

Software Engineering Institute

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Agile

SEI • Our Work • Agile

Agile is an iterative approach to software delivery that builds and delivers software incrementally from the start of a project instead of trying to deliver it all at once near the end.

In the case of an Agile lifecycle, requirements and solutions evolve through collaboration among self-organizing teams and project sponsors to encourage rapid and flexible response to change. Agile relies on small batches of work and fast learning cycles, instead of specifying extensive big-batch requirements up front. Programs need to extend this thinking beyond the software they are building, to the development and acquisition processes themselves.

More, better, faster. Those are the keys to the U.S. maintaining its technical and military lead over potential opponents around the world. But the U.S. lead is threatened as other nations approach parity. To stay ahead, the Department of Defense (DoD) has had to speed up acquisition and become nimbler in acquiring new technology—particularly advanced, high-quality, high-capability software systems.

The SEI has helped the DoD adopt and adapt a key response to this challenge: the Agile approach to creating software. When implemented properly, Agile can deliver higher quality and more capable software in a shorter period of time than traditional software development methods and processes. Agile simplifies software development, eliminates unnecessary hurdles, and enables maximum flexibility, quality, and user involvement. It delivers "performance at the speed of relevance."

Related Topic

DevSecOps



<https://sei.cmu.edu/our-work/agile/index.cfm>

OUR RESEARCH

DevSecOps

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DevSecOps is a set of principles and practices that provide faster delivery of secure software capabilities by improving the collaboration and communication between software development teams, IT operations, and security staff within an organization, as well as with acquirers, suppliers, and other stakeholders in the life of a software system.

To keep pace with potential adversaries, the Department of Defense (DoD) and government software development efforts need to deliver cutting-edge software capabilities quickly. However, as of 2012, the average development time from concept to deployment for major DoD IT systems was seven years, and in February 2017, the Government Accounting Office reported that the DoD "pays more than anticipated, can buy less than expected, and, in some cases, delivers less capability to the warfighter." The budgeting process alone can take as long as two years.

With the increasing importance for developing and deploying new technologies, it is critical for the DoD to find ways of accelerating the speed at which it moves from concept to capability. DevSecOps has proven successful in industry for doing just that, with many companies increasing not only the velocity at which they deliver secure software to users, but their incident response capabilities as well. DevSecOps can increase system quality, reduce costs and capability time-to-value, and minimize cognitive differences among all key system stakeholders.

As a result, the DoD and other government agencies are invested in finding how to effectively apply these techniques to their projects. The SEI supports this work by researching how to apply DevSecOps in the DoD and government settings to deploy new technologies more quickly and ensure that those technologies are secure.

Related Topic

Agile

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<https://www.sei.cmu.edu/our-work/devsecops/index.cfm>

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DATA MODELING AND ANALYTICS

We offer an approach that reduces risk and simplifies the selection and acquisition of big data technologies when you acquire and develop big data systems.

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Acquiring Systems, Not Just Software

DATA MODELING AND ANALYTICS

The U.S. Department of Defense (DoD) and federal agencies are increasingly acquiring software-intensive systems instead of building them with internal resources. However, acquisition programs frequently have difficulty identifying the critical software acquisition activities, deliverables, risks, and opportunities.

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AI Engineering: A National Initiative

ARTIFICIAL INTELLIGENCE ENGINEERING

The SEI is taking the initiative to develop an AI engineering discipline that will lay the groundwork for establishing the practices, processes, and knowledge to build new generations of AI solutions.

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Applying Causal Learning to Improve Software Cost Estimation and Project Control

SEI researchers have applied causal learning to help the Department of Defense identify factors that increase software costs and to provide guidance to control them.

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Architecture Analysis and Design Language

SOFTWARE ENGINEERING AND INFORMATION ASSURANCE

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Agile

With a focus on speeding the delivery of software capability to warfighters, the SEI has conducted research on Agile software approaches in the Department of Defense and other government settings since 2008.

[More about this topic \(2\)](#)



Show Me Agility: Agile Strategy Execution

The rapid pace of change in software development, in business, and in the world has many organizations struggling to execute daily operations, wrangle big projects, and feel confident that there ...

NOVEMBER 23, 2020 • BY **LINDA PARKER GATES**

IN **AGILE**



Mission-Based Prioritization: A New Method to Sequence Features, Capabilities, and Epics

Prioritization identifies the sequence in which requirements should be addressed and allows end users and stakeholders to evaluate and provide feedback on the most valuable features of the evolving system. ...

