Managing Backup and Restore Operations

The following topics describe Cisco NFVI management node backup and restore operations.

Managing Backup and Restore Operations

The management node hosts critical services such as Cisco VIM REST API, Cobbler for PXE, ELK for Logging/Kibana dashboard, and VMTP for cloud validation in Cisco VIM.

The management node is not redundant during the initial Cisco VIM offering, hence it is recommended to take backup of the management node. Using the saved management node information, you can restore the management node if you are facing any issues with the platform.

Backing up the Management Node

An administrator must maintain the number of back up snapshots on the management node. The backup of the management node is possible only after complete deployment of at least one Cisco VIM. Two copies of backup directories are maintained at the management node itself and the older copy will be overwritten when a next backup is performed.

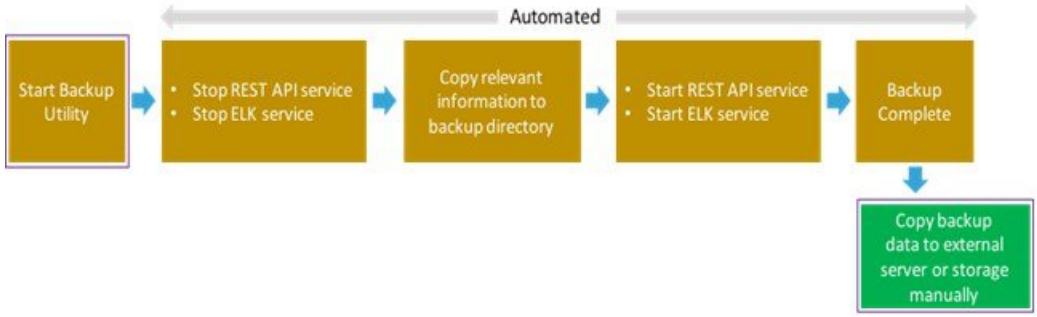
During the backup operation, activities such as pod management, software update or upgrade, and addition or deletion or replacement of nodes cannot be performed.

The REST API and ELK services are stopped during the backup operation, the OpenStack logs are cached on the control, compute, and storage nodes till the restoration of the management node is completed.

As part of the backup operation, two files are created: .backup_files and .backup_hash. .backup_files is a list of files that are backed up, while the second one is the hash. These two files are placed under the backup directory /var/cisco/backup_<tag>_<date-time> at the management node and also at the /var/cisco/ directory of all three controllers. These two files are used during the restore validation. When user attempt to restore from a particular backup, these two files within this backup are compared to those at the controllers. If there is any discrepancy, the restore validation will fail and user will be prompted to either terminate the restore operation or continue despite the validation failure. Only one copy of the .backup_files and .backup_hash are

kept at the controllers, that is every time a new backup is created, these two files are overwritten with the most recent ones. Hence the restore validation will only pass when the latest backup is used for restore.

Figure 1: Cisco NFVI Management Node Backup Operation



Before You Begin

- Save the management node information (for example, IP address of the management node) for use during the restore operation.
- Ensure that you have the br_mgmt and br_api IP addresses and respective network information.

Procedure

Step 1 Launch a SSH session to the Cisco NFVI management node.

Step 2 Navigate to the <installer-ws>/tools/mgmt/ directory.

Step 3 Execute **mgmt_node_backup.py**.

What to Do Next

The backup operation takes approximately 30 minutes and creates the backup_<tag>_<date-time> directory in the /var/cisco/ path.

Copy the directory to a remote server to recover the management node using rsync.

For example, to copy the backup directory to the remote server 20.0.0.5 /var/cisco/directory , execute the following command sequence:

```
rsync -e ssh -rtvpX --numeric-ids /var/cisco/backup_2017-01-09_14-04-38
root@20.0.0.5:/var/cisco/
```

Note On the remote server, protect the backup directory for any unauthorized access as the backup files may contain sensitive information

At the remote server, change directory to where the backup directory is copied to; in this example /var/cisco/backup_<tag>_<date-time>/.

To verify if the backup is not corrupted or modified, execute **./check_integrity**.

