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Implementation of a Customer Retention, Cross-Sell, Up-Sell and Payment Risk Solution using SAS® Telecommunications Intelligence Solutions for Orange Dominicana

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ABSTRACT

Telecommunications operators are faced with serious global competition in their mobile telephony market. Understanding, managing, growing and retaining its customers are some of the key initiatives critical for their success in the coming years. Orange in the Dominican Republic (ODO) developed a solution framework to address customer retention, sales, and payment risk issues, enhance their customer experience and create loyalty. ODO understood that process improvements were necessary to meet its growth expectations and achieve its marketing and revenue goals in its competitive environment. At the heart of the Solution defined by ODO, the SAS Telecommunications Intelligence Solutions provided a structure that allowed for the flexibility required to utilize the data from the Data Warehouse, and at the same time provided the Analytical power to generate the Intelligence for the CRM System. After a long effort working with the Business and IT Executives for corporate approval, Qualex and FT SI-Client (France Telecom) were selected to implement the solution to address ODO's Customer Intelligence needs. The joint participation of these two organizations brought unique synergies by merging the Qualex experience as company leader in the implementation of SAS solutions in the telecommunications industry with the knowledge and experience of FT-SI Client in Business Intelligence solutions within France Telecom. This paper describes critical assumptions, the project management methodology, resources needed to implement this solution and unique knowledge acquired during this project.

INTRODUCTION

In this project, Orange Dominicana had several objectives:

- Address its competitive needs.
- Maximize the utilization of the SAS/TIS functionality while maintaining independence.
- Execute on the global vision and roadmap for the IT evolution.

BUSINESS ISSUES

Customer Retention: Like every telecommunications operator, ODO faced a monthly churn rate for postpaid customers, hybrid and pre-paid. ODO decided to focus its attention on better customer management through retention practices, especially important given aggressive competition in the Telecommunications Market. Churn is one of the largest issues every telephone company faces and the ability to understand and forecast likely churn candidates is critical for revenue management.

Cross/Up Sell: An effective method to manage a growing customer base is the ability to understand the increasing and new needs of customers through past interactions with them. ODO decided to view its ability to cross-sell and up-sell products depending on the customer need as one of its key business drivers. This is a natural progression from the ability to forecast potential Churn candidates. ODO was already studying usage patterns, payment profiles, among other factors to be in a position to sell additional products and services to its customers.

Payment Risk: The availability of new services and the easy access to competition has put a strain on ODO to ensure a healthy customer base by attracting the 'good' customers. ODO recognized this potential issue and identified as another key issue the need to understand the credit worthiness of customers. Also, ensuring a better risk assessment allows ODO to fine-tune the threshold and increase their acquisition of the more profitable Postpaid and Hybrid customers while maintaining control of the involuntary churn. The ability to understand the credit worthiness of an existing customer as well as a potential new prospect is critical to the management of revenue by ODO.

THE SOFTWARE SOLUTION

SAS provided three software modules to address these specific business issues:

SAS® CUSTOMER RETENTION FOR TELECOMMUNICATIONS

It has a Telecommunications-specific data architecture (Churn Model Data mart) called Customer Retention Analytical Base Table – ABT. It contains a ready-to-deploy Analytical model (Based on ABT). It provides reports on who is leaving the company and a predictive model to determine who is likely to churn in the near future (Churn Lists). It also provides insights into the major factors influencing the decision to leave, Pre-built analytical data and processes, and has Pre-built ETL processes from the SAS TIS Infrastructure to generate the Churn ABT. It includes a Churn Retention Ready-to-deploy OLAP Cube.

SAS® CROSS-SELL AND UP-SELL FOR TELECOMMUNICATIONS

It has a Telecommunications-specific data architecture (Cross/Up Sell Model Data mart) called Cross/Up Sell Analytical Base Table – ABT and contains ready-to-deploy Analytical model (Based on ABT). It includes a market basket analysis predictive model. It provides a customer loyalty program analysis and reporting, a channel effectiveness analysis and reporting. It also contains a pre-built ETL process from SAS TIS Infrastructure to generate the Cross/Up Sell ABT, and it includes a Cross/Up Sell Ready-to-deploy OLAP Cube.

SAS® PAYMENT RISK FOR TELECOMMUNICATIONS

It has a Telecommunications-specific data architecture (Payment Risk Model Data mart) called Payment Risk Analytical Base Table – ABT that contains a ready-to-deploy Analytical model (Based on ABT). It includes Credit scoring predictive models, provides billed and unbilled call behavior analysis and reporting, and contains pre-built ETL process from SAS TIS Infrastructure to Payment Risk ABT. It also includes a Payment Risk Ready-to-deploy OLAP Cube.

