What is Trusted Computing?

Ariel Segall

Day 1

Approved for Public Release: 12-2749.
Distribution unlimited

 ©2012 . All Rights Reserved.

What is Trust?

According to the Trusted Computing Group[1]:

A trusted component is one which is predictable.

- Trusted is not the same as good!
  - But it gives us a foundation to build on
- Two broad reasons to trust:
  - Reliable evidence
  - Out-of-band assumptions/No choice!

[1] We'll get to them shortly

©2012 . All Rights Reserved.

What is Trust?

According to the Trusted Computing Group[1]:

A trusted component is one which is predictable.

- Trusted is not the same as good!
  - But it gives us a foundation to build on
- Two broad reasons to trust:
  - Reliable evidence *Attestation*
  - Out-of-band assumptions/No choice! *Root of Trust*

[1] We'll get to them shortly

©2012 . All Rights Reserved.

What is Trusted Computing?

- Not a precise term
- Generally, refers to systems that use hardware to provide security support to software
  - Today: Trusted Platform Modules (TPMs); processors with secure modes (TXT,SVM)
  - Future: Mobile Trusted Modules (MTMs)
- Also covers infrastructure relying on above
  - Software applications
  - Network Access Control (NAC)
  - Secure storage devices
  - etc...

Goal: build trust in entire system for some purpose

©2012 . All Rights Reserved.

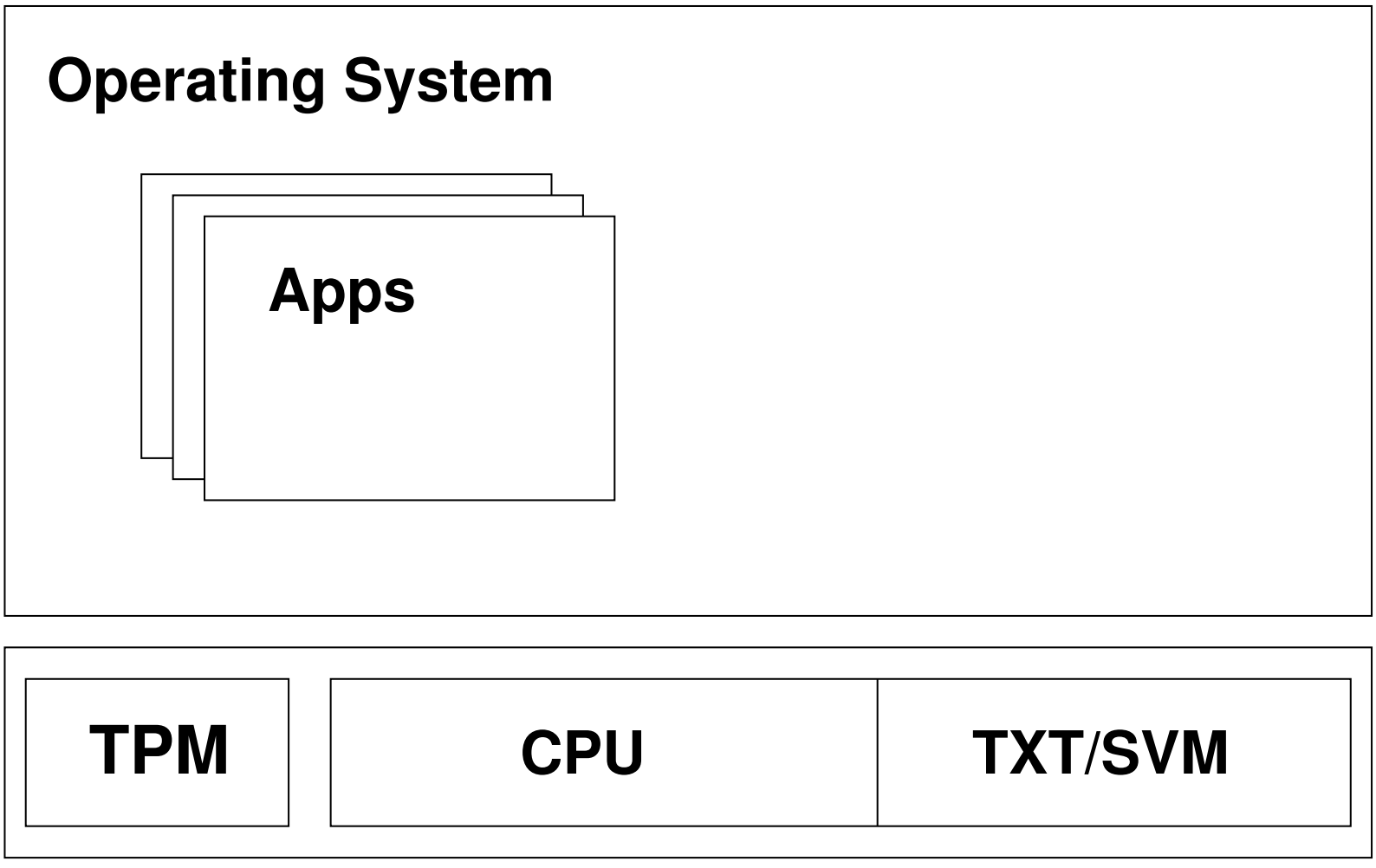
The Grand Trusted Computing Vision

- Before logging into a computer, I know it's good.
- Machines that aren't up-to-date are routed to a DMZ to perform updates before connecting to the network.
- Servers can confirm exactly which machines they're talking to and whether they're running good software before providing sensitive data.
- All of my data, including secret keys, are protected by hardware and cannot be stolen over the network.

