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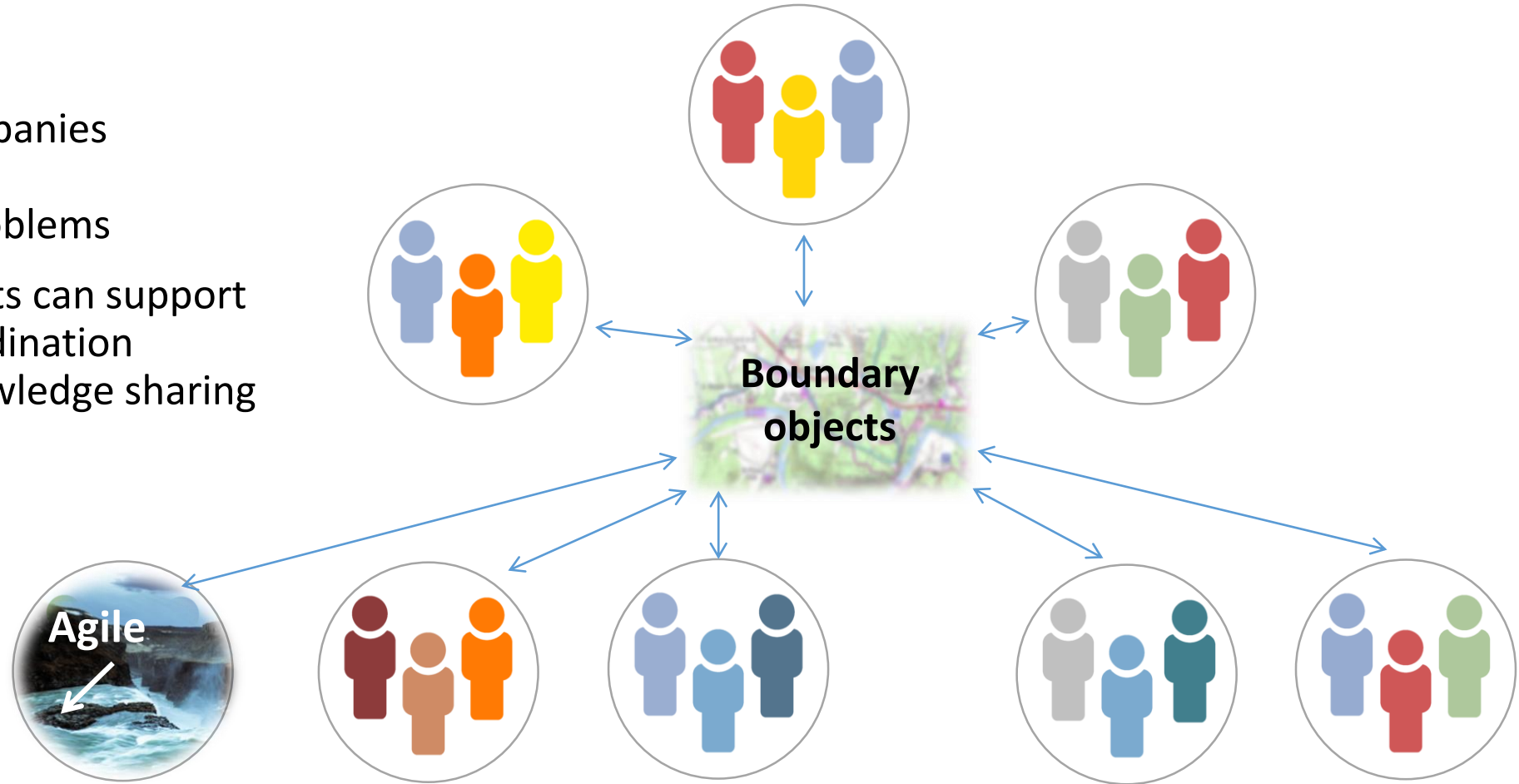
UNIVERSITY OF GOTHENBURG

