Inventory Count

DELMIA Apriso 2016 Implementation Guide

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Contents

Figures

1 Introduction

1.1 Purpose

This document gives an overview of the Inventory Count solution, providing background information, sample scenarios, and an overall description of the Standard Operations in the Inventory Count process.

1.2 Overview

The Inventory Count solution enables counting tasks to be performed faster and under close control of a system that is linked to the Logistic and Production solution. The solution is highly flexible, as it includes adjustable screens, support for many different flows, and atomic Business Component methods.

Many scenarios can be covered by the solution depending on the client requirements, because the screens are built around Standard Operations that can easily be changed and expanded. The grids used in the solution are dynamic, which means that their predefined queries can also be amended.

1.3 Scope

The scope of this document includes the following core areas:

- An overview of the Inventory Count solution
- Sample scenario usages of Inventory Count
- Standard Operations used in Inventory Count
- Performance results of Inventory Count Operations

1.4 Intended Audience

The intended audience of this document is the personnel responsible for implementing the Inventory Count solution in a Warehouse, plant, or factory, preparing the Standard Operations responsible for counting, and setting other phases of the count process.

1.5 Vocabulary

Inventory Count – a process which verifies if the actual inventory state in a Warehouse matches the system inventory. Inventory Count is defined under many different circumstances (e.g., ad hoc, manual) and can be performed on a wide range of inventory.

Count Procedure – defines what the flow of the counting should look like and, in some cases, also which inventory should be counted. Each Count Disposition has to have the Count Procedure assigned.

Count Disposition – specifies that Inventory Counting in a selected Warehouse should be performed.

Count Disposition Line – specifies which inventory should be counted (i.e., in which Warehouse Location or according to what settings).

Count Type – a feature of the Count Disposition that informs the user what kind of counting is being dealt with.

Cycle Count – specifies that inventory should be counted according to ABC Class settings.

ABC Class – gives more detailed information about the Cycle Count, defining how often Inventory with a given ABC Class assigned should be counted.

Snapshot – used to create a mirror image of the Inventory stored in the Warehouse. It is kept in the **COUNT_RECORD** table (for more information about database tables, please refer to the Database Documentation). The reason for using an inventory snapshot is that stock should not be counted if there is a risk it will change during the counting (e.g., inventory will be taken out or delivered). While counting, Warehouse Locations should be put on Hold (frozen) so that no changes are made which might lead to an incorrect counting outcome. However, it may happen that counting is performed on locations that are not held, in which case a snapshot can be created to make sure the results are accurate. Counting should be performed on stock that is not in the process of change.

Phantom – an entity that is created during the count execution process if the parameters provided for an item to be counted are such that it is impossible to unambiguously recognize a corresponding record (or records) in the snapshot. This entity is also created if a snapshot does not exist and the inventory description is not sufficient (e.g., a Lot Number is provided but the product is not provided, while the Warehouse holds the same Lots but different products).

Inventory Count Accuracy – used to indicate whether or not inventory is accurate after the count is finished. This relates to the Count Disposition and Count Disposition Lines. If the Count Disposition Lines are 100% accurate they are not reconciled, which speeds up the performance of the Inventory Count process. For more information, please refer to section 2.1.3 Count Disposition.

2 Usage Scenarios

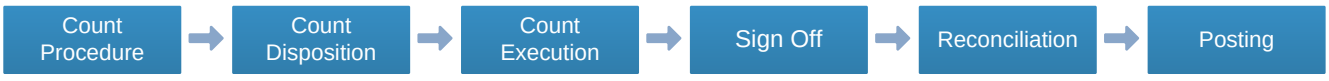
Inventory Counting is used to find the differences between what is stored in the system and what is actually present in the Warehouse. It is used to "clean" the Warehouse, and to reconcile the differences between what DELMIA Apriso sees as present in the Warehouse and the physical stock. After a certain period of Warehouse operation, some irregularities may find their way into the system. Inventory may be moved without recording that change in the system, or an accident may destroy part of the inventory. Such instances lead to discrepancies between what is stored in DELMIA Apriso and what is actually stored in the physical Warehouse Locations.

In this section, three sample usage scenarios are described along with their configurations, providing the basis for understanding and preparing Inventory Count processes in a Warehouse. Other usages can be applied through the modification of the scenarios below or the preparation of completely new flows. The sections below cover the configuration required for the given counting scenario, describing step by step what must be configured for the flow to be effective. There is also a separate section (2.4 Common Scenario Steps) which covers the steps that are common for all three scenarios (Execution, Sign Off, Reconciliation, and Posting).

> ⓘ It is important to remember that the Inventory 2 Count Monitoring and Maintenance screens are highly flexible and can easily be adjusted depending on the requirements of a given solution, due to the fact that they are built around Standard Operations which are invoked when certain actions are triggered on the screens. For more information on the Standard Operations used with this solution, please refer to chapter 3 Standard Operations of this document for a list of all the Standard Operations and brief descriptions of their functions.

The following scenarios will be explained in this section:

- Scenario 1: Full Inventory Count – counting the entire inventory stored in the Warehouse
- Scenario 2: Inventory Count in Manually Selected Warehouse Locations – counting inventory only in the Warehouse Locations that were manually selected in the Count Disposition
- Scenario 3: Inventory Count Based on the ABC Class – counting inventory on the basis of ABC flag settings



2.1 Scenario 1: Full Inventory Count

The Full Inventory Count covers the entire inventory in the given Warehouse without establishing specific criteria by which the counting should be performed. In this flow, all of the inventory will be counted regardless of its location, status, ABC flag, etc. The flow of this scenario is as follows:

1 Existing inventory is checked.

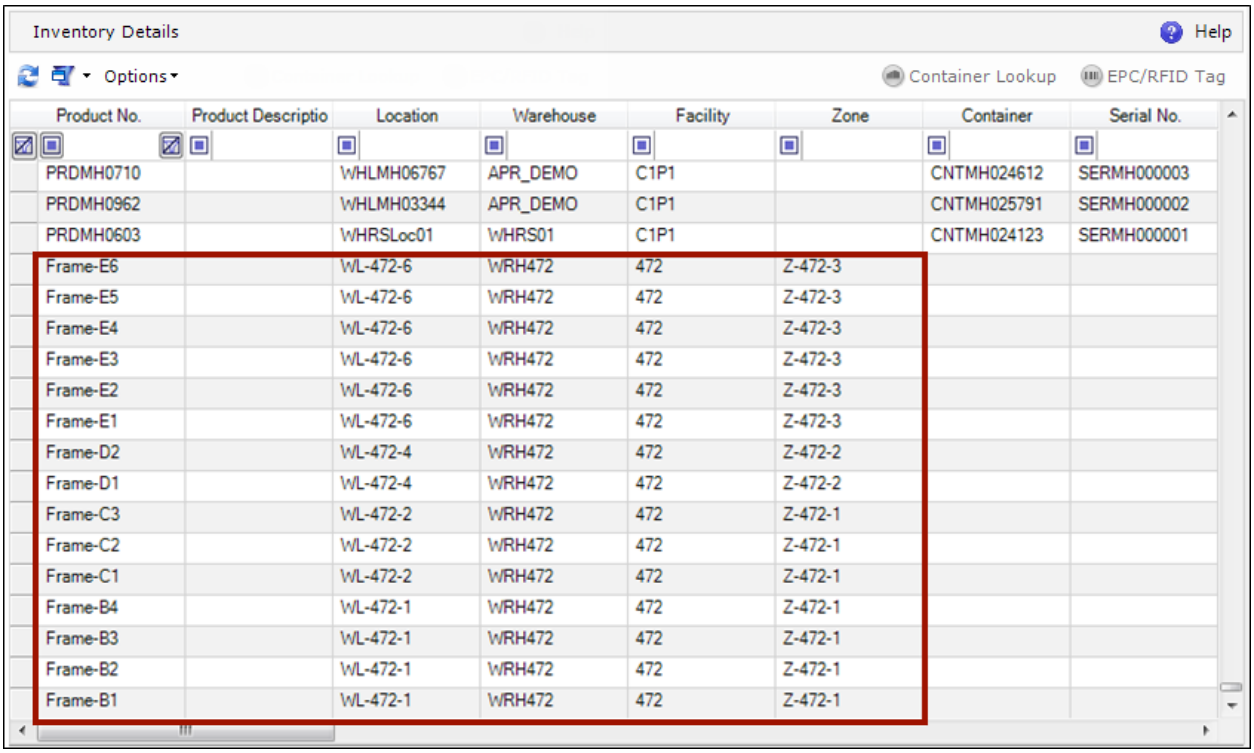
2 Count Procedure is prepared.
3 Count Disposition is created.
4 Count Disposition Lines are created.
5 Counting is executed.
6 Count Progress is checked.
7 Sign off is performed.
8 Reconciliation begins.
9 Results are posted.

ⓘ Section 2.2 Scenario 2: Inventory Count in Manually Selected Warehouse Locations of this guide describes a scenario which is a modification of the **Full Inventory Count** scenario.

2.1.1 Inventory Lookup before Count

Inventory is a list of products available in stock, and Inventory Lookup is used to check the state of the current inventory in the system. We can check the entire inventory present in the system by using the Inventory Details screen, or by filtering it and checking only the inventory with Serial Numbers or Serial Numbers and Containers. Inventory used in this scenario has no Serial Numbers or Containers, so we can therefore look at any of the three screens mentioned above to make sure that the inventory we wish to count is present in the system.

The Inventory Lookup screen can be navigated to in the DELMIA Apriso Desktop Client. For details on Inventory Lookup screens, refer to the Warehouse section of the DELMIA Apriso Desktop Client Help.



Product No.	Product Descriptio	Location	Warehouse	Facility	Zone	Container	Serial No.
PRDMH0710		WHLMH06767	APR_DEMO	C1P1		CNTMH024612	SERMH000003
PRDMH0962		WHLMH03344	APR_DEMO	C1P1		CNTMH025791	SERMH000002
PRDMH0603		WHRSLoc01	WHRS01	C1P1		CNTMH024123	SERMH000001
Frame-E6		WL-472-6	WRH472	472	Z-472-3		
Frame-E5		WL-472-6	WRH472	472	Z-472-3		
Frame-E4		WL-472-6	WRH472	472	Z-472-3		
Frame-E3		WL-472-6	WRH472	472	Z-472-3		
Frame-E2		WL-472-6	WRH472	472	Z-472-3		
Frame-E1		WL-472-6	WRH472	472	Z-472-3		
Frame-D2		WL-472-4	WRH472	472	Z-472-2		
Frame-D1		WL-472-4	WRH472	472	Z-472-2		
Frame-C3		WL-472-2	WRH472	472	Z-472-1		
Frame-C2		WL-472-2	WRH472	472	Z-472-1		
Frame-C1		WL-472-2	WRH472	472	Z-472-1		
Frame-B4		WL-472-1	WRH472	472	Z-472-1		
Frame-B3		WL-472-1	WRH472	472	Z-472-1		
Frame-B2		WL-472-1	WRH472	472	Z-472-1		
Frame-B1		WL-472-1	WRH472	472	Z-472-1		

Figure 1 Inventory Lookup

2.1.2 Count Procedure

Overview

A Count Procedure is the definition of how we want counting to be managed and executed. It must be set to establish the settings and parameters that will be used during the counting process. Multiple Count Procedures are possible, depending on the requirements of a given solution (e.g., annual, monthly, or ad-hoc counting can be defined). Each procedure can have a different flow as well as different parameters and Standard Operations for the execution of certain tasks. The following general options can be defined in a Count Procedure:

- Count Disposition Lines creation method
- Execution method
- Approval method
- Reconciliation method
- Posting method

The Count Procedures screen can be navigated to in the DELMIA Apriso Desktop Client. For details on setting up Count Procedures, refer to the Warehouse section of the DELMIA Apriso Desktop Client Help

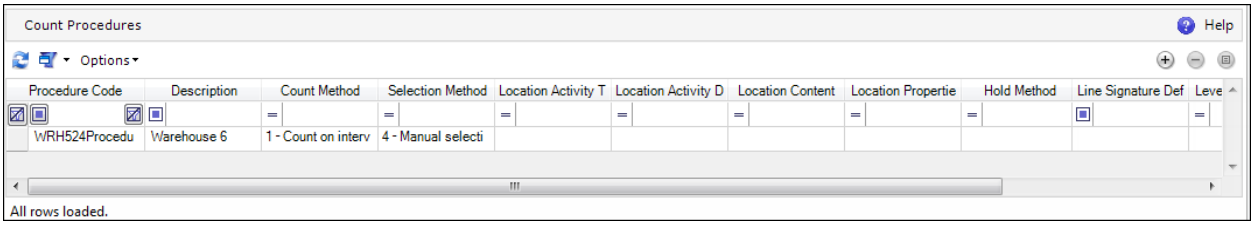


Figure 2 Count Procedure

Location Selection

The purpose of this flow is to count all of the Warehouse Locations; therefore, the selected **Location Selection Method** must point to all locations. This can be achieved in a number of ways, depending on the settings defined for the Warehouses in the system. For example, providing each Warehouse Location has a **Warehouse Location Class** assigned, we can:

1. Select the By Location Properties Location Selection Method.
2. Define the Location Properties Type as Warehouse Location Classes.
3. Link all of the classes, thus making sure all of the Warehouse Locations are counted.

