IPAM - CREATE AND MANAGE IP BLOCKS AND RANGES

Address space management

In IPAM, IP address blocks are large chunks of IP addresses that are used for organization of address space. IP address ranges are smaller chunks of IP addresses that typically correspond to a DHCP scope. IP address ranges are mapped to IP address blocks.



IP addresses can be entered into IPAM manually, or by importing from a comma-delimited file. Addresses can also be exported to a file in comma-delimited format.

Create, delete, import and export IP addresses

The following procedure demonstrates how IP address blocks, ranges, and addresses can be created, deleted, exported, and imported in IPAM.

To create, delete, import, and export IP addresses

- 1. In the upper IPAM navigation pane, click **IP Address Blocks**.
- 2. In the lower navigation pane, right-click **IPv4** and then click **Add IP Address Block**.

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IPv4	
Dublic Ar	Add IP Address Block
Public Ad	Add IP Address Range
Private A	Add IP Address
Unmapp	Import IP Address Blocks
IPv6	Import IP Address Ranges
Global A	Import IP Addresses
Unmappea	Import IP Address Ranges Inventory

Note

The IP address block you create is automatically added to public or private address space according to the start and end IP addresses you specify.

- 3. In the Add or Edit IPv4 Address Block dialog box, next to Network ID, type 10.0.0.
- 4. Next to **Prefix Length**, choose **8**. This is the /8 corresponding to the /24 subnet that is being dynamically allocated by DHCP1.
- 5. Click OK, and then next to Current View choose IP Address Blocks.

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	OVERVIEW SERVER INVENTO IP ADDRESS SPACE IP Address Blocks IP Address Inve IP Address Ran IP Address Ran MONITOR AND DNS and DHCP DNS and DHCP DHCP Scopes DNS Zone Moni Server Groups EVENT CATALOG IE T= IPv4 Public Address ↓ Private Address ↓ Unmapped Ad ↓	IPv4 1 total Current view: IP Adds Filter Utilization Network Utilization Network Under 10.0.0.0/8 Configuration Details Description: Network Start IP Address: End IP Address: IP Address Type: RIR: Percentage Assigned Percentage Utilized:	ress Blocks	End IP Address 10.255.255.255	RIR Last Assign Utiliza Total Assign Utiliza Receir Owne Last A	ation: Addresses: ned Addresses: ed Addresses: ved Date from RIF rr: kssigned Date:	Under 16777216 244 1	Tot

- 6. On the **Configuration Details** tab, next to **Utilized Addresses**, note that one IP address is currently in use. This corresponds to the lease issued by DHCP1 for Client1.
- 7. Next to Current view, choose IP Address Ranges.
- 8. On the **Configuration Details** tab, review the information displayed. Details are provided for Contoso-scope1 supplied by dhcp1.contoso.com.

nfiguration Details	tilization Trend Event Catalog			
Description:				
Network	10.0.0/24	Utilized Addresses:	1	
Subnet Mask:	255.255.255.0	Default Gateway:		
Start IP Address:	10.0.0.1	Dhcp Server Name:	dhcp1.contoso.com	
End IP Address:	10.0.0.254	Dhcp Scope Name:	Contoso-scope1	
IP Address Type:	Private	Exclusion Ranges:	10.0.0.1-10.0.0.10	
Assignment Type:	Dynamic	Owner:		
Overlapping:	No	Assignment Date:		
Percentage Utilized:	0.41	Last Reclaim Run Time:		
Utilization:	Under	Managed by Service:	MS DHCP	
Utilization Calculation:	Automatic			
Assigned Addresses:	244			
Service Instance:	dhcp1.contoso.com			

- 9. In the lower navigation pane, right-click IPv6 and then click Add IP Address Block.
 10. Under Specify the Network ID, type 21da:d3:0:2f3b:: and then move the slider next to Specify Prefix length to that the prefix is 64, and then click OK.

