**Technical requirements**

# I. General requirements

# II. Prerequisite

# III. Detailed Technical Requirements

I - GENERAL REQUIREMENTS

The scope of this specification gives technical requirements for a real-time rating and charging system for VinaPhone’s post-paid subscribers, the main points of which are:

* Providing a real-time rating and charging system that has the capacity of 2.000K active subscribers with 2.000K BHCA
* Main functions consist of: CAMEL ph2, CAMEL ph3; Real-time charging for telephony, Diameter, GPRS, SMS, MMS, Data; USSD; meeting demands for promotion and reward plans; subscriber management; recharging, etc.
* Providing A UPS On-Line for proposed equipments using AC power.

Bidder who submits the offer shall base on the details in this document to specify their proposal products.

For each item, the bidder has to fill in the column ‘COMP. GRADE’ using:

**FC** (**F**ull **C**ompliance), if the item is fully satisfied

**PC** (**P**artial **C**ompliance), if the item is partly complied with. The bidder is required to explain the differences or the exceptions that do not fully comply with the item

**NC** (**N**on-**C**ompliance), if the bidder is unable to meet the item.

Column ‘POINTS’ has the maximum number of points for each item. Vinaphone will give points that items obtain during the evaluation.

In order to be easier for Vinaphone to consider the product proposed, a soft copy of the tender is required.

Bidders have to provide further information by filling in the comment column (although this information is not the reason for either acceptance or rejection of the proposal) to clarify every item.

The Bidder's writing should be in English and in size larger than 10pt.

II- PREREQUISITE

* The grade of compliance mentioned in this part “II. Prerequisite” has two grades – FC and NC
* The product offered has to fully comply with each of the following items. The bid document will be dismissed if any of the items is NC
* The bidder must fill in the column “COMMENT” to further clarify the answer to each item. The filling can either be explanations or references in the document.

| **ITEM** | PREREQUISITE | **COMP. GRADE** | **COMMENT** |
| --- | --- | --- | --- |
| **1** | The redundancy model must support 1+1 for at least components functioning database and signaling, and N+1 for other important parts, in order to maintain a high availability. When a certain equipment (or part of it) is out of order, the redundancy part can take over all service of the faulty one without any interruptions. | **FC** | Comverse ONE RT components are fully redundant. No single point of hardware or software failure will result in unavailability of the platform. The platform is able to continue processing even when certain combinations of failure occur. The availability figure is better than 99.990%. Redundancy is built into every component of the system.   * An ‘N+1’ or ‘N+M’ redundancy scheme protects against SLU processor failure. * An Active-Active (1+1) approach is taken for each pair of the Call Control Server (CCS) and Signaling Gateway Unit (SGU). Multiple pairs of CCS & SGU can be configured for scalability. * Full redundancy is in place at the Platform Manager * The High Speed Backbone Network (Gbps) is configured with two paths between every system component. * Every component of the Service Data Point is duplicated.   For further information, please refer to the following attachments:  COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 4 - Platform Architecture Overview, pp 25-31) |
| **2** | High Availability Requirement  The design of system shall   * have no single point of failure * design and configure with high availability configuration * continue processing the event even when certain combination of failures occur * support 99.99% high availability figure | **FC** | High Availability is attained through:   * Load-sharing for data less computing elements * Active/Standby for critical execution components * All components can be scaled linearly * Distributed Architecture & remote IVR configuration * Redundant TCP/IP network backbone   For further information, please refer to the following attachments:  COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 4 - Platform Architecture Overview pp 15-31) |
| **3** | Redundancy requirement  All main parts of new equipments shall be doubled in order to maintain a high availability.  The redundancy model should support 1+1 or N+1 work model in order to maintain a high availability. When any of the certain equipment (or part of it) is out of service, the redundancy part can take over all service of the faulty one  In detail, the bidder shall state and describe the redundancy mechanism of each equipment provided.  In detail, the bidder shall state that all critical components of the equipments shall be duplicated: Processors, memory, control and data buses, and other critical components like Data Server Component, Dateless Server Component, Signaling Component, Networking and Infrastructure Component… | **FC** | The core Comverse ONE RT (such as SDP, SCP/IP (SGU, SLU), OCS (DGU/DSU), IVRU and SMP) elements use standard protocols to communicated to each others. The interfaces between the Network (MSC/SSP, HLR and GGSN) and the SCP are SS7 based (such as MAP/ISUP/CAMEL) and may look familiar to those familiar with TCP/IP protocols. In fact, the SS7 protocols implement much of the OSI seven-layer model. The internal communicate insides SCP, and between SCP (SGU/SLU), OCS (DGU/DSLU), SDP and SMP are based on TCP/IP.  The following diagram shows the internal architecture of Comverse ONE RT system    The Comverse ONE RT is based on IT infrastructure with the robustness of SS7 interface capabilities. The Real-Time components are fully redundant. No single point of hardware or software failure will result in unavailability of the platform. Furthermore, the platform is able to continue processing even when certain combinations of failure occur. The availability figure is better than 99.99%.  Scalability  For more information, please refer to  COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 4 - Platform Architecture Overview pp 15-31) |
| **4** | The system proposed must fully complies with 3GPP Release 99, Release 4, Release 5 and Release 6. | **FC** | Comverse ONE fully supports the following protocol   * ISUP signaling * MAP signaling for USSD * CAMEL phase 2 for voice * CAMEL phase 3 for GPRS (Optional) * CAMEL phase 3 for SMS-MO * OSA (Open Service Access) Interface for Part 12 Charging (Optional) * Diameter for Data charging   These protocols are based on standards recommended by the 3GPP organization from Release 99, Release 4, Release 5 and Release 6. For more information on these interfaces, please refer to:   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf   COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf |
| **5** | The system offered shall provide every one of the services that Vinaphone are providing.  Real-time authorization, notifications, online and offline rating, and comprehensive balance management and features of the system that are additionally required in the project, including: Camel ph3, GPRS, Diameter, SMS, MMS, Data, shall be included in the system offered. The bidder shall commit to integrate these functions with VinaPhone’s network without any trouble that may badly impact the services being provided. | **FC** | Current Comverse ONE RT supports these basic services. For more information on these interfaces, please refer to:   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf * COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf   Comverse will be responsible for the integration with Vinaphone’s core network. For more information on special integration for Vinaphone network, please refer to the technical proposal document. |
| **6** | The system shall integrate, charge real-time, and provide rating functionalities for value added and non-voice services including MMS, SMS, SMS based, RBT, GPRS, Voice SMS in Vinaphone network | **FC** | Charging of non-voice services will be based on the following interfaces and protocols:   * Camel 3 SMS (SMS-MO) * Camel 3 GPRS (Optional) * Diameter for Data charging   Comverse’s proposal includes Diameter for Data charging. Some interfaces may need integration work between COMVERSE ONE RT and the VAS vendor such. For CAP3-SMS, and CAP3-GPRS, this is basic integration with the core network.  For more information on these interfaces, please refer to:   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf * COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf   There are several special integrations for Vinaphone such as offline/online charging gateway, HLR synchronization, and etc |
| **7** | The bidder shall describe the ability to expand the system up to many millions of subscriber.  The proposal system shall have a clearly roadmap towards system expansion and upgrade to meet real-time rating and charging requirements for future services. | **FC** | The Comverse ONE RT is configured to support widely differing numbers of subscribers. In various sites around the world today, the same platform technology supports as few as 10,000 subscribers and as many as several million subscribers (25M++ with a single platform or more than 60M with multiple platforms on a distributed architecture), with virtually unlimited scalability. The platform is designed to grow incrementally without the need to replace the initial hardware (except end-of-life hardware components) and software components. This is achieved by replicating components at the platform as service usage increases.  For further growth, a single Comverse ONE RT is distributed across multiple sites, each HSBN being inter-connected using data routers. In this case, several sites combine to behave as a single, large system. A distributed System supports many millions of active service subscribers and BHCA. The distributed platform approach is also well suited to a geographically dispersed environment, and provides a logical means of expanding the capacity of the system over time.  Many configuration options are available – for example, one or more platforms is deployed in different geographic regions, one or more platforms is shared between regions, and so on.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 4 - Platform Architecture Overview pp 15-31) which shows how scalability can be achieved. |
| **8** | Equipments UPS on-line for AC power shall have two separate AC inputs (A/B) so that any of the equipments can stay working even if either of the AC inputs gets lost.  One required, two for redundancy (hot-plug) with separate power cords  UPS On-line for AC power shall have the power large enough, the configuration 1+1 and be able to supply at least 8 hours for the system running in its full capacity if the main power loses. **Important nodes, at least SCP, SDP shall use VinaPhone’s system -48VDC.** | **FC** | The system provide to VNP using DC power supply with 1+1 input for redundancy purposes. The system will use Vinaphone's DC power system.  Please refer to Physical & Environmental info.pdf -- section 3 Electrical specification, section 4 Power consumption |