The expectation was that the implementation of these SAS solutions would provide a more systematic customer-focused marketing approach, improved revenue streams, sustained customer growth and information architecture for expanded growth. The expected growth derived from the use of these solutions should not only drive improved revenue but also assist in retaining a large share of the existing customer base at the operator. Therefore, to meet its growth expectations and achieve its marketing and revenue goals, ODo decided to develop a robust Business Intelligence process to provide improvement in three key areas: Customer retention, Payment risk and Cross/up sell.

There were several requirements specific to this project. An IT requirement was to utilize the Oracle data warehouse as the source for the development and implementation of BI solutions. The project included a mixed composition of resources to maximize value and minimize cost. It is important to note that ODo retained a dedicated Project manager to support the Project from the ODo perspective.

ENVIRONMENT

HARDWARE

In relation to the development and implementation of these solutions, the technical environment consisted of a Data Warehouse environment. This data warehouse runs over two machines both running operating system Sun Solaris, SunOS 9. The physical data warehouse had been built in Oracle RDBMS, using PL/SQL. The data warehouse is utilized as the central repository of data within the operator. The data warehouse is the source for most upstream business intelligence solutions. For the implementation of these solutions Qualex and France Telecom experts recommended a technical architecture, which included the utilization of existing infrastructure to build and support the SAS/TIS solution modules. A Production server was delivered, installed and configured

DATA SOURCES

The data needed for the implementation of these SAS/TIS modules was:

- Customer, Contract, Account, Services, Plan data
- Call detail records (CDR's) for pre-paid and post-paid customers
- Disconnection, Credit, Payment information (current and historical)

Most of the data for this project was accessed from the existing Data Warehouse. Based on conversations with ODo's technical personnel and the Project Team's assessment, more than 80% of the data existed for the development and implementation of these solutions. Any missing data was reported to ODo's IT and ODo's IT in turn evaluated the best way to add this data to the data warehouse.

During the implementation, several roles and the corresponding responsibilities were staffed by Qualex, FT SI-Client and ODo. As the project team was formed, some roles were grouped or un-grouped depending on resource availability, delivery timeline, etc. In addition to regular staffing, a steering committee was created to support the team and provide guidance and further direction.

RESOURCES REQUIREMENTS

QUALEX AND FT SI-CLIENT

Qualex and FT SI-Client agreed to distribute functions as presented in Table 1 below. This activity distribution assured ODo that the project would be on time, on budget while achieving business objectives.

Table 1: Activity Allocation

Activity	Qualex	FT SI-Client
Project management	X	
General and detailed specifications	X	
Model implementation in DWH		X
ETL implementation		X
SAS Implementation	X	
Global integration	X	
Acceptance (testing)		X
Architecture		X
Documentation, Training	X	

Project Manager: understood the project requirements and ensured they were thoroughly and unambiguously documented. Prepared a project plan with achievable cost, schedule, and performance goals with input and support from technical, business, or domain counterparts. Identified and managed project risks throughout the project life cycle. Worked with Qualex, HQ management and ODo Project Manager to ensure the project team is well organized, adequately staffed, and working well together. Exercised proper project and change control procedures to manage project cost, schedule, requirements, and design baselines so they were traceable. Reported meaningful metrics for cost, schedule, quality, and risk. Conducted regular reviews of status, requirements, and design. Ensured the adequacy of technical documentation and quality management activities. Maintained meaningful communications among internal and external project stakeholders. Managed the project to attain the project goals and achieve stakeholder satisfaction. Tracked project time accurately. Tracked project related expenses accurately and reported in a timely fashion. Strived for on-time, on-budget, and high-quality implementations

Solution Architect/ ETL Developer / Technical Lead: responsible for designing, constructing, testing, Document Data Management Processes and Installations. Responsible for providing guidance/prepare/validate the Solution and Data Architecture. Developed the system design requirements from business requirements. Analyzed requirements and performed architectural and detailed design of the system. Provided work status and notice of quality management activities to the project manager. Worked with project manager to define and refine project tasks/estimates for the project. Provided technical guidance for project team members. Gathered status information from team members and communicated it to the project manager. Informed project manager of problems that impacted schedule, quality and/or cost. Kept up to date on technology. To the extent possible, replicated the customer environment and help set up the development and test environments. Planned, reviewed, and publicized standards to be followed within the project team. Ensured that quality management activities were scheduled and performed at the appropriate stages. Defined, assigned and supervised the work of development staff if any (not necessarily the staff itself). Served as task integrator, ensuring that components developed by individuals integrated seamlessly through planning, use of

standards, naming conventions, and having a central location for documentation for access by all project team members. Set up development and test environments and established software configuration management practices for software modules. Ensured that changes in any module were evaluated to guarantee compatibility across all modules. Provided documentation regarding technical issues such as design specifications and system administration. Set the agenda for and facilitated technical meetings.

