DEPLOYMENT GUIDE

Enabling Microsoft AD Sites and Services

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Introduction

Infoblox enables network administrators to bi-directionally synchronize the Infoblox Grid™ with Microsoft Active Directory (AD) controllers. During the synchronization process, the administrator can enable either unidirectional (Read) or bi-directional (Read/Write) synchronization of Microsoft AD sites and subnets, which are directory objects to represent network topology. Infoblox IP Address Management (IPAM) integration with Microsoft AD Sites and Services provides an administrator a real-time presentation of every subnet associated with each Microsoft AD site.

This document was prepared for NIOS 8.5. (Screen captures may differ from release to release.). A super-user account is used on the Infoblox Grid side and an administrator account is used on Microsoft server side for sync.

What Are Microsoft AD Sites and Services?

A Microsoft AD site represents the physical structure, or topology, of a customer network. Active Directory uses topology information to build the most efficient replication topology.

Sites help optimize replication using faster links. It also helps users logon to closest domain controllers instead of traversing slower links for authentication. This reduces logon time. Active Directory-enabled services can leverage site and subnet information to enable clients to locate the nearest server providers more easily.

Infoblox and Microsoft AD Sites and Services Features

The Infoblox and Microsoft AD Sites and Services integration enables the following functionality;

- Use Microsoft's Remote Procedure CAll (RPC) for agentless access to Active Directory information.
- Read-only or read/write privileges for Microsoft AD Sites and Services using the Infoblox Grid
- Auto-populate previously undiscovered subnets from Microsoft AD Sites and Services into Infoblox
- Move subnets between AD sites within Infoblox
- Create new AD sites within Infoblox
- Deleting AD sites within Infoblox
- Assign new subnets to AD sites within Infoblox
- View Microsoft Domain and AD site relationship
- Log AD site-specific data

Prerequisites

The following are prerequisites for the Microsoft AD Sites and Services integration with Infoblox;

- Functional Infoblox Grid with a Grid Master or standalone Infoblox member running NIOS 8.5 or later.
- To enable a Grid member to synchronize data with a Microsoft server and control DNS and DHCP services, on the Microsoft server:
    - Create a user account for the Grid member.
    - Grant the user account the necessary permissions.
- Microsoft Management license from Infoblox
    - For trial purposes, user can install 60 day temp license
- Current Microsoft Server Versions supported include 2008, 2008R2, 2012, and 2012R2, 2016, and 2019.

Best Practices for Network Connectivity between Infoblox Grid and Microsoft Servers

To get the most from the Infoblox and Microsoft AD Sites and Services integration, we recommend the following best practices:

- A Grid Member configured to synchronize Active Directory Sites and Services of a Microsoft server uses system resources (CPU, memory, and network) directly proportional to the number of Microsoft Servers that are managed by the appliance. Infoblox recommends that the managing Grid member should not serve other protocols nor be a Grid Master.
- The Grid member always initiates the connection to the Microsoft server. It is recommended that an encrypted LDAP connection be used between the Grid member and Microsoft server. The appliance displays a warning message when a non-encrypted connection is used.
- Take the object count of MS objects to be synced into account when planning for object capacity for the synching IB member and the Grid Master and Grid Master Candidate..
- The managing member for data synchronization should be located “close” to the MS server being managed (RTT < 50 ms) to increase efficiency of the sync protocol. Maximum RTT must be < 200 ms
- If there are more than one Microsoft domain controllers for a forest, then it's best to manage all domain controllers for redundancy purposes. The Grid member managing Microsoft servers will be

able to sync AD sites from the primary server, and in absence of that primary server, it will be able to sync data from other domain controllers.

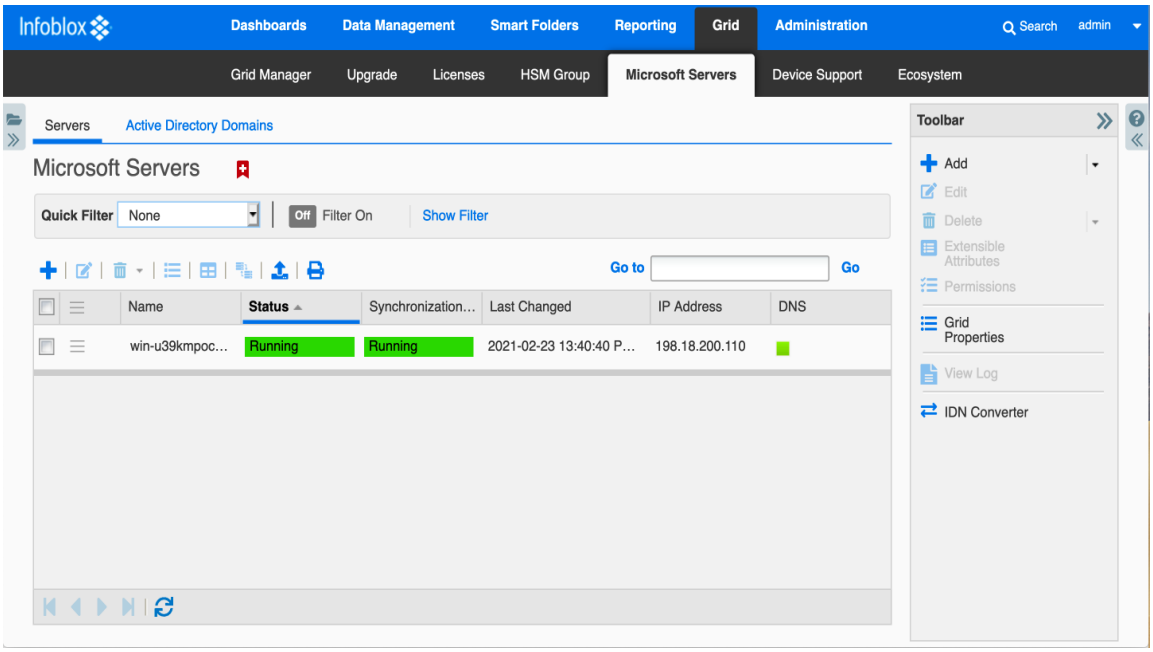
Deploying Microsoft AD Sites and Services

An administrator needs to enable the Microsoft AD Sites and Services feature within the Infoblox Grid for individual Microsoft servers. Once the sync is successful, the AD sites and associated subnets hosted on Microsoft servers can be viewed from within the Infoblox Grid. In order to push new AD sites and associated subnets from the Infoblox Grid to the Microsoft server, the sync must be configured for read/write privileges. In short, the Infoblox Grid provides administrators with the ability to push and pull AD site and subnet data to and from managed Microsoft servers.

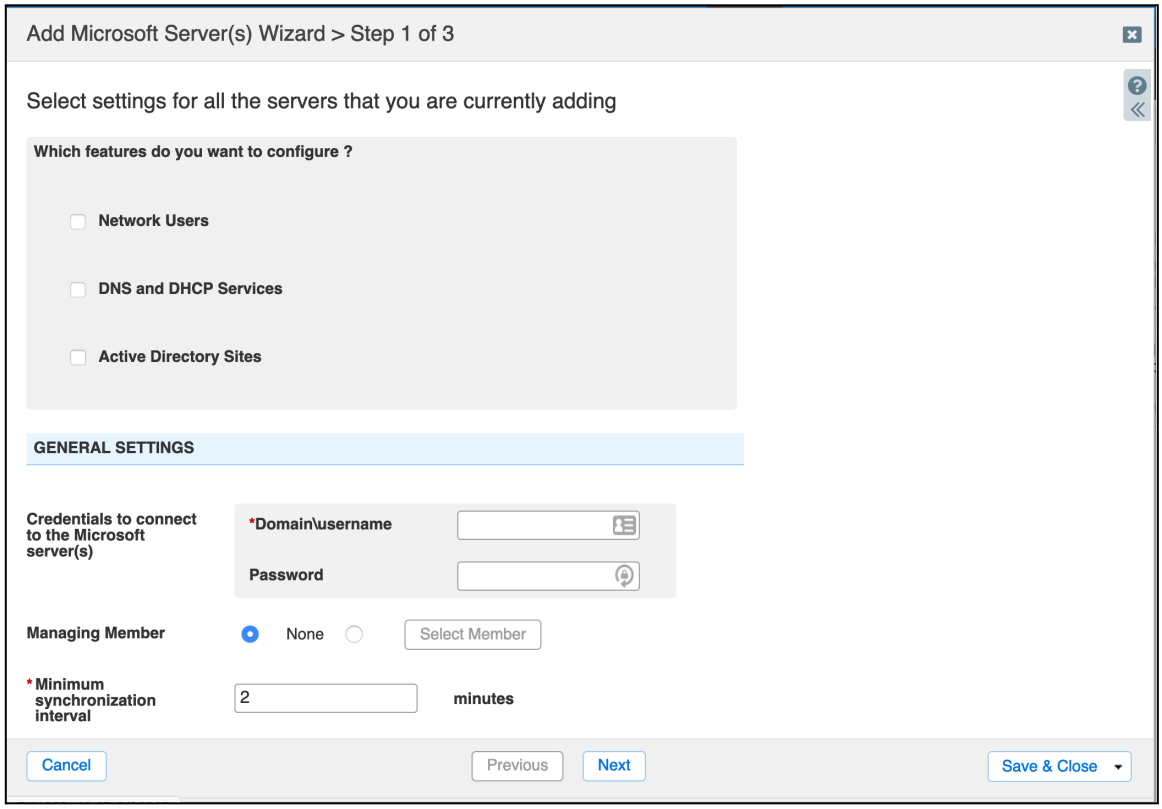
Assigning Grid Members to Microsoft Servers

To configure a Grid member to manage one or more Microsoft servers:

1. Navigate to **Grid** tab → **Microsoft Servers** tab → **Servers** tab.



2. Click on the '+' to bring up the **'Add'** wizard.



In the Add Microsoft Server(s) wizard, complete the following:

- Which features do you want to configure?: This section appears only when you have selected the Enable MS AD feature check box for mapping network users. You can select multiple options in this section:
  - **Network Users**: Select this check box to enable the Grid member to synchronize user information with the managed Microsoft servers.
  - **DNS and DHCP Services**: Select this check box to enable the Grid member to synchronize DNS and DHCP services with the Microsoft servers.
  - **Active Directory Sites:** Select this check box to enable the Grid member to synchronize Active Directory sites.
- In the General Settings section, complete the following:
  - **Credentials to Connect to the Microsoft Server(s)**: Enter the login name and password that the appliance uses to connect to the Microsoft servers. These must be the same as those you specified when you created the user account for the Grid member on the Microsoft servers. Note that you must specify the domain name and the user name in the following format: domain_name\user_name.

        - **Managing Member**: Click Select Member and select the Grid member that manages Microsoft servers.
          Select None if you do not want to associate a Microsoft server with a Grid member.

        - **Minimum Synchronization Interval (min)**: The default synchronization interval is two minutes. This is the time between the completion of one synchronization and the start of a new one. Synchronizing large data sets could take longer than the synchronization interval, causing a delay in the start of the next synchronization. For example, if the synchronization interval is two minutes but a synchronization takes five minutes, the time between the start of the first synchronization and the start of the next one is approximately seven minutes.

    - Logging Level: Select a logging level for the Microsoft server log from the drop-down list: Low, Normal, High, and Debug. NIOS logs the messages based on the logging level you set.

        - **Low**: Logs only error messages.

        - **Normal**: Logs warning and error messages.

        - **High**: Logs warning, error and information messages.

        - **Debug**: Logs messages about all events associated with synchronization.

    - **Logging output destination**: From the drop-down list, select an output destination to which the appliance saves log messages for Microsoft servers. When you select Microsoft Log, the appliance logs the messages that are generated for the respective Microsoft server in the existing Microsoft log. This is selected by default. When you select Syslog, NIOS logs the messages that are generated for the respective Microsoft server in the syslog. Comment: You can enter additional information about the servers.

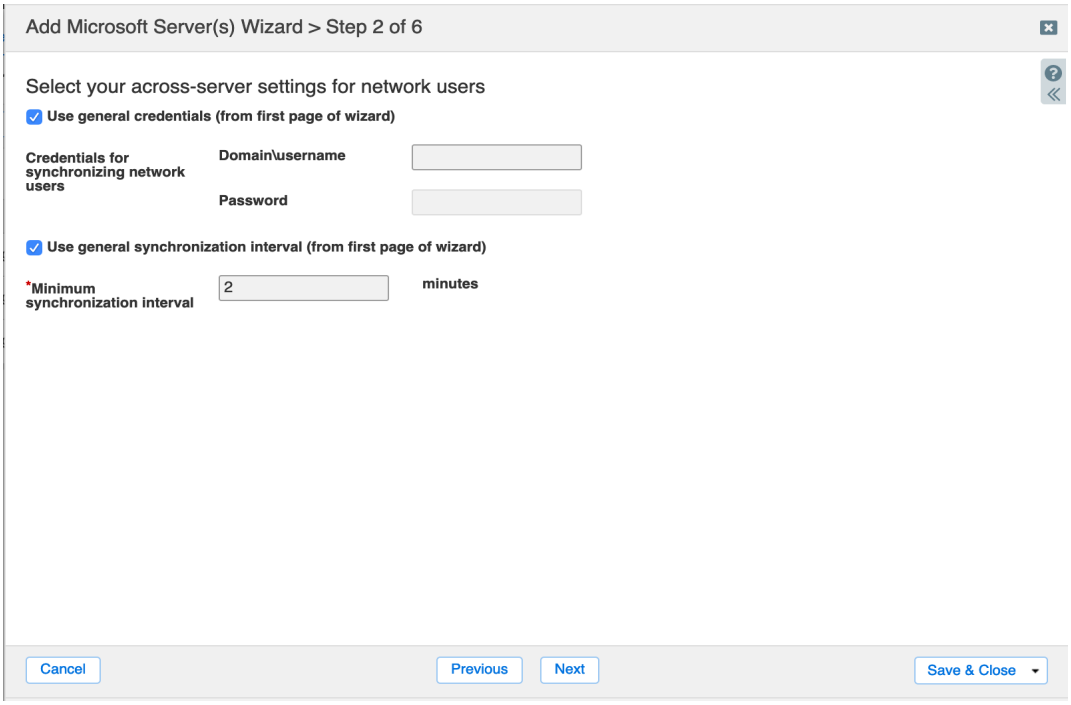
    - **Synchronize Data into Network View**: This field appears only when there is more than one network view in the grid. When there are multiple network views, you must specify to which network view the data from the Microsoft server is synchronized.

    - **Synchronize DNS Data into DNS View**: This field appears only when there is more than one DNS view in the selected network view. You can select a different network view for the Microsoft server.

    - **Disable Synchronization**: Select this to disable the Microsoft servers. This allows you to provision the Microsoft servers and then enable them at a later time.

