

DEPLOYMENT GUIDE

# Infoblox Cloud Platform and Cloud Network Automation

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## Introduction

As organizations continue to expand deployment of infrastructure and applications in public and private clouds, visibility and automation of these environments is vital. Infoblox Cloud Network Automation and Cloud Platform Appliances provide simplicity of deployment, ease of management, increased visibility, and a rich set of APIs for automation of hybrid cloud environments.

## Common Networking Challenges in Cloud Environments

When migrating to public and private clouds, IT professionals face a wide range of challenges.

- Network configuration for virtual machines (VMs) is time consuming and slows down rollout: It takes administrators hours or sometimes days to provision networks and IP addresses for VMs, virtual networks, and other cloud workloads, making it difficult to provide self-service style cloud services at a fast pace. Manual provisioning and reclamation is cumbersome and error prone, leading to a sprawl of unused IP addresses and DNS records.
- Solutions lack visibility and auditing capability for IP addresses and DNS records for VMs: IT teams need to know which IP addresses and DNS records are assigned to which resources at any point in time for security and auditing purposes.
- IT teams lack consistent and centralized IP address and DNS management: Without centralized management across the IT infrastructure (multiple data centers, physical, virtual, and cloud), VM and network management gets more time consuming and expensive and can lead to configuration errors.
- Cloud orchestration platforms for native DDI services are incomplete and unreliable: Existing
  orchestration solutions provide only basic cloud network automation capabilities. They most often lack
  high availability, have no central view of DHCP lease information across multiple DHCP servers, and
  provide very limited DNS and IPAM capability.
- Lack of multi-cloud and hybrid cloud correlation: Virtually every enterprise has a combination of platforms ranging from traditional physical networks to public cloud (such as AWS, GCP, or Azure) to private cloud (such as Nutanix, OpenStack, or VMware) to supported hypervisors (such as VMware ESXi, Microsoft Hyper-V, Nutanix AHV, or KVM). Without a consolidated view across all of the different platforms, IT teams struggle with correlating multiple disparate tools which leads to increased errors and incomplete, out-of-date information.

#### **Limitations in Other Infoblox Solutions**

- Lack of local survivability for distributed data centers: By default, all API calls go to the Grid Master in any Infoblox Grid. If there are WAN connectivity issues, spinning up of VMs and assigning them IP addresses and DNS records may be impacted.
- Lack of scalability for API calls: API calls to the Grid Master add to its load. While multiple Grid Master Candidates in your environment can be used to distribute REST API read only operations, there is no capability to distribute API calls across multiple appliances when provisioning a large number of networks and VMs.

#### **Solution**

Infoblox Cloud Network Automation enables you to support agile and dynamic next generation data centers and hybrid cloud environments that can handle anything your business demands. You can increase business speed, agility, and efficiency by taking charge of your core network services and security. Infoblox offers a rich set of APIs with which you can automate core network actions across your data centers, virtualized environments, and the cloud with Infoblox DDI. It allows you to proactively detect, isolate, and stop data exfiltration that exploits DNS vulnerabilities with enhanced DNS security and real-time threat intelligence. To help overcome the challenges outlined above, Infoblox offers Cloud Platform (CP) Appliances and Cloud Network Automation (CNA) Solutions.

#### **Cloud Platform Appliance**

The Infoblox Cloud Platform Appliance is a Grid member designed to accept and process WAPI (RESTful API) requests related to cloud objects, in addition to serving DNS, DHCP, and other protocols. Cloud Platform appliances support cloud API requests, which are a subset of the WAPI requests. You can deploy multiple Cloud Platform Appliances within your Grid to scale the processing of API requests and/or provide redundancy and fault tolerance across your hybrid cloud infrastructure. Infoblox Cloud Platform Appliances are designed to support a delegation model, enabling you to segment sets of DDI data for management through specific appliances.

#### **Cloud Network Automation**

The Infoblox Cloud Network Automation solution enables automation of IPAM (IP address management) for physical and virtual network devices on your Cloud Management Platform (CMP) whether it is private, public, or hybrid. Instead of manually provisioning IP addresses and DNS name spaces for network devices and interfaces, you can use Cloud Network Automation to leverage DNS and DHCP features of the Grid to manage your cloud networks. When your cloud consists of many servers and VMs that have multiple associated network interfaces, manually provisioning and de-provisioning IP addresses and managing DNS and DHCP data can become time consuming and error prone. Utilizing Cloud Network Automation can minimize human errors by streamlining IPAM, improving visibility of your cloud networks, and maximizing the flexibility and efficiency that virtualization offers in your cloud environment. In multi-tenant heterogeneous cloud environments, Cloud Network Automation enables a holistic view of the network components and simplifies their management. It makes it possible to assign tenant permissions to admin users to restrict these users to only view objects related to a given tenant or a set of tenants. Cloud Network Automation is a software module license that is enabled on the Grid Master.

## Deployment

Cloud Management Platforms (CMPs) such as VMware vRealize Automation and OpenStack orchestrate the provisioning of virtual machines (VMs) within the data center/private cloud. Infoblox Adapters are available for each of these CMPs and automate IP address allocation and DNS record creation for VMs as part of the VM provisioning process. Every time a VM is created through the CMP, this will result in a WAPI call to the Grid Master to create Host Records or separate Fixed Address/A/PTR records using the Next Available IP function for a given network. Similarly, when a VM is destroyed through the CMP, a WAPI call will be made to the Grid Master to de-allocate the IP address and delete the associated DNS records. Creation of other Infoblox objects such as networks, zones, network views, and DNS views can also be done as part of the provisioning process or by invoking workflows through the CMP. The adapters can be configured to support overlapping networks by specifying the use of Network Views/DNS Views when records are created. This is often used for implementing multi-tenancy for cloud environments.

The Cloud Platform Grid Member introduces the capability to respond to WAPI calls locally within the cloud data center or public cloud by the same member(s) that are serving protocols to that cloud environment. This enables local survivability for record creation/deletion with the ability to centrally manage multiple data center environments through a single Grid. Having the ability to respond to API calls through local members also increases the scale/responsiveness of the system since APIs do not have to go back to the Grid Master to create objects which must be synchronized to the local members. Instead, all API calls for that particular data center can be served locally and objects created immediately.

In addition to the Cloud Platform Grid Members, Infoblox provides a Cloud tab on the Grid Master to enable administrators to view Infoblox Cloud objects in a cloud-centric fashion. For example, IP address assignments for VMs can be filtered for particular tenants and this view can be delegated to specific tenant administrators enabling multi-tenancy.

In this guide, we will explore use-cases for Infoblox Cloud Platform Appliances and the Cloud Network Automation license. Details of the example deployment used throughout this guide are covered in the next sections.

This guide focuses on deployment steps specific to utilizing features of the Cloud Platform Appliances and the Cloud Network Automation license in private clouds, however, most use-cases and features shown here are also applicable in your public cloud environments.

## Prerequisites

The following are prerequisites for deploying, configuring, and testing the use-cases and features described in this guide.

- A private or public cloud environment to deploy vNIOS appliances in. In this guide, we use a private VMware cloud. It is possible to set up a similar POC environment on public clouds such as Azure, AWS, and GCP or supported hypervisors such Hyper-V, KVM, and Nutanix AHV. For detailed information on deploying vNIOS appliances to these platforms, refer to appliance documentation at <a href="https://docs.infoblox.com">https://docs.infoblox.com</a> or deployment guides at <a href="https://www.infoblox.com/resources/">https://www.infoblox.com/resources/</a>.
- Access to vNIOS images found on <u>https://support.infoblox.com</u>. For some public cloud deployments, virtual machines or images are available directly in those platforms.
- Understanding of basic networking concepts and tools, including IP addressing, DNS and command line/terminal applications.
- Knowledge of basic Infoblox Grid deployment and configuration. This is not strictly required, but you will need to reference other Infoblox documentation to fill these gaps.



As shown in the diagram above, we will consider a hybrid infrastructure, consisting of a corporate data center and two private cloud environments. Each private cloud is served by a cloud platform member deployed within its environment. Centralized management for the Infoblox Grid is provided by the Grid Master, deployed in the corporate data center. Additionally, the Grid Master will utilize the CNA license for visibility and automation throughout the hybrid environment.

### **Deployment Instructions**

This guide focuses on deployment steps specific to utilizing features of the Cloud Platform Appliances and the Cloud Network Automation license in an environment simulating the architecture detailed in the previous section. For details on deploying Infoblox appliances and an Infoblox Grid, which are not given in this guide, refer to Infoblox documentation at <a href="https://docs.infoblox.com">https://docs.infoblox.com</a>.

#### **Setup Details**

This deployment guide uses Infoblox vNIOS for VMware appliances. OVA images for vNIOS for VMware can be downloaded from the <u>Infoblox Support Site</u>.

#### vNIOS for VMware

The Infoblox vNIOS on VMware software can run on ESX or ESXi servers that have DAS (Direct Attached Storage), or iSCSI (Internet Small Computer System Interface) or FC (Fibre Channel) SAN (Storage Area Network) attached. You can install the vNIOS software package on a host with VMware ESX or ESXi 6.7, 6.5.x, 6.0.x, 5.5.x, 5.1.x, or 5.0.x installed, and then configure it as a virtual appliance

Grid Role	An Open Virtual Appliance (or Application) (.ova) single file distribution package	Link to Download Images
Member, Grid Master, Reporting	DDI:v815, v825, v1415, v1425, v2215, v2225, v4015, v4025, Flex, Reporting: v805, v1405, v2205, v5005 and CP: v805, v1405, v2205	Download Image
Resizable of Member, Grid Master, Reporting	DDI:v815, v825, v1415, v1425, v2215, v2225, v4015, v4025, Flex, Reporting: v805, v1405, v2205, v5005 and CP: v805, v1405, v2205	Resizable Download Image
Discovery	Discovery: ND-v805, ND-v1405, ND-v2205, ND-v4005	Download Image
Resizable of Discovery	Discovery: ND-v805, ND-v1405, ND-v2205, ND-v4005	Resizable Download Image

For detailed instructions on deploying vNIOS for VMware appliances and available appliance models, refer to the Installation Guide found on <u>https://docs.infoblox.com</u> or Deployment Guides available on Infoblox.com at <u>https://infoblox.com/resources</u>.

To follow the steps in this guide, use the details in the following table to deploy the three vNIOS appliances and a client VM to use for API calls and access to the Grid Master UI.

Note: The client VM is optional and only needed if you are unable to access the NIOS Grid Manager and APIs directly from outside your deployment environment. Additionally, while this guide shows an Ubuntu VM, other client types can also be used.

Virtual Machine	OS/Version	Model	IP Address
Grid Master	NIOS 8.5.0	IB-V825	172.16.1.3
Cloud Platform Appliance 1 (CP1)	NIOS 8.5.0	CP-V805	172.16.1.4
Cloud Platform Appliance 2 (CP2)	NIOS 8.5.0	CP-V805	172.16.1.5
Client Device	Ubuntu 18.04	N/A	172.16.1.101

#### **Grid Master**

First, we will add licenses and configure the Grid Master for a new Infoblox Grid.

- 1. Once you finish creating the Grid Master virtual appliance, power it on and access the virtual console.
- 2. Login with the default username: admin and password: infoblox.
- 3. Use the **set temp\_license** command to install the **Grid**, **DNS**, **DHCP**, and **NIOS** Model **IB-V825** licenses.

Infoblox > set temp_license
1. DNSone (DNS, DHCP)
2. DNSone with Grid (DNS, DHCP, Grid)
3. Network Services for Voice (DHCP, Grid)
4. Add NIOS License
5. Add DNS Server license
6. Add DHCP Server license
7. Add Grid license
8. Add Microsoft management license
9. Add Multi-Grid Management license
10. Add Query Redirection license
11. Add Threat Protection (Software add-on) license
12. Add Threat Protection Update license
13. Add Response Policy Zones license
14. Add FireEye license
15. Add DNS Traffic Control license
16. Add Cloud Network Automation license
17. Add Security Ecosystem license
18. Add Threat Analytics license
19. Add Flex Grid Activation license
20. Add Flex Grid Activation for Managed Services license
Select license (1-20) or q to quit:

The appliance will restart after installing the NIOS Model IB-V825 license. After the appliance restarts, you can optionally use the **show license** command to verify all licenses.

```
Infoblox > show license
Jersion
              : 8.5.0-390933
lardware ID
                : 422C5101AC698043782B5E66030BDE27
License Type
                : DNS
Expiration Date : 01/22/2021
License String : EwAAAEngEW5PfrMi6eMYiYK3+qV/1Xk=
License Type
                : DHCP
Expiration Date : 01/22/2021
License String : FAAAAEnmAWICfPxs6a1Wi4C0t7141X1/
License Type
               : Grid
Expiration Date : 01/22/2021
License String : GgAAAEjgFncMPb15qPpWiIP6tPMy0X51Tm+qCOuZ
License Type : NIOS (Model IB-V825)
Expiration Date : 01/22/2021
.icense String : GgAAAEPnDWECfPxs6a1Wi4C0t71/x3Z1Sjf9XLjP
```

- 4. After the Grid Master restarts, log back into the CLI.
- 5. Enter the command set network.
- 6. Enter the **IP address** for the appliance. Press **Enter**.
- 7. Enter the netmask or press Enter to leave the default, 255.255.255.0.
- 8. Enter the gateway address. Press Enter.
- 9. Press Enter to leave the VLAN untagged.
- 10. When asked to Configure IPv6 network settings, enter n and press Enter.
- 11. When asked to Become a grid member, enter n and press Enter.

12.At the confirmation prompts, enter y and press Enter.

```
Infoblox > set network
NOTICE: All HA configuration is performed from the GUI. This interface is
       used only to configure a standalone node or to join a Grid.
Enter IP address: 172.16.1.3
Enter netmask [Default: 255.255.255.0]: 255.255.255.0
Enter gateway address [Default: 172.16.1.1]: 172.16.1.2
Enter VLAN tag [Default: Untagged]:
Configure IPv6 network settings? (y or n): n
Become grid member? (y or n): n
New Network Settings:
 IPv4 address:
                        172.16.1.3
 IPv4 Netmask:
                        255.255.255.0
 IPv4 Gateway address: 172.16.1.2
 IPv4 VLAN tag:
                        Untagged
Old IPv4 Network Settings:
 IPv4 address:
                        192.168.1.2
 IPv4 Netmask:
                        255.255.255.0
 IPv4 Gateway address: 192.168.1.1
 IPv4 VLAN tag:
                        Untagged
        Is this correct? (y or n): y
```

The appliance will restart after configuring the network settings. After the appliance restarts, you can optionally use the **show network** command to verify configuration.

Infoblox > show network	
Current LAN1 Network Settings	
IPv4 Address:	172.16.1.3
Network Mask:	255.255.255.0
Gateway Address:	172.16.1.2
VLAN Tag:	Untagged
HA enabled:	false
Grid Status:	Master of Infoblox Grid
Note: Additional addresses com mand	nfigured can be viewed through "show interface" com

13.On the client device, open a web browser and navigate to the Grid Master at https://<LAN1\_IP\_address>, using the IP address of your virtual appliance.

14. If prompted, accept the self-signed certificate to continue to the Grid Manager GUI.

15.Log in using the default username: admin and password: infoblox.

	Grid Manager	
Disconnect NOW if y	ou have not been expressly author	ized to use this system.
	Username	
	admin	
	Password	
	••••••	
	Login	

16. Accept the EULA and Infoblox Customer Experience Improvement Program.

17.Use the Grid Setup Wizard to **Configure a Grid Master**.

Grid Setup	o Wizard						×
Step1	Step2	Step3	Step4	Step5	Step6	Step7	0
							~
Welcome to	the Infoblox NIOS Gr	rid Setup Wizard. This	wizard guides you th	rough the initial conf	iguration of NIOS.		
Are you conf	iguring a grid master	or joining this memb	er to an existing grid?				
Are you conf	<b>iguring a grid master</b> re a Grid Master	or joining this memb	er to an existing grid?				
Are you conf O Configur	<b>iguring a grid master</b> re a Grid Master sting Grid	or joining this memb	er to an existing grid?				
Are you conf O Configur	<b>iguring a grid master</b> re a Grid Master sting Grid	or joining this memb	er to an existing grid?				
Are you conf Configur	<b>iguring a grid master</b> re a Grid Master sting Grid	or joining this memb	er to an existing grid?				

