Different types of Wireless Survey Why and which do you need?

Full Control Networks Whitepaper

Carrying out a wireless survey has become the default starting point in investigating wireless issues or designing a new network. However, there are actually four different ways to do this.

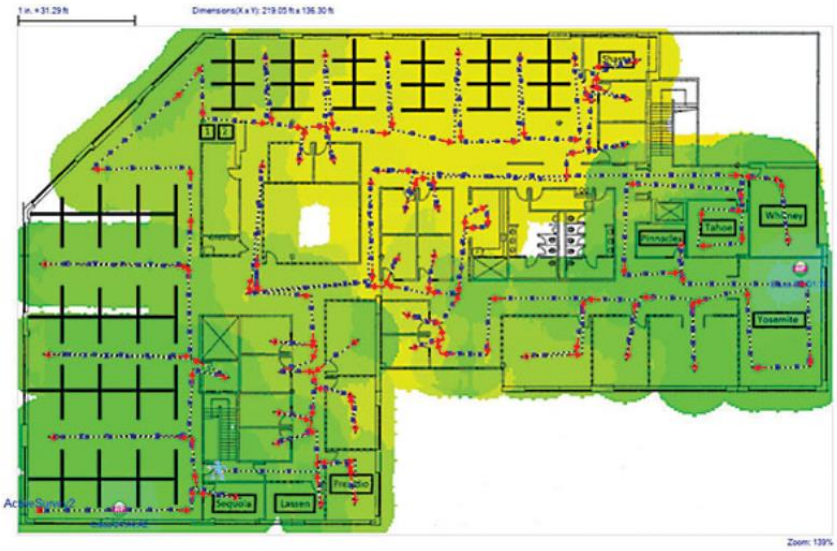
At Full Control Networks we do use all four, it just depends on what you're trying to do and what problems you're facing.

- Passive Survey : Gathers the basic data about the wireless coverage
- Active Survey : You move around the network like a user device
- Planning Survey : Designs new networks based on drawings and wall types
- AP on a stick : Designs new networks based on test data

Passive Survey

This is the most common type. It involves walking the area concerned and gathering data on the wireless coverage. It's called passive as you don't join the wireless network, you just effectively listen and record the key metrics about the coverage. Typically, the metrics are the signal strength and noise readings for all the SSIDs you can see being broadcast.

The advantage of this method is that it answers the most common question about wireless, "Are there any holes in the coverage?". This is also becoming a moving target, as we are finding older APs where the power on the radios is slowly failing, but also newer technologies demanding a higher specification of the wireless coverage. Hence just having some wireless in an area is no longer good enough.



The survey image to the left here shows where you have walked (the dotted lines), whilst the differing colour shading indicates the signal strength.

Using this data you can then predict the likely speeds a connected device is going to achieve.

01677 428700
info@fullcontrolnetworks.co.uk
www.fullcontrolnetworks.co.uk

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The biggest issue with this type of survey is that modern laptops don't offer up the noise information any more, hence the need to use a dedicated tool for gathering the signal data as noise and Signal to Noise Ratio (SNR) are key measurements you really need to know. We use dedicated data gathering devices from NetAlly to solve this.

Active Survey

This is very similar to the passive survey in the sense you walk around the area concerned gathering data, but this time your laptop or tester is actually joined to the wireless network. The advantage of this is that the measuring device is now acting in a similar way to the real devices, in that it joins and roams between Access Points (APs), but this is also its weakness too.

The good news is that is shows you where devices roam between APs. So, you get a good feel for the effective footprint of each AP and how effective your devices are moving between APs. It is also a way of detecting APs that are broadcasting a signal but not letting devices join them, which is surprisingly common.

The bad news is that the result you get from this survey does depend on where you start the survey, as the first AP you join dictates how you behave from there. Also, the roaming behavior is a function of the drivers in your device, hence using a Windows laptop to active survey a warehouse where Android scanners are used, won't be an entirely accurate depiction of what's going on.

Planning Survey

This type of survey does not gather data but predicts wireless coverage based on wall types and materials in your building. If you have a brand-new building and need to design a wireless network from scratch this is a popular way to do it. We also use this method to unpick really messy designs and give us a baseline design to head towards.

This method involves using software to mark out floor plan drawings with the correct wall types and other attenuation factors such as large furniture, racking and machines. Each wall type has a loss associated with it, for example a concrete wall attenuates the signal more than a partition wall. If you have a new wall type you have to find a way of measuring the loss associated with it, but there are ways to do that.

