SmartMigrate™

ROLTA

SAP Global Partner

Rolta SmartMigrate™
Comprehensive Migration Solution with
highest degree of Automation

Complete

Automation

Quality

Savings

Fixed Price

Seamless Migration of Your Applications on SAP HANA

Overview

Business Intelligence and Analytics continues to remain a top spend priority for CIOs. Companies have deployed a variety of databases, data warehouses, BI reporting, analytics, and self-service tools over the years, often driven by departmental considerations rather than a corporate-wide initiative. This has led to the proliferation of several platforms and tools performing the similar functions within the same organization. The spiraling costs associated with multiple platforms and tools are substantial, and include license fees, support and upgrade costs, administrative, training, hardware as well as maintenance costs.

With quintillion bytes of data generated every day and more than 90% of the data in the world being lesser than two years old, Big Data is changing the way businesses is done and data are managed. While organizations have traditionally used data to control the performance, leading organizations in this digital era exploit Big Data to excel. Big Data Analytics redefines not only the information landscape but also the data and analytics platforms. Existing and traditional BI environments including data, analytics and reporting platforms are not suitable for the demanding Big Data analytics and self-services BI initiatives. In an increasingly competitive environment, enterprises need to consolidate on a single modern enterprise wide analytics suite that not only delivers on the benefits of self-service BI to its end-user community, but also fulfills on the cost savings that result from the simplification of the IT landscape. This allows an enterprise to lay the foundation for adopting emerging technologies like mobile, cloud, Big Data, and social applications while providing a consolidated organization wide, cross functional platform for prescriptive and predictive analytics to stay competitive.

SAP HANA®, a high performance, in-memory real time data and analytics platform has emerged as a compelling platform of choice to equip the needs of digital transformation to leverage ever-increasing data volumes and analytics demands. However, to realize the benefits from adopting SAP HANA, companies also have to migrate their existing databases, data warehouses. BI reporting and analytics landscape and application environments (both, custom and SAP applications). Manual migration efforts are fraught with challenges such as time delays, error prone execution, requirement of superior technical expertise, etc. Manual migration invariably leads to effort and cost overruns and generally fail to deliver the desired outcomes.

Migration and Consolidation Challenges

Organizations that want to move from their disparate and multitude of databases, Data Warehouses, BI and reporting tools as well as rewiring their applications to leverage SAP HANA's in memory high performance analytics for real time and predictive analytics need a well thought approach and solution. However, any such business transformation exercise will raise many doubts and challenges for IT, including:

- How do we comprehensively define the migration strategy and roadmap?
- How can we develop a consolidated plan to migrate legacy IT infrastructure environments including hardware, databases, data warehouses, ERP and custom applications?

- How can we estimate the "Total Cost" and make it a self-funding program with reduction in TCO and faster ROI?
- Can we do a quick assessment of our current environment & quickly conduct a short proof of concept to structure the overall migration map and then create a detailed plan to move the environment to SAP HANA?
- How do we mitigate against risks of cost and effort overruns that typically arise from a large scale manual migration programs? Is it possible to get a fixed price quote to ease our budgeting and approval cycle?
- How can we ensure seamless migration without disrupting the business users?

- Can we migrate all the data, data structures, objects, constraints, views as well as functions, procedures, packages, which contain substantial amounts of business logic and are therefore very difficult to migrate?
- Can we move the existing ETL workloads and real time data feeds to the HANA environment seamlessly?
- Can custom and SAP applications also be modified to run on SAP HANA including co-existence of other application environments?
- How do we ensure that the migration program exploits the power of HANA by creating OLAP views and which views do we need to create?
- Can we benchmark and measure performance optimization?
- How do we validate and test at every stage to ensure high quality migration - Unit, System, Integration, Performance testing?
- Can the migration program support successful roll-out including training, validation and production support?
- Can we get ongoing managed support for the new environment which we are not familiar with?

Rolta SmartMigrate™ - Comprehensive Migration Solution

Rolta SmartMigrate™ is a unique comprehensive migration solution powered by highest degree of automation. It provides an end-to-end program for Technology Consolidation – Migration – Application transformation. It brings significant automated migration across the database / data warehouse migration, BI and Analytics platform migration, application rewiring and optimization for custom analytical, transactional and SAP ECC applications on SAP HANA. Rolta SmartMigrate™ thereby accelerates organizations on their business transformation journey to SAP S/4HANA.

FIGURE 1 Complete, accelerated, high-quality migration, predictable roll outs with highest degree of automation – backed by proven global delivery migration factory model
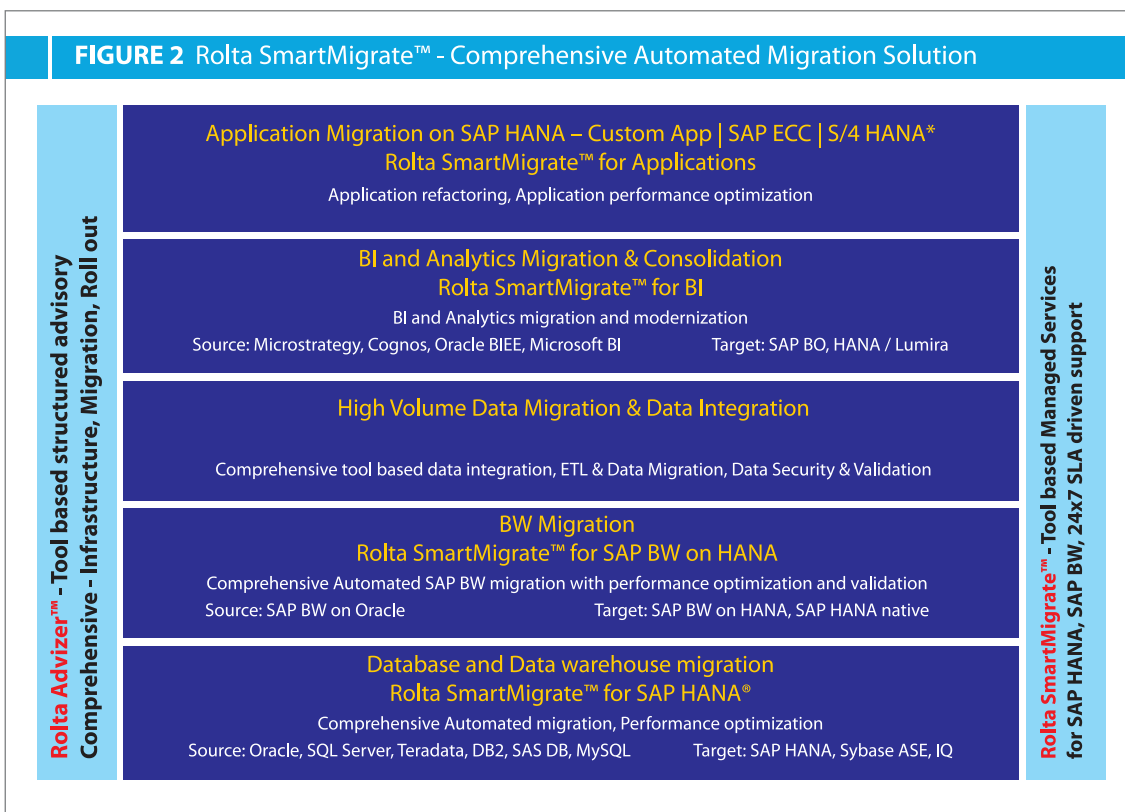
	Complete	• Comprehensive database analytics, application migration & optimization • From many-one as well as many-few consolidations
	Automated Least business-user efforts	• Ensures near-zero business user involvement • Automated assessment, migration, optimization and exception tracking
	Quality	• Unique IP-based to maximize quality & automation across entire migration life-cycle • Tool-based automation for data integrity, quality & security • Proven methodology-based for low rate of rework
	Savings	• Accelerated automation delivers tangible savings • Fixed-schedule, fixed-scope, fixed-cost • Phased migrations enable parallel rollouts & migrations

