Next G Connect

The Future of Network Deployment and the Changing Professional Services Organization

It is no secret in the wireless industry that spectrum is the life-blood of future networks - 5G and beyond - but did you know that Real Estate will play an equally important role for future networks? Starting with 5G, those stakeholders that choose to pay to deploy future networks will help determine how fast these future networks can be put in place and create another revenue stream for Professional Services Organizations (PSOs).

Public policy change will certainly affect these deployments and services. Indoor settings are where most wireless traffic occurs. Will building code requirements at the local level force all new commercial and residential structures to be required to be wired for future technology? Will access points and connections throughout the building be required in all structures? This will create more opportunities for wireless PSOs in the indoor environment. Outdoor policy is controlled at the local level, will local municipalities allow one comprehensive lease for all public owned infrastructure in their cities, towns, or villages, and to whom will they award it? Will each of the 3,034 counties, and 19,429 cities, towns, and villages get on board?

Currently, Mobile Network Operators (MNOs), both big and small, pay rent for infrastructure to other companies. Is the business model sustainable to pay for real estate, electricity, and backhaul for each individual company? Will the U.S. carriers decide to share infrastructure and equipment as is happening in other parts of the world? The PSO may need to become more maintenance-focused than build-focused if this change occurs. Maintenance contracts will become an important revenue stream for these PSOs. Base stations that contain the transmitters and receivers will become smaller, and many more of them will be required everywhere. PSOs will need to be able to respond to this new environment with innovative plans and repair/replace scenarios. Flat rate pricing plans will also play an important role.

The three layers of 5G and professional services skill-sets required to Build, Operate, and Maintain (BOM) the network.

The Coverage Layer of wireless networks have been being deployed for 35-plus years and uses low-band spectrum that has good range and penetrates buildings well. Its big drawback is the speed, capacity, and latency required for new applications; Virtual Reality gaming, and mission-critical services, require additional layers to work effectively. "Best effort" is how connectivity services are sold by carriers to the consumer and business segments. MNOs have typically purchased spectrum at auction and built, operated, and maintained these networks through a combination of self-performance and outsourcing different aspects of the BOM models. Each MNO has a different twist on how it executes on the BOM activities. PSOs have been able to grow by focusing most of their efforts on the build-out of these networks for the MNOs. The processes these companies use have been incrementally refined over the last 20 years, and today most use a similar methodology to build networks for the carriers, which has commoditized the services business. Execution is usually done at the local level while using the same back-office systems, with some of the key end-to-end disciplines being consolidated to a more regional or national level. The PSO business has gone from a low-risk, 'Time and Material' billing partnership-like engagement, to a higher-risk 'milestone-based' billing engagement that is more adversarial than in the past. In the past the MNO and PSO shared the risk of deployment, today much of that risk is on the PSO and less on the MNO, the result is poorer workmanship than in the past. Some companies survived and thrived, while many perished during this evolution. In the big picture it is both cheaper and more efficient to have a shared risk scenario.

The same roughly 155-step process to get a site on-air has remained similar from 1G to 4G. This applies to new site-builds, as well as retro-fitted sites and small cells. The current PSO consists of the following disciplines: Radio Frequency Engineering (RF), Site Acquisition and Real Estate (SA/RE), Zoning and Environmental Compliance (ZN, EC), Architectural Engineering for construction and zoning drawings (AE), Construction Management (CM), Line

and Antenna installation (L&A), Outside and Inside Plant (OSP/ISP Integration) that lay the fiber for backhaul, Integration and Commissioning (IC), Project Management (PM), Project Coordination (PC), and Logistics (Log). All these disciplines work as a unit to get sites built and turned over to MNOs to operate. A Program Management level is now required as companies have scaled up to get more done, more quickly. This level oversees the 12 disciplines of the Project Team and helps to start up new markets and complete corrective action activities of existing running markets. The Program Manager must also manage the carrier clients to allow the project teams to more efficiently, and effectively, complete their jobs. The client base is very small and similar for most PSOs. SA and RE have strict parameters to work under, and this discipline became less important as the industry moved from heavy, new site build to modifying existing sites. Currently, the RF Engineers at the MNOs make the decisions on how the network will be laid out and drive that system down through the value chain. This process will need to be Real Estate-driven for the next two layers of the 5G network to be built effectively across the United States.

