IBM – Airtel

Airtel - TIGO Merger (Rwanda)

BI Project v1.1

High Level Design

[Solution Architecture]

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Reviewers

| Name | Title | Responsibility |
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|  | IBM’s**Domain Enterprise Architect** | Solution conforms with IT architecture requirements |
|  | Impacted**III Party** Engagement Manager | System requirements are complete  Solution is supportable |
|  | Infrastructure**(IBM SSO)** | Infrastructure requirements are complete  Solution is supportable |
|  | Operations **(IBM TBO)** | Solution meets project governance requirements |
|  | **Airtel Program Manager** | Solution meets project governance requirements |
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Approvers

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| --- | --- | --- | --- |
| IBM Enterprise Architect from SRB | Solution is optimal for the business, complete and has approval from the Design Authority |  |  |
| Airtel’sSRBPermanent Member | Solution meets operational requirements |  |  |
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| IBM Project Manager | Solution meets project governance requirements |  |  |

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# About This Document

## Purpose

This document specifies the Technical System Requirements, High Level Architecture & solution for the integration of TIGO data with the existing IBM BI system in order to suffice business analytics requirement with merger of Airtel – TIGO in Rwanda OPCO. The document provides and insight in order to:

* Allow the technical requirements to be elucidated and the architecture and design decisions to be made and justified that meet the functional and non-functional requirements
* Allow development of more detailed technical documentation, as required

## Document Scope

The scope of the document is to provide the high level solution for systems integration and approach for using existing operational & analytical subjects in the BI system for the TIGO data. The document will not describe the Low level design, coding and testing related details.

## Audience

Document can be used across by the development team to get an overview of the system design and architecture to be followed across for the application. The document provides the High Level Design of the application which will be created across.

## Associated Documents

| Name | Version | Location |
| --- | --- | --- |
|  |  |  |

## Definitions

| Term/Abbreviation | Definition |
| --- | --- |
| BI | Business Intelligence |
| KPI | Key Performance Indicators |
| DWH | Data Ware House |
| SOR | System of Record |
| VAS | Value Added Services |
| CDR | Call Data Record |
| ER | Event Record |
| DB | Data Base |
| MSC | Mobile Switching Centre |
| CCN | Charging Control Node |
| ADJ | Adjustments |
| AIR | Account Information & Refill |
| SDP | Service Delivery Platform |
| KYC | Know Your Customer |
| SND/S&D | Sales & Distribution |
| GGSN | Gateway GPRS Support Node |
| SGSN | Serving GPRS Support Node |
| INTEC | Inter-Connect |

# Context

## Business Purpose

Business Intelligence provides a set of methodologies, architecture that transform raw data into meaningful data to support business analytics requirement of the end users.

BI Project will be the solution to provide Business Intelligence through development of Key Performance Indicators using the Data Warehousing approach and BI Data Mart model to help end users to provide an efficient solution for performing analytics for strategic decision-making.

Business purpose served by this solution will be BI view for presenting historical and current trends of the KPIs and ability to do performs MOLAP based analysis supporting decision making in addition to capability of drawing standard reports to support day to day business operations.

## Business Scope

* Business scope includes combined BI solution for Airtel & TIGO (Rwanda) provided to Marketing team for generating analytics & BI reports on various telecom subjects.
* This includes integration of BI system with various TIGO sources for data ingestion: Networks for CDR/ER (usage & charging data) and IT systems for Transactional data (INTEC, KYC, Pretups, S&D).
* Specific business requirements on various TIGO specific data Sources, Dimension’s data - Products, VAS bundles which need to be included in the existing BI system are covered in-detail under *“Requirements”* section of this document*.*

## Critical Success Factors & Dependencies

### Success Factors:

* Source system data accuracy - for KPI Data building and Integrity will be a critical success factor.
* Accurate & Timely creation of the KPIs in the BI system will be another critical success criterion.

### Dependencies:

* Data Feeds from the all Source system to target BI system in an agreed format as per Source System Agreement Document.
* Any changes in the data feed format shall be initiated by CR process and formally agreed between both systems and governed through revision in the original Source System Agreement Document.
* Data availability as per format & frequency defined under Source System Agreement document for integration between Source systems & BI systems. (refer to the source system agreement under the **section 4.3.4**)
* Network Connectivity between the source & target servers identified under the integration scope should be in place.
* Optimal Network Bandwidth availability for supporting data file transfers as per the volumetric/sizing.
* Optimal Disk & DB Storage for data retention on staging and BI system as per sizing estimation.

# Requirements

## Functional Requirements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **BRS Ref** | **Number** | **Requirement Description** | **Systems involved** |
| **US** | BRS\_CBR - CSR XXXX - BI Lite Africa V 0.4 14 Sep | **US1** | As a BI platform need to Integrate Below source system with BI so that Tigo Source can be loaded within Airtel BI System. Below are the Tigo source systems that will be integrated and the format should be same as the current Airtel Mediated source:   1. SDP CDRs 2. AIR CDRs (Refill & Adjustment) 3. CCN CDRs 4. MSC CDRs 5. SMSC CDRs 6. GGSN CDRs 7. SGSN CDRs 8. NRT AIR CDRs 9. NRT CCN CDRs   File Format for each of the source system is shared in section 2.1 “Airtel Mediation FRS”  **Note:** Source data to be provided to Airtel BI through Airtel Mediation system. | *For referring to sources involved refer to “Source System Agreement” under Requirement Appendices* |
| **US** |  | **US2** | As a BI platform require Tigo SDP dumps (Main Account and Dedicated Account) to be integrated within Airtel BI as per Tigo SDP specification.  Refer Section 2.1 “SDP Dump” for Tigo SDP specification. |  |
| **US** |  | **US3** | As a BI platform need to integrate below sources for Tigo Data as per existing Airtel BI format and logic. Integration method should be same as existing Airtel BI integration.   1. SND 2. ICT (Interconnect) 3. PreTups Data 4. PreTups Recharge   Refer Section 2.1 “RWANDA Source Column Mapping” for Column and Integration and “Extraction Logic” for existing agreed logic. |  |
| **US** |  | **US4** | As a BI platform need Tigo VAS Products & Bundles (In Sec2.1 “Tigo Product Catalogue”) to be migrated in Airtel BI.  Tigo to share Bundle and Product master as per below attached format :  Product Master Format:    Bundle Master Format: |  |
| **US** |  | **US5** | As a BI platform need All Dimensions to be updated with Tigo Data.  Tigo – Airtel call will be considered as Onnet call. |  |
| **US** |  | **US6** | As a BI platform, need below cubes and reports to be added with Tigo data and also segregation to be provided between Airtel and Tigo  Cubes:  1. Network Service Usage Analysis  2. Plan Churn Analysis  3. Revenue Recharge Analysis  4. Service Usage Analysis  5. SONA SOGA  6. Subscriber Activity Analysis  7. Subscriber Analysis  8. VAS Usage Analysis  9. VAS Subscriber Analysis  10. CWN Reports  Reports :  1. Inbound Roaming Tracker  2. Outbound Roaming Tracker  3. Inactivity Tracker  4. Business Health Tracker-UU  5. Business Health Tracker-Revenue  6. Business Health Tracker-Recharge  7. Business Health Tracker-Minutes  8. Business Health Tracker-Marketing  9. Business Health Tracker-Customer  10. Daily Campaign Cell, TG CG  11. Daily Campaign TG CG Summary  12. Weekly Campaign TG CG Detail  13. Weekly Campaign Cell Wise  14. Prepaid Report  15. Hourly KPI Report Rwanda Consolidated  16. Cognos Users Audit Report-RW  17. LMS Report  18. OG REC REPORT  19. Overall Monthly Report  20. Monthly Report  21. Gross Decay  22. REC Geography Analysis  23. International Pack Usage  24. Adjustment  25. BI Daily Cube and Report Status Dashboard Rwanda  26. Hourly KPI Report Rwanda  27. Daily Campaign ABC Detail  28. Daily Campaign ABC Detail  29. BI Daily Meta and Base Count Status Dashboard Rwanda  30. Weekly Campaign Cell Group Wise  31. Hourly KPI Report Rwanda 8AM  32. Decrement Migration  33. Winback LOU Report  34. Daily Campaign ABC Summary |  |
| **US** |  | **US7** | As a BI platform, I need Refill Profile ID column to be populated in AIR Refill CDR from mediation. |  |
| **US** |  | **US8** | As a BI platform, I need below KPIs to be implemented in Unica for Tigo RW: |  |
| **US** |  | **US9** | As a BI platform, I need Tigo KYC to be integrated in Airtel BI. Below field details are required from KYC Tigo RW: |  |

