Deployment Guide

Infoblox IPAM Plugin 1.1 for VMware vRA 8.1
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Introduction
The Infoblox IPAM plugin for vRealize Automation 8.1 integrates IP address allocation and DNS record creation into your Cloud Assembly deployments. The Plugin also lets you create On-demand networks which can be used for IPAM and DNS functionality, making delivery/deployment of Enterprise IT applications completely seamless. The plugin is available on the VMware Solution Exchange and uses extensibility actions to retrieve IP data from the Infoblox grid as well as update the grid with host records and other data for deployed virtual machines (VM) and networks.

Prerequisites
The Following prerequisites need to be met as part of this document to use Infoblox Plugin for vRA 8.1:

- A VMware private cloud with vSphere suite. The environment used for this document consists of 2 ESXi 6.5 servers, with vCenter running as a virtual machine.
- A fully configured network setup in vCenter.
- Fully installed vRealize Suite Lifecycle Manager (LCM), VMware Identity Manager (IDM), and vRealize Automation 8.1. It is recommended to use vRealize Easy Installer to deploy these in a few simple steps. Refer to VMware documentation for further information.
- At least one Infoblox NIOS or vNIOS appliance that supports a minimum wapi version of 2.7.
- Infoblox grid configured for IPAM and DNS.

Workflow
The following outline describes the basic steps needed to install, configure, and use the Infoblox IPAM plugin for vRA 8.1.

1. Configure the Infoblox grid.
2. Install the Infoblox plugin in vRA 8.1.
3. Create templates and customization specs in vCenter.
4. Add resources in vRA Cloud Assembly
5. Create blueprints in vRA Cloud Assembly.
6. Create a deployment from a blueprint.
7. Delete the deployment.

NIOS Setup
This section covers the steps to set up your Infoblox grid prior to installing and using the Infoblox plugin for vRA 8.1. This will cover five steps: create a DNS zone, create a network, create a network container, create a cloud API account, and add extensible attributes.

Create DNS Zone
In order to automatically assign DNS records to new virtual machines created through vRA deployments, we need to create an authoritative DNS zone to use for this. When we create a network, we will set this zone as the default domain for its DHCP options.

1. Login to Infoblox Grid Manager.
2. Navigate to the Data Management -> DNS tab.
3. Click the Add dropdown, select Zone -> Authoritative Zone.
4. On Step 1 of the wizard, select **Add an authoritative forward-mapping zone**, click **Next**.

5. On Step 2, enter a name for the zone, such as *infobloxguide.local*. Click **Next**.

6. On Step 3 of the wizard, select **Use this set of name servers**.
7. Click the dropdown and select **Grid Primary**.

8. Click **Select**. If you have multiple members in the grid, select one from the popup window. If you have only one member, it will be selected automatically.

9. Click **Add**.

10. Click **Save & Close**.

11. In the warning bar at the top of Grid Manager, click **Restart**.

12. In the Restart Grid Services window, click **Restart**.
Create Network

Next, we will create a network in the Infoblox grid to use for allocating IP addresses to VMs deployed through vRA 8.

1. Navigate to the Data Management -> IPAM tab.
2. Click the Add dropdown, select Network -> IPv4.
3. On Step 1 of the wizard, select Add Network -> Manually, and click Next.
4. Enter in your desired Netmask, such as 24.
5. Click the + to add a new network ID, such as 172.27.1.0.
6. Select the checkbox for Automatically Create Reverse-Mapping Zone.
7. Click **Next**.
8. On Step 3, click the **+** to add an Infoblox member to manage the network.
9. If you have multiple members in the grid, select one from the popup window. If you have only one member, it will be selected automatically.

10. Click **Next**.
11. On Step 4, first set the default router for the network by clicking **Override** in the Routers box.
12. Under IP Address, enter the default gateway for your network.

13. Scroll down and click Override in the Domain Name box.

   The plugin will not be able to read inherited options. The Domain Name option must be overridden and set at the network and/or range levels; otherwise, updates from the plugin will fail.

14. Enter the domain name from the zone you created earlier, for example infobloxguide.local.
15. Click Override in the DNS Servers box.
16. Enter the IP address of your Infoblox DNS server.

