Cisco Cloud Services Platform 2100

Turnkey and Open Data Center NFV Platform for Cisco and Third-Party Virtual Network Functions.

Product Overview

The Cisco® Cloud Services Platform (CSP) 2100 is a turnkey, open, x86 Linux Kernel-based Virtual Machine (KVM) software and hardware platform for data center Network Functions Virtualization (NFV). The platform enables network, security, and load balancer teams to quickly deploy any Cisco or third-party network virtual service through a simple, built-in native web User Interface (UI) (Figure 1), Command-Line Interface (CLI) (Figure 2), REST API (Figure 3), or NetConf/Yang using Cisco's Network Services Orchestrator (NSO) or any other northbound management and orchestration system. Any or all management interfaces can be used. The CSP 2100 is delivered as an appliance in 1-Rack-Unit (1RU) and 2RU form factors (Figure 4).

The CSP 2100 is a base NFV platform for Cisco's Secure Agile Exchange, which securely connects users, including employees, customers, and partners, to applications. In short, Secure Agile Exchange is a next generation Demilitarized Zone (DMZ) based on NFV and advanced security.

Figure 1. CSP 2100 Native Web UI

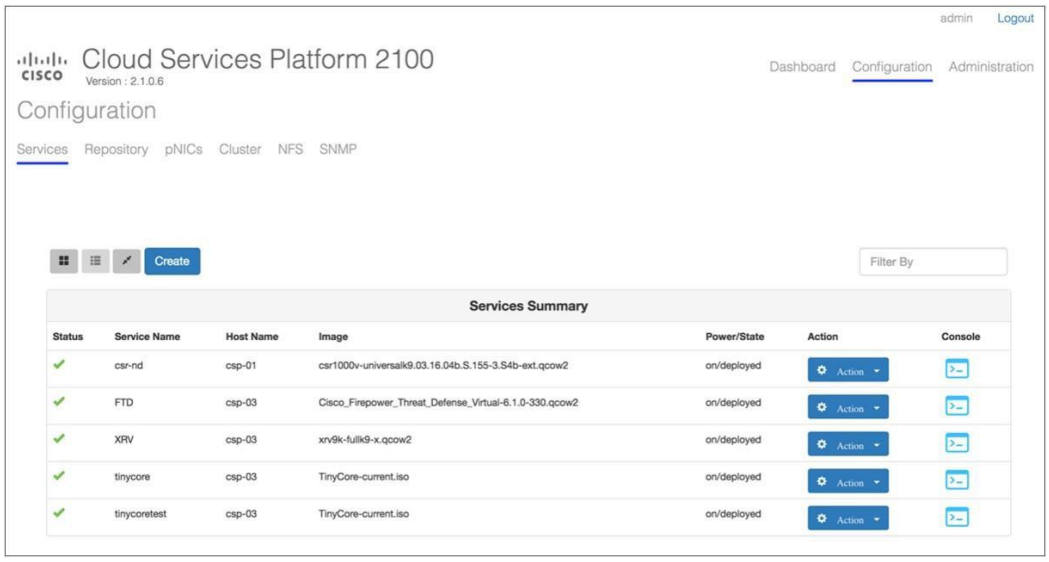


Figure 2. CSP 2100 CLI

```
csp-node-a# conf t
Entering configuration mode terminal
csp-node-a(config)# service csr1k
csp-node-a(config-service-csr1k)#  memory       2048
csp-node-a(config-service-csr1k)#  numcpu       1
csp-node-a(config-service-csr1k)#  macid        0
csp-node-a(config-service-csr1k)#  disk_size    4.0
csp-node-a(config-service-csr1k)#  iso_name     csr1000v-universalk9.03.16.01a.S.155-3.S1a-ext.qcow2
csp-node-a(config-service-csr1k)#  power        on
csp-node-a(config-service-csr1k)#  crypto_bw    0
csp-node-a(config-service-csr1k)#  vnc_password cisco
csp-node-a(config-service-csr1k)#  vnic 0
csp-node-a(config-vnic-0)#   tagged       false
csp-node-a(config-vnic-0)#   type         access
csp-node-a(config-vnic-0)#   model        e1000
csp-node-a(config-vnic-0)#   network_name eno16780032
csp-node-a(config-vnic-0)#  !
csp-node-a(config-vnic-0)#  vnic 1
csp-node-a(config-vnic-1)#   tagged       false
csp-node-a(config-vnic-1)#   type         access
csp-node-a(config-vnic-1)#   model        e1000