An alternative is to use the **By Standard Operation** method and select the Standard Operation APR_WH_IC.Location_GetList. By default, this Operation will return all of the Warehouse Locations to a Warehouse that will be counted based on this Count Procedure.

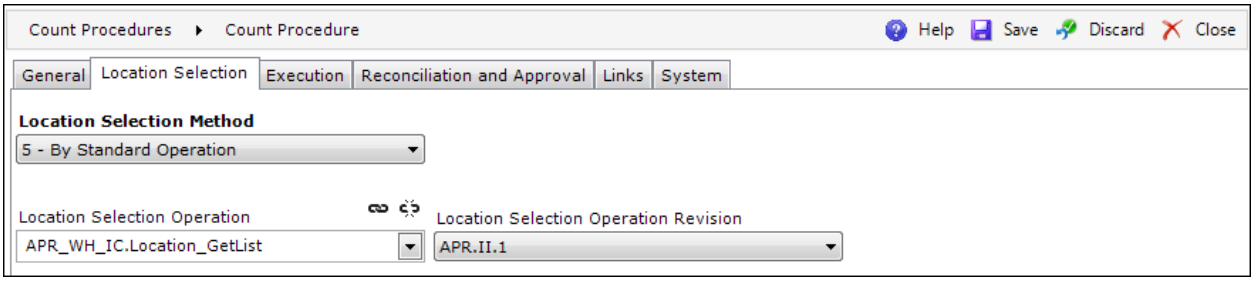


Figure 3 Count Procedure – Location Selection Method

ⓘ Modification of this step for the purpose of the **Inventory Count in Manually Selected Warehouse Locations** scenario is described in section 2.2.1 Count Procedure: Location Selection.

Hold and Release

Counting can but should not be performed in Warehouse Locations that are not put on Hold, as this may result in discrepancies when inventory is taken from or delivered to a given location while the counting is being executed. The Hold and Release Methods should be specified, along with criteria that establish when Hold and Release is to be performed.

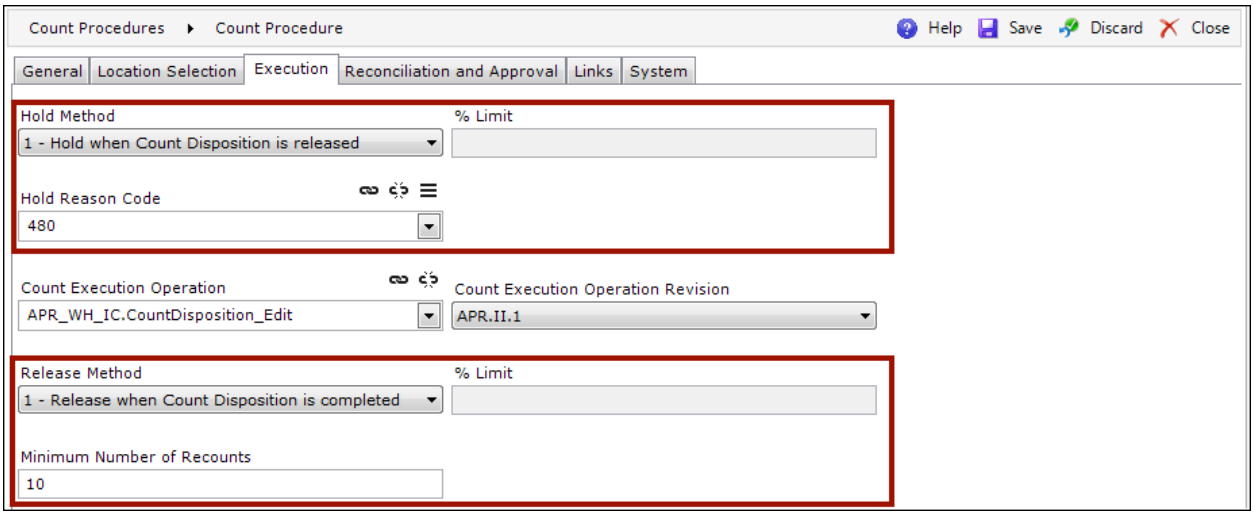


Figure 4 Count Procedure – Hold and Release

Count Execution Operation

The Count Execution Operation is responsible for what options, parameters, and/or actions are visible to the shop floor operator at the start of the counting process. The default Operation that can be linked here is APR_WH_IC.CountDisposition_Execute, which is delivered with DELMIA Apriso as a GPM package. For more information, please refer to the Count Execution Business Process Flow documentation. Because the Operation requires a snapshot to be created, the Create Snapshot check box should be selected on the **General** tab of the Count Procedure editor screen.

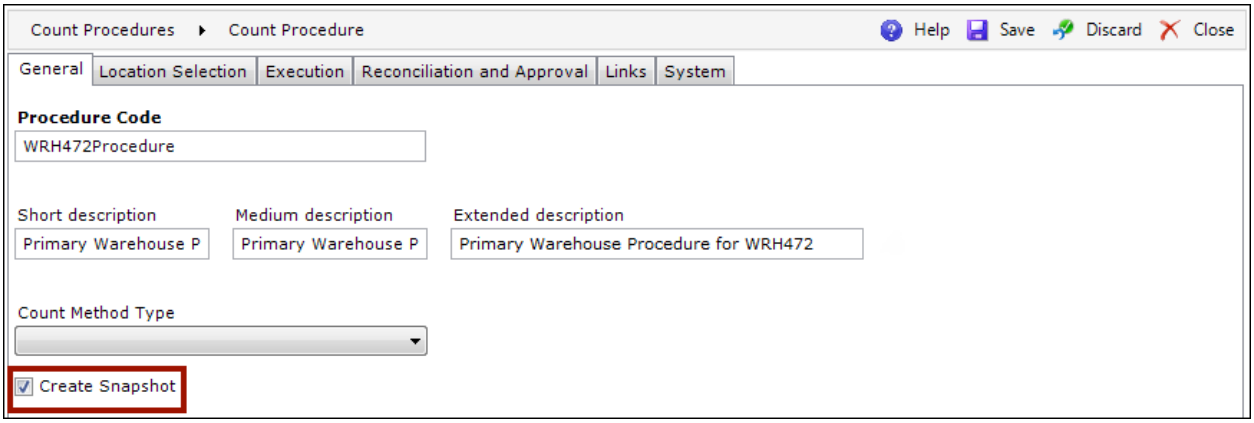


Figure 5 Count Procedure – Create Snapshot

ⓘ As with all other Standard Operations, this Operation can be customized according to specific requirements and may be set up so that a snapshot does not have to be created.

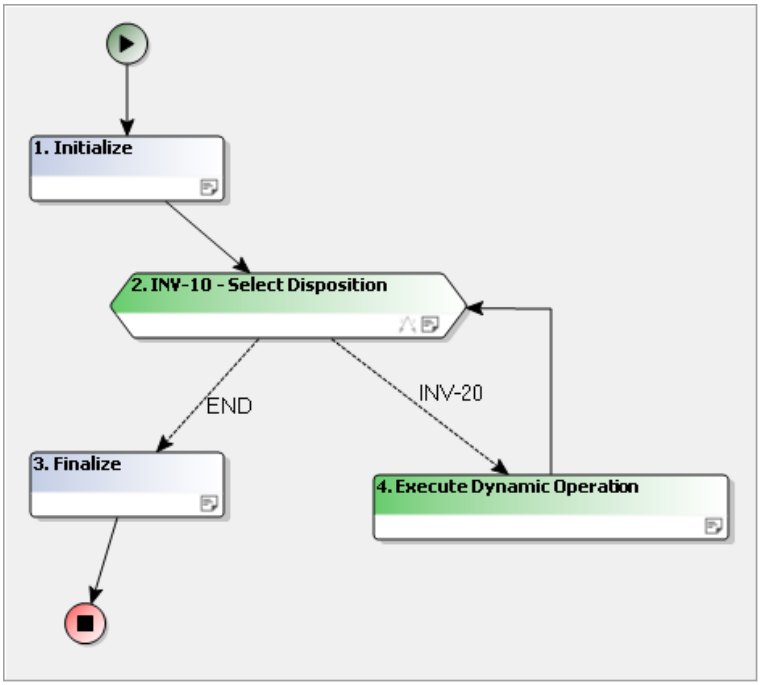


Figure 6 Count Execution Operation

Discrepancy Approval

In order to make sure that the counting is correct and no mistakes are made before Reconciliation, a signature should be required from the employee responsible for approving the counting results. In order for the signature to be requested from the system, an appropriate signature definition must be selected or created. The signature may be required to close a Count Disposition and/or Count Disposition Line. If the signature is required to close a Count Disposition Line, then the Count Disposition cannot be closed before all of the lines are approved and closed by an employee with the role established in the Signature Header definition (for more information, refer to the Electronic Manufacturing Records section of the DELMIA Apriso Desktop Client Help). Additionally, three different levels of discrepancy can be established that require different approvals.

The default Standard Operation responsible for signing is APR_WH_IC.Signature_Sign. This displays a sign-off screen when a signature is required. It is possible to amend this in such a way as to, for example, require different signatures depending on the level of discrepancy.

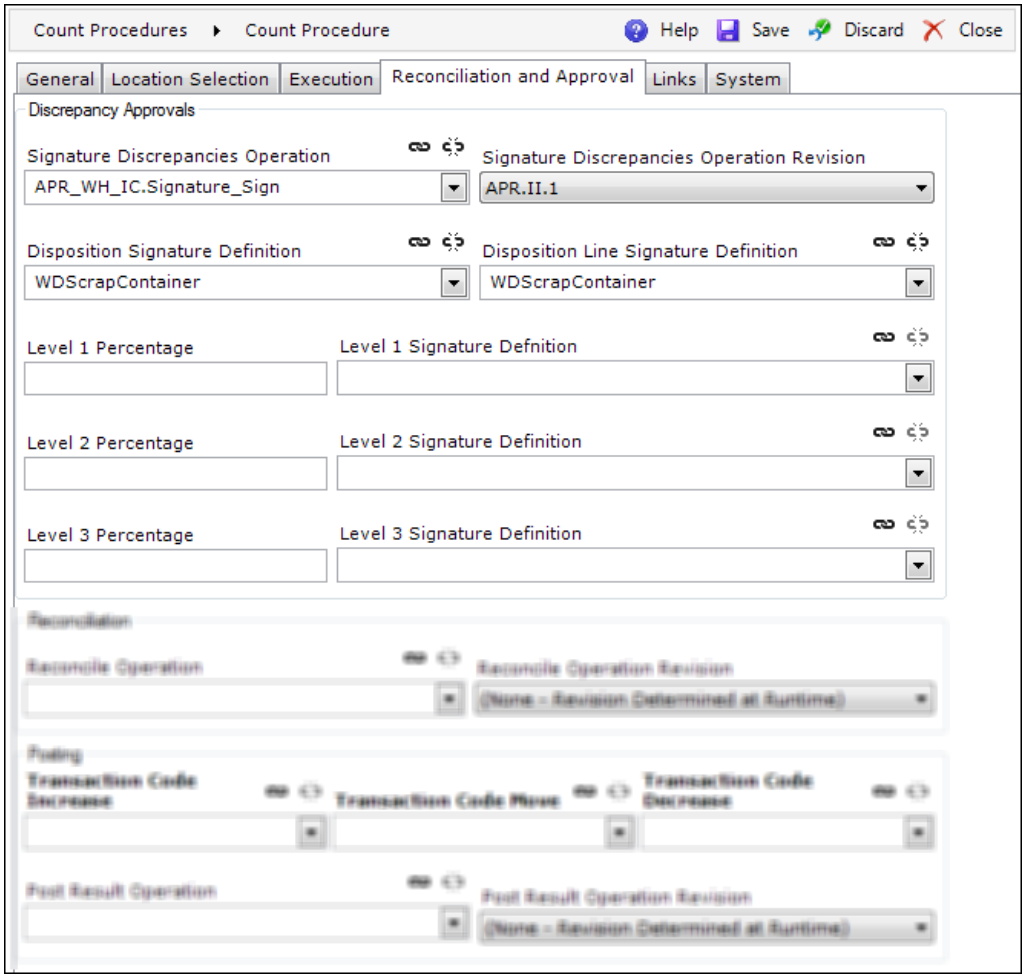


Figure 7 Count Procedure – Discrepancy Approvals

Reconciliation and Posting

Reconciliation is a process of adjusting the amount of inventory present in the system with the inventory counted in the physical Warehouse Locations. It is possible to define a Standard Operation which will be invoked when Reconciliation is started. There are four default Operations responsible for this action, depending on what is configured in the Count Procedure. By default, the APR_WH_IC.CountDispositionLine_Reconcile Operation can be used. Posting is used to send the results of Inventory Counting to external systems. If you want to post the results, Transaction Codes for the adjustments must be defined in order to be mapped correctly to the external systems. The default Standard Operations to generate XMLs with these results are APR_WH_IC.CountDispositionResults_Post and APR_WH_IC.CountDispositionExtendedResults_Post.