	Add or Edit IPv6 Ad	Idress Block
Spec 21d	cify Network ID: la:d3:0:2f3b::	
Spec	cify Prefix length:	
		64
Prov	10 20 30 40 50 60 70 80 vide the following values to add or edit the IPv6 4	90 100 110 120 127 address block:
1	Field	Value
	Automatically assign address values	Yes 👻
- 3	Start IP address	21da:d3:0:2f3b::
* 1	End IP address	21da:d3:0:2f3b:ffff:ffff:ffff.ffff
1	Regional internet registry (RIR)	Select 👻
1	Received date from RIR	Select a date 15
1	Description	
I	Last assigned date	Select a date 15
(Owner	
		OK Cancel

- 11. Choose **IP Address Blocks** next to **Current view** and confirm that the **21da:d3:0:2f3b::/64** block was successfully added.
- 12. Right-click **IPv4** and add the following IP address blocks:
 - o **192.168.0.0/24**
 - o **192.168.1.0/24**
- 13. Right-click **IPv4** and add the **207.46.0.0/16** address block. Since this is public address space, you must choose a regional Internet registry. Choose **ARIN**, and if desired, supply dates and a description for this block of public IP address space.

	Field	Value
ł	Network ID	207.46.0.0
	Prefix length	16
	Automatically assign address values	Yes
	Start IP address	207.46.0.0
•	End IP address	207.46.255.255
	Regional internet registry (RIR)	ARIN
	Received date from RIR	2/15/2012
	Description	207.46 block
	Last assigned date	Select a date 15
	Owner	

- 14. Ensure that the **Current view** selected is **IP Address Blocks** and click the **Network** field to sort by highest to lowest network ID. Also try sorting by some other fields.
- 15. In the lower navigation pane, under **IPv4**, click **Public Address Space** and verify that the **207.46.0.0/16** IP address block is displayed.
- 16. Right-click **IPv4** and then click **Add IP Address Range**.
- 17. Next to **Network ID**, type **192.168.0.0**, choose **25** next to **Prefix length**, and then click **OK**.

	Add or Edit IPv4 A	Address Range	x
Provide the fe	ollowing values to add or edit th	e IPv4 address range:	
Basic config	urations		\$
Field		Value	
* Network	c ID	192.168.0.0	
* Prefix le	ngth	25	-
* Subnet	mask	255.255.255.128	
Automa	tically assign address values	Yes	•
* Start IP	address	192.168.0.1	
* End IP a	ddress	192.168.0.126	
* Manage	d by service	IPAM	-
* Service	instance	Localhost	•
* Assignm	nent type	Static	•
Assignm	nent date	Select a date	15
* Utilizatio	on calculation	Automatic	-
Utilized	addresses	0	
Descript	tion		
Owner			
Custom Con	figurations		≈
		OK	Cancel

- 18. Right-click IPv4 and add the following IP address ranges:
 - o **192.168.0.128/25**
 - o **192.168.1.0/25**
 - o **192.168.1.128/25**
- 19. Right-click IPv4, and then click Add IP Address.
- 20. In the Add IP Address dialog box, next to IP address, type 192.168.0.1.
- 21. Next to MAC address, type 112233445566 and then click OK.
- 22. Next to **Current view**, choose **IP Addresses** and verify that the static IP address **192.168.0.1** was added, and that it is automatically assigned to the **192.168.0.1**-192.168.0.126 range.
- 23. With the current view set to IP Addresses, click TASKS and then click Export.



- 24. Choose a location where you want to save the file.
- 25. In the Save As dialog box, type ip-addresses next to File name and then click Save.
- 26. Right-click the **ip-addresses.csv** file and then click **Edit**.
- 27. Highlight the line containing the 192.168.0.1 IP address, right-click the line, and then click **Copy**.



- 28. Paste the contents of the copied line underneath the text four times, so that you create a total of six rows of text, with the first row containing the column headers.
- 29. Change the IP address in all five lines from 192.168.0.1 to values ranging from 192.168.0.2 192.168.0.6 and then save the file.

