



END-TO-END SUPPLY CHAIN VISIBILITY, SECURITY AND EFFECTIVENESS

/// VIEWPOINT PAPER



E2E: End-To-End Supply Chain Security, Emergency Response and Profitability

With heightened concerns for cargo security and continuing pressures for achieving effective emergency response and profitability, the transport sector has been slow to respond as if in denial of lethal and competitive realities. Given the compelling needs for change, there are several key questions to answer:

- What is the vision of where supply chain, shipment and asset visibility will be in five to seven years and what is the impact on supply chain profitability and security?
- How does the global supply chain's operating issues, pitfalls and opportunities impact profitability and security?
- What is the IT architecture supporting the next generation supply chain platform and how does it affect profitability and security?
- How will the next generation supply chain platform work?
- Where is the urgency for action?

Introduction

EDS' vision of where the supply chain, shipment and asset visibility and cargo security will be in five to seven years is a balanced solution focused on achieving key commercial and government objectives: (1) Economy, efficiency and effectiveness in operations characterized by rapid cargo throughput, rapid vehicle and vessel turnaround, and profitability and return on investment; (2) Uninterrupted commerce; (3) Effective emergency response; and (4) Absolute security. To achieve these objectives, the required operational outcomes include visibility of the supply chain, shipments, assets, and personnel and real time operations, emergency and security alerts and immediate response to abnormal situations.

There is no alternative to achieving effective emergency response, supply chain security and profitability and there is no dichotomy in achieving government and commercial objectives. Government security mandates alone will not yield desired results. Industry is driven by productivity, not security. However, government and industry perform their responsibilities based on the same operations and information. The by-product of commercial systems and processes designed to achieve high productivity and profitability is more effective security. Again, the common goal is complete security with no impediment to traffic flow.

The economy, efficiency and effectiveness of the global supply chain are enabled by collaboration, communication and integration, but are limited by significant operating issues and pitfalls. There is a complex array of entities, systems and procedures. Each entity is preoccupied with its intensive daily physical operations and is resistant to change. These enterprises are typically characterized by the following attributes: global, but fragmented, operations; exposure to industry consolidation; capital intensive; large number of employees; focused on cost control and elusive revenue growth; intense 24x7 operations; infrequent, but very large, capital projects (construction of new ports, terminals, rail lines, etc.); and data driven with legacy IT environments.

There is a wide range of issues that increase total logistics costs, cycle times and quality (such as dwell time, ineffective load planning, weather, fleet allocation, communication failures, lack of intermodal coordination, paperwork inefficiencies, and rules). The lack of sufficient shipment and transport asset visibility are among the most important issues in freight logistics and security. Supply chain transactions can become extremely complex with handoffs

between several transport modes, carriers and enterprises. Cargo processes are generally old, not integrated and lacking in data accuracy, reliability and security. Vulnerabilities to the risks of legacy systems are exacerbated when transport entities with similar risk exposures partner in the supply chain. There is a lack of data synchronization owing to disparate data bases and differences in languages and definitions coupled with massive amounts of important but transient data on shipments and transport conveyances and vehicles.

Cargo security is one of today's most compelling supply chain issues because it centers on threats to human life and the viability of our global commercial lifeblood. But, the threat of cargo terrorism and theft is the catalyst that can move supply chain players beyond traditional barriers and motivate change.

The ultimate solution is an end-to-end supply chain platform providing visibility and generating a dashboard or virtual operating center of real time events that raises alerts on abnormal situations: Real-time data gathering and reporting in the field. Real-time notification of exception events. Immediate response.

EDS, an HP company, views visibility of shipments, assets and people as the key to success and security in the global supply chain. The supply chain is a conduit for a full range of business components (shipments, assets, people, funds and data), all having operations, emergency and security vulnerabilities. Shipments include commercial cargo and parcels as well as maintenance supplies and replacement parts, critical emergency and medical supplies, and high risk cargo. Assets include conveyances, vehicles and facilities. People include employees, contractors/vendors, the public and customers.

