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Executive Summary

IBM Telecommunications Data Warehouse

IBM® Telecommunications Data Warehouse (TDW) is a comprehensive set of business models that represents information modeling best practices in context with telecommunications services. TDW provides an information architecture blueprint with detailed business content that can be applied to many initiatives, either enterprise wide or project specific. TDW's enterprise-wide ontology precisely defines the meaning of the many concepts that make up the core information and business environment of a communication service provider (CSP). It forms the basis for data warehouses, business intelligence (BI) systems, operational stores of data and other Information-focused business solutions.

The Telecommunications Market

Telecommunications service providers' strategic imperatives include managing the relentless business change that is driven by rapid technology advancement and convergence, deregulation and increased value chain complexity. Ever-increasing competition, interconnected next generation networks, service level optimization, syndicated content, billing and process add to this. The corresponding information technology that supports these changes is complex and expensive, and expands as the telecoms business model expands. CSPs must respond to external market forces, while simultaneously transforming their legacy business models to become agile, dynamic and transparent. Data management in such a continuously evolving environment is extremely challenging and must account for operations support systems (OSS), business support systems (BSS), legacy source systems plus line of business requirements and scope that are constantly in motion.

The lack of standard business definitions is a key inhibitor to telecommunications business transformation. Some problem areas for CSPs include the ability to:

- Respond in real time to market demands and threats by integrating customer touch points so as to improve cross-sell and up-sell uptake, increase account penetration, and improve customer value contribution. High data latency and lack of common customer identifiers across lines of business and geographic regions limit these opportunities and expose telecoms to data privacy and non-solicitation compliance risks.
- Accelerate product life cycle Management and reduce time-to-market and time-to-bid for new product offerings and custom solutions. A lack of reusable product components degrades bidding, order entry, provisioning and billing processes.
- Optimize parallel cost and capital base reengineering, consolidate and potentially outsource legacy OSS and BSS processes. Divergent data standards across lines of business, regions and functions inhibit such cost optimizations.
- Support process assurance requirements, especially those related to financial reporting and revenue tracking. Inconsistent key performance indicators (KPIs), definition and reporting and the lack of a chain of ownership for financial and performance data makes complete compliance difficult to impossible.
- Repositioning themselves in the value chain to optimize their risk-to-profit balance. Providers need better agreement on data standards with technical business partners, such as roaming partners, and within the supply and distribution chain comprising content, service and equipment providers, mobile virtual network operators (MVNOs) and value-added resellers.

Making better decisions faster can be the sole difference between surviving and thriving in an increasingly competitive communications marketplace. CSPs rely on data warehouses, BI and related data management solutions to make the decisions to support and transform their business models, but because telecommunications business volatility drives upgrades in operations support systems (OSS) and business support systems (BSS) plus continuous evolution of information requirements, and these changes consequently affect data management solutions, realizing tangible benefits from business transformations is challenging without enterprise data standards.

Clients are therefore increasingly turning to data management solutions based on the TDW industry standard data model and solution templates. These model templates enable CSPs to exploit the potential of non-standard information whether locked in legacy systems or summarized and distributed in data marts. The benefits come in reducing project schedules, cost and risk.

Uses of IBM Telecommunications Data Warehouse

- **Common Customer View**
Integrating customer identifiers, organizational structures and account hierarchies across lines of business and functions.
- **Product Life Cycle Management**
Integrating product management and performance measurement across lines of business and functions.
- **Campaign Performance Management**
Improving program planning and tracking of sales and marketing activities and performance metrics across channels and touch points.
- **Analytical Customer Relationship Management**
Integrating customer segmentation, data mining, online analytical processing (OLAP) and campaign management in closed-loop customer relationship management (CRM).
- **OSS/BSS Re-engineering**
Standardizing legacy data for migration to next-generation operational support systems (NGOSS), such as billing consolidation.
- **Data Warehouse and Data Mart Consolidation**
Reengineering legacy data warehouse and BI infrastructure consolidating data repositories and analytical reporting requirements.
- **Other Data Management Solutions**
Establishing data architectures for Enterprise Application Integration (EAI), Service Oriented Architectures (SOA) and other near-real-time data analysis, such as operational data stores for fraud management.

Data Integration and BI Self Service

TDW is designed with system-agnostic, platform-neutral data integration and change management at its core. This contrasts with deployments based on data models that are derived from or biased towards specific OSS/BSS source systems or a fixed set of BI requirements, and consequently and typically fail to integrate the data and therefore make query development difficult for IT and business end users.

TDW enables CSPs to create BI self-service models that clearly separate the responsibility for data integration from the responsibility for business analytics. TDW enables IT departments to take the lead in maintaining the integration of volatile source data. Lines of business can then focus on defining analytical requirements, priorities and designs.

Reengineering

TDW offers an iterative, project-by-project approach for reengineering an existing data warehouse or other OSS/BSS applications. The approach is based on cost/benefit analyses that assure a phased progression of low-risk, high-return projects well aligned with business priorities.

Business Advantages of TDW

A data warehouse designed with TDW enables an organization to positively respond to its pressures and to translate those pressures into business advantage.

Profit Improvement	Increase velocity, rationing and targeting of marketing programs and incentives to customer segments with proven contribution potential.
Customer Intelligence	Understand subscriber value across customer and product line life cycles. Improve response to customer needs using proactive and reactive programs focused on building and retaining a valuable subscriber base.
Operational Efficiencies and Risk Mitigation	Improve process assurance and service level agreement delivery, and minimize operational risks such as credit management.
Profit	Improve accuracy of transaction and service costing, pricing and costing rules, actual charges and discounts, historical activity and price performance.
Competitive Advantage	Better understand a customer's total telecommunications wallet, and identify and react to churn (customer defection) across the service and content value network.



Data Warehousing with TDW

Building a Data Warehouse

Achieving business transformation benefits through improved data management requires a comprehensive specification of an organization's data and analytical requirements. This specification must use data and solutions models that are independent of volatile OSS/BSS data architecture and fixed analytical reporting requirements. Designing and implementing such data and solution models is a complex process for which many organizations do not have the appropriate skills available in house. The best-practice solution is using commercial data and solution model templates from third parties to reduce project risk, cost and time-to-implementation.

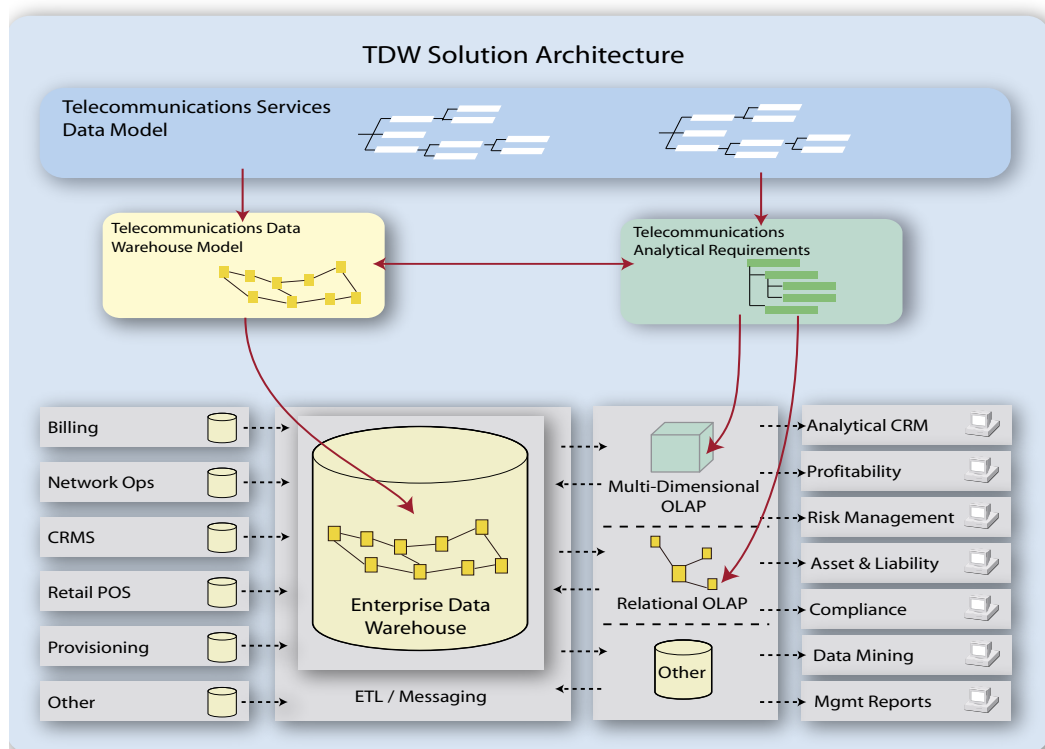
TDW enables CSPs to build data warehouse solutions to suit their specific needs using the included key components required for a data warehousing solution. TDW's flexible and scalable data warehouse infrastructure and content lets a CSP build comprehensive enterprise data warehouses and departmental data marts through rapid, phased development. TDW unleashes high-value data management solutions by allowing a CSP to focus on those business areas that offer the greatest returns and are most technically feasible. This approach assures that parallel or subsequent projects will be aligned to a single and proven data architecture.

TDW Solution Architecture

Data warehousing and BI solutions assume that:

- Line of business and functional users have a set of analytical reporting requirements to fulfill.
- A set of data is available from which to draw the information.

These assumptions represent two divergent approaches to define a project scope. The first is a top-down, business-oriented approach, while the second is bottom-up and data-driven. Best practices employ a combined approach and a gap analysis to determine the final project scope. This approach also identifies instances where no data is available to satisfy specific business requirements and instances where there are no identified business use cases for certain data sets in the source systems.



