

Using Change Control and Rollback in Your Nexus Dashboard, Release 4.2.1

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New and changed information

The following table provides an overview of the significant changes up to this current release. The table does not provide an exhaustive list of all changes or of the new features up to this release.

Release Version	Feature	Description
Nexus Dashboard 4.2.1	There were no major changes from the previous release.	

About Change Control

The change control feature allows you to track intent changes using a unique ticket that is associated with a specific action, and provides a stage/approve/deploy workflow with users that have the required privileges.

When you enable the change control feature, any supported deployment operations will be allowed only through change control tickets; all other deployment operations through the GUI or REST API will not be allowed without a change control ticket.

For example, when creating a network *without* change control enabled, you would enter the necessary configurations and deploy the change as you normally would. However, if you have the change control feature enabled, you will be able to save the configuration changes, but you will not be able to deploy those changes until the change control workflow has been completed for that specific operation. Creating, editing, and deleting a fabric do not use change control tickets and remain available when change control is enabled. See Typical Change Control Workflow for more information.



The rollback feature is a related feature to the change control feature, and is covered in the About Rollback area of this document.

The following topics provide more information on the change control feature:

- Guidelines and Limitations: Change Control
- [Enabling the Change Control Feature]
- Roles Associated With Change Control
- Typical Change Control Workflow
- Viewing Change Control Ticket Information
- Configuring the Auto Generated Ticket ID
- Change Control Ticket Lifecycle
- Ticket Purging Policy
- Policy Change History Usage
- Deployment History Usage
- Conflict Detection: Change Control

Guidelines and Limitations: Change Control

Following are the guidelines and limitations for the change control feature:

- Areas Where Change Control is Supported
- Areas Where Change Control is Not Supported
- Additional Guidelines and Limitations

Areas Where Change Control is Supported

The change control feature is supported in the following areas:

- Operations in all LAN fabric template types except:
  - IP Fabric for Media (IPFM) fabrics
  - Campus fabrics
- Operations related to endpoint locator
- Nexus Dashboard backup and restore
- Interface create/edit/delete
- Interface group create/edit/delete
- Link/IFCs create/edit/delete
- Network create/edit/delete
- VRF create/edit/delete
- Policy create/edit/delete

Areas Where Change Control is Not Supported

The change control feature is *not* supported in the following areas:

- Creating, editing, or deleting a fabric
  - These operations remain available when change control is enabled, but they do not trigger or require change control tickets
- Operations in IP Fabric for Media (IPFM) or Campus fabrics
- Private VLAN
- The **Wait for switch mode change to maintenance on deploy** option
- Interface-based flow telemetry
- Operations related to Layer 4 to Layer 7 services
- Security for VXLAN EVPN fabrics using security groups
- Reversing a network change from Layer 2 only to Layer 3
- Fabric backup and restore
- Change control is not supported on Nexus 7000 switches
- Routing Policies - L3Out is not supported



We recommend using change control when you need to track and roll back changes at a granular level. Fabric backup and restore allows you to take fabric-level snapshots of a configuration. These two features cannot be used in conjunction with each other.

Additional Guidelines and Limitations

- Operations related to image management, such as switch image upgrades and changing the switch mode, will continue to work as-is for the Super Administrator and Fabric Administrator role

users. No change control ticket is required for this operation.

- The Reload Switch option will continue to work as-is for the Super Administrator and Fabric Administrator role users. No change control ticket is required for this operation.
- The Push Config option will continue to work as-is for the Super Administrator and Fabric Administrator role users. No change control ticket is required for this operation.
- Change control tickets are fabric agnostic. In other words, changes from multiple fabrics can be tracked and deployed with a single ticket.
- Change control tickets are user agnostic, within a Nexus Dashboard. In other words, UserA can create a ticket, UserB and UserC can associate changes, and so on.
- Users with the intent CRUD privileges (Create, Read, Update, and Delete) can create the ticket and associate changes.
- There is no limitation on the maximum number of outstanding tickets that can be initiated.
- Ensure that switches are **In Sync** before making changes using tickets. See the **Resolving switch Out-Of-Sync conditions resulting from OOB changes** description in Special Change Control Workflows for more information.
- Multiple tickets can be active at the same time and worked on by different users, subject to conflict detection rules, and intent changes can be associated with each of those tickets. However, changes to an entity can only be associated with a single ticket.

  For example, assume a change control ticket **Ticket1** is created, where the operation is to edit Ethernet1/1. You cannot create another change control ticket (**Ticket2**) where that operation is also to edit Ethernet1/1. In this situation, Nexus Dashboard will detect the conflict and will automatically deny the operation for **Ticket2**, and will provide the reasons for the denial. See Conflict Detection: Change Control for more information. *

Enable the Change Control Feature

The change control feature is disabled by default.

Follow these steps to enable the change control feature.

1. Navigate to the **Fabric Management** page in Nexus Dashboard:

   Admin > System Settings > Fabric Management

2. Locate the **Change control** feature box in the **Fabric Management** page and click **Edit** in that box.
3. Click the box next to **Enable change control** to enable the change control feature.
4. Determine if there are other configuration settings that you want for change control:
   - **Enable for Orchestration**: Check the box to enable change control for orchestration for ACI fabrics. The orchestration options are not supported for NX-OS fabrics.

     The following options become available if you check the **Enable for Orchestration** option:

     - **Required number of approvers**: Enter the number of approvers required for change control tickets. Default is 1 approver.
     - **Allow self approval**: This field is enabled by default. Check the box to allow users who

select or create a change control ticket for an action to also approve that change control ticket.

- **Enable for ND Managed Fabrics**: Check the box to enable change control for Nexus Dashboard-managed fabrics.

  The following options become available if you check the **Enable for ND Managed Fabrics** option:

  - **Enable bypass change control for telemetry**: Check the box to enable bypass change control for telemetry.

    If there are any system-triggered changes to configuration settings related to telemetry, a ticket approval or deployment process is not required, as these changes will be automatically approved and deployed if the **Enable bypass change control for telemetry** option is enabled.

    You can also disable **Enable bypass change control for telemetry** option, if you want to create a ticket to approve/deploy. The disable option will not work for colocation fabrics.

  - **Ticket name prefix**: Change the Ticket ID prefix string from the default TICKET_, if necessary. See Configuring the Auto Generated Ticket ID for more information.

