Security Considerations and Building Trust

Olivier Mehani

Free Software Sydney Meeting — 2015-09-10

About me

- shtrom
- Been using Free software for 15 years (Linux, OpenBSD, . . .)
- Researcher at NICTA in the (former) Network Research Group
- Write code daily
- Administrate various networks at home and at work
- If I can't patch it, I won't use it
- mailto:shtrom@ssji.net
- 4435 CF6A 7C8D DD9B E2DE F5F9 F012 A6E2 98C6 6655
- http://blog.narf.ssji.net;
  http://www.narf.ssji.net/~shtrom/wiki/

About me

Outline

Hashing

Assymetric Cryptography
- Pretty Good Privacy (PGP)/Gnu Privacy Guard (GPG)
- Public-Key Infrastructure (PKI)

Trusting trust

Reproducible builds

Conclusion

Hashing

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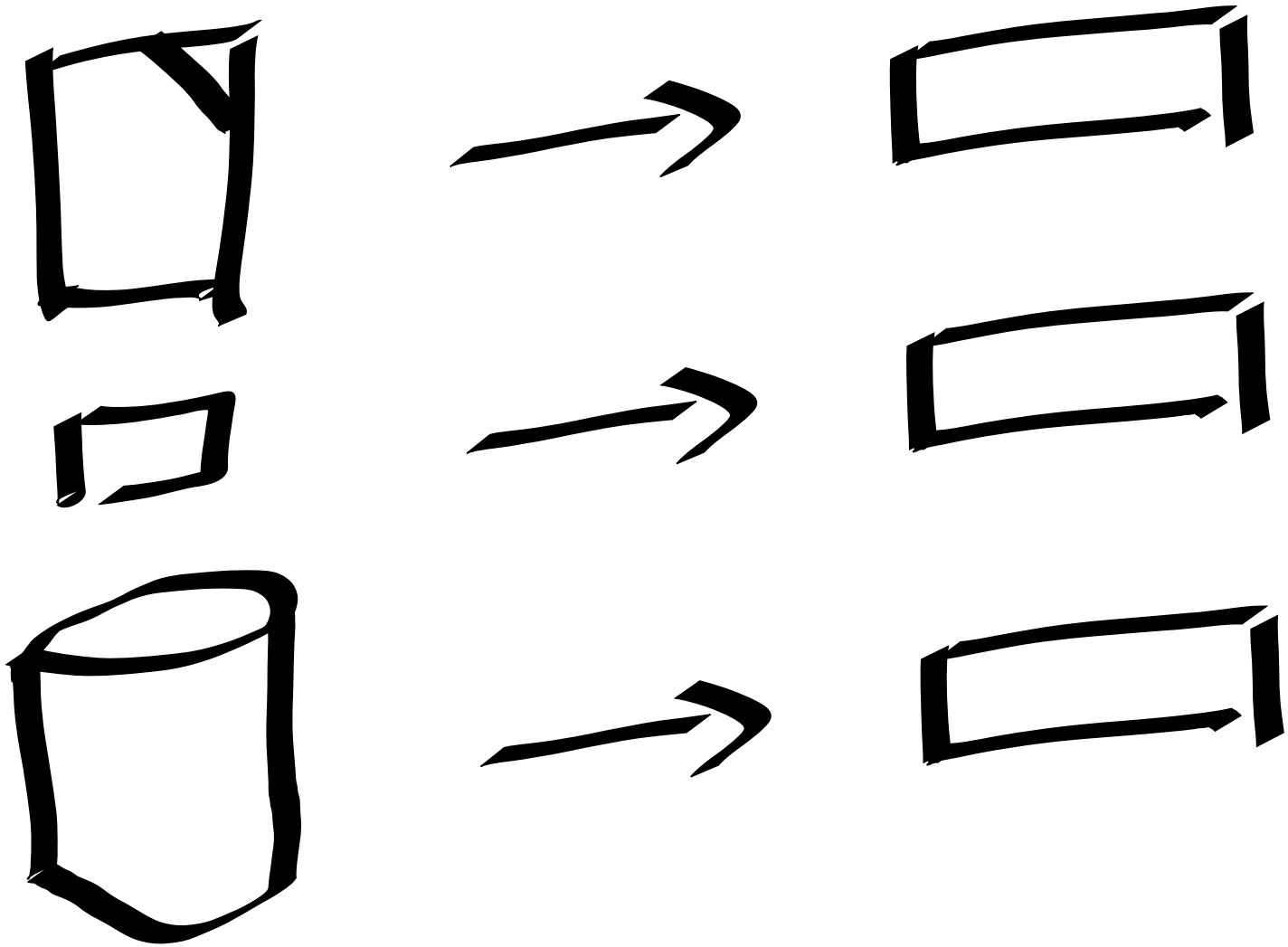

