Architecting Next-Gen Connected Logistics & Supply Chain Systems

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Fleet telematics is booming, but as evolving Advanced Driver Assistance Systems (ADAS) accelerate the move towards road trains and intermodal routing, the fleet telematics landscape will change unrecognizably. Telematics macro trends will lead to updates for fleet management systems as V2V technologies, autonomous vehicles and services to increase vehicle utilization increase operational efficiency and mitigate down time due to servicing.

Business Challenge

- The need for agile and flexible supply chains that empower the business to meet rapidly evolving requirements is a critical focal point for IT. Rigid silo’d telematics, ERP and legacy reporting systems may be ill equipped to deal with the changing regulatory environment, emerging competitive threats and higher business and customer expectations.

Solution Space

- Telematics needs to move beyond fleet management point solutions and integrate to the broader enterprise fabric to enable end to end logistics and supply chain visibility for inventory whether it is in a warehouse, on a production line or in transit.

Strategies

- Learn about enterprise architecture strategies for designing connected systems that integrate physical and digital supply chains with your transportation and logistics system that enable innovative business models while mitigating risk and managing security and increasing your capacity to meet customer changing SLA requirements.
The Big Shift #1: Forces driving transformation in Industry & Transportation

- Power Shift To Consumers
- Connected Experiences
- Globalization & Emerging Economies
- Changing Demographics
- Sustainability
- Complex Regulations
The Big Shift #2: Disruptive Technology Megatrends

- Mobility
- Cloud
- Social
- Big data
IDC Manufacturing Industry Predictions

#1. Success in the intelligent economy will be achieved through “engaged” organizations

- The Complexity Masters
- Talent shortfall causes pain; self-organizing global teams prevail
- Financial flexibility + organizational fluidity = improved market response

Current Enterprise

Focus primarily on “Systems of Record” and limited to automation of processes

Next Generation Enterprise

Support “Systems of Engagement” and support structured and unstructured decision making
The Internet of Everything

Source: BI Intelligence Estimates

We are here
Transportation Business Priorities need to adapt

**Innovate**
- Accelerate business with new products and features
- Gain new insight from connected systems/products
- Develop new partnerships across industries

**Perform**
- Increase visibility across globally dispersed operations
- Build cross-functional & situational business insight
- Increase value-chain collaboration

**Grow**
- Compete for attention across the digital marketing spectrum
- Develop a product-linked Services Portfolio
- Transform the Fleet Management Services experience
Where is your IT strategy operating today? Where are your customers moving?

Imagine if Information as a % of Product is >50% (Based on Value to the customers)

Think about building systems by skating to where the puck is heading vs. where it is at today.
Technology considerations enter at all layers of M4SC

- **Business Strategy**
  - How well does our IT strategy align to our Business Strategy. Are they in sync?
  - What % of the value of products is composed of information?

- **Supply Chain Strategy**
  - Have we chosen the right technology suppliers and aligned them to our business / SCM strategies?
  - Are we increasing the extent to which supplier’s technology is “sold through” rather than “sold to” us?

- **Supply Chain Network**
  - Have we integrated our Physical & Digital Supply Chains?
  - Is Information Risk Management (IRM) and Security Development Lifecycle embedded in our SCM processes?

- **Supply Chain Process**
  - Where do we need agile and flexible technology capacity?
  - Have we aligned the SLA’s of our technology suppliers?
  - Is IT an internal enabler and/or an active supplier?
  - Are our digital supply chains secure?

- **Supply Chain Resources**
  - Have we considered evolving requisite IT skills into competency models?
  - Have we considered IT management in our org design.
Connected Supply Chains to Support Physical and Digital Operations

Today's convergence of products and services requires a supply chain that is equally adept at physical and digital operations.

- **Physical**
  - Make
  - Source
  - Plan
  - Deliver
  - Service & Returns

- **Digital**
  - Content Management
  - Offer Management
  - CRM/BI/Security
  - Deliver SaaS

**Customer Experience**

**Reliability**
- On time? Complete? Undamaged?

**Responsiveness**
- From Customer Request to final acceptance

**Agility**
- How long to scale up? How expensive to scale down?

**Cost**
- Cost of Processes? Cost of Goods Sold?

**Assets**
- Working Capital? Return on Investments?
MAPPING OF MULTI-ENTERPRISE VALUE NETWORKS

- Use of Supply Chain Operations Reference Model (SCOR) as common process “lingua franca”
- Firms need to orchestrate Systems of Engagement across the Multi-Enterprise Value Chains
- Firms want to have BI reports that enable them to see across these all these activities
- Firms need Logistics End-to-End
- Firms need to manage their supply chains as a cloud based platform, *Always Connected*
Q: What is the biggest threat to the business if the physical and digital supply chains are not integrated?

