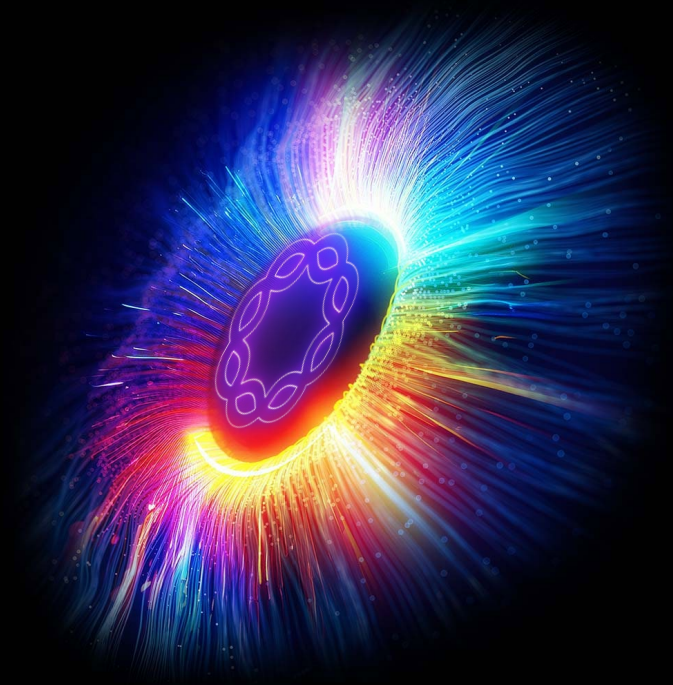
ribbon

INSIGHTS



Transformation Need :
On-Premise Centric
Complex Network infra
Business Continuity
IT Management
Fixed Scalability
Require Pre-Planning
Under/Over Usage

Welcome to Prague
"The city of a hundred spires"
ribbon

What’s on Tap for Today?

- Cloud Migrations “101”
- SBC Licensing “Demystified”
- Container Technology
- Optical Transmission with Ribbon’s Intelligent Middle Mile
- Session Wrap-up with David Hiscock

Demos

Lunch

One on One Meetings!!

Your feedback is important to us –

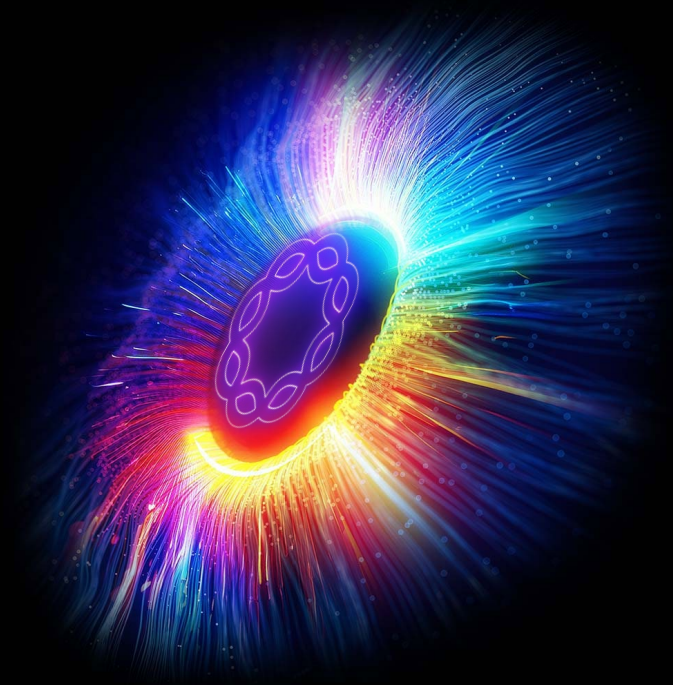
Let us know how we did!

Take The Survey

ribbon INSIGHTS

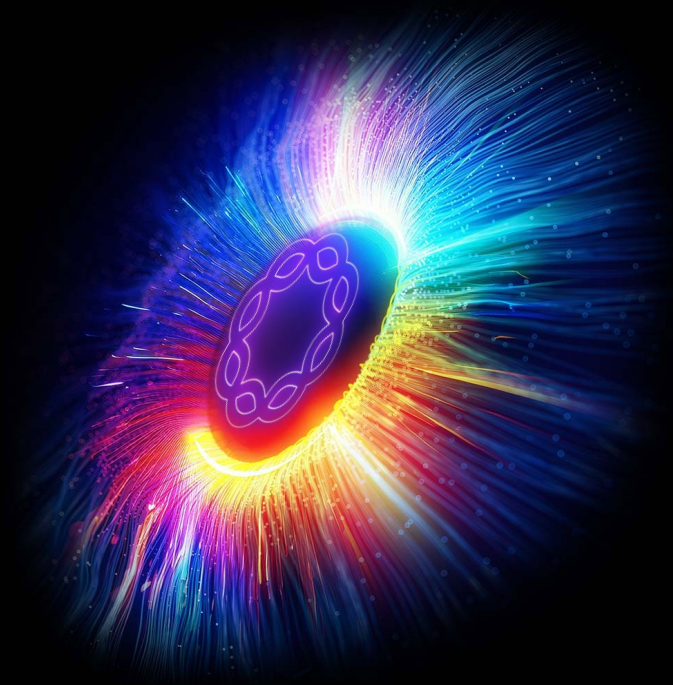
ribbon

INSIGHTS



ribbon

INSIGHTS



Customers migrate to the cloud

René Houtman

Chief Architect

ribbon INSIGHTS

Enterprise business through the years

Prague

René started
@ Sonus

2015

- SIP trunking
- MS gateway

2018

- SIP trunking
- MS gateway
- PBX interoperability
- recording

2024

- SIP trunking
- UCaaS/CCaas gateway
- PBX/UCaas interworking
- Analytics (Network and Fraud)
- Private/Public Cloud

Organizations Want to Move to the Cloud

A. Need certified and tested solutions to gracefully move phone lines, users and legacy devices

B. Want to assure that their communications remain secure as they move to the cloud

C. Must not disrupt employees and business process as they move

Cloud migration has to be secure, dependable and non-disruptive

Ribbon SBCs Helps Solve Common Barriers to Cloud Migration

Certified and tested with leading cloud platforms

Integrates or gracefully migrates PBX investments

Maintain or extend service provider contracts/ relationships

Integrates or gracefully migrates contact center investments

Connects legacy device or systems (paging, door phones, elevator phones etc.)

What we see in the market

- VMWare price increase (huge!)
  - Customers moving to appliance and public cloud
- Look for Metaswitch customers
  - Microsoft is defocusing on this (aka drop it)
- Upsell RBBN portfolio @ existing customers
- Cloud migrations need on-prem solutions
  - Consolidation SIP trunks into handful of SBC
  - SBC Edge HA, Edge 8000

VMWare

- Already support KVM and Hyper-V (incl. 2022)
  - Expand with support for Nutanix (test)
- Customer move to HW or Cloud
  - Contact Ribbon for support
- Offer DL licensing where applicable/possible
  - NWDL/MDL more flexible. Now available for SBC 1000 and 2000
- Feedback on requirements for VM Cloud solutions
  - We are looking to support smaller footprints for e.g. RAMP and Analytics.

Metaswitch Replacements

- SP and Enterprises affected
- Trusted, Carrier-Grade Replacements for Perimeta SBC

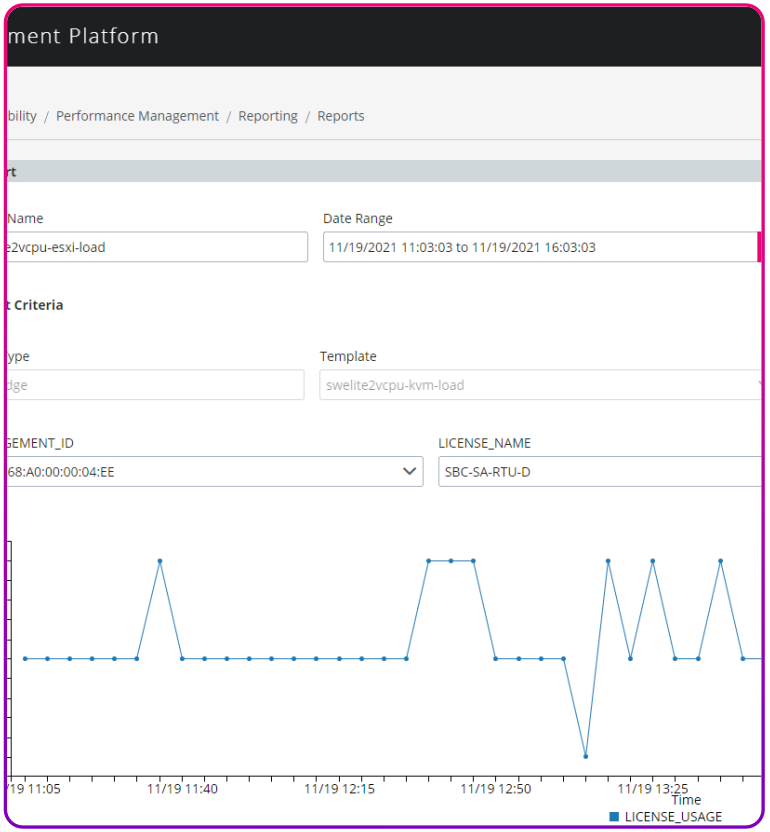
https://ribboncommunications.com/solutions/service-provider-solutions/metaswitch-network-replacements

Upsell other RBBN products

- SBC Core
  - Proxy SBC for UCaaS; Contact Center
- RAMP
  - Used for NWDL, but also full FCAPS management with modern look & feel
  - Can be installed in Azure and AWS
- Analytics
  - Fraud, Call Trust (branded caller ID). Use AI and ML to get in
  - Start small with monitoring, upsell other apps
- WebRTC gateway needed for flexible, mature and secure solution
  - Aim at Financial sector /large CC

RAMP voice quality reports

- Live call quality stats
- Currently for SBC1000/2000
  – Q1 2025 also for Swe Edge
- VQ data ingestion into Analytics planned



RAMP secure comms with SBC Edge

- Secure communication between RAMP and Ribbon Edge devices
- RAMP can manage devices behind firewall

Used for:

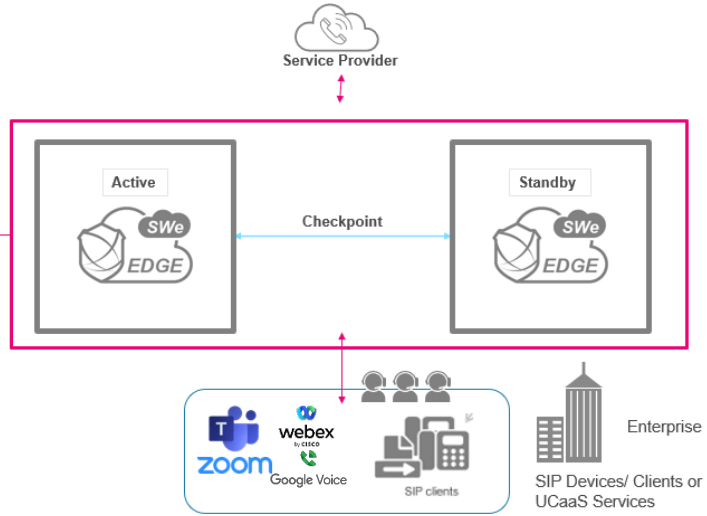
- Customers with hybrid networks
- Partners delivering managed services to customers

On prem solutions

ribbon
INSIGHTS

SBC SWe Edge – High Availability (HA)

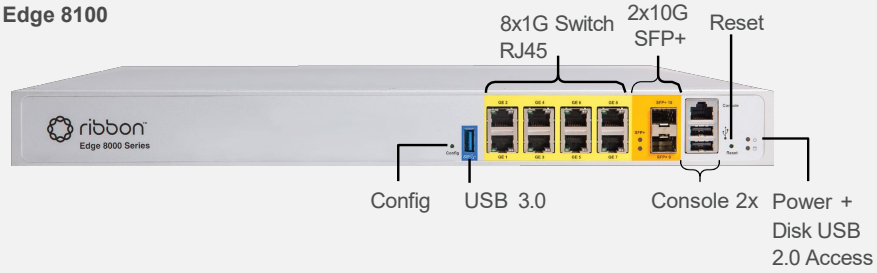
- SBC SWe Edge R12 or later supports High Availability with mid-call failover
  - On-premises deployments only; upgrade SA to HA possible
  - Support for vSBA
- Configuration sync is supported between active & standby SBC instances
- If the active SBC instance fails, the call processing (signaling & media) switches over to the redundant/standby SBC instance
- The standby SBC instance assumes call control, avoiding any service disruption for the end user's SIP trunk, SIP endpoint, Teams/Zoom/Webex/Google client, etc.
- The two SBC SWe Edge instances must be deployed on the same subnet – there is no physical (cable etc.) connection required



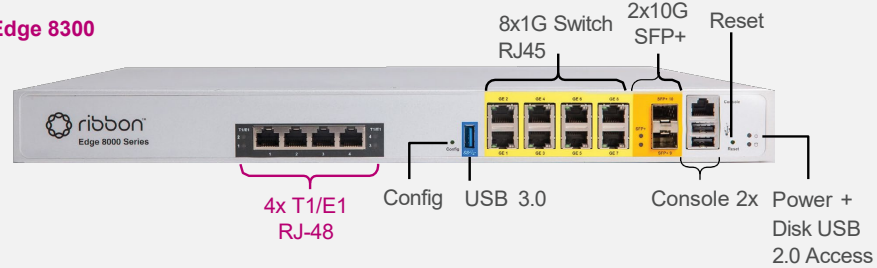
High availability option provides service continuity if an SBC instance drops out

2 Edge 8000 Options – Edge 8100 & Edge 8300

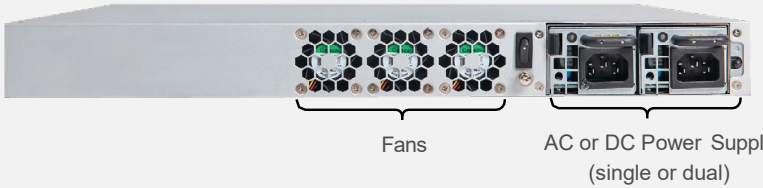
Edge 8100



Edge 8300



Edge 8100



Edge 8300

2 platforms : IP only (8100) or IP & legacy connections (8300)

Physical	Regulatory
• 1U high • CPU: C3758, 8-core, Onboard Atom® C3000	• IECEE/UL, US, IC, EU

Why Edge 8000

- Ribbon's proven SBC SWe Edge software
- Includes all existing certifications and field proven interop
- Leverages SBC Edge's familiar Easy Configuration Wizard (templates for faster set-up)
- Includes full media services and transcoding capabilities
- Ribbon appliance with HA / SIPREC / 25 cps / 1000 concurrent sessions

Edge 8500 New Product Introduction

- **Max 16 T1/E1/PRI**
- **Max 16 FXO**
- **Max 96 FXS**
- **1x ASM for SBA**

- GA early Q1 2025
- Xeon based 4 slot midplane design 10Gbps
- 1RU
- Dimensions: H 44mm x D 600mm x W 444.5mm
- Redundant field replaceable and hot swapable PSUs: AC – Single, AC –Dual, DC -Dual
- All slots support field replaceable (not hot swapable) PRI (T1/E1), FXS/FXO cards
- 10G SFPs supports wide variety of industry standard SFPs
- Card Varieties
  - SKU -8xT1/E1/PRI -card
  - SKU -24xFXS -card
  - SKU -8xFXO -card
  - SKU -ASM –card (slot 4 only)
- FIPs-3 and JITC, Teams, Zoom, WebEx, certification
- Homologation day 1: USA, Canada, EU, UK

Ribbon SBC Portfolio

Microsoft Certified for Direct Routing

Zoom Certified for BYOC

Webex Local Gateway Certified

Google SIP Link Certified

Service Provider Core

SBC 5400

- ✓ 75,000 Sessions
- ✓ SIP (up to 10 GB)
- ✓ High Availability

SBC 7000

- ✓ 150,000 Sessions
- ✓ SIP (10 GB)
- ✓ High Availability

SBC SWe

- ✓ "Unlimited" Sessions
- ✓ Virtual & Cloud
- ✓ Azure, AWS & Google
- ✓ GPU, CPU & DSP Transcode

Enterprise Edge

SBC 1000
SBC 2000

- ✓ 192 or 600 Sessions
- ✓ Teams SBA option
- ✓ FXO/FXS options

Edge 8100
Edge 8300

- ✓ 900 Sessions
- ✓ CPU Transcode
- ✓ FXO/FXS options
- ✓ 10 Gbps edge routing

SBC SWe Edge

- ✓ 1,000 Sessions
- ✓ Virtual & Cloud
- ✓ CPU Transcode
- ✓ Teams SBA option
- ✓ Azure & AWS

Service Provider Edge

EdgeMarc 302
EdgeMarc 304

- ✓ 2 or 4 Port ATA
- ✓ Field upgradable
- ✓ Centrally managed
- ✓ Zero Touch Provision