# III. DETAIL TECHNICAL REQUIREMENTS

| **ITEM** | **DETAILED TECHNICAL REQUIREMENTS** | **COMP. GRADE** | **COMMENT** |
| --- | --- | --- | --- |
|  | RATING AND CHARGING REQUIREMENT FOR POSTPAID |  |  |
|  | RATING AND CHARGING |  |  |
|  | RATING AND CHARGING MODULES  The system provides a single rating engine for all usage rating in the solution. The rating library is grouped in four modules:   * Guiding * Pricing * Charging   Balance Management  The real-time applications such as call processor, CAMEL 3 SMS/GPRS, Event Charging, and Diameter provide input to the rating engine in real time. The Rating Engine can run in online or offline mode to process usage events received via real-time/off-line applications wherever applicable.  The system can generate rated CDR for VNP to input to other BSS like billing, invoice etc | FC | 1) The unified rating engine (URE) is comprised of the following modules:   * Guiding: finding the user responsible for activity, the activity usage type, and the liable (billable) party * Pricing: determining the price of the usage based on offers, tariffs, and promotions (discounts and bonuses) * Charging: computing the charge for the usage * Balance Management: crediting/debiting accounts, locating the appropriate balance to charge   The URE modules allow customized replacements or overrides of core functionality in each logical unit. All URE modules use the Foundation Class Framework to ensure seamless portability across platforms and variations required to support internationalization.  The URE loads modules according to specifications in a configuration file in order to adapt dynamically to the functionality supported.  2) To present a single logical view of rating to the customer, the Comverse ONE solution supports a Unified Rating Engine (URE) for both online and offline rating. The URE carries out all the necessary processing of usage records to determine the charges on that usage so it can be billed correctly. For more information, please refer to COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf(Chapter 2 – Rating Architecture, pp. 9-16) |
|  | **Basic rating and charging requirement**   * Prevent over-usage, in order not to incur a negative balance or exceed a credit limit in the account * Deduct actual funds from an account balance to pay for services used by the postpaid subscriber in real time * Charge subscriber balances for concurrent transactions (e.g.,3-way calling) * Ensure that sufficient funds or credit is available from the start of a chargeable data session or event through to its completion, thereby enabling a service to continue only as long as funds are available * Ensure that depletion of one balance does not affect the ability of the subscriber to use the other services as long as a positive balance is available for that service * Prevent complete draining of funds by one service type and ensure that a negative balance, over credit limit does not occur. * Real-time balance management and service authorization for all customer usages (postpaid). * When a limit is reached service must be denied * Off-line processing must also be available for use if requires * Rating based on the value offered by the content, time of the activity, location of the source and destination, special features addressing. * The system shall support the real time postpaid roaming. * The system shall support the auto update tariff version; allow preparing the new tariff structure in advance. Vinaphone can prepare several set of future tariff and schedule in the system when it will be active. * Support community charging * Support emergency numbers and Toll free | FC | Comverse systems comply to all requirements listed here.  The balance reservation mechanism is provisioned with predefined reservation amounts that allow segments of a transaction to be completed and billed as long as sufficient “unreserved” funds or credit limits are available. If insufficient funds or credit is available to initiate or continue a transaction activity, the service is denied or terminated.  Offline Record Processing can be supported with COMVERSE ONE’s Revenue Recovery feature. It is a configurable mechanism that allows COMVERSE ONE to recover revenue that would normally be lost during periods of database unavailability. Billable activities that occur when COMVERSE ONE is either completely or partially unavailable, due to a hardware or software failure, network signaling failures, or because of maintenance activities, can be rated and charged to the subscriber.  The COMVERSE ONE billing model is capable of rating and charging for all billable transactions detected on its interfaces, including voice call and enhanced data services. All of the entities supporting rating and charging functions must be configured so that the COMVERSE ONE can identify subscriber transaction activities and select an appropriate Tariff Plan for each. Tariffs for future activation are supported. By creating a version that is scheduled to become the current version at some specific time in the future (i.e., a "future version"), it is possible to make changes and enhancements to the service that will take effect in the future, and the current use of the system is not affected.  Tariff selection can be based on activity type, transaction type, service package or tariff plan (day, night)  Real-time charging for postpaid roaming is supported via CAMEL2 roaming. Anyway, not all roaming partners that Vinaphone may have will support CAMEL2 Roaming  The system also support auto tariff version update  Community charging such as calling circle, friends and family packages are supported. |
|  | **Advanced Rating & Charging**  The system shall support credit and spending limit for postpaid subscribers.   * Postpaid monetary balances are cyclical and must have spending or credit limits. * Postpaid running balances can be funded by increasing the amount of credit or spending limit. Credit limits are set by the operator to limit financial exposure. Only a Customer Service Representative (CSR) can change the credit limit. * Spending limits are established by the customer to manage his or her own spending. Spending limits can be changed without special CSR authorization.   Total monetary Liability   * VNP can limit its financial exposure at the account level via Total Monetary Liability (TML). TML is a running total of how much money an account owes to a merchant VNP * The TML shall reflects all postpaid activities that accrue to the account; it reflects a combination of unbilled transactions plus billed and unpaid transactions | FC | 1. The system supports credit limit and spending limit for postpaid subscribers.  * The Comverse ONE solution employs cyclical balances, which are balances that are periodically reset to a specified value. All shadow balances are cyclical, as are postpaid currency balances. * A credit limit is a value the operator sets on a balance in order to limit the amount of exposure or risk for the subscriber/account. * In general, credit limits are the values to which balances are reset on a periodic basis. So, for example, an operator who wishes to limit a subscriber's monthly use of a balance can set a credit limit on that balance, as well as a cycle period and a reset date. At the reset date, the balance value is reset to the credit limit value. The responsibility for resetting the balance to the credit/spending limit is outside the URE. Credit limits in themselves have no direct affect on rating, because the URE just uses whatever balance values are defined. The only indirect effect is that resetting the balance to the credit/spending limit is done by a DB-stored procedure and nightly batch job, which could lead to errors should URE attempt to use the balance before the batch reset process has occurred.  1. The system supports the total monetary liability concept.  * Total Monetary Liability (TML) is an Account-level control used to limit total currency usage in postpaid Balances. It is not a balance, in that it does not really contain any funds. It is just a running limit of all postpaid currency charges in the Account and at the subscribers directly associated with the account. The functionality that TMLs supply is to provide another limit for postpaid currency usage. That is, when a TML is configured, the available amount for any postpaid currency balance is the lower of the available balance amount (Balance Value – Balance Minimum), and the TML available amount (TML Max - TML Value). * The TML can be used to limit the use of postpaid currency balances in the Account, and Subscriber-level currency balances for all Subscribers directly associated to the Account. * For an eligible postpaid balance, when shadow balances and TMLs are both used, the available amount is the lower of the (Shadow Balance Value - Shadow Balance Minimum). (Directed to Balance Value - Directed to Balance Minimum) and (TML Max - TML Value). TMLs do not directly limit shadow balance usage unless they "cover" the real monetary balance to which the shadow-balance points.   For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf (Section - Total Monetary Liability (TML) and Section Credit limits, pp. 170-171) |
|  | **Tariff plan**  Support for multiple-tariff, concurrent-tariff, and negative balance | FC | To support concurrent charging, Comverse ONE RT uses a Reservation mechanism for applying charges to the subscriber balance for current transaction activities. In this process, specific amounts of the subscriber balance are set aside or reserved as the activity proceeds and the reservation is consumed. In this way, the charges are deducted from the subscriber balance many times during a transaction instead of once at the end, thereby preventing the occurrence of a negative balance.  If needed, negative balances can be enabled as well.  For more information, please refer to  COMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf (Section Tariff Configuration, pp. 267-271) |
|  | **Tariff Override**   * The system shall able to differentiate the pricing based on subscriber balance values, subscriber home zone, subscriber longevity, special days, happy hour, favorite areas, and favorites URLs.   The values in the specified parameters can be used to override the associated tariff plan for the consumed service, at the subscriber level. | FC | Tariff Plan Override: The Unified Rating Engine can differentiate the pricing based on subscriber balance values, subscriber home zone, subscriber longevity, special days, happy hour, favorite areas, and favorites URLs. The values in the specified parameters can be used to override the associated tariff plan for the consumed service, at the subscriber level.  For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Flexible Rating and Charging, pp. 42-44) |
|  | Support recurring charge (periodic) and non-recurring charge (fee) | FC | Recurring and non-recurring charges are supported by Comverse ONE RT |
|  | **Rating and charging unit**   * Supporting at least two currency units and automatic exchange currency. * The system shall allow the Vinaphone to define the new unit type. The new unit type such as sms, mms, MB must link to the real currency. The GUI tools shall provide to manage/define new service. The system shall support up to 40 of unit types per subscribers. The system shall support up to 10000 of unit types. * The system shall support flexible balance reservation mechanism. It must be flexible enough to work with multiple balance for concurrent event charging * The system shall support detail charging precision with at least six decimal places. The system shall provide configurable parameters to control charging precision (for voice, and non-voice transaction) * The system must support re-rating, recalculate charges for previously rated or charged activities such as voice calls, data sessions, SMS, and so on * To comply with retroactive rate change, which may be caused by regulatory decisions * To correct faulty configurations, which could include such things as the wrong tariff, wrong calendar, or wrong location setup * To deal with CDRs received in a sequence that differs from the order in which the transaction occurred * Backdating a rate plan for subscriber * RT postpaid rating/charging/promotion with * credit limit – per Subscriber balance control * negative balance concept – per offer based balance control | FC | 1. COMVERSE ONE RT allows for charging in multiple currencies along with currency conversion. Currency conversion allows COMVERSE ONE RT to charge the subscriber in a selected currency when the currency associated with a particular tariff is different from the currency provisioned in the subscriber’s Primary Offer. 2. A Unit Type is a parameter used to determine the consumption of a transaction by measuring its duration in increments of time, such as seconds, or its extent in increments of volume, such as kilobytes or octets. A Unit Type is defined as currency or non-currency type such as seconds, octet, mp3, MPEG, JPEG, emails, SMS, MMS, or whatever a service provider wants to use. 3. The COMVERSE ONE RT employs a multiple balance management scheme that supports system wide 10,000 balances including a Core balance. Each subscriber can have a maximum of 40 balances. 4. The COMVERSE ONE RT does all charge calculations to at least six decimal places beyond the major currency unit ($2.123456) with configurable control over the number of decimal places shown in charges and balances. 5. Rerating is the ability to recalculate charges for previously rated or charged activities such as voice calls, data sessions, SMS, and so on. The following are possible reasons for re-rating:  * To comply with retroactive rate change, which may be caused by regulatory decisions * To correct faulty configurations, which could include such things as the wrong tariff, wrong calendar, or wrong location setup * To deal with CDRs received in a sequence that differs from the order in which the transaction occurred * Billing period change * Backdating a rate plan for a subscriber   Rerating selects unbilled usage and re-applies rates and pricing, re-guiding usage if necessary. The URC module collects unbilled usage data from such tables as CDR\_DATA, sorting and packaging the data into files having C-CAP pick up and process those files and then call the URE to refund the original charge and apply new pricing to the usage.  The rerating process involves the following steps:   1. Trigger rerating by initiating a rerating request 2. Identify and collect records and pre-processing 3. Subscriber record and store rerating histories 4. Identify applicable service data and calculate the re-rated charges   Rerating is either basic or standard.   * Basic rerating -- Consider only directly affected records. Each record is re-rated individually with a delta recorded for each activity. The deltas of all affected records are tallied and the subscriber record is updated with the total. * Standard rerating -- Consider all records for an individual subscriber within a period that includes all activities not directly affected.  1. In the solution the initial data comes from the CDR\_DATA table. If in addition re-guiding is necessary, it may be necessary to apply usage to a different account or subscriber on a different database server than the original one. 2. An offline CDR is a proprietary offline usage file that is an input to Comverse ONE, and is in the form of an ASCII file generated by the mediation device. It is a formatted file with a header that describes the format. Currently there are 40 record types for about 20 file types. 3. The Outage Record Processor (ORP) processes calls that may not have been rated at run time by a real-time process because the SDP was unavailable when the call occurred. Despite the Rating server being down, the subscriber can continue/complete the call. CDRs generated while an SDP is down are re-rated by the ORP. Call details during the outage are stored in the form of a CDR called the Outage Record. Outage Records are stored in the Outage Record file. ORP processes Outage Records, re-rates the call, and applies the appropriate charge for the activity. |
