Revenue Assurance for Carrier Interconnect

An AdvOSS Solution White Paper

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http://www.advoss.com/resources/whitepapers/Revenue-Assurance-for-Carrier-Interconnect.pdf

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Modern day carriers have all-IP cores. There are many services for which they need a third party vendor. Voice telephony over IP always requires a terminator for out of network calls, All content related services need interconnect with a content provider or aggregator.

All-IP Cores have made it seamlessly possible for them to Interconnect with any vendor. The convenience has brought lots of new possibilities but lots of new challenges as well. This white paper discusses the issues faced by Carriers in terms of their revenue assurance.

A basic solution for Carrier Interconnect from AdvOSS consists of:

- AdvOSS Session Border Controller
- AdvOSS Least Cost Router
- AdvOSS Interconnect Billing

The white paper also discusses how issues faced by Carriers in their Interconnect are handled by features available in AdvOSS Products.

Revenue Leakage

Revenue Leakage is about all the problem where the revenue of a Carrier is either not recognized in the first place or it is not realized after recognition.

Credit Exposure

Credit Exposure is the situation where the balance of a Customer has exceeded either its pre-paid balance or the authorized credit limit. Since traffic for a service provider runs in real-time, a rogue customer can cause substantial amount of usage in a relatively short period of time.

The problem is more intense in system which are running in batch processing of CDRs. AdvOSS provides multiple scenarios to handle the varying needs of Carriers to control their credit exposure.

- **Near Real-Time Mediation**

  In this scenario, CDR files are cut at a higher frequency (typically for 10 minutes) and they are rated and charged immediately after cut. This allows for Account Balance Management of Customers in near real-time and allows the cut off system to cut off the traffic or generate alarms when a Customer's balance fall low.
- **Prepaid Authorization**

  In this scenario, each call is Authorized before it is allowed to start and the balance along with the Credit Limit of the Customer is checked to ascertain that the customer has sufficient balance to allow this call.
- **Real-Time Unit Reservation**

  In cases where a Carrier is dealing with individuals having absolutely no credit worthiness, a guaranteed prepaid mechanism may also be configured where each call is authorized continuously throughout the duration of the call. This confirms that the Customer will be able to consume his credit to the last cent and the Carrier will still have no credit exposure at all.

Network Problems

Networks are becoming more reliable but are still error prone when it comes to traffic passing through public Internet. Packet loss is a common phenomenon and that results in revenue loss when it carries information about ending of ongoing sessions. The final 'bye' message sent by one of the endpoints is transmitted through all the concerned network elements as they use the details of sessions for charging and accounting of the completed session.

AdvOSS Session Border Controller (SBC) works as a SIP B2BUA (Back to Back User Agent). In addition to many other benefits, it gives the SBC the visibility to continuously keep itself in the call path and to touch with both originator and terminator equipment periodically to find out if the calls are actually going on. In case where it senses a lost bye message, it has the options to query the endpoint and also write a CDR for the duration of the call actually registered that far. This makes sure that the Carrier does not lose all revenue for a call even when networks are intermittent or unreliable.

Manual Mistakes

A typical rate sheet for a VoIP provider may have anywhere between 3K to 300K records. This is because of the complex nature of routing and rates in such network. In addition to this, Terminators have different ways of sending their rate sheets from plain .csv files to excel sheet in multiple different formats.

A Carrier needs to have means to import all these rate sheets correctly into its own system so as to be able to correct rating, charging and routing which are all based on such rates. A slight mistake in importing rates may cause wrong routing and charging

AdvOSS Charging and Rating Engine comes bundled with multiple templates formats which are currently used in the industry. Each template comes with a long list of rules checking and matching and allows an operator to identify many mistakes at the time of import of rate sheets.

In addition to this, AdvOSS Charging and Rating engine comes with a module of reconciliation that allows a Carrier to reconcile its CDRs with that of Customers / Terminators periodically. Any mistakes or errors still left in the system are quickly identified at this stage and can be fixed.

Exchange Rate Movements

For Carriers in the global world, it is difficult to always buy and sell in your home currency. This makes the interconnect Billing heavily dependent on a real-time multi-currency system. Every aspect of the system is vulnerable to exchange rate movements and with shrinking margins it requires agility on part of the Carrier to react to real-world movements in currency.

