

by Robert Robertson

Finding Solutions

SCL conference focuses on supply chain trends

What better way to find out the latest industry trends than to attend the Canadian Association of Supply Chain and Logistics Management's (SCL) Supply Chain Research Forum. The one-day event was part of the SCL's annual conference held last month in Toronto. With the theme *Profitability: Value Creation in the Supply Chain*, the forum brought together the likes of Kevin Hendricks, Richard Ivey School of Business, University of Western Ontario; Michael Haughton, associate professor, Wilfrid Laurier University; and Garland Chow associate professor, transportation and logistics at UBC.

According to Hendricks, there's a direct link between supply chain "glitches" and the stock market. During the past few years, Hendricks and his colleagues have tracked effective supply chain management (SCM)--or the lack of it--on a company's stock price. Hendricks said the stock market reaction to supply chain related glitch announcements is immediate, decisive and overwhelmingly negative. It also didn't matter what or who caused the glitch, as stock price, still dropped.

"In some cases, companies lost 10 percent of market value within two days of announcing supply chain glitches or problems," said Hendricks. "The six most common causes of glitches are parts shortages, new product ramp/rollouts, changes requested by customers, development problems, production challenges and quality issues. It's imperative to connect SCM performance and shareholder value."

3PL Edge

Haughton said his research shows that it's important for companies to understand and follow customs rules. According to Haughton, non-compliance fines can be hefty and the effectiveness of a company's supply chain can be affected. Chow discussed how third-party logistics (3PL) continues to be embraced by companies as an effective bottom-line strategy. Much of Chow's research deals with the Internet and how 3PL providers are adapting this technology into their services.

"Today, there's a trend among major 3PL providers to offer integrated services, especially with the involvement of the Internet. For 3PL provider and their customers, the Internet enables 'real-time' supply chain integration and collaboration," said Chow. "Many 3PLs are using the Internet to their advantage, instead of being eliminated by it. Looking to the future, I fully



expect customers will further demand new technology from their 3PL providers."

In another presentation, SCL's latest research efforts with Industry Canada were in the spotlight. This year, the SCL Research Committee and Industry Canada have held more Lean Logistics Technology Roadmap (LTRM) working groups. LTRM is an industry-led, market-driven process that brings together key stakeholders (manufacturers, distributors, researchers and government) to identify critical supply chain developments. Industry Canada's role is to facilitate the LTRM process. Led by Pat Cain (Progistix-Solutions Inc.), the SCL's Research Committee has been active with different industry initiatives since 1989.

It's expected the SCL will release the final results of the LTRM report at its fall symposium in Toronto. According to David Long, SCL president, the concept of lean logistics offers many benefits to companies. "Lean logistics can help increase a company's competitiveness, productivity and profitability. It also encourages the formation of new alliances, networks and partnerships across the supply chain," said Long. "As well, lean logistics changes the role of supply chain participants from moving goods to specializing in strategic information flow. It also provides direction to align government policies, programs and regulations."

In other news, the SCL and Industry Canada (in conjunction with Kom International and Oracle Corporation) unveiled its new Warehousing Web Visibility Tool Kit for Logistics Service Providers at the conference. The 30-page document is a step-by-step guide to help 3PL providers take advantage of the Internet as a strategic tool. Contained are useful references to best practices and journals. Some of the information covers the reasons for outsourcing's popularity; evaluation of current internal warehousing systems; methodology for return-on-investment (ROI); and how to establish a dynamic Web site, including the aspect of Internet security.

MM&D

For more information, contact the SCL at (905) 513-7300; Web-site: www.infochain.org



Warehousing Web-Visibility Tool Kit for Logistics Service Providers (3PL)



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Preface

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TABLE OF CONTENT

INTRODUCTION.....	4
What is Web-Visibility?	4
Who Should Read This?	4
WHY WEB-VISIBILITY?	5
Benefits driving the Outsourcing trend.....	5
The Black Box Effect: avoiding the risks of outsourcing	5
A Value Added Proposition	5
BENEFITS OF WEB-VISIBILITY	6
WEB-VISIBILITY MARKET TRENDS	7
WEB-VISIBILITY VALUE PROPOSITION INFRASTRUCTURE.....	8
Data Warehousing	8
WEB-VISIBILITY PROJECT TIMEFRAME.....	10
STEP 1: SOLUTION DEFINITION	11
1.1 Assessing the Relative Costs and Benefits of Adopting Web Visibility	11
Methodology for Return On Investment (ROI)	11
The ROI process consists of four primary phases:.....	12
1.2 Evaluate Your Current Internal Warehousing System	13
1.3 Update your databases, systems and processes to comply with the GTIN requirements.....	14
1.4 Identify Your Company’s Needs and Opportunities	15
A. Identify Customer Needs	15
B. Identify Opportunities.....	17
C. Identify your Champion.....	18
1.5 Inventory of Resources	18
How to use the checklist	18
CHECK LIST OF E-COMMERCE RESOURCES.....	19
1.6 Decide on your approach: in-house, outsourced, or a combination of the two	19
A. In-house Design Approach	19
B. Outsourcing Design Approach	20
C. Hybrid Approach.....	20
STEP 2: SOLUTION ACQUISITION	21
2.1 Selecting a Project Team, Vendor or Consultant	21
2.2 Setting Up Your Infrastructure	22
A. Setting up an Intermediary System.....	22
B. Developing or Purchasing Your Application Software.....	22
C. Establishing a Dynamic Site	23
2.4 Security of Your Web-Visibility System.....	24
STEP 3: SOLUTION IMPLEMENTATION.....	25
3.1 Developing a Plan to Implement Web Visibility	25
3.2 Integrating Existing and New Systems.....	25
3.3 Developing a Plan for Testing, Monitoring and Maintenance	25
System Testing, Monitoring and Maintenance Guide Testing	26
3.4 Decision Time: Deploy the System or Revise the Plan?	27
3.5 Putting Your System to Work.....	27
GOVERNMENT RESOURCES	28
JOURNALS, MAGAZINES AND PRINT MATERIALS	29
REFERENCES	30

INTRODUCTION

The e-Business market is being transformed by the rapid growth of Internet-based communications. The movement to Internet-based communications represents a paradigm shift from the client/server model. The power of Web-based applications is their ability to allow people to communicate mission-critical, real-time information anywhere in the world instantaneously. This migration has precipitated the widespread adoption of Internet software applications utilizing the latest technology to fulfill these new and complex communication needs. As these applications emerge their immediate and measurable benefit makes them essential business tools. With the increasingly competitive business landscape, it has become a strategic necessity to optimize a company's supply chain in a fashion that leverages the potential of the Internet.

