

WAREHOUSE MANAGEMENT BETTER BUSINESS PRACTICE

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Warehouse Management Better Business Practices: Cycle and Annual Counting

Is Inventory Accuracy a Possibility, or an Oxymoron?

If you cannot find the number of parts, finished goods, or products that your inventory system says you have, you are undoubtedly wasting your time looking for them. You, in turn, will also hold excess “just in case” inventory (thus raising your inventory carrying costs), delay customer orders, waste time in production and order fulfilment and generate unnecessary return processing costs.

The main reason why the numbers in your system and what you discover during a physical inventory sometimes do not match up is because of unrecorded inventory or inaccurate inventory transactions. It can be a box of inventory placed on the wrong shelf or forty pounds of steel fittings sent to manufacturing that were actually recorded as four pounds. A size four skirt that has been labelled incorrectly as a size six will generate a return, because the customer discovered that it was too small. When the product is returned into inventory, the receiver might just scan the bar code, updating the system with a phantom size six item. (This assumes that the packaging has not been destroyed, which in this case would be beneficial and most likely lead to discovery of the incorrect labelling). The panacea for this is accurate real-time inventory data.

There are two ways to track inventory. You can either do a periodic physical inventory count, which is usually an annual event, or you can implement a cycle count program.

Counting Once

On the surface, physical counts provide a measure of reassurance to your financial auditors. However, annual physical counts are expensive and can shut down production or shipping functions for one or more days. There are some important downsides to physical counts, which include the temptation to cut corners. In many ways, an annual count often introduces new errors that may not be found for several months. There is also the time consuming task of planning the physical inventory. You have to take many things into consideration, such as how many counting teams are required, how many man-hours it will take to get the job done, how much overtime you are willing to impose on your team to complete the count, how many recounts are required, how much equipment is needed, and whether you have enough gear or material on hand.

Counting Many Times

In contrast, cycle counting, when properly implemented and managed, delivers more accurate inventory data. According to the American Production & Inventory Control Society Online Dictionary, cycle counting is, “An inventory accuracy audit technique where inventory is counted on a cyclic schedule, rather than once a year.” A cycle inventory count is usually taken on a regular, defined basis (often more frequently for high-value or fast moving items and less frequently for low-value or slow moving items). Most effective cycle counting systems require the counting of a certain number of items every work day with each item counted at a prescribed frequency. The key purpose of cycle counting is to identify items in error, thus triggering research, identification, and elimination of the cause of the errors.”

Error elimination is one of the benefits of auditing inventory accuracy and choosing to reconcile errors on a cyclical schedule rather than annual. Organizations that implement cycle counting increase the probability of highly accurate real-time merchandise inventory. Who are some of these organizations? In December, 2007, the Aberdeen Group surveyed 552 companies to determine which warehouse capabilities had the strongest correlation to improved performance in the warehouse. According to their research, companies considered to be Best-in-Class were 49% more likely than their peers to practice cycle counting over physical inventories.

Another way of looking at cycle counting is confirmation of on-hand quantity. Accurate inventory data is one of the key foundations for better cooperation and collaboration between the warehouse and the client (internal clients such as production, for example, as well as external clients such as a retailer). Merchandise promotion, merchandising, and replenishment programs run more efficiently when the inventory numbers are accurate, such as improved order cycle times, reduced freight costs and smoother returns.

Benefits of Cycle Counting:

- Reinforces the importance of accuracy in your organizational culture
- Generates focus on continuous improvement at the organizational level as well as within specific departments such as purchasing, warehousing, and manufacturing
- Greatly improves your ability to identify and fix inaccurate data, such as misplaced, mislabeled, or lost stock
- Improves your supply chain operations through more accurate inventory data

- Improves accuracy of data analysis, whether initiated by the manufacturer, vendor, owner, or the accounting department
- Reduces out of stock SKUs through real-time inventory accuracy
- Helps identify and correct receiving, shelving, ordering, packaging, labelling, returns, and fulfilment errors
- Improves inventory turns because you can measure what's in stock and moving out the door
- Improves customer service through higher fill rates
- Raises productivity and efficiency through more accurate data – leading to reduced operational and inventory-carry costs

A Better Christmas for Everyone

Consider a Christmas shopping scenario when you may have visited a store to track down a gift. The gift was out-of-stock, but customer service called the regional warehouse and ordered it for you. Is the item really in stock as the system shows, and will it be available for pick-up in time for Christmas?

