In Containers We Trust? Building Trust In Containerized Environments

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1 Duke University
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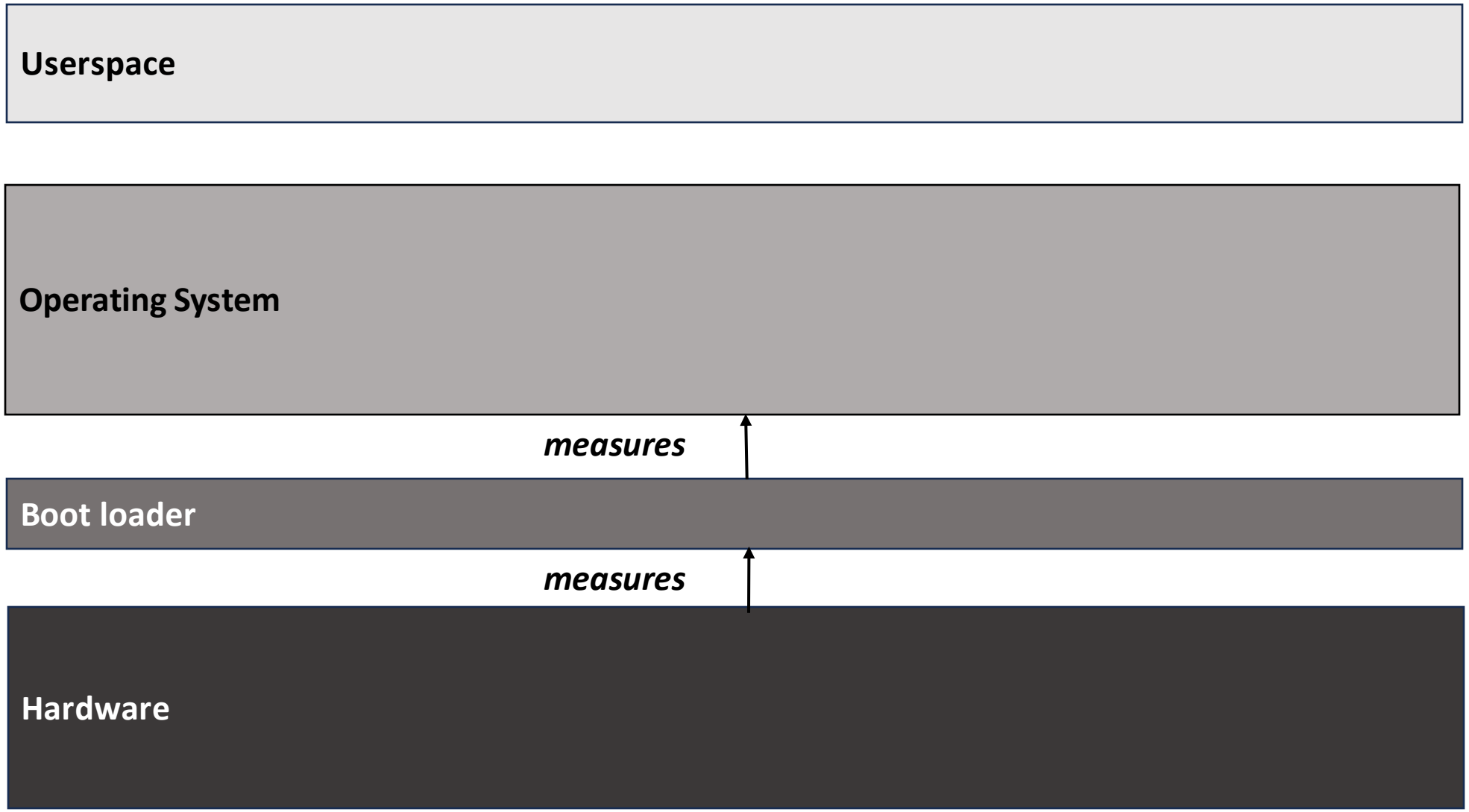
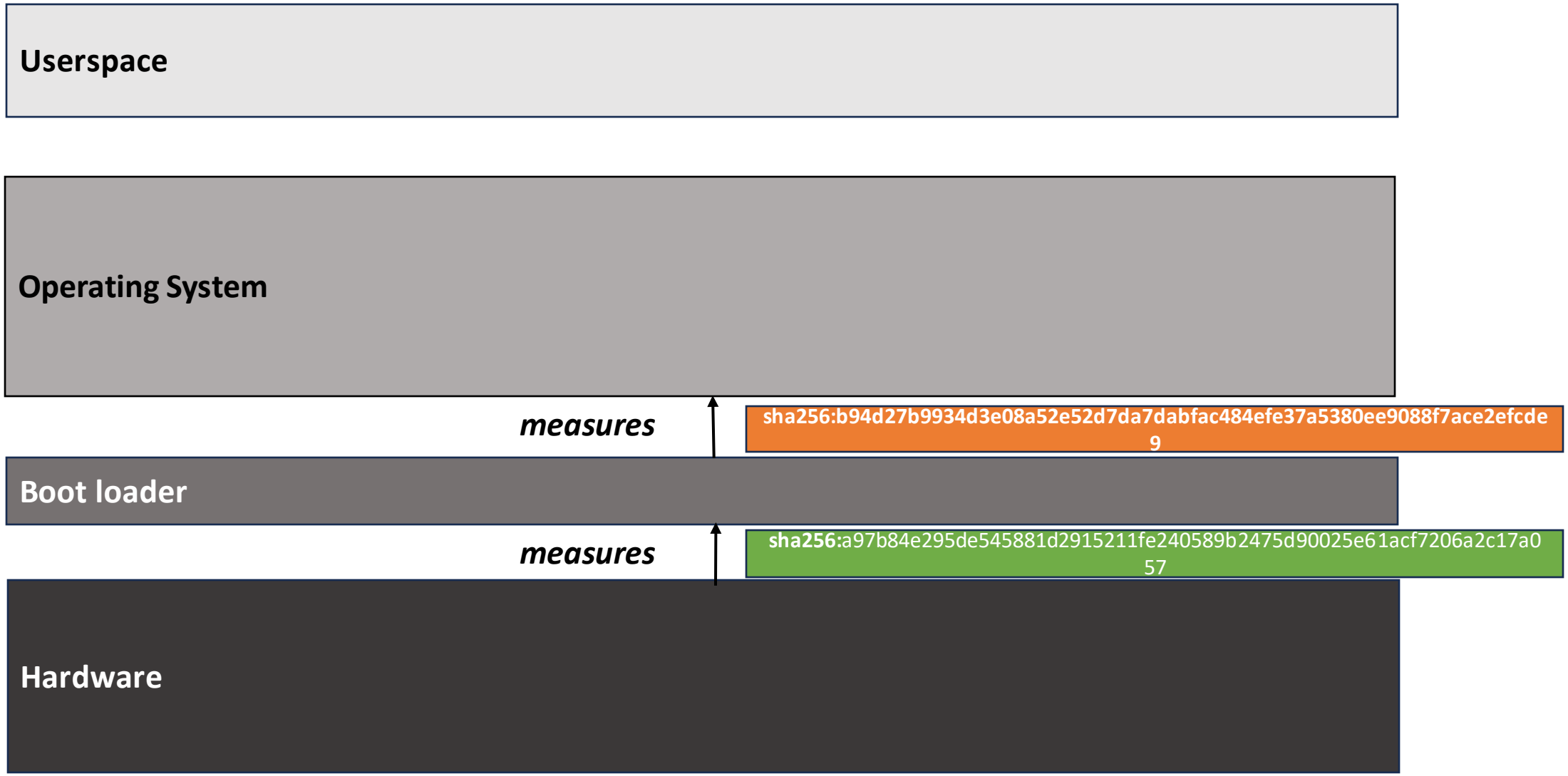
Containers are ubiquitous and blindly trusted…

