



Wireless Planning

Why and How?

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A Wi-Fi network at home has one or two routers.

You use Skype and browse the web.

It doesn't matter much how you design it.

A Wi-Fi network in a business usually has 10 to 10,000 access points.

The access to wireless LAN is often business critical.

The design does matter.

How many access points do you need?

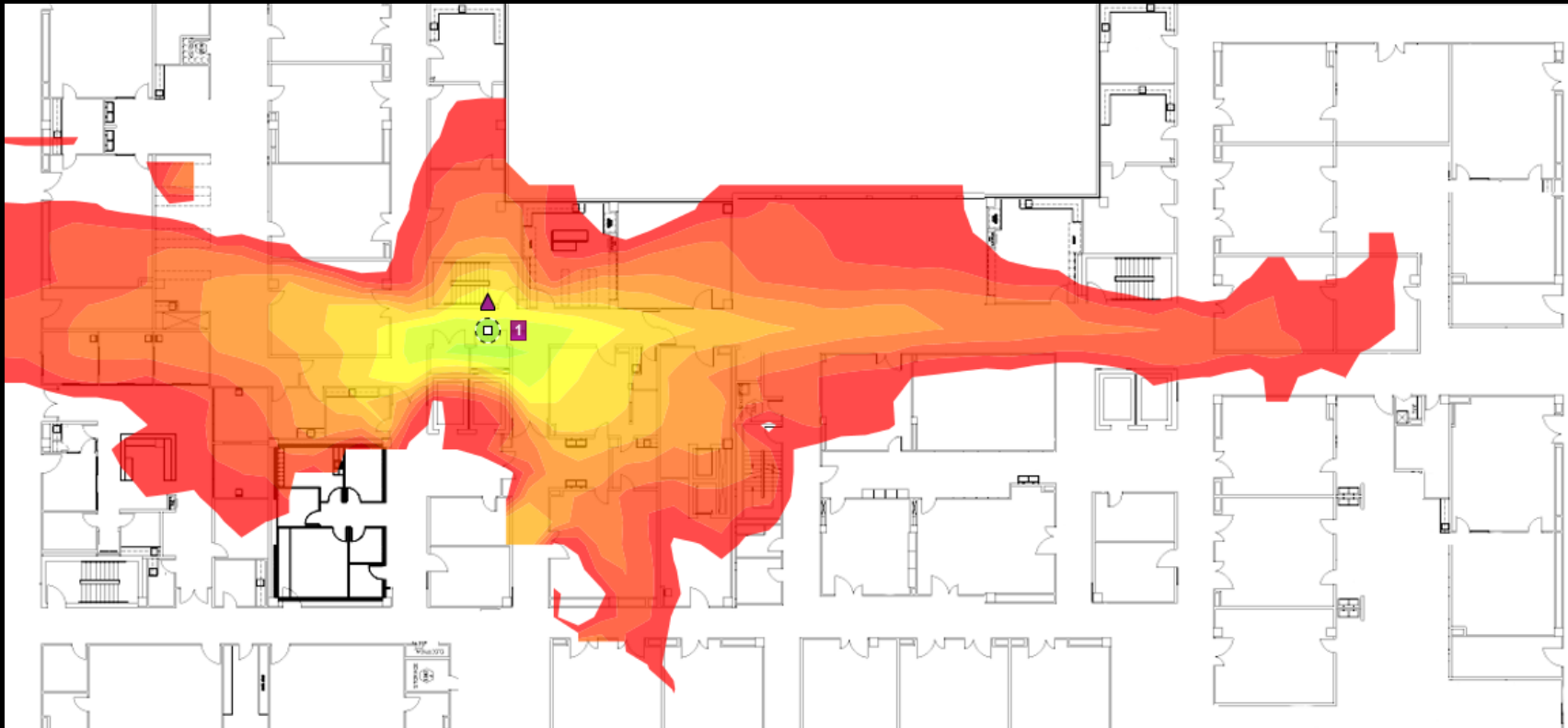
Where should you place the access points?

How should you configure the access points?

Challenge 1 - Coverage

Wi-Fi uses 2.4 and 5GHz radio waves.
The coverage area of a radio is **not circular**.

Case in point: a Wi-fi radio close to an elevator shaft, and a staircase.



Lesson #1:

One should avoid placing Wi-Fi radios using
“rule of thumb” methods, let alone guesswork

Recommendation #1:

Plan your Wi-Fi network carefully prior to deployment.

Use the right tools to speed up the process.

Challenge 2 - Capacity

The 2.4 and 5GHz frequency space is limited.

The frequency space is shared between all the users.

Adding a Wi-Fi access points to a strategic location will increase your capacity.

Adding a Wi-Fi access point without planning may **decrease** your capacity.

The number of users,
the behavior of the users,
the applications run on their devices,
and the types of their devices
it all needs to be considered.
Otherwise you'll run into capacity problems.

Calculating capacity is no simple math.

There are tools however that help a lot.

Still, some effort needs to be invested in this.

Lesson #2:

Covering the entire facility is not enough.
You need to consider network capacity as well.

Recommendation #2:

Carefully plan for capacity.

Today's needs are important, but preferably design for the next 2-3 years.

Challenge 3 - Interference

The 2.4 and 5GHz Wi-Fi bands are license-free.

That means anyone can use them.

All those other devices affect your connectivity.

On the same space with your Wi-Fi you'll find

Microwave ovens

Cordless phones

Wireless video cameras

Bluetooth, Zigbee

all of these will have an impact on your network.

The interference
is invisible to the human eye – just like the Wi-Fi signal are.

But it needs to be seen, and accounted for.

Otherwise, your network will likely not function as it should.

Lesson 3:
Interference isn't your friend.

Recommendation #3:

Use a spectrum analyzer to ensure cleanest possible channels for your Wi-Fi.
Eliminate or mitigate the interference problems by re-allocating Wi-Fi channels.

Challenge 4 – Putting it all together

Once the network has been designed and deployed,
it will “just work” – right?

Not always.

Wireless signals are a bit unpredictable.

People make configuration mistakes.

Radios can break down during delivery.

Things may not work together quite as planned.

It is an industry-standard practice to perform a site survey walk-through around the site once the Wi-Fi infrastructure has been deployed.

During this walk, the network is thoroughly tested for coverage, performance, and connectivity.

Lesson #4:

No matter how well you design,
check the end result on-site.

Recommendation #4:

Always perform a post-validation site survey
to ensure Wi-Fi network operation.

Challenge 5 – Troubleshooting

If you invest some time in Wi-Fi network design and validation,
the time **saved** in troubleshooting is multiple times higher.

The Wi-Fi network can monitor itself to some extent and report problems.

There are background monitoring tools that can run on mobile devices carried
by the users.

However, some troubleshooting
will always be required
during the life cycle of a Wi-Fi network

Lesson #5:

Design and validation saves you from most of the troubleshooting.

Still, some troubleshooting is inevitable.

Recommendation #5:

Prepare to invest some time in troubleshooting.

Leave easy-to-use monitoring / troubleshooting tools for end users if possible.

Ensure you have a troubleshooting toolkit, such as site survey tool, spectrum analyzer, and a packet analyzer.

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