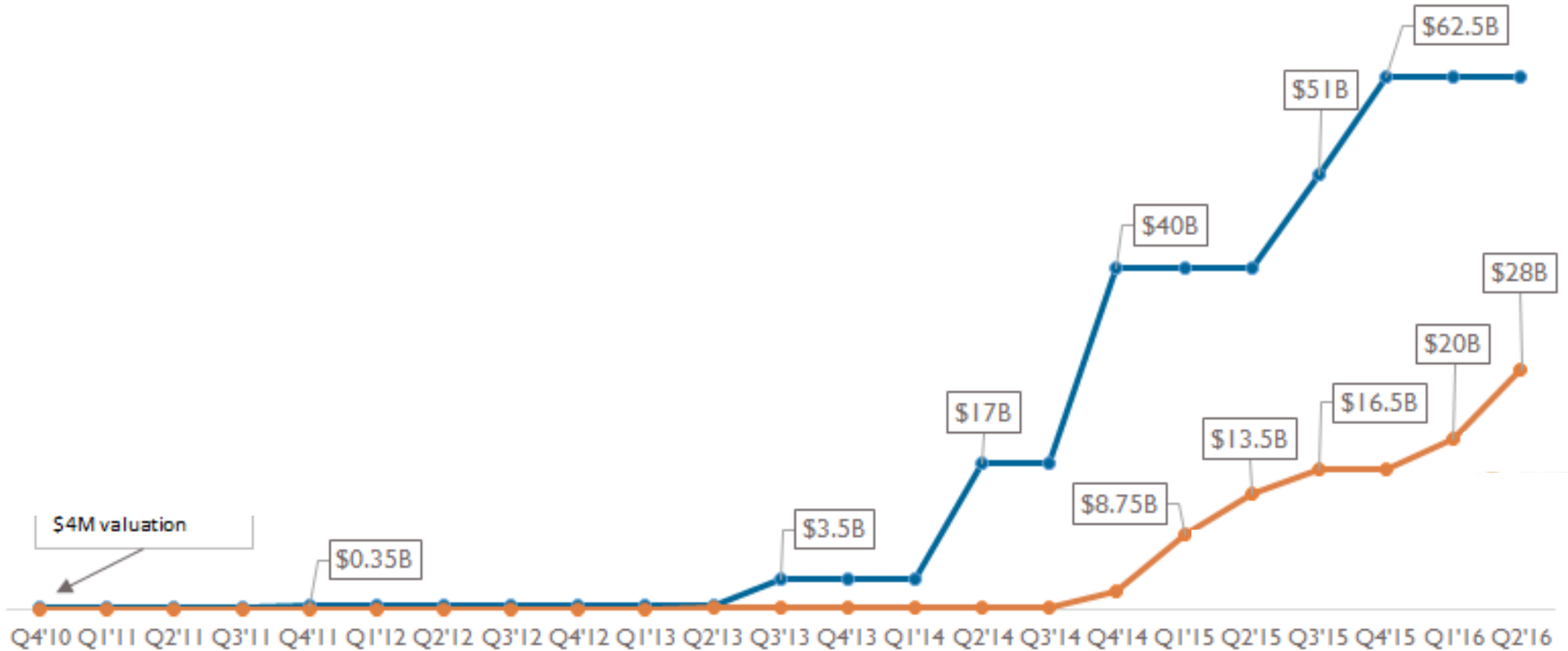


Optimization of Terminal Operations

September 23, 2016

11th Southern Asia
Ports, Logistics and Shipping 2016
Sri Lanka

A Quick Detour from Ports...



