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## 2013 Course Offerings

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SEI Professional  
Development Center

Research, Technology, and  
System Solutions





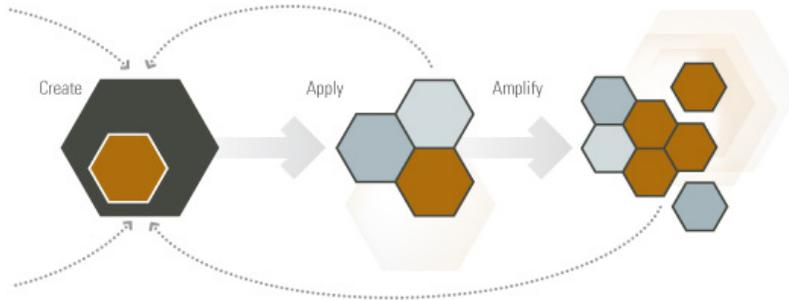
Whether you want to learn at your own pace via eLearning, or want to experience the superior training and networking opportunities of a classroom delivery, the SEI Professional Development Center will give you the tools you need to create and maintain software, systems, and organizations that are efficient, secure, and reliable.

## Solid Reputation

Since 1984, the Software Engineering Institute (SEI) has served the nation as a federally funded research and development center based at Carnegie Mellon University, a global research university recognized worldwide for its highly rated programs in computer science and engineering. As part of Carnegie Mellon, the SEI operates at the leading edge of technical innovation. The SEI staff has advanced software engineering principles and practices and has served as a national resource in software engineering, computer security, and process improvement.

## Unique Strategy

The SEI achieves its goals through technology innovation and transition. The SEI creates usable technologies by motivating research, applies them to real problems by partnering with government and industry, and amplifies their impact by accelerating broad adoption through direct engagement with the community and through partners.



## Profound Impact

The creation and eventual worldwide dissemination of the Capability Maturity Model Integration (CMMI) to improve software development practices and the creation of the CERT® Program to serve at the forefront of cyber security research and development are just two examples of the significant impact that the experts of the SEI had on the software industry.



## Vision, Mission, Facts, and Programs

### Vision:

Leading the world to a software-enriched society

### Mission:

The SEI advances software engineering and related disciplines to ensure the development and operation of systems with predictable and improved cost, schedule, and quality.

### Facts:

- Contract Renewed: June 2010
- No. of Employees: More than 600
- Headquarters: Pittsburgh, Pa.
- Satellite Offices:
  - Arlington, Va.
  - Los Angeles, Ca.
  - Frankfurt, Germany

### Technical Programs:

- **Research, Technology, and System Solutions**  
advancing architecture technology and practices for cost-effective development and evolution of flexible system capabilities at all scales
- **Software Engineering Process Management**  
helping organizations achieve and sustain competitive advantage via software process improvement
- **Acquisition Support Program**  
fostering improvements in the acquisition of software-intensive systems
- **The CERT Program**  
enabling organizations to resist, recognize, and recover from attacks on networked systems



**Software Engineering Institute**  
Carnegie Mellon



## Professional Development Opportunities

Since its creation, the SEI has defined and advocated methods for developing high-quality software and protecting networked systems. To effectively transition these methods, the SEI formed the Professional Development Center to establish training and certificate programs that enable individuals to benefit from the SEI's research in multiple disciplines. The same technical experts that conduct the research and apply these practices in the community are actively engaged in developing and delivering the SEI's educational products.

The Center is dedicated to providing continuing education for engineering and software professionals. Our mission is to provide individuals with excellent educational products to foster personal and professional growth and encourage adoption of industry best practices.

## Convenience & Flexibility

Each year, the SEI educates thousands of students from government, industry, and academia throughout the world. Through public course deliveries in several locations in both the United States and Europe, onsite course delivery at customer facilities, and an expanding offering of eLearning courses, the SEI provides students with the flexibility to choose the training format and plan a schedule that best meets their professional development needs.

## Lasting Benefits

By merging leading-edge research with real-world problems, the SEI Professional Development Center prepares students to be the next generation of leaders in both their organizations and the software engineering industry as a whole. You can rely on the SEI to continue to advance software engineering and related disciplines to ensure the development and operation of systems with predictable and improved cost, schedule, and quality—leading the world to a software-enriched society.

## Robust Curriculum

Offering more than 75 courses, the SEI curriculum covers both technical and management topics, which attract attendees from a variety of backgrounds, including program management, software engineering, technology transition, and system and network administration. Our attendees also represent a variety of organizations from countries across the world. Whether you work at a large company or run your own business, SEI courses can help you build individual, team, and organizational skills.

## Offerings



### Public Courses

These courses are delivered at SEI classrooms in Pittsburgh, Arlington, and Frankfurt. Every effort has been made to assure comfort and encourage conversation—an investment that leads to lasting connections among SEI classroom participants. SEI classroom courses contain a vibrant mix of participants that represent diverse professions, industries, and geographic regions. Located conveniently near hotels, museums, shops, and public transportation, courses in an SEI classroom allow participants to build connections and friendships that are invaluable to their careers.



### Onsite Courses

All SEI courses can be brought to your site for a qualified group of students. You save significantly on travel and productivity costs because courses can be scheduled when it is convenient for you. We send all of the course materials and supplies necessary for the class, and our experienced instructors quickly establish an effective classroom conducive to learning at your site. Our instructors also welcome input from the training coordinators and students to emphasize particular course topics that are important to your organization.



### Live, Virtual Courses

Coming in the fall of 2012, the SEI will offer a series of live, virtual courses for customers worldwide. Via the CERT Distributed Learning Center (CDLC), students will have real-time access to SEI instructors and course material from their own computers. This virtual classroom provides a convenient, flexible option for students to benefit from SEI training.



### Learner-Driven eLearning

The SEI offers multimedia products and courses that can be experienced anytime, on demand. SEI eLearning provides expert instruction as well as exercises, assessments, and other resources, creating a rich educational experience.



### Certificates

An SEI professional certificate provides acknowledgment of an individual's professional accomplishment in a particular technical area. Each certificate requires the candidate to work through a carefully designed curriculum. Join the many software and engineering professionals who have benefited not only from the skills they acquire, but also from the recognition of their continuing education and professional development.

# Research, Technology, and System Solutions

The SEI RTSS Program innovates software development for competitive advantage: with a focus on system structure and behavior, it creates and harnesses innovations for assured development, adaptation, and rapid deployment of software-reliant systems at all scales.

Specifically, the RTSS Program works to

- advance architecture technology and practices
- advance software product line practice
- develop principles and technology to understand, control, and bound the behavior of cyber-physical and social systems
- develop strategies for robust mobile computing in tactical environments

## ★ Accomplishments

- Nearly two decades of leadership in software architecture
- People from more than 900 organizations trained in SEI software architecture courses
- SEI software-architecture-related certificates conferred to more than 1,800 people
- More than 187,000 copies of our books on software architecture sold
- More than 2,400 citations, in professional journal articles and conference papers by researchers, of the books used in SEI architecture curriculum since 2005
- SEI Architecture Technology User Network (SATURN) Conference initiated in 2005 to bring together experts from around the world to exchange ideas and insights about developing, acquiring, and maintaining software and systems architecture
- Software Product Line Conference (SPLC), a premier forum for practitioners, researchers, and educators, founded and cosponsored
- Framework for Software Product Line Practice, internationally recognized reference model for software product lines, developed
- Architecture Tradeoff Analysis Method (ATAM), Views and Beyond documentation approach, and other widely applied tools and methods for architecture-centric engineering developed
- *Software Architecture in Practice*, the first text for software architecture practitioners, now in a third edition

## Areas of Established Expertise

The SEI RTSS Program provides solutions to system developers and acquirers through its long-established expertise in the following areas:

### Architecture

For many organizations, the achievement of business and mission goals is frustrated by software system problems such as poor quality and slow time to market.

