

Views and Beyond

The SEI Approach to Architecture Documentation

How you communicate software architecture to stakeholders is crucial to project success.

HOW DO YOU MAKE YOUR SOFTWARE'S ARCHITECTURE UNDERSTOOD so that others can build from it, analyze it, maintain it, and learn from it?

Your software's architecture may be its most critical determinant of success or failure. Without an adequate architecture that delivers required function as well as quality attributes (e.g., performance, maintainability, and security), the project will fail to meet business and mission goals. But communicating an architecture to its stakeholders is as important a job as creating it in the first place.

The SEI has a proven approach to documenting software architecture called *Views and Beyond* or *V&B*. We use the concept of a view as the fundamental organizing principle for architecture documentation. A view represents a set of system elements and the relations associated with them. Views represent the many system structures that are present simultaneously in software systems. The basic principle of V&B is that documenting a software architecture involves documenting the relevant views and then documenting the information that applies to more than one view.

Challenges

- How do you capture the software architecture for a system in a document that can successfully serve all of the architecture's stakeholders?
- How do you decide which architectural views to document?
- What information do you record about an architectural view beyond just the graphical box-and-line diagram or "cartoon"?
- How do you specify an architectural element's software interface? What information do you record?
- What information beyond views must be recorded? What information applies to more than one view? How do you record the relationship among views?
- How do you specify an element's behavior?
- What notations are available for documenting an architecture, for documenting a view, for documenting an interface, for documenting behavior?

The V&B Approach

V&B is more than an architecture documentation method. It also helps the architect identify and record necessary design decisions during development.

V&B approaches documentation as the helpful result of making an architecture decision—part of the architecting process rather than a separate follow-on step.

Documenting a software architecture is a matter of documenting the relevant views and then adding information that applies across views. The first step is to choose the relevant views, a choice that in turn depends on the anticipated usage. Documentation may be used to drive analysis, to constrain an implementation, to manage a project, or to convey an introductory overview of a system.

Documentation that applies across views follows a simple how-what-why approach: how the documentation is organized to serve stakeholders, what the architecture is, and why the architecture is the way it is (i.e., design rationale).

V&B works in both Agile and traditional development settings. It is notation, language, domain, and technology independent. It produces documentation that is compliant with Standards ISO/IEC 42010 and IEEE 1471-2000.

Benefits

The V&B approach helps you avoid the pitfalls of inappropriate, incomplete, or vague documentation. Organizations often commit massive expenditures for documentation, only to have the resulting artifacts gather dust on shelves. This happens when documentation is not properly planned or aims chiefly at satisfying standards rather than satisfying stakeholder needs. Every member of your software development project can benefit from the V&B approach.

SEI Support for V&B

The SEI can help you apply V&B in three ways:

1. See the book *Documenting Software Architectures: Views and Beyond, Second Edition*, which fully describes the V&B approach.
2. Download the Microsoft Word [template for a software architecture document](#) for free.
3. Get SEI coaching to help your organization produce high-quality architecture documentation using V&B. We work with you to articulate the anticipated uses of the documentation and the stakeholders who will carry out those uses.

If appropriate, we can facilitate the holding of a stakeholder workshop to select views. Once the views have been selected, we can provide templates and documentation guides for each view, as well as guidance about how views are related to each other and pitfalls associated with misusing each kind of view. In addition to documenting the structure of the system, an architect must document interfaces and behavior. So we also provide guidance for documenting dynamic or highly variable architectures, as well as guidance for combining views to produce information-packed hybrid views.

Software Architecture Training

The SEI offers software architecture courses and certificate and certification programs that are based on extensive SEI and community experience in architecting software-intensive systems.

More than 20,000 people from more than 1,800 organizations have attended courses in the SEI Software Architecture Curriculum, and more than 2,500 people have earned software-architecture-related certificates.

Visit [Architecture Training](#) to see the complete set of architecture-related offerings and register for upcoming courses.

Software Architecture Publications

Visit [Software Architecture Publications](#) to access SEI publications on a wide range of software topics.

Further Reading

Documenting Software Architectures in an Agile World.

Paul Clements, James Ivers, Reed Little, Robert Nord, and Judith Stafford.

A Structured Approach for Reviewing Architecture Documentation. Robert L. Nord, Paul C. Clements, David Emery, and Rich Hilliard.

About the SEI

The Software Engineering Institute is a research and development center 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.

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