Pushing Configuration Bundles in an Indexer Cluster

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Overview of Indexer Clustering

Configuration Management in an Indexer Cluster.
  • What is a bundle? And why should I care?
  • Creating and distributing the bundle to all peers
  • Other bundle operations (validate, check restart, and roll back)
  • To restart or not to restart
  • Phased bundle downloads

Demo

Troubleshooting and Best Practices

QA
Indexer Cluster Overview

Pushing Configuration Bundles in an Indexer Cluster
Indexer Clustering

Indexer cluster topology

- Search head
- Master
- Indexer
- FORWARDERS
- Forwarding data to indexers
- For replication
- Searchhead-idx
- Master-slave communication
- For generation info
- For replication
- For Search
- For Replication
Why Use Clustering?
Index Replication, Of Course

Data Availability
Data Fidelity
Data Resiliency
Disaster Recovery
Search Affinity

Index Replication, Of Course
Elements of an Indexer Cluster

Cluster Master
- Manages the cluster activities (peer addition, configuration distribution)
- Maintains an in-memory state of all the peers & their corresponding buckets, configs
- Orchestrates remedial activities during peer failures
- Tells search heads where to search

Cluster Peer (Indexer)
- Receive and index incoming data (typically from forwarders)
- Replicate data to other peers for data availability
- Respond to the incoming searches by providing search results
- Update cluster master on any state change (peer, buckets, configs etc.)
Configuration Management in the Cluster

Pushing Configuration Bundles in an Indexer Cluster
The Mysterious Bundle

- The set of configuration files and apps common to all peers
- Managed from the master
- Distributed to the peers in a single operation
  - i.e. indexes.conf, props.conf, and transforms.conf
  - apps will also include versions of these configuration files
Where do the Bundles reside?
Both in the Cluster Master and the Cluster Peers

Cluster Master

- `$SPLUNK_HOME/etc/master-apps`
  - `_cluster`
    - `default`
    - `local`
    - `app1`
    - `app2`

Cluster Peer

- `$SPLUNK_HOME/etc/slave-apps`
  - `_cluster`
    - `default`
    - `local`
    - `app1`
    - `app2`
To distribute new or edited configuration files or apps across peers, execute a Bundle Push Operation.
Bundle Pushing

It’s not like replication
States of a Bundle Push
States in a Bundle Push Status Report

1. Creation
2. Master Validation
3. Peer Validation
4. Reload
5. Rolling Restart
Validate a bundle with the peers if bundle is acceptable

$ ./bin/splunk validate cluster-bundle
Did something go wrong with the bundle that was just pushed? You can rollback the latest bundle

$ ./bin/splunk rollback cluster-bundle
To Restart or Not To Restart

.Configuration changes which need a restart to apply
  - Changes to indexes.conf (deleting an index), inputs.conf
  - Change home path in index.conf
  - Delete an existing App

.Configuration changes which do not need a restart to apply
  - Adding a new index in indexes.conf, or a new app with reloadable configuration
  - Changes or additions to transforms.conf or props.conf
Do you want to know whether your config changes require a restart?

Allows admins to plan ahead when the configuration changes will trigger a rolling restart.

$ ./bin/splunk validate cluster-bundle --check-restart

Reload and Restart Simulation
Oh No! Large Bundles

Network Congestion and Timeouts
Phased Bundle Downloads
Sending to One Peer at a time

Master

Indexer
bundle push

Indexer
bundle push

Indexer
bundle push

>1gb

bundle push
Enabling Phased Bundle Downloads

- This is recommended if a cluster master is pushing large bundles or even a smaller bundle but to a large cluster (20 or more indexers).
- To enable, set the following configuration within server.conf

```
#inside server.conf
[clustering]
mode=master
max_peers_to_download_bundle = 1
```
Recap

1. Configuration Bundle
2. Bundle Operations: Apply, Validate, Check for Restart, Rollback
3. States during Bundle Push
4. Phased Bundle Downloads
Bundle Operations
Cluster Master UI – Indexer Clustering