csp-node-a(config-vnic-1)#   network_name int_net_1
csp-node-a(config-vnic-1)#  !
csp-node-a(config-vnic-1)#  serial_port 0
csp-node-a(config-serial_port-0)#   serial_type  telnet
csp-node-a(config-serial_port-0)#   service_port 9010
csp-node-a(config-serial_port-0)#
csp-node-a(config-serial_port-0)# commit
Commit complete.
csp-node-a(config-serial_port-0)# end
csp-node-a# show service
NAME       POWER   STATE     VNC PORT  PROXY VNC_PORT UPTIME       CPU_LOAD  DISK_USED_MB   MEM_USED_KB    CRYPT
O_BW MB ERROR
================================================================================================================
================
csr1       on      deployed  5900      8785           4D50m55s     41        1024.0         2135656        0
       None
csr1k      on      deployed  5902      8787                                                                   0
       None
csr2       on      deployed  5901      8786           4D37m38s     27        1024.0         3631660        0
       None
csp-node-a#
```

Figure 3. CSP 2100 REST API, Showing the Provisioning of a VM

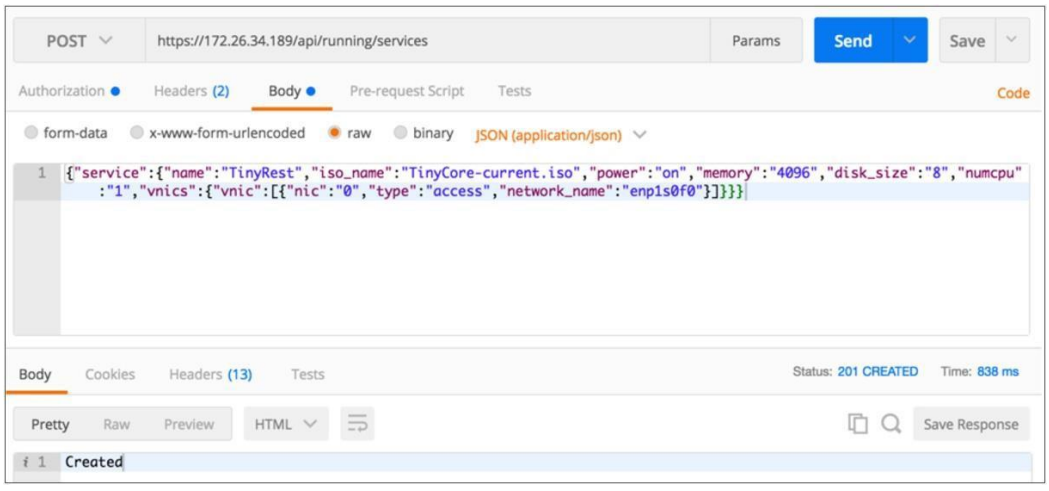


Figure 4. CSP 2100 Hardware Form Factors: 1RU and 2RU Platforms

Overview

Most applications have been virtualized over the past decade, and now the same trend is occurring for network services. With this trend, often referred to as network functions virtualization or NFV, network services can be deployed and managed much more flexibly, because they can be implemented in a virtualized environment using x86 computing resources instead of purpose-built dedicated hardware appliances. The CSP 2100 can assist you in making this technology transition.

Today's Challenges

Do your network, security, and load balancer teams have the ability to easily and quickly deploy virtual network services? Can your teams bring up these services at the pace that the DevOps and server teams need (within minutes)? In data centers and colocation facilities today, network services primarily run on purpose-built hardware appliances. This approach is inflexible in that you are locked into a single function on each physical network appliance for the life of the appliance, resulting in stranded resources. You often have to wait weeks or even months for new hardware.