Rolta SmartMigrate™ helps organizations to achieve complete, accelerated, high quality migration with best degree of automation, backed by proven global migration factory delivery model. As depicted in Fig No 2, Rolta SmartMigrate™ solution suite covers the end-to-end for migration and consolidation to SAP HANA. The solution, powered by the automated tool can be used for a comprehensive migration across data-analytics-application tiers for application transformation or some of the tiers in the phased migration / consolidation.

Starting with the initial advisory services powered by Rolta Advizer™ to define a comprehensive migration strategy along with a roadmap for delivery across the IT tiers comprising of Databases, Data Warehouses including SAP BW, BI and Reporting as well as application refactoring and application performance optimization for SAP ECC and custom applications to leverage the latest SAP S4HANA enterprise suite. Organization can also leverage 24x7 SLA driven support powered by Rolta SmartManage™.
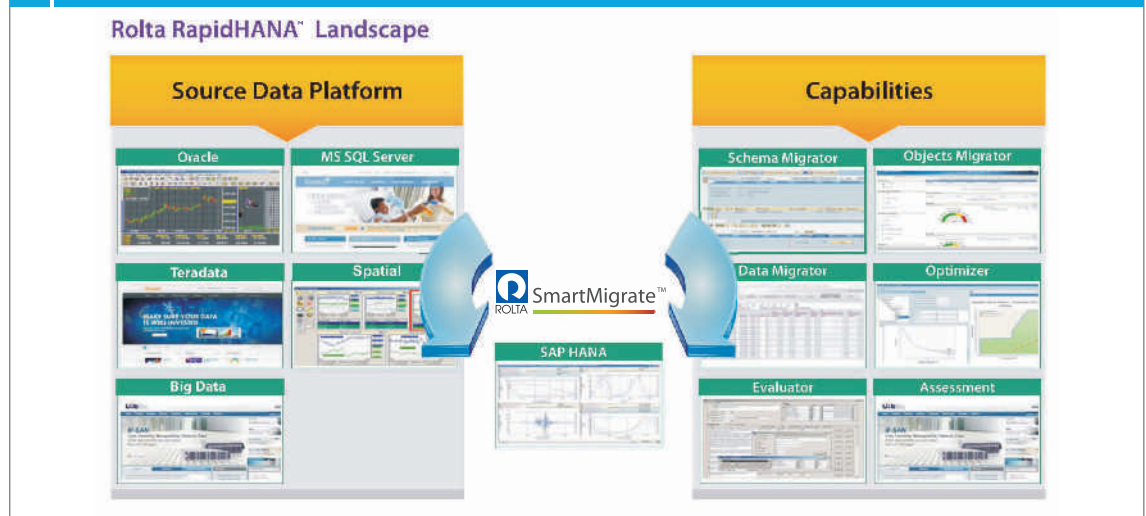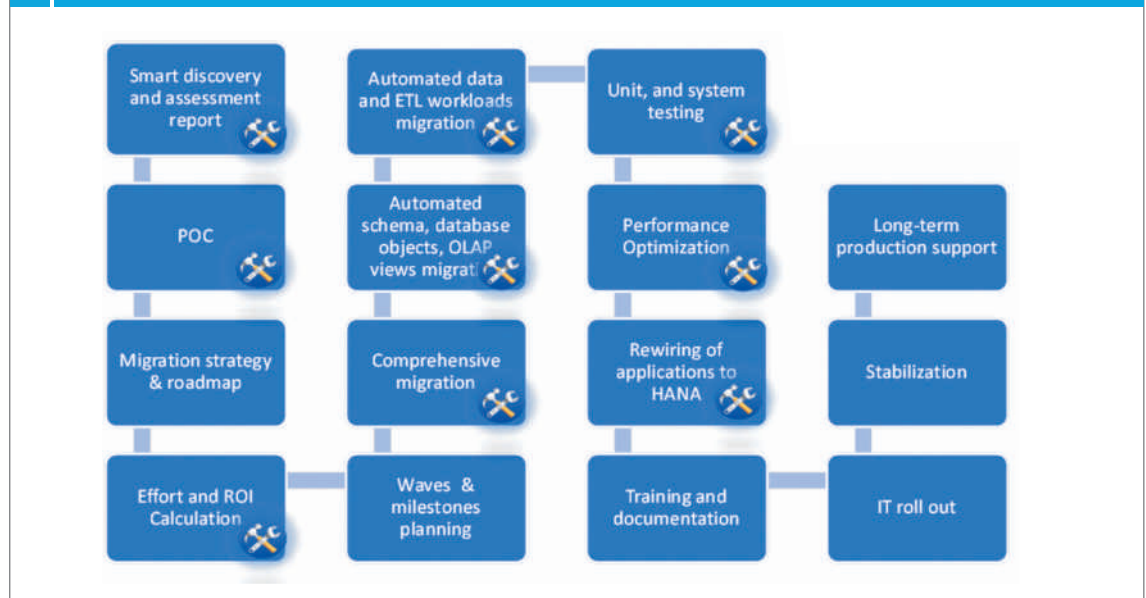

FIGURE 2 Rolta SmartMigrate™ - Comprehensive Automated Migration Solution

Rolta Advizer™ - Tool based structured advisory Comprehensive - Infrastructure, Migration, Roll out