3. Click **Next**.

4. If you have selected the Network Users check box, complete the following in the Select your across-server settings for Network Users page:



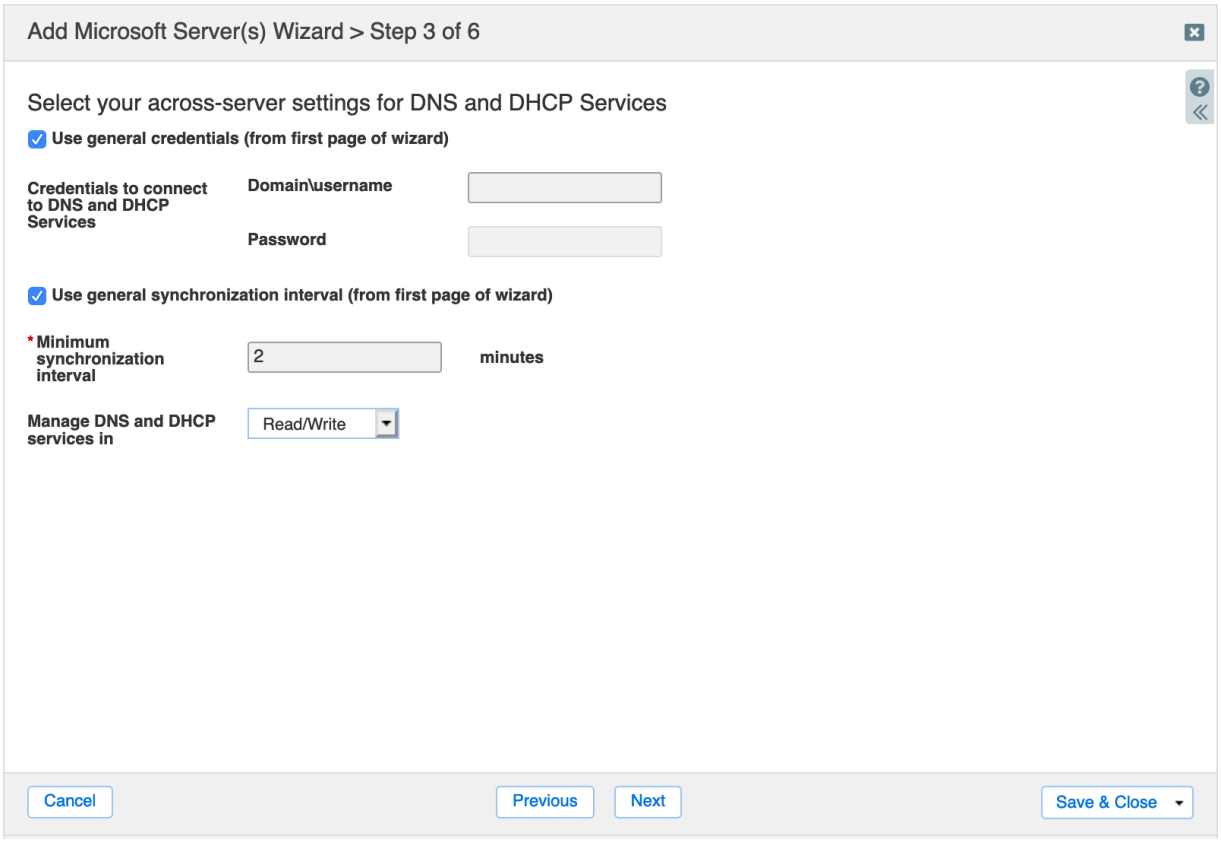
   - **Use General credentials (from the first page of wizard)**: Select this check box if you want to use the same credentials that you specified for connecting the Microsoft servers.

   - **Credentials for synchronizing Network User service information**: Specify a username and password to synchronize user information from Active Directory domain controllers. The username you specify here must belong to the Domain User group and Event Log Reader group in Microsoft.

   - **Use General synchronization interval (from first page of wizard)**: Select this check box to use the same synchronization interval that you specified in the Minimum Synchronization Interval for synchronizing the user and device mapping information from the Microsoft Active Directory authentication logs.

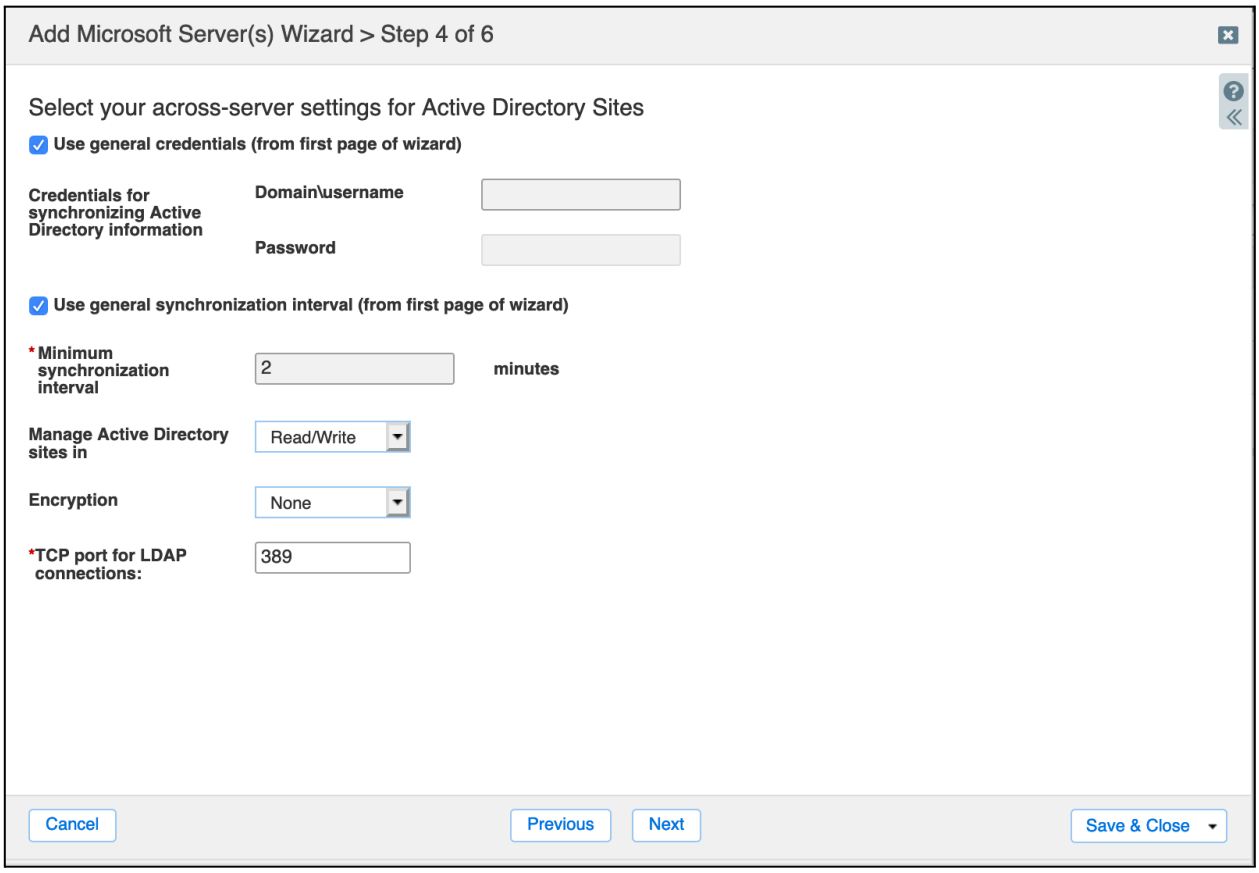
   - **Minimum synchronization interval**: The default synchronization interval is two minutes. This is the time between the completion of one synchronization and the start of a new one. Specify an interval to synchronize user information from the Microsoft Active Directory authentication logs.

5. If you have selected the DNS and DHCP Services check box, complete the following in the Select your across-server settings for DNS and DHCP Services page:



- **Use General credentials** (from the first page of wizard): Select this check box if you want to use the same credentials that you specified for connecting the Microsoft servers.
- **Credentials to connect to DNS and DHCP Services**: Specify a username and password to synchronize DNS and DHCP services. You must use the same username and password that you specify here when the appliance prompts for credentials during DNS or DHCP synchronization.
- **Use General synchronization interval** (from first page of wizard): Select this check box to use the same synchronization interval that you specified in the Minimum Synchronization Interval for synchronizing the DNS and DHCP services as well.
- **Minimum Synchronization interval**: The default synchronization interval is two minutes. This is the time between the completion of one synchronization and the start of a new one. Specify an interval to synchronize the DNS and DHCP data from the Microsoft server.
- **Manage DNS and DHCP services in**: Select a value from the drop-down list. You can choose to manage the DNS and DHCP synchronization services in either Read-only or Read/Write mode.

6. If you have selected the Active Directory Sites check box, complete the following in the Select your across-server settings for Active Directory Sites page:



- **Use General credentials** (from the first page of wizard): Select this check box if you want to use the same credentials that you specified for connecting the Microsoft servers. Clear the check box to specify a new username and password for managing Active Directory sites.

- **Credentials for synchronizing Active Directory information**: Specify a username and password to synchronize Active Directory sites. You must specify the same username and password that you specify here when the appliance prompts for credentials while synchronizing Active Directory sites.

- **Use General synchronization interval** (from first page of wizard): Select this check box to use the same synchronization interval that you specified in the Minimum Synchronization Interval for synchronizing Active Directory sites.

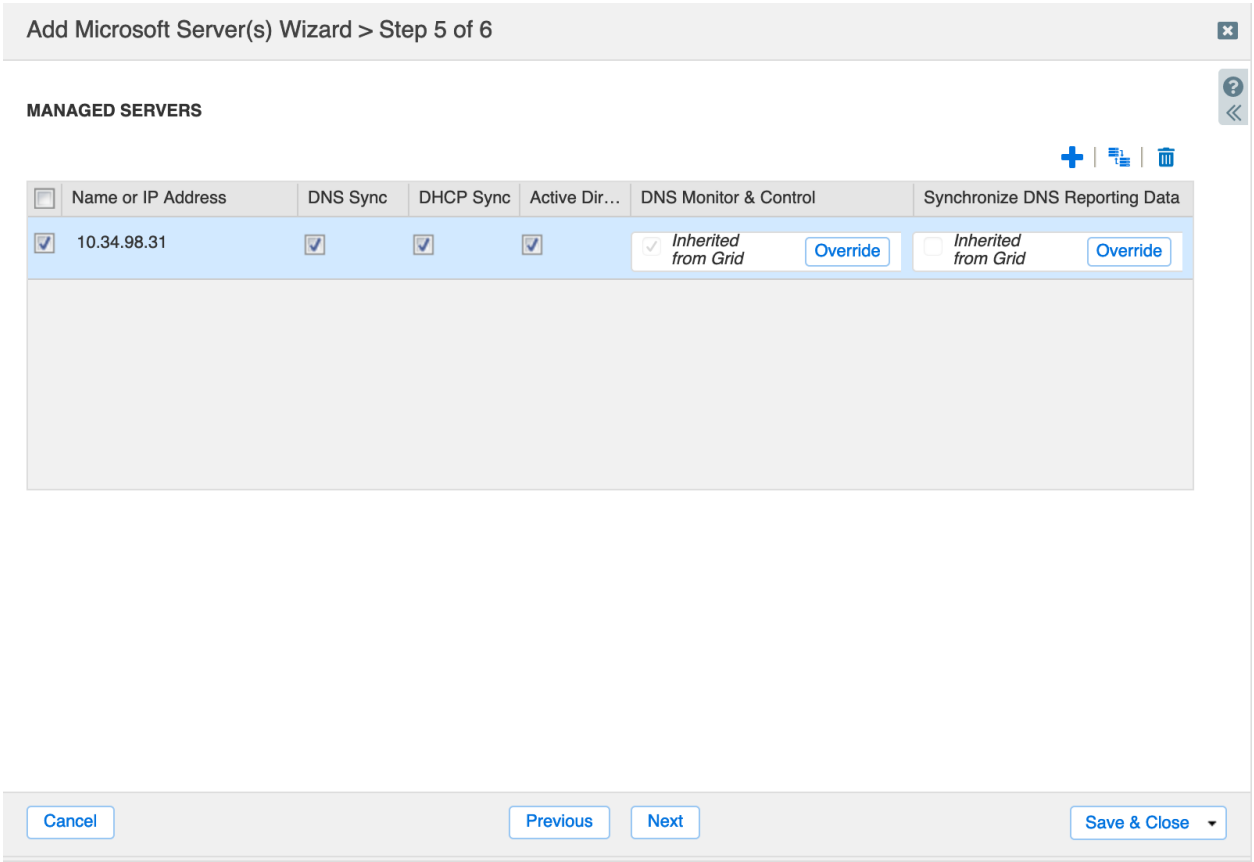
- **Minimum Synchronization interval**: The default synchronization interval is two minutes. This is the time between the completion of one synchronization and the start of a new one. Specify an interval to synchronize the Active Directory sites.

- **Manage Active Directory sites in**: Select a value from the drop-down list. You can choose to manage the Active Directory Site in either Read-only or Read/Write mode.

- **Encryption**: You can encrypt the network traffic between the Grid member and the managed Microsoft server using SSL. Select a value, None or SSL, from the drop-down list. Infoblox strongly recommends that you select SSL from the drop-down list to ensure the security of all communications between the NIOS appliance and the Active Directory server. When you select SSL, the appliance automatically updates the TCP port to 636. When you select this option, you must specify the FQDN of the Microsoft server instead of the IP address and you must upload a CA certificate from the Active Directory server. Click CA Certificates to upload the certificate. In the CA Certificates dialog box, click the Add icon, and then navigate to the certificate to upload it.

- **TCP port for LDAP connections**: The appliance displays the port number by default based on the encryption type that you select. When you select None, the appliance automatically updates the TCP port to 389.

7. Click **Next** and do the following in the Managed Servers table:



- **Name or IP Address**: Enter either the FQDN or IP address of the Microsoft server. In order for the member to resolve the FQDN of a Microsoft server, you must define a DNS resolver for the Grid member in the DNS Resolver tab of the Member Properties editor. Note that if the IP address of the Microsoft server is specified, then the DNS resolver must resolve it when the member and Microsoft server synchronize DHCP data only.

- **DNS Sync**: Select this option to enable the Grid member to manage the DNS service and synchronize DNS data with this server. Clearing this check box disables DNS service management and data synchronization. This allows you to pre-provision specific Microsoft servers and then enable them at a later time.

- **DHCP Sync**: Select this option to manage the DHCP service of the Microsoft server and synchronize DHCP data with this server. Clearing this check box disables DHCP service management and data synchronization. This allows you to pre-provision specific Microsoft servers and then enable them at a later time.

- **Active Directory Sites**: Select this option to manage Active Directory sites and synchronize Active Directory Sites and networks with the Grid.

- **DNS Monitor & Control**: Click **Override** to override the setting inherited from the Grid. To inherit the same settings as the Grid, click Inherit. Select this to enable monitoring and the ability to control DNS service for the Microsoft server.

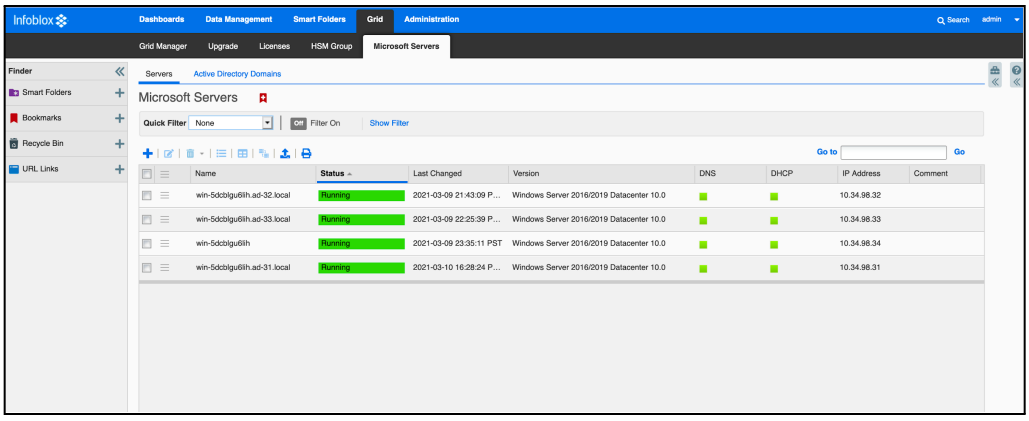
- **Synchronize DNS Reporting Data**: Click **Override** to override the settings that are inherited from the Grid. To retain the same settings as the Grid, click Inherit. Select this to synchronize DNS reporting data from the Microsoft server.