## Requirement Appendices: References

* + - Airtel Mediation FRS



* + - Airtel BI RW non-mediated Source Column Details/Extraction Logic



* + - Tigo Product catalogue for ref.



## USE Case ModelC:\WORKDRIVE\PROJECTS\CIO\Transition Docs\Design HLD LLD\DWHUseCaseModel_Main.png

#### Load ODS Data (for TIGO)

|  |  |
| --- | --- |
| **Subject Area** | BI ODS Data Model – BI Source Data Loading for TIGO data |
| **Business Event** | Scheduled Job execution |
| **Actor(s)** | BI DWH System |
| **Channel** | 1. **Mediation System:**   MSC CDRs  IN-CCN (Voice/SMS/DATA) CDRs  IN-AIR Recharge ERs  IN-AIR Adjustment ERs  IN-SDP Adjustment ERs  GGSN CDRs  SGSN CDRs  SDP Snapshot/SDP Dump   1. **IT Systems/DBs:**   KYC System DB  INTEC System DB  SND System DB  PRETUPS System |
| **Use Case Overview** | 1. **Data Feed files from Mediation system (for TIGO):**   Network CDR data for Voice/SMS/DATA services, Rated CDRs, Recharges ERs, Adjustments ERs and Subscriber Profile ERs are parsed & mediated via mediation system to BI system.  Feed files will be in form of delimited ASCII files and will be made available at BI staging on Daily basis in an agreed format and Time period as per the Source System Agreements.  Scheduled Jobs will be executed using ETL Data Stage/Streams Application which will be employed for ETL processing on the received source files.  As an output of this process Voice/SMS/DATA related CDRs/ERs feeds will be loaded under the target ODS structure of the BI DWH.  Following Source Feeds will be available from Mediation System for TIGO data:  **MSC CDRs** – MSC provides Network Usage CDR records (Calls/SMS). The call data record generated includes information like Usage, Cell Site, Call Type, etc. These CDRs are ingested in BI for Usage related analysis.  **IN-CCN (Voice/SMS/DATA) CDRs** – CCN is a charging node from which charging information related to CDRs like Voice, SMS, DATA is collected and stored in the ODS for BI purpose. Information is collected for both Main & DA.  **IN-AIR Recharge ERs** – AIR Refill ERs provides information on Recharges transactions being carried by the Subscriber.  AIR Refill records carries information like Service Class, Voucher Serial Number, Recharge Amount, revised Account Balance & expiry dates for Dedicated Accounts. Information is collected for both Main & DA for analysis on Subscriber Recharges.  **IN-AIR Adjustment ERs** – AIR Adjustments ERs provides information on adjustment transactions being carried to the Subscriber's Account balance. AIR adjustments are the transaction between two subscriber account example Me2You service and are initiated by subscriber. Information is collected for both Main & DA for BI Analysis.  **IN-SDP Adjustment ERs** – SDP Adjustments ERs provides information on adjustment transactions being carried to the Subscriber's Account balance. Information is collected for both Main & DA for BI Analysis.  **GGSN CDRs** – GGSN CDRs contains CDR records for DATA service for Content (Internet) GPRS session, includes Out roamer data sessions. Purpose is for BI Analysis on Subscriber DATA Usage.  **SGSN CDRs** – SGSN CDR records for DATA service for Content (Internet) GPRS session, includes In roamer data sessions. Purpose is for BI Analysis on Subscriber DATA Usage.  **SDP Snapshot/SDP Dump** – SDP provides information on current Subscriber Base, Stock in chain, new Activations, Subscriber Balance & Profile (including Customer Lifecycle status, Service Class, etc.).  SDP snapshot (Main & DA) information is obtained from the Mediation system as day end files. For TIGO separate subscriber snapshot files will be available having the same format as existing SDP snapshot feed file.   1. **Data Feed files from IT systems/DBs (for TIGO):**   Other Products data will be available via integration with IT systems (using direct DB connectivity / File based data extraction) for loading the required data to BI system. Following are the details on data feeds from IT systems/DBs:  **KYC System DB** – KYC Subscriber registration information is fetched from KYC into BI system for building BI KPIs.  **INTEC System DB** – INTEC system feeds - Interconnect CDRs are ingested in the BI system to build accurate interconnect traffic intelligence in BI. Analysis is done based on relevant Traffic reports generated by BI system and Daily traffic analysis ensures quick issue identification minimizing revenue/cost impact.  **SND System DB** – Data related to Distributors Sales & Distribution data is fetched from SND system using Oracle Views for Reporting purpose.  **PRETUPS System** – This feed is provided from Pretup system to BI for identifying ambiguous cases of recharges and adjustments.  *(Pls. refer to the source system agreement document attached under the section 4.3.4, for more details)* |
| **Preconditions** | * Source Feed Files for TIGO shall be in existing agreed format. * Data Files shall be available before ETL loading window/on agreed frequency. * Duplicate files shall not be sent by Source system. * Files shall have necessary read permissions for ETL system User. * Files shall not have non-printable characters except line feed. * In case of DB sources, Data shall be available in the staging tables for data extraction on fixed frequency. DB connectivity to source tables should be available with read rights. * Master Data loading for dimensions should be completed. |
| **Termination Outcome** | TIGO data Loading ETL Job process is complete and source data is persistently recorded in the Data structures/tables under BI DWH ODS layer.  TIGO Records will be loaded in the existing ODS tables post ETL transformations, based on the Business Logics/mapping with existing ODS structure and by associating respective Dimension Keys (as applicable) from SOR Layer.  Duplicate records will require to identified based on logic provided source wise. All duplicate tagged CDR/ER shall be rejected and such counts shall be recorded under ETL meta tables.  Bad Records which are not as per source system agreement which may be due to Source File Column count mismatch for a record or Column Datatype mismatch (for e.g. Date Field which is not in correct format) shall be rejected and such counts shall be recorded under ETL meta tables. |
| **Input Summary** | Sourcing of Voice/SMS/DATA services CDR Data, Rated CDR data, Recharges data, Adjustments data, Subscriber dump data and for other sources KYC, SND, INTEC & Pretups for DWH building process in BI. |

