



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 Optimization¹, a concept that many people in shipping talk about and depending on who you speak to, you can get a different answer to what is meant by it. That is caused by the fact that a lot of thinking and work is being done on this from different perspectives. These concepts are heavily under construction at the moment because there is an urgent need to significantly reduce emissions in shipping and improve efficiency². 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 in an efficient and safe manner. In this entire process, there is large improvement potential that may result in:

- ✖ Emission reduction of CO₂ and NO_x
- ✖ Lower bunker costs
- ✖ Better utilization 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 – very important – enabler for improvement is to have a joint goal rather than have each party focus on their individual key performance indicators which in some cases may even be conflicting with each other. For example, the terminal has been working very hard to optimize the vessel rotation time, but the nautical services are not available for departure of the vessel. In this case, the terminal efforts to make the quay available for the next vessel as soon as possible go into vain.

Improving port call efficiency is not the responsibility of the port alone. To improve, all parties involved in a port call, including the shipping line, port authority, terminal, agent and service providers, need to collaborate.

2. What is Port Call Efficiency?

Efficiency is the degree to which an activity is being 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 you would unnecessarily overload the airport with passengers if everybody would do that. Being late would result in you missing or delaying the flight.

You can imagine that for big vessels, this applies to an even larger extent. If vessels arrive to the port early, they have to wait and anchor or manoeuvre. This results in 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.

³ <https://portcalloptimization.org/images/Business%20process%20port%20call%20optimization.pdf>

⁴ <https://youtu.be/ioUpqZUNSlg>

Port call efficiency measures and drives the execution as per planning throughout the entire port call, starting at the departure from the previous port all the way to the departure from the current port and taking a holistic perspective.

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

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 is working 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. Historic performance management.

To improve the operational process daily, you can act on various levels. With PortXchange Synchronizer, we address three levels:

- ✖ We predict when certain things are going to happen *upfront*, so action can 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 for being able to do root cause problem solving and come up with structural process improvement to prevent events from happening again in the future. This is exactly what the goal of the port call efficiency metric is: having the right data at hand about what happened in your port calls to be able to structurally improve the way port calls are handled in the future.

2.2 Holistic approach including all steps of the port call

The port call efficiency concept cuts the process into 5 steps, measuring the performance for each of these steps on a port call and consolidated level. The score per 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 to deep dive into those inefficient port calls and investigate in which step of the process things went wrong.

The steps in the port call efficiency metric are:

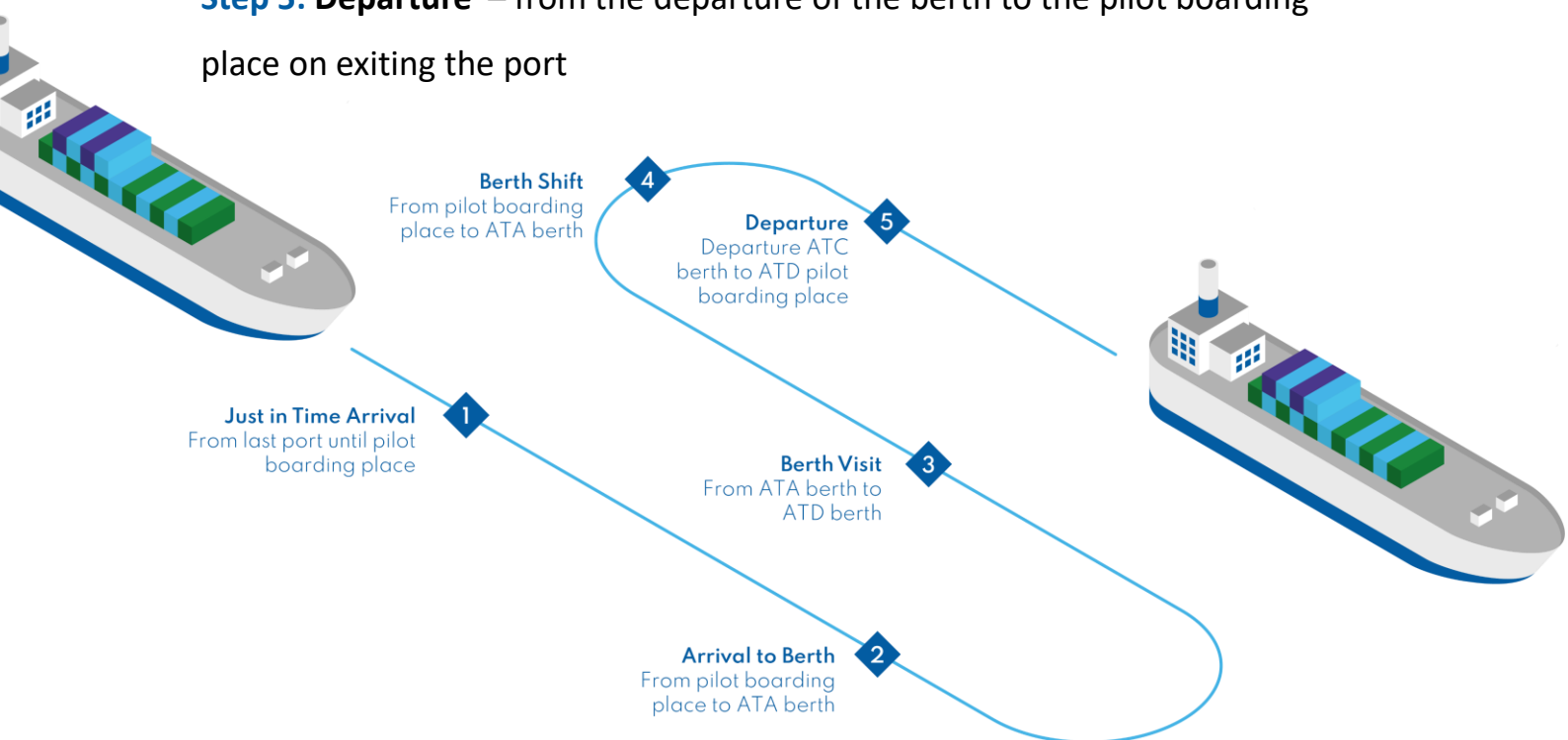
Step 1: Just in time arrival – from the previous port to the pilot boarding place

