F&L

THE EUROPEAN
FREIGHT & LOGISTICS
LEADERS FORUM

- HO BRUSSELS -

European Virtual Networking

Booklet N° 16
October 2004

During the past 25 years, the most distinguished Global Leaders have entrusted "Diakinisis S.A." for their logistics operations in Greece.

As a Service Organisation, our key strength is our Human capital: 400 high-calibre employees dedicated to Total Quality draw on the most updated technological tools & tailor-made applications to handle on average 120.000 cartons every day delivering 3.000 orders with 250 trucks all around Greece. Last year we served 30.000 points of destination & managed an excess of 60.000 SKUs.

Our 65.000 m^2 of depots in Aspropyrgos (Athens), Salonica (North) & Patras (West) are equipped with state-of-the-art handling equipment and advanced racking systems, notably picking light, auto-routing, electronic scanning, radio frequency WMS, ultra-density radio-shuttle storage etc.

A Profound Appreciation of the strategic impact of our performance to our Clients' yield commits ourselves to offering Supply Chain Management Solutions of the highest grade.
As a result, relations with our Clients have evolved into Life-long Partnerships that set the Benchmark across the industry.

DIAKINISIS S.A.

The Premiere Logistic Services Provider of Greece

ΑΠΟ ΤΟ 1977
ΔΙΑΚΙΝΗΣΙΣ

ELOT EN ISO 9002

Diakinisis S.A.
Warehousing-Distribution-Promotional Packaging
Athens: 6-8 Papaflessa Str., Aspropyrgos GR 19300, Greece
Salonica: Industrial Zone VI.P. Kalochori GR 57009, Greece
Patras: 8A G.Katsaba, Midiloglio GR 26500, Greece

Tel. Switchboard: (+301).210.553.8300
Fax: (+301).210.557.0542
e-mail: diakin1@hellasnet.gr
www.diakinisis.gr

THE EUROPEAN
FREIGHT & LOGISTICS
LEADERS FORUM

European Virtual Networking

F&L Working Group Members:

GERHARD REISCH	SUPPLY CHAIN REVIEWS, MANAGEMENT & SERVICES Working Group Chairman	(Austria)
BEN RADSTAAK	TMI / ACN	(Netherlands)
DIRK KRUSE	VW TRANSPORT	(Germany)
JORDI JOVE FARRANDO	LKW WALTER	(Austria)
JORGE GONZALEZ	TRANSFESA	(Spain)
PAUL VAN DER SANDEN	PHILIPS	(Netherlands)
RAYMOND VANRYKEL	EXXONMOBIL	(Belgium)

Contents

1. Management Summary

Get integrated

Supply chain management is increasingly becoming an important success factor as companies face the need for improved integration of functions across their enterprise and beyond. Being integrated is the key to drive your business forward.

As companies look for ways to reduce costs and improve service, ensuring a state-of-the-art IT infrastructure -the ability to link to networks, computers, routers, communications devices and people- is mission-critical. Therefore, companies must focus on new technologies that will further streamline processes and allow the sharing of information among partners in the supply chain, in order to deliver more value to their customers, employees and shareholders.

Current state and future use of virtual networking in the Supply Chain (EVN Survey)

A key element of our Report is our conducted survey within F&L and some other international companies. Bottom line: being connected is not yet a priority for many companies, telephone and faxes are still the main means of exchanging data, especially for transport orders. The drive towards increased supply chain visibility, reduction in transaction costs and improved customer service will force companies to integrate their processes through networking.

Don't miss this opportunity if you are a Logistics Service Provider!

Our EVN survey, in line with other studies highlights that organizations are investing or planning future technology investment in tracking and tracing visibility, company internet sites and back office functionality. *Shippers put the desire for complete end-to-end supply chain visibility as their number one requirement from the logistics industry.* Logistics Service Providers will have to adhere to this need, which is reflected in further investment in this area.

The technology is there. The success stories are there but the adoption rate has been low because it requires fundamental changes. For collaboration to happen in the truest sense, supply chain partners need to change their values, relationships and business practices.

Benefits and Goals!

The collaborative use of data across supply chains (e.g. forecasting, inventory levels, shipment call offs) allows one company to act on another's information. Real-time information access (Supply Chain Event Management, track & trace) enables companies to be more proactive and to make better and smarter business decisions, thereby saving money and providing better returns to their customers and their shareholders.

There is an ever increasing need for businesses to meet stringent business and financial objectives of reducing inventory, compressing cycle times, increasing quality and improving return on assets in industrial manufacturing and transportation and logistics environments. This report highlights the need and desire for companies, large and small, to use technology and implement solutions that can make their supply chains operate more efficiently.

Logistics in-between

Especially in logistics - defined by its focus on multi-party coordination - the need for partner connectivity, shared data and cross-party collaboration is extremely critical. Today's e-logistics solutions must do more than just automate processes; they must allow partners to connect and collaborate securely, in real time.

Supply Chain Management – Processes

To understand the importance of sharing data and gain visibility along the supply chain, this report provides valuable information concerning reasoning and different types of supply chain processes and activities, trends to achieve a "World Class Supply Chain" and "8 Core Principles" to have one!

Different ways of networking

Different networks are being used according to business needs and purpose. The report provides the basic definitions of Vertical, Horizontal, Private, Hubs, Knowledge networks, etc. There are also barriers why companies are not networking and the report lists some points to be thought of. But also advocates why one should be on a network!

Systems and Standards

Global companies are leading the industry in forcing supply chain partners to get connected and integrated to optimise supply chain performance. They have developed their own systems and their partners have to accept their standards and processes.

However, there is increasingly development of Logistics Platforms (open systems) able to connect to many different systems used by partners along the supply chain. Internet data transfer enables smaller businesses to exchange data and reap the benefits of visibility and real time information.

EDI was and still is expensive and will stay where it was introduced but ebXML, XAML etc., are the future…and less expensive. Standards are under development and will further speed up the use of internet based data transfer.

Examples

Several examples featured in this report demonstrate how far companies are already on the way of using Internet connections to optimise their Supply Chains and get the benefits of lower costs, higher profits and excellent service levels.

Security

One reason for hesitation to join the web is not to be left out of consideration, Security.
But considering aspects and following guidelines will make it a – at least – protected environment. This report spends several pages on this issue in order to increase the awareness needed and provide the information to be considered i.e. Guidelines on Security Policy, Standards and Procedures.

Appendixes

Information concerning system providers, checklists, definitions, detailed technical information on standards, logistics platforms and a review of freight exchanges are included.

Conclusions

The overall conclusion is clear, shippers have been - or are finalizing - the transformations of their overall supply chain processes to be much more cost effective and automated. Virtual networking has become the norm eliminating expensive dedicated point to point connections.
Shippers expect to drive down transaction costs considerably with improved customer satisfaction by increasing end to end supply chain visibility, automatic haulier call, providing track and trace capability....
Many service providers still struggle with this trend and are reluctant to adapt and integrate the "new" technology into their existing processes, a prerequisite for long term success.

The key messages out of F&L members replies is in line with other surveys done recently and put the need for integration on a very high level. There will be no escape to linking to networks, investing in IT technology and enabling electronic data and information exchange via the net. This will be a basicscrs for optimised supply chains.

Some of the most relevant messages to take note of are listed below:

- In the "Order management" process, use of portals and orders taken via the internet is on the rise, driven by the shippers while the service providers still regard EDI as the prime vehicle to transmit orders.
- In the "Inventory management" process, shippers are strongly focusing on implementing real time visibility within their organizations and Vendor Management Inventory schemes (Suppliers and Customers).
- In the "Demand and Supply" Process, shippers are focusing on building integrated systems; sharing forecasts both with customers and service providers is on the rise and e-mail and internet call offs become the standard communication vehicle for shippers while service providers expect telephone communications to hold.
- Both shippers and service providers expect track and trace and event management to be used frequently but shippers are pushing hard for it.

- In the "Distribution Planning" process shippers expect to post advanced shipping notes for their customers onto portals while service providers believe e-mail will be the delivery platform
- Shippers expect the transport call off to be done via internet, dedicated portals, EDI and e-mail and they expect carriers to integrate this call off into their scheduling systems with automatic track and trace capability. Shippers expect additional services from shared portals to optimize carrier selection and load consolidation
- A potential role for the F&L is to push for common standards across industry sectors and -at least- on a European scale in order to simplify the overall connectivity complexity across sectors (as many of the F&L members have business in different sectors) and improving overall efficient electronic communications, SCM processes and related connectivity costs.
- Electronic invoice clearance is another example where F&L could help the industry in its quest to become more efficient

Summarizing, the Working Group "European Virtual Networking" of the European Freight & Logistics Leaders Forum prepared this report to help F&L members to capture the benefits of virtual networking, e.g. improved customer service, better cycle times, lower costs, improved employee productivity, better asset utilization and revenue growth.

2. General introduction

"E-marketplaces will provide a platform for the marketing of logistics services to achieve process efficiency. Supply chain integration and E-marketplaces will support the development of logistics buyers/supplier networks by creating synergy's for both, buyers and sellers and 4PL's. However, to get most optimised results of collaboration, mutual trust is needed as well as standardisation. These are probably the most critical issues to be overcome."

The above statement is taken out of the F&L booklet No 10, November 2001!

As predicted then, the drive towards Supply Chain Optimization has gathered speed. Freight x-changes have not – and could not – deliver expected results but for some businesses. However, private networks, vertical or horizontal, have been created as the need for visibility, real time data exchange, improved customer service and supply chain process optimisation as well as collaboration has increased.

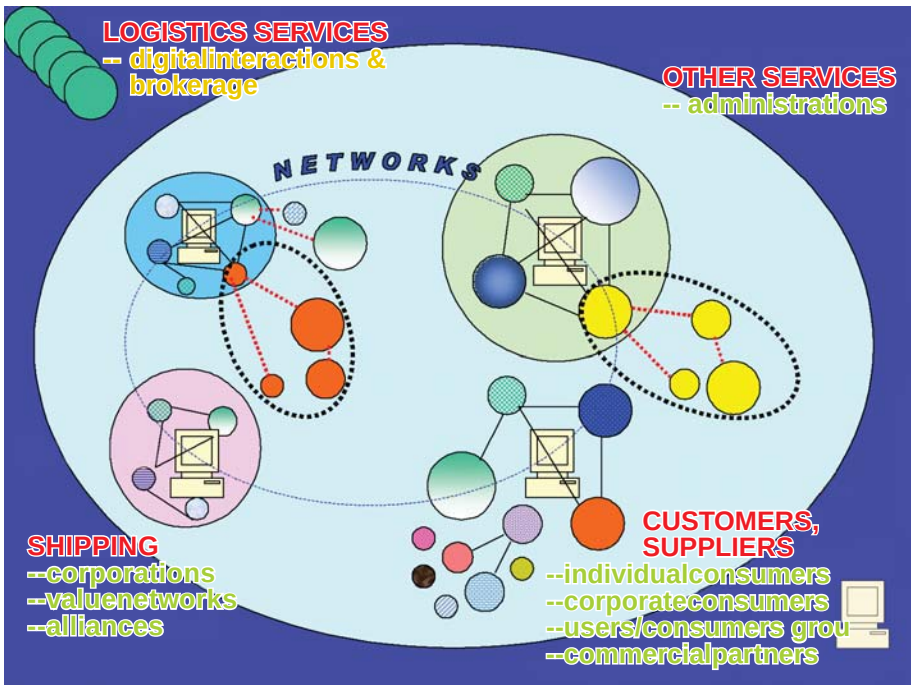
Acknowledging that Supply Chain Management has dramatic impact on business processes - especially between shippers and logistics service providers – F&L has addressed the main area of optimization: the alignment of logistics processes along the supply chain.

In extension of the two booklets issued,

- Impact of Supply Chain Management ®Evolution
  On Shippers and Logistics Service Providers Booklet No 9
- The impact of a virtual forwarding environment Booklet No 10,

The EVN working group has been established to review current and future developments concerning:

- European Virtual Networking



Background of this project 2.1

In yesterday's world, supply chain information was typically communicated without context through fax, e-mail and telephone conversations. Today, Supply Chain Visibility & Event Management solutions address the lack of context by providing a view into the supply chain, allowing management by exception, and establishing a platform for performance improvement.

The missing link in the Supply Chain Visibility and Event Management model is the network to share and exchange data and ensure quality by really working together in logistics.

Companies are synchronizing supply chain strategies and structures by delving deeper into each other's business practices to connect their enterprises.
Enterprises understand that the key to moving beyond basic delivery is to recognize the power of collaboration, sharing information by using networks.

Leading companies are establishing strategies and executing programs to extend and manage processes outside the four walls of the enterprise. Networked systems are a prerequisite in order to rapidly transmit any supply disruption information to the right parties as soon as possible. By trading off the economics of stock-outs, inventory, special handling, expediting and other costs, one can figure out the most optimal response to a supply disruption problem. Enterprise wide supply chain improvement strategies have proven to accelerate product fulfilment, improve fill rates, lower supply chain costs, and accelerate cash-to-cash cycles.

Logistics Networks are collaborative tools for trading partners, suppliers, customs brokers, transportation service providers, and consolidators. They contribute real-time information to support supply chain visibility and prevent waste and inefficiency of different kinds, thus adding value to the supply chain by improving service and lowering costs.

Transport companies must incorporate the infrastructure and logical connectivity to move data from application to application at high speeds and in huge volumes. Specific software and specialised platforms will enable such electronic communication between enterprises. End-to-end integration will be easier to achieve, cheaper and more reliable if the interconnections are put in place with a holistic view. The integrated enterprise is a complex puzzle with many pieces but huge potential for performance improvement and cost savings.

We will eventually see the emergence of end-to-end global supply chain management portals, which will link all logistics functions, including transportation management, trade compliance, landed cost calculation and optimisation... This goal is still a long way off because of lack of domain expertise, low levels of trust, cultural differences and technology infrastructure disparity….but it will come!

2.2 Approach

A key challenge is that the supply chain cuts through various functional organizational boundaries and is a complex path through different companies (from the suppliers' supplier to the customers' customer). Supply chain structures may even vary by industry sector and geography.

The main element of this project is a survey identifying the current status and the potential contribution of various virtual supply chain networks which companies in Europe are using today or are considering starting using in the next few years. With virtual supply chain networks we mean ways of working together ("networking") or being linked to supply chain partners, using information technologies (data exchange via EDI, file transfer, Internet and the likes) to share and enrich information needed for the management and planning of logistics processes (e.g. supply call-offs, production scheduling, collaborative planning, inventory management, track & trace, proof of delivery, automatic invoicing & payments and so on).

The report contains summarized survey results without revealing any confidential company specific information. In addition, the report contains some chapters with information on related issues. Security of the networks is one of those issues. The information presented in this paper is drawn from literature and a few interviews with experts.

Scope and Goal 2.3

The main goal of this project is to inform F&L members on the potential contribution of virtual networking in a European context and to show how networks can help to:

- optimize supply chain processes,
- reduce waste by collaboration,
- increase capacity utilisation in logistics assets and services, and
- improve efficiency and quality of service

To the benefits of supply chain partners, including all suppliers and customers along the supply chain...

In this project, the working group addressed the following areas:

- timely exchange of data and information among supply chain partners
- integration of the process – internal and external
- collaborative planning and forecasting
- use of "open" software to prevent multiple re-keying in different systems
- relationship and sharing of costs, risks and gains.

The main element of the project was a survey among F&L members in order to determine the actual use of networks, the kinds of networks used, the areas of collaboration, the pro's and con's of networking and the expected future use of networking.

In addition, the group has gathered networking examples in various industries (Automotive, Retail, Chemicals, Consumer, Electronics, Forwarding, Road Haulage, Air Cargo, and Intermodal Transport) and addressed related issues, such as networking security, standards and software.

2.4 Deliverables

This report on European Virtual Networking presents information on:

- The current use and outlook for networking;
- Different ways of networking
- Processes to be integrated
- Standards to be considered
- Systems and software for networking
- Examples from leading industries.

3. What is driving a virtual environment?

As it is also supported by answers to the EVN WG questionnaire concerning use of internet based processes (data/info x-change), the drive for being connected and to network is and will come even stronger from the shipper.

Forced by market pressure to remain competitive, there is an increasing need to optimise the supply chain, to enable collaboration especially to gain earlier access to data, to plan more efficiently, to react faster to non-planned events and to exchange information real time. This will increase as most of the products shipped are commodities generating small margins. So, costs will be an issue to be focussed on and stay there for some time.

Networks will address these challenges and improve customer's supply chain results by integrating logistics cost and service information (e.g., optimised transportation plans based on a set of planned orders) with real-time changes to inventory or delivery exceptions to enable planners to make better, more accurate decisions. As an example of the improved supply chain workflows delivered with the integrated solution, planners can evaluate multiple manufacturing or supply plans and see total supply chain costs, including optimised transportation costs, in choosing which plan provides the optimal scenario.

Supply Chain Management 3.1

The council of Logistic management defines SCM as the management and control of all material, funds and related information from the acquisition of raw materials (supplier's supplier) to the delivery of finished product to the end user (customer's customer). To take all benefit of an optimised supply chain, processes and supply chain partners need to be connected to ensure real time visibility and exchange of data.

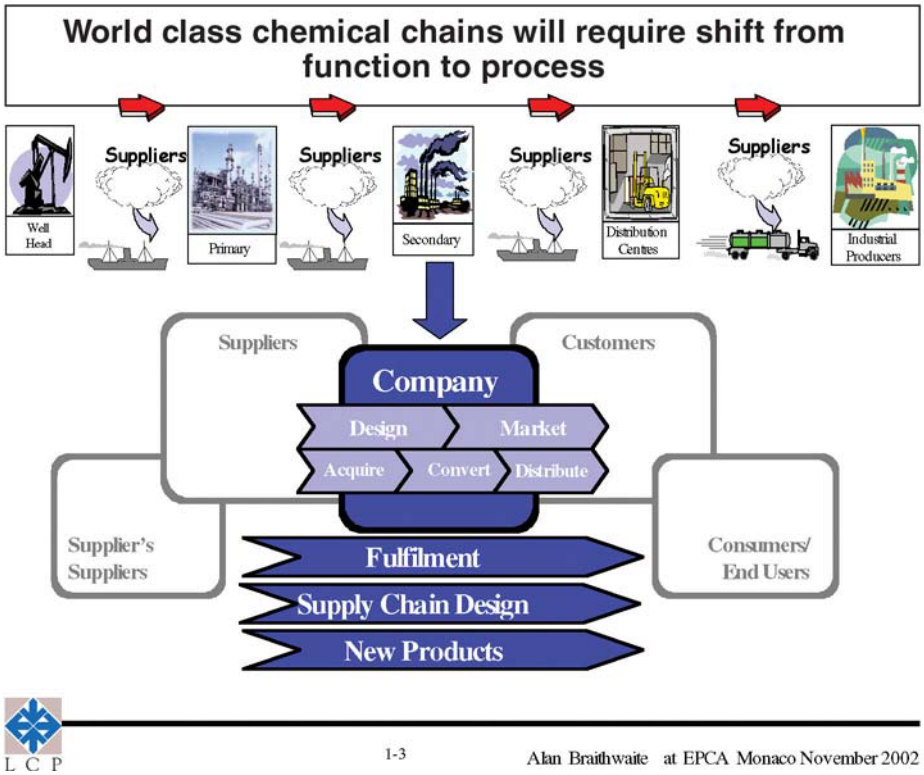
Supply chain management is one of the high level processes in any enterprise, other high level processes in nearly all enterprises are:

- Enterprise management, possible sub processes i.e. identify business direction, next year target setting....
- Supplier management, possible sub processes supplier strategy development, assessment of supplier capabilities...
- Raw material conversion, possible sub processes make product, maintain plant capability, ensure product quality

- Sell product, possible sub processes, price and volume management, customer relation management...
- Capital investment process
- Financial management
- Organizational development process
- Technology development process

3.2 SCM Process Chart

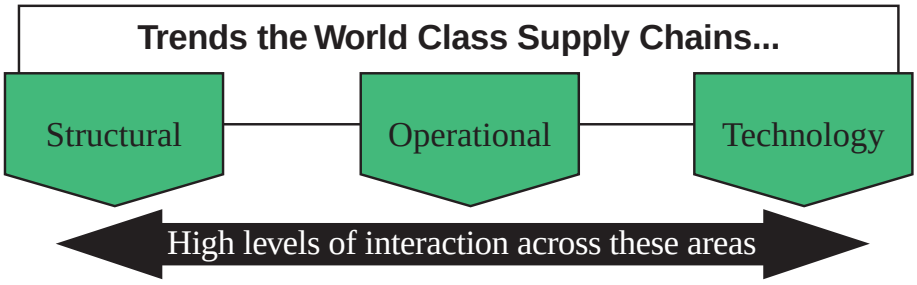
Many consultants advocate that world class supply chains require many companies to change fundamentally their business models (process orientated) as they transform from a functional into a process oriented business model. Prof A. Braithwaite, linked to Cranfield University (UK) presented this model at the European Petrochemical Association in Monaco in 2002.



The classical functional organization operates in silos with only few inter-functional interactions which, in many cases, leads to waste i.e. low capacity utilization, low plant efficiency, excess inventories, double handling, rush orders... and this hampers bottom line financial results of many businesses in a significant way.

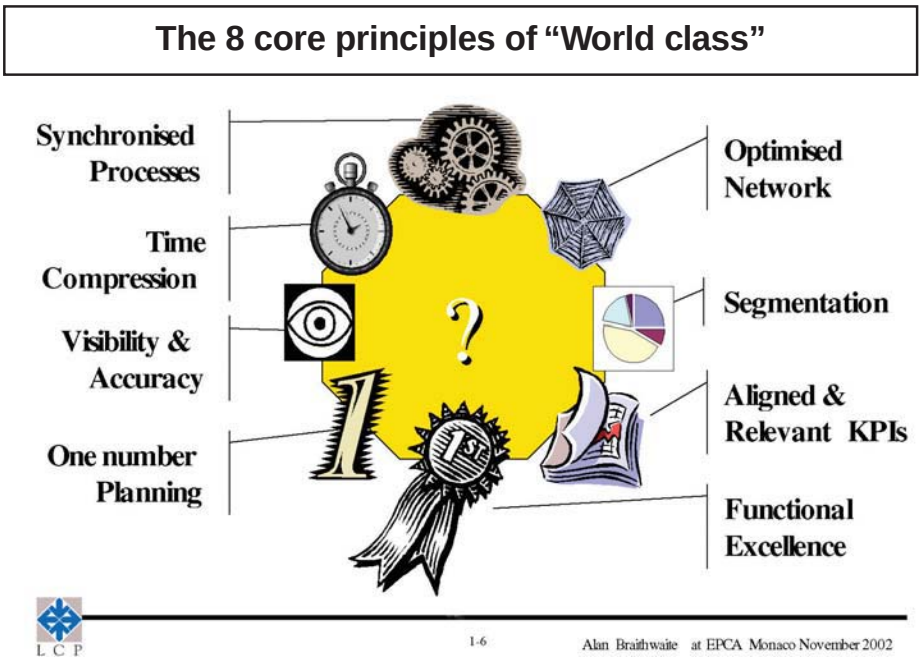
Supply Chain Trends 3.3

World class supply chains can eliminate these wastes but do require high level of interactions amongst structural, operational and technology enabled processes as illustrated in the next diagram.



Consolidation & sector focus	*Consolidated inbound logistics*	*E2E visibility and telemetry*
Internationalisation	*Rationalise logistics providers*	*Advanced planning systems*
Capacity rationalisation	*Collaborative back haulage*	*Collaborative systems*
Global low-cost sourcing	*Collaborative planning (CPFR)*	*Integrated front office (e)systems*
Fresh focus on distributors	*Integrated planning*	*Back office e-integration*
4PL / Lead Logistics Providers	*Changeover time reduction*	*Contract based e-procurement*
Supply chain organisations	*E2E flow management*	*Cost-to-serve strategy systems*

The 8 cornerstones of the emerging and world class supply chains are listed below:



3.4 Supply chain activities & processes

To fully grasp the rationale of the supply chain process map we can start at the enterprise level. Any enterprise performs a set of activities (processes) which can be logically grouped in many different ways.

These activities can be ordered into a hierarchy: high level activities can be broken down in second level activities, which can be broken down in third level activities....
Each process in an enterprise has a (formal or informal) process owner and people involved in the process have certain roles and responsibilities related to the execution of the activity, management of change for that process, measuring the process efficiency, process stewardship...Each process use certain resources (IT systems, labour...)

Looking through publications, there has been -and still is- confusion on what type of (sub) processes to include in Supply Chain Management (SCM). Some companies include transportation and warehousing, others add on site logistics, order handling and demand planning to these activities and some add procurement and finishing/packaging activities to that.

An enterprise vision on SCM is related to its development stage from a functional view (separate units) to a process view (internal coordination) to an integrated company (internal process integration) to an integrated chain (with external collaboration)

Overview of Supply Chain Management processes and sub processes:

LEVEL 1 PROCESSES:	Level 2 sub processes:
ORDER MANAGEMENT:	• Create customer master • Create price master • Create purchase order • Check product availability, credit... • Commit order • Call off haulier • Schedule transport • Dispatch and deliver • Generate Invoice
INVENTORY MANAGEMENT	• Set inventory targets based on product characteristicsm required service levels, demand forecast, variability, ... • Monitor inventory trends versus capacity limitations and targets • Trigger appropriate actions, e.g. plant slow down....
DEMAND PLANNING	• Create historical based demand forecast • Create sales adjusted demand forecast • Monitor order inflow • Monitor forecast accuracy
SUPPLY DEMAND BALANCING	• Monitor production limitations for next cycle • Balance supply versus demand and resolve conflicts
PRODUCTION AND PACKAGING SCHEDULING	• Monitor detailed production limitations for next cycle • Time schedule the plants, packaging lines.... • Monitor actual production and resolve conflicts
SUPPLY CHAIN EVENT MANAGEMENT	• Set event triggers • Define roles/responsibilities for each event and grant appropriate information access • Resolve conflicts
WAREHOUSE MANAGEMENT	• Define warehouse safety and operations standards • Monitor warehouse operations versus standards
DISTRIBUTION MANAGEMENT	• Define replenishments (including VMI), default supply points..., balancing service levels and osts • Monitor replenishments and resolve conflicts
TRANSPORT MANAGEMENT	• Define business rules on full loads/part loads/ truck booking/ check in/check out... • Monitor actual performance and costs, resolve conflicts
SUPPLY CHAIN NETWORK DESIGN	• Define tools & targets to optimize overall supply chain (warehouses, mode of transport, inventory positioning) • Balance costs, service levels and profitability • Perform network design accordingly

3.5 Different ways of Virtual Networking

Trading Exchange and SCM Application Framework

Impact of e-commerce applications, also important to SCM are Trading Exchange that brings buyers and sellers together on Web-site operation. Manufacturers will need to do business with and connect some of these operations to their enterprise system These Trading exchanges can be split in Public or Private Exchanges.

Generally speaking, exchanges utilise sets of predefined rules to fulfil the buying and selling needs of the e-Marketplace members. Exchanges match bid offers with ask offers based on the e-Marketplace rules and inform the parties involved of the potential match. The general idea is very similar to the procedures in stock market exchanges. Exchanges are the most complicated mechanism of conducting transactions in an e-Marketplace.

