

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 environment 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.

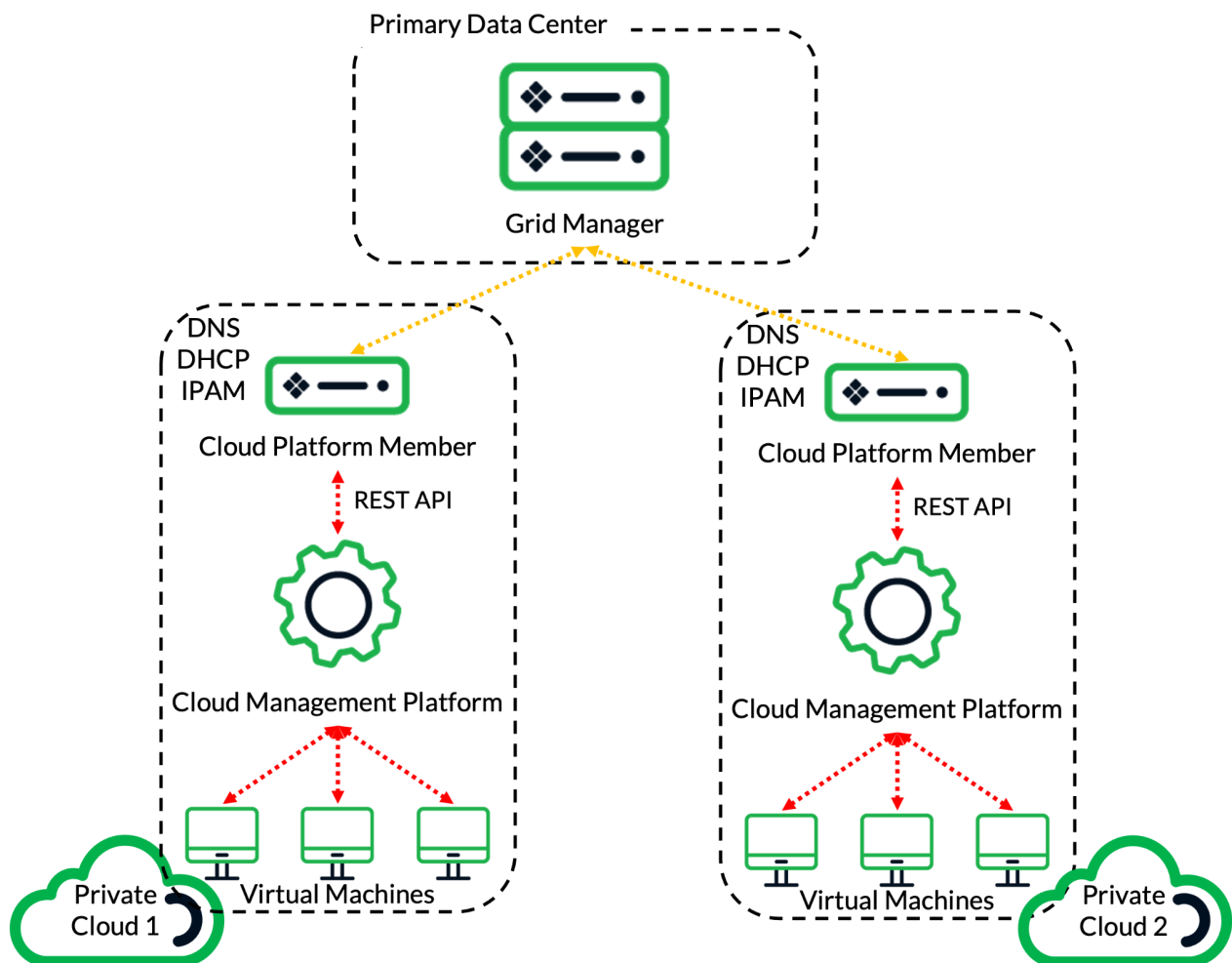
Prerequisites

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

- Grid Manager with Cloud Network Automation (CNA) license applied. You can apply a temporary CNA license via the CLI, using the command **set temp_license**.
- At least one Grid member with the Cloud Platform license, with Cloud API service running. Some examples shown in this guide require two Cloud Platform appliances.

- For NIOS 9.0.0 and NIOS 8.x versions, the Cloud Platform license runs on Cloud Platform models: CP-V805, CP-V1405, and CP-V2205.
- Beginning with NIOS 9.0.1, there are no longer any CP models. The Cloud Platform license can be applied to any of the following models: IB-V926, IB-V1516, IB-V1526, IB-V2326, and IB-V4126.
- 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

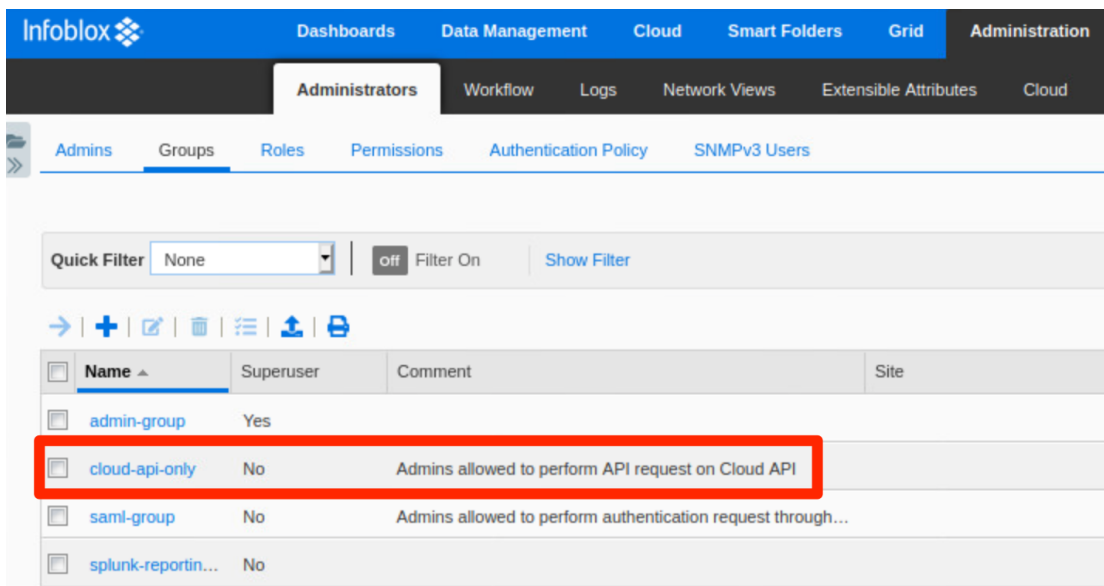
Manager, deployed in the corporate data center. Additionally, the Grid Manager will utilize the CNA license for visibility and automation throughout the hybrid environment.

Deployment Instructions

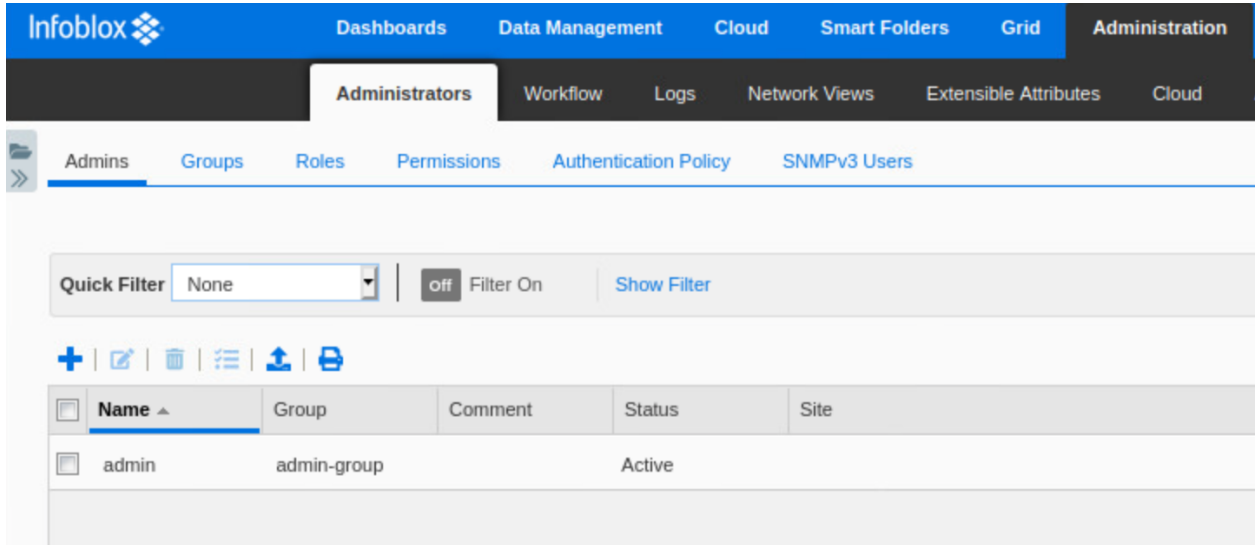
This guide focuses on deployment steps specific to utilizing features of the Cloud Platform Appliances and the Cloud Network Automation license in an environment simulating the architecture detailed in the previous section. For details on deploying Infoblox appliances and an Infoblox Grid, which are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

Cloud API User

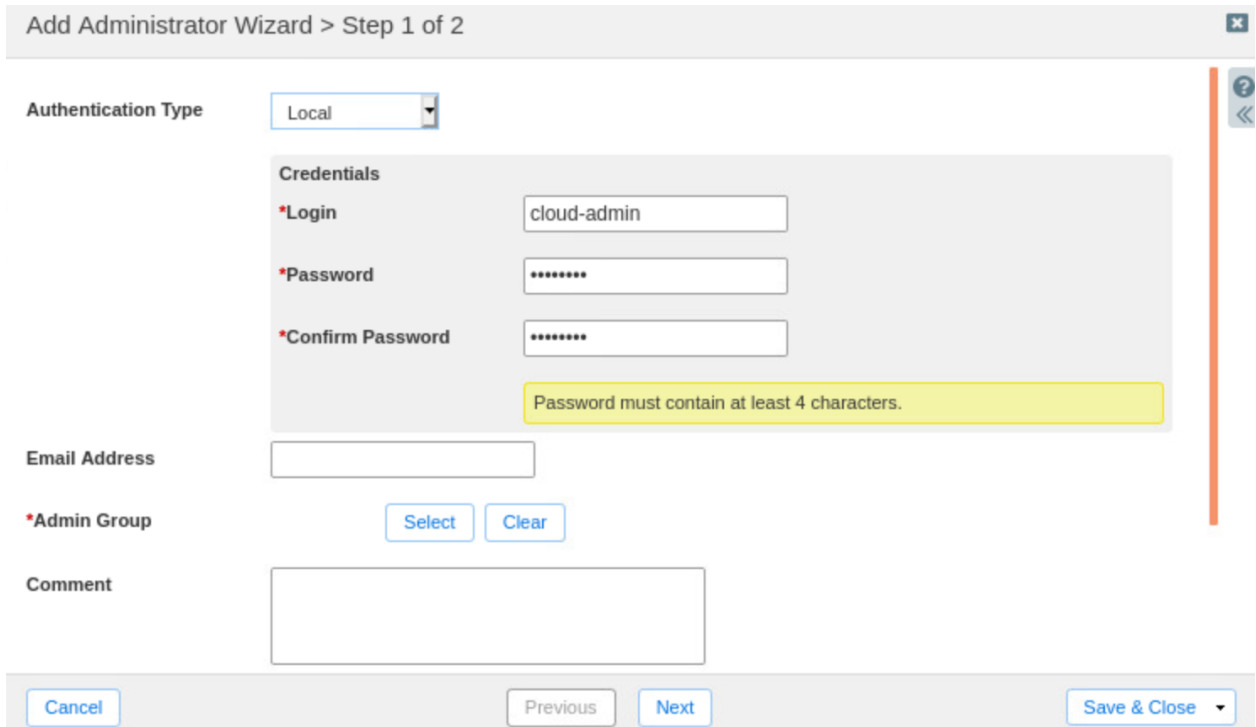
To send cloud API requests, you must define admin users and their permissions in the admin group. By default, the admin-group does not have authorization to make cloud API requests. When you install valid licenses and configure your Grid for Cloud Network Automation, NIOS enables the **cloud-api-only**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



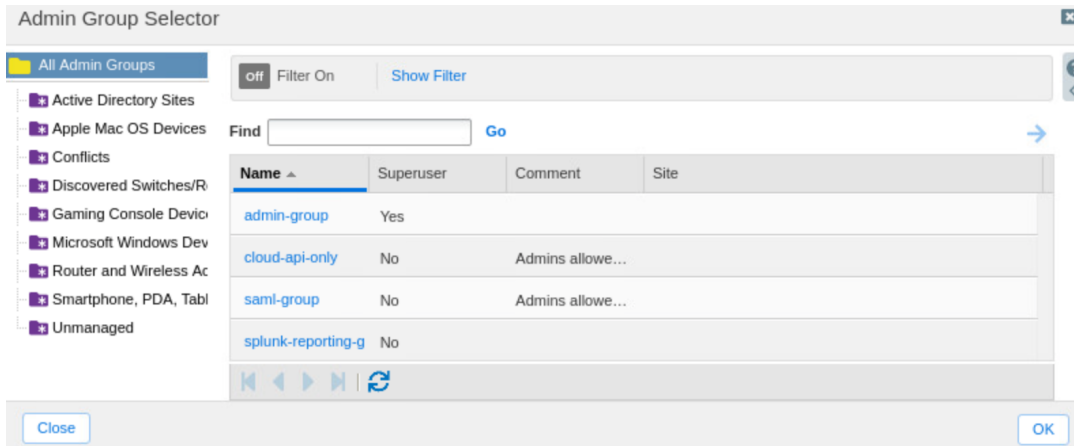
1. To create a new admin user, navigate to the **Administration** → **Administrators** → **Admins** tab.
2. Click the **+** (add button) to add a new admin user.



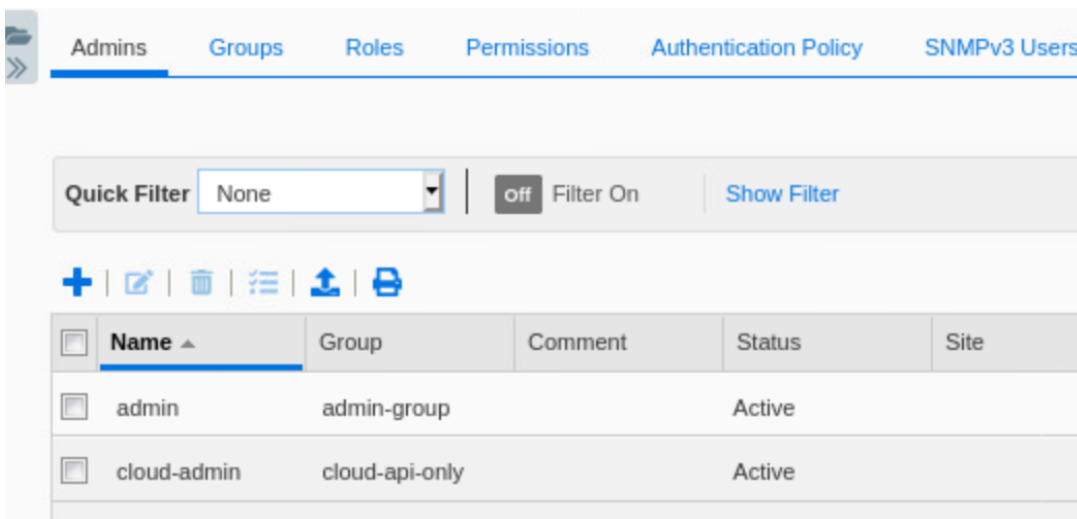
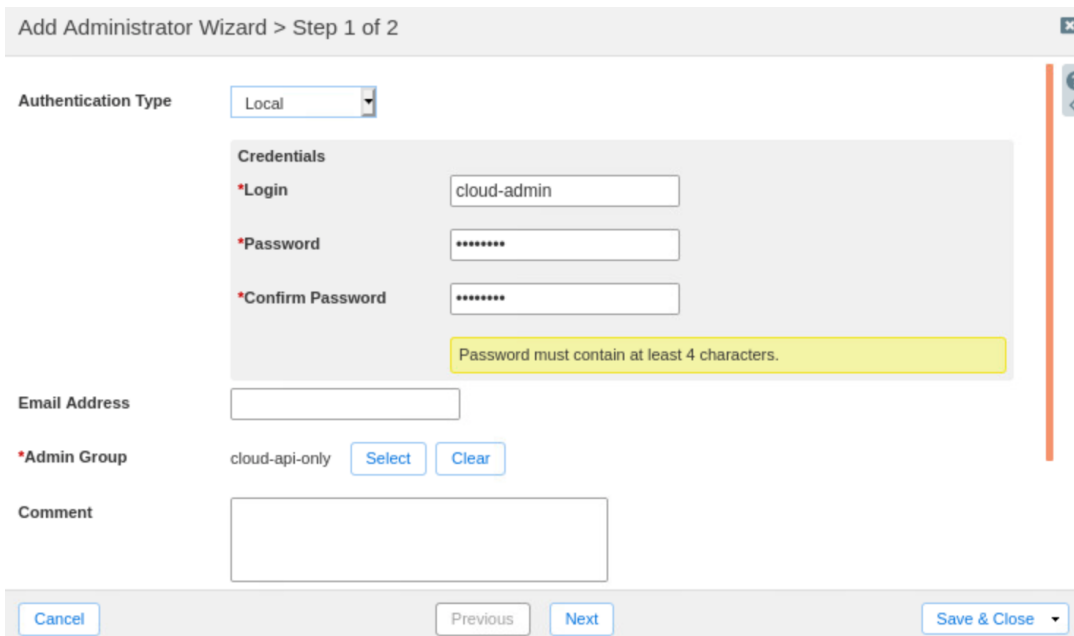
3. On Step 1 of the Add Administrator Wizard, select **Local** for **Authentication Type**.
4. Enter a Login name. For this guide, we will use **cloud-admin**.
5. Enter and confirm a Password. For this guide, we will use **infoblox**.



