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HARRIER
PROFESSIONAL SERVICES

- Autodidact 4 lyfe.
- Software Security
- Startups . . . Fortune 500s
- Likes Hackers, Brazilian Jiu Jitsu

Credits

- Gary McGraw
  - McGraw, Gary. *Software Security: Building Security In*. Upper Saddle River, NJ: Addison-Wesley, 2006. Print.
  - Silver Bullet podcast (https://www.cigital.com/podcast/)
- Pravir Chandra
  - OpenSAMM http://www.opensamm.org/author/chandra/
  - youtubes.
- Sunny Wear
  - Wear, Sunny. *Secure Coding Field Manual*. 4th ed. Charleston, SC: Sunny Wear, 2015. Print.
  - Local training
- US CERT
  - https://buildsecurityin.us-cert.gov/

Software Assurance

The OWASP way

Remixed SAMM 1.0 for presentation. All graphics marked for reuse.

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OpenSAMM.org

Objective

Narrative overview.

Quick comprehension.

Introduce the model, then briefly illustrate each practice.

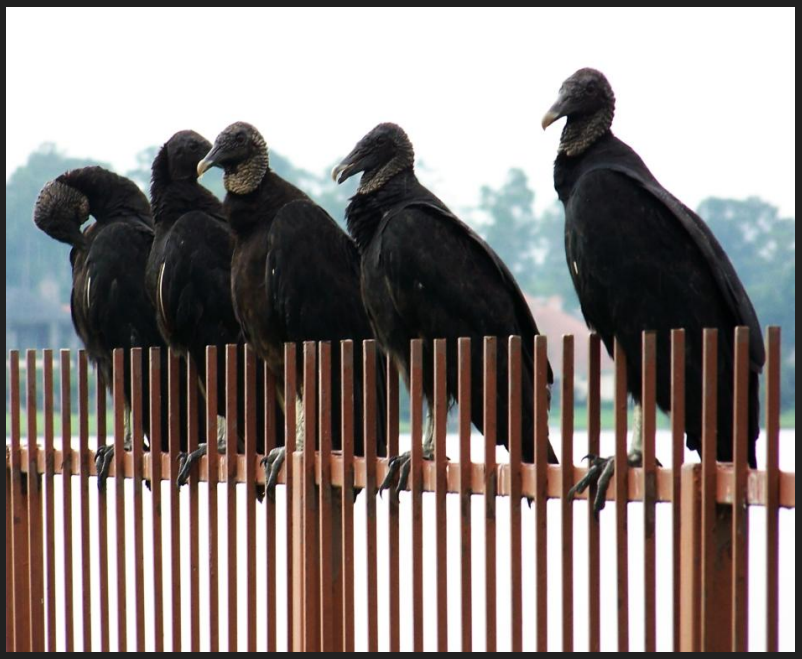
Goals:

- Enable quick understanding of Software Assurance for a wide audience.
- Inspire the adoption of assurance activity.

Why Care?

Why care?

Compliance has noticed.



Sadly, this is important to the adoption of Assurance in the SDLC:

- A group of buzzards is called a “wake”.
- The buzzards stick around when the herd’s experiencing significant loss

PCI-DSS 3.1 section 6.3:
“Without the inclusion of security during the requirements definition, design, analysis, and testing phases of software development, security vulnerabilities can be inadvertently or maliciously introduced into the production environment.”

HIPAA Security Rule:

- Speaks specifically to NIST.
- NIST SP 800-64 reads “To be most effective, information security must be integrated into the SDLC from its inception.“
- It’s said so since 2003.

Why care?

No clear perimeter.

Not simple.

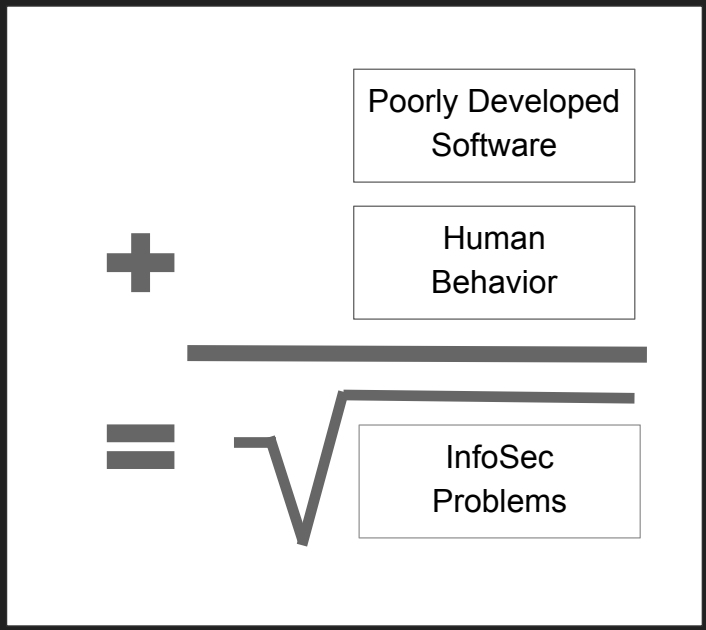
Discreet shoe-fitting device.

Trends in software:

- Perimeter dissolves
- Complexity increases
- Extensibility increases

Why care?

Risk Convergence.