The success of an e-Marketplace depends on many factors, one of which is the ease of performing a transaction. In order to provide an easy and quick method of accessing products and offerings available, the e-Marketplace uses an aggregated catalogue. Buyers interact with an aggregated catalogue to view the products with real-time pricing, descriptions, and comparisons between different vendors. The general idea is to consolidate products from multiple vendors with all possible existing transaction mechanisms in a single catalogue and allow the buyers to be more efficient in purchasing goods and services. E-Marketplace is a virtual place where it's possible to find services aggregation to exchange products. In general it can divide a marketplace in components: participants, rules, services, market maker. The last one is usually dedicated to management contents join with services providing and added value.

3.5.1 Public Exchange

Horizontal

Horizontal networks are established to the benefits of user groups e.g. to increase either purchasing power or pooling capacities for more efficient use of it.

It is a product-focused marketplace that may develop when a product or a family of product is purchased across multiple industries (e-g. steel or PCs). Product-focused exchanges typically serve industries in which extensive buy-and sell-side fragmenta-

tion makes it difficult for the players to achieve price and product discovery independently. That fragmentation, and the resulting natural friction in the market, makes these industries ideal candidate for B2B marketplace.

Online exchange allows uneven pricing, improve information access, speed up transaction cycles and slash transaction costs. This variation mainly addresses the spot purchasing needs of different types of businesses, and its main value proposition is the delivery of goods and services at reduced prices.

Vertical

Vertical networks emerge to serve the product needs of a particular group of buyers (e.g. Elemica, ChemMatch, which focused on the needs of the chemical industry). There is an efficiently managing interaction between buyers and sellers in a specific industry. Buyer-focused marketplaces (exchanges) deliver the same benefits and are structured along the same lines as product-focused markets, and they typically adapt over time to serve more categories of buyers.
Vertical e-Marketplaces are typically very industry specific and deal with a set of specialised goods or services. This variation mainly addresses the Supply Chain processes of businesses.

3.5.2 Private Exchange

Such networks are more in a private environment. Selected partner have access to and share information, mainly covering logistics processes. This will gain importance in the future as the pressure on supply chain optimization increases.

Private trading exchanges, or HUBs, will also play a vital role in SCM. Manufacturers must set up these operations that use the Internet to communicate with trading partners and represent another new way to conduct business with customers and suppliers.

While today's EDI networks and ERP and SCM applications can help buyers forecast demand and suppliers manage their inventories, e-Marketplace hold the promise of deepening and manage those relationships. Collaborative commerce is the use of an online B2B exchange to facilitate the flow of business processes in addiction to transaction. Business partners can exchange information such as inventory data by using a web server as an intermediary. In many cases, collaborative commerce simplifies data interchange by eliminating the need

for special client software at each customer's site. By using server as HUBs for collaborative commerce efforts, companies are seeking to exchange proprietary data, jointly manage projects, and cooperate on the design of new products.

Collaborative commerce may also speed up interaction between trading partners. It requires that data such as product pricing, inventory, shipping status, credit, and financial information be shared among business partners. When marketplaces move beyond basic transactions and into mission-critical collaboration, the question of public versus private exchange becomes an issue.

Clients of marketplace want the ownership of customer data that impacts pricing decisions. E-marketplaces offer the opportunity to deepen relationship between all trading partners while reducing cycle times throughout the Supply Chain.

In addition to these applications, a number of new e-commerce applications are emerging, outside the Company or hosted Websites by a lead Company or as outsourced to a third party.

They are:

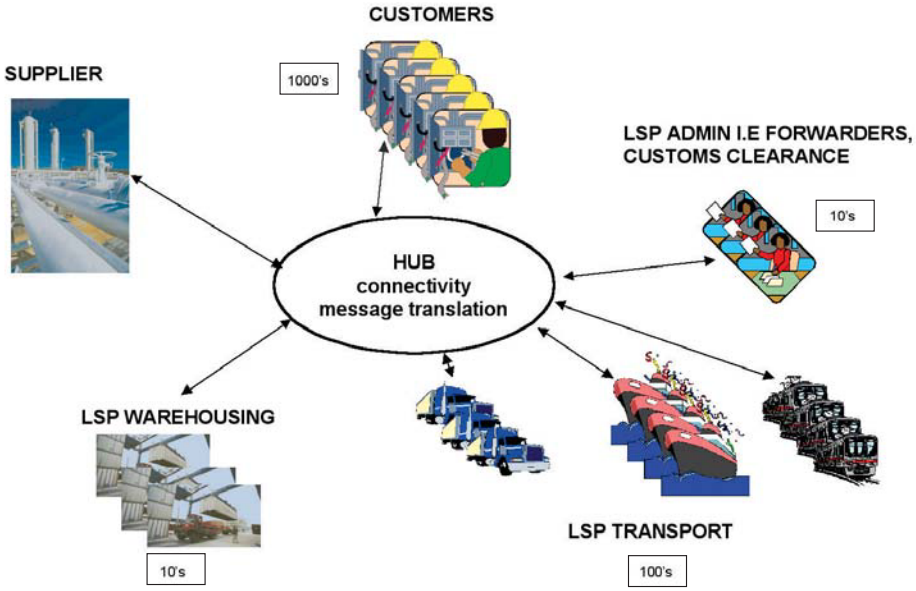
- **Customer Hubs:**
  Conducts e-commerce with customers.
  A Hub among different customers is created in
  Order to maximize the efforts made by supplier to improve the relationship with the demand Side.
- **Supplier Hubs:**
  Conducts e-commerce with suppliers. Different suppliers are linked via Web in order to Share resources and satisfy the customer requests and needs.
- **Logistics Service Provider Hubs:**
  Conducts e-commerce with 3PLs. Third Parties operating within logistics industry create a Services Hub to provide companies their logistics services. Supplies Chain Event Management (SCEM) acquires a great importance to correctly establish the link between 3PLs, transportation carriers, public warehouse operators and other companies.

3.5.3 Knowledge transfer

A different kind of networks represents knowledge transfer. This is a platform for associations, public or private to provide and exchange information e.g. CARGO 2000.

Why go virtual? 3.6

A simplified but representative supply chain requires many different partners to be involved and the flawless execution requires for each order specific, timely and error free information to be exchanged in a cost effective way. Lack of generally accepted communication and messaging standards, incompatible IT platforms and non integrated applications are key challenges to overcome in our overall quest to truly become world class supply chains. Internet based connectivity hubs which standardize messages while providing message translation for many industry sectors hold the promise of cost effectively providing the, much wanted, information efficiency.



Potential barriers 3.7

- Complexity: Many different messages related to the supply chain processes, i.e.:
  In order management: order creation, order status....
  In supply chain planning: inventory, VMI messages, telemetry...
  In Transportation: call off, booking, load tendering, status review, tracking, proof of delivery, documentation....
  Electronic payment, letters of credit.....

- Value proposition: What is the value added in the overall supply chain processes by eliminating waste (double data entry, data validation, data correction, non timely data, too much data.....)

- Solution providers: There are many different solution providers on the market with different cost structures and different complexity levels. Long term winners are difficult to identify. Evaluate carefully the financial stability of such platforms in order to mitigate risks.

- Transaction costs needs be carefully considered, as today such costs vary significantly among platforms.

- Business returns: Many supply chain managers are very careful in evaluating IT investments and incurring running IT costs for better supply chain process execution.

Whatever the barriers, the potential benefits of networking justify actions to overcome them.

4. EVN Survey - State of Electronic Data Transmission

Survey background 4.1

The key challenge in developing a survey for supply chain processes is that many processes cut across many functional and organizational boundaries. In addition definitions are not always clear and may be interpreted slightly different in as well in the various industry sectors as in the service provider's community.
To overcome this, we have focussed on the key processes as outlined in the SCM process chart (see 4.2)

In each company, the supply chain executive was asked to identify the appropriate group and forward the relevant questions to them. For each of the processes, the survey was designed to assess the current level of networking use but also future plans (within 3 years).
The data was gathered using an Excel spreadsheet and drop down menus to make it convenient for the respondents to answer within 30-45 minutes. In addition this spreadsheet facilitated the data consolidation effort, needed to draw the overall conclusions.

The official F&L organization classification on industry sectors and service providers was used to categorize the results. The respondents returned the survey to Gerhard who removed any company related information as to ensure complete confidentiality to all respondents.
The analysis was prepared by a team member and verified and fine-tuned by the full European Virtual network team members

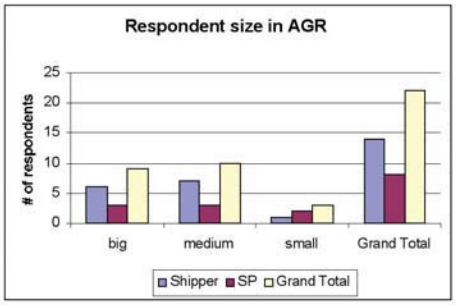
4.2 Survey respondents

SURVEY: RESPONDENTS PROFILE - SIZE

Count of Type of organization		Organization size			
Organization type	Type of organization	big	medium	small	Grand Total
Shipper	Automotive	1		1	2
	Chemicals	2	4		6
	Consumer goods	1	1		2
	Electronics		2		2
	Equipment	1			1
	Paper	1			1
Shipper Total		6	7	1	14
SP	3 PL	1			1
	4 PL	1			1
	LSP Intermodal		3	1	4
	LSP Road			1	1
	Other	1			1
SP Total		3	3	2	8
Grand Total		9	10	3	22

- 22 SURVEYS RETURNED 14 SHIPPERS & 8 SERVICE PROVIDERS
- OVERALL RETURN RATE = 20 %
- SURVEY REPRESENTATIVE FOR BOTH SHIPPERS AND SP'S BUT NOT IN ALL SUBCATEGORIES (I.E. SMALL SHIPPERS)
- COMPANIES GROUPED USING 3 GROSS REVENUE CATEGORIES

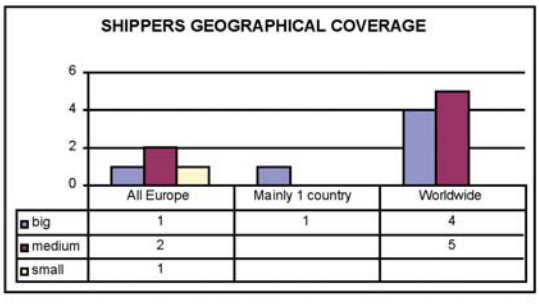
M EURO/Y	SHIPPERS	SP's
SMALL	<500	<10
MEDIUM	<5000	<300
BIG	>5000	>300



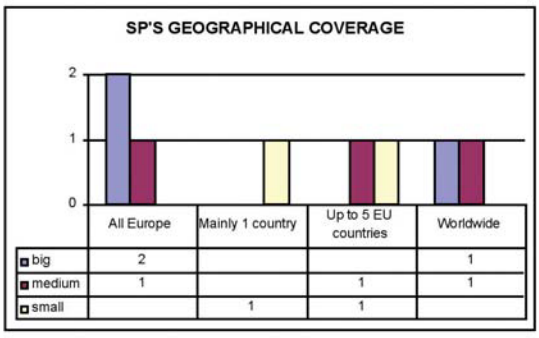
Virtual Network subgroup

Survey summary page 1

SURVEY: RESPONDENTS PROFILE - COVERAGE



- MAJORITY OF THE SHIPPERS RESPONDENTS HAVE WORLDWIDE COVERAGE



- SERVICE PROVIDERS RESPONDENTS COVERAGE HAS MORE VARIABILITY

Virtual Network subgroup

Survey summary page 4

SURVEY: RESPONDENTS PROFILE - EMPLOYEE RATIO'S

Average of AGR (KEURO PA)/Empoyee		Organization size			
Organization type	Type of organization	big	medium	small	Grand Total
Shipper	Automotive	187500		1111	94306
	Chemicals	588	998		861
	Consumer goods	185	233		209
	Electronics		206		206
	Equipment	289			289
	Paper	300			300
Shipper Total		31575	738	1111	14999
SP	3 PL	800			800
	4 PL	981			981
	LSP Intermodal		260	71	213
	LSP Road			150	150
	Other	159			159
SP Total		647	260	111	368
Grand Total		21265	579	444	9425

Average of #SC/#employees		Organization size			
Organization type	Type of organization	big	medium	small	Grand Total
Shipper	Automotive	3%		0%	2%
	Chemicals	2%	6%		5%
	Consumer goods	8%	10%		9%
	Electronics		#DIV/0!		#DIV/0!
	Equipment	33%			33%
	Paper	1%			1%
Shipper Total		8%	7%	0%	7%
SP	3 PL	90%			90%
	4 PL	0%			0%
	LSP Intermodal		68%	93%	77%
	LSP Road			75%	75%
	Other	100%			100%
SP Total		63%	68%	84%	71%
Grand Total		27%	24%	56%	30%

• SUPPLY CHAIN EMPLOYEES EMPLOYEES REPRESENT 2-3% OF THE SHIPPERS EMPLOYEES IN AUTOMOTIVE AND CHEMICALS WHILE SP'S TYPICALLY HAVE A LARGE RATIO OF SC EMPLOYEES

Virtual Network subgroup Survey summary page 6

4.3 Survey Format

European Freight & Logistics Leaders Forum

Virtual Networking team

Survey on current and future virtual networks usage

	TODAY	in 3 YEARS
1. Your company/division/business unit (Please select the blue box)		
Type of organization		
Geographical coverage		
Annual Gross Revenue (M Euro)		
Number of employees		
Number of employees in supply chain functions		
Who usually decides on need for networks		
2. Order management process (incl. Status feedback)		
Use of tel/ fax for customer orders		
Use of e mail for customer orders		
Use of EDI over dedicated networks for customer orders		
Use internet for customer orders		
Use of portal for customer orders		
Trading exchange (auctions) participation on request of customers		
e-collaboration program for customers (direct or via external hub ERP to ERP connections)		
Automatic replenishment orders (consignment fills, VMI fills...)		
3. Inventory & warehouse management process		
Real time visibility of all finished goods within your organization		
Vendor managed Finished goods Inventory (at your customer)		
Real time product availability to promise (against scheduled production) to customers		
Real time visibility of raw material inventory for your suppliers		
Supplier or vendor managed raw material Inventory		
4. Demand & Supply Planning process		
Use of tel/fax to call off supplies/services		
Use of e-mail to call of supplies/services		
Use of EDI over dedicated networksto call off supplies/services		
Use of internet to call off supplies/services		
Sharing of forecast with customers via networks		
Sharing of forecast with suppliers/services providers via networks		
Supply Demand process (from order to delivery) highly integrated		
On line demand visibility internally		
On line demand visibility to suppliers/service providers		
Collaborative planning with customers		
Collaborative planning with suppliers/service providers		
5. Supply Chain event management		
Is track and trace implemented throughout supply chain process		
Is exception handling triggered automatically when events are outside predetermined window		
6. Distribution planning process		
Advanced shipping notes are available to customers		
Advanced shipping notes from suppliers are available		
7. Transport Management process		
Use of tel/fax to call off transport		
Use of e-mail to call off transportation		
Use of EDI over dedicated networks to call off transportation		
Use of internet to call off transportation		
Use of dedicated Portals for transportation call off		
Used of shared portals to optimize carrier selection, load consolidation...		
Track and trace capability using manual updates in databases		
Track and trace capability using automatic updates via networks (PDA's, radio tags...)		
Transportation call off is integrated into carrier's transportation scheduling tools		

	Number 1 KPI used today	Number 2 KPI used today
8. Current Top 3 Process & Performance measurers by process		
Order Management Process		
Inventory & Warehouse management process		
Demand & supply planning process		
Supply Chain event management		
Distribution planning process		
Transportation management process		

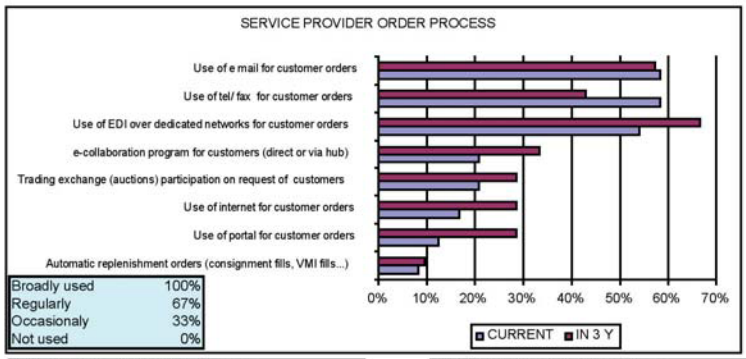
	Realized	Expected in 3 YEARS
9. Major benefits because of virtual networks		
Improved customer service		
Better cycle times		
Lower costs		
Improved employee productivity		
Better asset utilization		
Revenue growth		

	TODAY	in 3 YEARS
10. Which Enterprise Resource Planning system is in use		
11. Which external networks are you using effectively		
12. Which portals are you using effectively		
13. Which messaging standards are you using effectively		

14. Comments (please feel free to add your personal comments on learning, best practices failure... you are aware of in establishing or running virtual networks and which may help other F&L members	
15. What are the most important roadblocks you see to implement these networks effectively?	
16. Other comments/suggestions/remarks	

Level of Virtual Networking and trends 4.4

SURVEY: SP'S ORDER PROCESS TRENDS



Average of F Use of EDI over d	Organization size			
Type of organization	big	medium	small	Grand Total
3 PL	67%			67%
4 PL	100%			100%
LSP Intermodal		83%	67%	78%
LSP Road			67%	67%
Other	0%			0%
Grand Total	56%	83%	67%	67%

Average of F e-collaboration p	Organization size			
Type of organization	big	medium	small	Grand Total
3 PL	100%			100%
4 PL	0%			0%
LSP Intermodal		33%	0%	22%
LSP Road			67%	67%
Other	0%			0%
Grand Total	33%	33%	33%	33%

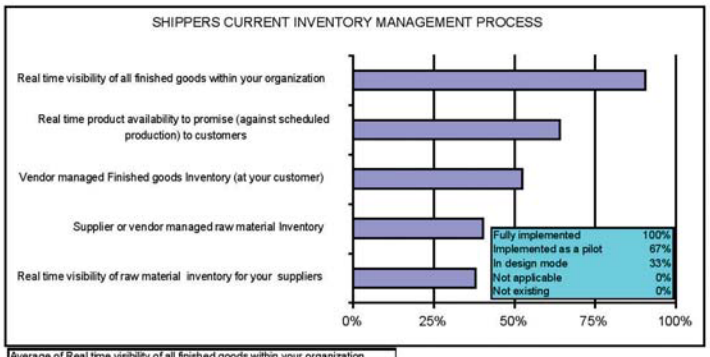
Average of F Use internet for customer orders	Organization size			
Type of organization	big	medium	small	Grand Total
3 PL	67%			67%
4 PL	33%			33%
LSP Intermodal		50%	0%	33%
LSP Road			0%	0%
Other	0%			0%
Grand Total	33%	50%	0%	29%

Average of F Use of portal fo	Organization size			
Type of organization	big	medium	small	Grand Total
3 PL	33%			33%
4 PL	33%			33%
LSP Intermodal		67%	0%	44%
LSP Road			0%	0%
Other	0%			0%
Grand Total	22%	67%	0%	29%

- **USE OF TELEPHONE EXPECTED TO DROP WHILE e MAIL EXPECTED TO HOLD POSITION**
- **EDI EXPECTED TO GROW DRIVEN BY THE BIF 3/4 PL'S**

Virtual Network subgroup Survey summary page 11

SURVEY: SHIPPERS CURRENT INVENTORY PROCESS



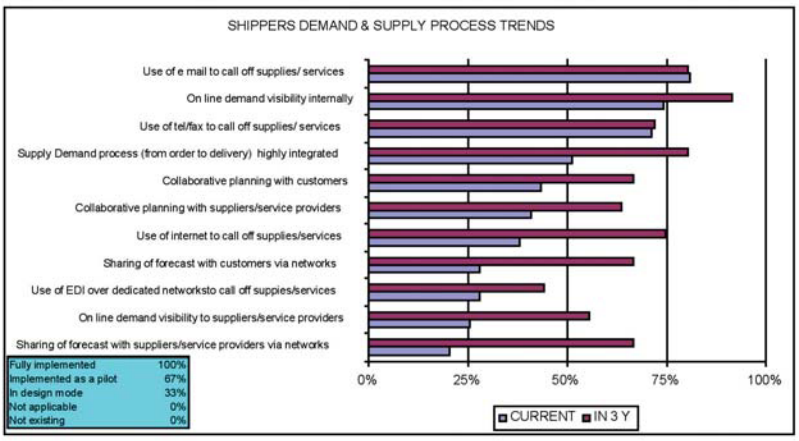
Average of Real time visibility of all finished goods within your organization	
Organization size	Total
big	100%
medium	81%
small	100%
Grand Total	90%

Average of Real time product availability to promise (agt	Organization size			
Type of organization	big	medium	small	Grand Total
Automotive	100%		0%	50%
Chemicals	67%	67%		67%
Consumer goods	0%	100%		50%
Electronics		100%		100%
Equipment	67%			67%
Paper	33%			33%
Grand Total	56%	81%	0%	64%

- **REAL TIME AVAILABLE TO PROMISE FULLY IMPLEMENTED IN AUTOMOTIVE AND MEDIUM SIZED CONSUMER GOODS AND ELECTRONICS COMPANIES, PAPER INDUSTRY LAGGING**

Virtual Network subgroup Survey summary page 12

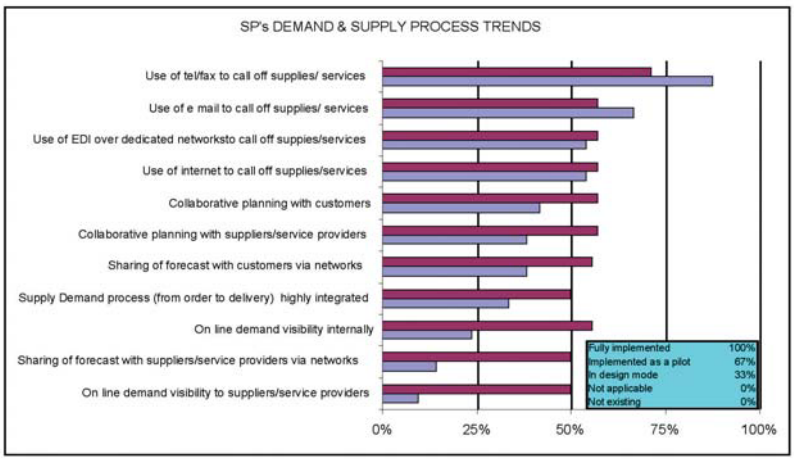
SURVEY: SHIPPERS D&S PLANNING PROCESS TREND



- **e MAIL REMAINS THE KEY TOOL TO CALL OFF SERVICES AND SUPPLIES BUT INTERNET CALL OFF'S COMING ON STRONG**
- **SHARING FORECASTS BOTH WITH CUSTOMERS AND SUPPLIERS IS EXPECTED TO BECOME STANDARD OVER THE NEXT YEARS**
- **SHIPPERS EXPECT MORE INTEGRATED DEMAND & SUPPLY PLANNING PROCESSES WITH FULL DEMAND VISIBILITY OVER THE NEXT YEARS**

Virtual Network subgroup Survey summary page 14

SURVEY: SP's D&S PLANNING PROCESS TREND

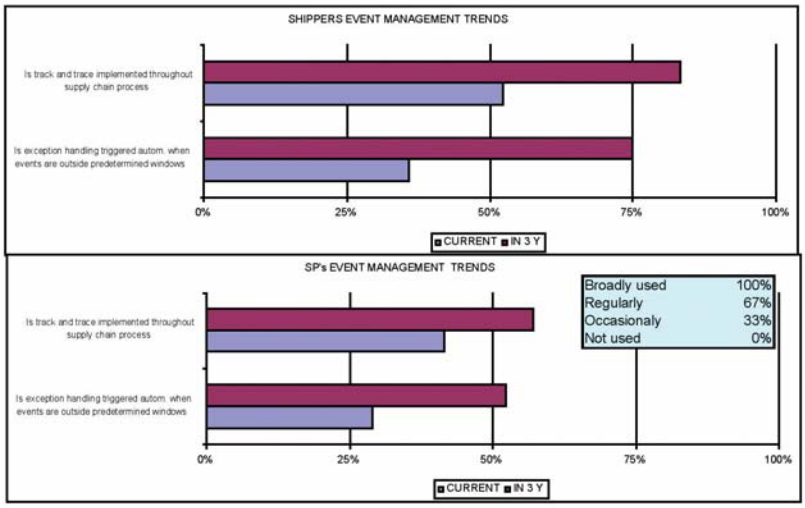


- **TELEPHONE REMAINS THE KEY TOOL TO CALL OFF SERVICES AND SUPPLIES BUT INTERNET, e MAIL, INTERNET AND EDI EXPECTED TO BE RUNNERS UP FF'S**
- **SHARING FORECASTS BOTH WITH CUSTOMERS AND SUPPLIERS IS EXPECTED TO BE PILOTED OVER THE NEXT YEARS**
- **SHIPPERS EXPECT MORE INTEGRATED DEMAND & SUPPLY PLANNING PROCESSES WITH FULL DEMAND VISIBILITY BEING DESIGNED OR PILOTED OVER THE NEXT YEARS**

Virtual Network subgroup Survey summary page 15

Virtual Network subgroup Survey summary page 14

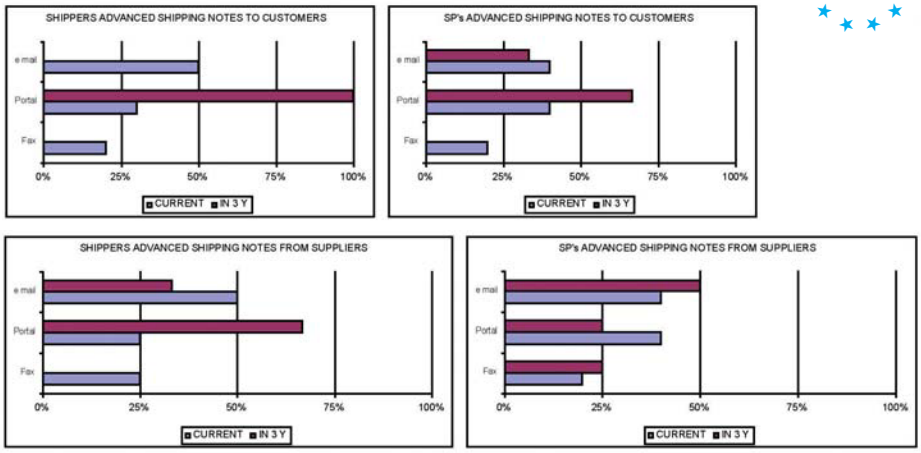
SURVEY: EVENT MANAGEMENT TRENDS



• BOTH SHIPPERS AND SERVICE PROVIDERS EXPECT TRACK AND TRACE AND EVENT MANAGEMENT TO BE USED FREQUENTLY BUT SHIPPERS AS PUSHING FOR IT

