



Addressing “Permanent Volatility” by Autonomic Logistics



CAP GEMINI
ERNST & YOUNG

Jeff Anderson
VP, Supply Chain Management
CGE&Y Government Solutions
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Overview

Bring on The Dramamine!

- Expectations are up (consumers and customers)
- Product lifecycles are shorter
- Connectivity with customers and partners must be both tighter and more agile
- Global economic forces affect *everyone*
- Powerful new enabling technologies are driving change
- Volatility has increased *dramatically*

Are we approaching the limits of manageability?



Overview

The Case for Industrial Darwinism

“In the natural world, species evolve – that is, they change to meet new challenges – or they die. The same genetic imperative operates in business.”

Professor Charles Fine, *Clockspeed*, Sloan School of Management, MIT, 1998, p. 3.



?

- or -



?

The question is: How does an enterprise become more adaptive within its particular ecosystem(s)?

Moving to Adaptiveness *From Internal Silos to Networked Ecosystems*

EXECUTION MINDSET

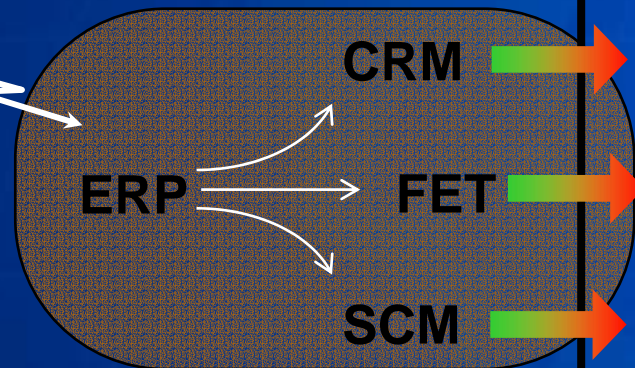
Business Dimension	Functional Excellence	Integrated Supply Chain	Adaptive Supply Chains
Integration	Silo	Enterprise	Extended Enterprise
Organization	Departmental	Centralized	Collaborative
Performance	Cost	Cost & Service	Readiness & Productivity
Decision	Functional	Process-Focused	Event-Based, Agent-Assisted
Technology	Point Solution	ERP/Bolt-On	Interdependent, Web-Connected
Time Focus	Months to Weeks	Weeks to Days	Real-Time

Adaptive Supply Networks Strategic Context

- From "Information Age" to "Execution Age" -



Focus of the last 10 years of reengineering and integration



Adaptive Enterprise Solutions

Such as:

- Distributed Order Management
- AutoID/RFID
- Agents & Event Management
- Dynamic Pricing
- Global Data Synchronization

Status in Today's Enterprises

- Largely automated to some level in Global 2500
- Focus of IT departments
- Focus of most IT consultancies

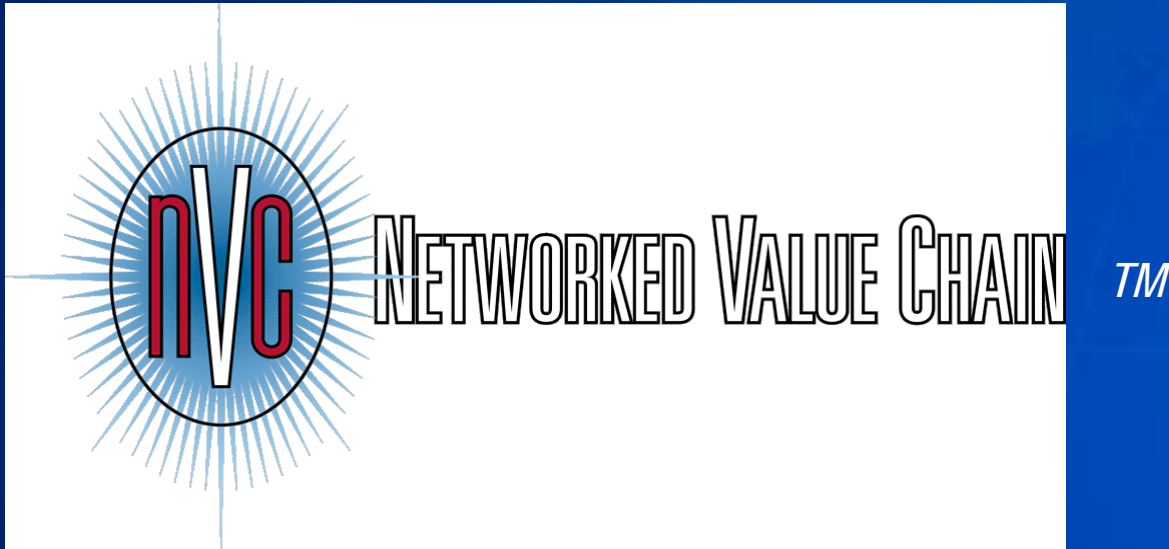
- Companies address randomly
 - People, brainpower, and initiative
 - Phone, fax, e-mail, pencil
- Leaders rapidly emerging in key "pockets"