TDW Components

TDW comprises three components that assist with analytical BI:

- IBM Telecommunications Data Warehouse Model (TDWM)
- IBM Telecommunications Services Data Model (TSDM)
- Telecommunications Analytical Requirements

IBM Telecommunications Services Data Model

TSDM is a hierarchical and customizable enterprise-wide telecommunications industry model of business terms and definitions that provides a direct link between analytical requirements, data concepts and a CSP's OSS/BSS environment. The content and usage of TSDM are described in detail in the Telecommunications Services Data Model section.

IBM Telecommunications Data Warehouse Model

TDWM is a normalized, generic and enterprise-wide entity relationship (ER) model used to develop a variety of telecommunications data management solutions. Comprising over 800 entities and 3,000 attributes, it forms the blueprint for implementing a data warehouse or other data repositories. TDWM supports rapid and phased implementation of data management solutions with a well-defined and proven data model. The content and customization of TDWM are described in detail in the Telecommunications Data Warehouse Model section.

Telecommunications Analytical Requirements

This model of analytical requirements is made up of 94 best-practice business and analysis templates grouped by business reporting area. Analytical requirements provide immediate benefits to a BI initiative in two ways:

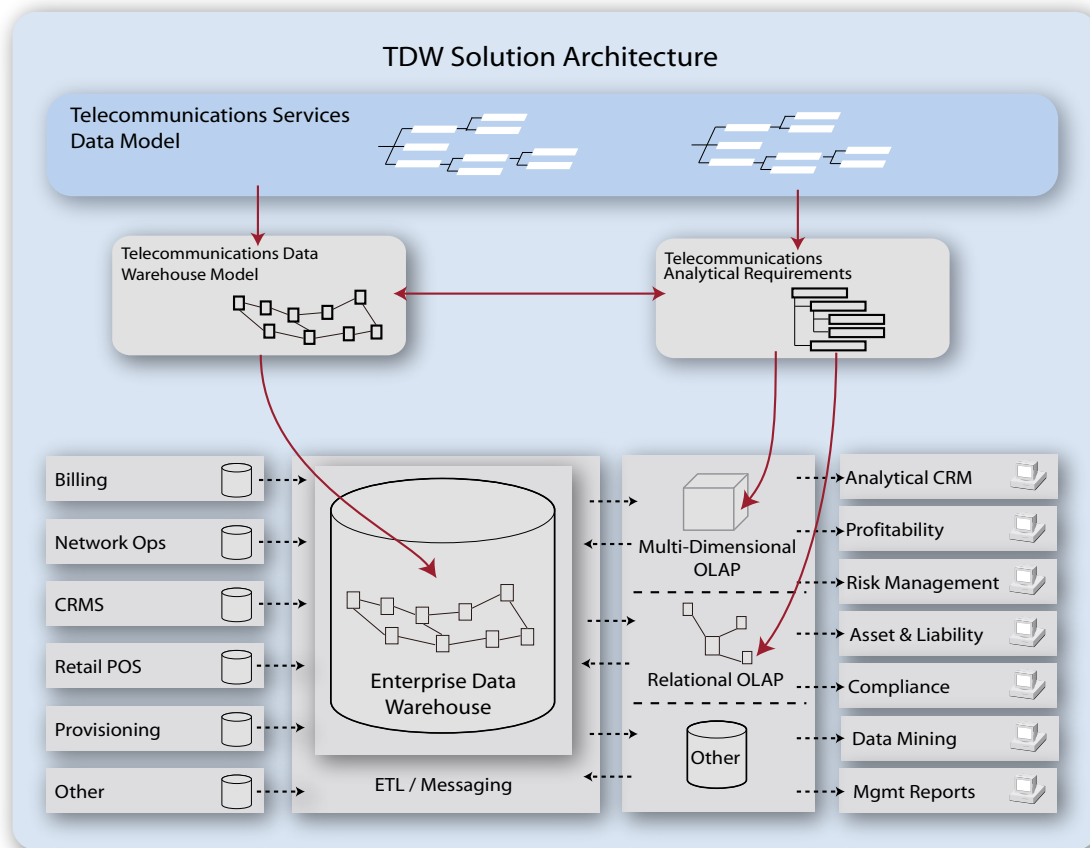
- Analytical Requirements provide a proven means for gathering business requirements by customizing predefined templates that directly relate to OLAP physical data structures.
- Once customized, the modified analytical requirements provide the design for the physical data structure generation, such as multidimensional OLAP (MOLAP) cubes and relational OLAP (ROLAP) reports.

Telecommunications Analytical Requirements enable business users to manage more efficiently the scope and design of a data warehousing development or reengineering project. The content and usage of analytical requirements are described in detail in the Telecommunications Analytical Requirements section.

TDW Customization

- Use the Telecommunications Analytical Requirements to interview the lines of business staff and gather business requirements. This provides a top-down project scope based on potentially overlapping business requirements. Many requirements that refer to the same set of measures and dimensions can be defined and validated together and fulfilled with reusable assets.
- Use TSDM to profile candidate source systems to define the data scope.
- Perform a gap analysis between the data scope and business scope to determine overall project feasibility and potentially reduce project scope. Customize the TDWM system of record and summary tables based on the reduced project scope instead of data modeling from scratch. This is also the initial guide for ETL design.
- Use the customized Telecommunications Analytical Requirements to design physical data structure generation, such as MOLAP cubes and ROLAP reports.
- Continue to refine the TDWM system of record model during ETL design and testing by adding additional subtypes and attributes. The highly normalized nature of TDWM allows for this type of parallel ETL development without adversely affecting other ETL processes and BI applications under development.

IBM Telecommunications Services Data Model



What is the Telecommunications Services Data Model?

TSDM is a classification model designed specifically for the telecommunications industry, containing thousands of carefully constructed business definitions reflecting many person years of analysis. It provides an enterprise-wide view of generic information concepts in telecommunications.

TSDM provides accelerated model development and assists in maximizing the value of information by getting it into the hands of business faster and with a higher quality extensible design. TSDM is a generic model, defining data that is common to all CSPs. The information reflected in the model is independent of organizational structure and has been validated by multiple CSPs.

TSDM is a business model that is:

- A vehicle for merging requirements of existing models
- Designed for stability, flexibility and reusability
- Inclusive of classification and inheritance

The TSDM content and structure enables information management to be proactive in their support and response to the dramatic changes driving the telecommunications industry. TSDM represents up to 80% of the information captured by a CSP's core business OSS/BSS applications (See: *Using Data Models to Maximize the Value of Your Data Warehouse*, Hurwitz & Associates, 2007). TSDM is not merely a listing of data types and definitions. Its structure addresses key issues facing CSPs in deregulation, competition and accelerating technological change.

TSDM is structured in a hierarchical, top-to-bottom structure with multiple layers of business content models containing industry standard business definitions. Each structure layer houses a model that builds on the previous layer with additional detail.

Issues TSDM Addresses

Improved customer care

TSDM reflects the complex interrelationships between customers and between customers and the CSP. It distinguishes between the nature of the customers and the relationship the customer has with the CSP. TSDM is therefore a pivotal component in the CSP's response to changing market dynamics, enabling the business to refine its approach to the management of customer relationships, while providing information systems staff with a blueprint for integrated customer care systems.

Rapid development of new products

TSDM's approach recognizes that products should be rapidly assembled from reusable components. It maintains the distinction between sales and marketing products templates offered, technical product instances provisioned and the product views required for financial reports. Further, it recognizes the complex ways in which a product can be acquired by a customer and how that product operates for the consumer. By clarifying the distinction between technical operation, marketing processes and the financial aspects of the products, TSDM enables the CSP to plan and manage the increasingly complex relationships between the products offered, the resources required to enable those products and the longer-term product usage that materially affects the financial standing of the business.

Complex relationships with competitors

TSDM's content reflects that competitors may also be customers and occasionally even strategic partners. It allows for defining and capturing these changing roles and the policies, regulations and agreements that impact these roles.

Integration of business and engineering

By design and purpose, TSDM does not logically differentiate data by source system. The model reflects a fully integrated view of data accessible by all business segments. The model focuses on providing the CSP with a means of understanding the different facets of each business challenge, and how those facets can be combined into a solution. It cuts through the confusion of OSS/BSS applications, and provides the path to coordination across lines of business and functional areas.

TSDM Benefits

TSDM has been developed with the assistance of telecommunications professionals. Its structure, especially that of the business model, has been designed to facilitate the understanding and navigation of the model even by those who may have had little exposure to data modeling. At the same time, the structure and rigor of TSDM satisfies the needs of business analysts whose thinking is perhaps more methodical. Consequently, TSDM provides a communication bridge between the data warehousing project team and OSS/ BSS technical staff as well as line-of-business and functional users.

