

Applications of AI in improving the efficiency of vessel port calls

ITS Finland Autumn Seminar
Helsinki 16.11.2023

Dr. Jussi Poikonen,
VP AI & Analytics



CHANGES FLOATING	Yes
LEFTS - 0-20 TONS	Yes
LEFTS - 100 TONS	Yes
SUPPLIES - ENGINE	Yes
TUGS - ASSISTANCE	Yes
US REPRESENTATIVE	Yes
LEFTS - 25-49 TONS	Yes
MEDICAL FACILITIES	Yes
ALTERNATE PORT NAME	Helsingfors
ANCHORAGE DEPTH (M)	3
FIRST PORT OF ENTRY	Yes
LEFTS - 50-100 TONS	Yes
SUPPLIES - FUEL OIL	Yes
FACILITIES - WHARVES	Yes
PILOTAGE - ADVISABLE	Yes
COMMUNICATIONS - RAIL	Yes
PILOTAGE - COMPULSORY	Yes
QUARANTINE - PRATIQUER	Yes
SUPPLIES - PROVISIONS	Yes
COMMUNICATIONS - RADIO	Yes
DIRTY HULL AND GEARING	Yes
FACILITIES - ANCHORAGE	Yes
SERVICES - ELECTRICITY	Yes
QUARANTINE - SANITATION	Yes
SERVICES - LONGSHOREMEN	Yes
COMMUNICATIONS - AIRPORT	Yes
COMMUNICATIONS - TELEFAX	Yes
SUPPLIES - POTABLE WATER	Yes
COMMUNICATIONS - TELEPHONE	Yes
ENTRANCE RESTRICTION - ICE	No
ENTRANCE RESTRICTION - TIDE	No
SERVICES - ELECTRICAL REPAIR	Yes
SERVICES - NAVIGATION EQUIPMENT	Yes
ENTRANCE RESTRICTION - HULLY SURVEY	No

CONFIDENTIAL



Leading the Transition to Sustainable & Intelligent Maritime Logistics



awake.ai



Application areas of AI in maritime logistics

Edge		Sea	Port	Hinterland
	Autonomous & remote controlled vehicles	MASS (Maritime Autonomous Surface Ships)	AGVs (Automated Guided Vehicles)	Autonomous trucks
	Monitoring, situational awareness	Vessel and container tracking, smart fairways	Cargo tracking and monitoring, digital twins	Automatic gate monitoring systems, vehicle tracking
	Predictive asset management	Predictive resource and energy management	Machinery health management	Predictive engine health and energy management
	Scheduling, optimization	ETA (Estimated Time of Arrival) predictions, JIT (Just In Time) arrivals	Cargo operations prediction, RTA (Requested Time of Arrival)	ETA, JIT
Cloud				

State of the art in port call planning & optimization

- Just-in-Time (JiT) scheduling
- Comprehensive integrations for port data ecosystem
- Visibility to all critical schedules & services
- Automated monitoring, warnings & notifications
- Integrated communication tools
- Comprehensive emission & scheduling performance statistics



State of the art in port call planning & optimization

- Just-in-Time (JiT) scheduling
- Comprehensive integrations for port data ecosystem
- Visibility to all critical schedules & services
- Automated monitoring, warnings & notifications
- Integrated communication tools
- Comprehensive emission & scheduling performance statistics



