VOSS Insights Install Guide

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1. VMWare Specification and Requirements

1.1. Dashboard Reporting VM Sizing Specifications

Size	Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Storage Spec	Network
Up to 5k users	8	2,8	16	500	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
5k to 20k users recom-mended option	12	2,8	32	500	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
20k to 40k users	16	2,8	128	500/1000	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB

- The specs for 5k up to 20k users is the recommended option.

1.2. Arbitrator VM Sizing Specifications

Size	Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Storage Spec	Network
Up to 10k	8	2,8	64	1000	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
10k to 30k	16	2,8	64	1000	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
>30k up to 60K recommended option	16	2,8	128	1000	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB

- The specs for >30k up to 60k users is the recommended arbitrator specification option.

Scalability questions to consider:

- Number of log devices
- Number of devices
- Number of users
- Number of Datacentres
- Storage retention Period
- Other Data external Data Sources
- System intergration
- Archiving requirements
- Local attached storage an not Network attached

Notes:

- The CPU an RAM needs to be reserved a top priority (all the cores and memory)
- Bandwidth between devices an Arbitrator needs to capable of data flows

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1.3. Arbitrator Correlation Consolidation VM Sizing Specifications

Arbitrator Correlation Consolidation recommended option:

Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Storage Spec	Network
16	2,8	128	1000	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB

Scalability questions to consider:

- Number of devices
- Number of flows per second
- Storage retention Period
- Local attached storage and not Network attached

Notes:

- The CPU an RAM needs to be reserved a top priority (all the cores and memory)
- Bandwidth between devices an Arbitrator needs to capable of data flows

1.4. DS-9 Netflow VM Sizing Specifications

Size	Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Storage Spec	Network
Small	12	2,8	32	500	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
Medium	16	2,8	64	500	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB
Large	16	2,8	64	500	SSD preferred Thick Eager Zero 15k HDD 1500 IOPS	1GB

Scalability questions to consider:

- Number of devices
- Number of flows per second

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- Storage retention Period
- Local attached storage an not Network attached

Notes:

- Larger then 200k flows per second requires distributed netflow servers
- The CPU and RAM needs to be reserved at top priority (all the cores and memory)
- Bandwidth between devices and Arbitrators needs to capable of data flows
- The CPU an RAM needs to be reserved a top priority (all the cores and memory)
- Bandwidth between devices an Arbitrator needs to capable of data flows

1.5. Raptor Call Path Generation VM Sizing Specifications

1.5.1. Raptor Server

Size	Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Network
Per Server	1	2	2	30	100MB

1.5.2. Raptor Client

Size	Cores (vCPU)	CPU Spec (Ghz)	Memory (Gb)	Storage (Gb)	Network
Per client	1	2	2	30	100MB

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2. Port Requirements

2.1. Correlation and Dashboard System Connectivity

This table includes connectivity requirements between VAA Arbitrator, Reporting Dashboard, as well as connectivity between these and the following: VOSS Automate, NTP, DNS and AD.

Source	Destination	Port / protocol	Notes
Correlation Server / Dashboard Server	Correlation Server / Dashboard Server	5432, 5433, 5000, 60514, 64514, 64515, 65515, 65516, 64005, 64004, 62009, 62010 (all TCP)	Note: Intra-system communication and queries – Bi-directional
Correlation Server	Correlation Server	62002, 62003, 62004, 62005, 62006, 11501,30501, 30503, 40501, 40503 (all TCP)	Note: VOSS Fabric TLS tunnel Connection Ports – Bi-directional between Customer systems and NOC systems for event forwarding
Correlation Server / Dashboard Server	Network Resources (NTP, DNS)	53, 123 UDP	Time and DNS
Client PC – GUI Interface and CLI Management Access	Correlation Server / Dashboard Server	443, 8443, 22, 80 TCP	User Interface Access
VOSS Automate	Dashboard Server	27020	Database access
Correlation Server / Dashboard Server	AD	389 636 TCP UDP	Authentication

2.2. Cisco UC Monitoring System Connectivity

Source	Destination	Port / protocol	Notes
Monitored Cisco UC system	Correlation Server / Dashboard Server	514 tcp/udp, 22 tcp, 162 udp	Cisco syslog, snmp trap, CDR/CMR file transfer
Correlation Server	Monitored Cisco UC system	443 tcp, 8443 tcp, 22 tcp, 21 tcp, 161 udp	Correlation server AXL query, ssh and snmp query

2.3. MS Teams System Connectivity

Source	Destination	Port / protocol	Notes
MS Teams - Cloud Agent	Cloud Arbitrator	5432 tcp 443 tcp	Collects data from the MS Teams Tenant to the arbitrator
Cloud Arbitrator	Dashboard Server	5432 tcp	Pushes data to the dashboard to display dashboard data
Client PC – GUI Interface and CLI Management Access	Correlation Server / Dashboard Server	443, 8443, 22, 80 TCP	User Interface Access

2.4. Netflow and DS9 Monitoring System Connectivity

2.4.1. Communication ports between Netflow Source and DS9

Source	Destination	Protocol	Port	Direction	Description
Netflow Source	DS9	UDP	9996	Unidirectional	Netflow v5 (Optional)
DS9	Netflow Source	UDP	161	Unidirectional	SNMP queries

2.4.2. Communication ports between the DS9 Server and Dashboard Server

Unless the DS9 and Dashboard Servers are located in the same subnet, system administrators need to ensure the following network ports are open between these two components.

Source	Destination	Protocol	Port	Direction	Description
Dashboard Server	DS9	TCP	8082	Unidirectional	Data respository acces
DS9	Dashboard Server	TCP	443	Unidirectional	DS9 System Stats
DS9	Dashboard Server	UDP	514	Unidirectional	DS9 System Logs

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2.5. VOSS Automate Port Usage

VOSS Automate port usage for each node type:

Protocol	Ports	WebProxy node	Application node	Database node
ssh / sFTP	TCP 22	X	X	X
http	TCP 80	X	X	
https	TCP 443, 8443	X	X	
snmp	TCP/UDP 161, 162	X	X	X
mongodb	TCP 27017, 27030		X	
mongodb	TCP 27019, 27020			X
LDAP	TCP/UDP 389 (636 TLS/SSL)		X	
NTP	UDP 123		X	
SMTP	TCP25		X	X

2.6. Skype for Business Monitoring System Connectivity

Source	Destination	Port / protocol	Notes
VOSS Forwarder installed on Windows Machine	Customer SfB Monitoring Server (SQL)	1433	Collection of CDR/QoS Data. SfB monitoring server is typically deployed on the SfB Front-End Server (Option 1)
VOSS Forwarder installed on Windows Machine	Separate Customer SfB Reporting Server - QoE DB (SQL)	1433	Collection of CDR/QoS Data from the Reporting (QoE) Server that is a replication of the SfB Monitoring Server (Option 2)
VOSS Forwarder installed on Windows Machine	Arbitrator Correlation	62009-62010, 514	Management and Syslog Traffic
VOSS Forwarder installed on Windows Machine	Dashboard / Reporting	62009-62010, 5432-5433, 80, 443, 514, 1194	Management and Syslog Traffic
SfB Monitoring Server	Dashboard / Reporting	1433	SQL Transactional Data Replication
SfB Monitoring Server	Arbitrator Correlation	80, 443	SDN Traffic
SfB Monitoring Server	Dashboard / Reporting	80, 443	SDN Traffic

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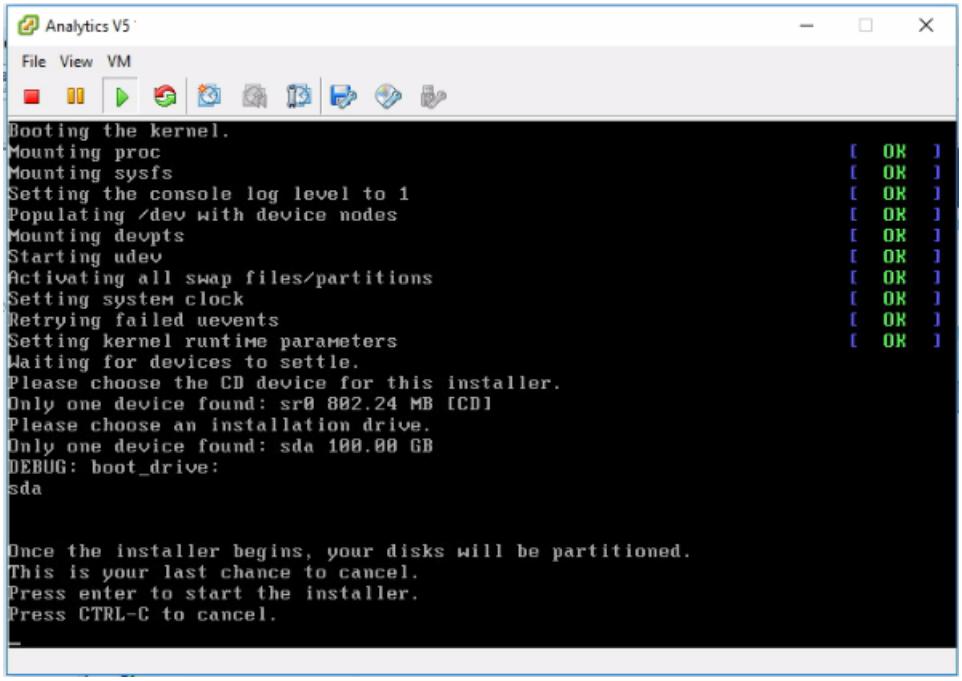
3. Deploy

3.1. Deploy and VM Installation Steps

1. Download the ISO to directory accessible by the VSphere client.
2. In the vSphere client, create a new Debian Linux 64-bit guest operating system VM with:
   - disk space
   - RAM
   - vCPU

   according to the recommended hardware specifications for the required configuration. See the *VMWare Specification and Requirements*.

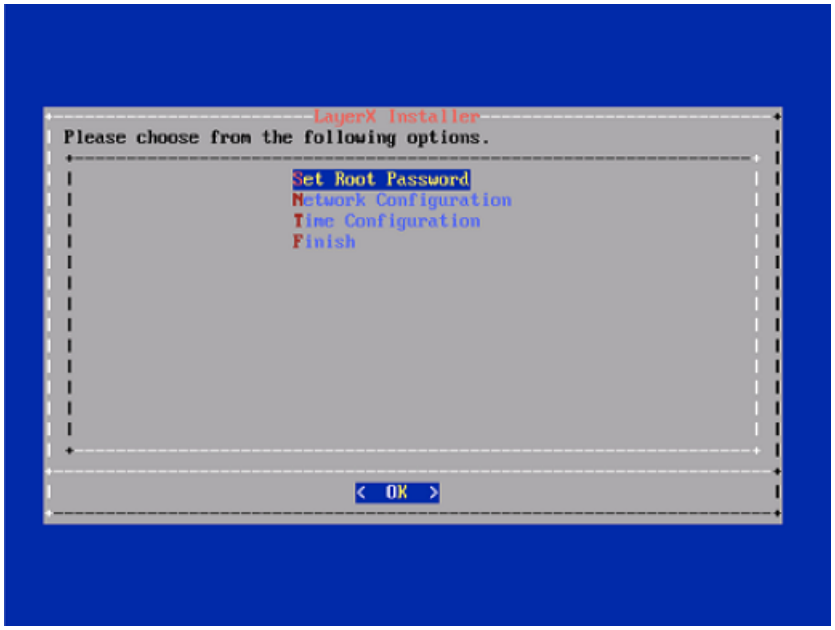
   Choose a VM name, for example “VAA”.
3. Attach the downloaded ISO to the CD/DVD drive. For Device Status, select Connect at power on. Make sure that the CD/DVD drive with the attached ISO is set to boot first.
4. Power on the VM.
5. You will be prompted with the following message:



6. Press <Enter> (to start install) or <Ctrl> + C to exit.
7. You will see `.lxp` packages being installed. This takes a while.

```
Info: install_package : Unpacking /mnt/cd/pkg/iana-etc.lxp
Info: install_package : Unpacking /mnt/cd/pkg/man-pages.lxp
Info: install_package : Unpacking /mnt/cd/pkg/attr.lxp
Info: install_package : Unpacking /mnt/cd/pkg/bc.lxp
Info: install_package : Unpacking /mnt/cd/pkg/berkeley-db.lxp
Info: install_package : Unpacking /mnt/cd/pkg/bglibs.lxp
Info: install_package : Unpacking /mnt/cd/pkg/bridge-utils.lxp
Info: install_package : Unpacking /mnt/cd/pkg/dhcpcd.lxp
Info: install_package : Unpacking /mnt/cd/pkg/diffutils.lxp
Info: install_package : Unpacking /mnt/cd/pkg/dmapi.lxp
Info: install_package : Unpacking /mnt/cd/pkg/ethtool.lxp
Info: install_package : Unpacking /mnt/cd/pkg/expat.lxp
Info: install_package : Unpacking /mnt/cd/pkg/gmp.lxp
Info: install_package : Unpacking /mnt/cd/pkg/lsof.lxp
Info: install_package : Unpacking /mnt/cd/pkg/mdadm.lxp
Info: install_package : Unpacking /mnt/cd/pkg/ncurses.lxp
Info: install_package : Unpacking /mnt/cd/pkg/net-tools.lxp
Info: install_package : Unpacking /mnt/cd/pkg/patch.lxp
Info: install_package : Unpacking /mnt/cd/pkg/paxctl.lxp
Info: install_package : Unpacking /mnt/cd/pkg/perl-SSLeay.lxp
Info: install_package : Unpacking /mnt/cd/pkg/popt.lxp
Info: install_package : Unpacking /mnt/cd/pkg/speex.lxp
Info: install_package : Unpacking /mnt/cd/pkg/strace.lxp
Info: install_package : Unpacking /mnt/cd/pkg/tar.lxp
```

8. After all the packages are installed you will automatically be presented with a basic configuration.



This allows you to set the following:

- Root Password
- Hostname
- IP Configuration
- DNS
- Time

Navigate to each of the setup screens using the following keys:

- <Up> Arrow key

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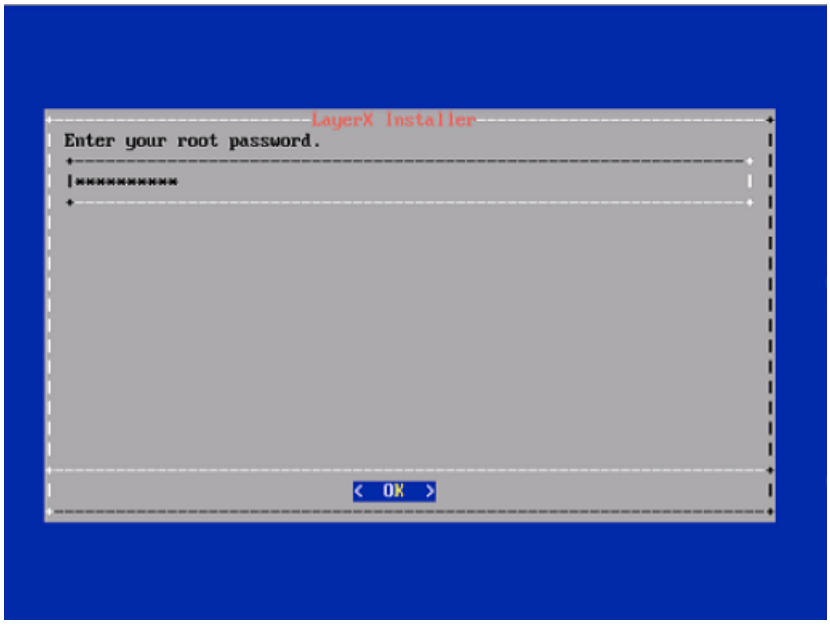
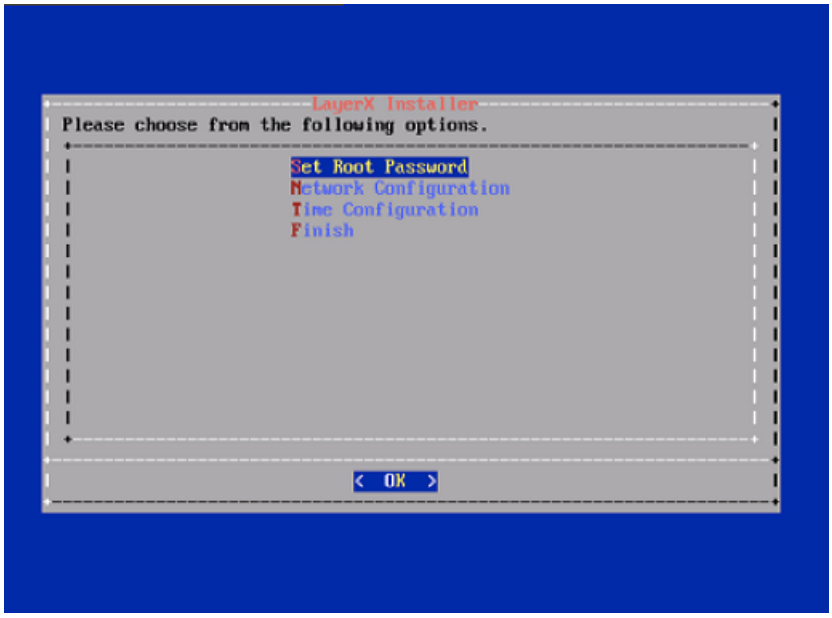
- <Down> Arrow key
- <TAB>
- <Enter>

9. To set the root password use the <Up> and <Down> arrow keys until Set Root Password is highlighted. Then press <Enter>.
10. You will then be asked to type the Root Password twice.



11. After entering the new Root Password you will return to the Main configuration screen.



You can now proceed to the *Networking Setup* section in the VOSS Insights Install Guide.