Note that synchronization of DNS reporting data is effective only when the DNS Sync option is enabled for the Microsoft server.

- **DHCP Monitor & Control**: Click Override to override the setting inherited from the Grid. To inherit the same settings as the Grid, click Inherit. Select this to monitor and control DHCP service for the Microsoft server.

- **Synchronize Network Users**: Click **Override** to override the settings inherited from the Grid. To inherit the same settings as the Grid, click Inherit. Select this to enable the identity mapping for the Microsoft server. Click **Save and Close**.

8. After about 5 minutes, you should see the following:



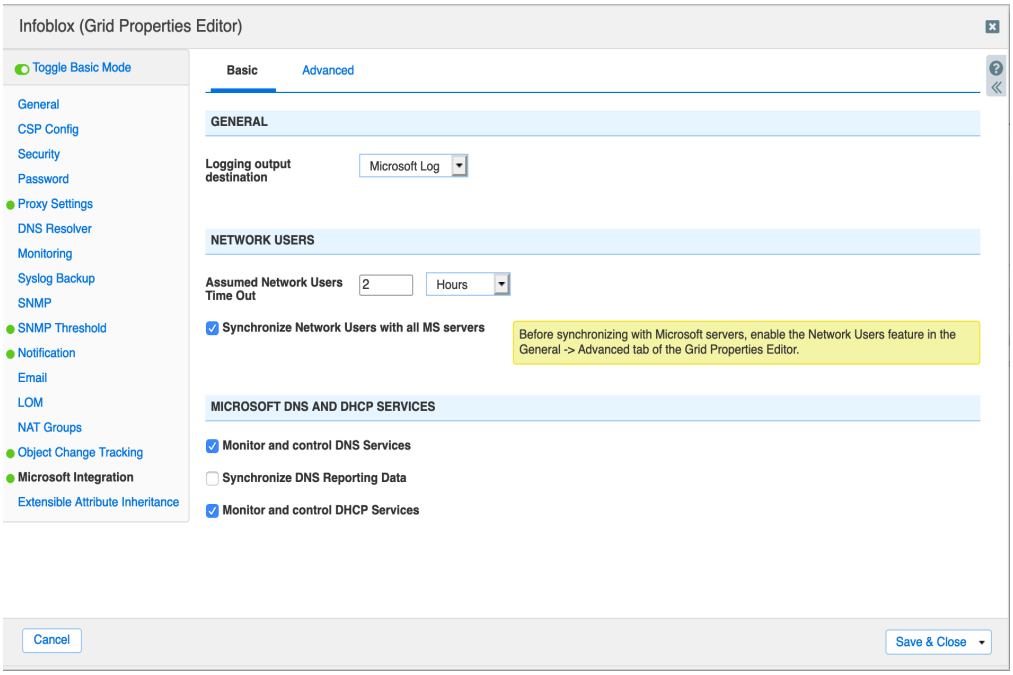
Note the bottom entry.

9. **Save** the configuration and click Restart if the Restart banner appears at the top of the screen.

Setting Grid Properties for Managing Microsoft Servers

To configure Grid properties for managing Microsoft servers, complete the following:

1. Grid: From the **Grid** tab → **Grid Manager** tab, expand the **Toolbar** and click **Grid Properties** → **Edit**. Select **Microsoft Integration** tab in the Grid Properties Editor wizard.



Complete the following in the Basic tab:

- **Logging output destination**: From the drop-down list, select an output destination to which the appliance saves log messages for Microsoft servers. When you select Microsoft Log, the appliance logs the messages that are generated for the respective Microsoft server in the existing Microsoft log. This is selected by default. When you select Syslog, NIOS logs the messages that are generated for the respective Microsoft server in the syslog.

- **Network Users**

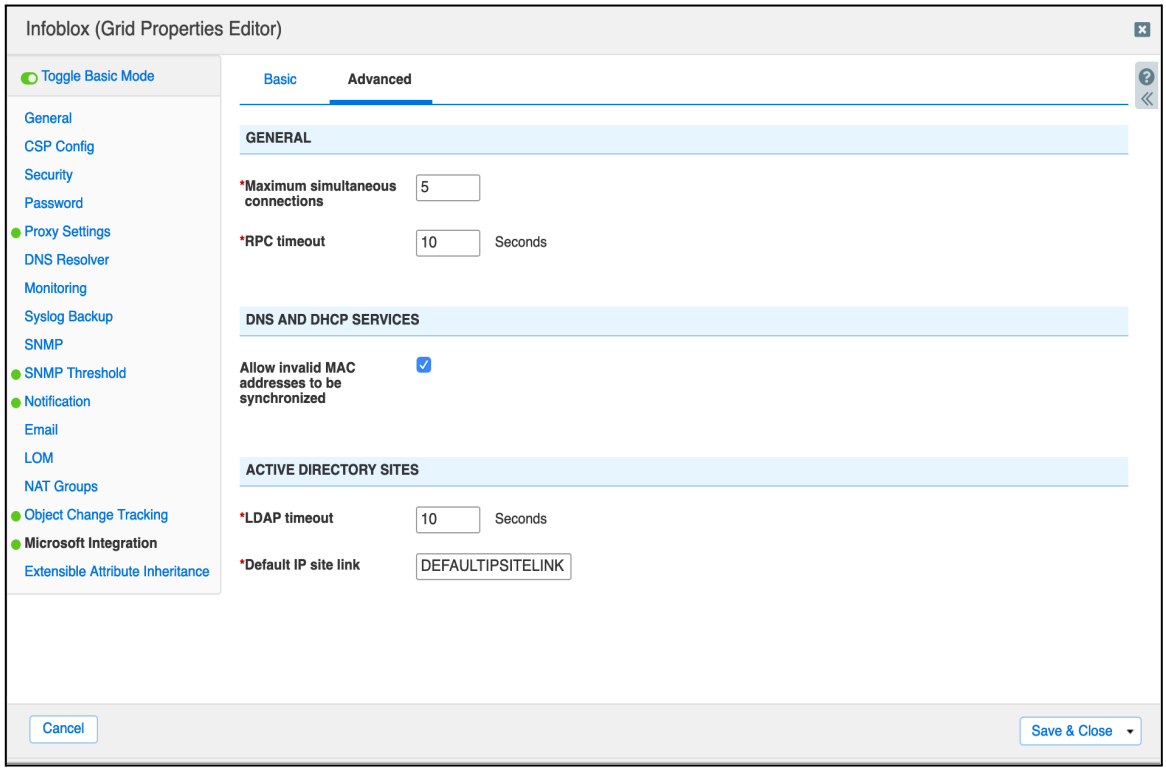
  - You can control the network users tab in the **Data Management** → **Network Users** screen. You can set the time from minutes to hours to days. Enable Synchronize Network Users with all MS Servers to ensure the Network Users screen is populated

- **Monitor DNS and DHCP Services**: You can enable monitoring and control services for DNS and DHCP services at the Grid level and override the settings for each service at the Microsoft

server level. This is enabled, by default. Each monitoring and control setting applies only to the corresponding service and is applicable to the respective Microsoft server only.

- **Monitor and control DNS Services**: Select this to enable monitoring and the ability to control DNS service for the Microsoft server.
- **Synchronize DNS Reporting Data**: Select this to synchronize DNS reporting data from the Microsoft server. Clearing this check box disables DNS reporting data synchronization.
- **Monitor and control DHCP Services**: Select this to enable monitoring and the ability to control a DHCP service for the Microsoft server.

2. Optionally, select the Microsoft Server Settings tab in the Grid Properties Editor wizard and complete the following in the Advanced tab or click the Advanced tab in the General tab in a Microsoft server editor:



- **Maximum simultaneous connections**: Specify a maximum number of simultaneous RPC connections that can be configured for the respective Microsoft server, which are managed by the Grid. The default is five. You can specify a value between two and 40.
  RPC timeout: Specify the RPC timeout value in seconds to control the network communication timeout. The default is ten seconds. You can specify a value between one and 60.
- **Allow Invalid MAC Address to be synchronized**: This is enabled, by default. Select this to enable synchronization for invalid MAC addresses.

- **LDAP timeout**: Specify the LDAP connection timeout value. The default is 10 seconds. You can specify a value between one and 60 seconds.

- **Default IP site link**: Specify the default IP site link in the form of a string. The appliance does not validate it against the Windows server during configuration. The appliance displays an error message during synchronization if the site link for IP does not match the configured name on the Windows server.

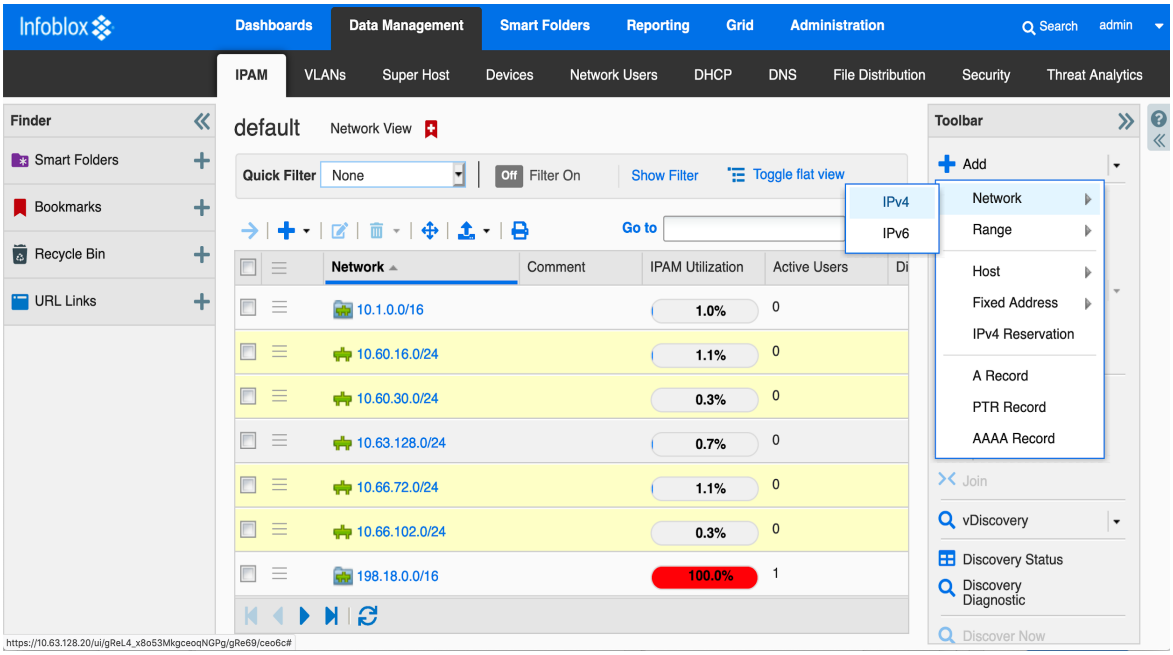
3. **Save** the configuration.

Adding AD Sites When Creating a New Network in Infoblox IPAM

The Infoblox and Microsoft AD Sites and Services integration provides a powerful capability of associating an AD site to a newly created network at the time the network is created. This saves a lot of overhead for network administrators who no longer have to create IP networks in IPAM separately and associate them later with AD sites. This is all possible in one easy-to-follow workflow named Add IPv4 Network Wizard,

1. Navigate to **Data Management → IPAM**

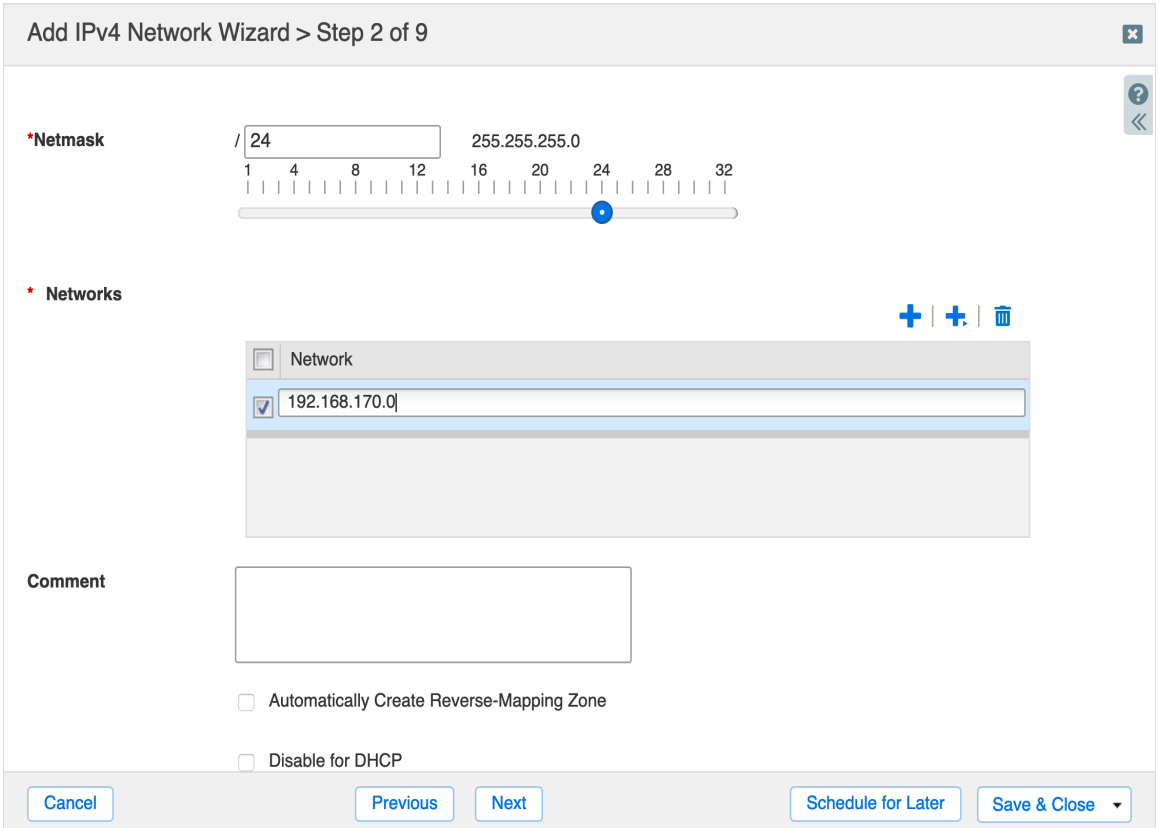
2. Click **Add → Network → IPv4**.



3. Click **Add Network** → **Manually**

4. Click **Next**.

5. Click the plus sign **(+)** and type a subnet value, such as 192.168.170.0 in the text box under Networks, and click **Next**



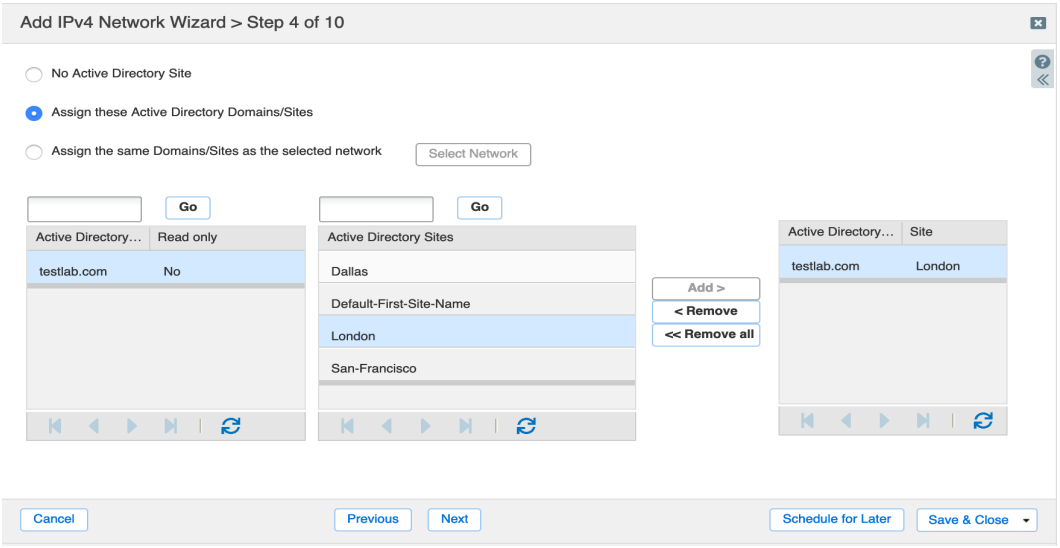
6. Click **Next** and click **Next** again.

