

MISSION:

A WORLD OF INNOVATION

Software Architecture Community of Practice at Raytheon

Sunitha Vallabhaneni
Douglas Dusseau
Keith Nolan



Agenda

- Background
- SwAP Program Structure
- Desired Capabilities of Graduates
- Collaboration Enablers
- Community of Practice Objectives
- Community of Practice Organization
- Lessons Learned
- Summary



Background

- RCAP (January 2004) – Raytheon established a company-wide **Raytheon Certified Architect Program (RCAP)** for senior system and enterprise architects
 - Spans all Raytheon Businesses; participants from U.S., U.K, and Australia
 - Participants are Raytheon employees only
 - Accredited by Open Group
 - Certification requires fulfillment of several dozen criteria in the areas of :
 - Professional Development, Core Skills, Practitioner Experience, Contributions to the Architecture Discipline



ET&MA
RAYTHEON CERTIFIED
ARCHITECT PROGRAM



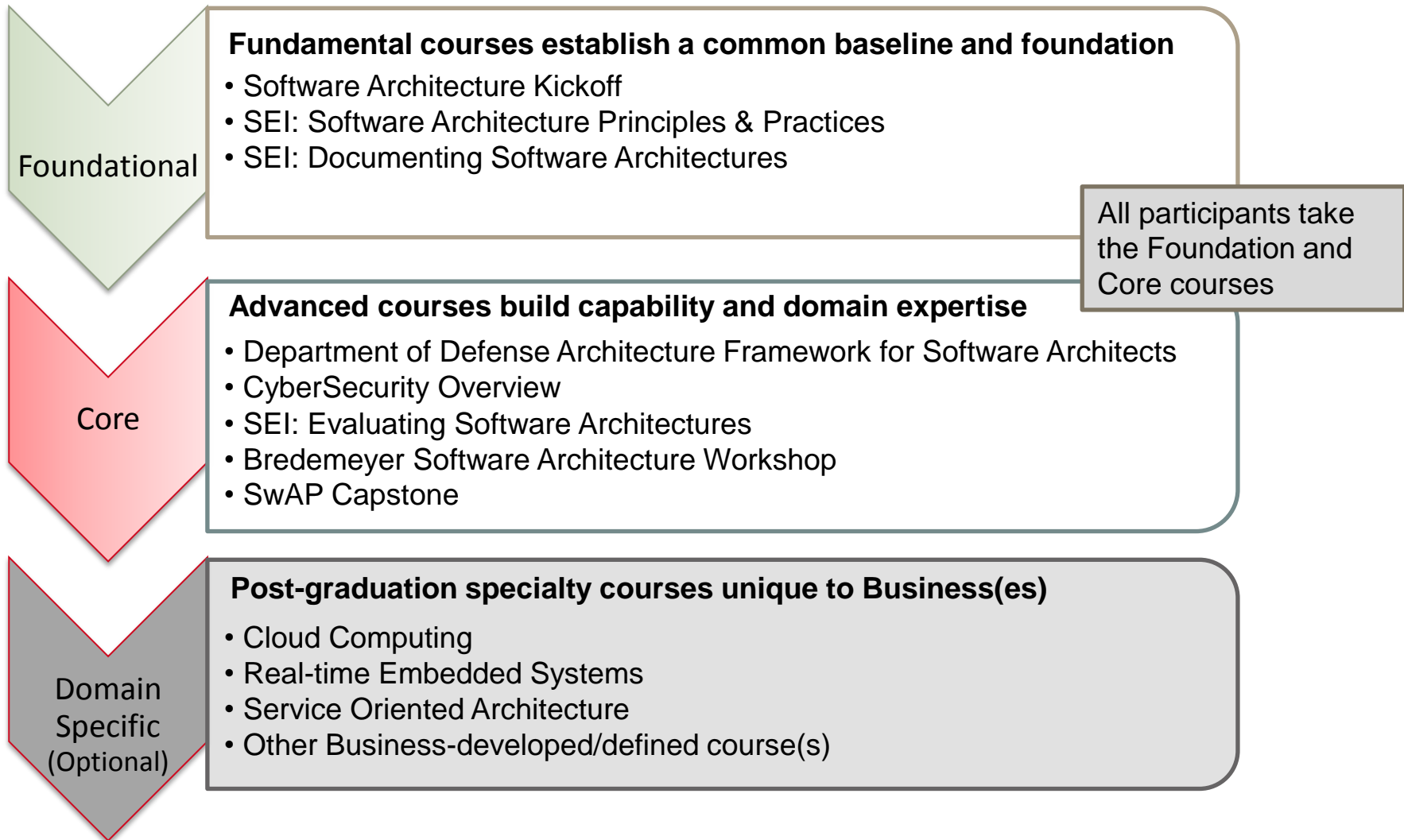
**Accredited
Program**

Background

SwAP (October 2011) – Raytheon supplemented RCAP with a new ‘training branch’ focused on software architecture, the [Software Architecture development Program \(SwAP\)](#)

- Focus is on training Software Architects
- Typical student has 5 to 15 years of experience – not as senior as the typical student in the RCAP
- No certification option at this time
- 3 Courses are common between the SwAP and RCAP
- Goals of the Program:
 - Improve program quality and schedule through standardization of software architecture practices
 - Enhance collaboration and reuse opportunities by establishing a company-wide community of Raytheon Software Architects
 - Develop and enhance the skills & capabilities needed for software architects

SwAP Program Structure



Capabilities of SwAP Graduates

Leadership of Software Architecture Activities

- Ensure a standardized, repeatable approach to architecting is employed, based on industry and Raytheon best practices
