Change Management Tutorial

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change management

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The purpose of Change Management in Critical Manufacturing MES is to control and track changes related to Versioned Entities, in a way that maintains compliance, traceability, and operational integrity.

The key features of Change Management in MES are the following:

1. Version and Revision Control

   - Managing different Versions and Revisions for all the change-controlled objects, to ensure that only approved versions are deployed on the shop floor.

   - Although Smart Tables are not versioned entities, it is possible to enable Change Control to keep track of their modifications (more information available in the Smart Tables User Guide and an example will be explained in the Change Controlled Smart Tables section).

2. Traceability and Auditability

   - Ensuring that all changes (who, what, when and why) are logged and traceable for audit and compliance.

3. Regulatory Compliance

   - Supports good practice standards, guaranteeing all changes go through formal approval processes like **Change Set** requests, and role-based approval.

4. Collaboration and Approval Workflow

   - Coordinates changes across cross-functional teams (QA, Production, IT) with clearly defined approval hierarchies.

   - The approval workflow is represented by a **State Model** in MES, where it is possible to have multiple approvers with a defined sequence.

   - Hierarchies can be achieved by managing **Change Set** state reviewers. These concepts will be explored in the Implicit Change Set section.

5. Rollback Capabilities

   - Facilitates rollback to prior configurations or workflows in case of failure or defects in the new version, by:

     - Sending the **Change Set** to rework

     - Rejecting the **Change Set**

     - Changing the active version to a prior version, if the **Change Set** is already approved.

6. Process Standardization

   - Promotes standardized approaches to modifications, reducing variability and ensuring consistent manufacturing practices.

Overview

This tutorial is organized into several sections, each focusing on specific functionalities related to **Change Sets**. The structure is as follows:
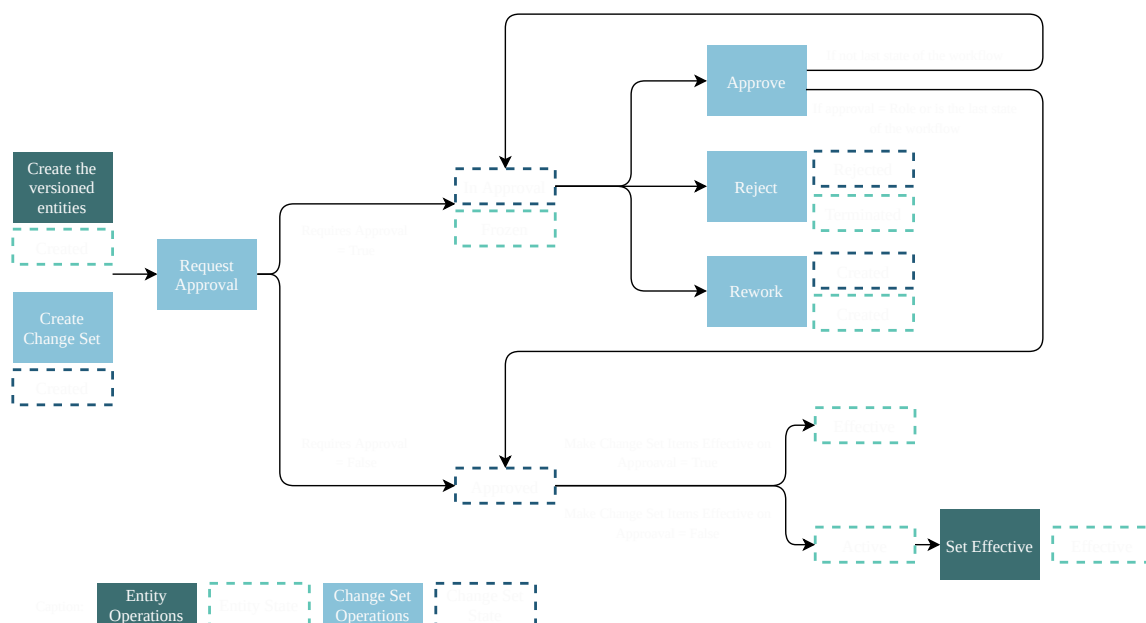
- Change Set Operations: to learn about the various operations you can perform on a **Change Set**, and understand how these actions affect the associated versioned entity instances.