Cycle counting needs to become part of your organizational DNA. Once you are up and running, you should be counting in a highly disciplined manner. You may end up counting three or four days per week. Sure, this may sound excessive, but if you cycle count infrequently, you guarantee mediocre results. The only way to get the full benefit of any cycle count program is to count regularly, keep excellent and accurate records (particularly your data entry process to transfer the numbers into your system), and ruthlessly investigate errors.

How to Implement a Cycle Counting Program

The following are areas you need to consider before you begin.

Frequency

How often are you going to count? First, you need to calculate how many counts per year you can perform, and then work backwards by calculating the number of counts per day that you can do. You should consider the effects of cycle counting on customer service, production, shipping and receiving. One way to calculate your frequency is to time yourself. If you tally the number of items you are able to count in a single hour, you can quickly calculate how long it will take to count your stock. While this is a rough estimate, it's a good starting point. Realistically, you should be counting your entire facility in cyclic quarters. As you progress through the first two quarters, you should be able to identify those

items that need to be counted less frequently, but no less than once or twice per year. If you cannot count your entire facility in one or two cyclic quarters, you may be understaffed.

Your Counting Strategy

Tip: Try not to over-complicate your strategy, especially in the beginning. Pick three to five core methods and deviate only if you need to improve your methods.

In advance, figure out how you're going to count, well before you distribute counting assignments to your staff. For example, are you going to count by location, item, expiration date, value, vendor, category, or another method?

One popular way to keep cycle counting manageable is to rank your inventory, using the ABC method. This method uses classifications to determine count frequencies. You assign an "A," "B," or "C" classification to each of your items depending on how often that item enters or leaves your facility, ensuring that the most frequently used or shipped items are counted more often. For example, you might count "Class A" items bi-monthly. "Class B" items are counted monthly, and "Class C" items are counted twice a year. You might count slow moving items only once a year, which could be coded "Class D." Inventory statistics generally show that the more often an item enters and leaves your inventory, the more often your data is incorrect. If the quantity is changing daily because it is a fast mover or popular item, then you are continually introducing opportunity for errors.

Tip: Cycle counting does not offer a "one size fits all" system. How, where and what you count are very dependent on your specific operation.

You can also count by geography or physical location, which is arguably a version of annualized physical counting, which is less time consuming. If counting by location, divide your warehouse into physical areas, such as aisles, doors, sections, departments, shelves, or bins. Plan an orderly and consistent counting pattern, one that covers the entire area and ensures that all items are counted and entered into your Warehouse Management System (WMS). Cycle counting by location is a good method to find misplaced or lost items hidden in corners or underneath shelving.

Tip: Until you are comfortable with the cycle counting process, it is recommended that you leave the quantities visible.

Are you going to provide counters with on-hand quantity visibility, or are you going to conduct “blind counts?” In blind counts, your counters locate the appropriate item, count it and either write it down on a piece of paper or enter it in a real-time mobile device that sends the count directly to the WMS application. The opposite situation is where a counter knows the inventory and is essentially trying to confirm what is written down on paper or visible on a screen.

Tip: Perform cycle counts when no other transactional activity is taking place.

For example, schedule your cycle counts during a down-time or when shipping and receiving is not taking place. Familiarize yourself with your WMS to ensure you know how to achieve your desired results. Another important issue is timing your count. Scheduling your cycle counting depends entirely on your business and all of the other schedules that make your business unique. If you are counting items that are in the process of being received, moved or picked, you will need to make sure that your WMS keeps you informed of what is taking place or does automatic inbound/outbound validation for you. Make sure your written procedures include what the WMS does or does not handle. If there is no validation, you will have to figure out a method of rationalizing inbound and outbound flow as well as the net. A WMS system is invaluable for this purpose. To do this, you need a comprehensive and global understanding of all of your organizational processes to figure out how to handle transactions.

Tip: Radio frequency enabled mobile devices can save time in recording cycle count information.

Whether you count with a spreadsheet in hand, or through an automated software application, you should consider the most efficient method for your operation. Does your chosen method support your unique process, including setup time, strategy, and frequency of counts? Most efficient methods include the use of a radio frequency enabled (RF) mobile device. You key in data, and through radio frequency signals, the mobile device sends your data back to the database automatically, saving you time from manual key-punch. Real-time gives the person in charge of counting “control” to update inventory in a real-time, live mode. Benefits include the elimination of double entries, reduced labor hours, just-in-time availability, collaboration, and accuracy. Other mobile devices allow you to enter your data on the device and then batch upload your data, when the device is placed in a cradle and hooked directly up to a computer. If this method is chosen you will need to consider the pitfalls of losing your data if the device fails, is mis-placed, or if someone forgets to place the device in the cradle.