- Ensure appropriate design decisions are made based on the priorities of the system's key non-functional requirements / quality attributes
- Ensure the architecture's compliance with government & Customer architecture policies, guidelines and standards
- Ensure architecture is documented and communicated in accordance with government & industry standards
- Ability to evaluate architectural alternatives, identify gaps and risks, and ensure the architecture solution fulfills the Customer's required capabilities

Leadership of Software Architecture Teams

- Understanding of various decision-making / governance models and how to select one appropriate for the program software architecture team's skill set and context

Understanding of Strategically Important Architecture Trends and Technologies

- Information/cyber security, Service-Oriented Architecture (SOA), cloud computing, domain-specific technologies

Understanding of Established Software Architecture Patterns, Strategies, and Tactics

- As relates to many attributes such as Interoperability, Usability, Affordability, Modifiability, Availability, Performance, etc..

Understanding of Raytheon's Architecture Enablers & Assets

- Ensure benefits are realized from existing architecture enablers as appropriate (product line architectures, reference architectures, architecture review checklists, etc...)

Improved Collaboration Ability

- Establish a 'common language' and foundation for Raytheon's software architecture community of practitioners, facilitating their sharing of best practices, tailored approaches and reuse assets

Collaboration Enablers

- Architecture Training
- Raytheon-wide Technology Interest Groups (TIGs)
- Internal Workshops and Symposia
- Raytheon Architecture Collaboration Tool (ACT)
- Raytheon Architecture Website
- Lotus Notes Mailgroups
- **RSpace Communities of Practice (CoPs)**



