Assurance and Analytics Install Guide

Jul 07, 2021

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Contents

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 recommended 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

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
- 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-4-UC, 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-4-UC	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 access
DS9	Dashboard Server	TCP	443	Unidirectional	DS9 System Stats
DS9	Dashboard Server	UDP	514	Unidirectional	DS9 System Logs

2.5. VOSS-4-UC Port Usage

VOSS-4-UC 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

3. Deploy

3.1. Deploy and VM Installation Steps

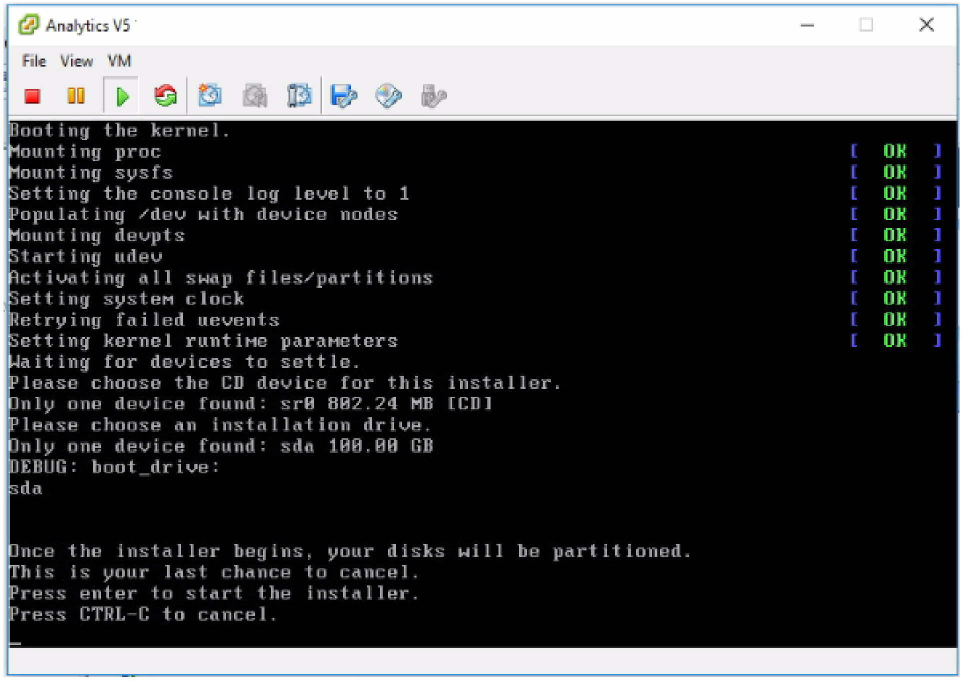
1. Download the ISO to directory accessible by the VSphere client.
2. In the vSphere client, create a new Debian Linux 64-bit guest operating system VM with:

   - disk space
   - RAM
   - vCPU

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

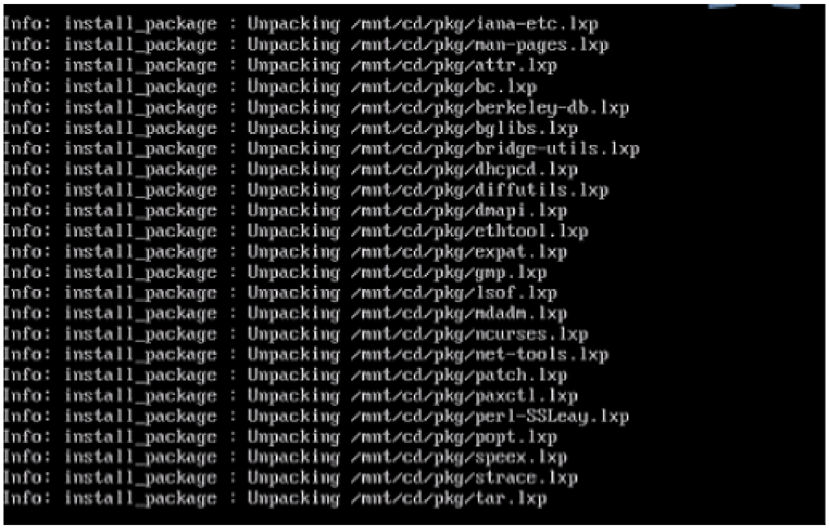
   Choose a VM name, for example “VAA”.

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:



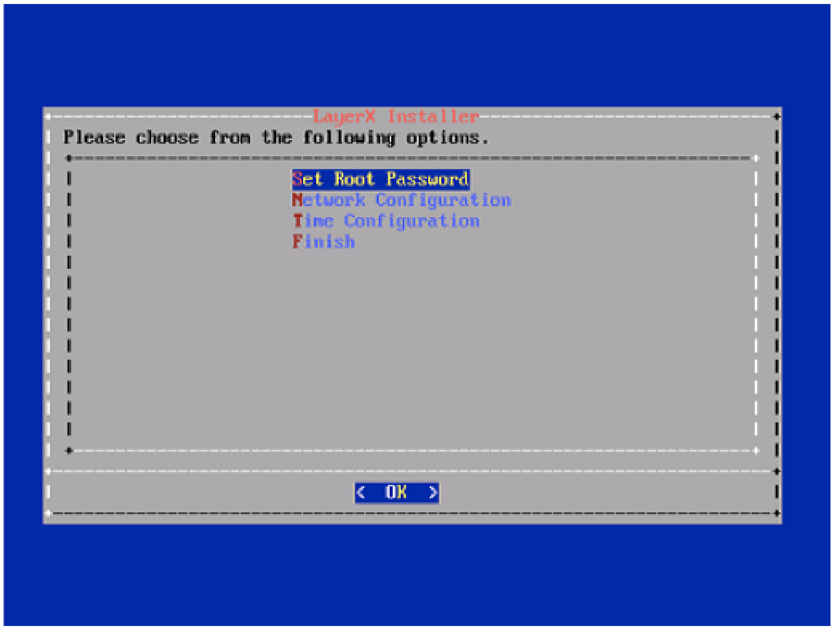
```
Booting the kernel.
Mounting proc                                                            [  OK  ]
Mounting sysfs                                                           [  OK  ]
Setting the console log level to 1                                       [  OK  ]
Populating /dev with device nodes                                        [  OK  ]
Mounting devpts                                                          [  OK  ]
Starting udev                                                            [  OK  ]
Activating all swap files/partitions                                     [  OK  ]
Setting system clock                                                     [  OK  ]
Retrying failed uevents                                                  [  OK  ]
Setting kernel runtime parameters                                        [  OK  ]
Waiting for devices to settle.
Please choose the CD device for this installer.
Only one device found: sr0 802.24 MB [CD]
Please choose an installation drive.
Only one device found: sda 100.00 GB
DEBUG: boot_drive:
sda


Once the installer begins, your disks will be partitioned.
This is your last chance to cancel.
Press enter to start the installer.
Press CTRL-C to cancel.
_
```

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.



LayerX Installer

Please choose from the following options.

Set Root Password
Network Configuration
Time Configuration
Finish

< OK >

This allows you to set the following:

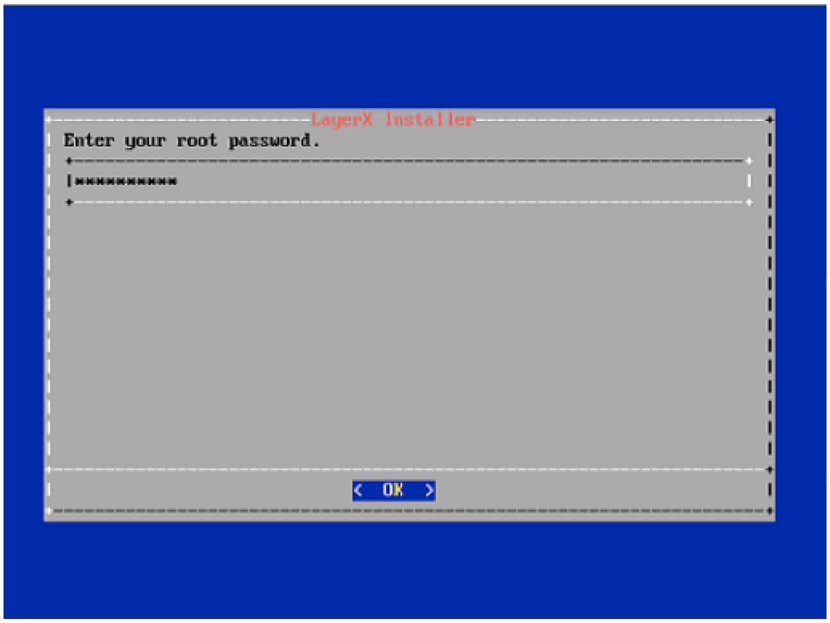
- Root Password
- Hostname
- IP Configuration
- DNS
- Time

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

- <Up> Arrow key

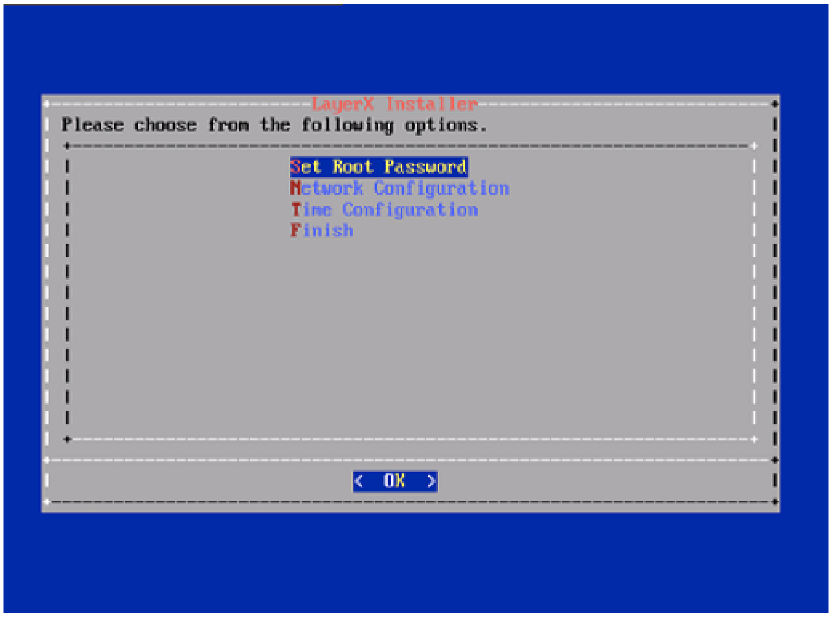
   - <Down> Arrow key
   - <TAB>
   - <Enter>

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.



```
LayerX Installer
Enter your root password.
|***********
< OK >
```

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



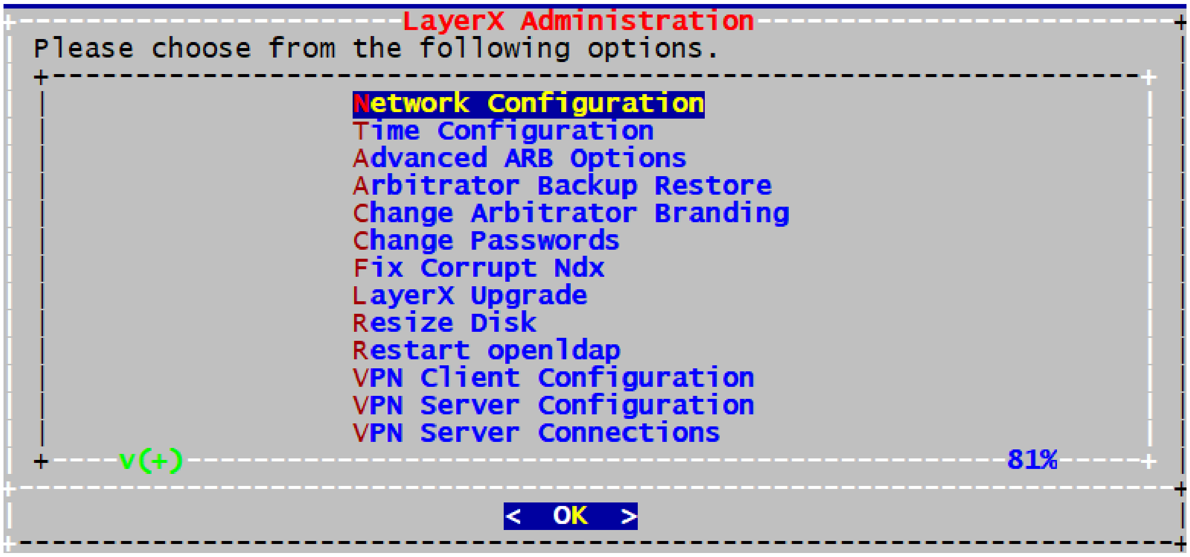
```
LayerX Installer
Please choose from the following options.
Set Root Password
Network Configuration
Time Configuration
Finish
< OK >
```

You can now proceed to the *Networking Setup* section in the Assurance and Analytics Install Guide.

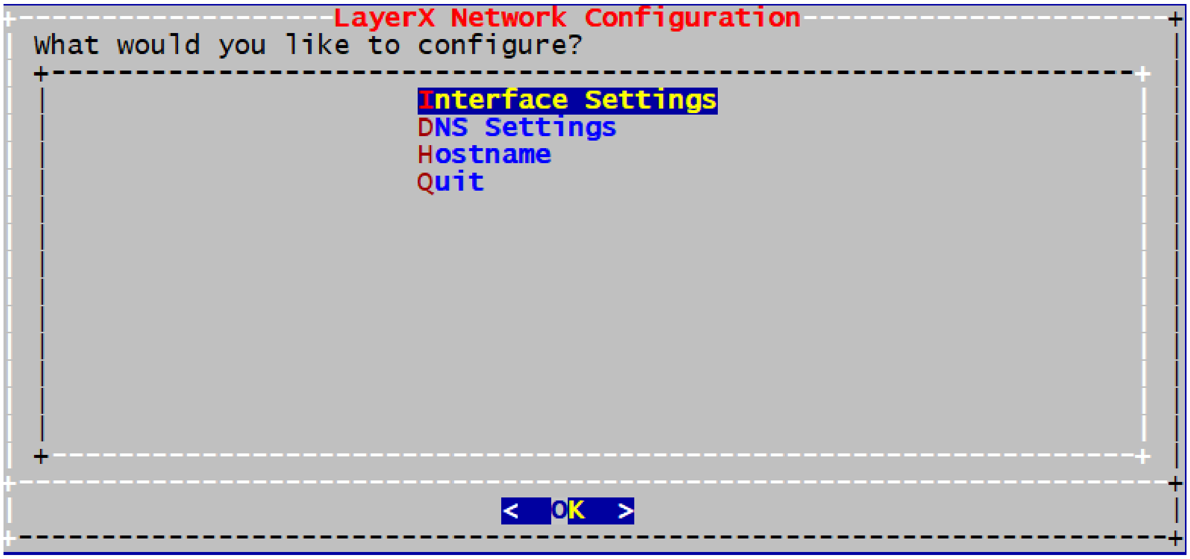
4. Networking Setup

4.1. Arbitrator Networking Setup

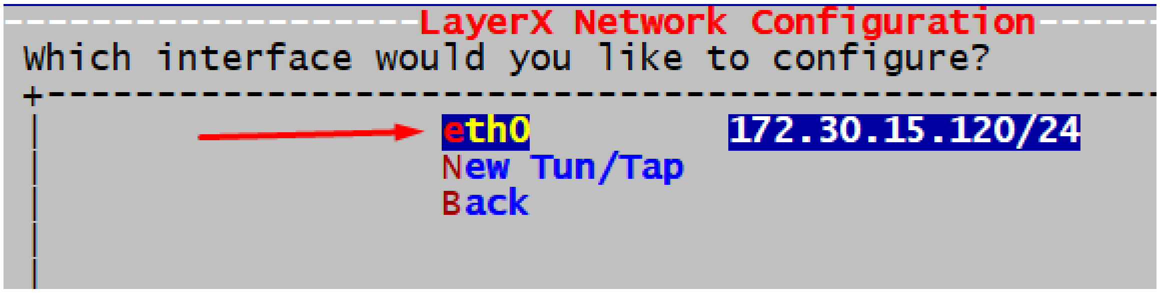
1. Deploy OVA Arbitrator
2. From the console login as `admin/admin`
3. Configure networking



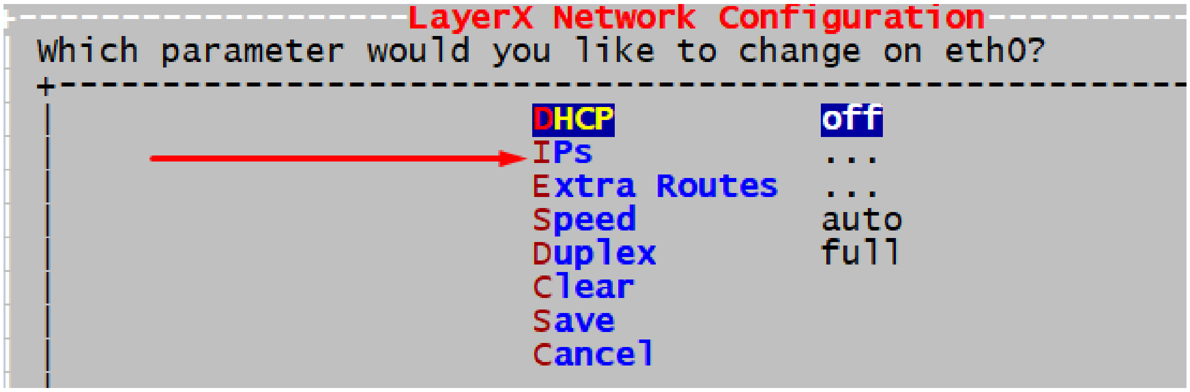
```
+-------------------------LayerX Administration-------------------------+
| Please choose from the following options.                             |
| +-------------------------------------------------------------------+ |
| |                  Network Configuration                             | |
| |                  Time Configuration                                | |
| |                  Advanced ARB Options                              | |
| |                  Arbitrator Backup Restore                         | |
| |                  Change Arbitrator Branding                        | |
| |                  Change Passwords                                  | |
| |                  Fix Corrupt Ndx                                   | |
| |                  LayerX Upgrade                                    | |
| |                  Resize Disk                                       | |
| |                  Restart openldap                                  | |
| |                  VPN Client Configuration                          | |
| |                  VPN Server Configuration                          | |
| |                  VPN Server Connections                            | |
| +----v(+)--------------------------------------------------81%------+ |
+-----------------------------------------------------------------------+
|                              <  OK  >                                 |
+-----------------------------------------------------------------------+
```