Virtual Network subgroup Survey summary page 16

SURVEY: DISTRIBUTION PLANNING TRENDS

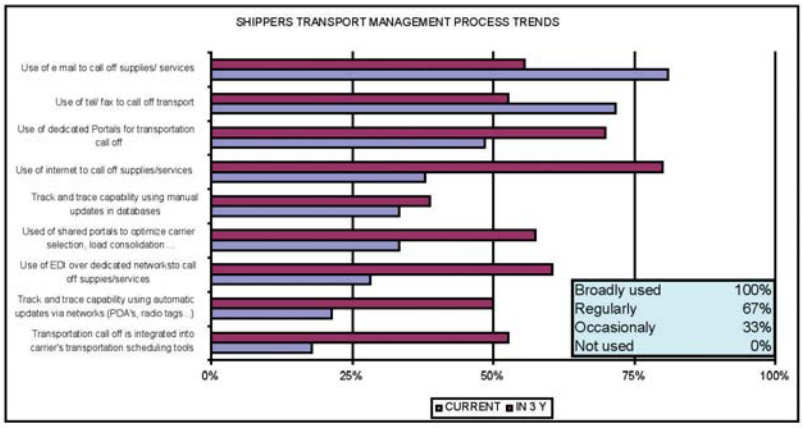


• SHIPPERS EXPECT TO FINALIZE IMPLEMENTATION ON DELIVERY OF ADVANCED SHIPPING NOTES TO THEIR CUSTOMERS VIA PORTALS WITHIN 3 YEARS, SERVICE PROVIDERS EXPECT e MAIL TO BE THE PREFERRED PLATFORM FOR DELIVERY

• BOTH SHIPPERS AND SP's EXPECT THEIR SUPPLIERS TO SEND ADVANCED SHIPPING NOTES THROUGH PORTALS OR e MAIL

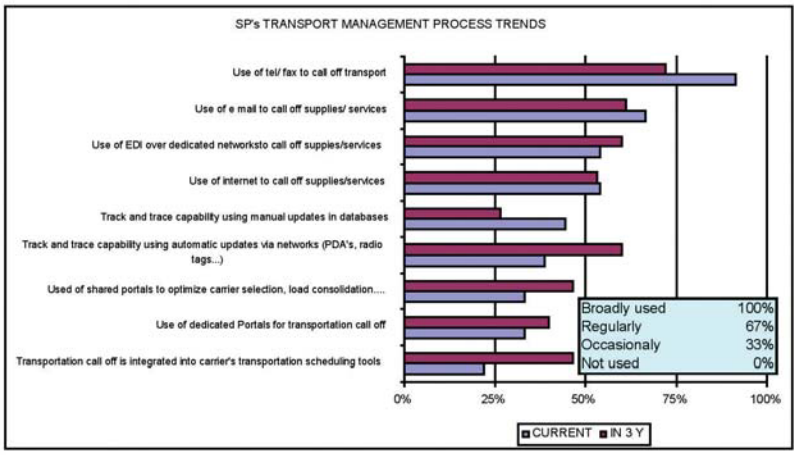
Virtual Network subgroup Survey summary page 17

SURVEY: SHIPPERS TRANSPORT MANAGEMENT TRENDS



- **SHIPPERS EXPECT TO CALL OFF TRANSPORT PRIMARILY VIA INTERNET, DEDICATED PORTALS, EDI AND e MAIL**
- **SHIPPERS EXPECT CARRIERS TO INTEGRATE CALL OFF GRADUALLY INTO THEIR INTO SCHEDULING TOOLS WITH AUTOMATIC TRACK AND TRACE CAPABILITY**
- **SHIPPERS ALSO EXPECT MORE SHARED PORTALS TO OPTIMIZE CARRIER SELECTION AND LOAD CONSOLIDATION**

SURVEY: SP's TRANSPORT MANAGEMENT TRENDS

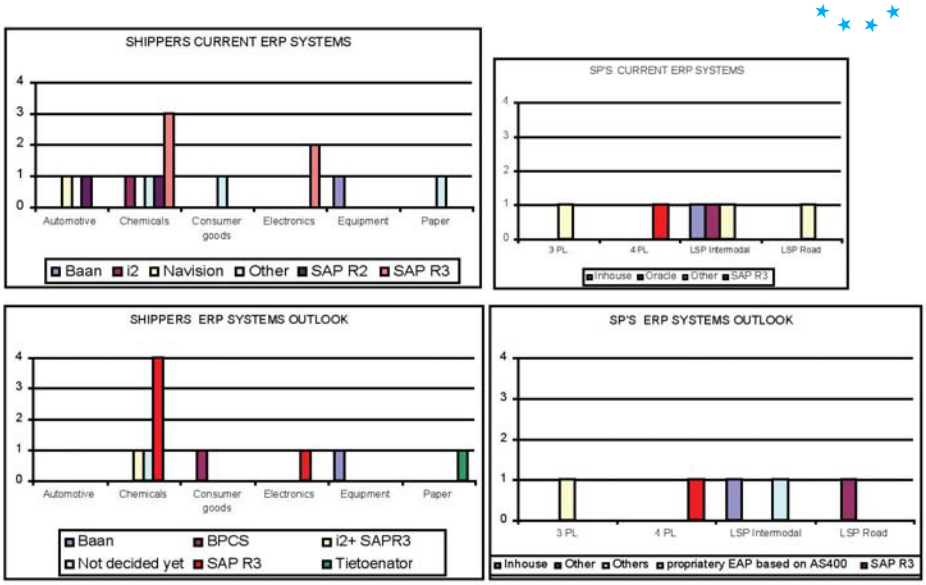


- **SERVICE PROVIDERS EXPECT TRANSPORT CALL OFF TO USE ALL PLATFORMS BUT TELEPHONE AND FAXES WILL REMAIN NUMBER 1**
- **SERVICE PROVIDERS EXPECT TO INTEGRATE CALL OFF GRADUALLY INTO THEIR INTO SCHEDULING TOOLS WITH AUTOMATIC TRACK AND TRACE CAPABILITY**
- **SERVICE PROVIDERS EXPECT SOME MORE SHARED PORTALS TO OPTIMIZE CARRIER SELECTION AND LOAD CONSOLIDATION**

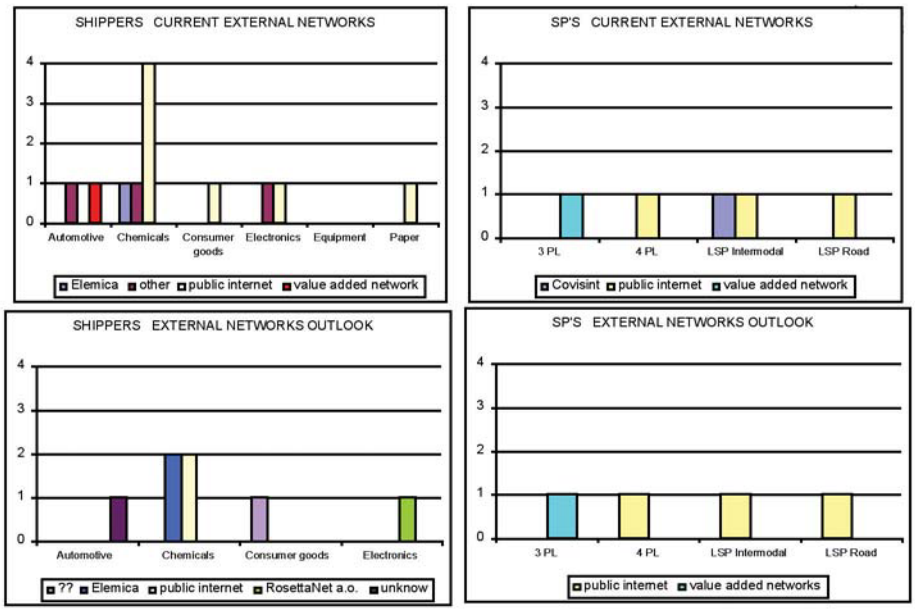
Network Trends

The industry initially tried to connect suppliers to some customers or service providers through direct point to point connections. The key disadvantages are related to the unique design of each of these connections leading to high design and maintenance costs and difficulties to simultaneously upgrade the connections. This becomes very apparent looking at the number of different Enterprise Resource Planning systems and external networks currently in use in our F&L community. As revealed in our survey, within the next 3 years no clear winners are expected, except for the Chemical industry where SAP R3 as an enterprise system, combined with the Elemica connectivity hub is on the rise.

SURVEY: ERP SYSTEM TRENDS



Virtual Network subgroup Survey summary page 24



Virtual Network subgroup Survey summary page 25

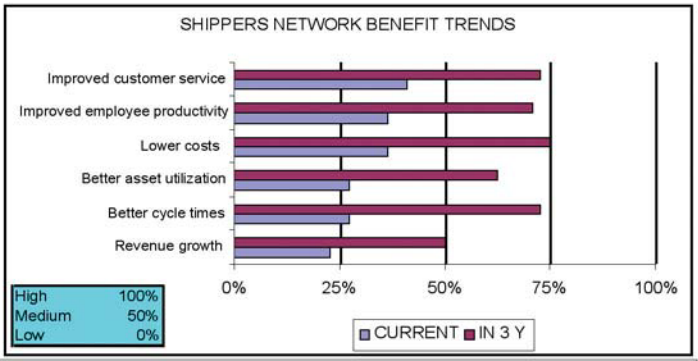
4.5 Benefits of virtual networking

Major benefits of electronic data x-change are
Real time info
Lower process cost
Visibility
The bottom line is improved business results, financially as well as in customer service.

These network effects include: lower transportation costs through real-time supply/demand balancing and volume aggregation; enable co-loading and merge in transit to lower logistics costs and improve customer satisfaction; improve capacity utilization across global, intermodal networks; increase fulfilment speed and reliability to end customers via collaborative logistics activities; give participants a single point of connection to all other community members; accelerate the building of new fulfilment marketplaces and exchanges.

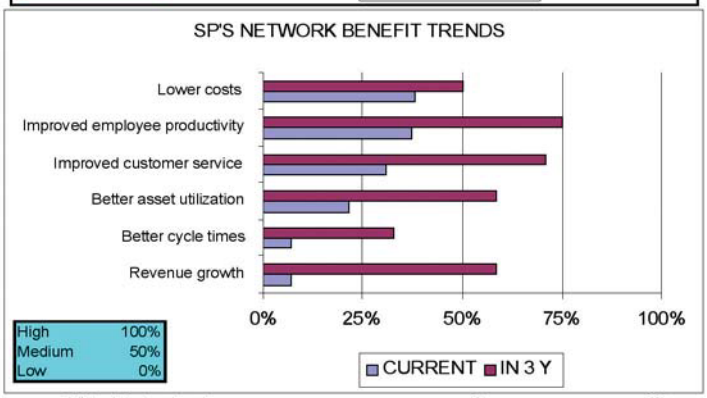
In our survey members have highlighted following areas of benefits:

SURVEY: EXTERNAL NETWORK TRENDS



Average of F Improved customer service	Organization size			
Type of organization	big	medium	small	Grand Total
Automotive		0%		0%
Chemicals	100%	67%		80%
Consumer goods	100%	50%		75%
Electronics		50%		50%
Equipment	100%			100%
Paper	100%			100%
Grand Total	83%	60%		73%

Average of F Lower costs	Organization size			
Type of organization	big	medium	small	Grand
Automotive		0%		0%
Chemicals	75%	75%		75%
Consumer goods	50%	100%		75%
Electronics		100%		100%
Equipment	100%			100%
Paper	100%			100%
Grand Total	67%	83%		75%



Average of F Improved employee productivity	Organization size			
Type of organization	big	medium	small	Grand
3 PL	100%			100%
4 PL				
LSP Intermodal		75%	50%	67%
LSP Road			100%	100%
Other	50%			50%
Grand Total	75%	75%	75%	75%

Average of F Improved customer service	Organization size			
Type of organization	big	medium	small	Grand
3 PL	100%			100%
4 PL	100%			100%
LSP Intermodal		75%	0%	50%
LSP Road			100%	100%
Other	50%			50%
Grand Total	83%	75%	50%	71%

Virtual Network subgroup Survey summary page 23

As there are many different players on the market and as there are no obvious winners it is not easy for F&L members to decide on these types of -significant- investments and related timing. In addition there are different hubs, standards, ERP systems.... among different sectors complicating the right choice for the- in general- less financially strong service providers

To identify the value of better communication, less delays, less missing documentation, employee productivity.... requires a different approach and calculus for some businesses. The recent experiences many business executives have had related to poor returns on- most of the times- hefty IT investments is not helpful to take these type of decisions.

4.6 Survey Conclusions

- Overall survey return rate ~ 20%. With 22 surveys returned, 14 shippers and 8 service providers, we have in many cases a representative sample, justifying reasonable accurate conclusions.
- The survey respondents count some 240000 employees of which 10000 employed in the supply chain.
- Supply chain organizations are emerging and taking on more responsibilities, especially in the chemical- and consumer goods segments
- In the "Order management" process, use of portals and orders taken via the internet is on the rise, driven by the shippers while the service providers still see EDI as the prime vehicle to generate orders.
- In the "Inventory management" process, shippers are strongly focused on implementing real time visibility within their organizations and Vendor Management Inventory schemes with their customers.
- In the "Demand and Supply" Process, shippers are focused on building integrated systems; sharing forecasts both with customers and service providers is on the rise and e-mail and internet call offs become the standard communication vehicle for shippers while service providers expect telephone communications to hold.
- Both shippers and service providers expect track and trace and event management to be used frequently but shippers are pushing hard for it.
- In the "Distribution Planning" process shippers expect to send advanced shipping notes to their customers via portals while service providers believe e-mail will be the delivery platform
- Shippers expect the transport call off to be done via internet, dedicated portals; EDI and E mail and they expect carriers to integrate this call off into their scheduling systems with automatic track and trace capability. Shippers expect additional services from shared portals to optimize carrier selection and load consolidation
- Key networking benefits quoted are reduced costs, better employee productivity, asset utilization and better customer service

- There are many ERP systems around with no clear winners except for the chemical sector where SAP R3 seems to become the standard
- There are even more external networks and portals around without a clear winner, in the chemical sector Elemica may become the standard
- Current messaging standards are primarily EDI, no clear winners for the future but CIDX seems to be more broadly accepted in the chemical sector
- A potential role for the F&L is to push for common standards across industry sectors and -at least- on a European scale in order to simplify the overall connectivity complexity across sectors (as many of the F&L members have business in different sectors) and improving overall efficient electronic communications, SCM processes and related connectivity costs.

Electronic invoice clearance is another example where the European commission could help the industry in its quest to become more efficient

5. Software & Systems for Data exchange

5.1 Introduction

Applications that aid the management of the Supply Chain are increasingly important, given the pressure for traditional companies to lower costs, drive inventory levels lower, increase the responsiveness of the Supply Chain, enable mass product customisation and the increased use of outsourced production.
To achieve each of these ambitions, Supply Chain must be co-ordinated though planning and execution to work, efficiently, internally within an organisation and externally with its supplier base and customers.

This part includes the software & systems being used for data exchange in virtual networking in logistics between partners, types of virtual environments, software systems available in networking / collaboration and standards used.

„If you look at business to business exchanges as one form of new business-to-business models on the Internet, the whole notion is to open up a vast volume of information that is available in real time to all players in a particular supply chain – or more accurately supply networks.
So everyone can see the whole picture simultaneously – what people need, what's available, what's in inventory, what capabilities each player brings to the table, and so forth"
„Moving to Supply Chain Networks" – Managing the Supply Chain: The General Manager's role, Harvard Business School.

Businesses are connecting to their suppliers and to their customers to allow systems to inter-operate.
The current issue for most companies is that they have existing legacy applications and ERP systems that need to be able to communicate with the supplier/customer systems that could also be ERP application, but probably not from the same ERP vendor.

This flexibility to communicate with different systems and interface by exchanging completely different business documents via several message formats (production, warehousing, transport orders, confirmations, status updates) helps to avoid multiple manual input, communication costs and sources of error in human communication.

Networking Application Taxonomy, Software & Systems for Networking & Collaboration 5.2

A variety of enterprise applications from vendors drives a company's SCM business processes. Users mix and match application to support an overall business process. For example, a Company might use both a demand planning and Supply planning application to support a Sales and Operations Planning (SOP) process conducted on a weekly or monthly basis.

Main Applications can be split as described hereafter.

SC Collaboration (SCC):

Supports the joint development of demand and Supply plans and schedules among internal users and external partners.

SC Planning (SCP):

Deals with the planning processes of both demand and Supply. Demand planning provides forecasts of future sales, against which a Company can estimate its Supply and production needs through the processes of Supply planning. In details,

- Network Design:
  Determines the optimal flow of products and materials across a network of suppliers, customers, manufacturing locations, and distribution centres, and supports channel and supplier strategy and facility role and location decisions.
  Modelling and simulations tools are here utilised
- Master Planning:
  Supports concurrent planning of the use of materials and manufacturing, distribution and transportation resources to meet forecast and actual demand.
  Applications contain integrated functionality in two or more function oriented application areas.
- Demand Planning and Forecasting:
  Supports the development of future demand based on historical patterns, future orders, and marketing activities and intelligence
- Distribution Planning:
  Supports inventory replenishment and deployment planning and scheduling, including VMI
- Manufacturing Planning:
  Supports tactical planning of plant and material resources to create master production schedule (MPS)

SC Execution (SCE):

Controls the processes through which demand is satisfied as it arises and includes applications such as warehouse and transportation management systems. In details,

- Production Scheduling:
  Determines the optimal sequence of orders based on materials, changeover requirements, customer due dates, work centre capability, and other constraints
- Warehouse Management:
  Supports all operations in and across warehouses and distribution centres including receiving, stocking, picking, packing, and shipment processes.
- Inventory Management:
  Supports the replenishment of component, subassembly and finished goods inventories, including setting inventory targets.
- International Trade Logistic:
  Supports the movements of goods across country borders and includes trade document development and track-an-trace processes.
- Transportation Management:
  Supports all aspects of transportation including rating, routing, scheduling, mode and carrier selection, load building, tendering, and freight audit and payment process.
- Order Management:
  Supports the order from quoting and entry to processing and final settlement and eventually all the activities related to negotiation approach (negotiation systems). In fact, nowadays, one of the mechanisms of e-market that arouses greater interest is based on the concept of Auction.
  Auction is a market with a set of explicit rules for the resource allocation and the corresponding prices on the basis of the competitor's bid. An auction can handle one or more then one object and in this case we have sequential and parallel auctions. In a third type of auctions, called combinatorial auctions, the participants want buy multiple items and each of them is able to make a bid for a subset of goods or for all the goods.

Supply Chain Event Management (SCEM):

Supports the measurement, monitoring, proactive notifying, decision-making, and control processes to manage events in an enterprise and across external trading partners in a Supply Chain.

Alerts message can be used to notify the situation to be managed immediately. Modelling and simulations tools are again deeply involved with this environment.

The major distinction between SCP and SCE applications is the users' planning horizon or decision time frame.

SCP applications generally support strategic and tactical planning processes that look several months to years into future, often in terms of weekly and monthly time buckets.

SCE applications deal with tactical and operational planning processes that look a day to weeks into the future, usually by minute or day time buckets.

Two of the previously mentioned SCM applications types, Supply Chain collaboration and SCEM, have been driven by the need to support e-business strategies involving processes that span enterprises, especially that leverage the Web. Most SCP vendors have responded to e-business by Internet-enabling applications that let a Company provide remote access to planning and scheduling systems for its employees and select customers and supplier via browsers.

Process automation: **5.3**

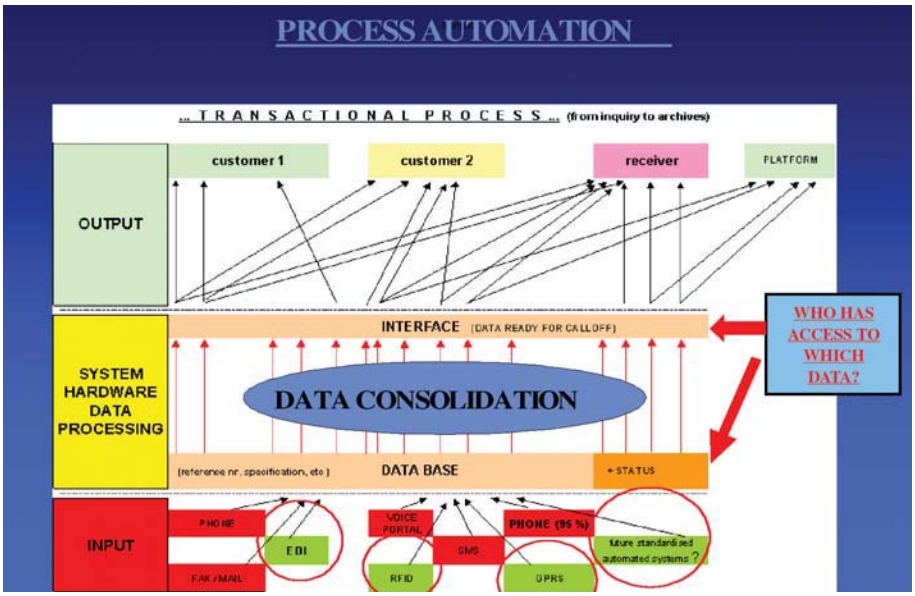
The technical implementation of sharing information between partners through networks (business to business or platforms) is not the main Constraint for succeeding when networking. Cost and control, type of industry are key points when deciding which way to go in networking. In case of Supply Chain networks (see slide below), the difficulty is to manage the automation of entering data (INPUT) into the system of the communicating partners.

Inputs:

- Multiple factories expedite materials to multiple customers in different countries. Multiple modes of transportation (truck, train, air, sea, LTL) apply with different possibilities to track information.
- Multiple ways LSP receive information on shipment status in the several European countries
- Multiple technologies are being applied, no single consense on which is the best technology (GPS, Satellite, GSM, SMS)

Therefore, the consolidation of incoming information (messages) is difficult if it is not entered manually in the system.
The main objective of all the partners in the Supply Chain is to define which information is „required" and „relevant" in the Supply Chain which allows to provide highest quality of information and reliability. „Less is more! ".

- Exception handling is more effective than, multiple reporting status.
- Avoid manual typing of information in the system is priority for all partners in the Supply Chain.
- Manual typing of information is an additional source of error, cost time and money.



Software & Systems Vendors for Networking & Collaboration via WWW 5.4

The following table describes a set of companies that provide solutions for Supply Chain Management, for e-Commerce, e-marketplace infrastructures and e-business in general:

Adexa
http://www.adexa.com/

Adexa is a leading provider of collaborative commerce solutions critical to e-Business. Adexa iCollaboration suite helps enterprises and trading exchange participants make faster, more informed business decisions. Agile Software Description: the leading provider of Collaborative Manufacturing Commerce solutions that speed the „build" and "buy" process across a virtual manufacturing network, thereby improving time to volume, customer responsiveness and cost of goods sold.

Ariba:
http://www.ariba.com

Ariba, Inc. provides the first and only comprehensive eCommerce solution for all strategic segments of business-to -business eCommerce.

AspenTech
http://www.aspentech.com/

The leading supplier of integrated software and solutions that enable process manufacturers to automate and optimise their plants and extended Supply Chains while enabling eBusiness.

Atlas Commerce
Atlas Commerce provides the eCommerce software infrastructure to power Supply Chain eHubs and Online Buying Communities.

Baan
http://www.baan.com/

Baan Company is a leading global provider of enterprise business solutions.

BroadVision
http://www.broadvision.com/

BroadVision provides a complete line of Internet software products and services for enabling large-scale Net business.

CA - Interbiz

Intelligent Enterprise Resource Planning (ERP) involves more than integrating functional applications such as manufacturing, distribution and finance.

Commerce One

Commerce One is the leader in global e-commerce solutions for business.

Efinity Description: Provider of Supply Chain management software solutions ***EXE Technologies*** a leading global provider of fulfilment, warehousing and distribution software.

i2 Technologies is the leading provider of Supply Chain optimisation solutions, with customers worldwide.

IBM

http://www.ibm.com/

IBM e-business revolutionizes the Supply Chain by providing its customers with dynamic and instant access to the most current data and applications...

The alliance with CISCO provides much more opportunities for both companies by offering to the customers solutions that enable customers to participate in the next generation of e-business.

J. D. Edwards

http://www.jdedwards.com/

The leading supplier of e-business solutions that deliver speed and agility for customers throughout the world.

Logility

http://www.logility.com/

Logility was the first value Chain management solutions provider to offer true, real-time CPFR via the Internet. Logility now offers Internet-based collaborative solutions for planning and Supply Chain Execution.

Manugistic

http://www.manugistics.com

A leading provider of eBusiness solutions that enable intelligent decisions across trading networks.

The Company provides solutions for Supply Chain Management, Service and Parts Management and Supplier Relationship Management, between others.

Oracle
http://www.oracle.com/

Oracle offers the fully integrated, end-to-end internet based Supply Chain management solution designed to help operate successfully as an e-business.
PeopleSoft's mission is to provide innovative software solutions that meet the changing business demands of organizations worldwide.

SAP
http://www.sap.com/index.asp

mySAP SCM uses the power of the business Internet to provide critical information about inventory levels, orders, forecasts, production plans, and other key performance indicators.

See Commerce
http://www.seecommerce.com/

SeeCommerce enables business managers and trading partners to continuously manage and improve business performance across complex Supply Chains.
SeeCommerce enables solutions in real-time and empowers global 2000 companies to:

- Improve decision allowing users to view the total supply chain in context.
- Take corrective actions and see measurable supply chain improvements for the problems effects appeared from one month to another.

Type of virtual environments: **5.5**

Today, ERP systems, Legacy systems and SCM applications are taking advantage of the standardisation of XML and TCP/IP in order to communicate and achieve a higher level of integration and inter-operation (Collaborative Commerce). Collaborative Commerce is a new model for business.
Driven by an explosion of business demands and opportunities and enabled by the Internet, component and integration technologies, collaborative commerce achieves dynamic collaboration among internal personnel, business partners and customers throughout a given trading community or market. Creating the Supply Chain communities is the new challenge. Enterprises harness the power of the Internet to gain revenue and profit improvement by going beyond Supply Chain models and Information sharing.

Collaborative commerce is the result of two developments:

- The range of business participants (***connection paradigm***) is expanding from those within an enterprise in the trading community.
- The enterprise's focus (***business paradigm***) is progressing from departmental productivity and external transaction handling to collaborative interaction.