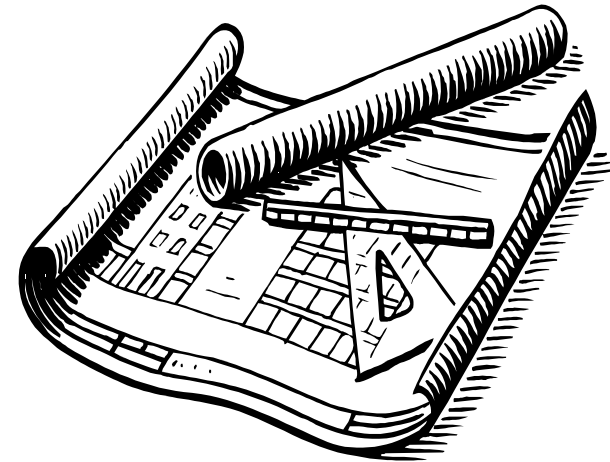
Community of Practice Objectives

- Improve communication
 - Forum for sharing ideas between software architects
 - Exposure to software architecture practices for aspiring software architects
 - Networking
- Improve general knowledge at Raytheon of SW Architecture principles and best practices
- Help bridge gap between business and SW teams (increase business value of SW)
 - Identify quality attributes / non-functional requirements and explicitly architect for them
- Help programs be more successful by leveraging a pool of experienced software architects (e.g. via architecture analysis / risk assessment, ATAM)
- Help coordinate architecturally relevant concerns across functional organizations



Community of Practice Organization

- **Kick Off**
 - Architects and aspiring architects from the business are invited
 - Each Business unit has its own CoP.
- **Chair/Co-chairs**
 - Communication, scheduling, and coordination with presenters
- **Monthly meetings**
 - Pre-selected topics / presenters
 - Open forum discussions
 - Typically 10 to 20 attendees
- **Communication tools**
 - Lotus Notes group mailing list - “SW Arch CoP”
 - Cross functional members
 - Sametime or Webex used for remote attendance
 - [eRoom](#) used for file sharing
- **Presentation Topics (Past)**
 - Project Specific Architecture from the Project Architect
 - Design Patterns
 - Leadership and soft skills for Architects
 - Product line Architecture



Lessons Learned

- Most effective type of CoPs are those which form organically and are self-organized as opposed to management directed
- Community should help select topics, but the co-chairs need to filter these to ensure sufficient interest
 - Hot topics definitely increase attendance
- Having co-chairs is essential to keeping the CoP active each month
- Need to coordinate with presenters months in advance to accommodate their busy schedules
- Scheduling during lunch time helps avoid conflicts with other meetings/rooms
 - Bringing in food helps with attendance too
- Sametime plus a call-in number is effective for remote attendance



Summary

- SwAP focuses on improving program quality and schedule through standardization of software architecture practices
 - Develops and enhances the skills & capabilities needed for software architects
 - Creates a collaborative ‘architect community’ – supplements existing RCAP program
- CoPs provides an effective collaboration environment providing access to the latest news, brown bags, roadmaps, architecture process, tools and reference material needed to educate aspiring architects.
- A CoP provides an opportunity for architects to interact with their peers and exchange ideas in a informal way.



Questions?

Biography



- Sunitha Vallabhaneni
Principal Software Engineer with Raytheon Intelligence, Information and Services. She has MS in Systems Engineering and MS in Computer Science. She has 17 years of experience in banking, insurance and defense industries. She has worked on a variety of projects associated with the implementation of Product Line Architecture at Raytheon. Completed the Raytheon Software Architecture Development Program (SwAP). She also leads the SW Architecture Community of Practice at IIS.

Biography



- Doug Dusseau

Joined Raytheon in 1996 and is currently a Senior Solutions Architect responsible for leading multi-disciplinary architecture teams for large-scale, software-intensive systems. Doug is a Raytheon Certified Architect, and a member of the Raytheon's Corporate Architecture Review Board for which he previously served a term as Chairman. He is certified by the Open Group as a Master Architect and by the SEI as an ATAM® Evaluator. Doug is one of the founders and program coordinators for the Raytheon Software Architect Development Program (SWAP). Doug is an instructor for four of the training courses in the SWAP program and has taught several additional architecture and systems engineering classes internally at Raytheon. He has a bachelor's degree in engineering from Purdue University and an MBA from Indiana University.

Biography



- Keith Nolan
Senior Principle Software Engineering with Raytheon Missile Systems. He started his career at Motorola's Space and Systems Technology Group developing software defined radios for the Navy. In 2007 he joined the Software Engineering Center at RMS and has supported the NLOS-LS and JUWL programs and is currently supporting SM-6. Completed the Raytheon Software Architecture Development Program (SwAP). Received an BSCE from the University of Florida and an MSSE from Johns Hopkins University.