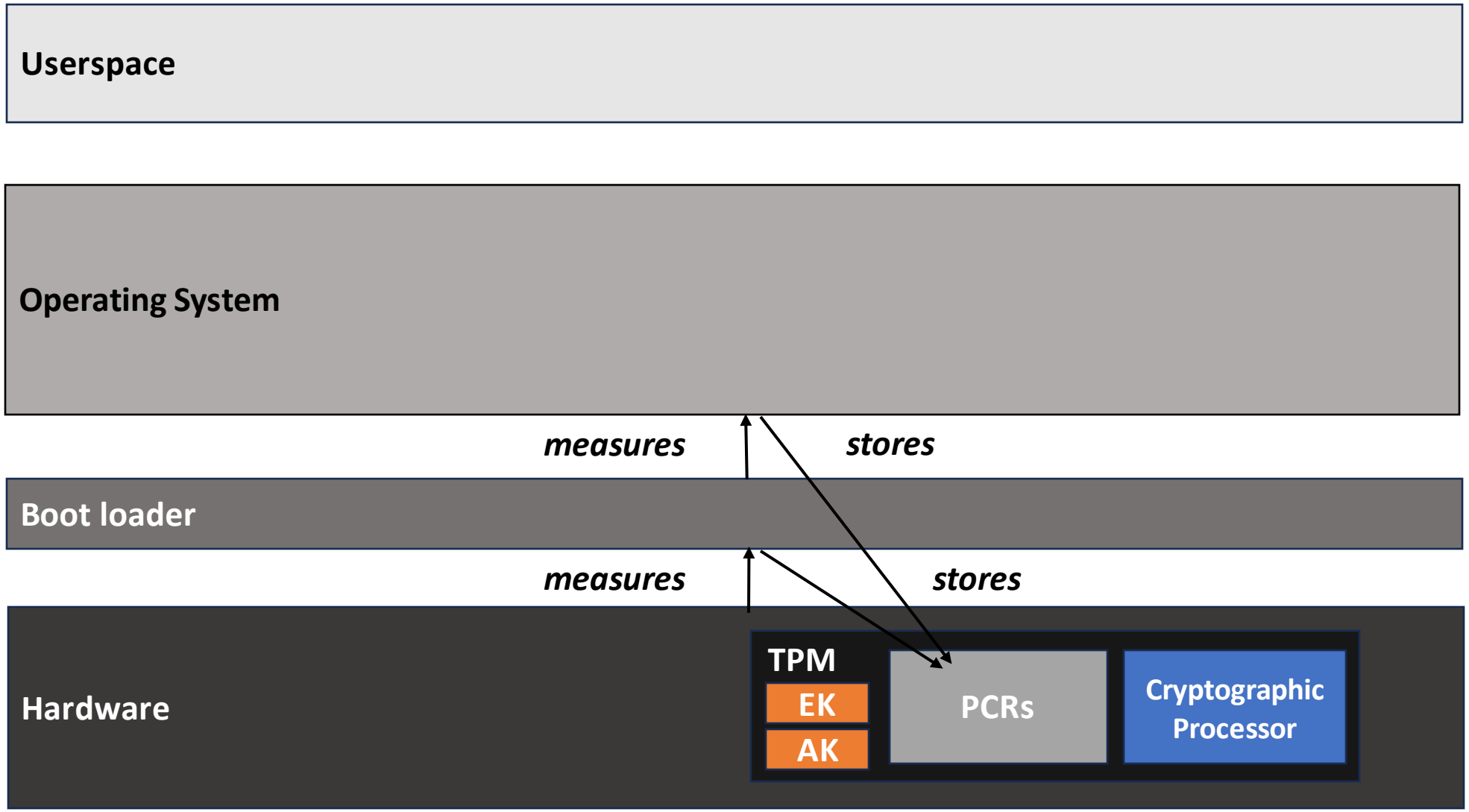
Defining Trust: Measurement



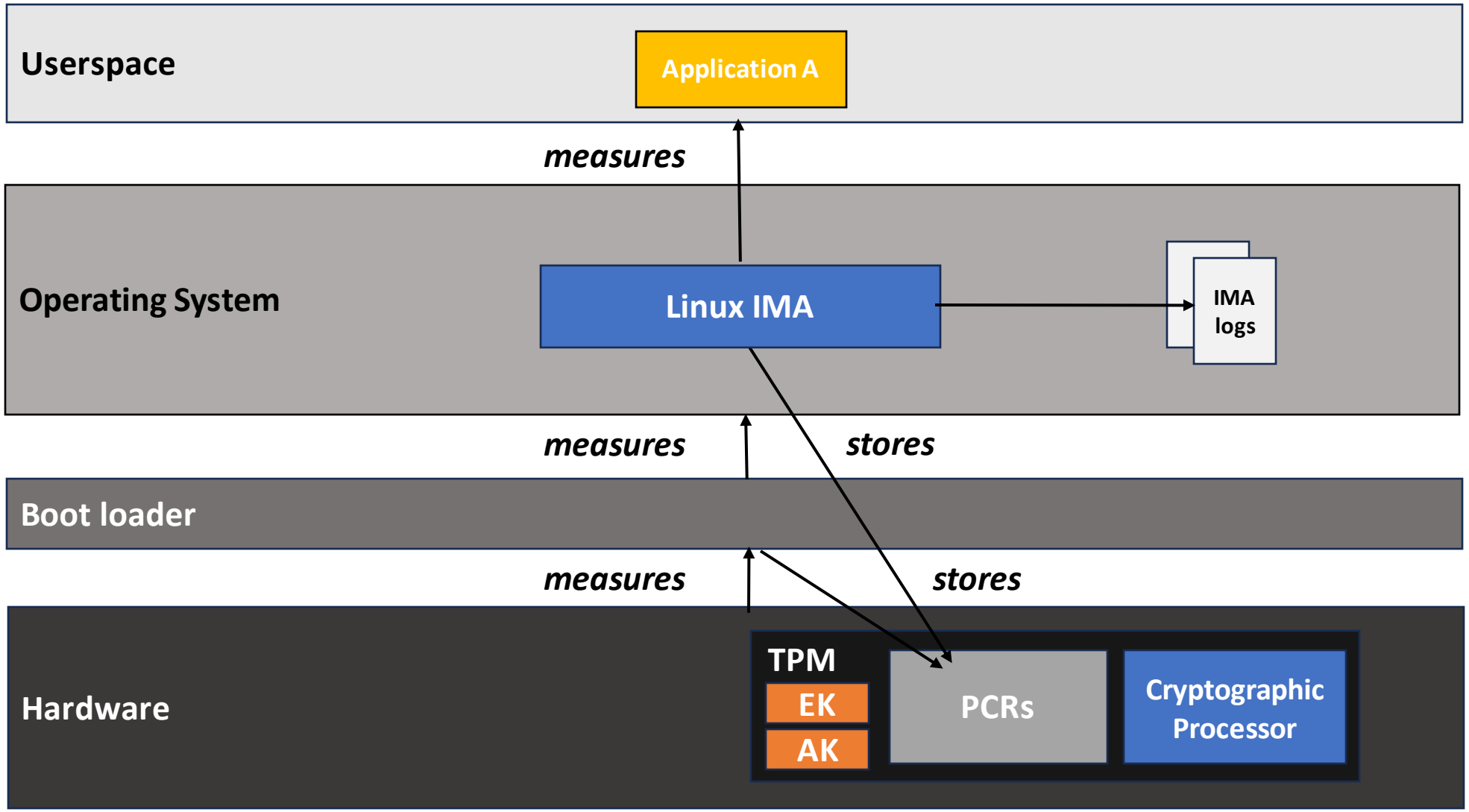
Defining Trust: Measurement