Modeling and Analysis of Boundary Objects and Methodological Islands in Large-Scale Systems Development

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Salome Maro, Jan-Philipp Steghöfer, Eric Knauss

The Challenge of Agile Inter-Team Coordination

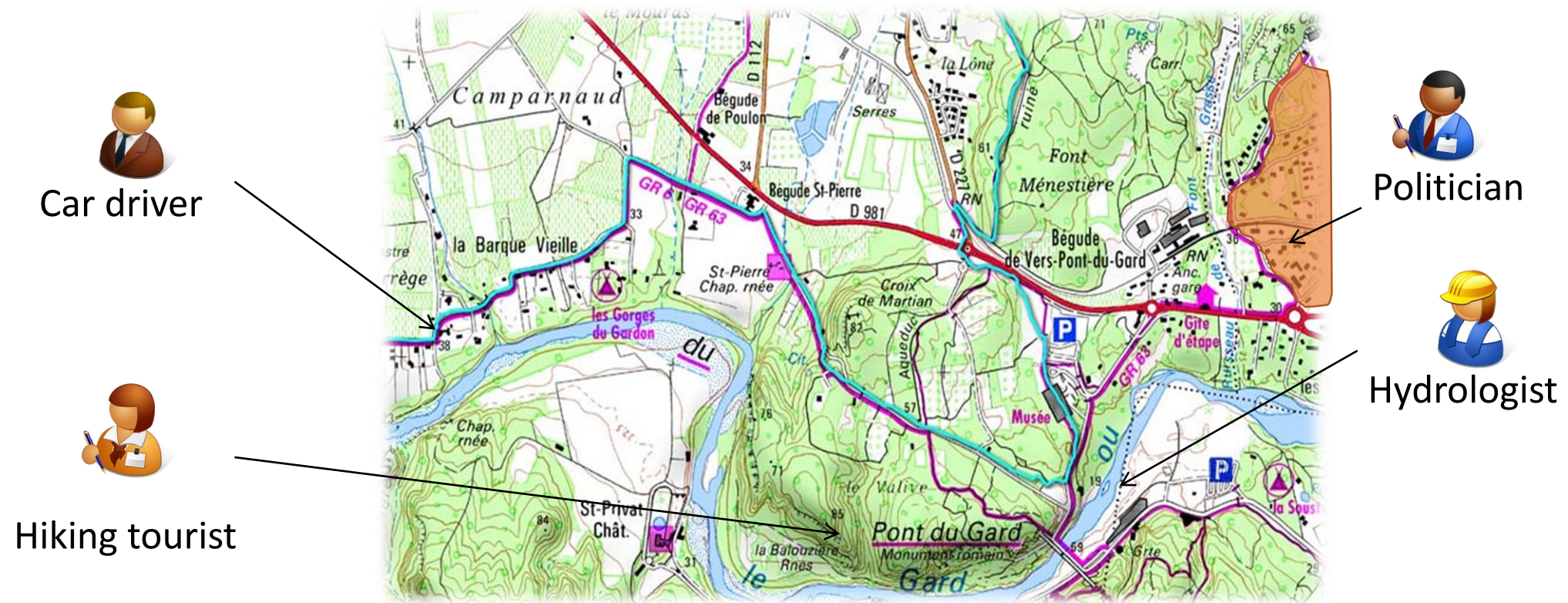
- Large-scale companies commonly face coordination problems
- Boundary Objects can support inter-team coordination and explicit knowledge sharing



“It feels like we are an agile island in a waterfall”
Not only an agile issue
→ use the term “methodological islands”