Who is in Charge? (And Other Personnel Issues).

Who will take responsibility for ensuring that your cycle count program actually works as planned? Identify one person for the task. You also might want to make this same person responsible for training staff on counting procedures and the value of inventory accuracy.

Tip: Include cycle counting and the importance of inventory accuracy in orientation programs for new employees.

Whoever is responsible for cycle counting should understand and accurately estimate the likely counting performance, against the time available for counting. Ensure that sufficient staff are available and appropriately trained, so that you can complete the count as planned. This means having necessary supplies on-hand. If you're using bar code or RFID scanners, make sure the battery is charged and users are trained on how to operate the device and navigate through the WMS application.

A Toe in the Water

Start small. In fact, start really small. Gently introduce your organization and employees to the brave new world of cycle counting.

Tip: Start with limited cycle counting and work the kinks out in your processes before you spread it across the organization. Here is a sample program to get you started with cycle counting:

1. Select 200 items, parts, products or finished goods from your inventory
2. Divide them into counts of 50 per day, that you will count Tuesday through Friday
3. Accurately count and record all items
4. Investigate variances each day
5. Keep track of daily accuracy and variance percentages
6. Investigate causes and origins of errors
7. Localize cause and correct inventory record
8. Determine cause and delegate responsibility for fixing it
9. Select another 200 items, parts, products or finished goods from your inventory for week two
10. Keep checking until accuracy exceeds 97% for a minimum of two weeks

Tip: Select slow moving items, parts, products and finished goods for your first cycle counting tests. You won't have to deal with or account for transactional movement of stock (either in or out of inventory), which will be a future issue when you start counting more frequently moved items.

Once you have completed this, review the process and results. What worked well? What didn't work? What surprises or unexpected information did you gather? After a few tests, adjust your cycle counts in manageable chunks that allow you to completely inventory your entire facility within three months. This will reduce the error rate if and when you perform an annual inventory.

If the lure of more accurate inventory data is too appealing to ignore, consider gradually expanding your cycle counting program in your organization. There is always room to improve on a cycle count. You can set up different cycles, add more items or locations, group items together, and separate complex items and locations. As you progress, find the methods that aide you in doubling or tripling your items or locations during a count. This will enable performance efficiencies during this process.

You should now be ready to expand cycle counting to include your entire organization. Once you have reviewed your cycle counting system, and optimized procedures for investigating and resolving errors, you can expand your counting program to include all inventory items.

Garbage In....How to Reduce Errors

Errors are part of the cycle counting life. Mistakes are a good thing, however, if you learn from them. Think initially in terms of discovering errors, then reducing them, and then ultimately eliminating them. Not only are you going to uncover multiple errors in inventory count, you're probably going to experience errors in the counting. One of the great benefits of cycle counting is continuous improvement. Various warehouse industry experts point to an error reduction circle, in which continuous improvement is the goal. Here is how this cycle looks:

1. Find the error
2. Research it
3. Identify its cause - misplaced items, misshipped items, incorrectly entered orders, etc.
4. Address and eliminate the cause - take corrective action based on what you learn

5. Continue cycle counting and implementing process improvements to raise inventory accuracy
6. Repeat
7. Repeat again

Consistency is the key. Spend time unearthing errors and eradicating them from your operations.

Tip: Focus on your consistency rather than industry benchmarks.

The Power to Move the Yardsticks

It is essential to implement a process to approve and adjust inventory levels for lost, found, or damaged items. The person responsible for this process must understand the effects of adjusting inventory to account for lost and found items. A lost product noted in a Monday count might have generated a purchase order two days later, because the forthcoming forecast requires it. What would happen then, if the product is located on Thursday? How do you reconcile all of these micro and macro effects on your inventory? In this case, the carrying cost will increase because more products are purchased. You now have less space for other items. You have added an additional item to receive increasing inbound labor. In some cases, the “Buyer” may appear to be at fault for ordering too much product. On the other side of the coin, if you over-count during a cycle count, or in essence over-state your inventory, the reverse applies and has a much worse affect because the product cannot be found. Your fill rate suffers, your customers might be agitated, you struggle to look for “missing” inventory that never existed in the first place, and the buyer doubles the order to make up for lost sales which now has the same affect as if the product were lost.