The SEI RTSS work in architecture-centric engineering exploits the relationship between a system's architecture and its quality attributes, and leverages architecture as the key means for ensuring that systems will support their business and mission goals.

### Product Line Practice

Through software product lines, companies can realize order-of-magnitude improvements in time to market, cost, productivity, quality, and other business drivers. The commercial impact of product lines is now seen in a variety of domains including office appliances, avionics, medical devices, automotive, and telecommunications.

The SEI RTSS Program works to make software product line development and acquisition a low-risk, high-return proposition.

### Ultra-Large-Scale Systems

Many of today's critical systems are ultra-large-scale (ULS) systems – interdependent webs of software-intensive systems, people, policies, cultures, and economics. These systems are inherently distributed, complex, adaptive, and continuously evolving. The SEI led the original study on ULS systems in 2006.

The SEI RTSS Program develops principles and technology to understand, control, and bound the behavior of ULS systems. In particular, the RTSS work in cyber-physical systems and socio-adaptive systems focuses on timing, correctness, and adaptive resource allocation. New work in advanced mobile systems explores architecture and technology that adapt new generations of mobile devices and sensors to support humans operating in demanding "edge" environments.

# RTSS Training

Based on our decades of experience in architectures for software-reliant systems and supported by four widely acclaimed books, our training in software architecture, service-oriented architecture (SOA), and software product lines

- equips software professionals with vendor-neutral, state-of-the-art practices
- increases knowledge
- enhances skills
- addresses organizational concerns

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## Software Architecture Professional Certificate

**Description:** provides both breadth and depth in software architecture concepts and practices

**Requirements:**

- Software Architecture: Principles and Practices course
- Software Architecture Design and Analysis course
- Documenting Software Architectures course
- Software Product Lines course
- Software Architecture: Principles and Practices exam

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## ATAM Evaluator Certificate

**Description:** prepares a qualified software professional to perform SEI-authorized ATAM architecture evaluations

**Requirements:**

- Software Architecture: Principles and Practices course
- ATAM Evaluator Training course
- Software Architecture: Principles and Practices exam

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## SOA Architect Professional Certificate

**Description:** provides the software architecture and SOA concepts and practices that a professional needs to design service-oriented systems successfully

**Requirements:**

- Software Architecture: Principles and Practices course
- Service-Oriented Architecture: Best Practices for Successful Adoption course
- Advanced Topics in Service-Oriented Architecture course
- Software Architecture: Principles and Practices exam

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## Software Product Lines Professional Certificate

**Description:** provides the needed breadth and depth in software product line concepts and practices to apply software product line practices

**Requirements:**

- Software Product Lines course
- Adopting Software Product Lines course
- Developing Software Product Lines course

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## PLTP Team Member Certificate

**Description:** prepares a qualified software professional to perform SEI-authorized Product Line Technical Probes

**Requirements:**

- Software Product Lines course
- Adopting Software Product Lines course
- Developing Software Product Lines course
- PLTP Team Training course

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## PLTP Leader Certificate

**Description:** provides a qualified software professional with the technical depth and social techniques needed to lead SEI-authorized Product Line Technical Probes

**Requirements:**

- Software Product Lines course
- Adopting Software Product Lines course
- Developing Software Product Lines course
- PLTP Team Training course
- PLTP Leader Training course
- PLTP Observation

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## Other Courses

- Advanced Software Architecture Workshop
- ATAM Leader Training
- Modeling System Architectures Using the Architecture Analysis and Design Language (AADL)

# Software Architecture: Principles and Practices

You will learn the essential concepts and practices involved in using software architecture effectively.

## Who Should Attend

This is an introductory course in software architecture. The course is designed for professionals who currently or who seek to design, develop, or manage the construction of software-reliant systems.

## Course Overview

You will gain insight into ways to use software architecture successfully in your software-reliant system development. Case studies illuminate the key technical and business issues regarding software architectures. In particular, the course covers

- what software architecture is and the value it provides
- the importance of quality attributes
- how to use, evaluate, and document software architectures
- the role of a software architect in an organization

This course is based on the book *Software Architecture in Practice, 3rd Edition*.

## Learning Outcomes

As a result of completing this course, you will be able to

- define software architecture
- explain how the architecture influence cycle affects software architects and software architecture
- understand how to achieve system qualities such as security, performance, and reliability
- explain how to use quality specifications to drive system design
- appreciate the importance of documenting software architecture
- explain methods for evaluating software architecture
- understand ways to make architecture reuse via product lines work for you

## Prerequisites

Before registering for this course, you should have experience in the development of software-reliant systems and some familiarity with modern software engineering concepts.

**REGISTER NOW**

Public: [www.sei.cmu.edu/goto/sappe](http://www.sei.cmu.edu/goto/sappe)  
eLearning: [www.sei.cmu.edu/goto/sappe](http://www.sei.cmu.edu/goto/sappe)

### COURSE OUTLINE

- Enterprise, System, and Software Architectures
- Typical Software Architecture
- Architectural Patterns, Reference Models, and Reference Architectures
- Architectural Structures
- The Architecture Influence Cycle
- Understanding Quality Attributes
- Achieving Quality Attributes
  - Patterns and tactics for software architecture
  - Attribute-driven design
- Documenting Software Architectures
  - View-based documentation
  - Standard organization for documentation
- Architecture Evaluation
  - Why, when, benefits, and costs of architecture evaluation
  - Architecture evaluation techniques
- Software Product Lines
  - Software product line commonalities and variations
  - Barriers and costs to adopting software product lines
- Celsius Tech Case Study

### MEET TWO OF OUR COURSE INSTRUCTORS



**Rob Wojcik** has more than 20 years of experience in developing software systems that utilize traditional as well as artificial intelligence and object-oriented technologies.



**Rick Kazman** is on the faculty of the University of Hawaii. His primary research interests are in software architecture, software engineering economics, design and analysis tools, and software visualization. He is the author of more than 100 technical papers and coauthor of several books, including *Software Architecture in Practice* and *Evaluating Software Architectures: Methods and Case Studies*.

### CERTIFICATES

Completion of the Software Architecture: Principles and Practices course fulfills a training requirement for three SEI certificate programs: Software Architecture Professional, SOA Architect Professional, and ATAM Evaluator.

### COURSE FEES [USD]

Public	
U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250
eLearning	
All	\$500

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE SOFTWARE ARCHITECTURE: PRINCIPLES AND PRACTICES COURSE

“It always helps to have an instructor who also wrote the book! Strengths of course: Use of group exercises, knowledge of the instructor, case studies... small class size helped!”

