



Acquisition Research Program:
Creating Synergy for Informed Change

Software Open Architecture: Managing Design for Achieving Warfighter Capability

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Role of Software Architecture

- Fully developing Open-systems Architecture (OA) software requirements is necessary, but only part of the answer
- SW architectural design is the key to achieving OA and other quality attributes
- Managing the SW design process is key
- Half or more of the SW engineering effort will be on the architecture



Integrating SW Design Management

- Managing SW design within the DoD Acquisition model and Systems Engineering Process (SEP)
- Keeping the user/stakeholders actively involved throughout the process
- Driving the SW architecture toward well-understood warfighter capability needs
- Designing the test program to evaluate effectiveness & suitability achievement throughout



SW Design Mgt Methodology

- SEI Architectural Tradeoff Analysis Methodologysm (ATAM)
 - Provides SW design analysis methodology
 - User/stakeholders significantly involved
 - Drives design toward user capabilities
 - Integrates well with Acq model and SEP
 - Vastly improves SW engineer understanding of system
 - Keys on scenario & test case development and user prioritization



SEI S/W Quality Attribute Workshop

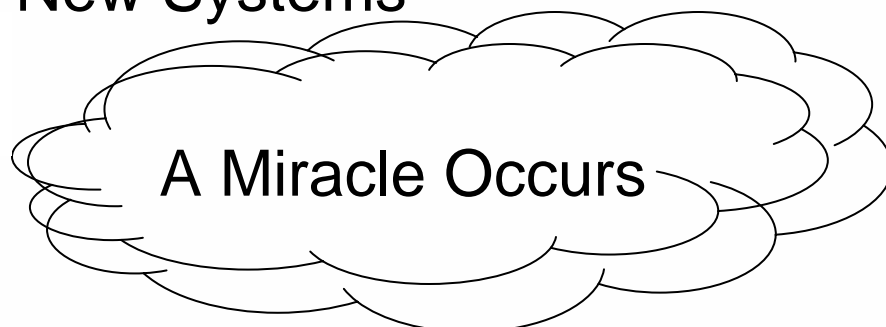
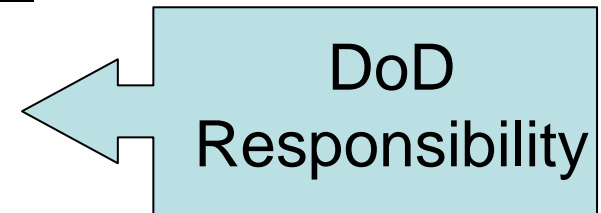
Traditional System Development

Operational Descriptions

High-Level Functional Requirements

Legacy Systems

New Systems



Quality Attributes Often Missing from Req Docs, or Vaguely Understood & Weakly Articulated