5. Click **Save**.

Once you have enabled the change control feature, all areas that are supported with change control are now tracked with a ticket. See Guidelines and Limitations: Change Control for a list of areas that are tracked with a ticket when change control is enabled, and see Typical Change Control Workflow to understand how having the change control feature enabled affects the Nexus Dashboard operations that are supported with change control.

You can return to the **Fabric Management** page to disable the change control feature; however, disabling the change control feature after you have enabled it is not supported when active tickets (works in progress) are detected. You must complete the change control process on any active tickets before you can disable the change control feature in this case.

Once you have successfully disabled the change control feature, the change operations will no longer be tracked with change control tickets. Completed tickets and associated data remains, but you cannot perform any actions against those areas.



If you disable the Change Control feature, the system marks all deployed tickets as ineligible for rollback. If you re-enable the feature, you cannot roll back tickets deployed before the feature was disabled. The **Rollback Allowed** status for these tickets is **FALSE**.

Post-restore ticket reconciliation and required actions

After restoring a backup, the ticket state may not fully reconcile with the device state already applied on the switches. This can occur in both single-ticket and multi-ticket environments. While restored tickets may correctly show an empty preview or diff, subsequent **Rollback** or **Deploy** actions can still generate invalid drift and cause switches to enter an **Out-of-Sync** state.

When a Nexus Dashboard restore is performed with **Change Control** enabled and active change control tickets exist, the system automatically creates an ND_RESTORE_TICKET_<timestamp> ticket in the **CREATED** state. The ND_RESTORE_TICKET_<timestamp> ticket blocks further change control operations until the required post-restore actions are performed, see Perform post-restore actions for more information.

Perform post-restore actions

Follow these steps to perform post-restore actions.

1. Cancel all existing tickets using **Actions > More > Cancel All**.
2. Disable the **Change Control** feature.
3. Perform any required configuration synchronization to return switches to an **In-Sync** state.
4. Re-enable change control feature

Roles Associated With Change Control

These roles are associated with the change control feature:

- **Approver**: Users with this privilege can approve change control tickets.

  A user that is assigned with the Approver role can double-check changes that are associated with a specific ticket and approve or deny those changes.

- **Support Engineer**: Users with this privilege can deploy change control tickets.

  Once a change control ticket is approved by a user with the Approver role, that ticket is then available to any user that is assigned with the Support Engineer role, who can then deploy the changes that have moved to the deployment stage in the change control workflow.

  A user who is assigned a Support Engineer role will also have to go through the necessary credentials process in the **LAN Credentials Management** page:

  Manage > Device Credentials > LAN Credentials Management

  For more information, see the "LAN Credentials Management" section in the Managing Your Device Credentials.

- **Fabric Administrator**: The traditional role of Fabric Administrator is also valid in the change control workflow, where a user with the Fabric Administrator role can also perform the actions associated with the Approver and Deployer roles.

  A user with the Fabric Administrator role can perform all the operations in Nexus Dashboard. For example, a user with this role can freeze a particular fabric or all fabrics in Nexus Dashboard.

- **Designer**: A user with the Designer role can make configuration changes on Nexus Dashboard and can deploy these changes later.

  A Designer can perform the following actions:

  - Edit interface configurations

- View or edit policies
- Create interfaces
- Change fabric settings
- Edit or create templates

However, a Designer cannot perform the following actions:

- Cannot make any configuration deployments to switches.
- Cannot perform deployment-related actions from the Nexus Dashboard Web UI or the REST APIs.
- Cannot access the administration options like licensing, creating more users, and so on.
- Cannot move switches in and out of maintenance mode.
- Cannot move fabrics in and out of deployment-freeze mode.
- Cannot install patches.
- Cannot upgrade switches.
- Cannot create or delete fabrics.
- Cannot import or delete switches.
- When you perform a **Recalculate & Deploy** action as part of a switch or interface configuration process, the host port resync process pulls the running configuration from the switches using LAN credentials. However, a user with the Designer role does not have access to the LAN credentials, so the **Recalculate & Deploy** action will fail in this case for users with the Designer role. Instead, a user with the Fabric Administrator role, with the appropriate LAN credentials, should perform the **Recalculate & Deploy** action in this case. Note that this issue exists regardless of whether change control is enabled or not.

Typical Change Control Workflow

Change control tickets have a defined workflow lifecycle, and include state information that indicates where they are in the workflow.

Following is a typical workflow when using change control:

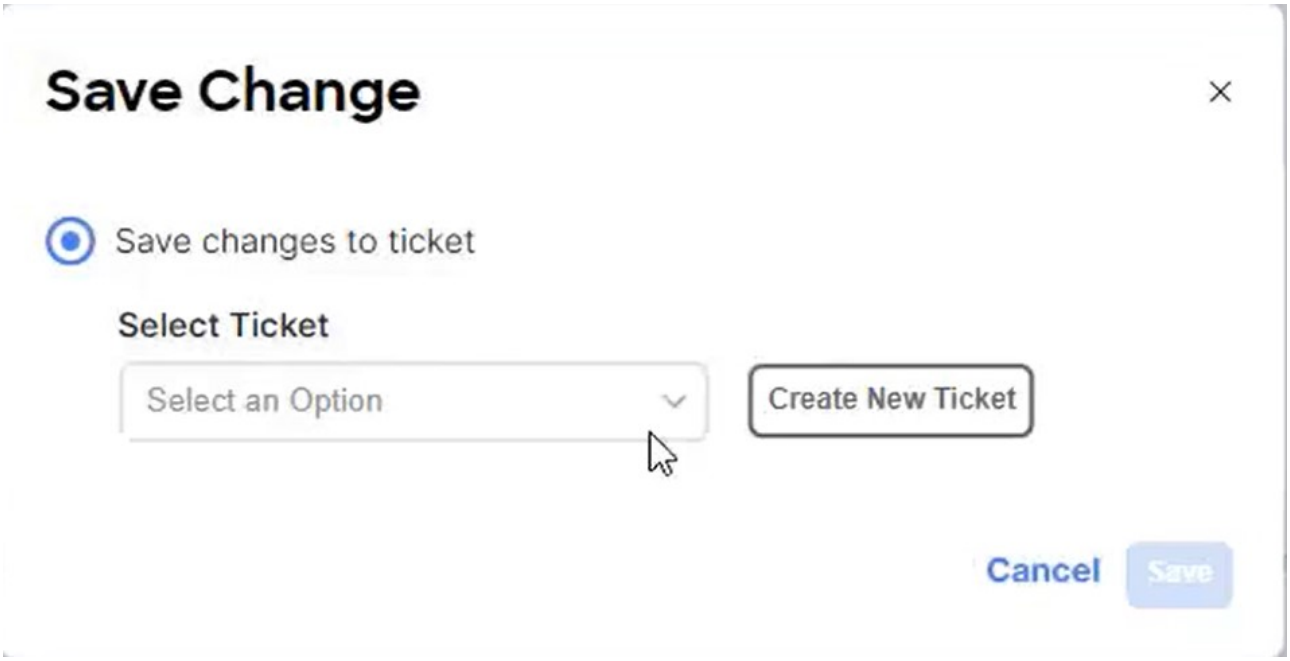
1. Verify that the change control feature has been enabled.

