Infoblox

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.

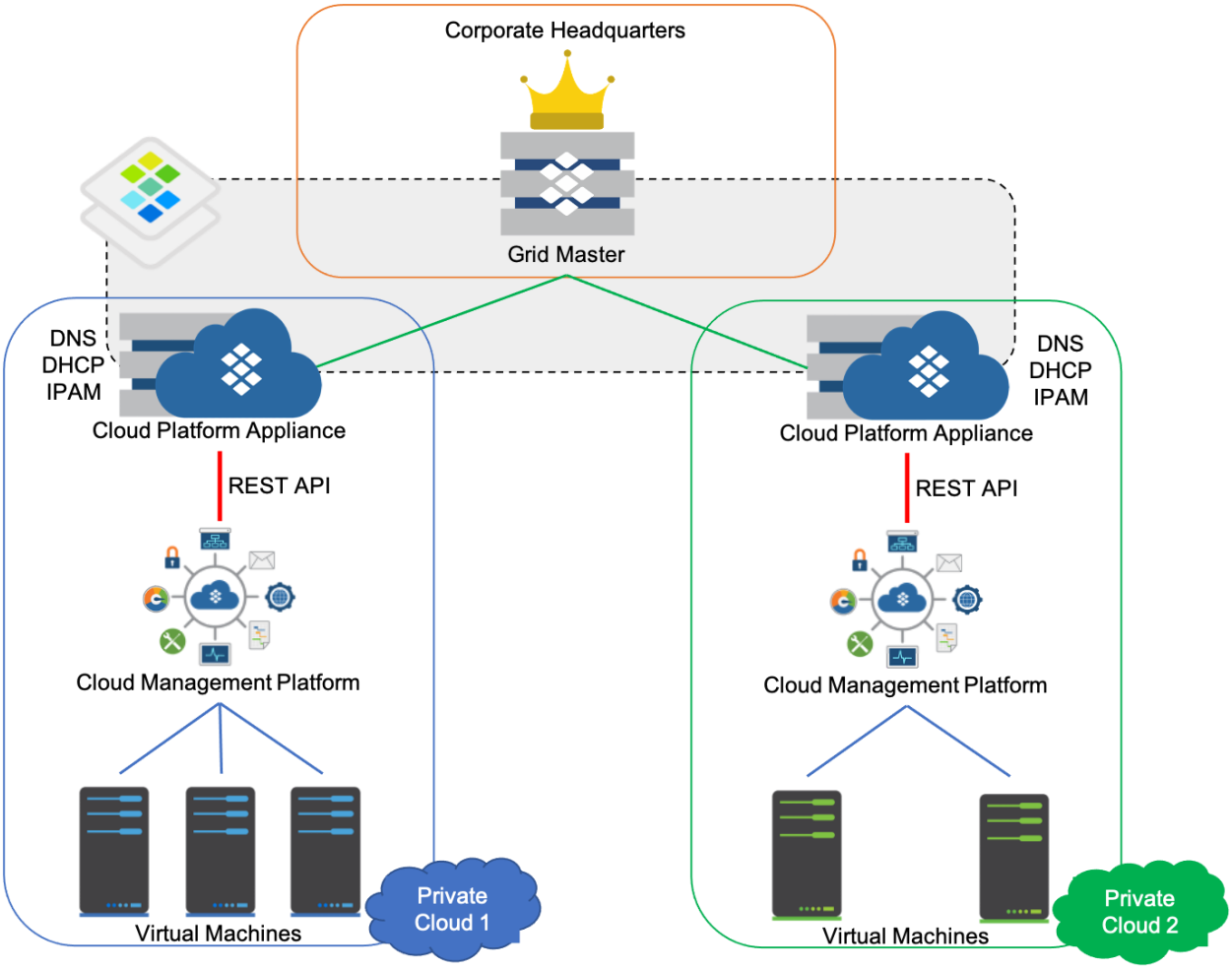
This guide focuses on deployment steps specific to utilizing features of the Cloud Platform Appliances and the Cloud Network Automation license in private clouds, however, most use-cases and features shown here are also applicable in your public cloud environments.

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 https://docs.infoblox.com or deployment guides at https://www.infoblox.com/resources/.
- Access to vNIOS images found on https://support.infoblox.com. 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.

Architecture



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 https://docs.infoblox.com.

Setup Details

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

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 https://docs.infoblox.com or Deployment Guides available on Infoblox.com at https://infoblox.com/resources.

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
Version          : 8.5.0-390933
Hardware 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   : FAAAAEnmAWICfPxs6a1Wi4C0t7141Xl/

License Type     : Grid
Expiration Date  : 01/22/2021
License String   : GgAAAEjgFncMPb15qPpWiIP6tPMy0X51Tm+qCOuZ

License Type     : NIOS (Model IB-V825)
Expiration Date  : 01/22/2021
License String   : GgAAAEPnDWECfPxs6a1Wi4C0t71/x3Z1Sjf9XLjP
```

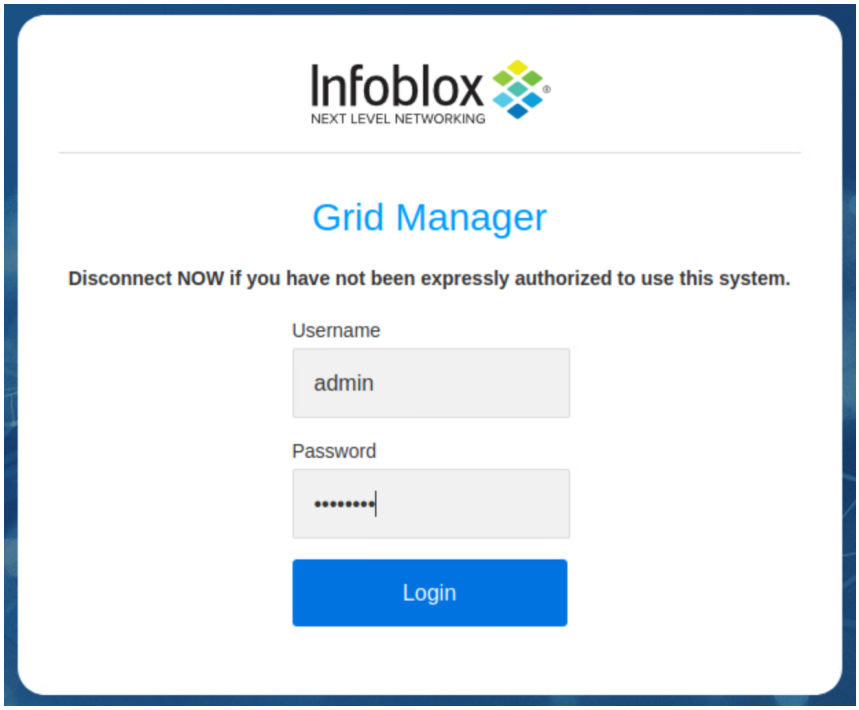
4. After the Grid Master restarts, log back into the CLI.
5. Enter the command **set network**.
6. Enter the **IP address** for the appliance. Press **Enter**.
7. Enter the **netmask** or press Enter to leave the default, **255.255.255.0**.
8. Enter the **gateway address**. Press **Enter**.
9. Press **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
```

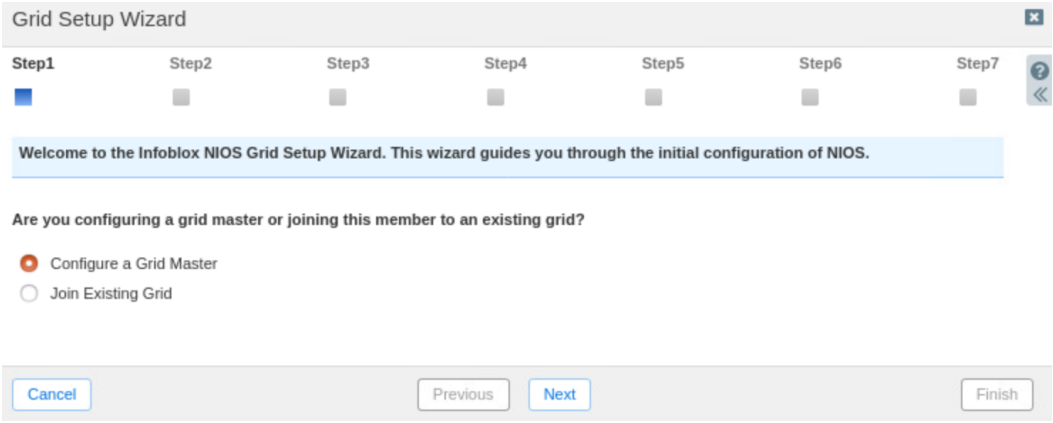
The appliance will restart after configuring the network settings. After the appliance restarts, you can optionally use the **show network** command to verify configuration.

```
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 configured can be viewed through "show interface" com
mand
```

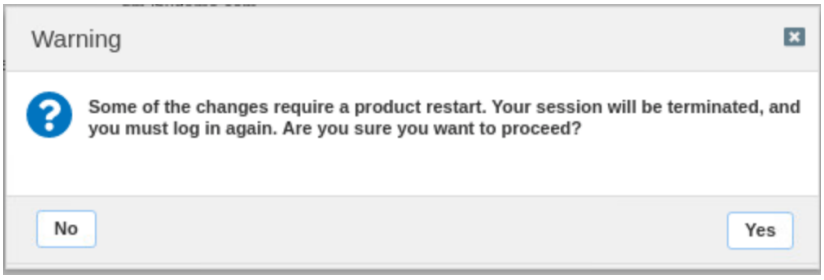
13. On the client device, open a web browser and navigate to the Grid Master at **https://<LAN1_IP_address>**, using the IP address of your virtual appliance.
14. If prompted, accept the self-signed certificate to continue to the Grid Manager GUI.
15. Log in using the default username: **admin** and password: **infoblox**.



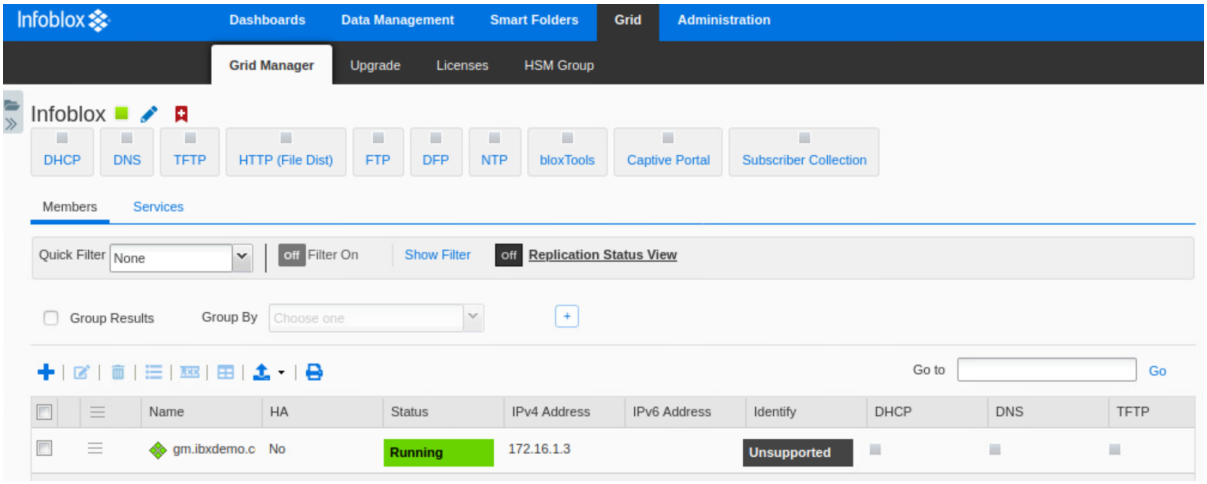
16. Accept the EULA and Infoblox Customer Experience Improvement Program.
17. Use the Grid Setup Wizard to **Configure a Grid Master**.



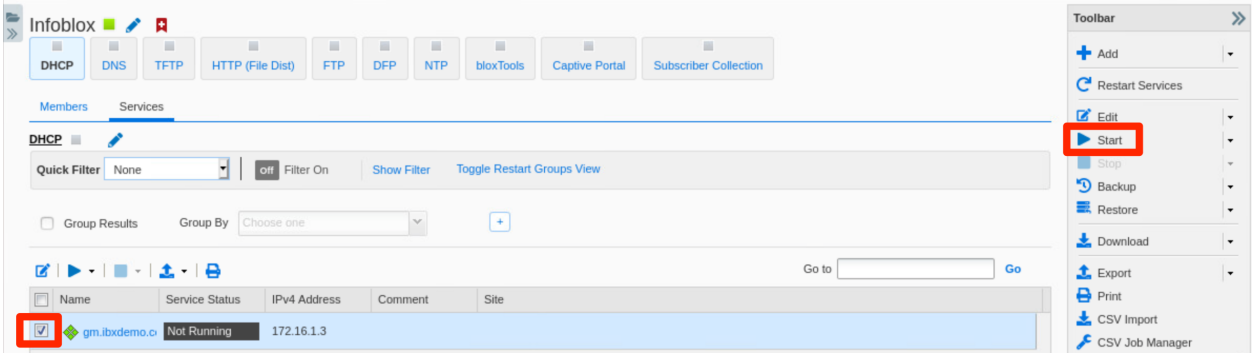
18. Complete the Grid Setup Wizard using the default values. If desired, you can change default values to suit your environment. For details on configuring a new Grid, refer to Infoblox NIOS documentation at https://docs.infoblox.com.
19. Once you have completed the wizard, agree to restart the device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



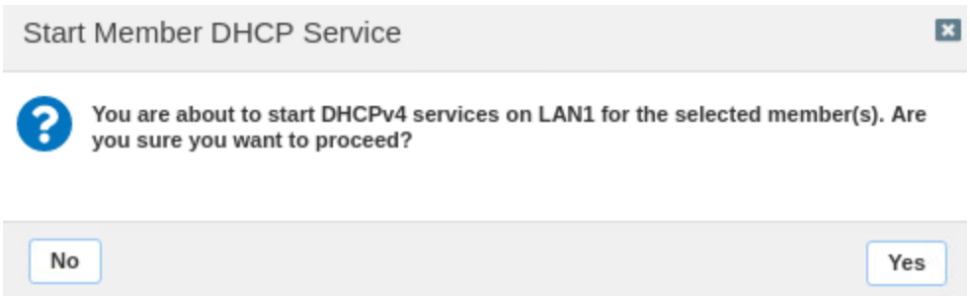
20. Once the restart is complete, log back in to the Grid Manager.
21. Navigate to the **Grid** → **Grid Manager** tab.



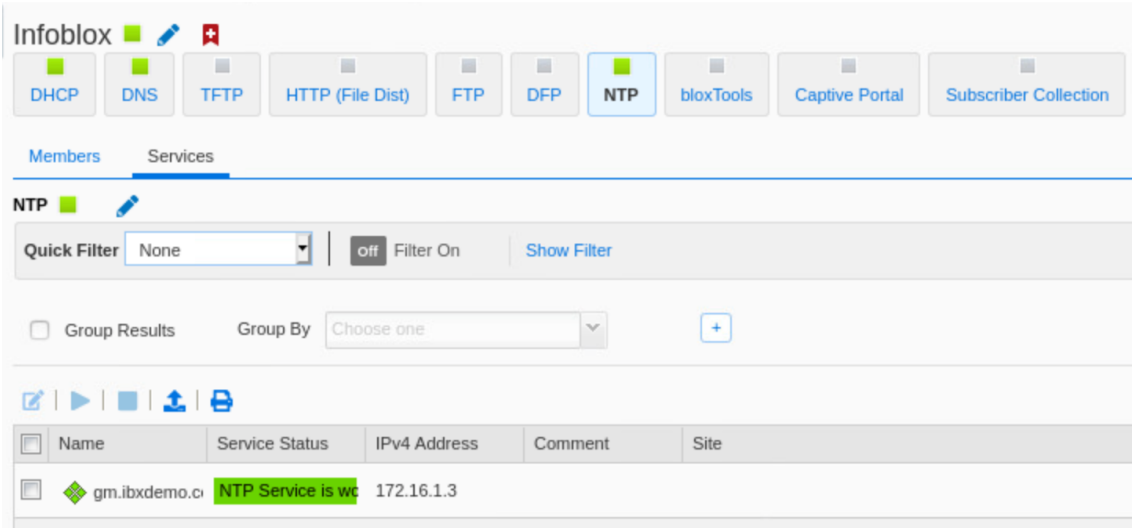
22. Click on the **DHCP** service.
23. On the DHCP service tab, select the checkbox next to your Grid Master.
24. Click on **Start** to start the service.



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



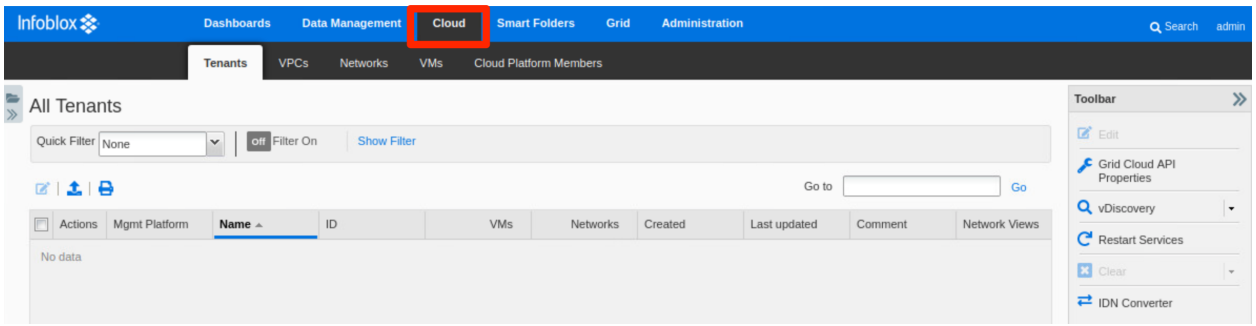
26. Repeat steps 22-25 for the **DNS** and **NTP** services.



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**.

```
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: 16_
```

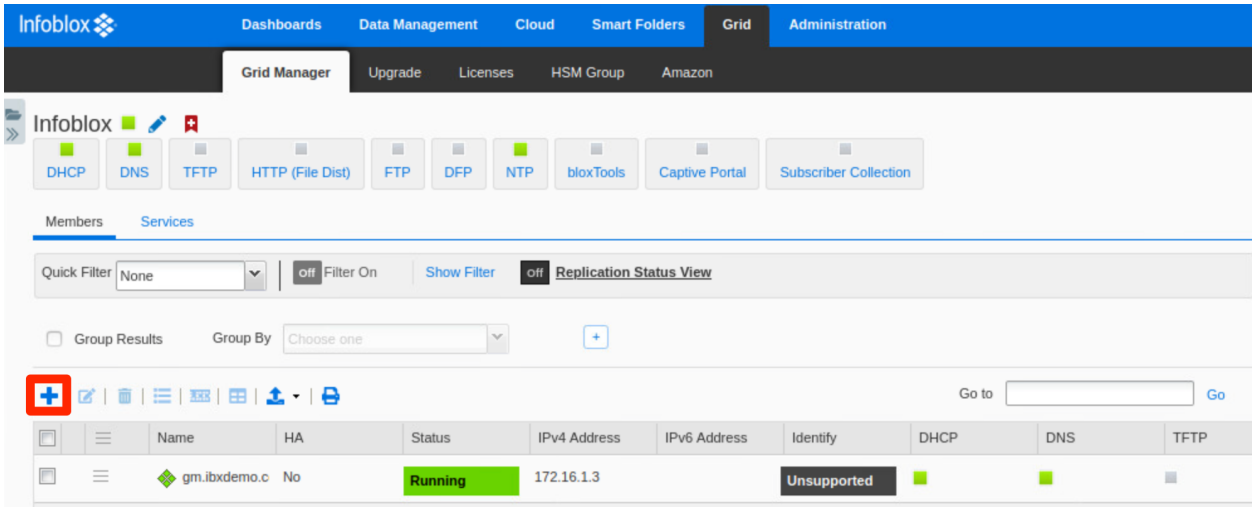
30. Confirm your selection when prompted.
31. In the web browser, logout and log back in to the Grid Manager. The **Cloud** tab has now been added to your Grid Manager.



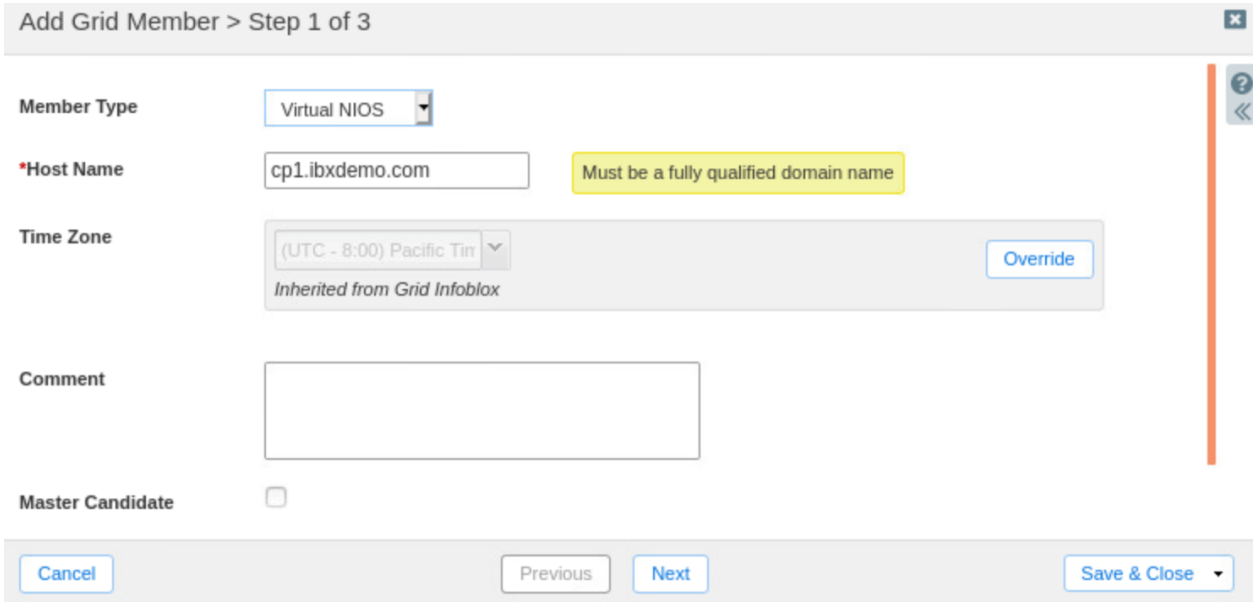
Add Cloud Platform Members

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

1. In the Grid Manager, navigate to the **Grid** → **Grid Manager** → **Members** tab.
2. Click the ➕ (add button) to add a new Grid member.



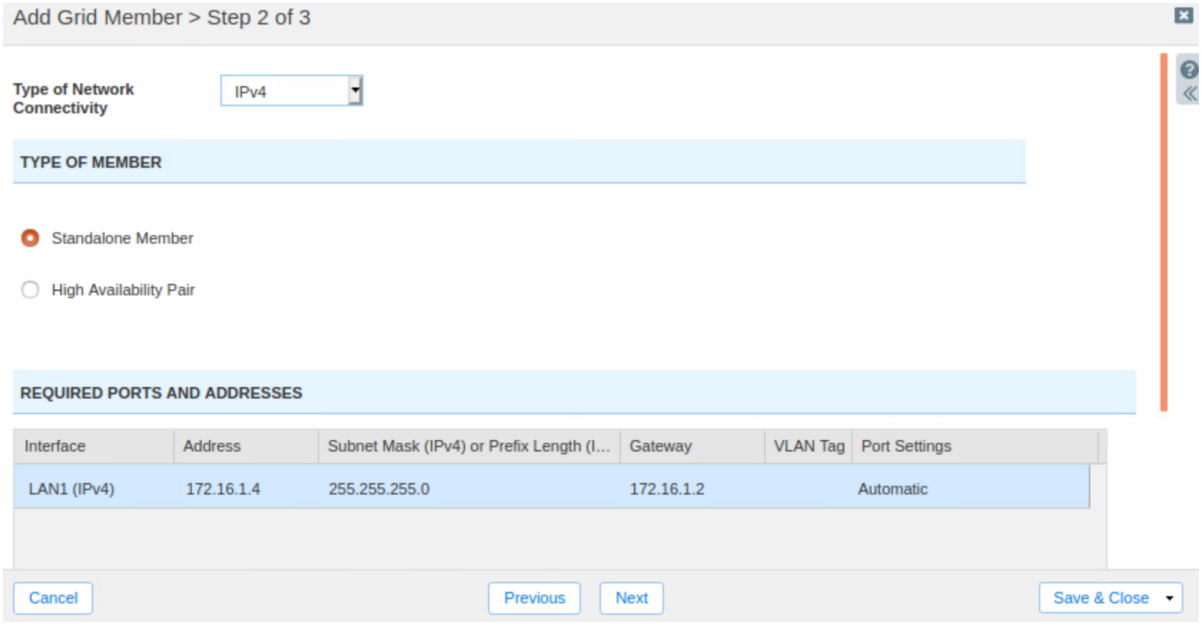
3. On Step 1 of the Add Grid Member wizard, select **Virtual NIOS** from the **Member Type** dropdown.
4. Enter a name for the new member. *Note: The Host Name must be a fully qualified domain name*.
5. Click **Next**.



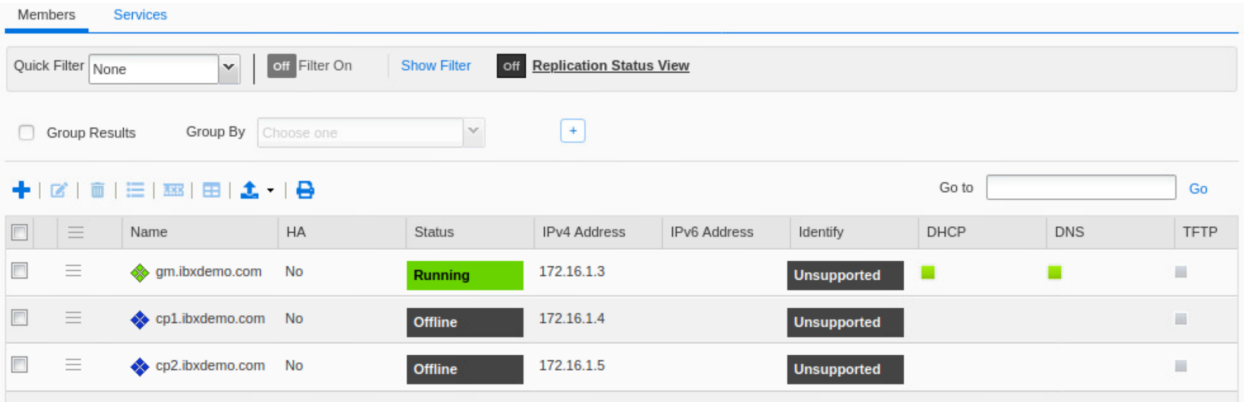
*Warning: Cloud Platform appliances cannot serve as a Grid Master Candidate. Ensure you do **NOT** select the checkbox for Master Candidate.*

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**.



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



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
Version          : 8.5.0-390933
Hardware 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   : FAAAAEnmAWICfPxs6a1Wi4C0t7141Xl/

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=
```

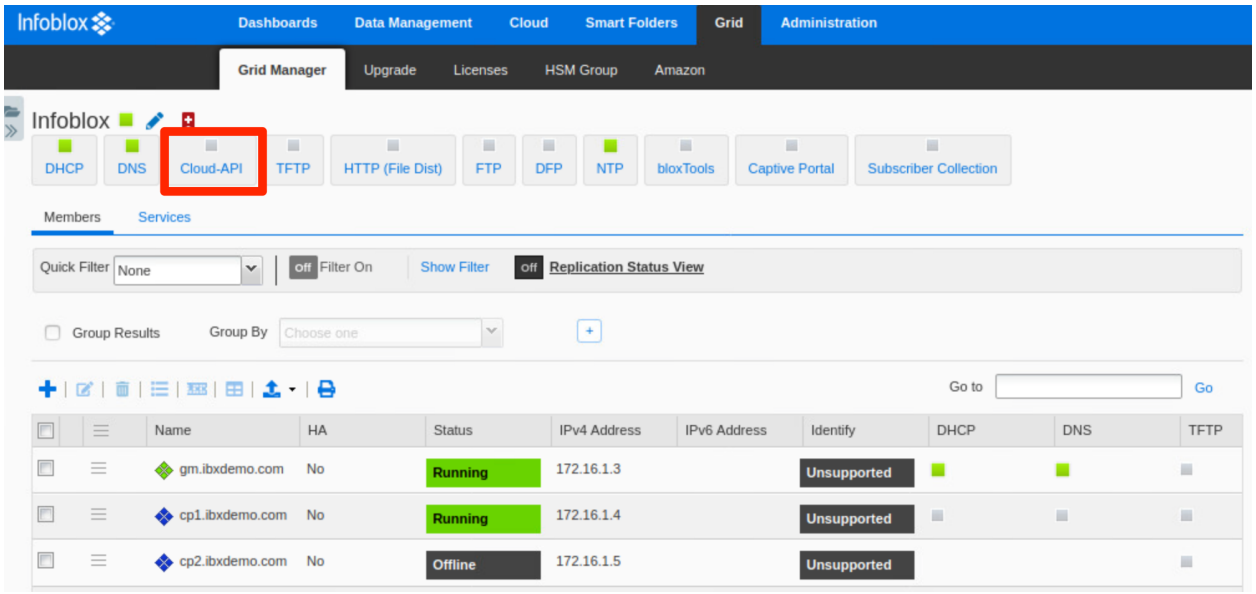
12. After the CP appliance restarts, log back into the CLI.
13. Enter the command **set network**.
14. Enter the **IP address** for the appliance. Press **Enter**.
15. Enter the **netmask** or press Enter to leave the default, **255.255.255.0**.
16. Enter the **gateway address**. Press **Enter**.
17. Press **Enter** to leave the **VLAN** untagged.
18. When asked to **Configure IPv6 network settings**, enter **n** and press **Enter**.

```
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: 172.16.1.4
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
```

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.

