RDK-B : Keeping Up with Connected Business

Saima Tasneem, Marketing Manager, Tata Elxsi

TABLE OF CONTENTS

INTRODUCTION

Broadband service providers across the world have been under constant pressure to provide faster and better-quality broadband experiences for their customers-be it for business or at home. For the service providers to be successful, they have to overcome challenges pertaining to the need of delivering better customer experiences most efficiently and cost-effectively as possible by leveraging the right technologies, enabling the right broadband ecosystem and delivering the services with agility.

With the growing mass proliferation of broadband-ready IoT devices, service providers face new challenges when it comes to both providing services and monetizing the Connected Enterprise. In a connectivity-driven economy, a temporary loss of internet means loss of access to business applications which in turn produces disruptions in business efficiency, employee productivity and loss of revenue. According to AppDynamics /Cisco research downtime can cost a Small to Medium Business between $8,580 and $74,000 per hour.

Reliable Internet connectivity boosted by the right commercial router along with a truly managed Wi-Fi as a service solution (based on mass telemetry and data analytics) that is owned by the services provider, is critical for businesses, both large and small, to conduct their daily operations effectively. This paper explores some of the current requirements that enterprise consumers and service providers have and how the open-source initiative will be crucial for broadband technology advancement to innovate.

SEAMLESS CONNECTIVITY DRIVES SMB AND REMOTE WORK

As Per SBA (Small Business Administration) in the US, there are 30.2 million small businesses, which comprise 99.9% of United States businesses and employs 58.9 million people, which is 47.5% of the country's total employees [1]. Small businesses make up a significant portion of the hiring organizations in the United States, and the expansion of the Internet is allowing more entrepreneurs to start their businesses on their own. Moreover, many employees now expect remote work opportunities. Remote work has been gaining traction and according to a survey by Global Workplace Analytics and FlexJobs indicates that it has grown 91% over the last 10 years, and 159% over the last 12 years. Advancements of technology boosted by the emergence of cloud and cloud computing made work from home entirely possible.

Small businesses rely on their Internet connection for daily operations. As more and more devices continue to be added to the business there will be increased dependence on connectivity for the smooth functioning of the business. Challenges such as security breaches, non-scalable and non-reliable network are critical to smooth functioning of the Small and Medium Businesses (SMBs).

Figure 1: Figure 1:Employees connecting enterprise and legacy systems in multiple data center through VPN and MPLS with firewall security from home and workplace

Also with the increasing popularity of "work from home" introduces a few concerns about security where employees need to access company networks from external servers. Thereby introducing a requirement for commercial network capabilities at home. Network features like Virtual Private Network allow employees to access the company's network and transmit information through an encrypted tunnel. Employee's privacy and security are protected at all times when accessing Wi-Fi with a VPN. Video chat and meetings require seamless connectivity as it can be problematic if there is a low-quality connection. It would be a challenge if the internet connection is unstable.

Because of the growing dependency on connectivity an SMB owner and a remote work employee looks for a complete Wi-Fi managed solution backed by a good quality commercial router. The popularity of

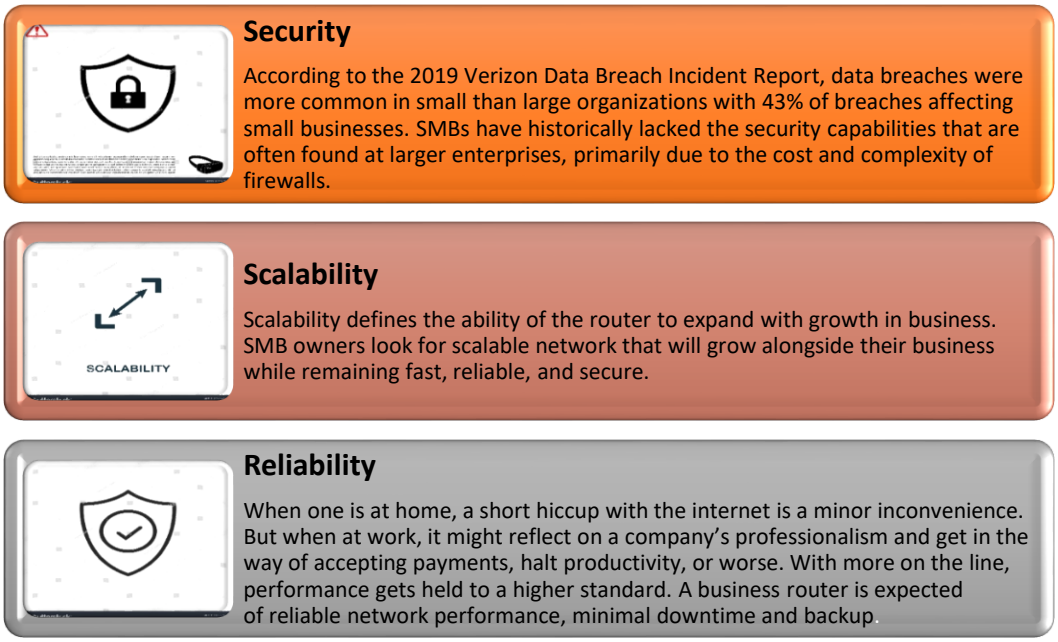
SMBs and remote work alternatives has contributed to the rise of managed service providers. Advancement in CPE and Wi-Fi management technologies have allowed operators to strive for a managed user experience. The concept of the smart office, new security challenges, new cloud-based business models, changing consumer expectations and requirements have created an opportunity to rethink how the broadband experience is delivered and measured in the business and at home.