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



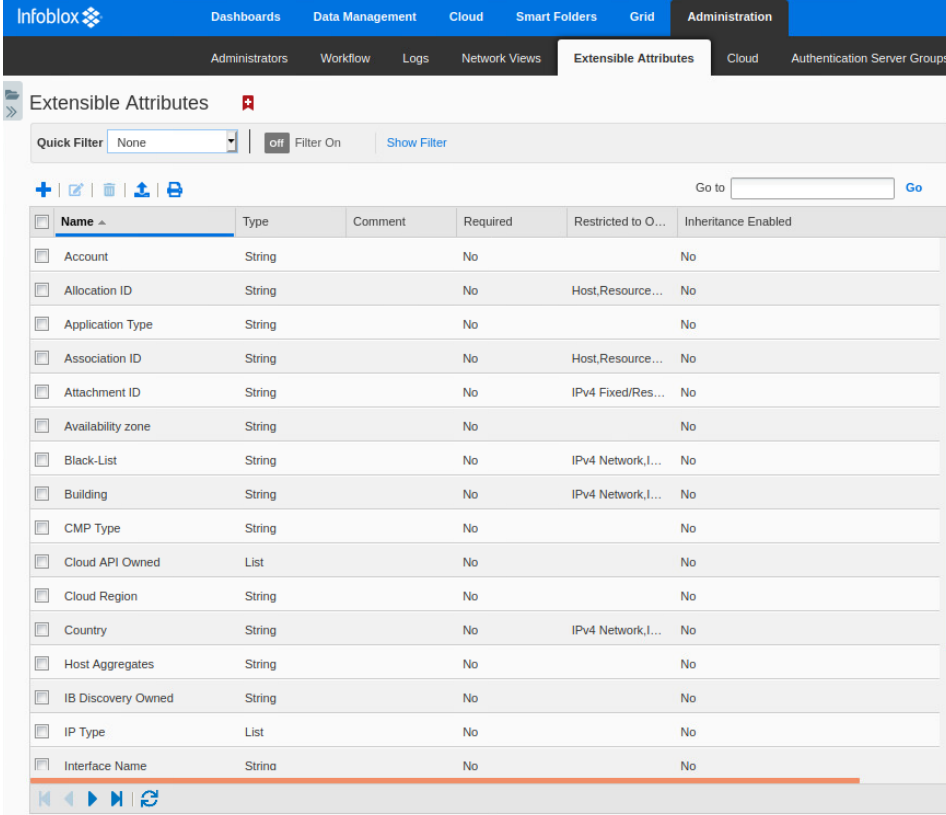
8. Back in the wizard, click **Save & Close** to create the user.



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.



The screenshot shows the Infoblox Administration console. The top navigation bar includes 'Administration' and 'Extensible Attributes'. Below the navigation bar, there is a search filter and a table of Extensible Attributes. The table has columns for Name, Type, Comment, Required, Restricted to O..., and Inheritance Enabled. The table lists 18 attributes, including Account, Allocation ID, Application Type, Association ID, Attachment ID, Availability zone, Black-List, Building, CMP Type, Cloud API Owned, Cloud Region, Country, Host Aggregates, IB Discovery Owned, IP Type, and Interface Name.

Name	Type	Comment	Required	Restricted to O...	Inheritance Enabled
Account	String		No		No
Allocation ID	String		No	Host,Resource...	No
Application Type	String		No		No
Association ID	String		No	Host,Resource...	No
Attachment ID	String		No	IPv4 Fixed/Res...	No
Availability zone	String		No		No
Black-List	String		No	IPv4 Network,I...	No
Building	String		No	IPv4 Network,I...	No
CMP Type	String		No		No
Cloud API Owned	List		No		No
Cloud Region	String		No		No
Country	String		No	IPv4 Network,I...	No
Host Aggregates	String		No		No
IB Discovery Owned	String		No		No
IP Type	List		No		No
Interface Name	String		No		No

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>.

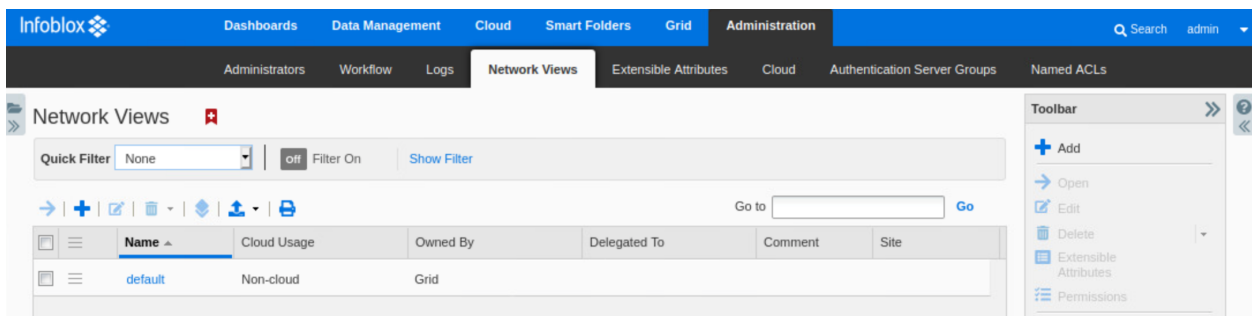
When a network view, network, or DNS zone is created, either the Grid Master or a Cloud Platform member can be authoritative for that object to avoid conflicts. The object can be created on the Grid Master and then delegated to a Cloud Platform member, or it can be created directly on a Cloud Platform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

Add Network View Wizard > Step 1 of 3

*Name

Comment

CLOUD

Delegate authority from the Grid Master

Delegated To

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

Warning

DNS view will be created automatically for this Network view. Do you want to continue?

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

The configuration changes require a service restart to take effect. Click Restart to restart relevant services now or click Ignore to restart the services later.

Infoblox [Dashboards](#) [Data Management](#) [Cloud](#) [Smart Folders](#) [Grid](#) [Administration](#) [admin](#)

[Administrators](#) [Workflow](#) [Logs](#) [Network Views](#) [Extensible Attributes](#) [Cloud](#) [Authentication Server Groups](#) [Named ACLs](#)

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

Restart Grid Services

Restart Grid Services If needed Force service restart

A forced restart may be delayed if there are pending restarts for the same service.

Restart Method Restart all Restart Groups Simultaneously for all members Sequentially for all members

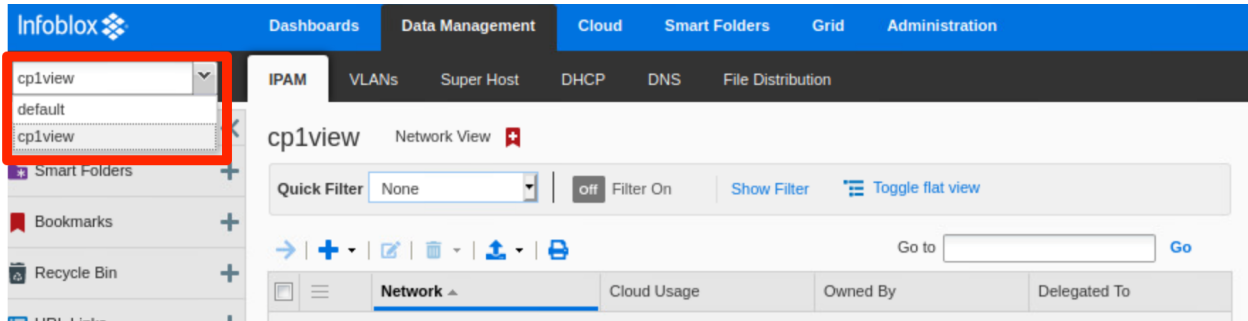
Affected Members and Services [View Pending Changes](#)

Member	IP	IP
To start polling, click the Poll Members icon above this table ...		

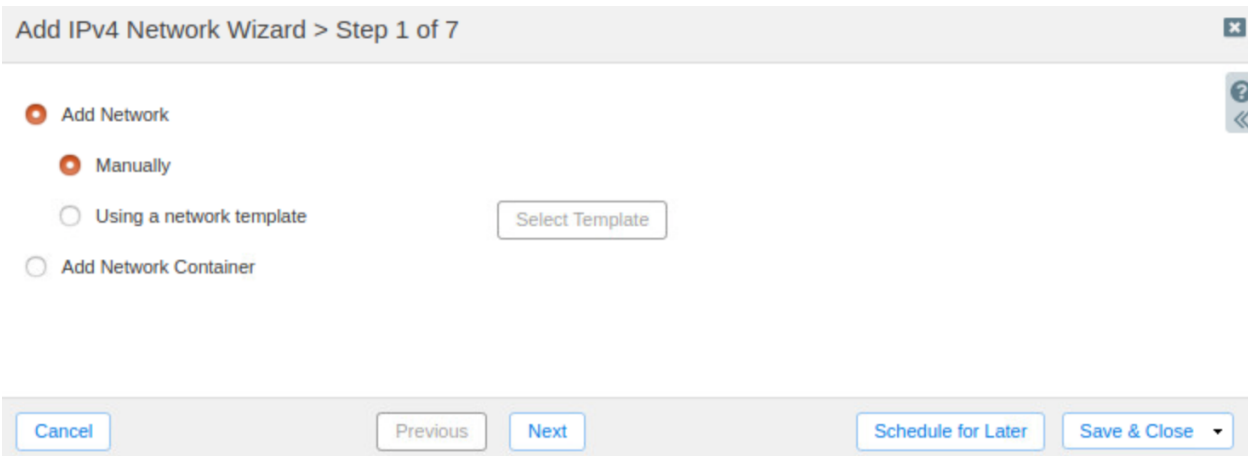
Create Network

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**.

Add IPv4 Network Wizard > Step 2 of 7

***Netmask** / 24 255.255.255.0
 1 4 8 12 16 20 24 28 32

*** Networks**

Network
10.10.10.0

Comment

Automatically Create Reverse-Mapping Zone

Disable for DHCP

Cancel Previous Next Schedule for Later Save & Close

10. On step 3, click the **+** (add button) to add a member to serve the network.

Add IPv4 Network Wizard > Step 3 of 7

Members

Name	IPv4 Address	IPv6 Address	Comment
No data			

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

Member Selector

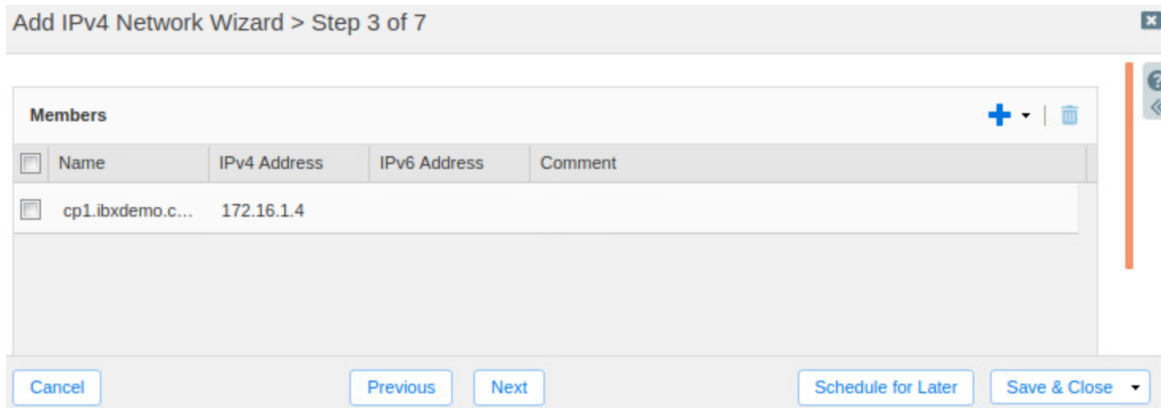
Filter On Show Filter

Find Go

Name	IPv4 Address	IPv6 Address	Comment	Site
cp1.ibxdemo.com	172.16.1.4			
cp2.ibxdemo.com	172.16.1.5			
gm.ibxdemo.com	172.16.1.3			

Close OK

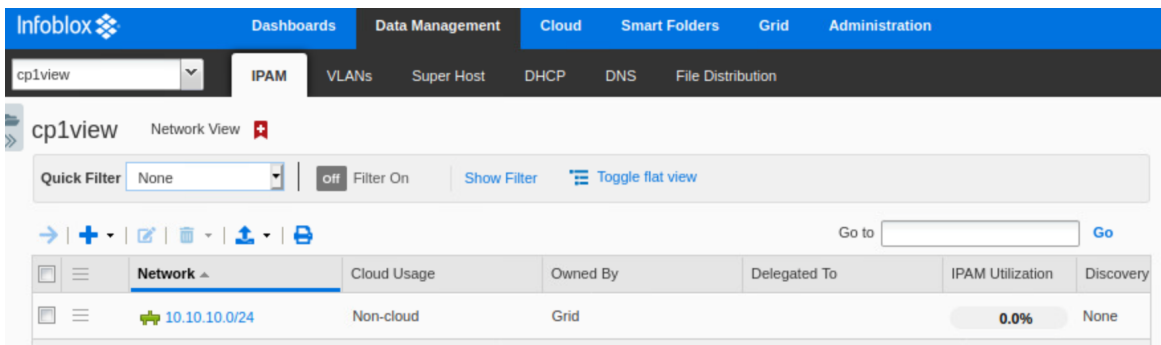
12. Click **Save & Close**.



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

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

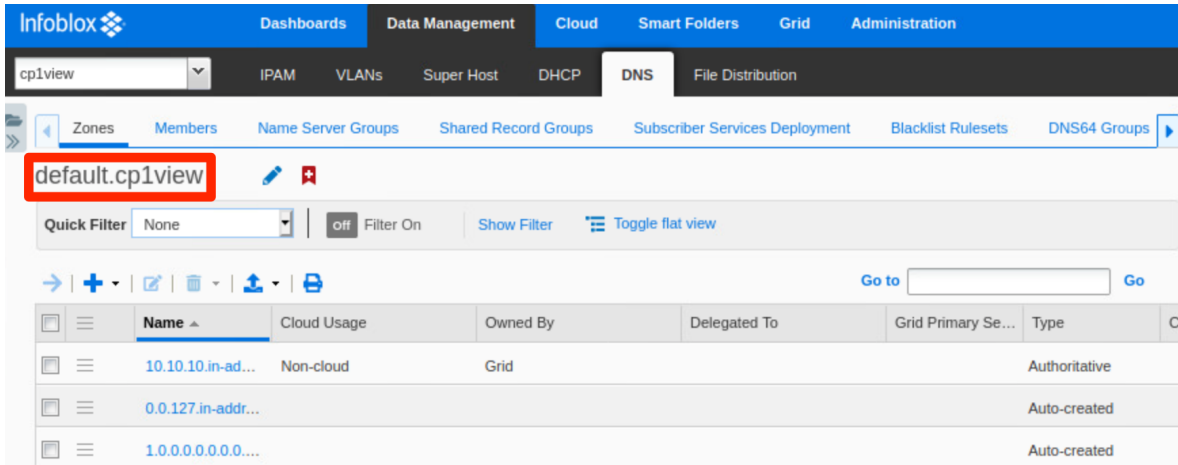
15. The new network is now created.




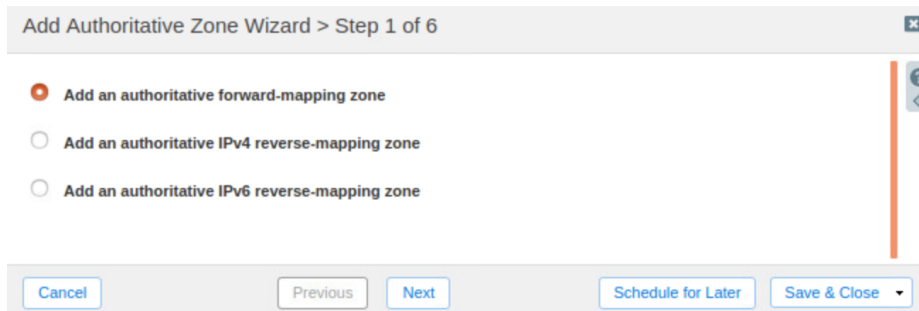
Create DNS Zone

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.

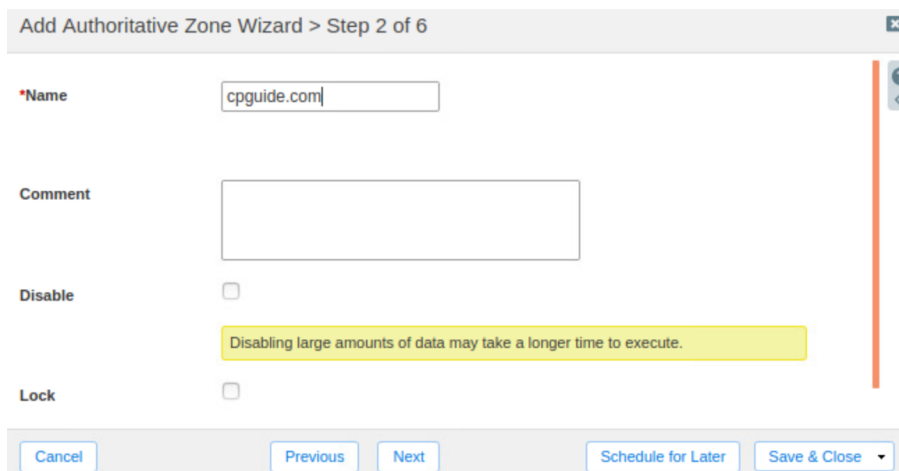
1. To add an authoritative DNS zone, navigate to the **Data Management** → **DNS** → **Zones** tab.
2. Ensure you are in the DNS view that belongs to your new network view. The view name will be in the format **default.name**, where name is the name of your network view.




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**.