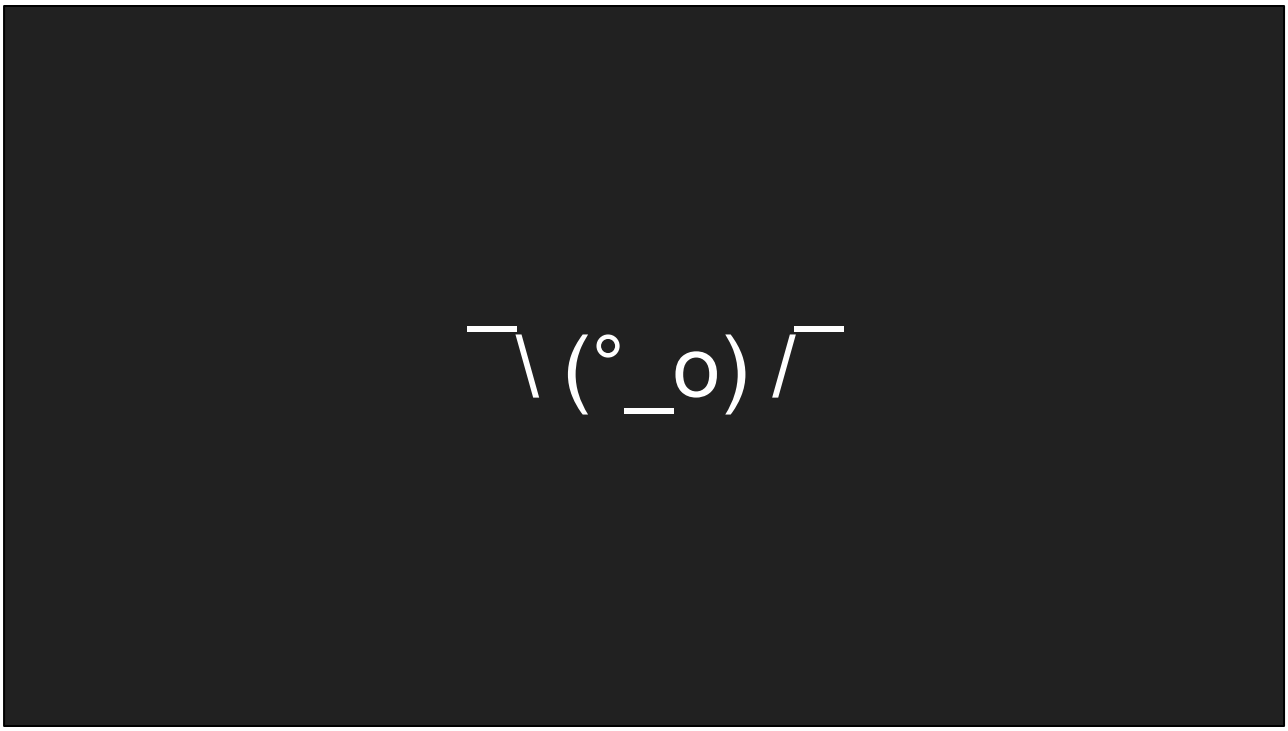


Software assurance in general addresses:

- Behavior
- Development of software

There are other places where this convergence exists . . .

Why OpenSAMM?



“It Depends.”

- ISO, IEEE are not freely available.
- The freely-available consensus standards evolve faster, and do map up.

Options:

- BSIMM6
  - Descriptive
  - Answers “weakest zebra” question (-- McGraw)
  - More detailed, software focused
- OpenSAMM
  - Prescriptive
  - Great marketing collateral . . .
  - Easy to consume at all levels

Model Intro

Open Software Assurance Maturity Model

http://www.opensamm.org/downloads/SAMM-1.0-en_US.pdf

Assurance

Deeds not words. Deeds not tools.

Assurance = **Integrity.**

Saying “We care about security” . . . and proving it with our actions.

Maturity

Quantify progress.

Apply flexibly.

How much assurance do we really have?

Model

“All models are wrong . . . ”

“ . . . but some are useful.”

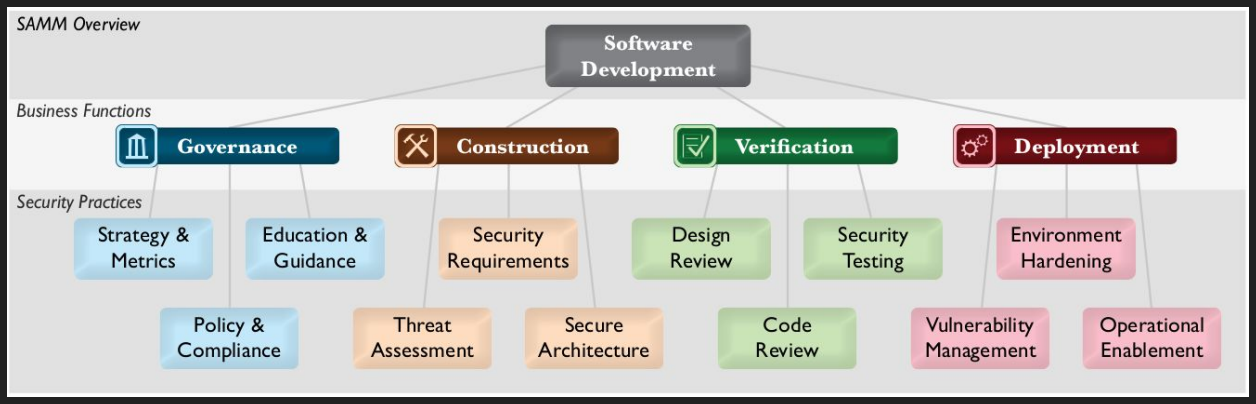
- George Box

Zen moment: models are not reality.

George Box has been called "one of the great statistical minds of the 20th century". Use a Bayesean classifier?

https://en.wikipedia.org/wiki/George_E._P._Box

OpenSAMM



Look at the back of the handouts...

Activity Overview


Governance

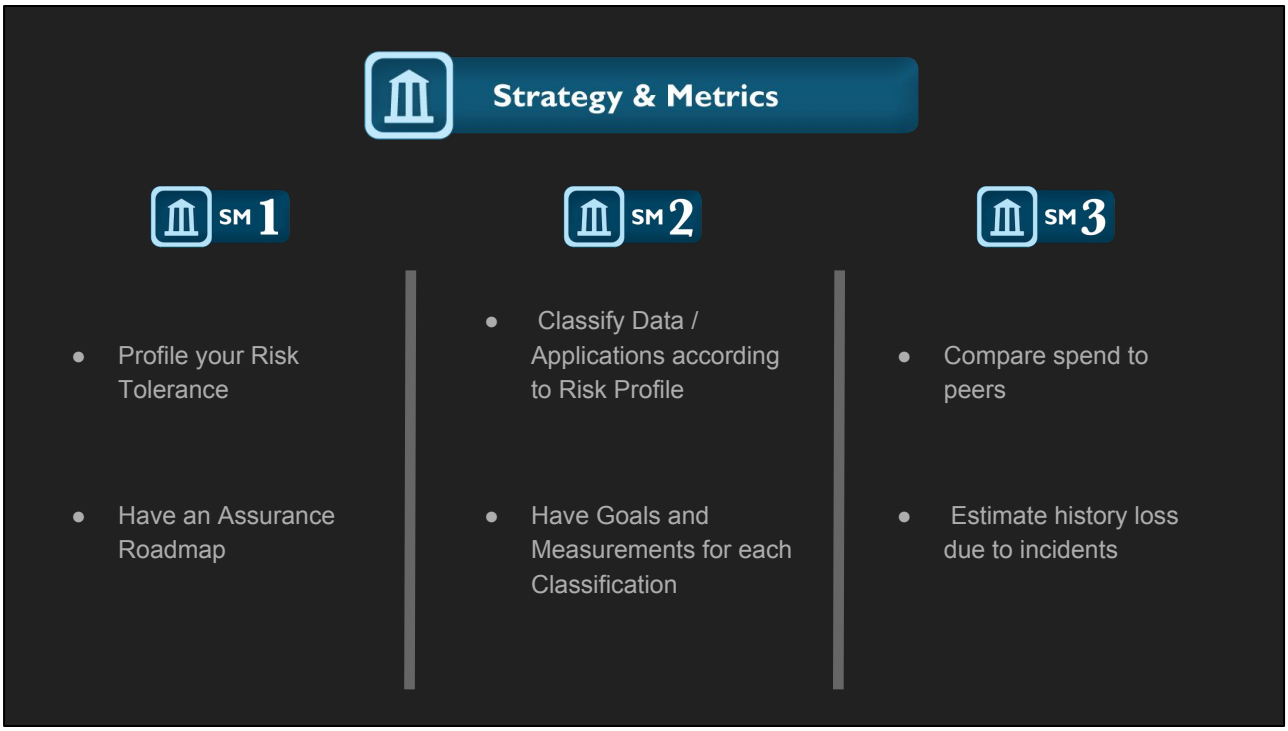
Difference between fear and risk?