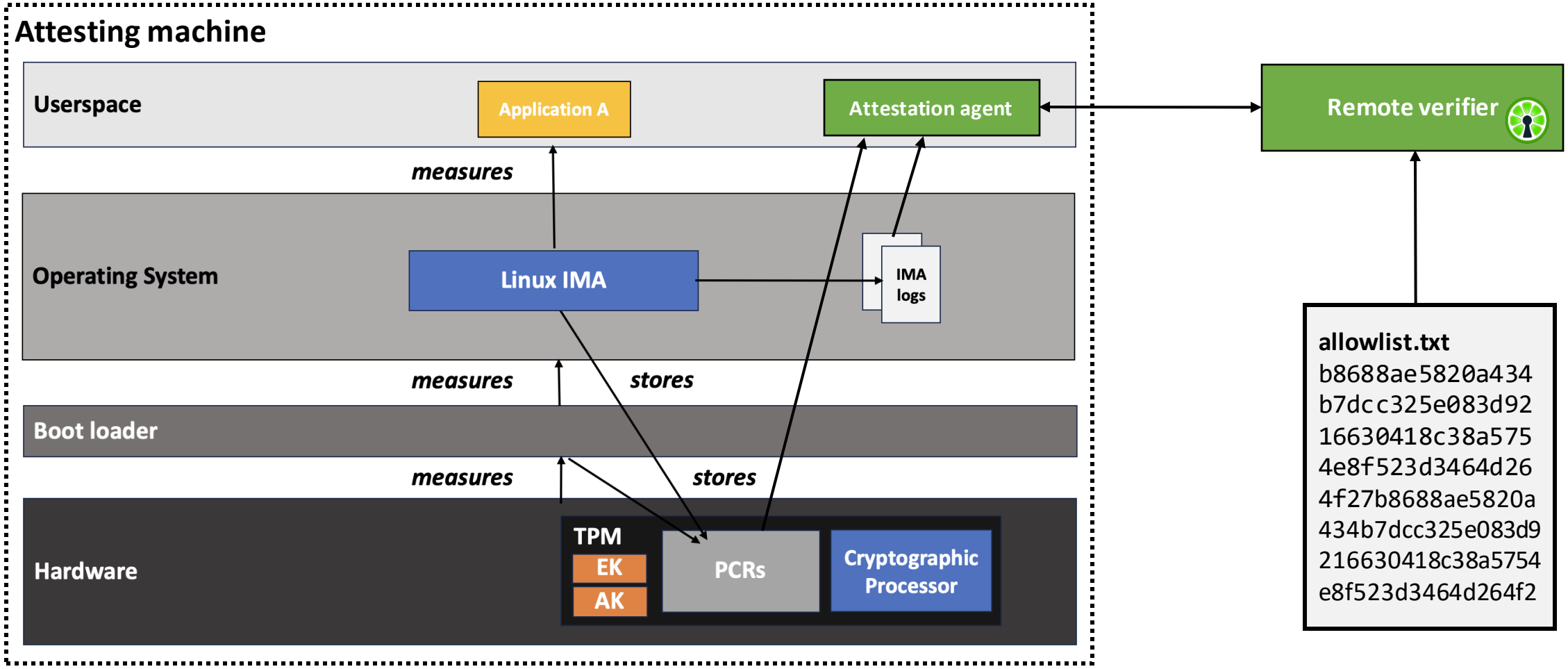
Building Trust from Hardware



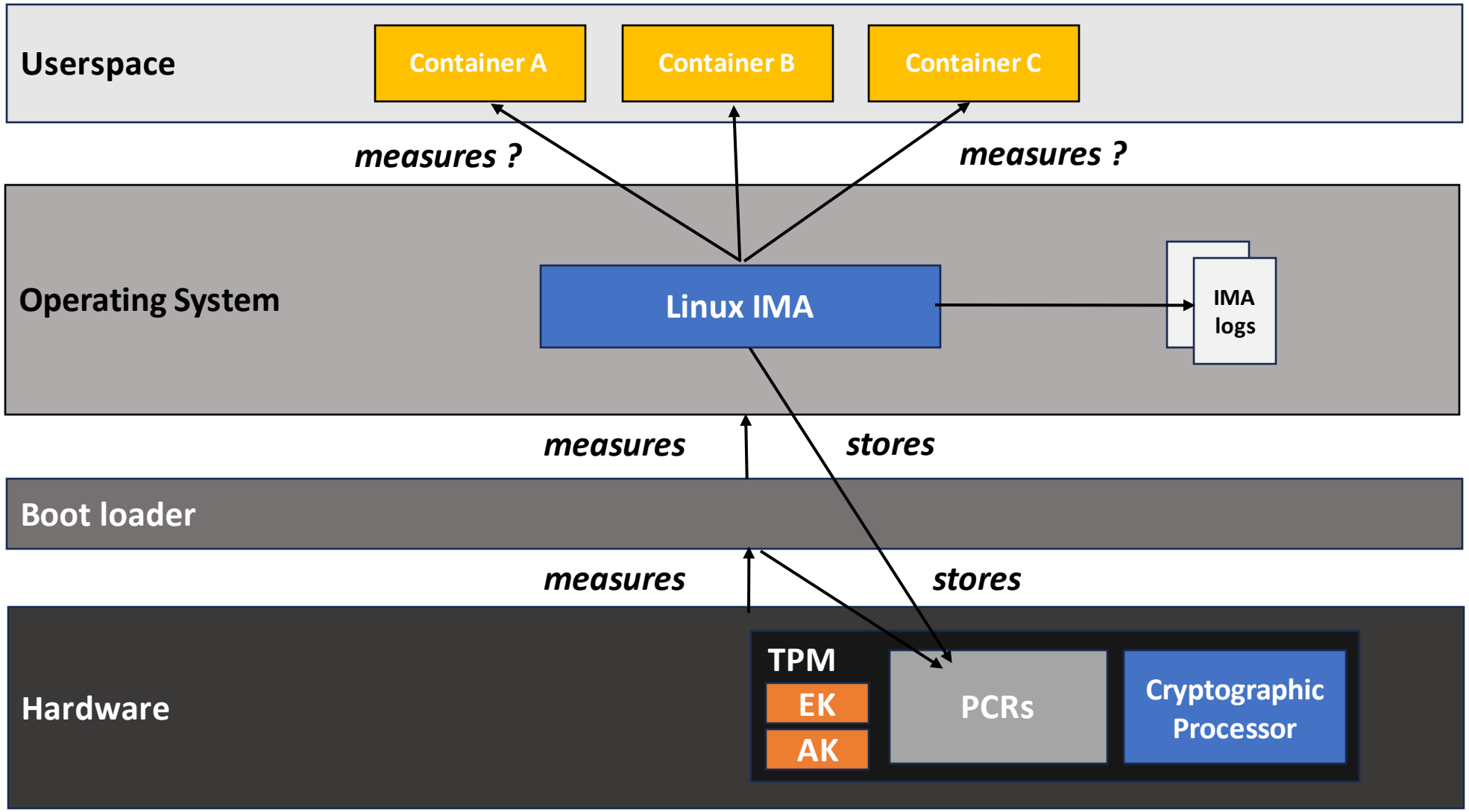
Extending Integrity Measurements in Runtime



