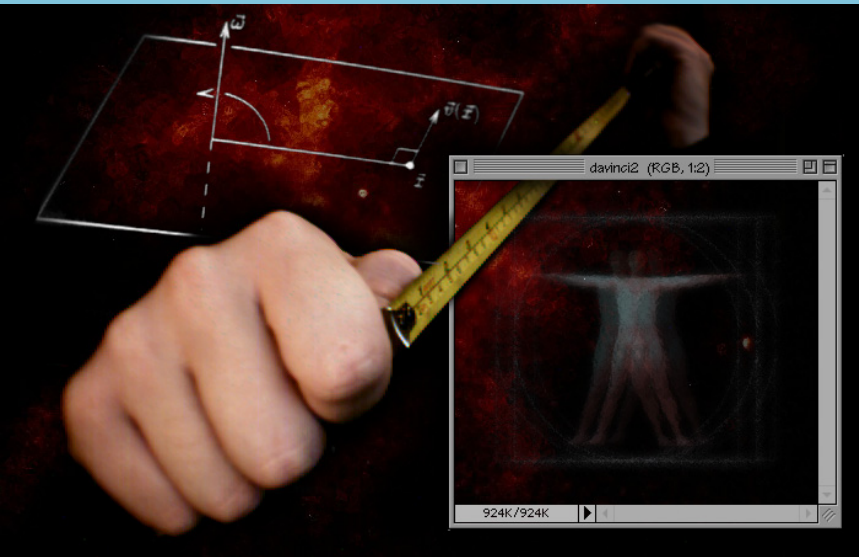


The Rostock Group

Design of correct systems



Who

Olivia Oanea

funded by
project
„Adapters“

Niels Lohmann

funded by
project
„Operating Guidelines“

Kathrin Kaschner

funded by university

N.N.

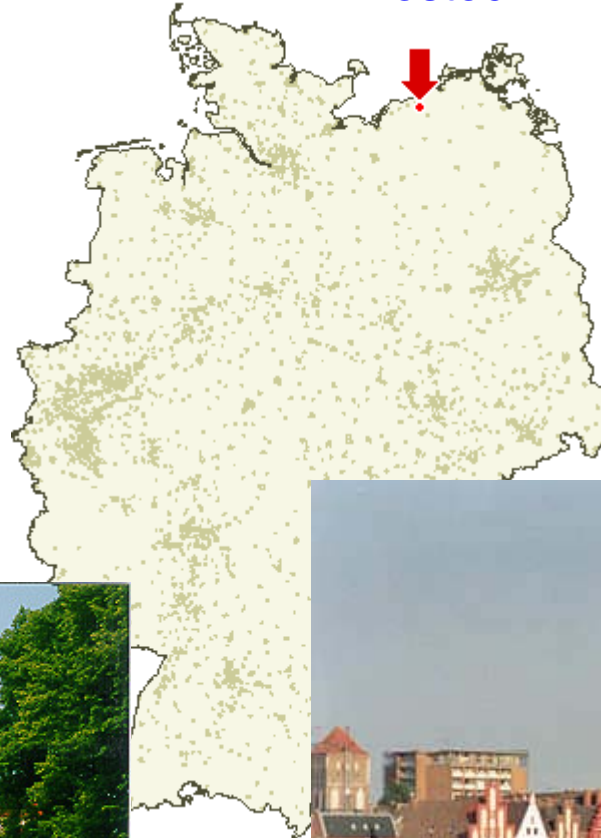
funded by
project
„Structural verification“

Karsten Wolf

funded by university

Where

Rostock



Come to the next
Advanced Course
in 2010!

St Petri

University since 1419



Downtown



Our mission:

Design of correct systems

- by verification
 - state space based:
LoLA
 - structural: Upcoming project
 - services:
Controllability etc.
- by construction
 - composition of services
 - Adapter synthesis
 - Support for contracts, choreographies etc.