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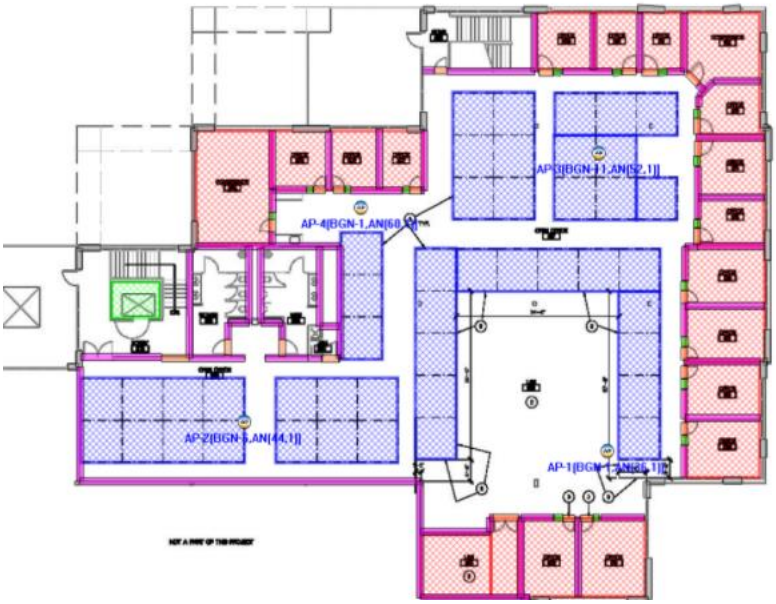

This example shows how a floor plan is marked out with the wall types and also the places where the customer does (blue hashed) and does not (red hashed) want the APs to be located.

The key to this method is to be pretty accurate about marking the drawings out and it helps if you can see the building not just the plans, but it's not essential. The software will then layout a design for you and in theory you can just go with that. We like to play with the design a bit to make sure that AP locations are realistic, experience tells us if you put them in difficult places, the installers will just put them somewhere else anyway.

With the tools we recommend you can merge together different types of survey, so if a building has partial coverage, you can Passive Survey the live parts and use a planning survey to fill in the gaps and merge the result together.

AP on a Stick

This is another method for planning out new wireless deployments and can be especially useful in "difficult" wireless environments. It involves having a battery powered Access Point (PoE makes this quite easy now) and usually some sort of tripod mount to elevate it to a realistic height. You can then walk away from the AP and see how far the signal realistically propagates before you start thinking of the next AP location. You need a way of recording the coverage patterns, so passive survey software or a wireless test device is required as well.

This method does have a few advantages. It gives you good data to design with in difficult areas and unknown wall types, plus allows you to establish the accurate footprints you will likely see from the APs. We have used this recently in "green" buildings to see how these newer building material types affect the signal.

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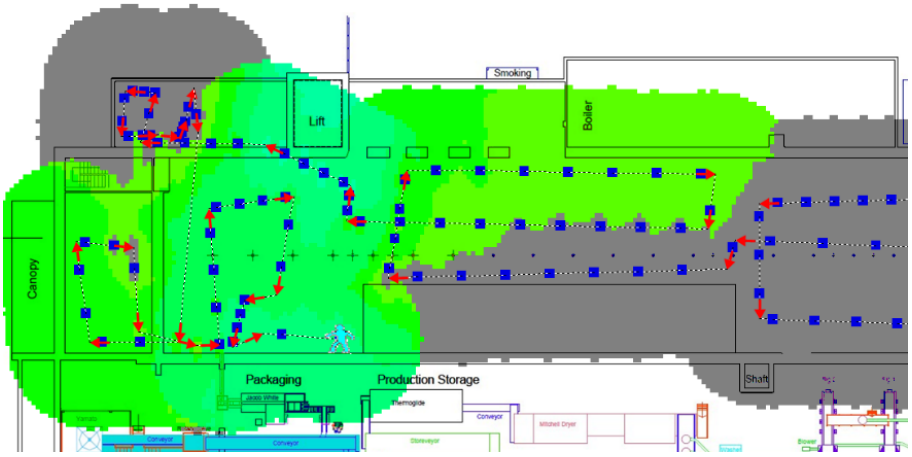

This survey data to the left shows the coverage of a single AP in a factory.

The results show you the effective footprint achieved by an AP in that location, hence helps you work out where the next AP should be positioned.

There are a few disadvantages though. It can be a very slow method (engineer speak for expensive) as you are effectively surveying one AP at a time, moving it and then doing it again. Also, where you place the first AP effectively dictates the rest of the design, which may or may not be an issue. We often combine this method with the planning method; use the AP on the stick to establish the footprint size and then plan the rest of the design around this data.

Tools we like

- ✓ AirMagnet SurveyPro : Passive, Active and Planning surveys all in one
- ✓ NetAlly AirCheck G2 : Wireless troubleshooting in a box - now also does active and passive surveys too
- ✓ NetAlly Etherscope nXG : Wired and Wireless troubleshooting in the same box. Also, can do the active and passive surveys.
- ✓ AP on a stick : We made our own with an Access Point (Xirrus), a PoE battery kit (PointSource) and a camera tripod off ebay!

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