

Integrated Observation and Modeling Techniques to Support Adaptation and Evolution of Software Systems

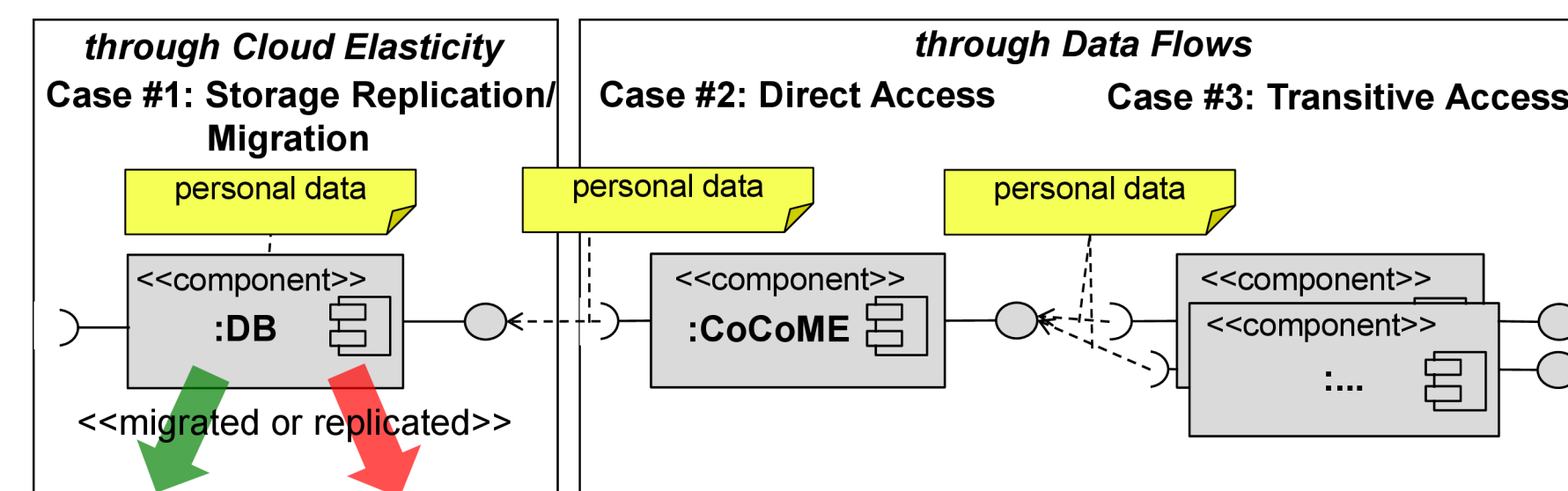
iObserve

Motivation and Objectives

- Monitoring of Distributed Cloud-based Applications
- Creating and Maintaining Run-time Models
- Continuous Model-based Analysis of
 - Privacy Policy Violations
 - Application Performance

Run-time Model based Privacy Checks

Privacy Policy Violations



Checking Algorithm

```

Algorithm 1 Policy Checking Algorithm
1: function CHECK(G, p)
2:   Vi ← GeoLocation(p) ∩ GeoLocation(G)
3:   Vi ← Data(p) ∩ Data(G)
4:   for vi ∈ Vi do
5:     for vj ∈ Vj do
6:       H ← PathFrom(vi, vj, G)
7:       if H ≠ ∅ then
8:         return false
9:   return true
    
```

