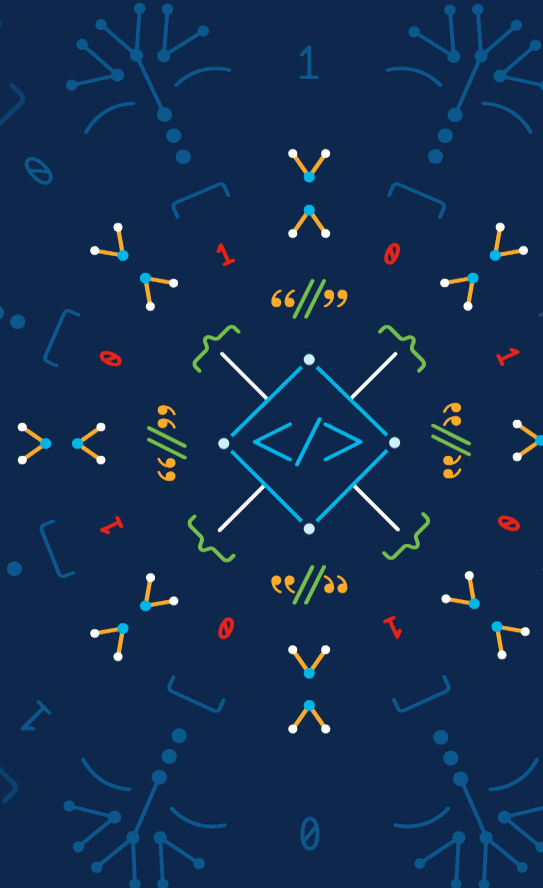


Technical Overview

Using Commit Queues

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Software Engineer – NSO CTO Team
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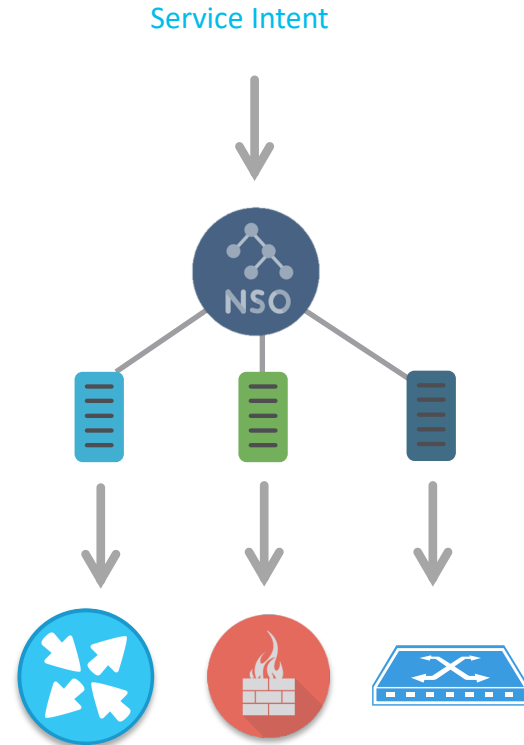
Core Concepts

Atomic transactions: safe and predictable → easy!



Commit Queues

- Need for increased transactional throughput
- Slow devices
- Network performance
- Intermittent network failures or device accessibility



Commit Queue Best Practices

- How to configure CQ:s?
 - Atomic/Non-atomic
 - Error option
 - Global/Device settings
- How to do error recovery?
 - Sync-to/Sync-from
 - Partial-Sync-From
 - Service Re-deploy
- How do CQ:s behave...



- LSA

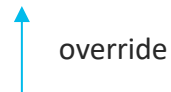
Configuration

- Global
- Device

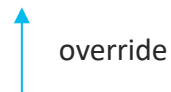
- /devices/global-settings/commit-queue
 - enabled-by-default (false)
 - atomic (true)
 - retry-attempts (unlimited)
 - retry-timeout (30)
 - check-integrity (true)
 - error-option (continue-on-error)
- /devices/device/commit-queue
 - enabled-by-default (<not set>)

Control

- Global settings



- Device settings



- Commit parameters

Commit Parameters

- commit commit-queue ...
 - *sync/async* *mandatory*
 - *atomic* (*true*¹)
 - *error-option* (*continue-on-error*¹)
 - *tag*
 - *trace-id*²

1) Global settings defaults are used if not specified.