Indexer Clustering: Master Node

- All Data is Searchable
- Search Factor is Met
- Replication Factor is Met

2 searchable, 0 not searchable Peers
3 searchable, 0 not searchable Indexes

<table>
<thead>
<tr>
<th>Peers (2)</th>
<th>Indexes (3)</th>
<th>Search Heads (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>filter</td>
<td>10 per page</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>Peer Name</td>
<td>Fully Searchable</td>
</tr>
<tr>
<td>----</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>1</td>
<td>peer2</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>2</td>
<td>peer1</td>
<td>✔ Yes</td>
</tr>
</tbody>
</table>
Bundle Operations
Configuration Bundle Actions

Indexer Clustering: Master Node

- **All Data is Searchable**: 2 searchable, 0 not searchable Peers
- **Search Factor is Met**

**Peers (2)** | **Indexes (3)** | **Search Heads (1)**
---|---|---
*filter* | | 10 per page

<table>
<thead>
<tr>
<th>Peer Name</th>
<th>Fully Searchable</th>
<th>Status</th>
<th>Buckets</th>
</tr>
</thead>
<tbody>
<tr>
<td>peer2</td>
<td>Yes</td>
<td>Up</td>
<td>9</td>
</tr>
<tr>
<td>peer1</td>
<td>Yes</td>
<td>Up</td>
<td>9</td>
</tr>
</tbody>
</table>
Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node

Validate and Check Restart  Push  Rollback

Bundle Information:
Updated Time ......................... 8/29/2017, 6:18:54 PM
Active Bundle ID ..................... F33EA0DAB3527A2B86C7D82F1010FC13
Latest Bundle ID .................... F33EA0DAB3527A2B86C7D82F1010FC13
Previous Bundle ID ................. 0C81B572B6DD2D9AD4B8BEF690CB676C
Bundle Operations

Configuration change to effect bundle push

```
kkolla@kkolla-HP:~/Work/instances/master/etc/master-apps/_cluster/local$ cat inputs.conf
[splunktcp://13452]
disabled=0
kkolla@kkolla-HP:~/Work/instances/master/etc/master-apps/_cluster/local$
```
Bundle Operations

Bundle Push from the UI

Distribute Configuration Bundle

Some configuration changes might require a restart of all peers. Would you like to push the changes? Learn More

Cancel  Push Changes
Bundle Operations
Bundle Push from the UI - Stages

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node
Validate and Check Restart Push Rollback

* Bundle validation is in progress.

Peers Validated: 2 of 2
Peers Reloaded: 0 of 2
Bundle Operations
Bundle Push from the UI - Stages

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node

Validate and Check Restart  Push  Rollback

• Bundle reload is in progress. Waiting for all peers to return the status.

Peers Validated: 2 of 2

Peers Reloaded: 2 of 2
Bundle Operations
Bundle Push from the UI - Stages

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node

Validate and Check Restart  Push  Rollback

Rolling restart of the peers is in progress.

Peers Validated: 2 of 2

Peers Reloaded: 2 of 2

Restarting Peer: 1 of 2
Bundle Operations
Bundle Push from the UI - Stages

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Back to Master Node

Validate and Check Restart  Push  Rollback

* Rolling restart of the peers is in progress.

Peers Validated: 2 of 2

Peers Reloaded: 2 of 2

Restarting Peer: 2 of 2
Bundle Operations
Bundle Push from the UI - Complete

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Validate and Check Restart  Push  Rollback

Last Push: ✔ Successful
Updated Time ......................... 9/23/2017, 4:02:34 PM
Active Bundle ID  .................. 46E49DA3A1C1972A85A4E49DE0F83BB9
Latest Bundle ID  .................. 46E49DA3A1C1972A85A4E49DE0F83BB9
Previous Bundle ID ................ F33E0DA83527A2BB6C7D82F1010FC13
Bundle Operations
UI – Before Bundle Push

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node
- Validate and Check Restart
- Push
- Rollback

Bundle Information:
Updated Time ........................................ 8/29/2017, 6:18:54 PM
Active Bundle ID ...................... F33EA0DAB3527A2BB6C7D82F1010FC13
Latest Bundle ID ..................... F33EA0DAB3527A2BB6C7D82F1010FC13
Previous Bundle ID ................. 0C81B572B6DD2D9AD4BBE690CB676C
Bundle Operations

UI – After Bundle Push

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Last Push: ✔ Successful

Updated Time: 9/23/2017, 4:02:34 PM
Active Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Latest Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Previous Bundle ID: F33EA0DA83527A2BB6C7D82F1010FC13
Bundle Operations
UI – Validate and Check Restart