A: Unsecured supply chains!
What is an unsecured supply chain?
THE NEED:
EMERGENCE OF SUPPLY CHAIN & LOGISTICS PLATFORMS AS A SERVICE

- CLOUD BASED, YET SECURE
- OPEN API’S, CONSUMABLE, DISCOVERABLE
- SENSOR & EMBEDDED SYSTEMS
- Telematics/Fleet Management
- Fulfillment & Logistics
- Enable End to End View of the Multi-Enterprise Value Chain

The Landscape — Visibility enables Effective Planning and Execution

- Multiple Demand Signals
  - Orders
  - Plans
  - Forecasts
  - Sales data

- Multiple Catalogs
  - Products
  - Services

- Multiple Customer Segments
  - Small Business
  - Corporate
  - Consumer

- Multiple Channels
  - Store / branch
  - Website / Kiosk
  - Call-center
  - Dealer / Distributor / Reseller Network
  - Sales force
  - EDI

- Multiple Fulfillment Methods
  - Pick-pack-ship
  - Project-based
  - Build-to-order
  - Drop-ship / direct-ship
  - Replenishment
  - Others

- Multiple Fulfillment Partners
  - Warehouse
  - Store / branch
  - Supplier / Own fleet / 4PL / 3PL Network
  - Own Service Network
  - 3rd party Service Network
  - Provisioning systems

- Varied levels of Technology and Process standards
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Telematics 2.0: Enabling the Connected Experience
...with vehicle-specific data, connectivity & applications
Enabling Connected Multi-Modal Operations

- Improve fleet/depot management
- Reduce Operational & Maintenance costs
- Reduce Insurance Cost
- Document Compliance – DOT, FAA, Customs
- Dynamic Scheduling
- Route planning
- Delivery SLA’s
- Supply Chain Management
Two dimensions of connectivity benefits

**People-Centric**
- 3rd Party Services
  - Retail
  - Insurance
  - Infotainment
- Home / Office
  - Connected Devices
  - Mobile Network Operator
- People
  - Social Networking

**Asset-Centric**
- 3rd Party Services
  - Remote Monitoring
  - Power Grid
- Road
  - Tolling
  - Traffic
  - Navigation
- Vehicles
  - Safety
  - Security

Dealers/Operators

OEM
Azure & Fleet Management

360SmartView is an integrated data solution that provides state agencies with vast amounts of targeted, secure data on ALL trucks passing through inspection facilities for highway planning, audit and enforcement purposes. Leverages industry standards.

- 5.9 RFID Integration
- LPR / DOT cameras
- Weight-in-Motion sensors
- Laser sensors
- Windows Azure
- Azure Service Bus
- Server AppFabric

360SmartView gives roadside officers a current, complete and correct carrier and vehicle profile on-the-spot.

Ushering in a new way for commercial vehicle enforcement agencies to do business, 360SmartView gives state agencies a warehouse of data on ALL trucks passing through inspection facilities for highway planning, audit and enforcement purposes.
Kyneta Demos First Ever Satellite Link With Metamaterials Antenna

Still waiting for cheap, portable satellite broadband? Sure it's open off the Redmond, Washington-based startup Kyneta's real work is to bring affordable broadband via a satellite to areas where it's not available. The company is typically working on a line of products aimed at bringing affordable broadband to remote or mobile locations, such as planes, trains, or offshore rigs and disaster zones. Now, after months in the laboratory, the company has announced its technology is able to work with an actual satellite.

This is no small feat. Kyneta's satellite terminals rely on a proprietary beam-shaping antenna design based on synthetic metamaterials, which can bend electromagnetic waves in ways that natural materials can't. The antennas are flat and wide: the smallest are about the size and shape of a laptop, they are flat and wide. These are equipped with an array of metamaterial elements that can be electronically tuned to maintain a satellite connection. (For a more detailed description of the technology's future potential, see the video above.)

There are a few problems. Metamaterials are expensive, lightweight, and expensive. The company says their technology is a billion-dollar opportunity. Kyneta plans to have its first products available in 2015.
Leverages Ka-band, lower cost, greater speed

Traditional L-band:
- 496 Kbps ↑ / 496 Kbps ↓
  - $2-5K per unit
  - $4-10 per MB

Ka band:
- 2 Mbps ↑ / 30 Mbps ↓
  - Competitively priced
  - ~$0.10-$0.25 per MB

**BANDWIDTH CAPACITY TO GROW 10X BY 2015**

Enabling inexpensive high-speed internet connectivity

**AUTOMATIC SWITCHING BETWEEN SATELLITES FOR UNINTERRUPTED CONNECTIVITY**

Enabling the always connected SCM fleet, across Truck, Train, Ship, Containers as a global mesh
Third field test of the intelligent container successfully completed

The sensor system as well as the feasibility of container ripening was verified during a test transport from Costa Rica to Europe. The test was completed successfully beginning of May 2013. Results will be presented at the CCM Workshop in Bonn.

The European Microsoft Innovation Center (EMIC) is the Aachen, Germany based innovation lab and part of the Microsoft Research Organization. Focusing on embedded computing technologies, EMIC contributes a virtualization platform for the Intelligent Container telematics component.
What we know. And don’t know.

**Consumers want connectivity**
- Regulations are demanding connectivity
- Marketers want access to the in-vehicle screen
- Consumers don’t want marketing

**How subscribers markets will develop**
- Which apps or experiences will be most used/valuable (beyond realtime traffic).
- How this will vary by geography and user.