State space verification

- Techniques
 - partial order
 - symmetry
 - coverability graph
 - sweep-line
 - Petri net tricks
- Properties
 - reachability
 - deadlocks
 - liveness
 - reversibility
 - home states
 - dead transitions
 - coverability
 - CTL
 - selected LTL

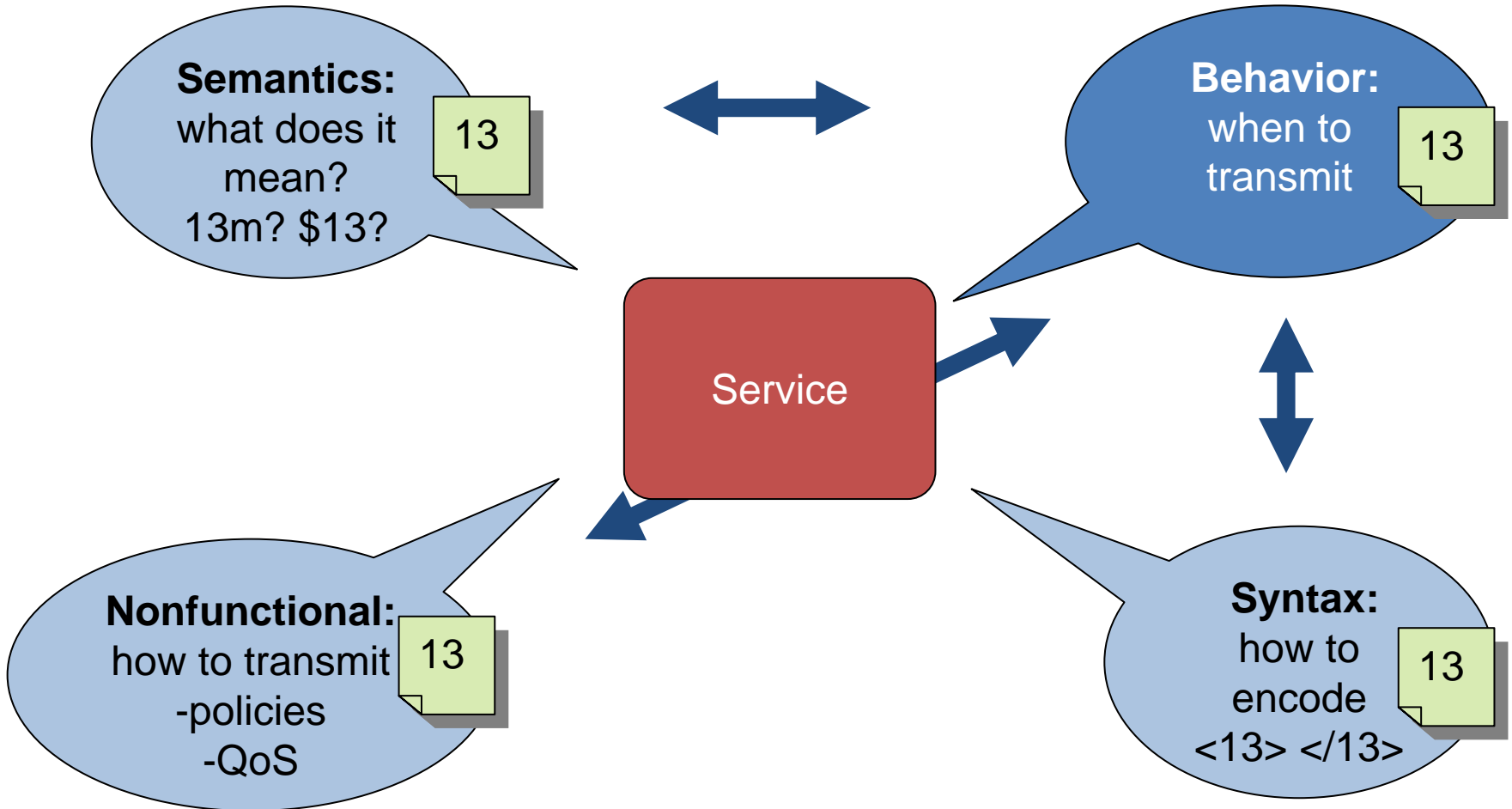
State space verification

- Applications
 - asynchronous circuits
 - biochemical systems
 - block level code verification
 - workflows (soundness)
 - service choreographies