SAS/TIS Implementation Specialist: this specialist provided expertise in SAS/TIS Solutions. This individual was adept at the specific solution and aware of the intricacies of the TIS architecture. This individual provided the entire team with the TIS specific knowledge i.e. the data fields that needed to be populated, what fields were required for the analytic models, what fields were required for reporting, among others. This person played an integral role by providing TIS specific knowledge to the entire project team

Product Specialist (included Analytical Experts, Web Experts, Generalist SAS Programmer): the product specialists included Analytic consultants who are specialized in the development and implementation of analytic models using relevant SAS technology. These specialists also included scorecard developers based on the needs that were uncovered during requirements. They also included web delivery experts and general SAS programmers. These professionals coded software units according to standards and conventions. Developed and executed unit, acceptance, system and integration test plans. Conducted code and GUI walk-through and other quality reviews. Prepared user and system documentation. Tracked time accurately via timesheets. Tracked project related expenses accurately and reported them in a timely fashion. Strived for on time, on budget, high quality implementation. Provided level of effort for tasks and adhered to estimates. Provided project manager with timely status reporting as well as immediate notification of any discoveries that would affect the project's cost or schedule or increase the project's risk factors.

Technical Writer / Documentation Specialist: supplemented the project with necessary technical writing skill. Proofread, reviewed and corrected documentation written by developers, technical lead, or the project manager. Took ownership of document creation, formatting, and implemented document writing and control standards. Ensured all technical documents met documentation standards and were appropriately trademarked. Acted in close association with the technical lead and the project manager.

Domain Business Consultant: this person acted as the liaison between the technical team and ODo. This person aided the Solution Architect in ensuring the business objectives have been incorporated into the solution implementation process. This is the person who has business knowledge of the mobile telecom industry and was able to provide guidance to the team. This person was involved in requirements gathering and analysis.

Trainer: this individual prepared the necessary training material and trained the Operator's business team in the usage of the application.

Testers: these individuals are non technical testers of the system and aided in the system and functional testing of the application.

ORANGE DOMINICANA

Project Sponsor: individual who financed or gained financial support for the project. He/she was the single point of contact for funding issues and strategic focus.

Project Manager: this professional maintained direct accountability for all tasks related to defining, designing, building, testing and deploying the system. This person was responsible for directing all project-related resources and vendor resources as well as ensured effective execution of the project plan.

Business Personnel, Business Process Owners/ Data Stewards: these individuals were the "content experts" on specific solution needs. They maintained an ongoing (daily) dialogue with the IT Business Analyst and contributed to drafts of requirements, reviews of technical specifications and development of test plans. They were responsible for addressing the business needs, defining the business rules and identifying the data sources that needed to be incorporated into the information architecture.

IT Personnel for related systems: these individuals were the "data expert" on the topic/function being addressed. They contributed by drafting requirements, reviews of technical specifications and development of test plans.

System Administrator: this individual maintained and managed the system. He worked in conjunction with the consulting team and tech lead to understand the development process and technology.

Corporate Trainer: this person managed training sessions on applications.

Process Expert: this person analyzed business processes and provided direction on how to incorporate new advantages into the existing environment. She shared best practices with other units.

PROJECT METHODOLOGY

INITIAL ASSESSMENT

An initial assessment was conducted to generate a clearer picture of the operator environment. A special focus was given to data. Qualex obtained sample data from ODo. Qualex and FT SI-Client Consultants assessed the data for completeness and cleanliness. Specifically, the consultants reviewed the data to determine if it was appropriately clean for analysis and reporting and for overall data integrity. At the completion of this activity, the Data Assessment Document (DAD) was created to detail the results of the data review and provide recommendations for improvement. The project plan was refined using the information gathered at the preliminary assessment.

