SecureCloud – Secure Big Data Processing in Untrusted Clouds

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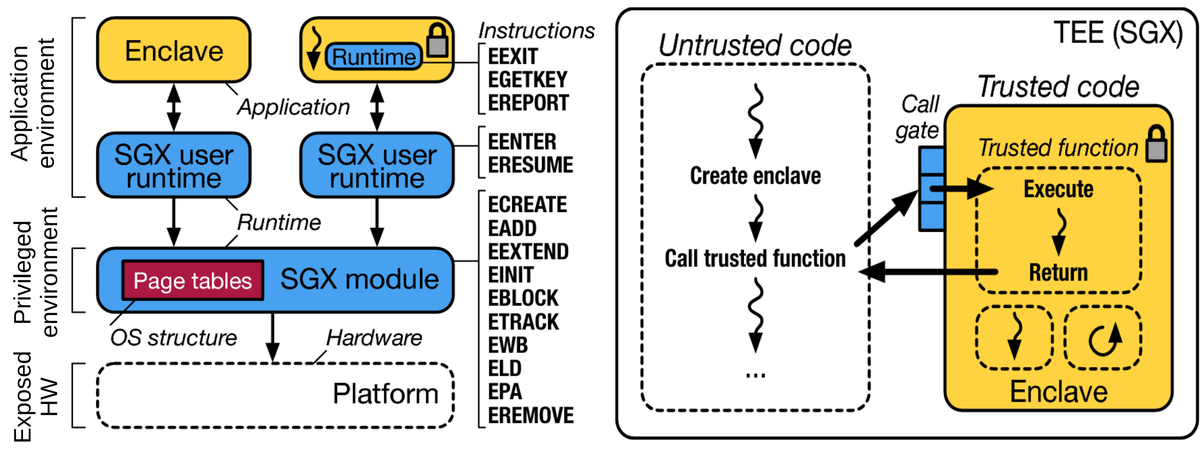
Context

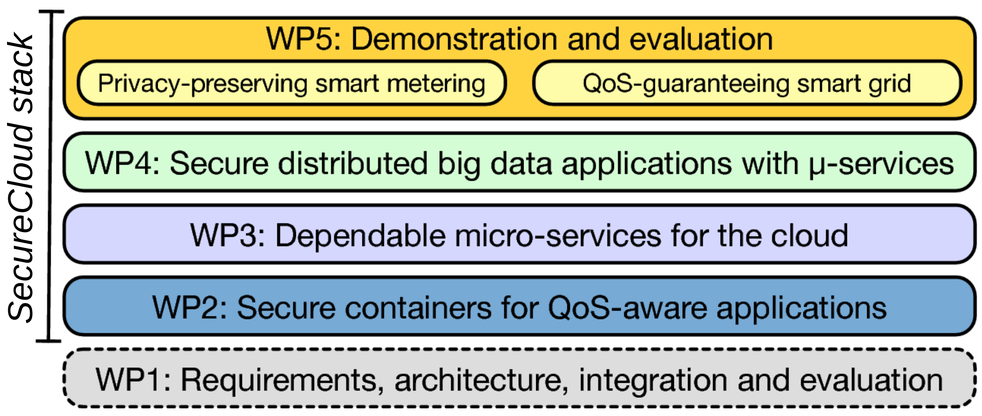
- Confidentiality, integrity and availability in the cloud
- Critical infrastructures (financial, health care, smart grids)
- Small trusted computing base (trusted execution environment)
- Commodity hardware

- Objectives:
  - Improve the state-of-the-art in cloud dependability
  - Seamlessly integrate into standard cloud stacks
  - Validate through use cases in the domain of critical infrastructures (smart grids)