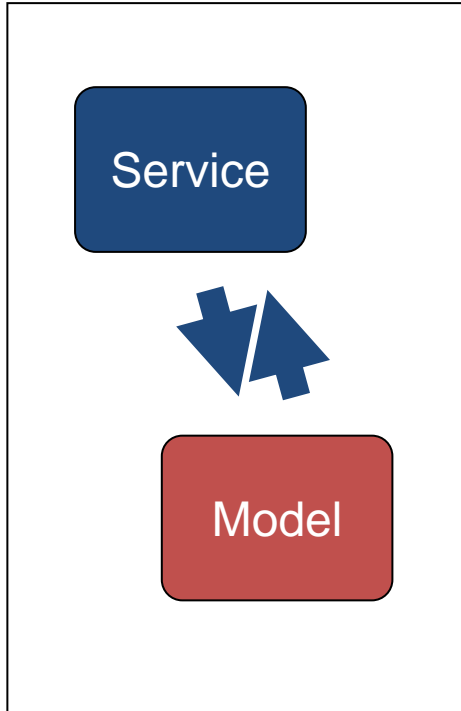
Structural verification

- Structural methods
 - linear algebra (invariants, state equation, rank theorem)
 - topology (siphons, traps, S/T-components)
 - decomposition
 - structural reduction
- New approaches
 - use know-how from state spaces (BDD, SAT, Partial Order)
 - efficient indexing on the net
 - compositional reasoning
 - derive counterexamples