```
Become grid member? (y or n): y
Enter Grid Master VIP: 172.16.1.3
Enter Grid Name: Infoblox
Enter Grid Shared Secret: test

 New Network Settings:
  IPv4 address:          172.16.1.4
  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
  Join grid as member with attributes:
     Grid Master VIP:      172.16.1.3
     Grid Name:            Infoblox
     Grid Shared Secret:   test

WARNING: Joining a grid will replace all the data on this node!
         Is this correct? (y or n): y_
```

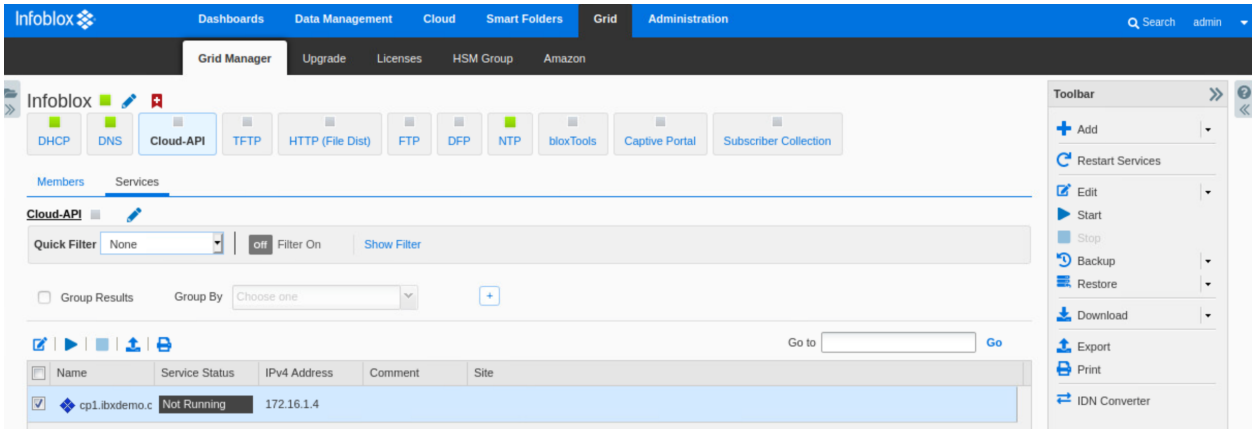
24. The appliance will restart and attempt to contact the Grid Master.
25. From the web browser on your client device, log back in to Grid Manager.
26. Navigate to the **Grid** → **Grid Manager** → **Members** tab.



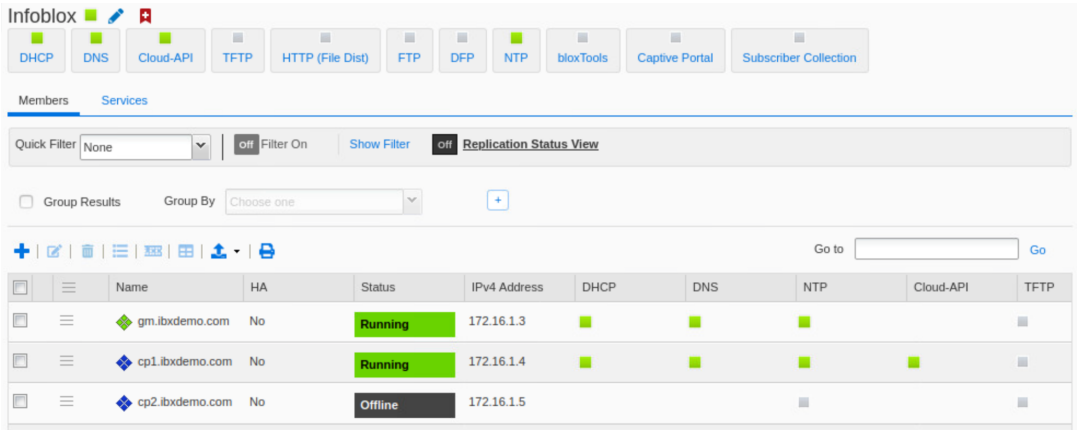
You can now see an entry for **Cloud-API** for services. This was automatically added when the Cloud Platform member joined the Grid. The cloud API service provides the ability to automate management of IP addresses and DNS records so your cloud environment can take full advantage of IPAM, DNS, and DHCP 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.

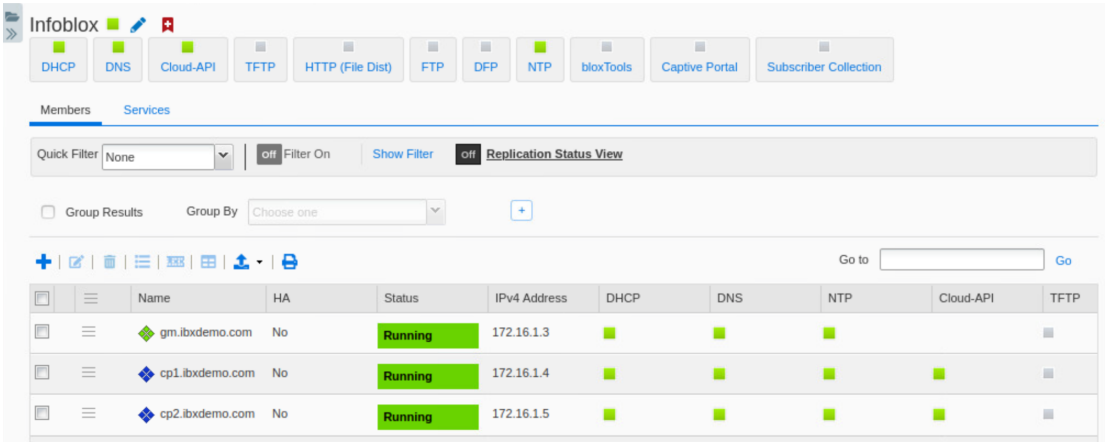
27. Click on the **Cloud-API** service.
28. Select the checkbox for your CP1 member.
29. Click **Start** in the Toolbar to start the service.



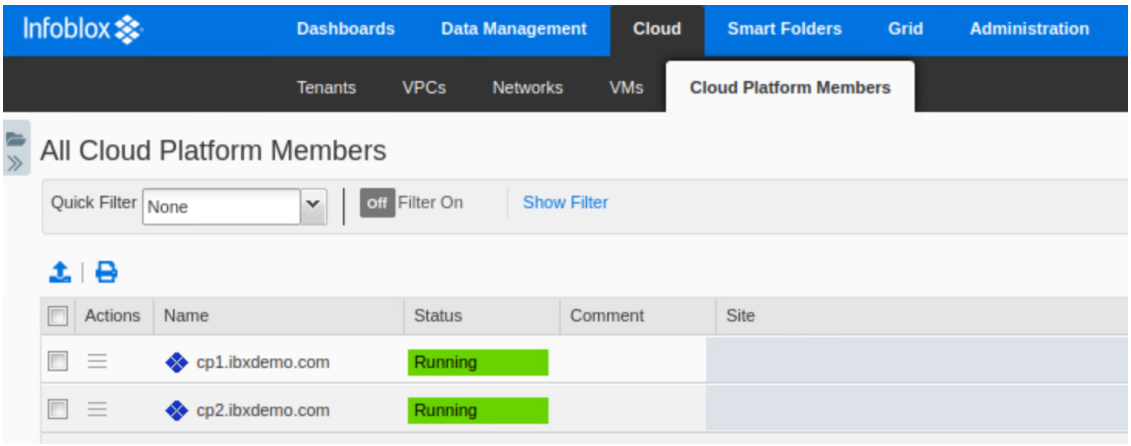
30. Click **Yes** in the confirmation dialog.



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

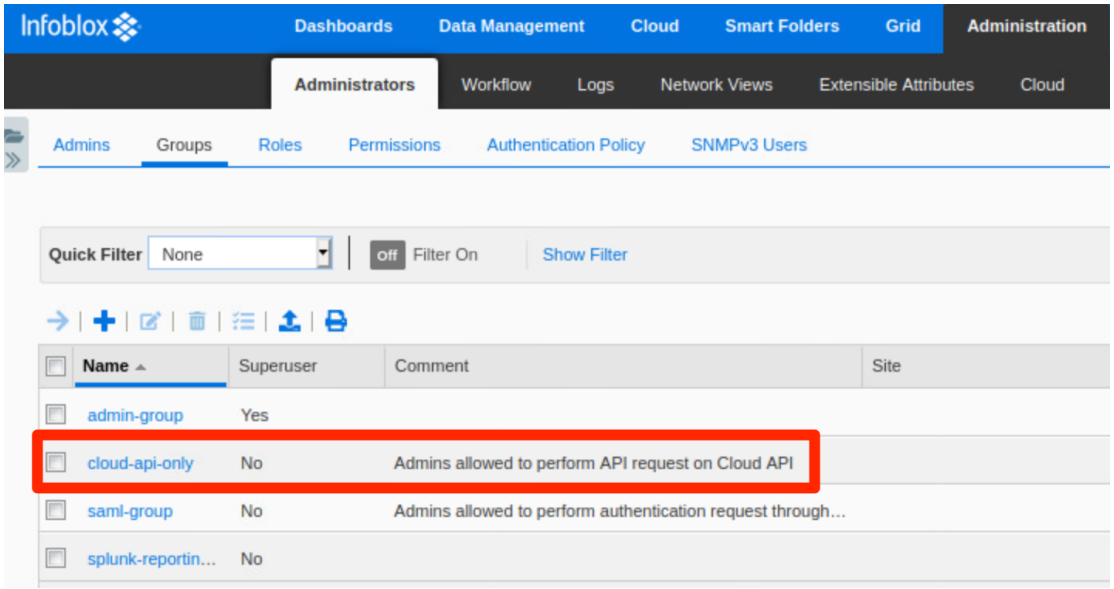


32. You can also view CP members by navigating to the **Cloud → Cloud Platform Members** tab.

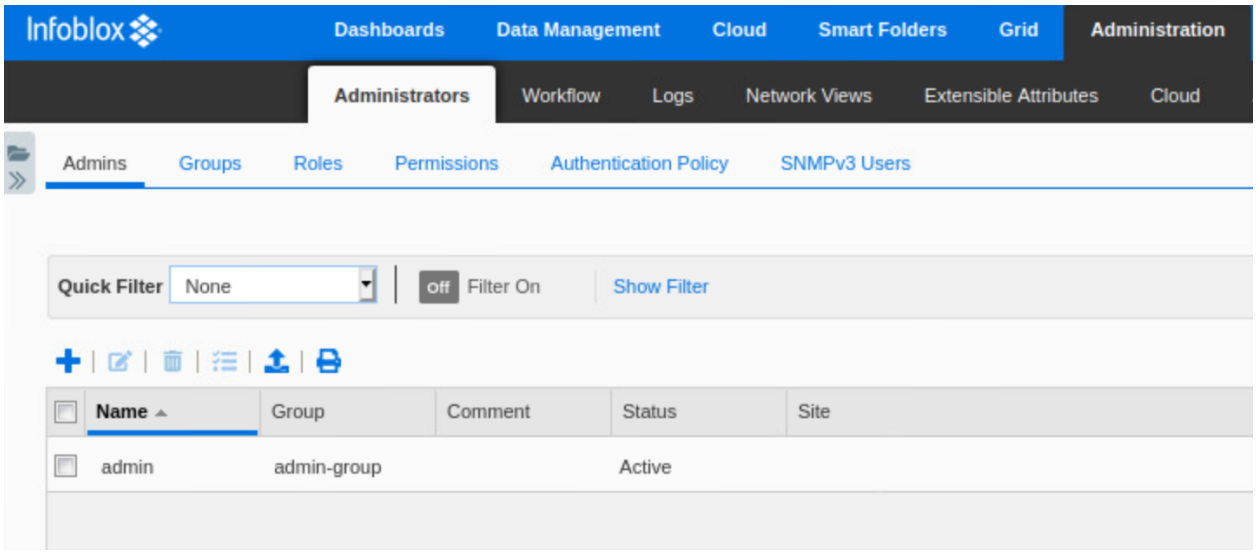


Cloud API User

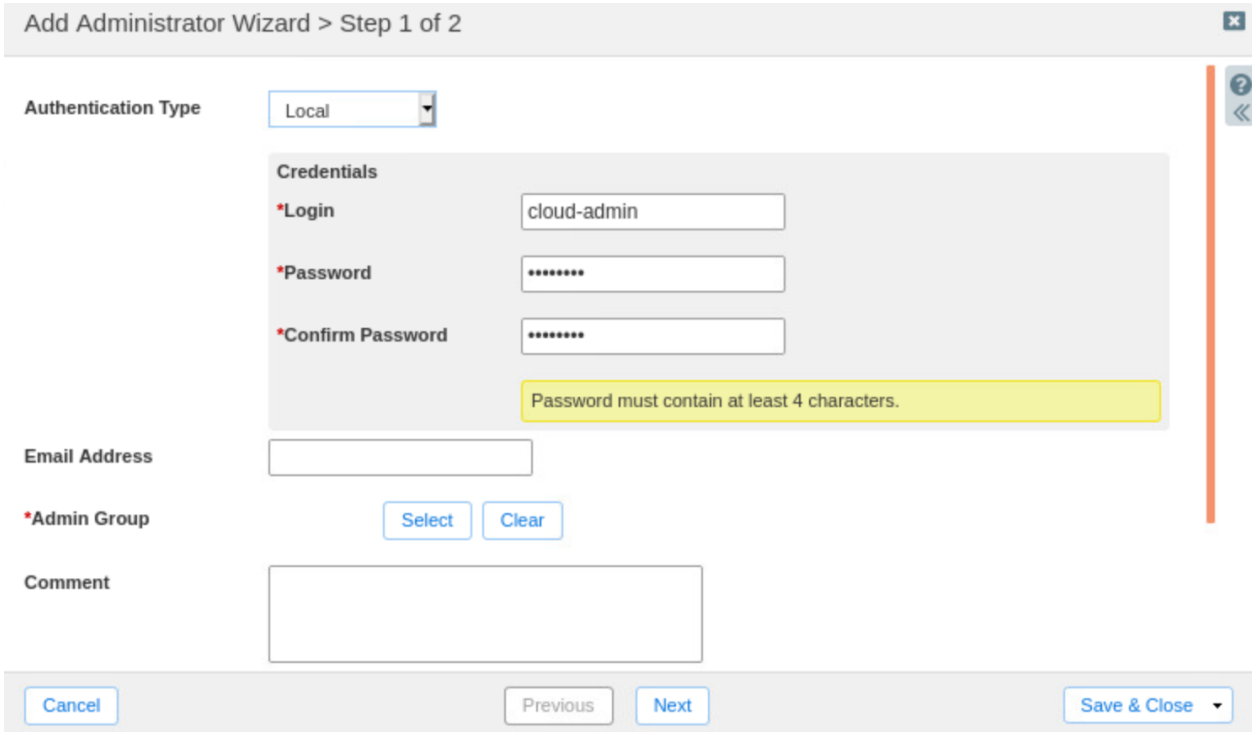
To send cloud API requests, you must define admin users and their permissions in the admin group. By default, the admin-group does not have authorization to make cloud API requests. When you install valid licenses and configure your Grid for Cloud Network Automation, NIOS enables the **cloud-api-only** 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.



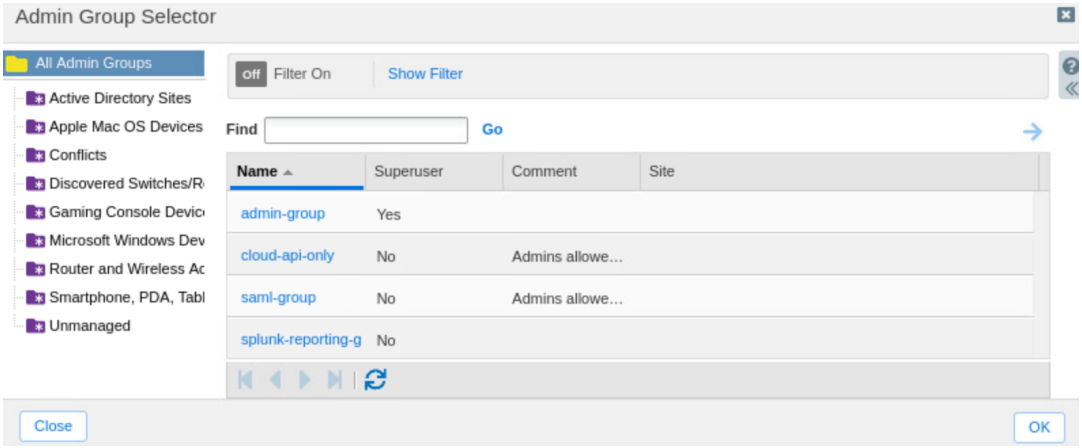
1. To create a new admin user, navigate to the **Administration → Administrators → Admins** tab.
2. Click the + (add button) to add a new admin user.



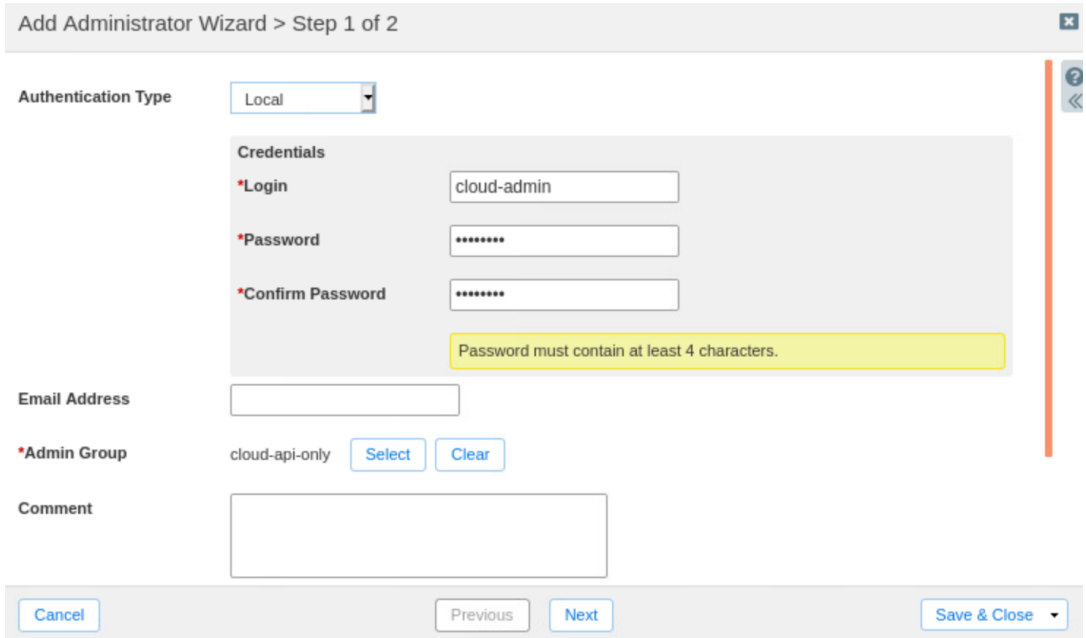
3. On Step 1 of the Add Administrator Wizard, select **Local** for **Authentication Type**.
4. Enter a **Login** name. For this guide, we will use **cloud-admin**.
5. Enter and confirm a **Password**. For this guide, we will use **infoblox**.

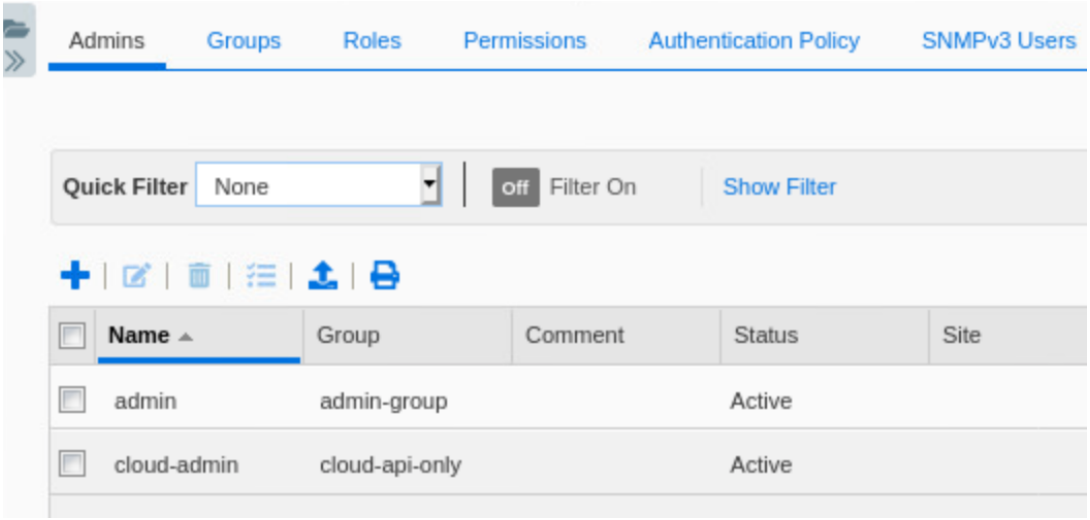


6. Next to **Admin Group**, click **Select**.
7. In the Admin Group Selector, click on the **cloud-api-only** group.



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

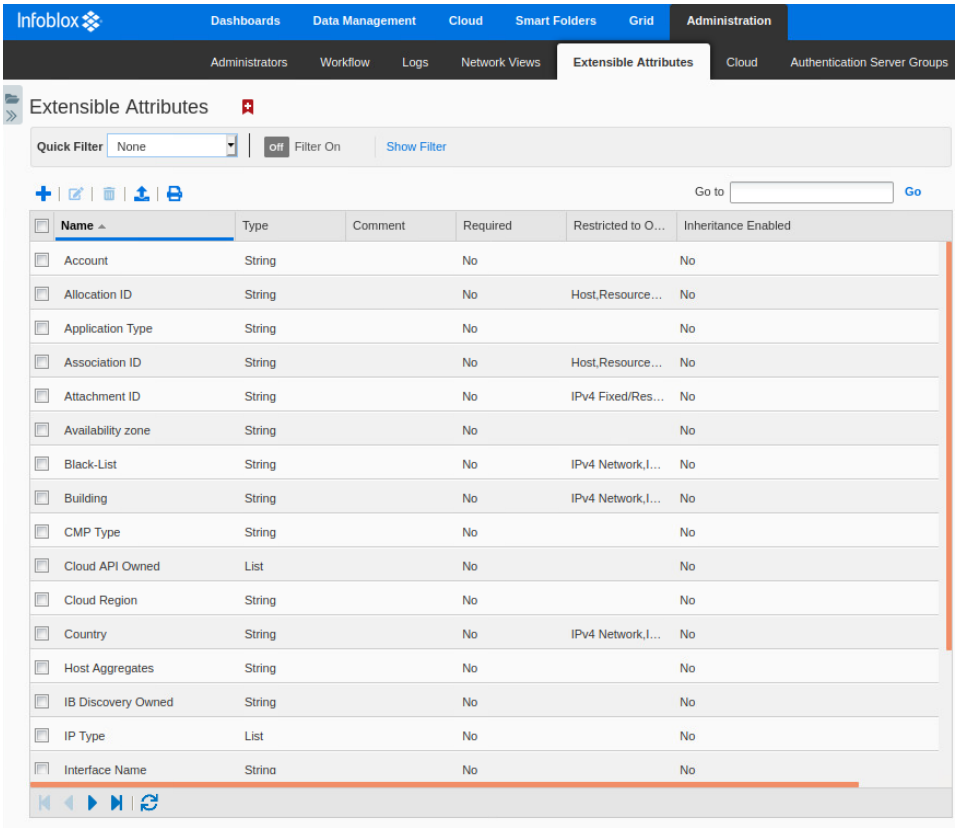




Extensible Attributes

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 → Extensible Attributes** tab.



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 https://docs.infoblox.com.

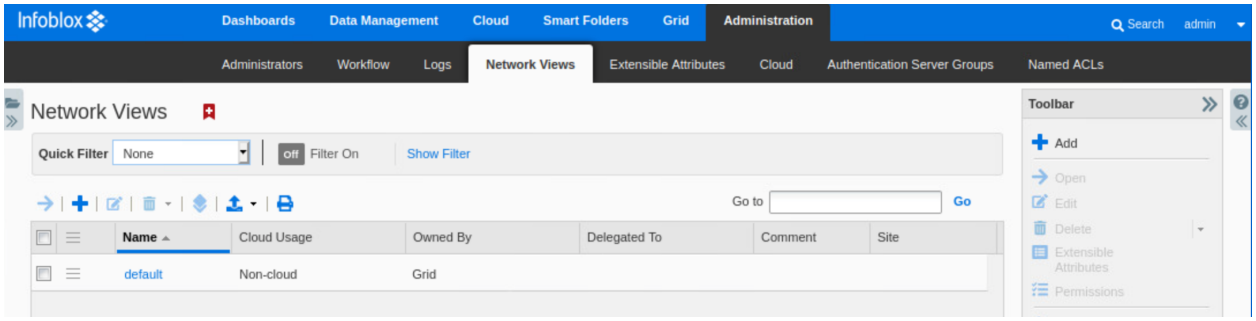
When a network view, network, or DNS zone is created, either the Grid Master or a Cloud Platform member can be authoritative for that object to avoid conflicts. The object can be created on the Grid Master and then delegated to a Cloud Platform member, or it can be created directly on a Cloud Platform 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

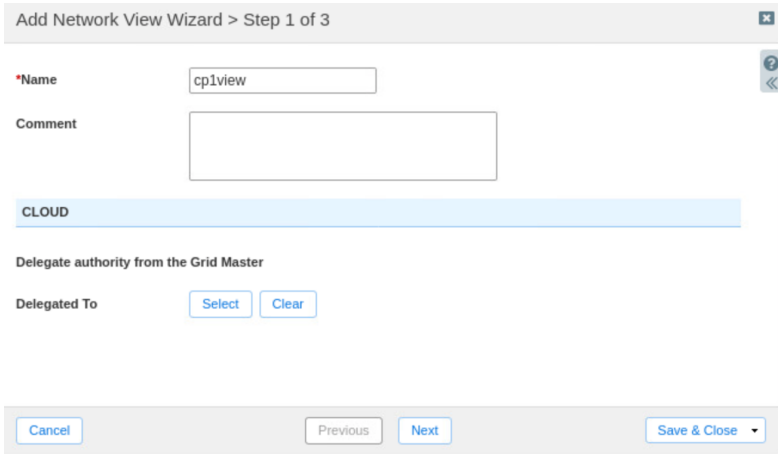
In this section, we will first create a network view. A network view is a single routing domain, with its own networks and shared networks. A network view can contain both IPv4 and IPv6 networks. Each network is contained within a network view.

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.

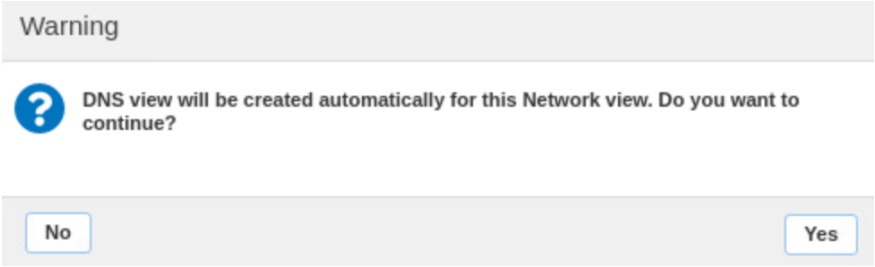
1. To create a network view, navigate to the **Administration** → **Network Views** tab in the Grid Manager.
2. Click the + (add button) to add a new network view.



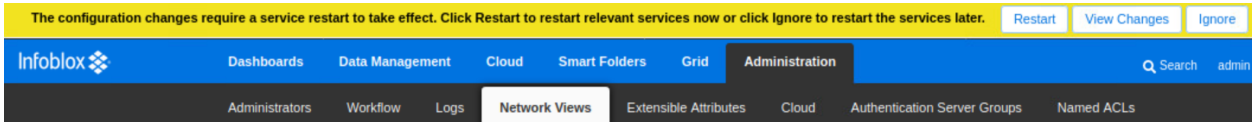
3. In the Add Network View Wizard, enter a **name** for the network view, for example **cp1view**.
4. Do not delegate the network view. We will delegate this later, after creating individual networks and DNS zones.
5. Click **Save & Close**.



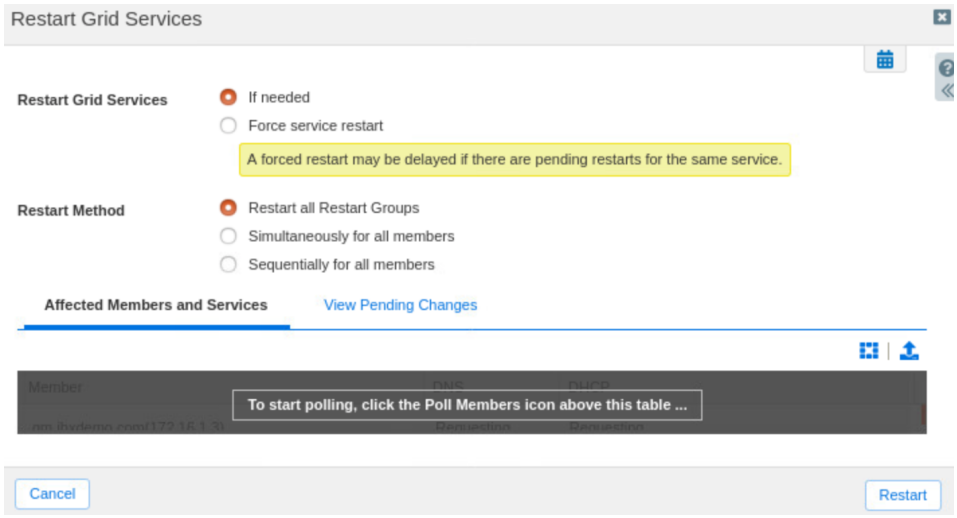
6. A warning will inform you that a DNS view will also be created for the new network view. Click **Yes**.



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



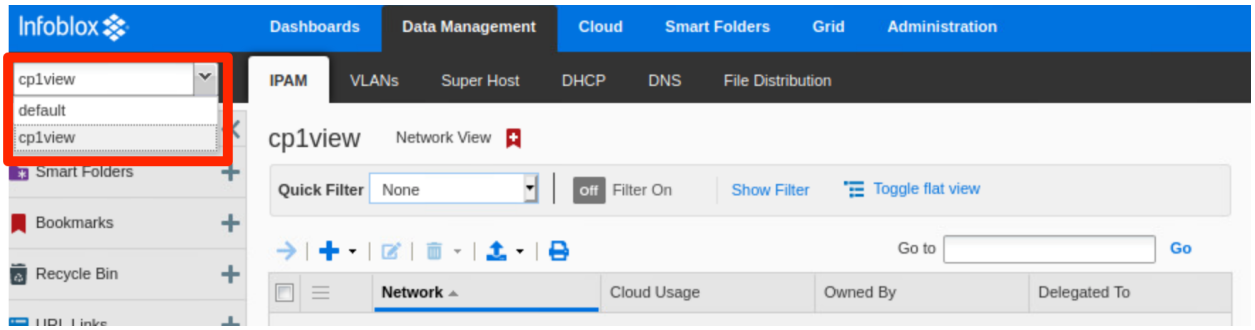
8. Click **Restart** in the Restart Grid Services window.



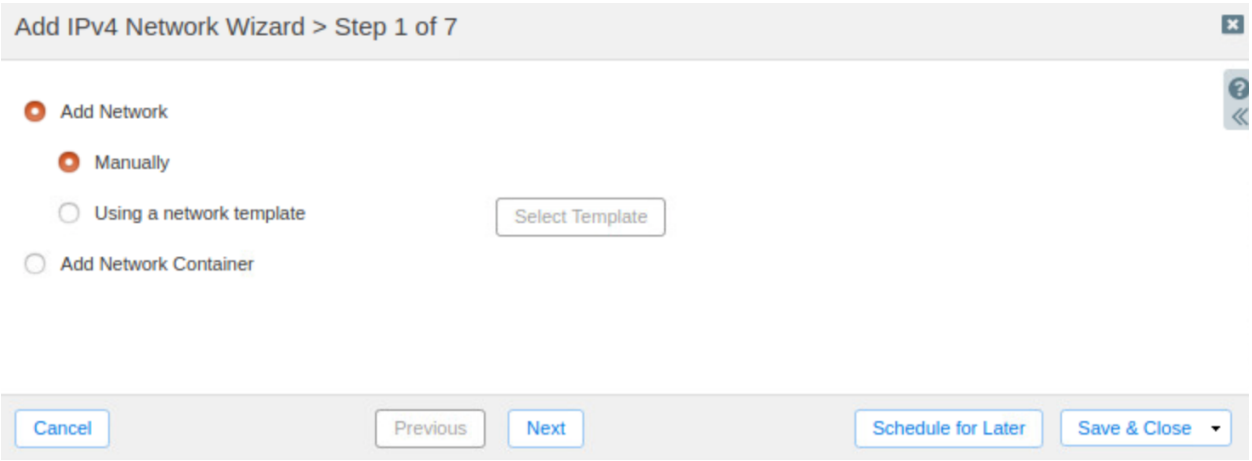
Create Network

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.

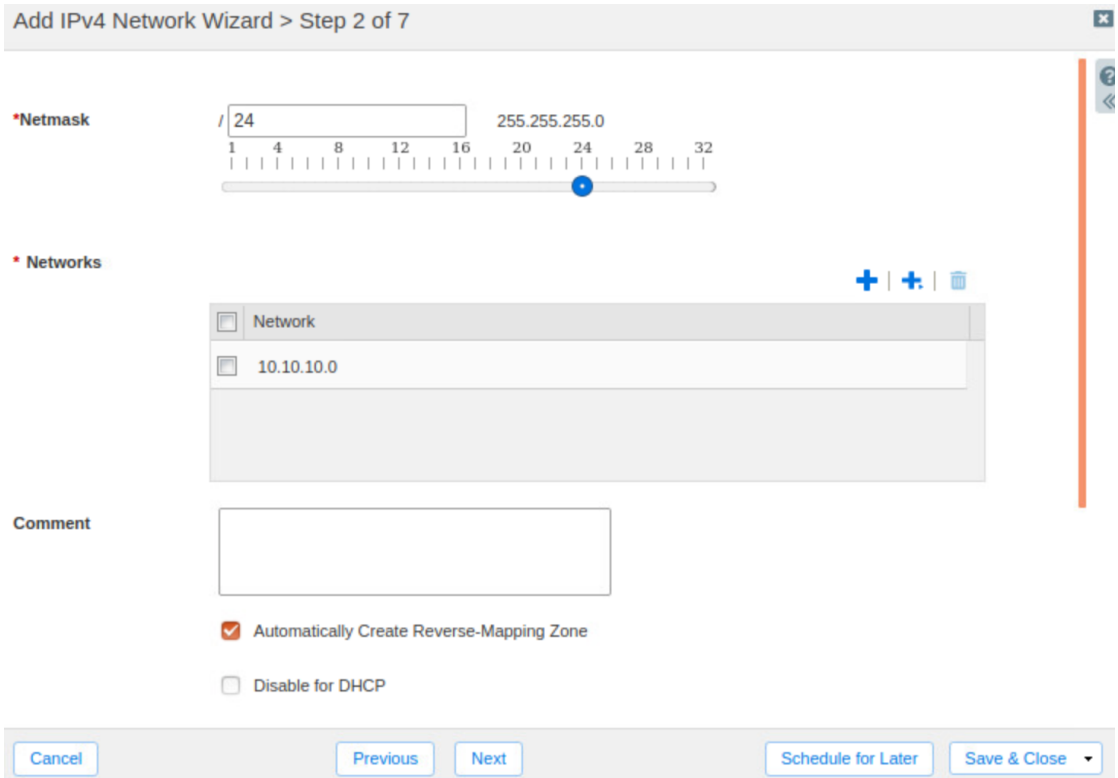
1. To create a network in this new view, navigate to the **Data Management** → **IPAM** tab.
2. Use the network view dropdown to select your new network view.



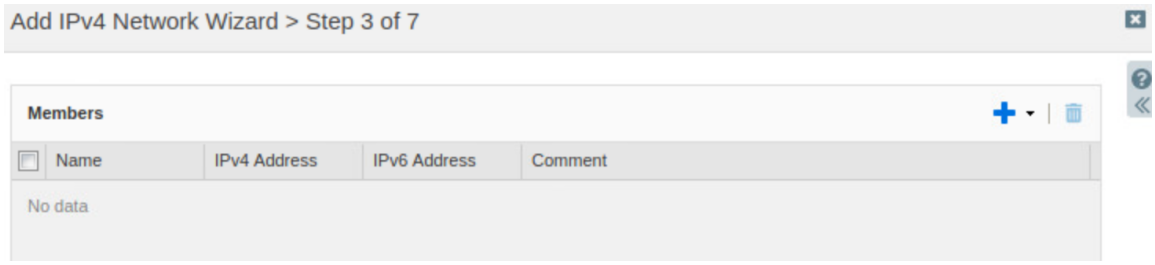
3. Click the + (add button) to add a new network.
4. On step 1 of the Add IPv4 Network Wizard, select **Add Network → Manually**.
5. Click **Next**.



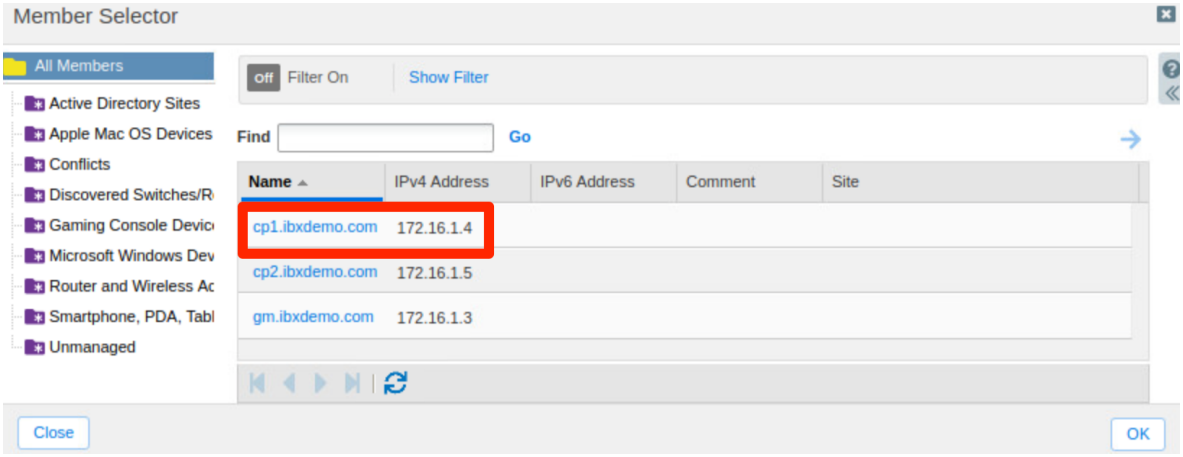
6. On step 2 of the wizard, set a **Netmask** for the network, by typing in the box or using the slider.
7. Click the + (add button) next to **Networks** and enter the network CIDR in the box, for example **10.10.10.0**.
8. Check the box next to **Automatically Create Reverse-Mapping Zone**.
9. Click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



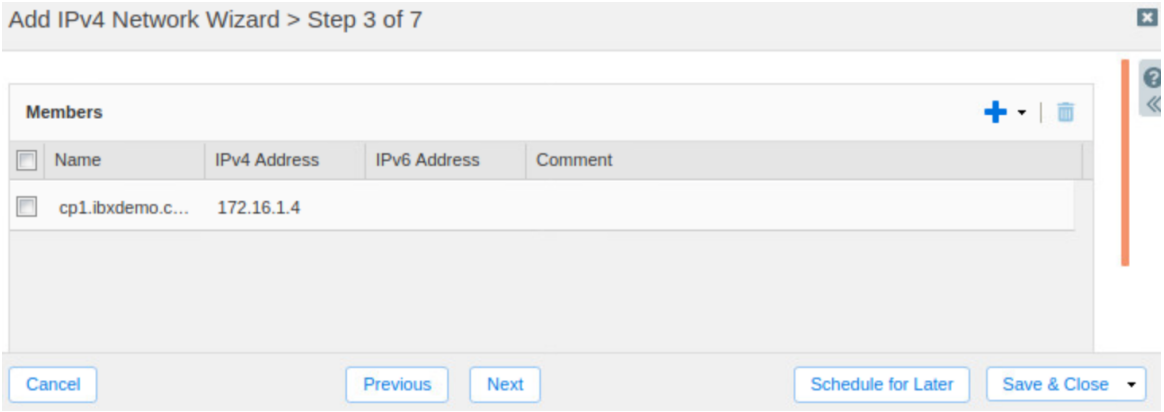
10. On step 3, click the + (add button) to add a member as a DHCP server for the network.



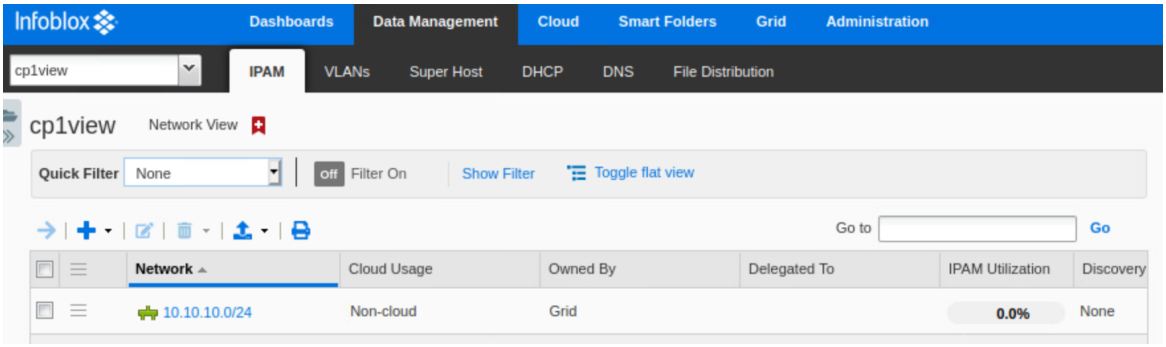
11. In the Member Selector dialog, select your first Cloud Platform member.



12. Click **Save & Close**.



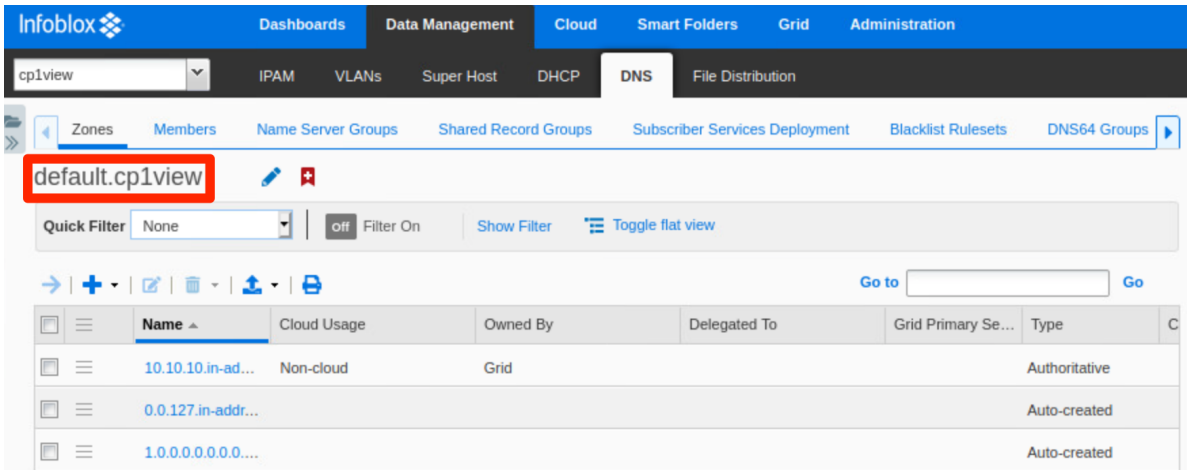
13. Click **Restart** in the warning bar when prompted.
14. Click **Restart** in the Restart Grid Services window.
15. The new network is now created.



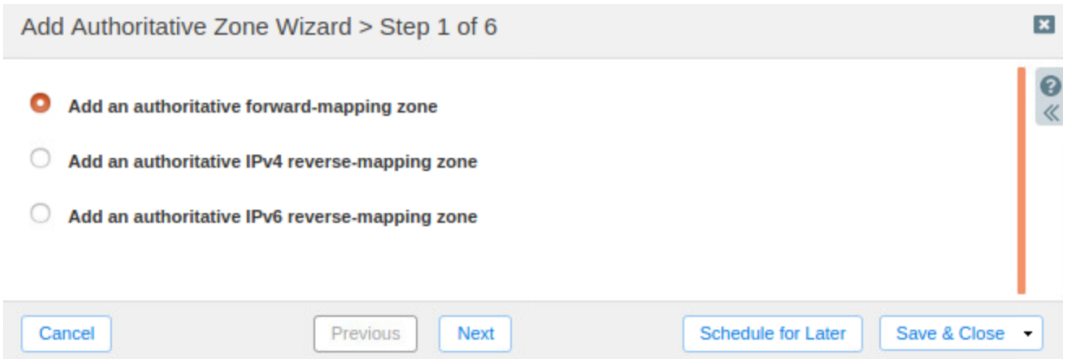