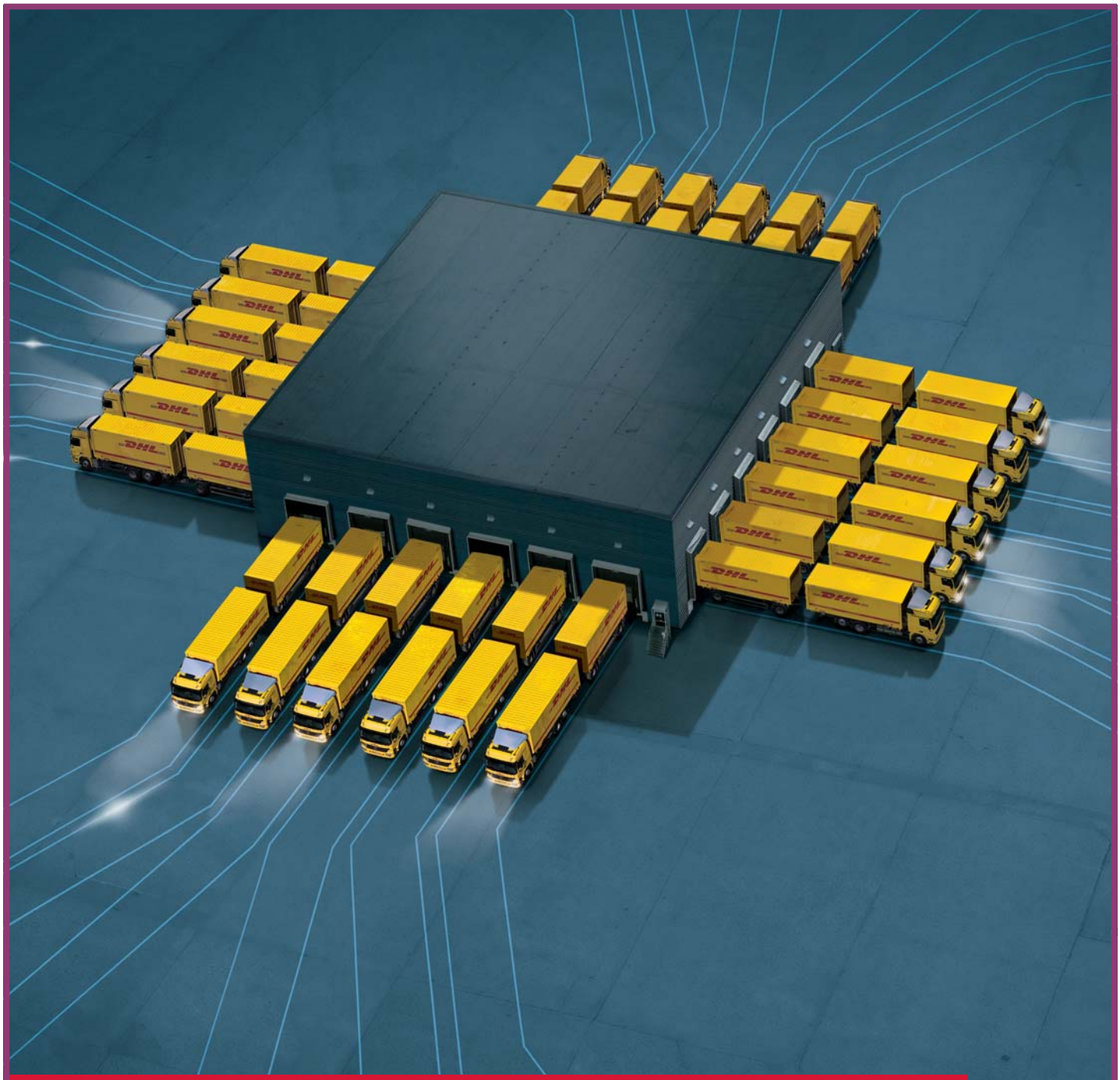
Business –to-Business networks

We can define Business-to-Business networks, as those which are implemented on bilateral communication of two or more partners with different IT systems, using common data standards.
This type of communication is mainly used by international companies and multinationals.
Their main aim is to implement data interchange with their logistics partners by using a very flexible internal / external standard, which gives them the possibility to change and maintain n the data format in a quick and simple way – with bilateral format business-to-business networks – you can react on operational needs and requirements.
The ways of communications which are being used are:

- FTP (File Transfer Protocol) – direct communication via Internet
- SMTP (email) – mail attachments containing EDI Data
- HTTPS (secure communication via Internet) – using encryption protocols to allow more security in the networks.
- VAN (Value Added Network) – Communication using a mailbox system as provided by an IT provider such as IBM Information Exchange / G.E. Information Services.

Common Data Formats are:
UN / EDIFACT: Electronic Data Interchange for Administration, Commerce and Transport
XML: Extensible Mark up Language – Web based data format
ASCII: Free text based data format for bilateral defined messages

Further information about formats and standards: http://www.w3.org
Technical descriptions appendix 7: Networking technology standards
Among the key findings of the report are the critical attributes seniour executives want from their business networks versus the criteria that these ways of communication include.



More performance inside.

We control even the most complex logistics processes.

We deliver more time for you to focus on your business. Because with DHL Solutions you can outsource many of your complex processes. Transport, consulting, warehousing, IT-based solutions and logistics financing. We deliver the entire spectrum of one-stop logistics services, fully integrated into your company's operations. Making sure that everything works smoothly. In short, DHL Solutions is a high-performance processor for all your logistics needs. Get in contact with us at **dhlsolutions@dhl.com** or **www.dhl.com**

Deutsche Post World Net
MAIL EXPRESS LOGISTICS FINANCE

WE MOVE THE WORLD DHL

PHILIPS

Forwarding and Distribution

has supported the creation of the final report of
F&L Working Group "European Virtual Networking"

6. Security of Virtual Networking in Logistics

Networks and information systems have become essential to businesses both large and small. They hold the promise of expanded markets and overall economic growth. But these opportunities depend on the security of those networks and information systems. In particular businesses that are working together in supply chains need to be very active in ensuring their information security.

Supply Chains are only secure when every participant, appropriately to their role, is aware of the relevant security risks, is taking preventive measures, is assuming responsibility and is taking the appropriate steps to improve the security of their information systems and network connections. Securing supply chains requires a combination of information network security and standards on the one hand and supply chain event management techniques on the other hand. Both the agreements between supply chain partners and the proper functioning of the technical systems supporting these agreements must be reliable.

In the view of the WG, security of Virtual Networking in Logistics consists of the following three components: basis principles, secure networking technology and application specific security functionality. This chapter deals with all of these:

- The first paragraph of this chapter provides a number of guidelines, derived from a recent OECD Guideline, entitled: "Information security issues and resources for small and entrepreneurial companies". We made a few connections to the use of IT networks in supply chains.
- the second paragraph examines some developments and the technology for securing information networks;
- The third paragraph discusses the complementary role of supply chain event management software.

Guidelines for the security of networks and systems[1] _____ 6.1

Security Policy, Standards and Procedures

Every business should have a set of information security policies, standards and procedures so that all employees know exactly what is expected of them.

(1) *Guidelines for the security of networks and systems - A business companion to the 2002 OECD Guidelines for the security of networks and information systems: Towards a culture of security - 2004*

The policy constitutes the 'Why' of information security; Security standards represent the 'What'; and procedures are the 'How'. Below, policy and standards are explained. Procedures are detailed instructions that flow from standards and must be tailored to businesses.

Security Policy

A simple and clear information security policy is essential. It should be as short as possible – no more than a few pages - and should be given to all employees. The policy should include the following:

- Information is vital to our business.
- We protect the confidentiality, integrity and availability of our business-critical information.
- We have standards that help us to do this – including:
  - physical security
  - personnel security
  - access controls
  - security technology
  - security response and recovery, and
  - security audits.
- We have procedures that help us to meet our standards.
- Employees should be familiar with the procedures relevant to their roles and responsibilities.
- We take disciplinary measures against employees who persistently or deliberately flout these information security policies, standards and procedures.

The policy should say where details of the standards and procedures can be found.

Security Standards

The standards listed in the security policy section above are examined in more detail below.

- **Physical security**
  - Fit appropriate locks or other physical controls to the doors and windows of rooms where you keep your computers.
  - Physically secure lap tops when they are unattended (for example, by locking them in a drawer overnight).
  - Ensure that you control and secure all removable media, such as removable hard-drives, CDs, floppy disks and USB drives, attached to your business-critical assets.

- Make sure that you destroy or remove all business-critical information from media such as CDs and floppy disks before disposing of them.
- Make sure that all business-critical information is removed from the hard drives of any used computers before you dispose of them.
- Store back-ups of your business-critical information either off-site or in a fire- and water-proof container.

❖ **Access controls**

- Use unique passwords, that are not obvious (not birth dates or easily found or guessed information) and change them regularly, preferably every three months.
- Use passwords that contain letters in upper and lower case, numbers and special keys, and are six or more characters in length. It helps if you consider your password as a memorable sentence, rather than a single word. For example the sentence: "at forty-two I'm a star!" could be translated into an eight-character password that looks like this: @42Ima*!
- Don't write your password down, and never share it with anyone. If you do have to share it, make sure you change it as soon as possible – no matter how well you trust the person you shared it with!
- Consider password encryption and regularly pass word changes.

❖ **Security technology**

- All computers used in your business should have anti-virus software installed, and the virus definitions must be updated at least once a week (many providers have a one-click update). All incoming and outgoing traffic should be scanned for viruses, as should any disk or CD that is used, even if it is from a 'trusted' source. At least once a month, computers should be scanned for viruses.
- If your computers are connected to the Internet, and especially if you use a broadband connection, you must deploy a software firewall. This will help to prevent malicious code from entering your computer and potentially compromising the confidentiality, integrity and availability of your network. It will also help to stop your system being used to attack other systems without your knowledge. Software firewalls for use by non-professionals are readily available at a reasonable cost. Your operating system, virus control software or ISP may also offer a firewall. Consumer and popular trade magazines

compare firewall functions and features of well known products, and so are good sources of information. Free shareware firewalls are available, but these usually require expert knowledge for correct use.

- In supply chains, most company networks are connected to the Internet and heavy flows of information flow via Internet and https links. All supply chain participants should consider deploying an 'all-in-one' hardware box that contains a firewall, anti-virus program and an intrusion detection system. This will greatly simplify the use and maintenance of essential Internet security technology.

❖ **Personnel**

- Perform integrity checks on all new employees to make sure that they haven't lied about their background, experience or qualifications.
- Give all new employees a simple introduction to information security, and make sure that they read and understand your information security policy. Make sure they know where to find details of the information security standards and procedures relevant to their role and responsibilities.
- Ensure that employees have access only to the information assets they need to do their jobs. If they change jobs, make sure that they do not retain their access to the assets they needed for their old job. When dismissing employees, ensure that they do not take with them any business-critical information.
- Make sure that no ex-employees have access rights to your systems and incorporate this in your exit policy.
- Make sure your employees know about the common methods that can be used to compromise your system. These include e-mail messages that contain viruses and 'social engineering' ploys used by hackers to exploit employees' helpfulness to gain information that will give them access to your system. Examples of 'social engineering' include a hacker using the telephone to pose as a systems maintenance engineer or pretending to be a new employee.
- Make sure your employees' roles/responsibilities are reflected in their IT access rights, with special care taken for super users.

❖ **Security Incident/Response**

- A security incident is any event that can damage or compromise the confidentiality, integrity or availability of your business-critical information or systems.

- It is important to make your staff aware of telltale signs of security incidents. These could include strange phone requests, especially for information, unusual visitors, strange patterns of computer activity, unusual appearance of computer screens and computers taking longer than usual to perform routine tasks.
- Your staff should understand that it is always better to notify the right person if they observe anything that might be a telltale sign of a security incident.
- If a security incident happens, employees should know who to contact and how.
- You should have in place a plan to assure business continuity in the event of a serious security incident. The plan should specify designated people involved in the response, external contacts, including law enforcement, fire and possibly technical experts, contingency plans for foreseeable incidents such as power loss, natural disasters and serious accidents, data compromise, no access to premises, loss of essential employees and equipment failure.
- The information security plan should also include data retention guidelines, back up policies, recovery policies and IT disaster recovery plans aligned with business continuity plans, inclusive testing.
- Your plan should be issued to all employees and should be tested at least once a year, even if you haven't had a security incident.
- After every incident when the plan is used, and after every test, the plan should be re-examined and updated as necessary using the lessons learned.

❖ **Audit Controls/ Due Diligence**

Good information security includes knowing who has access to your system and being able to log that access. You also need to have in place a system to make sure that your security procedures are actually followed. The ability to audit and evaluate information security compliance is essential – you can't manage what you don't measure!

- You should audit important aspects of your security, for example, who has access to your systems and who has used what information.
- You should have a record for each one of your security procedures. For example, if your procedure says that you test your back-up generator once a week, someone should sign

a record to show that this has been done. Keeping good records is essential to audit control.

- Some audit controls may be necessary for legal or regulatory purposes. Good record keeping will clearly demonstrate that you are complying with your obligations.
- An audit should ensure that the procedures you have in place are effective and relevant. It is a trigger to re-assess and re-evaluate the effectiveness of your information security standards and procedures.
- Audits are only effective if you follow through on their findings and identify and implement the steps that need to be taken.

A good audit trail is not just a paper exercise. If something goes wrong, the trail should let you to see what happened and why. This will help you to keep improving the security of your business. And the potential benefits no one ever hopes to take advantage from can be huge: no viruses, no hackers, no internal misuse, no data theft and, in the worst case, fast recovery of the business and the supply chain.

The path forward

There is no 'one size fits all' approach to information security, and there are no magic bullets. *Information security issues and resources for small and entrepreneurial companies* help managers to identify and respond to the security issues that are relevant to their companies. Everyone who uses this guide needs to tailor their information security policy, standards and procedures to their own company. Each company is unique, with its own set of needs, resources and circumstances. But what every company, no matter its size or location, shares is the need to play its role in creating a global culture of security.

If your company uses a computer, and if that computer is connected to a network, information security must be a part of the way you do business. Information security isn't just about technology, and it's not just for experts. You can radically improve the security of your business – and those you do business with, including your customers' customers and your suppliers' suppliers – by taking a few small steps. Using proper passwords, a firewall, virus detection and making regular back-ups will make a significant improvement in your security and the security of those you deal with. These steps require research and effort to begin with, but will soon become second nature to you and your employees.

But remember, security is a continuous process, not an end-state. The extensive resources on the ICC website give more information on a range of security topics and from experts around the world. *Information security issues and resources for small and entrepreneurial companies* is simply a starting point for securing the way you do business.

For more information and resources on information security, please visit the ICC website at
http://www.iccwbo.org/home/menu_electronic_business.asp.

Useful information and security services is also available from several sources and companies listed in Appendix IV (e.g. a company like Telindus is offering networks and assists its customers with security advice in order to give all supply chain partners a kick start.

Information Networking Security 6.2

As to the information networks, a 2003 study(2) shows that lot of work still needs to be done. The main conclusion of this survey from AT&T and the Economist Intelligence Unit is that the majority of corporate IT networks worldwide won't survive near-term business challenges. In this worldwide survey of 237 senior executives on the future of corporate networking, only 6% of respondents said their networks were fully up to the task of handling all their business challenges by 2005, while 58% responded their networks, at best, could handle only some of the challenges expected within the next two years. The report states that executives need more bandwidth, higher speeds and global reach.

Among the key findings of the report are the critical attributes senior executives want from their business networks today including:

- Openness: open standards are crucial for businesses to communicate with customers, employees, suppliers and others, providing quick and seamless connections across different applications.
- Security: networks of the future must offer security without compromising application integration or user-friendliness.

(2) *"Majority of Corporate IT Networks Worldwide Won't Survive Near-Term Business Challenges - Executives Cite Need for More Bandwidth, Higher Speeds and Global Reach", © 2003 PR Newswire Association, Inc., June 23, 2003. The report is available at* http://www.att.com/networkview.

- Intelligence: in order to identify and prioritize types of traffic and reroute data automatically when faults occur, intelligence must be built into the network itself. Smart networking offers greater efficiency and increased effectiveness of relationship building among customers, suppliers, employees and business partners.
- Convergence: collapsing multiple networks into one more easily managed network to carry different types of data and voice significantly reduces integration costs and complexity.
- Reliability: network outages were a nuisance 25 years ago; now they can be a business disaster. At the New York Stock Exchange, for instance, one second of trading interruption equals $500 million of delayed transactions. The network of the future must be absolutely stable and reliable.

The AT&T / EIU report assesses the capabilities of new Internet Protocol (IP) networks that allow customers to collapse parallel and multiple networks into one packet network capable of transmitting data, voice and video securely and with different levels of priority assigned to different types of data. It also examines the new role of managed service providers who can now make possible the outsourcing of design, construction, security and maintenance of complex networks.

Increasingly, supply chain partners working together in virtual networks, become heavily dependent upon each other. First of all, the IT networks of the individual partners must be secure. Taking sufficient reliability of the (local or wide area) corporate network as a given, this is a basically a matter of gateway security.

According to Gartner(3), there are four approaches to gateway security:
- intrusion detection and prevention,
- content switching,
- traditional firewalls, and
- application-specific and traditional firewalls

These technologies have the same goal: comprehensive network defence in a single device.

---

(3) Richard Stiennon: "Four Paths to True Network Security" - © 2003 Gartner, Inc. and/or its Affiliates - COM-20-0571 - 14 July 2003. Permission to incorporate parts of this article in the report need be requested before publication

In this article, Gartner states: "security is a journey, not a destination. Although that may be true, the journey toward higher levels of security has been tortuous. The primary threat to enterprise security is targeted at the port 80 door that enterprises have opened on firewalls to enable Web applications. The technology changes that are needed to address application attacks represent an inflection point in the gateway security space. The confluence in the evolution of high-speed application-specific-integrated-circuit based (ASIC) security appliances and innovative new security algorithms can accelerate progress toward a single gateway device that can block attacks in the network, as well as application-layer attacks."

Gartner predicts that by 2006, 80 percent of Global 2000 enterprises will have deployed deep packet inspection capabilities to provide application defence (0.7 probabilities). Enterprises will have a variety of choices for comprehensive network security, including solutions from non-traditional security vendors.

7. Virtual Networking examples

Introduction:

This part contains several examples of logistics virtual networks in place, driven by technology innovation, analysing several "workable solutions" based on what needs "logistics virtual networking" is expected to supply, benefits and cost of the entrepreneurship.

7.1 Chemicals

7.1.1 CIDX EXAMPLE (http://www.cidx.org/Default.asp)

CIDX is a robust trade association and standards body focused on realizing transactional efficiency throughout the global chemical industry supply chain.
From its beginning, CIDX has focused on improving the ease, speed and cost effectiveness of electronic business transactions between chemical companies and their trading partners. As electronic commerce in the chemical industry evolved, CIDX led the effort to standardize data and business processes in order to reduce connectivity barriers and improve data accuracy while ultimately increasing efficiency, reliability and the speed of electronic transactions.
In late 2000, CIDX members voted to ratify new by-laws thereby broadening and transforming the association into a robust trade association and neutral standards body focused on ***improving the ease, speed and cost of transacting business electronically between chemical companies and their trading partners.***
Known for high-level member expertise, CIDX member volunteers produce standards, guidelines, support materials and communications that help users implement the free standards. The group also organizes forums to network and share leveraged learning between chemical companies and their trading partners.
Three principles guide CIDX's development and release of standards. Standards must be:

1. **Open** – available free of charge to members and non-members without royalties or licensing fees
2. Neutral – to support current and emerging business models
3. Platform independent – to prevent restricting the use of any hardware or software platform

Chem. eStandards®™ are the uniform standards of data exchange developed specifically for the buying, selling and delivery of chemicals. They are based on the universally recog-

nized "gold standard" for electronic data exchange, eXtensible Mark-Up Language (XML). Chem. eStandards™ are open, platform-independent, uniform and available free of charge.

Current Chem. eStandards®™ Members

Accenture, ADEXS, Air Products and Chemicals, Inc., Akzo Nobel, Ashland, Atofina Chemicals, BASF Corporation, Bayer, Borealis A/S, BP Chemicals Celanese Chemicals, Chemcentral Corporation, ChemConnect, Inc., Ciba Specialty Chemicals, Clariant International Ltd., Dow Chemical Company, E.I. DuPont de Nemours Eastman Chemical Company, Elemica, Exxon Mobil Chemical Co., HAHT Commerce Inc., IBM Corporation, J.D. Edwards World Solutions Co., JCII - CEDI Project, Kerr-McGee Chemical, LLC, Lubrizol Corporation, Lyondell Chemical Company, Menlo Logistics Microsoft Corporation, Millennium Chemicals, NOVA Chemicals, Occidental Chemical, Olin Chlor Alkali Products, Omnexus, Oracle, PIDX, PPG Industries Inc., Rapid Inc., Rex, Rhodia Inc, Rohm & Haas Company, SAP, See-Beyond Technology Corporation, Shell Chemicals, Solutia, SOLVAY, Stepan Company, Univar USA Inc., Vendavo Vulcan Chemicals, webMethods

7.1.2 TRANSWIDE EXAMPLE (http://www.transwide.com/en/index.html)

TwCall-off is a communication tool to send, receive and confirm electronic transport orders between logistics providers and shippers.

TwSlot provides a collaborative solution where shippers, receivers and carriers can efficiently manage the entire process of organising time slot for incoming trucks at pick-up and delivery.

TwDoc issues and holds transport documents (such as the CMR) electronically at one point, giving all parties the opportunity to update and view the document during transit. All interested parties (shipper, logistics provider and end receiver) can access real time data such as non-conformity reservation, loading and unloading times, estimated time of arrival, and more.

TwControl is an exception management tool with an alert system signalling key personnel in the process with messages via email or fax when certain events occur.

TwData captures data on all of the events which have taken place on the platform, including reason codes for delays and errors from all parties, giving shippers and logistics providers the opportunity to fully analyse the real reasons for delivery and delay issues.

Transwide has customers all over Europe (NL, D, B, F, UK, E, I, CH, etc). While any solution, such as Transwide's, has to create economic value and fall within the strategic requirements of senior corporate executives, we strongly believe that it has to be endorsed on an operational level. With the role of managers at business unit level becoming ever more demanding, we recognise that services and solutions have to be robust and user friendly as well as generate significant process efficiencies and visibility.

7.1.3 AXIT EXAMPLE (http://www.axit.de)

For manufacturers operating in the chemical and pharmaceutical industries and their logistics operators, automatic data exchange is often an arduous process. Transferring data on forwarding orders and receiving tracking information always means big expenditures of work and time. The logistics platform AX4 by AXIT gives the producers in these industries and their logistics operators a perfect tool - AX4 chemicals - which enables optimization of automatic exchange of data connected with dispatches performed. While elaborating on the fundamentals of the solution and then implementing it, the specific requirements of the chemical-pharmaceutical industry were taken into account, especially the need to take into consideration the data on transporting hazardous materials. Module AX4 chemicals was first implemented in the chemical concern BASF.

In the chemical market, producers who offer a wide range of products often cooperate with many different logistics operators. The cooperation consists mainly in sending big amounts of data about the delivery process. Data formats in the industry usually vary, hence it is impossible to communicate with all the operators using a homogeneous interface. The result is increasing difficulty in managing the data exchange process, caused by the necessity to use many channels of information exchange. This particular problem was the main reason to create the solution AX4 chemicals, which lets the manufacturers standardize the process

of exchanging the data related to the whole logistics process, including order information, tracking information, alerts on deviations from expected scenarios of delivery, and information on problems accompanying the delivery.

Thanks to the communication interface, enterprises in the chemical industry can transfer the data on forwarding orders directly from their ERP systems to platform AX4. Logistics operators receive them from platform AX4, using EDI, in formats adjusted to their needs. The data can be also made available using an appropriate Internet application. The operator can also, using AX4, print transportation documents generated by the platform, i.e. forwarding orders or bills of lading. The platform is used in this way for example by forwarding agents who cooperate with BASF. Each of them uses the communication interface between their system and AX4 or the Internet application, according to their own system resources. Next to the transmission of order data, AX4 offers the producers in the chemical industry a homogeneous tracking system. Thanks to the system, the heterogeneous tracking data sent to AX4 by SMS, telecenter, Internet applications or received from the existing tracking systems of logistics operators are collected and unified to be rendered accessible in the homogeneous form to the authorized participants in the chain of supply. This takes place because platform AX4 matches all the tracking reports with the original order data and makes them accessible to the mandatory in their ERP system or directly at web sites. In this way, the mandatory gets the complete picture of the situation, which remarkably facilitates delivery management process. In addition, chemical companies can offer their customers the special functionality - AX4 chemicals. Thanks to this functionality, customers can monitor all expected deliveries in process, using their own account, established on the request of the chemical or pharmaceutical company. This lets each customer optimize the process of receiving in-bound deliveries.

In order to increase the transparency of the processes in the logistics chain, AX4 offers the function of monitoring, too. Within Supply Chain Event Management, the chemical company establishes a person who receives information about exceeding the scheduled delivery time or any other adverse events. The information can be sent by both fax and e-mail. Being quickly notified about a deviation from the established delivery scenario, the dis-

patcher is able to counteract any negative effects of such a situation. Chemical companies define themselves what type of information they find important, who is authorized to receive it and in what form it is to be sent.

Using platform AX4 brings also other benefits to the companies who choose to do so. A good example is BASF, which fixes and controls dates of delivery from its third biggest in Europe chemical warehouse in Ludwigshafen. To rule out all kinds of delays and needless periods of waiting for loading, the forwarding agent is obliged to send to AX4 the estimated delivery time by SMS. This enables preparing the goods at the indicated time. The forwarding agent is informed by SMS too about the exact place (the number of the loading platform) and the exact time of receipt of the goods.

Benefits for the logistics operators who use AX4

By offering the entrepreneurs in broadly interpreted chemical industry the solution AX4 chemicals, AX4 equips them with a comprehensive system to improve data transmission in the delivery process. Cooperating logistics operators also benefit from AX4. Thanks to AX4 interface, they can exchange data with different clients without the need to build a new communication interface every time. The possibility to integrate with their subcontractors using platform AX4 is a special benefit. Although the transportation of a consignment is performed by a subcontractor, it is possible to send to AX4 complete tracking statuses, which enables monitoring the whole supply chain.

The more logistic services providers render their services to one client the more expensive transport management become. It is essential to find services dealing with various communication channels in order to pass on order data and download feedback tracking data. AX4 offers a central platform, through which one can realise order management, as well as track parcels' routes. The issues of key importance for chemical industry are taken into thorough consideration by AX4 while applications are being created.

AX4 provides producers and logistic services providers from chemical industry with the ideal platform to exchange order data and accompanying tracking information. On the basis of AXIT experience, AX4 provides the services adjusted to the pecu-

liarity of chemical branch, connected for instance with transport of dangerous materials. What is more, AX4 integrates the computer systems of co-operating partners, without a need to modify or adjust already created systems. Multilanguage interface makes AX4 an internationally applicable solution.

To achieve the above-mentioned criteria AX4 offers:
Interface to ERP manufacturer system (e.g. SAP), possible to be defined in order to facilitate central exchange of order data not only counted as items but also mass,
passing on order data to logistic services providers taking into consideration special services for chemical industry, used with dangerous material data exchange,
dangerous materials data base with an easy search function, possibility to look through tracking information from all logistic services providers co-operating with your company (complete tracking).
SCEM - continuous monitoring over the whole process.

7.1.4 ELEMICA EXAMPLE (http://www.elemica.com)

Elemica is a leading network for the global chemical industry, developed by 22 of the leading chemical companies in the world for the benefit of the entire industry.

They are one of the first networks to offer total solutions focused on improving supply chain inefficiencies. Offering a "one-stop" experience through browser-based and Enterprise Resource Planning (ERP) connectivity, Elemica represents an outstanding level of commitment and coordination. Given our considerable liquidity, reach, security and capability, Elemica is in a leadership position to drive standards and lead the transformation of the chemical industry. Our vision is that these standards will lead to significant efficiencies in the commercial process providing savings across the industry of up to $20 billion*.

The key to delivering maximum value to every chemical company in the Elemica network is a winning e-commerce solution that focuses on connectivity, neutrality and security for users.

Global Reach & Connectivity
Our 22 founding chemical companies are among the industry leaders and represent a significant percent of the buy and sell transactions, creating substantial initial liquidity. This foundation

provides financial stability and global reach for Elemica, with the ability to scale quickly. This combination will attract many additional buyers and sellers, resulting in a broad collection of potential connections for new customers.

Neutrality
Elemica is an independent company with a dedicated management team. No single shareholder has more than a 7.5 percent equity stake in the company. Elemica is designed as an open network that embraces all chemical buyers and sellers looking for an e-commerce solution to improve supply chain efficiencies. Elemica is not an "aggregator" of chemical purchasing, nor a "buyer," "seller," or "owner" of products—it is a facilitator of transactions.