17. Click Save & Close.
18. In the warning bar at the top of Grid Manager, click **Restart**.

19. In the Restart Grid Services window, click **Restart**.

---

**Create Network Container**

In this step, we will create a network container to hold networks created by vRA deployments. When we create on-demand networks through vRA Cloud Assembly, smaller blocks of IP space will be allocated from this container for subnets.

1. From the **Data Management** -> **IPAM** tab, click the **Add** dropdown, select **Network** -> **IPv4**.
2. On Step 1 of the wizard, select **Add Network Container**.

3. Click Next.
4. Enter in your desired Netmask, such as **16**. *Allow for a large block of address space as this will be subnetted later.*
5. Click the **+** to add a new network ID, such as **172.30.0.0**.
6. Click **Save & Close**.
7. Select the new Network Container and click **Edit** in the action menu.
8. In the edit window, open the **IPv4 DHCP Options tab**.
9. Using the **Override** buttons, set the Router, Domain Name, and DNS Server for this network block.
Create Cloud API Account

Any admin account with access to the cloud API can be used for the Infoblox plugin for vRA 8.1, including the default admin account. As a best practice, an account with the least required privileges should be used. This account will need Read/Write permissions for the network objects, DNS zones, and reverse DNS zones that will be used. It will also need permission to Read the grid DHCP properties.

This section will detail how to set up a cloud admin account and give permissions to the cloud-api-only admin group for use with the vRA 8.1 Infoblox plugin.

Create Account

1. Navigate to the Administration -> Administrators tab.
2. Click the + to add a new admin user.
3. In the wizard, select Local for Authentication Type.
4. Enter a name and password for the admin account.
5. Next to Admin Group, click **Select**.
6. In the Admin Group Selector window, click on the **cloud-api-only** group.

   ![Admin Group Selector](image)

   **Admin Group Selector**

<table>
<thead>
<tr>
<th>All Admin Groups</th>
<th>Filter On</th>
<th>Show Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Directory Sites</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Mac OS Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflicts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discovered Switches/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaming Console Device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsoft Windows Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Router and Wireless Access Points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smartphone, PDA, Tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmanaged</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Find: [ ] Go

<table>
<thead>
<tr>
<th>Name</th>
<th>Superuser</th>
<th>Comment</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin-group</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cloud-api-only</td>
<td>No</td>
<td>Admins allow...</td>
<td></td>
</tr>
<tr>
<td>saml-group</td>
<td>No</td>
<td>Admins allow...</td>
<td></td>
</tr>
<tr>
<td>splunk-reporting-g</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Back in the Add Administrator Wizard, click **Save & Close**.

### Set Permissions

1. Navigate to the **Administration -> Permissions** tab.
2. In the Groups column, click on the **cloud-api-only** group.

   ![Set Permissions](image)

   **Set Permissions**

   1. Navigate to the **Administration -> Permissions** tab.
   2. In the Groups column, click on the **cloud-api-only** group.

3. Click on the **+** dropdown and select **Object Permissions**.

   ![Object Permissions](image)
4. Click **Select Object(s)**.

5. In the object filter, select **IPv4 Network** from the dropdown list.

6. Type the first octet of your network in the search bar.

7. Click on **Search**.
8. Click on the network you created earlier or select its checkbox and click **Select**.
9. In the Create Object Permissions window, select **Read/Write** next to the resource.
10. Select **Read/Write** for IPv4 Host Addresses, IPv4 DHCP Ranges, and IPv4 Fixed Addresses/Reservations.
11. Click **Save & Close**.
12. Repeat steps 3 through 11 to add the same permissions for your network container. Use **IPv4 Network Container** for the Type in the search filter.
13. Click on the + dropdown and select Object Permissions.
14. Click Select Object(s).
15. In the object filter, select All Zones from the dropdown list.
16. Type the first part of your DNS zone name in the search bar.
17. Click on Search.

18. If needed, drag to expand the Name column to view the entire name.
19. Click on the DNS zone you created earlier or select its checkbox and click Select.
20. In the Create Object Permissions window, select Read/Write next to the resource.
21. Select Read/Write for Host, A Records, and PTR.