NOVEMBER 12, 2020 • BY **KEITH KORZEC**

IN **AGILE**



<https://insights.sei.cmu.edu/blog/topics/agile/>

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Managing Vulnerabilities in Machine Learning and Artificial Intelligence Systems

JUNE 2021 • PODCAST

By Nathan M. VanHoudnos, Jonathan Spring, Allen D. Householder...

Allen Householder, Jonathan Spring, and Nathan VanHoudnos discuss how to manage vulnerabilities in AI/ML systems.

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AI Workforce Development

MAY 2021 • PODCAST

By Rachel Dzombak, Jay Palat

Rachel Dzombak and Jay Palat discuss growth in the field of artificial intelligence (AI) and how organizations can hire and train staff to take advantage of the opportunities afforded by AI and machine learning.

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Moving from DevOps to DevSecOps

MAY 2021 • PODCAST

By Hasan Yasar

Hasan Yasar discusses how organizations can transition from DevOps to DevSecOps.

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Digital Library

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Latest Publications

**A State-Based Model for Multi-Party Coordinated Vulnerability Disclosure (MPCVD)**

JULY 01, 2021 • SPECIAL REPORT

By Allen D. Householder, Jonathan Spring

This report discusses performance indicators that stakeholders in Coordinated Vulnerability Disclosure (CVD) can use to measure its effectiveness.

DOWNLOAD ►**Human-Centered AI**

JUNE 25, 2021 • WHITE PAPER

By Hollen Barmer, Rachel Dzombak, Matt Gaston...

This white paper discusses Human-Centered AI systems that are designed to work with, and for, people.

DOWNLOAD ►**Robust and Secure AI**

JUNE 25, 2021 • WHITE PAPER

By Hollen Barmer, Rachel Dzombak, Matt Gaston...

This white paper discusses Robust and Secure AI systems: AI systems that reliably operate at expected levels of performance, even when faced with uncertainty and in the presence of danger or threat.

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SEI on GitHub

Use this site to access and download the software, tools, and methods that the SEI creates, tests, refines, and disseminates. Organizations and individuals worldwide use these technologies and management techniques to improve the results of software projects, the quality and behavior of software systems, and the security and survivability of networked systems.

For more information about the SEI and its other work, visit sei.cmu.edu.

Recent Repos

seahorn / seahorn

SeaHorn Verification Framework

★ 299 🍴 106 ● C

cmu-sei / Alloy.UI

Alloy joins the other independent Crucible apps together to provide a complete Crucible experience (i.e. labs, on-demand exercises, exercises, etc.). Alloy UI is an Angular project that provides the front end for Alloy in the Crucible ecosystem.

★ 0 🍴 1 ● TypeScript

cmu-sei / Vm.Ui

The VM UI is the front end for the VM application that integrates with Player to display and manage virtual machines.

★ 0 🍴 0 ● TypeScript

All Repos (121)

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CERTCC / certfuzz

This project contains the source code for the CERT Basic Fuzzing Framework (BFF) and the CERT Failure Observation Engine (FOE).

★ 237 🍴 61 ● Python

<https://cmu-sei.github.io/>

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Knowledge and Techniques That You Can Apply Today

Our courses, workshops, and seminars are created and delivered by recognized experts who have practical experience in the disciplines they teach. Our courses transfer hands-on skills and real-world scenarios. In just a matter of days, you'll be more informed and ready to perform at a higher level.



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- ☐ Incident Handling
- ☐ Measurement & Analysis
- ☐ Network & Software Security
- ☐ Risk Assessment & Incident Threat
- ☐ Software Architecture

Delivery Type:

- ☒ Classroom
- ☐ Live-Online
- ☐ On-Demand
- ☐ On-Site

5 Results

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Agile Adoption Readiness and Fit Workshop

3 days/6 hours • acquisition

When adopting new governance practices, leaders often find mismatches between assumptions and the realities within their organizations. This 3-day workshop leverages the S2 Readiness and Fit Analysis (RFA) technique to help people involved in systems of systems from all levels of the enterprise senior leaders, policy makers, program managers,...

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Agile in Government: Concepts for Senior Executives

3 days/6 hours • acquisition

This 3-day tutorial is designed for a small group of senior executives in a program or agency who are contemplating or are already in progress with adoption of agile approaches in the organization within their purview. The tutorial includes the opportunity for discussion about practical application of concepts at the executive...

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Agile in Government: Practical Considerations

3 days/6 hours • acquisition

This 3-day live-delivery tutorial enables attendees to understand basic agile concepts that developers use, but primarily focuses on introducing the interactions that government program offices can and should have with developers (either organic or contracted) who are using agile methods to develop government systems. A combination of lecture...

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