2) NSO-5.5+

Sync/Async

- sync

commit commit-queue sync

```
commit-queue {  
    id 1618491912339  
    status completed  
}
```

or

```
commit-queue {  
    id 1618494017698  
    status failed  
    failed-device {  
        name ex1  
        reason RPC error towards ex1:  
resource_denied: resource denied:  
Forbidden!  
    }  
}
```


Sync/Async cont'd

- sync

Risks:

- No commit-queue id if terminal session/connection is broken/interrupted

Sync/Async cont'd

- async

Similar to using sync:

```
# commit commit-queue async

commit-queue {
    id 1618491912340
    status async
}

# devices commit-queue queue-item
1618491912340 wait-until-completed

result completed
```

or

```
result failed
```

But you don't get the failed devices.

retry-attempts

- Handle transient errors
- "unlimited" → Retry forever, no rollback-on-error
- Atomic true → Rollback on successful devices if "one" fails.
- Good to know:
 - Unlimited + atomic true
 - Can result in many rollback transactions on devices for each retry cycle.
- No distinction between: device not responding (transient error) and device rejecting configuration (permanent error). The only way to abort is to delete queue item.

check-integrity

In case of overlapping configuration no new transactions are allowed to be queued to the same device.

E.g. touching the same interface.

Deprecated in NSO 5.7

Scenarios

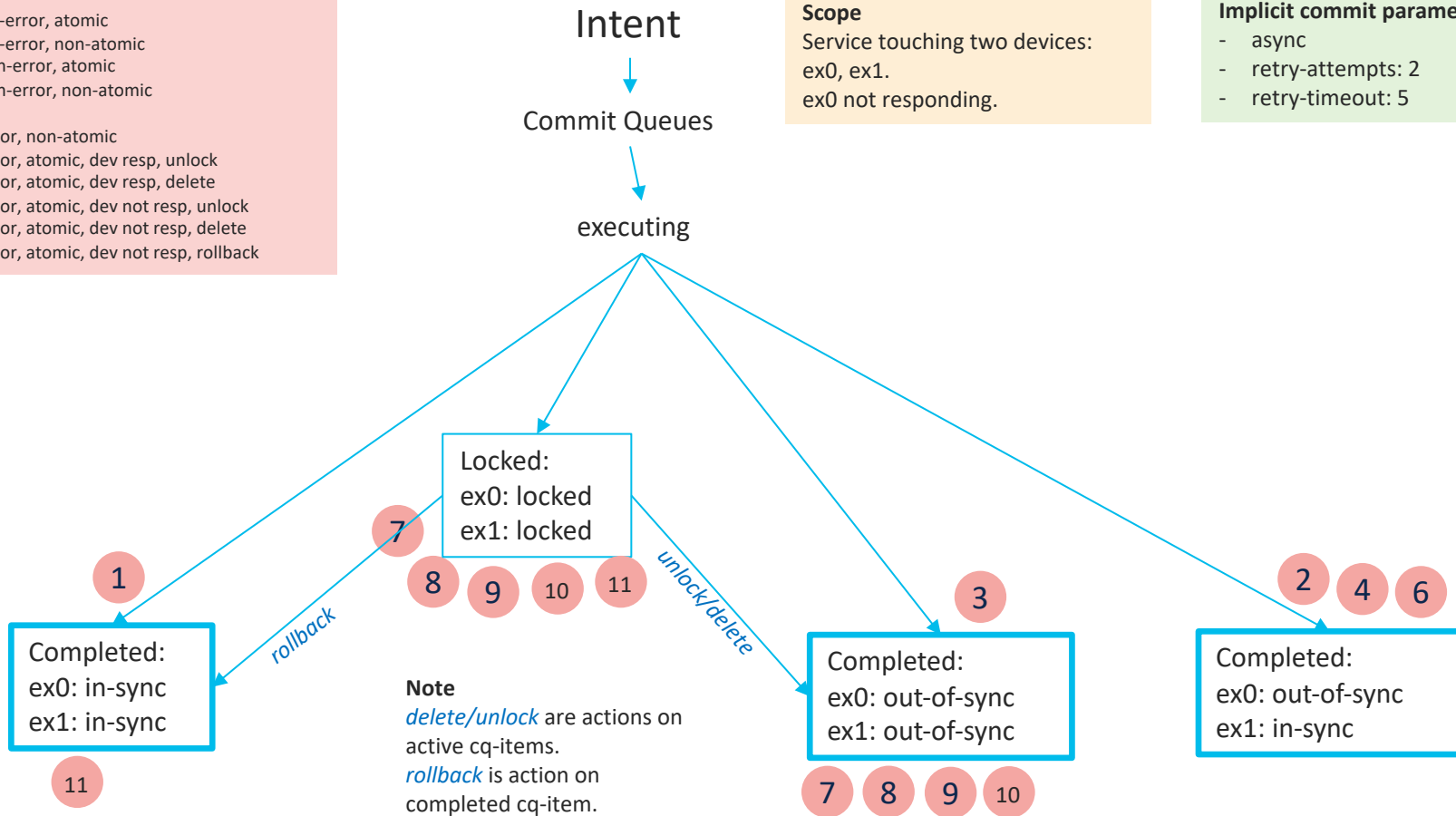
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- 11) stop-on-error, atomic, dev not resp, rollback