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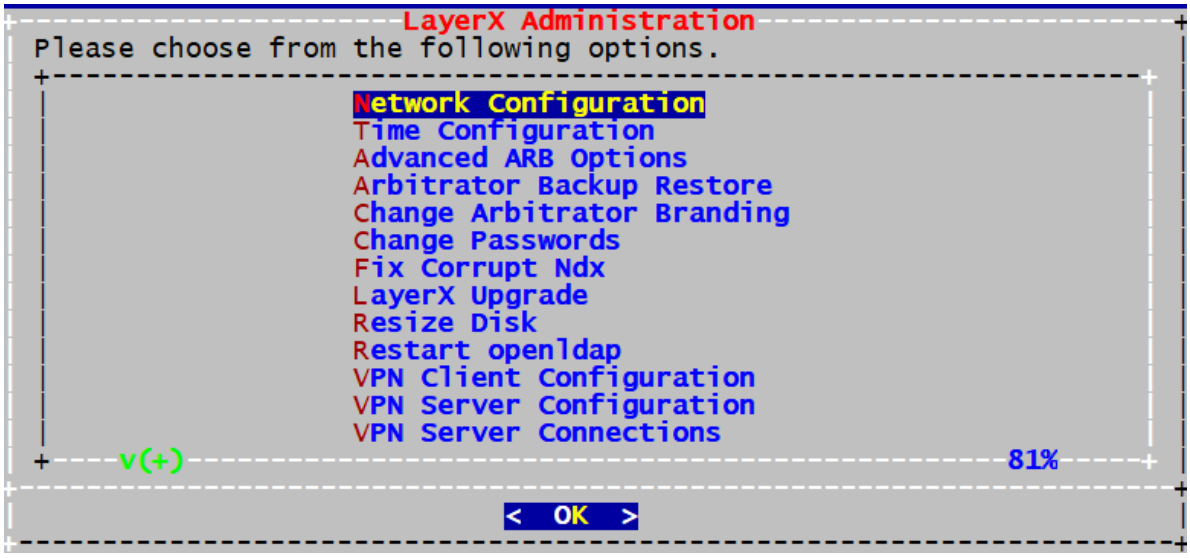
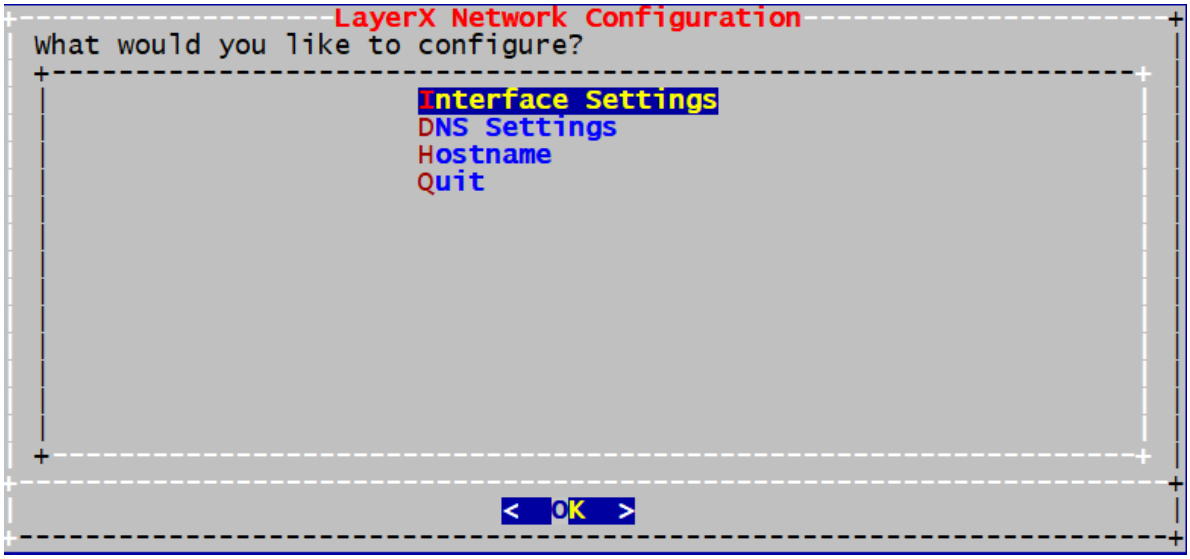
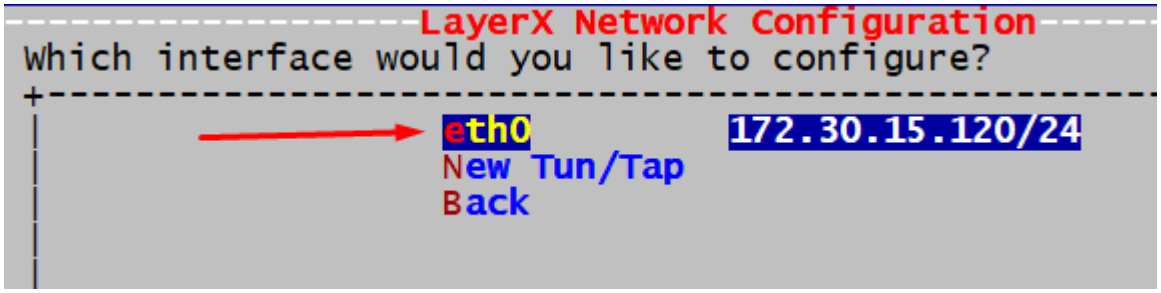
4. Networking Setup

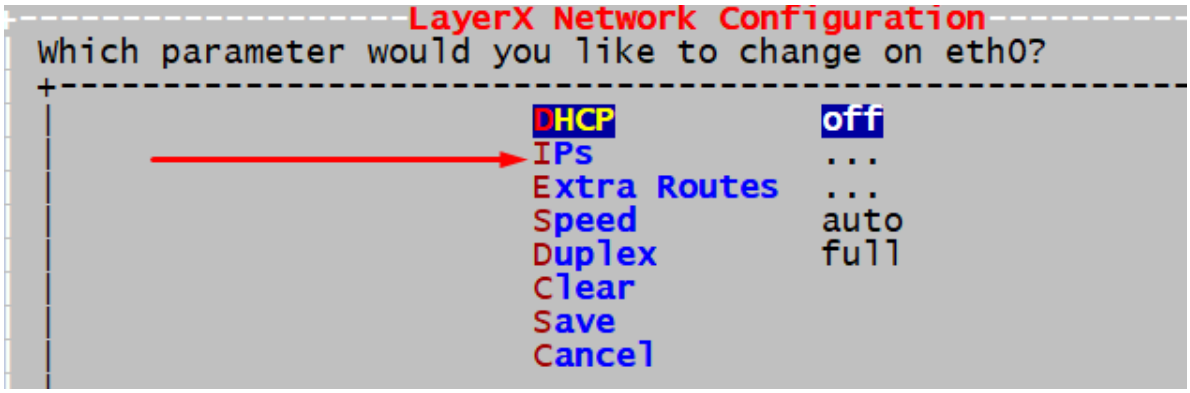
4.1. Arbitrator Networking Setup

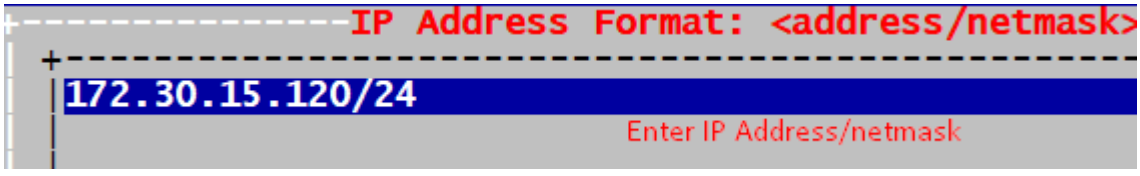
1. Deploy OVA Arbitrator
2. From the console login as `admin/admin`
3. Configure networking











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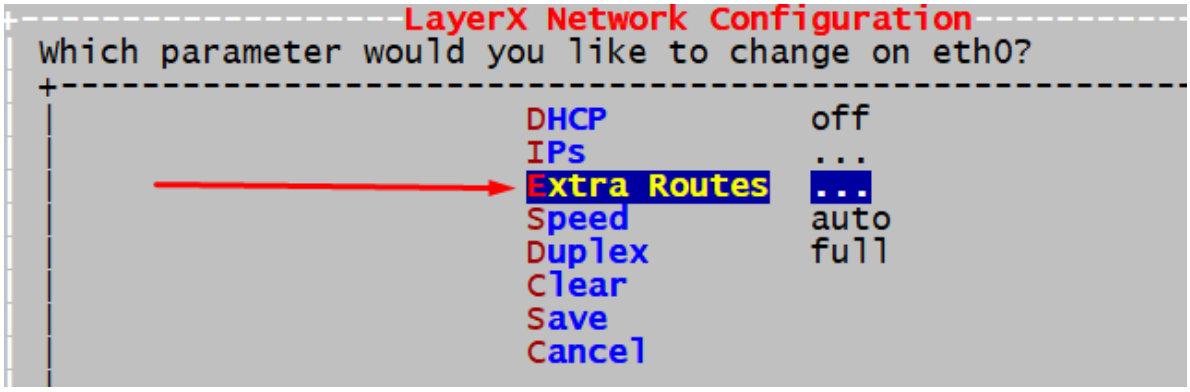
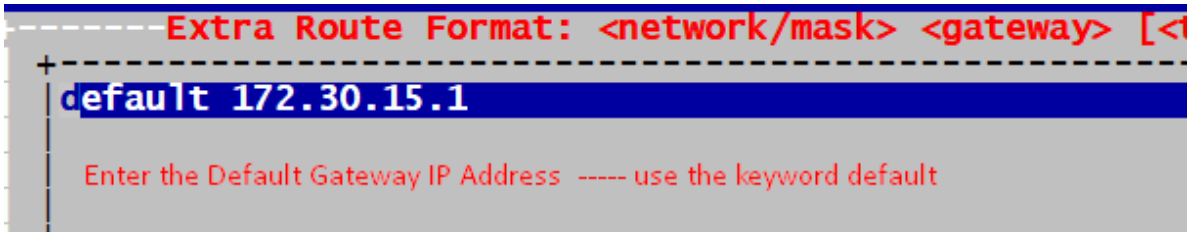


4. Once you have configured networking go back to Interface settings and set the hostname of the server and any DNS Settings.



5. Save then Quit.

4.2. Dashboard Reporter Networking Setup

1. Deploy OVA Dashboard/Reporter
2. Repeat the *Arbitrator Networking Setup* steps to configure Network/Hostname and DNS for the Dashboard/Reporter.

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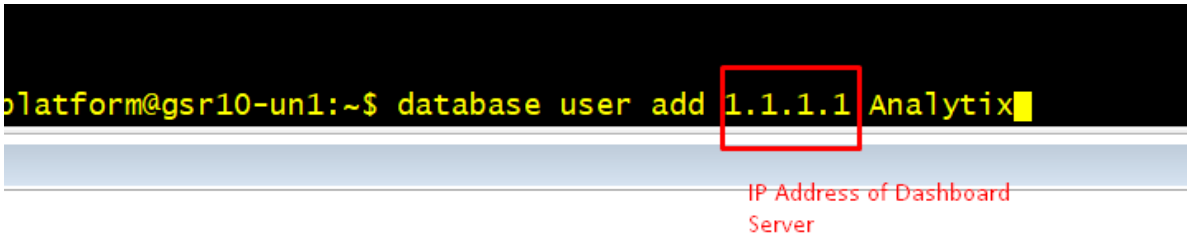
5. Database and System Setup

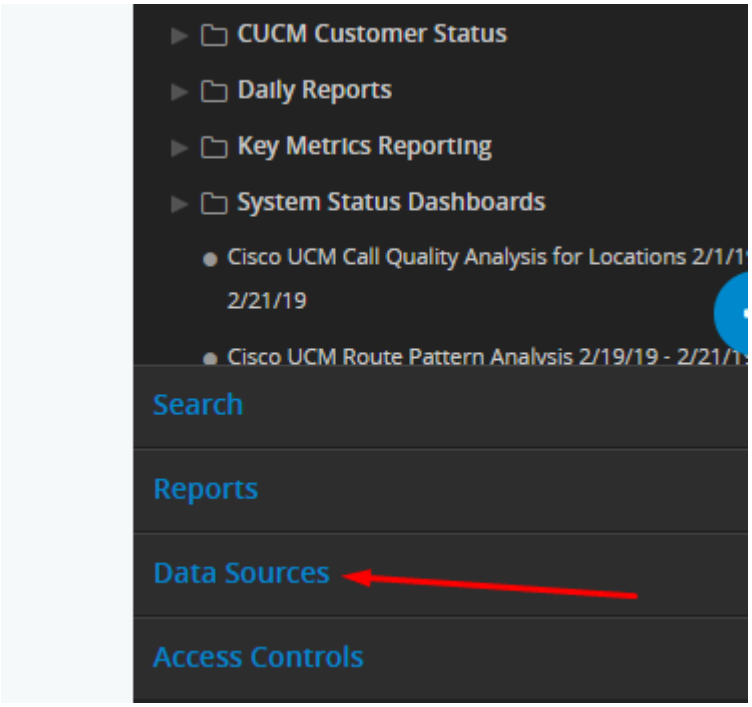
5.1. VOSS Automate Database Setup

1. Add a Database user - this is a Read only user

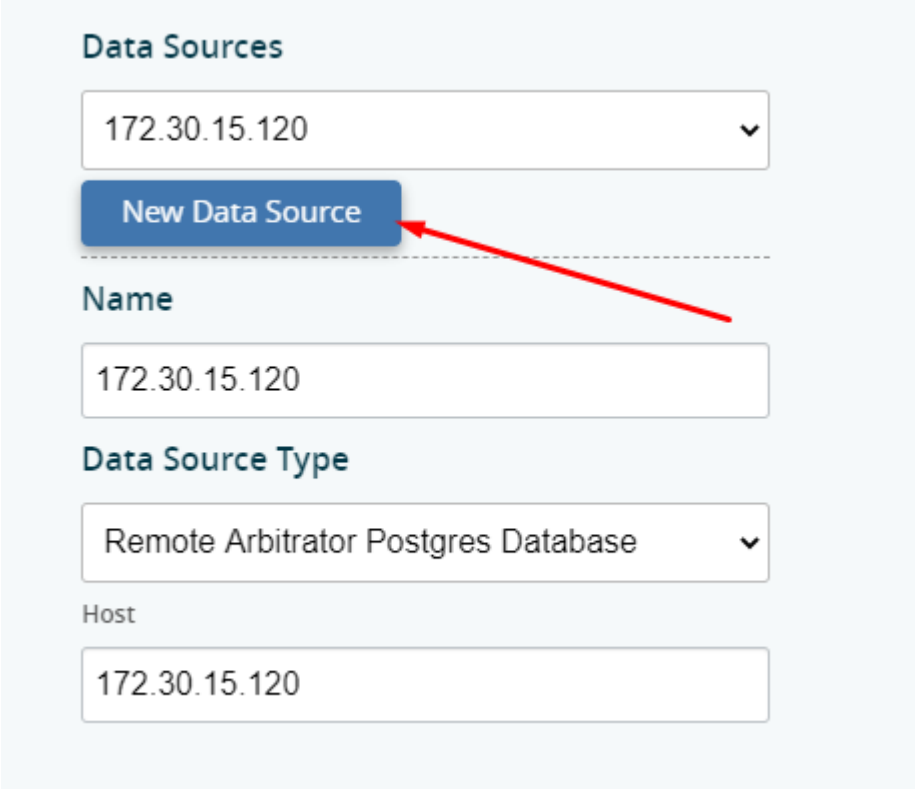


2. Take note of the username and password you have just configured
3. Now log in to the GUI on the Dashboard Server username admin — password admin
4. Click on the Hamburger Menu shown Below