22. Click Save & Close.
23. Click on the + dropdown and select Object Permissions.
24. Click Select Object(s).
25. In the object filter, select **All Zones** from the dropdown list.
26. Type the first octet of your network in the search bar.
27. Click on **Search**.

28. Click on the reverse lookup zone you created earlier.
29. In the Create Object Permissions window, select **Read/Write** next to the resource.
30. Select **Read/Write** for Host and PTR.

31. Click **Save & Close**.
32. Click on the **+** dropdown and select **Global Permissions**.
33. In the Permission Type dropdown, select **DHCP Permissions**.

34. Select **Read-Only** for Grid DHCP Properties.

35. Click **Save & Close**.

**Add Extensible Attributes for vRA Plugin**

The Infoblox plugin for vRA 8 uses the following extensible attributes (EA) in the Infoblox grid to hold metadata for resources:

- **Tenant ID** (string)
- CMP Type (string)
- VM ID (string)
- VM Name (string)
- VMware NIC index (integer)
- VMware resource ID (string)

Many of these extensible attributes are added to the grid when you install the Cloud Network Automation (CNA) license. You will need to manually add VMware NIC index and VMware resource ID.

1. Navigate to the Administration -> Extensible Attributes tab in Grid Manager.

2. Click the to add a new extensible attribute.

3. In the wizard, enter VMware NIC index for the name.

4. Select Integer in the Type dropdown.

5. Click Save & Close.

6. Repeat the above steps using VMware resource ID for the name and String for the type.

7. Verify that all 6 extensible attributes listed above are present in your grid.
Install Infoblox Plugin in vRA 8.1

The Infoblox IPAM plugin for vRA 8.1 is available to download on the VMware Solution Exchange, https://marketplace.vmware.com. You will need a My VMware account to download the plugin. You can sign up for a free account on the site.

1. On the Solution Exchange site, use the product search box to search for Infoblox.
2. In the search results locate the vRA Cloud Infoblox Plugin, version: 1.1.

Note: The plugin is developed and published by VMware and works with both vRA 8.1 and vRA Cloud.

3. Follow links to download the plugin and save it to your computer.

Add Infoblox IPAM Provider

To install the Infoblox IPAM plugin:

1. Login to vRA and open the Cloud Assembly console.
2. Navigate to the Infrastructure tab.
3. In the left menu under Connections, select Integrations.
4. Click on Add Integration.
5. For type, select **IPAM**.

6. Enter a Name for the integration.
7. Click **Manage IPAM Providers**.
8. Click **Import Provider Package**.

9. Select the **Infoblox.zip** file you downloaded earlier.
10. Click **Open**.
11. Once the file loads, click **CLOSE**.
12. Click in the Provider search bar.
13. Select **Infoblox** from the list.

**IPAM Provider**
Specify IPAM provider for integration. Add new if no providers are registered in Cloud Assembly

![Provider Search Bar]

14. Enter the Username for the Cloud API User you created in NIOS.
15. Enter the Cloud API User's Password.
16. Enter the resource URL or IP address of your NIOS server.

17. Click **Validate**. 
18. If you get a popup regarding an untrusted certificate, click **Accept** to accept NIOS self-signed certificate.

**Untrusted Certificate Found**

![Certificate thumbprint]

<table>
<thead>
<tr>
<th>Certificate thumbprint</th>
<th>Common name:</th>
<th>Issued by</th>
<th>Expires</th>
</tr>
</thead>
</table>

19. Wait for the validation to complete.
20. Once you see the “Credentials Validated Successfully”, click **Add** to finish installing the plugin.

![Validation success]

21. The plugin will begin running the extensibility action Infoblox_GetIPRanges.
22. To monitor the progress, from the **Infrastructure -> Integrations** page, click **OPEN** on your new integration.

![Integrations page]

23. View progress under Status.
Create Resources in vCenter

Prior to configuring resources and deploying blueprints using vRA and the Infoblox plugin, you will need at least one virtual machine template and one VM customization specification in vCenter.

