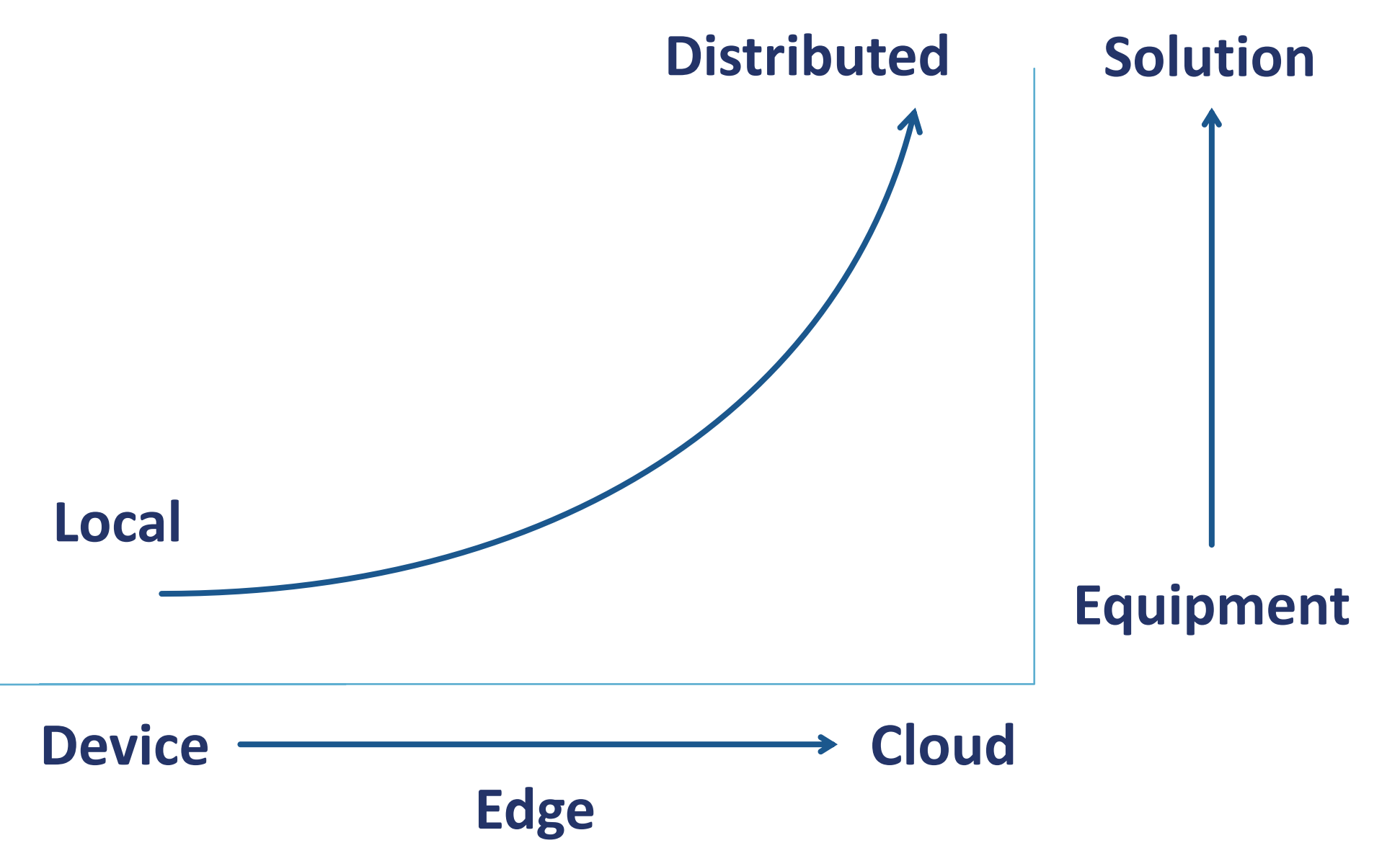
