Parallel Agile Software Development

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GSAW STEM Session

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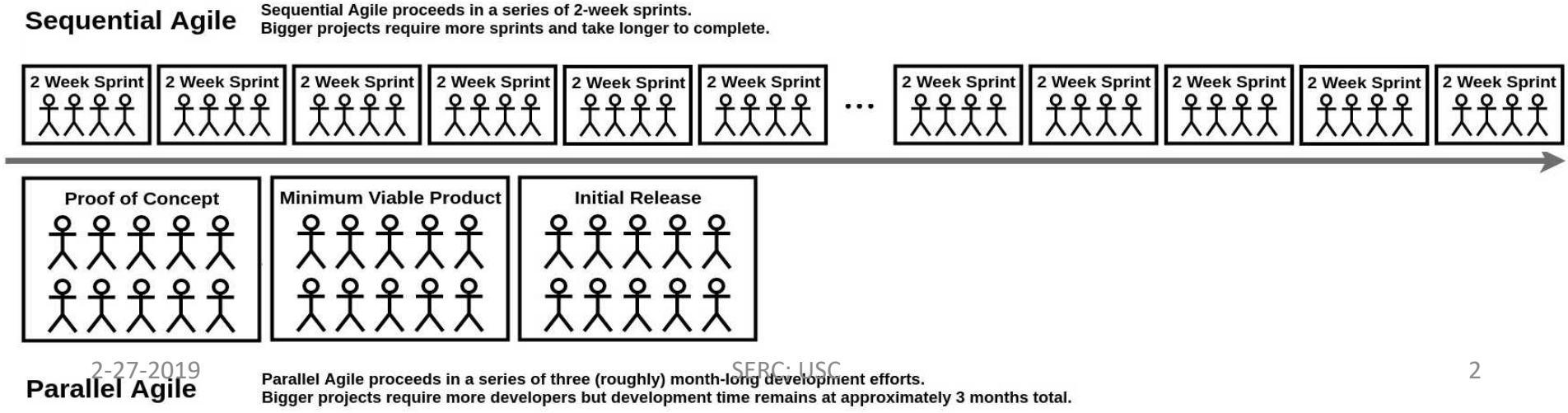
PARALLEL AGILE

Scale by adding developers, not stretching the calendar

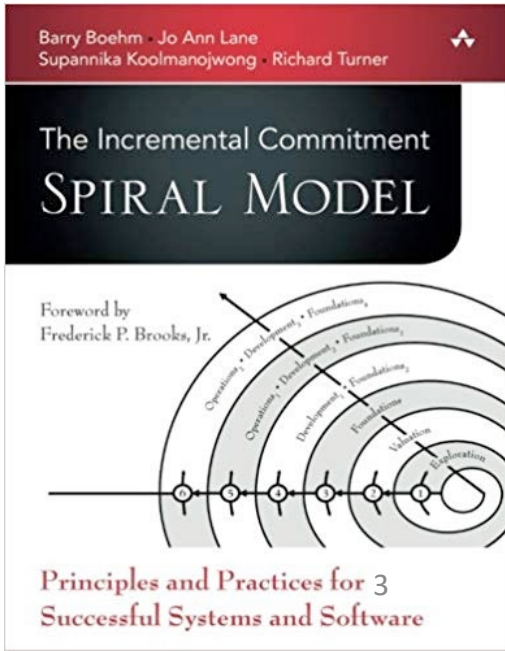
- Big projects don't add more sprints, they add more developers working in parallel
- Small, medium, (reasonably) large projects take the same amount of time (roughly 3 months) if enough developers are available
  - *No, we can't do an entire crisis management system in 3 months*
- Merge and integrate at the end of each phase
- Test team works concurrently with developers for each phase



