

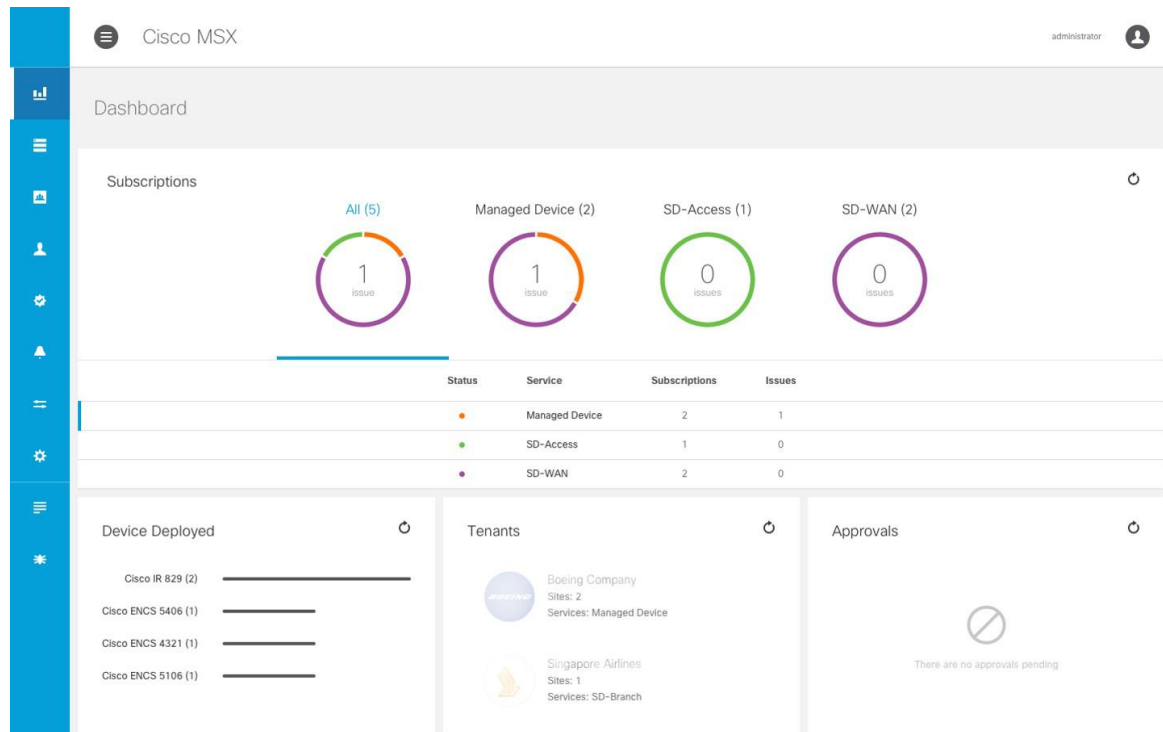


Cisco Managed Services Accelerator (MSX)

Contents

Cisco environmental sustainability	9
Cisco Capital	9

Cisco Managed Services Accelerator (MSX) is a multi-tenant, multi-service, cloud-native, service creation and delivery platform that helps service providers quickly, easily, and cost-effectively develop and deliver managed services to business customers.



Cisco Managed Services Accelerator helps service providers rapidly deliver managed network, security, and business services to market. Using MSX, service providers can create entirely new services from scratch or leverage pre-built service packs from Cisco. Whether deployed on site or as a cloud-based SaaS, MSX can be up and running with minimal integration costs and time, offering an unlimited range of managed services based on both virtual or physical network functions from both Cisco and third-parties.

In contrast to point solutions that support a limited number of fixed services, MSX is a true service creation platform that allows service providers to deliver differentiated services with greater end-customer value. Unlike do-it-yourself solutions that require large IT budgets and long lead times to build a system from the ground up, MSX can be deployed quickly and cost effectively. Using MSX, service providers can get to market immediately with pre-built service packs and/or develop fully-customized services on top of MSX to deliver a compelling competitive advantage.

