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# Reliance interop involving Ribbon QSBC, PSX Redirector and Ribbon Protect

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# Document Overview

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This document outlines the configuration best practices for the Ribbon QSBC when deployed with Ribbon PSX (Redirector) and Ribbon Protect for Value-Based Routing (VBR) and Standard Routing.

**Ribbon QSBC** is a network element deployed to protect SIP-based Voice over Internet Protocol (VoIP) networks. Early deployments of SBCs were focused on the borders between two service provider networks in a peering environment. This role has now expanded to include significant deployments between a service provider's access network and a backbone network to provide service to residential and enterprise customers.

**Ribbon Protect** provides a single view of the end-to-end network, critical for UC threat detection, fraud management, and network operations.

**Ribbon PSX** Ribbon's centralized policy and routing solution (PSX) provides a way to manage the security, complexity, and cost of routing calls across any operator's network.



Ribbon QSBC CDR data is processed by Ribbon Protect and generates QOS KPI values. Ribbon PSX uses the QOS KPI values to dynamically route the call to the route which has the best quality and is least expensive. PSX updates QOS KPI values for each trunk group (TG) configured in the PSX table.

TG is identified in PSX with the associated Q21 server name mentioned.

If a TG is not configured in PSX or the name of the TG in PSX does not match Q21 CDR, QOS KPI values for that TG cannot be updated in PSX DB.

If QSBC does not use LCR based routing, there are two options:

- QSBC can use its own routing logic and bypass PSX by routing to another endpoint (which is not pointing to PSX), or
- PSX needs to be configured with a Routing Label and the action set to "Route" instead of "LCR". In this scenario, normal PSX routing configuration is enough.

This guide contains the following sections:

- [Section A: QSBC Configuration](#)
  - Captures general QSBC configurations for Interop with PSX and Ribbon Protect.
- [Section B: PSX Redirector Configuration](#)
  - Captures the PSX Redirector configuration required for QSBC routing
  - Captures the PSX to Ribbon Protect interconnection related configuration
  - Captures PSX LCR Routing
- [Section C: Ribbon Protect Configuration](#)
  - Captures the configuration between QSBC and Ribbon Protect



## References

For additional information on the Ribbon QSBC, PSX, and Ribbon Protect refer to <https://ribboncommunications.com/>.

# Scope

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It is not the goal of this guide to provide detailed configurations that will meet the requirements of every customer. Use this guide as a starting point and build the QSBC, PSX, Protect product's configurations in consultation with network design and deployment engineers.

# Audience

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This is a technical document intended for telecommunications engineers with the purpose of configuring Ribbon QSBCs, PSXs and Protect. Steps will require navigating the product guide as well as the operations guide. Understanding the basic concepts of TCP/UDP, IP/Routing, and SIP/RTP is needed to complete the configuration and any necessary troubleshooting.



## Note

This configuration guide is offered as a convenience to Ribbon customers. The specifications and information regarding the product in this guide are subject to change without notice. All statements, information, and recommendations in this guide are believed to be accurate but are presented without warranty of any kind, express or implied, and are provided "AS IS". Users must take full responsibility for the application of the specifications and information in this guide.

## Product and Device Details

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The sample configuration in this document uses the following equipment and software:

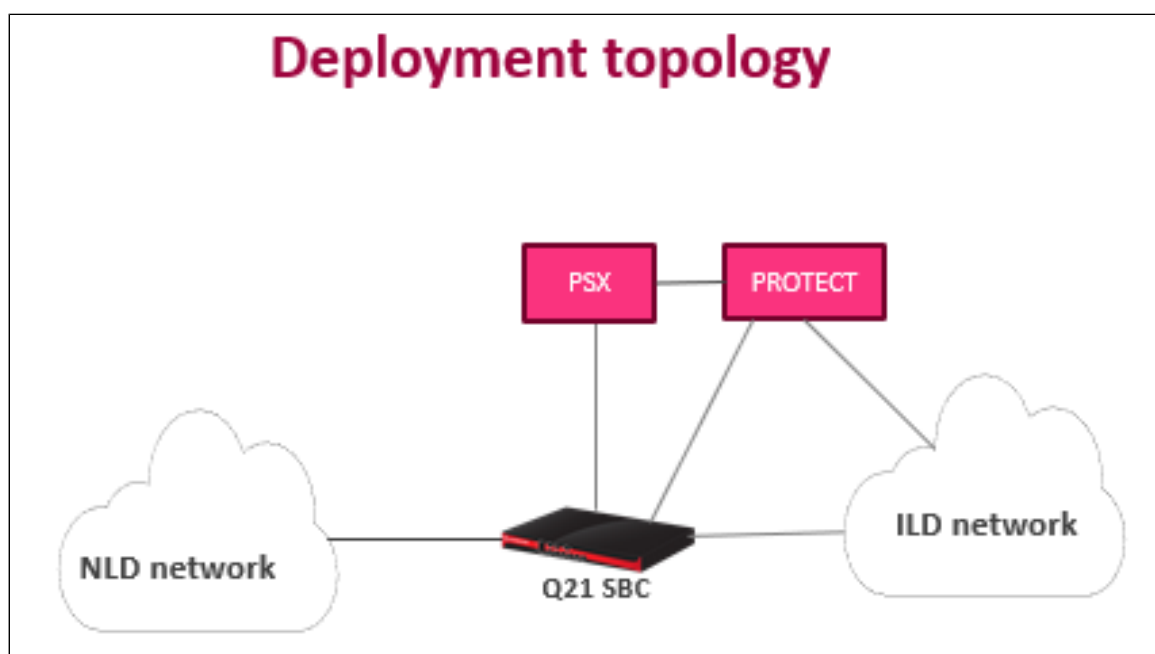
**Table 1:** Requirements

Vendor	Equipment	Software Version
Ribbon Communications	Ribbon QSBC	V9.4.0
	Ribbon PSX	V13.0.0R0
	Ribbon Protect	V20.06.0

## Network Topology Diagram

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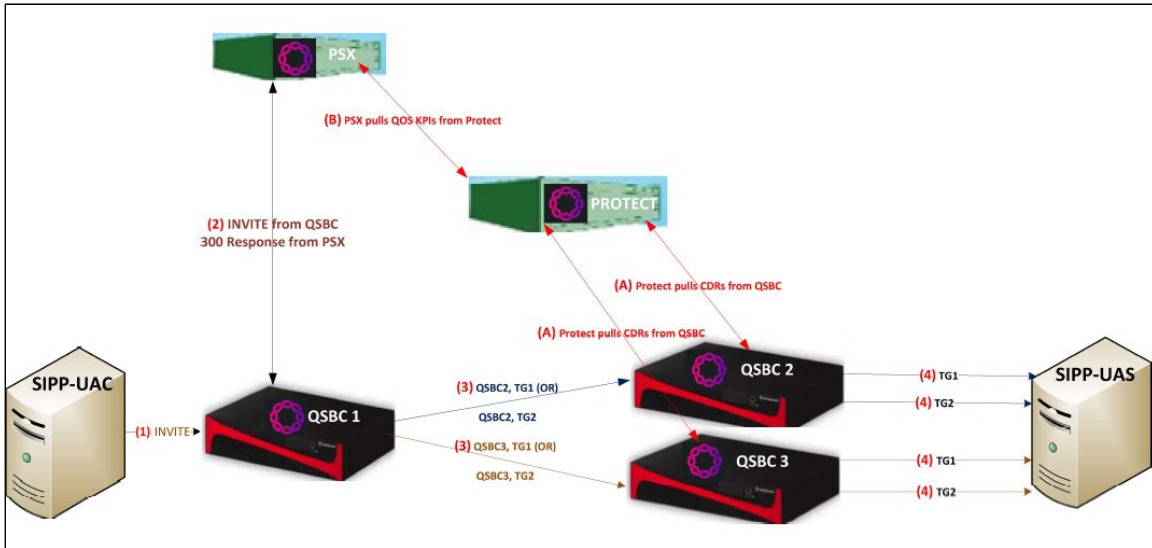
The following diagram shows the deployment topology.



The following diagram shows connectivity between QSBC, PSX and Ribbon Protect.

In the sample flow, QSBC1 needs to route the calls further based on QOS/LCR values collected by Ribbon Protect and used by PSX Redirector.

 Media is bi-directional in the following diagram but is not shown explicitly. Media doesn't flow through PSX Redirector and Ribbon Protect.