Scope

Service touching two devices:
ex0, ex1.
ex0 not responding.

Implicit commit parameters

- async
- retry-attempts: 2
- retry-timeout: 5



Scenarios

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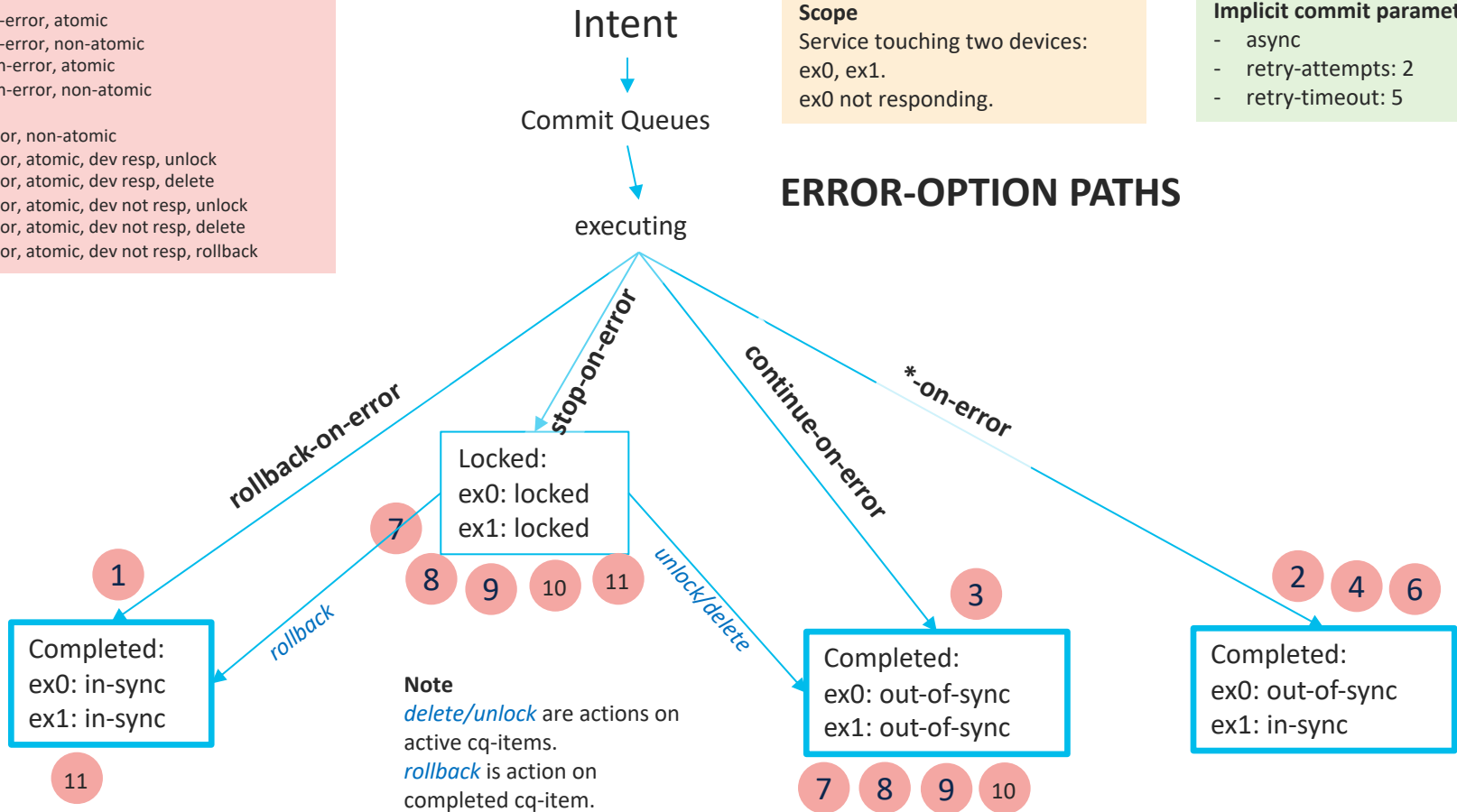
Scope