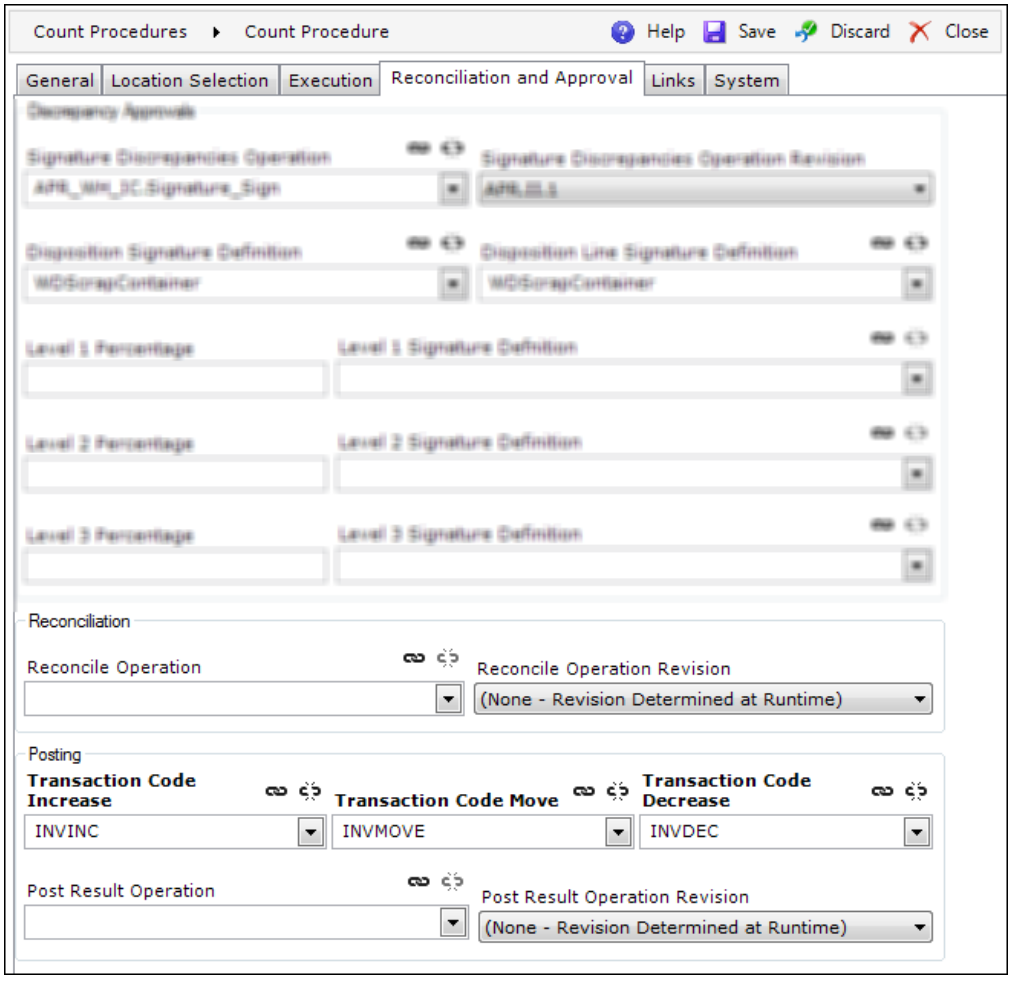


Figure 8 Count Procedure – Reconciliation and Posting

Warehouse Assignment

It is important to assign a given Count Procedure to a Warehouse or Warehouses where this Count Procedure will later be applied.

Figure 9 Count Procedure – Warehouse assignment

2.1.3 Count Disposition

Overview

A **Count Disposition** is an order for counting to be performed. When created, it requires a Count Procedure that has previously been established.

Count Disposition Lines are used to specify what exactly will be counted (Locations, Containers, Zones, etc.).

The Count Disposition screen can be navigated to in the DELMIA Apriso Desktop Client. For details on setting up Count Dispositions, refer to the Warehouse section of the DELMIA Apriso Desktop Client Help.

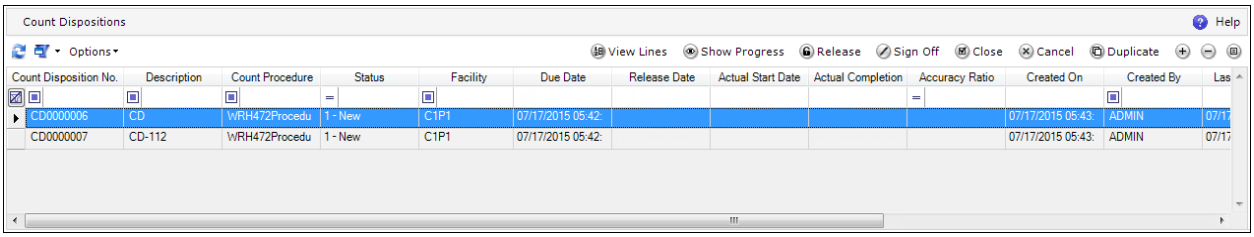


Figure 10 Count Dispositions

Adding a Count Disposition

When a Count Disposition is added or edited, the APR_WH_IC.CountDisposition_Edit Standard Operation is invoked and displays the screen visible in Figure 11 Count Disposition editor. This Operation can be amended to display a custom screen with the required options. By default, when creating a Count Disposition, the following must be assigned: a Count Disposition number, Facility, Warehouse, and Count Procedure. When a Warehouse is selected, the Count Procedure linked with that Warehouse will appear on the list.

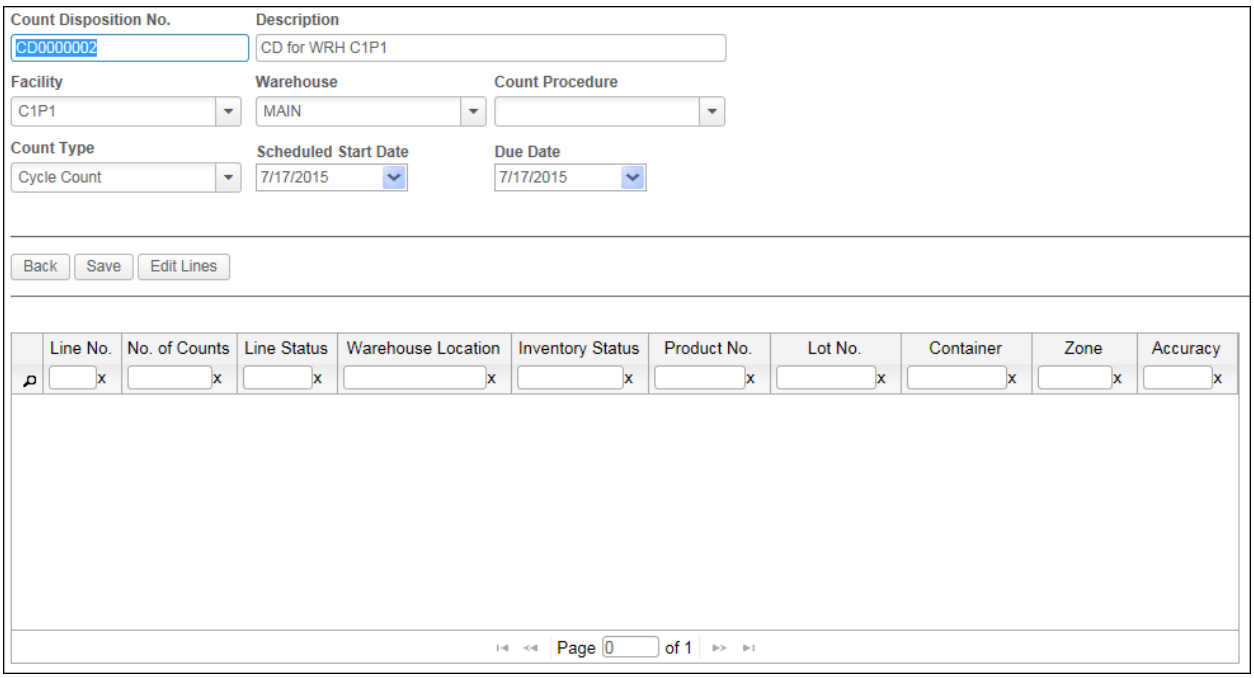


Figure 11 Count Disposition editor

In our scenario, we are using the facility structure as shown in Figure 12 Facility structure.

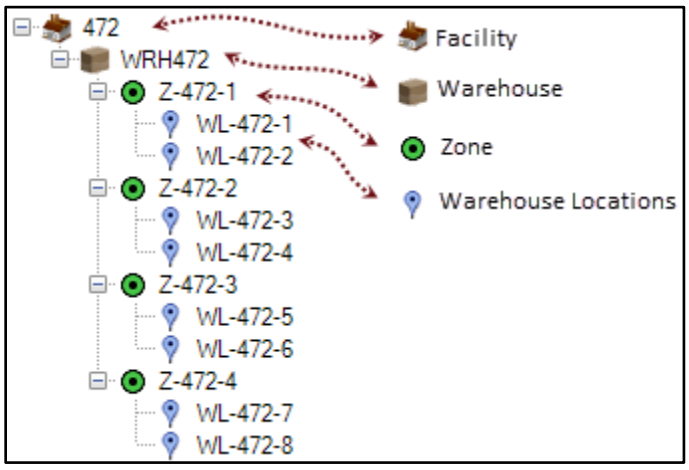


Figure 12 Facility structure

Adding Count Disposition Lines

Once the Count Disposition is created, we can define the Count Disposition Lines to establish which items should be counted based on the provided criteria (e.g., location, Zone, etc.). We can also create Count Disposition Lines using the previously selected Count Procedure, which we can do by clicking the **Generate by Procedure** button. The Standard Operation will verify our Count Procedure by checking the Location Selection Method, and it will create as many lines as there are locations defined by the procedure. In this scenario, all Warehouse Locations are counted; therefore, one line for each location is created. As visible in Figure 13 Count Disposition Lines, we should have eight Count Disposition Lines.

At this point the Count Disposition is set up, and its status and that of the lines is set to **New**.