Building Trust in Remote Environments

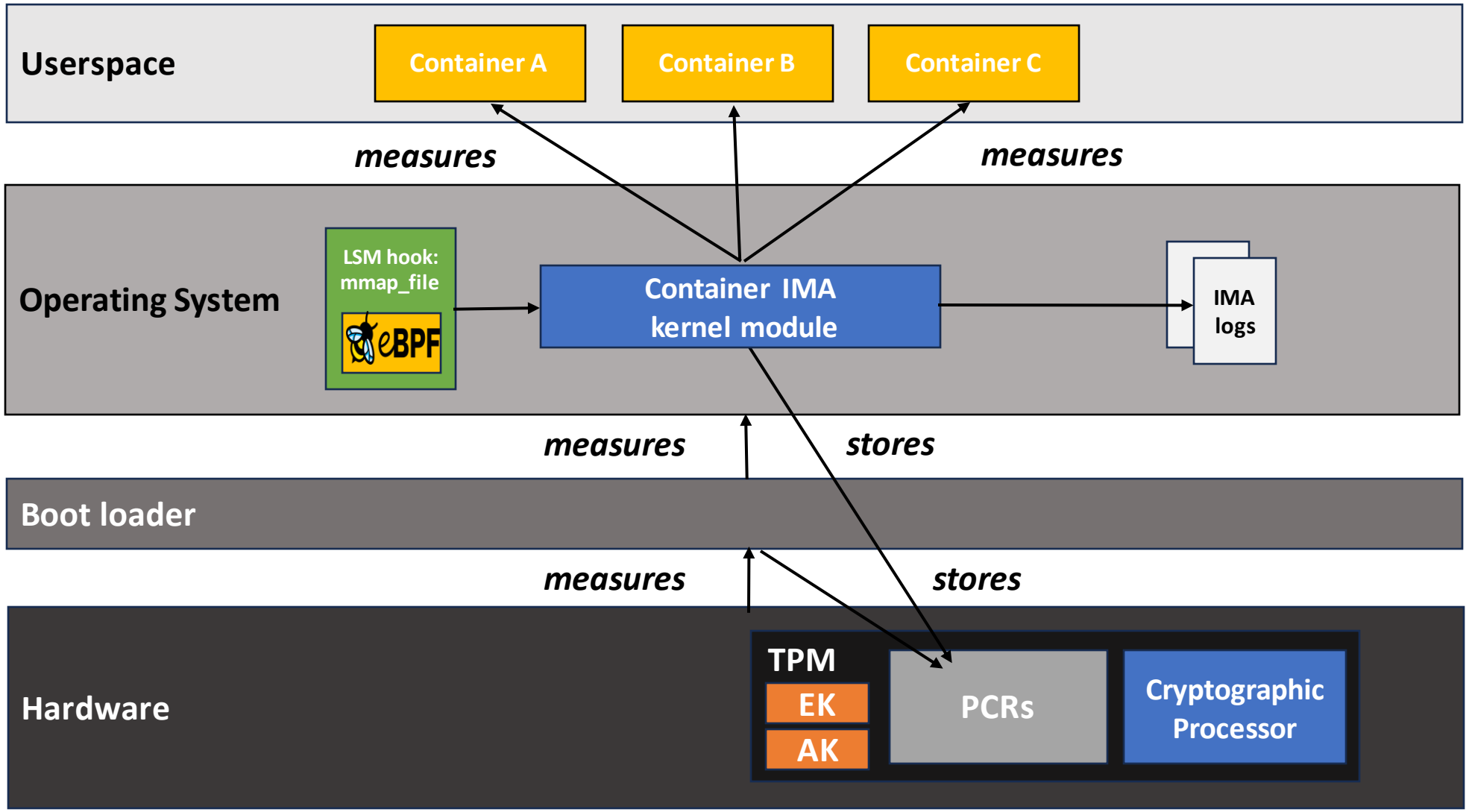


Container Present a Gap in Trust and Integrity

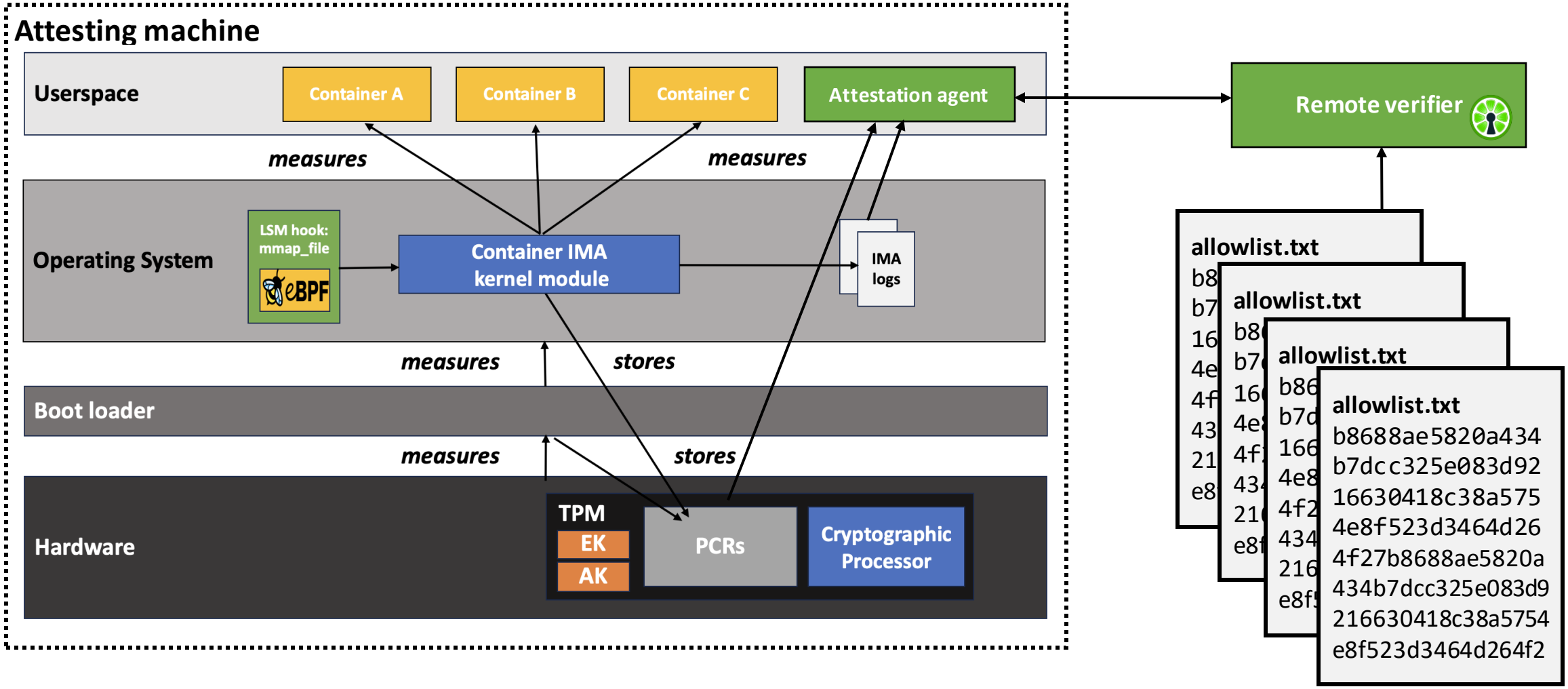


Enabling Container Attestation: A Preliminary Approach

