



VOSS Insights DS9 for NetFlow Install Guide

Release 23.1

Mar 15, 2023

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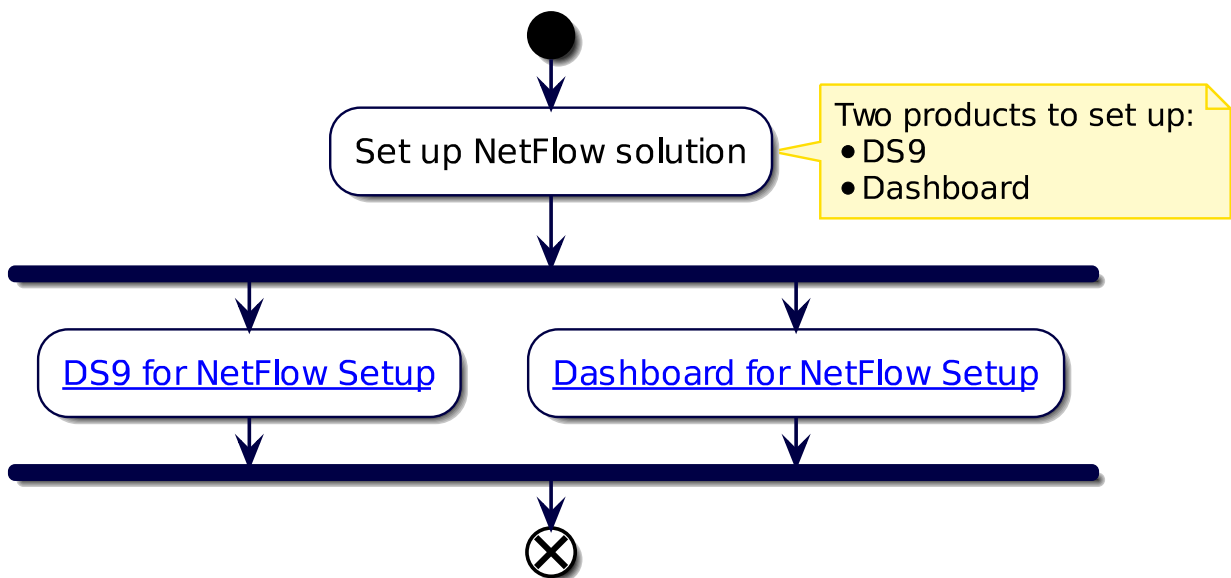
1. What's New

1.1. DS9 for NetFlow Install Guide: Release 23.1

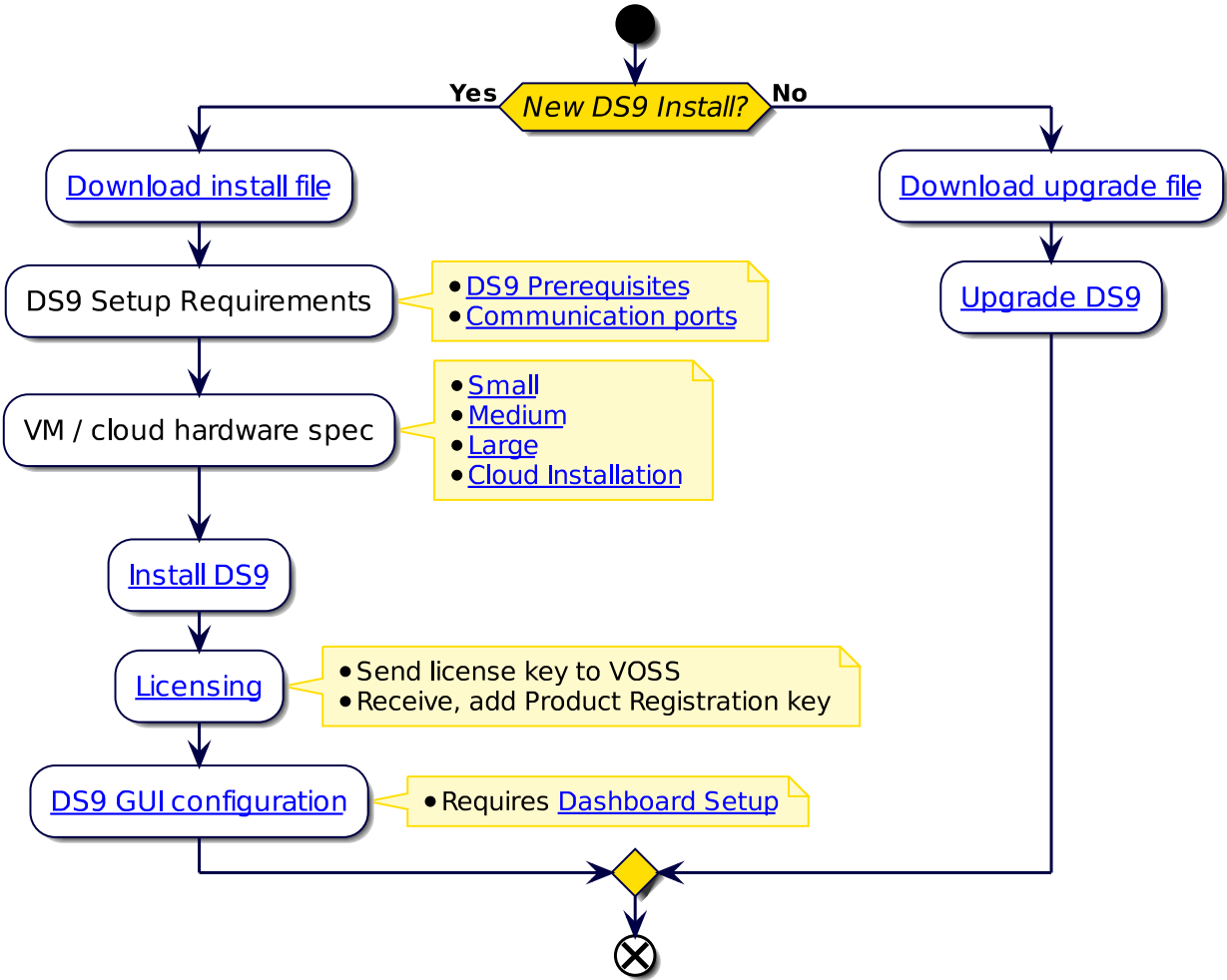
- EKB-14224: Advanced security options for Insights. See: [Deploy and VM Installation Steps](#)
Added installation note that in Apache Config, the SSLCipherSuite defaults to HIGH encryption.
- EKB-15117: Enhancement to add ssh_config menu and ssh_config override. See: [Deploy and VM Installation Steps](#)
Added details on SSH Config step and menu.

