Understanding the Inventory Give-Back Loop

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The "inventory give-back loop" is the part of the aACE COGS engine that accounts for returns and reuse.

For example, suppose we have an inventory lot for ten units of boxes; we ship ten units to a customer, and then the customer returns two. The COGS engine will "give back" two units to that inventory lot, so it has two units available for another shipment to a customer. This example would be reflected in the system as:

- 10 units received from supplier Inventory Lot created Lot: 10 units
- 10 units sent to customer Inventory Usage created (+10 units) Lot: 0 units
- 2 units received from customer Inventory Usage created (-2 units) Lot: 2 units

Give-Back Limits for Inventory Lots

An inventory lot's current Used balance is the largest number of units that can be given back to that lot:

Inventory		- (,							OPEN (
Purchase Inver	itory Lot							Notices 😣	Emails 🚩	Docs
General Info								Serialized	Track b	y Mfr Lot
Trans ID >	Date	Office >	Line	Item Code >	Code Description		Refe	rence #(s)		
PO-50015	06/06/19	AI	Tblt-	-1	Student tablet, 7" screen					
Ordered / Purchase	ed				Ordered / Received					
		Quantity	Each	Value			Quantity			Value
Ordered		50	300.00	15,000.00	Ordered		50		15	5,000.00
Purchased		50	300.00	15,000.00	Received		50		15	5,000.00
Purchased Remainin	g	0		0.00	Received Remaining		0			0.00
ccrued Inventory					Current Inventory					
		Quantity		Value			Quantity			Value
Received		50		15,000.00	Received		50		15	5,000.00
Purchased		50		15,000.00	Used	<	20	>	6	5,000.00
Accrued Inventory		0		0.00	Current Inventory		30		9	9,000.00
nventory COGS										
Usage ID	Trans ID	Trans D	ate Referer	nce #(s)			Quantity	Act Unit Cost	Тс	otal Cost
> 50010 >	SHIP-50012	6/11/2	019 Ord #	50005			20	300.00	6,	000.00
							20			00.00

A product return might include more units than can be associated with a single inventory lot:

• If other inventory lots for that line item code are available, those lots are used for the

additional inventory usage quantity.

Note: For returns, additional inventory lots are *always* selected using LIFO logic, even if your accounting preferences specify FIFO. This is because FIFO logic for returns means the cost of the first inventory lot would be used in perpetuity, even though those costs would be increasingly irrelevant over time.

• If no other inventory lots are available, the give-back loop iterates, allocating as much negative usage quantity as possible to the lot, then allocating a corresponding amount of positive usage quantity.

Example of the Inventory Give-Back Loop

The give-back loop is used to <u>resolve unallocated inventory usage</u>

(http://aace5.knowledgeowl.com/help/resolving-unallocated-inventory-usage), as shown in this example:

For line item code Tech-003a, a shipment of 50 units was sent to a customer, followed by a return shipment of 50. Both shipments generate inventory usage records:

					Inven	tory Usage								
Record	1: 1 of 2											rint 📇	Actions	" K a
Inve	ntory Usag	e Unsorted								\bigcirc				
•										/		OPEN		۹.
🖿 Usage	Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	Status		
> 50045	> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	50	19,999.50	OPEN		- Tr
> 50046	> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	-50	-19,999.50	OPEN	۲	- Tr
List Totals								0	0.00	•	0.00			
Show All	Find Open Inventory U	Jsage Related Records	•											

Tech-003a only has one inventory lot in the system. All 10 units have been allocated to previous inventory usage records from previous shipments, so the inventory lot is currently closed. Because the Lot Quantity is 10 and the Current Quantity is zero, this lot's current give-back limit is 10 (i.e. the lot's quantity Used).

• •					Inventory	Lots								₿
🖨 Record: 1	1 of 1												Print 🖶	Actions 🛪
Inven	tory Lots Sorte	d ku Line There Code												
	COTY LOUS Sorte	a by Line Item Code							\frown					Q 🗸
Lot	Line Item Code	Transaction ID	Date	Office	Ref #(s)		Lot Qty	Lot Value	Curr Qty	~Curr	Value	Accr Value	Status	•
Tech-003a El	ectronic Whiteboard Sc	reen												
> 50018	> Tech-003a	> PO-50016	06/06/19	AI		*	10	3,999.90	0		0.00	0.00	CLOSED	- 🔻 🔾
Tech-003a Elect	ronic Whiteboard Screen						10	3,999.90	0		0.00	0.00		
List Totals							10	3,999.90	0		0.00	0.00		
									\bigcirc					
Show All	Find Open Inventory Lots	Related Records 💌												

Before the COGS Reconciliation process begins, the inventory balance is at zero: 0 current

inventory (inventory lot) + 50 unallocated quantity (positive usage) - 50 unallocated quantity (negative usage) = 0.