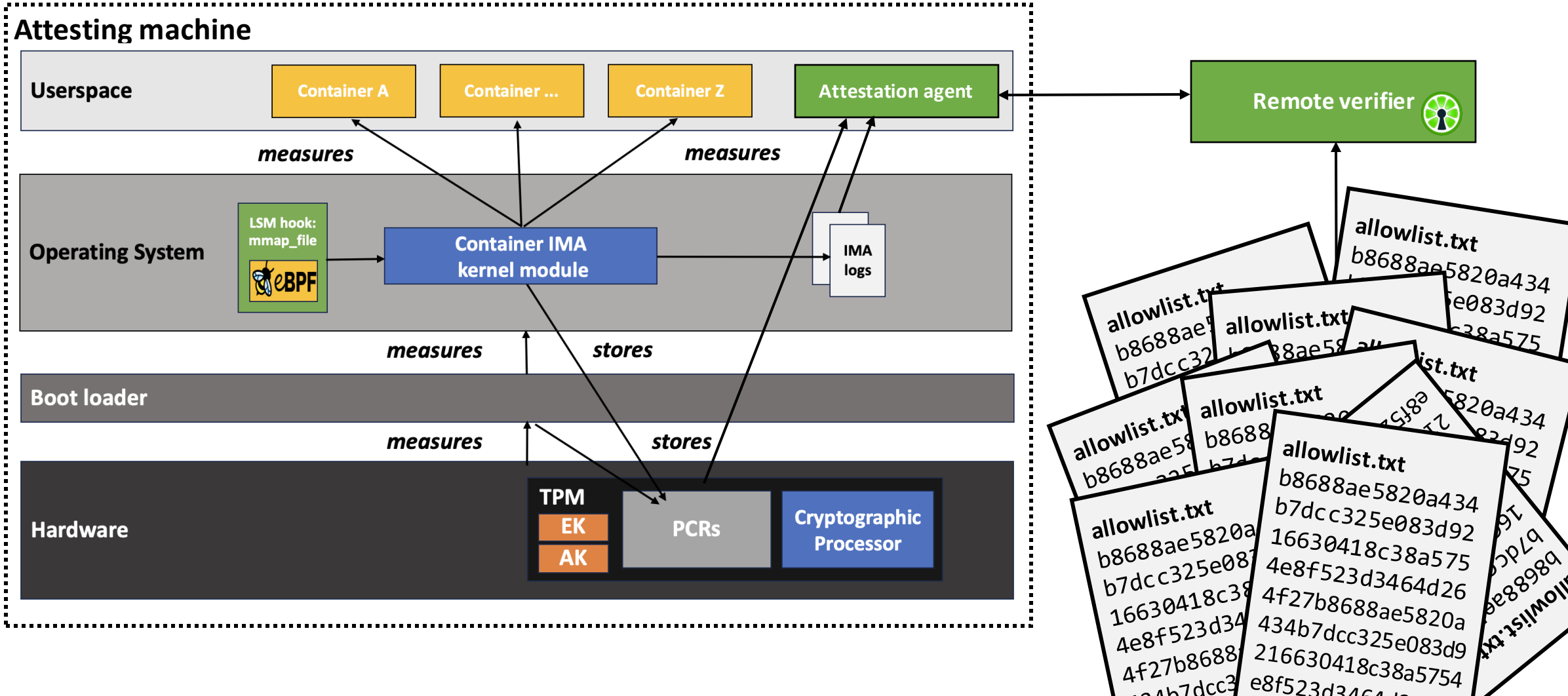
Extending IMA to Containers using eBPF



Attesting Container File Integrity

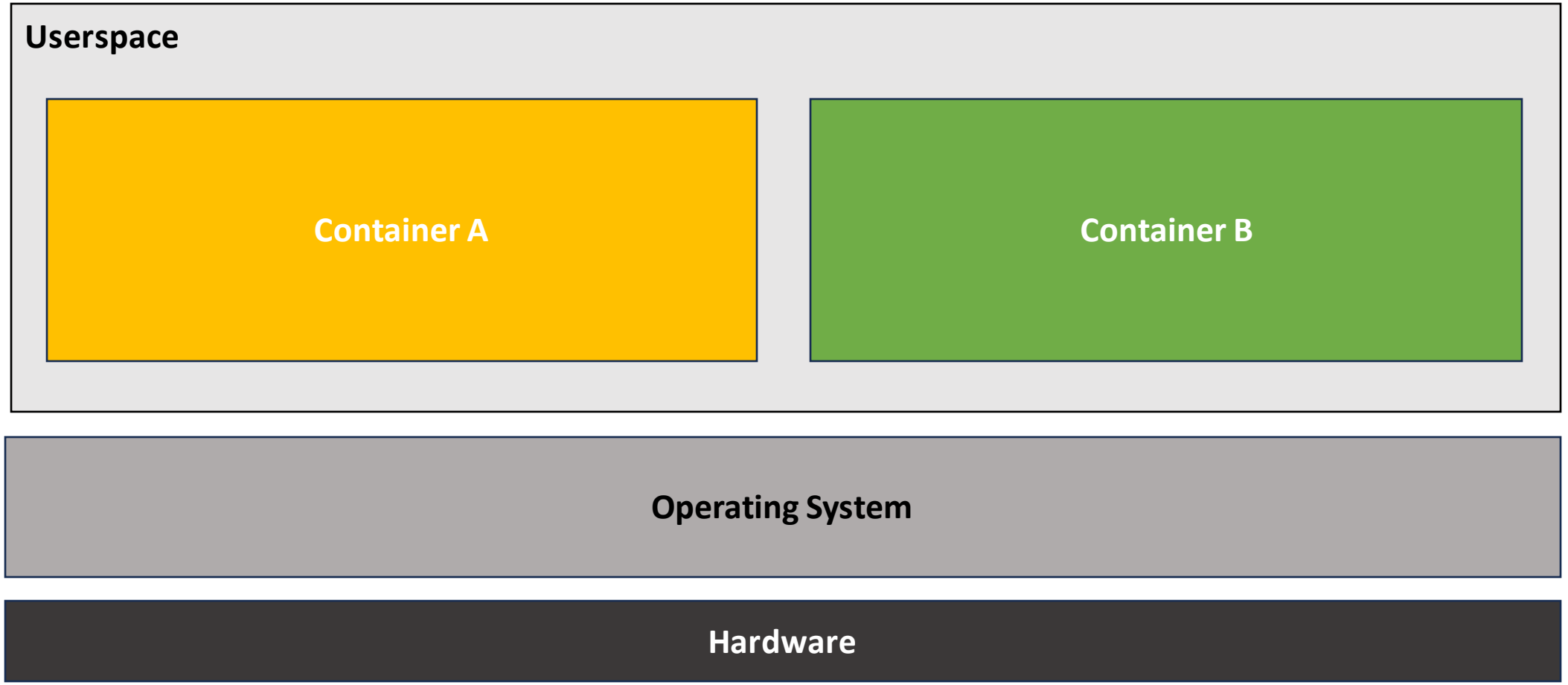


Attestation vs. Containers



Container Image Integrity