- Manual vs Implicit: to understand the differences between manual and implicit **Change Set**. This section explains configuration for each type and includes practical use cases and demonstration videos, such as:

  - Manual **Change Set** with Approval Role and Effective on Approval

  - Implicit **Change Set** using approval context with Approval Workflow

  - Send Implicit **Change Set** to Rework with Approval Workflow

  - Using Approvers and Observers in an Implicit **Change Set** with Approval Workflow

- Change Set Items with Different Approval Roles: to learn how to configure and manage **Change Set** Items that require different Approval Roles within the same **Change Set**.

- Change Controlled Smart Tables: to explore the available options for change management in Smart Tables and how **Change Sets** can be applied in these scenarios.

- Additional Notes: to discover other advanced operations, including transferring and comparing **Change Set** Items, taking ownership of a **Change Set**, and using **Employee** delegation.

Each section is designed to provide detailed instructions, configuration guidance, and examples to help you get the most out of Change Management functionality.

Change Set Operations

Change sets and versionable entities operate side-by-side. Operations performed at the **Change Set** level are reflected in the state of the entity for which the **Change Set** was created.

The image below explains the possible operations at **Change Set** level and the consequences they have on the respective entity.

> **ⓘ Info**
>
> For complementary information, refer to the diagrams presented in the User Guide Documentation.

For non-versioned entities, it is not necessary to create a change set to maintain control of changes. The lifecycle of these entities is simpler, as once created, they become Active and when terminated, they become Terminated.

Manual VS Implicit

Change Sets can be manual or automatic (implicit). The image below describes the differences between these two types:

- Manual **Change Set**: requires the manual creation and configuration of the **Change Set** for each new version/revision that is created for the versioned entity. The **Change Set** can be created previously or at the time of creating the new entity version/revision.

- Implicit **Change Set**: does not require manual creation of the **Change Set**. As soon as a new version/revision is created, the **Change Set** is automatically created based on the settings applied at the entity level in question.

Manual Change Set

Setup

For the **Change Set** to be created manually, edit the entity properties, by going to the Entity Types Page, and select the entity that will be the target of change control. It must have the following configuration:

- `Automatic Change Set` = False
- If `Use Change Set Approval Context` = True, the Smart Table ChangeSetApprovalContext will be resolved and the Role/workflow configured in the Smart Table needs to be the same as the one defined in the **Change Set**. If the Role/workflow in the **Change Set** is different from the one defined in the Smart Table, then an error will be thrown.
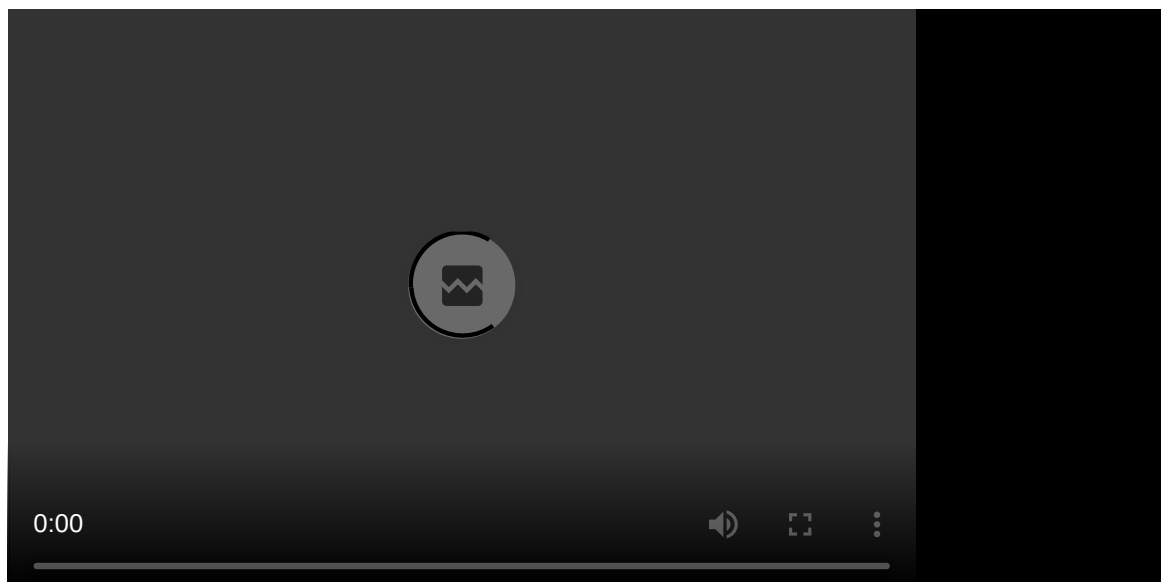
Approval Role and Effective on Approval