In addition, TSDM:

- Fully complements TDWM
- Provides a structured starting point to integrate data and process
- Provides a generic specification of data that helps to reduce redundancy and inconsistency across the enterprise
- Provides common definitions for increasing reuse of data elements
- Accelerates the application development life cycle, reducing development costs and project schedules
- Provides a consistent data architecture for modeling new or changed requirements
- Provides a single framework that incorporates detail data, business rules and analytical requirements
- Focuses the development effort on validating, enhancing and extending data requirements using an existing model rather than on labor-intensive and error-prone, custom data modeling

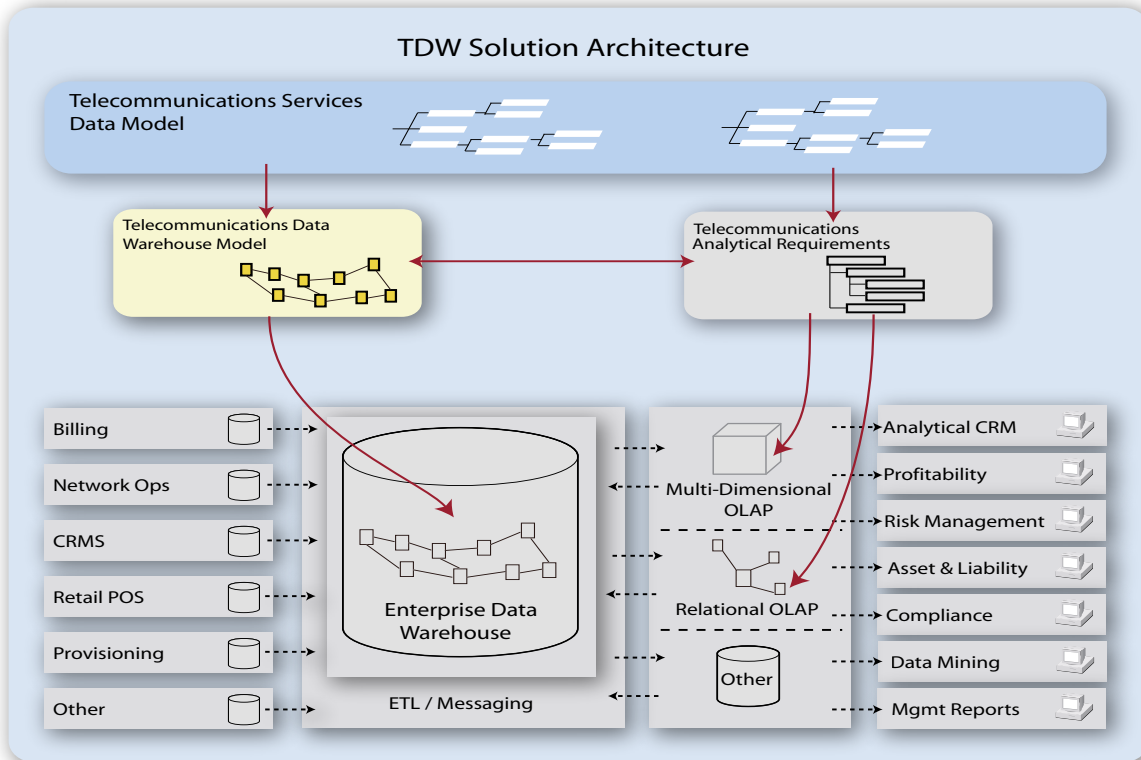
The Nine TSDM Data Concepts

Arrangement	<p>Arrangement (AR) represents an agreement, either potential or actual, involving two or more Involved Parties, that provides and affirms the rules and obligations associated with the sale, exchange or provision of goods and services. Subtypes include:</p> <ul style="list-style-type: none"> • Account Arrangement • Billing Arrangement • Payment Arrangement • Pricing Arrangement • Provisioning Arrangement • Telephony Arrangement • Service Level Agreement • Employment Arrangement
Business Direction Item	<p>Business Direction Item (BD) records an expression of an Involved Party's intent. These directions provide a clear and concise definition of an Involved Party's mission, values, policies and procedures, regulations, goals, strategies, key success factors, assumptions, measures, financial forecasts and business plans. Subtypes include:</p> <ul style="list-style-type: none"> • Assumption • Plan • Schedule • Target <ul style="list-style-type: none"> • Budget Item • Forecast • Objective
Condition	<p>Condition (CD) describes the specific requirements that pertain to how the business of a CSP is conducted and includes information such as prerequisite or qualification criteria and restrictions or limits associated with these requirements. Subtypes include:</p> <ul style="list-style-type: none"> • Rate <ul style="list-style-type: none"> • Billing Rate • Charging Rate • Exchange Rate • Product Rate Plan • Period • Conditional Numeric Range • Condition Temporal Range
Classification	<p>Classification (CL) identifies a value or qualifier that is a member of a data category. The purpose of the Classification entity is to provide a means by which the CSP may categorize information in the warehouse. Subtypes include:</p> <ul style="list-style-type: none"> • Account Type • Product Type • Event Type • Unit of Measure • Segment <ul style="list-style-type: none"> • Involved Party Group <ul style="list-style-type: none"> • Demographic Segment • Industry Classification
Event	<p>Event (EV) includes communications, accounting and maintenance transactions and posting entries. Customers, employees, business partners and other Involved Parties initiate actions with the CSP across the service delivery life cycle. Subtypes Include:</p> <ul style="list-style-type: none"> • Campaign • Product Offering • Product Order • Work Order <ul style="list-style-type: none"> • Installation • Service Usage • Communication <ul style="list-style-type: none"> • Customer Invoice Financial Transaction

Involved Party	<p>Involved Party (IP) identifies any individual, group of individuals, organization, organization unit or employment position about which the CSP wishes to keep information. Subtypes include:</p> <ul style="list-style-type: none"> • Individual • Organization • Organization Unit • Household • Employment Position
Location	<p>Location (LO) describes a place where something can be found, an address or a bounded area, such as a country or state. Subtypes include:</p> <ul style="list-style-type: none"> • Geographic Area <ul style="list-style-type: none"> • Rate Area • Service Area • Roaming Area • Sales Area • Postcode Area • Address <ul style="list-style-type: none"> • Geographic Point • Electronic Address <ul style="list-style-type: none"> • Email Address • Web Address • IP Address • Telephonic Address
Product	<p>Product (PD) describes the services, merchandise or facilities that can be offered, sold or purchased by the CSP, its competitors and other Involved Parties during the normal course of its business. Product also includes non-telecom goods and services that are of interest to the CSP. Subtypes include:</p> <ul style="list-style-type: none"> • Customer Premises Equipment • Customer Solution • Service Level • Content • Application Service • Value Added Service • Product Mix • Product Group
Resource Item	<p>Resource Item (RI) identifies a logical or physical item of value that is of interest to the CSP. Subtypes include:</p> <ul style="list-style-type: none"> • Network • Network Component <ul style="list-style-type: none"> • Termination Point • Node • Equipment Items <ul style="list-style-type: none"> • Network Equipment • Access Device <ul style="list-style-type: none"> • NIC • Telephone Socket



IBM Telecommunications Data Warehouse Model

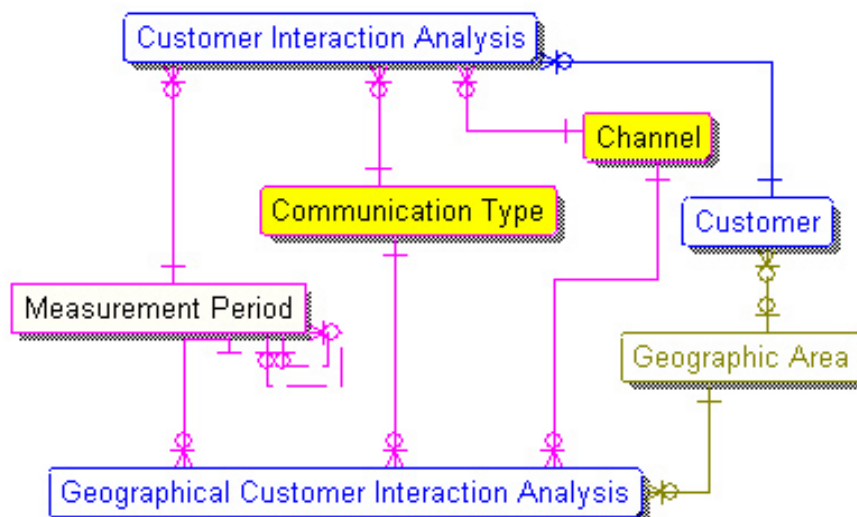


What is the Telecommunications Data Warehouse Model?

TDWM is a logical model consisting of more than 80% of the data structures typically needed by a CSP for a data warehouse. This platform-independent model can be automatically generated into a platform-specific physical data warehouse database once it has been customized to meet the exact requirements of the CSP.

A logical model is a representation of a CSP's data or information requirements, and is usually represented in an Entity Relationship Diagram (ERD) with business definitions. The data needs are represented without consideration for technology constraints associated with platforms, tools and software or how the application will be finally implemented. TDWM is generic and flexible in design and facilitates consistent understanding of a CSP's data.

An example of an ERD from TDWM:



TDWM features a flexible system of record (the primary data storage area) as well as the summary tables typically needed by CSPs to aggregate detailed data for analytical purposes. TDWM has been designed to be one step away from physical data base generation. Normally, only a portion of TDWM is generated in the initial project phase. Over time, other areas can be incrementally generated as the CSP tackles more source systems and business areas.

This comprehensive data model is derived from the TSDM (described previously) and can be used as the basis for a detailed analysis of the business areas of most concern to CSPs.

Uses of TDWM

- The design blueprint for an enterprise data warehouse. TDWM assists in the creation of a flexible and extensible data warehouse platform-specific physical database.
- A neutral reference point for consolidating multiple legacy data warehouses across lines of business or in the case of mergers and acquisitions.
- A data structure template for near-real-time data management solutions to support specific business applications such as CRM.

Benefits of TDWM

- Enables phased implementation based on prioritized business requirements.
- Supports easy, subsequent customization and extension of the data warehouse.
- Combines third normal form and star schema data model designs.

Major Groupings in TDWM

TDWM has subject area groupings based on the items' intended usage:

- System of record
- Summary area
- Analysis area

System of Record

This is the data warehouse component that is the primary storage area of detailed information. System of Records (SOR) is most often populated by extract, transform and load (ETL) processes from operational data. Typical SOR components or entities are:

Campaign	Campaign identifies a process the CSP undertakes in order to accomplish specific business defined objectives. A campaign is generally addressed to a segment of the CSP's potential and actual customers.
Channel	Channel identifies the different delivery and communications mechanisms through which products and services are made available to a customer and by which the CSP and customers communicate with each other. A channel is a role played by either an Involved Party, such as Employee or Organization Unit, or a Resource Item, such as a Network Segment or Website. The lowest granularity of Channel is a matter of choice for the CSP. Some may want to identify Phone Booths (one single Resource Item) as a Channel, whereas others want to identify each individual Phone Booth (each a Resource Item). A Call Center (an Organization Unit) may be sufficient granularity as a Channel while others require recording of each Call Center staffer (Employee). Where a given Involved Party or Resource Item instance can both receive or distribute services, it may be appropriate to associate it with two Channels. For example, a Call Center Employment Position may be part of the Call Center Receipt Channel for service orders, but part of the Call Center Distribution Channel for product campaigns.
Customer	A Customer is a role played by an Involved Party that is receiving services or products from the CSP, or who is a potential recipient of such services or products.