## Section A: QSBC Configuration

- Create as many EP as required including one EP (type SIPGW) towards UAC, one EP (type SIPPROXY) towards PSX Redirector, and a few EPs (type SIPGW) towards the next hop QSBCs or UASs.
- Create media-related configuration on QSBC and enable the generation of QOS parameters on QSBC CDRs with the command "[nxconfig.pl -e mqm -v 1](#)".
- For ingress TG-based routing, refer to "42: Trunk group Support" in the 9.4 QSBC Operations guide.
- For sending TGRP, DTG, OTG parameters in the egress INVITE, refer to "42.7: Support for trunk group context and RFC 4904" and "42.4: Configuring trunk group endpoint options" in the 9.4 QSBC Operations guide.
- No extra configuration is required on QSBC for connection to Ribbon Protect. Ribbon Protect fetches CDRs when configuration is complete on the Ribbon Protect side.
- Refer to the QSBC Operations guide for any other specific or basic configuration.

### Q21 Sample Configuration

**i** Here, the Q21 configuration is given for QSBC1, but it can be used for QSBC2 or QSBC3 if there is a requirement similar to QSBC1. Ribbon Protect pulls CDR data from QSBC2 and QSBC3 for QOS KPI analysis and then PSX pulls this data and updates its DB.

**i Note**  
This section may be modified based on customer specific requirements

### VNET Configuration

A signaling VNET (virtual network) is the combination of a physical interface, a gateway IP address (router), and an optional VLAN (virtual local area network) ID.

```
cli vnet add v1
cli vnet edit v1 gateway 10.34.92.1 ifname eth2
cli vnet add v2
cli vnet edit v2 gateway 10.34.94.1 ifname eth3
```

**i Note**  
Configure the QSBC Media separately.

### REALM Configuration

Realm is a logical service entry point for other devices to connect to the SBC. (A realm on the SBC is not synonymous with a SIP realm.)

For calls to connect successfully, you must have at least one realm configured on your system.

These refer to SIP Signaling IPs of QSBC towards various peers including SIP suppliers and SWe for Telstra.

```
cli realm add SYDPQ21LABVFNZREALM
cli realm edit SYDPQ21LABVFNZREALM vnet v1 rsa 10.34.92.166 mask 255.255.254.0 emr alwayson imr alwayson medpool 1

cli realm add GVPSYDPQFLEXLAN394REALM
cli realm edit GVPSYDPQFLEXLAN394REALM vnet v1 rsa 10.34.92.167 mask 255.255.254.0 emr alwayson imr alwayson
medpool 1

cli realm add GVPLABPMPLSGVOIPCUSTREALM
cli realm edit GVPLABPMPLSGVOIPCUSTREALM vnet v1 rsa 10.34.92.168 mask 255.255.254.0 emr alwayson imr alwayson
medpool 1

cli realm add LABGIA210REALM
cli realm edit LABGIA210REALM vnet v1 rsa 10.34.92.169 mask 255.255.254.0 emr alwayson imr alwayson medpool 1

cli realm add TCISYDLSWELABREALM
cli realm edit TCISYDLSWELABREALM vnet v2 rsa 10.34.94.166 mask 255.255.254.0 emr alwayson imr alwayson medpool 2

cli realm add GVPLABPMPLSGVOIPCUSTREALM2
cli realm edit GVPLABPMPLSGVOIPCUSTREALM2 vnet v2 rsa 10.34.94.167 mask 255.255.254.0 emr alwayson imr alwayson
medpool 2

cli realm add PSX
cli realm edit PSX vnet v2 rsa 10.34.94.168 mask 255.255.254.0 emr alwayson imr alwayson medpool 2
```

## **End Point Configuration**

PSX EndPoints (EPs) to send INVITE and receive 300 response

```
cli iedge add SYDLPSXLAB01EP 0
cli iedge edit SYDLPSXLAB01EP 0 realm PSX static 10.54.181.13 sip enable type sipproxxy dtg SLPSXLBPAD01 use4904tg
disable setdesttg disable vendor generic

cli iedge add SYDLPSXLAB01EP 1
cli iedge edit SYDLPSXLAB01EP 1 realm PSX static 10.54.181.13 sip enable type sipproxxy use4904tg disable setdesttg
disable vendor generic cp PSX01CP
```

## **SIP Supplier EPs**

F1.1 EP for PSX dedicate Realm (Existing EP) REALM: 10.54.92.166

```
cli iedge add SYDPQ21LABVFNZEP 0
cli iedge edit SYDPQ21LABVFNZEP 0 realm SYDPQ21LABVFNZREALM static 10.54.81.11 sip enable type sigpw cp TEAMS01CP
newsrctgt SLPSXLBPAD01 use4904tg disable vendor generic
cli iedge edit SYDPQ21LABVFNZEP 0 newsrctgt "SLVODAFNZL01"
```

B4-GW1 (Existing EP) REALM: 10.54.92.167 with 4904 disabled

```
cli iedge add SYDPQ21LABVFNZEP 1
cli iedge edit SYDPQ21LABVFNZEP 1 realm GVPSYDPQFLEXLAN394REALM static 10.54.81.11 contact 10.54.81.11:8012 sip
enable type sigpw dtg SLVODAFNZL01 tg SLVODAFNZL01 use4904tg disable vendor generic
```

F1.2 EP for Selection of Ingress via DNIS REALM: 10.54.92.168

```
cli iedge add SYDLSIPLAB02EP 0
cli iedge edit SYDLSIPLAB02EP 0 realm GVPLABPMPLSGVOIPCUSTREALM static 10.54.81.12 contact 10.54.81.12:8012 sip
enable type sigpw cp TEAMS02CP dtg SLVODAFNZL02 tg SLVODAFNZL02 use4904tg disable setdesttg enable vendor generic
```

F1.3 EP for Selection of Ingress via sourceTG=SLVODAFNZL03 (REALM: 10.54.92.168) with 4904 enabled

```
cli iedge add SYDLSIPLAB02EP 1
cli iedge edit SYDLSIPLAB02EP 1 realm GVPLABPMPLSGVOIPCUSTREALM static 10.54.81.12 contact 10.54.81.12:8014 sip
enable type sipgw newsrctdg SLPSXLBPAD01 dtg SLVODAFNZL03 tg SLVODAFNZL03 use4904tg enable vendor generic
```

#### B4-CSF2

```
cli iedge add SYDLSIPLAB02EP 2
cli iedge edit SYDLSIPLAB02EP 2 realm GVPLABPMPLSGVOIPCUSTREALM static 10.54.81.12 sip enable type sipgw dtg
SLGVQ21PAD02 use4904tg disable vendor generic
```

#### B4-CSF1 (Existing EP)

```
cli iedge add GVMSYDPGIASYDLP01 1
cli iedge edit GVMSYDPGIASYDLP01 1 realm LABGIA210REALM static 10.54.81.13 sip enable type sipgw dtg SLGVQ21PAD01
use4904tg disable vendor generic
```

#### F4, B1 (EP for 3XX to LAB SWE1)

```
cli iedge add SYDLSWELAB01EP 0
cli iedge edit SYDLSWELAB01EP 0 realm PSX static 10.54.81.66 sip enable type sipgw newsrctdg SLPSXLBPAD01
use4904tg enable vendor generic setdesttg enable URI 10.54.81.66
```

#### F4-B1 (EP for 3XX to LAB SWE2)

```
cli iedge add SYDLSWELAB02EP 0
cli iedge edit SYDLSWELAB02EP 0 realm TCISYDLSWELABREALM static 10.54.81.67 sip enable type sipgw newsrctdg
SLPSXLBPAD01 use4904tg enable vendor generic setdesttg enable URI 10.54.81.67
```

### **Sample Calling Plans**

#### **INGRESS FROM SUPPLIER CALLING PLAN**

```
cli cr add TEAMS09980315INGCR
cli cr edit TEAMS09980315INGCR calltype origin dest 09980315 prefix 64*09980315
cli cp add TEAMS02CP TEAMS09980315INGCR
cli iedge edit SYDLSIPLAB02EP 0 cp TEAMS02CP
```