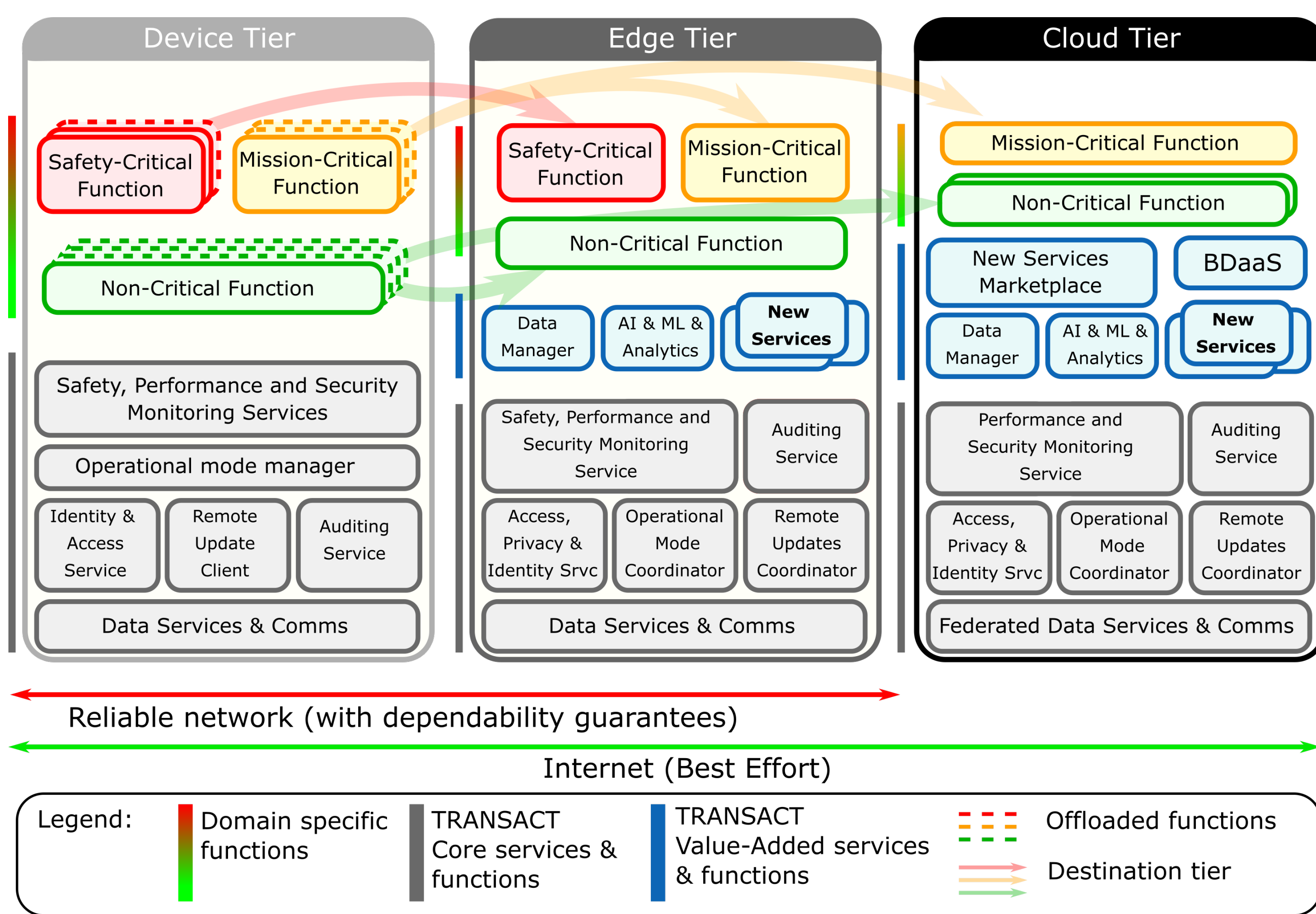




