EECS 4314 Advanced Software Engineering

Topic 08: A Reference Architecture for Web Servers Zhen Ming (Jack) Jiang

Slides Adapted from Ahmed E. Hassan

Relevant Readings

Ahmed E. Hassan and Richard C. Holt. A Reference Architecture for Web Servers. WCRE 2000.

Reference Architecture

- Architecture template for software systems in a domain
- A product architecture is an instantiation of the reference arch
- Defines the fundamental components and the relations between them
- Well known for mature domain (e.g., Compilers, Operating Systems)

Reference Architecture of a Compiler



Reference Architecture Benefits

- Documents existing well-proven designs
- Helps build complex systems
- Provides a common vocabulary
- Aids in the comparison of different architectures in the same domain
- Improves code reuse

Objectives of this topic

Process

- A process to derive a reference architecture by non-domain experts
- Reference architecture
 - A reference architecture for web servers

Validation

Mapping it to different product architectures



Web Servers

- Apache
- Microsoft IIS
- Netscape iPlanet Server
- AOL Server
- Jigsaw

Summary: 3 Servers

Web Server	Main arch.	Dev type	1 st release	Code size (KLOC)	Lang.	Arch. Stable (yrs)
Apache	Robert Thau	Open source (Apache)	April 1995	80	С	5
AOL Server	-	Commercial (NaviSoft, AOL)	May 1995	164	C & TCL	-
Jigsaw	Yves Lafon	Experimental (W3C)	May 1996	106	Java	2.5

Conceptual v.s. Concrete Architecture

Conceptual Architecture:

- Resides in the head(s) of the developer(s)
- Mental model: incomplete, inaccurate, ideal

Concrete Architecture:

- Extracted from the system's implementation
- Many mismatches with the conceptual architecture

Reference Architecture Derivation Process



Mapping the Reference Architecture to a Web Server - The Apache Web Server

Apache Apachep füchterprefah Achtibiteteneren apping

Mapping the Reference Architecture to a Web Server - The AOL Web Server

Jigswa server

- Similar mapping process
- Many different filters implemented for handling resources and protocols
 - Experimental nature
- Do not contain OSAL layer, why?
 - Implemented in Java

Mapping Summary

- Conceptual architecture of 3 servers maps nicely to reference architecture
- Main differences are splitting and merging of subsystems
- The derived architecture is independent of development methodology