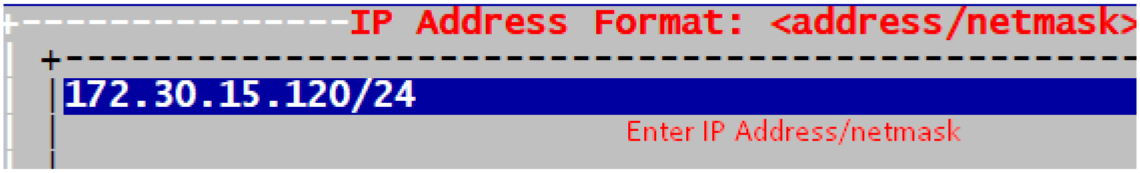
```
LayerX Network Configuration
What would you like to configure?

        Interface Settings
        DNS Settings
        Hostname
        Quit

              <  OK  >
```



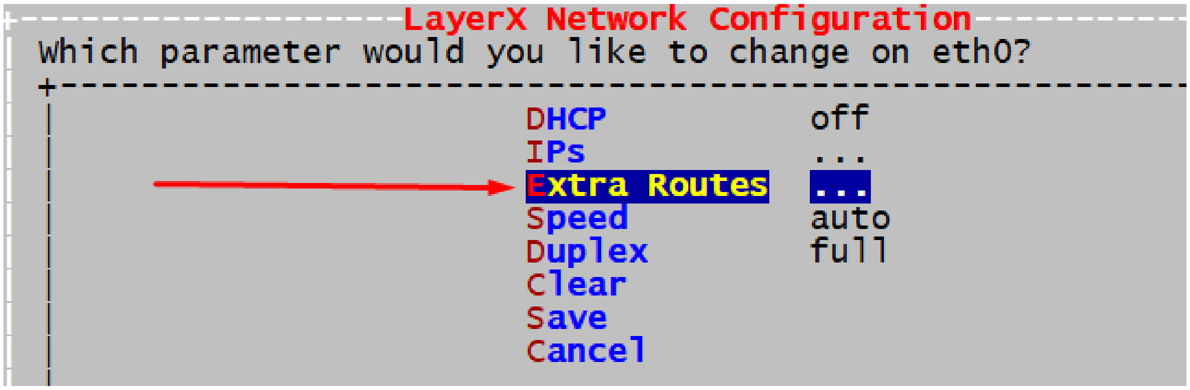
```
LayerX Network Configuration
Which interface would you like to configure?

        eth0            172.30.15.120/24
        New Tun/Tap
        Back
```



```
LayerX Network Configuration
Which parameter would you like to change on eth0?

        DHCP            off
        IPs             ...
        Extra Routes    ...
        Speed           auto
        Duplex          full
        Clear
        Save
        Cancel
```

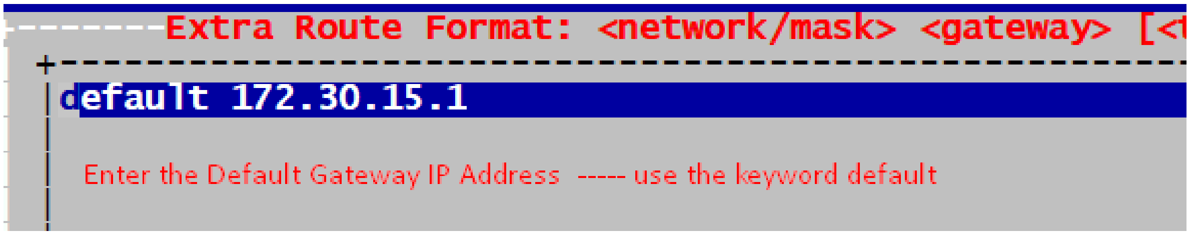


```
IP Address Format: <address/netmask>

172.30.15.120/24
                     Enter IP Address/netmask
```



```
LayerX Network Configuration
Which parameter would you like to change on eth0?

                    DHCP            off
                    IPs             ...
                    Extra Routes    ...
                    Speed           auto
                    Duplex          full
                    Clear
                    Save
                    Cancel
```

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



```
Extra Route Format: <network/mask> <gateway> [<t
default 172.30.15.1
```

Enter the Default Gateway IP Address ----- use the keyword default

5. Save then Quit.

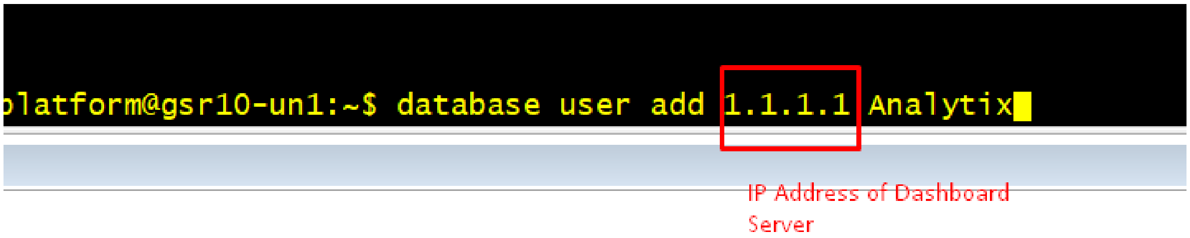
4.2. Dashboard Reporter Networking Setup

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

5. Database and System Setup

5.1. VOSS-4-UC Database Setup

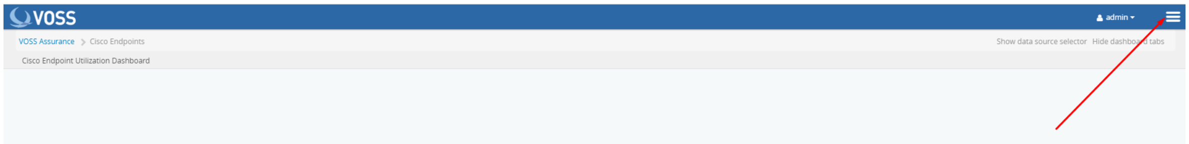
1. Add a Database user - this is a Read only user



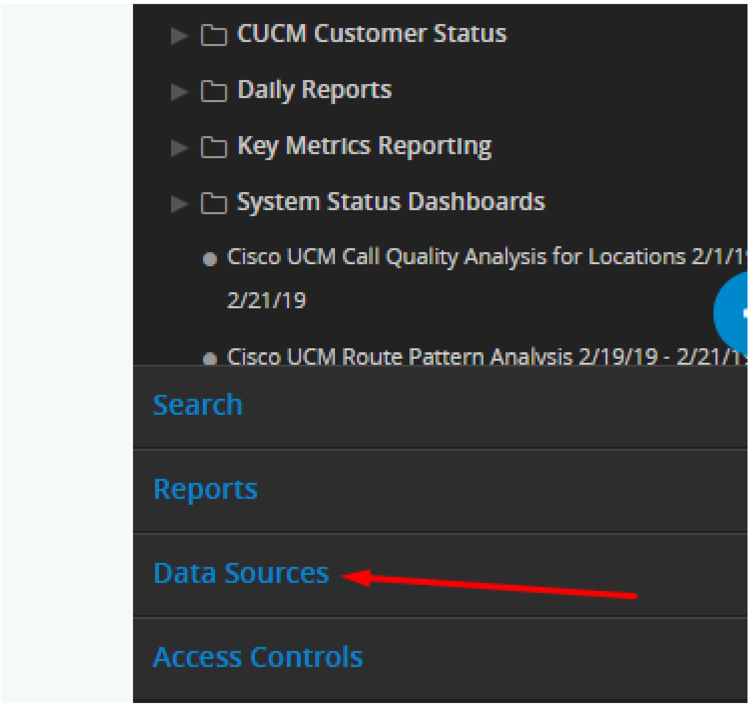
```
platform@gsr10-un1:~$ database user add 1.1.1.1 Analytix
```

IP Address of Dashboard Server

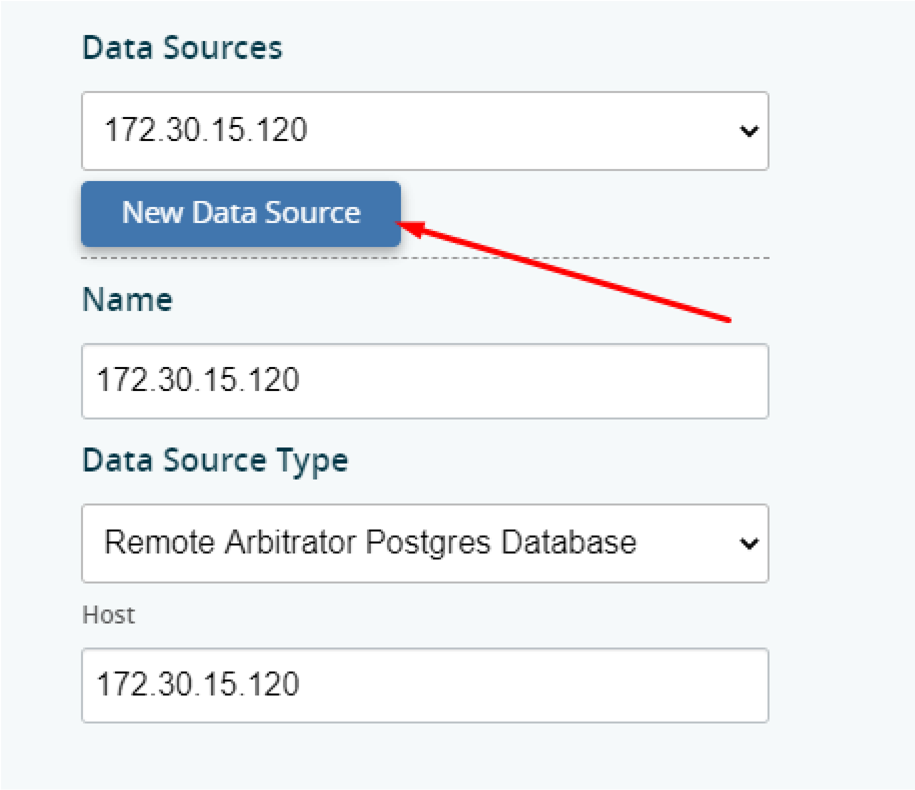
2. Take note of the username and password you have just configured
3. Now log in to the GUI on the Dashboard Server username admin — password admin
4. Click on the Hamburger Menu shown Below


VOSS
admin
VOSS Assurance
Cisco Endpoints
Show data source selector
Hide dashboard tabs
Cisco Endpoint Utilization Dashboard

5. Click on Data sources



6. Click on New Data Source



Data Sources

172.30.15.120

Name

172.30.15.120

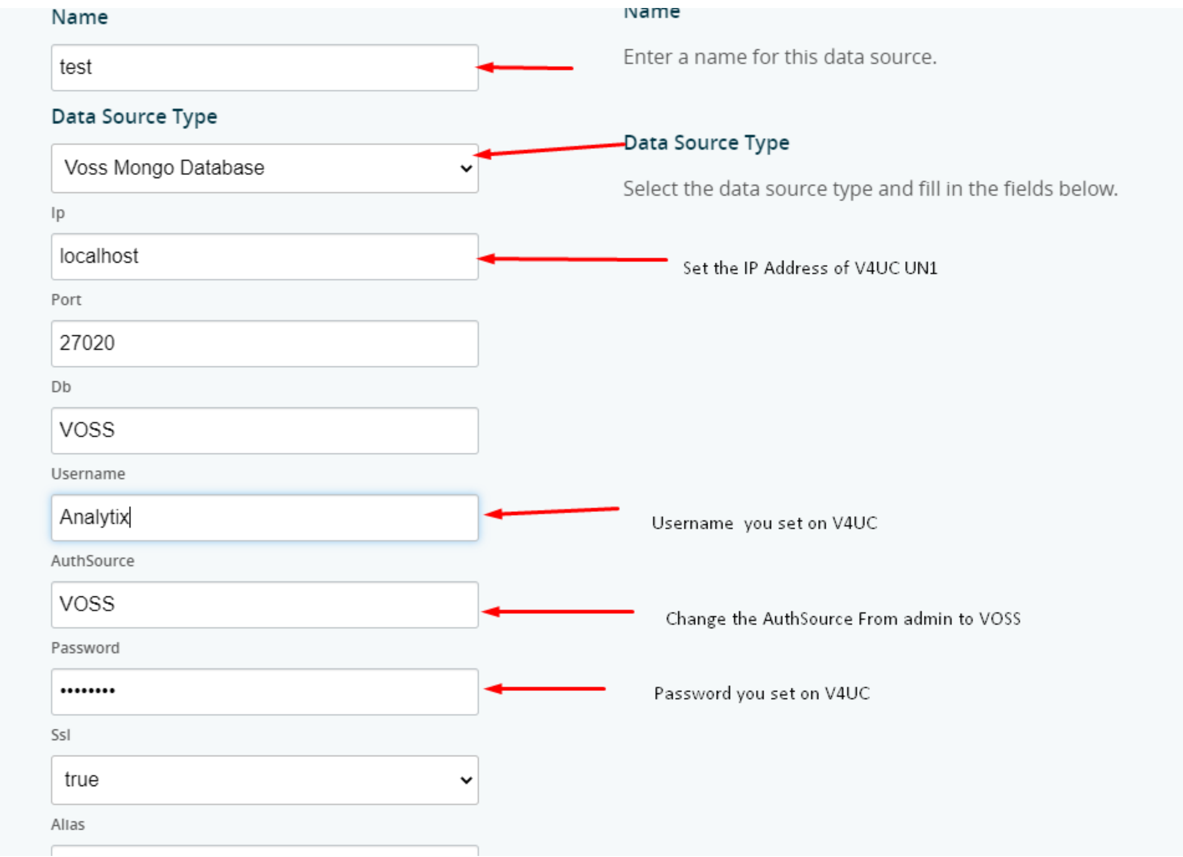
Data Source Type

Remote Arbitrator Postgres Database

Host

172.30.15.120

7. Fill out the form presented.



Name

test

Data Source Type

Voss Mongo Database

Ip

localhost

Port

27020

Db

VOSS

Username

Analytix

AuthSource

VOSS

Password

••••••••

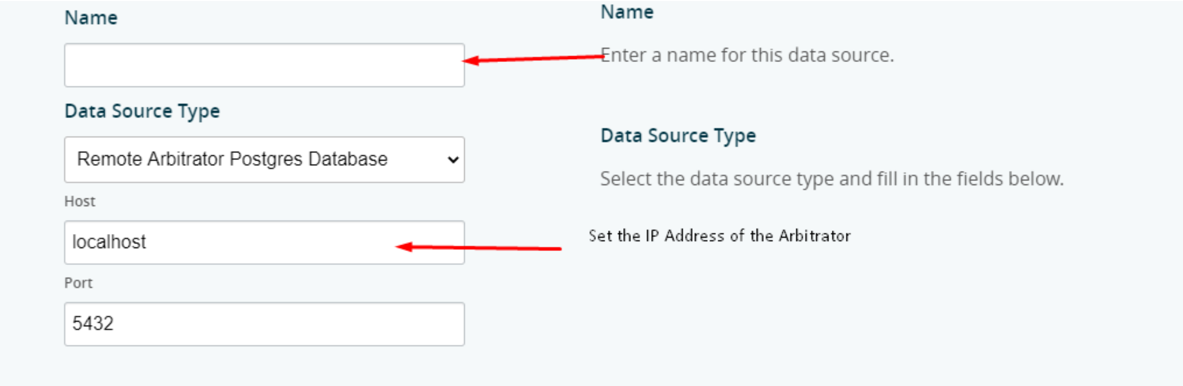
Ssl

true

Alias

Name
Enter a name for this data source.
Data Source Type
Select the data source type and fill in the fields below.
Set the IP Address of V4UC UN1
Username you set on V4UC
Change the AuthSource From admin to VOSS
Password you set on V4UC

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



Name

Data Source Type

Remote Arbitrator Postgres Database

Host

localhost

Port

5432

Name
Enter a name for this data source.
Data Source Type
Select the data source type and fill in the fields below.
Set the IP Address of the Arbitrator

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 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

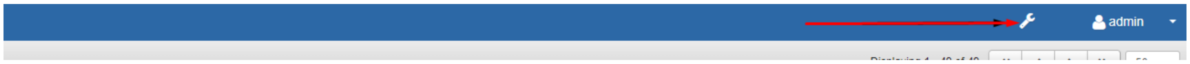
  A policy is a set of rules for the data that is turned in a to an alert. It enables an alert to be generated and defines the alarm ID and the content of the alarm that gets presented to a user.