Supply chain transformation is enabled by EDS' End-To-End (E2E) automated solution for collecting, synchronizing and analyzing data and for securely communicating actionable intelligence to raise real-time operational, emergency response and security alerts. The end-to-end solution provides real time data, event and alert visibility through a virtual operating center. Data is captured from legacy transaction and tracking systems and procedures and edge technology such as RFID, GPS, and RTLS and integrated in an agile enterprise platform. In turn, captured, integrated and aggregated data is further augmented by decision support capabilities including data warehousing, data mining, business intelligence and risk analysis.

The E2E Supply Chain platform produces a dual win for government and commercial freight logistics. The similarity of data for transport security and transport operations provides the basis for real-time dashboards or virtual operating centers for event alerts for security, emergencies and operations. The platform provides the ability to sense events, interpret data, raise alerts and initiate responses. Some illustrative examples:

- **EDS' Security Assessment Virtual Operating Center**
 - Ports: visibility of shipment/container transfers within the port and between terminals, in-gate and out-gate control
 - Rail: high risk cargo, hazardous materials loads on line, hazardous materials transit time versus standard transit time, hazardous materials setouts en route
- **EDS' Transportation Operations Situation Virtual Operating Center**
 - Ports: ship arrivals, container unloading and disposition, availability and location of empty containers and chassis
 - Rail: on-time arrivals and departures, cars on line, fleet disposition, empties and loads, locomotive and empty car availability, connections made
 - Air: percentage of on-time performance, delay minutes total by cause code, number of incidents of off-schedule or irregular operations

EDS' E2E Supply Chain platform adds value in decision support, efficiency, optimization and cost reduction by providing actionable, time sensitive intelligence, seamless

communication among all stakeholders and a business tool to increase the visibility, security, emergency response and efficiency of shipping operations. Benefits to government entities include the abilities to: track exceptions to daily operations/processes and identify trends in security and emergency exposures over time; enable access by multiple agencies to consistent, synchronized data; enable effective communication, coordination and data analysis among diverse federal and local agencies; rapid detection of anomalies; enable timely and coordinated responses to alerts; evaluate effectiveness of implemented countermeasures; effect policy and procedural improvements by quickly determining the impact of process changes; reduce time to implement new policies; enable standardization and training. Benefits to transport carriers include the abilities to: optimize capital investment in fleet; realize operating efficiencies in load planning, load balancing, fleet utilization, reduced back-haul empty, reduced waiting time at shippers' docks and receivers; eliminate paperwork; increase customer satisfaction; reduce risk of loss and damage and associated insurance costs. Benefits to shippers include the abilities to: increase competitiveness by tracking goods and shipments more efficiently; reduce inventory carrying costs; reduce transportation costs; reduce cycle time; reduce paperwork and automate required documentation; reduce risk of loss and damage and associated insurance costs.

EDS' E2E Supply Chain platform architecture has components that include remote data capture from legacy systems and edge technology, data synthesis and aggregation, business intelligence and risk analysis, and data and event visibility. In turn, the competencies of the E2E platform include built in security, secure communications, data integrity, interoperability, continuous improvement and transparent change.

An experienced view and approach should be applied for selecting and employing edge technology for field operations and remote data capture. Technology itself is not the answer. Technology should be pursued only as part of a planned integrated solution and requirements-driven approach. Integration of current and new technology into business processes will enable achieving envisioned benefits including cost savings and greater effectiveness. Therefore, a targeted business solution (end-state) and transition plan are necessary to determine how the

technology should be employed. The elements of a planned solution would include the vision of the overall business solution, technology integration, data integration and synthesis, intelligence processing, continuous risk and threat determination, real-time resource location and re-allocation based on incident or threat location and level, and real-time data and alert visibility available for command and control. The focus should be on the use and integration of technology into a complete sense, interpret and respond, real-time process, not the technology itself. Again, the focus on technology alone without a view and plan for the whole process is counter-productive.

EDS' Supply Chain platform reference architecture is based upon the principles of our Agile Enterprise Platform. The front-plane, cross-plane, back-plane and point solution layers of the Agile Enterprise platform install agility and manage complexity by isolating change in any of these layers from the others. This allows the users to rapidly make business process changes and maintain business process flow in spite of system changes. Once established, the user interfaces will remain fairly constant, which leads to less training, faster adoption, fewer errors and not having to overcome the natural resistance to change. This further allows for the seamless swap-out of system capabilities at the integration (cross-plane) or operating (back-plane) levels. As technology progresses, the system can be upgraded with little or no impact to the user and usually at lower costs. This also enables the replacement of spot solution functionality without impact to the infrastructure components.

