OPTIMISATION OF THE PORT OPERATION SYSTEM WITHIN DP WORLD AUSTRALIA

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***Abstract**: The paper summarises DP World's experience in optimisation of container terminal activities on a network of container terminals in Australia by creating a single operating interface across all four DP World terminals in Australia. A single operating centre, as demonstrated by DP World in Australia, provides more efficient container terminal operations and standard service with reduced cost and increased efficiency of the overall logistic chain under a corporate environment. The paper also presents DP World Australia's standardisation and optimisation of terminal users' requests process that provides logistic users' in addition of tracking of container flow, but also monitoring and tracking of a progress of their service requests related to container flow.*

***Keywords:** optimisation, container terminal DP World.*

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1. INTRODUCTION

Seaports are complex and dynamic entities, often dissimilar from each other, where various activities are carried out by and for the account of different actors and organisations. Such a multifaceted situation has led to a variety of operational, organisational and strategic management approaches to port systems [1].

DP World (DPW) has a portfolio of more than 65 marine terminals across six continents. Container handling is the company's core business and generates around 80% of its revenue. In 2012, DP World handled more than 56 million TEU (twenty-foot equivalent container units). With its committed pipeline of developments and expansions, capacity is expected to rise to more than 100 million TEU by 2020, in line with market demand.

DP World Australia manages a network of four container terminals in Australia including Brisbane, Sydney, Fremantle and Australia's busiest and largest container terminal in the Port of Melbourne (Figure 1).

The Port of Brisbane is the third largest capital city port in Australia. DP World's Fisherman Islands Terminal (FIT) is located at the mouth of the Brisbane River, 17 kms downstream from the city of Brisbane. FIT represents one of the most modern deepwater terminals on the Australian coast and features a 900 metre wharf serviced by four quay Post-Panamax cranes, - designed for the new generation of container vessels. FIT is currently undergoing expansion and change of mode: from forklift / reach stacker to semi automated ASC operations. By the end of the year the facility area will grow to 36ha and capacity in excess of 900,000 TEUs.

Figure 1. Locations of DP World's container terminals in Australia

Fremantle is the principal port of Western Australia, situated at the mouth of the Swan River on the western coast of Australia. It has easy rail and road connections to the other major Western Australian centres and other states. Located within the Port of Fremantle's inner harbour, Fremantle Terminal is equipped with specialised container handling equipment and computerised control systems and has extensive reefer facilities.

The Port of Melbourne is located at the mouth of the River Yarra, at the head of Port Phillip Bay and

adjacent to the city of Melbourne, the capital of the state of Victoria. Melbourne is the largest container handling port in Australia.

DP World Melbourne West Swanson Terminal opened in 1969 and was completely redesigned and redeveloped in 1995 into a full straddle operated terminal. It is equipped with the latest terminal control system and has easy access to rail facilities at the nearby Dynon rail terminals and the adjacent Intermodal site.

The DP World Sydney Container Terminal is strategically located in a protected harbour, on the northern shore of Botany Bay, 12 nautical miles south of Sydney Harbour. The terminal is located within the state's significant Sydney Airport/Port Botany precinct. The Port Botany terminal is DP World's second largest container terminal in the Australia – New Zealand (ANZ) region. The facility also boasts the latest in container handling equipment, a fully integrated computerised control system along with extensive reefer plug-in and monitoring facilities.

Container terminal operators are important facilitators of international trade. They help to bring out the potential competitive and comparative advantages of their hinterland. Although terminal handling charges play an important role in influencing the attractiveness of a container terminal, its users are ultimately concerned with the overall costs associated with using the terminal [2]. Container terminals that offer the most sustainable value to its users at the most competitive cost against other container terminals in other competing systems would be chosen as the terminal-of-call [3].

One of the ways to improve port efficiency, usually analysed in literature is to fully automate its container yards. In so doing, they could possibly improve operational efficiency by eliminating the inefficiency of humans. As a result, significant cost saving can be achieved by improving the productivity of the container terminal and reducing labour cost [4]. Other than carrying out port automation, one possible way is through optimisation. Basically, an optimised port operation system is able to maximise the utilisation of port facilities and provide a cheaper solution to achieve better port efficiency [4].

