

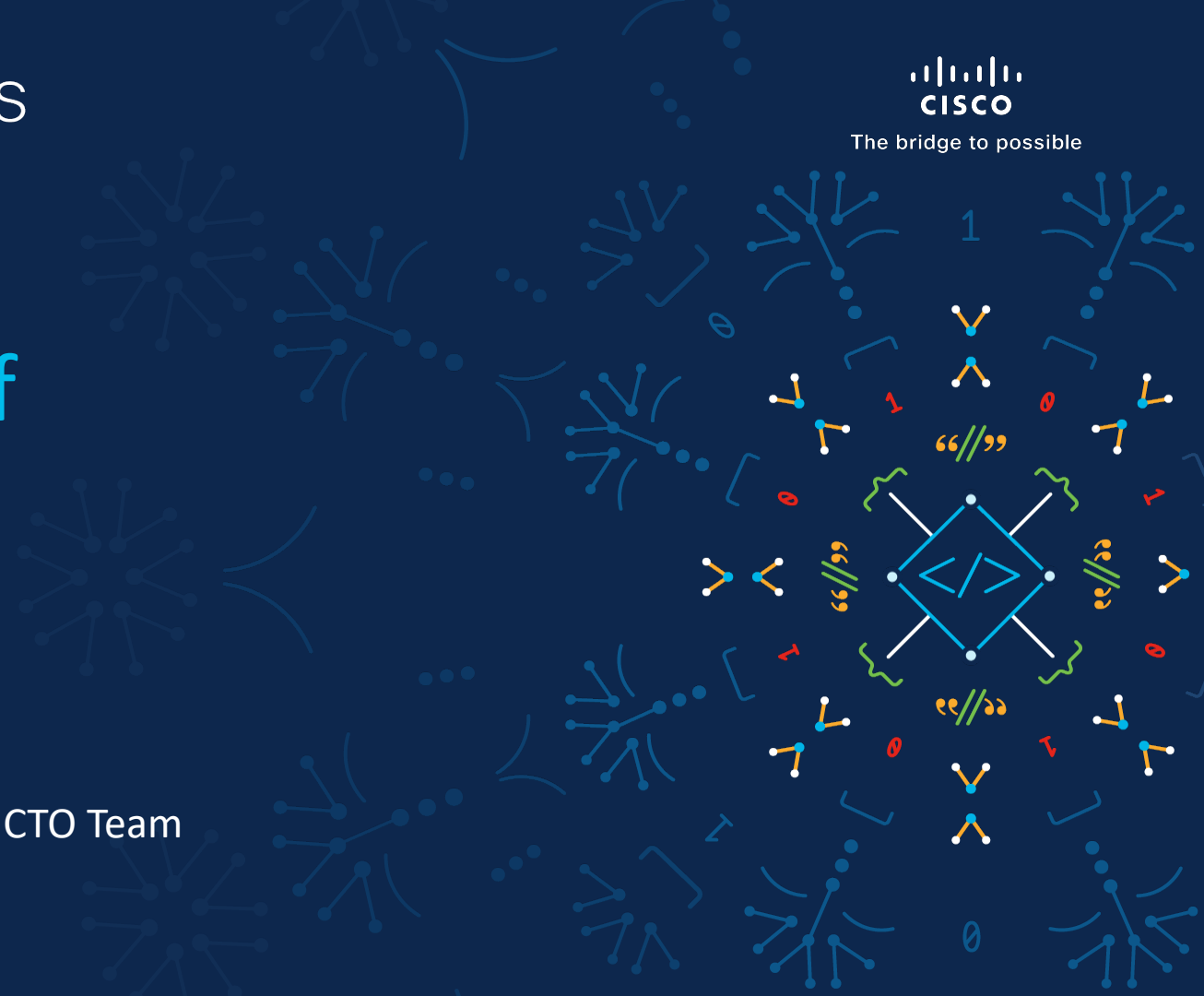
Overview of NSO HA

5.4 and beyond

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Why is HA Important?