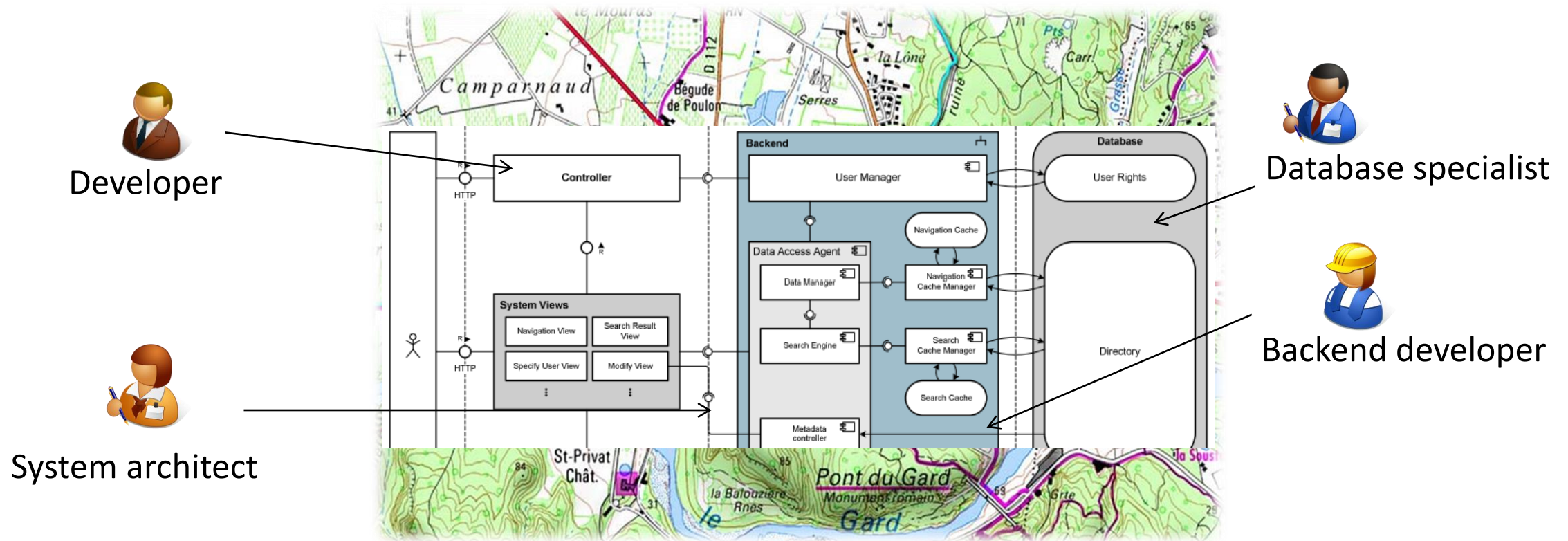
Boundary Objects

“Boundary objects are objects which are both plastic enough to **adapt to local needs and constraints** of the several parties employing them, yet robust enough to **maintain a common identity across sites.**” [1]