These are some of today's challenges for data center teams deploying virtual network services:

- Keeping pace with the server team: Can the network, security, and load balancer teams deploy a virtual network service within minutes?
- Commercial hypervisor product and support costs
- OpenStack complexity: It is still too complex for many organizations
- OpenStack overhead: It requires five to eight hosts just to get started
- Little or no access to VMware vCenter Server or Microsoft System Center VMM and computing resources
- Lack of a tool set to manage virtual services
- Lack of Linux OS expertise
- Low comfort level with dedicated hardware appliances

Solution

A solution that provides the agility of software with the performance of hardware can reduce both time and expense. That solution is the CSP 2100. Any Virtual Network Function (VNF) supporting the KVM hypervisor can run on the CSP 2100. From the edge of your network to your server farm or point of presence, you can virtualize services with the CSP 2100 to optimize your resource use, hosting several virtual services per node and extending your equipment lifecycle through reuse. And faster deployment of new virtual services can help you better support your users and applications.

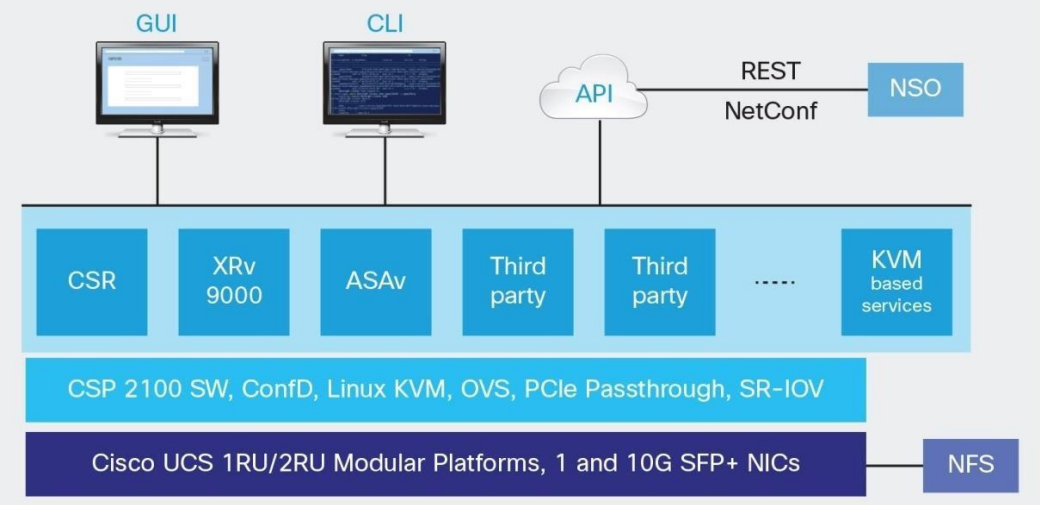
Why are customers choosing the CSP 2100?

- Operational simplicity
- Turnkey appliance that is up and running in 5 minutes
- Open NFV platform for both Cisco and third-party VNFs
- Network-friendly CLI syntax and a very intuitive GUI
- Automation and speed

What Is the CSP 2100?

The CSP 2100 is an x86 software and hardware platform designed to host and manage any VNF based on the KVM hypervisor (Figure 5). It provides basic lifecycle management by enabling its users to create, modify, upgrade, and shut down virtual machines at a moment's notice through an easy-to-use GUI, CLI, REST API, and/or NetConf/Yang interface.