- Goal: allow of attestation of ***container images***



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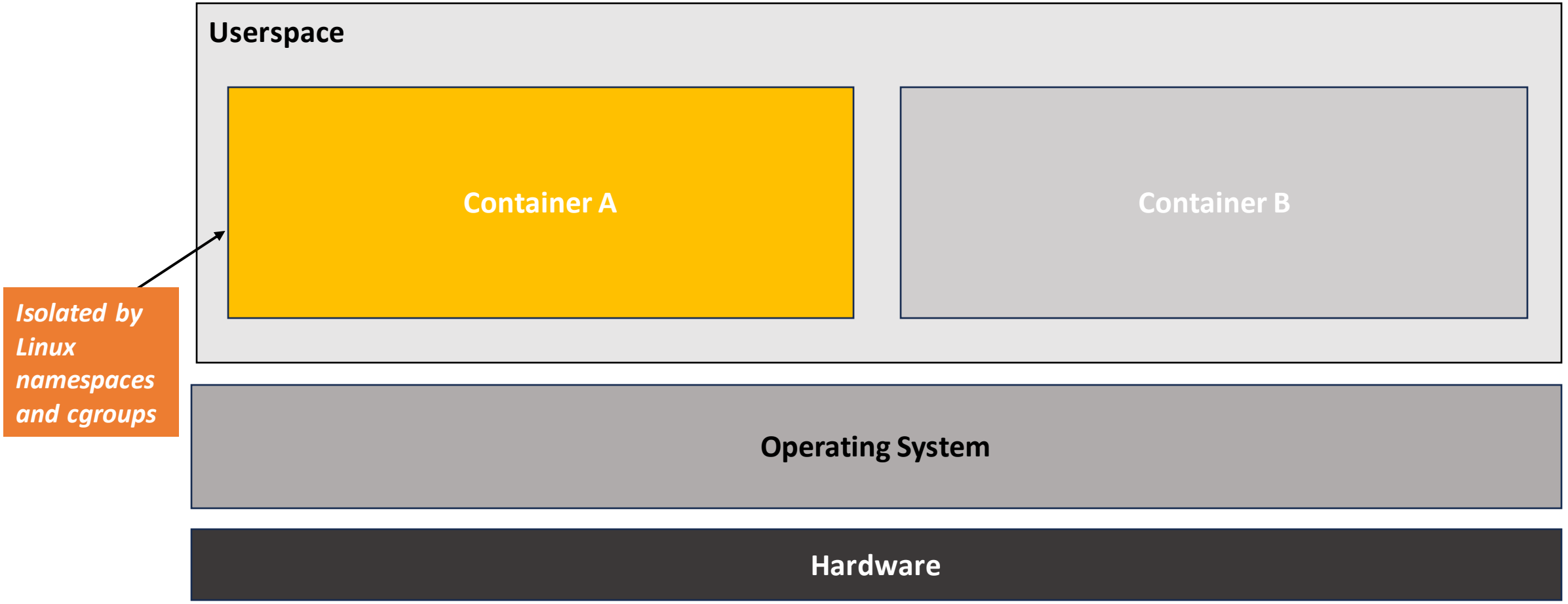
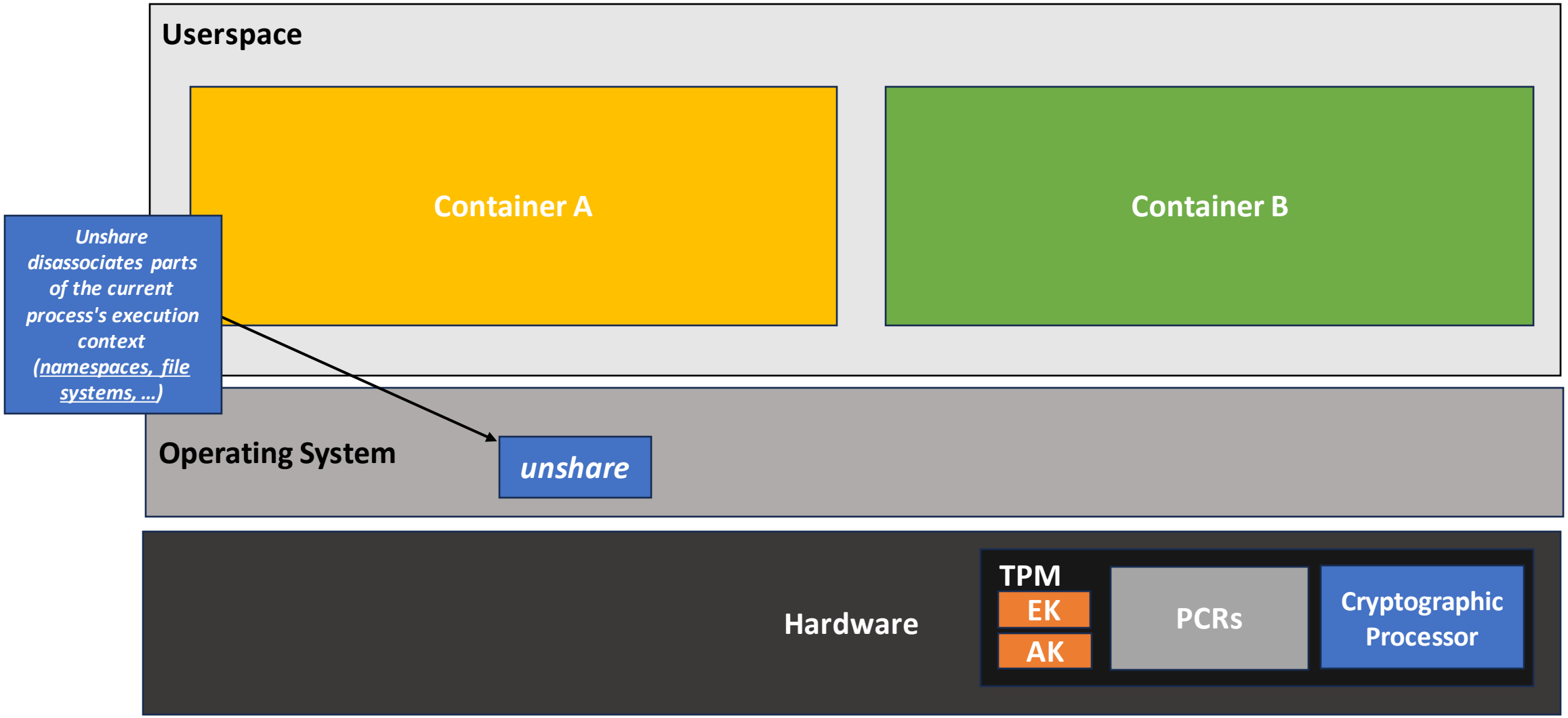
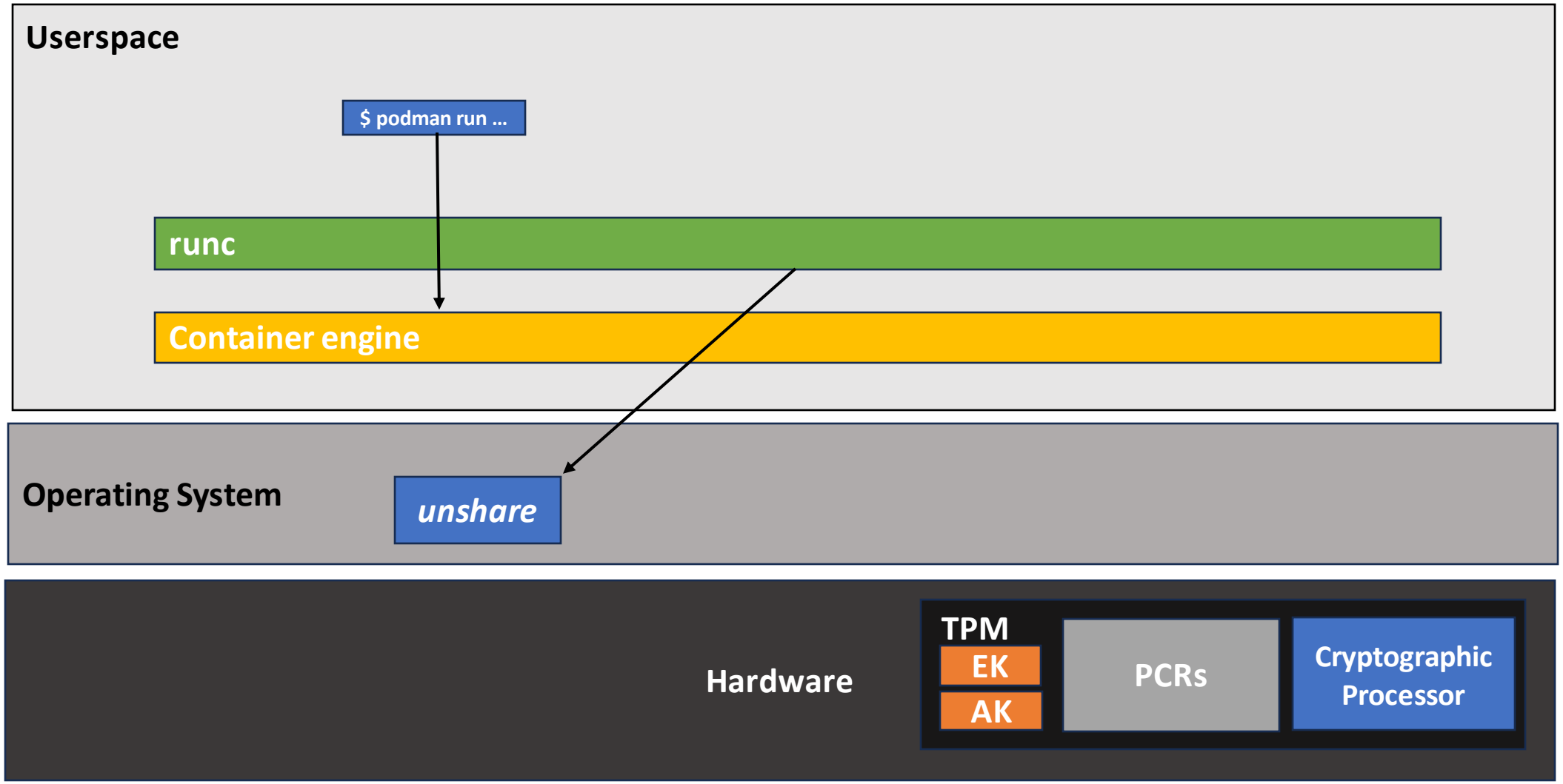