   See [Enabling the Change Control Feature] for those procedures.

2. Verify that the appropriate users have been assigned the necessary Approver and Deployer change control roles.

   See Roles Associated With Change Control for more information.

3. If you are performing an operation where change control is supported, at the end of that operation, a change control popup page appears, similar to the following:

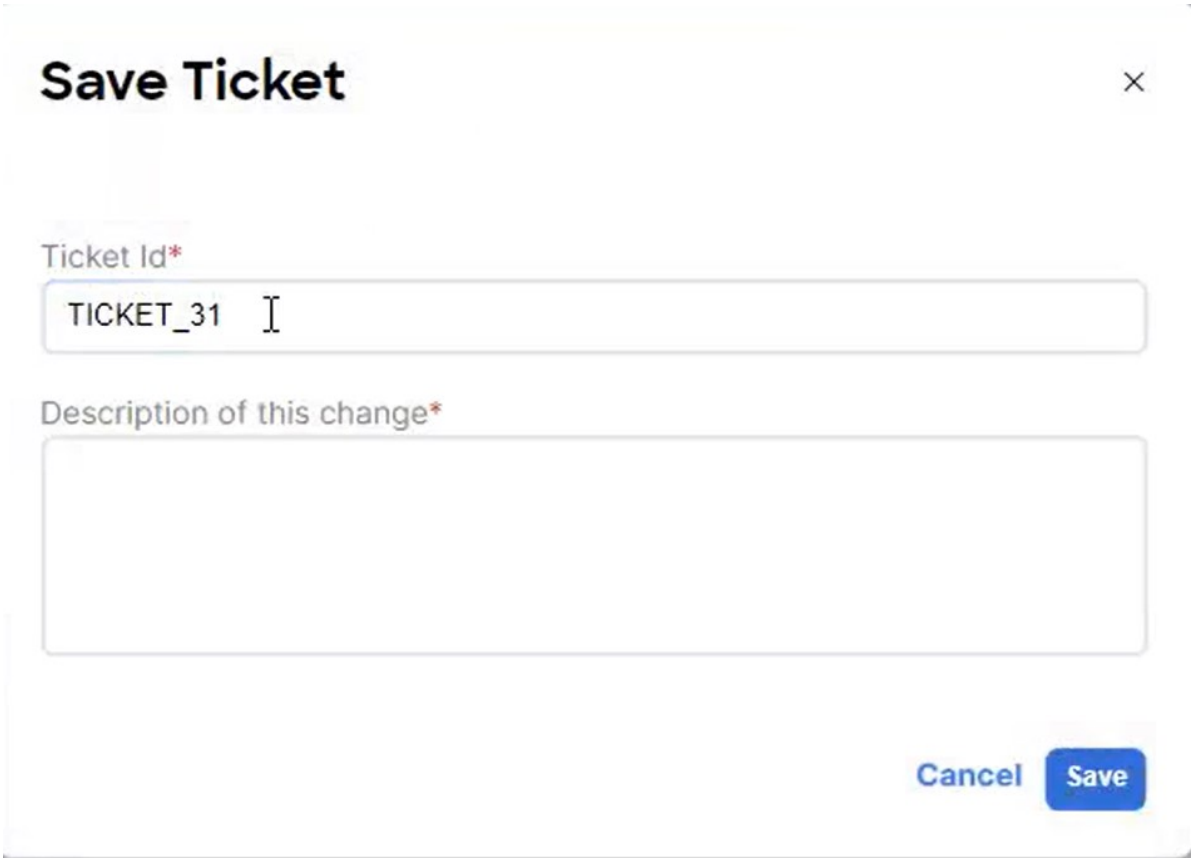


For example, if you have change control enabled and you are creating a new network, once you have entered all of the necessary information in the configuration fields and clicked **Save**, a change control ticket, similar to the image above, appears. Fabric create, edit, and delete operations do not trigger this popup and do not require change control tickets.

4. Enter the necessary information when the change control ticket appears to describe this change:
   a. In the **Select Ticket** field, select a previously-configured change control ticket, or click **Create New Ticket** to create a new change control ticket for this operation.

      See Guidelines and Limitations: Change Control for more information on scenarios where you might choose to use a previously-configured change control ticket for an operation.

      - If you selected a previously-configured change control ticket for this operation, click **Save**, then go to Step 5 in these procedures. Note that the following applies for the previously-configured change control tickets listed here:
        - Only tickets that are in the PENDING or DENIED states will be listed.
        - The ticket list is filtered with RBAC rules, so you will only see tickets that are associated with fabrics that you have access to.
      - If you clicked **Create New Ticket** to create a new change control ticket for this operation, the **Save Ticket** page appears.



Continue with these steps to configure the new change control ticket.

b. In the **Ticket Id** field, note that an automatically-generated change control ticket ID is entered by default for the new change control operation.

   Each new change control ticket is given an automatically-generated ticket ID in this format:

   <Ticket ID prefix string><Sequence id>

   - The <Ticket ID prefix string> part of the ticket ID is automatically generated based on the configurations in the **Admin > System Settings > Fabric Management > Change control** area. If you want to change the <Ticket ID prefix string> part of the automatically-generated ticket ID, see Configuring the Auto Generated Ticket ID.
   - The <Sequence id> part of the ticket ID is a numerical value that is automatically incremented.

c. Determine if you want to use the automatically-generated change control ticket ID for this operation or if you want to manually enter a different, unique ticket ID for this operation.