Network Component	This is an electronic delivery device that is a logical grouping of network equipment items at the levels at which the network is managed. For example, a set of connected network components forms a telecommunications network. Network Component represents the logical component of the network that is physically implemented by Network Equipment items. Several Network Equipment items can combine to create a single logical Network Component.
Segment	Segment groups items such as Involved Parties (market segments) and products (product groups) for a useful operational purpose.
Service Usage	Service Usage describes the function or purpose of a telecommunications service or product, e.g., facsimile transmission, local call, by any Involved Party for the duration of the usage. It is a key entity for measuring use, profitability, service quality, and more.
Financial Transaction	Financial Transaction is the recording of events that change the CSP's financial position or financial information base. For example: Financial Transaction #456 'Bill Refund' is the result of John Doe's 'Complaint' (Communication #342) to the CSP about overcharges on his telephony account (Arrangement #456123); Financial Transaction #321 is the recording of Jane Doe's 'Top-Up' of prepaid credit from an ATM on April 17, 2001. All Financial Transactions may be added together up in the various Summary entities.

Summary Area

This area contains commonly used summaries and aggregations. These summary entities can be populated by aggregating in the SOR itself or by obtaining preaggregated sums from operational systems such as G/L account balances. Creating and maintaining such summaries in the data warehouse gives reuse that improves query performance, reduces overall system load and improves consistency in analysis. Summary entities are designed to store key metrics such as average revenue per user (ARPU), and status indicators such as active subscriber.

Summary Areas include these entities:

Monitoring Unit Summary	Appends data summarized, aggregated, or derived by the data warehouse load process.
Monitoring Unit Balance	Appends summarized, aggregated, or derived data loaded as facts from operational sources, such as the General Ledger.
Arrangement Summary	A Monitoring Unit Summary used to store aggregation at the Arrangement level, such as the credits, debits and outstanding balance on billing accounts. Once the summary is calculated at the Arrangement level, the summaries can be rolled up into larger arrangements groups based on dimensions such as Involved Party, Organization Unit, Product, Channel.
Campaign Summary	A Monitoring Unit Summary used to track internal and external marketing events and segmentations that promote Products and other aspects of the business. The Campaign Summary entities enable the CSP to monitor the effectiveness and cost of Campaigns.
Involved Party Summary	Some of the subtypes of Involved Party would typically require periodic summaries. The Involved Party Summary is required for Customer and Organization Unit. The purpose of such summaries is to record key indicators for the relevant item.
Product Summary	Product Summary defines summarized product effectiveness measures such as profitability and usage rates.
Segment Summary	A segment is concerned with the various ways in which items are grouped. Examples include: Involved Party Segments, Market Segments, Product Segments and Network Segments. Segment Summaries are structures used to hold aggregated metrics of different segments

Analysis Area

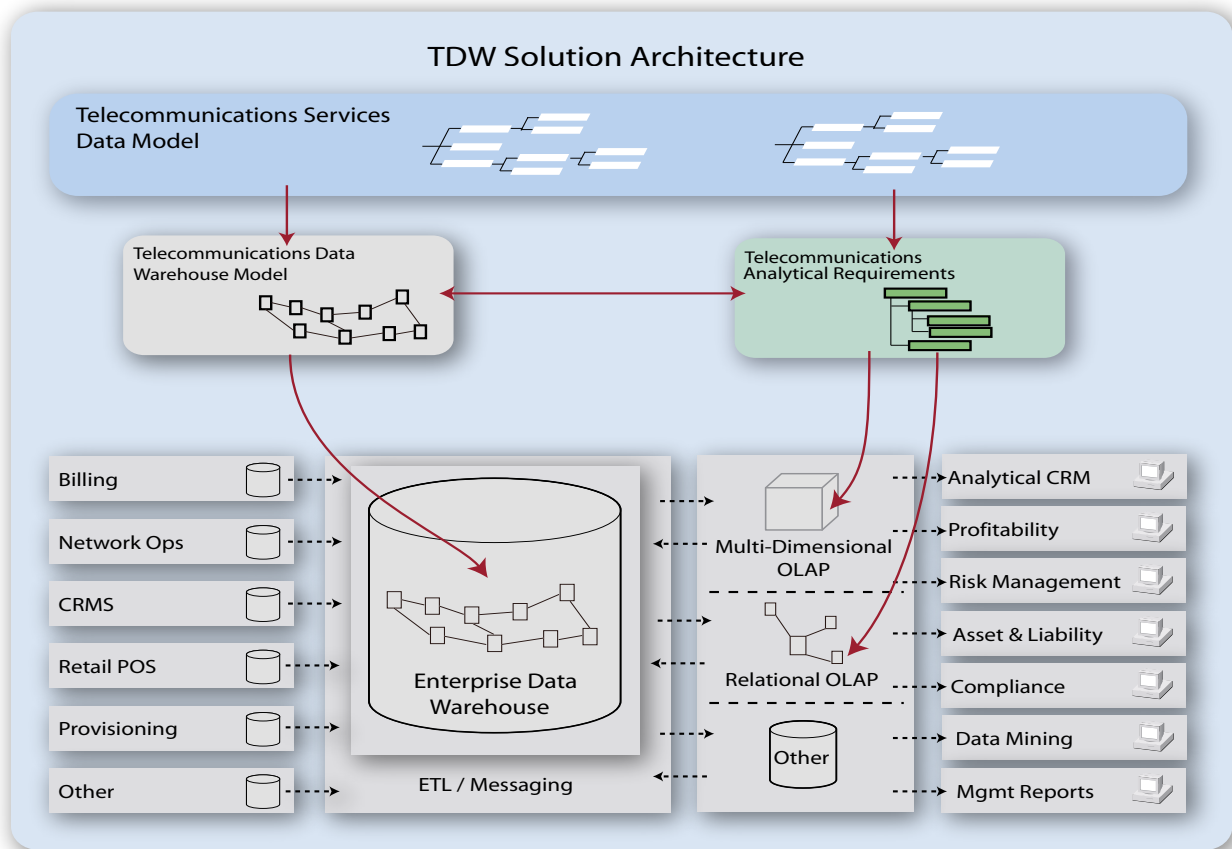
Analysis Area prepares data initially stored in the SOR for subsequent distribution such as to MOLAP cubes or ROLAP data marts. Analysis Area holds fact and dimension tables in snowflake designs. Examples of Analysis Area entities are:

- Operations
- Yield Management
- Credit Risk Management
- Customer Segmentation
- Service Quality Management

Analysis Area entities are described in more detail in the Telecommunications Analytical Requirements section.



IBM Telecommunications Analytical Requirements



What are Telecommunications Analytical Requirements?

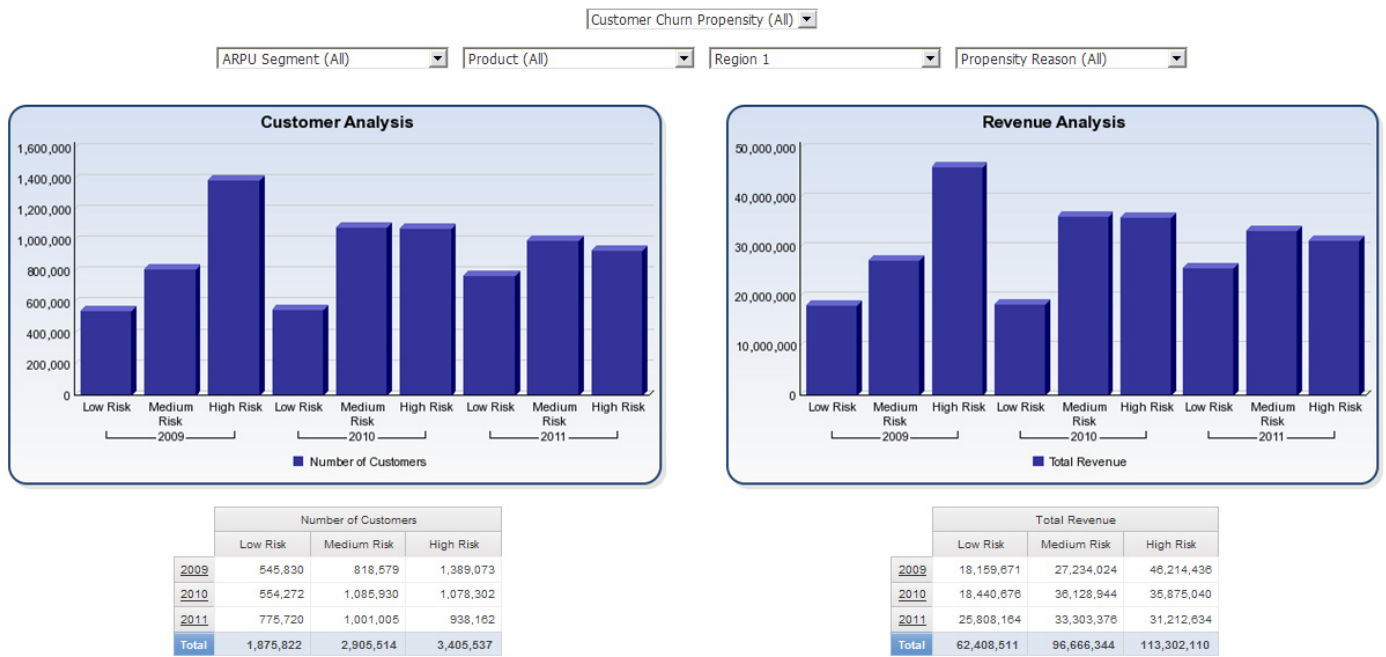
TDW incorporates predesigned BI solutions called Telecommunications Analytical Requirements that enable business managers to specify analytical reporting requirements quickly and easily. Each analytical requirement consists of measures and dimensions common to the telecommunications industry. A measure is a numerical business value such as Number of Customers or Profitability. A dimension is the category or grouping by which users want to report on or analyze those measures such as Customer Segment, or Product such as Number of Customers by Customer Segment or Profitability by Product.