First Allocation Loop

When the COGS Reconciliation process runs, aACE recognizes that there are no lots with available inventory, so the unallocated positive usage (i.e. the shipment to the customer) remains at 50; however, the negative usage (i.e. the product return) can give back 10 units to that lot, reducing the negative unallocated quantity to -40.

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> 50046	>	Tech-003a	> SHIP-50031	07/11/19	AI	>	50020		Ord #50020	*	-50	-19,999.50	-40	-15,999.60	OPEN		۳.	-
List Totals											0	0.00	10	3,999.90				
Show All		Find Open Inventory	Usage Related Records	•														

At this point, the inventory lot is open again and has 10 units.

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Lot	Line Item Code	Transaction ID	Date	Office	Ref #(s)		Lot Qty	Lot Value	Curr Qty	~Curr	Value	Accr Value	Status	
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Tech-003a Electr	ronic Whiteboard Screen						10	3,999.90	10	3,9	99.90	0.00		
List Totals							10	3,999.90	10	3,9	99.90	0.00		
Show All F	Find Open Inventory Lots	Related Records 💌												

Second Allocation Loop

Because there was a change in the usage quantities, aACE loops through the allocation process again.

Now the COGS engine can allocate 10 units of positive usage to the inventory lot, decreasing the unallocated positive usage to 40. This also reduces the inventory lot to zero again, preparing the way for 10 more negative usage records to be allocated, leaving -30.

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🖿 Usage	Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	Status	
> 50045	> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	40	15,999.60	OPEN	- Tr 🔴
> 50046	> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	-30	-11,999.70	OPEN	- 🕅 🔴
List Totals								0	0.00	10	3,999.90	1	
Show All	Find Open Inventory U	Isage Related Records	•										

This leaves the inventory lot with 10 units again, identical to the screenshot shown previously.

Third Allocation Loop

The process loops again, reducing both the positive and negative unallocated usage by 10 (i.e. +30/-20) as the inventory lot is depleted and replenished again.

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Inve	ntory Usag	e Unsorted								\frown				
•										/		OPEN	9	Q 🗸
🖿 Usage	Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	Status		
> 50045	> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	30	11,999.70	OPEN)	- 5
> 50046	> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	-20	-7,999.80	OPEN)	- 5
List Totals								0	0.00	10	3,999.90			
Show All	Find Open Inventory U	Isage Related Records	•											

Fourth Allocation Loop

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rd: 1 of 2								Ne	ew 🖶 🛛 Edit 🖋	Delete 🗙 🛛	Print 📇	Action	5
ntory Usage	Unsorted								\frown				
									$/ \rightarrow$		OPEN		C
Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	5 Status		
> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	20	7,999.80	OPEN		2
> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	-10	-3,999.90	OPEN		2
							0	0.00	10	3,999.90)		
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	Line Item Code	Line Item Code Transaction ID > Tech-003a > SHIP-50030	Line Item Code Transaction ID Date > Tech-003a > SHIP-50030 07/11/19	Line Item Code Transaction ID Date Office > Tech-003a > SHIP-50030 07/11/19 AI	the second description of the second descrip	Line Item Code Transaction ID Date Office Order Ref #(s) > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020	d: 1 of 2 entory Usage Unsorted Line Item Code Transaction ID Date Office Order Ref #(s) > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 *	d: 1 of 2 entory Usage Unsorted Line Item Code Transaction ID Date Office Order Ref #(s) Quantity > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 \$\$ 50 > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 \$\$ -50	d: 1 of 2 Nethory Usage Unsorted Line Item Code Transaction ID Date Office Order Ref #(s) Quantity ~ COGS > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 A* 50 19,999.50 > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 A* -50 -19,999.50	Intervention Date Office Order Ref #(s) Quantity ~ COGS Line Item Code Transaction ID Date Office Order Ref #(s) Quantity ~ COGS > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 * 50 19,999.50 > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 * -50 -19,999.50	Intervention Date Office Order Ref #(s) Quantity ~ COGS Unallocated Line Item Code Transaction ID Date Office Order Ref #(s) Quantity ~ COGS Unallocated Accrued COGS > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 * 50 19,999.50 -10 -3,999.90 > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 * -50 -19,999.50 -10 -3,999.90	d: 1 of 2 New ♣ Edit 倉 Deletes ¥ Print ♣ PrintCory Usage Unsorted Line Item Code Transaction ID Date Office Order Ref #(s) Quantity ~ COGS Unallocated Accrued COGS status > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 🖈 50 19,999.50 20 7,999.80 OPEN > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 📌 -50 -19,999.50 -10 -3,999.90 OPEN	d: 1 of 2 New * Edit * Delete * Print * Action Control Usage Unsorted OPEN Line Item Code Transaction ID Date Office Order Ref #(s) Quantity ~ COGS Unallocated Accrued COGS Status > Tech-003a > SHIP-50030 07/11/19 AI > 50020 Ord #50020 * 50 19,999.50 20 -3,999.90 OPEN - > Tech-003a > SHIP-50031 07/11/19 AI > 50020 Ord #50020 * -50 -19,999.50 -10 -3,999.90 OPEN -

The process loops again, reducing unallocated usage to +20/-10 as the inventory lot is depleted and replenished.