2. NetFlow Quickstart

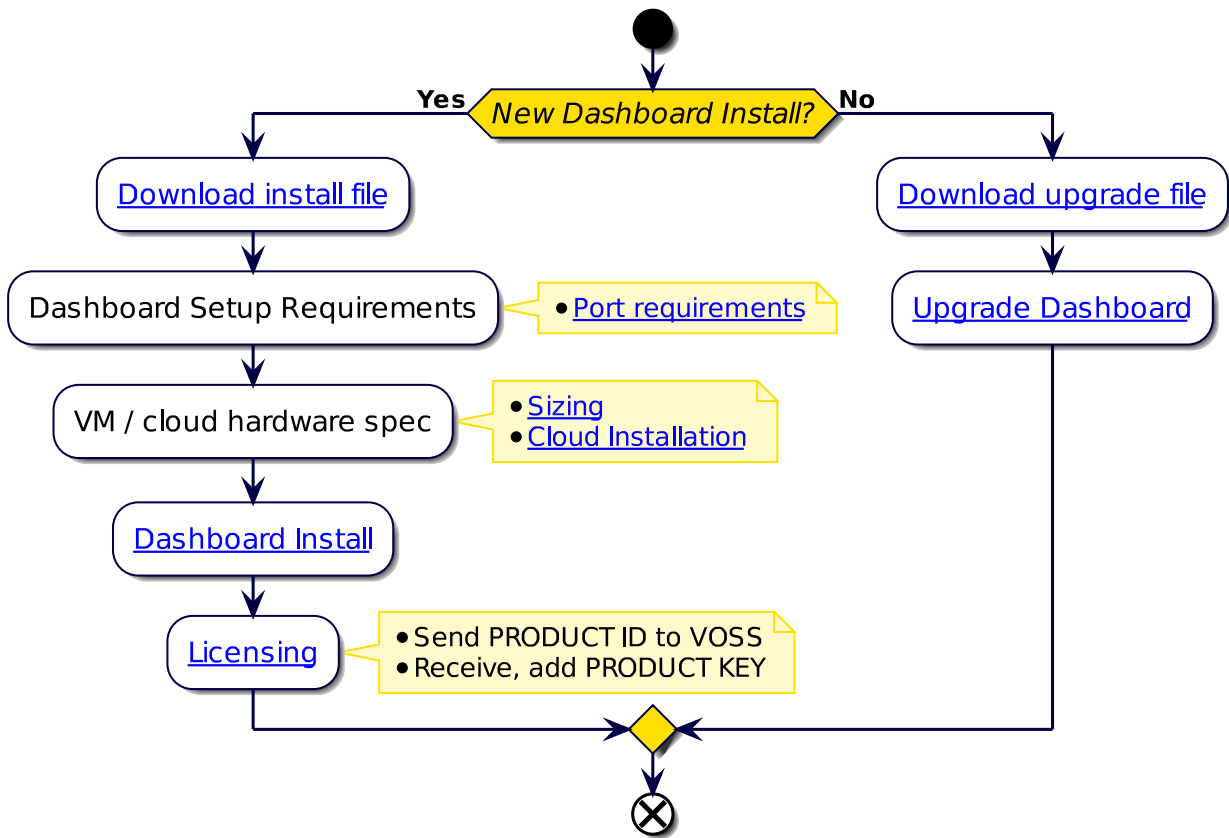
2.1. NetFlow Setup Overview



2.1.1. DS9 for NetFlow Setup



2.1.2. Dashboard for NetFlow Setup



2.2. NetFlow Solution Documentation

2.2.1. Additional Reference Documentation

- Dashboard Release Notes
- Compatibility Matrix
- Dashboard Install Guide
- Dashboard and Arbitrator Maintenance and Upgrade Guide
- Dashboard Administration Guide
- Dashboard API Guide
- Platform Guide

3. DS9 Download

- DS9 OVA file:
 1. Log in on the [VOSS Customer Portal](#)
 2. Go to **Downloads > VOSS Insights > Insights DS9 Hawaii > <release number> > New Installation.**
 3. Download the .ova file
- DS9 upgrade file:
 - a. Log in on the [VOSS Customer Portal](#)
 - i. Go to **Downloads > VOSS Insights > Insights DS9 Hawaii > <release number> > Upgrade.**
 - ii. Download the .lxsp upgrade file

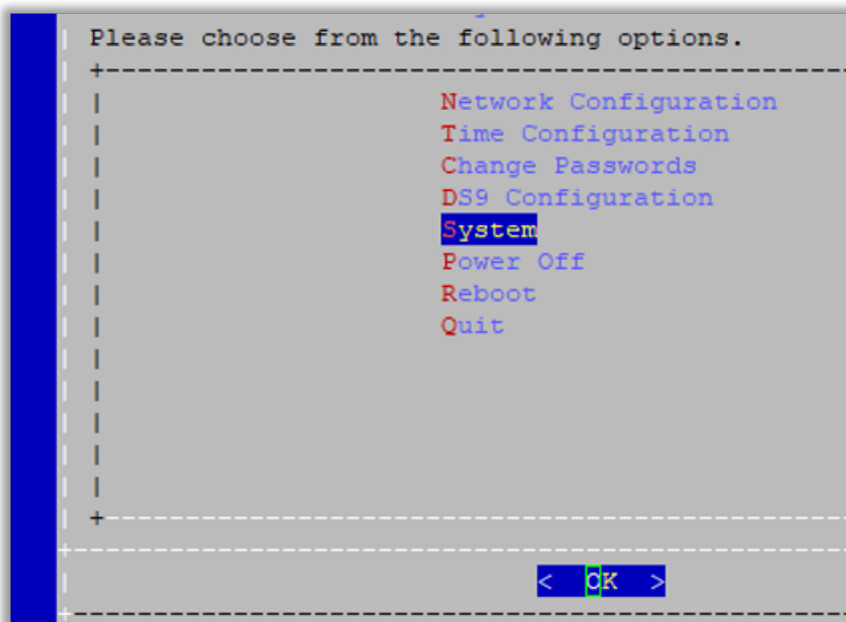
or

- b. Use the direct link - for automated download mechanisms:
 - i. <http://www.layerxtech.com/downloads/ds9/updates/layerX-lxtds9-hawaii-sp1-sp22.1.lxsp>

To ensure continuity, the release updates will still be available from the LayerX download site, allowing customers to either download files manually, or via the automated download mechanisms from that location.

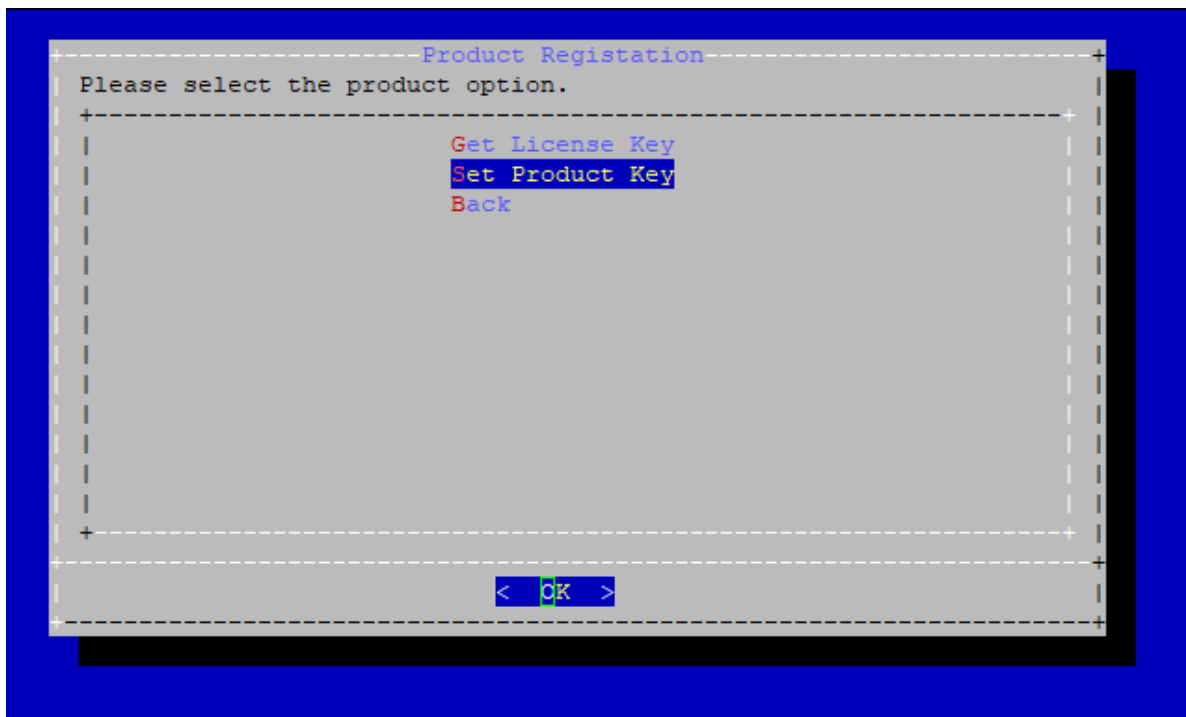
4. VOSS Insights DS9 for NetFlow Product Registration

