

UC#4 VesselEdge Edge Computing Onboard of Moving Vessels

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#### Architecture for increased flexibility, efficiency & safety





### VesselEdge – Overview

relating to the MobiSpaces Reference Architecture







## MobiSpaces Architecture and Mapping





## **Status** Interface List (Draft status)

ID#	Interface Name	Provider	Consumer	Description	Data
IDD#UC4-1	NMEA	AIS Receiver	- FRQ AIS decoder &	NMEA Stream	AIS Data
(available)			tracker		
			- Data Cleaning		
			component (tbd)		
IDD#UC4-1a	Clean NMEA	Data Cleaning	- FRQ AIS decoder &	NMEA Stream	Cleaned AIS
( <u>not</u> available yet)	stream	component (tbd)	tracker		Data
IDD#UC4-2	AIS stream	FRQ AIS decoder &	- Federated	JSON/WS	Cleaned,
(available)		tracker	Learning		decoded AIS
			component		stream
			- Trajectory		
			compression		
IDD#UC4-3	Model Transfer	Federated	Federated Learning	Numpy Arrays via	FL Model
( <u>not</u> available yet)		Learning	component	gRPC or REST API	updates
		component		(TBD)	
IDD#UC4-4	Compressed	Trajectory	Trajectory	TBD	Compressed
( <u>not</u> available yet)	Trajectories	compression	reconstruction		Trajectories
IDD#UC4-5	Reconstructed	Trajectory	FRQ Tracking,	TBD	Reconstructed
( <u>not</u> available yet)	Trajectories	reconstruction	rendering &		Trajectories
			recording		
IDD#UC4-5	Anomalies	Federated	FRQ anomalies	Anomalies Table	Anomalies
(available)		Learning	service	in PostGIS	
		component			











• Federated Learning (Task 5.2) of Spatiotemporal Data



Video frame from an animated visualisation of simulated mobile FL client data



- Data Cleaning (Task 3.4)
  Data Cleaning service / tool was evaluated on AIS dataset originating from MT (UC3).
- Trajectory compression (Task 4.4) data processing including compression to optimize the Edge Device use

## **Set MobiSpaces** Preliminary Experiments in Lab -3

#### Possible extension

AIS data enrichment with environmental information, including wind and waves data. Data transformation towards RDF data as a common data representation were successfully performed on AIS as well as Bathymetry data, which in combination may have exploitable advantages for Use Case 4.



AIS data enriched with environmental information. This specific plot shows the attribute "Significant height of combined wind waves and swell"



### Prototype phase (M12-M24)

- Integration step 2
  - K8s
  - Optimization and interfaces
- Experimentation
  - FL/ML
  - Other tasks
  - More data samples
- Integration with other tasks.
- KPI tests



# Thanks

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