Carnegie Mellon University

Architecture Design Documentation

17-313 Fall 2022

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S3D
Software and Societal Systems Department

Administrivia

- No Recitation
- HW3 C/D deadline TODAY Oct 13
- No CLASS Oct 18/20 - Fall Break
- HW4 will be out next week

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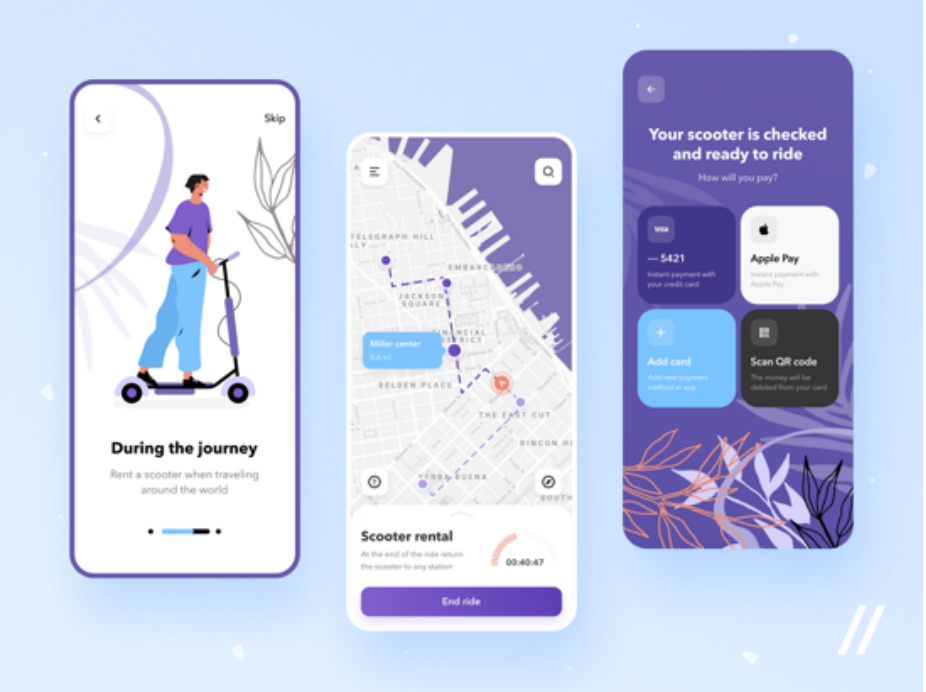
Let’s update the app!



What should we think about?

1 Add Payment Methods | 3 More Secure Authentication

2 Add Android Support | 4 Internationalization (i18n)

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Learning Goals

- Articulate the various purposes of a design document.
- Use design documentation to ensure that the correct thing is being implemented.
- Write useful, clear, high-quality design documentation.

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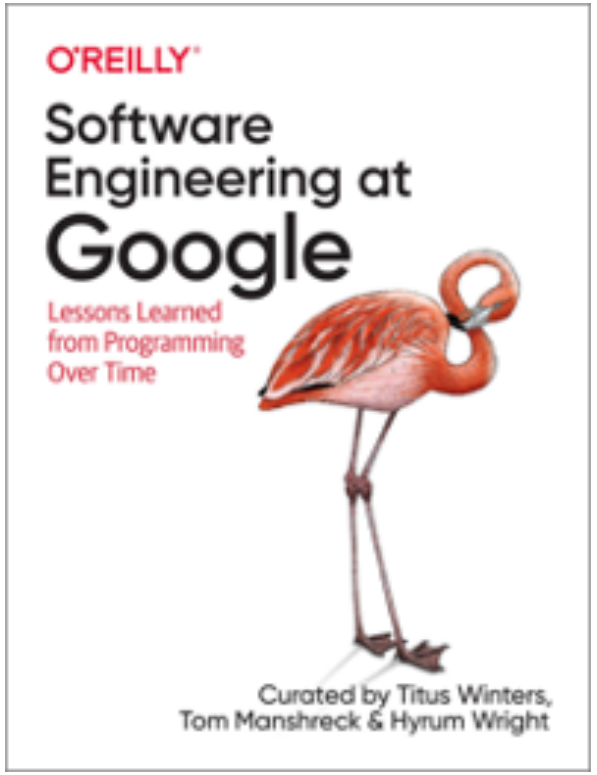
Types of documentation