The first example to be demonstrated uses two **Roles**:

- Operator: This **Role** is not defined as an Approval **Role**, but it can Request Approval
- Process Engineer: It is defined as an Approval **Role**; only a user belonging to this **Role** has permissions to Approve, Reject or send the **Change Set** for Rework

The video below explores this example of a **Change Set** in which an intervening party is required to approve the changes of a versioned entity.

> ℹ️ **Useful Documentation**
>
> - How to: Create a Change Set
> - How to: Create Items in a Change Set
> - How to: Create a New Version/Revision
> - How to: Approve/Cancel/Reject/Rework/Cancel a Change Set
> - How to: Set Effective a Versioned Entity

Implicit Change Set

Setup

For the **Change Set** to be created automatically, edit the entity properties, by going to the Administration Menu > Entity Types, and select the entity that will be the target of change control. It must have the following configuration:

- `Automatic Change Set` = True
  - Additional fields become enabled and need to be defined (Name Generator to be used in the **Change Set**, Approval Mode, etc.)
- `Change Set Name Generator` : Name Generator to be used as the **Change Set** name once it is automatically created. The Name Generator needs to be created in advance, through Administration > Name Generator.
- `Approval` :
  - It is possible to define a specific **Role** or workflow responsible for the **Change Set** approval. According to the selection (Role/Workflow), the field under it displays a dropdown list with the possible Roles/Workflows of approval.
  - Workflow is used when a sequence of **Roles** is required to perform the approval. This approval sequence must be defined in advance by creating a **State Model**. Note that the Entity Type defined in the **State Model** must be "Change Set"
  - If the dropdown list for either Role or Workflow is left empty and the property `Use Change Set Approval Context` is set to False, there will be no approval **Role**/workflow associated with the **Change Set** (here the system will behave the same way as when the **Change Set** is manually created and the flag `Requires Approval` is set to False).
- `Use Change Set Approval Context` : If true and if no **Role** and workflow were specified above (in the dropdown list), the ChangeSetApprovalContext Smart Table will be resolved and, according to the context, a Role/workflow of approval will be associated with the Change Set.
- `Enable Automatic Approval` : If true, if no **Role** and workflow are specified, and if the flag `Use Change Set Approval Context` is set to False, the **Change Set** will be automatically approved, without the need of selecting the Request Approval button.