DP World's approach to the port operation system optimization is based on centralization and creation a single operating interface across all of the container terminals in the region, and through standardisation and optimisation of Customer's Special Service Request Process, providing an enhanced and innovative service to their clients.

Introducing above mentioned port operation optimization concepts and presenting their characteristics is the main objective of this paper.

The paper is organized as follows. Section 2 presents the centralisation concept, while Section 3 describes elements of the Special Service Request Process. Some concluding remarks are given in Section 4.

2. DP WORLD'S CONCEPT OF THE PORT OPERATION CENTRALISATION

DP World in ANZ is in the unique position of supplying terminal services to Shipping Lines through exclusive nationwide contracts. Thus DP World stevedores the vessels of a particular service in all of the ports they call in Australia. This has given DP World the opportunity to create a single operating interface across all of the container terminals in the region providing an enhanced and innovative service to their clients.

In this way the need for reconceptualisation of the conventional port as a fixed and spatial entity to a network of terminal operating firms under a corporate logic [5], has become operational.

The move was successful which is confirmed by our main competitors adopting a similar model and have created similar centres within their organizations.

The centralisation and optimisation concept rests on Vessel Operations Group (VOG) and National Planning Centre (NPC).

The DPW Vessel Operations Group provides centralised and automated Customer Management, Coastal Scheduling and Vessel Planning services. It is the operational interface that coordinates and manages the flow of information between our customers and our business. VOG control and monitor client vessel's coastal arrivals and movements through the National Vessel Coordinator, and also it is an entry point for clients' planning offices and provides terminal planning services to DP World terminals in Australia.

National Planning Centre (NPC) as a planning and customer service branch of VOG provides:

- Ship exchange plans, (Order of Work; sequence sheets etc);
- Seaworthiness of planned vessels;
- Effective solutions to vessel operations, minimum cost; adequate utilisation of terminal resources and vessel space;
- Shipment of exceptional cargoes: Hazardous (HAZD), Break-bulk (BBLK), Out of Gauge (OOG) etc;

- Container Data Management

In 2012 the Vessel Operations Group coordinated 125 different vessels making total of over 2246 port calls in Australia and plan and sequence nearly 2.3 million container moves for all 4 DPW terminals in Australia.

This equates to 225 port calls and 230,000 container moves per planner annually.

As a comparison in 2002 the last year of terminal based planning, the annual equivalent was 99 Port calls and 62,000 moves per planner.

The value of a single point entry to the external client is that one telephone number is all that is needed for both planning and scheduling services which will reach someone that will be able to help them 24 hours a day 365 days a year for any DP World terminal in Australia. Moreover the person they are dealing with will be familiar to them and accustomed to their specific needs.

Single point entry also has some important advantages to DP World:

- It enables DP World to closely manage their working and commercial relationships with their clients by tying together the planning and scheduling functions.
- It enables DP World to provide a strong customer focused service recognising individual client needs.
- It provides the opportunity to forge closer ties with clients by breaking down the traditional relationship barriers and replacing these with a common approach to operational issues.
- It provides DP World the opportunity to provide operational and technical feedback and assistance to shipping lines to enhance the operational interface.
- It enables DP World to rationalise communications recognising the changing structure of the global shipping industry.
- It enables DP World to create a culture of reliance and trust in their relationship with their clients by providing in depth operational assistance and support.
- The ability to combine schedule coordination and the planning function enables DP World to exert greater control over coastal movements reducing the impact of vessel arrival peaking during periods of congestion

A centralised planning centre has a number of benefits for our terminals:

- It provides a nucleus of highly experienced planning staff who have a clear appreciation of terminal requirements and operational limitations around the coast.
- It provides a cost effective 24-hour service that would be onerous to replicate at the terminal level.
- Planners are focused on providing a high quality product for both Shipping Line and Terminal. This leads to a better working understanding at all levels of the relationship.
- Planners and vessel's staff develop a better relationship due to the frequency of contact. This allows ship board problems to be resolved professionally and quickly reducing potential operational delays at the terminal.

