Carnegie Mellon University
Software Engineering Institute

SEI Training

Managing Technical Debt in Software Systems

TECHNICAL DEBT OCCURS when a design or construction approach is taken that is expedient in the short term, but increases complexity and cost in the long term. Whether it results from ignorance, accident, or strategy, all software-reliant systems carry some technical debt. If managed well, some technical debt can accelerate design exploration. Left unrecognized and unmanaged, accumulated technical debt results in increased development and sustainment costs.

The course is designed for professionals who develop and maintain software-reliant systems and want to gain a better understanding of

- how technical debt manifests in software
- what developers, architects, and managers need to know about technical debt
- how to manage technical debt effectively

This one-day course emphasizes the importance of intentional and strategic management of technical debt that is supported by architecture-focused practices.

Objectives

The course provides attendees with in-depth coverage of the concepts needed to effectively manage technical debt. After attending, participants will have a better understanding of

- what technical debt is
- why managing technical debt is important
- the relationships between system qualities and technical debt
- the financial debt analogy: when to take on debt, the cost of debt, and when to pay back debt
- fundamental concepts for the cost of delay and rework
- how to conduct an initial risk analysis to get a better understanding of the vision, organization, architecture, and development practices that can contribute to technical debt
- the state of the practice in static and architecture analysis that can help practitioners monitor technical debt to understand accumulating maintenance costs
- the role of architecture-focused release planning in developing and executing a technical debt payback strategy

Who Should Attend?

professionals who design, develop, or manage the construction of software-reliant systems

practicing software professionals who want insight into the latest concepts of what technical debt is and how to manage it successfully

Topics

- The technical debt landscape
- When should you take on debt?
- What is the cost of debt?
- When should you pay back technical debt?

In a survey of 1,800 software engineers and architects, 27% said that they do not identify technical debt in their development projects (Figure 1). Only 16% used tools to identify technical debt, while 31% said that identifying technical debt was an implicit if not an explicit part of working through the backlog. Once technical debt is identified, it must also be managed. In this survey, 65% of respondents had no defined practice for managing technical debt in their development projects while 25% managed technical debt at the team level (Figure 2). Only 10% said that their business managers were actively managing technical debt.

Prerequisites

There are no prerequisites for this course. It is recommended that participants have some experience in the fields of development of software systems.

Materials

Students will receive the complete set of slides and recommendations for related papers and reference materials.

Three Ways to Attend

1. Classroom
2. eLearning
3. Private, instructor-led training at customer sites

For More Information

To learn more and to register for the course, visit:

- for classroom: **sei.cmu.edu/education-outreach/courses/course.cfm?courseCode=P127**
- for eLearning: **sei.cmu.edu/education-outreach/courses/course.cfm?courseCode=V37**

Survey results of 1,800 software engineers and architects

Figure 1

"How do you identify technical debt?"

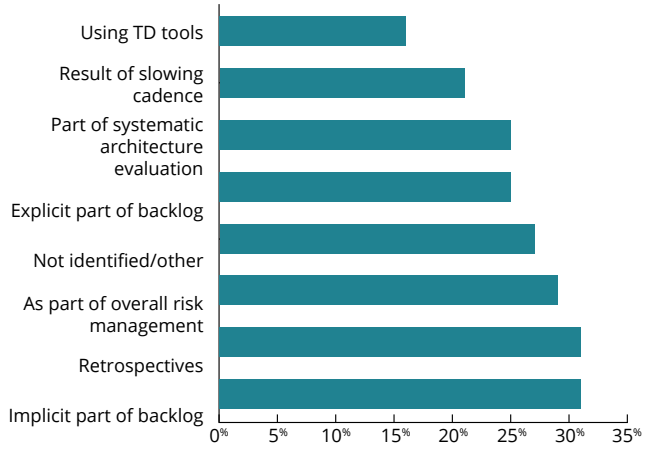
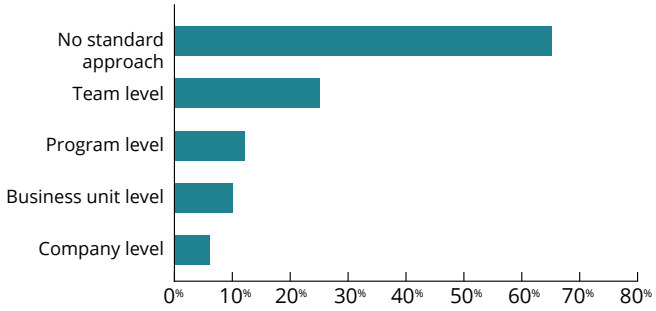


Figure 2

"How do you standardize the management of technical debt?"



Training courses provided by the SEI are not academic courses for academic credit toward a degree. Any certificates provided are evidence of the completion of the courses and are not official academic credentials.

About the SEI

The Software Engineering Institute is a federally funded research and development center (FFRDC) that works with defense and government organizations, industry, and academia to advance the state-of-the art in software engineering and cybersecurity to benefit public interest. Part of Carnegie Mellon University, the SEI is a national resource in pioneering emerging technologies, cybersecurity, software acquisition, and software lifecycle assurance.

Contact Us

CARNEGIE MELLON UNIVERSITY
SOFTWARE ENGINEERING INSTITUTE
4500 FIFTH AVENUE; PITTSBURGH, PA 15213-2612

sei.cmu.edu
412.268.5800 | 888.201.4479
info@sei.cmu.edu