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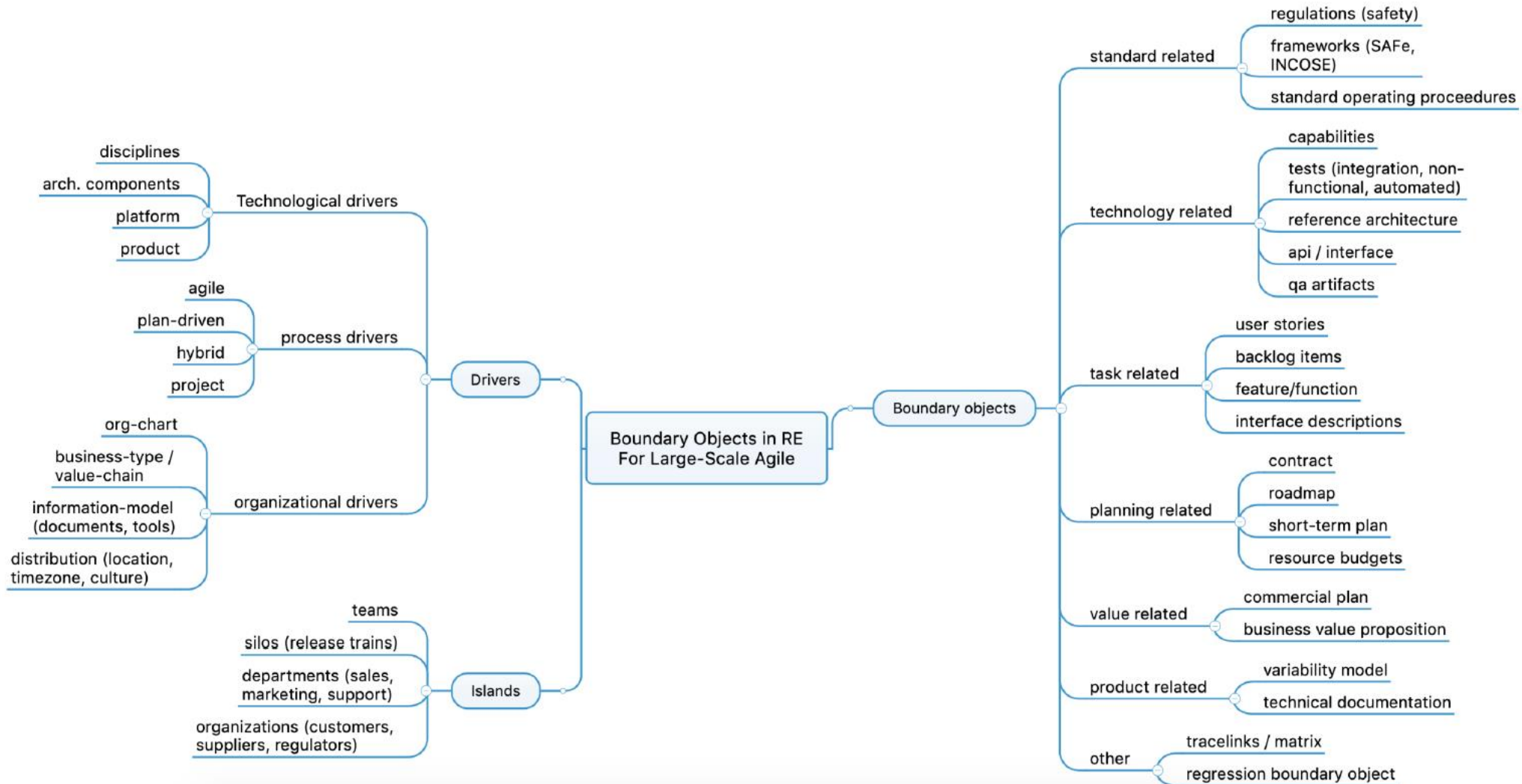


[1] Star, S. L. & Griesemer, J. R. (1989). Institutional Ecology, ‘Translations’ and Boundary Objects: Amateurs and Professionals in Berkeley’s Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science* 19, 3 (1989), 387–420.

[2] Wohlrab, R., Pelliccione, P., Knauss, E., & Larsson, M. (2019). Boundary objects and their use in agile systems engineering. *Journal of Software: Evolution and Process*, 31(5), e2166.

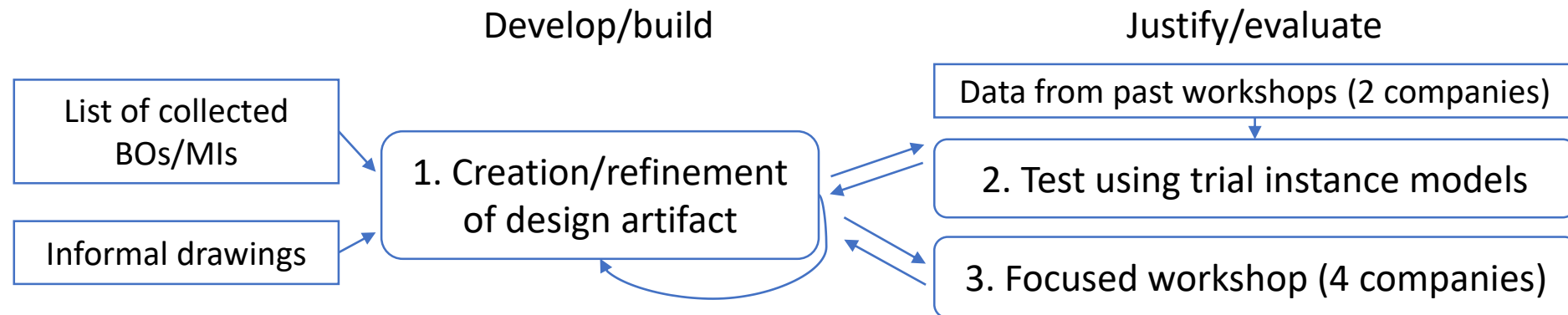
[3] Wohlrab, R. (2020). *Living Boundary Objects to Support Agile Inter-Team Coordination at Scale* (Doctoral dissertation, Chalmers University of Technology).

