

Conway's Law: The Structure of Products, Processes, and Organizations

Reading: Herbsleb & Grinter,
"Conway's Law Revisited"

Conway's Observation

- In any project large enough to require a complex organization, the structure of the project reflects the structure of the organization
 - Or is it vice versa? Which shapes which?
 - Probably both!

Stuff Changes

- Requirements change
 - You can partly anticipate it, but not completely
 - You cannot prevent it
- The environment changes
 - Lira and Francs are replaced by Euros. Your customers want web access. Microsoft just broke the API you were depending on. That database won't scale from 1000 users to 1,000,000 users.
- The organization changes
 - Jenny got an offer from Google and jumped ship.
 - John's been pulled off to work on a crisis project.
 - Your company was acquired by Motorola.

Interfaces are Change Barriers

- The point of an interface is to distinguish what is stable (the interface) from what is unstable (the implementation)
 - If I can change the implementation without changing the interface, we don't need to talk.
 - But this is a stronger notion of "interface" than syntactic module interfaces in languages

Module & Subsystem Interfaces are Human Interfaces

- Conway: The important interfaces are between modules built by different parts of the organization
- Parnas: The purpose of a module interface is to hide a design decision
 - Hide = allow independent change
- Herbsleb & Grinter: The development process has modules & interfaces, too

Processes

- Boehm: “Plan the flight, fly the plan”
- Herbsleb and Grinter: Don’t over-engineer the process
 - Trust people to handle exceptions and coordinate details of their work
 - *But* this depends heavily on informal, unplanned communication

Planning for Change

- Anticipate change: In the product architecture, in the organization structure, in the build plan
- But expect the unexpected:
Conway’s observation, via Herbsleb: **The structure itself shifts over time**

Distributed Development

- Increasingly common: Teams span both geography and companies
- Observation:
 - The formal, planned coordination is not enough. Stuff happens. Things change.
 - Informal and unplanned communication between sub-teams is a major challenge

The case study

- Big system, British & German teams
 - Coordination plan had 40 steps ... but was not followed (because it was wrong)
- Communication difficult

What went wrong?

Problems encountered

- Corporate & cultural styles
 - How do we hold a phone conversation?
 - Who makes a decision?
- Trust & territoriality
- Establishing communication
 - Knowing whom to ask
 - Cost of making contact (time zones, media)

Herbsleb & Grinter Recommend ...

- Attend to Conway's law, but also ...
- Create personal bonds and informal communication
 - Face-to-face makes other communication work better later
- Facilitate informal as well as formal communication