#### Load DWH SOR Masters (TIGO Dimension – master data)

|  |  |
| --- | --- |
| **Subject Area** | SOR Layer Model – BI Master Data Management for TIGO |
| **Business Event** | Scheduled Job execution |
| **Actor(s)** | BI DWH System |
| **Channel** | Dimensions/Master Data/Lookup Data |
| **Use Case Overview** | BI subjects & KPIs are built around the Dimensions which adds perspective to the Events/transactional Facts - data received from source systems, in order to provide analytical views and ability to perform dimension based MOLAP analysis.  Dimensions identified for building BI subjects are sourced from Marketing Team and source DB systems.  Following existing Dimensions / Masters available in the BI Data-Mart will require to be updated for capturing additional entries for TIGO:   * **Geography Dimension** * **Organization Dimension** * **Tariff Plan Dimension** * **Service Provider Dimension** * **Recharge Denomination/SKU Dimension** * **VAS Short Codes Master** * **VAS Product Dimension** * **Bundle Dimension**   Master Data Management for above identified dimensions will be performed by existing Data Stage ETL AS-IS process, triggered through Scheduled Jobs.  As an output of this process all Master data received from both sources (Airtel & TIGO) will be loaded under the target SOR layer (system of record) structures of the BI DWH. |
| **Preconditions** | * Master Data Feed Files shall be in existing agreed format. * Input Master Data Files shall be available before ETL loading window. * Files shall have necessary read permissions for ETL system User. * Files shall not have non-printable characters except line feed. |
| **Termination Outcome** | SOR Master Loading ETL Job is complete and Master data is persistently recorded under the BI DWH SOR layer. |
| **Input Summary** | Sourcing of the Airtel & TIGO related dimensions data in order to suffice Analytical requirement. |

#### VAS Products & Bundles for TIGO

|  |  |
| --- | --- |
| **Subject Area** | Building BI VAS subject data for TIGO products |
| **Business Event** | Scheduled Job execution |
| **Actor(s)** | BI DWH System |
| **Channel** | NA |
| **Use Case Overview** | TIGO will have specific VAS products which would require to be integrated with existing Airtel BI VAS subjects. The new TIGO specific VAS products will be loaded and maintained in the current VAS Dimensions (Product Dimension & Bundle Dimension) and following existing BI VAS subjects (Facts) would be used to cover TIGO KPIs as well.   * **VAS Usage Summary** - VAS Usage Summary records the subscriber wise summary of the service usage for various types of VAS Products. Data is summarized at Hour level. * **VAS Subscriber Analysis** – VAS subscriber Analysis records the analysis for various closely watched numbers like REC base, DREC for various VAS Products. * **VAS Usage Analysis -** VAS Usage Analysis records the analysis for the service usage, subscriptions, revenue for various types VAS Products & Bundles Products. |
| **Preconditions** | * All VAS related sources like AIR-Adjustments, Usage CDRs for identifying VAS subscription and VAS Usage are loaded in the ODS system. * All VAS related dimensions are uploaded/updated under the SOR layer. |
| **Termination Outcome** | VAS subject data building is complete under BI DWH Summary/Analytical & DataMart layer. |
| **Input Summary** | VAS data feed for subscription & usage. VAS Product & Bundle Master data. |

#### Reporting – Airtel / TIGO segregation at Organization level

|  |  |
| --- | --- |
| **Subject Area** | Segregation of the BI data basis the Organization (Airtel & TIGO). |
| **Business Event** | Scheduled Job execution |
| **Actor(s)** | BI DWH System |
| **Channel** | NA |
| **Use Case Overview** | For the purpose of building analytical subject areas in the BI having a segregation of Airtel & TIGO (Organization based tagging) will be done based on Mobile number and IMSI series. Further Organization as a dimension will be available in DataMart layer for having a segregation while Reporting.  Segregation will be available under following Cubes:   * **Network Service Usage Analysis** * **Plan Churn Analysis** * **Revenue Recharge Analysis** * **Service Usage Analysis** * **SONA SOGA** * **Subscriber Activity Analysis** * **Subscriber Analysis** * **VAS Usage Analysis** * **VAS Subscriber Analysis** * **CWN Reports**   Reports:   * **Inbound Roaming Tracker** * **Outbound Roaming Tracker** * **Inactivity Tracker** * **Business Health Tracker-UU** * **Business Health Tracker-Revenue** * **Business Health Tracker-Recharge** * **Business Health Tracker-Minutes** * **Business Health Tracker-Marketing** * **Business Health Tracker-Customer** * **Daily Campaign Cell, TG CG** * **Daily Campaign TG CG Summary** * **Weekly Campaign TG CG Detail** * **Weekly Campaign Cell Wise** * **Prepaid Report** * **Hourly KPI Report Rwanda Consolidated** * **Cognos Users Audit Report-RW** * **LMS Report** * **OG REC REPORT** * **Overall Monthly Report** * **Monthly Report** * **Gross Decay** * **REC Geography Analysis** * **International Pack Usage** * **Adjustment** * **BI Daily Cube and Report Status Dashboard Rwanda** * **Hourly KPI Report Rwanda** * **Daily Campaign ABC Detail** * **Daily Campaign ABC Detail** * **BI Daily Meta and Base Count Status Dashboard Rwanda** * **Weekly Campaign Cell Group Wise** * **Hourly KPI Report Rwanda 8AM** * **Decrement Migration** * **Winback LOU Report** * **Daily Campaign ABC Summary** |
| **Preconditions** | * All Subscriber Account SDP source data and CDR related source data loading is completed in ODS layer. * Data for DB related sources loading is completed. * Subscriber Profile (Mobile Telephony Arrangement) building is completed and Profile data is persistently recorded under the BI DWH SOR layer. |
| **Termination Outcome** | DB script for building BI DataMart is complete with segregation of Airtel/TIGO using Organization Dimension. |
| **Input Summary** | Subscriber Account Information – MSISDN, IMSI taken from the Subscriber Profile and KPI data from DWH Summary & Analytical layers for building DataMart KPI with segregation of Organization sufficing Analytical requirements. |

#### Campaign Data Mart & NRT

|  |  |
| --- | --- |
| **Subject Area** | BI Base KPI Building for Campaign Execution for TIGO.  NRT Feed to the Unica (CMS) for TIGO source streams. |
| **Business Event** | Daily KPI Derivations (from BI)  CDR/ER based NRT triggers |
| **Actor(s)** | BI DWH System |
| **Channel** | NA |
| **Use Case Overview** | **A)** BI Base KPI Building for Campaign Execution for TIGO (under CMDM):  Subscriber Key Performance Indicators provide the behavioral aspects, which are used for micro segmentation of the customers. The segments are used for communicating various product offers to the customer base. KPI reporting from Business Intelligence (DWH) is used for generation of these behavioral aspects.  These KPI are based on various source systems integrated into the system. Following are the High Level KPI subjects covered, same would be required for TIGO data:   * Data Volume - Volume data usage * Usage Revenue - Revenue earning based on Voice/SMS/Data and other KPI around it. * Outroamers - Out roamer identification etc * Event Count - These can be voice event count/sms event counts. * Rec Activation Info * Subscriber Balance - Balance of the Subscriber * Tariff Profile - Subscriber service class and other information corresponding to Tariff. * In Activation Date - Date of activation on IN * Recharges - Recharges performed by the subscriber in a day. * VAS - VAS Product information * Subscriber profile - Profile of the subscriber providing this Favorite leg and Value Segmentation.   **B)** NRT raw feed for TIGO related CDR/ER parsed and loaded in UNICA DB, following feeds would require to be processed:   * NRT AIR CDRs * NRT CCN CDRs |
| **Preconditions** | Data from following source systems should be available in the Base tables for CMS KPI derivations:   * **CCN (Voice, SMS & Data)** * **MSC CDR** * **SDP Main** * **Air Refill** * **Air Adjustments**   Following raw feeds shall be available for TIGO as pass-thru from mediation:   * **AIR Recharge CDRs** * **CCN CDRs** |
| **Termination Outcome** | **A)** KPI required by the CMS (UNICA) system are derived and accurate basis the data loaded in the CMDM Database.  **B)** KPI/Trigger data parsed from RAW CDR/ER feeds are processed and loaded in the UNICA Database. |
| **Input Summary** | Base BI data for CMS KPI derivation and Raw CDR/ER data as pass-thru from mediation for processing NRT triggers. |

