Article Analysis: The Golden Age of Software Architecture

The article I chose to analyze is titled, "The Golden Age of Software Architecture" published by the IEEE Software Journal in 2006. The purpose of this article is to "examine software architecture's growth in the context of a technology maturation model [1]." The authors state that in the near future, "software architecture will be an essential part of software system building, and will be taken for granted just like all truly successful technologies [1]." I agree with the authors' statement as my stance on this topic is that software architecture is a vital component in designing efficient software systems.

In 1985, Samuel Redwine and William Riddle reviewed several software technologies and analyzed how they developed. They stated that "technology transition follows technology development within an overall process of technology maturation [2]." They also concluded that a "technology typically takes 15 to 20 years to be ready for popularization, consisting of six major phases [2]." In this article, the authors take us through each of those phases and explain how software architecture has evolved over the past 30 years or so, using references to the Redwine-Riddle maturation model. In the early 1980's, software systems were developed and "designers described their structures with informal explanations [1]." Basic research in the field of software architecture; however, revealed the "advantages of deliberately designed, specialized software structures [1]." Engineers began to realize that software must be designed with a purpose, and not by accident. They also started to understand that "apart from producing a desired outcome, a computer's additional software qualities are equally as important [1]."

The authors state that in the late 1990's and early 2000's, the relationship between architecture and software qualities of a system was firmly understood. This relationship revealed "software architecture validation as a useful risk-reduction strategy in development of systems [1]." Also, the emergence of architectural views as a working concept by David Parnas was paramount. In his research, Parnas stated that "the effectiveness of a modularization is dependent upon the criteria used in dividing the system into modules [3]." He also observed that software systems have many structures performing various tasks and thus, selecting one as distinguished was useless. This concept "flowered in influential papers, firmly establishing views in architectural practice [1]."

The authors state that in the 2000's and till present day, architectural styles (also called patterns) have become more widespread, and are being used as design guides. UML has also become popular as it "integrated a number of design notations and developed a method for applying them systematically [1]." Finally, the authors state that the maturation model is ended by the popularization period, where software systems and knowledge about new technologies is made available to the public. This phase is "characterized by commercialized, and marketed versions of the technology, along with an expanded user community [1]."

The relationship between this article and software architecture is quite obvious. The authors describe how software architecture has evolved and conclude that "the last 15 years or so - roughly the middle four stages of the Redwine-Riddle model - truly have been software architecture's golden age [1]." I support the claims of this article and believe that the evolution of software architecture plays a major role in allowing engineers and designers to develop efficient

systems. "Software is characterized by inevitable changes and increasing complexity, which in turn may lead to huge costs unless rigorously taking into account change accomodations. For such systems, there is a need to address evolvability explicitly [4]." I believe that the authors' prediction that in the near future, software architecture will be considered an essential part of system building, is actually already true. In the 10 years since this article was written, I believe that the importance of architecture has really been valued and appreciated. "The golden age, is a period of prosperity and excellent achievement, often marked by numerous advances that rapidly move the technology from speculative to dependable [1]."

References

[1] M. Shaw, P. Clements. "The Golden Age of Software Architecture." IEEE Software, vol. 23, pp. 31-39, March/April. 2006.

[2] S. T. Redwine, W. E. Riddle. "Software Technology Maturation." Proceedings, IEEE Eighth International Conference on Software Engineering, Aug. 1985, pp. 189-200.

[3] D. L. Parnas. "On the Criteria To Be Used in Decomposing Systems into Modules." Proceedings, Research Showcase at Carnegie Mellon University, 1971.

[4] H. P. Breivold. "Software Architecture Evolution and Software Evolvability." M.Eng. thesis, Mälardalen University, Sweden, 2009.