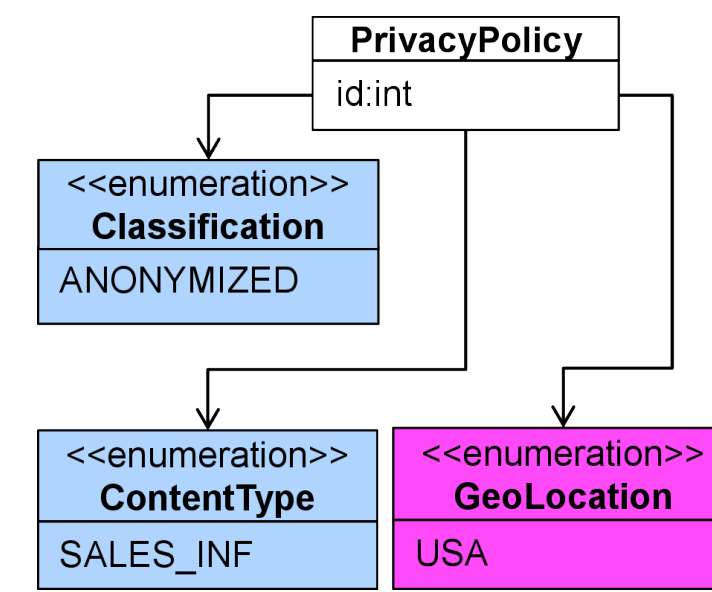
Model-driven Monitoring

```

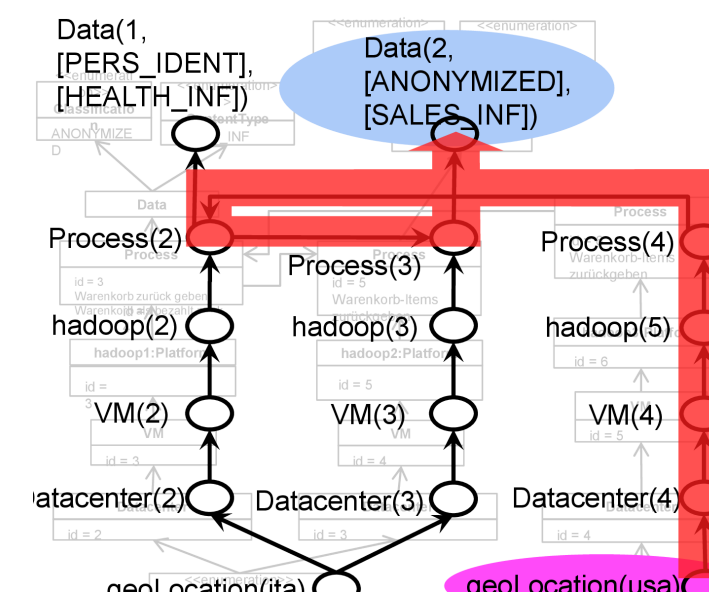
package org.spp.iobserve.common
author 'Jan Waller' @since '1.6'
template ICallRecord : IOperationRecord {
alias operationSignature as callerOperationSignature
alias classSignature as callerClassSignature
string calleeOperationSignature = ""
string calleeClassSignature = ""
}

package org.spp.iobserve.monitoring
aspect componentPointCut : componentProbe
pointcut componentPointCut TradingSystem... * (**) : *
probe componentProbe {
before collect CallOperationEvent(time, id, index,
<< name, name)
}
    
```

