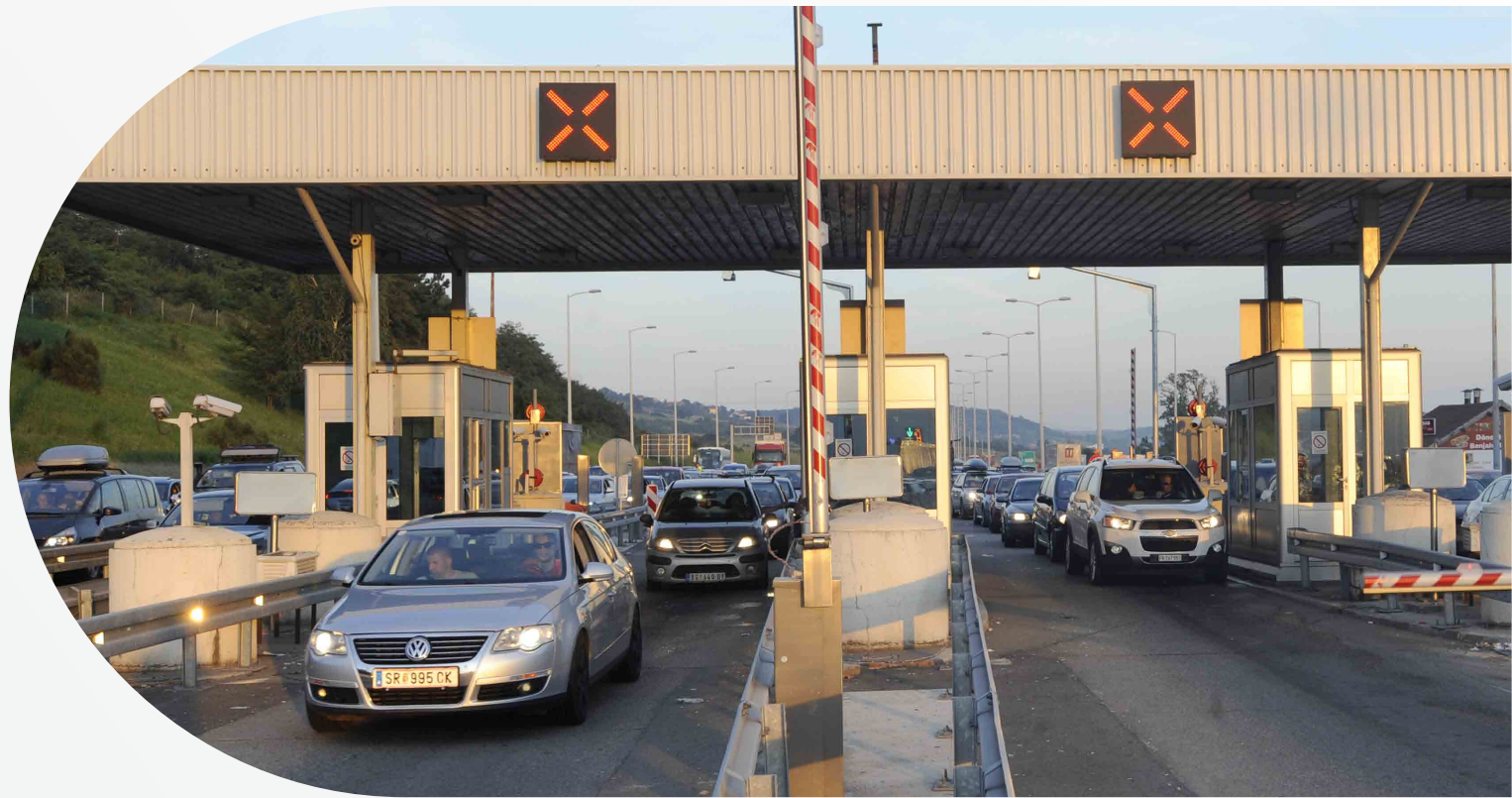# Case Study

Business Intelligence & Augmented Analytics

Augmented Analytics for a leading Highway Toll Plaza Management Company in India

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Client

Client is a leading Highway Toll Plaza Management Company, with a large portfolio of road projects and an order book value of USD 1.6 billion.

With successfully operational eight state highway projects and two national highway projects, client contributes to the development of the nation's road network.

The Objective

Client has been using Toll Management Systems and the Highway Traffic Management System from several technology vendors, such as Techsture Technology, Rajdeep Toll Management Systems, Aryaomnitalk Wireless Solutions, and Kent Transportation Systems spread across various highway projects.

They needed a robust BI solution that could derive consolidated analysis coming from various Toll Management Systems, monitor revenue leakage, and identify hidden patterns and trends that existed within data to provide meaningful deep dive analysis.

Client wanted to create a central data warehouse system with validated and improvised data from all toll plazas along with a BI solution for uniform, multidimensional information architecture. Their foremost need was timely data analysis to identify revenue leakage, track exempted vehicles, VIP passages for audit purposes, and security of data. They also wanted to analyze sales of new commuter passes and recharge done by existing commuters. Additionally, they wanted to empower business users with self-serve BI to ensure organizational performance and statutory compliance.

Apart from this, they also needed BI consultants to team with various technology vendors for the data consolidation from various toll projects spread across remote locations with poor connectivity and nontechnical manpower.