|  | Real time session control:  * Having ability of real-time rating and charging for many events at the same time * Managing a lot of different rating and charging structures and can convert a rating/charging structure into the real-time charging * Real-time authorization for all kind of service included: voice, data, SMS, content billing. * Monitor and manage credit limits on all subscribers, and authorizes or denies services. * Handle the rating control for current transactions * Teardown of service upon balance depletion * The system shall support rating/charging of concurrent event. Each event may happen on different network interface. For example: voice call, GPRS download, and sms from the same subscribers at the same period of time. * The Rating Engine can run in offline mode for processing the events received in batch mode. * The Rating Engine can process the outage records in an offline mode.   Need the trigger for RT postpaid subscribers (in HLR, same way with RT prepaid) | FC | 1, 2, 3) Comverse ONE RT supports concurrent charging of multiple services from multiple interfaces. Multiple tariff plans can be provisioned and assigned against specific activities (voice, SMS, etc). Each class of service is assigned its own tariff plan.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf (Section Tariff Configuration, pp. 267-271)   4, 5, 6) Services are authorized in real-time. C1-RT checks against the subscriber’s current balance before a call or session is allowed. As soon as a subscriber depletes his money, C1-RT requests the switch to tear down the call or session. Credit limits may also be assigned on all or a specific set of subscribers. When this limit has been reached, services will be denied. For more information, please refer to  * COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf(Section - Credit Limits, pp. 171-172)   7) The system can support offline rating using CDRs.  Call Detail Records (CDRs) generated by network and usage records. CDRs go through Data Mediation and File Manager, then input to Comverse ONE Unified rating engine. The engine will process the record for rating and charging purposes. For more information, please refer to  * COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf (Section - Input To The URE, pp. 13-14)   8) Outage record can be processed by Outage Record Processing (ORP) module. The ORP enables the system to continue its operation when one or more rating databases become unavailable. Outage records are produced internally by the DSLU when the rating database is completely or partially unavailable and the revenue assurance and inaccessible database features are enabled.  When configured for automatic-internal revenue assurance and inaccessible database, the OCS creates and sends outage records to the Billing Manager for calls occurring when the rating database is down. These records are later processed by the ORP to recover the revenue.  The outage records are created when the activity ends. To facilitate the completion of the activity, default rating/billing information (typically configured to limit the activity) is used for any/all information that could not be retrieved from the rating database. For more information, please refer to  * COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf, (Section - Outage Record Processing, pp.127-128) |
|  | File based rating.  System also support file based offline rating   * For roaming user * Postpaid subs which want to use the same rating/charging engine but does not want the system to monitor the call in real time * URP/ORP (Offline Record Processing) functionality will be needed. The URP/ORP does have specific data input format which VNP will need to prepare | FC | File based rating is supported by the Comverse ONE RT through the Unified Rating Engine (URE).  1) The unified rating engine (URE) is comprised of the following modules:   * Guiding: finding the user responsible for activity, the activity usage type, and the liable (billable) party * Pricing: determining the price of the usage based on offers, tariffs, and promotions (discounts and bonuses) * Charging: computing the charge for the usage * Balance Management: crediting/debiting accounts, locating the appropriate balance to charge   The URE modules allow customized replacements or overrides of core functionality in each logical unit. All URE modules use the Foundation Class Framework to ensure seamless portability across platforms and variations required to support internationalization.  The URE loads modules according to specifications in a configuration file in order to adapt dynamically to the functionality supported.  The URE can rate both the activities via the signaling or file based input. For more information, please refer to COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf(Chapter 2 – Rating Architecture, pp. 9-16) |
|  | **Services of Rating and charging** |  |  |
|  | Real time rating and charging for Voice call.The system shall support the following voice call scenario  * Mobile originated to Mobile/PSTN/IDD call * Mobile terminated call * Mobile originated to balance inquiry/recharge server/IVR | FC | All these scenarios are supported. Voice call processing begins with call setup and concludes with call teardown which is the call termination. Processing of location-based transactions like voice calls includes the following operations:   * Call setup − the network switch is configured based on the dialed number. Subscriber identification and authentication − the call is routed to the COMVERSE ONE RT for subscriber verification. * Pre-call processing − informational announcements are played to the subscriber. The subscriber’s balance is also checked to ensure that funds are available prior to connecting the call. * Connecting the call − the calling and called parties are connected.   The real-time rating and charging processes based on an appropriate tariff(s) begin at this point. The transaction can only proceed if available funds or credit in the subscriber’s balance are sufficient to pay for the first billable time unit of the call. The balance and reservation management processes will control the charging process as the transaction consumes the balance.  The Comverse ONE RT is always concerned with originating calls (calls placed by the subscriber). If the called party also pays for part of the call charges, terminating calls (calls made to the subscriber) are also processed.  Balance inquiry and Recharging through IVR is supported. There are two types of IVR sessions available: Interactive and Non-interactive. The subscriber calls a predefined access number which is typically printed on the card. This initiates an interactive session with the recharge server and the cash value of the recharge card gets added to the subscriber’s balances. IVR function can support for both postpaid and prepaid subscriber  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Section IN configuration pp. 25-26) * COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf |
|  | Real time rating and charging for non-voiceThe system shall support the following non-voice calls scenario  * SMS MO, SMS MT * GPRS data session * MMS charging   USSD recharge & Information server | FC | Comverse ONE RT fully supports charging of non voice / data services.   * SMS MO is supported through CAMEL3 * GPRS & MMS (if required to charge online) are supported through Diameter * The system also supports USSD Recharge and Information Serverfor Postpaid and prepaid.   Further information are available from attachments   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 2 Camel Enable Services pp 9-14 and Chapter 3 -USSD Enabled Services pp. 17-31) |
|  | **Call forwarding.**  Support real time rating and charging for Network call forwarding | FC | Comverse ONE rates and charges forwarded calls in real time. Call forwarding settings may also be provisioned on COMVERSE ONE RT. New subscribers can have their calls sent to a global voicemail number and all subscribers have the option of choosing alternative forwarding information. All call forwarding settings are dependent on the Primary Offer and can only be self-provisioned by the subscriber if the Primary Offer is provisioned to allow this. For more information, please refer to: COMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf (Class of Service section, pp. 129) |
|  | **Fax**  Support real time rating and charging for circuit switched Data & Fax call | FC | Fax and Data calls are charged in real time. The following transaction types can be uniquely identified and charged:Telephony (default)FAX\_GRP\_2\_3FAX\_GRP\_4SYNTAX\_VIDEOTEXINT\_VIDEOTEXINTTELEXX400For more information please refer to attachmentCOMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces and\_Notifications\_Guide.pdf (Section Circuit Switched Fax / Data Bearer, pp. 9) |
|  | **Roaming**  Support real time rating and charging for following roaming service   * Voice call. * SMS MO. * Giao dịch dữ liệu GPRS. * MMS. | FC | A roaming voice call is a voice call made from a location that matches with one of the locations defined in  Comverse ONE using location hierarchy and does not match with a location provisioned as one of the subscriber’s home locations. Charging for CAMEL 2 roaming service is supported by Comverse ONE RT.  Roaming can also supported via standard protocol like CAMEL3, Diameter, ECI  For more information, please refer to  COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf, (Section voice call roaming, pp. 131) |
|  | Support Emergency number, screening number and toll free numbers | FC | Emergency Numbers: Comverse ONE supports a list of emergency numbers that can always be called by any subscriber.  Screening Numbers: Some numbers and groups of numbers can be barred. Calling certain numbers or numbers that start with specific prefixes can be barred in two ways: ImplicitlyExplicitly Toll Free Numbers can as well be provisioned on Comverse ONE  For more information, please refer to:  COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf (Chapter 2 - IVR Self-Service Callflows, pp.i-87) |
|  | Rating and charging criterion |  |  |
|  | The system shall support following criteria for tariff selection:   * activity type (such as voice, sms, and …) * transaction type (originate, terminate, location) * Any features (location, F&F, group account, community charge, and ...) * Service packages * Time (day, hour) | FC | Tariff selection can be based on activity type, transaction type, service package or tariff plan (day, night) |
|  | **Location based capabilities**  The system shall support Location based rating.   * Location-based rating is supported for those activities that are sensitive to location. * Location-based rating involves the billing of usage based on the location of the originating party with reference to the location of the destination party. For example, calls in the same city incur are charged with a low tariff while calls between cities are charged at a higher tariff. * The location based rating shall able to map the location based on at least the following information   + Cell ID   + MSISDN / Telephone numbers   + MSRN   + Location number   + MSC ID | FC | 1. Rating Segmentation Keys: The Unified Rating Engine uses rating segmentation keys to translate the incoming usage event or physical service (that is, initial usage activity type) to determine the logical service (that is, final activity usage event). This enables the Unified Rating Engine to differentiate the various types of services offered and provides the flexibility to price the services according to location-based attributes, configurable subscriber-based and account-based attributes, and special features such as F&F, Calling Circle, and Access Method. 2. The location based rating shall able to map the location based on at least the following information  * Cell ID * MSISDN / Telephone numbers * MSRN   For more information, please refer to  COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Flexible Rating and Charging, pp. 42-43) |
|  | **Promotion** |  |  |
|  | **Basic promotion**   * The system shall support Usage-Based Promotions feature: * Allowing subscribers to be rewarded immediately, in real time, for reaching certain usage levels within a configurable period of time. * The system is capable of monitoring specific kinds of usage (i.e., off-peak calls, local calls, Short Message Service (SMS), recharges, etc.), and targeting bonuses and discounts for that usage. * The system shall support balance awards or percentage discounts on usage charges. * The system shall support system wide bonus and discount plan. The system shall allow Vinaphone to configure the bonus and discount plan. * The system shall support Service packages level bonus and discount plan. * The system must support promotion after successful recharge. The system shall be able to provide flexible recharge balance.   The system shall support at least 30 bonus counters (accumulator) per subscribers. The counter is used to count/and measure the charging activity e.g. ... Call, sms, mms, MB, ring tone, and … The counter will be used to trigger the bonus/award and discount. | FC | The Unified Rating Engine‘s real-time promotions capabilities enable network operators to design and implement promotion plans that encourage subscriber usage and increase customer loyalty. Real-time promotions allows subscribers to be rewarded immediately, in real time or in deferred mode, upon reaching certain usage levels within a configurable period of time.   1. **Real-Time Accumulators:** Measures chargeable activity in real time (such as calls, recharges, data, and SMS) to enable granting awards and discounts in real time based on measured usage:    * Accumulates currency, units, events, number of recharges, or recharge value    * Criteria for accumulation includes service types (for example, international calls) and time types (for example, peak/off-peak)    * Qualification criteria includes the minimum value before accumulation begins and the maximum value at which accumulation stops    * Calculates rate of accumulation (that is, amount accumulated multiplied by rate)    * Accumulators can be reset at a defined frequency or when reaching a specific threshold    * Account-level accumulators can measure any usage that was redirected to the account-level balances 2. **Real-Time Bonuses:** Balance-based bonuses grant free future usage in real time when a predefined threshold is reached:    * Balanced-based bonuses can be granted for immediate use or for future use (that is, deferred awards)    * Balanced-based bonuses can be tracked as grants that can be independently managed (that is, an independent expiration date can be specified for each award granted)    * Bonuses can be awarded to more than one balance upon reaching specified thresholds    * One or more supplementary offers can be awarded via bonuses upon reaching specified thresholds    * At minimum, the bonus is based on one accumulator (which is designated as the primary accumulator). Bonus/discount can be based on 5 accumulators.    * Additionally, corresponding to each threshold, up to four accumulators can be specified that are used as qualifying criteria for determining bonus eligibility 3. **Real-Time Discounts:** Discounts are percentage or fixed-amount reductions in real time against the total charge of the event:    * Only monetary balances can be discounted    * Discounts can be awarded to any activity or part of activity upon reaching predefined thresholds    * Discounts expire at the end of the period of the accumulator from which it was awarded   For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Real-Time Promotions and Grants Management, pp. 48-50) |