#### **EGRESS TO PSX CALLING PLAN**

(For 64\* prefix numbers routed to PSX redirector)

```
cli cr add TEAMS09980315EGRCR
cli cr edit TEAMS09980315EGRCR calltype dest dest 64*09980315 prefix 0998031512345
cli cp add PSX01CP TEAMS09980315EGRCR
cli iedge edit SYDLSXLAB01EP 1 cp PSX01CP
```

#### **Link Calling Plan with MULTIPLE Calling Route**

```

cli cr add TEAMS09980316INGCR
cli cr edit TEAMS09980316INGCR calltype origin dest 09980316 prefix 09980316
cli cp add TEAMS01CP TEAMS09980316INGCR

cli cr add TEAMS0998032INGCR
cli cr edit TEAMS0998032INGCR calltype origin dest 0998032 prefix 0998032
cli cp add TEAMS01CP TEAMS0998032INGCR

cli cr add TEAMS099803301INGCR
cli cr edit TEAMS099803301INGCR calltype origin dest 099803301 prefix 099803301
cli cp add TEAMS01CP TEAMS099803301INGCR

cli cr add TEAMS099803302INGCR
cli cr edit TEAMS099803302INGCR calltype origin dest 099803302 prefix 099803302
cli cp add TEAMS01CP TEAMS099803302INGCR

cli cr add TEAMS0998034INGCR
cli cr edit TEAMS0998034INGCR calltype origin dest 0998034 prefix 0998034
cli cp add TEAMS01CP TEAMS0998034INGCR
cli iedge edit SYDPQ21LABVFNZEP 0 cp TEAMS01CP

```

## Section B: PSX Configuration

### PSX Redirector related configuration

- The PSX requires a SIP server entry created with QSBC SIP IP towards the PSX side.
- The PSX requires a Trunk Group created with SIP server created in the previous step. If this step is missed, PSX uses the default SIP server entry, "DEFAULTSIPSERVER".
- The PSX Trunk Group requires a Feature Control Profile with "IP Protocol Flags" enabled, and "Support Domain Name in 300 Contact" enabled with the PSX processing mode set to "Redirector".
- Additionally, if required, the Feature control profile options can have "Process TGRP", "Process Trunk-context", "Process Originating Trunk Group And Trunk-context over OTG" enabled.
- The PSX Trunk Group can have IP Signaling profile with "Destination Trunk Group Options" set to either "Include DTG" or "Include Tgrp with domain name" based on customer requirement.
- The PSX Trunk Group can have IP Signaling profile with "Destination Trunk Group Options" set to either "Include DTG" or "Include Tgrp with domain name" based on customer requirement.
- Additionally, if required, IP Signaling profile can have "Originating Trunk Group Options" set to either "Include DTG" or "Include Tgrp with domain name" based on customer requirement.
- The PSX can have any kind of routing including standard routing based on trunk group or destination number with a Routing Label containing all the routes. Each route requires a destination "SIP server" and "Trunk Group". SIP server can have FQDN configured or IP address according to the requirement.
- The PSX Ingress Trunk Group requires the "Use IPTG Routing" option to be enabled.
- The PSX can return up to 10 Routes only in 300 Response when acting as a redirector.

### PSX LCR configuration

This section describes the implementation of the LCR feature in the PSX for this project.

#### 1.1 Description

LCR routing chooses a destination routing path based on the cost that provides the most savings. LCR makes the selection based on rate lists provided by one or more vendors. LCR must provide the least expensive way to route a call.

Vendors publish rate sheets to network operators. Network operators load and manage these rate sheets. The rate sheet data along with Quality of Service information is used to provide value-based routing to customers of the network operators. The rate sheet life cycle management includes parsing the rate sheets using their metadata template files, storing them in a local database to view them, pushing the optimized intermediate form rate sheets to PSX primary and secondary boxes, and undoing or rolling back loaded rate sheets. Routing of calls from customers to vendors relies on the vendor rates, offers agreed to with customers, exception handling, and call quality (or QoS).

Network Operators provide call routing services to their customer by using services from its vendors. Suppliers or vendors supply rate sheets, whereas customers are associated with Offer Bundles provided by the reseller. Network Operators offer bundled services to customers, which include a sell rate sheet. Offer Bundles can be generic and offered to multiple customers, or they can be made customer-specific to handle specific customer agreements. The TG and other call processing elements such as the carrier and subscribers are used to uniquely identify a customer.

A vendor contains a rate sheet and a set of egress trunk groups. The network operator offers multiple services to customers based on cost and quality. These services are referred to as Offers. Each Offer comes with a sell rate sheet that defines the cost TOTs and a set of quality parameters that define the expected quality of the offer. For example, a 'Premium' offer may cost more and has high quality, whereas a 'Silver' offer may be cheaper, but with a significantly lower quality compared to the Premium quality.

The network operator also picks certain vendors and associates them with the offer. This information may or may not be available to the customer. The association indicates that calls of customers using an offer will only be routed to the associated vendors taking cost and quality into account.

### 1.1.1 Quality of Service

Quality of Service (QoS) is a combination of various parameters measurements which impact the call and voice quality. QoS depends on terminating vendor trunk groups. The QoS parameters are name-value pairs from the LCR perspective. The service provider can provision any number of factors or parameters.

QoS plays a major role in an Offer. A Premium package, for example, can come with a better quality of service as compared to, for example, a Silver package. Each package has its defined QoS parameter ranges. There is an expected QoS of the Premium Package Offer along with the cost as defined by the Sell Rate Sheet. The Network Operator must make sure that the vendors added to the offer are meeting the defined QoS.

QoS parameters are defined at a global level in the system and the defined QoS parameters can be chosen and combined using AND and OR logical operations with a subset of range values for computation purposes.

An Offer is associated with a QoS profile. If it is not associated (NULL profile), then no QoS checks happen for that Offer.

Each QoS profile contains a set of rules. Each rule has an order. The rules are evaluated based on the order. Each rule contains one or more QoS parameters interconnected with AND operations.

Each QoS parameter range must be defined and be within the range defined for that parameter at the global or system level. The rules within a given profile are interconnected with the OR operation. If a rule is evaluated to TRUE then no further evaluations are necessary and the QoS standards are met. If it is evaluated to FALSE then the next rule is evaluated. If all rules in the given profile are exhausted and all of them yielded FALSE, then it indicates failure to match set standards of QoS and results in ignoring the route associated with that egress TG.

#### **8 QoS Parameters for LCR or VBR are given below**

1. AHCT: Average Call Hold Time
2. ASR: Answer Seizure Ratio (Call Attempts Vs Completion)
3. JITTER: Jitter is the variation in delay of received packets
4. MOS: Mean Opinion Score
5. MOU: Minutes of Usage
6. NER: Network Effectiveness Ratio. It's similar to ASR but excludes customer behavior & terminal behavior like user busy or no answer
7. PDD: Post Dial Delay. It's the time between end of dialing & beginning of ringing
8. PLP: Packet Loss Percentage

### 1.1.2 Vendor

Each vendor has a rate sheet and expected or committed quality of service (based on a bilateral agreement). Each vendor owns one or more trunk groups. A vendor may be part of one or more offers. Each trunk group may be associated with the QoS parameters, which is used in rule computation to assess, whether the TG meets the quality standards defined at the Offer level. For example, consider Vendor A is put into a Premium Package. If one of the trunk groups, TG1, owned by the vendor has an extended PDD, then the network operator can manually update the PDD QoS parameter on that TG. This value may result in failure of some or all the QoS rules defined at the Offer level for calls attempting to go over TG1. As a result, the TG1 may not be considered for routing, because it may not meet the quality requirements of the Premium Offer. But, the same trunk group QoS range may be meet the requirements for the Wholesale Package.

If no QoS parameter is set, then a call is routed on a trunk group without any QoS checks. The QoS name-values must be provisioned by the Network Operator using the LCR provisioning GUI or CLI mechanisms.

A report which details trunk groups that have QoS parameters set is available.

### 1.1.3 Customer

A customer subscribes to an Offer provided by the Network Operator. A customer may subscribe to more than one offer in certain scenarios. For example, a customer may purchase a Premium package to handle specific calls; for top management callers, and Silver package for all other callers in the company.

The customer expects the quality of service to be on par with the defined ranges as part of the 'Offer'. The QoS parameters are defined as part of the QoS profile and associated with an Offer. QoS parameter values can be set at the Egress Trunk Group Level. It is the responsibility of the Network Operator to provision the QoS values appropriately on Trunk Groups.