EdgeMarc 2900

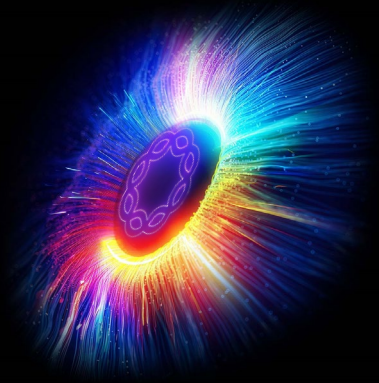
- ✓ 300 Sessions
- ✓ FXO/FXS options
- ✓ PoE options
- ✓ Zero Touch Provision

EdgeMarc 6000

- ✓ 500 Sessions
- ✓ FXO/FXS options
- ✓ LTE 4G Option
- ✓ Zero Touch Provision

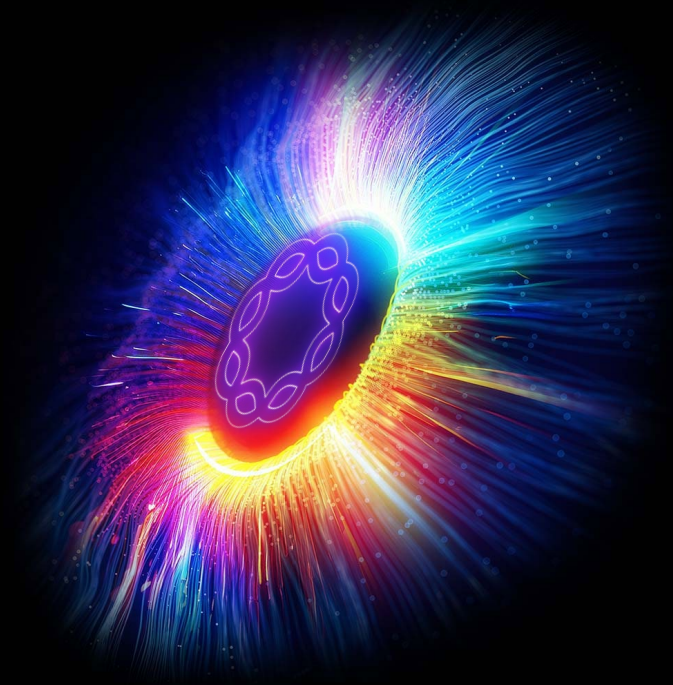
ribbon

INSIGHTS



ribbon

INSIGHTS



SBC Licensing Demystified

Michael Reckert

Systems Engineering Sr. Specialist

ribbon INSIGHTS

Confidentiality Warning

The following document is the property of Ribbon and must be kept confidential.
It is provided to you under obligations of confidentiality for a limited purpose, and any distribution of the document or further disclosure of the subject matter of the document is strictly prohibited without the express written consent of Ribbon Legal Department.

If you are not the intended recipient and are not authorized to access this document, you are hereby notified that any review, retransmission, conversion to hard copy, copying, circulation or other use of this document or its contents is strictly prohibited, and we ask that you please notify the sender immediately by return e-mail, and delete this document from your system.

SBC Licenses
Overview

ribbon
INSIGHTS

Ribbon SBC Portfolio

Microsoft Certified for Direct Routing

Zoom Certified for BYOC

Webex Local Gateway Certified

Google SIP Link Certified

Service Provider Core

SBC 5400

- ✓ 75,000 Sessions
- ✓ SIP (up to 10 GB)
- ✓ High Availability

SBC 7000

- ✓ 150,000 Sessions
- ✓ SIP (10 GB)
- ✓ High Availability

SBC SWe

- ✓ "Unlimited" Sessions
- ✓ Virtual & Cloud
- ✓ Azure, AWS & Google
- ✓ GPU, CPU & DSP Transcode

Enterprise Edge

SBC 1000
SBC 2000

- ✓ 192 or 600 Sessions
- ✓ Teams SBA option
- ✓ FXO/FXS options

Edge 8100
Edge 8300

- ✓ 900 Sessions
- ✓ CPU Transcode
- ✓ FXO/FXS options
- ✓ 10 Gbps edge routing

SBC SWe Edge

- ✓ 1,000 Sessions
- ✓ Virtual & Cloud
- ✓ CPU Transcode
- ✓ Teams SBA option
- ✓ Azure & AWS

Service Provider Edge

EdgeMarc 302
EdgeMarc 304

- ✓ 2 or 4 Port ATA
- ✓ Field upgradable
- ✓ Centrally managed
- ✓ Zero Touch Provision

EdgeMarc 2900

- ✓ 300 Sessions
- ✓ FXO/FXS options
- ✓ PoE options
- ✓ Zero Touch Provision

EdgeMarc 6000

- ✓ 500 Sessions
- ✓ FXO/FXS options
- ✓ LTE 4G Option
- ✓ Zero Touch Provision

SBC Edge & SBC Core Offerings

Licensing Models

1. **Node Locked Licensing (NLL) - SBC Core & Edge**
   - Historically supported model used by the SBC
   - Perpetual
2. **Network Wide Domain Locked Licensing (NWDL) - SBC Core & Edge**
   - Domain Locked Licensing (DL) allows a Customer to use licenses across the Customer's network
   - Perpetual
3. **Multiyear Domain Locked Licensing (MDL) - SBC Core & Edge**
   - Domain Locked Licensing (DL) allows a Customer to use licenses across the Customer's network
   - Subscription
4. **True Forward (TF) - SBC Core**
   - Shared domain locked feature licensing
   - Subscription

Standard SBC 5000 and SBC 7000 License Model

- Licenses available for purchase
- Generally, licenses are independent (no required order for purchase)

Session License	Feature License	HW License
(SIP license for IP ↔ IP calls)	(SIP Registrar, Encrypt, SIPREC, …)	(Media Interface Upgrade 5400 only)

Base system features, requiring no license
(Incl. Base OS, REST)

SBC 5400

SBC 7000

Standard SBC SWe License Model

- Licenses available for purchase
- Generally, licenses are independent (no required order for purchase)

Session License
(SIP license for IP ↔ IP calls)

Feature License
(SIP Registrar, Encrypt, SIPREC, …)

Hypervisor

Off the Shelf Servers

Two Types of SBC 1000 & SBC 2000 Solutions

SBC 1000

SBC 2000

“Standard” SBC 1000 and SBC 2000 products

- All products not identified as gateways (i.e. no **–GW** at the end of SKU name)
- Includes all products for Survivable Branch Appliance (“SBA”)

SBC 1000

SBC 1000 Gateways

- All products with **–GW** at end of SKU name
- Requires added licensing for some feature
- Reduced HW resources to support optimized pricing

Refer to SKU map for exact details on SKUs

Standard SBC 1000 and SBC 2000 License Model

- Licenses available for purchase
- Generally, licenses are independent (no required order for purchase)

TDM Port License
(e.g. T1/E1, FXS, BRI)

Session License
(SIP license for IP ↔ IP calls)

Feature License
(SIP Registrar, Forking, OSPF, …)

Base system features, requiring no license
(Incl. Base OS, Active Directory, REST, SBA or CCE)

SBC 1000

SBC 2000

SBC 1000 Gateway License Model

Session License
(SIP license for IP ↔ IP calls)

Feature License
(SIP Registrar, Forking, OSPF, …)

Can only be activated if top-up license has been applied

Feature "Top-Up" License

TDM Port/Select Feature Licenses (e.g. T1/E1, FXS, BRI, SILK Codec)

Can be activated without regard to the top-up license

Base system features, requiring no license

SBC 1000 Gateway

Edge8000 License Model

- Node Locked Licenses only available for purchase
- Generally, licenses are independent (no required order for purchase)

SBC

VNF Session License
(SIP license for IP ↔ IP calls)

Feature License
(SIP Registrar, Forking, …)

Coming soon!

Base system features, requiring no license
(Incl. Base OS, T1/E1, FXS)

Edge 8000 SBC/Gateway

Standard SBC SWe Edge License Model

- Licenses available for purchase
- Generally, licenses are independent (no required order for purchase)

Session License
(SIP license SG, SGX, SP) for IP ↔ IP calls)

Feature License
(SIP Registrar, Encrypt, SIPREC, …)

Hypervisor

Off the Shelf Servers

SBC SWe Edge

Standard SBC Licensing
(Node Locked Licensing)

ribbon
INSIGHTS

TDM & FXS Licenses

- SBC 1000 and SBC 2000 configurations contain hardware for future expansion
  - New licenses unlock hardware: T1/E1, FXS, FXO, BRI ports
  - No penalty for underestimating capacity
  - No truck roll for capacity expansion

- Easier stocking and faster order fulfillment
  - Few number of HW product codes / SKUs
  - No more build to order requirement
  - Simpler Support and RMA procedures

Refer to SKU map for exact details on SKUs

Standard SBC 1000 Ordering – TDM Port Licenses

SBC 1000

Product Code	Description	When to Order	Notes
SBC-1K-LIC-T1E1	Enables 1 PRI port	Used to enable an additional PRI port on an SBC 1000 with existing T1/E1 HW. Can be added at the time of order or as a field upgrade	First physical port is licensed and available for use by default from the factory. A maximum of 3 additional ports may be licensed per system*
SBC-1K-LIC-FXS	Enables 4 FXS ports (single FXS card)	Used to enable an additional 4 FXS ports on an SBC 1000 with FXS HW. Can be added at the time of order or as a field upgrade	First 4 physical ports (single FXS card) is licensed and available for use by default from the factory. A maximum of 20 additional ports may be licensed per system*
SBC-1K-LIC-FXO	Enables 4 FXO ports (single FXO card)	Used to enable an additional 4 FXO ports on an SBC 1000 with FXO HW. Can be added at the time of order or as a field upgrade.	First 4 physical ports (single FXO card) is licensed and available for use by default from the factory. A maximum of 8 additional ports may be licensed per system*
SBC-1K-LIC-BRI	Enables 4 BRI ports (single BRI card)	Used to enable an additional 4 BRI ports on an SBC 1000 with BRI HW. Can be added at the time of order or as a field upgrade.	First 4 physical ports (single BRI card) is licensed and available for use by default from the factory. A maximum of 4 additional ports may be licensed per system*

Refer to SKU map for available expansion specifics for a given SKU

SIP ↔ SIP Session Licensing

- Unlike TDM/FXx ↔ SIP calls, additional license required to enable a SIP ↔ SIP call (aka SIP session)
  - A SIP session is a SIP transaction that establishes **a bi-directional audio/video media exchange (RTP media stream)** between two IP-enabled ports on the SBC
    - Media does not have to transit the SBC (“direct media”)
    - No difference from a licensing perspective if the media transits the SBC … or not
  - All SIP ↔ SIP session services are enabled with a license
    - No additional license for encryption services (unlike SWe Edge)
    - No additional license for DSP mode (services requiring DSP intervention, such as transcoding or media encryption)
- Customers must ensure their specific SBC has adequate DSP resources to deliver RTP media manipulation services.

Refer to SKU map for available DSP resources for a given SKU

Standard SBC 1000 Ordering – SIP Session Licenses

SBC 1000

Product Code	Description	When to Order
SBC-1K-LIC5SIP	Enables 5 SIP sessions	Add 5 SIP IP ↔ IP session licenses to an SBC 1000 either at the time of initial order or as a field upgrade
SBC-1K-LIC10SIP	Enables 10 SIP sessions	Add 10 SIP IP ↔ IP session licenses to an SBC 1000 either at the time of initial order or as a field upgrade
SBC-1K-LIC25SIP	Enables 25 SIP sessions	Add 25 SIP IP ↔ IP session licenses to an SBC 1000 either at the time of initial order or as a field upgrade

- All 6.1 or greater SBC 1000 SKUs can support 192 SIP sessions
  - 192 direct media or media proxy mode always supported in every SKU
  - # of SIP sessions supporting media encryption (RTP ↔ SRTP) or transcoding is dictated by available DSP resources* in a given SBC 1000 SKU
- All earlier SBC 1000 units (shipped earlier than Q4 2016) support maximum 160 sessions
- Capacity details found at SBC 1000/2000 Performance and Capacity

*Refer to SKU map for available DSP specifics for a given SKU

Standard SBC 2000 Ordering – SIP Session Licenses

SBC 2000

Product Code	Description	When to Order
SBC-2K-LIC5SIP	Enables 5 SIP sessions	Add 5 SIP IP ↔ IP session licenses to an SBC 2000 either at the time of initial order or as a field upgrade
SBC-2K-LIC10SIP	Enables 10 SIP sessions	Add 10 SIP IP ↔ IP session licenses to an SBC 2000 either at the time of initial order or as a field upgrade
SBC-2K-LIC25SIP	Enables 25 SIP sessions	Add 25 SIP IP ↔ IP session licenses to an SBC 2000 either at the time of initial order or as a field upgrade
SBC-2K-LIC100SIP	Enables 100 SIP sessions	Add 100 SIP IP ↔ IP session licenses to an SBC 2000 either at the time of initial order or as a field upgrade

- All SBC 2000 SKUs can support 600 SIP sessions
  - 600 direct media or media proxy mode always supported in every SKU
  - # of SIP sessions supporting media encryption (RTP ↔ SRTP) or transcoding is dictated by available DSP resources* in a given SBC 2000 SKU
- Capacity details found at SBC 1000/2000 Performance and Capacity

*Refer to SKU map for available DSP specifics for a given SKU

SBC 1000 Ordering – Feature Licenses

SBC 1000

Product Code	Description	When to Order	Considerations
SBC-1K-LIC100REG	Enables 100 Registrar licenses	When registering SIP phones is a requirement. Add in 100 license increments, up to 600 maximum	May additionally require SIP session licenses.
SBC-1K-LIC-FORK	Enables Call Forking	When call forking is required. License is on/off per SBC 1000	May additionally require SIP session licenses.
SBC-1K-LIC-ROUTG	Enables IP routing	When OSPF dynamic routing is required. License is on/off per SBC 1000	Also enables IPSEC feature in support of the RBA feature.
SBC-1K-LIC-WBGSM	Enables Adaptive Multi-Rate wide-band coder	When customer requires support for G.722.2 codec	

SBC 2000 Ordering – Feature Licenses

SBC 2000

Product Code	Description	When to Order	Considerations
SBC-2K-LIC100REG	Enables 100 Registrar licenses	When registering SIP phones is a requirement. Add in 100 license increments, up to 1000 maximum	May additionally require SIP session licenses.
SBC-2K-LIC-FORK	Enables Call Forking	When call forking is required. License is on/off per SBC 2000	May additionally require SIP session licenses.
SBC-2K-LIC-ROUTG	Enables IP routing	When OSPF dynamic routing is required. License is on/off per SBC 2000	Also enables IPSEC feature in support of the RBA feature.
SBC-2K-LIC-WBGSM	Enables Adaptive Multi-Rate wide-band coder	When customer requires support for G.722.2 codec	

SBC 1000 Gateway Licensing

ribbon
INSIGHTS

SBC 1000 Gateway TDM Licenses

- Can be activated without regard to the top-up license (i.e. don't need top up license!)
- Simply follow the instructions posted for the standard SBC 1000 configurations

TDM Port, Select Feature License (e.g. T1/E1, FXS, BRI, SILK Codec)

SBC 1000 Gateway

SBC 1000 Gateway Top-Up License and Above

Session License
(SIP license for IP ↔ IP calls)

Feature License
(SIP Registrar, Forking, OSPF, …)

Can only be activated if top-up license has been applied

Feature “Top-Up” License

TDM Port License (e.g. T1/E1, FXS, BRI)

Can be activated without regard to the top-up license

Base system features, requiring no license

SBC 1000 Gateway

SBC & Other Features Require Supplementary License

SBC 1000 Gateways

- *"Premium Features"* unavailable on SBC 1000 gateways on shipment
- Premium features can NOT be IMMEDIATELY activated through feature licenses (unlike the standard SKUs) … must *first* apply a TOP-UP license

- SIP Calls
- SIP Registrations
- Forking
- Active Directory®*
- Transcoding
- OSPF
- RIP
- QoE
- BroadSoft® Subscriber
- AMR-WB
- Video Pass through
- SIP VQ Reporting

SBC 1000 Gateways Shipped With Premium Features Deactivated and Require Additional License Beyond Feature Licenses for Reactivation

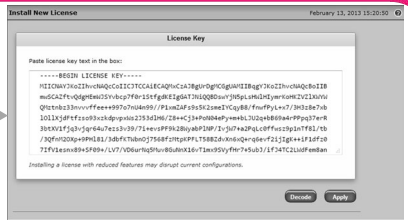
* Feature license not required; TOP-UP license activates Active Directory feature

Your Gateway Evolves with Your Needs

SBC 1000 PRI Gateways

Purchase “top-up” license
SBC-1K-LIC-P-GWUPG

Purchase desired feature license(s)

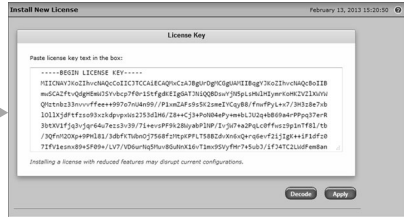


Apply license key into WebUI

SBC 1000 BRI Gateway

Purchase “top-up” license
SBC-1K-LIC-B-GWUPG

Purchase desired feature license(s)