Initial Elicitation of Boundary Objects



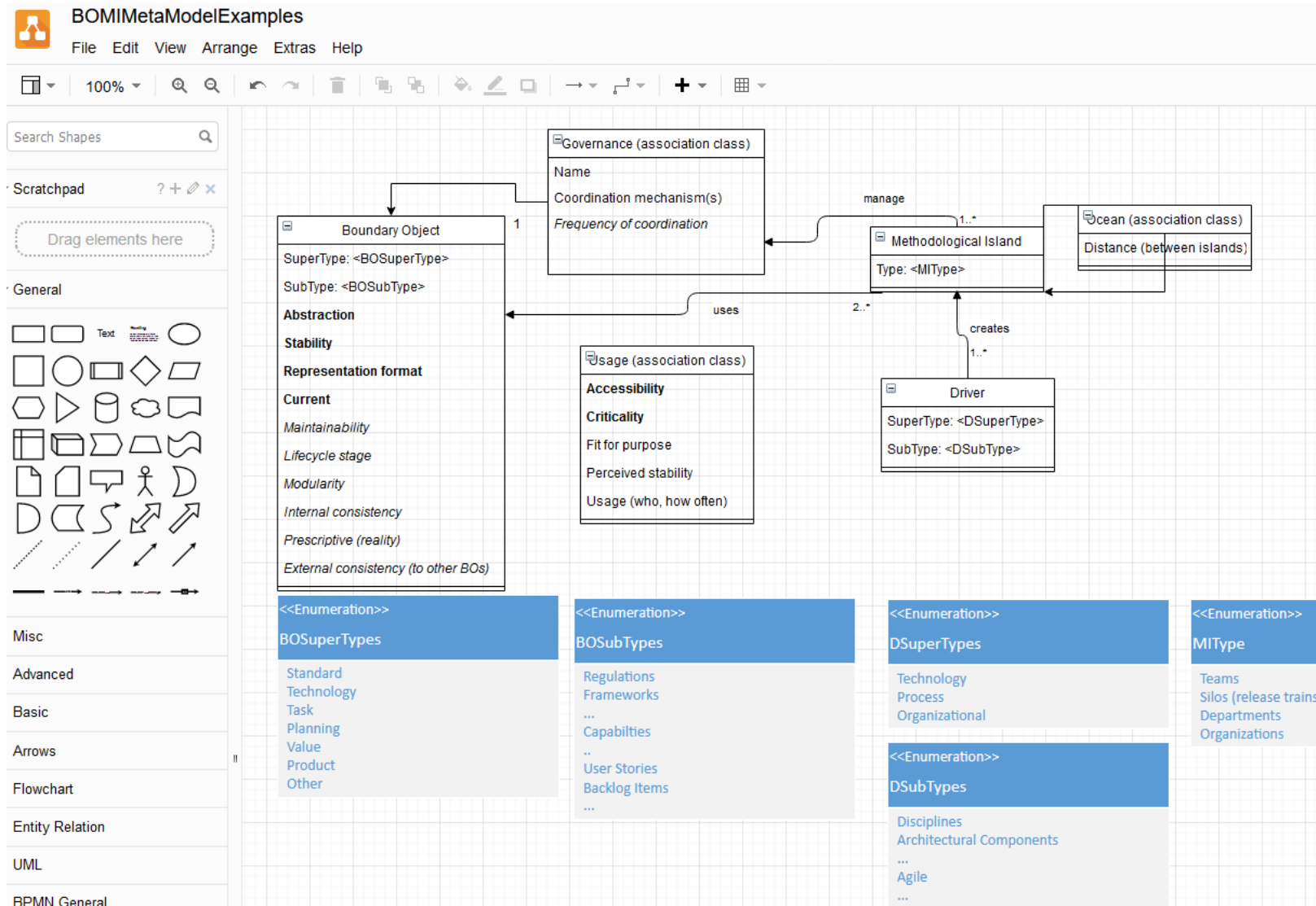
Research Method

- Create a method to systematically capture Boundary Objects and Methodological Islands (BOMI)
- Design science approach with a conceptual model as the design artifact