Security for Users
Elemica is incorporating state-of-the-art security measures to safeguard the flow and accessibility of information so that participants' individual transaction data is not shared with any other company. We have taken security measures including highly visible firewalls and strong data protection policies, a policy of confidentiality regarding handling of customer data, encryption technology to safeguard confidential data, secured information with access limited by individual user and regular independent auditing of these policies and procedures.

Investing Member Companies
Air Products and Chemicals, ATOFINA, BASF, Bayer, BP, Brenntag, Celanese CHEMCHENTRAL, Ciba Specialty Chemicals, Degussa, the Dow Chemical Company DSM, DuPont, Millennium Chemicals, Mitsubishi Chemical Corporation Mitsui Chemicals, Rhodia, Rohm and Haas, Shell, Solvay, Sumitomo Chemical Univar

7.2 Automotive

7.2.1 VDA STANDARDS EXAMPLE:

The automotive industry has lead due to their complexity, number of partners, visibility requirements, process complexity, globalisation, and required real information needs to virtual networking. VW relates to this process in the need to get all partners in a network, exchanging information with standard messages. - Their efforts in standards set by VDA (Verband Deutsche Automobilindustrie) and Odette, this was one of the main topics discussed in the last VDA Logistikkongress in February 2004 in Leipzig.

Examples how the VDA manages standards in the German automotive industry: www.vda.de

The VDA nationally and internationally promotes the interests of the entire German automotive industry in all fields of the motor transport sector, for example in economic, transport and environmental policy, technical legislation, standardisation and quality assurance. In addition, the VDA organises, under its own auspices, the IAA International Motor Show, which is held every year. The IAA Passenger Cars is held in odd-numbered years and in even-numbered years it is the turn of the IAA Commercial Vehicles.

The members of the association are companies that operate a plant in the Federal Republic of Germany for the industrial production of motor vehicles and their engines, trailers, special bodies and containers and vehicle parts and accessories.

From these manufacturing sectors, about 510 companies with a total of 710,000 employees have joined the association. The head office of the association is in Frankfurt-am-Main. The VDA also has offices in Berlin and Brussels.

EDI work group
The objective of the work group on EDI (electronic exchange of CAx data) is to automate global data exchange processes by using international standards such as ANX and ENX (secure networks in the automotive industry, as opposed to the open WWW), ENGDAT (electronic delivery note for engineering data) and ENGPART (data format for automated partner data management). The relevant VDA recommendation 4951 has been split into sub-documents for improved transparency and ease of use (VDA 4951/1 to /4). A new sub-document on "the exchange of assembly information in the ENGDAT package" (/5) was produced. The work group also played a prominent part in the newly formed SASIG-ENGDAT working group, which is developing a successor to ENGDAT geared to the requirements of global product data management systems. The manufacturers of data transfer systems have also been participating in the activities.

CAFM work group
The work of the CAFM (Computer Aided Facility Management) group focuses on improving the scope for data transfer in the

area of computer-assisted factory planning, documentation and management. The group has developed processors for the STEP-based transfer format "STEP-CDS" and checked their quality. A quality-assurance programme based on a STEP-CDS viewer was also developed. The STEP-CDS definition has been expanded to include 3D description formats.
The project "study of manufacturer-supplier cooperation processes" was completed. Profiles, with attributes and requirements, were defined which will facilitate future cooperation agreements. VDA has distributed the project documentation as an HTML Intranet document on CD to all CAD/CAM work group participants.

PDTnet project
The CAD/CAM work group and the ProSTEP consortium (www.prostep.de) continued their joint activities in 2001. The aim of the PDTnet (product data network) project is to introduce a neutrally based (STEP) exchange facility for meta-data (non-geometrical product-defining data), thereby reducing the pressure on suppliers to equip themselves with a range of different PDM systems. The pilot projects are already starting to show results, which are being incorporated into software.

PDM data exchange work group
The work group on PDM (Product Data Technology and Communication in the OEM/Supplier Network) data exchange is cooperating at European level (Odette) in the preparation of a VDA recommendation incorporating all experience obtained to date with neutrally based (STEP) PDM data exchange. Amongst other things the methodology and experience from pilot projects will be incorporated into the existing cooperation models to promote their widespread implementation in production projects. Exchange scenarios were developed based on an analysis of present-day processes.
Collaboration in the Odette Engineering Functional Committee (O-EFC) on the Europe-wide distribution and harmonisation of national recommendations once again proved highly fruitful in 2001.
Amongst other things, experience and findings relating to the topics CAD/CAM data quality, ENGDAT/ENGPART and raster data format were exchanged and formulated as European standards. Via this committee, the European automotive industry has been able to further adapt its procedures and methods and thus also to take a strong, unified position in the global

SASIG initiative. The O-EFC members comprise Germany (VDA), France (GALIA), Luxembourg, Sweden (Odette Sweden) and Spain (ANFAC).
In addition to publication, coordination and implementation of the various regional standards at global level, further tasks were added to the work of SASIG in 2001. In two work groups it is now also looking at the topics "Product Data Quality" and "ENGDAT successor".
The SASIG members comprise Australia (FCAI), Germany (VDA), France (GALIA), Sweden (Odette Sweden) and the USA (AIAG).

The use of these standards in the German industry allows the automotive industry 1st tier to control the physical flow of goods from material supply to destination. The sending of VDA messages (EDI messages designed for the automotive industry) is key for the material forecast and ETA of arrival of materials. It gives all parties the required visibility and control on the physical, information and financial flow:

7.2.2 VOLKSWAGEN

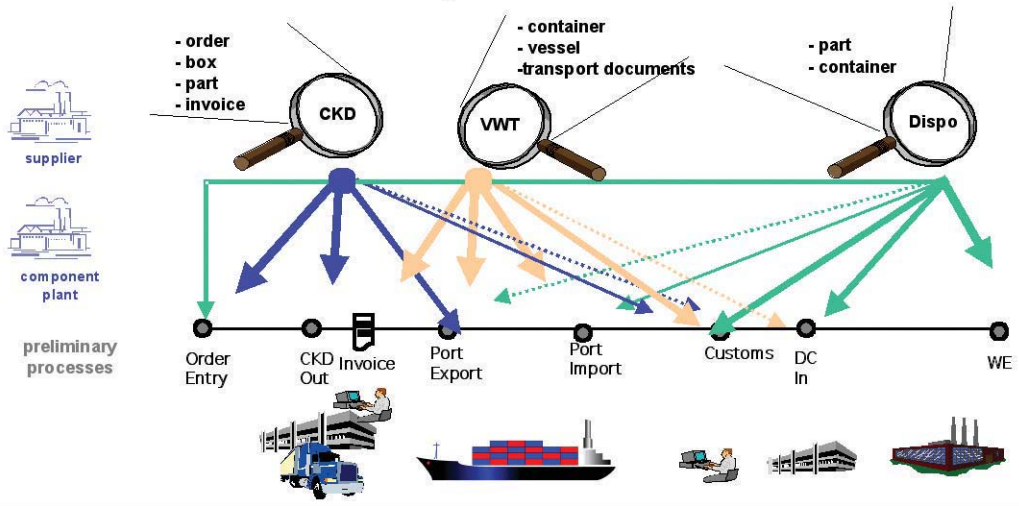
Case study: GLOBUSS Tracking + Tracing (VOLKSWAGEN TRANSPORT)
- Private Business to Business Networks

VOLKSWAGEN TRANSPORT, as a major player in the fields of transportation and logistics, is the ideal partner for all your international transportation requirements. With a Staff of 1585 employees handles complex transport, logistics and procurement processes at our Wolfsburg headquarters as well as branch-offices on every continent in managing the material and vehicle flow for all VW-Group brands, such as Volkswagen, Audi, Skoda, and Seat from our 15 locations around the world. Active in over 150 markets, Volkswagen Transport moved a volume of 9,5 million tons of material and 3.09 million vehicles last year

For the tracking + tracing of materials flows for sea transportation Volkswagen Transport created a private virtual network to allow all participant in the supply chain to track and trace containers, from origin to destination allowing transparency on the material flow and the production planning. Some slides about the process and benefits:

Functionality (1)

Different user groups have varying views to chain segments, entities and own identification keys...



VOLKSWAGEN Transport

VOLKSWAGEN AG

Introduction (1)

GLOBUSS is ...

- **The Tracking and Tracing System for the CKD -process in the Volkswagen Group.**
- **GLOBUSS provides information and views regarding orders, parts, boxes containers and means of transport for different user groups.**
- **The system is available for users in - and outside of the logistical process via the VW -Intranet by simple use of a browser (plus SECUR -ID for Internet -use) .**

VOLKSWAGEN Transport

VOLKSWAGEN AG

Introduction (2)

Objectives of GLOBUSS...

- Creation of higher transparency in the supply chain
- Higher disposition and planning certainty
- Reduction in stock and capital cost
- Allow timely reaction to bottleneck situations
- Improvement of the rate of available information
- Simplify settlement of claims
- Reduction of airfreight
- One Group-wide standard tracking and tracing system

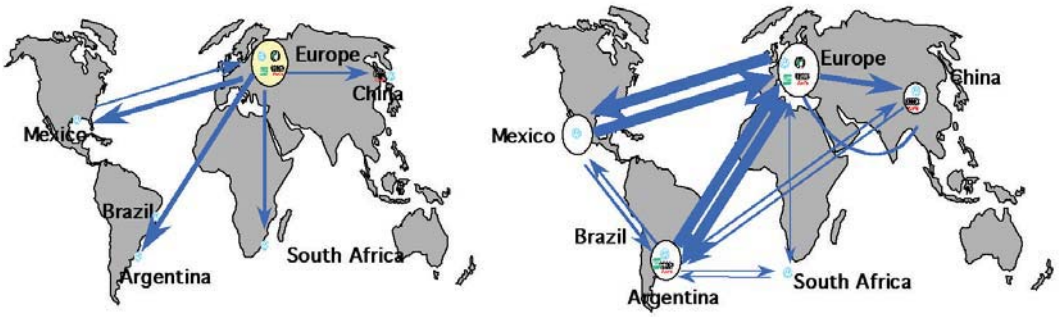
VOLKSWAGEN Transport

VOLKSWAGEN AG

Introduction (3)

Motivation - Increase of the complexity of the material flow

1997 → 2003



VOLKSWAGEN Transport

VOLKSWAGEN AG

7.3 Electronics

7.3.1 ARZOON EXAMPLE

Arzoon, www.arzoon.com, is a web-based tracking+tracing platform which processes information about the status events received by a carrier via FTP (file transfer protocol – bilateral communication of servers via internet) in bilateral defined message formats (EDIFACT) and gives the authorized user the possibility to view the status of an order on an html surface (website).

This means that the information which is available in the carrier's IT system is sent out to the Arzoon server where the data is processed into a visible way for parties which are not connected to their partners via EDI.
Solectron www.solectron.com, worldwide provider of electronic manufacturing services is using the Arzoon platform by providing its customers with status information about shipments without making necessary for them to build up an expensive and sophisticated IT Solutions.
More detailed information about Arzoon and case studies:
www.arzoon.com/pdf/EMS.CaseStudy.011218.pdf

7.3.2 DESCARTES EXAMPLE www.descartes.com

The system for visibility of business procedures in the Supply Chain provided by Descartes is also based on an interface which connects the Descartes server with the service provider (carrier). Information is exchanged in several data formats (e.g. EDIFACT, confirmation messages – standard IFTMBC, status messages – standard IFTSTA) and processed in to the Descartes visibility web interface which gives the possibility to check the status of a shipment to evaluate the performance of the service provider and to create statistics out of the databases-

7.4 Logistics Service Providers

7.4.1 TRANSFESA EXAMPLE – Private networks:

T r a n s f e s a is a Pan - European logistics operator prepared to deliver the whole range of logistics services within the logistics supply chain to its clients.
Over the past years the company has achieved an important position pro-

viding services to companies producing automobiles, undertaking their warehouse management services, consolidation, transport and distribution for the worlds leading automobile manufacturers. The company's activity is also increasing in other sectors such as chemicals, cereals, bulk freight, household appliances and other industrial freight.
Transfesa´s headquarters is located in Madrid (Spain) and, with the help of its delegations located throughout Spain and Portugal, its own offices in the main European countries and its participation in other companies within the logistics sector, fulfils all the logistics requirements of its clients who are distributed throughout the European continent.
Most of its transport volume is performed via the railways making use of the company's own fleet of 7,900 special wagons which are equipped with interchangeable axles enabling them to transit trough Europe's different rail widths thus eliminating the need of freight transhipment. Over the past ten years, Transfesa has developed its intermodal transport services and built its own fleet of more than 2,000 swapbodies.
The company's activity in road based transport services is also increasing thereby guaranteeing service standards to our clients by providing multi transport modes. In order to do so, the company uses its own fleet (250 trucks and 270 trailers) as well as sub - contracted means.
As per client requirements, Transfesa is continuously designing and developing new high capacity transport means.
1,063 highly qualified professionals work at Transfesa and at its national and foreign subsidiaries located in different European centres. The company is backed up by a powerful information system that is constantly updated in order to adapt the markets current necessities.
Quality and environmental issues are two key fundamental issues within the Transfesa culture.
All of the Transfesa Group companies have obtained the ISO 9001:2000 quality award at all their work centres and for all their services as well as the ISO 14001 environmental certification.

TOIS – Internet based client service platform.
As of April 2000, Transfesa has put into operation an Internet platform that provides a range of services to clients all over Europe via a standard Internet connection. This system is called **TOIS, Transfesa Online Information System** and provides a series of services at http://www.transfesa.com, namely:

- Complete real time information regarding all processes within the transport and warehousing cycles, online tracking and tracing of swapbodies, wagons, invoicing, freight status, etc. including information regarding estimated times of arrival and actual times of arrival reporting in a complete end-to-end logistics service.
- News and Incidences on the logistic processes monitored.
- Contact tool via e-mail or sms to reach the logistic manager responsible for the traffic with a click.
- Provides constant information 24 hours a day and 7 days a week.
- 100% standard internet compatible technology. Does not require clients - partners to adapt their systems to access TOIS information. Incorporates the strictest and most updated security measures.
- Allows for individual client and partners access under a secure connection with access to information adapted to each clients specific requirements.
- When the user accesses the platform, a certain profile is assigned to allow access to his own information and with the right permission to read only or even modify.

Tracking information in the system is being updated constantly by different sources: Transfesa's internal corporate ERP and tracking system (ANUBIS) as well as connections to different partners, European railways and GPS satellite systems.

TOIS platform is fully flexible and may be adapted to any required protocol for electronic data interchange so as to be able to communicate with a client's particular I.T. system. It incorporates various proven and available technologies to communicate with customers and providers such as:

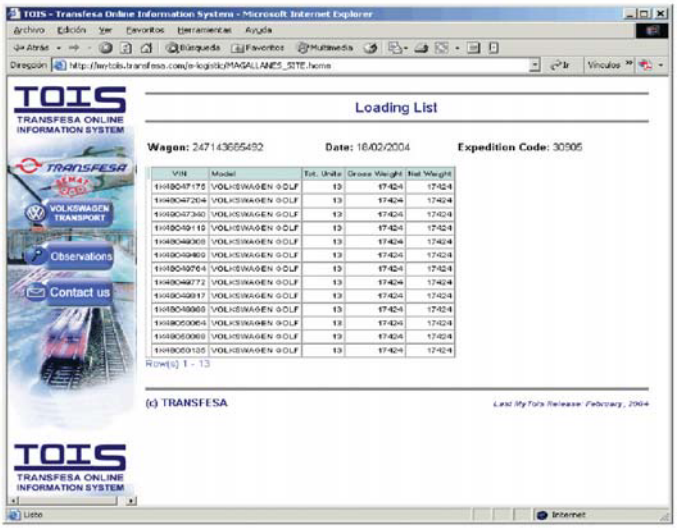
- **Interchange of In-house format files, according to big customers needs.**
- **EDI and XML**, under different standards like EDIFACT, VDA, Odette, among others.
- **Internet**, via Transfesa´s Online client Information System (TOIS) the traffic information can be directly updated with the logistic manager profile and correct permissions.

Example : Transfesa Online Information System (TOIS)

Detailed Tracking Information , integrated with corporative systems

Example : Transfesa Online Information System (TOIS)

Detailed Tracking Information , for every good transported (Volkswagen vehicles, in this case)



7.4.2 LKW WALTER EXAMPLE

LKW WALTER www.lkw-walter.com as European Road Transport Logistics Service Provider runs connections / virtual networks for different types of organisations and industries with currently over 75 big multinational partners all over Europe

Company Profile:

- A totally independent, private, Austrian family-run business
- Established in 1924
- 950 employees
- More than 700.000 FTL/year
- Provisional turnover for financial year 2003/2004: EUR 769,5 million
- EUR 15 million nominal capital of the public limited company (plc)
- First-class credit rating from international credit agencies Dun & Bradstreet: 4A1 - Duns number 30-040-4043

Core-Business:

Full truck loads throughout the whole of Europe - Your full TRUCK loads in ONE hand

For more than 50 years we have developed a powerful network of selected transport partners.
Due to the vast truck fleet of our integrated carriers and more than 2,000 swap bodies for combined road/rail transport we ensure that loading space is available, always and everywhere.

Irrespective of our customers location we organise their full truck loads all over Europe:

- within the EU (including Switzerland and Norway
- domestic transport within the EU Countries
- as well as from all EU countries to Eastern Europe, the Balkans, the CIS countries and the Middle East, both import and export

Our customers - Fortune 500 companies as well as medium and small sized enterprises across Europe - place more than 2,700 orders for FTL with us daily.

With LKW WALTER they have just ONE single partner for their full truck load transport.

We speak all Eastern and Western European languages and offer:

- Best-in-class solutions through synergies resulting from our transport services across industries
- Personal advice and efficient Key Account Management
- Quality, Safety and Environment Management (ISO 9001:2000, SQAS, SHE-report)

Getting connected

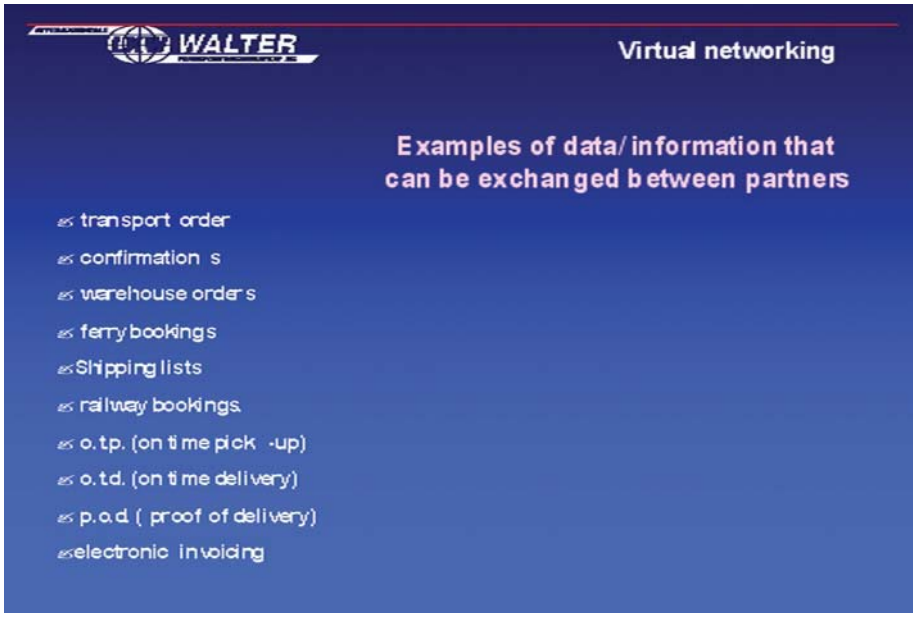
LKW WALTER is key player in the "European Virtual Environment".

- B2B-Connections with more than 75 multinational companies and their subsidiaries across Europe.
Optimal solutions- For small and medium sized customers we offer an interface via www.lkw-walter.com - available in 25 languages!

.... Our approach is to avoid double-data handling minimise all possible steps of manual entering, fax or phone ordering.

Virtual networking allows maximising added value to customers, minimising human error and sharing information with our partners in the Supply Chain.

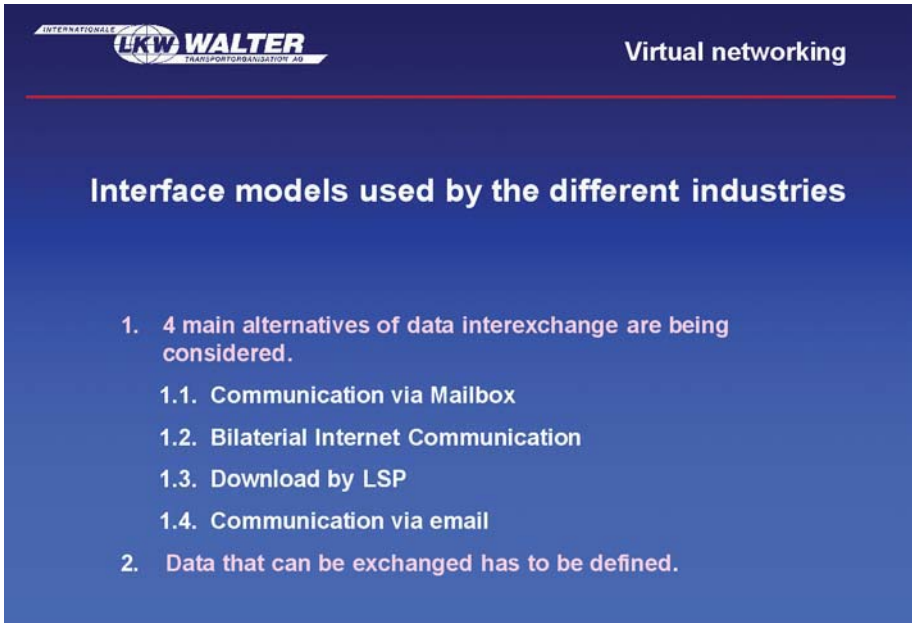
Type of information being frequently exchanged via EDI / XML:



Implementation depends on the level of integration of all the supply chain players thus the IT-Systems of LKW WALTER are designed to ensure 100 % connectivity with all existing standards.

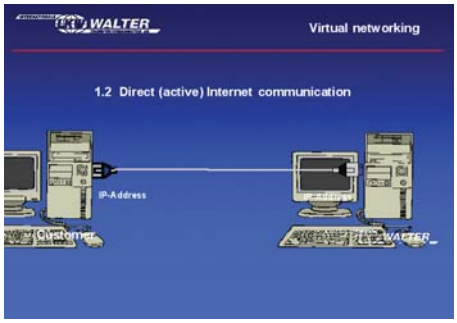
.... Standards being used based on industries mainly for multinational companies and its integration with supply chain partners: Automotive: VDA, Chemicals: CIDX, FMCG mainly EDIFACT and XML.

.... Four types of interface models used by the different industries are: Shippers decide which system is to be used: we integrate ourselves as partner in the supply chain.



Data exchange via EDI / XML...
Virtual networking LKW WALTER (2003)

Exchanges:	513.000	Electronic messages (EDI / XML)
	110.000	Transport orders
	80.000	Completion confirmations
	209.000	Ferry bookings
	9.000	Electronic invoicing



....additionally small and middle size customers and our integrated transport partners frequently use the multiple functions of www.lkw-walter.com **for e.g**

Online information service for all partners in the Supply Chain at www.lkw-walter.com:

- CMR Information (general information)
- The truck: technical information about payload, weight, measures
- Updated information about public holiday and driving restrictions in Europe
- Weight restrictions across Europe
- Incoterms
- Transport insurance (information and online registration)
- Distance finder (map&guide)

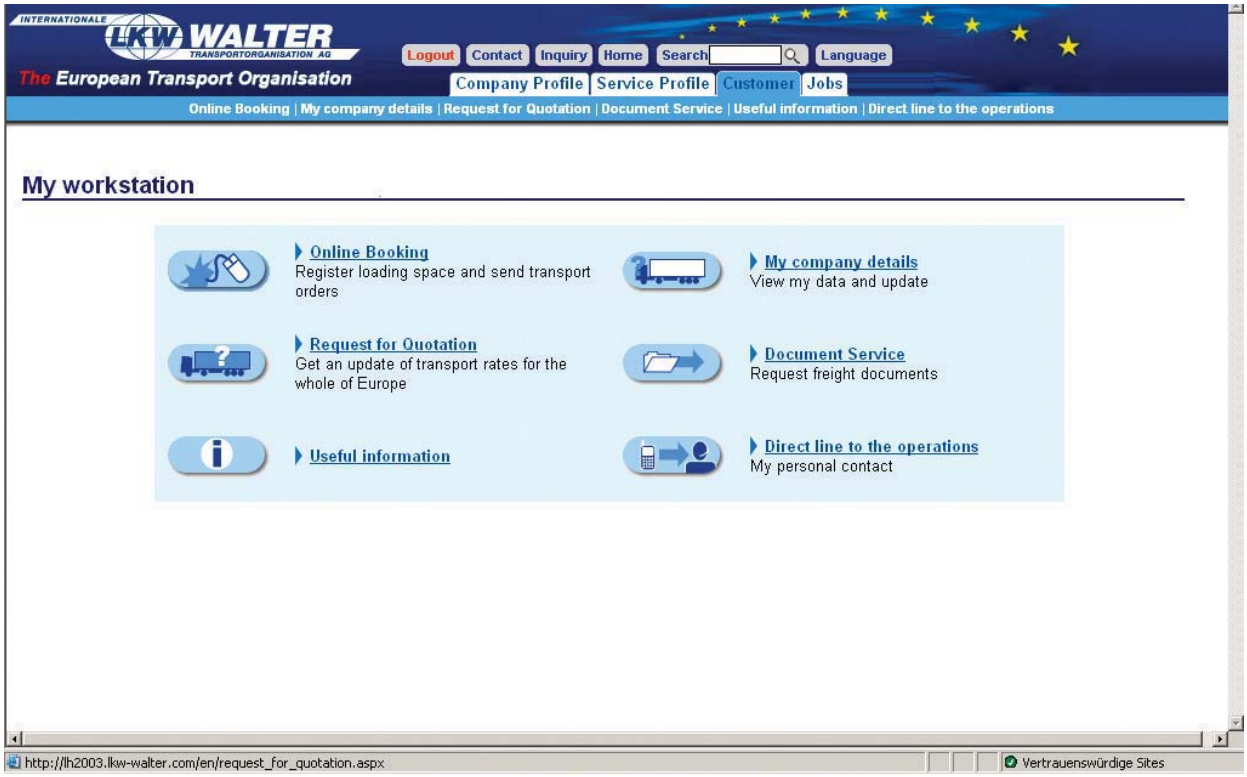
❖ Direct line to the operations

Added value to Customers:

❖ Online booking via internet

❖ Document service
  - Requirement of PODs
  - Shipment overview (different functions)

❖ Request for quotation



Added value to integrated transport-partners:

- Web-enabled fleet management
- Account-status
- "Today's loads"
  - Order Management + Planning
  - 24 hrs connected to our integrated partners
- Registration / Information of empty trailers
- Direct line to the operations

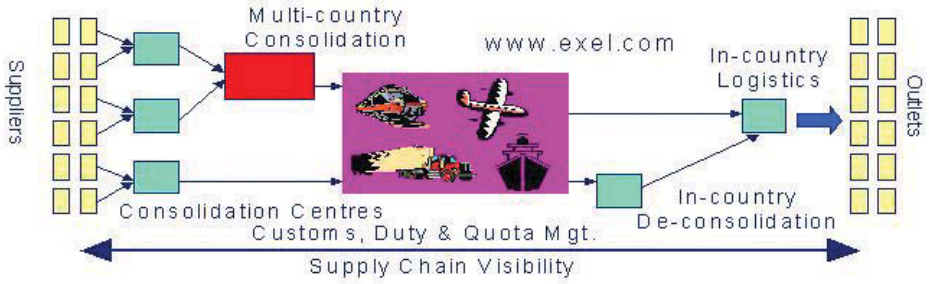
7.4.2 VISIBILITY EXAMPLE EXEL:

The emergence of one-stop shop and total operational visibility

Customers are looking for fewer partners to provide all of their F&D services and electronically give them visibility of such activities.