Web-Visibility is a powerful force that is redefining business practices in supply chain across the world. The Government of Canada recently joined forces with the Canadian Association of Supply Chain and Logistics Management to commission a study of web visibility and its impact on the competitiveness of the Canadian Logistics Industry. The purpose of this study was to raise awareness of the need for logistics service firms to provide Web-based access to information shared across the supply chain and increase its adoption in the Canadian Logistics industry. The Toolkit is a step-by-step guide to adopting Web-Visibility, with useful references to best practices, journals and other resources.

What is Web-Visibility?

Monitoring and managing the flow of inventory through a multi-party supply chain is now possible with Web-Visibility capabilities. Web-Visibility offers accurate and timely monitoring and managing of flow by all parties. It is also new ways of cutting operational costs and improving customer service. Supply chain visibility applications enable the enterprise to extract data from multiple platforms and applications and share that up and down the supply chain. Visibility tools do not necessarily create information; they consolidate it into a central point and pass it on. With this type of solution, Third Party Logistics (3PL) clients and customers can focus on managing their supply chain by monitoring movement and exception with customized status and events notifications via the Internet.

Who Should Read This?

The primary audience for this Toolkit is Canadian Logistics Service Providers (3PL) that have some warehousing activities and familiarity with e-commerce, but without extensive applications in place. This particular Tool Kit can be adapted for all type of warehousing systems, from the basic Business System/Enterprise Resource Planning (ERP) to complex Warehouse Management Systems (WMS).

WHY WEB-VISIBILITY?

Benefits driving the Outsourcing trend

The 3PL competitive advantage is more than providing quality service. Information technology is now the differentiating factor between competitors in this market. Third party logistics providers (3PL) have long felt the push from clients to provide real time visibility of logistics information beyond the four walls. With growing demand for increased service levels in the supply chain, many companies are now partnering with Third Party Logistics firms to handle the distribution function in their business.

One of the primary reasons for this, is that companies are simply not equipped to keep pace with advances in information technology. Rapid IT requirements growth and increased technological complexity have made it difficult and time-consuming for companies to manage their internal logistics operations IT infrastructure through recruiting and retaining IT personnel. Companies look to engage 3PL to access state-of-the-art supply chain management technology without having to incur the time and resources needed to build these sophisticated solutions in-house. In addition, many companies are recognizing that partnering with a 3PL will improve the economic performance of the company. One of the key indicators considered by investors is a company's Earning Value of Assets. By selling off the warehouses and truck fleet of the company, assets are reduced thereby improving this financial performance indicator.

The Black Box Effect: avoiding the risks of outsourcing

As a result of the move to 3PLs, companies are less in touch with the inventory of the products they are producing and selling. This "black box" can result in a tenuous relationship between the client and the 3PL. The client (manufacturer) continues to sell products as fast as they can produce it, however, they have entrusted the fulfilment of orders to the 3PL.

A Value Added Proposition

3PL providers are adopting developments in Internet technology to eliminate this "black box" situation. This is achieved by making the information in the Warehouse Management System (WMS) or in the Enterprise Resource Planning (ERP) / Business System available to the client and its customers via a simple Internet connection. The WMS / ERP Systems contains all the information related to all the orders placed to the warehouse and this is made available all the partners in the supply chain as needed. This is achieved through the use of EDI, database technology, and the Internet. This information availability is becoming a major differentiating factor when a company is choosing between competent 3PLs. According to e-logistics survey from IDC, about 78% of respondents indicated that they are likely to use web-based supply chain management services in the near future and 12% currently use these services.

BENEFITS OF WEB-VISIBILITY

	Specific Benefits
Improved customer service	<ul style="list-style-type: none"> ➤ Real-time access to data for customer: <ul style="list-style-type: none"> - Incorporates status updates that have been received just seconds earlier. Gives users real-time access to information about multi-party events for informed business decisions. Customized report creation - Integrated exception alert engine automatically notifies users of changes, problems. Monitors milestones like early/late arrival. - Lets users find shipments and view associated status via their own information, such as P.O. number, sales order or waybill. Enables tracking and tracing and accommodates user's existing business process and info systems. - Can be branded with logos, terminology, etc. as user organization's own value-added visibility service. Increases depth and satisfaction of relationship user builds with their own customers. ➤ Supports selective data sharing with specified trading partners. Facilitates smoother inter-enterprise operations and supply chain management. ➤ Expanded service coverage (longer hours, wider area) ➤ Flexible communication methods
Gain access to new marketplaces	<ul style="list-style-type: none"> ➤ Expanded customer base <ul style="list-style-type: none"> - Access to new markets that requires Web-Visibility functionality - Differentiation in a price driven market ➤ Enhanced company image and brand
Improved business operations efficiency	<ul style="list-style-type: none"> ➤ Automation of operations such as shipment tracking ➤ Automation of transactions such as order processing <ul style="list-style-type: none"> - Increased overall transactional and operational efficiency ➤ Increased profit margin on services via value added proposition ➤ Reduced transaction and customer service costs

WEB-VISIBILITY MARKET TRENDS

As lead times are compressed and trade becomes more dynamic, collaboration and access to key data enables granular access and control over supply chain processes until the last possible moment of execution. Enterprises continue to evolve toward more linear supply chains and dynamic distribution become more prevalent. Enterprises are required to react to events as they occur and to make intelligent decisions given current circumstances. This means the new breed of Supply Chain Management (SCM) systems will need to react, re-plan, optimize and execute operations based on real-time data and must change to meet trading partners' new demands (*Gartner Inc. SCM Convergence Within the Four*

