

Raytheon's Architecture Journey

**Software Architecture Technology
User Network (SATURN) Workshop**
April 25-26, 2006; Pittsburgh, PA

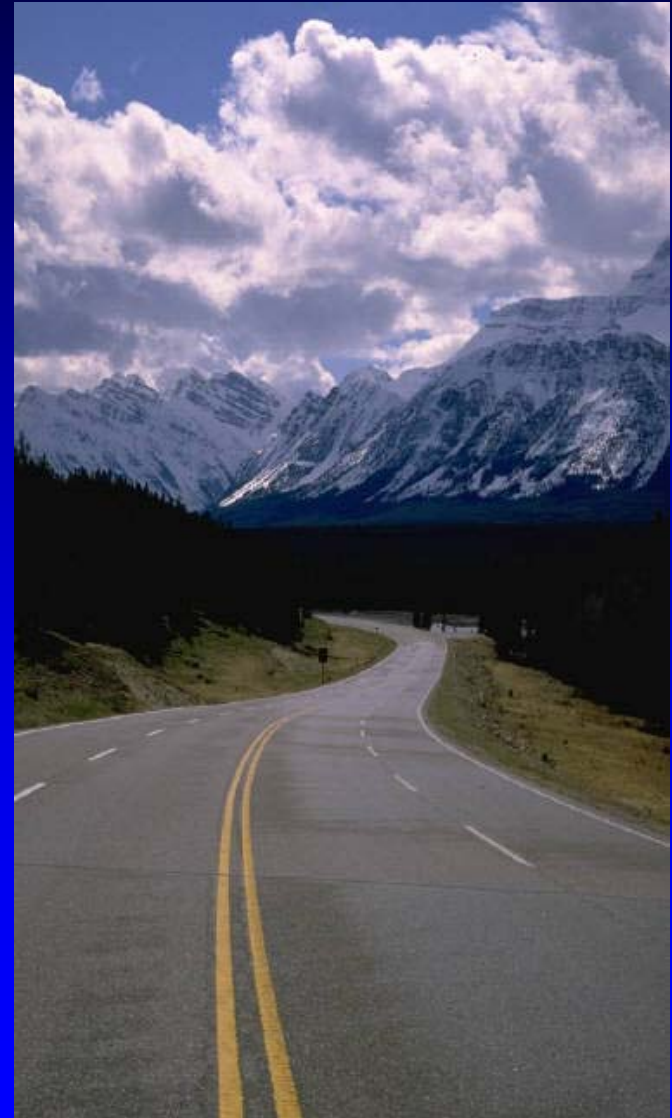
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Customer Success Is Our Mission

The Journey...

- Why Architecture?
- Which Architecture?
- Initiatives
- Summary



Why Architecture?

Evolution of a Discipline



Customer/User Expectations & Requirements



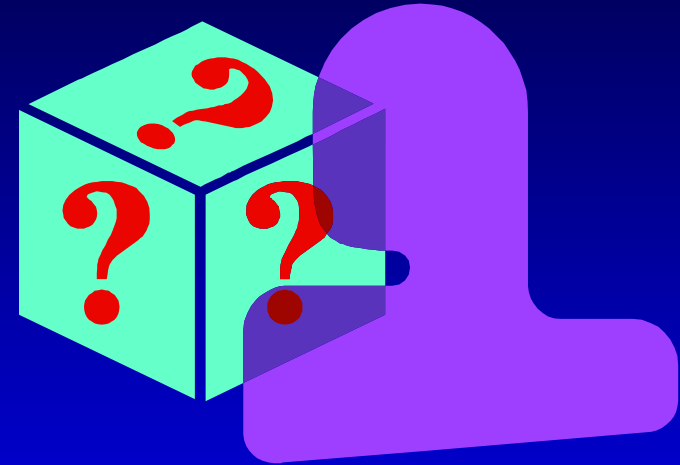
Communication, Communication, Communication



Which Architecture?