Create DNS Zone

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.

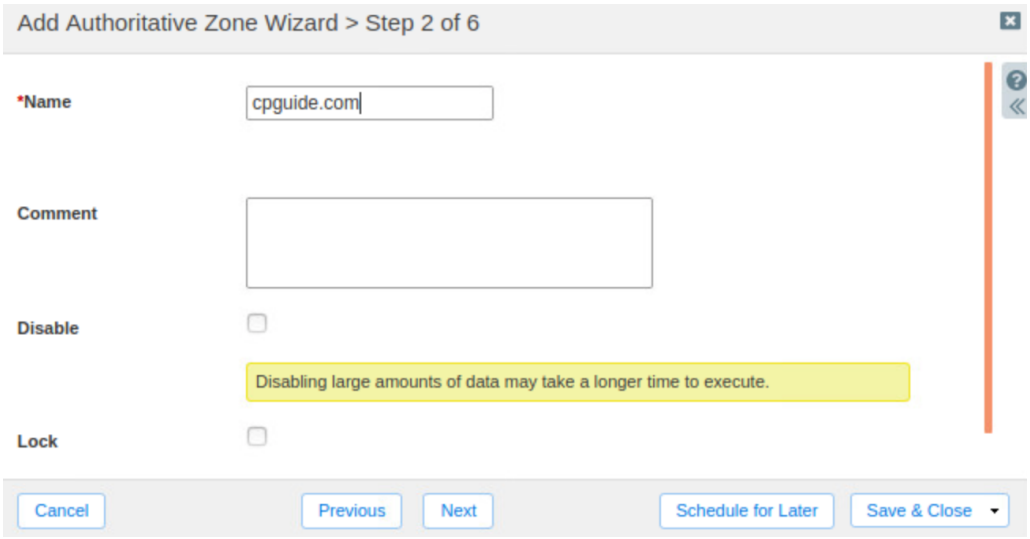
1. To add an authoritative DNS zone, navigate to the **Data Management → DNS → Zones** tab.
2. Ensure you are in the DNS view that belongs to your new network view. The view name will be in the format **default.name**, where **name** is the name of your network view.



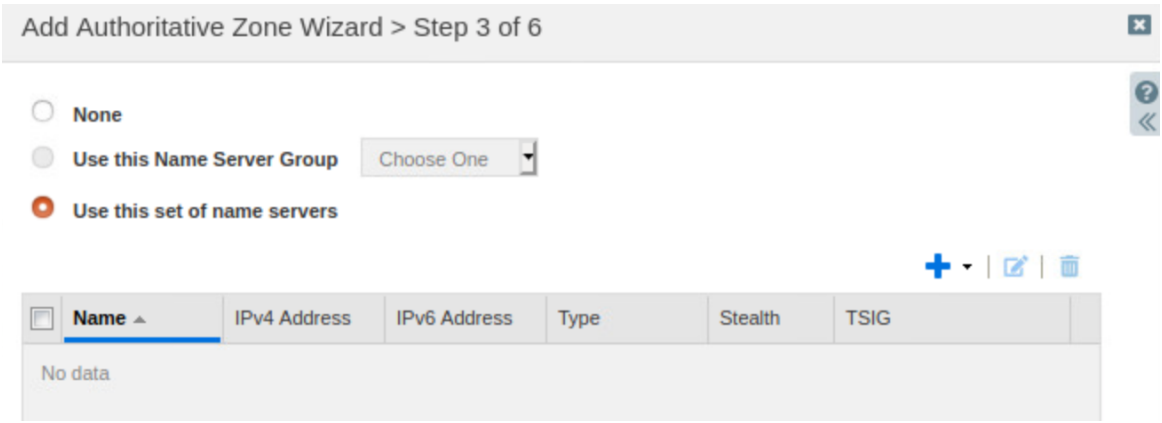
3. Click the ✚ (add button) to add a new zone.
4. On step 1 of the Add Authoritative Zone Wizard, select **Add an authoritative forward-mapping zone**.
5. Click **Next**.



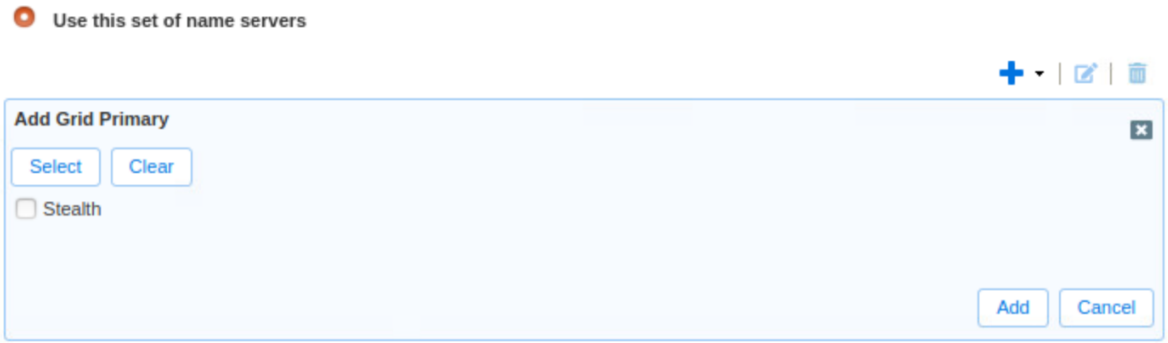
6. On step 2 of the wizard, enter a **Name** for your zone, for example **cpguide.com**.
7. Click **Next**.



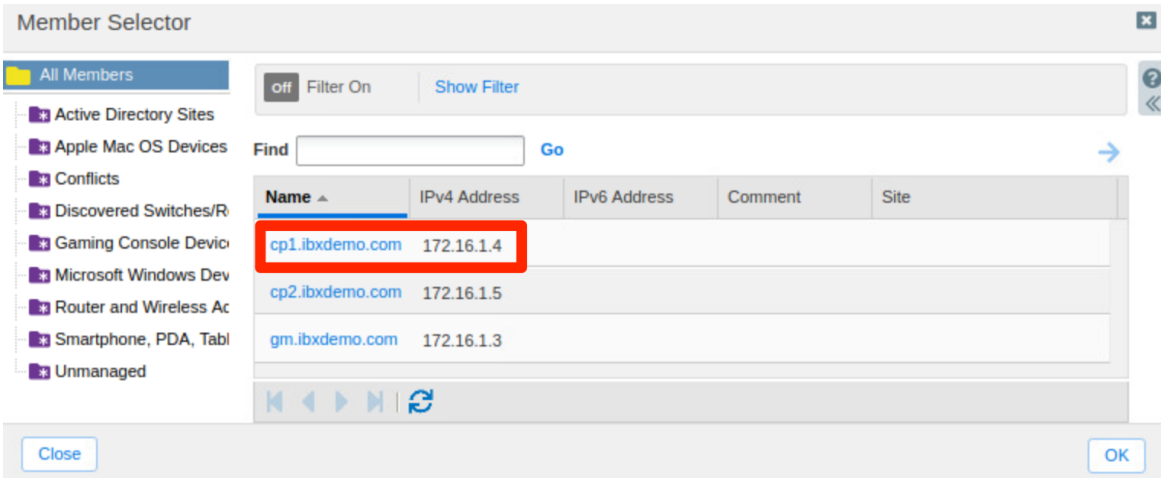
8. On step 3, select **Use this set of name servers**.
9. Click the + (add button) to add a Primary DNS name server for the zone.



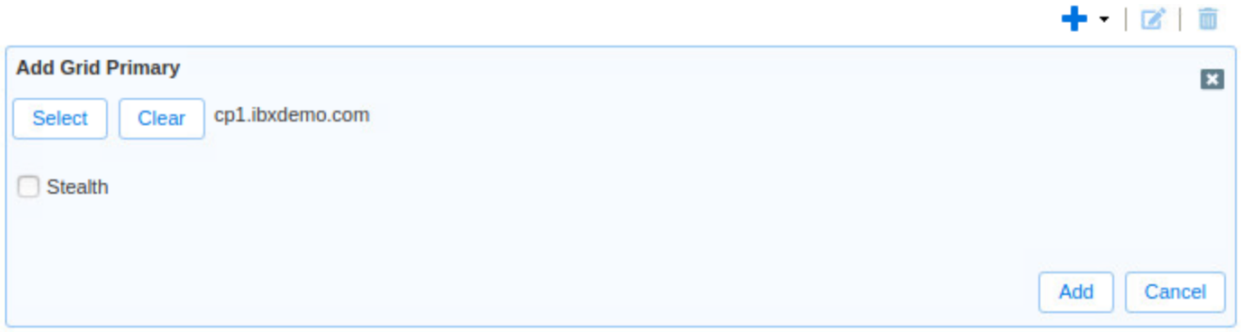
10. Under Add Grid Primary, click **Select**.



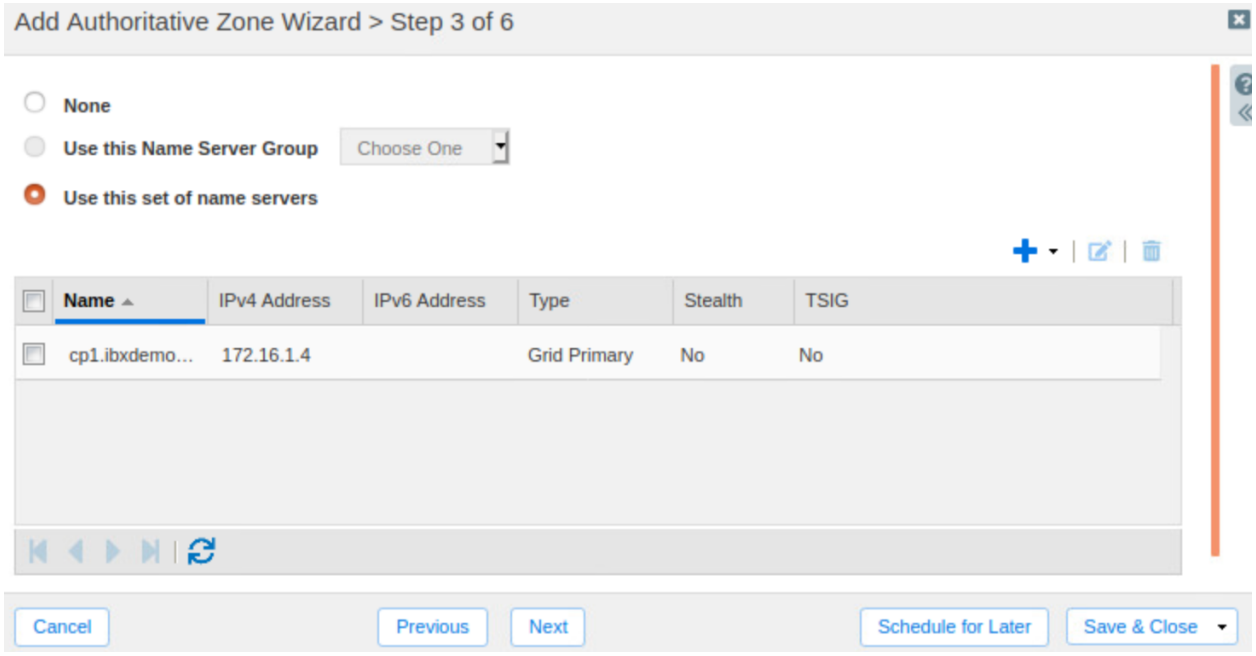
11. In the Member Selector dialog, select your Cloud Platform member 1. By selecting the Cloud Platform member as the primary name server in this step, the zone will automatically be delegated to that member.



12. Click **Add**.

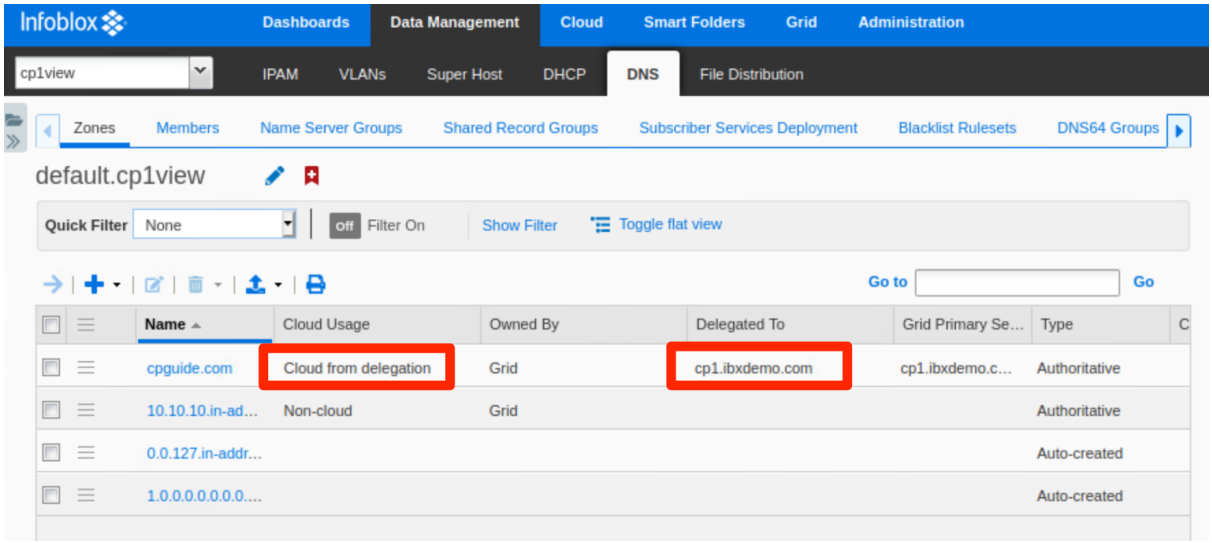


13. Click **Save & Close**.



14. Click **Restart** in the warning bar when prompted.
15. Click **Restart** in the Restart Grid Services window.

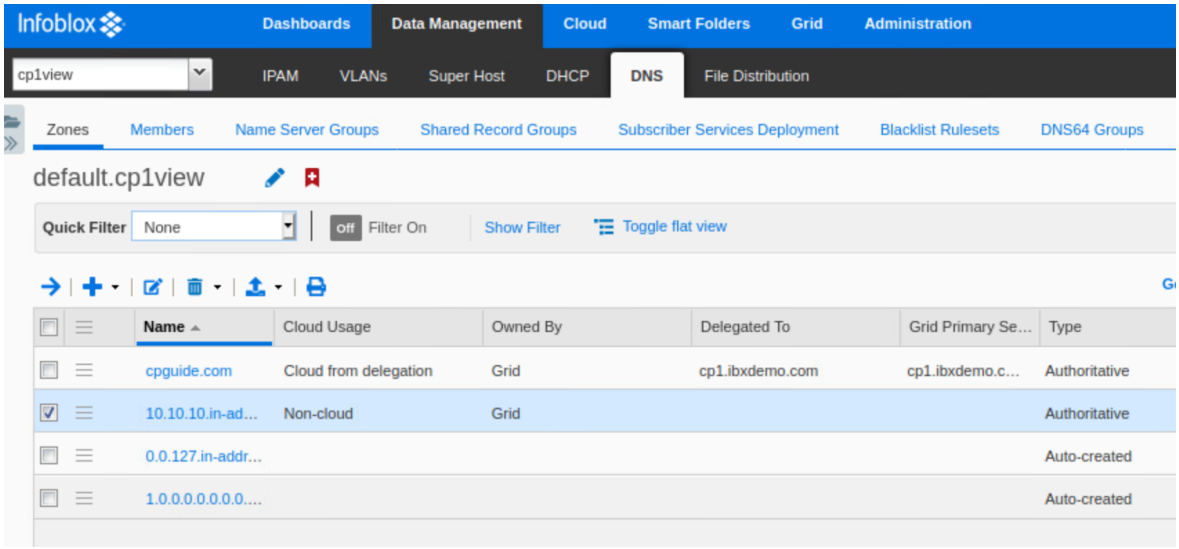
16. Notice that the new zone shows Cloud from delegation in the Cloud Usage column and the CP member name in the Delegated To column.



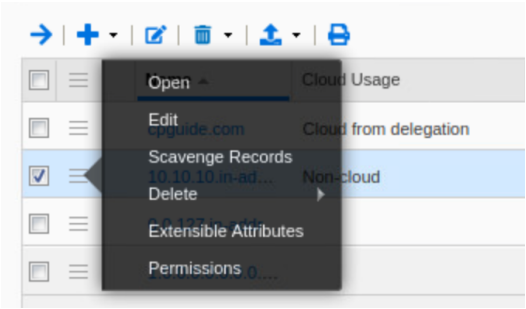
Assign Name Server for Reverse Mapping Zone

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.

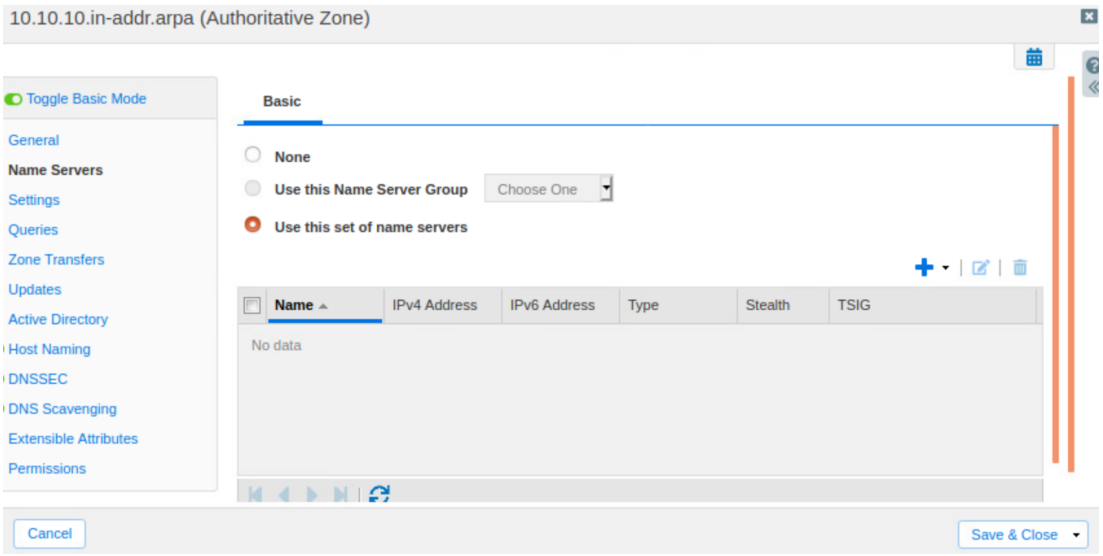
1. Navigate to the **Data Management** → **DNS** → **Zones** tab.
2. Select the checkbox next to the reverse mapping zone.
3. Click the ☰ (action menu).



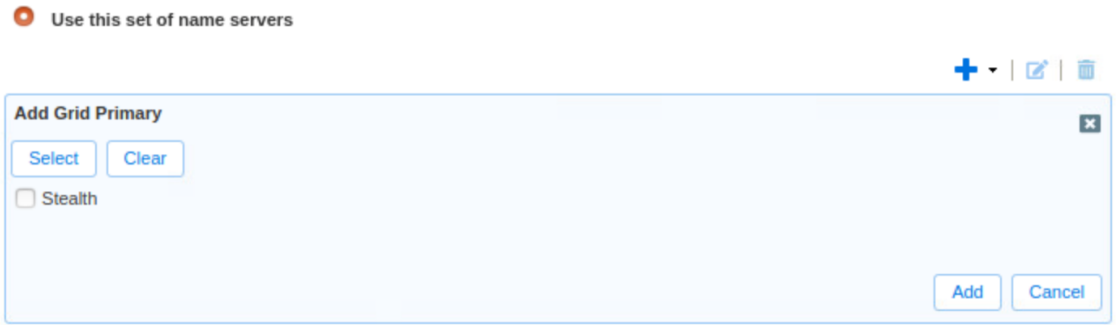
4. Click **Edit**.



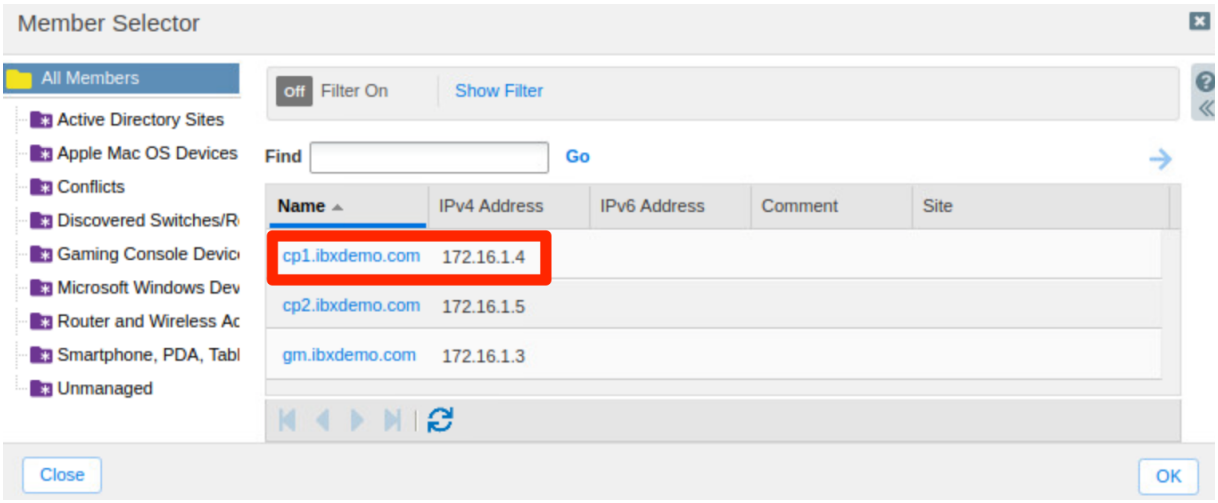
5. In the Authoritative Zone window, navigate to the **Name Server** page.
6. Select **Use this set of name servers**.
7. Click the + (add button) to add a Primary DNS name server for the zone.



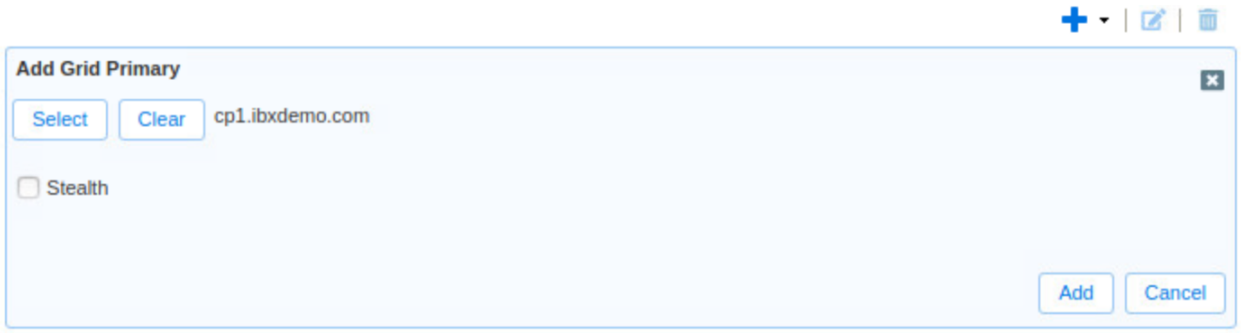
8. Under Add Grid Primary, click **Select**.



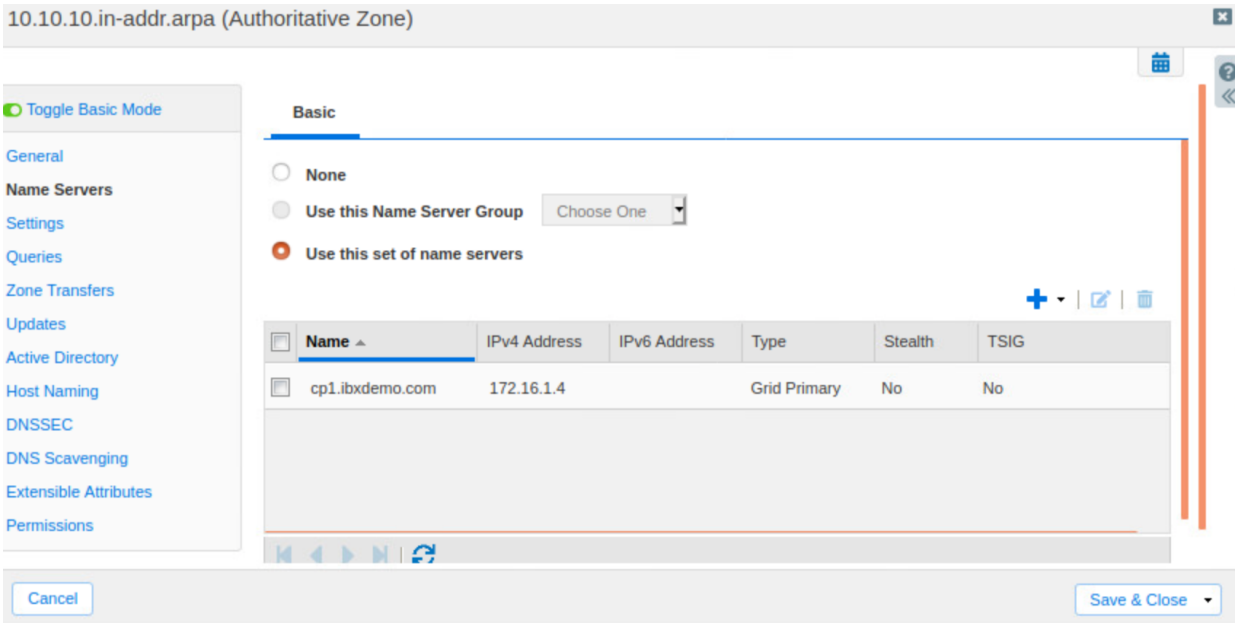
9. In the Member Selector dialog, select CP1. By selecting the Cloud Platform member as the primary name server in this step, the zone will automatically be delegated to that member.



10. Click **Add**.



11. Click **Save & Close**.

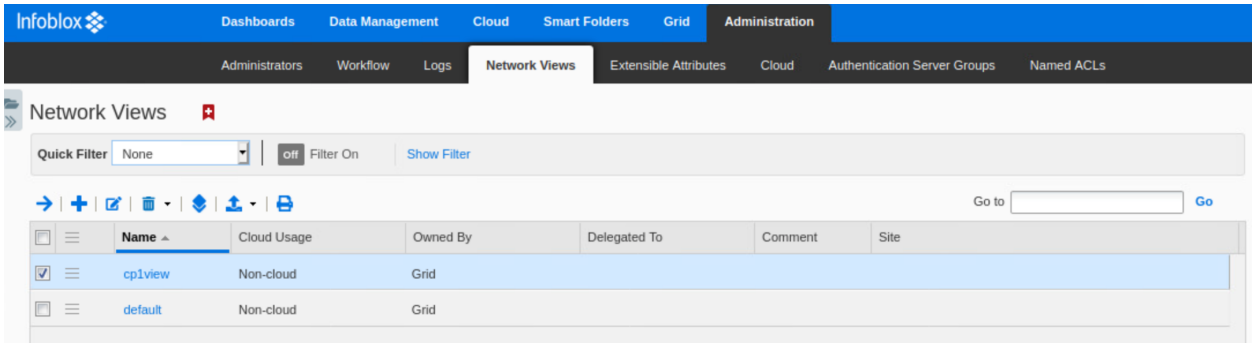


12. Click **Restart** in the warning bar when prompted.
13. Click **Restart** in the Restart Grid Services window.

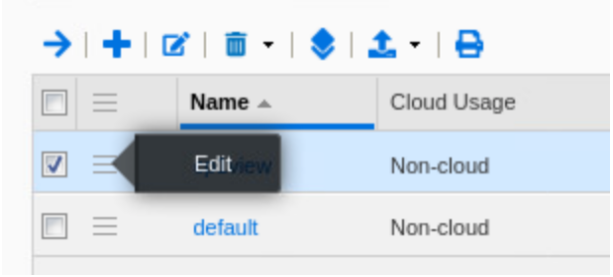
Delegate Authority for Network View

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.

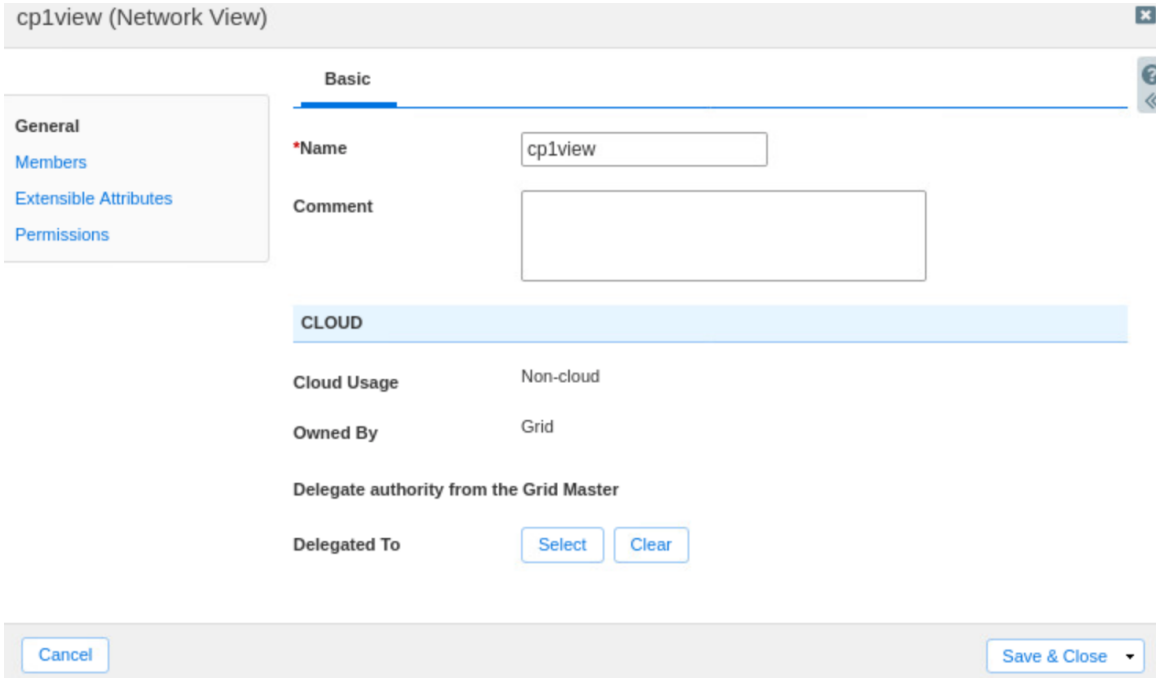
1. To delegate the entire network view to your Cloud Platform member, navigate to the **Administration** → **Network Views** tab.
2. Select the checkbox next to your new network view and click the ☰ (action menu).



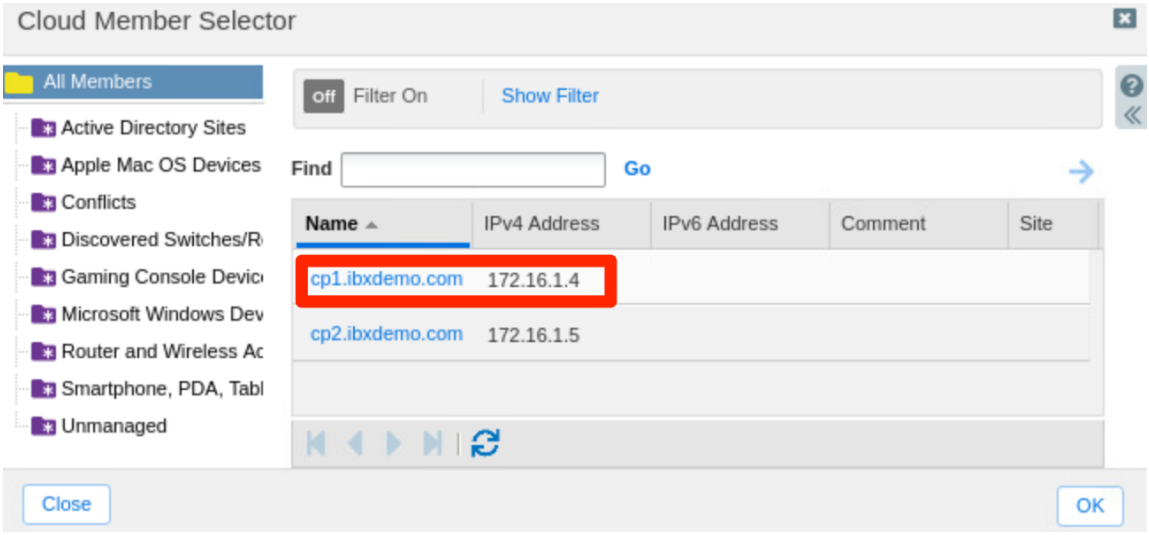
3. Click **Edit**.



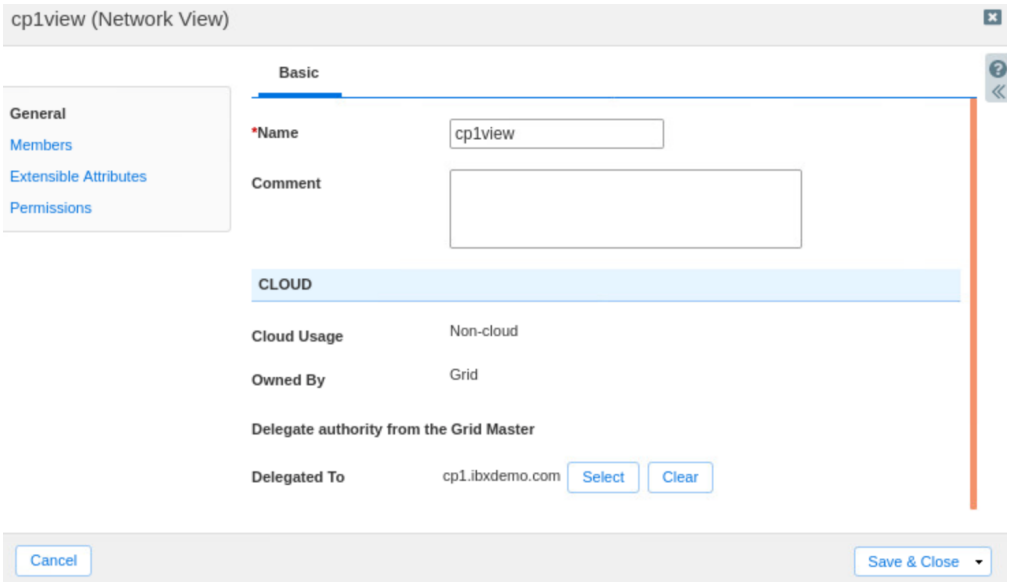
4. In the network view window, under Delegate authority from the Grid Master, click **Select** next to Delegated To.



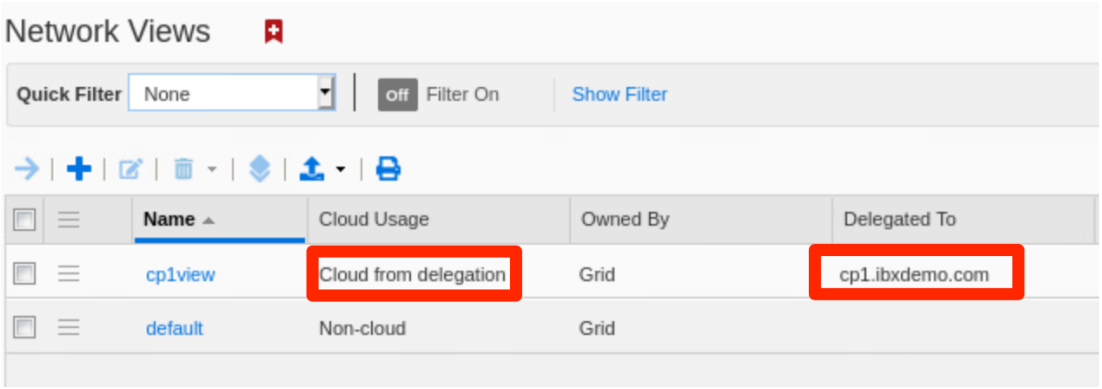
5. In the Cloud Member Selector dialog, select Cloud Platform member 1.



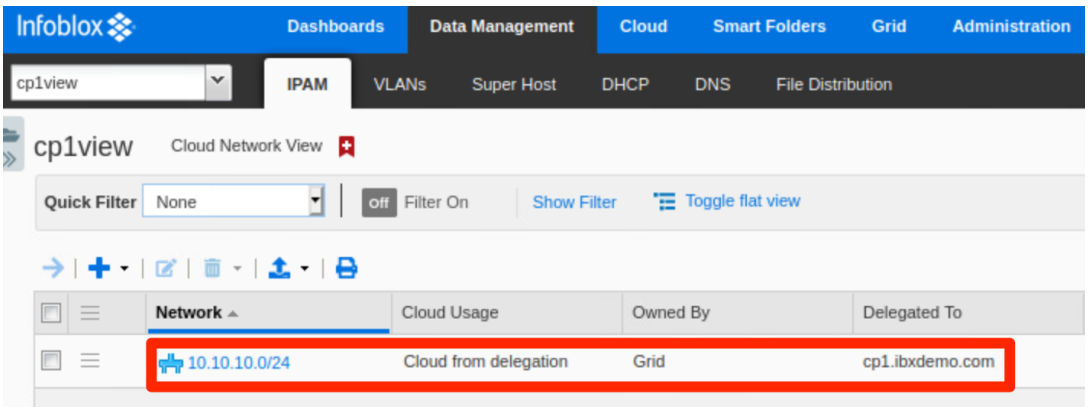
6. Click **Save & Close**.



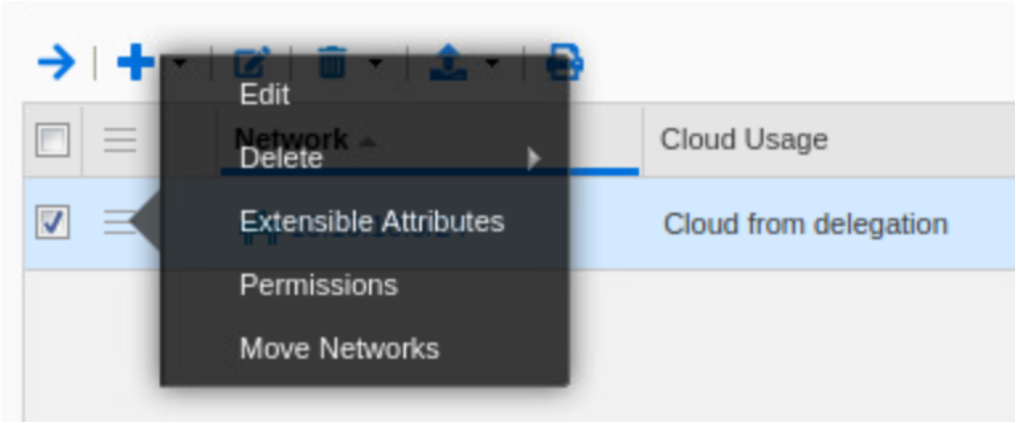
7. Click **Restart** in the warning bar when prompted.
8. Click **Restart** in the Restart Grid Services window.
9. Notice that the network view now shows Cloud from delegation in the Cloud Usage column and the CP member name in the Delegated To column.



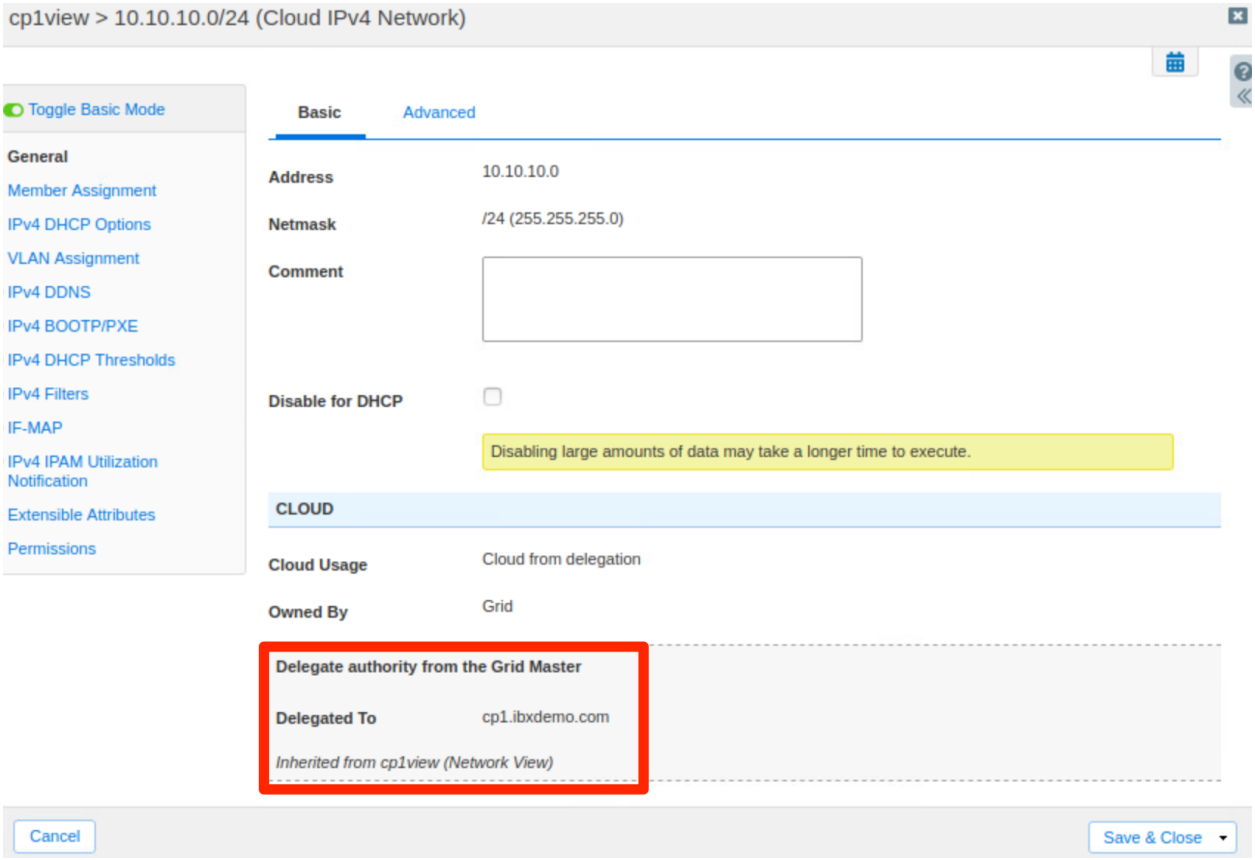
10. Navigate to the **Data Management** → **IPAM** tab. You can see the previously created network has been delegated to the Cloud Platform member and the icon color has changed from green to blue.



11. Select the checkbox next to the network and click the ☰ (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.

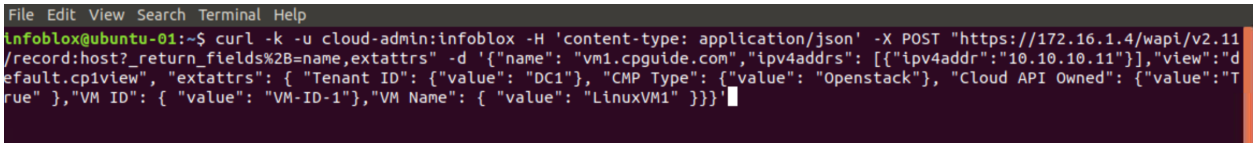


Create Host Record in Delegated Network and Zone

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.

<table>
<tr><td rowspan="3">Operation</td><td>REST Method</td><td>API Call</td><td>Sample Body</td></tr>
<tr><td colspan="3">Sample cURL Command</td></tr>
<tr><td colspan="3">Sample Output</td></tr>
<tr><td rowspan="3">Create a Host Record within a Tenant</td><td>POST</td><td>https://172.16.1.4/wapi/v2.11/record:host</td><td>{"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" }}}</td></tr>
<tr><td colspan="3">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" }}}'</td></tr>
<tr><td colspan="3">{"_ref": "record:host/ZG5zLmhvc3QkLjIuY29tLnRlc3Qudm0x:vm1.cpguide.com/default.cp1view",
"extattrs":
{"CMP Type": {"value": "Openstack"},
"Cloud API Owned": {"value": "True"},
"Tenant ID": {"value": "DC1"},
"VM ID": {"value": "VM-ID-1"},
"VM Name": {"value": "LinuxVM1"} },
"ipv4addrs":
[{"_ref":
"record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMi5jb20udGVzdC52bTEuMTAuMTAuMTAuMTEu:10.10.10.11/vm1.cpguide.com/default.cp1view",
"configure_for_dhcp": false,
"host": "vm1.cpguide.com",
"ipv4addr": "10.10.10.11" }],
"name": "vm1.cpguide.com",
"view": "default.cp1view"}</td></tr>
</table>

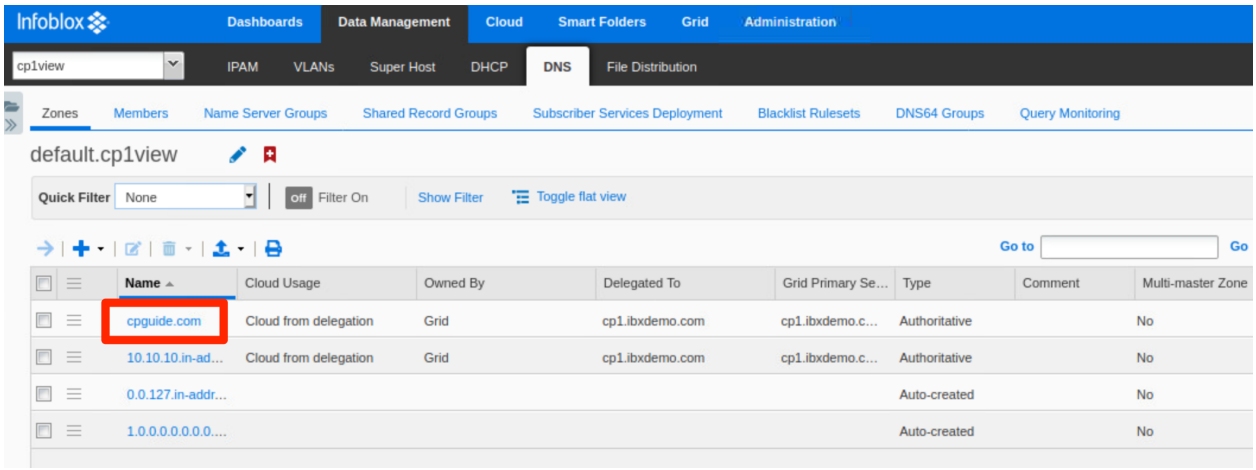
1. To test this cloud API call, open a terminal window on your client device.
2. Copy the example cURL command from above and paste it in the terminal. Ensure you use the IP address of the CP1 appliance, the correct DNS view name, and the correct DNS zone.



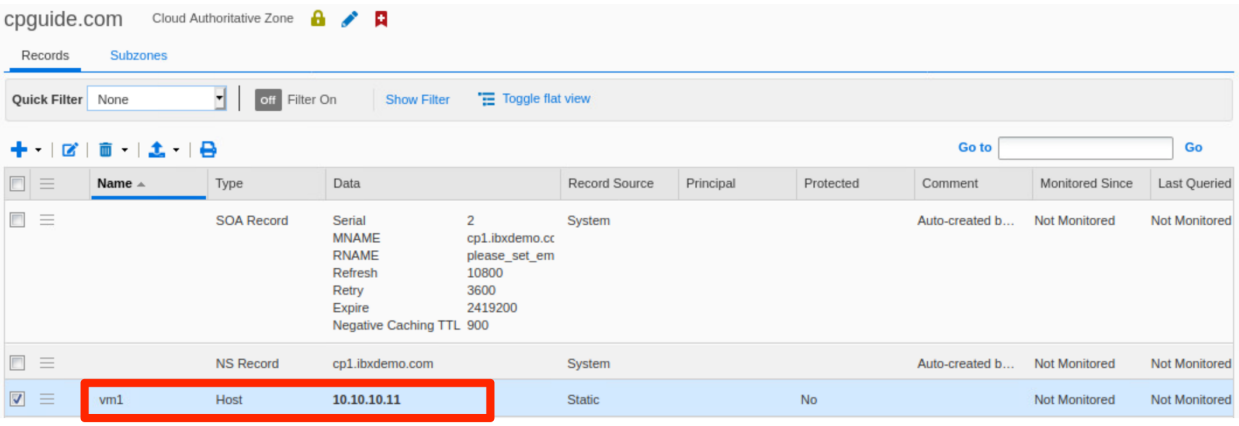
3. Press **Enter**. The screenshot below shows the output from a successful API call.

