Integrity Management Architectures

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Problem of Trust

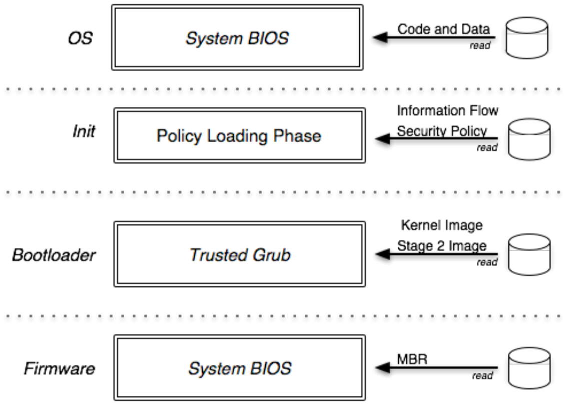
Untrustworthy code is frequently run on computers regardless of it impact on the **integrity of the system**. It is difficult for a user to tell whether an arbitrary program is trustworthy, which further complicates issues.

Goal

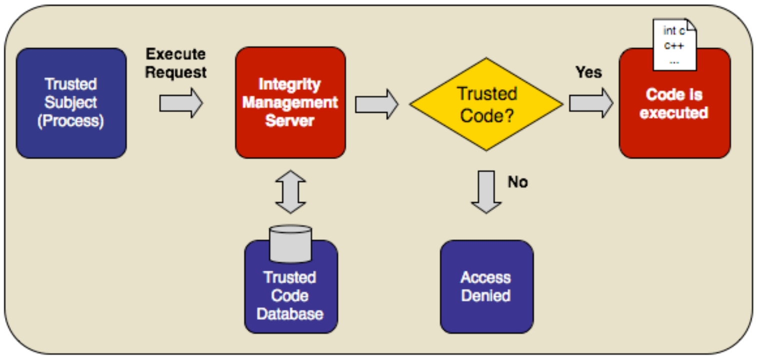
Ideally, a system should always behave as expected (with high integrity). This requires certain **trusted components** to be of **high integrity** from the time they are loaded and beyond.

Recording and Reporting

We use the **TPM** to perform measurements and reliably report system state. From boot we measure all code loaded into the system as well as **information flow and MAC policies**. By recording only code loaded into trusted subjects, we **reduce the number of measurements**. This approach is similar to PRIMA, but we integrate our integrity management architecture directly into SELinux.



Enforcing



Integrity management is integrated into **SELinux** and utilizes subject types to identify trusted subjects types. When code is loaded under one of these types, a **local database** is referenced to compare known good hashes to what has been measured. A system can then **attest** its state by passing its measurement log to a verifying party where it can be check against a similar trust database.

Secure Core

- This system is **stripped down to its essential programs**, which must all be of high integrity.
- All configuration data must also be **traceable back to creation** and administration should be **extremely limited**.
- Luke St.Clair, Joshua Schiffman, Trent Jaeger, and Patrick McDaniel, **"Establishing and Sustaining System Integrity via Root of Trust Installation"**, 23rd Annual Computer Security Applications Conference (ACSAC), December 2007.

Mixed Environment

- This scenario allows for untrustworthy code to be present in the system so long as the **high integrity components are protected**.
- Data on the system can evolve and **less guarantees** can be established for it. Rely upon **security policy and filters** to manage data integrity.
- This is typical of most computing systems.

Sponsored by NSF (CNS-0627551) and IBM Research