Have we described the demons? Do we have a plan to escape them?

- Record your fears (define risk profile).
- Have a roadmap from fear to assurance (OpenSAMM roadmap).
- Inform with data **(internal and external)**.

“The Triumph of Death” by Pieter Bruegel the Elder. Depicts 16th century security fears.

https://en.wikipedia.org/wiki/The_Triumph_of_Death

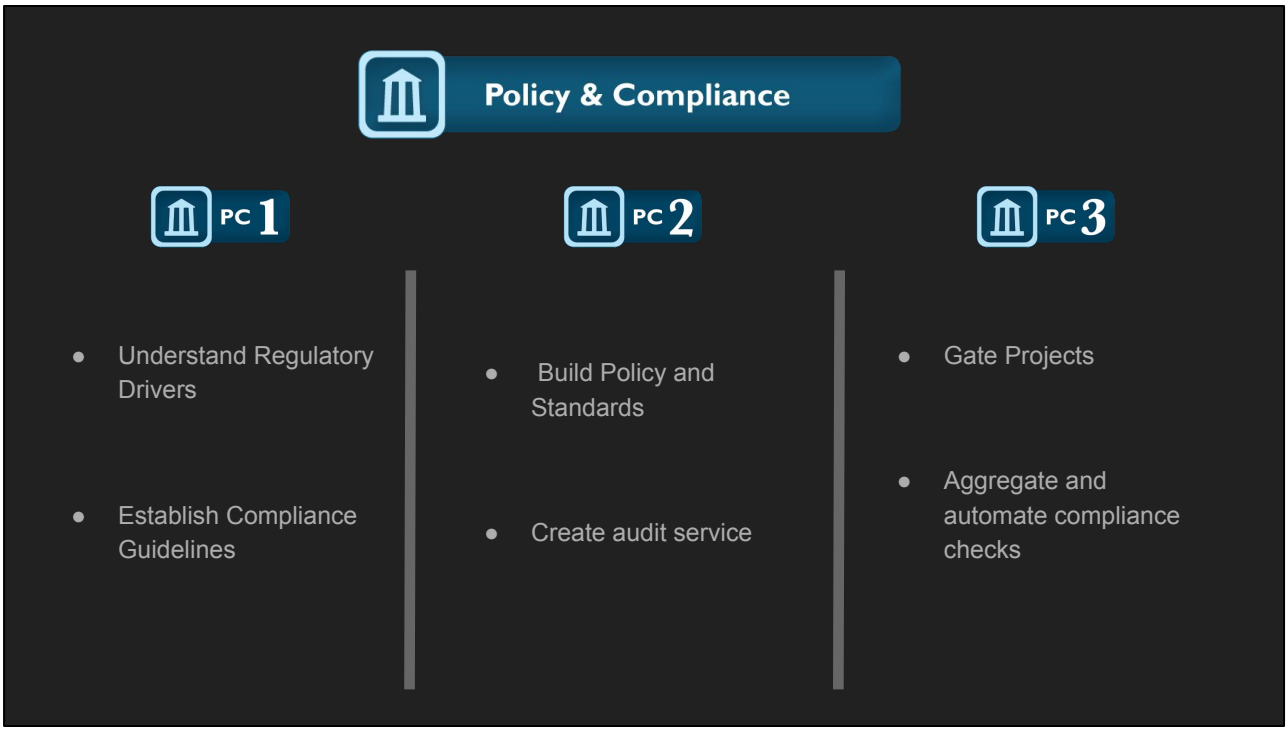


Who are your risk managers?

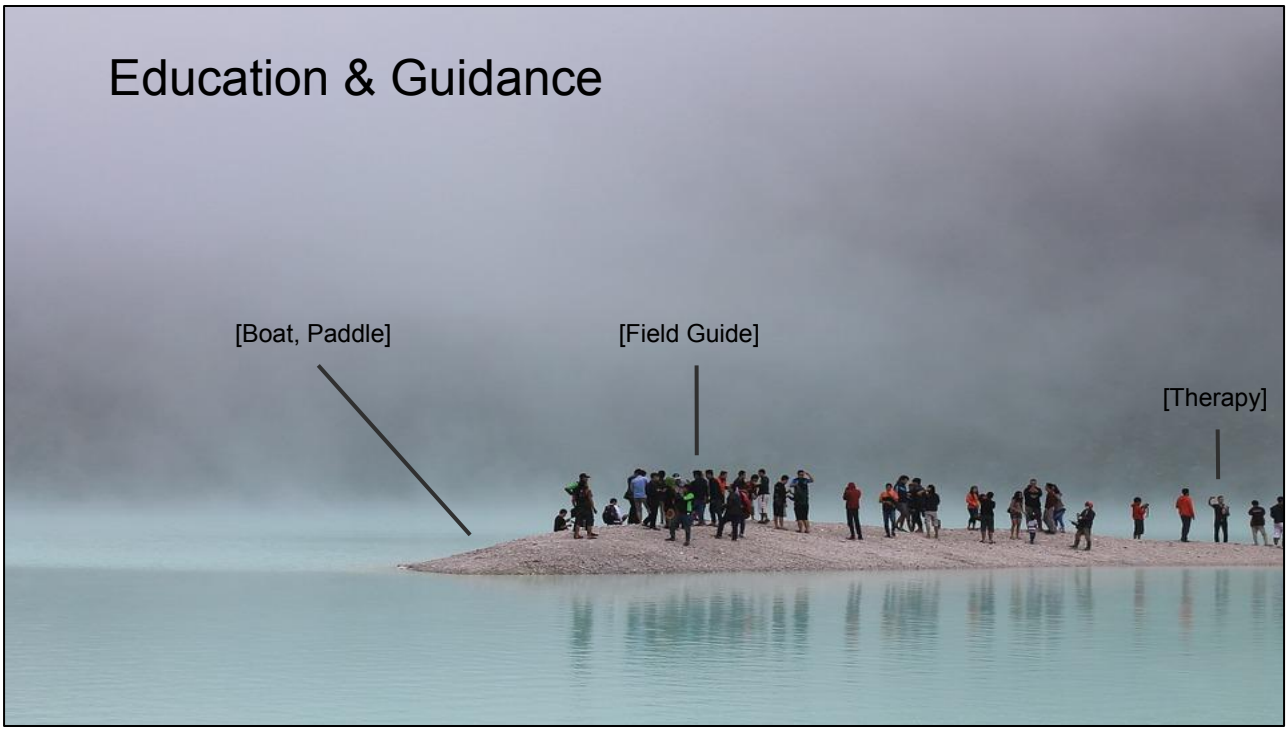
- Senior, Strategic Leadership.

- Understand and meet external requirements.
- Drive internal security standards.
- Maintain integrity through audit.

Regulatory framework is an imperfect vision of security, set forth by well meaning people. They are a place to begin, not a place to end.



- Policy and Standard for SECURITY and regulation.



