Computer Security

Honeypots, Side-Channel Attacks

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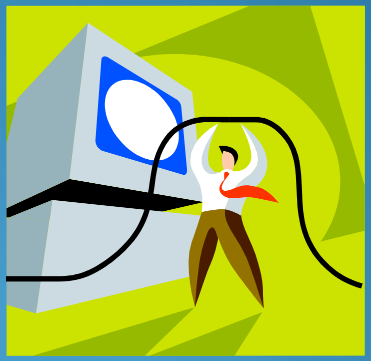
Honeypots



Honeypot - definition

Definition :

- Honeypots are fake computer systems, setup as a "decoy", that are used to **collect data on intruders**
- This "decoy" appears to contain operating system vulnerabilities that make it an attractive target for hackers.
- A honeypot, loaded with fake information, appears to the hacker to be a legitimate machine.
- While it appears vulnerable to attack, it actually prevents access to valuable data
- It is an example of a **deception system**.

Honeypots - categories

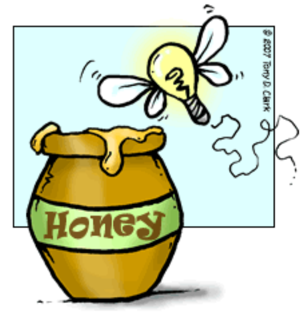
Honeypots are categorized based on their deployment:

- Production honeypots – normally low-interaction honeypots with the intention to reduce risk in an organisation
- Research honeypots - gather information about the motives and tactics of the attackers. They are complex to deploy and maintain. They capture extensive information

or with respect to the level of interaction they have with the attackers:

- low-interaction – simulates the services that the attackers are normally asking for. Low resource-demanding, fast response
- high-interaction - offers most of the services of a system. Expensive to maintain. Difficult to detect.

Honeynet



- A honeynet is a network of honeypots
- The purpose is to invite attack, so that an attacker's activities and methods can be studied and that information used to increase network security can be gathered
- Results from the nodes in the honeynet can be analysed in a central node
- The advantage with a honeynet is that distributed attacks and low-interference (stealth) attacks can be studied

Side-channel Attacks

Side-channel attacks

- A side channel attack is any attack based on information gained from the physical implementation of a cryptosystem
- It normally requires physical access to the hardware
- A side-channel attack is an attack based on side-channel information, i.e. “extra” information that can be retrieved from a crypto device and that is neither plaintext or the ciphertext

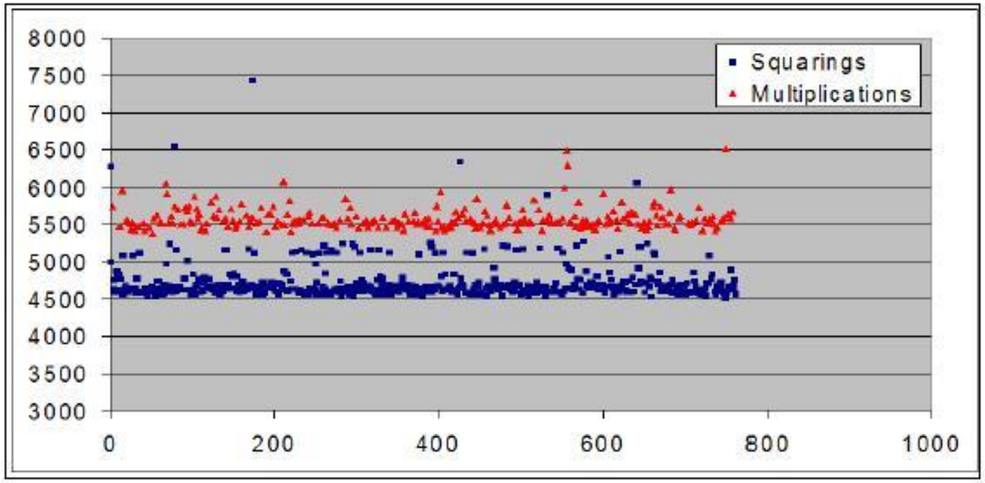
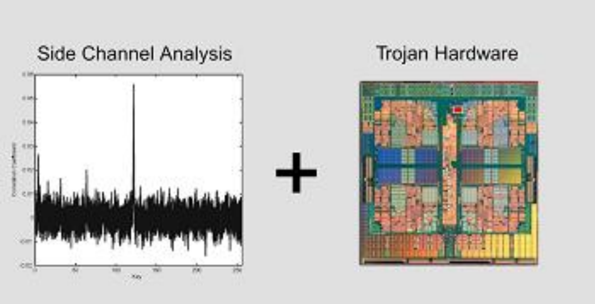


Fig. 9. Best result of our SBPA against OpenSSL RSA, yielding 508 out of 512 secret key bits.

Side-channel attacks



- Types of side-channel attacks:
  - Timing attack – attacks based on measuring how much time various computations take to perform.
  - Power monitoring attack - attacks based on observing the varying power consumption by the hardware during computation
  - Electromagnetic attacks – based on observing electromagnetic emanation, cp. TEMPEST (Sw. RÖjande Strålning = RÖS)
  - Acoustic cryptanalysis - attacks which exploit the sound produced during a computation
  - Differential fault analysis - in which secrets are discovered by introducing faults in a computation.