This week on Security Now!

- The "Pixie Dust" failure of WPS
- Disabling RC4
- Mozilla putting on the pressure to phase out HTTP
- Anti-analysis malware aggressively attacks researcher's machines
- A deeper look into the evolution of DDoS.
- A handful of updates and announcements.
- Two very different and well thought out statements about law enforcement backdoors.

"Pixie Dust" offline attack on WPS

  - 8-digit PIN printed on the router's label, sometimes on an LCD screen.
  - Often there's a pairing button.
  - You need to know the PIN *or* press the button.
  - "Reaver" was a brute force attack.
  - Devices added a one-minute lockout to prevent brute forcing.
Dominique Bongard discovered that some WiFi APs have weak ways of generating the 128-bit E-S1 and E-S2 nonces... that MUST be unpredictable.

If an attacker can determine their values, the WPS PIN is easily determined.

"Enrollee nonce" is a public shared value.

E-Hash1 = HMAC<sha-256> (E-S1, PSK1, PKE, PKR)
E-Hash2 = HMAC<sha-256> (E-S2, PSK2, PKE, PKR)

Ralink APs:
- E-S1 = E-S2 = 0

Broadcom/eCos devices:
- The two "secret" E-S1 and E-S2 nonces are generated immediately after the enrollee nonce. And we know the function that gives us this data (Linear Congruential PRNG with *NO* external entropy). So if we substitute in seeds, we will find matching nonces, and from there we can find the E-S1 and E-S2 nonces.

In Realtek:
- The PRNG directly uses the time in seconds from January 30th, 1970 until the generation of the data.
- The chip uses the same generator to make the Enrollee nonce as it does to make E-S1 and E-S2.
- If the entire exchange occurs within that same second, E-S1 = E-S2 = Enrollee Nonce.
- If it occurs over the course of a few seconds, all we have to do is find the seed that gave us the Enrollee Nonce, and then increment it and taking the output as E-S1 and E-S2.

**RC4 was disabled in FFv36 (we're now at 37.0.2)**

- RC4 is now considered insecure and all UI indicators will react as such.
- SSLv3 has been disabled by default in Firefox 34, but the UI has been changed to help the user better understand what’s happening.
- Also, RC4 is no longer offered in the initial handshake of TLS.

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- "Deprecating Non-Secure HTTP"

Firefox Security Lead Richard Barnes:
<quote> Today we are announcing our intent to phase out non-secure HTTP. After a robust discussion on our community mailing list, Mozilla is committing to focus new development efforts on the secure web, and start removing capabilities from the non-secure web. There are two broad elements of this plan:

- Setting a date after which all new features will be available only to secure websites
- Gradually phasing out access to browser features for non-secure websites, especially features that pose risks to users’ security and privacy.

Interesting approach: New features that sites might use would require HTTPS, though without HTTPS older less desirable "workarounds" could still be used. Thus putting pressure on the site from the developer end. 

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Anti-Analysis Malware:

- A new strain of spyware that logs keystrokes and steals data has a destructive side to it, unleashing wiper capabilities if it detects it's being analyzed and audited.
- Craig Williams of Cisco: “It sounds cliché, but this is really a digital arms race and we’re seeing the next evolution of it here. Malware authors are no longer content with detect-and-shut-down. Now, if malware realizes it's being audited, the binary will destroy the system. It’s a simple case of attackers trying to dissuade researchers from going after a sample.”
- Many anti-analysis features designed to evade analysis:
  - Contains 8000 executable functions that are never used.
  - Writes a byte of data to memory 960 millions times to break sandbox logging. (Would create a 100Gb log file.)
  - Unpacking code:
    - <quote> The unpacking code is monstrous and has many times the complexity of the anti-analysis code. The code contains dozens of functions overlapping with each other and unnecessary jumps added only to increase complexity. The result is a nightmare of a control flow graph with hundreds of nodes.”
    - It hashes itself and, if any change is detected, overwrites the user's MBR. If it cannot, it encrypts each file in the user's home folder with a randomly generated key.

Cloudflare Blog: An introduction to JavaScript-based DDoS

- Traditional NTP or DNS reflection attacks
- The new attack vector: JavaScript.
- A malicious page hosts JS which created image tags to induce the browser to request images.
- A shared JS library repository is compromised!
  - jQuery: ~30% of websites using it in 2014.
  - In 2014 jQuery.com’s website was compromised.
- Facebook SDK, Google Analytics
- **Introducing "Sub Resource Integrity" -- SRI -- Proposal from the W3C**
  - <script src="https://code.jquery.com/jquery-1.10.2.min.js"></script>
  - <script src="https://code.jquery.com/jquery-1.10.2.min.js" integrity="sha256-C6CB9UYIS9UJeqinPHWTHVqh/E1uhG5Twh+y5qFQmYg=" crossorigin="anonymous"></script>
  - This is new and not well supported... but Chrome and Firefox have it in the works.
- Repository breaches are typically found and corrected quickly, so attacker need something more.
- The need is to get many browsers to load a malicious script.
- So if you cannot reliably modify the source of the script, intercept it.
- Man In The Middle attacks are TRIVIAL to implement for ANY non-HTTPS site.
  - <<explain that and drive that point home>>
- The solution for MITM attack prevention... is encryption.
Miscellany

YouTube/SGgrc

- First video: testimony edited down.
- Video ReDo. --- editing/cutting/cropping existing MPEG-format streams.
  - "I" - independent frame
  - "P" - uses previous frame data to represent changes from them.
  - "B" - backward ... can look upstream into the future as well as at previous frames.

Hook:

- Kongregate is FLASH
- Hook's author is going in another direction next...

Quote of the week:

- Gene Hastings (@ehastings)
- @SGgrc You may think that "IoT" means "Internet of Things." But really, it means "Internet of Targets."

SpinRite:

- askapache (@askapache) 4/30/15, 11:05 AM
- @SGgrc Steve SpinRite saved my drive! Even the bios wasn't recognizing it!
  pic.twitter.com/6SiBv9yfbA
• SpinRite just saved *ME* many days of work...

• A revelation about end-user RAID protection.

**Law Enforcement Backdoors**

**Matt Blaze**
• B.S. Computer Science, 1986, City University of New York (Hunter College).
• M.S. Computer Science, 1988, Columbia University
  (Thesis: Caching in Large-Scale Distributed File Systems)

**Jonathan Mayer**, Computer Scientist + Lawyer at Stanford
• "You Can't Backdoor a Platform"

Imagine how very creepy it would be if it was actually illegal for an individual to use strong crypto software to encrypt a file they wish to store in the cloud.