Visibility(example Exel):

- Allows customers to limit uncertainty, and gain both predictability and confidence in their Supply Chains
- Can have a dramatic impact on Supply Chain performance – service improvement and cost reduction



7.4.3 DUPONT'S GLOBAL VISION - "TRANSOVAL,"

(Originally the name of DuPont Europe's logistics operations group, is now a registered Web site domain owned by DuPont.) The portal hosts the exchange of logistics data among employees in one business unit with 50 motor carriers and will expand markedly. The portal—dubbed "TransOval"—will manage all of DuPont's global freight movements, both inbound and outbound, via ocean, rail and air as well as truck. "TransOval was created to address the need for improved decision-support information globally... TransOval will provide integrated logistics decision-support information and visibility across the entire supply chain."

Benefits expected

Information exchanged between customers and suppliers, increased transport security, reduced inventory levels, decreased freight costs, improved operational efficiencies, and superior customer service.

How does it work?

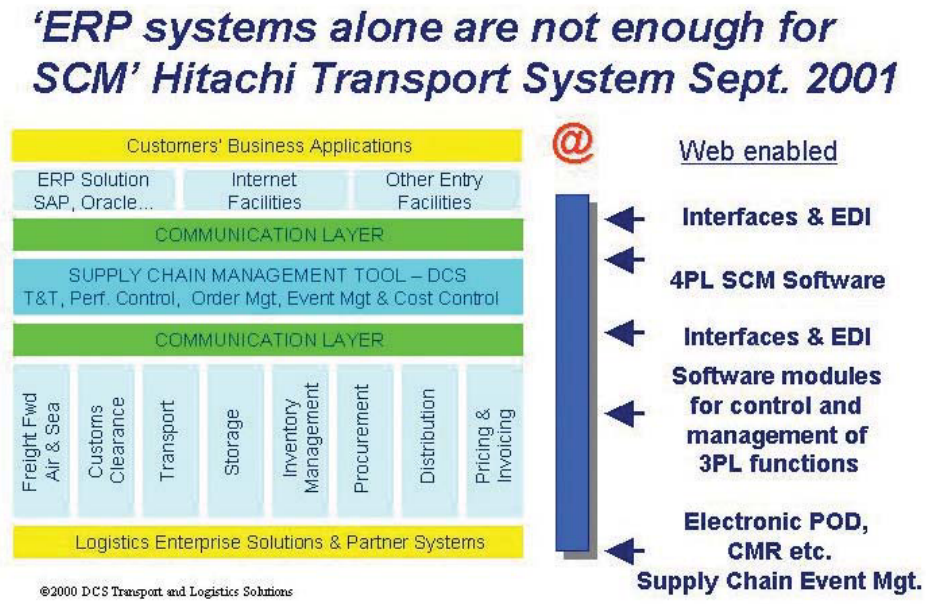
When fully implemented, TransOval will include

1. **Logistics order management --** integration of order management systems that exist among DuPont's global businesses.

2. **Shipment planning and optimisation --** including routing and carrier usage.
3. **Execution --** two-way communication between TransOval and DuPont's business partners.
4. **Financial settlement --** freight payment and cost allocation

The private exchange today is incorporated into the company's extranet, with a firewall for safety between the company's computers and the Internet. "TransOval creates an umbrella Web site under which links everything to do with logistics.

7.4.4 HITACHI TRANSPORT SYSTEM



7.5 Examples from the Air Cargo Industry

Today, there are three virtual networks in the global air cargo industry:

- Cargo 2000: a quality management and standardisation initiative
- GF-X: a trading platform for airfreight carriers and forwarders;
- CPS, a portal with multi-carrier booking and shipment management facilities.

Both GF-X and CPS run on propriety IT platforms and are more or less competing initiatives. Cargo 2000 does not operate on an IT platform, but is a virtual cooperation between air carriers, air freight forwarders and air cargo handling companies. Below, we will briefly describe each of these initiatives. Cargo2000 (C2K)

About Cargo 2000[4]

Cargo 2000, an IATA Interest Group, brings together some 30 major airlines, freight forwarders and ground handling agents with the unique goal of implementing a new quality management system for the worldwide air cargo industry. Their objective is simple: to implement processes, backed by quality standards, that are measurable and supported by data, thereby improving the efficiency of air cargo, enhancing customer service levels and reducing operational costs.

The largest process improvement initiative in the air cargo industry

Based on detailed customer research and with the assistance of leading IT companies, the group has re-engineered the transportation process from shipper to consignee through a "Master Operating Plan". This Master Operating Plan is at the heart of an industry-wide process control and reporting system which in turn drives the corrective action systems. The key to the Master Operating Plan is the creation of a unique "route map" for individual shipments, which is then monitored and measured throughout the life of that shipment. Implementation of the project is divided into three phases.

- Phase 1 provides for post shipment audit of the airport-to-airport movement at a master air waybill level (MAWB). Once a booking is made, a route map/plan is automatically created with a series of checkpoints containing events and scheduled times for events against which the movement is managed and measured. This enables the system to alert the Cargo 2000 member to any exception to the plan, allowing the relevant airline or forwarder to pro-actively respond to customer expectations.
- Phase 2 provides for interactive monitoring of door-to-door movement at house waybill level (HAWB);
- Phase 3 provides for real-time management of the transportation channel at individual piece level.

Cargo 2000 members are:

Air Canada, Air France Cargo, Alitalia Cargo, American Airlines, Austrian Airlines, British Airways World Cargo, Cargolux Airlines International, Cathay Pacific Airways, DHL Danzas, Delta Air Logistics, Exel, Geologistics, Korean Air, Kuehne & Nagel, KLM Cargo, Lufthansa Cargo, Nippon Cargo Airlines, Panalpina, Polar Air Cargo, SAS Cargo, Schenker, SDV/SCAC, Singapore Airlines Cargo, SwissWorld Cargo, Trans-Trade Inc., United Airlines, Yusen Air & Sea

(4) Source: www.cargo2000.com (additional information available).

Cargo 2000 industry associate members are:
AF Logistik, Menzies Aviation, Riege Software, Swissport, World Flight Services.

The next text box provides detailed information about some backgrounds and procedures of Cargo 2000.
Cargo 2000 – improving the quality of air cargo[5]
When the issue of 'Quality' arises, businesses in most industries tend to divide themselves into one of three camps: non-believers that see no tangible value in the pursuit of quality, 'lip service' contingent that talk about the importance of quality but do little or nothing to deliver it and those that recognize how vital quality is to the future of their business and are prepared to make the necessary commitment to achieve improvements for themselves and their customers. When Cargo 2000 first began to talk about a new quality management system for the air cargo industry, the reaction from within the industry was mixed. Even today, many organisations outside of Cargo 2000 do not fully understand what we are working towards, why it is so important that we achieve our objectives and the progress we have made.

What does Cargo 2000 do?
Cargo 2000 requires that every shipment be booked. Once a booking is made, a Route Map is automatically created with checkpoints to control the shipment and make sure it moves to meet the service commitment to the Shipper. The ultimate goal is to control the movement of freight door-to-door with bar-coding and scanning at unique piece Level. To achieve this, Cargo 2000 designed a phased implementation program:

- Phase 1: Airport to Airport – Shipment Planning & Tracking at MAWB level
- Phase 2: Door to Door – Shipment Planning and Tracking at HAWB level
- Phase 3: Door to Door – Shipment Planning and Tracking at individual piece level – Document Tracking.

What is a Route Map and how does it work?
The Route Map is a Plan to 'Deliver on Time', 'As Promised to the Customer'. The concept is quite simple: Based on your service commitment, you will select a flight or a service. After booking with the airline, the plan will be created. It will indicate the times

(5) Editorial by Ron Cesana, Project Director, Cargo 2000 (© Cargo 2000, initially published in 2002, updated in July 2004).

at which certain critical events must happen in order to fulfil the commitment to the customer. In many respects, this is on a par with a passenger travelling to a destination for an appointment: what time is my departure, what time do I have to be at the airport, when will I reach my destination, what time will I be out of Customs so that I can make it to my appointment. That is exactly what the Route Map manages by establishing the exact times events need to happen – and ensuring that they are completed on-schedule.

Unlike a passenger, of course, cargo cannot speak so the route map contains an 'alarm' system to issue alerts when there is a danger of a milestone being missed. This allows for a pro-active response to fulfil the customer expectation. The great thing about this technology is that it also provides valuable data on everything that happens and this is where Quality kicks in.

Why do we (the air cargo industry) need Quality?
The answer is simple: because Customers want us to have a Quality System. It is the language they speak and understand. Customers want to know when something goes wrong and, above all, what we are doing about it. Customers are tired of statements not backed up by data. Instead, they want us to have a solid and systematic corrective action system so that the same error does not happen over and over again. For those reasons, we need Quality Standards because it can gain significant efficiencies by improving the way we do business.

What does the Quality System do?
It measures everything. Cargo 2000 has standardised the way Route Maps are created, what is measured and when. It is forcing members to improve. You need to measure performance in order to know where you are and how to improve. We have already seen considerable improvement since we started the Implementation of Cargo 2000; Corrective Action, Preventative Action, Continuous Improvement, Best Known Methods, KPI (Key Performance Indicators) and so on…. are a series of words that will become part of the front-line employee's 'day to day' terminology. Performance reports are a requirement for Cargo 2000 and will eventually allow benchmarking.

Where are we now?
Phase 1 of Cargo 2000 is ready and in operation. Members have

been certified at 250+ locations. Together, they service 65 cities and 4,000 individual trade lanes worldwide (vs. 400 a year ago). These airlines are monthly reporting over 47,000 MAWBs and approx. 180,000 HAWBs. Their flown as booked & delivered performance has improved substantially with many reporting 95%. In all, we are doing things faster, better, cheaper.
Phase 2 is ready: two members started implementation & measuring over 90,000 HAWBs a month.
Phase 3 specifications will be finalized soon and Cargo 2000 has met with EAN to discuss the EAN 128 standard for our unique piece level barcode. We continue to seek and participate in meetings with worldwide shippers' councils to work on establishing common KPIs.

Cargo 2000 is still work in progress – but we are making significant progress that can ultimately benefit all quality organisations in our industry. Cargo 2000 aims to its greatest benefit from improving the quality of service the members provide for shippers. The European Shippers' Council stated at Cargo 2000's AGM in Paris: 'We remain convinced that Cargo 2000 is the body to implement a global standard having identified all of the critical activities in the cargo chain. We see one standard, an industry standard, a Cargo 2000 standard.'

Global Freight Exchange – GF-X

About GF-X

Global Freight Exchange (GF-X) aims to transform the $50bn airfreight sector through the development of a neutral trading platform for airfreight carriers and forwarders.

Founded in 1998, GF-X's progress has been driven by its commitment to a core set of values and skills: neutrality, professionalism and an emphasis on helping its clients manage and negotiate e-commerce implementation.

The solution is a sophisticated platform that enables forwarders to secure capacity with major carriers quickly, simply and in a cost effective way. This delivers substantial operating efficiencies, faster transactions, dynamic pricing and access to a wider range of global transactions for our clients. GF-X has the potential to deliver hundreds of millions of dollars of benefit to the airfreight industry.

Industry views on GF-X:

- "Air France Cargo has decided to join GF-X to benefit from the most advanced electronic marketplace in the industry. This will help us to make our differentiated product offering electronically available to the leading international forwarders" (Marc Boudier, Executive Vice President, Air France Cargo).
- "This system works well. We're seeing regular growth in the numbers of electronic bookings and we're very enthusiastic about people booking over the Internet" (Mark Najarian, Vice President of Sales and Marketing, American Airlines Cargo).
- "In the often challenging world of airfreight, we believe that GF-X and its member participants can bring about change. We are pleased to include this ongoing initiative as a key part of our e-commerce strategy" (Ram Menen, Director Cargo, Emirates).
- "In the future we will be working even more closely together with GF-X and our forwarders in order to drive the migration to e-business in the air cargo industry" (Andreas Otto, Member of the Executive Board of Lufthansa Cargo).
- "We believe that GF-X represents an opportunity to improve and standardise our business processes worldwide. This will save us valuable time, which we can then spend on delivering an excellent service to our customers" (Thomas Mack, Vice President Air Freight, and Schenker).
- "GF-X is the only e-commerce provider with a live system that is integrated with carriers and has both the detailed functionality and the change management focus required to drive out benefits for the whole industry" (Gunter Rohrmann, Head of Global Customers, Danzas Group).
- "The new booking functionality will drive real benefits for forwarders & carriers by eliminating the monthly faxes and phone calls between carriers and forwarders and ensuring accurate data sharing and alerts" (Roland Bischoff, Global Airfreight Director, Kuehne & Nagel).
- "I think we have now established that this is THE platform for the industry" (Bruno Sidler, President and CEO, Panalpina).

Early 2003, GF-X announced full compliance with Cargo 2000 (see press release in text box).

GF-X to deliver full operational visibility to meet Cargo 2000 requirements - First pilot launched with British Airways World Cargo and Descartes Systems

20 January 2003 - Global Freight Exchange (GF-X) is to offer existing and future customer's full operational visibility of their goods in transit alongside its existing bookings processes to meet all of the requirements of Cargo 2000's new quality management system. The first pilot to integrate operational visibility and booking processes will begin in the early part of this year involving air cargo carrier, British Airways World Cargo with CDMP (Common Data Management Platform) services provided by The Descartes Systems Group Inc. and its wholly-owned subsidiary, DSG-Tradevision. GF-X expects similar agreements with other CDMP operators to provide customers with a choice of ways to access operational data.

Commented Manuel Pietra, Descartes co-chief executive officer and president, "We are pleased to play a key role as one of the first CDMP service providers to integrate operational visibility and booking processes with GF-X.
Providing the solution to our customer, British Airways World Cargo, will give the carrier full visibility of shipments from booking through to final delivery on the GF-X system." In the future, customers will be able to make a booking via GF-X and link to their preferred CDMP provider for full access to shipment visibility. If a user is not a customer of the CDMP operator concerned, they will still be able to obtain a summary of key milestones on the status of their booking.

Les Howell, Manager Supplier & Systems Management, for British Airways World Cargo said: "BAWC is a strong supporter of both GF-X and Cargo 2000. Linking GF-X online selling with DSG-Tradevision online shipment performance provides us with an excellent opportunity to expand the integrated e-services that we offer our customers".

Demetrios Zoppos, Managing Director of GF-X, said: "It has always been our intention to provide a combined bookings and operational visibility solution because we clearly recognise the value to our customers of doing so. However, we believe customers must be free to choose who provides them with operational visibility. We plan to integrate our service with multiple CDMP providers for this purpose."

Cargo Portal Services - CPS

About CPS[6]

Unisys-operated Cargo Portal Services (CPS) is a full-service Internet portal for the air cargo industry providing:

- Neutral multi-carrier booking facilities, in-line with agreed rates and allotments;
- Cargo 2000 pro-active shipment event management and tracking in-line with industry best practice;
- And computer system-to-system communications for better integration between forwarders and carriers.

CPS is free to forwarders, is secure because information is confidential to each registered user, and is global as it links directly with the carriers' central systems.
Featuring Air Canada, Austrian Airlines, KLM Royal Dutch Airlines, Northwest Airlines and United Airlines, and operated by Unisys, CPS is open to all carriers and forwarders on a neutral basis.

On February 26, 2004, CPS processed its first system-to-system freight booking. As of July 2004, over 2,290 branch offices of 1,194 forwarder companies in 41 countries are on-line with CPS. CPS carriers serve 430 cities in 117 countries.

The next text box provides detailed information about CPS

CPS in detail[7]

CPS aims to offer forwarders a neutral automated way to work with multiple carriers and gain improved shipment visibility. Carriers can simplify business processes and raise service levels by pro-actively managing shipments in line with key performance indicators in line with Cargo 2000.

Today, business between carriers and forwarders is mostly based on multiple phone calls in order to review transportation options and book services based on price, service and availability and to track shipment status. This involves many phone calls, most of which can easily be replaced by providing visibility of capacity, allotments and shipment status to forwarders through the Internet.

---

(6) Source: www.cargoportalservices.com
(7) Abstract from CPS brochure.

Bookings made electronically through a forwarder's own system or a web page should be immediately confirmed to avoid disputes and then to drive pro-active shipment management processes with on-going status updates. All of these services should be integrated to reduce process duplication. Carriers need to balance the need to differentiate themselves from their competitors with the need to work with competitors to offer critical mass and neutrality. They also need to collaborate to share the costs of common development, operation and promotion.

Internet technologies can replace legacy Cargo Community Systems and XML replaces or builds on EDI. These design principles are shaping the way organizations do business globally, reducing costs and providing greater flexibility – key requirements for today's logistics service providers. Based on current applications and with new developments, CPS delivers value to carriers and forwarders, while building on the investment each has made in their own core operational systems.

Functionalities:
The services and carriers available to each user can be set and maintained through profiles.
Each forwarder has a profile through which they can control access to carrier services and to individual users within their enterprise. Each carrier has their own profile through which their administrator can control the key aspects of their business available through the portal.
At the lowest level, individual users have a profile that records their preferences and settings and which is used to pre-fill regular information where appropriate.
Any user can view schedules and view flight and shipment status information. Subject to authority being granted by the carrier administrator, users of the services can also view private allocations or free space availability, view rates, make new bookings and manage existing bookings.

Once a shipment has been booked, a set of key time-based milestones is automatically generated covering key milestone events processed by carriers and their ground handlers. These are used to continually track shipments booked electronically against plan and pro-actively alert any exceptions so that remedial action can be taken early. In this way, the services can promote more time-definite shipments and reliable deliveries.

Context sensitive on-line help is available at all times to help users operate the services fully. Information is tracked electronically to build up intelligence, though all information is treated as proprietary to each participant other than when aggregated across multiple organizations.

CPS is available through a WWW browser with security enabled and via system-to-system links to keep the host systems of carriers, handlers and forwarders synchronized. Integration for users of the Unisys carrier enterprise system (LMS) is straightforward as it includes the XML interfaces required. For carriers running other systems and for forwarders, an interface guide is available that describes the various interface options available.

Use of the CPS services is free for forwarders. For carriers, a key aspect of the services is that they use the Internet to reduce communications costs. A community governance body representing all carrier participants and with forwarder representation allocates a development fund for enhancements that is built up from service charges.

Cargo 2000, GF-X and CPS are complementary virtual networks
Carriers and forwarders can choose to participate in all of the initiatives presented in this paragraph and e.g. KLM Cargo does so. A holistic view on the combined use of each of these 3 air cargo platforms is expressed in an article in Payload Asia[8] based on an interview with KLM Cargo senior management:
If alliances are one area where KLM has finally resolved a period of uncertainty, e-booking is another. For some time KLM Cargo has refused to commit itself to either the Global Freight Exchange (GF-X) or Cargo Portal Service (CPS) online booking solutions, with Wisbrun instead stressing "connectivity" - preparing KLM Cargo IT systems and processes to be able to work with whatever solutions the customer requires. Now it has effectively come off the fence by agreeing to work with both platforms, the first carrier in the world to do so. It has been an open secret for months that KLM Cargo was trialling bookings through GF-X with certain big European forwarders, and it has now come out into the open about the trials. Though it has not formally joined yet, Bram Gräber, senior vice president commercial for KLM Cargo, admits that "it is inevitable that by extending the pilot, we will become members

(8) www.payloadasia.com, *November 2003*

sooner or later." At the same time, Gräber reveals that KLM Cargo will also be offering its capacity on CPS. "It has 600 forwarder offices who would like to use the application, so it would be foolish to deny them," he says. Adds executive vice president of KLM Cargo Michael Wisbrun: "If you talk to forwarders, they might be using GF-X in Europe and CPS in the offices in the US. Our customers are on both and so we have to be. The dialogue with the customer is always the dominant force in our behaviour.

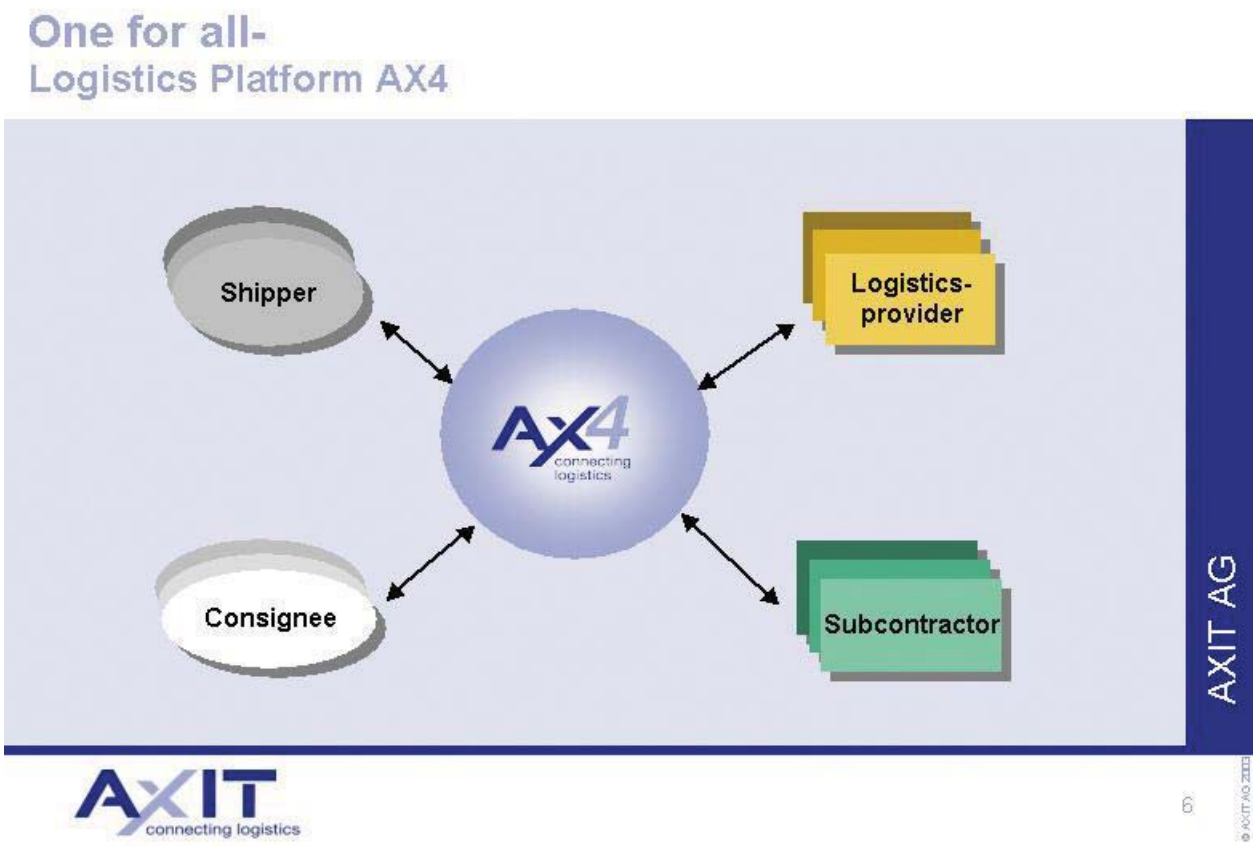
All of this is not an abandonment of the connectivity approach, but the result of it, Gräber insists. "We spent a lot of time developing our own internal booking tool, a cumbersome and expensive project, but since we have had that, it is not so difficult to work with other platforms," he says. Last but not least, after its early scepticism, KLM Cargo has become an enthusiastic participant in Cargo 2000. "We are proud that we are the largest provider of measurements to Cargo 2000," Gräber says. It is also about to unroll a new status messaging tool which will allow forwarders to customise the way they get status messages from KLM Cargo. The new system will allow forwarder to select what messages they wish to receive and where they wish to receive them, whether into their systems or onto their desktops. Pilots of the new tool will start in January

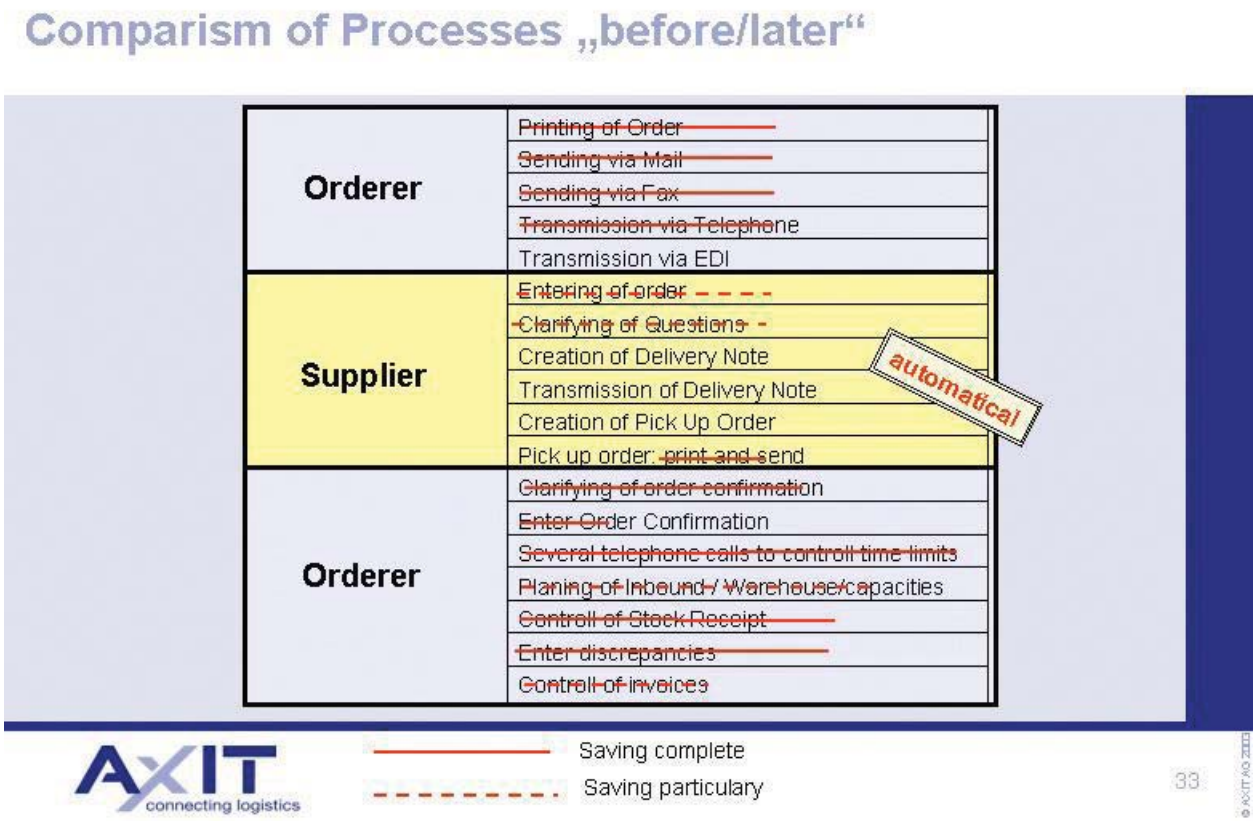
Instead stressing "connectivity" - preparing KLM Cargo IT systems and processes to be able to work with whatever solutions the customer requires. Now it has effectively come off the fence by agreeing to work with both platforms, the first carrier in the world to do so. It has been an open secret for months that KLM Cargo was trialling bookings through GF-X with certain big European forwarders, and it has now come out into the open about the trials. Though it has not formally joined yet, Bram Gräber, senior vice president commercial for KLM Cargo, admits that "it is inevitable that by extending the pilot, we will become members sooner or later." At the same time, Gräber reveals that KLM Cargo will also be offering its capacity on CPS. "It has 600 forwarder offices who would like to use the application, so it would be foolish to deny them," he says. Adds executive vice president of KLM Cargo Michael Wisbrun: "If you talk to forwarders, they might be using GF-X in Europe and CPS in the offices in the US. Our customers are on both and so we have to be. The dialogue with the customer is always the dominant force in our behaviour.