The **Accuracy Ratio** column displays the AccuracyRatio for the given Count Disposition Line. Accuracy is calculated when a Count Disposition Line is counted (i.e., its status is Counted). The ratio is counted in the following way: 1 minus the number of counted records that required adjustment due to discrepancy, divided by the total number of counted records:

$$1 - \frac{n}{x}$$

In the equation, *n* is the number of records that had to be reconciled, and *x* is the total number of counted records. For example: four items are counted in one Count Disposition Line, two of which require adjustment, and thus the Accuracy Ratio is 50%:

$$1 - \frac{2}{4} = 0.50$$

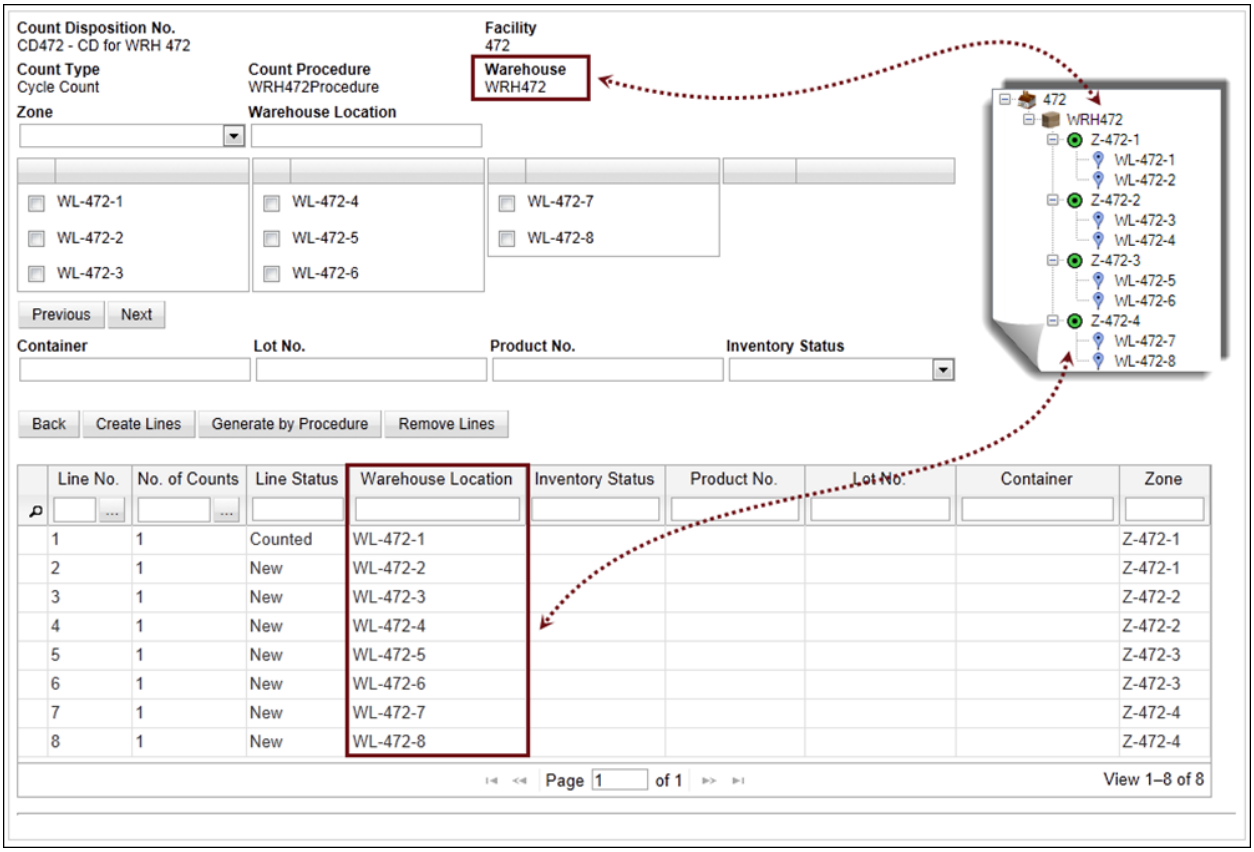


Figure 13 Count Disposition Lines

ⓘ Modification of this step for the purpose of the **Inventory Count in Manually Selected Warehouse Locations** scenario is described in section 2.2.2 Count Disposition: Adding Count Disposition Lines.

Count Progress before Count

Count Disposition is now set up and counting can start. To make sure that the disposition is ready, navigate to the Count Dispositions screen, find the disposition**,** and make sure its status is **New**.

The **Accuracy Ratio** column displays the Accuracy Ratio for the given Count Disposition. Accuracy is displayed when the given Count Disposition is counted or closed. The ratio is counted in the following way: 1 minus the number of counted lines that required adjustment due to discrepancy, divided by the total number of counted lines:

$$1 - \frac{n}{x}$$

In the equation, *n* is the number of lines that had to be reconciled and *x* is the total number of counted lines. For example: four lines are counted in one Count Disposition, two of which require adjustment, and thus the Accuracy Ratio is 50%:

$$1 - \frac{2}{4} = 0.50$$

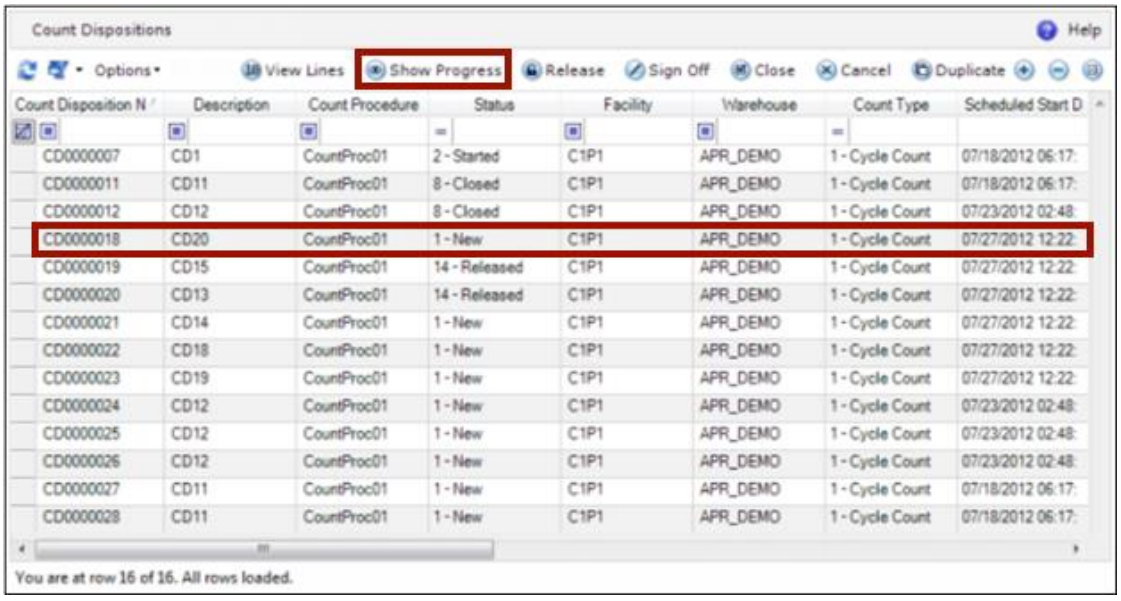


Figure 14 Count Disposition status – New

Click (Show Progress) to open the Count Progress screen for our Count Disposition. The screen should be empty, as the Count Disposition has not been released yet and therefore the snapshot was not created.

Releasing a Count Disposition

To release a Count Disposition means to make it available for use in the counting process. This indicates that the Warehouse Location is ready to be counted. To accomplish this release, select the disposition and click (Release) on the Count Dispositions browser screen. The Standard Operation responsible for this action is APR_WH_IC.CountDisposition_Release, which can be amended according to requirements. The Count Disposition Status is now changed to **Released**.

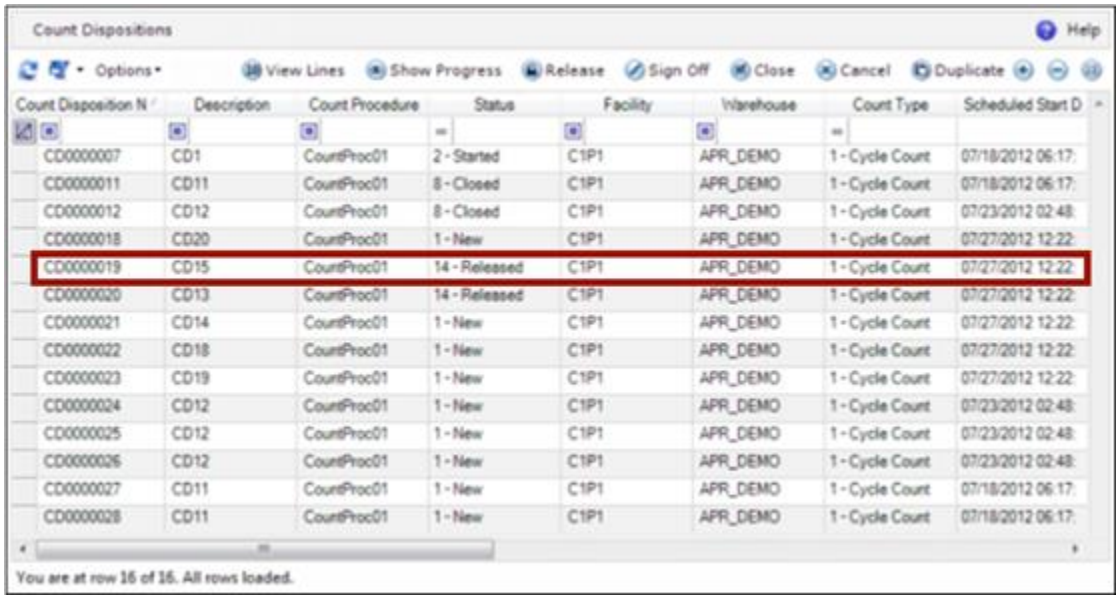


Figure 15 Count Disposition Status – Released

2.1.4 Common Scenario Steps

At this point, the process of counting the inventory followed by the Reconciliation and Posting of results can begin. For details, please refer to section 2.4 Common Scenario Steps.

2.2 Scenario 2: Inventory Count in Manually Selected Warehouse Locations

This scenario is a modification of Scenario 1: Full Inventory Count, the only difference being that the Full Inventory Count covers the counting of all Warehouse Locations in a given Warehouse, while this scenario will only cover the Warehouse Locations selected manually during the Count Disposition creation process.

This section only describes the two steps that are different from Scenario 1: Full Inventory Count:

4 Choosing the Location Selection Method for the Count Procedure.
5 Selecting the Warehouse Locations during the creation of the Count Disposition Lines.

For the remaining phases of the scenario flow, please refer to section 2.1 Scenario 1: Full Inventory Count.

2.2.1 Count Procedure: Location Selection

The purpose of this flow is to count only the selected Warehouse Locations. During preparation of the Count Procedure, the Location Selection Method should be set to **Manual selection of Locations**.

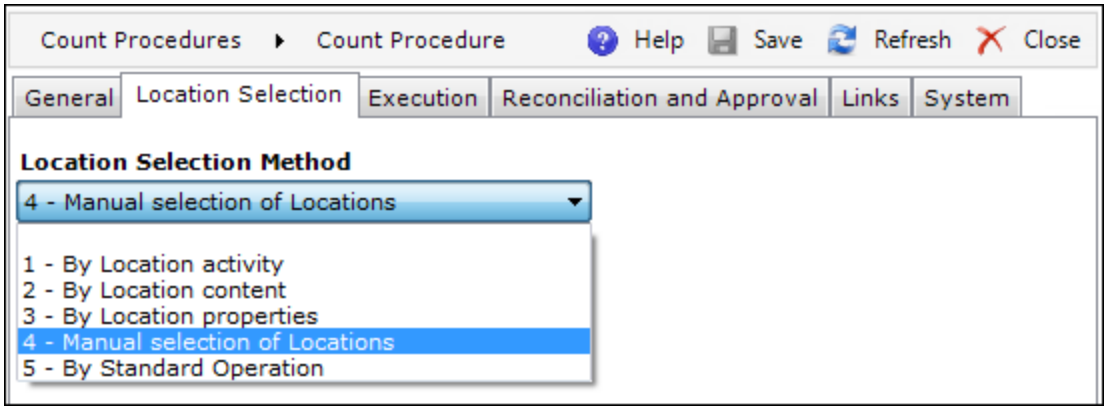


Figure 16 Count Procedure – Manual selection of Locations

2.2.2 Count Disposition: Adding Count Disposition Lines

When the Count Disposition is created, we can define the Count Disposition Lines which will establish which items should be counted based on the provided criteria. In this scenario, we will create Disposition Lines only for the required Warehouse Locations.

To do this, the below steps must be followed:

1 Define a Warehouse Location by:
  a Manually entering it in the Warehouse Location field. The Location must exist in the given Warehouse.

b Selecting the location(s) from a list of Warehouse Locations that appear on the screen.

2 Click the **Create Lines** button and the line(s) for the given location(s) will appear on the list.

Each Count Disposition Line is in the **New** status.