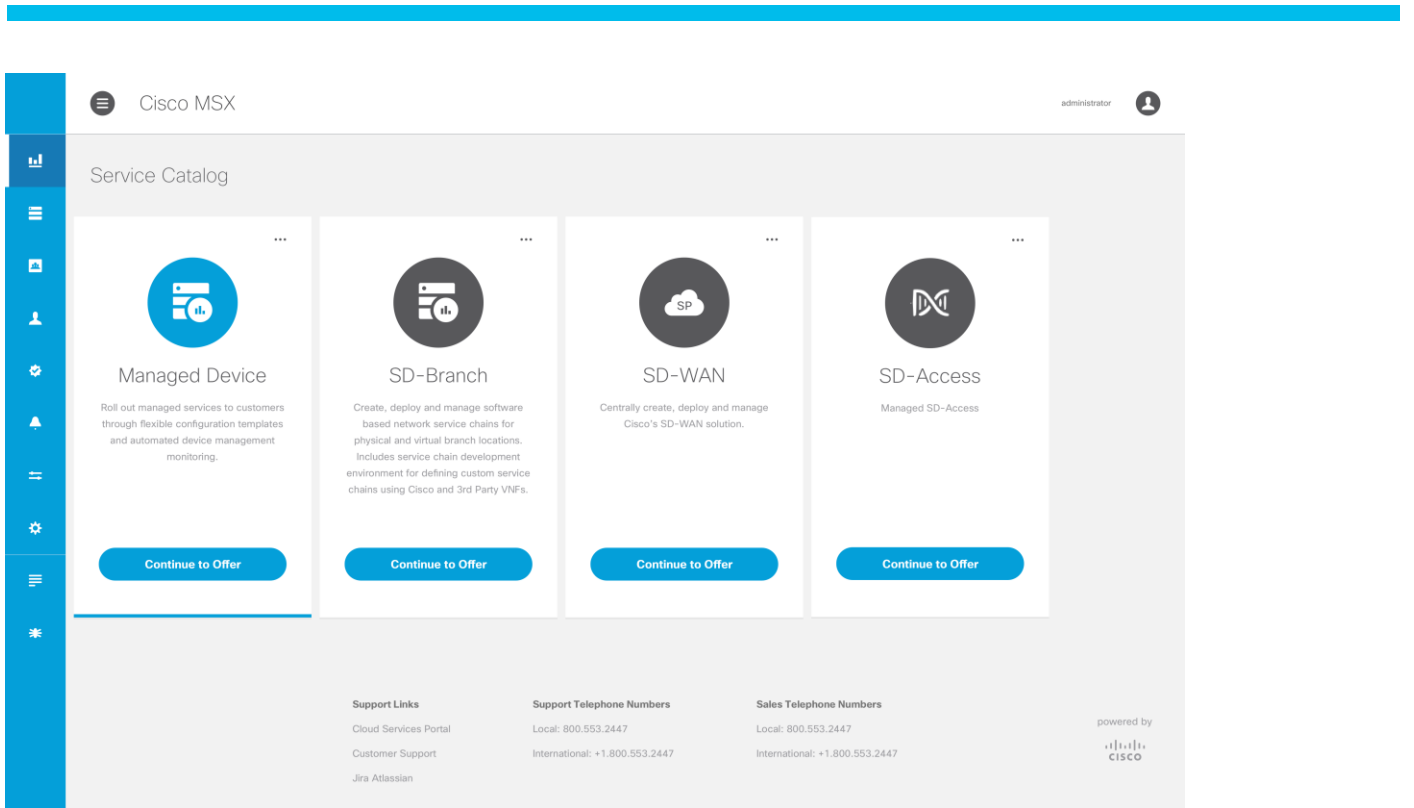


Table 1. Features

Strategic Features	Key Concepts
<p>Service Creation Platform</p>	<p>Multiple Tenants, Multiple Services</p> <p>MSX supports the simultaneous delivery of multiple services to multiple customers, whether those services are pre-built service packs purchased from Cisco or custom services developed by the service provider.</p> <p>Open API and SDK</p> <p>MSX implements an open API and SDK that enables service designers to build rich services. These APIs are the same ones used by Cisco’s own service designers to create pre-built service packs, so the full power of the platform is available to customers.</p> <p>Rich Templating</p> <p>MSX provides a rich templating environment for physical devices and VNFs, allowing service designers to create new services as topologies of VNFs, deployed to Cisco’s ENCS platform, or standard service topologies running on physical devices.</p> <p>Service Extensions</p> <p>Sometimes a pre-built service is just what you want, except for small changes/customizations for each customer. MSX’s service extension capability simply and easily allows for customization of a MSX Service on a site or customer basis, without having to modify the service internals.</p>