   If you do not want to use the automatically-generated ticket ID, you can delete the default text in the **Ticket Id** field and replace it with new text, if necessary. The new ticket ID must meet the following criteria:

   - Only a-z, A-Z, 0-9, _, - characters are allowed.
   - The ticket ID should start with an alphabetical character.
   - Maximum length is 64 characters.

d. In the **Description of this change** field, enter the reason for this change control ticket (for example, "This ticket is for creating the 'DC1' Data Center VXLAN EVPN fabric"). The

maximum length for the text in this field is 255 characters.

e. Click **Save** after you have entered the necessary information in the fields in the **Save Ticket** page.

   You are returned to the **Save Change** page, with the new ticket ID showing in the **Select Ticket** field by default.

f. Click **Save** in the **Save Change** page.

5. After you have completed the configurations in the **Save Change** page and clicked **Save**, you are returned to the original page where you were attempting to perform an operation where change control is supported.

   For example, using the example operation that we described earlier in these procedures, you would return to the **Create Fabric** page. You would then proceed through that remaining set of processes specific to this action as you normally would, such as clicking **Save** in the **Create Fabric** page and returning to the **Fabric Overview** page for that new fabric.

   Note that you may not be able to perform certain subsequent actions the same way as before if you have change control enabled. For example, continuing with the fabric creation scenario, normally you would be able to click **Actions > Recalculate & Deploy** in the **Fabric Overview** page for the fabric that you just created. However, when change control is enabled, that option changes to **Actions > Recalculate**; a user with the Support Engineer role can only deploy the change through the change control ticket process once change control is enabled.

6. View the information on the new change control ticket.

   Navigate to **Manage > Change Control** to view detailed information about this change control ticket, and other change control tickets that are already configured on this system. See Viewing Change Control Ticket Information for more information.

7. Submit the ticket for approval, if necessary.

   If you have a Nexus Dashboard Network Admin user role, you do not have to submit the ticket for approval in this step; the ticket will be automatically approved internally. Skip to the deployment process in Step 8 below in this case.

   a. With the **Active** tab selected in the **Change Control** page, select the change control ticket that you want to submit for approval.

   b. Click **Actions > Submit for approval**.

      A warning message appears, asking if you're certain that you want to submit this change control ticket for approval.

   c. Enter a reason for the approval request in the text page, then click **Ok**.

Special Change Control Workflows

The following change control workflows have special characteristics that make them unique in some way:

- **Cancelling All active tickets and disabling the change control feature**: Normally, the change control feature cannot be disabled if active tickets are present. However, there may be situations

where the change control feature must be disabled forcefully with active tickets. The **Cancel all** option (**Actions > More > Cancel all**) is available to Fabric Administrator users to forcefully move all active ticket states to CANCELLED.



This does not perform the rollback action. The ongoing configuration intent is kept intact.

After performing the **Cancel all** action, you can then disable the change control feature from **Admin > System Settings > Fabric Management > Change control**. You can enable the change control feature again from the same location at a later date, if desired.

- **Deleting unwanted tickets**: Only tickets in the CREATED state can be deleted. All records for this will be purged.
- **Changing the switch mode**: Nexus Dashboard supports changing the switch mode in the Topology and Image Management windows; however, since operations related to image management are not integrated with change control, changing the switch mode or other operations from image management will work as-is, while the other flows will require ticket IDs for making changes.
- **Resolving switch Out-Of-Sync conditions resulting from OOB changes**: When Nexus Dashboard detects out-of-band (OOB) configuration changes to switches, their Config Status changes to **Out-Of-Sync**. Gettting those switches back to an In-Sync state without additional configuration intent changes will require deploying the pending diffs using this procedure:
  1. Choose the switches with a Config Status of **Out-Of-Sync** or **Pending**.
  2. Click **Actions > Configurations > Associate with change ticket** and associate with a ticket.
  3. Deploy the diffs using the usual Change Control ticket workflow.

  Out-of-band changes on a switch will appear on existing active tickets.
- **Resolving bad intent issues**:
  - If a ticket is in the APPROVED state but you then need to edit the intent, the Approver user can DENY the ticket to allow further edits.
  - If a deployment attempt has been made on a ticket in APPROVED state, the deployment may fail due to a bad intent, such as a typo, an invalid CLI entry, and so on. The ticket state will show as DEPLOYMENT_ATTEMPTED once the deployment fails. The Approver user can then DENY the ticket to allow further edits and go through the normal ticket deployment flow.
- **Deny/Return For Edits**:
  - For tickets that are in the **APPROVAL_PENDING** or **APPROVED** states, it is possible to make further changes to these tickets by using the **Action > Deny/Return For Edits** option. This is supported for users with any of these roles:
    - Fabric Administrator
    - Approver
    - Designer

    A Designer can perfom this action only if they created the ticket.
  - For tickets that are in the **DEPLOYMENT_ATTEMPTED** state, it is possible to make further

changes to these tickets by using the **Action > Deny/Return For Edits**. This is supported for users with any of these roles:

- Fabric Administrator
- Approver

- **Issues with user roles and VXLAN EVPN Multi-Site Fabrics**:

  An issue may arise due to user roles when working with VXLAN EVPN Multi-Site fabrics.

  Assume your Nexus Dashboard has a fabric group (*fabgroup-fab1*) with two child fabrics (*fab1* and *fab2*). A user with a Designer role (*StagerFab1*), who has write access to the "all" domain and to the the *fab1* child fabric, wants to make configuration changes, such as creating overlay definitions, to the VXLAN EVPN Multi-Site fabric.

  - If change control is not enabled, the *StagerFab1* user is allowed to create overlay definitions in the VXLAN EVPN Multi-Site fabric. That's because, under normal conditions, a user has write access to a VXLAN EVPN Multi-Site fabric if they have both:
    - write access (Fabric Administrator or Designer) on the "all" domain, and
    - write access (Fabric Administrator or Designer) on at least one child fabric in the VXLAN EVPN Multi-Site fabric
  - However, if change control is enabled, the *StagerFab1* user is allowed to create overlay definitions in the VXLAN EVPN Multi-Site fabric, but since the change control ticket involves a VXLAN EVPN Multi-Site fabric and the *fab1* and *fab2* child fabrics, the change control ticket will get filtered out for the *StagerFab1* user because the change control ticket has changes in the *fab2* child fabric, which the *StagerFab1* user does not have write access for.