Tip: Cycle Count Accuracy is as critical as receiving, production, picking, and shipping. Assign responsibility appropriately.

If your cycle counting program is successful, there is little benefit to conducting an annual physical inventory. Some in your organization might be reluctant to forego the annual physical count however. If you can prove the accuracy of your inventory through cycle counting, you should be able to persuasively argue against the annual count.

Overview of the Annual Count

In this first chapter of our Better Business Practices Series, we explore the many benefits of cycle counting. Chief among them is the elimination of an annual

physical count of your inventory. While cycle counting is our preferred inventory counting process, many companies still conduct annual counts. Acknowledging that many companies still conduct annual counts, here is our look at the Better Business Practices for an annual physical inventory.

Benefits of Counting

Anyone who has ever planned or participated in an inventory count knows what a frustrating, tedious and time-consuming activity it can be. The actual process of counting requires you to remove employees from their regular jobs for hours, if not days, in every inventory location. Depending on your warehouse operation, this could affect shutdowns in other parts of your business such as manufacturing. The frustration of counting every item, and hunting for items and materials that are nowhere to be found or unidentifiable can be acute, and the organizational value of stock accuracy is considerable.

Whether through cycle counting or conducting an annual tally, the accuracy of your inventory data enables your sales, customer service and financial management systems to operate much more efficiently and effectively. Your annual count confirms what you actually have in stock and then adjusts your database records to reflect reality. Do the on-hand product quantities in your computer reflect what is actually on the shelves in your warehouse? If your buyers or sales personnel make replenishment decisions or customer promises using inaccurate stock balances, mistakes will happen.

When your database indicates less stock than there actually is, you'll end up ordering sooner than necessary and more than you require. You commit capital to products you don't currently need. When your database indicates more stock than there actually is, you may not re-order in time and produce a stock-out. To help avoid both of these undesirable results as well as satisfy tax obligations and financial and insurance requirements, you need to account for the cost of your inventory.

Consider the opportunity cost of investing money unnecessarily in inventory. What would your return be if you took the capital tied up inventory and invested it elsewhere, possibly in a traditional conservative investment like a CD or Treasury bill? If you're financing your inventory, how much interest are you currently paying the bank?

Look at the financial implications of the goods you store in your warehouse. If you are not sure how much you're spending to carry inventory, here are some of the places where your money is going:

1. Putaway costs

2. The labor costs of moving material within the warehouse
3. Percentage of building costs (including rent and utilities) for space used in the areas of your operation where you store inventory
4. Insurance costs
5. Physical inventory and cycle counting
6. Inventory shrinkage (such as employee theft), obsolescence and damage, etc.

If you understand the value of inventory counting, but have not yet implemented cycle counting, your only choice is an annual count. Make it as easy as possible by using the following inventory better business practices and guidelines.

Preparing for an Inventory

That old saying, "no one plans to fail, they just fail to plan," applies to physical inventories. Planning and preparing in advance will save you both time and money. Your inventory count will be more organized, and your staff will be less frustrated. The results will be more accurate and the data will have more value.

Once you have scheduled a date for the count, have your sales team notify customers of the shut down or non-shipment period. Give customers a cut-off date for order placement to guarantee outbound shipping before the shut down. The advisory activities should also extend to your suppliers. Plan to delay deliveries during the count. Communicate this information to all transport or delivery companies that regularly visit the facilities participating in the inventory.

Tip: It is very difficult to hit a moving target, so don't allow any movement of inventory during the count, (except in very special cases).

In your advance planning, divide the warehouse into counting areas. Divide and conquer in small, managed steps. Break the overall counting process up into a series of smaller counts. Repetitively counting five, ten, twenty, or thirty thousand products is tiring. Your employees can easily become overwhelmed and discouraged by the volume of data that needs to be collected.

A physical inventory is a "wall-to-wall" count of your warehouse, so chart your layout in advance. Create a map indicating the location of every shelf, pallet rack and all other places where material is stored. One of the better business ways to increase accuracy is to assign counters by area in the warehouse, rather than

product lines. (It is more difficult to account for misplaced material when counting by product line).

