Port Xchange

WHITE PAPER

PORT CALL EFFICIENCY
The research to help you drive actual improvements during a port call

INTRODUCTION

Port Call Efficiency is like Port Call Optimisation[1], a concept that is much talked about in the shipping industry and, depending on who you speak to, is interpreted differently. That is because a great deal of thought and work is being devoted to this from different perspectives. These concepts are now being intensively revised due to the urgent need to significantly reduce emissions in shipping and improve efficiency[2]. In this white paper, we share the vision of PortXchange on Port Call Efficiency and how we used this concept to drive actual improvements in ports.

[1] https://portcalloptimization.org/images/Flyer%20port%20call%20optimization%20200401.pdf
[2] https://shipowners.fi/wp-content/uploads/2019/10/Finland.pdf

1. Managing Port Calls

A port call is a joint process[3] in which many different parties work together to get vessels into the port, operate them and get them out of the port, safely and efficiently. In this process, there is great improvement potential that may result in:

* Emission reduction of CO2 and NOx
* Lower bunker costs
* Better utilisation of assets and port & terminal infrastructure
* Less waiting time

To improve the port call process, it is not only important that all parties involved work together, but also that they look at a single point of truth regarding, for example, estimated times of arrival, start of cargo operations, departure, etc. A third – vital – enabler for improvement is to have a joint goal rather than each party focusing on their individual key performance indicators, which may even be in conflict with each other. For example, the terminal has been working very hard to optimise the vessel rotation time, but the nautical services are not available for the vessel's departure. In this case, the terminal's efforts to make the quay available for the next vessel as soon as possible are in vain.

Improving port call efficiency is not just the responsibility of the port. To achieve improvement, all parties involved in a port call, including the shipping line, port authority, terminal, agent and service providers, must collaborate.

2. What is Port Call Efficiency?

Efficiency is the degree to which an activity is executed according to plan. For example, if you buy a flight ticket and your ticket states boarding starts at 14.00, the idea is to arrive as close to 14.00 as possible. Not too early and not too late. Being early is not optimal, as this would unnecessarily overload the airport with passengers if everybody did that. Being late would result in you missing or delaying the flight.

This obviously applies to an even greater extent for big vessels. If vessels arrive at the port early, they need to wait and anchor or manoeuvre. This produces unnecessary emissions and bunker consumption[4]. Being late results in waiting time or re-planning of all other parties in the port such as the terminal, port authority and service providers.

Port call efficiency measures and drives the scheduled execution during the port call, starting with the departure from the previous port to the departure from the current port and taking a holistic perspective.

This is unlike the most common ways that are used in the industry to look at port call efficiency from each party's individual perspective.

---

[3] https://portcalloptimization.org/images/Business%20process%20port%20call%20optimization.pdf
[4] https://youtu.be/ioUpqZUNSlg

2.1 The one metric that matters

To enable structural improvements in port call processes worldwide, PortXchange has developed the Port Call Efficiency metric: one single KPI that measures the performance of each port call. The advantages of having such a metric are:

* Everybody works towards the same goal, no conflicting KPIs.

* It is possible to benchmark your performance against the industry average to drive internal performance. This applies to ports, shipping lines, terminals, etc.

To improve the daily operational process, you can act on various levels.

With PortXchange, we address three levels:

* We predict when certain things are going to happen *upfront*, enabling action to be taken before the event. We use machine learning for this and inform users pro-actively if they have set their warnings and notifications.

* We provide *real-time* information about the port and vessels to enable decision-making based on actual information.

* We provide information about how a port call was performed to enable *historic* performance management.

Historic performance management is based on the right data. It is key to being able to perform root cause problem solving and come up with structural process improvement to prevent events from being repeated in the future. This is precisely the goal of the port call efficiency metric: having the right data at hand about what happened during your port calls so that you can structurally improve how port calls are handled in the future.