    To work around this issue, the *StagerFab1* should be assigned a Fabric-Administrator role instead of a Designer role. A user with a Fabric-Administrator role is given the following access:

  - Fabric-Administrator access to domains associated with all member fabrics
  - Fabric-Administrator access to the "all" domain

  A user with a Fabric-Administrator role will be able to successfully make the configuration changes described above with change control enabled.

Viewing Change Control Ticket Information

Navigate to the **Tickets** screen to view information on the change control tickets that have been configured for your Nexus Dashboard system:

Manage > Change Control

Information on the all of the configured change control tickets are provided in the two tabs in the **Tickets** screen:

- Active
- Complete

You can also view detailed information on a specific change control ticket. See Details on a Specific Change Control Ticket for more information.

Active

Tickets in any state other than DEPLOYED or CANCELLED are considered **Active**.

The **Active** tab provides the following detailed information on active change control tickets:

Field	Description
Time	The date and time that the change control tickets were triggered.
Tickets	The names of the change control tickets.
Description	The reason for the change control tickets (the information provided in the **Description of this change** field in the change control tickets).
Status	The status of the change control tickets, such as **CREATED**, **PENDING**, **APPROVED**, **DENIED**, and so on. See Change Control Ticket Lifecycle for more information on the various states that are displayed in the **Status** field and what they mean.
Last Reason	The last reason of the change control tickets, such as **Change Associated**.
Created By	The IDs of the users who triggered the change control tickets.
Approved By	The IDs of the users who approved the change control tickets. See Roles Associated With Change Control for more information.
Deployed By	The IDs of the users who deployed the change control tickets. See Roles Associated With Change Control for more information.

In the **Active** tab, the **Actions** button provides the following actions:

- **Create ticket**: Allows you to create a change control ticket.
- **Submit for approval**: Click a box next to a change control ticket that has a status of PENDING, then click **Submit for approval** to send that change control ticket to a Nexus Dashboard Change Approver.
- **Preview**: Allows you to preview information about the change control ticket, such as the devices that are part of the change control ticket and the progress of the operation that is associated with the change control ticket.
- **Approve**: If you have a Nexus Dashboard Change Approver role, click a box next to a change control ticket that is in the Active state, then click **Approve** to approve that change control ticket.
- **Deny**: If you have a Nexus Dashboard Change Approver role, click a box next to a change control ticket that is in the Active state, then click **Deny** to deny that change control ticket.
- **Deploy**: If you have a Nexus Dashboard Change Deployer role, click a box next to a change control ticket that is in the Active state, then click **Deploy** to deploy that change control ticket.
- **Rollback**: Click a box next to a change control ticket that has a status of PENDING, then click **Rollback** to roll back that change control ticket. See About Rollback for more information.
- **Delete**: Click a box next to a change control ticket that is in the Active state, then click **Delete** to delete that change control ticket.

Complete

Tickets in the DEPLOYED or CANCELLED state are considered **Complete**.

The **Complete** tab provides the following detailed information on active change control tickets:

Field	Description
Time	The date and time that the change control tickets were completed.
Tickets	The names of the change control tickets.
Description	The reason for the change control tickets (the information provided in the **Description of this change** field in the change control tickets).
Status	The status of the change control tickets, such as **DEPLOYED** or **CANCELLED**.
Last Reason	The last reason of the change control tickets, such as **Deployment Successful - No Changes** or **Ticket Rolled Back**.
Created By	The IDs of the users who triggered the change control tickets.
Approved By	The IDs of the users who approved the change control tickets. See Roles Associated With Change Control for more information.
Deployed By	The IDs of the users who deployed the change control tickets. See Roles Associated With Change Control for more information.

In the **Complete** tab, the **Actions** button provides the following actions:

- **Rollback**: Click a box next to a change control ticket that has a status of DEPLOYED, then click **Rollback** to roll back that change control ticket. See About Rollback for more information.

Details on a Specific Change Control Ticket

Additional details are available for each change control ticket.

1. Navigate to the main **Tickets** page:

   Manage > Change Control

2. Double-click on any change control ticket listed under the **Tickets** column in either the **Active** or the **Complete** tab in the **Tickets** page.

   The details page for that specific change control ticket appears.

   - Change Records
   - Audit History
   - Deployment History

Change Records

The **Change Records** page shows the set of changes that are associated with this ticket.

The following fields are shown in the **Change Records** page:

Field	Description
Action	Indicates the user activity.

Operation	Indicates the type of operation used in the change control ticket, such as **Update** or **Add**.
Fabric	The name of the fabric that the change control ticket is associated with.
User	The user ID of the person who triggered the change.
Rollback Allowed	Indicates if Nexus Dashboard can revert the specific change. For more information, see Guidelines and Limitations: Rollback. NOTE: Even if this flag is set to "true," Nexus Dashboard enables the **Rollback last action** option only for tickets in the **PENDING** or **DENIED** states. For tickets in the **DEPLOYED** state, Nexus Dashboard supports only the **Full ticket rollback** option.
Timestamp	The date and time when the change was triggered.
Details	Click **View Details** to view additional details on this change control ticket.

Audit History

The **Audit History** page shows the state of the transitions associated with this ticket.

The following fields are shown in the **Audit History** page:

Field	Description
Updated Time	The date and time that the stage in the change control ticket workflow occurred (the stage shown in the **Status** column).
User	The user ID of the person who triggered the change.
Status	The state of the transition for the change control ticket.
Reason	The reason for the change control ticket (the information provided in the **Description of this change** field in the change control ticket).

Deployment History

The **Deployment History** page shows the set of deployment records that are associated with this ticket (available only when a deployment has been attempted).

The following fields are shown in the **Deployment History** page:

Field	Description
HostName	The IP address of the entity that the change control ticket was triggered on.
Entity Name	The name of the entity that the change control ticket was triggered on.
Entity Type	The type of entity that the change control ticket was triggered on.
Source	The source where the entitythat the change control ticket was triggered on resides.
Commands	Click **Detailed History** to view details of the before and after commands associated with the change control ticket was triggered.
Status	The state of the transition for the change control ticket.

Serial Number	The serial number of the entity that the change control ticket was triggered on.
Status Description	The status of the change control ticket.
User	The user ID of the person who triggered the change.
Time of Completion	The date and time when the change control ticket was successfully deployed.