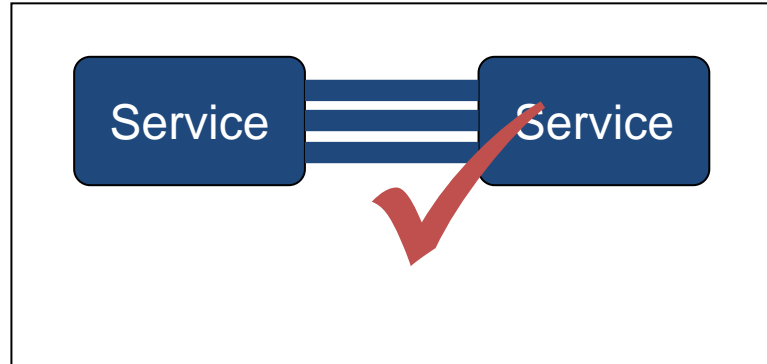
Service Behavior



Service Behavior

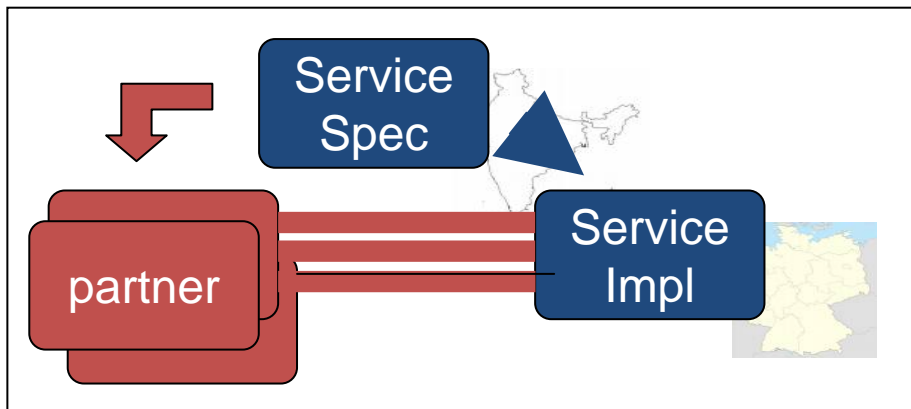


Formal Semantics

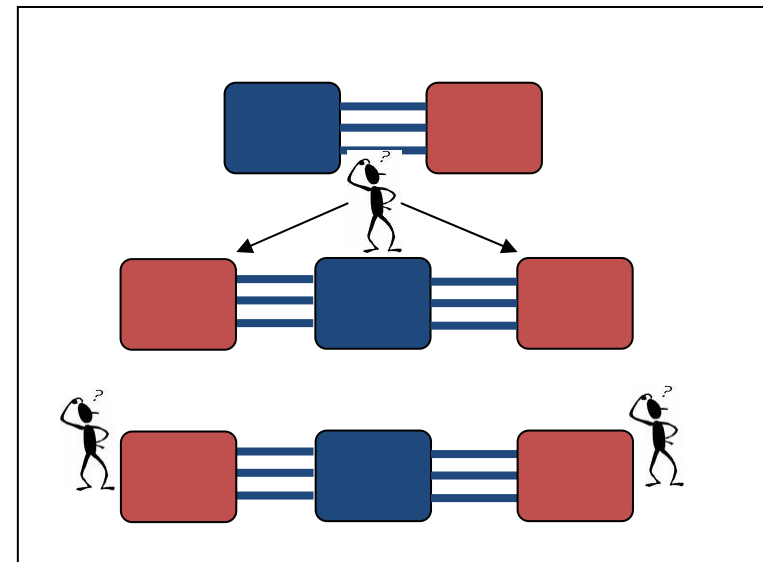


Checking compatibility

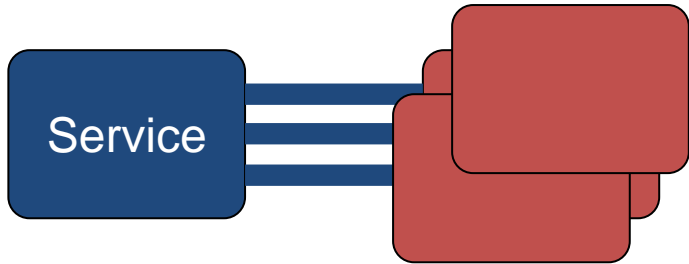
Test cases



Controllability/
Partner synthesis

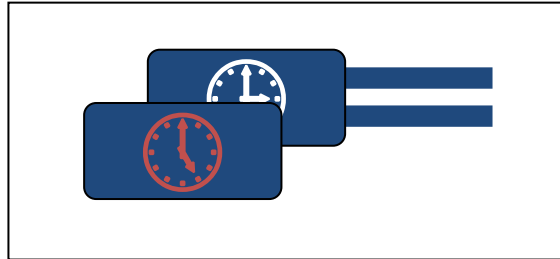
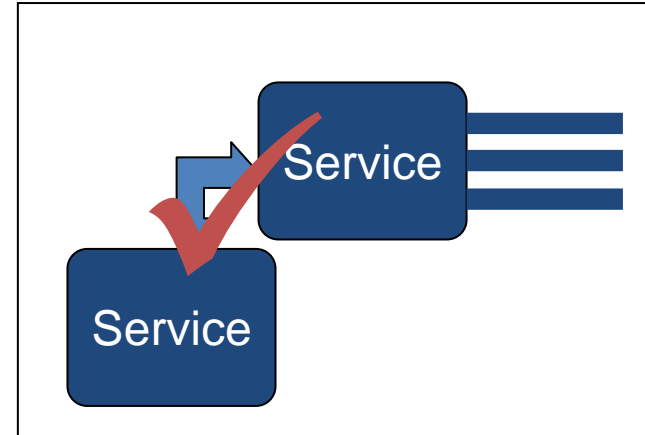


