Integrated Testing Strategy for SMAC

White Paper

Connected devices provide organizations with opportunity to tap the access to voluminous data and design strategies for introducing efficiencies and improve growth

Introduction

The Internet of Things has not only enabled connecting thousands of devices but is also generating tons of data that gives scope for ingesting, storing, processing and analyzing data. The unprecedented volume, velocity and variety of data are compelling organizations to create a new architecture for their data and analytics capabilities, improve their data management technologies and platforms, and revise their governance policies and practices.

Given the strategic importance of the data thus generated and retrieved, IoT Analytics is expected to grow from USD 7.19 Billion in 2017 to USD 27.78 Billion by 2022, at a Compound Annual Growth Rate (CAGR) of 31.0 percent, according to Markets and Markets.

A variety of devices such as Fit Bit, Smart Bulbs, Car Assistant, Factory Floor Manufacturing Unit, Wind Mill Speed Detector are enabling industries such as manufacturing, consumer wearables, smart homes, smart electronics, automotive and weather forecasting use IoT analytics for bringing in efficiencies to the processes and designing focused business strategies for reducing costs and improving revenue growth.

Becoming IoT Ready

While organizations are preparing themselves to tap this potential, the road to IoT Analytics is fraught with challenges.

First is that of scale and speed. While IoT analytics happens over cloud, it may not be enough to cope with the large amounts of data that need to be processed in real time. Also, the IoT analytics software may need to scale faster than others and therefore needs to be flexible.

Second, IoT sensors, devices and gateways are spread out and just moving the terabyte of data over broadband network may slow the process, defeating the very purpose. Therefore, organizations need capabilities to process it at the edge and send the results to the central system. This can help in taking timely decisions.

This in turn requires complex event processing (CEP) and streaming analytics, with the software being able to handle time-series data, time windows, moving averages, and temporal event patterns.

The tremendous amount of data being pushed through multiple nodes over low-bandwidth causing delays can put information out of sequence, creating issues as well as challenges of collection latency, duplicate messages and reliability.

Integrating machine-learning with data analytics can enhance prediction capabilities.

For organizations wanting to leverage IoT analytics, this requires investing time and resources to be able to benefit from it and keep pace. Partnering with a specialist can help overcome these issues while being able to use the analytics meaningfully.

Customer-Centric IoT Analytics Strategy

Indium Software, a two-decade old Big Data solutions provider, has the expertise and experience to understand the client's business, its data sources, existing infrastructure, IoT analytics requirements and design a suitable solution to provide insights that are relevant to meet the client's business goals.

Indium Software's approach to deal with the voluminous data can be summarized as follows:

A Sample IoT Data Flow…

Sample Flow 1

IoT Device → mongoDB *Staging Database* → kafka *Streaming* → Computing Platform → Feed to the App / Dashboard

Sample Flow 2

IoT Device → Edge / Real Time Analytics → Feed to the App / Dashboard

Disparate Data Sources

Indium Software has worked with a connected car intelligence detection company, a group company of a Tier-1 automotive parts supplier operating in three continents and delivering enhanced value through connected car and telematics solutions. The client developed a plug-and-play IoT product that reads and sends event logs, trip details, engine, battery health etc. to a mobile app.

It needed to setup a Big Data infrastructure to support real-time events such as:
- Impact alerts
- Tow alerts
- Driving violation alert etc.

Indium Software helped develop an analytics solution to help car owners optimize their trips, rate the driver's performance, and monitor their vehicle's health. Through this, the client was able to:
- Optimize their trips based on previous trips across multiple drivers
- Monitor driving behavior of their drivers
- Monitor their vehicle's health by tracking battery, fuel levels, speed

Enabling Preventive Maintenance

A California based value-added services provider for semiconductor manufacturers needed a predictive maintenance solution. It followed a process of creating chips involving a chain of individual steps; with each process module producing multiple wafers in defined recipes of temperature, pressure conditions etc.

Indium Software designed a solution:
- Using algorithms such a Mahalanobis, Hotelings T2, tSNE
- Sensors that sent data to PostgreSQL DB
- Visualizing predictive analytics output in R shiny

As a result, it was able to measure the efficiency of the wafer production, monitor the production line of wafers, identify the outliers in the process modules, and predict defects.