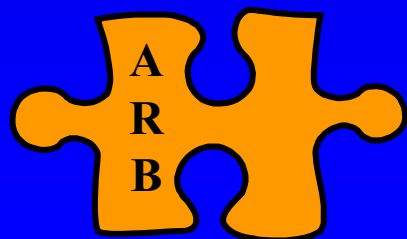
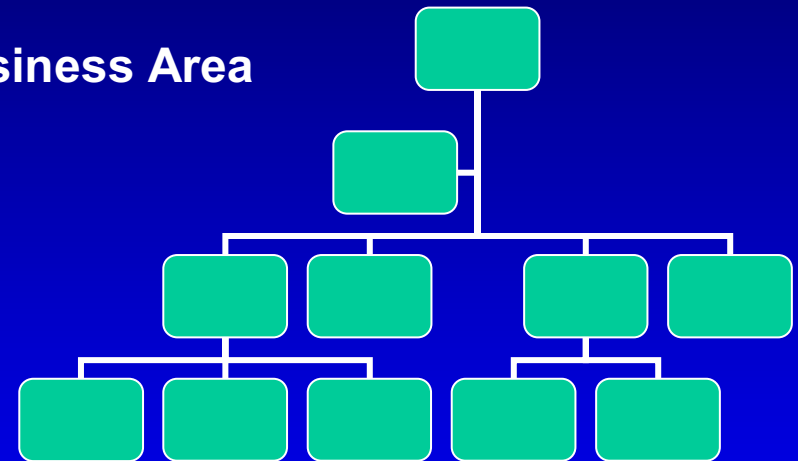
- Software Architecture
- Systems Architecture
- Enterprise Architecture

- All Of The Above



Architecture Review Board (ARB)

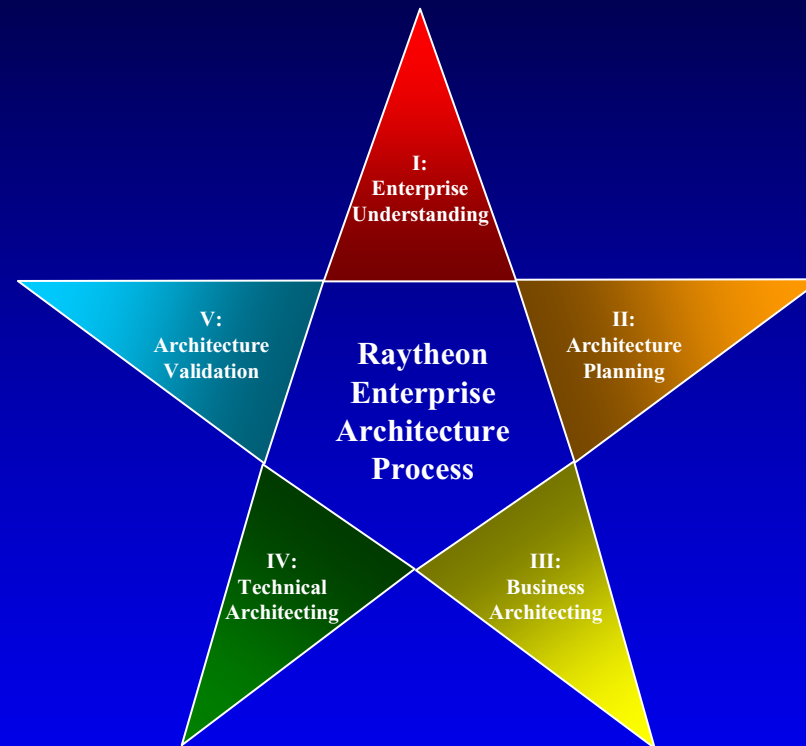
- **Corporate Organizational Structure**
 - **ARB Chair** **Direct report to Corporate VP of Technology**
 - **Representatives** **From each core Business Area**
- **Focus On...**
 - **Architecture initiatives & guidance across Raytheon**
 - **Architecture reviews**
 - **Internal architect certifications**





Raytheon Enterprise Architecture Process (REAP)

- Unification of Industry & Government Standards
- Systems & Enterprise Architecture-Focused
- 42 Subprocesses Within 5 Major Activities
- Established Corporately in November 2002