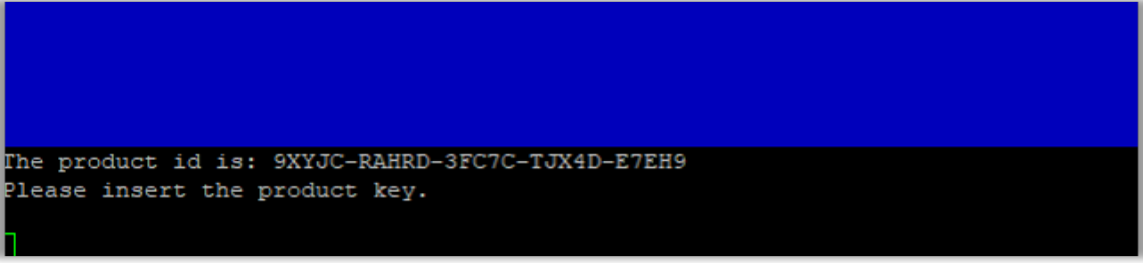
1. Connect to the DS9 server using an SSH client on port 22 and login using the admin credentials to access the **Administration** menu.
2. Select the **System > Product Registration** menu.





3. Select the **Set Product Key** option to input the Product Key.



A terminal window with a blue header bar. The text displayed is: "The product id is: 9XYJC-RAHRD-3FC7C-TJX4D-E7EH9" followed by "Please insert the product key." on the next line. A green cursor is visible at the start of the second line.

```
The product id is: 9XYJC-RAHRD-3FC7C-TJX4D-E7EH9
Please insert the product key.
```

4. Paste the Product Key into the interface and hit <Enter> to update the licensing expiration on the DS9 Netflow server.
5. Once returned back to the **Product Registration** menu, select **Back** to navigate back to the **Administration** menu then select **Quit** to exit the interface and close the SSH session.

5. VOSS Insights DS9 for NetFlow Base Environment Installation

5.1. VOSS Insights DS9 Standalone Installation

VOSS Insights DS9 is a standalone single server to collect, process and store NetFlow-v5/v9/v10 and SNMP data. Visualization of the data will be handled via the VOSS Insights Dashboard reporting.

5.1.1. Assumptions

- Host machines will be located within the same sub-network
- All the required TCP/UDP ports are open between DS9, Dashboard and NetFlow sources.
 - TCP: 5432 - 8082
 - UDP Depending on desired vflow: 2055 - 9996 - 4739 There is no redundancy requirement for any of the components
- Internet access is available to the DS9 system during installation.
After the installation, no internet access is necessary.
- Customer premises equipment is sending NetFlow data to Collector successfully Collector can access customer premises equipment via SNMP v1/2/3 successfully

5.1.2. Installation

Items that will be needed during configuration:

1. Hostname
2. Dashboard Reporter IP
3. For each NetFlow device added:
 - IP of device interface sending NetFlow to the DS9
 - NetFlow version
 - SNMP version
 - v1 or v2c - community string

- v3 - user name, user password, and encryption key
- NAT IP address (often same as IP)

6. Preparing a Production Environment for VOSS NetFlow Solution

6.1. Abstract

This guide is an overview of all the action items that need to be completed by system administrators before implementation of a successful deployment.

6.2. Checklist

The following action items need to be completed by system administrators before the implementation starts:

ID	Action	Description	Criticality
1	Hardware specifications	The hardware/VM specifications have to meet the requirements defined by VOSS	Critical
2	Software specifications	VOSS Dashboard server is delivered as an OVA which includes an operating system. If this is a VM deployment, the following should be available in customer's VM datastore: <ul style="list-style-type: none"> • Latest OVAs. (Available at VOSS Customer Portal. Log in and select DOWNLOADS.) 	Critical
3	Firewall rules	All the required traffic rules are applied to customer environment based on the firewall matrix provided by VOSS deployment Team.	Critical
4	Internet access	Internet access is enabled for the DS9 during implementation. Once the implementation is over, internet access is no longer required.	Critical
5	Round trip times (RTT)	RTT time between the DS9 and Dashboard Server is not more than 100msec.	Critical
6	NetFlow configuration	NetFlow sources are configured to send their NetFlow data to VOSS DS9 Servers based on the suggested settings by VOSS	Critical
7	SNMP configuration	NetFlow sources are configured with SNMP v1 or 2c or v3.	Critical
8	NetFlow and SNMP details	Following information is provided to VOSS deployment team: <ul style="list-style-type: none"> • Device IP & Hostname and NetFlow version for the NetFlow source(s) • SNMP details for NetFlow source(s) 	Critical
9	Remote access	Some method of remote access is enabled for VOSS deployment team.	Critical
10	Integration to customer environment	Both DS9 and Dashboard Servers have access to customers data infrastructure for the following services: NTP, SMTP, DNS.	Critical
11	Authentication via existing customer resources	Dashboard Servers have access to customers' existing Active Directory/Identity servers to authenticate users via LDAP or SAMLv2.	Optional

6.3. Requirements

The following list of items needs to be provided to VOSS before the deployment:

ID	Action	Description	Criticality
1	IP Addresses for VOSS components	IP addresses & Subnetmasks & Default IP Gateway settings for all the VOSS Host Machines (DS9, Dashboard Servers).	Critical
2	IP Addresses for Data services	IP addresses for the following services: DNS, NTP, SMTP, LDAP/SAMLv2.	Critical
3	Remote access details	VPN access details for VOSS Team to access the DS9 and Dashboard remotely.	Critical
4	Primary and Secondary contact details	Primary and secondary contact details for technical and project management related items.	Critical
5	Email authentication for scheduled reports	SMTP authentication details for smart host servers.	Optional
6	SNMP community strings, versions and other details	SNMP community strings and protocol versions need to be provided to VOSS for successful SNMP queries.	Critical
7	List of NetFlow Sources	Provide VOSS a list of NetFlow sources (routers, switches) with the following details: IP addresses, Make/Model, Software Version, NetFlow version.	Critical
8	List of IP addresses and Hostnames	A CSV or Excel file that maps certain IP addresses to internal hostnames can help VOSS Team to improve the data visualization experience by mapping IP address fields to hostnames.	Optional

7. DS-9 NetFlow VM Sizing Specifications

VOSS Insights DS9 for NetFlow sizing specifications are divided into small, medium and large solutions based on tiers related to the number of flows that need to be supported.