2.2 Holistic approach including all steps of the port call

The port call efficiency concept breaks the process down into 5 steps, measuring the performance for each of these steps at a port call and consolidated level. The score for each step then adds up to a total port call performance score. This makes it easy to see which port calls were efficient and which ones were inefficient. This concept also allows for an in-depth investigation into those inefficient port calls and discovering where the process went wrong.
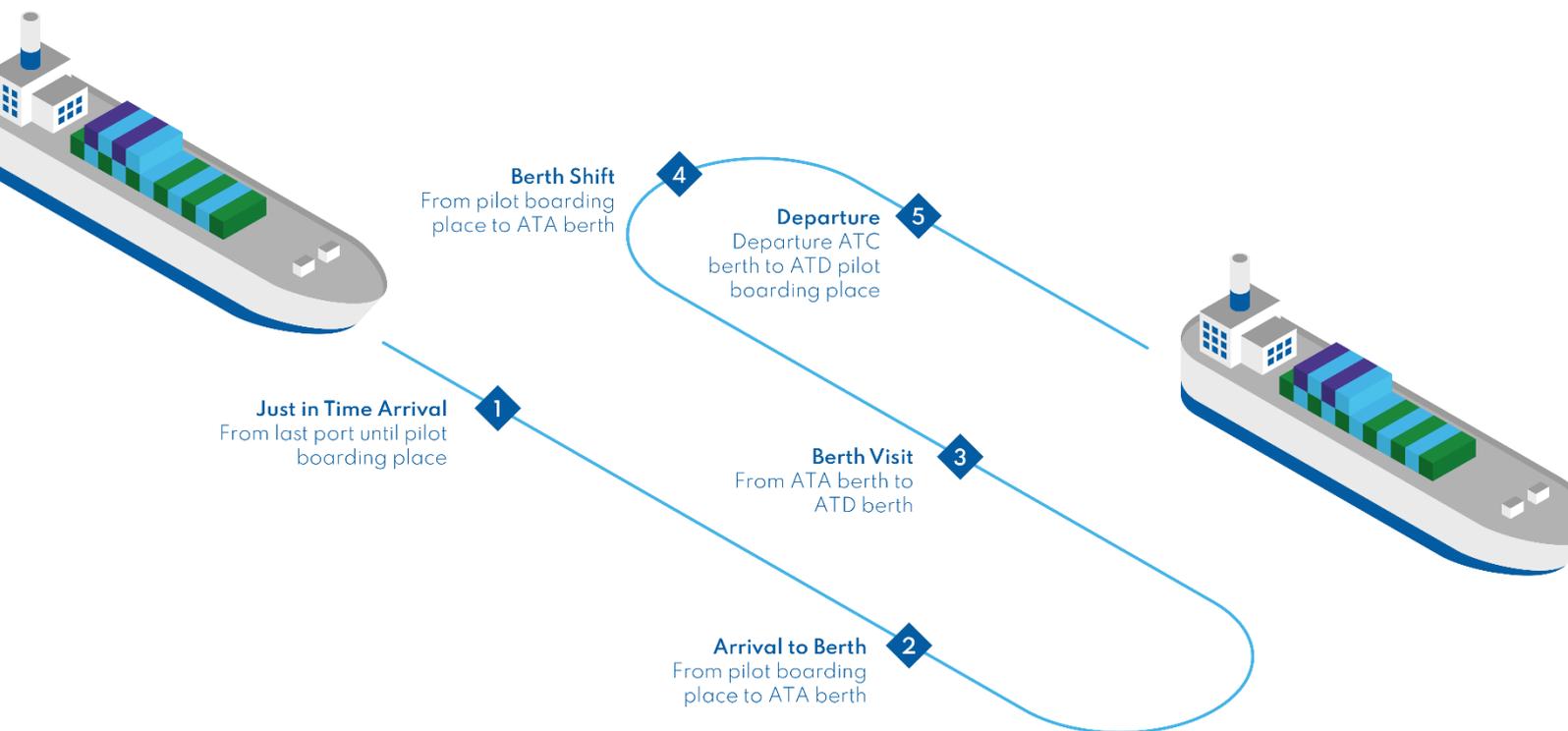
The steps in the port call efficiency metric are:

Step 1: **Just in time arrival** – from the previous port to the pilot boarding place

Step 2: **Arrival to berth** – from the pilot boarding place to the berth

Step 3: **Berth visit** – from arrival to the berth to departure from the berth

Step 4: **Berth shift** – if applicable, the shift to a next berth, which then leads back to step 3

Step 5: **Departure** – from the departure from the berth to the pilot boarding place on exiting the port

Berth Shift
From pilot boarding place to ATA berth
4

Departure **5**
Departure ATC berth to ATD pilot boarding place

Just in Time Arrival **1**
From last port until pilot boarding place

Berth Visit **3**
From ATA berth to ATD berth

Arrival to Berth **2**
From pilot boarding place to ATA berth

What makes this metric valuable is that most companies look at their own internal data when they evaluate performance. In this KPI, we use information from all parties involved in the port call, planning and actual, looking at the most reliable source for each milestone. This gives a very realistic overview of what happened during a port call, independent of perspective. By only looking at the information from one party, you miss the bigger picture.