```
{
    "_ref": "record:host/ZG5zLmhvc3QkLjEuY29tLmNwZ3VpZGUudm0x:vm1.cpguide.com/default.cp1view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "DC1"
        },
        "VM ID": {
            "value": "VM-ID-1"
        },
        "VM Name": {
            "value": "LinuxVM1"
        }
    },
    "ipv4addrs": [
        {
            "_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMS5jb20uY3BndWlkZS52bTEuMTAuMTAuMTAuMTEu:10.10.10.11/vm1.cpguide.com/default.cp1view",
            "configure_for_dhcp": false,
            "host": "vm1.cpguide.com",
            "ipv4addr": "10.10.10.11"
        }
    ],
    "name": "vm1.cpguide.com",
    "view": "default.cp1view"
infoblox@ubuntu-01:~$
```

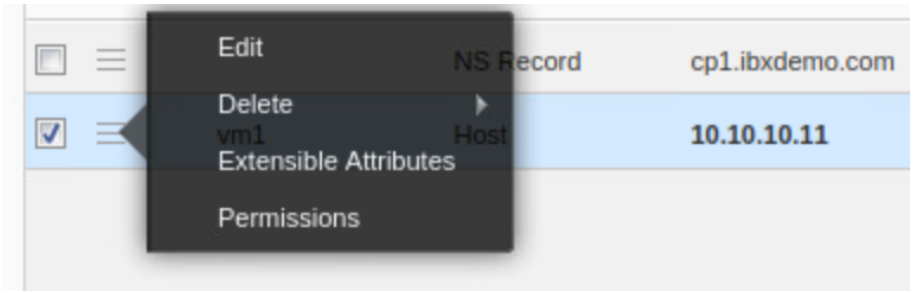

4. To view the host record in Grid Manager, navigate to the **Data Management** → **DNS** → **Zones** tab.
5. If necessary, use the network view dropdown to select the **cp1view** network view created earlier.
6. Click on the **cpguide.com** zone created earlier.



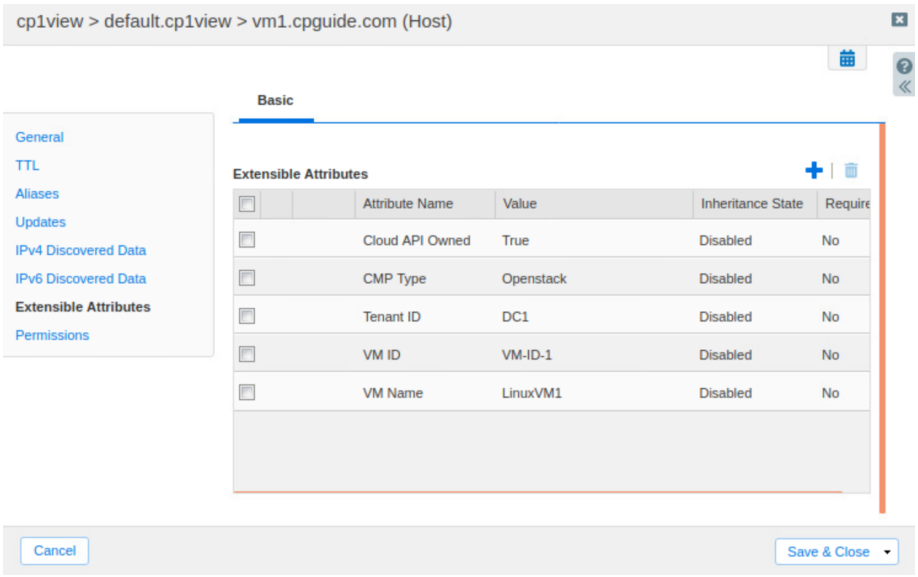
7. The newly created host record is visible. Select the checkbox for the host record.



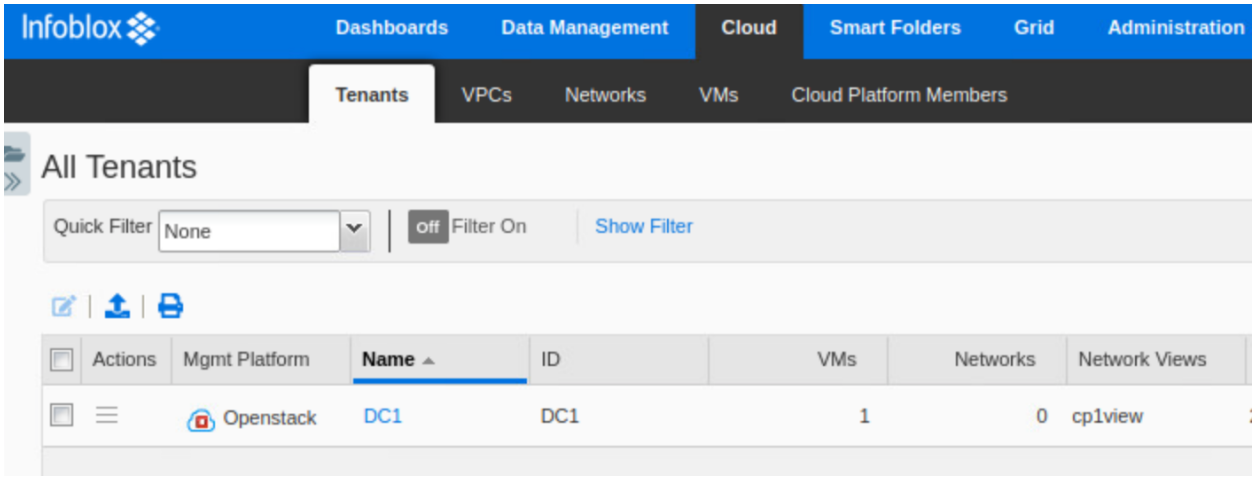
8. To view Extensible Attributes added to the record through the cloud API, click the ☰ (action menu).
9. Click on **Extensible Attributes**.



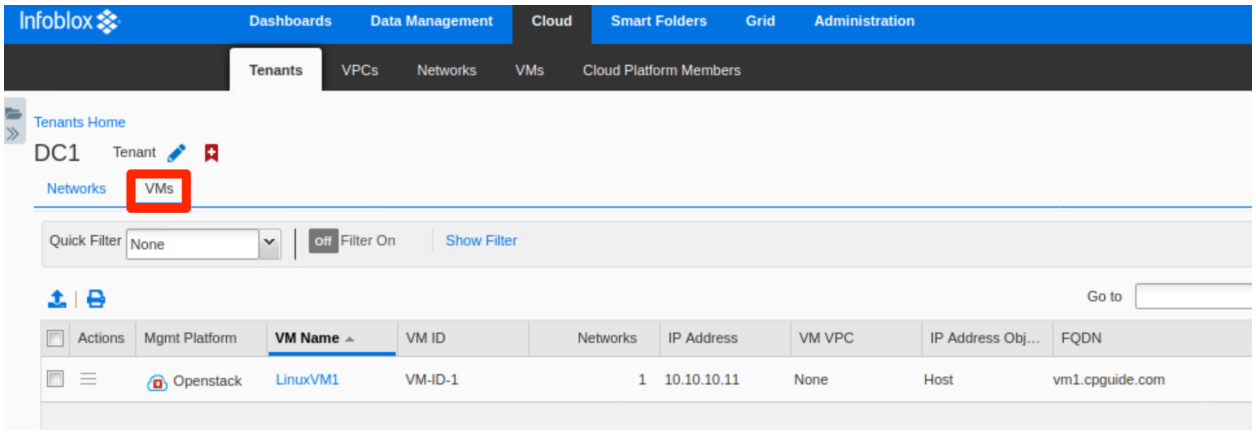
10. You can see cloud specific EAs such as CMP Type and Tenant ID have been assigned to the record.



11. Click Cancel to close the host record window.
12. Navigate to the **Cloud** → **Tenants** tab. Here you can see a new tenant is added, **DC1**.



13. Click on **DC1**.
14. Click **VMs**. You will see details of the virtual machine that was specified when creating the host record.



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 https://docs.infoblox.com. 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.

<table>
<tr><th rowspan="3">Operation</th><th>REST Method</th><th>API Call</th><th>Sample Body</th></tr>
<tr><td colspan="3">Sample cURL Command</td></tr>
<tr><td colspan="3">Sample Output</td></tr>
<tr><td rowspan="3">Create a Host Record within a Tenant</td><td>POST</td><td>https://172.16.1.4/wapi/v2.11/record:host</td><td>{"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" }}}</td></tr>
<tr><td colspan="3">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" }}}'</td></tr>
<tr><td colspan="3">{"_ref": "record:host/ZG5zLmhvc3QkLjIuY29tLnRlc3Qudm0x:vm2.cpguide.com/default.cp1view", "extattrs": {"CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value": "True"}, "Tenant ID": {"value": "DC1"}, "VM ID": {"value": "VM-ID-2"}, "VM Name": {"value": "LinuxVM2"} },</td></tr>
</table>

	"ipv4addrs": [{"_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMi5jb20udGVzdC52bTEuMTAuMTAuMTAuMTEu:10.10.10.12/vm2.cpguide.com/default.cp1view", "configure_for_dhcp": false, "host": "vm2.cpguide.com", "ipv4addr": "10.10.10.12" }], "name": "vm2.cpguide.com", "view": "default.cp1view"}

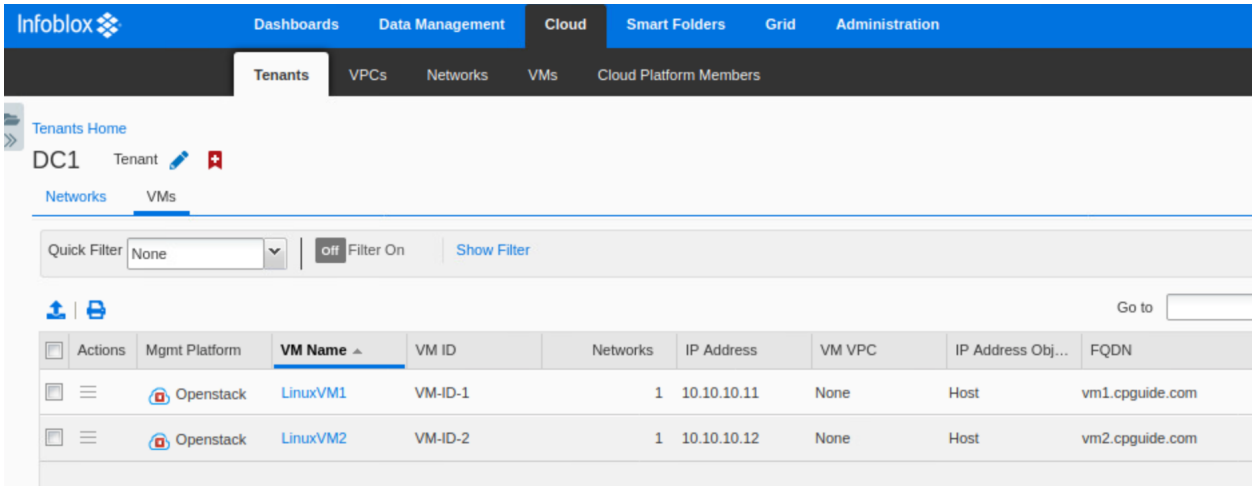
3. To test this cloud API call, open a terminal window on your client device.
4. Copy the example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP1 appliance, the correct DNS view name, and the correct DNS zone.