Make sure all inventory is clearly identified and located in its assigned location. If you have multiple locations for the same items, consolidate them into as few locations as possible. By combining smaller quantities into larger aggregated units, you reduce counting time. Preparation also includes a thorough clean-up which should be completed before you count.

Tip: You cannot count what you do not have. Ship everything you can before starting your count. Pay particular attention to whatever items are located in your returned goods and vendor return areas. All items in these areas should be returned to its proper storage location, returned to the vendor, repaired or thrown out before your inventory day.

To reduce shut down time, count as many parts or slow moving or bulk items as possible before your inventory date. Once these have been counted, avoid double counting by tagging the containers with tags or brightly colored stickers to signify that the contents have already been tallied. This tagging system works as long as long as there will be no material transactions prior to the physical inventory.

Manpower Needs and Training

Inventory counting proceeds much faster and more efficiently when you have sufficient staff. Do you know how much staff you will need? An easy way to find out is to conduct a small test count, recording the number of items counted and the time needed to complete the count. Depending on your total number of inventory items or SKUs, and the projected number of days or hours available, you can calculate the number of counters you will need. When calculating your headcount requirements, don't forget to consider the number of data entry personnel and the computer resources needed to support their work. This advanced personnel planning also includes selecting and training supervisors to oversee the counting, tallying, verification and discrepancy processes.

Tip: A counting team can handle 50-100 items per hour. Items that need to be weighed or moved to count may take longer. Boxes or cartons, of course, can be mounted very quickly.

After you have determined how many counters you need, do you know where they will be on inventory day? An often overlooked point is the impact of vacation. Give everyone plenty of advanced notice to avoid overlap with

employees' planned absences. At the pre-count training, make sure everyone receives an inventory playbook containing the inventory activity schedule, procedure details, and work list. Include FAQ to answer likely questions. Who is responsible for each task? How are they going to count? What should they do when they have a problem? What method are you using to designate areas that have already been counted? Include the count sheets (or demonstrate how to use the data capture devices) they are going to use. Clearly specify how they should record quantities, reconcile errors or discrepancies, and handle emergency shipments. Make sure to conduct a similar training session for those responsible for data entry.

Tip: There will always be items in your warehouse that you do not need to count, such as packing supplies, miscellaneous items not considered as inventory, as well as warehouse equipment. Decide in advance what should not be counted and use a system with colored tags to identify them. To keep the information fresh, schedule these training sessions several days before inventory day. Do not schedule it more than a week in advance.

Technology and Counting Materials

How you choose to count may require investing in technology, such as bar code readers. If you choose the paper method, you'll still need to buy necessary supplies (such as pencils, pens, markers, stickers, clip boards, calculators, and scales). Depending upon what material handling equipment you already have in your warehouse, you may also have to rent or borrow equipment such as pallet jacks, forklifts, and ladders.

Much like the benefits discussed in the chapters on Better Business Practices for putaway, slotting and picking, automation can deliver important time reductions. Automation during inventory can appreciably increase accuracy of your data entry, shorten counting time, decrease costs if you use outside auditors, and reduce your shut down period.

1. Bar code readers

These are probably your better business choice to automate your annual inventory. You can download data captured by readers directly into your computer system, eliminating opportunities for data entry clerical errors. If bar code is your technology of choice, make sure to affix bar code labels to all cartons. These labels should include an ID number, item description, unit of measurement, and quantity. The counter scans the item, and enters the unit of

measure and quantity. Open cartons are manually counted, with the tally entered into a handheld computer.

2. Counting Card

If you are using paper, you are either using count (index) cards or counting sheets. The typical count card method prior to actual counting is to place one in each bin that needs to be counted. Counters progress through their assigned counting areas and note quantities on each card. Providing each counter with a supply of blank cards enables them to note incorrectly stocked material, which then can be quickly relocated to its proper location following the count.

3. Count Sheets

Up to 25-30 inventory items are listed on each page. Organize the items by location area and number the pages in the order they will be counted.

Inventory Day

Make sure that all shipments, both inbound and outbound, have been completed and recorded before your count. All transactions, including shipping receipts, location transfers, customer returns, vendor credits, cost updates and quantity adjustments, should have been entered into your system prior to the start of your count. With the pre-inventory books now closed, you're ready to begin. You should not enter any transactions of any kind until your completely audited inventory is finished. The same thing goes for material movement, including outbound shipping or receiving. Do not move, send or receive any material while your count is in progress, to avoid counting it twice or missing it completely. If you do receive emergency or rush shipments, consider quarantining them for post-inventory handling or putaway.

