



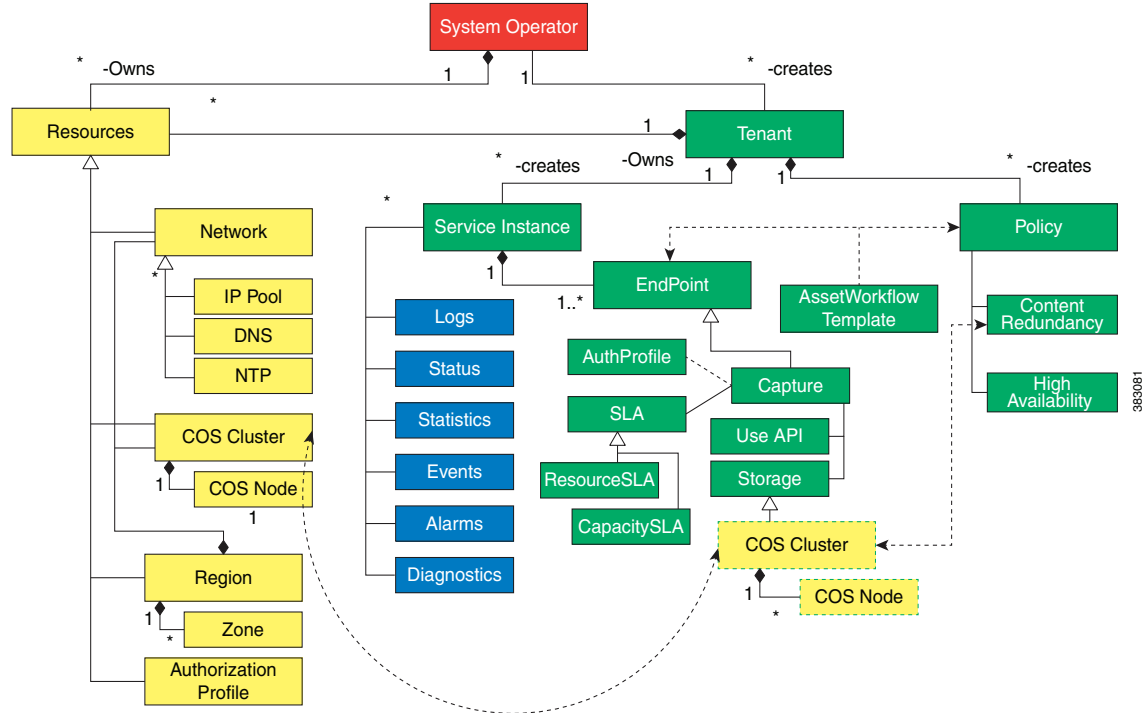
# Reference Information

This section contains additional reference material for further understanding the COS system, and information on performing commonly executed tasks and system maintenance.

## COS Service Model

The COS service model is shown in the Unified Modeling Language (UML) diagram below:

**Figure A-1** COS Service Model



A COS operator can assume one of the following roles:

- System Operator
- Tenant

The System Operator provisions the system resources (marked in yellow in the diagram above) and creates the Tenant.

The entities managed by the Tenant are marked in green in the diagram above.

The tenant creates service instances using pre-existing service templates. To provision a service instance, the tenant assigns system resources to the service instance and configures it. When the service instance is activated, all configurations related to the service are performed and the service becomes available.

When activated, the service instance also produces certain outputs that are marked in blue in the diagram above.

## Using the COS Service Manager GUI

The COS Service Manager GUI enables you to quickly and easily access many COS deployment and monitoring functions. This section provides basic login and navigation instructions for the GUI.

Steps for using the GUI to perform specific deployment and monitoring tasks are provided in chapters devoted to these topics.



### Note

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The COS Service Manager GUI is described here as it appears in a COS-only deployment. When COS is deployed as a service of MOS, its GUI is presented as a subset of the MOS Service Manager GUI, and some navigational details differ accordingly.

