Better Together: Ruckus Networks & Airvine

Introduction to Airvine

Airvine is a fast-growing Silicon Valley innovator of intelligent broadband wireless backhaul solutions for the enterprise. The company has developed the industry's first indoor 60 GHz wireless system that exceeds the speed and rivals the reliability of existing cabling at a fraction of the deployment time and cost. Patented RF innovations extend the range and gain of wireless signals, penetrating walls and steering around obstacles that impede transmission. Something never seen before is possible within the 60 GHz band.

The Airvine WaveTunnel™ has a 60 GHz radio on each end of the node capable of receiving and transmitting simultaneously, making it capable of moving data across multiple units with no throughput loss unlike a mesh network. There is no limit to how many units can be strung together in a string or in a counter rotating ring that doubles the carrying capacity to 6 Gbps.

The built-in 4-port switch supports a rich feature set that includes:

- link aggregation
- 802.1q VLAN support
- 802.3at power out

Some of the software features and innovations include:

- Automatic 45-degree beam steering
- A ring topology with counter rotating data paths that can double the data throughput,
- Built in Wi-Fi radio for setup
- Support for QOS and more.

Airvine WaveTunnel™ nodes form a self-healing, highly redundant infrastructure that can support mission critical traffic.

Figure 2 WaveTunnel™ Deployment Example

The WaveTunnel™ manager application can be loaded on any mobile device and connected to the built-in Wi-Fi management radio for quick setup and management. The management radio can be turned off later when not needed and the units can be managed with a built-in GUI or command line.

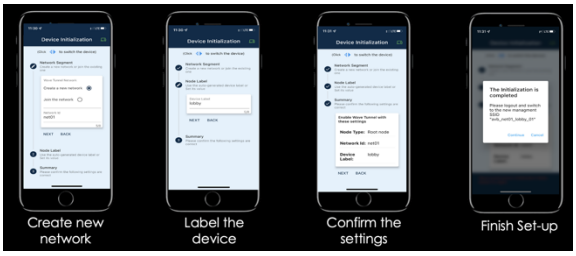

Figure 3 WaveTunnel™ Manager Application

Our Better Together Story

Ruckus Networks is already an industry leader when it comes to Wi-Fi, even more so as the environment gets more challenging. However, the desire to deliver the same amazing end user experiences to an ever-expanding spectrum of end users across an ever-evolving set of use cases has resulted in Ruckus Networks partnering with the industry-leading technology solution partner Airvine. In this case, Airvine helps in transporting the data from the AP back to the rest of the network even more efficiently to allow for a seamless connectivity for the best end user experience. Using modern planning tools, it is easy to point to a location and say "we need an AP right *there*" but when trying to take that design and implement it in the real world, it's never that easy.

Too many times wireless designers are asked to compromise their wireless designs to meet the limitations of the wired infrastructure. Utilizing Airvine's 802.11ad, 60 GHz technology, these limitations will no longer impact the Wi-Fi design, allowing the finished product to deliver exactly what the customer needs. While not limited to the following ideas, these are the primary use cases we imagine where Airvine and Ruckus Networks can work together to deliver on this potential.

Temporary / Event Networks

This type of scenario aligns with the strengths of an Airvine solution. Temporary events have requirements that are outside the typical network capabilities. They immediately become a challenge for customers that require a solution that is mobile, flexible and quick to deploy, especially when that solution is only needed for a week or less. Anybody who has ever been to a conference and have seen Aps on tripods and Cat6 cable taped to the floor understand this. Whether it is Wi-Fi coverage, additional cameras, or other network devices, up to and including temporary switches in an unusual location to support these specific requirements, Airvine adds the network flexibility that temporary events demand.

Permanent network extension (Retrofit Older Buildings)

While temporary events networks can benefit from Airvine by allowing connections back into the network when there isn't the time or budget to make those connections, there are times when time or money isn't the obstacle. Many projects are done to retrofit older buildings to add in modern amenities. Sometimes these updates take priority over architectural precedence and aesthetics, however network updates don't usually get these considerations.

The Airvine solution is in play here as well. In addition to aesthetic concerns, there are also construction concerns that may create roadblocks to routing traditional infrastructure cable where it is needed. Historical or heritage buildings are usually made of older and much more substantial building materials like stone, brick, and concrete, but there are often a variety of rules on what you can and cannot do when trying to pull wire. Drilling through walls is often prohibited and this usually forces cable conduit to follow a very circuitous path to get to its destination.

The WaveTunnel™ can be installed in a heritage building just as easily as in a modern building. If the walls are too thick and offer too much path loss to allow a 60 GHz signal to propagate across a room and through the wall and on to its destination, then an Airvine node can be placed against the wall. The signal only needs to propagate through the wall and is received by another radio on

the other side. This is made possible by the near field capabilities of the Airvine WaveTunnel™ nodes which generate a very dispersed signal pattern that delivers maximum energy through the wall to the radio on the other side.

Network segmentation for IoT

Providing additional security, throughput or other design goals requiring physical traffic separation would normally require additional wiring along with associated infrastructure like cabling and switches to be set up in parallel. Airvine WaveTunnel™ can be quickly deployed to support these devices without all the time and cost of doubling the infrastructure. An Airvine infrastructure can also be used to augment an existing network by adding capacity through a multipath approach.

