

Enabling an Information-Driven Battlespace Through Net-Centric Logistics

Greg Deabler

Today's military logisticians are challenged by building an information bridge between the last tactical mile in the battlespace and the extended, increasingly networked, and multi-faceted supporting supply chain. Central to addressing this challenge is the development of an information capability framework that enables visibility and the fusion of strategic and tactical logistics. In this Q&A, Greg Deabler, client industry executive for defense in the EDS Global Government Industry Group, discusses how military clients around the world can bridge the gap between the "last tactical mile" and the broader supply chain through net-centric logistics.

What challenges are defense clients facing today in logistics?

Defense supply chains are like no other. They serve far-away, always-moving and remote customers performing combat and other high-risk operations in harsh conditions. There is little to no supply and event visibility. There are strict "never out" conditions for thousands of mission essential items. This environment is commonly referred to as "the last tactical mile."

The commercial equivalent to this would be having a constantly moving and a limited-capability "point-of-sale." Imagine a large global retailer not having a barcode scanner at the end of the check-out line, not knowing what has been sold and what needs re-supplying. This knowledge of demand and supply status is the "heart" of most supply chains – the beat that paces all else. Supply chains need either real or predicted demand signals to pace synchronization with the supply side. And of course, the non-financial "price" of supply chain failure is quite high in defense.

The challenges of the "last tactical mile" are aggravated by the complexity of the underlying end-to-end supply

chain systems. Like commercial supply chains, most military supply chains are challenged in synchronization and speed by constraints imposed by their structure. The end-to-end defense supply chain – particularly that of the U.S. Department of Defense (DoD) – is a composite of individual organizations with their own processes and systems that optimize their input to their output – not of the whole system. To their credit, they are beginning to build enterprise resource planning (ERP) and integrated data environments, shoring up automated identification technologies (AIT) and infrastructure, fusing processes and even joining up commands. But when you step back and look at the end-to-end picture of net-centric operations it is apparent that there is still much to do.

In the near term, coalition militaries are faced with a wave of equipment coming back from heavy use in Iraq and Afghanistan. This equipment needs not only maintenance, repair and overhaul (MRO), but in many cases will need to be replaced by newer versions of the same equipment or by different components that will deliver new or enhanced warfighting capabilities. Maintenance depots and industry partners alike will be challenged to provide the necessary capacity to efficiently and effectively handle this MRO surge.

So the never-ending quest becomes one of visibility and of exploiting that visibility into synchronization and speed. Throw in the fact that militaries continue to rely more heavily on industry and joint and coalition forces, and the complexity increases exponentially.

How can militaries, coalition partners and industry address these challenges?

To bridge last tactical mile challenges with the broader supply chain, militaries must acknowledge, plan and invest in building an integrated framework of information capabilities that underpin a modernized and emerging collaborative logistics network of participants – militaries,

coalition partners, contractors, non-government agencies (NGOs) and many others. This network should be tightly orchestrated with emerging net-centric operations – the dynamic information-intensive battlespace.

Together, this is called Net-Centric Logistics.

It is a combination of available and emerging global defense logistics capabilities across this vast network mentioned above. Net-centric logistics addresses two painful long-standing issues: a) visibility, and b) the fusion of strategic logistics with tactical logistics. As a military commander put it, logistics “is increasingly becoming less about moving ‘stuff’ and more about moving information about stuff.” Think of the FedEx model; we value online or even mobile in-transit tracking information almost as much as the physical arrival of the shipment. Consequently, logistics information increasingly is an integral part of the military’s joint operational picture.

In EDS, we’ve developed a demonstration of these capabilities, called the Defense Visual Operations Center (DVOC), or fusion center, that provides role-based information, supply chain intelligence, collaboration and situational awareness across the domains in the context of a mock joint forces mission with a keen focus on warfighter support. It showcases the benefits of a properly built and maintained information management framework with the following design principles and components:

- business process modeling and robust workflow
- service-oriented architecture
- collaboration services

- complex event processing
- data fusion
- business intelligence
- federated identity for role-based access

It shows that net-centric logistics is truly about sensing and responding to the battlespace. It also demonstrates that while technologies can go a long way in providing powerful visibility,

intelligence and collaboration, the redefinition of roles, processes, and how decisions are made are also central in this quest. See Figure 1. Value will leak from these net-centric logistics projects and implementations if they are not tightly coupled with operational know how.

What are some examples of clients enhancing their net-centric logistics capabilities?

Most militaries across the globe are either laying foundational capabilities from which to deploy more advanced capabilities or deploying niche, high-value capabilities. Some are doing both to capture operational value sooner rather than later, while still investing in and building for the long-term.



Figure 1. Defense Visual Operations Center (DVOC)

Three critical and inter-related foundational capabilities that most militaries have and will continue to make investments in are:

- Enterprise data solutions that digitize logistics data, such as asset, item-level parts and associated product lifecycle data elements. After data is digitized, militaries are then able to integrate their vast data environments so that they can help drive greater information sharing and interoperability across joint forces. Militaries are realizing that in order to do net-centricity, the data obstacle must be removed.
- Enterprise resource planning and/or commercial off-the-shelf (COTS)-based applications to modernize and standardize existing systems capabilities. This standardization drives out waste in interfaces, system administration, information latency and expands user access to key enterprise information and decision support.
- Automated identification technology (AIT) infrastructure, such as deploying radio-frequency identification (RFID) tags, readers and middleware across the supply chain to bridge the enterprise capabilities previously mentioned with dynamic customer demands, including the warfighter and the always-moving battlespace. AIT is the tip-of-the-spear sensing mechanism that makes the net-centric logistics function agile and provides total asset visibility.

