



DS0219

Warehouse System Integration



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Problem Definition

<i>Problem Definition & Background</i>	CCDA
<p>ACMECO sells packages of educational materials, such as workbooks, CDs, teaching guides, etc. An assortment of different related material is “pre-assembled” into a kit (a single item in GP).</p> <p>ACME uses a 3rd party warehouse to store, assemble and ship the materials. All purchasing and sales are done through GP. The warehouse has its own inventory system. ACME sends notification to the warehouse about what needs to be assembled, and the warehouse sends back information about what finished good (“kitted”) items were produced.</p> <p>An existing integration reads the build file and uses the Inventory BOM for each made item to calculate which components need to be deducted from inventory. The integration creates an unposted Inventory Adjustment to remove the components from inventory, and add the assembled item. The current system is based on inventory having a standard cost valuation method, so any difference between component costs and made item is variance. ACME is moving to actual cost, and needs the integration to accurately calculate the cost of the made item based on the components.</p> <p>ACME occasionally disassembles the kits. The disassembly information is transmitted in a different file of inventory adjustments. The cost of the made item needs to be distributed across the components so that the overall inventory value does not change as a result of the disassembly.</p>	

Solution Overview

<i>Solution Overview</i>	CCDA
<p>The solution will require a dedicated GP client to be logged-in so that transactions can be processed in real-time whenever import files are available. This will be the “integration processor”. It will watch for pending transactions coming from the warehouse. When a complete input/output transaction is received (an assembly), the processor will:</p> <ol style="list-style-type: none"> 1. Create and post an “input” inventory adjustment. This will credit Inventory and debit a WIP account. The “inputs” are identified by retrieving the Inventory BOM for the made item in the assembly file. 2. It will calculate the total actual cost of the inputs from the posted input transaction. The Inputs transaction must be posted for this calculation to occur because GP draws inventory out of FIFO layers at the moment of posting. This event results in the exact actual cost being derived for the input items. 3. It will then create and post an “output” inventory adjustment. The cost of the input(s) will be applied to the output(s). The transaction will credit the WIP account, and debit the finished item(s) Inventory account(s). <p>The complete posting of inputs and outputs is referred to below as a single “transaction”.</p> <p>Inside of GP a new window will allow the user to process the imported production information. The core concept of the integration is the automatic creation and posting of two inventory adjustments: (1) the first to “consume” raw materials, and (2) the second to “produce” finished goods into inventory.</p> <p>The integration inside of GP will perform the following:</p> <ul style="list-style-type: none"> • INPUT Posting: <ul style="list-style-type: none"> ○ A list of the components that need to be adjusted out will be taken from the Inventory BOM for the made item. The assembly file contains a list of made items only. ○ An inventory adjustment will be created to adjust OUT the input items ○ The posting process will credit the appropriate inventory accounts, and 	

- debit a WIP account.
- During the inventory posting process, the GP Inventory module will calculate the actual costs of the inventory items consumed based on the inventory FIFO layers.
- The integration will retrieve the total costs from the posted Inputs
- An integration tracking table will be updated with the GP Inventory Transaction Number, and the resulting Journal Entry number from posting the Inventory Transaction.
- **OUTPUT Posting:**
 - An inventory adjustment will be created to adjust IN the finished good. The total costs from the Input Posting are allocated to the finished good.
 - This posting process will credit the WIP account and debit the inventory account for the finished good.
 - The integration table will be updated with the GP Inventory Transaction Number for the outputs, and resulting Journal Entry number from posting the Inventory Transaction.

Teardowns, or disassembly will work in a similar fashion. The Teardowns are included in a file of adjustments sent separately from the assembly file. The components removed and the parent item are provided in the file (details below in the Integration section). The Teardown item is the “Input”, and the components removed are the “Outputs”.

The integration inside GP will perform the following:

- **INPUT Posting:**
 - The Teardown item (item being disassembled) is identified in the import file.
 - An inventory adjustment will be created to adjust OUT the input item
 - The posting process will credit the inventory account of the Input item, and debit a WIP account.
 - During the inventory posting process, the GP Inventory module will calculate the actual cost of the inventory item consumed based on the inventory FIFO layers.
 - The integration will retrieve the total cost from the posted Input
 - An integration tracking table will be updated with the GP Inventory Transaction Number, and the resulting Journal Entry number from posting the Inventory Transaction.
- **OUTPUT Posting:**
 - The components removed from the Teardown Item will be identified in the

Import File.