Create Template

Use your preferred method to create a VM template. For the template to work properly with vRA and the Infoblox plugin, ensure:

- VMware tools are installed on the VM. OS customization will not work without this.
- Perl is installed on the VM. OS customization will not work without this.
- The network interface (NIC) for the VM is set to "Connect at Power On".

The template used for this document uses CentOS 7 with a single NIC and open vm tools installed.

Create VM Customization Specification

Customization Specifications are XML files that allow you to customize the configuration of guest operating systems when deploying new VMs. This guide demonstrates creating a specification for Linux VMs. Steps for Windows VMs will differ slightly but the same settings shown here should be applied.

1. Login to the vSphere Client.
2. From the Home menu, Navigate to Policies and Profiles.
3. Click on **New** to create a Customization Specification.

4. In the wizard, enter a name for the customization specification.
5. Select **Linux** as the Target guest OS.
6. Click **NEXT**.
7. On the Computer name page, ensure **Use the virtual machine name** is selected.
8. For Domain name, enter the domain you created earlier, for example: infobloxguide.local.
9. Click **NEXT**.

New VM Customization Specification

- **Computer name**
  - Specify a computer name that will identify this virtual machine on a network.
  - **Use the virtual machine name**
  - Enter a name in the Clone/Deploy wizard
  - Enter a name

- **Domain name** infobloxguide.local

10. On the Time zone page, select your Area and Location for the Time Zone. Click **NEXT**.
11. On the Network page, ensure "**Use standard network settings for the guest operating system, including enabling DHCP on all network interfaces**" is selected.
12. Click **NEXT**.
13. On the DNS settings page, enter an IP address for your Primary DNS server.
14. Under DNS Search Paths, enter the local domain you created earlier and click **ADD**.
15. Click **NEXT**.

16. On the final page, click **FINISH**.
Configure Resources in vRA Cloud Assembly

This section will detail the configuration of the minimal resources needed in vRealize Automation Cloud Assembly to deploy VMs and networks using the Infoblox plugin. The tags assigned when creating some of these resources are particularly important as they will inform the blueprint deployment which resources to use. The configuration items and resources needed are:

- Cloud Zone
- Project
- Image Mapping
- Network Profiles

Create Cloud Zone

According to the in-application documentation, a Cloud Zone defines the compute resources that can be used for provisioning virtual machines. Cloud Zones also allow you to define capabilities by adding tags that will be matched when deploying blueprints.

1. Login to vRA and open Cloud Assembly.
2. Open the Infrastructure tab.
3. Navigate to Cloud Zones under Configure.
4. Click on NEW CLOUD ZONE.
5. On the Summary tab, select your Account / region from the dropdown.
6. Enter a name for the Cloud Zone.
7. Add two Capability tags such as `infoblox-demo` and `infoblox2`. The tags can have any name you choose. You will add these same tags to other resources in later steps to differentiate between them in your blueprints.

8. Click **CREATE**.
Create Project

According to the in-application documentation, Projects are groups that control which users can utilize which resources.

1. Click on Projects under Configure.
2. Click NEW PROJECT.
3. On the Summary tab, enter a name for your Project.
4. Open the Users tab.
5. Click on ADD USERS.
6. Type the first few letters of your vRA username in the search box. Select your user.
7. Use the Assign role dropdown to select Administrator.
8. Click ADD.
9. Open the **Provisioning** tab.
10. Click **ADD CLOUD ZONE**.
11. Select your Cloud zone from the list.
12. Click **ADD**.

13. Add the same Tags you used for the Cloud Zone.
14. Scroll down and enter \$\{resource.name\}-\$\{###\} for the Custom Naming Template. *This will be used for VM DNS host names, using the name we give in the blueprint concatenated with a random 3-digit number.*

![Custom Naming](image1)

**Custom Naming**
Specify the naming template to be used for machines provisioned in this project.

<table>
<thead>
<tr>
<th>Template</th>
<th>${resource.name}-${###}</th>
</tr>
</thead>
</table>

**Request Timeout**
If this project team is deploying blueprints that need more than 2 hours to provision, you can specify an extended period before the deployment fails. If both the blueprint and the project include timeout values, the largest value takes precedence.