—Jim Sturdivant, U.S. Army

# Software Architecture Design and Analysis

You will learn the concepts needed to effectively design and analyze a software architecture.

## Who Should Attend

This is an intermediate course in software architecture. The course is designed for practicing software architects as well as designers and developers of software-reliant systems.

## Course Overview

This two-day course provides in-depth coverage of the concepts needed to effectively design and analyze a software architecture. The essential considerations for defining any architecture are carefully examined and then illustrated through application of the SEI Attribute-Driven Design (ADD) software architecture design method.

This course also explores architecture analysis in depth and introduces the SEI Quality Attribute Workshop (QAW) and the SEI Architecture Tradeoff Analysis Method (ATAM). Through multiple exercises, participants study an application of these methods and get a chance to apply them to sample problems. In particular, the course covers

- the lifecycle view of architecture design and analysis methods
- the QAW, a method for eliciting critical quality attributes such as availability, performance, security, interoperability, and modifiability
- the ADD method, a method for designing a software architecture
- the ATAM, a method for evaluating a software architecture based on a set of attribute-specific measures of the system

This course is based on the books *Software Architecture in Practice* and *Evaluating Software Architectures: Methods and Case Studies*.

## Learning Outcomes

After attending this course, you will be able to

- understand the essential considerations in any architectural design process
- explain the value of the QAW for eliciting critical quality attributes
- apply the ADD method for designing an architecture
- understand the role of architecture evaluation
- explain the value of the ATAM for evaluating architecture
- use the methods within a software development lifecycle

## Prerequisites

Before registering for this course, you must complete the Software Architecture: Principles and Practices course.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/sada](http://www.sei.cmu.edu/goto/sada)

### COURSE OUTLINE

- **Software Architecture Analysis**
  - Examination of the Quality Attribute Workshop (QAW)  
*QAWs provide a method for identifying a system's architecture-critical quality attributes—such as availability, performance, security, interoperability, and modifiability—that are derived from mission or business goals.*
- **Software Architecture Design**
  - Examination of the Attribute-Driven Design (ADD) Method  
*The ADD method is a systematic, step-by-step approach for designing the software architecture of a software-reliant system.*
  - Examination of the Architecture Tradeoff Analysis Method (ATAM)  
*The ATAM is a method for evaluating software architectures relative to quality attribute goals.*
- **Lifecycle View of Architecture**

### MEET TWO OF OUR COURSE INSTRUCTORS



**Rod Nord** is a senior member of the technical staff at the SEI, where he works to develop and communicate effective methods and practices for software architecture. He is the author of several technical papers and articles and is a coauthor of *Applied Software Architecture* and *Documenting Software Architectures: Views and Beyond*.



A senior member of the SEI technical staff, **Ipek Ozkaya** is the technical lead of its value-driven incremental development work. She also is a co-organizer of the Third International Workshop on Managing Technical Debt, co-creator of the Hard Choices board game, frequent presenter at academic and industry conferences, and author of several articles.

### CERTIFICATES

Completion of the Software Architecture Design and Analysis course fulfills a training requirement for the SEI Software Architecture Professional Certificate.

### COURSE FEES [USD]

Public	
U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE SOFTWARE ARCHITECTURE DESIGN AND ANALYSIS COURSE

“Provided new insight into the parts of the system I develop.”

—Software Engineer, Private Industry

“Thanks for teaching this course with passion and genuine interest.”

—Software Architect

# Documenting Software Architectures

You will learn how to document architecture to communicate effectively with all project stakeholders.

## Who Should Attend

This is an intermediate course in software architecture. The course is designed for

- software architects and software lead designers whose jobs include producing architectural documentation
- software technical managers whose jobs include overseeing and/or managing the architecture definition process
- software engineers who may be expected to use architecture documentation

## Course Overview

This two-day course provides in-depth coverage of effective software architecture documentation practices. It presents the information in the context of prevailing prescriptive models, including the Rational Unified Process (RUP), the Siemens Four Views software approach, the IEEE 1471-2000 standard, and the Unified Modeling Language (UML). In particular, the course covers

- principles of sound documentation
- view types, styles, and views
- advanced concepts such as refinement, context diagrams, variability, and interfaces documentation
- documenting the behavior of software elements and systems
- choosing relevant views
- building a documentation package using a seven-part template

This course is based on the book *Documenting Software Architectures: Views and Beyond*.

## Learning Outcomes

After attending this course, you will be able to

- explain the basic principles of sound technical documentation
- implement a stakeholder-based approach to documenting software architectures
- understand the views available for documenting architectures
- choose the set of views that will be most valuable to the architecture's stakeholders
- gather the information needed to document a view and information that applies across views
- use formal and informal notations (including UML) to represent elements and relations in a view
- document a software interface and software behavior

## Prerequisites

Before registering for this course, you must

- have experience in designing and developing software-intensive systems
- understand the basic concepts of software architecture. You can gain this understanding by completing the Software Architecture: Principles and Practices course.

**REGISTER NOW**

Public: [www.sei.cmu.edu/goto/dsa](http://www.sei.cmu.edu/goto/dsa)

eLearning: [www.sei.cmu.edu/goto/dsae](http://www.sei.cmu.edu/goto/dsae)

### COURSE OUTLINE

- Why Document a Software Architecture?
- Principles of Sound Documentation
- Views and Styles
  - The Style Zoo: Module styles
  - The Style Zoo: C&C styles
  - The Style Zoo: Allocation styles
  - Exercise 1
- Documenting Software Interfaces
  - Exercise 2
- Documenting Behavior
  - Exercise 3
- Beyond the Basics
  - Exercise 4
- Choosing the Views
- Building the Architecture Documentation Package
- Reviewing Architecture Documentation
  - Exercise 5
- Views and Beyond with Other Approaches
- Conclusions and Q&A

### MEET TWO OF OUR COURSE INSTRUCTORS



**John Klein** has more than 20 years of experience developing systems and software, including multimodal agents, architectures for communication analytics, and the creation and enhancement of the Customer Interaction Software Product Line architecture.



**Paulo Merson** has more than 20 years of software development experience and is an independent contractor who contributes to work in software architecture, architecture documentation and UML, architecture reconstruction, and SOA. He also works in industry as a software architect. He coauthored and has taught the Documenting Software Architectures course since 2004. He is coauthor of *Documenting Software Architectures: Views and Beyond, 2nd Edition*, the textbook for the course.

### CERTIFICATES

Completion of the Documenting Software Architectures course fulfills a training requirement for the SEI Software Architecture Professional Certificate.

### COURSE FEES [USD]

#### Public

U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250

#### eLearning

All	\$500
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The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE DOCUMENTING SOFTWARE ARCHITECTURES COURSE

“I’m going to begin training my team on architecture and the importance of good documentation.”

—James Lawrence, Software Architect, Raytheon

# Software Product Lines

You will learn the basic concepts and practices involved in software product lines.

## Who Should Attend

This is an introductory course in software product lines. The course is designed for software engineers and technical managers who are interested in effective reuse strategies or who are adopting or using a software product line approach.