✎ Edit Entity Type

Allow Automatic Change Set: ⬤

Make Change Set Items
Effective on Approval : ◯

* Change Set Name
Generator: [   ] ▾

Approval: ⦿ Role
◯ Workflow

Role: [   ] ▾

Notify Requester: ◯
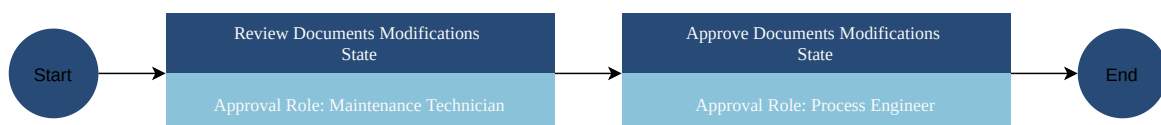
Notify Approvers: ◯

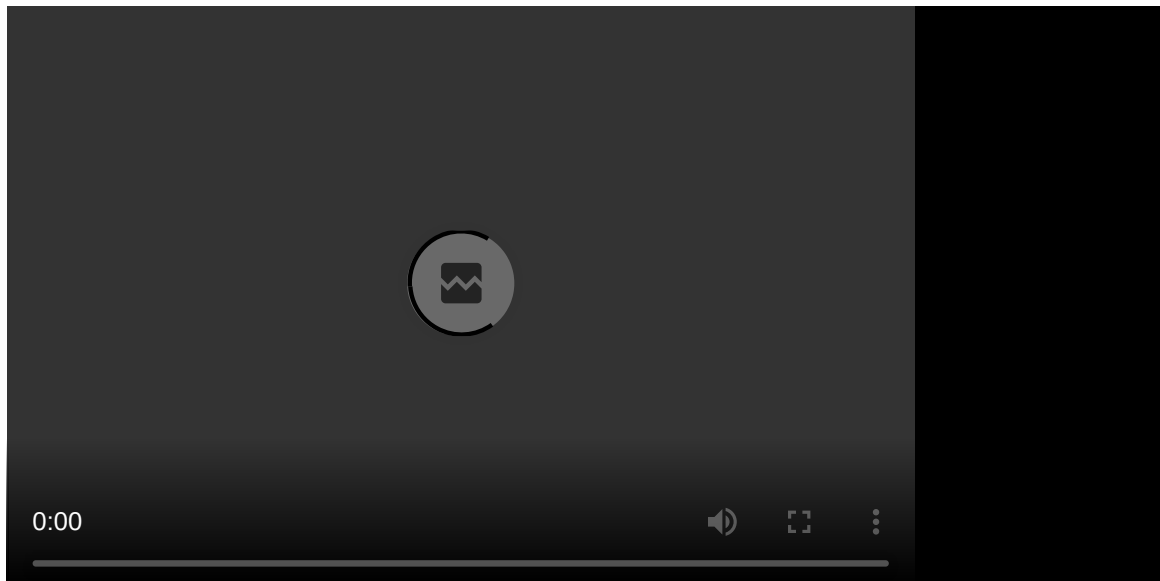Use Change Set Approval
Context: ⬤

Enable Automatic Approval: ◯

Approval Context

In this scenario, the ChangeSetApprovalContext Smart Table will be used to automatically create the **Change Set** with the workflow defined in the table for the **Document** Entity Type.

The video below walks through all the steps from creating the **Document** version, to approving the various workflow states and marking the version as Effective.

