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Life Hacks for Wi-Fi Engineers

IT Professional Wi-Fi Trek 2015
#wifitrek



Agenda

- Ekahau product overview
- Ekahau product information
- Ekahau awesomeness
- Competitor bashing
- No time for your questions. Just buy Ekahau stuff.

**OR MAYBE
NOT**

Agenda

- Wi-Fi Hacks

- Site survey – details & best practices

- Ask anything

About the Presenter

- Jussi
- Janitor at Ekahau
- Twitter: @jussikiviniemi



Ekahau at CWNP

- Who else is here?
 - Mikko - PLM
 - Hannele – Marketing
 - Keith & Devin – Trainers



Join the Ekahau Lounge

- #ESSRequest post-it note board
 - Tell us what ESS 10.0 should be like
 - Winner will get his feature request implemented



Actual lounge interior may vary

What is Ekahau anyway?

RTLS

Location Tracking Systems

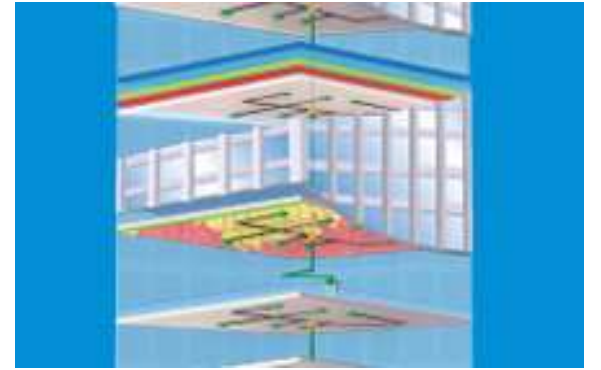


Wi-Fi Design

Tools for Wi-Fi Engineers

“Who will acquire Ekahau?”

Looking at RTLS company acquisitions...





BELDEN
SENDING ALL THE RIGHT SIGNALS



AeroScout®



STANLEY®







Hack #1: Cut the repetition





Draw these 4000 walls!



Draw the walls of a hospital

- A complete hospital has, say, 6,500 wall segments
 - Ground floor: 2000 segments
 - Patient floor: 500 segments each
- At two seconds per wall segment
 - 13,000 seconds
 - 3,6 hours
- It's time you asked for those CAD drawings
 - Walls simplified and imported automatically



Survey these 2600 rooms.
Three times!



GROUND FLOOR PLAN

Perform all the site surveys in one go

- Passive
 - Use multiple adapters to speed up walking
- Active
 - At least for 5GHz band (more utilized in production)
- Spectrum
 - Preferably both bands simultaneously
 - 2.4GHz more prone to interference
 - 5GHz more utilized in production
- Throughput
 - Optional
 - Use with caution if simultaneously with spectrum
 - Will affect the results

Generate these 385 reports
(that are almost similar)



Reporting Wi-Fi Designs is a pain

- After producing 300 almost similar reports to different customers, you'll agree
- Do what these guys have done: Get fully customized reports with a single click
- The drawback: No easy way out
 - a) Build your own scripts / macros
 - b) Use Wi-Fi Design Tools that support it



Hack #2: Understand site surveys

Survey Phase

Predictive site surveys

(network plan, simulation)



Pre-Deployment site surveys

(AP on a stick)



Post-Deployment site surveys

(validation)



Periodic site surveys

(health check)

Question

“How many APs? Where?
Power? Channels? Antennas”?

“What does the real world RF look like”

“Does this network actually work?”

“Does it **still** work? What has changed?”

On-Site Survey Measurements



- Passive
- Active
- Throughput
- Spectrum

Passive Site Surveys

- Most common. Used for most heatmaps.
- NIC Disassociated
- Scan through all channels
- Discover APs and their settings
 - MAC, channel, payload (data rates, channel widths, etc)
 - Each MAC (SSID) is it's own entity. Combining them as a radio / AP not in standard
- Read signal strength and noise level for each AP