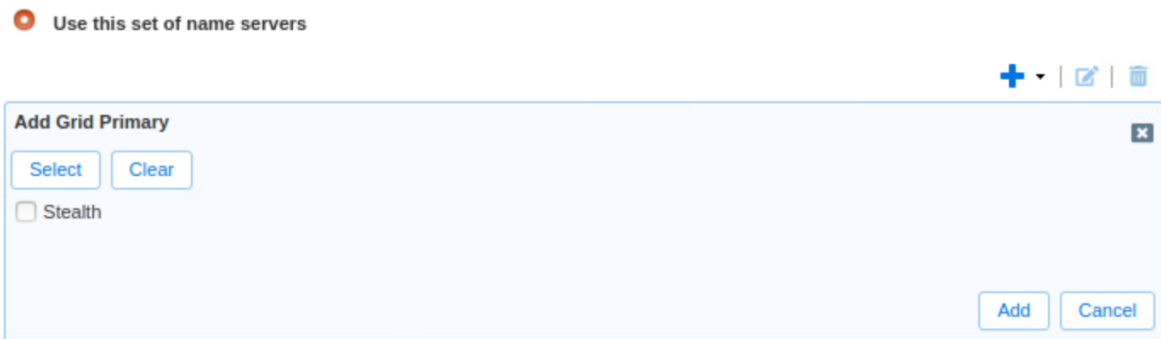
6. On step 2 of the wizard, enter a Name for your zone, for example **cpguide.com**.
7. Click **Next**.



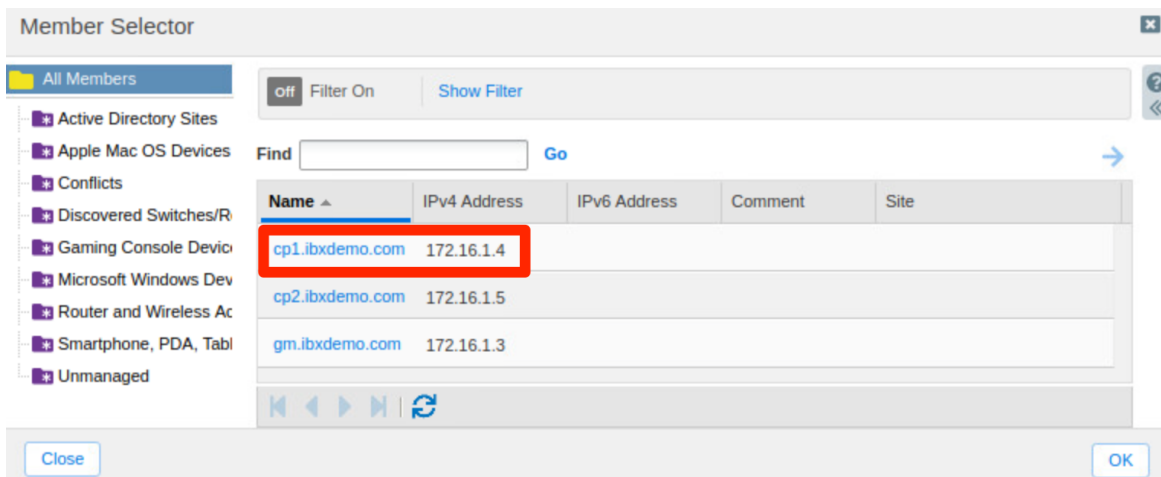
8. On step 3, select **Use this set of name servers**.
9. Click the  (add button) to add a Primary DNS name server for the zone.



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**.

Add Grid Primary

Select Clear cp1.ibxdemo.com

Stealth

Add Cancel

13. Click **Save & Close**.

Add Authoritative Zone Wizard > Step 3 of 6

None

Use this Name Server Group Choose One

Use this set of name servers

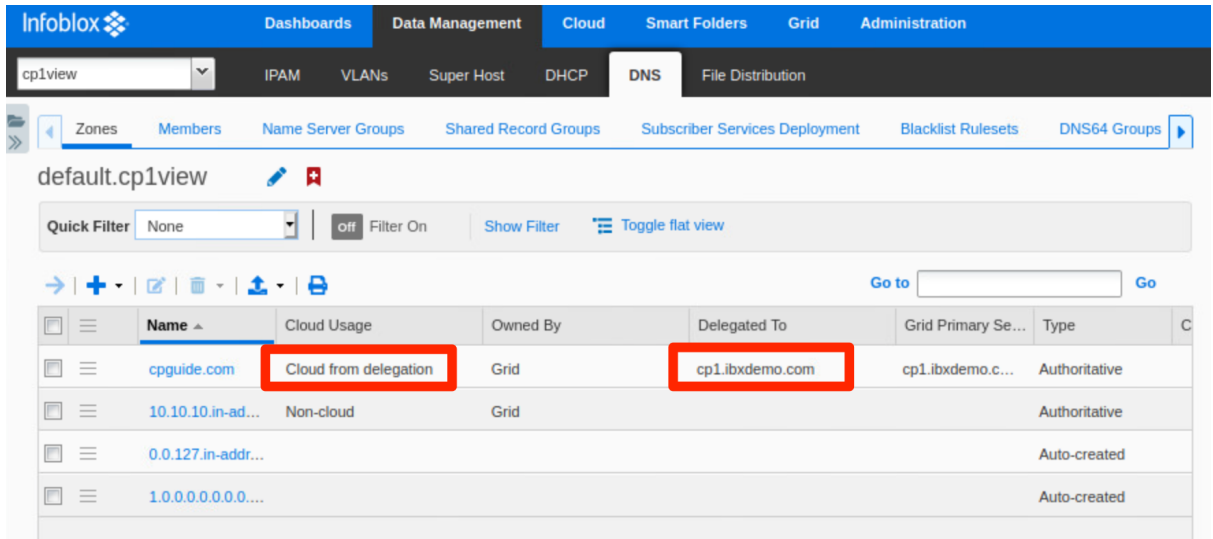
Name	IPv4 Address	IPv6 Address	Type	Stealth	TSIG
cp1.ibxdemo...	172.16.1.4		Grid Primary	No	No

Cancel Previous Next Schedule for Later Save & Close

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

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

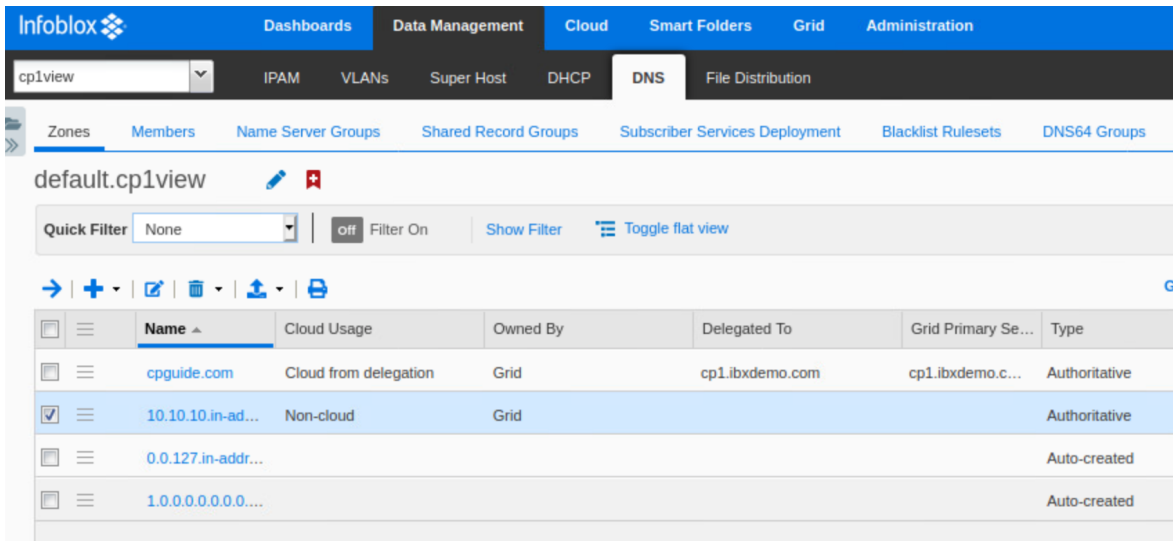
16. Notice that the new zone shows Cloud from delegation in the Cloud Usage column and the CP member name in the Delegated To column.



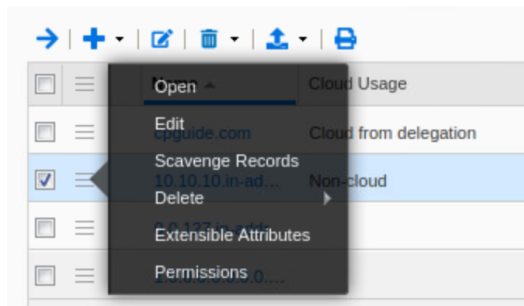
Assign Name Server for Reverse Mapping Zone


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.

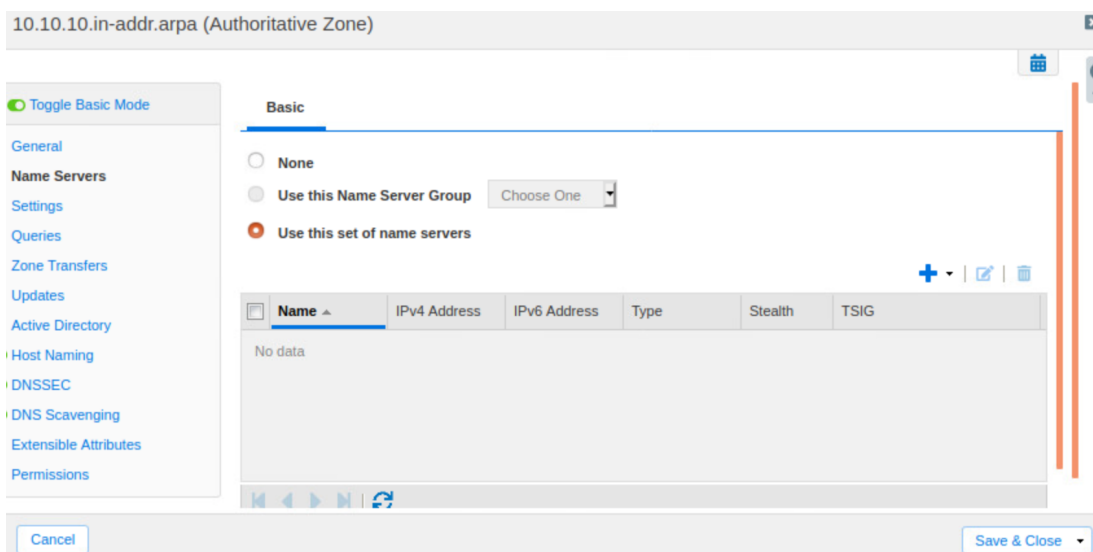
1. Navigate to the **Data Management** → **DNS** → **Zones** tab.
2. Select the checkbox next to the reverse mapping zone.
3. Click the ☰ (action menu).



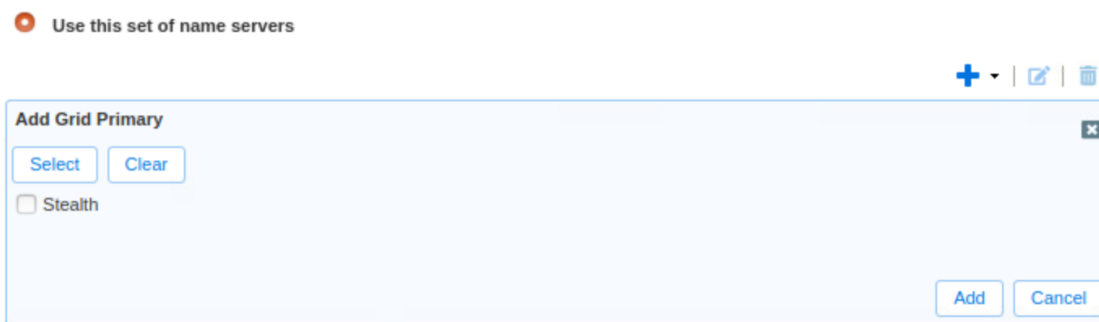
4. Click **Edit**.



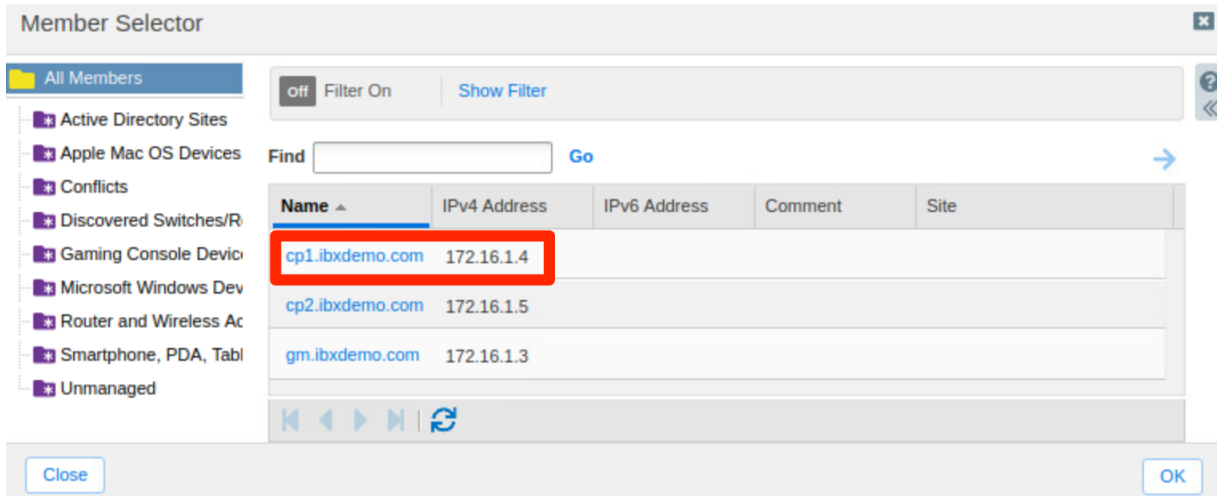
5. In the Authoritative Zone window, navigate to the **Name Server** page.
6. Select **Use this set of name servers**.
7. Click the  (add button) to add a Primary DNS name server for the zone.



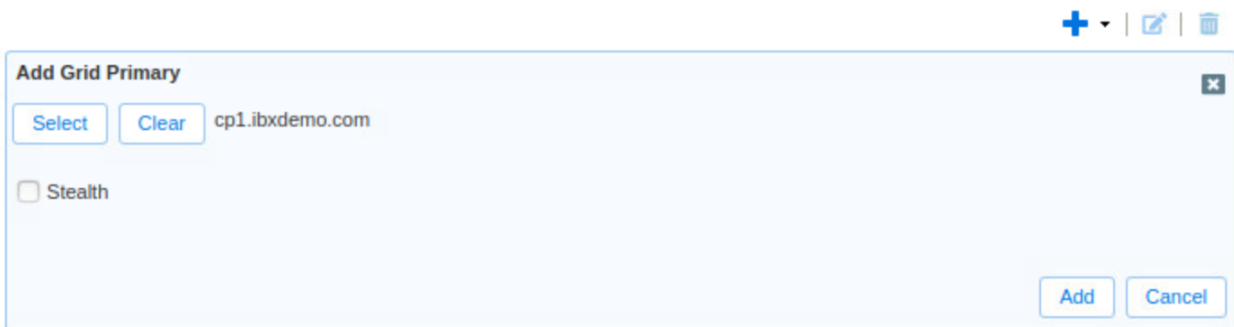
8. Under Add Grid Primary, click **Select**.



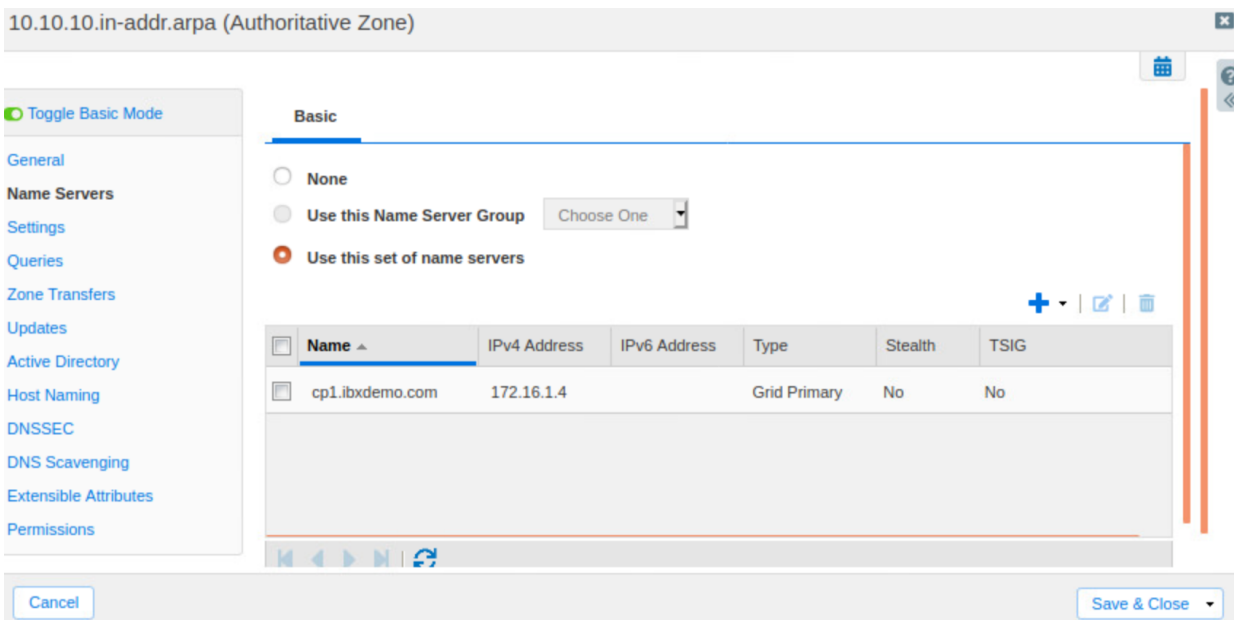
9. In the Member Selector dialog, select CP1. By selecting the Cloud Platform member as the primary name server in this step, the zone will automatically be delegated to that member.