95% penetrated at 1st level

5% penetrated at 1st level



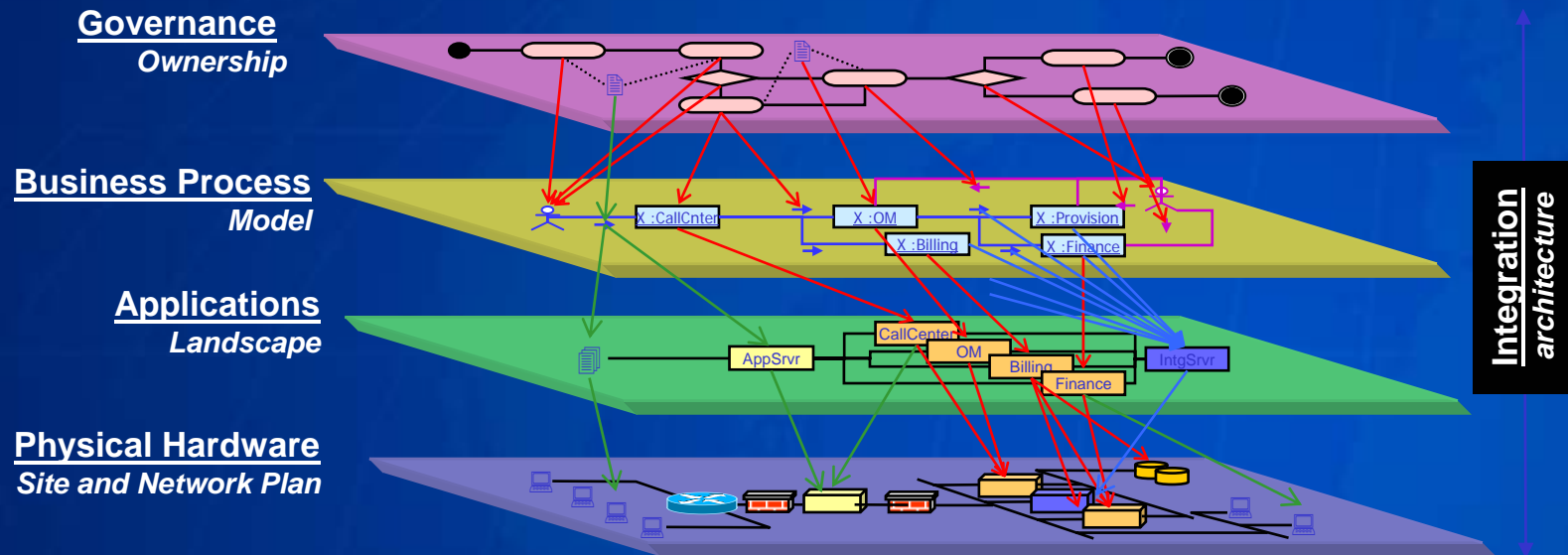
Adaptive Supply Networks *Networked Value Chain Framework*



- ☑ ***“Plug-n-Play” Architecture***
- ☑ ***Warfighter Value-Driven Operations***
- ☑ ***Advanced Adaptive Technologies***

NVC (Plug-n-Play)