Telecommunications Analytical Requirements provide the framework to define and deliver high-value BI applications. Business users can work with the Telecommunications Analytical Requirements to specify their own requirements much more quickly than if they created them from scratch. Prototype OLAP applications can be quickly generated on the basis of customized requirements.

Because the Telecommunications Analytical Requirements are mapped to TDWM, the scoping performed by business users is reflected in TDWM, enabling fast scoping based on user-validated requirements.

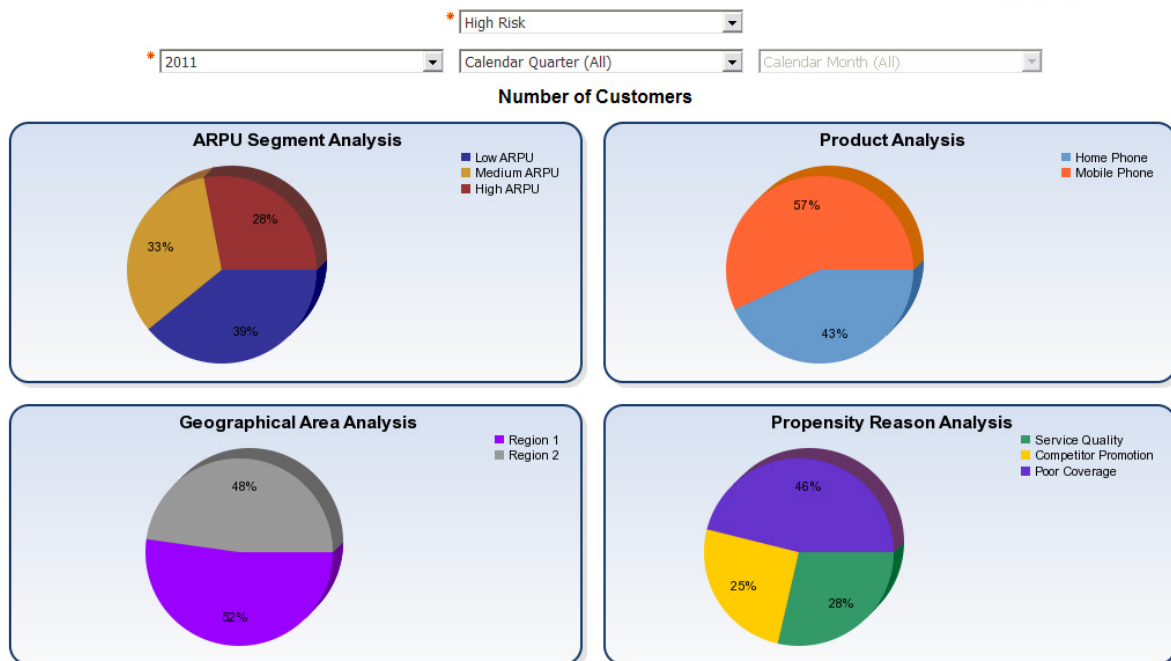
Analytical requirements are used for MOLAP data mart designs from which reports and charts are created once the marts are populated, for example:

Customer Churn Propensity



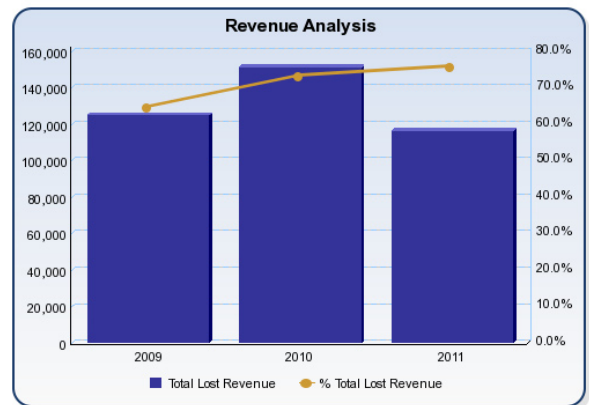
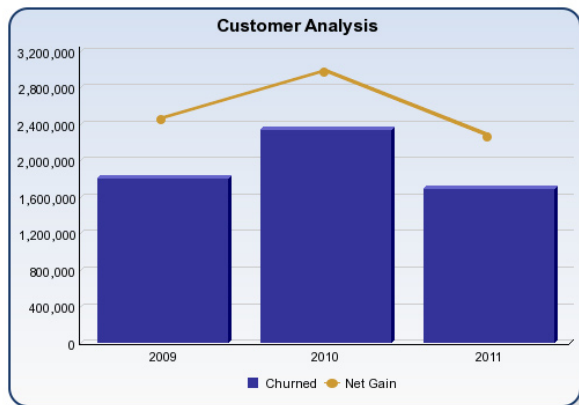
Analyzes customer propensity to leave CSPs for another and the potential revenue implication.

Customer Churn Propensity Summary



Summarizes customer propensity to churn.

Customer Churn Analysis



	Number of Churned Customers	Number of New Customers	Number of Returning Customers	Customer Net Gain
2009	1,805,566	2,421,166	1,851,521	2,467,121
2010	2,337,368	2,946,128	2,382,812	2,991,572
2011	1,687,730	2,241,770	1,729,088	2,283,128
Summary	5,830,664	7,609,064	5,963,421	7,741,821

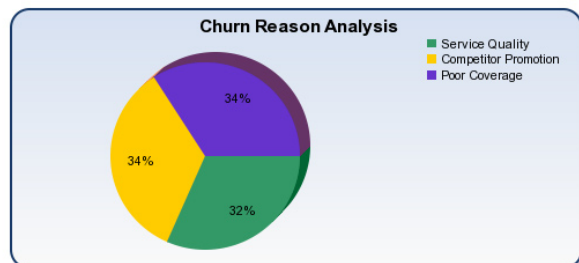
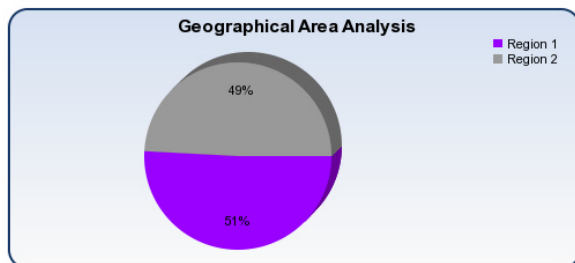
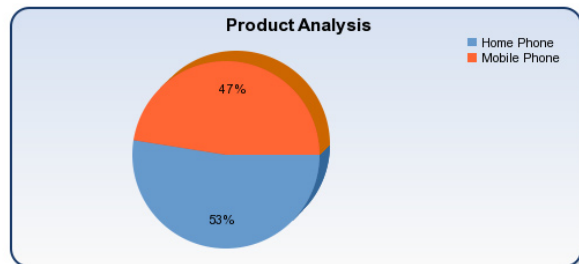
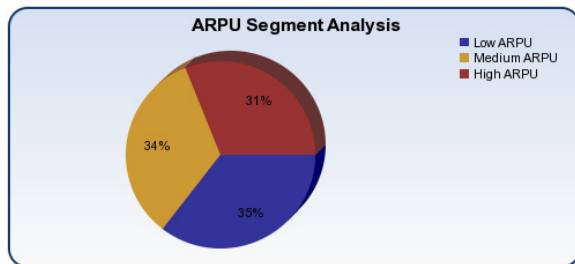
	Total Lost Revenue Due To Churn	Total Revenue	% Total Lost Revenue Due To Churn	Lost Life Time Value Due To Churn
2009	124,641	192,177	64.9%	288,245
2010	150,707	204,617	73.7%	350,730
2011	115,906	152,262	76.1%	266,745
Summary	391,254	549,056	71.3%	905,720

Analyzes actual customer churn and revenue implication.

Customer Churn Analysis Summary

* 2011 | Calendar Quarter (All) | Calendar Month (All)

Number of Churned Customers



Summarizes actual customer churn.

Business Coverage

The Six Business Areas

TDW has 94 Analytical Requirements and over 1,000 measures and dimensions arranged in the following business areas.

- Finances
- Profitability
- Relationship Management
- Usage
- Revenue Assurance
- Service Management

Finances

Finance analytical requirements focus on the analysis and reporting of the financial standing of a CSP including the underlying factors and baselines, such as the KPIs and segments, that drive revenue and cost.

Balance Sheet Analysis

Cash Flow Analysis

Commercial Customer Financial Analysis

Credit and Collections Analysis

CSR Performance Analysis

Customer Billing Analysis

Customer Delinquency Analysis

Customer Lifetime Value Analysis

Financial Management Analysis

Financial Summary Analysis

Income Analysis

Income Statement Analysis

Individual Credit Risk Profile

Individual Customer Financial Analysis

MVNO Cost Plus Revenue Analysis

MVNO Retail Minus Revenue Analysis

MVNO Service Analysis

Postpaid Revenue Analysis

Prepaid Revenue Analysis

Service Order Processing Analysis

Statement Shareholder Equity Analysis

Stock Availability Analysis

Profitability

The Profitability analytical requirements assess the contribution of specific products and channels to a services provider's overall profitability.

Customer Profitability Analysis

Market Basket Analysis

Outlet Location Profitability Analysis

Product Profitability Analysis

Retail Transaction Analysis

Sales Channel Analysis

Advertising Profitability Analysis

Advertising Inventory Management Analysis

Relationship Management

The Relationship Management analytical requirements focus on the analysis and management of the CSP's channels, processes, programs and campaigns that drive customer acquisition, value contribution, satisfaction and return.