## Course Overview

This course introduces the basic concepts of software product lines and provides an overview of the essential technical and management practices needed to succeed with software product lines. In particular, the course covers

- fundamental concepts of software product lines
- the costs and benefits of using a product line approach
- essential product line activities
- software product line practice areas
- software product line practice patterns
- the SEI Product Line Technical Probe (PLTP)
- case studies of organizations that have achieved success with software product lines
- a phased approach for adopting software product lines

This course is based on the book *Software Product Lines: Practices and Patterns*.

## Learning Outcomes

After attending this course, you will be able to

- explain the essential activities involved in fielding software product lines
- understand the costs and benefits of adopting a product line approach
- apply the software engineering, technical management, and organizational management practices necessary for achieving successful software product lines
- understand patterns that aid in product line adoption
- apply a product line diagnostic method and an adoption roadmap
- understand how a product line approach can be combined with other technology and business trends
- select the patterns that best apply to your organization
- form a path to software product line adoption

## Prerequisites

Before registering for this course, you must have

- experience in designing and developing software-reliant systems
- some familiarity with modern software engineering concepts and management practices
- understanding of basic software architecture concepts. You can gain this understanding by completing the Software Architecture: Principles and Practices course.

**REGISTER NOW**

Public: [www.sei.cmu.edu/goto/spl](http://www.sei.cmu.edu/goto/spl)

eLearning: [www.sei.cmu.edu/goto/sple](http://www.sei.cmu.edu/goto/sple)

### COURSE OUTLINE

- **Software Product Line Fundamentals**
  - Basic ideas and terms
  - Benefits of software product lines
  - The three essential activities
- **Software Product Line Practice Areas**
- **Software Engineering Practice Areas**
  - Understanding relevant domains
  - Requirements engineering
  - Architecture definition
  - Component development
- **Technical Management Practice Areas**
  - Scoping
  - Configuration management
  - Data collection, metrics, and tracking
- **Organizational Management Practice Areas**
  - Launching and institutionalizing
  - Structuring the organization
  - Developing a business case
  - Funding

### MEET ONE OF OUR COURSE INSTRUCTORS



**Pat Donohoe** is a senior member of the technical staff at the SEI. In addition to serving as a course instructor, Pat develops workshops on software product line practice and researches production strategy for software product lines.

### CERTIFICATES

Completion of the Software Product Lines course fulfills a training requirement for four SEI certificate programs: Software Architecture Professional, Software Product Line Professional, Product Line Technical Probe (PLTP) Team Member, and PLTP Leader.

### COURSE FEES [USD]

Public	
U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250
eLearning	
All	\$500

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE SOFTWARE PRODUCT LINES COURSE

“I learned that it is important to have a product line champion in the organization.”  
—Software Architect

“A good introduction to software product lines.”  
—Software Architect



The SEI offers certificates and certifications. We award certificates to individuals who complete a particular set of training courses. Certifications typically have rigorous training, testing, and maintenance requirements.

# Adopting Software Product Lines

You will learn what is involved in product line adoption and how to plan for it.

## Who Should Attend

This course is valuable for

- software engineers or technical managers who are interested in moving to a software product line approach
- anyone who is responsible for creating and/or managing the adoption of a software product line

## Course Overview

In the two-day Adopting Software Product Lines course, you will learn about a practical, phased, pattern-based approach to planning and orchestrating software product line adoption. In particular, this course covers

- product line adoption fundamentals
- adoption models
- adoption planning
- exploiting other ongoing improvement activities, such as Six Sigma and CMMI

## Learning Outcomes

As a result of completing this course, you will

- gain a practical introduction to software product line adoption
- understand a phased approach for handling software product line adoption as a technology change
- understand a pattern-based product line adoption roadmap
- be able to provide the guidelines and artifacts for planning product line adoption
- see the relationship between software product line adoption and other ongoing activities

## Prerequisites

Before registering for this course, you must

- have experience in designing and developing software-reliant systems
- be familiar with modern software engineering concepts
- complete the Software Product Lines course

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/aspl](http://www.sei.cmu.edu/goto/aspl)

### COURSE OUTLINE

- **Adoption Fundamentals**
  - Software product line adoption: what and why?
  - Technology change models and mechanisms
- **Adoption Models**
  - Ideal model
  - Adoption factory pattern
  - Using the adoption factory pattern
- **Adoption Planning**
  - Planning principles and plans
  - Planning process
- **Exploiting Other Current Activities**
  - CMMI and process improvement
  - Architecture-centric development and hardware engineering

### MEET ONE OF OUR COURSE INSTRUCTORS



**Larry Jones** is the lead of the Product Line Practice Initiative in the Research, Technology, and System Solutions Program. Before joining the SEI, Larry served in the U.S. Air Force in a variety of software development, management, and education positions. He served as principal scientist at the SHAPE Technical Centre in The Hague, Netherlands. He is the former chair of the Computer Science Department at the U.S. Air Force Academy. He has remained active in the education community through accreditation activities in the Accreditation Board for Engineering and Technology (ABET) and the Computing Sciences Accreditation Board (CSAB).

### CERTIFICATES

The Adopting Software Product Lines course fulfills a training requirement for the SEI Software Product Line Professional, PLTP Team Member, and PLTP Leader Certificates.

### COURSE FEES [USD]

#### Public

U.S. Industry	\$1400
U.S. Gov./Academic	\$1100
International	\$2100

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE ADOPTING SOFTWARE PRODUCT LINES COURSE

“Really tried to cater the course to the expectations of the participants.”  
—Systems Engineer

## DEVELOP THE TALENT ON YOUR TEAM

Bring SEI training to your location

- Training scheduled around your current projects, exactly when you need it
- Expert, SEI-Certified instructors with years of real-world experience
- Reduced per-student costs

Find out more by writing to the SEI at [course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu) or calling us at +1 412-268-7622

# Developing Software Product Lines

You will carry out essential management and engineering activities necessary for successful product line practice.

## Who Should Attend

This course is valuable for

- software engineers who are interested in applying software product line engineering in their organizations
- managers in organizations that are considering the use of software product line engineering

## Course Overview

In the two-day Developing Software Product Lines course, you will prepare to use essential engineering and management practices, through team-based exercises that use a comprehensive software product line example that includes a complete set of assets and artifacts. In particular, this course covers

- practice areas essential for software product lines
- expansion of concepts introduced in the Software Product Lines course
- essential management and engineering activities

## Learning Outcomes

As a result of completing this course, you will

- gain in-depth knowledge of software product line concepts
- demonstrate knowledge of the necessary management practices needed for successful use of software product lines
- demonstrate knowledge of essential engineering practices needed for successful use of software product lines
- understand the practices involved in an application of software product lines, from participating in team exercises using a comprehensive software product line example

## Prerequisites

Before registering for this course, you must

- have experience in designing, developing, and/or managing software-intensive systems
- be familiar with modern software engineering concepts
- complete the Software Product Lines course
- understand basic software architecture concepts. You can gain this understanding by completing the Software Architecture: Principles and Practices course.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/dspl](http://www.sei.cmu.edu/goto/dspl)

### COURSE OUTLINE

- Software Product Line Concepts
- Software Product Line Fundamentals
- Software Product Line Practice Areas
- Structured, Team-Based Exercises for
  - Software engineering practice areas
  - Technical management practice areas
  - Organizational management practice areas

### MEET ONE OF OUR COURSE INSTRUCTORS



**John D. McGregor** is an associate professor of computer science at Clemson University and a senior partner in Korson-McGregor. His research interests include strategic software engineering, software product lines, and component-based software engineering. With the SEI, he has assisted organizations with software product lines in domains such as automotive, medical, financial, and aeronautical.