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## Before You Begin

Please note the following before logging in and using the COS Service Manager GUI:

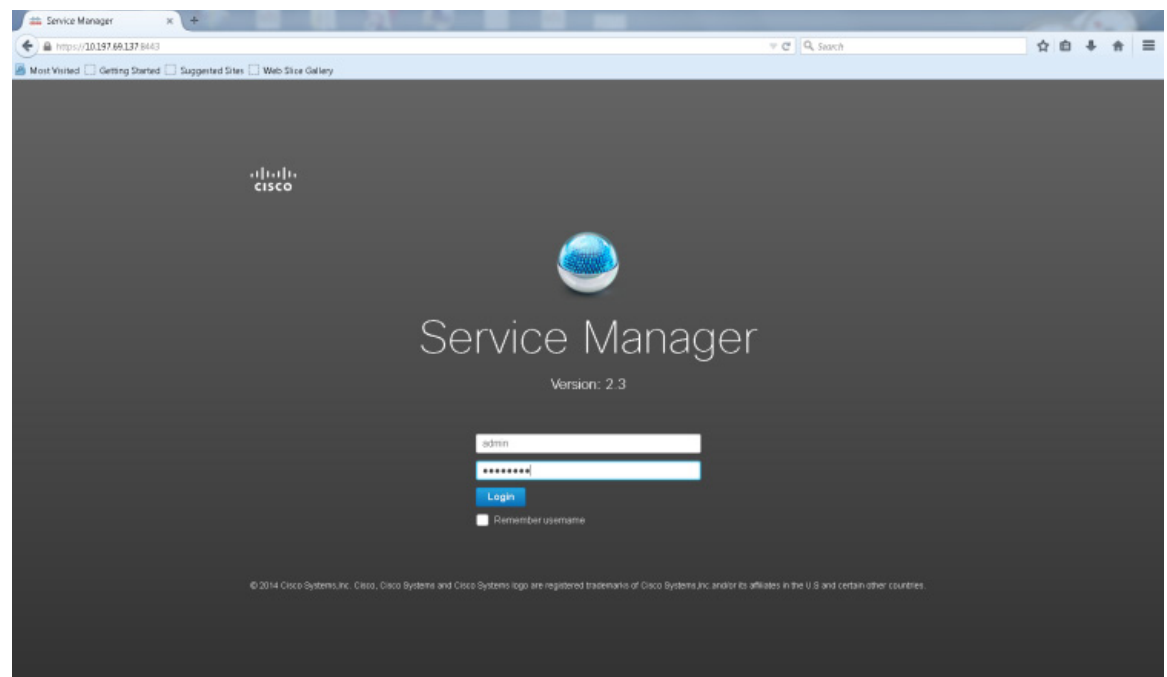
- The COS Service Manager GUI runs on the following operating systems and browsers:
  - Windows Internet Explorer 9 (IE9) or later for Windows 7
  - Mozilla Firefox 20 or later for Windows 7
  - Google Chrome 30.x for Windows 7
  - Apple Safari 7.x for Windows 7 on MAC OS Version 10.9 or later
- The GUI requires a display resolution of 1600 x 900 or better. If the PAM IP address on which you access the GUI is NATed, response time can be noticeably slow.
- The GUI times out after one hour (60 minutes) of activity. To avoid timeouts, make and save a configuration change, or click a tab or refresh icon, before the one-hour idle timeout expires.
- Configuration changes that you make in any section of the GUI are saved when you click the **Save** button. If you log out of the GUI or if the GUI times out before you save your changes, all changes made since your last save are lost.
- If you try to delete an object in the GUI that has been associated with another object (for example, a capture endpoint that has been associated with an asset workflow), the GUI prevents the deletion and displays an explanatory error message.
- If you redeploy or upgrade the COS OVA, you must clear your browser cache for the GUI changes to take effect.

## Logging In

To access the COS Service Manager GUI, perform the following steps:

- Step 1** Access the GUI using the PAM IP address. The URL format is:  
`https://pam_ip_address:8443`
- Step 2** Log in to the GUI with your Username and Password.  
The default username is **admin**. The default password is **default**. We recommend that you change these after deployment is complete.

