

Strengthen the Asi@Connect Female Network Engineer (SAFE) Project

Online Webinar Course-5

on

Wireless Network Design

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Venue: Virtual (Using Zoom Platform)

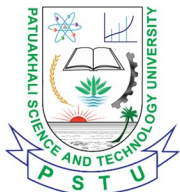
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Campus Scenario



In a sea of current customers, potential customers, and everyone else, how do you track what's working?

Unlike online, customers don't log in when they arrive



General WiFi Network Design Considerations

Important: Purpose of Wireless Site Survey

Typically, a site survey falls between the initial design phase and the installation of a wireless network and is used to collect as much information about requirement, business needs, environment...etc. as possible. Depending on the type of purpose looking to install a new wireless network, the objectives of a site survey can vary in difficulty. While there is no set structure for how to perform a site survey, having insight into the business will help in determining the scope of the survey.



Wireless Network Design Considerations

Size of Physical Location

Intended Use of the Wireless Network

Number of Wireless Devices

Implementing of a new wireless network design takes a lot of planning (WiFi Design Guide). In order to complete the network design phase, the following factors should be taken into consideration and thoroughly planned out:

Wireless Client Device Capabilities

The Environment

Performance Expectations

Bring Your Own Device (BYOD) Acceptance

Building Age and Construction Materials

Network Infrastructure Devices

1. Size of the Physical Location

The size of a business' physical location will determine the extent of the site survey. A small establishment will most likely not require a full survey. While it is still recommended that the surveyor visit the location, only simple tests might be needed to determine RF channels and AP mounting options. A large installation, on the other hand, will require a much more extensive survey that can include manual or predictive site surveys.

2. Intended Use of the Wireless Network

A site survey takes into consideration the size of the location and the intended use of a wireless network in order to determine the amount of access points needed for the installation. A smaller, casual establishment, like a café, probably needs WiFi for internet browsing, social media, or checking emails. A larger establishment might be running more applications, such as electronic imaging, graphics design, and database programs, which will require more access points.

3. Number of Wireless Devices

The number of users and user devices impacts the number of access points needed for a wireless network. Many organizations estimate 3-5 devices per user. So, as more devices connect to the network and increase capacity requirements, the need for additional access points will also increase.

4. Wireless Client Device Capabilities

Knowing what types of devices are connecting to your wireless network is extremely important. Some devices, such as tablets and smartphones, have specific functionality that need to meet network requirements. During the site survey, the surveyor will interview people to determine what types of wireless devices are regularly being used.

5. The Environment and Peripherals

When designing a wireless network, it is important to understand what kind of environment it will be installed in. Different environments, such as general office spaces, health-care locations, and educational settings, will offer different challenges.

6. Performance Expectations

Part of the site survey will include determining and defining the customer's expectations for performance. The performance of a network is based on the number of infrastructure devices installed, including bridges and access points.

7. Bring Your Own Device (BYOD) Acceptance

When performing an RF site survey, it is necessary to consider the amount of mobile devices connecting to a network. Since the rise of smartphones, more and more companies are allowing employees to bring their own devices into the wireless environment. This requires the network to be able to support more than the anticipated amount of devices.

8. Building Age and Construction Materials

The age and construction materials of a building need to be determined during a site survey as they can severely impact signal strength. For example, an older building will most certainly require more access points due to the construction materials in both interior and exterior walls.

9. Network Infrastructure Devices

When designing a wireless network, it is imperative to determine if the organization has the space and equipment to install a new network. Therefore, the surveyor will review the number of available Ethernet ports and the locations of the telecom/wiring closets.



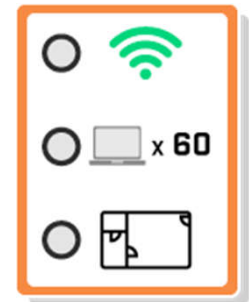
Wireless Network Design Steps

Consultation

Design is the most crucial phase in a WiFi project's life cycle. Before that can even begin, WiFi networking experts need to be consulted.

Consultant will focus on following issues:

- Guide the information gathering process
- Discuss network needs and requirements
- Offer compliance advice
- Conduct network validations
- Create project plans, timelines, and budget estimates



Site Planning & Design

After gathering information about the kind of network to be implemented and how it will be used, designing the WiFi network can begin. This is a very involved process that requires predictive planning and on-site surveying to verify.

- Help plan timelines
- Estimate pricing
- Provide Scope of Work
- Existing network validations
- Predictive site surveys



Wireless Site Surveys

Following the inventory and the initial design, site surveys are conducted to further enhance the design development for each building. These surveys are used to determine optimal access point (AP) placement based on expected usage.

- Provide level of effort / quote for pre-deployment site survey / access point on a stick (APaaS) survey
- Conduct onsite survey to determine access point counts and locations
- Generate WiFi design report with access point locations, equipment needed
- Finalize level of effort / quote for installation and equipment
- Have project discussion meeting to confirm timeline for install



Regulatory and Compliance

Any Compliance required?

- IoT and Guest network applications complicate your compliance posture
 - More vectors of attack than previous
 - Can't completely lock down information without impacting mobile point of sale
- Record and report on what matters
 - A rapidly changing client mix can add noise to network compliance reports



Solving Compliance

- Automatic quarantine ensures that data is kept protected
- Segmentation enforced down to the SSID on the AP
 - Ensures that devices stay in the area they're authorized for
 - Removes unnecessary devices from compliance scope
- Management platforms automate logging and reporting for proving compliance





Gartner and Global Position of Wireless Vendor

Market Known Leaders (Top 10 / Well Known)

1. Juniper – Leader
2. HPE / Aruba – Leader
3. Cisco – Leader
4. Extreme Networks – Leader
5. Huawei – Visionaries
6. Fortinet – Visionaries
7. Ruckus Networks – Niche Players
8. Arista Networks – Niche Players
9. Cambium Networks – Niche Players
10. Ubiquiti Networks – Niche Players

2020 Gartner Magic Quadrant for Wired and Wireless LAN Access Infrastructure

Figure 1. Magic Quadrant for Wired and Wireless LAN Access Infrastructure



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<https://www.fortinet.com/solutions/gartner-wired-wireless-lan>



Wireless Features and Security Considerations for a Campus Networks

... and of course everything else you expect

- Broadcast / Multicast management
- Multiple PSK for WPA2 personal
- Fast failover controller redundancy
- Rogue detection and Suppression
- WIDS
- Frequency and AP load balance
- Mesh wireless network
- Remote APs
- Onboard BT/BLE
- Location Tracking
- SSID scheduling
- DFS Fallback
- Captive Portal
- DOS attack prevention
- Wave-2 operation on 802.3af
- 802.3az-Power-efficient Ethernet
- Fast roaming mechanisms 802.11 r/k/v
- Bonjour genius
- Channel utilization (Duty-cycle measurement)
- QoS profiles (per SSID/per Client)
- WMM Access Control
- Automatic channel selection
- Probe response suppression
- Protected Management Frames
- Opportunistic Key Caching
- TX Beamforming
- HotSpot 2.0
- Per Group rate limiting



Questions and Answers