

Microsoft Dynamics® AX 2012 R2

# Enhancements to Inventory close performance

White Paper

This white paper describes changes in the way the Inventory close and Recalculation batch jobs use the batch framework in Microsoft Dynamics AX.

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# Table of Contents

<b>Introduction.....</b>	<b>3</b>
Microsoft Dynamics AX 2012 .....	3
Microsoft Dynamics AX 2012 Feature Pack .....	3
<b>Process .....</b>	<b>4</b>
Preparing calculation parameters .....	4
Preparing calculation level.....	4
Preparing process flow.....	4
Processing calculation level .....	5
Finalizing calculation level .....	5
Iteration completion .....	5
Posting to ledger.....	5
<b>Parameters .....</b>	<b>5</b>
Batch helpers .....	5
Bundles .....	6
Bundle size .....	6
<b>User interface changes.....</b>	<b>7</b>
New parameters .....	7
Improved insight and traceability.....	7

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## Introduction

The Inventory close and Recalculation jobs in Microsoft Dynamics AX are known to be very time consuming. Based on customer feedback about this issue, a performance review has been performed. The performance review showed a bottleneck in the scheduling of calculation tasks when items with few transactions are closed.

The review has driven significant changes in the way the Inventory close and Recalculation jobs utilize the batch framework in Microsoft Dynamics AX. The process flow has become more efficient, and there is improved insight into, and traceability of, the current stage of the Inventory close and Recalculation jobs when they are run in a batch.

The changes are included in Microsoft Dynamics AX 2012 R2, and they can also be downloaded as a hotfix for previously released versions of Microsoft Dynamics AX 2012.

## Microsoft Dynamics AX 2012

KB article number: 2765275

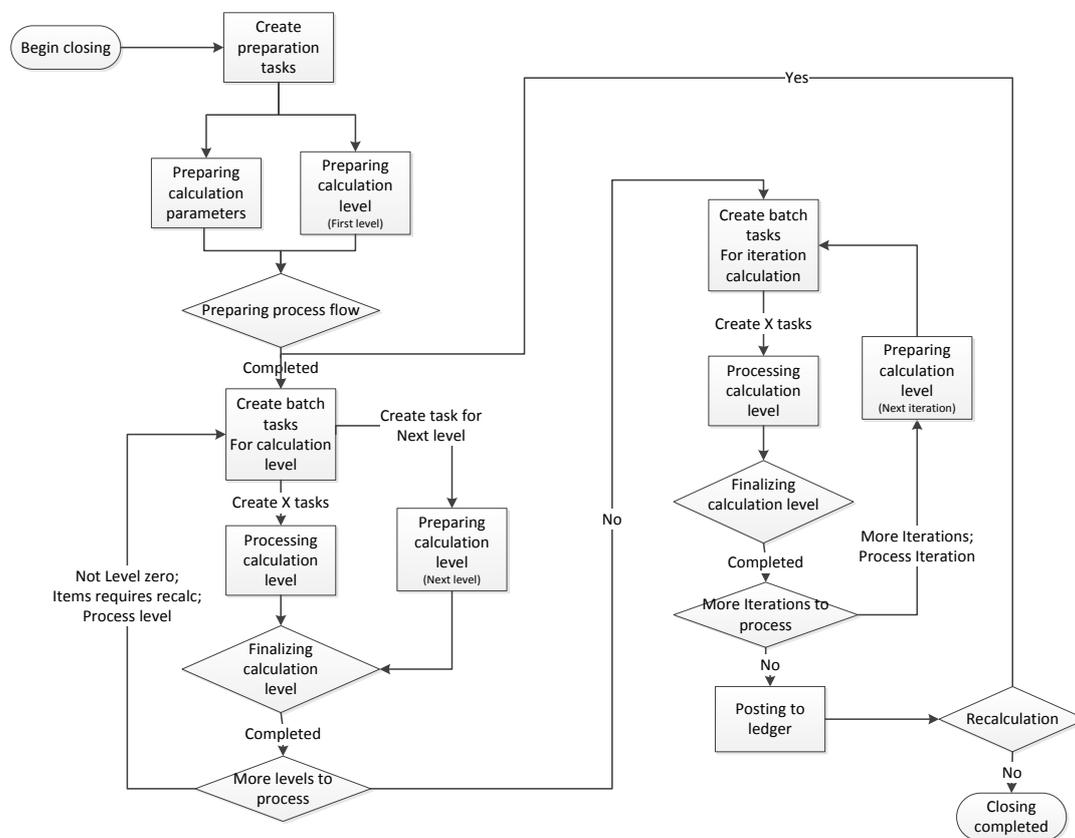
## Microsoft Dynamics AX 2012 Feature Pack

KB article number: 2765275

**Note:** The changes only relate to the way the calculation processes are sequenced in the jobs. The actual calculations that are performed have not been changed, and the outcome of the batch jobs is unchanged.

