



Lifecycle Management for Virtual Machine Applications Configuration Guide, Cisco IOS XE Fuji 16.7.x

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Revised: March 14, 2018,

IOx: Support 3rd Party Apps in KVMs

The IOx: Support 3rd Party Apps in KVMs feature enables fog computing on Cisco IOS. IOx provides support for implementation of third party applications (KVMs) on Cisco network edge devices and across multiple hardware platforms. The IOx: Support 3rd Party Apps in KVMs feature supports Local Manager which is the Web UI supported by Cisco Application Hosting Framework (CAF) and also supports Fog Director which is the centralized management engine which can be used to manage the entire lifecycle of an application.

Information About IOx: Support 3rd Party Apps in KVMs

The IOx: Support 3rd party apps in KVMs feature provides support for hosting multiple 3rd party applications (KVM's) on the same hardware. The IOx: Support 3rd party apps in KVMs feature provides an SDK and also supports virtualization. Each VM is independent of the other and resources are shared among the VM's. The developer can specify resources that is to be allocated for each VM.

The IOx: Support 3rd party apps in KVMs feature provides a platform that allows you to manage the entire life cycle of applications including development, distribution, deployment, hosting, monitoring, and management. The reporting module provides effective monitoring capabilities for maximizing security while connecting the applications and services to the cloud. ASR1K NPTv6 allows for greater reliability as it provides support for multihoming and load balancing and achieves the translation without breaking the end-to-end reachability at the network layer.

Benefits of Using IOx: Support 3rd Party Apps in KVMs

The IOx: Support 3rd party apps in KVMs feature provides a common software infrastructure to host applications in network devices in such a way that they are independent of the hardware the applications are hosted on.

The IOx: Support 3rd party apps in KVMs feature supports Local Manager which is a user friendly interface that is provided for making it easy for the developers and the administrators to build and deploy IOx applications across multiple hardware platforms. IOx also provides a set of services that can be used to accelerate the development of IOx applications and supports complete life cycle management capabilities for applications hosted on network devices.

Fog Director is supported by the IOx: Support 3rd party apps in KVMs feature which enables you to perform actions like start or stop, uninstall, and upgrade applications. Fog director supports can be scaled to support up to 5000 devices which enables you to perform lifecycle enablement tasks on a large number of devices simultaneously, with minimal delay. You can also monitor applications installed on all devices and can also troubleshoot applications and the application enablement infrastructure using the Fog Director.

Restrictions for IOx: Support 3rd Party Apps in KVMs

- IOx supports only VM style applications. LXC (container applications) is not supported.
- IOx is not backward compatible with Vman. If an application is deployed using Vman CLI, IOX does not support it.
- IOx: Support 3rd Party Apps in KVMs does not support concurrent requests from multiple clients. You cannot use Fog-director or Local manager simultaneously for any operation.
- The maximum number of applications that can be in running state at any instant is 4. This is consistent across all Polaris platforms.
- For ASR1K, the maximum VCPU per application is 1 and maximum CPU resource per application is limited to 12% even if you request for more.

Prerequisites for Configuring IOx: Support 3rd Party Apps in KVMs

Make sure that you have a router that has a hard-disk or NIM-SSD and a minimum of 8GB RAM before deploying IOx to prevent application failure when deployed using IOx.

You must first enable the IOx on the device using the **iox** configuration command to be able to start using the user interface and services.

Configuring IOx: Support 3rd Party Apps in KVMs

To enable IOx:

```
enable
configure terminal
iox
exit
```

To disable IOx:

```
enable
configure terminal
no iox
exit
```

To setup a management interface to pass traffic to Cisco Application Hosting Framework (CAF). In the following configuration we enable both IPv4 and IPv6:

```
enable
configure terminal
vrf definition Mgmt-intf
  address-family ipv4
  exit-address-family
  address-family ipv6
  exit-address-family
exit
```

To configure a DHCP pool for an application to obtain an IP address from the address pool:

```
enable
configure terminal
ip dhcp pool gospool
network 25.25.0.0 255.255.255.0
default-router 25.25.0.1
domain-name sample.com
dns-server 72.163.128.140
remember
exit
```