7. In the Add Microsoft Server(s) Wizard →Step 4 of 6 dialog box:

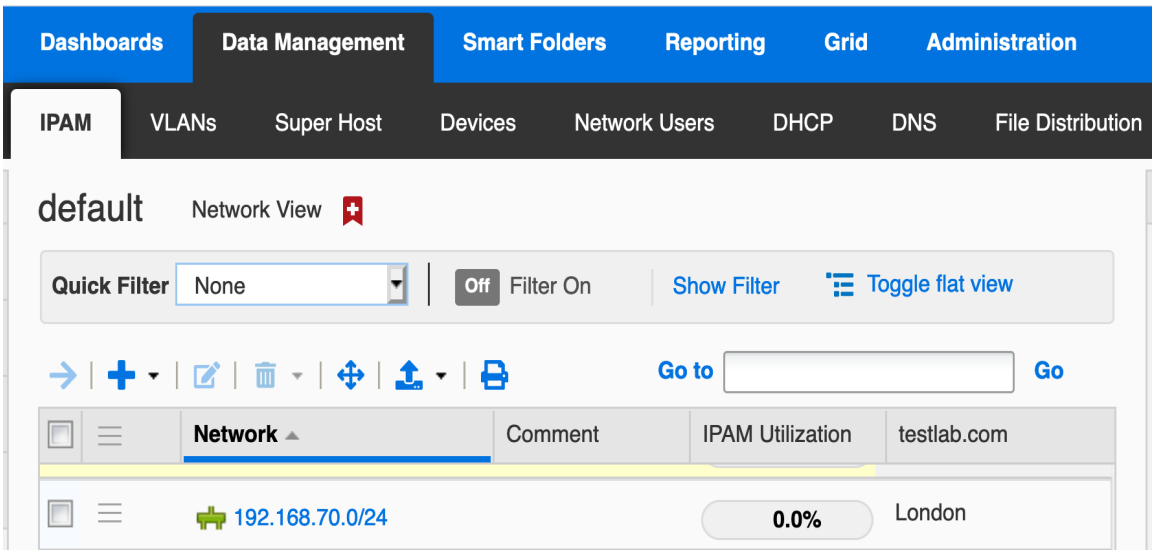
   a. Select **Assign these Active Directory Domains/Sites**.

   b. Then select the desired Active Directory Domains and Active Directory Sites from the left side and click **Add** to move them to the rightmost list. In the example below, testlab.com domain and London site.

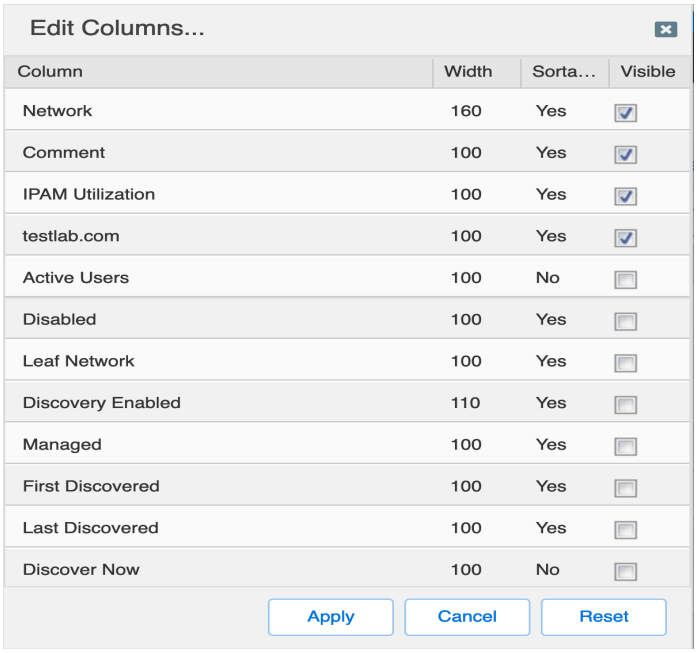
   c. Click **Save & Close**.



8. To view the newly created network and its associated site, go to **Data Management → IPAM**.



NOTE: To see the Microsoft-specific AD sites column, enable the column and it will display the title of the AD domain. The Sites column is not associated with the AD sites. In the Edit Columns dialog box shown below, testlab.com is the selected AD domain. Select the domain you configured.



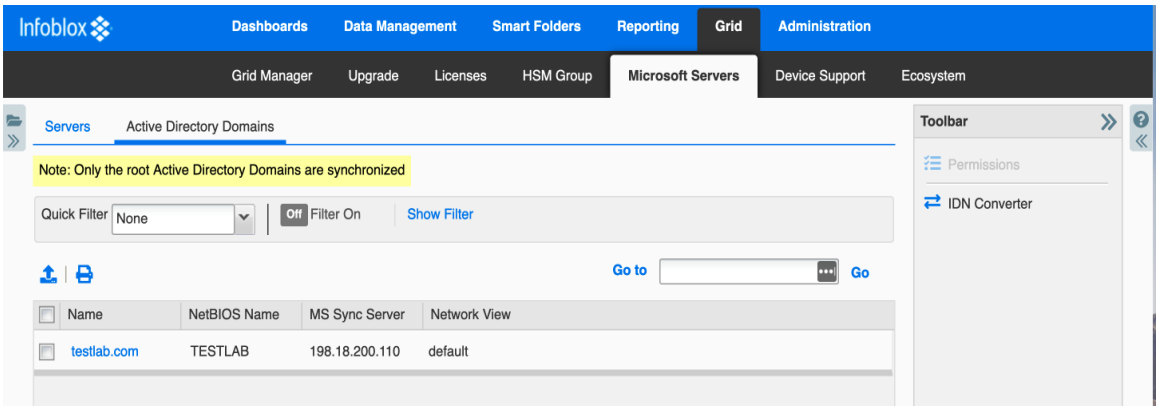
Managing AD Sites

There is a broad capability to view, modify, and add AD Sites and subnets between the Infoblox Grid and managed Microsoft servers.

Viewing Active Directory Domains and Sites

An administrator can view AD domains and associated Sites and Subnets, pulled from the managed Microsoft servers, by following the steps below,

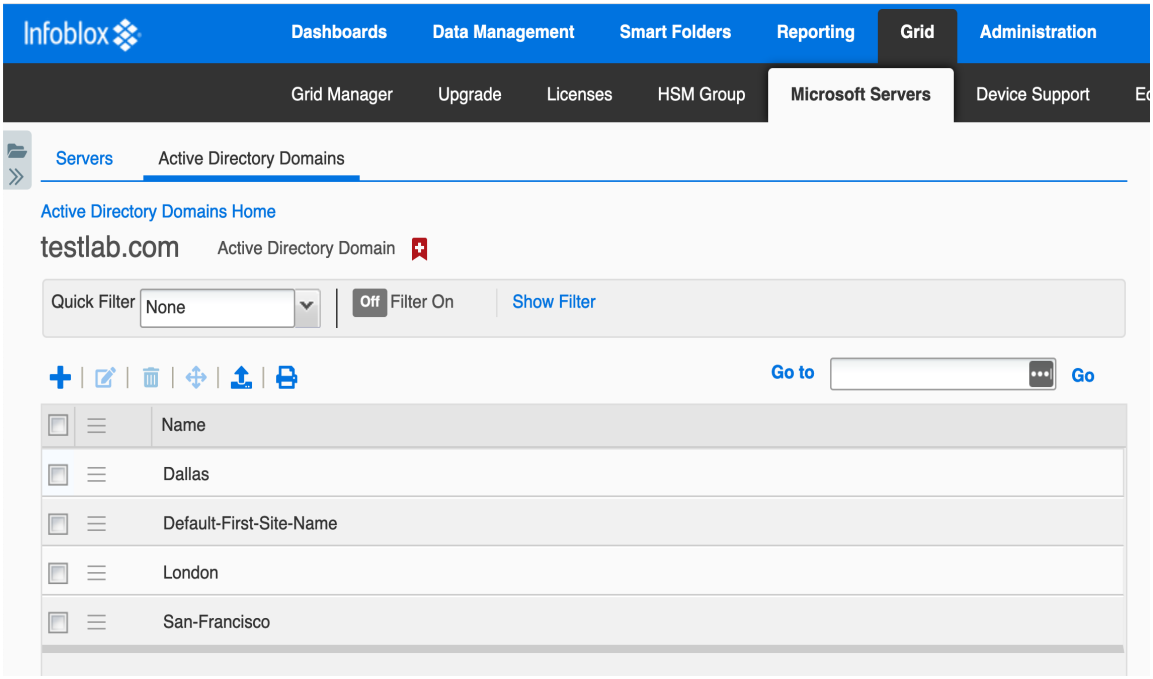
1. Go to **Grid → Microsoft Servers → Active Directory Domains**



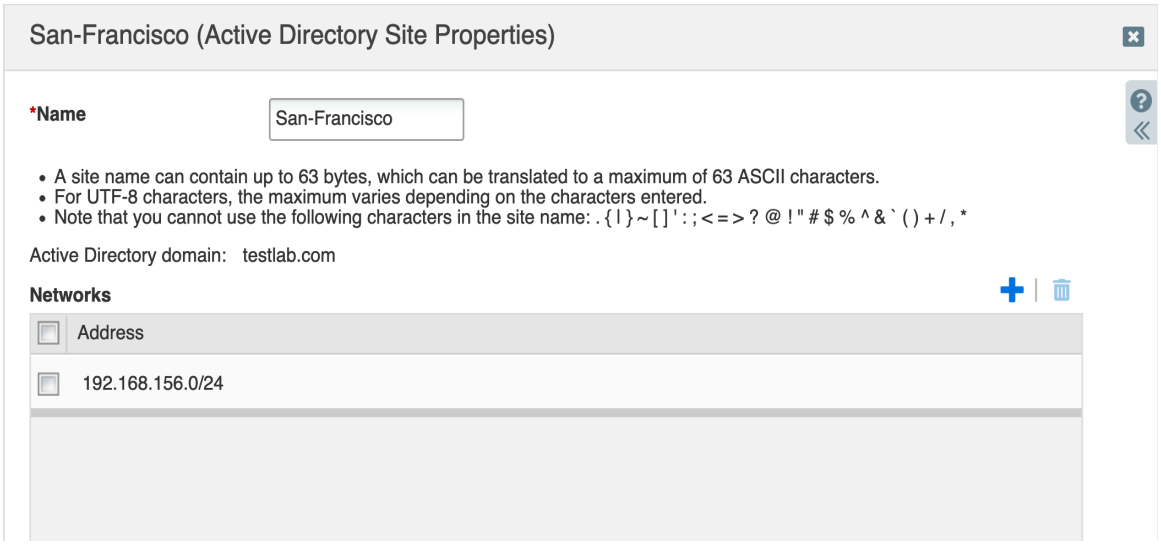
The Grid displays the following information:

- **Name**: The name of the Active Directory Domain; click on the name to view the Active Directory Sites below it
- **NetBIOS Name**: The name returned in the NetBIOS format
- **MS Sync Server**: The Microsoft synchronization server that is associated with the Active Directory Domain
- **Network View**: The network view that is associated with the Active Directory Domain

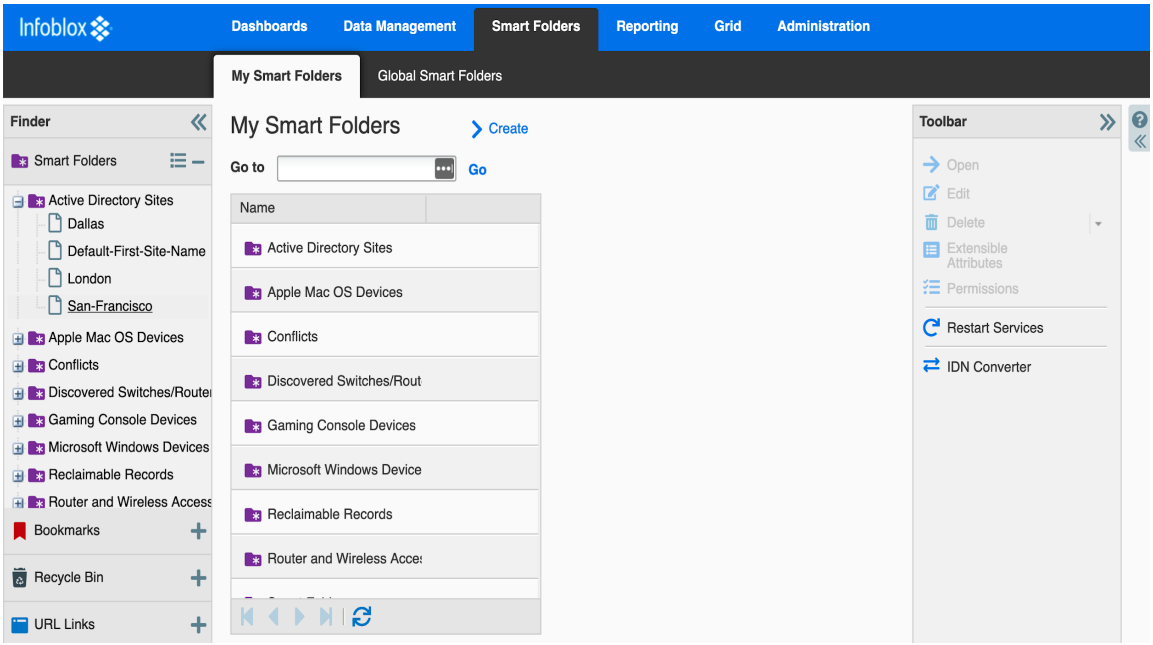
2. To view AD sites associated with an AD domain, click the domain name that is displayed as a hyperlink. The list of AD sites associated with that AD domain is displayed in Active Directory Domains Home. In this example, the testlab.com link has been clicked