```
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.

```
{
    "_ref": "record:host/ZG5zLmhvc3QkLjEuY29tLmNwZ3VpZGUudm0y:vm2.cpguide.com/default.cp1view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "DC1"
        },
        "VM ID": {
            "value": "VM-ID-2"
        },
        "VM Name": {
            "value": "LinuxVM2"
        }
    },
    "ipv4addrs": [
        {
            "_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMS5jb20uY3BndWlkZS52bTIuMTAuMTAuMTAuMTIu:10.10.10.12/vm2.cpgui
de.com/default.cp1view",
            "configure_for_dhcp": false,
            "host": "vm2.cpguide.com",
            "ipv4addr": "10.10.10.12"
        }
    ],
    "name": "vm2.cpguide.com",
    "view": "default.cp1view"
}infoblox@ubuntu-01:~$
```

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** → **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.



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.

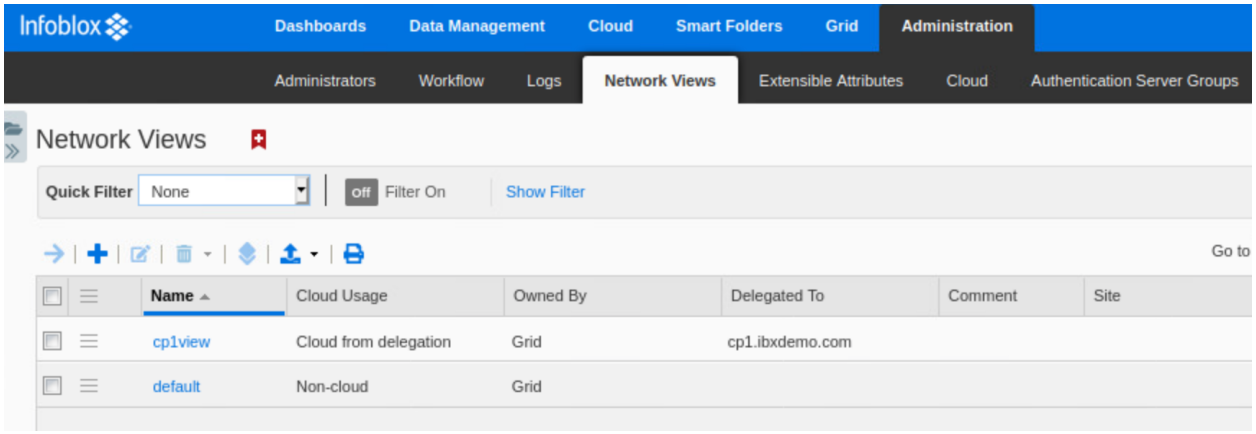
When a network view is created, a corresponding DNS view is also created. DNS views provide the ability to serve one version of DNS data to one set of clients and another version to another set of clients. With DNS views, the appliance can provide a different answer to the same query, based on the source 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.

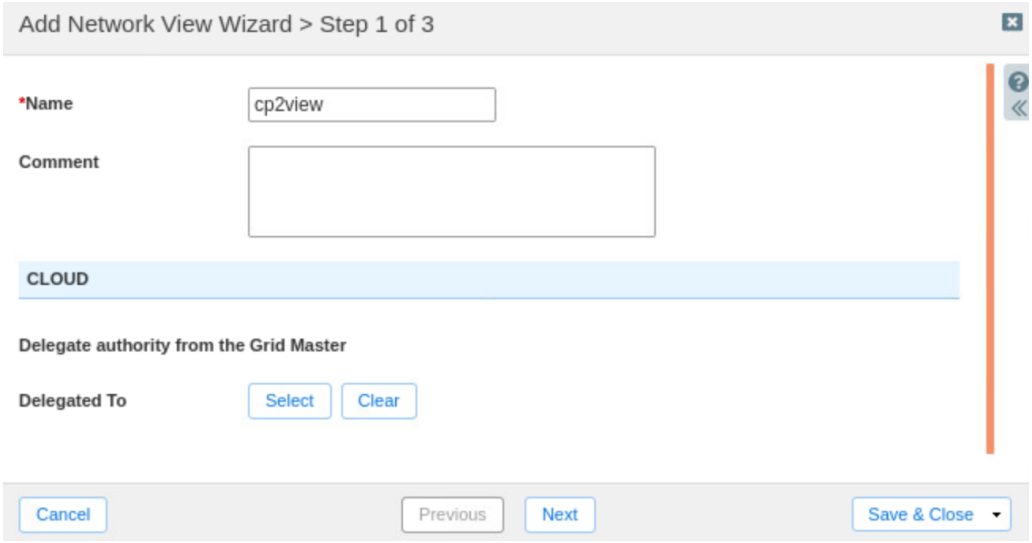
To demonstrate this use case, we will create overlapping networks under tenants in multiple network views, each delegated to different Cloud Platform members. First, we will create a new network view and delegate it to Cloud Platform member 2.

1. Log in to Grid Manager.
2. Navigate to the **Administration** → **Network Views** tab.

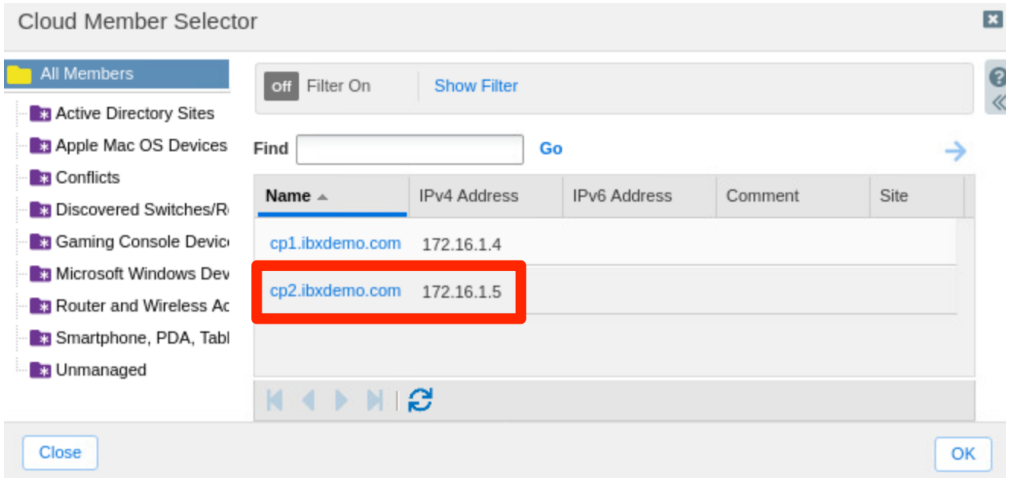
3. Click the + (add button) to add a new network view.



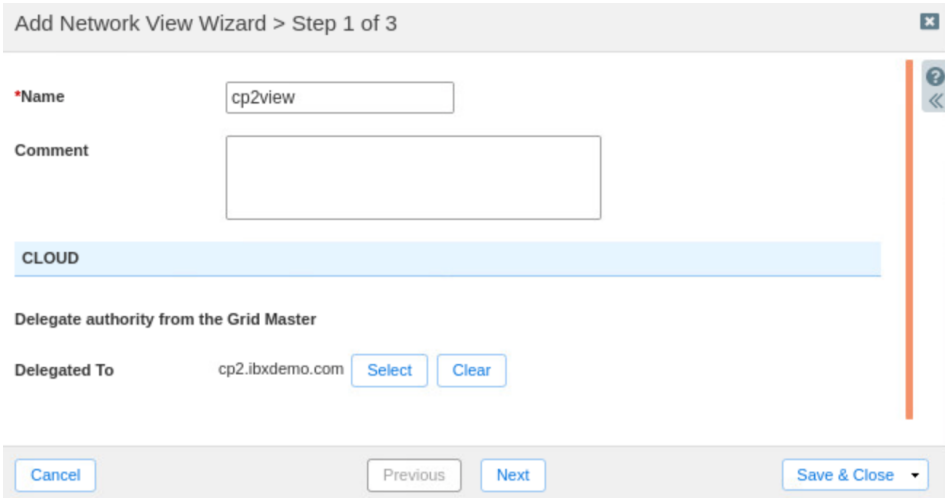
4. In the Add Network View Wizard, enter a **name** for the network view, for example **cp2view**.
5. Click **Select** next to Delegated To.



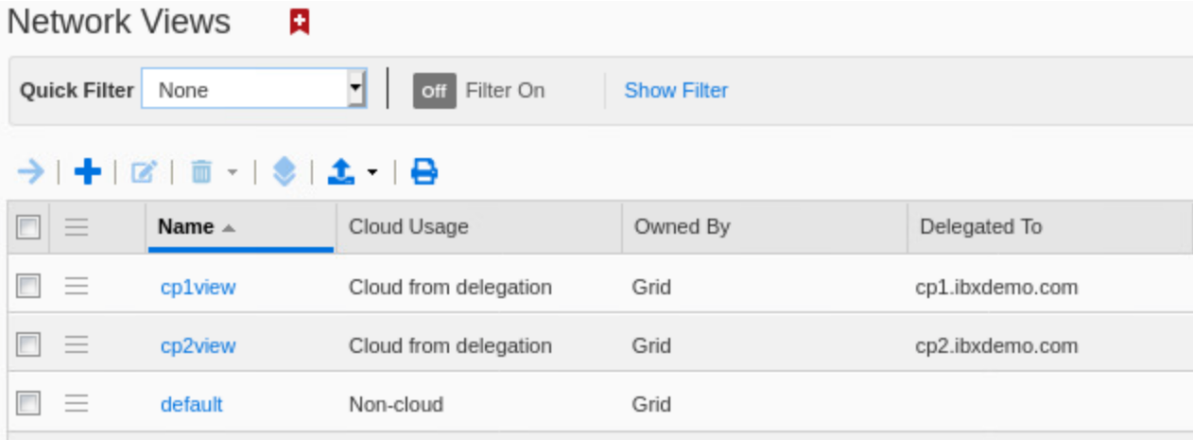
6. In the Cloud Member Selector dialog, click on **CP2**.



7. Click **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.



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

Operation	REST Method	API Call	Sample Body
	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":

<table>
<tr><td rowspan="3"></td><td></td><td></td><td>{"value":"True" }}}</td></tr>
<tr><td colspan="3">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" }}}'</td></tr>
<tr><td colspan="3">{"_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"
}</td></tr>
<tr><td rowspan="3">On Cloud Platform Member 2, create a network 1.1.1.0/24 in cp2view under a tenant Dev2</td><td>POST</td><td>https://172.16.1.4/wapi/v2.11/network</td><td>{"network": "1.1.1.0/24",
"network_view": "cp2view",
"extattrs":
{ "Tenant ID": {"value":
"Dev2"},
"CMP Type": {"value":
"Openstack"},
"Cloud API Owned":
{"value":"True" }}}</td></tr>
<tr><td colspan="3">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" }}}'</td></tr>
<tr><td colspan="3">{"_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"
}</td></tr>
</table>

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": { "Tenant ID": {
"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:~$
```

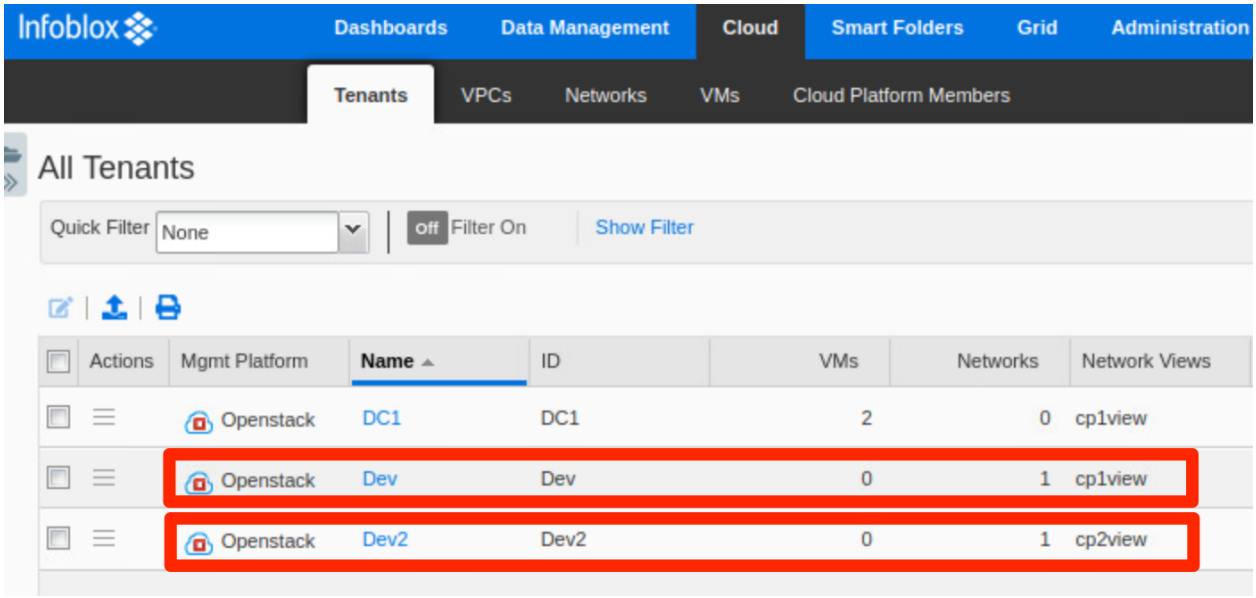

15. To create the network and tenant in **cp2view**, copy the second example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP2 appliance and the correct network view name.


```
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.

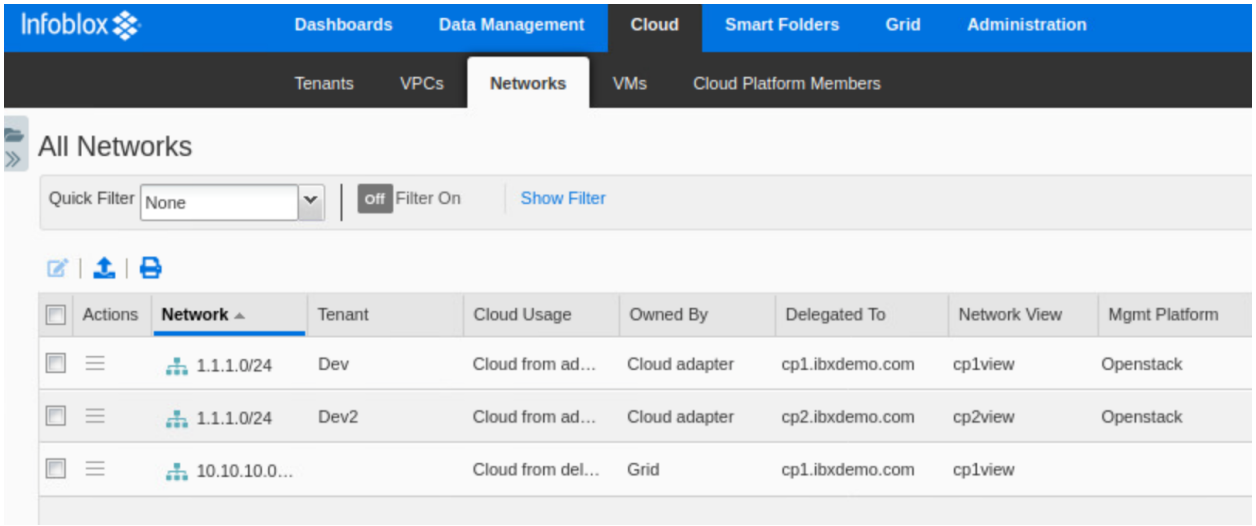

```
{
    "_ref": "network/ZG5zLm5ldHdvcmskMS4xLjEuMC8yNC8y:1.1.1.0/24/cp2view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "Dev2"
        }
    },
    "network": "1.1.1.0/24",
    "network_view": "cp2view"
}infoblox@ubuntu-01:~$
```


17. To view the new tenants and networks, log in to Grid Manager.
18. Navigate to the **Cloud** → **Tenants** tab.



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

19. Navigate to the **Cloud** → **Networks** tab.



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.

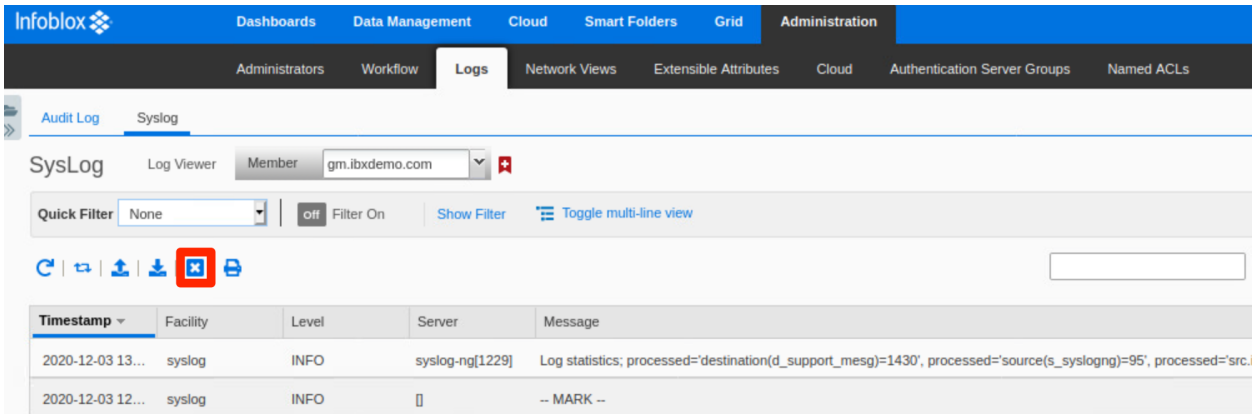
Proxy API Requests

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.

