Platform Guide

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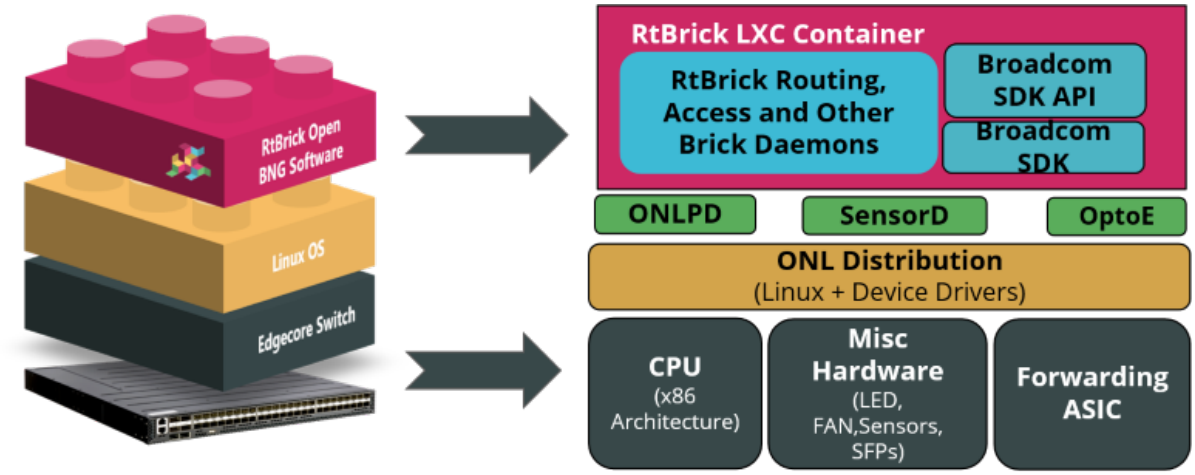
Table of Contents

1. Platform Overview

The RtBrick FullStack (RBFS) software runs as a LXC container on a Linux host operating system in the Edgecore switches, which are capable of Layer 2 and Layer 3 switching. Multiple switches can be combined to support several subscribers using a leaf and spine architecture or deployed as a standalone using the consolidated BNG approach. Additionally, the ZTP (Zero-Touch-Provisioning) and REST-based APIs that expose the state of the system are also supported.

The image below shows a high-level overview of the platform architecture.



The platform consists of hardware based on forwarding ASIC and host operating system based on Open Network Linux (ONL). An RBFS container that resides on top of this software includes all necessary packages to deliver access and routing protocols.

This guide looks at the platform features, the different supported hardware platforms, and features that are supported on each hardware platform.

1.1. Supported Platforms

RtBrick's software has been validated on the following hardware platforms.

- Edgecore AS7316-26XB
- Edgecore AS5916-54XKS
- Delta AGCVA48S
- UfiSpace S9500-22XST
- UfiSpace S9600-32X
- UfiSpace S9600-72XC

1.2. Brick Daemon (BD)

RBFS runs multiple Brick Daemons (BD). Every application that runs within RBFS is fundamentally a brick daemon. For example, forwarding daemon (fibd), configuration daemon (confd), BGP (bgp.iod or bgp.appd), or interface management daemon (ifmd).

1.2.1. Brick Daemon (BD) Restartability

If a brick daemon fails (for a limited number of times), RBFS will restart it automatically. If the automatic restart does not succeed, you can use the Ubuntu system control to start a daemon.

For more information about troubleshooting the Brick Daemons, see section "2.2. Brick Daemons" of the *RBFS NOC Troubleshooting Guide*.

2. RBFS on UfiSpace S9600-72XC

RtBricks' open BNG software running as a spine-leaf architecture that provides full BNG functionality on an Ufispace S9600-72XC based on a Broadcom Q2C chip. RtBrick supports leaf image for the S9600-72XC platform.

The Ufispace S9600-72XC is based on Broadcom StrataDNX Qumran 2C switch silicon, capable of line-rate 2.4 Tbps Layer 2 and Layer 3 switching.