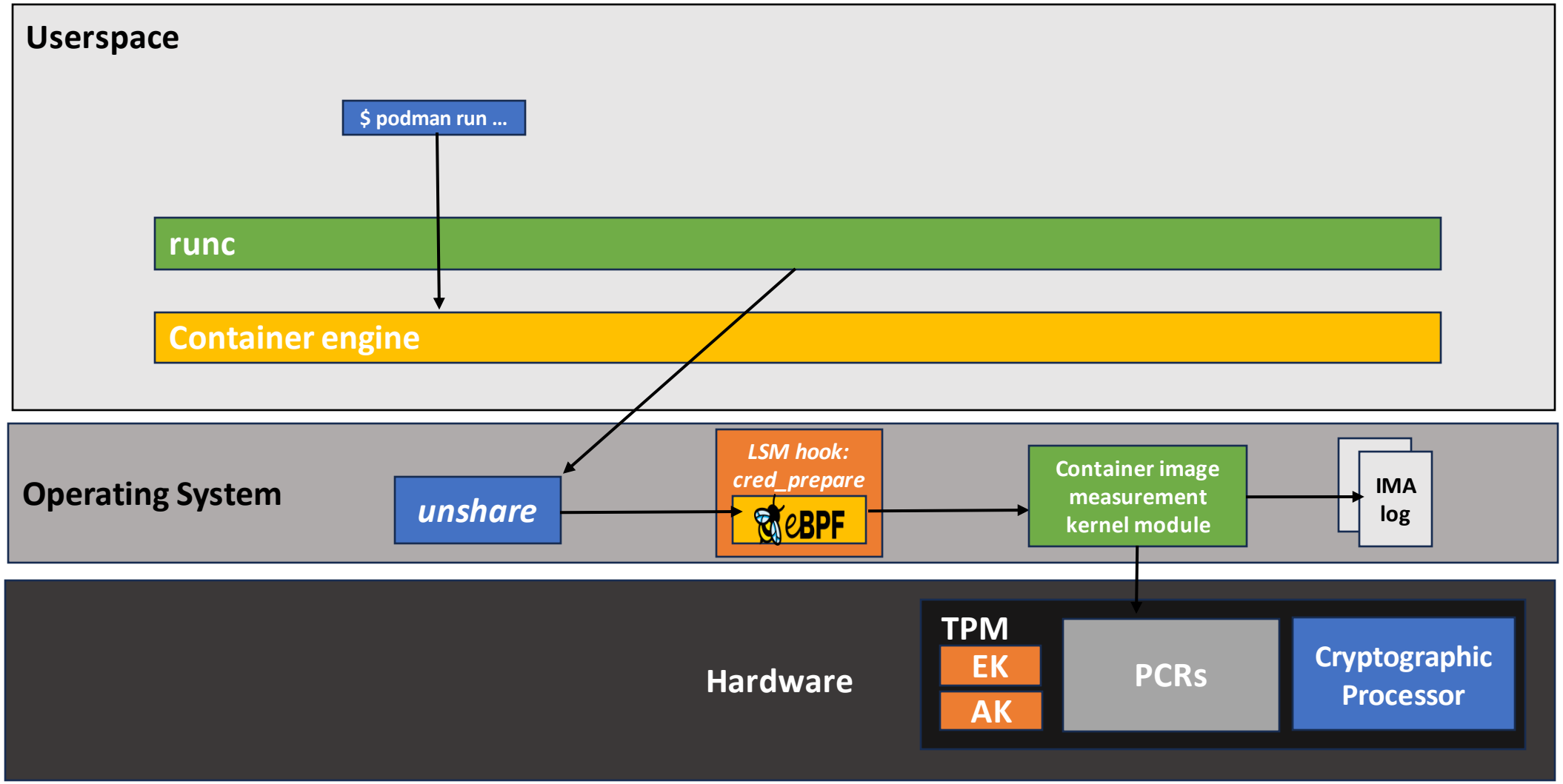
Visibility of Container Creation in the Kernel