DODAF

FEAF

Zachman

TOGAF

ATAM®

Architecture Training

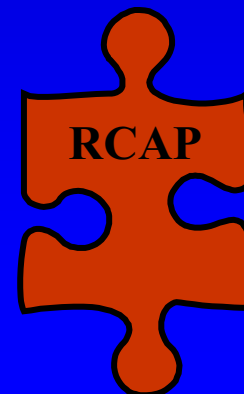
- Different 'Levels' Required
 - Junior Awareness
 - Mid-Level Introductory
 - Senior In-Depth
- Corporate Training Programs
- Blend of Internal & External Courses
- REAP-Aligned





Raytheon Certified Architect Program (RCAP)

- **Internal Certification for Senior Architects Across Raytheon World-wide**
- **Core Requirements**
 - Training
 - External Certifications
 - Practitioner Experience / Demonstration of Application
 - Leadership
 - Certification Board Review
- **Status**
 - Five Waves Underway
 - Pursuing Independent Accreditation of Our Program



Architect Certifications

- Raytheon Certified Architect Program (RCAP)

- Software Engineering Institute
 - Software Architect, ATAM®



- Federal Enterprise Architecture Certification (FEAC) Institute
 - DoDAF, Federal



- The Open Group Architecture Framework
 - TOGAF-8



- Zachman International
 - (upcoming) Enterprise Architect



- Sun Microsystems
 - J2EE Enterprise Architect



Architecture Tools

- Vendor Products are Evolving
- Growing Support of Frameworks
- Consolidation Is Occurring
- Detailed Trade Study in 2005
 - Dozens of ranked criteria
 - In-depth analysis
 - Vendor dialogues
 - Common modeling

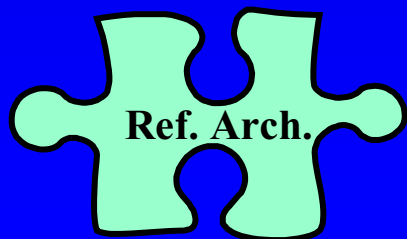


Reference Architectures

Reference Architecture

A high-level system design free of implementation details; an architecture template

- Corporate
- Business Area-specific



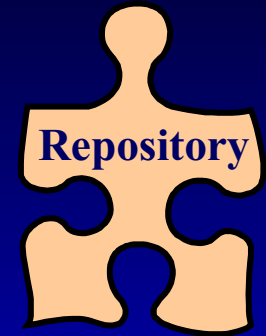
Architecture Technical Interest Groups

- **Raytheon-wide Communities of Interest**
 - Systems & Enterprise Architecture
 - Software Architecture
 - Net-Centric Architecture
- **Sponsorship**
 - Systems Engineering Technology Network
 - Software Engineering Technology Network
- **Hundreds of members across Raytheon**
- **Activities include workshops, projects, architecture-centric webinars, and general collaboration**



Architecture Repository

- Securely Store/Retrieve Architectural Artifacts
- Common Location for Architecture Styles & Patterns, Reference Architectures, Tool Templates, etc.
- Baseline taxonomy defined by corporate Architecture Review Board



Industry/Consortia Collaborations

- Software Engineering Institute
- The Open Group Architecture Forum
- Object Management Group (OMG)
- International Council on Systems Engineering (INCOSE)
- Zachman International
- Systems Architecture Forum