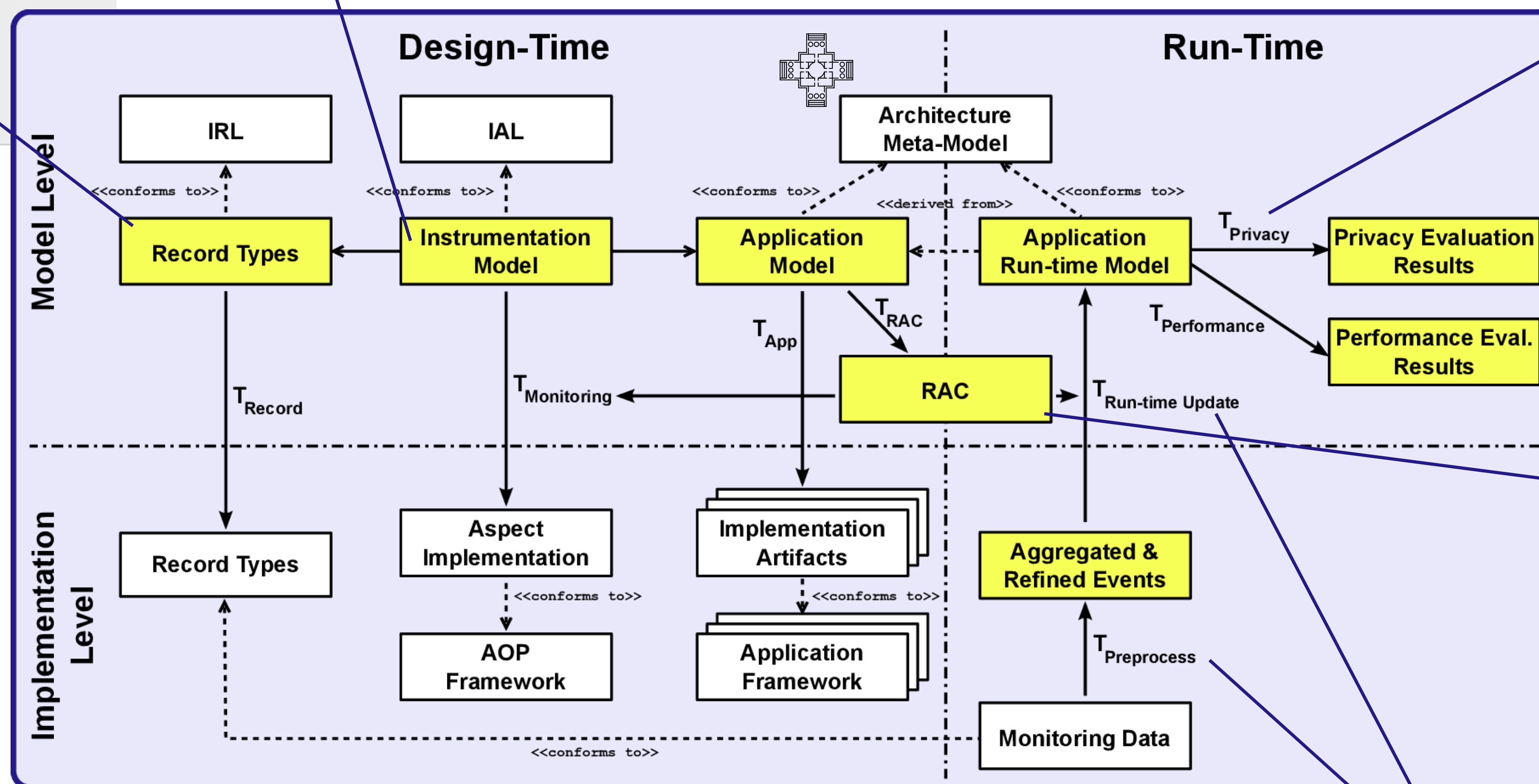
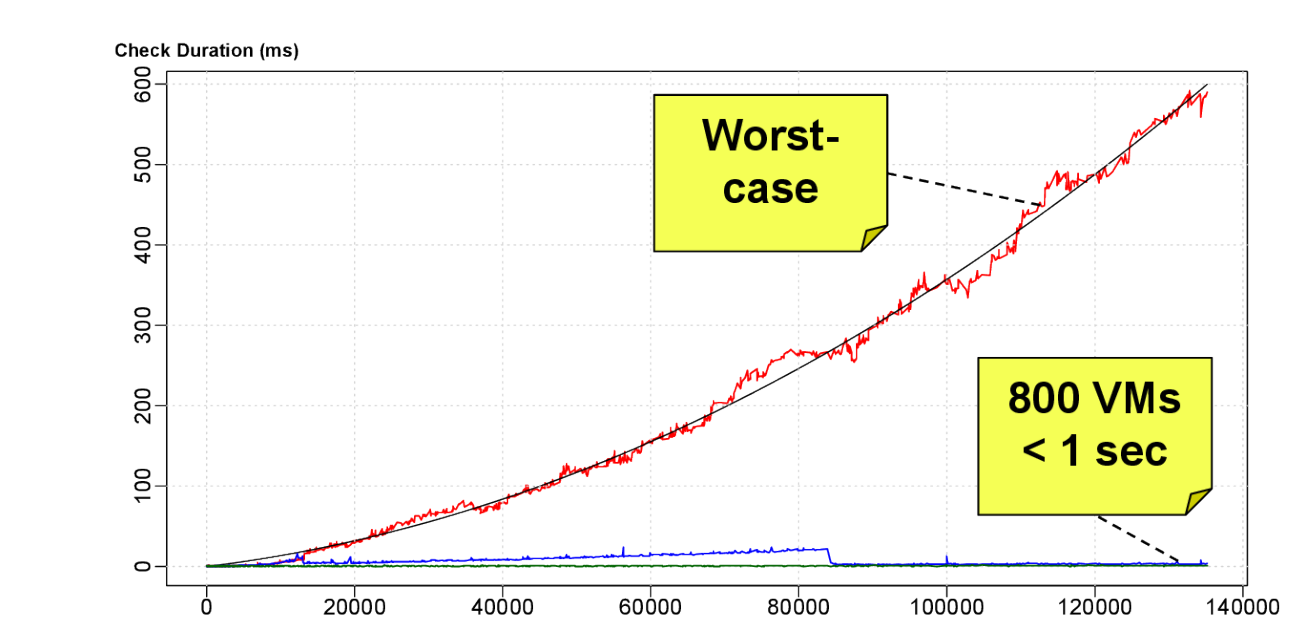
Privacy Example