Service Behavior

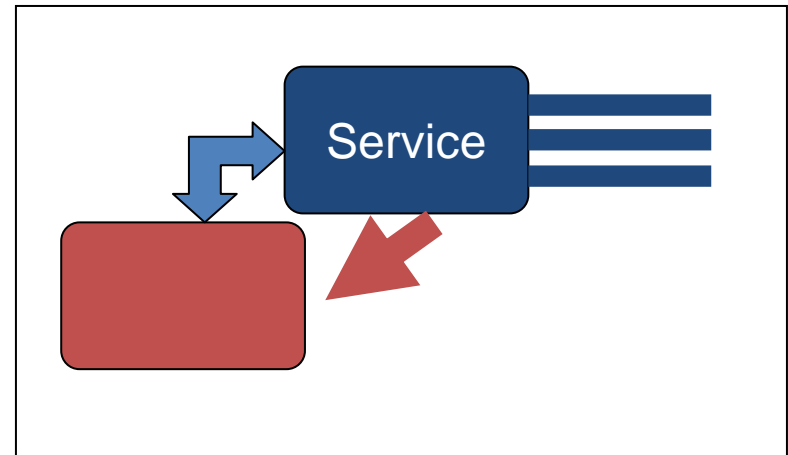


Partner characterisation/
Operating guidelines

Substitutability

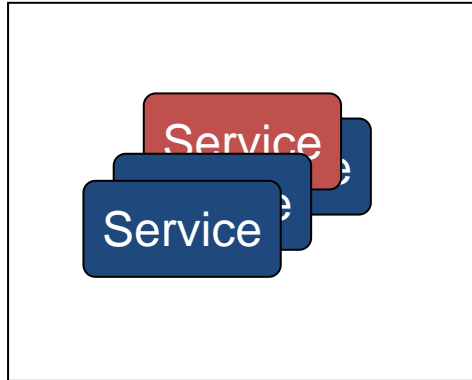


Instance migration

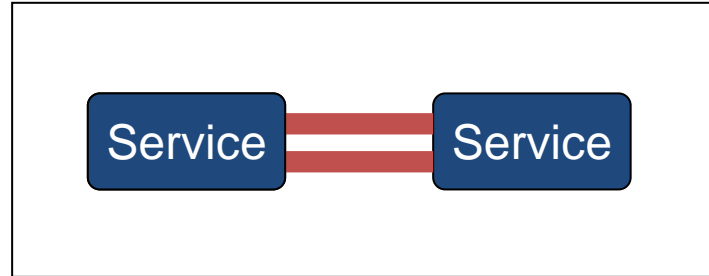


Transformation

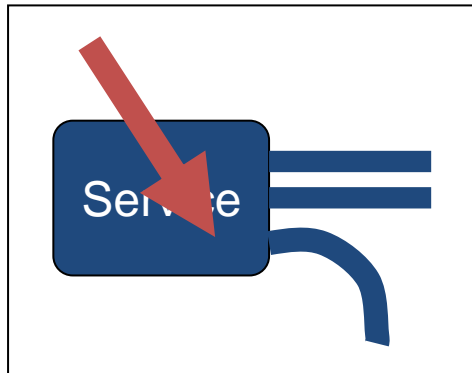
Service Behavior



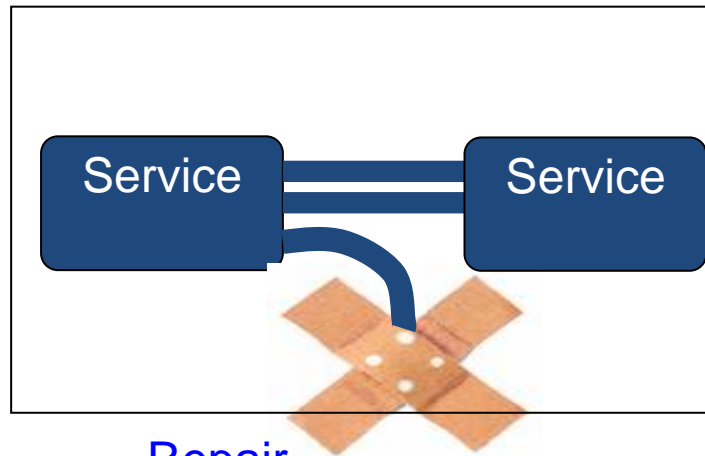
Navigation/Querying



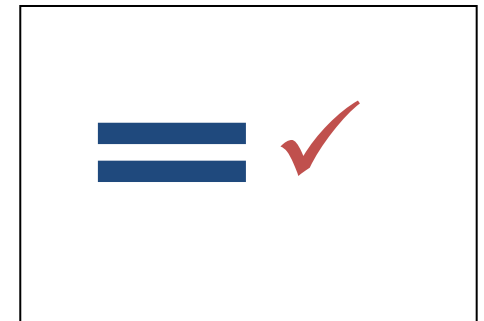
Composition/Adaptation



Diagnosis



Repair



Realizability

Problem dimensions

shape of partner

centralized

decentralized

autonomous

asynchronous

synchronous