## Non Functional Requirements

### Capacity

For performing the capacity planning we have considered following facts while deriving the sizing of the application:

* CDR/ER Volume –
  + Existing CDR volumetric (In million) – 300 Mn
  + TIGO CDR volumetric (In million) – 1000 Mn
* Subscriber Base –
  + Existing Subs Base (In million) – 1.6 Mn
  + TIGO Subs Base (In million) – 6 Mn
* **Capacity Augmentation Required** (basis above additional volumetric for TIGO):

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Application** | **Existing Storage (In GB)** | **Storage per million Subs Base (In MB)** | **Storage per million CDR volumetric**  **(In MB)** | **Additional Storage required based on TIGO Subs Base**  **(In GB)** | **Additional Storage required based on TIGO CDR Volumetric (In GB)** | **Total Additional Storage required with Buffer 25%**  **(In GB)** |
| DB2 | 6144 | 3.93216 | 0.02097152 | 23040 | 20480 | 25600 |
| Data Stage | 197 | 0.12608 | 0.000672427 | 738.75 | 656.66 | 820.83 |
| Stream | 1269.76 | 0.8126464 | 0.004334114 | 4761.6 | 4232.53 | 5290.66 |
| Cognos | 150 | 0.096 | 0.000512 | 562.5 | 500 | 625 |
| CMDM DB2 (UNICA DB) | 3072 | 0.00192 | NA | 11520 | NA | 14400 |

***Note:*** *High level estimation based on Avg. Per Day Records expected to be received from each source estimated based on* ***per million subscribers is provided below (for ref. only)****.*

* **File System Sizing:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **File System (Source Feed Volumetric)** | **Avg. No. of Rows per Day** | **Avg. Row Size (in Bytes)** | **Retention (in days)** | **Total Raw Data Size (in GBs)** |
| MSC | 8031650 | 300 | 7 | 15.71 |
| CCN Main | 11995823 | 930 | 7 | 72.73 |
| CCN DA | 39697355 | 530 | 7 | 137.16 |
| AIR Main | 287130 | 540 | 7 | 1.01 |
| AIR DA | 3420256 | 500 | 7 | 11.15 |
| AIR ADJ MAIN | 593391 | 280 | 7 | 1.08 |
| AIR ADJ OTHER | 318068 | 280 | 7 | 0.58 |
| SDP ADJ MAIN | 1665627 | 540 | 7 | 5.86 |
| SDP ADJ OTHER | 583057 | 600 | 7 | 2.28 |
| GGSN | 7219994 | 340 | 7 | 16.00 |
| SGSN | 4231254 | 310 | 7 | 8.55 |
| SDP MAIN | 2475710 | 250 | 7 | 4.03 |
| SDP OTHER | 1025880 | 180 | 7 | 1.20 |
| **Total Size (Un-Compressed)** | | | | **277.35 GB** |

* **DWH DB Sizing:**

1. DWH ODS Layer – CDR/DB Sources:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source Type** | **Source Name** | **Avg. Per Day Records** | **Avg Row Uncompressed Size (In Bytes)** | **Data Size/Day**  **(In MBs)** | **Indexes Size/Day**  **(30%)** | **Retention Period**  **(In Days)** | **Total Size  (In GBs)** |
| **CDR Sources** | MSC | 8031650 | 300 | 2297.87 | 689.36 | 90 | 262.55 |
| CCN Main | 11995823 | 930 | 10639.30 | 3191.79 | 90 | 1215.62 |
| CCN DA | 39697355 | 530 | 20064.92 | 6019.48 | 90 | 2292.57 |
| AIR Main | 287130 | 540 | 147.87 | 44.36 | 90 | 16.90 |
| AIR DA | 3420256 | 500 | 1630.91 | 489.27 | 90 | 186.34 |
| AIR ADJ MAIN | 593391 | 280 | 158.45 | 47.54 | 90 | 18.10 |
| AIR ADJ OTHER | 318068 | 280 | 84.93 | 25.48 | 90 | 9.70 |
| SDP ADJ MAIN | 1665627 | 540 | 857.77 | 257.33 | 90 | 98.01 |
| SDP ADJ OTHER | 583057 | 600 | 333.63 | 100.09 | 90 | 38.12 |
| GGSN | 7219994 | 340 | 2341.08 | 702.32 | 90 | 267.49 |
| SGSN | 4231254 | 310 | 1250.92 | 375.28 | 90 | 142.93 |
| SDP MAIN | 2475710 | 250 | 590.26 | 177.08 | 90 | 67.44 |
| SDP OTHER | 1025880 | 180 | 176.10 | 52.83 | 90 | 20.12 |
| **Airtel Money Source** | AM Transaction Header | 73418 | 220 | 15.40 | 4.62 | 90 | 1.76 |
| AM Transaction Details | 284653 | 430 | 116.73 | 35.02 | 90 | 13.34 |
| AM Subscribe Account | 1939615 | 380 | 702.91 | 210.87 | 1 | 0.89 |
| AM Channel Account | 19555 | 380 | 7.09 | 2.13 | 1 | 0.01 |
| AM Action History | 937 | 134 | 0.12 | 0.04 | 90 | 0.01 |
| AM Account Balance | 1048014 | 210 | 209.89 | 62.97 | 90 | 23.98 |
| **Interconnect DB** | INTEC | 3406203 | 750 | 2436.31 | 730.89 | 90 | 278.37 |
| **KYC DB** | KYC | 2983782 | 140 | 398.38 | 119.51 | 1 | 0.51 |
| **SND DB** | SND | 4297412 | 250 | 1024.58 | 307.37 | 1 | 1.30 |
|  | **Storage** | | | | | | **4956.06** |

1. DWH Summary Layer –

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Source Type** | **Source Name** | **Avg. Per Day Records** | **Avg Row Uncompressed Size (In Bytes)** | **Data Size/Day**  **(In MBs)** | **Indexes Size/Day**  **(30%)** | **Retention Period**  **(In Days)** | **Total Size  (In GBs)** |
| **CDR Service Usage & Charging Summary** | Service Usage Summary | 6250331 | 160 | 953.72 | 286.12 | 210 | 254.26 |
| Service Usage Charging Summary | 3680027 | 230 | 807.20 | 242.16 | 210 | 215.20 |
| Service Usage Charging DA Summary | 3752271 | 165 | 590.44 | 177.13 | 210 | 157.41 |
| Subscriber Revenue Summary | 2482209 | 130 | 307.74 | 92.32 | 210 | 82.04 |
| VAS Usage Summary | 7714025 | 170 | 1250.63 | 375.19 | 210 | 333.42 |
| Network Usage Summary | 630746 | 130 | 78.20 | 23.46 | 210 | 20.85 |
| **Airtel Money Summary** | AM Transaction Summary | 100015 | 100 | 9.54 | 2.86 | 210 | 2.54 |
| **Intec Summary** | INTEC Summary | 2212817 | 225 | 474.82 | 142.45 | 210 | 126.59 |
|  | **Storage** | | | | | | **1192.31** |