Checking Example

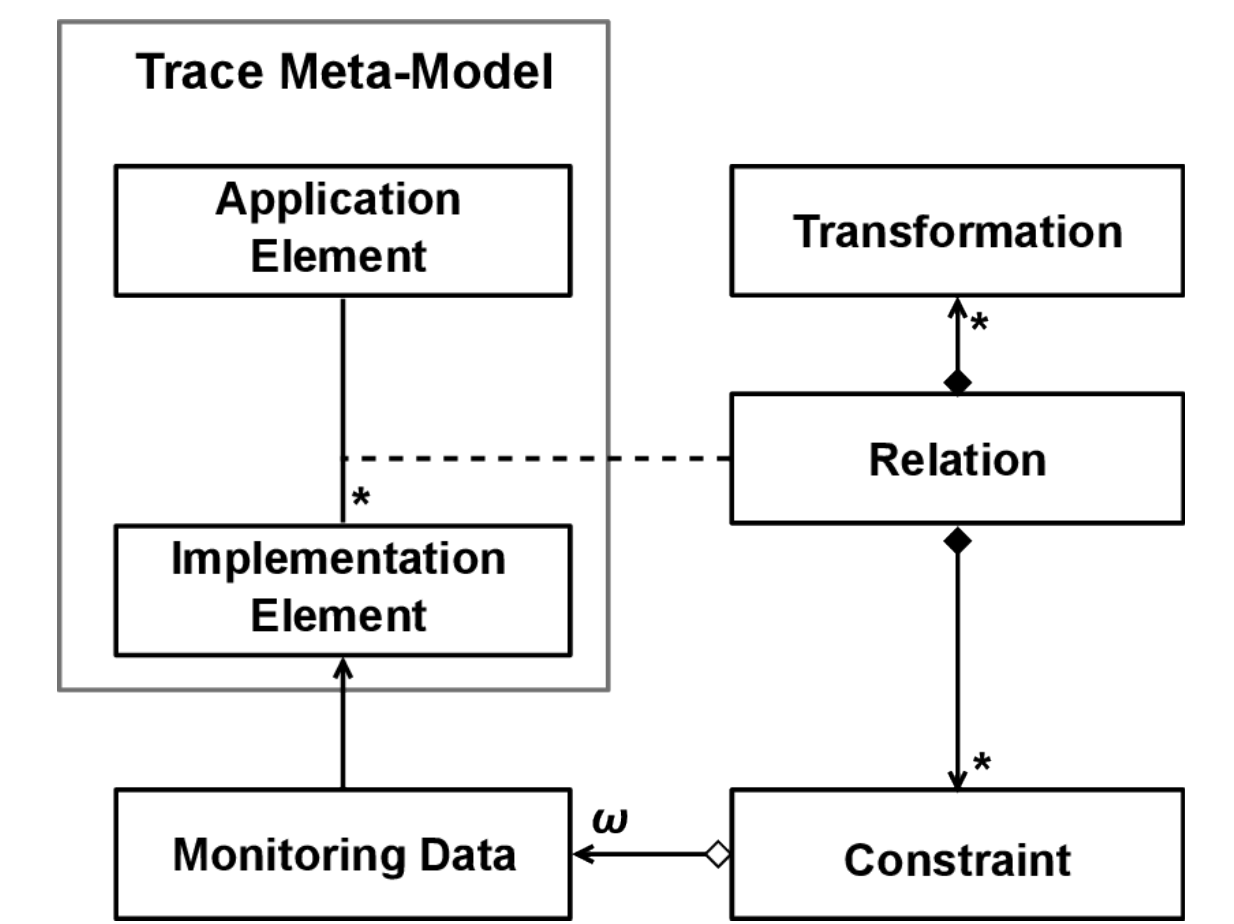


Performance Scalability Evaluation



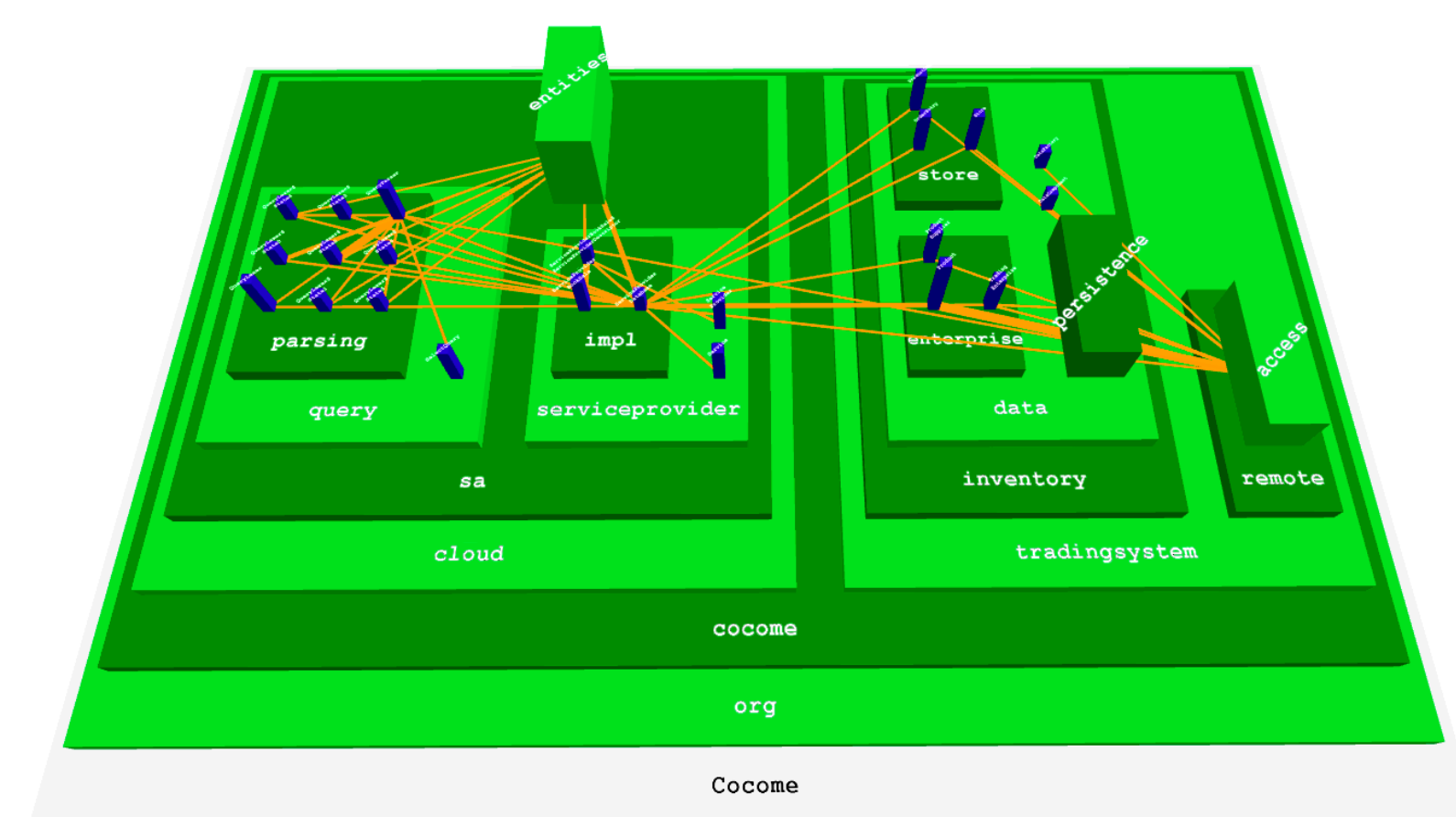
Bridging the Gap

