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EXECUTIVE BRIEF

Evolving the Home Network for a New Generation of UHD, IoT and VR Service Experiences

Carol Ansley, *Senior Director, Counsel, ARRIS*

Introduction

Since the early days of home networking, the pace of innovation has been accelerating quickly. Perhaps the most glaring example can be found in the recent explosion of streaming video traffic, which caused access point vendors and service providers alike to reexamine how to optimize Wi-Fi to give consumers a high-quality experience. This sparked a new wave of change, from the acceleration of 802.11 specifications to expanded frequencies to the use of multiple antenna configurations, which have combined to help Wi-Fi deliver video to multiple connected devices while sustaining acceptable performance levels for a wide range of streaming video services.

But the evolution of the home network isn't over. Today's consumers not only expect high-quality streaming capabilities; they are beginning to expect even more from their access points. As more content providers begin to offer 4K, high dynamic range and other ultra-high definition (UHD) video experiences, consumers expect that Wi-Fi will be able to meet ever increasing requirements for throughput and reach. In addition, the proliferation of Internet of Things (IoT) devices is not only driving a requirement for more robust Wi-Fi, its placing a new set of specialized requirements on today's access points that are creating diverse needs for both power and performance. Finally, the excitement around virtual reality (VR) applications in the home is setting up a new potential bandwidth explosion that may far surpass that of the streaming video revolution.

Meeting the unique needs of UHD, IoT and VR traffic requires a shift in thinking about the access point technologies that are deployed in the home, a strategic approach to the overall home network architecture and new analytical capabilities that can help service providers glean actionable insights from each access point they deploy. As the evolution of the home network marches on, it's a good idea to examine some of the many advances that are paving the way for better connected experiences for consumers, and new opportunities for service providers.

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New Wireless Connectivity Options

To meet the needs of both IoT traffic, which often requires low power, low bit rate connectivity, and streaming video, which requires high performance, high bit rate connectivity, we will likely need to deploy wireless access points with multiple connectivity options. This means diversifying the radio frequency bands that access points operate within, and deploying new wireless protocols within them. For low power, low bit rate traffic such as door locks and window sensors, for example, 802.11ah operating at 900 MHz provides a viable option with an added benefit of a long reach. Within the 2.4 GHz band, 802.15.4 and Zigbee® may work well. By deploying these technologies alongside high performance 2.4 and 5 GHz technologies such as 802.11ac, 801.11ad and 802.11ax, we can ensure that access points are well equipped to cover the diverse requirements of tomorrow's in-home applications.

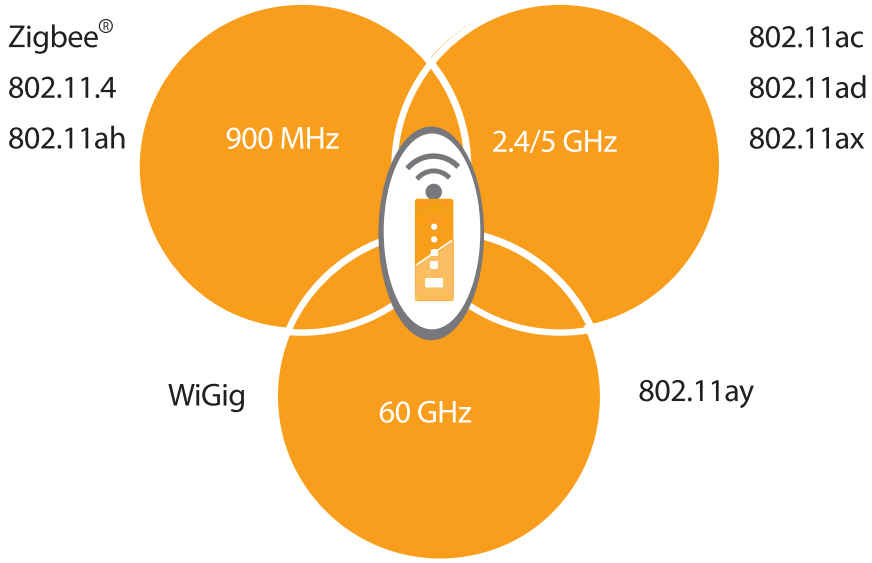

Figure 1: New wireless connectivity options built around IoT, UHD and VR traffic

A New Home Network Backbone

As wireless access points evolve to connect a wider range of device types, a new approach to home networking is coming into focus. A single, central access point is unlikely to reach every device in the home, especially as short range technologies begin to take hold. Therefore, it is likely that multiple access points will comprise the next-generation home network, and to deliver traffic

to and from them will likely require a home network backbone. Among the most promising solutions to building this backbone are 60 GHz wireless connections that leverage highly focused beams to achieve the highest bit rates. Wired connections such as MoCA and G.hn may also provide the performance needed to deliver the near Gigabit speeds that will be required to support the aggregation of voluminous UHD and VR traffic from multiple access points.

Figure 2: The emergence of the home network backbone

A Big Data Approach to Analytics

Even before new connectivity options and a backbone architecture find their way into the home network, there is an immediate opportunity to improve the performance of the access points that have already been deployed. By collecting and analyzing data that is accessible within today's access points, such as the, we can gain valuable insights into the performance characteristics of Wi-Fi with the goal of improving throughput and the consumer experience.

A recent ARRIS analysis of the received signal strength indication (RSSI) data for access points in both North America and the U.K. yielded notable results that have the potential to reshape how we approach access point selection in different regions. The results of this study will be shared in

an ARRIS paper that will be presented at the SCTE/ISBE Cable-Tec Expo 2016.

Analyzing RSSI data is but one example of the many opportunities we have to aggregate, analyze and act on the information that can be gleaned from an access point. To evolve the home network for a new era of application diversity and service performance, our industry must unleash all of the intelligence that an access point can provide. That means building advanced data collection services into these powerful devices, and ensuring that the information can be efficiently delivered to a central point for analysis. It also requires new systems that harness Big Data thinking to provide a simple view of this sophisticated information.

Conclusion

While the home network has undergone rapid and substantial change in recent years, history just might prove that we are about to enter a period of innovation that is accelerating more quickly than ever before. Consumer demand for higher quality video, diverse device types and immersive virtual experiences will challenge today's single protocol, single access point home networks and create new opportunities for both device and architectural evolution. And while those steps are right around the corner, there are steps we can take today by leveraging data collected within the access point to guide the deployment of home networks with better performance, greater reliability and fewer coverage gaps.

To learn more about the future dynamics of home networking, please read the ARRIS technical paper titled **"Advanced Wireless Possibilities."**