### CERTIFICATES

Completion of the Developing Software Product Lines course fulfills a training requirement for the SEI Software Product Line Professional, PLTP Team Member, and PLTP Leader Certificates.

### COURSE FEES [USD]

Public

U.S. Industry	\$1400
U.S. Gov./Academic	\$1100
International	\$2100

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE DEVELOPING SOFTWARE PRODUCT LINES COURSE

“I’ll look at building a business case for the software product line approach and at the tools discussed in the course.”

—Software Architect, DoD Contractor

“The instructor provided very good examples... and challenged thinking in particular areas.”

—Course Attendee



## SATURN

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- Join the SATURN group on LinkedIn at <http://bit.ly/aZNdct>.
- Check out the ongoing discussion in the SATURN Network blog at <http://saturnnetwork.wordpress.com/>.
- Look into the annual SATURN Conference at [www.sei.cmu.edu/saturn/](http://www.sei.cmu.edu/saturn/).
- Use SATURN technologies. Visit [www.sei.cmu.edu/architecture/](http://www.sei.cmu.edu/architecture/) for more.

# PLTP Team Training

You will learn the skills needed to contribute as a team member in an SEI-authorized Product Line Technical Probe (PLTP).

## Who Should Attend

This course is valuable for

- software engineers and technical managers who will be involved in software product line adoption
- anyone who wants to use the PLTP to gauge the strengths and challenges of an organization relative to software product lines

## Course Overview

In the two-day PLTP Team Training course, you will learn the PLTP process and practice the skills necessary to be a contributing member of a PLTP. In particular, the course covers

- the SEI Framework for Software Product Line Practice
- approaches to analyzing organizational practices within the Framework
- the SEI PLTP process
- techniques to assess organizational readiness

## Learning Outcomes

As a result of completing this course, you will be able to

- contribute to an SEI-authorized PLTP as a team member
- discuss and describe the SEI Framework for Software Product Line Practice
- assess organizational readiness

## Prerequisites

Before registering for this course, you must have

- experience in designing and developing software-reliant systems
- experience or familiarity with software management practices
- experience with developing and/or managing software product lines
- an understanding of basic software architecture concepts. You can gain this understanding by completing the Software Architecture: Principles and Practices course.
- completed these SEI courses
  - Software Product Lines
  - Adopting Software Product Lines
  - Developing Software Product Lines

**REGISTER NOW** Onsite: [www.sei.cmu.edu/goto/plpteam](http://www.sei.cmu.edu/goto/plpteam)

### COURSE OUTLINE

- **Overview of the SEI Framework for Software Product Line Practice**
  - The Framework captures the latest information about successful software product line practices. This information has been gleaned from studies of organizations that have built product lines, from direct collaborations on software product lines with customer organizations, and from leading practitioners in software product lines.
- **Using the Framework to Analyze Organizational Practices**
- **Structured Exercises to Practice Team-Member Skills for Each Phase of the PLTP Process**
  - Preliminary phase
  - Technical probe phase
  - Follow-on phase

### MEET ONE OF OUR COURSE INSTRUCTORS



**Larry Jones** is the lead of the Product Line Practice Initiative in the Research, Technology, and System Solutions Program. Before joining the SEI, Larry served in the U.S. Air Force in a variety of software development, management, and education positions. He served as principal scientist at the SHAPE Technical Centre in The Hague, Netherlands. He is the former chair of the Computer Science Department at the U.S. Air Force Academy. He has remained active in the education community through accreditation activities in the Accreditation Board for Engineering and Technology (ABET) and the Computing Sciences Accreditation Board (CSAB).

### CERTIFICATES

The PLTP Team Training course fulfills a training requirement for the SEI PLTP Team Member Certificate.

### COURSE DELIVERY

#### Onsite

The SEI can deliver this course at customer sites by special arrangement.



### Build Your Credentials

Gain an SEI professional certificate in software architecture, software product lines, or SOA. Keep improving the skills you need to help your organization deliver the richly featured, high-performing software-reliant products that customers demand.



## DEVELOP THE TALENT ON YOUR TEAM

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- Reduced per-student costs

Find out more by writing to the SEI at [course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu) or calling us at +1 412-268-7622

# PLTP Leader Training

You will learn how to lead an SEI-authorized Product Line Technical Probe (PLTP).

## Who Should Attend

This course is valuable for

- SEI-trained PLTP team members who want to become PLTP Leaders
- SEI-trained PLTP team members who want to conduct SEI-authorized PLTP exercises

## Course Overview

In the two-day PLTP Leader Training course, you will prepare to lead an SEI-authorized PLTP. Through several exercises, you will learn and practice steps in the PLTP process from the leader's point of view. You will also demonstrate the social and technical skills necessary to lead a PLTP. In particular, the course covers

- concepts behind the SEI PLTP process
- steps in the SEI PLTP process
- organizational skills needed to lead an SEI PLTP
- communication and facilitation skills important for leading an SEI PLTP

## Learning Outcomes

As a result of completing this course, you will be able to

- reinforce your understanding of the SEI PLTP process
- hone leadership skills necessary for the PLTP
- use the PLTP to develop an action plan for improving an organization's capability for achieving product line success and associated business goals

## Prerequisites

Before registering for this course, you must

- complete the PLTP Team Training course
- sign a license agreement for the PLTP question bank

**REGISTER NOW** Onsite: [www.sei.cmu.edu/goto/plpleader](http://www.sei.cmu.edu/goto/plpleader)

### COURSE OUTLINE

- **PLTP Process Concepts and Steps**
- **Organizational, Communication, and Facilitation Skills Needed to Lead a PLTP**
- **Practice Exercises to Demonstrate Needed Skills for PLTP Preliminary Phase**
  - The primary purpose of the Preliminary Phase is to gather initial information that provides a sketch of the organizational context for the probe. The PLTP Leader guides the team to determine how to proceed with the technical probe.
- **Technical Probe Phase**
  - During this phase, the PLTP Leader guides the team in conducting structured interviews of small groups designated as representative of the product line stakeholders and analyzing the interview data to the 29 practice areas specified in the SEI Framework for Software Product Line Practice. The leader also directs the team in reporting the results of its analysis at the end of this phase.
- **Follow-On Phase**
  - In this phase, the PLTP Leader guides the team to prepare and deliver a written report that details the findings of the PLTP.

### MEET ONE OF OUR COURSE INSTRUCTORS



**Larry Jones** is the lead of the Product Line Practice Initiative in the Research, Technology, and System Solutions Program. Before joining the SEI, Larry served in the U.S. Air Force in a variety of software development, management, and education positions. He served as principal scientist at the SHAPE Technical Centre in The Hague, Netherlands. He is the former chair of the Computer Science Department at the U.S. Air Force Academy. He has remained active in the education community through accreditation activities in the Accreditation Board for Engineering and Technology (ABET) and the Computing Sciences Accreditation Board (CSAB).

### CERTIFICATES

The PLTP Leader Training course fulfills a training requirement for the SEI PLTP Leader Certificate.

### COURSE DELIVERY

#### Onsite

The SEI can deliver this course at customer sites by special arrangement.