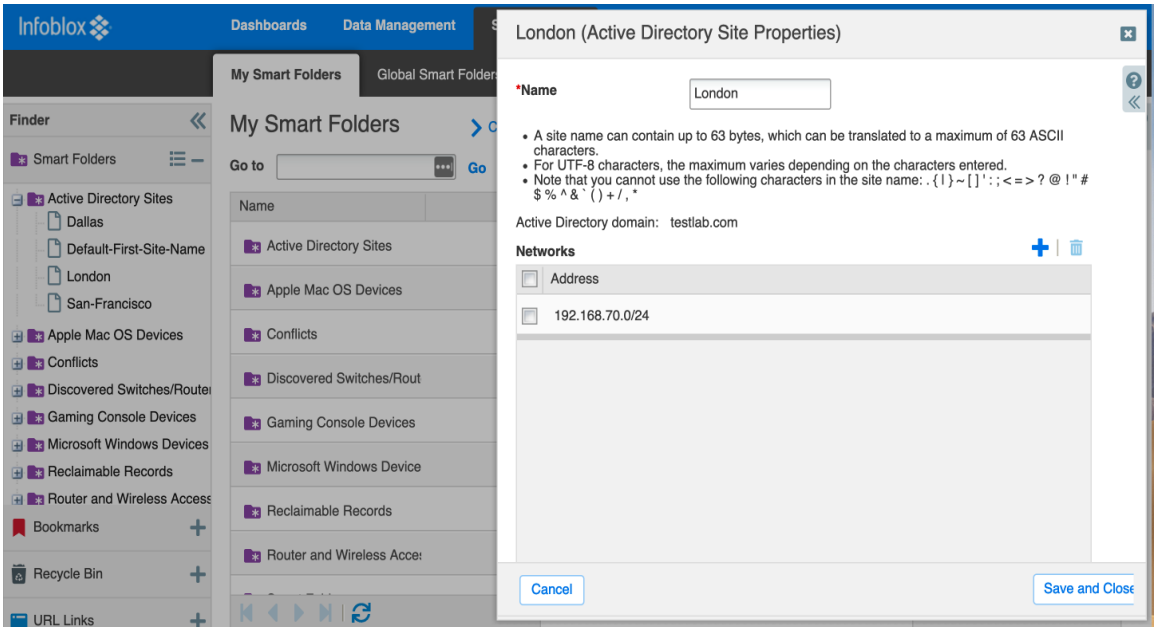
3. To view the subnets associated with sites, click on the hamburger icon next to a site, and click **Edit**. In this example, the subnet 192.168.156.0/24 is associated with the San-Francisco site



4. Another way of viewing networks associated with AD sites is through Smart Folders. Go to **Smart Folders → My Smart Folders → Active Directory Sites**



5. Click on the **Active Directory Sites** to expand it, and then click on any site to see networks associated with that site, in this example, London

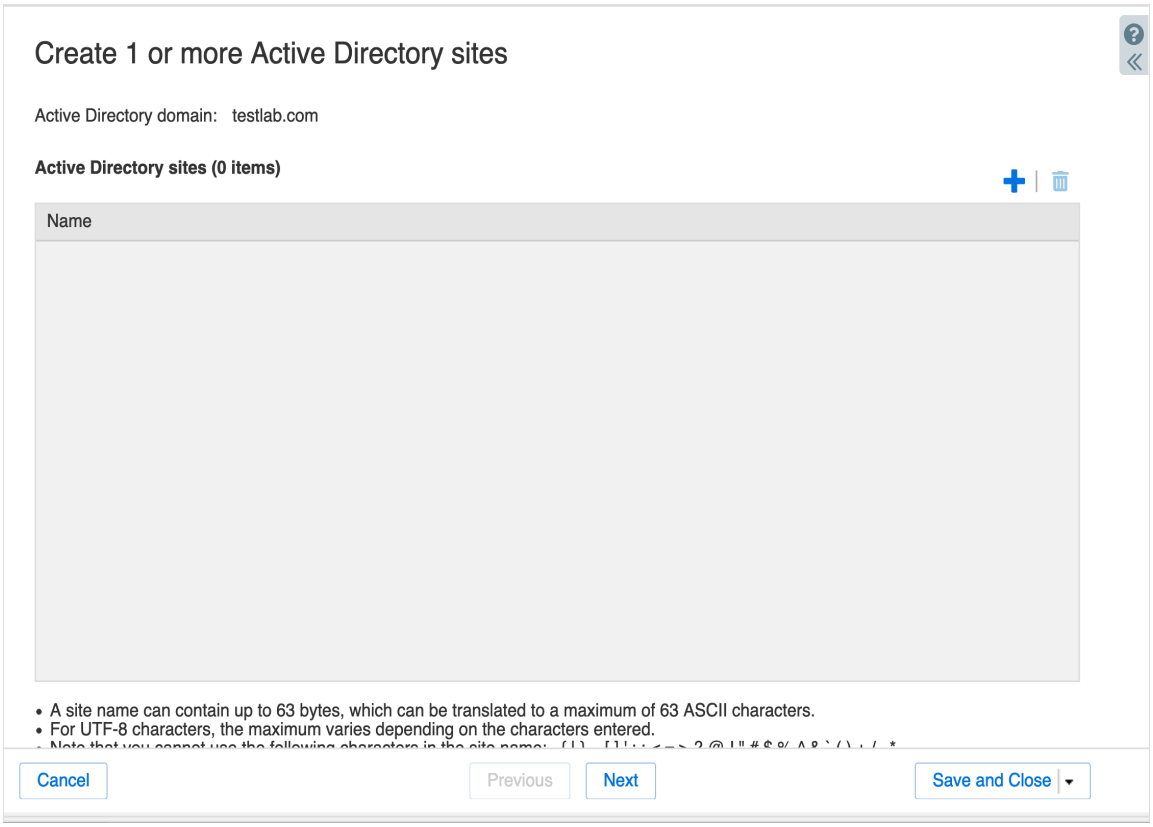


Creating a New Microsoft AD Site and Assigning a Network

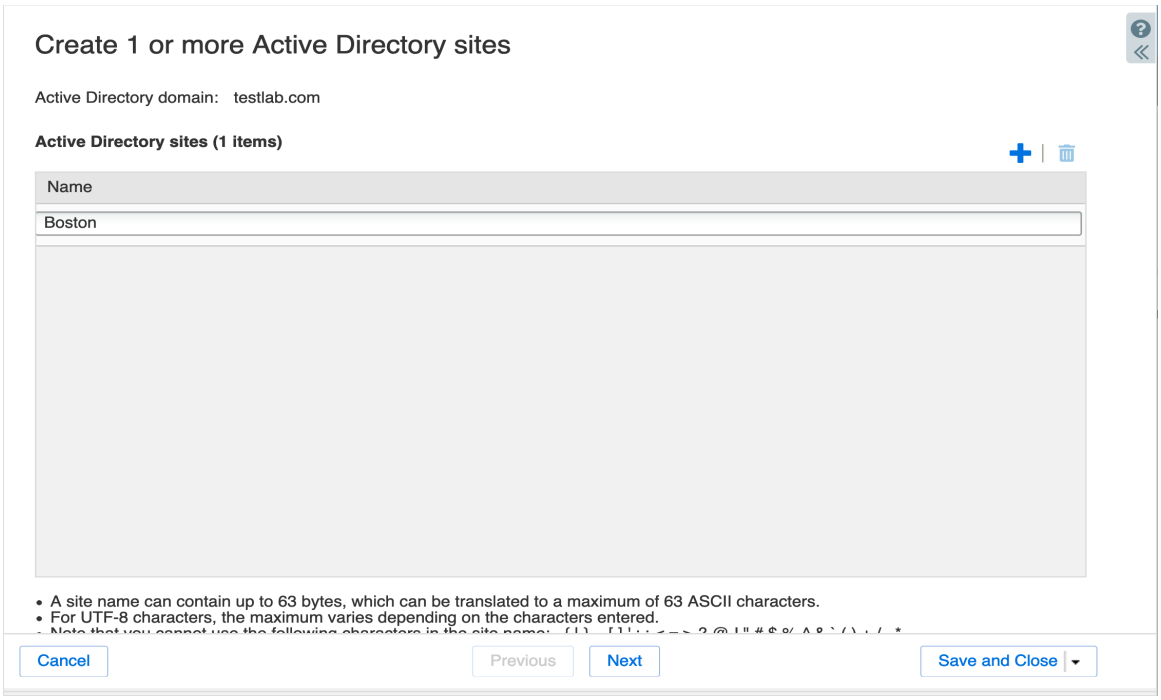
NIOS provides the ability to create a new AD site and associate networks to it. This data then gets pushed out to the managed Microsoft server.

In this example a new site named Boston is created and it is assigned IP subnet 192.168.153.0/24.

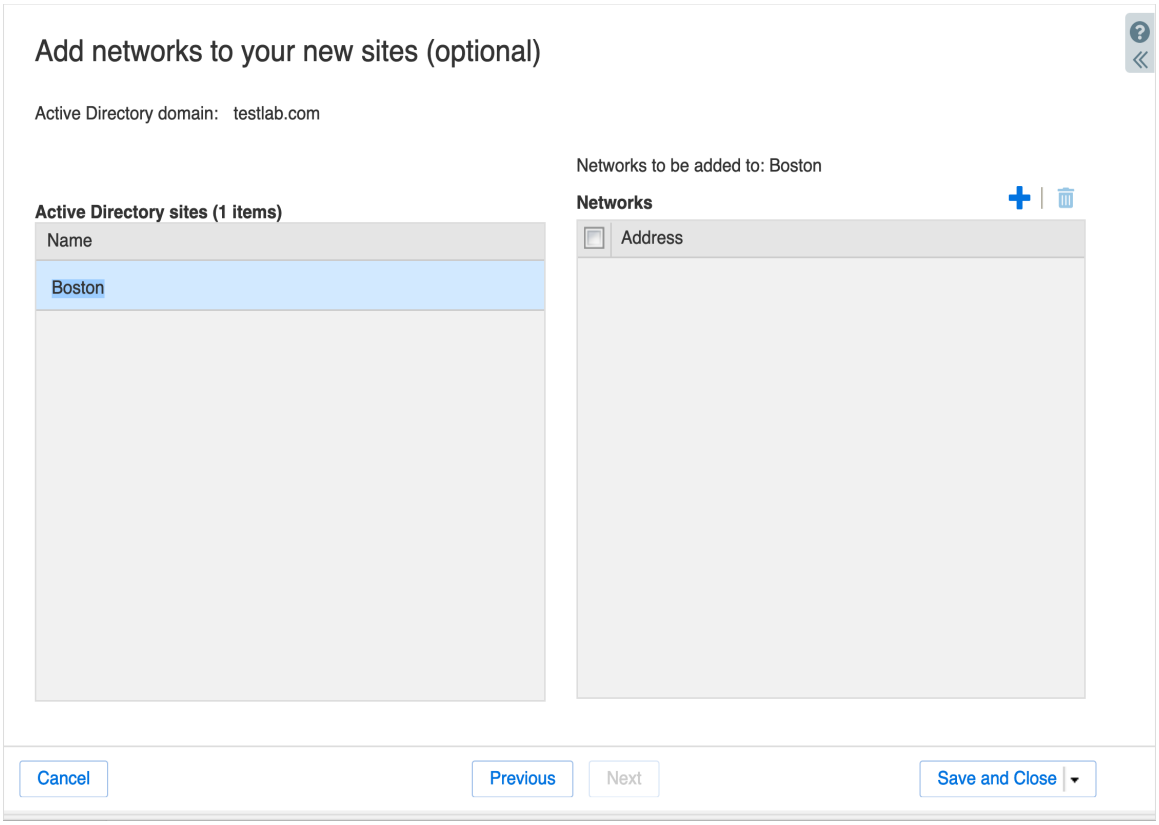
1. Click on **Grid** → **Microsoft Servers** → **Active Directory Domains** → **Add**



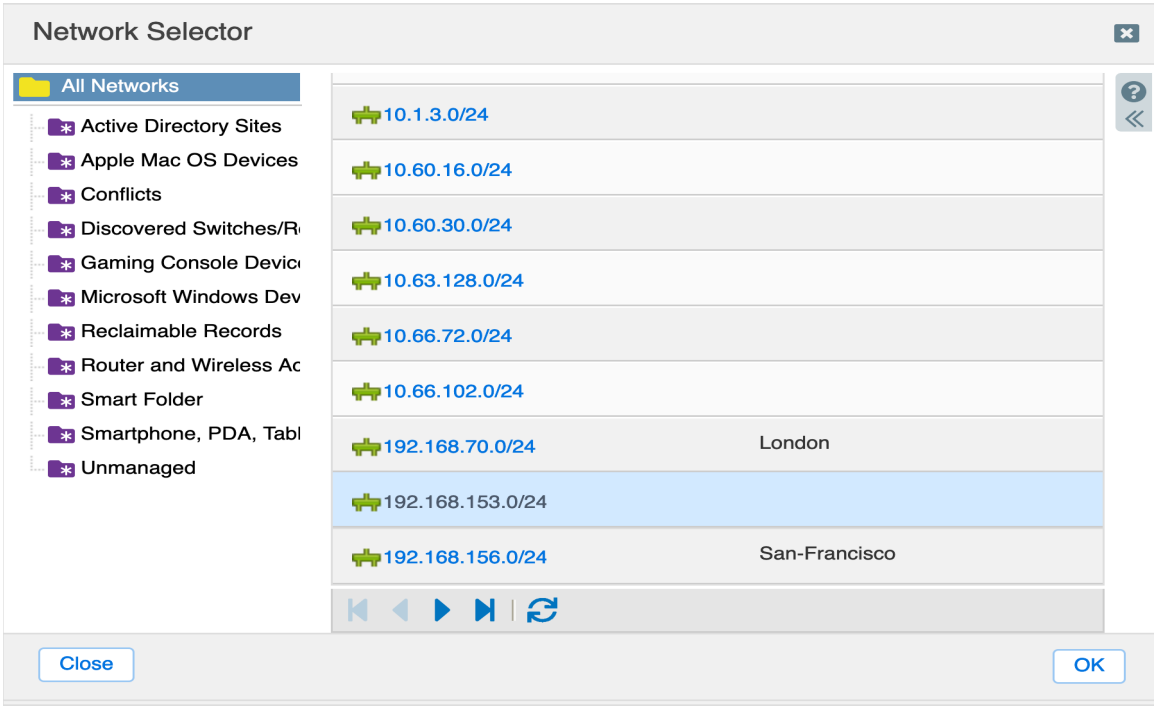
2. Click the plus sign **(+)** to add a name for the site, for example Boston



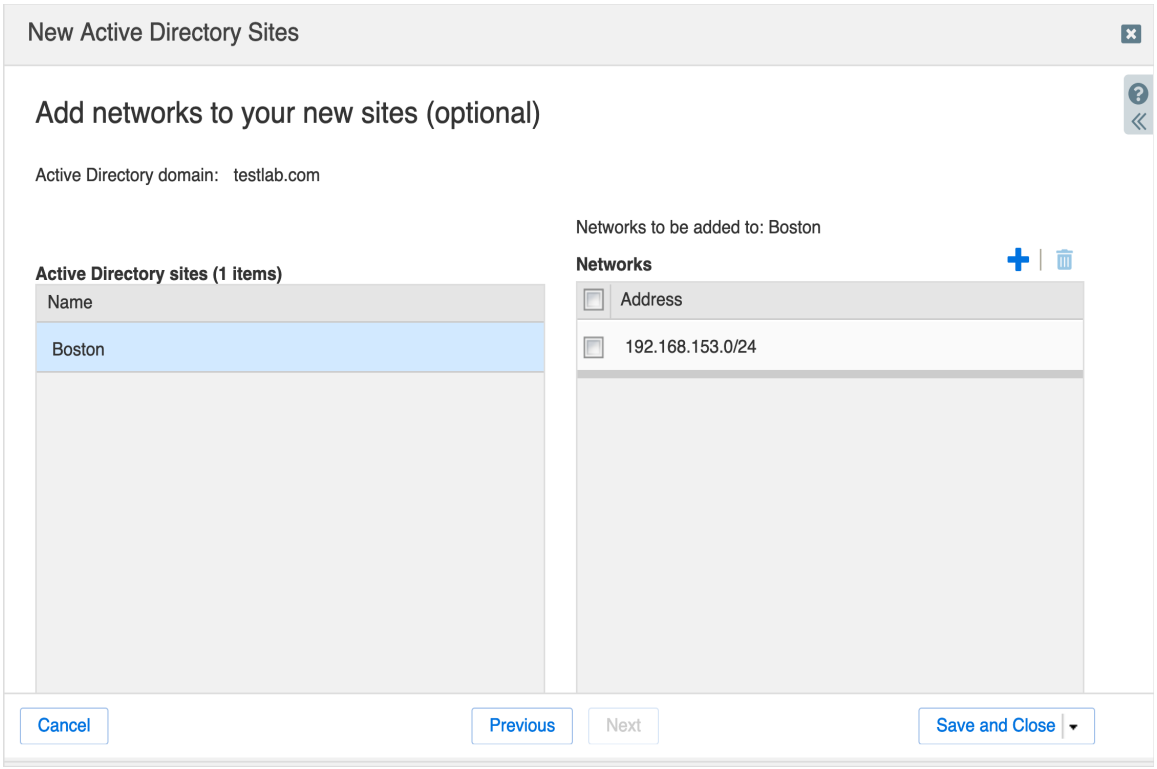
3. Click **Next** and select the Boston site in the Active Directory Sites column



