

# Cisco Open SDN Controller 1.2

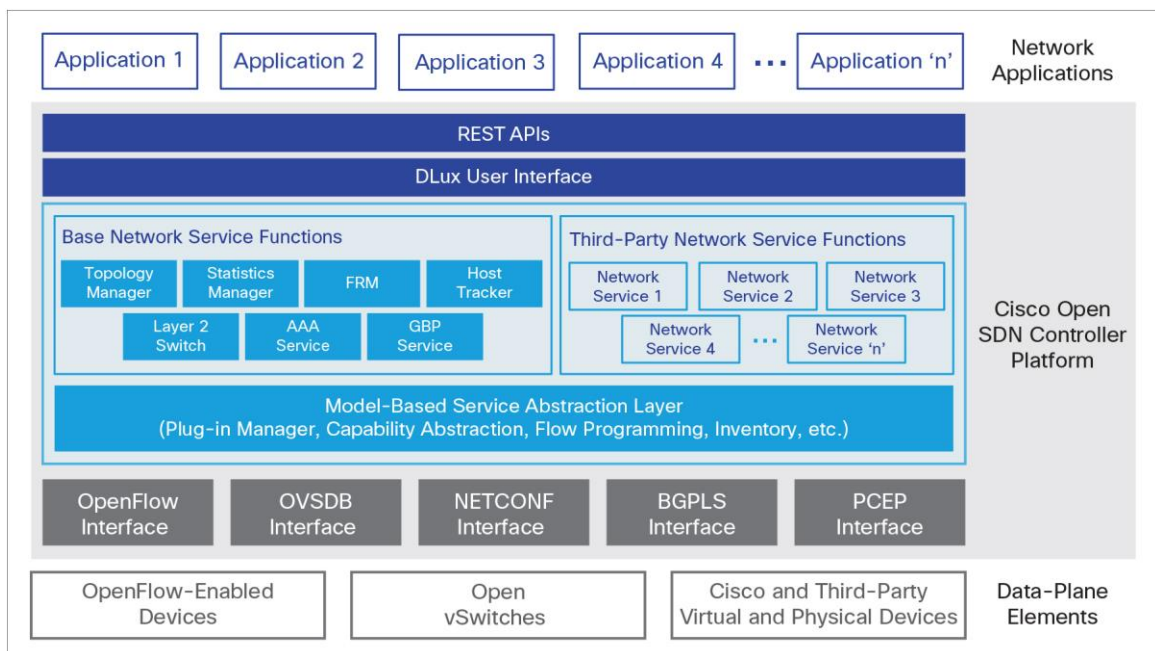
The Cisco<sup>®</sup> Open SDN Controller is Cisco's commercial distribution of the open source OpenDaylight software-defined networking (SDN) controller.

## Product Overview

The Cisco Open SDN Controller is a commercial distribution of [OpenDaylight](#) that delivers business agility through automation of standards-based network infrastructure.

Built as a highly scalable software-defined networking (SDN) platform, the Open SDN Controller abstracts away the complexity of managing heterogeneous networks to improve service delivery and reduce operating costs (Figure 1).

**Figure 1.** Cisco Open SDN Controller Platform



As an open source based software, the Open SDN Controller continuously advances through on-going Cisco innovation and the support of the OpenDaylight community.

Application demand is pushing IT to meet service and scale levels beyond what is possible with traditional networks. To accelerate IT, processes to provision, configure, operate and monitor networks must be automated and instrumented through abstraction based intelligence and control. Robust controller-based applications creation, integration, and verification support is provided through comprehensive development environment from [Cisco DevNet](#).

The Open SDN Controller is optimized for open source innovators who value “supported” open source SDN technologies, application developers building upon OpenDaylight, and environments like higher education that use technologies like OpenFlow to support heterogeneous network elements.

## Features and Benefits

Table 1 lists the main features and benefits of the Open SDN Controller.

**Table 1.** Features and Benefits

Feature	Benefit
<b>Commercial distribution</b>	Provides hardened, validated, and supported OpenDaylight software distribution
<b>Clustering</b>	Increases availability and scale
<b>Serviceability</b>	Provides monitoring, metrics collection, and log management
<b>OVA file packaging</b>	Simplifies installation and increases deployment flexibility
<b>Northbound Representational State Transfer (REST) APIs</b>	Allows easy integration of applications
<b>Network service Java APIs</b>	Enables the creation and support of new embedded network service functions to deliver custom controller capabilities
<b>Southbound device plug-ins</b>	<ul style="list-style-type: none"><li>• Connects compatible Cisco and third-party virtual and physical network elements</li><li>• Supports heterogeneous network environments</li></ul>

## Robust Application Development Environment

Cisco DevNet provides a robust application development environment for the Open SDN Controller. DevNet is a community for software developers who use Cisco technologies in their work. The DevNet portal is DevNet’s online presence through which software developers have access to APIs, software development kits (SDKs), sandboxes, support, community forums, and more to help them build applications based on Cisco products.