www.sei.cmu.edu



www.opengroup.org



www.omg.org



www.incose.org



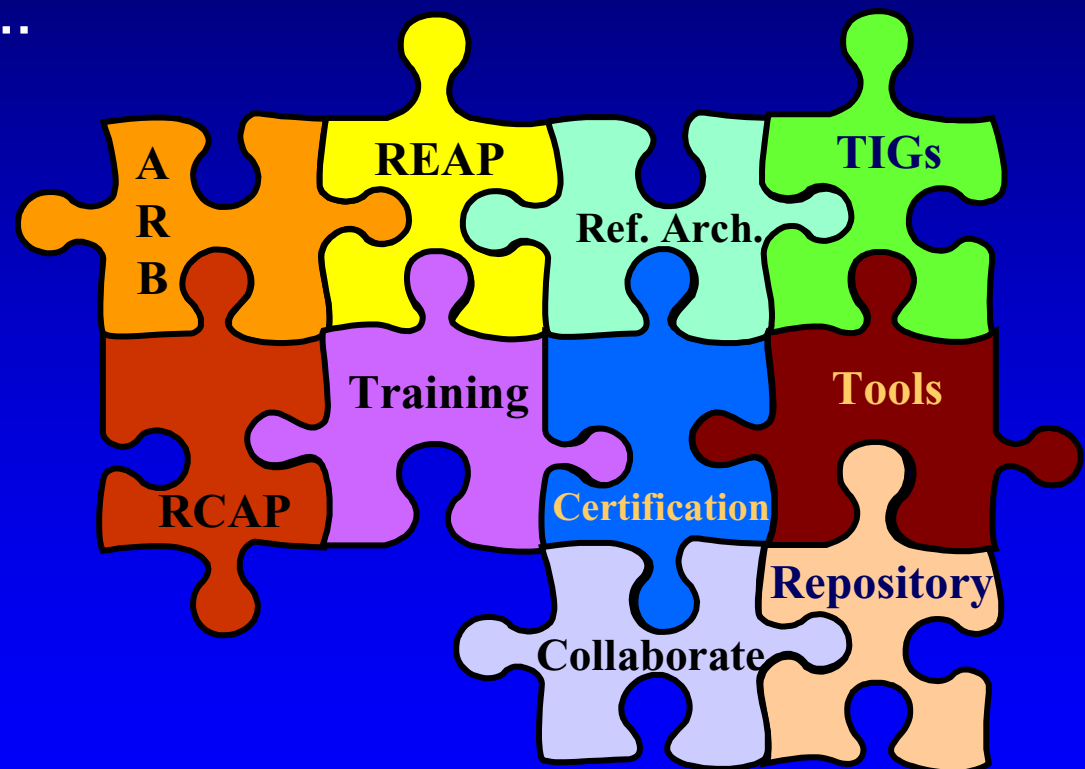
www.zifa.com



www.architectingforum.org

Summary

- **Architecture:** The Way Forward for Complex System Development
- Institutionalization Takes...
 - Money
 - Talent
 - Time
- It Takes Many Pieces To Complete The Puzzle



Questions?

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Acronyms

ARB	Architecture Review Board
ATAM[®]	Architecture Tradeoff Analysis Method[®] [SEI]
DoDAF	Department of Defense Architecture Framework [US]
FEAC	Federal Enterprise Architecture Certification [US]
FEAF	Federal Enterprise Architecture Framework [US]
IEEE	Institute of Electrical and Electronics Engineers
INCOSE	International Council on Systems Engineering
J2EE	Java 2 Platform, Enterprise Edition
OMG	Object Management Group
RCAP	Raytheon Certified Architect Program
REAP	Raytheon Enterprise Architecture Process
SEI	Software Engineering Institute [Carnegie-Mellon University]
TOGAF	The Open Group Architecture Framework
TIG	Technical Interest Group
US	United States

Biography

Rolf Siegers is an Engineering Fellow and Chief Architect of the Garland Engineering Center in Raytheon's Intelligence and Information Systems. He joined Raytheon in 1984 and leads the corporate Raytheon Enterprise Architecture Process (REAP) Initiative, Raytheon's standardized, company-wide architecting process. Rolf sits on Raytheon's corporate Architecture Review Board (ARB), leading and supporting a variety of architecture-related initiatives.



Rolf's program experience includes leading several multi-discipline software architecture teams for large-scale, software-intensive national and international systems since 1997. He is a certified TOGAF-8 architect (The Open Group), ATAM® Evaluator (SEI), and Software Architecture Professional (SEI). He has previously presented at conferences by the US Department of Defense, Integrated Defense Architectures, The Open Group, and INCOSE.

Rolf holds bachelor degrees in Computer Science and Mathematics from Huntingdon College and is a member of IEEE and INCOSE. He resides in Dallas, Texas with his wife Anita and children Hannah, Emily, and Dylan.