Changing landscape of Customer Premise Networks with IoT

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What is the problem?

Customer premise networks have been evolving since the early days of POTS (Plain Old Telephone Service).

Introduction of new services like Cable TV, Broadband and later VoIP, have driven numerous changes in the premise networking requirements. It is therefore no surprise that with the emergence of a vast array of new IoT applications, the premise networking requirements will change yet again.

Key Takeaways

- Premise networks have been evolving

- Emergence of IoT in the premise is driving many changes

- What are some of these changes?

- What is the cable industry doing to prepare for these changes?

Key words: IoT, Standards, Smart Homes

Background

Customer premise networks have been evolving since the early days of POTS (Plain Old Telephone Service). The introduction of new services like Cable TV, Broadband, and later VoIP, has driven numerous changes in the premise networking requirements. It is, therefore, no surprise that with the emergence of a vast array of new IoT applications, the premise networking requirements will change yet again.

To better understand these changes in the Premise Networks as well as plan for them in advance, the SCTE has launched a new initiative under its IoT Working Group called the Wiring Closet drafting group. This is a cross-functional team comprising of members from the IoT, Smart Cities, Telecom for Health, and Aging-in-place working groups. The expectation is to gather and consolidate Premise Networking requirements from all these various IoT applications and make some recommendations for future premise networks.

Evolution of Premise Networks

Premise Networks have evolved since the early days of telecom. Staring with basic POTS (Plain Old Telephone Service) which needed telephone wiring to be installed at the premise. All that was needed was a junction box outside the premise where the telephone cable from the phone company was brought in, along with another cable to where the telephone handset was located.

As the needs grew, this expanded to multiple telephone sets in different rooms as well as needs for multiple lines for voice and Fax services. There was already a need to manage all this wiring. This was done in a small Wiring Closet from where all the wiring in the premise was distributed. Introduction of Cable TV services brought in new needs for coaxial cable distribution. This was already starting to get complicated with larger homes requiring extensive wiring – and even need for powered amplifiers to distribute the signal. The needs in offices and commercial establishments were so extensive that they needed a dedicated room to house all the equipment and wiring infrastructure.

As old buildings were hard to retrofit with all the evolving wiring distribution and powering needs, the building industry started putting in some basic telecom infrastructure in new building designs from the start. While this made things a lot easier, there were plenty of other challenges. Each builder did things differently. There were no standards, and significant complications arose in Multi-Dwelling Units (MDU) where multiple occupants managed their networks.

The next phase of evolution began with the introduction of high-speed internet services like DSL and HFC. This introduced need for Ethernet cabling in homes. Further evolution of broadband services brought WiFi support with ever-increasing speed requirements. Also, the need for whole-home WiFi added additional requirements throughout the home.

Introduction of IoT Services

The advent of new IoT services has dramatically changed the needs of the premise network.

Now there are no longer just a handful of devices needing connectivity. The whole building can be teeming with "smart" devices needing to be

connected. IoT has also let loose a whole host

of new technologies and applications – all vying for consumer attention. In our summer 2021 magazine, I had written about the plethora of new technologies and protocols being introduced for IoT. These include WiFi, Bluetooth, Zigbee, Z-Wave, LoRa, Thread, and many others. These have created a lot of confusion for customers, and that has challenged the deployment of many products due to compatibility and interoperability problems. In the same article, I also wrote about the recent initiative by several vendors and service providers to consolidate the technologies and standards and enable interoperability under the name project Matter.

In addition to the new technologies and protocols, IoT has also enabled a broad range of new services that have varying needs in the customer premise. Some of the new services include video monitoring, pet monitoring, and home automation (thermostat, locks, etc.). There are also new specialized services including Home Health, Telemedicine, Elder Care, Aging-in-place, Smart Cities/Communities, etc. All these new services place additional requirements on the promised network.

Let's look at some of these new needs next.

Needs of Emerging IoT Services

As noted above, a broad range of new IoT services is emerging in the premise.

The widespread availability of broadband services has enabled video monitoring services for home security as well as pet monitoring. A broad range of indoor and outdoor cameras are available for this. Cameras can use wired (ethernet) or wireless (WiFi) backhaul. Multiple cameras may be located throughout the premise – including outdoors. This places special requirements on the premise network to support network connection and power feeds at various locations in the premises.

Further evolution of IoT services in the premises led to building automation services like door/window sensors, automatic locks, smart lighting, thermostat, and water monitoring and control. Most of these services rely on a variety of IoT communication protocols including Z-wave, Zigbee, BLE, and Thread as discussed earlier. There is typically a gateway device located on the premise that connects all these devices to the internet.

Some more recent services that are emerging include pet monitoring, aging-in-place, telehealth, and smart neighborhoods. Some of these services are extending the IoT services beyond the premise itself. These require longer-range communication technologies such as LoRA WAN.

What should MSO's do about this?

As noted above, a broad range of new IoT services is emerging in the premise. MSO's find themselves amid all these changes. They can choose to stay on the sidelines and let other players take the lead. Unfortunately, this will relegate them to the role of just a connectivity provider. On the other hand, MSO's can leverage their central role in the premise network and build on that capability to offer a rich set of value-added products and services that can offer long-term revenue opportunities.

The SCTE is exploring these specific options in the IoT working group. If you are interested in learning more about this topic or would like to contribute your ideas – join us in the IoT Wiring Closet working group at the SCTE.

Reference material

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