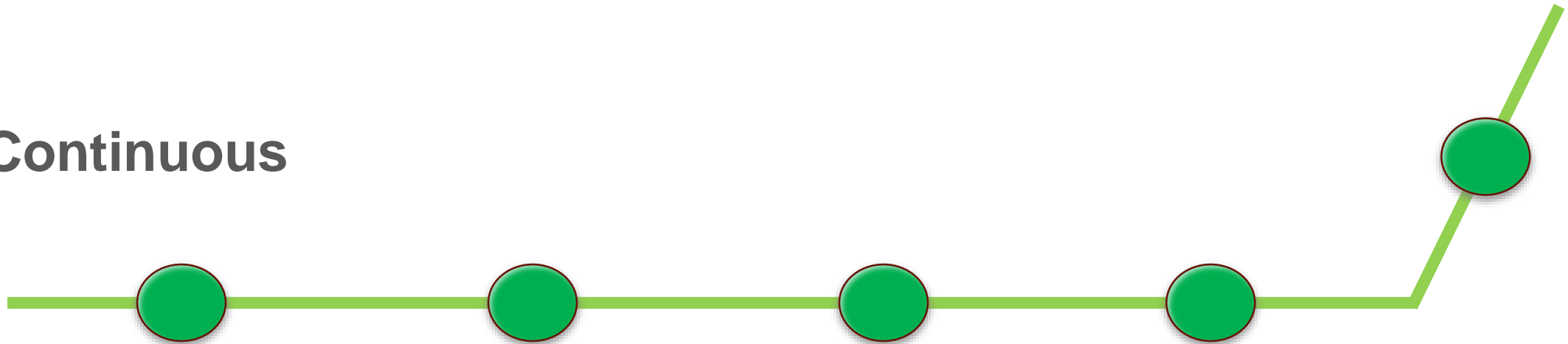
Under the hood: Passive Site Survey

Goal: Measure signal strength, SNR, MAC, AP info

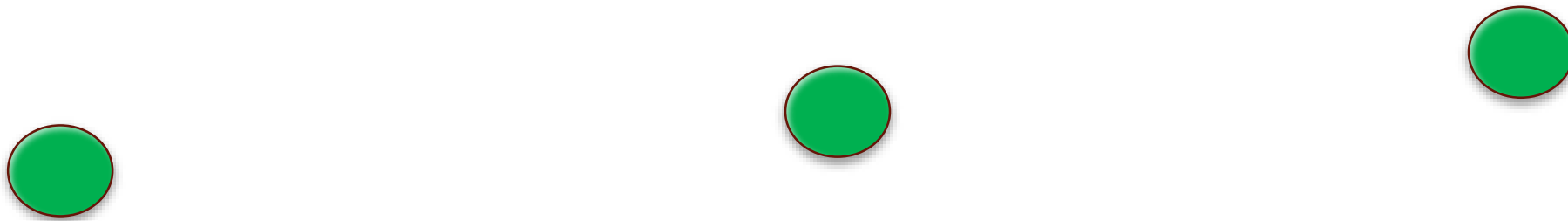
1. Send broadcast probe
2. Listen for beacons and probe responses for 105ms
3. Report the results to survey software
4. Switch to next channel

Continuous vs Stop-and-Go Survey

■ Continuous



■ Stop-and-Go



Busting the Myths: Continuous Mode

- The measurements are **not** placed where you click
 - The click first on the map places no measurements
 - Based on interpolation between two clicks
- Scanning does **not** start when clicking on the map
 - Scanning starts when you start the survey tool

The most common error of Continuous Surveys

Stopping for a period of time in a location...

...and not clicking when you continue walking

- Sure, you remember to click when you arrive to location...
- ... but do you remember to click on the **same** location when you leave?
- Remember, the scanning is continuous, not just when you click

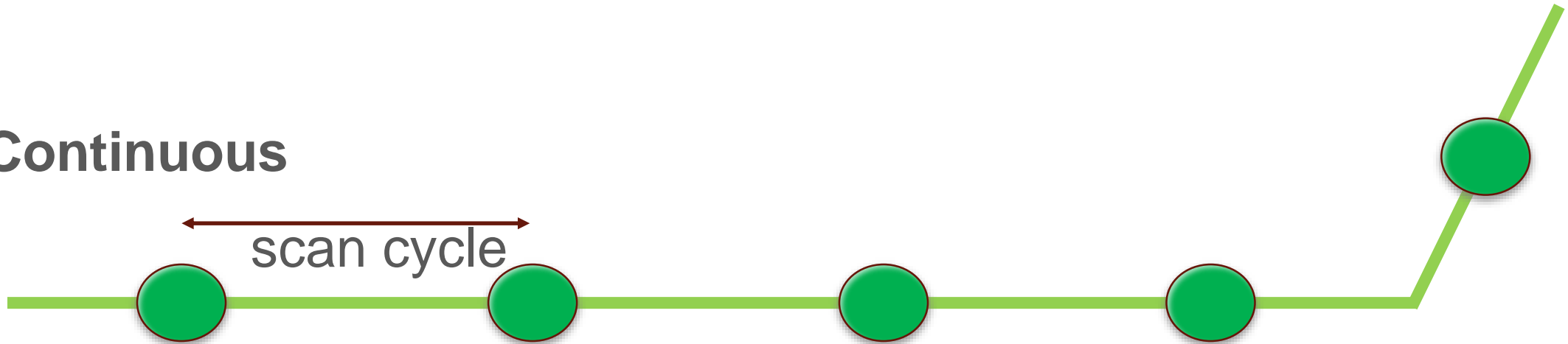
Placing passive survey measurements on the map