Service touching two devices:
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ex0 not responding.

Implicit commit parameters

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ERROR-OPTION PATHS



Scenarios

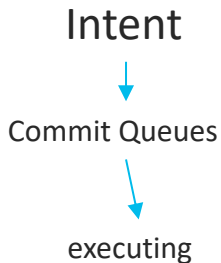
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Service touching two devices:
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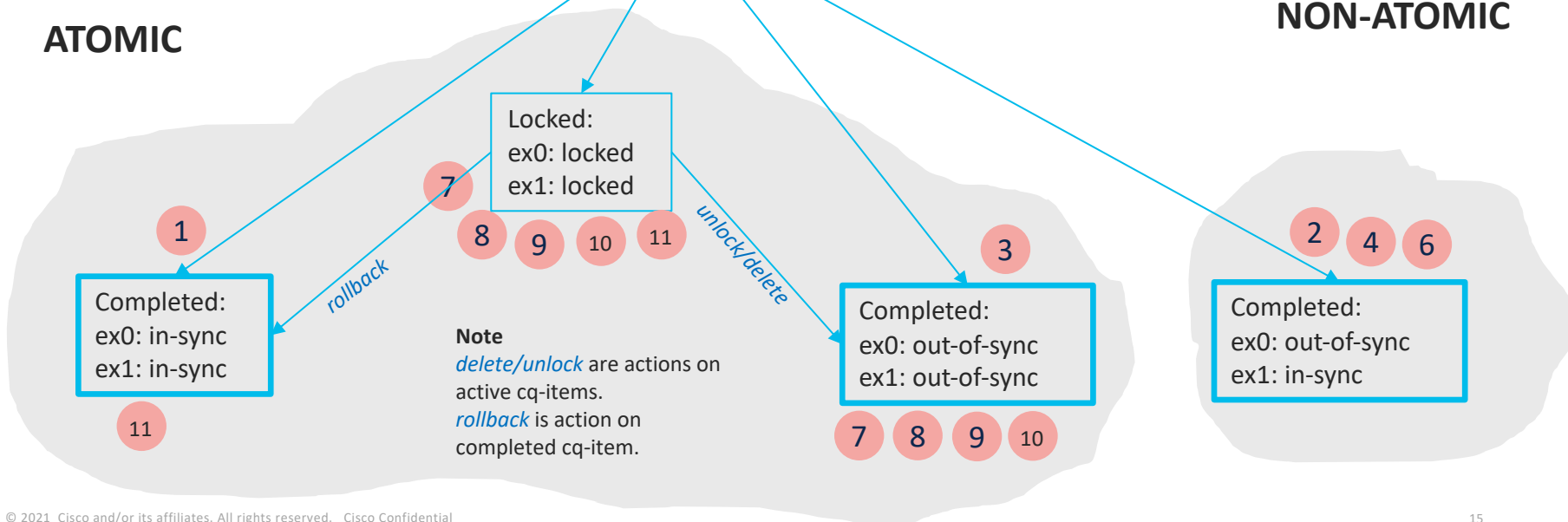
Implicit commit parameters