- The list of Output items will be added to an inventory adjustment to put them into inventory.
- The cost of the Input Item will be allocated to the Output(s) based on a ratio of the outputs current cost. See Costing Example below. This method ensures there is no change in inventory valuation as a result of the disassembly.
- This posting process will credit the WIP account and debit the inventory account(s) of the output items.
- The integration table will be updated with the GP Inventory Transaction Number for the outputs, and resulting Journal Entry number from posting the Inventory Transaction.

Costing Example

This example applies to Teardowns only.

Original assembly transaction:

BOOK \$2.00
 CD \$9.00
 GUIDE \$3.50

Additional rules and requirements:

- The Item listed in the assembly import file (RB-file) must have an Inventory BOM
- The BOM will be treated as a Single-Level BOM. No functionality is provided to include components for deeper levels of the BOM.
- Quantity Precision. The 3rd Party Warehouse Management System (3PWMS) has an unknown level of precision (unknown to us) in its quantity tracking. All quantities from the 3PWMS will always be rounded UP to the level of precision supported by GP. So if 3PWMS sends 10.00001 and GP only supports 2 decimals for the item, it will be entered into GP as 10.01.
- Inventory Sites. The Default Site assigned to the Item will be used as the Draw From site for raw materials, and as the Post To site for finished goods.
- All items used in the manufacturing process must have an Actual Cost method (FIFO Perpetual or LIFO Perpetual). Average or Standard Costing methods are not being addressed in this design.
- Regardless of GP Setup, the integration will not be allowed to drive inventory

negative.

- Serial Numbers and Lot Numbers are not supported
- Multi-bin is not supported
- GP Setup must allow Inventory Adjustments to post to and through GL
- Transactions will always post using the current date as the GL post date.
- It is assumed all finished goods are produced in the Base Unit of Measure for that item.
- The Finished Good item must have the following GL accounts: Inventory on Item Account Maintenance
- The Raw Material item(s) must have the following GL account: Inventory on Item Account Maintenance.

There are a number of potential error conditions that could be encountered.

- System Settings
 - Multi-bins is enabled
 - Setup does not allow inventory transactions to post to and through GL
 - Fiscal period is not open for Inventory
 - Fiscal period is not open for GL
- Item Setup
 - Invalid or missing raw material Item Number
 - Invalid or missing finished good item number
 - Invalid or missing required Item GL Account Numbers
 - Incorrect Item Valuation Method
 - Item is Lot or Serial tracked
 - No default site on any of the item numbers
 - Inadequate raw material inventory available

Before processing, error checking will be performed and the results recorded in an Error Log table. All detected errors will be recorded (as opposed to skipping the document when the first error is detected), so that if multiple errors exist for a single transaction they will all be reported. Any error will cause the transaction to fail, and processing will continue with the next transaction.

Transactions with errors will be addressed manually. No method is provided in this design



to fix errors.	
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Costing Example

The Assembly Transactions will be performed in two steps.

ASSEMBLY			
	Item	QTY	Ttl Cost
	BOOK	4	\$2.00
	CD	1	\$9.00
	GUIDE	2	\$3.50
	Item	QTY	Ttl Cost
	KIT	1	\$14.50

The first step will create and post an inventory adjustment to adjust OUT the components (Book, CD, Guide). This results in \$14.50 going into WIP.

The second step will create an inventory adjustment to adjust IN the assembled item (KIT). The image below shows where the quantity will be placed in inventory based on the Valuation Method. The example where four KITS have been made, each time the cost of the components increased by \$1.

LIFO



FIFO



Depending on when a KIT is disassembled, the cost of the KIT disassembled could range from \$11.50 to \$14.50.

In LIFO, if you assemble the KIT and then immediately disassemble it (no other transactions have occurred), the KIT will be pulled out of inventory at \$14.50.

However, in FIFO the cost of the KIT will be the oldest remaining FIFO layer. In this case, \$11.50. If you assembled the KIT and immediately disassembled the KIT, GP will post the “inputs” transaction at \$11.50.

Assuming a FIFO costing method is used, disassembly costing will be calculated as shown below.

TEARDOWN			
	Item	QTY	Ttl Cost
	KIT	1	\$11.50
Cost Ratios			
	BOOK	\$2/\$14.50	0.14
	CD	\$9/\$14.50	0.62
	GUIDE	\$3.50/\$14.50	0.24
Cost Allocation			
	BOOK	0.14 * \$11.50	1.61
	CD	0.62 * \$11.50	7.13
	GUIDE	0.24 * \$11.50	2.76

The Cost Ratios are calculated based on the Sum of the Current Cost of the input items.