2.1. Switch Silicon: Broadcom Qumran-2C

The UfiSpace S9600-72XC switch is based on Broadcom’s Qumran-2C BCM88820 chip.

2.2. Hardware Specification

Table 1. UfiSpace S9600-72XC Hardware Specification

Model	UfiSpace S9600-72XC
Form-factor	2RU, 436W x 87.7H x 609.6D mm (17.17"x3.45"x24")
Switch Silicon	Broadcom Qumran-2C BCM88820
CPU	Intel Skylake-D D-2145NT 8 Cores @1.9GHz
System Memory	2x 16GB DDR4 R-DIMM with ECC
Configuration	• 64 x 25GE SFP28 ports • 8 x 100GE QSFP28 ports • 2 x 10GE SFP+ management ports • 1 x RJ45 serial console port

For more information, click the link below.
https://ufispace.com/products/telco/aggregation/s9600-72xc-25g-100g-open-aggregation-router-tcam

2.3. Supported Features

The table below lists the features that are supported by RBFS on UfiSpace S9600-72XC platform.

Supported	Unsupported
Routing Protocols: BGP, Policy **Forwarding**: OAM, LLDP, L2X (Local & Remote), HQoS, Accounting, Inband Management, Mirroring **Multicast**: IGMPv2/v3, PIM **Subscriber Management**: PPPoE, L2TPv2, IPoE, RADIUS Services, Dual Stack, IPTV Service, L2BSA, LI **Infrastructure**: Logging, NTP, LED Control **Security**: Securing the Management Plane, Local User Management **Telemetry**: Resmon, TSDB	**Forwarding**: LAG **Security**: Securing the Control Plane

3. RBFS on UfiSpace S9600-32X

RtBricks' open BNG software running as a spine-leaf architecture that provides full BNG functionality on an Ufispace S9600-32X based on a Broadcom Q2C chip. RtBrick supports spine image for the S9600-32X platform.

The Ufispace S9600-32X is based on Broadcom StrataDNX Qumran 2C switch silicon, capable of line-rate 2.4 Tbps Layer 2 and Layer 3 switching.

3.1. Switch Silicon: Broadcom Qumran-2C

The UfiSpace S9600-32X switch is based on Broadcom's Qumran-2C BCM88820 chip.

3.2. Hardware Specification

Table 2. UfiSpace S9600-32X Hardware Specification

Model	UfiSpace S9600-32X
Form-factor	2RU, 436W x 87.8H x 762D mm (17.17"x3.46"x30")
Switch Silicon	Broadcom Qumran-2C BCM88820
CPU	Intel Skylake-D D-2145NT 8 Core @1.9GHz
System Memory	32GB DDR4 with ECC
Configuration	• 32 x 40GE/100GE QSFP28 ports • 4 x 1GE/10GE/25GE SFP28 ports (break out from Port 0) • 1 x RJ45 serial console port

For more information, click the link below.
https://ufispace.com/products/telco/aggregation/s9600-32x-25g-100g-aggregation-router

3.3. Supported Features

The table below lists the features that are supported by RBFS on UfiSpace S9600-32X platform.

Supported	Unsupported
Routing Protocols: BGP, IS-IS, OSPFv2, Policy **Forwarding**: HQoS, OAM, LLDP, L2X, Inband Management, Mirroring **Multicast**: PIM **Infrastructure**: Logging, NTP, LED Control **Security**: Securing the Management Plane, Local User Management **Telemetry**: Resmon, TSDB	**Forwarding**: LAG **Multicast**: IGMPv2/v3 **Security**: Securing the Control Plane

4. RBFS on Delta AGCVA48S Platform

RtBricks' open BNG software running as spine-leaf architecture provides full BNG functionality on an Delta AGCVA48S based on a Broadcom-Q2C chip. RtBrick supports access-leaf images for the Delta AGCVA48S platform.

4.1. Switch Silicon: Broadcom Qumran-2C

The Delta AGCVA48S switch is based on Broadcom's Qumran-2C with a form-factor of 2RU, 19 Inch, Rack-Mountable equipment.