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- retry-attempts: 2
- retry-timeout: 5



ATOMIC

NON-ATOMIC



Scenarios

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Intent

Commit Queues

executing

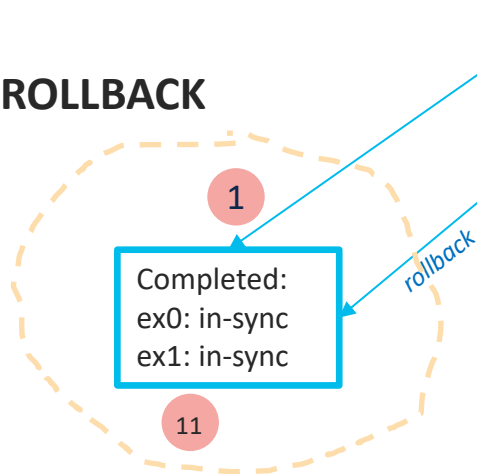
Scope

Service touching two devices:
ex0, ex1.
ex0 not responding.

Implicit commit parameters

- async
- retry-attempts: 2
- retry-timeout: 5

ROLLBACK

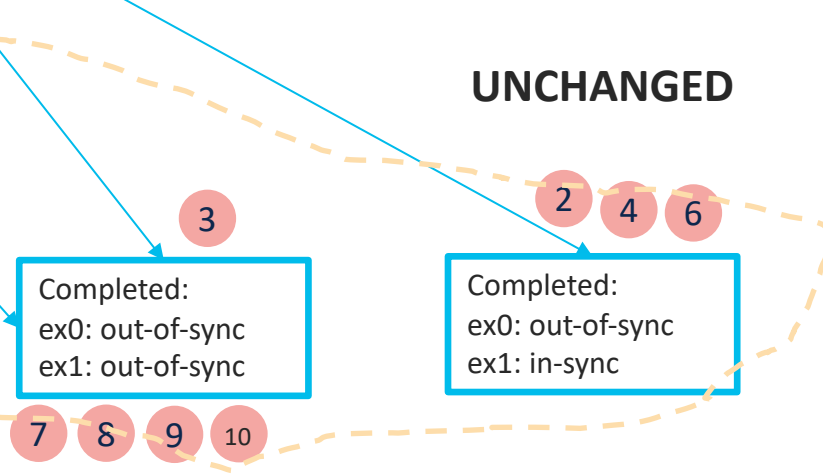


Locked:
ex0: locked
ex1: locked

Note

delete/unlock are actions on active cq-items.
rollback is action on completed cq-item.