CONNECTIVITY CHALLENGES FOR SMALL AND MEDIUM BUSINESS

A slow connection can hurt one's business. A small business owner understands the need of how truly an excellent internet service improves business. A business broadband subscription with the right business router and managed Wi-Fi services (at home too for remote work opportunities) by the service provider can go a long way in providing sustainable and improved business avenues. But evolution is necessary due to the challenges of a bigger scope, scale, and higher stakes.

Commercial Router Challenges

For an SMB owner or a remote worker buying a suitable commercial router isn't as simple as purchasing a consumer product from an online store or at the best price on the shelf at a local electronics store. Security, support, remote access, business-grade VPN, WAN redundancy, connectivity options, and scalability features, are more important to business users than things like raw speed, value or QoS features.



Managed Wi-Fi Services Challenges

These days' people expect instant connectivity, when it comes to a business setting, quick and easily accessible Wi-Fi connectivity means tangible benefits such as enhanced productivity, efficiency, and teamwork, apart from just ease of business. However, the maintenance, updates, and security for a business WiFi network can be a daunting task. To make sure that businesses are offering a fast, reliable, and secure connection to employees and customers, SMB owners need to rope in managed service providers to manage their wireless LAN. Managed Wi-Fi is the outsourcing of WiFi network management to a qualified managed service provider or ISP (Internet Service Provider).

However, service providers face a number of challenges while trying to take ownership of the connected business:

1. **Competition from CE manufactures/Online Retailers:** Subscribers are turning to other companies for more than just routers. Companies like Amazon, Plume, Best Buy/Geek, etc., are not only selling routers but are also selling Wi-Fi assessments, set-up services, warranties, and extended tech support. As it turns out, there is no shortage of companies willing to provide consumers with the help that they require in dealing with their Wi-Fi related issues.

2. **Poor access point placement and dead zones:** Poor access point (AP) placement is the key cause of WiFi related service calls. One of the key reasons that affect home wi-fi and the most significant, is the placement of wireless APs which can be one of the most significant factors in performance. A dead zone might be the result of poor AP placement, it is usually due to the size of the home, the walls or the materials that block signals. These factors can require multi-access points to address, either in the form of extenders or repeaters that can be backhauled with a dedicated wireless link or with wireline.

3. **Security**: It is relatively easy to set up a consumer network (home set up) because you know who's going to be using it. However, in a business network, it requires to have completely different standards for both security and connectivity.

4. **Maintaining Legacy Systems:** Legacy clients, such as 2.4 GHz-only devices, causing congestion and interference and Legacy gateways not supporting band steering. As transitions are made, service providers have to be able to seamlessly migrate, or evolve the Operations Support Systems (OSS) and Business Support Systems (BSS) that manage the infrastructure and operation of their network and subscribers.

5. **Other factors**: Other factors that negatively affect WiFi performance are

    a) Latency, which could be either WiFi or Layer 3 network related

    b) Poor implementation of airtime fairness and the ability to identify and remedy "airtime hogs"

    c) Support and troubleshooting for network performance. MSPs should be able to have a regional view of outages and network performances.

IMPORTANCE OF OPEN-SOURCE INITIATIVES

According to Broadband Forum CEO Robin Mers, the unification of open source with open standards will be essential to the efficient and cost-effective delivery of emerging broadband access technologies and services. Operators don't want to throw away the hundreds of billions of dollars invested in infrastructure they already have. There is a need to map open source innovations on to existing deployments so that new functionality can be added simply and with the highest possible return on invested capital and with minimal disruption to subscribers

One such open-source initiative is the Reference Design Kit for Broadband (RDK-B) which standardizes software functionalities for broadband devices, enabling MSOs to deploy services to a large customer base efficiently. The primary purpose of RDK-B is to create a standardized software stack for various OEMs, providing them with specific features to manage complex broadband functions such as Wide Area Networking (WAN), Local Area Networking (LAN), data reporting and management, home-networking technologies such as Wi-Fi and Multimedia over Coax Alliance (MoCA), and Internet of Things (IoT) controllers.

RDK-B for Commercial Network Requirement

The RDK-B stack supports a highly modular architecture that allows developers to have provisions for dynamic service discovery common data model, multiple management interfaces like SNMP, TR069, WebUI.