www.cbinsights.com

Vehicle Dispatching Systems



Drivers



Match



Riders



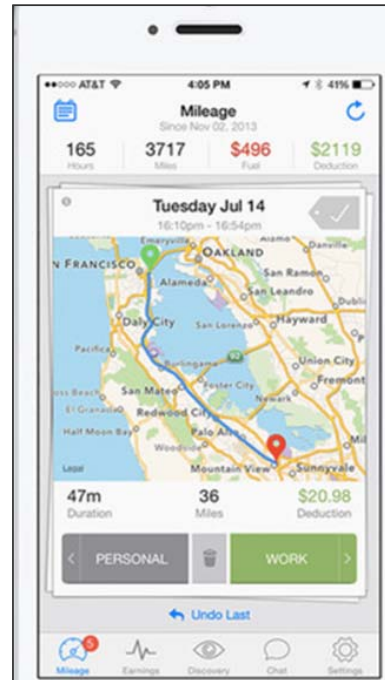
Technology Enablers



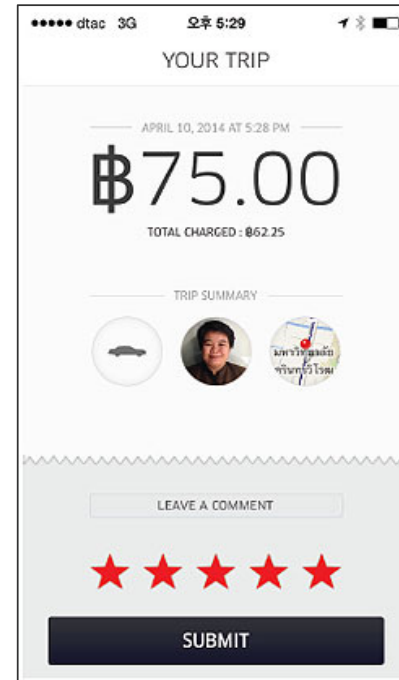
& Mobile Devices



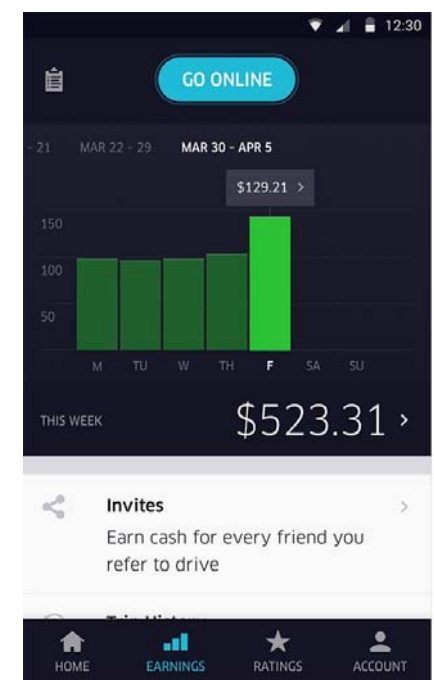
Mapping



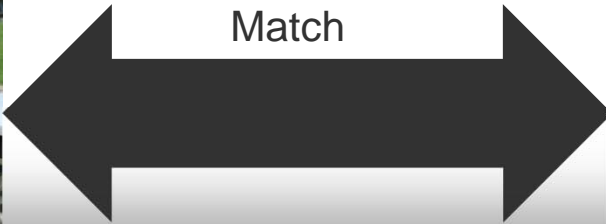
Billing & Accountability




Reporting



The Drive Toward Automation



 **travis kalanick** ✓
@travisk Follow

Drivers on @uber_nyc making \$90k/yr
Driverless car is a multi-decade transition. Let's
take a breath and I'll see you in the year 2035

RETWEETS 140 LIKES 127

2:13 PM - 28 May 2014

Toyota and Uber to Ridesharing Collaborate

May 24, 2016
Toyota City, Japan, May 24, 2016 --
safer, more efficient and convenient
way the world moves, are announcing

Technology | Tue Apr 26
Google, driving cars

-like

Optimizing Operations at Container Terminals



Customer Requirement:

Load and Discharge Cargo from Vessels



What can Terminal Operators Control?

What Does “Optimizing Operations” Mean?