1. DWH Analytical Layer –

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source Name** | **Avg. Per Day Records** | **Avg. Row Uncompressed Size (In Bytes)** | **Data Size/Day**  **(In MBs)** | **Indexes Size/Day**  **(30%)** | **Retention Period**  **(In Days)** | **Total Size  (In GBs)** |
| COMPETITOR SHARE ANALYSIS | 33337 | 60 | 1.91 | 0.57 | 210 | 0.51 |
| CWN ANALYSIS | 216160 | 140 | 28.86 | 8.66 | 210 | 7.69 |
| NETWORK SERVICE USAGE ANALYSIS | 630486 | 150 | 90.19 | 27.06 | 210 | 24.05 |
| PLAN CHURN ANALYSIS | 2469 | 80 | 0.19 | 0.06 | 210 | 0.05 |
| RECHARGE ANALYSIS | 110804 | 80 | 8.45 | 2.54 | 210 | 2.25 |
| RECHARGE DA ANALYSIS | 1429329 | 70 | 95.42 | 28.63 | 210 | 25.44 |
| REVENUE ANALYSIS | 207935 | 90 | 17.85 | 5.35 | 210 | 4.76 |
| SERVICE USAGE ANALYSIS | 1397569 | 140 | 186.60 | 55.98 | 210 | 49.75 |
| SERVICE USAGE CHARGING ANALYSIS | 562692 | 200 | 107.32 | 32.20 | 210 | 28.61 |
| SERVICE USAGE CHARGING DA ANALYSIS | 572108 | 110 | 60.02 | 18.00 | 210 | 16.00 |
| SUBSCRIBER ACTIVITY ANALYSIS | 794203 | 75 | 56.81 | 17.04 | 210 | 15.14 |
| VAS CWN ANALYSIS | 218822 | 70 | 14.61 | 4.38 | 210 | 3.89 |
| VAS USAGE ANALYSIS | 557178 | 170 | 90.33 | 27.10 | 210 | 24.08 |
| CARRIER SERVICE USAGE ANALYSIS | 167 | 110 | 0.02 | 0.01 | 210 | 0.00 |
| **Storage** | | | | | | **202.23** |

1. BI DataMart Layer –

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source Name** | **Avg. Per Day Records** | **Avg. Row Uncompressed Size (In Bytes)** | **Data Size/Day (In MBs)** | **Indexes Size/Day (30%)** | **Retention Period**  **(In Days)** | **Total Size  (In GBs)** |
| COMPETITOR SHARE ANALYSIS | 33337 | 120 | 3.82 | 1.14 | 227 | 1.10 |
| SUBSCRIBER ANALYSIS | 216160 | 280 | 57.72 | 17.32 | 227 | 16.63 |
| NETWORK SERVICE USAGE ANALYSIS | 630485 | 300 | 180.38 | 54.12 | 227 | 51.98 |
| PLAN CHURN ANALYSIS | 2469 | 160 | 0.38 | 0.11 | 227 | 0.11 |
| RECHARGE ANALYSIS | 110803 | 160 | 16.91 | 5.07 | 227 | 4.87 |
| RECHARGE DA ANALYSIS | 1429328 | 140 | 190.84 | 57.25 | 227 | 55.00 |
| REVENUE ANALYSIS | 207935 | 180 | 35.69 | 10.71 | 227 | 10.29 |
| SERVICE USAGE ANALYSIS | 562691 | 400 | 214.65 | 64.39 | 227 | 61.86 |
| SERVICE USAGE DA ANALYSIS | 572108 | 220 | 120.03 | 36.01 | 227 | 34.59 |
| SUBSCRIBER ACTIVITY ANALYSIS | 794202 | 150 | 113.61 | 34.08 | 227 | 32.74 |
| VAS SUBSCRIBER ANALYSIS | 218821 | 140 | 29.22 | 8.76 | 227 | 8.42 |
| VAS USAGE ANALYSIS | 557177 | 340 | 180.66 | 54.20 | 227 | 52.06 |
| CARRIER SERVICE USAGE CHARGING ANALYSIS | 167 | 220 | 0.04 | 0.01 | 227 | 0.01 |
| **Storage – Retention 6+1 Daily, 12+1 Monthly, 3+1 Yearly = 227** | | | | | | **329.66** |

* **HW Augmentation Requirement (CPU, Memory, Storage):**



### Performance & SLOs

No specific ask as per requirement document. Successful KPI data building and timely generation through BI system will be the generic criteria taken into consideration.

### Scalability

No specific ask as per requirement document. As generic criteria Application shall be scalable enough to cater capacity for next 3 Years.

### Availability (including Recoverability and Reliability)

CIA rating of the application is 554 where in availability is 4. In accordance to Availability Definition the application will have High Availability.

**Negligible** - No impact if the asset is not available.

**Low** - Non-availability of asset would have minimal / insignificant impact for example, assets with Maximum Permissible Downtime greater than 5 working days.

**Moderate** - Non-availability of asset may have some impact if prolonged for a long period of time. For example, assets where Maximum Permissible Downtime is between 1 & 5 working days.

**High** - Non-availability of asset would result in significant impact. This would typically apply to assets where Maximum Permissible Downtime is 1 working day or less.

**Very High** - Non-availability of asset will result in very high consequences / severe loss. This would typically apply to assets where Maximum Permissible Downtime is 4 hours or less.

Criticality rating of an asset is assessed based on the following qualifiers:

* Impact on customers confidence (end customers) leading to indirect financial loss (goodwill, opportunity loss)
* Impact on Revenue Opportunity
* Impact on subscriber retention for probable churn



### Maintainability (including Flexibility and Portability)

No specific ask as per requirement document.

Application shall be flexible to incorporate more KPI with less impact on the KPI computation logic.

Data Mart Layer will be designed as portable layer based on Airtel TIGO merger requirements and may be ported as is in other OPCOs BI systems.

DWH design will support generic & flexible relational structure for Master Data Management resulting in development of consistent & reusable ETL code helpful in maintainability.

### Security

As per Bharti, General Security Guidelines.



### Data Integrity (including Currency, Locality of Updating, Data Retention)

Data Integrity as per CIA rating 554 would be 5. Thus a Very High Integrity is required.

**Integrity**

Definition: A characteristic applying to organization’s information assets that provides assurance, under all conditions, that the asset has not been altered without authorization

If the integrity of asset is compromised, the impact on the organization needs to be understood/estimated by asset owner. Based on the sensitivity of the asset, integrity characteristic of an asset has to be rated on a scale of 1-5, 1 being minimum impact, i.e. negligible and 5 being Very high impact.

**Negligible** - No impact if the asset is compromised.

**Low** - Insignificant impact if the asset is compromised. Typically, this would include information which would not result in a financial / business loss if made available publicly.

**Moderate** - Some impact if the asset is compromised. It may result in some level of business / financial loss, if disclosed to unauthorized users.

**High** - Significant impact if the asset is compromised. It would probably result in significant business / financial loss

**Very High** - Severe / highest impact if the asset is compromised. Would most probably result in very high business / financial loss, which may be disastrous.

