Is the PCM Ready for ACTORs and Multicore CPUs?
A Use Case-based Evaluation

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Software Engineer → Model → Prediction

- Single-Core: [Lehrig16], [Becker14]
- Multi-Core: [Frank16]
Q₁: Is it possible to model a parallel system following the ACTORS approach with the PCM?

Q₂: How accurate are the simulated predictions compared to the real execution?
Bank Transactions

- Multiple Accounts with a positive balance
- Transactions could fail and block each other
- Differing outcomes depending on the execution order
- Common use case for ACTORs
Deployment Diagram:

![Deployment Diagram](image-url)
SEFF ExperimentHandler:

<< Fork >>

ForkedBehaviours
<< Synchronisation Point >>

<< ExternalCallAction >>
ITrans1_ExpHandler.executeTransaction()

InputVariableUsage
transactionPartition = numberOfTransaction/2

<< ExternalCallAction >>
ITrans2_ExpHandler.executeTransaction()

InputVariableUsage
transactionPartition = numberOfTransaction/2
Research Question $Q_1$:

- Each Actor must be modeled individually
- High manual effort
- No asynchronous message passing

Our Model:

- Very abstract
- Loses ACTORS characteristics
- Low homomorphism
## Performance Results:

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<tr>
<th>Worker Threads</th>
<th>Execution</th>
<th>Simulation</th>
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Questions?

OpenMP

Multi-Core

akka
Research Question $Q_2$:

Accuracy vs. Threads

Accuracy decreases as the number of threads increases.