- Optimizing operations is making the decisions that:
 - **Minimize** costs
 - Plan the yard with fewer resources
 - Plan the yard to reduce container rehandling/shuffling
 - Plan the yard to reduce future truck drive times and congestion
 - Plan vessels with fewer resources
 - Plan vessels to reduce yard congestion / asset idling time
 - Plan vessels to reduce yard crane resources / excessive travel
 - Deploy fewer tractor trailers (PMs)
 - Reduce unladed tractor trailer drive time
 - **Maximize** revenue
 - Increase QC/berth productivity (more MPH)
 - Increase berth utilization (more customers/throughput)
 - Increase yard utilization
 - Increase gate throughput



Optimization in Navis N4



Navis N4 offers intelligent software that helps standardize processes and make optimal decisions



- **Expert Decking**

Automatic Yard Planning



- **Vessel AutoStow**

Automatic Vessel Planning



- **PrimeRoute for Tractor Trailors**

Automatic Tractor Trailer Scheduling, Pooling, Dispatching



Standardizing Best Practices



Customer Results After Expert Decking Implementation

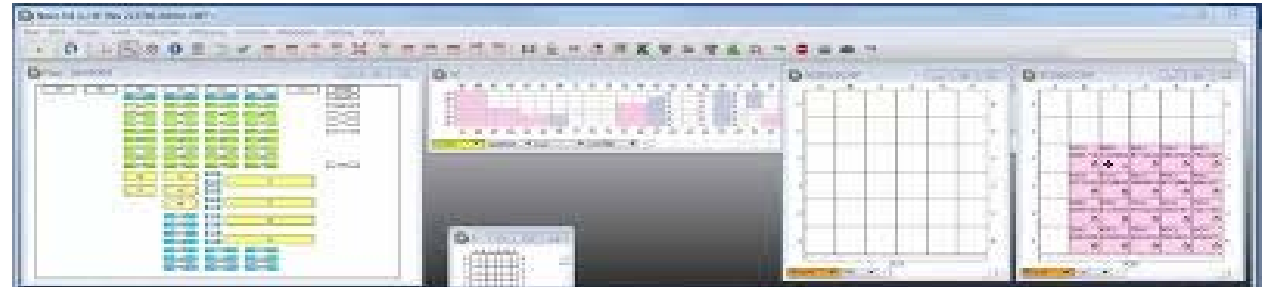
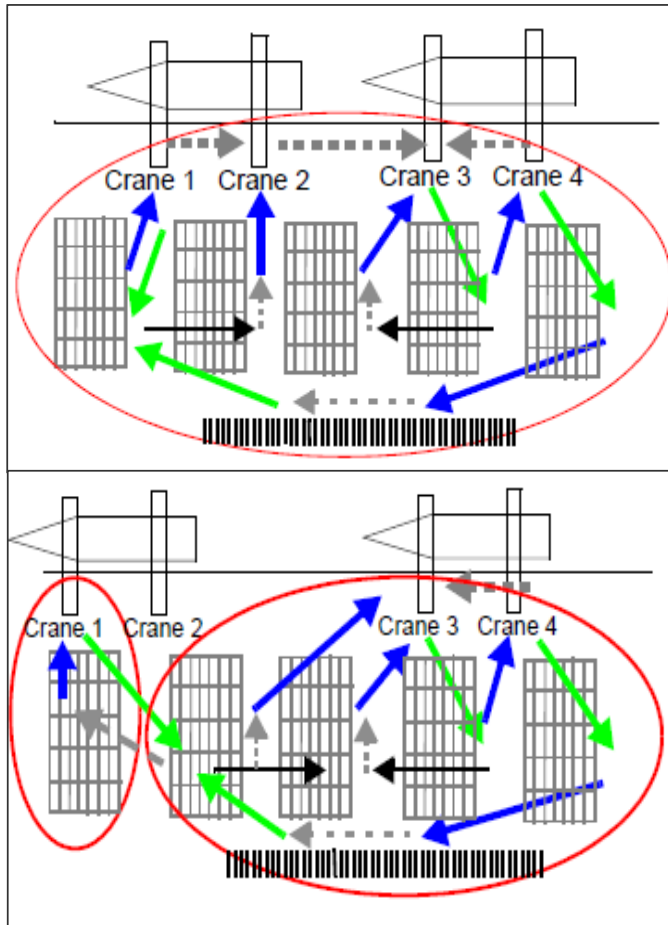
Filter Name	Equip. Type	Weight (tonnes)	Cat	Group	Unit	Is Dept	Is Rft	Is Full	Is OOG	Full Warn	Dsr'd Wh Cnt	Chss Stat
# SC	20BU,20CP,2HOT	X	X	X	X	No	N/A	Yes	N/A	95	-1	NC
# SD	20GP,20OT,2HOT	X	X	X	X	No	N/A	Yes	N/A	95	-1	NC
# BLOCK SC	20BU,20GP,2HOT	X	X	X	X	No	N/A	Yes	N/A	95	-1	NC
20 FL FCL	20FL	X	X	X	X	No	N/A	Yes	N/A	95	-1	NC
20 RF FCL	20RE,2HRE	X	X	X	X	No	Yes	Yes	No	95	-1	NC
20 TK FCL	20TK	X	X	X	X	No	No	Yes	No	95	-1	NC
20 TK MTY	20TK	X	X	X	X	No	N/A	No	N/A	95	-1	NC
20.1-25.0T	X	20.1-25.0	X	X	X	No	N/A	N/A	N/A	95	-1	NC
20GP 00-15T	20GP	0.1-15.0	X	X	X	No	No	Yes	No	95	-1	NC
20GP 15-20T	20GP	15.1-20.0	X	X	X	No	No	Yes	No	95	-1	NC
20GP 20-25T	20GP	20.1-25.0	X	X	X	No	No	Yes	No	95	-1	NC
20GP >25T	20GP	25.1-35.0	X	X	X	No	No	Yes	No	95	-1	NC
20GP MT GSL	20GP	X	X	GSL	X	No	No	No	No	95	-1	NC
20OT FCL	20OT	X	E	X	X	No	N/A	N/A	N/A	95	-1	NC