Configuring the Auto Generated Ticket ID

The change control ticket ID is set to be automatically generated, where each change control ticket uses the following format:

<Ticket ID prefix string><Sequence id>

Where:

- The <Ticket ID prefix string> is a configurable property, with **TICKET_** used as the default value.
- The <Sequence id> is a numerical value that is automatically incremented that cannot be changed, starting with the default value of 0.

For example, if you were to change the value of the <Ticket ID prefix string> from **TICKET_** to **ND1_**, then the change control tickets would start with the names ND_0, ND_1, and so on.

To configure the auto generated Ticket ID information:

1. Navigate to:

   Admin > System Settings > Fabric Management > Change control

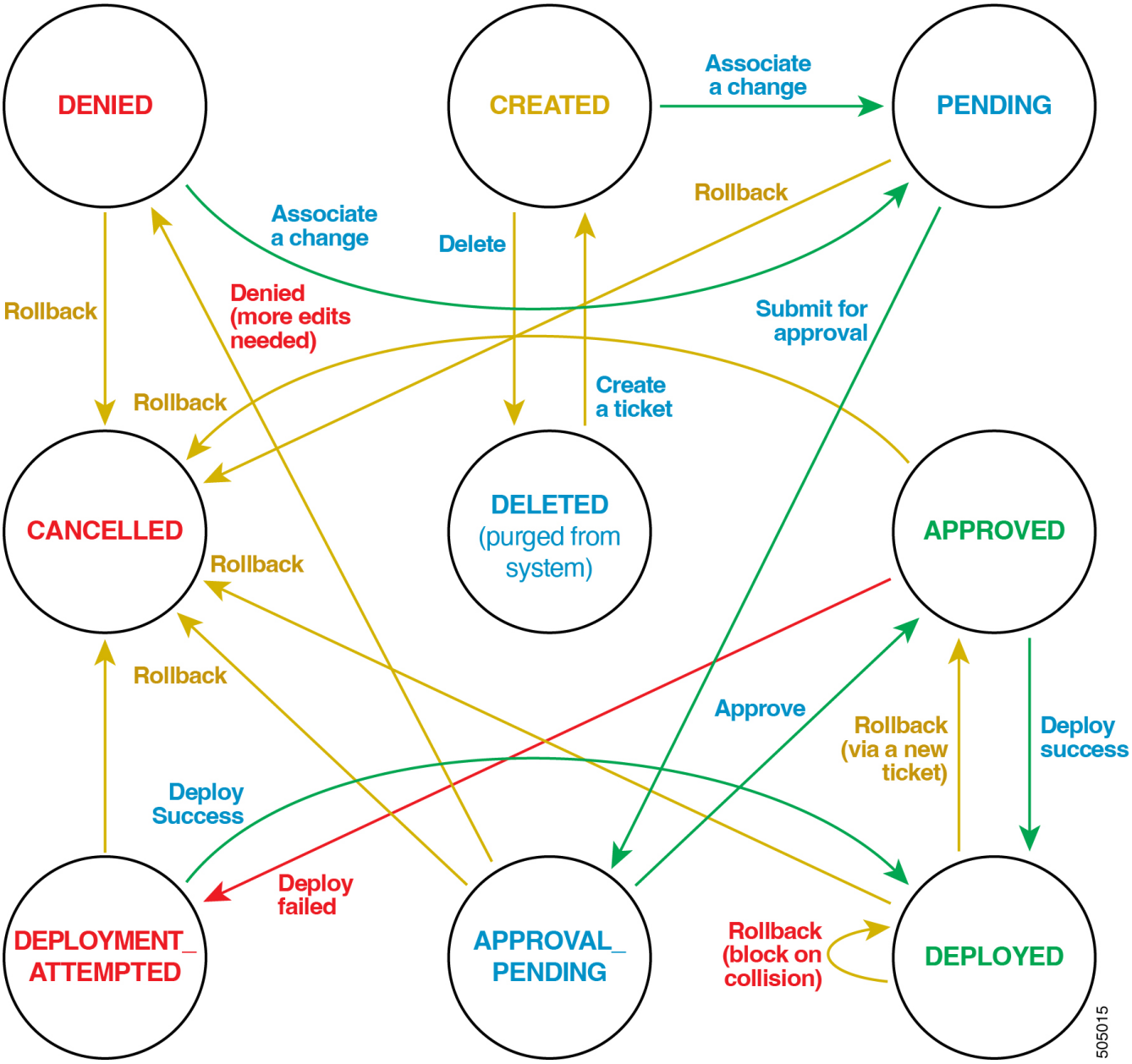
2. Locate the **Ticket name prefix** field.
3. Enter the value that you want to use for the <Ticket ID prefix string> part of the change control ticket ID.

   Only a-z, A-Z, 0-9, _, - characters are allowed, and the name should start with an alphabetical character.

4. Click **Save**.

Change Control Ticket Lifecycle

The following figure shows the various states that a change control ticket goes through.



The following table describes each stage of the change control ticket lifecycle.

Field	Description
CREATED	Newly-created tickets will be in the CREATED state.
PENDING	A ticket with at least one associated change will be in the PENDING state.
APPROVAL_PENDING	Intent changes associated with an APPROVAL_PENDING ticket are completed and have been submitted for approval. Only users with Super Administrator and Designer privileges can perform this action.
APPROVED	The user with Approver (and Super Administrator) privileges has reviewed the changes and is satisfied with the content. This state indicates that the ticket is ready for deployment.

DENIED	The user with Approver privileges (and Super Administrator) has reviewed the changes but requests more changes to be associated. This state indicates that the Designer must amend the existing ticket. Once a change is associated with a ticket in this state, it will move to the PENDING state.
CANCELLED	This could ndicate a ticket that has been rolled back. This is a terminal state. See About Rollback for more information. This can also occur when a Nexus Dashboard Network Admin user performs a **Cancel all** action. This action is not a rollback, but instead forcefully moves the ticket to a CANCELLED state, leaving all the intent changes as is.
DEPLOYED	The user with Support Engineer (and Super Administrator) privileges has successfully deployed the ticket. This is a terminal state.
DEPLOYMENT_ATTEMPTED	This indicates an earlier failed deployment attempt. Users with Support Engineer (and Super Administrator) privileges have attempted a deployment that may have failed due to bad intent, issues with the reachability of the switch, or some other error condition. The ticket will either need to be edited (a change of intent) and/or will require a reattempt deployment after the error condition is fixed. Changing the intent will require the Approver user to **Deny** the ticket so that it goes to the DENIED state, and will then go through the approval process again. Any number of deployment attempts can be performed in this state until the entire set of diffs gets deployed successfully. Once the deployment is successful, the ticket will move to the DEPLOYED state.

