indium
Make Technology Work

QUALITY ASSURANCE OF DIGITAL INTELLIGENCE IN ENERGY INDUSTRIES

PROJECT OVERVIEW

Indium supported the client in automating test cases for repetitive business workflows, carrying out data assurance for the platform's functionalities, and proposing QA plan after thorough understanding of the data types at different stages of data flow.

CLIENT DOMAIN

Energy & Utilities

SOLUTION DELIVERED

Data Assurance, Test Automation

KEY HIGHLIGHTS

- In depth Data Quality Assurance covering source to target migration data integrity, consistency of data formats and business rules.

- Data validations for live streaming data.

- Custom automation framework to validate repetitive data comparisons, UI components and regression.

- 90% Test cases automated.

ABOUT CLIENT

Client is an Energy Analytics services provider that leverages Data Science/Machine Learning to deliver digital intelligence for renewable energy industry (solar and wind power infrastructure).

The platform monitors live data from energy turbines and suggests operating performance/efficiency for forecast and maintenance. The app is built on a data management layer (Big Data) that is fed to training models (AI/ML) and outputs analytics data / data visualization for decision making. The platform integrates with cloud data sources.

BUSINESS REQUIREMENTS

- Data Assurance for the full portfolio of features: forecasting, performance insights and visualization.
- Understand the data mechanics at different stages, data preparation for specific use cases, exploration and visualization workflows and propose QA plan.
- Data quality validations on a continuous and periodic basis.
- Automate scenarios for repetitive business logic and Regression (maximum coverage).

SOLUTION HIGHLIGHTS

- Provided QA Approach for Data Management accommodating test coverage for data from different systems, data in motionand at rest, availability, and accessibility for data analysis.
- Recommended QA iterative schedule (live data and updated every 10 minutes) for dynamic nature of data and change rate of the data in the dashboard.
- Performed Data Quality Validations for database formatting and integrity to rule sets.
- Source to target data (migration) validations for different data formats and logic.
- Data stored in Excel / Key &Value / Data Stream / Data Lake formats.

- Data (readings) in different engineering units and conversions (Ex: KWH to MWH/GWH, Date and Time Zone Conversions)
- Built Automation Framework to test Source-Target data reliability, Data Comparison use cases (Business users' data with App data).
- Automated Web – UI and API powered functionality: Framework developed on Maven with Cucumber and Karate with Cucumber.
- Simplified methods for API testing (manual testing) to automatically read and look up for values in DB.
- Automated complex logic to validate data records streaming data generated (per sec).
- Automated intricate UI based scenarios on the dashboard – such as data validations from charts / graphs representing real time data.
- Executed regression test cases with incremental functional developments (in complete coordination with the development team) without affecting the existing Dev Plan.

