Software Engineering at Microsoft, Google, Facebook

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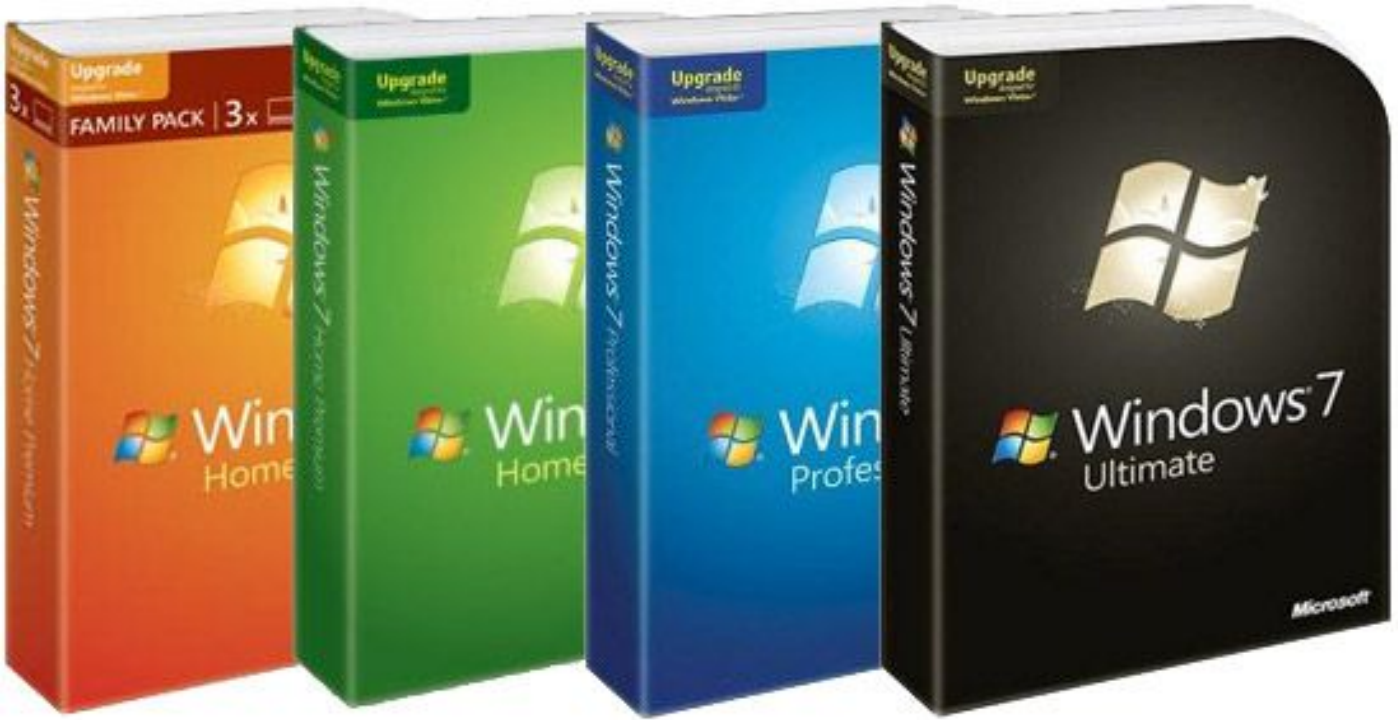
About me...

- Went to graduate school at UW, dropped out to work on real systems
- Microsoft: 1997 - 2007
  - Windows
  - .NET Framework
  - eCommerce
- Google: 2007 - 2017
  - Ads
  - Chrome Web Store
  - Inbox
  - Allo
- Facebook: 2017 - present
  - Marketplace

Comparing

- Engineering culture
- Engineering systems, languages, and tools
- Engineering processes

Microsoft


Upgrade
FAMILY PACK | 3x
Windows 7 Home
Upgrade
Windows 7 Home
Upgrade
Windows 7 Profes
Upgrade
Windows 7
Ultimate
Microsoft

Windows (1997-2000)

- Engineering Culture
  - Large engineering team (1000s of engineers)
  - Multi-year ship cycles
  - Large test teams
  - Code changes are risky, can break app compatibility and take months to catch
  - Developer is king
  - Collaboration between teams sometimes challenging
- Engineering systems, languages, and tools
  - C (with minor C++ syntax)
  - No source level debugging
  - Non transactional Source Control System (SLM)
  - Build lab and checkin window
  - Many branches, integrations extremely costly (SD)
  - Stress testing

Windows (2)

- Engineering processes
  - No process for API design
    - CreateWindow, CreateWindowEx, CreateWindowExA
    - ```
      typedef struct tagMODULEENTRY32 {
        DWORD   dwSize;
        ...
      } MODULEENTRY32;
      ```
  - No process for UX design
  - No process for adding new binaries to the build
  - Heavy processes around approval for bug fixes
- But…
  - Managed to ship high quality releases despite all these challenges!
      ```

.NET Framework

- Engineering Culture
  - Mid-size eng team (100s of engineers)
  - Multi-year ship cycles
  - Large test teams
  - Willingness to take risks and make large architectural changes
  - Feature Crews
- Engineering systems, languages, and tools
  - C++, home grown STL-like library
  - Source level debugging
  - SD, many branches, costly integrations
  - Heavy tooling investments around perf
  - Home grown automation for checkin management
- Engineering processes
  - Much more thought and review around architecture and API design

Google

Google

- Engineering Culture & Processes
  - Quality comes first
  - Company standards around readability, style guides, & code reviews
  - Design Review
  - Launch Review: security, privacy, legal, scalability, ux, accessibility, eng, product, production, api, many many more.
  - Small test teams
  - XFN teams
  - Committees for everything
    - Promotion
    - Hiring
    - Events
    - Naming rooms
    - Etc.

Google

- Engineering systems, languages, and tools
  - C++/Java/Python
  - Every team deploys own servers, tooling to make that easier
  - Single source repository across entire company!
  - Any engineer can build & work on any part of the codebase
  - Standard tools across all teams
    - Source control
    - Checkin management
    - Data center job management
    - Everything ops (building, deploying, monitoring, etc.)
    - Best in industry libraries and internal systems for distributed programming

Facebook


44
RPD racing
karolína
FURMET MONT
VASVIN KFT.
PRONET
PTIMUM
Scuderia Praha

Facebook

- Engineering Culture & Processes
  - Move fast, optimize for impact
  - Minimize unnecessary processes
  - No test teams, but some manual QA
  - Heavier XFN emphasis than Google
  - DS, Metrics, focus on measuring everything, growth, experiments
  - Bootcamp, possible to fix bugs in any team’s code with minimal ramp up

Facebook

- Engineering systems, languages, and tools
  - Hack & React Native (no compilation!)
  - Single source repository across entire company!
  - Any engineer can build & work on any part of the codebase
  - WWW
    - Continuous deployment & test automation
    - Scale
    - GraphQL
    - Powerful and standardized internal abstractions across entire codebase
  - Standard tools across all teams
    - But maybe less mature systems than Google for development outside of WWW

Discussion

- XFN, team structure, test
- Tools & Languages
- Branches
- Deployment
- Process & Risk tolerance
- Company-wide standardization
- DS & Experimentation
- Ownership
- Collaboration