The Coverage/Capacity Layer of the wireless networks in the mid-band frequencies are beginning to be deployed indoors and outdoors as Citizens Band Radio Spectrum (CBRS) begins to augment/replace WIFI. The spectrum-sharing experiment is beginning to utilize this band. Private LTE networks can be built, and some progressive REITs will be paying for the cost of infrastructure to keep their tenants and have a competitive office building. Revenue-sharing models with connectivity providers will be considered. This area will create another opportunity for revenue for PSOs as things continue to evolve. A different set of skills added onto the ones described above will be needed as this layer of the network evolves. SA and RE will drive key decisions, and the relationships created with the property owners will become extremely important. Maintenance of the networks, and responsiveness to customers, will become more critical.

The Super High-capacity and Low-latency Layer of the network will also have to be built simultaneously with the other two layers. The millimeter-wave band that was in vogue because of the 1996 Telecom Act is becoming a hot commodity again; the 28, 37, 39, 41 GHz frequencies are all becoming important again. These networks were typically built with an inside-out approach at the local level. Will the spectrum-sharing model that is being looked at in the mid-band layer work for this layer as well? Sharing of infrastructure will be much more cost effective. PSOs have a revenue opportunity at this layer where many, many more sites will be required than ever before. How will the 12 disciplines that form the current end-to-end macro-site builds evolve and change to meet a higher quantity of sites at a faster roll-out schedule? More service technicians with the ability to perform diagnostics will need to be available all over the country to keep this layer running smoothly. The IC personnel of the past will be different than the ones needed for the future. The SA and RE personnel will need to form relationships with public entities at the local level to negotiate Public Private Partnerships that will be valuable for all the parties.

It's the money. Who pays the Cap-Ex and Op-Ex, and who gets the revenue from yet-to-be-imagined services?

Who pays? Revenue-sharing? Infrastructure as a Service (IaaS)? Commoditization of spectrum? Today's MNOs foot a large portion of the bill to get connectivity in the coverage layer. It will be financially challenging to build out the next two layers with this same, very mature approach. Today MNOs pay third-party companies for the use of infrastructure. Typically, a monthly rent is paid to use the infrastructure, and additional monies are paid to upgrade equipment on the site. Will these infrastructure companies own or rent the equipment on their sites in the future? Will they charge a user fee like the software industry does, making all users responsible, and not just the MNOs? Will they be required to be responsible for outages as "best effort" will no longer be the way consumers and businesses tolerate wireless network connectivity? Will it work like electricity? The current system is set-up for "best effort", the future systems will most likely need something better. Will REITs strike revenue-sharing deals with the infrastructure providers, MNOs, and application providers? This was a popular method in the late '90s and early '00s to get internet connectivity with the millimeter-wave providers. Will it come back in

vogue? How will you separate the infrastructure from the spectrum? You need both components to make a wireless network work. Will it be sold as a commodity as some companies are suggesting? With all these changes coming rapidly, the PSO will need to grow and change. Every company may have their own individual, private network and may need some of the current professional service industries skill-sets to keep the businesses functioning; wireless Information Technology technicians will be in demand.

Indoor/Outdoor - the cost will fall on different stakeholders depending on indoor or outdoor applications. Will the owner of the property take controlling interest in everything that happens in the indoor environment? Including revenue opportunities? Will local governments, through PPPs, become more responsible for the outdoor environment to make their area competitive for commerce? Will they be willing to bear some of the cost, and be rewarded with the service revenue? Will the service revenue generated allow the networks to be upgraded continuously?

A personnel shortage already exists in the industry for completing the coverage-layer of the network, which takes the least amount of human resources. How many more people will be needed in the industry to BOM the other two layers of future G-Networks? What will your company do to be progressive in tackling this issue? The PSOs of the future will need to improve manpower acquisition, certification, training, and retention programs from current programs in place. To increase profits, these firms will need to increase both employee and customer satisfaction and reduce employee turn-over.

Who we are:

NGC is a consulting team of highly skilled and experienced professionals. Our background is in wireless communications for both the commercial and public safety sectors. The team has led deployment and operations spanning decades in the wireless technology. We have designed software and hardware for both network infrastructure and edge devices from concept to POC/FOA. Our current areas of focus include 4G/5G, IoT and security.

The team has collectively been granted over 160 patents in the wireless communication space during their careers. We have also written multiple books used extensively in the industry on wireless technology and published by McGraw-Hill.

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If you see something that should be added, changed or simply want to talk about your potential needs please contact us at info@nextgconnect.com or call us at 1.845.987.1787.