Each solution below includes the VM specifications for both the VOSS Insights DS9 server and the VOSS Insights Dashboard server.

7.1. Small NetFlow Solution

The three small tiers in Flows per Second:

- 1,000
- 5,000
- 10,000

Dashboard Server VM		DS9 NetFlow Collector VM	
Cores	12	Cores	16
Memory GB	32	Memory	64
Disc Storage GB	500	Disc 1 OS in GB	250
SSD provisioned as Thick Eager Zero		Disc 2 Storage in GB	500
		All Discs must be SSDs and Provisioned as Thick Eager Zero	

7.2. Medium NetFlow Solution

Two medium tiers in Flows per Second:

- > 10,000 but <= 25,000
- > 25,000 but <= 50,000

Dashboard Server VM		DS9 NetFlow Collector Bare Metal Server (Dell R740 or Equivalent)	
Cores	16	Cores	16
		CPU Needs to be Intel Gold or better.	
Memory GB	64	Memory	196
Disc Storage GB	500	Disc 1 OS in GB	250
SSD provisioned as Thick Eager Zero		Disc 2 Storage in TB	1,5
		Read Intensive SSDs required	
		Dual Intel 10GB NIC	1
		Intel Quad 1GB NIC	1
		iDRAC Enterprise or Equivalent	
		Dual Power Supplies	

7.3. Large NetFlow Solution

Two large tiers in Flows per Second:

- > 50,000 but <= 100,000
- > 100,000 but <= 200,000

Note: The DS9 Collector requires a minimum of 2 Bare Metal Servers to collect this volume in one location.

Dashboard Server VM		DS9 NetFlow Collector Bare Metal Server 1 (Dell R740 or Equivalent)	
Cores	16	Cores	16
		CPU Needs to be Intel Gold or better.	
Memory GB	64	Memory	196
Disc Storage GB	500	Disc 1 OS in GB	250
SSD provisioned as Thick Eager Zero		Disc 2 Storage in TB	3
		Read Intensive SSDs required	
		Dual Intel 10GB NIC	1
		Intel Quad 1GB NIC	1
		iDRAC Enterprise or Equivalent Dual Power Supplies	
		Dual Power Supplies	

Bare Metal Server 2 (Dell R740 or Equivalent)	
Cores CPU Needs to be Intel Gold or better.	16
Memory	196
Disc 1 Storage in TB	3
Disc 2 Storage in TB	3
Disc 3 Storage in TB	3
Read Intensive SSDs required	
Dual Intel 10GB NIC	1
Intel Quad 1GB NIC	1
iDRAC Enterprise or Equivalent Dual Power Supplies	
Dual Power Supplies	

Note:

- Larger than 200K flows per second requires special pricing and configuration.
- Distributed DS9 collection is available. This may reduce the compute required at each collection location.

8. NetFlow and DS9 Monitoring System Connectivity

8.1. Communication ports between NetFlow Source and DS9

Source	Destination	Protocol	Port	Direction	Description
NetFlow Source	DS9	UDP	4739	Unidirectional	IPFIX (Optional)
NetFlow Source	DS9	UDP	2055	Unidirectional	NetFlow v9 (Optional)
NetFlow Source	DS9	UDP	9996	Unidirectional	NetFlow v5 (Optional)
NetFlow Source	DS9	UDP	6343	Unidirectional	Sflow v5 (Optional)
DS9	NetFlow Source	UDP	161	Unidirectional	SNMP queries

8.2. Communication ports between Dashboard Server Users and Dashboard Server

Source	Destination	Protocol	Port	Direction	Description
Dashboard users	Dashboard Server	TCP	443	Unidirectional	HTTPS (GUI access)

8.3. 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.

8.4. Communication ports that are required for remote management purposes

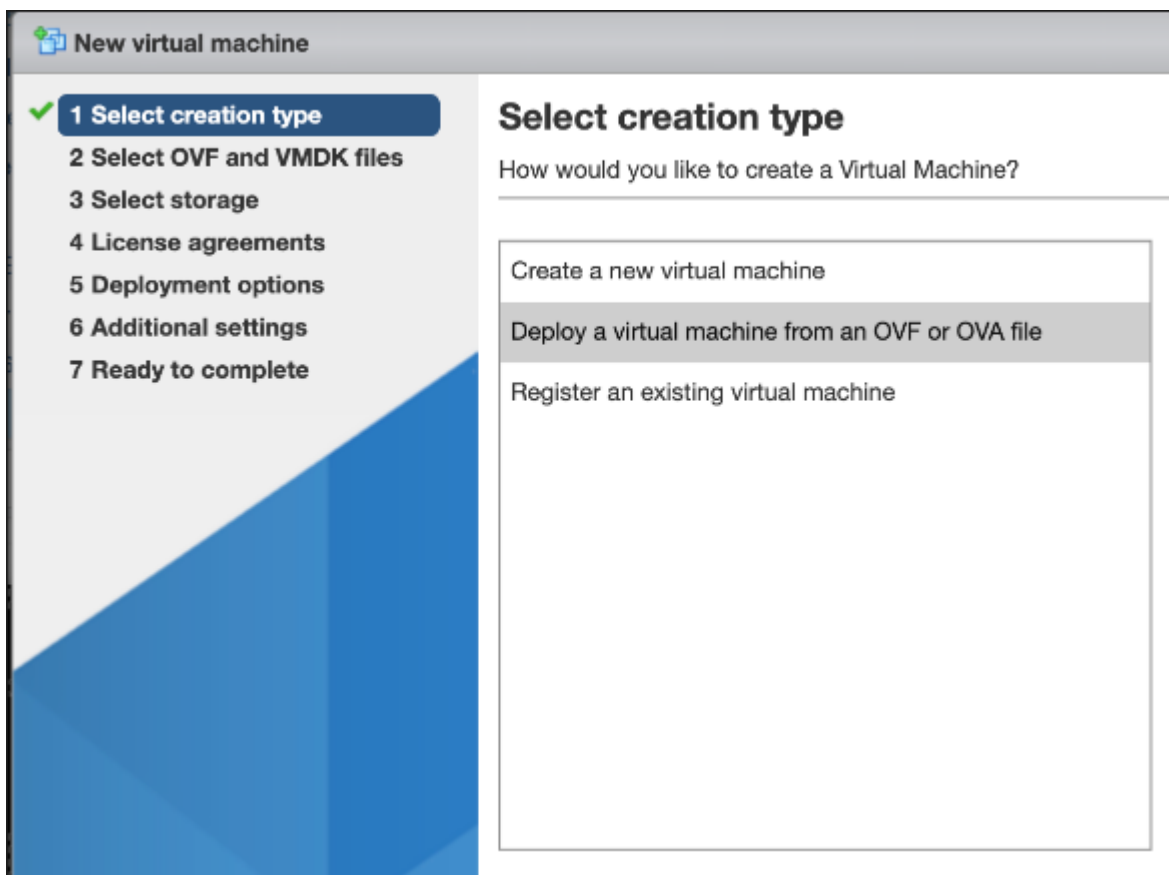
Source	Destination	Protocol	Port	Direction	Description
Dashboard Server	DS9	TCP	5432	Unidirectional	Data respository access
Dashboard Server	DS9	TCP	8082	Unidirectional	Data respository access
Dashboard Server	DS9	TCP	443	Unidirectional	DS9 System Stats and management
DS9	Dashboard Server	UDP	514	Unidirectional	DS9 System Logs

8.4. Communication ports that are required for remote management purposes

Source	Destination	Protocol	Port	Direction	Description
Admin users	DS9	TCP	22	Unidirectional	SSH (remote CLI access) and file transfer
Admin users	Dashboard Server	TCP	22	Unidirectional	SSH (remote CLI access) and file transfer
Admin users	Dashboard Server	TCP	443	Unidirectional	WEB access

9. Deploy and VM Installation Steps

1. Download the OVA for your system to a directory accessible by the VM client.
2. Deploy the OVA:
Select the downloaded OVA file and choose a VM name.