<table>
<thead>
<tr>
<th>Timeout</th>
<th>Example: 1s, 2h, 3m, 5s</th>
</tr>
</thead>
</table>

15. Click **CREATE**.

**Create Image Mapping**
Image Mappings specify VM images that will be used when deploying from blueprints.

1. Click on **Image Mappings** under Configure.
2. Click **NEW IMAGE MAPPING**.
3. Enter a name.
4. Under Configuration, search for or select your Account / Region from the dropdown.
5. Select an Image which meets the requirements discussed in the Create Resources in vCenter section of this document.

![Create Image Mapping](image2)

**New Image Mapping**
Define one or many images or machine templates for a specific name. You can also define images or machine templates for a specific region.

<table>
<thead>
<tr>
<th>Image name</th>
<th>Infoblox-Demo</th>
</tr>
</thead>
</table>

**Configuration**

<table>
<thead>
<tr>
<th>Account / Region</th>
<th>Image</th>
<th>Constraints</th>
<th>Cloud Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>@vcenter.infobloxdemo.com / Tacoma</td>
<td>CentOS6</td>
<td>Example: license.name, hard</td>
<td>![ADD Button]</td>
</tr>
</tbody>
</table>

6. Click **CREATE**.

**Create Network Profiles**
According to the in-application documentation, a Network Profile defines networks and settings used when provisioning VMs. As a step in creating the Network Profile, we will map an IP range designated in our Infoblox grid to be used for our VM network. We will create two network profiles, one for an existing network and one for creating on-demand networks.
Profile for Existing Network

1. Click on **Network Profiles** under Configure.
2. Click **NEW NETWORK PROFILE**.
3. On the Summary tab, select your Account / region.
4. Enter a Name for the profile.
5. Add a capability tag matching the first one you used for the Project and Cloud Zone, for example **infoblox-demo**.

### New Network Profile

**Summary**

A network profile defines a group of networks and network settings used when machines are provisioned.

<table>
<thead>
<tr>
<th>Account / region</th>
<th>vsae.infobloxdemo.com / Teloma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Infoblox-Demo</td>
</tr>
</tbody>
</table>

**Capabilities**

Capability tags listed here are matched to constraint tags in the blueprint.

- **infoblox-demo**

**Networks** tab

- Click **ADD NETWORK**.
- Select your Distributed Port Group.
- Click **OK**.

10. Select your network and click **MANAGE IP RANGES**.
11. Click **NEW IP RANGE**.

**Manage IP Ranges**

Defines the set of IP addresses that can be reserved during provisioning.

![IPAM Plugin](image)

12. Select **External** for Source.
13. Next to Provider, search for the plugin integration you added earlier.
14. Next to Address Space, select **default** from the dropdown.

**Add IPAM IP Range**

<table>
<thead>
<tr>
<th>Network</th>
<th>DPortGroup</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Provider</th>
<th>Infoblox</th>
</tr>
</thead>
</table>

| Address Space | default |

15. Select the checkbox for the network you created earlier in your Infoblox grid.
16. Click **ADD**.
17. Close the Manage IP Ranges window.
18. Click CREATE.

New Network Profile

Profile for On-demand Networks

1. Click NEW NETWORK PROFILE.
2. On the Summary tab, select your Account / region.
3. Enter a Name for the profile.
4. Add a capability tag matching the second one you used for the Project and Cloud Zone, for example infoblox2.
5. Open the **Network Policies** tab.
6. For Isolation Policy, select **Create an on-demand network** from the dropdown.
7. Choose a Network domain (from your domains in vCenter).
8. For Source, select **External**.
9. Next to IP blocks, click **ADD IP BLOCK**.

10. For IPAM integration, select **Infoblox**.
11. For Address Space, select your network view, for example **default**.
12. Select the checkbox for the Network Container you created in the Infoblox grid.
13. Click **ADD**.
14. For Subnet size, select a size from the dropdown. This size should create subnets that fit inside your network container. For example, if the network container is a /16, set the subnet size to /24. *If the subnet is not a smaller IP space than the network container, the deployment will fail.*

15. Click **CREATE**.

**Create Blueprints in vRA Cloud Assembly**

Next, we will create two blueprints to utilize the Infoblox plugin for IPAM and DNS configuration on VMs and allocate IP space for on-demand networks.