DPW NPC is working in a very vibrant environment that has very different needs, practices and standards: 4 different terminal working practices; 4 different yard planning strategies; multiple traffic flows and stack access; 25 vessel operators, 29 planning centres and 30 different shipping lines offices; 21 different trades, more than 120 different vessels on regular services; 37 – 40 vessels per week,

At the beginning NPC adopted local practices and processes related to ship planning and vessel operations with minimum intentions to make changes to, at that time, already established local vessel operations (except changes due to centralised non terminal based planning function). However during years NPC has developed into one of the driving forces for standardisation and optimisation of vessel operations and customer service in all 4 terminals on national level.

3. STANDARDISATION AND OPTIMISATION OF CUSTOMER'S SPECIAL SERVICE REQUEST PROCESS

3.1. The main idea and the concept

Special Service Requests (SSRs) relate to the update or change to container records such as change of Port of Discharge, change of vessel / voyage, change of ISO code, change of Final Destination, change of container Export Document Number (EDN) / Custom Authorisation Number (CAN), change of reefer temperature or vent settings, change to commodity code etc as well as special activities such as: late receivals, container inspection, HAZD exemptions etc (Figure 2.).

DPW's clients use to send service requests via email to the NPC and /or to DPW terminals

requesting changes to container details or special services related to particular containers. This process was inefficient with lot of waste; the procedures within terminals were different which required additional training for DPW staff as well as for external clients. The main problems we were faced with were:

- External Clients: Service Failure (request not received, not actioned); Clients were not able to monitor the progress of the status of the request; Authorization of requests, acceptance of associated costs; Training due to Change of personnel
- Internal Clients (Terminals and NPC): Revenue leakage - service provided but billing event not captured; Invoice dispute – lack of documentation; Change of internal processes and responsibilities; Large number of emails; Service requests with insufficient data, chain emails; SSR Process Management, Priorities, Monitoring, Reporting and Training

DPW NPC has developed a web-based application that allows shipping lines to lodge Special Service Requests (SSR) through the DPW Customer Portal which has replaced the old system based on emails.

This new system is simple to use and provides a common workflow of service requests enabling the tracking of SSRs through automated notification and reporting. The new standardised processes have improved the response times to clients' requests and have substantially reduced the incidence of error.

Under the new system special service requests are lodged through the DPW Customer Portal (held at 1-Stop). Users are also able to send EDI messages for particular SSR using system to system connection as special arrangement (Figure 2.).

User receives confirmation of lodgement and is provided with an SSR reference number after the request is submitted. This allows the User to monitor the progress of an SSR which will be automatically updated in the system as its status changes.

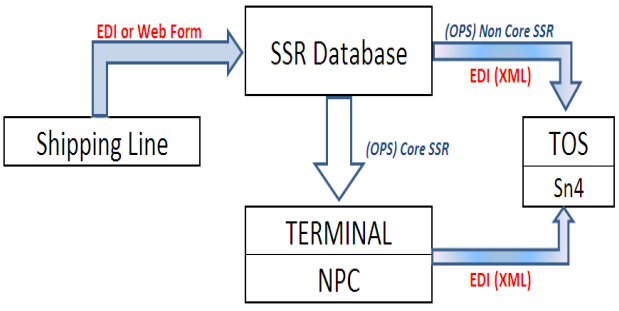


Figure 2. SSR System structure

The system provides the following benefits:

- 24/7 online request using DPWorld Portal
- Paperless work
- Standardised format which ensures that all necessary data and information has been supplied eliminating the need for clarifying correspondence
- Reduced response time
- Escalation methodology
- One point of contact
- Improvements in the billing
- Intimation of pending SSR request
- Reduction of revenue leakage - service provided but billing event not captured
- Reduction of invoice dispute
- Workflow management of internal processes and responsibilities
- Elimination of workflow process errors
- Transparency of the progress of the request
- Reduction of email traffic