RDK-B's solution stack for business routers as well for WiFi managed services are discussed below:

RDK-B for Business Router

RDK-B with its added advantages of easy integration, portability, extensibility, security and reduced cost of maintenance makes it an ideal choice to support the various functional requirements of a commercial router.

Challenges faced	Mitigating with RDK-B
Security	• Security and protection through multiple level firewalls - Firewall setting specific to the commercial router enabling advanced firewall mechanism to avoid hack • DDOS protection • Spam and Malware protection • Content filtering to control what websites your staff can access or not • Flexible but Secure VPN access.
Scalability	• Support across VoIP, LAN, and Wi-Fi along with higher data throughput. • Multiple WAN ports to help establish more than one connection to one or several ISPs • Availability of various voice ports for setting up a private exchange for internal VoIP connectivity • Virtual LAN and Multiple SSIDs - beyond offering just a wireless guest feature, separate customized networks facilitation enabling multiple SSIDs for offering virtual wireless networks
Reliability	• Handle a large volume of traffic without interference - Advanced Wi-Fi standards with support up to 5GHz Radio that provides 23 non-overlapping channels with fewer chances to encounter interference. - High capacity VPN Server - 50-100 connected devices - CPU utilization below 80% • Minimal Downtime and Backup - Battery- USB supported - Backup options for WAN

RDK-B for Wi-Fi Managed Services

Though challenging, Wi-Fi connectivity and the promise of a connected home/business presents a great opportunity for providers to offer premium services that are self-branded or facilitated by a third-party service. Few of the essential features that RDK-B provides that MSP can offer as part of their managed Wi-Fi services are:

- WiFi connectivity over both 2.4 GHz and 5 GHz.
- WPS (Wi-Fi Protected Setup, a security standard that tries to make connections between a router and wireless devices faster and easier.) support for WiFi connectivity
- Easy monitoring of WiFi credentials through UI

- WiFi Air Time Management feature that helps the user to assign weight and prioritize the bandwidth allocation based on SSID
- WiFi Spectrum Analyzer feature which provides the real-time metrics for the WiFi radio spectrum
- Band Steering feature which helps the device to smartly switch the connected devices between 2.4 GHz and 5 GHz frequency band
- WiFi Range Extender support
- Prefer Private Mode when enabled prioritizes the private SSID over hotspot while at home
- Hotspot- Ability to access the service provider network outside the home WiFi range
- Supports Home Network Administration Protocol (HNAP) which is an HTTP-Simple Object Access Protocol (SOAP)-based protocol that allows advanced programmatic configuration and management by remote entities
- Supports MoCA 2.0 for WiFi extenders (Multimedia over Coax Alliance (MoCA) supports networking over coaxial cable)

CONCLUSION

Managed Service Providers (MSP) must manage numerous parts and complexity involved for the benefit of their clients, right from CPE provision, installation and managing the entire network. The more sites and pieces in the network, the more value customers can reap from their MSPs, resulting in lower Capex, Opex, and additional revenues from marketing and engagement activities.

Furthermore, adopting the open-source strategy, RDK is turning into the worldwide answer for an entire home/office network solution provider amongst service providers. With RDK, there is access to real-time data on the network, devices, and products whose data can help operators pinpoint the root of technical issues before customers start to call about them. The quicker operators can move to RDK-based solutions, the better the customer experience.

A complete system integrated approach to RDK implementation with a comprehensive set of services such as consulting, application development, localization, porting, validation and deployment support is the ideal choice of the hour for a smooth transition to future proof revenues.

ABOUT TATA ELXSI

Tata Elxsi is a global design and technology services Company. Tata Elxsi works with leading MSOs, content providers and studios to develop innovative services and applications that create subscriber stickiness and drive revenue growth.

Tata Elxsi, a premier partner of RDK Management, has established its leadership in RDK space by directly participating in commercially deployed RDK solutions. Tata Elxsi has been an active stakeholder for the development, enhancement, and integration of features on RDK-B for commercial routers

REFERENCES

1. 2018 Research on Small Business by US Small Business Administration (https://www.sba.gov/sites/default/files/advocacy/2018-Small-Business-Profiles-US.pdf)
2. Work from Home statistics by Maddie Shepherd (https://www.fundera.com/resources/working-from-home-statistics)
3. Press Release by Broadband Forum on open source and standards (https://www.broadband-forum.org/broadband-forum-the-next-era-of-broadband-relies-on-open-source-and-standards-joining-forces-now-is-the-time-to-move-forward-together)
4. Wi-Fi as a Service Market Report by ReportLinker (https://www.reportlinker.com/p04230317/Wi-Fi-as-a-Service-Market-by-Service-Type-User-Location-Organization-Size-Vertical-and-Region-Global-Forecast-to.html)
5. Broadband Features supported by RDK (https://wiki.rdkcentral.com/display/RDK/Broadband+Services)