20TK MTY	20TK	X	X	X	X	No	N/A	No	N/A	95	-1	NC
40 RF FCL	40REK,40RE	X	X	X	X	No	Yes	Yes	No	95	-1	NC
40 RF MT	X	X	X	X	X	No	No	No	No	95	-1	NC
40FL FCL	40FL,4HFL	X	X	X	X	No	No	Yes	N/A	95	-1	NC
40GP 00-12T	40GP	0.1-12.0	X	X	X	No	No	Yes	No	95	-1	NC
40GP 12-20T	40GP	12.1-20.0	X	X	X	No	No	Yes	No	95	-1	NC
40GP 20-25T	40GP	20.1-25.0	X	X	X	No	No	Yes	No	95	-1	NC
40GP > 25T	40GP	25.1-35.0	X	X	X	No	No	Yes	No	95	-1	NC
4HGP 00-12T	4HGP	0.1-12.0	X	X	X	No	No	Yes	No	95	-1	NC
4HGP 12-20T	4HGP	12.1-20.0	X	X	X	No	No	Yes	No	95	-1	NC
4HGP 20-25T	4HGP	20.1-25.0	X	X	X	No	No	Yes	No	95	-1	NC
4HGP > 25T	4HGP	25.1-35.0	X	X	X	No	No	Yes	No	95	-1	NC
ACS	X	X	X	ACS	X	No	No	Yes	No	95	-1	NC
ARK 20FL MT	20FL,2HFL	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 20GP MT	20GP	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 20OT MT	20OT,2HOT	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 20RF MT	20RE,2HRE	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 40FL MT	40FL,4HFL	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 40GP MT	40GP	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 40OT MT	40OT,4HOT	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 40RF MT	40RE,4HRE	X	X	X	ARK	No	No	No	No	95	-1	NC
ARK 4HGP MT	4HGP	X	X	X	ARK	No	No	No	No	95	-1	NC
CMA 20FL MT	20FL,2HFL	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 20GP MT	20GP	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 20OT MT	20OT,2HOT	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 20RF MT	20RE,2HRE	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 40FL MT	40FL,4HFL	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 40GP MT	40GP	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 40OT MT	40OT,4HOT	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 40RF MT	40RE,4HRE	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
CMA 4HGP MT	4HGP	X	X	X	CMA_MOV	No	No	No	No	95	-1	NC
COS 20FL MT	20FL,2HFL	X	X	X	COS	No	No	No	No	95	-1	NC
COS 20GP MT	20GP	X	X	X	COS	No	No	No	No	95	-1	NC
COS 20OT MT	20OT,2HOT	X	X	X	COS	No	No	No	No	95	-1	NC