8	ip-addresses.csv - Notepad	
File Edit Format View "Duplicate", "Expiry "No", "Valid", "192.16 "No", "Valid", "192.16 "No", "Valid", "192.16 "No", "Valid", "192.16 "No", "Valid", "192.16	Help Status", "IP Address", "MAC Address", "Manac i8.0.2", "11-22-33-44-55-66", "IPAM", "Localf i8.0.4", "11-22-33-44-55-66", "IPAM", "Localf i8.0.5", "11-22-33-44-55-66", "IPAM", "Localf i8.0.6", "11-22-33-44-55-66", "IPAM", "Localf i8.0.6", "11-22-33-44-55-66", "IPAM", "Localf	^
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- 30. Right-click **IPv4** and then click **Import IP Addresses**.
- 31. Select the **ip-addresses.csv** file and then click **Open**.
- 32. In the **Import IP Addresses** dialog box, verify that **5 out of 5 records successfully imported** is displayed, and then click OK.
- 33. Verify that five new IP addresses were added to the **192.168.0.1-192.168.0.126** range.
- 34. Right-click the **192.168.0.6** IP address and then click **Delete**.
- 35. Verify that the 192.168.0.6 IP address was removed from the list.

Find available IP addresses and create reservations

A network administrator might wish to locate an available IP address and use it for static assignment to a network device. The following steps demonstrate how to use the **Find and Allocate Available IP Address** function in IPAM for this scenario.

To find, reserve, and reclaim IP addresses

- 1. With the **Current view** set to **IP Address Ranges**, right-click the 10.0.0.1/24 range that is assigned by DHCP1 and then click **Find and Allocate Available IP Address**.
- 2. Because the first ten IP addresses are reserved in the Contoso-scope1 DHCP scope, and Client1 has been allocated the first available IP address, the first available IP address will be 10.0.0.12.
- 3. Wait a few seconds for **Ping Reply Status** and **DNS Record Status** to resolve and display **No Reply** and **Not Found**, respectively.

	Find and Allocate Availab	le IP Address		×
Find and Allocate	Available IP Add	dress		
Show All Find Available IP A Basic Configurations - DHCP Reservation - DNS Record - Custom Configura	Find Available IP Range details: Managed by service: Service instance: Search criteria:	Address 10.0.0.0/24 MS DHCP dhcp1.con Omit existi reservation mapping t database.	I (10.0.0.1 - 10.0.0.254) toso.com ing DHCP leases and 1.Omit IP addresses o this range within IPAM	III
	Available IP addresses Available IP Address 10.0.0.12	Ping Reply Status No Reply	DNS Record Status Not Found	
	Basic Configurat	ions	Find Next	<
		ОК	Cancel Apply	

- 4. Click **Basic Configurations**.
- 5. Next to MAC address, type 112233445566 and next to Device type choose VOIP Gateway.
- 6. Click **DHCP Reservation**.
- 7. Next to **Reservation server name**, choose **dhcp1.contosoc.com**. The **Reservation scope name** will automatically display **Contoso-scope1**.
- 8. Next to **Reservation name**, type **voip-gw**, and then next to **Reservation type**, choose **Both**.
- 9. Click DNS Record.
- Next to Device name, type voip-gw, next to Forward lookup zone, choose contoso.com, and then next to Forward lookup primary server choose DC1.contoso.com.
- 11. If a reverse lookup zone has not been created yet, no in-addr.arpa zone is available to select.
- 12. Click **OK**, and then in the IPAM navigation pane under **IP ADDRESS SPACE**, click **IP Address Inventory**.
- 13. In the lower navigation pane, click the arrow next to **IPv4** to expand IPv4 and then click **VOIP Gateway**.

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14. Verify that the **10.0.0.12** IP address is displayed.