|  | **Advance promotion**  The system’s usage-based promotion capability shall support granting promotions based on multiple accumulators, qualification criteria at an accumulator level (for example, accumulate calls greater than 60 seconds up to 300 seconds), rate of accumulation, resetting accumulator at threshold level, fixed discount values, and account-level accumulations   * Rate of Accumulation – The account accumulated can be multiplied by rate. For example: Accumulate seconds of use for all calls of one minute or more, but only accumulate up to 4 minutes with rate of 2 * Multiple Accumulators – promotion based on multiple accumulator (up to 5 accumulators) * Accumulators Qualifications – The system shall have capability to limit (max) accumulation per usage. For example: only accumulate when charges > 3 minutes, Accumulate calls > 1 minute but only accumulate up to 5 minutes.   Deferred Award – Schedule award to be used on the specific time. For example: spend 100,000 VND on voice in this month, receive 100 free SMSs to be used next month | FC | The Unified Rating Engine usage-based promotion capability has been further enhanced to support granting promotions based on multiple accumulators, qualification criteria at an accumulator level (for example, accumulate calls greater than 60 seconds up to 300 seconds), rate of accumulation, resetting accumulator at threshold level, fixed discount values, and account-level accumulations.  Deferred award is also supported. Real-time promotions allows subscribers to be rewarded immediately, in real time or in deferred mode, upon reaching certain usage levels within a configurable period of time.  The rate of accumulator and accumulator qualifications and multiple accumulators concepts are supported by Comverse ONE system.  For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Real-Time Promotions and Grants Management, pp. 48-50) |
|  | **INTERFACES FOR CHARGING**  * Camel ph2 real-time rating and charging of CS traffic (voice, video, roaming) * Camel ph3 (for real-time rating and charging of MO SMS, roaming, GPRS traffic) * Open standard CAMEL (for real-time rating and charging of roaming traffic). * SOAP/XML, Payment Server * OSA, (MMS charging and content charging) (option) * IP socket based API for data * Diameter for data charging * Diameter (OCS) (eg: support IMS in the future) (Option)   Numbers of connections, SS7 links shall be described and showed in the bidding document | FC | Comverse’s proposal includes the following real-time charging interfaces: CAP2 to the Mobile Switch for voice chargingCAP3 for SMS ChargingDiameter for Data chargingCAP3 for GPRS Charging (Optional)  * OSA for event/ charging (Optional) * Diameter (OCS) (eg: support IMS in the future) (Optional)   Detailed information about these interfaces can be found in the following attachments: CAMEL2 Call Flows.pdf  There are several special integrations for Vinaphone such as online/offline charging gateway, HLR synchronization, and so on. |
|  | **DATA EXPORTING CAPABILITY**  The system shall have the capability to provide daily subscriber activity and history file to external file server for data analysis purposes  History file includes the information related to changing the way the system rate and charge to subscriber or money adjustment of subscriber.  For example, in July 1st , the subscriber C changes from class of service A to class of service B; subscriber A registers calling circle/F&F feature. All such information should included in history file.  Activity history file such as call history should include location information (cell ID, MSC ID etc ) and location number. | FC | The SDP database contains information that may be used for generating reports on external systems. This information is located in specific database tables and may be exported or extracted from the Comverse ONE RT. These tables are: Subscriber DataRecharge Voucher DataAccount History DataMeasurements DataEvent Log Data The Data Warehouse Utility (DWH) provides the Comverse ONE RT with the capability to transport and archive daily subscriber activity and history files to a centralized file server (CFS).  For more details, please refer to attachment:   * COMONE\_3\_5\_RT\_DAT\_6\_0\_Real-Time\_Reports\_and\_Data\_Extracts\_Guide.pdf (Chapter 2-Prepaid Data Warehouse Export Utility, pp. 15-85) |
|  | **CDR**  * Supporting tools to provide exploiters with the commercial tools aimed at giving out charging charts and plans flexibly in the fastest time to complete and attract customers * Supporting the functionality of creating CDR record for all events * The system shall generate CDR (Call Detail Record) and EDR (Event Detail Record) for voice transaction and non-voice transaction. * The system shall allow Vinaphone to adjust or pick what information shall be included in the CDR file. Please provide information on available fields, and configuration control capability. * Rated CDRs have to include Network information like Cell ID, MSC ID, LAC etc and location number * Rated CDR includes full information so that based on only information within one rated CDR, VNP can know how the usage/activity was charged, rated or promotional. * At least, rated CDRs have to include following information: special feature information, location, time type, calendar type, usage type, class of service (all kinds of offer), balance, tariff, promotion plan, duration of call, started time, answered time, total money charged, note, service (forwading, conference…), caller ID, callee ID, kinds of transaction (SMS, voice, data, VAS etc), application ID (VAS) | FC | All Detail Records (CDRs) and Event Data Records (EDR) are generated by the system. CDRs are collected into files that reside on the SLU and are subsequently transferred to the TRM. Such files are generated on a service-level-configurable, periodic basis (as defined by the value of a service-level attribute). **The default is one file every hour, and the maximum frequency is one file every minute.**  Available fields are listed in the following attachment:  COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf (Section - Call Detail Record Overview, pp. 19-106) |
|  | Subscriber Management |  |  |
|  | **Managing of subscriber life cycle**   * Having ability of sending notes to the subscriber a day before its expired date * Barring all incoming/outgoing calls at the transfer time of expired date at HLR * After the expired date, the subscribers still can make Toll Free Number calls to execute functions as charging account, calling to the customer care... * Sending message/events relating to subscriber’s life cycle to external systems * Being able to adjust the subscriber’s expired date from the Subscriber Management Center * Being able to set up the lifecycle of a subscriber with the specific features for Sub-Subscribers * Supporting querying information of lifecycle of a subscriber via IVR, USSD or Web   Updating information of service suspend at HLR when subscriber’s bill over the allowed account | FC | The system support following life cycle state flow. The life cycle is assigned as part of Primary Offer. Once subscriber associates with Primary Offer, it will inherit all the life cycle. The following diagram shows the generic life cycle state support by C1-RT  Subscribers may be notified if their accounts are about to expire. Account life cycle settings are configurable, e.g. which transactions can still be allowed can be set by the operator.For the HLR integration, the COMVERSE ONE RT notification can work with the existing Mediation device, which will communicate with the HLR for subscriber changes. The following diagram shows how the integration has been done between Comverse ONE and Mediation device. VNP Notifications   1. Incoming and outgoing call can be blocked if subscriber is expired or blocked at HLR. However, the subscribers in these states can still make Toll Free Number or reach operator’s customer care.  Customer care client (CCC) can be used to review and adjust subscriber status. Adjustments to customer data may be done through CCC or Unified API.  1. The subscriber status also can be check via the USSD as part of response of USSD voucher top-up or USSD balance inquiry 2. The subscriber status also can be checked via the IVR voucher top-up and IVR balance inquiry 3. The external application such as web self-care can check the Comverse ONE subscriber status via the SAPI interface.   For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Customer\_Care\_Client\_Provisioning\_Guide.pdf  For IVR functions, please refer to  * COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf  For USSD function, please refer to  * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 3- USSD Enabled Services,pp.17-22)  For Web application to retrieve data, please refer to  * COMONE\_3\_5\_RT\_TR\_2\_0\_Unified\_API\_Guide.pdf |
|  | Customer Care Client tool  Support Customer Care Client tool. This tool help Customer Care staff to support subscribers as follows   * Read/modify/Create subscriber profile * Read the usage history of subscriber including call history, SMS history etc. * In usage history such as call history, Location Number and Location Information (cell ID, MSC ID etc ) should be shown. In other word, Customer Care staff can check this information on CCC | FC | Customer Care Client (CCC) is a Windows graphical user interface (GUI) application that supports the provisioning of account and subscriber information. CCC is the interface used by customer service representatives (CSRs) working with the Real-Time Charging derivative of the Comverse ONE solution. As a brief summary, CCC provides the ability to do the following:   * Create and manage accounts and subscribers * Manage offers associated to accounts * Manage offers associated to subscribers * Recharge the owning account balance * Recharge a subscriber balance   Usage history can be shown in CCC by customer care staff |
|  | **Other management requirement**   * Friendly GUI subscriber management interface * Supporting API protocol with Web/GUI to connect Customer Care Center * Communication based on TCP/IP * API must support a lot of connections at the same time from external access * Supporting changing HLR Profile from the Customer Care Center. This must take effect immediately at HLR * Having ability of temporarily locking all services of a designated subscriber and changing the locked/unlock status takes effect immediately | FC | The CCC is the graphical user interface (GUI) that facilitates the provisioning and use of customer and voucher information  1. Comverse ONE exposes a set of unified API for integration to external system. The API support many connections at the same time. The communication is done via TCP/IP. The external application can access to SAPI via either web-services or Java SDK  For the HLR integration, the COMVERSE ONE RT notification can work with the existing Mediation device, which will communicate with the HLR for subscriber changes. The following diagram shows how the integration has been done between Comverse ONE and Mediation device. VNP Notifications  Notification event triggers are sent from the database (SDP) to the notification agent running on the SLU. The notification agent sends the events to the Mediation Device. Mediation Device then reformats the notification in MML format and sends it to the VNP SOG which in turn sends the message onto the VNP HLR for subscriber status update in the appropriate HLR. Status of a subscriber can be locked or unlocked immediately.  For more information on GUI based Customer Care Client, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Customer\_Care\_Client\_Provisioning\_Guide.pdf   For TCP/IP, and API capabilities, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Unified\_API\_Guide.pdf |
|  | **Activation and registration of subscribers**   * The system can use MSISDN as key data to recognize subscribers * Supporting configuring pre-active subscribers * Automatically starting a new subscriber at all codes at the same time   Can create batch-file automatically to support subscriber administration | FC | The MSISDN can be used as key data. For MSISDN (account base – cellular telephone number) information  The subscriber state can be set to ‘Awaiting Activation- This state allows manual activation of accounts from the Customer Care center. The CC Batch can be used to do batch activation as well as create new subscribers  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Bulk\_Provisioning\_Guide.pdf (Section CC Batch, pp. 7-25) |
|  | **Account**  The system need support account and subscriber concept as follows:  An account represents the liable party and owns the accounts receivable. It can have the following entities as potential children: account (other accounts, as part of a hierarchy), subscriber (zero, one, or multiple subscribers), offer (zero, one, or multiple offers), and bundle (zero or one bundle). Accounts can be organized into hierarchies. Accounts can have real-time balances and accumulators.  Whereas, the subscriber represents the delivery point of service. Subscribers can have bundles (zero or one bundle) or offers (zero, one, or multiple offers) as potential children. Subscribers can have real-time balances and accumulators. | FC | An account represents the liable party and owns the accounts receivable. It can have the following entities as potential children: account (other accounts, as part of a hierarchy), subscriber (zero, one, or multiple subscribers), offer (zero, one, or multiple offers), and bundle (zero or one bundle).  Accounts can be organized into hierarchies and have a presence in both the Customer database and the Rating database. Accounts can have real-time balances and accumulators. |
|  | **Account Hierarchy**  The system shall support account hierarchy.   * Account hierarchy can be N levels deep and each tier can be N accounts wide.   Accounts can have just one subscriber, many subscribers, or no subscribers, and each of them holds reference to the immediate parent and the root hierarchy account. | FC | Comverse ONE supports the concept of account hierarchy. As shown in the sample account hierarchy below, account hierarchies can be N levels deep and each tier can be N accounts wide. Accounts can have just one subscriber, many subscribers, or no subscribers, and each of them holds reference to the immediate parent and the root hierarchy account. Account hierarchies can be used to reflect a customer‘s organization structure, geography, departments, and so on. They can also be used to define which accounts receive invoices and how some charges are redirected. The account hierarchy can be N levels. IT can have just one subscriber, or many subscribers and many levels.    For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Account Hierarchy, pp. 17) |