- Offer help mitigating security bugs and flaws
  - Resources, guides advice
  - Coaching
- Continue education

When venturing into new territory, it's easy to feel stranded. **Don't drop a development team in the wilderness without a guide.**


Education & Guidance
EG 1
Do Technical Security Training
Build Library of Technical Guidance
EG 2
Do Role-Specific Training
Provide Expert Consulting Service
EG 3
Create Support Portal
Do Role-based Certification

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Construction

Remember the demons? The Soviet Union was one of them post WWII (arguably).
U2 was commissioned by CIA to better understand Soviet capability and intention. This info was applied to national security.

Note: Threat assessment is NOT threat intelligence(™). It is threat intelligence applied to the development of a system. [Deeds not tools!]

Post-WWII, only visual intelligence was from German spy planes. U2 could fly above fighters, radar and SAM...
https://en.wikipedia.org/wiki/Lockheed_U-2


Threat Assessment
TA 1
Build Threat Models
Profile Attackers
TA 2
Develop Abuse Cases
Rate and Weight Threats
TA 3
Risk-rate Third-party Components
Consider Compensating Controls in Models

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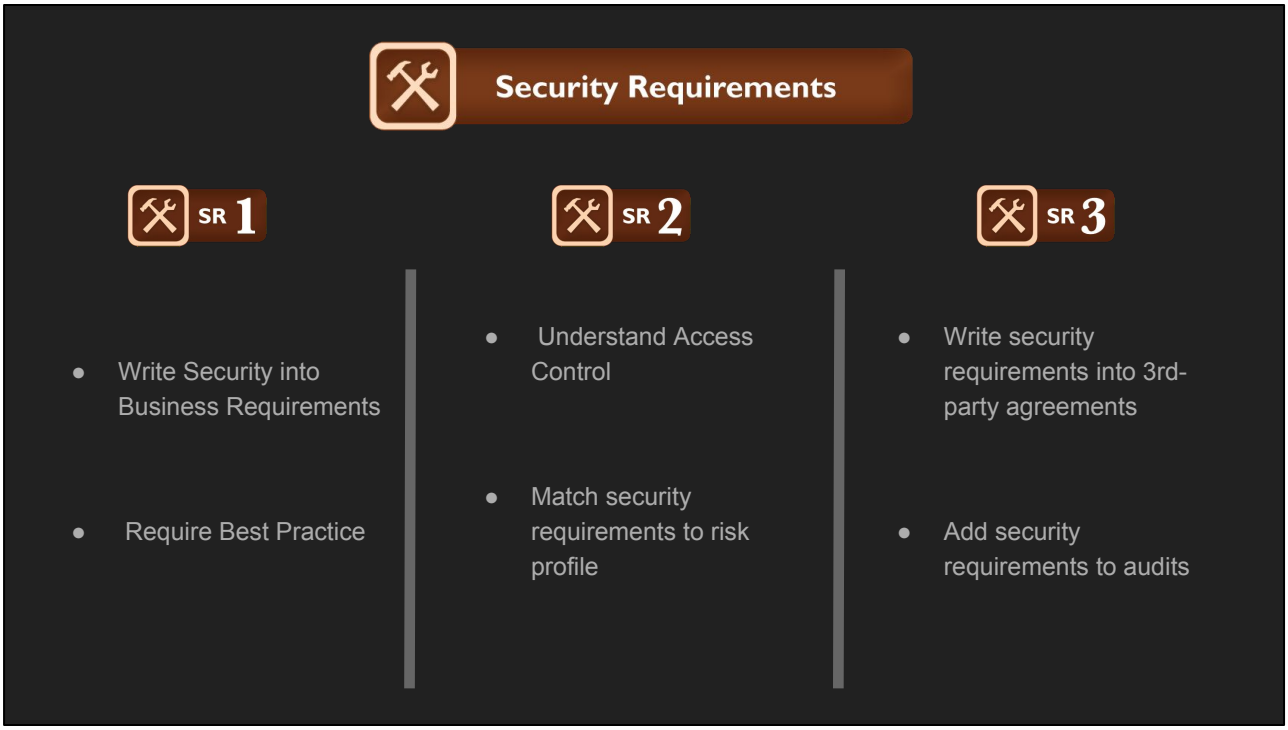
Specify the expected behaviors within a system.

How should they interact with each other, how should they interact with actors.


Security Requirements
SR 1
Write Security into Business Requirements
Require Best Practice
SR 2
Understand Access Control
Match security requirements to risk profile
SR 3
Write security requirements into 3rd-party agreements
Add security requirements to audits

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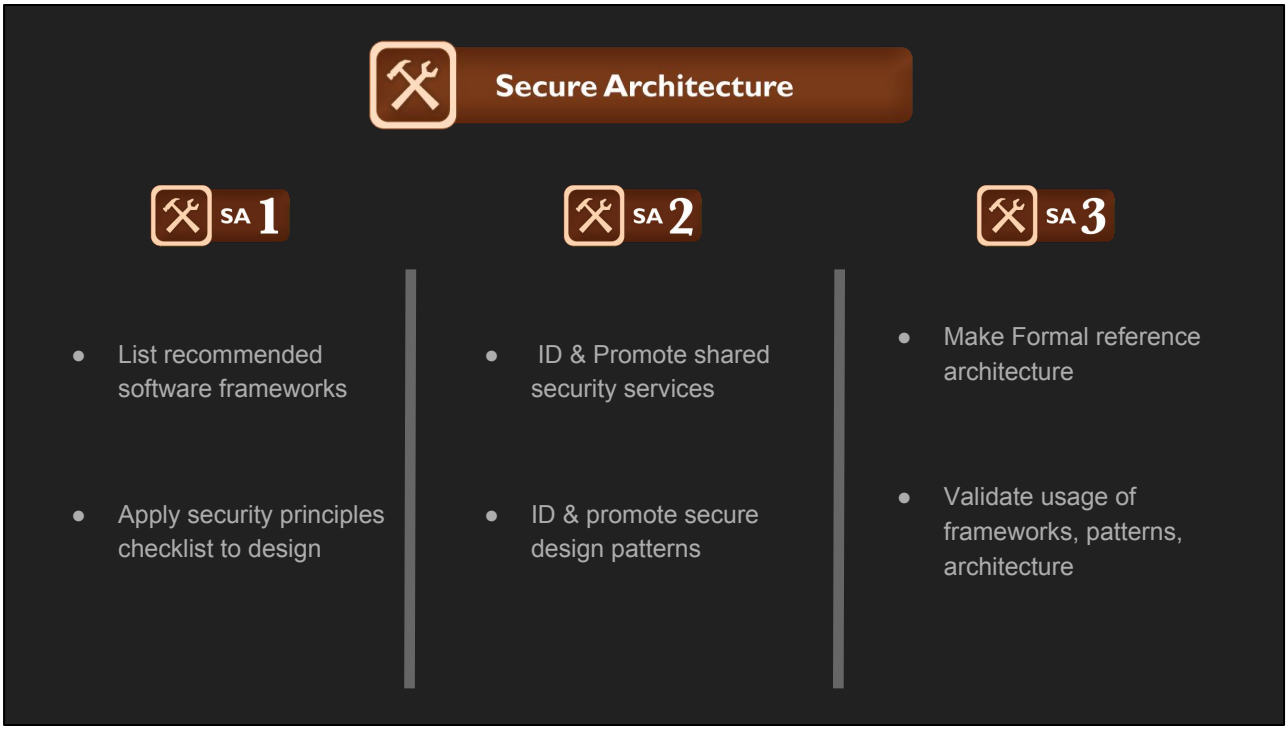
Define how you build the thing . . . Securely. This house had a blueprint, but . . .
“We use this framework”
“We build in this way”

threat model = the cold. Architects said “because cold, 2” extra foundation, special joints for the roof, and R32 minimum insulation ratings. Put your pipes in the middle of the house”

Did the architect then leave the project? No.