- Reference documentation (incl. code comments)
- Design documents
- Tutorials
- Conceptual documentation
- Landing pages



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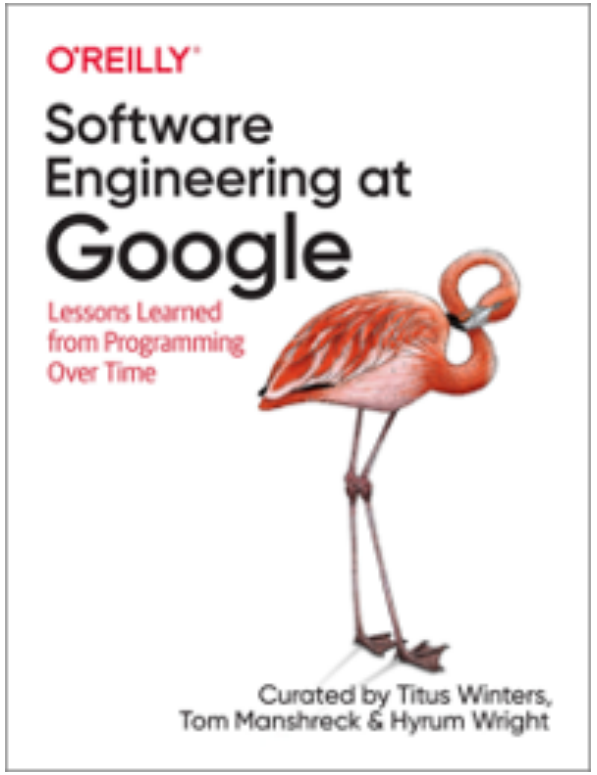
Design Documents

- **Code review before there is code!**
- Collaborative (Google Docs)
- Ensure various concerns are covered, such as: security implications, internationalization, storage requirements, and privacy concerns.
- A good design doc should cover:
  - Goals of the design
  - Implementation strategy
  - propose key design decisions with an emphasis on their individual tradeoffs



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Companies using an RFC-like engineering planning process*

- Airbnb
- Affirm
- Algolia
- Amazon
- AutoScout24
- Asana
- Atlassian
- Blue Apron
- Bitrise
- Booking.com
- Brex
- BrowserStack
- Canonical
- Carousell
- Catawiki
- Cazoo
- Cisco
- CockroachDB
- Coinbase
- Comcast Cable
- Container Solutions
- Contentful
- Couchbase
- Criteo
- Curve
- Daimler
- Delivery Hero
- Doctolib
- DoorDash
- Dune Analytics
- eBay
- Ecosia
- Elastic
- Expedia
- Glovo
- Gojek
- Grab
- Faire
- Flexport
- GitHub
- GitLab
- GoodNotes
- Google
- Grafana Labs
- GrubHub
- HashiCorp
- Hopin
- Hudl
- Indeed
- Intercom
- LinkedIn
- Kiwi.com
- Klarna
- MasterCard
- Mews
- MongoDB
- Monzo
- Mollie
- Miro
- N26
- Netlify
- Nobl9
- Notion
- Nubank
- Oscar Health
- Octopus Deploy
- OLX
- Onfido
- Pave
- Peloton
- Picnic
- PlanGrid
- Preply
- Razorpay
- Reddit
- Red Hat
- SAP
- Salesforce
- Shopify
- Siemens
- Spotify
- Square
- Stripe
- Synopsys
- Skyscanner
- SoundCloud
- Sourcegraph
- Spotify
- Stedi
- Stream
- SumUp
- Thumbtack
- TomTom
- Trainline
- TrueBill
- Trustpilot
- Twitter
- Uber
- VanMoof
- Virta Health
- VMWare
- Wayfair
- Wave
- Wise
- WarnerMedia & HBO
- Zalando
- Zapier
- Zendesk
- Zillow