UNCHANGED



Scenarios

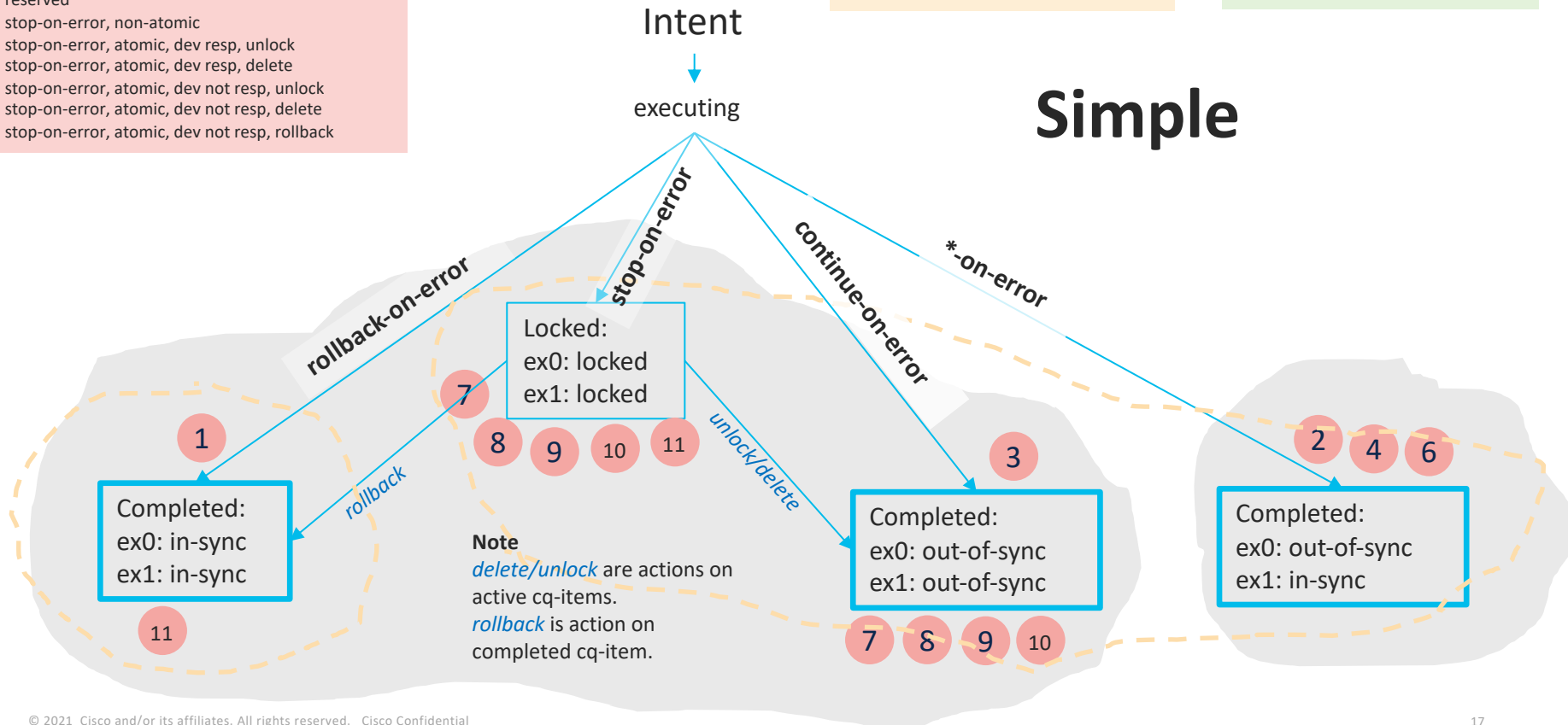
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Scope

Service touching two devices:
ex0, ex1.
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- 11) -