PARALLEL AGILE

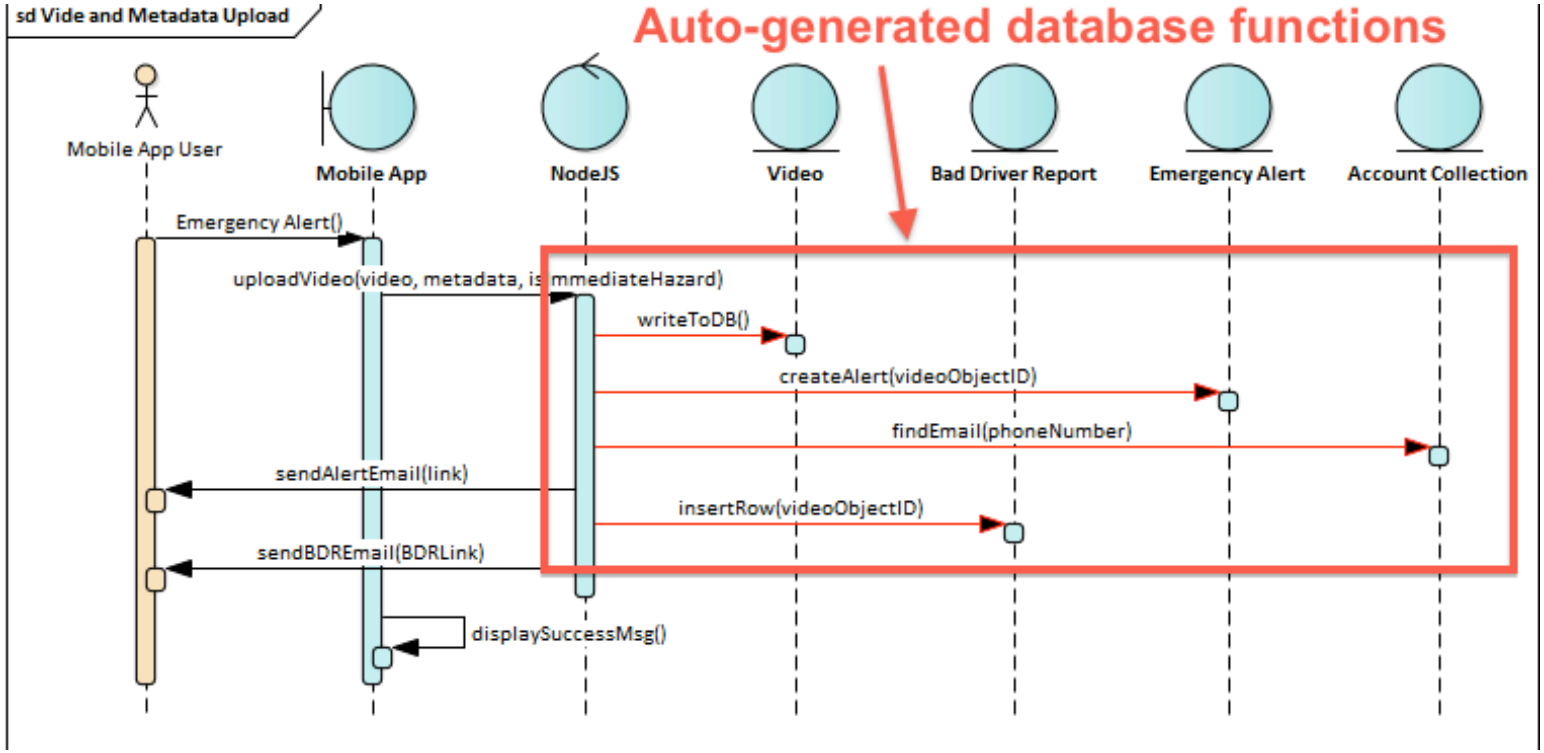
Get to market faster without sacrificing quality

- 3 phases: Proof of concept, MVP, Initial Release
  - Each phase approximately a month long
  - Proof of concept uses storyboarding, prototyping to discover requirements, reduce risk
  - MVP uses UML modeling, details sunny/rainy day scenarios, reduce technical debt
  - Initial Release focuses on automated code generation, acceptance testing, performance tuning, optimization, reduce hotfixes