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

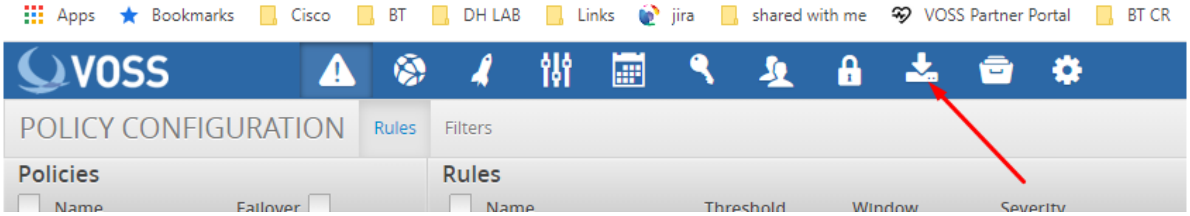
Policies	`SiteStats_08122020.lxcfg`
	`POLICIESUCCE221020.lxcfg`
	`POLICIESCUCM221020.lxcfg`
	`POLICIESCUCIMP221020.lxcfg`
	`PINGMON.lxcfg`

5.2.2. Installation Steps

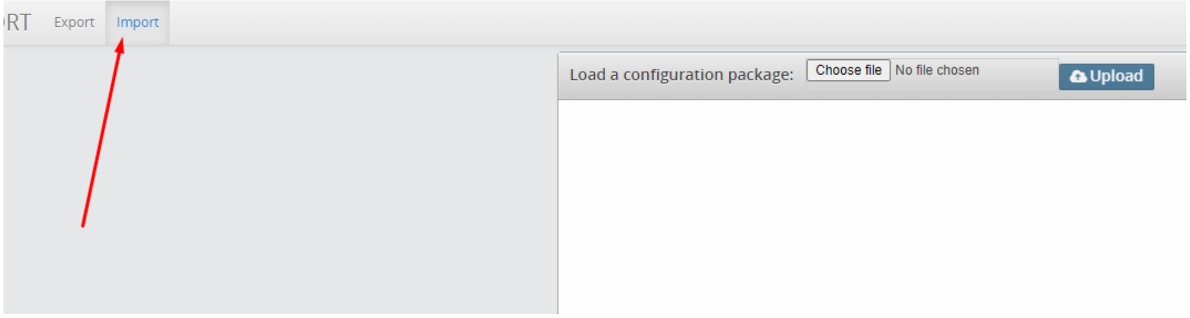
1. Log in to the Arbitrator: `admin/admin`
2. Click on the spanner icon



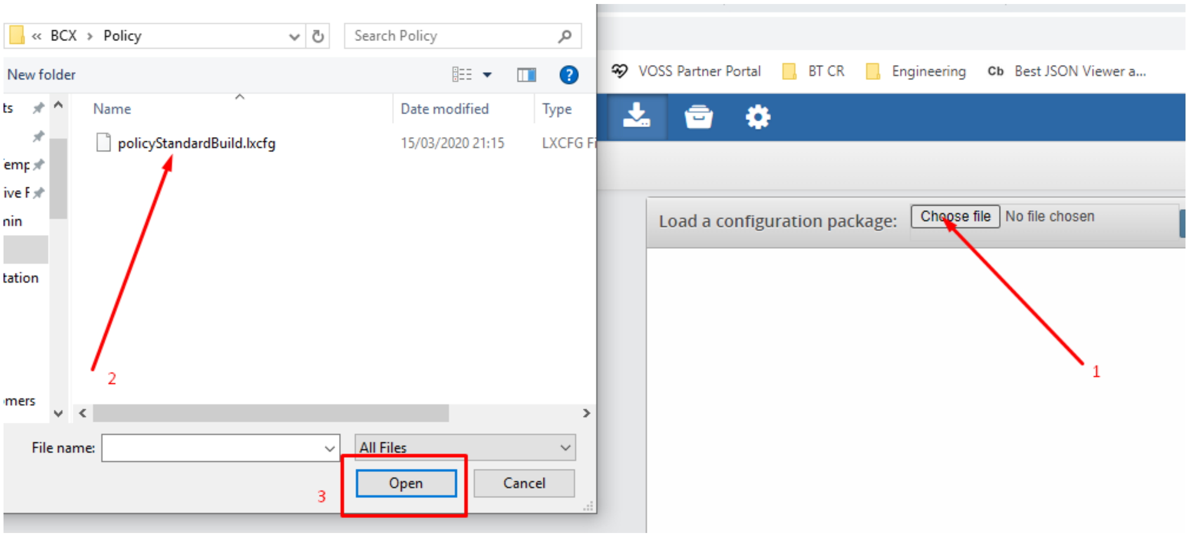
3. Click on the icon shown below



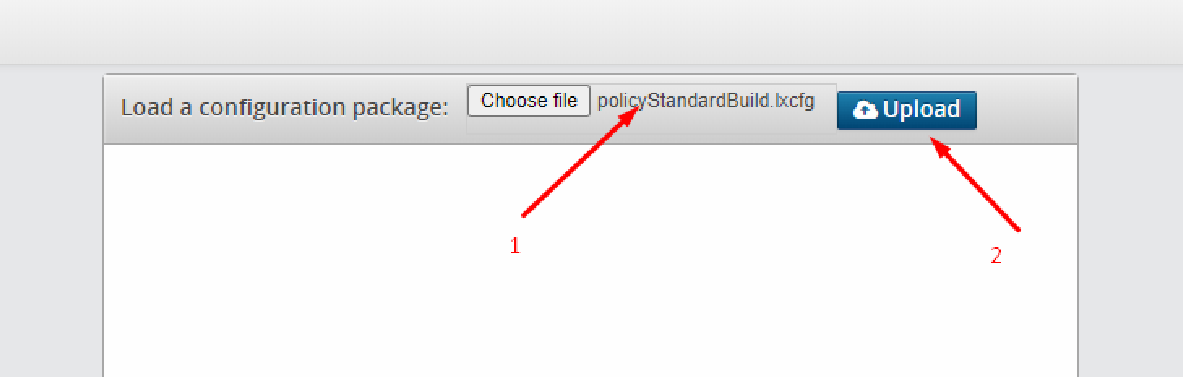
4. Click on **Import**



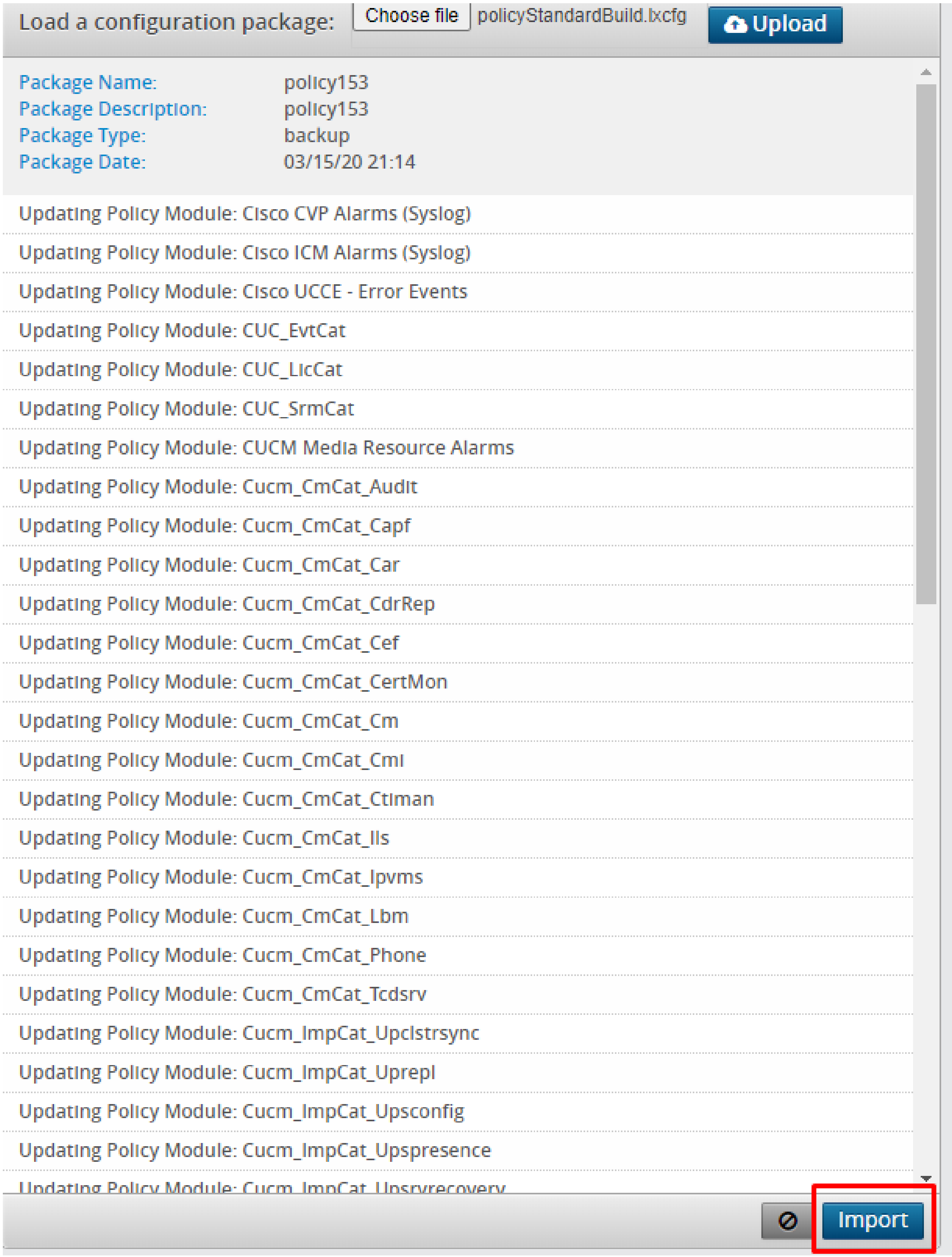
5. Click on **Choose file**, then select your file and click **OK**.



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



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



Load a configuration package: policyStandardBuild.lxcfg

Package Name:	policy153
Package Description:	policy153
Package Type:	backup
Package Date:	03/15/20 21:14

```
Updating Policy Module: Cisco CVP Alarms (Syslog)
Updating Policy Module: Cisco ICM Alarms (Syslog)
Updating Policy Module: Cisco UCCE - Error Events
Updating Policy Module: CUC_EvtCat
Updating Policy Module: CUC_LicCat
Updating Policy Module: CUC_SrmCat
Updating Policy Module: CUCM Media Resource Alarms
Updating Policy Module: Cucm_CmCat_Audit
Updating Policy Module: Cucm_CmCat_Capf
Updating Policy Module: Cucm_CmCat_Car
Updating Policy Module: Cucm_CmCat_CdrRep
Updating Policy Module: Cucm_CmCat_Cef
Updating Policy Module: Cucm_CmCat_CertMon
Updating Policy Module: Cucm_CmCat_Cm
Updating Policy Module: Cucm_CmCat_Cmi
Updating Policy Module: Cucm_CmCat_Ctiman
Updating Policy Module: Cucm_CmCat_Ils
Updating Policy Module: Cucm_CmCat_Ipvms
Updating Policy Module: Cucm_CmCat_Lbm
Updating Policy Module: Cucm_CmCat_Phone
Updating Policy Module: Cucm_CmCat_Tcdsrv
Updating Policy Module: Cucm_ImpCat_Upclstrsync
Updating Policy Module: Cucm_ImpCat_Uprepl
Updating Policy Module: Cucm_ImpCat_Upsconfig
Updating Policy Module: Cucm_ImpCat_Upspresence
Updating Policy Module: Cucm_ImpCat_Upsrvrecovery
```

8. Repeat this procedure for:

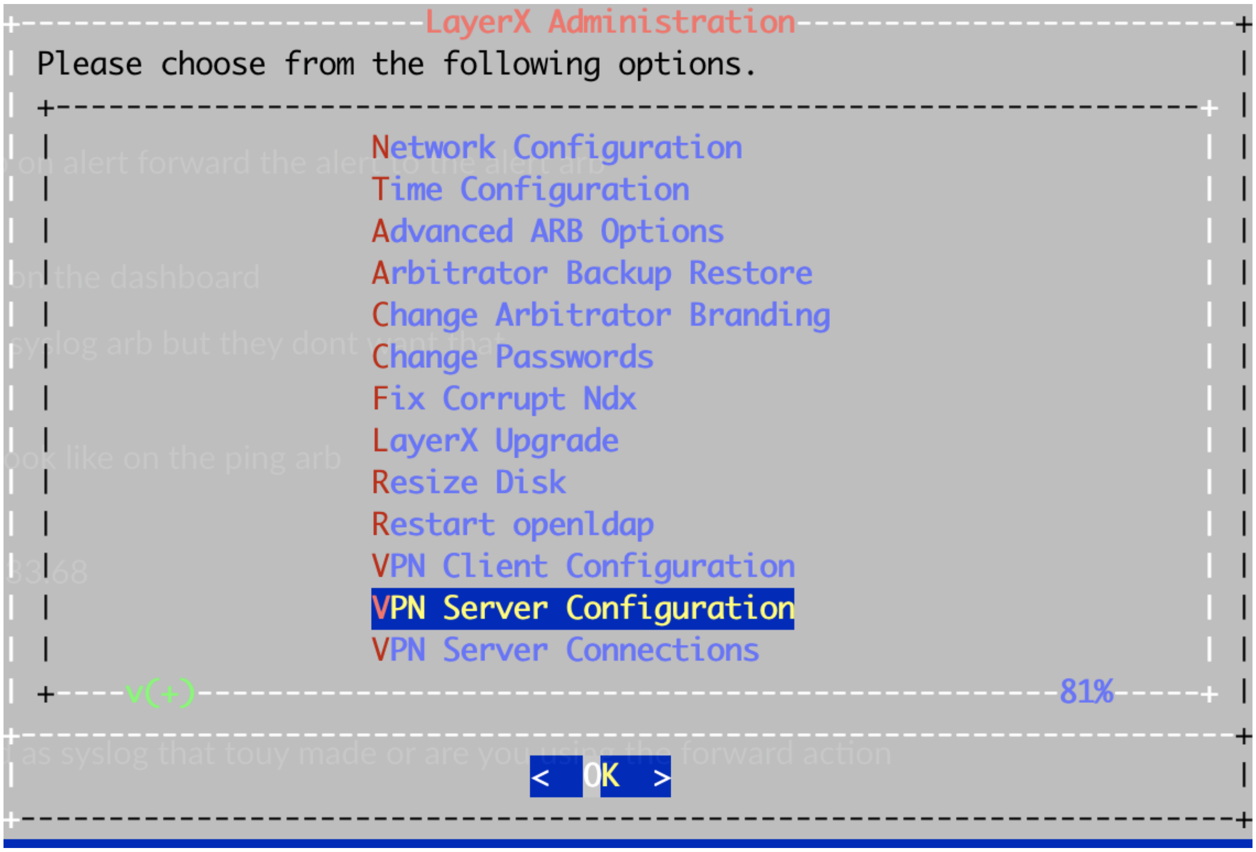
   - **Controls**
   - **Probes**

- **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



```
+----------------------LayerX Administration------------------------+
| Please choose from the following options.                         |
| +-------------------------------------------------------------+ |
| |                 Network Configuration                       | |
| |                 Time Configuration                          | |
| |                 Advanced ARB Options                        | |
| |                 Arbitrator Backup Restore                   | |
| |                 Change Arbitrator Branding                  | |
| |                 Change Passwords                            | |
| |                 Fix Corrupt Ndx                             | |
| |                 LayerX Upgrade                              | |
| |                 Resize Disk                                 | |
| |                 Restart openldap                            | |
| |                 VPN Client Configuration                    | |
| |                 VPN Server Configuration                    | |
| |                 VPN Server Connections                      | |
| +----v(+)--------------------------------------------81%----+ |
+-------------------------------------------------------------------+
|                          <  OK  >                                 |
+-------------------------------------------------------------------+
```

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)

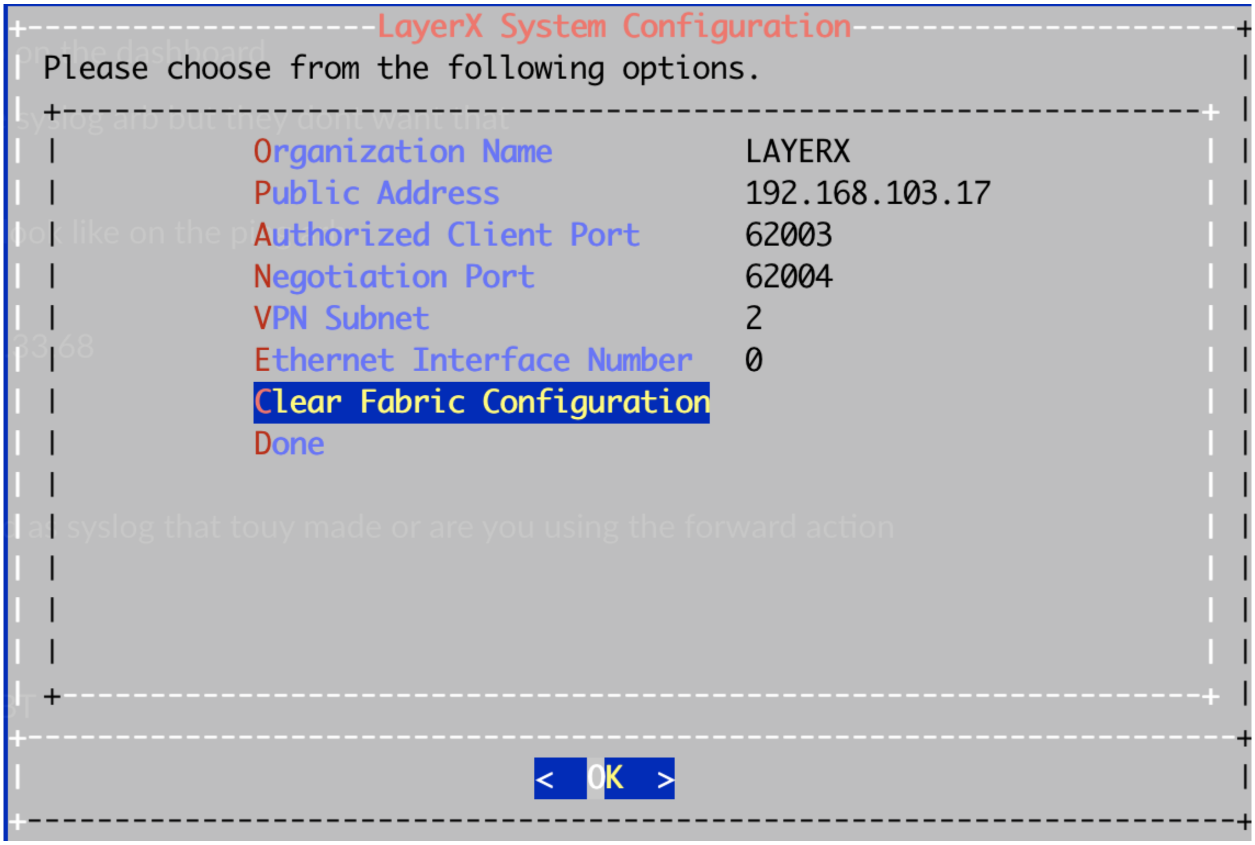
c. Set Authorized Client Port to 62003

d. Set the Negotiation Port to 62004

e. Set the VPN Subnet (to a number between 1 and 150)