- Campaign Analysis
- Contract Renewal Analysis
- Cross Sell Analysis
- Customer Acquisition Analysis
- Customer Arrangement Analysis
- Arrangement Churn Analysis
- Customer Complaints Analysis
- Customer Interaction Analysis
- Data Package Sales Analysis
- NLD / IDD Defection Analysis
- Number Portability Analysis
- Wallet Share Analysis
- Customer Profiling-Activity by Time, LO, CNL
- Customer Profiling-Survey Response
- Customer Churn Analysis
- Customer Churn Financial Analysis
- Customer Churn Propensity Analysis

Usage

The Usage analytical requirements evaluate the CSP's customers' use of network components, products, services, content and applications, including patterns of usage, subscriptions, and transmissions across access devices, product and service types, providers and channels.

- Content Usage Analysis
- E-Commerce Analysis
- Inbound Roamer Usage Analysis
- Outbound Roaming Analysis
- Pre-Rated CDR Analysis
- Product Usage Analysis
- SMS / MMS Usage Analysis
- TDW PPV and VOD Usage
- Wireless Data Usage Analysis
- Wireless Voice Usage Analysis
- Wireline Data Usage Analysis
- Wireline Voice Usage Analysis
- VAS Usage Pattern Analysis

Service Management

Service Management provides the CSP with insight into the following focus areas:

- Quality of the customer experience while using the CSP service suite and network analysis of the CSP service infrastructure.
- Analysis of the effectiveness of customer services provided.
- Focus on customer and third-party monetary transactions.

Core Services Usage

Voice Usage Analysis

Broadband Usage Analysis

Online Usage Analysis

Email Usage Analysis

SMS Usage Analysis

MMS Usage Analysis

IPTV Usage Analysis

VOD Usage Analysis

Content Usage Analysis

Core Services Experience

Voice Experience Analysis

Broadband Experience Analysis

Online Experience Analysis

Email Experience Analysis

SMS Experience Analysis

MMS Experience Analysis

IPTV Experience Analysis

VOD Experience Analysis

Content Experience Analysis

Core Services Availability

Voice Availability Analysis

Broadband Availability Analysis

Online Availability Analysis

Email Availability Analysis

SMS Availability Analysis

MMS Availability Analysis

IPTV Availability Analysis

VOD Availability Analysis

Content Availability Analysis

Monetary Services

Top Up Behavior Analysis

Top Up Financial Analysis

Top Up Experience Analysis

Pre Paid Analysis

Revenue Assurance

Provides an analysis of the relationship between network resources, services, customers and generated revenue, and enables the CSP not only to detect revenue leakage (such as un-billed customers and mis-billed customers), stranded assets and operational inefficiencies, but also to understand the reasons why these issues occur.

In addition to fraud, reasons for revenue loss (leakage) include:

- Network provisioning
- Mediation and CDR errors
- Billing and interconnect inconsistencies
- Loss of data and corrupted files
- Fragmented support systems
- Incoherent databases
- Manual or ill-defined business processes

The current metrics in this focus area define KPIs that provide a common framework to measure three important aspects of revenue assurance:

- Revenue leakage
- Process efficiency in connection with revenue assurance
- Data quality

Revenue Leakage Analysis

Data Quality and Coverage Summary

RA Process Efficiency Analysis



Finances

Balance Sheet Analysis - To analyze 10Q and 10K Balance Sheets which report total assets, total liabilities, and total shareholders equity at a specific time. The Sarbanes Oxley Act Balance Sheet Analysis template assists in optimizing report generation with regard to the Securities and Exchange Commissions (SEC) 10Q and 10K regulatory filing requirements.

Typical Measures: Balance Sheet Total Assets, Total Liabilities and Share Capital

Typical Dimensions: Telco Organization Group Reporting Structure, Measurement Currency

Cash Flow Analysis - To analyze a Telco organization's Cash Flow which is the amount of cash a Telco Organization generates and uses during a period, calculated by adding non-cash charges (such as depreciation) to the net income after taxes. Balance Sheet Analysis - The Sarbanes Oxley Act Cash Flow Analysis template assists Telco Organizations in optimizing report generation with regard to the Securities and Exchange Commissions (SEC) 10Q and 10K regulatory filing requirements.

Typical Measures: Net Cash Flow from Investing Activities, Net Increase in Cash and Cash Equivalents

Typical Dimensions: Group Reporting Structure, Measurement Currency

Commercial Customer Financial Analysis - To analyze the costs to the Telecommunications Services Provider due to the provision of equipment to Customers at less than the cost to the Telecommunications Services Provider e.g. a discounted mobile handset used as an incentive to activate a new Arrangement, the primary costs of establishing a new customer and the number of times an arrangement has been in a delinquent status

Typical Measures: Adjustments, Customer Discounts, Total Number of Delinquent Accounts, Total Amount Billed

Typical Dimensions: Billing Cycle, Customer Market Segment, Customer Relationship Age Segment

Credit and Collections Analysis - To determine trends in the efficiency of the Finance section in the collection of overdue payments from Customers.

Typical Measures: Number of Customers, Total Payment Amount, Average Number of Billings Past Due

Typical Dimensions: Product, Geographic Area, Potential Exposure Range

CSR Performance Analysis - To analyze how the Telecommunications Services Provider via its Customer Service Representative (CSR) interacts with its customers, and the effectiveness of communications and channels in terms of winning new business.

Typical Measures: Number of Active Communication Threads, Total Direct Cost of Communications

Typical Dimensions: Customer, Organization Unit Business Region

Customer Billing Analysis - To analyze customer billing management in the areas of billed ARPU, amount billed, discount, payments rejections.

Typical Measures: Average Account AR Adjustment Amount, Total Number of Account Arrangements

Typical Dimensions: Billing Cycle, Involved Party Type, Language, Preferred Payment Method

Customer Delinquency Analysis - To analyze customers who have at least at least one Arrangement that has been deemed delinquent, in terms of the length of time for which the delinquencies have occurred, and the delinquent amounts outstanding.

Typical Measures: Delinquent Amount, Total Delinquency Count, Number of Days Delinquent

Typical Dimensions: Customer, Arrangement Time To Expiration Segment

Customer Lifetime Value Analysis - To evaluate the total projected earnings of a customer to the Telecommunications Services Provider over the probable lifetime of that customer.

Typical Measures: Customer Lifetime Revenue To Date, Customer Projected Revenue, Customer Churn Rate

Typical Dimensions: Time Period, Arrangement Life Cycle Status Reason

Financial Summary Analysis - To support the Telco Organization in the generation and analysis of the Security and Exchange Commissions (SEC) 10Q and 10K reports which support the Telco Organization with regard to compliance with Sections 302 and 404 of the Sarbanes Oxley Act.

Section 302. Corporate responsibility for financial reports.

Section 404. Management assessment of internal controls.

Typical Measures: Profit Margin Amount, Net Income from Continuing Operations

Typical Dimensions: Organization Unit, Channel Ownership Type

Income Analysis - To evaluate the Income of the CSP by Operating Segment, Product, Channel, Market, etc.

Typical Measures: Gross Number of New Customers, Opening Number of Access Points

Typical Dimensions: Product Type, Channel

Income Statement Analysis - To analyze a Telco Organization's Income Statement which is a financial report that by summarizing revenues and expenses, and showing the net profit or loss in a specified accounting period. It depicts a Telco Organization's financial performance due to operations as well as other activities rendering gains or losses. Also known as the profit and loss statement.

Typical Measures: Sales Amount Exclusive of Sales Tax, Income Statement Net Income

Typical Dimensions: Telco Organization Group Reporting Structure, Measurement Currency

Individual Credit Risk Profile - To analyze the subscribers and prospects of the CSP to ascertain positive and negative credit risk indicators.

Typical Measures: Average Monthly Income, Average Credit Score, Average Number of Product Arrangements/Customer

Typical Dimensions: Arrangement Balance Range, Customer Arrears Propensity, Financial Legal Status Type

Individual Customer Financial Analysis - To analyze the costs to the Telecommunications Services Provider regarding the total net amount of non-recurring credits and debits applied to an Account Arrangement for any allowances, charges, discounts, reimbursements or waivers due to special promotions, product or service quality or as a result of accounting or billing errors.

Typical Measures: Arrangement Change in Balance, Number of Payments Received

Typical Dimensions: Customer Annual Income Segment, Demographic Segment

MVNO Cost Plus Revenue Analysis - To evaluate Mobile Virtual Network Operator (MVNO) revenue from the perspective of both the Mobile Network Operator (MNO) and MVNO for the purpose of revenue optimization, pricing and yield management.