3. Select *storage* according to the recommended hardware specifications for the required configuration. See the *VMWare Specification and Requirements* for your system.
4. Select *network* mappings according to the recommended hardware specifications for the required configuration. See the *VMWare Specification and Requirements* for your system.
5. When you run the VM, you will see `.1xp` packages being installed. This takes a while.

```
Info: install_package : Unpacking /mnt/cd/pkg/iana-etc.lxp
Info: install_package : Unpacking /mnt/cd/pkg/nan-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/dhcpd.lxp
Info: install_package : Unpacking /mnt/cd/pkg/diffutils.lxp
Info: install_package : Unpacking /mnt/cd/pkg/dnapi.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/lsdf.lxp
Info: install_package : Unpacking /mnt/cd/pkg/ndadm.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-SSLey.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
```

6. After all the packages are installed, the VM is automatically powered off.

```
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
DHCPDISCOVER on eth0 to 255.255.255.255 port 67
No DHCP OFFERS received.
Unable to obtain a lease on first try. Exiting.
useradd: user 'admin' already exists
mount: /mnt/target/dev: device is busy
```

You will see the auto-poweroff message on the console.

7. After the system boots, wait at the login: prompt until a banner with an About console display shows displaying values for the placeholders below:

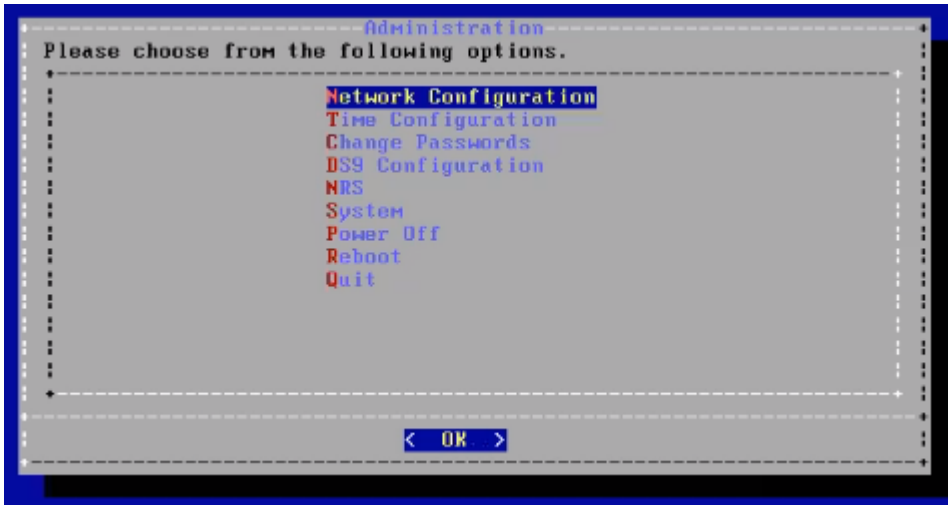
```
-----
                          About
-----
Hostname: <hostname>
Version: <version>
Theme: <theme>
Flavor:
License: NNNNN-NNNNN-NNNNN-NNNNN-NNNNN
Days Licensed: nnnnn
Days Remaining: nnnnn
Product Key:
Website: <website>
Kernel: Linux n.nn.nn-lxt-3 x86_64 GNU/Linux

<hostname> login:
```

8. At the login: prompt, log in as admin with password as the last 10 characters of the License: value, excluding the dash.

Note: Since the Licence key value is only displayed here. When you ssh in it will not be seen. Be sure to copy out your admin password from this console.

9. It is recommended that you now change your password using the **Change Passwords** menu.
10. After login, the **Administration** menu shows, as in the example below for DS9:

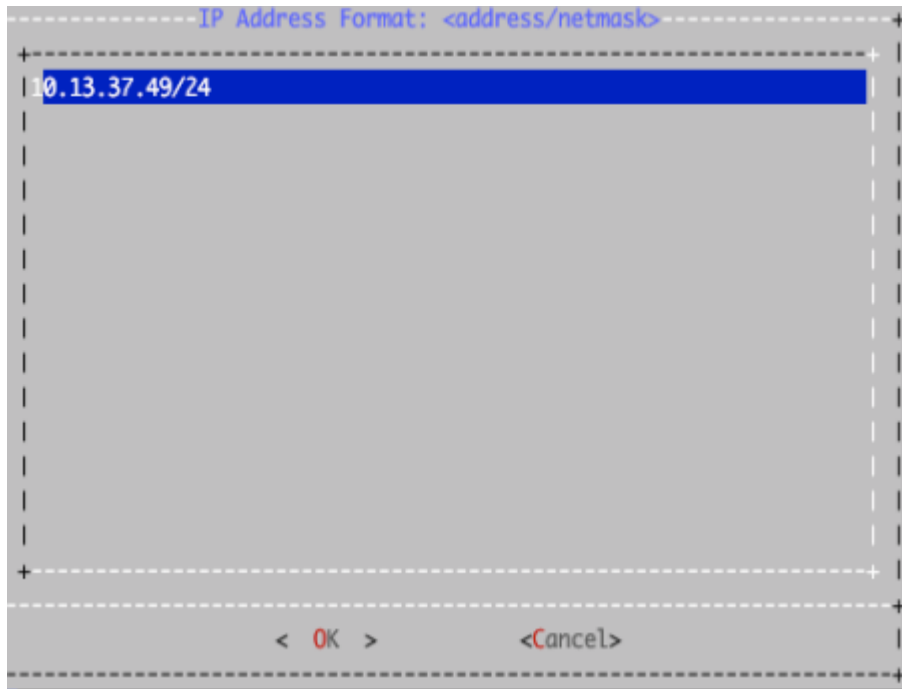


11. Under **Network Configuration**, provide ip/netmask, default gateway and hostname.
 - a. Under **Interface Settings**, select the interface to configure.

Modify the parameters for the selected interface:

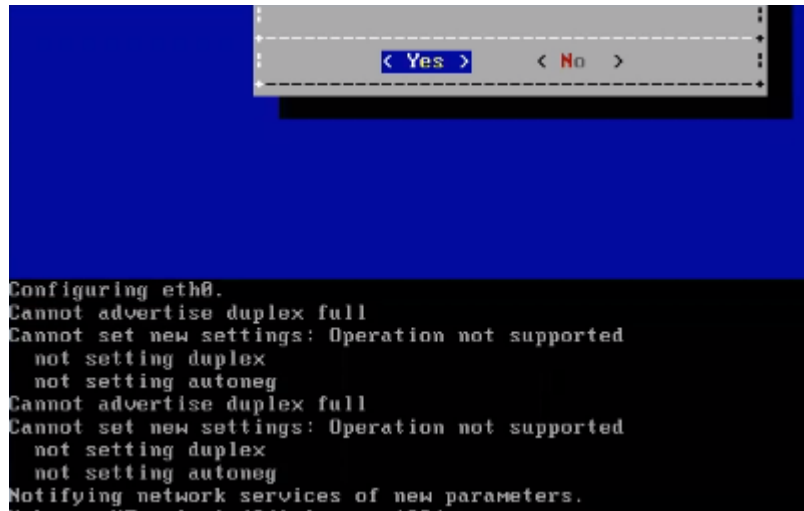


Select **IPs** and set the IP Address and netmask in the format `nn.nn.nn.nn/24` and save.