*not a complete list

pragmaticengineer.com

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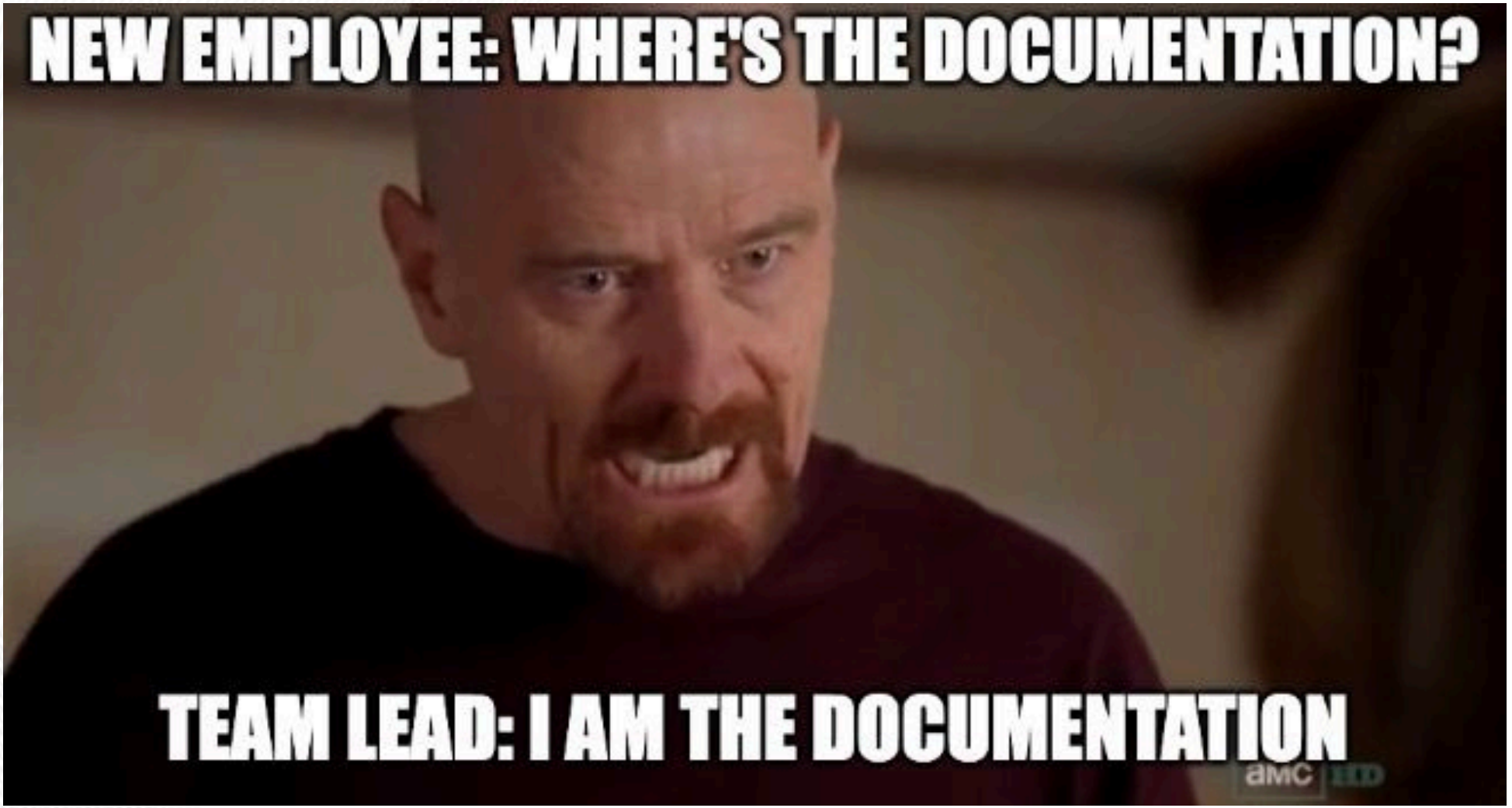
Why is it important



Why is it important

Information Needs in Collocated Software Development Teams

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5.6 Reasoning about Design

Developers sought four kinds of design knowledge:

- (d_1) *What is the purpose of this code?*
- (d_2) *What is the program supposed to do?*
- (d_3) *Why was this code implemented this way?*
- (d_4) *What are the implications of this change?*

focus
cooperative and human aspects of SE.....