ÿTip

So far, changes have only been made to the IPAM database. The following steps will be used to create a DHCP reservation and DNS host record.

15. Right-click the 10.0.0.12 IP address and then click Create DNS Host Record.



- 16. Right-click the 10.0.0.12 IP address and then click Create DHCP Reservation.
- 17. On the **Configuration Details** tab, verify that **Create Success** is displayed next to **DHCP** reservation sync and **DNS Host Record sync**.
- 18. On DHCP1, in the DHCP console, verify that the reservation is present in the Contososcope1 DHCP scope.



19. On DC1, in DNS Manager, verify that the host record is present.

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File Action View Help				
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B DNS	Name	Туре	Data	Timestam
 DC1 Global Logs DNS Events Forward Lookup Zones Sources msdcs.contoso.com contoso.com contos	 msdcs sites tcp udp DomainDnsZones ForestDnsZones (same as parent folder) (same as parent folder) (same as parent folder) Client1 dc1 DHCP1 IPAM1 	Start of Authority (SOA) Name Server (NS) Host (A) Host (A) Host (A) Host (A) Host (A)	[27], dc1.contoso.com., h dc1.contoso.com. 10.0.0.1 10.0.0.11 10.0.0.1 10.0.0.2 10.0.0.3	static static 2/14/2012 2/14/2012 static 2/14/2012 2/14/2012
Conditional Forwarders	le voip-gw	Host (A)	10.0.0.12	static
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- 20. On IPAM1, right-click the 10.0.0.12 IP address and then click Edit IP Address.
- 21. Under **Basic Configurations**, click **Select a date** next to **Assignment date** and enter today's date.
- 22. Click **Select a date** next to **Expiry date**, select a date one month from today, and then click **OK**.

Important

Expiry settings are alerts you can create for objects in the IPAM database. When a

reserved IP address passes the expiry date, it is not removed from reservations on the DHCP server, but IPAM will provide events and alerts when the expiry date is close.

- 23. Verify that Valid is displayed under Expiry Status.
- 24. Click **TASKS** and then click **IP Address Expiry Log Settings**.
- 25. Under Expiry Alert Threshold, type 31.
- 26. Under **Logging Frequency**, choose **Log all expiry status messages periodically** and then click OK.

⊽Tip

By default, expiry logging begins 10 days before the expiration date. When you choose to log alerts periodically, they will be logged each time the expiry task runs. The expiry task runs once each day by default, but can be configured to run more or less frequently.

- 27. Refresh the IPAM console view and verify that **Expiry Due** is displayed under **Expiry Status**.
- 28. Edit the IP address again and change the assignment date and expiry date to one week in the past. Verify that the address is now displayed as **Expired**.
- 29. Right-click the 10.0.0.12 address and then click **Delete DHCP Reservation**. This removes the DHCP reservation from the DHCP server.
- 30. Right-click the 10.0.0.12 address and then click **Delete DNS Host Record**. This removes the forward lookup record from the authoritative DNS server.
- 31. Click **IP Address Blocks** in the IPAM navigation pane and change the current view to **IP Address Ranges**.
- 32. Highlight all the available ranges by holding down the SHIFT key and clicking the top and bottom ranges.
- 33. Right-click the highlighted IP address ranges, and then click Reclaim IP Addresses.
- 34. Under **Select IP addresses to be reclaimed**, select the checkbox next to the 10.0.0.12 address, click **Reclaim** and then click **Close**. This removes the IP address from the IPAM database.