- 18.Complete the Grid Setup Wizard using the default values. If desired, you can change default values to suit your environment. For details on configuring a new Grid, refer to Infoblox NIOS documentation at <u>https://docs.infoblox.com</u>.
- 19. Once you have completed the wizard, agree to restart the device if prompted.



20. Once the restart is complete, log back in to the Grid Manager.

21.Navigate to the **Grid**  $\rightarrow$  **Grid Manager** tab.

Infoblox 📚 🛛 🖻	Dashboards Data	Management S	mart Folders	Grid Adminis	tration			
G	Grid Manager Upg	rade Licenses	HSM Group					
Infobiox P P DHCP DNS TFTP Members Services	HTTP (File Dist) F	TP DFP NT	P bloxTools	Captive Portal	Subscriber Collection			
Quick Filter Name	v off Filter On	Show Filter	off Replication St	atus View				
Annual Mone								
Group Results Group	Choose one	~	+					
+ ♂ @ ⊟ ∞ ⊞	1 🕹 - 1 🖨					Go to		Go
□	НА	Status	IPv4 Address	IPv6 Address	Identify	DHCP	DNS	TFTP
🔲 📃 🔶 gm.ibxdem	io.c No	Running	172.16.1.3		Unsupported	-	-	

22.Click on the **DHCP** service.

23.On the DHCP service tab, select the checkbox next to your Grid Master.

24. Click on **Start** to start the service.

۱ 💭	nfoblox 🗕	1										Toolbar	≫
	DHCP DN	S TFTP	HTTP (File	Dist) FTP	DFP	III NTP	bloxTools	Captive Portal	Subscriber Collection			🕂 Add	-
												C Restart Services	
_	Members	Services										🗹 Edit	-
D	нср 📃 🥑	•										Start	-
	Quick Filter	lone	• •	f Filter On	Show F	ilter	Toggle Restart (	Groups View				Stop	~
				-								3 Backup	-
	Group Res	ults G	roup By Choo			~	+					Restore	-
	0											🛓 Download	-
	2   🕨 -	-   🗘 -	- ⊖							Go to	Go	1 Export	
[	Name	Serv	vice Status	IPv4 Address	Comm	ent	Site					😝 Print	
	🖉 🐟 am iby	demo ci Not	Running	172.16.1.3								L CSV Import	
	Guina and		rtanning	112.10.1.0								🔎 CSV Job Manager	

25.Click Yes in the Start Member DHCP Service dialog.



26.Repeat steps 22-25 for the DNS and NTP services.

Infoblox	TFTP HTTP (File	e Dist) FTP	DFP NTP	bloxTools	Captive Portal	Subscriber Collection
Members Service	s					
NTP 📕 🥜						
Quick Filter None	• •	Filter On	Show Filter			
Group Results	Group By Cho		~	+		
	Ð					
Name	Service Status	IPv4 Address	Comment	Site		
gm.ibxdemo.co	NTP Service is wo	172.16.1.3				

27. Once all services are running, log back in to the Grid Master CLI using the virtual console or SSH.

28.Use the **set temp\_license** command.

29. Enter 16 to select the Cloud Network Automation license.

Infol	lox > set temp_license	
1.	DNSome (DNS. DHCP)	
2.	DNSone with Grid (DNS, DHCP, Grid)	
3.	Network Services for Voice (DHCP, Grid)	
4.	Add NIOS License	
5.	Add DNS Server license	
6.	Add DHCP Server license	
7.	Add Grid license	
8.	Add Microsoft management license	
9.	Add Multi-Grid Management license	
10.	Add Query Redirection license	
11.	Add Threat Protection (Software add-on) license	
12.	Add Threat Protection Update license	
13.	Add Response Policy Zones license	
14.	Add FireEye license	
15.	Add DNS Traffic Control license	
16.	Add Cloud Network Automation license	
17.	Add Security Ecosystem license	
18.	Add Threat Analytics license	
19.	Had Flex Grid Activation license	
20.	Had Flex Grid Hetivation for Managed Services licens	e
Seleo	t license (1-20) or a to quit: 16	

30.Confirm your selection when prompted.

31. In the web browser, logout and log back in to the Grid Manager. The **Cloud** tab has now been added to your Grid Manager.

l	nfoblox 📚	Dashboard	ls Da	ta Management	Cloud	Smart Folders	Grid	Administ	ration				Q Search	admin
		Tenants	VPCs	Networks	VMs Cl	oud Platform Mer	nbers							
<b>1</b> ×	All Tenants											Toolbar		≫
	Quick Filter None	▼ of	f Filter On	Show Filte	r							🕼 Edit		
	Ø 1 ± 1 Đ								Go to		Go	Grid Clo Propertie	ud API es	
	Actions Mamt Platform	Name		ID		VMc	letworks	Created	Last undated	Comment	Network Views	Q vDiscove	ery	-
		Ivane 🔺		ID .		VINIS	VELWOIKS	Createu	Lasi upualeu	Comment	INCLINUTE VIEWS	C Restart	Services	
	No data											X Clear		-
												₹ IDN Con	verter	

#### **Add Cloud Platform Members**

Next, we will add and and join the Cloud Platform members to the Grid.

- 1. In the Grid Manager, navigate to the Grid  $\rightarrow$  Grid Manager  $\rightarrow$  Members tab.
- 2. Click the 📩 (add button) to add a new Grid member.

Infoblox 📚	\$	Dashboards	Data Management	Cloud Smart F	olders Grid	Administration			
		Grid Manager	Upgrade Licenses	HSM Group	Amazon				
Infoblox	DNS TFTP	HTTP (File Dist)	FTP DFP N	P bloxTools	Captive Portal	Subscriber Collection			
Quick Filter	None	▼ off Filte	r On Show Filter	off Replication S	tatus View				
Group	o Results Gr	oup By Choose or	ie 👻	+					
+ 🛛		🖮   🕹 -   🖨					Go to		Go
	Name	HA	Status	IPv4 Address	IPv6 Address	Identify	DHCP	DNS	TFTP
	🚸 gm.ibxo	lemo.c No	Running	172.16.1.3		Unsupported	•	•	

- 3. On Step 1 of the Add Grid Member wizard, select Virtual NIOS from the Member Type dropdown.
- 4. Enter a name for the new member. Note: The Host Name must be a fully qualified domain name.
- 5. Click Next.

Add Grid Member >	Step 1 of 3	×
Member Type	Virtual NIOS	<b>0</b> «
*Host Name	cp1.ibxdemo.com Must be a fully qualified domain name	
Time Zone Comment	(UTC - 8:00) Pacific Tin V Inherited from Grid Infoblox	
Master Candidate		
Cancel	Previous Next	Save & Close 🔹

Warning: Cloud Platform appliances cannot serve as a Grid Master Candidate. Ensure you do **NOT** select the checkbox for Master Candidate.

6. On Step 2 of the wizard, ensure **Type of Network Connectivity** is set to **IPv4**. Ensure **Type of Member** is set to **Standalone Member**.

- 7. Enter the **IP address** for the member, referring to the table on page 7 of this guide. Enter the **subnet mask** and the IP address of your **gateway**.
- 8. Click Save & Close.

Add Grid Membe		×					
Type of Network Connectivity	IPv4	H					<b>8</b> «
TYPE OF MEMBER							
<ul> <li>Standalone Mem</li> <li>High Availability I</li> </ul>							
REQUIRED PORTS	AND ADDRESSES						
Interface	Address	Subnet Mask (IPv4) or Prefix Length (I	Gateway	VLAN Tag	Port Settings		
LAN1 (IPv4)	172.16.1.4	255.255.255.0	172.16.1.2		Automatic		
Cancel		Previous	Next			Save & C	Close 🔹

9. Repeat steps 2-8 for Cloud Platform member 2. The two new members are visible in the Members tab, showing an Offline status.

Mem	bers	Services								
Quick	Filter Non	e 🗸	off Filter On	Show Filter off	Replication Status	View				
	Group Resu	alts Group By		Y	+					
+1	2   🗑	≡   ==   ± -						Go to		Go
		Name	HA	Status	IPv4 Address	IPv6 Address	Identify	DHCP	DNS	TFTP
	$\equiv$	🚸 gm.ibxdemo.com	No	Running	172.16.1.3		Unsupported	•	•	
	$\equiv$	cp1.ibxdemo.com	No	Offline	172.16.1.4		Unsupported			
	$\equiv$	cp2.ibxdemo.com	No	Offline	172.16.1.5		Unsupported			

- 10.Next, ensure your CP appliances are powered on. Access the virtual console of CP1 and log in with the default username and password.
- 11. Use the set temp\_license command to install the Grid, DNS, DHCP, Cloud Platform, and NIOS Model CP-V805 licenses.

The appliance will restart after installing the NIOS Model CP-V805 license. After the appliance restarts, you can optionally use the **show license** command to verify all licenses.

```
Infoblox > show license
Jersion
                : 8.5.0-390933
Hardware ID
                : 422C5101AC698043782B5E66030BDE27
               : DNS
License Type
Expiration Date : 01/22/2021
License String : EwAAAEngEW5PfrMi6eMYiYK3+qV/1Xk=
               : DHCP
License Type
Expiration Date : 01/22/2021
License String : FAAAAEnmAWICfPxs6a1Wi4C0t7141X1/
License Type
               : Grid
Expiration Date : 01/22/2021
License String : GgAAAEjgFncMPb15qPpWiIP6tPMy0X51Tm+qCOuZ
License Type
                : NIOS (Model CP-V805)
Expiration Date : 01/22/2021
License String : GgAAAEPnDWECfPxs6a1Wi4C0t71/x3Z3Rzf9UrjM
License Type
               : Cloud Platform
Expiration Date : 01/22/2021
License String : GQAAAE7iDWcaEq5gsuMbisy0tL1803x2Ayv9WL8=
```

12.After the CP appliance restarts, log back into the CLI.

13.Enter the command set network.

14.Enter the **IP address** for the appliance. Press **Enter**.

15. Enter the netmask or press Enter to leave the default, 255.255.255.0.

16.Enter the gateway address. Press Enter.

17. Press Enter to leave the VLAN untagged.

18. When asked to **Configure IPv6 network settings**, enter **n** and press **Enter**.

19. When asked to **Become a grid member**, enter **y** and press **Enter**.

20.Enter the LAN1 IP address of your Grid Master. Press Enter.

- 21.Enter the Grid name. Press Enter.
- 22. Enter the **Grid Shared Secret**. If you did not change this in the Grid setup, the default is **test**. Press **Enter**.
- 23.At the confirmation prompts, enter **y** and press **Enter** to confirm.



24. The appliance will restart and attempt to contact the Grid Master.

25. From the web browser on your client device, log back in to Grid Manager.

26.Navigate to the Grid  $\rightarrow$  Grid Manager  $\rightarrow$  Members tab.

Infoblox 📚	Dashboards	Data Management	Cloud	Smart Folders	Grid	Administra	tion		
	Grid Manager	Upgrade License	es HSN	/I Group Amaz	on				
Infobiox  DHCP DNS Clour	d-API TFTP	HTTP (File Dist)	DFP	NTP blox1	i iools Ca	aptive Portal	Subscriber Collection		
Quick Filter None	Group By Choose o	er On Show Filter	off Re	plication Status Vi	<u>ew</u>				
+ 0 0 = =							Go to		Go
□	HA	Status	IP	v4 Address	Pv6 Addres	s Identify	DHCP	DNS	TFTP
🔲 📃 🔶 gm.ib	xdemo.com No	Running	17	2.16.1.3		Unsup	oorted		
🖻 📄 🔶 cp1.it	bxdemo.com No	Running	17	2.16.1.4		Unsup	ported		
🔲 📃 🚸 cp2.it	bxdemo.com No	Offline	17	2.16.1.5		Unsup	ported		

You can now see an entry for **Cloud-API** for services. This was automatically added when the Cloud Platform member joined the Grid. The cloud API service provides the ability to automate management of IP addresses and DNS records so your cloud environment can take full advantage of IPAM, DNS, and DHCP capabilities in NIOS without the need for manual intervention. This cloud API service accepts and processes a subset of the

WAPI requests that are supported on the Grid Master either directly from an adapter or proxied through another CP appliance or from the Grid Master.

27.Click on the Cloud-API service.

28.Select the checkbox for your CP1 member.

29.Click Start in the Toolbar to start the service.

Inf	oblox 📚	Dashboards	Data Manage	ment Cloud	Smart Folders	Grid	Administra	tion		Q Search	admin	-
		Grid Manager	Upgrade	Licenses H	SM Group Ama	azon						
	nfoblox 🗕 🥓 📮									Toolbar	≫	0
"	DHCP DNS Clou	d-API TETP	HTTP (File Dist	) FTP DF	P NTP blo	Tools C	aptive Portal	Subscriber Collection		🕂 Add	-	"
										C Restart Services		
_	Members Services								 	🗹 Edit		
2	Cloud-API 🔲 🥜									Start		
	Quick Filter None	▼ off	Filter On	Show Filter						Stop		
										🕚 Backup	-	
		Crew Ru								Restore	-	
	Group Results	Group By Choose		·						🛓 Download		
	☞   ▶   ■   ±   ⊖							Go to	Go	1 Export		
	Name Se	rvice Status IPv	/4 Address	Comment	Site					🖶 Print		
	Cp1.ibxdemo.c No	ot Running 17	2.16.1.4									

30. Click **Yes** in the confirmation dialog.

	DNS Cloud-API TF	TP HTTP (File D	Dist) FTP D	FP NTP I	bloxTools Captiv	e Portal Subscrib	er Collection		
Members	Services								
Quick Filter	None	off Filter On	Show Filter Off	Replication Statu	is View				
Group	Results Group By		~	+					
+   🛛	💼   🖂   🏧   🖽   🏦 -	-   🖨					Go to		Go
	Name	HA	Status	IPv4 Address	DHCP	DNS	NTP	Cloud-API	TFTP
	🚸 gm.ibxdemo.com	No	Running	172.16.1.3		•	•		
	🔷 cp1.ibxdemo.com	No	Running	172.16.1.4	•		•	•	
	cp2.ibxdemo.com	No	Offline	172.16.1.5					

31.Repeat steps 10-30 to join Cloud Platform appliance 2 to the Grid with its unique IP address and start services.

<b>1</b> ×		Cloud-API	TP HTTP (File D	ist) FTP D	FP NTP	bloxTools	Captive Portal	Subscriber Collection		
	Members	Services								
	Quick Filter Nor	e Y	off Filter On	Show Filter off	Replication Sta	tus View				
	Group Res	ults Group By		~	+					
	+ 2 =	三   ஊ   田   土 -	- I <del>O</del>					Go to		Go
		Name	HA	Status	IPv4 Address	DHCP	DNS	NTP	Cloud-API	TFTP
		🚸 gm.ibxdemo.com	No	Running	172.16.1.3	-				
		cp1.ibxdemo.com	No	Running	172.16.1.4	-				
		cp2.ibxdemo.com	No	Running	172.16.1.5	-		-	•	

#### 32. You can also view CP members by navigating to the Cloud $\rightarrow$ Cloud Platform Members tab.

lr	nfoblox 📚	Dashboard	s Data Managen	nent Clou	d Smart Folders	Grid	Administration
		Tenants	VPCs Network	s VMs	Cloud Platform Mem	bers	
1 >	All Cloud	Platform Members					
	Quick Filter	None v off	Filter On Sho	w Filter			
	1 B						
	Actions	Name	Status	Comment	Site		
		🚸 cp1.ibxdemo.com	Running				
		cp2.ibxdemo.com	Running				

#### **Cloud API User**

To send cloud API requests, you must define admin users and their permissions in the admin group. By default, the admin-group does not have authorization to make cloud API requests. When you install valid licenses and configure your Grid for Cloud Network Automation, NIOS enables the **cloud-api-only** admin group. You can assign admin users to this group to authorize them to send cloud API requests to your Cloud Platform appliances. You cannot delete this admin group or create a new admin group using the same name. However, if desired you can create additional admin groups with authorization to send cloud API requests.