We're not there yet, but we're moving in the right direction.

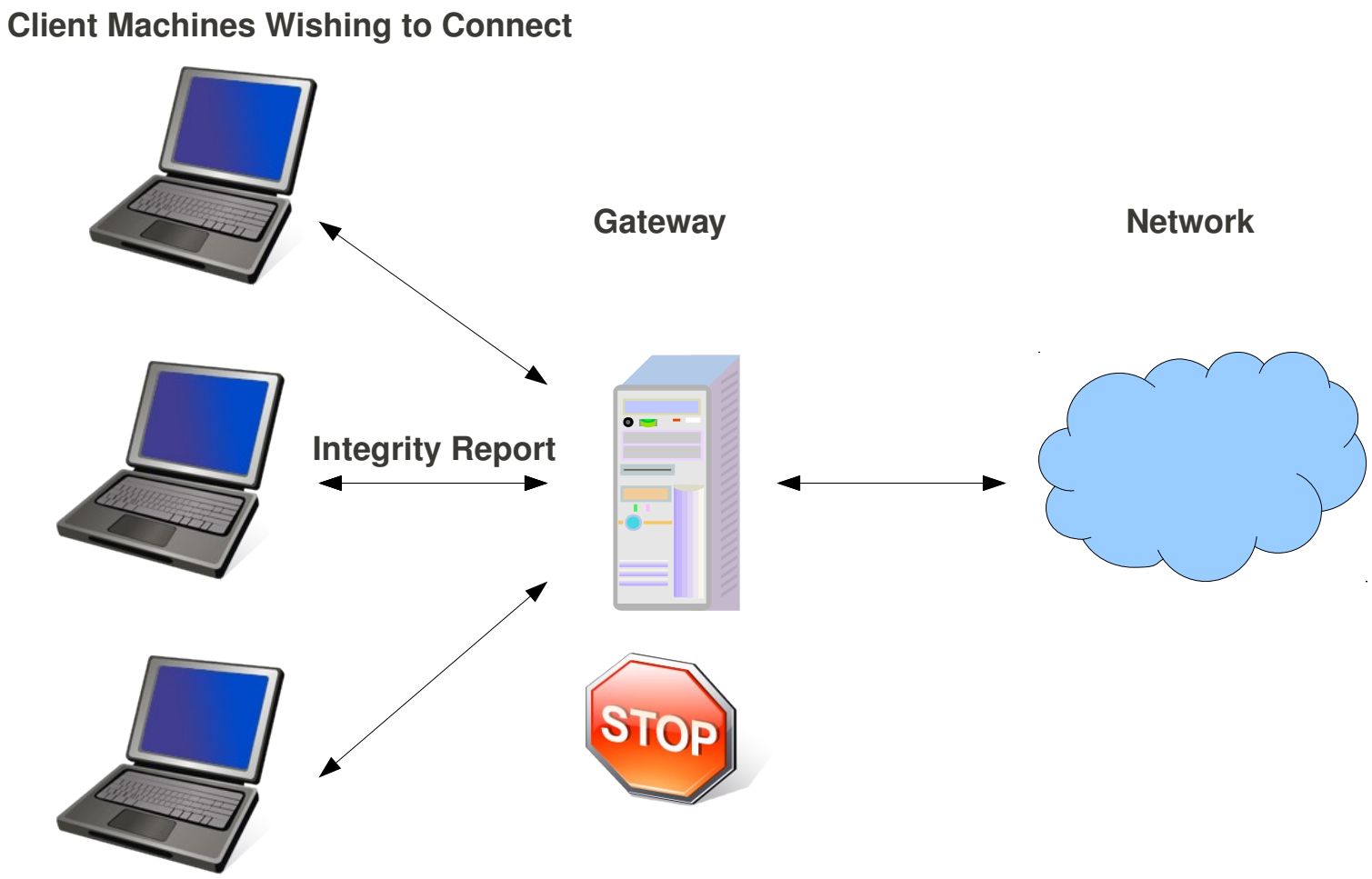
©2012 . All Rights Reserved.

A High-Level Workstation View



©2012 . All Rights Reserved.

Trusted NAC From 50,000 Feet



©2012 . All Rights Reserved.

The Trusted Computing Group (TCG)

- Industry (mostly) consortium
- Defining standards for trusted computing
- Layered vision: starting from hardware, moving up to applications
- Workgroups focused on particular subsets of the problem; e.g:
  - Technological: TPM, Mobile Solutions
  - Interoperability: Infrastructure, Trusted Network Connect
  - Use cases: Server, Trusted Multi-Tenant Infrastructure
- www.trustedcomputinggroup.org
- Formerly the Trusted Computing Platform Alliance (TCPA)

Most technologies in this area are defined by or with the TCG.

©2012 . All Rights Reserved.

Why the TCG Matters

Sometimes we trust because we have no choice!

- TCG standards help define which components we must trust
- Standards can be evaluated to determine if we *should* trust
- TCG has compliance programs
  - Not government CA, but better than nothing
- Give us a foundation on which to build

Unfortunately, not very good at communicating with users.

©2012 . All Rights Reserved.

Trusted Computing Topics in This Class

- Trusted Platform Modules
  - The foundation most of the rest is built on
  - Most of the technical meat of this class
- Roots of Trust for Measurement
  - With the TPM, what allow us to verify machine state
  - Two kinds: static (BIOS) and dynamic (CPU)
- Trusted Network Connect
  - NAC protocol with trusted computing support
- Not covered in detail:
  - Storage: Too specialized
  - Most infrastructure protocols: Too many!

©2012 . All Rights Reserved.