Google

Software Engineering - Principles

aka SWE Book Theses

What's the Secret?

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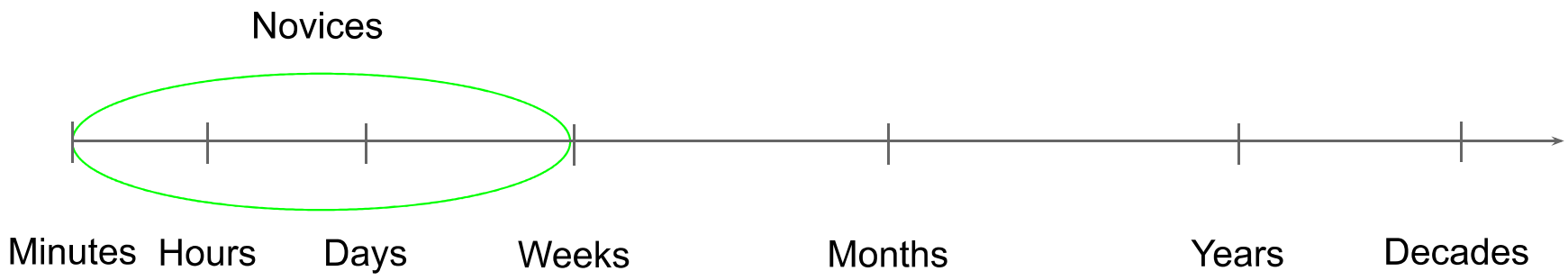
Hint: no silver bullet

Principle #1 - Time

What’s the expected lifespan of this code?

Principle #1 - Time



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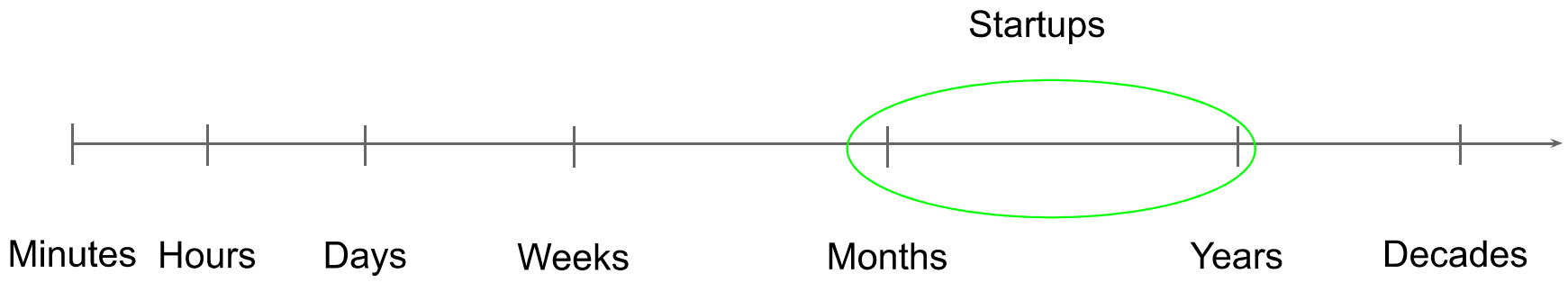

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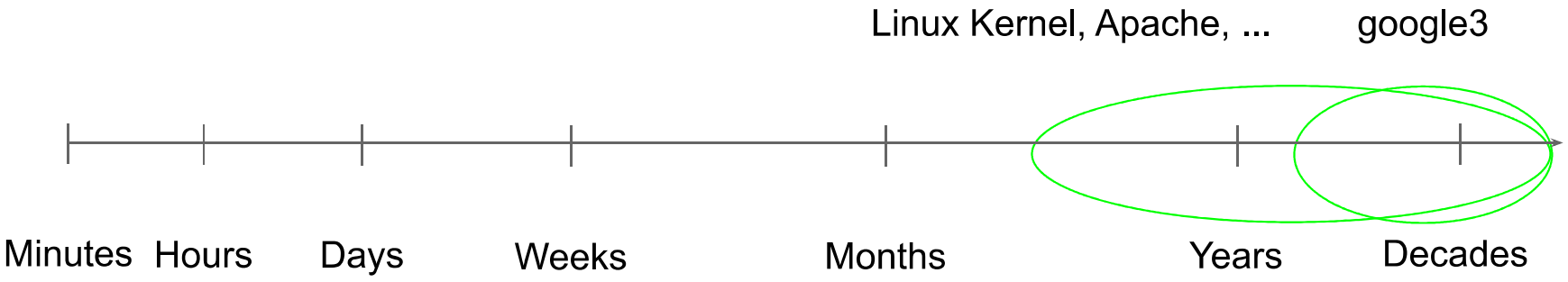

