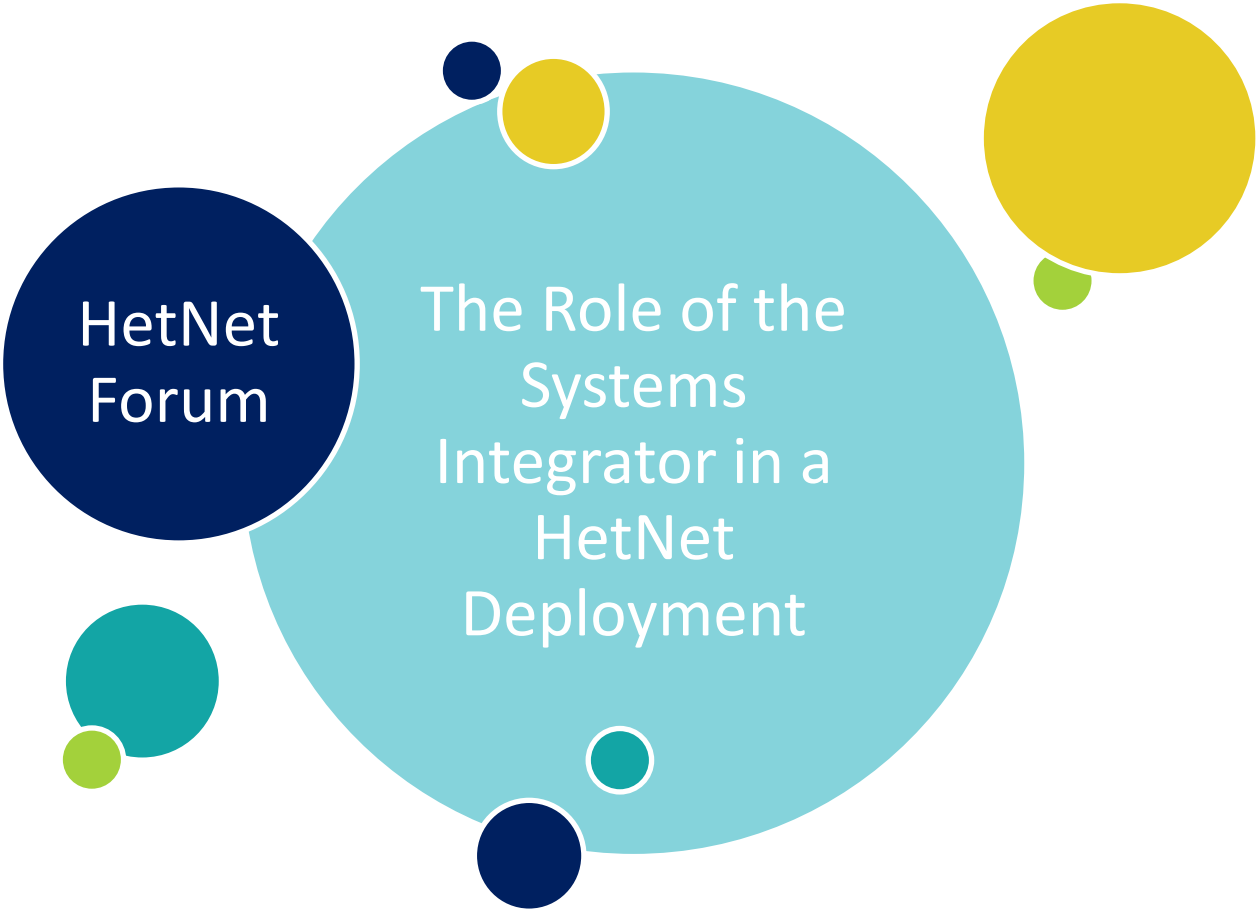
HetNetForum



A Whitepaper from the HetNet Forum

Building owners and managers are faced with a new challenge when trying to lease space or develop new properties: Wireless connectivity is integral to their ability to easily lease the space. Why? A few statistics can tell the story: One of the biggest trends in business today is the Bring Your Own Device (BYOD) phenomenon. In a 2012 survey, Forrester Research found that more than 50% of employees were using their own technology for business. According to a 2013 iGR survey of small- to medium-sized business IT managers, almost 62% of employees said their company had an official BYOD policy at their company.