queued

semantical constraints

messaging

compatibility notion

deadlock freedom

weak termination

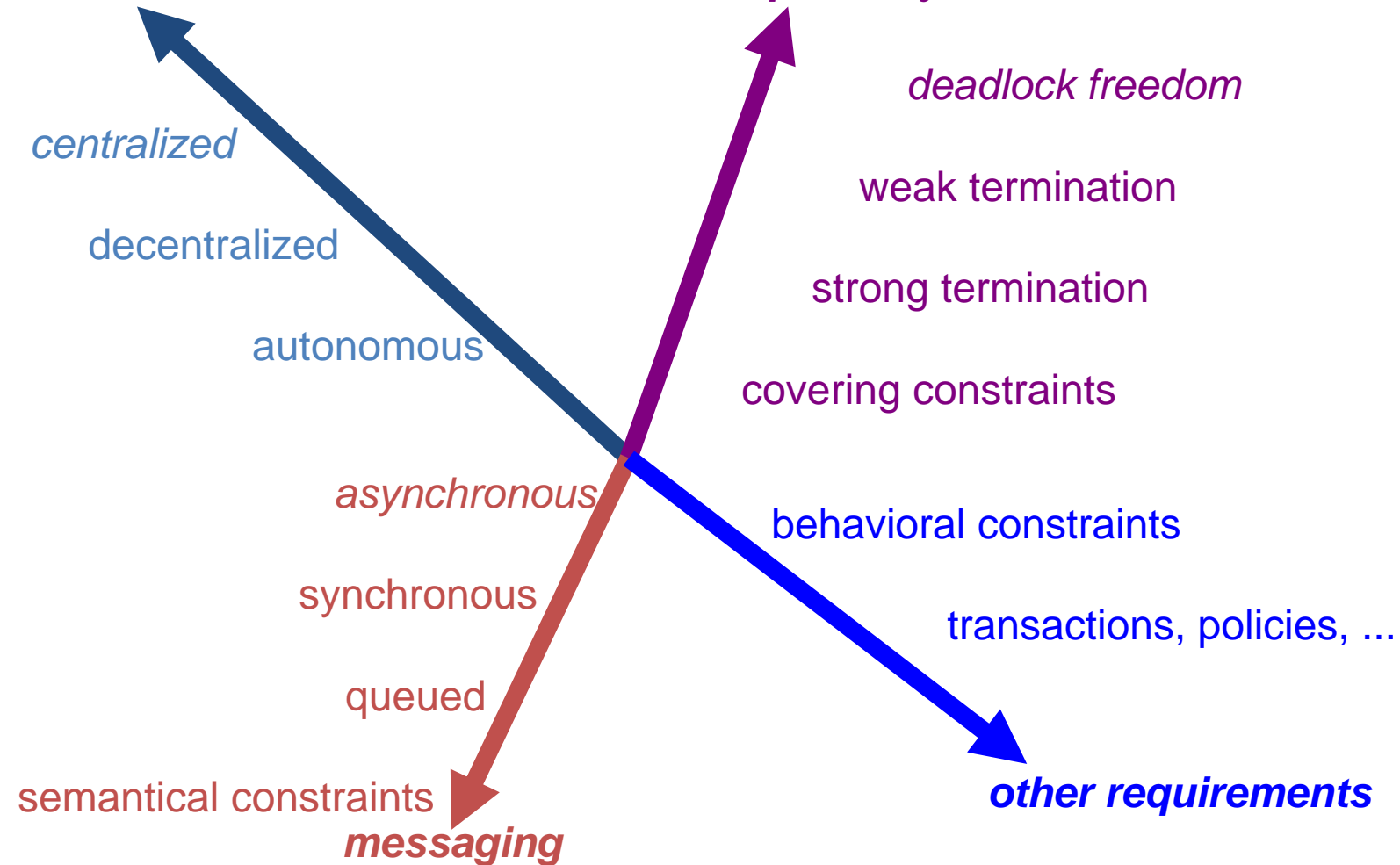
strong termination

covering constraints

behavioral constraints

transactions, policies, ...

other requirements



Our technology stack

inspect / compare / manipulate IG/OG

Rachel

partner characterization ... operating guidelines

Fiona

partner synthesis ... interaction graph

Fiona

state space exploration ... model checking

LoLA

model generation ... compiler

oWFN2BPEL

BPEL2oWFN

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