|  | **Shadow subscriber.**  The system support Shadow-subscriber as follows:   * The original subscriber and the associated shadow subscriber have independent life cycles. The shadow subscriber has its own payment methods and primary offer/bundle and/or supplementary offers * Shadow-subscriber-based liability redirection is used to override usage charges by using the target subscriber’s rating plan * The CSR can set up the details of the redirection using GUI. | FC | Shadow-subscriber-based liability redirection is used to override usage charges by using the target subscriber‘s rating plan. Internally, the original subscriber and the associated shadow subscriber have independent life cycles. The shadow subscriber has its own payment methods and primary offer/bundle and/or supplementary offers. The CSR can set up the details of the redirection using Customer Center.  In the example shown in Figure below, Acme pays for John Smith‘s phone and voice service. But John also wants data service, even if he has to pay for it himself. When he requests this service, the CSR creates a shadow subscriber including the following (as represented in the far right column of the diagram below):    For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section – Liability redirection, pp. 22-23) |
|  | **Balance Management:**   * The normal status shall support the following: idle status, active status, await for activation via first call, await for activation via recharge. * The system shall allow Vinaphone to define active status and account life cycle and shows the state transition diagram between status * The system shall support up to 40 balances per subscribers, for example: currency (VND), sms, mms, ring tone, MB… * The system shall support real time balance management for account and billing packages for postpaid subscribers: * Configure the balance unit and in what order * Allow the association of different services to different balances * Allow limiting the use of a balance to a specific activity (for example, SMS, Voice, MMS, or only off-peak hours and for local use only, etc.) * Group Accounts * Virtual accounts | FC | The Balance Management module provides the following capabilities:   * Applies the actual charge after all rating considerations (such as discounts, bonus, charge redirection), update accumulators, and determine any bonuses to be awarded to the user * Provides charge advice at end of activity * Determines balance eligibility * Reservation   The system can support up to 40 balances.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf (Section – Balance management module, pp. 11-12)   The system support real-time balance management of postpaid subscribers in Vinaphone.  In order to resolve conflicts in balance configuration, all balances instantiated in offers at a subscriber / account level are ranked in a priority order. The priority order of subscriber balances is based on the guided-to offer, the offer balance priority configured in the subscriber's Upsell Template, and the Balance Charge Order in the offers. Balance can be configured as the number of SMS, MMS, and Number of minutes with a specific validity period. Group and virtual accounts are also supported.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Rating\_Technical\_Reference.pdf (Section – For more information, please refer to Chapter 10 – Balance Eligibility, pp. 169-172) |
|  | **Support Shadow balances**  The system shall supports shadow balances as follows:   * Shadow balance functionality enables a shadow balance to point to a real balance anywhere in the subscriber's account hierarchy, not just the subscriber's parent account. * For any subscriber, all shadow balances must point to real balances in the same target account. * Subscriber-level configuration options control how to do charging when shadow balances point to targets outside of the direct parent account are used. There are two options:   + Use real, fallback to shadow (default): Attempt to use only real balances. If the real balances cannot pay the charge, then use only shadow balances   + Use shadow, fallback to real: Attempt to use only shadow balances. if the shadow balances cannot pay the charge, then use only real balances   Each usage (or non-usage charge such as RC or NRC) has a single liable party; thus, if the subscriber has a shadow balances pointing to an account other than the immediate parent, the usage is paid for either the shadow balances, or the real balances but not both. | FC | Shadow balances are used for charge redirection from a specific balance to a different specific balance. A shadow balance (represented by the dotted-line pentagons in the figure below) can point to a real balance of any parent account in the same hierarchy. Balance-sharing rules define which subscriber shadow balances should be redirected to actual balances on an account level. CSRs can also set a limit on how much the shadow balances draw from the account-level balance. Shadow balances are cyclically reset.  The figure below shows the relationship of shadow balances in a sample family account. In the figure, the mother‘s award consumption draws from the family account-level award balance. In this case, all award balances (for mother, son, and father) point to the award balances from the family account.    For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section – Shadow balance, pp. 21-22) |
|  | **Charge Redirection**  The system shall support charge redirection as following (1) shadow balances and (2) liability redirection   * Shadow Balances are used for charge redirection from a specific balance to a different specific balance.   Liability Redirection is a way to redirect charges from an account or subscriber to another account or from an account or subscriber to a shadow subscriber on another account | FC | There are two ways to support charge redirection using the Comverse ONE solution: (1) shadow balances and (2) liability redirection.   1. Shadow balances are used for charge redirection from a specific balance to a different specific balance. A shadow balance (represented by the dotted-line pentagons in the figure below) can point to a real balance of any parent account in the same hierarchy. Balance-sharing rules define which subscriber shadow balances should be redirected to actual balances on an account level. CSRs can also set a limit on how much the shadow balances draw from the account-level balance. Shadow balances are cyclically reset. 2. In addition to shadow balances, the Comverse ONE solution supports the concept of liability redirection. Liability redirection is a way to redirect charges from an account or subscriber to another accounts, or from an account or subscriber to a shadow subscriber on another account. Liability redirection can be pointer-based or shadow-subscriber-based.   For more information please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section - Charge Redirection, pp. 21-23) |
|  | **Liability Redirection**  Liability redirection involves conditional charge redirection to liable parties as follows:   * Account to account * Subscriber to account * Subscriber to shadow subscriber   Liability redirection templates enable you to define the charge redirection rules that can be provisioned by the CSR.  A liability redirection template consists of one or more liability redirection rules, plus a redirection template that associates the rule with a suggested primary offer. Priorities of Liability Redirection template determines the priority in which redirection templates are matched to subscribers. | FC | In addition to shadow balances, the Comverse ONE solution supports the concept of liability redirection. Liability redirection is a way to redirect charges from an account or subscriber to another account, or from an account or subscriber to a shadow subscriber on another account. Liability redirection can be pointer-based or shadow-subscriber-based.  Pointer-based liability redirection is used in situations where tariffs of the source entity are used to rate the call and the target account is paying for the charge. The CSR can set up the details of the redirection. For example, company XYZ might want its Finance department to pay for the invoices of its Sales and Operations departments.  Shadow-subscriber-based liability redirection is used to override usage charges by using the target subscriber‘s rating plan. Internally, the original subscriber and the associated shadow subscriber have independent life cycles. The shadow subscriber has its own payment methods and primary offer/bundle and/or supplementary offers. The CSR can set up the details of the redirection using Customer Center.  For more information, please refer to   * COMONE\_3\_5\_50\_Real\_Time\_Solution\_Description.pdf (Section – Liability redirection, pp. 22-23) |
|  | **Recharging execution**  Supporting modes of charging:   * Voucher refill via IVR * Voucher refill via USSD * Batch refill * Banking interface * Customer Care interface * Supporting charging account online/offline based on batch – file   Having ability of designating account limit to create queries automatically via bank communication. | FC | The requested recharge mechanisms are supported.The system support voucher top-up via the USSD and IVR. For more information, please refer to  * COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf (Section, recharging server, pp. 21-27)  For Batch refill and interface to banking or other electronic topup, Comverse provides an interface called Unified API. Vinaphone can develop its own application and communicate with Comverse ONE via the Unified API. For more information, please refer toCOMONE\_3\_5\_RT\_TR\_2\_0\_Unified\_API\_Guide.pdfFor customer care interface for recharging: please refer to  * COMONE\_3\_5\_RT\_TR\_2\_0\_Customer\_Care\_Client\_Provisioning\_Guide.pdf (Chapter 8 – Working with voucher, pp. 125-133). |
|  | Customer Interaction |  |  |
|  | **The System shall support the following interactive channel**   1. IVR 2. SMS notification 3. USSD 4. All of above requirements shall be configured via the GUI based application.   The system shall support different access numbers (such as USSD access number, IVR access number) depend on market segment (COS/Offer/Reseller  The system support interactive functions as follows:     * Supporting at least 4 languages (2 languages shall be included) * Account query via IVR, USSD * IVR (Interactive Voice Response) for balance inquiry/recharge information * USSD recharge/inquiry/notification * Noticing expired date via IVR, USSD * Noticing account status to be out of date soon via SMS * Noticing SMS or USSD to subscribers * Service stopped * Promotion information * Noticing End of Call for different services * Noticing End of Call/other events * Having ability of creating and sending text messages after end-of the call including text and numbers with the following contents: Balance, Cost, Bonus, Expiry Date, Clearing Date.... * Supporting the usage of matrix to handle information before sending notices * Noticing awards, next awards via SMS or USSD * Free noticing via SMS or USSD * Supporting subscribers to be able to communicate with the system by multi – frequency code DTMF to see account information and self managing information. | FC | The Information server provides information to subscribers about their accounts. The information can be requested by subscribers through IVR, SMS or USSD. Notifications are used by COMVERSE ONE to provide instant information to the subscriber regarding events and account activity. Notifications are commonly used for: Alerting the subscriber that an event (e.g., account expiration) is about to occurWarning that account balance is below a configured thresholdNotice that a periodic charge has been deducted from the subscriber’s accountProviding charging details for the most recent activity transactionFor more information, please refer to attachment  * COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf(Chapter 2 - IVR Self-Service Callflows, pp.i-87) * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 5 – Notifications Overview, pp.35-50) |
|  | **Notification.**  The GUI application shall provide the following additional capability setting   * Subscriber notification based on the events * SMS notification, , SMS notification after recharge * USSD notification * Notification based on usage promotion/awards * Notification based on recharge promotion/awards * Notification Latching (duplicate notification) control * Select notification language (for SMS and USSD notification) * Support to send notification via TCP/IP messages to external interface * The Bidder shall provide detail explanation or reference to document which provide step by step of the above request | FC | Comverse ONE RT provides the following notification events: State – Change of account state (e.g., from Active to Suspended) or previous stateRecharge – Successful recharge of the account.Balance – A change of account balance that causes it to reach a predefined threshold (e.g., after a billable call)Change of Expiration Date – Account or Balance expiration (core)Usage Award – (Near Award, Award) a bonus or discountActivity CharacteristicActivity ChargeSpending LimitBalance transfer – Group Account to Account and Group Balance to BalanceIdentity Change – Currently only available with the converged feature It is possible to "latch" a condition so that once the condition is met and the message is sent the first time, the message is not sent again and again because the condition continues to be matched. If a condition is not latched, the message will be sent every time the condition is met. Notification language also can be configured via the PCAT  More information and step-by-step provisioning can be found in the following manual:   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf (Chapter 6 -Subscriber and Account Notification Provisioning, pp. 53-88) |
|  | The system shall support Supplementary self-service access number call.This feature shall includeAdministrative call (e.g. recharge call, information inquiry) numberCustomer care numberLanguage selectionOperator specific defineThese access numbers can be specified for each service provider. It also allows Vinaphone to select the language. | FC | Comverse ONE supports calls to access numbers with the following menu/purpose:Main Administrative MenuRecharge ServerInformation ServerCustomer CareLanguage ChoiceFriends and Family (F&F)Self-Service Subscriber Provisioning after Successful RechargeCall ForwardingNetwork Call ForwardingThese access numbers can be specified per service provider.For a description of the above-listed menu, please refer to the following attachments:  * COMONE\_3\_5\_RT\_TR\_1\_0\_IVR\_Callflows\_Reference.pdf (Chapter 2 - IVR Self-Service Callflows, pp.i-87) |
|  | ADMINISTRATION AND EXPLOITION |  |  |