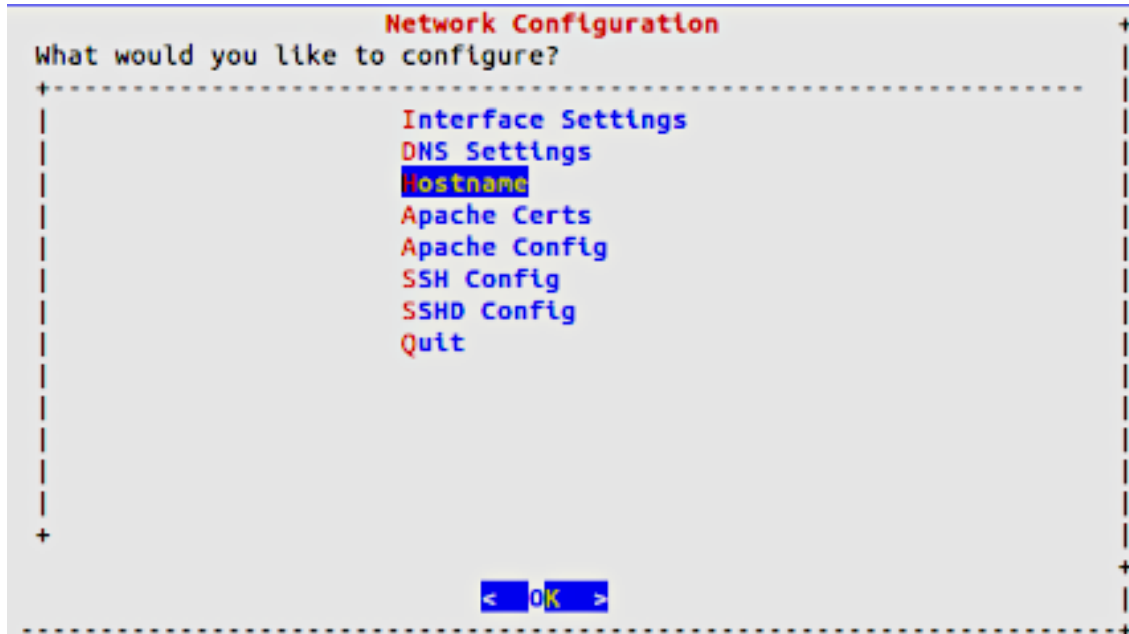


Set up the default gateway under the **Extra Routes** menu.

Be sure to use the format *default <gateway IP address>* for the entry. The word *default* is required. For additional route entries use the *<subnet> <gateway>* format. Similar to what would be done on a Linux system at the CLI.

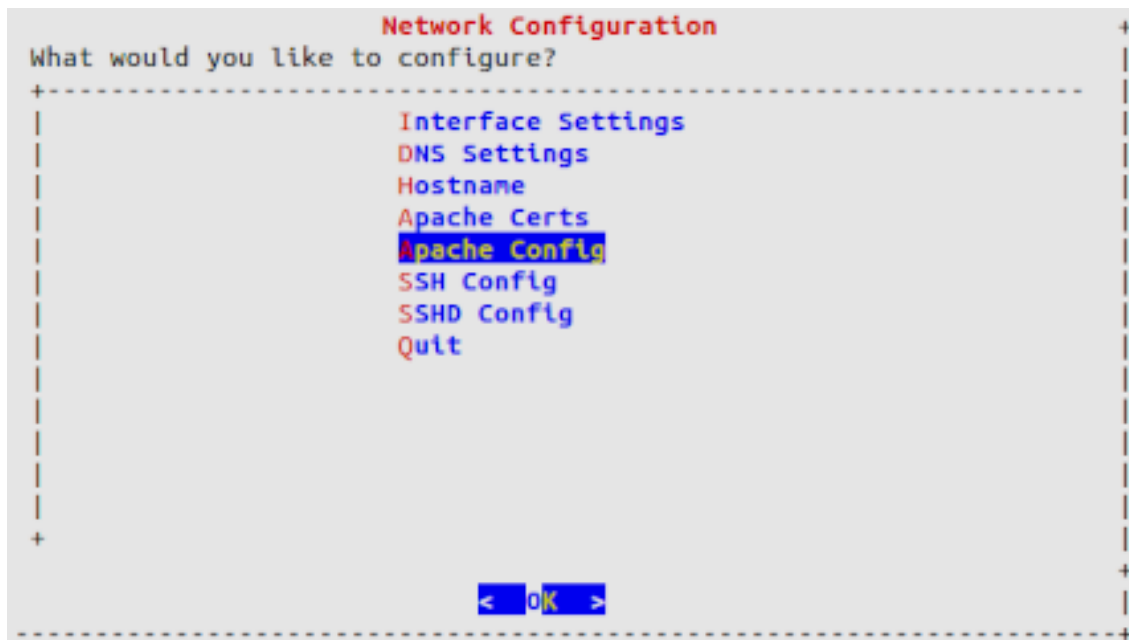


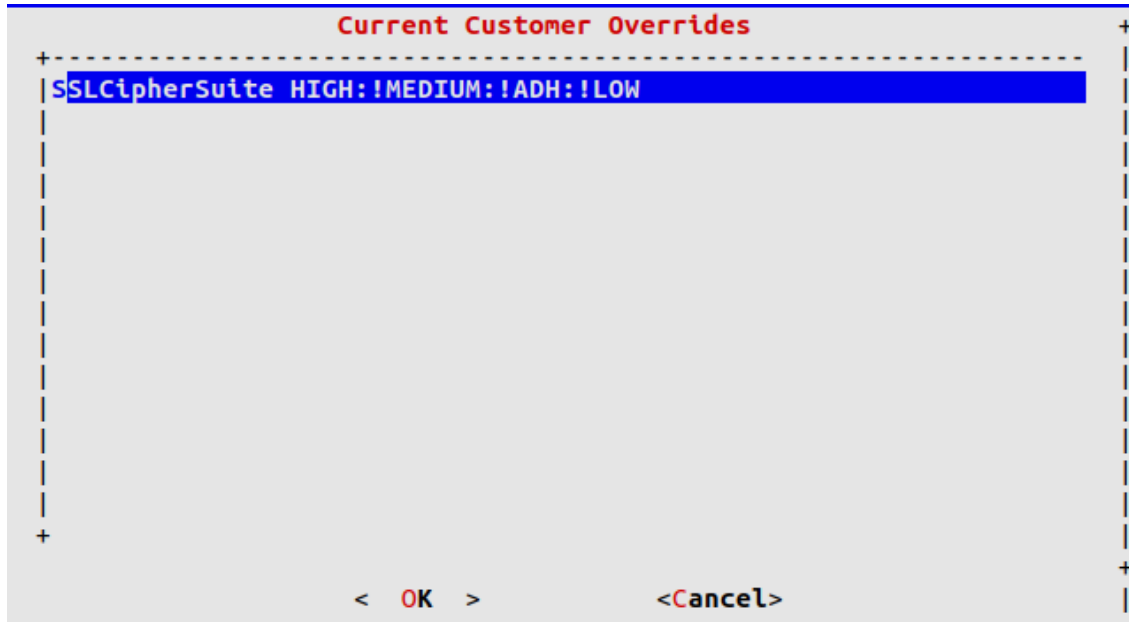
b. Set hostname



The console will show the Updating hosts: message. Note that this setup takes a few minutes.

