Security, Cryptography, and Magic

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Weak Points of the Internet

- The DNS
- Routing
- Host security

Cryptography can help with the first two, but...
Security Flaws

- At least 85% of CERT advisories describe problems that cryptography can’t fix.
- 9 out of 13 advisories last year are about buffer overflows.
  - Of the others, 2 describe problems in cryptographic modules...
Going Around the Cryptography

- Cryptography relies on the secrecy of keys. Can we protect them, on today’s systems?
- Smart cards, etc., encrypt, decrypt, and sign what the host system hands them. Can we trust the host?
- What about the certificate hierarchy?
Certificates

- Most users don’t know what certificates are.
- Of those who do, most don’t verify the signature chain.
- Most of those people don’t know if they should trust an arbitrary root.
- Conclusion: for most practical purposes, we don’t have a PKI -- and most people neither know nor care.
Cryptography and Identity

● Given the PKI problems, encrypted traffic is effectively unauthenticated.

● This does prevent broad-spectrum eavesdropping.

● But active attacks can go around the cryptography to penetrate systems -- and such attacks are taking place.
Conclusions

- Cryptography is necessary, but not sufficient.
- Using cryptography *properly* is very hard.
- We can wave our magic wands and solve that problem, and deploy strong cryptography everywhere.
- But we don’t have a big enough wand to fix the buggy code.