Industry-Specific Reference Architectures



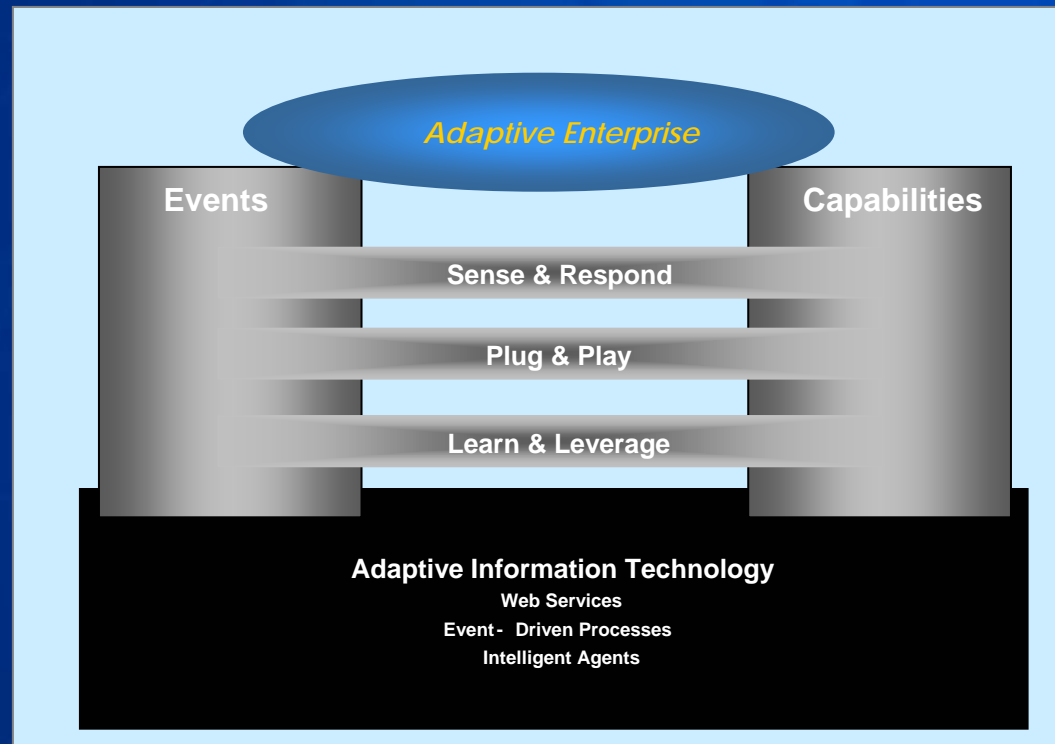
- Process architecture** – detailed closed-loop process flows, responsibilities, cycle times, workflows
- Governance architecture** – ownership and influence of decisions, policies, decision flows, objects
- Integration architecture** – roles, responsibilities, organization, control-system, performance metrics
- Application architecture** – applications, functionality, data & flows, interfaces, middleware
- Physical architecture** – servers, drives, firewalls, network, scalability, reliability, security, management

NVC (Warfighter Value-Driven Ops) *Focusing on Execution*

- Addressing “Permanent Volatility” with Adaptive Architecture -

Volatility Drivers

- Economic and political instability
- Tighter integration with customers and alliance partners
- New technologies
- Potentially high supply *and* demand volatility



Benefit Levers

- Better ability to deal with unforeseen supply/demand imbalances
- Automated decision-making
- Improved demand sensing
- Additional cost efficiencies

Representative

Readiness
Enhancement

Asset
Productivity

Cost
Containment



NVC (Warfighter Value-Driven Ops) "Hot Topics" in Sustainment SCM



* Including Radio-Frequency ID (RFID)



NVC (Advanced Adaptive Applications) *Leading Enhancements Available Today*

There are a host of more sophisticated process/technological improvements which are candidates for rapidly improving supply chain results...

- **Global Transportation Optimization**
(Example Technologies: G-log, GT-Nexus)
- **Dynamic Reallocation**
(Example Technologies: Manugistics, PROS)
- **Intelligent Fulfillment**
(Example Technologies: Manugistics, SAP)
- **Supply Chain Event Management (SCEM)**
(Example Technologies: Viewlocity, Seecommerce)
- **Distributed Decision-Making (Agents)**
(Example Technologies: NuTech, Vizional)
- **Automated Strategic Sourcing**
(Example Technology: Emptoris)

...most can be implemented in parallel with on-going initiatives.