## Process

The following process diagram illustrates the sequence of individual tasks when the Inventory close and Recalculation jobs are run in a batch.



When the Inventory close job is started, the following three tasks are created to prepare the calculation:

- Preparing calculation parameters
- Preparing calculation level
- Preparing process flow

### Preparing calculation parameters

This task prepares information to determine whether returns and marking need to be processed for each item. The information is stored in the InventCostListParm table and is used by the "Processing calculation level" task.

### Preparing calculation level

This task bundles items that should be processed at the first bill of materials (BOM) level.

### Preparing process flow

This task waits for the first two tasks to be completed. When those tasks are completed, the "Preparing process flow" task creates one "Processing calculation level" task per helper, as defined in the **Inventory and warehouse management parameters** form, and also creates one "Preparing calculation level" task. For more information about the definition of batch helpers, see the [Batch helpers](#) section.

## Processing calculation level

This task picks a bundle of items that is ready for processing, performs the calculation for each item in the bundle, marks the bundle as processed, and continues with a new bundle. This task is completed when all bundles are processed.

## Finalizing calculation level

This task determines whether there are more levels to process.

### ***More levels to process***

If there are more levels to process, the "Finalizing calculation level" task creates new "Processing calculation level" tasks to calculate the BOM level. The task also creates a new "Preparing calculation level" task to bundle items for the next BOM level, if applicable.

### ***No more levels to process***

If there are no more levels to process, the "Finalizing calculation level" task determines whether any items need to be recalculated.

- If items need to be recalculated, the items are bundled, and new calculation tasks are created, together with an "Iteration completion" task.
- If no items need to be recalculated, a "Posting to ledger" task is created.

## Iteration completion

This task determines whether any items need to be recalculated.

- If items need to be recalculated, the items are bundled, and new calculation tasks are created, together with an "Iteration completion" task.
- If no items need to be recalculated, a "Posting to ledger" task is created.

## Posting to ledger

This task posts the transactions to the main accounts.

## Parameters

### Batch helpers

The logic that is associated with a batch helper has been redefined. In the **Extra batch helpers** field on the **General** tab in the **Inventory and warehouse management parameters** form, you can specify the number of extra batch helpers that are allowed.

#### Closing

Extra batch helpers:

Helper batch group:

Number of items per bundle:

The new logic that is implemented is intended to utilize parallel processing from the batch framework much more efficiently than the original logic. A helper now defines the following information:

- The number of parallel processes, also referred to as threads, that are allowed for the Inventory close and the Recalculation jobs in the batch framework.
- The number of tasks that are created for each BOM level.

**Note:** You must specify the number of batch helpers that are allowed; otherwise, the Inventory close and Recalculation jobs cannot use the available threads. The system will not run the jobs in parallel just because the selected batch server has 16 threads available.

### Examples

Helpers	Tasks	Threads	Comment
4	4	16	Only four threads from the batch server will be used for parallel processing. Twelve threads are available for other batch jobs.
20	20	16	Only 16 threads from the batch server will be used for parallel processing. Four tasks are waiting for available threads.

To optimize the performance of the Inventory close and the Recalculation jobs, you must align the setup of the **Extra batch helpers** parameter with the capabilities of the batch group. For more detailed information about the system requirements for Microsoft Dynamics AX 2012, download the following document: <http://www.microsoft.com/en-us/download/details.aspx?id=11094>.

Various kinds of bottlenecks can occur, depending on data composition and hardware. Therefore, the addition of extra batch helpers will not necessarily improve performance.

### Bundles

A new parameter has been introduced that lets you specify the maximum number of items that can be processed at once by an inventory closing batch helper. The parameter is called **Number of items per bundle**, and it is used exclusively for the Inventory close and Recalculation jobs.

The **Number of items per bundle** parameter is located on the **General** tab in the **Inventory and warehouse management parameters** form.

**Closing**

Extra batch helpers:

Helper batch group:

Number of items per bundle:

Previously, in the batch framework, an item represented a task that was picked up by a helper and processed by a batch framework thread. With the new parameter, you can specify the number of items for a bundle. The bundle is a logical representation of a group of items that are randomly picked from the same BOM level and then processed sequentially.

The default size of the group is 40, and with this size, 40 items are randomly picked for the group and processed sequentially by a task.

### Bundle size

The optimal bundle size is almost impossible to predict. Use the following guidelines to determine when you should increase or decrease the bundle size:

- Increase the bundle size if the number of items with few or no transactions is high (for example, approximately 100,000 items), and if the number of items with an average number of transactions is low (for example, approximately 2,000 items).
- Decrease the bundle size if one or more "Processing calculation level" tasks are completed a significant amount of time before the others. In this case, a decrease in the bundle size will increase parallelization.

# User interface changes

## New parameters

You must enter values for the **Extra batch helpers** and **Number of items per bundle** parameters in the **Inventory and warehouse management parameters** form.

- Click **Inventory and warehouse management > Setup > Inventory and warehouse management parameters** to open the form.