- c. For **Apache Config**, the SSLCipherSuite defaults to HIGH encryption.





Note:

- For SSLProtocol, only TLSv1.2 is supported.
- OpenLDAP also defaults to HIGH encryption.
- OpenSSH does not support weak ciphers.

- d. For **SSH Config**, custom entries can be added if needed - the following entries have been added:

```
kexalgorithms
diffie-hellman-group14-sha1
diffie-hellman-group-exchange-sha1
hostkeyalgorithms
ssh-rsa
```

- e. For **SSHD Config**, multi-line entries can be added if needed - for example for CUCM v11.5 support. See: [Multi-line CUCM Cipher support](#).

Note: This step is not relevant to the DS9 and Insights NetFlow solution. This step is relevant only to an Insights Assurance solution and its integration with Cisco UC systems.

12. Base system installation is now complete. Select **Quit** to exit the **Administration** menu on the console and continue with product registration and with the configuration of your system through the GUI:

- Insights Dashboard
See the VOSS Automate Database Setup section in the VOSS Insights Install Guide.
- Insights Arbitrator (relevant only to an Insights Assurance solution and its integration with Cisco UC systems)
See the Install Arbitrator System section in the VOSS Insights Install Guide.
- Insights DS9

Note: Prior to opening the DS9 GUI, reboot the system.

See the DS9 Product Registration and Configuration on the Dashboard section in the VOSS Insights DS9 for NetFlow Install Guide.

9.1. Multi-line CUCM Cipher support

This section provides details for the use of the **SSHD Config** menu option.

Note: This section is not relevant to the DS9 and Insights NetFlow solution. This solution is relevant only to an Insights Assurance solution and its integration with Cisco UC systems.

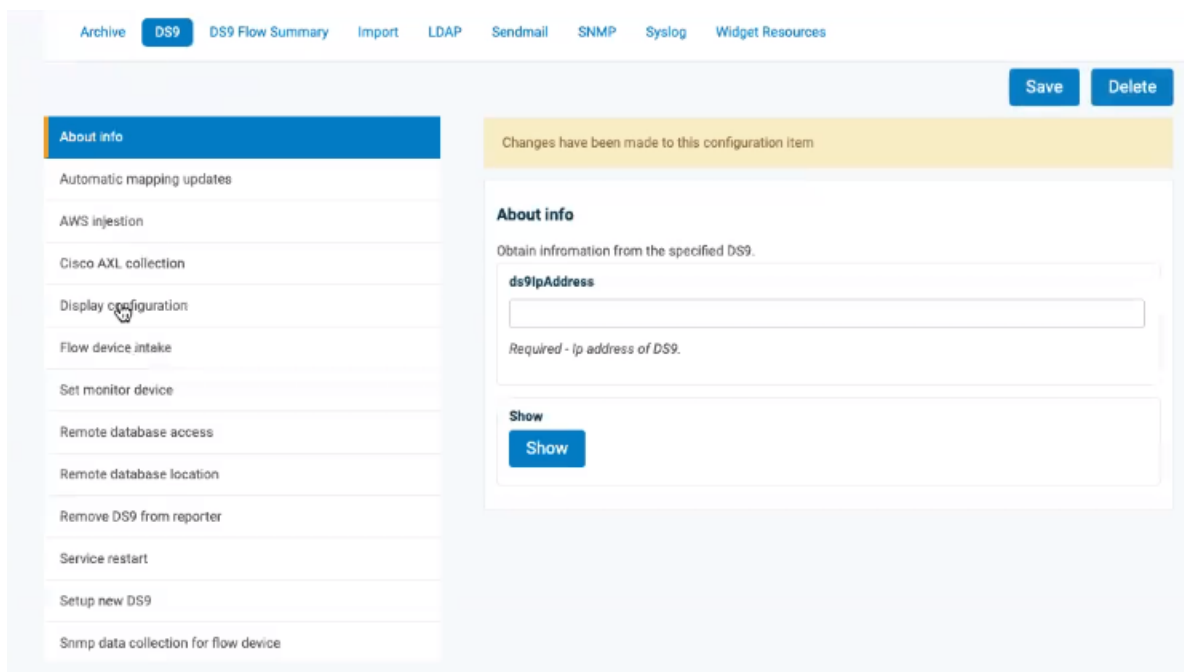
For CUCM v11.5 support:

```
kexalgorithms diffie-hellman-group1-sha1,diffie-hellman-group14-sha1,diffie-hellman-
↪group-exchange-sha1
ciphers aes128-cbc,3des-cbc,aes128-ctr,aes192-ctr,aes256-ctr,aes128-gcm@openssh.com,
↪aes256-gcm@openssh.com
macs hmac-md5,hmac-sha1,hmac-sha2-256,hmac-sha1-96,hmac-md5-96
hostkeyalgorithms ssh-rsa,ssh-dss
```

10. DS9 Configuration on the Dashboard

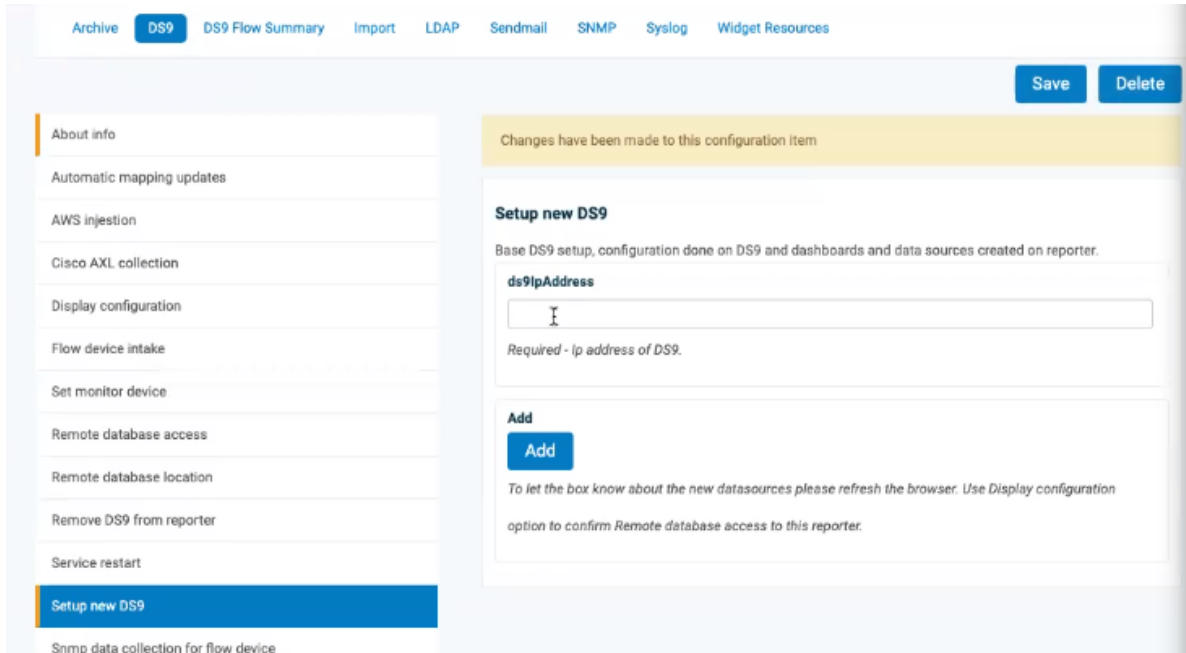
To complete the configuration between the Insights Dashboard Reporter and DS9, flow devices and SNMP configuration can be carried out:

1. Log in on the Dashboard GUI as admin, then go to **admin > Configuration**. On the **Configuration Settings** page, select the **DS9** tab.