This BYOD policy has translated into one fact for building owners and managers: their customers have employees using a variety of smartphones, tablets and other devices from a number of wireless service providers on a number of different wireless networks. Therefore, building owners and managers have to ensure adequate wireless coverage and capacity from all of the wireless service providers in their buildings and across their campuses. To meet that demand, Distributed Antenna Systems (DAS) and other small-cell technologies may need to be deployed.
A Systems Integrator can help business owners and managers find the right solution for their venue, and works with all of the players involved in getting that equipment deployed in a manner that suits everyone.

The Role of the Systems Integrator

A DAS project can be described in three words: Smarts, Parts and Hearts. All three must be present for a successful project. The Smarts Role is fulfilled by the Systems Integrator and is one of the most critical aspects for a successful DAS project.

The Systems Integrator is responsible for a broad list of deliverables:

- RF Survey;
- Benchmark Testing;
- RF Design;
- Rough Order of Magnitude;
- Site Walk;
- Constructability Study
- Final RF Design and Proposal;
- Backhaul Engineering
- Equipment Selection, Procurement & Staging;
- Installation;
- Testing; Commissioning;
- Integration with the Macro Network(s);
- Final Close-out Package; and
- Ongoing Monitoring and Maintenance.

The Systems Integrator is the bridge between the venue owner, carriers and other interested parties such as Local AHJ (Authority Having Jurisdiction) and/or Fire Marshalls, to make sure all critical requirements of a DAS project are identified, agreed upon, incorporated into the project proposal and delivered.

A needs assessment is the first step toward scoping a DAS project. The numerous stakeholders in a DAS project will have slightly different perspectives on the critical requirements. The Systems Integrator

plays the role of bringing all the requirements and stakeholders together to reach agreement on the project scope and proposal while delivering the DAS project on time and on budget.

A venue owner will have specific DAS system requirements: the system and coverage must be ubiquitous; may need to include multiple carriers; should enhance a customer's experience at the venue; be available and accessible for employees at the venue; be cost-effective (or in some cases be at no cost to the venue); be invisible and aesthetically installed; may need to include other services such as an overlay to the system (Wi-Fi); and the installation be performed via safe practices, during restricted hours and not disruptive to the venue or guests. In some cases, the venue owner or a third party will own the DAS infrastructure instead of the wireless service provider.

A wireless service provider will have specific DAS system requirements: the system design and RF engineering must meet best practices for a quality end-user experience; be reliable; provide robust in-building coverage and offload traffic from the macro system; for example. Carriers also will want the DAS to be able to handle future capacity needs and be flexible to accommodate technology enhancements. Carriers also will require that the business case Return On Investment (ROI) be achieved; the equipment must be accessible for upgrades and maintenance; satisfy the venue, public safety or AHJ requirements; and be installed per safe practices.

The Local AHJ, Fire Marshall and First Responders may also have specific requirements for a DAS pursuant to the International Code Council (ICC, IFC 510.1) and National Fire Protection Association (NFPA 72-2010 Chapter 24) as adopted into their local building codes. The code language contains specific requirements for DAS systems related to Coverage, Quality, Survivability, Power Backup and License. In some cases, compliance to the codes must be demonstrated during the building design phase to secure the construction plan approval.

The Systems Integrator is the hub for all aspects of a DAS project. Once all the requirements are understood, the design must be tested, validated, fine-tuned and approved for implementation. Specialized RF propagation and modeling software tools are utilized by the Systems Integrator, along with a site walk, to ensure a high quality design, proposal and accurate cost estimate for the project.

The Systems Integrator manages the project with software tools to provide coordination with all the stakeholders. These tools will keep a project timeline intact and budget on track. Technical expertise and field installation experience ensures the construction and installation of a DAS system that is respectful to the carrier and venue with proper cable management, accurate equipment labeling, aesthetically pleasing colors and design, and safe practices. Certification, training and strong relationships with the DAS original equipment manufacturers (OEMs) are required to correctly engineer, procure, install, commission and integrate the DAS into the existing RF environment with no interference to the macro network.

Key Questions for the Venue Owner

Venue owners will need to work with their Systems Integrator to answer a number of questions, some of which are highlighted below:

- Do I need only cellular coverage from one wireless service provider or all service providers in the venue?
- Do I need Wi-Fi on my DAS or to upgrade my existing Wi-Fi coverage?

- Do I need public safety communications in my building?
- Am I planning on offering new services associated with the venue? For example, a stadium owner may want to offer a new way to sell food and beverages or novelty items.

