

# ArmoredSoftware: Trust in the cloud

Annual Demonstration

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January 15, 2015

## Introduction and Project Goals

- Big Picture

- Implementation

## Prototype demonstration and discussion

- Refine big picture to current demo

- Protocol Execution

- Appraisal

- Measurement

- Communication

- Demonstration

## Short term goals and milestones

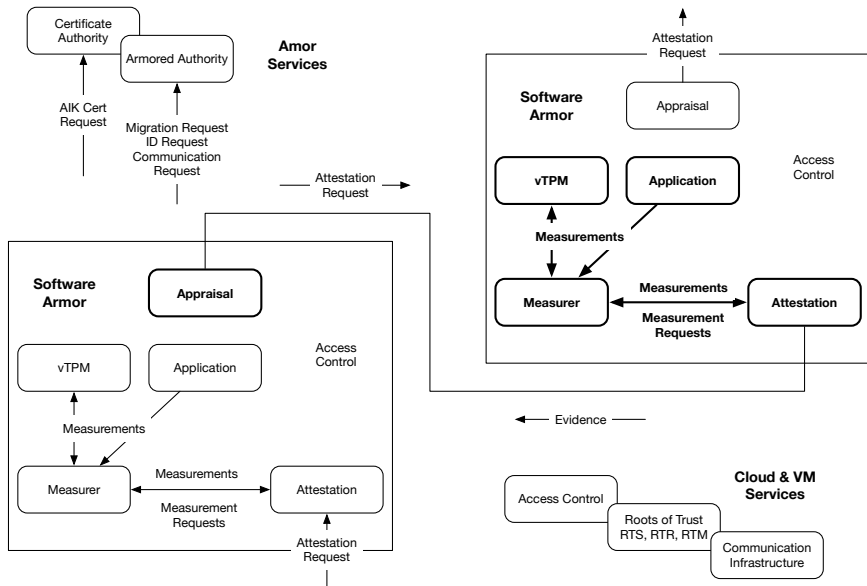
## Questions and guidance

## Trust in the Cloud

Provide new capabilities that help establish and maintain trustworthy cloud-based application deployment

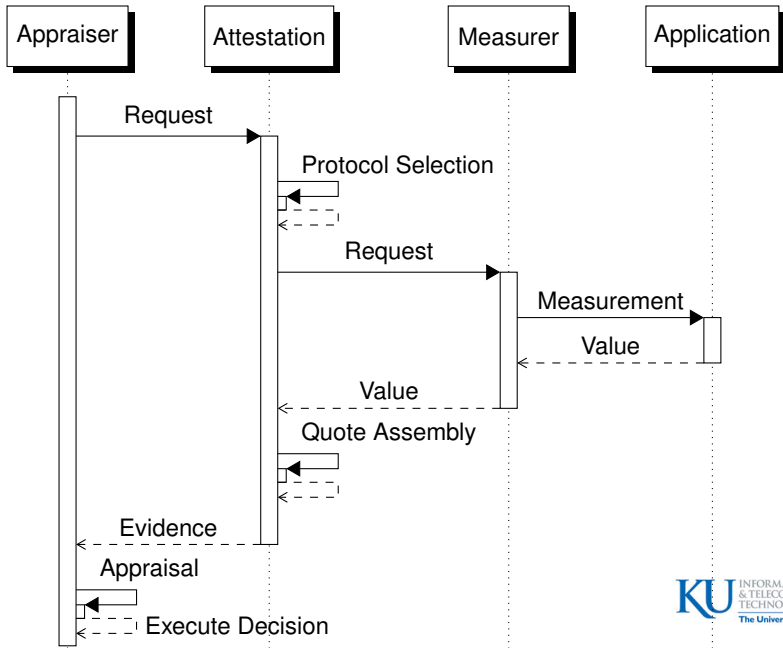
- ▶ Establish trust among cloud components
  - ▶ trust among cohorts of processes
  - ▶ trust among processes and environment
- ▶ Promote informed decision making
  - ▶ data confidentiality can be confirmed
  - ▶ execution and data integrity can be confirmed
- ▶ Autonomous run-time response and reconfiguration
  - ▶ responds to attack, failure, reconfiguration, and repair
  - ▶ response varies based on measurement
- ▶ Lightweight integration with existing cloud
  - ▶ targeting TXT, Xen, Linux, and OpenStack infrastructure
  - ▶ user-space measurement and attestation

# High-Level Architecture



- ▶ Standard delivery platform
  - ▶ Xen+XSM VM infrastructure
  - ▶ OpenStack cloud infrastructure
  - ▶ Fedora, HotSpot JVM, GHC
- ▶ Standard communication mechanisms
  - ▶ JSON structures for all exchanged data
  - ▶ *vchan* for on-platform communication
  - ▶ TCP/IP for off-platform communication
- ▶ Trusted Computing Group standards compliant
  - ▶ Trusted Platform Module (TPM) 1.2
  - ▶ TCG vTPM in principle
- ▶ Executable protocol representation
  - ▶ protocol fragments as first-class structures
  - ▶ strand space formal semantics

# CA-Based Attestation Protocol



# What We Are Demonstrating



## 3-4 Slides on Attestation Protocol Execution

# 1-2 Slides on Appraisal

## 3-4 Slides on Measurement

## 2-3 Slides on Communication Mechanisms




# Step Through Demonstration

# Goals and Milestones for 2015

- ▶ Push to the cloud
- ▶ Establish roots of trust and trust argument
- ▶ Executable protocol representation and protocol semantics
- ▶ Operational, integrated vTPM prototype
- ▶ Name Server / Certificate Authority prototype
- ▶ More capable measurement
- ▶ Downloadable demonstration

# Questions and Guidance

- ▶ What problems are interesting?
- ▶ What problem would be a nice attention grabber?
- ▶ What should we be watching and integrating with?

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