Quality Assurance: The Quest for Accuracy

Accuracy is critical - if your count is inaccurate at the end of your inventory, you have wasted time and money. Physical inventories are only worthwhile if the resulting data accurately reflects the contents of your warehouse. Incorrect data is as valuable to you as no data at all. Audit while your people are still counting.

As soon as your staff is finished counting a specific area, have an auditor recount to verify the counts of selected products. You should have determined the

recount threshold with your auditors in advance. Before you count, decide what error percentage will kick off a recount. Since they represent the most dollars flowing through your inventory, concentrate on verifying the “A” items. Correct your balance-on-hand numbers in your database as soon as the auditor verifies that the counts are accurate.

Tip: If auditing reveals several counting errors in the same location, have the assigned counting team recount the entire section.

Whenever there are important differences between on-hand balances (reflected in the pre-inventory total) and counted quantities, you should list these items on discrepancy reports and investigate them. Calculate the value of these pre-inventory and counted quantities and prioritize them based on those with the largest spread. Remember that some errors have nothing to do with counting accuracy. Differences can be attributed to a variety of reasons such as data entry errors from when the counts were originally entered into the system or even differences in the units of measure. Items may have been entered by counters in pounds whereas the database system has them listed by piece.

After the Inventory: Preparing for Next Year

Sit down and solicit feedback from everyone, regardless of their seniority. What worked? What did not? If you are going to continue with your physical inventory (rather than change to a cycle counting program), discuss a plan or format for the following year. Talk about how you can make your next physical inventory easier, faster, cheaper, and more accurate.

Tip: Create and maintain a physical inventory project folder or binder in which you keep suggestions, examples of counting sheets, results from previous inventories and “how-to” and better business practices articles that you can down the road.

What to Avoid

Here are some things to avoid:

Counting damaged or obsolete inventory

If you find damaged goods or obsolete inventory during your pre-inventory cleanup, return them to the vendor for possible credit, or assign them to a special storage location for post-count disposal. By disposing them as quickly as possible, you'll eliminate future storage costs.

Moving Misplaced Materials

Whenever counters find misplaced materials, they should count them, record the relevant information, tag them as counted and make a note that they're out of place.

Moving Forward: Implementing Your Own Inventory Program

Think of managing inventory, rather than just storing it. The more material in your warehouse, the longer it takes to count. Make sure as you move forward that you prohibit paperless withdrawals from your warehouse. Enforce a company policy that every stock withdrawal requires appropriate paperwork, including product samples. When they are returned to stock, adjust your inventory. If they never reappear, charge the sales representative's account.

Finally, seriously consider eliminating your annual physical county by replacing it with cycle counting. Keep in mind the benefits of cycle counting, as it eliminates the disruption of an annual count and increases the accuracy of your real-time inventory data.

Biography - Joseph DeBella



Joseph DeBella joined VAI in 2008. As a Director of IBM Independent Software Vendor (ISV) Alliance, he oversees VAI's worldwide Independent Software Vendor (ISV) relationship with IBM, providing sales and program marketing support to both the IBM Sales force and IBM Global Business Services (GBS). Joe's extensive management, technology and sales experience in the enterprise software market is integral to VAI's goal of developing a broader footprint within IBM and among mid-market companies. A primary driver behind this expansion strategy is Joe's keen insight and ability to sell and deliver VAI's S2K ERP software suite through IBM GBS.

In addition to his overall business applications, solution development, consulting and sales expertise, Joe is a well-respected authority on rapid implementation methods and application maintenance support alternatives, regularly sharing his

experience and knowledge via white papers and articles both through IBM and industry analysts. Joe is a frequent speaker at Gartner's SME Bi-Annual Conference and other industry or analyst-based venues, addressing areas such as methods and solutions to deliver high impact applications in a rapid and cost efficient manner.

Prior to joining VAI, Joe served in an executive role at IBM, most recently within GBS, where he spearheaded numerous innovative software and services initiatives for the small- to mid-sized markets. He holds a bachelor's degree in electrical engineering and computer science from Cornell University. He is a member of multiple professional organizations such as the Institute of Electrical and Electronics Engineers (IEEE), the Council of Logistics Management (CLM), the International Society of Logistics (SOLE) and the Warehouse Education & Research Consortium (WERC).

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