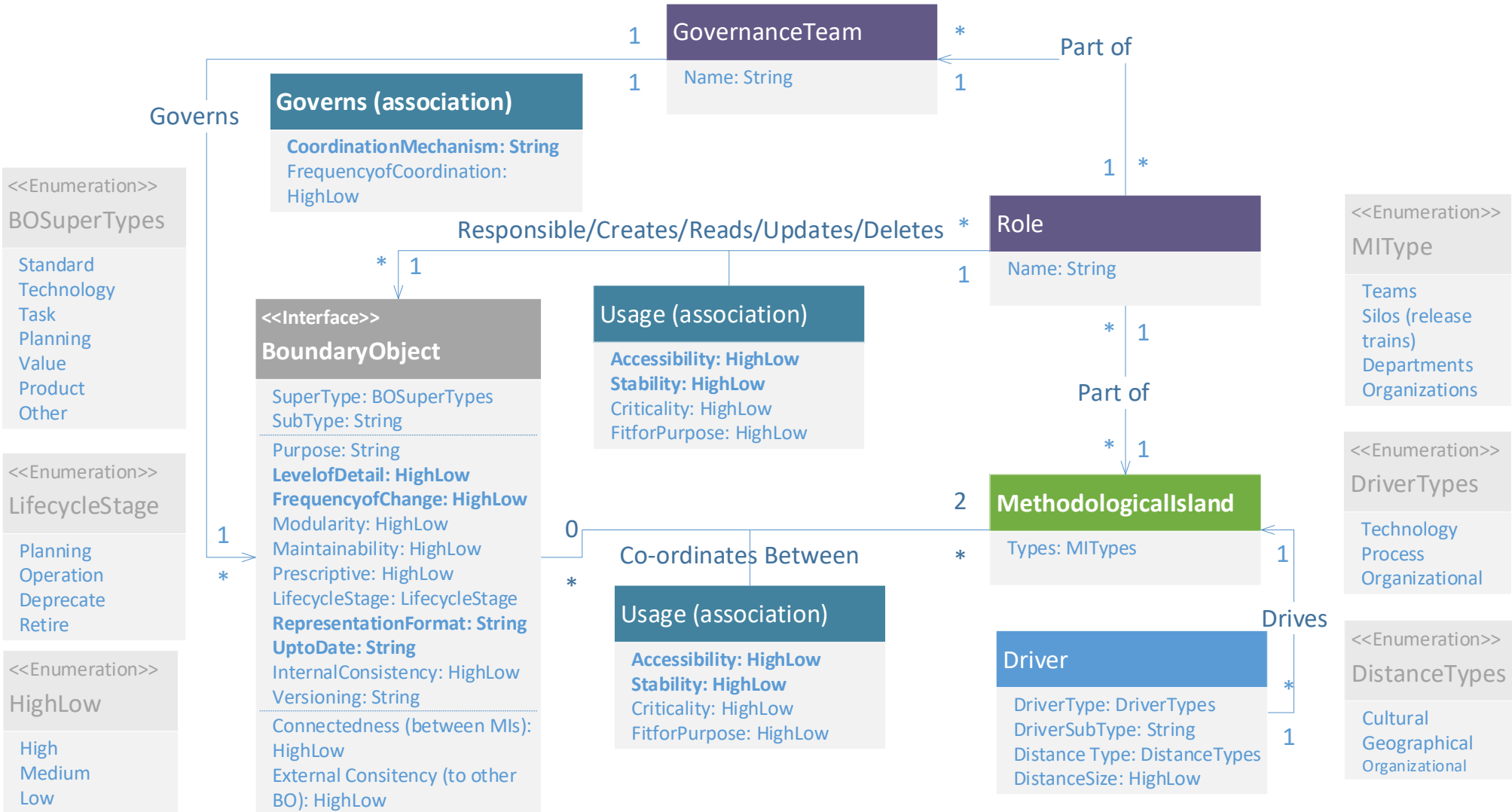


- Four participating system development companies (telecommunications, mechanical