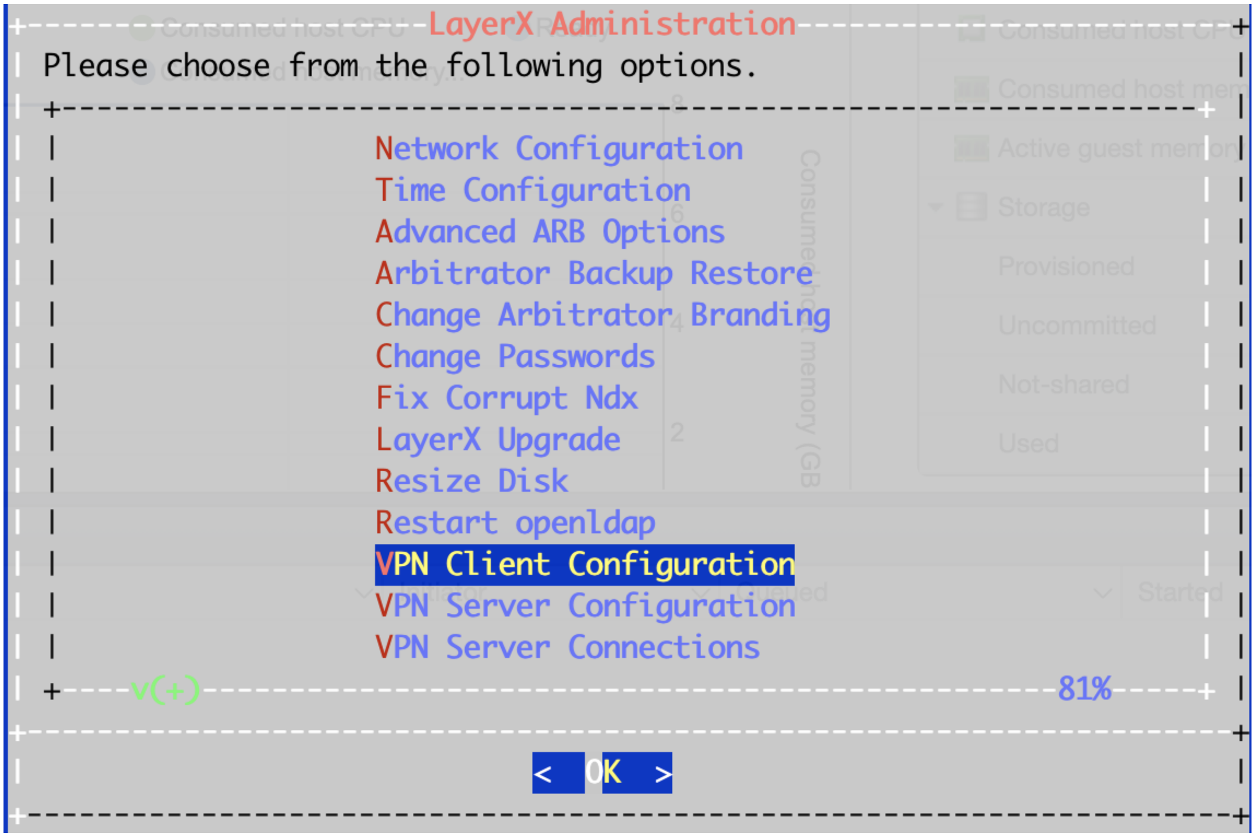
f. Set the Ethernet Interface Number (Usually 0)

As shown in the example below:



```
+--------------------LayerX System Configuration---------------------+
| Please choose from the following options.                          |
| +--------------------------------------------------------------+ |
| |            Organization Name            LAYERX               | |
| |            Public Address               192.168.103.17       | |
| |            Authorized Client Port       62003                | |
| |            Negotiation Port             62004                | |
| |            VPN Subnet                   2                    | |
| |            Ethernet Interface Number    0                    | |
| |            Clear Fabric Configuration                        | |
| |            Done                                              | |
| |                                                              | |
| |                                                              | |
| |                                                              | |
| |                                                              | |
| |                                                              | |
| +--------------------------------------------------------------+ |
+--------------------------------------------------------------------+
|                             <  OK  >                               |
+--------------------------------------------------------------------+
```

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

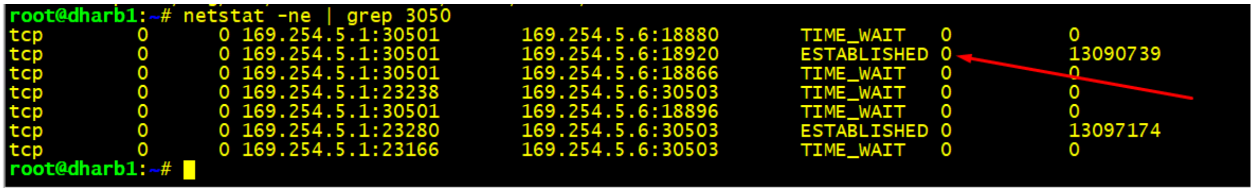


```
+-----------------------LayerX Administration---------------------------+
| Please choose from the following options.                             |
| +-------------------------------------------------------------------+ |
| |                  Network Configuration                            | |
| |                  Time Configuration                               | |
| |                  Advanced ARB Options                             | |
| |                  Arbitrator Backup Restore                        | |
| |                  Change Arbitrator Branding                       | |
| |                  Change Passwords                                 | |
| |                  Fix Corrupt Ndx                                  | |
| |                  LayerX Upgrade                                   | |
| |                  Resize Disk                                      | |
| |                  Restart openldap                                 | |
| |                  VPN Client Configuration                         | |
| |                  VPN Server Configuration                         | |
| |                  VPN Server Connections                           | |
| +----v(+)----------------------------------------------------81%----+ |
+-----------------------------------------------------------------------+
|                              <  OK  >                                 |
+-----------------------------------------------------------------------+
```

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**.

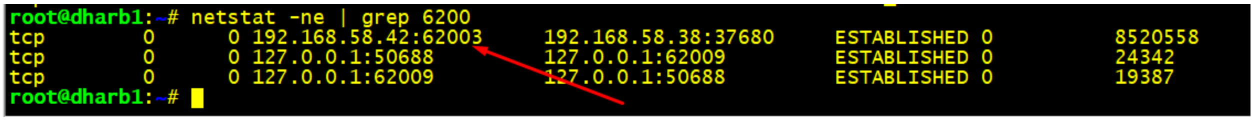
A Tunnel will now be set up between the Arbitrators.

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:~# 
```

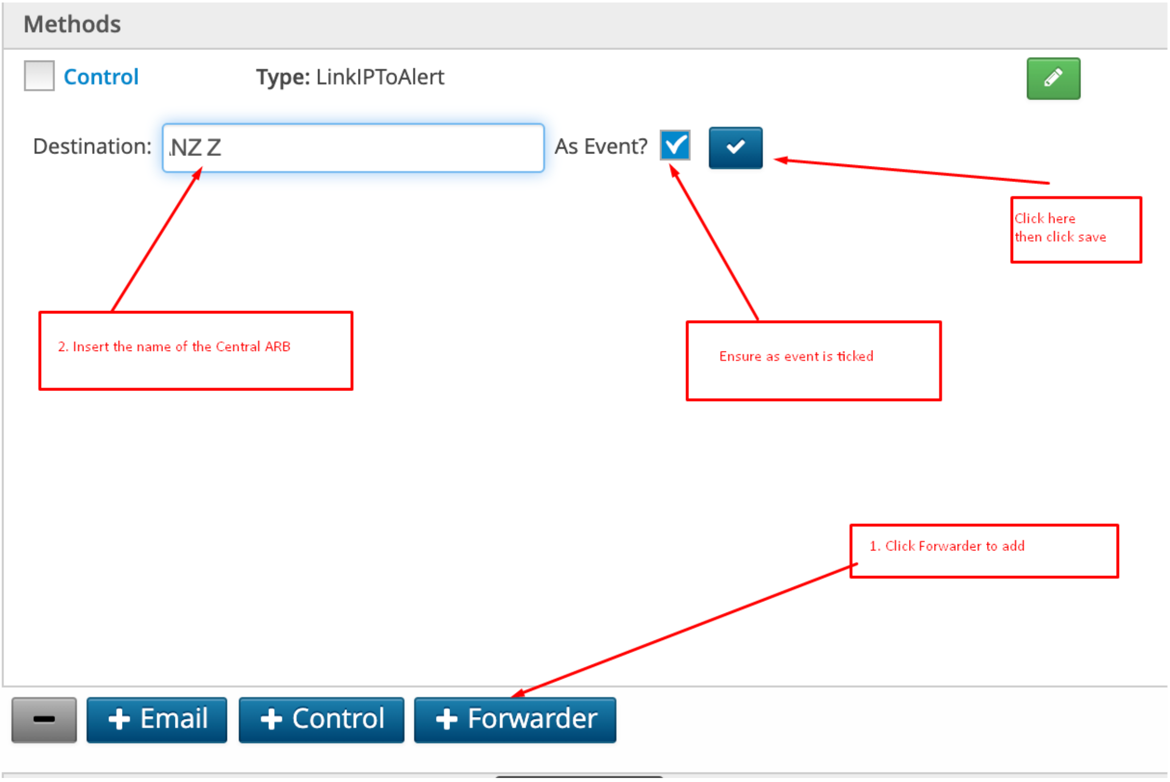
The tunnel is setup using `169.253.x.x` addresses:



```
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:

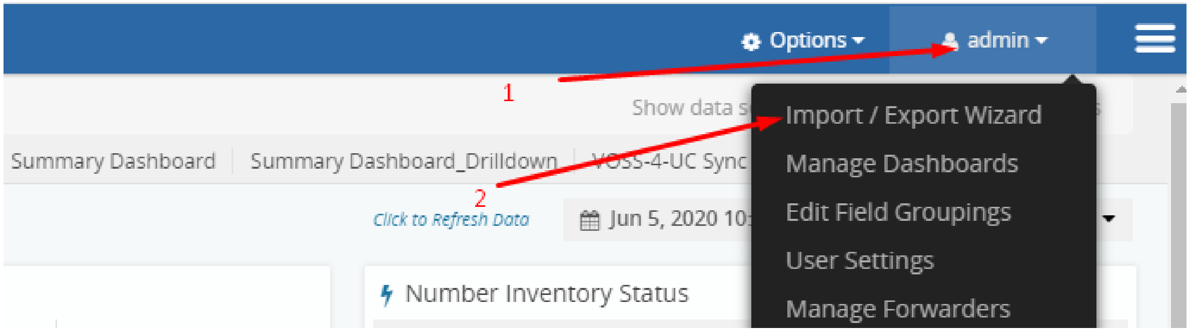
- On the Subordinate Arbitrator go to Response Procedures in the config area of the GUI:



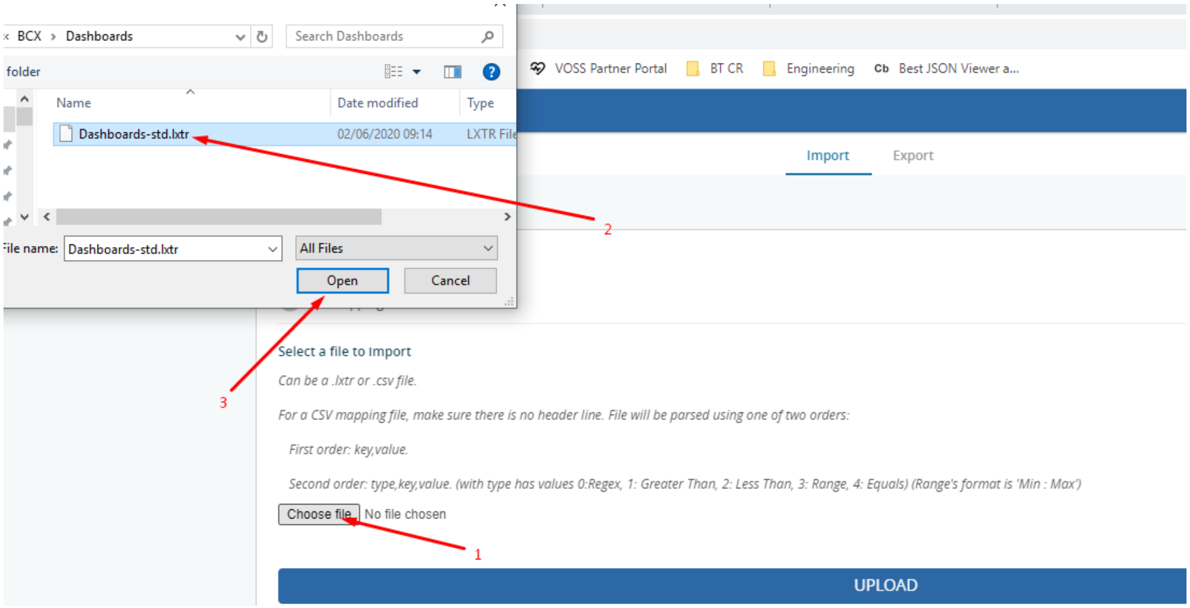
Methods
Control
Type: LinkIPToAlert
Destination: NZ Z
As Event? ☑
Click here then click save
2. Insert the name of the Central ARB
Ensure as event is ticked
1. Click Forwarder to add
+ Email
+ Control
+ Forwarder

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**.



Select a file to import

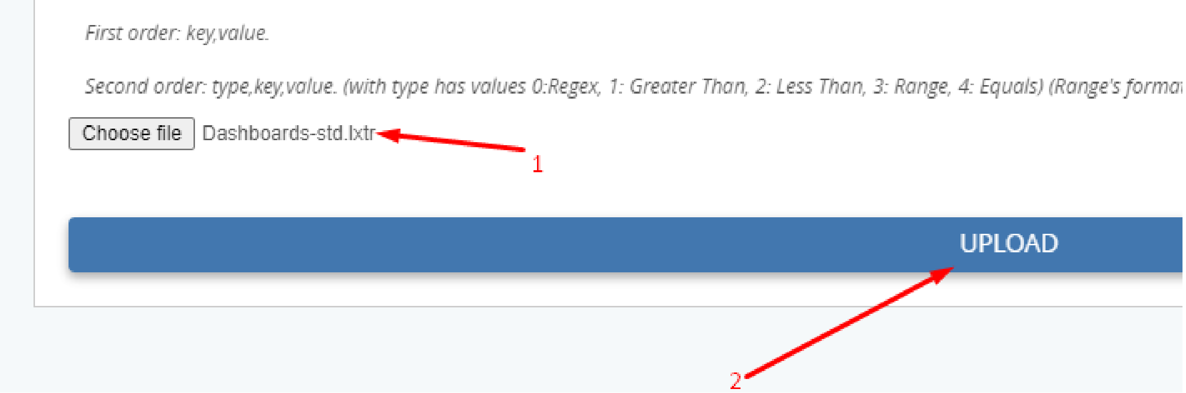
Can be a .lxtr or .csv file.

For a CSV mapping file, make sure there is no header line. File will be parsed using one of two orders:

First order: key,value.

Second order: type,key,value. (with type has values 0:Regex, 1: Greater Than, 2: Less Than, 3: Range, 4: Equals) (Range's format is 'Min : Max')

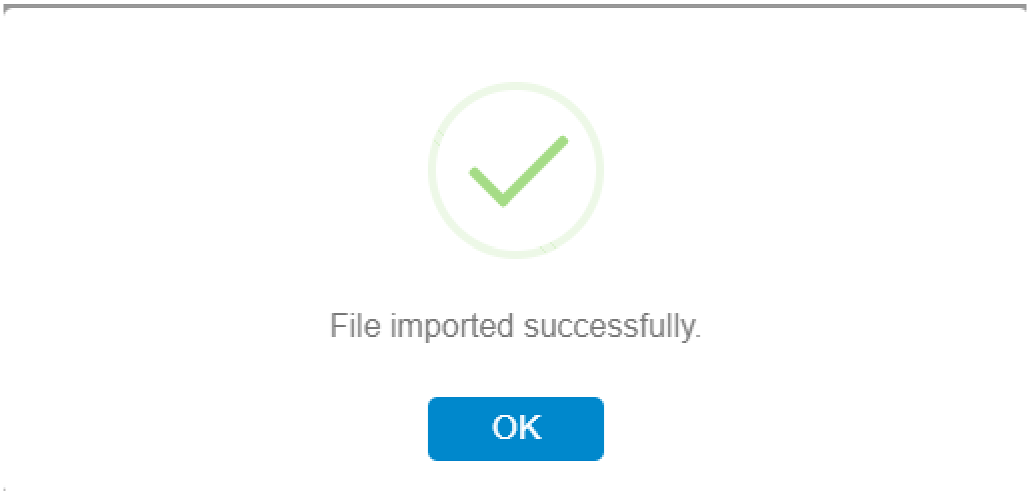
4. Ensure your file is visible adjacent to **Choose file**, then click **Upload**.



First order: key,value.

Second order: type,key,value. (with type has values 0:Regex, 1: Greater Than, 2: Less Than, 3: Range, 4: Equals) (Range's forma

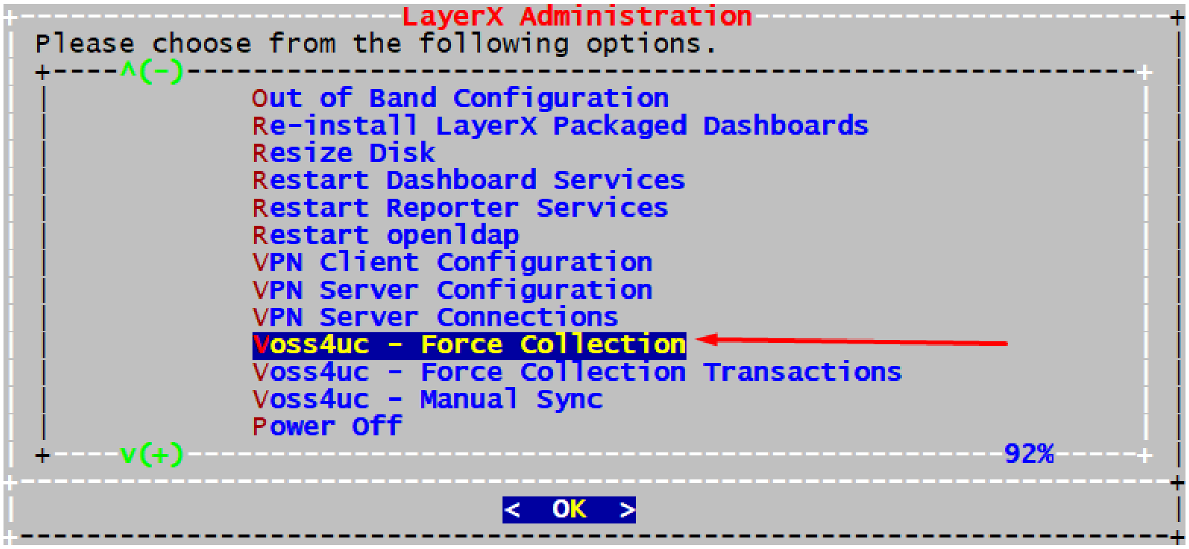
5. Your file will then upload, and you will see the below — click **OK**.



File imported successfully.

