

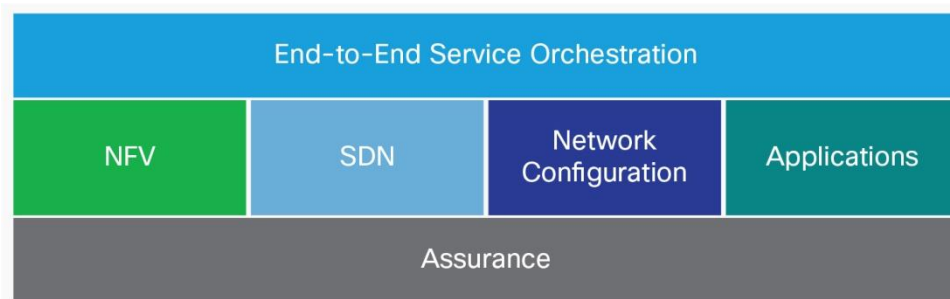
# Cisco Network Services Orchestrator Enabled by Tail-f

## Product Overview

Cisco® Network Services Orchestrator (NSO) enabled by Tail-f® is an industry-leading orchestration platform for hybrid networks. It provides comprehensive lifecycle service automation to enable you to design and deliver high-quality services faster and more easily.

The network is a foundation for revenue generation. Therefore, service providers must implement network orchestration to simplify the entire lifecycle management for services. For today's virtualized networks, this means transparent orchestration that spans multiple domains in your network and includes network functions virtualization (NFV) and software-defined networking (SDN) as well as your traditional physical network and all its components (Figure 1).

**Figure 1.** Cisco NSO Provides End-to-End Orchestration Across Multiple Domains



Network Services Orchestrator helps service providers to achieve important business objectives:

- Faster development and deployment of new revenue-generating services
- Better quality of services, with fewer human errors and less repetitive manual work
- Vendor independence

The orchestrator provides a single networkwide interface for all network devices and services as well as a common modeling language and data store for both services and devices.

Network Services Orchestrator supports the implementation of services on a wide variety of networking devices, including traditional hardware-based devices, virtual software appliances (NFV), and SDN controllers. To manage the virtual machine lifecycle, the orchestrator includes optional integration with the Cisco Elastic Services Controller (ESC), which deploys and manages virtual applications. The orchestrator can use other NFV managers as well.

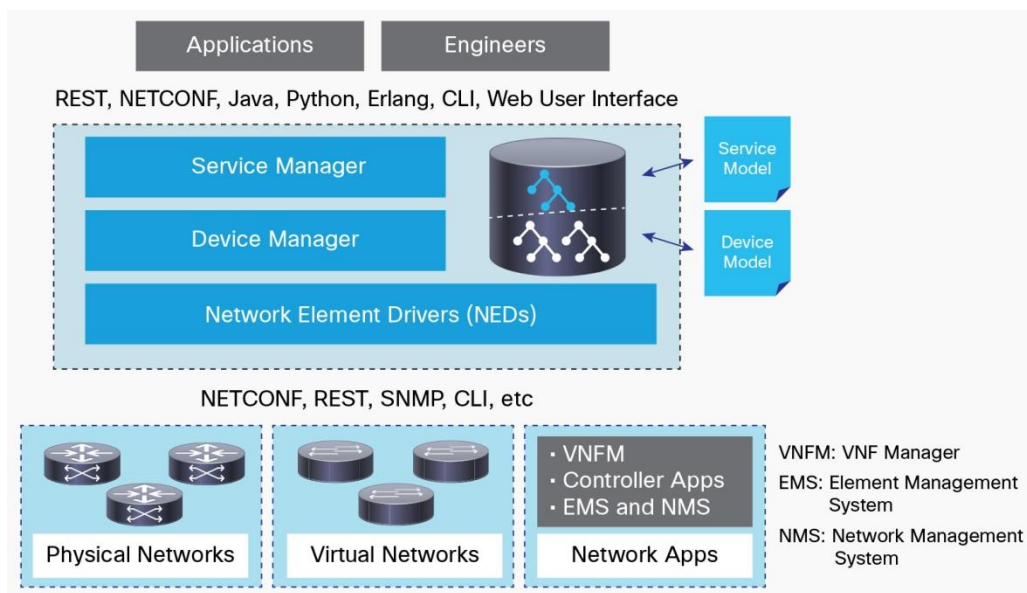
The service specifications are defined in semantic service models. Network Services Orchestrator can load these at run time. Examples include Layer 2 and Layer 3 VPNs, service chains, Border Gateway Protocol (BGP) peering, and access control lists (ACLs). The service manager provides full support for any service change, including arbitrary modifications in real time. The orchestrator renders the minimum configuration change for the devices to

achieve the desired service state. The device manager applies these changes in a transaction-safe approach to the network functions using the network element drivers (NEDs). Network Services Orchestrator ships with comprehensive multivendor support through the NEDs.

