Singapore

Background

What motivated the establishment of your Single Window (SW)?

In the mid 1980's, the Singapore government decided to streamline the processes involved in the regulatory framework of trade permit approvals to further strengthen the established trade hub status of Singapore and to improve external trade. Special committees comprising high powered government officials and business leaders were set up to ensure sufficient backing for the use of IT to support the re-engineering and improvement of the trade regulatory framework and processes. In fact, then Minister for Trade and Industry, Brigadier General Lee Hsien Loong (now the Prime Minister of Singapore) chaired the review committees for approval of the plans and implementations.

Starting with the trade process involving a few government agencies in 1989, the Singapore TradeNet® System today provides the trading community with an electronic means of submitting trade documents to all relevant government authorities (Singapore Customs and the controlling agencies) for their processing, through a single electronic window. Within 10 minutes after submission of the permit application, traders will receive an electronic response, be it approval or rejection, with details on the approval conditions or reasons for rejection.

TradeNet was established with the key objectives to:

1. Reduce the cost of trade documentation
2. Reduce delays in turnaround time for trade documentation
3. Increase authorities' processing efficiencies with a streamlined process flow
4. Attract foreign direct investment as a result of operational efficiency and transparency

TradeNet, the world's first nationwide electronic trade documentation system, has been recognised as a great contribution to Singapore's pro-business environment, increasing efficiency and lowering business costs for the Singapore trading community with the innovative use of IT.

What year was it established?

TradeNet was launched on 1 Jan 1989. It was recognised by the Government that the introduction of the TradeNet would bring about many benefits to the Singapore trading community and hence to the economy as a whole. The high cost savings, greater efficiency and shorter turnaround time derived from TradeNet made Singapore a much more competitive trading hub.

What is the current status of the facility (study, pilot phase, running)?

The TradeNet system has been in operation and serving the Singapore trading community since 1989. 100% of the trade declarations are submitted and processing electronically via the TradeNet system. The Government had also mandated the electronic submission of trade declarations.

Through TradeNet, some 9 million trade permit applications are processed per year, of which 90% are processed within 10 minutes and some 70,000 certificates of origin are issued yearly via TradeNet.

Establishment

How did the SW interface with already established systems (if any existed)?

Before TradeNet, there was no one overall computer system to coordinate all processes and trade permit processing was done manually. The main design principle that TradeNet adopted was to reduce the interfaces required by the shipping community with the systems belonging to different government agencies.

Different methods of interfaces were used for the integration. For those agencies which had yet to develop a system for processing trade permits, a user interface was provided for approval of exceptions which the business rules in TradeNet could not automatically approve. For those with existing systems, TradeNet built a few standard interfaces including MQ, flat file transfers, ftp etc.

However, it is important to note that all the processing logic and rules are centralised in TradeNet, thereby realising the optimisation of resources and time spent by automating the business rules of the agencies involved.

Did any other SW model serve as inspiration or model?

In 1986, a core team and several working groups comprising representatives from relevant government authorities and private sector parties were formed. They were to conceptualize a nationwide single electronic window for traders to submit trade declarations electronically to the government authorities as there was no other single window that could be modelled after.

Hence, existing procedures of various authorities concerning information and processing requirements were analysed, documented and simplified such that trade procedures were streamlined. Automation was implemented based on a single form concept that is able to meet the trade documentation requirements of all government authorities. CrimsonLogic Pte Ltd (formerly known as SNS Pte Ltd) was formed as a private entity to deliver and host the TradeNet system.

What process was followed in setting it up? Was there a pilot project?

A phased approach was adopted. First to be implemented was the electronic processing and approval of import and export permit applications for non-controlled and non-dutiable goods. The facility

was later extended, under the second phase, to cover controlled and dutiable goods. Automated inter-bank deductions and application for certificates of origin were introduced in subsequent phases.

The initial phase kicked off in January 1989 with a group of 50 pilot users. The system was extended to the rest after the successful implementation of the pilot phase. Electronic permit application submission was not made mandatory on day 1 of TradeNet operation. In fact, as an interim and parallel implementation strategy, it was rolled out with an option to allow manual permit application as a counter service.

What kind of training for the staff was required in the establishment and how was it organized?

Among the other essential basic computer training, there were 3 key training subjects prior to the implementation:

- Business process management & re-engineering
- Standards adoption
- Trade documentation domain knowledge

User profiles were surveyed and their needs for training identified. The different categories of users were then scheduled for the relevant training.

How long did it take the facility to become operational?