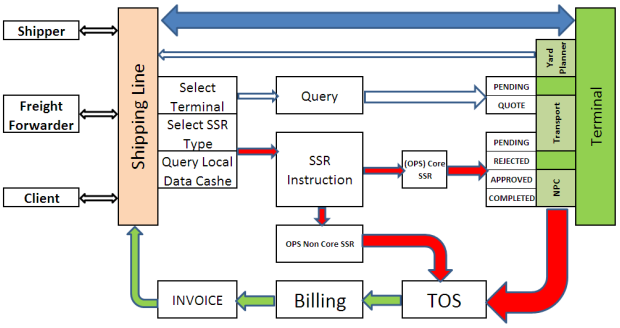


Figure 3. SSR workflow diagram

3.2. Web-based application for SSR

New system for Special service request is implemented through the web based application offering wide types of SSRs, which could be easily selected from the drop-down list. SSR workflow diagram is shown in the Figure 3. The SSR workflow has 4 sub-workflows:

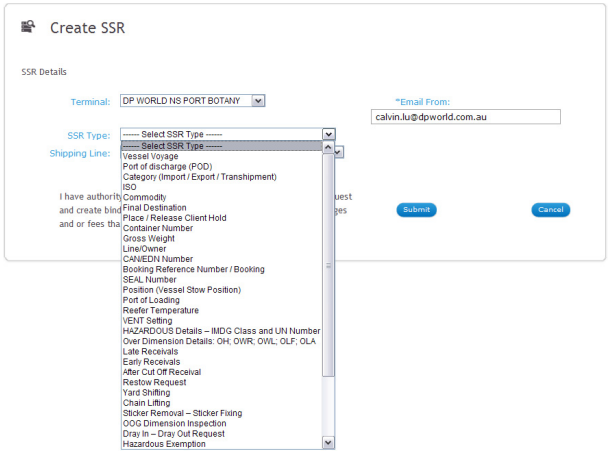
a) Query workflow where client (shipping line) query cost and operational possibility for particular request; after assessment wit 3rd party (shipper etc) a query might become a SSR request (instruction)
b) SSR Instruction – request for terminal to action particular instruction;
c) Billing and Invoicing of completed activities
d) Email workflow between terminal and client–information of the status of particular SSR.

At terminal level workflow (email notification and SSR dashboard) are set as per adequate

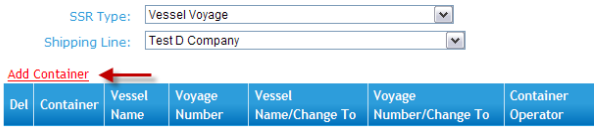
operations procedures which ensures that all relevant users are correctly and timely notified of the request and activity they have to perform and to complete the SSR.

Shipping Lines' users control the notification workflow between them and their clients (shippers, freight forwarders, transport co etc) by adding relevant email addresses as recipients of SSR change of phase notifications (pending, approved / rejected, completed etc).

Software application assumes performing the following steps visually presented by a few screenshots of the users' interface. After successful login, the process of creation SSR begins with user's selection of the terminal and the type of SSR from the drop-down lists.



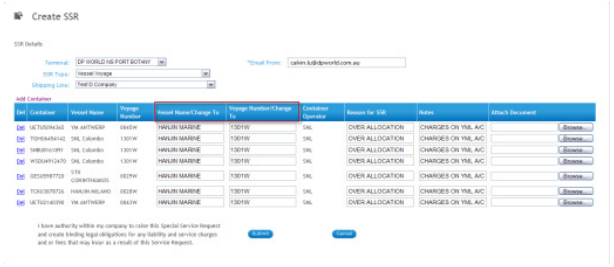
Then, user needs to "click" ***Add Container*** to add containers which are required for changes.