This makes the metric a very holistic one and relevant to all parties involved, covering the entire port call process. The steps will be explored further in part 3 of the paper.

2.3 What does success look like?

With accurate performance data, you can set targets for yourself. Every port and company operating in it is very different from you. Only you can tell what your success looks like and define your goal accordingly. You can see on a scale from 0% to 100% how you are performing and set your target to improve compared to your historic performance.

You can also benchmark yourself against other industry players. In the port call efficiency metric, we (anonymously) indicate the performance of other similar companies, giving you an idea of where you stand.

2.4 Get rid of the buffers

Being able to execute properly in the mid to long term also helps improve the planning because fewer buffers need to be built in. This is something you tend to see a lot in logistics planning: just to be safe, an extra 10 minutes or half an hour is added to ensure there is enough time in the planning. All these buffers add up to a lot of time, which can all be classified as waste. In fact, in many of our discussions with customers, we noticed that different parties in the port were not even aware of each other's buffers and sometimes a buffer was built in from two sides for the same step in the process[5]. If you start collaborating in the joint process, you will look at the same information together and work towards port call efficiency as a community rather than suboptimising through individual KPIs.

Once you begin to work with real-time accurate information, it starts to feel safe to reduce or even remove these buffers.

---

[5] https://port-xchange.com/pilots/reduce-idle-time/

3. Port Calls and Standardisation

Efficiency improvement in the supply chain starts with communication. Everyone in the chain must be speaking the same language. In a complex environment like a port, miscommunication can have significant consequences.

Ports, terminals, services providers and shipping lines each look at productivity from their own perspective and have their own milestones. This can create confusion and conflicting goals. From a terminal perspective, a port call ends when the cargo operations have finished and the vessel has left the berth. From a pilot's perspective, a port call only ends when the pilot has completed his work and left the vessel. This may sound logical, but in practice it can lead to confusion and problems.

In this paper, we define a port call as: 'the time frame between which a vessel has departed from the previous port and the moment the vessel arrives at the pilot boarding place for departure from the current port.' All activities within that time frame, such as bunkering, pilotage, cargo operations, linesmen, are part of the port call.

For measuring and optimising Port Call Efficiency, besides standard milestones[6], we need IT definitions of the milestones. This enables all parties involved to share their planning and actual information in real time. With this goal in mind, the International

Taskforce Port Call Optimisation[7] has done a great deal of work in this field, resulting in industry standards for communication. PortXchange uses these communication standards in the platform. Some ports are already using (some of) the industry standards while others are not. If necessary, PortXchange therefore helps parties translate their information into the industry standards, making the solution available to every port in the world.

[6] https://portcalloptimization.org/images/Port%20Information%20Manual%203.01.pdf
[7] https://portcalloptimization.org/

4. Achieving Process Improvements

There is no silver bullet, platform or digital solution that will automatically improve the highly complex port call process for all parties. It is a matter of sitting down with everyone involved, mapping the current process, looking at pain points and agreeing on the next steps. Together with the standardisation and digitalisation of this new process, major improvements have been achieved in ports working with PortXchange. Nevertheless, improving the port call process is hard work. Once improvements are achieved, however, the impact is sustainable and significant[8].

4.1 Efficiency per step

By comparing planning and actual times, PortXchange calculates the efficiency at each step. In other words, inefficiency is the difference between the planned and actual times. If a step is completed sooner than planned, no extra efficiency points are added because deviating from the plan means other parties have to reorganise themselves. No plus or minus points are currently awarded in such a situation. For the planning information, the planning at the moment the vessel enters the port and arrives at the pilot boarding place is used. The planning is then frozen for the calculation.

At the end of the port call, every step is given a score and the total port call score is the weighted average of all steps combined. Only step 1 - Just in Time Arrival - is an exception to this logic because the ocean journey generally takes much longer than the process in the port. In the most optimal case, the efficiency score is 100%, and in the worst case, 0%.

4.2 Sub-KPIs for driving efficiency

It is hard to influence these steps in one go. For example, we want to improve our berth visit efficiency. To do so, it is useful to define sub-KPIs per step. These sub-KPIs can vary for each port or terminal because everyone has their own strengths and weaknesses in managing port calls, so this differs per location.

