

# Software Engineering

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# Outline

- What is Software Engineering?
- What is hot?
- Who are the big players?
- What is UCSD doing?

# What is Software Engineering?

- The establishment and use of **sound engineering principles** in order to obtain **economical software** that is reliable and works **efficiently** on **real** machines

*Fritz Bauer*

*NATO Software Engineering Conference*

*Garmish, Germany Oct 1968*

# What is Software Engineering?

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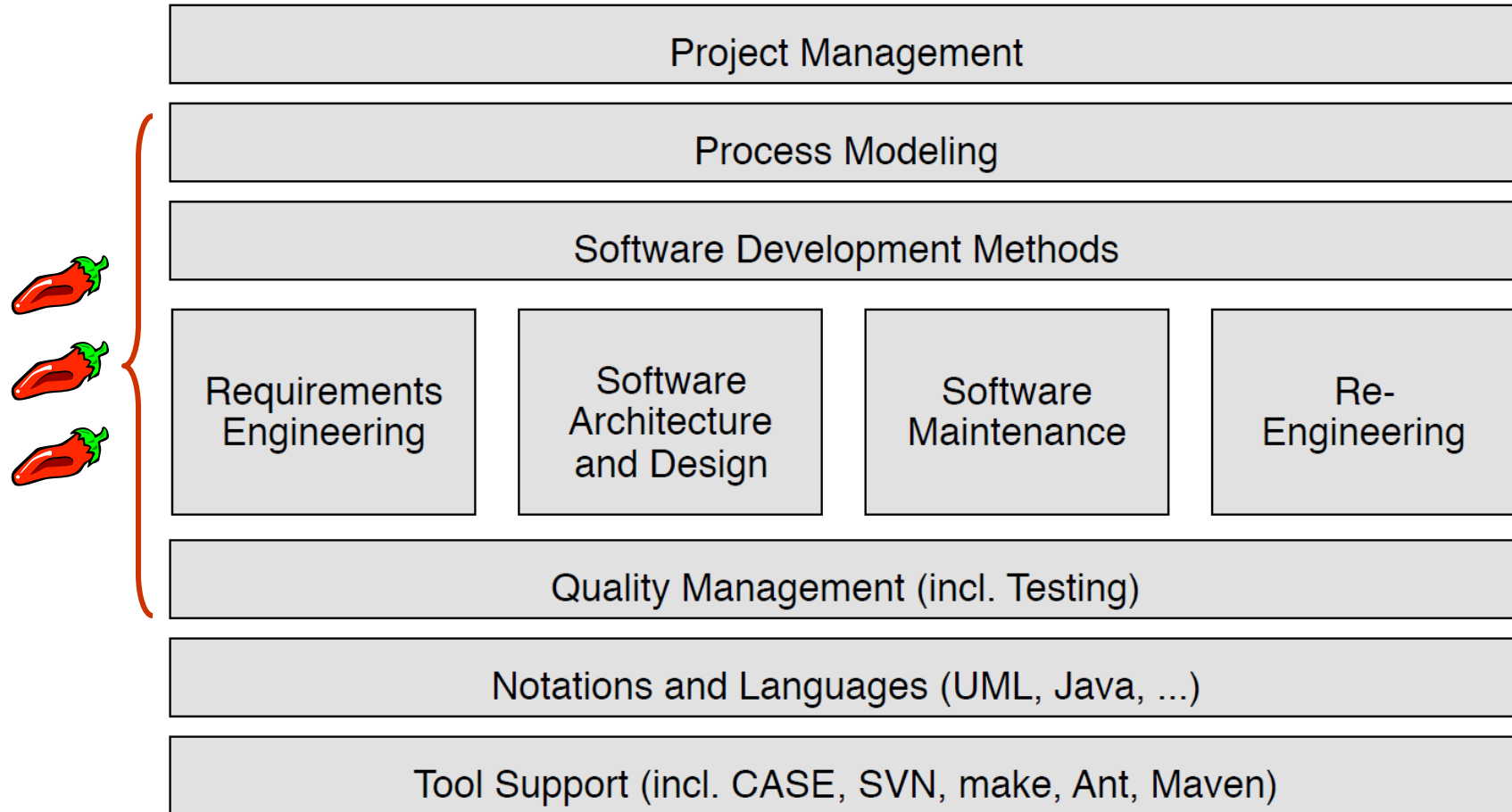
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- Management of complex relationships between entities to produce and maintain properly targeted software