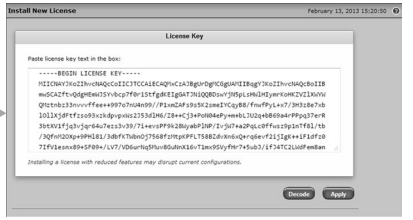


Apply license key into WebUI

SBC 1000 FXS Gateway

Purchase “top-up” license
SBC-1K-LIC-FXS-GWUPG

Purchase desired feature license(s)



Apply license key into WebUI

SBC Licenses Shared Among Nodes

NWDL / MDL / TF Licensing

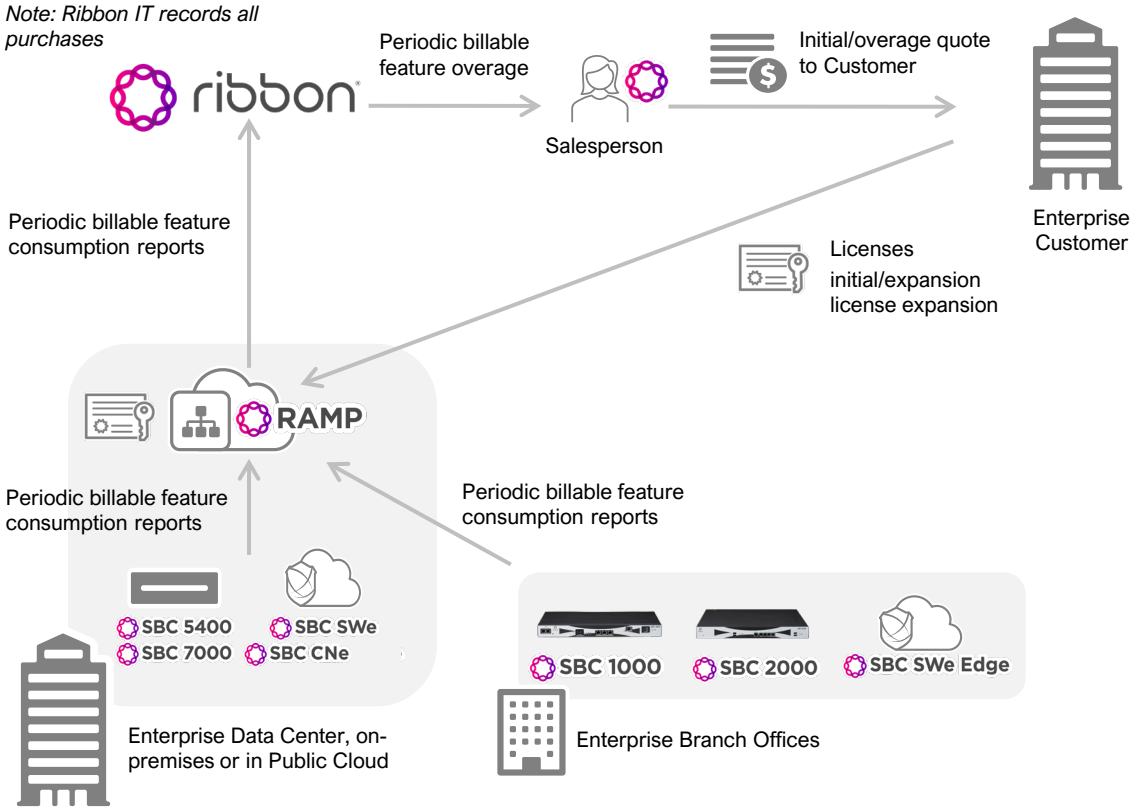
ribbon INSIGHTS

Cloud & Edge Product License Offers

Offer	Commercial Model	Features & Flexibility	Availability	RAMP / Reporting
Node Locked (NLL)	Perpetual; maintenance quoted separately	• On-premises only • Licenses fixed to node • EMS & RAMP management	• Available • EMS support ended Q2 2024	No RAMP required
NWDL – Network Wide Domain Locked	Perpetual with license tracking and true up; maintenance quoted separately	• On-premises only • Licenses shared among nodes • RAMP management • No instance migration or CNF	• Available • EMS support ended Q2 2024	RAMP / Reporting required
MDL – Multiyear Domain Locked	Subscription, 5-year term, with license tracking and true up; maintenance quoted separately	• On-premises only • Licenses shared among nodes • RAMP management • No instance migration or CNF	Available	RAMP / Reporting required
True Forward	Subscription, 1 or 3-year term; maintenance included	• “Take anywhere” flexibility for on-premises & public cloud • Licenses shared among nodes • RAMP management • Instance migration and CNF	Available	RAMP / Reporting required

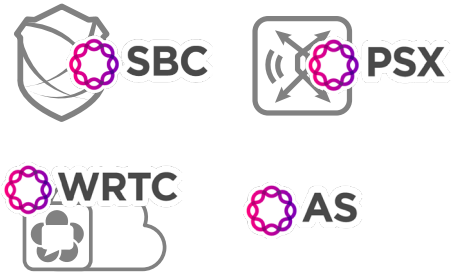
Reporting Topology and Actors

- SBCs offer, report billable usage
  - Billable usage *only* with activated features
  - Activated features run to SBC configured limits (not license population #!)
- RAMP manages license pool:
  - Customer ordered features, for activation, along with initial quantity
  - User loads features for **activation** into SBCs
  - Reports aggregate feature usage to Ribbon IT
  - License pool “grows” with excess usage upon additional purchase from customer
- Ribbon IT records initial purchase; reports overage to salesperson
- Ribbon salesperson generates initial/overage quote to enterprise
- Enterprise updates NWDL/MDL or TF pool in RAMP



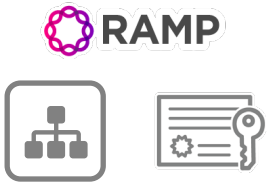
Domain Locked Licensing Infrastructure Network Actors

SBCs, PSX, Application Server, WebRTC GW, …



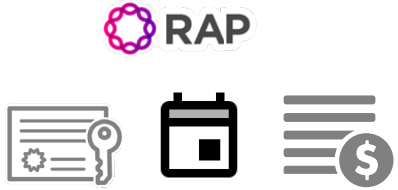
- Downstream platforms delivering real-time communications services subject to domain licensing
- Reports successful subscription-related feature delivery northbound periodically

Ribbon Application Management Platform



- Upstream management platform with domain licensing domain licensing management pool
- Southbound product features activation
- Northbound feature usage collection and reporting

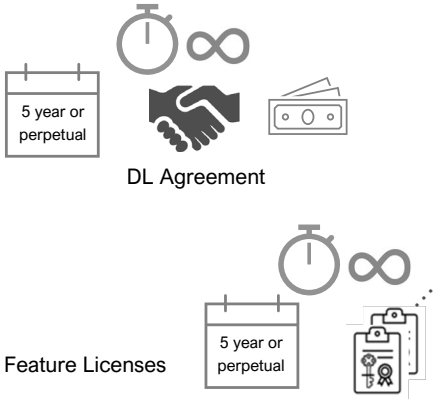
Ribbon Audit Portal



- Domain Licensing reconciliation
- Collects subscription-related feature usage from RAMP
- Calculates usage along with implications on commitments (if applicable)

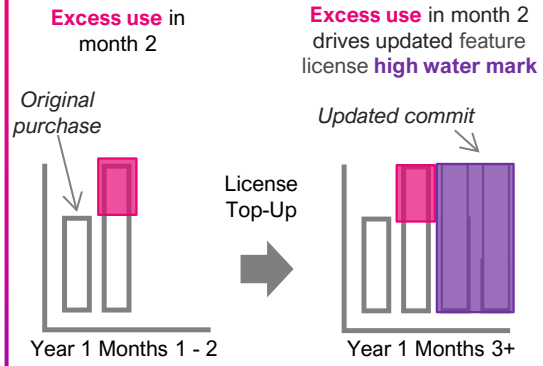
DL (Domain Locked Licensing) Features & Operations

Agreement



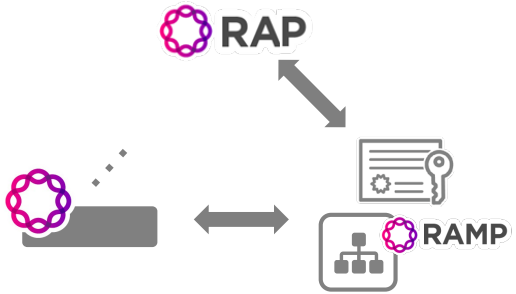
- Customer acknowledges DL (MDL & NWDL) product description & licensing guide, pays upfront
- A la carte feature license file generated

Excess Use Accounted in Arrears



- Excess use sparks adjustment in feature license “high water mark”
- License quote forwarded to customer; updated license generated
- No limit to excess use recognition & reconciliation events

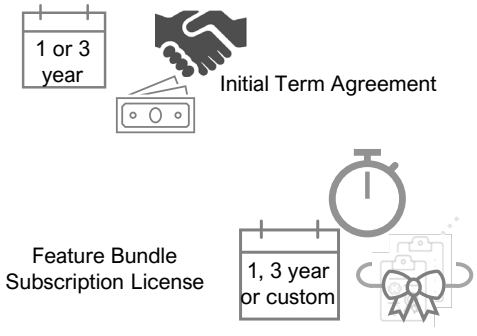
DL Infrastructure



- DL (Domain Locked Licensing) infrastructure required for operations
- Supports device configuration & usage measurements

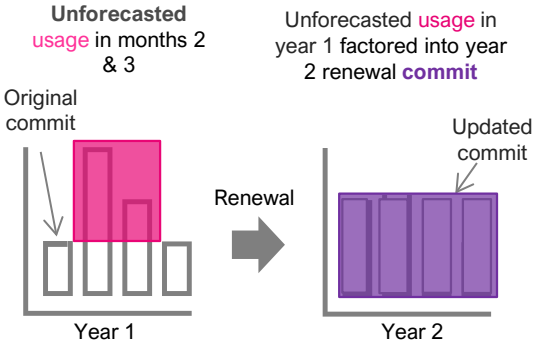
True Forward Subscription Features & Operations

Prepaid Term Commitment



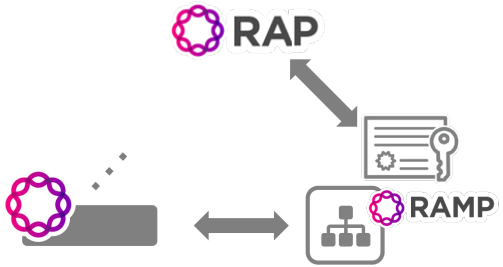
- Customer acknowledges product description & agreement; pays upfront
- Simplified bundled product and maintenance license

True Forward Growth



- No overage $ in most cases → no surprise bill
- Commit adjusted for overage at renewal / annual anniversary
- Commitment adjustment is possible within term (“excess overage”)

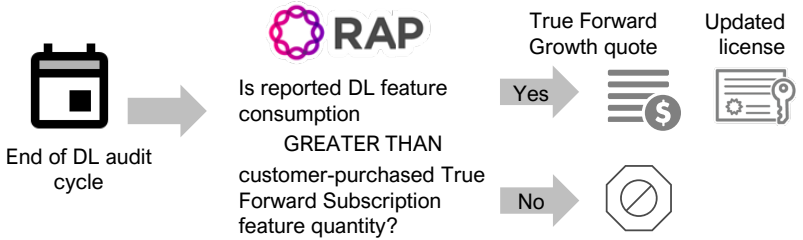
Domain Locked Licensing Infrastructure



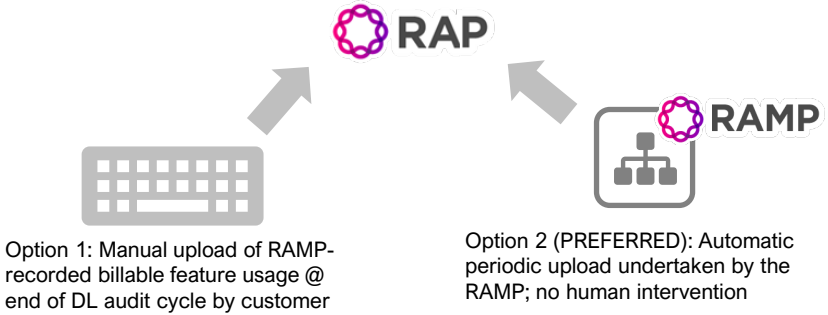
- Domain locked licensing infrastructure required for subscription operations
- Supports subscription configuration & usage measurements

Ribbon Audit Portal (RAP)

- DL reconciliation platform hosted by Ribbon
  - Compares reports from RAMP (manually or automatically fed) with applicable customer purchases and recognizes overages
  - Generates excess use (i.e., True Forward Growth) quote for reconciliation & licenses if applicable
  - RAP will be available for customers to login & review



- Manual or automatic upload for DL auditing
  - Automatic upload is preferred
  - Customer may undertake manual upload, at Ribbon's discretion



License - Obtaining and Installing

ribbon
INSIGHTS

Self-License Notification E-Mail

Ribbon License Available for Generation: SO#1234567 , PO# 444444444 Quote# RB-56789

CS Customer Support
To Example_Partner

Reply | Reply All | Forward

Di 19.03.2024 21:58

NOTE: This email was received from an external source. If there is anything suspicious or unusual about this email please DO NOT open any attachments or click any links and report the email using the Report Message button.

The license(s) for use with your product is/are available to be generated using the Ribbon Self-Service Licensing and Downloads portal.

Order Details:
- Partner: Ribbon Partner Example
- End Customer: Ribbon Example Customer

To generate your license, please click on the following link: https://url.usb.m.mimecastprotect.com/s/IyNMCwn6n1iLI7n9uVF6qp?domain=nam11.safelinks.protection.outlook.com

When prompted, please enter the following Order Number: 1234567

Once generated, the license needs to be installed into your Ribbon product to enable the feature functionality you have purchased.

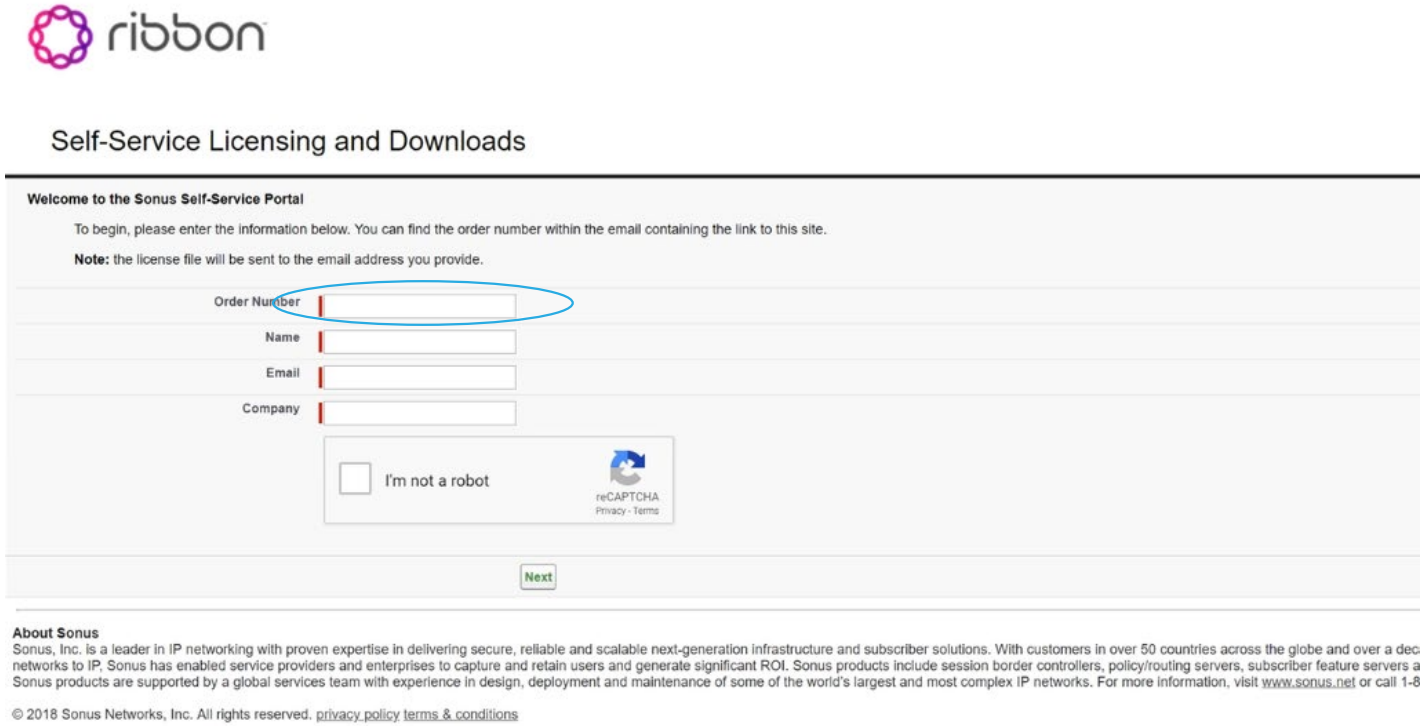
Notes:
- Only one license email is sent per order placed with Ribbon, even if multiple feature licenses have been ordered.
- The link provided above is unique for this order and must be used to download software purchased on this order.
- This email can be forwarded as needed to whomever needs to generate the licenses or download the software for this order.
- Use of these licenses and the Ribbon Communications software is per the current end user license agreement, which can be found at https://url.usb.m.mimecastprotect.com/s/r_WECxoWogfJEyjwCvApNK?domain=nam11.safelinks.protection.outlook.com.
- If you purchased Network Wide Licenses for the SBC or PSX, a description of these licenses can be found at https://url.usb.m.mimecastprotect.com/s/KBq_CypWpjCNOg3kcQFrJ2?domain=nam11.safelinks.protection.outlook.com.