**Data Retention**

Data shall be retained in the BI Database with no change in existing BI retention policy:

* Daily ODS transactions :- 2+1 months
* Daily Aggregates (MSISDN level) :- 6+1 months
* Monthly Aggregates (MSISDN level) :- 12+1 months
* Data Mart Aggregates:
  + Daily 6+1 months
  + Monthly 12+1 Months
  + Yearly 2+1

For File storage - last 7 days files will be retained at the BI staging location.

*\* Note: For Data Sizing as per retention requirement, pls. refer to section 3.3.1 Capacity.*

# End to End Solution Description

This section details the design for the recommended solution, and explains what is involved in implementing the design.

## Architectural Decisions

### Architectural Decisions Record

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** | Common DWH/DM for both Airtel & TIGO | **Topic** |  |
| **Architectural Decision** | TIGO data would be integrated to existing DWH system by scaling the existing systems for providing a common reporting solution. | **AD ID** | AD-01 |
| **Problem Type** | Function Placement  Data Source  Data Location  Integration Method | | |
| **Issue or Problem** | With merger of TIGO Organization, data related to TIGO sources would require to be reported through AS-IS Airtel BI solution.  Current infrastructure (w.r.t system sizing – available CPU Cores, Memory & Storage) is not sufficient for handling the additional ~ subscriber data for TIGO and would either require HW augmentation or alternatively will require separate new DWH instance created for capturing TIGO data (which would further require common data-mart/reporting layer for combined reporting at Top) | | |
| **Assumptions** | Network CDR/ER related source data for TIGO organization obtained from Mediation system would be available in the AS-IS format of Airtel source feeds.  Integration and Extraction Method for data sourced from other IT Systems/DBs: KYC System DB, INTEC System DB, SND System DB, PRETUPS System will remain AS-IS.  Data would be available source wise on same frequency and within existing latency time (i.e. w.r.t time by when source data is received on the BI system). | | |
| **Motivation** | As combined reporting solution is required for reporting of both organization’s data - after merger, a common solution provided by scaling the existing system HW would be more manageable solution in terms of maintenance and in terms of handling complexity of combined reporting from a single DataMart at the top.  Moreover as business has agreed on providing a common source feed formats for all data sources of TIGO motivates further for moving on to a common system solution. | | |
| **Alternatives** | Alternatively a separate additional DB instance can be provisioned for loading base data for TIGO data without any impact on the current DB system HW and on top a common DataMart layer can be build for combined reporting. | | |
| **Decision** | Decision is to have TIGO data integrated in the existing DWH system by scaling the existing systems for providing a common reporting solution. | | |
| **Justification** | Current BI solution can be easily scaled up with HW augmentation as same solution has already been tested with equivalent subscriber base in other OPCOs instances. | | |
| **Implications** | Existing BI systems would require to be scaled up in order to accommodate data for TIGO, KPI processing and Reporting for combined TIGO & Airtel. | | |
| **Derived requirements** | NA | | |
| **Related Decisions** | NA | | |

## Design Decisions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DD ID** | **Design Problem Statement** | **Design Decision** | **Design Pattern Name** | **Reason** |
| DD-01  (\* New Design Decision for handling TIGO segregation) | Segregation of Airtel & TIGO data for reporting purpose | Organization Dimension will be incorporated in all DataMart subjects for handling both below scenarios: **A)** For combined reporting (for both Airtel & TIGO) at console level using the first level of the Organization Dimension Hierarchy.  **B)** For segregation of reporting for Airtel and TIGO using second/third level of Organization Dimension Hierarchy. | Dimensional Modelling – Data Modelling technique | 1. Organization based tagging can be done based on Subscriber Mobile number and IMSI series. 2. Further Organization as a dimension made available in DataMart layer can provide an elegant way to represent both combined & segregated Airtel & TIGO reporting subjects. |
| DD-02  (Existing Design Decision remain common for TIGO reporting) | Dimensional Model for Data Mart Design rather than flat KPI data structure based fixed reports requirements | Design decision is to employ Dimensional Modelling technique for modelling BI Data Mart. | Dimensional Modelling – Data Modelling technique | 1. Flat Reporting structure as per requirement will be very rigid 2. Flat structure if employed will not be flexible to suffice to near future requirements (i.e. unknown queries that may be sufficed from same subjects. 3. Employing Dimensional Modeling technique will help to device BI subject KPIs that can be viewed from multiple perspectives (Dimensions). 4. Thus will be able to suffice to both known queries (as per requirements) and unknown queries that users may be interested in future or derived through insight. 5. Dimensional Model will also provide easily navigable & optimized data structures for querying & drawing analysis results. |
| DD-03  (Existing Design Decision remain common for TIGO reporting) | Cube based approach for reporting - presentation layer rather than ROLAP based reports | Design Decision is to employ Cube based technique for Presentation Layer | MOLAP Cubes – MDX based query technique | 1. As in addition to the fixed reports requirement is to do provide period wise trend analysis from BI system for strategic analysis by comparing MOM, QOQ, YOY analysis best way is to have pre-aggregated data built in form of Cubes for efficient analysis without any performance issues. 2. As dimensional modelling is decided to be employed for Data Mart design, Cubes can be built on top without much transformations required on modelling part. 3. Cubes as presentation layer will be able to provide a self-serviced model where in users will have flexibility to choose from Dimension & Measures on their own for drawing desired results (which will provide a kind of analyst assisted model rather than analyst driven fixed solution) |

## Functional Solution Overview

### Architecture Overview – System Context

### System Context Diagram

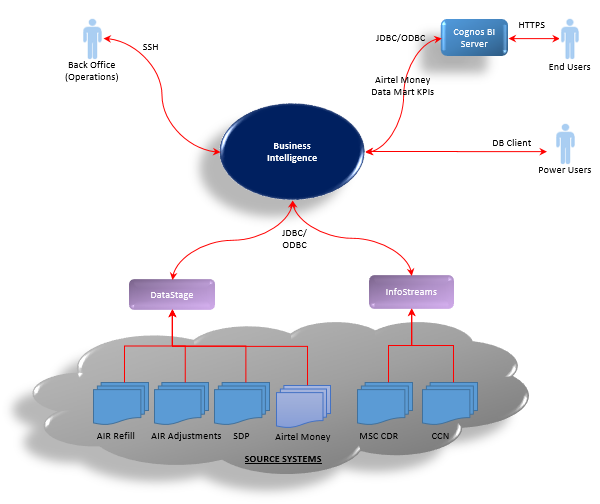


Figure: 2

### Architecture Overview Diagram

### AOD Diagram

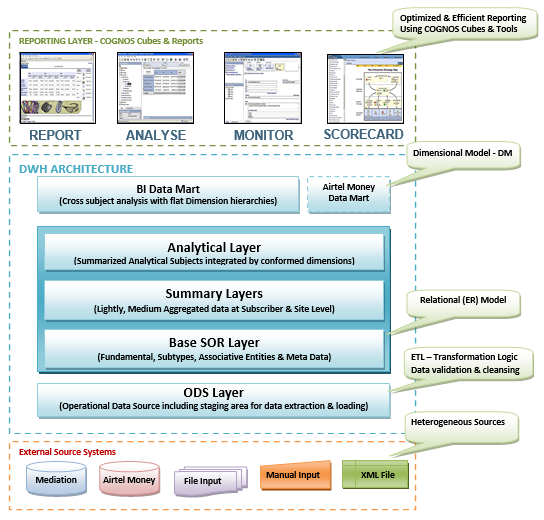


Figure: 3

### Solution Functional Points:

1. Load ODS Data (for TIGO):

BI source data loading for TIGO data (CDR/ER/Transactions) will be done in the existing data structures of the BI DWH ODS layer. There will be two types of feeds for TIGO as follows:

1. Data Feed files from Mediation system (for TIGO):

* All CDR/ER data obtained from the mediation for TIGO sources will be provided in AS-IS mediation feed format of BI.
* There will be no changes required in any source feed except for “AIR Refill CDR” in which there will be additional one field added “Refill\_Profile\_ID” – which will be incorporated in the existing mediation feed for Airtel/TIGO and further will be included as an enhancement in the existing Recharge Tables under the BI ODS Layer.
* Strong assumption is that data feeds for TIGO will be available at the same frequency and within existing latency time (i.e. w.r.t time by when source data is received on the BI system) so that there is no external impact on D-1 readyness of BI.

