





Reusable Software System Architecture For Soft And Hard Data Fusion


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Éric-Olivier Bossé¹, Melita Hadzagic¹, Nathan
Kashyap², Olivier Labonté¹, Mathieu Lavallée¹,
Michel Mayrand¹, Isabelle L. Prévost¹, Elisa
Shahbazian¹

Presentation Plan

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- A short, horizontal bar with a gradient from light orange to dark orange.
- Intro & Context of the FuSHIA project
 - System design and architecture
 - Data representation
 - Interfaces
 - Conclusion

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- A short, horizontal bar with a gradient from orange to red.
- FuSHIA is a generic framework
 - Fusion of hard/soft data for intelligence analysis
 - DIRP application of FuSHIA
 - Maritime domain awareness
 - OSD + AIS/Polar Epsilon

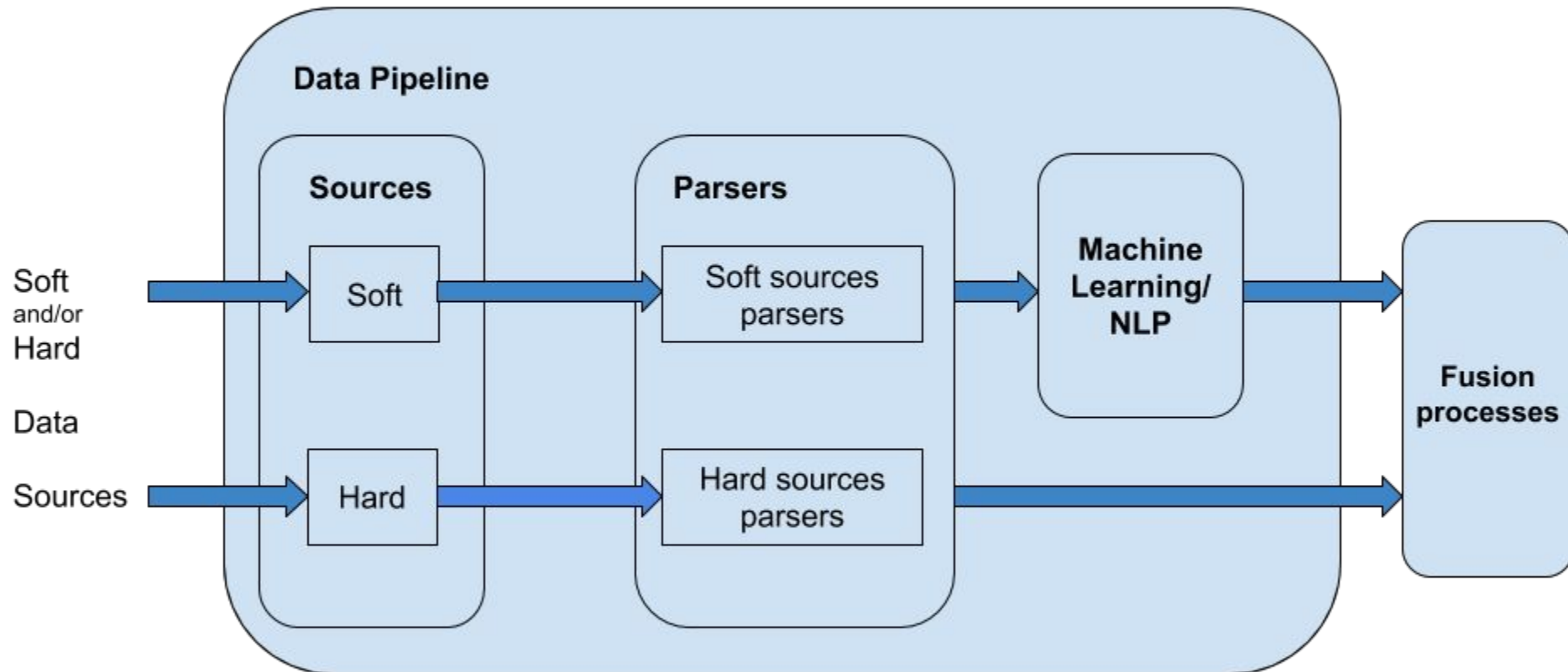
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- A short, horizontal bar with a gradient from orange to red.
- Reusability
 - Application domains
 - Flexibility
 - Different sources
 - Different formats
 - Performance
 - Scalability
 - Cloud-friendliness