5. Click on Data sources



6. Click on New Data Source



7. Fill out the form presented.

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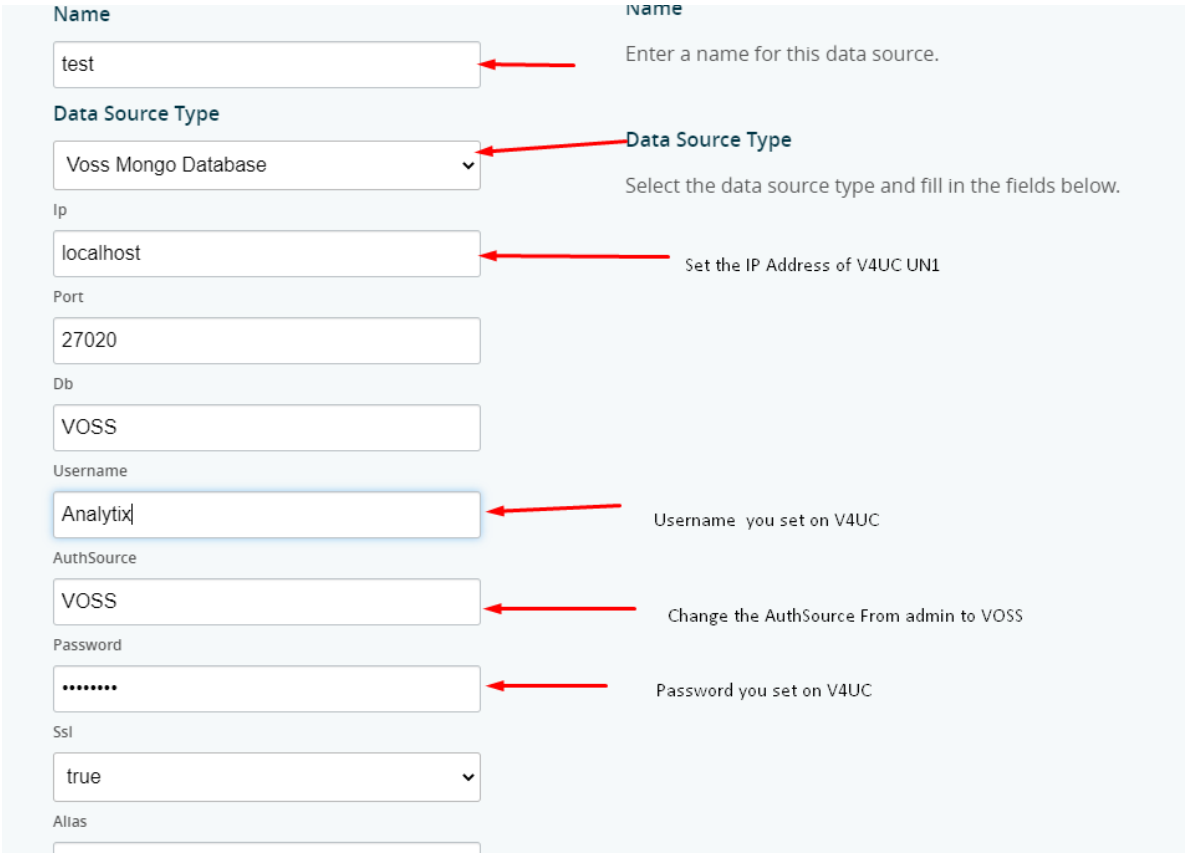
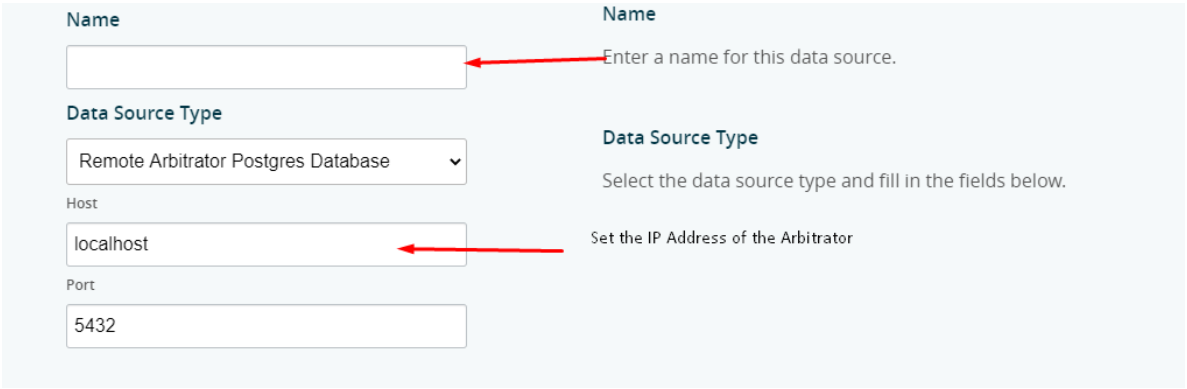


8. Repeat the process above to Add the Arbitrator as a Data Source



5.2. Install Arbitrator System

5.2.1. Policy Configuration Files

Polices are a modular groupings of correlation rules, actions and response procedures that define how to respond to certain situations that happen on the monitored systems. Policies are usually system and manufacturer specific but can contain custom scripts for actions and response procedures. Each policy will also contain several correlation rules that are designed to create Alerts based on the best practices of that

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particular system manufacturer.

The configuration files in this table are installed at the end of the installation process. The purpose of the components are:

- Controls

  Controls are actions that the system can automate user actions to support data collection, analysis before presenting to an operational user as a alert to help reduce User input and provide information and actions faster.

  - Turn a alarm a different colour
  - Push alert to another system such as dashboard server or a correlation server
  - Auto acknowledge alarms
  - Email the alert to a destination
  - Create a ticket with ServiceNow
  - Pre scripted action based on a response

  Other options that can be developed are:

  - Using API send the data to another destination
  - Interact with another system
  - Run a script to collect additional information
  - Run a script with actions to change state or configuration

- Probes

  A probe is a script that is defined to poll a system to collect data from a remote system. This is important if the data required cannot be streamed from a system to the arbitrator to be ingested, the arbitrator and collect the data remotely by periodic probing of the system. Examples of probes that collect data

  - AXL
  - API
  - CLI

- Response procedures

  Contains group of controls that are assigned to the policies

- Policies

  A policy is a set of rules for the data that is turned in a to an alert. It enables an alert to be generated and defines the alarm ID and the content of the alarm that gets presented to a user.

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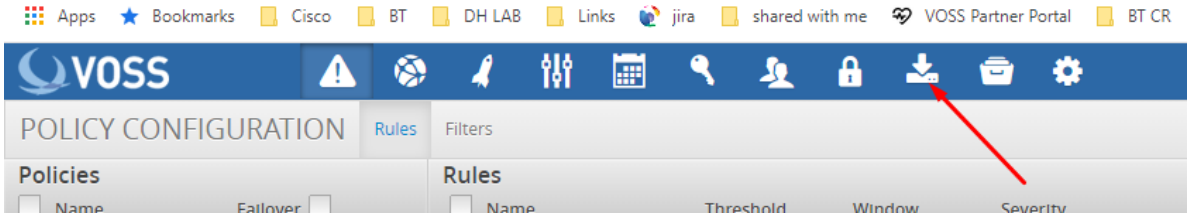
Component	Filename
Controls	`STDCONTROLS.lxcfg`
Probes	`StandardDeploymentProbes.lxcfg` `PROBES.lxcfg`
Response Procedures	

Policies	`SiteStats_08122020.lxcfg`
	`POLICIESUCCE221020.lxcfg`
	`POLICIESCUCM221020.lxcfg`
	`POLICIESCUCIMP221020.lxcfg`
	`PINGMON.lxcfg`

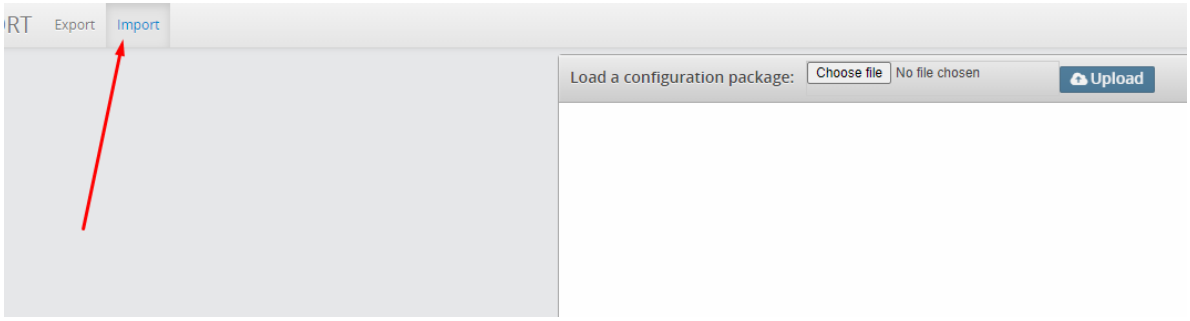
5.2.2. Installation Steps

1. Log in to the Arbitrator: `admin/admin`
2. Click on the spanner icon

3. Click on the icon shown below



4. Click on **Import**



5. Click on **Choose file**, then select your file and click **OK**.

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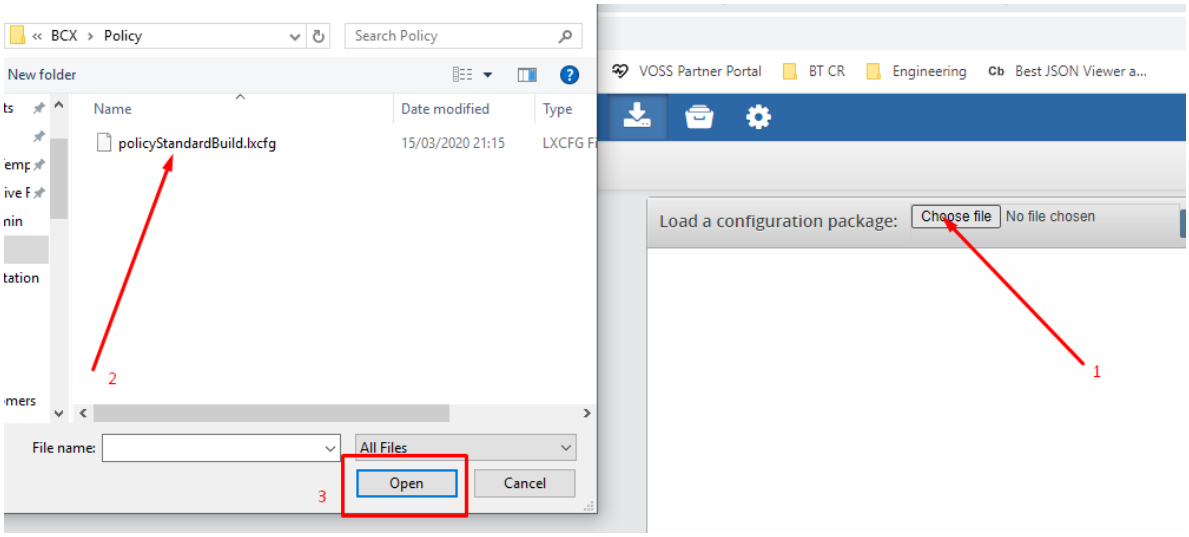
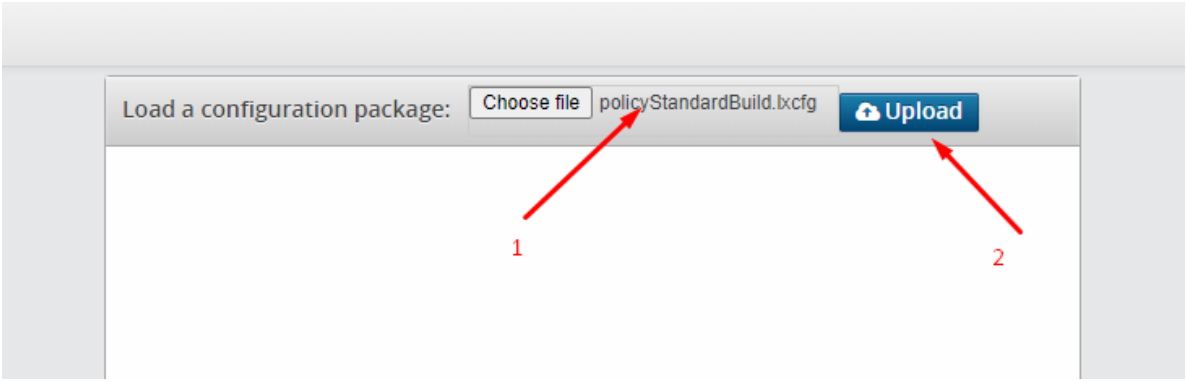


6. Ensure the file you have just selected shows next to choose file, then click **Upload**.



7. Once the file has uploaded click **Import**.

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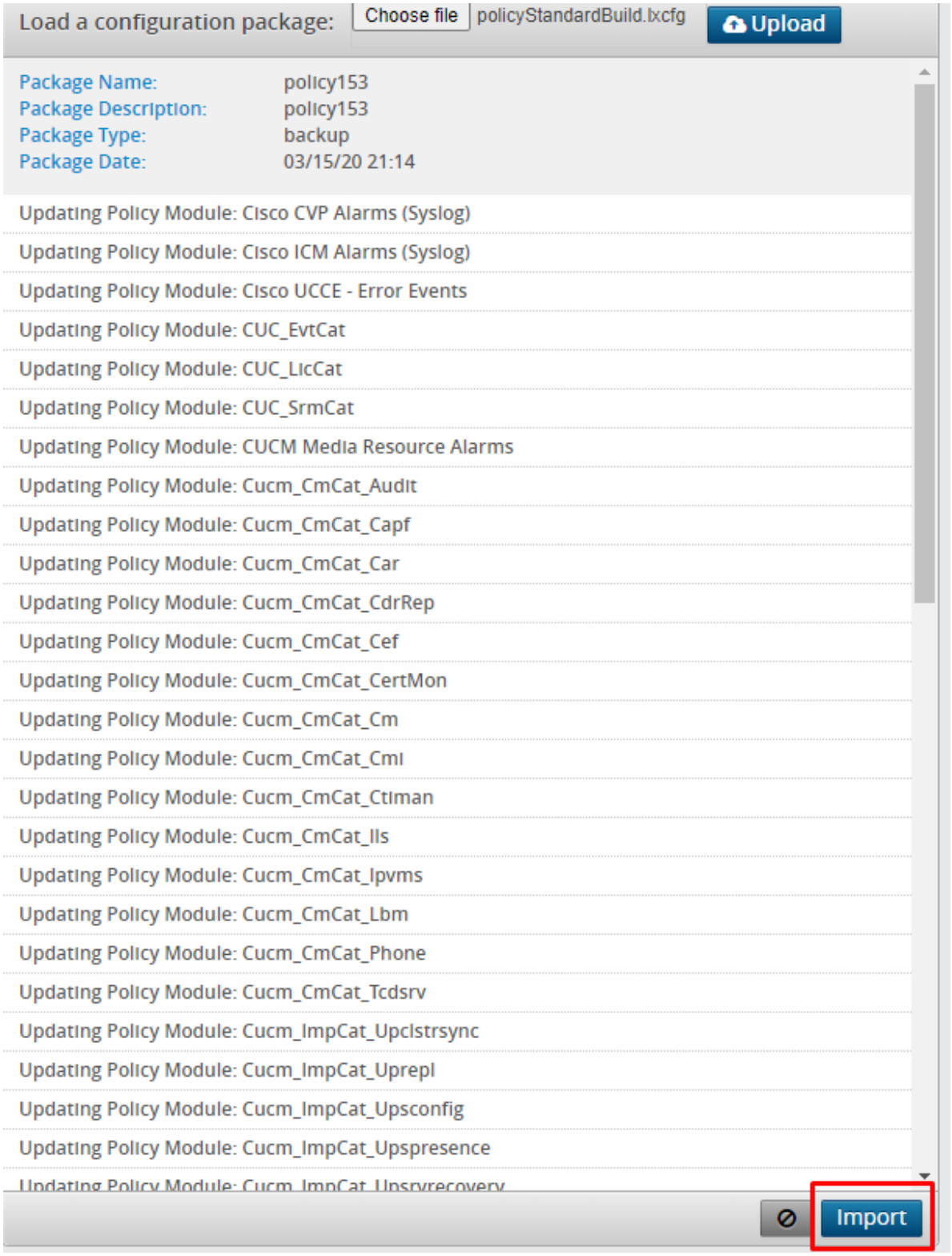

8. Repeat this procedure for:
    - **Controls**
    - **Probes**

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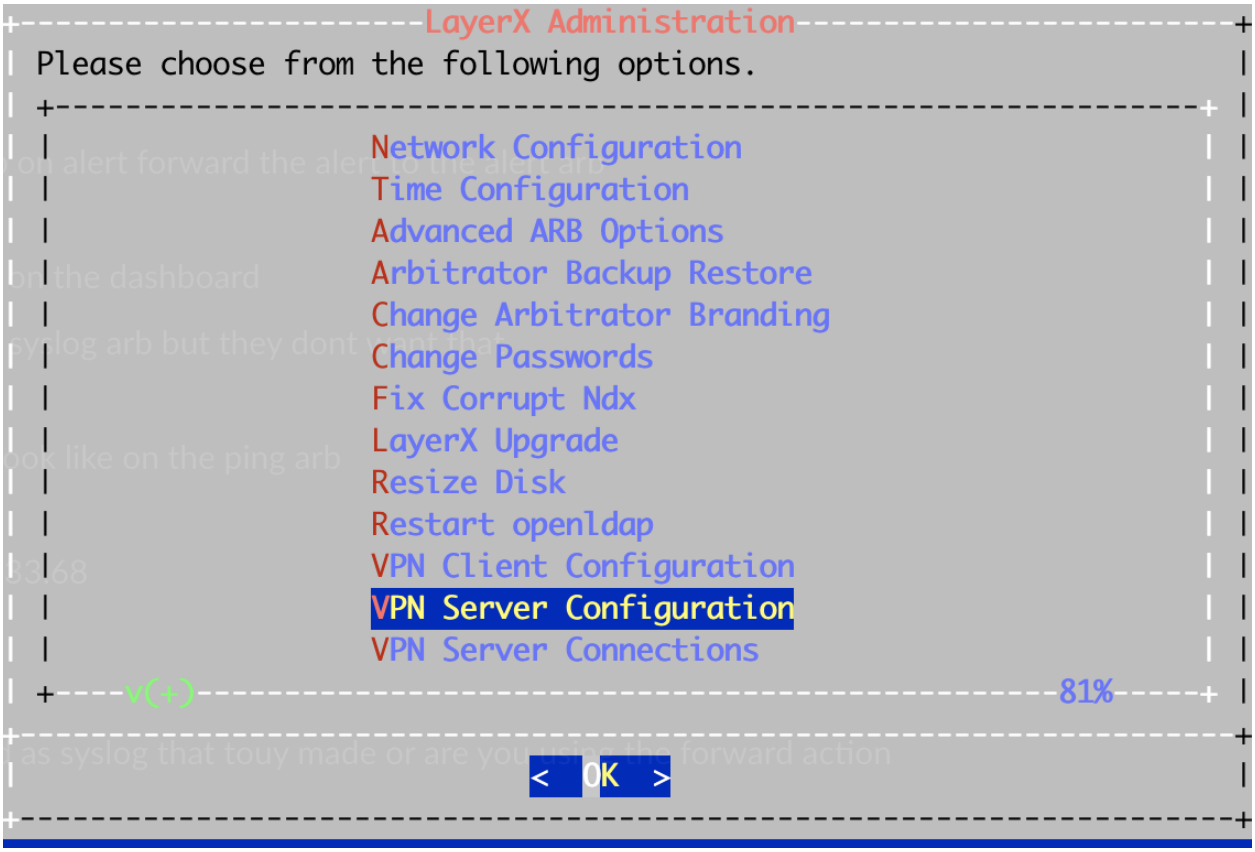
- **Response Procedures**
- **Policies**