The screenshot displays the DS9 configuration interface. At the top, there is a navigation bar with tabs: Archive, DS9 (selected), DS9 Flow Summary, Import, LDAP, Sendmail, SNMP, Syslog, and Widget Resources. On the right side of the navigation bar, there are 'Save' and 'Delete' buttons. Below the navigation bar, there is a yellow notification banner that reads 'Changes have been made to this configuration item'. The main content area is divided into two columns. The left column contains a list of configuration options: About info (highlighted), Automatic mapping updates, AWS injection, Cisco AXL collection, Display configuration, Flow device intake, Set monitor device, Remote database access, Remote database location, Remove DS9 from reporter, Service restart, Setup new DS9, and Snmp data collection for flow device. The right column contains the configuration form for the selected 'About info' option. The form has a title 'About info' and a subtitle 'Obtain information from the specified DS9.'. It features a text input field labeled 'ds9IpAddress' with a required field indicator below it: 'Required - ip address of DS9.'. At the bottom of the form, there is a 'Show' button.

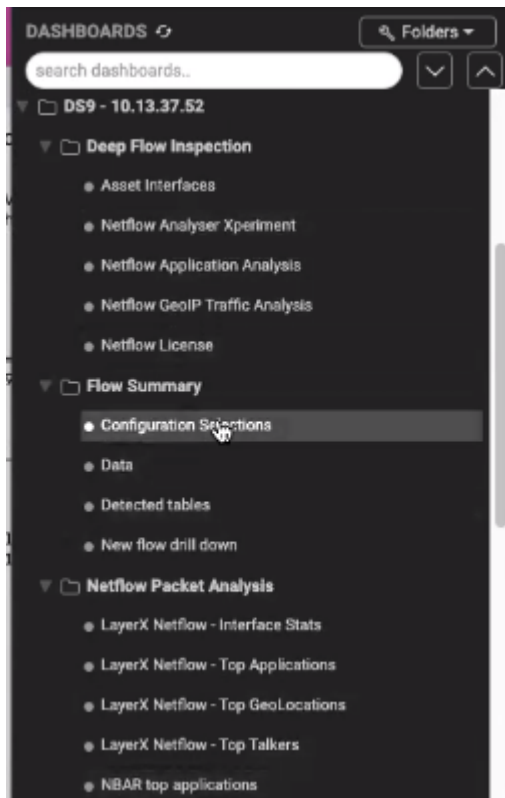
2. Choose **Setup new DS9**, add the **ds9IpAddress**, then click **Add**. Repeat this step according to the number of DS9 systems to be utilized in the environment.



3. Refresh the Dashboard browser page and from the menu, select **Data Sources**.

The new entries for the IP address are listed as DS9 SNMP . . . , DS9 SUMMARY . . . DS9 TOPN . . . entries.

4. Under the **DASHBOARDS** menu, the new **DS9 - <IP>** dashboard menu shows, for example:



Note at this stage the sub-menus are still empty.

5. Set up the DS9 to receive netflow from the source devices sending to the DS9. Go to **admin >**

Configuration and on the **Configuration Settings** page, select the **DS9** tab.

6. Choose **Flow device intake** and for each remote netflow device that the DS9 server will receive flow data, set up **ds9IpAddress**, **remotelpAddress** and **port** and click **Add**.

The screenshot shows the DS9 Configuration Settings page. The 'DS9' tab is selected in the top navigation bar. The left sidebar contains a menu with 'Flow device intake' highlighted. The main content area displays the 'Flow device intake' configuration form. A yellow banner at the top of the form indicates 'Changes have been made to this configuration item'. The form includes the following fields and controls:

- ds9IpAddress**: A text input field containing '10.13.3'. Below it is the text 'Required - Ip address of DS9.'
- Show**: A blue button labeled 'Show'. Below it is the text 'Shows list of ip addresses configured to receive flow.'
- remotelpAddress**: A text input field. Below it is the text 'Ip address to allow access. Supports comma separated list. This is required for Add or Delete below.'
- port**: A text input field. Below it is the text 'Required for Add. Netflow 5 = 9996; Netflow 9 = 2055; Netflow 10 = 4739; Sflow = 6343.'
- Add**: A blue button labeled 'Add'. Below it is the text 'Sends request to DS9, use Show for confirmation.'
- Delete**: A blue button labeled 'Delete'.

7. NetFlow source device interface utilization statistics that are gathered using SNMP data collection is also required. Choose the **Snmp data collection for flow device** menu, enter data into the fields according to your SNMP version configuration preferences, then click **Add**.

Repeat this step for each of the flow sources set up to send flow to the DS9.

Specify the same IP address of the NetFlow source to be queried in the **devicelpAddress** field and the **snmplpAddr** field if NAT is not being used to connect to the NetFlow source device from the DS9 system.

If NAT is used to connect to the NetFlow source device, specify the NAT IP address of the NetFlow source device in the **snmplpAddr** field to use as the Ip address to connect to the system for the SNMP query.

Input the real IP address of the system into the **devicelpAddress** field and then input the SNMP authentication parameters.

Click the **Add** button when complete.

Repeat for each NetFlow source device to be queried. The authentication parameters will cache in the browser so only changing the **devicelpAddress** and **snmplpAddr** fields is usually required for a new

entry.

The screenshot shows a configuration interface with a left-hand navigation menu and a main content area. The navigation menu includes items like 'About info', 'Automatic mapping updates', 'AWS injection', 'Cisco AXL collection', 'Display configuration', 'Flow device intake', 'Set monitor device', 'Remote database access', 'Remote database location', 'Remove DS9 from reporter', 'Service restart', 'Setup new DS9', and 'Snmp data collection for flow device' (which is highlighted in blue). The main content area has a yellow notification bar at the top stating 'Changes have been made to this configuration item'. Below this is the title 'Snmp data collection for flow device' and a description: 'Optional but allows for interface details to be displayed.' There are three input fields: 'ds9IpAddress' with a value of '1', 'deviceIpAddress' (empty), and another 'deviceIpAddress' (empty). Below the first field is a 'Show' button with the text 'Show status of snmp collection.' Below the second field is an 'Enable' button with the text 'Sends request to DS9, use Show for confirmation.' Below the third field is a 'Disable' button with the text 'Sends request to DS9, use Show for confirmation.' At the bottom, there is a 'Show configured' button with the text 'Show ip addresses of devices configured for snmp collection.'



Delete

Delete

Sends request to DS9, use Show configured for confirmation.

Select an option

- SNMPv1
- SNMPv2c
- SNMPv3

Select the SNMP version. Access from the specified DS9 to this device m

snmpIpAddr

Same as snmpIpAddress above but can be different. Ex. For NAT.

userName

authProtocol

Select authentication protocol.

authPassPhrase

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