| * + - 1. dmini | **Product Configuration (PCAT)**  * The system shall provide single-point interface that manages all aspects of service provisioning in the solution * It allows quick and accurate creation and management of offers, bundles, plans, and terms * The system shall bring about dramatic reductions in operator product-development cycles * The Product Catalog provides a holistic view of all relevant data and enables marketing-offer personalization and segmentation * It shall facilitate coherence and enhances life-cycle management and eases operational constraints * It shall provide easy-to-use object-oriented interface, you can achieve faster turn-around time from product conception to market availability * The Product Catalog shall supports postpaid configuration   Product Catalog shall use of logical layers. These logical layers are aimed at different user groups. For instance, the Marketing/Packaging layer is where the customer-facing market offers are configured, while the Service layer is where services and usage activities are defined. Other layers are the Rating Definition layer and the Basic System Infrastructure layer |  | Comverse Product catalog can support all requirements described in this section.  The Product Catalog acts as a single interface for configuring the business offerings that are ultimately provisioned and managed across the Comverse ONE solution, thus enhancing the operator's efficiency.  It enables quick and accurate creation and management of offers, bundles, plans, and terms, as well as all underlying data that is ultimately involved in the operator’s configuration and provisioning of service.  In addition to enabling the configuration of entities, Product Catalog is the single point access for managing all data versions. Product Catalog provides a holistic view of all relevant data and enables marketing-offer personalization and segmentation. Dramatic reductions in operator product-development cycles can be realized. The Product Catalog allows operators to create offers, bundles and plans per business needs. It also allows creating various marketing offers per business requirements. Product Catalog enables coherent and flexible service configuring in the Comverse ONE solution via a single easy-to-use interface. It is organized into logical layers corresponding to different  operational domains and user groups:   * **Basic System Infrastructure Layer**: For configuration of basic system data such as units and currencies * **Service Layer**: For defining usage activities and service-related details such as notifications and access numbers * **Rating and Billing Definition Layer**: For setting up rates, balances, accumulators, and promotions * **Marketing/Packaging Layer**: For configuring customer-facing market offers  The following diagram shows the Product Catalog information Converged-PC-Catalog-Model For more information, please refer toCOMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf  * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf |
|  | **Product Catalog Versioning**   * Product Catalog versioning involves the segmentation of datasets to facilitate propagation and thus control the release of data to test, production, and other systems. * Operators manage the Product Catalog network data layer and various entities that are used for core system provisioning.   Resellers and Virtual Network Operators (VNOs) have their own Product Catalog datasets. Data is segmented and maintained by the resellers in separate partitions. Resellers can version their own datasets but have no access to the datasets of other resellers. | FC | Product Catalog versioning involves the segmentation of datasets to facilitate propagation and control the release of data to test, production, and other systems. Different versions of these datasets, corresponding to different time periods, can be propagated to target systems.  When you work in Product Catalog, it’s very important that you pay attention to the dataset version you are using. Product Catalog manages the following version types:   * Service Version: Includes all data global to the operator. This dataset is shared by all resellers. Database entities in the service version are configured in the Basic System Infrastructure and Service layers. * Reseller Version: Contains data specific to a reseller. A reseller version is always linked to a service version because reseller data relies on operator-specific lower level data that is managed in the service version. Database entities in the reseller version are configured in the Service, Rating and Billing Definition, and Marketing/Packaging layers. * Product Catalog Version: Consists of one service version and all corresponding reseller versions, which are grouped together and propagated as a unit.   In addition, Product Catalog maintains major and minor versions of reseller versions and Product Catalog versions.  A major version is intended to handle any addition or modification of Product Catalog entities and the underlying dataset. Major versions enable you to create new entities of all types.  A minor or “corrective” version enables you to correct lower-level rate data for the purpose of re-rating. But you cannot create new entities or make changes to higher level entities, such as bundles and offers. Minor versions can only be used to correct major versions that have entered the Historic state — they cannot be applied to active major versions.  Please also note that   1. Product Catalog versioning is the process of segmentation of datasets to facilitate propagation and thus control the release of data to test, production, and other systems. 2. Operators manage the Product Catalog network data layer and various entities that are used for core system provisioning. 3. Resellers and Virtual Network Operators (VNOs) will have their own Product Catalog datasets. Data is segmented and maintained by the resellers in separate partitions. Resellers can version their own datasets but have no access to the datasets of other resellers.   For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf (Chapter 3 -Versions, Lifecycle, and Propagation) |
|  | **Service Packages management:**   * The system shall support at least 1000 service packages, post-paid plan. For example: VinaCard is one service packages, iTouch is one of postpaid plan. * Different Service packages or plans have different characteristics such as different tariff scheme, different promotion/discount, and different recurring/periodic charge. * Each service packages or plans must have their own configuration which set up from system. * The system shall support service package change and notification per each service packages or plans.   The system shall support at least 50 service providers (the service provider (SP) could be regional office or distributor who selling postpaid services). Each SP shall have different characteristics for example: different access number, different set of recharge card, different set of service and packages, plans. | FC | Comverse ONE product catalog satisfies all requirements listed in this section.  1. The system support over 1000 service packages. 2. The packages are differentiated by different characteristics such as tariff scheme, promotion, discount, etc. 3. Service packages or plan do have their own configurations, which can be modified by users. 4. Modifications of service packages or plan can be easily configured in the system. Notification for the change is also supported.   A reseller is an independent business entity that sells a specific set of bundles and offers. These bundles and offers can be configured by the reseller, or by the operator acting on the reseller’s behalf. Each reseller is assigned its own Product Catalog dataset, which supports versioning. Each reseller version exists in a separate partition, and a reseller has no access to the Product Catalog data of other resellers. This arrangement enables network operators to host multiple service providers on a single Comverse ONE Billing & Active Customer Management solution platform, while giving each service provider completely independent management of their subscribers, service plans, and vouchers. The system can support many resellers. |
|  | **Primary offer**   * A primary offer is mandatory and is provisioned to a subscriber to enable it to receive and consume services. Without a primary offer a subscriber cannot exist in the system. Primary offers include a large number of configurable options. * Most of the service behavior, including the billable activities, tariff structure, account balances, promotion plans, enabled dialed numbers, and the number of phone book entries enabled for a subscriber in the friends and family feature are defined as part of the primary offer. Additionally the primary offer includes contract terms, RC terms, NRC terms, external ID type entities that guide usage events, balances, and accumulators. * Each subscriber is assigned to one and only one primary offer. A subscriber bundle contains only one primary offer. * Overall, the behavior of the service for a given subscriber is determined by the primary offer. The subscriber primary offer name is listed in the subscriber record and is read whenever the service processes the subscriber. | FC | A primary offer is mandatory and is provisioned to a subscriber to enable it to receive and consume services. Without a primary offer a subscriber cannot exist in the system. Primary offers include a large number of configurable options.  Most of the service behavior, including the billable activities, tariff structure, account balances, promotion plans, enabled dialed numbers, and the number of phone book entries enabled for a subscriber in the friends and family feature are defined as part of the primary offer. Additionally the primary offer includes contract terms, RC terms, NRC terms, external ID types entities that guide usage events, balances, and accumulators.  Each subscriber is assigned to one and only one primary offer. A subscriber bundle contains only one primary offer.  Overall, the behavior of the service for a given subscriber is determined by the primary offer. The subscriber primary offer name is listed in the subscriber record and is read whenever the service processes the subscriber.  Only a few personal configuration attributes (such as the subscriber's default language) are kept in the subscriber records; the rest are defined in the subscriber primary offer and are shared by all the subscribers assigned to it.  For more information, please refer to:   * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf (Section – Primary offer, pp. 18) |
|  | **Supplementary offer**  A supplementary offer enables subscribers to consume services in addition to those associated with the primary offer. Supplementary offers have the following characteristics:   * Composed of 0 or more usage, service, and promotion plans * Associated with zero or 1 template of each the following types: plan override template * Associated with zero or 1 rule of each of the following types: subscriber/account prerequisite rule, bundle/offer prerequisite rule, exclusion Rule * Configured for sale outside of primary offer compatibility templates * Supplementary offers can also be associated with contract terms, RC terms, NRC Terms, balances and accumulators.   Can be configured for sale outside of Primary Offer Compatibility Templates | FC | Support of several active instances of a Supplementary Offer. A supplementary offer enables subscribers to consume services in addition to those associated with the primary offer. Supplementary offers have the following characteristics:   * Composed of 0 or more usage, service, and promotion plans * Associated with zero or 1 template of each the following types: plan override template * Associated with zero or 1 rule of each of the following types: subscriber/account prerequisite rule, bundle/offer prerequisite rule, exclusion Rule * Configured for sale outside of primary offer compatibility templates * Supplementary offers can also be associated with contract terms, RC terms, NRC Terms, balances and accumulators. * Can be configured for sale outside of Primary Offer Compatibility Templates * Supplementary offers have a the following dates: * Sales effective date: a free date-type attribute that controls the availability of the offer for subscription * Sales expiration date: a free date-type attribute that controls the expiration date on which the offer is no longer available for subscription. * Automatic expiration: controls the duration of the Supplementary Offer; Either a fixed Date or a Duration with A value   For more information, please refer to:   * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf (Section – Supplementary offer, pp. 20) |
|  | **Account offer**  An account offer models service that is consumed at the account level. Unlike a primary offer, an account offer is optional.   * An account offer is composed of zero or more services or promotions. It is driven by rules, contract, RC terms, NRC terms, and accumulators. An account offer cannot contain a usage item. | FC | An account offer models service that is consumed at the account level. Unlike a primary offer, an account offer is optional.  An account offer is composed of zero or more services or promotions. It is driven by rules, contract, RC terms, NRC terms, and accumulators. An account offer cannot contain a usage item.  An account offer has effective and expiration dates:   * Sales effective date: a free date-type attribute that controls the availability of the offer for subscription * Sales expiration date: a free date-type attribute that controls the expiration date on which the offer is no longer available for subscription. * Automatic expiration: Either a fixed Date or a Duration with A value * A unit as a choice from (minutes, hours, days, weeks, months, years   For more information, please refer to:   * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf (Section – Account offer, pp. 19) |
|  | **Platform Management**  A common platform for Operations, Administration, and Maintenance (OA&M) shall be used  The platform shall provides a single centralized control point for all OA&M functions in the solution  A single GUI and command-line interface (CLI) presentation to operate, administer, and maintain the entire solution system and to present the administrative capabilities such as process management and alarm notifications, for all units in the solution.  The system shall support web-services based protocol for subscriber and recharge card provisioning.  SMS based interface for notification (SMPP)  The system shall support TCP/IP based for Alarm and Billing information transfer | FC | The Unified Platform provides a unified infrastructure that allows for a single set of operations, administration, and maintenance (OA&M) functionality across both the network-side and IT-side building blocks of Comverse ONE. The Unified Platform provides a single Manager/Agent infrastructure that is adaptable to disparate platforms in the operator’s environment. The out-of-the-box Unified Platform is pre integrated with all the Comverse ONE applications and unit supplied by Comverse, and provides a single uniform interface for managing and administering all the units of a Converse ONE system.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Platform\_Operations\_Guide.pdf (Section - Overview of the Unified Platform, pp. 17-18)   Comverse ONE solution, the supported northbound managers that can receive alarms forwarded from the Unified Platform are the following:   * Simple Network Management Protocol (SNMP) managers, which include: * Remote Site Manager (RSM), used by the Comverse Billing Line of Product support engineers * System Management Unit (SMU), used by other Comverse divisions * A client organization’s SNMP-compliant manager, such as Hewlett-Packard * OpenView (HPOV) or IBM Tivoli * Simple Mail Transfer Protocol (SMTP) managers for alarm notifications via email * Short Message Service (SMS) managers for alarm notifications via text messages to cell phones or similar devices |