If you need any assistance, please contact Ribbon TAC (portalhelp@rbbn.com) or visit the Ribbon Website, https://url.usb.m.mimecastprotect.com/s/5kbRCzqgqkiRW3z9UKw25U?domain=nam11.safelinks.protection.outlook.com.

Thank you,
Ribbon Global Technical Services Team

Notice: This e-mail together with any attachments may contain information of Ribbon Communications Inc. that is confidential and/or proprietary for the sole use of the intended recipient. Any review, disclosure, reliance or distribution by others or forwarding without express permission is strictly prohibited. If you are not the intended recipient, please notify the sender immediately and then delete all copies, including any attachments.

Self-License Portal Login



License Generation - General

Self-Service Licensing and Downloads

Please enter the Hardware ID and/or Serial Number for each system configuration for which you are generating a license.

For information on finding your hardware ID, click here.

Please note: SBC SWe uses the VMWare UUID for the Hardware ID only.

UUID #1

Line Number	Item	Item Description	Quantity Ordered	Quantity Remaining	Quantity to License
1.1.2	SBC-SWELITE-LIC25SP	25 SBC SWE LITE SIP SIGNALING AND MEDIA SESSIONS, INCLUDING ENCRYPTION AND TRANSCODING	1	1	1

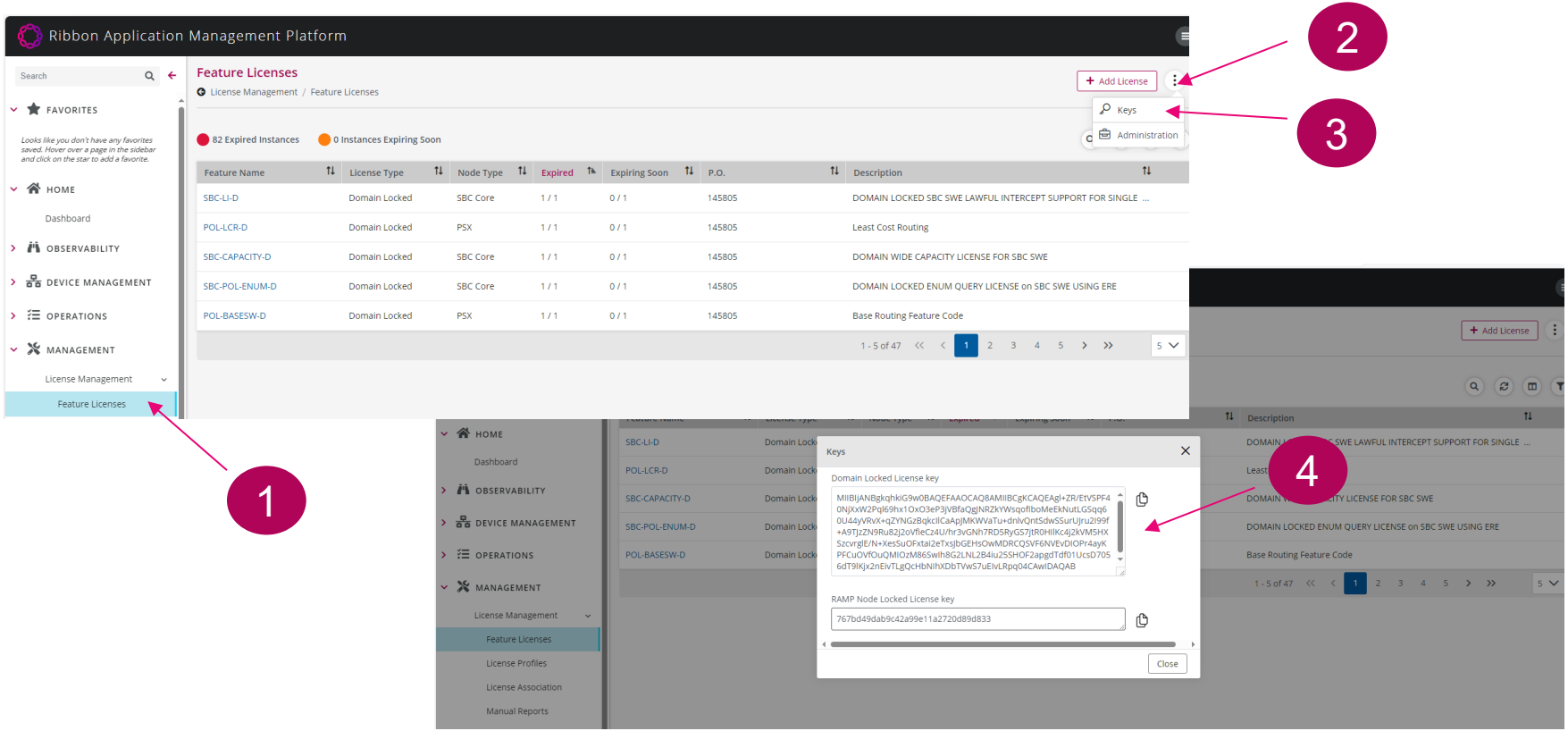
Prev Generate

About Sonus

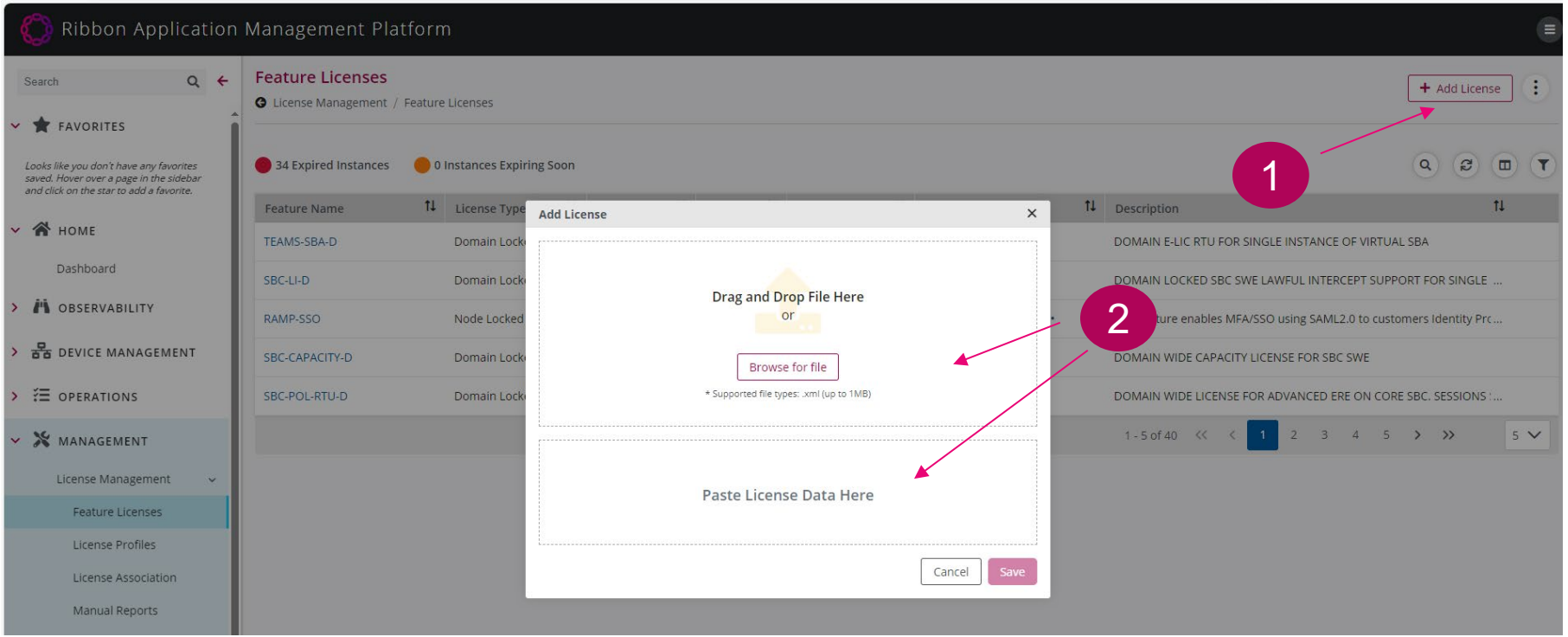
Sonus, Inc. is a leader in IP networking with proven expertise in delivering secure, reliable and scalable next-generation infrastructure and subscriber solutions. With customers in over 50 countries across the globe and over a decade of experience in transforming networks to IP, Sonus has enabled service providers and enterprises to capture and retain users and generate significant ROI. Sonus products include session border controllers, policy/routing servers, subscriber feature servers and media and signaling gateways. Sonus products are supported by a global services team with experience in design, deployment and maintenance of some of the world's largest and most complex IP networks. For more information, visit www.sonus.net or call 1-855-GO-SONUS.

© 2014 Sonus Networks, Inc. All rights reserved. privacy policy terms & conditions

NWDL Licenses on RAMP



Adding Licenses to RAMP



Summary

ribbon INSIGHTS

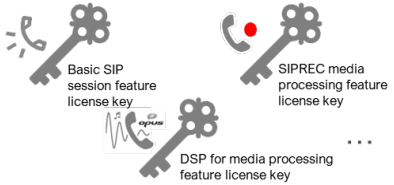
Summary SBC1000 and SBC2000

- SBC 1000 and SBC 2000 standard configuration licensing includes:
  - TDM licenses
  - SIP Session licensing, including considerations for DSP services
  - Feature licensing

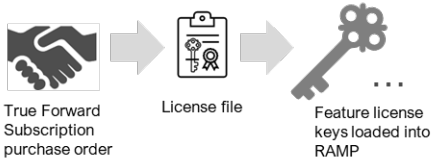
- SBC 1000 gateway configurations includes the same licenses as the standard configurations; however, an additional top-up license is required for select features

- SB 1000 and SBC 2000 NWDL Configuration includes:
  - TDM Licenses
  - SIP Session Licensing
  - Feature Licensing **(Limited to: Sessions, Transcoding, AMR Wideband, Sip Registrants)**

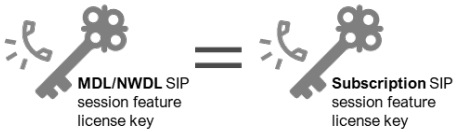
Summary of DL and True Forward



- **Feature license keys** are billable product services
  - Feature license keys maps 1:1 to a unit of billable service on True Forward Subscription supporting products
  - List of available feature license keys in product technical docs (PSX, SBC)



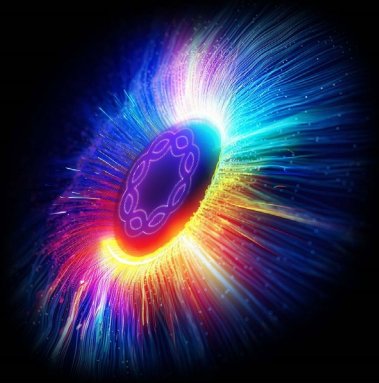
- True Forward Subscription SKUs bundle multiple products feature license keys together
  - Customers order desired SKUs; may be multiple keys and units of keys per SKU
  - Resulting license file includes feature license keys "contained" in ordered SKUs
  - License is loaded into the RAMP
    - Feature license keys are "pushed" southbound to activate behavior
    - SBC/PSX sends northbound consumed billable service units i.e., consumed feature license keys



- Common feature license keys used for Domain Locked Licensing-based offers (MDL, NWDL, True Forward Subscription)
  - Feature license key "privileges" determined by purchased offer
  - True Forward Subscription offer provides greater flexibility (eg. Public Cloud support, etc.) than other offers

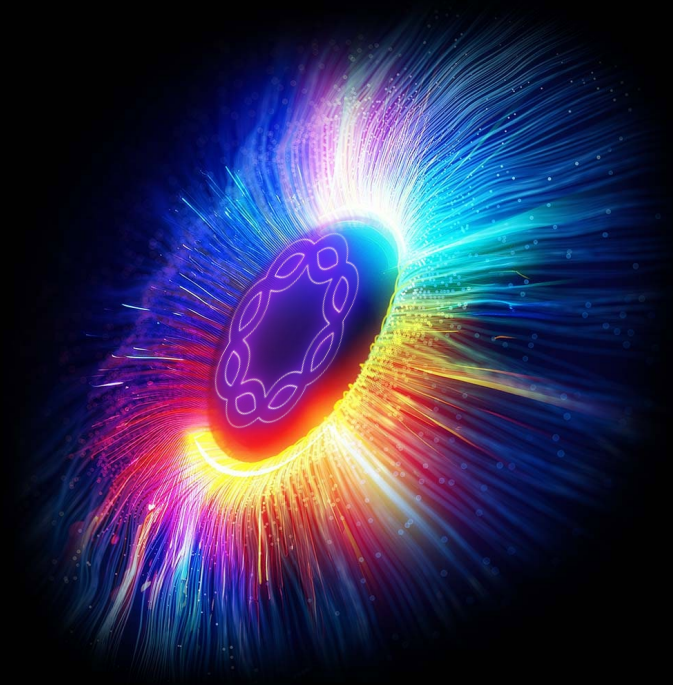
ribbon

INSIGHTS



ribbon

INSIGHTS



Container Technology Market Ready

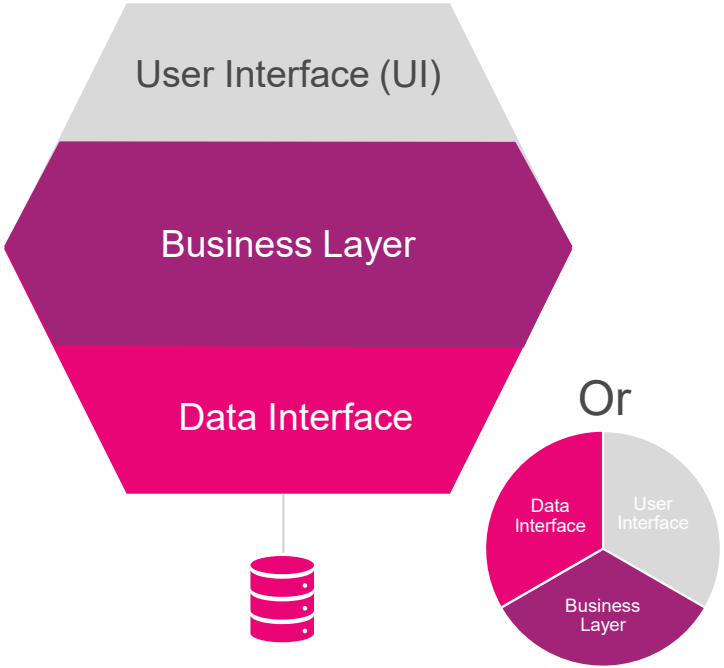
Paul Clough

Chief Architect

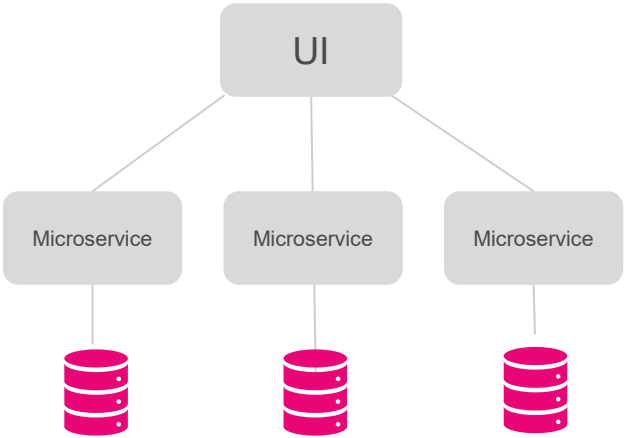
ribbon INSIGHTS

Architecture Evolution

Monolithic Architecture



Microservices Architecture



Defacto Industry Standard Practice

Provides unprecedented automation, with application flexibility, efficiency and resiliency.

Architecture Aligned to Cloud Native Practices

Applications re-architected to benefit from Cloud Native infrastructure.

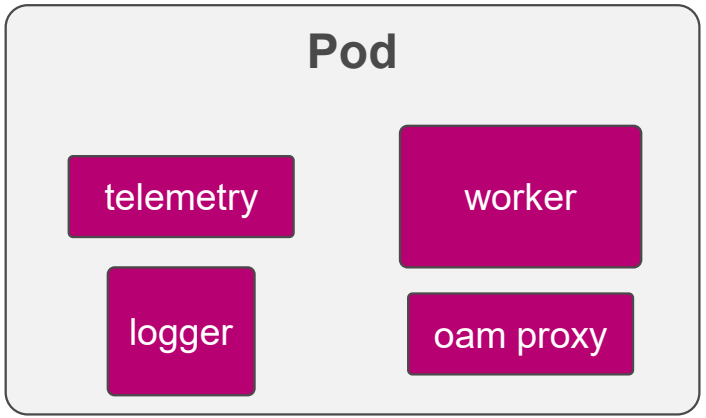
Delivers more efficient solutions portable across private and public cloud.