4. Click the plus sign (+) in the Network column to open the Network Selector window

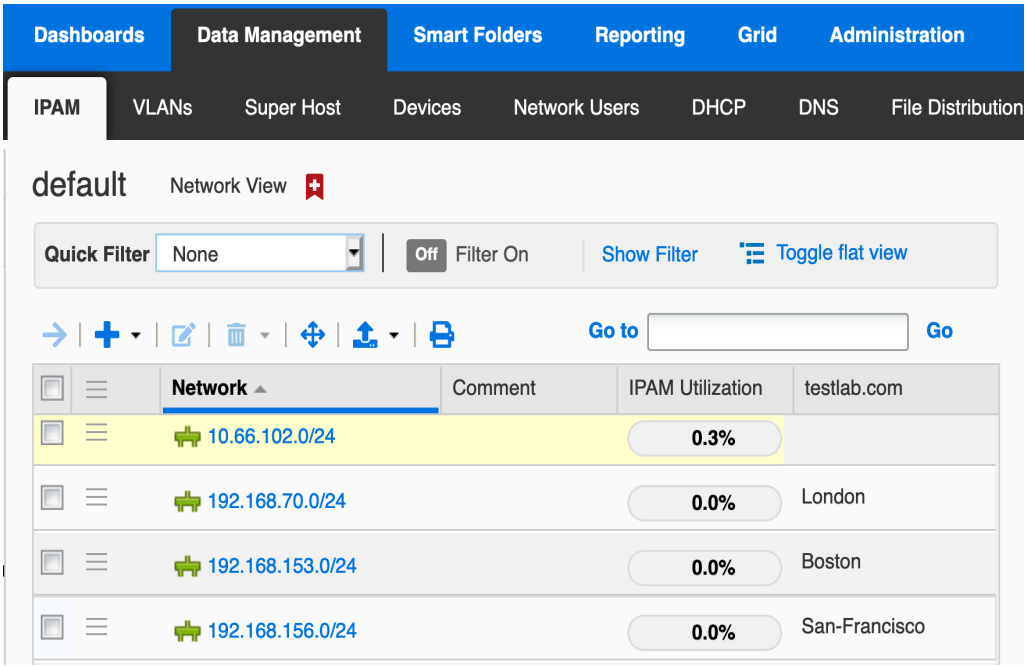


5. Select a network in the Networks list, such as 192.168.153.0/24, and click **OK**.



6. Click **Save and Close**.

7. Go to **Data Management** → **IPAM** to view the new site, Boston, next to the appropriate subnet, 192.168.153.0/24 in this example

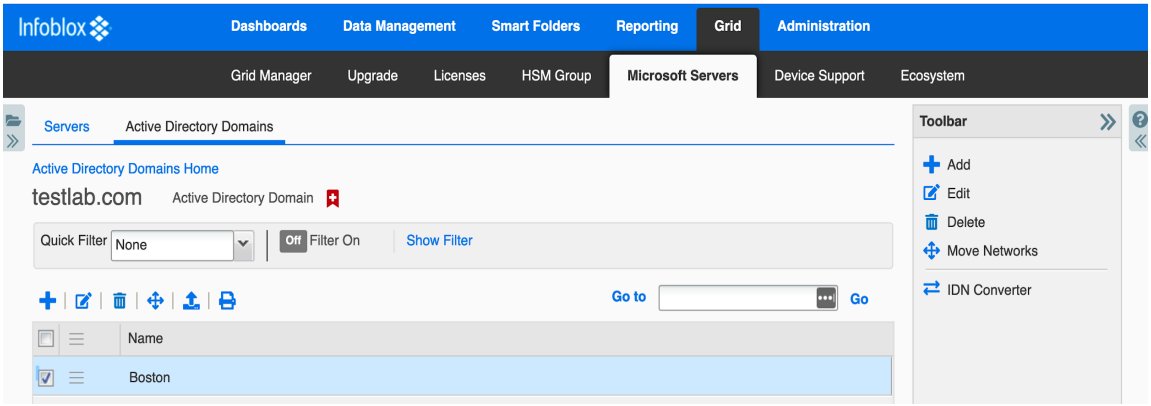


Adding Multiple Networks to an AD Site

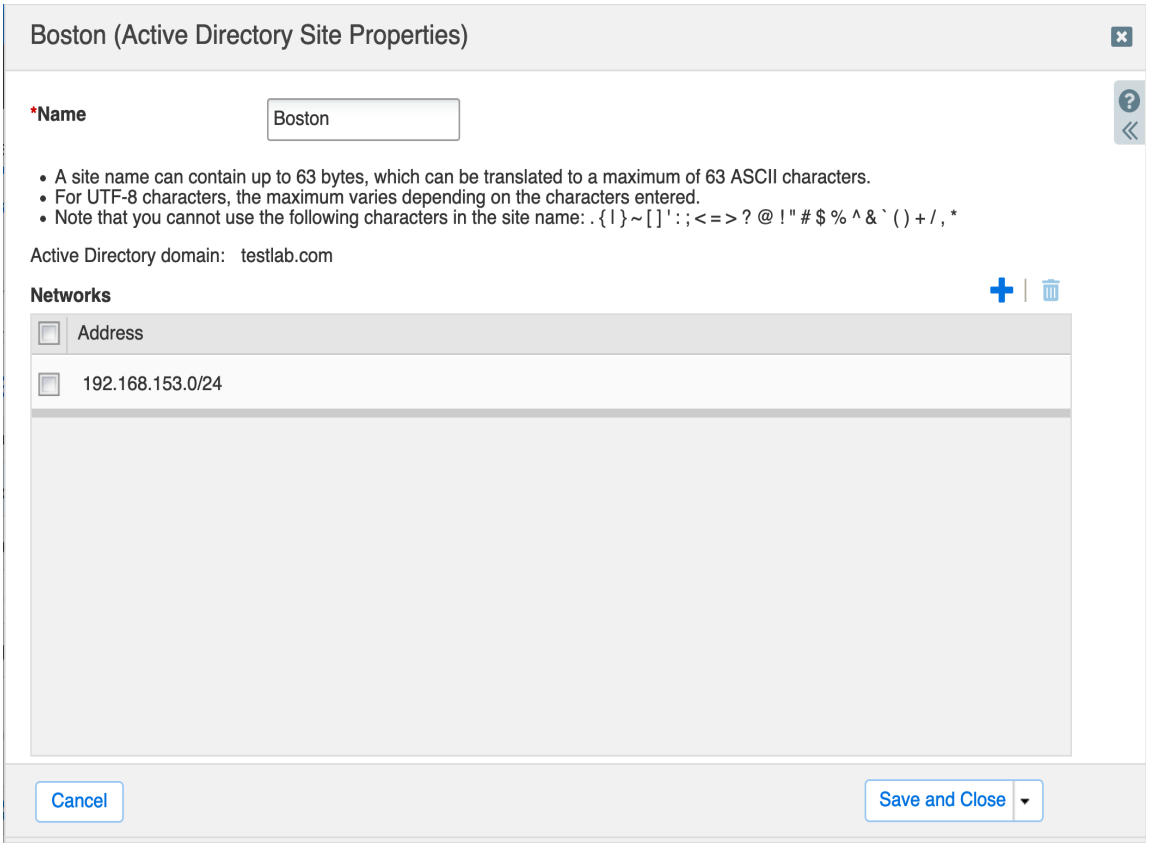
The following procedure shows how to add multiple networks to an AD site.

1. Go to **Grid → Microsoft Servers → Active Directory Domains**.

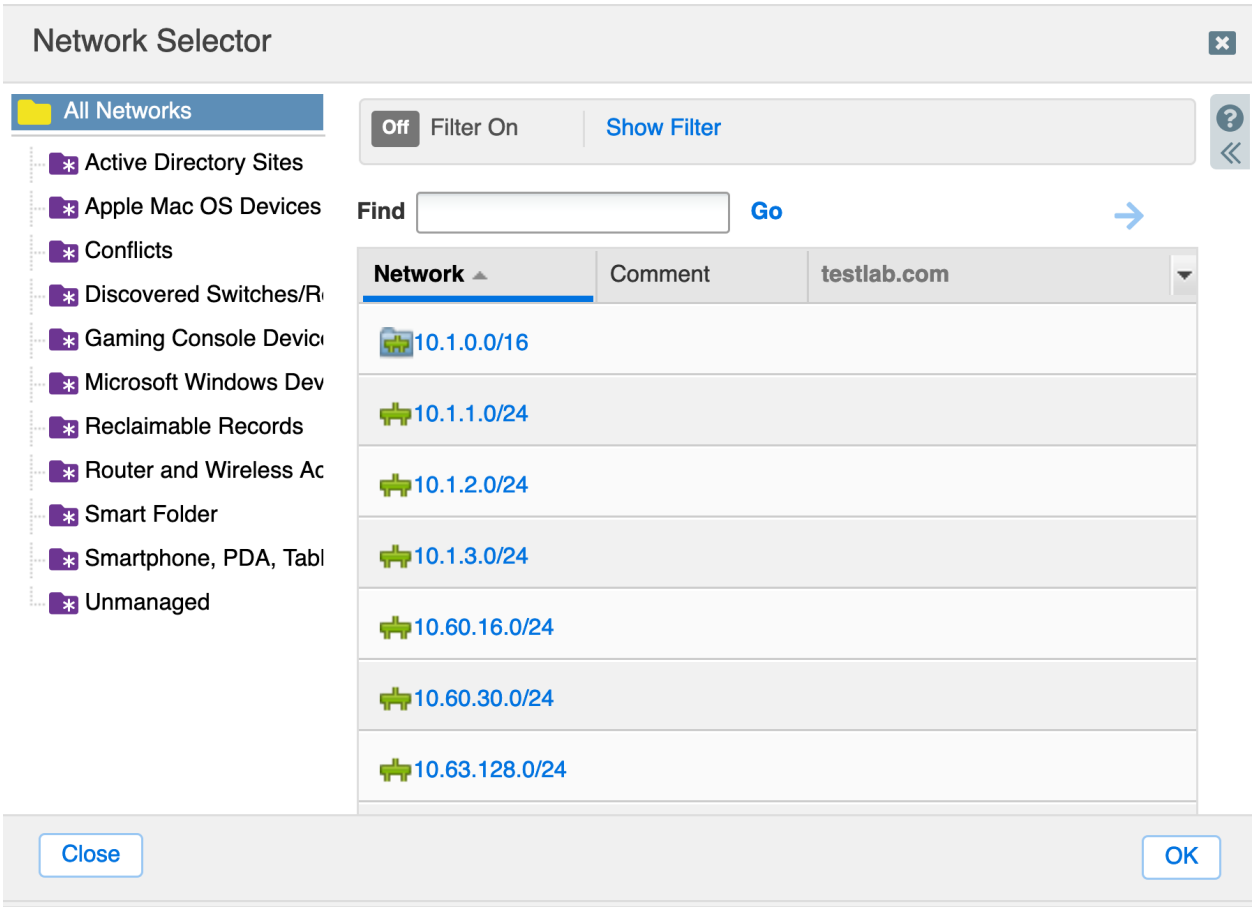
2. Click on a Domain link, in this example testlab.com.



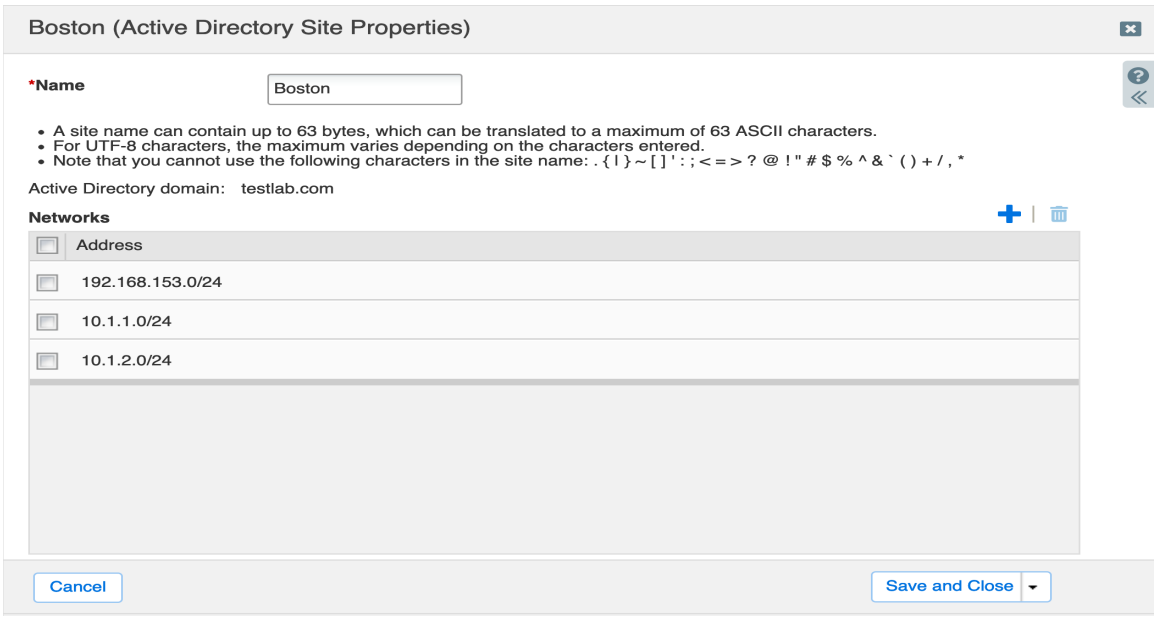
3. Click on the hamburger icon next to the site, Boston, you want to add networks to, and click **Edit**



4. Click the plus sign (+) to display the Network Selector which displays a list of networks.



5. Choose all the networks to add to the selected site by pressing the Ctrl or command key, based on the OS, and selecting the desired networks. In this example, networks 10.1.1.0/24 and 10.1.2.0/24



