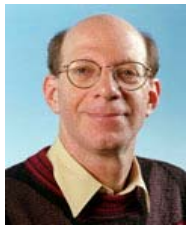
Security and Dependability @ VU

vrije Universiteit amsterdam

The People



Andrew Tanenbaum

Herbert Bos

Willem De Bruijn

Jorrit Herder

Asia Slowinska

Philip Homburg

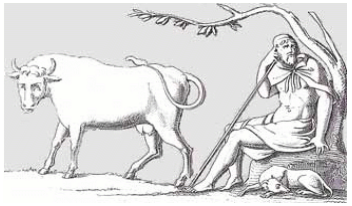
Georgios Portokalidis

Focus

- Build a *reliable* OS

Minix-3

- Detect and fingerprint attacks



Argos
Prospector
etc

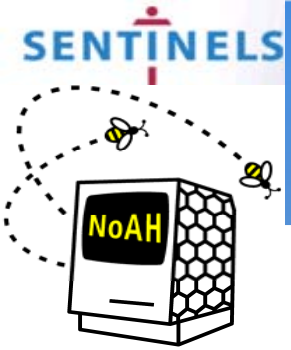
- Mobile devices security

Smartphones

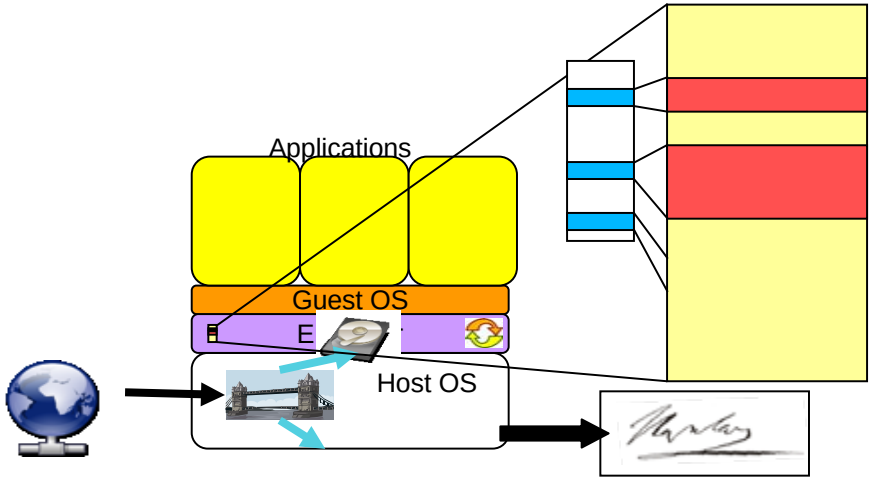
Minix-3

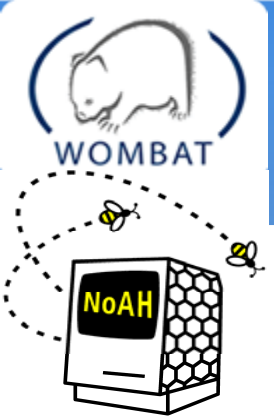
- Derives from Minix, but completely rewritten
- Deliberately small and simple
  - Kernel <4000 lines of code
- Provides
  - Stringent fault isolation
  - Stability
  - Security
- Do not compromise reliability for performance
- A lot of interest from embedded systems community

Attack Detection @ Host



- Argos: honeypots
  - Secure emulator employing dynamic taint analysis
  - >2800 downloads
  - Easily extensible
  - Supported by Sentinels and NoAH
- Eudaemon: apply same protection to production machines
- Prospector: generate reliable signatures





Attack Detection @ Host (2)

- Shelia: a client side honeypot
  - Actively look for malicious server
  - By going through spam folder
  - Follow every link, open every attachment
  - Supported by NoAH and WOMBAT

Detect Attacks - Network

- Cardguard: intrusion detection on a network card

Network Monitoring: Streamline

- Framework for high-speed I/O
- Used in several monitoring projects

Smartphones - Accessing The Internet in the Future

Smartphones – Miniature PCs

- Many applications
- Used for transactions ($)
- Privacy sensitive data
- Full blown OS + software stack implementations

Smartphones – Standardization

Monocultures face huge dangers

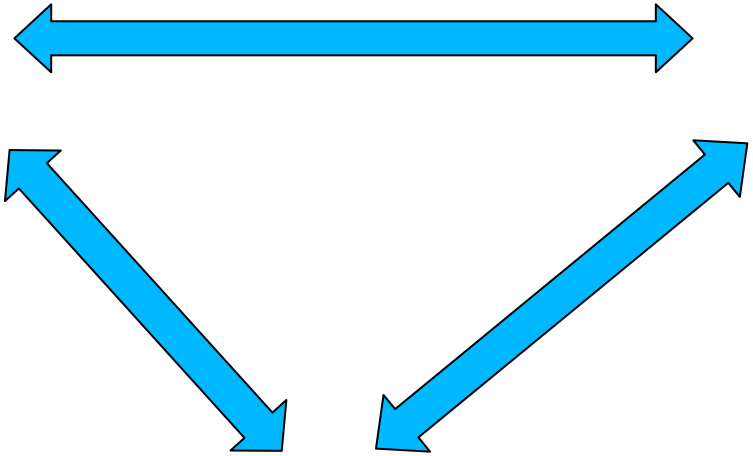
Are we ready for the next killer app/phone?

(android, iphone, facebook app)

Smartphones Go Everywhere

HOME

Privacy?



OFFICE

By pass security?

ROAD

Threats?

Smartphones - Not PCs

- Limited resources
  - RAM
  - CPU
  - Battery
- Ultra-mobile
- Architecture differences
- Face more dangers from physical environment

Smartphones – Some thoughts

Solid security

Data recovery

Data privacy

Things we would like to have

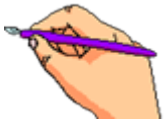
High CPU & RAM utilisation

Bulky transmissions

Time consuming calculations

Things we can’t have

Smartphones: A Solution



Record

Always on servers

Duplicate

Smartphones – Many Problems

- High transmission costs (3G, WiFi)
- Bluetooth (P2P like communications)
- Detection lag (Bad guys need little time to invade privacy)
- Encryption & compression (High computation costs)

Rewind?