Application Migration on SAP HANA – Custom App | SAP ECC | S/4 HANA*
Rolta SmartMigrate™ for Applications
Application refactoring, Application performance optimization

BI and Analytics Migration & Consolidation
Rolta SmartMigrate™ for BI
BI and Analytics migration and modernization
Source: Microstrategy, Cognos, Oracle BIEE, Microsoft BI   Target: SAP BO, HANA / Lumira

High Volume Data Migration & Data Integration

Comprehensive tool based data integration, ETL & Data Migration, Data Security & Validation

BW Migration
Rolta SmartMigrate™ for SAP BW on HANA
Comprehensive Automated SAP BW migration with performance optimization and validation
Source: SAP BW on Oracle   Target: SAP BW on HANA, SAP HANA native

Database and Data warehouse migration
Rolta SmartMigrate™ for SAP HANA®
Comprehensive Automated migration, Performance optimization
Source: Oracle, SQL Server, Teradata, DB2, SAS DB, MySQL   Target: SAP HANA, Sybase ASE, IQ

Rolta SmartMigrate™ - Tool based Managed Services for SAP HANA, SAP BW, 24x7 SLA driven support
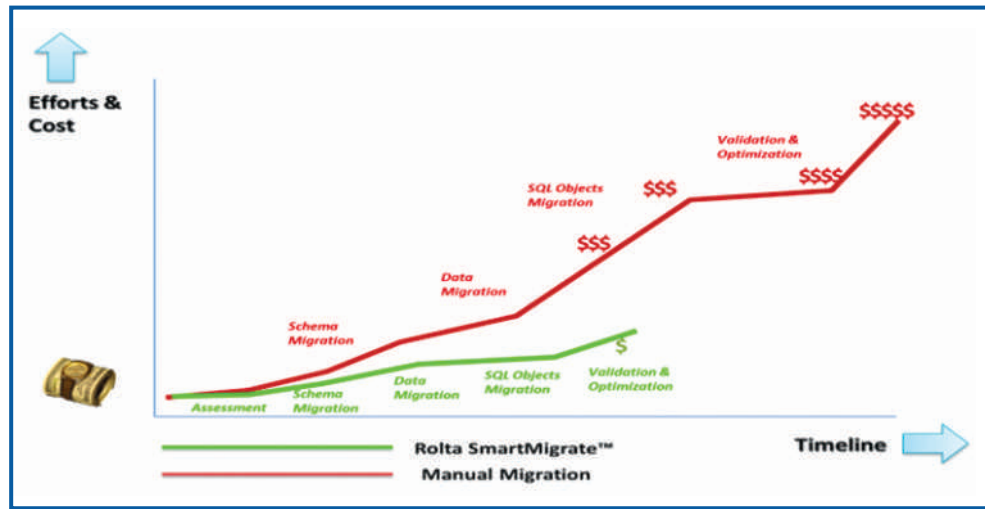

Rolta SmartMigrate™ for SAP HANA

Rolta SmartMigrate™ for SAP HANA® is a comprehensive, automated solution for database migration to SAP HANA. It supports automated out-of-the-box migration from Oracle / SQL Server / Teradata / IBM DB 2 / SAS DB / MS SQL platforms (including data warehouses, spatial data) to SAP HANA. Furthermore, with its pluggable architecture it can be extended for migration from other legacy database environments.

As can be seen from the following diagram, this comprehensive program covers all the phases for a successful migration from the initial discovery and assessment all the way through to the final production support. It also depicts the areas of automation which significantly accelerates the migration with minimal risks.

FIGURE 3 Rolta SmartMigrate™ for SAP HANA

FIGURE 4 Rolta SmartMigrate™ based acceleration and automation

Rolta SmartMigrate™ for SAP HANA provides the most comprehensive, end-to-end database and data warehouse migration program, delivered in well-designed phases. These phases begin with the smart discovery and assessment report, and last till the completion of the migration, followed by post implementation support as needed.

The Rolta SmartMigrate™ for SAP HANA program typically commences with a focused smart discovery, followed by an assessment report. The assessment report contains a summary of the customer's existing data landscape and a summary of the hardware sizing, based on the source and target environment and workloads.

FIGURE 5 Rolta SmartMigrate™ for SAP HANA

The next step is to perform a short proof-of-concept (POC), which serves to validate as well as demonstrate the completeness and technical validity of the Rolta SmartMigrate™ for SAP HANA approach and assessment performed earlier. Any refinements required can be made at this stage. At this point, a comprehensive migration strategy and roadmap is prepared that serves to guide the Rolta SmartMigrate™ for SAP HANA program during the entire execution of the project. The migration is performed in targeted "waves" (or "phases") with well-defined milestones to assess progress and to perform any course corrections as needed. The migration includes the automated migration of the source schema, database tables, structures, views, sequences, views, procedures, functions, etc. As the database migration continues, separately, the ETL scripts and mappings are also migrated from the source application to the target application.

The accuracy and integrity of the data migration process is validated via a comprehensive testing methodology in place – via unit and system tests as well as manual running of queries.

To ensure that the migrated database on HANA runs in a performant manner and leverage the unique capabilities of its in-memory, columnar architecture, Rolta SmartMigrate™ for SAP HANA analyzes queries on both the source and target databases, and based on the comparison, not only suggests remedial steps – should the queries not be as fast on HANA as expected – but also goes ahead and creates the required analytical views (a.k.a OLAP views).
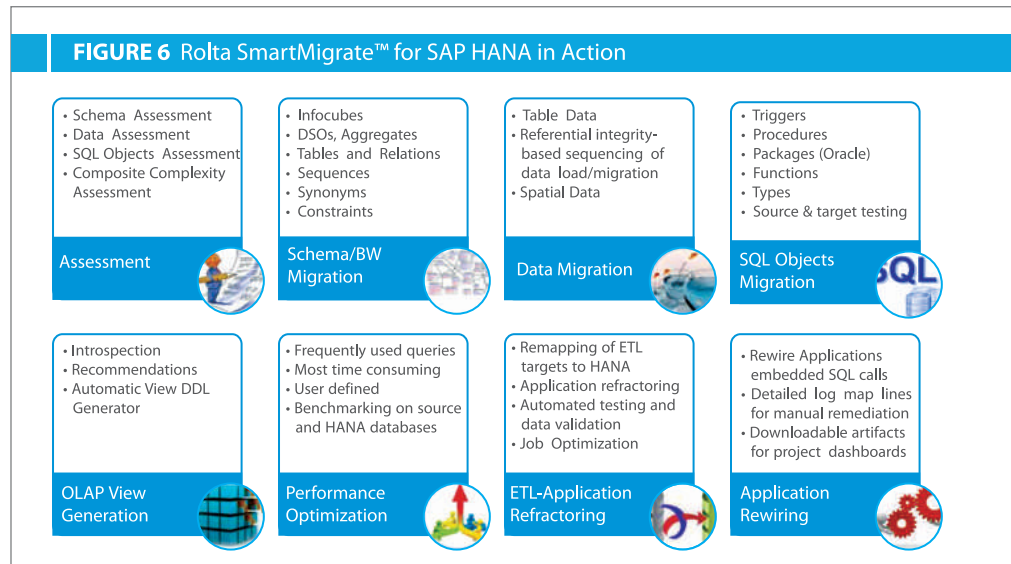
After successfully migrating the database to HANA, the next step is the rewiring of the downstream analytical applications running against the database to access the data in HANA.