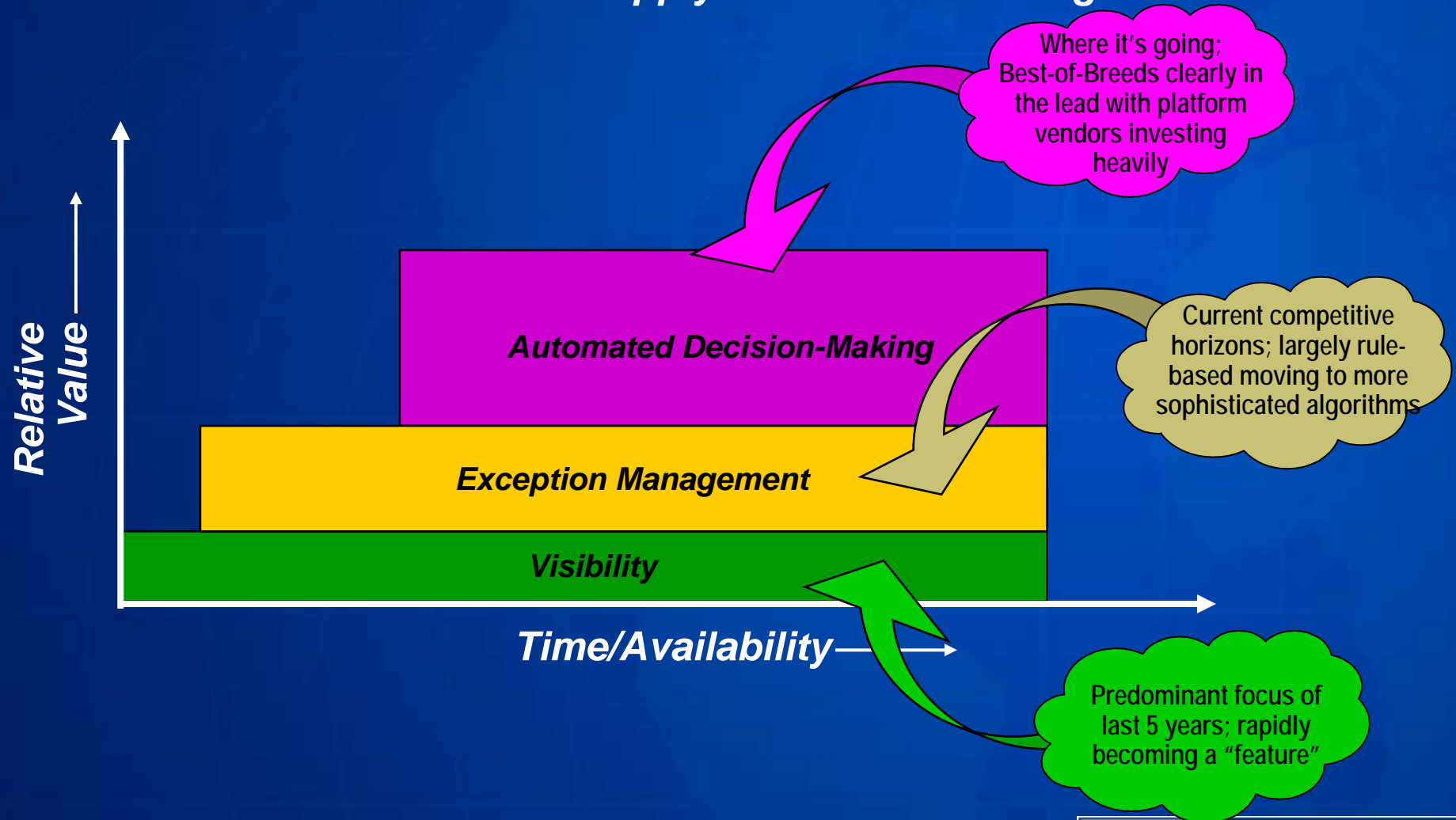
NVC (Advanced Adaptive Applications) *Selected "Deep Dives"*

- Adaptive Supply Chain Execution (ASCE): agents and real-time distributed decision-making
- Fourth Party Fulfillment (4PF): beyond Lead Logistics Provider (LLP)
- Radio-Frequency Identification (RFID): more than just another barcode

ASCE

Levels of Event Management

- The Three Levels of Supply Chain Event Management -



ASCE

Distributed-Decision-Making via "Agents"

A software agent is an intelligent software object that can be programmed to operate proactively to achieve predefined goals independently.

Simply stated, software agents allow decisions to be made in a real-time, decentralized fashion using business rules, rather than the traditional batch, centralized manner common today.

Agents act just like ants, bees, or people: once basic rules are understood, they don't have to come back "home" to deal with every difficulty they encounter.



ASCE *Agents – Transport Case*

Major European based-carrier with over 10,000 trucks moving per day. Scope of effort is consolidating partial loads to full truck loads with dynamic route optimization across Europe.

Situation in Hamburg dispatching center

◆ Number of Trucks	150
◆ Number of Loads per week	400
◆ Number of Dispatchers	5

Objectives

- Increase capacity utilization
- Increase loading flexibility within time restrictions
- Optimize transport route and minimize transportation cost
- Internal cost transparency of procured capacity
- Flexibly align execution with change of business goals