Secure Architecture
SA 1
List recommended software frameworks
Apply security principles checklist to design
SA 2
ID & Promote shared security services
ID & promote secure design patterns
SA 3
Make Formal reference architecture
Validate usage of frameworks, patterns, architecture

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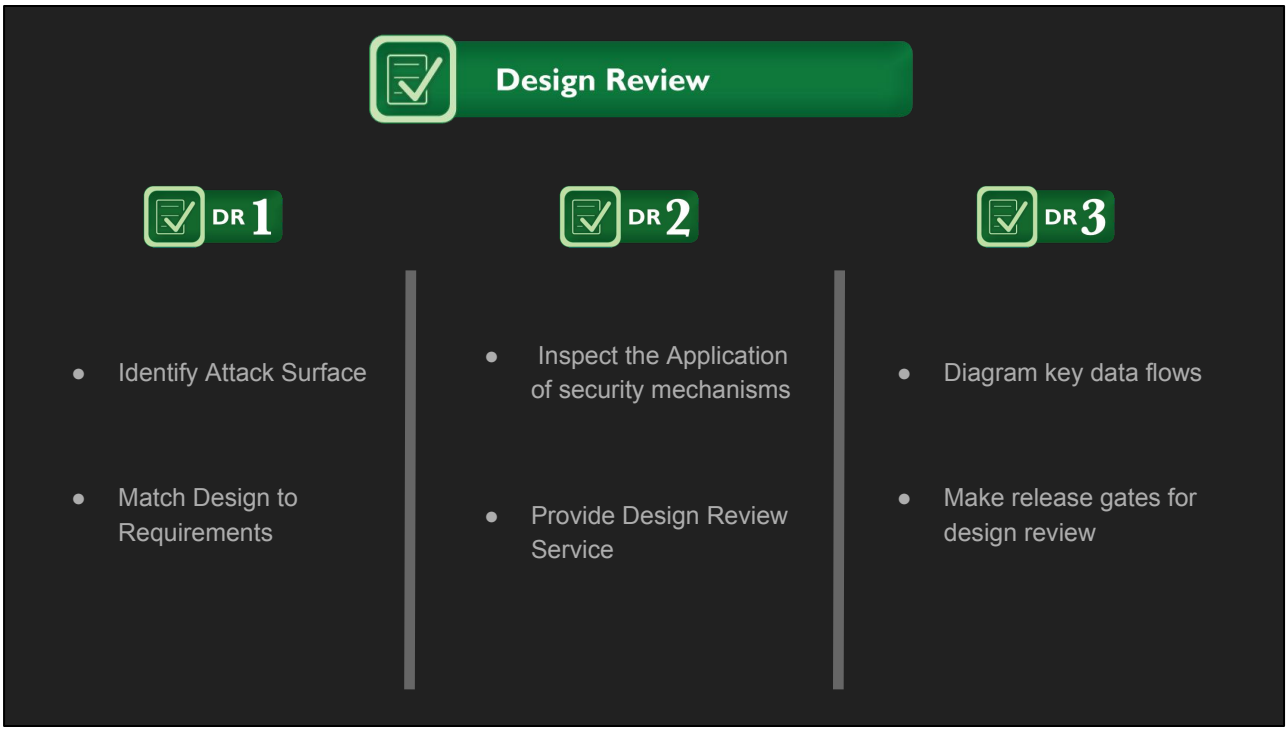
Verification

- Consider design and architecture of built software.
- This is an exercise in detecting flaws:
  - does the design reflect the purpose of security?
  - Is the vision of architecture represented in the substance of what which is created.

Lee Green, VP at IBM. In quote, he speaks of the Eames, who were credited with inspiring IBM’s design philosophy.
https://en.wikipedia.org/wiki/Charles_and_Ray_Eame

Legs = Security mechanism


Design Review
DR 1
Identify Attack Surface
Match Design to Requirements
DR 2
Inspect the Application of security mechanisms
Provide Design Review Service
DR 3
Diagram key data flows
Make release gates for design review

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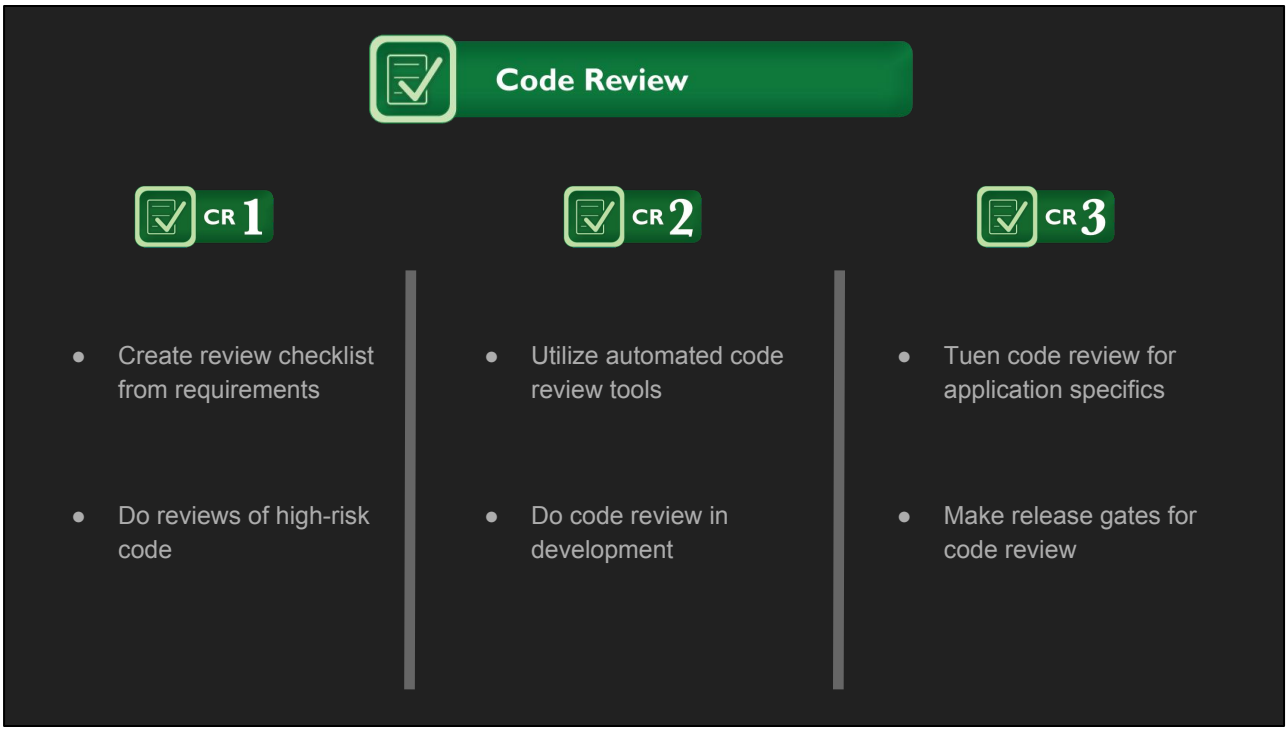
Inspect the code for bugs.