## SEI CERTIFICATES AND CERTIFICATIONS

The SEI offers certificates and certifications. We award certificates to individuals who complete a particular set of training courses. Certifications typically have rigorous training, testing, and maintenance requirements.

# ATAM Evaluator Training

You will learn how to contribute to evaluation teams in SEI-authorized Architecture Tradeoff Analysis Method (ATAM) evaluations.

## Who Should Attend

This course is valuable for

- anyone who is responsible for or involved in the evaluation of software architectures, such as software architects, system architects, software designers, and system designers
- individuals who want to participate in SEI-authorized ATAM evaluations

## Course Overview

Through lectures and highly interactive exercises, you will learn how to apply the ATAM to evaluate software architectures. A significant portion of the course is dedicated to participants performing an ATAM evaluation exercise with guidance from instructors. In particular, this two-day course covers

- overview of the ATAM
- software architectures and quality attributes
- Phase 1 activities of the ATAM
- preparation for and activities of Phase 2 of the ATAM

## Learning Outcomes

As a result of completing this course, you will understand

- the various roles of the team members and their responsibilities in an ATAM evaluation
- quality attributes and their role in software architectures
- quality attribute tradeoffs
- why architecture analysis is important
- how to execute an ATAM evaluation, in particular
  - the steps of the ATAM
  - the artifacts created during the evaluation

## Prerequisites

Before registering for this course, you must

- have significant experience in designing and developing software-reliant systems
- be familiar with modern software engineering concepts
- complete the Software Architecture: Principles and Practices course

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/atamevaluator](http://www.sei.cmu.edu/goto/atamevaluator)

### COURSE OUTLINE

- Overview of ATAM
- ATAM Phase 0: Partnership and Preparation
- ATAM Phase 1: Initial Evaluation
- Exercise on ATAM Phase 1
- ATAM Phase 2: Complete Evaluation
- Exercise on ATAM Phase 2
- ATAM Phase 3: Follow Up

### MEET ONE OF OUR COURSE INSTRUCTORS



**Felix Bachmann** is a senior member of the technical staff at the SEI working in the Research, Technology, and System Solutions Program. Felix is a coauthor of the Attribute-Driven Design Method, a contributor to and instructor for the ATAM Evaluator Training, a coauthor of *Documenting Software Architectures: Views and Beyond*, and leading researcher on an architecture-design expert system.

### CERTIFICATES

Completion of the ATAM Evaluator Training course fulfills a training requirement for the SEI ATAM Evaluator Certificate.

### COURSE FEES [USD]

Public	
U.S. Industry	\$2900
U.S. Gov./Academic	\$2300
International	\$4350

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE ATAM EVALUATOR TRAINING COURSE

“The instructor provided excellent tips and techniques. I plan to implement what I learned in the next three months.”

—Rob de Prez, Vocalink, UK



# SATURN

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- Use SATURN technologies. Visit [www.sei.cmu.edu/architecture/](http://www.sei.cmu.edu/architecture/) for more.

# ATAM Leader Training

You will learn and practice the social and leadership skills needed to successfully lead an architecture evaluation using the SEI Architecture Tradeoff Analysis Method (ATAM).

## Who Should Attend

- ATAM evaluators who want to improve their ATAM facilitation skills
- ATAM evaluators who want to become SEI-Certified ATAM Leaders

## Course Overview

This two-day course develops the social and leadership skills needed to successfully lead an architecture evaluation using the ATAM. Through exercises, you will practice ways to

- manage the multiple people with diverse viewpoints involved in an ATAM evaluation
- determine when to engage and when to observe
- ensure that all participants are doing the right job

In particular, the course addresses

- ATAM leader roles and responsibilities
- basic facilitation techniques
- managing group dynamics
- applying the techniques during ATAM evaluations

## Learning Outcomes

As a result of completing this course, you will be able to

- apply proven meeting-management and facilitation techniques during an ATAM evaluation
- manage the roles of ATAM participants
- listen for architectural risks and capture them faithfully

## Prerequisites

Before attending this course, you will need to successfully complete these SEI training courses:

- Software Architecture: Principles and Practices
- ATAM Evaluator Training

We also strongly recommend that all attendees participate in at least one ATAM evaluation before taking this course.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/atamleader](http://www.sei.cmu.edu/goto/atamleader)

### COURSE OUTLINE

- ATAM Roles and Responsibilities
- Exercises to Develop Skills Based on the Leadership Implications of Phases in an ATAM Evaluation
- Presenting the ATAM
- Presenting Business Drivers
- Presenting Architecture
- Identifying Architectural Approaches
- Generating Quality Attribute Utility Trees
- Analyzing Architectural Approaches
- Brainstorming and Prioritizing Scenarios

### MEET ONE OF OUR COURSE INSTRUCTORS



**Felix Bachmann** is a senior member of the technical staff at the SEI working in the Research, Technology, and System Solutions Program. Felix is a coauthor of the Attribute-Driven Design Method, a contributor to and instructor for the ATAM Evaluator Training, a coauthor of *Documenting Software Architectures: Views and Beyond*, and leading researcher on an architecture-design expert system.

### CERTIFICATES

Completion of the ATAM Leader Training course fulfills a requirement for the SEI ATAM Leader certification program.

### COURSE FEES [USD]

Public	
U.S. Industry	\$3000
U.S. Gov./Academic	\$2400
International	\$4550

The SEI can deliver this course at customer sites by special arrangement.



# SATURN

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- Use SATURN technologies. Visit [www.sei.cmu.edu/architecture/](http://www.sei.cmu.edu/architecture/) for more.

# Service-Oriented Architecture: Best Practices for Successful Adoption

You will gain a realistic understanding of the potentials and pitfalls of service-oriented architecture (SOA) adoption.

## Who Should Attend

This course is valuable for

- technical managers, managers, and software engineers who are looking for a solid overview of what SOA adoption really involves
- individuals tasked with development and deployment of service-oriented systems or with migration of legacy systems to SOA environments
- individuals who make decisions about SOA strategy and implementation

## Course Overview

The one-day Service-Oriented Architecture: Best Practices for Successful Adoption course introduces four pillars that are necessary for SOA success:

- Strategic approach, focusing on alignment with business goals
- SOA governance
- Realistic context-based technology evaluations
- Change of mindset—a different development and implementation approach

In particular, the course covers

- introduction to SOA
- basic concepts and roles of SOA
- web services
- basic SOA operations
- challenges for the service developer, the service consumer, and the infrastructure provider
- four pillars of SOA adoption

## Learning Outcomes

As a result of completing this course, you will be able to

- explain the basic concepts related to SOA and service-oriented systems
- recognize nine common misconceptions about SOA
- discuss the potentials and pitfalls of SOA adoption
- explain the importance of these keys to successful SOA adoption: SOA strategy, SOA governance, contextual technology evaluation, and a recognition of the need for a change of mindset

## Prerequisites

There are no prerequisites for this course.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/soabestpractices](http://www.sei.cmu.edu/goto/soabestpractices)

### COURSE OUTLINE

- **The “50,000-Foot” View**
- **Nine Common Misconceptions**
  - SOA provides the complete architecture for a system.
  - All legacy systems can be easily integrated into a SOA environment.
  - SOA is all about standards, and standards are all that is needed.
  - The use of standards guarantees interoperability in a SOA environment.
  - SOA is all about technology.
  - It is very easy to develop applications based on services.
  - A service registry allows service binding dynamically at runtime.
  - Testing service-oriented systems is no different than testing any other type of system.
  - Everything in a service-oriented system has to be a service.
- **The “5,000-Foot” View**
- **The “1,000-Foot” View**
  - Exercise: service-oriented systems development
- **Pillars of SOA Adoption**
  - Exercise: SOA strategy and governance

### MEET TWO OF OUR COURSE INSTRUCTORS



**Grace Lewis** is the deputy lead for the Advanced Mobile Systems (AMS) Initiative and the lead for the Edge-Enabled Tactical Systems (EETS) research team, which has a number of projects related to mobile systems at the edge. Her main interests are mobile computing, SOA, and cloud computing.



