SPARX SYSTEMS

SMART FREIGHT PROCESS MODEL
Developed for Port of Melbourne using Enterprise Architect

CHALLENGE

The primary purpose of Smart Freight is to generate major efficiency gains and reduce freight congestion in and out of the Port of Melbourne through the development of integrated Information and Communication Technology (ICT) based solutions.

SOLUTION

An integrated Enterprise Architecture model provides an effective and dynamic means of analyzing the relationships between organizational roles, processes and technology, and potentially other dimensions, within a specific project or process area and also across the entire organization.

WHY ENTERPRISE ARCHITECT

By using Enterprise Architect, Red Wahoo were able to develop an Enterprise Architecture Framework within months, rather than years, and in doing so realized a significant cost reduction for the client.

Background

As the point of ingress and egress for a country's imports and exports, a port is a regional gateway to international trade and is therefore, a key competitive asset. In the overall transportation network they are a critical component and facilitate the majority of international trade. As such ports are a link to international sources and markets and the economic growth of a region or nation can be inhibited by sub-optimised or weak, port infrastructure.

Insofar as they serve as a common portal for sea, road and rail, the major ports deliver combined functionality. Trans-shipment and transit of imported goods increases the need for efficiency. The goods are repackaged for easier transportation to local terminals or transported for redistribution, often using road and rail links.

As shipping trade increases and vessels become larger with increased capacity the corresponding growth in port activity will place additional pressure on existing infrastructure and increase the complexity of in situ operational processes.

"Regional and inter-capital freight flows could grow at up to 8% per year resulting in a doubling of freight volumes by 2016. Innovative and commercially realistic strategies are required to enhance the capability and capacity of the Victorian TDL (Transport, Distribution and Logistics) industry, if it is to be able to deal effectively with this growth in the freight task. This includes working toward the Government's objective to have 30% of freight transported to and from all Victorian ports by rail by 2010". [1]

Port of Melbourne

The Port of Melbourne is of key economic importance to Melbourne and Victoria as it handles more than 80 per cent of Victoria's exports. The Port of Melbourne is Australia's largest and busiest container port, handling nearly 40 per cent of the nation's container trade. It is also the largest automotive port in Australia and one of the largest general cargo ports.

The Port of Melbourne supply chain involves around 3,200 ships from over 40 shipping lines, nearly 2 million TEUs and 50 million tonnes of bulk cargo transiting the wharves of four stevedores, three train operators and 250 trucking companies.

On an average weekday, over 4,000 trucks visit the Port of Melbourne. Container movement through the port generates at least 100,000 shipping transaction documents a day. In some circumstances a single container can generate in excess of 60 documents. [2]

Smart Freight Initiative

To support the creation of a seamless system for the State's freight and logistics industry, the Victorian Government commissioned the Smart Freight initiative.

The primary purpose of Smart Freight is to generate major efficiency gains and reduce freight congestion in and out of the Port of Melbourne through the development of integrated Information and Communication Technology (ICT) based solutions.

The Victorian Government Department of Infrastructure engaged Red Wahoo to build an Enterprise Architecture model of the Port of Melbourne (PoM) Supply Chain.

The model allows organisations operating within the Port of Melbourne network to:

- *Identify where they operate and fit within the network*
- *The commercial interactions between stakeholders*
- *Business collaborations between stakeholders*
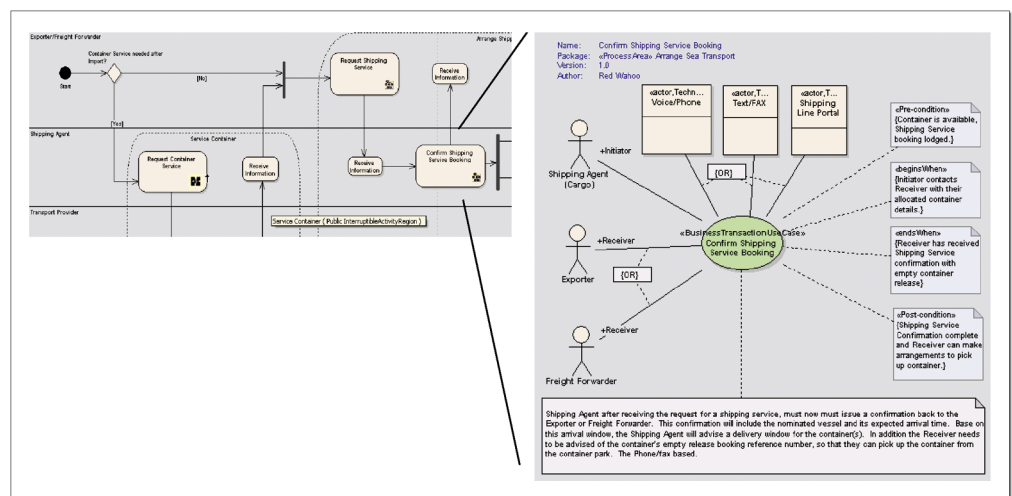- *Technologies employed to enable interactions between stakeholders.*

