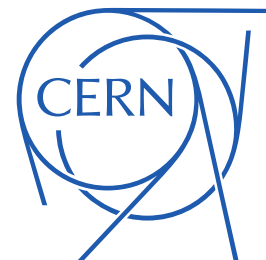# Update about **Wi**-Fi **S**ervice **E**nhancement at CERN

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Agenda

- Wi-Fi Service Enhancement project
- Wi-Fi network architecture
- Network devices
- Outdoor coverage
- Current status of the Wi-Fi network
- Network management
- Problems and challenges
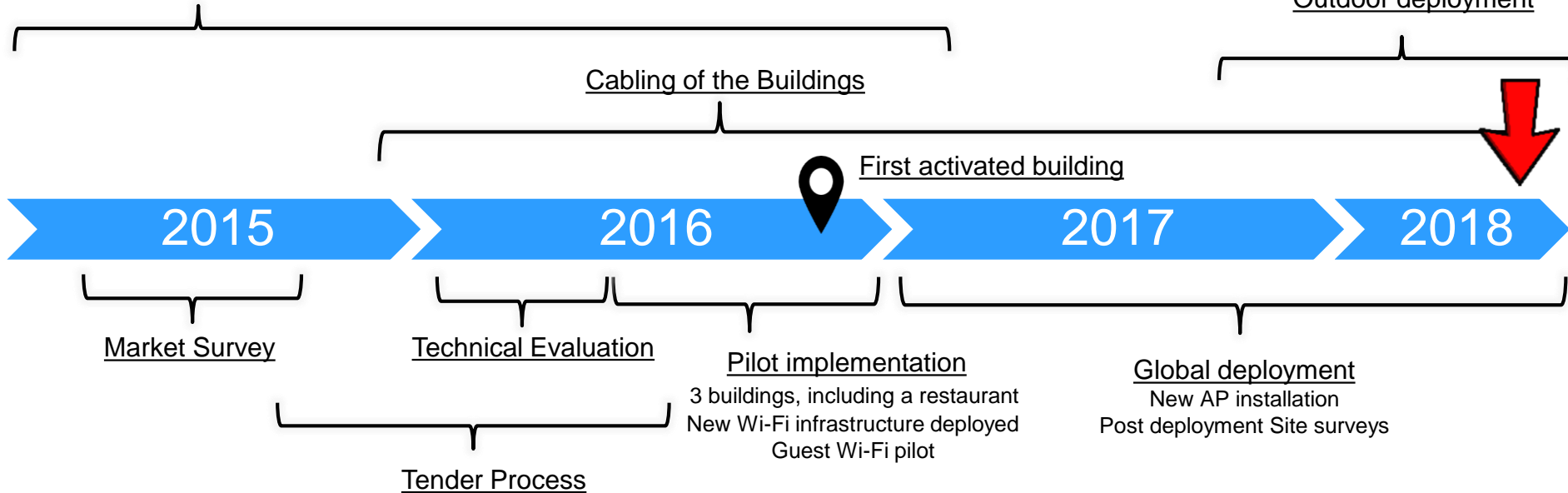- Next steps

WiSE Project

- WiSE - Wi-Fi Service Enhancement project

- Already presented at HEPiX fall 2016 (Berkeley)

- Goals of the project:

  - Provide high quality Wi-Fi coverage in all office buildings and public areas across the CERN campus (~200 buildings)

  - Ensure seamless roaming within the Wi-Fi coverage area

  - Support the latest available Wi-Fi standard 802.11ac

  - Provide additional services such as Wi-Fi for visitors

WiSE Project - timeline

Wi-Fi Planning and Validation
RF Simulation + Site survey
to validate the AP positions

Outdoor deployment

Cabling of the Buildings

First activated building

| 2015 | 2016 | 2017 | 2018 |

Market Survey

Technical Evaluation

Pilot implementation
3 buildings, including a restaurant
New Wi-Fi infrastructure deployed
Guest Wi-Fi pilot

