The Most Important Thing
How Mozilla Does Security and What You Can Steal

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So you want to steal a security architecture...

Do you actually want to get better?
Do you care about responsiveness?
Can you let go of secrecy?
Why steal from us?

We have been at it for a while...
in a phenomenally hostile environment...
with 180 million users...
and we seem to be doing a lot of things right...
and you can see how we do it
This Diagram is Stupid

Metrics
↓
Design
↓
Implementation
↓
Testing
↓
Response
Good Security is a Feedback Loop

- The idea that security can be wholly top-down, with discrete one-way steps in an orderly flow from start to end is the worst kind of process management fiction

- Your security process should instead ask at every step, “How can we make sure problems like this never happen again?”
The single most important thing you can do is find ways to capture expensive knowledge so that you never pay for the same lesson twice.
Response

A security compromise is the most expensive knowledge of all.
Response

Prepare → Triage → Schedule → Fix → Deploy

Post-Mortem

- Where is it written down?
- Who should help?
- With tests! (More later)
- This is not the same as shipping! (More later)

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Learning from Response

- It's okay for post-mortems to be short
- It's not okay to skip them
- If you make them into blame-finding, they stop being useful (even for blame-finding!)
Ask Questions

• Who did we have to bring in late?
• Why didn’t we notice that we broke the internet?
• How could we have dealt better with the original reporter?
• What were our bottlenecks?

*Write down the answers for next time*

*there’s always a next time*
Testing

Testing is your best defense against forgetting, because you will forget
Data Point

We run:

• 55,000 automated tests
• in 6 test frameworks
• on 4 platforms
• at least 20 times a day
You Already Know Why

- Tests protect your features from security-based changes
- Tests protect your security from feature-based changes
- Tests capture and transfer expensive knowledge
- Tests reduce Bus Factor
Now Make It Happen

- It must be easy to add new tests
  - Yes, this is tricky at first
- Money can be exchanged for goods and services!
- Nothing lands without tests
It’s Hard To Test <X>

• This is terrifying
• Steal another framework
• Don’t underestimate manual testing
Power Tools

• Fuzzing
• Penetration Testing
• YMMV
One More Thing

Tests that don’t run are a waste of everyone’s time

Option: Automatic Gunfire
Buy a box that sits in a corner and runs tests off trunk every hour. Put a gun on it that shoots people who break tests.

Option: Manual Slog
Make check-in approval contingent on running tests, every single time.
Implementation

“We have tests” is not an excuse to keep breaking things
Where Mistakes Are Made

• Strategic-level mistakes can be made in design, but *most security bugs come from mistakes not caught during implementation*

• Your ability to profit from expensive knowledge is highest here, but here is where you’re probably doing the worst job
No-Brainers

• Static analysis tools
• `assert()`
• “Public” Betas
  • Alphas?
  • Source?
Tougher

• Non-security bugs point to security bugs
• Do you have crash reporting?
• No bug happens once
  • Where else are you assuming that a null pointer isn’t exploitable?
• Bad patterns - knowledge that you get to benefit from more than once.
The Game Changer

The most important change you can make at implementation is mandatory review

- Socializes security knowledge by sharing it
- Gatekeeper against “This is little, it’ll be fine”
- $P(\text{Mistake}_1) \times P(\text{Mistake}_2) \ll P(\text{Mistake}_1)$
Design

Every time you eliminate a threat class, an angel gets its wings.
Making Things Right

Make it easier to profit from expensive knowledge

• Design for re-use
• Find areas that keep needing “temporary” field patches and fix them for good
• Design for testability
• Threat modelling
Metrics

Measure what matters, not what’s easy to measure

Now with 12% more bits!
Don’t Know What Matters?

• Ask sales
• Ask your users
• Don’t ask your competitors, they are looking for the easy way out
The #1 Grade-A Stupidest Metric of All

Bug Count

• A focus on bug counting creates perverse incentives for security
• Developers hide bugs from management
• You hide bugs from customers

Counting bugs teaches you to bury all the expensive knowledge you should be sharing
Think Harder

- Days of exposure
- Average time to deploy fix
  - Better would be avg. time until > 90% of users are using the fix
- Customer downtime
Get Creative

- Number of regressions per update cycle
- Number of all nighters
- Start using similar metrics when judging your own suppliers & platforms
- Tension between metrics can be a good thing, if it pulls people towards awesome
Stupid Criticisms

• This model is totally reactive, not proactive
• This model is steady-state, not innovative
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Remember This Slide

• Capture expensive knowledge everywhere, so that you don’t have to re-learn it
• Apply that knowledge everywhere
• Nothing lands without tests
• Nothing lands without code review
• Counting bugs is stupid, try harder
Credits