Architecture of FuSHIA


System design

- Data pipeline
- Kappa architecture
- Supporting technologies

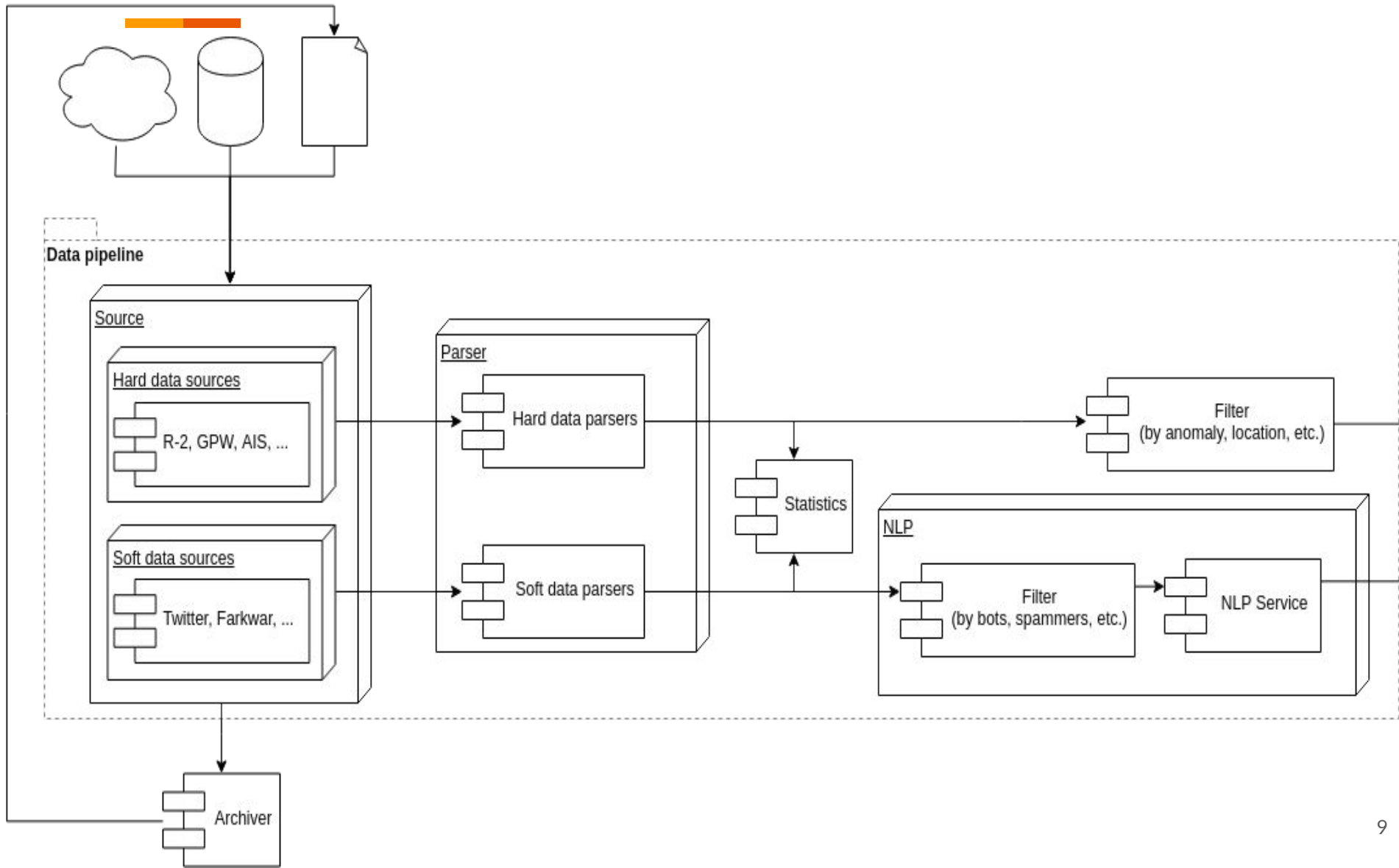
Data pipeline



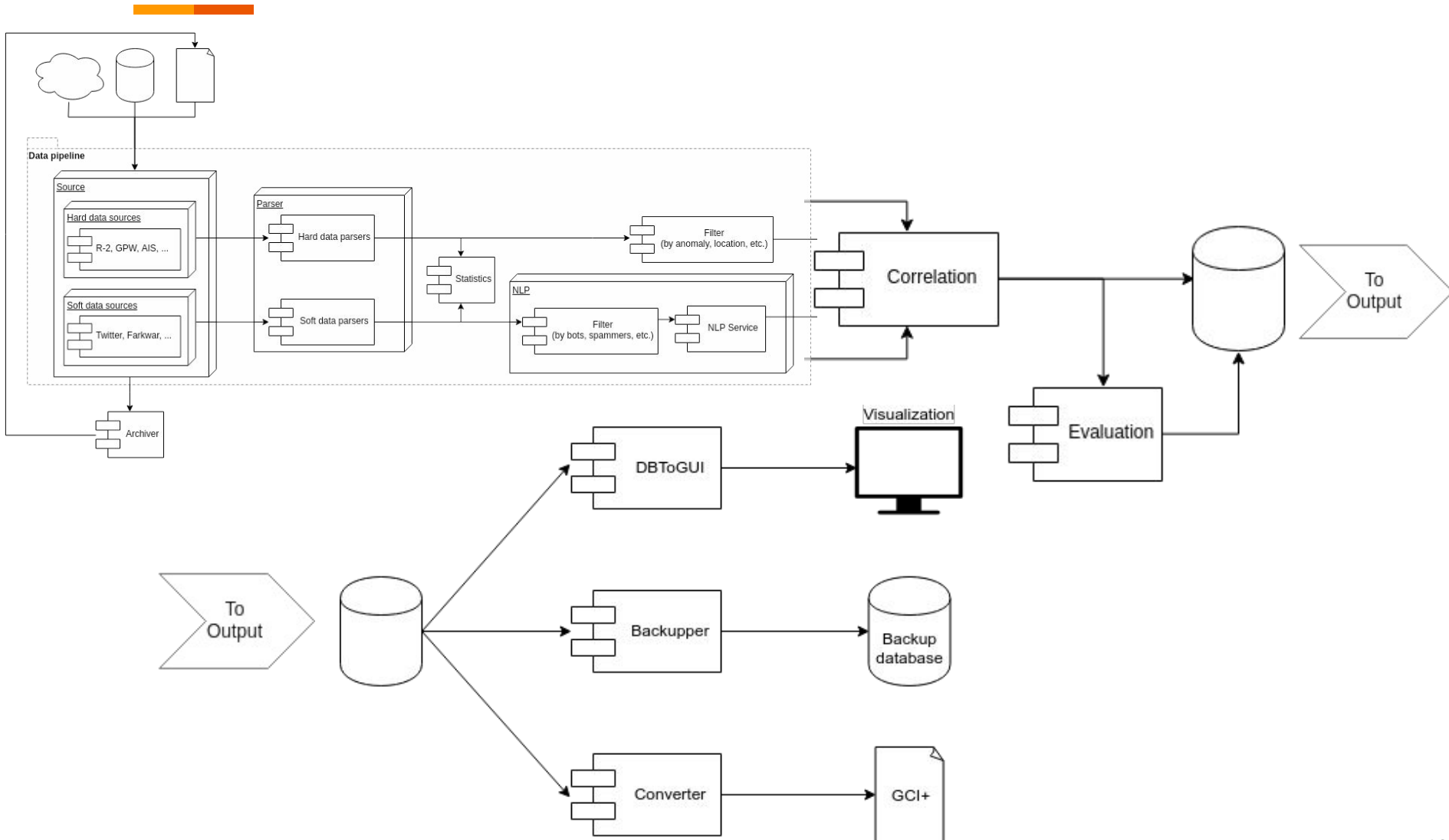
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- A short, horizontal bar with a gradient from light orange to dark orange.
- Streams of data through the pipeline
 - Microservices connected with Kafka
 - Multiple scenarios possible
 - Live feeds/Batch processing
 - Unstructured/structured data


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- A short, horizontal bar with a gradient from orange to red.
- Docker
 - Docker orchestration
 - Docker-compose
 - Portainer
 - In-house configuration UI
 - MongoDB
 - Spring microservices

Detailed pipeline



Detailed pipeline - Cont.



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- A short, horizontal bar with a gradient from orange to red.
- Easy to add:
 - New hard/soft sources
 - New parsers
 - New algorithms
 - Easy to scale
 - Easy to deploy