BUSINESS IMPACT

- Customized Defect Reports to detail the defect categories for business rule fulfillment, deviations due to upgrades, data duplication etc.
- Identified the priority of defects (simple-medium-complex) to assess business impact.
- Clear understanding of business rules and logic contributed to zero maintenance errors.
- Automated complex logic for normalizing the data fields and maintained golden standards in quality and consistency.
- Central asset sharing (Documentation) was included in the QA Governance plan for common knowledge of the team to catch up with the complex workflows and business rules without delays.
- QA team demonstrated good understanding of domain and complexity of data transactions with minimal instructions from Product Owner.
- Successfully validated historic data of 10 months for 500 assets (each with million records) in 24 hours.
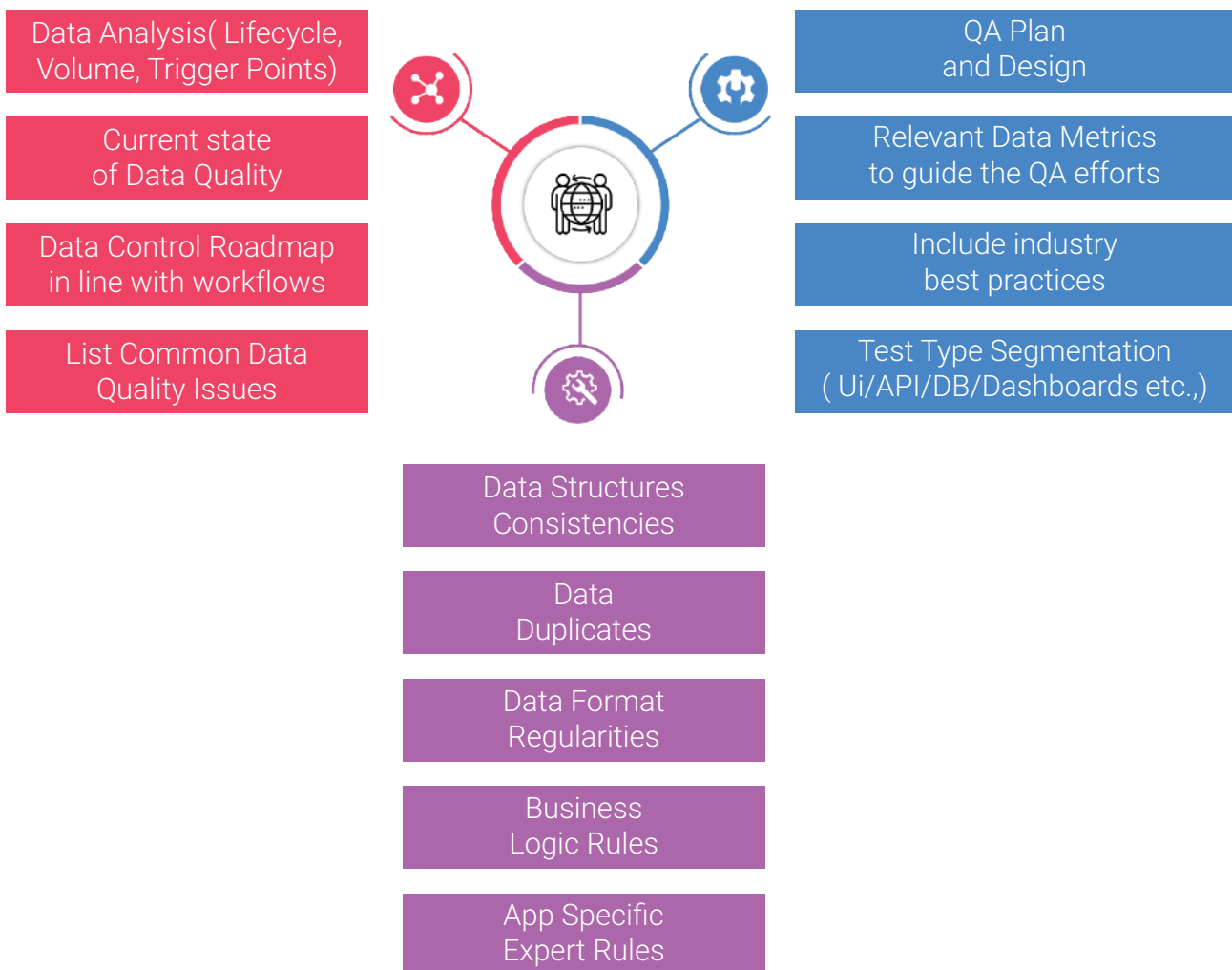
- Reduced lifecycle costs (> 20%) with Automation; Overall 90% of Test Cases Automated.
- Optimized headcount from 4 FTEs for Manual Validations to 1 FTE with Automation Planning and Execution. The execution time reduced from an average of 3 Weeks to 4 Hours.
- Supported bimonthly releases with 100% defects fixed.

TECH STACK

Framework: Maven with Cucumber and Karate with Cucumber

eclipse

databricks

Jira

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Data Analysis(Lifecycle, Volume, Trigger Points)

Current state of Data Quality

Data Control Roadmap in line with workflows

List Common Data Quality Issues

QA Plan and Design

Relevant Data Metrics to guide the QA efforts

Include industry best practices

Test Type Segmentation (Ui/API/DB/Dashboards etc.,)

Data Structures Consistencies

Data Duplicates

Data Format Regularities

Business Logic Rules

App Specific Expert Rules

ABOUT INDIUM

Indium Software is a fast-growing Digital Engineering company, focused on building modern solutions across Applications, Data, and Gaming for its clients. With deep expertise in next-gen offerings combining data and applications, Indium offers a wide range of services including Product Engineering, Low-Code development, Data Engineering, Ai/ML, Digital Assurance, and end-to-end Gaming services.

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USA	INDIA	UK	SINGAPORE
Cupertino | Princeton Toll-free: +1-888-207-5969	Chennai | Bengaluru | Mumbai | Hyderabad Toll-free: 1800-123-1191	London Ph: +44 1420 300014	Singapore Ph: +65 6812 7888

www.indiumsoftware.com

For Sales Inquiries
sales@indiumsoftware.com

For General Inquiries
info@indiumsoftware.com