PARALLEL AGILE

Database access code doesn´t get written manually



in round numbers this might be 20-40% of your code

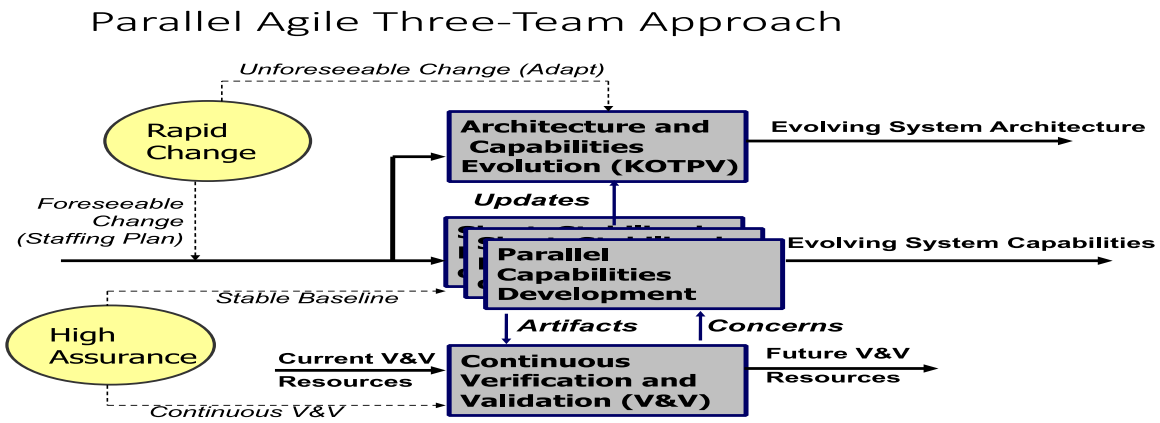
PARALLEL AGILE

– Current status

- 2014-2015 Location Based Advertising (75 students)
  - Implemented commercially; discontinued due to low sales
- 2015 Picture Sharing (12 students)
  - Experiment comparison with Architected Agile project
  - PA project faster, less effort; comparable performance
- 2016-2018 CarmaCam (75 students)
  - In LA-Metro experimental use for bus-lane monitoring
  - Several additional organizations, applications interested
- 2017-2018 TikiMan Go Game project (25 students)
  - Being prepared for commercial application

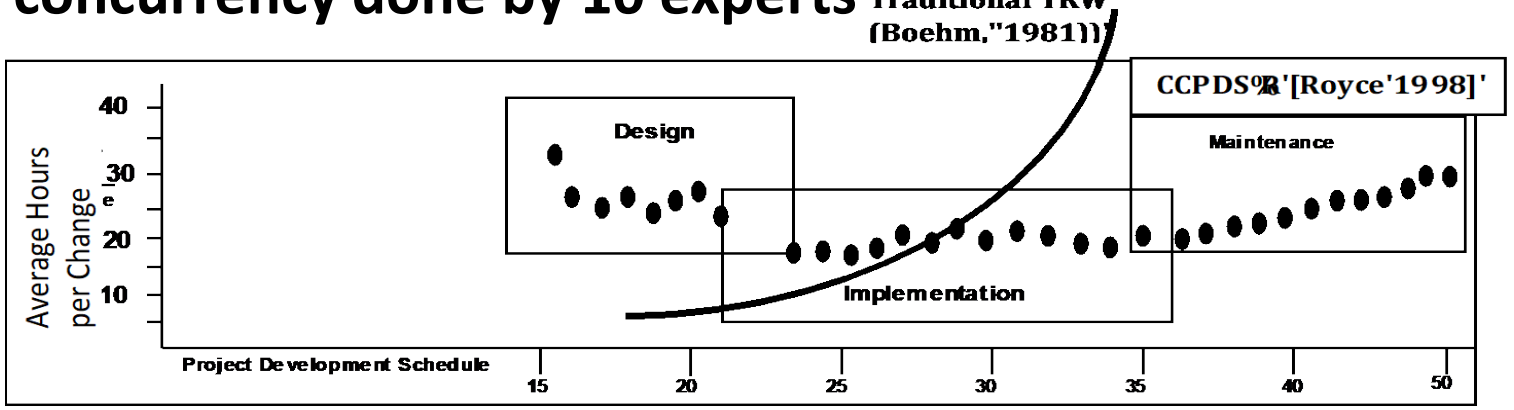
Large Scale PA Critical Success Factors

- Three Team approach; similar to Bosch ART approach
  - Agile Rebaselining: Keeper Of The Project Vision/Architecture
    - USC: Rosenberg: Ensure MVC compliance, rainy-day use cases
    - TRW: Systems Engineering team; Handle all concurrency
  - Developers and Product Owners:
    - Rapid concurrent development
  - Independent Verification and Validation
    - Continuous across development



TRW Large-Scale PA Experience

- Walker Royce: 1-million SLOC Command-Control System
- Extensive early architecture and risk resolution; all concurrency done by 10 experts



  - 47 sequential-Ada programmers; Executing Arch. Skeleton
- Neil Siegel: several even-larger systems
  - Very high productivity; low error rate
  - Proof of value: worse productivity, error rate when new customer forced traditional approach; full productivity resumed when original approach resumed

STEM Aspects

- **Computer Science**
  - **Model-View-Controller architecture**
- **Software Technology**
  - **Automatic code generation**
- **Software Engineering**
  - **Storyboarding, prototyping, 3-team approach**
- **Mathematics**
  - **Statistically-based cost estimation model**

Parallel Agile and USC STEM Efforts

- **Masters students**
  - **Learn about new technologies**
  - **Learn how to apply them**
- **PhD students**
  - **Learn how to create new technology**
  - **Learn how to test hypotheses about its effects**