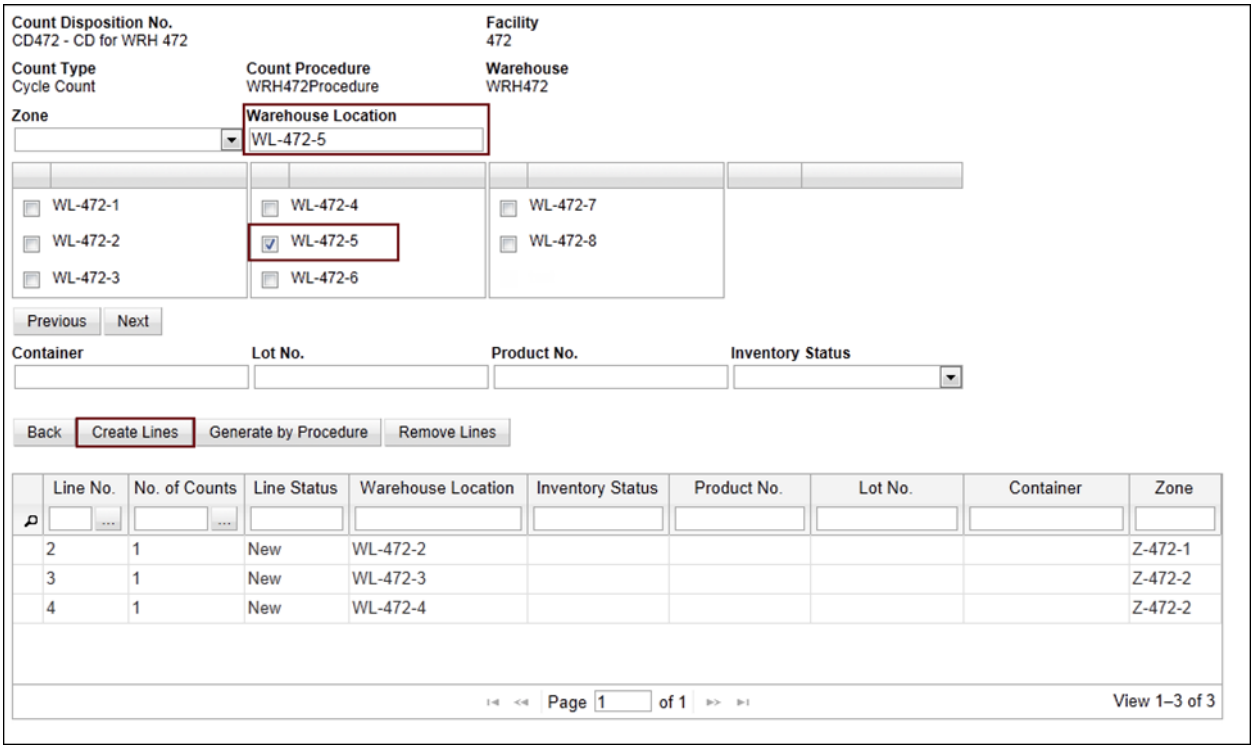


Figure 17 Count Disposition Lines – Manual selection of Locations

2.3 Scenario 3: Inventory Count Based on the ABC Class

An Inventory Count based on ABC Class settings assumes the cycle counting of products that have an ABC Class set. An ABC Class determines how often the given inventory is supposed to be counted, and its settings depend on the requirements in a given Warehouse. Sample settings can assume:

- ABC Class A – counting is performed once a year
- ABC Class B – counting is performed every six months
- ABC Class C – counting is performed once a quarter
- ABC Class D – counting is performed every two weeks

An ABC Class is often used for counting products of high value, dangerous materials, or products bound by legal agreements.

This section describes a sample scenario of how to configure the system so that counting is performed based on ABC Class settings.

The flow of this scenario is as follows:

1 Products are configured for an ABC Class.
2 Count Frequency and Count Frequency links are created.
3 A job is created.

4 The job invokes a Standard Operation which checks the ABC Class of the products and determines which products are to be counted and where these products are located.
5 A disposition is created with lines for each location where the product is situated.
6 The counting is executed.

2.3.1 Product ABC Class Assignment

An ABC Class can be created by navigating to the Product ABC Class Maintenance screen, or it can be created and assigned to a product directly from the Product Maintenance screen located in the same Portal menu.

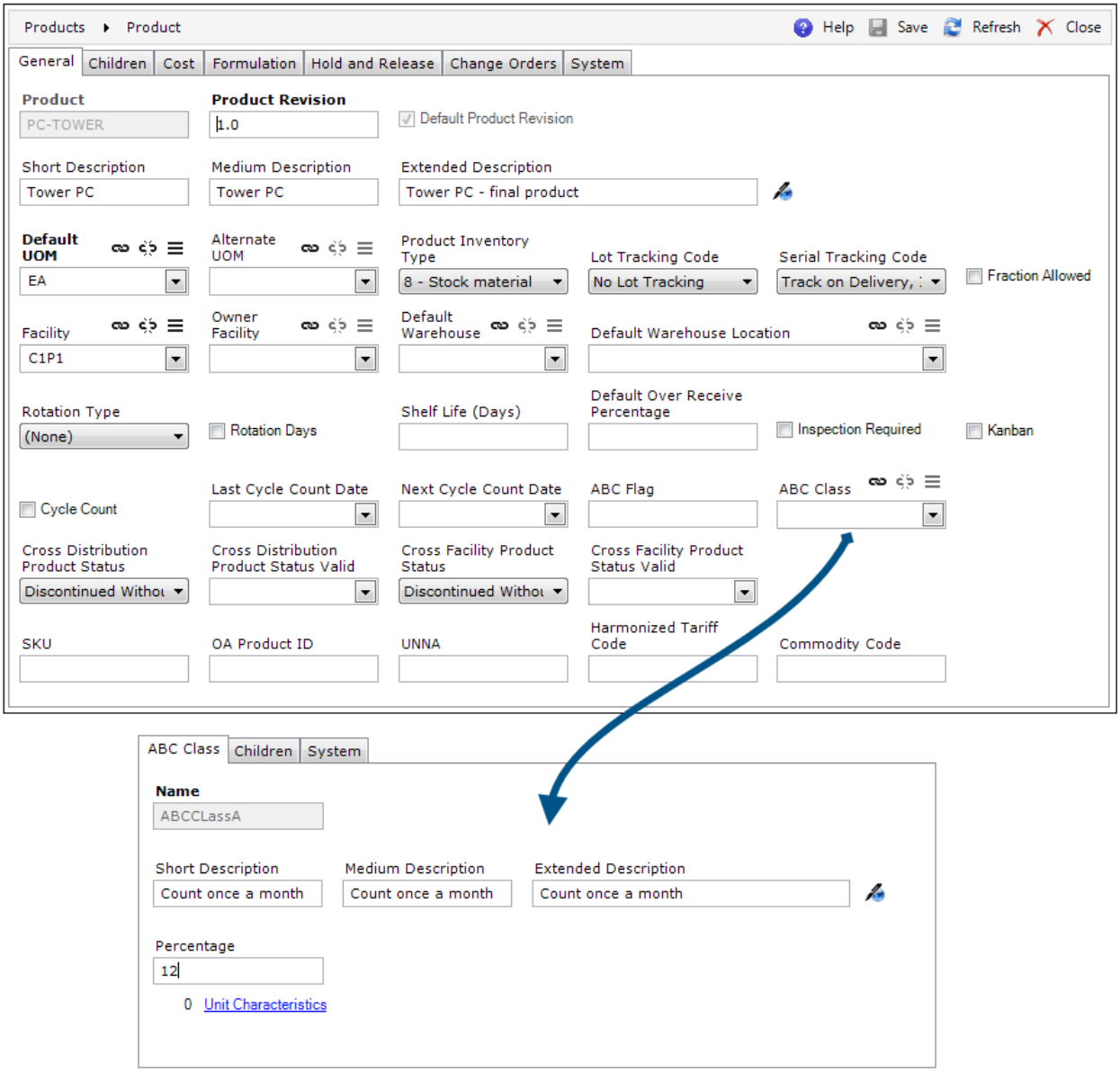


Figure 18 Assignment of ABC Class to product

2.3.2 Product ABC Class Configuration

The ABC Class must be assigned to the product that is to be counted. The settings of the ABC Class should apply to the requirements of counting the given product.

For a product ABC Class, we can specify the frequency of the count occurrence, the date indicating when the last count was performed, and the date when the next count should take place. The set of parameters of the ABC Class can be defined using the Count Frequency Maintenance screen, which can be accessed by navigating to the Count Frequency screen in the DELMIA Apriso Desktop Client.

> ⓘ Do not set the Last and Next Cycle Count Date on the Product M&M screen, as these database columns are obsolete. Use the Count Frequency Maintenance screen instead.

On the Count Frequency Maintenance screens, define the following settings:

1. Create a new Count Frequency.
2. Assign the Last and Next Cycle Count Dates. You can define other parameters, such as the number of days between subsequent counts or the maximum number of days by which the count can be delayed.
3. Create a Count Frequency Link, where you will assign the product ABC Class that will be counted.

For more information on Count Frequency Maintenance screens, please refer to the Count Frequency Maintenance section of the DELMIA Apriso Portal Online Help.

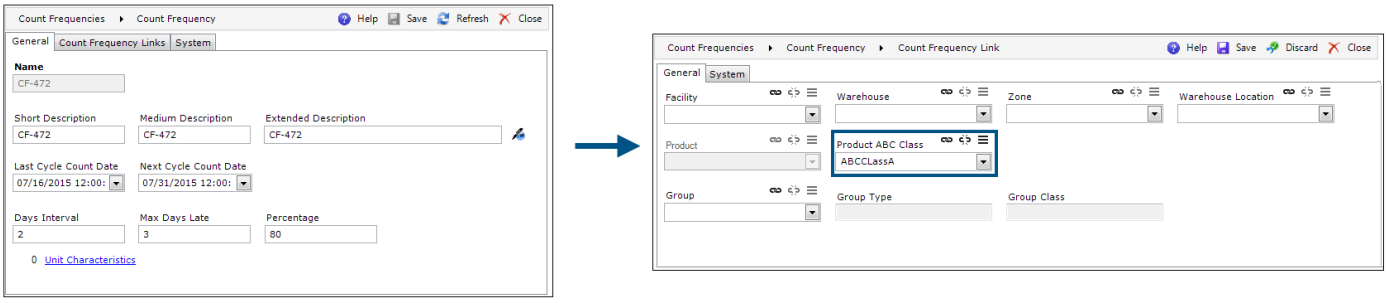


Figure 19 Count Frequency Maintenance

2.3.3 Scheduled Job to Create Count Dispositions

A scheduled job should be created to generate new Count Dispositions for products that are due to be counted based on the settings of the ABC Class parameters.

The scheduled job can be created by navigating to Job Scheduler in the DELMIA Apriso Desktop Client. For more information on creating jobs, please refer to the Background Job Processing Technical Guide.

Standard Operation

The job should be run once a day and should invoke a Standard Operation that will check if:

- There are COUNT_FREQUENCY records with the approaching cycle count date that are linked to ABC Classes
  - The NextCycleCountDate should be checked, or the LastCycleCountDate + DaysInterval if that is not set
- There are products that have these ABC Classes assigned

For more information on database tables, please refer to the Database Documentation.

Count Disposition Creation

When the products are found, the Operation should retrieve a list of Warehouse Locations with a given product from the inventory and create one or more Count Dispositions with lines for each required location and product.

The scheduled start date and due date of the Count Disposition should be set according to the Count Frequency parameters (i.e., NextCycleCountDate and MaxDaysLate). The dates of the last and the next Cycle Count in the COUNT_FREQUENCY record should be updated when the Count Disposition is created.

2.3.4 Common Scenario Steps

At this point, the process of counting the inventory followed by the Reconciliation and Posting of results can begin. For details, please refer to section 2.4 Common Scenario Steps.

2.4 Common Scenario Steps

This section describes the four Inventory Count phases which are common for the three scenarios described in this document. These phases are:

1. Count Execution
2. Sign Off
3. Reconciliation
4. Posting

2.4.1 Count Execution

Overview

At this point, all of the settings are prepared for the counting to begin. The counting process will be started by an employee user (in this example, a shop floor operator) who will physically perform the counting. This sample scenario assumes that the APR_WH_IC.CountDisposition_Execute Standard Operation will be used, which is delivered with DELMIA Apriso as a GPM package. For details on the flow of this Operation, please refer to the Count Execution Business Process Flow documentation. The Execution Flow section below describes the overall flow of the execution.