The end-stages of a successful Rolta SmartMigrate™ for SAP HANA program are the roll out by IT, a stabilizing and monitoring period, creation of the required documentation artifacts, creation & delivery of a training plan, and finally, a commitment to provide long-term production support.

Rolta SmartMigrate™ for SAP HANA in Action

In order to successfully complete the end-to-end migration, Rolta SmartMigrate™ for HANA follows the 8 critical technical stages of Assessment, Schema Migration, Data Migration, SQL Objects Migration, Creation of OLAP Views, Performance Optimization, ETL application refactoring and Application Rewiring.

FIGURE 6 Rolta SmartMigrate™ for SAP HANA in Action

Assessment	Schema/BW Migration	Data Migration	SQL Objects Migration
• Schema Assessment • Data Assessment • SQL Objects Assessment • Composite Complexity Assessment	• Infocubes • DSOs, Aggregates • Tables and Relations • Sequences • Synonyms • Constraints	• Table Data • Referential integrity-based sequencing of data load/migration • Spatial Data	• Triggers • Procedures • Packages (Oracle) • Functions • Types • Source & target testing

OLAP View Generation	Performance Optimization	ETL-Application Refractoring	Application Rewiring
• Introspection • Recommendations • Automatic View DDL Generator	• Frequently used queries • Most time consuming • User defined • Benchmarking on source and HANA databases	• Remapping of ETL targets to HANA • Application refractoring • Automated testing and data validation • Job Optimization	• Rewire Applications embedded SQL calls • Detailed log map lines for manual remediation • Downloadable artifacts for project dashboards

An automated, GUI-based assessment adviser introspects the complete source database environment and underlying infrastructure. The output is a detailed summary report outlining the migration roadmap, effort estimation as well as the list of objects that will be migrated automatically and which would require to be manually migrated. As a result, it provides complete tracking of the manual migration activities.

The Rolta SmartMigrate™ for SAP HANA has an interactive user interface that guides the overall migration process and allows the administrator to select the database migration steps to perform, skip, or perform later. It additionally provides feedback on tasks requiring manual intervention before it can proceed to subsequent stages for end-to-end quality of the migration.
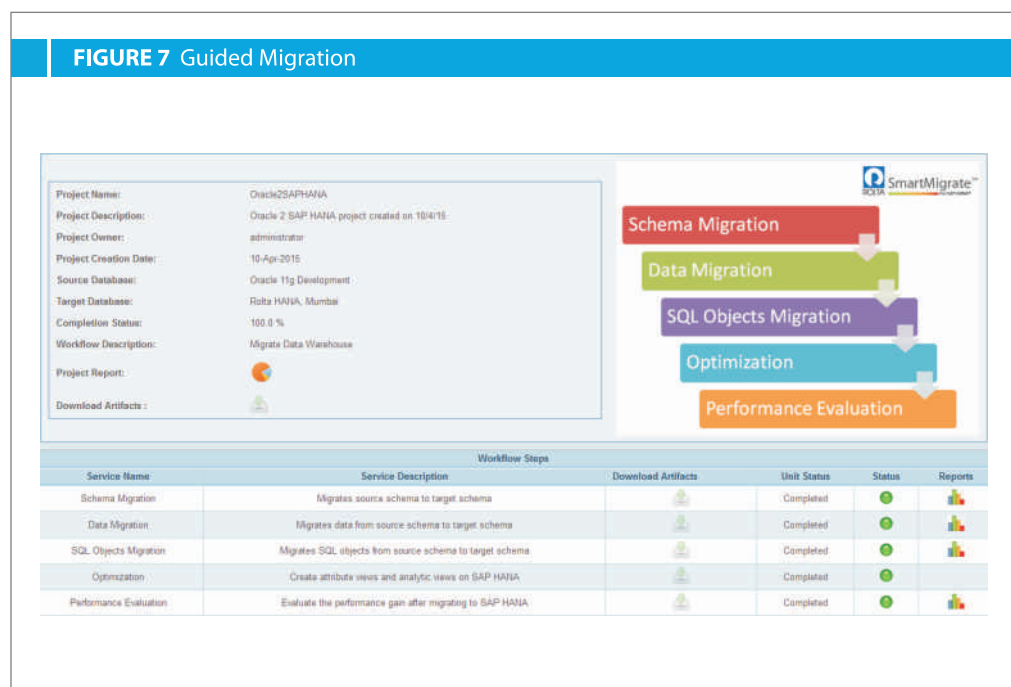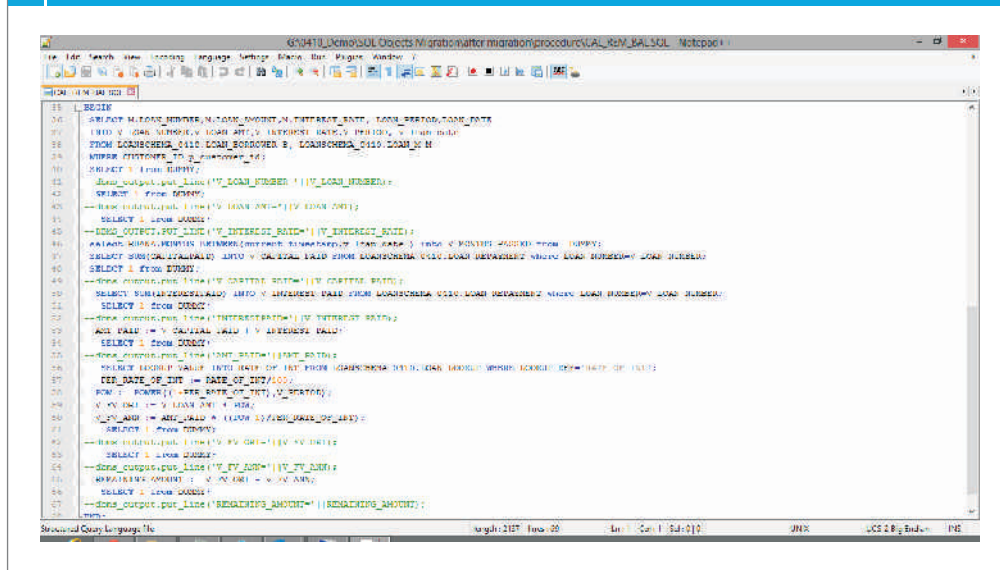
FIGURE 7 Guided Migration

FIGURE 8 SQL Object Migration

Rolta SmartMigrate™ for SAP HANA migration application, not only provides the SQL objects that did not migrate to be downloaded, but also marks out the sections and lines of code within the SQL object (like a function, package, or stored procedure, etc.) that needs manual migration.