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.

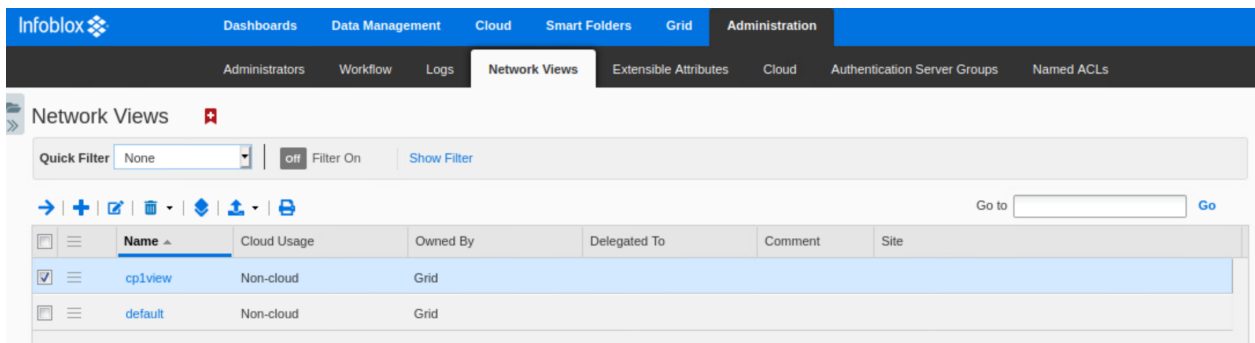


	Name ^	Cloud Usage	Owned By	Delegated To	Grid Primary Se...	Type
<input type="checkbox"/>	cpguide.com	Cloud from delegation	Grid	cp1.ibxdemo.com	cp1.ibxdemo.c...	Authoritative
<input type="checkbox"/>	10.10.10.in-ad...	Cloud from delegation	Grid	cp1.ibxdemo.com	cp1.ibxdemo.c...	Authoritative
<input type="checkbox"/>	0.0.127.in-addr...					Auto-created
<input type="checkbox"/>	1.0.0.0.0.0.0....					Auto-created

Delegate Authority for Network View

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

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).

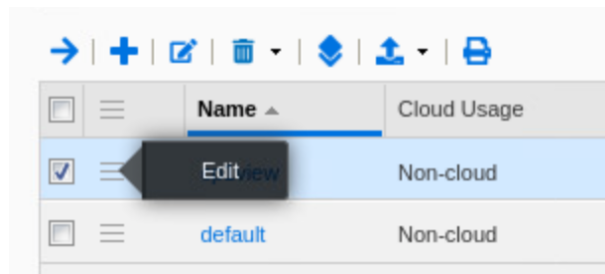


Infoblox Administration Network Views

Quick Filter: None | Filter On | Show Filter

	Name ^	Cloud Usage	Owned By	Delegated To	Comment	Site
<input checked="" type="checkbox"/>	cp1view	Non-cloud	Grid			
<input type="checkbox"/>	default	Non-cloud	Grid			

3. Click **Edit**.



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

cp1view (Network View)

Basic

General
[Members](#)
[Extensible Attributes](#)
[Permissions](#)

*Name

Comment

CLOUD

Cloud Usage Non-cloud

Owned By Grid

Delegate authority from the Grid Master

Delegated To

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

Cloud Member Selector

All Members

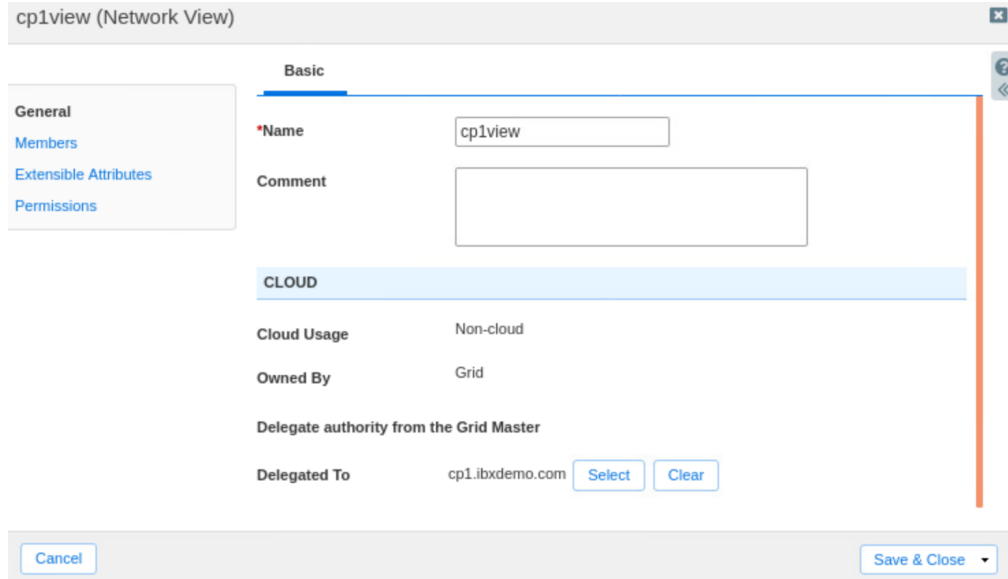
- * Active Directory Sites
- * Apple Mac OS Devices
- * Conflicts
- * Discovered Switches/R
- * Gaming Console Devic
- * Microsoft Windows Dev
- * Router and Wireless Ac
- * Smartphone, PDA, Tabl
- * Unmanaged

off Filter On

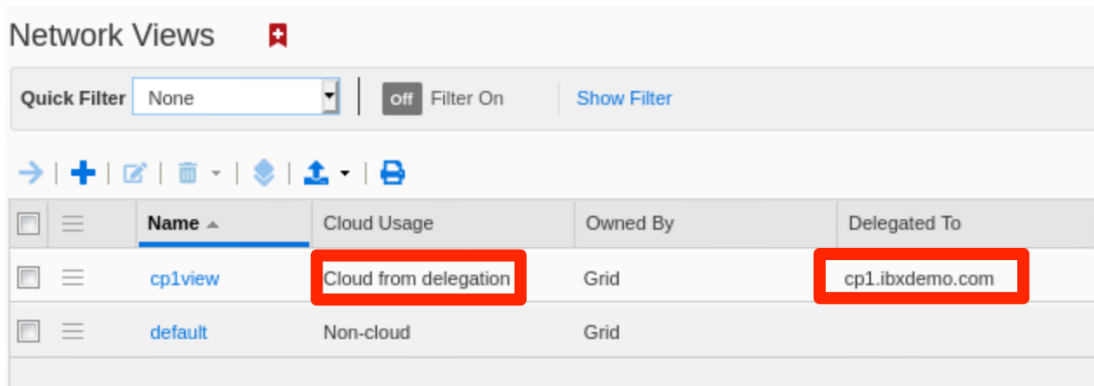
Find

Name	IPv4 Address	IPv6 Address	Comment	Site
cp1.ibxdemo.com	172.16.1.4			
cp2.ibxdemo.com	172.16.1.5			

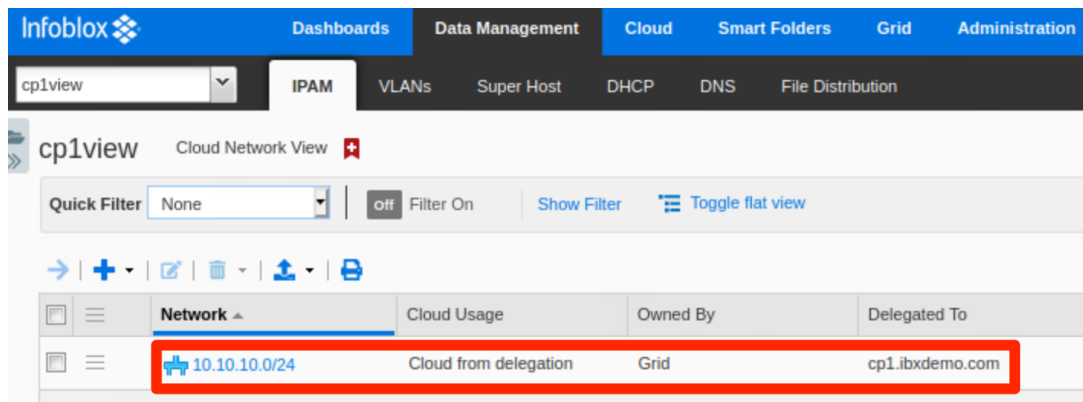
- Click Save & Close.



- 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.

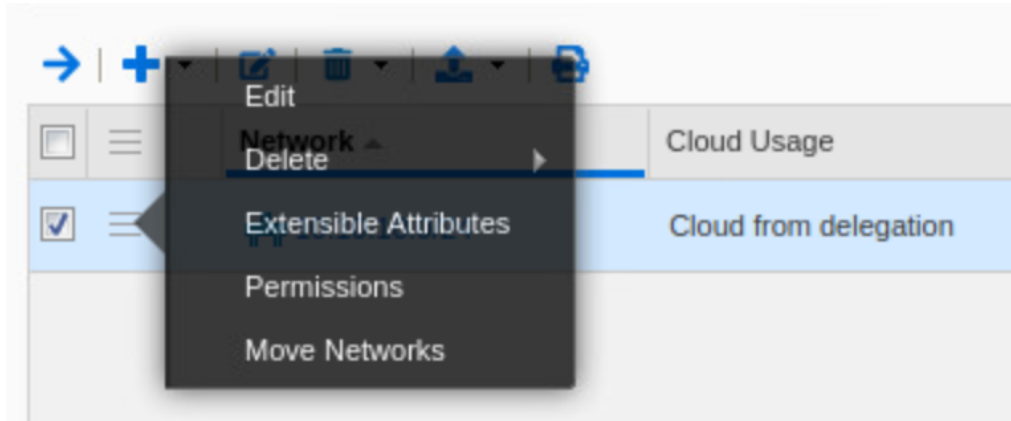


- Navigate to the **Data Management** → **IPAM** tab. You can see the previously created network has been delegated to the Cloud Platform member and the icon color has changed from green to blue.

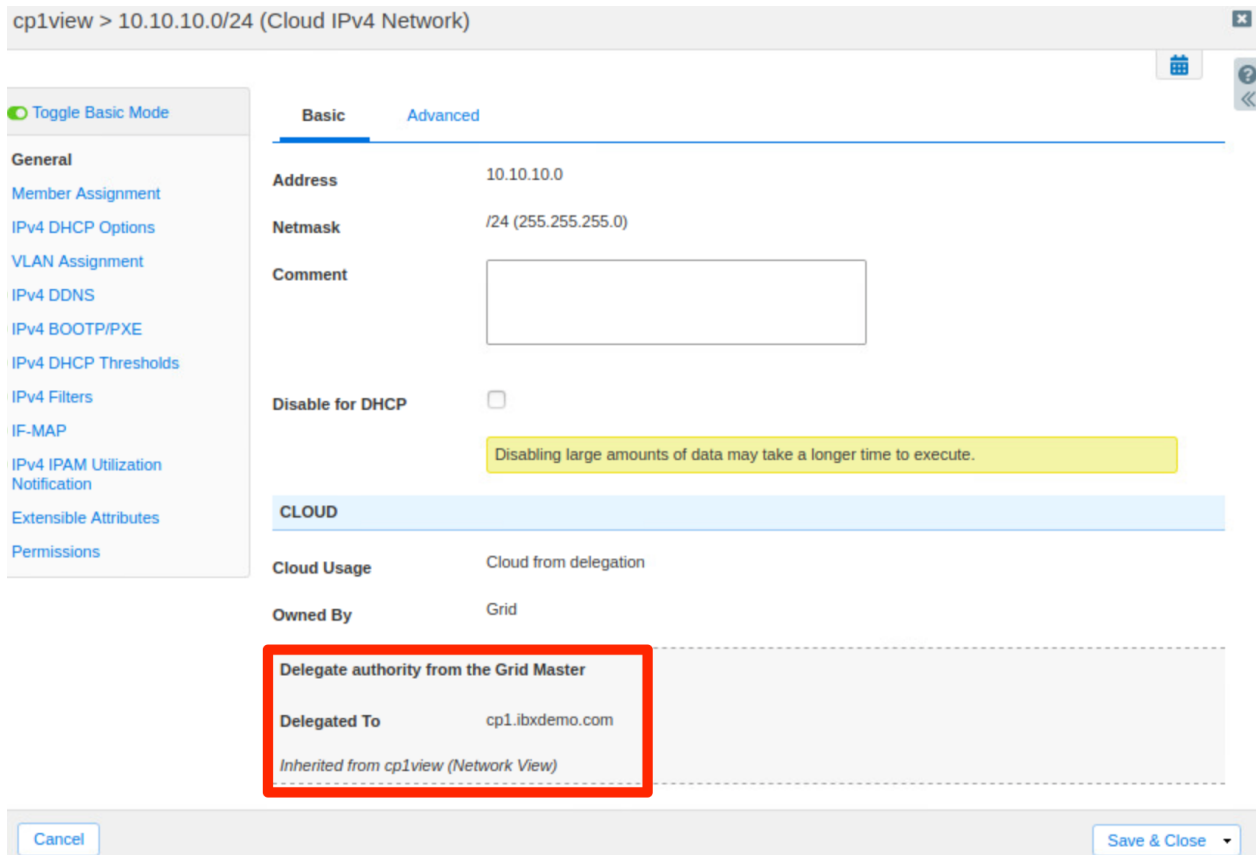


- Select the checkbox next to the network and click the (action menu).

10. Click **Edit**.



11. 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.

Operation	REST Method	API Call	Sample Body	
	Sample cURL Command			
	Sample Output			
Create a Host Record within a Tenant	POST	https://172.16.1.4/wapi/v2.11/record:host	<pre>{ "name": "vm1.cpguide.com", "ipv4addrs": [{ "ipv4addr": "10.10.10.11" }], "view": "default.cp1view", "extattrs": { "Tenant ID": { "value": "DC1" }, "CMP Type": { "value": "Openstack" }, "Cloud API Owned": { "value": "True" }, "VM ID": { "value": "VM-ID-1" }, "VM Name": { "value": "LinuxVM1" } } }</pre>	
	<pre>curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST 'https://172.16.1.4/wapi/v2.11/record:host?_return_fields%2B=name,extattrs' -d '{"name": "vm1.cpguide.com","ipv4addrs": [{ "ipv4addr": "10.10.10.11" }], "view": "default.cp1view", "extattrs": { "Tenant ID": { "value": "DC1" }, "CMP Type": { "value": "Openstack" }, "Cloud API Owned": { "value": "True" }, "VM ID": { "value": "VM-ID-1" }, "VM Name": { "value": "LinuxVM1" } }}'</pre>			
	<pre>{ "_ref": "record:host/ZG5zLmhvc3QkLjluY29tLnRlc3Qudm0x: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/ZG5zLmhvc3RfYWwRkcmVzcyQuMi5jb20udGVzdC52bTEuMTAuMTAuMTAuMTEu: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" }</pre>			

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 URL or IP address of the CP1 appliance, the correct DNS view name, and the correct DNS zone.

```

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