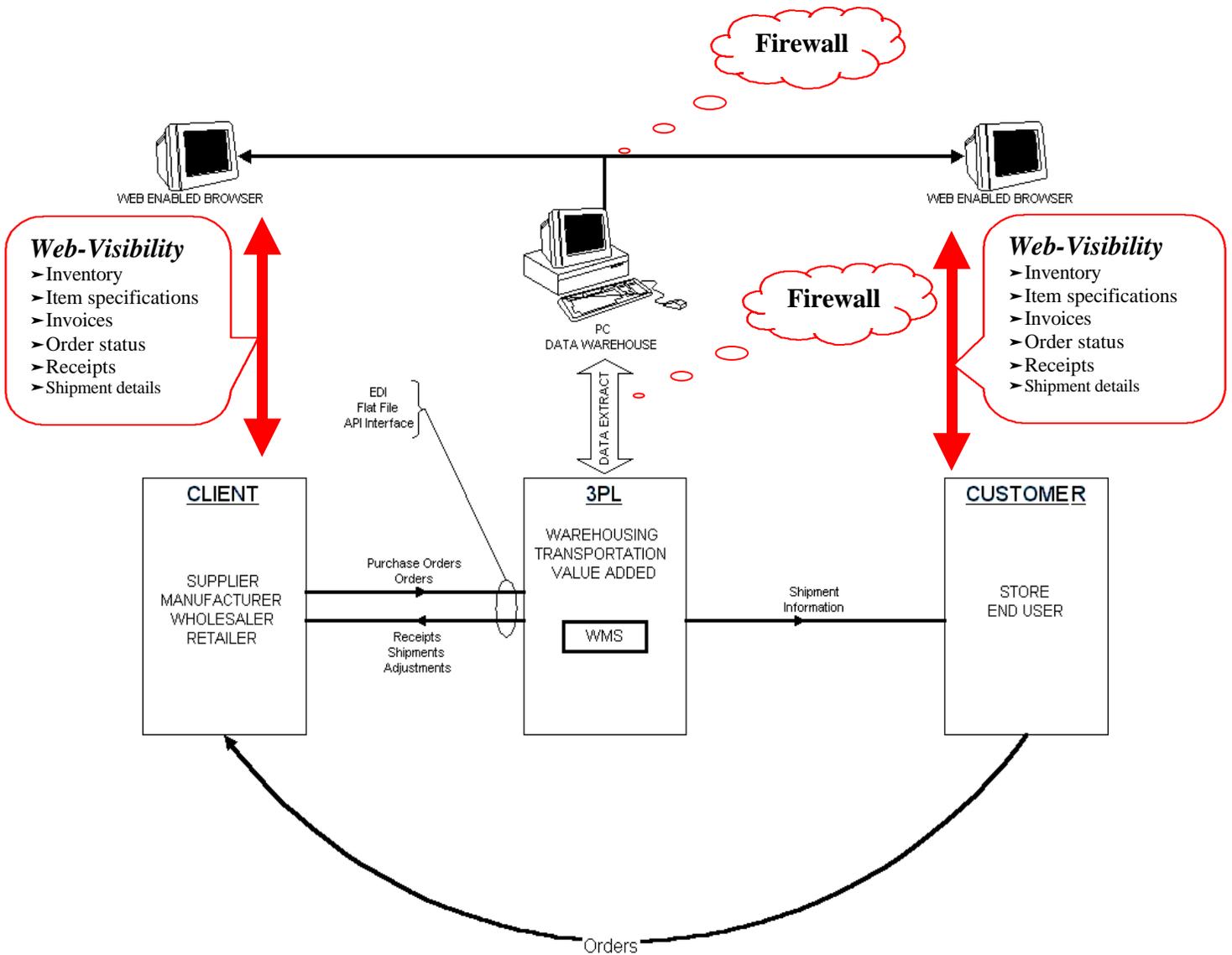
third and fourth party logistics providers will be driving firms' logistics online. More than 21% of all -added

standardized technology such as the Internet to connect users.

IDC's eLogistics Survey 2000 also found that shippers are looking for these value added services and are actively evaluating 3PL offering on line services to find the right fit. About 78% of respondents indicated that they are likely to use web based supply chain management services

existent tracking and tracing technology and capabilities of their 3PL. They indicated that track and trace is a key Respondents gave high technology ratings to service providers with tracking capabilities (*IDC's eLogistics Survey 2000*).

WEB-VISIBILITY VALUE PROPOSITION INFRASTRUCTURE



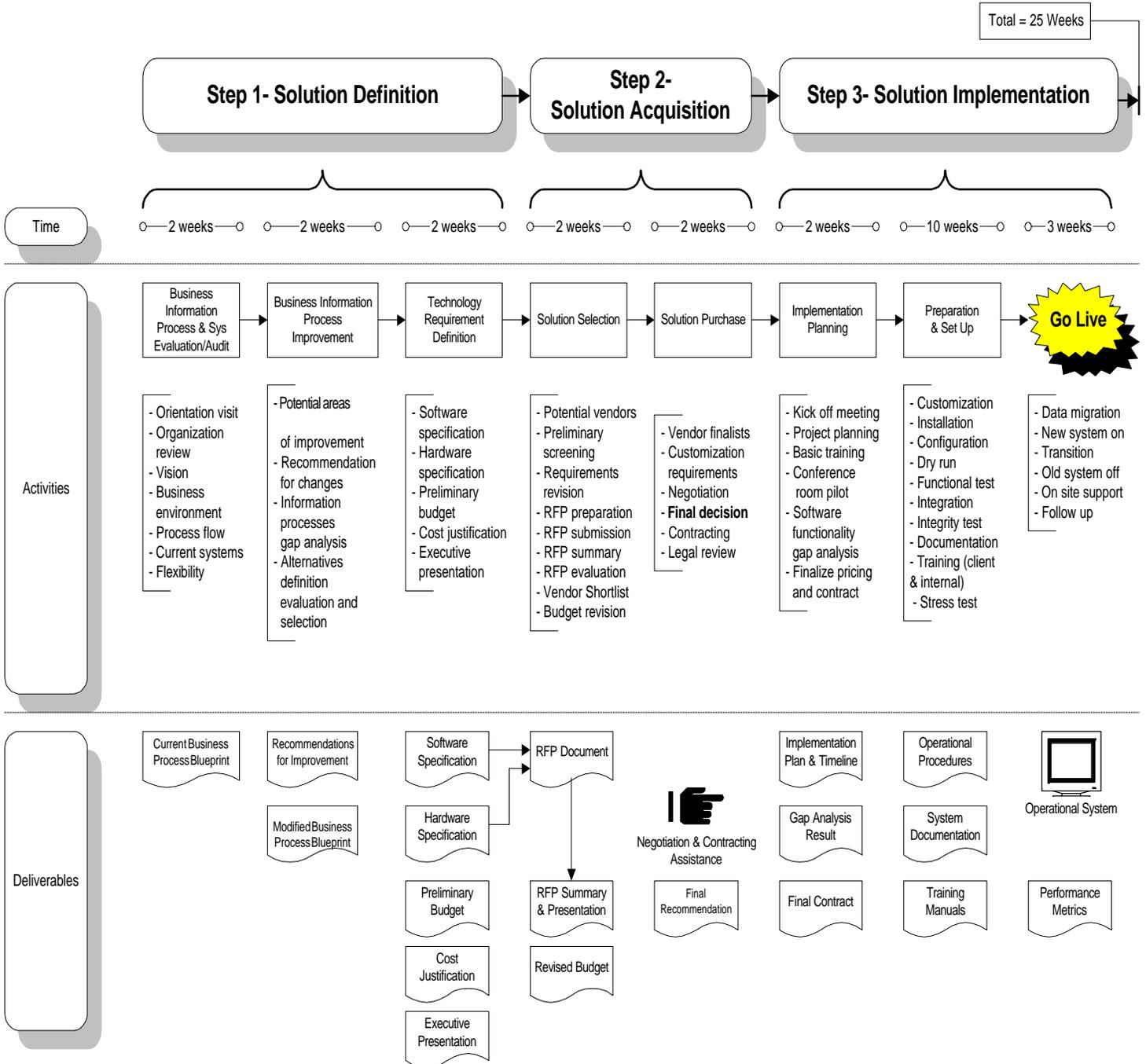
Data Warehousing

Due to the potentially enormous number of queries made by the many customers and clients employed by the 3PL, it is necessary to remove the burden of these queries from the WMS / ERP-Business System. The data is placed on a purpose built “data warehouse” which presents the data in a more digestible form and is able to handle the large demand.

