

Technical Remarks on Government Access to Plaintext

Ronald L. Rivest

Institute Professor
MIT, Cambridge, MA

National Academies Panel
2016-11-11



Outline

Where are we?

Trying to give clear definitions

Challenges for government access

Other issues

Conclusions



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- ▶ Crypto Wars 1.0 (80s and 90s)
- ▶ **What if LE had prevailed then?**
 - Clipper Chip or equivalent in all confidential communications.
 - Still be waiting for e-commerce...
- ▶ Problem is pretty much the same, but the world is **much** more complex now.

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- ▶ An anti-encryption “magic wand.”
- ▶ Designed, implemented, paid for, and managed by someone else.
- ▶ Effective—hard to evade or subvert.

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- ▶ Clear **international guidelines**.
- ▶ **Fairness to U.S. companies**.



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- ▶ An approach that **doesn't set standards that empower dictators and authoritarian regimes**.
- ▶ An approach that **doesn't throw sand in the gears of technical progress**.

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- ▶ Result of applying “decryption” to a
“ciphertext”??

What is “**encryption**”?

- ▶ Invertible transformation whose inverse (“decryption”) requires a secret key?

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- ▶ **Hard to tell if using AES is “encryption”!**



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- ▶ (Are we going in circles with these definitions?)

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- ▶ Must be some party with access to plaintext (or to secret decryption key).

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- ▶ **In any case, TTP becomes a single point of failure.**

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- ▶ **Government access seems to preclude this best practice for data erasure.**



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- ▶ **Government access would require violation of this best practice.**



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- ▶ **Government access methods may not be compatible with FHE.**



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Challenge: Other New Forms of Cryptography

Cryptography is rapidly evolving and producing many new and useful ways of achieving confidentiality. You can encrypt so that:

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- ▶ decryption is only possible after **a certain amount of time**.
- ▶ **decryption doesn't always succeed** (yes, this can be useful!).
- ▶ a user can **convincingly deny that a given “ciphertext” has any associated “plaintext”**



Challenge: **Other New Forms of Cryptography** **(cont.)**

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- ▶ you can **search for ciphertexts encrypting a given plaintext.**
- ▶ you can **encrypt and authenticate at the same time.**
- ▶ **Government access may be incompatible with these (and other) new forms of cryptography.**



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Issue: Innovation may be harmed

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- ▶ Regulation of cryptography may stifle innovation critical for the growth of the American internet-based economy.

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- ▶ **Classified information**?
- ▶ **Government access may need to be limited to certain kinds of information.**



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- ▶ Costs of “letting LE in” may be at least as high or higher than the cost of “keeping Chinese out”.
- ▶ **It may be better for our country if our security engineers focus on “keeping the Chinese out.”**

Issue: Regulation likely to be ineffective

- ▶ AES invented by Belgians!
- ▶ Number of apps for sale having encryption: “There are at least 865 hardware or software products incorporating encryption from 55 different countries. This includes 546 encryption products from outside the US, representing two-thirds of the total. ... 66% are proprietary, and 34% are open source.”
- ▶ There are other ways of achieving confidentiality besides “encryption.”
- ▶ **Government access policy would need to be international and cover other mechanisms for confidentiality.**



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Conclusions

- ▶ “Government access to plaintext” is a complex issue.
- ▶ I’ve only touched on a few of the issues and examples.
- ▶ Please think hard about the challenges given here, and the **25 unanswered questions** at end of “**Keys Under Doormats**” paper.
- ▶ **This committee may be looking for a “solution” that doesn’t exist...**



The End