DevNet provides resources and support to bring your solutions online faster and with the highest possible quality. Whether you are a network engineer just starting to write code or an experienced software developer, DevNet helps you build applications to enhance and manage Cisco networks, or create new, network-enabled software applications for your customers. At the DevNet portal, you’ll find systems integration know-how, network management best practices, integrated server strategies, ready-to-use code samples, and software development sandboxes.

Joining the DevNet Community is free and easy. Developers who are DevNet members can take advantage of its many benefits and services, including:

- **APIs:** Get everything you need to build innovative Cisco technologies into your applications quickly and efficiently.
- **Developer sandbox:** This cloud lab service, available 24 hours a day every day, helps you get your applications to market fast and efficiently with zero deployment impact.
- **Community forums and exchanges:** Get access to Cisco technical experts as well as fellow developers who may have traveled the same path as you.
- **Interoperability verification testing:** Use Cisco’s approved testing methodology to test and certify platform integration.

**Note:** Cisco Solution Partners can use the Cisco Compatible logo after successful completion of interoperability verification testing.

For more information about the Open SDN Controller application development environment, visit [developer.cisco.com/site/openSDN](http://developer.cisco.com/site/openSDN).

## Platform Support

Table 2 lists the platforms that the Open SDN Controller supports.

**Table 2.** Platform Support

Product Family	Platforms Supported	Cisco Software Images (Feature Sets) Supported
<b>Cisco ASR 9000 Series Aggregation Services Routers</b>	Cisco ASR 9001, 9904, 9006, 9010, 9912, and 9922	<ul style="list-style-type: none"> <li>• Cisco IOS® XR Software 5.2.0, with OpenFlow 1.0 and 1.3 and Border Gateway Protocol - Link State (BGP-LS)</li> <li>• Cisco IOS XR Software 5.3.0L, with Path Computation Element Communication Protocol (PCEP)</li> </ul>
<b>Cisco Nexus® 3000 Series Switches</b>	Cisco Nexus 3016Q, 3048, 3064X, 3064-32T, 3064T, 3132Q, 3132Q-X, 3172PQ, 3172TQ, 3524 and 3548	Cisco NXOS® Software 6.0(2)U4(1), ofa1.1.5, with OpenFlow 1.3
<b>Cisco Catalyst 4500X Series Switches</b>	Cisco Catalyst 4500X-40 SFP+, 4500X-32 SFP+, 4500X-24 SFP+, 4500X-16 SFP+, 4500X-F-32 SFP+, 4500X-F-16 SFP	Cisco Catalyst Software 3.7.1, ofa2.0.0 with OpenFlow 1.3
<b>Cisco Catalyst 4500 Series Routers</b>	Cisco Catalyst 4500 E Series with Supervisor cards SUP7E, SUP7LE and SUP8E	Cisco Catalyst Software 3.7.1, ofa2.0.0 with OpenFlow 1.3

## Licensing

The Open SDN Controller is available through a software subscription license that entitles customers to use the controller software for a specified term.

Two types of Open SDN Controller licenses are available: the Base license and the Node Connection license.

- **Base license:** This license allows the controller to be deployed in either a 1-node or 3-node clustered configuration. A single Base license is required for each Open SDN Controller deployment.
- **Node Connection license:** This license enables connection between an Open SDN Controller southbound interface and a controlled physical or virtual device. Node Connection licenses are generic and are not specific to the interface type.

Node Connection licenses are available in bundles for 50, 100, 250, 500, or 1000 node connections and can be combined as needed to achieve a total licensed device count. Node Connection licenses are available for 1-, 3-, and 5-year terms.

## Product Specifications

Table 3 presents the specifications for the Open SDN Controller.

**Table 3.** Product Specifications

Item	Specification
<b>Southbound plug-ins</b>	<ul style="list-style-type: none"> <li>• OpenFlow</li> <li>• NETCONF</li> <li>• BGP-LS</li> <li>• PCEP</li> <li>• OVSDB</li> </ul>
<b>OpenFlow support</b>	<ul style="list-style-type: none"> <li>• OpenFlow 1.0 <ul style="list-style-type: none"> <li>◦ Link Layer Discovery Protocol (LLDP) topology</li> <li>◦ Transport Layer Security (TLS) 1.2</li> <li>◦ Basic Layer 2 and 3 flows</li> </ul> </li> </ul>