**Create Blueprint to use Existing Network**

1. In vRA Cloud Assembly, open the **Design** tab.
2. Select **Blueprints** in the left menu.
3. Click on **NEW**.
4. Enter a Name for the blueprint.
5. Select your Project.
6. Click **CREATE**.

**Add Resources**

To add resources to the blueprint, drag and drop them from the resource menu onto the canvas.

1. Locate the Network and Machine resources, under vSphere.
2. Drag and drop the Network resource onto the canvas.
3. Drag and drop the Machine resource onto the canvas. You may see a red warning message on the VM resource; you can safely ignore this for now.

4. Click the connection point on the Network resource and drag to connect it to the VM.

**Configure Properties and Inputs**

Properties and inputs for blueprint resources can be configured by adding YAML code or using Properties and Input tabs in the blueprint editor. We will use some of each for this document.

1. Highlight the VM resource in the canvas.
2. Click on the **Inputs** tab on the right side of the blueprint window.
3. Click **NEW**.
4. For Name, enter **hostname**.
5. For Title, enter **hostname**.
6. Set Type to **string**.

7. Scroll down and set a Default Value.
8. Click **CREATE**.
9. Click on the **Code** tab.
10. Click between the quotes next to image:
11. Select or type the name of the Image Mapping you created earlier.

```
formatVersion: 1
inputs:
  hostname:
    type: string
    title: hostname
    default: host

resources:
  Cloud.vSphere_Machine_1:
    type: Cloud.vSphere.Machine
    properties:
      image: 'Infoblox-Demo'
      properties:
        Cloud.vSphere_Machine_1:
          type: Cloud.vSphere.Network
          properties:
            networkType: existing
```

12. Create a new line below image.
13. Specify your Customization Specification by entering `customizationSpec: <name-of-spec>`. Use the name of the Customization Specification you created in vCenter.
14. Create a new line below customizationSpec.
15. Specify the VM name by entering **name: \${input.hostname}**. *This uses the input you created earlier to name the VM.*

```
properties:
  image: 'Infoblox-Demo'
  name: \${input.hostname}
  cpuCount: 1
```

16. Add a new line under `network`.
17. Specify creation of a static IP by entering **assignment: static**.

```
resources:
Cloud_vSphere_Machine_1:
  type: Cloud.vSphere.Machine
  properties:
    image: 'Infoblox-Demo'
    customizationSpec: Infoblox-Demo
    name: \${input.hostname}
    cpuCount: 1
    totalMemoryMB: 1024
  networks:
    - network: '${resource Cloud_vSphere_Network_1.id}'
      assignment: static
```

18. Under the Network resource, add a new line under `networkType`.
19. Enter **constraints**:

20. Under constraints, enter **- tag: <tag-name>**. *This should be the tag you used when creating the Network Profile for an existing network.*

```
Cloud_vSphere_Network_1:
  type: Cloud.vSphere.Network
  properties:
    networkType: existing
  constraints:
    - tag: infoblox-demo
```

Your completed blueprint should look similar to the screenshot below, substituting names where appropriate.
21. Click **CLOSE**.

**Create Blueprint for On-Demand Networks**

1. Follow instructions from the previous section to create another blueprint with a different name.
2. Add two virtual machine resources, and a network resource. Connect both VMs to the network resource.
3. Add two inputs: hostname1 and hostname2.
4. Add a **name** line to each VM. Use the appropriate input, `$(input.hostname1)` for VM 1 and `$(input.hostname2)` for VM 2.
5. Specify the image for each VM.
6. Add a **customizationSpec** line for each VM. Use the name of the Customization Specification you created in vCenter.
7. Add **assignment: static** to the networks section for each VM.
8. For the network resource, **networkType**, enter **private**.
9. Add a constraint tag section for the network, using the tag which matches your on-demand network profile, for example **infoblox2**.