In the LIFO scenario the calculations would be as shown below.

TEARDOWN	Item	QTY	Ttl Cost
	KIT	1	\$14.50
Cost Ratios			
	BOOK	\$2/\$14.50	0.14
	CD	\$9/\$14.50	0.62
	GUIDE	\$3.50/\$14.50	0.24
Cost Allocation			
	BOOK	0.14 * \$14.50	\$2.03
	CD	0.62 * \$14.50	\$8.99
	GUIDE	0.24 * \$14.50	\$3.48

Note that while the KIT cost is coming out at \$14.50, due to rounding the component costs may not be returned exactly the same as the came out of inventory. In this case the ratios were only calculated with 2-decimal places to highlight the possible rounding effects. In GP this will be calculated to 5-decimals.

In either case, the net effect is no overall change to the inventory valuation due to the disassembly.

Design Features

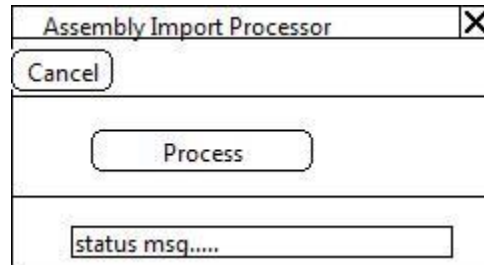
Setup	CCDA						
<p>The Setup window will be access from Tools >> Setup >> Company >> Assembly Integration Setup.</p> <div data-bbox="411 540 1050 881" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <div style="border: 1px solid black; padding: 2px;">Setup X</div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;">Save</div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;"> WIP Account <input style="width: 100%;" type="text" value="000-1301-00"/> <input style="float: right; width: 20px; height: 15px; border: 1px solid black;" type="button"/> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;"> Description <input style="width: 100%;" type="text" value="WIP Material"/> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;"> File Location <input style="width: 100%;" type="text" value="d:\integration\"/> <input style="float: right; width: 20px; height: 15px; border: 1px solid black;" type="button"/> </div> </div> <p style="text-align: center; margin-top: 10px;"> <input style="width: 20px; height: 15px; border: 1px solid black;" type="button"/> = Lookup Button </p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 20%;">Field</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>WIP Account</td> <td>This account will be used as a “wash” account for the assembly processes. There will only be a balance in this account for the brief amount of time it takes to post the Inputs and Outputs transactions. When Output posting is complete, the WIP account will again have no balance.</td> </tr> <tr> <td>File Location</td> <td>The network location where the integration can locate the integration files</td> </tr> </tbody> </table>	Field	Function	WIP Account	This account will be used as a “wash” account for the assembly processes. There will only be a balance in this account for the brief amount of time it takes to post the Inputs and Outputs transactions. When Output posting is complete, the WIP account will again have no balance.	File Location	The network location where the integration can locate the integration files	
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Integration	CCDA																																																	
<p>Assembly information is transmitted from the Warehouse in a CSV file on a daily basis. It is uploaded every morning for the previous day's activities. ACME has a processor in place that automatically retrieves the file from the FTP site and brings it into a staging folder on the network.</p> <p>The processor will place a COPY of the RB file in an integration folder to be used by this software. When the software has finished processing a file it will be DELETED from the integration folder.</p> <p>The file has the following naming convention: RBYYMMDD##</p> <p>YY = two digit year MM = two digit month DD = two digit day ## = incrementing number if multiple files are transmitted. At this time there is a single daily transmission, so the final segment is always "01" (zero one).</p> <table border="1" data-bbox="226 993 1228 1166"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>HISP 001364 K</td> <td>978-1-60007-007-5</td> <td>AVENTURAS 2/E PACK A + WORKBOOK/VIDEO MANUAL</td> <td>20</td> <td>RR DONNE</td> <td>4.3</td> <td>8</td> </tr> <tr> <td>HISP 001380 K</td> <td>978-1-59334-933-2</td> <td>AVENTURAS 2/E HE INSTRUCTOR RESOURCE PACKAGE</td> <td>2</td> <td>RR DONNE</td> <td>5.6</td> <td>6</td> </tr> <tr> <td>HISP 001449 K</td> <td>978-1-60007-065-5</td> <td>IMAGINA SECONDARY TEACHER RESOURCE PACKAGE</td> <td>5</td> <td>RR DONNE</td> <td>3.5</td> <td>10</td> </tr> <tr> <td>HISP 001547 K</td> <td>978-1-60007-181-2</td> <td>IMAGINEZ EXAM PACK A</td> <td>45</td> <td>RR DONNE</td> <td>3.3</td> <td>1</td> </tr> <tr> <td>HISP 001552 K</td> <td>978-1-60007-194-2</td> <td>ENFOQUES 2/E PACK A + SAM</td> <td>125</td> <td>RR DONNE</td> <td>3.6</td> <td>10</td> </tr> <tr> <td>HISP 001562 K</td> <td>978-1-60007-226-0</td> <td>FACETAS 2/E PACK A + MAESTRO WEBSAM</td> <td>86</td> <td>RR DONNE</td> <td>1.7</td> <td>22</td> </tr> </tbody> </table> <p>A sample of the file is shown above. Column B contains the assembled item number, and column D contains the quantity.</p> <p>The Teardowns are contained in a file of general "adjustments." The file has an identical naming convention, except the RB is replaced with AJ. A sample is shown below.</p>	A	B	C	D	E	F	G	HISP 001364 K	978-1-60007-007-5	AVENTURAS 2/E PACK A + WORKBOOK/VIDEO MANUAL	20	RR DONNE	4.3	8	HISP 001380 K	978-1-59334-933-2	AVENTURAS 2/E HE INSTRUCTOR RESOURCE PACKAGE	2	RR DONNE	5.6	6	HISP 001449 K	978-1-60007-065-5	IMAGINA SECONDARY TEACHER RESOURCE PACKAGE	5	RR DONNE	3.5	10	HISP 001547 K	978-1-60007-181-2	IMAGINEZ EXAM PACK A	45	RR DONNE	3.3	1	HISP 001552 K	978-1-60007-194-2	ENFOQUES 2/E PACK A + SAM	125	RR DONNE	3.6	10	HISP 001562 K	978-1-60007-226-0	FACETAS 2/E PACK A + MAESTRO WEBSAM	86	RR DONNE	1.7	22	
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A	B	C	D	E	F	G	H	I	J	K	L	M
HISP 0050	M0810124			VHL 2009 all items		0043686	WTEARDV	99	#####	TEARDOW	WO#133461	HISP 506
HISP 0050	M0810139			VHL SPAN all items		0044597	WTEARDV	99	#####	TEARDOW	WO#133461	HISP 506
HISP 0050	M0810145			VHL FILMS all items		56655	W0FF339A	-1	#####	TEARDOW	WO#133461	HISP 506
HISP 0050	M0810145			VHL FILMS all items		56655	W0JJ298F	-98	#####	TEARDOW	WO#133461	HISP 506
HISP 0057	M0910179			ESPACES 2 all items		0046857	WTEARDV	99	#####	TEARDOW	WO#133461	HISP 506
HISP 0057	M0910178			IMAGINA all items		0046857	WTEARDV	99	#####	TEARDOW	WO#133461	HISP 506