Figure 1   **The Enterprise Architect model allows commercial interactions between the stakeholders to be clearly defined at both a business process and technology level**

The model is used by PoM Supply Chain participants both large and small to provide a clear picture of how they can improve interactions with supply chain participants and for reduction of the number of assumptions about processes and information flows throughout the supply chain.

The model was published using Sparx Systems Enterprise Architect [3] and can be viewed at: http://www.doi.vic.gov.au/connectfreight

Model Development

Enterprise Architect was selected as the UML Tool for the PoM Supply Chain Model. Enterprise Architect is a product of Sparx Systems which is based in Creswick, Victoria. Enterprise Architect has achieved international acclaim as one of the best UML tools on the market.

Sparx Systems is also supportive of both State and Federal modelling initiatives; Enterprise Architect has been used in the Federal Government's GovDex [4] initiative and is also being used in the Master of e-Commerce program at Melbourne University.

The development of an Enterprise Architecture framework has traditionally been time consuming and costly. By using Enterprise Architect, Red Wahoo were able to develop an Enterprise Architecture Framework within months, rather than years, and in doing so realized a significant cost reduction for the client. Furthermore it has allowed the client to understand and analyse the business processes in its jurisdiction, and therefore identify and prioritise areas requiring process improvement.

The methodology chosen for the POM Supply Chain Model is a subset of the Business Collaboration Framework (BCF [5]) methodology created by the UN/CEFACT [6], (United Nations /Centre for Trade Facilitation of Electronic Business). The BCF methodology was developed to allow communities to model the complex commercial and technical interactions that occur between organisations.

Unlike traditional process modeling approaches BCF provides many advantages:

- *All processes are documented to a common level of detail. Traditional approaches often allow an analyst to document well understood processes in detail, while poorly understood processes are glossed over.*

- *All entities such as roles, assets, documents, information, technologies etc are named once. This ensures consistency throughout the model and enables meaningful analysis of the resulting model.*

- *A consistent structure is applied from business strategy through to task by organisational unit, service area or department. This enables processes, roles, activities, technologies and tasks to be assessed for compliance to and support of corporate strategies and objectives.*

- *No vendor lock-in to a particular proprietary methodology or tools. Typically the model is owned, governed and worked on by the customer organization on an ongoing basis long after Red Wahoo has completed the initial set up.*

Benefits

Construction of an integrated and well structured Enterprise Model offers many business benefits:

Enterprise Knowledge

An integrated Enterprise Architecture model provides an effective and dynamic means of analyzing the relationships between organizational roles, processes and technology, and potentially other dimensions, within a specific project or process area and also across the entire organization.

An Enterprise Architecture view is important for both system-related tasks such as requirements gathering or needs assessment and people-related tasks such as user skills definition or change impact assessment.

Process and Information Harmonisation

In many businesses processes and information are replicated across and between departments, but in different ways. This leads to additional cost, inefficiency and fragmented work processes.

Within the Enterprise Architecture model processes are organized within higher order Process and Business Areas, and ultimately, Business Goals, Objectives and Strategy.

Performance Improvement

The model then provides the business analyst with the information and tools to identify and harmonize processes leading to simplification of operations, efficiency gains and cost reduction.