### Closing

Extra batch helpers:

Helper batch group:

Number of items per bundle:

## Improved insight and traceability

As a result of the new process flow, significant changes have been made that affect insight into, and traceability of, the current stage of the Inventory close and Recalculation jobs when they are run in a batch. You can now view the time spent on different types of task preparation, the calculations at each level, with iterations, and posting to the ledger. This information might be useful if you have to investigate an optimization.

- Click **System administration > Inquiries > Batch jobs > Batch job**. In the **Batch job** form, select a batch job, and then click **View tasks** to open the **Batch tasks** form.

Status	Task description	Company accounts	Partition key	Class name	Class description	Has conditions	Run location	Batch group	Progress	Start date/time	End date/time
Ended	Close294463875	ext	ext	InventCostClosing	Close inventory	No	Server		100.00	10/12/2012 03:18:21 pm	10/12/2012 03:18:21 pm
Ended	Preparing calculation level	ext	ext	InventCostBundleTask	Preparing calculation level	No	Server		100.00	10/12/2012 03:18:22 pm	10/12/2012 03:18:23 pm
Ended	Preparing item parameters	ext	ext	InventCostPrepareParamTask	Preparing item parameters	No	Server		100.00	10/12/2012 03:18:22 pm	10/12/2012 03:18:23 pm
Ended	Preparing process flow	ext	ext	InventCostPrepareCompletionTask	Preparing process flow	Yes	Server		100.00	10/12/2012 03:18:24 pm	10/12/2012 03:18:24 pm
Ended	Preparing calculation level	ext	ext	InventCostBundleTask	Preparing calculation level	No	Server		100.00	10/12/2012 03:18:24 pm	10/12/2012 03:18:24 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	Yes	Server		100.00	10/12/2012 03:18:24 pm	10/12/2012 03:18:24 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:24 pm	10/12/2012 03:18:24 pm
Ended	Finalizing calculation level	ext	ext	InventCostLevelCompletionTask	Finalizing calculation level	Yes	Server		100.00	10/12/2012 03:18:25 pm	10/12/2012 03:18:25 pm
Ended	Preparing calculation level	ext	ext	InventCostBundleTask	Preparing calculation level	No	Server		100.00	10/12/2012 03:18:25 pm	10/12/2012 03:18:25 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	Yes	Server		100.00	10/12/2012 03:18:25 pm	10/12/2012 03:18:25 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:25 pm	10/12/2012 03:18:25 pm
Ended	Finalizing calculation level	ext	ext	InventCostLevelCompletionTask	Finalizing calculation level	Yes	Server		100.00	10/12/2012 03:18:26 pm	10/12/2012 03:18:26 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:26 pm	10/12/2012 03:18:26 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	Yes	Server		100.00	10/12/2012 03:18:26 pm	10/12/2012 03:18:26 pm
Ended	Finalizing calculation level	ext	ext	InventCostLevelCompletionTask	Finalizing calculation level	Yes	Server		100.00	10/12/2012 03:18:27 pm	10/12/2012 03:18:27 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:28 pm	10/12/2012 03:18:28 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:28 pm	10/12/2012 03:18:28 pm
Ended	Finalizing iteration level	ext	ext	InventCostIterationCompletionTask	Finalizing iteration level	Yes	Server		100.00	10/12/2012 03:18:29 pm	10/12/2012 03:18:29 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:30 pm	10/12/2012 03:18:30 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:30 pm	10/12/2012 03:18:30 pm
Ended	Finalizing iteration level	ext	ext	InventCostIterationCompletionTask	Finalizing iteration level	Yes	Server		100.00	10/12/2012 03:18:31 pm	10/12/2012 03:18:31 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:33 pm	10/12/2012 03:18:33 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:33 pm	10/12/2012 03:18:33 pm
Ended	Finalizing iteration level	ext	ext	InventCostIterationCompletionTask	Finalizing iteration level	Yes	Server		100.00	10/12/2012 03:18:34 pm	10/12/2012 03:18:34 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:35 pm	10/12/2012 03:18:35 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:35 pm	10/12/2012 03:18:35 pm
Ended	Finalizing iteration level	ext	ext	InventCostIterationCompletionTask	Finalizing iteration level	Yes	Server		100.00	10/12/2012 03:18:36 pm	10/12/2012 03:18:36 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:37 pm	10/12/2012 03:18:37 pm
Ended	Processing calculation level	ext	ext	InventCostCalculateTask	Processing calculation level	No	Server		100.00	10/12/2012 03:18:37 pm	10/12/2012 03:18:37 pm
Ended	Finalizing iteration level	ext	ext	InventCostIterationCompletionTask	Finalizing iteration level	Yes	Server		100.00	10/12/2012 03:18:38 pm	10/12/2012 03:18:38 pm
Ended	Posting to ledger	ext	ext	InventCostLedgerPostingTask	Posting to ledger	No	Server		100.00	10/12/2012 03:18:38 pm	10/12/2012 03:18:39 pm

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