Execution Flow

1. The shop floor operator user goes to a Warehouse Location that is supposed to be counted and invokes the Operation responsible for the counting.
2. A Count Disposition is selected from the drop-down list. At this point, the Count Disposition status is changed to **Started**.

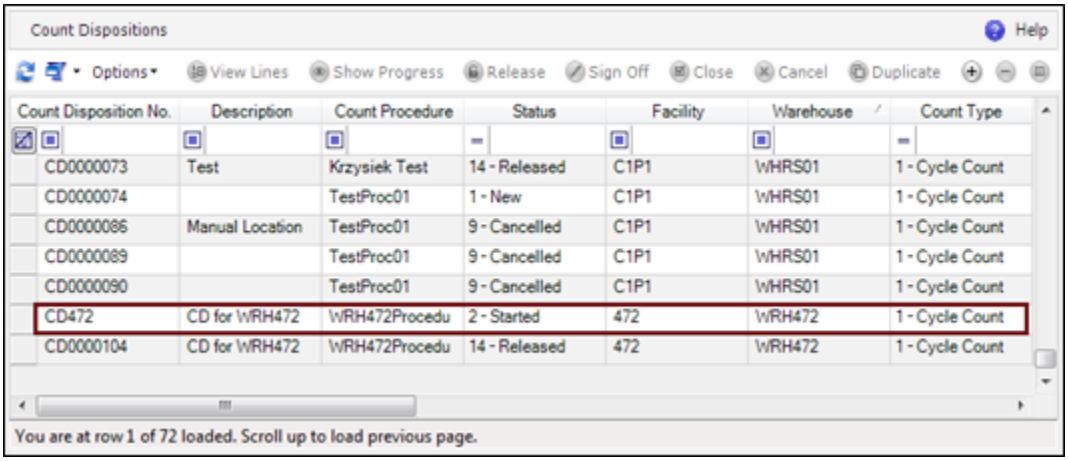


Figure 20 Count Disposition Status – Started

3 The Warehouse Location that will be counted is scanned or entered manually.

4 The item that will be counted is scanned.

5 Inventory in the given Warehouse Location is counted. The shop floor operator user types in the result of the counting.

> ⓘ To make sure that physical inventory is counted properly, the user does not have information as to how much of this inventory is present in the system.

If the quantity provided by the shop floor operator user is different than the quantity present in the system, the Operation requires the user to count again, this time providing more detail about the inventory.

6 When the counting is finished, the Warehouse Location is scanned once again. The system recognizes that the counting of this location is complete, and displays a summary of the results. At this point the status of the Count Disposition Line changes to **Counted**.

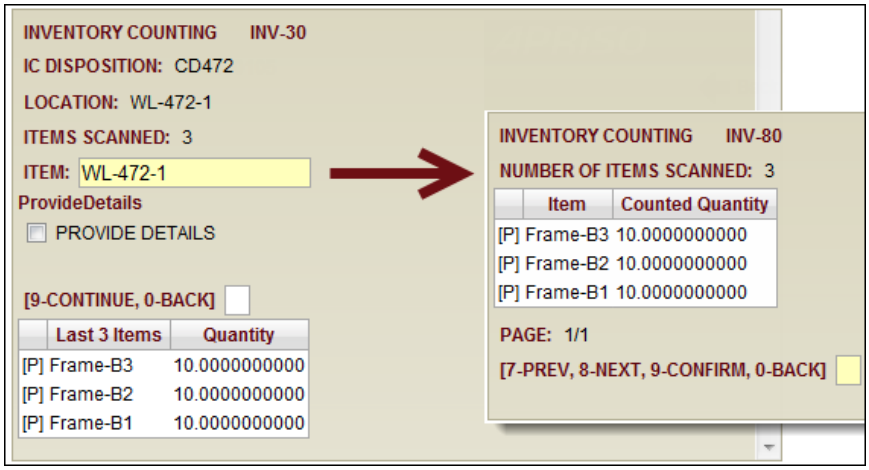


Figure 21 Count Execution – finish counting the Warehouse Location

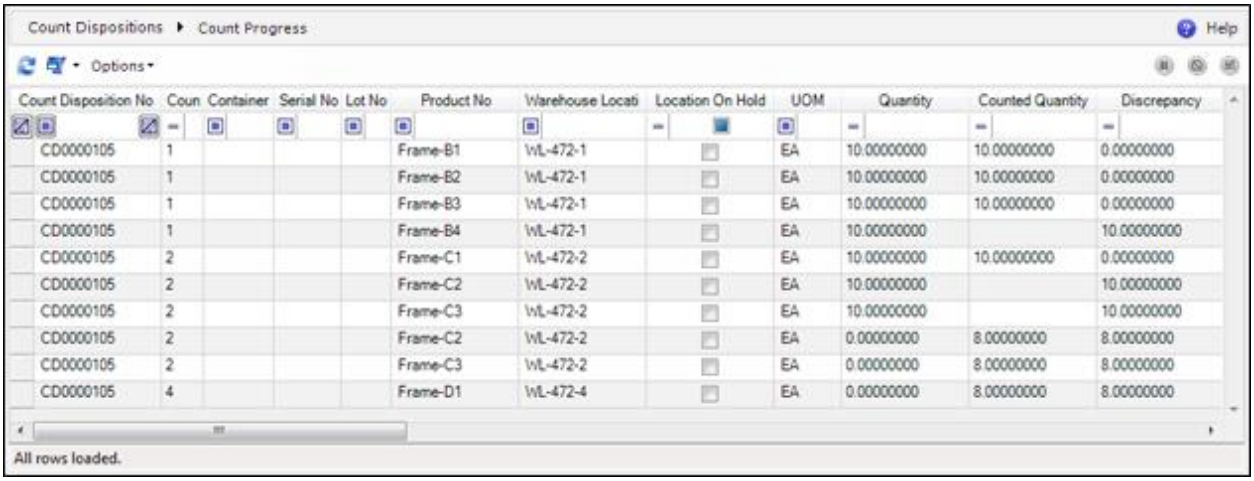
2.4.2 Sign Off

Overview

In the Count Procedure, we defined the signature that is required for approval of the counting results. This option is used to make sure that, if a discrepancy occurs, it is analyzed and taken into consideration by the employee responsible.

Count Progress after Count

The supervisor can check the progress of counting by going to the Count Progress screen. On this screen, the quantity of the counted inventory in the system, the quantity that was counted for that inventory in the physical location, and the discrepancy between the two can be seen. It is also possible on this screen to hold a location if, for example, there are grounds to believe that a discrepancy in counting occurred due to the location not being put on Hold (and thus inventory was delivered to or taken out of it). Incorrect records can also be deactivated and other ones approved on this screen.



Count Disposition No	Coun	Container	Serial No	Lot No	Product No	Warehouse Locati	Location On Hold	UOM	Quantity	Counted Quantity	Discrepancy
CD0000105	1				Frame-B1	WL-472-1		EA	10.00000000	10.00000000	0.00000000
CD0000105	1				Frame-B2	WL-472-1		EA	10.00000000	10.00000000	0.00000000
CD0000105	1				Frame-B3	WL-472-1		EA	10.00000000	10.00000000	0.00000000
CD0000105	1				Frame-B4	WL-472-1		EA	10.00000000		10.00000000
CD0000105	2				Frame-C1	WL-472-2		EA	10.00000000	10.00000000	0.00000000
CD0000105	2				Frame-C2	WL-472-2		EA	10.00000000		10.00000000
CD0000105	2				Frame-C3	WL-472-2		EA	10.00000000		10.00000000
CD0000105	2				Frame-C2	WL-472-2		EA	0.00000000	8.00000000	8.00000000
CD0000105	2				Frame-C3	WL-472-2		EA	0.00000000	8.00000000	8.00000000
CD0000105	4				Frame-D1	WL-472-4		EA	0.00000000	8.00000000	8.00000000

Figure 22 Count Progress after count

Sign Off

The Supervisor can now verify the results of counting and either order the Count Disposition Lines to be recounted, or close the Count Disposition to approve the results. Since our Count Procedure requires the Count Disposition to be signed before closing it, the system will not allow the disposition to be closed prior to provision of the signature. The supervisor can now go to the list of Count Dispositions, select the required disposition, and click (Sign Off).

> ⓘ A Count Disposition can only be signed off on if all of the **Count Disposition Lines** are in the **Counted**, **Cancelled**, or **Approved** status. It is important to remember that if both the Count Disposition and Count Disposition Lines require a sign off, then it is possible to sign and close the Count Disposition without signing the lines. But if only the Count Disposition Lines require a signature, they must all be signed off on prior to closing the Count Disposition.

If the Count Disposition Lines are in the correct status (i.e., they are Counted, Cancelled, or Approved), the Count Disposition can be signed as well. Its status now changes to **Approved**.

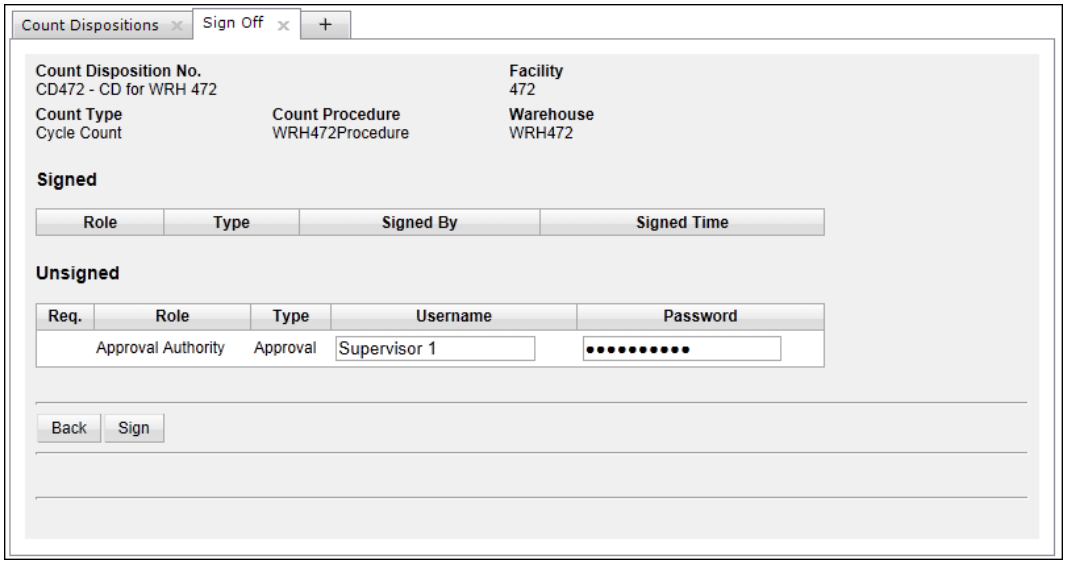


Figure 23 Sign off

2.4.3 Reconciliation

The supervisor can now close the Count Disposition. The Standard Operation will verify if the signature was required, and if so, whether it was provided. Next it will reconcile the inventory, which means that the quantity in the system will be adjusted to the quantity counted in the physical locations. This can be checked on the **Inventory 2 Lookup** screen.

ⓘ Count Disposition Lines which are 100% accurate (i.e., the inventory Accuracy Ratio equals 1) are not taken into consideration during Reconciliation, which improves the performance of the whole process.

2.4.4 Posting

At this point the count results can be sent to an external SAP system. An XML is generated on the basis of the WriteTransactionHistory Business Components method settings. It is possible to define what needs to be generated in the XML depending on the given requirements. The XML can be viewed by Job Scheduler: XML Messages in the DELMIA Apriso Desktop Client. For more information, please refer to the Background Job Processing Technical Guide.

3 Standard Operations

The usage of many of the settings and functions required in the counting process is based on Standard Operations. This makes it possible to prepare new Standard Operations or use/amend existing ones in order to apply only the settings and functionalities in the implementation process that are based on specific requirements.

This section outlines the purpose of these Standard Operations and lists the Business Components and Sub Operations they invoke. For more information on each Operation, please review its structure in DELMIA Apriso Process Builder.

3.1 Count Execution

APR_WH_IC.InventoryCount_Execute

This Standard Operation is delivered as a GPM package. For more information on its flow and usage, please refer to the Count Execution Business Process Flow.