1. Data Feed files from IT systems/DBs (for TIGO):

* Integration and Extraction Method for data sourced from other IT Systems/DBs: KYC System DB, INTEC System DB, SND System DB, PRETUPS System will remain AS-IS.
* Existing BI data structures will be used AS-IS for loading base data & further KPI building without any design changes required.
* Current extraction logic is shared below for ref. can be reused if similar views can be made available at the source end:



1. Load DWH SOR Masters (TIGO Dimension – master data)

BI Master Data Management for TIGO will be done using the existing Datastage jobs with no additional Dimension taken in current work scope. Following existing dimensions will be reuses and updated for capturing TIGO specific master entries:

* Geography Dimension
* Organization Dimension
* Tariff Plan Dimension
* Service Provider Dimension
* Recharge Denomination/SKU Dimension
* VAS Short Codes Master
* VAS Product Dimension
* Bundle Dimension

Business Marketing team need to provide the updated master, which can be uploaded using the existing BI master data management module.

1. VAS Products & Bundles for TIGO:

Following new VAS Products & Bundles will be introduced in the BI for TIGO:



* Logics used for identifying VAS products listed above in the sheet attached will be based on “Externaldata1” field as per distinct values coming for respective Products in the “AIR Refill” source.
* Logics used for identifying a Bundle Product listed above in the sheet attached will be based on “Refill Profile ID” new field that will be introduced in the “AIR Refill” source feed.
* All above logics for identifying and tagging subscription events for VAS Product & Bundles will be handled by existing “Lookup Schema” & “Lookup Value” data structure of BI which is used for softcoding of the business logics.
* New lookups will require to be defined and maintained in the existing structure once logic for each VAS Product & each Bundle has been finalized with the business.

1. Reporting – Airtel / TIGO segregation at Organization level

Segregation of the BI data w.r.t Organization (Airtel & TIGO) will be done based on Subscriber Mobile number and IMSI series. Further Organization as a dimension will be made available in DataMart layer which will be used to provide both combined & segregated Airtel & TIGO reporting view.

*\*\* refer to “DD-01” under the section “4.2 Design Decisions” for more details.*

1. Campaign Data Mart & NRT
2. BI Base KPI Building for Campaign Execution for TIGO

* Existing base KPIs structure will be reused for deriving campaign specific KPIs for TIGO with no additional KPI requirement.
* BI KPI feed format to downstream UNICA (CMS) application will remain AS-IS for TIGO and thus there is no impact on existing loading process of BI KPIs under CMDM (Campaign Datamart).
* Data Structure holding the BI KPI data hosted in the target Campaign Datamart system will also remain AS-IS without any additional design changes required.

1. NRT Feed to the Unica (CMS) for TIGO source streams

* NRT raw feed for TIGO related CDR/ER for following sources would be provided as pass-thru from the mediation. The binary files should be in same format as existing NRT feed structure and shall have same encoding. There is no impact on the existing solution and same existing parser and InfoStreams NRT module will be reused for processing these feeds:
  + NRT AIR CDRs
  + NRT CCN CDRs

***Note:*** *HW augmentation would be required for sufficing to the above TIGO solution/functional points. Information on the sizing estimate and required HW/System Augmentation is covered in detail under section 3.3 Non Functional Requirements > 3.3.1 Capacity.*

### Interfaces

The embedded Excel sheet provides Interface Specifications for all upstream/downstream sources to current BI solution scope.



### Source System Agreement Documents

The Source System Agreement documents defines the Key information on the integration process & File Specifications in detail for each BI source in current scope.

Source system agreement remain AS-IS without any changes to the existing file-naming conventions, frequency on which data feeds are pushed/available to BI system.

### Logical Data Model

Logical BI Data Model and data structure remain same. Only additional dimension would be “Organization” dimension which will be introduced in all BI data mart subjects for segregation of reporting for Airtel & Tigo.

Following attached is the LDM for Data Mart incorporating “Organization Dimension”:

Ps. Refer to “Dim Organization” dimension included in each subject:



***Note:*** *For ref. to data model first copy above attached file to any disk location (can be done using right click on icon for above attached file then - copy & paste) and then unzip the zip file into a separate folder and then start navigating with index.html page.*

### Handling Failure Scenarios

* In case of connectivity issues, SNMP notifications need to be generated and thrown to Tivoli Monitoring System.
* Retry mechanism need to be built by systems for following events:
  + Password Expiration (Three Retires – Should be configurable as per OPCO).
    - Cases:

1. In case of Password Expiration of Database, SNMP Alerts need to be thrown. In addition Operational Alerts can also be sounded by sending either mail or SMS to the registered Operations persons.
2. SFTP Server password expiration, same mechanism as above need to be followed.
   * Connectivity Issues (This needs to be configurable)

### Data Migration

NA – there is no data migration requirement as part of the current scope of work.

## Non Functional Solution Overview

### Deployment Architecture

#### Deployment Diagram

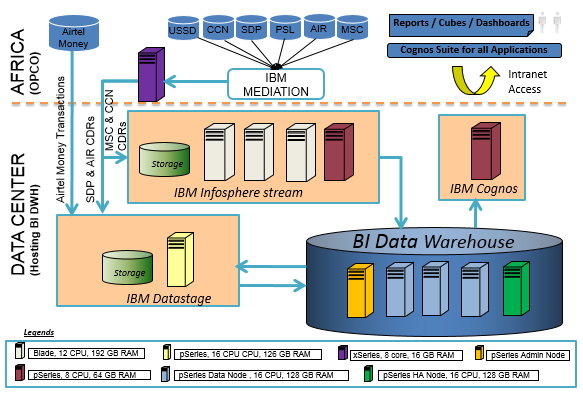


Figure: 5

#### Sizing of Servers, Storage and Network

Solution will be deployed on existing BI system and no new system component would be required. Although it is recommended that as current BI ETL server for Rwanda is co-hosted with the Cognos reporting server, it should be moved to separate dedicated servers. Pls find the details covered *under section 3.3 Non Functional Requirements > 3.3.1 Capacity.*

Current BI system may require capacity augmentation for Storage as per Sizing estimates. Pls refer to sizing estimate provided *under section 3.3.1 Capacity.*

#### Software Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Srl. No. | Software Name | Type | Location (server name/IP) | Number of new Licenses required | Comments, if any |
|  | NA |  |  |  |  |

No Additional Software is required as solution will be deployed on existing BI system.

**Note:** Although it is recommended that Cognos current version 10.1.1 should be migrated to higher Cognos 10.2.2 version available.