Including AI components

Just-in-Time (JiTT) scheduling

Situational awareness

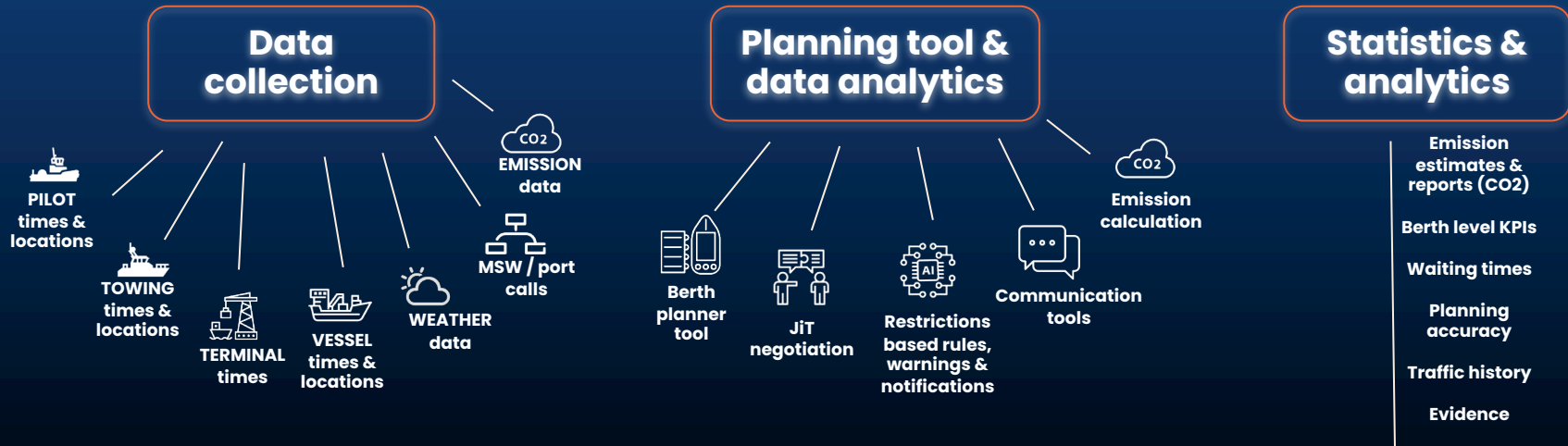
Collect & share data for different stakeholders

Just-in-Time planning and communication

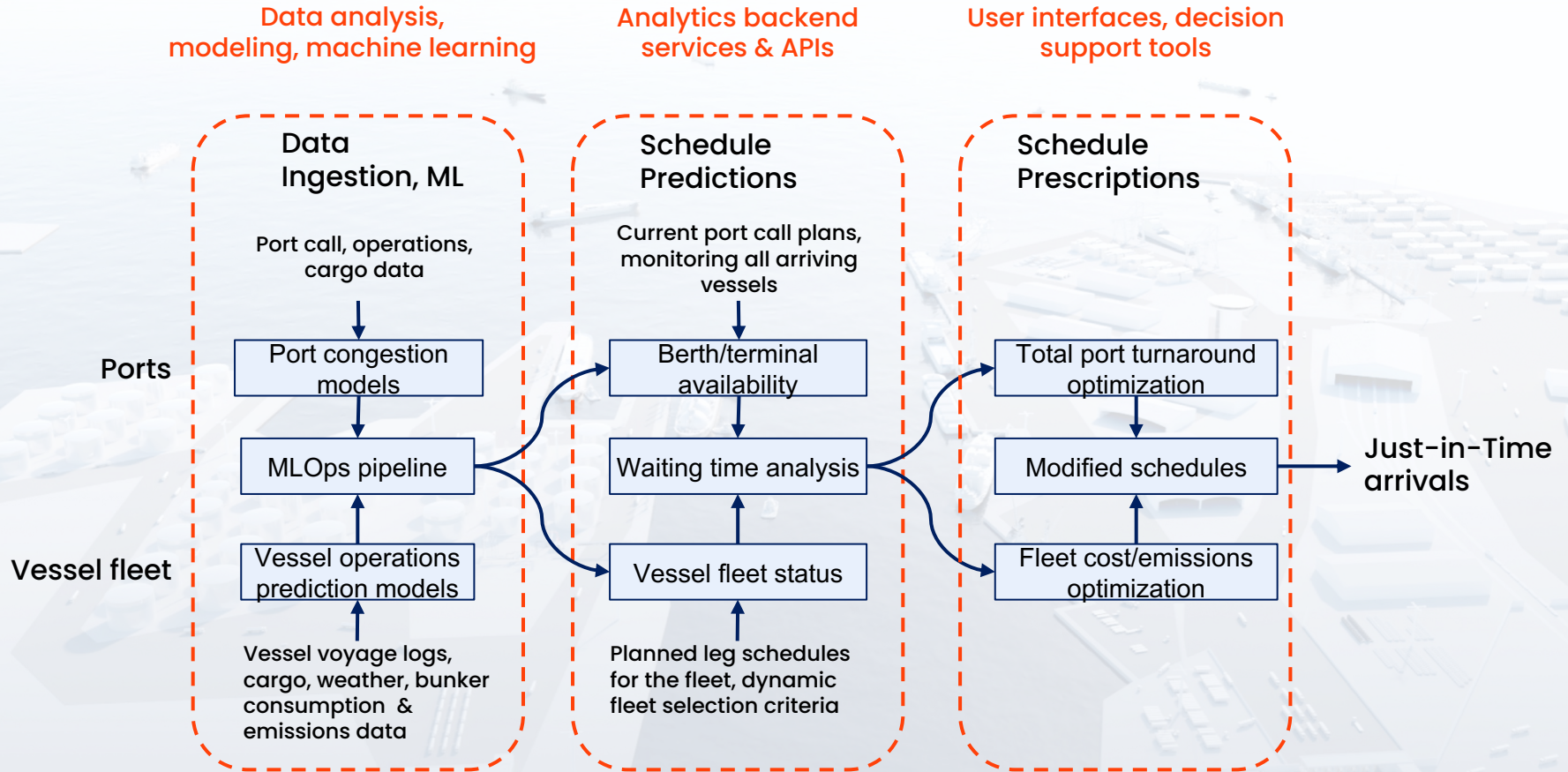
Improving planning by using accurate and reliable information