Data representation

Impact on system design

- Data sources
- Data model



Hard data

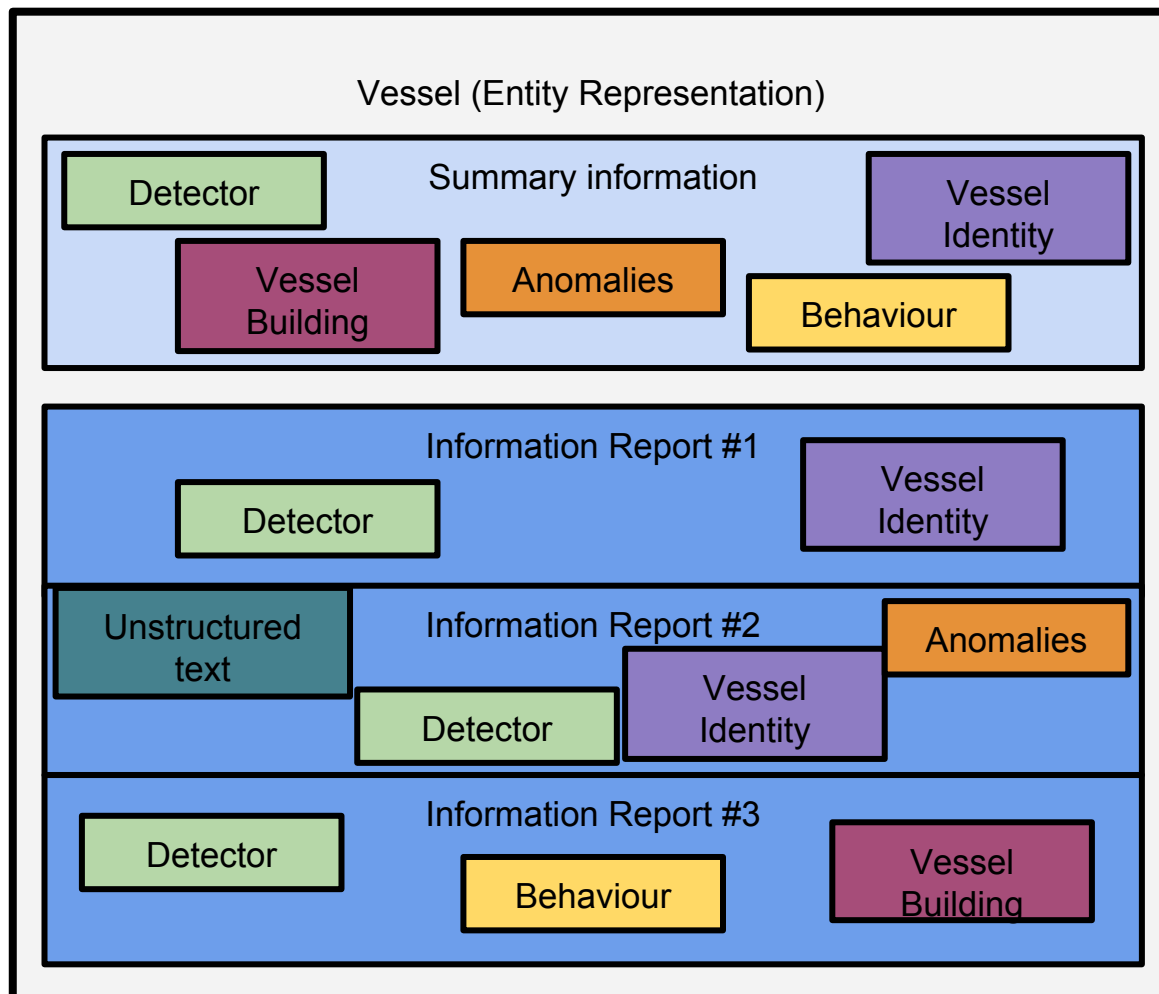
- Generally structured
- Batch and streams
- Variable temporal resolution

Soft data

- Mix of structured and unstructured
- Continuous processing
- Sporadic updates

Data Model

How to hold
information
from structured
AND unstructured
data?