```

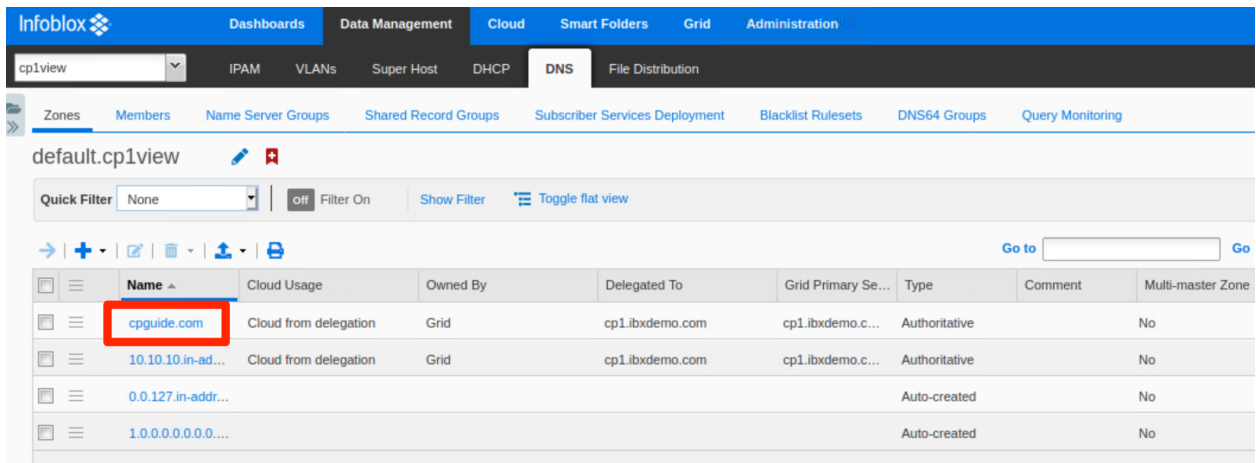
3. Press **Enter**. The screenshot below shows the output from a successful API call.

```

{
  "_ref": "record:host/ZG5zLmhvc3QkLjEuY29tLmNwZ3VpZGUudm0x:vm1.cpguide.com/default.cp1view",
  "extattrs": {
    "CMP Type": {
      "value": "Openstack"
    },
    "Cloud API Owned": {
      "value": "True"
    },
    "Tenant ID": {
      "value": "DC1"
    },
    "VM ID": {
      "value": "VM-ID-1"
    },
    "VM Name": {
      "value": "LinuxVM1"
    }
  },
  "ipv4addrs": [
    {
      "_ref": "record:host_ipv4addr/ZG5zLmhvc3RFYWRkcmVzcyQuMS5jb20uY3BndWlkZS52bTEuMTAuMTAuMTAuMTAu:10.10.10.11/vm1.cpgui
de.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.


cpguide.com Cloud Authoritative Zone

Records Subzones

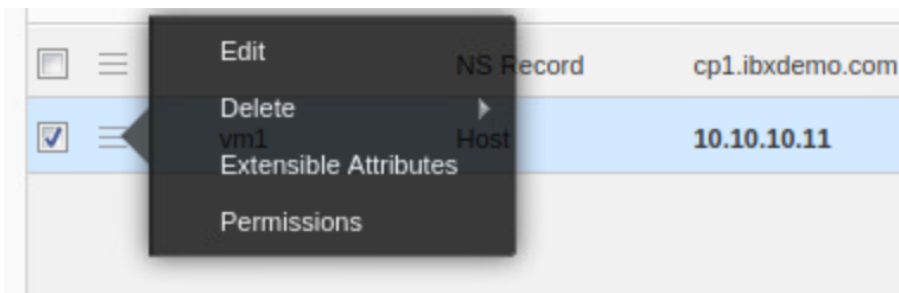
Quick Filter: None | off Filter On | Show Filter | Toggle flat view

Go to: Go

Name	Type	Data	Record Source	Principal	Protected	Comment	Monitored Since	Last Queried
	SOA Record	Serial 2 MNAME cp1.ibxdemo.cc RNAME please_set_em Refresh 10800 Retry 3600 Expire 2419200 Negative Caching TTL 900	System			Auto-created b...	Not Monitored	Not Monitored
	NS Record	cp1.ibxdemo.com	System			Auto-created b...	Not Monitored	Not Monitored
vm1	Host	10.10.10.11	Static		No		Not Monitored	Not Monitored

8. To view Extensible Attributes added to the record through the cloud API, click the  (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.

cp1view > default.cp1view > vm1.cpguide.com (Host)

Basic

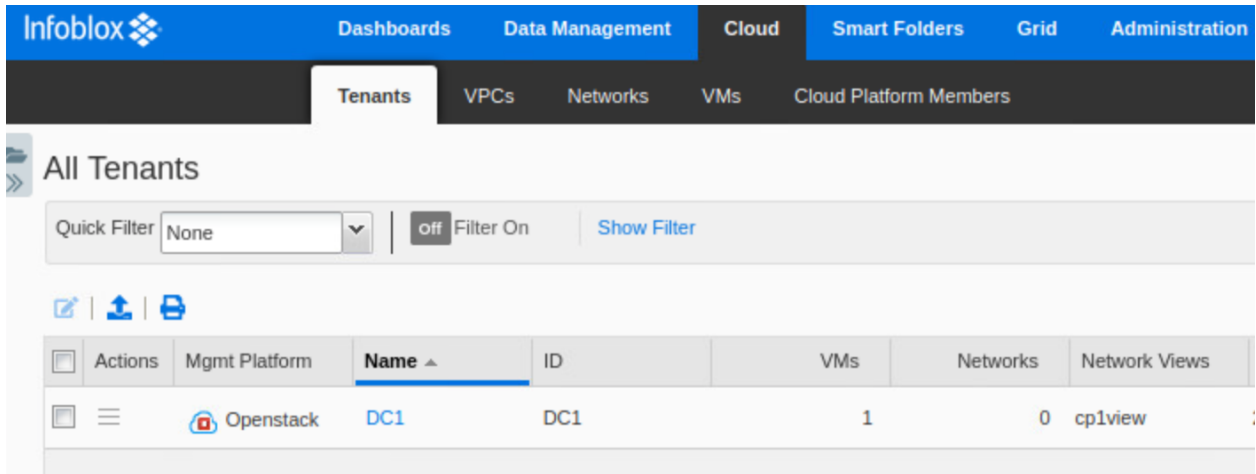
General
TTL
Aliases
Updates
IPv4 Discovered Data
IPv6 Discovered Data
Extensible Attributes
Permissions

Attribute Name	Value	Inheritance State	Require
Cloud API Owned	True	Disabled	No
CMP Type	Openstack	Disabled	No
Tenant ID	DC1	Disabled	No
VM ID	VM-ID-1	Disabled	No
VM Name	LinuxVM1	Disabled	No

Cancel Save & Close

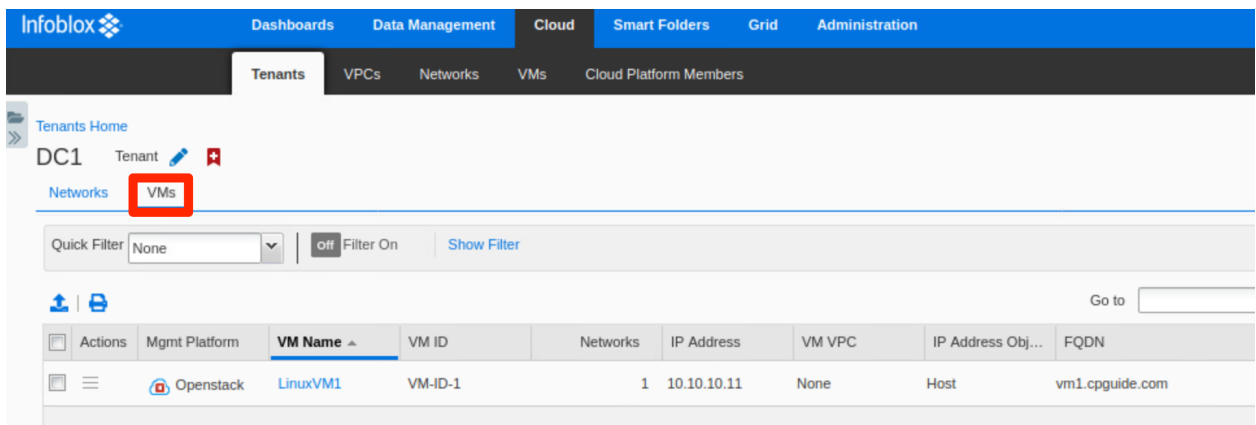
11. Click Cancel to close the host record window.

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 (DNS, 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.

Operation	REST Method	API Call	Sample Body
	Sample cURL Command		
	Sample Output		
Create a Host Record within a Tenant	POST	https://172.16.1.4/wapi/v2.11/record:host	{ "name": "vm2.cpguide.com", "ipv4addr": [{"ipv4addr": "10.10.10.12"}], "view": "default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": { "value": "True" }, "VM ID": { "value": "VM-ID-2"},

		"VM Name": { "value": "LinuxVM2" } }
	<pre>curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11/record:host?_return_fields%2B=name,extattrs" -d {"name": "vm2.cpguide.com","ipv4addr": [{"ipv4addr":"10.10.10.12"},"view":"default.cp1view", "extattrs": { "Tenant ID": {"value": "DC1"}, "CMP Type": {"value": "Openstack"}, "Cloud API Owned": {"value":"True"}, "VM ID": { "value": "VM-ID-2"},"VM Name": { "value": "LinuxVM2" } } }</pre>	
	<pre>{ "_ref": "record:host/ZG5zLmhvc3QkLjluY29tLnRlc3Qudm0x: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"}}, "ipv4addr": [{"_ref": "record:host_ipv4addr/ZG5zLmhvc3RfYWRRkcmVzcyQuMi5jb20udGVzdC52bTEuMTAu MTAuMTAuMTEu: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" }</pre>	

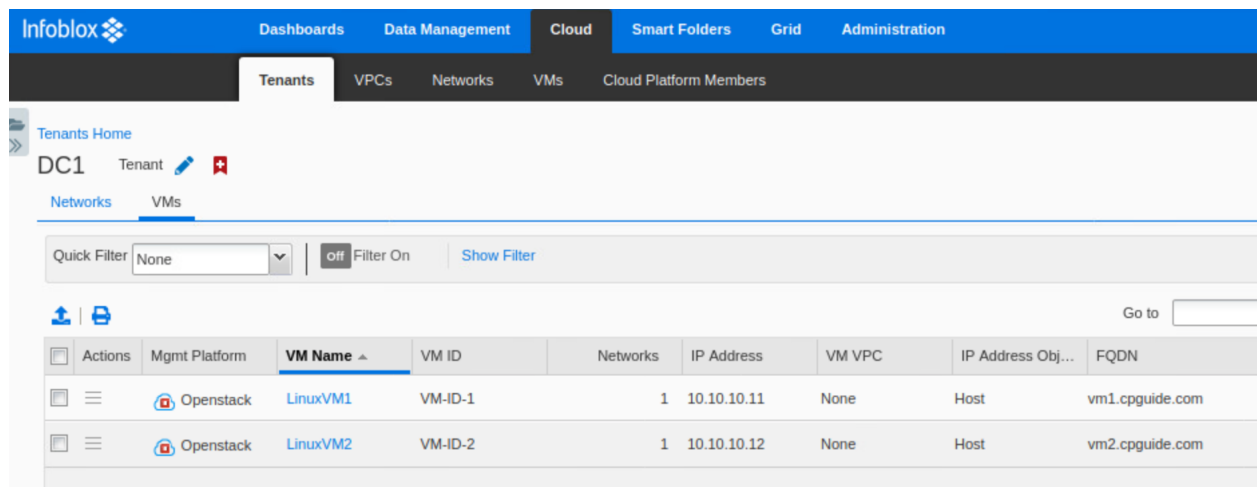
3. To test this cloud API call, open a terminal window on your client device.
4. Copy the example cURL command from above and paste it in the terminal. Ensure you use the IP address of your CP1 appliance, the correct DNS view name, and the correct DNS zone.

```
infoblox@ubuntu-01:~$ curl -k -u cloud-admin:infoblox -H 'content-type: application/json' -X POST "https://172.16.1.4/wapi/v2.11
/record:host?_return_fields%2B=name,extattrs" -d '{"name": "vm2.cpguide.com","ipv4addr": [{"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/ZG5zLmhvc3RfYWwrcmVzcyQuMS5jb20uY3BndWlkZS52bTIuMTAuMTAuMTAuMTIu: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"
}
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

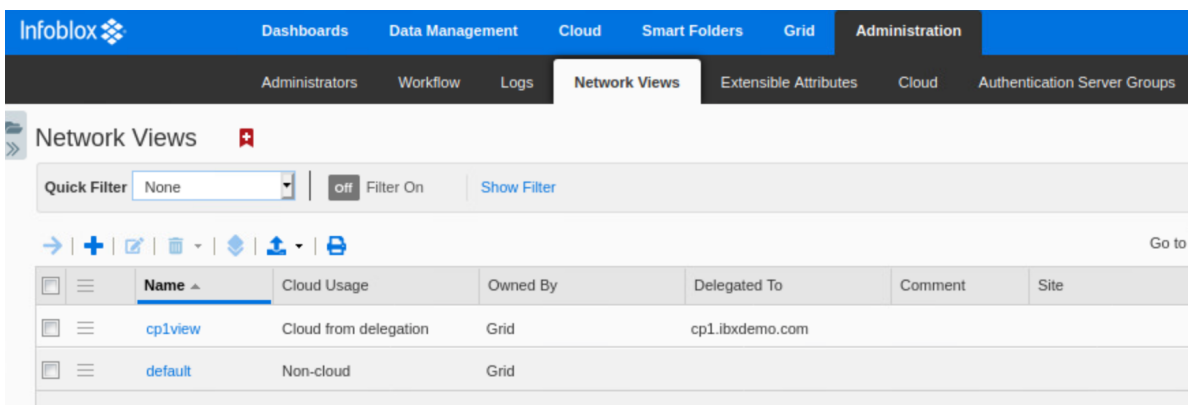
You can leverage a combination of Network Views and Cloud Platform members for a multi-tenant solution.

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.

Add Network View Wizard > Step 1 of 3

*Name

Comment

CLOUD

Delegate authority from the Grid Master

Delegated To

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

Cloud Member Selector

All Members

off Filter On Show Filter

Find Go

Name	IPv4 Address	IPv6 Address	Comment	Site
cp1.ibxdemo.com	172.16.1.4			
cp2.ibxdemo.com	172.16.1.5			

7. Click **Save & Close**.

Add Network View Wizard > Step 1 of 3

*Name

Comment

CLOUD

Delegate authority from the Grid Master

Delegated To

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

Network Views +

Quick Filter Filter On [Show Filter](#)

→ | + | ↗ | 🗑️ | 🔄 | ⬆️ | 📄

<input type="checkbox"/>	<input type="checkbox"/>	Name ▲	Cloud Usage	Owned By	Delegated To
<input type="checkbox"/>	<input type="checkbox"/>	cp1view	Cloud from delegation	Grid	cp1.ibxdemo.com
<input type="checkbox"/>	<input type="checkbox"/>	cp2view	Cloud from delegation	Grid	cp2.ibxdemo.com
<input type="checkbox"/>	<input type="checkbox"/>	default	Non-cloud	Grid	

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

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

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.

Actions	Mgmt Platform	Name	ID	VMs	Networks	Network Views
	Openstack	DC1	DC1	2	0	cp1view
	Openstack	Dev	Dev	0	1	cp1view
	Openstack	Dev2	Dev2	0	1	cp2view

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

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

Actions	Network	Tenant	Cloud Usage	Owned By	Delegated To	Network View	Mgmt Platform
	1.1.1.0/24	Dev	Cloud from ad...	Cloud adapter	cp1.ibxdemo.com	cp1view	Openstack
	1.1.1.0/24	Dev2	Cloud from ad...	Cloud adapter	cp2.ibxdemo.com	cp2view	Openstack
	10.10.10.0...		Cloud from del...	Grid	cp1.ibxdemo.com	cp1view	

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


Proxy API Requests

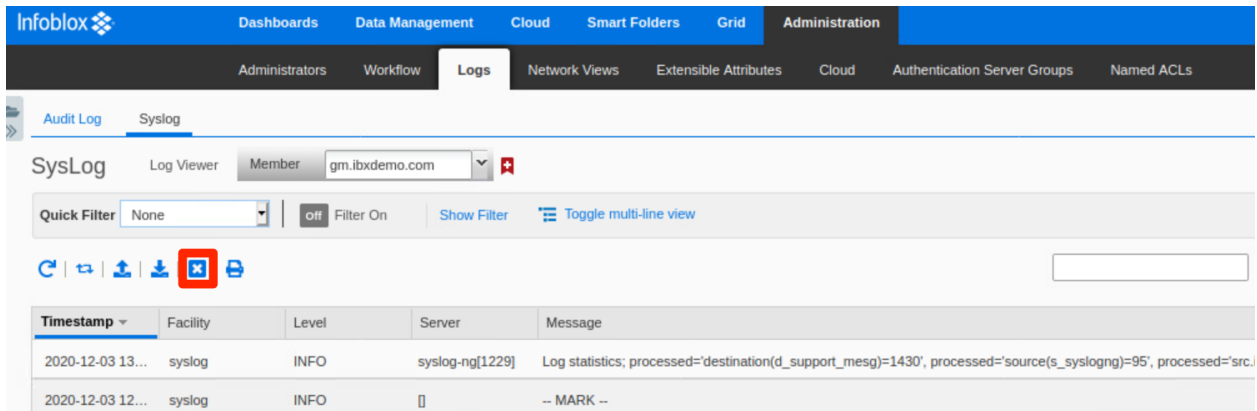
Cloud Platform appliances, and the Grid Master, include built-in functionality to proxy cloud API calls to the appropriate CP member or Grid Master for processing. Cloud API calls can be sent to any Cloud Platform member in the Grid and the call is either processed locally or transparently forwarded to the appliance that

is authoritative for the object referenced in the API request. The requestor (user) does not need to maintain the object to owner relationship, as the request will be proxied to the correct member.

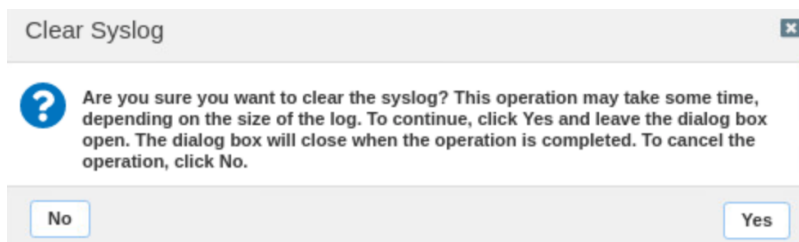
This functionality is limited to only cloud API requests. Additionally, proxying is limited to one hop in the Grid. If the destination appliance cannot process a proxied request, the request will not be forwarded again and the client will receive an error.

To demonstrate this capability, use the following steps:

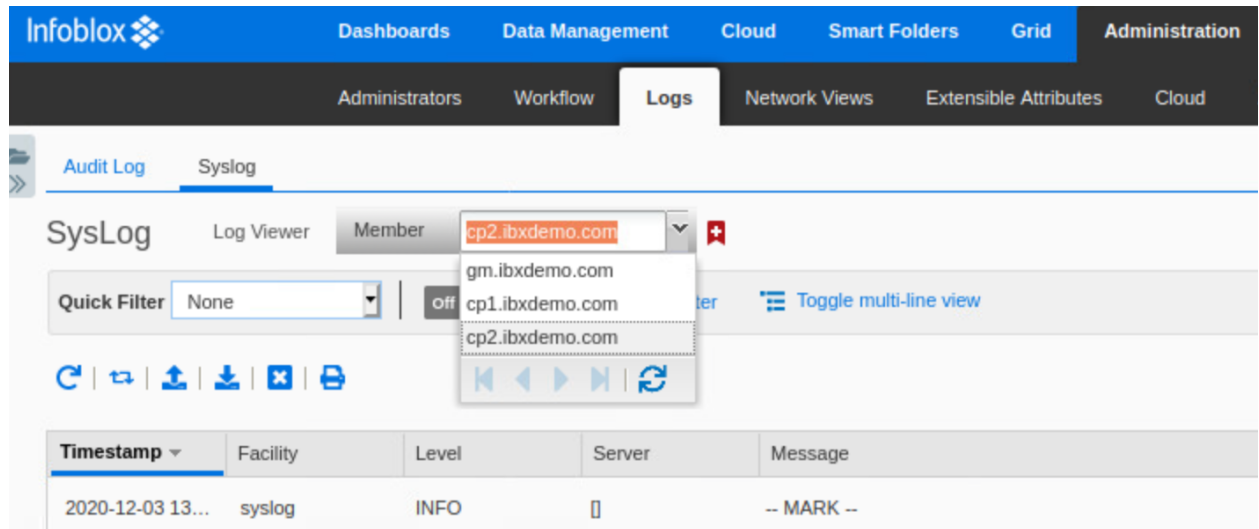
1. First, we will clear the Syslog to make it easier to view the proxy in action. Log in to the Grid Manager.
2. Navigate to the **Administration** → **Logs** → **Syslog** tab.
3. Click the  (clear button) to clear current logs.