Before: Total allocation filters = 185

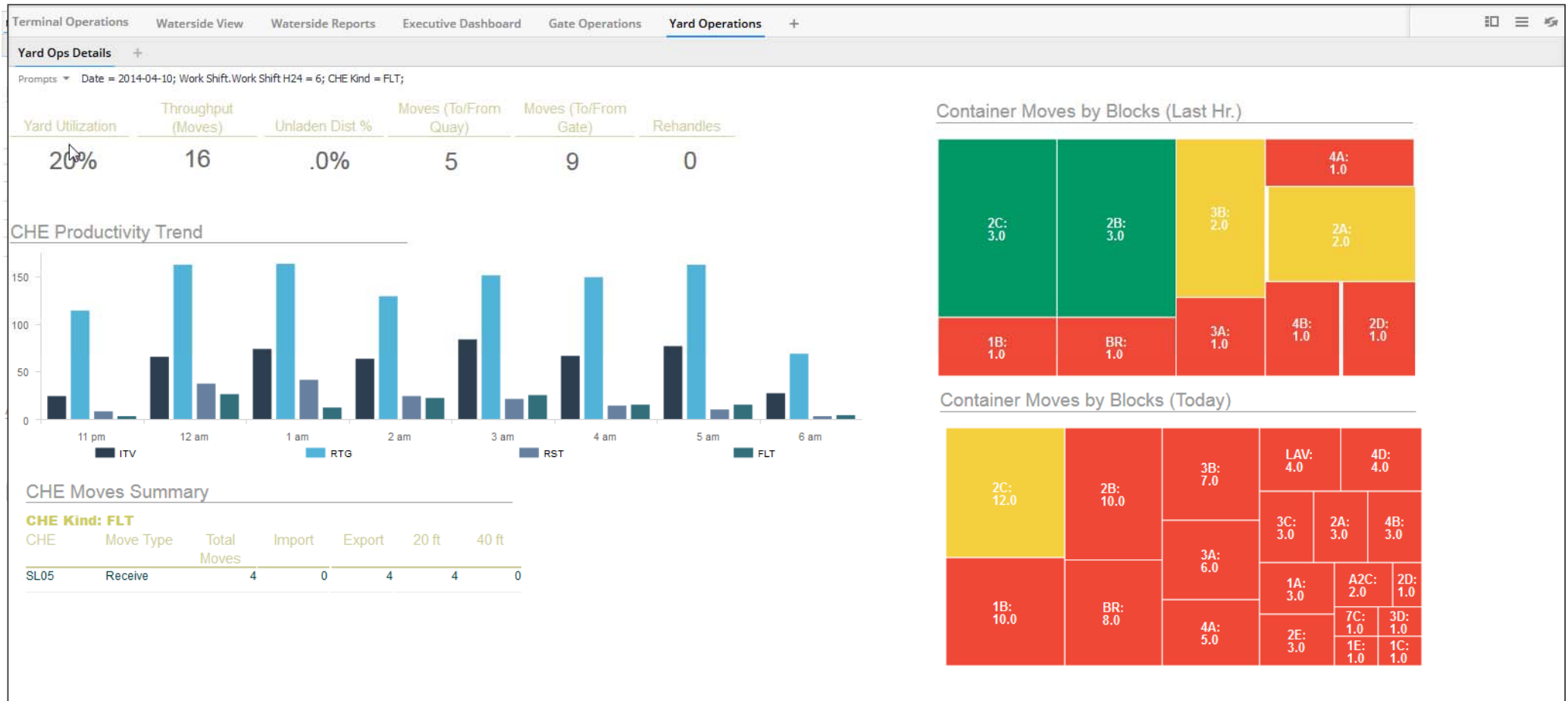
Filter Name	Cat	Sts	Is Prprj	Is Haz	Is Rft	Is Full	Is OOG	Full Warn	Dsr'd Wh Cnt	Chss Stat
EMPTIES	%	MTY	No	No	No	No	N/A	95	-1	NC
GENERAL	%	FCL	No	No	No	Yes	No	95	-1	NC
HAZ	%	FCL	No	Yes	No	Yes	No	95	-1	NC
OOG	E,I,T	%	No	N/A	No	Yes	Yes	95	-1	NC
REEFERS	%	%	No	N/A	Yes	Yes	No	95	-1	NC