In	ifoblox 💲	\$	Dashboa	ards	Data Manager	nent (	Cloud	Smart Fold	lers Grid	Adr	ministration
			Administ	trators	Workflow	Logs	Netwo	rk Views	Extensible At	tributes	Cloud
	Admins	Groups	Roles Pe	ermissions	Authenti	cation Polic	y St	IMPv3 Users			
	Quick Filte	er None	-	off Filt	er On S	how Filter					
	<b>→</b>   <b>+</b>	☞   面	#   <b>±</b>   ⊖								
	Name	<b>^</b>	Superuser	Comr	nent				Site		
	admir	n-group	Yes								
	cloud	-api-only	No	Admir	ns allowed to pe	erform API I	request or	Cloud API			
	saml-	group	No	Admir	ns allowed to pe	erform auth	entication	request throu	gh		
	splun	k-reportin	No								

- 1. To create a new admin user, navigate to the Administration  $\rightarrow$  Administrators  $\rightarrow$  Admins tab.
- 2. Click the 📩 (add button) to add a new admin user.

lr	nfoblox 📚	Dashboard	s Data Manaç	jement Clo	ud Smart Fold	lers Grid	Administration
		Administra	tors Workflow	Logs	Network Views	Extensible Attribu	utes Cloud
× 11	Admins Group	s Roles Pern	nissions Authe	ntication Policy	SNMPv3 Users		
	Quick Filter None	•	Filter On	Show Filter			
	+	118					
	Name 🔺	Group	Comment	Status	Site		
	admin	admin-group		Active			

- 3. On Step 1 of the Add Administrator Wizard, select Local for Authentication Type.
- 4. Enter a Login name. For this guide, we will use cloud-admin.
- 5. Enter and confirm a **Password**. For this guide, we will use **infoblox**.

Add Administrator W	izard > Step 1 of 2		×
Authentication Type	Local		<b>8</b> «
	Credentials		
	*Login	cloud-admin	
	*Password	•••••	
	*Confirm Password	••••••	
		Password must contain at least 4 characters.	
Email Address			
*Admin Group	Select	Clear	
Comment			
Cancel		Previous Next Save &	Close •

- 6. Next to Admin Group, click Select.
- 7. In the Admin Group Selector, click on the **cloud-api-only** group.

All Admin Groups	off Filter On	Show Filter			
Active Directory Sites					
Reple Mac OS Devices	Find	G	io i		$\rightarrow$
Conflicts     Discovered Switches/R	Name 🔺	Superuser	Comment	Site	
Gaming Console Device	admin-group	Yes			
Microsoft Windows Dev Router and Wireless Ac	cloud-api-only	No	Admins allowe		
Smartphone, PDA, Tabl	saml-group	No	Admins allowe		
Numanaged	splunk-reporting-g	No			
		C			

#### 8. Back in the wizard, click Save & Close to create the user.

Add /	Add Administrator Wizard > Step 1 of 2									
Auther	ntication Type	Local					<b>8</b> «			
		Credentials *Login	cloud-a	dmin						
	*Password		•••••							
		*Confirm Password	•••••							
			Passwo	ord must contain at least 4 (	characters.					
Email	Address									
*Admii	n Group	cloud-api-only Select	Clear				I.			
Comm	ent									
Can	cel	[	Previous	Next		Save & Clos	e •			
<b>.</b>	Admins Gr	roups Roles	Perm	issions Authe	ntication Policy	SNMPv3 U	Jsers			
(	Quick Filter N	lone 💌	o	ff Filter On	Show Filter					
	+   Ø   0	注日								
	Name 🔺	Group		Comment	Status	Site				
	admin	admin-group	)		Active					
	cloud-admi	n cloud-api-on	ily		Active					

#### **Extensible Attributes**

Prior to adding the Cloud Network Automation license to the Grid Master, the Grid contained a limited set of predefined Extensible Attributes (EAs) used to define and track objects in the Grid.

When you enable Cloud Network Automation, NIOS installs a set of EAs specific for cloud usage. To view the full list of EAs which are now available, navigate to the **Administration**  $\rightarrow$  **Extensible Attributes** tab.

l	nfob	lox 📚	Dashboards	Data Management	Cloud Smart F	olders Grid	Administration	
			Administrators	Workflow Logs	Network Views	Extensible Attrib	utes Cloud	Authentication Server Groups
<b>.</b> »	Ext	tensible Attribute	s 📮					
	Qui	ick Filter None	• Off Fil	er On Show Filte	er			
	+	0000					Go to	Go
		Name 🔺	Туре	Comment	Required	Restricted to O	Inheritance Enable	d
		Account	String		No		No	
		Allocation ID	String		No	Host,Resource	No	
		Application Type	String		No		No	
		Association ID	String		No	Host,Resource	No	
		Attachment ID	String		No	IPv4 Fixed/Res	No	
		Availability zone	String		No		No	
		Black-List	String		No	IPv4 Network,I	No	
		Building	String		No	IPv4 Network,I	No	
		CMP Type	String		No		No	
		Cloud API Owned	List		No		No	
		Cloud Region	String		No		No	
		Country	String		No	IPv4 Network,I	No	
		Host Aggregates	String		No		No	
		IB Discovery Owned	String		No		No	
		IP Туре	List		No		No	
		Interface Name	Strina		No		No	
	M	< > N   8						

## **Delegating Authority**

Authority delegation in Infoblox Cloud Network Automation is the ability to assign control of DNS, DHCP, and IPAM objects in the Grid to a Cloud Platform appliance. When authority for an object is delegated to a Cloud Platform member, the Grid Master no longer has authority over these objects or the objects within them. Authority delegation can be explicitly assigned or inherited from parent objects. The following object types can be explicitly delegated from the Grid Master:

- Network Views
- Network Containers (IPv4 and IPv6)
- Networks (IPv4 and IPv6)
- DHCP Ranges (IPv4 and IPv6)
- DNS Authoritative Zones, Note: DNS zones are also implicitly delegated if the assigned primary name server is a Cloud Platform member.

Supported objects can be delegated to only one Cloud Platform member, except for DNS zones. DNS zones can be delegated to multiple members by assigning multiple Cloud Platform members as primary name servers

for the zone. For further information on Authority Delegation, refer to Infoblox documentation at <u>https://docs.infoblox.com</u>.

When a network view, network, or DNS zone is created, either the Grid Master or a Cloud Platform member can be authoritative for that object to avoid conflicts. The object can be created on the Grid Master and then delegated to a Cloud Platform member, or it can be created directly on a Cloud Platform member using a Cloud API call. Once the object is created and assigned to a Cloud Platform member, all further updates to the delegated network objects will be processed by the Cloud Platform member it is assigned to.

#### **Create Network View**

In this section, we will first create a network view. A network view is a single routing domain, with its own networks and shared networks. A network view can contain both IPv4 and IPv6 networks. Each network is contained within a network view.

In a multi-tenant environment, where you may have overlapping IP address space, a network view can be delegated to be served by a Cloud Platform member and act as a container for all objects belonging to an individual tenant. All of the network objects within a delegated network view will also be delegated to the designated Cloud Platform member.

- 1. To create a network view, navigate to the **Administration**  $\rightarrow$  **Network Views** tab in the Grid Manager.
- 2. Click the 📩 (add button) to add a new network view.

Infoblox 📚	Dashboards	Data Manag	ement	Cloud	Smart Folder	s Grid	Administration				Q Search	admin	•
	Administrators	Workflow	Logs	Network	Views Ex	tensible Attribu	tes Cloud	Authentication	Server Groups	Named A	CLs		
🗮 Network Views	4									Toolbar		≫	0
Quick Filter None	• Off F	ilter On	Show Filter	r						🕂 Add			
										→ Ope			
→   +   Ø	ᆂ -   🖨						Go to		Go	🗹 Edit			
Name 🔺	Cloud Usage		Owned By	v	Deleg	ated To	Commer	t Site		Dele		-	
default	Non-cloud		Grid							Exte Attril			
										r= Pem			

- 3. In the Add Network View Wizard, enter a name for the network view, for example cp1view.
- Do not delegate the network view. We will delegate this later, after creating individual networks and DNS zones.
- 5. Click Save & Close.

Add Network Vi	ew Wizard > Step 1 of 3	E
*Name	cp1view	
Comment		
CLOUD		
Delegate authority fr	rom the Grid Master	
Delegated To	Select Clear	
Delegated To	Select Clear	
Delegated To	Select Clear	
Delegated To Cancel	Select Clear Previous Next Save	& Close 💌

6. A warning will inform you that a DNS view will also be created for the new network view. Click Yes.



7. Click **Restart** in the warning bar when prompted.

The configuration changes	The configuration changes require a service restart to take effect. Click Restart to restart relevant services now or click Ignore to restart the services later.								estart the services later.	Restart	View Changes	Ignore
Infoblox 📚	Dashboards	Data Manage	ment	Cloud	Smart Fo	olders	Grid	Administration			Q Sea	rch admin
	Administrators	Workflow	Logs	Netwo	ork Views	Exten	isible Attribu	tes Cloud	Authentication Server Gro	oups N	amed ACLs	

8. Click Restart in the Restart Grid Services window.

Restart Grid Services		E
Restart Grid Services	If needed Force service restart	ä
Restart Method	A forced restart may be delayed in there are pending restarts for the same service.     Restart all Restart Groups     Simultaneously for all members     Sequentially for all members	
Affected Members and	Services View Pending Changes	13   ±
Member	To start polling, click the Poll Members icon above this table	
Cancel		Restart

#### **Create Network**

Next, we will create a network in the new network view. Networks can be explicitly delegated to a Cloud Platform member from the Grid Master or inherit delegation from their parent network container or network view.

- 1. To create a network in this new view, navigate to the **Data Management**  $\rightarrow$  **IPAM** tab.
- 2. Use the network view dropdown to select your new network view.

Infoblox 📚	Dashboards	Data Management	Cloud	Smart	Folders	Grid A	dministration		
cp1view 💌	IPAM VLA	Ns Super Host	DHCP	DNS	File Distribu	tion			
default cp1view	cp1view	Network View 🚦							
Smart Folders	Quick Filter	None	off Filte	er On	Show Filter	Tog	gle flat view		
Bookmarks +	→   + •	☞   💼 •   🔹 •   🤅	•				Go to		Go
Recycle Bin		Network 🔺	Clou	ud Usage		Owned By		Delegated To	,
- IIDI Linke 📕									

3. Click the + (add button) to add a new network.

4. On step 1 of the Add IPv4 Network Wizard, select Add Network → Manually.

5. Click Next.



- 6. On step 2 of the wizard, set a **Netmask** for the network, by typing in the box or using the slider.
- 7. Click the (add button) next to **Networks** and enter the network CIDR in the box, for example **10.10.10.0**.
- 8. Check the box next to Automatically Create Reverse-Mapping Zone.
- 9. Click Next.

Add IPv4 Netw	ork Wizard > Step 2 of 7	×
*Netmask	1       4       8       12       16       20       24       28       32         1       1       1       1       1       1       1       1       1       1	<b>@</b> «
* Networks	+   +   =	
	Network	
	10.10.10.0	
Comment		1
	Automatically Create Reverse-Mapping Zone	
	Disable for DHCP	
Cancel	Previous Next Schedule for Later Save &	Close -

10.On step 3, click the + (add button) to add a member as a DHCP server for the network.

Add IPv4 Net	work Wizard > Step			×	
Members		+•  💼	<b>0</b> «		
Name	IPv4 Address	IPv6 Address	Comment		
No data					

11. In the Member Selector dialog, select your first Cloud Platform member.

Member Selector						×
All Members	off Filter On	Show Filter				0
Active Directory Sites	_					«
Apple Mac OS Devices	Find		Go			$\rightarrow$
Conflicts	Name 🛦	IPv4 Address	IPv6 Address	Comment	Site	
Discovered Switches/R	Hume -	II VYAddress	in vo Address	Comment	- Chic	
Baming Console Device	cp1.ibxdemo.com	172.16.1.4				
Microsoft Windows Dev	cn2 ibydemo.com	172 16 1 5				
Router and Wireless Ac	opz.ibxdemo.com	172.10.1.5				
📑 Smartphone, PDA, Tabl	gm.ibxdemo.com	172.16.1.3				
📲 Unmanaged						
	K I F H	đ				
Close						ОК

#### 12.Click Save & Close.

Add IPv4 Network	Wizard > Step	3 of 7			×
Members					+ ·   🗊 🤇
Name	IPv4 Address	IPv6 Address	Comment		
cp1.ibxdemo.c	172.16.1.4				
Cancel		Previous		Schedule for Later	Save & Close 🔹

13.Click **Restart** in the warning bar when prompted.

14.Click **Restart** in the Restart Grid Services window.

15. The new network is now created.

Infoblox 📚	Dashboards	Data Management	Cloud	Smart Folders	Grid A	dministration		
cp1view 💙	IPAM VLAN	Ns Super Host	DHCP DN	IS File Distril	bution			
> cp1view Network View	<b>A</b>							
Quick Filter None	▼ Off F	Filter On Show Filt	er 📜 Togg	gle flat view				
→   + •   ⊠   ≡ •   ;	1 - I 🖨					Go to		Go
Network 🔺	C	Cloud Usage	Owned By		Delegated To		IPAM Utilization	Discovery
10.10.10.0/	24 N	lon-cloud	Grid				0.0%	None

#### **Create DNS Zone**

Next, we will create an authoritative DNS zone in the DNS view automatically added under our new network view. DNS zones are implicitly delegated to a Cloud Platform member when that member is assigned as the primary name server for the zone.

- 1. To add an authoritative DNS zone, navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.
- 2. Ensure you are in the DNS view that belongs to your new network view. The view name will be in the format **default.name**, where **name** is the name of your network view.

lr	nfob	lox 📚		Dashboards	Data Manage	ement Clou	ıd Sma	rt Folders	Grid	Administration		
c	p1view	V	*	IPAM VL	ANs Super H	lost DHCP	DNS	File Distrib	oution			
<b>.</b> *	4	Zones	Members	Name Server C	Groups Share	ed Record Group	s Subs	criber Services	s Deployment	Blacklist Rulesets	DNS64 Gr	oups 🕨
	def	ault.cp	olview	R 🔊								
	Qui	ck Filter	None	▼ Off	Filter On	Show Filter	Toggle fl	at view				
	<i>→</i>	+-	🗷   🗇 -   🕇	1 🖨						Go to		Go
		$\equiv$	Name 🛋	Cloud Usag	e	Owned By		Delegated	То	Grid Primary Se	Туре	С
		=	10.10.10.in-ad	Non-cloud		Grid					Authoritative	
		=	0.0.127.in-addr	•							Auto-created	
		=	1.0.0.0.0.0.0.	-							Auto-created	

- 3. Click the + (add button) to add a new zone.
- 4. On step 1 of the Add Authoritative Zone Wizard, select Add an authoritative forward-mapping zone.
- 5. Click Next.

Add Authoritative Zor	ne Wizard > Step 1 of 6	E	3
Add an authoritative t	orward-mapping zone		<b>8</b> «
O Add an authoritative I	Pv4 reverse-mapping zone		
Add an authoritative I	Pv6 reverse-mapping zone		
Cancel	Previous Next	Schedule for Later Save & Close •	

- 6. On step 2 of the wizard, enter a **Name** for your zone, for example **cpguide.com**.
- 7. Click Next.

	Add Authoritative Zor	ne Wizard > Step 2 of 6	5				×	
	*Name	cpguide.com					<b>0</b> «	
	Comment							
	Disable	Disabling large amounts of d	lata may take a longer	time to execute				
	Lock							
	Cancel	Previous	t I	Schedule for	or Later	Save & Close	•	
8. On	n step 3, select <b>Use t</b>	his set of name serv	vers.					
9. Cli	ck the 🕇 (add butt	on) to add a Primary	DNS name serv	ver for the z	zone.			
Add	Authoritative Zone	Wizard > Step 3 of 6	j					×
0	None Use this Name Server Gr Use this set of name ser	roup Choose One				<b>.</b>		<b>?</b>
No	Name A IPv4 Ad	ldress IPv6 Address	Туре	Stealth	TSIG	TIG		
10.Un O Us	der Add Grid Primary	y, click <b>Select</b> .				+ -	18	î
Add Gr Selec	t Clear							×
0						Add	Cano	cel

11. In the Member Selector dialog, select your Cloud Platform member 1. By selecting the Cloud Platform member as the primary name server in this step, the zone will automatically be delegated to that member.