Challenges

- Consolidation of data from various Toll Management Systems from different technology vendors with some of them located in remote areas and with poor connectivity
- Lack of skilled manpower with technical expertise at toll plaza sites
- Coordination with various technology vendors for data structure understanding and consolidation

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- Defining and monitoring KPIs across the organization for performance management
- The Toll Management System and Highway Traffic Management System spread across various highway projects, resulting in silos of databases and information
- Compatibility of BI with different data sources

To overcome these challenges, the client wanted a powerful Business Intelligence (BI) solution built on industry-standard architecture that was flexible enough to connect all data sources available now and in future and pull data from various toll plazas located across India. The client expected a browser-based BI system that could be accessed from any location to answer all business and time-critical questions related to trends, exceptions, revenue leakage, fraud detection, and overall efficiency of a toll plaza.

The Solution

The Smarten team presented ready-to-use, off-the-shelf BI templates for Toll Plaza Performance Management to the client to show how Smarten would effectively satisfy all their functional and technical needs. The demonstration involved the client's technical and management teams. They analyzed the solution from various perspectives of implementing a centralized BI system in their organization.

The Smarten team worked with the client's IT team and all technology vendors to consolidate data from all toll plazas, validated the data to improve data quality, and designed a central data warehouse. Multidimensional cubes were mapped with the data warehouse, which enabled the client to leverage prebuilt ready dashboards, KPIs, analysis, and reports for toll plaza performance management.

A simple, user-friendly interface allowed leveraging of the BI solution for every business user, requiring no programming or expert support. Smarten's compatibility with various data sources and fine-grained security helped the organization harness the BI potential to its fullest.

Hands-on workshops on BI concepts, best practices, system administration, and end user training were conducted for power users who further trained other users in the organization thereby ensuring rapid implementation of the business intelligence solution. In addition, the Smarten solution worked as a self-starter package, leading to significant reduction in Total Cost of Ownership for the client.

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Technology & Platform

Server   : Red Hat Enterprise Linux Server (64)
O.S.   : Linux
ERP   : Techsture Technology, Rajdeep Toll Mgt System,
                               AryaOmnitalk Wireless Solutions &
                               Kent Transportation System
Backend (Database)   : SQL Server, Oracle, and CSV files

Key business intelligence objects implemented in the first phase of deployment include:

Revenue Transaction:

- Revenue Transaction Dashboard with consolidated data from all the toll plazas spread across various highway projects

- Amount difference trend analysis—Auditor vs. Operator

- Audited Ratio (Datewise and Shiftwise)—calculated based on the operator and audited amount

- Transaction Revenue KPI and its trend and breakdown

Traffic Overview:

- Traffic Analysis—Datewise & Categorywise total chargeable and exempted traffic count, percentage ratio, and its summary

- Vehicle Category Analysis

- Violation Analysis & KPI

- Exemption Analysis & KPI (Authorized & Chargeable)

- Automatic Vehicle Classification & Counting (AVCC) Violation KPI

- Project Planning & Target Achievement Analysis

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New Sales & Recharge:

- Monthly Revenue Analysis: Toll Transactions, Tag Sales & Tag Recharges

- Weekly Revenue Performance Analysis & KPI

- Daily Revenue Performance Analysis: Trend of Total Revenue generated and difference of two periods

Smarten Team Role

Smarten team provided dedicated consultancy and support services to the client for:
- Installation & connectivity with various data sources and formats
- Coordination with different toll plaza software vendors
- Pulling data from toll plazas, data validation, and building a central data warehouse
- Use of Smarten Toll Plaza Management solution and mapping it to a central data warehouse

- Design, development, and deployment of other required dashboards, cross-tab analysis, KPIs, graphs, and reports
- BI concepts and best practices sessions
- Technical training
- Administration training
- Business analyst training
- End user training

Conclusion

The Smarten team successfully implemented an Smarten Business Intelligence solution for Toll Plaza Management in less than three weeks.

Key Benefits and Deliverables:
- Predefined Toll Plaza Performance Management solution with ready-to-use dashboards, KPIs, reports, and analysis
- Data quality improvement and data consolidation from all toll plazas for high-quality and reliable information for decision-making
- Consolidated view of all toll plaza operations spread across various highway projects

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- Exceptions and trends analysis to help with revenue leakage, performance management, and operations MIS reporting
- Dashboards for revenue earned, traffic analysis, and new sales of commuter passes and recharges for existing commuter passes with fine-grained access rights, enabling a view that is gives overall performance of various highway projects
- Improved visualization and monitoring of KPIs, such as Violation KPI, Exemption KPI, and Automatic Vehicle Classification & Counting (AVCC) KPI
- Distribution of reports to users in appropriate formats
- Low cost of acquisition, short rollout time, and less training needs added to lower TCO
- User-friendly interface reduced burden of ad hoc queries to IT team
- Enterprise architecture with zero footprint browser interface ensured rapid rollout across various locations to a large number of users
- Responsive user interface allowed users to access the solution with all popular smart phones, tablets, and other mobile devices

The Smarten solution deployed has offered a web-based, self-serve BI system to the client in less than three weeks and within a rational budget. KPI analytics allows establishing metrics to monitor and manage results at every level in the organization.

The success of this project is a perfect example of how Smarten's ready-to-use, industry-specific BI templates, short implementation cycle, and swift integration of data from disparate sources ensure enterprisewide rollout with highest ROI and unbeatable TCO.

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