How to Tell the Birds from the Primes

Martin Abadi, Andrew Birrell,
Ilya Mironov, Ted Wobber, Yinglian Xie

Microsoft Research Silicon Valley

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Ron was wrong, Whit is right

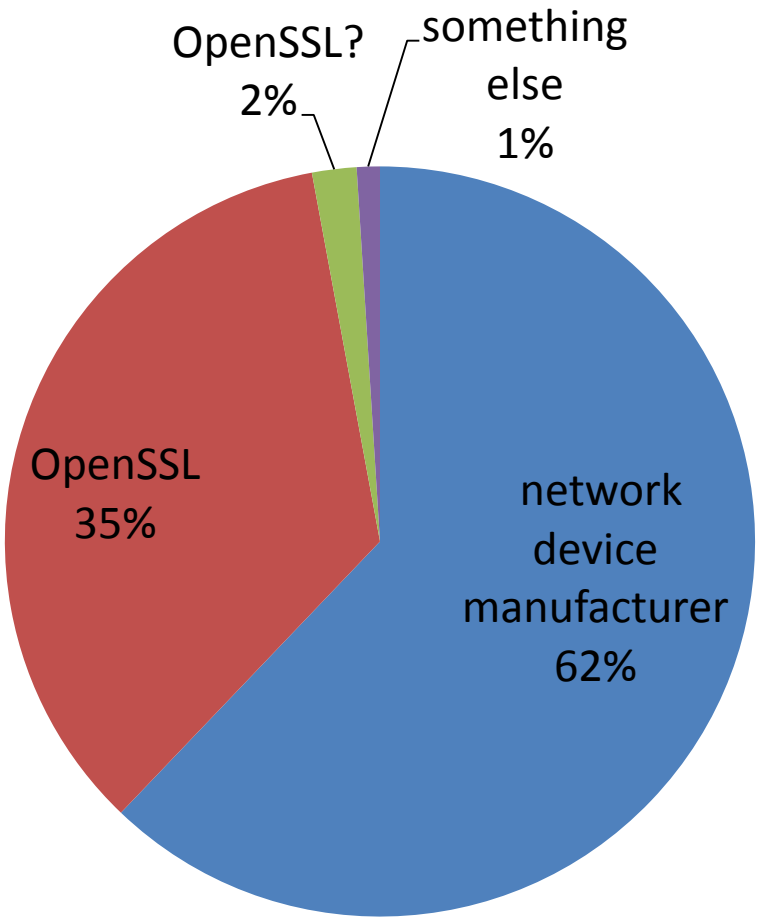
Arjen K. Lenstra[1], James P. Hughes[2],
Maxime Augier[1], Joppe W. Bos[1], Thorsten Kleinjung[1], and Christophe Wachter[1]

[1] EPFL IC LACAL, Station 14, CH-1015 Lausanne, Switzerland
[2] Self, Palo Alto, CA, USA

Ron was wrong, Whit is right, Arjen is ...?

- Snapshot of EFF Observatory from 2010
- 4.4M distinct keys
- 10K distinct factorizable RSA moduli
- Reproduced results from Lenstra et al., ePrint 2012/64

Origin?


OpenSSL?
2%
something
else
1%
OpenSSL
35%
network
device
manufacturer
62%

How OpenSSL Samples Safe Primes?

Safe primes: $q = 2p + 1 \in \mathbb{P}$, where $p \in \mathbb{P}$

1. Sieving step:

   Find "candidate" odd q, such that

   $$q \not\equiv 0,1 \bmod 3,5 \ldots, 17863$$

2. Verification step:
   a) Apply Miller-Rabin to q
   b) Apply Miller-Rabin to $(q-1)/2$

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OpenSSL can only output a prime q, such that $q - 1 \nmid 3,5, \ldots, 17683$

1:15 primes have this property

Not a vulnerability, but a fingerprint

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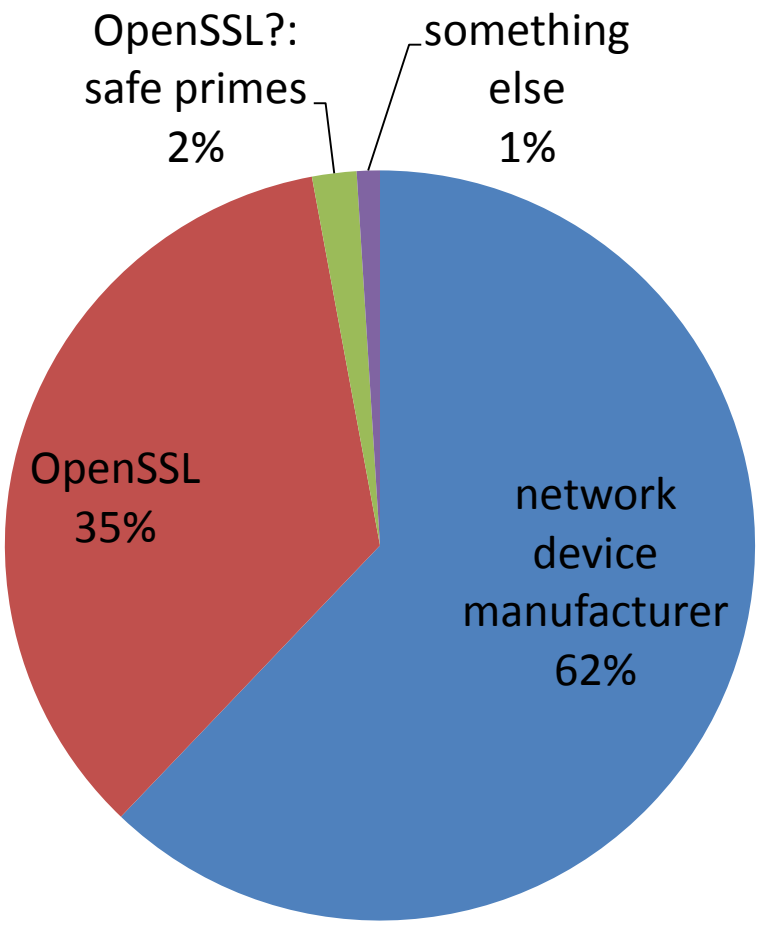
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