products, automotive)

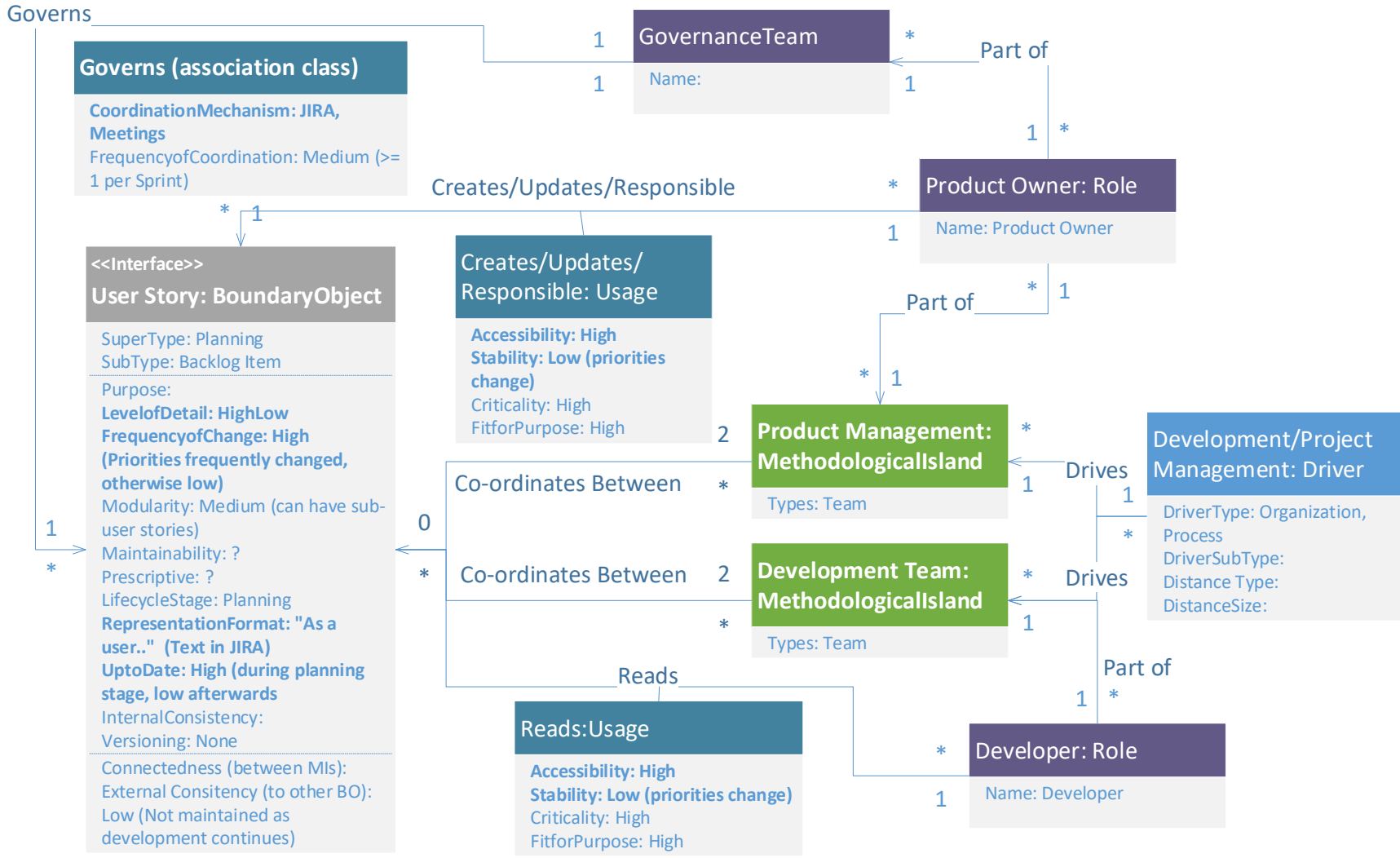
Workshop (with 4 companies)