Information is periodically extracted from the WMS/ERP-Business System through data extraction routines called “refreshers” and deposited into the data warehouse that is web-enabled via an Extranet. A firewall is inserted between the WMS/ERP Business System and the data warehouse in order to secure the internal systems and a second one at the Extranet level to secure client private strategic information. From here, both the client and the customer can view the information and plan accordingly.

Different information can be extracted separately as required, i.e. order status can be verified more frequently than a complete inventory snapshot of the warehouse. Frequent order status snapshots are attractive to the customer. Day end inventory dumps allow the 3PL to adjust their billing rates in way that are advantageous to the client. More sophisticated systems allow 3PL and its partners to integrate their supply chain via exception and monitoring movement with customized status and event notifications. Emerging WMS technologies are designed to handle multiple clients and multiple customers. This requires an elevated level of security for the information being stored on the 3PL’s WMS. Both the clients and the customers have restricted access to the information on the 3PL web site. A client only has access to information for which he has the appropriate user name and password. The same goes for the customers. This information availability is becoming the differentiating factor when a company is choosing between competent 3PLs.

WEB-VISIBILITY PROJECT TIMEFRAME



STEP 1: SOLUTION DEFINITION

1.1 Assessing the Relative Costs and Benefits of Adopting Web Visibility

Once you have decided to implement web visibility functions, whether from a WMS or a limited business application system, the relative costs and benefits will have to be assessed. In so doing, you can determine whether your 3PL is ready to implement such a function or needs to further develop its current tracking system. Of the expected costs and benefits of a web visibility system, costs are generally the easier side to quantify. Costs for such systems typically fall into several major categories:

- Planning costs;
- Initial hardware costs;
- Initial software costs;
- Initial development (staff) costs; and
- Continuous operations and maintenance costs.

It is generally possible to estimate these costs with a fairly high degree of confidence, based on estimates from vendors and research into the experiences of other firms. Once each cost component has been estimated, it is usually helpful to consider them together on an annualized basis, factoring in both the initial and continuous costs.

Methodology for Return On Investment (ROI)

Estimating the magnitude of benefits produced by a web visibility system is somewhat more difficult. This is because some of the benefits are difficult to put a dollar value on. For instance, it may be fairly easy to estimate the amount of customer time saved by implementing one application, but how do you put a dollar value on customer convenience or the experience using your customer oriented site? In this case, the best you may be able to do is to study the experiences of other firms in implementing similar applications. When studying the benefits, it is of the utmost importance to consider that web capabilities are becoming increasingly important to remain truly competitive in this industry. The initial cost layout may be worth the long-term results and payoff.

In order to demonstrate the value proposition, we suggest you that you develop a step by step ROI approach. Our partner, *Oracle Corporation*, have been developing such a dynamic methodology that we are suggesting you for your IT investment. The primary objective of the ROI analysis effort is to perform a diagnostic scan that enables improved understanding of the project initiative, enabling the customer to quickly make an informed decision. The ROI process is a customer specific diagnostic scan that quantifies an opportunity and builds a value proposition that substantiates the business case.

The ROI process consists of four primary phases:

Reach Agreements;

- Identify business process area that merits evaluation
- Agree to objectives, deliverables and timelines

Discovery;

- Assess the opportunity (performed via a workshop)
- Benchmark current performance levels and identify potential improvements
- Agree upon success criteria and levels of improvements

Document Results;

- Recap the results of the workshop
- Build the Business Case Justification

Present the Results;

- Results will be presented to management to lay the foundation for sustainable benefit.

The ROI process is the framework of both the evaluation and implementation process between our companies. This single process ensures that communication and commitments made during the evaluation process will be delivered during the implementation phase.

Issues Addressed

Using, “enabling the customer to make an informed decision” as a tangible goal, the ROI process is structured to help customers quickly clarify the following questions.

- What is the customer trying to achieve?
- What is not working satisfactorily?
- What is the root cause?
- What is the solution?
- How will the solution help actualize benefits?
- What is the Return on Investment?

Deliverables

Workshop Recap -- this document recaps the workshop activities and results, highlighting what was discovered and agreed upon.

Business Case Justification -- focuses on your business needs and how Oracle’s solution meets those needs. This document can be used to solidify end-user requirements, evaluate the Oracle solution and business case, and gain consensus within your company.

Business Case Justification presentation -- this is a joint overview presentation, led by your team leader. It is centered on discussing the results of collective efforts to date, and to gain consensus on the project direction.

1.2 Evaluate Your Current Internal Warehousing System

By taking a brief look through the remaining sections in this Toolkit, you should get a sense of whether your current IT infrastructure matches your level of web visibility expectations. Currently, many logistics providers have a business system with limited functionality as opposed to a fully integrated Warehouse Management System (WMS). The chart below outlines the different levels of internal systems that your firm may currently run to track warehousing and transportation activities. By looking at the various features in each level, you may find that you are more integrated than previously thought. The remainder of the Toolkit will be based on these specific system definitions.



Enterprise Resource Planning (ERP) / Standard Business System	Basic Warehouse Management System (WMS)	Advanced Warehouse Management System (WMS)	Advanced Warehouse & Transport Management Systems (WMS – TMS)
<ul style="list-style-type: none"> - Aggregate Inventory Data - Financial Information 	<ul style="list-style-type: none"> - Unit Load License Plates - Receiving - Putaway Tracking - Stock Locator - Cycle Counting - Compliance Shipping Labels - Shipping Tracking 	<ul style="list-style-type: none"> - Inbound Order Planning - Order Wave Planning - Compliance Forms - Load Creation Advice - Opportunity X-Dock - Loading Mgmt - System-Directed Putaway - RF Task Interleaving - Stock Location Mgmt - System-Directed Replenishment - Auto Wave Planning - Wave Planning Support - Suggested Shipping Cartons 	<ul style="list-style-type: none"> - Event Management - Transportation Management - Engineered Labor Standards - Physical Automation Support - Voice Technology - Planned X-Dock - Value Added Services

1.3 Update your databases, systems and processes to comply with the GTIN requirements

The purpose of the new Global Trade Identification Number (GTIN) is to replace the multitude of UPC bar codes that currently exist, and to harmonize them globally using a universal 14-digit global classification system with full implementation by 2005. This will eliminate the need for different translators, yielding a more efficient supply chain as a single bar code label will work across the entire supply chain. For example, a single can of cola could have four GTINs associated with it: (1) can; (2) box; (3) case; and (4) pallet.