Towards safe and secure distributed cyber-physical systems



Develop a universally applicable distributed solution architecture, framework and transition methodology for the transformation of standalone safety-critical CPS into distributed safety-critical CPS solutions.



TRANSACT technological innovations:

- Extend the existing edge/cloud technologies, to support safety-critical CPS and enable a continuous deployment of functions
- Extend model-based and simulation-based design tools to support the correct integration and deployment of safety-critical components
- Develop dynamic end-to-end safety and performance monitoring systems, load balancing mechanisms and graceful degradation strategies
- Implement end-to-end security and privacy technologies based on both theoretical (by design) and actual (monitoring) scenarios
- Develop techniques for the virtual design, implementation, certification and early integration of large distributed CPS
- Integrate AI based services and data analytics services into safety-critical CPS.

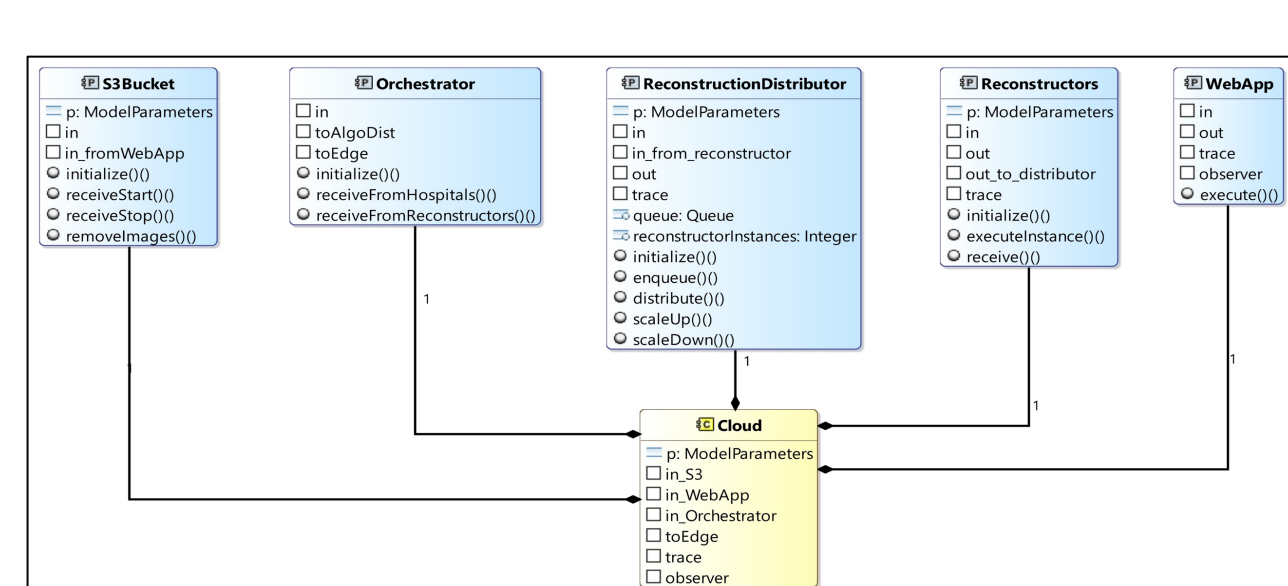
POOSL for early system validation

Parallel Object-Oriented Specification Language (POOSL)