Final BOMI Metamodel



Example Instance Models from Workshop

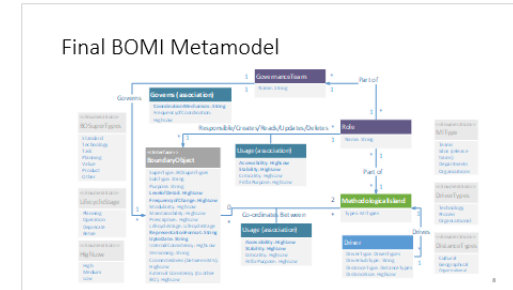
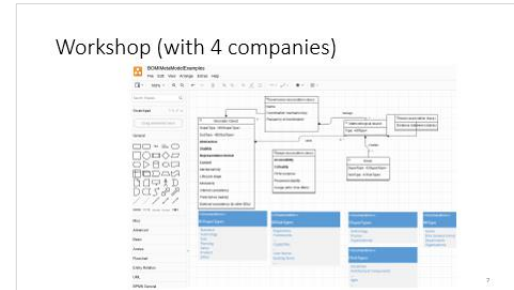
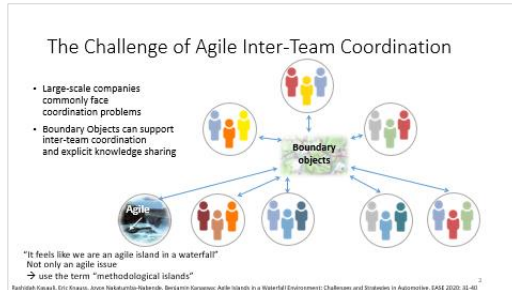


BOMI Smells Examples

Smell Type	Description	OCL
Within BO	Low Modularity	context BoundaryObject inv LowModularity: self.Modularity = "Low"
	High level of detail, frequent change	context BoundaryObject inv DetailedHighChange: self.LevelofDetail = "High" and self.FrequencyofChange = "High"
Within Usage	Not fit for purpose	context Usage inv NotFit: self.FitForPurpose = "Low"
	High criticality, low stability	context Usage inv CriticalUnstable: self.Criticality = "High" and self.Stability = "Low"
Presence of...	No governance team	context BoundaryObject inv Governed: self.Governed->size > 0
	No one responsible for BO	context BoundaryObject inv Responsible: self.Responsible->size > 0
Across Elements	Governing roles should use BO	context BoundaryObject inv GovernsUses: self.Governs -> forAll(g g.PartOf-> select(r r.uses = self)->size > 0)

Thank you!
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Conclusion



- Proposed a conceptual model for boundary objects and methodological islands and a list of bad smells over the instances
- Based on a study with four system development companies
- Future work
 - Development of a domain-specific visual language and tool support
 - Proactive method for coordination issues:
Now that we can identify problems, how can we suggest fixes?