AN1096 - How to plan a Net2 wireless installation

Choosing the equipment

You should consider the merits of both hardwired and wireless ACU's when planning a Net2 installation. The best option may be to mix Net2 ACU styles using the hardwired data line system in corridor areas that have side rooms and wireless ACU's in the more open locations (reception, warehouse, car parks, etc) where cabling is difficult or expensive to install.

Also note that some of the Net2 features, (e.g. Fire Doors) are not available for wireless operation.

This Application Note is designed to minimise the potential problems that are frequently associated with wireless communication.

The position of the various Net2Air bridge and wireless controllers can have a significant effect on the reliability of the system and so it is well worth getting this right first time.

NOTE: A poor or intermittent signal will not stop the wireless controller from operating but may delay card activation.

Wireless coverage

The typical range in an office environment is 10 metres. Where there is clear 'line of sight' across an open space, (warehouse roof void, car park, etc) a range of 30 metres is possible. The use of the Net2Air site surveyor kit is strongly advised to confirm these distances.

A Surveyor that initially shows a Green indication can reduce to a single Red LED when moved into the corner of the room. Remember, the indication is checking, not only for signal strength but more importantly for corrupted data packets.

Net2Air site surveyor kit (690-200)

The kit consists of a mains powered base station and a test card that displays the signal condition on a row of LED's.

The card checks the data content as well as signal strength to confirm reliable communication.

Press and hold the button on the test card for at least 15 seconds to ensure a good sample of the signal strength.

Providing all LED's light up, it is a suitable location to install the equipment. If not, a new location should be found and checked until all the LED's are lit. Try re-locating the wireless controller or bridge into a more direct 'line of sight'.

Wireless obstructions

Fixed obstructions

These will be walls, racking, cabinets, etc. They are often made of metal or have a metal reinforcement that will block the data signal.

Moveable obstructions

These include storage bins, vehicles, people, etc. You need to be aware of this if traffic levels vary on a daily basis. Again we are trying to maintain a clear line of sight between the bridge and the wireless door controller.

Positioning the equipment

All wireless communication will be influenced by the 'Multi path' effect. In essence it is one radio signal being split into several signals each time it is reflected by an object. These signals arrive at slightly different times at the receiver which then has difficulty in determining the content of the original data.

Floors, ceilings, desks, shelving etc will all contribute to these reflections and so the following general rules should be adopted to reduce this effect to a minimum.

Net2 nano

1. In an office environment, you should mount the Net2 nano mid way between the desk height and the ceiling. This will minimise the reflections from either surface. With higher ceilings, mounting the unit one arms length above head height is a good guide. This keeps the signal above human traffic and also avoids surface reflections.

2. Avoid corner or 'dead end' locations as the signal will be reflected by the multiple surfaces.

3. Where possible, mount the Net2 nano on a wall facing the bridge and therefore maximising the 'line of sight' that can be achieved.

Net2Air bridge

The positioning of the bridge(s) on the site is as important as the Net2 wireless units. The same previous advice on location also applies here but the unit is more likely to be standing on a surface, than wall mounted. In this case, the bridge should be placed towards the edge of the surface rather than the centre to minimise surface reflections. Again, if it can be located above head height, it will keep the signal path away from obstruction.

How many bridges?

We can now apply the ideas previously covered, to the site layout. Open plan offices may only require a single bridge to cover the area, as 'line of sight' will be possible to all the wireless controllers. A warehouse environment with floor to ceiling racking will present a much bigger problem and using wired Net2 units in this area may be a better solution. Remember, both styles can run on the same system.

As a starting point, each Net2Air bridge can support 10 Net2 wireless units located within 10 metres of the unit. (Fig 1). Larger sites may require a bridge at either end to cover all the wireless locations. (Fig 2).

The Site Surveyor will be the best guide to this. Once you have decided where Net2 units are required, put the base station where the bridge will be located and check the signal condition at each wireless position.

This procedure should determine the definitive number of bridges and their locations.
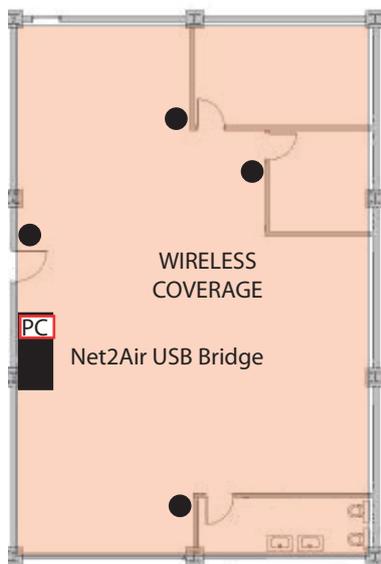
Site layout

Fig 1. A single Net2Air bridge (USB or Ethernet) can run a small site of up to 10 Net2 wireless ACU's.
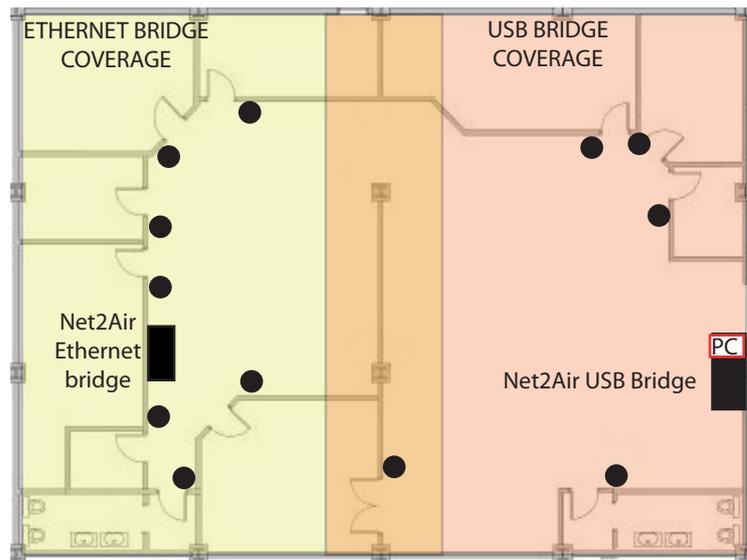
Fig 2. Larger sites with dividing walls may require additional Net2Air bridges for reliable wireless coverage. Only one USB bridge is possible per system so any extra units would be Ethernet units. Net2 wireless units that are in range of more than one bridge will bind with the strongest signal during installation.

Fig 3. In this example we have an open storage area and a more complex office environment. We would recommend using wired Net2 ACU's for the offices and wireless ACU's with a Net2Air Ethernet bridge to cover the storage area, removing the need for long cable runs. This uses the benefits of each system.