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/ZG5zLnpvbmlkLjMuY29tLmNwMg:cp2.com/default.cp2view",			

	<pre>"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" }</pre>		
<p>Issue the call to Grid Master to create a Host Record under the zone cp2.com in cp2 view</p>	<p>POST</p>	<p>https://172.16.1.3/wapi/v2.11/record:host</p>	<pre>{ "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" }}}}</pre>
	<pre>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" }}}</pre>		
	<pre>{"_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/ZG5zLmhvc3RfYWRRkcmVzcyQuMy5jb20uY3AyLnZtMS4xLjEuM S4xMS4:1.1.1.11/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" }</pre>		

```
}  
}
```

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"}], "view": "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/ZG5zLnprvbmUkLjIuY29tLmNwMg: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.

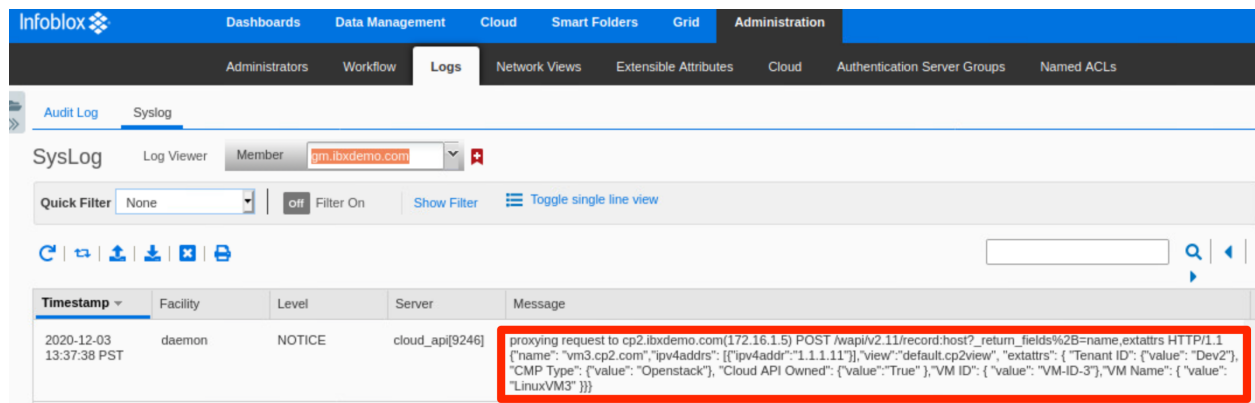
```

{
  "_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/ZG5zLmhvc3RFYWRRcmVzcyQUMi5jb20uY3AyLnZtMy4xLjEuMS4xMS4:1.1.1.11/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 from the Member selector dropdown. A syslog entry shows the request proxying to CP2.



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

Audit Log Syslog

SysLog Log Viewer Member cp2.ibxdemo.com

Quick Filter None Filter On Show Filter Toggle single line view

Timestamp	Facility	Level	Server	Message
2020-12-03 13:37:42 PST	user	DEBUG	cloud_api[24217]	[cloud-admin]: proxied_from:gm.ibxdemo.com,172.16.1.3, Created HostRecord vm3.cp2.com DnsView=default.cp2view address=1.1.1.11: Set extensible_attributes=[[name="CMP Type",value="Openstack"],[name="Cloud API Owned",value="True"],[name="Tenant ID",value="Dev2"],[name="VM ID",value="VM-ID-3"],[name="VM Name",value="LinuxVM3]],addresses=[address="1.1.1.11",fqdn="vm3.cp2.com",view=DnsView.default.cp2view]
2020-12-03 13:37:42 PST	user	DEBUG	cloud_api[24217]	[cloud-admin]: proxied_from:gm.ibxdemo.com,172.16.1.3, Created HostAddress 1.1.1.11 network_view=cp2view: Set address="1.1.1.11",configure_for_dhcp=False,match_option="MAC_ADDRESS",parent=HostRecord:2.com.cp2.vm3
2020-12-03 13:32:04 PST	user	DEBUG	cloud_api[24215]	[cloud-admin]: Created AuthZone cp2.com DnsView=default.cp2view: Set extensible_attributes=[[name="CMP Type",value="Openstack"],[name="Cloud API Owned",value="True"],[name="Tenant ID",value="Dev2]],fqdn="cp2.com",view=DnsView.default.cp2view.grid primaries=[[grid_member=Member:cp2.ibxdemo.com]]

17. Navigate to the **Data Management** → **DNS** → **Zones** tab.

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

Infoblox Dashboards Data Management Cloud Smart Folders Grid Administration

cp2view IPAM VLANs Super Host DHCP DNS File Distribution

Zones Members Name Server Groups Shared Record Groups Subscriber Services Deployment Blacklist Rulesets




default.cp2view

Quick Filter None Filter On Show Filter Toggle flat view

Name	Cloud Usage	Owned By	Delegated To	Grid Primary Se...
cp2.com	Cloud from adapter	Cloud adapter	cp2.ibxdemo.com	cp2.ibxdemo.c...
0.0.127.in-addr...				
1.0.0.0.0.0.0...				






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

default.cp2view

cp2.com Cloud Authoritative Zone   

Records Subzones

Quick Filter Filter On [Show Filter](#) [Toggle flat view](#)

<input type="checkbox"/>	<input type="checkbox"/>	Name ▲	Type	Data	Record Source	Principal	Protected
<input type="checkbox"/>	<input type="checkbox"/>		SOA Record	Serial 2 MNAME cp2.ibxdemo.cc RNAME please_set_em Refresh 10800 Retry 3600 Expire 2419200 Negative Caching TTL 900	System		
<input type="checkbox"/>	<input type="checkbox"/>		NS Record	cp2.ibxdemo.com	System		
<input type="checkbox"/>	<input type="checkbox"/>	vm3	Host	1.1.1.11	Static		No

Multiple Primary Name Servers

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

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

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

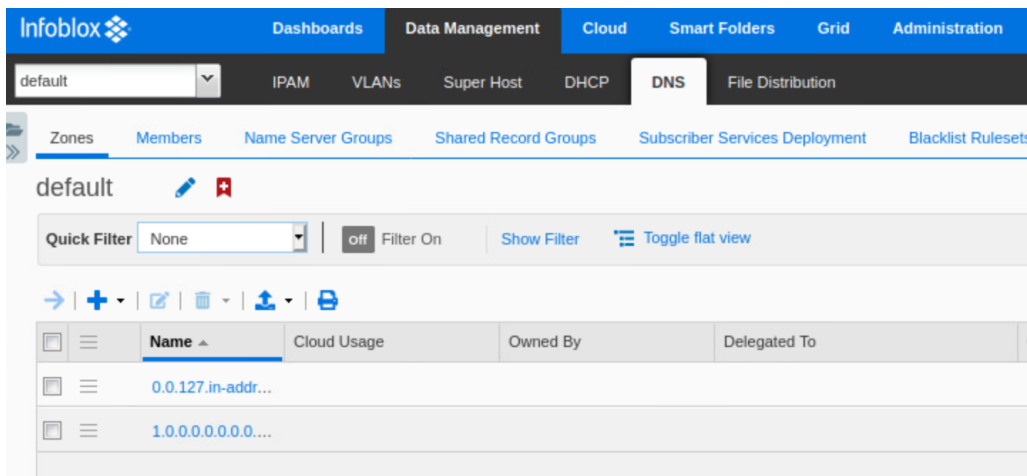
For other considerations and best practices when assigning multiple primaries for a zone, refer to Infoblox NIOS documentation at <https://docs.infoblox.com>.

Create DNS Zone with Multiple Primaries

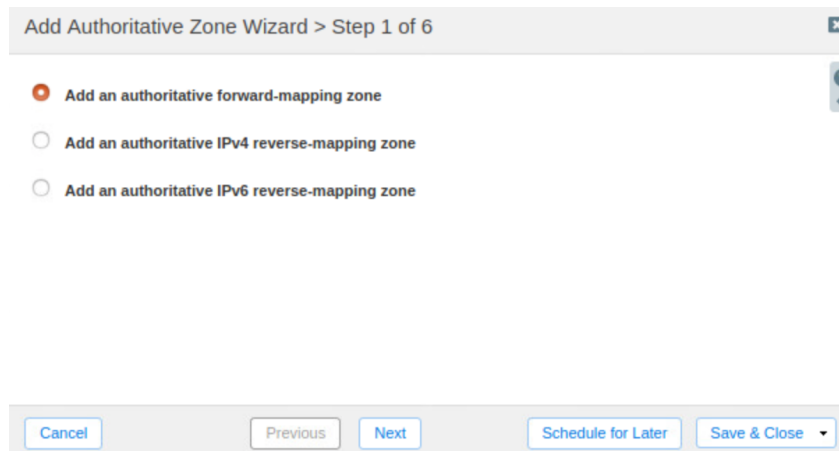
To illustrate this use case, use the following steps.

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**.

Add Authoritative Zone Wizard > Step 2 of 6

*Name

Comment

Disable

Lock

Disabling large amounts of data may take a longer time to execute.

Cancel Previous Next Schedule for Later Save & Close

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

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

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

Add Authoritative Zone Wizard > Step 3 of 6

None

Use this Name Server Group

Use this set of name servers

+ | | |

Add Grid Primary

Select Clear

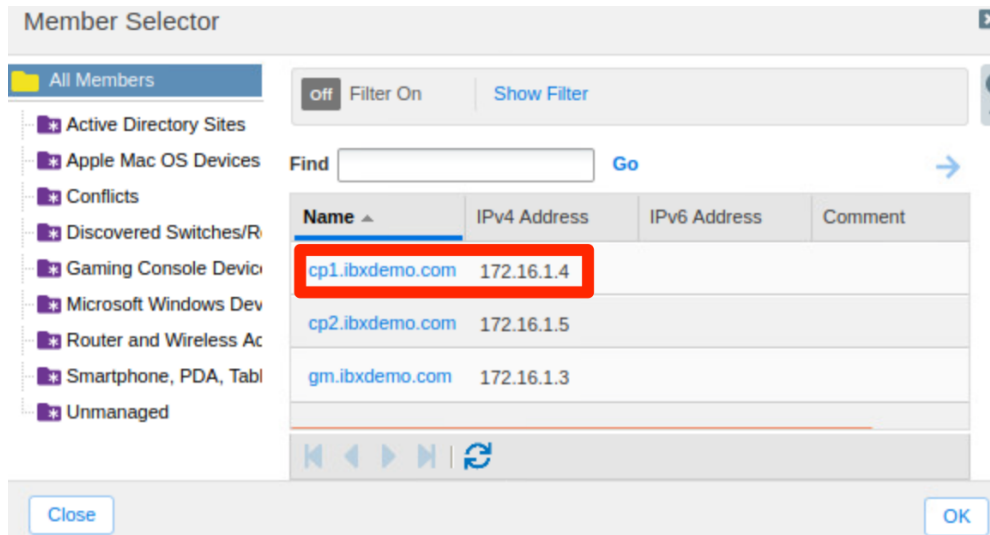
Stealth

Add Cancel

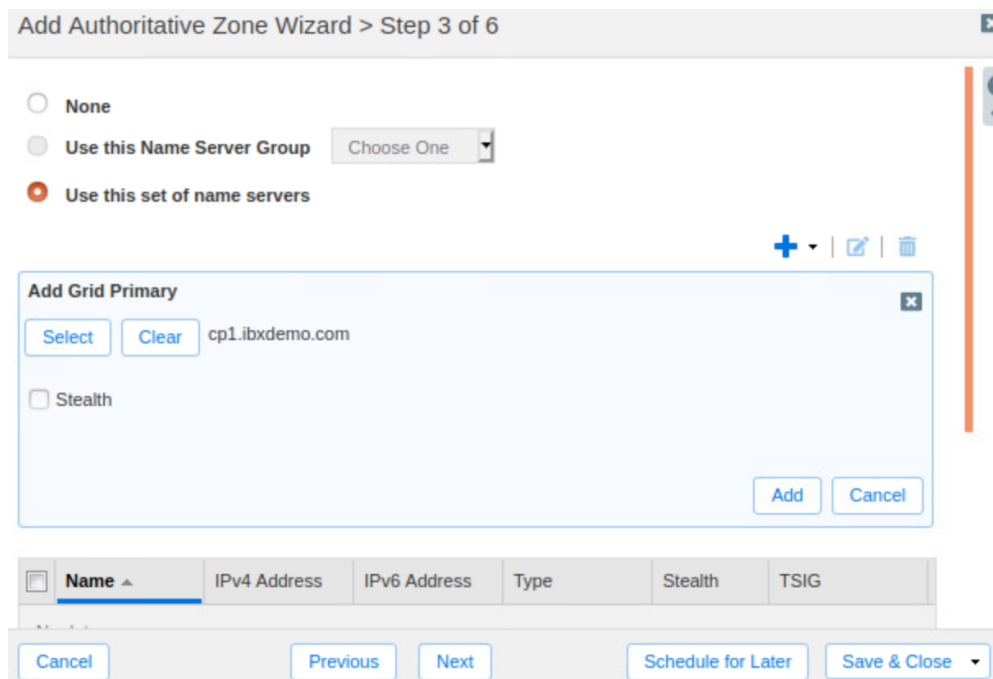
Name	IPv4 Address	IPv6 Address	Type	Stealth	TSIG
No data					

Cancel Previous Next Schedule for Later Save & Close

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

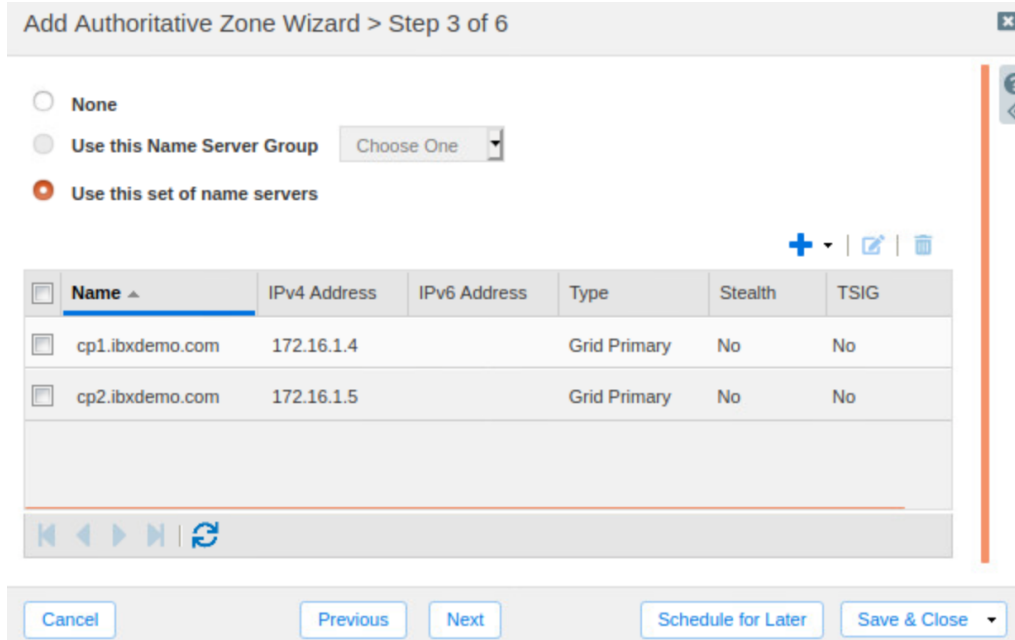


12. Click **Add**.

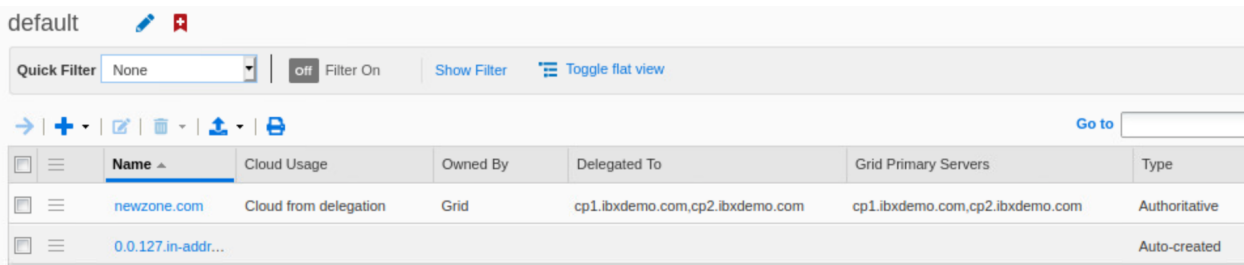


13. Repeat steps 9-12, selecting **CP2** as a second Grid Primary.

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/ZG5zLmJpbmRfYSQuX2RlZmF1bHQyY29tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xMQ: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/ZG5zLmJpbmRfYSQuX2RlZmF1bHQyY30tLm5ld3pvbmUsc2VydmVyMSwxLjEuMS4xMQ:server2.newzone.com/default", "ipv4addr": "2.2.2.2", "name": "server2.newzone.com", "view": "default" }		

1. Open a terminal window on your client device.

- 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.

