

LongRead

Ports and technology



Changing the mindset

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Last year, Ryan Petersen, chief executive and founder of digital freight forwarder Flexport, settled into the back seat of a taxi just outside the Long Beach port complex and sighed.

“That was awesome,” he told this reporter, “We call Flexport a tech company, but what I have just seen completely blew my mind. I have never seen robotics used on that scale before.”

He had just been on a port tour of the newly opened Long Beach Container Terminal, the fully automated box facility developed to the tune of \$2bn by Hong Kong shipping line OOCL.

“For the last four years I’ve been building a digital supply chain company that was founded on the

understanding that the shipping industry is antiquated and uncoordinated and hasn’t been able to harness technology to improve efficiency – and all this time, right under my nose, places and systems like this were being built,” he added.

There are few companies whose names have seemed to become the byword for the debate over the technological transformation that is taking place in global supply chains and the logistics industry, as Flexport. To say that Mr Petersen has ruffled a few feathers among the established

Products that deliver meaningful supply chain solutions



freight forwarding companies would be a serious understatement – although there has been far less malice on his part than some seem to have credited him with. This itself largely, one suspects, was created by a certain amount of envy at the ease with which he appears have raised well over \$100m in funding.

The reaction of the freight forwarding community notwithstanding – the ensuing year has seen a host of established operators present new digital initiatives, as well as an even larger host of start-ups – what Flexport’s near-ubiquity has done is change the whole nature of the conversation in the industry.

Digital talk

Lars Jensen, founder and chief executive of SealIntelligence Consulting, explained in a TOC Europe preview post that much of the talk about digitising container supply chains misses what has actually taken place.

“Looking at many of the initiatives which rose to prominence in 2017, two elements are important. The first is that the clear majority were not started in 2017. They were instead launched in the 2012-2016 period. This indicates that despite the seeming sudden rise in digitisation, it is actually the result of several years preparing the groundwork for these concepts.

“Secondly, and as importantly, it is hard to see genuinely ground-breaking new concepts among these.

“However, this is besides the main point in this context. The important part is that fundamentally the rise of digitisation as seen in 2018 does not have technology as its main driver,” he adds.

When asked to define technology, the science fiction writer Douglas Adams, the late author of the revered *Hitchhiker’s Guide to the Galaxy*, replied with a typically comic aphorism: “Technology is what we call stuff that doesn’t work yet.”

This writer has been looking high and low – literally, from academia to mob wisdom – for ways to frame the discussion about technology and disruption in logistics, and there is no one who has captured it quite as succinctly as Mr Adams.

“Technology is usually what is being talked about, but the critical thing we have begun to see changing is the industry’s view on how to use the technology,” Lars Jensen continues.

Rotterdam introduces Pronto solution



While many of the digitisation efforts in container supply chains have focused on easing the movement of cargo through ports and terminals, the port authority of Rotterdam has focused on optimising vessel movements with the creation of the Pronto app, which it claims can reduce vessel waiting times in port by as much as 20%.

Combining a range of data sources on one platform, Pronto allows shipping companies, agents, terminal operators and other service providers to exchange information relating to their port calls.

Once a vessel’s estimated time of arrival becomes known, it is assigned a timeline within Pronto. This timeline specifies each milestone the vessel will pass during its port call: from its arrival and stay in the port to its departure.

Rotterdam chief financial officer Paul Smits, whose responsibilities also include digitisation, says: “The application allows all users to optimally plan, execute and monitor activities throughout the entire port call. This yields concrete benefits for all parties involved. The uniform mutual exchange of standardised data allows port calls to be planned more effectively and efficiently and rounded off in a shorter period of time. Pronto was extensively tested over the past year during the development phase.

“We will now be making it available to members of the port community – either in exchange for data or for a fee. We expect more and more terminals in the port to start using Pronto, which in turn will increase the accuracy of the data it generates.”

Oil giant Shell was involved in the pilot phase, and the company’s general manager of shipping & maritime for Europe and Africa, Ed Barsingerhorn, says it saw benefits even at that early stage.

“The pilot convinced us of the added value of Pronto. We have reduced the waiting time by up to 20% for departing ships. It is essential that all parties involved in the process, including terminal and agent, work closely together and share relevant data.

“When we exchange time stamp data, not only in Rotterdam but also between ports, the improvement potential increases significantly. Ships can sail optimally laden and arrive just-in-time through better planning.”

