

Architecture Frameworks & Modeling

Dr. James N Martin, Aerospace Corporation

Abstract

Architecture provides the unifying structure (or roadmap) for exploration of the problem space and for characterization of the solution space such that better decisions can be made. Architecture is an arrangement of feature and function that maximizes some objective. This tutorial will describe fundamental concepts used in architecture modeling that will assist you in developing and using your own architectures.

The use of an architecture framework leads to a more model-driven systems approach and allows you to “discover” the essential attributes of the problem space that must be addressed by the system solution. Architecture models are where these essential attributes are defined and evaluated. This approach to architecting will be described within the context of the DOD Architecture Framework (DODAF) and other frameworks like the Federal Enterprise Architecture Framework (FEAF) and the Zachman Framework.

There can be a hierarchy of architectures that helps focus the architecture team on the right level of abstraction. One common hierarchy starts at the top with National level architectures and works down to the levels of Department/Federal, Service/Agency, Mission Area/Cross-Mission Area, Program/Node, and so on. The architecture you develop will have impacts above and below you in the hierarchy. The notion of levels in a hierarchy will be discussed along with how to use this to structure your modeling and simulation activity. The differences between enterprise architectures and system architectures will also be discussed

Several examples of architecture frameworks will be discussed along with application guidance for each: Zachman, Gartner Group, The Open Group, Reference Model of Open Distributed Processing, Federal Enterprise Architecture (US), and Department of Defense (US). The various modeling constructs within the DOD Architecture Framework will be described so that you can see how a framework can integrate the overall systems architecting and engineering activities.

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Biography

James N. MARTIN is an internationally known writer and lecturer on systems engineering. He wrote one of the most widely read books on systems engineering, “Systems Engineering Guidebook,” published by CRC Press. His experience includes over twenty five years in systems development of telecommunications products and services (most of this with Bell Labs) as program manager, systems engineering manager, system architect, requirements manager, and lead systems engineer. His experience with technology includes mobile wireless, underwater fiber optic, satellite broadband wireless, reconnaissance sensors and distribution networks, and airborne network hubs.

At the Aerospace Corporation, Dr. Martin is a system architect for communications networks and space systems. He also teaches at The Aerospace Institute and at seminars around the world. He led the development of ANSI/EIA 632, the US national standard that defines the processes for engineering a system. Dr. Martin graduated with a PhD from George Mason University, an MS from Stanford and a BS from Texas A&M. He is a Fellow member of INCOSE and winner of the INCOSE Founders Award.