To do this, the **State Model** that represents the workflow needs to be created beforehand. In this example, the Maintenance Technician and Process Engineer **Roles** were used, as presented in the diagram below.
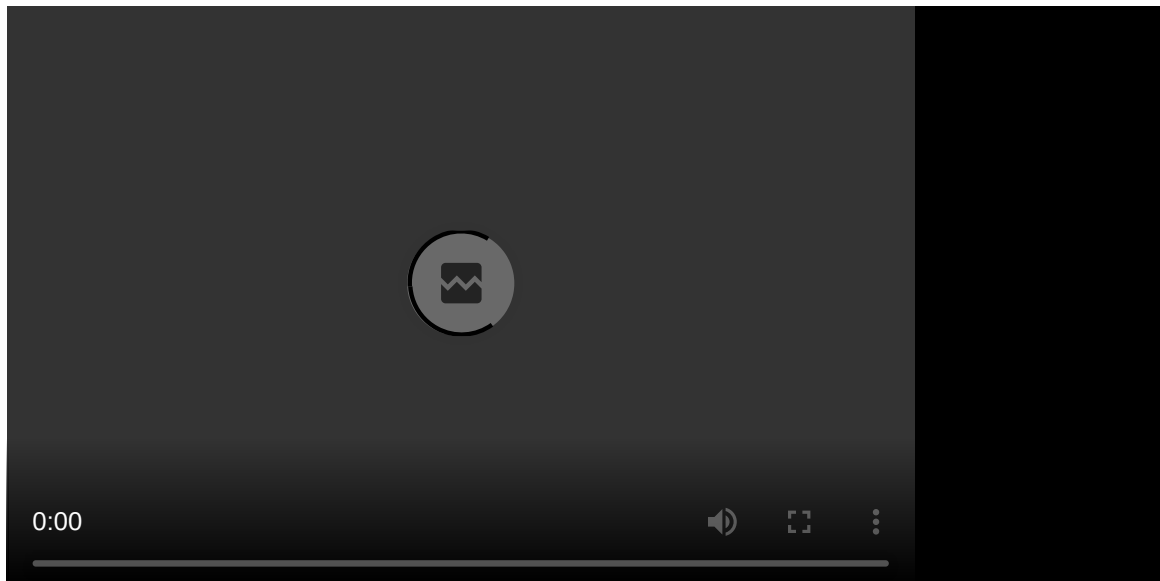
> **ⓘ Useful Documentation**
>
> - How to: Define automatic Change Sets
> - How to: Create an Approval Workflow
> - How to: Create a Change Set
> - How to: Create Items in a Change Set
> - How to: Create a New Version/Revision
> - How to: Approve/Cancel/Reject/Rework/Cancel a Change Set

Change Set Rework

After requesting the **Change Set** approval, there are three possible outcomes:

- Approve the **Change Set**: - When approving the **Change Set**, its system state becomes Approved and the **Change Set** is Terminated - In case of an approval workflow, during the several stages of the **State Model**, the **Change Set** is maintained In Approval and, in the last state, it becomes Approved and the **Change Set** is Terminated

- Send the **Change Set** to rework: - When sending the **Change Set** to rework, its system state changes to Created and it is necessary to perform Request Approval again (the cycle starts from the beginning) - It is possible to add a comment when sending the **Change Set** to rework - The comment is visible in the **Change Set** history

- Reject the **Change Set**: - When rejecting the **Change Set**, its system state becomes Rejected and the **Change Set** is Terminated - It is possible to add a comment when sending the **Change Set** to rework

The scenario in the video below will describe the Rework example, with an Approval Workflow with the **Roles** of Maintenance Technician and Maintenance Engineer, and where it will be possible to confirm the behavior described above.

> **ⓘ Useful Documentation**
>
> - How to: Define automatic Change Sets
> - How to: Create an Approval Workflow
> - How to: Create a Change Set
> - How to: Create Items in a Change Set
> - How to: Create a New Version/Revision
> - How to: Approve/Cancel/Reject/Rework/Cancel a Change Set

Approvers and Observers

This scenario will explore the possibility of having two stakeholders in the Approval Workflow states defined in the **Change Set**.