Global deployment
New AP installation
Post deployment Site surveys

Tender Process

Wi-Fi network architecture

- Tender winner: **aruba**

  a Hewlett Packard
  Enterprise company

- Aruba controller-based solution
  - Traffic centralisation for seamless roaming
  - Configuration centralisation
  - Scalability and redundancy
  - Radio Frequency settings automation
  - Configuration automation using API

Wi-Fi network architecture
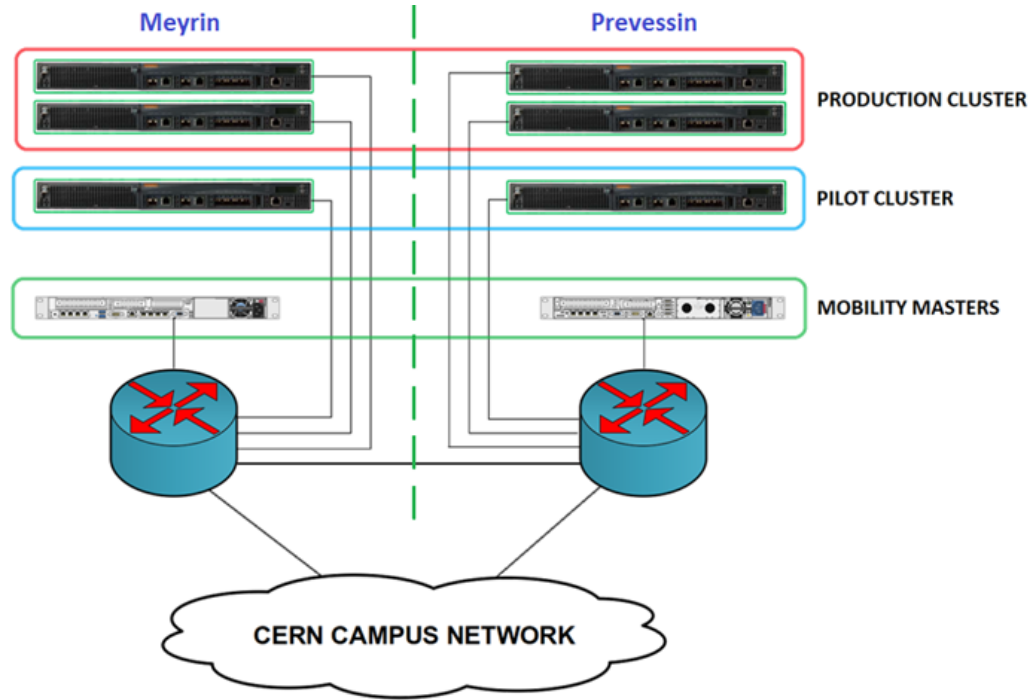
Network devices

- Aruba controllers
- Aruba APs
  - Indoor
  - Outdoor
- Brocade ICX switches
- Brocade MLX routers

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Network devices

- Aruba controllers
- Aruba APs
  - Indoor
  - Outdoor
- Brocade ICX switches
- Brocade MLX routers

WiSE Project – current status

- We are almost there!