**Figure A-2** COS Service Manager GUI Login Page

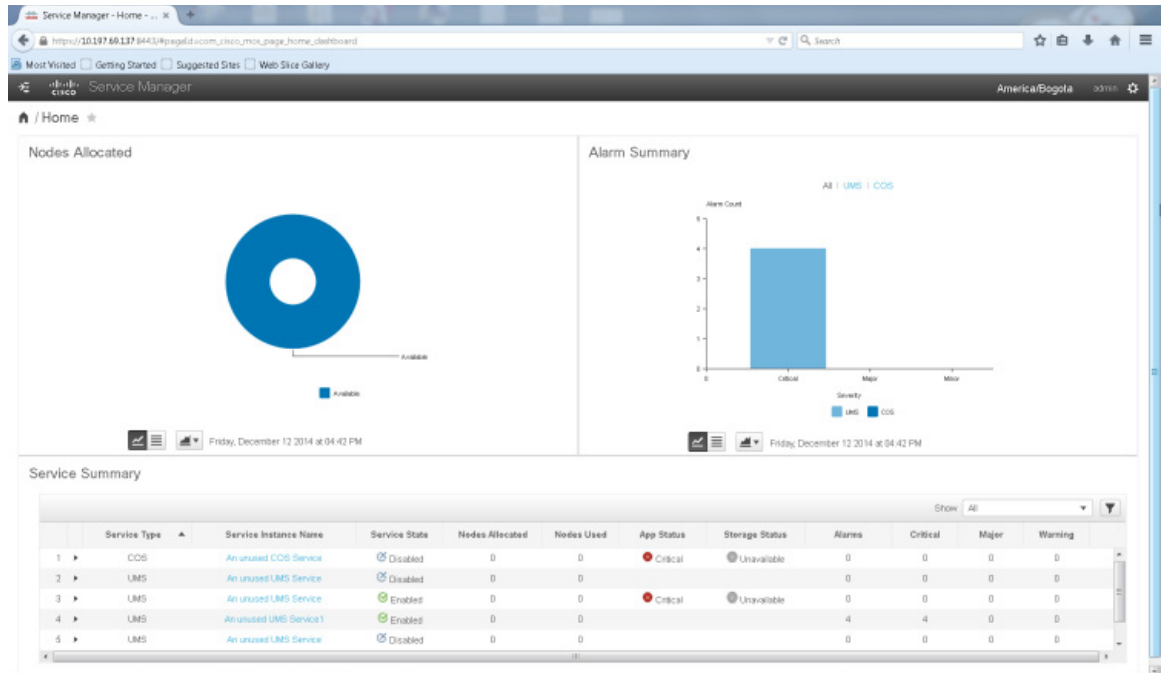


The home page of the GUI appears, and you can now begin using the GUI.

- Step 3** To exit the GUI from any page, click the **Username** displayed at upper right in the GUI and choose **Log out** from the drop-down menu.

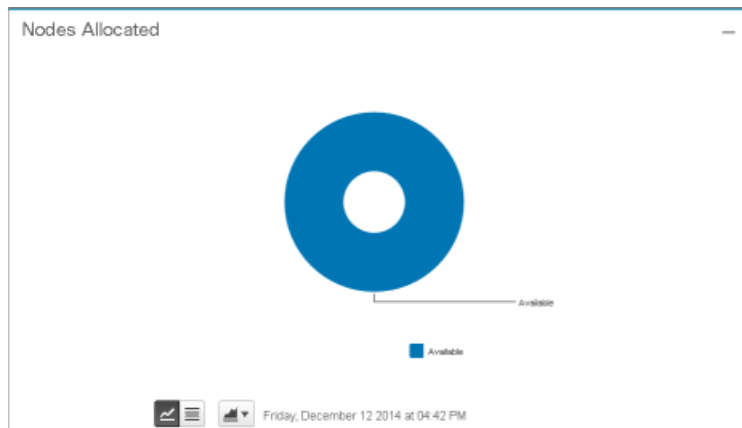
## Using the Home Page

The Home page appears by default, and provides a high-level overview information for COS. The Home page displays the following information, which is refreshed every 5 minutes.

**Figure A-3** COS Service Manager GUI Home Page

## Nodes Allocated

The Nodes Allocated section of the Home page displays COS node usage broken down by service type (such as Live or VOD), available nodes, and nodes that are in maintenance mode. You can click on sections of the chart to navigate to pages containing more details.

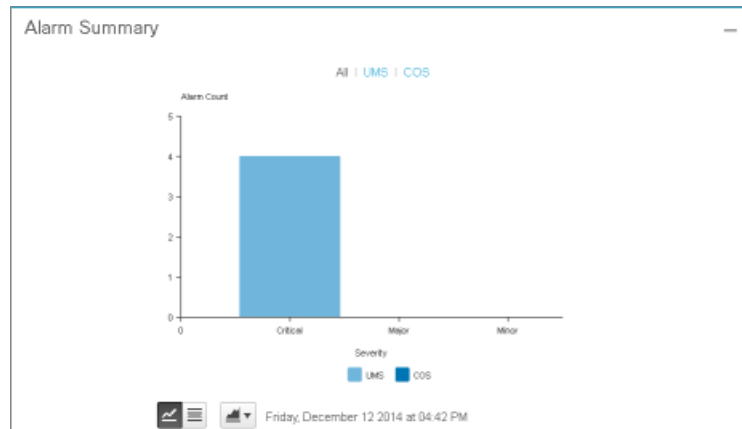
**Figure A-4** Home Page - Nodes Allocated Section

Icons at the bottom of this section let you choose between chart view and table view, choose different chart types, and export the associated data.