Member Selector						×
All Members	off Filter On	Show Filter				
Apple Mac OS Devices	Find		Go			$\rightarrow$
Conflicts     Discovered Switches/R	Name 🔺	IPv4 Address	IPv6 Address	Comment	Site	
Gaming Console Device     Microsoft Windows Dev	cp1.ibxdemo.com	172.16.1.4				
Router and Wireless Ac	cp2.ibxdemo.com	172.16.1.5				
Unmanaged	gm.ibxdemo.com	1/2.16.1.3				
		e				
Close						ОК

#### 12.Click Add.

	🕂 🗝 🛛 🛣 🗍 🛅
Add Grid Primary	X
Select Clear cp1.ibxdemo.com	
Stealth	
	Add Cancel

#### 13.Click Save & Close.

dd Authoritative	e Zone Wizard	d > Step 3 of 6						×
<ul> <li>None</li> <li>Use this Name S</li> <li>Use this set of n</li> </ul>	Gerver Group	Choose One					•   🗭   🖩	
Name 🔺	IPv4 Address	IPv6 Address	Туре	Stealth	TSIG			Т
cp1.ibxdemo	172.16.1.4		Grid Primary	No	No			Т
								I
6 ( ) N I (	<b>;</b>							
Cancel		Previous	Next			Schedule for Later	Save & Clos	e -
14.Click Resta	art in the war	ning bar when	prompted.					

15.Click **Restart** in the Restart Grid Services window.

16.Notice that the new zone shows Cloud from delegation in the Cloud Usage column and the CP member name in the Delegated To column.

lr	nfob	lox 📚	l	Dashboards	Data Manager	ment Cloud	Sma	rt Folders	Grid	Administration		
ct	o1viev	1	<b>*</b>	IPAM VLA	Ns Super Ho	ost DHCP	DNS	File Distrib	ution			
	4	Zones	Members N	Name Server Gr	oups Shared	d Record Groups	Subs	criber Services	Deploymen	t Blacklist Rulesets	DNS64 Groups	
	def	ault.cp	1view	n 🖉								
	Qui	ck Filter	None	• Off	Filter On	Show Filter	Toggle fl	at view				
	->	+-	🗷   🗃 -   ᆂ	- 1 🖨						Go to	Go	
		$\equiv$	Name 🔺	Cloud Usage		Owned By		Delegated	То	Grid Primary Se	Туре	С
		=	cpguide.com	Cloud from d	lelegation	Grid		cp1.ibxdem	o.com	cp1.ibxdemo.c	Authoritative	
		=	10.10.10.in-ad	Non-cloud		Grid					Authoritative	
		=	0.0.127.in-addr								Auto-created	
		=	1.0.0.0.0.0.0								Auto-created	

#### Assign Name Server for Reverse Mapping Zone

Next, we will assign a Cloud Platform member as the Grid Primary for the reverse mapping zone which was automatically created when we created a network. This will automatically delegate the zone to the Cloud Platform appliance.

- 1. Navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.
- 2. Select the checkbox next to the reverse mapping zone.
- 3. Click the  $\equiv$  (action menu).

lt	nfob	lox 📚		Dashbo	ards I	Data Management	Cloud	Smar	rt Folders	Grid	Administration		
c	p1viev	V	~	IPAM	VLANs	Super Host	DHCP	DNS	File Distri	bution			
1	Zoi	nes	Members	Name Serve	er Groups	Shared Record (	Groups	Subscribe	er Services D	eployment	Blacklist Rulesets	DNS64 Group	)S
	def	ault.c	olview	× 🖪	I								
	Qui	ck Filter	None	•	off Filte	er On Show F	ilter	Toggle fla	at view				
	→	+-	<b>2</b>   🖬 -	1	•								G
		$\equiv$	Name 🔺	Cloud	d Usage	Owne	d By		Delegated	То	Grid Primary	Se Type	
		=	cpguide.con	n Cloud	d from deleg	gation Grid			cp1.ibxder	no.com	cp1.ibxdemo.c	c Authoritative	
	<b>v</b>	=	10.10.10.in-	ad Non-	cloud	Grid						Authoritative	
		=	0.0.127.in-a	ddr								Auto-created	
		$\equiv$	1.0.0.0.0.0	).0								Auto-created	

4. Click Edit.



- 5. In the Authoritative Zone window, navigate to the Name Server page.
- 6. Select Use this set of name servers.
- 7. Click the + (add button) to add a Primary DNS name server for the zone.

Basic							
-							
○ None							
Use this Nam	e Server Group	Choose One					
O Use this set of the set of t	of name servers						
						+ - 1 121	m
-			-			• • •	
Name 🔺	IPv4 Address	IPv6 Address	Туре	Stealth	TSIG		
No data							
	Basic None Use this Nam Use this set of No data	Basic None Use this Name Server Group Use this set of name servers No data	Basic None Use this Name Server Group Choose One Use this set of name servers Use this set of name servers No data No data	Basic None Use this Name Server Group Choose One Use this set of name servers Use this set of name servers No data No data	Basic None Use this Name Server Group Choose One Use this set of name servers Use this set of name servers Name ▲ IPv4 Address IPv6 Address Type Stealth No data	Basic None Use this Name Server Group Choose One Use this set of name servers Use this set of name servers Name ▲ IPv4 Address IPv6 Address Type Stealth TSIG No data	Basic None Use this Name Server Group Choose One Use this set of name servers Use this set of name servers ↓ ↓   2   Name ▲ IPv4 Address IPv6 Address Type Stealth TSIG No data

8. Under Add Grid Primary, click Select.

O Use this set of name servers

	🕂 -   🗹   👼
Add Grid Primary	×
Select Clear	
Stealth	
	Add Cancel

9. In the Member Selector dialog, select CP1. By selecting the Cloud Platform member as the primary name server in this step, the zone will automatically be delegated to that member.

Member Selector						×
All Members	off Filter On	Show Filter				
Active Directory Sites	Find		Go			<i>→</i>
Conflicts     Jiscovered Switches/R	Name 🔺	IPv4 Address	IPv6 Address	Comment	Site	
Gaming Console Device	cp1.ibxdemo.com	172.16.1.4				
Router and Wireless Ac	cp2.ibxdemo.com	172.16.1.5				
Smartphone, PDA, Tabl	gm.ibxdemo.com	172.16.1.3				
_	N A P NI	đ				
Close						ОК

10.Click Add.

Add Grid Primary	×
Select Clear cp1.ibxdemo.com	
Stealth	
	Add Cancel

#### 11. Click Save & Close.

10.10.10.in-addr.arpa	(Author	ritative Zone)							×
Toggle Basic Mode		Basic						Ħ	8
General Name Servers Settings Queries Zone Transfers	0	None Use this Name Serve Use this set of name	r Group Choos servers	e One 🖣			<b>+</b> •   Ø	Ē	
Updates Active Directory		Name 🔺	IPv4 Address	IPv6 Address	Туре	Stealth	TSIG		L
Host Naming DNSSEC DNS Scavenging Extensible Attributes Permissions		cp1.ibxdemo.com	172.16.1.4		Grid Primary	No	No		
Cancel							Sav	re & Close	•

+ • | 🗹 | 🛅

- 12.Click **Restart** in the warning bar when prompted.
- 13. Click **Restart** in the Restart Grid Services window.

>	+ •	🖻   🛅 -   🏦	•   🖨				
	$\equiv$	Name 🔺	Cloud Usage	Owned By	Delegated To	Grid Primary Se	Туре
	=	cpguide.com	Cloud from delegation	Grid	cp1.ibxdemo.com	cp1.ibxdemo.c	Authoritative
	$\equiv$	10.10.10.in-ad	Cloud from delegation	Grid	cp1.ibxdemo.com	cp1.ibxdemo.c	Authoritative
	$\equiv$	0.0.127.in-addr					Auto-created
	$\equiv$	1.0.0.0.0.0.0					Auto-created

#### **Delegate Authority for Network View**

Next, we will delegate the newly created network view to a Cloud Platform member. This can also be done while creating the network view. Once we delegate the network view to a Cloud Platform member, all objects in the view, including networks and DNS zones, will be automatically delegated through inheritance.

- To delegate the entire network view to your Cloud Platform member, navigate to the Administration → Network Views tab.
- 2. Select the checkbox next to your new network view and click the  $\equiv$  (action menu).

Infoblox 💸 🔋 🛛 Dasht	iboards Data Manager	ment Cloud Smart	Folders Grid Adı	ministration		
Admin	nistrators Workflow	Logs Network Views	Extensible Attributes	Cloud Auther	ntication Server Groups	Named ACLs
Network Views 📮						
Quick Filter None	off Filter On	Show Filter				
→   +   ♂   面 •   \$   <b>1</b> •	-   🖨				Go to	Go
🔲 📃 Name 🔺 Clo	oud Usage	Owned By	Delegated To	Comment	Site	
🛛 📃 cplview Nor	on-cloud	Grid				
🗐 📃 default Nor	on-cloud	Grid				

3. Click Edit.

→   +   @   @ •   \$   ± •   ₽						
	Name 🔺	Cloud Usage				
	Editriew	Non-cloud				
	default	Non-cloud				

4. In the network view window, under Delegate authority from the Grid Master, click **Select** next to Delegated To.

cp1view (Network Vi	ew)		×
	Basic		
General Members Extensible Attributes Permissions	*Name Comment	cp1view	
	CLOUD		
	Cloud Usage	Non-cloud	
	Owned By	Grid	
	Delegate authority f	rom the Grid Master	
	Delegated To	Select Clear	
Cancel			Save & Close 🔻

5. In the Cloud Member Selector dialog, select Cloud Platform member 1.

Cloud Member Select	or				
All Members	off Filter On	Show Filter			
Active Directory Sites					
Apple Mac OS Devices	Find		Go		$\rightarrow$
Conflicts	Name 🔺	IPv4 Address	IPv6 Address	Comment	Site
Discovered Switches/R	Nume –	II VY Address	ii vo Address	Comment	One
📲 Gaming Console Devic	cp1.ibxdemo.com	n 172.16.1.4			
All Members All Members All Members All Members Active Directory Sites Apple Mac OS Devices Conflicts Gaming Console Device Gaming Console Device Close Close	en2 ibudeme een	170 10 1 5			
	cp2.ibxdemo.com	172.16.1.5			
📑 Smartphone, PDA, Tabl					
Active Directory Sites Apple Mac OS Devices Conflicts Discovered Switches/R Gaming Console Device Microsoft Windows Dev Router and Wireless Ac Smartphone, PDA, Tabl Unmanaged	H I F H	đ			
Close					ОК

6. Click Save & Close.

cp1view (Network Vie	ew)		×
	Basic		6
General Members Extensible Attributes Permissions	*Name Comment	cp1view	
	CLOUD Cloud Usage	Non-cloud	
	Owned By	Grid	
	Delegate authority f	from the Grid Master	
	Delegated To	cp1.ibxdemo.com Select Clear	
Cancel			Save & Close 🔻

- 7. Click **Restart** in the warning bar when prompted.
- 8. Click Restart in the Restart Grid Services window.
- 9. Notice that the network view now shows Cloud from delegation in the Cloud Usage column and the CP member name in the Delegated To column.

Network	Views 🚦					
Quick Filter     None     Image: Show Filter       Image:						
→   +   0	8   🗰 +   📚   :	<b>t.</b> -   🔒				
	Name 🔺	Cloud Usage	Owned By	Delegated To		
	cp1view	Cloud from delegation	Grid	cp1.ibxdemo.com		
	default	Non-cloud	Grid			

10.Navigate to the **Data Management** → **IPAM** tab. You can see the previously created network has been delegated to the Cloud Platform member and the icon color has changed from green to blue.

lr	nfoblox 📚	D	ashboards	Data Management	Cloud	Smart Folders	Grid Administration
C	p1view	► IF	PAM VLA	ANs Super Host	DHCP	DNS File Distri	bution
>	cp1view	Cloud Network V	ïew 👤				
	Quick Filter	None	off	Filter On Show Fi	lter 📜	Toggle flat view	
	→   + •	2   🖬 -   🕹	-   🖨				
		Network -		Cloud Usage	Owned	Ву	Delegated To
		<b></b>		Cloud from delegation	Grid		cp1.ibxdemo.com

11. Select the checkbox next to the network and click the  $\equiv$  (action menu). 12.Click Edit.



13. You can see in the Cloud IPv4 Network window that the delegation of this network has been inherited from the network view.

cp1view > 10.10.10.0/2	4 (Cloud IPv4 Netw	ork)		F
Taggia Basis Mada			ŧ	
O Toggle basic Mode	Basic Adv	anced		_
General	Address	10.10.10.0		
Member Assignment	Address			
Pv4 DHCP Options	Netmask	/24 (255.255.255.0)		
VLAN Assignment	Comment			
neral mber Assignment 4 DHCP Options AN Assignment 4 DDNS 4 BOOTP/PXE 4 BOOTP/PXE 4 DHCP Thresholds 4 Filters MAP 4 IPAM Utilization tification tensible Attributes trmissions				
Pv4 BOOTP/PXE				
Pv4 DHCP Thresholds				
Pv4 Filters	Disable for DHCP			
F-MAP				
IPv4 IPAM Utilization Notification		Disabling large amounts of data may take a longer time to execute.		
Extensible Attributes	CLOUD			
Permissions	Cloud Usage	Cloud from delegation		
	Owned By	Grid		
	Delegate authority f	rom the Grid Master		
	Delever 17	and involves and		
	Delegated To	cp1.ibxdemo.com		
	Inherited from cp1vie	w (Network View)		
Cancel			Save & Close	•

#### **Create Host Record in Delegated Network and Zone**

Now that you have a network view, network, and authoritative DNS zone delegated to a Cloud Platform member, all API calls for objects in that network view will be made to the Cloud Platform member. To view this in action, we will create a host record (for a VM) using a cloud API request. We will use the following sample API call.
	REST Method	API Call	Sample Body					
Operation	Sample cURL Command							
	Sample Output							
	POST	https://172.16.1.4/wapi/v2.11/record:host	<pre>{"name": "vm1.cpguide.com", "ipv4addrs": [{"ipv4addr":"10.10.10.11"}], "view":"default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }, "VM ID": { "value": "VM-ID-1"}, "VM Name": { "value": "LinuxVM1" }}}</pre>					
Create a Host Record within a Tenant	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11/record:host?_return_fields%2B=name,extattrs" -d '{"name": "vm1.cpguide.com","ipv4addrs": [{"ipv4addr":"10.10.10.11"}],"view":"default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-1"},"VM Name": { "value": "LinuxVM1" }}}							
	<pre>{"_ref": "record "extattrs": {"CMP Type": "Cloud API C "Tenant ID": - "VM ID": {"va "VM Name": "ipv4addrs": [{"_ref": "record:host_ip MTEu:10.10.10 "configure_fo "host": "vm1. "ipv4addr": " "name": "vm1 "view": "defau</pre>	:host/ZG5zLmhvc3QkLjluY29tLnRlc3Qudm0x:vm1.c {"value": "Openstack"}, )wned": {"value": "True"}, ("value": "DC1"}, ilue": "VM-ID-1"}, {"value": "LinuxVM1"} }, vv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMi5jb20udG 0.11/vm1.cpguide.com/default.cp1view", or_dhcp": false, cpguide.com", 10.10.10.11" }], .cpguide.com", ilt.cp1view"}	oguide.com/default.cp1view",					

- 1. To test this cloud API call, open a terminal window on your client device.
- 2. Copy the example cURL command from above and paste it in the terminal. Ensure you use the IP address of the CP1 appliance, the correct DNS view name, and the correct DNS zone.