After: Total allocation filter = 5

Leveraging Terminal Data in the TOS



Managing Performance with Business Intelligence



Available Port Technology

navis[®]

Gate Appts, RFID,
OCR, LPR,
Weighbridge

Rail OCR,
A-RGC

Automatic
Yard
Planning

Mobile Devices
& Yard
Inventory

Global
Pooling &
Scheduling

QC OCR,
QC R/C

Automatic
Vessel
Planning

Automatic Yard
Crane
Scheduling

ITV Job Step
PDS, RFID

Automatic
Reefer
Monitoring

All These Technologies are
Currently Used at Terminals
Running Navis N4

Data Exchange,
EDI, Web Portal,
ITT, Billing

Customer Case Studies



DaChan Bay Terminals



“As a result of successes from N4’s capabilities, we are revitalizing container stacking to avoid unnecessary shuffling. We are also now able to control yard density with a preset target to ensure effective use of equipment resources, as well as set target performance metrics for each vessel to achieve maximum ROI.”

– Barbara Zhang, Operation General Manager

ABOUT DCB

- Strategically located terminals provide key trade access for South China
- Expansive express barge network covers 8 major cities in West Pan-Pearl River Delta regions and more than 50 terminals in Guangdong, Guangxi and Hainan
- Achieved 1.26 million TEUs in 2015

CHALLENGES

- Needed to meet and uphold the standards of automation being established across the shipping sector and demanded by carriers and shippers
- Former in-house system, was not scalable with the terminal’s growth, and did not provide the necessary flexibility and visibility to operators
- Required TOS to interface with shipping and cargo line customers, meet demands of both port locations, and integrated with current billing system.

SOLUTION

- Navis N4 TOS

RESULTS

- In the first four months of 2016, TEU cost decreased by 5% compared to 2015
- Total haulage productivity increased by 18%; total haulage costs decreased by 19%
- Improved quayside times and vessel rates
- Ability to control yard density with a preset target to ensure effective use of equipment resources



TERMINAL DETAILS	T1 & T2
Container Terminal Area	307 ha
Gantry Cranes	79
RTG Cranes	183
Empty Container Handler	56
Terminal Tractors	569

15.2 Million Annual TEU throughput

9th largest in the world, largest outside of Asia



Significant improvements to operational metrics after PrimeRoute

12 % gain in gross crane MPH

21 % gain in TT MPH

20 % reduced unladen travel time

17 % tractor fuel reduction

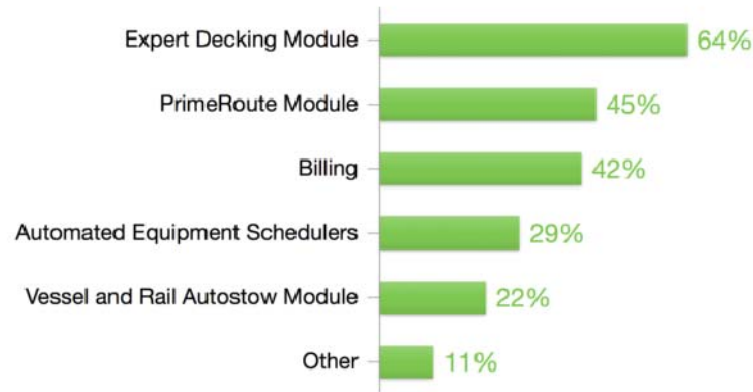
31 % reduced mainline vessel port stays



Research by TechValidate

The Importance of N4 modules

What features of N4 are most valuable to the management of your terminals' operations?