**Consumers do want personalization**
- Consumers do want simplicity
- Consumers want to use their own stuff
- Consumers don’t want to pay

**Key requirement: Managing the uncertainty**

**How much consumers will pay**
- What payment models will emerge.
- How apps suppliers will get paid.
- How advertisers will pay. Who they will pay.

**OEMs are building solutions into vehicles**
- Aftermarket solutions are emerging
- Third party services are being built eg PAYD/PHYD
- The result is an explosion of data

**How regulators will act/react**
- How much data will be generated. And retained.
- Who will own the data. How Privacy concerns/rules will impact data acquisition, storage and use.
Strategy: Enable the Fleet OEMs, Operators & Channels to Manage the Uncertainty across the Supply Chain

**Manage the Technology**
- meet technology and consumerization expectations
- stay on top of the constant release of mobile devices
- manage the application choice v. safety dilemma

**Manage the Service**
- establish and operate service delivery platforms
- deploy services where economies of scale are not present
- manage service delivery changes

**Manage the Data**
- capture connectivity data, vehicle, user, location and context
- draw new insight from data
- integrate data insight into new business processes
Elements of the Solution

All building blocks must be in place to leverage synergies of the SOA architecture.

**Presentation**
- Visualization, Time, Geospatial

**Predictive Analytics/BI**
- NL Query, Familiar UI, In Memory Performance

**Data Acquisition, ETL, ESB/Messaging**
- Data Quality, Business Semantic Layer

**Industry Frameworks & Data Models**
- SCM/SCOR

**Aggregate Data Store**
- High-availability, SQL & No-SQL, In Memory OLTP, Federation

**Power View, Bing Maps, SharePoint**
- Power Pivot, Power Map, PowerBI in Excel

**SSIS, DQS, BTS, BISM,**

**Data-Tier App Framework (DACFx)**

**SQL Server 2014 – In Memory PDW, PDW Hardware Azure, PolyBase, Hadoop**
The Cloud & Social Enables Connections

Enterprise Networks | Devices | Consumers

The Challenge: Integrating Disparate Cultures and Business Models
Managing the Technology

Shared core brings enterprise-class computing to all devices

The Need:
- The legacy NT Kernel has been in use for the last 20 years.
- The legacy kernel in Windows has been forked since the mid nineties, in order to support the range of hardware devices.
- Microsoft needed to re-write the kernel to extend the O/S architecture for the next 20 years.
- Project started in 2008 by MSR, delivered first developer preview in Sept 2011

Benefits

Manageability
- Common management model across devices (servers, PCs, notebooks, tablets, smartphones, embedded devices, apps, VMs, and DBs)

Scalability
- Devices can now scale flexibility over time as hardware architecture advances

Security & Identity
- Common security and identity model across devices

Performance
- Dramatically reduced boot time across all devices. Leverage of GPU’s for rendering in browser. Support for in-memory architectures (VM’s, Data connections, OLTP, etc.)

Support
- Reduced cost to support a common kernel across the Microsoft platform
Shared Windows Workflow Foundation brings cross platform process orchestration

- Major players in BPM/Workflow space have acquired a number of smaller players
  - IBM → FileNet, Holosofx, Lombardi
  - OpenText → Metastorm, ProVision, Global360
  - Oracle → PeopleSoft, Siebel, BEA, Fuego
    *None of them have figured out an SOA consolidation strategy*
- MS has been unique in its singular vision of a SOA model for workflow, leveraged throughout all its platforms.

Benefits

Supportability
Common workflow model enables developers to easily move from one platform to another.

X-Platform Orchestration
Workflows can hand off between platforms on premise, in the cloud or hybrid models, at different levels of complexity.

Configurability
Can manifest
- Light duty user configurable workflows in SharePoint / O365
- IT configurable workflows in Dynamics, TFS and PS
- Complex workflows coded as services in BTS/Azure

Support
Reduced cost to support a common service architecture across the Microsoft platform
Automotive Retailer Avoids $1.3 Million in IT Costs with Cloud-Based PC Management Tool

Toyota Motor Europe (TME) had no tools to manage 3,500 car-diagnostic PCs running outside the corporate domain at 3,000 dealerships. TME chose Windows Intune to manage the PCs remotely from a web-based console. It can standardize software deployments to ensure consistent customer service and enhance the security of managed computers to reduce downtime at dealerships. Remote assistance capabilities will also help reduce on-site support costs.
Architecting the Cloud for Connected Vehicles

Manage the Service

Connectivity Customers

Toyota’s EV/PHV Telematics Service launched globally in 2012

Windows Azure as the global platform

Toyota Alliance
A 21st Century partnership
Microsoft's Windows Azure Cloud Platform To Be Used By Qoros To Develop Car Infotainment Devices

Qoros’ infotainment and services use Windows Azure cloud platform

Several market-first functions navigation, monitoring, information sharing

Seamlessly integrate across infotainment touchscreen and users’ other mobile devices

Public preview for Windows Azure in China
Thank You!

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