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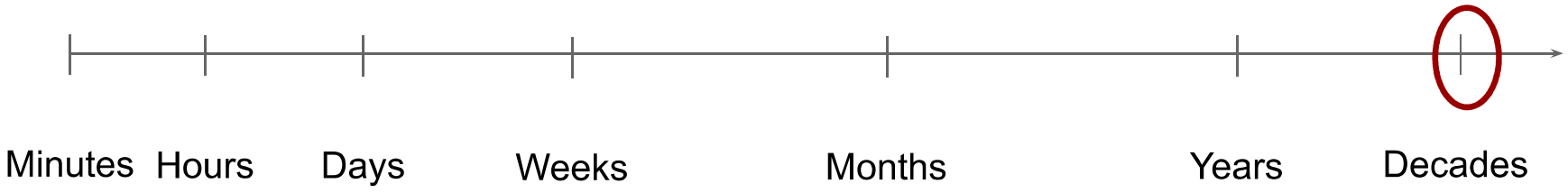

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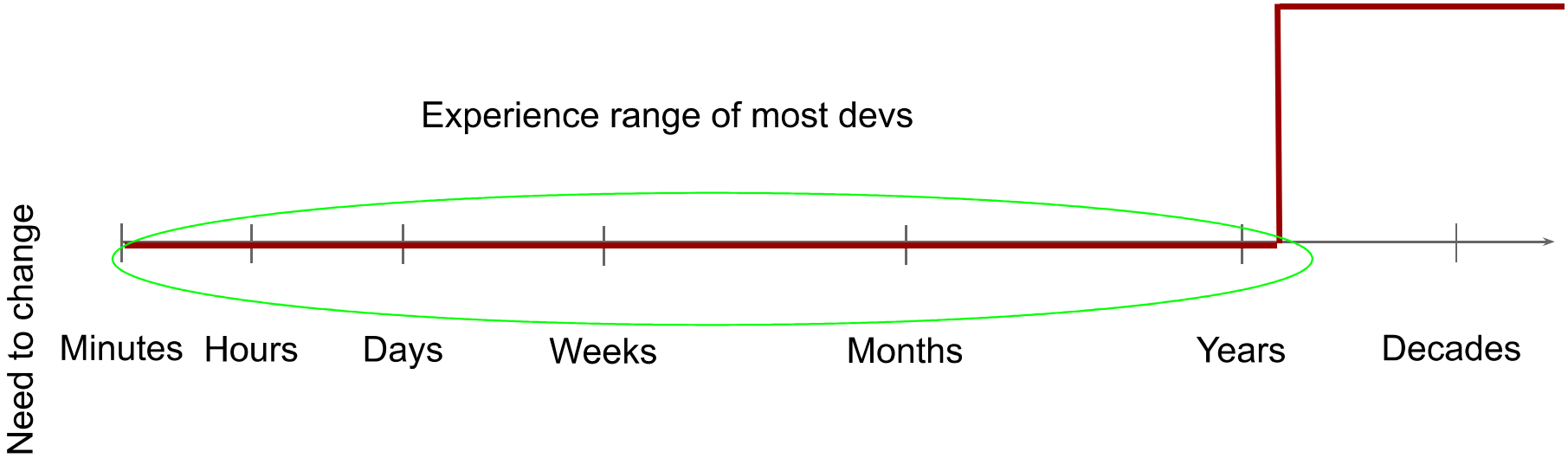

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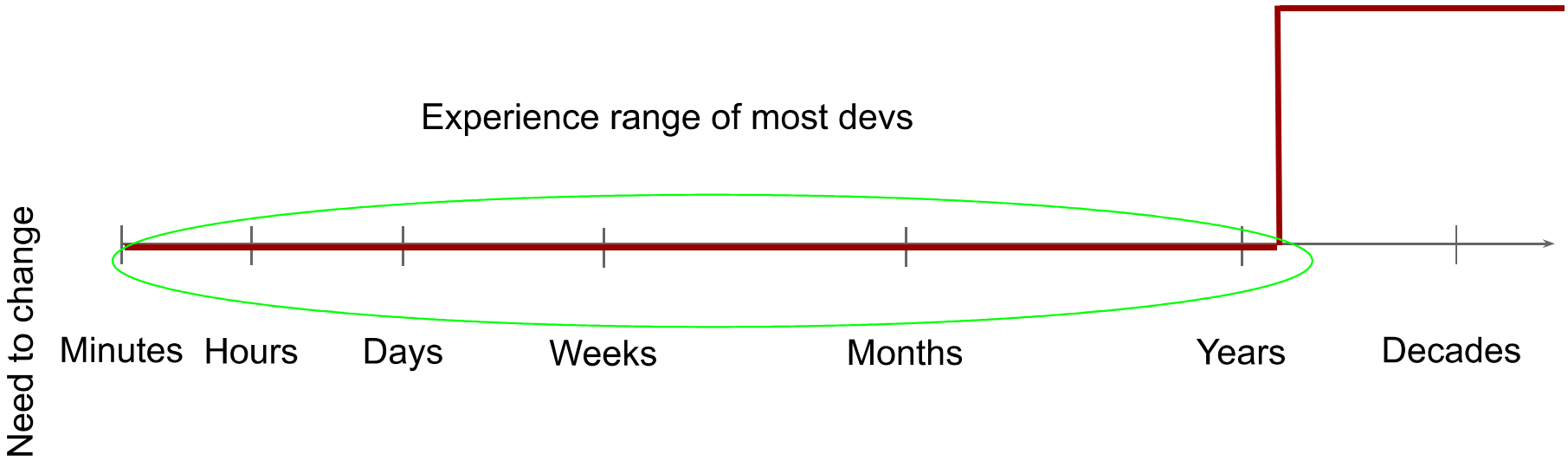