Carrier Coordination

Wireless Service Provider coordination is one of the most critical parts of the process. DAS integrators familiar with the Wireless Service Provider process for carrier involvement should have a systematic approach to each of the carriers. This approach consists of five phases: Initiation; Funding; Design; Regulatory and Authorization.

In the Initiation phase, the Systems Integrator should provide a summary of the ecosystem to the wireless service providers so they know all of the stakeholders involved in the process. They also need to engage the carriers and and register them as well as qualify the RF sources.

During the Funding Phase, the Systems Integrator will develop the business case for the DAS, provide financial analysis to the carrier and ultimately decide on funding.

During the Design Phase, the Systems Integrator will work with the Wireless Service Provider to review the design, accept the design and specify the RF sources.

The Systems Integrator also will have to coordinate with the service provider regarding any regulatory approvals needed from the JHA from the submittal process through review and acceptance.

A DAS built without carrier authorization is an inexpensive piece of equipment that is useless because the operator won't attach to it. As such, the Systems Integrator needs a retransmission agreement from the service provider. This process includes developing the agreement, reviewing the agreement and executing the agreement.

Common Mistakes to Avoid

A lot can go wrong in the design, deployment and maintenance of a DAS network simply because there are so many moving parts. Most importantly, it is mission critical to completely understand the project scope and requirements and set accurate expectations upfront with all involved parties. For complicated builds a site walk is likely mandatory and pre-arranged objectives for the walk must be established. Poor initial assessments, including a lack of qualified RF engineering expertise, can lead to a project director underestimating the cost of the DAS. Money and time are wasted when there are significant change orders requested to update the designs for the DAS to become functional.

Another common mistake is underestimating the critical role of the wireless operator. In the early days of DAS, a passive system could be installed in a building to bring better wireless coverage to that building without the wireless operator's knowledge. As long as the DAS didn't interfere with the macrocellular signal, the venue owner could address his wireless needs without much cooperation from the cellular carrier. That is no longer the case. Wireless

operators have invested billions of dollars to build out their networks. They are focused on giving their customers a quality experience. Anything that causes their macro network to perform sub-par will be found and turned off. Each operator has its own set of standards and processes that must be followed in a DAS deployment. Don't think that just because the DAS has been installed, the wireless operator will attach to it because it has already been built. Getting proper wireless operator cooperation at the beginning of the project cannot be overstated.

Accommodations in the head-end for carrier RF sources and OEM equipment to house the DAS equipment are very important during a DAS deployment. Wireless operators will each need their own space for their head-end equipment. Don't forget about HVAC, electrical power availability, building access, risers between floors and length of runs during the information gathering process.

There are industry standard software applications used in the DAS business. These must be used for larger scale designs in order to get carrier acceptance for that design. Some OEMs offer comprehensive training programs for product, installation, maintenance, monitoring and design. Experienced System Integrators will take the time to invest in the training and tools available in the DAS industry. Not doing so is a recipe for failure. In many cases, the carriers will mandate some sort of training certification in order to be considered for DAS projects where they play a role.

Many System Integrators have entered the DAS space as a complement to their existing business models. While that is a logical path, much due diligence is required on the part of the client to validate the System Integrators' experience with the roles described earlier. Certain distributors are also versed in DAS design. These distributors can bring knowledge, expertise and other services to help you with your business.

What invention is on the horizon that will further change the way people connect with their wireless devices and applications? Furthermore, city landscapes can change. A DAS designed today might need to take into account the skyscraper being built across the street. Future-proofing the network for technology change and population growth is a wise practice.

Conclusion

Wireless broadband connectivity is becoming as important as heat and electricity in venues. One could argue it is the fourth utility. As such, ensuring new venues have the right infrastructure in place to address increased wireless demand is important. Similarly, older venues need robust wireless coverage in order to remain relevant in the ever-changing real estate market. Taking a long-term approach to wireless coverage by working with the necessary players in the ecosystem will ensure capital is spent wisely the first time, avoiding the need to re-address coverage and capacity issues annually.

The HetNet Forum, formerly The DAS Forum, is dedicated to the advancement of heterogeneous networks. HetNets provide increased network coverage, capacity and quality through the use of a variety of infrastructure and technology, enabling seamless voice and data communications. The HetNet Forum is a membership section of PCIA – The Wireless Infrastructure Association. For more information on the HetNet Forum, contact Tracy.Ford@pcia.com