What Makes APIs Hard to Learn? Answers from Developers

Martin P. Robillard, *McGill University*

Understanding Design Aspects and Rationale

Many survey respondents expressed the feeling that a lack of knowledge about the API's high-level design hindered their progress:

> *I don't understand the design intents behind the API, the overall architecture, why certain functions are designed as such.*

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Common parts/templates

- Overview/feature description: what problem is being solved?
  - High-level requirements, both functional and quality
- Background/key terms
- Goals/non goals
- Design alternatives, tradeoffs, assumptions
- Decision
- Other considerations/elements of design

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Examples:
Sourcegraph RFCs
(Request For Comments)

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Sourcegraph

Great code search helps you **write, reference, and fix, faster.**

Over 800,000 developers use Sourcegraph to:

- Find anything in multiple repositories, fast
- Navigate with definitions and references
- Make large-scale code changes
- Integrate code with other services

Learn more about Sourcegraph →

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When to use an RFC:

Sourcegraph

- You want to frame a problem and propose a solution.
- You want thoughtful feedback from team members on our globally-distributed remote team.
- You want to surface an idea, tension, or feedback.
- You want to define a project or design brief to drive project collaboration.
- You need to surface and communicate around a highly cross-functional decision with our formal decision-making process.

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Don’t use an RFC when:

- You want to discuss personal or sensitive topics one-on-one with another team member.
- You want to make a decision to change something where you are the decider. In the vast majority of cases, creating an RFC to explain yourself will be overkill. RFCs should only be used if a decision explicitly requires one of the bullets in the previous page.

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RFCs = asynchronous conversation

- There's no implicit demand for an immediate response.
- Reviewers have time to consider and propose changes.
- More people can collaborate at once without clashing.
- RFCs are easily searchable and referable.
- RFCs are retained indefinitely.

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RFC Labels

Sourcegraph

- **WIP**: The author is still drafting the RFC and it's not ready for review.
- **Review**: The Review label is used when the RFC is ready for comments and feedback.
- **Approved**: When the RFC is for the purpose of making a decision, the Approved label indicates that the decision has been made.
- **Implemented**: When the RFC is for the purpose of making a decision, the Implemented label indicates that the RFC's proposal has been implemented.
- **Closed**: When the RFC is for the purpose of collaboration or discussion but not necessarily to make a decision or propose a specific outcome that will eventually become Implemented, the Closed label indicates that the RFC is no longer an active collaborative artifact.
- **Abandoned**: When the RFC is for the purpose of making a decision, and there are no plans to move forward with the RFC's proposal, the Abandoned label indicates that the RFC has been purposefully set aside.

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Observe sourceGraph Design Docs

Docs are publicly available:

https://drive.google.com/drive/folders/1zP3FxdDlcSQGC1qvM9lHZRaHH4I9Jwwa

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Exercise!

- Background/key terms
- Problem
  - Overview/feature description: what problem is being solved?
  - High-level requirements, both functional and quality
- Proposed Solution
- Trade-offs
  - Pros/cons of each alternative
- Definition of Success

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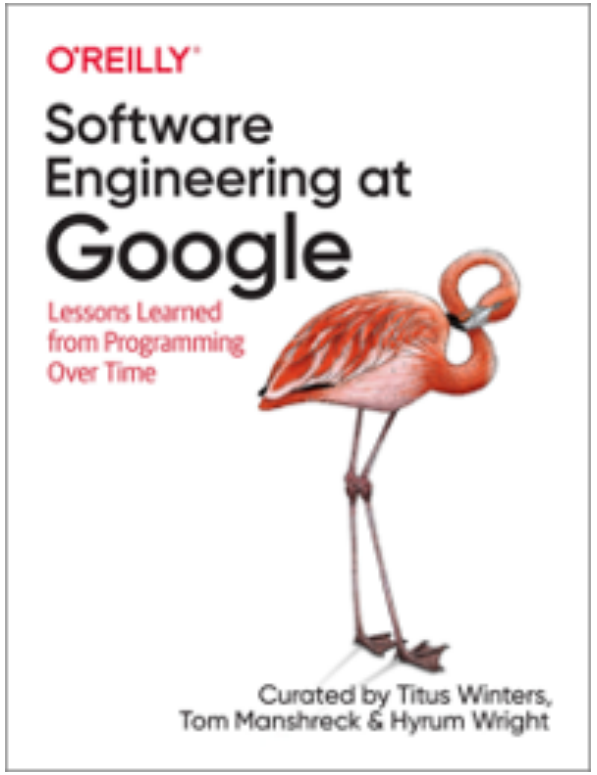
Design Documents

Best design docs suggest design goals, and cover alternative designs, documenting the strengths and weaknesses of each.



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