Large spaces like warehousing and venues

Large open spaces require great numbers of access points, cameras and other IOT devices and miles of cabling. The cost of providing all the cabling, fiber runs, switches, patch panels become a huge challenge especially with rising labor and material costs. This cumbersome approach is also rigid and does not easily adapt to changing requirements. Airvine WaveTunnel™ provides a cost-effective alternative that is cheaper and faster to deploy and maintain while providing high-capacity redundancy and flexibility to adapt to new business requirements. Venues can leverage the flexibility of WaveTunnel™ to add ticket scanning, digital signage, and cameras in a way that is cost effective and quick to deploy while maintaining security standards.

Cabling Delays (Moved, Adds, & Changes)

Legacy solutions utilizing Cat5, Cat6, and now Cat7 copper cabling have dominated enterprise backbones for decades. Newer standards like Cat6 and Cat7 can deliver throughput approaching 10 Gbps at distance of up to 100 meters. These higher speeds sound compelling, but they come with some serious constraints to make them work. Wired backbone networks have always struggled with moves, adds, and changes, which occur with great regularity in today's enterprise networks.

Techniques like zone cabling have had some success in making the reconfiguration process less painful, but technicians must still be brought on-site to pull wire through walls and ceilings. A process that is slow, expensive, and very disruptive to business processes. In today's fast-paced business environment, a solution is required that allows the network to quickly adapt to business imperatives and not the other way around.

Solutions are beginning to emerge that leverage breakthroughs in radio engineering along with the enormous capacity of the millimeter-wave bands to backhaul data traffic at multi-gigabit speeds and with all the flexibility that comes with wireless technology.

The all-wireless backbone makes for an effortless, moves, adds, and changes process. When it becomes necessary to modify business processes and move groups from one location to another, all that is required is to unplug the Wi-Fi 6 Access Point and the Airvine WaveTunnel™ node and move both to a new location. The WaveTunnel™ node would reacquire a signal at its new location and the system would be up and running in a matter of minutes. The advantages here are significant:

- Eliminates the CAPEX impact of having to pull wire to support network changes, which can be anywhere from $200 to $500 for each affected cable drop.
- The delay to get a technician on-site to pull wire can impact business processes.
- The process of pulling the wire can cause further disruptions.
- In certain types of older buildings (historical and heritage) re-wiring becomes even more challenging due to restrictions in where the conduits can be laid.

The requirement to support regular moves, adds, and changes comes up in a lot of Enterprise verticals including education, healthcare, warehousing, manufacturing, etc. The case for wireless backbones is compelling as they can easily match or exceed the throughput of Cat6/7 copper cabling with the added flexibility that comes with wireless technology.

The Airvine solution is also a perfect fit for use cases where the cabling company can use them in places where there are delays in the construction process in establishing a new path. Installing the Airvine WaveTunnel™ as a temporary bridge while waiting on construction gets the network online much faster, allowing business to resume normal operations while waiting on construction. Once the permanent cabling runs are finished, a simple cutover allows the contractors to take their nodes back and use them on the next project.

Network Extension

In addition to the use cases already discussed, there can also be challenges with right-of-way in certain situations that are very difficult to overcome with cabling of any type.

This might be the case when connecting two buildings together with a road or railroad tracks in the path. Backbone extension also comes into play at a hospital that is trying to connect remote COVID tents in parking garages or parking lots back to the main building. Yes, they control the right-of-way, but it's still a challenge to pull wire across hospital grounds.

The Airvine solution can extend beyond the rated distance of 100 meters by simply adding another WaveTunnel™ node to act as a repeater. This can be used to connect more remote locations, even when they aren't line of sight. It is also an excellent solution for linking two buildings together across railroad tracks, or a road.

Parking lot security is becoming paramount in today's world, with the challenge of retrofitting existing parking lots (some of them rather large) either a complex or costly endeavor. By utilizing strategically placed WaveTunnel™ nodes, parking lot owners can add in cameras where they need them without needing to trench fiber to these locations, and without needing to worry about repairs of a cable that is buried under their revenue generating space.

The flexibility to easily extend the range in any situation allows the Airvine solution to support the business agility that is so important in today's networks.

Summary

Ruckus Networks has long been known for delivering the most reliable networks in the most demanding environments. With ever-evolving business needs, traditional cable plants have always struggled with moves, adds, and changes, which occur with regularity in today's enterprise networks. In this ever-changing world there is a need for a wireless backhaul network that is just as robust as the wireless access networks for an organization to be able to deliver the best end user experience. When running cables becomes a hindrance, solution providers need a method that is dependable and capable to bridge the gap between their access networks and the network core when time is of the essence.

Airvine and its WaveTunnel solution provide flexible deployment options, a Next-Gen RF system, Electronic Beam Steering, forward error correction, dual-ring SONET-like switchover, beamforming, and interference mitigation, the Airvine WaveTunnel™ solution delivers that robust and capable solution for networks that encounter challenges that used to be unsurmountable. Together, providers can offer a solution that brings the network access to the clients, instead of asking the clients to come to the network. The next generation of in-building wireless backhaul is here and it's time to just Airvine it!. For more information, please visit www.airvine.com.