Ticket Purging Policy

- Tickets in the DEPLOYED and CANCELLED states (Complete), along with their associated records, will be retained for a certain number of days based on a setting in the **LAN-Fabric** tab in the **Server Settings** page.

  Set the amount of time that tickets will be retained by navigating to:

  Admin > System Settings > Fabric Management > Advanced Settings > LAN-Fabric

  Locate the **Change Control Completed Tickets Purge Interval in days** field and enter the appropriate value. The default value for this field is 30, and the acceptable range for this field is 10-60 days.

- The purging check occurs once per day.
- Tickets identified for purging will be removed from Nexus Dashboard along with their associated Policy Change History and Deployment History records. No record of the purged ticket will be maintained on Nexus Dashboard.

Policy Change History Usage

Change control tickets use the **Policy Change History** record for tracking changes.

- The **PTI History Tracking** server setting, if checked, will disable the tracking of Policy Change records. When the Change Control feature is enabled, this server setting is a no-op.
- The **Purge limit for PTI history** server setting controls the maximum number of policy change records that will be retained. When the Change Control feature is enabled, change records associated with tickets will not be purged. The Policy Change History records will be purged along with the ticket identified to be purged.

Deployment History Usage

Tickets use the **Deployment History** record for tracking deployment changes.

The **Purge limit for deployment history** server setting controls the maximum number of deployment records that will be retained. When the Change Control feature is enabled, deployment records associated with tickets will not be purged. The Deployment History records will be purged along with the ticket identified to be purged.

Beginning with Nexus Dashboard 3.2.1, to prevent a backup and restore failure due to a timeout because the purge limit for deployment history exceeds 4 million records, Nexus Dashboard checks the number of deployment history records every five minutes. Nexus Dashboard checks whether the number of deployment history records in the pmn_deployment_history table is more than 2 million and the number of deployment history records that are older than 24 hours is more than 300,000. If the condition matches, Nexus Dashboard purges the expired records that are older than 24 hours and keeps at most ten expired records for the host or flow policy for each device.

Conflict Detection: Change Control

Nexus Dashboard entities (such as switches, interfaces, networks, VRFs, and so on) can be associated with one active ticket at a time (any ticket whose state is not DEPLOYED or CANCELLED). If you attempt to trigger a change control ticket when a conflict is detected, Nexus Dashboard will not allow that change control ticket to be triggered and will describe the conflict so that you can resolve the issue.

The following conflict checks are performed when changes are associated with active tickets:

- **Entity conflicts**: Each entity can be part of a single active ticket. For example, if Ethernet1/1 of switch A is associated with a change in ticket T1, the same interface cannot be updated by another ticket (T2). However, the same ticket T1 can be used for making further changes to Ethernet1/1 of switch A.
- **Fabric level actions**: Edit settings and Recalculate actions must be in same ticket. If a Recalculate action is part of a ticket, another Recalculate action with a different ticket will be denied.
- **Switch level conflicts**: python, python_cli check at switch level (serial number), template_cli and switch_freeform check PTI id
- **Host Port Resync**: A Recalculate action must be part of the same ticket.

About Rollback

Using the rollback feature, tickets that have been created for change control can be rolled back or reverted, if necessary.

Rollback is supported in the following situations:

- Change control tickets can be rolled back while they are still being worked on, such as a situation where a change was started but then a decision was made to abandon that change. This ticket can be rolled back, at which point all the intent changes made are reverted back to their previous state.
- Tickets that have been deployed can also be rolled back. In this case, a new ticket will be automatically created, which has the intent to be rolled back.



Because the rollback feature is an extension of the change control feature, the rollback feature is available only if you have enabled the change control feature. See [Enabling the Change Control Feature] for those procedures.

The following topics provide more information on the rollback feature:

- Guidelines and Limitations: Rollback
- Typical Rollback Workflow
- Special Rollback Workflows
- Conflict Detection: Rollback

Guidelines and Limitations: Rollback

The rollback feature is an extension of the change control feature. Therefore, all guidelines and limitations described in Guidelines and Limitations: Change Control also apply to the rollback feature. * Rollback for tickets deployed before a feature toggle: If you disable and then re-enable the Change Control feature, you cannot roll back tickets deployed before the feature was disabled. The system blocks these rollbacks. If you try to roll back these tickets, an Invalid request error occurs.

Additional guidelines and limitations for rollback

- Rollback is only supported for tickets associated with these entities.
  - Policies (regular and shared)
  - Networks
  - VRFs
  - Interfaces/links
    - You can perform a **Rollback last action** on any of the entities listed above only if the ticket is in an undeployed state (**Active** tab). Nexus Dashboard disables this option once you deploy the ticket.
    - You cannot perform a **Rollback full ticket** for actions involving entities other than those listed above.

For actions where **Rollback full ticket** is not supported, use separate tickets.

- Only users with the following roles can perform a rollback:
  - Users with an **Super Administrator** role
  - Users with a **Designer** role can perform a rollback; however, an additional **Support Engineer** role is needed to be able to deploy the rollback.

    Following is an example scenario that illustrates where users with certain roles can perform the approval and deployment actions associated with change control tickets, and can also perform a rollback action on those change control tickets:

    1. User-A, who has a Designer + Support Engineer role, creates an intent and associates it with a change control ticket. Later on, User-A also submits the ticket for approval.
    2. User-B, who has an approver role, approves the change control ticket.
    3. User-A then deploys the ticket, since User-A has the Designer + Support Engineer role.
    4. Later on, when it's determined that this change control ticket should be rolled back, User-A is also able to roll back this ticket due to the Designer + Support Engineer role.
- Rollback is supported in the following situations:
  - **Undeployed Tickets**: These are change control tickets where changes have been staged but have not yet been deployed (tickets shown in the **Active** tab in the **Change Control** window). In this case, the changes associated with the ticket will be discarded and the ticket will be moved to the CANCELLED state.

    For undeployed tickets:

    - You can perform a full ticket rollback, or you can perform a rollback of the last action for the undeployed ticket.
    - This rollback can be performed by an Fabric Administrator or any of the staging-related roles.
  - **Deployed Tickets**: These are tickets where changes have been deployed (tickets shown with a DEPLOYED status in the **Complete** tab in the **Change Control** window). In this case, a new ticket with changes to revert the original changes will be created. The new ticket must go through the usual approval process to get deployed, and the original ticket will be moved to the CANCELLED state.