Decisions based on data

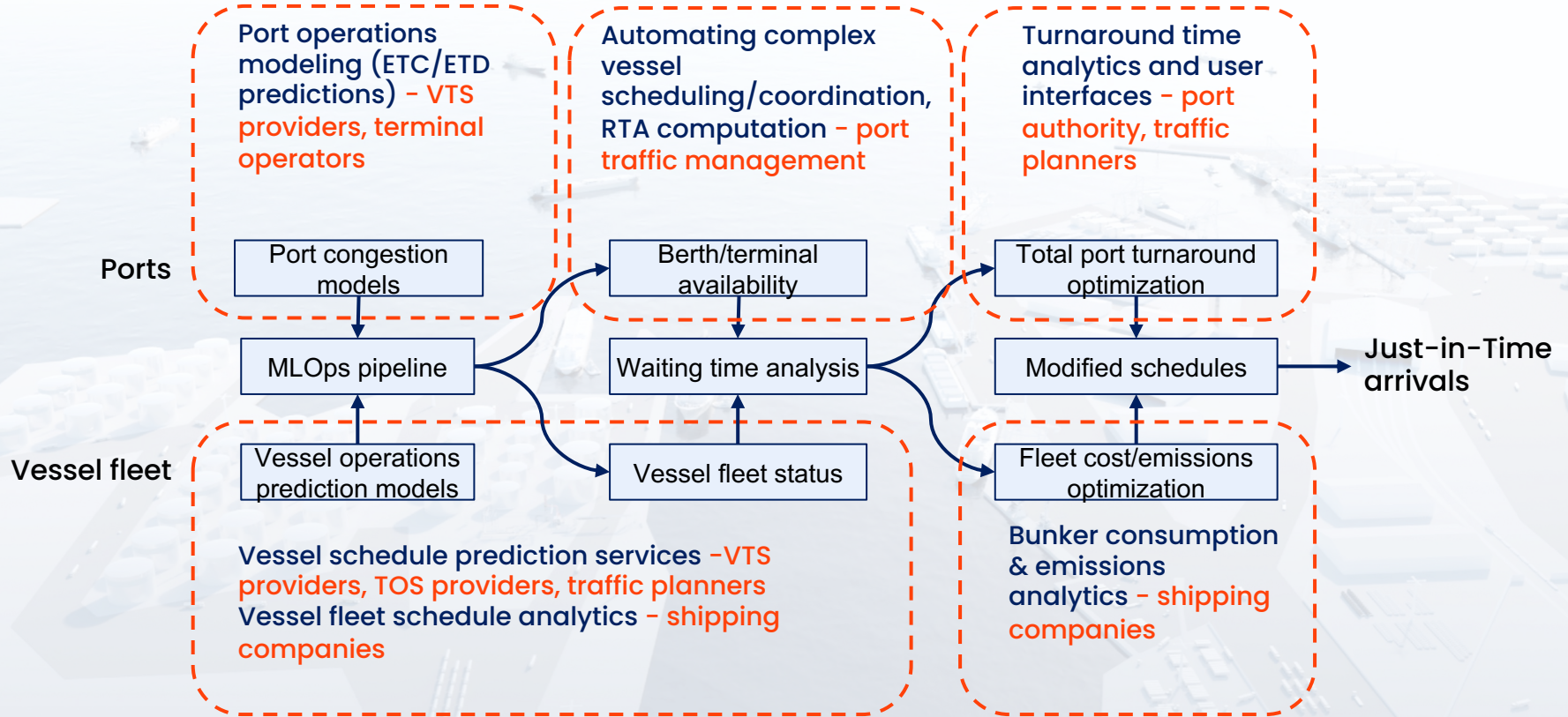
Historical data analysis, KPIs & decision making