|  | **Security Management**  * The solution shall provide security services that allow customers to safeguard their data and enable users to do the work they need to do to maintain and use the system. * Additionally, these capabilities can be used to achieve Sarbanes-Oxley compliance. * The system shall support long & secure token which shall be used in all communication between client and server * The Security Server provides centralized authentication, authorization, and accounting to help achieve these ends * The solution shall provide capabilities for all three of these security areas.   + (1) Authentication,   + (2) Authorization,   + (3) Accounting, | FC | The Comverse ONE RT includes the Security Server which is SOX Compliant. The Security Server provides WEB GUI for VNP to operate and maintain all users in the system.  The Comverse ONE RT includes the Security Server which is SOX Compliant. The Security Server provides WEB GUI for VNP to operate and maintain all users in the system. The following diagram show the security server architecture  Security_Func_Arch_1  The following screenshot shows the security administration GUI   1. Authentication is the ability to identify the intended user and to verify that the user requesting access is one of the users of the system. This authentication is provided through the exchange login and password security credentials. A robust password creation scheme allows administrators to set the terms and constraints of passwords to ensure that strong passwords are used. Functionality includes:  * Security Server authenticates and provides security assertions that are exchanged between applications * All security assertions exchanged between applications are digitally signed * Applications use the Security API to retrieve public keys that are managed by the Security Server * Applications use the Security Server to authenticate the subject’s credentials  1. Authorization occurs when the system grants access and functionality privileges to authenticated users so they can do work. A system of roles and privileges allows administrators control of the user’s access to data and the capabilities to view and change the data. Functionality includes:  * GUI applications enforce Role-Based Access Control (RBAC) based on roles carried in the Security Assertion Markup Language (SAML) authentication statement * The Unified API Server uses Extensible Access Control Markup Language (XACML) to enforce Policy-Based Access Control (PBAC)  1. Accounting is (1) the process of tracking the work that is occurring on the system and (2) the ability to associate any work back to a user. User actions are tracked by user activity records stored in logs, which allows any transaction to be traced to the user who performed the action if needed. The user activity records can be viewed centrally for the entire system. Functionality includes:  * The Unified API server and Unified Rating Engine use the Security API to construct and store user activity records locally * The Operations Agent periodically transfers the user activity records from the local nodes to a central location * Back-office users’ activity records are captured for all database transactions in the database * GUI applications that use a middleware rely on the middleware to capture the GUI users’ activities * GUI applications that directly use databases rely on the database to capture the GUI users’ activities   For more information, please refer to:   * COMONE\_3\_5\_50\_Security\_Platform\_Operations\_Guide.pdf (Section – Security Solution Overview, pp. 7). |
|  | The system shall provide GUI application for Service provisioning purposes. The service provisioning tools shall support the following function   * Billing & charging definition * Usage definition (such as voice call, sms, mms, data…) * Charging definition (or tariff definition) * Service packages definition (such as VinaText, VinaDaily, VinaCard, and ...)   The Bidder shall provide detail explanation or reference to document which provide step by step of the above request | FC | Product Catalog (PCAT) is GUI based application for Comverse ONE RT Service Provisioning. For more information, please refer to the following documents   * COMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf * COMONE\_3\_5\_RT\_TR\_2\_0\_ Product\_Catalog\_Overview.pdf |
|  | The GUI based application shall provide the following capability for Service packages definition   * Set the Pre-call announcement * Set the Mid-call announcement * Set the recharge policy & Recharge promotion * Set the recurring charge * Set the notification characteristics * Set the USSD activity * Set the promotion plan * Set the call forwarding behavior   The Bidder shall provide detail explanation or reference to document which provide step by step service provisioning | FC | Product catalog can be used to provision services packages. A Primary Offer (PO) is the basic entity used to define prepaid service packages, and constitutes a major part of the service data. Most of the service behavior, including thresholds, currency unit, expiration options, those listed in the requirements, and many other service characteristics, are defined as part of the Primary Offer.  More information and details on the step-by-step provisioning can be found in the product catalog manual.   * COMONE\_3\_5\_RT\_TR\_2\_0\_Product\_Catalog\_User\_Guide.pdf |
|  | The GUI application shall provide the User administration functionality. The capability shall allow the system administrators to manage at least the following   * which users of the system * which terminal on the network * authorization user/terminal has (view, add, modify, delete) * The system shall allow the System administrator to define the access authorization that each user/terminal has to access the data storage. The access authorization category shall support at least 2 groups of users the system administrator and customer care.   The Bidder shall provide detail explanation or reference to document which provide step by step of the above request. | FC | The solution provides security services that allow VNP to safeguard their data and enable users to do the work they need to do to maintain and use the system. Additionally, these capabilities can be used to achieve Sarbanes-Oxley compliance. The Security Server provides centralized authentication, authorization, and accounting to help achieve these ends.  Security services are most easily remembered as AAA, for Authentication, Authorization, and Accounting. The solution provides excellent capabilities for all three of these areas.  The Comverse ONE RT includes the Security Server which is SOX Compliant. The Security Server provides WEB GUI for VNP to operate and maintain all users in the system. The following diagram show the security server architecture  Security_Func_Arch_1  The following screenshot shows the security administration GUI   1. Authentication is the ability to identify the intended user and to verify that the user requesting access is one of the users of the system. This authentication is provided through the exchange login and password security credentials. A robust password creation scheme allows administrators to set the terms and constraints of passwords to ensure that strong passwords are used. Functionality includes:  * Security Server authenticates and provides security assertions that are exchanged between applications * All security assertions exchanged between applications are digitally signed * Applications use the Security API to retrieve public keys that are managed by the Security Server * Applications use the Security Server to authenticate the subject’s credentials  1. Authorization occurs when the system grants access and functionality privileges to authenticated users so they can do work. A system of roles and privileges allows administrators control of the user’s access to data and the capabilities to view and change the data. Functionality includes:  * GUI applications enforce Role-Based Access Control (RBAC) based on roles carried in the Security Assertion Markup Language (SAML) authentication statement * The Unified API Server uses Extensible Access Control Markup Language (XACML) to enforce Policy-Based Access Control (PBAC)  1. Accounting is (1) the process of tracking the work that is occurring on the system and (2) the ability to associate any work back to a user. User actions are tracked by user activity records stored in logs, which allows any transaction to be traced to the user who performed the action if needed. The user activity records can be viewed centrally for the entire system. Functionality includes:  * The Unified API server and Unified Rating Engine use the Security API to construct and store user activity records locally * The Operations Agent periodically transfers the user activity records from the local nodes to a central location * Back-office users’ activity records are captured for all database transactions in the database * GUI applications that use a middleware rely on the middleware to capture the GUI users’ activities * GUI applications that directly use databases rely on the database to capture the GUI users’ activities |
|  | **API**  **Provide single API to external system:**   * Supports online transaction processing (OLTP) and batch deployment modes * Supports Web Services as a standard interface * The Unified API also includes an Enterprise JavaBeans (EJB) interface, but this interface is highly abstracted and is not intended for direct use by client applications that do not use the client SDK * Exposes a set of objects and methods that expose a full breadth of integration functions of the Offer including customer care, balance management, and so on * Supports virtual network operator (VNO) and dealer concepts * Customizable by third parties via client software development kits (SDK) * Provides the technical foundation necessary for your organization to pursue SARBOX compliance   Supports multiple languages and localization (I18N and L10N) | FC | Comverse provides unified API for exposing a set of objects and methods that expose a full breadth of integration functions. The Unified API provides a unified programmatic interface to the Comverse ONE solution for client-side application development. This API encapsulates complicated business logic and abstracts the complex underlying details. The Unified API runs in a J2EE environment, exposing a web services interface. The Unified API also provides the client SDK, which is a Java object oriented client application development toolkit that is integrated with an abstract Enterprise JavaBean interface.  The server implementation is stateless and client-side utilities are available to facilitate any state management needed by client applications. Note that the Unified API also includes an Enterprise JavaBeans (EJB) interface, but this interface is highly abstracted and is not intended for direct use by client applications that do not use the client SDK. It can also support multiple languages and localization.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Unified\_API\_Guide.pdf (Chapter 2- Unified API Overview, pp.11-73) |
|  | Operation and maintenance |  |  |
|  | **System operation**  The system shall provide complete operation tools of the system components which include the following   * Data component * Service control point component (Voice, GPRS, SMS, Diameter, and others) * Intelligent Peripheral * Networking infrastructure * IP gateway for subscriber provisioning component.   The operation tools shall include   * MML based command * Backup & restore process * centralize control from management unit   network configuration control | FC | The Unified Platform architecture consists of a centralized Unified Platform Manager (UPM), a Unified Platform Agent (UPA) on each managed node, and client interface(s). The design of the Unified Platform Manager, as well as the Unified Platform Agents, is based on a service-oriented architecture. The Unified Platform includes services that provide the following:   * Event and Alarm Management * Process Management * Job and Workflow Management * System Inventory Management * Log and File Management   The following diagram shows the UPM Architecture    For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Platform\_Operations\_Guide.pdf (Section Platform operations guide, pp. 18)  For more information on platform operation & its associated tools, please refer to  * COMONE\_3\_5\_RT\_TR\_2\_0\_Platform\_Operations\_Guide.pdf  For reports and data extract for post processing, please refer to  * COMONE\_3\_5\_RT\_DAT\_6\_0\_Real-Time\_Reports\_and\_Data\_Extracts\_Guide.pdf (Chapter 2- Prepaid DataWarehouse Export Utility, pp. 15-85)  For more information on platform measurement, please refer to  * COMONE\_3\_5\_50\_System\_Measurements\_Guide.pdf |
|  | **Remote Management System**  The system shall include centralize operation & management components. The component shall automate the maintenance and support of system. The component should support the following function   * Backup of software images * Restore of software images * configuration control of system components   The Bidder shall explain in detail on how the proposed system fulfill this requirements |  | The Remote Service Manager (RSM) is a centralized management platform that automates the maintenance and support of live Comverse ONE RT systems. The RSM includes a central control unit, located at a 24/7 Service Center facility in Comverse’s support offices, and remote units installed at the operator site.The RSM solution is made up of the following software components:Site Server: Automatically collects a comprehensive set of data directly from each Comverse ONES customer site. The system supports many protocols, including SNMP, Telnet, Syslog Server, TL1, and FTP. The system also supports the Perl scripting language.Communication Server: This is the communication layer between the Site Server and the Vendor Server. It performs the following functions:Handling clients: Storing client (Site Server and Vendor Server) information so as to enforce quota policy on a client level, and to help the Communication Server administrator manage the Communication Server systemHandling messages between clients: Communicating files (such as Product Lines and Problem Reports) and requests between the Vendor Server and the Site Server, storing them and enabling their retrieval. The message transfers are done over the Internet, and all data is encrypted. Posting is seamless, efficient, and highly secure. RSM Vendor Server: This server comprises several software components, enabling Comverse to assign specific responsibilities and capabilities to individual TAC engineers. |
