



*Performance Control in
Wireless Sensor Networks*

**A Middleware Solution for
Performance Control**

Anja Klein,
SAP Research Center Dresden

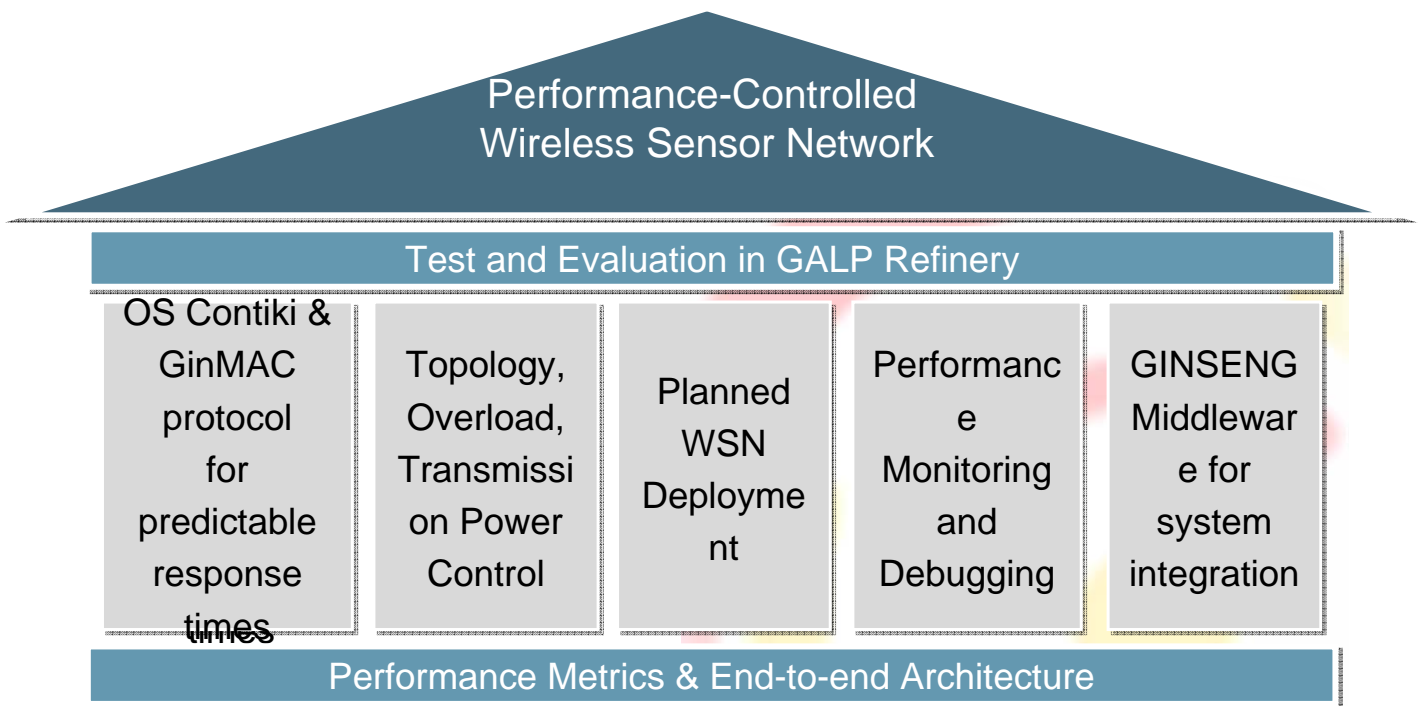
4th Monitoring and Control Concertation Meeting, WSNs and Cooperating Objects
Brussels, June 2nd 2010



Outline

- GINSENG Overview
- Performance Control in WSN
- Middleware Architecture
- Next Steps

GINSENG Approach



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WSNs and Cooperating Objects

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Performance Control in WSN

- **GinMAC**
 - GinMAC slots employed (with redundancy) to assure bounded delivery latency
 - Guarantees reliable and timely data delivery
 - Compensates for fluctuating link quality
- **Topology control** ensures network structure lies within bounds of MAC capacity
- **Transmission power control** trade reliability for energy savings based on Link Quality Estimators
- **Overload control** maintains acceptable fidelity of delivered data during periods of transient/persistent congestion

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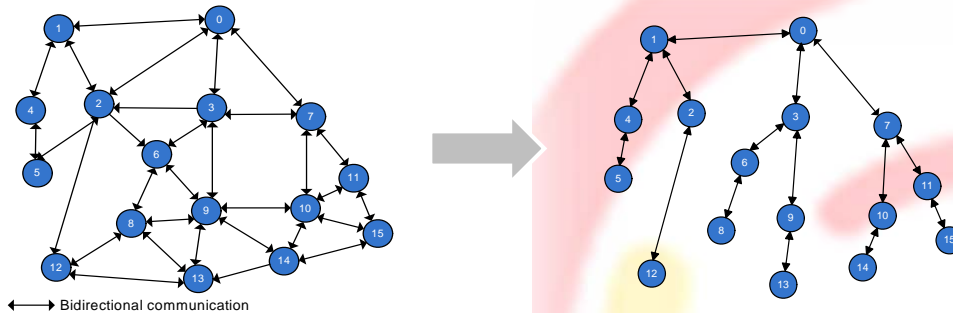
WSNs and Cooperating Objects