See: *Policy Configuration Files*

5.3. Set up Arbitrator to Arbitrator Communication

Log in as admin on the central/lead arbitrator and go to VPN Server Configuration



Then Clear Fabric Configuration, then reset this up:

a. Set the Organization name
b. Set The Public Ip Address (this is the address of the Arbitrator)
c. Set Authorized Client Port to 62003
d. Set the Negotiation Port to 62004
e. Set the VPN Subnet (to a number between 1 and 150)
f. Set the Ethernet Interface Number (Usually 0)

   As shown in the example below:

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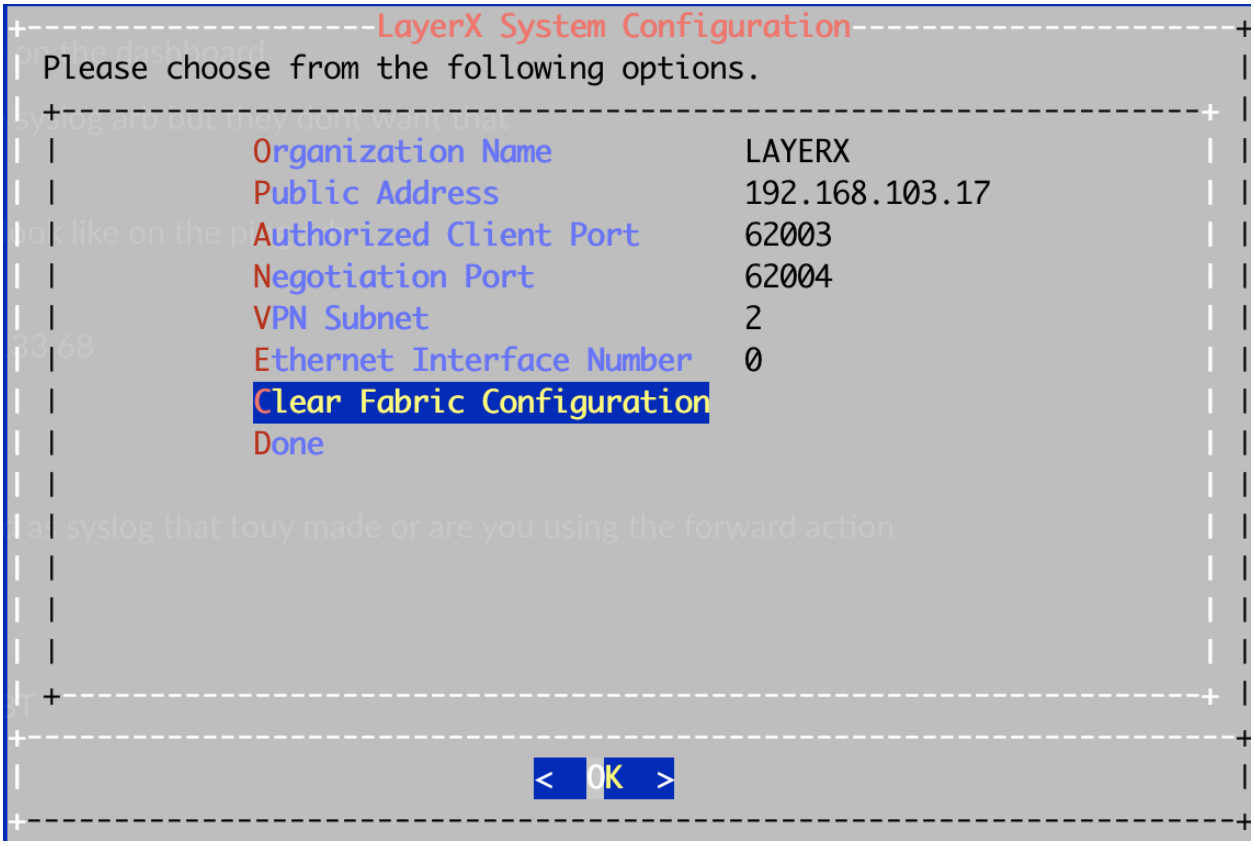

On the subordinate Arbitrator log in as admin and navigate to VPN Client Configuration

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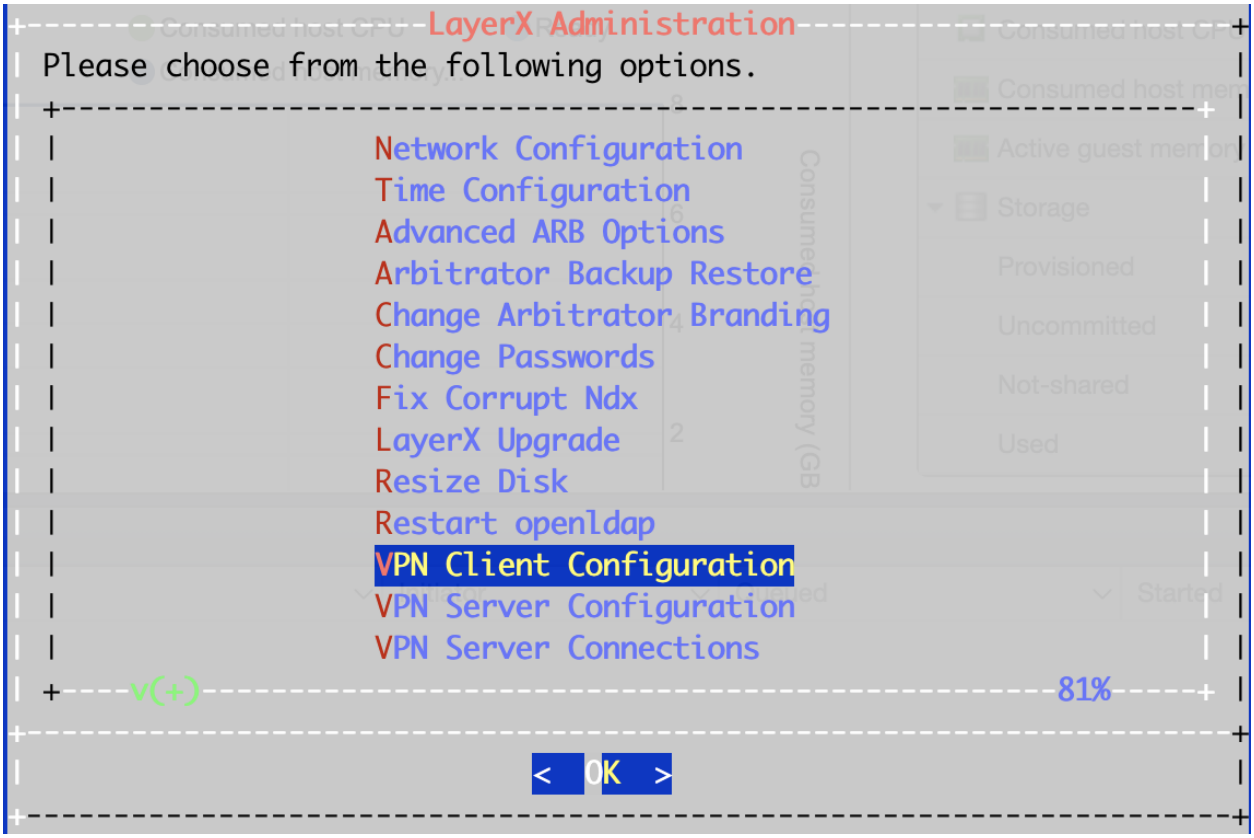

1. Clear Fabric Configuration to remove any remnants of other tunnels
2. Then set the Server Address as the IP address of the Central/Lead Arbitrator
3. Ensure the Negotiation Port is set as `62004`
4. Click **Done**.

A Tunnel will now be set up between the Arbitrators.

You can check this by running the following commands in CLI when logged in as root:

```
root@dharb1:~# netstat -ne | grep 3050
tcp        0      0 169.254.5.1:30501       169.254.5.6:18880       TIME_WAIT   0          0
tcp        0      0 169.254.5.1:30501       169.254.5.6:18920       ESTABLISHED 0          13090739
tcp        0      0 169.254.5.1:30501       169.254.5.6:18866       TIME_WAIT   0          0
tcp        0      0 169.254.5.1:23238       169.254.5.6:30503       TIME_WAIT   0          0
tcp        0      0 169.254.5.1:30501       169.254.5.6:18896       TIME_WAIT   0          0
tcp        0      0 169.254.5.1:23280       169.254.5.6:30503       ESTABLISHED 0          13097174
tcp        0      0 169.254.5.1:23166       169.254.5.6:30503       TIME_WAIT   0          0
root@dharb1:~#
```

The tunnel is setup using `169.253.x.x` addresses:

```
root@dharb1:~# netstat -ne | grep 6200
tcp        0      0 192.168.58.42:62003     192.168.58.38:37680     ESTABLISHED 0          8520558
tcp        0      0 127.0.0.1:50688         127.0.0.1:62009         ESTABLISHED 0          24342
tcp        0      0 127.0.0.1:62009         127.0.0.1:50688         ESTABLISHED 0          19387
root@dharb1:~#
```

To set Alerts to be forwarded from the subordinate Arbitrators to the Central/Lead Arbitrator:

- On the Subordinate Arbitrator go to Response Procedures in the config area of the GUI:

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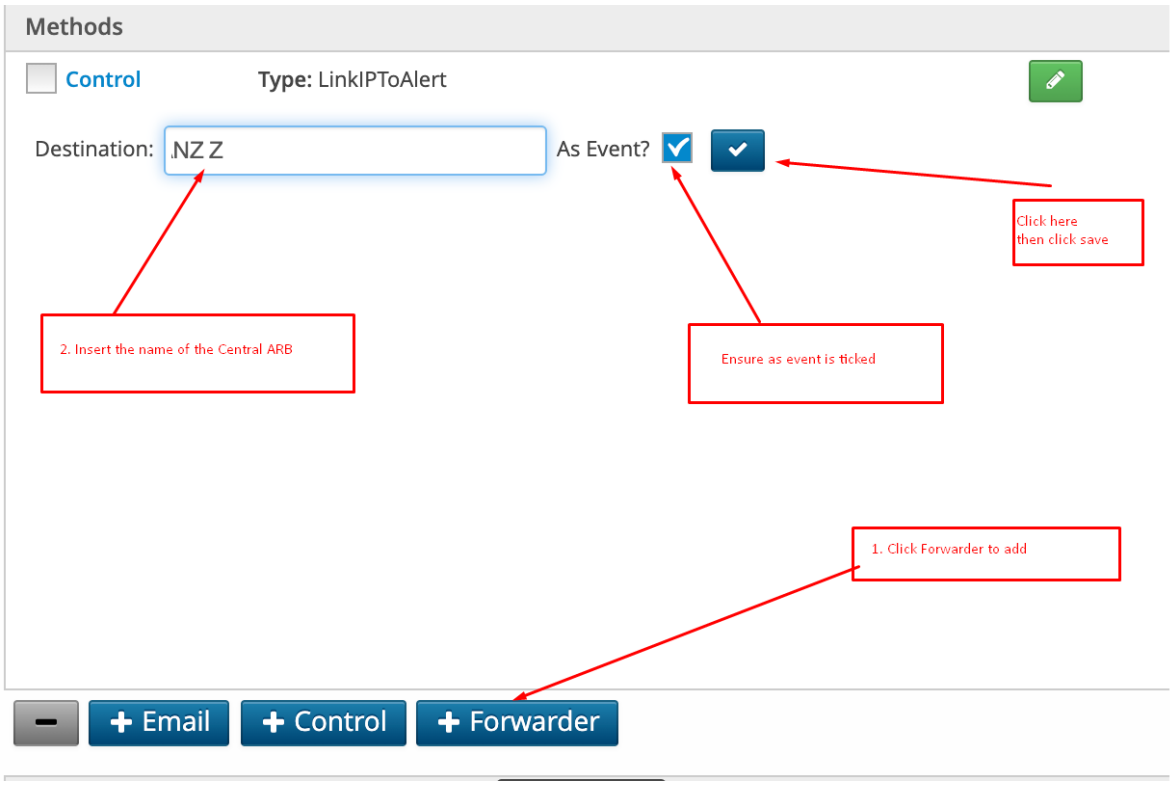
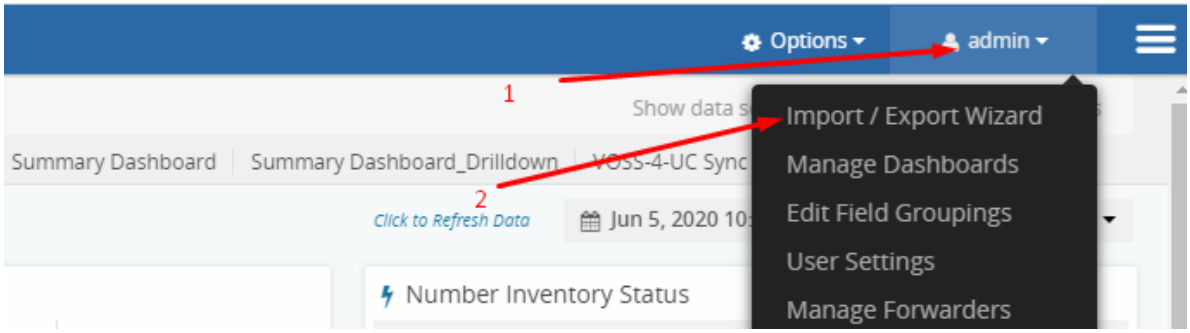


5.4. Install Dashboard System

1. Access the Dashboard Server: `admin/admin`
2. In the top banner bar click on admin, then click on **Import/Export Wizard**.



3. Click on **Choose file**, then navigate to the file you wish to import (dashboard files have the `.lxtr` file extension) then click **OK**.

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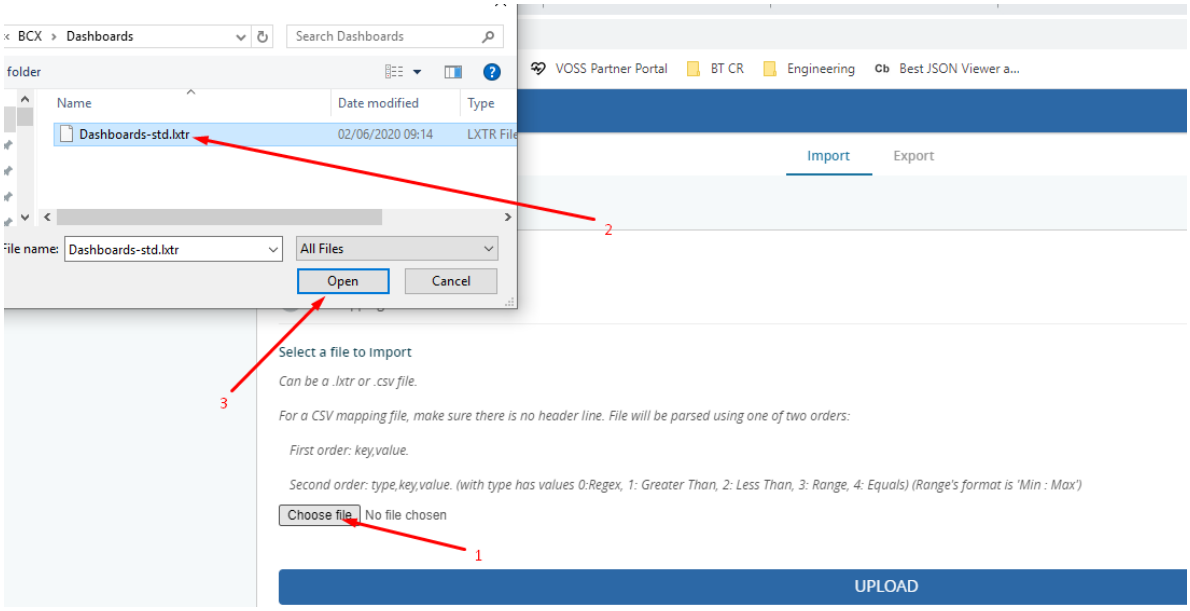
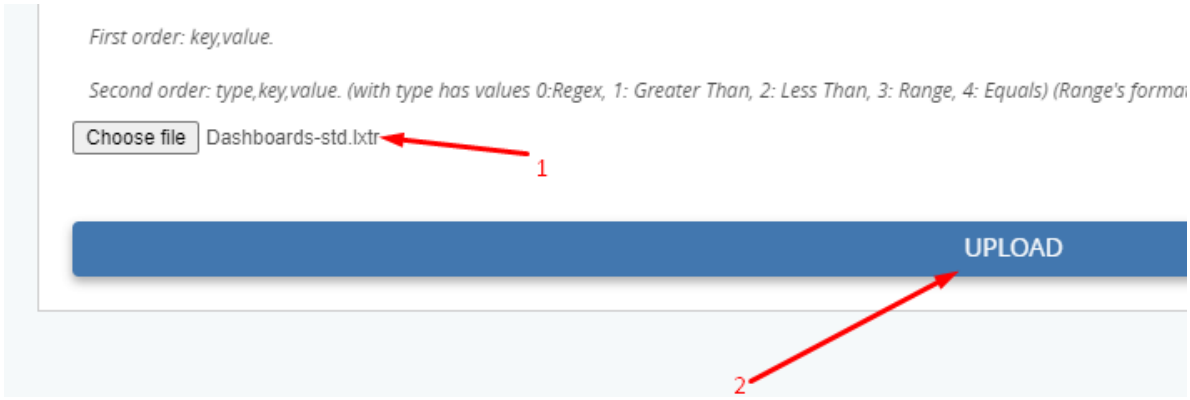
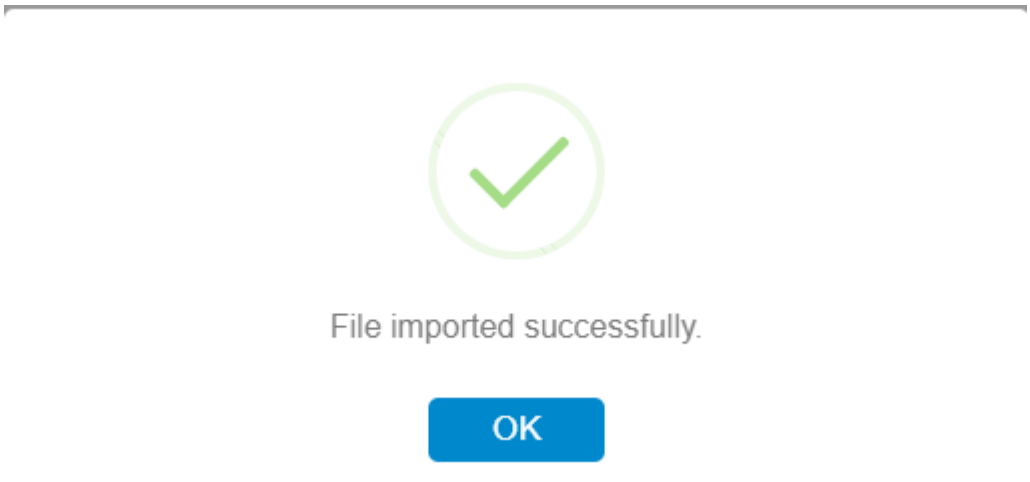