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 of the berth to the pilot boarding place on exiting the port



What makes this metric valuable, is that most companies are looking 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, in a port call, independent of perspective. By only looking at the information from one party, you are missing out on 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.

Also, you can benchmark yourself against other industry players. In the port call

efficiency metric, we (anonymously) indicate what the performance is of other companies that can be compared to yours, giving you an idea of where you stand.

2.4 Get rid of the buffers

Being able to execute properly on the mid to long term also helps improve the planning as fewer buffers need to be built in. This is something you typically see a lot in logistics planning: just to be safe, an extra 10 minutes or half an hour is added to make sure 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 discussions we had with customers, we noticed 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 sub optimize through individual KPIs.

Soon after 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 Standardization

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 lead to confusion and conflicting goals. From a terminal standpoint, a port call has ended when the cargo operations have finished and the vessel has departed from the berth. While from a pilot standpoint, a port call has only ended 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 to the pilot boarding place for departure from the current port.” All activities in that time

window, such as bunkering, pilotage, cargo operations, linesmen, are part of the port call.

For measuring and optimizing Port Call Efficiency, we need, apart from standard milestones ⁶, IT definitions of the milestones. This enables all involved parties to share their planning and actual information real-time with each other. With this goal in mind, over the past years a lot of work has been done in this field by the International Taskforce Port Call Optimization ⁷, resulting in industry standards for communication. PortXchange Synchronizer is using these communication standards in the platform. Some ports are already using (part of) the industry standards and some ports are not, that is why PortXchange helps parties translate their information to the industry standards if needed, making the solution available for every port in the world.

⁶ <https://portcalloptimization.org/images/Port%20Information%20Manual%203.01.pdf>

⁷ <https://portcalloptimization.org/>

4. Realizing Process Improvements

There is no silver bullet, a platform or a digital solution that will automatically improve the highly complex port call process for all parties. It is a matter of sitting together with everyone involved, mapping the current process, looking at pain points and agreeing on the next steps. Together with the standardization and digitalization of this new process, great improvements have been achieved in ports that are working with PortXchange Synchronizer. But make no mistake that improving the port call process is hard work. However, once improvements are achieved, the impact is sustainable and significant ⁸.

4.1 Efficiency per step

By comparing planning and actual times, PortXchange Synchronizer calculates the efficiency per step. In other words: inefficiency is the difference between the planned and actual times. In case a step is completed sooner than planned, no extra efficiency points are added, because deviating from the plan

means other parties have to reorganize themselves again. At this moment, no plus or minus points are 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 being used. The planning is then frozen for the calculation.

At the end of the port call, every step gets 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 as the ocean journey typically takes much longer than the process in the port. In the most optimal case, the efficiency score is 100%, and in the worst case, it is 0%.

4.2 Sub-KPI's for driving efficiency

It is hard to influence these steps in one go. For example, we want to improve our berth visit efficiency. That is why it is useful to define sub-KPI's per step. These sub-KPI's can differ per port or terminal as everyone has their own strengths and weaknesses in managing port calls, this really differs per location.

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

Examples of sub-KPI's 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

Waiting time vessel on nautical service providers, waiting time from nautical service providers on vessel, exchange time of vessels

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

Waiting time vessel on nautical service providers, waiting time nautical service providers on vessel

By driving the performance on one of the sub-KPI's, you will influence the step score and thereby the total Port Call Efficiency.

5. Visualization of Port Call Efficiency

At the moment, users receive their performance information during the onboarding projects. In these projects, we focus on improving the 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-KPI's to drive these positive changes.

PortXchange is working on the realization of a dashboard accessible to users with the performance information compared to the industry benchmark. The platform is an excellent base for continuous improvements based on real data, not only internal data but also data from different companies in the port. With this new performance dashboard, users have a very powerful tool in their hands to independently drive these improvement projects.

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

6. Port Call Efficiency: Who Benefits?

Every 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 some 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 Synchronizer, 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, as 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 prominent informing the shipping line that the bunker vessel will probably not finish on time for the planned departure time of the vessel. This information allows the shipping line to take a calculated decision on whether to continue with the bunker operation as planned, to move it or to cancel it and to bunker in another port⁹.

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



PORTS

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



TERMINALS

Make the best possible use of their quays and cranes by reducing idle time. By having more reliable and real-time information on arrival of vessels, terminals can optimize their berth planning. Also, working in a more efficient way 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 optimally¹⁰.



AGENTS

Handle more operations by having better visibility and higher predictability on 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 Optimization

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

Working with PortXchange Synchronizer is something that you can start 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 as every port is an ecosystem with many interdependencies.

Also, between ports optimization can take place if both ports are connected and benchmarking between ports can be done in order to drive your own performance up.

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

ABOUT THE AUTHOR



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Dita has 12+ in the maritime shipping industry. She applies her extensive experience in operational excellence and digitalization to drive innovation and make port calls efficient and greener.

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