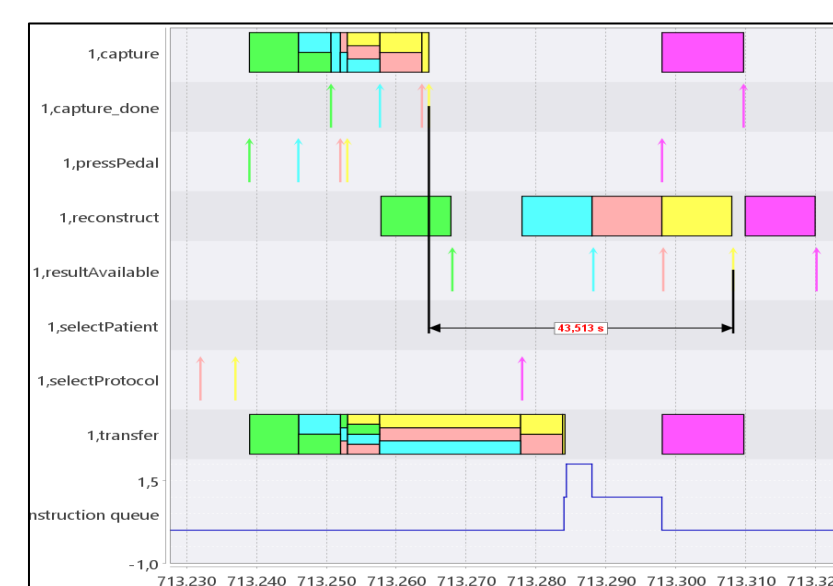
- Light-weight modeling and simulation for early system validation
- Successful applications in high-tech companies

Eclipse Open-Source Project

- Eclipse Modeling Project for model-based development technologies
- Research result from TU/e and ESI, industrialised by Obeo
- POOSL website: <https://www.poosl.org/>
- Source code: <https://github.com/eclipse/poosl>

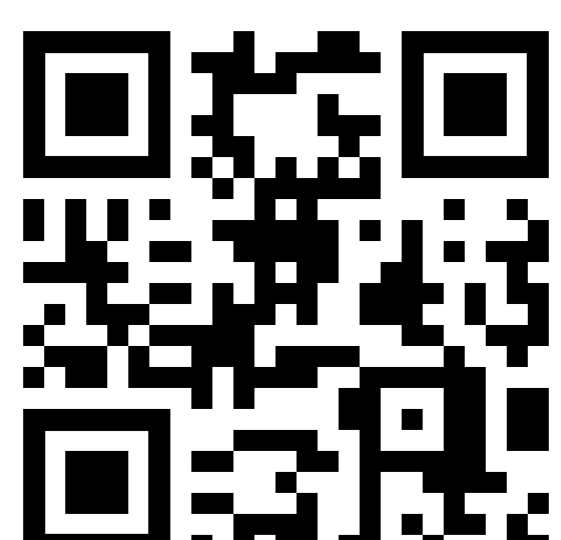


Modeling & simulation by POOSL



Visualization by TRACE

- + Native integration with POOSL
- + Eclipse Incubator project
- + <https://www.eclipse.org/trace4cps>