4. Ensure your file is visible adjacent to **Choose file**, then click **Upload**.



5. Your file will then upload, and you will see the below — click **OK**.



6. Log in to the Dashboard CLI as `admin/admin`.
7. Navigate down to **Voss4uc - Force Collection** and click **OK**. This will then sync VOSS Automate data

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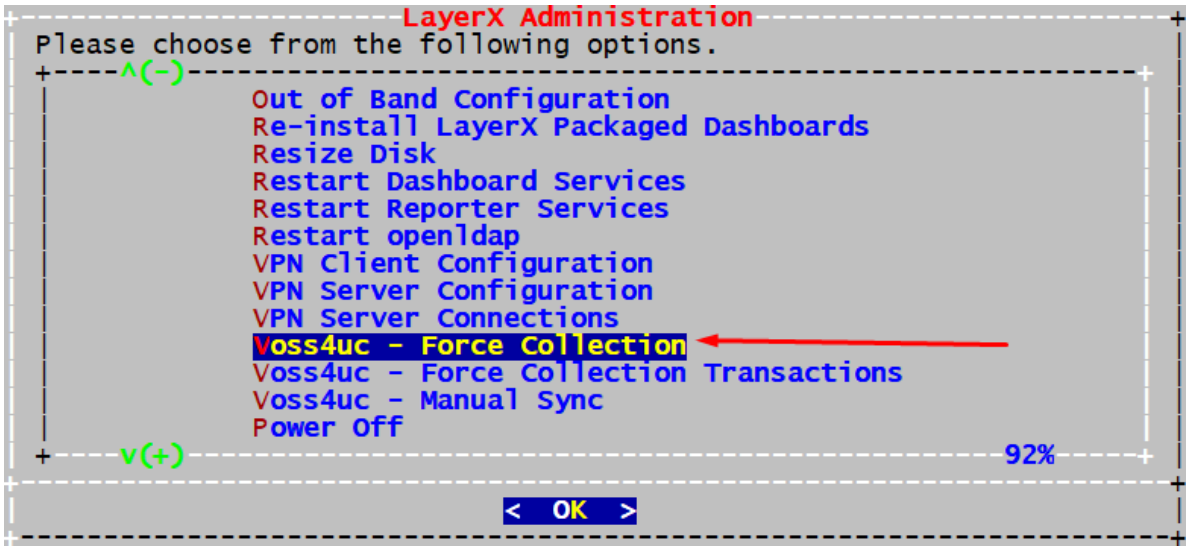
into the dashboard.



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6. Certificates

6.1. Add Certificates

1. SCP the new `server.crt` and `server.key` tiles to the `etc/apache2/` directory on the system, ovewriting the old certificate files.

   Recommended: back up the current certificate files prior to overwriting them.

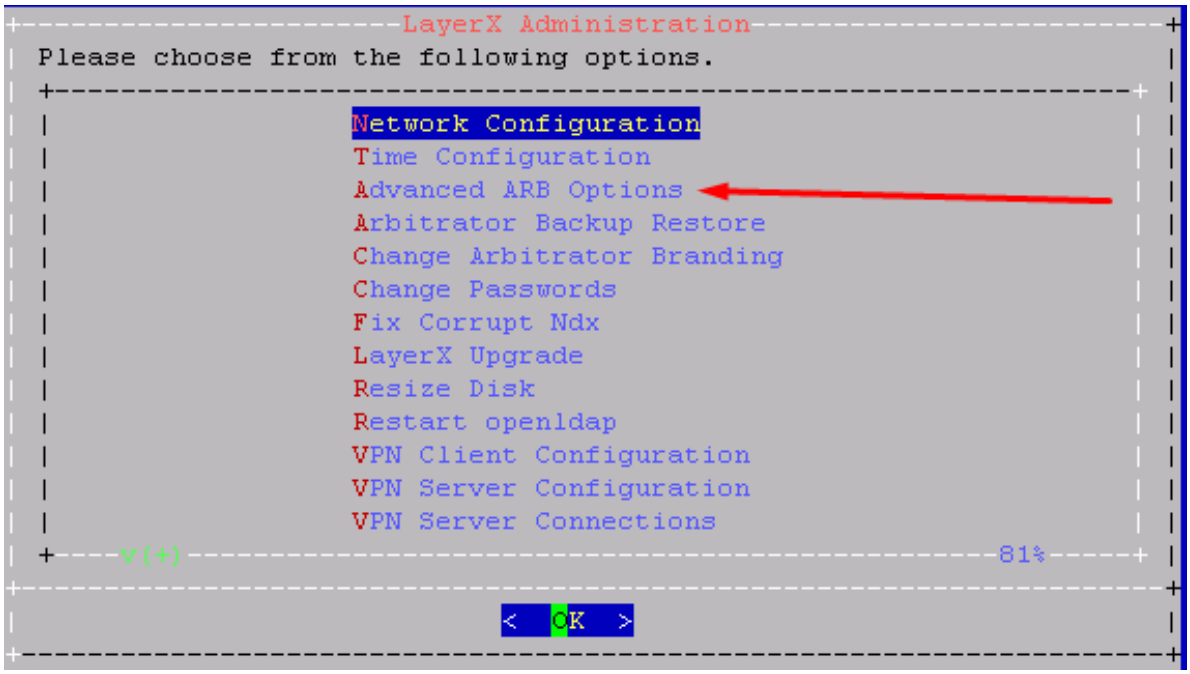
2. SSH to the system as `root` and restart the apache service using the **sv restart apache** command.
3. Clear browser cache.
4. Apache will now use the new signed certificate.

7. CUCM Asset Onboarding

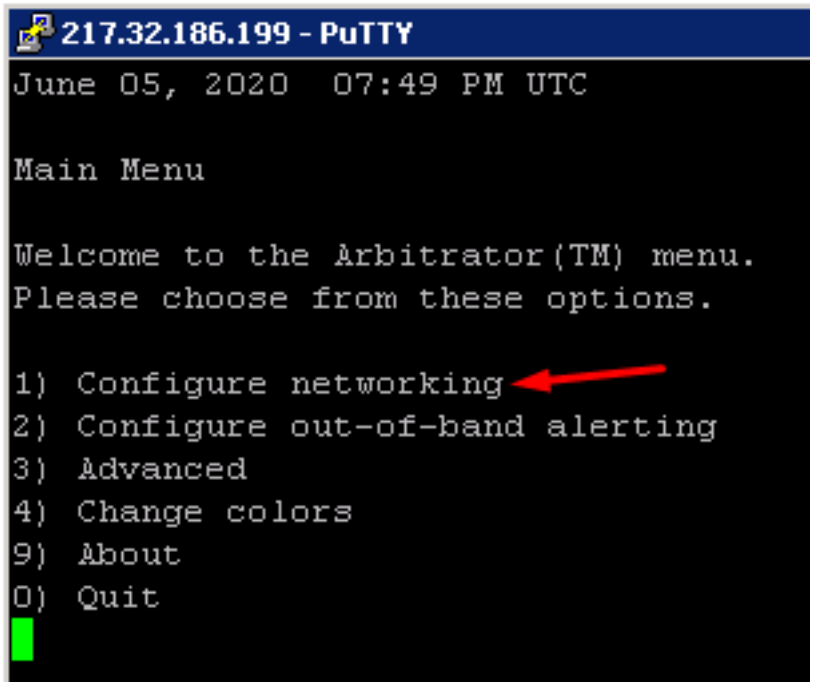
7.1. Customer Onboard

7.1.1. Add Customer CDR Folders

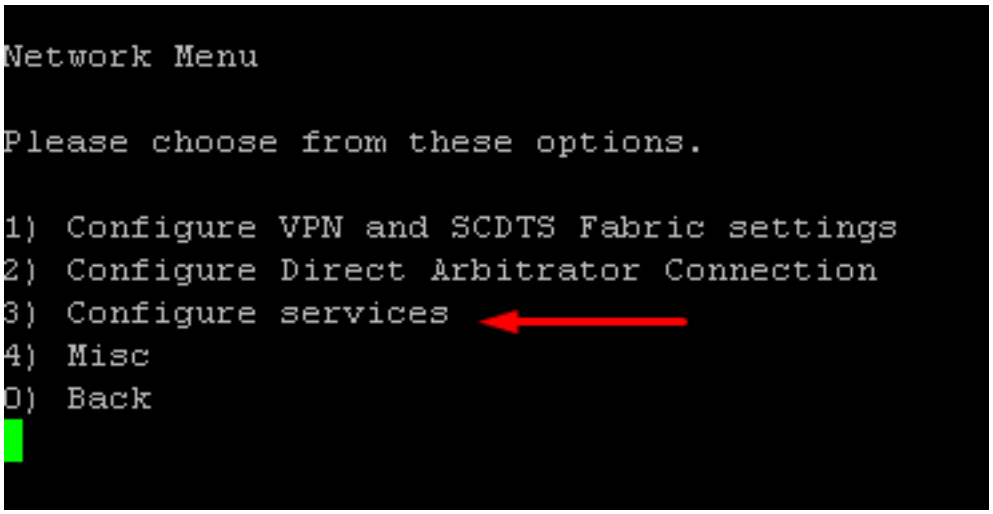
1. Log in via the command line interface to the Arbitrator selected to receive CDR data from the CUCM.
2. Use the admin credentials to log in.



3. Navigate to Advanced Arb Options (as shown above) and click ok.



4. Now press 1.



5. Now press 3.

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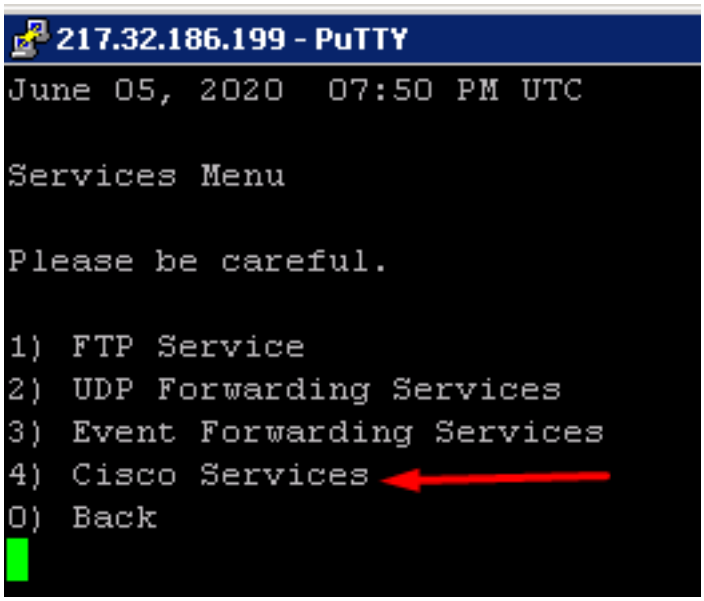
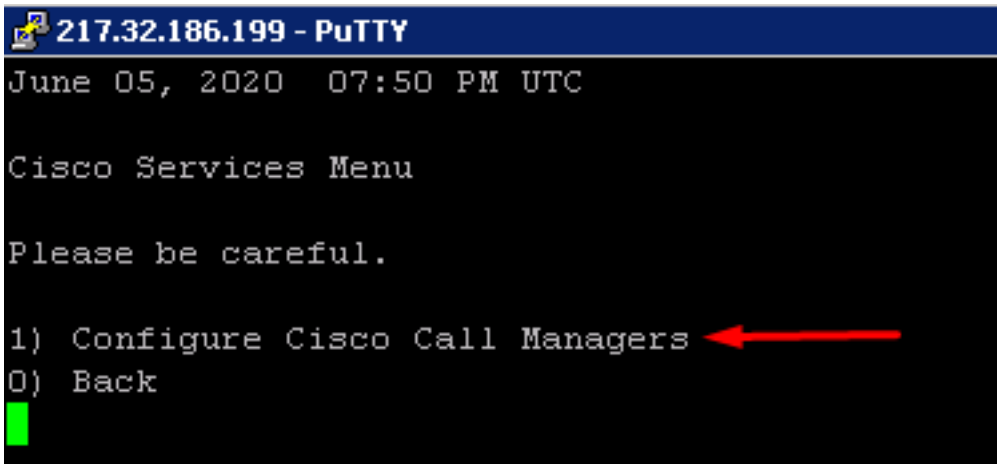


6. Press 4.



7. Press 1.

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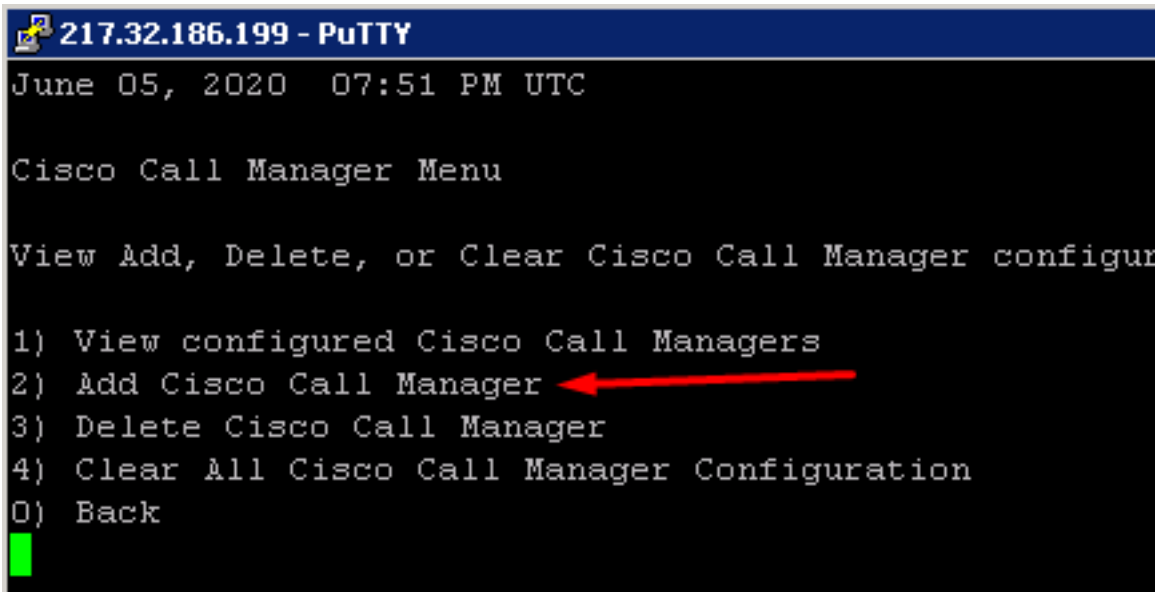

8. Press 2.

   This will open the screen below.