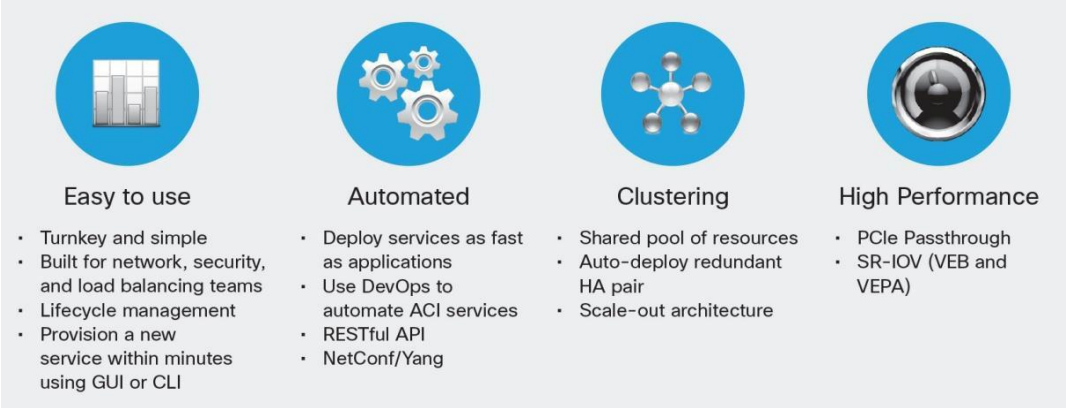
Figure 5. CSP 2100 High-Level Architecture



Why Consider the CSP 2100?

Replace dedicated network appliances with the agility and flexibility of software that offers near-hardware performance (Figure 6).

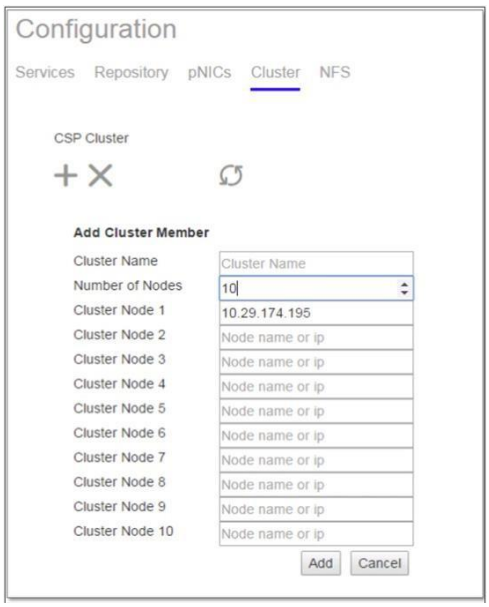
Figure 6. CSP 2100 Primary Benefits



Clustering

Clustering allows you to create a pool of CSP 2100s from which to launch and mange VNFs. Users can log in to any node within a cluster and see what's going on across the cluster. Clustering can be configured via the GUI, CLI, REST API, or NetConf (Figure 7).

Figure 7. Clustering Using the GUI or CLI



```
csp-03# config
CSP(config)# cluster mycluster
CSP(config-cluster-mycluster)# node 10.1.1.10
CSP(config-cluster-mycluster)# node 10.1.1.11
CSP(config-cluster-mycluster)# node 10.1.1.12
CSP(config-cluster-mycluster)# commit
CSP(config-cluster-mycluster)# exit
```

What VNFs Can I Run?

Since the CSP 2100 is built on Linux, you can host any Cisco or third-party VNF that supports the KVM hypervisor. Some of the Cisco VNFs available include the following:

- Cisco Cloud Services Router (CSR) 1000V virtual router
- Cisco IOS® XRv 9000 Router
- Cisco Adaptive Security Virtual Appliance (ASAv)
- Cisco Firepower™ NGFW Virtual
- Cisco Prime® Virtual Network Analysis Module (vNAM)
- Cisco Virtual Wide Area Application Services (vWAAS)
- Cisco Web Security Virtual Appliance (WSAv)
- Cisco Virtual Security Gateway (VSG) for Cisco Nexus® 1000V Series Switch deployments
- Cisco Virtual Supervisor Module (VSM) for Cisco Nexus 1000V Series Switch deployments
- Cisco Data Center Network Manager (DCNM)

