

**TATA ELXSI**

# RDK-B for Commercial Routers



## WHITEPAPER

Media and Communication

### **AUTHOR**

**Pret Joseph**

Practice Head – RDK

**Panchakshari H S**

Architect – Media & Communication





## RDK-B for Commercial Routers

# Executive Summary

The popularity of SOHO (Small Office Home Office) has been on the rise in recent years. Internet connectivity has become the backbone for global businesses, boosting entrepreneurial ventures, and employee flexibility offered by companies. A commercial router is a good fit for small businesses having around 50 connected devices, such as in hospitality, construction, real estate, entertainment, financial services, insurance, healthcare, manufacturing, and retail.

Based on the demand of the business, few of the important considerations while choosing a business router include the level of security, whether the router can establish a Verified Private Network (VPN) and the area required to be covered by the router (a small office might need to have more coverage than, say, a cafe) etc.

This whitepaper explains the considerations of an SMB customer while selecting a commercial router and how RDK-B- an open source initiative standardizing software functionalities for broadband devices meets the expected requirements of a commercial router.



Reliability and stability over multiple devices, handling high data throughput supporting scores of users (including guests) on the network, security, and protection against hacking, etc. are critical for an SBM company.

-  **SCALABILITY**
-  **RELIABILITY**
-  **STABILITY**
-  **SECURITY**

## Selection criteria of commercial routers

Buying a commercial router isn't as simple as purchasing a consumer product based on the best ratings from an online store or at the best price on the shelf at a local electronics store. Reliability and stability over multiple devices, handling high data throughput supporting scores of users (including guests) on the network, security, and protection against hacking, etc. are critical for an SBM company. Here are the requirements that should be considered while choosing a commercial router, along with the supporting features:

Selection Criteria	Features
<ul style="list-style-type: none"> <li>Reliable and stable connectivity over multiple devices</li> </ul>	<ul style="list-style-type: none"> <li>4 to 16 Ethernet ports</li> <li>Multiple SSIDs (Primary and Secondary)</li> </ul>
<ul style="list-style-type: none"> <li>Availability of various voice ports for setting up a private exchange for internal VoIP connectivity</li> </ul>	<ul style="list-style-type: none"> <li>2 to 8 voice ports</li> </ul>
<ul style="list-style-type: none"> <li>Availability of guest SSID feature to get connected to the office network</li> </ul>	<ul style="list-style-type: none"> <li>Options for multiple guest SSIDs</li> <li>Radius server for authentication</li> </ul>
<ul style="list-style-type: none"> <li>VPN</li> </ul>	<ul style="list-style-type: none"> <li>VPN feature to set up a secure tunnel between the office branches</li> </ul>
<ul style="list-style-type: none"> <li>Support for Advanced Wi-Fi standards</li> </ul>	<ul style="list-style-type: none"> <li>Support for:                             <ul style="list-style-type: none"> <li>- 2.4GHz and 5GHz Radios</li> <li>- 802.11n and 802.11ac in addition to 802.11a, 802.11b, and 802.11g, Wi-Fi Extender (Mesh)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>IP features</li> </ul>	<ul style="list-style-type: none"> <li>DHCP Relay, DNS, VLAN, VPN pass-through and more configuration options open to the system admin</li> <li>DHCP server per interface (Configurable lease pool, lease time and reserved IP)</li> </ul>

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

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>Scalability in terms VoIP, LAN, and Wi-Fi along with higher data throughput</li> </ul>                         | <ul style="list-style-type: none"> <li>Ability to connect up to 50 clients for Wi-Fi</li> <li>Up to 8 VoIP ports</li> <li>Up to 8 LAN ports</li> </ul>                               |
| <ul style="list-style-type: none"> <li>Reliability in terms of minimal downtime</li> </ul>  | <ul style="list-style-type: none"> <li>Battery – USB supported</li> <li>Backup options for WAN using LTE or WANOE</li> </ul>   |
| <ul style="list-style-type: none"> <li>Backup power options</li> </ul>  | <ul style="list-style-type: none"> <li>USB Battery</li> </ul>  |
| <ul style="list-style-type: none"> <li>Security and protection through multi-level firewalls, DDOS protection, spam and malware protection</li> </ul> | <ul style="list-style-type: none"> <li>Advanced multi-level firewall with malware and spam protection</li> <li>Advanced firewall setting to protect from external hacking</li> </ul> |

#### Capacity and Performance Considerations

- Wi-Fi throughput – 400/100 for 5 Ghz in max configuration
- Ethernet switch on LAN side with 200MB capacity
- High capacity VPN server
- Number of connected devices – 50 to 100
- CPU utilization below 80%

## RDK-B and Commercial Routers

The Reference Design Kit for Broadband (RDK-B) is an open-source initiative standardizing 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.