A post-migration performance benchmarking, built into Rolta SmartMigrate™ for SAP HANA, graphically compares execution times of the most commonly run queries on the source database system and the destination system of SAP HANA. Based on this comparison, Rolta SmartMigrate™ for SAP HANA goes one step further, and actually suggests the appropriate OLAP Views to be created – information or analytic views, for example. Rolta SmartMigrate™ for SAP HANA then creates these views, which the administrator can import into HANA with a single click!

FIGURE 9 OLAP View Optimization
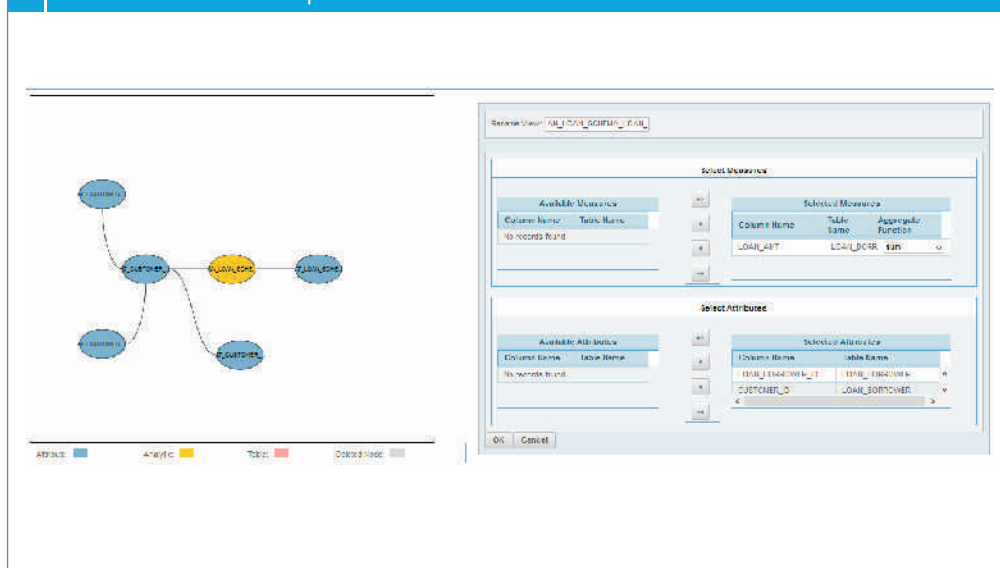
Rolta SmartMigrate™ for SAP BW to HANA

Many organizations may have also invested in SAP Business Warehouse (BW) and would want to migrate this to SAP HANA based on SAP's technology roadmap. SAP BW is essentially a Data Warehouse running on a traditional database and can also be migrated using the automated Rolta SmartMigrate™ for HANA described above. While SAP does provide automated scripts for such SAP BW to HANA migration, Rolta SmartMigrate™ for SAP BW to HANA provides compressive migration with several distinct advantages. These include automation of many of the migration steps including testing and validation, performance optimization etc. It supports all the options – BW on HANA "as is", BW on HANA with optimization, BW to native HANA as reimplementation

FIGURE 10 Rolta SmartMigrate™ for SAP BW to HANA
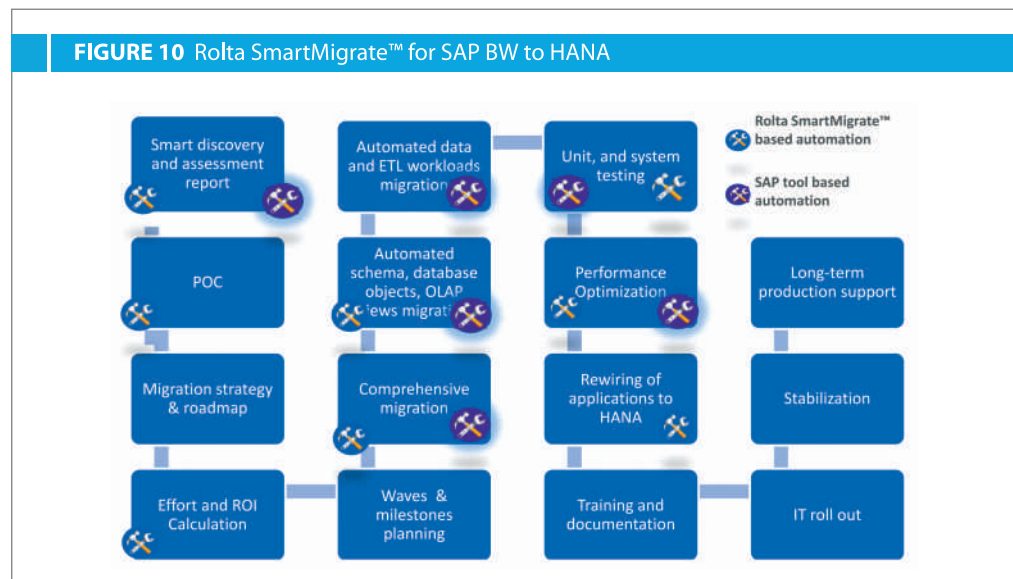
Rolta SmartMigrate™ for Data Migration and Integration

In order to leverage the in-memory compute power of SAP HANA, vast amounts of data has to be ingested from the plethora of databases residing across the organization. Based on a careful assessment of what data needs to undergo one-time migration or an on-going integration feeding data either through ETL batch processes for bulk data or real-time data feeds. Rolta SmartMigrate™ for data migration and integration is a comprehensive automated tool based for ETL & data migration and data integration which also ensure strict adherence to data security while also validating the processes. It leverages Rolta's patented Rolta iPerspective™ technology for secure real time data integration. Additionally Rolta SmartMigrate™ for Data Migration and Integration also has the ability it ingest Big Data from Hadoop clusters for enriched analytics.

This helps to do quick cut over from source environment – staging – production environment with hardly any system down time or duplicate / loss of data and Jobs.