Additionally, several examples of niche high-value capabilities include:

- “On-star”-like solutions and embedded sensors on strategic assets, such as armored vehicles and aircraft, that help monitor conditions and maintenance specifications, including when to detect impending transmission or component failure. Sensor and chip technology is advancing so rapidly that supply chain assets indeed are becoming “smart.”
- Visualization and geographic information systems (GIS)-based inventory tracking that can precisely target available supply with nearby demand.
- Business intelligence and analytic software that

performs large-scale and complex analysis on growing amounts of data produced by these aforementioned sensors and AIT. Militaries are able to do pattern recognition to dynamically update strategic supply positioning plans with real-time supply consumption or “point-of-sale” (POS) data.

Lastly, the above capabilities are still not enough to guarantee actual benefits. These capabilities are forcing militaries and industry closer together in new partnership, outsourcing and contracting relationships in such areas as “Performance-Based Logistics” and “Product Lifecycle Management.” Industry clearly plays a key role in an environment where higher performance standards are being demanded with constrained budgets.

How does the warfighter benefit from net-centric logistics?

At the end of the day, the warfighter always has and always will want the right things at the right place at the right time. Those are the simple orders. Further capabilities and benefits are unleashed when this is achieved in a sustained, predictable fashion amidst an array of unpredictable circumstances, events and environments.

Being agile in a dynamic battlefield has its competitive advantages, including real-time insight into what is available, knowing when supplies and assets will arrive, the flexibility to keep moving and have logistics re-routed, and an ability to change requirements, collaborate with suppliers and meet requirements dynamically. Pace and timing are critical and setting fact-based expectations to military units is also essential to maintaining operations tempo. Automating maintenance, predicting consumption of soon-to-break components or providing in-transit visibility become less burdensome. Giving back one or two hours a day to warfighters and commanders has huge impacts. Net-centric logistics takes the worry away, enabling the warfighter to focus on the mission at hand.

Our clients continue to seek force multiplier capabilities that shift the balance “tail to tooth” or “factory to foxhole” by maximizing warfighter performance, while also being more efficient. As we’ve learned in the commercial world, a lean supply chain can also be a mean one and that is what net-centric logistics is about: an agile supply chain.

What are some lessons learned from past experiences in the logistics field?

One of the interesting trends is the importance of data and data quality in supply chains. Data is an Achilles' heel in all of this. All organizations to some degree have a data dilemma because data is often inaccurate, inaccessible and not standardized. Because data is very process-driven and all processes are driven by humans to some degree, there is too good a probably for error or variations. These errors ultimately trickle down to the databases and can cause a breakdown in the fusion of the data.

For example, in standing up a fusion center for one of our clients, our team was asked to extract data from their current systems and present it to users. We found that the data quality wasn't good because it was incomplete or it was poorly formatted. Data management provides structure and process, and without it, you get what you have, which is a hairball of data. Clients are finding that they have not been managing data strategically.

There are capabilities available to help clients manage their data. There is deep commercial experience on deploying and managing massive data warehouses and business intelligence capabilities with a variety of COTS-based and data extract, transform and load (ETL) tools.

What does it take to implement the net-centric logistics capabilities?

Net-centric logistics is a framework that is essentially a "fabric" of sense and respond capabilities to set up an information-intensive supply chain with four primary layers. The foundational layer is the core infrastructure, including a secure communications network, AIT and a portfolio of existing legacy applications. The second layer, called the "back plane," reveals and correlates logistics data from the supply chain and AIT. It does the heavy lifting involved with interfaces, data transformation, translation and message management. This layer is then managed by a third logistics enterprise services layer, or "cross plane," that houses enterprise logistics content, business rules provides decision support, modeling and simulation, diagnostics and health management. It essentially packages and enhances logistics data and value in context of a mission. The fourth and final layer, called the

"front plane," connects users to information and provides the common operating picture (COP) and provides overall command and control, visualization and situational awareness. Each layer is tied together through a service-oriented architecture (SOA) or fabric. Without SOA, there is no leverage, no service-orientation and therefore great manual expense is incurred to just meet simple, minimum objectives.

In order to stand all these layers up, our defense logistics clients will need a well-defined strategic plan or operational vision, and that entails the requisite transformation enablers of strong leadership, governance, change management and communications.

Let's take an example that brings all this together. I mentioned AIT. This is where technologies like RFID hold the potential to unleash compelling new visibility into supply movements and supply chain events. However, putting RFID chips everywhere does not give you net-centric logistics. This capability must be put in context, integrated to the enterprise and always tied to the mission and warfighter. Consequently, we encourage the design of AIT solutions to begin with command and control and decision support objectives, more specifically the user. This will then help "dictate" the deployment and effectiveness of AIT.

The essence of net-centric logistics is about supplying a dynamic battlespace, and to do so we need a well-oiled information supply chain. And while the saying "speed kills" can apply here, today's military supply chains are about being agile – having the leverage and the speed to carry out their mission. ■