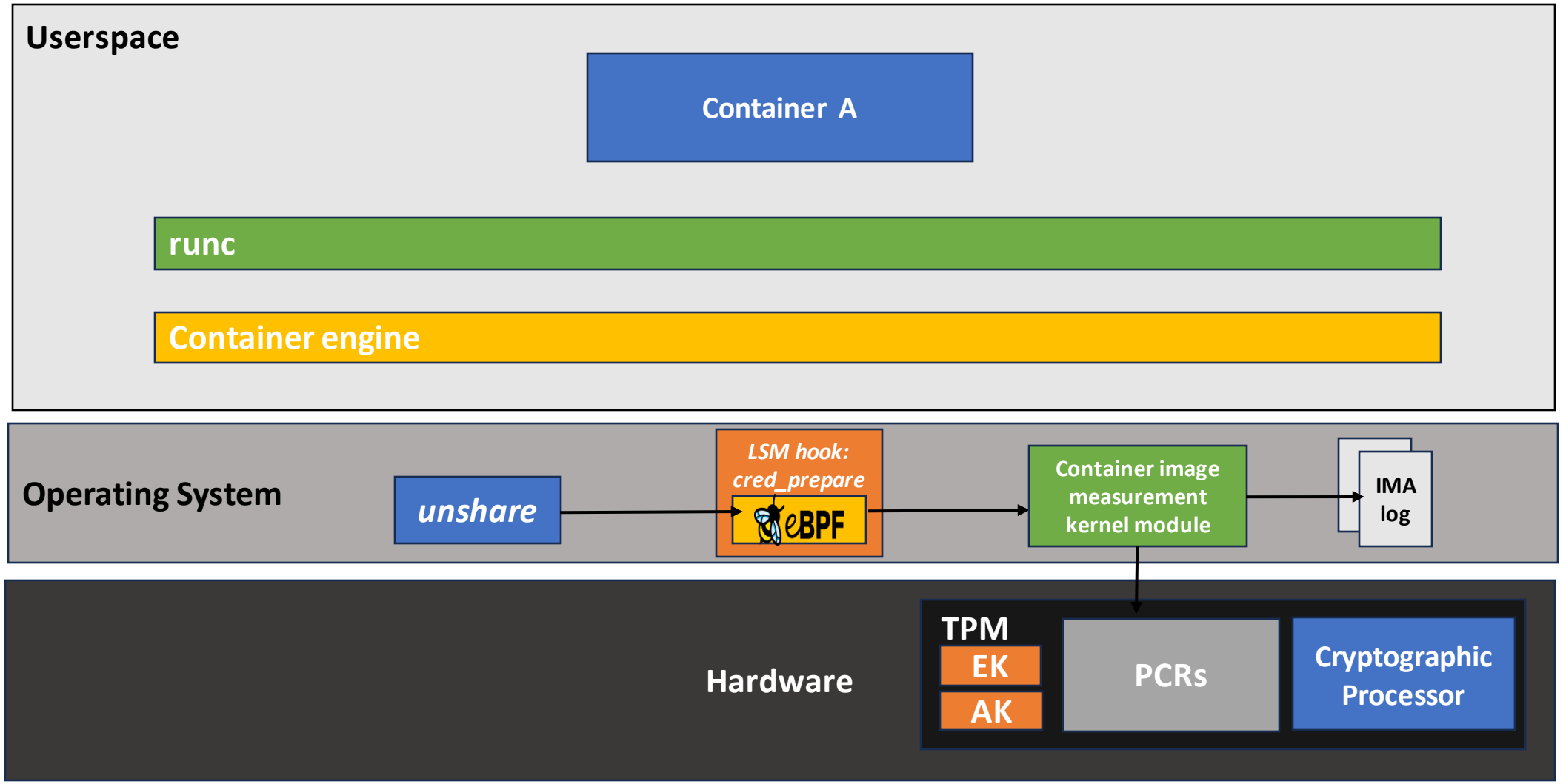
Visibility Through the Unshare System Call



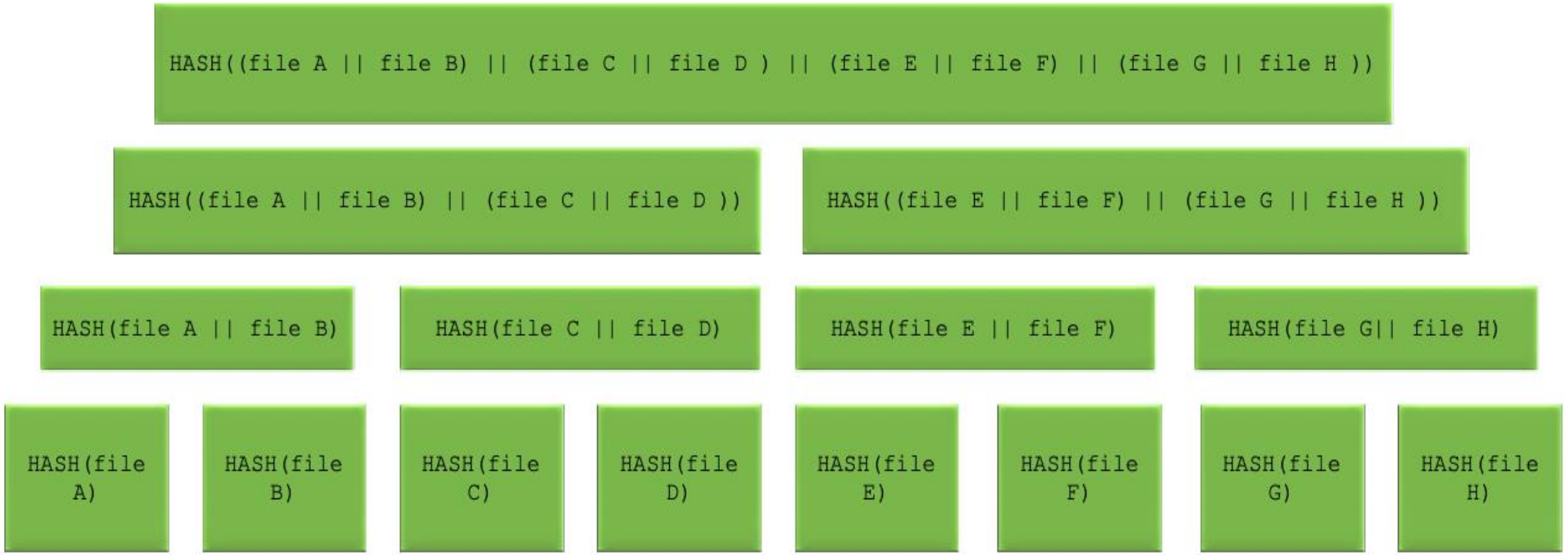
Visibility Through the Unshare System Call



Measuring Container Images From the Kernel



Kernel-Verifiable Image Digests



Extending the IMA log with Image Digests

- TODO

Evaluating Measurement Overhead

- EVALS TODO

Demo Environment

- TODO

Enabling Container Integrity Verification

- Current image digests are dependent on images layers, manifest files, image ids, ...
- Kernel-verifiable digests need to be provided to extend the chain of trust from hardware up to each container instance

Building trust in containers through image integrity measurements leveraging trusted hardware.

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https://github.com/avery-blanchard/container-ima
https://github.com/avery-blanchard/container-integrity-measurement