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-4-UC data into

the dashboard.



```
+-------------------------LayerX Administration--------------------------+
| Please choose from the following options.                              |
| +----^(-)-------------------------------------------------------------+ |
| |             Out of Band Configuration                               | |
| |             Re-install LayerX Packaged Dashboards                   | |
| |             Resize Disk                                             | |
| |             Restart Dashboard Services                              | |
| |             Restart Reporter Services                               | |
| |             Restart openldap                                        | |
| |             VPN Client Configuration                                | |
| |             VPN Server Configuration                                | |
| |             VPN Server Connections                                  | |
| |             Voss4uc - Force Collection                              | |
| |             Voss4uc - Force Collection Transactions                 | |
| |             Voss4uc - Manual Sync                                   | |
| |             Power Off                                               | |
| +----v(+)-------------------------------------------------------92%---+ |
+------------------------------------------------------------------------+
|                               <  OK  >                                 |
+------------------------------------------------------------------------+
```

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.

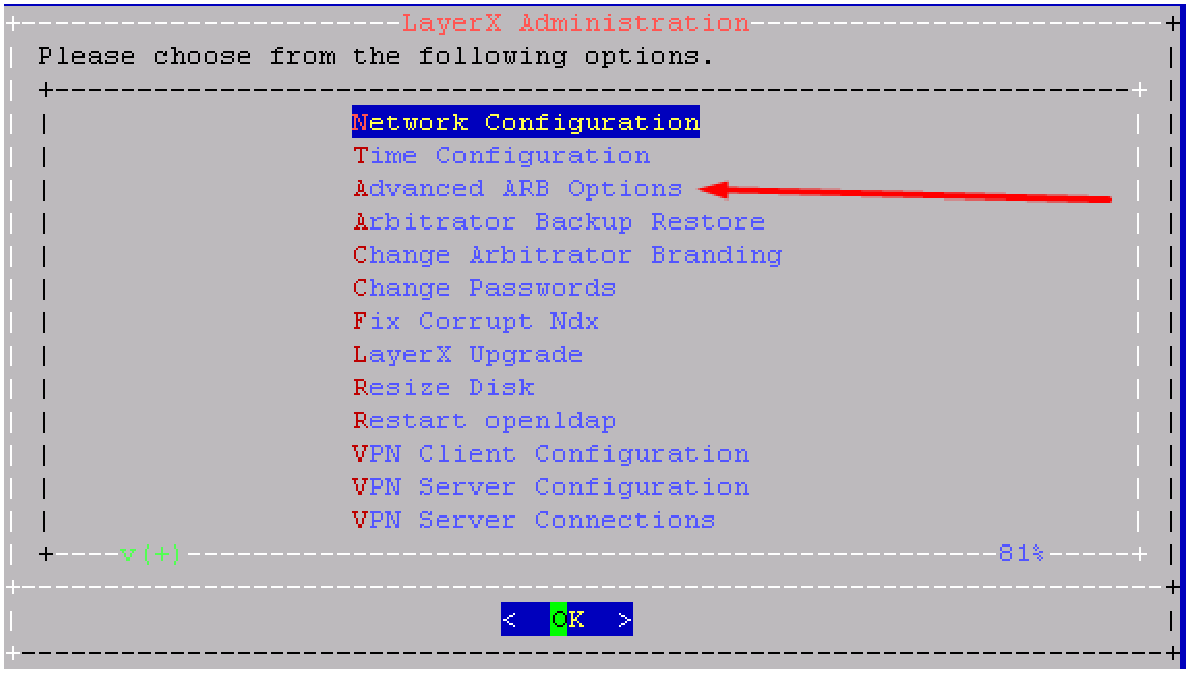
2. SSH to the system as `root` and restart the apache service using the **sv restart apache** command.
3. Clear browser cache.
4. Apache will now use the new signed certificate.

7. CUCM Asset Onboarding

7.1. Customer Onboard

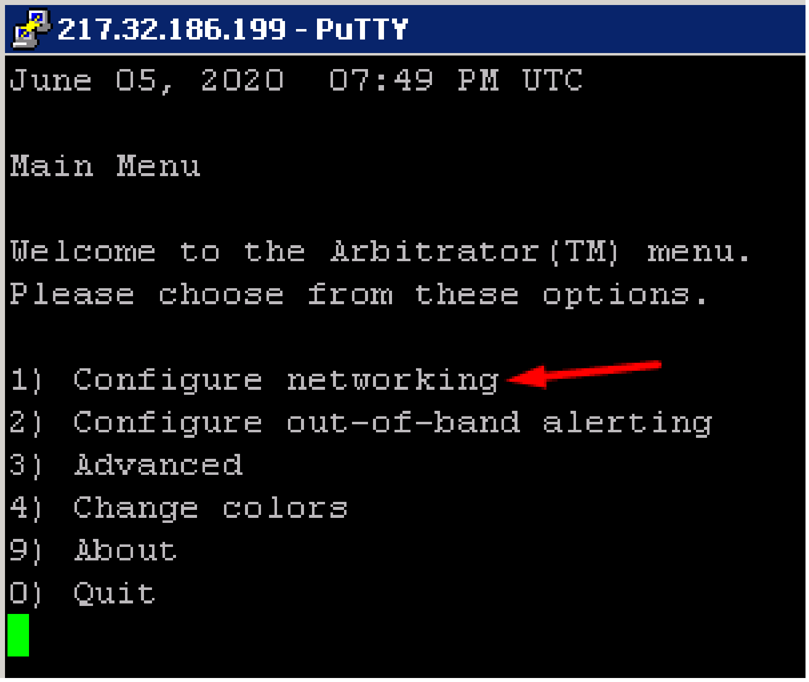
7.1.1. Add Customer CDR Folders

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.



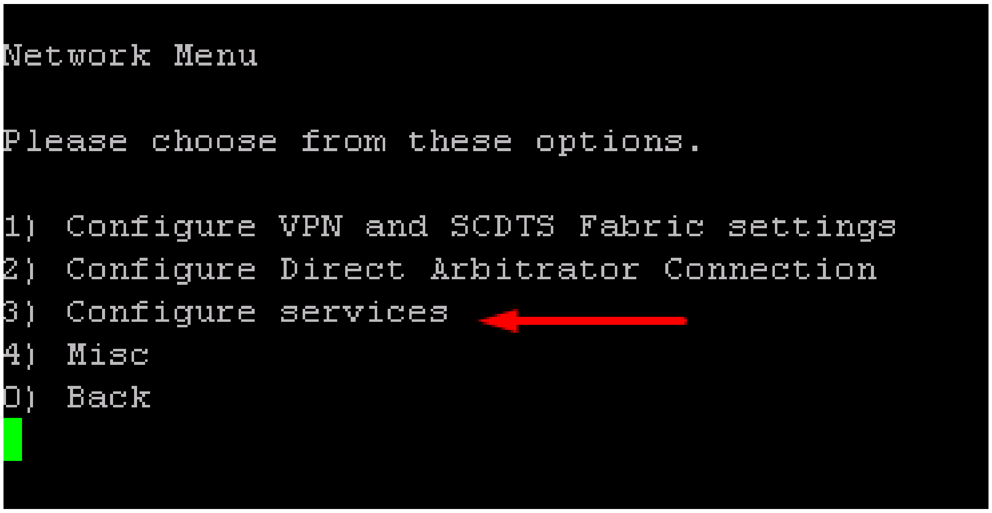
```
+-----------------------LayerX Administration------------------------+
| Please choose from the following options.                          |
| +----------------------------------------------------------------+ |
| |                 Network Configuration                          | |
| |                 Time Configuration                             | |
| |                 Advanced ARB Options                           | |
| |                 Arbitrator Backup Restore                      | |
| |                 Change Arbitrator Branding                     | |
| |                 Change Passwords                               | |
| |                 Fix Corrupt Ndx                                | |
| |                 LayerX Upgrade                                 | |
| |                 Resize Disk                                    | |
| |                 Restart openldap                               | |
| |                 VPN Client Configuration                       | |
| |                 VPN Server Configuration                       | |
| |                 VPN Server Connections                         | |
| +----v(+)------------------------------------------------81%-----+ |
+--------------------------------------------------------------------+
|                           <  OK  >                                 |
+--------------------------------------------------------------------+
```

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



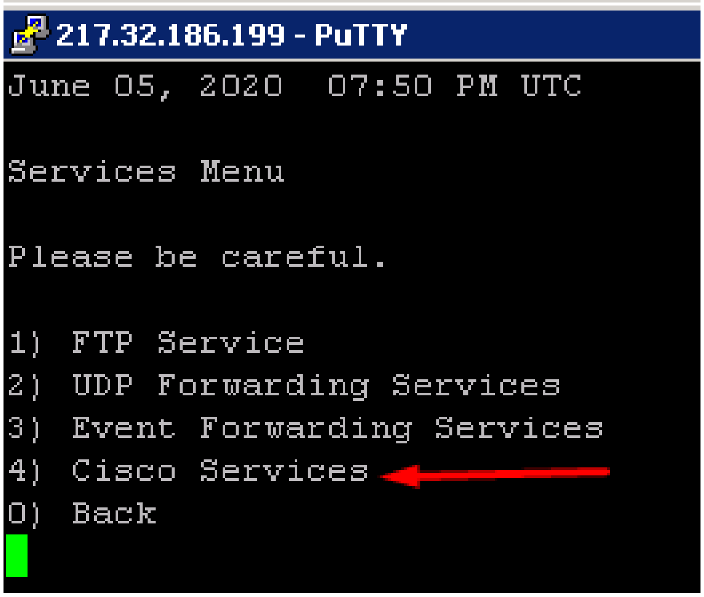
```
217.32.186.199 - PuTTY
June 05, 2020  07:49 PM UTC

Main Menu

Welcome to the Arbitrator(TM) menu.
Please choose from these options.

1) Configure networking
2) Configure out-of-band alerting
3) Advanced
4) Change colors
9) About
0) Quit
```

4. Now press 1.



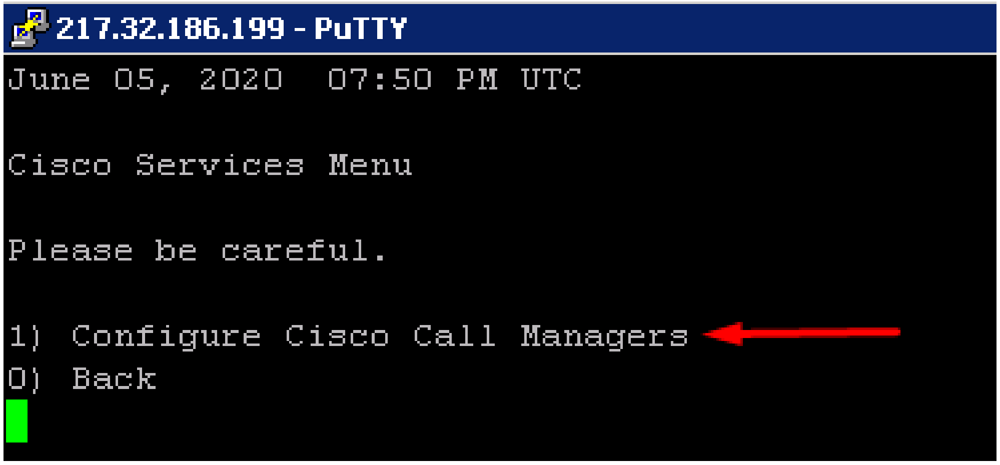
```
Network Menu

Please choose from these options.

1) Configure VPN and SCDTS Fabric settings
2) Configure Direct Arbitrator Connection
3) Configure services
4) Misc
0) Back
```

5. Now press 3.



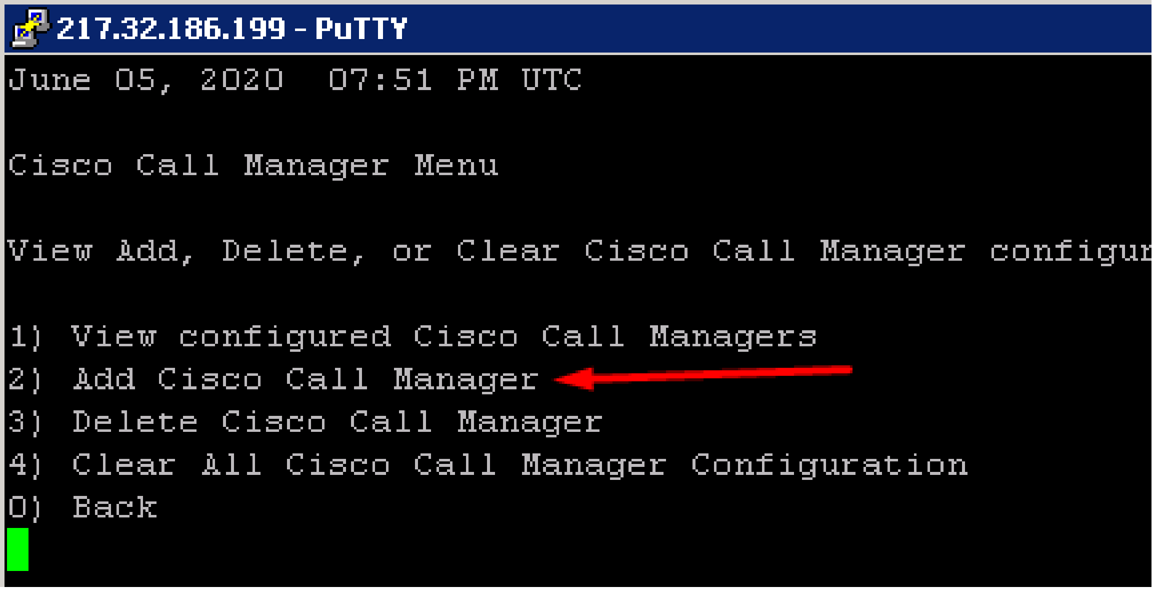
```
217.32.186.199 - PuTTY
June 05, 2020  07:50 PM UTC

Services Menu

Please be careful.

1) FTP Service
2) UDP Forwarding Services
3) Event Forwarding Services
4) Cisco Services
0) Back
```

6. Press 4.



```
217.32.186.199 - PuTTY
June 05, 2020  07:50 PM UTC

Cisco Services Menu

Please be careful.

1) Configure Cisco Call Managers
0) Back
```

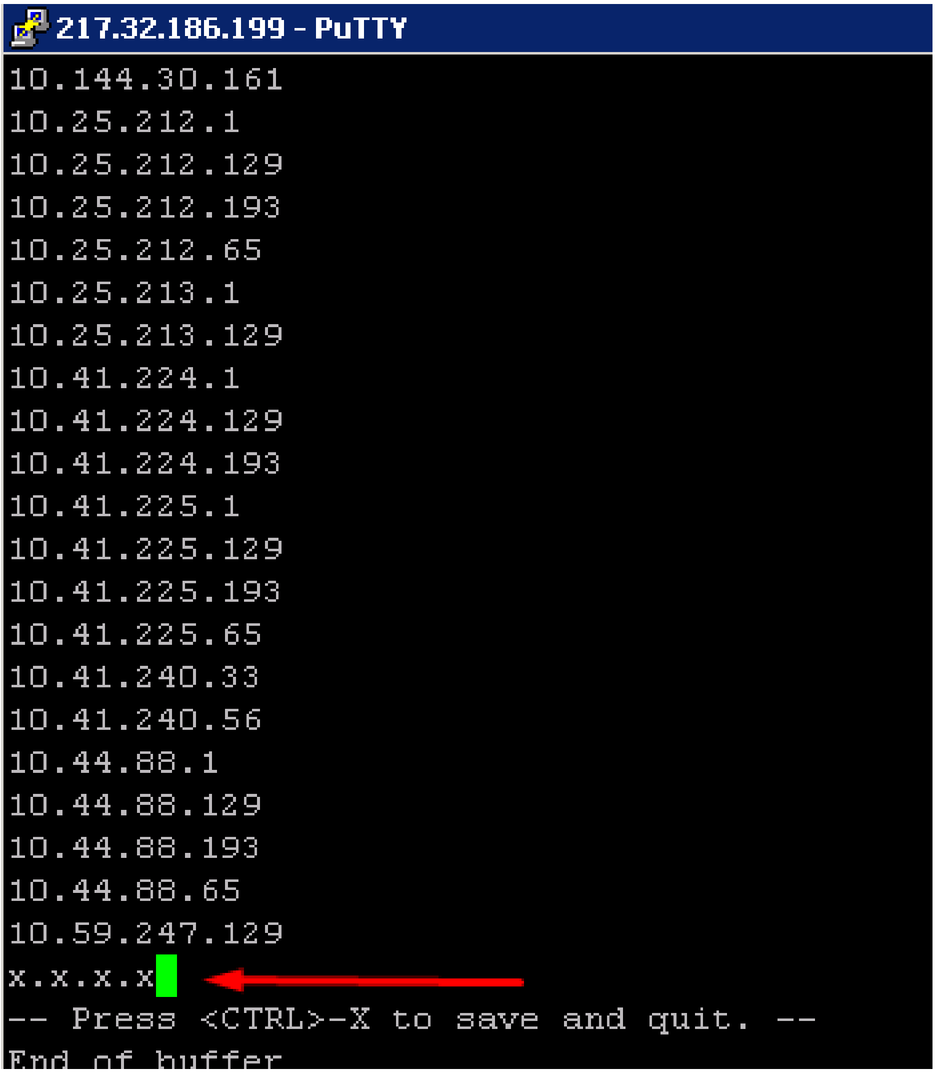
7. Press 1.



```
June 05, 2020  07:51 PM UTC

Cisco Call Manager Menu

View Add, Delete, or Clear Cisco Call Manager configur

1) View configured Cisco Call Managers
2) Add Cisco Call Manager
3) Delete Cisco Call Manager
4) Clear All Cisco Call Manager Configuration
0) Back
```

8. Press 2.

   This will open the screen below.

