

Architectural Skills

CSSE6400

Richard Thomas

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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]*



- Architects need greater technical breadth than depth.
- Breadth allows better consideration of trade-offs.
- Avoid trying to become an expert across many areas – you'll fail.
- Don't stop learning – increase your breadth – don't let your knowledge become stale.

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]*.

- First citation is original article.
- Second citation is one of several about MIT and Harvard research into the phenomenon, calling it the “mirroring hypothesis”.
- Elaborate on this point and Coplien's research into organisational sociology.

Conway's Law Consequences

- Business Process Management
 - Microservices to reflect organisation structure
 - Teams formed around services
- BPM: Redesign organisation structure to reflect system you want.
 - Microservices: Design system to reflect your organisation.
 - Elaborate on benefits of both approaches.
 - Comment on benefits of small focussed teams.

Conway's Law Consequences

Team insularity – more loyal to team than organisation.

- Amazon example from week 11, negotiation difficulties with other teams.
- Need to ensure inter-team cooperation.
- Possibly move people between teams.
- Cloud platforms, and microservices, also support this and with larger teams.
- Intra-team communication becomes more difficult with large teams.

Conway's Law Issues

- Cross-cutting concerns
 - e.g. Security
- Organisation structure should align with market structure
- Physical location of teams
 - Cross-cutting concerns span services, and consequently teams.
 - Can't have a "security" service. It has to be part of every service.
 - Teams solely based around Conway's law and services may not deliver some cross-cutting concerns.
 - Cooperation, documentation and audits may be necessary.
 - Market structure may complement team structure to place teams closer to their end users.
 - Global development and outsourcing mean different teams are likely to be in different locations.
 - Requires additional overhead and documentation for cooperation between teams.

Evidenced-Based Software Engineering

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

Elaborate on finding reliable sources of information and confirming facts yourself.

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

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