Analytics components for JiT



JiT analytics - key stakeholders for AI

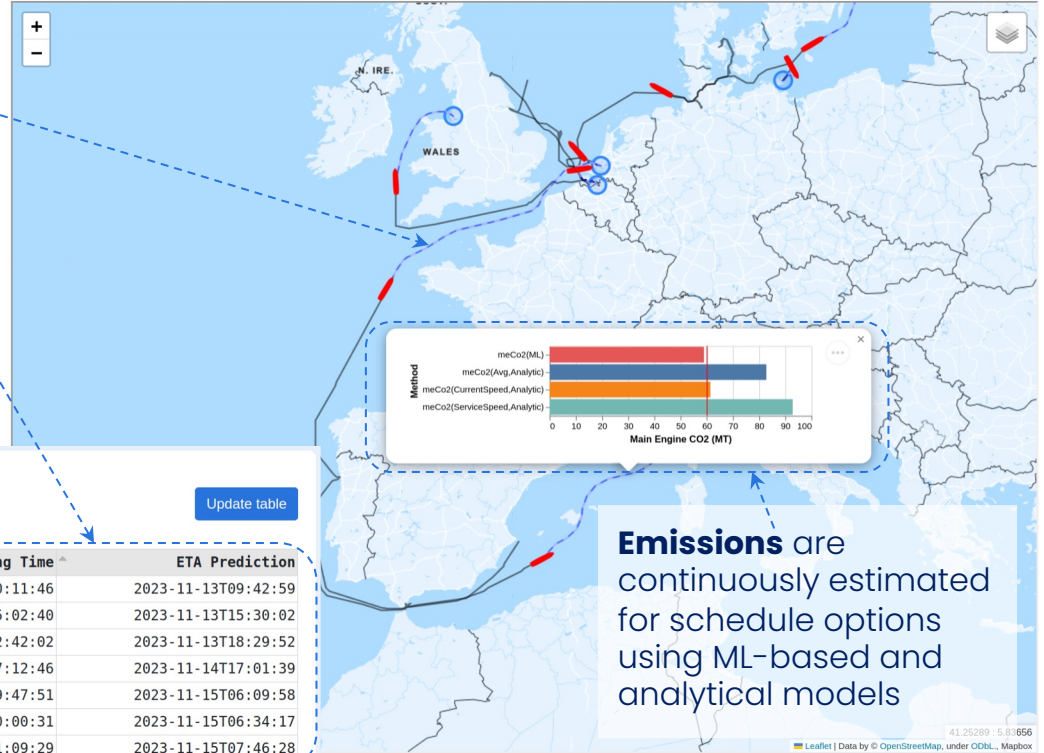


JiT analytics - machine learning examples

Vessel route predictions are needed to estimate remaining travel time and **time of arrival** to destination; ML models are used to optimize these predictions