### 1.1.4 Customer Identification Criteria

All data necessary to identify a customer and an offer is available in a table called VBR\_CUSTOMER\_IDENTITY. The ingress call processing elements which identify a customer is a part of this table. The call processing element types supported are currently limited to the following (ordered by precedence – high to low):

- Subscriber
- Trunkgroup
- Gateway
- Carrier



The Subscriber value may contain a prefix instead of full number. There is no primary key for this table. A unique index is needed on all columns to avoid duplicate rows. The value Sonus\_NULL is used if no value is provisioned.

## 1.1.5 Profit Margins

From a service perspective a Network Operator needs to guard against losing money or control how much money they are willing to lose. This directly affects the routing decision for a call. A Network Operator can route calls for certain customers with a small or even negative profit margin but can drop calls for other Customers if the calls incur a loss. It is critical for the LCR system to support a mechanism for profit protection for Network Operators.

Margin is defined on an Offer by the Network Operator. A service provider can for example define a margin as at least X% profit, no loss routing, or a Y% loss.

Network Operators can override the margin defined at the offer level by setting a margin at the customer-offer level.

## 1.1.6 Margin Profile

A margin profile is associated with either an Offer or with a Customer in the context of an offer. The margin is the same for all the dial codes in the sell rate sheet associated with the offer. If the margin profile is not associated with an Offer or customer, then the call is completed irrespective of price. The sell rate sheet and margins are ignored, in this case. The margin profile contains a percentage. If the percentage is positive it indicates a profit, if it is negative it indicates a loss.

For example, if the percentage is +20%, it indicates the profit has to be at least 20%. The margin profile then ignores all the routes where the cost is below the 20% margin. If the sell rate sheet indicates the price for the 781123 dial code as 0.5, then the vendor rate sheet entries prices are  $\leq 0.4$ .

If the percentage is -20%, the service provider is willing to take a loss of at most 20%. So the margin profile ignores the routes where the cost is above 20% loss. If the sell rate sheet indicates the price for the 781123 dial code as 0.5, then the vendor rate sheet entries prices are  $\leq 0.6$ .

The gain or loss percent value is computed from the sell rate sheet.

Two customers may sign up for same Offer (for example, Premium), the network operator can set up different margins for these customers by overriding the margin profile defined at the offer level.

## 1.1.7 Minutes of Use

Volume or Dollar Commitment

This is a commitment from the Buy Side to the Sell Side to route the committed amount of call in terms of volume, that is Minutes of Use, or in terms of dollar amount paid to the Sell Side, over a specified time period. The time period is typically on a monthly basis. Some Network Operators may, once the quota committed to a Vendor is filled before the month end, temporarily suspend call termination towards the vendor if a cheaper vendor can be used to terminate the calls until the start of the next month.

Sonus LCR provides place holders for minutes of use. As part of the vendor data, the "minutes of use" flag is turned ON. When this flag is turned ON, it influences the routing. If MOU is turned ON, then the vendor is used as top route irrespective of cost, but the cost has to be within the margins defined. This means when a vendor has a dial code which can complete the call, it need to be chosen (based on if the vendor is part of the Offer) irrespective of cost. If more than one vendor has the MOU agreement, then the vendor priority determines which vendor to choose first in call completion. QoS filtering is also applied on the MOU vendors.

## 1.1.8 Exceptions or Black Lists

Some of the dial codes for specific suppliers be blacklisted for all customers or for a specific customer. A customer can request a supplier to be put in black list. An offer may be associated with zero or more customers. Each customer has the ability to put certain suppliers or dial codes in the black list.

The exceptions contain type and scope. The scope indicates the scope of the exception (ALL, Offer Id, or Customer Id). Each type may have one or more values. The following types and values are supported. If the CustomerId is Sonus\_NULL, it impacts all customers.

## 1.2 Rate Sheet

Rate sheets come in various formats and flavors. The Rate sheet from each vendor follows a different template. The Rate sheet template defines the metadata and also provides parsing instructions.

- A generic rate sheet template is defined, which captures various permutations and combinations of rate sheets.
- Each rate sheet must be accompanied by a template; otherwise the rate sheet cannot be parsed.
- Vendors can reuse the templates for their rate sheets unless the format is changed. A format change triggers changes to the template file.
- The rate sheet id, name, effective, and expiry (if any) dates must be available before starting the parsing process. If the parsing produces errors, you must fix the errors before retrying the operation.
- These errors cannot be tracked during pre-processing. If the parsing is successful, an intermediate file is created.
- Sometimes the vendor has to be contacted for clarifications to fix the rate sheet before proceeding further.

Loading a Rate sheet involves:

- Parsing the Rate sheet using template file and generating an intermediate rate sheet file. The intermediate format is a common format for all the rate sheets.  
Loading the intermediate Sonus LCR rate sheet file into the Database.
- The rate sheet is in a comma separated (.csv) file format.
- The rate sheet parser uses the rate sheet along with the template as input. The parser reads the rate sheet template and builds an internal data structure. It then processes the rate sheet using the translation semantics gathered from the template file and stored in the internal data structure.
- The parser creates the intermediate Sonus LCR Rate sheet file, which you can load into the PSX Database using the rate sheet loader program.

Load Rate Sheet to the PSX:

The following example shows the generation of the PSX loading the "Rate Sheet".

Rate sheet example (Viettel-P.csv):

DESTINATION, DIALCODE, RATE
Cambodia - All, 855, 0.0520
Cambodia - Fixed (Metfone), 8552346, 0.0610
Cambodia - Fixed (Metfone), 855236, 0.0610
Cambodia - Fixed (Metfone), 8552446, 0.0610
Cambodia - Fixed (Metfone), 855246, 0.0610
Cambodia - Fixed (Metfone), 8552546, 0.0610
Cambodia - Fixed (Metfone), 855256, 0.0610
Cambodia - Fixed (Metfone), 8552646, 0.0610
Cambodia - Fixed (Metfone), 855266, 0.0610
Cambodia - Fixed (Metfone), 8553246, 0.0610
Cambodia - Fixed (Metfone), 855326, 0.0610
Cambodia - Fixed (Metfone), 8553346, 0.0610
Cambodia - Fixed (Metfone), 855336, 0.0610
Cambodia - Fixed (Metfone), 8553446, 0.0610
Cambodia - Fixed (Metfone), 855346, 0.0610
Cambodia - Fixed (Metfone), 8553546, 0.0610
Cambodia - Fixed (Metfone), 855356, 0.0610
Cambodia - Fixed (Metfone), 8553646, 0.0610
Cambodia - Fixed (Metfone), 855366, 0.0610
Cambodia - Fixed (Metfone), 8554246, 0.0610
Cambodia - Fixed (Metfone), 855426, 0.0610
Cambodia - Fixed (Metfone), 8554346, 0.0610
Cambodia - Fixed (Metfone), 855436, 0.0610
Cambodia - Fixed (Metfone), 8554446, 0.0610
Cambodia - Fixed (Metfone), 855446, 0.0610
Cambodia - Fixed (Metfone), 8555246, 0.0610
Cambodia - Fixed (Metfone), 855526, 0.0610
Cambodia - Fixed (Metfone), 8555346, 0.0610
Cambodia - Fixed (Metfone), 855536, 0.0610
Cambodia - Fixed (Metfone), 8555446, 0.0610
Cambodia - Fixed (Metfone), 855546, 0.0610
Cambodia - Fixed (Metfone), 8555546, 0.0610
Cambodia - Fixed (Metfone), 855556, 0.0610
Cambodia - Fixed (Metfone), 8556246, 0.0610
Cambodia - Fixed (Metfone), 855626, 0.0610
Cambodia - Fixed (Metfone), 8556346, 0.0610
Cambodia - Fixed (Metfone), 855636, 0.0610
Cambodia - Fixed (Metfone), 8556446, 0.0610

Template example (Viettel-P\_Template.dat):

```

BUSINESS
(
TYPE="VENDOR"
ID="VIETTEL_PREMIUM"
)

INPUT
(
COLUMN="1"
TITLE="DESTINATION"

COLUMN="2"
TITLE="DIALCODE"

COLUMN="3"
TITLE="RATE"
)

OUTPUT
(
TITLE="Country"
DEFAULT=""

TITLE="DialCode"
VALUE="2"

TITLE="Rate"
VALUE="3"

TITLE="Jurisdiction"
DEFAULT="0"
# 0=Unknown, 1=Out of State, 2=In State, 3=Inter Lata, 4=Intra Lata

TITLE="Comment"
VALUE="1"
)

RATESHEET
(
ID="VIETTEL_P_RS_01102019"
DESCRIPTION="VIETTEL_PREMIUM Nov 2019 Rate Sheet"
EFFECTIVE_DATE="01-11-2019"
EFFECTIVE_TIME="00:00:00"
CURRENCY_CODE="USD"
EXPIRY_DATE=""
EXPIRY_TIME=""
)

```

Save both files in a directory readable for the "ssuser".