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Performance Control in WSN

- **Planned deployment**

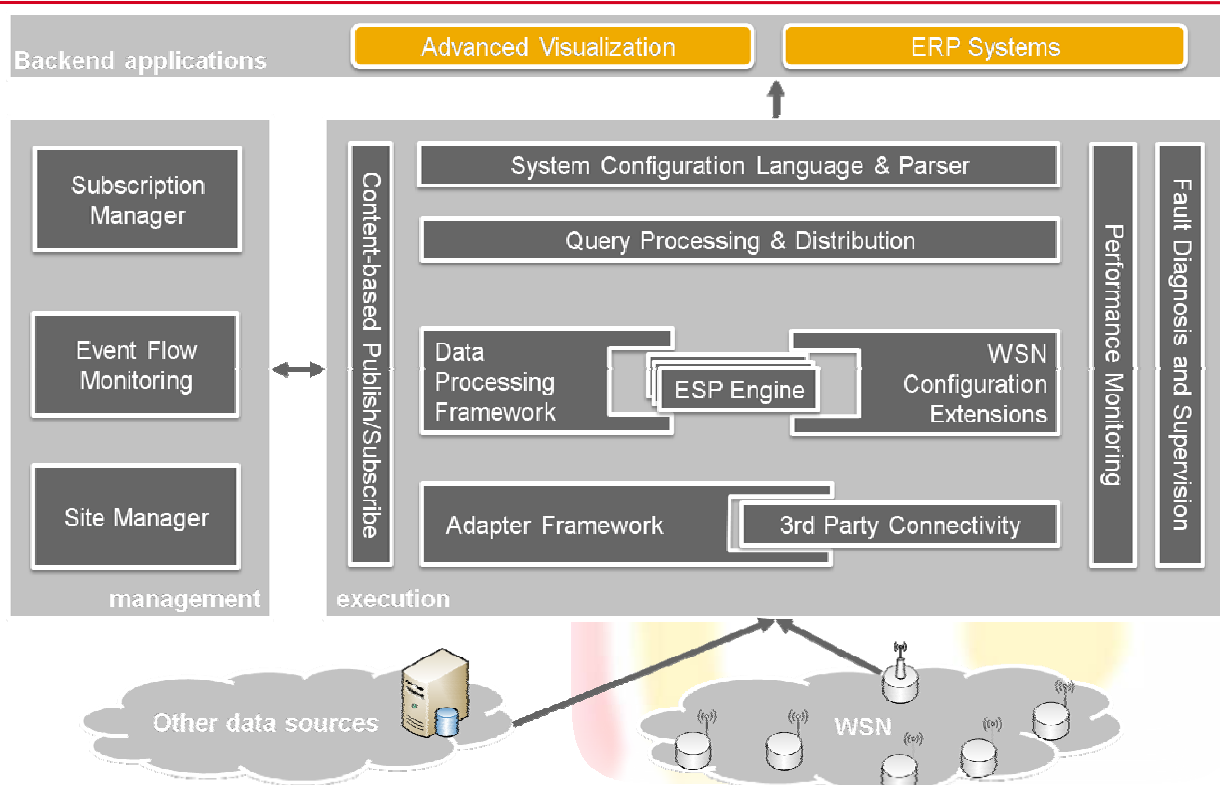
- No random communication
- Planned network structure in controlled tree-style



