



Platform Guide

Version 21.7.1, 30 July 2021

| Registered Address | Support | Sales |
|---|--|--|
| 26, Kingston Terrace, Princeton, New Jersey 08540, United States | | |
| | | +91 80 4850 5445 |
| http://www.rtbrick.com | support@rtbrick.com | sales@rtbrick.com |

©Copyright 2021 RtBrick, Inc. All rights reserved. The information contained herein is subject to change without notice. The trademarks, logos and service marks ("Marks") displayed in this documentation are the property of RtBrick in the United States and other countries. Use of the Marks are subject to RtBrick's Term of Use Policy, available at <https://www.rtbrick.com/privacy>. Use of marks belonging to other parties is for informational purposes only.

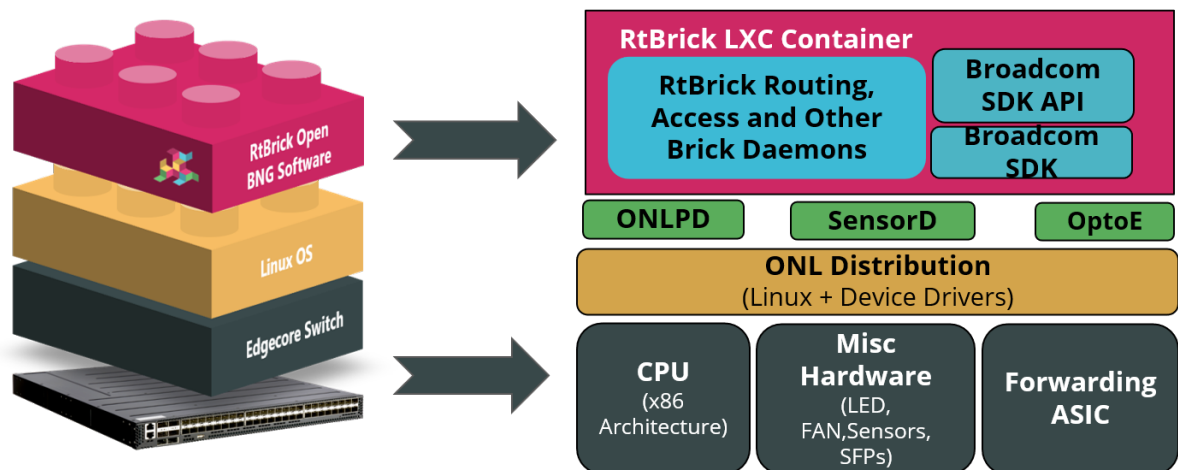
Table of Contents

| | |
|--|----|
| 1. Platform Overview | 3 |
| 1.1. Supported Platforms | 3 |
| 1.2. Brick Daemon (BD) | 4 |
| 1.2.1. Brick Daemon (BD) Restartability | 4 |
| 2. RBFS on Edgecore AS7316-26XB Platform | 5 |
| 2.1. Switch Silicon: Broadcom Qumran-AX BCM88470 | 5 |
| 2.2. Hardware Specification | 5 |
| 2.3. Supported Features | 5 |
| 3. RBFS on Edgecore AS5916-54XKS Platform | 7 |
| 3.1. Switch Silicon: Broadcom Qumran-MX BCM88375 | 7 |
| 3.2. Hardware Specification | 7 |
| 3.3. Supported Features | 7 |
| 4. RBFS on Delta AGCVA48S Platform | 9 |
| 4.1. Switch Silicon: Broadcom Qumran-2C | 9 |
| 4.2. Hardware Specification | 9 |
| 4.3. Supported Features | 9 |
| 5. RBFS on UfiSpace S9500-22XST | 11 |
| 5.1. Switch Silicon: Broadcom Qumran-AX | 11 |
| 5.2. Hardware Specification | 11 |
| 5.3. Supported Features | 11 |
| 6. RBFS on UfiSpace S9600-32X | 13 |
| 6.1. Switch Silicon: Broadcom Qumran-2C | 13 |
| 6.2. Hardware Specification | 13 |
| 6.3. Supported Features | 13 |
| 7. RBFS on UfiSpace S9600-72XC | 15 |
| 7.1. Switch Silicon: Broadcom Qumran-2C | 15 |
| 7.2. Hardware Specification | 15 |
| 7.3. Supported Features | 15 |

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 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.

2.1. 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.

2.2. Hardware Specification

Table 1. 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 | <ul style="list-style-type: none"> • 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>

2.3. Supported Features

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

26XB Platform.

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

3. 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.

3.1. 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.

3.2. Hardware Specification

Table 2. 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 | <ul style="list-style-type: none"> • 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>.