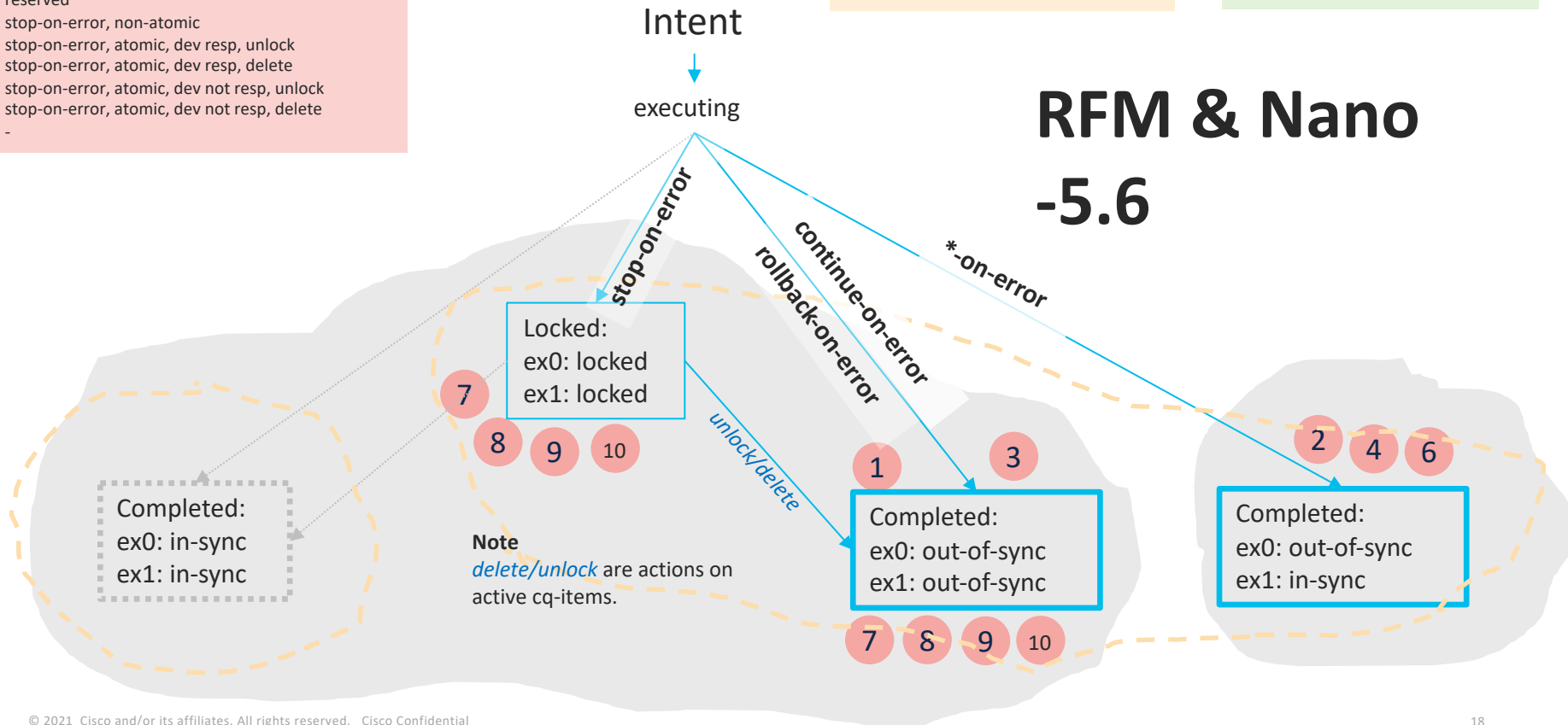
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RFM & Nano -5.6