Strategic Features	Key Concepts
<p>Pre-Built Service Packs</p>	<p>Faster Time to Market Cisco offers pre-built, “plug and play” service packs for MSX that, once configured to the service provider’s network, allow service providers to go to market quickly with multiple services, such as ...</p> <p>SD-WAN Service Pack Cisco MSX has a pre-built service pack for Cisco SD-WAN, making it easy for service providers to quickly roll out feature-rich SD-WAN services that leverage the large installed-base of Cisco hardware.</p> <p>SD-Branch Service Pack Cisco’s SD-Branch service pack allows service providers to deploy templated configurations of VNFs to Cisco’s ENCS, UCS-C220, and CSP2100 CPE hardware systems.</p> <p>Managed Device Service Pack Cisco’s Managed Device service pack allows service providers to quickly and efficiently deploy and manage Cisco and third-party devices through a robust templating function.</p> <p>Meraki SD-WAN Service Pack MSX can attach to a tenant’s existing Meraki control plane, allowing managed service providers to easily create new Meraki sites and manage mixed SD-WAN environments from a single user interface.</p> <p>SD-Access Service Pack MSX SD-Access reduces opex and improves service quality by extending Cisco DNA Center to provide managed intent-based policy and LAN/WLAN provisioning with built-in multi-tenancy and federated monitoring.</p>
<p>OSS / BSS Integration</p>	<p>Billing API MSX generates appropriate billing events that can be attached to external, common billing systems to ensure that end-customers receive an integrated bill that includes services delivered through MSX as well as other services.</p> <p>Order Entry API The MSX order entry API allows external systems to place orders within MSX (useful when MSX is being front-ended by another service provider user-portal or other systems) and allows MSX to generate service ordering notifications to external BSS systems for proper service delivery workflow.</p> <p>User Identity API MSX supports user identity integration and single-sign on through standard SAML and OAUTH protocols, ensuring a smooth user experience.</p> <p>Service Assurance MSX naturally collects statistical data about service performance. This data can be viewed in MSX or pulled via API or streamed to external systems for viewing and analysis.</p>

Strategic Features	Key Concepts
Automated Orchestration	<p>Fully-Automated Service Delivery</p> <p>MSX automates service delivery to ensure low operating costs, eliminate configuration errors, and provide a smooth end-customer experience. Once a user specifies a desired service, MSX can deliver that new service with a simple mouse click. End-users can make sweeping changes to a service in the end-user portal and MSX can then reconfigure the devices if necessary.</p> <p>Model-Driven Orchestration using Cisco Network Services Orchestrator (NSO)</p> <p>MSX leverages the rock-solid reliability of Cisco NSO. Service providers who have already adopted NSO will find it easy to create new service packs for MSX to help deliver their existing NSO services.</p>
Cloud-Native Architecture	<p>Public Clouds</p> <p>MSX is implemented with Docker Containers, is fully API-driven, includes a micro-service framework, fully API-driven and VIM-agnostic, so it runs great on public clouds like Amazon Web Services, or Private Clouds running on OpenStack, helping service providers get to market quickly, with minimal infrastructure investment.</p> <p>Cisco NFVI</p> <p>For service providers who want to deliver cloud-based VNFs, private cloud infrastructure based on Cisco NFVI is often the most cost effective. An MSX installation can start small, with just a few servers, and scale up as required.</p>
Supports Virtual, Physical, and Third-Party functions	<p>Third-Party NFVI</p> <p>MSX also supports third-party NFVI configurations based on recent versions of OpenStack.</p> <p>Virtual and Physical</p> <p>While some systems only cater to virtual network functions or physical devices, MSX is completely agnostic and supports both. In fact, a single end-user service might include a combination of virtual networking functions and physical networking functions. MSX implements powerful service models for Cisco and 3rd Party devices using Cisco's world-class Network Services Orchestrator (NSO) and open REST APIs.</p> <p>An Open Platform</p> <p>Some SD-WAN and NFV systems are closed and restrictive, only allowing customers to use protocols, technologies, and VNFs from the same company. MSX is wide open. Service providers can easily add VNFs or physical devices from third parties, integrate with external systems, and develop their own services based on underlying third-party technology.</p>
Available as a Service	<p>Cloud-based SaaS</p> <p>MSXaaS delivers the Cisco Managed Services Accelerator in a cloud-based SaaS model, enabling rapid delivery of service offerings to market. With MSXaaS, SPs can quickly launch their MSX-based offerings using established operational models while minimizing impact to internal operations team. Cisco provides 24x7 operations, monitoring and incident management of the MSX platform and associated services. Continual updates maintain platform security, and ongoing security audits guard against security threats.</p>