|  | **REPORTS**  The system shall provide mechanism for Vinaphone to create, execute and schedule report generation with it data server with small performance impact to the system.   * The system shall provide at least the following report: * Subscriber reports * Recharge card reports   Statistical reports | FC | The following reports can be generated:Subscriber Reports: A report may list all the subscribers who will become suspended within seven days, or count all the subscribers who have less than $10 in their accounts.Voucher Reports: A report may list expired vouchers, unused vouchers of a given batch, and the sum of all the money kept in the voucher system.Statistical Reports: The system keeps track of various statistics, and stores the sampled numbers in the database. Some of that data is platform-related (like the memory utilization in the system computers) while other data deals with the Comverse ONE RT (for example, the number of seconds used by Comverse ONE RT subscribers every hour). Reports can be run against the collected statistics to provide an aggregate picture of the system and service behavior. Such data can be used for operational purposes (for example, to determine when a system expansion is due) or marketing needs (for example, to measure the effect of a marketing promotion).Please refer to the following attachments for further details on Reports:COMONE\_3\_5\_RT\_DAT\_6\_0\_Real-Time\_Reports\_and\_Data\_Extracts\_Guide.pdf (Section - Reports Overview, pp. 3-13) |
|  | **STATISTICS**  The system shall provide the statistic measurement of the following system components   * Voice service logic unit * GPRS service logic * computing element statistics   traffic monitoring | FC | Comverse ONE automatically collects statistical data from the Service Logic Unit (SLU). This includes service statistics on the SLF layer and platform data on the IPF layer. It also automatically collects DTCAP measurements generated by the DTCAP router that provide information on the TCAP inbound and outbound traffic flows through the Service Gateway Unit (SGU). Finally, the Comverse ONE collects traffic monitoring data that supports the reporting and analyzing of traffic statistics on both the SLU and the SDP.  For more information, please refer to attachment: COMONE\_3\_5\_50\_System\_Measurements\_Guide (COMMON DOC with C1-CV).pdf (Section - Measurements Overview,pp.3) |
|  | **Monitor**  The system shall provide the monitoring components. The monitoring components shall support event management, task management, report, collect data. The basic function shall include   * Event/Alarm notification * SNMP V2 support * workflow control   The Bidder shall explain in detail on how the proposed system fulfill this requirements | FC | 1. The Unified Platform architecture consists of a centralized Unified Platform Manager (UPM), a Unified Platform Agent (UPA) on each managed node, and client interface(s). The design of the Unified Platform Manager, as well as the Unified Platform Agents, is based on a service-oriented architecture. The Unified Platform includes services that provide the following:  * Event and Alarm Management * Process Management * Job and Workflow Management * System Inventory Management * Log and File Management   The following diagram shows the UPM Architecture    The following screenshot shows the UPM Web GUI.   Preventive maintenance involves a visual inspection of various components of the system and regular backup procedures. For more information, please refer toCOMONE\_3\_5\_50\_Unified\_Platform\_Guide.pdf (Section - Unified Platform Architecture, pp. 9-10)  1. The Alarm Reference provides details for all alarms that are generated by Comverse ONE network and application components. Comverse ONE components emit SNMP traps for the purpose of Fault Management and Service Assurance. All managed components are monitored by the Comverse ONE Unified Platform. Each managed component has an agent running that provides continuous monitoring of key resources. Non-managed components (i.e. network components), where an agent is not present, will send these alarms directly to the manager for processing. When a fault condition is detected an alarm is generated and forwarded to the centralized manager. The manager if required will forward the alarm to the registered northbound managers.   For more information, please refer to COMONE\_3\_5\_50\_Alarm\_Reference.pdf |
|  | **Preventive maintenance procedure**  The system shall support several tiers of preventive maintenance procedure. The preventive maintenance shall include   * Daily preventive maintenance procedure * Weekly preventive maintenance procedure * Monthly preventive maintenance procedure * Site auditing * On demand preventive maintenance   The Bidder shall provide detail information on the preventive maintenance procedure of the system. | FC | The Unified Platform architecture consists of a centralized Unified Platform Manager (UPM), a Unified Platform Agent (UPA) on each managed node, and client interface(s). The design of the Unified Platform Manager, as well as the Unified Platform Agents, is based on a service-oriented architecture. The Unified Platform includes services that provide the following:   * Event and Alarm Management * Process Management * Job and Workflow Management * System Inventory Management * Log and File Management   The following diagram shows the UPM Architecture    Preventive maintenance involves a visual inspection of various components of the system and regular backup procedures For more information, please refer toCOMONE\_3\_5\_50\_Unified\_Platform\_Guide.pdf (Section - Unified Platform Architecture, pp. 9-10) |
|  | DIAMETER Support DCCA basic to allow to many applications to connect to the system.  Support rating and charging for Event and session  Support Diameter PS according to 3GPP PS TS 32.299 và TS 32.251.  Support OCS – Diameter & IMS in the future | FC | Comverse supports both Dimater DCCA and Diameter PS per the 3GGPP PS TS 32.299 and TS 32.251.  Please note that   * Comverse includes Diameter PS for data charging to support existing prepaid subscriber on RTBS system. * Comverse includes Diameter PS for data charging to support real time postpaid subscriber which will be handled by the Comverse ONE real time system. * Please note that after the implementation is done, there will be six Diameter Gateways (connection points).   + Three additional Diameter Gateway Units will be implemented on existing RTBS system for data charging of prepaid subscriber.   + One additional Diameter Gateway Units will be implemented on Comverse ONE RT platform to support real time mobile postpaid subscriber.   The RTBS and Comverse ONE RT is platform readiness to support Diameter IMS when needed in the future. The additional HW/SW will be needed in order to support Diameter IMS. |
|  | OTHER REQUIREMENT |  |  |
|  | SIGNTRAN  System support SS7 over IP with Signtran M3U. | FC | Comverse ONE supports SS7 over IP with Signtran M3UA as well as High-Speed Links (HSL) |
|  | INTERNAL and EXTERNAL PROTOCOLS  * The intercommunication between the system component such as SCP to database, or IVR to SCP shall base on TCP/IP protocol. * The intercommunicate between data-less system component such as SCP and Signaling unit, or IVR with signaling unit shall base on TCP/IP protocol. * **The solution provides security services that allow Vinaphone to safeguard their data and enable users to do the work they need to do to maintain and use the system.** | FC | 1, 2) The core Comverse ONE RT elements (such as SDP, SCP/IP, OCS and SMP) use standard protocols to communicate to each other. The interfaces between the Network (MSC/SSP, HLR and GGSN) and the SCP are SS7 based (such as MAP/ISUP/CAMEL) and may look familiar to those familiar with TCP/IP protocols. In fact, the SS7 protocols implement much of the OSI seven-layer model. The internal communication inside the SCP, OCS and between SCP, OCS, SDP and SMP are based on TCP/IP.  The following diagram shows the internal architecture of Comverse ONE RT system    The Comverse ONE RT is based on IT infrastructure with the robustness of SS7 interface capabilities. The Real-Time components are fully redundant. No single point of hardware or software failure will result in unavailability of the platform. Furthermore, the platform is able to continue processing even when certain combinations of failure occur. More details can be found in theComverse ONE Architecture Information.pdf – section 1.3 Platform Redundancy and Scalability. 3) The Comverse ONE RT security platform is SARBOX compliant. The purpose of the security platform and SARBOX in the realm of the Comverse ONE solution is to present sufficient controls to allow client organizations to be SARBOX compliant, address widespread security requirements.  As a summary, the Comverse security platform does the following:   * Supplies appropriate controls to ensure that any changes to the system related to financial control or financial data are monitored and audited. * Follows industry best practices and standards for authentication, authorization, and accounting (AAA). * Provides centralized key management for symmetric encryption keys and centralized database password management. * Provides integration points to allow for interfacing to your organization’s existing security infrastructure or, if no infrastructure is in place, provides a security infrastructure for components external to the Comverse ONE system.   For more information, please refer to   * COMONE\_3\_5\_50\_Security\_Platform\_Operations\_Guide.pdf (Chapter 2- Security Overview, pp. 7-11)   4) Comverse provides unified API for exposing a set of objects and methods that expose a full breadth of integration functions. The Unified API provides a unified programmatic interface to the Comverse ONE solution for client-side application development. This API encapsulates complicated business logic and abstracts the complex underlying details. The Unified API runs in a J2EE environment, exposing a web services interface. The Unified API also provides the client SDK, which is a Java object oriented client application development toolkit that is integrated with an abstract Enterprise JavaBean interface.  The server implementation is stateless and client-side utilities are available to facilitate any state management needed by client applications. Note that the Unified API also includes an Enterprise JavaBeans (EJB) interface, but this interface is highly abstracted and is not intended for direct use by client applications that do not use the client SDK. It can also support multiple languages and localization.  For more information, please refer to   * COMONE\_3\_5\_RT\_TR\_2\_0\_Unified\_API\_Guide.pdf (Chapter 2- Unified API Overview, pp.11-73) |
|  | **System Capacity**  The system shall support multi-million subscribers per platform. The system shall be configured to support large number of subscribers. The system shall be designed to support future growth of Vinaphone subscribers forecast without the need to replace the initial hardware and software component. Please provide estimate number of each component  Single platform Scalability  The system shall support scalability based on increasing number of system (platform component). Please provide explanation. | FC | Comverse ONE RT is highly scalable. It can be configured to support widely differing numbers of subscribers. The platform is designed to grow incrementally without the need to replace the initial hardware and software components. This is achieved by replicating components at the platform as service usage increases.An estimate showing the number of each component is provided in the BOM. More information can be found in the following attachments:For system scalability: Comverse ONE Architecture Information.pdf – section 1.2 Comverse ONE Solution Highlight, section 1.3 Platform Redundancy and ScalabilityFor SDP Capacity: IBM-SDP.pdfAttached as well are some certificates for Comverse ONE RT & RTBS customer, GSM-references-certifications (Vimplecom).pdf, GSM-references-certifications (Kievstar).pdf. Please note that the current operation is on the Comverse ONE RT systems which are upgraded from Comverse RTTBS  Multiple scalability configurations are supported by the Comverse ONE RT system design. These may either be through centralized or distributed architecture. To scale upwards, additional components may just be added as the capacity need increases. Examples are shown in the attached document:  Comverse ONE Architecture Information.pdf – section 1.2 Comverse ONE Solution Highlight, section 1.3 Platform Redundancy and Scalability |
|  | Semi distributed platform scalability  The system shall support scalability based on partial distributed system architecture, such as remote voice components for trunk saving. Please provide explanation. | FC | Comverse ONE RT can be implemented with a partially distributed architecture which is based on the combination of Centralized architecture with the remote IVR systems;  Comverse ONE RT supports remote IVR functionality, which allows an operator to save on intersite traffic. With this option, both pre-call announcement and IVR based recharge and information server calls are provided through the remotely located IVR.  Please refer to the example in the attached document  Comverse ONE Architecture Information.pdf –section 1.3 Platform Redundancy and Scalability, subsection 1.3.4 Distribute Architecture. |
|  | Full distributed platform scalability  The system shall support scalability based on distributed system architecture (multiple geographic). Please provide explanation. | FC | Comverse ONE RT can be implemented with a fully distributed approach where the distribute site slave SDP hosts replication of service/package configuration (sync from main site master SDP), and subscriber information.  Please refer to the example in the attached document  Comverse ONE Architecture Information.pdf –section 1.3 Platform Redundancy and Scalability, subsection 1.3.4 Distribute Architecture |
|  | **DESCRIPTION REQUIREMENT FOR FUTURE SUPPORTS**  Bidder shall be required to describe the developing trend of the proposal system on:   * Support for 2.5G, 3G, 3.5G and LTE   + CSD and FAX charging   + OCS-Diameter & IMS based charging capability and diameter protocol   The proposed system shall support/upgradeable to support the OCS-Diameter & IMS services related charging. | FC | The Technical proposal shows the architecture and interfaces included within the Comverse proposal. Data charging can be implemented through Diameter. Charging for IMS services are supported with Diameter IMS. A description of the charging interfaces (Event Charging Interface, Diameter, IMS, OSA,etc) can be found in the following attachments: COMONE\_3\_5\_RT\_DAT\_6\_0\_Charging\_Interfaces\_Guide.pdf Please note that Diameter IMS is not included in this proposal.  For CAMEL2, please refer to CAMEL2 Call Flows.pdf For CAMEL2/CAMEL3, please refer to   * COMONE\_3\_5\_RT\_TR\_1\_0\_Network\_Interfaces\_and\_Notifications\_Guide.pdf |
|  | **PRODUCTS**  Meeting all the operating condition in Vietnam   * Weather, climate, and the environment with high stability and operability * The environment in which nodes shall be able to work is: * Operating temperature: 0 – 45o C corresponding to the humidity of 20% to 85% * Non operating temperature: 0 – 60o C corresponding to the humidity of 95% | FC | The attached document Physical and Environment info details the electrical, mechanical, environmental and physical specifications of the product.  For SDP, please refer toIBM P5 750.pdf  For Physical & Environmental info, please refer to  Physical & Environmental info.pdf |