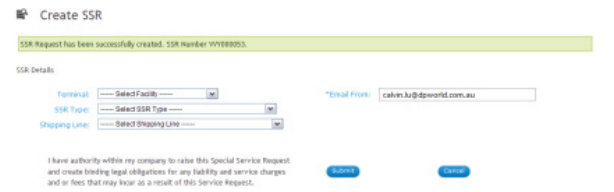
After containers are added they should be validated by "click" on ***Validate***.

The system will validate the container numbers through terminal system and return the result. It will ONLY list all the validated container numbers.

Requested change is then typed in the ***Change To field*** and other optional fields like ***reason*** and ***notes***, and then submitted by "clicking" the ***Submit*** button.

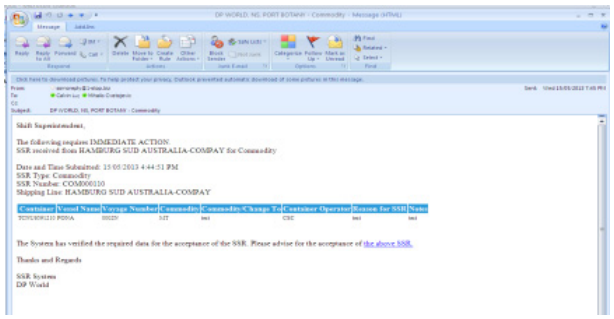


If successful, the screen will be displayed as below with ticket number generated automatically, and an email notification will be automatically sent to relative parties.



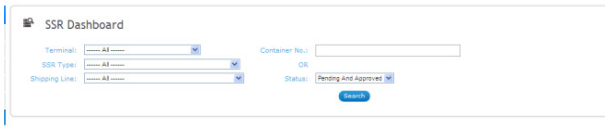
Some of the SSR types require documents to be attached, e.g. B959 form, Break-bulk photos etc. This can be inserted while creating the SSR. The attachment will be sent together with the notification via email.

User will receive an email confirming the SSR has been successfully submitted indicating the terminal, type of request, SSR Number and SSR details; with hyperlink to SSR Reporting or the Management Screen.

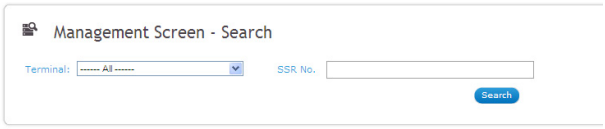


Additionally, system generates following mails: Acceptance and Completion of SSR.

Since all data related to SSR are saved in database, user can search SSR by Container number, terminal, SSR type and SSR status.

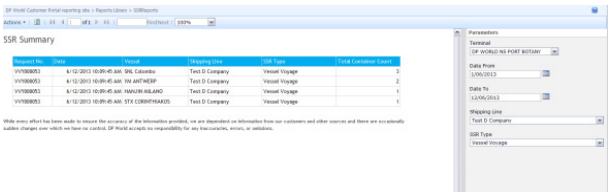


From the port managers and port officers' point of view, application offers opportunity for generating two types of reports, while Management screen is used for audit of particular SSR.



Container Report shows a list of detailed container numbers by SSR type and status set in the parameters panel.

The second report "SSR Report" shows a list of SSRs by type set in the parameters panel.



4. CONCLUSION

Optimisation of a network of terminals in a particular region by creating a single operating interface across all terminals, as demonstrated by DP World in Australia, can provide a more efficient and standardised service to container terminal users, while reducing the cost and increasing the efficiency of the overall logistic chain under a corporate environment. Increasing terminal efficiency, as continuous process, is not related only and exclusively to automatisation of yard, waterside and landside operations. Terminal efficiency is also related to optimisation of terminal operations activities on a network of terminals in a particular region such as vessel scheduling and ship planning, as currently in DPW ANZ region, but it can also be expanded to other operational activities. The productivity of ship planning team in DPW, for example, has increased nearly 4 times – from 62,000 to 230,000 moves per planner. Standardisation and optimisation of terminal users' requests is providing logistic users' with full control of container flow, not only by monitoring the progress of container moves into, within, and out of the terminal but also to monitor their service requests related to container flow. In the first month after Special Service Request implementation in DPW ANZ the service response time has been reduced by more than 15% .

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