```
lnfoblox@ubuntu-01:~$ curl -k -u cloud-admin:lnfoblox -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" } } }'
```

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

```
{
  "result": {
    "_ref": "record:a/ZG5zLmJpbmRfYSQuX2RlZmF1bHQuY29tLm5ld3pvcUsc2VydMvYMSWylJiUuMi4x:server1.newzone.com/default",
    "ipv4addr": "2.2.2.1",
    "name": "server1.newzone.com",
    "view": "default"
  }
}
```

- In the Grid Manager, navigate to the **Administration** → **Logs** → **Syslog** tab.
- Use the Member selector dropdown to select **CP1**.
- A SysLog entry shows the new A record created on CP1 (not proxied).

The screenshot shows the SysLog interface with the Member dropdown set to 'cp1.ibxdemo.com'. The log entry is as follows:

Timestamp	Facility	Level	Server	Message
2020-12-04 11:01:23 PST	user	DEBUG	cloud_api[8129]	[cloud-admin]: Created ARecord server1.newzone.com DnsView=default address=2.2.2.1: Set extensible_attributes=[name="CMP Type",value="Openstack"],[name="Cloud API Owned",value="True"],[name="Tenant ID",value="Dev3"],[name="VM ID",value="VM-ID-4"],[name="VM Name",value="Server1"],address="2.2.2.1",fqdn="server1.newzone.com",view=DnsView.default
2020-12-04 11:01:23 PST	daemon	INFO	named[6871]	zone newzone.com/IN: ZRQ applied transaction 36 with SOA serial 2. Zone version is now 1.

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

The screenshot shows the DNS Zones interface for the 'newzone.com' zone. The 'Records' tab is selected, and the 'server1' A Record is highlighted. The records are as follows:

Name	Type	Data	Record Source	Cloud API Owned
	SOA Record	Serial 2 MNAME cp1.ibxdemo.com RNAME please_set_email.absolutely.now Refresh 10800 Retry 3600 Expire 2419200 Negative Caching TTL 900	System	
	NS Record	cp1.ibxdemo.com	System	
	NS Record	cp2.ibxdemo.com	System	
server1	A Record	2.2.2.1	Static	True

- To create a second record, using the cloud API on **CP2**, open a terminal on your client device.
- 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"} } }'
```

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

```
{
  "result": {
    "_ref": "record:a/ZG5zLnJpbmRFYSQuX2RlZmF1bHUyY29tLn5ld3pvbmUsc2VydMvYmIwYjIuMi4y:server2.newzone.com/default",
    "ipv4addr": "2.2.2.2",
    "name": "server2.newzone.com",
    "view": "default"
  }
}
infoblox@ubuntu-01:~$
```

- In the Grid Manager, navigate to the **Administration** → **Logs** → **Syslog** tab.
- Use the Member selector dropdown to select **CP2**.
- A SysLog entry shows the new A record created on CP2 (not proxied).

The screenshot shows the SysLog interface with the member selector set to cp2.ibxdemo.com. A log entry is highlighted with a red box, showing the following message:

```
[cloud-admin]: Created ARecord server2.newzone.com DnsView=default address=2.2.2.2: Set extensible_attributes=[{"name="CMP Type",value="Openstack"},{"name="Cloud API Owned",value="True"},{"name="Tenant ID",value="Dev3"}, {"name="VM ID",value="VM-ID-5"}, {"name="VM Name",value="Server2"}, {"name="address",value="2.2.2.2"}, {"name="fqdn",value="server2.newzone.com"}, {"name="view",value="DnsView.default"}]
```

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

The screenshot shows the DNS Zones interface for the zone newzone.com. The records table is displayed with the following data:

Name	Type	Data	Record Source	Cloud API Owned
	SOA Record	Serial 3 MNAME cp1.ibxdemo.com RNAME please_set_email.absolutely.now Refresh 10800 Retry 3600 Expire 2419200 Negative Caching TTL 900	System	
	NS Record	cp1.ibxdemo.com	System	
	NS Record	cp2.ibxdemo.com	System	
server1	A Record	2.2.2.1	Static	True
server2	A Record	2.2.2.2	Static	True

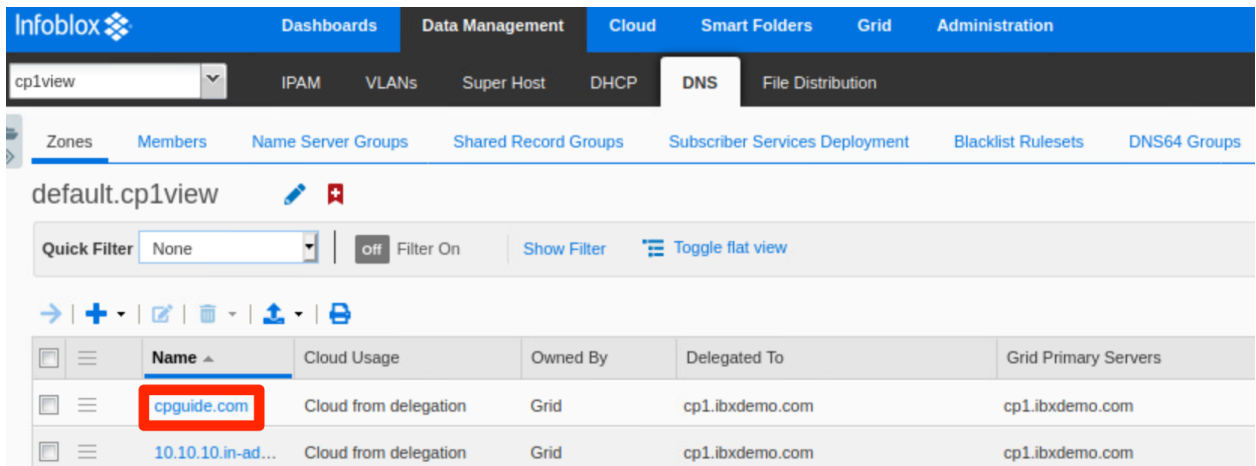
UI Support for Delegated Objects

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

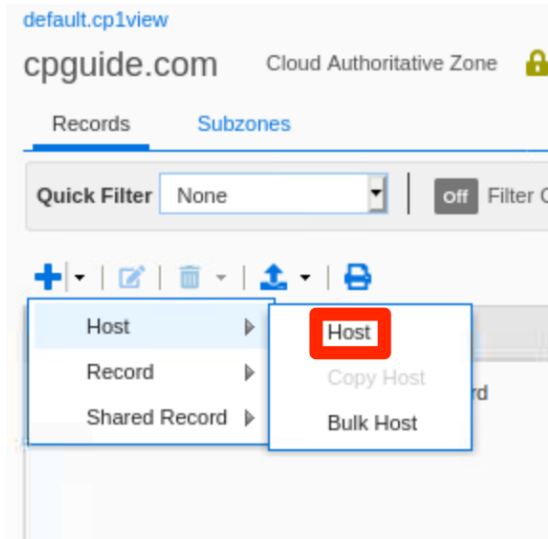
Create Host Record

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

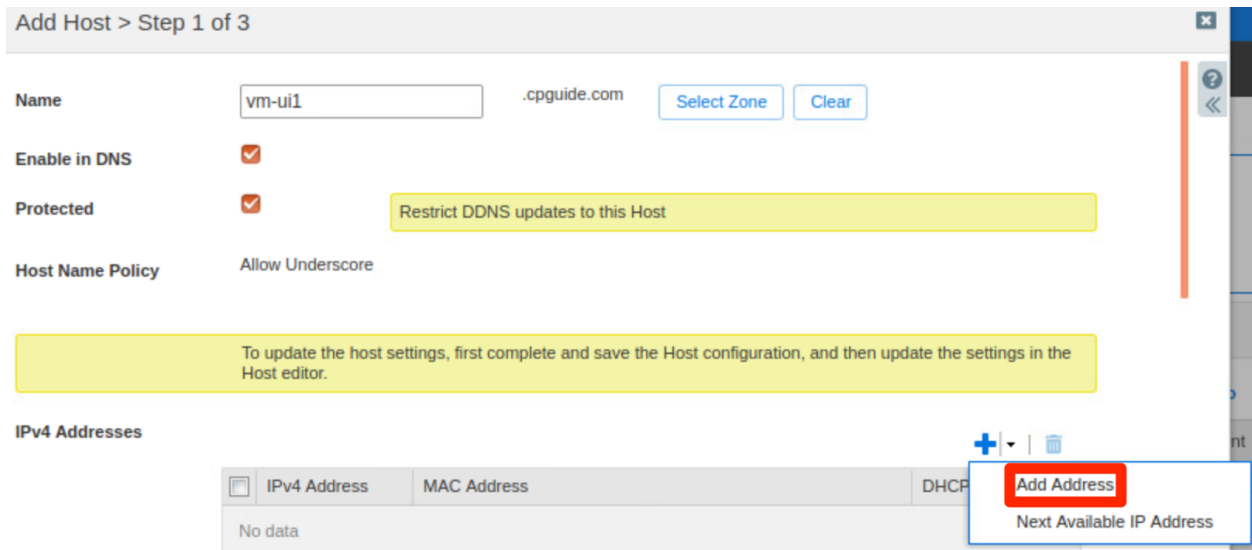
1. In the Grid Manager, navigate to the **Data Management** → **DNS** → **Zones** tab.
2. Use the network view dropdown to select the **cp1view** network view.
3. Click on the authoritative zone to view.



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.

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

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

Add Host > Step 1 of 3

Name .cpguide.com [Select Zone](#) [Clear](#)

Enable in DNS

Protected Restrict DDNS updates to this Host

Host Name Policy Allow Underscore

To update the host settings, first complete and save the Host configuration, and then update the settings in the Host editor.

IPv4 Addresses + | 🗑️

<input type="checkbox"/>	IPv4 Address	MAC Address	DHCP
<input checked="" type="checkbox"/>	1.1.1.103		<input type="checkbox"/>

[Cancel](#)
[Previous](#)
[Next](#)
[Schedule for Later](#)
[Save & Close](#)

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

13. Click **Save & Close**.

Add Host > Step 2 of 2

Extensible Attributes + | 🗑️

<input type="checkbox"/>	Attribute Na...	Value	Inheritance State	Required
<input type="checkbox"/>	Cloud API ...	False	Disabled	No
<input type="checkbox"/>	CMP Type	Openstack	Disabled	No
<input type="checkbox"/>	Tenant ID	Dev	Disabled	No
<input checked="" type="checkbox"/>	VM ID	<input type="text" value="vm-ui1"/>	Disabled	No

[Cancel](#)
[Previous](#)
[Next](#)
[Save & Close](#)

14. The new Host record has been added.

cpguide.com Cloud Authoritative Zone

Records Subzones

Quick Filter: None Filter On Show Filter Toggle flat view

Name	Type	Data	Record Source	Cloud API Owned
	SOA Record	Serial: 2 MNAME: cp1.ibxdemo.com RNAME: please_set_email.absolutely.now Refresh: 10800 Retry: 3600 Expire: 2419200 Negative Caching TTL: 900	System	
	NS Record	cp1.ibxdemo.com	System	
vm-ui1	Host	1.1.1.103	Static	False
vm1	Host	10.10.10.11	Static	True

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

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


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

16. Click the  (delete button).

cpguide.com Cloud Authoritative Zone

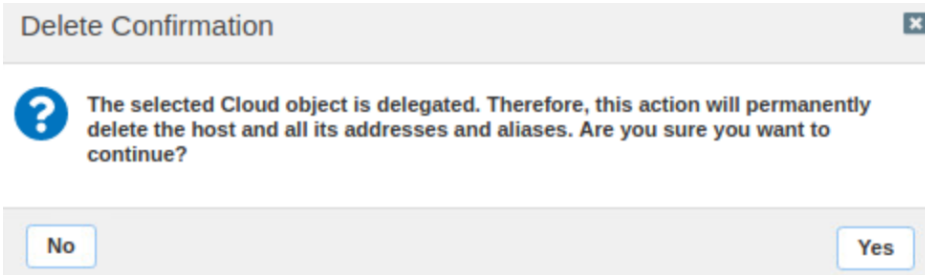
Records Subzones

Quick Filter: None Filter On Show Filter Toggle flat view

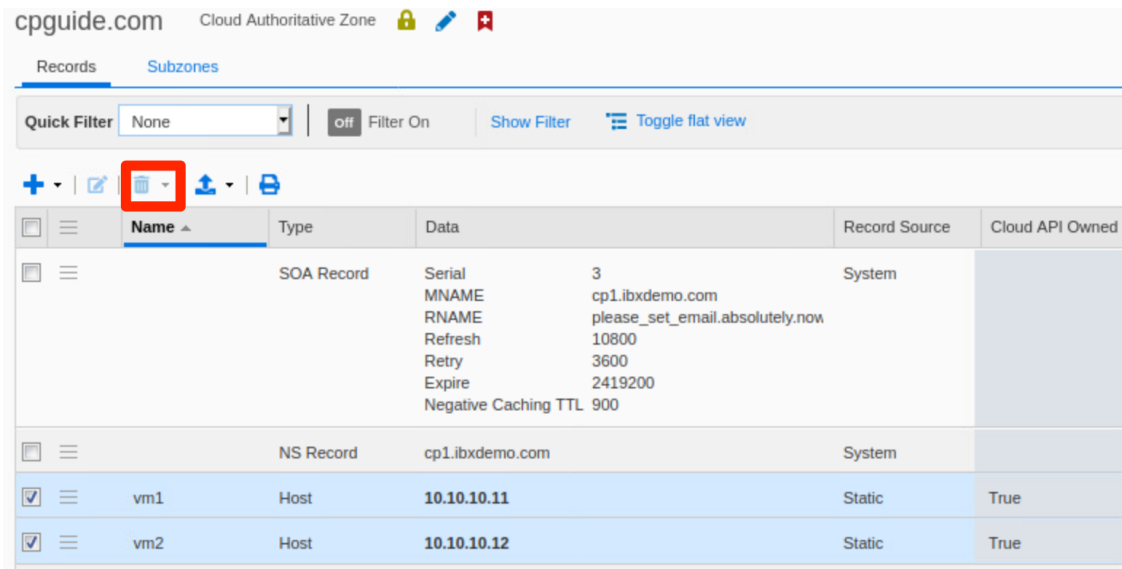


Name	Type	Data	Record Source	Cloud API Owned
	SOA Record	Serial: 2 MNAME: cp1.ibxdemo.com RNAME: please_set_email.absolutely.now Refresh: 10800 Retry: 3600 Expire: 2419200 Negative Caching TTL: 900	System	
	NS Record	cp1.ibxdemo.com	System	
<input checked="" type="checkbox"/> vm-ui1	Host	1.1.1.103	Static	False
<input type="checkbox"/> vm1	Host	10.10.10.11	Static	True

17. In the Delete Confirmation dialog, click Yes.



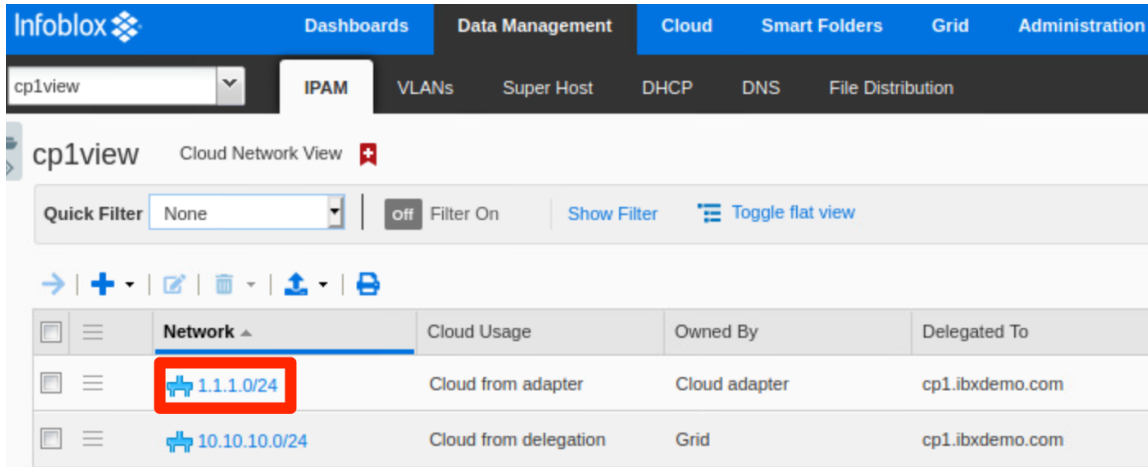
Note: You cannot delete multiple delegated records at once. If you select multiple records, the delete button is grayed out.



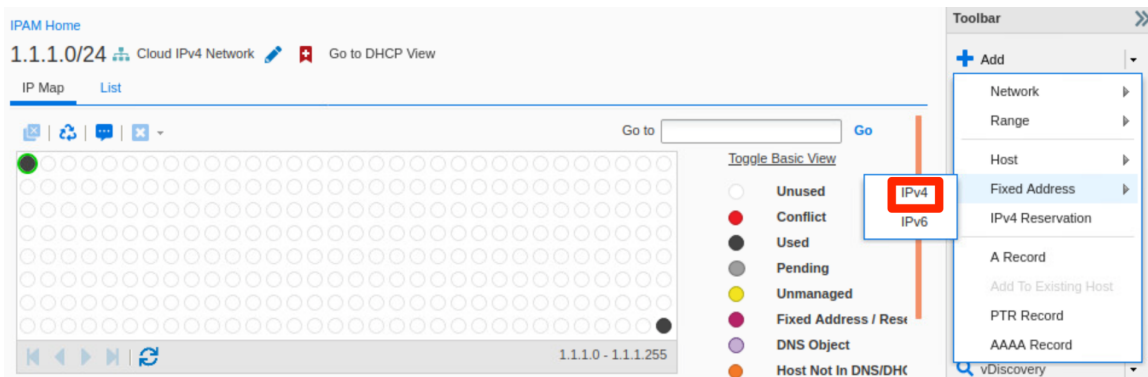
Create Fixed Address

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

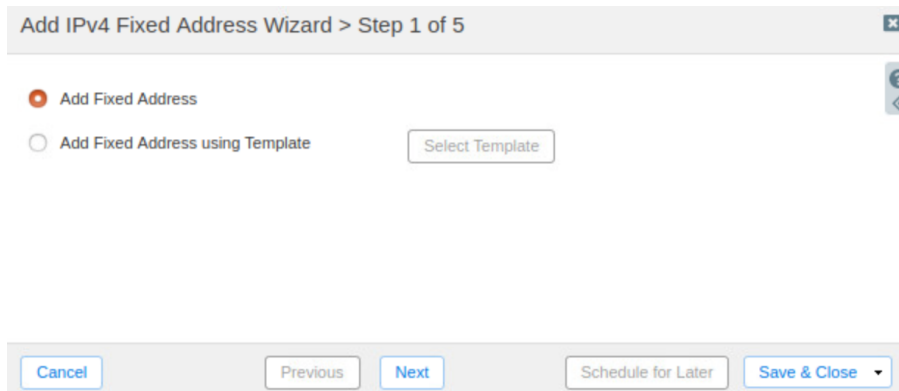
1. In the Grid Manager, navigate to the **Data Management** → **IPAM** tab.
2. If necessary, Use the network view dropdown to select the **cp1view** network view.
3. Click on a network to view.