Prior to loading a rate sheet, the PSX must be provisioned with the Vendor names and Offer names.

Log in to the PSX as ssuser and execute the following commands:

This command generates the intermediate rate sheet (intermediate\_vendor01.dat). This rate sheet is loaded into the PSX later.

```
lccrsprsr -t <path>/<template file> -i <path>/<rate sheet file> -o <path>/<intermediate file>
```

To upload the intermediate file to the PSX, run the following command:

```
lccrsldr -l <path>/<intermediate file>
```

To load an offer rate sheet, change the type to "OFFER" in the business section. The rest of the template remains the same.

```
BUSINESS
{
  TYPE="OFFER"
  ID="OFFER_01"
}
```

To generate the intermediate rate sheet, run the following command:

```
lccrsprsr -t <path>/<template offer file> -i <path>/<rate sheet offer file> -o <path>/<intermediate offer file> -ofr offer_id
```

To load the rate sheet for the offer:

```
lccrsldr -l <path>/<intermediate offer file>
```

## 1.3 LCR Currency

Use this screen to define the currency data of the rate sheets.

Currency:	USD
Country:	US
Last Updated:	2019-11-11 11:39:15
Conversion Factor:	1.0

## 1.4 Vendor Routing Label

This Routing Label contains the routes associated with the vendor which the PSX returns in the policy response to the SBC/GSX. The routes selection in the action frame notifies the PSX that a route must be returned as part of the response. Each combination of the SBC/GSX node / Trunk Group (Egress TG) pair must be added as a route option in the Routing Label.

For this design, the following routing labels provide an example of the design. Appropriate routing labels are created in actual implementations.

The following are the routing labels that are being used for the vendor associated with the routing label.

Routing Label	Vendor
SINGTEL_PREMIUM_RL	SINGTEL_PREMIUM
PCCW_PREMIUM_RL	PCCW_PREMIUM
VIETTEL_PREMIUM_RL	VIETTEL_PREMIUM
CITICTEL_STANDARD_RL	CITICTEL_STANDARD
SINGTEL_STANDARD_RL	SINGTEL_STANDARD

## 1.5 LCR Vendor

Create a Vendor entry using the LCR Vendor screen. Make sure you provision the Vendor Id (for example, VIETTEL\_PREMIUM), a Routing Label Id (for example, VIETTEL\_PREMIUM\_RL) that is associated with the vendor, and a Currency Code (for example, USD).

**Vendor:** VIETTEL\_PREMIUM

Vendor Name: VIETTEL\_PREMIUM

Description: Viettel Premium Standard

---

Routing Label: VIETTEL\_PREMIUM\_RL

Contact Address:

Contact Phone:

Contact Person:

Contact Email:

MOU:  In Use  Not In Use

MOU Priority: 0

Directory Path:

Template File:

Minutes Purchased: 0

Minutes Used: 0

Reset MOU

**Offers**

Offers
PREMIUM

LCR Offer: <None>

**Rate Sheets**

Rate Sheet
VIETTEL_P_RS_01102019

**Rate Sheet ID:** VIETTEL\_P\_RS\_01102019

Description: VIETTEL\_PREMIUM Nov 2019 Rate Sheet

Status:  Active  Inactive

Currency Code: USD

Date Loaded: 2019-11-11 04:34:38

Effective Date: 2019-01-11 00:00:00

Expiry Date:

Rate Sheet File: Viettel-P.dat

Rate Sheet Type:  Dial Code  LATA-OCN

**Rate Sheet Data**

Search Criteria

Dial Code:

Dial Code	Jurisdiction
237	<Unknown>
23766	<Unknown>
258	<Unknown>
25886	<Unknown>
25887	<Unknown>
509	<Unknown>
50932	<Unknown>
50933	<Unknown>

Dial Code: 237

Jurisdiction: <Unknown>

Currency Code: <None>

Cost: 0.296200

Effective Date:

Description: Cameroon - All

To import Vendor Rate Sheets, use the rate sheet parser and loader tool to load vendor rate sheets. The vendor must exist in database for the data to be imported.

```
lcrsldr -l <path>/<intermediate file>
```

 Make sure the vendor name matches the Vendor template file.

### 1.6 LCR Offer

Create an Offer entry using the LCR Offer screen. Set the Offer Id (for example, PREMIUM). If needed, create Offers and provide the Offers to the customers. Offers can contains a sell rate sheet and a set of QoS parameter values. The following is an example of an offer for US customers.

<b>Offer:</b>	PREMIUM				
<b>Offer Name:</b>	PREMIUM				
<b>Description:</b>	Premium Offer				
<b>Margin Profile:</b>	<None>				
<b>QoS Profile:</b>	<None>				
<b>Directory Path:</b>					
<b>Template File:</b>					
<b>Rate Sheets</b>					
<table border="1"><thead><tr><th>Rate Sheet</th></tr></thead><tbody><tr><td> </td></tr></tbody></table>	Rate Sheet		<b>Rate Sheet ID:</b> <input type="text"/> <b>Description:</b> <input type="text"/> <b>Status:</b> <input checked="" type="radio"/> Active <input type="radio"/> Inactive <b>Currency Code:</b> <None> <b>Date Loaded:</b> <input type="text"/> <b>Effective Date:</b> <input type="text"/> <b>Expiry Date:</b> <input type="text"/> <b>Rate Sheet File:</b> <input type="text"/> <b>Rate Sheet Type:</b> <input checked="" type="radio"/> Dial Code <input type="radio"/> LATA-OCN <input type="button" value="New"/> <input type="button" value="Add/Update"/> <input type="button" value="Delete"/>		
Rate Sheet					
<b>Rate Sheet Data</b>					
<b>Search Criteria</b>					
<b>Dial Code:</b> <input type="text"/>	<input type="button" value="Search"/> <input type="button" value="Show More"/>				
<table border="1"><thead><tr><th>Dial Code</th><th>Jurisdiction</th></tr></thead><tbody><tr><td> </td><td> </td></tr></tbody></table>		Dial Code	Jurisdiction		
Dial Code	Jurisdiction				
<b>Dial Code:</b>	<input type="text"/>				
<b>Jurisdiction:</b>	<Unknown>				
<b>Currency Code:</b>	<None>				
<b>Cost:</b>	<input type="text"/>				
<b>Effective Date:</b>	<input type="text"/>				
<b>Description:</b>	<input type="text"/>				

New
Add/Update
Delete

**Vendors**

Available Vendors

CITICTEL\_STANDARD  
SINGTEL\_STANDARD  
Sonus\_NULL

Add >>

<< Remove

Added Vendors

PCCW\_PREMIUM  
SINGTEL\_PREMIUM  
VIETTEL\_PREMIUM

**Vendor Groups**

Available Vendor Groups

Add >>

<< Remove

Added Vendor Groups

The example above contains 3 vendors.

To import Offer Rate Sheets, use the rate sheet parser and loader tool to load offer rate sheets.

The Offer must exist in database for the data to be imported. Loading offer rate sheet is optional and is necessary only when margins are a consideration.

```
lcrsldr -l <path>/<intermediate offer file>
```

There are 4 types of LCR offers in this initial deployment:

LCR Offers	Description
PREMIUM	Assigned to national to international calls beginning with 007 prefix
STANDARD	Assigned to national to international calls beginning with 008 prefix
PREMIUM_TRANSIT	Assigned to TDM international trunk groups for international to international calls
STANDARD_TRANSIT	Assigned to SIP international trunk groups for international to international calls

### 1.7 LCR Customer

The following is an example of an LCR Customer:

**Customer:** PREMIUM

Customer Name: PREMIUM

Description: Premium Offer

---

Contact Details

Address:

Phone:

Person:

Email:

---

Offers

Offers
PREMIUM

LCR Offer: PREMIUM

Description:

Margin Profile: <None>

New Add/Update Delete

Offers Data

View:  Identification Criteria  Exceptions

Identification Criteria

Offer	Type	Element1	Element2	Element3
PREMIUM	Carrier	007		

CPE Type: Carrier

Carrier: 007

Not Applicable

Not Applicable

Add Delete

Set the Customer Identification Criteria (Call Processing Element Type). The CPE types are Trunk Group, Gateway, Carrier, or Subscriber.



