-layer and multi-domain resilience

## Summary

By enabling operators to achieve the highest levels of network resilience, Infinera vASON technology offers significant advantages over distributed control planes. vASON can be introduced and changed quickly as a central software instance, while supporting all existing network structures. Furthermore, vASON addresses the most critical needs in GMPLS networks by supporting specialized disaggregated network elements and enabling multi-vendor resilience. Infinera vASON delivers the advanced network resilience and integrated control features that operators need to manage their existing networks effectively and cost-efficiently, as well as their future disaggregated network architectures.

## KEY FEATURES

- Consistent with standard GMPLS/ASON control plane functionalities
- Fast multi-failure protection and restoration in Layer 0 and Layer 1 networks
- Programmable restoration behavior
- Online route validation with real-time optical impairment check
- Integration into established service provisioning workflows
- Easy and smooth integration into multi-vendor automation environments
- Seamless support for new transmission technologies