Those Canadian firms that change their databases, systems and processes to comply with the GTIN requirements will be better equipped to transact global trade. Improving standards compliance for product identification and data synchronization within the Canadian retail supply chain will assist to prepare retailers for the shift to more advanced business-to-business global e-commerce standards (e.g., XML, ebXML) that are currently in development.

A smooth transition to the EAN.UCC System GTIN Family of Data Structures will contribute to more efficient supply chains for those Canadian firms that currently private label, manufacture, receive or scan UPC labelled products and/or that have the potential to be impacted by the new RSS (Reduced Space Symbology) coding that is being built into the GTIN to address produce and pharmaceutical labelling issues.

Canadian manufacturers, retailers and their supply chain partners need to understand the importance of planning, preparing and testing for compliance with the pending GTIN conversion. Minimizing possible disruptions in the operation of the Canadian supply chain, particularly at the level of the retailer, is of the utmost importance in the new global commerce arena.

An integral first step is a validation requirement to ensure that authentic UPC bar code prefixes are being used by manufacturers, suppliers, importers, wholesalers, retailers and distributors participating in the Canadian supply chain. Failure to use ECCC certified bar codes, for example, is resulting in lost export sales for Canadian manufacturers as large US retailers, such as Wal-mart are requesting certificates of authority as part of their contract requirements. Global Commerce Initiative reports that only one in five retailers verifies incoming bar codes and that, at the end of 2001, only 12% of point-of-sale retail systems were capable of scanning 14-digit GTINs; a figure which is expected to be in the neighborhood of 80% after 2005.

A quick environmental scan has confirmed that there is currently very little in the way of Canadian information or content on the steps needed to transition to the GTIN. Canadian industry, particularly those companies involved in export trade, need to begin the process of assessing the possible impacts of the GTIN on their product identification related hardware and software applications with a view to either upgrading or repairing systems as required to facilitate GTIN compliance by 2005.

1.4 Identify Your Company's Needs and Opportunities

The next step in the web visibility planning process is to identify your company's needs and opportunities in this area. You have to answer many important questions including: Does your company currently support a web-enabled system that offers delivery alerts, report and tracking tools? Do you have a full-fledged WMS system? EDI? Are your customers able to look up the status of their order? The receipt details? Their inventory balances, transactions and item information? This step consists of three parts: identifying customer needs through internal and external research, identifying opportunities by determining which of your business processes are best suited to automation and identifying a project champion.

A. Identify Customer Needs

Customer needs will be the driving force behind your move to implement web visibility. Tailoring solutions to provide your customers with the information they require enhances their experience with your company and allows you to avoid spending scarce resources in areas that your customers are not interested in. Fortunately, you don't have to look far to research your customers' needs. Information can be obtained in a number of ways:

- **Internal Sources** – Hold internal meetings to discuss your web visibility project can provide a forum for staff to provide useful feedback. Expand past your IT person/department to those who use the WMS/business applications and deal directly with customers. These groups may have some valuable suggestions and insight as to what your clients are looking for.
- **Customer Outreach** - Talk to your customers, ask them questions regarding their needs and what would make them more efficient, what services they would like to see you providing and possible barriers they are currently facing. The product you are developing will be for the customer so ensure that their needs are going to be met.
- **Researching the Competition** - Such research allows you to learn how other companies have targeted their efforts, and how successfully they have met customer needs. This research is not restricted to only the competition; look at companies in related fields or are the same size and dynamics as yours. Some sources that you can consult include: company websites, printed promotional materials and annual reports. Do not just focus on the domestic market; see what companies in the United States and around the world are doing as well. This will give you a better understanding of the entire market. After collecting this data, you will be able to benchmark your company's performance against others in your field to determine how successful you truly are.
- **Current Journals and Magazines** - By reviewing these you can become aware of current trends and issues in the industry. The Resources section of this Toolkit provides a starting point for locating relevant periodicals. In addition to journals and

magazines, consult with your industry associations – they should be able to provide you with market information. There is a listing of logistics industry associations also attached in the Resources section.

In addition to determining the needs of your customers, it will be important to assess how many customers your company's web enabled product is going to support. This number will have an impact on the frequency by which data will have to be transferred from the WMS/business application to the intermediary system that hosts the web visibility function. You will also have to determine the complexity and sensitivity of the information you are supplying to customers so that the proper security measures are taken. The main pieces of information that the client is going to expect from the web visibility product will be:

- Inventory
- Item information
- Invoices – both for the customer and the client
- Order status – has it been picked/packed/shipped/opened
- Receipts
- Shipments – estimated time of arrival/carrier/probill

You are going to have to determine which of these your system will be able to provide.

B. Identify Opportunities

Determining your customers' needs is one half of the process of identifying your web visibility solution; the second part is deciding which areas of your WMS/business application system are best suited to this medium. When identifying web visibility opportunities to improve your business, it helps to visualize your business processes. Look at your resources and current expertise areas. The chart below will help you with this assessment. It outlines what functionalities are possible to have as part of your web enabled product based on what level of system you have determined you have in Section 1.2 of this Toolkit.

Web-Visibility Functions / IT Systems	Inventory	Item Specifications	Invoices	Order Status	Receipts	Shipment Details	Exception – based alerts / performance monitoring
Enterprise Resource Planning (ERP) / Standard Business System	Availability: On hand / back order	SKU Number / basic description only	Fix	Process or not	Not available	Ship / Not ship	Not available
Basic Warehouse Management System (WMS)	Real time information on quantity and availability per site	Industry specific: high detail level	Customized to the clients and customers needs.	Process evolution: taken, print ... Track and trace on real time basis at warehouse level.	Real time information available inside the wall: incoming orders, receipts...	Ship / Not Ship	Not available
Advance Warehouse Management System (WMS)	Real time information on quantity and availability per site	Industry Specific: high detail level	Customized to the clients and customers needs.	Schedule to go out	Real time information available	Ship / Not Ship with detail information: probill number...	Monitoring and exception from the warehouse activities, limited applications.
Advance Warehouse Management System (WMS) link to Transport Management System (TMS)	Real time information on quantity and availability per site	Industry Specific: high detail level	Customized to the clients and customers needs.	Track and trace on real time basis at supply chain level	Inbound real time information available	Detailed information with transport company information available	Monitoring and exception at supply chain level, integration to partners systems.

C. Identify your Champion

Before you decide to implement an intermediary system to support your web visibility function, your company has to ensure it has executive commitment. 50% of all information technology (IT) projects fail because they failed to gain CEO commitment from the beginning. Senior Management buy-in will determine the success rate of this initiative as will a champion at this level. While developing your business case, make sure that the finance and the IT departments are fully informed and part of the decision making process. In conjunction with these groups, a budget has to be developed that determines the return on investment, net present value and cost justifications this endeavor will have for the company. This will help to ensure that you do not under budget for the project – be overly conservative by a long shot.