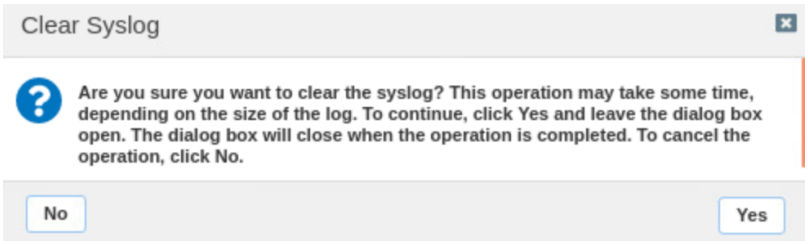
This functionality is limited to only cloud API requests. Additionally, proxying is limited to one hop in the Grid. If the destination appliance cannot process a proxied request, the request will not be forwarded again and the client will receive an error.

To demonstrate this capability, use the following steps:

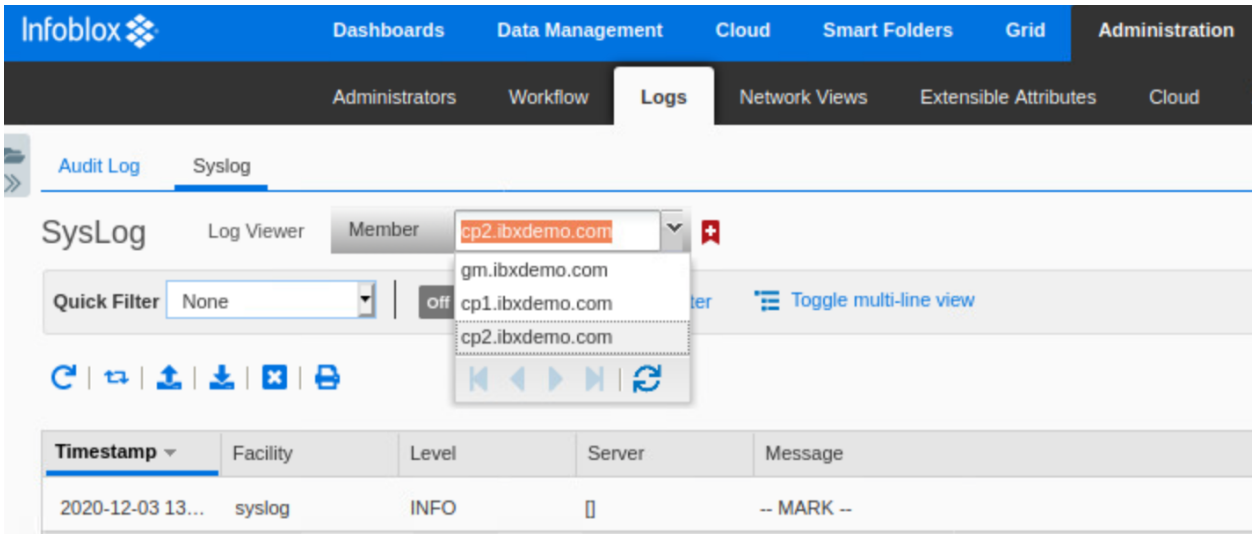
1. First, we will clear the Syslog to make it easier to view the proxy in action. Log in to the Grid Manager.
2. Navigate to the **Administration** → **Logs** → **Syslog** tab.
3. Click the (clear button) to clear current logs.



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



5. Use the Member selector dropdown to select **CP2**.



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.

Operation	REST Method	API Call	Sample Body
	Sample cURL Command		
	Sample Output		
On Cloud Platform Member 2, create a zone cp2.com in cp2view	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" }}}'
	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" }}}'		
	{"_ref": "zone_auth/ZG5zLnpvbmUkLjMuY29tLmNwMg:cp2.com/default.cp2view", "extattrs": {"CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value": "True"}, "Tenant ID": { "value": "Dev2"} }, "fqdn": "cp2.com", "grid_primary": [{"name": "cp2.ibxdemo.com", "stealth": false }], "view": "default.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-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.3/wapi/v2.11/record:host?_return_fields%2B=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" }}}'		
	{"_ref": "record:host/ZG5zLmhvc3QkLjMuY29tLmNwMi52bTE:vm3.cp2.com/default.cp2view", "extattrs": {"CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value": "True"}, "Tenant ID": {"value": "Dev2"}, "VM ID": {"value": "VM-ID-3"}, "VM Name": {"value": "LinuxVM3"} }, "ipv4addrs": [{"_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMy5jb20uY3AyLnZtMS4xLjEuMS4xMS4:1.1.1.11/vm3.cp2.com/default.cp2view", "configure_for_dhcp": false, "host": "vm3.cp2.com", "ipv4addr": "1.1.1.11" }], "name": "vm3.cp2.com", "view": "default.cp2view" }		

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" }}}'
```

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

```
{
    "_ref": "zone_auth/ZG5zLnpvbmUkLjIuY29tLmNwMg:cp2.com/default.cp2view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "Dev2"
        }
    },
    "fqdn": "cp2.com",
    "grid_primary": [
        {
            "name": "cp2.ibxdemo.com",
            "stealth": false
        }
    ],
    "view": "default.cp2view"
}infoblox@ubuntu-01:~$
```


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.

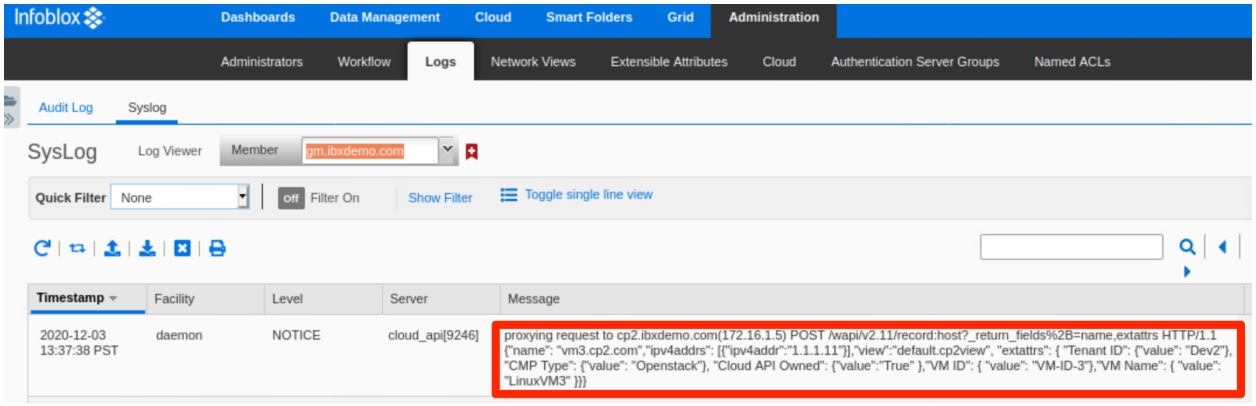

```
infoblox@ubuntu-01:~$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.3/wapi/v2.11
/record:host?_return_fields%2B=name,extattrs" -d '{"name": "vm3.cp2.com","ipv4addrs": [{"ipv4addr":"1.1.1.11"}],"view":"default.
cp2view", "extattrs": { "Tenant ID": {"value": "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.

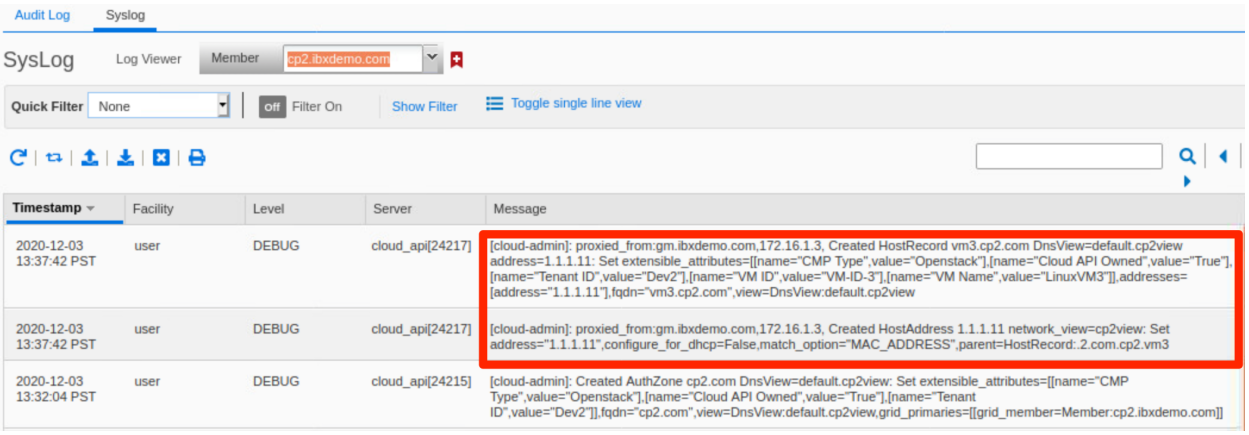

```
{
    "_ref": "record:host/ZG5zLmhvc3QkLjIuY29tLmNwMi52bTM:vm3.cp2.com/default.cp2view",
    "extattrs": {
        "CMP Type": {
            "value": "Openstack"
        },
        "Cloud API Owned": {
            "value": "True"
        },
        "Tenant ID": {
            "value": "Dev2"
        },
        "VM ID": {
            "value": "VM-ID-3"
        },
        "VM Name": {
            "value": "LinuxVM3"
        }
    },
    "ipv4addrs": [
        {
            "_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRkcmVzcyQuMi5jb20uY3AyLnZtMy4xLjEuMS4xMS4:1.1.1.11/vm3.cp2.com/default.c
p2view",
            "configure_for_dhcp": false,
            "host": "vm3.cp2.com",
            "ipv4addr": "1.1.1.11"
        }
    ],
    "name": "vm3.cp2.com",
    "view": "default.cp2view"
```


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

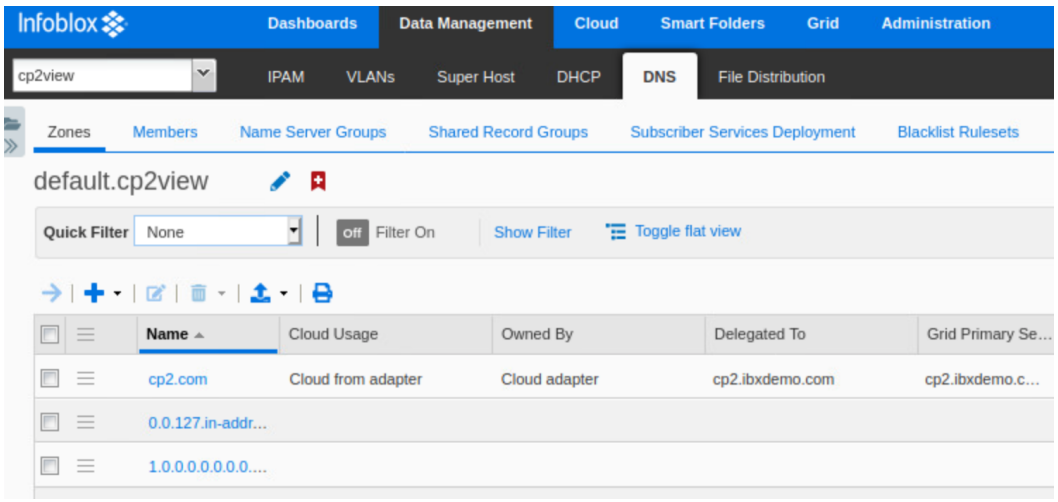
15. Select the Grid Master form the Member selector dropdown. A syslog entry shows the request proxying to CP2.



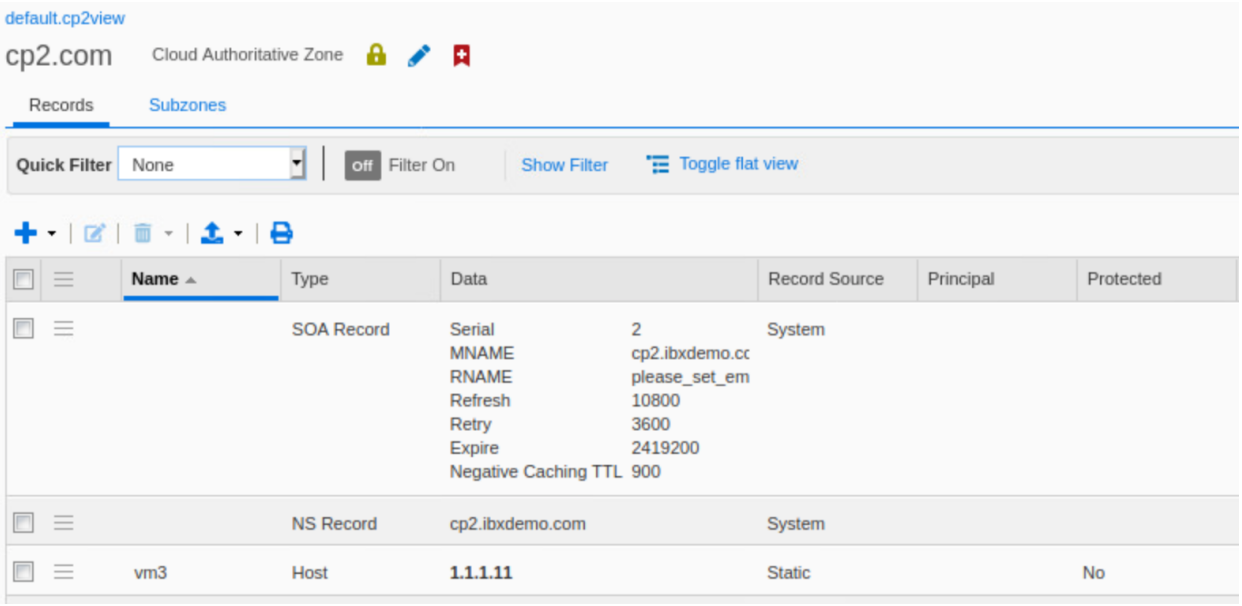
16. Select CP2 form the Member selector dropdown. Syslog entries show the proxied request from the GM, creating the host address and host record.



17. Navigate to the **Data Management** → **DNS** → **Zones** tab.
18. Use the network view dropdown to select the **cp2view** network view.



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



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 https://docs.infoblox.com.

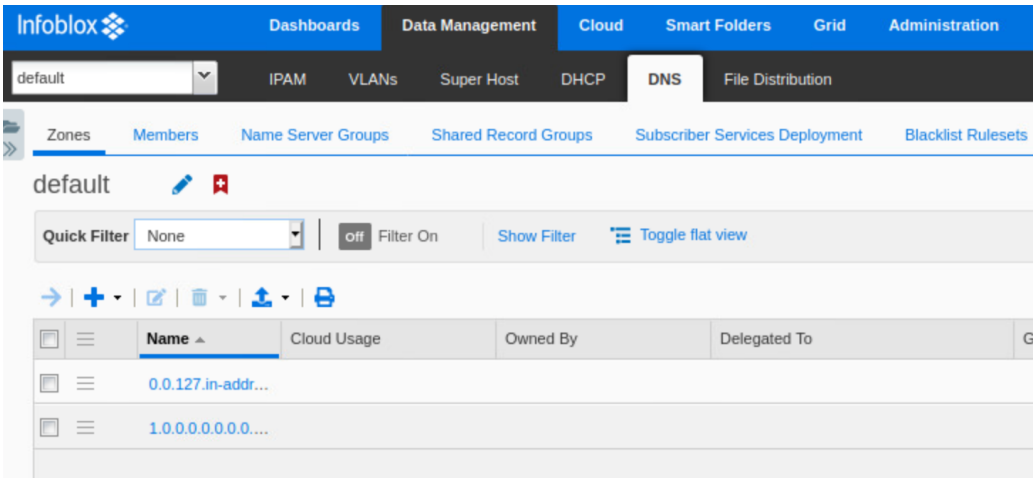
Create DNS Zone with Multiple Primaries

To illustrate this use case, use the following steps.

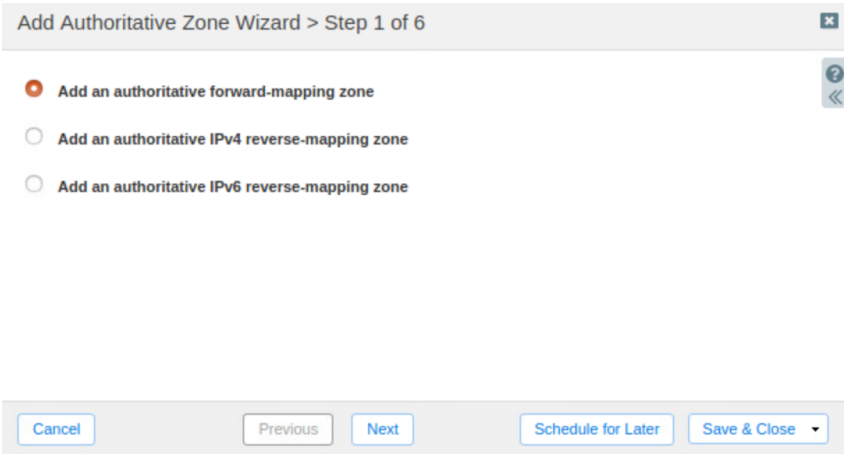
Warning: This section only demonstrates the ability to process zone changes on multiple CP members. If you have followed the other sections of this guide, the new DNS zone will not be resolvable from the CP members due to the ordering of DNS views they serve. To make this zone resolvable, you can change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

1. Log in to the Grid Manager. Navigate to the **Data Management** → **DNS** → **Zones** tab.

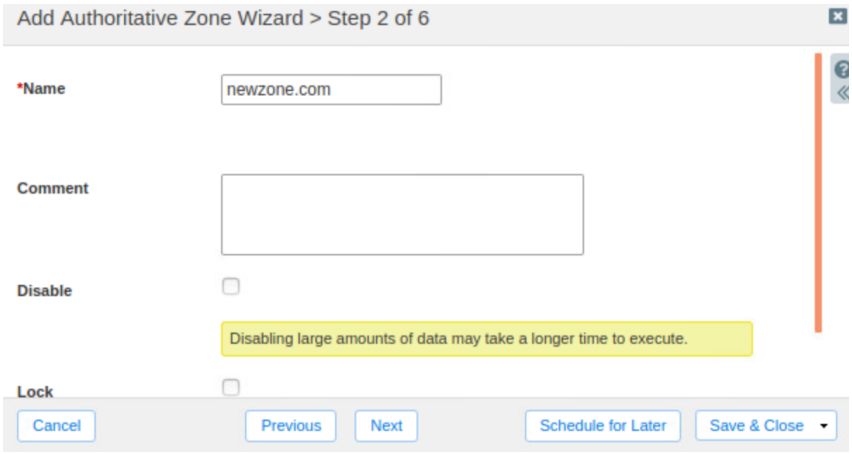
2. Use the network view dropdown to select the **default** network view.
3. Click the (add button) to add a new zone.



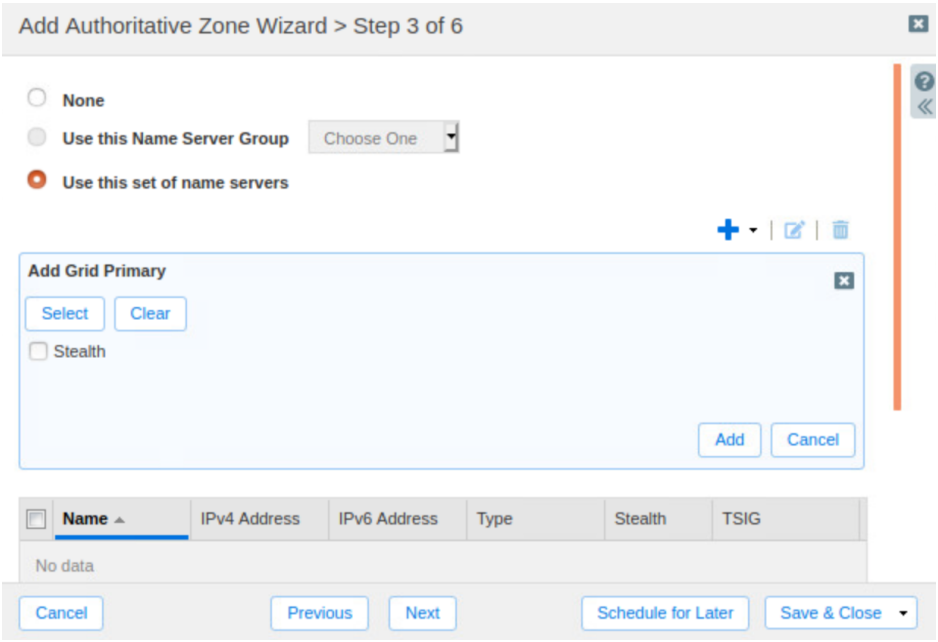
4. On step 1 of the Add Authoritative Zone Wizard, select **Add an authoritative forward-mapping zone**.
5. Click **Next**.



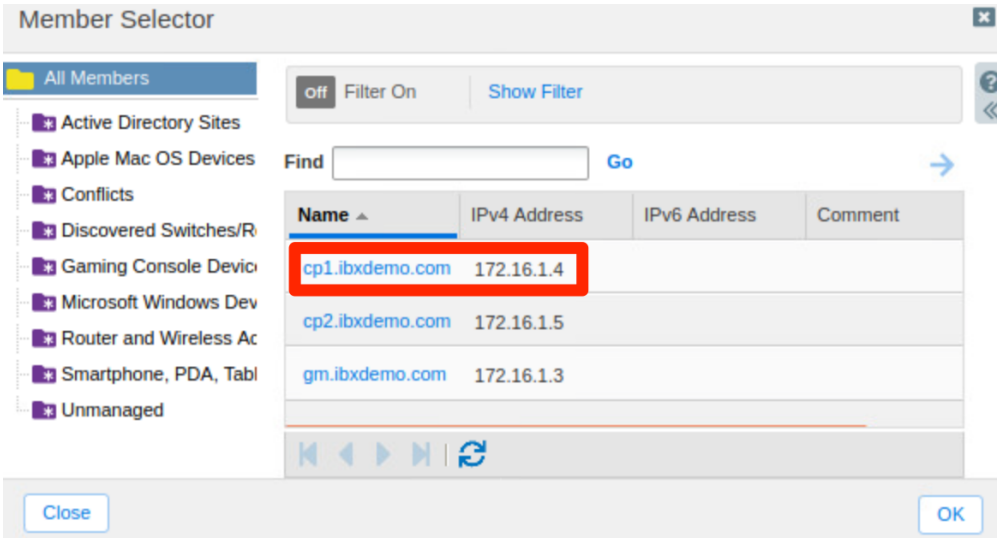
6. On step 2, enter a **name** for the zone.
7. Click **Next**.



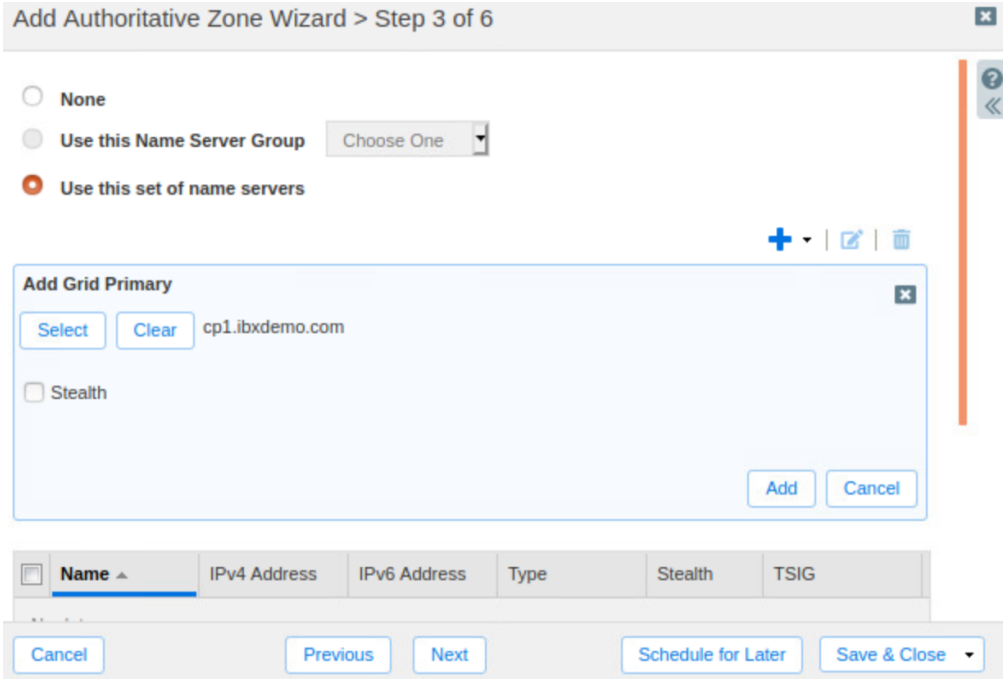
8. On step 3, select **Use this set of name servers**.
9. Click the + (add button) to add a name server.
10. Click **Select** to choose a Grid Primary.



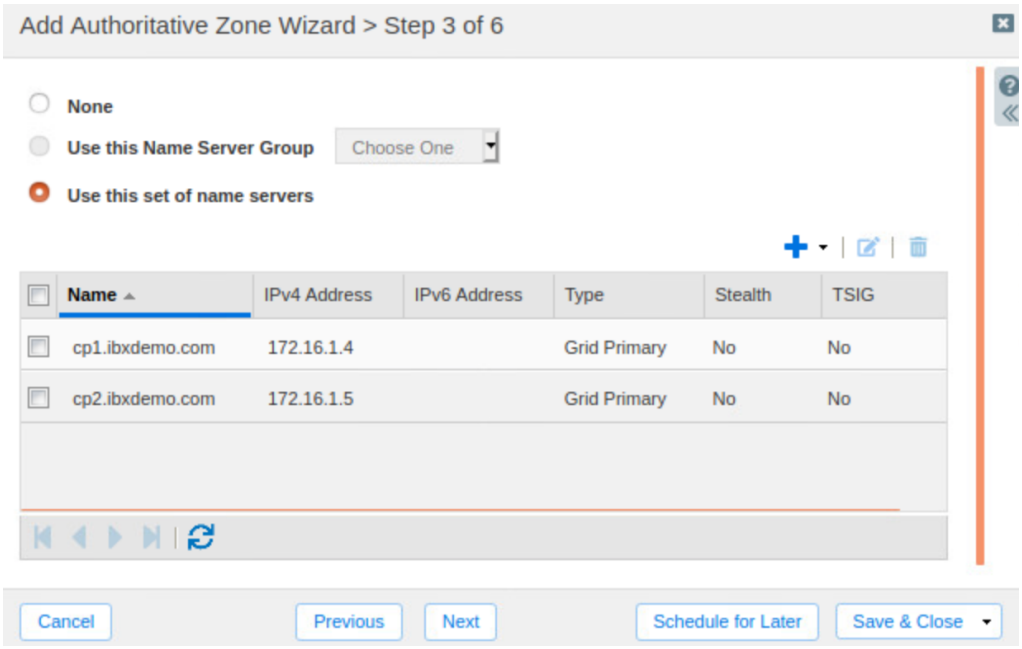
11. In the Member Selector dialog, click on **CP1**.



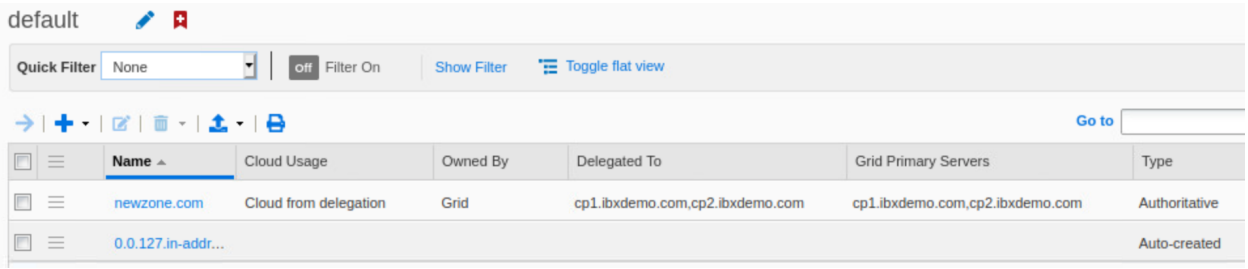
12. Click **Add**.



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



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.