- Independent microservices
- Logic separate from state
- Efficient redundancy scheme
- Leverages Kubernetes services
- Observability framework
- Elastic scalability

Cloud Native Terminology

Containers are the simplest building block of the solution

Containers are grouped in Pods to provide a specific service

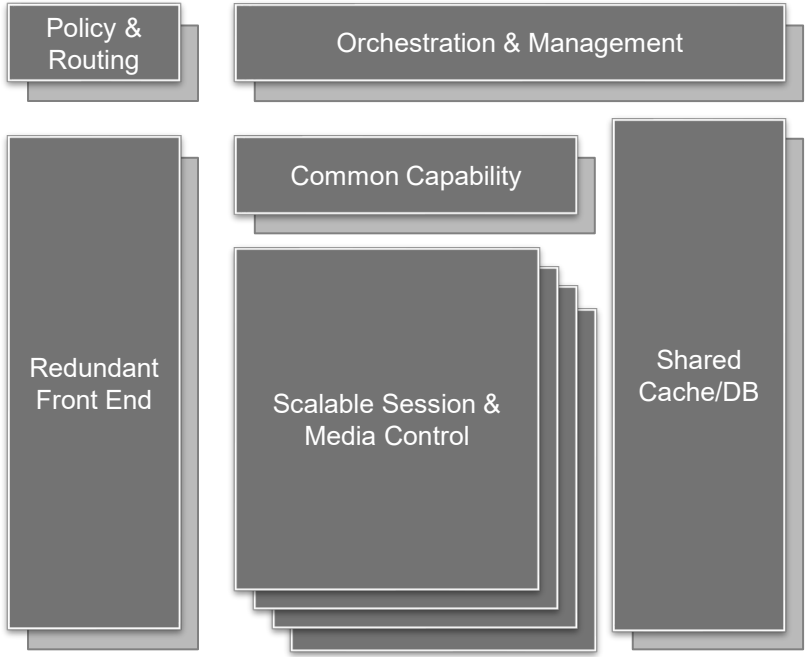


Ribbon SBC CNe Functions

Integrated function that centralises policy and routing control across a network of SBCs

External access (in and out), providing intelligent distribution of incoming requests across SBC components

Dynamically scalable, n:k redundant signalling and media control and handling

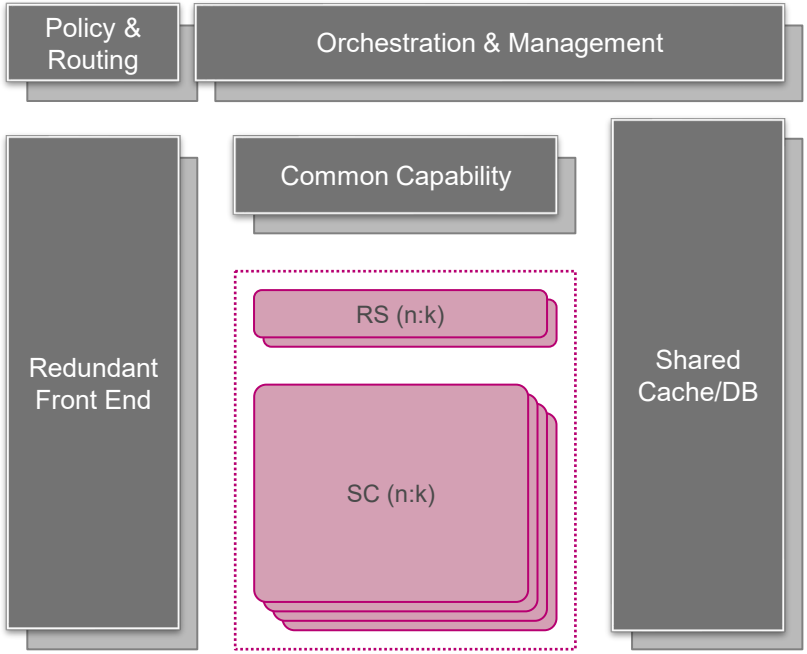


Supervises failover and autoscaling across the SBC components and provides management APIs to external systems

Aggregate common functions across all SBC components (reachability, admission control, etc.)

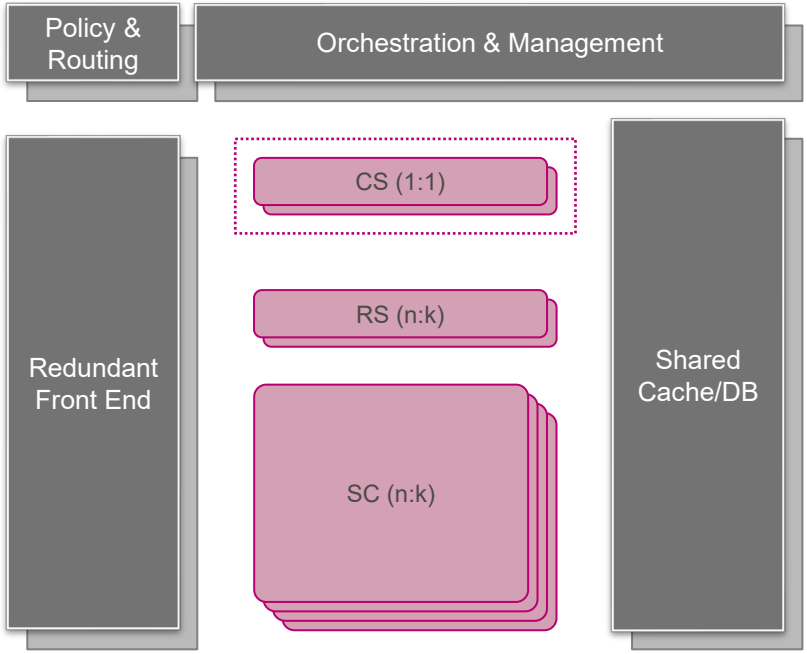
Common store for call state information that allows data to be accessed by a new component taking over from a failing one

Ribbon SBC CNe Session & Media Control Microservices



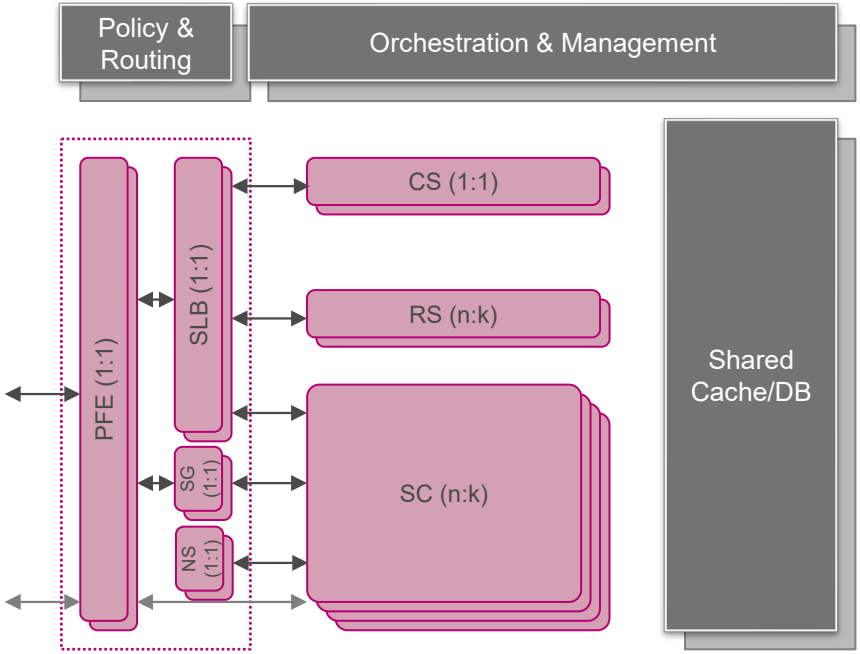
- **Session Control (SC)** Pod is the main SIP and media processing engine
  - Auto scale based on current load of existing instances.
  - Thresholds for scale out and scale in can be defined in the SC Pod manifest files.
  - The SC Pod that takes over from a failed Pod retrieves the relevant call state from an external Redis-DB Cache.
- **Register/Relay (RS)** Pod handles SIP Registration and other SIP Out of Dialog requests
  - For completed Registration sessions, it stores registration data in the Redis-DB Cache.
  - RS Pod receives REGISTER and other Out of dialog requests (SUBSCRIBE, OPTIONS, PUBLISH, MESSAGE) from the SLB.

Ribbon SBC CNe Common Capability Microservices



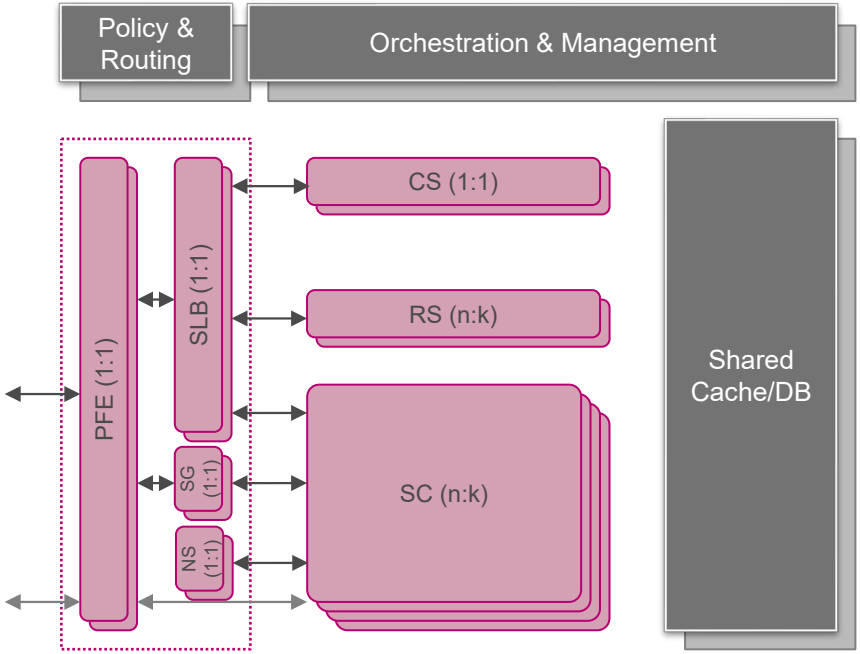
- **Common Service (CS)** Pod handles functions that require centralized processing
  - Includes address reachability tracking, path checking, and call admission control.
  - CS handles any necessary aggregation and shares the aggregated view with all other relevant Pods in the cluster.
  - The CAC container implements admission control for the whole CNe.
  - Each SC Pod queries the CAC service for call admission purposes.
  - This ensures correct overall admission control both in terms of call counts and call rates.

Ribbon SBC CNe Redundant Front End Microservices



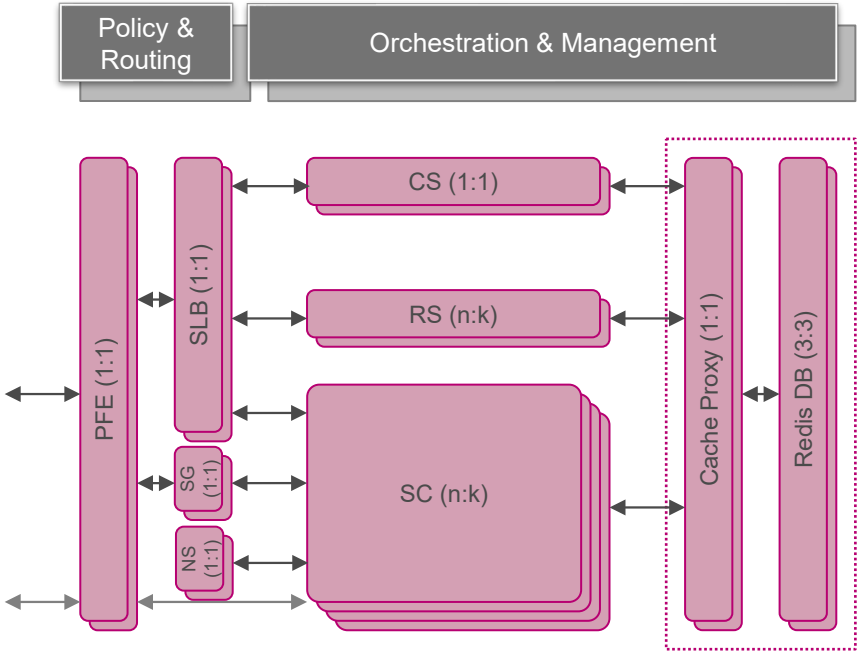
- **Packet Front End (PFE)** Pod is responsible for handling the external signalling and media traffic
  - All external communication through any protocol (SIP, DNS, Diameter, X2) happens through PFE.
  - PFE will forward incoming signalling packets to SLB/SG Pods and media packets to SC Pods.
  - Only PFE and SLB have external (public) IP addresses
  - SG and SC Pods do not expose external (public) IP addresses.
  - PFE is not required in the cases where different IP are used for signalling and media.
- **Network Services (NS)** Pod manages the floating public IP Address pool of an SC Pod used for external communication

Ribbon SBC CNe Redundant Front End Microservices



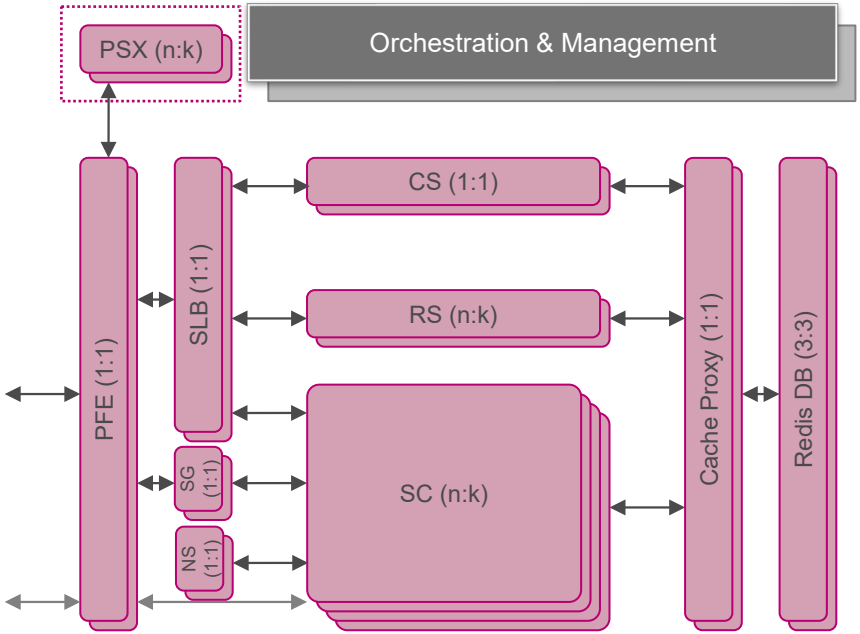
- **SIP Load Balancer (SLB)** Pod acts as the single entry/exit point for all SIP Signalling to the SBC CNe
  - SLB route Calls (INVITEs) to SC Pods and Out of dialog requests (REGISTER, OPTIONS, SUBSCRIBE etc) to RS Pod.
  - SLB implements load balancing of received SIP requests to the SC and RS Pods based on their reported metrics.
- **Signalling Gateway (SG)** Pod is the gateway for all communication with external entities
  - DNS, Diameter, Diameter+ (SBC to PSX), X2 (for LI)
  - The DNS queries from SC Pod, the PSX query from SC Pod etc. goes through SG Pod.

Ribbon SBC CNe Shared Cache/DB Microservices



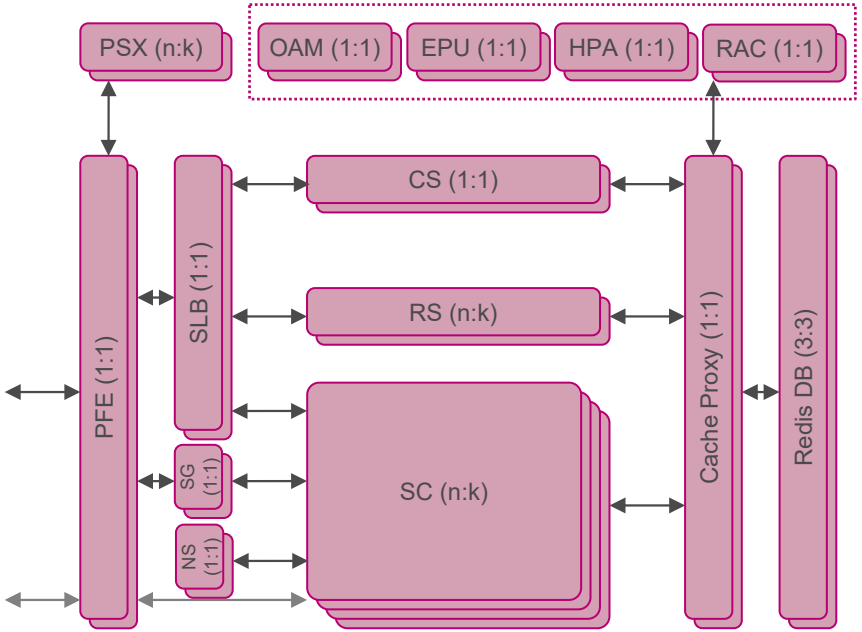
- **Redis-DB Cache** Pod is used to store session and state data
  - All Pods which need to store any state/data use Redis-SB.
  - Includes call state, registration data and any other state information.
  - A standby Pod taking over responsibility of a failed Pod retrieves relevant state from the DB Cache.
- **Cache-Proxy** Pod is the proxy for all Pods which use Redis-DB Cache
  - Contains rbbn-cache-proxy and rbbn-telemetry-agent containers.
  - Uses eth0 interface for communication with other pods.