## Alarm Summary

The Alarms Summary section of the Home page displays the number of alarms logged for each service type, further broken down by severity of the alarms (critical, major, or minor).

**Figure A-5** Home Page - Alarm Summary Section



Icons at the bottom of this section let you choose between chart view and table view, choose different chart types, and export the associated data.

## Service Summary

Located below these two panes is a Service Summary table that lists all of the service instances currently defined for the deployment.

**Figure A-6** Home Page - Service Summary Section

The figure is a table titled "Service Summary". It has a "Show" dropdown menu set to "All". The table has the following columns: Service Type, Service Instance Name, Service State, Nodes Allocated, Nodes Used, App Status, Storage Status, Alarms, Critical, Major, and Warning. There are five rows of data.

	Service Type	Service Instance Name	Service State	Nodes Allocated	Nodes Used	App Status	Storage Status	Alarms	Critical	Major	Warning
1	COS	An unused COS Service	Disabled	0	0	Critical	Unavailable	0	0	0	0
2	UMS	An unused UMS Service	Disabled	0	0			0	0	0	0
3	UMS	An unused UMS Service	Enabled	0	0	Critical	Unavailable	0	0	0	0
4	UMS	An unused UMS Service1	Enabled	0	0			4	4	0	0
5	UMS	An unused UMS Service	Disabled	0	0			0	0	0	0


The Service Summary section displays the following information for each COS node (you cannot edit these fields):

- Service Type — Type of service instance, such as **Live** or **VOD**.
- Service Instance Name — Name of the service instance.
- Service State — Indicates whether the service instance is currently **Enabled** or **Disabled**.
- Nodes Allocated — Number of nodes allocated for use by the service instance.
- Nodes Used — Number of nodes currently being used by the service instance.
- Node Status — Current status of the node associated with the service instance.
- Storage Status — Current status of the storage associated with the service instance.

- Total Alarms — Total number of alarms logged for the service instance.
- Critical — Number of Critical alarms logged for the service instance.
- Major — Number of Major alarms logged for the service instance.
- Warning — Number of Warning alarms logged for the service instance.

To display the endpoint summary for a service instance, click its **Expand** arrow.

**Figure A-7** Home Page - Endpoint Summary Section



The screenshot shows a 'Service Summary' window with a table titled 'Endpoint Summary'. The table has columns for Endpoint Name, Endpoint Type, Nodes Allocated, Nodes Used, Node Status, Storage Status, Total Alarms, Critical, Major, and Warning. The first row shows an endpoint named 'cel' of type 'Cloud Storage' with 0 nodes allocated and used, a 'Critical' node status, and 'Unavailable' storage status. The second row shows an endpoint named 'LMS' of type 'An unused LMS Service' with a 'Disabled' status and 0 nodes allocated and used. The table also shows 0 total alarms, 0 critical, 0 major, and 0 warning alarms for each endpoint.

Endpoint Name	Endpoint Type	Nodes Allocated	Nodes Used	Node Status	Storage Status	Total Alarms	Critical	Major	Warning
1 cel	Cloud Storage	0	0	Critical	Unavailable	0	0	0	0
2 LMS	An unused LMS Service	0	0	Disabled		0	0	0	0

The Endpoint Summary table displays the following information for each endpoint (you cannot edit these fields):

- Endpoint Name — Name of the endpoint.
- Endpoint Type — Type of endpoint. Valid values are **Capture** and **Playback**.
- Nodes Allocated — Number of nodes allocated for use by the service instance.
- Nodes Used — Number of nodes currently being used by the service instance.
- Node Status — Current status of the node associated with the service instance.
- Storage Status — Current status of the storage associated with the service instance.
- Total Alarms — Total number of alarms logged for the service instance.
- Critical — Number of Critical alarms logged for the service instance.
- Major — Number of Major alarms logged for the service instance.
- Warning — Number of Warning alarms logged for the service instance.

To collapse the interface information, click the **Collapse** arrow.



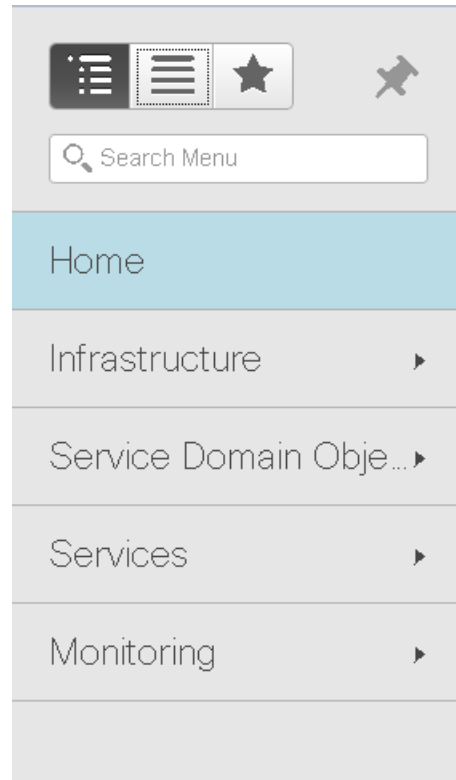
**Note**

Clicking a Service Instance Name takes you directly to a page with more detailed information.