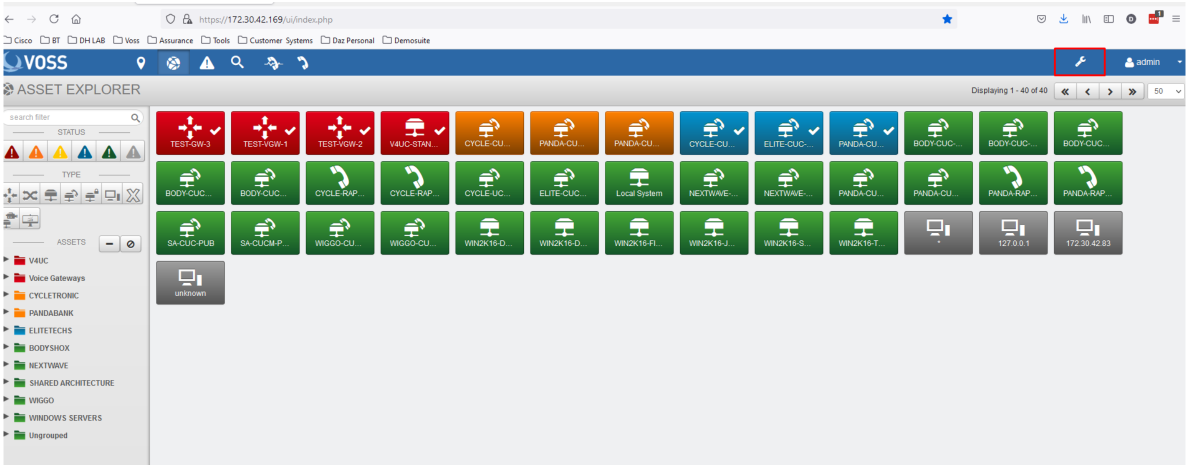


```
10.144.30.161
10.25.212.1
10.25.212.129
10.25.212.193
10.25.212.65
10.25.213.1
10.25.213.129
10.41.224.1
10.41.224.129
10.41.224.193
10.41.225.1
10.41.225.129
10.41.225.193
10.41.225.65
10.41.240.33
10.41.240.56
10.44.88.1
10.44.88.129
10.44.88.193
10.44.88.65
10.59.247.129
x.x.x.x
-- Press <CTRL>-X to save and quit. --
End of buffer
```

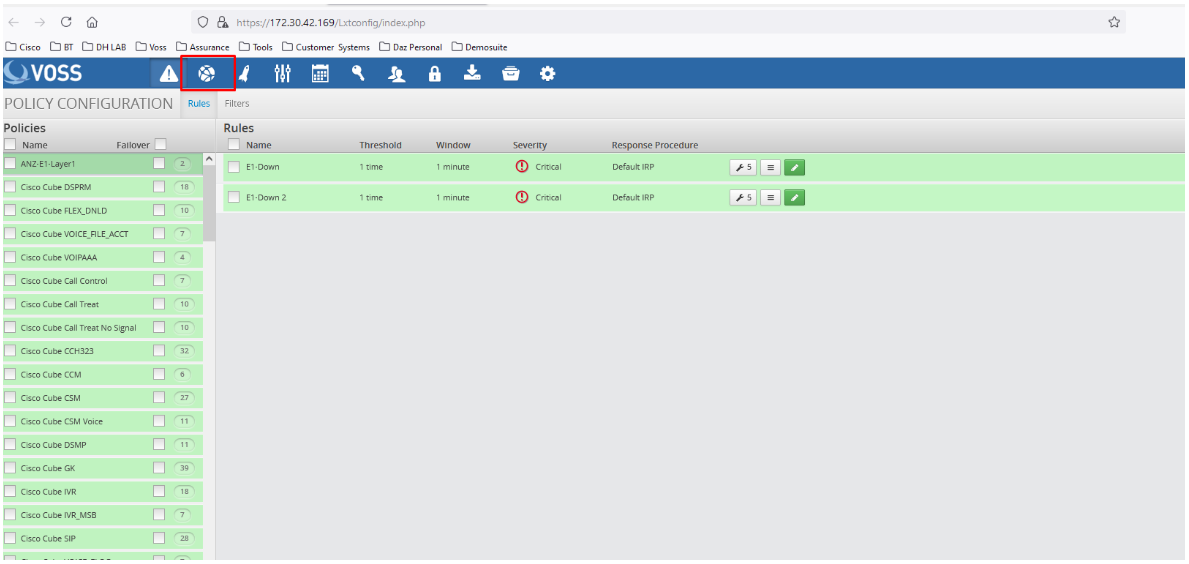
9. Add the IP Address of the call manager then press **<CTRL>-X** to save.

7.1.2. Add Customer Assets

1. Log in to the Arbitrator as admin.



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



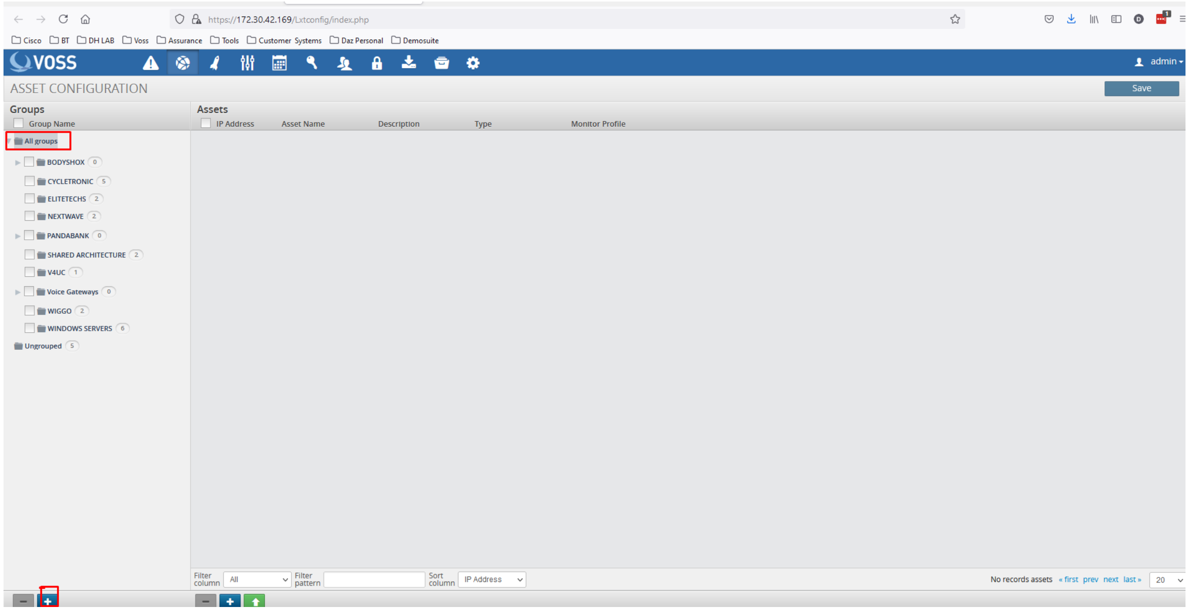
Policies

Name	Failover	
ANZ-E1-Layer1	□	2
Cisco Cube DSPRM	□	18
Cisco Cube FLEX_DNLD	□	10
Cisco Cube VOICE_FILE_ACCT	□	7
Cisco Cube VOIPAAA	□	4
Cisco Cube Call Control	□	7
Cisco Cube Call Treat	□	10
Cisco Cube Call Treat No Signal	□	10
Cisco Cube CCH323	□	32
Cisco Cube CCM	□	6
Cisco Cube CSM	□	27
Cisco Cube CSM Voice	□	11
Cisco Cube DSMP	□	11
Cisco Cube GK	□	39
Cisco Cube IVR	□	18
Cisco Cube IVR_MSB	□	7
Cisco Cube SIP	□	28

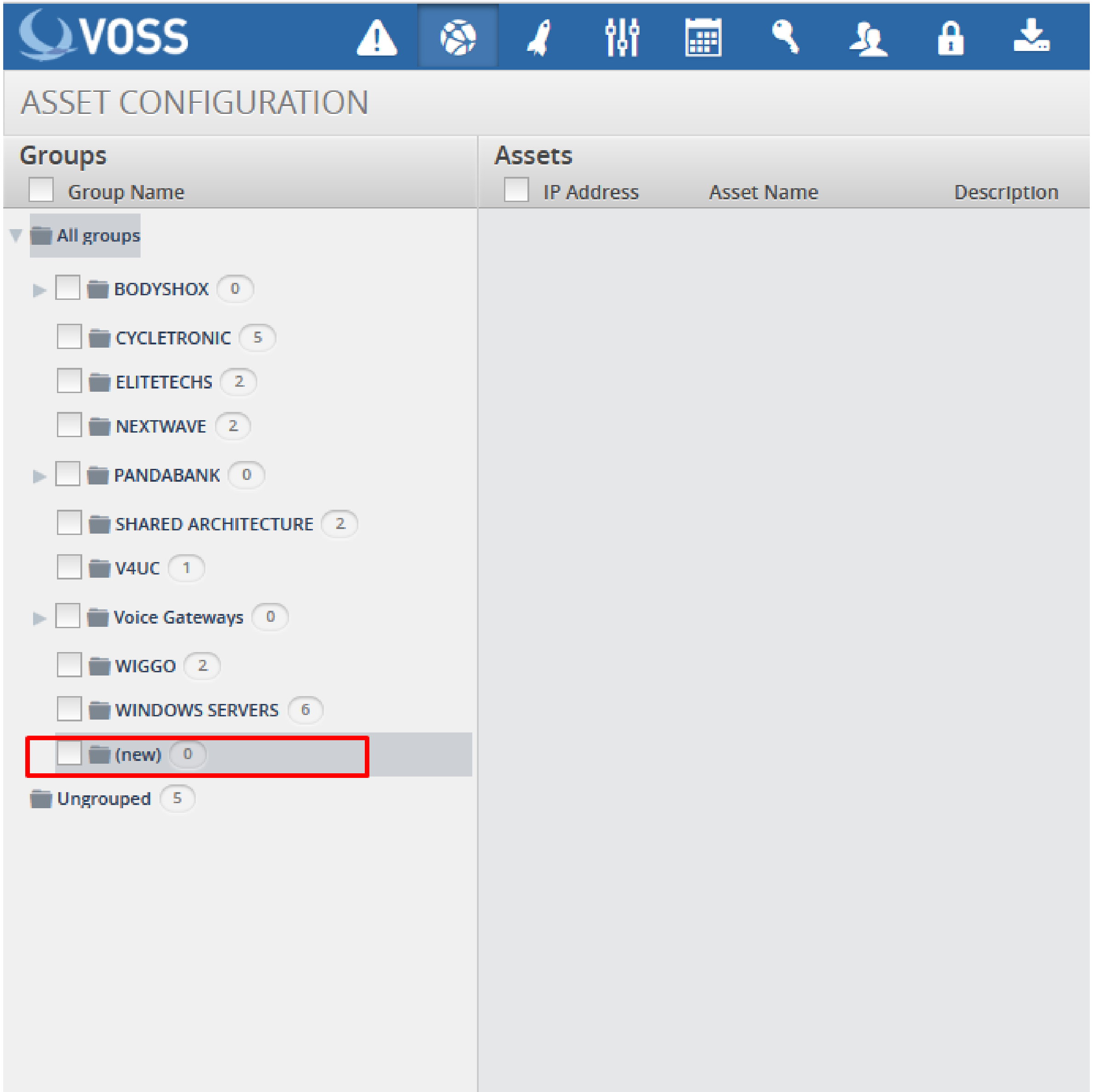
Rules

Name	Threshold	Window	Severity	Response Procedure	
E1-Down	1 time	1 minute	Critical	Default IRP	5
E1-Down 2	1 time	1 minute	Critical	Default IRP	5

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

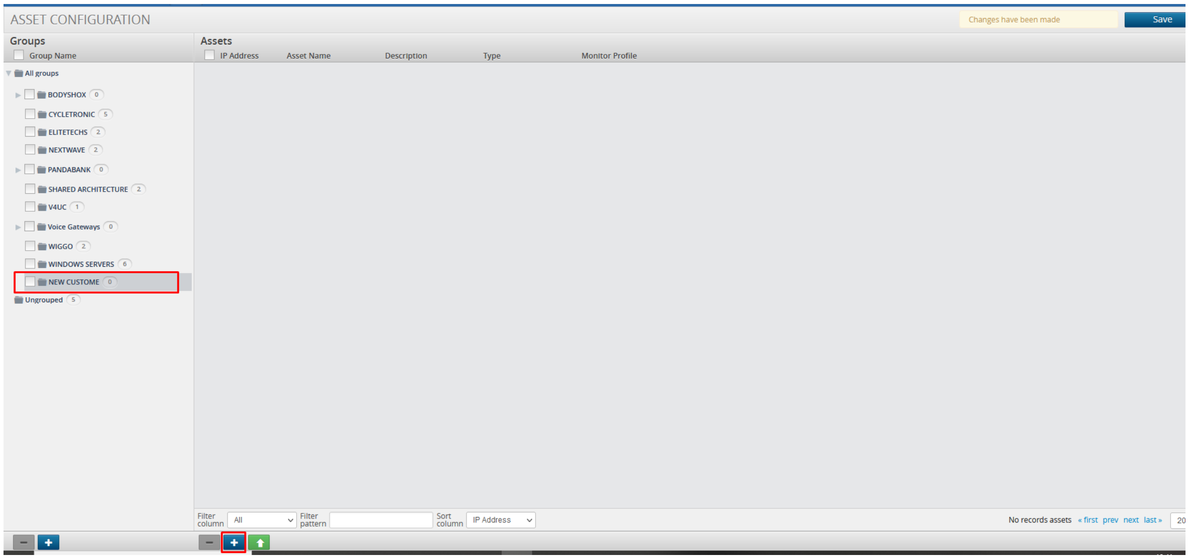


4. With **All groups** selected, click the **+** icon

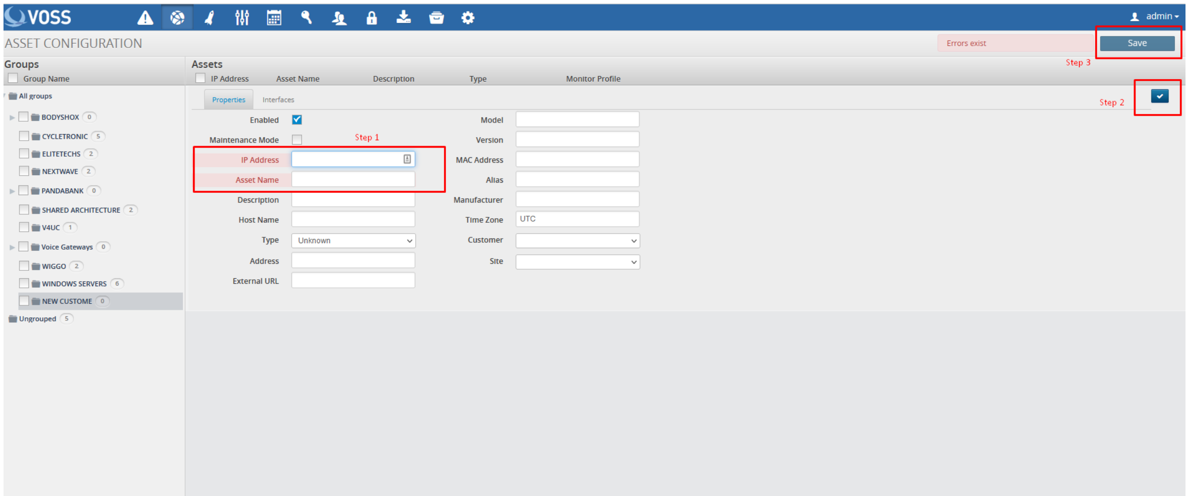


This will create a new folder as shown above.

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



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.

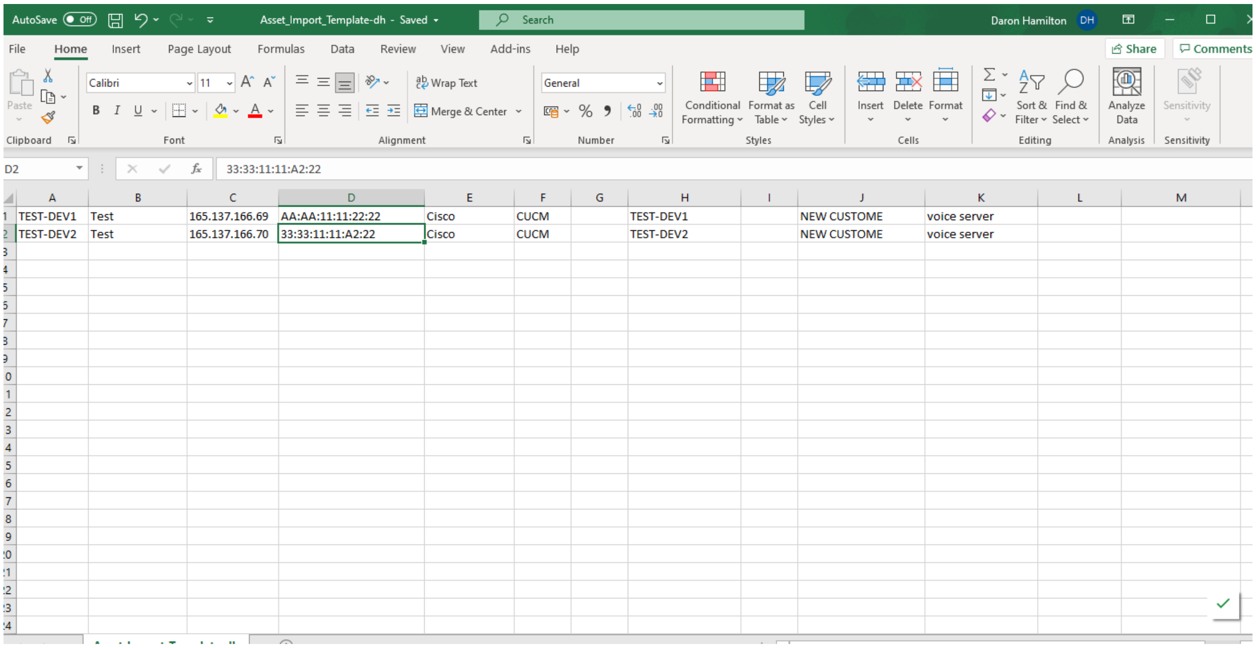
- Step 2 – Click on ✓
- Step 3 – Click **Save**

Repeat the above for all assets you wish to monitor.

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

CSV Import of Assets

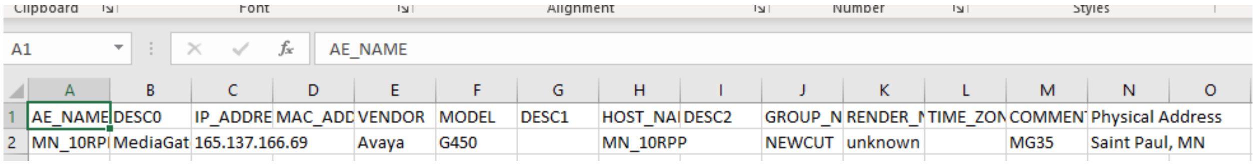
It is possible to upload multiple assets using a CSV file.



D2 33:33:11:11:A2:22

	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.



A1 AE_NAME

	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_	TIME_ZON	COMMEN	Physical Address	
2	MN_10RPI	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.