1.5 Inventory of Resources

An important step in determining what you need to implement web visibility is to take an inventory of the existing resources that you have in place today. Such resources range from computers, to network infrastructure, to staff with skills in specialized Information Technology areas. The following checklist, shown in the table below, can help you conduct a preliminary inventory of your firm's existing resources.

How to use the checklist

1. Take note of every resource that your firm currently possesses by marking the box next to each item. In the case of computers, staff and your IT department, you may wish to estimate the size of each resource - for instance, the number of Web design professionals or the number of desktop computers/servers in your company.
2. Examine where your strengths and weaknesses are. For instance, if you have extensive hardware and fast Internet access but a small IT department, note that the latter could be an area of weakness. Depending on your opportunities (identified in Step 1.3, B), you may decide to invest in certain areas to support your e-commerce infrastructure. Keep in mind, however, that it is doubtful that you will need every item in the checklist, unless your company is very large and is implementing extensive web visibility solutions. Visit ebiz.enable web site at www.strategis.gc.ca/ebizenable for further guidance on the checklist items.

CHECK LIST OF E-COMMERCE RESOURCES

IT DEPARTMENT		SOFTWARE	
IT Skills	☐	Web Browser (ex. Internet Explorer)	☐
Hardware Maintenance	☐	Database Server (Oracle, DB2, MSQL, etc)	☐
Software Maintenance	☐	Web Server (ex. MS IIS, Apache)	☐
Database Programming/ Administration	☐	Application Server (ex. WebSphere, Oracle)	☐
Web Design	☐	Virus Software	☐
Web Programming	☐	Enterprise Resource Planning Software	☐
Internet Security	☐		
Networking	☐	INTERNET ACCESS	
		Dial-up Connection	☐
IT BUDGET	☐	ADSL	☐
		Cable Internet	☐
HARDWARE		ISDN	☐
Desktop Computers	☐	T1/T3	☐
Server	☐		
Faxes	☐	SUPPORT STAFF	☐
Phone Lines	☐		
NETWORKING			
Local Area Network	☐		
Wide Area Network	☐		
Value Added Network	☐		
Intranet	☐		
Extranet	☐		
Firewall	☐		

1.6 Decide on your approach: in-house, outsourced, or a combination of the two

The inventory of resources you have conducted in this step will help you decide whether to develop and maintain your web visibility applications in-house or work with an outside vendor or consultant. Chances are, as a medium sized 3PL without a fully integrated WMS, this will be an outsourced task. Depending on your resources and the type of application you wish to adopt, you may also choose to adopt a hybrid approach, in which you develop some functions in-house and work with consultants in other areas.

A. In-house Design Approach

The table below summarizes the advantages and disadvantages of in-house design. For those 3PL providers with an advanced WMS application, in-house design can be an

effective method for planning, designing and implementing web visibility. Setting up an intermediary system site may require little more than some in-house talent and several easily accessible Web design tools. However, more sophisticated WMS' that allow customer interaction require more intensive programming skills and tools which your resources may not be able to support.

Advantages	Disadvantages
Better accessibility to the project	Less exposure to outside knowledge and resources
Better knowledge of the system and its development	Limitations of staff skills and their experience
Retention of knowledge and skills in staff	Longer development times
Greater self-reliance and independence for updates and expansion	Higher ownership costs, in some cases

B. Outsourcing Design Approach

Depending on your firm's ability to carry out web visibility implementation, you may find that you will need outside help. This is where a consultant or vendor enters the picture. Hiring a consultant usually involves a larger initial cost, however, experience has been that the higher initial investment pays off in the long run and results in lower ownership costs. The table below summarizes the advantages and disadvantages of outsourcing.

Advantages	Disadvantages
Experienced staff with technical "know-how"	Less accessibility to the project
Greater exposure to outside knowledge and resources	Less knowledge of the system and its development
Faster development times	Lack of growth of knowledge and skills in your staff
Experienced staff in specialized areas, such as on-line security	Not in house staff.

C. Hybrid Approach

Finally, you may wish to pursue an approach that combines in-house development with assistance from a consultant or vendor. For instance, you may wish to have an external company host your site while you develop your web visibility applications internally. Or you may choose the opposite approach and host your own Web site (if, for instance, you already have an extensive on-line presence) but have an Application Service Provider (ASP) implement your web visibility functions. There are many other combinations here, including outsourcing just the security, testing, monitoring or maintenance of your web visibility solution.

STEP 2: SOLUTION ACQUISITION

2.1 Selecting a Project Team, Vendor or Consultant

Once you have decided whether to develop your web visibility solutions in-house, externally, or using a combination of resources, you will need to put together an internal project team, or select an outside vendor or consultant. Assembling an internal project team involves several considerations; the following aspects should be considered:

- Identifying an effective leader for the effort. This person should possess both the "big-picture" business vision and a solid understanding of the technologies involved. They should be able to engage others in their effort.
- Assembling a team that can execute the day-to-day tasks of developing web visibility solutions.
- Ensuring that these personnel have the time and support to carry out their mission in the targeted time frame.

If you have chosen to outsource part, or all, of the web visibility deployment process, you will need to select a team as well. Choosing the right consultant to work with your team, is a matter of studying your firm's needs and matching those to the consultant's expertise. For a list of IT suppliers in the supply chain arena, visit:

<http://www.infochain.org/directory/index.html>

Cost is, of course, a major consideration in choosing a consultant or vendor, but not without regard to other factors. The old rule of thumb "you get what you pay for" is just as relevant in web-enabled products as anywhere else. Finding a well-qualified consultant with previous project experience or by referral may prove more prudent. Fortunately with the availability of the Internet, finding consultants that specialize in e-business applications has never been easier. This selection process should not be taken lightly; some areas to watch out for in this selection process are:

- **Being under prepared** – This will result in possibly selecting the wrong individual. It may be time consuming, but get help in the preparation stage if you need it and interview your prospective consultants beforehand. Time well invested now will save you from unnecessary problems in the future.
- **Poor business requirement definition** – Do not try and pick someone who has a vision that is too large for your company to implement. Be realistic.
- **Lack of due diligence** – take no chances. In the case of a consultant, evaluate the company the person works for as well as the individual's expertise.
- **Under negotiating** – This is why a lot of companies over spend on projects. Negotiation is the art of paying fair market value.

2.2 Setting Up Your Infrastructure

The next major step in planning to implement your web visibility solution is to plan for the infrastructure necessary to keep it operating. The following sections discuss the main areas that should be considered.

A. Setting up an Intermediary System

A Data Warehousing PC server is a computer that allows computers connected to the 3PL system to receive all required data that will be transmitted to the web enabled browsers. The more traffic the site receives, the more sophisticated the Web server must be to handle the load.