To enable login credentials for Polaris WebUI under which IOx Local Manager is embedded:

```
enable
configure terminal
username root privilege 15 password 0 root
exit
configure terminal
interface VirtualPortGroup1
ip address 25.0.0.1 255.255.255.0
end
```

To enable a virtual interface between IOS and VMAN from where traffic can be passed to an application. IOx currently uses only this interface:

```
enable
configure terminal
ip nat inside
no mop enabled
no mop sysid
exit
interface VirtualPortGroup0
configure terminal
```

```
interface GigabitEthernet0/0/3
end
```

To setup WAN interface for passing traffic from outside to an application and assigning IP address for management interface:

```
enable
configure terminal
ip address 10.126.93.198 255.255.255.0
ip nat outside
media-type rj45
negotiation auto
exit
interface GigabitEthernet0/0/3
configure terminal
interface GigabitEthernet0
description Management Interface
exit
vrf forwarding Mgmt-intf
ip address 1.100.40.24 255.255.255.0
negotiation auto
exit
interface GigabitEthernet0
end
```

To enable IOx to accept third party applications or unsigned applications. In the following configuration App1 is the name of the application to be deployed and the traffic to the application is passed through virtual service Virtualportgroup1:

```
enable
configure terminal
virtual-service
signing level unsigned
exit
virtual-service
configure terminal
virtual-service App1
vnic gateway VirtualPortGroup1
exit
virtual-service App1
end
```

To enable IOx, HTTP server for enabling user interface, and NAT configuration of external traffic to an application using WAN interface:

```
enable
configure terminal
Iox
ip nat inside source static tcp 25.25.0.2 9000 interface GigabitEthernet0/0/3 9000
ip nat inside source list NAT_ACL interface GigabitEthernet0/0/3 overload
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
ip route 0.0.0.0 0.0.0.0 10.126.93.1
ip route 10.0.0.0 255.0.0.0 10.126.93.1
ip access-list standard NAT_ACL
permit 25.25.0.0 0.0.255.255
exit
ip access-list standard NAT_ACL
end

enable
configure terminal
interface GigabitEthernet0/0/0
ipv6 address 2001:AB01::1/64
ipv6 enable
nat66 inside
negotiation auto
interface GigabitEthernet0/0/1
ipv6 address 2002:AB01::1/64
ipv6 enable
nat66 outside
negotiation auto
```

```
nat66 prefix inside 2002:AB01::/64 outside 2002:AB02::/64
end
```

Verifying IOx: Support 3rd Party Apps in KVMs Configuration



Note The debugs for IOx can be enabled and downloaded from the System Info tab of the Local Manager (IOx WebUI).

Use the **show iox-service** command to verify the IOx configuration:

Device# **show iox-service**

Virtual Service Global State and Virtualization Limits:

```
Infrastructure version : 1.7
Total virtual services installed : 1
Total virtual services activated : 0
```

```
Machine types supported : KVM, LXC
Machine types disabled : none
```

```
Maximum VCPUs per virtual service : 4
Resource virtualization limits:
```

Name	Quota	Committed	Available
system CPU (%)	75	0	75
memory (MB)	4096	0	4096
bootflash (MB)	1000	0	575
harddisk (MB)	20000	10077	8983
volume-group (MB)	381552	0	361072

IOx Infrastructure Summary:

```
-----
IOx service (CAF) : Running
LibvirtD          : Running
```

Additional References for IOx: Support 3rd Party Apps in KVMs

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for IOx: Support 3rd Party Apps in KVMs

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for IOx: Support 3rd Party Apps in KVMs

Feature Name	Releases	Feature Configuration Information
IOx: Support 3rd Party Apps in KVMs	Cisco IOS XE Denali 16.3.1	The IOx: Support 3rd Party Apps in KVMs feature enables fog computing on Cisco IOS. IOx provides support for implementation of third party applications and services on Cisco network edge devices and across multiple hardware platforms. The following platforms are supported by the IOx: Support 3rd Party Apps in KVMs feature in this release: ASR1001-X, ASR1002-X, ASR1002-HX, ASR1001-HX, ISR4321, ISR4331, ISR4351, ISR4431, ISR4451x. The following commands were modified: show iox-service

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