PROJECT KICKOFF

ODo, Qualex and FT SI-Client facilitated a Project Kickoff meeting. During this meeting with ODo executives, the joint team made introductions and outlined roles & responsibilities. They also took the opportunity to review any information that was gathered during the assessment process, including any assessment documents or proposals. As this was the first official meeting for the project, the team discussed Qualex's Project Management Methodology and its key components such as the accepted approach for Change Management and Risk Mitigation. Qualex and FT SI-Client drafted a Communications Plan, for their own part of the implementation that has been followed during the project.

A review of the Project Roadmap and preliminary project plans provided the opportunity for the participants to understand the implementation approach, approximate timeframes for the key activities, and identify resources that were expected for a successful implementation. Finally, Qualex and FT SI-Client provided direction for ODo to prepare for the detailed Requirements sessions that was to follow in the next phase. Qualex and FT SI-Client completed the internal preparations for the project and created the Project Definition Document (PDD) that captured the information that was gathered during the Kickoff.

A Steering Committee to include senior management from ODo, Qualex and FT SI-Client was created with the following functions:

- Key decision making
- General status review
- Risks and Mitigation plan presentation and validation
- Business strategic decision presentation and validation: schedule, migration scope, priorities, business evaluation, technical evaluation
- Final system acceptance and validation

Qualex and FT SI-Client produced three documents:

- Assessment Analysis
- Hardware Recommendations
- Implementation Proposal

REQUIREMENTS GATHERING – BUSINESS AND APPLICATION REQUIREMENTS

During the requirements phase, business workshops were held on-site with ODo teams, so that participants could work together to identify and validate the detailed business and technical requirements for the system.

DATA REQUIREMENTS

Requirements for the data warehouse and data sources were gathered. Consultants reviewed the data for the preparation of the base data model. ETL business rules used to populate the data model were also discussed at this point with ODo & FT SI-Client Team. Data filters were discussed and defined, as well as the required elements, defaults, and layouts.

ANALYTIC OPTIONS

ODo project stakeholders regrouped to define the final requirements for analytics. Consultants reviewed the outcomes intended from the analytic models and identified the class, dependant, independent variables necessary to create the final analytic models. As modeling is a repetitive process, there was need to access data at this stage by

the analytic consultant so as to gauge the variable strength and get an idea of any additional variables needed to use in the models.

REPORTING OPTIONS

ODo stakeholders reviewed reports in the SAS TIS modules as well as the reporting needs from the data mart and/or from the analytic models. Report layouts were documented by consultants. Tables and variables necessary for the reports were documented as well. A gap analysis was performed to ensure that data was available to create the necessary reports.

TRAINING REQUIREMENTS

There were many training options available for users or administrators of the system. These options were discussed during the requirements workshops and ODo identified the resources that would require training. The Consultants developed training plans and integrated them into the Project Plan. Training also occurred in the form of informal knowledge transfer during the project, formal classroom training or on-site, and through documentation. User groups were separated into the following groups:

End Users: these users were to use the web interface to perform reporting and analysis by creating and using different views of the data. Some more basic users could have chosen to only access published reports. The End Users typically made up the largest user group.

Advanced Analysis Users: this group of users included individuals that have a thorough understanding of the data in an unstructured format and who also have experience or interest in statistical analysis and reporting. This was usually a much smaller group of users. These users accessed Advanced Analysis Tools through a client application installed on their desktop.

System Administrators and IT Support: these were the individuals responsible for maintaining the final System from Orange's technical (IT) perspective. Orange has a requirement to comply with governance guidelines from the France Telecom group.

REQUIREMENTS REVIEW AND SYSTEM DESIGN

At the start of this phase, ODo reviewed the SRS and DAD to establish the final project scope. The ODo Project team identified scope exceptions and sought consensus on requirements that were not to be supported by this phase of the project due to priority, timing, or data availability. This allowed the Consultants to focus their design efforts only on those items which were in scope and that had documented requirements. Following are the other key areas that the Consultants focused on during the Design phase.

DATA WAREHOUSE AND DATA MARTS

Consultants began work to map data sources to the identified data tables and created a data model. They then designed the ETL business rules needed to populate the SAS TIS Data Model.