www.transact-ecsel.eu

Use case: cloud-assisted image guided surgery

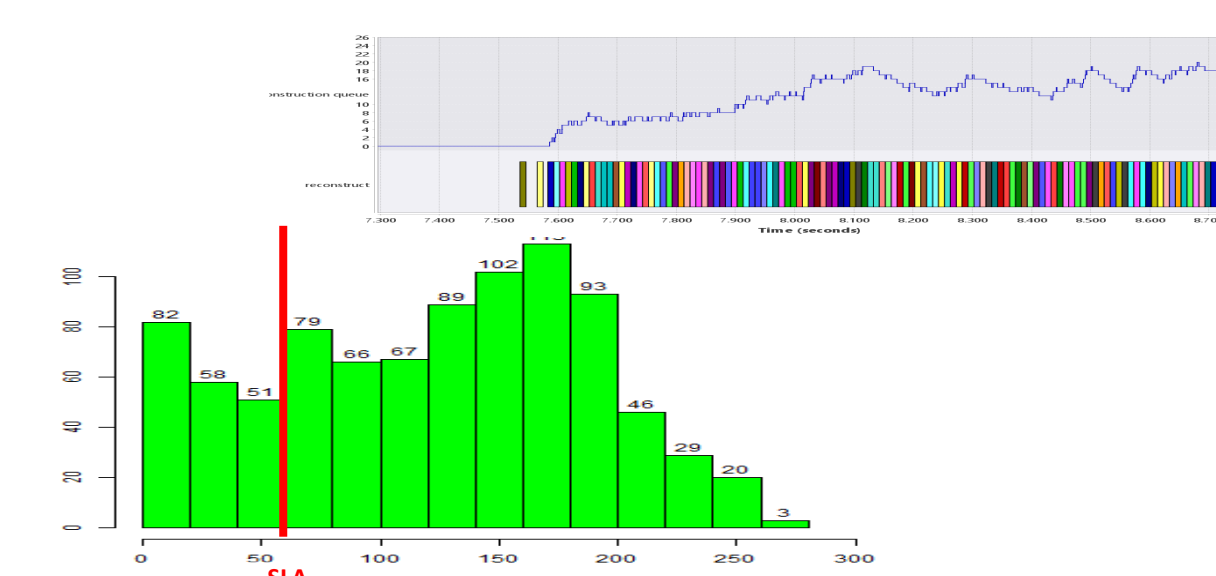


- Advanced image processing in the cloud, while patient is on the table
- Response time should not keep surgeon waiting
- How to meet SLA for Response Time?

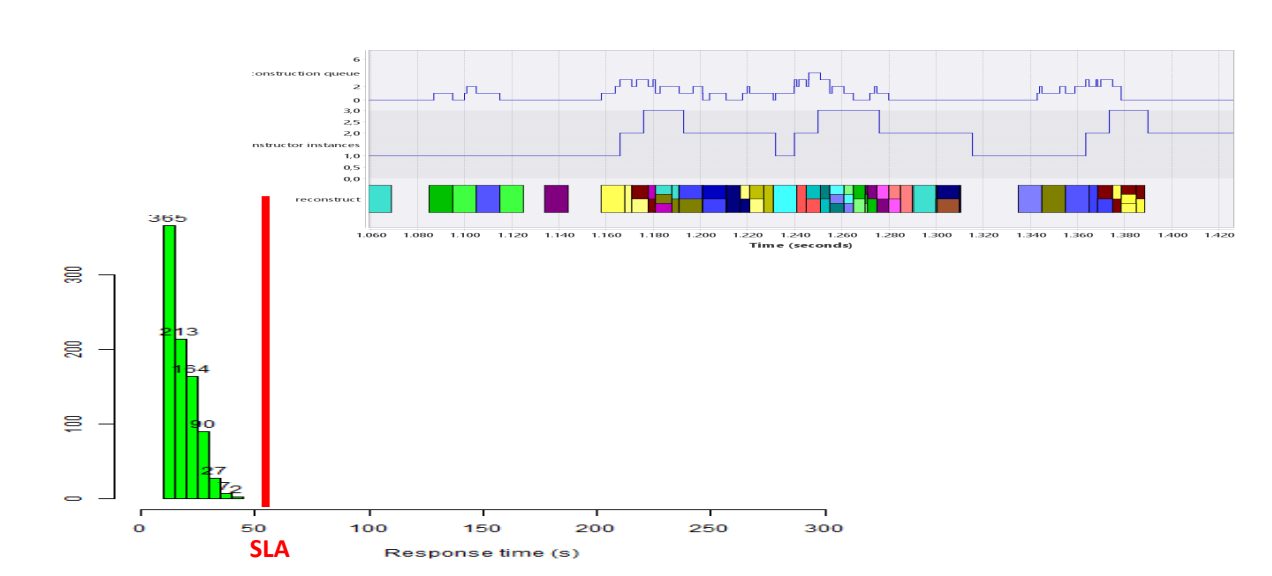
So many hospitals?
So many operations?
So many cloud requests?

Model stochastic, time-varying demand

of cloud resources?
How to scale?
How to meet timing?



1 cloud resource instance



3 cloud resource instances (dynamic scaling)



TRANSACT has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 101007260. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Netherlands, Finland, Germany, Poland, Austria, Spain, Belgium. Denmark, Norway.