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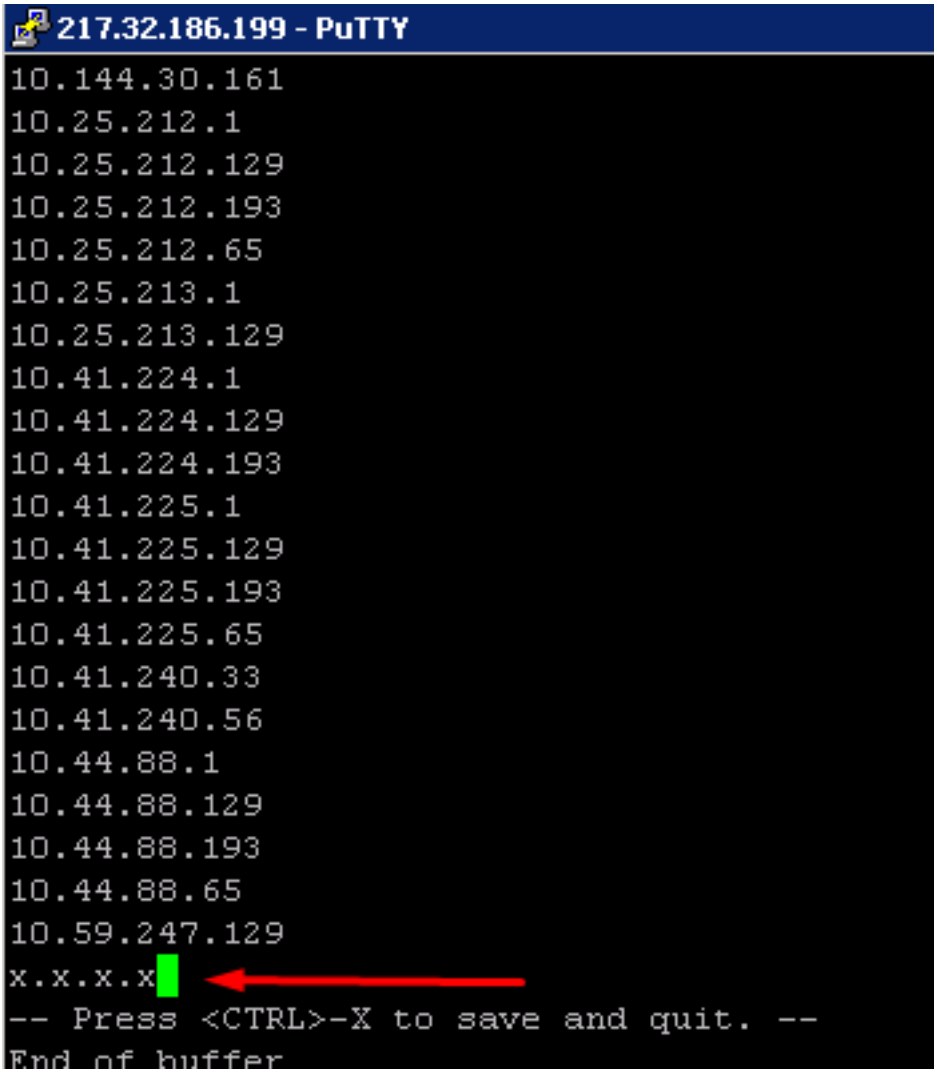

9. Add the IP Address of the call manager then press **<CTRL>-X** to save.

7.1.2. Add Customer Assets

1. Log in to the Arbitrator as admin.

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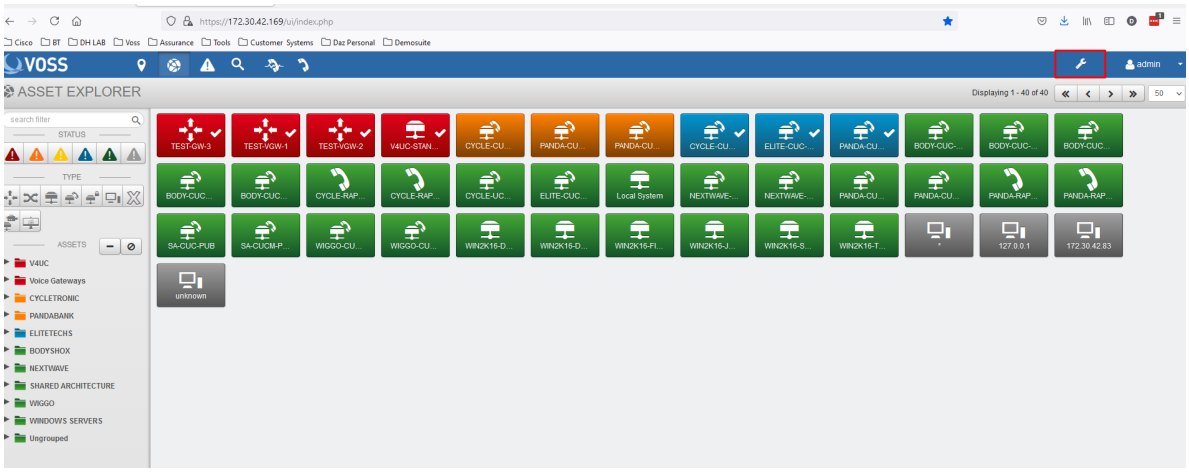
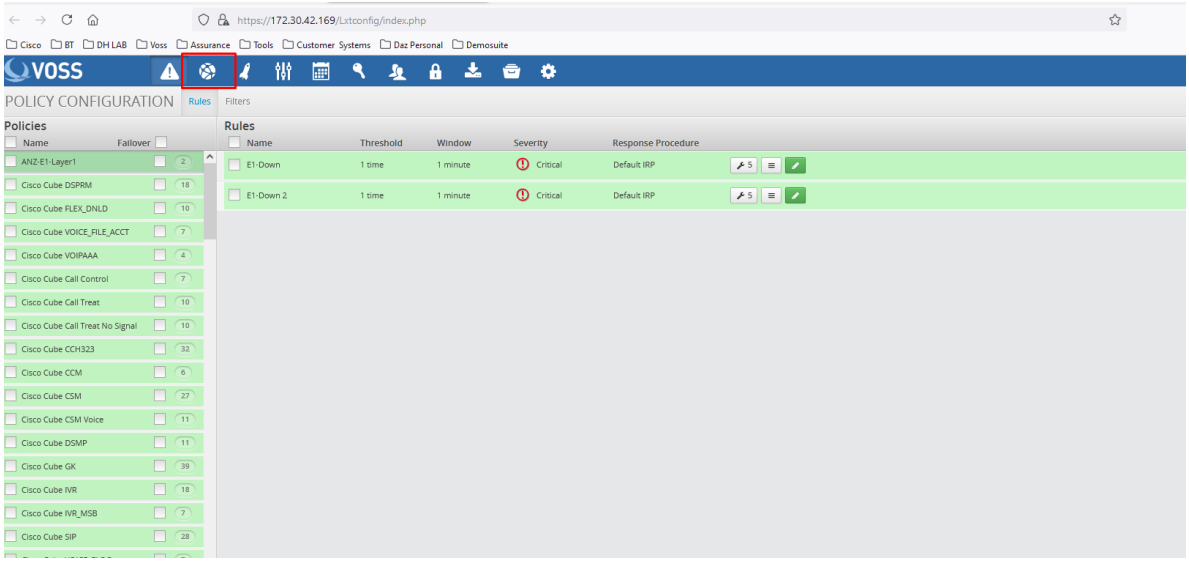


2. Click on the wrench icon (Highlighted in the red box)



3. Click on the Globe icon (as highlighted in the red box), this will then open the Asset Configuration screen.

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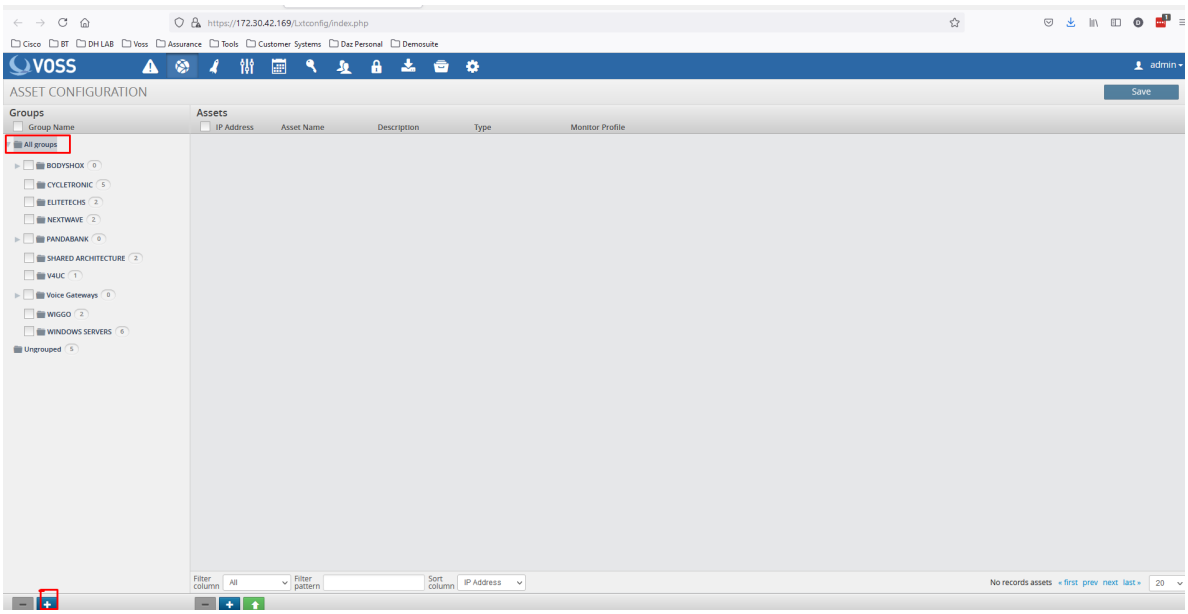

4. With **All groups** selected, click the **+** icon

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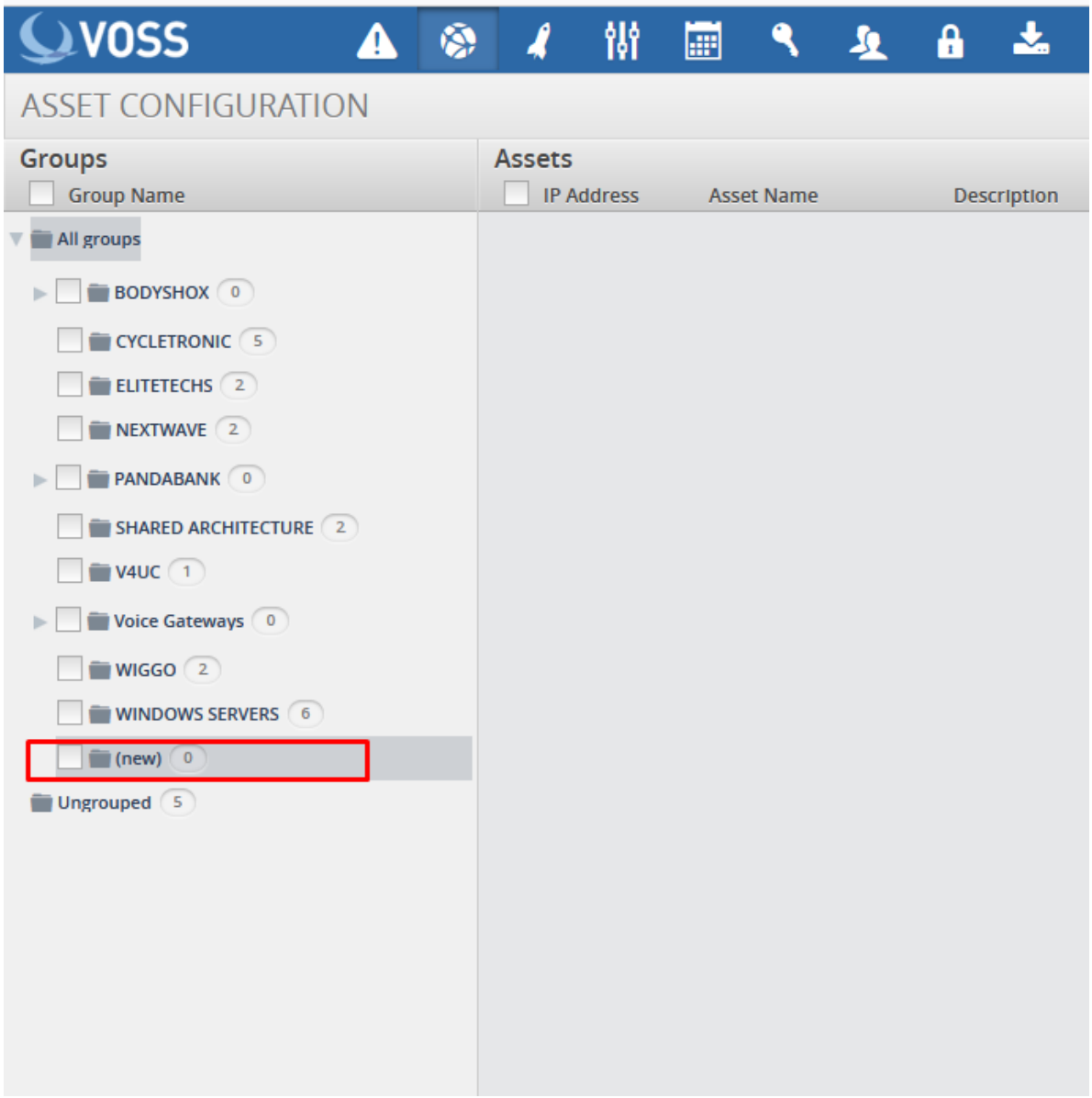

This will create a new folder as shown above.

To rename this folder double click on it, rename and press **<Enter>**.

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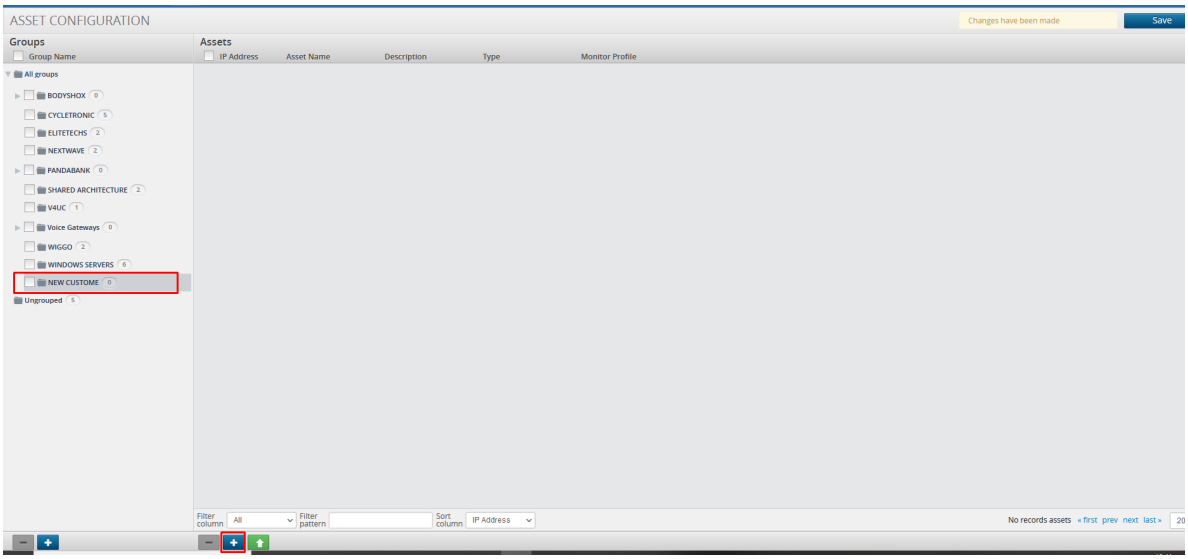
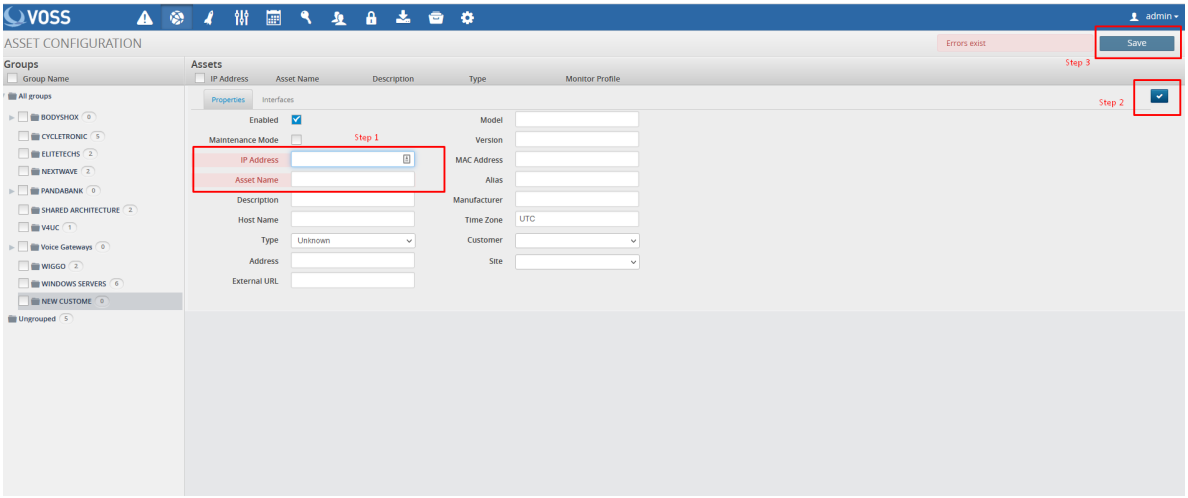


With the new folder (NEW CUSTOMER) highlighted, click the **+** in the right-hand pane.



- Step 1 – Enter IP Address (Mandatory)

  Asset Name (Mandatory)

  You may then enter any other information you have into the relevant fields.

- Step 2 – Click on
- Step 3 – Click **Save**

Repeat the above for all assets you wish to monitor.

Alternatively, you can upload multiple assets using a CSV import.