The IT infrastructure for an end-to-end cargo operations, emergency response and security solution must embrace data capture in the context of the physical operation and critical data utilization. For example, the IT architecture in the cargo container context would include both a physical and logical layer. The physical layer would embrace the infrastructure for the location, identification and condition of each container and vehicle. The logical layer would embrace the infrastructure for tracking (location awareness, diversion detection and diversion remediation), analysis (integrity of shipper, transporter, receiver, shipment and history), and predictability.

End-to-end transport asset and cargo data and event visibility is achieved through EDS' Virtual Operating

Center (VOC), an online command and control center that integrates, synthesizes and distributes real-time situational data for critical decision support. This VOC unifies disparate data sources into a common operational picture for many different users, enables quick access to the status of transport assets, provides visibility of the alerts resulting from real-time analysis and data integration and, most importantly, enables decisions for response. The VOC provides domain situational awareness on a hierarchical basis (top-down). Each key node in the operational flow has a display of their domain and salient information. Web portal, 3-D visualization and business intelligence tools are the means through which data and alerts are viewed and analyzed. Ultimately, the VOC obtains visibility into the transportation supply chain to effectively anticipate, prepare for and respond to emergencies, security threats and daily operating incidents.

The E2E Supply Chain platform and, particularly, the VOC illustrate EDS' capabilities. The EDS value proposition to the global supply chain is:

- Visibility of shipments, assets, people and security
- Visibility and accountability for each network operations component/node
- Performance metrics for the end-to-end supply chain and each component/node
- Ongoing improvement of effectiveness and optimization of assets and operations
- Next generation Just-In-Time (JIT)
- Elimination of handoffs
- Elimination of paperwork
- Multiple sources, single data entry and multiple electronic user or stakeholder information access

Our Shared Challenge Going Forward

We share common challenges in the global supply chain to respond to natural disasters and emergencies and to achieve security and profitability. We also share a common body of knowledge about the global supply chain. Likewise, there are solutions to resolve our challenges. However, if this is all true and there are no alternatives to emergency responsiveness, security and profitability in the supply chain, where is the urgency to do something about it?

About the author

Barry Ptashkin is a Vice President, Client Industry Executive, in the EDS Global Government Industry Group, and is responsible for strategic initiatives focused in the Transportation Sector and global supply chain. In addition to more than 30 continuous years of consulting experience, Barry has six years of hands-on transport sector operations management experience. He earned an MBA from Loyola University of Chicago and is a Certified Management Consultant by the Institute of Management Consultants and a Senior Member of the Institute of Industrial Engineers.

Contact

Barry Ptashkin
Vice President, Transportation Sector
EDS Global Transportation Industry Group
phone: 1 561 967 9312
e-mail: barry.ptashkin@eds.com

Contact us

EDS Headquarters

5400 Legacy Drive
Plano, Texas 75024
USA
1 800 566 9337

Global Government

United States
13600 EDS Drive
Herndon, Virginia 20171
USA

EDS Regional Headquarters

Asia

36F, Shanghai Information Tower
211 Century Avenue
Pudong
Shanghai, SHA
China 200120
86 21 2891 2888

Australia & New Zealand

Level 1, The Bond
30 Hickson Road
Millers Point
New South Wales 2000
Australia
612 8965 0500

Canada

33 Yonge Street
Toronto, Ontario
M5E 1G4
Canada
1 416 814 4500
1 800 814 9038
(in Canada only)

Europe, Middle East & Africa

2nd Floor
Lansdowne House
Berkeley Square
London W1J 6ER
44 20 7569 5100

Latin America

Estrada Samuel Aizemberg, 1707
Tower C - 4th Floor
São Bernardo do Campo, SP
Brazil 09851-550
55 11 4399 8875

HP Worldwide Corporate Headquarters

3000 Hanover Street
Palo Alto, California 94304-1185
USA
1 650 857 1501

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