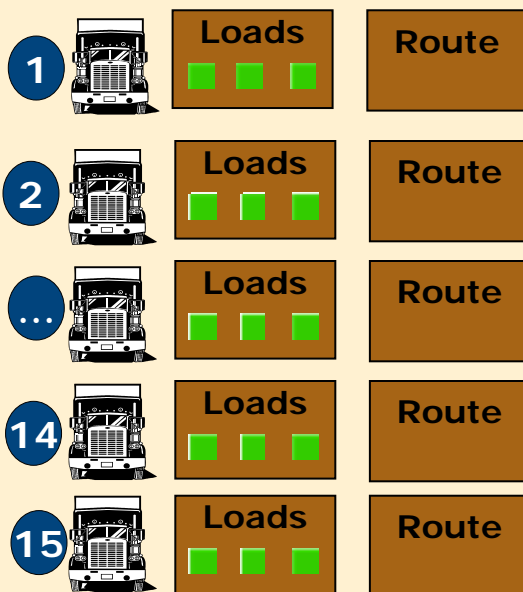
ASCE

Agents - Pre-Existing Transport Process

One Dispatcher's Transport Plan

One Dispatcher's Transport Plan

One Dispatcher's Transport Plan



Managing Real-Time Events and Deviation to Plan

Dispatcher handles **daily**

- Planning capacity for real and anticipated transportation orders
- Daily short term matching of anticipated orders with planned capacity
- Manage all events trying to find the best solution

Real-Time Visibility

Dispatcher needs real-time data visibility about actual loads, truck positions, and time restrictions to **continuously re-optimize** planned routes

ASCE

Agents – Transport Network Complexity

Handling Complexity in a Dynamic Transportation Network

Lots of options

- For each event in client's dispatching center, there are about 50,000 possible options.

Complexity

- For each option we have to evaluate the impact on
 - Execution plans (transportation constraints) and
 - Impact on business goals (customer service levels, costs, etc.)

No Time

- Can't be done by a human even *close* to real-time!



ASCE *Agents - ATN Pilot Impacts*

Field Value

- Capacity visibility
- Demand visibility
- Real-time capacity procurement
- Cost versus customer satisfaction

Business Value

Improved vehicle productivity

Capture new demand

Customer satisfaction and retention

Shareholder Value

- ☑ Increased capacity utilization from 70 to 74%
- ☑ Increased revenues by 15%
- ☑ Increased margins by 100% (from 2% to 4%)

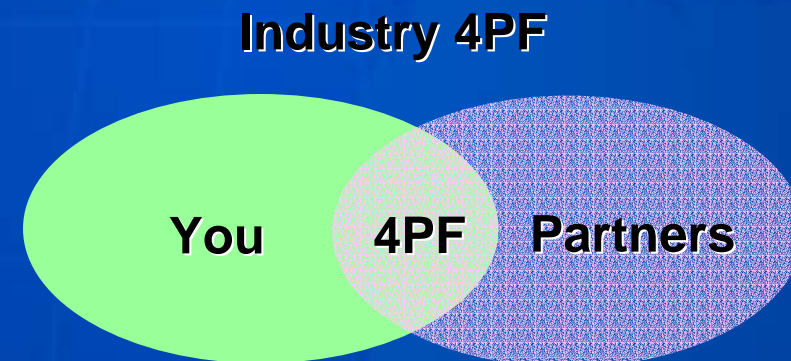


4PF

A New, Value-Driven Model

The new Industry 4PF is based on some key characteristics:

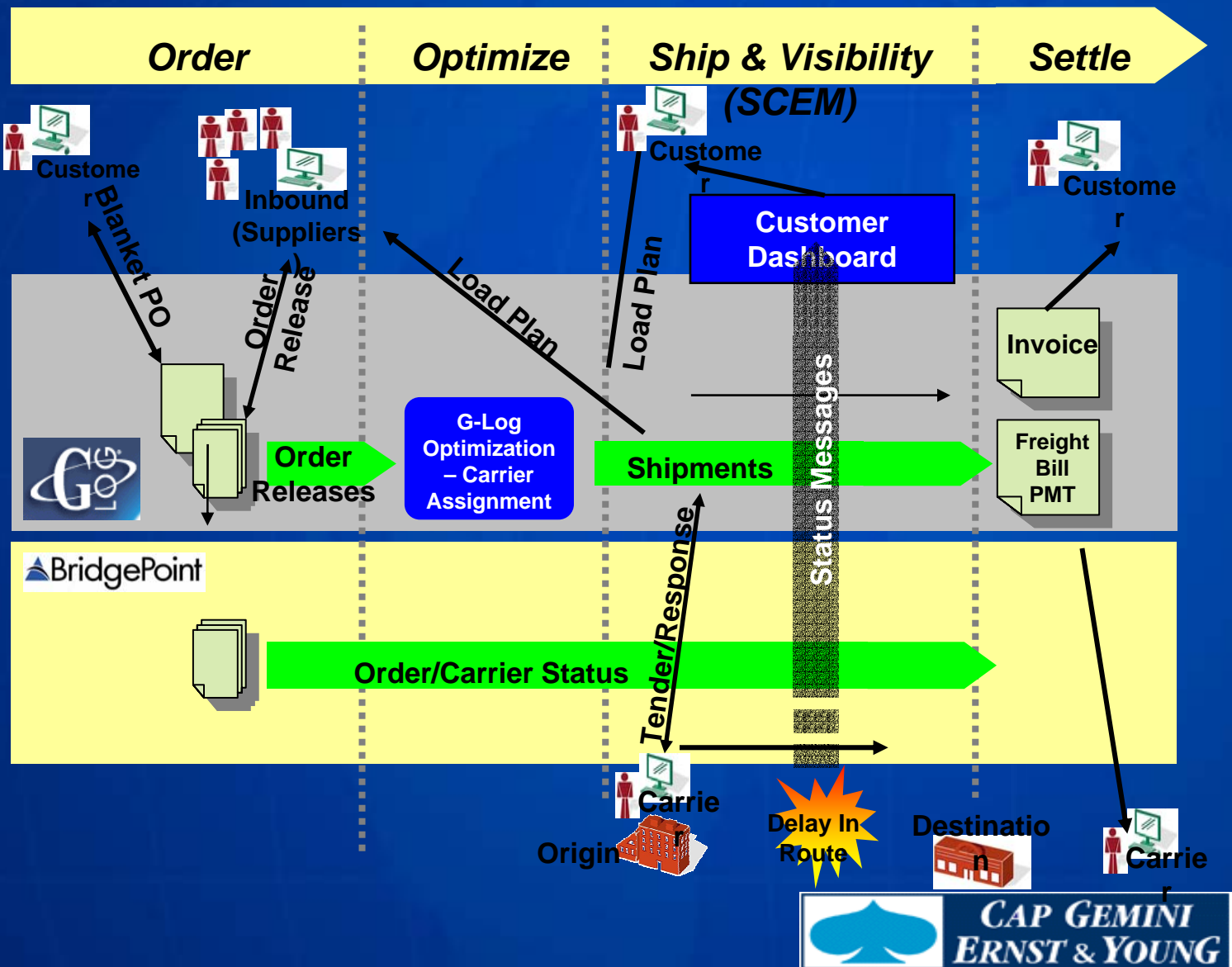
- It should be built around areas of key Supply Chain value
- Developed around the synergies within the industry
- Intimate Supply Chain industry knowledge
- Brings together expertise to manage the whole supply chain
- Manages your risks
- Creates flexibility
- Shared development cost of next generation capability
- Provides ongoing lower cost to serve