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**.

The screenshot shows the 'Add IPv4 Fixed Address Wizard' at Step 2 of 4. The form includes the following fields and options:

- *Network:** 1.1.1.0/24 (255.255.255.0) with 'Select Network' and 'Clear' buttons.
- *IP Address:** 1.1.1.21 with a 'Next Available IP' button that is grayed out.
- *Assign IP Address by:** Radio buttons for 'MAC Address' (selected), 'DHCP Client Identifier', and 'DHCP Relay Agent'. The 'MAC Address' field contains 'aa:bb:cc:11:22:33'. The 'DHCP Relay Agent' field has a 'Circuit ID' dropdown and an empty text input.
- Name:** vm-ui2
- Comment:** An empty text input field.
- Disabled:** An unchecked checkbox.

At the bottom, there are buttons for 'Cancel', 'Previous', 'Next', 'Schedule for Later', and 'Save & Close'.

Note: The Next Available IP function is not available when adding a fixed address to a delegated network in the UI and is grayed 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**.

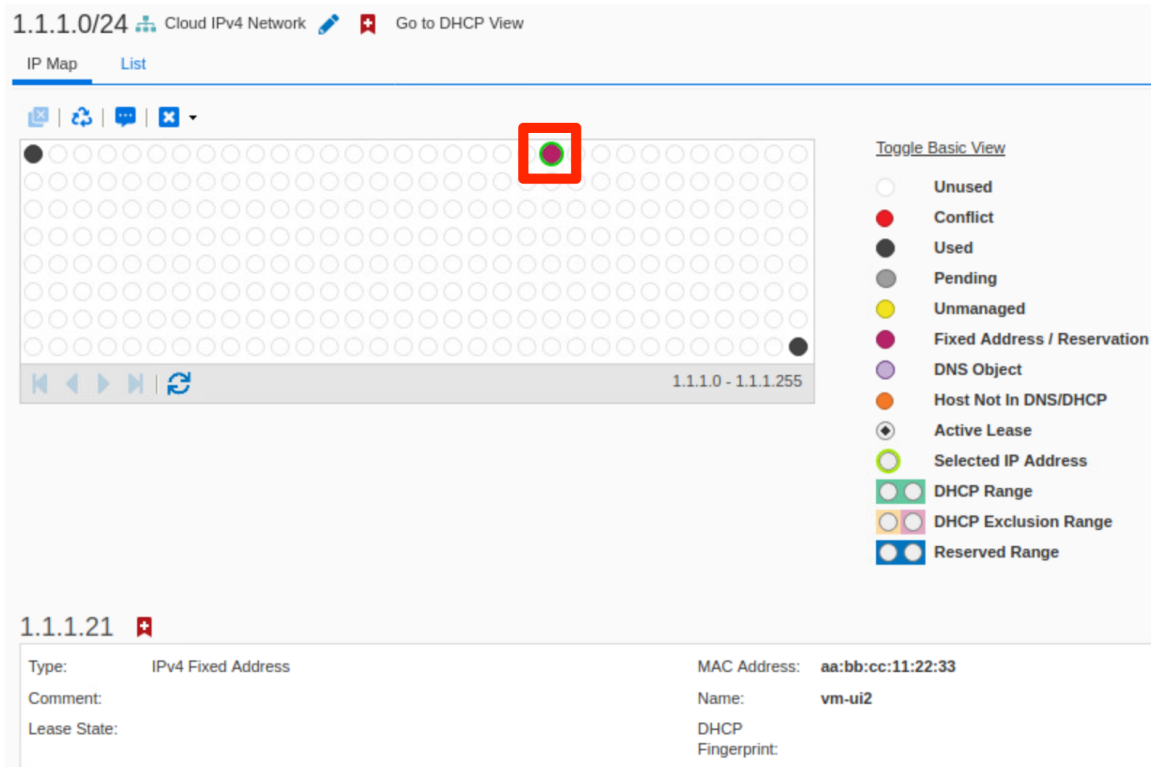
13. Click **Save & Close**.

The screenshot shows the 'Add IPv4 Fixed Address Wizard' at Step 4 of 4. The 'Extensible Attributes' table is the main focus:

<input type="checkbox"/>	Attribute Na...	Value	Inheritance State	Required
<input type="checkbox"/>	Cloud API ...	False	Disabled	No
<input type="checkbox"/>	CMP Type	Openstack	Disabled	No
<input type="checkbox"/>	Tenant ID	Dev	Disabled	No
<input checked="" type="checkbox"/>	VM ID	vm-ui2	Disabled	No

At the bottom, there are buttons for 'Cancel', 'Previous', 'Next', and 'Save & Close'.

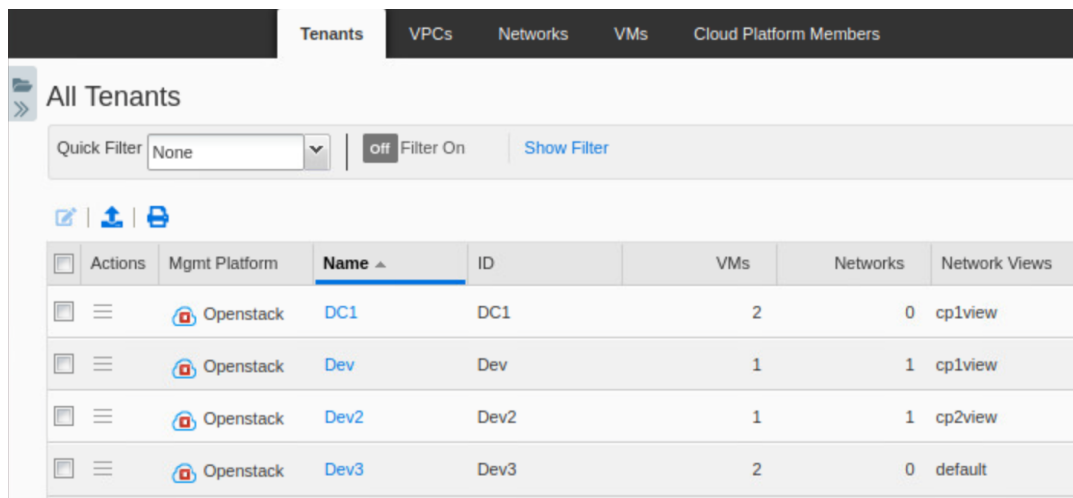
14. The fixed address has been added. Click on the address in the IP Map to view details.



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.

Actions	Mgmt Platform	VPC Name	Networks	Network View	VMs	Tenants	Cloud Usage
	Amazon	VPC-01	2	default	1	1	Used by cloud
	Amazon	VPC-02	4	default	2	1	Used by cloud

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

Actions	Network	Tenant	Cloud Usage	Owned By	Delegated To	Network View	Mgmt Platform
	1.1.1.0/24	Dev	Cloud from ad...	Cloud adapter	cp1.ibxdemo.com	cp1view	Openstack
	1.1.1.0/24	Dev2	Cloud from ad...	Cloud adapter	cp2.ibxdemo.com	cp2view	Openstack
	10.10.10.0...		Cloud from del...	Grid	cp1.ibxdemo.com	cp1view	

- **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.

Actions	Mgmt Platform	VM Name	VM ID	IP Address	IP Address Object Type	FQDN	Networks
	Openstack	Server1	VM-ID-4	2.2.2.1	A Record	server1.newzone.com	0
	Openstack	Server2	VM-ID-5	2.2.2.2	A Record	server2.newzone.com	0
	Openstack	LinuxVM3	VM-ID-3	1.1.1.11	Host	vm3.cp2.com	1
	Openstack	LinuxVM2	VM-ID-2	10.10.10.12	Host	vm2.cp2.com	1
	Openstack	vm-ui2	vm-ui2	1.1.1.21	IPv4 Fixed Address		1

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

Actions	Name	Status	Comment	IPv4 Address
	cp1.ibxdemo.com	Running		172.16.1.4
	cp2.ibxdemo.com	Running		172.16.1.5

Cloud Dashboard and Report

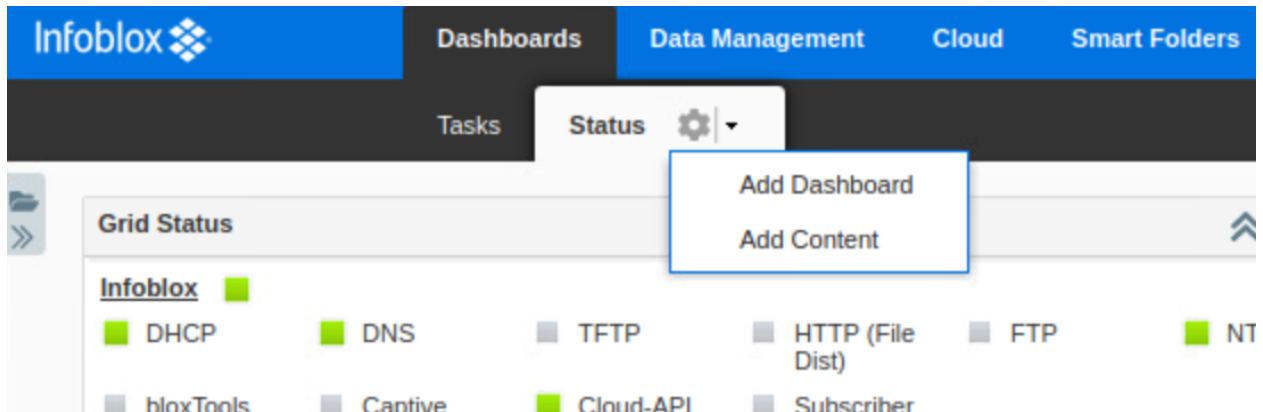
To give you further insight into your hybrid infrastructure, the Infoblox Cloud Network Automation license enables a Cloud Statistics widget for your Grid Manager dashboards. This includes statistics for IP address utilization by tenant and IP type (fixed/floating). Cloud networks are also added to the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


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

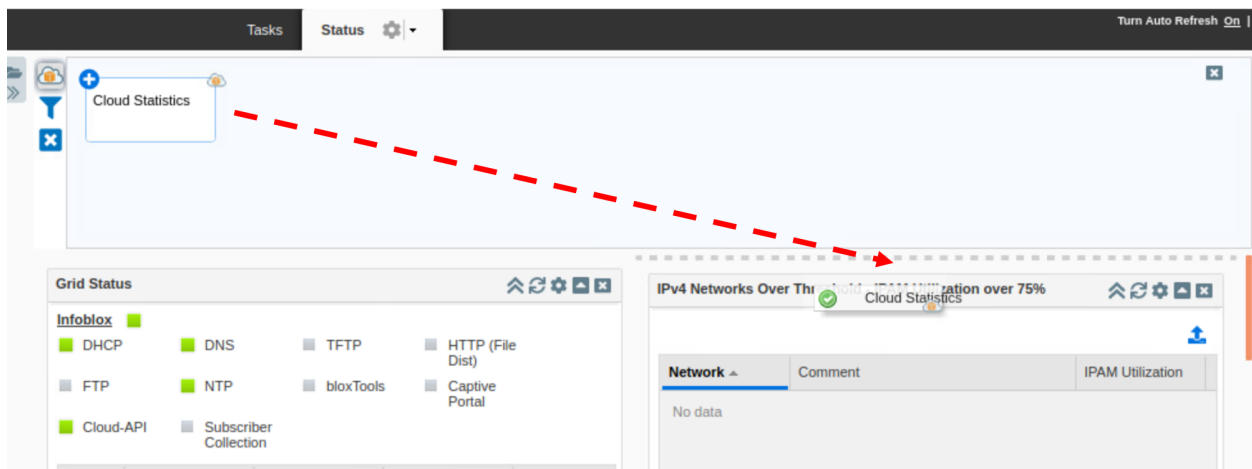
For additional information on dashboards and reports, refer to Infoblox NIOS documentation at <https://docs.infoblox.com>.

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.

Cloud Statistics > All Tenants

Show Statistics From:
 All Tenants
 Select Tenant

Show:
 All IP Addresses
 Fixed
 Floating

Auto Refresh Period seconds

Tenant & VMs Fixed vs. Floating Available vs. Allocated

4	2	2	Average per Tenant
	6	6	
Tenants	Cloud VMs	IP Addresses	

Refresh 60 seconds Last updated: 2020-12-08 11:01:02 PST

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

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


Cloud Statistics > All Tenants

Show Statistics From:
 All Tenants
 Select Tenant

Show:
 All IP Addresses
 Fixed
 Floating

Auto Refresh Period seconds

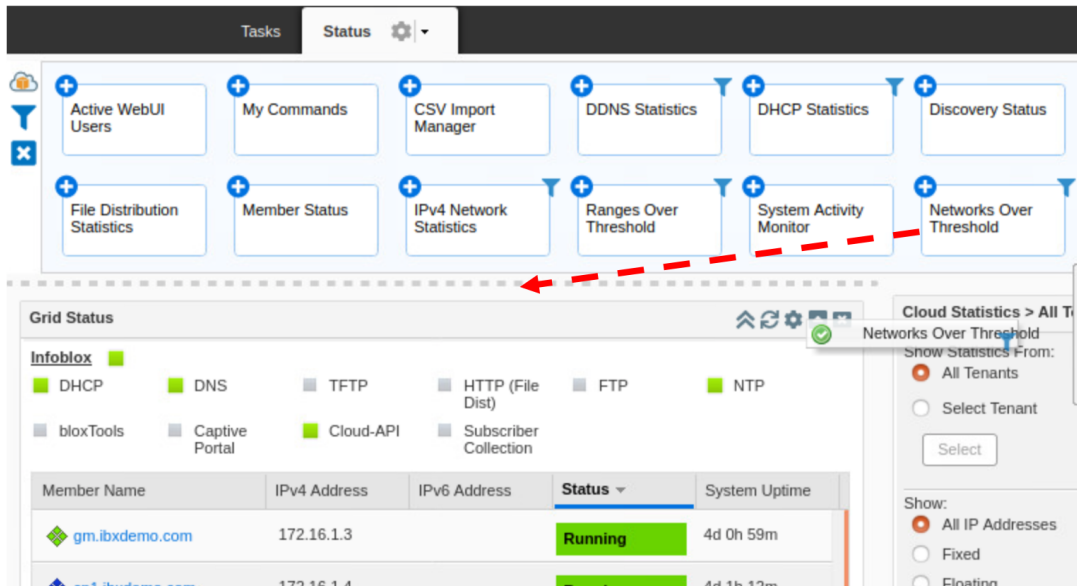
Tenant & VMs Fixed vs. Floating **Available vs. Allocated**

	502	6
IP Address Allocation	Available	Allocated

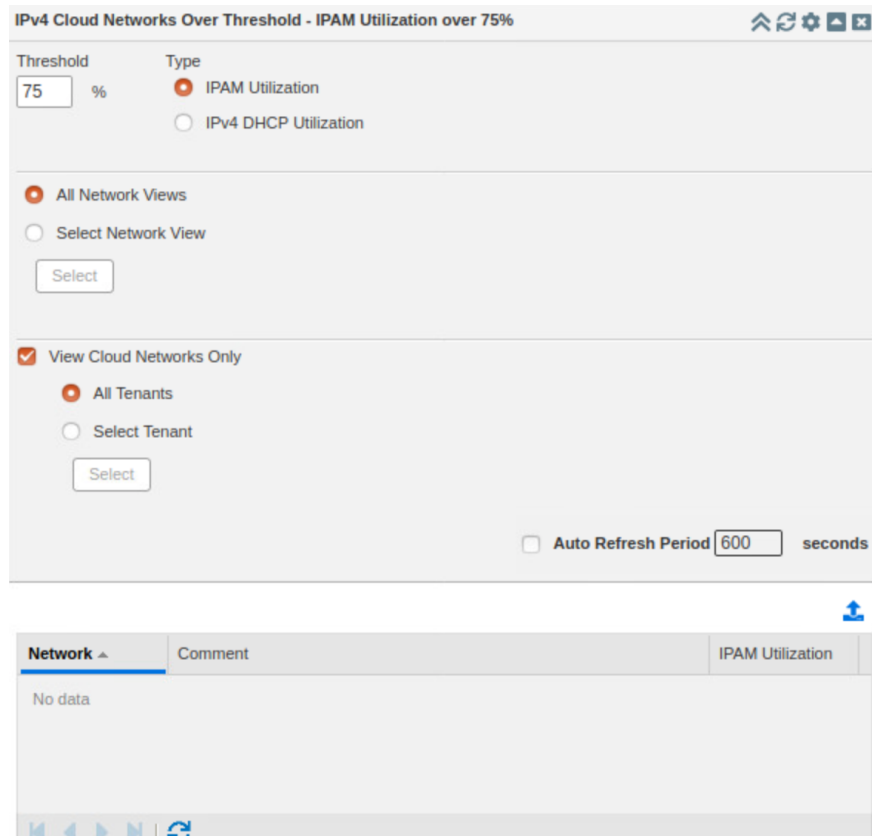
Refresh 60 seconds Last updated: 2020-12-08 11:43:50 PST

- 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 unites networking and security to deliver unmatched performance and protection. Trusted by Fortune 100 companies and emerging innovators, we provide real-time visibility and control over who and what connects to your network, so your organization runs faster and stops threats earlier.

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