Operation	REST Method	API Call	Sample Body
	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","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" }}}'
	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" }}}'		
	{"_ref": "record:a/ZG5zLmJpbmRfYSQuX2RlZmF1bHQuY29tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xMQ:server1.newzone.com/default", "ipv4addr": "2.2.2.1", "name": "server1.newzone.com", "view": "default" }		
On Cloud Platform Member 2, create an A record in zone with multiple primaries	POST	https://172.16.1.5/wapi/v2.11/record:a	'{"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" }}}'
	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" }}}'		
	{"_ref": "record:a/ZG5zLmJpbmRfYSQuX2RlZmF1bHQuY30tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xMQ:server2.newzone.com/default", "ipv4addr": "2.2.2.2", "name": "server2.newzone.com", "view": "default" }		

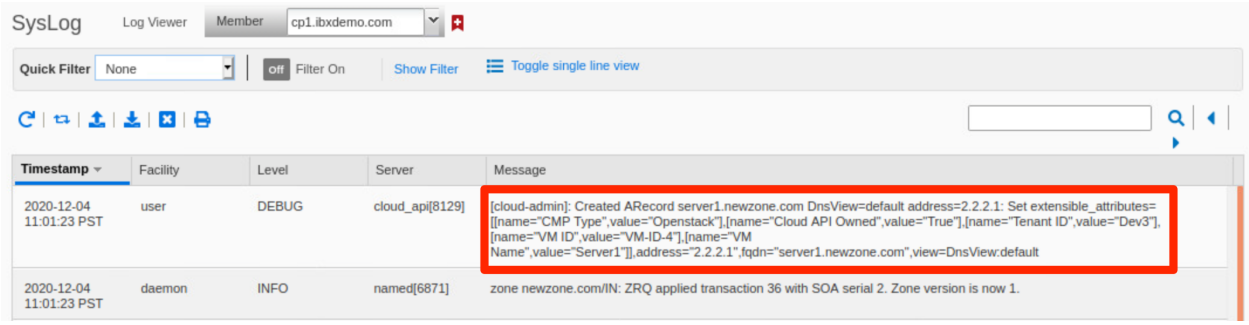
1. Open a terminal window on your client device.
2. Copy the first example cURL command from above and paste it in the terminal. Ensure you use the IP address of your **CP1** appliance, the correct DNS zone, and the correct DNS view name.

```
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%2B=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" }}}'
```

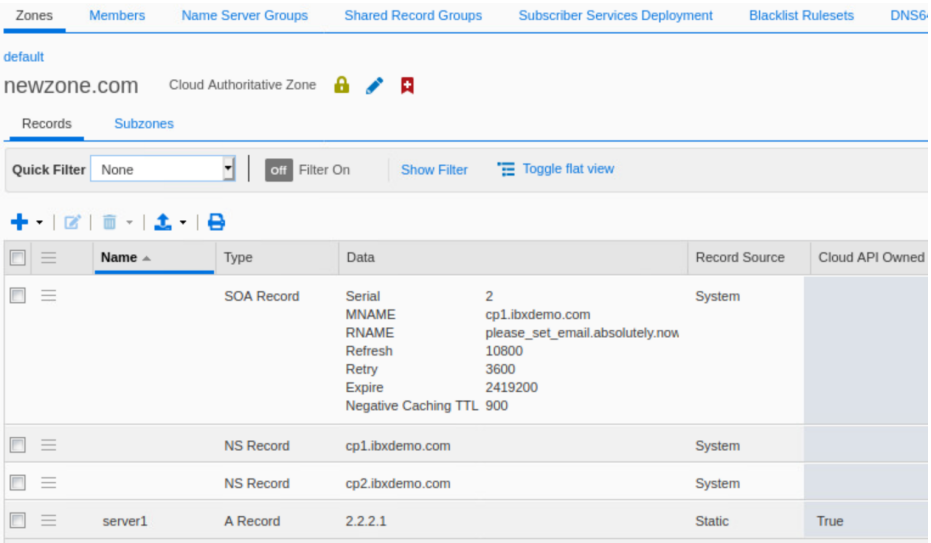
3. Press **Enter**. The screenshot below shows the output from a successful API call.

```
{
    "result": {
        "_ref": "record:a/ZG5zLmJpbmRfYSQuX2RlZmF1bHQuY29tLm5ld3pvbmUsc2VydmVyMSwyLjIuMi4x:server1.newzone.com/default",
        "ipv4addr": "2.2.2.1",
        "name": "server1.newzone.com",
        "view": "default"
    }
}infoblox@ubuntu-01:~$
```


4. In the Grid Manager, navigate to the **Administration** → **Logs** → **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).



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



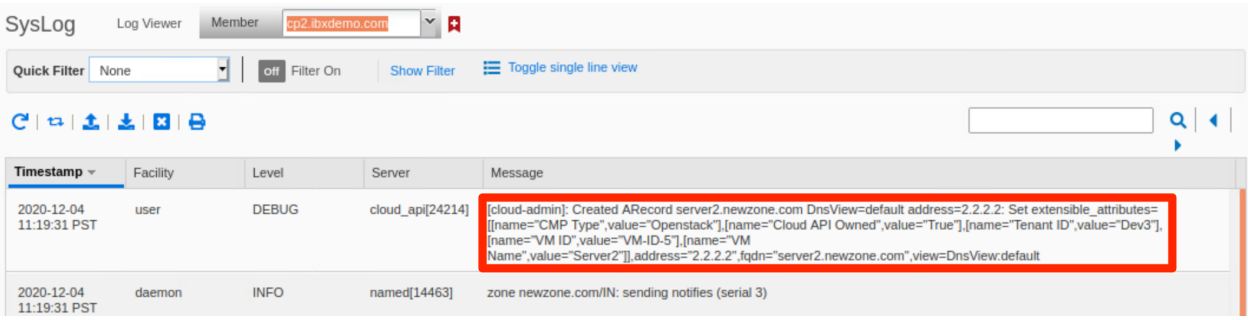
9. To create a second record, using the cloud API on **CP2**, open a terminal on your client device.
10. Copy the second example cURL command from above and paste it in the terminal. Ensure you use the IP address of your **CP2** appliance, the correct DNS zone, and the correct DNS view name.


```
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":"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" }}}'
```

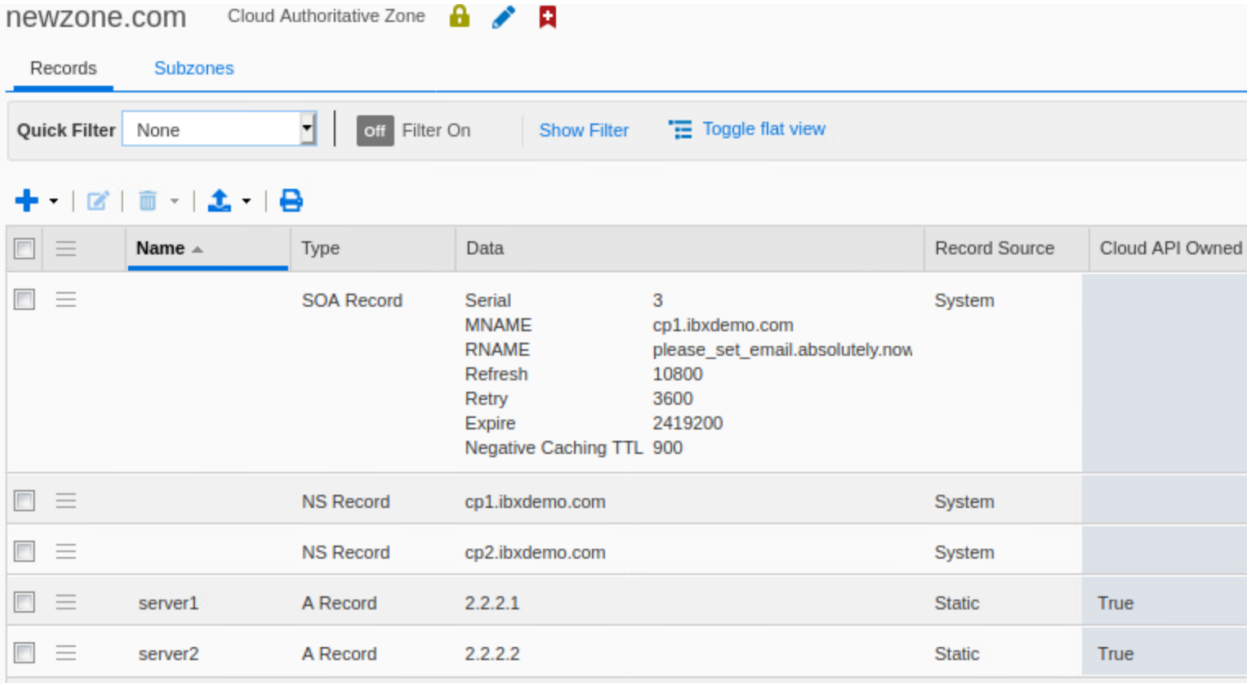

11. Press **Enter**. The screenshot below shows the output from a successful API call.

```
{
    "result": {
        "_ref": "record:a/ZG5zLmJpbmRfYSQuX2RlZmF1bHQuY29tLm5ld3pvbmUsc2VydmVyMiwyLjIuMi4y:server2.newzone.com/default",
        "ipv4addr": "2.2.2.2",
        "name": "server2.newzone.com",
        "view": "default"
    }
}infoblox@ubuntu-01:~$
```


12. In the Grid Manager, navigate to the **Administration** → **Logs** → **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).



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



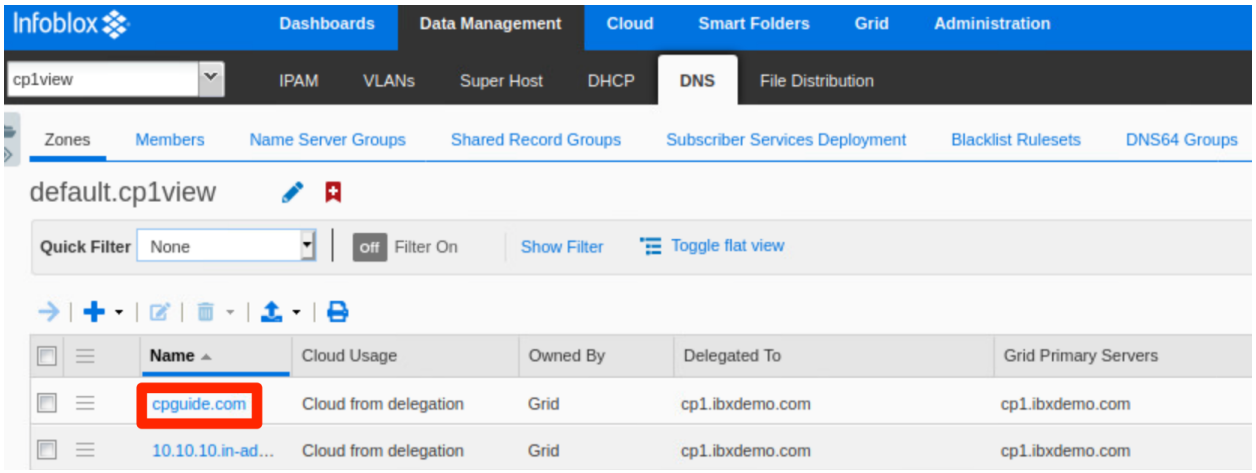
UI Support for Delegated Objects

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.*

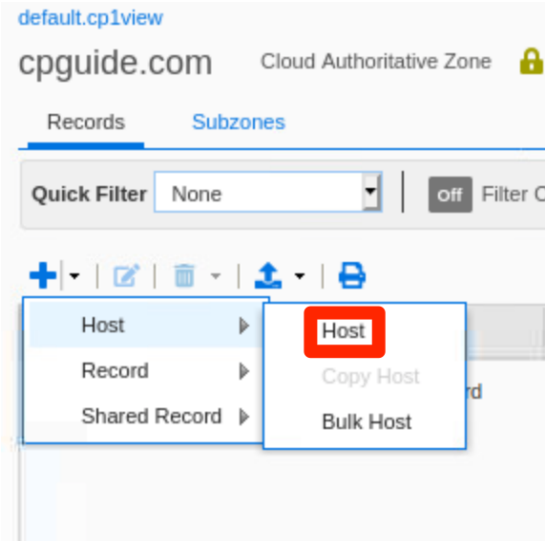
Create Host Record

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

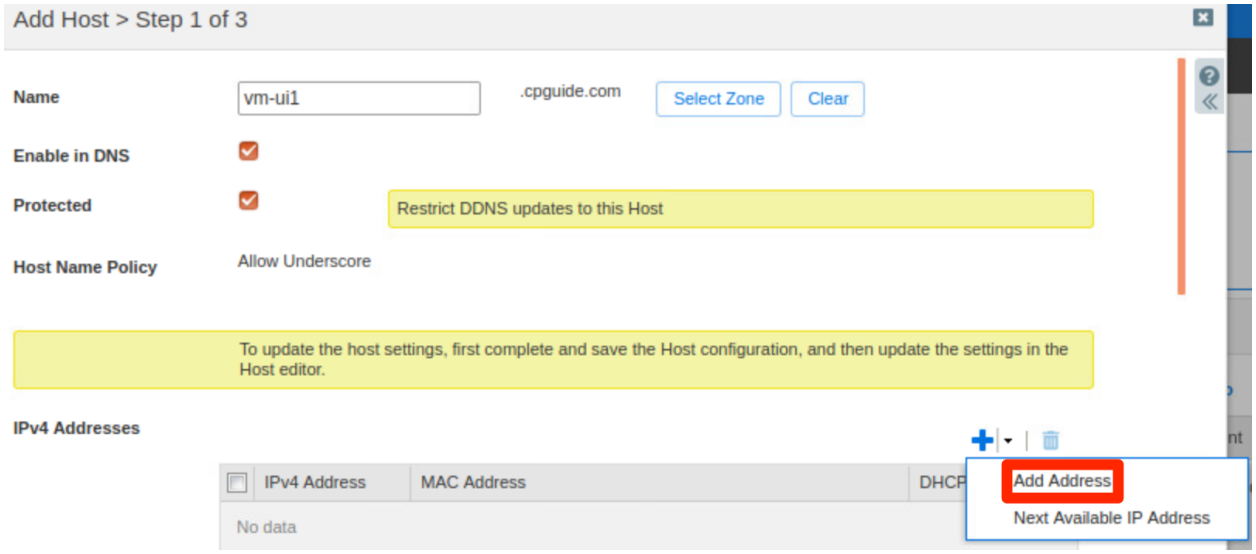
1. In the Grid Manager, navigate to the **Data Management** → **DNS** → **Zones** tab.
2. Use the network view dropdown to select the **cp1view** network view.
3. Click on the authoritative zone to view.



4. Click the ✚ ▾ (add dropdown).
5. Hover on **Host**.
6. Click on **Host** in the expanded menu.

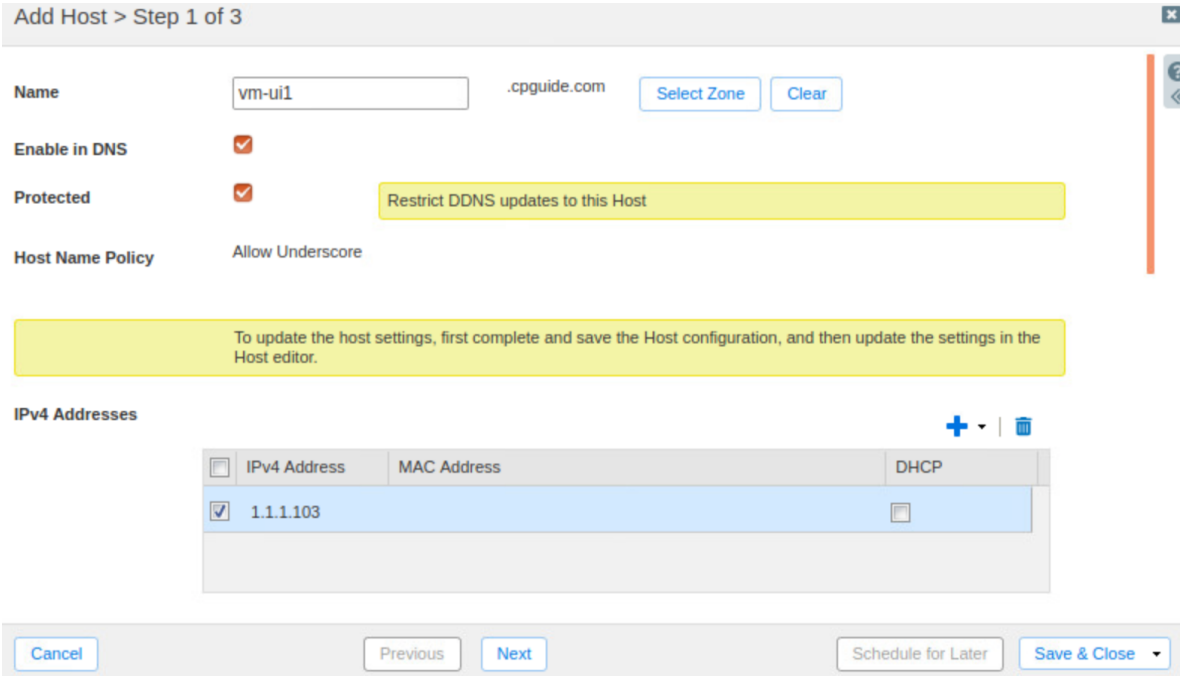


7. On step 1 of the Add Host wizard, enter a **name** for the host.
8. Next to IPv4 Addresses, Click the ✚ ▾ (add dropdown).
9. Click on **Add Address**.

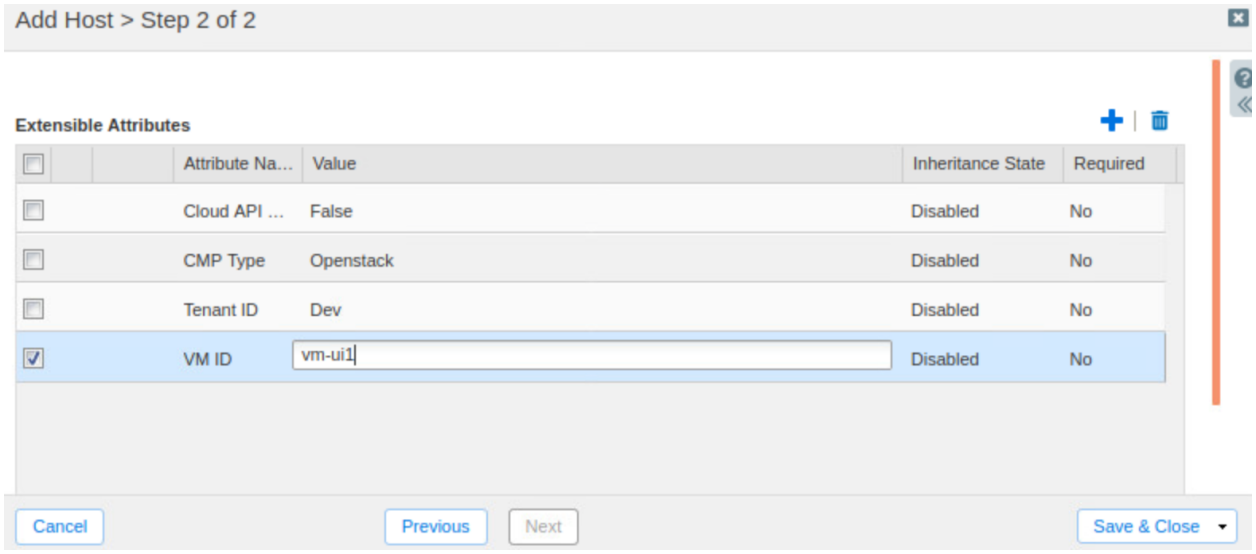


Note: You cannot use the Next Available IP Address function. It will return the following error.

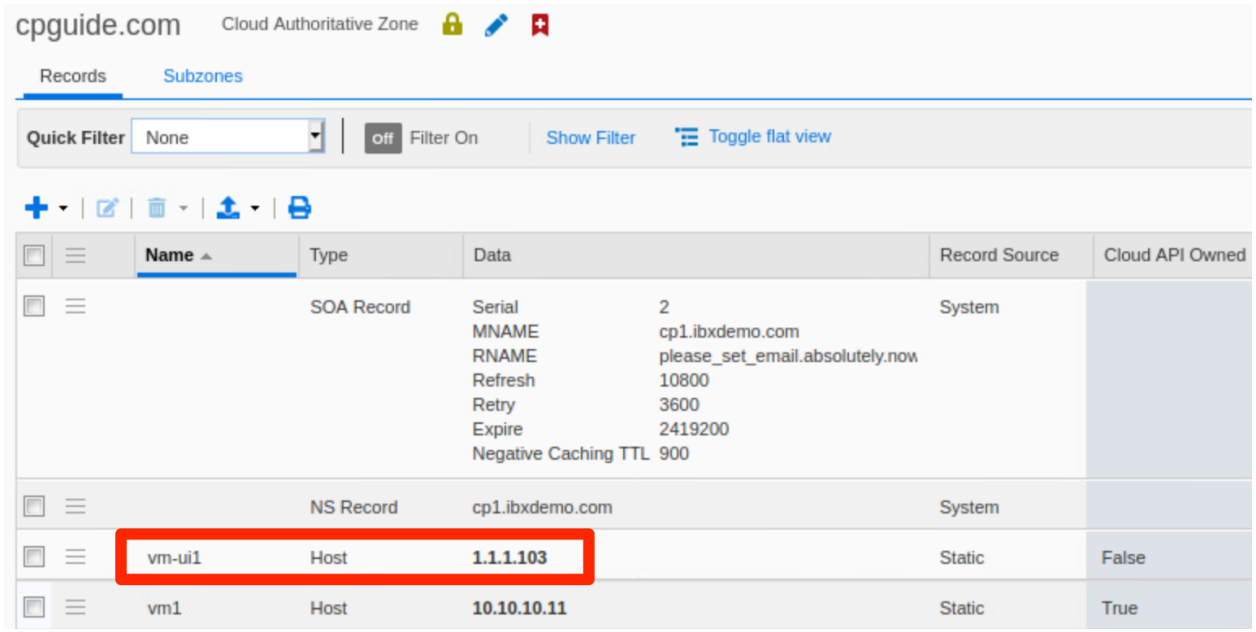
10. Enter an IP address for the host from one of the networks belonging to **CP1**.
11. Click **Next**.



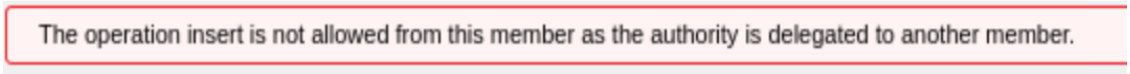
12. On step 2, you see that a list of mandatory extensible attributes are pre-populated. Enter values for **CMP Type**, **Tenant ID**, and **VM ID**.
13. Click **Save & Close**.



14. The new Host record has been added.

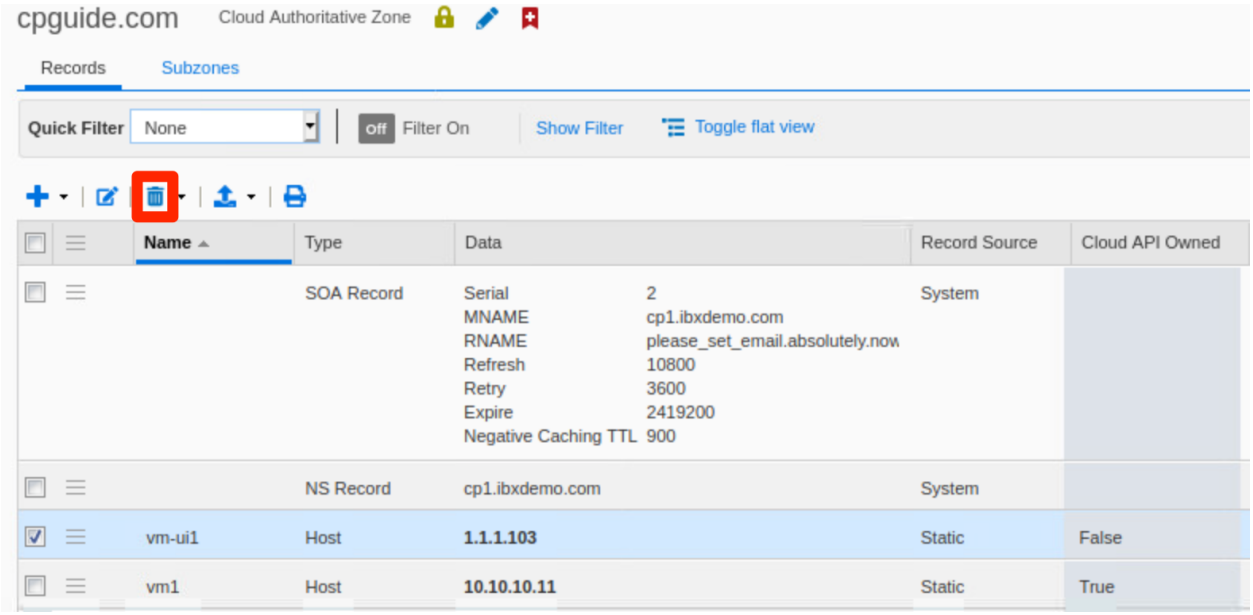


Note: If you try to add a different record type that is not supported, you will encounter the following error.

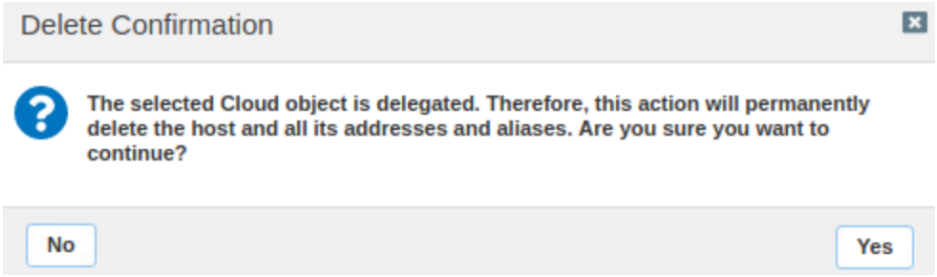


15. You can also delete records, one at a time. Select the checkbox next to a Host record.

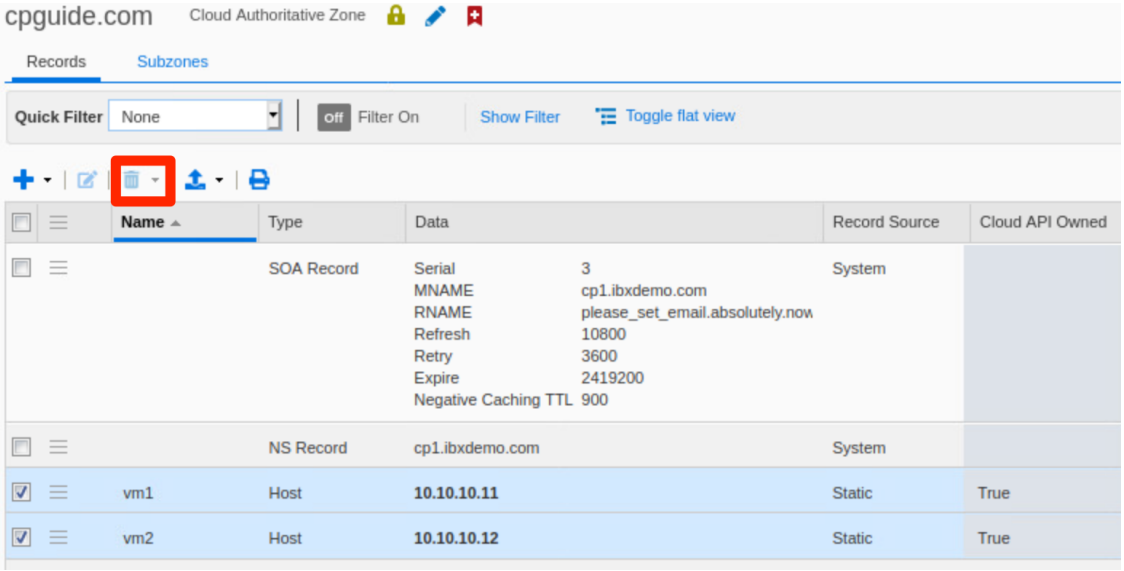
16. Click the (delete button).



17. In the Delete Confirmation dialog, click **Yes**.



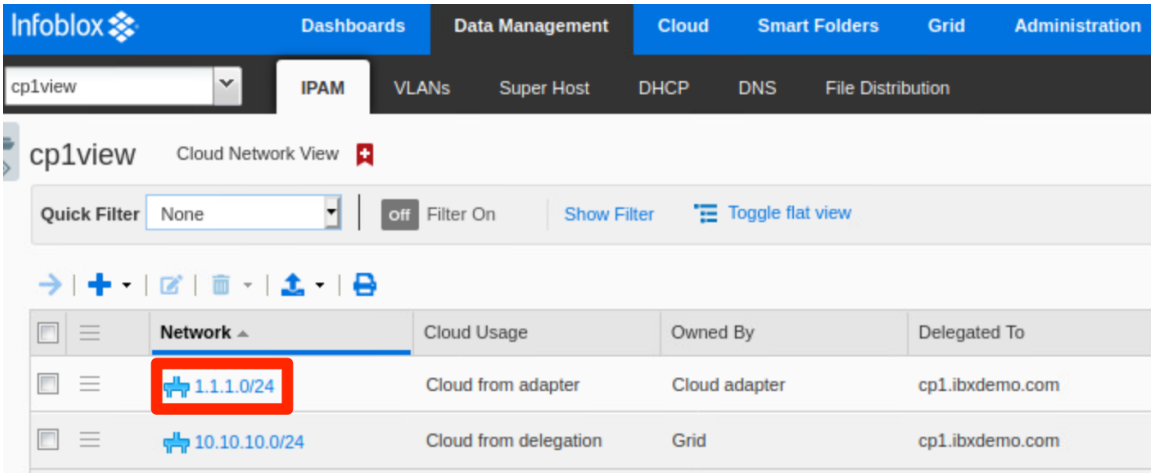
Note: You cannot delete multiple delegated records at once. If you select multiple records, the delete button is greyed out.



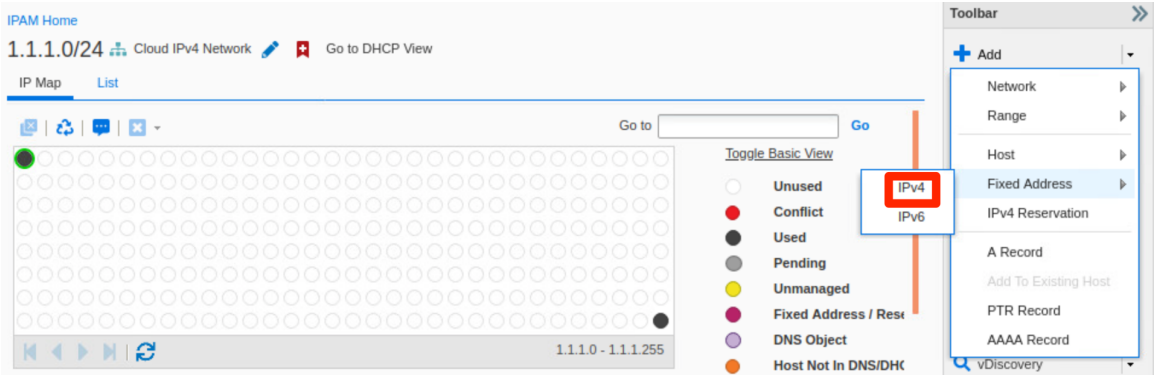
Create Fixed Address

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

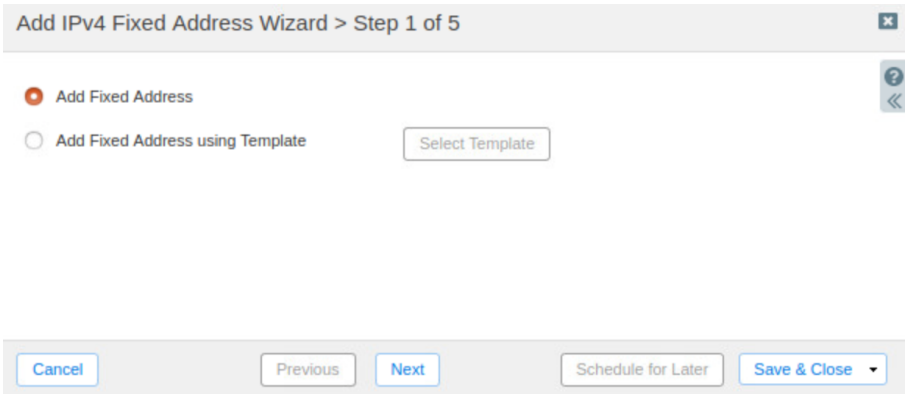
1. In the Grid Manager, navigate to the **Data Management** → **IPAM** tab.
2. If necessary, Use the network view dropdown to select the **cp1view** network view.
3. Click on a network to view.