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Scope

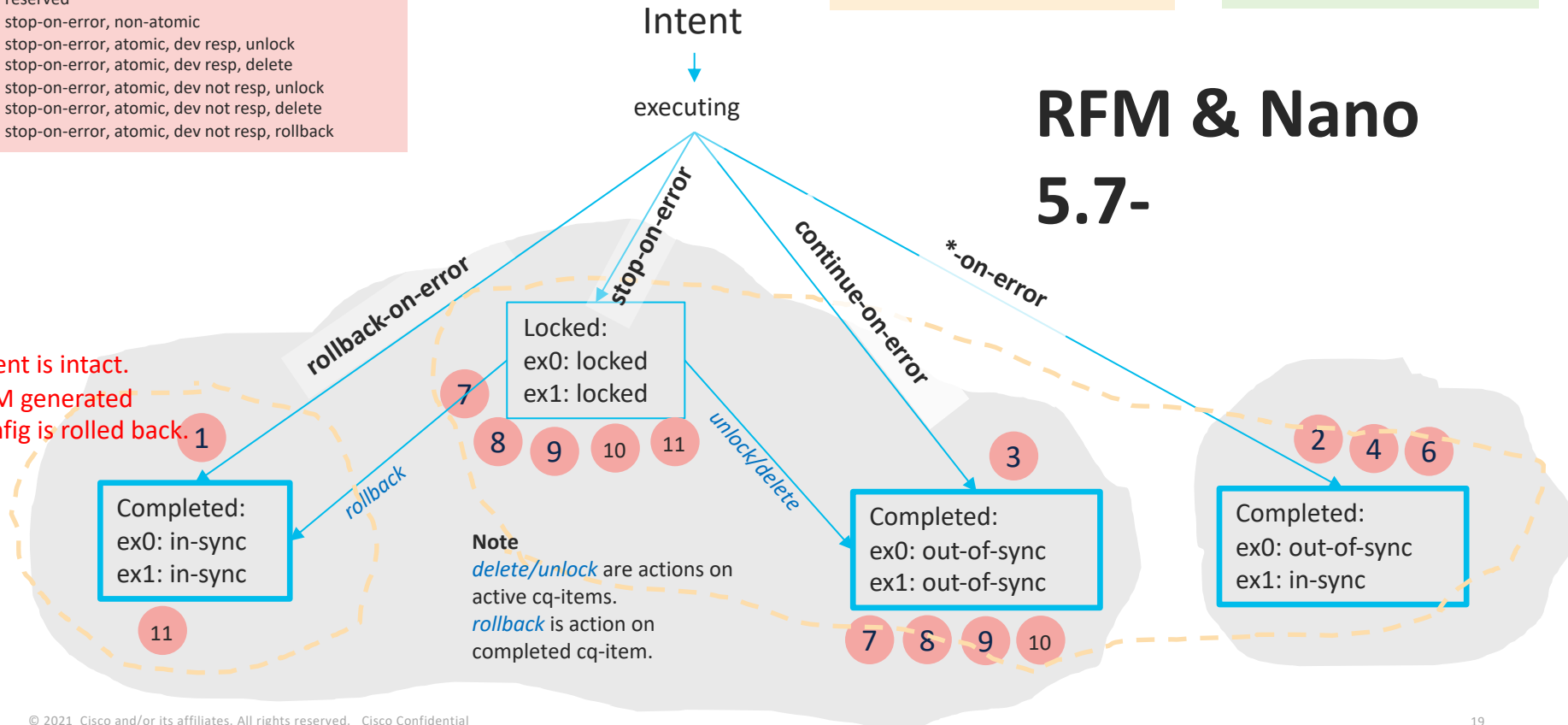
Service touching two devices:
ex0, ex1.
ex0 not responding.

Implicit commit parameters

- async
- retry-attempts: 2
- retry-timeout: 5

RFM & Nano 5.7-

Intent is intact.
RFM generated
config is rolled back.



NSO Scenario Explorer

- Commit Queues
- Commit Queue Progress Events
- Commit Queues + LSA
- Service Plan Change Events
- Netsim Control Panel
- <https://gitlab.com/nso-developer/nso-scenario-explorer.git>

The screenshot displays the NSO Portal interface for Commit Queues. The main content area is divided into several sections:

- Services:** A table with columns for Name, Devices, and Commit-Queue. One entry is visible: test1, ex1, 1613726776570.
- Active Commit Queue:** A table with columns for Tag, Age, Status, ex0, ex1, and ex2.
- Completed Commit Queue:** A table with columns for Id, Tag, Status, When, Failed, and Devices. A 'Purge' button is present. One entry is visible: 1613726776570, lsa:lower-nso-1:1613726776427, failed, 2021-02-19T09:26:16.758126+00:00, ex1, ex1.
- Alarms:** A table with columns for Type, Device, and CI. Two entries are visible: commit-through-queue-failed (ex1) and out-of-sync (ex1). A 'Purge' button is present.

Overlaid on the bottom right is a terminal window titled 'NSO Netsim Control Panel'. It displays the following output:

```
Press 'H' to show the help screen.

ex0      A 0.5
ex1      A 0.5
ex2      A 0.5
ex3      A 0.5
ex4      A 0.5
ex5      A 0.5
upper-nso  A 0.5 T Accept Deny
lower-nso-1 A 0.5
```



The bridge to possible