eBACS: ECRYPT Benchmarking of Cryptographic Systems

http://bench.cr.yp.to

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Joint work with:
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Maybe more measurements:
“Oh, lots of overhead in hashing 256 bytes. I’ll try 4096 bytes.”
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This pattern repeats for every cryptographic implementor. Hundreds (thousands?) of separate ad-hoc timing tools run on various hardware.

NESSIE’s performance evaluators tuned C implementations of many cryptographic systems, all supporting the same API; wrote a benchmarking toolkit; ran the toolkit on 25 computers.

Many specific performance results: e.g., 24 cycles/byte on P4 for 128-bit AES encryption.
ECRYPT I had five “virtual labs.” STVL, symmetric-techniques lab, included four working groups. STVL WG 1, stream-cipher group, ran eSTREAM (2004–2008).

De Cannière published eSTREAM benchmarking toolkit.

Stream-cipher implementations matching the benchmarking API were contributed by designers, published, often tuned; benchmarked on many computers. e.g. 18 cycles/byte on P4 for third-party asm AES in toolkit.
2006: VAMPIRE, “Virtual Application and Implementation Lab,” started eBATS ("ECRYPT Benchmarking of Asymmetric Systems"), measuring efficiency of public-key encryption, signatures, DH.

Published a new toolkit.

Project is continuing.
Has written, collected, published 55 public-key implementations matching the benchmarking API. Benchmarked on many computers.
2008: VAMPIRE started eBASC ("ECRYPT Benchmarking of Stream Ciphers") for post-eSTREAM benchmarks.

VAMPIRE also started eBASH ("ECRYPT Benchmarking of All Submitted Hashes").

eBACS ("ECRYPT Benchmarking of Cryptographic Systems") includes eBATS, eBASH, eBASC. Continues under ECRYPT II.

New toolkit, API; coordinated with CACE library (NaCl). AES now 14 cycles/byte on P4.
Many advantages of eBACS over ad-hoc benchmarking:

- >1000 compiler options.
- >100 machine-ABI pairs.
- Many message lengths.
- Very high reliability.
- Public verifiability.
- Real API, not only timing.
- Easy for implementor!

Today have 431 implementations.

Biggest disadvantage:
Report latency is high;
hard to use during development.

... but we’re working on this.