Matching Demand & Supply

A large South East Asian Taxi player, with a fleet size of about 23,000 spread over 61 depots and over 8.5 million passengers per required insights from the geospatial time- series data it captured for every taxi every second.
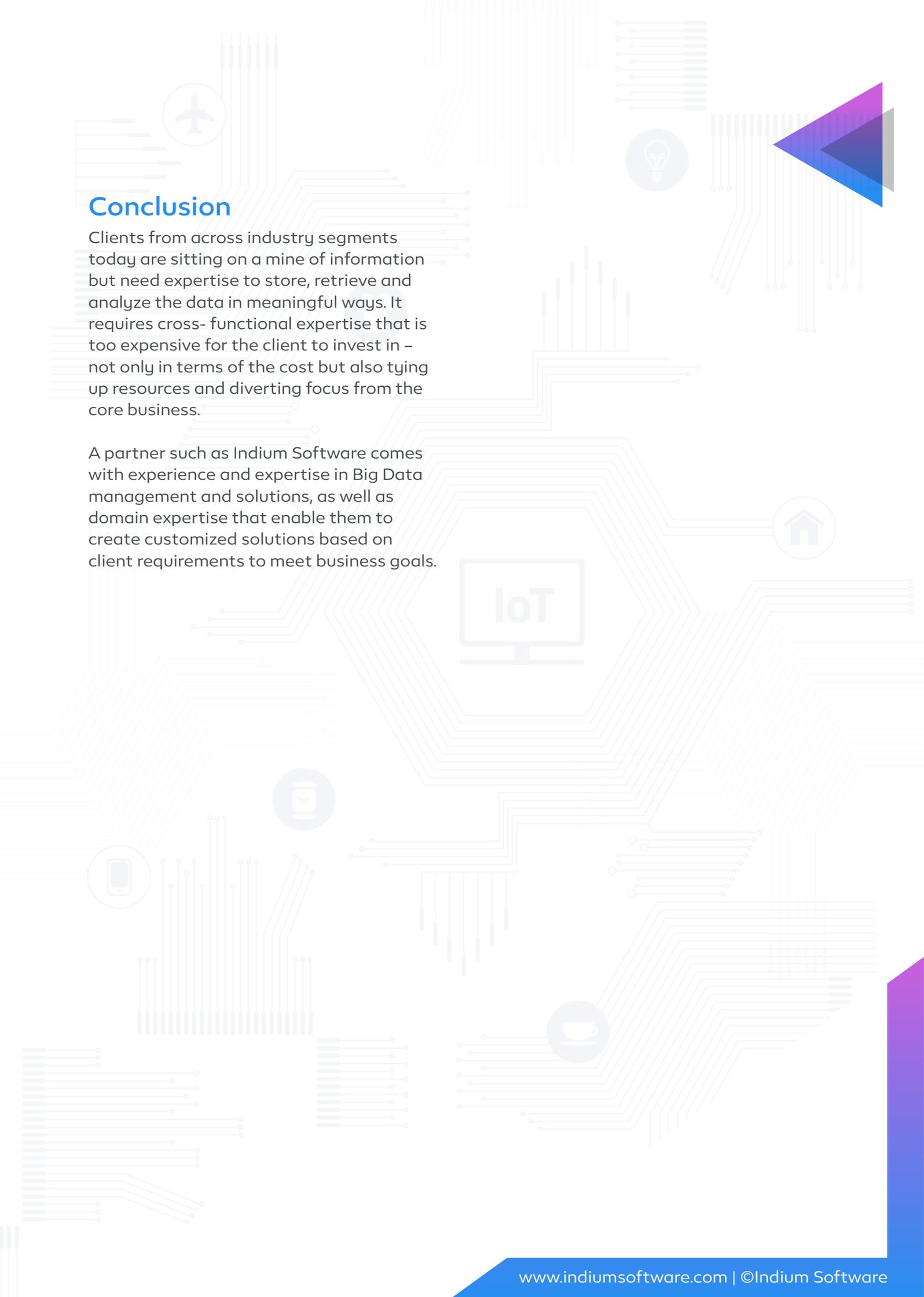
Conclusion

Clients from across industry segments today are sitting on a mine of information but need expertise to store, retrieve and analyze the data in meaningful ways. It requires cross- functional expertise that is too expensive for the client to invest in – not only in terms of the cost but also tying up resources and diverting focus from the core business.

A partner such as Indium Software comes with experience and expertise in Big Data management and solutions, as well as domain expertise that enable them to create customized solutions based on client requirements to meet business goals.

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