4.2. Hardware Specification

Table 3. Delta AGCVA48S Hardware Specification

Model	Delta AGCVA48S
Form-factor	2RU, 19 Inch, Rack-Mountable
Switch Silicon	Broadcom Qumran-2C BCM88820
CPU	Intel Xeon Broadwell-DE D1548 8-Cores 2.0 GHz
System Memory	2x16GB SO-DIMM
Configuration	• 4 x 10GbE SFP+ • 48 x 25GbE SFP28 • 10 x 100GbE QSFP28

For more information, click the link below.
https://www.delta-japan.co.jp/event/interop2021/product/Delta_Agema_TriFold_Brochure-A4.pdf

4.3. Supported Features

The table below lists the features that are supported by RBFS on Delta AGCVA48S platform.

Supported	Unsupported
Routing Protocols: BGP, IS-IS, OSPFv2, Policy **Forwarding**: HQoS, Accounting, Inband Management, OAM, L2X, LLDP, Mirroring **Multicast**: IGMPv2/v3, PIM **Subscriber Management**: PPPoE, L2TPv2, IPoE, RADIUS Services, Dual Stack, IPTV Service, L2BSA, LI **Infrastructure**: Logging, NTP LED Control **Security** Securing the Management Plane, Local User Management	**Forwarding**: LAG **Security** Securing the Control Plane **Telemetry**: Resmon, TSDB

5. RBFS on UfiSpace S9500-22XST

RtBricks' open BNG software running as Consolidated BNG architecture provides full BNG functionality on UfiSpace S9500-22XST that is based on Broadcom-QAX chip. RtBrick supports Consolidated BNG for the UfiSpace S9500-22XST.

5.1. Switch Silicon: Broadcom Qumran-AX

The UfiSpace S9500-22XST switch is based on Broadcom-QAX BCM88470 chip.

5.2. Hardware Specification

Table 4. UfiSpace S9500-22XST Hardware Specification

Model	UfiSpace S9500-22XST
Form-factor	1RU, 440w x 43.5h x 302d mm (17.32" x 1.713" x 11.89")
Switch Silicon	Broadcom Qumran-AX BCM88470
CPU	Intel Broadwell-DE D1519 4 Cores @1.5GHz
System Memory	1 x 8 GB
Configuration	• 2 x 100GE QSFP28 port • 8 x 25GE SFP28 ports • 8 x 10GE SFP+ ports • 4 x 1GE RJ45 ports

For more information, click the link below.
https://www.ufispace.com/products/telco/access/s9500-22xst-rj45-disaggregated-cell-site-gateway

5.3. Supported Features

The table below lists the features that are supported by RBFS on UfiSpace S9500-22XST platform.

Supported	Unsupported
Routing Protocols: BGP, IS-IS, OSPFv2, Policy **Forwarding**: HQoS, OAM, L2X, Inband Management, LLDP, Firewall filter, LAG, Mirroring **Multicast**: IGMPv2/v3, PIM **Subscriber Management**: PPPoE, L2TPv2, RADIUS Services, Dual Stack, IPTV Service, Accounting, DHCP Relay, L2BSA **Infrastructure**: Logging, LED Control, NTP **Security**: Securing the Management Plane Securing the Control Plane, Local User Management **Telemetry**: Resmon, TSDB	**Forwarding**: Multifield (MF) Classifier **Subscriber Management**: LI

6. RBFS on Edgecore AS7316-26XB Platform

RtBricks' open BNG software running as a Consolidated BNG, that provides full BNG functionality on an EdgeCore AS7316-26XB based on a Broadcom QAX chip, which is suitable for deployments in low-density areas and hardened platforms at cell-sites.

The Edgecore AS7316-26XB is an open design cell site gateway platform that provides a combination of 1/10 Gbps, 25 Gbps, and 100 Gbps interfaces, utilizing merchant silicon and an x86 processor with optimized performance for service provider access and aggregation networks.

6.1. Switch Silicon: Broadcom Qumran-AX BCM88470

Broadcom Qumran-AX BCM88470 platform which is delivered on a single 1RU device provides a Consolidated BNG. The QAX platform has a lower form factor chipset from Broadcom Jericho-1 family.