3.3. Supported Features

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

| Supported | Unsupported |
|---|---|
| <p data-bbox="183 208 563 282">Routing Protocols: BGP, IS-IS, OSPFv2, Policy</p> <p data-bbox="183 322 421 396">Multicast: IGMPv2/v3, PIM</p> <p data-bbox="183 436 715 555">Subscriber Management: PPPoE, L2TPv2, RADIUS Services, LI, DHCP Relay</p> <p data-bbox="183 595 525 669">Forwarding: HQoS, L2X, OAM, LLDP</p> <p data-bbox="183 710 572 784">Infrastructure: Logging, LED Control, NTP</p> <p data-bbox="183 824 679 981">Security: Securing the Management Plane, Securing the Control Plane, Local User Management</p> <p data-bbox="183 1021 403 1095">Telemetry: Resmon, TSDB</p> | <p data-bbox="804 208 999 282">Forwarding: LAG</p> |

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 | <ul style="list-style-type: none"> • 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 |
|--|--|
| <p data-bbox="183 206 561 280">Routing Protocols: BGP, IS-IS, OSPFv2, Policy</p> <p data-bbox="183 320 663 394">Subscriber Management: PPPoE, L2TPv2, RADIUS Services</p> <p data-bbox="183 434 421 508">Forwarding: OAM, L2X, LLDP</p> <p data-bbox="183 548 357 622">Telemetry: Resmon</p> | <p data-bbox="807 206 997 280">Forwarding: HQoS, LAG</p> <p data-bbox="807 320 1193 394">Infrastructure: Logging, LED Control, NTP</p> <p data-bbox="807 434 1299 589">Security: Securing the Management Plane, Securing the Control Plane, Local User Management</p> <p data-bbox="807 629 976 703">Telemetry: TSDB</p> <p data-bbox="807 743 1038 817">Multicast: IGMPv2/v3, PIM</p> <p data-bbox="807 857 1206 931">Subscriber Management: LI</p> |

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 | <ul style="list-style-type: none"> • 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 |
|--|--|
| <p data-bbox="183 206 480 277">Routing Protocols: BGP</p> <p data-bbox="183 322 376 394">Forwarding: OAM, LLDP</p> <p data-bbox="183 439 357 510">Telemetry: Resmon</p> | <p data-bbox="807 206 1099 277">Routing Protocols: IS-IS, OSPFv2, Policy</p> <p data-bbox="807 322 1284 394">Subscriber Management: PPPoE, L2TPv2, RADIUS Services</p> <p data-bbox="807 439 1038 510">Forwarding: HQoS, L2X, LAG</p> <p data-bbox="807 555 1193 627">Infrastructure: Logging, LED Control, NTP</p> <p data-bbox="807 672 1299 824">Security: Securing the Management Plane, Securing the Control Plane, Local User Management</p> <p data-bbox="807 869 978 940">Telemetry: TSDB</p> <p data-bbox="807 985 1038 1057">Multicast: IGMPv2/v3, PIM</p> <p data-bbox="807 1102 1206 1173">Subscriber Management: LI</p> |

6. 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. RtBricks 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.

6.1. Switch Silicon: Broadcom Qumran-2C

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

6.2. Hardware Specification

Table 5. 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 | <ul style="list-style-type: none"> • 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>

6.3. Supported Features

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

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

7. RBFS on UfiSpace S9600-72XC

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

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

7.1. Switch Silicon: Broadcom Qumran-2C

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

7.2. Hardware Specification

Table 6. 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 | <ul style="list-style-type: none"> • 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://ufispaces.com/products/telco/aggregation/s9600-72xc-25g-100g-open-aggregation-router-tcam>

7.3. Supported Features

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

| Supported | Unsupported |
|--|--|
| <p data-bbox="183 206 478 280">Routing Protocols: BGP</p> <p data-bbox="183 324 375 398">Forwarding: OAM, LLDP</p> <p data-bbox="183 443 359 517">Telemetry: Resmon</p> | <p data-bbox="807 206 1101 280">Routing Protocols: IS-IS, OSPFv2, Policy</p> <p data-bbox="807 324 1284 398">Subscriber Management: PPPoE, L2TPv2, RADIUS Services</p> <p data-bbox="807 443 1037 517">Forwarding: HQoS, L2X, LAG</p> <p data-bbox="807 562 1189 636">Infrastructure: Logging, LED Control, NTP</p> <p data-bbox="807 680 1300 824">Security: Securing the Management Plane, Securing the Control Plane, Local User Management</p> <p data-bbox="807 869 981 943">Telemetry: TSDB</p> <p data-bbox="807 987 1037 1061">Multicast: IGMPv2/v3, PIM</p> <p data-bbox="807 1106 1204 1180">Subscriber Management: LI</p> |