Interfaces

- Dynamic Configuration
- Visualization

Dynamic Configuration

source

Configs: 1

Instances: 1

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fw: 1

+

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Add

parser

Configs: 1

Instances: 1

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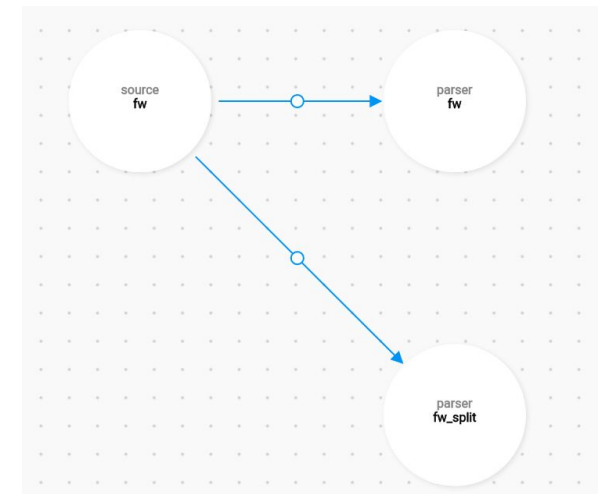
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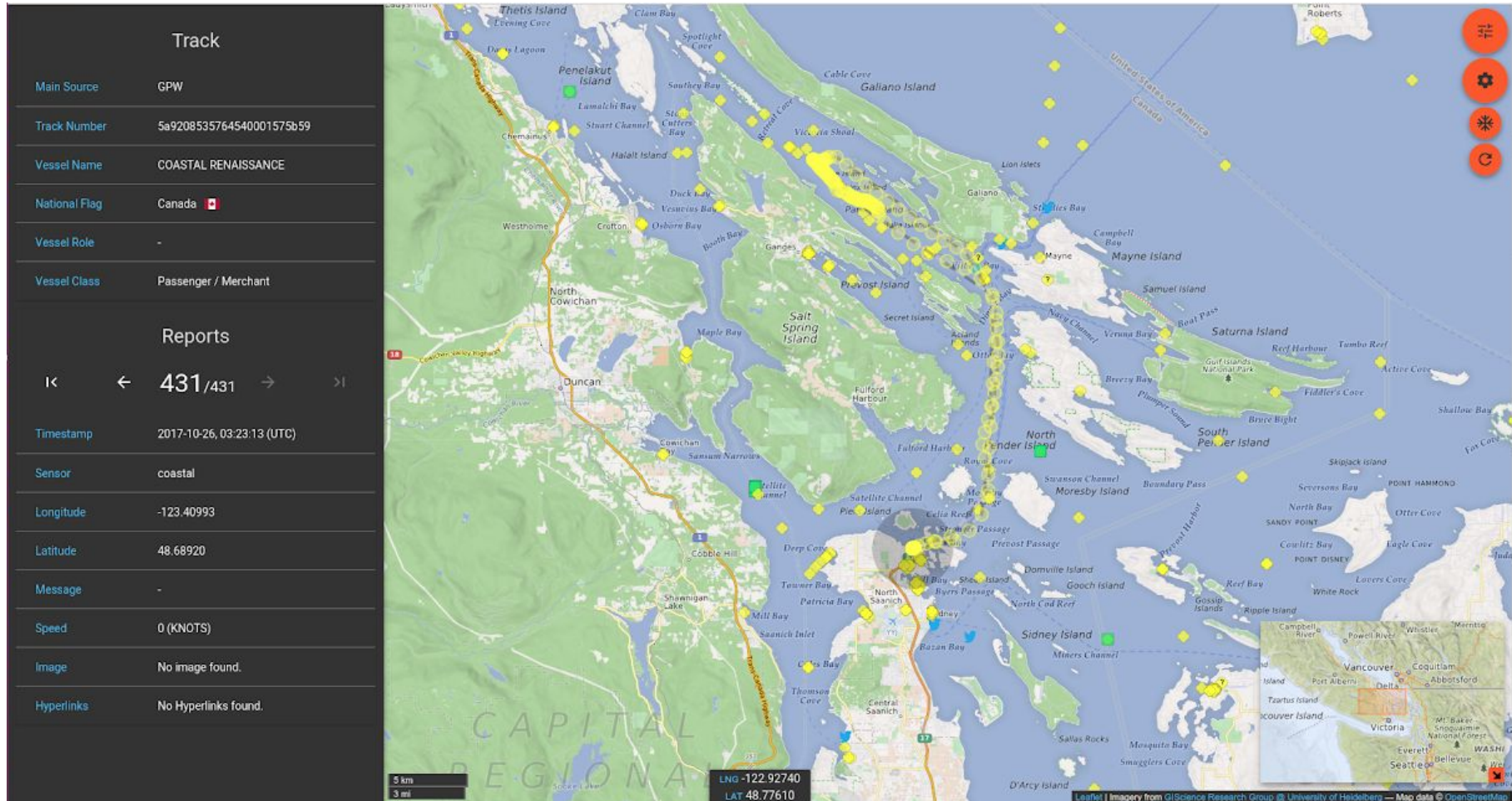
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Add




Visualization



Conclusion

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- A short, horizontal bar with a gradient from light orange to dark orange.
- Flexible and reusable framework
 - Cloud friendly
 - Ingests hard and soft data sources
 - Generic data model
 - User friendly interfaces

Future developments

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- A short, horizontal bar with a gradient from orange to red.
- Improvements to the configuration UI
 - Replay module
 - Static database

New applications based on the FuSHIA architecture are already under development.

Questions?

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