- Reduce downtime
- Prevent loss of data
- Not a replacement for backup!
- Always test your backup procedure
- Monitor your system

HA from NSO's perspective

- Replicated read-only copy
- Hot standby
- Not a distributed database

History

- HA API
 - confd_bemaster
 - confd_beslave
 - confd_benone
 - confd_get_status
- Event Notifications API
 - confd_notifications_connect
 - confd_read_notification
 - CONFD_NOTIF_HA_INFO
- Management Agent API
 - maapi_set_readonly_mode
- Integrate with HA framework of your choice
- Available since version 1.0

History

- NSO Tailf HCC
 - NSO 3.x
 - Tail-f High Availability Cluster Communications (tailf-hcc)
- Simple framework
- Handle failover^{Until...}
- Virtual IP management
- Advertise VIP over BGP
 - Quagga with Quagga NED + config templates

Today

- Replication to 1 or 2 secondary nodes
 - Synchronous/Asynchronous
- Automatic or manual failover
- Virtual IP
- Advertise VIP over BGP
- Alarms on failure

Features - version

- 5.4
 - Built-in HA framework
 - Auto join HA cluster
 - Auto re-connect for secondary
 - Startup behavior
 - Virtual IP
 - Advertise VIP over BGP using GoBGP
- 5.7
 - Consensus to avoid split-brain
 - High availability monitor
- 5.8
 - Package upgrade

Built-in HA Framework

- No need for additional package(s)
- Handles replication
- Handles failover

YANG NSO 5.4

tailf-hcc up to 4.5

```
container ha {  
  list member {  
    leaf name;  
    leaf address;  
    leaf default-ha-role;  
    leaf failover-master;  
    ...  
  }  
  ...  
}
```

YANG NSO 5.4

tailf-hcc 5.0 and beyond

```
container high-availability {  
  leaf token;  
  leaf enabled;  
  list ha-node {  
    leaf id;  
    leaf address;  
    leaf nominal-role;  
    leaf failover-master;  
    ...  
  }  
  container settings {  
    ...  
  }  
}
```

The tailf-hcc confusion

tailf-hcc up to 4.5

- The be used with NSO up to 5.3
- Handles failover
- Failover
- Alarms
- Virtual IP
- BGP (Quagga)

- Java package

tailf-hcc 5.0 and above

- The be used with NSO 5.4 and above
- Virtual IP
- BGP (GoBGP)