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- Cryptographic hash
  - Easy to verify that data matches
  - *Hard* to create data matching a specific hash
  - $\Rightarrow$ Block chains proof-of-work
    - Brute-force a random value for a block which makes the hash start with n 0s

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Public/private keypairs

- Key pair
  - Publish the public key widely
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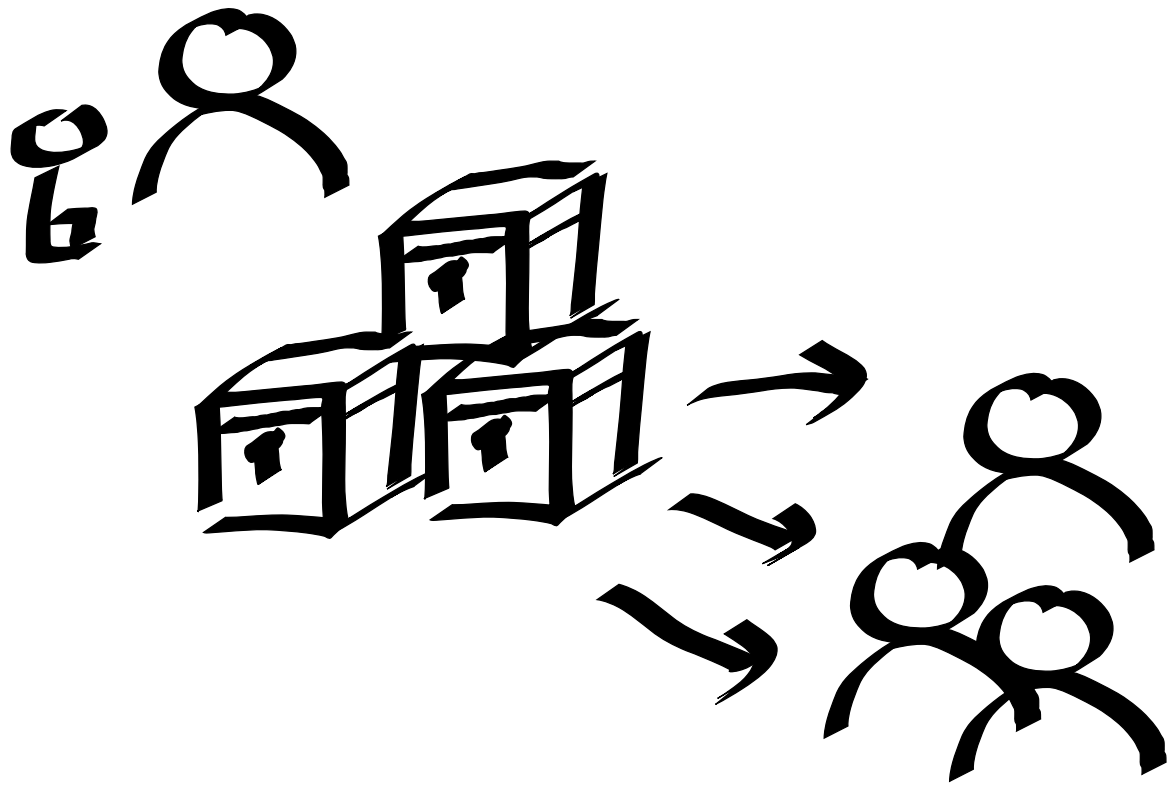