“We are increasingly seeing the launch of pilot projects where not only the tools but also the business models are not fully in place yet. Instead customers are invited to participate in the further testing and development. And the focus is shifting to how new tools can solve actual problems.”

In this context, it is fitting that some of the simplest and potentially most effective digital initiatives to optimise efficiency of container supply chains is not coming from logistics service providers or shipping lines but from ports and terminals operators.

Ports already occupy the central position in container supply chains, and the latest developments on the part of DP World and PSA demonstrate they have come to grips with their changing place in world trade. There has been a considerable change in the mindset of port operators, one that has been taking place alongside the technological changes occurring in wider society.

For the past few years, port operators have become increasingly aware that their customer base is not just shipping lines, but also the



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PSA group chief executive Tan Chong Meng gave the keynote speech at this year's TOC Asia container supply chain event in Singapore

shippers, 3PLs and hauliers.

As PSA group chief executive Tan Chong Meng explained in his keynote speech at this year's TOC Asia container supply chain event in Singapore, terminal operators have had to grapple with the twin issues of liner consolidation and the efficiency challenges posed by the widespread introduction of ultra-large container vessels.

"But today we talk less about megavessels and more about digitisation. At PSA we took a step back to try and understand how the world is changing because if logistics is an engine of the world economy then we need to understand what sort of economy there will be in the future."

He said this had boiled down to some "hard truths".

"The first is that cargo is changing, which is quite a revolution for PSA. Previously we considered ourselves primarily as movers of boxes, but we realised that it is not just about the number of boxes we move but the purpose that we fulfil in doing that.

"Consumer demand is changing – there is a higher demand for reliability and there are faster product cycle times; and all the stuff that is affecting B2C – the last mile in the supply chain – will come to affect the middle mile where we operate.

"Secondly there is the observation that technology will both enable and disrupt – e-commerce is doubling

every four years and people aren't just buying online, there are buying offshore as well; 60% of Singapore's e-commerce sales are now cross-border," he says adding that the latest forecasts indicate that global e-commerce sales could reach \$4.5trn by 2021.

Changing supply chains

PSA also believes that two emerging technologies – 3D printing and electric vehicles – are likely to "go mainstream" and fundamentally change global supply chains.

"3D printing will become part of everyday lives," Mr Tan said, "Some reports suggest that it will account for 30-50% of manufacturing, and while there are obvious implications for the transport of raw materials to feed this growth, the other obvious conclusion is that there will be less manufactured goods to transport in containers."

Similarly, PSA also believes that electric vehicles could "become the new norm" by 2030.

'Cargo is changing, which is quite a revolution for PSA. Previously we considered ourselves primarily as movers of boxes, but we realised that it is not just about the number of boxes we move but the purpose that we fulfil in doing that

"The reduced numbers of parts in electric cars – an eight-cylinder petrol engine has 1,200 parts, compared with a corresponding electric car, which has just 20 – has huge implications for container transport, as well as how you ship lithium batteries," he says.

"And because of all these shifts many manufacturing supply chains are starting to pivot and there are many common themes – central supply chain planning and shorter product cycles being just two.

"In addition, cross-integration between industries is taking place, which is redefining the value curve with new physical-digital connectivity but is also coming at a time when there is a lack of connectedness and visibility in traditional supply chains," he says.

According to a survey last year by the Business Performance Innovation Network, 82% of respondents "feel the level of connectedness and visibility needs to be improved", while 12% thought there is "virtually no visibility at all".

Further, the logistics industry is facing a problem of perception – 57% believed there was poor coordination between supply chain partners; 50% believed there was too little transparency and 37% saw inefficiencies in the supply chain.

As a result, Mr Tan said, PSA had "started to look more closely at things beyond the port parameters",



Port 2050

What could shape the port of the future

TRENDS EMERGING



Physical



- Ports as hubs for wider economic activity – logistics, manufacturing, 'free areas'
- More solutions specific for customers
- Decline in coal and hydro-carbon cargoes
- Connectivity – ongoing shift to multi-modal

- More flexible usage of assets
 - Use of data for real time utilisation
 - End to end supply chain visibility
 - Adaptable buildings / space
- Large scale port-based value addition
- Connectivity
 - Focused key trade corridors
 - More & better integrated hub & spoke water borne freight
 - New modes (e.g. hyper loop)
- Constrained assets / 'capacity markets'



Augmentation and Automation



- Remotely operated equipment (e.g. cranes)
- Autonomous operations (e.g. container yards)
- Operators as supervisors & technology users

