Sec App Dev 2010

The View From the Giants' Shoulders

Ken van Wyk

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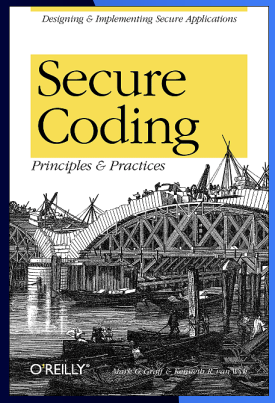
Work Experience
- 20+ years in Information Security
  - Carnegie Mellon University CERT/CC Founder
  - U.S. Department of Defense CERT
  - SAIC, Para-Protect
  - President and Founder, KRvW Associates, LLC (http://www.krvw.com)

Security Work
- Technical lead on hundreds of commercial engagements since 1996, including
  - Application security assessments
  - Enterprise risk assessments
  - Secure network architecture
  - Security testing of enterprises and applications
- Author of two popular O'Reilly and Associates books
  - Incident Response: Planning and Management
  - Secure Coding: Principles and Practices

Credentials
- BS Lehigh University 1985, Mechanical Engineering

Personal Interests
- Travel, world cuisine, wine, mountain biking, zymurgy

Family (http://www.vanwyk.org/ken)
- Wife, two spectacularly spoiled basset hounds



Introductions

Please tell us a little about your

- Software interests
- Software dev technologies
- Any specific topics you want to learn about this week?

Headlines

Why aren’t things improving?

Learn from history

We don't pay enough attention to our failures

Consider other engineering disciplines

- Study and learn from mistakes
- Continuous improvement

Lack of knowledge

- Developers tend to lack security knowledge
- Security team tends to lack development knowledge
- Not healthy
  - "Us" and "them"

We're overly trusting

- We tend to have misplaced trust in our users
- Sometimes users are malicious
- Sometimes they don't even try to be

Focus

- Too much attention is paid to functional spec
- Consider what can go wrong as well
  - Most of what we care about in security is in the non-functional areas

Old school paradigms

- Old school information security solutions don't adequately protect the software
- Consider IM, Skype, WiFi, VPNs

Testing isn't working

- Software testing does not adequately address security
- Penetration testing is not sufficient

The Road Ahead

If that's not enough, what should we do differently?

You'll hear many answers to that this week

Let's consider a few things first

What is “secure enough”?

- Is it enough to stop the bad guys?
- What about interfacing with the security team?
- What other responsibilities do we have?

Case study: Biotech firm

- Business servers crashing 1-2 times per day
- Security personnel found a “ping of death” attack
  - Originating on a company PC
  - Which one? ???
  - Logs vacuous

Case study, cont'd

- Company called in outside CSIRT to investigate
- System logs told us almost nothing
- Network data showed level 3 data
  - Attacker spoofed IP

Case study, cont'd

Impact

- Downtime ~ 48 hours
- Costs ~ USD$10 M
- Not reported publicly
- Attacker found but never arrested

Completely avoidable

- Application logging
- Evidentiary support

Case study: Financial firm

- CEO makes bold security statement on CNN
  - Firewall/IDS alerting ensues
- Company calls external CSIRT to investigate

Case study, cont'd

- Logging sources
  - Router (netflow)
  - Firewall
  - Web server
  - All quiet in middleware
  - Database transactions
- None of it was useful
  - Why?

Case study, cont'd

- Impact
  - No downtime
  - Costs ~ USD$250k
  - No attacks found
  - Firewall bug fixed
- Completely avoidable
  - Cohesive logging
  - Time synchronization

If it were simple...