- **Column B** contains the item number.
- **Column I** contains the quantity. Components are Positive. Disassembled item is negative.
- **Column K** contains the adjustment type. The file may contain non-teardown transactions, and may not contain any teardown transactions. The relevant lines are identified by TEARDOWN. Components and KIT Item are not listed in any particular order, so the KIT may precede, follow, or be within the list of its components.
- **Column L** contains an identifier that groups a KIT to its components. Grouping by Column L there will be one disassembled item with a negative quantity together with one or more components that have a positive quantity.

The Assembly Import Processor will be accessed from Tools >> Utilities >> Inventory >> Assembly Import.



When the Import Processor is launched (Process is clicked) it will immediately check for pending RB or AJ files in the Import Folder. If any are present, it will start processing them. The status message at the bottom of the window will display information about the file and item being processed.

Clicking CANCEL will abort the process.

Should GP be forced to shut down during processing, the import file and or inventory

adjustments could become corrupt. No functionality is provided to recover from such an event. Manual adjustments would be required to complete any unfinished processing.

The Processor will periodically check for new files. When it finds one, it will read the file into a staging table in the GP company SQL database. Once the file has been brought into the database, the actual assembly processing will be performed using the SQL table, and the source CSV file will be deleted.

As each record is processed, a Status field will be updated to indicate the success or failure of that line. This table will also track the Inventory Adjustment and Journal Entry created for the Input and Output sides of the transaction.

When the Import Processor is started (or restarted) it will check the import table for unprocessed transactions. These will be handled first. In the event the user intentionally cancelled the process and does not want the imported records to be processed, these rows would have to be manually deleted.

The Assembly process is described in detail in the Solution Overview section.