- 185 buildings cabled
- 180 buildings activated
- Almost 300 switches deployed
- Around 3,700 APs deployed
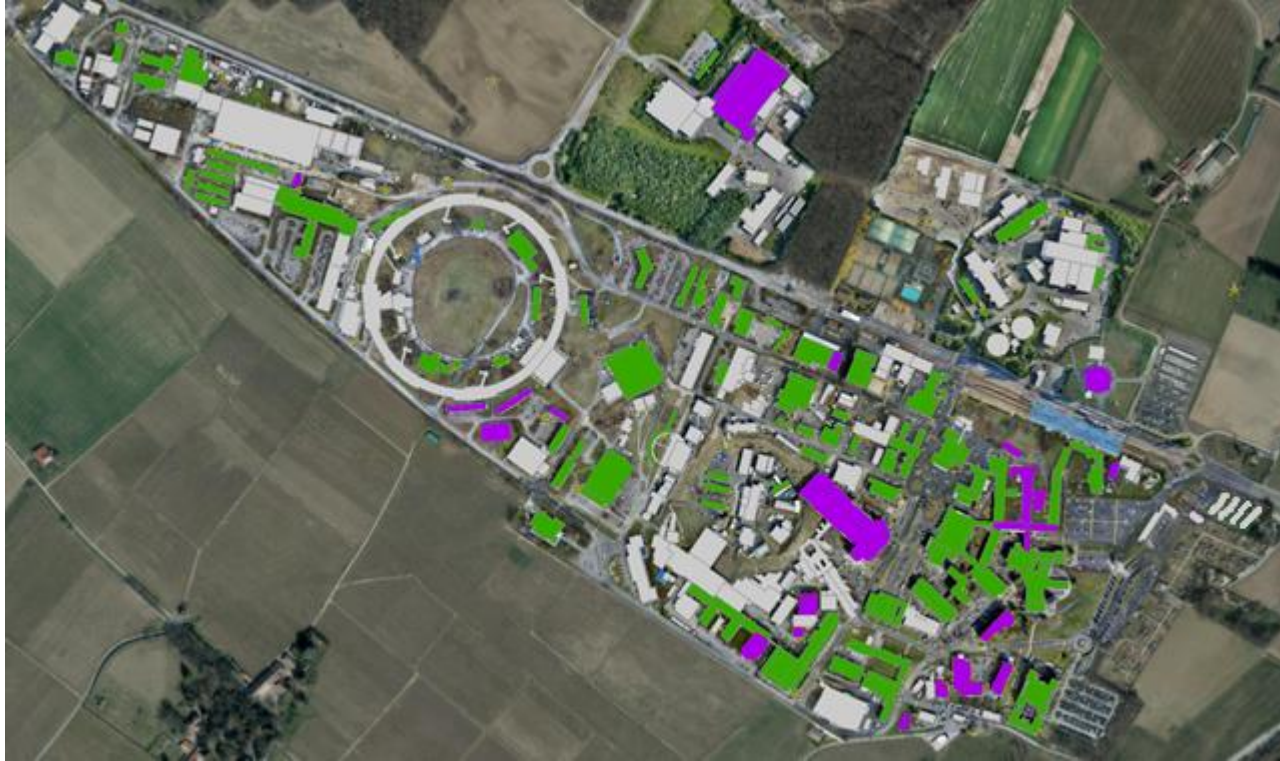- Just 20 buildings still to be equipped with APs

- More than 11,000 unique devices per day
- More than 7,000 simultaneous users every day