## Using the Navigation Panel

Clicking the Navigation button at upper left in the GUI opens the Navigation panel.

**Figure A-8** Home Page - Navigation Panel



### Selecting the View

Use the icons at the top of the panel let you toggle between three views:

- The Navigation menu, open by default
- The Index, which includes a Search function
- The Favorites list

### Bookmarking a Page

You can bookmark a page of interest and add it to the Favorites list. To do this, navigate to the page and click the **Pin** icon located to the right of the Favorites button.

### Home Button

Click the **Home** button to return to the COS Service Manager GUI Home page from any other page. This also closes the Navigation panel.

## Infrastructure

Click the **Infrastructure** button to open (or if open, to close) a list of pages for viewing and configuring various infrastructure components.

- Choose **Storage > COS Nodes** to configure COS nodes.
- Choose **Storage > COS Clusters** to configure clusters.
- Choose **IP Pools and Networks** to configure IP pools.
- Choose **Platform Services** to set up, edit, or view server information.
- Choose **Regions and Zones** to display and configure regions and zones.

**Note**

Step-by-step instructions related to all of the above tasks are provided in [Chapter 2, “Deploying COS”](#).

## Service Domain Objects

To configure COS service domain objects, select **Service Domain Objects**, and then select one of the following:

- Choose **Profiles > Auth Profiles** to configure authorization profiles.
- Choose **Policies > Asset Redundancy Policies** to configure asset redundancy policies.

## Services

To configure COS service domain objects, select **Services**, and then choose **Services > Cloud Object Store** to configure the COS service.

**Note**

After choosing **Services > Cloud Object Store**, an Overview tab appears that lists all Cache Interfaces. If an interface is in Active status, the associated port is ready for a connection. However, if there are any issues with the port, they are listed on the Fault Detail tab only.

**Note**

Additional menu options such as **Services > Unified Media Service** indicate a COS + MOS deployment. See the *Cisco Media Origination System Release 2.3 User Guide* for instructions on using these options.

## Monitoring

To access COS monitoring features, select **Monitoring**, and then select one of the following

- Choose **Alarms > Active** to access a list of currently active alarms.
- Choose **Alarms > History** to access a list of all alarms, both active and inactive.
- Choose **Diagnostic Settings > System Diagnostics** to access system diagnostics.
- Choose **Diagnostic Settings > Service Diagnostics** to access service diagnostics.
- Choose **Events** to access a list of significant system events.
- Choose **Configuration Viewer** to access an interactive and searchable view of network objects, relationships, and configurations. Choose between tree view and graph view, then click any object to view its configuration.