- Performing a task that hasn't been done to this project before
- Doing it without expertise/experience
- Doing a larger-than-usual jump (e.g. v1 to v5, rather than just v5 to v6)

Principle #1 - Time

Sustainability is the goal: for the expected lifespan of your code, you are **able** to change all of the things that you ought to change, safely.

Principle #1 - Time

Many developers have never worked on a sustainable project with a recognized 5+ year lifespan.

Principle #1 - Time

Software Engineering is not merely programming - it is the art of making a program resilient to change over time.

Principle #1 - Time

- Keep in mind the expected lifespan
- Understand that long lifespans are rare, hard to plan for, and not well understood
- Sustainable code is capable of change - that probably means different things at different time scales.
- Sustainable is often hard to get to.

Principles #2: Scale

When change over time leads to growth,

where do we start to fail?

Principles #2: Scale

- Hardware resources (CPU, RAM, Disk, Network)
- Software resources (Addresses, ports)
- Human resources

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Better Deprecation:

- The team responsible does the bulk of the work.

Principles #2: Scale

In a successful organization, everything that must be done repeatedly* must consume sub-linear resources - especially sub-linear human resources.

Scale: Weekly Merge Meeting

About 1 in 4 SWEs have had a regularly-scheduled meeting to discuss “merge schedule.”

- `git` makes it more common to have heavily-branched workflow
- long-lived dev branches are risky to merge
- manage the risk: merge carefully and rarely

How does this scale?

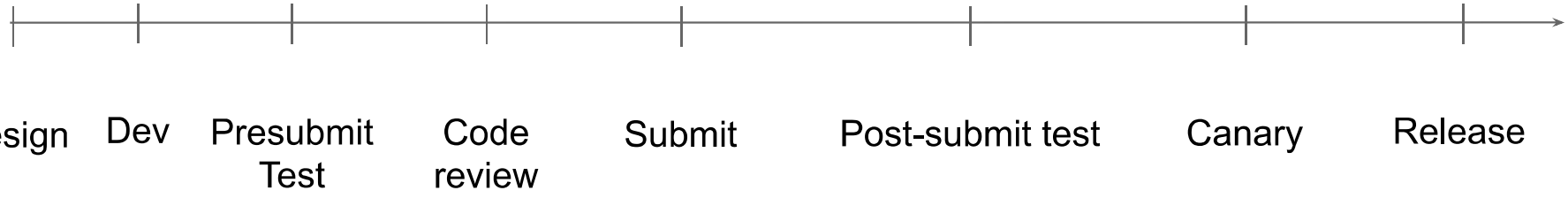
Scale: No Weekly Merge Meeting

Published research: “Trunk-based development leads to better outcomes.”

- No long-lived dev branches
- No choices where to commit
- No choices which version to depend upon

Time & Scale: Shifting Left

Published research: “Trunk-based development leads to better outcomes.”



Principle #2 - Scale

- Be mindful of superlinear scaling costs
- Anything that must be done repeatedly by humans should be sub-linear
- Expertise and automation usually pay off super-linearly
- The “normal” way of doing things may have scaling problems.

Principles #3: Tradeoffs

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Re-evaluate as needed.

What's the Secret?

Google SWE “Secrets”

1. Software Engineering is more than just programming, it’s Time
   - Especially consider the impact of time
2. Be mindful of scale
   - Super-linear scaling is bad for required processes
   - Expertise/specialists can provide super-linear impact in their domain
3. Make evidence-based decisions
   - No “because I said so”
   - Evidence will change over time, re-evaluate as needed

Google SWE Book

- Pillars (these)
- Culture (happy devs, productive teams)
- Policies and Processes (how to make things work smoothly)
- Tools (tech)

Google SWE “Secrets”

It’s programming if “clever” is a compliment.

It’s software engineering if “clever” is an accusation.