Check_integrity depends on the following packages, they should be installed on the server where check_integrity is executed.

```
python-prettytable
python-jinja2
python-babel
python-markupsafe
python-setuptools
pytz
```

Backup with Forwarding ELK logs to External Syslog Server

When the feature Forwarding ELK logs to External Syslog Server is enabled, during the backup process, in both the auto-backup and manual backup, the ELK logs are not collected. For manual backups, user can override by appending the -a or --add-elk option to the backup command. The -s or --skip-elk option is to skip the ELK logs collection regardless of the forwarding feature is enabled or not.

```
# cd installer/tools/mgmt
# ./mgmt_node_backup.py --help
Usage:  ./mgmt_node_backup.py [options]
Options:
    -h, --help      show this help message and exit
    -s, --skip-elk  do not collect ELK logs during backup
    -a, --add-elk   force to also collect ELK logs on backup
```

Backing up VIM Insight

Administrator maintains the backup for Insight on the management node. The backup of the Insight is done only after the complete deployment of the Insight bootstrap. Only two copies of backup directory are maintained at the management node. The older copy will be overwritten when a next Insight backup/autobackup takes place.

Insight backup is stored at default backup location /var/cisco/insight_backup/insight_backup_<release_tag>_<date>_<time>. If a user wants to take a backup of Insight at a different location use -backupdir/-b option from bootstrap_insight; details of which are provided later in this section.

Insight UI will also trigger an autobackup whenever it detects an operation relating to MySQL database entry to preserve the latest state of Insight.

Note Insight backup is not allowed after an update. Update is an intermediate stage between rollback and commit. Any change made relating to MySQL database entry after an update from Insight UI will not be backed up.

Autobackup Insight

If there is a change, Insight Installation will automatically run a daemon process to take the autobackup.

Live status of the process is determined by checking the log located at "/var/log/insight/insight_autobackup/insight_autobackup.logs" or systemctl status insight-autobackup.

Note Max of 10 log files of size 1024*1024 are maintained in the directory.

Following are the scenarios where autobackup is initiated:

Insight Operation	Auto-backup Performed
Adding/Deleting POD	Yes
Changing POD REST Password and Certificate	Yes
Add/Edit/Delete all types of users	Yes
Add/Edit/Delete Roles	Yes
Modify User and Role association	Yes
Revoking/Adding user permission	Yes
Login/Logout	No
Context Switching	No
Change User Password	Yes

Procedure

Step 1 To check the status of the Insight follow the below steps:

```
systemctl status insight-autobackup
insight-autobackup.service - Insight Autobackup Service
   Loaded: loaded (/usr/lib/systemd/system/insight-autobackup.service; enabled; vendor
preset: disabled)
   Active: active (running) since Wed 2017-08-30 01:17:18 PDT; 19s ago
 Main PID: 19949 (python)
   Memory: 12.4M
   CGroup: /system.slice/insight-autobackup.service
           └─19949 /usr/bin/python
/root/<installer-tag>/insight/playbooks/../insight_autobackup.py
```

Step 2 To stop Insight autobackup by following the below steps:

```
systemctl stop insight-autobackup
insight-autobackup.service - Insight Autobackup Service
   Loaded: loaded (/usr/lib/systemd/system/insight-autobackup.service; enabled; vendor
preset: disabled)
   Active: inactive (dead) since Mon 2017-09-04 00:43:43 PDT; 5s ago
  Process: 19993 ExecStop=/bin/kill ${MAINPID} (code=exited, status=0/SUCCESS)
 Main PID: 19984
   Memory: 56.0K
   CGroup: /system.slice/insight-autobackup.service
```

Step 3 To start Insight autobackup by following the below steps:

```
systemctl start insight-autobackup
insight-autobackup.service - Insight Autobackup Service
   Loaded: loaded (/usr/lib/systemd/system/insight-autobackup.service; enabled; vendor
preset: disabled)
   Active: active (running) since Wed 2017-08-30 01:17:18 PDT; 19s ago
 Main PID: 19949 (python)
   Memory: 12.4M
   CGroup: /system.slice/insight-autobackup.service
           └─19949 /usr/bin/python
/root/<installer-tag>/insight/playbooks/../insight_autobackup.py
```

Step 4 The way Insight works is as follows:

1 Install

- As soon as galera db and insight containers are up the script will be invoked.
- Log dir : tailf /var/log/insight/insight_autobackup_logs/insight_autobackup.log.
- It has a 10 seconds pulse which will tell if the service is up or not.
  - [2017-09-04 00:49:01,504] INFO [Insight Autobackup] Insight Autobackup Service Running.
  - [2017-09-04 00:49:11,514] INFO [Insight Autobackup] Insight Autobackup Service Running.
  - [2017-09-04 00:49:21,525] INFO [Insight Autobackup] Insight Autobackup Service Running.
- If there is any change it will take a backup (time to check Sql diff is 30 seconds).
- It will create "rbac_latest.sql" and "insight_latest.tar.gz" and dump in the latest backup dir.
- During restore the bootstrap script will check if "rbac_latest.sql" or "insight_latest.tar.gz" is present in the backup dir if not it will work the way it used to work earlier.

2 Update

- During update bootstrap insight does not support backup.
- Autobackup service would be terminated and no backup would be maintained in the intermediate state.

3 Rollback

- Script will be invoked again from the previous workspace.

4 Commit

- Script will be invoked again from the new workspace.

5 Uninstall

- Service file will be deleted.
- Log directory will remain as the same.

Backup Insight at default backup location

Procedure

Step 1 Launch a SSH session to Cisco Insight management node and follow the below steps:

```
 # cd <insight-ws>
#./bootstrap_insight.py –help

usage: bootstrap_insight.py [-h]  –-action ACTION
                            [--regenerate_secrets] [--setpassword]
                            [--file INSIGHTSETUPDATA] [--keep] [--verbose]
                            [--backupdir BACKUPDIR] [-y]

Insight install setup helper.
optional arguments:
  -h, --help            show this help message and exit
  --action ACTION, -a ACTION
                        install - Install Insight UI
                        install-status - Display Insight Install Status
reconfigure - Reconfigure Insight DB password or TLS                    Certificate
                        update - Update Insight UI
                        update-status - Display Insight Update Status
                        rollback - Rollback Insight UI update
                        commit - Commit Insight UI update
                        backup - Backup Insight UI
                        uninstall - Uninstall Insight UI
  --regenerate_secrets, -r
                        System generated INSIGHT_DB_PASSWORD
  --setpassword, -s     User supplied INSIGHT_DB_PASSWORD,
  --file INSIGHTSETUPDATA, -f INSIGHTSETUPDATA
                        Location of insight_setup_data.yaml
  --keep, -k            Preserve Insight artifacts during uninstall
  --verbose, -v         Verbose on/off
  --backupdir BACKUPDIR, -b BACKUPDIR
                        Path to backup Insight
  -y, --yes             Option to skip reconfigure or uninstall steps without prompt
```

Step 2 Run the bootstrap command to view the Cisco VIM Insight backup details:

```
# ./bootstrap_insight.py –a backup
VIM Insight backup logs are at: /var/log/insight/<bootstrap_insight_<date>_<time>.log

Cisco VIM Insight backup Info!
+---------------------+-------+-------------------------------------------------------------------------+
| Description         | Status| Details
         |
+---------------------+-------+-------------------------------------------------------------------------+
| Insight backup Status| PASS  | Backup done @
         |
|                     |       |
```

```
/var/cisco/insight_backup/insight_backup_<release_tag>_<date_time>|
+--------------------+-------+-------------------------------------------------------------------------+
Done with VIM Insight backup!
```

Backup Insight at user defined backup location

Procedure

Step 1 Launch a SSH session to Cisco Insight management node and follow the below steps:

```
# cd <insight-ws>
#./bootstrap_insight.py –help
usage: bootstrap_insight.py [-h]  --action ACTION
                            [--regenerate_secrets] [--setpassword]
                            [--file INSIGHTSETUPDATA] [--keep] [--verbose]
                            [--backupdir BACKUPDIR] [-y]

Insight install setup helper.
optional arguments:
  -h, --help            show this help message and exit
  --action ACTION, -a ACTION
                        install - Install Insight UI
                        install-status - Display Insight Install Status
reconfigure - Reconfigure Insight DB password or TLS                    Certificate
                        update - Update Insight UI
                        update-status - Display Insight Update Status
                        rollback - Rollback Insight UI update
                        commit - Commit Insight UI update
                        backup - Backup Insight UI
                        uninstall - Uninstall Insight UI
  --regenerate_secrets, -r
                        System generated INSIGHT_DB_PASSWORD
  --setpassword, -s     User supplied INSIGHT_DB_PASSWORD,
  --file INSIGHTSETUPDATA, -f INSIGHTSETUPDATA
                        Location of insight_setup_data.yaml
  --keep, -k            Preserve Insight artifacts during uninstall
  --verbose, -v         Verbose on/off
  --backupdir BACKUPDIR, -b BACKUPDIR
                        Path to backup Insight
  -y, --yes             Option to skip reconfigure or uninstall steps without prompt
```