TradeNet was conceptualised in 1986. The planning and development of TradeNet was carried out from 1987 to 1988. TradeNet was rolled out on 1 Jan 1989.

Services

What services does the SW provide? What documents /information/process are covered?

TradeNet allows the application, submission, receiving, processing and returning of response to trade declarations submitted. It covers the import (dutiable/GST/non-dutiable/warehousing/free trade zone), export (GST/non-dutiable) and transhipment declarations.

For importers/exporters/freight forwarders, among others, the major services include:

- User and company registration
- Receipt and intelligent routing of user submitted trade permit and certificate of origin applications from the Trade Net® Front-End software to Singapore Customs and the controlling agencies for their processing
- Syntax checks on the message structure
- Code table validations of the received applications against the code tables (e.g., product codes, Harmonised System codes etc)
- Automated permit processing based on the rules and criteria of Singapore Customs and the controlling agencies

- Attaching supporting documents for permit declaration
- Allowing the user to submit permit amendment, cancellation or refund application based on permit
- Self printing of certified true copy of permits and downloading of permit information
- Web enquiry facilities to:
  - Check the status of their TradeNet permit applications
  - Enquire & download code tables (e.g. port codes, country codes, etc.)
- Automated billing and direct bank account debit facility on the statutory and processing fees incurred
- 24x7 Call Centre Support

For Singapore Customs and the controlling agencies, the major services provided under TradeNet include:

- Automated and online processing allowing manual intervention to pend, approve, reject some selected types of applications for permits and certificates of origin
- Online enquiry and downloading of TradeNet permit and certificate of origin applications
- Online maintenance of the code tables (e.g. product codes, trader, license, establishment codes, etc)
- Interconnectivities with the controlling agencies' in-house systems for the file transfer and reporting functions for transferring and uploading of their controlled permit information and databases (e.g., trader, declarant and license information)
- Generation of ad hoc and periodic statistics reports

To other Users (such as the port terminal operators):

- Extraction cum provision of interconnectivities with the user in-house system for transfer of TradeNet permit information to PSA;
- Provision of interconnectivities for exchange of information between port terminal operators & Singapore Customs such as data for manifest reconciliation

How many transactions per day are handled? What percentage of total transactions?

The TradeNet system handles approximately 30,000 permit applications per day, amounting to some 9 million transactions a year. 100% of the total trade permit applications are processed by the TradeNet system. The Singapore Government has mandated the electronic submission of trade permit application.

How many clients does the SW have at the present time?

The TradeNet system is used by approximately 2800 companies with more than 8,000 users.

Operational model

How does it work? What is the operational model for the SW (describe the business process model)?

The shipping and trade community can submit their trade declaration using the Front-End (FE) TradeNet software offered by any software providers approved by Singapore Customs or the simple web-based application provided by the Government. The FE software offers the users a variety of data submission methods, i.e. via internet / web application, client based input or host-to-host connection. After the user submits the declaration, the FE system sends the data for automated processing by the various authorities via TradeNet.

The permit processing sub-module of TradeNet provides an intelligent routing agent that automatically determines the workflow required for that particular permit application and routes it to the relevant authorities for their processing. A set of rules embedded in the rules engine will then execute the processing requirements for each of the controlling agencies involved in the processing.

With the in-built intelligence that enables automated processing, more than 90% of the declarations do not require manual intervention and users are able to receive and print their approved cargo clearance permit within 10 minutes. There are also options for declarants to transmit data directly via their host systems in any structure data format.

Web portal services are provided for traders to process their permits, check on the transaction status and make billing enquiries. It also allows download of permit listing, and code tables (e.g. country, port, harmonized system codes etc). The portal also enables the authorities to process the declarations and to make enquiry.

Who are the main clients?

There are 3 main client groups for TradeNet which is the following:

- Trading community – traders, freight forwarders, declaring agents, service bureau
- Controlling agencies
- Singapore Customs

Which public and private agencies are involved in the facility?

Please see above.

Business model

What is the business model? How is it financed

Singapore Customs adopted a Public-Private Partnership (PPP) model for the development and implementation of TradeXchange®

(government, private sector, Private-Public partnership)?

and revamp of TradeNet in 2007. TradeXchange is a neutral and secure and neutral IT platform that facilitates the exchange of commercial and regulatory information for the trading and logistics communities. It enables value-added service providers to offer end-to-end application services to the trade and logistics community, such as supply chain management, trade documentation preparation, trade finance and insurance. TradeNet, a core application of TradeXchange, was revamped to provide a more streamlined and simplified trade declaration system and more value-added services to users.