ANALYSIS OPTIONS

The analytic models and reports were also reviewed based on the required outcome of these models and what business problems they intended to solve. The reports were re-designed from the data available and the analytic models were adjusted. Work Products that were used during this phase of the project included:

- Project timeline (milestone list)
- System Design Document (SDD)
- Hardware installation report
- Updated project plan

ETL PHASE - EXTRACT, TRANSFORMATION, AND LOAD OF DATA

This activity included extracting the source data from the source systems and transforming the data per the requirements specifications. The data refresh process was built, as well as the backup/recovery and archive processes. A job scheduling was created to support any batch processes and reports. Work Products used during this phase of the project included:

- Data model/dictionary
- Updated business rules (amended in the SDD)
- Updated Project Plan

SAS® TELECOMMUNICATIONS INTELLIGENCE SOLUTIONS MODULES DEPLOYMENT

In this phase, the construction allowed for the development of an individual data mart. The initial data mart was specific to the customer retention issue. From the data mart analytic models and reports were developed during this phase. The application and user interfaces along with the necessary security components were also installed in this phase. As development continued for all areas of this phase, unit and integration testing occurred. Work Products used during this phase of the project included:

- Development of the data mart, analytic model(s), report(s), and User Interface with security
- System Test Plans
- Completion of unit and integration testing
- Updated Project Plan
- VPN Access

FINAL SAS® TELECOMMUNICATIONS INTELLIGENCE SOLUTIONS TEST AND DEPLOYMENT PHASE

Installation of the SAS® Telecommunications Intelligence Solutions onto the designated hardware platform happened during the Delivery and Implementation Phase. ODo obtained and installed the server. The server was staged two weeks prior to the start of this phase. Consultants performed testing across the Solution, including data testing, system testing, performance testing and tuning in compliance with requirements. ODo was involved with User Acceptance testing as defined by the Test Plans they have created. HQ and Qualex also worked to complete the system related documentation that was delivered to ODo. This includes a User Guide and System Administration document.

Work Products used during this phase of the project included:

- User, system administration document
- Installation guide
- Updated project plan

KNOWLEDGE TRANSFER / TRAINING PHASE

Qualex assisted ODo in the coordination of knowledge transfer sessions. These transfer sessions were detailed in the project timeline. ODo decided who would be required at these sessions. Knowledge Transfer was done with the End Users and Advanced End Users together and then in separate sessions with the system administration personnel.

Work Products used during this phase of the project included:

- Knowledge transfer sessions
- End users/advanced end users and administrators

CONCLUSIONS

Clear definition of roles and responsibilities was critical to keep the project on time and budget.

The team tried to maximize the utilization of the functionality and the technological mechanisms offered by SAS® Telecommunications Intelligence Solutions. The Team modified the basic solution only in exceptional cases.

This way the system performance was improved significantly, the future evolution of the system was simplified due to version changes of the base product and the incorporation of new functionalities included in future product versions was facilitated.

The transition to subsequent phases was prepared, and new functional modules and elements of technical integration added.

The Team kept in mind the global vision of ODo as well as the final objectives. For this purpose, the Team tried to think of a solution for this project maximizing the utilization of the different developments that could be undertaken in the future.

The combination of local resources from ODo and external resources provided a great pool of technical talent. Qualex and FT SI-Client have an ample group of consultants with great experience in Telecommunication operators. This gave the ability to offer, from the very beginning, great value to ODo. In particular, Qualex has worked for the top American telecommunications companies. Similarly, FT SI-Client has contributed value and experience in numerous international operators. The combination provided enhanced value for ODo as well as the ability to continue practicing predictive analytics by the local team.

The presence of integrators like Qualex and FT SI-Client in this project has given noticeable benefits by:

- Avoiding complete dependency upon a single software editor
- Keeping ODo's data warehouse as central and strategic in customer knowledge and data storage
- Reducing consultancy expenses in the future
- Reducing cost of implementation by modifying architecture and renegotiating consultancy cost
- Using tools recommended at France Telecom Head Quarter Group level

PROJECT BENEFITS

Retention Module

- ODo can predict churn propensity into the subscriber base
- ODo can Identify churn's key indicators
- ODo's subscribers can be effectively targeted with proactive retention campaigns, prior to churn

Up-Sell and Cross-Sell Module

- Customers with high probability of buying specific products can be identified and their information updated at the branch office level, giving the possibility to convert each customer contact into a sale opportunity
- Increase of ARPU (Average Revenue per User) by offering "best fit" product to customer, using Cross-sell (New product offering for target people) or Up-sell (upgrade offers for the customer)
- Generation of information on ideal Product/Services Bundles for each customer Profile
- Generate the "next best product" for each customer

Payment Risk Module

- Calculate current and potential revenue at risk
- Identify key indicator for profiles with payment defaults and bad debts
- Run service suspension analysis
- Optimize collection process
- Use credit scoring and behavior scoring of ODo's customer base to define profiles with risk
- "Open" access for more post-paid customers with controlled risk
- Increase revenue by proposing an increase of service packages to customers with right profile
- Perform up & cross sell with controlled risk

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