Ribbon SBC CNe Policy & Routing Microservices



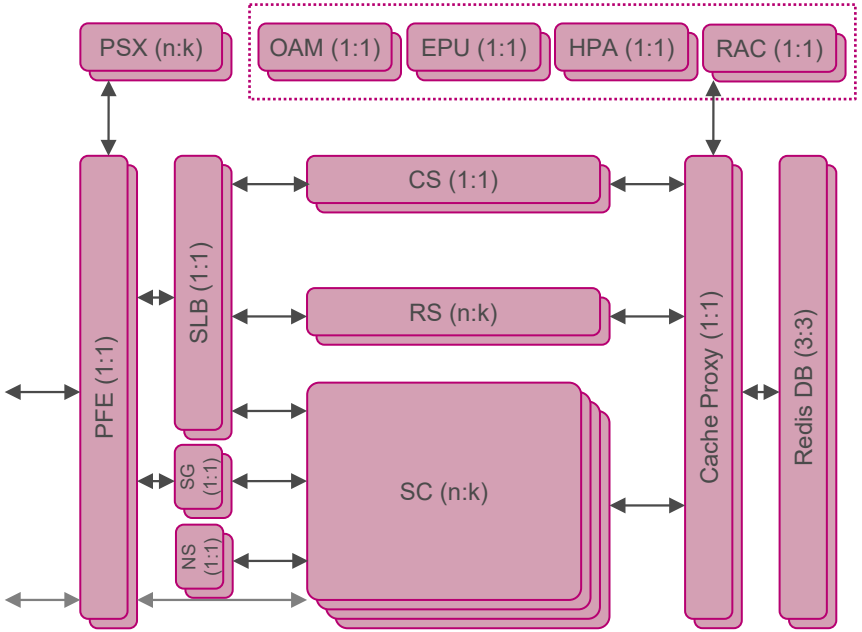
- **Policy & Routing (PSX)** function provides a centrally managed, distributed database
  - Provides policy and routing functions as part of the SBC microservices architecture
  - Implements active-active resiliency via Primary and Replica servers, with transaction independence and consistency.
  - Primary servers are deployed in a cluster as a common database for the network.
  - Replica servers are synchronised with the Primary cluster and provide real time call processing responses deployed in a N:k load shared mode.
  - Tightly integrated with the SBC CNe under the same element management system

Ribbon SBC CNe Orchestration & Management Microservices



- **Role Assignment Controller (RAC)** Pod determines the roles to each of the Pods
  - RAC also assigns the role to the all Pods.
  - Assigned roles are "Active" or "Inactive".
  - Performs takeover actions when it detects a failed Pod.
- **Horizontal Pod Autoscaler (HPA)** Pod handles scale-out and scale-in
  - Aggregates the metrics reported by each Pod and assesses against configured thresholds.
  - The solution must dynamically scale-in and scale-out the elements against these thresholds.
  - Ensures the N:k ratio of (N Active and k Standby) of SC and RS Pods is maintained.

Ribbon SBC CNe Orchestration & Management Microservices



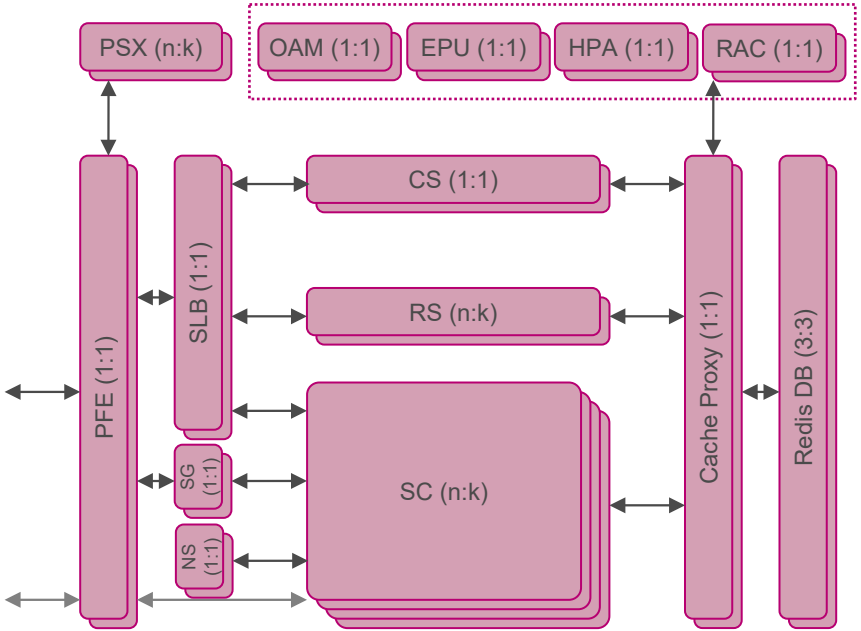
- **Operations and Management (OAM)** Pod is the single point configuration
  - Exposes a REST API and CLI through which configuration can be provided and queried.
  - OAM distributes configuration information to relevant Pod instances.
  - Interfaces with RAMP for statistics, alarms, traps, licensing and CDRs.
- **End Point Updater (EPU)** Pod is required if the default (eth0) interface for inter-pod communication is not required.
  - EPU service monitors the inter-pod communication of all pods launched as part of SBC CNe and updates the associated Kubernetes endpoints.

Ribbon SBC CNe Functions

Integrated function that centralises policy and routing control across a network of SBCs

External access (in and out), providing intelligent distribution of incoming requests across SBC components

Dynamically scalable, n:k redundant signalling and media control and handling



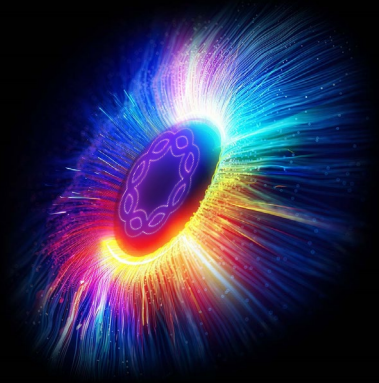
Supervises failover and autoscaling across the SBC components and provides management APIs to external systems

Aggregate common functions across all SBC components (reachability, admission control, etc.)

Common store for call state information that allows data to be accessed by a new component taking over from a failing one

ribbon

INSIGHTS



Learning Enabled Automation Platform

LEAP

ribbon INSIGHTS

Competing resource demands

Slower rollout of new features

The Challenging Realities of Software Deployment

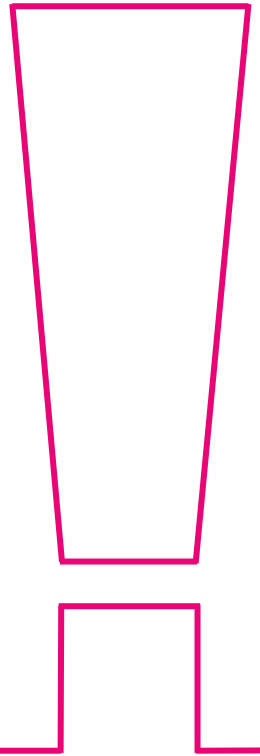
Manual, time consuming, and limited testing

Security vulnerabilities

Why are software upgrades critical?

Software Upgrades Enable New Features and Enhance Security

Staying current with the latest software release is critical. Software upgrades unlock new features, optimize performance, address known issues, and safeguard against security vulnerabilities.

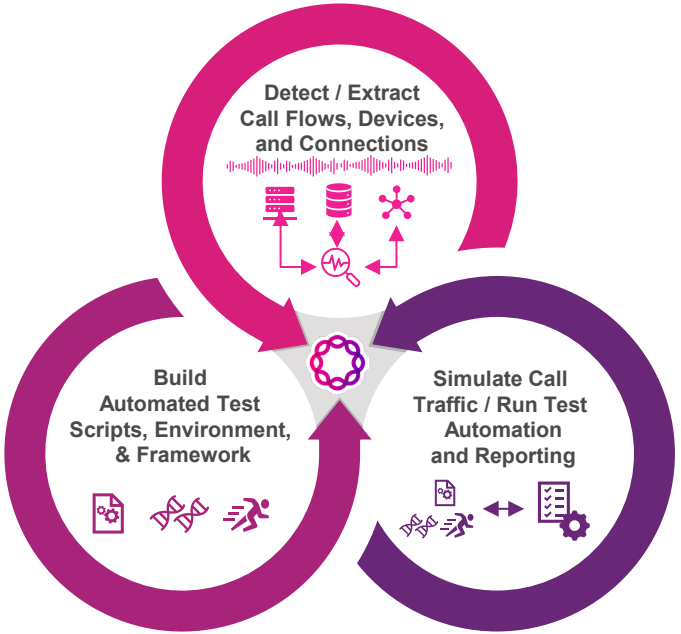


- **Security**
- **New Features / Enhancements**
- **Improved Performance**
- **Fix Known Software Issues**
- **Support / Compliance**

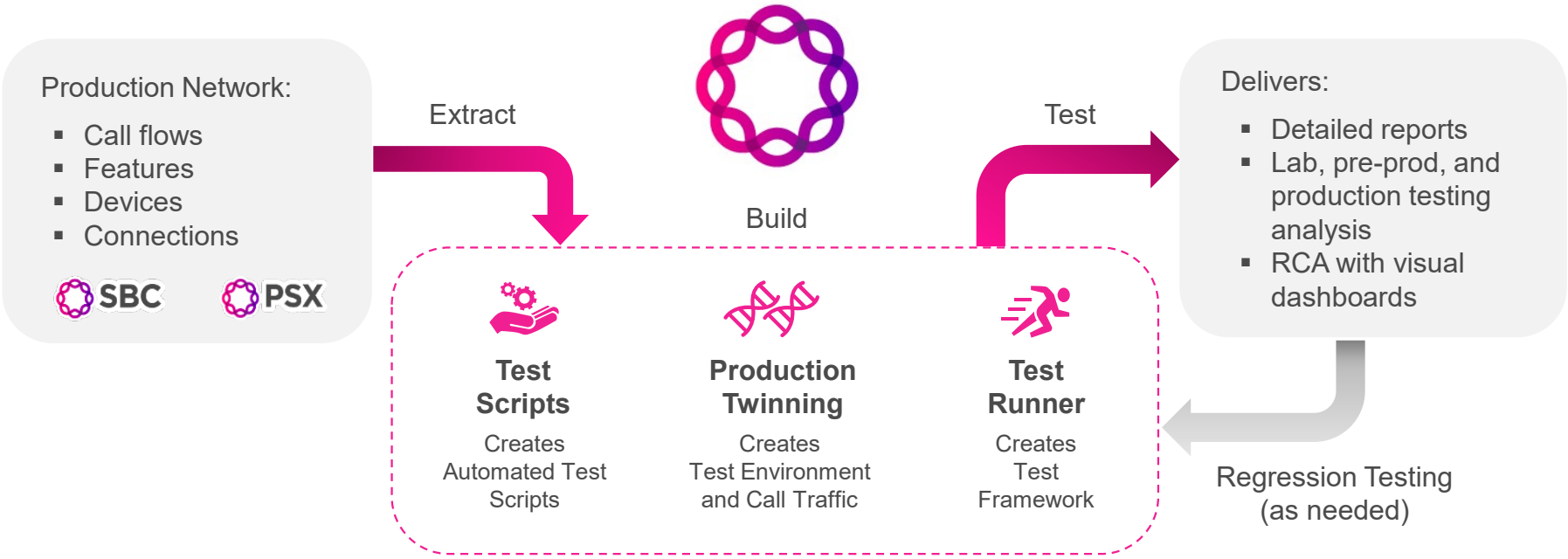
What is LEAP?

LEAP Automates Testing and Enables Faster Software Upgrades

Speed up testing cycles and automate testing processes with Ribbon LEAP. LEAP's powerful automation simplifies and streamlines the entire software upgrade process.



LEAP Automation Elevates and Improves Test Coverage



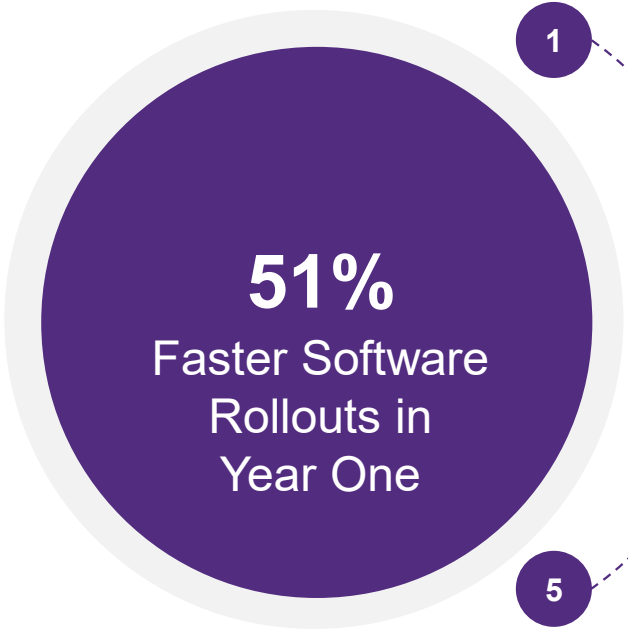
What savings can LEAP deliver?

1. **Reduce Resources, Effort, Testing Tools**
   Eliminate months of resource-intensive, manual testing
2. **Faster Issue Detection and Resolution**
   Reduce time spent identifying and resolving software issues
3. **Reduced Software Upgrade Time**
   Get access to the newest features faster
4. **Reduced Risk of Downtime**
   Safeguard networks from downtime / security vulnerabilities
5. **Minimized Software / Upgrade Assurance Costs**
   Reduce software upgrade / support costs with active maintenance

What savings can LEAP deliver?

1. **Reduce Resources, Effort, Testing Tools**
   Eliminate months of resource-intensive, manual testing
2. **Faster Issue Detection and Resolution**
   Reduce time spent identifying and resolving software issues
3. **Reduced Software Upgrade Time**
   Get access to the newest features faster
4. **Reduced Risk of Downtime**
   Safeguard networks from downtime / security vulnerabilities
5. **Minimized Software / Upgrade Assurance Costs**
   Reduce software upgrade / support costs with active maintenance

What savings can LEAP deliver?



1. **Reduce Resources, Effort, Testing Tools**
   Eliminate months of resource-intensive, manual testing
2. **Faster Issue Detection and Resolution**
   Reduce time spent identifying and resolving software issues
3. **Reduced Software Upgrade Time**
   Get access to the newest features faster
4. **Reduced Risk of Downtime**
   Safeguard networks from downtime / security vulnerabilities
5. **Minimized Software / Upgrade Assurance Costs**
   Reduce software upgrade / support costs with active maintenance

What are the Benefits of LEAP Test Automation?

Save costs, time, and resources, while ensuring security and network compatibility with LEAP's AI / automated delivery, testing, configuration, and management.

- Faster, more efficient software upgrades
- Reduces security vulnerabilities
- AI / Automation reduces strain on resources
- Automated test scripts generation and execution
- Enhanced defect avoidances
- Reduces manual efforts and risk
- Huge operational savings and ROI
- Fewer errors and proactive detection of network issues

Experience better business outcomes!