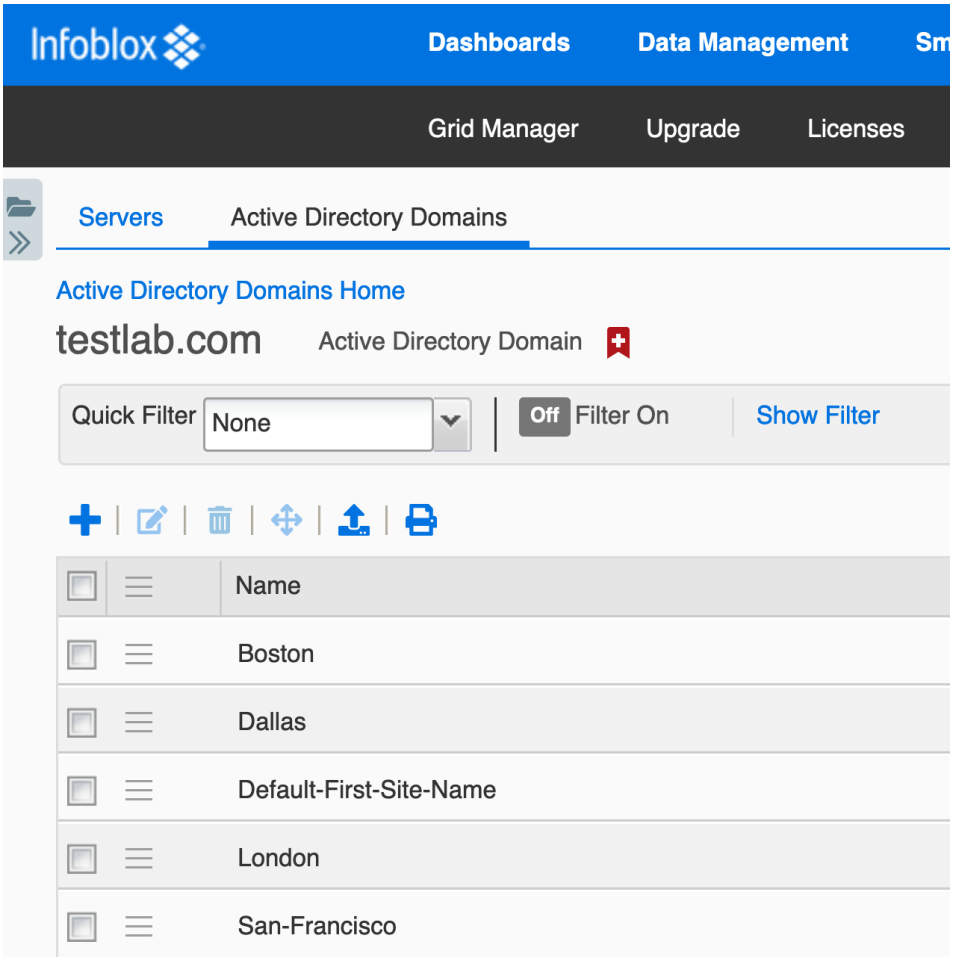
6. Click **Save & Close**

Moving Networks between AD Sites

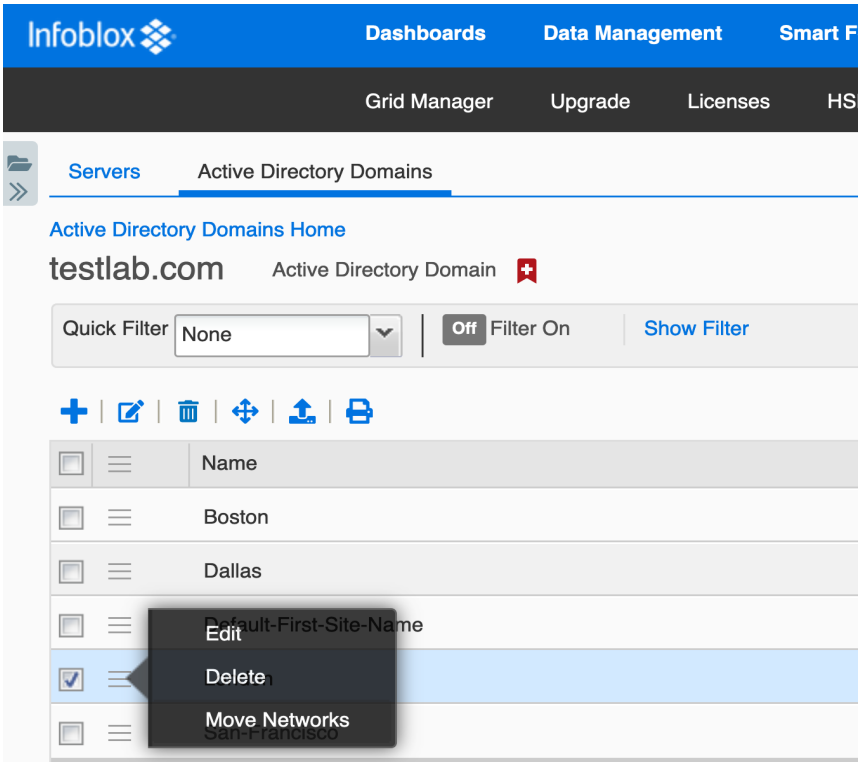
The ability to move networks between AD sites makes life easier for network administrators, as it gives them the ability to move networks from one AD site to another. This is required during a move of logical networks across physical boundaries, for example, when a company acquires a new building in a different location.

The following procedure makes a network part of a new AD site. In this example network 192.168.155.0/24 is being moved from London to San-Francisco.

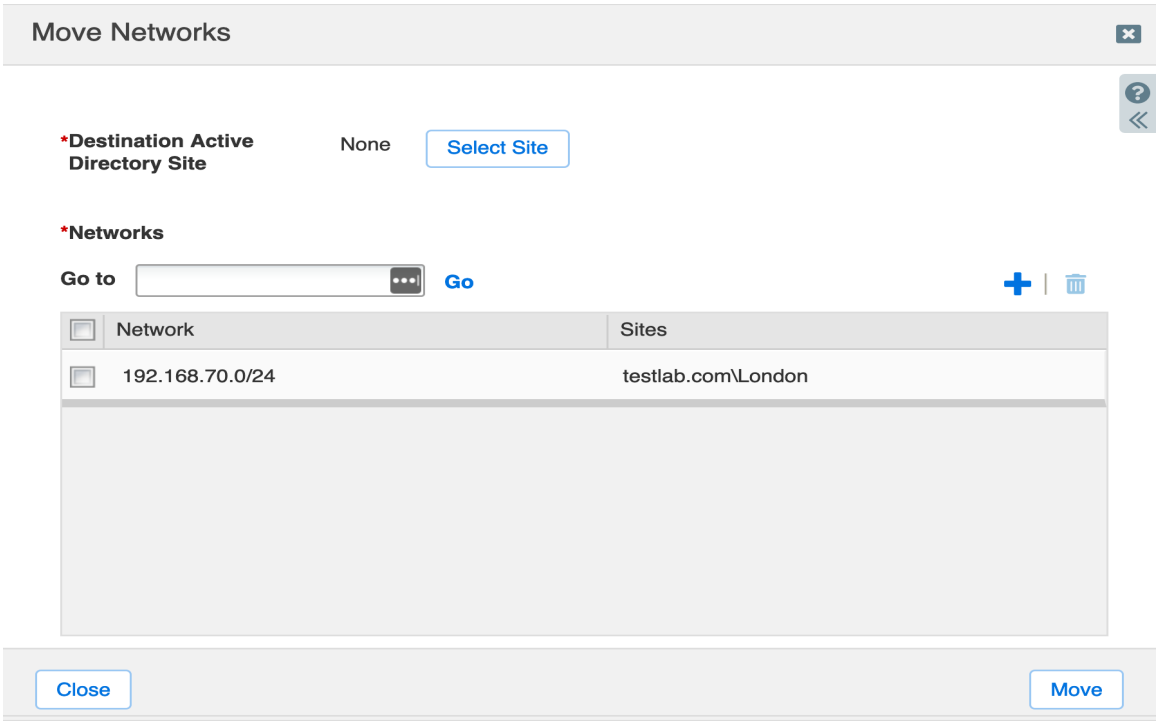
1. Go to **Grid** → **Microsoft Servers** → **Active Directory Domains**.
2. Select the desired domain link, in this example, testlab.com.
3. Click the hamburger icon next to the site where networks will be moved from, in this example,



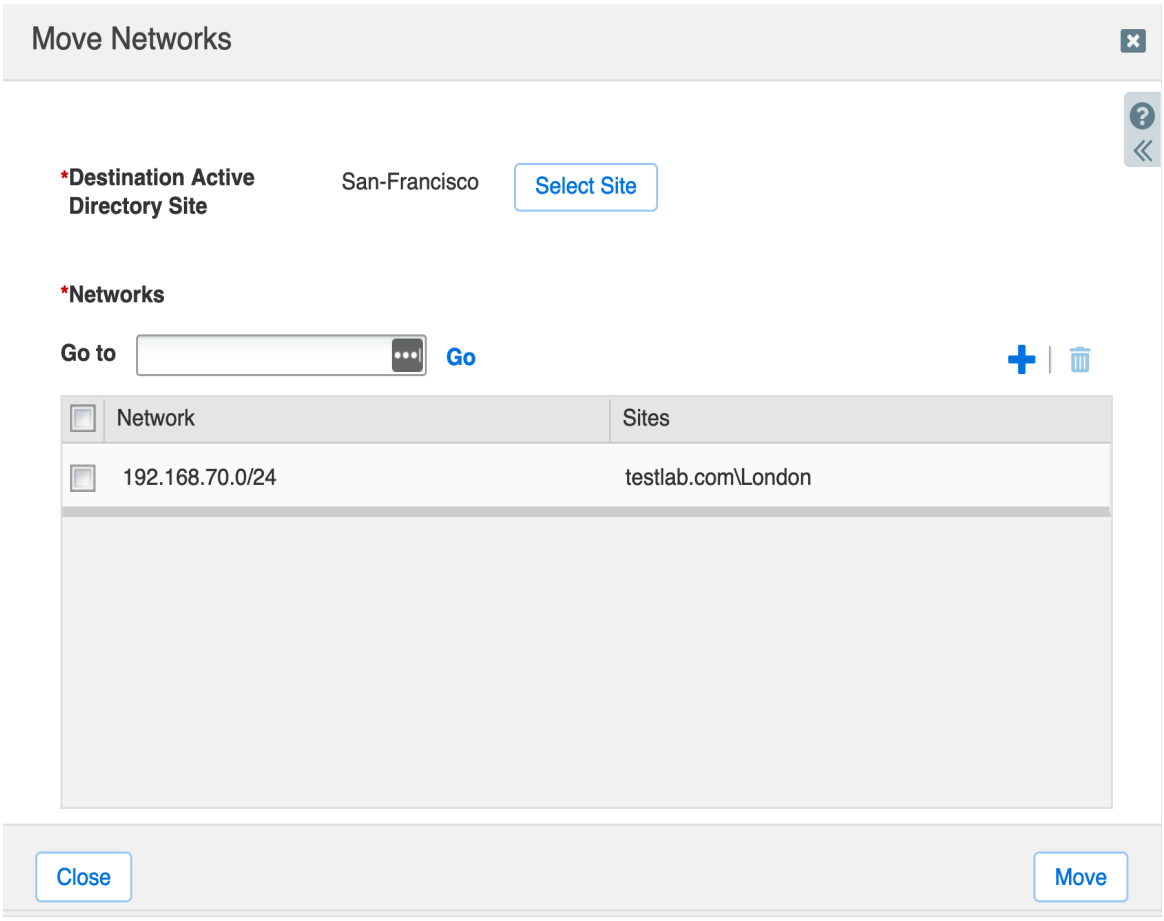
4. Click **Move Networks**



5. Click **Select Site** next to the Destination Active Directory Site option



6. In Microsoft Sites Selector, select a site from the list, in this example San-Francisco

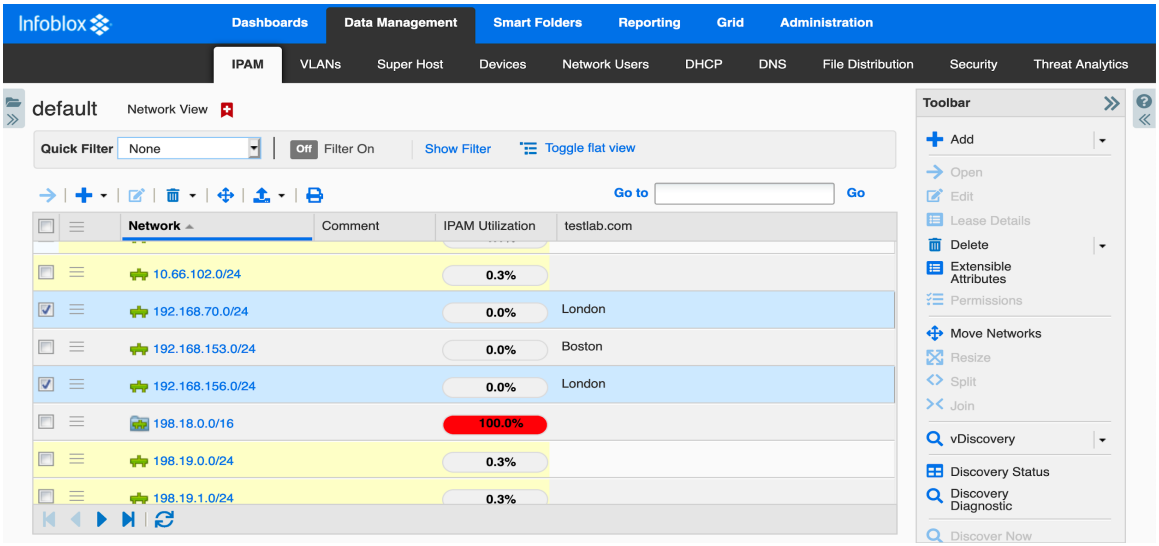


7. Select a **network**, in this example 192.168.70.0/24
8. Select **Move**

Moving Multiple Networks to an Active Directory Site

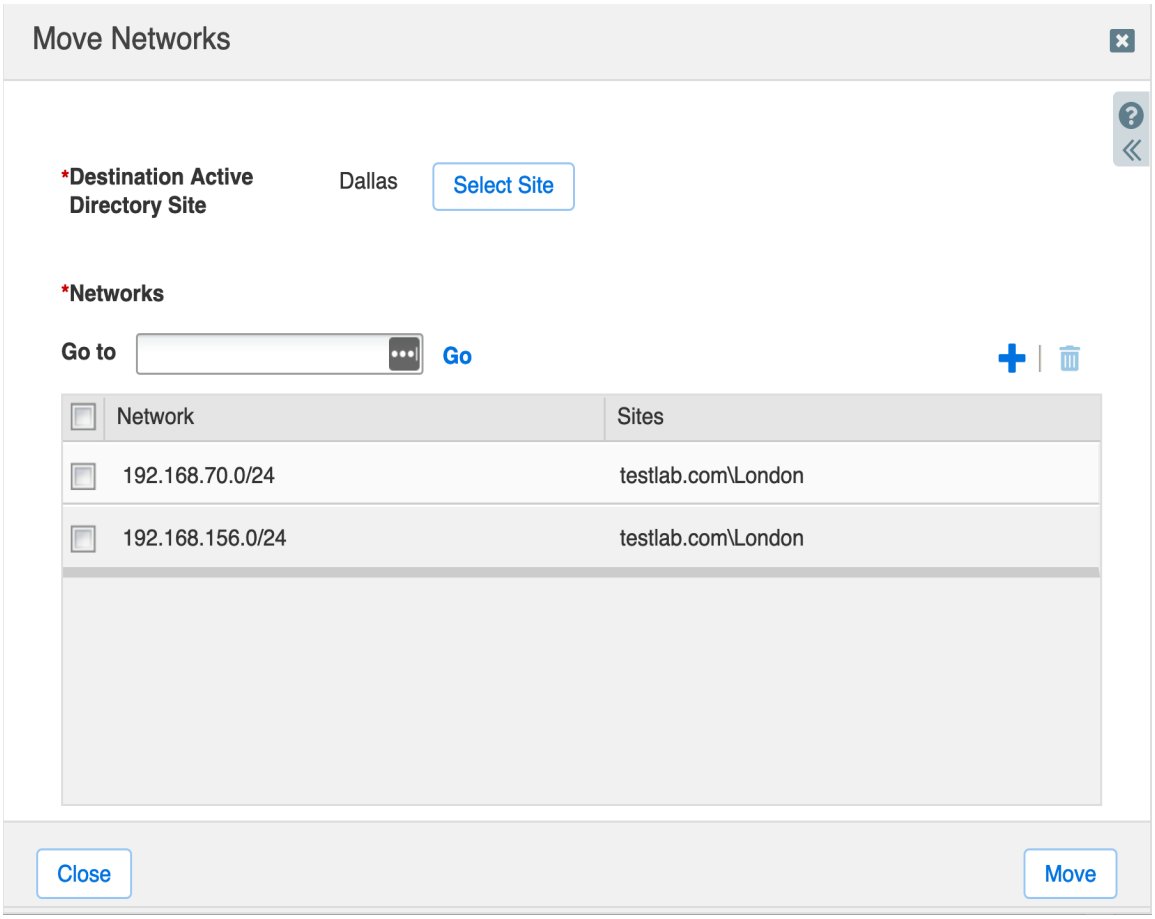
An administrator can move multiple networks to an AD site in a single operation. In the example below, all networks are moved from Boston to Dallas in a single operation