The completed blueprint should look similar to the one in the screenshots below, substituting names where appropriate.
**Deploy Blueprint in vRA Cloud Assembly**

Prior to deploying your blueprint, you can use the Test feature in vRA Cloud Assembly to verify that your blueprint is valid. To test, click the **TEST** button in the blueprint window.

Deploying a blueprint will create the associated resources. We can monitor the deployment and see actions taken by the Infoblox plugin in both vRA and the NIOS Grid Manager.

1. Open the blueprint you want to deploy.
2. Click the **DEPLOY** button.
3. In step 1 of the deployment window, enter a Name for the deployment.
4. Select or search for a Blueprint Version.

---

**Code section of blueprint.**

```plaintext
formatVersion: 1
inputs:
  hostname1:
    type: string
    default: Host1
    title: VM1-Name
  hostname2:
    type: string
    default: Host2
    title: VM2-Name
resources:
  Cloud_vSphere_Machine_1:
    type: Cloud.vSphere.Machine
    properties:
      image: CentOS
      cpuCount: 1
      totalMemoryMB: 1024
      customizationSpec: Linux
      name: '${input.hostname1}'
      networks:
        - network: '${resource.Cloud_vSphere_Network_1.id}'
          assignment: static
  Cloud_vSphere_Machine_2:
    type: Cloud.vSphere.Machine
    properties:
      image: CentOS
      cpuCount: 1
      totalMemoryMB: 1024
      customizationSpec: Linux
      name: '${input.hostname2}'
      networks:
        - network: '${resource.Cloud_vSphere_Network_1.id}'
          assignment: static
  Cloud_vSphere_Network_1:
    type: Cloud.vSphere.Network
    properties:
      networkType: private
      constraints:
"```
5. Click **NEXT**.
6. On step 2, enter hostnames or leave the default.
7. Click **DEPLOY**.

You can monitor the progress of your deployment on the **Deployments** tab in vRA Cloud Assembly.
View Infoblox Extensibility Actions

As part of the deployment process, the Infoblox plugin will run certain actions based on the type of request submitted: Infoblox_AllocateIP, Infoblox_Update, and Infoblox_AllocateIPRange (for on-demand network creation).

1. To view the details on these actions, navigate to the Extensibility tab in vRA Cloud Assembly.
2. Click on Action Runs under Activity.
3. Select All runs from the dropdown.

4. To view details on any of the actions, click on them in the table.

5. You can view details of the inputs and outputs for the action which is useful in troubleshooting.
6. Click on the Log tab to view a sequential log of the action run.

This screenshot shows a portion of the log from the Infoblox_AllocateIP action. It shows the creation of a host record and allocation of an IP using the next available IP function.

7. Click CLOSE to go back to the list of actions.

8. Click on another action such as the Infoblox_Update to view details on how it updates the Infoblox Grid with data on the VMs created.

9. Use the same process to deploy and view your other blueprint.

View Details in Infoblox Grid Manager

To view the DNS and IPAM data automatically added to the Infoblox grid using the vRA integration, login to Grid Manager.

1. Navigate to the Data Management -> DNS -> Zones tab.
2. Click on the zone you created earlier to view it.
This screenshot shows the host record created for our new VM by the Infoblox_AllocateIP action.

3. To view extensible attributes added by the Infoblox_Update action, click the action menu next to the host record.
4. Select Extensible Attributes.
This screenshot shows the VMware specific attributes you created earlier, populated with data specific to the newly deployed virtual machine.

5. To view IPAM data for the new VM, navigate to the Data Management -> IPAM tab.
6. Click on the network created earlier to view details.

This screenshot shows the IP which was allocated to the VM. It also contains the MAC address of the VM, written to the grid with the Infoblox_Update action.

7. To view IPAM data for the on-demand network, navigate to the Data Management -> IPAM tab.
8. Click on your network container to open it.