Associate Offers with a customer. For this deployment, Carrier (007) is an example for PREMIUM (Premium Customers). There are 4 types of LCR customers in this initial deployment:

LCR Customer	LCR Offers	Identification Criteria
PREMIUM	PREMIUM	Carrier = 007
STANDARD	STANDARD	Carrier = 008
PREMIUM_TRANSIT	PREMIUM_TRANSIT	Trunk Group = TDM International Trunk Groups i.e. BTSGP3_TG
STANDARD_TRANSIT	STANDARD_TRANSIT	Trunk Group = SIP International Trunk Groups i.e. BIMIC1_TG

### 1.8 Additional Information

For the LCR deployment, the following additional entity is created:

1) Routing Label = LCR\_RL

Routing Label: LCR\_RL

Action

Routes  Script  Route Hopping  LCR

Number Of Routes Requested: 10  All

The routing label above is required for LCR configurations with LCR selected as the action.

2) Standard Route

Entity Type:	<None>			
Not Applicable	<None>	<None>	<None>	<input type="checkbox"/> All
Not Applicable	<None>	<None>	<None>	
Not Applicable	<None>	<None>	<None>	
<input checked="" type="radio"/> Call Parameter Filter Profile:	<None>			
<input type="radio"/> Call Parameter Filter Profile Group:	<None>			
Destination National:				
Destination Country:	<None>			
Domain Name:	<None>			
<input checked="" type="radio"/>				
<input type="radio"/> IP Address:	0	0	0	0
Partition:	007			
Routing Label:	LCR_RL			

Call Type	Transmission Medium
	Speech
	3.1 KHz Audio
	7.0 KHz Audio
	56 kbps
	64 kbps
	Packet
	Multirate
	384 kbps
	1536 kbps

All Call Type Bits

Time Range: ALL

The standard route above is an example of a route with an assigned LCR routing label. This standard route affects all calls in the 007partition. The LCR\_RL routing label means that the PSX will process all calls matching the criteria as an LCR call.

## 1.9 Create LCR QOS

Use this to create minimum and maximum values for each QOS parameter as shown below in the sample configuration:

**Figure 1:** Create LCR QOS

**QOS Profile: DINESH**

Description: \_\_\_\_\_

TG Recovery Proportion: 100

Rule	QOS Type Name	Minimum Value	Maximum Value
0	SONUS_AHCT	0.000000	1000000.000000
0	SONUS_ASR	.800000	1.000000
0	SONUS_JITTER	0.000000	100.000000
0	SONUS_MOS	4.000000	5.000000
0	SONUS_MOU	100.000000	1000000.000000
0	SONUS_NER	.800000	1.000000
0	SONUS_PDD	0.000000	100.000000
0	SONUS_PLP	0.000000	.900000

Rule: 0

QOS Type Name: SONUS\_AHCT

Minimum Value: 0.000000

Maximum Value: 1000000.000000

New Add/Update Delete

### 1.10 LCR Trunk Group QOS

PSX uses this table to update the QOS values for every TG of QBC2 and QBC3 in this example.

This table is also used to select or reject that TG while returning routes in the PSX Response in 300 Multiple Choice.

**Figure 2: Create LCR Trunk Group QOS**

**LCR Trunk Group QOS**

SQL Search Criteria (160 entries)

Trunk Group: \*

Search More...

Trunk Group	Gateway	QOS Type Name
SIP	Q21_CONTACT1	SONUS_AHCT
SIP	Q21_CONTACT1	SONUS_ASR
SIP	Q21_CONTACT1	SONUS_JITTER
SIP	Q21_CONTACT1	SONUS_MOS
SIP	Q21_CONTACT1	SONUS_MOU
SIP	Q21_CONTACT1	SONUS_NER
SIP	Q21_CONTACT1	SONUS_PDD
SIP	Q21_CONTACT1	SONUS_PLP
SIP2	Q21_CONTACT1	SONUS_AHCT
SIP2	Q21_CONTACT1	SONUS_ASR
SIP2	Q21_CONTACT1	SONUS_JITTER
SIP2	Q21_CONTACT1	SONUS_MOS
SIP2	Q21_CONTACT1	SONUS_MOU
SIP2	Q21_CONTACT1	SONUS_NER
SIP2	Q21_CONTACT1	SONUS_PDD
SIP2	Q21_CONTACT1	SONUS_PLP
SIP	Q21_CONTACT10	SONUS_AHCT
SIP	Q21_CONTACT10	SONUS_ASR
SIP	Q21_CONTACT10	SONUS_JITTER
SIP	Q21_CONTACT10	SONUS_MOS
SIP	Q21_CONTACT10	SONUS_MOU
SIP	Q21_CONTACT10	SONUS_NER

Gateway: Q21\_CONTACT1

Trunk Group: SIP

QOS Type Name: SONUS\_ASR

QOS Type Value: 0.900000

### PSX to Ribbon Protect Interconnection

- PSX can fetch QOS KPI values (.csv files) from Ribbon Protect with the following interconnect configuration.

# Configuring SSH for PSX and Ribbon Protect's Dig Core Pod

## Prerequisites

Ensure that you have the following details of the Ribbon Protect's Dig Core Pod:

- IP Address: Dig Core IP
- Login ID/Password of an account (dig core IP): Default user credentials: pstk / pstk
- Directory where the KPI files are kept and updated frequently with .csv extension. The default is /stats/scoring/vbr

## Procedure Steps

1. You must manually complete this configuration before the file transfer begins on both Active and Standby machines.

- Login to the Master PSX as an ssuser.
- Run the following command to generate the Public and Private keys:

```
$ ssh-keygen
```

The command above generates two key files:

id\_rsa which is a Private Key  
id\_rsa.pub which is a Public Key

- Transfer the public key id\_rsa.pub file to the Ribbon Protect's Dig Core Pod under path /home/pstk/.ssh/

```
$ scp /export/home/ssuser/.ssh/id_rsa.pub pstk@DigCoreIP:/home/pstk/.ssh/id_rsa.pub
```

- Ensure that the rsync utility is available under /usr/local/bin. If not, create a soft link using the following command:

```
ln -s /usr/bin/rsync /usr/local/bin/rsync
```

This is needed for the Solaris PSX Master to work with Dig Core Pod.

- Append the transferred Public Key from file id\_rsa.pub on the destination Protect's Dig core machine's authorized\_keys file (/home/pstk/.ssh/authorized\_keys)  
Example:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAQEA2t+bzQrc7iaiIZuxaoLaP2p7QWDQkMuNhMzh4KlqMADrnU10Jgaq7tMYvBbEpV2a8DbOqZKBahqz  
/DgKZNW3dwPcZ6GsbGVGRfOyuHbDdR+A/2SGXw1CqmMMBx/5eU0tFLhZv+qnY/BpZaIS9hc  
/xbhEQdBwRmcHoS0bCuQkK+q5+nbCxKV+EcleHqFG3i9vVaOP5E6fNlxSHGdtCA/K78kIPSR2zye9AmfrqsubMUqxX+4VpjxL8gfL5  
/X27Nsp0Lh0CbBq4Mw9MbaPPcg6qTos4WZvCeEmWsLEYQnRfhp6WNI0G7OYOEOwCOJAfbTCXYphzNYSUXj01w+nZ4JQ== ssuser@mypsx
```

where mypsx is the Hostname of the Master PSX machine.

2. Set up KPI transfer and processing.

This is a one-time configuration to complete the setup process.

- On PSX master, run the following command as an ssuser from the path /export/home/ssuser/SOFTSWITCH/BIN.