# What's Hot



Ingolf Krueger, 2009



# What is Hot?



- Service oriented computing (SOC/SOA)
- Model-driven architecture/engineering (MDA/MDE)
- Cloud computing
- Cyberinfrastructures (CI)
- Ultra-large scale systems (ULSYS)
- Information Assurance (IA)
- Green Computing
- Domain specific languages (DSL)
- Web Services (WS)
- Agile Methodologies

# Who are the Big Players?

- Carnegie Mellon – Software Engineering Institute
- TU München
- Vanderbilt
- Harvard
- UT Austin
- University of Innsbruck
- Purdue
- IBM, Microsoft, SAP, US Govt, et al
- UCSD (of course)

# What is UCSD Doing?

- Service oriented architectures
- Model driven architecture
- Re-engineering
- Policy-reactive systems
- Process engineering

**OOI** – Ocean Observatories Initiative

**RESCUE** – Response to Crisis

**CAMERA** – Marine Ecology Research

**PALMS** – Exposure Biology

**CyCORE** – Comparative  
Effectiveness (cancer)

**Citisense** – City-scale quality of life

**Proteomics** – Protein identification

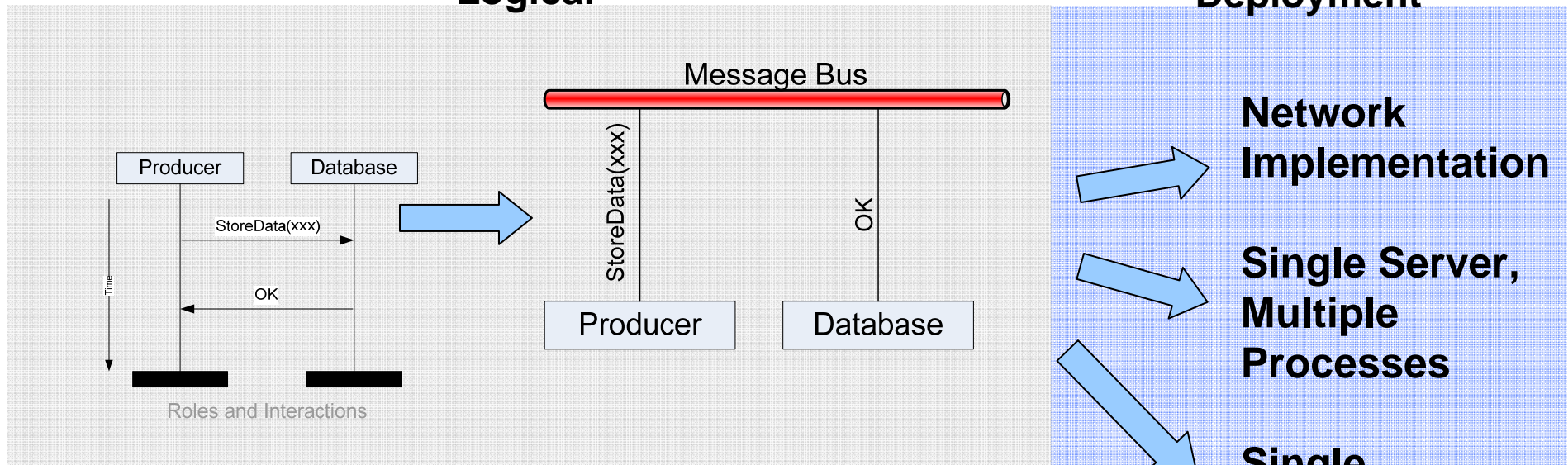


# A Quick Peek

## Service Oriented Architectures and Processes

Logical

Deployment



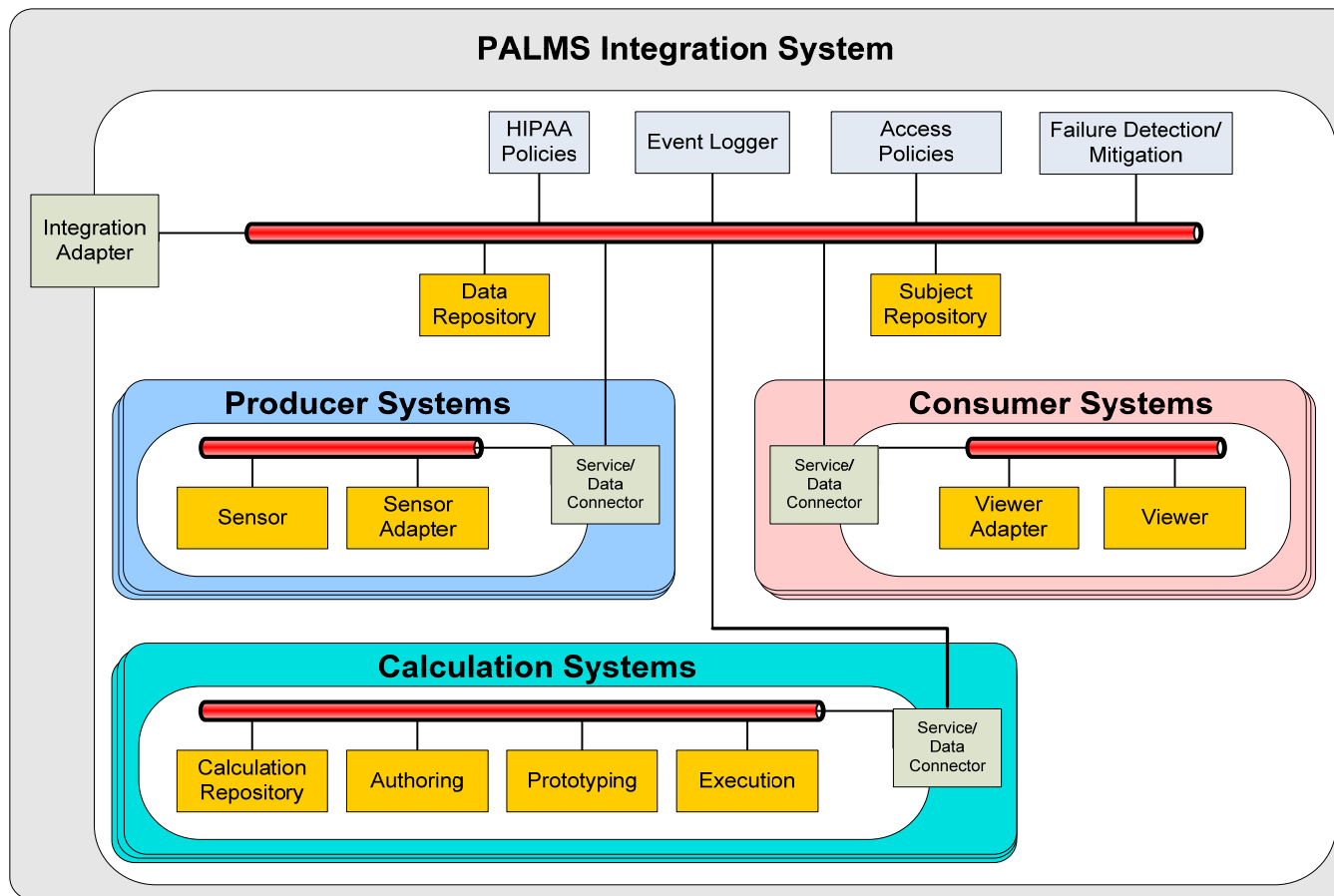
- Loose Coupling
- Late Binding
- Scalability
- Composition
- Interoperability
- Testability
- Malleability
- Manageability
- Dependability
- Incremental development

**Network  
Implementation**

**Single Server,  
Multiple  
Processes**

**Single  
Application,  
Linked Modules**

# Logical Architecture (PALMS)



*Rich Service*

# Questions?