Step 2 Run the following command to view the Cisco VIM Insight backup details:

```
# ./bootstrap_insight.py –a backup –-backupdir <user_defined_path>
VIM Insight backup logs are at: /var/log/insight/<bootstrap_insight_<date>_<time>.log

Cisco VIM Insight backup Info!
+----------------------+--------+-------------------------------------------------------------+
| Description          | Status | Details
  |
```

```
+----------------------+--------+-------------------------------------------------------------+
| Insight backup Status | PASS   | Backup done @ <user_defined_path>
  |
|                       |        |
  |
+----------------------+--------+-------------------------------------------------------------+

 Done with VIM Insight backup!
```

What to Do Next

Copy the backup directory to a remote server using rsync to recover the Insight later. We recommend you to copy backup dir using rsync as it preserves the permissions of the files.

For example, to copy the backup directory to the remote server 20.0.0.5 /var/cisco/insight_backup/directory , execute the following command sequence: .

```
rsync -e ssh -rtvpX --numeric-ids
/var/cisco/insight_backup/insight_backup_2.1.5_2017-01-09_14-04-38
root@20.0.0.5:/var/cisco/insight_backup/
```

On the remote server, protect the backup directory for any unauthorized access, as the backup files may contain sensitive information

Restoring the Management Node

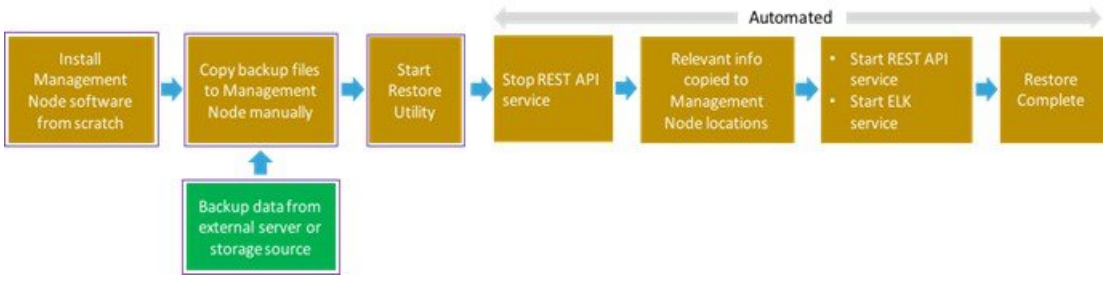
As an administrator, you have to re-image the management node with the same ISO version when the backup is performed, before initiating the restore operation. Restore will fail when there is a version mismatch.

Note Version checking is available only for offline installation.

As part of the restore operation, system checks for management node's IP address information to match the prior configuration. Logs are cached on the control, compute and storage nodes from the moment of the management node fails until its restoration.

If you are using Cisco VIM Insight (in Tech Preview), in the same management node, you will have to re-bootstrap it for installation. During installation, RBAC and Pod registration information will be lost, hence it is advised to make a note of the RBAC and Pod information.

Figure 2: Cisco NFVI Management Node Restore Operation



Before You Begin

Ensure that you have the br_mgmt and br_api IP addresses of the failed management node.

Procedure

Step 1 Re-image the management node with the ISO version with which you want to restore the node, and with the same IP address that is used before the failure of the node.

Step 2 Navigate to /var/cisco/directory at the remote server where the backup directory is copied during the backup operation. Execute **./check_integrity** to verify if the backup is not corrupted or modified.

Step 3 Copy the backup file to the /var/cisco/directory of the re-imaged management node.
For example, to copy the backup directory from the remote host 20.0.0.5 to the management node /var/cisco/directory, execute the following command sequence:

```
rsync -e ssh -rtvpX --numeric-ids root@20.0.0.5:/var/cisco/backup_2017-01-09_14-04-38
/var/cisco/
```

Step 4 Navigate to the backup directory and execute the following command to verify if the backup is not corrupted or modified.

```
# cd /var/cisco/backup_<date-time>
# ./check-integrity
```

Step 5 In /var/cisco/backup_<date-time> directory, execute the following command:

```
/var/cisco/backup_<date-time> # ./restore
```

The restore operation takes around 45 minutes.