All of this is not an abandonment of the connectivity approach, but the result of it, Gräber insists. "We spent a lot of time developing our own internal booking tool, a cumbersome and expensive project, but since we have had that, it is not so difficult to work with other platforms," he says. Last but not least, after its early scepticism, KLM Cargo has become an enthusiastic participant in Cargo 2000. "We are proud that we are the largest provider of measurements to Cargo 2000," Gräber says. It is also about to unroll a new status messaging tool which will allow forwarders to customise the way they get status messages from KLM Cargo. The new system will allow forwarder to select what messages they wish to receive and where they wish to receive them, whether into their systems or onto their desktops.

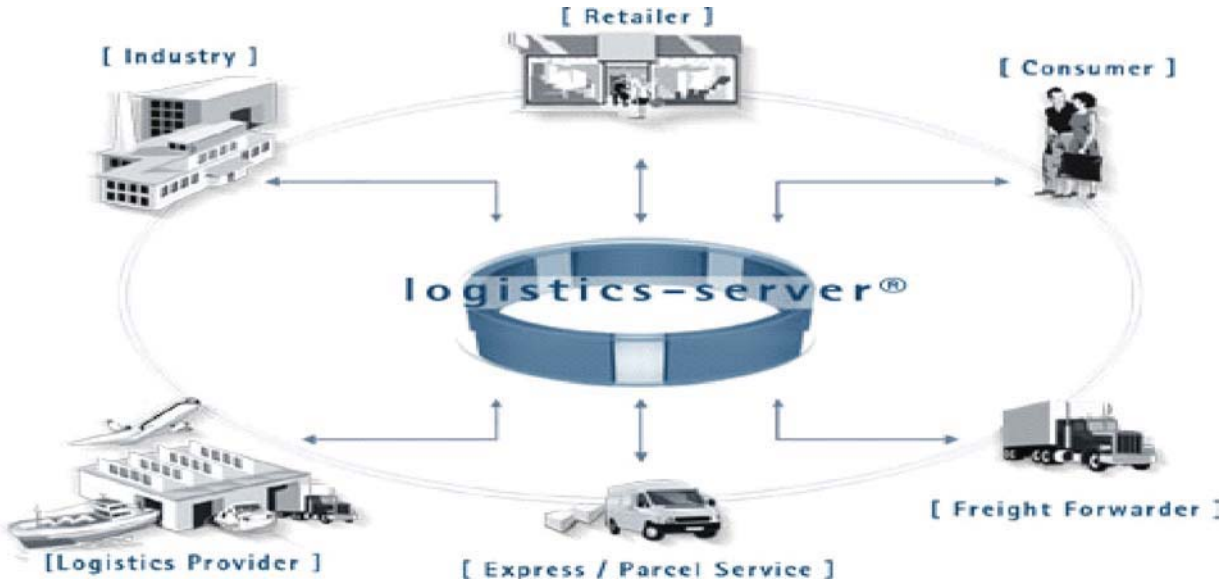
Logistics Platforms – Examples 7.6

7.6.1 AXIT – AX4 www.mylogistics.net/de/ax4/ax4.jsp





7.6.2 Inet – logistics www.inet-logistics.com




Distribution logistics
Challenges
Lack of information flow
Both shippers and logistics service providers use their own individual IT-solutions
Only occasional linking-up of logistics service providers using individual solutions
Technical system integration is time-consuming and expensive
High administrative expenditure
Multiple manual data recording due to missing communication media
Additional manual data recording due to insufficient automation
No uniform placing of transport orders (diversity of transport documents)
Insufficient process monitoring
Often missing and insufficient status reports from logistics service providers
No information in case of deviations
Page: 2
3009.04

7.6.3 Transwide www.transwide.com/en/logistics.html

Transwide supports the logistics provider in every step of the transportation cycle.

- Has receipt of the transport order been confirmed?
- Did the driver arrive on time and did he collect the goods without delay?
- Was the shipment exactly as specified and undamaged?
- Did the vehicle arrive on time and did he deliver without damage or delay?
- Who is liable for the vehicle being delayed?
- What happened with shipment X of last month?

These are critical business questions which each shipper should be able to answer in real time? Only then will logistics providers be able to understand where service improvement opportunities are and how processing can be reduced.

Transwide's unique suite of products and services enhance the way that logistics providers interact, communicate and report with their customers. Electronic communication ensures that you have the answers to your questions real time. Our solutions do this by electronically facilitating and improving processes:

- Transport order receipt/confirmation
- Load subcontracting
- Shipment status reporting
- Transport documentation issuance, visibility and audit
- Customer delivery status notification and proof of delivery
- Performance data capture for real time and historic analysis

See your benefits

7.6.4 *LINE – Logistics Information Network Enterprise*
www.portsnportals.com/system.html

Twenty-first century supply chain management is all about speed, efficiency, cost reduction, connectivity and collaboration. Progressive manufacturers are looking for compressed cycle times and increased information flows. The supply chain management systems of the past were not designed to operate in this changed environment, but new technologies have been created to meet these new demands.

LINE's collaborative logistics solutions offer significant improvements in efficiency and savings in time and cost for sourcing goods and services. They provide the visibility and connectivity needed to deliver closer cross-functional and cross-enterprise integration in real time, both inside and outside the organization. The result? Better business decisions.

LINE's solutions help break down the walls between diverse participants in the supply chain. Where products were once designed for ease of assembly, today they can be designed for optimum supply chain efficiency.
Through the power and speed of the Internet, you can capture a wide range of supplier data and manage all your suppliers better with more detailed information on capacity and service levels.

Many virtual platforms in transport & logistics vanished _____ 7.7

After the collapse of the Internet hype, many people started questioning the viability of online marketplaces.
Although they are increasingly accepted as a fact of business life, they are reserved about arranging physical delivery of the goods they trade.

Still, some of the very few web based transport & logistics platforms and market places which are still alive, are forming links with carriers or freight exchanges, reports analyst Marcia MacLeod[9] (see box):

(9) *Source: e.Logistics Online,* www.elogmag.com

"In theory, industry exchanges (or portals or marketplaces or whatever else one calls them) are great. Buyers can source new suppliers; vendors can reach new customers; new and existing trading partners can improve communications and shorten the supply chain. But there is one very important element missing from most exchanges: freight. How do businesses buying through an exchange get their purchases delivered? In case regular relationships are insufficient, a buyer - or seller - could go on to one of the many freight exchanges or auctions. In the deep-sea shipping world, for instance, they could use CargoSmart, GT Nexus and INTTRA, while for finding and contracting carriers they could try Freight Traders. Yet none of these, as far as we know, is yet linked in to another industry exchange - for instance, the exchanges for apparel, electronics, fast-moving consumer goods and so on. Various marketplaces are talking to freight companies or freight exchanges. The chemical industry is particularly interested in forming relationships with freight companies that can handle hazardous goods. CargoSmart has said it is "actively pursuing" partnerships with other industry exchanges and can "see value in this type of collaboration," but nothing has yet been cemented.

There appear to be several reasons why freight is being left out of the marketplace equation: volumes through many of the exchanges are still low and many exchanges are still too tenuous to be very attractive, which may be why some have such small volumes in the first place. Freight companies, whether in portals or not, want to do business with stable exchanges, the type of company they would wish to be associated with in any case. Since the whole marketplace concept is still fairly new and not well developed, many exchanges are more concerned about attracting members and getting them trading than in broadening the range of services they can offer. Originally public exchanges looked at offering a broad range of services, but because the business isn't coming, people became sceptical and the focus began to narrow, which is why more companies are turning to private exchanges."

Others have also developed in other ways than originally planned. E.g. Cargo 2000 was initially aiming to set up an IT network for exchanging air cargo performance data but restarted a few years ago and is now aiming to provide a quality management system.

Many are quite inactive or have totally vanished. Therefore, and in order to assess the status of virtual networking in Europe, the EF&L working group Virtual Networking started analysing 60 web based transport & logistics platforms and market places without a specific commodity focus. Most of these web addresses visited were listed in the F&L report "The impact of a virtual forwarding environment" published in 2001.

The results were astonishing: only 8 of the 60 sites visited are actually (or seemingly) still in business. All results are specified in three tables (details under Appendix II)

- 8 sites are apparently active market places and portals with exchange functionality;
- 26 sites are inactive (still there, but without any evidence of recent use);
- 26 sites are closed or irrelevant (effectively out of the exchange business).

8. Appendix

8.1 Appendix I - Supply Chain Processes

There has been –and there still is- confusion on what type of (sub) processes to include in Supply Chain Management (SCM). The Council of Logistic Management (CLM) defines Supply Chain Management as the management and control of all material, funds and related information from the acquisition of raw materials (supplier's supplier) to the delivery of finished product to the end user (customer's customer). For our project, we will follow this definition, which implies that SCM includes transportation and warehousing, on site logistics, order handling, demand planning, procurement and finishing/packaging. In addition, we pursue an integrated chain vision on SCM, as virtual networking pre-eminently focuses on external collaboration (rather than a mere enterprise vision on functional, process or integrated company supply chain issues and developments).

This survey focuses on the following supply chain processes:

Order management process:

- Means of communication for customers orders & status feedback: (use of telephone, fax, e-mail, EDI, dedicated networks, Internet, portals)
- Use of trading exchanges & auctions
- Participation in e-collaboration programs (direct, via external hub, ERP to ERP connections)
- Automatic replenishment orders (consignment fills, VMI fills…)

Inventory & warehouse management process:

- Real time visibility of finished goods
- Vendor managed Finished goods Inventory
- Real time product availability to promise (against scheduled production) to customers
- Real time visibility of raw material inventory for your suppliers
- Supplier or vendor managed raw material Inventory

Demand & Supply Planning process:

- Means of communication to call off supplies/services
- Sharing of forecast with customers and suppliers/service providers via networks
- Integration of supply to demand process (from order to delivery)

- On line demand visibility: internally and to suppliers/service providers
- Collaborative planning with customers and suppliers/service providers

Supply Chain event management:

- Use of track and trace throughout supply chain process
- Exception handling: manual or triggered automatically when events are outside predetermined windows

Distribution planning process:

- Advanced shipping notes are available to customers
- Advanced shipping notes from suppliers are available

Transport Management process:

- Means of communication to call off transport
- Use of shared portals to optimize carrier selection & load consolidation
- Track and trace capability using manual updates in databases or automatic updates via networks (PDA's, radio tags…)
- Integration of transportation call off's in carrier's transportation scheduling tools

8.2 Appendix II - Market Place Review

Still active logistics platforms or transport market places:

Sites visited	Results from site visits
www.cargo2000.com	IATA Interest Group consisting of some 30 major airlines and a growing number of freight forwarders and air cargo ground handling agents, aiming to implement a new quality management system for the worldwide air cargo industry.
www.cargosphere.com	US site for a/o on-line public negotiation of cargo services, supported by the National Customs Brokers and Forwarders Association of America Shippers Association which has launched a contract management and rate negotiation system for use by its members. CargoSphere.com implemented the application for use by the network of freight forwarders, customs brokers and carrier-members of the NCBFAA Shippers Association. The contract management component provides online viewing of carrier contracts so users can compare rates and services. Also, CargoSphere's rate negotiation software allows users to conduct confidential online negotiations with carriers to their completion.
www.cargoreservations.com	The "single largest multi-modal, global freight exchange", joining buyers with shipping needs to forwarders and carriers who have freight capacity in one marketplace. Buyers can post freight, track shipments and manage contracts. Forwarders can find parties able to move freight, or can join the carriers in bidding on freight items to be moved on their own network. Carriers can post available capacity or quote on freight posted by forwarders and shippers.
www.freightquote.com	USA focussed provider of fully automated online freight management services, comparing numerous carriers in seconds. Founded in 1998, the company was named the fastest growing company in Kansas City by Ingram's magazine and was #5 on Entrepreneur magazine's list of Hot 100 for the year 2003
www.freight-traders.com	Procurement service provider specialising in the design and management of freight tenders. Interesting case studies by several multinational shippers report huge savings on freight spending. Won two awards in 2002: Wall Street Journal's Innovation Award and the ILT's Information Management Award
www.gf-x.com	Global Freight Exchange (GF-X) offers a neutral trading platform for air-freight carriers and forwarders, which enables forwarders to secure capacity with major carriers quickly and cost effective.
www.teleroute.com	Claims to be "The Leading European Freight Exchange". Reports over 70,000 real time offers placed in its freight exchange every day with over 45,000 users all over Europe accessing this exchange daily to advertise freight for transport and/or to search for freight for their own vehicles. Teleroute began in France in 1985 and has expanded its local presence into 25 European countries, including Poland, the Czech Republic, Hungary and Slovakia.
www.timocom.de	Virtual marketplace for freight forwarders and transport companies, available in 14 European languages, aiming at freight forwarding and transport companies. Approximately 42,000 empty vehicles and available loads can be found daily, offered by pan European clientele currently encompassing over 13,000 customers.

26 inactive and/or questionable platforms & market places:

Sites visited	Results
www.3t-cargo.com	Only available in German language - seems to be 'sleeping': „Diese Börse gibt es erst seit Juli 2001, die Kinderkrankheiten sind nahezu beseitigt, jetzt muß die Anzahl an Angeboten und Gesuchen steigen."
www.aktuell3000.de	Only available in German language - seems to be 'sleeping' as no recent info is presented.
www.blotec.com	Only available in German language - seems to be 'sleeping': „In letzter Zeit wurde unsere Datenbank häufig nicht aktualisiert. In Zukunft jedoch haben wir dafür Sorge getragen das dieser Fehler abgestellt wird. Vielen Dank!"
www.box24.de	Very little information, but: "In the last month of 2001 over 285 new members!"
www.cargex.de	Only available in German language - seems to be 'sleeping' as no recent info is presented
www.cargo4u.com	Freight Exchange System for forwarders and carriers for European road freight, also contains a Freight Directory. Last update: 2002
www.cargoclix.com	Most info in German only. No information about actual use
www.cargohub.com	Web portal hosting transport operators in France and offering web access to French ports and airports. No activity reports.
www.cargomaster.de	German only Freight Exchange ("Internationale Frachtenbörse") with 430 registered users, but no information about actual use
www.cargomile.com	Only accessible with password – search leads to web site developers
www.cargopool.de	Closed Internet market-place, which can be utilized for optimizing vehicle disposition. No activity reports.
www.delego.com	Swedish Internet-based marketplace for transportation services Most recent info (press relaese) dates back to August 14, 2000
www.frachtmarkt.de	Logistics Portal with a/o free exchange functionality, German language only, no information on actual use
www.frachtnetz.com	Freight exchange, only available in German language. No activity reports.
www.freecargo.com	Free transportation exchange, listing 7,000 European transport & forwarding companies. "Private system for transporters only, which enables transporters to exchange loads and equipment within their own community to deploy their equipment more efficiently." Few updates since 2003; several pages are old, invalid or still under construction
www.freightgate.com	US provider of Internet solutions for the freight industry: tools for supply chain collaboration & visibility, RFQ and tender management, service contract and quote management; interactive online sailing schedule, and an "extension for online exchanges to provide interactive shipping services to users". Still active issuing press releases, though they were for the last time in the news in February 2002.
www.freightmarket.com	No activity reports.

Sites visited	Results
www.glomap.com	German market-place for cargo and transport capacity.
www.interspeed.de	Freight exchange in German language only, without any information about actual or past use – last site changes in 1999
www.levelseas.com	e-business marketplace for bulk ocean transportation, see interesting information on its set-up and 'struggle for life' below
www.lkwonline.de	Freight exchange - only available in German language. Hosted (?) by IT-partner GmbH in Freiburg. No information on actual use: no updates, no press releases.
www.netshipbrokers.com	Online database of Open Cargoes, Open Vessel Positions and Sale & Purchase (S&P) requirements + exchange of Chartering and S&P information
www.shipahead.com	Information & E-commerce Service for the Shipping Industry
www.shipbestway.com	Canadian Freight Forwarder presenting its web site as "state of the art Freight Management System geared for management of all forms of traffic logistics". All 7 press releases date 1998.
www.spedi.de	German Freight Forwarder presenting its web site as independent search engine for cargo and road transport capacity: "wenn Sie auf der Suche nach den richtigen internationalen Speditionen und Frachtführern sind". (German language only)
www.svg-frachten.de	Freight Exchange, in German language only: „Es handelt sich um eine Börse, an der Laderaum und Ladung gehandelt werden. Die Laderaumverteilungsstelle (LRV) vermittelt zwischen speditionen und transportunternehmen und berechnet 6 % der Frachtsumme als Provision. Zur Zeit sind 3 aktuelle Frachten in der Datenbank vorhanden."

24 closed (out of business) and irrelevant platforms & marketplaces:

Sites visited	Results
www.benelog.com	Virtual marketplace („platform") to procure road freight contracts and other services. Bankruptcy petition presented on May 5, 2004.
www.cargo4u.com	Freight Directory containing outdated addresses of a/o road and air freight forwarders in the Netherlands and Belgium, copied from a telephone book.
www.auctioncargo.com	URL not known (anymore)
www.bestrado.de	"Die bestrado AG hat ihren Geschäftsbetrieb ab dem 1.10.2001 bis auf weiteres eingestellt"
www.cargodirect.de	Domain temporarily unavailable. Sie können hier eine E-Mail an den Domainadministrator senden
www.cargonow.com	URL not known (anymore)
www.cargorent.de	Facilitates transport companies in the optimisation of their processes by connecting scheduling systems and route planning solutions with on-board computer and internet
www.cargoweb.nl	Stopped recently (early 2003)
www.contingate.de	Ends up at "Tiscali.mobile-office-gateway" in German
www.cyvoyage.com	URL not known (anymore)
www.demotrans.com	Platform for research and development of e-logistic services for transportation industry, no real company.
www.digitalfreight.com	Ends up at www.manugistics.com (SCM software)
www.drive.to/frachtboerse	The requested URL was not found – site is available
www.elogisticsglobal.com	URL not known (anymore)
www.eurodat-services.com	URL not known (anymore)
www.eurotrans.com	This site is currently under construction - © Eurotrans 96
www.freight-online.com	Previously a web-based agent for a/o shippers and carriers in France, now directing immediately to starting page www.searching.net.
www.freightstats.com	General consumer & business portal
www.gl-net.com	Ends up at Chinese site: www.mingdaflocking.com
www.haulage-links.ie	URL not known (anymore)
www.leertour.de	Site is for sale: „Nutzen Sie leertour.de ab sofort wieder kostenlos. Sie möchten Ihre eigene Frachtbörse für alle oder nur für Ihre Kunden gründen. Dann haben wir ein interessantes Angebot für Sie. Kaufen Sie die Domain Leertour.de"
www.logistikmarkt-online.de	Logistics company directory („redaktionell geführtes Branchenverzeichnis für die Logistikindustrie mit über 3600 Firmen")
www.nedcargo.com	All Internet activities were stopped in April 2002 because of heavy losses. Now active as 3PL
www.ogenet.com	URL not known (anymore)
www.onlinecargo.com	Site is for sale
www.transport.ro	Site is under construction

8.3 Appendix III – List of Terms and Definition

EDI, defined as the interchange of information from one company's computer to another's over communications circuits in standard formats.

Horizontal Play/Horizontal Hub: This is a term for a function that cuts across many industries, usually defines a facility or organization that is providing a common service.

Vertical Hub/Vertical Portal: Serving one specific industry. Vertical portal websites that cater to consumers within a particular industry. Similar to the term "vertical industry", these websites are industry specific, and like a portal, they make use of Internet technology by using the same kind of personalization technology. In addition to industry specific vertical portals that cater to consumers, another definition of a vertical portal is one that caters solely to other businesses.

Third-Party Logistics (3PL): Outsourcing all or much of a company's logistics operations to a specialized company.

Third Party Logistics Provider: A firm which provides multiple logistics services for use by customers. Preferably, these services are integrated, or "bundled" together by the provider. These firms facilitate the movement of parts and materials from suppliers to manufacturers, and finished products from manufacturers to distributors and retailers. Among the services which they provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding.

Fourth-Party Logistics (4PL): Differs from third party logistics in the following ways;

- 4PL organization is often a separate entity established as a joint venture or long-term contract between a primary client and one or more partners;
- 4PL organization acts as a single interface between the client and multiple logistics service providers;
- All aspects (ideally) of the client's supply chain are managed by the 4PL organization; and,
- It is possible for a major third-party logistics provider to form a 4PL organization within its existing structure (Strategic Supply Chain Alignment; John Gattorna). Also see: Lead Logistics Provider

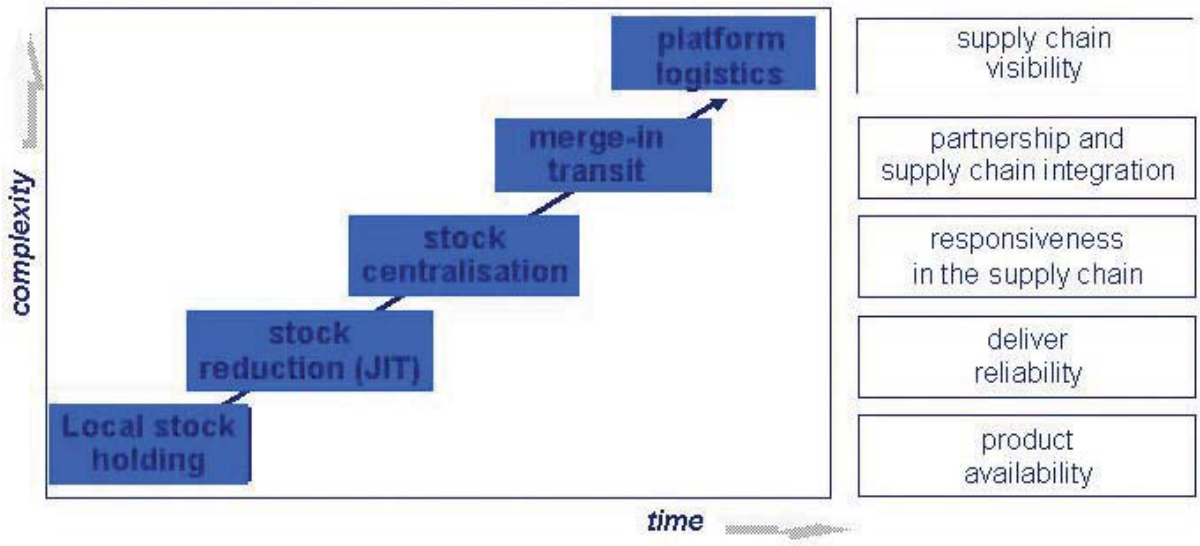
Appendix IV - Private Network Providers 8.4

A number of companies provide the technology for creating and maintaining private logistics exchanges or networks. Below is a list of some of those providers, along with their Web site addresses.

- Celarix (Cambridge, Mass.) www.celarix.com
- Descartes Systems (Waterloo, Ont.) www.descartes.com
- Elogex (Charlotte, N.C.) www.elogex.com
- G-Log (Shelton, Conn.) www.g-log.com
- GT Nexus (Alameda, Calif.) www.gtnexus.com
- i2/FreightMatrix (Dallas) www.freightmatrix.com
- LeanLogistics (Holland, Mich.) www.leanlogistics.com
- Manhattan Associates/Logistics.com (Atlanta, Ga.) www.logistics.com
- Manugistics (Rockville, Md.) www.manugistics.com
- Nistevo (Eden Prairie, Minn.) www.nistevo.com
- NTE (Downers Grove, Ill.) www.nte.com

Example Sun MicroSystems:

Supply chain dynamics demand specific capabilities



solutions / INTTRA-Link

INTTRA-Link enables shippers and forwarders to conduct ocean cargo e-commerce via standardized transactions with multiple carriers.

INTTRA-Link customers manage cargo and bookings, submit shipping instructions, and track and trace shipments around the globe.

INTTRA-Link Shipping Instructions

- Supports detailed information for multiple containers and multiple commodities
- Facilitates CSI requirements and allows possible reduction of carrier fees by delivering data into carriers' back-end systems
- Directs seamless booking/shipping instruction process
- Supports split-goods and multi-level packaging

INTTRA-Link Booking

- Provides the ability to book with multiple carriers using existing in-house systems
- Facilitates standard confirmation messages to all receivers
- Provides immediate ocean carrier booking number through Rapid Reservation

INTTRA-Link Track & Trace

Benefits

- Single point of electronic connectivity to multiple carriers
- Standardized processes and transaction formats
- Global and uniform visibility to in-transit shipments
- Ability to leverage previous system investments
- Minimal infrastructure or software investments required - or none at all
- Flexibility - ability to readily add more INTTRA carriers

Appendix V - Logistics platforms - Links 8.5

Enable Collaboration with Supply Network Partners Through a Web-Based Portal That Provides Connectivity, Process Integration and Event Management (EM):

AXIT (AX4) - **www.mylogistics.net/de/ax4/ax4.jsp**

Inet-logistics - **www.inet-logistics.com**

Elemica - www.elemica.com

Transwide - www.transwide.com/en/logistics.html

LINE – Logistics Information Network Enterprise
www.portsnportals.com

INTTRA – www.inttra.com

Appendix VI - What a network needs 8.6

Companies may talk of the need for a tightly controlled, multi-tiered network of supply-chain partners. But turning that talk into reality is quite another matter. There are seven "strict requirements":

1. The alignment of .supply-chain Partners must start at a relatively senior level. Without support from the top, harmony isn't possible.
2. The partners must agree on what their relationship covers, and what it doesn't. For example, a manufacturer must identify which of its many distribution channels require a common focus.
3. Participation must be consistent and uninterrupted. Any partner causing a temporary "blackout disrupts the ability to maintain an end-to-end view and makes recovery extremely difficult.
4. Communication must take place on a "quasi-real time" basis. Few if any companies demand that information be constant and immediate; daily reports may be frequent enough.
5. Channel-wide metrics must be in place. Partners need a "dashboard" which everyone can consult at a glance, for such things as inventory levels throughout the pipeline.
6. Partners must keep their focus on demand by the end- customer. The transition from "push" to "pull" Systems, controlled by actual purchases instead of manufacturers' requirements, continues.
7. Partnerships should occur `only • *where* there's a tangible business case that makes sense. A deal that doesn't impact a company's bottom line isn't worth the investment in resources, technology and business-process design.