Intel SGX

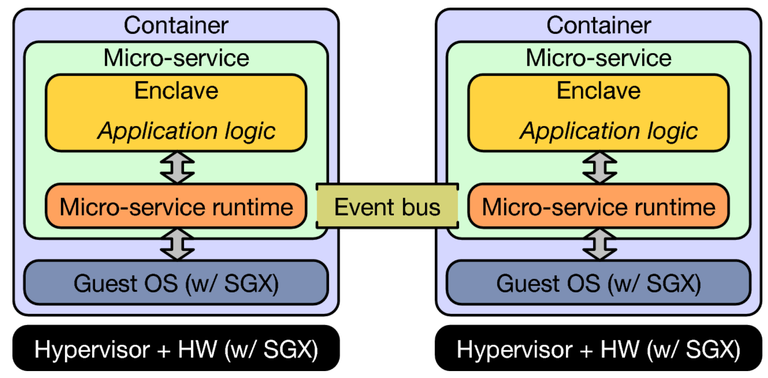


Layered architecture

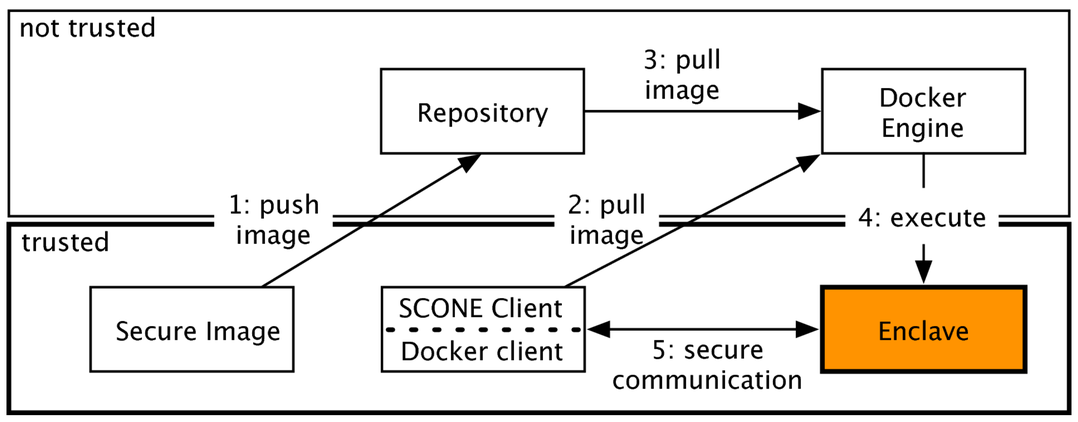


SecureCloud approach

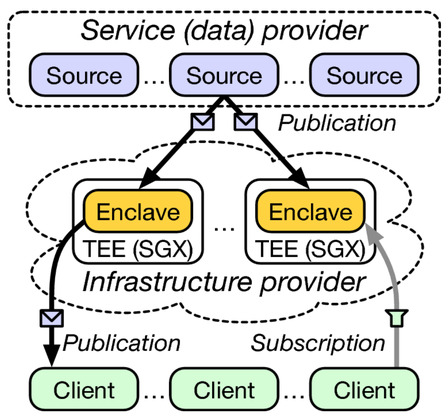
- Secure containers for QoS-aware applications
- Dependable micro-services for the cloud
- Secure distributed big data applications

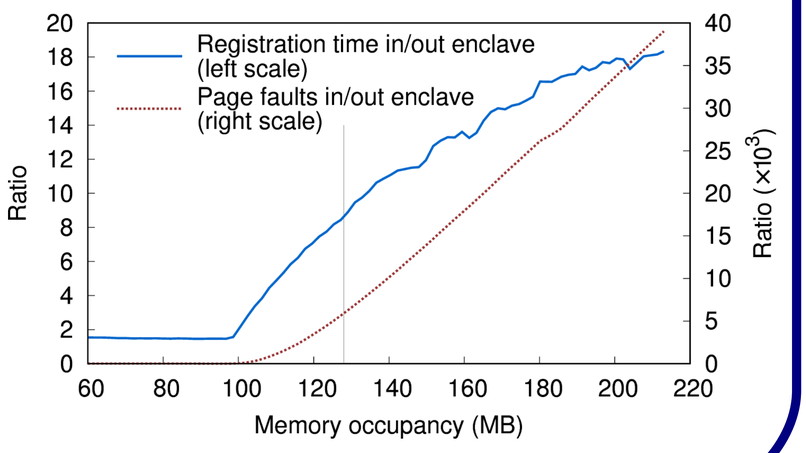


Secure docker containers (SCONE)



SCBR and performance overhead (page faults)





Conclusions

- SecureCloud designs and develops technologies for future cloud environments
- Enhanced dependability to host critical infrastructure applications in the cloud
- Initial SGX-based prototypes demonstrate SecureCloud's promising approach

The road ahead:

- Management and orchestration services
- Effective partitioning of applications
- Efficient memory usage
- Infrastructure and micro-services development
- Components validation and integration

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