- Further applications of enhanced technology developments
- An Internet of Things enabled world
- New business opportunities – 'Air Traffic Control' for near UK waters; drone operation hubs; human services to enable remote / autonomous operations
- Changed roles for human interface

POSSIBLE FUTURE



THE HUMAN DIMENSION

Challenges but also opportunities

- **Safer jobs** – Less man / machine interface, height, confined spaces
- **Different jobs** – e.g. high intensity crewing, data services
- **Better jobs** – more skilled, new skills
- **Balance** – Increased gender diversity
- **Continuity** – Ports will remain significant sources and catalysts of employment



EMERGING NOW

Digital



Sustainable

- Ports as data platforms (e.g. Port Community Systems and advanced inventory systems)
- Providing tracking data
- Blockchain and 'smart contracts'
- Cyber security as a core skill

- Ports as (renewable) power stations
- Electrification of processes and plant & equipment
- Reducing emissions and improving air quality through smarter operations (e.g. Vehicle Booking Systems)
- UK as a key influencer of global standards

- Applying Artificial Intelligence, Machine Learning, 'Digital twins' and other advanced analytics for applications such as predictive planning & operations, self diagnosis
- Seamless end-to-end data supply chains – data as a service
- Large scale blockchain adoption
- More dynamic charging in response to demand

- Large scale alternative fuelling
- Ports as key nodes in energy transition – both as consumers & enablers
- Electric vessels for some uses (e.g. coastal feeder services)
- Natural capital businesses
- Use of advanced analytics in monitoring & approvals
- Appropriately integrated regulatory framework

GAME-CHANGERS



THE ROLE FOR GOVERNMENT

Create an enabling framework for investment, development and innovation

- **Do** – provide infrastructure – physical and knowledge; set a consistent long-term direction; join and align the regulatory framework with strategic goals (e.g. trade)
- **Don't** – pick winners, over regulate



Dyson's Singapore technology centre contains a supply chain control tower that runs its global production and shipping programmes. The centre is also adjacent to Dyson's West Park manufacturing facility, where one of its digital motors comes off a highly automated production line every 2.6 seconds

“Our aim is simply to add value to manufacturing and supply chains with more services – and this is not an option, but an anchor.”

A key plank of this strategy is to enable the creation of advanced manufacturing facilities, particularly those near to its Singapore hub.

“Singapore’s manufacturing industry is changing – look at Dyson’s new plant here, producing highly priced components. We want to be part of that vision. If we can raise the flow of cargo it will be good for all logistics service providers and not just the port,” he says.

Opened in February, the hi-tech UK manufacturer is set to invest US\$561m in its Singapore technology centre, which will be focused on developing artificial intelligence (AI), machine learning and software, and critically contains a supply chain control tower that runs its global production and shipping programmes. The centre is also adjacent to Dyson’s West Park manufacturing facility, where one of its digital motors comes off a highly automated production line every 2.6 seconds.

PSA’s philosophy to align itself with manufacturing trends has been also reflected in the development of new trade corridors, in a move not dissimilar from APM terminals’ strategy of going inland (see page 9).

This includes the seven-day transport corridor it is developing between China’s inland manufacturing hub of Chongqing and Singapore, which it conceived in conjunction with Singaporean shipping line PIL.

Another example is the development of an air-sea supply chain for perishable goods moving from New Zealand to North Europe, which takes, on average, 42 days by ocean.

Vast improvement

PSA has helped to improve the interchange between ocean and air freight modes, so that goods are now air freighted from New Zealand to Changi airport in Singapore and then transferred to vessels at PSA’s terminals – and the new 25-26-day transit times offers a vast improvement in value for shippers as it brings goods to the end market some two and a half weeks earlier, representing considerably more earning power as well as reducing exporters’ working capital tied up in inventory.

In terms of technology, the basis for its investment has been “about getting deeper and further into supply chains”, and its recently unveiled Calista solution was developed after extensive, and unprecedented, consultation with “shippers, 3PLs and stakeholders and as we focused on innovating physical transport solutions, we encountered a lot of non-physical problems”.

“Many of the pain points are known about, but in general the industry has been unable to deal with them, although there have been numerous efforts to solve them over the last few years,” he explains.

“However, logistics is a three-dimensional challenge: the physical, the regulatory and the financial. Ideally, we should be able to deal with all three on one platform.”