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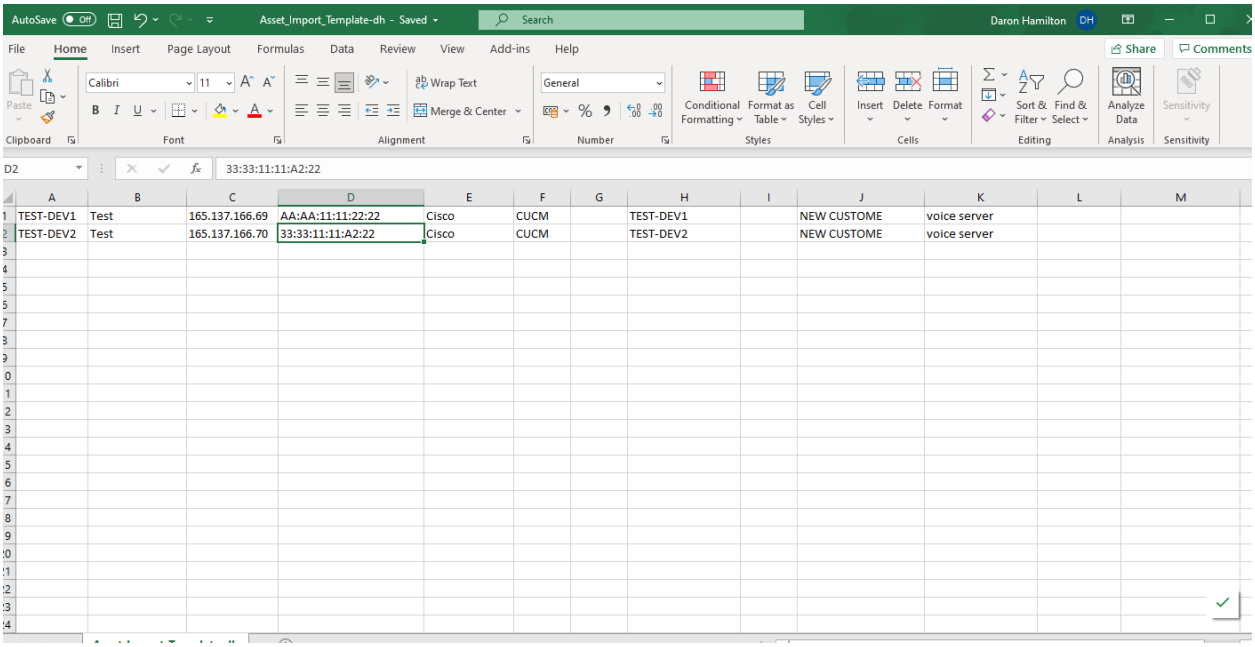
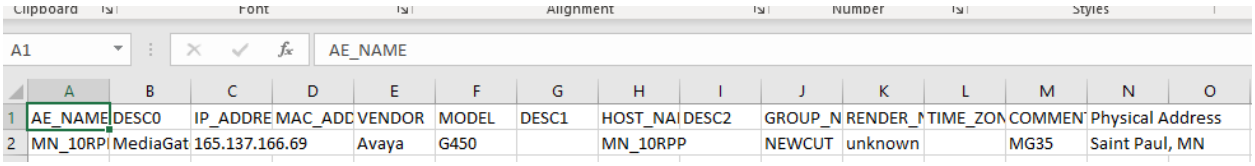
CSV Import of Assets

It is possible to upload multiple assets using a CSV file.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	TEST-DEV1	Test	165.137.166.69	AA:AA:11:11:22:22	Cisco	CUCM		TEST-DEV1		NEW CUSTOME	voice server		
2	TEST-DEV2	Test	165.137.166.70	33:33:11:11:A2:22	Cisco	CUCM		TEST-DEV2		NEW CUSTOME	voice server		

The CSV file is available in the Google Drive.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	AE_NAME	DESC0	IP_ADDRE	MAC_ADD	VENDOR	MODEL	DESC1	HOST_NA	DESC2	GROUP_N	RENDER_N	TIME_ZON	COMMEN	Physical Address	
2	MN_10RP	MediaGat	165.137.166.69		Avaya	G450		MN_10RPP		NEWCUT	unknown		MG35	Saint Paul, MN	

Above is an example.

The mandatory fields are:

- `AE_NAME`
- `IP_ADDRESS`

You can also use this CSV to create the asset and the Asset group and place the asset into the group.

Note:

- Remove the header row before you try to upload.
- Mac Address field must be in the following format: `XX:XX:XX:XX:XX:XX`
- Renderer – This selects the icon seen on the Arbitrator. The options are:

```
unknown
router
firewall
switch
voice switch
switch voice
server
```

(continues on next page)

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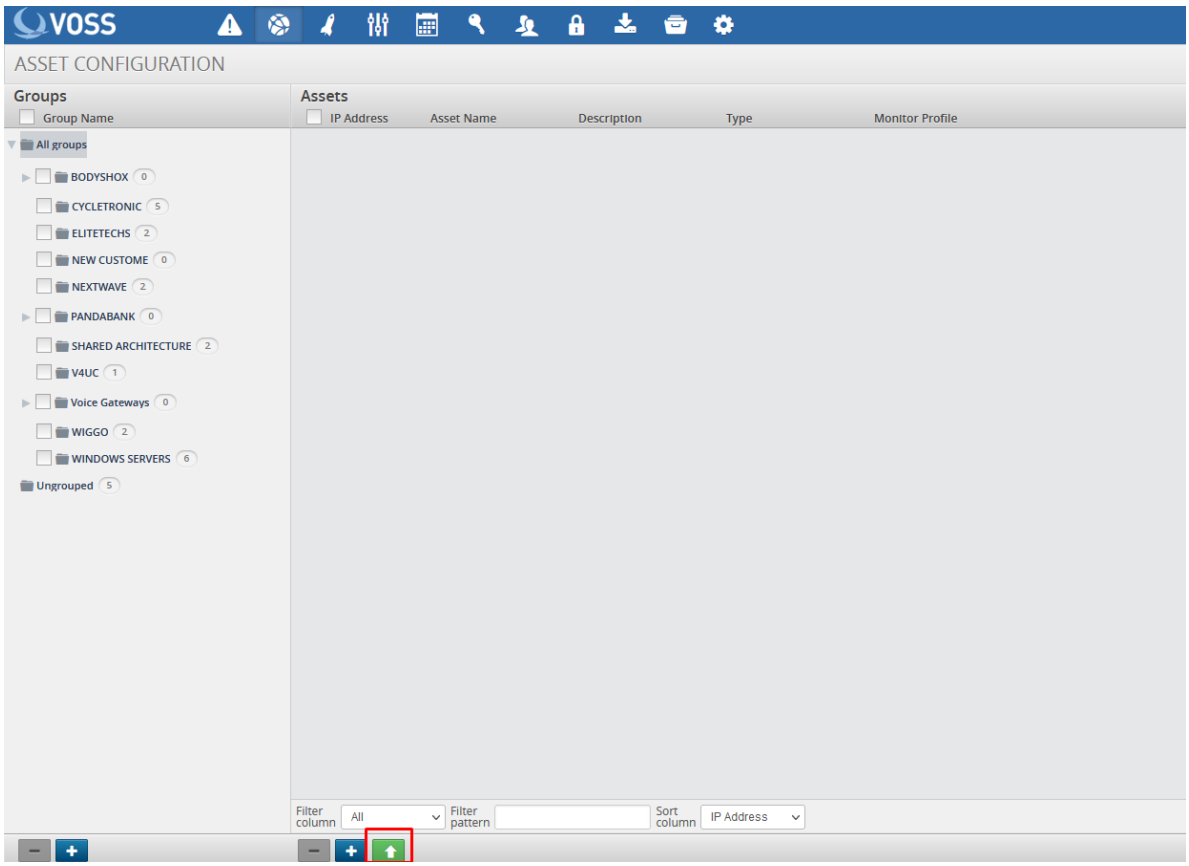
(continued from previous page)

```
voice server
server voice
workstation
phone
```

How to Import using CSV

1. Log in to the Arbitrator with admin privileges.
2. Click on the to open the configuration screen.
3. Click on the to open the Asset Configuration screen.



4. Click on the

   This will then open the below.

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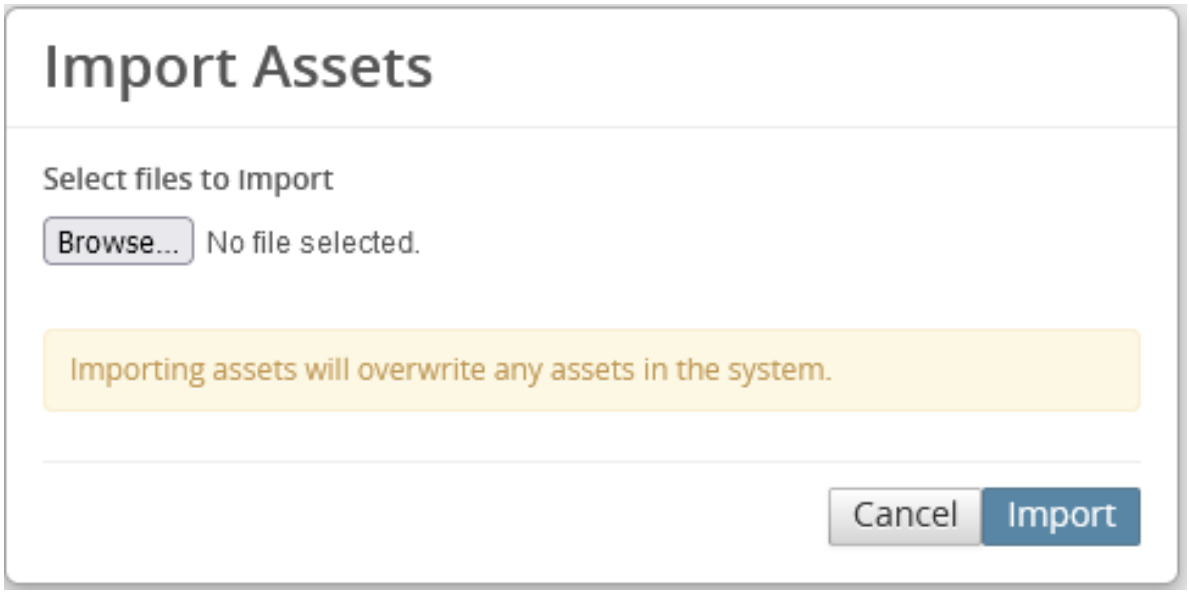
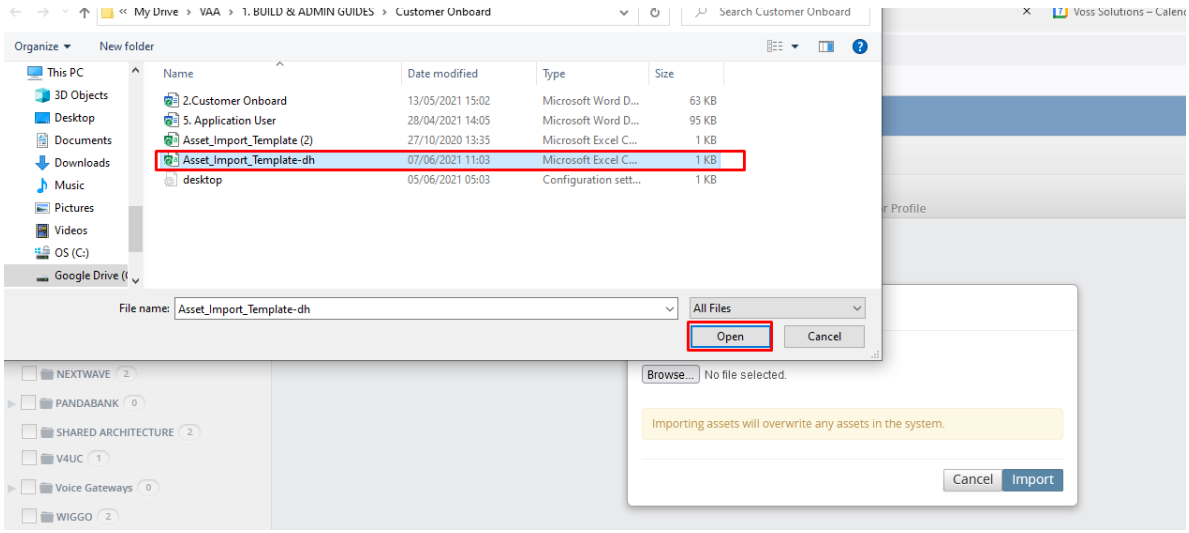


5. Browse to your csv file.



6. Click **Open**.

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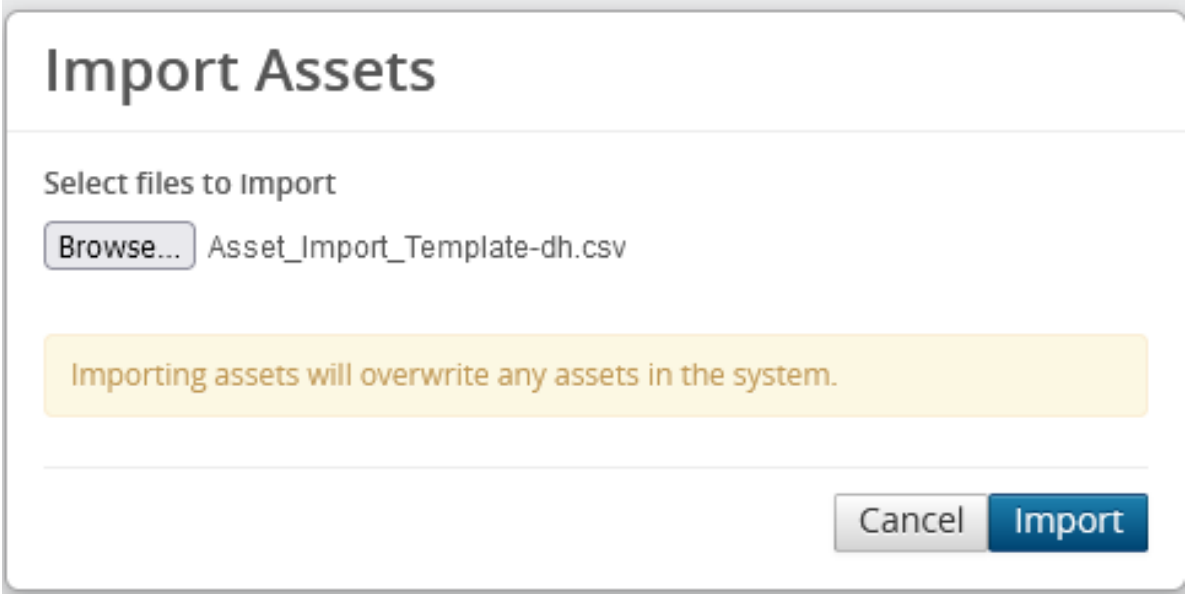
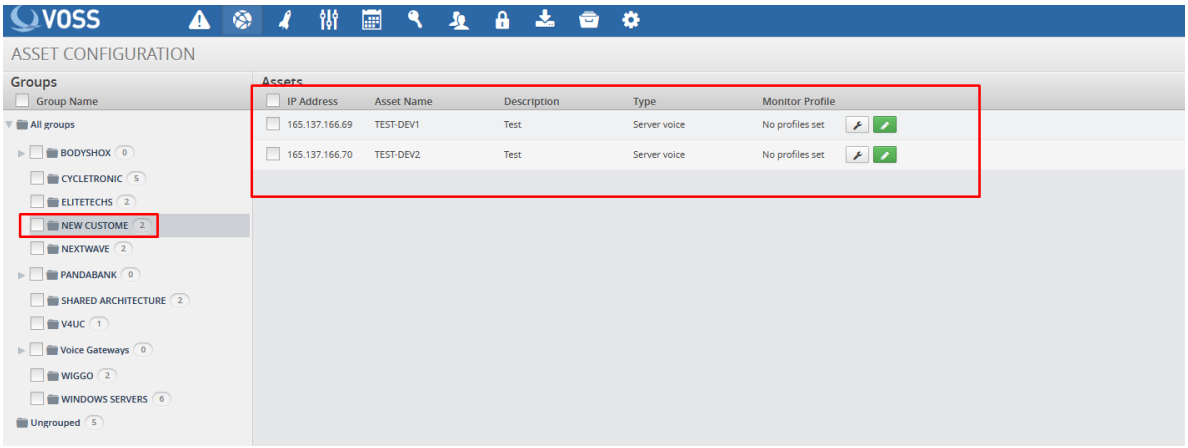


7. Click **Import**

   Once the Import has completed check, the **Asset Configuration** screen to confirm your assets are present and in the correct location.



7.1.3. Assigning Probes to Assets

Assign Standard Probes

1. Log in to the Arbitrator with admin privileges.
2. Click on the to open the configuration screen.
3. Click on the to open the Asset Configuration screen.
4. Select the Asset Group that contains the assets you wish to configure