1. Go to **Data Management → IPAM**



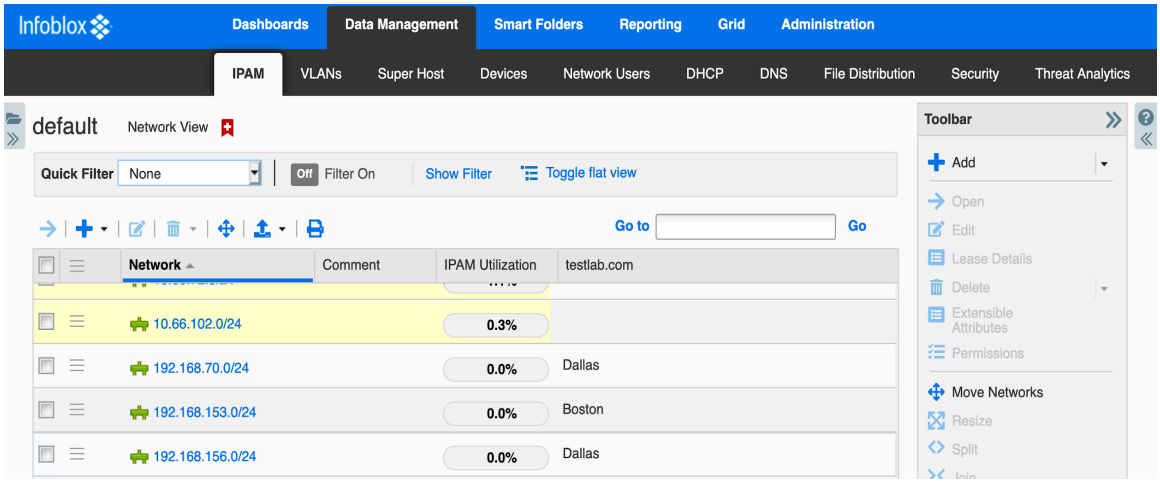
2. Select all the networks associated with London to be moved, and click **Move Networks** in the toolbar

3. Click the **Select Site** button and choose Dallas to set Destination Active Directory Site to Dallas



4. Click **Move**

All moved networks are now associated with the Dallas site under IPAM as shown below



Automating Networks as part of AD Sites Using Network Templates

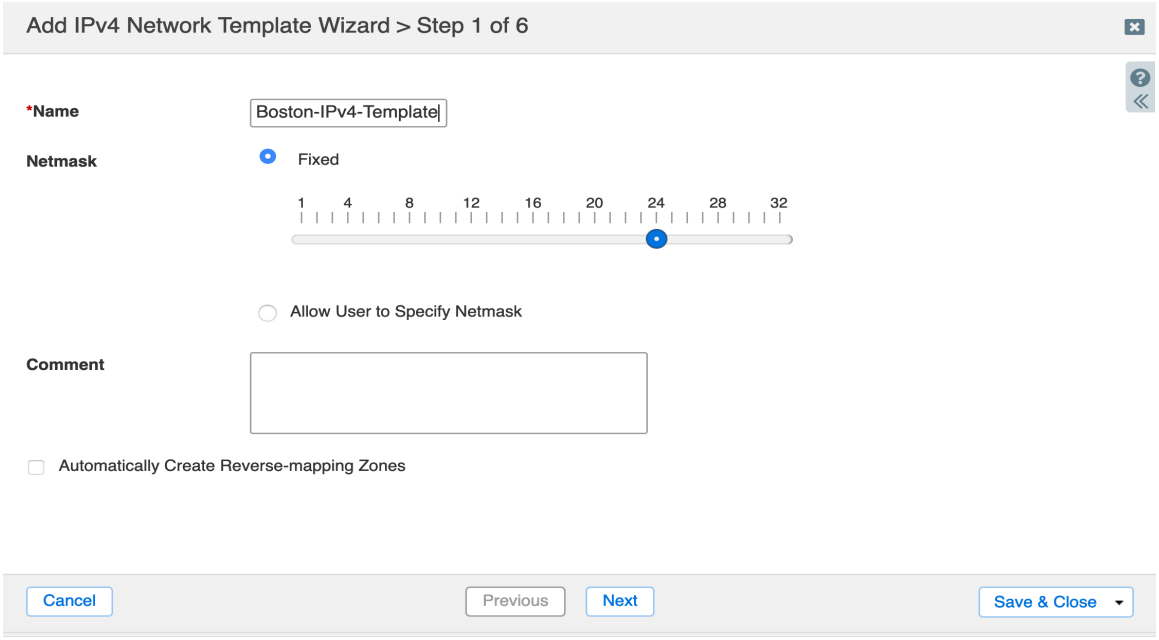
One of the primary requests from network administrators is to automate network management as much as possible, specifically fully automated network creation. Infoblox NIOS provides several network templates to automate network management, one of which automates IPv4/IPv6 network creation—from subnet mask to managing members and creating reverse mapping zones to associate specific AD sites.

This example demonstrates this powerful capability by using a network template that makes all new networks part of the Boston AD site. First, create a network template that makes sure that each network created using the template will be part of the Boston site.

1. Click **Data Management** → **DHCP** → **Templates**

2. **Click Add** button → **Template** → **IPv4 Network** Template or IPv6 Network Template. As shown in the figure below, the template is for IPv4 network creation.

3. In the Name field, type Boston-IPv4-template. Keep Netmask at /24 and click **Next**



4. Click **Next** and click **Next** again

5. Select either option for Assign these Active Directory Domains/Sites and select the desired domain name and site from that domain name,

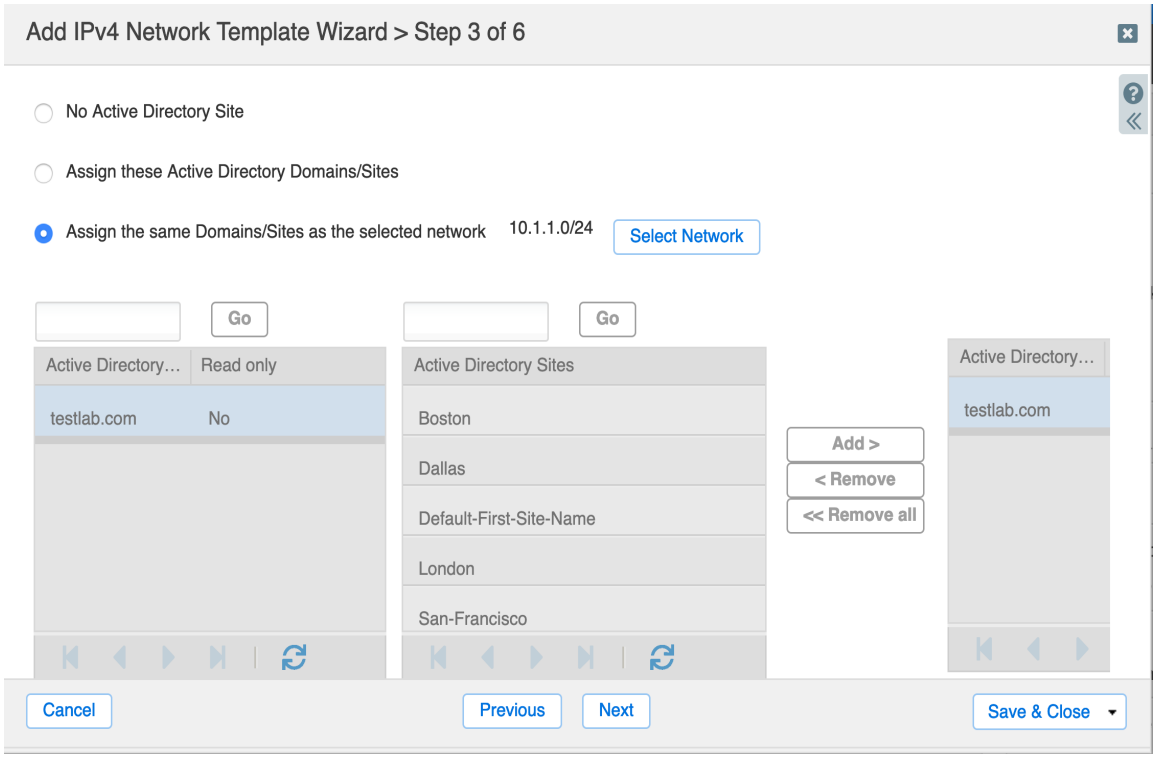
Or you can select the option Assign the same domains/sites as the selected network and click Select network to select a network that is part of an AD site that we want the new networks to be part of.

NOTE: The second option will work only if there is already a network created with the target site you want to use.

In this example, since we want the template to make all new networks part of the Boston site, Boston is selected as the AD site for the template using one of the two above options. There is a network 10.60.22.0/24 that is already part of the Boston site.

6. Select Assign the same domains/sites as the selected network, click **Select network**, and select 10.60.22.0/24.

NIOS automatically populates the AD site table with the site of the network, in this case Boston

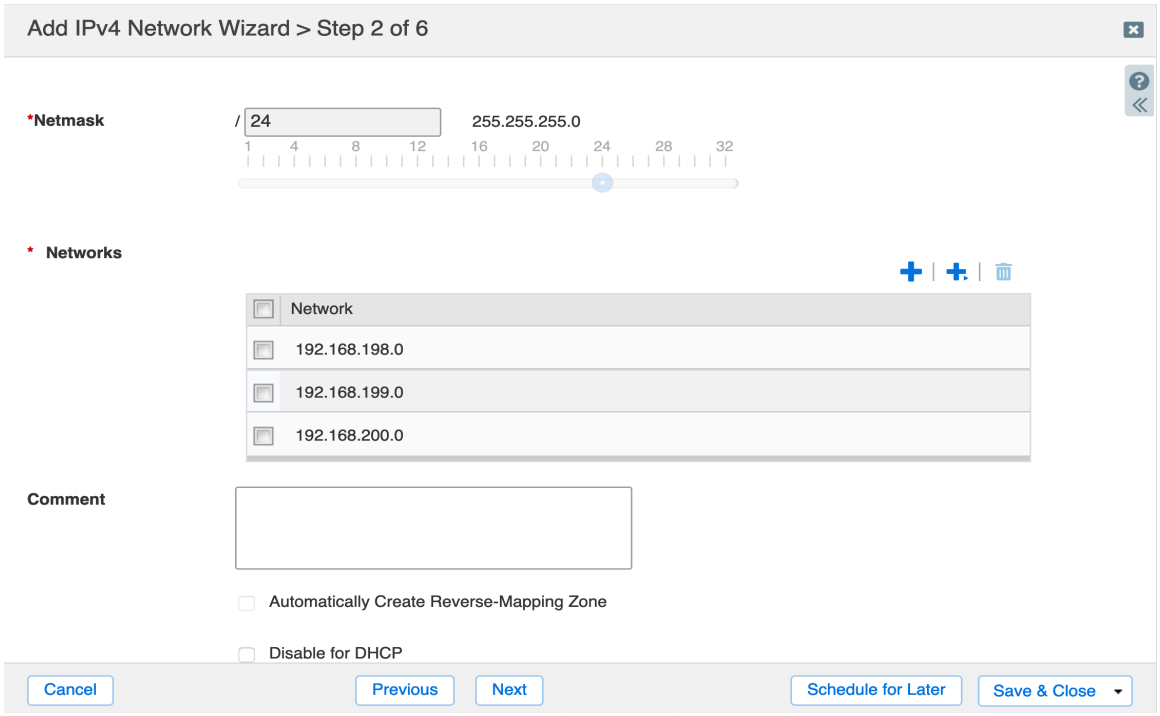


7. Click **Save & Close**.

Now create a new network using the template created above

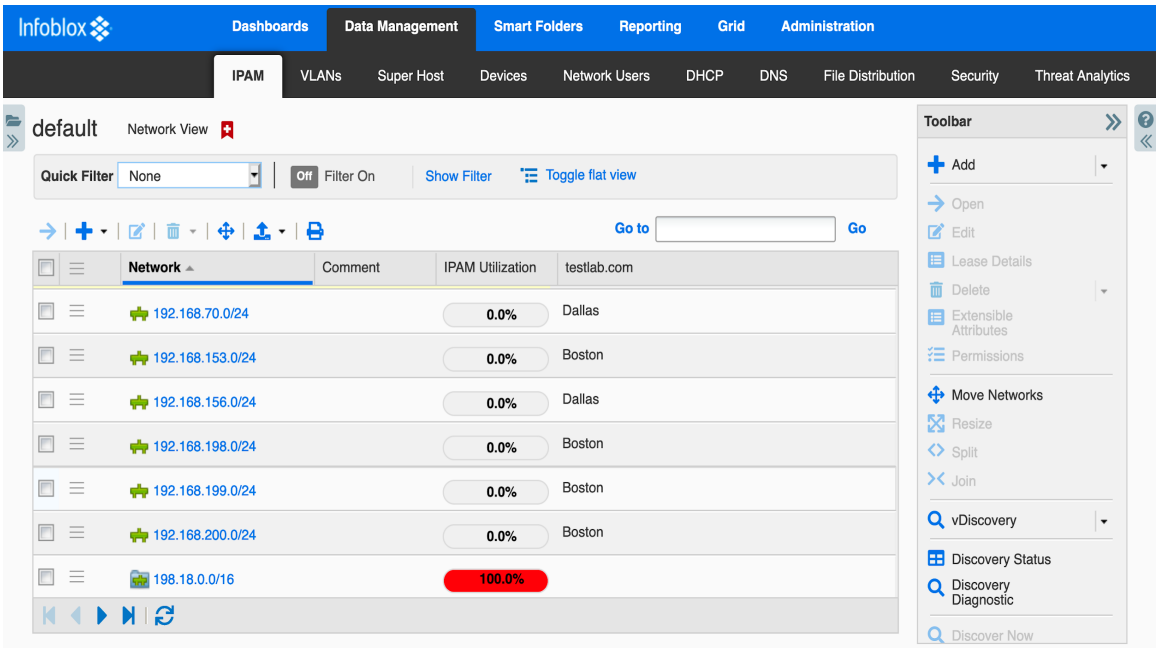
8. Click **Data Management** → **IPAM**
9. Click **Add** Button→ **Network** → **IPv4** to start the Add IPv4 network wizard.
10. Select **Add Network**, and select the option Using a network template.
11. Click **select template** and select the desired template, in this example, Boston-IPv4-template, and click Next
12. Click under the Networks field, click the plus sign (**+**) to add IPv4 networks, in this example, 192.168.198.0, 192.168.199.0, and 192.168.200.0.

The screen now looks like the one shown below.



13. Click **Save & Close**.

14. To verify the creation of new networks and the AD site they belong to, go to **Data Management → IPAM**



All three newly created networks are automatically associated with the AD site Boston—the site was added because of the template used.

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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