Note: this is a multiple-choice question – response percentages may not add up to 100.

Source: TechValidate survey of 112 users of Navis N4 Terminal Operating System

Published: Oct. 12, 2015

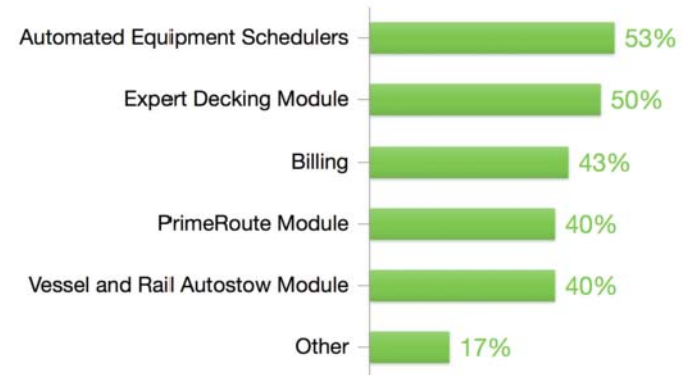
TVID: 77A-947-B1E



Research by TechValidate

After using N4 for 5-7 years, what N4 features are most valuable to you?

What features of N4 are most valuable to the management of your terminals' operations?



Note: this is a multiple-choice question – response percentages may not add up to 100.

Source: TechValidate survey of 30 users of Navis N4 Terminal Operating System. Sample comprised of customers who selected 5 - 7 years.

Published: Oct. 12, 2015

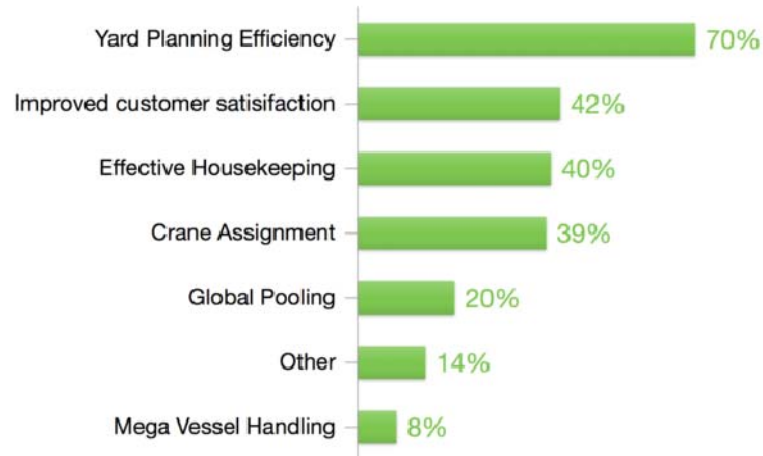
TVID: B3F-541-C47



Research by TechValidate

N4 is helping to lower operational costs

In what area(s) is N4 helping your terminal to lower operational costs?



Note: this is a multiple-choice question – response percentages may not add up to 100.