    For deployed tickets:

    - You can only perform a full ticket rollback. You cannot perform a rollback of the last action for a deployed ticket.
    - This rollback can be perfomed by an Fabric Administrator or the Designer.
- Rollback is not supported in the following situations:
  - **Interface groups**: Even though change control is supported for interface groups, rollback is not supported for interface groups.
  - Rollback is not supported for an action ticket that is associated with changes to fabric settings.
  - A rollback of auto-generated rollback tickets is not allowed. The auto-generated rollback tickets are shown as **NDFC_RB-xxxx** tickets; they are generated during the rollback of deployed tickets.

- Any action that involves an inventory change (for example, if you add or delete switches).
- There may be challenges when rolling back certain actions that were “one way” (for example, some role changes).
- Any change control ticket that has Layer 4 to Layer 7 services actions associated with it cannot be rolled back. In other words, if you take an action in the Layer 4 to Layer 7 services window with a new or existing (shared) control ticket, you cannot roll back that change control ticket.
- Similarly, any change control tickets associated with endpoint locator (EPL) cannot be rolled back.

Typical Rollback Workflow

Users with sufficient privileges can perform a rollback.

Following is a typical workflow when using the rollback feature:

1. Navigate to **Manage > Change Control** to view all of the undeployed and deployed change control tickets.
2. Identify a change control ticket that you want to roll back, listed either under the **Active** tab (undeployed tickets) or with a DEPLOYED status under the **Complete** tab (deployed tickets).
3. Click the box next to that change control ticket, then click **Actions > Rollback**.

   A warning messsage appears, asking if you are sure that you want to roll back this ticket.

4. Click **Confirm** in the warning message to continue with this rollback action.

   The **Change Control** window reappears.

   - If you rolled back an undeployed ticket, the rolled-back change control ticket is removed from the list of tickets shown on **Active** page. The rolled-back ticket now appears in the **Complete** page, with CANCELLED shown in the **Status** column and "Ticket Rolled Back" shown in the **Last Reason** column.
   - If you rolled back a deployed ticket, the rolled-back ticket in the **Complete** page changes states, with CANCELLED shown in the **Status** column and "Ticket Rolled Back" shown in the **Last Reason** column.

     Follow these additional steps when rolling back a deployed ticket:

     a. Click the **Active** tab in the **Change Control** page.

        The rolled-back ticket now appears under the **Active** tab, with the status shown as APPROVED.

     b. Click the box next to the rolled-back ticket, then click **Actions > Deploy** to deploy the rolled-back ticket again.

     c. Navigate back to **Manage > Change Control** and click the **Complete** tab.

        The rolled-back ticket now appears with DEPLOYED in the **Status** column.

Special Rollback Workflows

The following rollback workflows have special characteristics that make them unique in some way:

- **Rollback of last action for an undeployed ticket**:

  If you have an undeployed ticket, any user with Designer or Super Administrator roles can roll back the last action that was taken for that undeployed ticket. When all the associated changes are rolled back, the ticket state will be moved back to the CREATED state. Note that you can roll back the last action only on a ticket that is in a pending or denied state.

  For example, assume that you have a single change control ticket with 10 different changes as part of that single ticket, and you want to undo the last change in that undeployed change control ticket. Follow these procedures to rollback the last action in an undeployed ticket in this situation:

  1. Navigate to **Manage > Change Control**, then select the **Active** tab to display all of the undeployed tickets.
  2. Double-click on the undeployed ticket where you would like to rollback the last action on that ticket.

     The overview window for that undeployed ticket appears.
  3. Verify that you can see "true" as the value in the **Rollback Allowed** column for this undeployed ticket.

     You cannot roll back the last action of this undeployed ticket if the value in the **Rollback Allowed** column shows "false".

     When a ticket moves to the **Complete** tab (Status: **DEPLOYED**), Nexus Dashboard disables the **Rollback last action** option in the **Ticket Details** view. To revert the deployed changes, use the **Full Ticket Rollback** process. This process creates a new compensation ticket (NDFC_RB-xxxx).
  4. Click **Actions > Rollback last action**.

     A warning message appears, asking if you're sure that you want to roll back the last action on this ticket.
  5. Click **Confirm** to continue with the rollback.

     The last action in this undeployed ticket is now rolled back.
  6. Navigate back to the **Active** tab in the **Change Control** window.

     The value in the **Status** column for this undeployed ticket changes to CREATED.

- **Full ticket rollback**:
  - Deployed Tickets:
    - Users with the Super Administrator role can perform a rollback on a deployed ticket, which will move the current ticket to a CANCELLED state. A new ticket can then be created internally for the rollback that will be in an APPROVED state that needs to be deployed.

        - Following are the characteristics of an internally-created rollback ticket:
            - The ticket ID shows as **NDFC_RB-xxxxx**. For example, **NDFC-RB-565666666**.
            - The description is shown as " Changes for rolling back ticket XXXXXX" .
            - Both the original and newly-created ticket will cross reference each other's ticket IDs and will be shown in the Nexus Dashboard GUI window.
            - Additional changes to the new ticket are not allowed.
            - The rollback ticket will be moved to an approved state at the end of rollback.
    - When a ticket is rolled back, it will be cancelled. No further actions can be performed on that ticket.
    - When a deployed ticket is rolled back, a new rollback ticket is created. That newly-created rollback ticket will be in the Approved state, so you can perform a deployment on that rolled back ticket.

Conflict Detection: Rollback

The following conflict checks will be performed when a ticket rollback is attempted:

- For deployed tickets, each entity in a ticket that is being rolled back will be checked based on the rules provided in the Conflict Detection: Change Control section.

  For example, assume a deployed ticket is rolled back and has an entity E1. If one of the other pending tickets are associated with the same entity E1, then the rollback request will be treated as a conflict and will be denied.

  As another example, if there are one or more other deployed tickets that are associated with the same entity and if any of those changes are newer than the ticket being rolled back, then the rollback request will be treated as a conflict and will be denied.

- Action level rollbacks are treated the same way as pending tickets, except that the scope is limited to one action.
- The same rules for entity conflicts also apply for action conflicts, such as recalculate config.

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