Rolta SmartMigrate™ for BI

Organizations planning to consolidate and standardize their BI platform clearly face several technical and business deterrents. Rolta SmartMigrate™ for BI helps organizations to effectively address the deterrents pertaining to consolidation & migration of their legacy systems and safely embark on their standardization and consolidation requirements. The following diagram shows these challenges and how these can be overcome through an automated solution such as Rolta SmartMigrate™.

FIGURE 11 Rolta SmartMigrate™ for BI
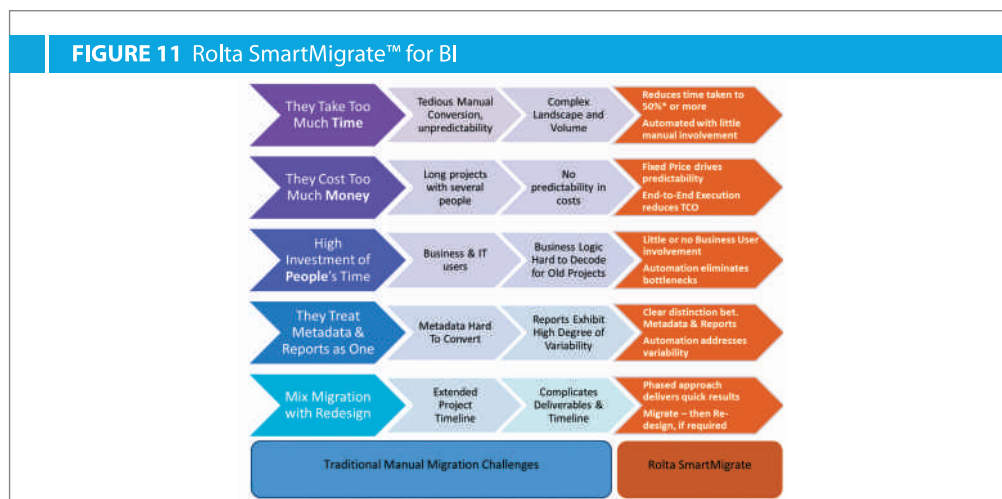
Rolta SmartMigrate™ IP automates the migration from multiple BI platforms onto a single consolidated platform. Rolta SmartMigrate™ uses a pluggable architecture to migrate and consolidate from a variety of analytical and reporting platforms to the customer's choice of best-of-breed BI platforms. Rolta SmartMigrate™ is an out-of-the-box solution that provides a high degree of automation. The solution is capable of migrating from source platforms including Microstrategy, Cognos, OBIEE, Microsoft BI and BOBJ to BOBJ as shown in the diagram below.


FIGURE 12 Rolta SmartMigrate™ for BI
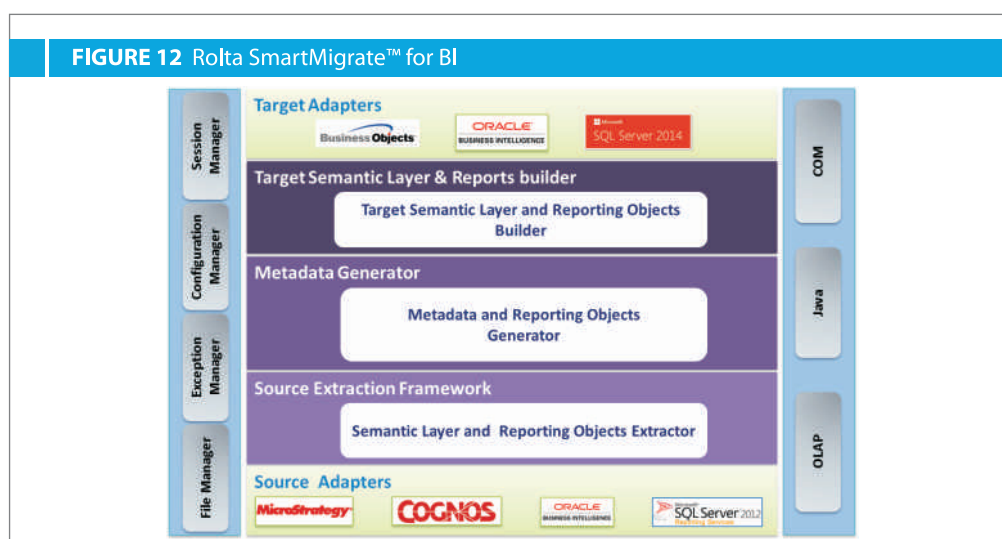
This unique field - proven solution features:

- API and Meta model based accelerator for automated migration
- Migrates semantic layer as well as Reports/ Dashboards
- Enables Self Service BI. Retains source project /module structure on the target platform
- Migration of individual and batch of reports
- Architected to facilitate optimal adoption of features in target platform

Rolta SmartMigrate™ for BI in Action

Rolta SmartMigrate™ for BI is a comprehensive BI / Analytics migration program with highest degree of automation. Migration of reports from source to target happens in a series of steps as shown in Fig no 13


FIGURE 13 Rolta SmartMigrate™ for BI in Action
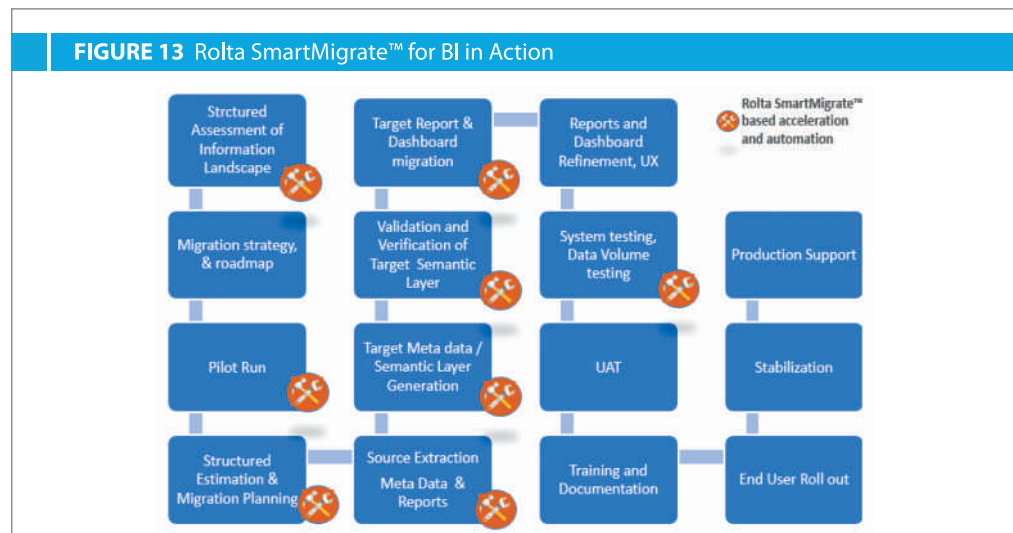
An initial discovery process analyzes the source inventory and its nuances like versions, number of reports, dashboards, complexity of these objects etc. This information is used to plan the entire migration process. Depending on the version and specific source tool the metadata is extracted to a Meta model by the source adaptor. The analysis of the source reports happens as next step. During this phase the subset of reports that need to be migrated (for testing/UAT) are analyzed. A report is created which is used to tune Rolta SmartMigrate™ tool to handle special functions used in the source and also create the appropriate test criteria for post migration testing. Extraction of source reports metadata such as reports created using different modules begins and the reports meta model is created