Orchestration is not solely about provisioning services. It also plays an important role in promoting adherence to service-level agreements (SLAs). As a vital part of the service orchestration, Network Services Orchestrator provisions assurance systems, deploys virtual probes, etc. to help make sure that the service is monitored.

Figure 2 shows the logical architecture for the orchestrator.

**Figure 2.** Cisco Network Services Orchestrator Logical Architecture



## Features and Benefits

Table 1 summarizes the main features and benefits of Network Services Orchestrator.

**Table 1.** Features and Benefits

| Feature   | Benefit   |
|---|---|
| <b>Model based</b>  | <ul style="list-style-type: none"> <li>Accelerates additions and changes to device vendors and service types</li> <li>Improves service agility and flexibility</li> </ul> |
| <b>Transactional</b>  | <ul style="list-style-type: none"> <li>No manual fallout</li> <li>No stale configurations</li> </ul>  |
| <b>Real-time, fine-grained, deep configuration changes (devices and services)</b> | <ul style="list-style-type: none"> <li>Allows centralized full control of all devices and services</li> </ul>   |
| <b>Configuration database synchronized with network</b>                           | <ul style="list-style-type: none"> <li>Promotes accurate and efficient use of network resources</li> </ul>  |
| <b>Full-service lifecycle management (create, modify, and decommission)</b>       | <ul style="list-style-type: none"> <li>Provides flexible dynamic services to end users</li> <li>No manual fallout</li> </ul>  |

| Feature   | Benefit   |
|---|---|
| <b>Multivendor and multiservice support</b>                           | <ul style="list-style-type: none"> <li>• Uses one system, one user interface, and one API to manage the whole network</li> </ul>                                |
| <b>Comprehensive set of northbound APIs, rendered from the models</b> | <ul style="list-style-type: none"> <li>• Easily integrates with northbound systems such as operation support systems (OSSs) and self-service portals</li> </ul> |
| <b>Networkwide unified command-line interface (CLI)</b>               | <ul style="list-style-type: none"> <li>• Provides a power tool for network engineers</li> <li>• Builds trust</li> </ul>   |
| <b>Extensible through APIs and package manager</b>                    | <ul style="list-style-type: none"> <li>• Provides DevOps model for orchestration</li> </ul>   |
| <b>Smart licensing</b>  | <ul style="list-style-type: none"> <li>• Offers simple compliance assurance with reporting of license entitlements and current use</li> </ul>                   |
| <b>Flexible consumption</b>   | <ul style="list-style-type: none"> <li>• Offers perpetual licensing and licensing by term subscription for 1 or 3 years</li> </ul>                              |

## Service Agility

Network Services Orchestrator simplifies the process of provisioning and controlling applications and services in both physical and virtual networks. It decouples network services from specific components, while automatically configuring the network according to the service specifications.

As a result, the addition of new services and devices is faster and easier and no longer requires custom code. The orchestrator reduces the time needed to design, deploy, and manage new services. It makes possible true, real-time service provisioning. It enables you to:

- Bring services to market faster
- Improve your service agility
- More quickly act on and identify new revenue opportunities
- Enhance operational efficiency

Network Services Orchestrator is designed to deliver consistent, transparent performance across a broad range of environments and platforms. It provides complete support for your physical and virtual network elements, with a consistent operational model across both. And it can perform orchestration across multiple vendor environments and support multiple technology stacks. This powerful, flexible solution lets you transform your business and engage customers with an attractive, robust set of service offerings.

The orchestrator is model based, with services and device configurations specified in declarative YANG data models. Therefore, you can modify your service offerings easily, without expensive services implementation, giving you the agility you need to bring services to market ahead of the competition.

Powered by sophisticated automation, Network Services Orchestrator lets you avoid slow, manual processes to deploy new services faster. Its true no-touch automated features also help you build operational excellence. You'll reduce human errors and repetitive manual work, while improving the quality of your applications and services.

The orchestrator provides both ETSI NFV orchestration, focusing on the application lifecycle, and service orchestration, focusing on the dynamic configuration of services. Network Services Orchestrator ships with an optional NFV manager (Elastic Services Controller), for virtual network functions (VNF) management.

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