Focus efforts based on risk.


Code Review
CR 1
Create review checklist from requirements
Do reviews of high-risk code
CR 2
Utilize automated code review tools
Do code review in development
CR 3
Tuen code review for application specifics
Make release gates for code review

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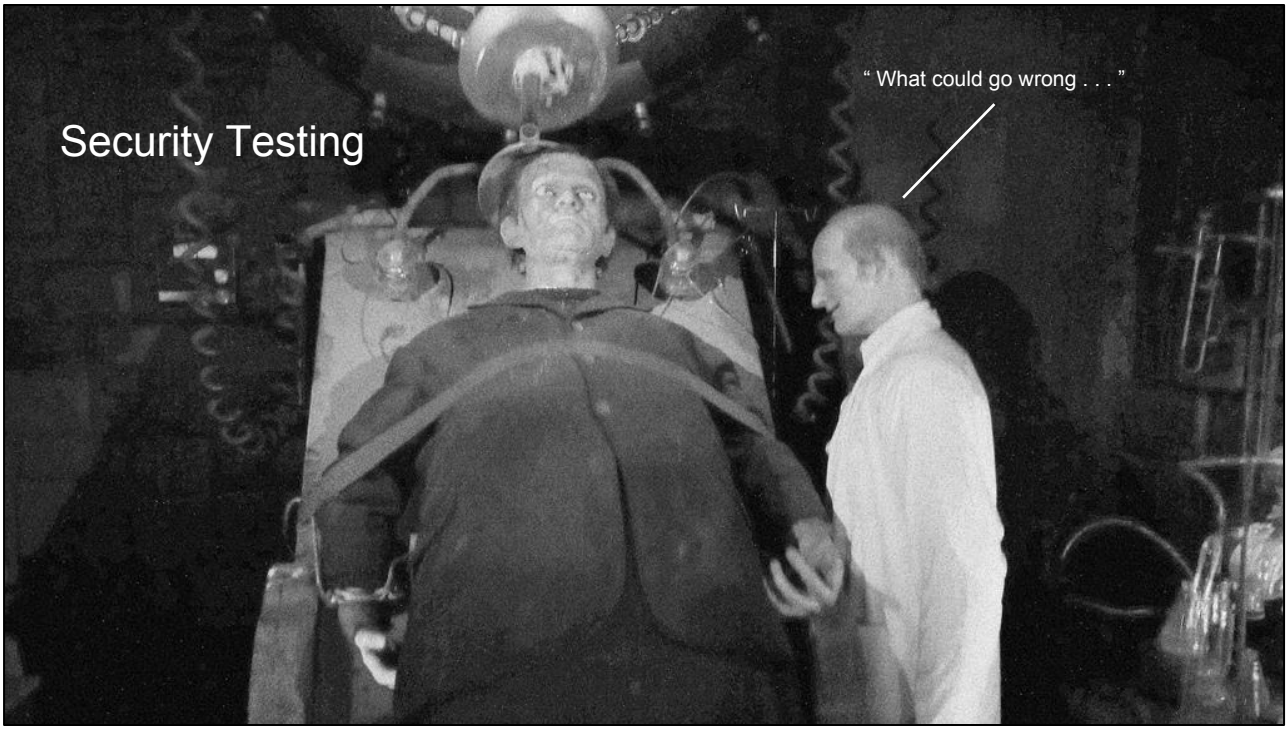
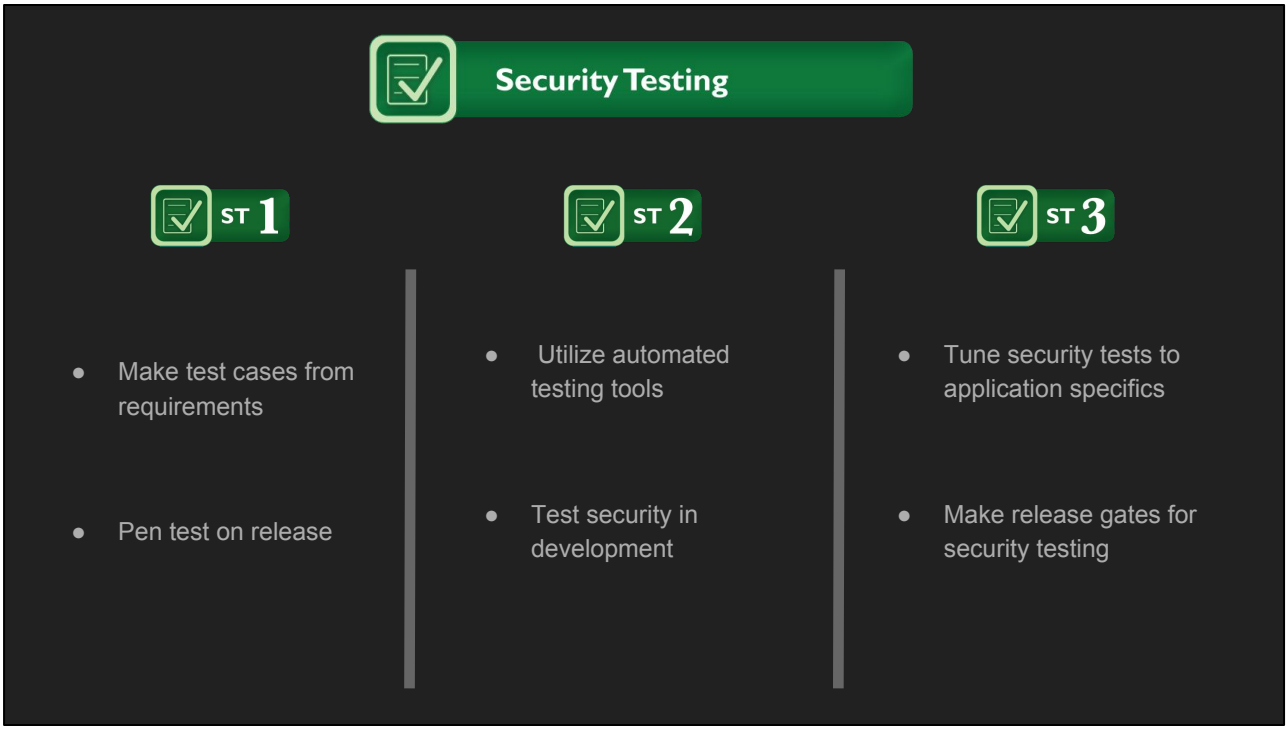


- Inspect the monster in its runtime environment, living and breathing.
- Question and test assumptions made in building it.