**Also additional user base Cognos licenses may require to be procured depending upon additional users requirement for TIGO.**

#### List OSS Libraries:

NA.

### Capacity

Pls refer to sizing/volumetrics documented under section 3.3.1 Capacity.

### Performance (including SLOs)

Existing BI DWH shall accommodate TIGO ODS data loading & Analytical Subject building for KPI generation. Additional CPU, RAM, Storage would be required in the existing system to scale existing storage & processing capacity as per estimated volumetrics.

Following considerations have been taken into account for Performance of the combined Airtel-TIGO BI subjects & KPI building process and timely generations:

* + Source Data will be loaded on hourly/daily basis under the DWH ODS layer for both Airtel & TIGO.
  + Data structures will be supported with proper MDC, partitioning & indexes for faster retrieval of data from ODS.
  + Summary Layer with lightly aggregated data at subscriber level will be built on daily and monthly basis for performance optimization.
  + Analytical Layer with subject wise data aggregation build from Summary & SOR layer will further provide conformed source for BI subject analysis.
  + Data Mart Layer constructed following dimensional modelling technique built on top of the BI DWH will be providing efficient/optimized query access and easily navigable data structures.
  + In addition, Cognos Cubes will be built from DM layer for reporting presentation layer to the end users/analyst covering both combined & segregated view of Airtel & TIGO reporting views (using Organization Dimension). Cubes will enhance query performance w.r.t pre-calculated aggregates at various dimensions, hierarchy levels and Measurement Period (daily/weekly/monthly/yearly) suited for period trend analysis & self-serviced MOLAP analysis.

### Scalability

BI Hardware can be vertically scaled for additional data loads.

New KPI addition and there aggregations can be enhanced basis the future requirements.

Application shall be scalable enough to cater capacity for next 3 Years. The estimated growth factor included for capacity augmentation will be 10% YoY based upon data growth projections.

No. of users supported shall be as per the signed requirement:

* Total Cognos/Reporting end users 50.
* Concurrent users to be 15.
* 5 Power users.

User base to remain consistent as per current requirement, however application will be scalable to add new user load with revised feasibility & capacity planning required to be done at the time of new requirement.

### Availability (including Recoverability and Reliability)

CIA Rating for the application is 554 where in Availability is marked as 4. Availability will be as per the current BI system.

### Security

1. Data security -

CIA rating for the application is 554 so the confidentiality factor has been marked as 5.

* 1. In flight

In flight security will be maintained using the SFTP.

* 1. in-memory

NA

* 1. in-storage (db, flat file)

NA

1. Access security –
   1. Application to Application

NA

* 1. User to Application

User to application security will be maintained using secured SSL based web communication access (HTTPS).

### Manageability

Details on the solution to make the system easy to manage:

1. Will be covered by Maximising the configurability of the system
2. Data Mart Layer will be designed as portable layer based on organization merger requirements and may be ported as is in other OPCOs BI systems.
3. DWH design will support generic & flexible relational structure for Master Data Management resulting in development of consistent & reusable ETL code helpful in maintainability.
4. ETL Jobs will be parametrised using the metadata technique for soft coding and manageability.

### Data Integrity (including Currency, Locality of Updating, Data Retention)

Pls refer to the source system agreement under the section 4.3.4

## Process Impacts

| Process Area | Description | Impact |
| --- | --- | --- |
| NA | NA | NA |
|  |  |  |

## Constraints and Assumptions

1. Sources which are integrated in Airtel BI, for those Tigo Files should be sent in Airtel BI Format.
2. Airtel BI DWH process will be started post all source data of Airtel & Tigo is made available with BI
3. Tigo Number series to be provided by business
4. Airtel Mediation to share data as per Airtel BI Format.
5. Tigo Data Migration is not in scope
6. Tigo reports (Hourly/daily/weekly/monthly) would not be required to be built on Airtel BI and will be out of scope of this requirement (CBR). Any Tigo report can be taken up as a separate CSR once migration is completed
7. No new source integration i.e. sources that are not integrated in Airtel BI will be out of scope of this requirement (CBR). Any new integration can be taken up as a separate CSR once migration is completed
8. Any business requirement(s) not included in this CBR document will not be part of this project, and will not impact the acceptance of the solution of this project. Any requirement not explicitly mentioned in this CBR will be out of scope of this CBR/project.
9. All BFRs are subject to technical feasibility.
10. Once the CBR is signed-off by Bharti business, IBM will conduct a thorough feasibility analysis of all the BFRs. Any gaps identified during the Feasibility study will be communicated to Bharti business.
11. KPI data accuracy and integrity will be dependent upon the source system(s).
12. Feasibility of data availability will depend upon data availability from Source System.
13. Airtel/Tigo business teams would validate the KPIs data.

## Dependencies/Interdependencies

1. For VAS Products, Source and identification logic to be shared.
2. Tigo SDP dumps should be available in BI by 00:30Hrs Op Co time and all other source system by 02:00Hrs Op Co time for BI D-1 availability.
3. Tigo RW Toll Free Master & Short Code Master.
4. Promotional/ Bulk SMS application number for Tigo RW.
5. Decrement of Tigo subscriber base for last 6 months.
6. Subscriber wise Last Usage Date, Activation Date, First REC Date, First RGE Date, Favourite LAC / Cell For Tigo RW.
7. Dimension data for Tigo will be provided by the Buisness.

## Issues

| Ref | Issue Description | Resolution Approach |
| --- | --- | --- |
|  |  |  |

## Risks

| Ref | Risk Description | Mitigation Approach |
| --- | --- | --- |
| RK001 |  |  |

# Operational & Support Considerations

**Backup Policies**:

1. DB2 - Weekly Cold Backup - Entire Data
2. Cube Daily Backup on Cognos Server

**Note:** There is no changes to the backup policy and existing backup policy for BI would be applicable.

**Password Change:** Password change in BI is 45 Days as per GSD guidelines.

**Logs Analysis:** Details of file paths for application logs will be shared under B2O documents.

| Operational/Support Area | Consideration/Implication |
| --- | --- |
| **Level 1 Application Support** | Details will be shared later |
| **Level 2 Application Support** | Details will be shared later |
| **Level 3 Application Support** | Details will be shared later |
| **Application Operations** | The application is self-running. The only monitoring which might be required would be   * If password has expired or not * ODS data is loaded successfully or not. * KPI data is created successfully or not. |
| **Operation Methods and Procedures** | Utilities will be provided across for activities like:   * End system Application Monitoring. * Manual Executions in case of Failures |
| **User Administration and Support** | This will be performed by the Operations users/Support Staff as applicable in OPCO. |
| **End User Training** | Initial User Training will be given by development team.  But once Operation Handover has taken place this will be taken care of by Operations user, who will be also provided the same training. Training material for the same will be shared across to operations. |
| **Support Staff Training** | Will be performed by Development team as part of Operations handover. |
| **Operational Reporting** | Possible Requests:   1. DB is up or not 2. Data Files are generated or not 3. Log / Performance stats can be enquired for BI system as per source system agreements.   Support Staff can ask for various system stats:   1. CPU usage 2. RAM/Storage utilisations |
| **Data Backup, Archiving, Audit** | Described above. |

# Future Considerations

1. Based upon future projections, estimated growth factor included is 10% YoY (for next three years).
2. Provision of new additional KPI/Reports with minimum impact is taken into consideration using dimensional modeling technique (ref. to section 4.2 design decisions).