The target adaptor then takes over, creating the target reports and dashboards from the meta model. Due to differences between source and target platforms, some of the reports need manual intervention. This list of manual actions required is also generated by the tool which is then applied over the migrated reports and dashboards. The highly automated test plan is then executed to verify the content of source and target reports.

Fig 14 shows the stages of the complete migration process

FIGURE 14 Rolta SmartMigrate™ for BI in Action
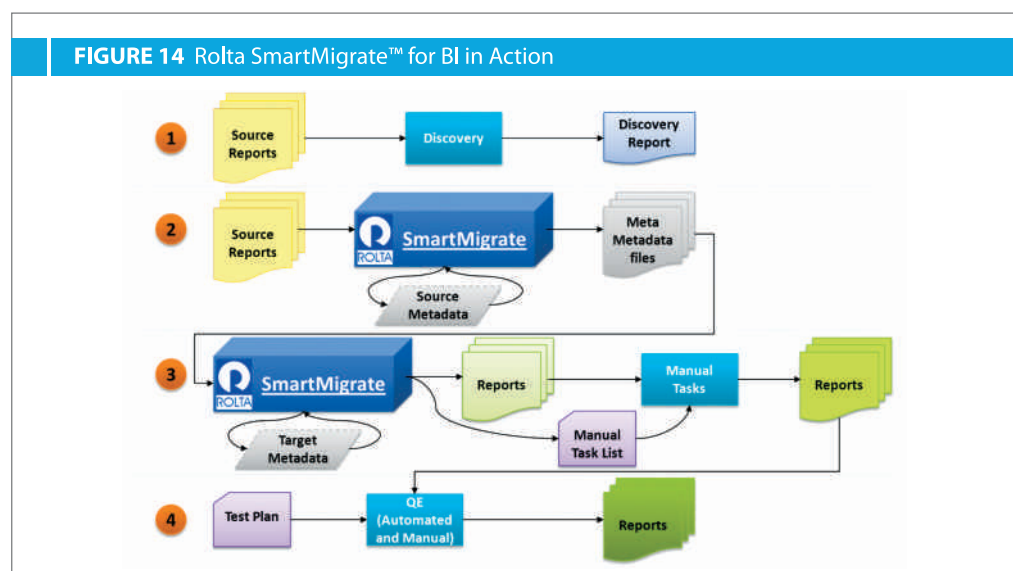
Rolta SmartMigrate™ for BI-Benefits

- Comprehensive program. Discovery to Roll out
- Acceleration of the BI maturity journey to self-service BI: 3-4 times faster
- Automated IP driven solution, assured quality, consistency and user experience
- 60-70% direct cost savings compared to manual migration
- 80% reduction of business and business IT consulting efforts at customer front because of the unique reverse engineered meta data model
- Reduction in the migration cycle by >60%,
- Fixed price, fixed duration, predictable roll ours, assured success
- Deep expertise on SAP BusinessObjects, MicroStrategy, IBM Cognos, Oracle BI, Microsoft BI

Rolta SmartMigrate™ - Application Migration on HANA

Often migration to SAP HANA is driven by set of key business drivers – Enabling business users with Self service BI and analytics, application transformation to become real time enterprise (such as SAP ECC on HANA or S/4 HANA), IT optimization and technology consolidation. The migration journey completes in most of the cases by having the Applications as well migrated and optimized for SAP HANA. This might have different level of complexities based on how modularis the application. It can be as simple as rewiring of application on HANA or some degree of code rewrite in data access layer of the application or substantial refactoring of the application. Rolta Smartmigrate™ helps to achieve best possible automated migration along with comprehensive tracking of application refactoring backed with automated test validation to complete both analytical and transactional applications on SAPHANA.

Rolta, being Strategic OEM partner of SAP, works very closely on co-innovating the migration automation for SAP Business suite on HANA and S/4HANA migration.

Rolta SmartMigrate™ - Migration Factory Delivery model

The field proven Rolta SmartMigrate™ solution suite for migration and consolidation to a modern SAP based solution is delivery by Rolta through a factory based model with optimized on-site and off-shore resource mix. This approach assures a fixed price and fixed time frame delivery with a predictable ROI for such a comprehensive migration program. The following diagram shows Rolta's global Rolta SmartMigrate™ delivery model. Rolta is part of SAP's global database migration factory program and preferred partner of Automated HANA.

FIGURE 15 Rolta SmartMigrate™ - Migration Factory Delivery model
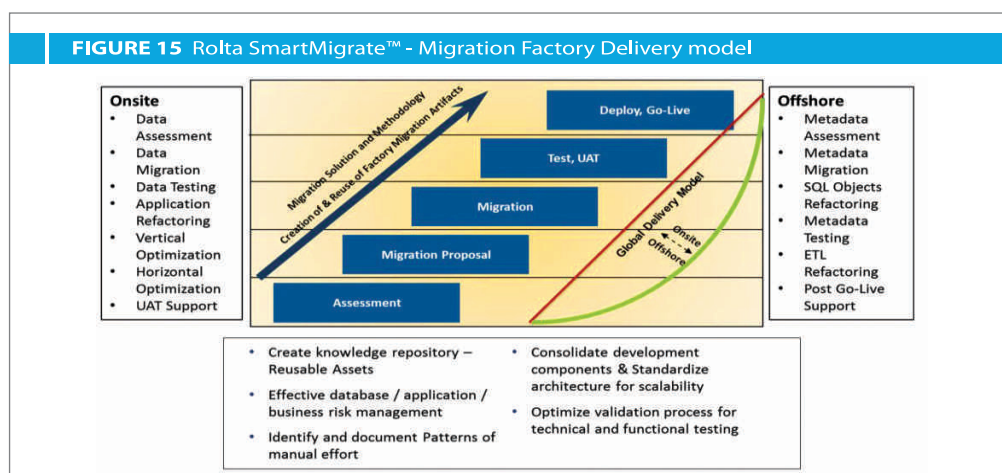
Case Study :   Safran Project powered by SAP HANA

Business Challenges

When Safran Software Solutions, a leading provider of project planning, scheduling and risk management solutions, wanted to migrate its flagship product, Safran Project, from a relational database to SAP HANA®, they turned to Rolta for a complete, automation enabled, fast migration.