Typical Measures: Total Actual Usage Duration, Average MNO CP Wholesale Revenue Per Usage

Typical Dimensions: Event Type, Customer Market Segment

MVNO Retail Minus Revenue Analysis - To evaluate Mobile Virtual Network Operator (MVNO) revenue from the perspective of both the Mobile Network Operator (MNO) and MVNO for the purpose of revenue optimization, pricing and yield management. This cube uses the Revenue Minus (RM) methodology in evaluating the RM Network Charge Amount.
Typical Measures: Total MVNO RM Income, Average MNO RM Income Per Unit
Typical Dimensions: Customer Market Segment, Peak Time Segment

MVNO Service Analysis - To measure the critical factors involved with the efficiency of service both from the perspective of the MNO, the MVNO and customers of the MVNO.
Typical Measures: Browsing Performance BP, CRM/Back-End Performance CRM/BEP
Typical Dimensions: Complaint Severity, Channel Type

Postpaid Revenue Analysis - To evaluate the Postpaid usage of the Operator's customers of its products and services including revenue contribution for the purpose of revenue optimization, pricing and yield management.
Typical Measures: Average Revenue Per Account, Total Billed Usage Duration
Typical Dimensions: Brand, Line of Business Segment, Access Device Type

Prepaid Revenue Analysis - To evaluate Prepaid voucher sales revenue and entitled usage of the Operator's pre-paid customers of its products and services for the purpose of revenue optimization, pricing and yield management.
Typical Measures: Bonus Entitlement Amount, Recharge Entitlement Amount
Typical Dimensions: Access Device Type, Customer Market Segment

Service Order Processing Analysis - To measure the critical factors involved with the efficiency of handling requests for services, both from Customers and from within the Telecommunications Services Provider.
Typical Measures: Number of Service Order Escalations, Number of Product Arrangements Closed
Typical Dimensions: Product, Arrangement

Statement Shareholder Equity Analysis - To analyze a Telco Organization's Statement of Shareholders' Equity which includes net profit / loss for period, issuance and repurchase of stock, other gains and losses recognized directly in shareholders equity and the impact of changes in accounting policy and fundamental errors when these are presented as a prior period adjustment. The Sarbanes Oxley Act Statement of Changes in Shareholders' Equity Analysis template assists Telco Organizations in optimizing report generation with regard to the Securities and Exchange Commissions (SEC) 10Q and 10K regulatory filing requirements.
Typical Measures: Accumulated Other Comprehensive Income Ending, Total Shareholder Equity Ending
Typical Dimensions: Time Period, Scenario

Stock Availability Analysis - To analyze the amount of stock held by the Telco Organization in its various locations and the amount of stock on order in relation to expected sales demand and scheduled replenishment deliveries.
Typical Measures: Number of Cases On Hand, Number of Items On Order
Typical Dimensions: Time Period, Product

Profitability

Customer Profitability Analysis - To evaluate the contribution to profit of the customers of the Telecommunications Services Provider.

Typical Measures: Market Sizing Measures Group, Key Performance Indicators

Typical Dimensions: Housing Tenure, Individual Age Segment,

Market Basket Analysis - To analyze the shopping baskets of a Telco Organization based on brand, channel, campaign season, region, store location, product and many other factors.

Typical Measures: Average Number of Customer Visits, Number of Market Baskets With Items On

Typical Dimensions: Campaign Season Type, Individual Dimension Group

Outlet Location Profitability Analysis - To analyze a Telco Organization's store performance based on geographic location, demographics, store format and proximity to competitors.

Typical Measures: Average Floor Space Area, Average Profit Margin Amount

Typical Dimensions: Competitor Proximity, Geographic Area Nature

Product Profitability Analysis - To evaluate the contribution to profit of the various products and services of the Telecommunications Services Provider.

Typical Measures: Total Fee Revenue, Profitability Measures

Typical Dimensions: Organization Size Segment, Business Cost Center Type

Retail Transaction Analysis- To evaluate the Retail Transactions made by the Telecommunications Services Providers' customers of its products and services, including volumes and time periods.

Typical Measures: Total Transaction Amount, Average Time Since Last Transaction

Typical Dimensions: Customer Market Segment, Event Type

Sales Channel Analysis - To identify the contribution to profit of the Telecommunications Services Provider's sales channels, including value-added resellers (VARs), interconnected carriers, virtual network operators and communications services providers, as well as other channel partners.

Typical Measures: Number of Upgrades Requested. Market Sizing Measures Group

Typical Dimensions: Time Period, Customer Market Segment, Customer Relationship Age Segment

Advertising Profitability Analysis - To identify the contribution to profit of the Telecommunications Services Provider's advertising services.

Typical Measures: Number of Ad Viewings, Number of Customers Responding, Ad Revenue

Typical Dimensions: Time Period, Customer Target Group, Advertisement Restrictions Types, Advertisement Ownership

Advertising Inventory Management Analysis - To support advertising inventory of the Telecommunications Services Provider.

Typical Measures: Number of Ad Viewings, Number of Hours Available, Advertising Time Used

Typical Dimensions: Time Period, Customer Target Group, Advertisement Type, Advertisement Ownership



Relationship Management

Campaign Analysis - To analyze and compare the effectiveness of customer and product promotions, marketing drives, and advertising.

Typical Measures: Campaign Deliverable Amount, Total New Revenue from Campaign

Typical Dimensions: Competitive Win Status, Customer Market Segment

Contract Renewal Analysis - To evaluate the extension and renewal of Service Usage Arrangements (i.e., contracts) by the Services Providers' customers.

Typical Measures: Closing Number of Service Usage Arrangements, Opening Number of Users

Typical Dimensions: Demographic Segment, Scenario

Cross Sell Analysis - To analyze the characteristics of multi-product usage by customers. Identifying profitable usage trends of a base product suggests complementary product and service bundles.

Typical Measures: Average New Product Arrangement Balance, Number of New Product Arrangements

Typical Dimensions: Organization Unit Function, Organization Size Segment

Customer Acquisition Analysis - To analyze the types of Customer that are joining the Telecommunications Services Provider, their reasons for doing so and the Channels that are acquiring them with a view to establishing the most cost-effective ways of growing the Telecommunications Services Provider's Customer base.

Typical Measures: Free Credit Amount, Total Acquisition Cost

Typical Dimensions: Organization Unit Business Region, Customer Acquisition Source

Customer Arrangement Analysis - To analyze Account Arrangement Types e.g. end users per account, churn rate, new users.

Typical Measures: Total Closing Number of Active Account AR, Total Number of New Customers

Typical Dimensions: Organization Unit Function, Access Device Type

Arrangement Churn Analysis - To understand the reason and impact of customers closing an Arrangement with the Telecommunications Services Provider.

Typical Measures: Arrangement Churn Rate, Net Change in Number of Arrangements

Typical Dimensions: Arrangement Life Cycle Status Reason, Time Period

Customer Complaints Analysis - To understand the pattern of complaints and the effectiveness of the resolution process.

Typical Measures: Maximum Inbound Communication Response Time, Customer Complaint Ratio

Typical Dimensions: Processing Involved Party, Product Type

Customer Interaction Analysis - Analysis of how the CSP interacts with its customers, and the effectiveness of various Communication Types and Channels in terms of winning new business.

Typical Measures: Average Number of Communications Per Thread, Mean Time Between Communications

Typical Dimensions: Customer Market Segment, Scenario

Data Package Sales Analysis - To evaluate the performances of channels and campaigns to sell data packages (e.g., GPRS, ADSL, etc.) to customers of the Services Providers.

Typical Measures: New Account Arrangement Data ARPU, % New Service Usage Arrangements from CrossSell

Typical Dimensions: Channel, Initial Product

NLD / IDD Defection Analysis - To evaluate the usage of competitor National Long Distance (NLD) and International Direct Dial (IDD) gateways and prefixes by the Services Providers' subscribers including patterns of usage and lost revenue estimates.

Typical Measures: Number of Calls, Percentage of Voice Usage Volume Lost

Typical Dimensions: Service Usage Direction, Competing Service Provider

Number Portability Analysis - To evaluate the acquisition and loss of subscribers by the Services Providers due to number portability regulations.

Typical Measures: Port-in Trend, Port-out Trend

Typical Dimensions: Day of Week, Line of Business Segment

Wallet Share Analysis - To identify the total communications spend of Customers compared to their utilization of products and services of the Telecommunications Services Provider, with a view to measuring the realized and unrealized revenue and income opportunity.

Typical Measures: Customer Market Share Percentage, Number of Households With Products

Typical Dimensions: Organization Unit Business Region, Organization Unit Function

Customer Profiling-Activity by Time, LO, CNL - Customer Profiling-Activity by Time, Location and Channel.

Typical Measures: Number of Service Usages, ARPU - Average Revenue Per User

Typical Dimensions: Customer Market Segment, Individual Dimension Group

Customer Profiling-Survey Response - Customer Survey Response Analysis.

Typical Measures: Number of Customers Responding, Response Percentage

Typical Dimensions: Number of Customers Responding, Response Percentage

Customer Churn Analysis - To understand the reason and impact of customers ceasing to use the Telecommunications Services Provider's products and services.

Typical Measures: Number of Churned Customers, Total Lost Revenue Due To Churn

Typical Dimensions: Customer Market Segment, Demographic Segment, Customer Profitability (ARPU) Segment

Customer Churn Financial Analysis - Analysis of the financial aspect of Customer Churn behavior.

Typical Measures: Lost ARPU Due To Churn, Total Lost Revenue Due To Churn, Lost Revenue Percent

Typical Dimensions: Customer Market Segment, Demographic Segment, Customer Profitability (ARPU) Segment

Customer Churn Propensity Analysis - Analysis of the Customer tendency to Churn.

Typical Measures: Life Time Value, Number of Customers

Typical Dimensions: Customer Churn Propensity, Demographic Segment, Customer Profitability (ARPU) Segment

Usage

Content Usage Analysis - To evaluate the Content Usage of the Services Providers' customers of its content products (e.g., news, entertainment, stock quotes, etc.)

Typical Measures: Plan Content Units Limit, Number of New Content Subscriptions

Typical Dimensions: Charging Rate Type, Hour of Day

E-Commerce Analysis - To evaluate the electronic shopping behavior of the Services Providers' customers (e.g., news, entertainment, games, gaming and financial services, etc.)

Typical Measures: Number of Users, E-Commerce Users Percentage of Subscriber Base

Typical Dimensions: Hour of Day, Network Type

Inbound Roamer Usage Analysis - To evaluate the Inbound Roaming Usage of non-subscribers including patterns of usage of voice, data and content products.

Typical Measures: Roaming ARPU, Average Period Since Last Trip

Typical Dimensions: Customer Market Segment, Portal Website

Outbound Roaming Analysis - To evaluate the Roaming Usage of the Telecommunications Services Providers' customers of its products and services, including patterns of trips and interconnect revenue by different products and channels.

Typical Measures: Net Revenue, Gross Revenue

Typical Dimensions: Brand, Line of Business Segment

Pre-Rated CDR Analysis - To investigate the types, amounts and origin of traffic being carried on Network Segments, and their contribution to overall network capacity uptake.