Fifth Allocation Loop

With this loop, the unallocated usage quantities are reduced +10/0. When the inventory lot

is replenished this time, the negative inventory usage quantity reaches zero, so that usage record is closed.

• • •)					Invent	ory Usage								8
🔷 R	lecord:	1 of 2								Ne	ew 🖶 🛛 Edit 🖋	Delete 🗶 🛛 P	rint 📇 🕖	Actions 🛪	
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🛓 Usag	ge	Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	Status		
> 5004	45	> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	10	3,999.90	OPEN	ም 🔵	-
> 5004	46	> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	0	0.00	CLOSED	$\pi_{\rm C}$	-
List Tot	tals								0	0.00	10	3,999.90			
Show	/ All	Find Open Inventory	Usage Related Records	•											

Final Allocation

The remaining 10 units of positive unallocated usage are allocated to the lot, reducing that quantity to zero and closing the inventory usage record.

					Inven	ntory Usage								8
🔷 Recor	rd: 1 of 2											rint 📇 🛛 /	Actions 🕽	7
Inve	ntory Usag	e Unsorted								\frown				
•										$\langle \rangle$		OPEN	Q	•
LUsage	Line Item Code	Transaction ID	Date	Office	Order	Ref #(s)		Quantity	~ COGS	Unallocated	Accrued COGS	Status		
> 50045	> Tech-003a	> SHIP-50030	07/11/19	AI	> 50020	Ord #50020	*	50	19,999.50	0	0.00	CLOSED	∞ π	- 1
> 50046	> Tech-003a	> SHIP-50031	07/11/19	AI	> 50020	Ord #50020	*	-50	-19,999.50	0	0.00	CLOSED	_ ₹	- 1
List Totals								0	0.00	v	0.00			
Show All	Find Open Inventory	Usage Related Records	•											

This step also leaves the inventory lot record at zero units again, so it is closed.

• • •					Inventory	Lots									
Record:	1 of 1												Print 🖶	Action	s 🖈
Inven	tory Lots Sorted	l by Line Item Code													
0															Q
Lot	Line Item Code	Transaction ID	Date	Office	Ref #(s)		Lot Qty	Lot Value	Curr Qty	~Curr	Value	Accr Value	Status		
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> 50018	> Tech-003a	> PO-50016	06/06/19	AI		*	10	3,999.90	0		0.00	0.00	CLOSED		Ŧ.
Tech-003a Elec	tronic Whiteboard Screen						10	3,999.90	0		0.00	0.00			
List Totals							10	3,999.90	0		0.00	0.00			
Show All	Find Open Inventory Lots	Related Records 💌													

After the COGS Reconciliation process ends, the inventory balance is again at zero: 0 current inventory (inventory lot) + 0 unallocated quantity (positive usage) - 0 unallocated quantity (negative usage) = 0.

On the inventory lot detail view, we can review the quantities that were processed. Even though the lot can only receive 10 units (i.e. its give-back limit), the Inventory COGS section

shows -50/+50 for the usage quantities that were processed. This is because the give-back loop processed those 10 units ~five times.

Invento	ry Lot: Tech	-003a (500	18)					CLO	OSED (
Purchase I	nventory Lot						Notices	s 🕛 🛛 Emails 🎽	Docs
General Info							0	Serialized Track b	by Mfr Lot
Trans ID >	Date	Office >	Line Item Cod	le >	Code Description		Reference #(s)	Released to gene	eral invento
PO-50016	06/06/19	AI	Tech-003a		Electronic Whiteboard Screen				
Ordered / Pure	chased				Ordered / Received				
		Quantity	Each	Value		q	Juantity		Value
Ordered		10	399.99	3,999.90	Ordered		10		3,999.90
Purchased		10 3	99.99	3,999.90	Received		10		3,999.90
Purchased Rem	naining	0		0.00	Received Remaining		0		0.00
Accrued Inven	tory				Current Inventory				
		Quantity		Value		ç	Juantity		Value
Received		10		3,999.90	Received		10		3,999.90
Purchased		10		3,999.90	Used		10		3,999.90
Accrued Invent	tory	0		0.00	Current Inventory		0		0.00
Inventory COG	is								
Usage ID	Trans ID	Trans Date	Reference #(s)			Qua	antity Act Ur	nit Cost T	otal Cost
> 50043	> SHIP-50010	7/11/2019	Ord #50000-1	L			10 3	399.99 3	,999.90
> 50046	> SHIP-50031	7/11/2019	Ord #50020				-50 3	- 19	,999.50
> 50045	> SHIP-50030	7/11/2019	Ord #50020				50 3	399.99 19	,999.50
						sed	10	3	999.90