The result, developed in conjunction with Singapore-based CrimsonLogic is Calista [CArgo Logistics, Inventory Streamlining & Trade Aggregation], an open platform that connects the digital and physical movements, and allows shippers and 3PLs to better manage trade finance and documentation flows.

The pilot phase will see an investment of S\$20m (US\$15.12m) and will principally allow electronic documentation to be reused to avoid repeated manual processes – and although it is backed by PSA, Calista is intended to be an open and global platform which other port and logistics players are invited to participate in, eventually covering the flow of goods in supply chains across different regions, countries, logistics providers and ports.

The architecture is open and uses blockchain technology, which means that shipping instructions can be read

APM Terminals builds up inland services portfolio

While the DP World and PSA developments are different systems looking to address different – but certainly related issues – they jointly demonstrate that the attitude and outlook of port operators has undergone a profound change in recent years.

A similar transformation appears to have taken place at APM Terminals which, as part of the corporate restructuring being undertaken at parent company AP Møller-Maersk, is laying out a new capital expenditure (capex) strategy aimed at optimising inland box flows, and a reduced focus on large-scale port and terminal development projects.

This means honing the synergies with sister companies Maersk Line and Damco.

Speaking to *The Loadstar* on the sidelines of the TPM conference in Long Beach earlier this year, the then chief operating officer, Henrik Lundgaard Pedersen – who has since left the group to become the new chief executive of Associated British Ports – said the next phase of AP Møller-Maersk's investment programme would be focused on serving its landside customers: the shippers whose cargo passes through its global facilities.

“We have four main container terminal expansion projects underway – Moin in Costa Rica, Vado in Italy, Tema in Ghana and Tangiers in Morocco – and once these are completed our focus in terms of capex will be on optimising our terminals and the way they interact with the hinterland.”

Whereas previously the operator's inland services were run by just one executive, a new team has been hired to work on the project, led by Dries van Dongen, the recently appointed global head of landside customers and inland services.

“When Maersk talks about being a global integrator of container services, that is end-to-end,” explained Mr Lundgaard Pedersen.

“Our part of that is to make sure the cargo moves in and out

of our terminals on the landside in the most efficient way,” explained.

At its Buenaventura terminal on Colombia's Pacific coast, shippers deliver coffee and sugar exports in bags, and APMT has been stuffing those cargoes into containers on exporters' behalf in the terminal yard.

“Similarly, we are de-stuffing Asian container imports in our yard before the cargo is released inland.”

In contrast, in Chile and Peru the company has set up operations to stuff containers at shippers' premises – a copper mine in Chile and at a large food plantation in Peru – before they are transported to the sea ports.

This has also led to supply chain coordination with Maersk's supply chain management subsidiary Damco. At an inland APMT facility in Thailand, there are Damco employees working on container logistics on behalf of some automotive suppliers.

“Ultimately, it doesn't really matter whether it is a Damco employee or APMT employee performing the tasks.”

The initiative comes as the company seeks to secure cargo flows through its facilities, and Mr Lundgaard Pedersen revealed that landside problems at some terminals had led to some shippers refusing to contract with lines that called at those ports.

“We had an instance this year when a shipping line came to us and said that they wouldn't be using our terminal because their largest customer didn't want to use our facility.

“The line allowed us to talk to the shipper, propose new solutions and eventually we won that service,” he told *The Loadstar*.

He said that capex would now be focused on building warehouses, both adjacent to its box terminals and at inland locations, as well as investment in smaller handling equipment to operate those facilities and IT to process logistic movements as its inland services builds up.

A photograph showing a port terminal with a worker in the foreground. The worker is wearing a white hard hat and a blue Maersk uniform. The terminal is filled with stacks of containers, and a large blue crane is visible. In the background, there is a cityscape and a body of water.

AP Møller-Maersk has a new strategy aimed at optimising inland box flows, and a reduced focus on large-scale port and terminal development projects

and revised for port gate usage and customs declarations.

Eugene Wong, chairman of CrimsonLogic and its parent company, Global eTrade Services, tells *The Loadstar*: “We are now in the pilot phase, and it involves multiple tradelanes and different customer profiles – multinational shippers and transportation providers are taking part.

“By September, we should be able to assess its impact. The main challenge has been inertia in terms of users and the inertia that companies have in partnering – everyone is a competitor, and everyone is a potential partner, and it has taken a while for companies to accept this.

“It’s not just PSA – other partners could come in and join the project.