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Last Push: ✔ Successful
Updated Time: 9/23/2017, 4:02:34 PM
Active Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Latest Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Previous Bundle ID: F33EA0DAB3527A2B6C7D82F1010FC13
Bundle Operations
Configuration change to effect bundle Check Restart

```
kkolla@kkolla-HP:~/Work/instances/master/etc/master-apps/_cluster/local$ cat inputs.conf
[splunktcp://33452]
disabled=0
kkolla@kkolla-HP:~/Work/instances/master/etc/master-apps/_cluster/local$
```
Bundle Operations

Validate and Check Restart from the UI

Configuration Bundle

Click Push to distribute the configuration bundle, or rollback to the previous bundle.

Validate and Check Restart

Validate and Check if Restart is Required

Some configuration changes might only be valid on certain versions of Splunk Enterprise, or might require a restart of all peers. Would you like to validate and check if these changes would require a restart? This will not push the changes. Learn More

Cancel Validate and Check Restart

Last Push: ✔ Successful

Updated Time: 9/23/2017, 4:02:34 PM
Active Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Latest Bundle ID: 46E49DA3A1C1972A85A4E49DE0F83BB9
Previous Bundle ID: F33EA0DAB3527A2BB6C7DB82F1010FC13
Bundle Operations
Validate and Check Restart from the UI

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

< Back to Master Node

Validate and Check Restart  Push  Rollback

🌟 Bundle validation is in progress.

Peers Validated: 2 of 2

Peers Reloaded: 1 of 2

Peers Checked For Restart: 0 of 2
Bundle Operations

Validate and Check Restart from the UI

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Back to Master Node

Validate and Check Restart  Push  Rollback

*: Bundle dryrun reload is in progress. Waiting for all peers to return the status.

Peers Validated: 2 of 2

Peers Reloaded: 2 of 2

Peers Checked For Restart: 2 of 2
Bundle Operations
Validate and Check Restart from the UI

Configuration Bundle Actions
Click Push to distribute the configuration bundle to the set of peers. Optionally, validate the bundle and check if peer restart is required without distributing the bundle, or rollback to the previous bundle. Learn More

Last Validate and Check Restart: ✓ Successful

Restart ? ........................................... Required
Updated Time ................................. 9/23/2017, 4:02:34 PM
Active Bundle ID .............................. 46E49DA3A1C1972A85A4E49DE0F83BB9
Latest Bundle ID .............................. 46E49DA3A1C1972A85A4E49DE0F83BB9
Previous Bundle ID ......................... F33EA0DAB3527A2BB6C7D82F1010FC13
Latest Check Restart Bundle .............. 78BEED3BF7E5FEF6E791AD3E5AEAF1B3
Troubleshooting and Best Practices

Pushing Configuration Bundles in an Indexer Cluster
INFO CMBundleMgr - apply bundle status transitioning from='None', to='Bundle Creation is in progress.'
INFO CMMaster - Creating a new bundle on the master.
INFO CMBundleMgr - apply bundle status transitioning from='None', to='Bundle validation is in progress.'
INFO CMMaster - Bundle validation is in progress for peers=8A0E551F-227C-48DC-9018-515A63F971E8,F78272B2-24DC-43BD-A402-A101123F2B4F.
Bundle validation success reported by [F78272B2-24DC-43BD-A402-A101123F2B4F peer_name=peer1] successful for bundleid=1E704E11131BC274111CD8991E0DE621
INFO CMPeer - Bundle validation success reported by [8A0E551F-227C-48DC-9018-515A63F971E8 peer_name=peer2] successful for bundleid=1E704E11131BC274111CD8991E0DE621
INFO CMBundleMgr - apply bundle status transitioning from='Bundle validation is in progress.', to='Bundle reload is in progress. Waiting for all peers to return the status.'

INFO CMMaster - Peers have indicated they are reload capable, issuing bundle reload.

