A Brief Overview of Some of the Most Interesting Cutting-Edge Research on Computer Systems: highlights from the 2011 Symposium on Operating Systems Principles (SOSP)

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All papers, slides, and videos are available at: http://sigops.org/sosp/sosp11/current/index.html

Some important themes of the conference were:

1. Virtualization
2. Cloud computing, especially security in the cloud
3. Deterministic multithreading
4. Increasing use of Trusted Platform Modules (TPMs)

We present brief examples of each.

1. Virtualization: Running multiple virtual cell phones on a single cell phone

See the paper *Cells: A Virtual Mobile Smartphone Architecture* from Columbia University (Andrus et al). (Slides). Watch the demo in the YouTube video from 22:30-25:20. The first audience question (26:00-29:00) is also interesting.

2. Cloud security: A new type of database that allows you to compute queries on encrypted data without ever decrypting it, so even a malicious administrator of the database can't read the data.

See the paper *CryptDB: Protecting Confidentiality with Encrypted Query Processing* from MIT (Popa et al). (Slides).

3. Deterministic multi-threading: Eliminate concurrency bugs in multithreaded software by ensuring the order of threads' execution is exactly the same every time the program is run.

See the paper *Efficient Deterministic Multithreading through Schedule Relaxation* from Columbia University (Cui et al). (Slides).

4. TPMs: a new operating system that uses a TPM to guarantee validity of most actions taken by the computer (rather than merely verifying the correctness of the initial state).

See the paper *Logical Attestation: An Authorization Architecture for Trustworthy Computing* from Cornell University (Sirer et al). (Slides).

And finally, the winner of the best presentation award was James Mickens for Atlantis: Robust, Extensible Execution Environments for Web Applications. Video (watch especially from 3:30-9:00); slides. Well worth watching!