Safran Project's database was complex, with a large number of different data types, triggers, stored procedures, and functions. Rolta stepped in to help. After an automated assessment using Rolta SmartMigrate™ for SAP HANA, an inventory revealed more than 500 constraints, which would mean that any manual migration process would be time-consuming and prone to errors. The sophistication of the solution was reflected in the complexity of the database: across the 10,000 lines of SQL code in the database, there were several thousand instances of conditional operators, string functions, select statements, outer joins, cursor operations, substring functions, concatenation and conversion functions, and declarations. Not only would the column store need to be created as part of the migration, but the SAP HANA Analytical Views would need to be designed to fully leverage SAP HANA's in-memory computing power. In short, this was a complex data base migration.

The Solution: Complete Migration using Rolta SmartMigrate™ for SAP HANA

Rolta was able to complete the entire migration from initiation to migration, remediation, testing and validation, and performance optimization, in just three weeks because of the high degree of automation combined with a systematic migration process. Some of the steps required in the migration included:

- Automated assessment for Schema Complexity Analysis to determine the extent of automated migration and manual remediation that would be required.
- Self-table update triggers were converted and handled using procedures from the custom library
- SQL queries in the source database used scalar functions, which were substituted with procedures from Rolta SmartMigrate for SAP HANA's custom library
- Recursive procedures were refactored similarly
- Statement-level triggers were suitably refactored into row-level triggers

The Benefits

Safran was able to rely on Rolta's automated migration process to migrate their complex application to run on SAP HANA. Some of the benefits they saw include:

- **Rapid migration** of their application **within 3 weeks**–delivered on-time and budget
- **83% improvement** in performance after migration, thanks to Rolta SmartMigrate's ability to optimize the migration to exploit the in-memory compute power of SAP HANA
- Safran was quickly able to achieve "Certified for SAP HANA" certification

"We are seeing an increased demand from customers for adoption of the SAP HANA platform, and we are pleased that Rolta has been able to help us realize the benefits of SAP HANA so smoothly," said Dean Edmundson, CEO Americas, Safran Software Solutions.

Case Study : A Global Travel Security Advisory Firm

Business Need: A leading security firm focused in providing real time security offerings to world travelers. The solutions need the ability to have real time mobile access to global security concerns, across the globe, available 24/7, on their PDA. For the nonlinear growth of the business and data, they needed to implement a Data Management System (DMS) to support their data

analytic initiative. Customer was looking for an end-to-end solution and preferably a single window solution.

Solution: SAP and Rolta designed a solution on SAP HANA for the Data Management System and real time advanced analytics solution.

Benefits: Rolta, a global strategic OEM partner of SAP, brought in a complete solution that included:

- RoltaAdvizer™: An IPled structured advisory for the IT infrastructure maturity assessment and solution
- HP–SAP HANA Appliance with easy funding
- Rolta SmartMigrate™ for HANA: Design-Development - Migration - Testing - Deployment of Data Warehouse on SAP HANA with a governance model based on best-practices

- Rolta SmartManage™ : 24x7 Global Managed Services support for Prescient Edge's SAP HANA ecosystem

This helped the customer to simplify and accelerate the adoption of in-memory, high performant data platform SAP HANA and model their business solution with best practices and strong SAP HANA expertise of Rolta to provide single window, end to end solution.

Case Study: A large insurance services organization in Europe

Business Need: A large insurance services firm in Europe wanted to consolidate 50+ databases and data warehouses of Oracle, IBM DB2, SQL Server, Teradata etc to SAP HANA. This involved both consolidation, migration with performance optimization of data warehouses , ETL job rewiring and application rewiring and optimization

Solution: SAP and Rolta designed a solution leveraging the Rolta SmartMigrate™ for HANA for the comprehensive migration with a

unique migration factory onsite – offshore delivery model.

Benefits

- **Significant cost reduction** with consolidation
- **Fixed cost,** significantly **reduced migration cycle,** migration factory model with predictable rollout
- Vertical optimization to exploit the in-memory computing of SAP HANA

Case Study: Rolta helps a large global Hi-TECH customer in accelerating their Self Service BI journey

Business Need: A large global hi-tech manufacturing company with very complex BI landscape had multiple business intelligence tools and thousands of reports that were created over many years.

The customer was having more than three Business Intelligence tools. The objective was to consolidate the BI platform to SAP BO and MSBI and migrate over 3000 Microstrategy reports. This large volume had to be migrated within nine months and rolled out to multiple regional business units spread globally.

Rolta Solution

Rolta SmartMigrate™ for BI helped to migrate the reports in record time. A well-defined migration factory model powered by highest degree of automation helped to achieve was used for concurrent predictable rollout.

Benefits

Accelerated migration at **reduced cost** has enabled IT to progress rapidly on the technology consolidation program

Significant reduction in **maintenance costs** due tostandardized platform

With the automated tool needing least business users' effort during migration, it helped to achieve **significant cost savings and seamless migration and rollout**

Congratulating the success of the migration program and roll out, the **program sponsor commented on Rolta's value "… I am also glad that in spite of many challenges, you were able to deliver the projects on or ahead of schedule at exceptional quality. I thank you and your team for the hard work, innovation and above all, your 'can do' attitude that you demonstrated to complete this project".**

About Rolta

Rolta is a leading provider of innovative IT solutions for many vertical segments, including Utilities, Oil & Gas, Manufacturing, Federal and State Governments, Defense, Homeland Security, Financial Services, Retail, and Healthcare. By uniquely combining its expertise in the IT, Engineering and Geospatial domainsRolta develops exceptional solutions for these segments. The Company leverages its industry-specific know-how, rich repository of field-proven intellectual property that spans photogrammetry, image processing, geospatial applications, Business Intelligence, Big Data analytics and Cloud computing for providing sophisticated enterprise-level integrated solutions. Rolta OneView™ Enterprise Suite is one such innovative Big Data Analytics solution for asset-intensive industries with field-proven benefits. It brings unique value through its IT-OT integration and Predictive Analytics capabilities using Rolta's patented technology. Rolta is a multinational organization headquartered in India with revenues exceeding US$ 600M and over 3500 people operating from 40 locations worldwide and has successfully executed projects in over 45 countries.

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