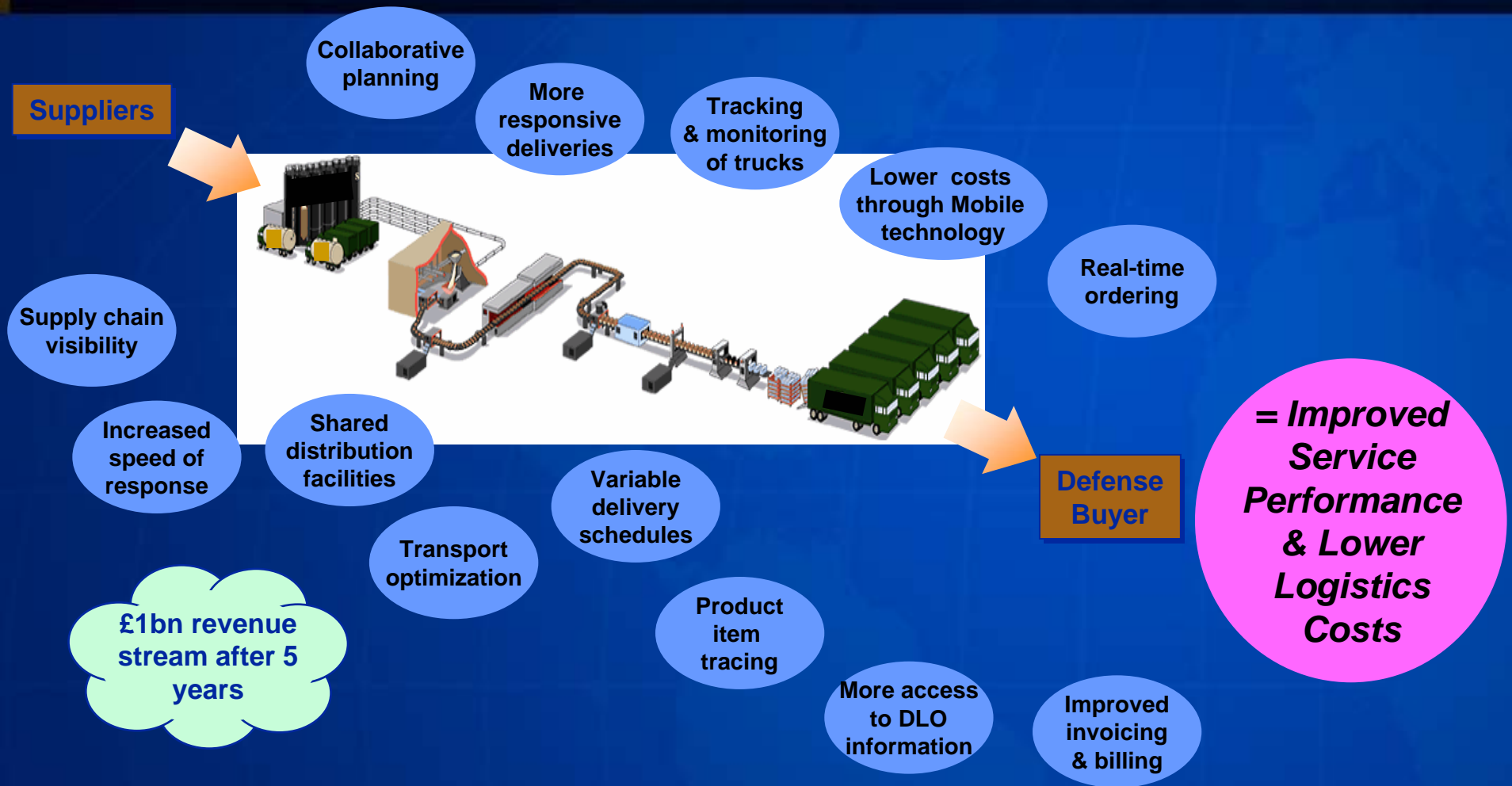
Outsourcing part or all of the SC becomes a strategic decision

4PF FedEx Case Example

- ✓ Customers generate the business demand
- ✓ Federal Express owns and operates the business process
- ✓ CGEY integrates customers and operates the technology
- ✓ ~200 carriers provide transport options



4PF UK MoD Case Example



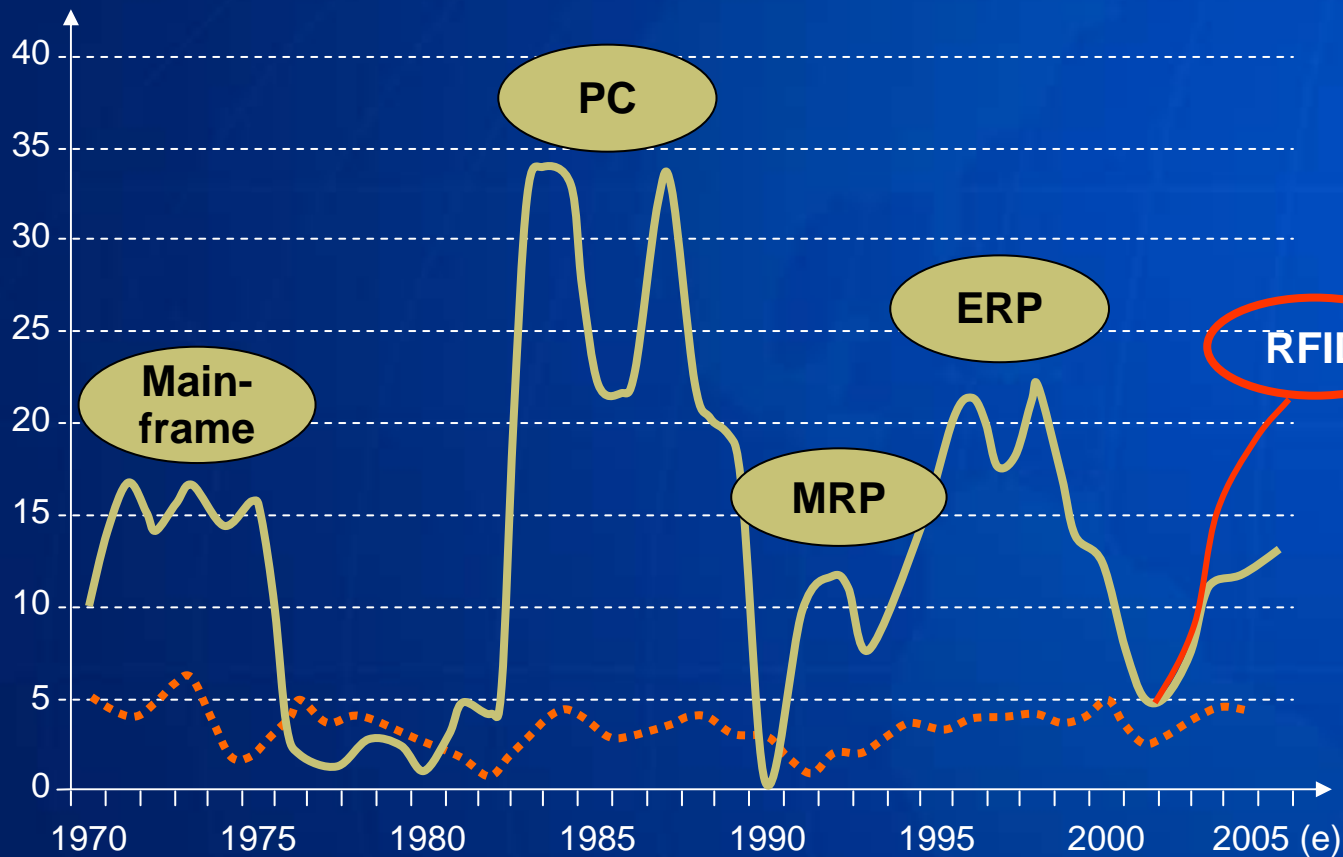
A major player in the defense industry could take the lead to develop a common technology and process platform