8 https://www.porttechnology.org/news/imo_alliance_to_establish_just_in_time_operations/

Examples of sub-KPIs are:

Step 1: Just in time arrival
Anchor time, bunker consumption, CO2 emission, NOx emission, actual sailing speed deviation from optimal sailing speed

Step 2: Arrival to berth
Vessel time waiting for nautical service providers, waiting time for vessel by nautical service providers, vessel exchange time

Step 3: Berth visit
Idle time on arrival or departure, delays cause by bunker services, delays caused by other services

Step 4: Berth shift
Berth exchange time

Step 5: Departure
Vessel time waiting for nautical service providers, waiting time or vessel by nautical service providers

By driving the performance on one of the sub-KPIs, you will influence the step score and thus the total Port Call Efficiency.

5. Visualisation of Port Call Efficiency

Users currently receive their performance information during the onboarding projects. In these projects, we focus on improving performance in particular areas agreed at the beginning of the project. Together with the users, we select which steps can be improved and we set the correct sub-KPIs to drive these positive changes.

PortXchange is working on making a dashboard accessible to users with the performance information compared to the industry benchmark. The platform is an excellent basis for continuous improvements based on real data, not just internal data but also data from different companies in the port. This new performance dashboard gives users a very powerful tool to independently drive these improvement projects.

All improvements start with accurate and complete data. With your performance to hand, based on all the available sources that were involved in your port call, you can structurally improve your way of working.

6. Port Call Efficiency: Who Benefits?

Each step of the port call has a primary supplier, customer and process owner. The customer is usually the one benefiting most from improved efficiency in the step. However, there are benefits for most parties in every step. These benefits are not always obvious. For example, if the terminal has an active role in managing port calls through PortXchange, the shipping line calling on their berths may experience significant lower emissions on their port calls. This is not something the terminal does deliberately, or experiences and knows right away, because it is a result of the attention and improved communication between the parties. And the impact on the whole ecosystem is enormous. In other cases, the benefits are more obvious, informing the shipping line that the bunker vessel will probably not finish on time for the vessel's planned departure time. This information allows the shipping line to take a calculated decision on whether to continue the bunker operation as planned, move it or cancel it and bunker in another port[9].

The key benefits of having a high port call efficiency per party are as follows:

PORTS

Optimise use of their infrastructure, optimise throughput, reduce NOx emissions (less anchorage) and, in case of congestion, more vessels can be handled. Also, a high Port Call Efficiency reduces waiting times for the nautical service providers.

TERMINALS

Optimise use of their quays and cranes by reducing idle time. By having more reliable and real-time information on arrival of vessels, terminals can improve their berth planning. Also, working more efficiently results in happier customers for the terminal.

SHIPPING LINES

Reduce emissions and bunker consumption with Just in Time Arrivals. Also, by doing port calls faster, they can use their vessel and container fleet more efficiently[10].

AGENTS

Handle more operations by having better visibility and higher predictability about what is happening in the port. Being an enabler in reducing emissions and improving efficiencies boosts the competitive position of agencies.

[9] https://port-xchange.com/pilots/reduce-delays-on-departure/
[10] https://port-xchange.com/pilots/improve-just-in-time-sailing-reduce-waiting-time/

7. From Validating to Real Time Optimisation

Port Call Efficiency is available in ports working with PortXchange because planning and actual data is needed from parties in the port. It is also most valuable in combination with the tooling in the platform to actually make an impact on the overall Port Call Efficiency.

You can start working with PortXchange on a small scale in the port with a 'coalition of the willing'. From there, the platform can expand to more users and parties, which will also improve the visibility and impact because every port is an ecosystem with many interdependencies.

Furthermore, optimisation between ports can be achieved if both ports are connected and benchmarking between ports can be done to drive up your own performance.

With the Port Call Efficiency metric, we want to take another step in standardising the shipping industry and improving the collaboration between shipping companies, terminals, agents and ports so that we can make an impact on emission reduction.

ABOUT THE AUTHOR

Dita Bruijn
Director of Operations at PortXchange

Dita has 12+ years' experience in the maritime shipping industry. She applies her extensive know-how with respect to operational excellence and digitisation to drive innovation and make port calls more efficient and greener.

Acknowledgment

MORE INFORMATION?

PortXchange Products B.V.
Stationsplein 45
3013 AK Rotterdam

For more information about PortXchange:
visit www.port-xchange.com or contact

Willem van Esch
Director of Business Development
+31 6 51 48 80 25
willem.van.esch@port-xchange.com