No matter how good the Dr.’s intentions, the monster never quite cooperates...


Security Testing
ST 1
Make test cases from requirements
Pen test on release
ST 2
Utilize automated testing tools
Test security in development
ST 3
Tune security tests to application specifics
Make release gates for security testing

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Deployment

Handling vulnerabilities, and handling incidents (two sides, same coin)

- Define Roles (the PM receives the report, the team lead forms the incident response group)
- Define the bat-signal.


Vulnerability Management
VM 1
Identify point of contact for project
Make loose incident response team
VM 2
Define incident response process
Adopt a disclosure process
VM 3
Do root cause analysis on incidents
Measure trends in incidents

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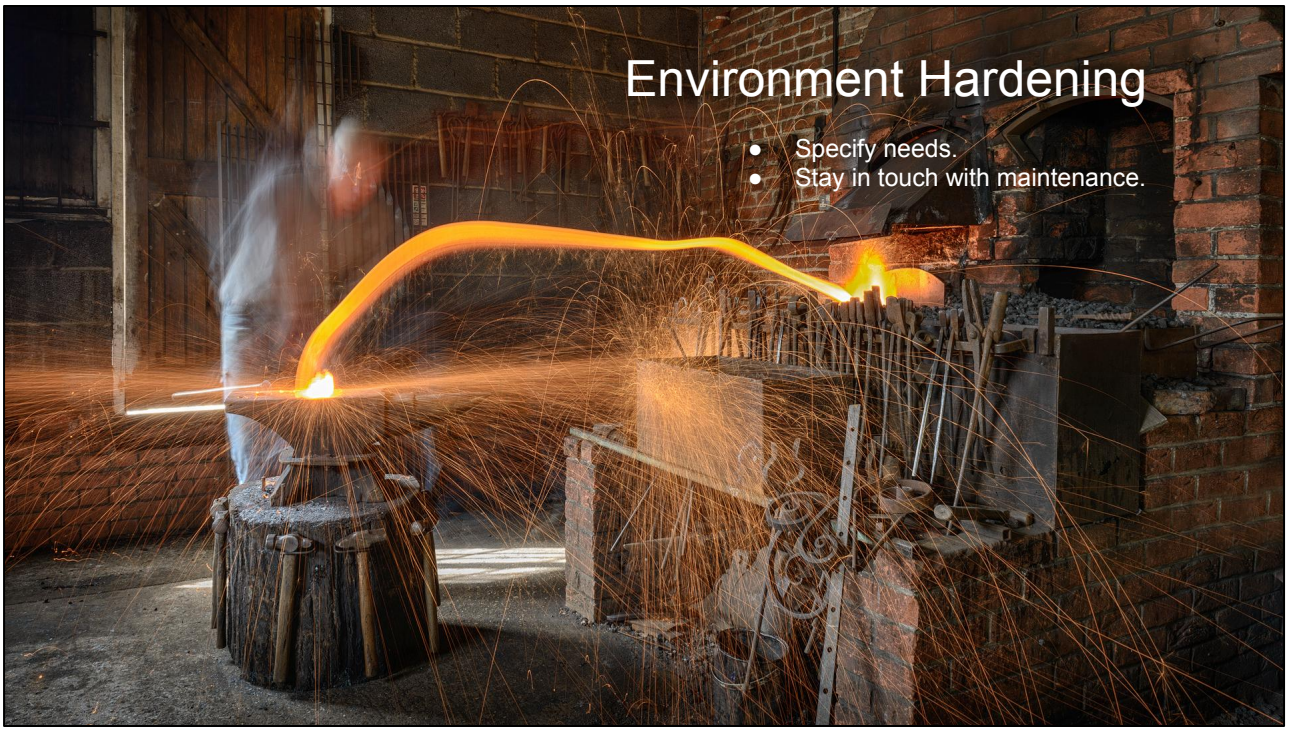
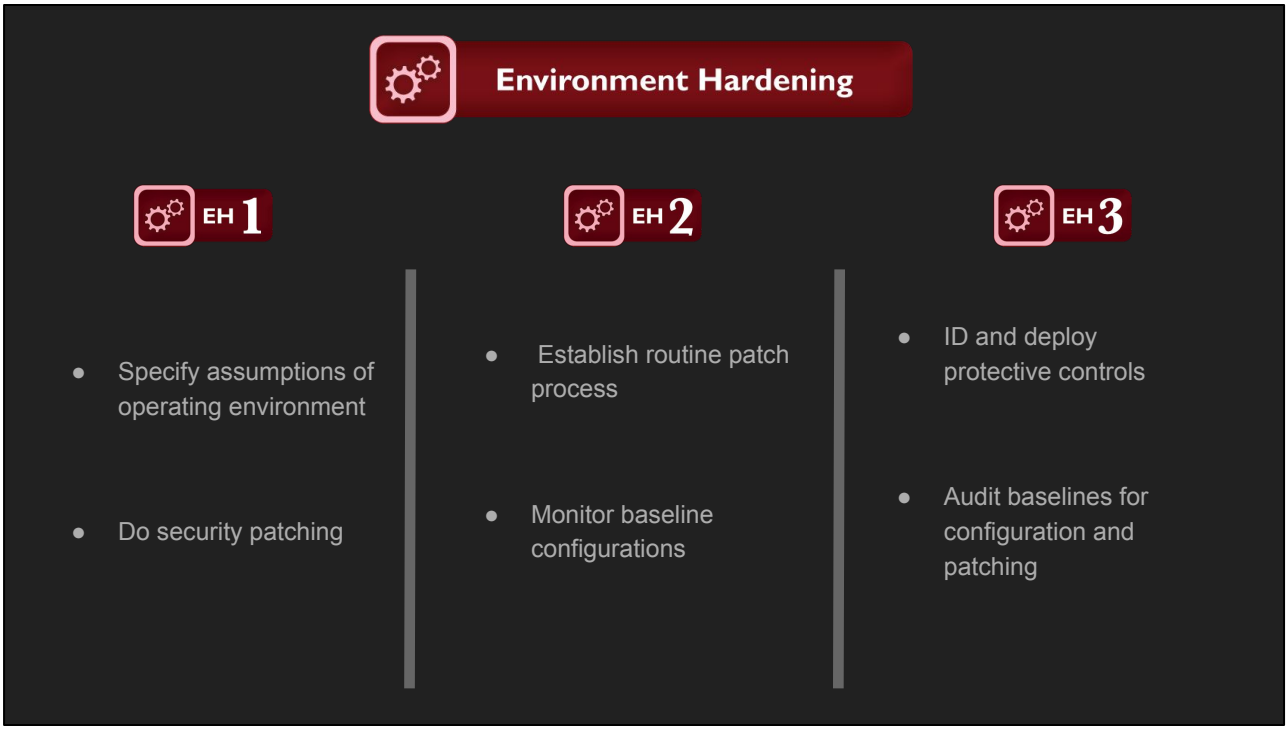


Ensure the underlying infrastructure is configured securely.