- Erlang package

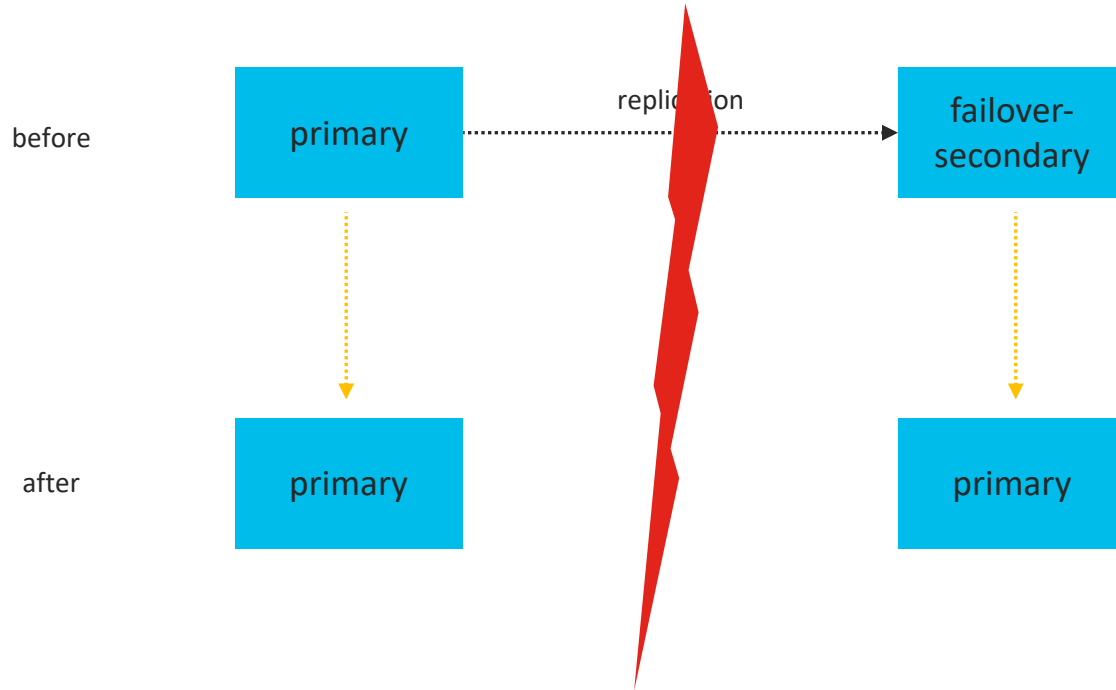
Start-up behavior NSO 5.4

- Enable is persistent
- assume-nominal-role
true/false
- join-ha true/false

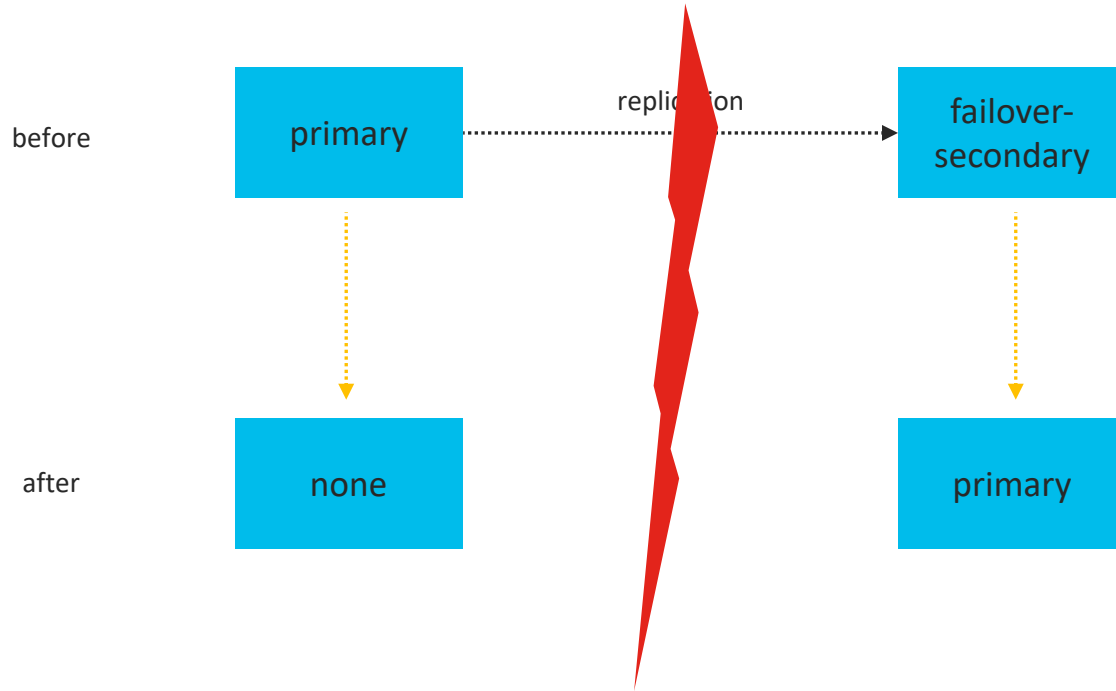
Rule based Consensus NSO 5.7

- Prevent split-brain
- 2 or 3 nodes

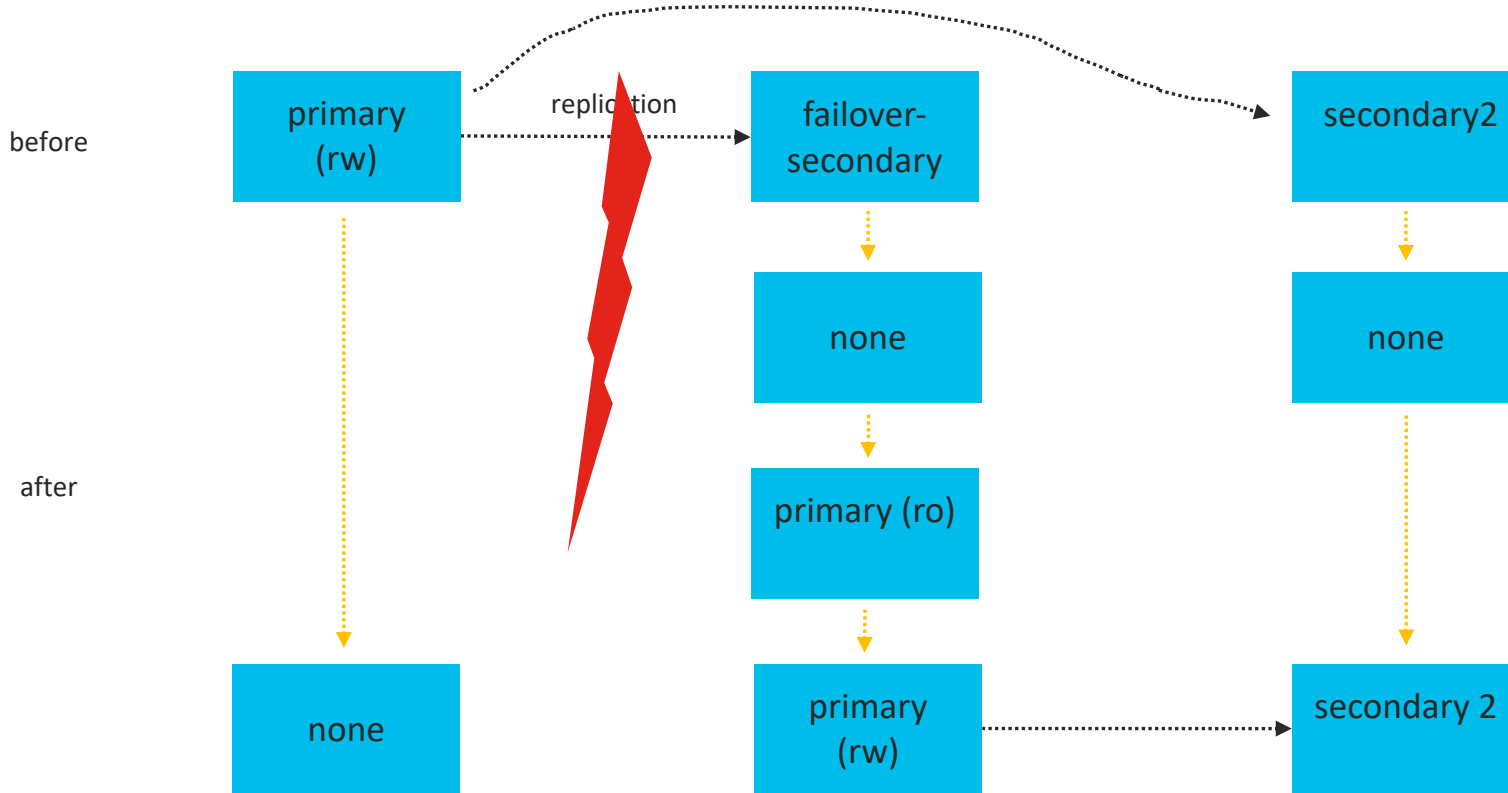
Failover – default behavior



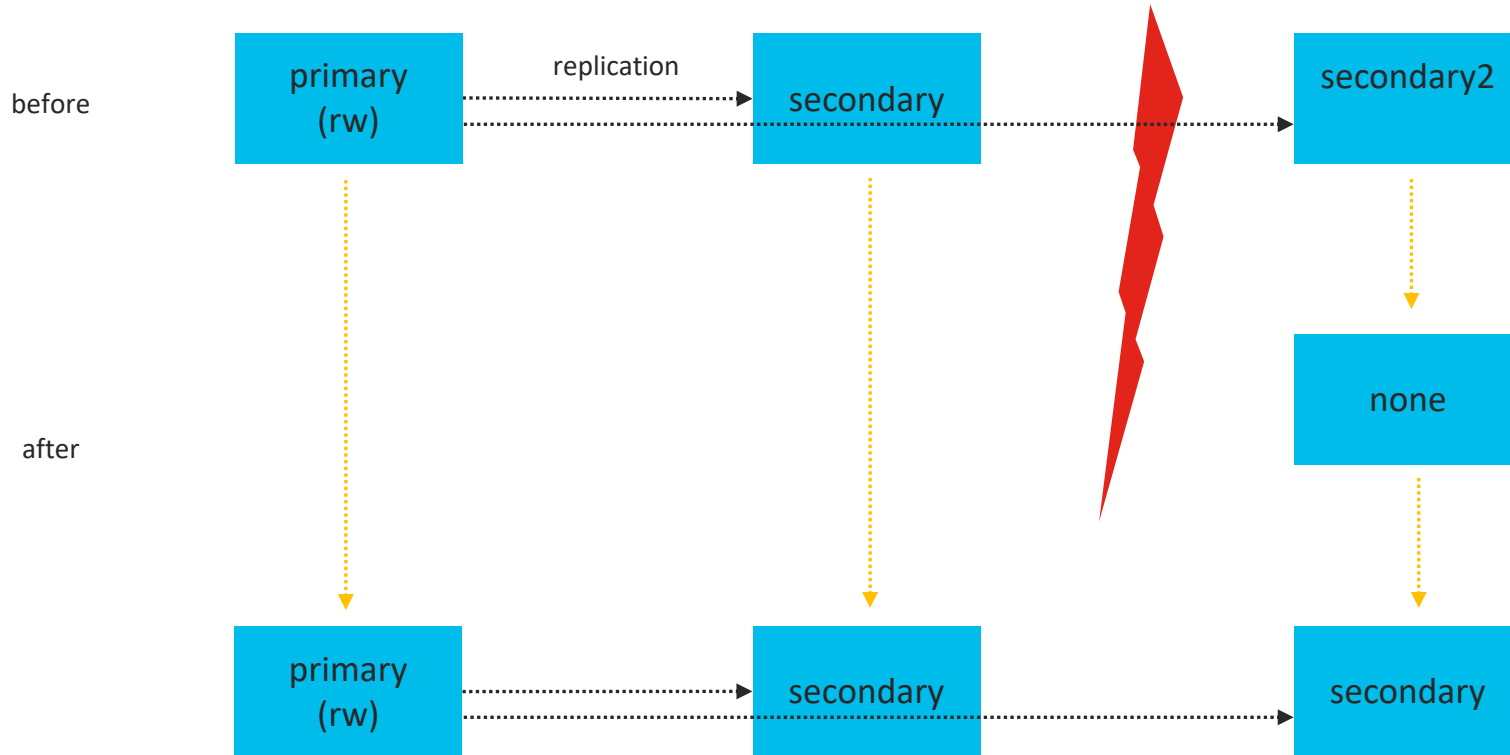
Failover – Consensus rule based (two nodes)



Failover – Consensus rule based (three nodes)



Failover – Consensus rule based (three nodes)






High availability monitor (NSO 5.7)



High availability cluster
NSO VERSION:5.7

admin ▾

n1 current	n2	n3