Strategic partner

“That said, PSA is our strategic partner and has cooperated with us on previous projects. The value of the platform is the number of connections and people who use it – so our strategic partners are well aware that Calista has to be neutral,” he explains.

It also does have a revenue model, currently being honed down, and it is likely to be a mixture of subscriptions and transaction fees.

Nonetheless, what has transpired in the years since Facebook has become a global corporate behemoth is that the value of a platform is simply a function of the number of participants that use it, an understanding that underpins DP World’s Where’s My Container (WMC) app.

Currently only in use in the Dubai-based operator’s UK ports of Southampton and London Gateway, this year saw the launch of the next generation of WMC, which managing director Chris Lewis describes as an “evolution” of the previous iteration, and a development that had been inspired by customer feedback.

“Going forward we are retaining all its current functionality but also helping customers save money by providing real time information on the status of their containers.

“Customers can take decisions based on fact rather than assumption – there has been a widespread acknowledgement in the port industry that ports were a black hole into which containers disappeared when they had either been unloaded from a vessel or delivered through its gates by truck or train.

“DP World is embracing digitisation



‘The fact is that we know everything about a container – we know where it is stored; we know its status; whether it has been put on hold by customs or port health and if it is to be inspected – we know its availability. The key thing about this is that it is all done in real time’
– Chris Lewis

to tackle the perception that there is a cargo black hole,” he says.

Perhaps alone amongst terminal chief executives, Mr Lewis has an IT background – before joining DP World he was head of IT at the Hutchison-owned port of Felixstowe – and has a keen understanding of the mechanics behind new technology.

It is perhaps because of this knowledge that the beauty of WMC is its sheer simplicity – all that was required in its first phase, launched in May 2017, was the container number. Anyone could access the system, input the number and it would report the latest milestone that the box had passed – unloading; in the yard stack; ready for collection etc...

“The fact is that we know everything about a container – we know where it is

stored; we know its status; whether it has been put on hold by customs or port health and if it is to be inspected – we know its availability.

“The key thing about this is that it is all done in real time.

Change in status

“As soon as something has happened to it and there has been a change in status, WMC knows this, and that means that everyone also knows it – shippers or their hauliers are not going to be sending a truck to a terminal to collect a container until its available,” he says.

The one key change in the relaunched app is that users now have to register – over the past year it became glaringly apparent to DP World executives that the major problem with having such an open platform was that they simply



It became apparent to DP World executives that the major problem with having such an open platform was that they simply didn't have any information on its users

it is fitting that some of the simplest and potentially most effective digital initiatives to optimise efficiency of container supply chains is not coming from logistics service providers or shipping lines but from ports and terminals operators



didn't have any information on its users.

"We didn't know who was using the previous system – all we knew that there were over 6,000 different IP addresses, but that was the extent of the data. We did a lot of talking to customers and found a lot of users from the retail and automotive sectors, as well as hauliers and even shipping lines.

"I know that automotive manufacturers in the UK are already using it a huge amount because it is feeding information into their supply chains, and as the use of artificial intelligence in supply chains develops, this is precisely the kind of information that is crucial to optimising supply chains," Mr Lewis explains.

"Users of the existing WMC have told us they were able to reduce their inbound distribution windows by two days," he says.

And privately, one DP World terminal operations manager in the UK tells *The Loadstar* that if he gets a container enquiry WMC is generally the first resource he turns to.

Meanwhile, Mr Lewis also promises further development over the next three months, as premium services are introduced.

"The current WMC system in Southampton and London Gateway will continue, because the new version is on a different platform, and there will be transition phase of customers of the old system have their details recorded on the new one.

A second phase, which was demoed at the Multimodal show in Birmingham in early May, was WMC Premium which gives enhanced status message and extra milestones. Customers will be charged on a subscription basis and it is set to go live this summer, with potential customers given a 90-day free trials.

Bespoke milestones

A third phase has higher volume messaging and offers customers the option to create bespoke milestones, and will be launched in the autumn of 2018.

"We are doing a pilot project of this version with some customers using artificial intelligence.

"But in terms of the basic system, the main feedback we had was not to change any of the functionality – if anything, the main upgrade of this second release is the SMS alerts," he says.

However, that is not entirely true – a

far more significant alteration has taken place in the IT architecture, he admits.

"The real difference is mostly in the background – the system that was running WMC got its information from interrogating our systems such as the Terminal Operating System.

"The big change is that we are now building our own data warehouse which has all that information loaded directly into it and means that that WMC now has its own database and the response times are much quicker."