AdvOSS Interconnect Billing is fully multi-currency enabled on both customer and vendor sides. The movements in exchange rate can be entered into the system as frequently as needed and they apply immediately and reflect in the all the reports which are also generated in real-time.

Exchange rate movements may also affect the actual cost of the call. AdvOSS LCR is also fully multi-currency enabled and uses the exchange rate entered in the system to match costs in foreign currency to the costs in local currency.

Fraud

Fraud is a major concern for any Carrier involved in the Carrier interconnect business. The extreme flexibility that all-IP networks bring to the Carrier, also bring the same convenience to fraudsters to abuse the system. Following major fraud avenues are to be handled by a Carrier.

Identity Theft

All the charging by the terminators and carriers is done by getting the identification information from the signalling plane. In all-IP networks, it is the IP address of the end point that originated the traffic which is used as the key to identify the Customer and then to charge him.

A major avenue of fraud is in identity theft where a malicious user manages to enter his IP into the allow list of the terminator or the Carrier. It it manages to enter its IP to the Terminator, it sends traffic directly to the Terminator and the fraud will only be catched when the CDRs or the account is reconciled with the terminator.

If the malicious IP was entered into the Carrier system, it will be detected when the account is reconciled with the Customer.

AdvOSS system provides a very secure GUI along with many other security settings that make it difficult for a malicious user to access the GUI and enter malicious data.

Reconciliation also allows frequent reconciliations to detect any malicious entries.

In addition, the system can be configured to always send alerts through SMS, Email or even automatic phone calls when new IP addresses are added in the system or other such information is changes.

Unauthorized Access

Unauthorized access is about the hacking of credentials of a valid user. Once the account is hacked, the hacker can manipulate entries by adding fake payments or changing balances.

AdvOSS Interconnect Billing comes with detailed Data Integrity checks that find out most errors in balance by cross matching totals. Plus AdvOSS Interconnect Billing generates a real-time balance sheet and entries in balance sheet get out of balance when such malicious activity is done.

This is in addition to security at the network layer where only access is through VPN and that also uses high encryption SSL settings to communicate with the server.

CDR Manipulation

CDR Manipulation is the act of adding fake entries by a terminator or removing valid CDRs by a Customer or changing other parameters in the call like time of call, duration of call or dialed numbers etc. All such frauds are detected through the comprehensive reconciliation module given as part of the AdvOSS Interconnect Billing.

Payment Fraud

Payment frauds are false or delayed payment confirmations sent by customers. It is an off-line activity where the Carriers needs to enter all the received payments into the system. Under situations where

the authenticity of a payment is dubious AdvOSS Interconnect Billing allows the Carrier to reduce the credit limit of the Customer until the payment is confirmed.

As a more advanced use case, in real-time systems, the Carrier can also reduce the concurrent call capacity for a specific customer to curtail its exposure until the payment is confirmed.

Extra Costs

Extra costs are all those expenditures which can or should be saved.

Routing Optimization

With multiple terminators, each call needs to be routed to the least cost route available. With available routes running into thousands, it is a problem of extreme complexity.

The problem is made more complex when it comes to failovers in calls which are frequently done because of low ASRs on the networks.

AdvOSS Least Cost Router is a comprehensive product that looks up the rate sheets of all the terminators and routes each call to the least cost route available. In addition, it also interacts closely with AdvOSS Session Border Controller and manages fail-overs to secondary routes.

Negative Margins

With thousands of routes and multiple selling rate sheets, it becomes prohibitively difficult to ascertain the actual margin on any call. With multiple routing schemes, it is possible that some routes are running into negative margins or others are running at lower than acceptable margins.

AdvOSS Interconnect Billing does Terminator rating and charging at the same time that it does Customer rating and charging. Both the selling and buying prices for each call are recorded side by side in the same CDR. Alerting policies can also be set to alarm an administrator about such CDRs and allows him to make policies for such calls.

In real-time system, the monitoring GUI shows a real-time snapshot of all ongoing calls and shows calls with negative margins in red color so that the Admin can take immediate action on such calls.

Capacity Under Utilization

At times the Carrier has arrangements to terminate unlimited calls on a given capacity. At other times, a Carrier would have limited capacity on a lower priced route and would like to use that route to its full capacity before rolling over the costs to next higher priced route.