**Marc Novakowski** is a member of the technical staff at the SEI. He has more than 10 years of professional software development experience spanning defense, commercial, and academic fields. His current areas of expertise include SOA, mobile computing, and identity management.

### CERTIFICATES

Completion of the Service-Oriented Architecture: Best Practices for Successful Adoption course fulfills a training requirement for the SEI SOA Architect Professional Certificate program.

### COURSE FEES [USD]

Public	
U.S. Industry	\$700
U.S. Gov./Academic	\$550
International	\$1050

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE SERVICE-ORIENTED ARCHITECTURE: BEST PRACTICES FOR SUCCESSFUL ADOPTION COURSE

“My main objective in attending the SEI course was to get a broad and compact overview of the topic from experts. That I got, and then some!”

—Roger Champagne, Associate Professor, École de Technologie Supérieure, Montréal, Québec, Canada

# Advanced Topics in Service-Oriented Architecture

You will gain a solid foundation for designing and implementing systems based on SOA.

## Who Should Attend

This course is valuable for

- system and software architects
- project managers and IT personnel
- developers of service-oriented systems

## Course Overview

In this two-day course, you will learn more about architecting, designing, securing, and testing service-oriented systems and about implementing SOA governance. In particular, the course covers

- fundamental concepts of service-oriented architecture
- architecture and design of service-oriented systems
- SOA governance
- security considerations in service-oriented systems
- assurance in SOA environments
- future challenges for SOA adoption

## Learning Outcomes

As a result of completing this course, you will be able to

- explain the components of service-oriented systems
- understand how SOA can benefit organizations in terms of cost efficiency, leveraging legacy systems, and agility
- discuss architecture aspects of SOA design, including important quality attributes
- use scenarios to specify quality attribute requirements
- apply five categories of design decisions
- use three approaches for the integration of service consumers and service providers
- understand and choose from SOA governance models
- apply a technique that can be used as a starting point to help your organization understand its specific SOA governance needs and navigate the available offerings
- recognize the top web-service security threats
- understand three sources for service security problems
- describe strategies for assurance in SOA environments

## Prerequisites

Before registering for this course, you must have

- successfully completed Service-Oriented Architecture: Best Practices for Successful Adoption, or
- obtained an SEI waiver acknowledging equivalent service-oriented architecture knowledge. All requests for waivers must be submitted to [course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu) prior to the start of the course and should detail educational background and SOA professional experience.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/advancedsoa](http://www.sei.cmu.edu/goto/advancedsoa)

### COURSE OUTLINE

- **Service-Oriented Architecture: Review of Terminology**
- **Architecture and Design of Service-Oriented Systems**
- **SOA Governance**
  - SOA governance elements
  - SOA governance models
  - A scenario-based technique for developing SOA governance
- **Security Considerations in Service-Oriented Systems**
  - SOA security problem statement
  - SOA security architecture
- **Assurance in SOA Environments**
  - Assurance strategies
  - SOA elements that require assurance
  - Assurance roles and responsibilities
  - System aspects that require assurance
  - Methods for providing assurance
  - Planning for SOA assurance
- **Future Challenges**
  - SOA adoption in practice
  - SOA is potentially being stretched beyond its limits
  - Need to separate service orientation from SOA implementation technologies

### MEET TWO OF OUR COURSE INSTRUCTORS



**Grace Lewis** is the deputy lead for the Advanced Mobile Systems (AMS) Initiative and the lead for the Edge-Enabled Tactical Systems (EETS) research team, which has a number of projects related to mobile systems at the edge. Her main interests are mobile computing, SOA, and cloud computing.



**Stephany Bellomo** is a senior member of the technical staff at the SEI, assisting DoD, intelligence, and civil government agencies with software problems in an effort to improve software quality, reduce cost, and deliver on schedule. Her responsibilities involve applying SEI and non-SEI methods and techniques to various software-related problems.

### CERTIFICATES

Completion of the Advanced Topics in Service-Oriented Architecture course fulfills a training requirement for the SEI SOA Architect Professional Certificate.

### COURSE FEES [USD]

Public	
U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250

The SEI can deliver this course at customer sites by special arrangement.

### WHAT ATTENDEES SAY ABOUT THE ADVANCED TOPICS IN SERVICE-ORIENTED ARCHITECTURE COURSE

“The course gives a vendor-neutral view about the technologies involved.”  
—Software Engineer

“I’m better equipped to make decisions about service-oriented systems.”  
—Executive

# Advanced Software Architecture Workshop

You will put into practice your knowledge of successful architecture principles, applying what you know to a concrete architecture problem.

## Who Should Attend

This course is valuable for

- software architects and software lead designers who want to practice what they have learned in the SEI software architecture curriculum
- seasoned software architects who want to get ready for a project that requires major architecture improvements

## Course Overview

The four exercises of this two-day workshop guide you through a typical architecture-improvement cycle in a concrete project setting. You will address risks uncovered from an evaluation of an architecture using the SEI Architecture Tradeoff Analysis Method (ATAM). In particular, the course covers

- architecture improvement planning
- design
- peer review
- design revision based on review results
- acquisition context

## Learning Outcomes

As a result of completing this workshop, you will

- gain in-depth knowledge of concepts needed to effectively improve existing architectures
- understand how to improve architecture through a defined process
- be able to analyze and plan architecture tasks
- know how to improve an existing architecture design
- understand how to conduct a scenario-based peer review
- know how to prepare architecture documentation

## Prerequisites

Before attending this course, you must have

- successfully completed the Software Architecture: Principles and Practices and Documenting Software Architectures courses, or
- obtained an SEI waiver acknowledging equivalent software architecture knowledge. All requests for waivers must be submitted to [course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu) prior to the start of the course and should detail educational background and software architecture professional experience.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/asaw](http://www.sei.cmu.edu/goto/asaw)

### COURSE OUTLINE

- Architecture Presentation
- Workshop Exercise: Planning
- Workshop Exercise: Design
- Workshop Exercise: Peer Review
- Workshop Exercise: Revise Design
- Acquisition Context

### MEET ONE OF OUR WORKSHOP FACILITATORS



**Felix Bachmann** is a senior member of the technical staff at the SEI working in the Research, Technology, and System Solutions Program. Felix is a coauthor of the Attribute-Driven Design Method, a contributor to and instructor for the ATAM Evaluator Training, a coauthor of *Documenting Software Architectures: Views and Beyond*, and leading researcher on an architecture-design expert system.