Table 2. Specifications

Specifications	
Supported Service Packs	<p>Cisco SD-WAN</p> <p>Cisco SD-Branch</p> <p>Cisco Managed Device</p> <p>Cisco Meraki SD-WAN</p> <p>Cisco SD-Access</p>
Virtual Infrastructure Manager (VIM) Requirements	<p>Public Clouds: AWS requires 23 virtual machines for platform and one inception virtual machine for the installation.</p> <p>Private Clouds: OpenStack clouds with Keystone API v2 and v3 (identity), Nova API v2 (compute), and Cinder API v1 and v2 (volume storage). These requirements can be met with various commercial OpenStack distributions such as Red Hat OpenStack (RHOS).</p> <p>Cisco VIM 3.4 Cisco NFVI or Cisco NFVI Micropod.</p>
Installer Prerequisites for OpenStack	<p>Quota Requirements:</p> <p>Instances: 25</p> <p>Floating IP: 4</p> <p>Security Groups: 13</p> <p>Security Group Rules: 300</p> <p>vCPU: Minimum of 136</p> <p>Volume Storage: 361 GB</p> <p>RAM: 272 GB</p> <p>CentOS cloud image version: CentOS-7-x86_64-GenericCloud-1804</p> <p>Docker version 1.10.3</p>
Identity Management, Single Sign On, Authentication, and User Access Control	<p>Single Sign On: SAML</p> <p>Authentication: OAUTH2</p> <p>Role-Based Access Control (RBAC): Every user is assigned to one or more groups that control access to individual functionality within the MSX user interface. New groups can be created to reflect individual organizational structures or operational process requirements.</p>
APIs	<p>All user-accessible functionality within MSX is also accessible via a robust set of REST APIs. MSX events are propagated via REST or SMTP. All APIs are governed by the same authentication and access control system that also governs the user interface. MSX can interface with other systems easily and be driven fully via API calls, allowing for “headless” operation without the GUI if so desired.</p>
SDK	<p>MSX includes a comprehensive, Java-based Software Development Kit (SDK) to support enhancements of existing services or the development of new services. A Javascript UI library includes a variety of standard components that allow custom services to visually integrate with Cisco pre-built service packs.</p>
Service Extensions	<p>MSX Service Extensions provide a standard way for service providers to “tweak” and extend Cisco pre-built service packs without having to develop custom code. Using Service Extensions, a service provider can push additional configuration to devices that is not already included as part of the service definition provided by the service pack.</p>

Specifications	
Hardware Support	MSX supports both Cisco and third-party devices. Specific service packs may have specific requirements for hardware or firmware, depending on the functionality being delivered in the service pack. Support for specific hardware may require additional development on the part of the service provider. Service providers wanting to understand how specific hardware would be supported are encouraged to ask their Cisco sales teams for additional information.
Virtual Networking Function Support	MSX generally supports any and all Virtual Networking Functions (VNFs). Specific service packs may have specific requirements for VNFs, depending on the functionality being delivered in the service pack. Support for specific VNFs may require additional development on the part of the service provider. Service providers wanting to understand how specific VNFs would be supported are encouraged to ask their Cisco sales teams for additional information.
Simple, Customizable User Interface	<p>The MSX user interface provides a simple, unified view of the tenants and services under management and allows the service provider to deploy, view, manage, analyze, customize, and secure tenants' services quickly and easily ...</p> <p>Brandable: The MSX user interface and dashboards are customizable and "brandable" and support the integration of service provider logos and color schemes to provide direct end-customer access to MSX functionality.</p> <p>Service Catalog: MSX provides simple self-service catalogs that can be customized for every market segment to help Service Providers rapidly bring new service to market.</p> <p>Security: See "Identity Management, Single Sign On, Authentication, and User Access Control" section.</p> <p>Customer Self-Service: SP end-customers (tenants) can order, provision, configure, and monitor services via the MSX UI. MSX generates appropriate billing and operational events and passes those along to OSS and BSS systems via the MSX event API.</p> <p>Operator-Specific Views: Operators get a unified view across all end-customer tenants, including service status, service health, deployed services, etc. Operators can also manage all physical devices and VNFs across all end-customer tenants, performing regular device maintenance such as firmware and software updates. Finally, operators can perform numerous administrative tasks such as managing end-customer tenants, user, and deployed services on behalf of end-customer tenants.</p>
Orchestration	MSX provides full orchestration capabilities for underlying service hardware. This includes support for Cisco PnP Connect that automates the entire day-zero experience from device procurement to provisioning for complete and true Zero-Touch-Provisioning .
Service Monitoring and Telemetry	<p>Collectors: Agentless, using SNMP, SSH, ICM Service Extensions P, HTTP. Custom collectors can also be built using the SDK and API.</p> <p>Log collection using Syslog and Netflow.</p> <p>Searchable and queryable data implemented with a Cloud Native and scalable data platform, allowing service providers to manage service metrics and generate analytics across a massive number of tenants and devices.</p>

Cisco environmental sustainability

Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the “Environment Sustainability” section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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