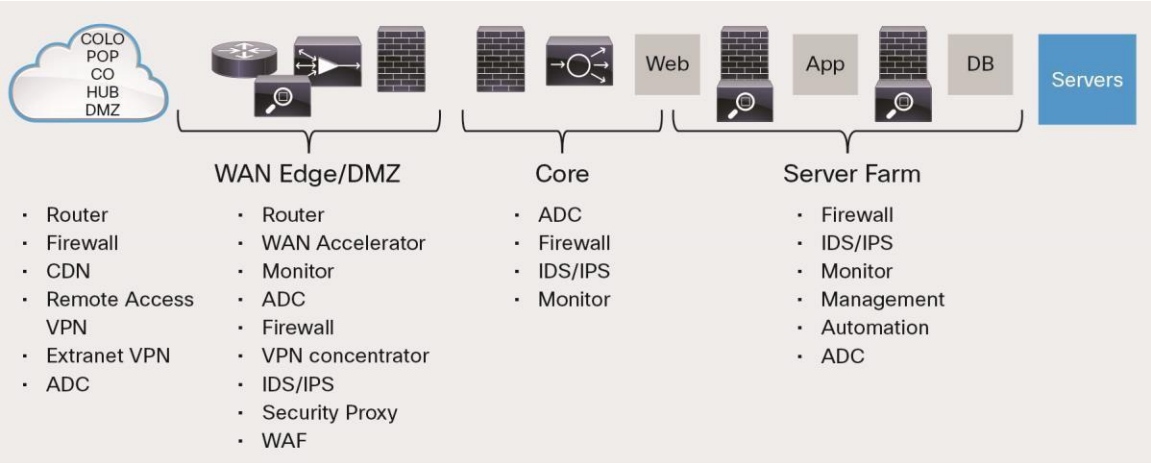
The CSP 2100 supports a wide variety of VNFs from third-party vendors, including firewalls, load balancers, and other value-added services. Several third-party VNFs can be run on the CSP 2100, but for the best experience and to obtain Cisco Solutions support customers should deploy VNFs that are certified as a part of the Cisco Third Party VNF Ecosystem. For information on the Cisco Third Party VNF Ecosystem and which VNFs are certified and supported on the CSP 2100 see here:

https://www.cisco.com/c/dam/en/us/solutions/collateral/enterprise-networks/enterprise-network-functions-virtualization-nfv/nfv-open-ecosystem-qualified-vnf-vendors.pdf

Where Can I Use the CSP 2100?

The CSP 2100 is being deployed within data centers, colocation centers, the WAN edge, the DMZ, and even at a Service Provider's Point-of-Presence (PoP). The CSP 2100 can bring up routers, monitoring tools, WAN acceleration tools, and firewalls in a pooled environment, as well as load balancers where needed. In the data center, it can serve north-south services such as load balancers and firewalls to the server farm. And in the server farm, it can serve east-west services such as firewalls and load-balancing and monitoring services (Figure 8).

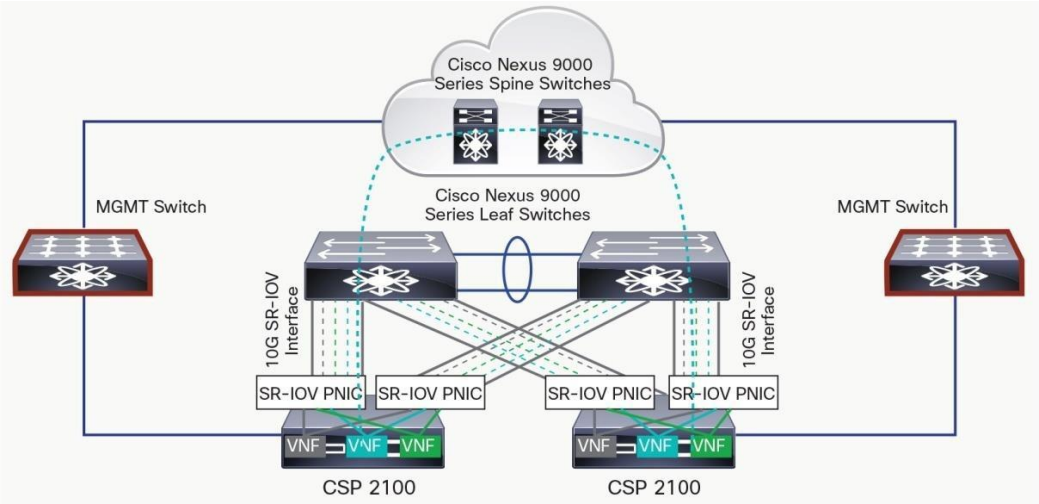
Figure 8. Places in the Network for the CSP 2100



How is the CSP 2100 being deployed?