9. Click on the new network, then click the to view details.
10. Click on any of the used IPs to view details.

This screenshot shows details of the newly created network, including IP use and details for VMs.

**View Deployment in vCenter**

To view the new virtual machine and verify the IP and hostname were assigned, login to the vSphere client. Navigate to **Hosts and Clusters**. Click on your new VM.
This screenshot shows the IP address and hostname assigned to the VM in vCenter.

You can also login to your VMs using the web console and use network commands such as `ip address show` to verify the IP address is assigned to your VM.

This screenshot shows the output of the `ip address show` command on a CentOS VM. Note the configured IP address allocated from Infoblox.

**Delete Deployment**

The Infoblox plugin for vRA 8.1 includes actions to deallocate IP addresses, IP ranges, and host records when deployments are deleted. To delete the deployment, login to vRA.

1. Navigate to **Cloud Assembly, Deployments** tab.
2. Click on your deployment to open it.
3. From the ACTIONS dropdown, select **Delete**.
4. Click **SUBMIT**.
6. You can view plugin actions related to deployment deletion by navigating to the **Extensibility** tab.

This screenshot shows the log from Infoblox_DeallocateIP action. The action has triggered deallocation of the IP address and deletion of the host record.

To verify host records and IPAM data for the deployment have been removed from the Infoblox grid, login to grid manager and navigate to appropriate Data tabs.

You can view this activity in Infoblox logs by navigating to **Administration -> Logs -> Syslog** or **Audit Log**.
**SysLog**

<table>
<thead>
<tr>
<th>Timestamp</th>
<th>Facility</th>
<th>Level</th>
<th>Server</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-04-27 12:15:15 PST</td>
<td>daemon</td>
<td>INFO</td>
<td>named[8869]</td>
<td>zone.ibxdemo.com/209 applied DELETE for host2: 209.90.64.2 (as host rps=0).</td>
</tr>
<tr>
<td>2020-04-27 12:15:15 PST</td>
<td>daemon</td>
<td>INFO</td>
<td>named[8869]</td>
<td>zone.ibxdemo.com/209 applied DELETE for host1: 209.90.64.3 (as host rps=0).</td>
</tr>
</tbody>
</table>

**Audit Log**

<table>
<thead>
<tr>
<th>Timestamp</th>
<th>Admin</th>
<th>Action</th>
<th>Object Type</th>
<th>Object Name</th>
<th>Execution Status</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-04-27 12:16:41 PST</td>
<td>cloud-admin</td>
<td>DELETED</td>
<td>IPv4 Networks</td>
<td>172.30.0.0/24</td>
<td>Normal</td>
<td>network_view=default:</td>
</tr>
<tr>
<td>2020-04-27 12:15:19 PST</td>
<td>cloud-admin</td>
<td>DELETED</td>
<td>Host</td>
<td>host2.ibxdemo....</td>
<td>Normal</td>
<td>DnsView=default address=172.30.0.2:</td>
</tr>
<tr>
<td>2020-04-27 12:15:19 PST</td>
<td>cloud-admin</td>
<td>DELETED</td>
<td>Host</td>
<td>host1.ibxdemo....</td>
<td>Normal</td>
<td>DnsView=default address=172.30.0.3:</td>
</tr>
</tbody>
</table>
Limitations

- The vRA 8.1 Infoblox IPAM plugin v1.1 is currently managed by VMware. The plugin is not officially supported by Infoblox. Infoblox is actively working towards certifying/providing support for this plugin.
- This document was tested in a vSphere 6.7 cloud environment, and not with Azure, AWS, or other cloud providers.
- Plugin functionality is currently limited to IP address allocation, network creation, and DNS record creation.

Additional Resources

Demo Video: [https://www.youtube.com/watch?v=u35vk81J8VE&feature=youtu.be](https://www.youtube.com/watch?v=u35vk81J8VE&feature=youtu.be)

Infoblox NIOS 8.5 Documentation: [https://docs.infoblox.com/display/nios85](https://docs.infoblox.com/display/nios85)


Infoblox enables next level network experiences with its Secure Cloud-Managed Network Services. As the pioneer in providing the world’s most reliable, secure and automated networks, we are relentless in our pursuit of network simplicity. A recognized industry leader, Infoblox has 50 percent market share comprised of 8,000 customers, including 350 of the Fortune 500.

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