File Edit View Search Terminal Help infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11 /record:host?\_return\_fields%2B=name,extattrs" -d '{"name": "vm1.cpguide.com","ipv4addrs": [{"ipv4addr":"10.10.10.11"}],"view":"d efault.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"T rue" },"VM ID": { "value": "VM-ID-1"},"VM Name": { "value": "LinuxVM1" }}}'

3. Press Enter. The screenshot below shows the output from a successful API call.

"_ref": "record:host/ZG5zLmhvc3QkLjEuY29tLmNwZ3VpZGUudm0x:vm1.cpguide.com/default.cp1view",
"extattrs": {
"CMP Type": {
"value": "Openstack"
},
"Cloud API Owned": {
"value": "True"
).
"Tenant ID": {
"value" · "DC1"
ر ا ۱۳۷۸ کې د ا
value : vm-1D-1
"VM Name": {
"value": "LinuxVM1"
}
},
"ipv4addrs": [
{
<pre>" ref": "record:host ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyOuMS5jb20uY3BndWlkZS52bTEuMTAuMTAuMTAuMTEu:10.10.11/vm1.cpqui</pre>
de.com/default.cp1view".
"configure for dhcp": false
"host": "vm1 coulde com"
"iovadde", "10 10 11 "
name : "VMI.cpgutde.com",
"view": "default.cpiview"
Infoblox@ubuntu-01:~S

- 4. To view the host record in Grid Manager, navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.
- 5. If necessary, use the network view dropdown to select the **cp1view** network view created earlier.
- 6. Click on the **cpguide.com** zone created earlier.

l	nfoblox 📚	D	ashboards	Data Manage	ement Cloud	l Smar	rt Folders	Grid	Administration			
c	p1view	¥ IF	PAM VLA	Ns Super H	lost DHCP	DNS	File Distri	ibution				
	Zones	Members Name	e Server Group	s Shared R	Record Groups	Subscribe	er Services D	eployment	Blacklist Rulesets	DNS64 Groups	Query Monitoring	
	default.cp1view 🧪 🖪											
	Quick Filter None off Filter On Show Filter ' Toggle flat view											
	<b>→</b>   <b>+</b> •	☞   @ •   🕹	-   🖨								Go to	Go
		Name 🔺	Cloud Usage		Owned By		Delegated	i To	Grid Primary Se	Туре	Comment	Multi-master Zone
		cpguide.com	Cloud from d	elegation	Grid		cp1.ibxdemo.com cp1.ibxdemo.c			Authoritative		No
🔲 🗮 10.10.10.in-ad Cloud from delegation Grid cp1.ibxdemo.com cp1.ibxdemo.c Authoritativ						Authoritative		No				
		0.0.127.in-addr								Auto-created		No
		1.0.0.0.0.0.0.0								Auto-created		No

7. The newly created host record is visible. Select the checkbox for the host record.

Cpguide.c Records Quick Filter	Cloud Authoritative Zone       Image: Cloud Authoritative Zone       Image: Cloud Authoritative Zone         Records       Subzones         Quick Filter       None       Image: Cloud Authoritative Zone         Generative Zone       Image: Cloud Authoritative Zone       Image: Cloud Authoritative Zone         Quick Filter       None       Image: Cloud Authoritative Zone       Image: Cloud Authoritative Zone										
+ •   🛛	+ •   ∅										
	Name 🔺	Туре	Data		Record Source	Principal	Protected	Comment	Monitored Since	Last Queried	
		SOA Record	Serial MNAME RNAME Refresh Retry Expire Negative Caching TTL	2 cp1.ibxdemo.cc please_set_em 10800 3600 2419200 . 900	System			Auto-created b	Not Monitored	Not Monitored	
		NS Record	cp1.ibxdemo.com		System			Auto-created b	Not Monitored	Not Monitored	
	vm1	Host	10.10.10.11		Static		No		Not Monitored	Not Monitored	

- 8. To view Extensible Attributes added to the record through the cloud API, click the  $\equiv$  (action menu).
- 9. Click on Extensible Attributes.

Edit	NS Record	cp1.ibxdemo.com
Delete vm1 Extensible Attrit	Host butes	10.10.10.11
Permissions		

10. You can see cloud specific EAs such as CMP Type and Tenant ID have been assigned to the record.

					曲
	Basic				
General					
тι	Extensible At	tributes			+  🗊
liases		Attribute Name	Value	Inheritance State	Require
odates		Cloud API Owned	True	Disabled	No
v6 Discovered Data		CMP Type	Openstack	Disabled	No
tensible Attributes		Tenant ID	DC1	Disabled	No
rmissions		VM ID	VM-ID-1	Disabled	No
		VM Name	LinuxVM1	Disabled	No
	-				
Cancel				Sav	ve & Close

11. Click Cancel to close the host record window.

12.Navigate to the Cloud  $\rightarrow$  Tenants tab. Here you can see a new tenant is added, DC1.

lı	nfoblox 📚	1	Dashboards Da	ata Management	Cloud	Smart Folder	rs Grid	Administration			
			Tenants VPCs	Networks	VMs (	Cloud Platform Me	embers				
<b>1</b> >	All Tenants	S									
	Quick Filter No	ne	✓ Off Filter On Show Filter								
	21 ± 1 8										
	Actions I	Mgmt Platform	Name 🔺	ID		VMs	Networks	Network Views			
		Openstack	DC1	DC1		1	0	cp1view 2			

### 13.Click on DC1.

14. Click VMs. You will see details of the virtual machine that was specified when creating the host record.

l	nfoblox 📚	Dashboards	Data Management	Cloud	Smart Folders	s Grid	Administration		
		Tenants VP0	Cs Networks	VMs C	Cloud Platform Me	mbers			
1 >	Tenants Home DC1 Tenant  Tenant Tenant Tenant Tenant Tenant Tenant								
	Quick Filter None	▼ Off Filte	er On Show Filte	er					
	±   ⊖								Go to
	Actions Mgmt Platform	VM Name 🔺	VM ID	Ne	etworks IP Ad	dress	VM VPC	IP Address Obj	FQDN
	🔲 📃 🝙 Openstacl	k LinuxVM1	VM-ID-1		1 10.10	10.11	None	Host	vm1.cpguide.com

# **Use Cases**

In this section, we will use cloud API calls and/or a set of tasks in the Grid Manager GUI to demonstrate common tasks, use cases, and benefits of Cloud Platform appliances and Cloud Network Automation. The API examples shown in this section are limited to the use cases discussed and do not cover all cloud API functionality. For additional information on Infoblox API, including cloud API, refer to documentation at <a href="https://docs.infoblox.com">https://docs.infoblox.com</a>. The following tasks and use cases are explored:

- Locally Survivable Solution Within a Data Center
- Scalable Solution for API Calls and DDI Services
- Multi-tenant Solution
- Proxy API Requests
- Multiple Primary Name Servers
- UI Support for Delegated Objects
- Enhanced User Interface for Cloud Visibility

# Locally Survivable Solution Within a Data Center

This solution offers localized management of objects by delegating ownership to Cloud Platform members. Cloud Platform members can serve API requests and protocols (DHS, DHCP) locally within data centers outside an organization's primary data center. Centralized management and visibility is retained through the Grid Master and Grid Manager UI.

The Cloud Platform members will continue to serve APIs and other services even when disconnected from the Grid Master. If you are experiencing WAN connectivity issues or the Grid Master goes offline, your data center is not brought down since the API calls are served locally by the CP member. When connectivity is restored to the Grid Master, the Cloud Platform appliance will automatically sync changes made while the connection was down. These updates will then be visible in Grid Manager.

You can use the following steps to verify and demonstrate the local survivability use case:

- 1. Shut down the Grid Master.
- 2. Use the following API call to create a new host record for a virtual machine on the locally available Cloud Platform member.

	REST Method	API Call	Sample Body					
Operation	Sample cURL Command							
	Sample Output							
Create a Host Record within a Tenant	POST	https://172.16.1.4/wapi/v2.11/record:host	<pre>{"name": "vm2.cpguide.com", "ipv4addrs": [{"ipv4addr":"10.10.10.12"}], "view":"default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }, "VM ID": { "value": "VM-ID-2"}, "VM Name": { "value": "LinuxVM2" }}}</pre>					
	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11/record:host?_return_fields%2B=name,extattrs" -d '{"name": "vm2.cpguide.com","ipv4addrs": [{"ipv4addr":"10.10.10.12"}],"view":"default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-2"},"VM Name": { "value": "LinuxVM2" }}}'							
	<pre>{"value":"True" },"VM ID": { "value": "VM-ID-2"},"VM Name": { "value": "LinuxVM2" }}}' {"_ref": "record:host/ZG5zLmhvc3QkLjluY29tLnRlc3Qudm0x:vm2.cpguide.com/default.cp1view",</pre>							

- 3. To test this cloud API call, open a terminal window on your client device.
- 4. Copy the example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP1 appliance, the correct DNS view name, and the correct DNS zone.

infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11
/record:host?\_return\_fields%2B=name,extattrs" -d '{"name": "vm2.cpguide.com","ipv4addrs": [{"ipv4addr":"10.10.10.12"}],"view":"d
efault.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"T
rue" },"VM ID": { "value": "VM-ID-2"},"VM Name": { "value": "LinuxVM2" }}}'

5. Press **Enter**. The screenshot below shows the output from a successful API call, demonstrating that you can continue managing objects on the Cloud Platform member, even when the Grid Master is offline.



- 6. To verify changes are synced once connectivity is restored, power on your Grid Master.
- 7. Wait a few minutes until the Grid Manager UI is available and log in.
- 8. Navigate to the **Cloud**  $\rightarrow$  **Tenants** tab.
- 9. Click on the **DC1** tenant.

10. Click on VMs. You can see that the object for your newly added VM has been synced to the Grid.

l	nfobl	ox 📚		Dashboards	Data	Management	Cloud	Smart F	olders	Grid	Administration		
				Tenants	/PCs	Networks	VMs	Cloud Platfo	rm Members				
1 >	Tenan DC: Net	its Home 1 Ter works	nant 💉 📮 VMs										
	Qui	ck Filter	None	▼ Off F	-ilter On	Show Filter	r)						
	<u>t</u>	•											Go to
		Actions	Mgmt Platform	VM Name	<u> </u>	VM ID	ľ	Networks	IP Address	1	VM VPC	IP Address Obj	FQDN
		=	Openstack	k LinuxVM1		VM-ID-1		1	10.10.10.11	N	lone	Host	vm1.cpguide.com
		=	Openstack	LinuxVM2		VM-ID-2		1	10.10.10.12	N	lone	Host	vm2.cpguide.com

# Scalable Solution for API Calls and DDI Services

By adding additional Cloud Platform members to your data center or cloud environment and delegating a subset of objects to each, you can horizontally scale API call capacity. The following table shows capacity limits for available Cloud Platform appliance models as well as the number of VMs each is recommended to serve.

Model	Recommended Number of VMs	API Calls per Minute	DNS Queries per Second	DHCP Leases per Second	
CP-V805	1,000	10	4,000	60	
CP-V1405	5,000	50	30,000	210	
CP-V2205	20,000	200	143,000	600	

## **Multi-tenant Solution**

You can leverage a combination of Network Views and Cloud Platform members for a multi-tenant solution.

When a network view is created, a corresponding DNS view is also created. DNS views provide the ability to serve one version of DNS data to one set of clients and another version to another set of clients. With DNS views, the appliance can provide a different answer to the same query, based on the source and/or destination of the query. A DNS view can be in only one network view, but a network view can contain multiple DNS views.

Network views can be used in cloud environments or data centers to isolate each environment or tenant to their own respective view. This enables support of overlapping networks across different tenants, each in its own network view, thus enabling multi-tenancy for cloud environments. Note that when DHCP service is provided, a Cloud Platform member may only be associated with a single network view.

To demonstrate this use case, we will create overlapping networks under tenants in multiple network views, each delegated to different Cloud Platform members. First, we will create a new network view and delegate it to Cloud Platform member 2.

- 1. Log in to Grid Manager.
- 2. Navigate to the Administration  $\rightarrow$  Network Views tab.

3. Click the 🕇	(add button) to add a new network view.
----------------	---

lr	nfoblox	٢		Dashboards	Data Manag	ement	Cloud S	mart Fo	lders Grid	Adm	inistration		
				Administrators	Workflow	Logs	Network Vie	ews	Extensible Attrib	utes	Cloud	Authenticatio	n Server Groups
<b>1</b> ×	Netwo	ork	Views	R									
	Quick I	Filter	None	• off F	ilter On	Show Filter							
	→   -	- 1 0	8   🖬 +   🄇	1 ± •   Ə									Go to
			Name 🔺	Cloud Usage		Owned By	,	De	elegated To		Comment	Site	
			cp1view	Cloud from de	legation	Grid		cp	1.ibxdemo.com				
			default	Non-cloud		Grid							

- 4. In the Add Network View Wizard, enter a **name** for the network view, for example **cp2view**.
- 5. Click **Select** next to Delegated To.

Add Network View Wizard > Step 1 of 3								
*Name	cp2view	<b>@</b> «						
Comment								
CLOUD								
Delegate authority from th	e Grid Master							
Delegated To	Select Clear							
Cancel	Previous Next Save & Close	se 🔹						

6. In the Cloud Member Selector dialog, click on CP2.

All Members	off Filter On	Show Filter			
Active Directory Sites					
Apple Mac OS Devices	Find		Go		-
Conflicts	Name	IDv4 Address	IDv6 Addre	ess Comment	Site
R Discovered Switches/R	Name A	IF V4 Address	IF VO Addit	ess comment	Sile
💽 Gaming Console Devic	cp1.ibxdemo.com	172.16.1.4			
📑 Microsoft Windows Dev	cp2 ibydamo.com	172 16 1 5			
🖹 Router and Wireless Ac	Cp2.ibxdemo.com	172.10.1.5			
📑 Smartphone, PDA, Tabl					
📑 Unmanaged					
	<b>N A D N</b> I	ð			

#### 7. Click Save & Close.

Add Network Vi	ew Wizard > Step 1 of 3	×
*Name	cp2view	
Comment		
CLOUD		
Delegate authority f	rom the Grid Master	
Delegated To	cp2.ibxdemo.com Select Clear	
Cancel	Previous Next	Save & Close 🔹

- 8. A warning will inform you that a DNS view will also be created for the new network view. Click **Yes**.
- 9. Click **Restart** in the warning bar when prompted.
- 10.Click **Restart** in the Restart Grid Services window.

Network Views											
Quick Filter         None         off         Filter On         Show Filter											
→   +   2   = -   \$   ± -   ₽											
	Name 🔺	Cloud Usage	Owned By	Delegated To							
	cp1view	Cloud from delegation	Grid	cp1.ibxdemo.com							
	cp2view	Cloud from delegation	Grid	cp2.ibxdemo.com							
	default	Non-cloud	Grid								

11. Next, we will create overlapping networks and new tenants in the two network views, using the following cloud API calls.

	REST Method	API Call	Sample Body					
Operation		Sample cURL Command						
	Sample Output							
On Cloud Platform Member 1, create a network 1.1.1.0/24 in cp1view under a tenant Dev	POST	https://172.16.1.4/wapi/v2.11/network	{"network": "1.1.1.0/24", "network_view": "cp1view", "extattrs": { "Tenant ID": {"value": "Dev"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned":					

			{"value":"True" }}}				
	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11/network?_return_fields%2B=network,extattrs" -d '{"network": "1.1.1.0/24", "network_view": "cp1view", "extattrs": { "Tenant ID": {"value": "Dev"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value": "True" }}}						
	<pre>{"_ref": "network/ZG5zLm5ldHdvcmskMS4xLjEuMC8yNC8y:1.1.1.0/24/cp1view", "extattrs": {"CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value": "True"}, "Tenant ID": {"value": "Dev"} }, "network": "1.1.1.0/24", "network_view": "cp1view" }</pre>						
	POST	https://172.16.1.4/wapi/v2.11/network	{"network": "1.1.1.0/24", "network_view": "cp2view", "extattrs": { "Tenant ID": {"value": "Dev2"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }}}				
On Cloud Platform Member 2, create a network 1.1.1.0/24 in cp2view under a tenant Dev2	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.5/wapi/v2.11/network?_return_fields%2B=network,extattrs" -d '{"network": "1.1.1.0/24","network_view": "cp2view","extattrs": { "Tenant ID": {"value": "Dev2"},"CMP Type": {"value": "Openstack"},"Cloud API Owned": {"value":"True" }}}'						
	<pre>{"_ref": "network/ZG5zLm5ldHdvcmskMS4xLjEuMC8yNC8y:1.1.1.0/24/cp2view",     "extattrs":     {"CMP Type": {"value": "Openstack"},     "Cloud API Owned": {"value": "True"},     "Tenant ID": {"value": "Dev2"} },     "network": "1.1.1.0/24",     "network_view": "cp2view" }</pre>						

- 12. To create the network and tenant in **cp1view**, open a terminal window on your client device.
- 13.Copy the first example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP1 appliance and the correct network view name.

infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11 /network?\_return\_fields%2B=network,extattrs" -d '{"network": "1.1.1.0/24","network\_view": "cp1view","extattrs": { "value": "Dev"},"CMP Type": {"value": "Openstack"},"Cloud API Owned": {"value":"True" }}}'

14. Press Enter. The screenshot below shows the output from a successful API call.

```
"_ref": "network/ZG5zLm5ldHdvcmskMS4xLjEuMC8yNC8x:1.1.1.0/24/cp1view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "Dev"
        }
    },
    "network": "1.1.1.0/24",
    "network_view": "cp1view"
}infoblox@ubuntu-01:~$
```

15. To create the network and tenant in **cp2view**, copy the second example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP2 appliance and the correct network view name.

# infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.5/wapi/v2.11 /network?\_return\_fields%2B=network,extattrs" -d '{"network": "1.1.1.0/24","network\_view": "cp2view","extattrs": { "Tenant ID": { "value": "Dev2"},"CMP Type": {"value": "Openstack"},"Cloud API Owned": {"value":"True" }}}'

16. Press Enter. The screenshot below shows the output from a successful API call.



17. To view the new tenants and networks, log in to Grid Manager.

18. Navigate to the **Cloud**  $\rightarrow$  **Tenants** tab.

Infoblox 📚		Dashboards Data Managemen		a Management	Cloud Smart Folders		olders Grid	Administration		
				Tenants	VPCs	Networks	VMs (	Cloud Platfor	m Members	
*	All	Tenan	its							
	Qui	ck Filter	None	▼ Off	Filter On	Show Filter				
	ß	±	3							
		Actions	Mgmt Platform	Name 🔺		ID		VMs	Networks	Network Views
		=	Openstack	DC1		DC1		2	0	cp1view
		$\equiv$	Openstack	Dev		Dev		0	1	cp1view
		≡	Openstack	Dev2		Dev2		0	1	cp2view

Here you can see the two new tenants, **Dev** associated with **cp1view**, and **Dev2** associated with **cp2view**.

lr	nfoblox 📚		Dashboards	Data Management	Cloud	Smart Folders	Grid	Administration	
			Tenants VF	PCs Networks	VMs (	Cloud Platform Membe	ers		
1 >	All Netwo	orks							
	Quick Filter	None	▼ off Filt	ter On Show Filter	r				
	211 (	₽							
	Actions	Network 🔺	Tenant	Cloud Usage	Owned B	Delegated	То	Network View	Mgmt Platform
		1.1.1.0/24	Dev	Cloud from ad	Cloud ada	apter cp1.ibxder	no.com	cp1view	Openstack
		1.1.1.0/24	Dev2	Cloud from ad	Cloud ada	apter cp2.ibxder	no.com	cp2view	Openstack
		10.10.10.0		Cloud from del	Grid	cp1.ibxder	no.com	cp1view	

The two new networks using the same CIDR, have both been added. Each is isolated to their own network view and served by a separate Cloud Platform member. This makes it easy to work with network objects locally and in an isolated, yet centralized manner. In the example architecture used in this guide, where Cloud Platform Members 1 and 2 are each in different data centers, the network views cp1view and cp2view each contain all network objects for their respective data centers.

# **Proxy API Requests**

Cloud Platform appliances, and the Grid Master, include built-in functionality to proxy cloud API calls to the appropriate CP member or Grid Master for processing. Cloud API calls can be sent to any Cloud Platform member in the Grid and the call is either processed locally or transparently forwarded to the appliance that is authoritative for the object referenced in the API request. The requestor (user) does not need to maintain the object to owner relationship, as the request will be proxied to the correct member.

This functionality is limited to only cloud API requests. Additionally, proxying is limited to one hop in the Grid. If the destination appliance cannot process a proxied request, the request will not be forwarded again and the client will receive an error.

To demonstrate this capability, use the following steps:

- 1. First, we will clear the Syslog to make it easier to view the proxy in action. Log in to the Grid Manager.
- 2. Navigate to the Administration  $\rightarrow$  Logs  $\rightarrow$  Syslog tab.
- 3. Click the 🙁 (clear button) to clear current logs.

	Infoblox 📚	Dashboards	Data Management	Cloud	Smart Folders	Grid	Administration		
		Administrators	Workflow	Network	k Views Exten	sible Attribute	es Cloud	Authentication Server Grou	ps Named ACLs
>	Audit Log Syslog								
	SysLog Log Viewer	Member gr	n.ibxdemo.com	A					
Quick Filter None y off Filter On Show Filter 😁 Toggle multi-line view									
	C   12   🕹 😫 🛃	€						[	
	Timestamp - Facility	Level	Server	Mess	sage				
	2020-12-03 13 syslog	INFO	syslog-ng[12	29] Log s	tatistics; processed	destination(	(d_support_mesg)=	1430', processed='source(s	_syslogng)=95', processed='src.
	2020-12-03 12 syslog	INFO	0	MA	RK				

4. In the Clear Syslog dialog, click Yes to clear the logs.

Clea	ar Syslog	×
8	Are you sure you want to clear the syslog? This operation may take some time, depending on the size of the log. To continue, click Yes and leave the dialog box open. The dialog box will close when the operation is completed. To cancel the operation, click No.	
No	Yes	•

5. Use the Member selector dropdown to select CP2.

l	nfoblox 📚	Dashboards	Data Manage	ement	Cloud	Smart Fol	lders Gri	id Ad	Iministration
		Administrators	Workflow	Logs	Network	k Views	Extensible At	tributes	Cloud
	Audit Log Syslog								
	SysLog Log Viewe	r Member	o2.ibxdemo.com	~	9				
	Quick Filter None	gi	m.ibxdemo.com p1.ibxdemo.com	te	r 🌐 T	oggle multi-li	ne view		
	C == 1 = 1		2.ibxdemo.com	C					
	Timestamp - Facility	Level	Se	rver	Mes	sage			
	2020-12-03 13 syslog	INFO	0		MA				

- 6. Click the 🙁 (clear button) to clear logs for this member.
- 7. In the Clear Syslog dialog, click **Yes** to clear the logs.
- 8. Next, we will create a DNS zone in **cp2view** using an API call to **CP2** and create a new record in this zone by proxying the request through the Grid Master. The following API calls will be used.

	REST Method	API Call	Sample Body				
Operation		Sample cURL Command					
		Sample Output					
	POST	https://172.16.1.5/wapi/v2.11/zone_auth	'{"fqdn": "cp2.com", "grid_primary": [{"name":"cp2.ibxdemo.com"}] , "view":"default.cp2view", "extattrs": { "Tenant ID": {"value": "Dev2"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }}}				
On Cloud Platform Member 2, create a zone cp2.com in cp2view	curl -k -u cloud "https://172.16 '{"fqdn": "cp2.c { "Tenant ID": { {"value":"True"	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST 'https://172.16.1.5/wapi/v2.11/zone_auth?_return_fields%2B=fqdn,grid_primary,extattrs" -d ("fqdn": "cp2.com","grid_primary":[{"name":"cp2.ibxdemo.com"}],"view":"default.cp2view","extattrs": "Tenant ID": {"value": "Dev2"},"CMP Type": {"value": "Openstack"},"Cloud API Owned": "value":"True" }}}'					
	<pre>{"_ref": "zone_ "extattrs": {"CMP Type": "Cloud API C "Tenant ID": }, "fqdn": "cp2.cd "grid_primary" [{"name": "cp</pre>	auth/ZG5zLnpvbmUkLjMuY29tLmNwMg:cp2.com/de {"value": "Openstack"}, Dwned": {"value": "True"}, { "value": "Dev2"} om", : 2.ibxdemo.com", alth": false It.cp2view"	fault.cp2view",				
Issue the call to Grid Master to create a Host Record under the zone cp2.com in cp2 view	POST	https://172.16.1.3/wapi/v2.11/record:host	{"name": "vm3.cp2.com", "ipv4addrs": [{"ipv4addr":"1.1.1.11"}], "view":"default.cp2view", "extattrs": { "Tenant ID": {"value": "Dev2"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }, "VM ID": { "value":				

			"VM-ID-3"}, "VM Name": { "value": "LinuxVM3" }}}
curl -k -u cloud "https://172.16 "vm3.cp2.com" ID": {"value": "I },"VM ID": { "va	-admin:infoblox -H 'content-type: application/jso 1.3/wapi/v2.11/record:host?_return_fields%2B= ,"ipv4addrs": [{"ipv4addr":"1.1.1.11"}],"view":"de Dev2"}, "CMP Type": {"value": "Openstack"}, "Cl lue": "VM-ID-3"},"VM Name": { "value": "LinuxV	n' -X mam fault. oud <i>I</i> VI3" }	POST e,extattrs" -d '{"name": cp2view", "extattrs": { "Tenant API Owned": {"value":"True" }}'
<pre>{"_ref": "record "extattrs": {"CMP Type": "Cloud API C "Tenant ID": "VM ID": {"va "VM Name": }, "ipv4addrs": [{"_ref": "record:host_ip 1.1.11/vm3.cp2 "configure_fo "host": "vm3. "ipv4addr": "' }], "name": "vm3 "view": "defau }</pre>	:host/ZG5zLmhvc3QkLjMuY29tLmNwMi52bTE: {"value": "Openstack"}, wned": {"value": "True"}, ("value": "Dev2"}, lue": "VM-ID-3"}, ("value": "LinuxVM3"} vv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMy5jb2 c.com/default.cp2view", r_dhcp": false, cp2.com", I.1.1.11" .cp2.com", It.cp2view"	20uY	cp2.com/default.cp2view", 3AyLnZtMS4xLjEuMS4xMS4:1.

- 9. Open a terminal window on your client device.
- 10.Copy the first example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP2 appliance, hostname of your CP2 appliance for the name server, and the correct DNS view name.

infoblox@ubuntu-01:-\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.5/wapi/v2.11
/zone\_auth?\_return\_fields%2B=fqdn,grid\_primary,extattrs" -d '{"fqdn": "cp2.com","grid\_primary":[{"name":"cp2.ibxdemo.com"}],"vie
w":"default.cp2view","extattrs": { "Tenant ID": {"value": "Dev2"},"CMP Type": {"value": "Openstack"},"cloud API Owned": {"value"
;"True" }}}'

<sup>11.</sup> Press Enter. The screenshot below shows the output from a successful API call.



12. To create the Host record in this zone using the proxy, copy the second example cURL command from above and paste it in the terminal. Ensure you use the IP address of your Grid Master and the correct DNS view name.

infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.3/wapi/v2.11 /record:host?\_return\_fields%28=name,extattrs" -d '{"name": "vm3.cp2.com","ipv4addrs": [{"ipv4addr":"1.1.1.11"}],"view":"default. cp2view", "extattrs": { "Tenant ID": {"value": "Dev2"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" } ,"VM ID": { "value": "VM-ID-3"},"VM Name": { "value": "LinuxVM3" }}}'

13. Press Enter. The screenshot below shows the output from a successful API call.



14. To view the logs showing the proxy, in Grid Manager return to the **Administration**  $\rightarrow$  **Logs**  $\rightarrow$  **Syslog** tab.

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15. Select the Grid Master form the Member selector dropdown. A syslog entry shows the request proxying to CP2.

lt	nfoblox 📚	Dashbo	oards Data	a Management	Cloud	Smart Fo	olders	Grid	Administration				
		Adminis	strators Wo	orkflow Logs	Networ	k Views	Extensible	e Attribute	s Cloud	Authentication Server Gro	oups Nam	ned ACLs	
	Audit Log Sy	slog											
	SysLog L	og Viewer Memb	per gm.ibxde	emo.com 👻	9								
	Quick Filter None 🚽 off Filter On Show Filter 🔚 Toggle single line view												
	C   12   1	±∣⊠∣⊖											] <b>Q</b>   ◀   ▶
	Timestamp 👻	Facility	Level	Server	Mes	sage							
	2020-12-03 13:37:38 PST	daemon	NOTICE	cloud_api[924	6] proxy {"nan "CMF "Linu	ving request ne": "vm3.cj P Type": {"va ixVM3" }}}	t to cp2.ibxde p2.com","ipv alue": "Open	emo.com( 4addrs": [ stack"}, "(	172.16.1.5) POST {"ipv4addr":"1.1.1. Cloud API Owned"	/wapi/v2.11/record:host?_ 11"}],"view":"default.cp2vie : {"value":"True" },"VM ID":	_return_fields% ew", "extattrs": { { "value": "VM-	2B=name,extattrs { "Tenant ID": {"va -ID-3"},"VM Name	s HTTP/1.1 lue": "Dev2"}, e": { "value":

16.Select CP2 form the Member selector dropdown. Syslog entries show the proxied request from the GM, creating the host address and host record.

Audit Log	Syslog				
SysLog	Log Viewer Men	nber <mark>cp2.ibxdemo</mark>	.com 🍸 🍷		
Quick Filter	one 💌	off Filter On	Show Filter	E Toggle single line view	
C 🖙 🕹	±   ⊠   ⊖				q   •
Timestamp 👻	Facility	Level	Server	Message	
2020-12-03 13:37:42 PST	user	DEBUG	cloud_api[24217]	[cloud-admin]: proxied_from:gm.ibxdemo.com,172.16.1.3, Created HostRecord vm3.cp2.com Dn address=1.1.1.1: Set extensible_attributes=[[name="CMP Type",value="Openstack",[[name="CM [name="Tenant ID",value="Dev2], [name="VM ID",value="VM ID",v	sView=default.cp2view oud API Owned",value="True"], .inuxVM3"]],addresses=
2020-12-03 13:37:42 PST	user	DEBUG	cloud_api[24217]	[cloud-admin]: proxied_from:gm.ibxdemo.com,172.16.1.3, Created HostAddress 1.1.1.11 network address="1.1.1.11",configure_for_dhcp=False,match_option="MAC_ADDRESS",parent=HostRec	<pre>c_view=cp2view: Set cord:.2.com.cp2.vm3</pre>
2020-12-03 13:32:04 PST	user	DEBUG	cloud_api[24215]	[cloud-admin]: Created AuthZone cp2.com DnsView=default.cp2view: Set extensible_attributes=[ Type",value="Openstack"].[name="Cloud API Owned",value="True"].[name="Tenant ID",value="Dev2"]].tqdn="cp2.com",view=DnsView:default.cp2view.grid_primaries=[[grid_member	[name="CMP r=Member:cp2.ibxdemo.com]]

17.Navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.

18.Use the network view dropdown to select the cp2view network view.

lr	nfob	olox 📚	÷	Dashbo	ards [	Data Managen	nent Clo	ud Sma	rt Folders	Grid	Adminis	tration
c	o2viev	N	¥	IPAM	VLANs	Super Ho	st DHCP	DNS	File Distr	ibution		
1 >	Zo	nes	Members	Name Serve	er Groups	Shared Re	cord Groups	Subscrib	er Services [	Deployment	Blackli	ist Rulesets
	default.cp2view 🥒 📮											
	Quick Filter None off Filter On Show Filter 😁 Toggle flat view											
	<b>→</b>	i <b>+</b> -	🗹   🛅 🗸	1	•							
		≡	Name 🔺	Cloud	d Usage		Owned By		Delegate	d To	Gr	rid Primary Se
		=	cp2.com	Cloud	d from adap	ter (	Cloud adapter		cp2.ibxde	mo.com	cpi	2.ibxdemo.c
		$\equiv$	0.0.127.in-a	ddr								
		=	1.0.0.0.0.0	).0								

19. Click on the **cp2.com** zone. The Host record has been successfully created using the proxy functionality.

default.cp2view Cp2.com Records	default.cp2view       cp2.com     Cloud Authoritative Zone       Records     Subzones									
Quick Filter	Quick Filter None I off Filter On Show Filter Toggle flat view									
+ -   🗭   💼 -   ± -   🖶										
	Name 🔺	Туре	Data		Record Source	Principal	Protected			
		SOA Record	Serial MNAME RNAME Refresh Retry Expire Negative Caching TTL	2 cp2.ibxdemo.cc please_set_em 10800 3600 2419200 900	System					
		NS Record	cp2.ibxdemo.com		System					
	vm3	Host	1.1.1.11		Static		No			

## Multiple Primary Name Servers

In order to increase availability of the DNS service, Infoblox NIOS allows multiple primary name servers to be assigned for an authoritative DNS zone. When multiple Cloud Platform members are assigned as primary name servers for a zone, the zone is delegated to each of the assigned primary members. Using the cloud API, changes to the zone can be processed on any of these members. The changes are then synced through the Grid Master and pushed to the other name servers.

There are some limitations to keep in mind when configuring multiple Cloud Platform members as primary name servers for a zone.