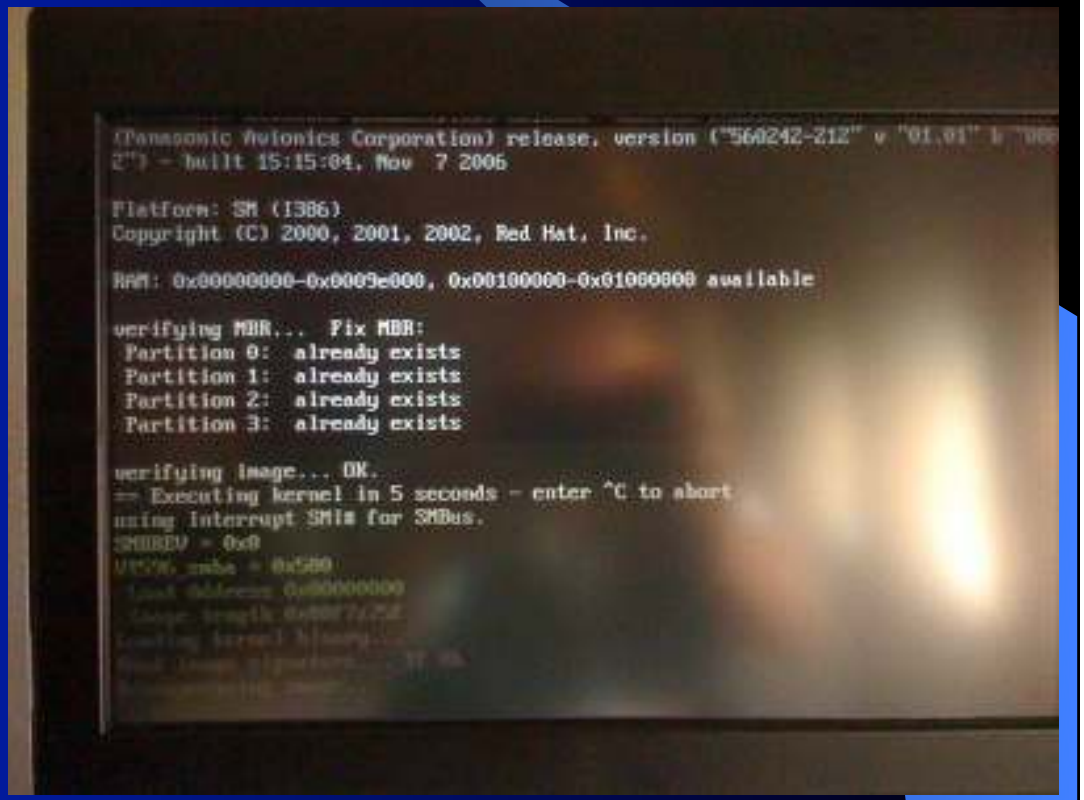
It's not just as simple as logging everything

- That often gives away too much data
- Seriously

Embedded systems too

Seen on a Boeing 747-400 while the system was being rebooted

- Due to an electronic fault



Not serious enough?

Seen on an ATM

Some customer cards caused a system fault...

Even the little mistakes count

Automated parking kiosk at IAD airport

Web sites too

CNN mobile portal

Mistakes remembered

The public sees these mistakes and remembers them

We've got to do better

Until then, this is not "engineering" in any sense of the word

So let's learn from history

- Consider some guiding principles
  - Beyond Saltzer and Schröder
- Lower level
  - Address the OWASP Top-10, CWE 25, etc.

Input and output validation

- Positive validation
  - Proven safe, or else dangerous
- Safely output mistrusted data
  - Cause no harm in output environment
- Always

Protect secrets

- Sensitive info must be protected
  - In transit and at rest
  - Commensurate to value
- Key management is everything
  - Except for all the rest

Anticipate and handle errors

- Assume things will go wrong
- Anticipate
- Use the toddler-in-traffic metaphor

Protect session and state

When working in non-stateful medium

- It's up to the application

State mechanisms must be protected

- Confidential
- Random
- Unforgeable
- Tamper-evident

Authenticate your users

- Who are you?
  - Prove it
- Commensurate to value
- Feasibility matters

Control access

- One simple question
  - Are you authorized to do what you're requesting?
- Every sensitive function, data, etc.
  - Needs to be designed in

Integrate into the enterprise

Consider what the CSIRT will need from your app

- Block the attacks
- Log what happened
- Take evasive action
  - Driven by policy

Just to name a few...

Contact details

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