APR_WH_IC.CountDisposition_Execute

This Standard Operation is delivered as a GPM package. For more information on its flow and usage, please refer to the Count Execution Business Process Flow.

3.2 Count Procedure

This category contains Standard Operations that can be linked on the Count Procedure screen.

APR_WH_IC.Location_GetList

This Standard Operation returns a list of all of the Warehouse Locations for a given Warehouse. It can be used when the selected **Location Selection Method** for the Count Procedure is **By Standard Operation**.

Inputs: CountDispositionID

Outputs: WarehouseLocationIDList

APR_WH_IC.CountDisposition_Reconcile

This Standard Operation performs inventory Reconciliation, i.e., it moves and adjusts the amount of inventory present in the system to the inventory counted in the physical Warehouse Locations.

The Operation calls the following **Sub Operations**:

- APR_WH_IC.CountDisposition_GetDynamicOperationFUID
- APR_WH_IC_CountDispositionLine_Reconcile

Input: CountDispositionID

APR_WH_IC.CountDispositionLine_Reconcile

This Standard Operation is used to reconcile Count Disposition Lines.

The Operation calls the following **Business Component** method:

- ChangeCountDispositionLineStatus

The Operation also calls the following **Sub Operations**:

- APR_WH_IC.CountDispositionLine_ReconcileContainer
- APR_WH_IC.CountDispositionLine_ReconcileSerials
- APR_WH_IC.CountDispositionLine_AdjustInventory
- APR_WH_IC.CountDispositionLine_AdjustWithoutSnapshot

APR_WH_IC.CountDispositionLine_ReconcileContainer

This Standard Operation is responsible for reconciling the master Container, which is a Container that can hold other Containers but cannot be contained in anything else itself.

The Operation calls the following **Business Component** methods:

- CreateContainer_v96
- MoveInventory2ByContainer

APR_WH_IC.CountDispositionLine_ReconcileSerials

This Standard Operation is responsible for reconciling the inventory with Serial Numbers.

The Operation calls the following **Business Component** methods:

- IncreaseInventory2
- MoveInventory2

APR_WH_IC.CountDispositionResults_Post

This Standard Operation generates an XML message with information about the structure of the Count Disposition and Count Disposition Lines and posts the count results to external systems.

The Operation calls the following **Business Component** method:

- WriteTransactionHistory

Inputs: CountDispositionID

For the XML to be properly generated, it has to be enabled in the Central Configuration (Property Bag v2 has to be enabled for the list inputs to be used).

APR_WH_IC.CountDispositionExtendedResults_Post

This Standard Operation checks if snapshot was created.

1 If a snapshot was not created, then it generates an XML message with information about the Count Disposition and Count Disposition Lines, and it posts the count results to external systems (it thus works the same as the **APR_WH_IC.CountDispositionResults_Post** Standard Operation described above).
2 If a snapshot was created, then it checks if phantoms exist.
   a If they exist, an error is displayed.
   b If they do not exist, then the Operation generates an XML message with information about the Count Disposition, Count Disposition Lines, and Count Records, and it posts the count results to external systems.

The Operation calls the following **Business Component** method:

- WriteTransactionHistory

Inputs: CountDispositionID

3.3 Count Dispositions

This category contains Standard Operations which define the actions performed on Count Dispositions and Count Disposition Lines (e.g., close, release, edit).

APR_WH_IC.CountDisposition_Edit

This Standard Operation displays the Count Disposition Editor screen, where Count Dispositions can be created or edited. It is invoked from the Count Dispositions browser after clicking (Add) or (Properties).

The Operation calls the following **Business Component** methods:

- GetSequences
- ManageCountDisposition
- UpdateDescription

The Operation also calls the following **Sub Operations**:

- APR_WH_IC.CountDispositionLine_ShowGrid
- APR_WH_IC.CountDispositionLine_Edit

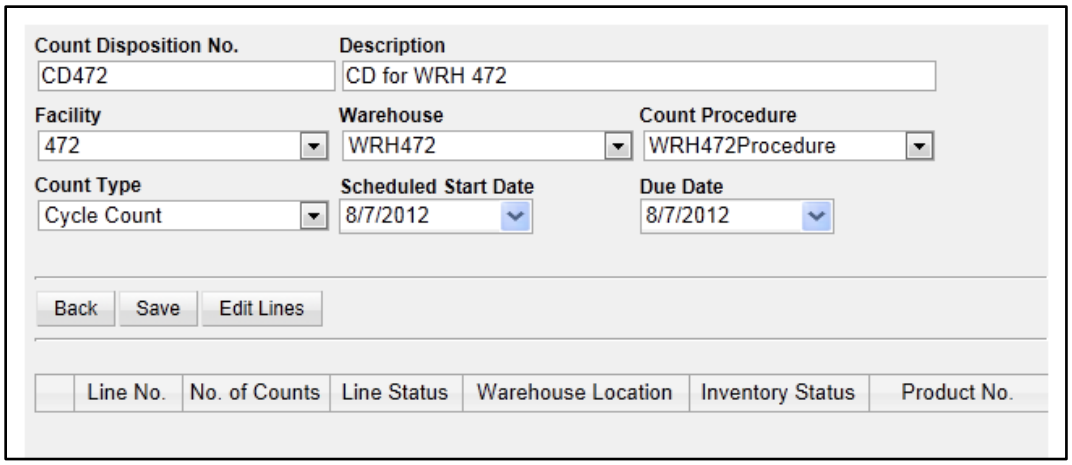


Figure 24 APR_WH_IC.CountDisposition_Edit

APR_WH_IC.CountDispositionLine_Edit

This Standard Operation opens the Count Disposition Lines editor and allows for the creating, editing, and removing of lines. It also displays a list of Warehouse Locations available for the given Count Disposition.

The Operation calls the following **Business Component** methods:

- InsertCountDispositionLine
- DeleteCountDispositionLine

The Operation calls the following **Sub Operations**:

- APR_WH_IC.CountDispositionLine_ShowGrid
- APR_WH_IC.ShowLocations
- APR_WH_IC.CountDispositionLine_ProcedureGenerate

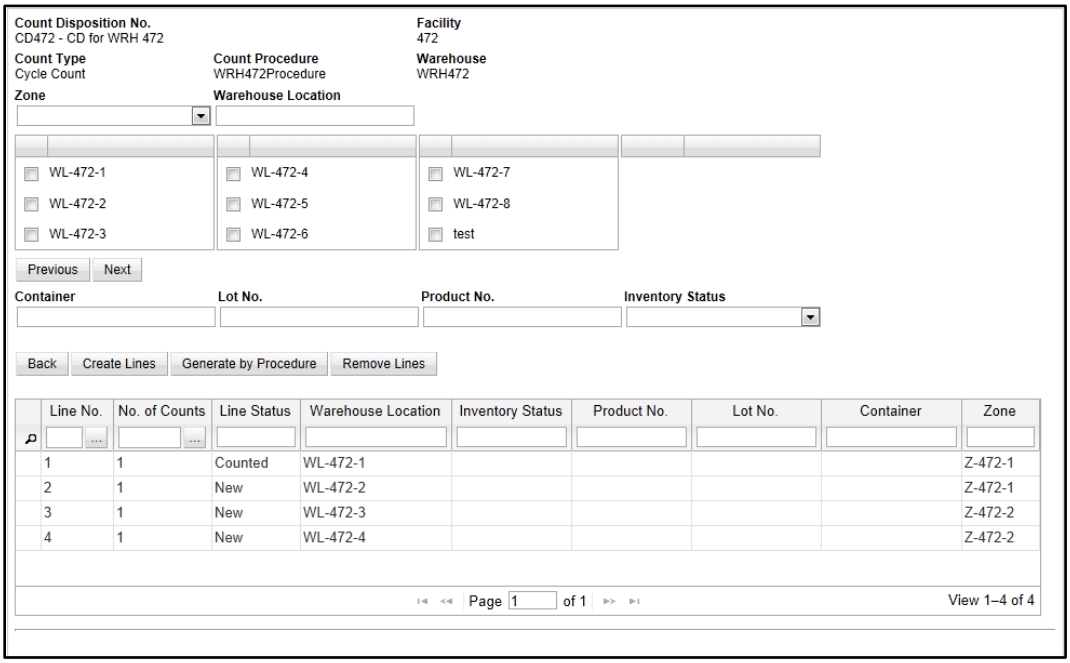


Figure 25 APR_WH_IC.CountDispositionLine_Edit

APR_WH_IC.CountDispositionLine_List

This Standard Operation displays the Count Disposition Lines Management screen and enables managing the lines. It provides options for releasing, recounting, signing off, cancelling, and editing Lines.

The Operation calls the following **Sub Operations**:

- APR_WH_IC.CountDispositionLine_ShowGrid
- APR_WH_IC.CountDispositionLine_Release
- APR_WH_IC.CountDispositionLine_SetRecount
- APR_WH_IC.CountDispositionLine_SignOff
- APR_WH_IC.CountDispositionLine_Cancel
- APR_WH_IC.CountDispositionLine_Edit

By default, it is invoked from the Count Disposition Browser after clicking (View Lines).

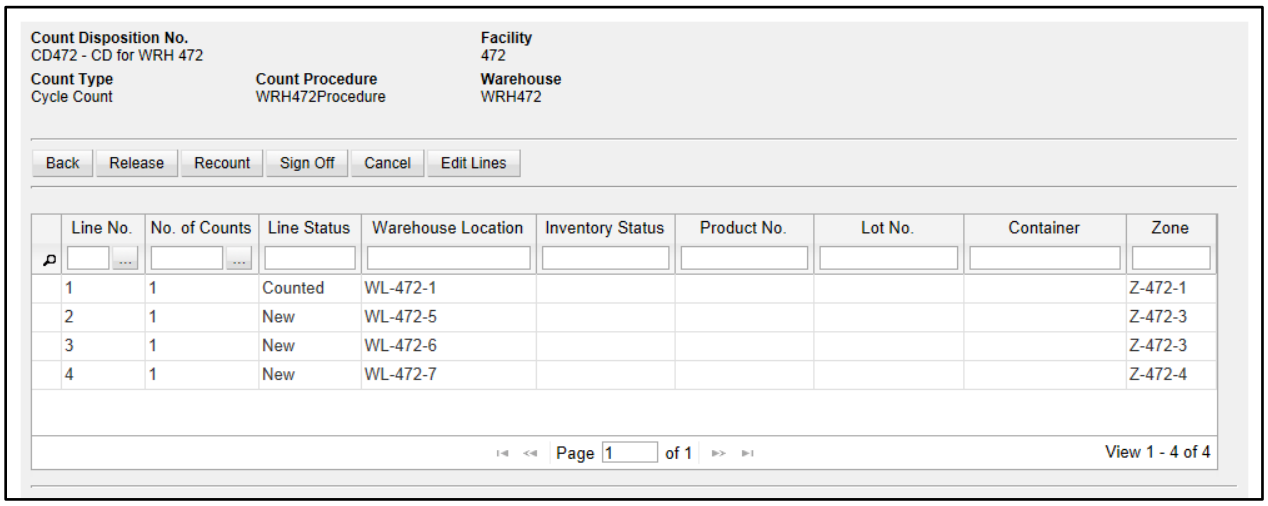


Figure 26 APR_WH_IC.CountDispositionLine_List

APR_WH_IC.CountDisposition_Release

This Standard Operation is used to update the status of the Count Disposition and its lines from New to Released, which makes it possible to start the process of counting. The Operation validates if the Count Disposition is in the **New** status, and if it is not then it displays an error.

The Operation calls the following **Business Component** methods:

- ChangeCountDispositionStatus
- ChangeCountDispositionLineStatus
- ManageCountDisposition

By default, the Operation is invoked from the Count Disposition browser after clicking (Release).

Inputs: CountDispositionID

APR_WH_IC.CountDispositionLine_Release

This Standard Operation is used to release a Count Disposition Line by updating its status from New to Released. The Operation validates that the Count Disposition Line is in the **New** status, and if it is not then it displays an error.

The Operation calls the following **Business Component** methods:

- ChangeCountDispositionLineStatus
- ChangeCountDispositionStatus
- ManageCountDisposition

By default, the Operation is invoked from the Count Disposition Lines Management screen after clicking the (Release).