Most designs are leveraging SR-IOV connectivity for near line-rate performance along with a data center fabric using a spine and leaf architecture provided by Cisco Nexus 9000 Series Switches (Figure 9).

Figure 9. Sample High Availability SR-IOV Connectivity Design



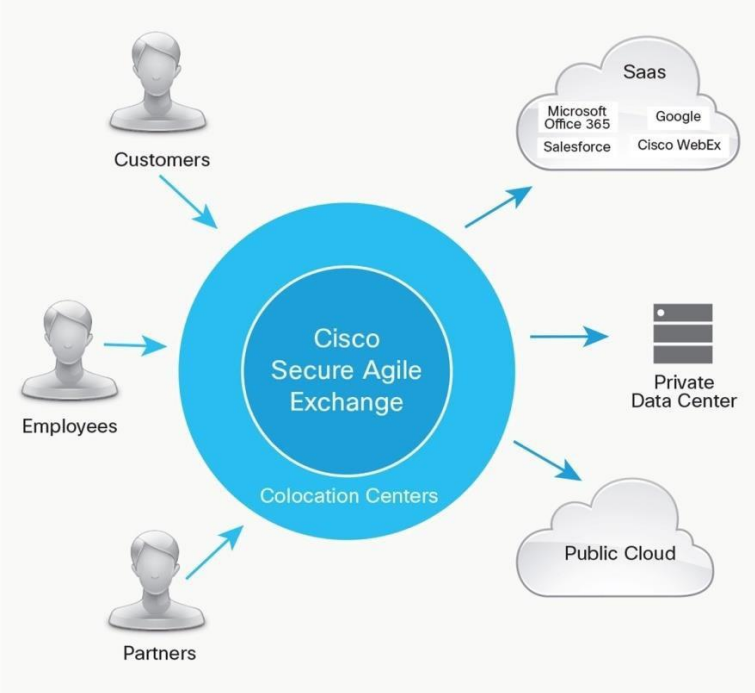
Cisco Secure Agile Exchange

With CSP 2100 as the base NFV platform, Secure Agile Exchange securely connects users, including employees, customers, and partners, to applications. By deploying Secure Agile Exchange in colocation centers or data centers, you can virtualize network services as well as other applications and consolidate them into a single platform. This makes it simple to deploy and manage, and can reduce costs (Figure 10).

Secure Agile Exchange consists of the following:

- NFV platform: CSP 2100
- Switching fabric: Cisco Nexus 9000 Series Switches
- Networking services: Cisco Cloud Services Router 1000V, Adaptive Security Virtual Appliance, Cisco Firepower NGFW Virtual, and third-party VNFs
- Services
  - Cisco advisory and implementation services
  - Cisco managed services

Figure 10. Secure Agile Exchange



Product Specifications

Table 1. Product Specifications

Item	Specification
Chassis	1-Rack-Unit (1RU): Based on Cisco UCS® C220 M4 (UCSC-C220-M4S) 2-Rack-Unit (2RU): Based on Cisco UCS C240 M4 (UCSC-C240-M4SX)
Processors	2x Intel® Xeon E5-2600 v3 and v4 Series processors
Memory	16 GB DDR4-2133-MHz RDIMM/PC4-17000/dual rank/x4/1.2v 16 GB DDR4-2400-MHz RDIMM/PC4-19200/single rank/x4/1.2v 32 GB DDR4-2400-MHz LRDIMM/PC4-19200/quad rank/x4/1.2v Up to 24x DIMM slots Up to 768 GB of RAM