Source: TechValidate survey of 108 users of Navis N4 Terminal Operating System

Published: Oct. 12, 2015

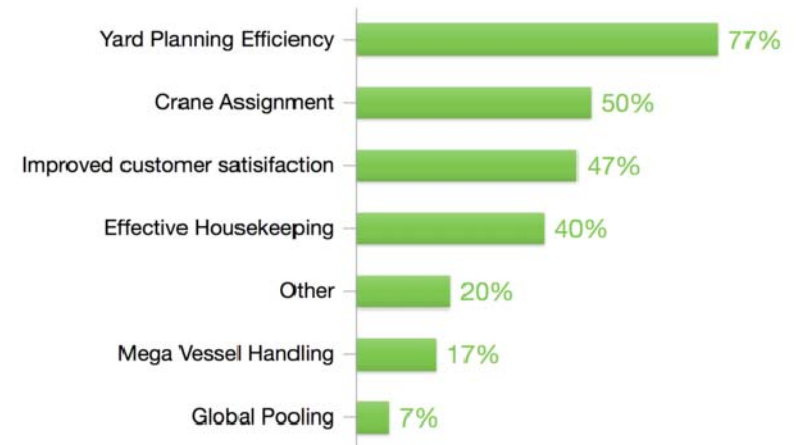
TVID: D05-E72-A9C



Research by TechValidate

Areas where N4 is helping Lower Costs for terminals on N4 for 5-7 years

In what area(s) is N4 helping your terminal to lower operational costs?



Note: this is a multiple-choice question – response percentages may not add up to 100.

Source: TechValidate survey of 30 users of Navis N4 Terminal Operating System. Sample comprised of customers who selected 5 - 7 years.

Published: Oct. 12, 2015

TVID: 1AD-606-B67

Committed to Port Industry and Future



ICT FOCUS

WorldCargo

Navis's N4 boom

Navis is having significant success in Latin America with its flagship N4 TOS. In the three months since June, eight terminals have gone live with N4, and 16 more are in the process of implementation, with go-live scheduled from 2015 to 2017.

Martin Bask, senior director of sales, Americas at Navis, said it now enjoys 100% of the Argentine market, but 13 terminals in Brazil and two more expected in Chile. These include Terminal Pacifico Sur Valparaiso (TPSV), which is replacing the CTI TOS, developed by Handling Port Consulting, with N4. Other new business includes terminals in Buenos, Paraguay and Venezuela, where Navis has won the

TOS contract at the Port of La Guayaquil.

Navis is achieving much more success in South and Latin America with N4 than it did with SPARC3, which a number of terminals considered too expensive. Nave VP and general manager Chuck Schroeder said this was more so for smaller terminals, but Navis is now very competitive in this market. Nave did, at one point, introduce a mid-range version of N4 for small terminals, called Ago, but has decided since to focus on N4, and adjust the price for smaller customers.

Navis has also continued to spend on integrating N4 to reduce implementation costs. The product is much more



Shreevil, Pacific Star Logistics is replacing CTI with Navis N4

integrated, and also are familiar with the customer requirements.

Another factor in Navis' recent success, added Schroeder, is that the market has become more sophisticated and wants to do more with IT. TPSV has taken the journey from stock orders to ETO, and is now looking to implement N4 with Tapes Desktop, Navis' yard optimization tool. Another new customer is installing N4 with Business Intelligence tools and a PCS system.

Navis is now working on offering a

configurable than SPARC3, and many of the transitions are carried out by a local partner (Present in the Americas) and, in some instances, Navis has trained terminal operators to do their own installations.

Navis also has three partners that can perform Gateway extensions for customers. Locally Bask added that some customers are actually going further and using "local IT shops" to do their own

Gateway extensions and integrations, all at local prices and independently of Navis.



FEATURING

- 30 Global Ports
- Most Dynamic New Builds
- Voices from Mega Port CEOs
- Training and Automation



GLOBAL ISSUES

The port of the future capturing the sense of wonder



Dr Oscar Pernia, Director of Product Strategy, Navis; and Manuel Perez, Director of Product Management (Engineering), Xvels; California, USA

For the port of the future, bigger vessels, broader carrier alliances, container capacity consolidation and larger hub and spoke port networks will be changing costs

eliminating or drastically reducing the estimated US\$17 billion waste in current port and carrier business processes.

More-hubs, connectivity and

The port of the future will be integrated into a maritime information network where relevant data is accessible and shared with shipping partners in a secure environment. Automatic processing of



www.porttechnology.org Navis World Edition 60





27 *Years*

305 *TOS Terminals*

80 *Countries*

142 *N4 Live*

232 *N4 Committed*

455 *Employees*

6 *Offices*

navis[®]

Thank You

11th Southern Asia
Ports, Logistics and Shipping 2016
Sri Lanka