### COURSE FEES [USD]

#### Classroom

U.S. Industry	\$1500
U.S. Gov./Academic	\$1200
International	\$2250

The SEI can deliver this course at customer sites by special arrangement.

### Build Your Credentials

Gain an SEI professional certificate in software architecture, software product lines, or SOA. Keep improving the skills you need to help your organization deliver the richly featured, high-performing software-reliant products that customers demand.



# SATURN

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- Check out the ongoing discussion in the SATURN Network blog at <http://saturnnetwork.wordpress.com/>.
- Look into the annual SATURN Conference at [www.sei.cmu.edu/saturn/](http://www.sei.cmu.edu/saturn/).
- Use SATURN technologies. Visit [www.sei.cmu.edu/architecture/](http://www.sei.cmu.edu/architecture/) for more.

# Modeling System Architectures Using the Architecture Analysis and Design Language (AADL)

You will learn fundamental model-based engineering concepts for embedded real-time software system development by using the SAE AADL standard.

## Who Should Attend

This course is valuable for

- software/system architects and developers who are considering options for engineering embedded real-time systems
- individuals tasked with the validation of embedded real-time system performance
- managers and software/system architects who are looking for a solid overview of system and software modeling
- individuals who make decisions about the development or acquisition of embedded real-time systems

## Course Overview

In this five-day course, through lecture and exercises, you will learn about and use the SAE AADL standard and gain an overview of other types of system and software modeling, such as MDA, SysML, and UML. In particular, the course covers

- how model-based engineering applies to software systems
- modeling of software and its mapping to hardware
- different modeling perspectives (runtime, data view, etc.) that support quantitative analysis of models
- AADL modeling constructs
- structured incremental refinement of AADL models
- modeling constructs to facilitate data analysis
- how to model multimodal and large-scale systems

## Learning Outcomes

As a result of completing this course, you will

- apply core elements of the AADL
- appreciate the value of model-based engineering for system development in your application domain
- understand fundamental model-based engineering concepts, specifically key principles and methods
- examine alternative choices for representation and modeling
- quantitatively validate quality attributes

## Prerequisites

Before attending this course, you should have

- fundamental knowledge in the areas of developing embedded real-time systems, software engineering, and architectures
- working knowledge of a programming language
- familiarity with a modeling language and the concept of abstraction

In addition, you will find that a working knowledge of the Eclipse environment is helpful.

**REGISTER NOW** Public: [www.sei.cmu.edu/goto/msa](http://www.sei.cmu.edu/goto/msa)

### COURSE OUTLINE

- Model-Based Engineering and the AADL Standard
- Lecture and Structured Exercises for
  - Conceptualizing a system
  - Modeling and analyzing flows
  - Modeling software runtime characteristics
  - Modeling execution platform components
  - Modeling logical resources
  - Modeling data and subprograms
  - Modeling operational modes
- Advanced Topics
- Modeling Guidelines

### MEET ONE OF OUR COURSE INSTRUCTORS



**Peter Feiler** is the technical lead and author of the SAE AS-2C Architecture Analysis & Design Language (AADL) standard. Feiler is also the author of numerous papers and book chapters on modeling for embedded-systems development. He is a senior member of the technical staff at the SEI.

### COURSE FEES [USD]

#### Classroom

U.S. Industry	\$2700
U.S. Gov./Academic	\$2200
International	\$3100

The SEI can deliver this course at customer sites by special arrangement.

### REQUIRED EQUIPMENT

Students must bring a personal computer equipped with

- Java 5.0 or higher
- Microsoft Windows 7, Windows 2000 Professional with Service Pack 3, Windows XP Home Edition with Service Pack 2, Windows XP Professional with Service Pack 2, or Windows Vista (tested on Windows Vista Enterprise, Business, Home Premium, and Home Basic editions)



## DEVELOP THE TALENT ON YOUR TEAM

Bring SEI training to your location

- Training scheduled around your current projects, exactly when you need it
- Expert, SEI-Certified instructors with years of real-world experience
- Reduced per-student costs

**Find out more by writing to the SEI at [course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu) or calling us at +1 412-268-7622**



## How To Register

You can register for many SEI courses online. Some courses require an application process. Please visit the SEI training website to submit your course registration and payment. Once your registration has been processed, you will receive an email confirming course delivery details (e.g., start time, hotel, and accommodations).

## Register Early

The number of students per course is limited, and many courses fill to capacity. Visit the SEI website and submit your registration early to ensure your space in your preferred course.

## Forms of Payment Accepted

- Credit card (Visa, MasterCard, or American Express)
- Check
- Company or government purchase order
- Wire transfer

## Training Course Fee Includes

- Comprehensive course materials
- Certificate of completion
- For classroom training: continental breakfasts, refreshment breaks, and lunches

## Pricing Guidelines

- Courses delivered in the United States
  - Government pricing: All U.S. government employees (federal, state, local). This does NOT include government contractors.
  - Academic pricing: All employees and students of a U.S. academic/educational organization (university, college, institute).
  - Industry pricing: All employees located within the United States. This includes government contractors, general industry, nongovernment employees, and those individuals not part of an academic institution.
  - International pricing: International rates must be paid by registrants whose offices are located outside the United States.
- Courses delivered outside of the United States
  - International pricing: International rates must be paid by registrants regardless of the registrant's office location.

## Cancellation and Refunds

The SEI will issue refunds (less a \$75 administrative fee) for written cancellations received no less than three weeks before the course begins. Refunds will not be given for courses missed due to acts of nature.

## Substitutions and Transfers

Registrants may send a substitute to attend an SEI course (provided that the substitute meets any prerequisites) by submitting a request via email prior to the start of the course.

By sending a written request, registrants may transfer registration fees from one SEI course offering to another that occurs within 12 months. There is no charge for the first transfer if requested no less than three weeks before the course begins. Transfer requests received less than three weeks before the course begins and all subsequent transfers will be charged a \$50 administrative fee.

## Public Training Policies

The SEI accepts qualified registrants for training on a first-come, first-served basis. Dates and prices are subject to change. The SEI reserves the right to cancel a course offering due to low enrollment.

## Travel Planning

The SEI training website provides lodging recommendations for courses held at SEI offices in Pittsburgh, Pennsylvania; Arlington, Virginia; Los Angeles, California; and Frankfurt, Germany. For training events at other locations, the SEI will enclose travel and lodging information with the confirmation email sent to registrants. Registrants are responsible for arranging their own travel and lodging accommodations.

## Statement of Accessibility

Carnegie Mellon University makes every effort to provide accessible facilities and programs for individuals with disabilities. To arrange accommodations/services, please contact the SEI by email ([course-info@sei.cmu.edu](mailto:course-info@sei.cmu.edu)) or telephone (412-268-7622) at least three weeks prior to the course start date.

## Continuing Education Units

Upon successful completion of SEI courses, students are awarded Continuing Education Units (CEUs). The number of CEUs earned for a course will be included on the certificate of course completion.

## Family Educational Rights and Privacy Act of 1974 (FERPA)

Course participant records created at the SEI in connection with SEI education and training courses are strictly confidential, and their protection is mandated under federal legislation known as the Family Educational Rights and Privacy Act of 1974 (FERPA).





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