These stakeholders are called Reviewers and can be classified as Approvers or Observers, with the following responsibilities:
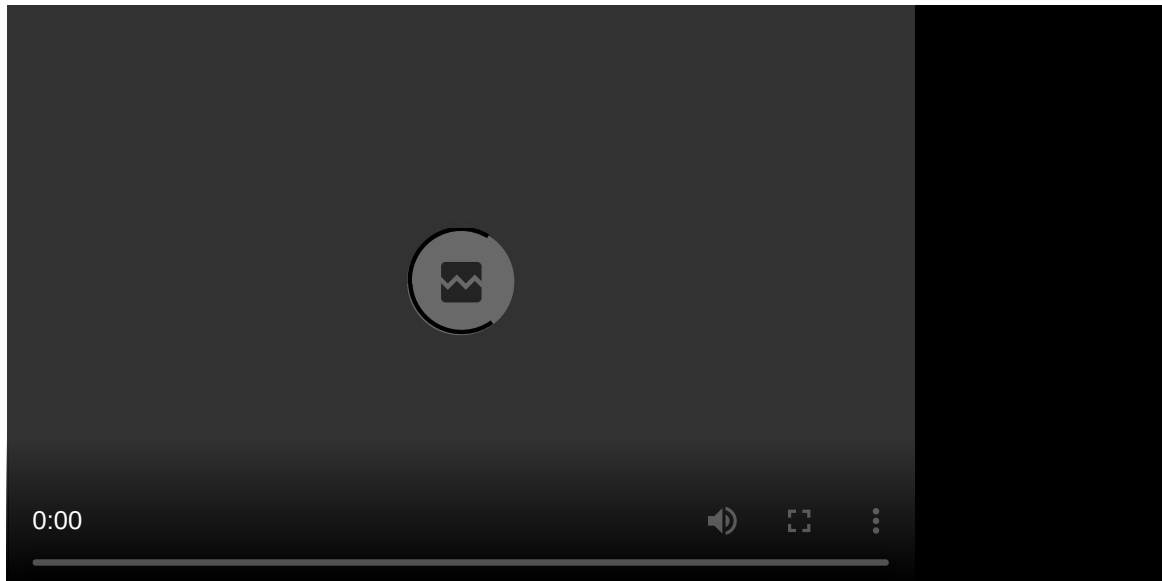
- If the Reviewer is set as Approver, they must explicitly approve the **Change Set** at a certain state (this action is mandatory and relevant).
- If the Reviewer is set as Observer, they can add, approve or reject, but their response is not required and not relevant to the approval of the **Change Set**, but will be retained in the historical details of the state transition approval.

> **ⓘ Info**
>
> To know more about managing Approvers and Observers, take a look at the User Guide documentation: Manage Change Set State Reviewers operation.

The next video explains the scenario with a workflow involving the following **Roles** and states:

- **Roles**: Operator; Maintenance Technician; Maintenance Engineer; Quality Engineer; Process Engineer
- **State Model** Workflow: - Maintenance Modifications - Observer: Maintenance Technician - Approver: Maintenance Engineer - Quality Verification - Observer: Quality Technician - Approver: Quality Engineer - Final Approval - Approver: Process Engineer

> **ℹ Useful Documentation**
>
> - How to: Define automatic Change Sets
> - How to: Create an Approval Workflow
> - How to: Create a Change Set
> - How to: Create Items in a Change Set
> - How to: Create a New Version/Revision
> - How to: Approve/Cancel/Reject/Rework/Cancel a Change Set
> - How to: Manage Change Set Subscribers
> - How to: Set a Change Set Observer

In this example, no **Roles** are defined in the **State Model**. The stakeholders are only configured in the **Change Set** as Reviewers. However, it is possible to also define **Roles** for each state in the **State Model**. If defined this way, the order to approve/reject a **Change Set** can be defined as: Reviewer Observer > Reviewer Approver > **State Model** Approver.

If the **State Model** has an Approver **Role** associated with it, and if a Reviewer Approver is also defined, it is necessary for the Reviewer Approver to take his decision first:

- The **State Model** Approvers can only take their decision after the Reviewer Approvers tak their decision
- If the Reviewer Approver rejects the **Change Set**, its state will change to terminated and the decision of the **State Model** Approver is no longer needed.

Change Set Items with different Approval Roles

A single **Change Set** can have multiple Items with different Approval **Roles**.

It is possible to create **Change Set** Items directly in the **Change Set** by selecting the "Items" section and pressing "Create."

To change individual Approval **Roles** for a specific **Change Set** Item, within the same "Items" menu, it is needed to select the desired items and select "Manage Change Set Items".

It will then be possible to have a common **Change Set** where the Approval **Role** is different from the various Approval **Roles** for each **Change Set** Item.

In this scenario, for **Change Set** Items to become Effective, the process involves first approving each **Change Set** Item individually. To do this, after Requesting Approval, choose the desired item and select "Approve Items."