```
$setupnextxkpi.sh <Dig Core IP address or host name> <wait time before raising trap>
```

## Example

```
$setupnetxkpi.sh 10.6.30.128 10
```

where

10.6.30.128 is the IP Address of the Dig core Pod.

10 is the wait time before raising a trap

- Stop the scripts or kpinonstop.sh or kpisync.sh if they are running.
- Update the script kpinonstoptemplate.sh with the Dig Core Pod IP Address and the time limit to wait before raising a trap.
- Perform this step if you are setting up the configuration for the first time.
- Verify the ssh connection from the PSX Primary and NetScore

```
$ ssh -i /export/home/ssuser/.ssh/id_rsa pstk@DigCoreIP
Are you sure you want to continue connecting (yes/no)? yes
```

- Enter Yes. Once the Dig Core Pod is connected, you do not need to re-enter your password during each KPI transfer.

### 3. Restart the Softswitch on the Master PSX.

- To stop the softswitch, log in and run the following command:

```
cd /export/home/ssuser/SOFTSWITCH/BIN
./stop.ssoftswitch
```

- To start the softswitch, log in and run the following command:

```
cd /export/home/ssuser/SOFTSWITCH/BIN
./start.ssoftswitch
```

The softswitch starts the kpinonstop.sh (if exists) in the background and stops kpinonstop.sh, kpisync.sh and lcrpildr if they are running before invoking kpinonstop.sh.

The softswitch stops kpinonstop.sh, kpisync.sh and lcrpildr if they are running.

This ensures that the KPI transfer functions long as the softswitch is up and running

## Section C: Ribbon Protect Configuration



Make sure that the Ribbon Internal IP address is in a different network from the network of the devices under monitoring such as PSX, GSX, SBX, QSBC.

Log in to Ribbon Protect GUI via the web browser with its Management (MAG) IP.

Go to System -> Add-on Manager -> Q20-Q21 Live Base KPIs -> Click "Deploy Add-on" for deploying the Add-on for VBR.

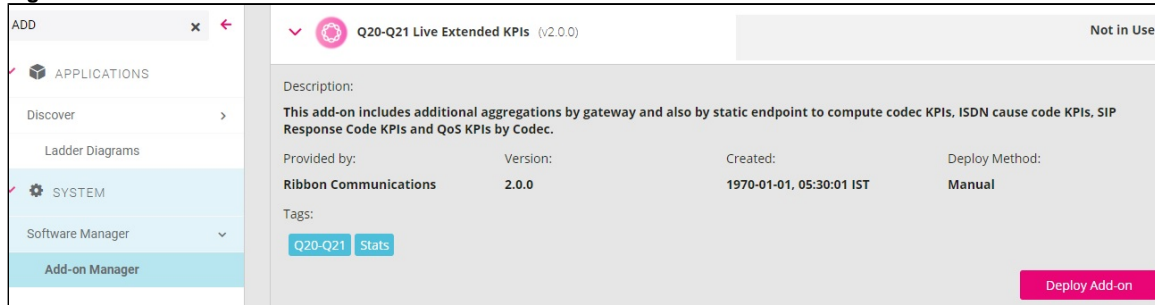
**Figure 3:** Add-on Q20-21 Live Base KPIs

The screenshot shows the 'ANALYTICS' dashboard. On the left, a sidebar has 'ADD' at the top and 'SYSTEM' below it, with 'Add-on Manager' selected. The main area shows the 'Q20-Q21 Live Base KPIs (v2.0.0)' add-on, which is 'In Use'. The description states: 'This add-on includes base aggregations by gateway, calling number prefix, called number prefix and static endpoint which are used to compute call statistics KPIs, QoS KPIs and error KPIs. The add-on also includes the datasources and dashboards related to Q20-21 endpoint monitoring.' Below this, a table lists: Provided by: Ribbon Communications; Version: 2.0.0; Created: 1970-01-01, 05:30:02 IST; Deploy Method: Manual. There are also tags for 'Q20-Q21', 'Stats', and 'Events'. A pink 'Deploy Add-on' button is at the bottom right.

Go to System -> Add-on Manager -> Q20-Q21 Live Extended KPIs -> Click "Deploy Add-on" for deploying the Add-on for VBR.

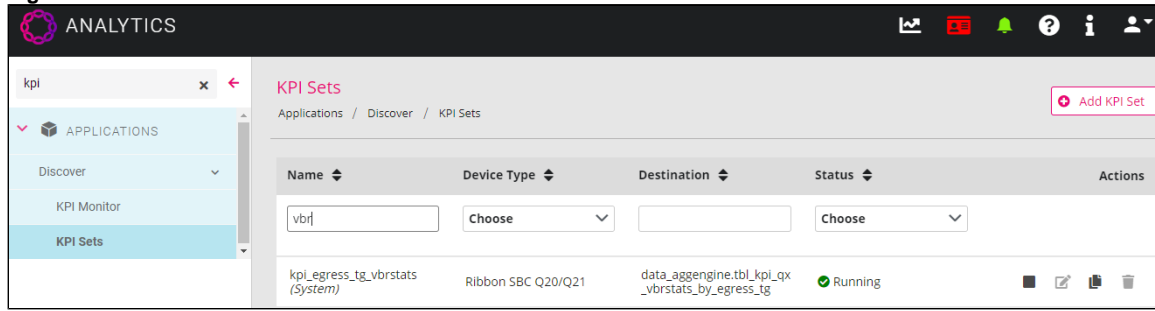
This add-on includes additional aggregations by gateway and also by static endpoint to compute codec KPIs, ISDN cause code KPIs, SIP Response Code KPIs, and QoS KPIs by Codec.

**Figure 4: Q20-Q21 Live Extended KPIs**



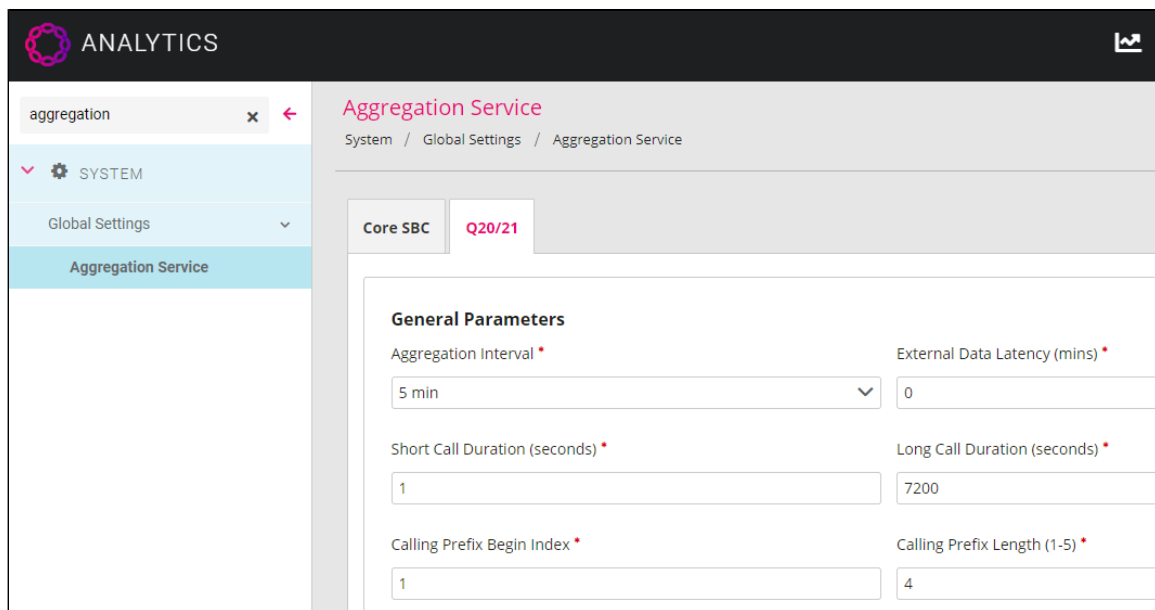
Go To Applications Discover KPI Sets "Run" (if not in the run state).

**Figure 5: Download CSR**



Aggregation service for QSBC and Core SBC set to 5 mins interval (System -> Global Settings -> Aggregation Service -> Q20/21)

**Figure 6: Aggregation service for QSBC**



**ANALYTICS**

aggregation

SYSTEM

Global Settings

Aggregation Service

Called Prefix Begin Index: 1

Called Prefix Length (1-5): 4

Threshold for Packet Loss %: 1

RFactor Level 1: 72

Threshold for Latency (ms): 100

RFactor Level 2: 80

Threshold for Jitter (ms): 100

RFactor Level 3: 90

Valid Seizure Disconnect Reasons: 7 - Forbidden-User Blocked, 1026 - Forbidden-User Blocked At Destination, 5403 - Forbidden

Custom Disconnect Reasons:

Reason 1: 13 - Not Found-No Route Found

Reason 2: 14 - Service Unavailable-No Ports Availabl

Devices Device List Add the device type as Ribbon SBC Q20/Q21 (with its name and IP) and enable sftp settings, CDR, and PCAP (if required).

**Figure 7: Add Device**

**ANALYTICS**

device

DEVICES

Device Dashboards

Device Types

Device List

Device Data Enrichment

Device Groups

Device Mitigation Scripts

**Edit Device**

Devices / Device List / Edit Device

**Device Details**

Device Type: Ribbon SBC Q20/Q21

Name: Q21-SVT-91-22

Cluster Name: Q21

Time Zone: UTC

Latitude: 0

Longitude: 0

**ANALYTICS**

device

DEVICES

Device Dashboards

Device Types

Device List

Device Data Enrichment

Device Groups

Device Mitigation Scripts

**Channels**

At least one channel must be selected

If the device uses channels, enable each channel needed and enter the information needed.

SFTP

Host: 10.34.91.22

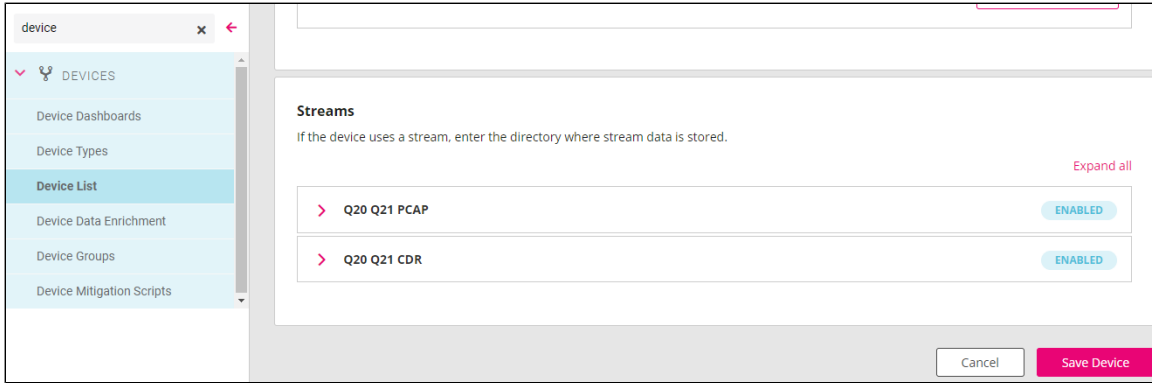
Port: 22

Username: root

Password: Password

Compression: Disabled

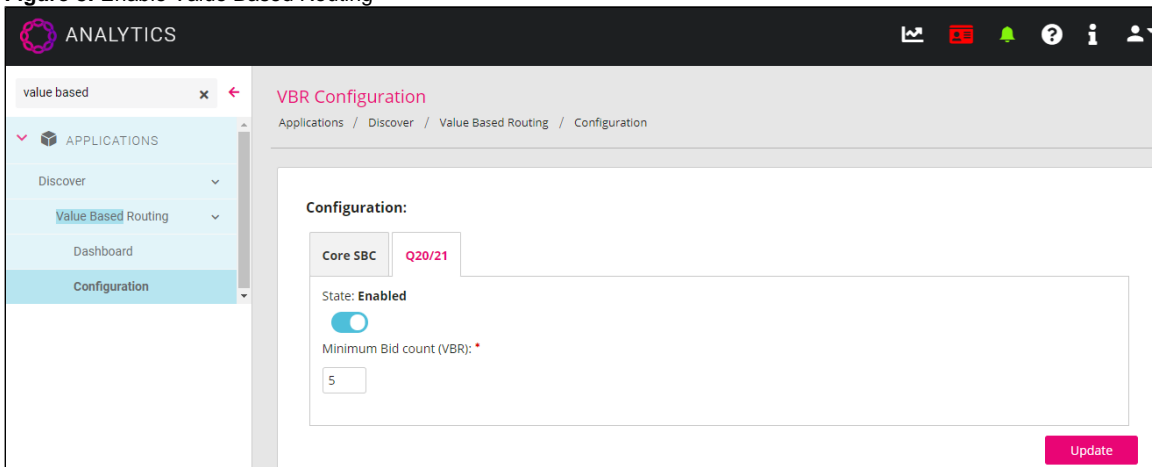
Test Connection



Enable "Value based Routing" by configuring "min bid count" to "5" (or any number according to the requirement) and select "Update".

Go to Applications Discover Value Based Routing Configuration.

**Figure 8: Enable Value Based Routing**



## Section D: Troubleshooting Information

### Troubleshooting PSX Redirector interconnection with Ribbon Protect

When Ribbon Protect, PSX and QSBCs are configured and are up and running, you can check whether PSX is pulling data from Ribbon Protect. Access the PSX as root and check the /var/log/messages log.

If PSX successfully pulls data, you can see logs similar to the following:

Sep 19 05:44:54 STPSX02 lcrkpildr[29547]: lcrkpildr: finished kpi file (/tmp/VBR-network-15-2020-09-18Z23:35:00.csv) load at Sat Sep 19 05:44:54 2020#012.

Sep 19 05:44:54 STPSX02 lcrkpildr[29547]: lcrkpildr: loading took 0 seconds.

Sep 19 05:44:54 STPSX02 lcrkpildr[29547]: lcrkpildr: kpi file (/tmp/VBR-network-15-2020-09-18Z23:35:00.csv) load report (last updated=1600474494) - noValues=6, unchanged=70, gets=74, inserts=0, updates=4, gateway-trunkgroup not found=0, insert failures=0, update failures=0

### Troubleshooting Ribbon Protect

Log in to the Ribbon Protect Internal IP and execute the following.

#### A) For Checking VBR/LCR data in Ale-Lcr Pod


##### 1. To Display All running Pods