Input: CountDispositionLineID

APR_WH_IC.CountDisposition_SignOff

This Standard Operation displays a Sign Off screen where signatures for the required Count Disposition can be provided. It validates if the status of all of the Count Disposition Lines is

Counted. If the signatures are correct, it changes the status of the Count Disposition to **Approved**.

The Operation calls the following **Business Component** methods:

- CreateSignatureHeaderByDefinition
- ValidateSignatureAllSigned
- ChangeCountDispositionStatus
- UpdateCountDisposition

By default, the Operation is invoked from the Count Disposition Browser after clicking (Sign Off).

Inputs: CountDispositionID

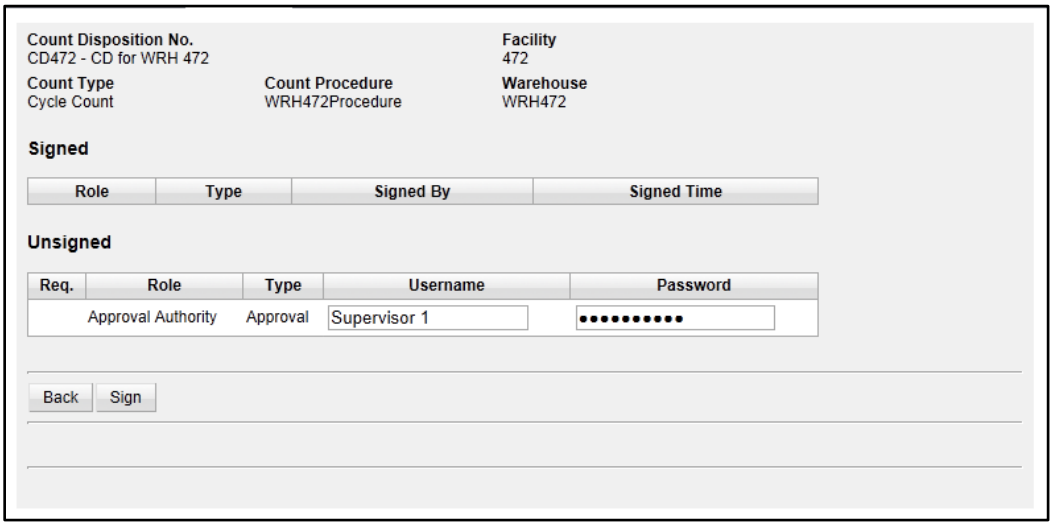


Figure 27 APR_WH_IC.CountDisposition_SignOff

APR_WH_IC.CountDispositionLine_SignOff

This Standard Operation displays a Sign Off screen where signatures for the required Count Disposition Line can be provided. It validates if signatures are required and if the provided signatures are correct. If correct, it updates the status of Count Disposition Line to **Approved**.

The Operation calls the following **Business Component** methods:

- CreateSignatureHeaderByDefinition
- ValidateSignatureAllSigned
- ChangeCountDispositionLineStatus
- UpdateCountDisposition

The Operation calls the following **Sub Operations**:

- APR_WH_IC.Signature_Display_Signed
- APR_WH_IC.Signature_Display_Unsigned_Multi
- APR_WH_IC.Signature_Sign

By default, the Operation is invoked from the Count Disposition Lines Management screen after clicking (Sign Off).

Input: CountDispositionLineID

APR_WH_IC.CountDisposition_Close

This Standard Operation verifies if the signatures were provided (if required), if all of the Count Disposition Lines are closed, and if Reconciliation and Posting are required. If the signature process was not completed or if lines are not closed, it displays an error message. If Reconciliation and/or Posting are required, the appropriate Sub Operations are called. Once these processes are finished, the Operation releases the Warehouse Locations that were on Hold during the counting process.

The Operation calls the following **Business Component** methods:

- CreateSignatureHeaderByDefinition
- ValidateSignatureAllSigned
- UpdateCountDisposition

The Operation calls the following **Sub Operations**:

- APR_WH_IC.CountDisposition_Reconcile
- APR_WH_IC.CountDisposition_CloseAndPostResults

By default, the Operation is invoked from the Count Disposition browser after clicking (Close).

Input: CountDispositionID

APR_WH_IC.CountDisposition_CloseAndPostResults

This Standard Operation changes the Count Disposition status to **Closed**, posts the results if required, and releases the Warehouse Locations if they are on Hold. It also calculates the Accuracy Ratio of a Count Disposition to provide information on overall count accuracy. For a detailed description on how count accuracy is calculated can, please refer to section 2.1.3 Count Disposition.

The Operation calls the following **Business Component** methods:

- ChangeCountDispositionStatus
- ReleaseWarehouseLocation

The Operation calls the following **Sub Operations**:

- APR_WH_IC.CountDisposition_GetDynamicOperationFUID
- APR_WH_IC_CountDispositionResults_Post

APR_WH_IC.CountDisposition_Cancel

This Standard Operation is used to cancel a Count Disposition that is in any other status than **Closed** or **Completed** along with its lines. The Operation also validates if any Warehouse Locations were put on hold against the selected Count Disposition. If so, it releases those Warehouse Locations.

The Operation calls the following **Business Component** methods:

- ChangeCountDispositionStatus
- ReleaseWarehouseLocation

The Operation calls the following **Sub Operation**:

- APR_WH_IC.CountDispositionLine_Cancel

By default, the Operation is invoked from the Count Disposition browser after clicking (Cancel).

Inputs: CountDispositionID

APR_WH_IC.CountDispositionLine_Cancel

This Standard Operation is used to cancel a Count Disposition Line in any existing status.

The Operation calls the following **Business Component** method:

- ChangeCountDispositionLineStatus

By default, the Operation is invoked from the Count Disposition Lines Management screen after clicking (Cancel).

Input: CountDispositionLineID

APR_WH_IC.CountDisposition_Duplicate

This Standard Operation duplicates an existing Count Disposition. The new Count Disposition is assigned the next Count Disposition number in the sequence, its status, and whether its lines are set to **New**.

The Operation calls the following **Business Component** methods:

- GetSequences
- ManageCountDisposition
- InsertCountDispositionLine

By default, the Operation is invoked from the Count Disposition browser after clicking (Duplicate).

Input: SourceCountDispositionID

Output: CountDispositionID

APR_WH_IC.CountDispositionLine_ProcedureGenerate

This Standard Operation automatically generates Count Disposition Lines based on the settings provided in the Count Procedure used with the given Count Disposition. The Operation determines the Location Selection Method based on the Count Procedure, and creates Count Disposition Lines for the returned Warehouse Locations.

The Operation calls the following **Business Component** method:

- InsertCountDispositionLine

The Operation calls the following **Sub Operations**:

- APR_WH_IC.Location_GetList
- APR_WH_IC.CountDisposition_GetDynamicOperationFUID

By default, it is invoked from the Count Disposition Editor screen when the **Generate by Procedure** button is clicked.

Input: CountDispositionID

APR_WH_IC.CountDispositionLine_SetRecount

This Standard Operation changes the status of a Count Disposition Line from Counted, Completed, or Approved to Released. It deactivates the Count Records, recreates a snapshot of the inventory (if that is required by the Count Procedure), and resets the inventory Accuracy Ratio.

The Operation invokes the following **Business Component** methods:

- DeactivateCountRecordsByDispositionLine
- UpdateCountDispositionLineCount
- ChangeCountDispositionStatus
- ChangeCountDispositionLineStatus
- RemoveDispositionSignatures
- RemoveDispositionLineSignatures

The Operation calls the following **Sub-Operation**:

- APR_WH_IC.CountDispositionLineSnapshot_Create**.**

By default, the Operation is invoked from Count Disposition Lines Management screen when the **Recount** button is clicked.

Input: CountDispositionLineID

APR_WH_IC.CountDispositionLine_AdjustInventory

This Standard Operation adjusts (increases or decreases) or moves inventory during the Reconciliation process.

The Operation calls the following **Business Component** methods:

- DecreaseInventory2
- IncreaseInventory2

APR_WH_IC.CountDispositionLine_AdjustWithoutSnapshot

This Standard Operation adjusts (increases or decreases) the inventory during the Reconciliation process. Reconciliation is based on the current inventory state.

The Operation calls the following **Business Component** method:

- DecreaseInventory2

APR_WH_IC.CountDispositionLine_ShowGrid

This Standard Operation displays the list of Count Disposition Lines. It is used in other Operations as a Sub Operation.

APR_WH_IC.CountDispositionLineSnapshot_Create

This Standard Operation creates a snapshot of the entire inventory as determined by the Count Disposition Line.

The Operation calls the following **Business Component** method:

- **ManageCountRecord**

Inputs: CountDispositionID

APR_WH_IC.ShowLocations

This Standard Operation displays a list of Warehouse Locations for the Count Disposition Line editor.

3.4 Count Progress

This category contains Standard Operations which define the actions performed on the Count Progress screen.

APR_WH_IC.CountRecord_Approve

This Standard Operation approves the selected Count Record. For the final Reconciliation for each Container/Serial, only one count can be Active, in order to ensure that the Reconciliation process is flawless. This Operation sets the selected Count Record as Active and deactivates all other Count Records for the same item (Serial/Container).

This Operation calls the following **Business Component** methods:

- DeactivateCountRecord
- ActivateCountRecord

By default, the Operation is invoked from the Count Progress screen after clicking (Approve Record).

Input: CountRecordID

APR_WH_IC.CountRecord_Deactivate

This Standard Operation deactivates the selected Count Record.

The Operation calls the following Business Component method:

- DeactivateCountRecord

By default, it is invoked from the Count Progress screen after clicking (Deactivate Record).

Input: CountRecordID

3.5 Signatures

This category contains the Standard Operations responsible for managing signatures in the Inventory Count process.

APR_WH_IC.Signature_Display

This Standard Operation displays signed records and prompts for required signatures.

APR_WH_IC.Signature_Display_Signed

This Standard Operation displays the signed records of a given Signature Header.

APR_WH_IC.Signature_Display_Unsigned_Multi

This Standard Operation displays the remaining signatures for multiple Signature Headers of the same type.

APR_WH_IC.Signature_Sign

This Standard Operation updates the database with signature information.

The Operation calls the following **Business Component** method:

- SignSignature

4 Inventory Count Performance Results

The performance test was executed on an **MS SQL** database containing **870,000** records in the **INVENTORY2** table.

4.1 Generating Count Disposition Lines

- 1 Warehouse Location with 57,000 inventory records: 1 sec.
- 1000 Warehouse Locations with 645,000 inventory records: 9.5 sec.
- 2000 Warehouse Locations with 704,000 inventory records: 16.7 sec.
- 3000 Warehouse Locations with 745,000 inventory records: 25.4 sec.
- 5000 Warehouse Locations with 800,000 inventory records: 50.3 sec.

4.2 Releasing a Count Disposition

- 1 Count Disposition Line with 57,000 inventory records: 84 sec.
- 1000 Count Disposition Lines with 2,930 inventory records: 49.7 sec.

4.3 Close an Inventory Counting Operation

- 1 Count Disposition, 1 Count Disposition Line, 1,000 Count Records: approx. 3 min.
- 1 Count Disposition, 1 Count Disposition Line, 2,500 Count Records: below 9 min.

Only one element was counted during the Inventory Count, so the system had to call the **DecreaseInventory2** Business Component method 999 or 2,499 times and the **IncreaseInventory2** Business Component method or **DecreaseInventory2** Business Component method one time.

5 References

All the documents referenced below are available from the DELMIA Apriso Start page, which can be accessed on your DELMIA Apriso server (`<server name>/apriso/start`). The newest versions of all the documents are available from the 3DS Support.

1 **Dassault Systèmes**, DELMIA Apriso Portal Online Help

This Help describes the DELMIA Apriso Portal and all of the Maintenance and Monitoring screens embedded in it.

2 **Dassault Systèmes**, DELMIA Apriso Desktop Client Help

This Help describes usage of the DELMIA Apriso Desktop Client application and the Monitoring and Maintenance screens embedded in it.

3 **Dassault Systèmes**, Count Execution Business Process Flow

This document describes the contents of the GPM package delivered with sample Standard Operations responsible for the count execution flow.

4 **Dassault Systèmes**, Database Documentation

A standalone Web-based application enabling the easy viewing of DELMIA Apriso database tables (organized into groups), their descriptions, and the relations between them.

5 **Dassault Systèmes**, Background Job Processing Technical Guide

This document provides an overview of the Background Job Processing tool, introduces the background information necessary for using it, and describes how to carry out common tasks.