Technology Alignment

In many organizations data and information is replicated across multiple IT platforms. An Enterprise Architecture separates processes and information from technology and the model enables business analysts to assess the fit of technology solutions to business process requirements.

Improved Communications

Communications and understanding between operational departments is often fragmented leading to conflict, debate and misunderstanding.

Figure 2 **An integrated and interactive model provides a holistic view of end-to-end business processes and allows the viewer to "drill down" to more detail**

An Enterprise Architecture model provides a clear view of cross department process and information requirements. Optimal use of the model leads to improved communications, understanding and interdepartmental cooperation.

The increased use of Information and Communications Technology (ICT) will be crucial to improving the supply chain performance of Victoria's freight and logistics Industry.

Conclusion

To mitigate the risk of supply chain disruptions, changes in demand and exceptions in a globally dispersed trading network, end to end visibility and traceability of inventory is essential. Without this, real opportunities are often invisible and perceived opportunities are often fraught with unseen difficulties. Likewise, clarity and understanding can help justify perceived opportunities.

The Enterprise model developed in Enterprise Architect lays the foundation for understanding the business landscape effectively and in manageable manner.

In the Port of Melbourne between 25 and 30 different stakeholders are involved in import and export supply chains. The Port of Melbourne Supply Chain Model developed by Smart Freight describes all the individual business interactions that take place between these parties and the technology that is utilized by each.

The Model is the first of its kind to be available publicly, and is currently being distributed to industry and education institutions. Improvements in the efficiency of the import and export supply chains are expected to lead to measurable gains for the Victorian economy.

The model has been used by other enterprises and government alike to identify opportunities for business process improvement. It was integral to scoping and commencing the follow on phase of work (ie. implementation of an information exchange infrastructure). The model continues to be updated and used throughout the port community as a means of communicating and further understanding the Port of Melbourne supply chain.

The work that Red Wahoo has undertaken has been recognized by the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) which plans to use the Model as the basis for a global supply chain reference model. The Business Activity Harmonisation Study (BAHS) has based their Whole of Supply Chain Awareness pilot on the Smart Freight Model. [7]

About Red Wahoo

Red Wahoo is an Australian professional services and software organization having specialized skills and credentials in community adoption of broad scale interoperability.

Red Wahoo is recognized as a significant contributor to the international standards bodies including UN/CEFACT, OASIS and W3C. This investment is unrivalled in Australia and Red Wahoo is committed to the leverage of this investment to the benefit of its clients.

Red Wahoo currently holds the Chair of the UN/CEFACT Architecture Working Group. It is also collaborating with CEFACT participants including the University of Vienna to develop a plug in tool set that facilitates business modellers to follow CEFACT methods using Enterprise Architect.

Red Wahoo is author of the Australian Government Name and Address XML Schema standard, and authors of the Government Information Exchange Methodology (GIEM).

About Department of Infrastructure Victoria

The Victorian Government Department of Infrastructure (DOI) supports the ministerial portfolios of Public Transport, Roads and Ports and Major Projects and is responsible for administration of a budget of $10.1 billion over the next 5 years. The mission of the Department of Infrastructure is to lead the strategic planning, integration, development and management of:

- *transport;*
- *major projects;*
- *freight and logistics; and*
- *security of critical infrastructure to enhance Victoria's growth and liveability.*

The Department is committed to undertaking this role in ways that are economically, socially and environmentally sustainable. [8]

References

1   http://www.business.vic.gov.au/busvicwr/_assets/main/lib60048/sce-plan.pdf

2   http://www.doi.vic.gov.au/DOI/Internet/Freight.nsf/AllDocs/4FF972208DEF539FCA257066001AF1C
     2?OpenDocument

3   http://www.sparxsystems.com/

4   https://www.govdex.gov.au

5   http://www.cs.univie.ac.at/upload/publications/00000.MKWI2004-finalVersion-
     HofreiterHuemerNaujok.pdf

6   www.unece.org/cefact/

7   http://www.doi.vic.gov.au/Doi/Internet/Freight.nsf/AllDocs/DAC36845FF93520DCA257066001ADDDA?
     OpenDocument

8   http://www.budget.vic.gov.au/CA2572B00081B35D/WebObj/BP3Ch3DOI/$File/BP3Ch3DOI.pdf