The Data Warehousing PC server is a computer with software that allows it to store and retrieve data on a network. This data is generally grouped into tables that have a common theme or type of information. For example a table could contain information about shipments such as the customer's ID, time of pick-up, last point of contact, estimated time of arrival, and the cost of the shipment. The database server plays a key role in the e-commerce operation by providing information on demand to your customer through your web-enabled browser. For example, when a customer requests shipment status information on-line, the server receives the request, queries the database server for the information and displays it back to the web site. As with web servers, a database server can be simple or sophisticated, depending on the volume of data. Depending on this sophistication and the needs of the customers, information can be downloaded once a day or as frequently as required.

To better visualize the intermediary system's function, refer to the diagram : Web Visibility Value Proposition Infrastructure on page 7 of this Toolkit.

B. Developing or Purchasing Your Application Software

To coordinate the flow of information from your database to the customer's web browser, you need to develop or purchase application software. The application software contains the programming logic that takes care of these core functions as well as intermediary steps. These steps include:

- Logging the customer into your web site using a password and user-id;
- Receiving requests from the customer through the web site;
- Searching the database to retrieve the requested information; and
- Displaying the information back to the customer's web browser.

Typically, application software can be written in a variety of programming languages. The programming language(s) that you use may depend on a variety of factors such as existing software, budget and performance requirements. Typically, most web application

software is written in Java, a very common language used for e-business application sites. Developing your application software involves determining what components you will use and matching them with the best programming language.

If you are purchasing your application software be sure to invest the time in researching the product and test driving it. Many companies end up spending millions of dollars on technology solutions and fail to realize their return on investment. First and foremost you must have the CEO's commitment to this investment; budget approval must be done beforehand.

Document and map a thorough study of your current operations and interview your prospective vendors beforehand. Do not take everything you are told by the vendors at face value. Have people from your organization test out the software, make sure there are user manuals and process documentation available and do not buy into future releases that have not yet been developed. Make sure every component is documented and received in writing in case you are unsatisfied or the vendor fails to meet various terms of the agreement. Do not only focus on the software, look into the company. You want to ensure that you have the right partner and product. Study their software development methodology and release cycle. If possible, conduct reference checks with past clients and customers of theirs and visit their offices. All of this may appear to be time consuming, but it will avoid needless spending and result in the best solution for your company.

C. Establishing a Dynamic Site

Web enabled products have changed dramatically over the past few years. In a short time, they have evolved from simple pages with links and images to fully interactive sites using a combination of interactive applications and animation. The most significant change has been in the ability of sites to provide information on demand. For example, a customer visiting your site can instantaneously view the status of his or her shipment with the click of a mouse. The move from static web pages to dynamic web sites makes on-line interfaces the perfect tool for e-business.

At this point you have now had an overview of what a WMS manages. Depending on your business application system, the information that would be typically posted on the web site where the customer has access to could include any, or all, of the following:

- Inventory;
- Item Specifications;
- Invoices (to customer from client, to client from 3PL);
- Order status (open order, picked, packed, shipped);
- Receipts;
- Shipment details: estimate time of arrival, carrier, probill.

2.4 Security of Your Web-Visibility System

Internet security is one of the largest barriers to the growth of on-line business transactions. It is important to note, however, that this issue is more of a perceived barrier than a technical one. The technology for secure Internet transactions exists today, with varying degrees of reliability. In this step of the planning process, you will develop a strategy for ensuring the security of your applications and data for both the customers and clients. This may require attention to the following areas:

- **Securing the connection by installing a firewall.** A firewall is software (or a combination of software and hardware) that filters on-line traffic based on a set of rules. Firewalls can cost upwards of \$70,000 or they can be downloaded for free. The type of firewall that you will need depends on the size of your organization and the sensitivity of your data.
- **Securing your servers.** Securing your servers requires the proper installation of the operating system and the software running on it. All operating systems come with security checklists. Web and database servers also have security checklists and procedures that should be followed after installation.
- **Securing your application code.** If you are developing your application software in-house, it's important to ensure sound security measures. The rule of thumb in developing application software for the Internet is to trust no one. The most common attack on a web site is submission of malicious code through web forms. Filtering out malicious code is the job of the application developer.

When securing your system it is a good idea to get the help of an outside consultant or security expert. Having the same person or persons who designed your system do the security work can be risky. This is where an independent security audit comes into play. Security consultants specialize in finding security holes in systems by conducting audits.

Advantages of Performing Security Audits

1. Maximizing system security
2. Avoiding loss of valuable data
3. Increasing customer confidence
4. Independent and non-biased security evaluation

STEP 3: SOLUTION IMPLEMENTATION

3.1 Developing a Plan to Implement Web Visibility

At this point you have determined your customers' needs by doing some market research, taken stock of your firm's web visibility readiness, and decided on which approach to take. Now you are ready to take the next step to have your team, whether internal or external, develop a plan to guide the development and implementation process.

3.2 Integrating Existing and New Systems

One of the most important parts of the planning process is developing a strategy for integrating your new system with any existing or legacy systems your company may have in place. The first step to starting an integration plan is to review your needs and capabilities. You've determined your needs in Step 1, and you've assessed your capabilities in Step 2. Using these two pieces of information, you can come up with an effective integration plan that will help you achieve your business goals.

3.3 Developing a Plan for Testing, Monitoring and Maintenance

Developing a plan for testing, monitoring and maintenance is a crucial step in ensuring that your web visibility solution achieves its objectives. Downtime of a system can cost your firm significantly in terms of lost revenues and customer satisfaction. Therefore, high availability is crucial to the success of your web visibility system. The following guidelines, shown in the table on the next page should be considered in planning for testing, monitoring and maintenance of your web visibility system. While developing a plan for testing, monitoring and maintenance of your e-commerce system may require an initial time investment; it will prove well worth the effort as you deploy the project.

However, even these cases may be difficult to compare because firms often approach deployment from such different starting points, and firms may serve different markets or geographic areas. In this case, the best a firm can do is produce a rough estimate of benefits, compare these to the estimated costs, and make a decision based on the best information available.

System Testing, Monitoring and Maintenance Guide Testing

Testing **Pilot Projects.** Running a pilot project involves finding a willing customer that will agree to use the new web enabled system over the duration of the pilot. The pilot project should address the following sections:

- Training – Too often, companies do not provide adequate training to their staff. Very little time is spent cross training individuals, which results in the creation of unnecessary work for another area. The training should be done internally as well as with the customer so that when the system goes “live,” the success rate will be much higher.
 - Does the customer find the system easy to use?
 - Does the customer feel that there is value added to their experience?
 - Are there any deficiencies in the system that the customer observed?
 - Is the customer willing to continue using the system and if not, why?
-

Monitoring **Analyze** how your customers are using the site by:

- Reviewing transaction records or web server logs. You can determine how often, how long and at what times your customers are using the site.
 - Perform routine customer interviews to provide better insight into customer experience with your site.
-

Maintenance **Software Maintenance:**

- Install software patches. To remedy new security holes or performance problems, vendors release software patches.