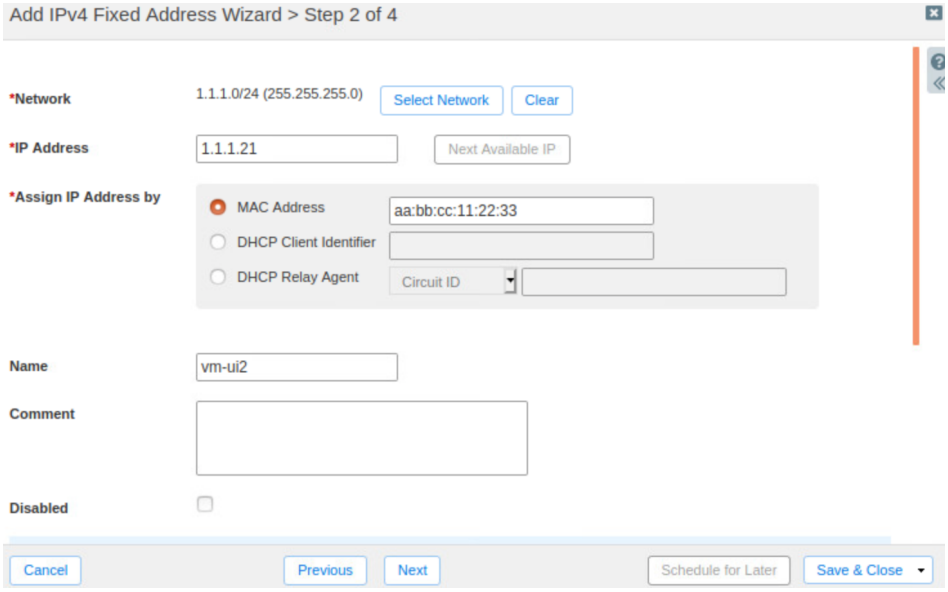
4. Open the Add dropdown in the Toolbar.
5. Hover on **Fixed Address**.
6. Click **IPv4** in the expanded menu.



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

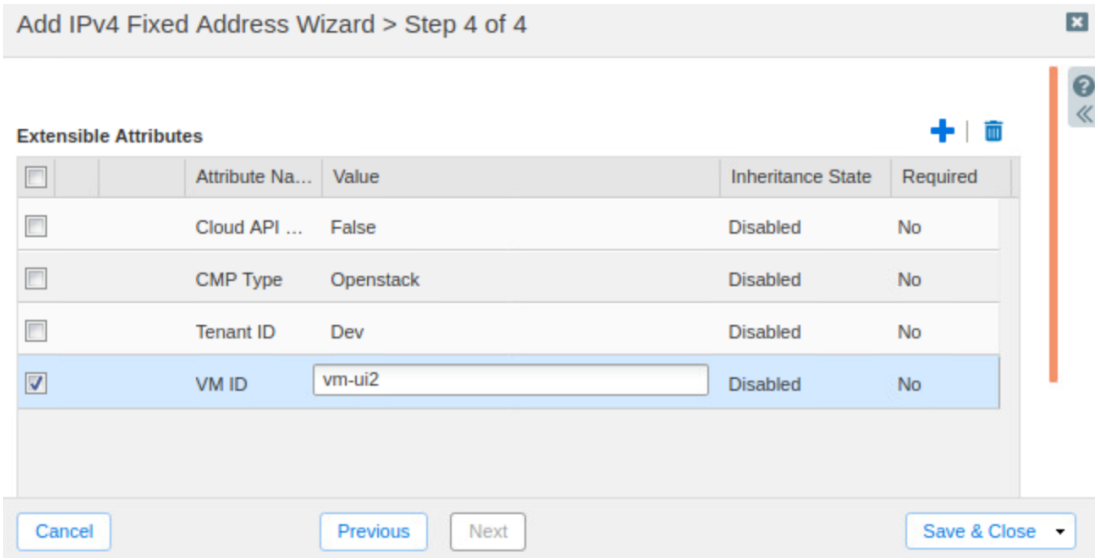


9. On step 2, enter an **IP Address**, **MAC Address**, and optionally a **Name**.
10. Click **Next**.

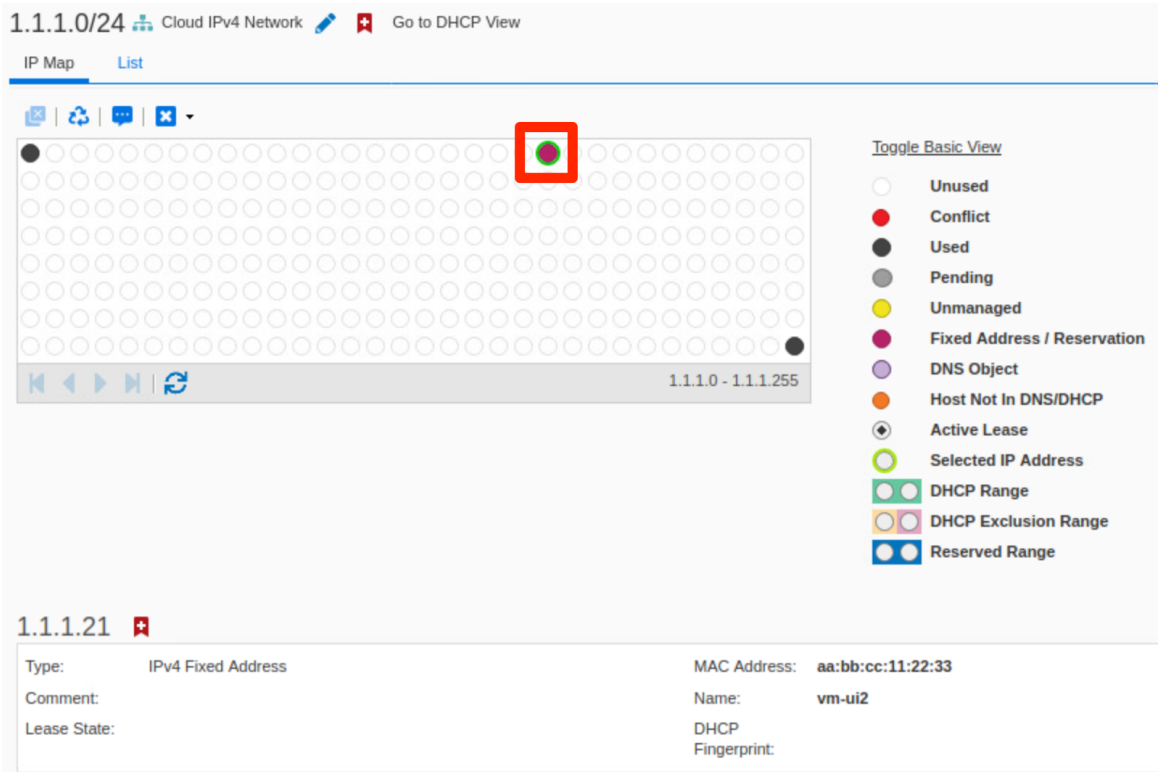


Note: The Next Available IP function is not available when adding a fixed address to a delegated network in the UI and is greyed out as shown above.

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**.



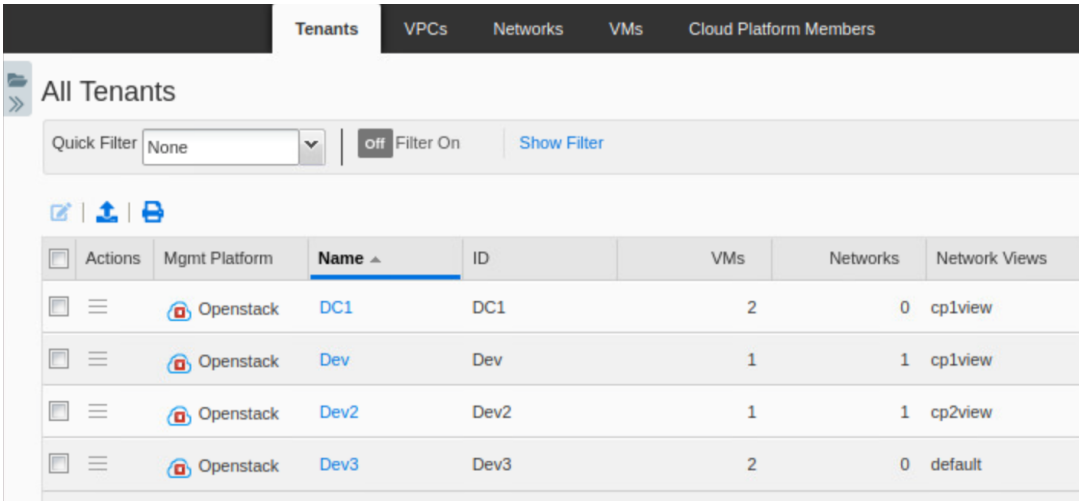
14. The fixed address has been added. Click on the address in the IP Map to view details.



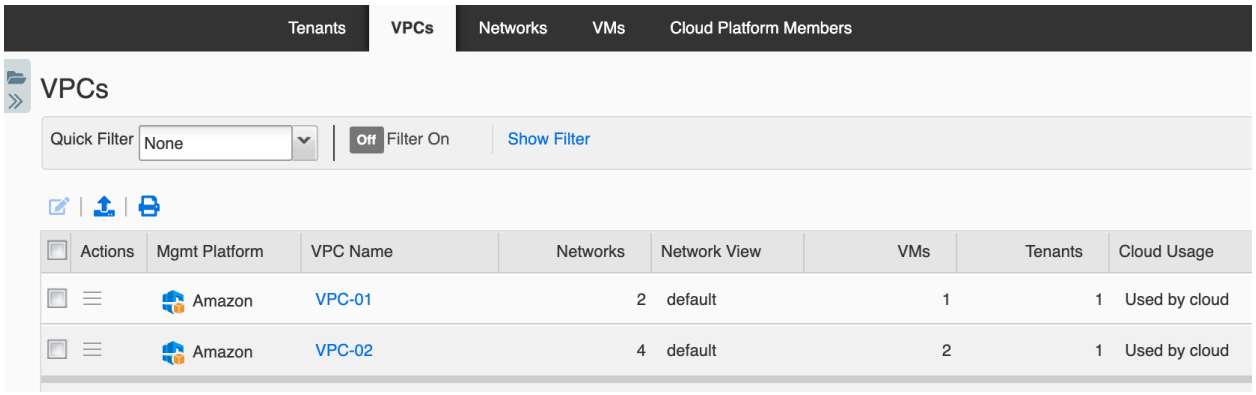
Enhanced User Interface for Cloud Visibility

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.

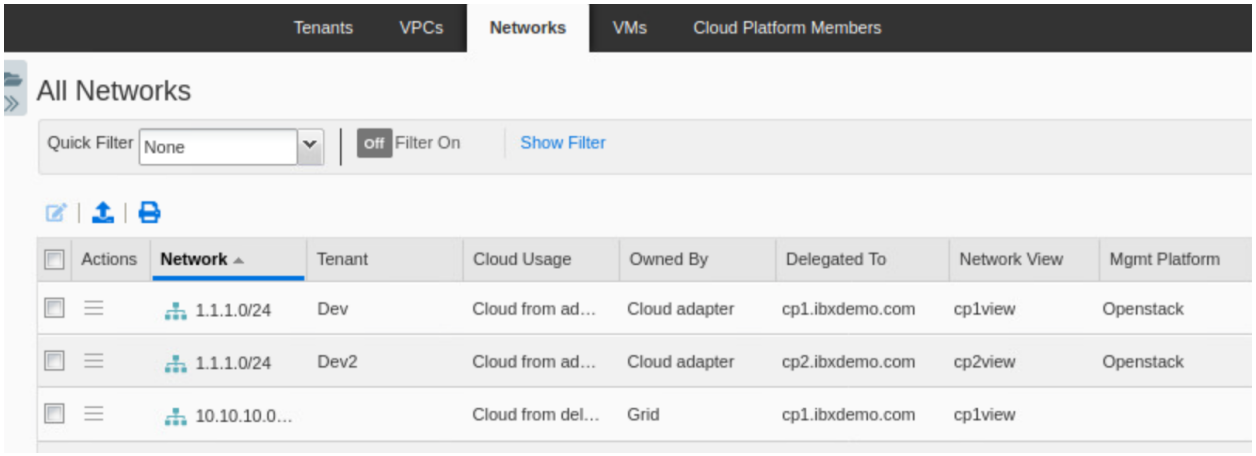
- **Tenants:** This tab displays all cloud tenants contained in your Grid. You can drill down to view all networks and VMs associated with each tenant.



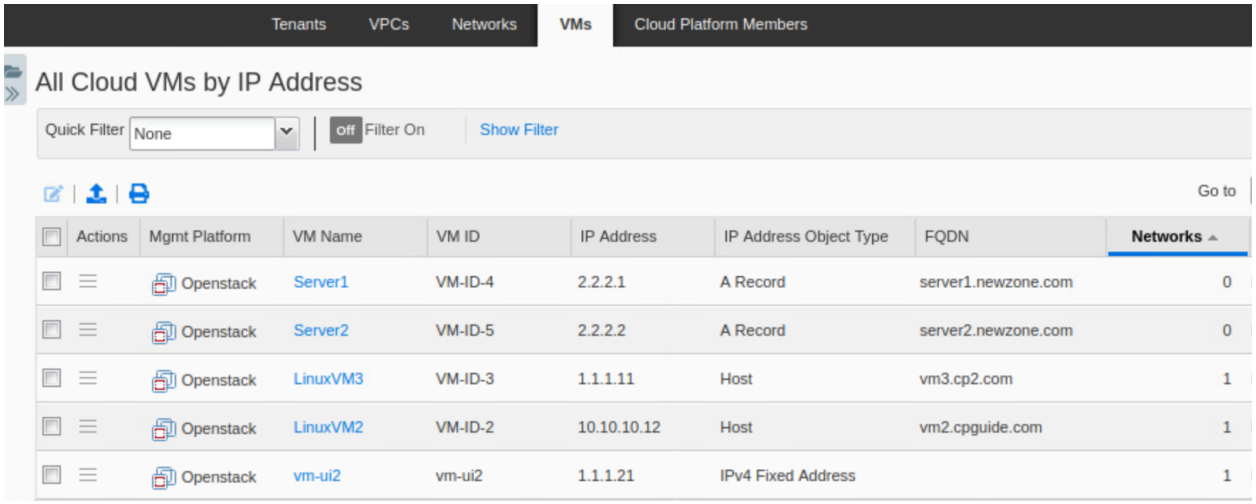
- **VPCs**: This tab displays Virtual Private Clouds, used to contain private networking space in many public and private clouds such as AWS, Azure, VMware and Openstack. *Note: Not all cloud platforms use the concept of VPCs in a manner that will populate data in the VPCs tab*.



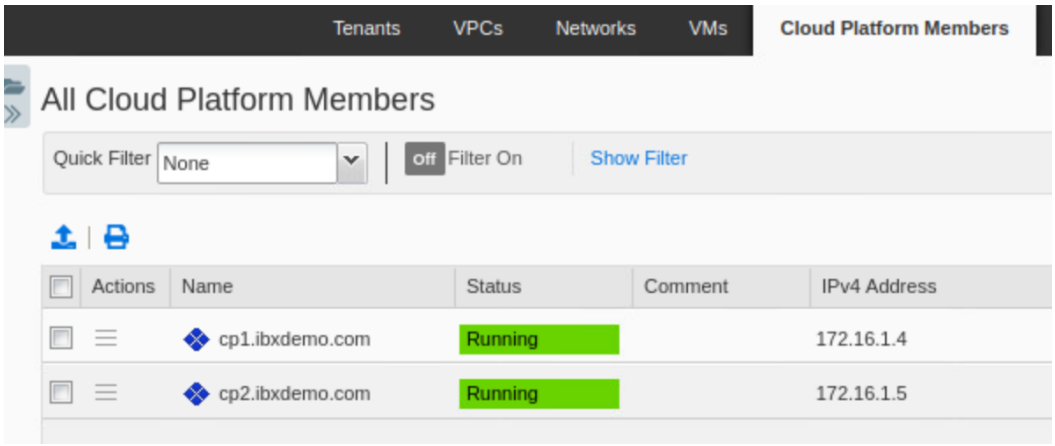
- **Networks**: This tab displays all cloud networks in your Grid. From here, you can easily jump to IPAM data or other views to display additional details for a network. Searches, Smart Folders, and reports can also leverage the metadata stored as EAs for each network.



- **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.



- **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.



Cloud Dashboard and Report

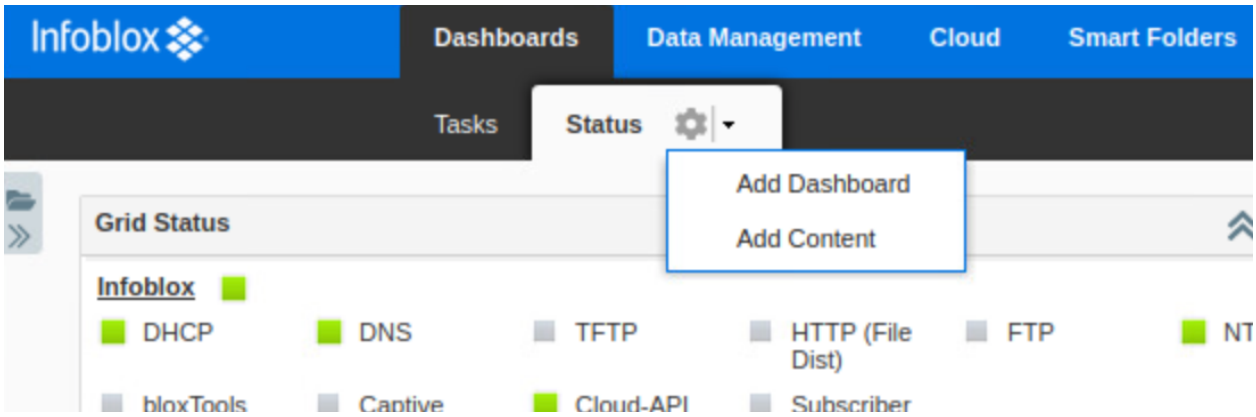
To give you further insight into your hybrid infrastructure, the Infoblox Cloud Network Automation license enables a Cloud Statistics widget for your Grid Manager dashboards. This includes statistics for IP address utilization by tenant and IP type (fixed/floating). Cloud networks are also added to the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

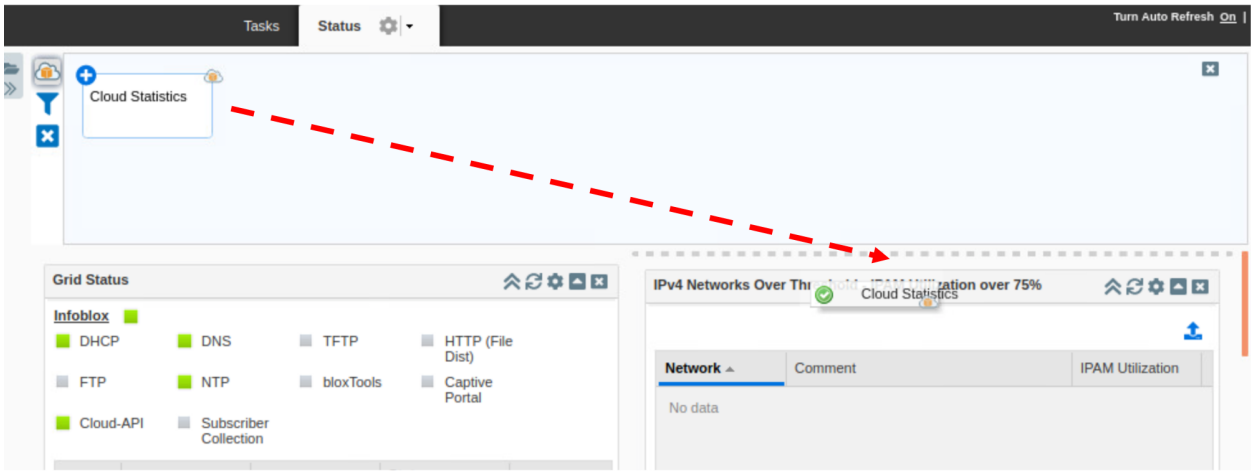
For additional information on dashboards and reports, refer to Infoblox NIOS documentation at https://docs.infoblox.com.

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

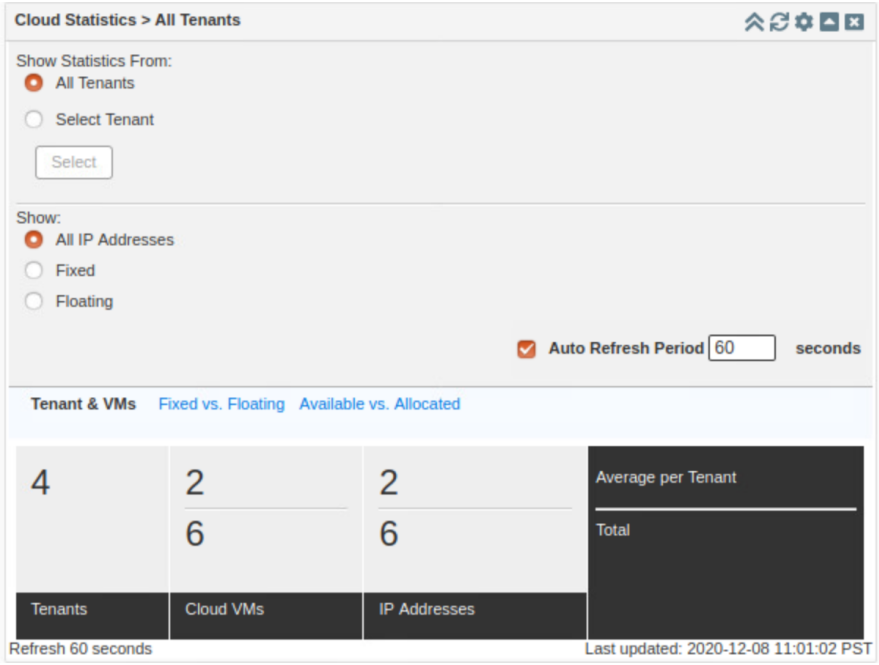
1. In the Grid Manager, navigate to the **Dashboards** → **Status** tab.
2. Expand the Status dropdown and select **Add Content**.



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.

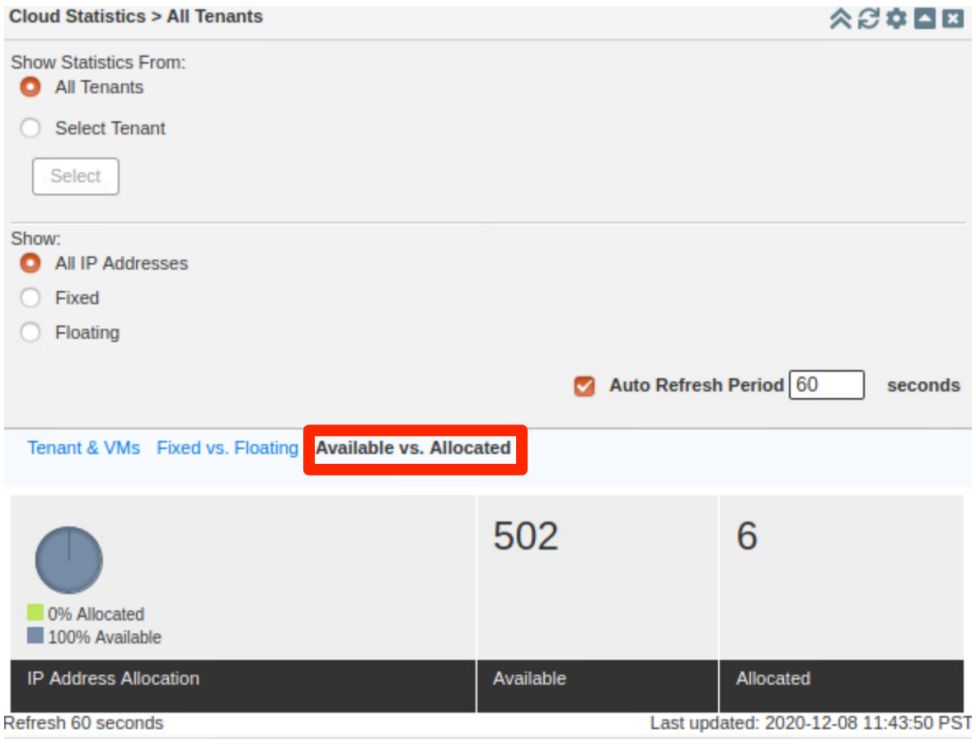


5. The widget displays the Number of Tenants, VMs, and IP addresses in use. Optionally, click the checkbox for **Auto Refresh Period** to set refresh time. You can also use **Select Tenant** to view statistics for individual tenants.

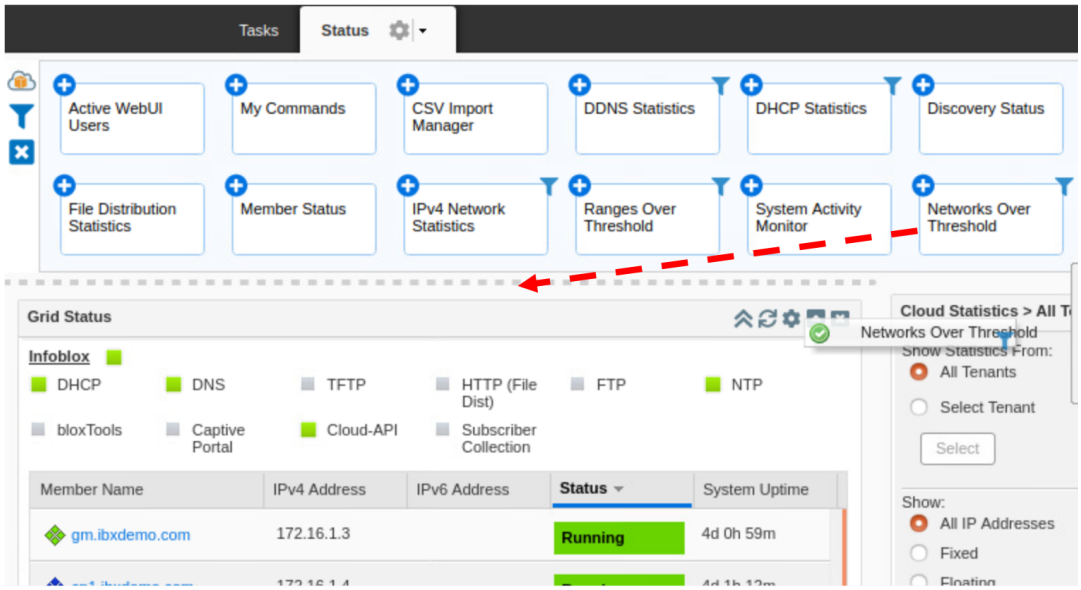


Note: Fixed and Floating address types refer to OpenStack IP address types and are not relevant to all deployments.

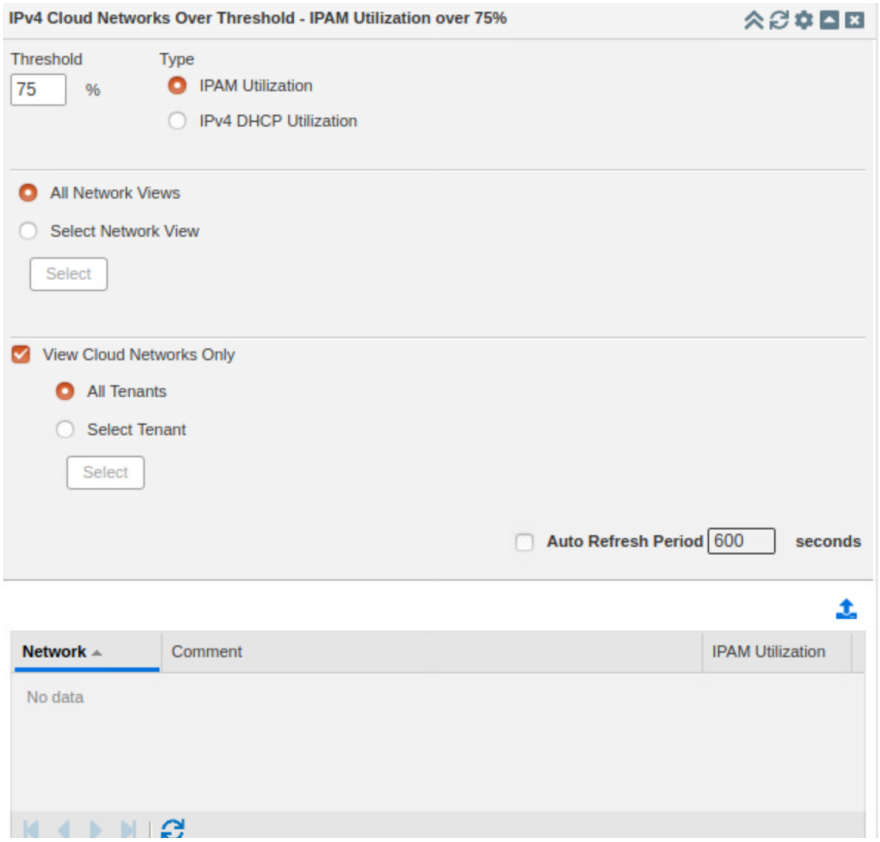
6. Click on **Available vs. Allocated**. Here you can see the total available cloud IP addresses compared to those which are allocated.



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



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.

Infoblox

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.

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