Item	Specification
Network interface cards	Intel i350 LAN on Motherboard (LOM) (2 x 1 Gigabit Ethernet) Intel i350 modular LOM (mLOM) (4 x 1 Gigabit Ethernet) Intel X520 dual-port 10-Gbps SFP+ adapter (Niantic) Intel XL710-DA4 quad-port 10-Gbps SFP+ adapter (Fortville)
Networking	PCIe Passthrough Single-root I/O virtualization (SR-IOV): • Virtual Ethernet Bridge (VEB) • Virtual Ethernet Port Aggregator (VEPA) Open Virtual Switch (OVS) Edit running VM vNIC configuration without taking the service down Port channeling Macvtap E1000 VirtIO
PCIe slots	1RU platform: Up to 2x PCI Express (PCIe) 3.0 slots 2RU platform: Up to 6x PCI Express (PCIe) 3.0 slots
Hard drives	SFF HDDs or SSDs Hot-swappable, front-accessible drives 1RU platform: Up to 8x drives 2RU platform: Up to 24x drives
RAID	12-Gbps SAS modular RAID controller 12-Gbps SAS 4-GB Flash-Backed Write Cache (FBWC) module RAID 10
Cisco Integrated Management Controller (IMC)	Integrated Baseboard Management Controller (BMC) IPMI 2.0 compliant for management and control 1x 10/100/1000 Ethernet out-of-band management interface CLI and web GUI management tool for automated, lights-out management KVM
Management and operations	GUI CLI REST API NetConf/Yang Secure Shell Version 2 (SSHv2) Syslog Simple Network Management Protocol (SNMP) (IF MIB for PNIC, IF UP/DOWN TRAP, ENTITY MIB) Multiple virtual serial consoles (for supporting the Cisco IOS XRv 9000 Router and other VNFs)
Cisco FlexFlash	2 x 64-GB Secure Digital (SD) cards
Internal USB	16-GB USB flash drive
Rail kit	Ball-bearing rail kit
Power supplies	1RU platform: 770W AC hot-pluggable power supply (1 or 2) 1050W V2 -48 VDC power supply (1 or 2) 2RU platform: 1200W/800W V2 AC power supply (1 or 2) 930W V2 DC power supply (1 or 2)
VNF disk types	IDE and VirtIO
VNF image types	*.iso *.ova *.qcow/qcow2 *.raw *.vmdk

Item	Specification
Access control	Ability to disable any unused interfaces Option to dedicate CSP 2100 management port Option to dedicate VNF management port Management Access Control List (ACL) Role-Based Access Control (RBAC) Authentication, Authorization, and Accounting (AAA) • TACACS+ • RADIUS
Automation	Day-zero config file support Ability to save service templates REST API and NetConf/Yang Cisco Network Services Orchestrator (NSO) integration
Storage	Local (HDDs or SSDs) NFS • Support loading a VNF image from an NFS location • Allocate NFS disk location for VM creation Support for multiple disks (local or NFS)
Clustering	Pool resources to n number of nodes Scale-out on demand Automate resource management GUI supports up to 10x nodes
Backup	Appliance-level running configuration backup and restore (local or NFS storage) VNF data backup and restore (local or NFS storage)

Ordering Information

Table 2. Ordering Information

Part Number	Product Description
CSP-2100	Data Center NFV Platform [fixed 1RU configuration]
CSP-2100-HA	Data Center NFV Platform [2-node cluster; fixed 1RU configuration]
CSP-2100-X1	Data Center NFV Platform [modular 1RU configuration]
CSP-2100-X2	Data Center NFV Platform [modular 2RU configuration]
CSP-2100-HA-N1K-48	Data Center NFV Platform [2-node cluster; fixed 1RU configuration; 48x Nexus 1000V licenses]
CSP-2100-HA-N1K-96	Data Center NFV Platform [2-node cluster; fixed 1RU configuration; 96x Nexus 1000V licenses]
CSP-N2XX-AIPCI01=	Intel X520 Dual Port 10-Gbps SFP+ Adapter
CSP-PCIE-IQ10GF=	Intel XL710 quad-port 10-Gbps SFP+ Adapter
CSP-SFP-1WSR=	SFP+ for Intel X520, 10 GE, SR Optical

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cloud Services Platform 2100. The innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operational efficiency and improve your IT infrastructure. Cisco Advanced Services use an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco Smart Net Total Care 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 help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise. For more information, please visit https://www.cisco.com/go/services.

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For More Information

For additional information about the Cisco CSP 2100, visit https://www.cisco.com/go/csp.

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