Hardware Maintenance:

- Perform routine checks. Replace any worn out or defective components. Hardware performance monitoring software is also available (either with the operating system and/or the server itself).
 - Provide redundancy. High-end servers use a redundant array of independent disks (RAID). These hard drives can be replaced while the server is still on and since they store the same data in different locations, they provide a level of redundancy or "fault tolerance."
-

3.4 Decision Time: Deploy the System or Revise the Plan?

Having assessed the relative costs and benefits of your planned web visibility system, now it is time to make a decision. If the benefits outweigh the costs and justify the effort spent on developing the plan, you will likely want to put the plan into action. If the costs outweigh the benefits, or the benefits are marginal, your plan may need to be re-worked. It is important to note that with today's rapid pace of technological development, there is always an element of uncertainty when deciding whether to invest in technology solutions. It is possible that by the time your system is implemented, new technologies or methods of business interaction will have emerged that make your system less than state-of-the-art. The good news in this area, however, is that industries are moving towards common software platforms and standards that should make applications interoperable and functional well into the future. Furthermore, by developing and adopting your plan now, you can position your firm ahead of the curve in web visibility deployment, and maximize your competitiveness as other firms strive to keep pace.

3.5 Putting Your System to Work

Now that you've made the decision to deploy your system, the last step is to put the system to work and see how it performs. You may choose to move into full-scale deployment right away, or you may choose to start with a pilot project and expand it as conditions warrant. Either way, continuous testing, monitoring and maintenance of your system are critical. Once you have deployed the system and the monitoring results are positive, you're on your way to full web visibility!

GOVERNMENT RESOURCES

Ebiz.Enable – <http://strategis.ic.gc.ca>

Ebiz.enable is an e-business portal designed specifically to guide commercial organizations through the issues and options encountered in implementing e-business strategies.

SourceCAN – <http://www.sourcecan.com>

SourceCAN is a Web-based storehouse of the most complete information on Canada's business sector, a fully vetted database of Canadian companies and their capabilities that is constantly being updated. Use it to find potential logistics partners, clients and suppliers.

Canada Business Service Centre - <http://www.cbcs.org/>

The CBSC web site offers a single point of access to information on federal and provincial government programs, services and regulations. Documents called Info Faxes can be downloaded from the Web site; they include the latest government studies and statistics on e-commerce.

Electronic Commerce Canada -<http://www.ecc.ca>. Electronic Commerce Canada is a voluntary organization providing a forum for sharing information and discussing ideas and initiatives. Free half-day educational awareness seminars are conducted monthly, from September to June, for those interested in electronic technologies.

Electronic Commerce Council of Canada (ECCC) – <http://www.eccc.org>.

The ECCC is a not-for-profit voluntary standards organization that works with multiple industry sectors to enhance the efficiency and effectiveness of their supply chains. The ECCC also provides education and documentation on standards.

Electronic Commerce in Canada - <http://ecom.ic.gc.ca>.

Electronic Commerce in Canada is an Industry Canada Website providing information on Canada's Electronic Commerce Strategy and its various initiatives.

Strategis E-commerce resource listings - <http://strategis.ic.gc.ca/SSG/it05171e.html>.

Strategis listing of Canadian IT resources for hardware and software providers, Web service providers and total solutions providers, EDI providers and access technologies (network facilities) providers.

The ECO Framework - <http://eco.commerce.net>.

ECO is an e-commerce Web site promoting a standard framework for interoperability within e-commerce markets.

JOURNALS, MAGAZINES AND PRINT MATERIALS

Supply Chain and Logistics Journal - <http://www.infochain.org/quarterly/journals.html>
The official publication of the Canadian Association of Supply Chain & Logistics Management. A quarterly magazine focusing on all aspects of the Supply Chain.

Business2.0 – <http://www.business2.com>.
Business2.0 is a magazine providing news and resources for e-business and e-commerce. Print subscriptions are also available on-line.

BusinessWeek ebiz – <http://www.businessweek.com/ebiz/index.html> . Business Week's ebiz magazine provides information, news and current events in the world of e-business. Issues can be viewed on-line for free. Print subscriptions are also available on-line.

CIO.com – <http://www.cio.com/>.
CIO is a magazine providing news and information about Information Technology and e-commerce to the information executive. Current and previous issues can be viewed on-line for free. Print subscriptions are also available on-line.

ECOM World – <http://www.ecomworld.com/>.
Electronic Commerce World, a monthly business-to-business magazine, provides business executives and managers with comprehensive coverage of e-commerce technology and services. It informs executives on how to improve their businesses using e-commerce methods and it provides e-commerce vendors and users, with insight on how they can plan their market strategies.

E-Commerce Times – <http://www.ecommercetimes.com/>.
The E-Commerce Times is a free on-line publication, with daily news and feature articles for entrepreneurs and companies doing business on the Internet.

eCompany Now - <http://www.ecompany.com/>.
eCompany Now is a magazine delivering news about technology trends on the Web. Articles are written in practical terms for business people who want to know how to put the Web to work for their business. Featured articles can be viewed on the Web for free. An on-line subscription is also available.

Internet World – <http://www.iw.com/> /
Internet World provides information for business leaders to make highly effective strategic, managerial and purchasing decisions as they drive their Internet initiatives and grow their businesses. Visitors can view articles on-line or subscribe to the print version.

REFERENCES

- IDC, Are Shippers Ready for Web-Based Logistics Management Services, 2001
- IDC, IDC e-logistics Survey 2001, 2001
- IDC, SynQuest: A promising Strategy for Success in Moving from Manufacturing into Supply Chain Automation, 2001
- Forrester, New Technology Can – And Must – Improve Partnering, 2001
- IDC, Product Supply Chain Applications: Challenging the Collaboration of Supply Chain Partners, 2001
- Financial Times, Users focus sharply on cost cuts and flexibility. Amid the downturn in many sectors, an efficient and adaptable supply chain has become crucial to business survival, reports Penelope Ody, December 5, 2001
- Forrester, Nistevo Enables Logistics Network Collaboration, 2000
- Forrester, Network Supply Chains Emerge, 2001
- E-commerce Times, Supply Chain Apps Hold the Bottom Line, February 8 2002
- Forrester, Multiplier Efficiencies: A Value Chain Mirage, 2001
- Gartner, Supply Chain Collaboration: Lessons from the leading Edge, 2001
- Kom International Inc.
- Canadian Supply Chain and Logistics Management Association Research Board
- E-commerce and the Canadian Trucking Industry Tool Kit, March 2002, Industry Canada, Transport Canada, Canadian Trucking Alliance, IBI Group in association with Sabounghi & Associates