RFID

History of Disruptive Technologies

IT Services Market – 1970-2005

per annum growth rate in percent



"The future has a way of arriving unannounced."

--George F. Will

RFID IS the next BIG wave

..... = GGP

— = IT Services

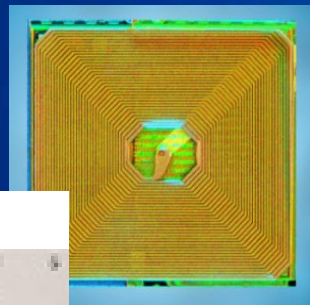
Source: "Global Consulting Market Place: Key Data, Forecast and Trends", Kennedy Information Research Groups, 2002; CGE&Y research



RFID

Myth #1 (A New Technology)

Conventional Wisdom: *RFID is a breakthrough technology that has recently emerged and will take the business and consumer worlds by storm.*



Reality:

RFID tags and scanners have been around for many years. Heavy industry and the military have used “active” tags for some time, as have you if you have a “toll tag” for the motorway. Most of us use some form of passive tag to access our offices with a simple swipe. The real breakthrough is that new manufacturing technologies have driven the size and price per chip down dramatically so they can now be used cost-effectively just about anywhere... as well as accepted standards.



RFID

Myth #2 (The Value Is In The Chip)

Conventional Wisdom: *Now that the chips are economically practical, they will become commonplace and they will carry valuable information from point of manufacture to the point of use. The age of the “smart device” is upon us.*



Reality: *In and of themselves, RFID chips (passive, that is) are no more than advanced bar codes. They only hold 100 to 200 bytes of data! While this will increase with time, the real value is in the business processes they enable, the other technologies they are connected to, and the speed with which information can be transmitted reliably.*

RFID

Myth #3 (The Privacy "Issue")

Conventional Wisdom:

The use of RFID tagging, especially in consumer applications, will mean companies and governments will be able to track products and consumer actions, even within their homes.



Reality:

The "consumer advocate" groups have been watching too much Star Wars! The ability of even the most sophisticated scanners to read tags on a store shelf within 50cm of the product is still being tested. While the retail store shelf will, without doubt, become reality for RFID within a few years, there is virtually no chance that the product will be tracked beyond the store in any meaningful manner.

RFID *Sample Apps*

Function

- Tracking
- Tracing
- Anti-counterfeiting
- Entertainment
- Safety
- Security
- Auto-rejection
- Transactions
- Proof of ownership
- Anti-tamper, anti-theft

Example

- Pharmaceutical supply chain
- Monitor prisoners, children
- Verify authenticity covertly
- Voice activation in toys
- Pharmaceutical use instructions
- Personnel tagging in secure areas
- Electronic handshake requirement
- Electronic road-tolls
- Tagging of valuable products
- Real-time detection, identification



Sources: ABI, VDC, Philips, IDTechEx, HP Docs

Conclusions

How Will You Respond to Industrial Darwinism?