running as: master  configured as: master	running as: slave  configured as: slave	running as: unknown  configured as: slave

Package upgrade (NSO 5.8)

Package upgrade admin

```
Progress trace
Sync start
transferring file: cisco-ios-cl1-3.8.tar.gz
transferring file: cisco-ios-cl1-3.8.tar.gz (0.172s)
transferring file: cisco-iosxr-cl1-3.5.tar.gz
transferring file: cisco-iosxr-cl1-3.5.tar.gz (0.203s)
set node to read-only mode (0.008s)
perform ha_upgrade
package reload ha: local init (10.247s)
package reload ha: check if cluster is in sync (0.032s)
package reload ha: local perform (4.988s)
package reload ha: local commit
package reload ha: reload vms (1.633s)
package reload ha: local commit (2.988s)
Sync complete
sync-result/node-id: n1
sync-result/result: true
perform ha_upgrade (10.548s)
```

ADD PACKAGES

Browse files... Upload

Available

Loaded Distribute packages to all HA nodes

- cisco-ios-cl1-3.8 Loaded v3.8.0.1
- cisco-iosxr-cl1-3.5 Loaded v3.5.0.7

C Commit Manager E Configuration Editor A Alarm Manager B Dashboard D Device Manager S Service Manager P Package Upgrade

Additional Packages

- Load balancer support
 - HA Portier
 - Port forwarding on primary node
 - HA Status
 - Authentication-less HA status over HTTP
- Currently provided “AS IS”



The bridge to possible