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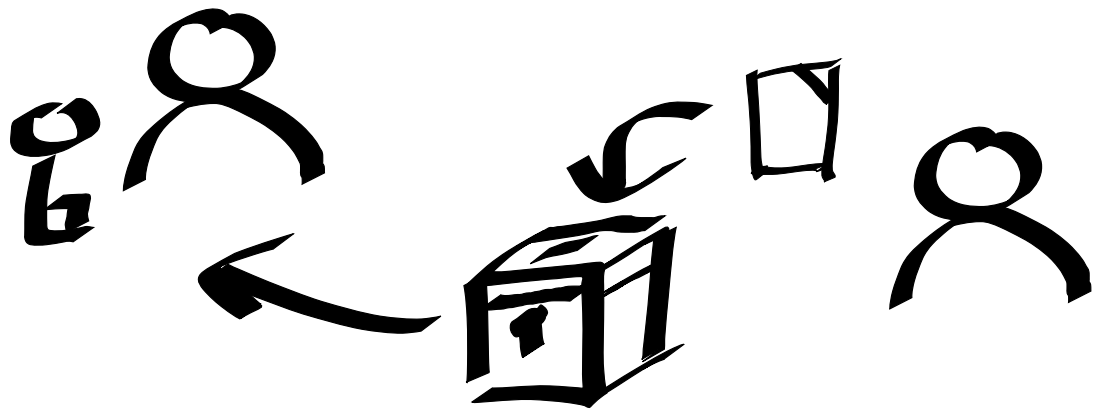

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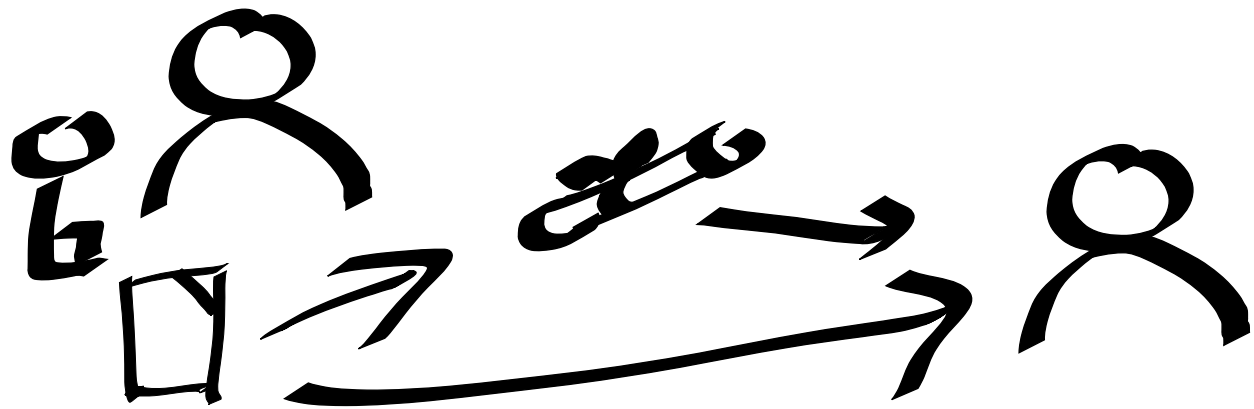

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- Problem: How do we know who a public key really belongs to?

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- Check data authenticity
  - Verify signature of a hash that matches dowloaded data
    - `gpg --verify data.asc`

Public-Key Infrastructure (PKI)

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- Alternate CAs models
  - CAcert:[1] based on web-of-trust verification
    - human assurers verify your name/ID
    - not in common truststores
  - Let's Encrypt:[2] Mozilla and others' initiative
    - reduce the barrier to entry for encryption
    - doesn't solve the trust abuse problem
    - will launch soon

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Trusting trust

- One bit flip can introduce a vulnerability
  - Hashes can help identify this

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- $\Rightarrow$ Seeing the source and trusting the build system is not enough

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  5. Anybody else can redo it and verify independently

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