And by transferring that visibility to shippers and their 3PLs, suddenly a new range of supply chain options open up that can help shippers avoid potential bottlenecks, such as the possibility of creating a "speedy boarding" or handling for certain cargo.

"If you have a container you are interested in we can give you an estimated time of unloading. Now if a particular container was critical to the continuation of a supply chain then on exceptional basis we could give priority to certain boxes.

"But in general, people are very interested in when the cargo is cleared and available for collection," he says.

Conference, Exhibition & Networking Event

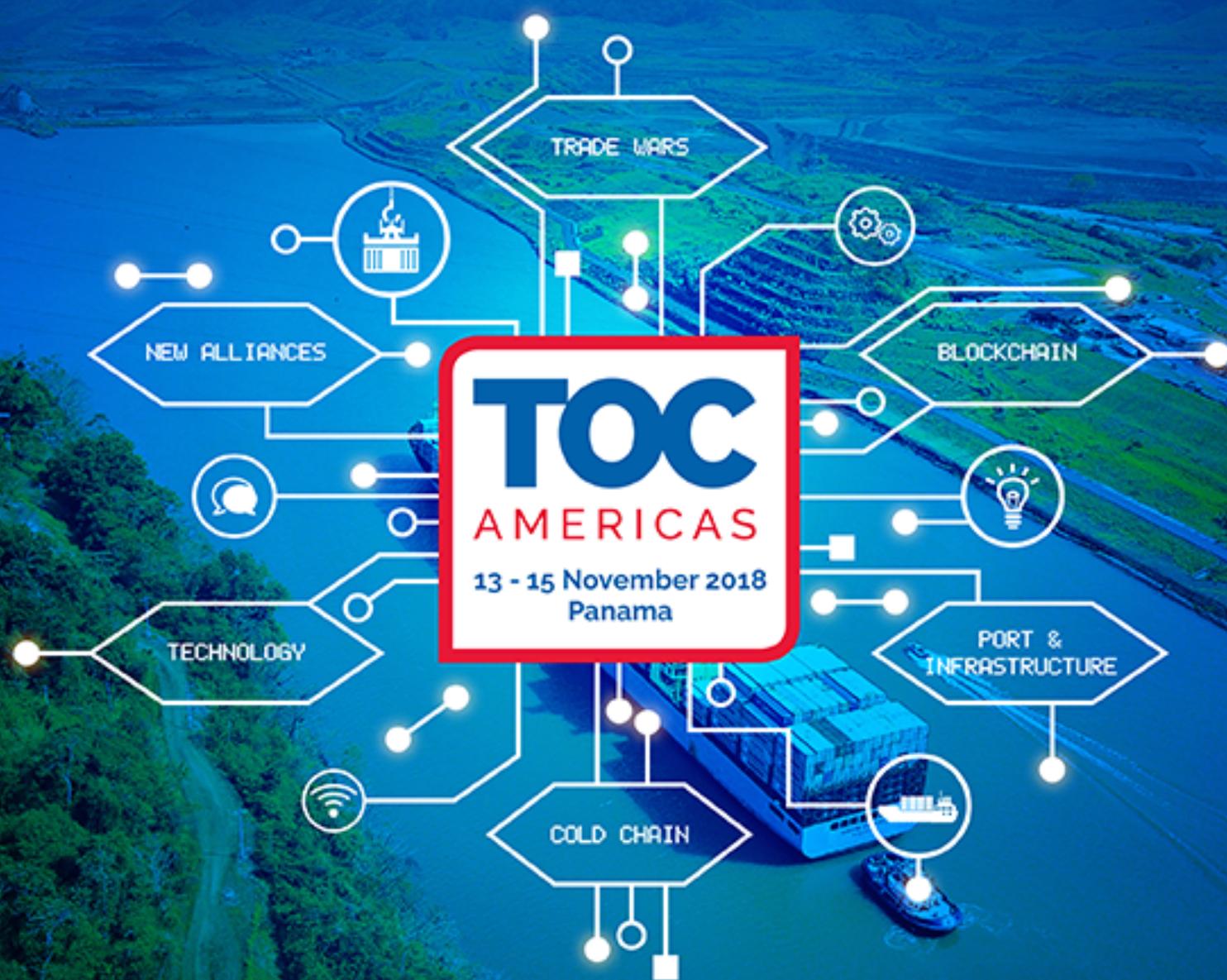
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