INFO CMPeer - Bundle reload status peer=8A0E551F-227C-48DC-9018-515A63F971E8 peer_name=peer2 restart_required=1 rolling_restart=1 dryrun=0 reasons=[One or more configs require a restart to take effect. Configs=inputs]

INFO CMPeer - Bundle reload status peer=F78272B2-24DC-43BD-A402-A101123E2B4F peer_name=peer1 restart_required=1 rolling_restart=1 dryrun=0 reasons=[One or more configs require a restart to take effect. Configs=inputs]

INFO CMMaster - Restart required to apply the bundle.

INFO CMBundleMgr - apply bundle status transitioning from='Bundle reload is in progress. Waiting for all peers to return the status.', to='Rolling restart of the peers is in progress.'

INFO CMMaster - Starting a rolling restart of the peers.
$ ./bin/splunk show cluster-bundle-status

```
17:03 $ splunk show cluster-bundle-status

master
cluster_status=None
active_bundle
  checksum=ED4C6043F8F5345DBDCD3DD304636F9C
timestamp=1501714888 (In localtime=Wed Aug 2 16:01:28 2017)
latest_bundle
  checksum=ED4C6043F8F5345DBDCD3DD304636F9C
timestamp=1501714888 (In localtime=Wed Aug 2 16:01:28 2017)
last_validated_bundle
  checksum=ED4C6043F8F5345DBDCD3DD304636F9C
timestamp=1501714888 (In localtime=Wed Aug 2 16:01:28 2017)

peer2 8A0E551F-227C-48DC-9018-515A63F971E8 default
active_bundle=ED4C6043F8F5345DBDCD3DD304636F9C
latest_bundle=ED4C6043F8F5345DBDCD3DD304636F9C
last_validated_bundle=ED4C6043F8F5345DBDCD3DD304636F9C
last_bundle_validation_status=success
restart_required_apply_bundle=0
status=Up
```
INFO CMMaster - Changing the dryrun bundle on the master, dryrun='815D4F439CA468F282164B7E456154E7'.

CMBundleMgr - apply bundle status transitioning from='None', to='Bundle validation is in progress.'


INFO CMPeer - Bundle validation success reported by [F78272B2-24DC-43BD-A402-A101123F2B4F peer_name=peer1] successful for bundleid=815D4F439CA468F282164B7E456154E7

INFO CMPeer - Bundle validation success reported by [8A0E551F-227C-48DC-9018-515A63F971E8 peer_name=peer2] successful for bundleid=815D4F439CA468F282164B7E456154E7

INFO CMMaster - CMMaster issuing a dry run of bundle push
INFO  CMBundleMgr - apply bundle status transitioning from='Bundle validation is in progress.', to='Bundle dryrun reload is in progress. Waiting for all peers to return the status.'

INFO  CMMaster - Dry Run Complete
INFO  CMBundleMgr - apply bundle status transitioning from='None', to='Bundle Creation is in progress.'
INFO  CMMaster - Initiating rollback bundle process
INFO  CMBundleMgr - Rolling back bundle on the master to previousActive bundle=ED4C6043F5345DBD3D304636F9C previousActive bundlePath=/Users/kkolla/Work/instances/master/var/run/splunk/cluster/remote-bundle/971e64c31b6bb0c0e7479cf500e0647-1501714888.bundle
INFO  CMBundleMgr - setting previousActive bundle=ED4C6043F5345DBD3D304636F9C to active bundle=1E704E11131BC274111CD8991E0DE621
INFO  CMMaster - Peers have indicated they are reload capable, issuing bundle reload.
INFO  CMMaster - Starting a rolling restart of the peers.
Keeping Track of Bundles

which bundle again?

The bundles folder

$SPLUNK_HOME/var/run/splunk/cluster/remote-bundle

- 815D4F439CA468F282164B7E456154E7
- _cluster
- app1
- 1E704E11131BC274111CD8991E0DE621.tar.gz.previous
- ED4C6043FBF5345DBDCD3DD304636F9C.tar.gz.active
Best Practices

1. Find a reasonable time to do your bundle push

2. Do NOT change slave configurations locally

3. When in doubt, use “—check-restart”

4. Enable phased bundle downloads for large bundles or large clusters

URLs:

https://docs.splunk.com/Documentation/Splunk/6.6.3/Indexer/Managecommonconfigurations

https://docs.splunk.com/Documentation/Splunk/6.6.3/Indexer/Configurationbundleissues
Thank You

Don't forget to rate this session in the .conf2017 mobile app