9x
Faster Software Rollouts

Automated Testing for Faster Upgrades

58%
Savings in Year One

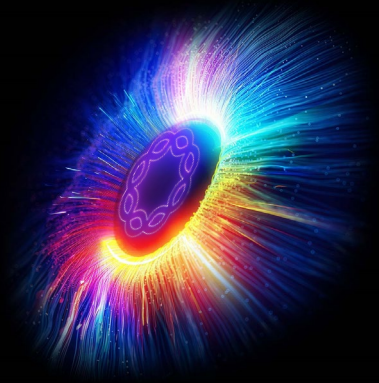
Eliminates Resource-Intensive, Manual Testing

51%
Improvement in Test Coverage

Test Coverage for All Call Flows, Devices, and Connections

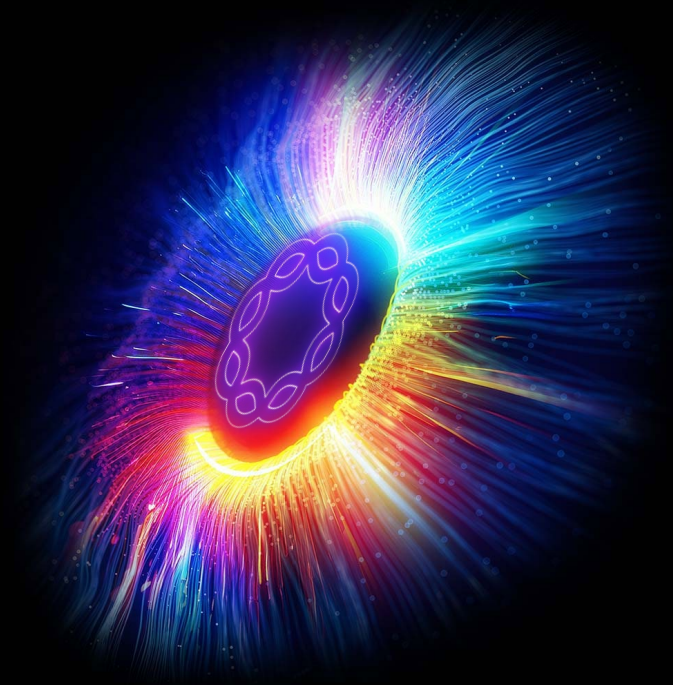
ribbon

INSIGHTS



ribbon

INSIGHTS



Coherent Optical Transmission in Ribbon's Intelligent Middle Mile

Jonathan Homa

Director IP Optical Solutions Marketing

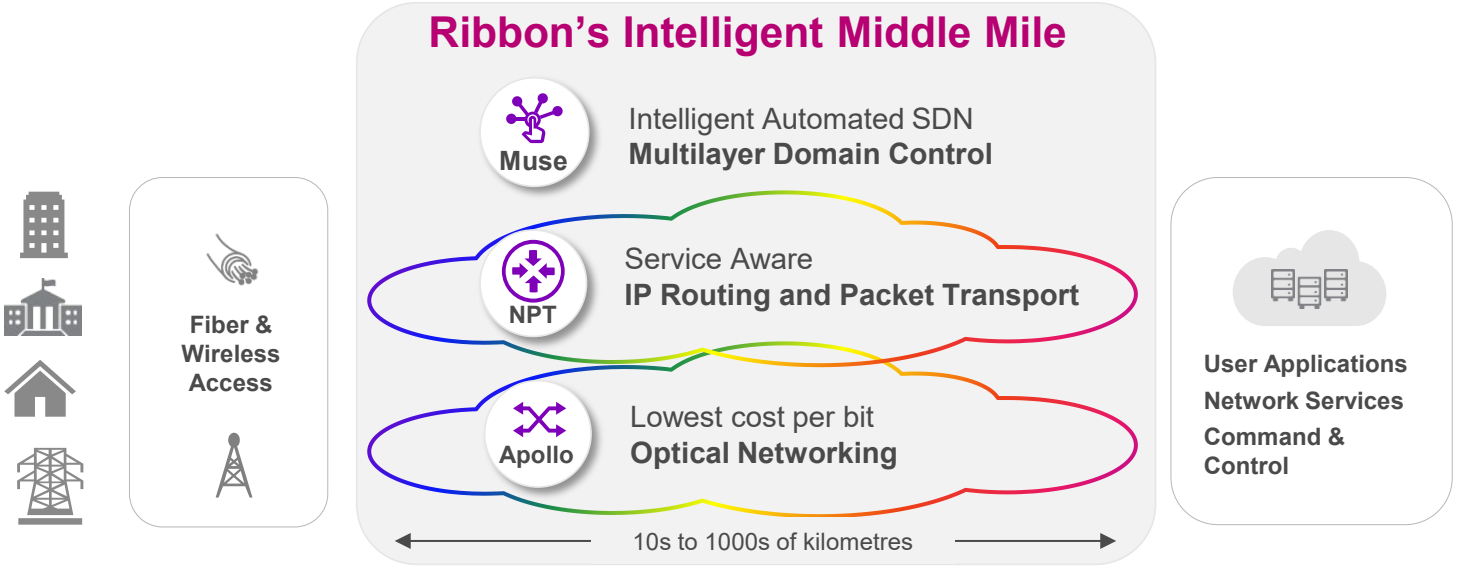
Fiber Optic Transmission

How **many times** can light circle the earth on a fiber optic cable in one second?

A. 1/2
B. 2
C. 5
D. 7
E. 10

ribbon INSIGHTS

Application to Ribbon's Intelligent Middle Mile



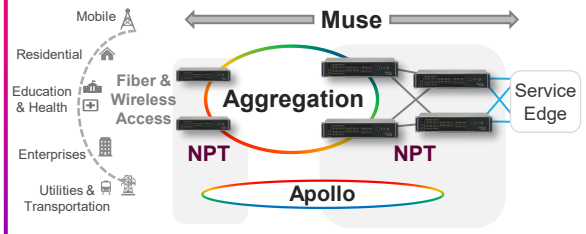
Service Aware
Forecast Tolerant
Intent Driven

OPTIMIZES

Revenues
Capex
TCO

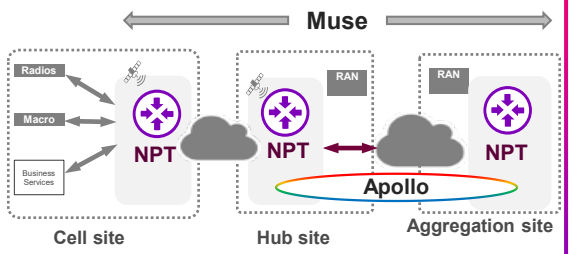
Ribbon – The Middle Mile Experts

Broadband Backhaul & Networking



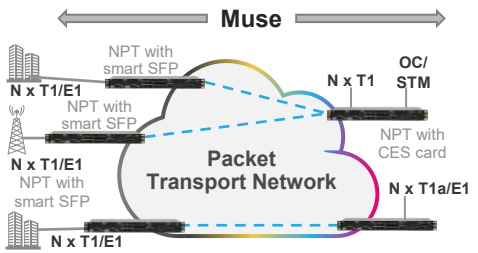
ISPs, Optical backbones, NRENs

5G xHaul



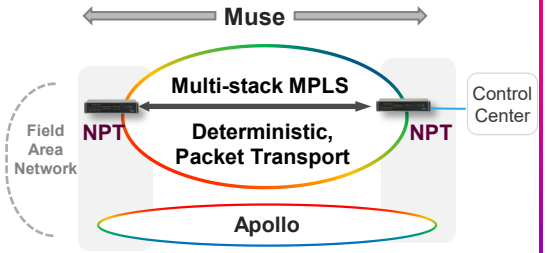
Mobile Operators, Backhaul Wholesalers

TDM to IP Migration



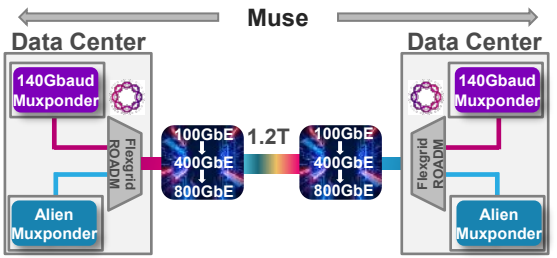
All Service Providers and Network Operators

Critical Infrastructure



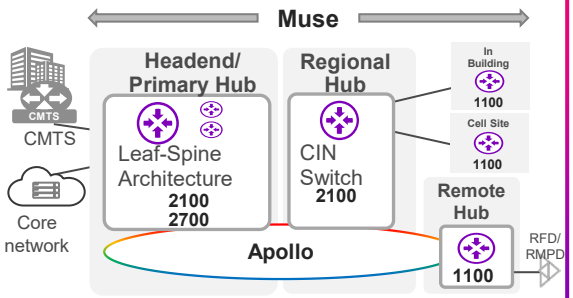
Defense, Utilities, Transportation

High-Capacity Interconnect



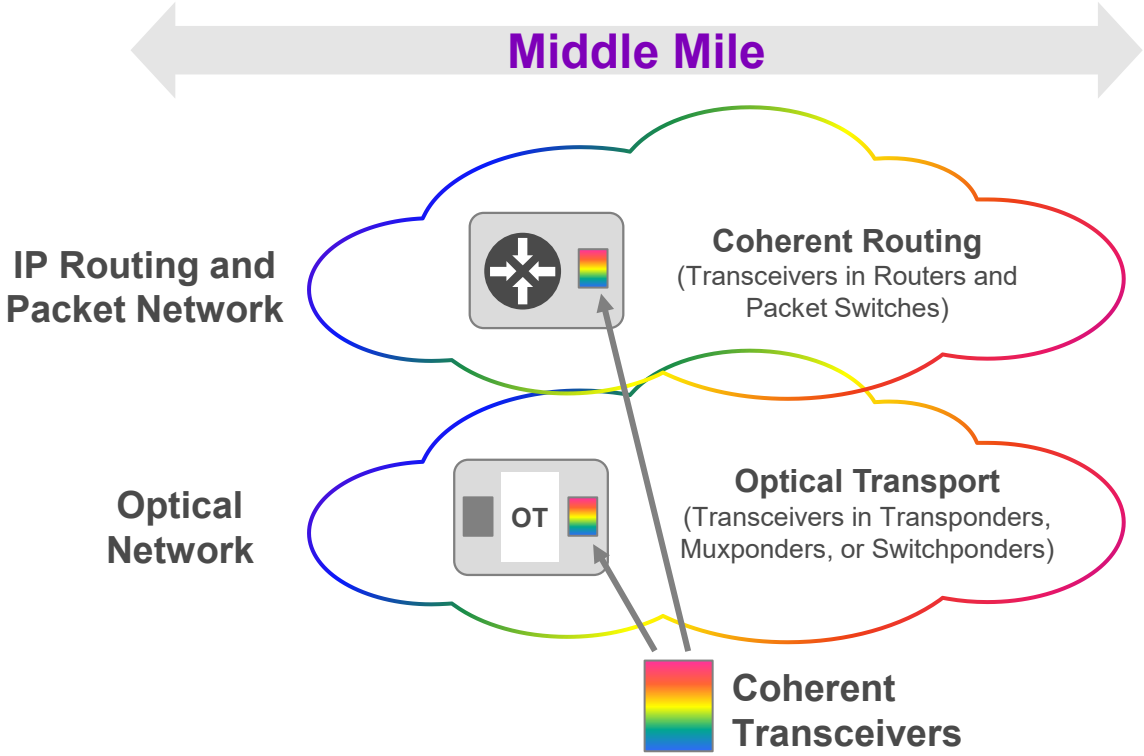
Data Center Interconnect, Submarine

Converged Interconnect Network



Cable Companies

Where Coherent Transceivers Go



Coherent Transceiver Optimizations

Capacity-Reach Optimized

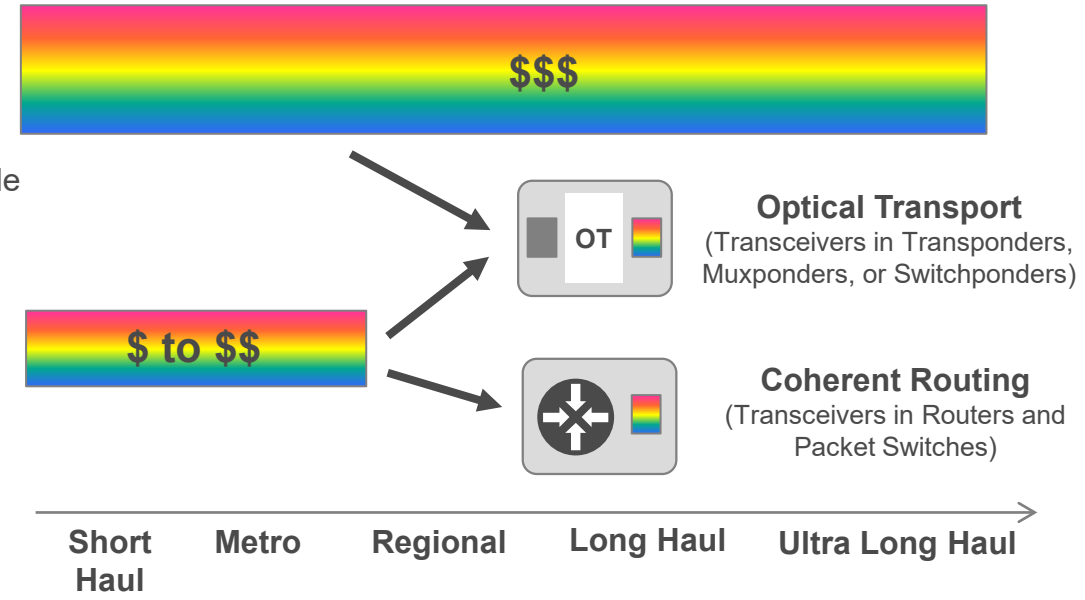
CIM 8

- Modules and large pluggables
- 400G to 1.2T
- Future 2.4T
- 80W to 120W
- OTN
- Proprietary (interoperable capable)

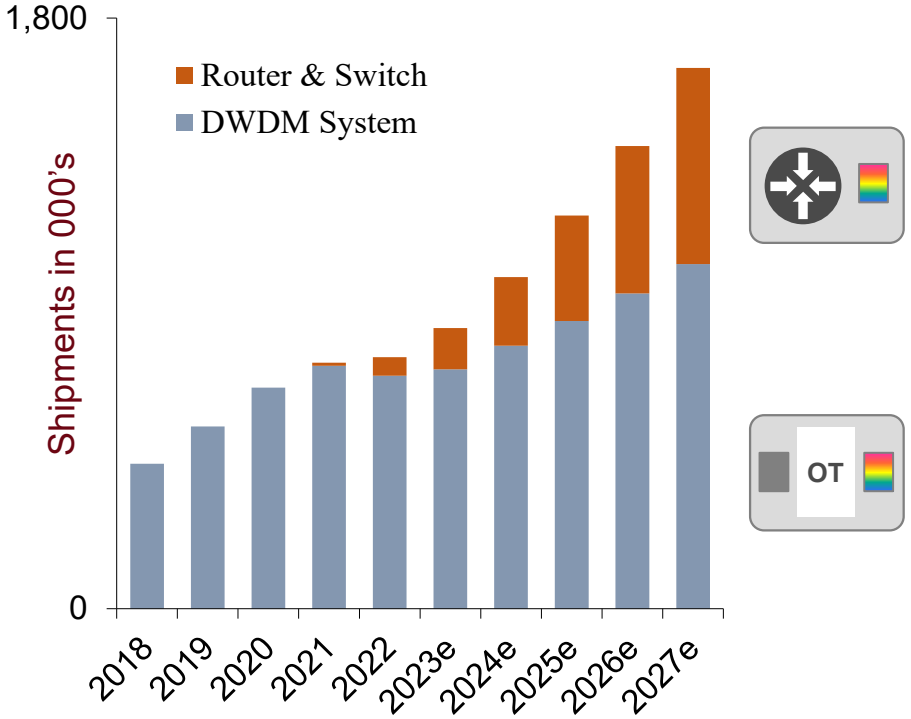
Power-Cost Optimized

QSFP-DD CFP2 DCO

- Small pluggables
- 100G, 400G
- Near future 800G
- 6W to 25W
- OIF, Open ZR+, OpenROADM (OTN)



Coherent Optics Market

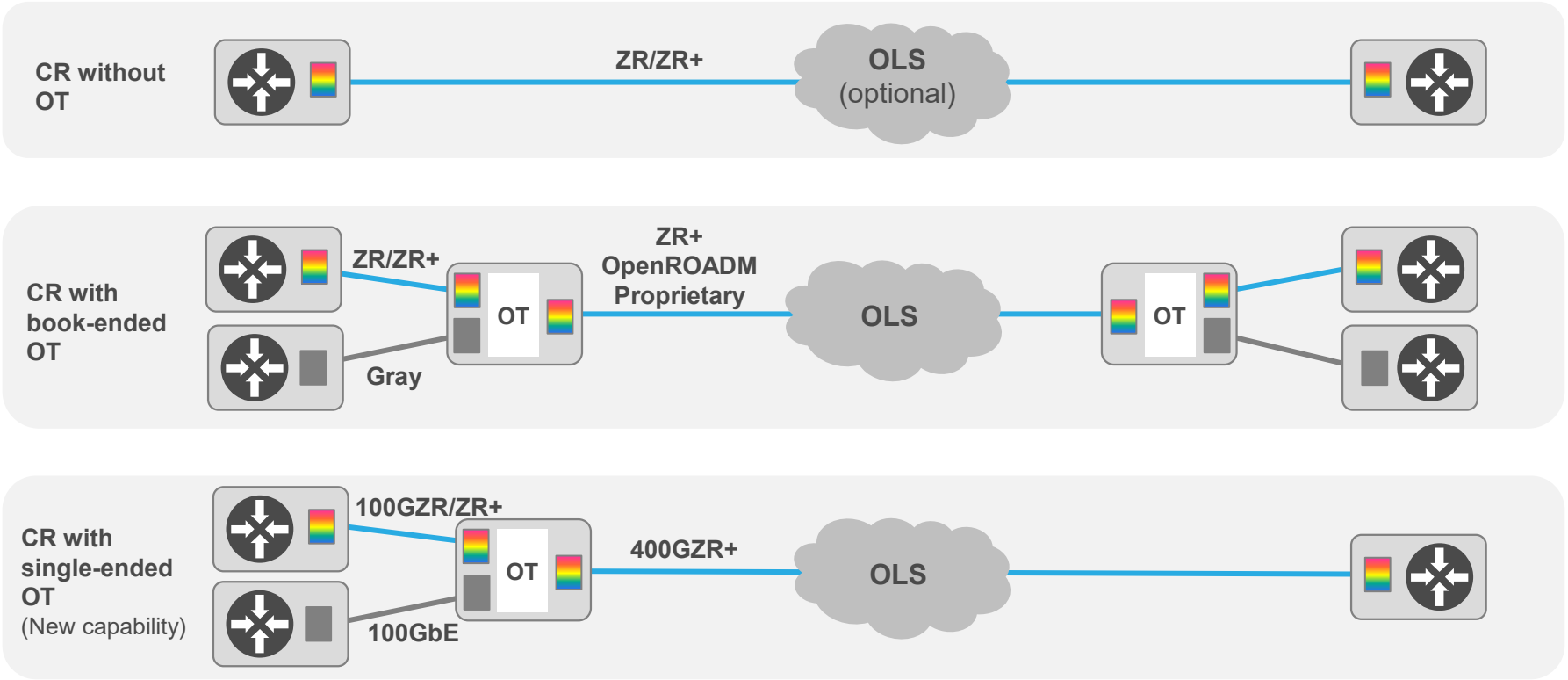


Coherent Routing
(Transceivers in Routers and Packet Switches)

Optical Transport
(Transceivers in Transponders, Muxponders, or Switchponders)

©2024 Dell'Oro Group. All Rights Reserved.