CrimsonLogic Pte Ltd, a private company, was selected through an open competitive tender to develop, operate and maintain TradeXchange and TradeNet. The PPP model enables Singapore Customs to leverage on the capabilities and expertise of the IT company to build and operate these systems, while CrimsonLogic is able to recover its capital investments and operating expenses through collecting processing fees from users.

What are the user fees (if any) and annual revenue? Model of payment (fixed price per year, price per transaction, combination, other model)?

We charge based on a per use basis as follows:

- Monthly Account / User id fee: S$20 / S$20[1] per account / user
- Usage Fee: Approx. S$2.88[2] per transaction (includes statutory fees) / permit

The mode of payment is through direct debit from the declarants' bank accounts.

How will the SW be sustained over the coming years?

The revenue collected from processing fees is used to fund the operation, maintenance, regulatory enhancements and technology refresh of TradeNet.

Do the revenues generated cover operational costs or do they make a profit?

The revenues collected are mainly for the purpose explained above, merely for cost recovery and a margin for improvements in processes and technology refresh.

Are the revenues (if any) reinvested in the SW?

Yes, the revenue collected from TradeNet is used to fund the operation, maintain and enhance the system including routine technical upgrades and incorporation of new rules and regulations from the government. It also caters for continuous technology refresh to ensure that the system continues to be on the leading edge of technology and meeting the increasing user needs.

Technology

What technology is used?

The 1st generation TradeNet system, implemented on 1 Jan 1989, was operating in COBOL/CICS on a Mainframe platform. As part of our continuous effort in upgrading and refreshing our technology,

[1] Approximately US$13.85
[2] Approximately US$1.99

TradeNet was right-sized to an open platform using Object Oriented Methodology, Java/J2EE technology and is now operating on the Unix Platform. It utilises the following:

Java & J2EE

- J2EE, EJB 2.0 (Enterprise Java Beans), Core Java, Java Servlets, JSP, JMS (Messaging), RMI, Java Applets, JDBC, Struts, Hybermate, Spring

XML Tools and Technologies

- XML, XSL, XSLT, JAXP, Apaches' Xerces Parser, SAX & DOM APIs

Object Oriented Methodologies

- UML object-oriented analysis and design methodology

Communications

- Short message service (SMS)
- Email (SMTP), Secure Email (S-MIME)
- SecureFTP (S-MIME)
- Fax

How are data submitted (electronically – what type of format/language, paper – what forms, combination – what kind of combination)?

The data is submitted electronically in UN/EDIFACT standards format or Extensible Markup Language (XML). Alternatively, the users could submit in other formats and the approved software providers then translates the information into that required by TradeNet.

Where are data sent and lodged (government or private entity)?

Data are sent by private entities (i.e. trading community) to the government authorities for processing.

Who can submit data (importer, exporter, agent, customs broker)?

Importers, exporters, freight forwarders and declaring agents, who are registered with Singapore Customs, can submit the data. Traders can also file their declaration using the services rendered by documentation service providers. The service providers will enter and submit the trade declaration to the TradeNet system on behalf of the Traders.

Promotion and communication

How did you promote the facility?

During the initial implementation, the promotion was done via large scale nation-wide campaign. Currently, CrimsonLogic has a team of staff dedicated to manage the key users accounts including the controlling agencies. Online web enquiry facilities are provided in the Singapore Customs and the controlling agencies' websites as well as Crimsonlogic's website. Mass marketing and communication programmes are done as and when required to roll out major changes and implementation.

How were all stakeholders

Regular meetings are held with the key stakeholders to review the

kept informed about the facility's progress?	facility's progress.
What kind of training was provided for users?	New subscribers to TradeNet can opt to attend courses conducted by Singapore Customs on TradeNet procedures. CrimsonLogic and the various software vendors also provide training to the users on the use of the system.
Do you provide any helpdesk or customer service?	Yes. CrimsonLogic provides a 24/7 call centre service for our customers.
	Judicial aspects
Is use of the facility obligatory or voluntary?	The electronic submission of the permit application is made mandatory by the Singapore Government. Users who are not registered and do not have the front-end software may approach the documentation service providers to submit the applications.
Do participants need to sign a contract with provider/agency in order to participate?	Yes. The participant is required to sign a contract with the service provider, as well as a set of terms and conditions of use with the Government.
Was specific legislation (or change of old legislation) necessary?	The electronic submission via TradeNet is mandated by the Singapore Government, with the statutory fees legislated. Contractual agreement is signed for the use of the system.
How is the privacy of information protected?	The documents and information submitted to TradeNet are restricted for use only by the respective authorised users. Authorised users of the Singapore Customs and controlling agencies can also view and download these declarations for approval, reporting and record keeping purposes. During the messaging stage where the trade declarations are sent from the traders' local computers to the TradeNet system via the messaging engine, the data are sent via secured channels and encrypted throughout the transport layer. In this way, the trade declarations are safe and secured from any form of intrusions.
	Standards
What is the role of international standards (UN/EDIFACT, UNLK, UN LOCODE, UN/CEFACT Single Window Recommendation, etc) in your SW?	TradeNet Ver 4.0 message specification is developed in compliance with the UN/EDIFACT version D.05B message specifications and its recommendation e.g., UN/LOCODE etc. The message type adopted includes CUSDEC, CUSRES, APERAK (and many others). TradeNet Ver 4.0 Extensible Markup Language (XML) Message Specification is developed adopting the OASIS Universal Business Language Technical Committee (UBL TC) recommendation and in compliance with the UN/CEFACT ebXML Core Component Technical Specifications (CCTS). The adoption of established and widely practised industry messaging standards provides the ease of