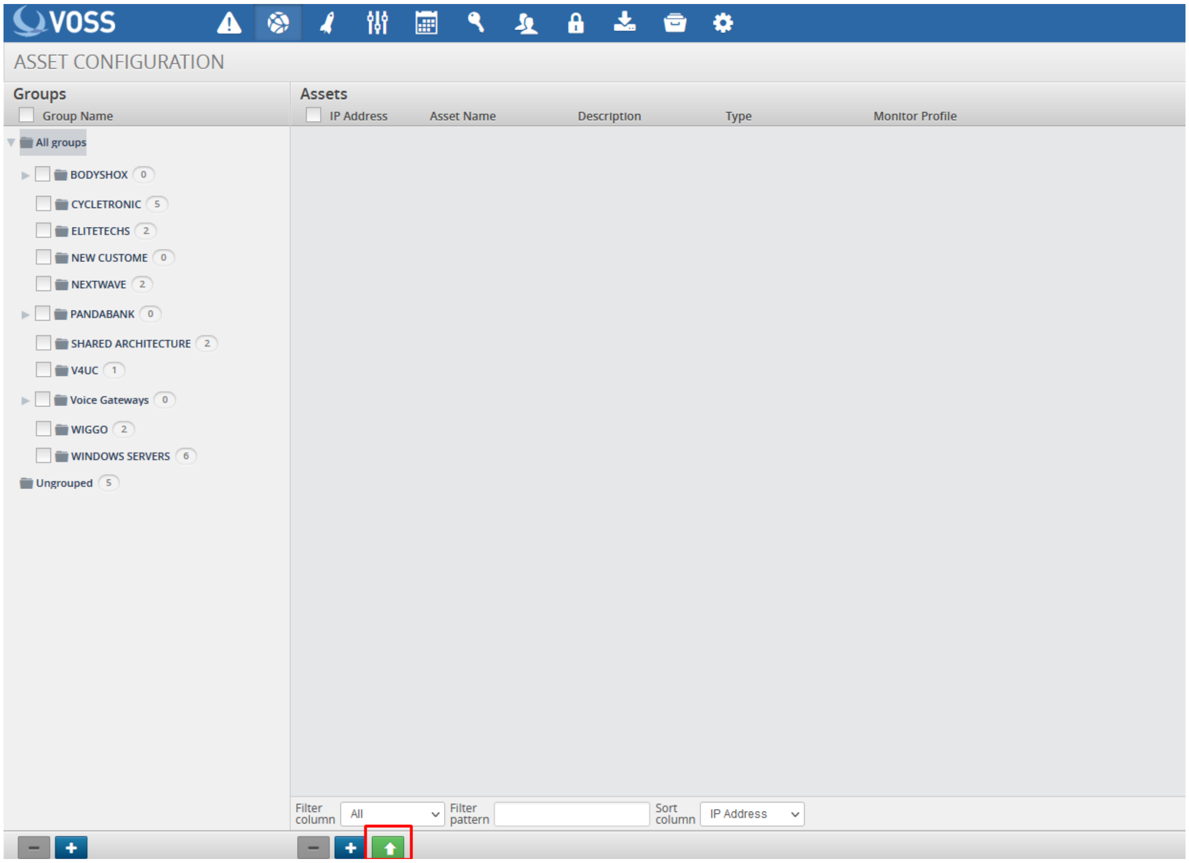
Note:

- 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
voice server
server voice
workstation
phone
```

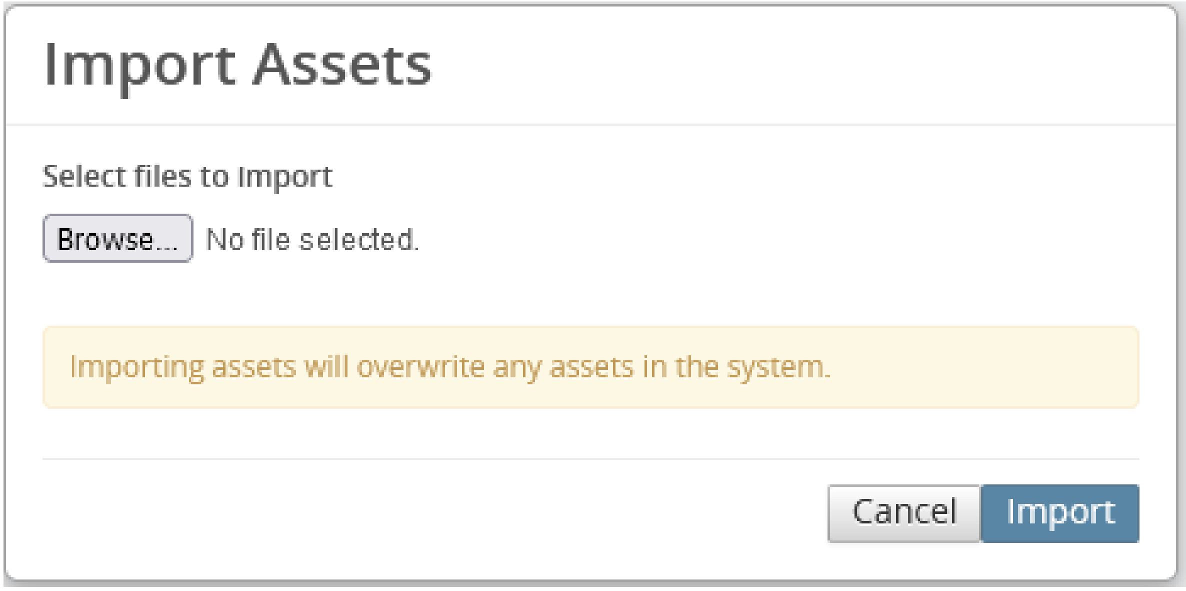
How to Import using CSV

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.



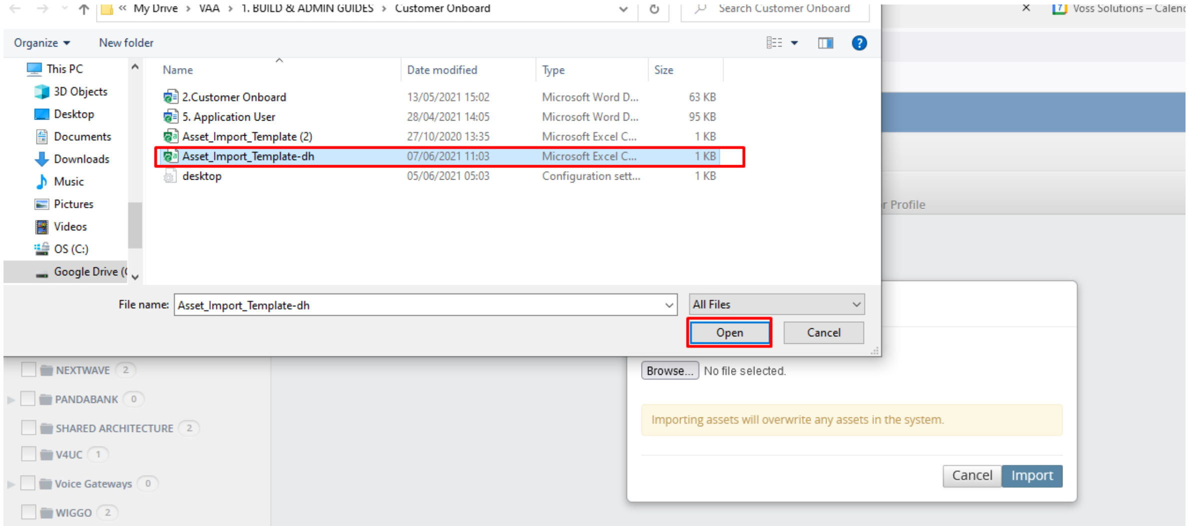
Import Assets

Select files to Import

No file selected.

Importing assets will overwrite any assets in the system.

5. Browse to your csv file.



« My Drive › VAA › 1. BUILD & ADMIN GUIDES › Customer Onboard

Name	Date modified	Type	Size
2.Customer Onboard	13/05/2021 15:02	Microsoft Word D...	63 KB
5. Application User	28/04/2021 14:05	Microsoft Word D...	95 KB
Asset_Import_Template (2)	27/10/2020 13:35	Microsoft Excel C...	1 KB
Asset_Import_Template-dh	07/06/2021 11:03	Microsoft Excel C...	1 KB
desktop	05/06/2021 05:03	Configuration sett...	1 KB

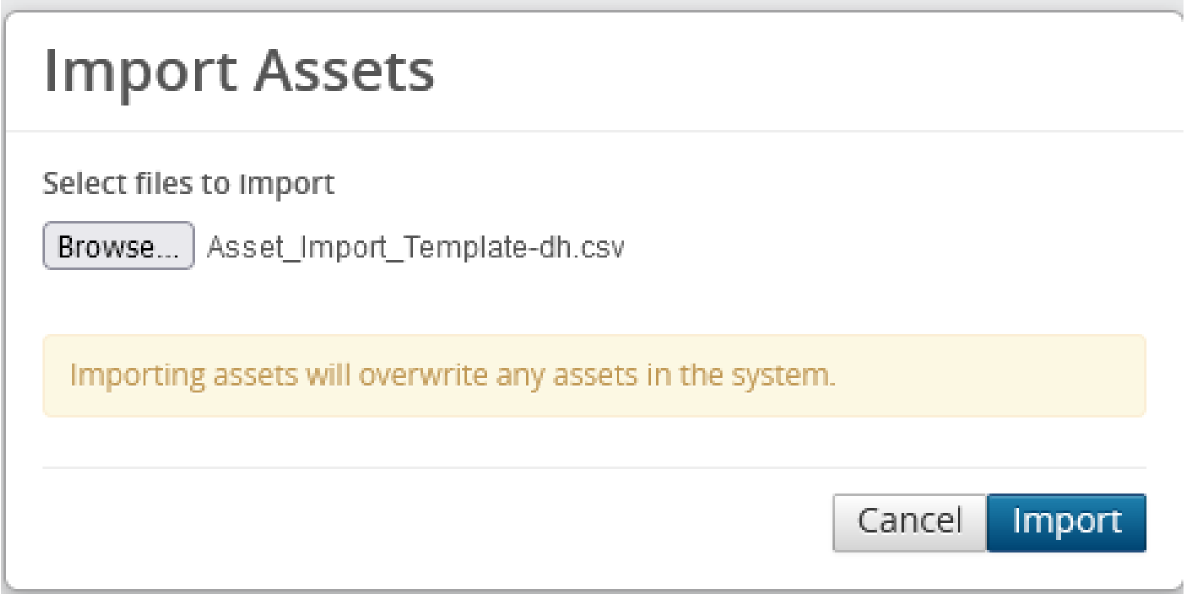
File name: Asset_Import_Template-dh

All Files

No file selected.

Importing assets will overwrite any assets in the system.

6. Click **Open**.



Import Assets

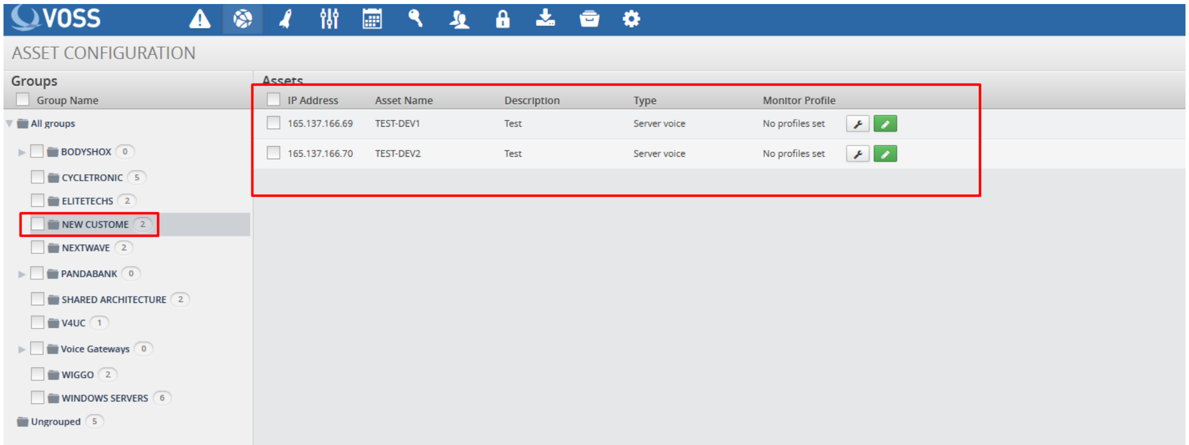
Select files to Import

Asset_Import_Template-dh.csv

Importing assets will overwrite any assets in the system.

7. Click **Import**

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



ASSET CONFIGURATION

Groups

□ Group Name	
All groups	
□ BODYSHOX	0
□ CYCLETRONIC	5
□ ELITETECHS	2
□ NEW CUSTOME	2
□ NEXTWAVE	2
□ PANDABANK	0
□ SHARED ARCHITECTURE	2
□ V4UC	1
□ Voice Gateways	0
□ WIGGO	2
□ WINDOWS SERVERS	6
Ungrouped	5

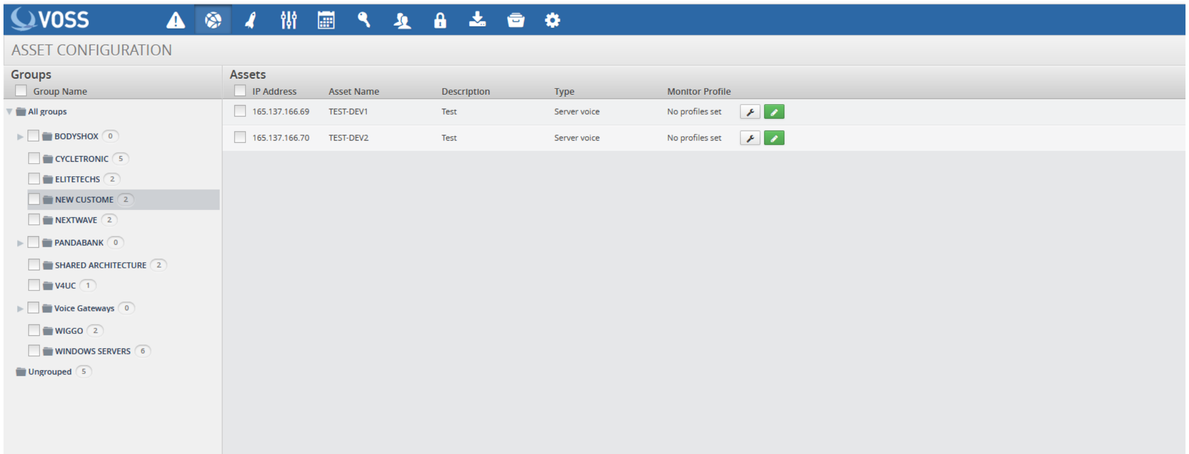
Assets

□ IP Address	Asset Name	Description	Type	Monitor Profile
□ 165.137.166.69	TEST-DEV1	Test	Server voice	No profiles set
□ 165.137.166.70	TEST-DEV2	Test	Server voice	No profiles set

7.1.3. Assigning Probes to Assets

Assign Standard Probes

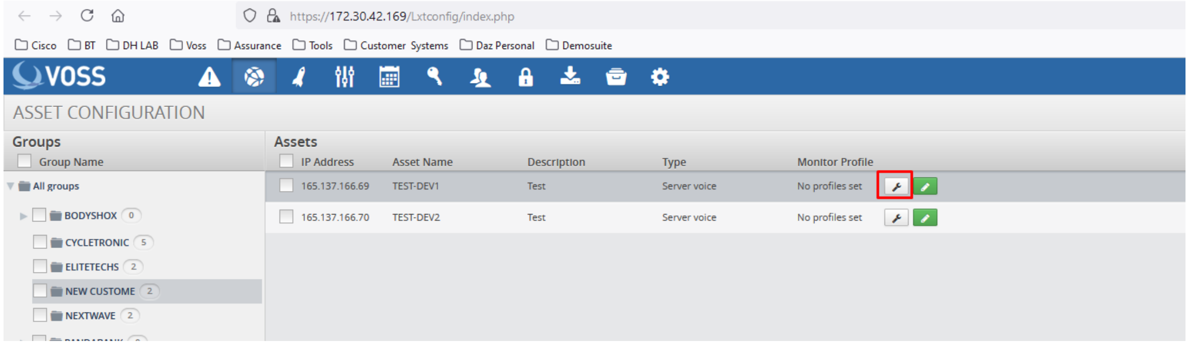
1. Log in to the Arbitrator with admin privileges.
2. Click on the 🔧 to open the configuration screen.
3. Click on the 🌐 to open the Asset Configuration screen.
4. Select the Asset Group that contains the assets you wish to configure



□ Group Name
All groups
□ BODYSHOX 0
□ CYCLETRONIC 5
□ ELITETECHS 2
□ NEW CUSTOME 2
□ NEXTWAVE 2
□ PANDABANK 0
□ SHARED ARCHITECTURE 2
□ V4UC 1
□ Voice Gateways 0
□ WIGGO 2
□ WINDOWS SERVERS 6
Ungrouped 5

□	IP Address	Asset Name	Description	Type	Monitor Profile
□	165.137.166.69	TEST-DEV1	Test	Server voice	No profiles set
□	165.137.166.70	TEST-DEV2	Test	Server voice	No profiles set

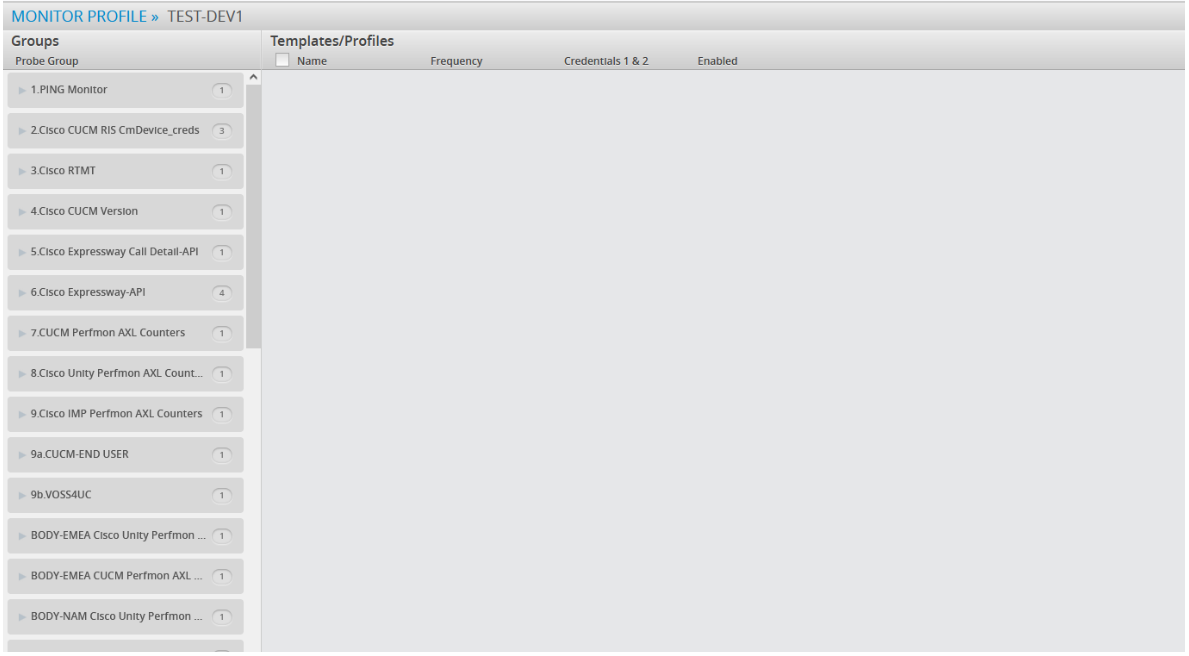
5. Click on the wrench icon as shown below.



□ Group Name
All groups
□ BODYSHOX 0
□ CYCLETRONIC 5
□ ELITETECHS 2
□ NEW CUSTOME 2
□ NEXTWAVE 2

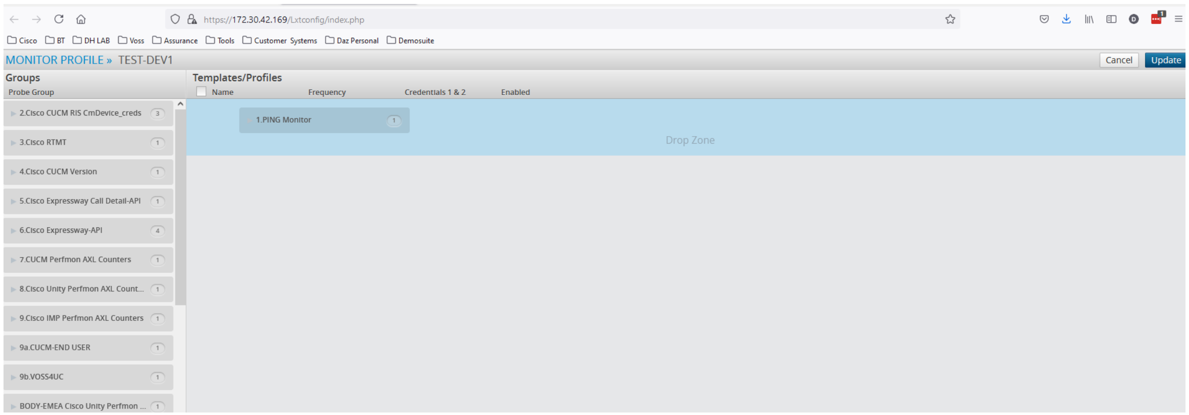
□	IP Address	Asset Name	Description	Type	Monitor Profile
□	165.137.166.69	TEST-DEV1	Test	Server voice	No profiles set
□	165.137.166.70	TEST-DEV2	Test	Server voice	No profiles set

This will then open the Assignment screen.

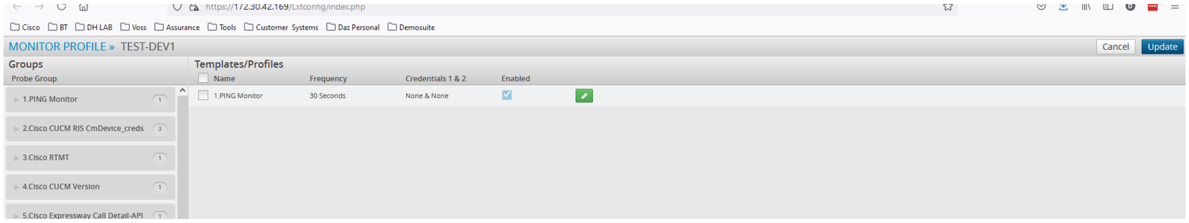


Probe Group
1.PING Monitor 1
2.Cisco CUCM RIS CmDevice_creds 3
3.Cisco RTMT 1
4.Cisco CUCM Version 1
5.Cisco Expressway Call Detail-API 1
6.Cisco Expressway-API 4
7.CUCM Perfmon AXL Counters 1
8.Cisco Unity Perfmon AXL Count... 1
9.Cisco IMP Perfmon AXL Counters 1
9a.CUCM-END USER 1
9b.VOSS4UC 1
BODY-EMEA Cisco Unity Perfmon ... 1
BODY-EMEA CUCM Perfmon AXL ... 1
BODY-NAM Cisco Unity Perfmon ... 1

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


https://172.30.42.169/Lxtconfig/index.php
Cisco
BT
DH LAB
Voss
Assurance
Tools
Customer Systems
Daz Personal
Demosuite
MONITOR PROFILE » TEST-DEV1
Cancel
Update
Groups
Probe Group
2.Cisco CUCM RIS CmDevice_creds 3
3.Cisco RTMT 1
4.Cisco CUCM Version 1
5.Cisco Expressway Call Detail-API 1
6.Cisco Expressway-API 4
7.CUCM Perfmon AXL Counters 1
8.Cisco Unity Perfmon AXL Count... 1
9.Cisco IMP Perfmon AXL Counters 1
9a.CUCM-END USER 1
9b.VOSS4UC 1
BODY-EMEA Cisco Unity Perfmon ... 1
Templates/Profiles
Name
Frequency
Credentials 1 & 2
Enabled
1.PING Monitor 1
Drop Zone

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



Name	Frequency	Credentials 1 & 2	Enabled
□ 1.PING Monitor	30 Seconds	None & None	☑ ✎

8. If you then click on ✎ you can set any time schedules / credentials required for this probe

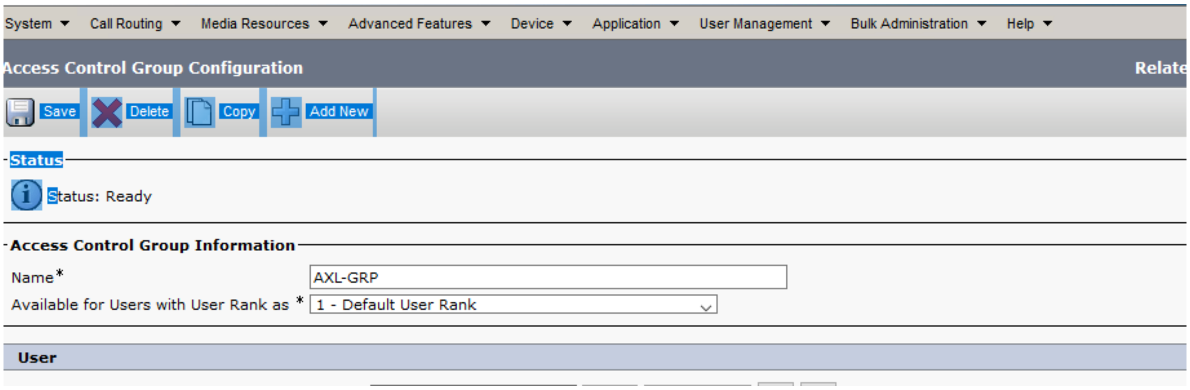
9. Once finished click **Update** and then click **Save**.

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.



Access Control Group Configuration

Status

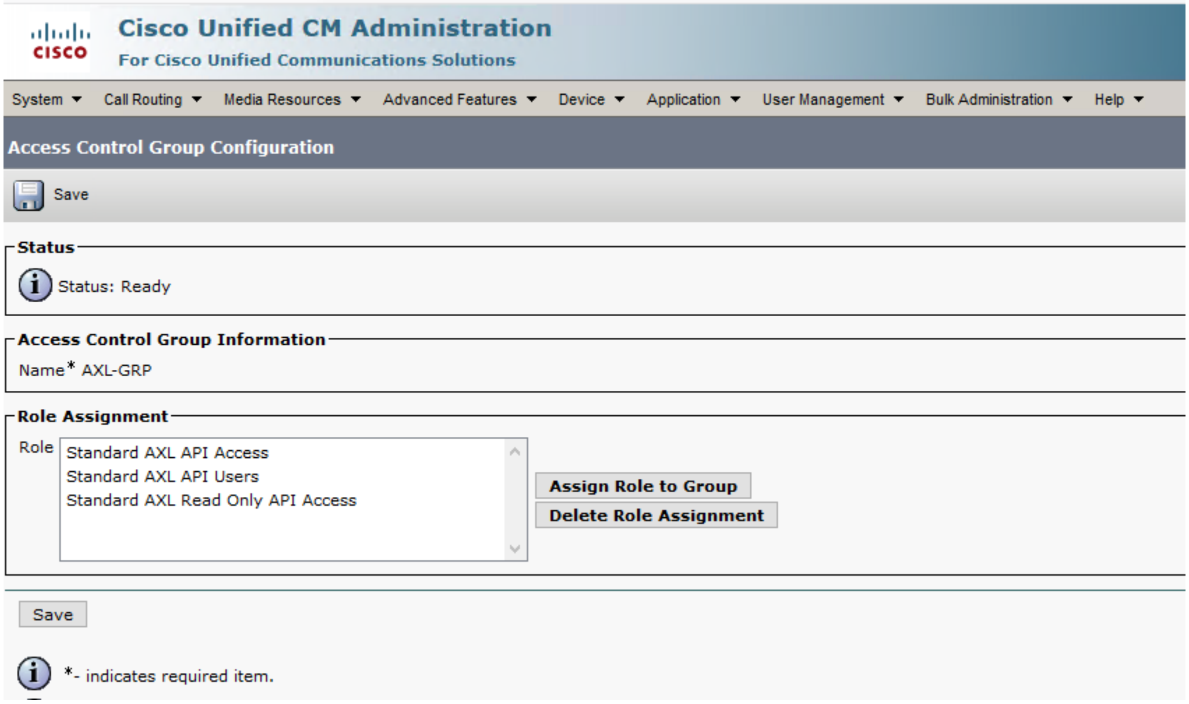
Status: Ready

Access Control Group Information

Name* AXL-GRP

Available for Users with User Rank as * 1 - Default User Rank

4. Add roles to this new group.



Access Control Group Configuration

Status

Status: Ready

Access Control Group Information

Name* AXL-GRP

Role Assignment

Role: Standard AXL API Access, Standard AXL API Users, Standard AXL Read Only API Access

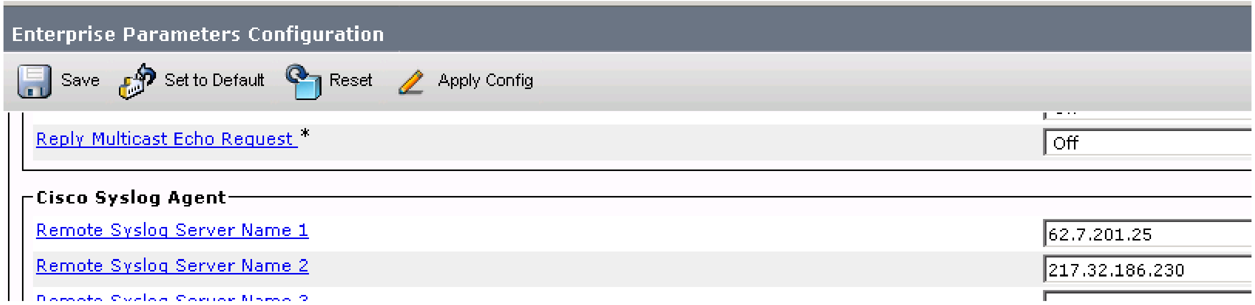
*- indicates required item.

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.



Reply Multicast Echo Request * — Off

Cisco Syslog Agent

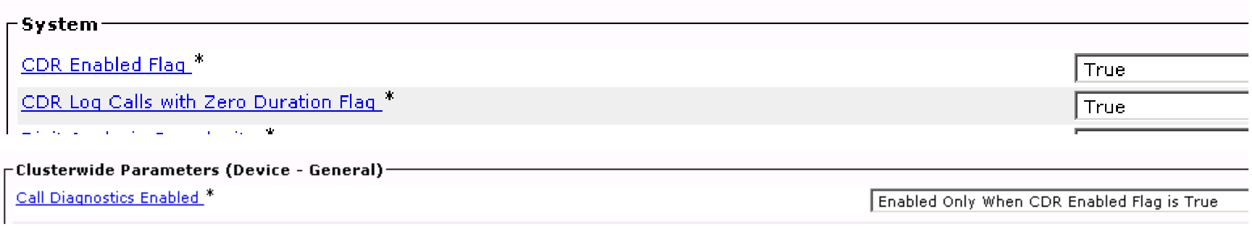
Remote Syslog Server Name 1 — 62.7.201.25

Remote Syslog Server Name 2 — 217.32.186.230

CUCM Service Parameters

Ensure CDR Service Parameters are set:

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



System

CDR Enabled Flag * — True

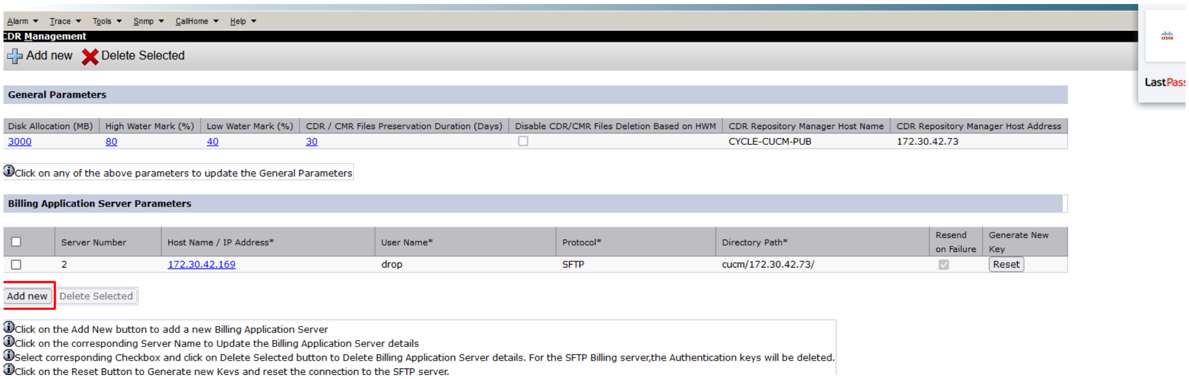
CDR Log Calls with Zero Duration Flag * — True

Clusterwide Parameters (Device - General)

Call Diagnostics Enabled * — Enabled Only When CDR Enabled Flag is True

CUCM Serviceability

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



General Parameters

Disk Allocation (MB)	High Water Mark (%)	Low Water Mark (%)	CDR / CMR Files Preservation Duration (Days)	Disable CDR/CMR Files Deletion Based on HWM	CDR Repository Manager Host Name	CDR Repository Manager Host Address
3000	80	40	30	□	CYCLE-CUCM-PUB	172.30.42.73

ⓘClick on any of the above parameters to update the General Parameters

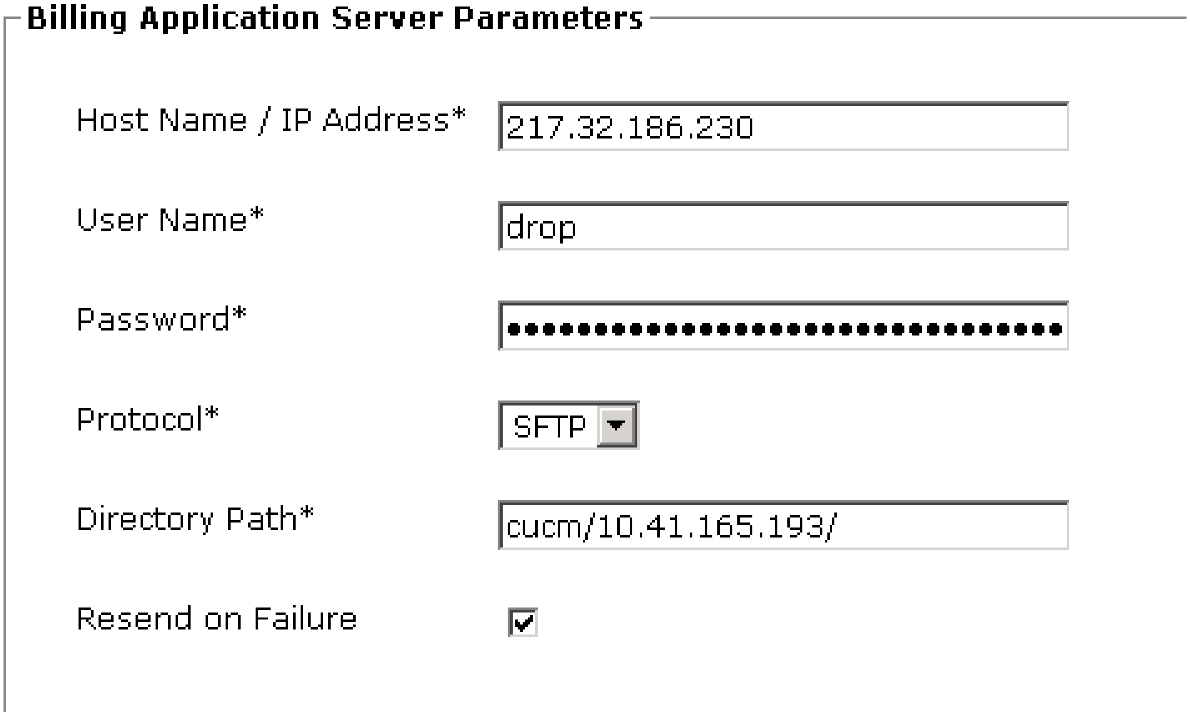
Billing Application Server Parameters

□	Server Number	Host Name / IP Address*	User Name*	Protocol*	Directory Path*	Resend on Failure	Generate New Key
□	2	172.30.42.169	drop	SFTP	cucm/172.30.42.73/	☑	Reset

Add new | Delete Selected

ⓘClick on the Add New button to add a new Billing Application Server
ⓘClick on the corresponding Server Name to Update the Billing Application Server details
ⓘSelect corresponding Checkbox and click on Delete Selected button to Delete Billing Application Server details. For the SFTP Billing server,the Authentication keys will be deleted.
ⓘClick on the Reset Button to Generate new Kevs and reset the connection to the SFTP server.

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



Billing Application Server Parameters

Host Name / IP Address*	217.32.186.230
User Name*	drop
Password*	●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●
Protocol*	SFTP
Directory Path*	cucm/10.41.165.193/
Resend on Failure	☑