8.7 Appendix VII - How to pick a private logistics exchange

How to pick a private logistics exchange

By James A. Cooke Executive Editor -- 5/1/2003

Private logistics exchanges, these exclusive Web sites, also known as private portals or private networks, help companies centralize control over such activities as managing their core carriers and viewing inventory throughout their supply chains. They also can serve as repositories for data that's shared among a selected group of transportation providers and trading partners. "The benefits (of these private networks) depend on the type of exchange," says Jeff Woods, a senior analyst with the Gartner Group in Stamford, Conn. "Some reduce freight costs or safety stock and inventory. Some will give you better control over promotional items."

Because the benefits of a private exchange can be quite substantial in some cases, they are fast gaining adherents. But they're not something you can jump into quickly. Not only is there considerable expense and commitment involved in building one, but there also are some 20 vendors claiming that they can set up these password-protected sites in some fashion or another.

So if you're among the growing number of shippers who are thinking about setting up a private network, it's a good idea to consider the following seven qualifiers before you choose a vendor and sign on the dotted line.

1 *Buy a network solution, not a site package.* Too often, shippers find that some private "networks" are actually a transportation management or inventory-visibility package that is limited to operations inside a company's four walls. A network solution, by contrast, is designed to facilitate communication among many parties. All members of your supply chain—carriers, suppliers, and customers—should be able to submit and receive information through an Internet-based private information network.

Minimize the points of data integration. Ideally, all the operational data to go through one management network to create a single database.

2 *Look for multiple-partner connectivity*. The vendor should be able to interface with multiple partners in multiple formats, from EDI (electronic data interchange) to XML (extensible markup language) The network provider should also be able to accommodate other, less-sophisticated forms of communication like faxing if necessary, he adds.

3 *Check for ease of integration with other systems*. The provider should be able to integrate its solution with existing applications quickly and seamlessly, both within the walls of your company and with the various members of the trading community. A vendor should already have interfaces in place to allow data to be exchanged with existing software, whether it's a specific logistics application or general office software for handling e-mails. All of that information, moreover, should be easily accessible in a single place. "The logistics manager should get direct access to SAP on the same screen with access to his e-mail," says Gary Cross, a consultant in the supply chain practice at IBM in Armonk, N.Y.

4 *Make sure the system offers advanced analytical tools*. Because a private network creates a central depository of information, it provides an opportunity to examine that data and discern patterns in your transportation and distribution operations. To get the most out of a private exchange, therefore, look for a provider that includes advanced tools such as planning, analysis, and optimization applications.

Planning tools take advantage of visibility—advance knowledge of incoming ship-

ments—to allow more efficient coordination of freight movements and warehouse resources. In conjunction with optimization applications, for example, these tools can show you where to consolidate shipments to save on transportation.
Some providers offer tools that support strategic modelling of the physical distribution network. This type of software can improve the contracting process because it can help determine where in the supply chain shipment volumes are great enough to leverage for lower rates.

5 *Choose a scaleable solution that can grow with your business*. Be sure to look for a vendor whose network solution is scaleable. If, for example, you need to add more carriers or other modes of transportation, then the network should be able to easily accommodate them. And if you decide to greatly increase the volume of shipments through the portal, the planning and optimization tools should still be able to quickly process the concomitant increase in data.

6 *Pick a business solution rather than a specific technology*. Make sure that whichever technology you choose supports your overall corporate logistics objectives. If, for example, you want a portal mainly in order to oversee carriers, then it doesn't make sense to buy a solution that is more apropos to visibility management. "The driving force should be the business process rather than the technology," says Uchneat.
Once you've determined which business process is most important, identify any information and technology gaps that stand in the way of implementing or improving that process. Then look for a vendor that is offering a product that will support your objectives. "It's the ability of the vendor to fill in gaps to enable a specific business process that you want," Uchneat says.

7 *Ask for customer references*. Any provider should be able to showcase other companies that have successfully implemented its solution.

Appendix VIII - Technology Standards State of the Art. 8.8

8.8.1 SCM applications evolution trends

Businesses are connecting to their suppliers and to their customers to allow systems to inter-operate. By extending the Supply Chain to suppliers and customers, companies can reduce the cycle time for orders and allow for more accurate forecasting of demand for products. The current issue for most companies is that they have existing legacy applications and ERP systems that need to be able to communicate with the supplier/customer systems that could also be ERP application, but probably not from the same ERP vendor.

This situation comes from the information systems development happened during the past years, from the sixties. At the beginning, proprietary legacy systems were developed in the `60s or `70s. They were mainframe based, developed in Cobol, Assem-

bler, etc and not in real time. Therefore missing documentation was normal, and no integration and lacking customer focus were features of this kind of approach. Historically they were designed to *simplify processes* such as order entry (MAKE logic). The driving goal of the organisation in this stage is to produce dependable, consistent, quality product, at the lowest cost (focus on automating existing functions and tasks). While task specialisation improved productivity dramatically, it also fragmented processes beyond recognition. In a task-centric world, processes tend to fall between the cracks. They become slow, inflexible, error prone, and replete with the costs of the managerial overhead needed to hold them together.

In the `80s, the task-oriented nature of applications evolved to become more *functionally integrated*. Fortunately, information technology is allowing us to reintegrate tasks into connected processes. For instance, order entry was transformed into sales applications (BEST of BREED Logic). Companies moving toward Stage two concentrate on serving the customer, specifically focusing on order fulfilment (focus on customers). But in the reality of today's global economy , functional specialisation can be crippling. What is needed is the ability to provide solutions, which requires that everyone comprehends the global picture and remain flexible in the face of new or complex situation. This requirement has created the need of cross-functional application integration.

With the early `90s came the advent of BPR (business process reengineering), and organisations began focusing on managing and optimising cross-functional business processes. A process perspective transforms a group of ad hoc and fragmented functional activities into a system that is organised, repeatable and reliable. The shift from task-oriented to *process-oriented* organisation has natural impact on the information systems (Drive business efficiency). The mentioned change is accomplished by deploying business applications that fuse multiple functions into a collection of well-orchestrated clusters. For instance, increasingly sales applications are being integrated with customer service and marketing application to form customer relationship management solutions.

ERP (Enterprise Resource Planning) systems are the solution. ERP system allows having a complete picture of Business within a unique application.

Next step is SCM application (or APS, Advanced Planning System). ERP and SCM application are apparently similar. On the contrary, there is a great difference related to way by which they work. ERP systems provide a great deal of planning capabilities, the various materials, capacity, and demand constraints are all considered *separately*, in relative isolation of each other. The more leading edge SCM products are able to consider a the *relevant constraints simultaneously*, and to perform real time simulations of adjustment in the constraints. ERP systems have a harder time adding this more dynamic functionality because they are chiefly concerned with transaction processing, and also have many more jobs to do than just SCM. Getting answers from an overloaded ERP system may take hours, whereas getting them from a separate SCM system may take minutes or seconds (Ram resident functionality).

SCM applications reduce time and overall cycle time, by recognising constraints and not scheduling a job to begin until the constraints have been removed. Creating market value is the new open issue (Extended Supply Chain).

Today, the standardisation of XML and TCP/IP scheme are the means ERP systems, Legacy systems and SCM applications require in order to communicate and achieve a higher level of integration and inter-operation (Collaborative Commerce). Collaborative Commerce is a new model for business. Drive by an explosion of business demands and opportunities and enabled by the Internet, component and integration technologies, collaborative commerce achieves dynamic collaboration among internal personnel, business partners and customers throughout a given trading community or market. Creating the Supply Chain communities is the new challenge. Enterprises harness the power of the Internet to gain revenue and profit improvement by going beyond Supply Chain models and Information sharing.
Collaborative commerce is the result of two developments:

- The range of business participants (***connection paradigm***) is expanding from those within an enterprise in the trading community.

- The enterprise's focus (***business paradigm***) is progressing from departmental productivity and external transaction handling to collaborative interaction.

Business applications are expanding from a domain (e.g. traditional SCM) and e-commerce orientation to collaborative commerce focus . Collaborative commerce enabled application will replace static, Web-enabled Supply Chain/value Chain applications as the dominant applications model by 2004 (Gartner). A point must be, in any case, defined. Before e-business, users acquired applications technology through the purchase of hardware, software and services. E-business functionality now expands the options as users can access systems via Intranet and Extranet. One alternative is to acquire applications and services from outsourcing providers and Application Service Providers (ASP).

Considering the Production environment, Multi-agent systems can be used in order to face problems tied to the INTELLIGENT Production (Intelligent Manufacturing). In the more recent years agent technology has been applied to production problems, in particular multi-enterprise manufacturing integration, Supply Chain management, planning and manufacturing control, inventory management. In the field of intelligent and distributed production systems, agents are used:

- To encapsulate the existing software systems in way to integrate manufacturer enterprise activities like design, planning, programming, simulation, execution, and distribution, with those of suppliers, customers and partner in an intelligent and distributed environment;
- To represent and model production resources (workers, machinery, equipment, products and stocks) in way to facilitate planning, programming and control activities of the resources
- To model special services of a production system.

The Multi-Agents are typically based on Artificial Intelligence. Intelligence agents use AI to assist in decision-making (DSS), especially in real-time decisions. An agent is a software process whose goal is to communicate and interact with other agents, so that decisions affecting the entire Supply Chain can be made on a global level. Expert Systems also capture an expert's knowledge in a data base and use it to solve problems. Expert Systems rely on an extensive database of knowledge, usually expressed as a set of rules.

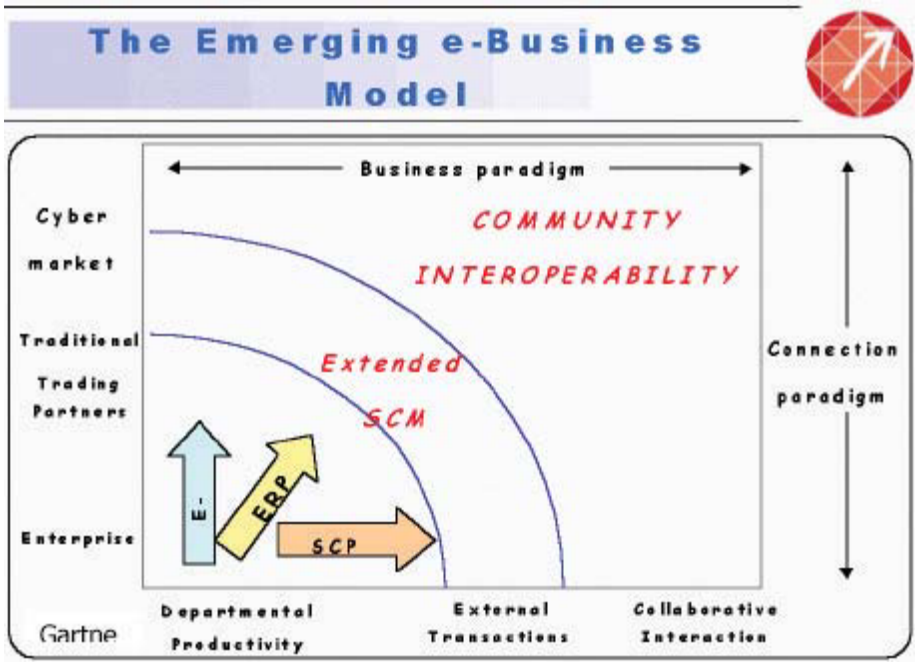


Fig. 1

Summarizing the evolution followed by SCM applications, the evolving steps are (Fig. 2):

'60 - '70: Make (task-oriented Logic)
'80 - '90: Best of Breed (function-oriented Logic)
'90 - '97: Integrated Suites (process oriented – ERP, partially)
'98 - '99: Enterprise integration and SCM
(Fully Extended ERP plus APS)
'00- '02: Interoperability with communities
(and eventually multi-agent systems for DSS)

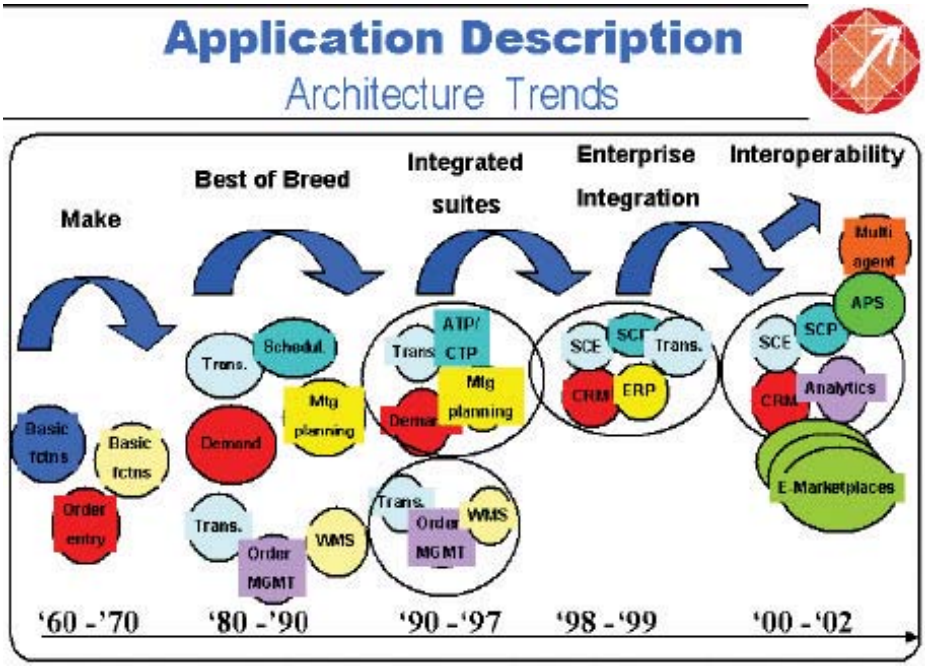


Fig. 2

8.8.2 Application standards

	ebXLM	BizTalk	BPMI	MDC	RosettaNet	UDDI	WSDL	XAML
Transactions			✘					✘
Negotiation	✘	✘						
Business Process	✘	✘	✘	✘	✘			
Service Description	✘	✘			✘		✘	
Registry	✘	✘			✘	✘		

Covered areas.

It's important to specify that the evolution of standards is changing very fast, and the information here recollected can be "overwritten" rapidly.

ebXML (electronic business XML)
Website: http://www.ebxml.org/

ebXML is a modular suite of specifications that enables enterprises to conduct business over the Internet.
The ebXML standard method enables companies to exchange business messages, conduct trading relationships, communicate data in common terms and define and register business processes.

ebXML is a framework that is at the same time generic, flexible and easily manageable.

ebXML is backed by UN/CEFACT (www.unece.org/cefact) the United Nations body whose mandate covers world-wide policy and technical development in the area of trade facilitation and electronic business and OASIS (http://www.oasis-open.org) the international, not-forprofit consortium that advances electronic business by promoting open, collaborative development of interoperability specifications.

The consortium initiative began in the fall of 1999; in May 2001 it ends by delivering a suite of specifications, white papers and other related documents. At the present the work continues within UN/CEFACT and OASIS.

The vision of ebXML is to create a single global electronic marketplace where enterprises can meet and conduct business with each other through the exchange of XML based messages.

The ebXML architecture provides:

- A method to define business processes and their associated messages and content.
- The mechanism to register and discover business process sequences with related message exchanges.
- A way to define Company profiles.
- A way to define trading partner agreements.
- A uniform message transport layer.

BizTalk Initiatives – Microsoft
WebSite: http://www.biztalk.org/

Under the BizTalk name there are several Microsoft driven initiatives that range from a Server (BizTalk Server 2000) to a business description language (XLANG). From this point of view BizTalk is not a standard but a complete implementation of a suite for developing b2b applications. The presence of BizTalk here is caused by the fact that it a "proof of concept" of how the various standards work together. In the following lines there is a BizTalk brief review.

❖ BizTalk Framework

The BizTalk Framework 2.0 is an XML framework for application integration and electronic commerce. It includes a design framework for implementing an XML schema and a set of XML tags used in messages sent between applications.

BizTalk Framework Schemas, which are business documents and messages expressed in XML, can be registered and stored on the BizTalk.org Web site for reuse. The BizTalk Framework Schema design has been submitted to the W3C.

BizTalk Framework is based upon existing standard like HTTP, MIME and SOAP.
From a logical point of view we have three layers: the application, a compliant Server (that is a Server enabled to BizTalk Framework) and the transport layer. In this context the applications send back and forth BizTalk Messages through servers. The message itself contains the documents needed by applications to perform their business operations.

In order to asynchronous document exchanges we have a double requirement:
1. Confirmation of delivery and physical acceptance of a message
2. Of verification of message content and intent to perform the business action requested.

This problem is resolved via additional tags that identify the receipt (of delivery and commitment), the time of expire, the sender and the receiver.

❖ BizTalkServer

BizTalk Server enables the deployment of integrated business processes between business partners with a suite to manage XML messages and XML Schemas.

In the server there are two runtime engines: the first is dedicated to messaging and the second is related to workflow orchestration.

The messaging engine performs data driven message translation and protocol changes between applications, it uses internal queues for the delivery of messages: this operation can be performed in asynchronous or synchronous manner.

The engine dedicated to workflow orchestration is more inherent to the business processes design and the to the standardisation efforts presented in this paper. The server functionality permits the flowcharting of the process with its sequential operations, concurrency, decision points and external referral to outside applications. The language used to describe the entire process is a vocabulary called XLANG.

The server stores its data via SQL Serves databases, in detail it tracks message specifications, maps between message specifications (that is translations between different message representations), integration, configuration, information, workflow and message auditing information.

BizTalkServer 2002 is a new version that builds on the landmark release of BizTalkServer 2000. It enhances features to improve management and expands support for Internet protocols.

BizTalkServer 2002 provides:

❖ Expanded Internet support with BizTalkServer 2002 you can receive documents directly from the Internet through **Hypertext Transfer Protocol and it can integrate XML web services.**

❖ Quicker connections with partners the new technology SEED permits to connect to business partners rapidly, whether you have two business partners or thousands.

- Much more connections with partners.
  BizTalkServer 2002 partner edition provide a trading partner integration solution that can be implemented, regardless of size or budget. The combination of BizTalkServer Partner Edition and SEED delivers on to reduce the cost and complexity of trading partner integration.

A new product is coming soon: the Microsoft BizTalk accelerator for Swift, to provide reliable and secure delivery of financial messaging.

In order to simplify the infrastructure and to reduce cost all while with a great flexibility to handle the changing customer requirements, Microsoft is positioned to deliver the next generation enterprise integration solutions.

EAI technology solves business challenges. BizTalk Server and the BizTalk Accelerator for SWIFT, reduce the complexity of financial EAI and deliver rapid return on deployment timelines, simplified architectures, and lower initial ongoing costs.

At the present the new work is to develop BizTalkServer 2004 to find solutions that connects systems, people and trading partners together through manageable business processes.

XAML (Transaction Authority Markup Language)
Website: http://www.xaml.org/

XAML is a vendor-neutral standard that enables the co-ordination and processing of online transactions in the field of XML web services, it is intended to be a completely open standard for web-based business transactions.

The standard defines a set of XML message formats and interaction models that web services can use in order to provide business-level transactions that span multiple parties across the Internet.

This standard is backed by Hp, IBM, Oracle and Sun.

The principal objectives for XAML are:

- Provide a specification for the XML message interfaces and interaction models of web services to support the coordination and processing of multi-stage transactions on the Internet.

- Specify interfaces and protocols that preserve investment and strengths in transaction monitors and resources.
- Specify interfaces and protocols that can be "added on"to existing and emerging web service interfaces and protocols, including SOAP.
- Specify interaction models for software systems that provide business-level transactions that co-ordinate the processing of multiple distributed web services.
- Build on existing and emerging industry standards.

The consortium work started on October 2000.

BPMI (Business Processes Management Initiative)
Website: http://www.bpmi.org

BPMI is a non-profit organisation that empowers companies to develop and operate business processes that span multiple applications and business partners.

The BPMI mission is to promote and develop the use of Business Process Management (BPM) through the establishment of standards for process design, deployment, execution, maintenance, and optimisation. BPMI.org has been initiated in August 2000, at the present well knows members are: Bea, DHL, HP, IBM, ILOG, Sun, BT, Axway software …

The Business Process Modelling Language (BPML) and the Business Process Query Language (BPQL) have been developed between the consortium.

BPML is a meta-language for the modelling of business processes; it provides an abstracted execution model for collaborative and transactional business processes based on the concept of a transactional finite-state machine.

BPQL is a definition of a standard interface to a business process management infrastructure.

BPQL relies on UDDI in order to discover and to register the Public Interfaces of e-business.

MDC OIM (Open Information Model)
Website: http://www.mdcinfo.com/

Meta Data Coalition (MDC) is a consortium founded in 1995 with the common purpose to define, implement and maintain a metadata interchange format standard. The coalition allies software vendors and users: the principal well know member is Microsoft (that joined on 1998). According to a September 2000 new MDC will join to OMG.

Between the different projects they have had currently running, the most important has been one related to b2b: the Open Information Model (OIM). OIM is a set of metadata specifications, illustrated via UML, to facilitate sharing and reuse in the application development and data warehousing domains.

In this field we find the specifications that describe the business engineering models.

The goal of business or enterprise modelling is to develop a blueprint depicting how a Company or a part of a Company operates or should operate. In this context, a business is defined as a set of co-operative activities performed by the people or machines or both.

The principal areas that are covered by this modellization effort are:

- Business goals: the model describes relations between goals, their importance and priority.
- Organisations: there are presented the actors and the resources involved in the business processes
- Business Processes: the model describes the operations performed and the responsibilities of actions.
- Business Rules: there are sharpened the constraint under which the processes can be performed.

RosettaNet
Website: http://www.rosettanet.org/

Rosetta Net is a non-profit consortium composed by more than 400 of the world's leading Semiconductor Manufacturing, Electronic Components and Information Technologies and Telecommunications companies working together. Founded in June 1998, the scope of RosettaNet is to create and implement open e-busi-

ness standards, that present itself as a robust non-proprietary solution. In the following lines there are some of the RosettaNet's products available at this moment:

- Two dictionaries: RosettaNet Business Dictionary and Technical Dictionary. Both were created to reduce the terminological confusion in the procurement process. There are also defined the principal properties useful to depicting business transactions.

- RosettaNet Implementation Framework (RNIF): this framework provides exchange protocols. The language used is XML and the covered aspects are transport, routing, packaging, security, signals and trading partners agreement.

- RosettaNet PIP Directory.

- RosettaNet Partner Interface Processes (PIPs): these processes are specialised system-to-system XML-based dialogs properly choreographed. The principal interested business areas are: Administrative, Testing, Partnership, Product and Service Review, Product Distribution, Notification , Information and Collaborative Design & Engineering, Order Management; Inventory Management, Marketing Information Management, Service and Support, Manufacturing.

- RosettaNet Product & Partner codes.

UDDI (Universal, Description, Discovery and Integration)
Website: http://www.uddi.org/

The UDDI Project is a comprehensive, open industry initiative enabling businesses to discover each other, and define how they interact over the Internet and share information in global registry architecture. UDDI is also a framework for Web services integration, creates a standard interoperable platform in order to enable companies and applications find and use Web services. It contains standards-based specifications for service description and discovery. The UDDI specification takes advantage of World Wide Web Consortium (W3C) and Internet Engineering Task Force (IETF) standards such as XML, HTTP, Domain Name System (DNS) protocols and Simple Object Access Protocol (SOAP).
UDDI is initially backed by Ariba, IBM and Microsoft, later Accenture, Bea, CompaQ, Hp, Intel, Iona, Rational, Sun were joined in.

The consortium addresses the following problems:

- The quick discover of the right business by organisations
- The modalities to enable e-Commerce when the desired business is discovered
- The creation of an industry-wide approach for businesses to reach their customers and partners with information about their products and Web services.

On the other hand the UDDI project addresses immediate benefits, like:

- Expanding offerings
- Reaching new customers
- Extending market reach
- Increasing access to current customers allowing participation in the global Internet economy
- Using a set of protocols that enable businesses to invoke services over the Internet to provide additional value to their preferred customers.

UDDI was designed to provide existing directories and search engines with a centralised source for this data, and it is anticipated that most consumers and businesses will continue to use existing search engines and business directories as their preferred method for viewing the data that companies register in the UDDI Business Registry. The UDDI Business Registry will serve as a building block, which will enable them to transact globally with one another by allowing them to publish their preferred means of conducting e-Commerce or other transactions.

WSDL (Web Services Description Language)
Website: it is possible to find information on:
http://www.w3.org/TR/wsdl

WSDL addresses the need to describe the communications within the web community in a structured way; it is an XML format for describing network services as a set of endpoints operating on messages containing either document oriented or procedure-oriented information. The operations and messages are described abstractly, and then bound to a concrete network protocol and message format to define an endpoint. The natural use of WSDL is related to well known message formats and network protocols like SOAP 1.1, HTTP and MIME, but this implementation is not exclusive.

A network service is described in terms of:

- Types: a container for data type definitions using some type system (like XML Schema).
- Message: an abstract, typed definition of the data being communicated.
- Operation: an abstract description of an action supported by the service.
- Port Type: an abstract set of operations supported by one or more endpoints.
- Binding: a concrete protocol and data format specification for a particular port type.
- Port: a single endpoint defined as a combination of a binding and a network address.
- Service: a collection of related endpoints.

Well known members of this consortium are Ariba, IBM and Microsoft.

b2b related standards							
BPMI	*ebXML*	*MDC OIM*	*RosettaNet*	*SOAP*	*UDDI*	*WSDL*	*WAML*
Extricity	Commerce One	Microsoft	IBM	IBM	Ariba	IBM	IBM
IBM			Adexa	Microsoft	Atlas Commerce	Microsoft	Oracle
ILOG			Baan		Commerce One		
SAP			Descartes		Extricity		
TIBCO			I2 Technologies		I2 Technologies		
			J.D. Edwards		IBM		
			Manugistics		Microsoft		
			Oracle		Oracle		
			People Soft		Right Works		
			SAP		SAP		
			TIBCO		TIBCO		
List of mentioned (by our deliverable) enterprises that participate to definition of standards							
Note that RosettaNet supports ebXML							

Simplified mapping of the standards mentioned above.

AD INTERIM OFFICE

THE EUROPEAN FREIGHT & LOGISTICS
LEADERS FORUM
Via Tortona, 16 - 20144 Milano - Italy
Tel. +39.02.89423765 - Fax +39.02.83201592
e-mail: felforum@europeanfreight.org - www.europeanfreight.org

TRANSFESA

C. Musgo, 1 - 28023 Aravaca (MADRID) - SPAIN
Tel. +34.91.387.99.00 - Fax +34.91.372.90.59
Web: www.transfesa.com

LOGISTICS PROVIDER

BVQI ISO 14001 BVQI ISO 9001

TRANSFESA

Full service logistics integrator.

Intermodal transport, warehousing, consolidation centres, value added services for the supply chain / distribution services, national & international transport by rail, road and sea.

Local distribution, sequenced deliveries, JIT deliveries, management of terminal facilities, vehicle logistics centres, PDI, vehicle preparation services, final vehicle distribution to dealerships and real time consignment tracking system.