Stop-And-Go Survey Mode

- The measurements are placed exactly where you click
- Scanning does **not** start when clicking on the map
 - Scanning starts when you start the survey tool

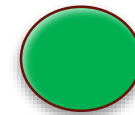
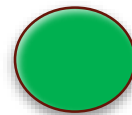
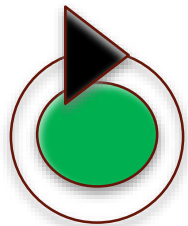
Continuous vs Stop-and-Go Survey

■ Continuous



■ Stop-and-Go

wait time (several scan cycles)



Stop and Go Surveys – Wait Time vs Scan Cycle

- 10 sec Stop-and-Go wait time
- 4 second scan cycle
- You get 2-3 scan measurements per location
- 3 scans: First measurement comes in at the 1 second mark, second at 5, third at 9
- 2 scans: First measurement comes in at the 3 second mark, second at 7

Which channels to scan?

If you're not sure, scan all of them

- 36 channels : around 4 seconds per scan cycle
- Walk 1 meter per second – get a scan every 4 meters
 - Hallway speed. In rooms, it's slower
- You may want to scan more channels than your APs are on **today**
 - Understand all the neighbor networks & ACI impact & future-proofness

Limiting down channels

- 1,6,11 + 36-64 (UNII-1 & 2a) = 11 channels = about 1 second scan cycle
 - Lose ACI info on 2.4GHz. Lose UNII-2c and 3

Using Multiple Wi-Fi Adapters for Passive

Common approach for three adapters

- Adapter 1: 2.4 GHz
- Adapter 2: Lower 5 GHz
- Adapter 3: Upper 5 GHz
- One adapter fails, your data for that area is flawed

Failover redundant approach

- All adapters scanning all channels 2.4+5
- If one adapter fails, you will still have valid data (just less of it)
- Survey point along long hallways not as evenly distributed

Hack #3:

Choosing Your Gear

- Planning / reporting: 16GB RAM, 4+ cores, max the MHz
 - iMac / Mac Pro, Macbook Pro
- Field use: less than that has to do (8GB RAM) Toolkit
 - Macbook (Air), Surface Pro (?), Dell XPS 13
- Invest in what saves time
- Tool standardization has its benefits



Hack #4

Some important Wi-Fi design tools

- Free signal meter
- Spectrum analyzer
- Site survey tool
 - Including standardized adapter!
- Planning tool
- On-the-spot troubleshooter
- Report generator
- Packet analyzer
(not for everyone, CWAP recommended)



Hack #5

Your Wi-Fi design toolkit should be:

1. Suitable.
2. Reliable.
3. Quick to use
4. Easy to learn and train.
5. Fit the budget.

The

“SRQEF”

rule of Wi-Fi tools



Hack #6

Tool Standardization

- Pick and choose the best from all vendors
 - Consider the integration points
- Project file compatibility
- Reporting consistency
- Measurement accuracy
- Training and knowledge synergies
- Not just in-house, but sub-contractors



Hack #7: We actually like talking to you

- Aerohive: @WiFi_Princess (Abby Strong), @MatthewSGast
- AirMagnet: @Advani_Dilip
- Apple: @HenryStukenborg
- Aruba: @SRynearson , CharlieClemmer
- Cisco: @Cisco_Mobility
- Ekahau: @EkaMikko, @JussiKiviniemi , @Wi-FiAndrew
- Extreme: @MikeLeibovitz
- Meru-Fortinet: @MeruNetworks
- Metageek: @FuelCellWiFi (Joel Crane)
- Ruckus: @GTHill , @GregKamer
- WildPackets: @JayBotelho



Hack #8: Ask for an eval

- Wi-Fi tool vendors “love” (= are forced) to give out free evaluation versions.
- Test-drive the tool carefully before choosing.
- Also, ask for a one-to-one webinar / webmeeting to see how tool is used and get your questions answered

Hack #9: Talk to your network users

- They know what they want from a network
- They know when it doesn't work, before you do.

Why talk to users?

- Most problems are solved in 2 minutes by asking the right questions
 - Wi-Fi adapter disabled
 - Laptop hard switch
 - From OS settings
 - Wi-Fi network disconnected
 - Random problem that's fixed by turning Wi-Fi on and off
 - Wrong security key
 - Connected to the incorrect Wi-Fi network

Trust your network

“If you feel confident about the network,
it’s likely a client problem”

Hack #10: Training - Tons of Free / Cheap Stuff!



- Free videos & whitepapers on most vendor & CWNP websites



- Many offer free, one-to-one webinar based training
→ Free, just schedule it



- Classroom training
→ \$

There's still a ton of time...

... for questions!