AdvOSS Least Cost Routing Engine can be made fully aware of such unlimited capacity routes and coupled with concurrency management system, can be configured to use the capacity of any route to its fullest before moving on to the next higher cost route.

Codec and Bandwidth Abuse

Bandwidth is scarce and expensive on some routes. On such routes, the selling price depends on the bandwidth that will be used by the Customer. That in turn depends on the Codec that the customer will

be using to communicate. Compression codecs typically take 7 to 10 times less bandwidth than raw codecs.

AdvOSS Session Border Controller allows real-time negotiation and authorization of allowed codecs which can be set for individual customers. Any customer who is not allowed a raw codec will be denied access or forced to use a compression codec.

In other scenarios, a different codec may also trigger a transcoding operation which is usually expensive in terms of computation capacity available and may also degrade the voice quality.

AdvOSS SBC gives granular control over codecs which are allowed to any customers thus giving full control over use of bandwidth in the hands of the Carrier.

Opportunity Losses

Opportunity losses are those scenarios where the Carrier had an opportunity to increase its revenue or decrease its costs but could not realize the potential available. Such scenarios include:

Rating Classes

Rating Classes are multiple classes of routes like Premium, normal, best effort etc. that allow a Carrier to charge higher prices from Customers who are willing to pay for higher quality. AdvOSS Charging and Rating Engine along with AdvOSS Least Cost Router are fully aware of multiple Rating Classes and allows a Carrier to run multiple parallel networks of premium and standard routes and charge premium prices to customers on premium routes.

Wasted Capacity

Because of peak / off-peak hours in the traffic patterns, a Carrier is typically using only 25% of its available capacity. This is because traffic in off-peak hours is lower and during late night hours may actually drop to almost zero. Since many of the costs of a Carrier are fixed, it is to a Carrier's benefit to utilize its resources 24 x 7.

AdvOSS Charging and Rating Engine allows a Carrier to offer Time of Day based rates. This in turn allows it to offer lower rates during off-peak hours and better align its utilization towards maximizing the potential available in the network.

Non-Usage Charges

In a Carrier environment, Customers are usually service providers themselves which are only charged for the usage that they make. But it may be possible or desirable by the Carrier to charge some charges to Customers just for allowing them to be on the network or for actually reserving some resources to them.

All such charges whether periodic or subscription or others are handled in AdvOSS Interconnect Billing that gives a Carrier maximum flexibility to define such charges in different ways and charge them to the customers.

Rounding and Breakage

Rounding is the pulse at which the charging is done. In a minute by minute charigng, the duration of a call is rounded up to the next full minute. This is a source of extra income which may typically add 2% to 10% to the gross revenue of a Carrier.

Breakage is about the expiry of the credit in a Customer's account. It is usually applicable to smaller customers but may still be a source of extra revenue to a Carrier.

AdvOSS Charging and Rating Engine provides full support for defining the pulse in two separate steps. AdvOSS Interconnect Billing provides support for balance expiry and breakage.

Personalized Packages

At times some customers have special needs. They need to have special rates to some destinations.

With personalization, offering such special rates requires defining a full new package which has its own operational overheads and needs to be maintained once defined.

AdvOSS Interconnect Billing allows a Carrier to define special rates for some specific Customers to some specific destinations. This personalization gives flexibility to Carrier and allows for better retention of existing customers and gives flexibility to sales team to bring new customers on board offering them special personalized packages to their favorite destinations.

Concurrency Control

Concurrency Control provides an opportunity to a Carrier to restrict the number of concurrent calls received from a Customer. This can only be enforced in a strict real-time environment. The restriction allows a Carrier to better align its available capacity among multiple customers and may also enable it to charge higher subscription charges for reserving a higher capacity for Customers.

AdvOSS Session Border Controller is fully capable of enforcing concurrent call limits for individual customers.

Conclusion

AdvOSS Interconnect Billing is a complete solution comprising mainly of AdvOSS SBC along with AdvOSS Interconnect Billing.

The solution provides multiple functional use cases and non-functional features needed by a Carrier to fully deploy and run an Interconnect business. Among its many concerns are concerns of Revenue Assurance as Carriers today are working on increasingly competitive prices and thinning margins.

This white paper discussed multiple concerns of Carriers about revenue assurance and mentioned ways on who AdvOSS products handle those concerns.