

Architectural Skills

CSSE6400

Richard Thomas

May 20, 2024

Quote

Architecture is the stuff you can't Google.

– Mark Richards *[Richards and Ford, 2020]*

Quote

There are no right or wrong answers in architecture—only trade-offs.

– Neal Ford *[Richards and Ford, 2020]*

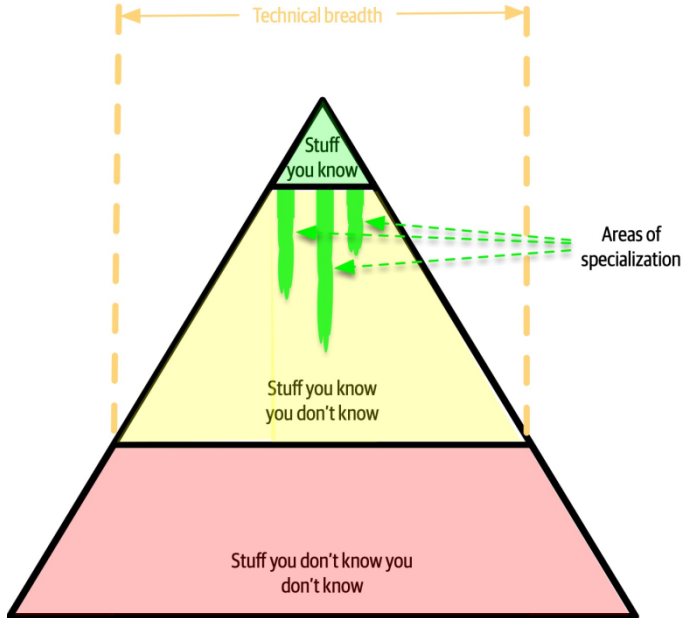
Architectural Design

Architects use knowledge and experience to analyse trade-offs to design architectures appropriate to the system context.

Developers – Technical Depth *[Richards and Ford, 2020]*



Architects – Technical Breadth *[Richards and Ford, 2020]*



Definition 1. Conway's Law

Organisations design systems whose structure is inevitably a copy of the organisation's communication structure *[Conway, 1968] [MacCormack et al., 2012]*.

Conway's Law Consequences

- Business Process Management
- Microservices to reflect organisation structure
- Teams formed around services

Conway's Law Consequences

Team insularity – more loyal to team than organisation.

Conway's Law Issues

- Cross-cutting concerns
 - e.g. Security
- Organisation structure should align with market structure
- Physical location of teams

Definition 2. Peopleware

People involved in development of systems.

– Peter G. Neumann (1977)

Stakeholders *[Coplien and Bjørnvig, 2011]*

- End users
- Organisation
- Customers / Sponsors
- Domain Experts
- Developers

Communication

- Written
 - For those who are not there
- Oral
 - Immediate & interactive

Circumventing Conway's Law *[Woods, 2017]*

- Cloud Platforms
- Microservices
- APIs
- *Culture*

Evidenced-Based Software Engineering

Don't follow fads, seek evidence for good practice.

Let's hear from an expert

Software Engineering's Greatest Hits

**what we actually know about software development
and why we believe it's true**



Greg Wilson

<http://third-bit.com/talks/greatest-hits/>



1 / 47

References

- [Conway, 1968] Conway, M. E. (1968).
How do committees invent?
Datamation.
- [Coplien and Bjørnvig, 2011] Coplien, J. O. and Bjørnvig, G. (2011).
Learn Architecture for Agile Software Development.
Wiley.
<http://www.leansoftwarearchitecture.com/>.
- [MacCormack et al., 2012] MacCormack, A., Baldwin, C., and Rusnak, J. (2012).
Exploring the duality between product and organizational architectures: A test
of the “mirroring” hypothesis.
Research Policy, 41(8):1309–1324.
- [Richards and Ford, 2020] Richards, M. and Ford, N. (2020).
Fundamentals of Software Architecture: An Engineering Approach.
O’Reilly Media, Inc.

[Woods, 2017] Woods, D. (2017).

How platforms are neutralizing conway's law.

[https://www.forbes.com/sites/danwoods/2017/08/15/
how-platforms-are-neutralizing-conways-law/](https://www.forbes.com/sites/danwoods/2017/08/15/how-platforms-are-neutralizing-conways-law/).