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

#### The new critical areas of implementation for RDK-B when adapting for commercial routers are:

- New data model support and persistence
- Integration of new packages



Tata Elxsi has been an active stakeholder for the development, enhancement, and integration of features on RDK-B for commercial routers.

- Integration with new chipsets – HAL implementation, capacity harnessing
- Security additions
- Testing – New features, penetration, Wi-Fi performance, voice features, scalability
- CPU load optimization in a high bandwidth environment

The new packages can either be adapted from open-source and customized or can be developed in-house. An example of open-source customization is the content sharing feature developed for RDK-B environment using components available for a Linux environment. This also exposes the TR-181 data models for remote configuration and management. With these additional features (DLNA/FTP/SAMBA), customers can either directly browse or upload/download the media files.

The implementation of these features is designed in such a way that customer can access multiple USB or NAS data, with each one having independent credentials for access.

**The following open-source modules were adopted for this functionality:**

- Samba package
- Minidlna package
- SFTP package

IPsec-based VPN is an essential requirement for commercial routers to communicate securely between offices by setting up the VPN tunnel between gateways.

The open source modules adopted for the implementation of IPSec VPN include IPsec tool, Key management tool, and Racoon.

Some of the implementations, such as advanced firewall and customized web UI, require ground-up development of packages.

## Tata Elxsi's contributions to RDK-B for commercial routers

Tata Elxsi has been an active stakeholder for the development, enhancement, and integration of features on RDK-B for commercial routers. Some of the key features developed/ integrated include:

- IPsec VPN tunnel: Enables secure communication between two gateways
- L2VPN: Enables VPN on cable modem to get an IP at layer 2
- IP pass-through: Enables a specific IP to pass through the traffic without any firewall rules
- IPsec pass-through: Enables access for publicly open VPN servers allowing the connected client to get an IP from VPN server



- Hotspot: Enables guest SSID for the public to connect
- Multi VLAN: Enables co-existence of mixed mode and router & bridge mode at the same time at the gateway
- Firewall setting specific to the commercial router: Enables advanced firewall mechanism to avoid hack
- Multiline VOIP support with SIP and MGCP for different markets: Enables multiple voice line with PC 1.5/2.0 using VOIP mechanism
- Content sharing for DLNA, Samba, and SFTP
- Development of Web UI applications on RDK-B for the commercial router: Used for remote management on WAN network for an operator to configure and also on LAN for end-user to configure the gateway.
- Validation, QA, Inter-op, and other pre-deployment tests (Stability, performance, etc.)

## Conclusion

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. And Tata Elxsi, a premier partner of RDK Management, has established its leadership in RDK space by directly participating in commercially deployed RDK solutions.

We provide a comprehensive set of services which includes App Development, Localization, Porting & Validation, System Integration and Deployment support to customers in RDK space.

## References

[RDK Central Wiki](#)

## Authors



**Pret Joseph**

Practice Head – RDK



**Panchakshari H S**

Architect – Media &  
Communication

**About Tata Elxsi Limited.** Tata Elxsi is a global design and technology Services Company and a part of the \$100+ billion Tata Group. Tata Elxsi works with leading MSOs, content providers and studios to develop innovative services and applications that create subscriber stickiness and drive revenue growth.

This is backed by more than two decades of design and engineering experience and deep specialization in video broadcast and OTT engineering and service delivery, a global delivery presence and offshore development centers in India.

For more information, please visit [www.tataelxsi.com](http://www.tataelxsi.com)

[info@tataelxsi.com](mailto:info@tataelxsi.com)