Mapping monitoring data to the application model



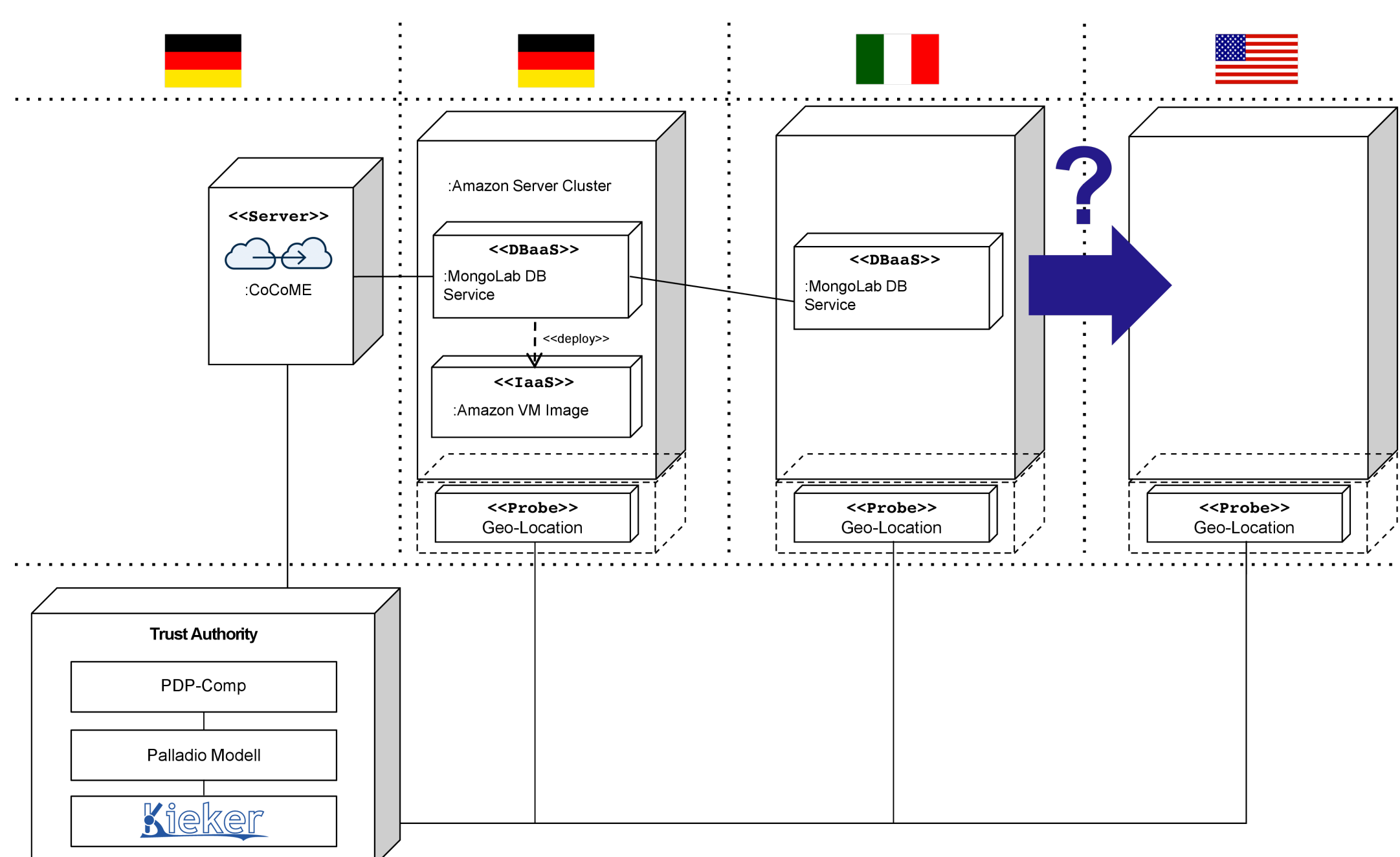
3D Visualization

Explore run-time architecture



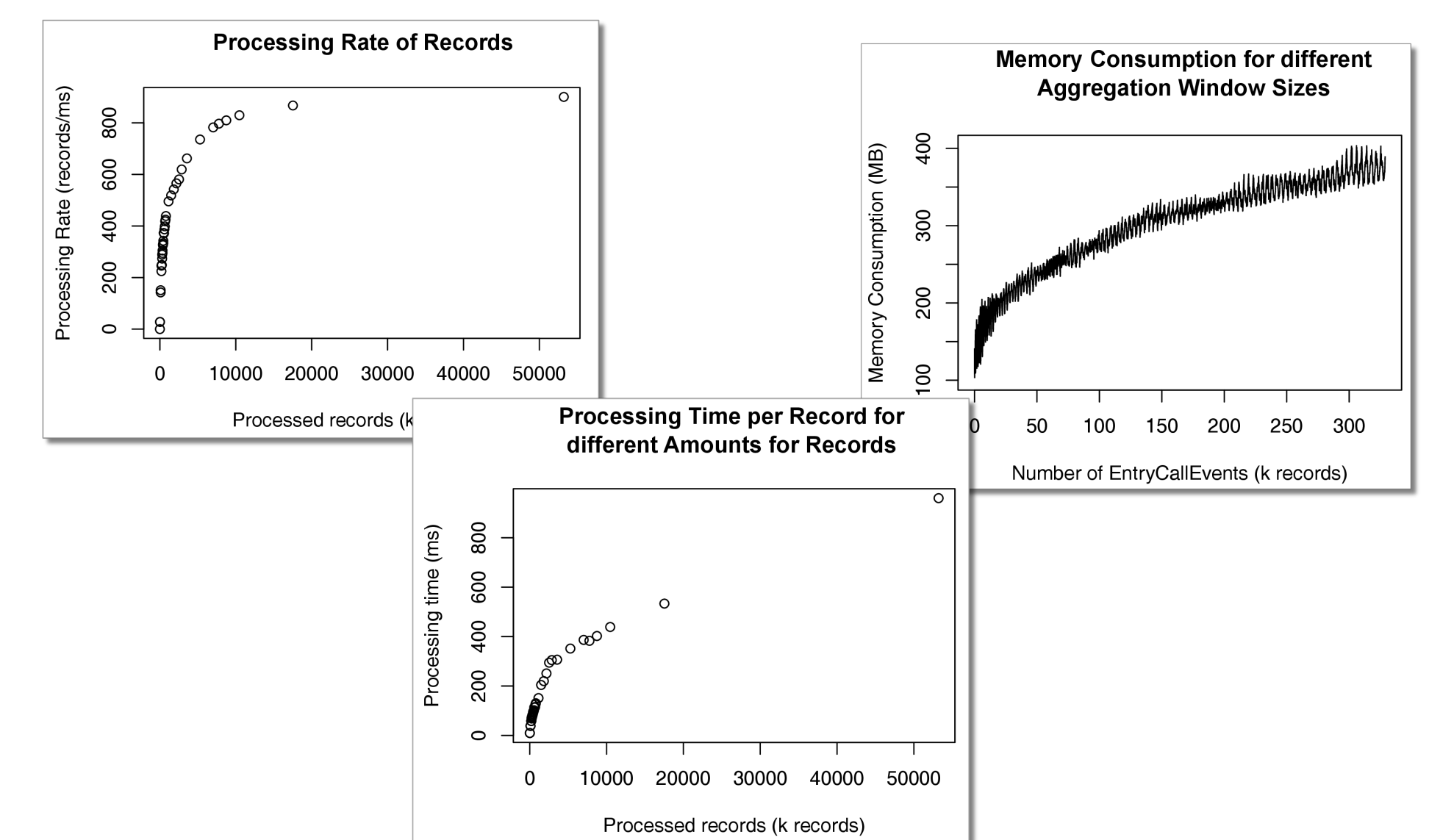
ExplorViz

CoCoME Scenario



Run-time Model Update

Performance and Scalability



Case Study CoCoME



<http://www.cocome.org>

Principal Investigators

Prof. Dr. Wilhelm Hasselbring, Prof. Dr. Klaus Pohl, Prof. Dr. Ralf Reussner

Additional Team Members

Reiner Jung, Dr. Andreas Metzger, Eric Schmieders, Dr. Robert Heinrich