Specific-System Architecture

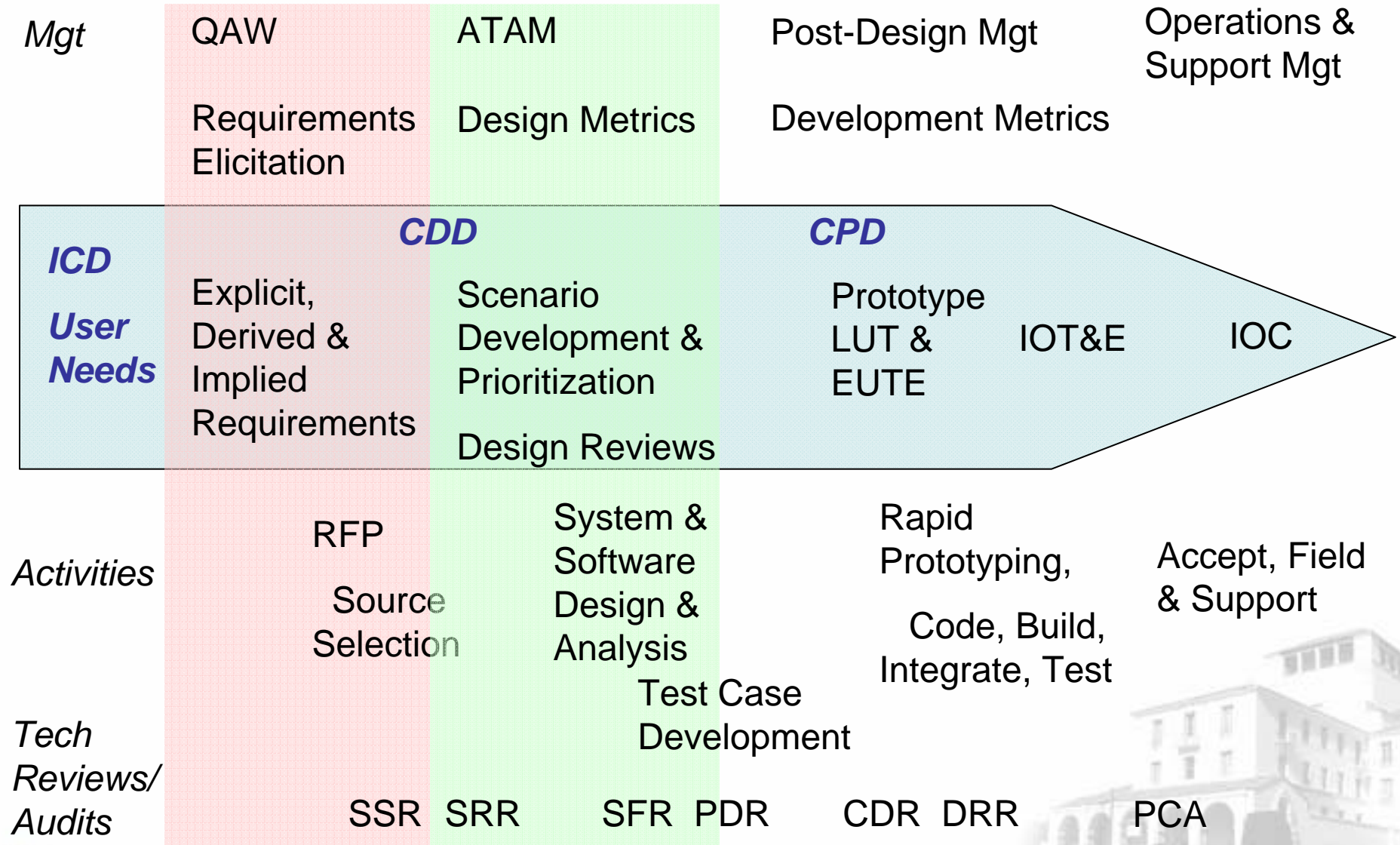
Software Architecture

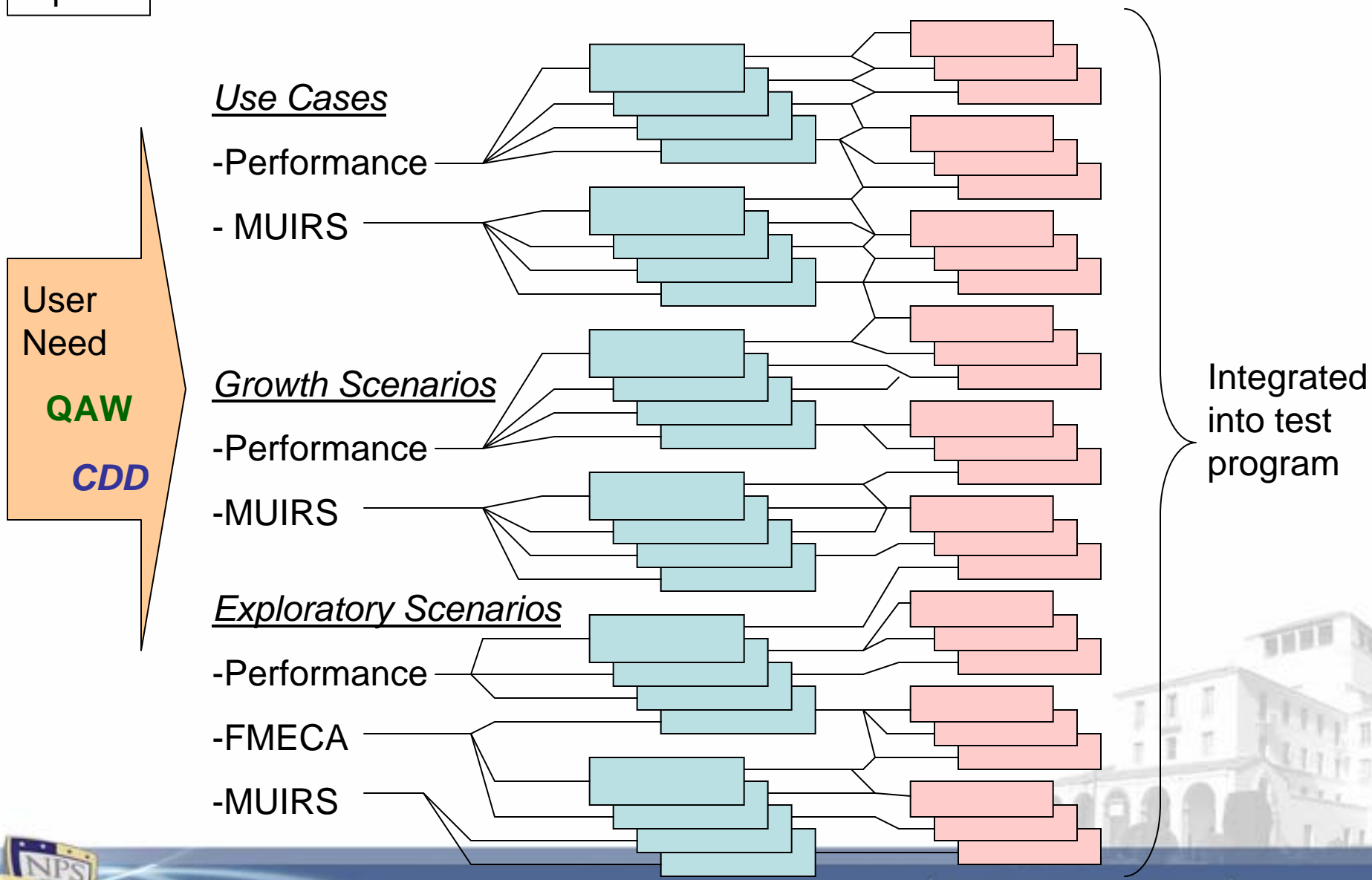
Detailed Design

Implementation



QAW & ATAM Integration into SW Lifecycle Management





Summary

- Well-defined, clear requirements are critical, but not sufficient to design robust, flexible, OA system and software architecture
- Software engineers need to understand requirements in the context of operational employment
- SEI's ATAMsm produces scenarios detailing operations, future capability needs (OA driver), and expectations under adverse and degraded modes
- It leverages the JCIDS process, integrates the warfighter, and compliments the SEP & acquisition model
- Orients the test program to OA design and provides traceability from user requirements through test program