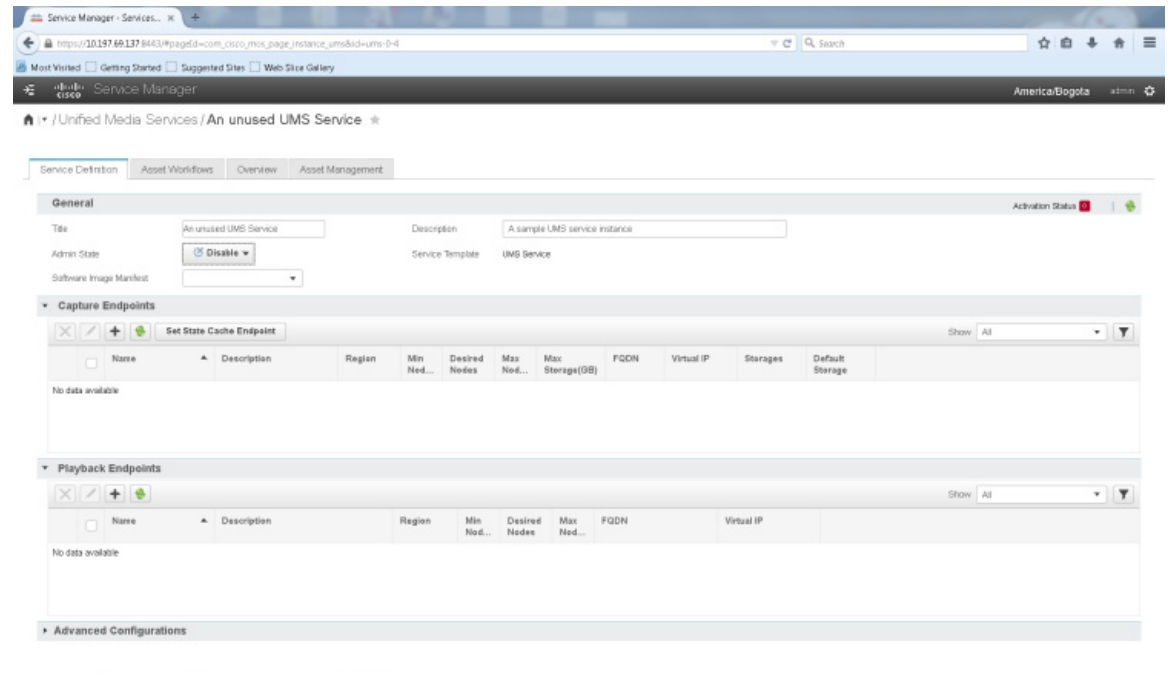
**Note**

Step-by-step instructions related to all of the above tasks are provided in [Chapter 3, “System Monitoring”](#).

## Working with Tables

Most of the pages that make up the COS Service Manager GUI present information in tables. A toolbar at the top of each table provides common features that let you quickly perform needed functions.

**Figure A-9 GUI Table Tools**



On most pages, you can:

- Add, select and edit, or select and delete table entries.
- Sort entries by table column
- Change the order of the columns.
- Use filters to control what is displayed.

This section describes each of these operations.

### Adding an Entry

To add an entry to a table, click **Add Row** at the top of the table. Enter or select values for the new entry, and then click **Save** to add it to the table.

## Editing an Entry

To edit an entry in a table, use one of the following methods:

- Select it and click **Edit** at the top of the table.
- Click in any of the fields for the entry.
- Enter or select new values for the entry, then click **Save** to save the new values in the table.

## Deleting an Entry

To delete an entry from a table, select the entry and click delete at the top of the table. When prompted, click **OK**. The entry is removed from the table.

## Refreshing the Table

To refresh the entries in a table, click **Refresh** at the top of the table.

## Sorting Entries

To sort entries in a table based on the contents of a column, click the column header. Click once to order the table in alphanumeric ascending order. Click again for descending order.

## Changing the Order of Columns

To change the order of columns in a table, drag-and-drop the column headings.

## Filtering Contents

To filter the contents of a table, choose a filter from the drop-down list at top right of the table, or click the Filter icon to toggle between different filters.

- **All** — Display all of the table contents. This is the default display.
- **Quick Filter** — Display only those elements of one or more columns that contain specified text strings.
- **Advanced Filter** — Display only those elements of the table that match a set of one or more rules that you specify.

For each rule, specify a column; a type of filter, such as **Contains** or **Starts with**; and a text string.

To add another rule to the filter, click the plus sign (+). You can specify more than one rule for a given column.

If you have specified more than one rule, the **Match** drop-down list appears.

To specify that an element of the table must match all of the specified rules in order to be included in the list, select **Match > All**.

- To specify that an element of the table need only match one or more of the specified rules in order to be included in the list, select **Match > Any**.
- To delete a rule from the filter, click the minus sign (-).
- To apply the filter to the elements of the table, click **Go**.

- To clear the filter and display all elements of the table, click **Clear Filter**.
- **Manage Preset Filters** — Edit or remove Advanced Filters that you have saved.

**Note**

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When you refresh the pages in your browser, all saved filters are removed.

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## Managing GUI Users

COS stores the usernames and passwords for the GUI in the file `etc/opt/cisco/cos/public/users.properties` stored on the PAM VM.

**Note**

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We recommend that you change the default username and password following installation.

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COS provides the following scripts to help you manage usernames and passwords:

- To list current users, enter the following command:  
`listusers-gui`
- To add a new user, enter the following command:  
`adduser-gui username password`
- To change an existing user, enter the following command:  
`chpass-gui username password`
- To delete a user, enter the following command:  
`deluser-gui username`

You can enter multiple commands when adding, changing, or deleting multiple users or passwords. For example, if you are adding two users, changing two users, and deleting one user, you can enter the following sequence of commands:

```
adduser-gui username1 password1
adduser-gui username 2 password2
chpass-gui username3 password3
chpass-gui username4 password4
deluser-gui username5
```

Usernames and passwords for the COS GUI:

- Can be strings of any length.
- Can include uppercase or lowercase letters, numbers, and any special characters. However, the characters `<`, `>`, `|`, `!`, and `&` must be preceded by a backslash.
- Are not case-sensitive.