- Updates to the zone are sent to the Grid Master and then synced to other name servers. If the CP member which processes the update is not able to communicate with the Grid Master, changes to the zone will not be synced to other members until that connectivity is restored. The Cloud Platform member which processed the change will serve the updated zone, while any other members assigned to the zone will continue to use zone data from their last sync with the Grid Member.
- This is also true if a member is unable to communicate with the Grid Master when changes are processed on a different Cloud Platform member. The offline member will not receive the updates until it is able to communicate with the Grid Master.

For other considerations and best practices when assigning multiple primaries for a zone, refer to Infoblox NIOS documentation at <a href="https://docs.infoblox.com">https://docs.infoblox.com</a>.

## **Create DNS Zone with Multiple Primaries**

To illustrate this use case, use the following steps.

Warning: This section only demonstrates the ability to process zone changes on multiple CP members. If you have followed the other sections of this guide, the new DNS zone will not be resolvable from the CP members due to the ordering of DNS views they serve. To make this zone resolvable, you can change the order of DNS views for each member. For further information on DNS view ordering and configuration, refer to NIOS documentation at <u>https://docs.infoblox.com</u>.

1. Log in to the Grid Manager. Navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.

- 2. Use the network view dropdown to select the default network view.
- 3. Click the 🛨 (add button) to add a new zone.

lt	nfob	olox 📚	÷	Dashbo	ards	Data Managem	nent Cloud	l Smar	t Folders	Grid	Administration
d	efault		~	IPAM	VLANs	Super Hos	st DHCP	DNS	File Distr	ibution	
<b>1</b>	Zo	nes	Members	Name Serve	r Groups	Shared Red	cord Groups	Subscribe	r Services D	Deployment	Blacklist Rulesets
~	det	fault	R 🖉								
	Qu	ick Filte	r None	•	off Filt	er On S	how Filter	Toggle fla	at view		
	+	+-	🗭   🛅 🗸	1 🕹 - 1 🗧	•						
		≡	Name 🔺	Cloud	i Usage	(	Owned By		Delegate	d To	G
		=	0.0.127.in-a	addr							
		≡	1.0.0.0.0.0.	0.0							

- 4. On step 1 of the Add Authoritative Zone Wizard, select Add an authoritative forward-mapping zone.
- 5. Click Next.

Add Authoritativ	e Zone Wizard > Step 1 of 6		×
Add an authori	itative forward-mapping zone		Ø
O Add an authori	itative IPv4 reverse-mapping zone		
Add an authori	itative IPv6 reverse-mapping zone		
Cancel	Previous Next	Schedule for Later Save & Close -	-

- 6. On step 2, enter a **name** for the zone.
- 7. Click Next.

Add Authoritativ	ve Zone Wizard > Step 2 of 6	×
*Name	newzone.com	<b>@</b> «
Comment		
Disable	Disabling large amounts of data may take a longer time to execute.	
Lock	Previous Next Schedule for Later Save &	Close •

8. On step 3, select Use this set of name servers.

9. Click the + (add button) to add a name server.

10.Click **Select** to choose a Grid Primary.

Add Authoritative	e Zone Wizard	d > Step 3 of 6	ò			×
<ul> <li>None</li> <li>Use this Name S</li> <li>Use this set of m</li> </ul>	Gerver Group	Choose One			+-11211	<b>8</b>
Add Grid Primary Select Clear Stealth						
Name 🔺	IPv4 Address	IPv6 Address	Туре	Stealth	Add Cancel	
No data						
Cancel	Prev	ious Next		Schedule for	Later Save & Clo	se 🔹

11. In the Member Selector dialog, click on **CP1**.

Member Selector					×
All Members	off Filter On	Show Filter			
Apple Mac OS Devices	Find		Go	$\rightarrow$	
Conflicts     Discovered Switches/R	Name 🔺	IPv4 Address	IPv6 Address	Comment	
Gaming Console Device	cp1.ibxdemo.com	172.16.1.4			
Router and Wireless Ac	cp2.ibxdemo.com	172.16.1.5			
Smartphone, PDA, Tabl	gm.ibxdemo.com	172.16.1.3			
••••••••••••••••••••••••••••••••••••••		e			
Close				OI	k ]

### 12.Click Add.

Add Authoritative Zone Wizard > Step 3 of 6	×
<ul> <li>None</li> <li>Use this Name Server Group</li> <li>Choose One</li> <li>Use this set of name servers</li> </ul>	() () ()
Add Grid Primary	
Select Clear cpi.ibxdemo.com	
Add Cancel	
Name ▲         IPv4 Address         IPv6 Address         Type         Stealth         TSIG	
Cancel Previous Next Schedule for Later Save & Cl	ose 🔹

13.Repeat steps 9-12, selecting **CP2** as a second Grid Primary.

14.Click Save & Close.

Add Authoritative Zone Wizard > Step 3 of 6								
<ul> <li>None</li> <li>Use this Name Server Group Choose One</li> <li>Use this set of name servers</li> </ul>								
	Name 🔺	IPv4 Address	IPv6 Address	Туре	Stealth	TSIG	L	
	cp1.ibxdemo.com	172.16.1.4		Grid Primary	No	No	L	
	cp2.ibxdemo.com	172.16.1.5		Grid Primary	No	No	L	
M	< ► N 2							
Ca	incel	Previous	Next	Sched	lule for Later	Save & Close	• •	

- 15. Click **Yes** in the Warning dialog.
- 16.Click **Restart** in the warning bar when prompted.
- 17.Click Restart in the Restart Grid Services window.
- 18.Notice that the new zone shows both CP members in the Delegated To and Grid Primary Services columns.

def	ault	🖍 🖪							
Quick Filter         None         Image: Show Filter         Image: Toggle flat view									
→	→   + •   @   = •   ± •   ⊕ Go to								
	$\equiv$	Name 🔺	Cloud Usage	Owned By	Delegated To	Grid Primary Servers	Туре		
	=	newzone.com	Cloud from delegation	Grid	cp1.ibxdemo.com,cp2.ibxdemo.com	cp1.ibxdemo.com,cp2.ibxdemo.com	Authoritative		
	=	0.0.127.in-addr					Auto-created		

#### **Create DNS Records Using Multiple Primaries**

Next, we will create new records in the zone, using the cloud API, to demonstrate the ability to process zone changes on both of the assigned Cloud Platform members. We will use the following API calls for this example.

	REST Method	API Call	Sample Body			
Operation	Sample cURL Command					
	Sample Output					
On Cloud Platform Member 1, create an A record in zone with multiple primaries	POST	https://172.16.1.4/wapi/v2.11/record:a	'{"name": "server1.newzone.com","ipv4 addr":"2.2.2.1","view":"default ", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP			

			Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-4"},"VM Name": { "value": "Server1" }}}'			
	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11/record:a?_return_fields%2B=name,ipv4addr&_return_as_object=1" -d '{"name": "server1.newzone.com","ipv4addr":"2.2.2.1","view":"default", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-4"},"VM Name": { "value": "Server1" }}}'					
	<pre>{"_ref":     "record:a/ZG5zLmJpbmRfYSQuX2RIZmF1bHQuY29tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xM Q:server1.newzone.com/default",     "ipv4addr": "2.2.2.1",     "name": "server1.newzone.com",     "view": "default" }</pre>					
On Cloud Platform	POST	https://172.16.1.5/wapi/v2.11/record:a	'{"name": "server2.newzone.com","ipv4 addr":"2.2.2.2","view":"default ", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-5"},"VM Name": { "value": "Server2" }}}'			
Member 2, create an A record in zone with multiple primaries	curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.5/wapi/v2.11/record:a?_return_fields%2B=name,ipv4addr&_return_as_object=1" -d '{"name": "server2.newzone.com","ipv4addr":"2.2.2.2", "view":"default", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },"VM ID": { "value": "VM-ID-5"},"VM Name": { "value": "Server2" }}}'					
	<pre>{"_ref":     "record:a/ZG5zLmJpbmRfYSQuX2RIZmF1bHQuY30tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xM Q:server2.newzone.com/default",</pre>					

- 1. Open a terminal window on your client device.
- 2. Copy the first example cURL command from above and paste it in the terminal. Ensure you use the IP address of your **CP1** appliance, the correct DNS zone, and the correct DNS view name.

infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11 /record:a?\_return\_fields%28=name,ipv4addr&\_return\_as\_object=1" -d '{"name": "server1.newzone.com","ipv4addr":"2.2.2.1","view":"d efault", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" }, "VM ID": { "value": "VM-ID-4"},"VM Name": { "value": "Server1" }}}'∎

3. Press Enter. The screenshot below shows the output from a successful API call.



- 4. In the Grid Manager, navigate to the Administration  $\rightarrow$  Logs  $\rightarrow$  Syslog tab.
- 5. Use the Member selector dropdown to select CP1.
- 6. A SysLog entry shows the new A record created on CP1 (not proxied).

SysLog	Log Viewer Mem	ber cp1.ibxdemo.	com 🍸 其	
Quick Filter No	ne 💌	off Filter On	Show Filter	Toggle single line view
C   ta   🛓	±   ⊠   ⊖			
Timestamp 👻	Facility	Level	Server	Message
2020-12-04 11:01:23 PST	user	DEBUG	cloud_api[8129]	[cloud-admin]: Created ARecord server1.newzone.com DnsView=default address=2.2.2.1: Set extensible_attributes= [[name="CMIP Type",value="Openstack", [[name="Cloud API Owned",value="True"], [name="Tenant ID",value="Dev3"], [name="TwI D",value="Mul-D-d", [name="TwI Name",value="Server1"]], address="2.2.2.1", figdn="server1.newzone.com", view=DnsView:default
2020-12-04 11:01:23 PST	daemon	INFO	named[6871]	zone newzone.com/IN: ZRQ applied transaction 36 with SOA serial 2. Zone version is now 1.

- 7. To view the new record in the zone, navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.
- 8. Click on the DNS zone to view records.

Zo	nes	Members	Name Server Groups	Shared Record Groups	Subscriber Services Deploy	ment Blacklist F	Rulesets DNS6
defau Ne\ R	ult NZON ecords	e.com Subzon	Cloud Authoritative Zone	A / A			
Qui	ick Filte	r None	off Filter	On Show Filter	Toggle flat view		
+	•   🗭	🗑 -   🛔	L - I 🖶				
		Name 🔺	Туре	Data		Record Source	Cloud API Owned
	≡		SOA Record	Serial MNAME RNAME Refresh Retry Expire Negative Caching TTL	2 cp1.ibxdemo.com please_set_email.absolutely.now 10800 3600 2419200 900	System	
	$\equiv$		NS Record	cp1.ibxdemo.com		System	
	$\equiv$		NS Record	cp2.ibxdemo.com		System	
	=	server1	A Record	2.2.2.1		Static	True

- 9. To create a second record, using the cloud API on CP2, open a terminal on your client device.
- 10.Copy the second example cURL command from above and paste it in the terminal. Ensure you use the IP address of your **CP2** appliance, the correct DNS zone, and the correct DNS view name.

infoblox@ubuntu-01:~\$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.5/wapi/v2.11
/record:a?\_return\_fields%2B=name,ipv4addr&\_return\_as\_object=1" -d '{"name": "server2.newzone.com","ipv4addr":"2.2.2.2","view":"d
efault", "extattrs": { "Tenant ID": {"value": "Dev3"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True" },
"VM ID": { "value": "VM-ID-5"},"VM Name": { "value": "Server2"}}'

11. Press Enter. The screenshot below shows the output from a successful API call.



12. In the Grid Manager, navigate to the Administration  $\rightarrow$  Logs  $\rightarrow$  Syslog tab.

13.Use the Member selector dropdown to select CP2.

14.A SysLog entry shows the new A record created on CP2 (not proxied).

SysLog	Log Viewer M	ember <mark>cp2.ibxdem</mark>	p.com 👻 🛨	
Quick Filter	None	off Filter On	Show Filter	
C   🖘   🛓				
Timestamp -	Facility	Level	Server	Message
2020-12-04 11:19:31 PST	user	DEBUG	cloud_api[24214]	[cloud-admin]: Created ARecord server2.newzone.com DnsView=default address=2.2.2.2: Set extensible_attributes= [[name="CMP Type",value="Openstack"][name="Cloud API Owned",value="True"],[name="Tenant ID",value="Dev3"], [name="VM ID",value="VM-ID-5"],[name="VM Name",value="Server2"]],address="2.2.2.2",tigdn="server2.newzone.com",view=DnsView:default
2020-12-04 11:19:31 PST	daemon	INFO	named[14463]	zone newzone.com/IN: sending notifies (serial 3)

15. You can also view the new record in the zone on the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.

ne\ R	NZONE	COM Cloud A	uthoritative Zone	B 💉 🖪					
Qui	Quick Filter None 🖸 Off Filter On Show Filter Toggle flat view								
+	+ -   🖄   💼 -   🕹 -   🖨								
	=	Name 🔺	Туре	Data		Record Source	Cloud API Owned		
	=		SOA Record	Serial MNAME RNAME Refresh Retry Expire Negative Caching TTL	3 cp1.ibxdemo.com please_set_email.absolutely.now 10800 3600 2419200 900	System			
	=		NS Record	cp1.ibxdemo.com		System			
	=		NS Record	cp2.ibxdemo.com		System			
	=	server1	A Record	2.2.2.1		Static	True		
	=	server2	A Record	2.2.2.2		Static	True		

## **UI Support for Delegated Objects**

While most interaction with objects delegated to Cloud Platform members is done using the cloud API, the Grid Manager UI provides limited ability to create/delete some object types. Within delegated networks and zones, you can create/delete Fixed Addresses, Reservations, and Host records using Grid Manager. In this case, the creation/deletion is synced to the member which owns the delegated objects. *Note: Updating of these delegated objects is not supported.* 

## **Create Host Record**

To create a Host record in a delegated zone, use the following steps.

- 1. In the Grid Manager, navigate to the **Data Management**  $\rightarrow$  **DNS**  $\rightarrow$  **Zones** tab.
- 2. Use the network view dropdown to select the **cp1view** network view.
- 3. Click on the authoritative zone to view.

Infoblox 📚	Dashboard	s Data Managemer	nt Cloud	Smart Fo	lders Grid	Administration	
cp1view		VLANs Super Host	DHCP	DNS F	ile Distribution		
Zones Memb	ers Name Server G	roups Shared Reco	rd Groups	Subscriber Se	rvices Deployment	Blacklist Rulesets	DNS64 Groups
default.cp1vi	ew 🥒 🖪						
Quick Filter None	e 🔹	Filter On Sho	w Filter	Toggle flat vie	w		
→ +•  @	🗑 -   🕹 -   😝						
🔲 📃 🛛 Nam	Cloud Us	sage Ov	ned By	Delegated T	ō	Grid Primary	Servers
🔳 📃 cpgu	uide.com Cloud fro	om delegation Gri	d	cp1.ibxdemo	o.com	cp1.ibxdemo.	com
□ = 10.1	.0.10.in-ad Cloud fro	om delegation Gri	d	cp1.ibxdemo	.com	cp1.ibxdemo.	com
<ol> <li>Hover on</li> <li>Click on</li> </ol>	n <b>Host</b> . <b>Host</b> in the expa	inded menu.					
		default.cp1view					
		cpguide.con	n Clou	d Authoritativ	ve Zone 🔒		
		Records	Subzones				
		Quick Filter No	ne	•	off Filter C		
		+	-   🟦 -				
		Host	Þ	Host			
		Record	Þ	Copy Host	rd		

Bulk Host

7. On step 1 of the Add Host wizard, enter a **name** for the host.

Shared Record 🕨

- 8. Next to IPv4 Addresses, Click the + (add dropdown).
- 9. Click on Add Address.

Add Host > Step 1 o	f 3		×
Name	vm-ui1	.cpguide.com Select Zone Clear	<b>@</b> «
Enable in DNS			
Protected		Restrict DDNS updates to this Host	
Host Name Policy	Allow Underscore		
	To update the host s Host editor.	settings, first complete and save the Host configuration, and then update the settings in the	
IPv4 Addresses		+	nt
	IPv4 Address No data	MAC Address DHCP Add Address Next Availa	able IP Address

Note: You cannot use the Next Available IP Address function. It will return the following error.

Request the next available IP address, when parent object (network) is not under authority of current member, is forbidden.

10.Enter an IP address for the host from one of the networks belonging to CP1.