integration with systems on different platforms.

Benefits

What are the benefits to clients and to participating agencies?

The benefits are summarized in the table below.

How did it benefit trading community and the Government?

TradeNet has revolutionised the trade documentation process in Singapore and has been a subject of two Harvard Business School case atudies[3]. It has been identified as one of the strategic national information systems that enhanced the competitiveness of Singapore as a global city of international trade. Surveys and studies have revealed that TradeNet has brought about the following benefits to the trading community.

The following accolades and awards were won by TradeNet:

"It is estimated that TradeNet saves Singapore traders around US$1 billion per year." *Robert M Howe, IBM*

"…Fill in one online form and receive the import or export license 15 seconds later …" McKinsey Quarterly 2001 No.2

"…received Top eAsia award under Trade Facilitation Category" 2003 September

"CrimsonLogic was entrusted to own and operate the TradeNet system, with the Singapore Trade Development Bureau, the port and civil aviation authorities, and the international airport as stakeholders…." *Customs Modernization Handbook by the World Bank, 2004*

Table 1 (below) illustrates some of the tangible benefits to the trading community brought about by TradeNet, excluding economic gain such as the FDI figures.

Characteristics	Previous Manual Process	With TradeNet
Submission of documents	By dispatch clerks	From comfort of office
Submission of documents	Within office hours only	Available 24 hours daily
Trips to the Controlling Authorities per document	At least 2 required	None required
Copies of documents	Multiple copies (up to 35 forms)	Single copy (to be printed at user's premise)
Processing time for approval	From 4 hours to 2 days	Within 10 minutes

Dutiable goods handling	Separate documents for Customs processing	Same electronic document routed to Customs for processing
Controlled goods handling	Separate documents to different Controlling Agencies for processing	Same electronic document routed to Controlling Agencies for processing
Fees Charged	S$10 – S$20	S$2.88
Customs duties collection	By cheque	Automated bank deductions

What was the impact on Customs revenues?

TradeNet enhances transparency via online submission and automated processes. Duties, fees and taxes are collected accurately and promptly from the traders. The payment system is directly interfaced with the banks to facilitate the respective direct debiting and crediting of traders and governments bank accounts. There is no loss of revenue collection with automated system validation and assessment of duties, fees and taxes.

What problems did it solve?

In general, TradeNet has greatly improved and streamlined the trade process which was vital to the Singapore's economy. Besides the benefits listed above, additional achievements were accomplished with the Internet-based TradeNet system:

Faster response to facilitate dynamic enforcement and implementation of rules and regulations: Urgent implementation of regulatory and policy changes can be done quickly with the system. For example, this includes imposing restrictions to import specific type of goods to/from certain countries due to, say, outbreak of diseases. It eliminates the tedious dissemination process for any such changes to be implemented under the manual process flow. Timely and accurate enforcement are made possible.

Enable accurate and prompt collection of trade statistics: Trade statistics are collected on a timely manner for analysis of trading patterns and forecasting of potential trading trends.

Improved Customer Service with TradeNet Accessible Anytime, Anywhere: With TradeNet on the internet, users can gain access to the system from any location as it is a web-based application. With the 24 x 7 service standard provided for TradeNet, the permit application and processing service is available for use round-the-clock. As TradeNet serves a huge base of 8,000 users, the internet service brings about more efficiency and savings.

Ease of Use and Increased Efficiency and Productivity: Productivity level increases as a result of the shortened turnaround time for the processing of trade declarations. With efficient and user-friendly Web portals provided, TradeNet users carry out their daily

trading businesses with a breeze. Only one permit application is necessary for submission to various agencies using a common web interface for all goods and purposes.