Item	Specification
	<ul style="list-style-type: none"> <li>◦ Address Resolution Protocol (ARP) header support: match on source and destination IP address and source and destination MAC address</li> <li>◦ Normal action</li> <li>● OpenFlow 1.3 <ul style="list-style-type: none"> <li>◦ Multiprotocol Label Switching (MPLS)</li> <li>◦ QinQ</li> <li>◦ Group table: All, Fast Failover, and IP Hop</li> <li>◦ Logical interface</li> <li>◦ IPv6 header: source IP address, destination IP address, and flow label extension header</li> <li>◦ Provider Backbone Bridging (PBB) 1.3</li> <li>◦ Metering tables</li> <li>◦ Internet Control Message Protocol (ICMP) Version 6 Neighbor Discovery support: target IP address, source link layer, and destination link layer</li> </ul> </li> <li>● Cisco Multiprotocol Label Switching (MPLS) extensions (set Virtual Routing and Forwarding [VRF], set next hop, and set Forward Class [FCID])</li> </ul>
<b>Open vSwitch Database Management Protocol (OVSDB) support</b>	<ul style="list-style-type: none"> <li>● Connection Service</li> </ul>
<b>NETCONF support</b>	<ul style="list-style-type: none"> <li>● RFC 6241 <ul style="list-style-type: none"> <li>◦ Read configuration (get and get-config)</li> <li>◦ Edit configuration</li> <li>◦ Copy configuration</li> <li>◦ Delete configuration</li> <li>◦ Notifications</li> </ul> </li> </ul>
<b>YANG support</b>	<ul style="list-style-type: none"> <li>● RFC 6020</li> <li>● OpenDaylight YANG models at <a href="https://wiki.opendaylight.org/view/YANG_Tools:Available_Models">https://wiki.opendaylight.org/view/YANG_Tools:Available_Models</a></li> </ul>
<b>BGP-LS support</b>	<ul style="list-style-type: none"> <li>● RFC 1997</li> <li>● RFC 4271</li> <li>● RFC 4360</li> <li>● RFC 4760</li> <li>● RFC 6793</li> <li>● draft-ietf-idr-ls-distribution-11</li> </ul>
<b>PCEP support</b>	<ul style="list-style-type: none"> <li>● RFC 5440</li> <li>● RFC 5541</li> <li>● RFC 5455</li> <li>● RFC 5521</li> <li>● RFC 5557</li> <li>● draft-ietf-pce-stateful-pce-07</li> <li>● draft-ietf-pce-pce-initiated-lsp-00</li> <li>● draft-sivabalan-pce-segment-routing-05</li> <li>● draft-sivabalan-pce-lsp-setup-type-03</li> </ul>
<b>Embedded applications</b>	<ul style="list-style-type: none"> <li>● Cisco OpenFlow Manager</li> <li>● Cisco PCEP Manager</li> <li>● Cisco BGP/LS Manager</li> <li>● Cisco Inventory Manager</li> <li>● Model Explorer</li> <li>● Tags Manager</li> </ul>
<b>Base services</b>	<ul style="list-style-type: none"> <li>● Model-Driven Service Abstraction Layer (MD-SAL)</li> <li>● Topology Manager</li> <li>● Statistics Manager</li> <li>● Switch Manager</li> <li>● Forwarding Rules Manager</li> <li>● Host Tracker</li> <li>● ARP Manager</li> </ul>
<b>Services container</b>	<ul style="list-style-type: none"> <li>● Karaf: <a href="http://karaf.apache.org/">http://karaf.apache.org/</a> (3.0.1)</li> </ul>

Item	Specification
<b>Clustering</b>	<ul style="list-style-type: none"> <li>• Northbound REST APIs</li> <li>• Network services</li> <li>• OpenFlow southbound plug-ins</li> <li>• Consolidated logs, monitoring, and metrics</li> <li>• Data store</li> <li>• VIP (Virtual IP address) support</li> <li>• Enhanced Clustering</li> </ul>
<b>Serviceability</b>	<ul style="list-style-type: none"> <li>• Log management</li> <li>• Monitoring and metrics collection (CPU, memory, disk, and network interface utilization)</li> </ul>
<b>Web UI support</b>	<ul style="list-style-type: none"> <li>• Chrome (43.0 and above)</li> <li>• FireFox (34.0 and above)</li> </ul>
<b>Role-Based Access Control</b>	<ul style="list-style-type: none"> <li>• LDAP</li> <li>• RADIUS</li> </ul>

## System Requirements

The Open SDN Controller is distributed as an Open Virtualization Archive (OVA) file. Table 4 lists the system requirements for the Open SDN Controller OVA.

**Table 4.** System Requirements

<b>Disk space</b>	Minimum 64 GB required
<b>Hardware</b>	Intel 4-core processor
<b>Memory</b>	Minimum 16 GB of RAM required
<b>Hypervisor</b>	<ul style="list-style-type: none"> <li>• VMware ESXi 5.1 or later</li> <li>• Oracle Virtual Box 4.3 or later*</li> </ul>

\* Currently configured with 2 vcpus and 8GB memory to facilitate bootup in smaller order machines

## Ordering Information

The Open SDN Controller is available and shipping. To place an order, visit the [Cisco Commerce Workspace](#).

## Warranty Information

For more information about the Open SDN Controller warranty, visit <http://www.cisco.com/go/warranty>.

## Cisco and Partner Services

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing Cisco SDN solutions. The innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operation efficiency and improve your data center network. Cisco Advanced Services uses an architecture-led approach to help you align your network infrastructure with your business goals and achieve long-term value. Cisco SMARTnet™ Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. Spanning the entire network lifecycle, Cisco Services offerings help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise. For more information, please visit <http://www.cisco.com/go/services>.

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### For More Information

To learn more about the Cisco Open SDN Controller, visit [cisco.com/go/opensdn](http://cisco.com/go/opensdn).

For more information about other Cisco SDN solutions, visit [cisco.com/go/sdn](http://cisco.com/go/sdn).



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