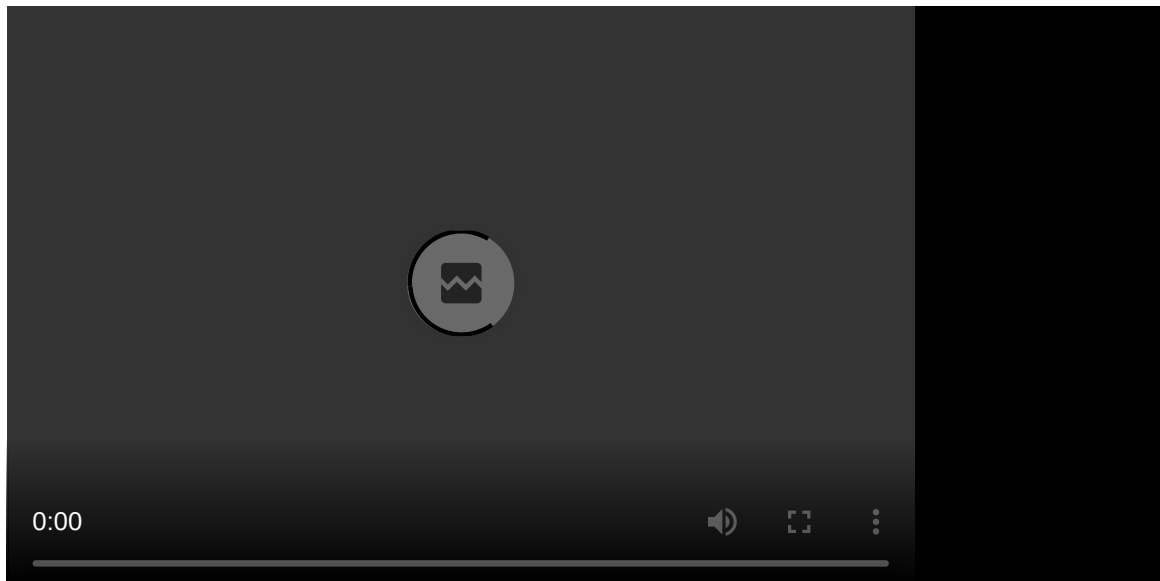Only after all items have been approved can the final approval of the common **Change Set** be performed.

Change Controlled Smart Tables

Although Smart Tables are not versioned entities, it is also possible to enable change control so that all changes are managed via a **Change Set**.

The video below demonstrates how to change the settings of a Smart Table so that it behaves as described, and how this is reflected when some changes need to be made to it.

> ℹ **Useful Documentation**
>
> - How to: Enable Smart Table's Change Control
> - How to: Create a Change Set
> - How to: Approve/Cancel/Reject/Rework/Cancel a Change Set

Additional Notes

Transfer and Compare Items

It is also possible to perform other operations at the **Change Set** Items level:

- Transfer – Transfer one or more items from one **Change Set** to another
- Compare – Compare the differences between the new version/revision and the other version/revision before approving it

> ℹ **Useful Documentation**
>
> - Transfer Change Set Items User Guide
> - Compare Change Set Items User Guide
> - How to: Transfer Items to a Change Set
> - How to: Manage Items in a Change Set

Take Ownership

A **Change Set** can be viewed in two different ways:

- **Change Set** without an Owner: If a **Change Set** has no assigned Owner, any User can request approval for it.
- **Change Set** with an Owner: If a **Change Set** has an assigned Owner, only that specific User can request approval.

This is where the "Take Change Set Ownership" action comes into play. A User can choose to take ownership of a **Change Set**, which then allows them to initiate the approval request for that workflow.

> **ⓘ Info**
>
> To know more about this operation, take a look at the User Guide documentation: - Take Change Set Ownership

Employee Delegate

For **Change Sets** with Approval Workflow, where **Employees** are defined as Approvers, if the defined **Employee** is unavailable for a period of time to approve the **Change Set**, it is possible to delegate this approval to another **Employee**.

This can be done through the **Employee** page, under Manage Employee Delegates.

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