Vessel destinations are not reported in fully machine-readable format; ML models are used to improve classification accuracy

Fleet Monitoring Map



Emissions are continuously estimated for schedule options using ML-based and analytical models

Fleet Information

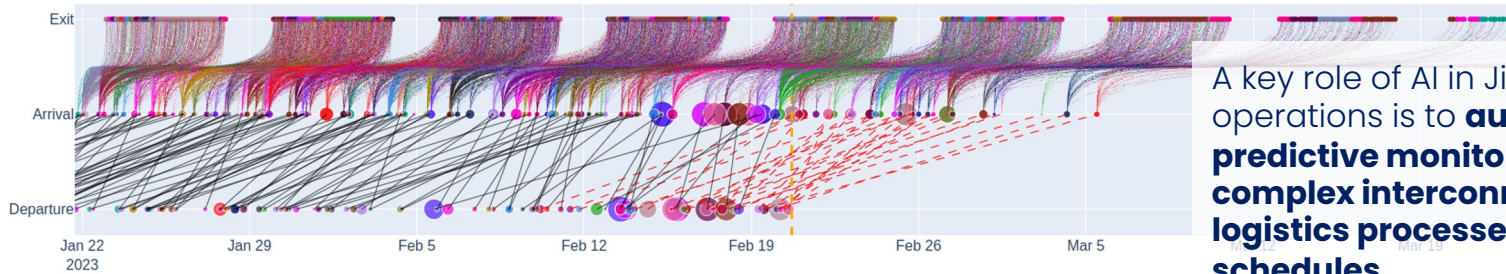
Ship Name	mmsi	Dest Locode	Traj Remaining Time	ETA Prediction
STOLT GREENSHANK	235096859	BEANR	20:11:46	2023-11-13T09:42:59
STOLT OSPREY	235112065	BEANR	5:02:40	2023-11-13T15:30:02
STOLT SEAGULL	235112571	GBLIV	12:42:02	2023-11-13T18:29:52
ANNETTE ESSBERGER	255806303	PLSZZ	1 day, 17:12:46	2023-11-14T17:01:39
AMALIE ESSBERGER	255805370	ITLIV	1 day, 19:47:51	2023-11-15T06:09:58
WILHELMINE ESSBERGER	244961000	NLRMT	1 day, 20:00:31	2023-11-15T06:34:17
DUTCH EMERALD	246436000	SEHUS	1 day, 21:09:29	2023-11-15T07:46:28

11/09/2023 → 11/14/2023

Apply Dates

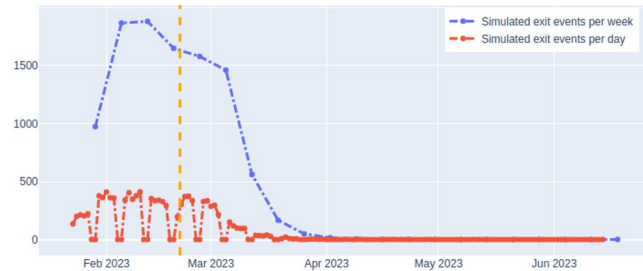
JiT analytics - modeling port operations

Simulated exit events

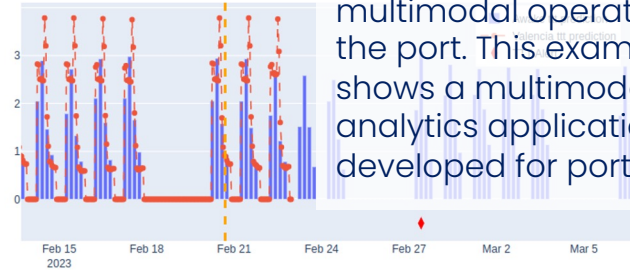


A key role of AI in JiT operations is to **automate the predictive monitoring of complex interconnected logistics processes and schedules.**

Number of container exits



Truck Turnaround Time



This can be extended to multimodal operations across the port. This example figure shows a multimodal predictive analytics application developed for port of Valencia.

Approaching vessels





Contact: jussi.poikonen@awake.ai