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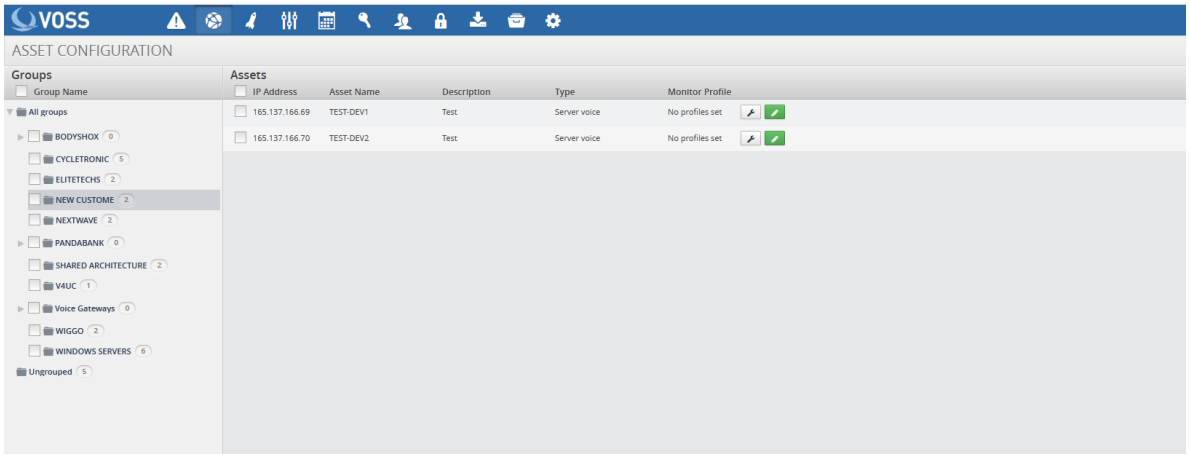
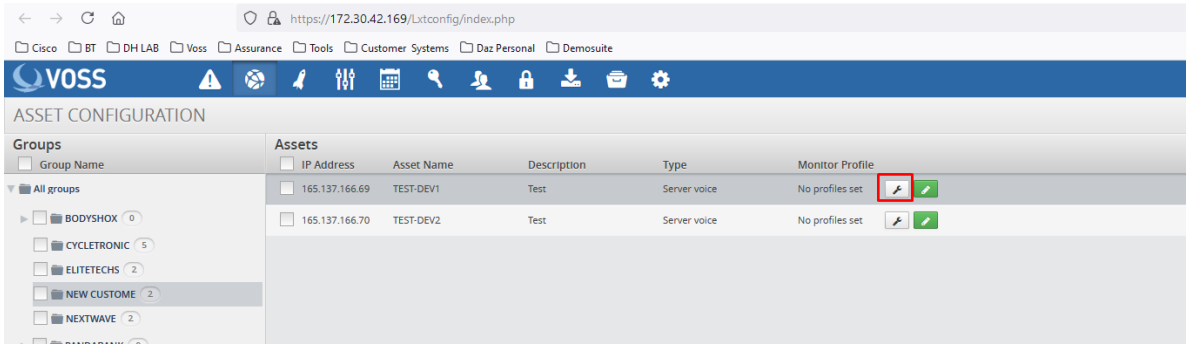
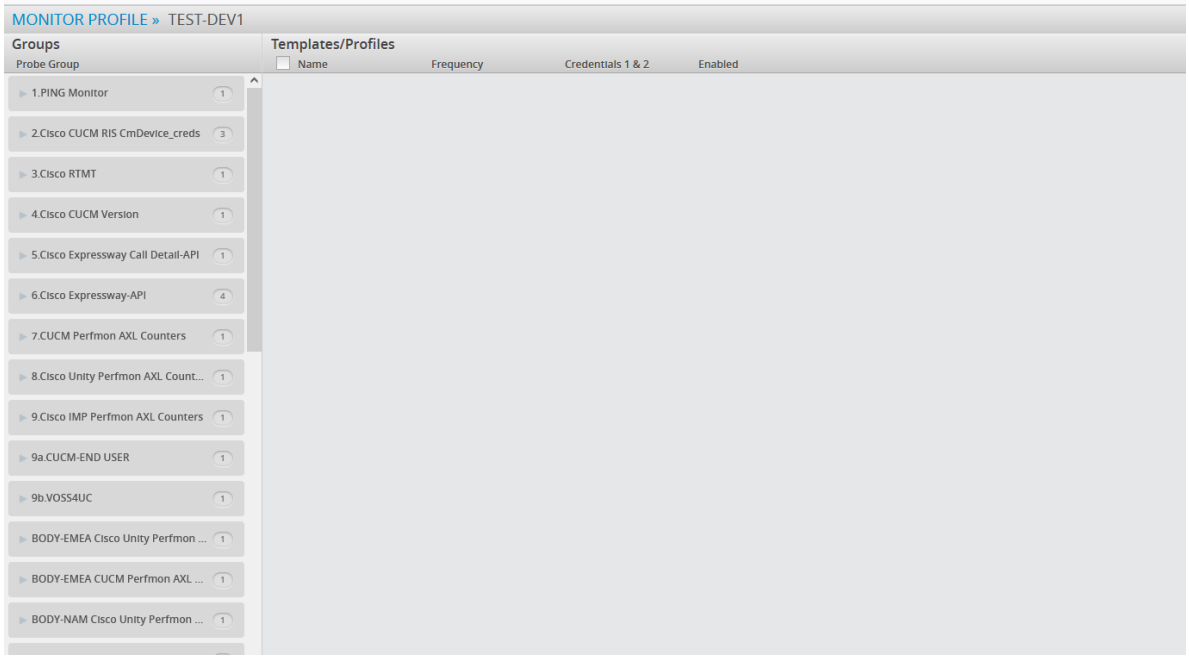


5. Click on the wrench icon as shown below.



This will then open the Assignment screen.



6. You can now drag the required probe from the left pane to the right pane.

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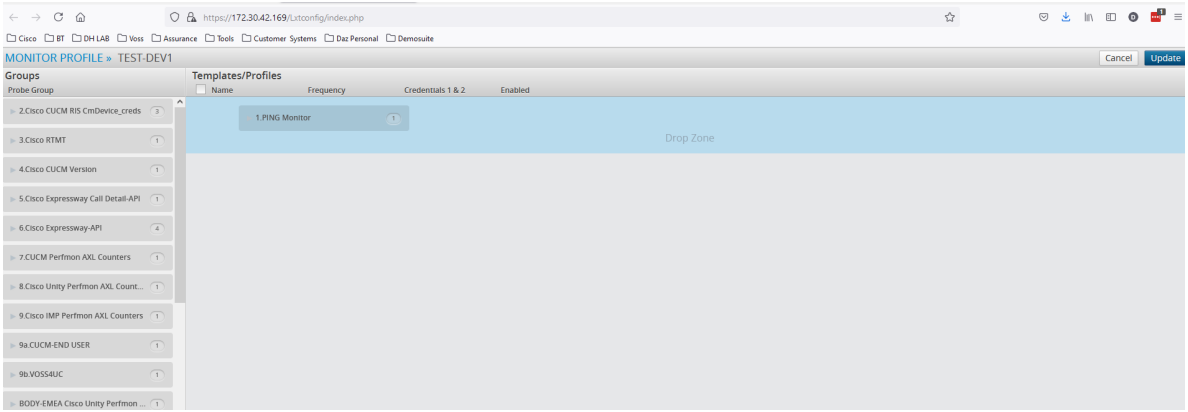
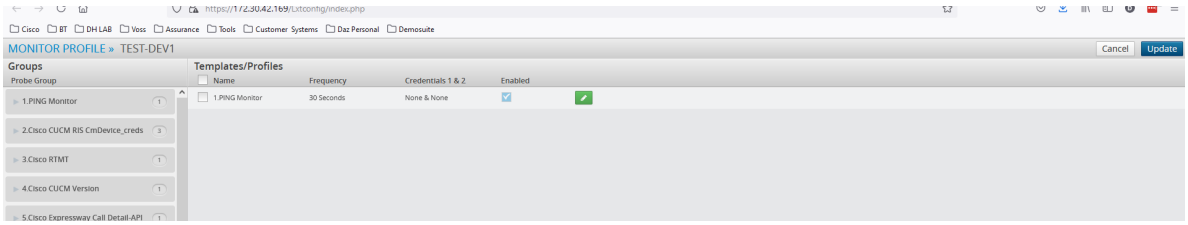


7. Ensure the Drop Zone (Blue Area) Reduces down before you drop.



8. If you then click on you can set any time schedules / credentials required for this probe
9. Once finished click **Update** and then click **Save**.

Note: It is possible to assign multiple probes at the same time.

7.2. Call Manager Configuration

7.2.1. Application User

1. Create an Application User on the Call Manager, follow the standard Cisco documentation.
2. This user will need to have permissions granted.
3. Create a new Access Control Group named AXL-GROUP.

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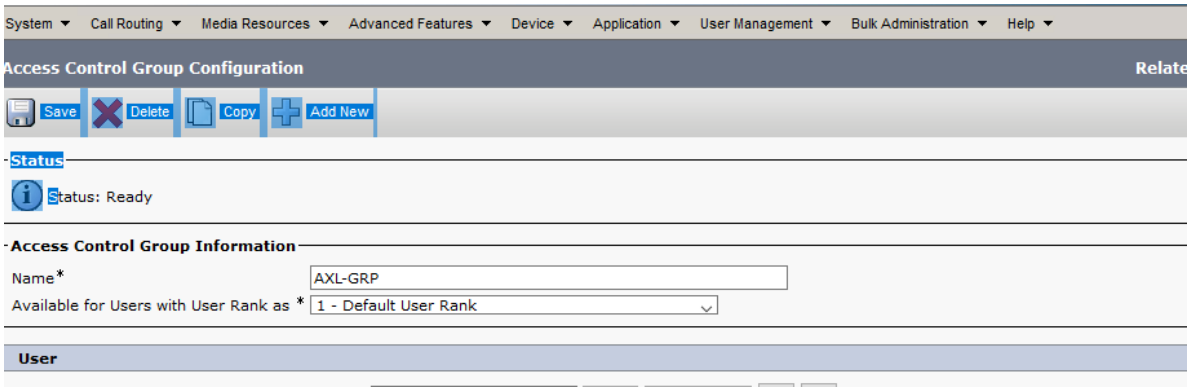
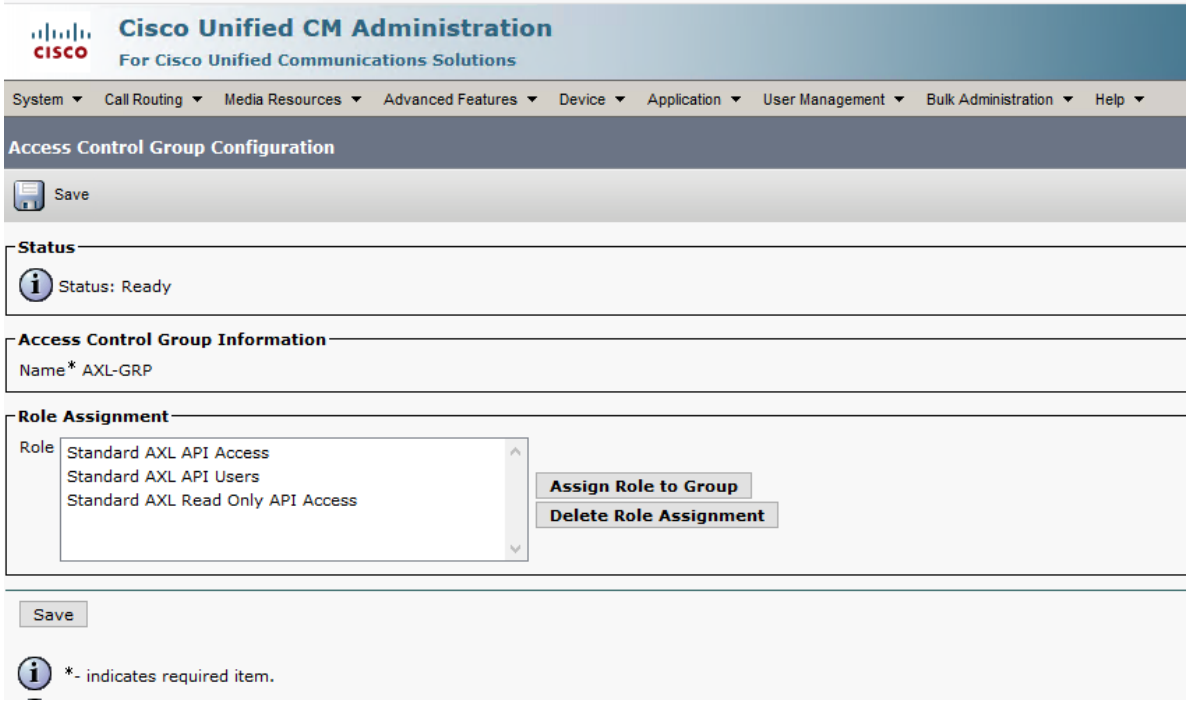


4. Add roles to this new group.



5. Edit the Application User you created and assign the following groups:
   - **AXL-GROUP**
   - **Standard CCM Server Monitoring**
   - **Standard RealtimeAndTraceCollection**

7.2.2. Enterprise Parameters

In Enterprise Parameters navigate the section Cisco Syslog Agent and configure the IP address of the Arbitrator in one of the Remote Syslog Server Name fields.

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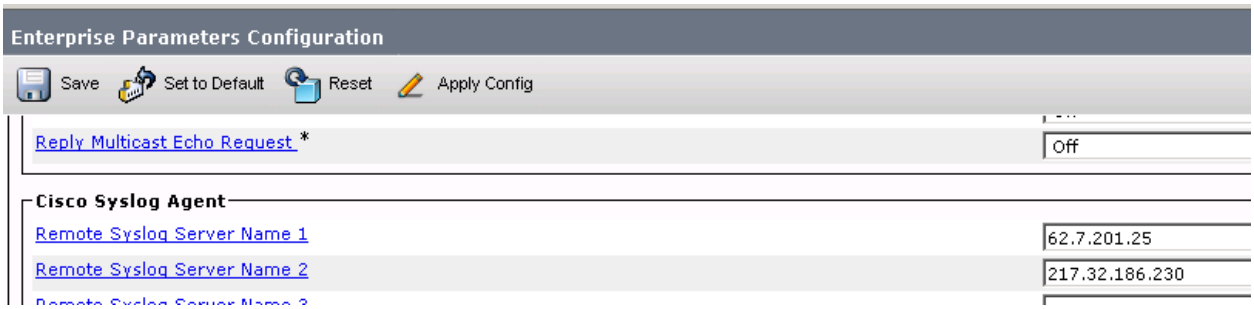
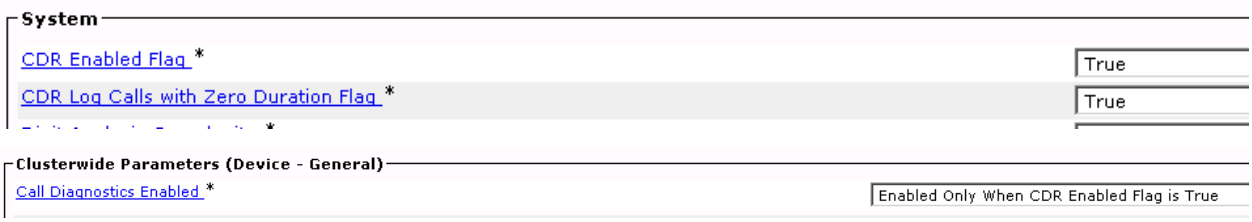


CUCM Service Parameters

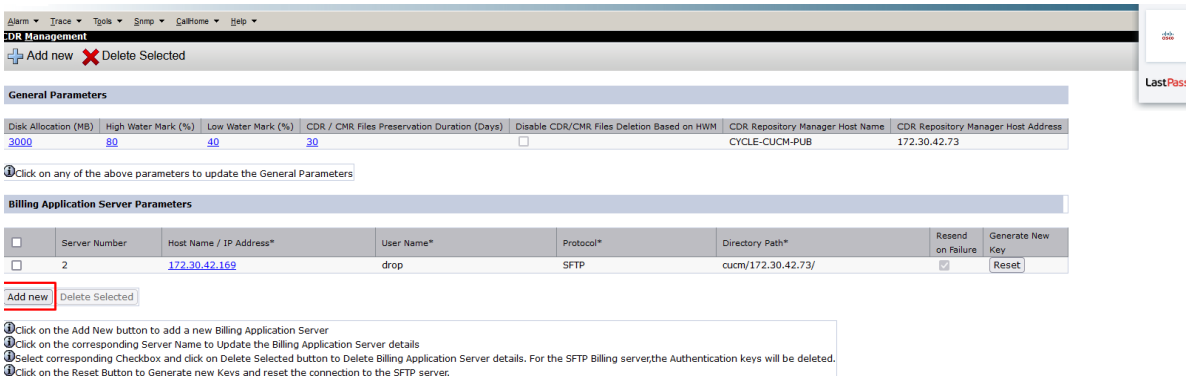
Ensure CDR Service Parameters are set:

- **CDR Enabled Flag** = True
- **CDR Log Calls with Zero Duration** = True
- **Call Diagnostic Enabled** =True



CUCM Serviceability

1. Navigate to Cisco Call Manager Serviceability.
2. Select **Tools > CDR Management**



3. Fields:
    - **Hostname/IP Address***: insert the arbitrator IP Address
    - **User Name***: insert the username drop
    - **Password***: insert your password for the user drop account.
    - **Protocol**: SFTP
    - **Directory Path***: cucm/ip address of call manager

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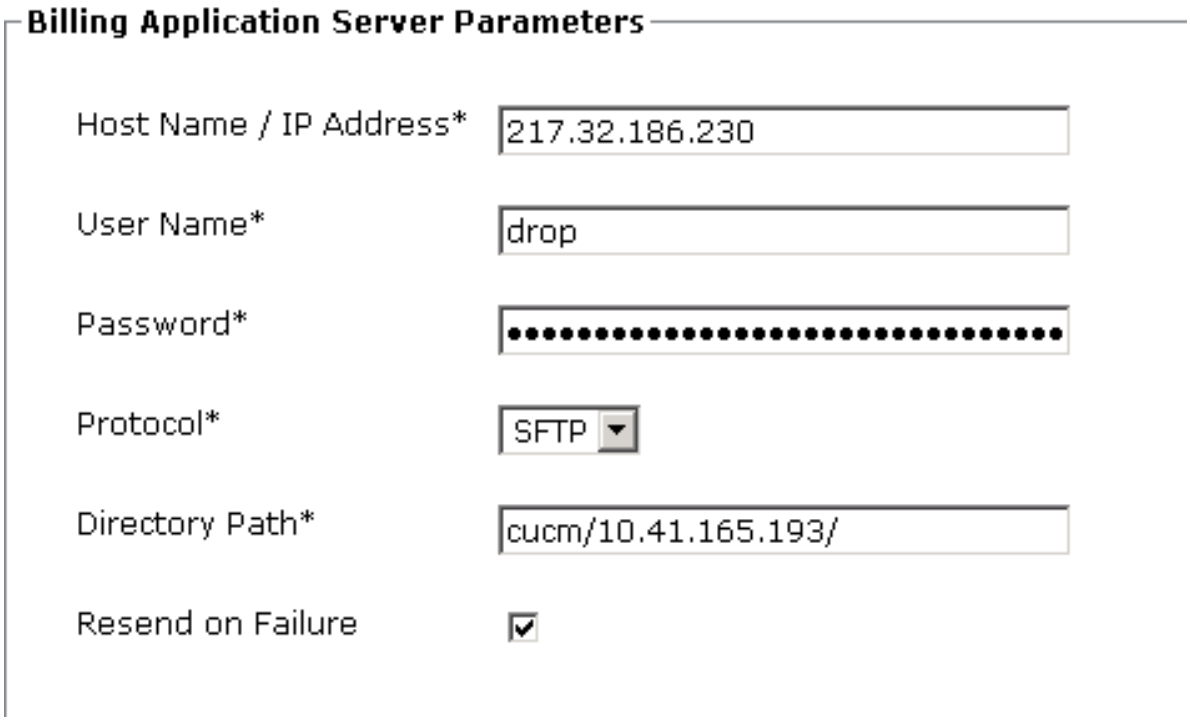

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