# COS Network Ports and Services

The following table identifies open network ports for COS nodes and the services that own these ports.

**Table A-1** *COS Network Ports and Services*

Scope/Interface	Port	Purpose	Owning Service
Management	TCP 7000	Cassandra internode communication	cassandra
Management	TCP 7199	Cassandra JMX communication	cassandra
Management	TCP 9042	Cassandra CQL native transport port	cassandra
Management	TCP 9160	Cassandra Thrift client API	cassandra
Management	TCP 9090	Cosd request listener	cosd
Data	TCP 80	HTTP traffic for Swift and Swauth interfaces	cserver
Data	UDP 3478	STUN traffic	cserver
Data	UDP 48879	Internal COS node communication	cserver
Data	UDP 57005	Internal COS node communication	cserver
Management	UDP 123	Network Time Protocol	ntpd
Management	TCP 25	Postfix mail system traffic	postfix
Management	TCP 5666	SuperDoctor5 Nagios Remote Plugin Extender (NRPE)	sd5
Management	TCP 5999	SuperDoctor5 Nagios Remote Plugin Extender (NRPE)	sd5
Local	TCP 31000-32999 *	SuperDoctor5 internal communication	sd5
Management	UDP 7777	SuperDoctor5 internal communication	sd5
Local	TCP 199	Simple Network Management Protocol	snmpd
Management	UDP 161	Simple Network Management Protocol	snmpd
Management	UDP 162	SNMP Traps	snmpdtrapd
Management	TCP 22	Secure Shell (SSH)	ssh

\* The sd5 service chooses a single available port in the range of 31000-32999 on startup.

## COS Maintenance

It may be necessary to reboot or shut down a COS node for conditions such as routine maintenance. Care should be taken in the process to avoid impact to the services provided by the COS cluster.

## COS Node Reboot

To reboot a COS node, execute the **reboot** command from a terminal console or remote shell. The system will begin a shutdown phase to reboot.

- Any active HTTP and TCP sessions with the COS node data network interfaces will be reset by the node. The client will have the responsibility of retrying operations with the remaining COS nodes in the cluster.
- The COS management system will automatically update the DNS registry to remove listings for the COS node.
- The COS services will automatically be restarted when the system is back online after reboot.
- If the COS cluster has been configured to replica data, copies of any object data residing on the COS node will be accessible from the remaining COS nodes.

## Behavior of COS Services on COS Node Boot

There are four primary system services that provide COS functionality on a COS node: `cassandra`, `cosd`, `cos_aicc`, and `cserver`. These services can be manipulated using standard Linux system service tools.

To prevent these services from starting automatically on a COS node boot, execute the following commands as the root user from a shell on that node:

```
[root@cos-node-1 ~]# chkconfig cassandra off
[root@cos-node-1 ~]# chkconfig cosd off
[root@cos-node-1 ~]# chkconfig cos_aicc off
[root@cos-node-1 ~]# chkconfig cserver off
```

To enable automatic service loading on node boot, execute the following commands:

```
[root@cos-node-1 ~]# chkconfig cassandra on
[root@cos-node-1 ~]# chkconfig cosd on
[root@cos-node-1 ~]# chkconfig cos_aicc on
[root@cos-node-1 ~]# chkconfig cserver on
```

To view the current state of service loading, execute the following command:

```
[root@cos-node-1 ~]# chkconfig --list
auditd          0:off  1:off  2:on   3:on   4:on   5:on   6:off
cos_aicc        0:off  1:off  2:on   3:on   4:on   5:on   6:off
cosd            0:off  1:off  2:on   3:on   4:on   5:on   6:off
cassandra      0:off  1:off  2:on   3:on   4:on   5:on   6:off
crond          0:off  1:off  2:on   3:on   4:on   5:on   6:off
cserver        0:off  1:off  2:on   3:on   4:on   5:on   6:off
ip6tables      0:off  1:off  2:on   3:on   4:on   5:on   6:off
iptables       0:off  1:off  2:on   3:on   4:on   5:on   6:off
netconsole     0:off  1:off  2:off  3:off  4:off  5:off  6:off
netfs          0:off  1:off  2:off  3:on   4:on   5:on   6:off
network        0:off  1:off  2:on   3:on   4:on   5:on   6:off
ntpd           0:off  1:off  2:off  3:off  4:off  5:off  6:off
ntpdate        0:off  1:off  2:off  3:off  4:off  5:off  6:off
postfix        0:off  1:off  2:on   3:on   4:on   5:on   6:off
rdisc          0:off  1:off  2:off  3:off  4:off  5:off  6:off
restorecond    0:off  1:off  2:off  3:off  4:off  5:off  6:off
rsyslog        0:off  1:off  2:off  3:off  4:off  5:off  6:off
sslauthd       0:off  1:off  2:off  3:off  4:off  5:off  6:off
sshd           0:off  1:off  2:on   3:on   4:on   5:on   6:off
syslog-ng      0:off  1:off  2:on   3:on   4:on   5:on   6:off
udev-post      0:off  1:on   2:on   3:on   4:on   5:on   6:off
```

