Technology Convergence & Its Adaptability to New Capability

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Key Technologies

- GUI Engineering
- Software Applications Engineering
- Database Architecture
- Network Architecture
- Hardware Engineering
- Computer Architecture
- ILS Engineering

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The Challenge

- Technology
- Process/Procedures
- Products/Assets
- Proposals/Reviews

Utility

High

Low
Process/Procedures

- Systems /Software Engineering Issues
- Architecture issues
- Sharing Knowledge
- Impact of new/emerging technology on procedures
- Impact of new/emerging technology on cost estimation
- CMM, CMMI and ISO
Products/ Assets

- Independent Research & Development (IR&D)
- Standards (DoDAF, SOA)
- Prototypes
- Team practices (Agile development, Extreme programming)
- New emerging environments/tools (.Net, C#, UML2, SysML, etc.)
Proposals/ Reviews

- Capture Process
- Design Assurance
- Independent Non-Advocacy Reviews
- Cost Estimation Process
- Design to Cost techniques
An Example:

IPC Architecture Migration to Better
Adapt to New Capability
Problem Statement

- To enhance the messaging and data distribution capability in a legacy ground system to better adapt to new capability
Background

- A legacy ground system uses proprietary shared memory queues to enable processes to exchange data/messages within and across UNIX platforms
- **Strengths**
  - Excellent mechanism to share data on the same machine when high performance is required

- **Weaknesses**
  - High-cost & error-prone to configure shared memory to enable process-to-process communication
  - No out-of-the-box publish/subscribe capability
  - No multicast capability to minimize network traffic
**New Publish/Subscribe IPC**

- **Strengths**
  - Provides publish/subscribe capability
  - Lower cost to add new data publishers and subscribers

- **Weaknesses**
  - Costly to implement in a legacy system
New Heterogeneous IPC Architecture

Legacy Data Providers -> Write -> Queues -> Read/Write -> Queue Bridge

Queue Adapter -> Read/Write -> Message Topics

New Data Providers -> Publish -> Message Topics

Queue Adapter -> Subscribe -> New Users

Legacy Users

Write

Read