Coherent Routing (CR) with Optical Transport (OT) Configurations



Reasons to Consider Optical Transport versus IPoDWDM

Coherent Routing (IPoDWDM)

Most appropriate for point-to-point links and simpler networks where it has lower cost and complexity.

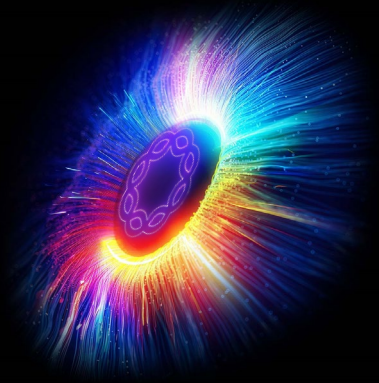
Optical Transport (muxponders)

- Optical **aggregation** of multiple high-speed ports onto a single wavelength, with full throughput and zero latency
- Substantial **OAM** over the optical path, which is particularly important when the path traverses multiple ROADM nodes

Each network must be considered in its **totality** to determine the **optimal** economics, performance, and functionality

Ribbon Products

ribbon
INSIGHTS



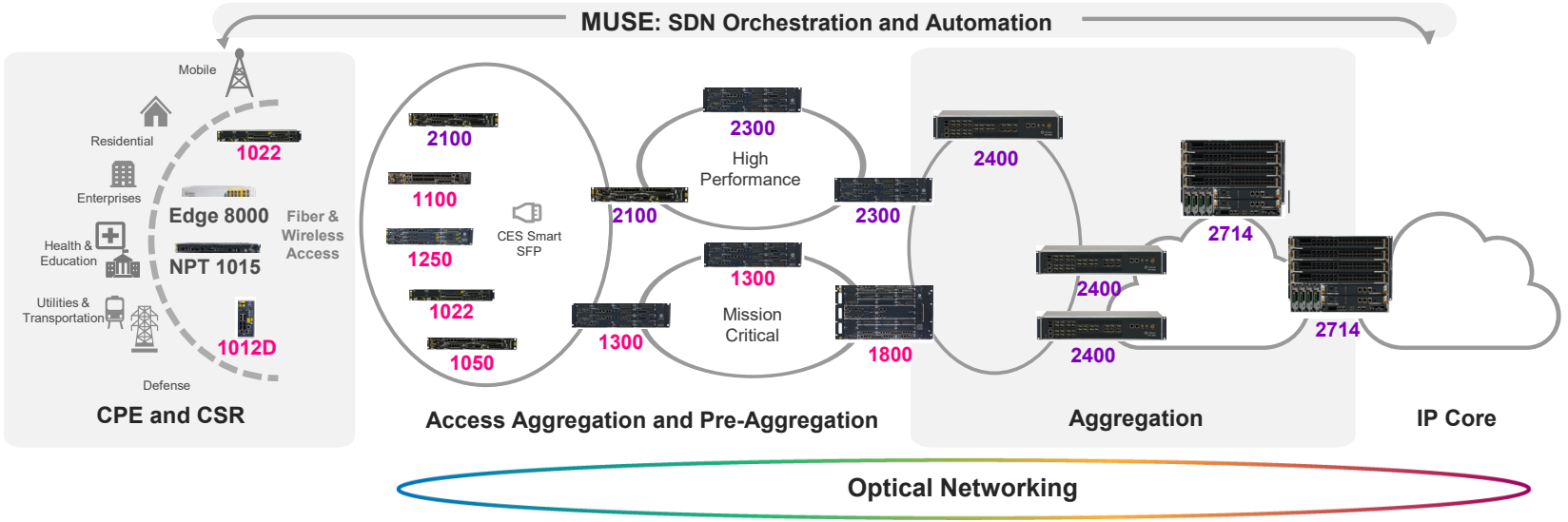
NPT Use of Power-Cost Optimized Coherent Transceivers

NPT **XDR** Family
High-Performance Routers

Supports 400G ZR/ZR+ using QSFP-DD

NPT **AR** Family
High Availability Routers

Supports 100G ZR/ZR+ using QSFP28

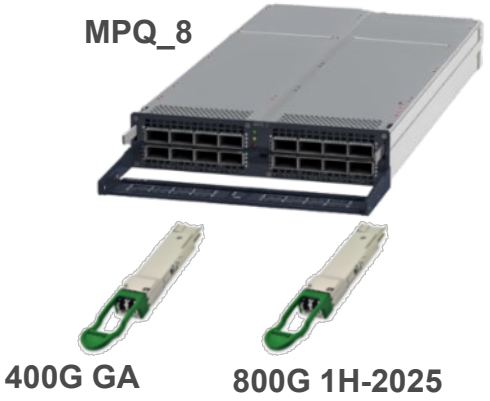


Apollo Options for 100GbE and 400GbE Transport

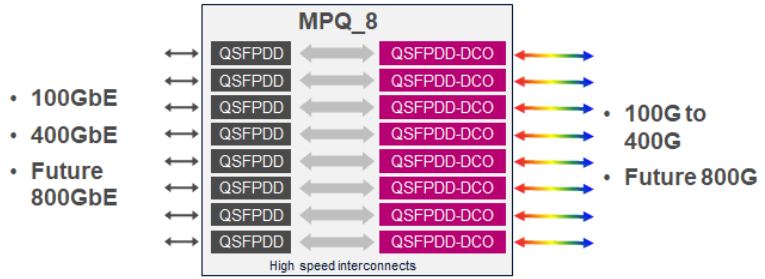
	Apollo 9408 High Density Applications	Apollo 9600 Series Modular Applications
	 Data Center 600mm deep F2B airflow	 Telco 300mm deep R2L airflow (9608D F2B airflow)
Capacity-Reach (Performance) Optimized	 MPJ1200_2 with 2 x CIM8 5nm-140Gbaud to 1.2T	TM800_2 with 2 x CIM8 5nm-140Gbaud to 800G
Power-Cost Optimized	MPQ_8 with 8 x QSFP-DD FPQ_2 for LR4 support 0dBM 400G Metro upgradeable to 800G	TM400_2 with 2 x CFP2-DCO • 0dBM 400G Metro • 0dbM 400G LH

Industry-Best 400G/800G Power-Space-Cost Optimized Ethernet DCI

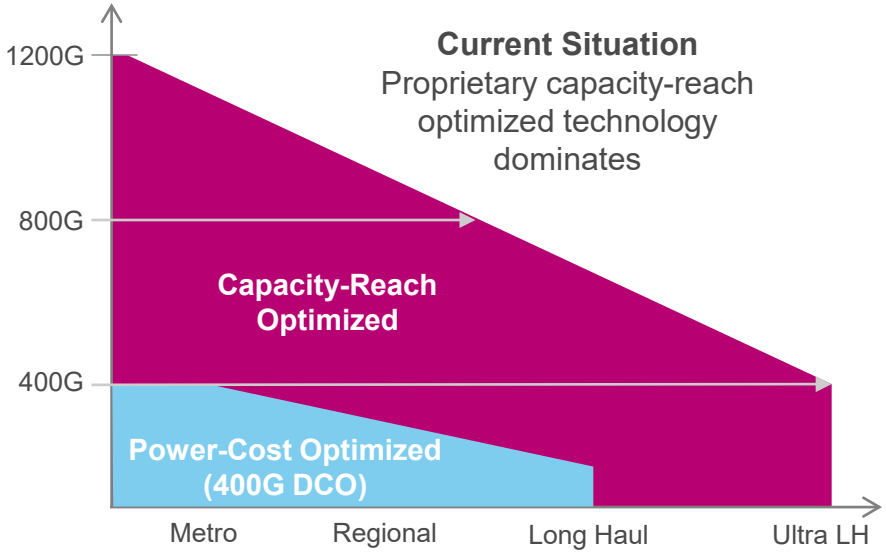
- **Unique Investment Protection:** 400G now with upgradability to 800G on the same blade
- Highest 2RU density:
  - 400G 12.8T
  - 800G 25.6T
- Lowest power consumption
  - 400G 0.09W/G
  - 800G 0.07W/G
- Can combine with pluggable QSFP amps, OLP and OTDR to dramatically lower TCO

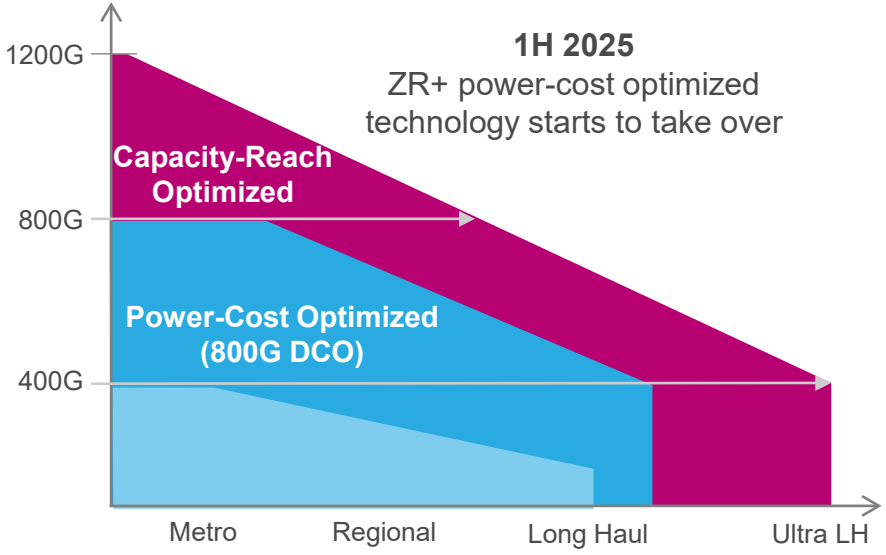


	ribbon	cisco	ciena	NOKIA	Infinera
800G Ready	**Yes**	No	No	No	No
2RU Density 400G	**12.8T**	12.8T	4.8T	3.2T	3.2T
2RU Density 800G	**25.6T**	N/A	N/A	N/A	N/A



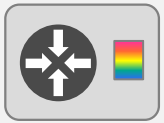
Changing Dynamics of Optical Transport





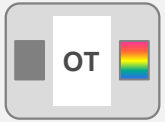
Coherent Optics Summary

Coherent Routing



- Lower cost in simpler networks
- Lower complexity

Optical Transport

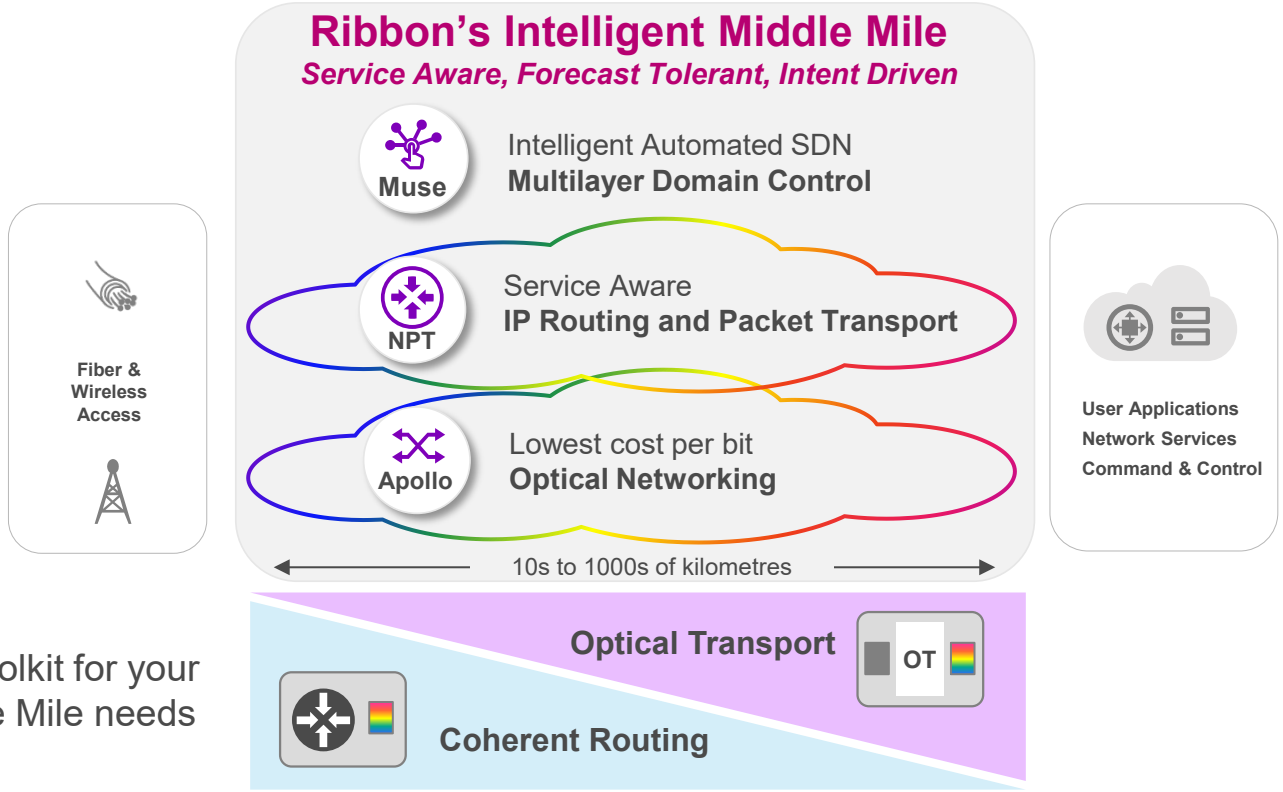


- Router ports aggregation
- OAM in more complex networks
- Regen and long haul

Mix

In many networks provides the best balance of cost and flexibility

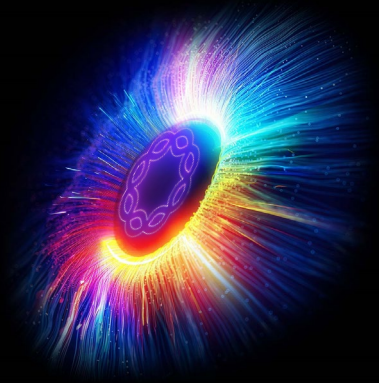
Ribbon’s Intelligent Middle Mile



Full toolkit for your Middle Mile needs

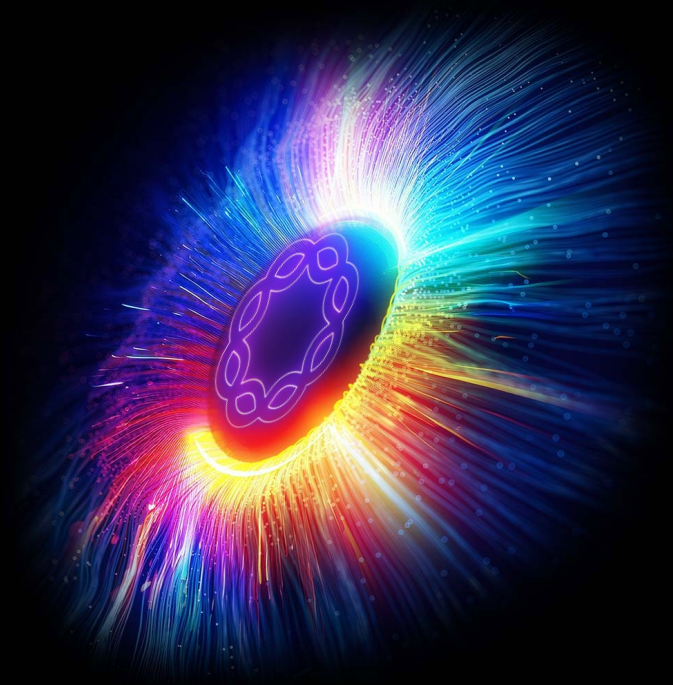
Thank You

ribbon
INSIGHTS



ribbon

INSIGHTS



Your feedback is important to us –

Let us know how we did!

Take The Survey

ribbon INSIGHTS

STAY
ENGAGED
• TRAINING
• NEWSLETTERS & PORTAL
• OUR TEAM
RBBN.COM