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Challenges of Software Development in an Open Architecture Environment

Reuben S. Pitts III
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The Panel

- **Chair: Reuben Pitts III**, President, Lyceum Consulting, LLC
- **Paper -- Achieving Better Buying Power Through Cost-Sensitive Acquisition of Open Architecture Software Systems**, Walt Scacchi, University of California–Irvine and Thomas Alspaugh, University of California–Irvine
- **Paper -- Analyzing Quality Attributes as a Means to Improve Acquisition Strategies:** Lisa Brownsword, Carnegie Mellon University; Cecilia Albert, Carnegie Mellon University; Patrick Place, Carnegie Mellon University; David Carney, Carnegie Mellon University



The Panel

- **Combining Risk Analysis and Slicing for Test Reduction in Open Architecture: Valdis Berzins, Naval Postgraduate School**

Open Architecture Definition

- Open Architecture is a set of principles, best practices and processes that yields systems that:
 - Provide more opportunities for competition and innovation
 - Optimize total system performance
 - Are easily developed & upgradeable
 - Minimize total ownership cost
 - Rapidly field affordable, interoperable systems
 - Achieve component software reuse
- OA is not only a technical attribute; it has many aspects:
 - Includes existing Navy OA guidance, e.g., MOSA, and commercial best practices
 - Driven by open acquisition, e.g, business processes
 - Provides for Open Mission Operations



Definition – Open Architecture

- The official definition of Naval Open Architecture is, "the confluence of business and technical practices yielding modular, interoperable systems that adhere to open standards with published interfaces. OA delivers increased warfighting capabilities in a shorter time at reduced cost."

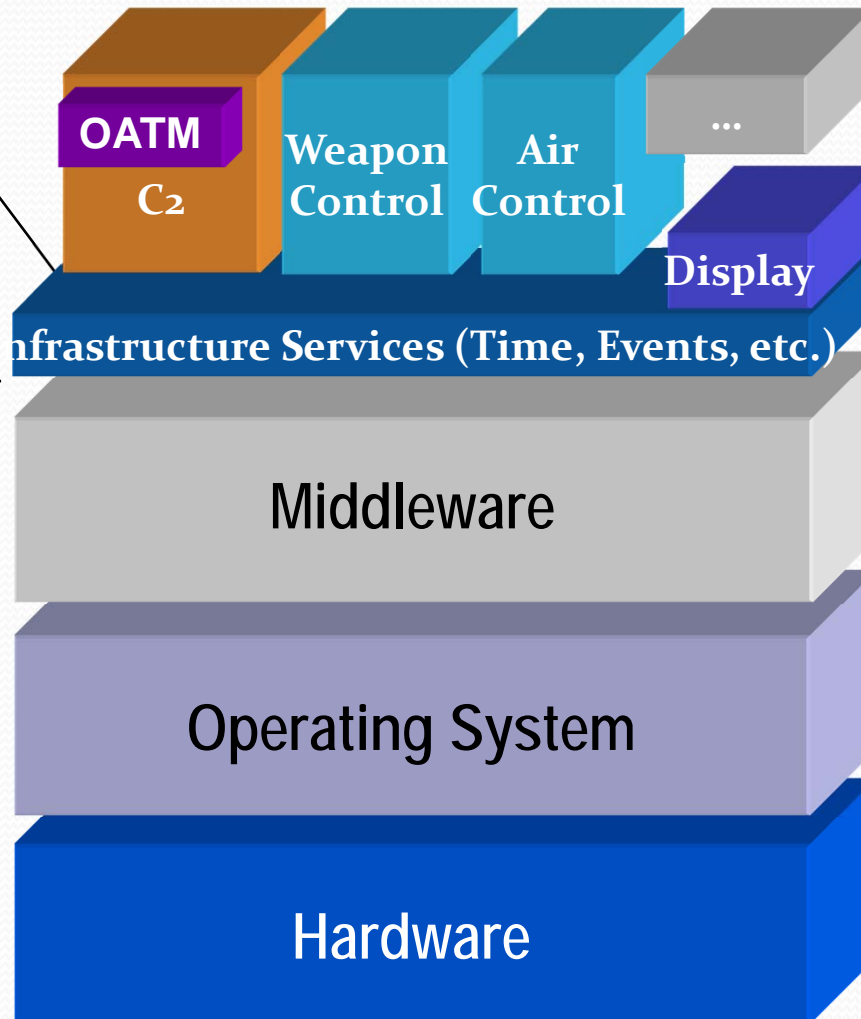
Layered Architecture Approach

Infrastructure:

- Common Services and APIs (Time, Events, Navigation, etc.)
- Flexibility to Support Forward-Fit and Back-Fit

Surface Domain OA Computing Environment (OACE)

- Standards-Based Interfaces
- Commercial Mainstream Products and Technologies



Applications:

- Common Components
- Platform-Specific Components

Total Ship Computing Environment - Infrastructure



The Value Proposition Of Open Architecture

- OA will enhance composability, interoperability, and net-centricity for the warfighter
- Openness leads to faster and more affordable fielding of systems
- Openness leads to more efficient and less costly system lifecycle support
- Value of OA must be measured in terms of quantitative, e.g., cost, and qualitative (for example shortened cycle time) measures
- Software reuse is a by-product, but not necessarily where the major cost benefits lie



Benefits of Open Architecture

- Modular design and design disclosure
- Reusable application software
- Interoperable joint warfighting applications and secure information exchange
- Life-cycle affordability
- Encouraging competition and collaboration through development of alternative solutions and sources