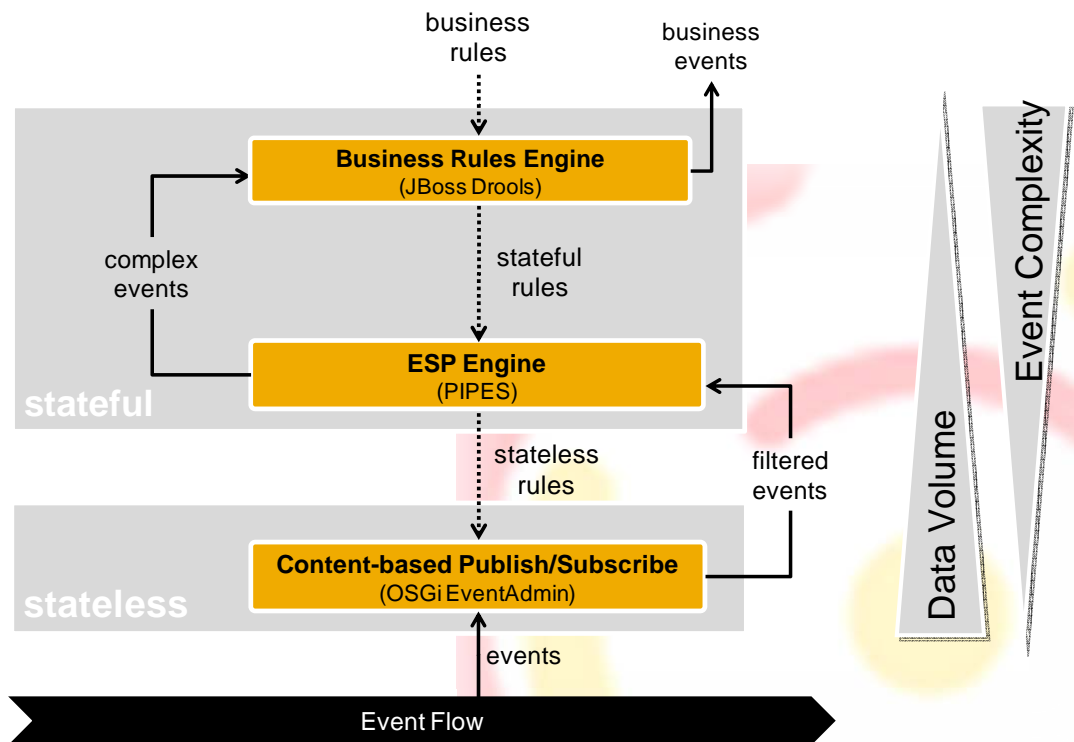
- **Performance debugging system**

- Supporting tools for performance monitoring
- Usage of on-node file system storage space

Middleware Architecture



MW - Data Processing Framework



MW - Performance Monitoring

- **Required Steps**

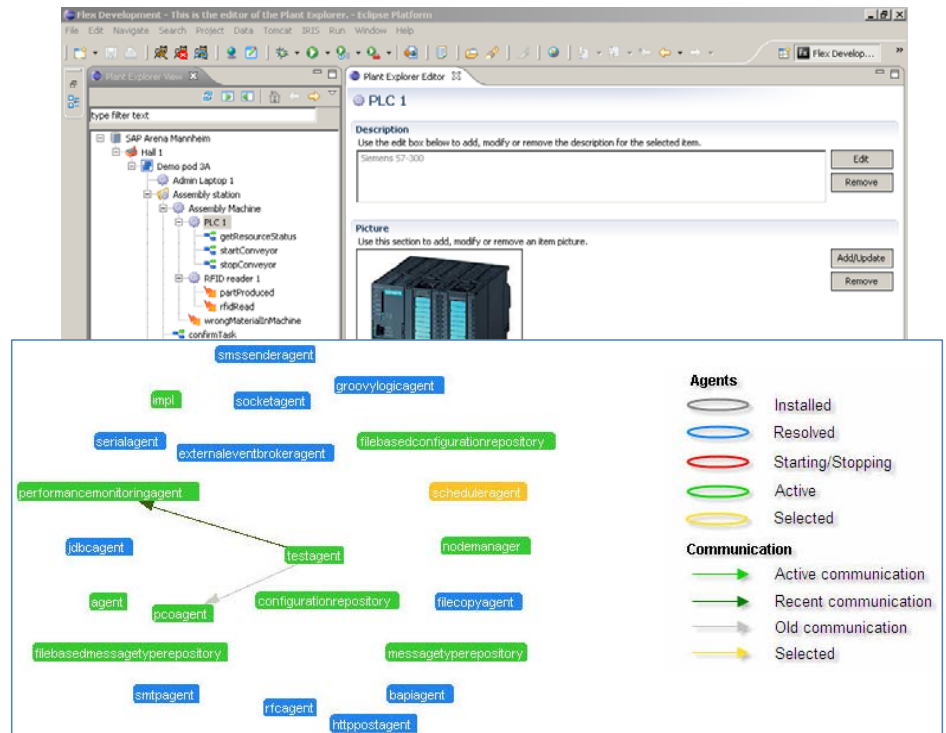
1. Definition of Performance Metadata
2. Performance Algebra
3. Performance Improvement

- **Realisation**

- Data Format for MW Eventing: WSN Message
- Extension of Data Processing Framework & ESP Engine
- Optimisation Algorithms for Performance-driven Optimisation of Event Stream Processing

MW - Service & Update Management

- **OSGI Environment**
 - Deployment, start, update, etc. during runtime
- **Site Manager**
 - Agent configuration
 - Agent deployment
- **Subscription Manager (OSGi Event Admin)**
- **Event Flow Monitoring**



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Next Steps

- **Middleware Distribution**
 - Distributed Middleware Nodes
 - Distributed Event Stream Processing
- **Mobility Support**
- **Integration of Security Aspects**
 - Authentication of WSN sink node(s) & applications
 - Encryption of data transfer
- **End-to-end Deployment & Testing**

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