6.2. Hardware Specification

Table 5. Edgecore AS7316-26XB Hardware Specification

Model	Edgecore AS7316-26XB
Form-factor	1RU, 19 Inch, Rack-Mountable
Switch Silicon	Broadcom Qumran-AX BCM88470
CPU	Intel Broadwell-DE D-1519 1.5G 4C
System Memory	DDR4 SO-DIMM 2x 8GB SDRAM with ECC support
Configuration	• 16 x SFP+ (each supporting 10 GbE or 1 GbE) • 8 x SFP28 (each supporting 10 GbE or 25 GbE) • 2 x 100G QSFP28 (each supporting 1 x 40/100 GbE or 4 x 10/25 GbE or 2 x 50 GbE)

For more information, click the link below.
https://www.edge-core.com/productsInfo.php?cls=291&cls2=342&cls3=343&id=603

6.3. Supported Features

The table below lists the features that are supported by RBFS on Edgecore AS7316-

26XB Platform.

Supported	Unsupported
Routing Protocols: BGP, IS-IS, OSPFv2, Policy **Forwarding**: HQoS, OAM, L2X, Inband Management, LLDP, Firewall filter, LAG + Mirroring **Multicast**: IGMPv2/v3, PIM **Subscriber Management**: PPPoE, L2TPv2, RADIUS Services, Dual Stack, IPTV Service, Accounting, DHCP Relay, L2BSA **Infrastructure**: Logging, LED Control, NTP **Security**: Securing the Management Plane, Securing the Control Plane, Local User Management **Telemetry**: Resmon, TSDB	**Forwarding**: Multifield (MF) Classifier **Subscriber Management**: LI

7. RBFS on Edgecore AS5916-54XKS Platform

RtBricks' open BNG software running as a spine-leaf architecture, that provides full BNG functionality on an EdgeCore AS5916-54XKS based on a Broadcom QMX chip. RtBrick supports spine as well access-leaf images for the AS5916-54XKS platform.

The Edgecore AS5916-54XKS is based on Broadcom StrataDNX Qumran MX switch silicon, capable of line-rate 800 Gbps Layer 2 and Layer 3 switching. The switch can be deployed either as a top-of-rack switch in a data center, or as a carrier access/aggregation switch, and edge router.

7.1. Switch Silicon: Broadcom Qumran-MX BCM88375

Broadcom Qumran-MX BCM88375 platform can help build fixed form factor, feature-rich, deep-buffered switches to enable cloud-scale networking and Carrier network applications. The BCM88375 device processes up to 800 Gbps traffic, supporting up to six 100G full-duplex ports at Layer 2 through Layer 4 with integrated deep-buffer traffic management capabilities, and a fabric interface.

7.2. Hardware Specification

Table 6. Edgecore AS5916-54XKS Hardware Specification

Model	Edgecore AS5916-54XKS
Form-factor	1RU
Switch Silicon	Broadcom Qumran-MX BCM88375
CPU	Intel Xeon D-1548 processor 8 cores 2.0 GHz
System Memory	DDR4 SO-DIMM 16 GB x 2
Configuration	• 48 x SFP+ each supporting 10 GbE or 1 GbE • 6 x 100G QSFP28 each supporting 1 x 40/100 GbE

For more information, click the link below.
https://www.edge-core.com/productsInfo.php?cls=291&cls2=327&cls3=328&id=753.

7.3. Supported Features

The table below lists the features that are supported by RBFS on Edgecore AS5916-54XKS Platform.

Supported	Unsupported
Routing Protocols: BGP, IS-IS, OSPFv2, Policy **Forwarding**: HQoS, L2X, OAM, LLDP Mirroring **Multicast**: IGMPv2/v3, PIM **Subscriber Management**: PPPoE, L2TPv2, RADIUS Services, LI, DHCP Relay **Infrastructure**: Logging, LED Control, NTP **Security**: Securing the Management Plane, Securing the Control Plane, Local User Management **Telemetry**: Resmon, TSDB	**Forwarding**: LAG