Real-time Solution powered with Business Intelligence (BI) capabilities

For Effective Public Transport Management
Client Profile

UK based ISV with profound expertise in Traffic and Public Transportation domain, catering hardware and software solutions to government bodies and private transport operators. Rigorously rendering real-time solutions befitting the demands of various counties of UK and Australia.

Business Scenario

The client required a BI solution that enables real-time information tracking to implement best practices for an ideal fleet management leading to satisfactory public transport service for the commuters. Enhanced technology architecture and advanced analytical solutions were required that can cater single platform for both, local government authorities and private transport operators.

A platform that helps local authorities to control the Excess Wait Time (EWT) of commuters and measure the performance of the operators using the real-time network information to take operational as well as strategical decisions. Also, it helps private operators to analyze their performance and provide detailed reports to the local authorities required for operational reporting purposes.

Considering the above situation, client asked for a BI consultancy and development services to design a solution that:

- Acts as an ideal solution for frequent and non-frequent service operators as well as traffic commissioners
- Enables local authorities and operators with real-time performance tracking of frequent and non-frequent service
- Provides accurate headway tracking
- Aids traffic commissioners in deciding the ideal number of service in the common corridor
- Helping both the operators and local authorities taking decision regarding the penalties due to early or delayed departure affecting the EWT of the commuters
- Surgical Techniques
- Enables the operators to inform and justify the abnormal hazards in the service avoiding penalties
Cygnet’s Solution

Cygnet offered an end-to-end Business Intelligence (BI) solution acting as an integral part of the BI strategy by participating in Business Intelligence Competency Centre (BICC) as a technology expert. In the implementation phase, Cygnet developed and maintained a solution that caters standard and self-service BI analytics backed by strong technological architecture for data management, data processing and data analytics.

The solution is elaborated in two phases where in the strategy phase we act as a BI consultant and in the implementation phase, we act as a BI technology enabler:

**Strategy Phase- Cygnet as BI consultant:**

The BICC with participants such as experts of the Transport Act along with Cygnet as a technology partner was formed with an agenda to excerpt best practices for an ideal Fleet Management by resolving following problems:

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<th>Business Practices</th>
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<td>To address problem of tracking of early and delayed frequent and non-frequent operator services leading to minimal EWT.</td>
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<tr>
<td>Empower local authorities with predictive analytics capabilities to take decision regarding the ideal number of service required on the common corridor of multiple service headways.</td>
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<td>Enable operators to alert as well as justify the delay in the services because of the abnormal hazards.</td>
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<table>
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<th>Technology Skills</th>
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<td>Development of web based solution that enables collection and display of real-time information with UI defined for non-technical users.</td>
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<td>Designing of multi-dimensional data warehhouse with archival database designed to collect and archive millions of records from complex data structure on daily basis.</td>
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<td>Advanced Analytics and self-service BI enabling best of Data Processing and visualization.</td>
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<td>Defining fact tables and dimension tables for reports that highlights early and delayed frequent and non-frequent services utilizing the data collected via time points and manual data entries.</td>
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<td>Formulating standard reports of abnormal hazards used to alert the local authorities justifying their delay or cancellation of service from the operators.</td>
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<td>Providing an easily accessible UI for authorities to help them process and analyze the data and create reports to predict the ideal number of services on common corridor.</td>
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Implementation Phase- Cygnet as BI enabler:
A team of 29 qualified engineers and data analysts over a period of 12 months participated in the project to provide a Robust and Intelligent Solution with following BI and Data Analytics capabilities:

**Business Practices**
- Formulas designed based on the approved early and delayed time range from the Transport Act for frequent and non-frequent services using the real-time and manual data processed in the Analysis Cube using the distributed Star Schema.
- Deploying Recommendation Algorithms in the raw data that can be displayed using the PowerView visualization tool to predict the ideal number of services for the common corridor.
- Collecting the data on periodic basis using SIRI to create alert on the concerned dashboards of local authorities.

**Technology Skills**
- **ASP.NET, C#** based development of web based portal.
- **OLAP** system along with **SSIS** designed for multi-dimensional data warehouse with live and archival database.
- **Report builder tool** along with **Data Dictionary** provided to enable self-service BI.

**Analytics Skills**
- **Frequent Service Regularity Report, Time Keeping Analysis Reports, Adherence Report by Fixed Time Window/ Stop/ First Stop** along with other Adherence reports designed using the attributes from the cube for early and delayed frequent and non-frequent services.
- **Journey Match KPI Report, Actual versus Survey Data by Stop** and other reports designed to report abnormal hazards to the local authorities using time points data and manual inputs of operators and government surveyors.
- Designed a dashboard for non-technical Report Managers using **Web GUI and MDX queries** tools of designing integrating the raw data from the central server using **ETL** process.

**Tools & Technology**
- SQL Server and MSBI (SSIS, SSRS, SSAS)
- ASP.NET,
- C#,
- Web GUI,
- MDX queries
Benefits to the End Users

- Optimum data coverage with 98% accuracy leaving negligible dark data collected from 5000+ Journeys, 1000+ Buses, 10 million + predictions generated every date and 30+ Vehicle Position updates generated every second
- Reports utilized as KPIs to analyze performance of buses, drivers based on the data generated from 72500 bus stops, 568 displays, 4998 buses, 861850 passengers, 34474 journeys (daily), 1015890 kilometers travelled (daily) and 4850 drivers
- Real-time tracking of the buses, traffic and hotspots using the GPS tracking system
- 38% Reduction in the time gaps in between routes and journeys
- Reduction in the cost of public transport using the predictive analysis
- Enabling operators to effectively plan, schedule and monitor their service
- Eliminating the errors of third party human intervention
- Setting up ideal service for optimum traveler satisfaction
- Enabling local authorities to attain minimal EWT

Benefits to the Client

Reduced data management cost of 8TB size by 35%

24*7, 365 days customer and maintenance support

Reduced Data Warehouse Cost by 80%

Provided strategic Data Analytics consulting for product enhancement
About Cygnet

Cygnet Infotech is one of the most trusted names in the IT space delivering technology solutions to global clients across 29 countries. Born out of a vision to create software development company where quality, innovation and personalized services trump low cost, makeshift solution, Cygnet partners with its client to help them transform in to high performance businesses.

Cygnet has deep industry and business process expertise, global resources and a proven track record in delivering innovative technology solutions. Cygnet can mobilize the right people, skills and technologies that improves business performance.

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