Typical Measures: Provisioning Costs, Failure Rate

Typical Dimensions: Service Usage Type, Network Segment

Product Usage Analysis - Product Usage Analysis is the analysis of how different demographic groups are using the CSP's Products.

Typical Measures: Minimum Amount of Daily Usage, Number of Failed Connections

Typical Dimensions: Product, Customer Market Segment

SMS / MMS Usage Analysis - To evaluate the Wireless Usage of the Services Providers' customers of its SMS and MMS products including patterns of transmission and reception.

Typical Measures: Average Number of Messages Per Content Unit, Number of Failed Connections

Typical Dimensions: Customer Market Segment, Portal Website

TDW PPV and VOD Usage - To evaluate the Pay Per View and Video on Demand Usage of the Services Providers' customers including patterns of sessions, subscriptions and transmissions by set top box type, content type, schedule and channel, etc.

Typical Measures: Number of Revenue Generating Units (RGUs), Total Revenue Per Revenue Generating Unit

Typical Dimensions: Household, Network Channel

Wireless Data Usage Analysis - To evaluate the Wireless Usage of the Services Providers' customers of its data products (e.g., GPRS, WAP, etc.) including patterns of sessions and transmissions.

Typical Measures: Customer Base Data Product Penetration, Voice ARPU

Typical Dimensions: Demographic Segment, Line of Business Segment

Wireless Voice Usage Analysis - To evaluate the Wireless Usage of the Services Providers' customers of its voice products (e.g., local voice, National Long Distance, International Direct Dial, International Inbound Roaming) including patterns of usage.

Typical Measures: Average Actual Duration Per Data Usage Session

Typical Dimensions: Channel, Demographic Segment

Wireline Data Usage Analysis - To evaluate the Wireline Usage of the Services Providers' customers of its data products (e.g., Leased Lines, ISDN, dialup Internet, xDSL, VOIP, Digital Television) including patterns of sessions and transmissions.

Typical Measures: Customer Base Data Product Penetration, Plan Units Download Limit

Typical Dimensions: Customer Market Segment, Demographic Segment

Wireline Voice Usage Analysis - To evaluate the Wireline Usage of the Services Providers' customers of its voice products (e.g., Local Voice, National Long Distance, International Direct Dial, etc.) including patterns of usage.

Typical Measures: Number of Failed Connections, Total Voice Usage Billed Volume

Typical Dimensions: Customer Relationship Age Segment, Organization Unit

VAS Usage Pattern Analysis - Value Added Services Usage Pattern Analysis is the analysis of how different customer groups are using the VAS.

Typical Measures: Number of Service Usages, Number of Customers Using VAS, VAS ARPU

Typical Dimensions: Geographic Area, VAS Product Type, Customer Market Segment

Revenue Assurance

Revenue Leakage Analysis - Revenue Leakage: These KPIs measure the percentage and the value of revenue leakages of a CSP (percentage of discovered leakage out of the total revenues, etc.)

Typical Measures: Percentage of Customers Bills Adjusted, Percentage of Billable CDRs Suspended Or Error

Typical Dimensions: Billing Cycle, Time Period, Geographic Area

Data Quality and Coverage Summary - Data Quality and Coverage: These KPIs measure the quality of data within different CSP systems and the coverage of RA activities (percentage of data validated, percentage of discrepancies in data between systems, etc.).

Typical Measures: Percentage of Validated Data Records Misaligned, Percentage of Customers Into Reconcile Process

Typical Dimensions: Time Period

RA Process Efficiency Analysis - RA Process Efficiency: These KPIs measure the efficiency of RA processes within a CSP (revenue recovered, recovery period, etc.)

Typical Measures: Percentage of Recoverable Revenue, Percentage of Recovered and Billed CDRs, Average Time To Recover Revenue

Typical Dimensions: Time Period, Billing Cycle, Line of Business Segment

Service Management

Core Services Usage

Voice Usage Analysis - To evaluate the Voice Usage behavior of subscribers to the CSP.

Typical Measures: Subscriber Base, Average Call Duration, Number of Attempted Calls

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Broadband Usage Analysis - To evaluate the Broadband Usage behavior of subscribers to the CSP.

Typical Measures: Duration of Data Service Session, Data Download Volume

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Online Usage Analysis - To evaluate the Online Usage behavior of subscribers to the CSP.

Typical Measures: Number of Successful Data Connections, Average Number of Sites Visited

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Email Usage Analysis - To evaluate the Email Usage behavior of subscribers to the CSP.

Typical Measures: Average Email Volume Sent, Duration of Data Service Session

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

SMS Usage Analysis - To evaluate the SMS Usage behavior of subscribers to the CSP.

Typical Measures: Average Size of Message, Average Num of Successfully Sent Messages

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

MMS Usage Analysis - To evaluate the MMS Usage behavior of subscribers to the CSP.

Typical Measures: Average Size of Message, Average Num of Successfully Sent Messages

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

IPTV Usage Analysis - To evaluate the IPTV Usage behavior of subscribers to the CSP.

Typical Measures: Number of Successful Data Streaming Connections, Average Duration of Data Streaming Session

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

VOD Usage Analysis - To evaluate the MMS VOD behavior of subscribers to the CSP.

Typical Measures: Average Duration of Video Download Session, Number of Attempted Video Download Connections

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Content Usage Analysis - To evaluate the Content Usage behavior of subscribers to the CSP.

Typical Measures: Number of Attempted Data Connections, Data Download Volume

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Core Services Experience

Voice Experience Analysis - To evaluate the subscribers experience while using the Voice service of the CSP.

Typical Measures: Number of Dropped Calls, Number of Call Attempts Which Failed, Average Setup Time

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Broadband Experience Analysis - To evaluate the subscribers experience while using the Broadband service of the CSP.

Typical Measures: Number of Successful Data Connections, Reliability of Data Service, Average Data Download Speed

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Online Experience Analysis - To evaluate the Subscriber experience while using the Online Service of the CSP.

Typical Measures: Page Load Time, Roundtrip Delay, Number of Dropped Data Sessions

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Email Experience Analysis - To evaluate the Subscriber experience while using the Email Service of the CSP.

Typical Measures: Average Data Upload Speed, Average Time To Send Email

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

SMS Experience Analysis - To evaluate the Subscriber experience while using the SMS Service of the CSP.

Typical Measures: Average Time Taken To Submit Message, Success Rate of Messages Sent

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

MMS Experience Analysis - To evaluate the Subscriber experience while using the MMS Service of the CSP.

Typical Measures: Average Time Taken To Submit Message, Success Rate of Messages Sent

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

IPTV Experience Analysis - To evaluate the Subscriber experience while using the IPTV Service of the CSP.

Typical Measures: Number of Dropped Data Streaming Sessions, Jitter Buffer Delay

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

VOD Experience Analysis - To evaluate the Subscriber experience while using the VOD Service of the CSP.

Typical Measures: Duration of Frame Freeze, Latency of Video Download Session

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Content Experience Analysis - To evaluate the Subscriber experience while using the Content Service of the CSP.

Typical Measures: Number of Dropped Data Sessions, Average Data Download Speed

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Core Services Availability

Voice Availability Analysis - To evaluate the availability of the Voice service from the CSP.

Typical Measures: Service Outage Time - Full Outage, Number of Call Attempts Which Failed

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Broadband Availability Analysis - To evaluate the availability of the Broadband service from the CSP.

Typical Measures: Mean Time Between Failures (MTBF), Service Outage Time - Partial Outage

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Online Availability Analysis - To evaluate the availability of the Online service from the CSP.

Typical Measures: Average Data Upload Speed, Roundtrip Delay, Service Outage Time

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Email Availability Analysis - To evaluate the availability of the Email service from the CSP.

Typical Measures: Reliability of Data Service, Mean Time Between Failures (MTBF)

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

SMS Availability Analysis - To evaluate the availability of the SMS service from the CSP.

Typical Measures: Average Num of Successfully Received Messages, Service Outage Time - Full Outage

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

MMS Availability Analysis - To evaluate the availability of the MMS service from the CSP.

Typical Measures: Average Num of Successfully Received Messages, Service Outage Time - Full Outage

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

IPTV Availability Analysis - To evaluate the availability of the IPTV service from the CSP.

Typical Measures: Number of Dropped Data Streaming Sessions, Media Content Provider Outage Time

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

VOD Availability Analysis - To evaluate the availability of the VOD service from the CSP.

Typical Measures: Service Outage Time - Full Outage, Average Video Download Speed

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Content Availability Analysis - To evaluate the availability of the Content service from the CSP.

Typical Measures: Mean Time Between Failures (MTBF), Average Data Download Speed

Typical Dimensions: Peak Time Segment, Network Busy Hour, Geographic Area, Access Device Type

Monetary Services

Top Up Behavior Analysis - To evaluate the Top Up behavior of subscribers to the CSP.

Typical Measures: Number of Successful Top Ups, Value of Top Up Vouchers Activated

Typical Dimensions: Vendor, Amount of Top Up Segment, Channel of Selling Top Up

Top Up Financial Analysis - To evaluate the Top Up Financial behavior of subscribers to the CSP.

Typical Measures: Average Top Up Amount, Number of Top Up Vouchers Activated

Typical Dimensions: Vendor, Geographic Area, Promotion, Amount of Top Up Segment

Top Up Experience Analysis - To evaluate the Top Up Experience of subscribers in a CSP's network.

Typical Measures: Average Duration To Activate Credit, Number of Failed Top Ups

Typical Dimensions: Vendor, Geographic Area, Channel of Selling Top Up

Pre Paid Analysis - To evaluate the Pre Paid service behavior of subscribers in a CSP's network.

Typical Measures: Number of Active Pre Paid Subscribers, Number of Port in Pre Paid Subscribers

Typical Dimensions: Deactivation Reason Type, Geographic Area, Customer Profitability (ARPU) Segment



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