Maintenance and Easy Deployment: Processing and validation rules are tied to political, social and environmental changes. Changes to processing and validation rules are made easy with J2EE technology deployed, specifically the Rules Engine where the permit processing rules path and action profile can be easily updated in readable XML format or parameterised in code tables. Any change of rules will require only an update to the XML file or code tables and can be effected once reloaded to the system.

This is crucial as it reflects and affects the efficiency of the government authorities in exercising controls whenever required. As this is a server-based application, all changes and maintenance of the application and data were carried out at the server. In this way, deployment for any future upgrades can be easily and instantaneously effected. No tedious application deployment for the more than 8,000 workstations of TradeNet users is required, thus saving time, effort and resources.

Cost effectiveness: both for users and ser vice providers.

Users: Employing scalable, portable and reusable software gives rise to savings. Having the system available on the web, users can access using their existing workstations and internet connections. There is no one-time or annual software maintenance or setup cost attached. Business operating costs (i.e. warehouse storage charges) will no longer be increased due to delays in documentation. In fact, the manpower cost has been reduced with the simplified processes and high system availability.

Service Providers: The TradeNet system is designed to allow deployment on multiple servers where the load can be balanced. The current hardware setup has been optimised to meet the required performance expectation given the transaction load. With the new architectural design that allows optimisation of the hardware setup and flexibility to scale with future growth, the operating and maintenance cost can be more effectively controlled and managed.

Ease of Integration and Connectivity. With the use of leading-edge technology (J2EE, XML and MQ Series) and systems running on diversified platform, integration with trading partners and authorities can be easily and concisely implemented.

Ease of Future development to cater for local trade growth and international trade information exchange.

Hardware Scalability: Investments on hardware can be scaled up or down depending on the processing performance expectation and transaction volume.

Software Portability and reusability: One of the advantages of J2EE technology is that it enables portability (write once, run anywhere)

and reusability. Modules created in J2EE for one project can be easily applied and reused in others, especially when they have common functionality and features.

Promotes data sharing and reduces data redundancy or repeated data entries. TradeNet permit preparation module has currently established itself to be an accessible, affordable and user-friendly Internet-based application for trade permit preparation.

CrimsonLogic has gone a step further to cater to the growing needs of traders by providing other useful trade-related solutions such as logistics, trade insurance and finance, purchasing and warehouse solutions to the trading community as a bundle together with a web-based front end TradeNet permit preparation module.

As the solutions come together as a bundle on the same platform, information sharing between the different applications can be enabled, providing a seamless flow of information between the different applications within each company's business process flow. It minimises the need for repeated data entry on the same piece of cargo information and provides a single sign-on interface to all the modules in the trade cycle.

Lessons Learnt

What were the crucial success factors?

The main success factor of TradeNet lies in the Government's foresight in identifying the problems, finding a solution and championing the implementation. The cohesiveness of all the stakeholders, the systematic planning with phased implementation strategy as well as the adoption and use of appropriate technology were also pivotal to the success.

What were the greatest obstacles?

The greatest obstacles during the initial phases of implementation were the need to change the mindsets of the users to switch from their existing manual process to an electronic means of trade declaration.

What are the main lessons learned?

Refer to answer to "*What were the crucial success factors*?"

Future plans

What are the plans for further development of the SW?

In the future, TradeNet will enhance its connectivity to commercial IT systems via TradeXchange so as to achieve more seamless flow and re-use of data along the supply chain..

What are the biggest obstacles to further development of the SW?

The biggest obstacle is to align the interests of IT service provides, including community platform operators, so that they see the value in integrating with TradeXchange .

Do you intend to make agreements concerning SW cooperation on the regional level?

CrimsonLogic is already providing single electronic window consultancy to overseas governments as well as Asian Development Bank, WorldBank and Commonwealth Secretariat funded projects. Further, TradeNet-like systems have been implemented in other countries such as Ghana, Mauritius, Panama, Madagascar, Ivory Coast and Saudi Arabia. Cross border linkages are also available to enable data sharing with some of the Asian and Americas economies. More are being added.

Are you planning to have agreements for exchange of data with SW running in other countries?

CrimsonLogic is one of the founding members of the Pan Asian e-Commerce Alliance. This is a grouping of regional trade declaration operators. The Alliance meets regularly to discuss the exchange of cross border trade data amongst its trading communities. CrimsonLogic has also tested the operational model for the cross border exchange of trade declaration data with some of the alliance countries.

Source for further information

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