WiSE Project – current status

- Number of devices connected to Wi-Fi network

Total Clients
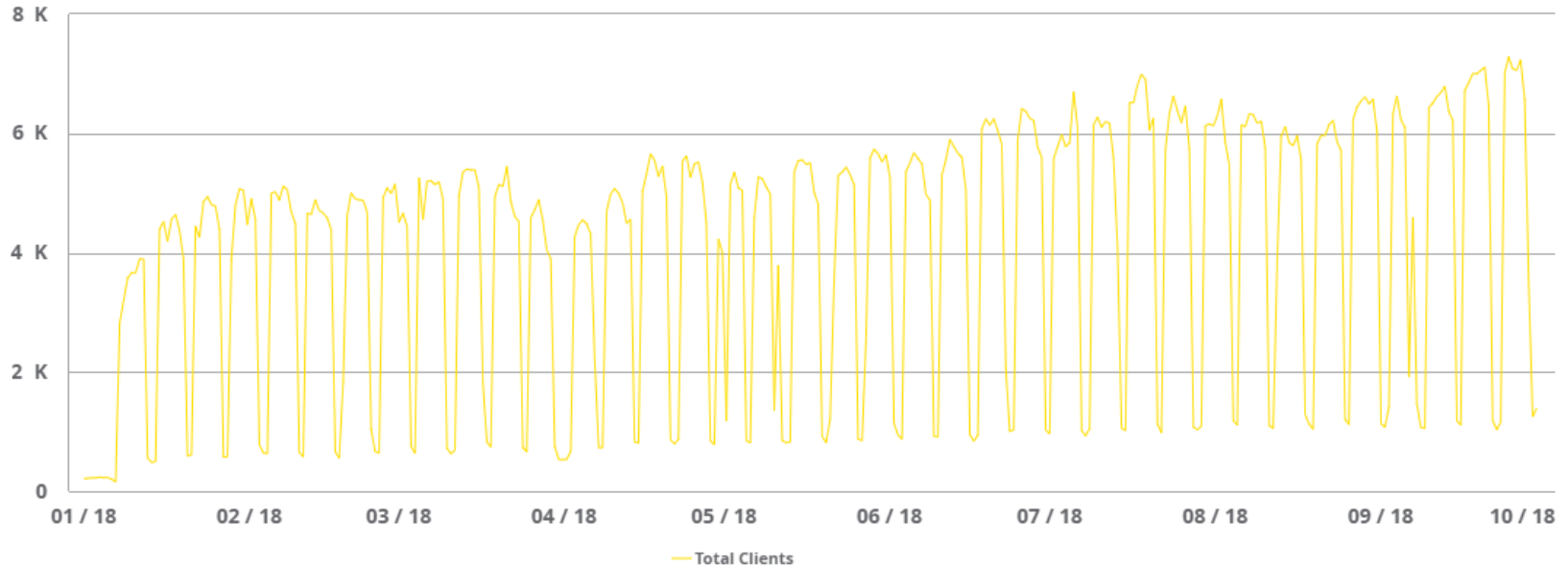
WiSE Project – current status

Activated buildings

Buildings to be equipped with APs

Outdoor coverage

- WiSE Project extension

- Goal:

  - Provide outdoor connectivity and roaming alongside main pedestrian paths across the CERN campus

  - Sites in France will also be covered as no Swiss 3G/4G network is available there
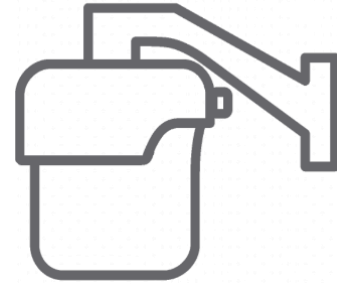
Outdoor coverage – Meyrin site

Outdoor coverage – Prevessin site

Network management

- Single point of configuration and management
- Dedicated tool for monitoring, debugging and statistics
- Automation using provided API
  - Simple installation and replacing of APs
- Transparent updates (Live update feature)
- Efficient automatic system for channel and power assignment
- Possibility to differentiate and separate visitors' traffic

Problems and challenges

- Aruba software (we started from version 8.0.0)
- Stability of Brocade routers managing Wi-Fi traffic

- Aesthetics (removing old APs)
- Installation of the infrastructure in isolated places

Problems a

- Aruba softwa   sion 8.0.0)
- Stability of Br   g Wi-Fi traffic

- Aesthetics (r
- Installation o   lated places

Next steps

- Finish deployment of APs in office buildings

- Finish deployment of outdoor APs

- Upgrade routers responsible for Wi-Fi traffic

- Convince people to use Wi-Fi instead of cable connections

- Remove any remaining private APs

- Convince users not to interfere with the infrastructure…

Next steps

- Finish deplo... ...of AP... ...office b... ...dings

- Finish deplo...

- Upgrade rou... ...traffic

- Convince pe... ...of cable connections

- Remove any...

- Convince us... ...e infrastructure…

Next steps

- Add controllers to the cluster to keep initial redundancy level

- Deployment of Aruba solution also in technical buildings

- Upgrade security of the Wi-Fi networks to WPA3 (when it will be standardize)

- Test and evaluation of new APs with ZigBee radio

Any questions?