Step 6 Before restoration, the restore script performs validation of the backup directory. If validation fails, restore operation will be halted and an error message will be displayed. The script will also verify the last performed backup directory in the Management Node, and if any defects are detected, the user needs to confirm to proceed with restore operation.

```
 …
2017-02-02 21:25:23 INFO Starting Cisco VIM restore...
 2017-02-02 21:25:23 INFO Cisco VIM restore: estimated run time is approx. 45 mins...
 2017-02-02 21:25:23 INFO Please see progress log for restore at
/var/log/mercury/installer/restore_2017-02-02_21:25:23.log
 2017-02-02 21:25:27 ERROR Error: Backup id is not the one expected
 Error: Found hashID file only in controller(s): j10-controller-2, j10-controller-3
 Management backup files are ok (as per j10-controller-2)
 Management backup files are ok (as per j10-controller-3)
 The management node changed after the last backup was stored. Do you still want to proceed
 restoring this management node? [Y/n] y
 2017-02-02 22:17:55 INFO Workspace restored to /root/installer-6518
 2017-02-02 22:17:55 INFO Cisco VIM restore: Executing restore playbook ...
 2017-02-02 22:18:47 INFO Cisco VIM restore: Executing bootstrap playbook ...
```

Note The default behavior is to continue by keying **Return** or **Y**. Keying **N** will abort the restore operation.

```
 …
2017-02-02 21:25:23 INFO Starting Cisco VIM restore...
2017-02-02 21:25:23 INFO Cisco VIM restore: estimated run time is approx. 45 mins...
2017-02-02 21:25:23 INFO Please see progress log for restore at
/var/log/mercury/installer/restore_2017-02-02_21:25:23.log
2017-02-02 21:25:27 ERROR Error: Backup id is not the one expected
Error: Found hashID file only in controller(s): j10-controller-2, j10-controller-3
Management backup files are ok (as per j10-controller-2)
```

```
Management backup files are ok (as per j10-controller-3)
The management node changed after the last backup was stored. Do you still want to proceed
 restoring this management node? [Y/n] n
 Aborting the restore operation as per user request
```

Once restore operation ends, several health check points will be automatically executed and the summary of results for that particular cloud reachability will be display.

Step 7 User can run the following checks manually to verify the status of the restore:

- Check the status of the REST API server:

```
# cd installer-<tagid>/tools
#./restapi.py -a status
Status of the REST API Server: active (running) since Thu 2016-08-18 09:15:39 UTC; 9h
 ago
REST API launch directory: /root/installer-<tagid>/
```

- Check the setup_data and runtime consistency of the management node:

```
# cd installer-<tagid>/; ciscovim run --perform 1,3 -y
```

- Execute the cloud sanity command:

```
#   cd installer-<tagid>/tools
# ./cloud_sanity.py -c all
```

Management Node Auto-backup

After the successful completion of certain Pod management operations, a backup of the management node is performed automatically. Only one copy of the auto-backup directory is kept at /var/cisco/ at any given time. The directory format is autobackup_<tag>_<timestamp>

Below is a list of operations:

- Fresh install of Cisco VIM
- Commit an update
- Replace controller
- Add or Remove compute nodes
- Add or Remove storage node
- Reconfigure
- NFVIMON

Enabling or disabling the variable auto-backup, is defined in the setup_data.yaml file. It is enabled by default.

Add the following setup-data.yaml file snippet:

```
#####################################################
# AutoBackup configuration
#####################################################
#Default is True
#autobackup: True or False
```

The following tables shows when an auto-backup is performed during update or rollback or commit.

POD operation	Auto-backup performed
Update	No
Rollback	No
Commit	Yes
Update fail with auto rollback	No

After successful auto-backup directory creation, user can copy it to an external server for later restoration as mentioned in Restoring the Management Node.

During the auto backup, if **Forwarding ELK logs to External Syslog server** option is enabled, the ElasticSearch database will not be maintained and the ELK logs will not be recovered after restoring the management node.