- Maintain a configuration spec (project group communicates effectively, expressing the configurations needed to run the app securely)
- Manage patches (with communication…)

What happens when Infrastructure and the Project don't communicate? patches break apps, and apps confound infrastructure.

Note that infrastructure is much more than this: From the perspective of software projects, they train the horse, and infrastructure puts the shoes on it.


Environment Hardening
EH 1
Specify assumptions of operating environment
Do security patching
EH 2
Establish routine patch process
Monitor baseline configurations
EH 3
ID and deploy protective controls
Audit baselines for configuration and patching

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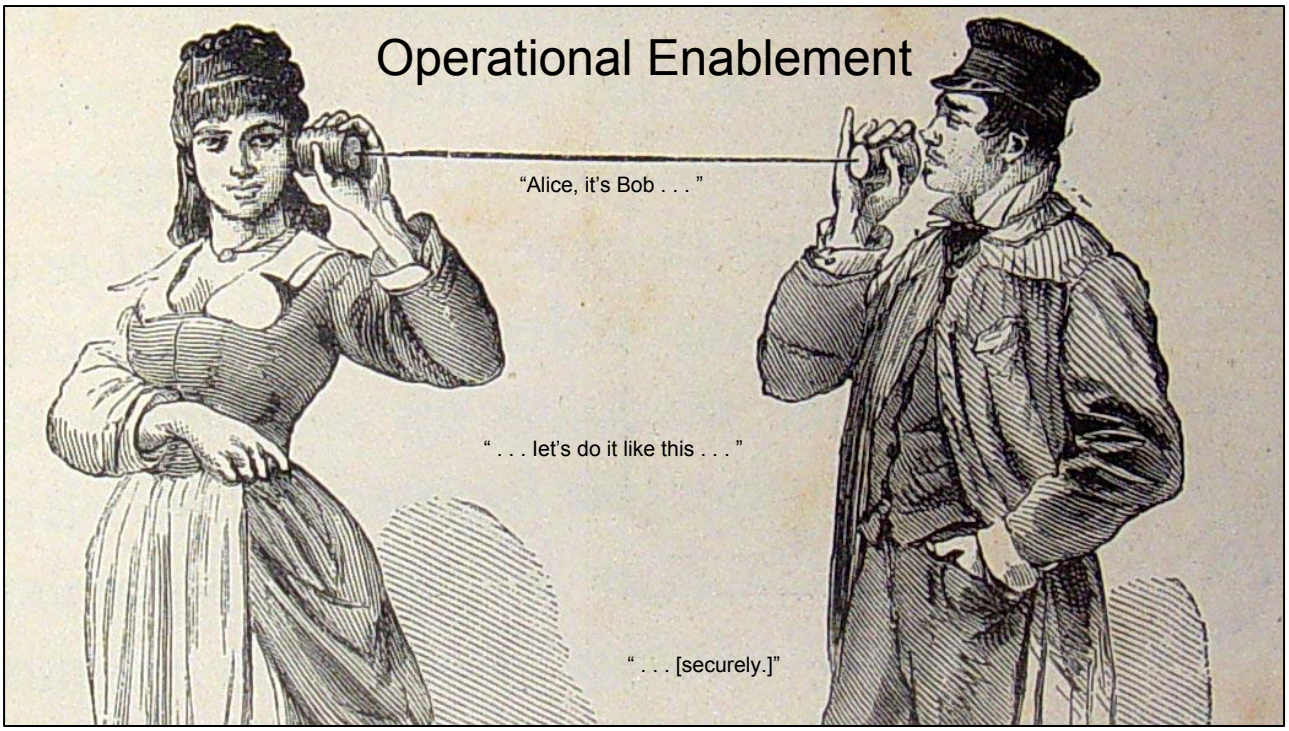
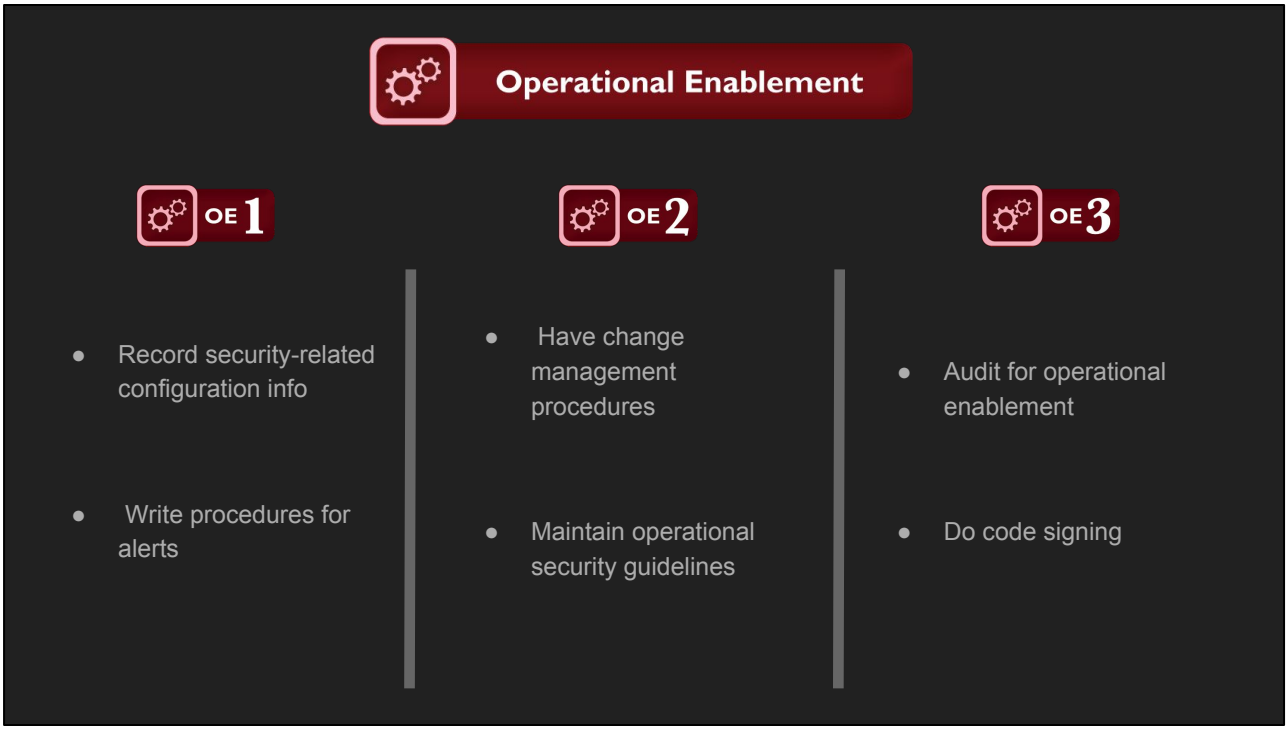


Communicate best way to use the software.

- Gather information critical to using an app securely.
- share that information to the appropriate people (users, operators, administrators).


Operational Enablement
OE 1
Record security-related configuration info
Write procedures for alerts
OE 2
Have change management procedures
Maintain operational security guidelines
OE 3
Audit for operational enablement
Do code signing

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Case Study

Fin.