```
kubectl get pods -o wide
```



## 2. To Login to Specific Pod like Ale Lcr

```
kubectl exec ale-lcr-5dcd76c45-qkxcb -it bash
```

 Ale Lcr Pod name varies. Take the name from the output in the previous step.

## 3. Check that the VBR/LCR csv file is stored in the following path.

```
cd /home/lcr/
```


## **B) For Checking VBR/LCR data in Dig Core Pod**

### 1. To Display All running Pods

```
kubectl get pods -o wide
```

### 2. To Login to Specific Pod like Dig Core

```
kubectl exec digcore-5fb8988b65-cg829 -it bash
```

 The Dig core Pod name varies. Take the name from the output in the previous step.

### 3. Check VBR/LCR csv file stored in the following path.

```
cd /var/dropbox/pstk/stats/scoring/vbr
```

## **C) For Checking VBR/LCR data in Hadoop DB**

Enter the following 3 commands:

```
kubectl exec hadoop-master-0 -it bash  
su -s /bin/bash impala -c "impala-shell --ssl -k -i hadoop-data-0.hadoop.default.svc.cluster.local"  
use sensorstore;
```

### 1. To Check the Quantity of Q21 CDRs fetched by Ribbon Protect from Q21

```
select count(*) from tbl_ribbonsbcqx_cdr;
```

## **D) For Checking VBR/LCR data in PostGres DB**

Enter the following 3 commands:

```
kubectl exec postgres-0 -it bash  
psql -U postgres appstore;  
select * from data_aggengine.tbl_kpi_qx_vbrstats_by_egress_tg;
```

## **E) For checking Ribbon Protect Log**

Log in to the Internal IP and then go to directory /flume and check the latest vigil log.

```
cd /flume  
  
vi vigil-1591603823719-192.log
```

*There should not be any SQL exception related errors like the sample log shown below:*

```
[2020-06-16 12:51:05,910][aggengine][ERROR][aggengine][vigil.app.common.DBActor][43]: SQLException SQL State = 08006 Error Code = 0  
[2020-06-16 12:51:05,911][aggengine][ERROR][aggengine][vigil.app.common.DBActor][44]: SQLException message An I/O error occurred while  
sending to the backend.  
[2020-06-16 12:51:05,911][aggengine][ERROR][aggengine][vigil.app.common.DBActor][45]: SQLException
```

## Conclusion

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These Application Notes describe the configuration steps required for QSBC interop with PSX Redirector and Ribbon Protect. All features and serviceability test cases were completed.