Everything you need to know about cryptography in 1 hour

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  - Know where some of the common mistakes are.
  - Know when you're doing something non-standard and you really need to consult a cryptographer.

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    - Hopefully they'll decide that your information isn't that important.

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- In most cases you will want to put together two or more cryptographic components.

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- *Symmetric* cryptography is when converting plaintext to ciphertext uses the same key as converting ciphertext to plaintext.
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- *Ideal* cryptographic components don't really exist, but if a cryptographic component is recognizably non-ideal, it is generally considered to be broken.

Hashing

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    - In particular, knowing $H(x)$ might allow an attacker to compute $H(y)$ for some values of y.

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    - The Flickr API used hashing to authenticate API requests where they should have used a MAC.

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- DON'T: Leak information via timing side channels when you verify a signature.

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- Other side channels include electromagnetic emissions ("TEMPEST"), power consumption, and microarchitectural features (e.g., L1 data cache eviction on Intel CPUs with HyperThreading).

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- DON'T: Write code which which leaks information via how long it takes to run.

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  - If an attacker can get useful information about a block cipher by looking at how it handles different (but related) keys, the block cipher is said to be vulnerable to a *related-key attack*.

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- DO: Verify the authenticity of your encrypted data *before* you decrypt it.

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- An asymmetric authentication scheme is considered to be broken if an attacker with access to the verification key can generate *any* valid ciphertext, *even if he can convince you to sign arbitrary other plaintexts*.

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- DO: Be especially careful to avoid timing side channels in RSAES-OAEP.

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  - No, not even if they're encrypted.

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- DO: Think very carefully about which certificate authorities you want to trust.

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Weird stuff

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  - You want to ignore any of the advice I've given in this talk.

Questions?