		Rec	laim IP .	Addresses					×
Select IP addresses to recla	im								
Select IP addresses to reclain	n from the identified l	P address ran	ige						
	Selected IP address	ranges:							
Select addresses to reclaim	Network	Percentage	Utilized	Reclaim Last Run	Start IP Address	End IP Ad	dress	Managed by	Servi
	10.0.0/24	0.41			10.0.0.1	10.0.0.254		MS DHCP	
Summary	192.168.0.0/25	3.97			192.168.0.1	192.168.0	.126	IPAM	
	192.168.0.128/25	0			192.168.0.129	192.168.0	.254	IPAM	
	192.168.1.0/25	0			192.168.1.1	192.168.1	.126	IPAM	
	192.168.1.128/25	0			192.168.1.129	192.168.1	.254	IPAM	
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	Select IP addresses t	to be reclaime	ed:						
	Expiry Status	Expiry Date	IP Addre	ess MAC Address	Managed	by Service	Servic	e Instance	Dev
	Expired	2/8/2012	10.0.0.12	2 11-22-33-44-	55-66 MS DHCP		dhcp1	.contoso.com	voip
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	Select all Unsel	ect all				Rec	laim	Cano	el
									.d

Tip

Reclaiming IP addresses allows you visualize expiry status and delete multiple IP addresses. You can also right-click one or more IP addresses and click **Delete** to remove IP addresses from the IPAM database.

Create custom logical groups

The **IP Address Inventory** group is a built-in group with **IP** addresses organized by device type. In addition, **IPAM** allows you to create custom logical groups. To create custom groups:

To create custom logical groups

- 1. In the IPAM navigation pane, under IP ADDRESS SPACE, click IP Address Range Groups.
- 2. On the Server Manager menu, click **Manage** and then click **IPAM settings**.
- 3. In the **IPAM settings** dialog box, click **Configure custom fields**.
- 4. In the **Configure Custom Fields** dialog box, under **Add custom fields below**, scroll to the bottom of the list, type **Building** for the **Custom Field Name**, and then select **Yes** under **Multi-Value**.
- 5. Press ENTER or TAB to commit the new custom field name. A blank line will open that can be used for additional custom fields.
- 6. Click **Building** and then under **Custom Field Value** type the following values. Press ENTER after you type each one:

- 1. Headquarters
- 2. **Operations**
- 3. Sales
- 4. Data Center

(ou can extend built-in custom fields below by adding a user-defined custom fields. Custom fields can be associa	cius		
ddresses, and servers to create logical groups.	additional values, or o ated with IP address r	reate new anges, IP	
Step 1: Add custom fields below:			
Custom Field Name	Multi-Value	Category	
VMM Logical Network	No	Built-in	^
Building	Yes	User defir	1
			\sim
elect a multi-value custom field above and provide un Custom Field Value Headquarters	ique values for the fi	eld below:	
Operations			
Sales			
			=
Data Center			=
Data Center			=
Data Center		Delete va	= ~
Data Center Note: Changes to custom field names or values will a logical groups.	affect all associated e	Delete va	= v

- 7. Repeat the previous step to add another custom field named **Floor** with the following two custom field values:
 - First
 - Second
- 8. Click **OK** twice, and then click **Close**.
- 9. Click **IP Address Ranges**, right-click the **192.168.0.0/25** range, and then click **Edit IP** Address Range.
- 10. Click **Custom Configurations**, and then next to **Custom field to configure**, choose **Building**.
- 11. Next to Specify a value, choose **Headquarters** and then click **Add**.

- 12. Choose Floor next to Custom field to configure, choose First, and then click Add.
- 13. Edit the other three IP address ranges and add a unique building and a floor to each.

Tip

You can also select multiple IP address ranges and add custom fields to all the ranges in one step.

- 14. Refresh the IP Address Ranges view, right-click the column header and then select **Building** and **Floor** two of the fields to display. The building and floor is now displayed with each IP address range in the list.
- 15. Right-click **IPv4** and then click **Add IP Address Range Group**.
- 16. Under **Provide name of the address range group**, type **Building/Floor**.
- 17. Under **Custom Fields**, select **Building** and then select **Floor** so that items are grouped first by Building and then by Floor.
- 18. Click OK, and then click the arrow next to IPv4.
- 19. Verify that you can view IP address ranges by building and floor.