To manually start the services, execute the following commands:

```
[root@cos-node-1 ~]# service cassandra start
[root@cos-node-1 ~]# service cosd start
[root@cos-node-1 ~]# service cos_aicc start
[root@cos-node-1 ~]# service cserver start
```

# COS Service Reliability

This section describes the response of the COS AIC server to changes in the states of disks, interfaces, and services on COS nodes. The COS AIC client and the Service Monitor convey the changes in state by sending appropriate events to the COS AIC server.

If a change is critical and indicates that the node cannot service requests, the AIC server ensures that the node's interfaces are not part of the DNS, so that service requests are not addressed to the node.

## COS Node Disks

When the COS AIC server receives an event indicating the failure of all the disks on a COS node, it checks the status of the node in its records.

- If the node status is **down**, the server removes the node's interfaces from the DNS server.
- If the node status is **up**, no action is necessary.

When the COS AIC server receives an event indicating some or all of the disks on the COS node are functional, it checks the status of the node in its records.

- If the node status is **down**, the server adds the node's interfaces back to the DNS server.
- If the node status is **up**, no action is necessary.

## COS Services

When the COS AIC server receives an event indicating that one or more of the COS services — Cisco Cache Server (CServer), Cisco Cloud Object Storage Daemon (cosd), and Cassandra Server — are not functional, it checks the status of the node in its records.

- If the node status is **down**, the server removes the node's interfaces from the DNS server.
- If the node status is **up**, no action is necessary.

When the COS AIC server receives an event indicating all the COS services are operational, it checks the status of the node in its records.

- If the node status is **down**, the server adds the node's interfaces back to the DNS server.
- If the node status is **up**, no action is necessary.

## COS Node Interfaces

When the COS AIC server receives an event indicating that one or more interfaces are not functional, along with a list of the faulty interfaces, it checks the status of these interfaces in its records.

- If the fault interfaces are part of the DNS, they are removed from it.
- If an interface is not in the list of faulty interfaces, and is not part of the DNS, the AIC server adds the interface to the DNS server.

## Server Reachability

The Service Monitor periodically receives the status of a COS node from the COS AIC client on that node. If the Service Monitor does not receive status information for a COS node within the stipulated time, it determines that the node is not reachable. Consequently, it sends an event to the COS AIC server indicating that the node is down. In response, the server checks the status of the node in its records.

- If the node status is **down**, the server removes the node's interfaces from the DNS server.
- If the node status is **up**, no action is necessary.

When the Service Monitor receives status information for a COS node, indicating that the node is reachable, it sends an event to the COS AIC server conveying that the node is up. In response, the server checks the status of the node in its records.

- If the node status is **down**, the server adds the node's interfaces back to the DNS server.
- If the node status is **up**, no action is necessary.

## COS Node Hard Drive Replacement

COS software can be deployed currently on the Cisco Content Delivery Engine (CDE) platforms CDE 460 and CDE 470. For information about replacing the hard drives of the CDE 460 and CDE 470 platforms, see the section Replacing External Storage Drives of the chapter Installing the Content Delivery Engines in the [Cisco Content Delivery Engine 205/220/250/420/460/470 Hardware Installation Guide](#).

## Replicating Objects During Swift Write Operations

While an object is being created or modified using Swift write operations, copies of the object data can be stored in real time on the local COS node as well as the node's peers in the COS cluster. This functionality works only if the RAID feature on the node is disabled.

To disable the RAID feature on the node, open `/arroyo/test/setupfile` and set **allow vault raid** to **0**.

To replicate object data on the node, open `/arroyo/test/setupfile` and set **vault local copy count** to a value greater than **1**. This value specifies the how many copies of the object data are to be stored on the node.

To replicate object data on the peer nodes, open `/arroyo/test/setupfile` and set **vault mirror copies** to a value greater than **1**. This value specifies how many remote copies of the object data are to be maintained.