11. Click Next.			
Add Host > Step 1 d	of 3		×
Name	vm-ui1	.cpguide.com Select Zone Clear	<b>(</b>
Enable in DNS			
Protected		Restrict DDNS updates to this Host	
Host Name Policy	Allow Underscore		
	To update the host Host editor.	settings, first complete and save the Host configuration, and then update the settings in the	
IPv4 Addresses		+-  =	
	IPv4 Address	MAC Address DHCP	
	1.1.1.103		
Cancel		Previous Next Schedule for Later Save	& Close 🔹

12.On step 2, you see that a list of mandatory extensible attributes are pre-populated. Enter values for CMP Type, Tenant ID, and VM ID.

13.Click Save & Close.

× Add Host > Step 2 of 2 6 « **+**∣ ḿ Extensible Attributes Attribute Na... Value Inheritance State Required Cloud API ... Disabled False No СМР Туре Openstack Disabled No Tenant ID Dev Disabled No 1 VM ID vm-ui1 Disabled No Save & Close Cancel Previous Next • 14. The new Host record has been added. Cloud Authoritative Zone 🔒 🧪 cpguide.com Ħ Records Subzones off Filter On Toggle flat view Quick Filter None Show Filter + • | 🗭 | 🛅 • | ᆂ • | 🖨 Cloud API Owned Name 🔺 Туре Data Record Source SOA Record Serial 2 System MNAME cp1.ibxdemo.com RNAME please\_set\_email.absolutely.now Refresh 10800 3600 Retry 2419200 Expire Negative Caching TTL 900 NS Record cp1.ibxdemo.com System vm-ui1 Host 1.1.1.103 Static False vm1 Host 10.10.10.11 Static True

Note: If you try to add a different record type that is not supported, you will encounter the following error.

The operation insert is not allowed from this member as the authority is delegated to another member.

15. You can also delete records, one at a time. Select the checkbox next to a Host record.

16.Click the 🔲 (delete button).

cpguide.com Cloud Authoritative Zone 🔒 💉 📮										
Records Subzones										
Quick Filter None Giff Filter On Show Filter Toggle flat view										
+- © =- ±- +										
🔲 📃 Name 🔺	Туре	Data		Record Source	Cloud API Owned					
	SOA Record	Serial MNAME RNAME Refresh Refry Expire Negative Caching TTL	2 cp1.ibxdemo.com please_set_email.absolutely.now 10800 3600 2419200 . 900	System						
	NS Record	cp1.ibxdemo.com		System						
Vm-ui1	Host	1.1.1.103		Static	False					
🔲 📃 vm1	Host	10.10.10.11		Static	True					

17.In the Delete Confirmation dialog, click Yes.

8	The selected Cloud object is delegated. Therefore, this action will permanently delete the host and all its addresses and aliases. Are you sure you want to continue?	
---	---	--

Note: You cannot delete multiple delegated records at once. If you select multiple records, the delete button is greyed out.

cpg Re	CPGUIDE.COM Cloud Authoritative Zone 🔒 💉 📮 Records Subzones											
Qui	Quick Filter None 🕤 Off Filter On Show Filter 😁 Toggle flat view											
+	+											
	=	Name 🔺	Туре	Data		Record Source	Cloud API Owned					
			SOA Record	Serial MNAME RNAME Refresh Retry Expire Negative Caching TTL	3 cp1.ibxdemo.com please_set_email.absolutely.now 10800 3600 2419200 900	System						
	=		NS Record	cp1.ibxdemo.com		System						
<b>V</b>	=	vm1	Host	10.10.10.11		Static	True					
	=	vm2	Host	10.10.10.12		Static	True					

## **Create Fixed Address**

To create a Fixed Address in a delegated network, use the following steps.

- 1. In the Grid Manager, navigate to the **Data Management**  $\rightarrow$  **IPAM** tab.
- 2. If necessary, Use the network view dropdown to select the **cp1view** network view.
- 3. Click on a network to view.

Infoblox 📚		Dashboards	Data Management	Cloud Smart Folders		Grid Administration	
cļ	p1view 👻	IPAM VLA	Ns Super Host	DHCP	DNS File Distri	bution	
	cp1view Cloud Netwo	ork View 📮					
Quick Filter None off Filter On Show Filter Toggle flat view							
	→   + •   @   = •	1 - I 🖯					
	Network 🔺		Cloud Usage	Owned	Ву	Delegated To	
	🔲 🗏 💾 1.1.1.0/24		Cloud from adapter	Cloud a	dapter	cp1.ibxdemo.com	
	🔲 🗮 📲 10.10.10.0	0/24	Cloud from delegation	Grid		cp1.ibxdemo.com	

- 4. Open the Add dropdown in the Toolbar.
- 5. Hover on **Fixed Address**.
- 6. Click **IPv4** in the expanded menu.

IPAM Home			Toolbar	X
1.1.1.0/24 🚠 Cloud IPv4 Network 💉 📮 Go to DHCP View			🕂 Add	-
IP Map List			Network	•
🖾   🚓   🕎   🛛 🗸	Go to	Go	Range	Þ
000000000000000000000000000000000000000	000000000	Toggle Basic View	Host	Þ
		Unused	Fixed Address	Þ
		Conflict	IPv4 Reservation	ı
		Used		
		Pending	A Record	
		O Unmanaged	Add To Existing H	Host
		Fixed Address / Rese	PTR Record	
		DNS Object	AAAA Record	
	1.1.1.0 - 1.1.1.255	Host Not In DNS/DHC	VDiscovery	•

- 7. On step 1 of the Add IPv4 Fixed Address Wizard, select Add Fixed Address.
- 8. Click Next.

Add IPv4 Fixed	Address Wizard > St	ep 1 of 5		×
Add Fixed Address	ess			@ «
Add Fixed Addre	ess using Template	Select Template		
Cancel	Previous	Next	Schedule for Later	Save & Close 🔹

9. On step 2, enter an IP Address, MAC Address, and optionally a Name.

#### 10.Click Next.

		1
Network	1.1.1.0/24 (255.255.255.0) Select Network Clear	
IP Address	1.1.1.21 Next Available IP	
Assign IP Address by	MAC Address     aa:bb:cc:11:22:33	
	O DHCP Client Identifier	
	O DHCP Relay Agent	
lame	vm-ui2	
Comment		
	0	

Note: The Next Available IP function is not available when adding a fixed address to a delegated network in the UI and is greyed out as shown above.

- 11. On step 3, leave the defaults and click Next.
- 12.On step 4, you see that a list of mandatory extensible attributes are pre-populated. Most values are inherited from the network object. You will need to enter a VM ID.
- 13.Click Save & Close.

Add IPv4 Fix	ed Address V	Vizard > Step 4 of 4			
Extensible Attrib	outes			<b>+</b> ∣	<
	Attribute Na	Value	Inheritance State	Required	
	Cloud API	False	Disabled	No	
	CMP Type	Openstack	Disabled	No	
	Tenant ID	Dev	Disabled	No	
	VM ID	vm-ui2	Disabled	No	١.
Cancel		Previous Next		Save & Close	a •

14. The fixed address has been added. Click on the address in the IP Map to view details.

1.1.1.0/24 the Cloud IPv4 Network / Go to DHCP View		
1.1.1.21 ₽		Toggle Basic ViewUnusedConflictUsedPendingUnmanagedFixed Address / ReservationDNS ObjectHost Not In DNS/DHCPActive LeaseSelected IP AddressDHCP RangeOHCP Exclusion RangeReserved Range
Type: IPv4 Fixed Address Comment: Lease State:	MAC Address: Name: DHCP Fingerprint:	aa:bb:cc:11:22:33 vm-ui2

## Enhanced User Interface for Cloud Visibility

With the Cloud Network Automation license, the Cloud tab is added in Grid Manager. The Cloud tab includes five additional tabs that each provide different perspectives for viewing your cloud resources, making it easy to see what is deployed in each of your cloud environments. The additional tabs display your cloud resources by Tenant, VPC, Network, VM, and Cloud Platform Members.

• **Tenants:** This tab displays all cloud tenants contained in your Grid. You can drill down to view all networks and VMs associated with each tenant.

			Tenants	VPCs	Networks	VMs	Cloud Platform	Members		
1 >	All Tenan	ts								
	Quick Filter         None         off         Filter On         Show Filter									
	🗭   🕹   🖶									
	Actions	Mgmt Platform	Name 🔺		ID		VMs	Networks	Network Views	
		Openstack	DC1		DC1		2	0	cp1view	
		Openstack	Dev		Dev		1	1	cp1view	
		Openstack	Dev2		Dev2		1	1	cp2view	
		Openstack	Dev3		Dev3		2	0	default	

• **VPCs**: This tab displays Virtual Private Clouds, used to contain private networking space in many public and private clouds such as AWS, Azure, VMware and Openstack. *Note: Not all cloud platforms use the concept of VPCs in a manner that will populate data in the VPCs tab.* 

		-	Tenants	VPCs	Networks	VMs	Cloud Platform N	lembers		
<b>1</b> >	VPCs									
	Quick Filter None   Inter Show Filter									
	Actions	Mgmt Platform	VPC Nan	ne	Ne	tworks	Network View	VMs	Tenants	Cloud Usage
		鵫 Amazon	VPC-01			2	default	1		Used by cloud
		🏫 Amazon	VPC-02			4	default	2		Used by cloud

• **Networks**: This tab displays all cloud networks in your Grid. From here, you can easily jump to IPAM data or other views to display additional details for a network. Searches, Smart Folders, and reports can also leverage the metadata stored as EAs for each network.

			Tenants	VPCs	Networks	VMs	Cloud Plat	form Members		
1	All Netw	orks								
	Quick Filter None off Filter On Show Filter									
	☞   초   ⊖									
	Actions	Network A	Tenant		Cloud Usage	Owned	Ву	Delegated To	Network View	Mgmt Platform
		1.1.1.0/24	Dev		Cloud from ad	Cloud a	dapter	cp1.ibxdemo.com	cp1view	Openstack
		1.1.1.0/24	Dev2		Cloud from ad	Cloud a	dapter	cp2.ibxdemo.com	cp2view	Openstack
		# 10.10.10.0			Cloud from del	Grid		cp1.ibxdemo.com	cplview	

• VMs: This tab shows all cloud virtual machines. Details for each VM such as IP addresses, associated object types, and FQDNs are displayed on this tab.

			١	lenants VPCs	Networks	VMs Cloud P	latform Members		
<b>1</b> ×	All	Cloud	VMs by IP A	Address					
	Qui	ick Filter	None	✓ Off Filter 0	On Show Filter	r			
	ľ	11	€						Go to
		Actions	Mgmt Platform	VM Name	VM ID	IP Address	IP Address Object Type	FQDN	Networks 🔺
		=	Dpenstack	Server1	VM-ID-4	2.2.2.1	A Record	server1.newzone.com	0
		$\equiv$	Dpenstack	Server2	VM-ID-5	2.2.2.2	A Record	server2.newzone.com	0
		$\equiv$	Dpenstack	LinuxVM3	VM-ID-3	1.1.1.11	Host	vm3.cp2.com	1
		$\equiv$	Dpenstack	LinuxVM2	VM-ID-2	10.10.10.12	Host	vm2.cpguide.com	1
		=	D Openstack	vm-ui2	vm-ui2	1.1.1.21	IPv4 Fixed Address		1

• **Cloud Platform Members**: This tab displays all Cloud Platform members in the Grid. You can edit some Cloud API properties of the members from this page.

		Tenants	VPCs	Networks	VMs	Cloud Platform Members				
1	All Cloud Platform N	lembers	5							
	Quick Filter None									
	±   ⊖									
	Actions Name		Status	C	omment	IPv4 Address				
	🔲 📃 🐟 cp1.ibxdem	o.com	Running			172.16.1.4				
	🔲 📃 🐟 cp2.ibxdem	o.com	Running			172.16.1.5				

## **Cloud Dashboard and Report**

To give you further insight into your hybrid infrastructure, the Infoblox Cloud Network Automation license enables a Cloud Statistics widget for your Grid Manager dashboards. This includes statistics for IP address utilization by tenant and IP type (fixed/floating). Cloud networks are also added to the Networks Over Thresholds widget.

The CNA license also provides a VM Address History Report detailing IP address and DNS Record allocation/deallocation for VMs by tenant. This report additionally allows you to drill down into lease history for VM IPs. Using this report also requires an Infoblox reporting appliance and is not shown in this guide.

For additional information on dashboards and reports, refer to Infoblox NIOS documentation at <u>https://docs.infoblox.com</u>.

To use the Cloud Statistics widget on your dashboard, use the following steps.

- 1. In the Grid Manager, navigate to the **Dashboards**  $\rightarrow$  **Status** tab.
- 2. Expand the Status dropdown and select Add Content.

Inf	oblox 📚	Dasi	Dashboards		Data Management		Smart Folders
		Task	s Statu	s 🔅 -			
1 >	Grid Status			Ado	Add Dashboard Add Content		\$
	Infoblox DHCP	DNS	TFT	•	HTTP (File Dist)	FTP	п 🗖
	bloxTools	Captive	Clou	d-API	Subscriber		

3. Click the (cloud icon) next to the listed widgets to filter for cloud widgets.

4. Click and drag the Cloud Statistics widget onto your dashboard.



 The widget displays the Number of Tenants, VMs, and IP addresses in use. Optionally, click the checkbox for Auto Refresh Period to set refresh time. You can also use Select Tenant to view statistics for individual tenants.

Cloud Statistics > Al	I Tenants		◈중≑▇⊠
Show Statistics From: O All Tenants			
<ul> <li>Select Tenant</li> </ul>			
Select			
Show: O All IP Addresses	<b>a</b> .).		
O Fixed			
Floating			
		🗹 Auto	Refresh Period 60 seconds
Tenant & VMs Fi	xed vs. Floating Available	vs. Allocated	
4	2	2	Average per Tenant
	6	6	Total
Tenants Refresh 60 seconds	Cloud VMs	IP Addresses	Last updated: 2020-12-08 11:01:02 PST

Note: Fixed and Floating address types refer to OpenStack IP address types and are not relevant to all deployments.

 Click on Available vs. Allocated. Here you can see the total available cloud IP addresses compared to those which are allocated.


7. To view cloud networks in the Networks Over Thresholds widget, expand the Status dropdown and select **Add Content**.

Active WebUI Users	Hy Commands	CSV Import Manager	DDNS Statistics	5 DHCP Statistics	Discovery Status
File Distribution Statistics	• Member Status	IPv4 Network     Statistics	Ranges Over Threshold	System Activity Monitor	• Networks Over Threshold
Frid Status					Cloud Statistics > / etworks Over Threshold
DHCP DNC bloxTools Ca	S TFTP	HTTP (File Dist) Pl Subscriber Collection	FTP	NTP	All Tenants     Select Tenant
Member Name	IPv4 Address	IPv6 Address	Status 👻	System Uptime	Show:
🚸 gm.ibxdemo.com	172.16.1.3		Running	4d 0h 59m	All IP Address
A	170.10.1.4		-	4d 1h 12m	<ul> <li>Floating</li> </ul>

8. Locate the Networks Over Thresholds widget and drag it onto your dashboard.

9. In this widget, you can enter the Threshold you want to view. To see only cloud networks over this threshold, click the checkbox for **View Cloud Networks Only**.

◈ᢒ≑⊒⊠
1 600 seconds
IPAM Utilization

Note: As shown above, no networks will be listed unless they are above the set threshold.

## Limitations

Please note the following limitations when deploying Cloud Network Automation and Cloud Platform appliances.

- The default admin user is not allowed to make cloud API calls by default and design. This setting can be changed, but it is not recommended for security best practices.
- When a Cloud Platform member is offline, any object delegated to that member cannot be undelegated.
- To create Host records on a Cloud Platform member, the member must be authoritative for both the IPAM network and DNS zone used for the Host.
- Not all WAPI calls are supported on Cloud Platform appliances. Only cloud API requests, a subset of the WAPI, are supported. You must use WAPI version 2.0 and above.
- Cloud Platform members cannot be configured as Grid Masters or Grid Master Candidates.
- Response Policy Zones (RPZ) cannot be delegated to Cloud Platform members.
- Cloud Platform members cannot be added to DHCP failover associations.



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Infoblox is the leader in modern, cloud-first networking and security services. Through extensive integrations, its solutions empower organizations to realize the full advantages of cloud networking today, while maximizing their existing infrastructure investments. Infoblox has over 12,000 customers, including 70 percent of the Fortune 500.

Corporate Headquarters | 2390 Mission College Boulevard, Ste. 501 | Santa Clara, CA | 95054 +1.408.986.4000 | info@infoblox.com | www.infoblox.com

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