

INTERNET OF THINGS (IOT) COMPETENCY



Growth Mindset

Founded in 2000,
600+ strong team.



Technology Partners

Microsoft | AWS
Magento | Episerver |
Snowflake



Long-term Relations

70+ customers spread
across 4 continents. 50%
customers with 5+ year
long relationships



Industry Certification

ISO 27001:2013, ISO
9001:2015 Certified, CMMI
level III, PCI DSS and GDPR
Compliant

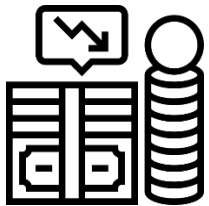
Role of IoT in Digital Transformation



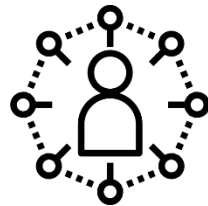
The 451 Research survey report on IoT found that over 65% of IT and IoT decision-makers plan to increase their IoT spending in the next 12 months, with an average spending increase totaling nearly 18%.

Gartner forecasts that the enterprise and automotive Internet of Things (IoT) market will grow to 5.8 billion endpoints in 2020, a 21% increase from 2019. By the end of 2019, 4.8 billion endpoints are expected to be in use, up 21.5% from 2018.

How does the Internet of Things affect digital transformation?



Reducing operating costs



Improving employee productivity



Meaningful, tailored customer experience

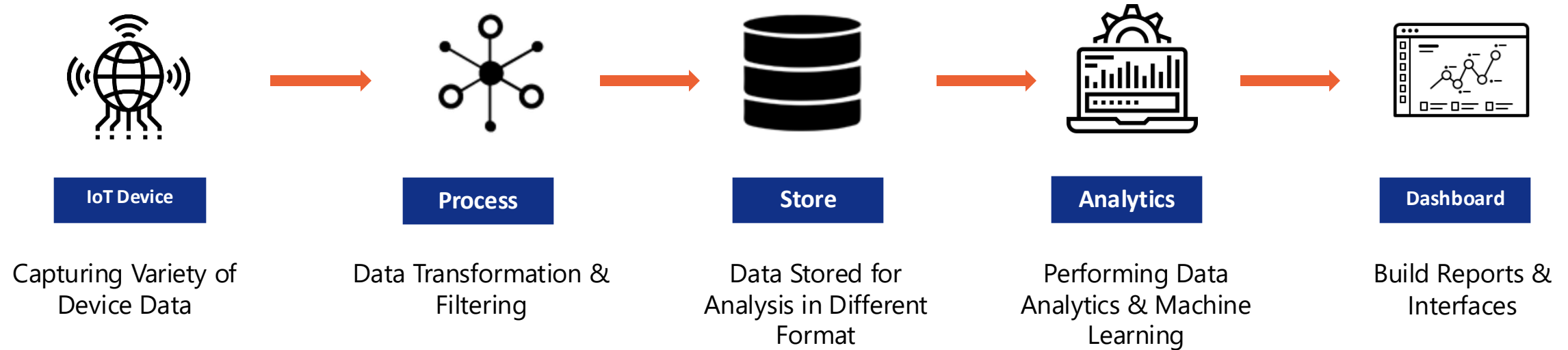


Boosting business efficiency



Opening up new business opportunities

Summary of our IoT Services



IoT Services

Advisory

Design & Engineering

Analytics

Managed Services



Industry 4.0

- Energy Management and Auditing
- Power Management
- Remote Monitoring and Operations of Machines
- Predictive maintenance analysis



Smart Healthcare

- Real Time Patient Monitoring
- Real Time Heart Rate, Sugar and Blood Pressure Monitoring
- Sending Alerts on critical / Threshold Surpass Values
- Predictive Analysis of Health Condition of Patient



Intelligent transportation

- Real time Monitoring of Transport
- Real time Video Monitoring
- Food and Beverages Quality Control



Connected Agriculture

- Real time Monitoring of Soil Moisture
- Weather forecasting
- Predictive Analysis
- Sending Real Time Alerts to Farmers

Our experience in Industry 4.0



According to the BCG, 50% of IoT spending will be driven by discrete manufacturing, transportation and logistics, and utilities by 2020. Here are some IoT uses in Industry 4.0

Production Visibility

Connecting machines, tools, and sensors in the shop floor to give process engineers and managers much-needed visibility into production

Higher operator productivity

Increasing the productivity of the manufacturing workforce and using IIoT to enable tools, operators to go through workflows faster without compromising quality

Faster improvement cycles

IoT enabled shop floor giving Process engineers, manufacturing engineers, quality engineers, frontline engineers in the shop floor the ability to automate data collection so they have more time to spend improving processes

Increase machine utilization

Tracking machine metrics lets manufacturers identify and fix causes of unplanned downtime, provide preventive maintenance to their equipment and thus increase machine utilization throughout the shop floor

Better facility management

Leveraging sensors in manufacturing facilities can improve their management and therefore reduce the operational costs of a factory.

Supply chain optimization

IoT enabled sensors to permit monitoring of events across a supply chain, providing access to real-time information by tracking inputs, equipment, and products

Our process of applying IoT



Analysis

Systems and environments

Data collection points

Compliance and governance

Policies

Existing network infrastructure

Enterprise technology stack

Fragmentation

Budgetary constraints

Strategy



Business roadmap



*Hardware, network
management*



*Data collection, reporting,
mining*



*Security, Compliance and
Governance*

Implementation

Device powering management. Firmware upgrades via network
Remote device management
Choosing WiFi/Bluetooth/ZigBee
Environment Analysis

Setting up a big data engine. Setting up dashboards and BI
Maintaining replicas, views. Remote device management. Using a middleware or iPaaS

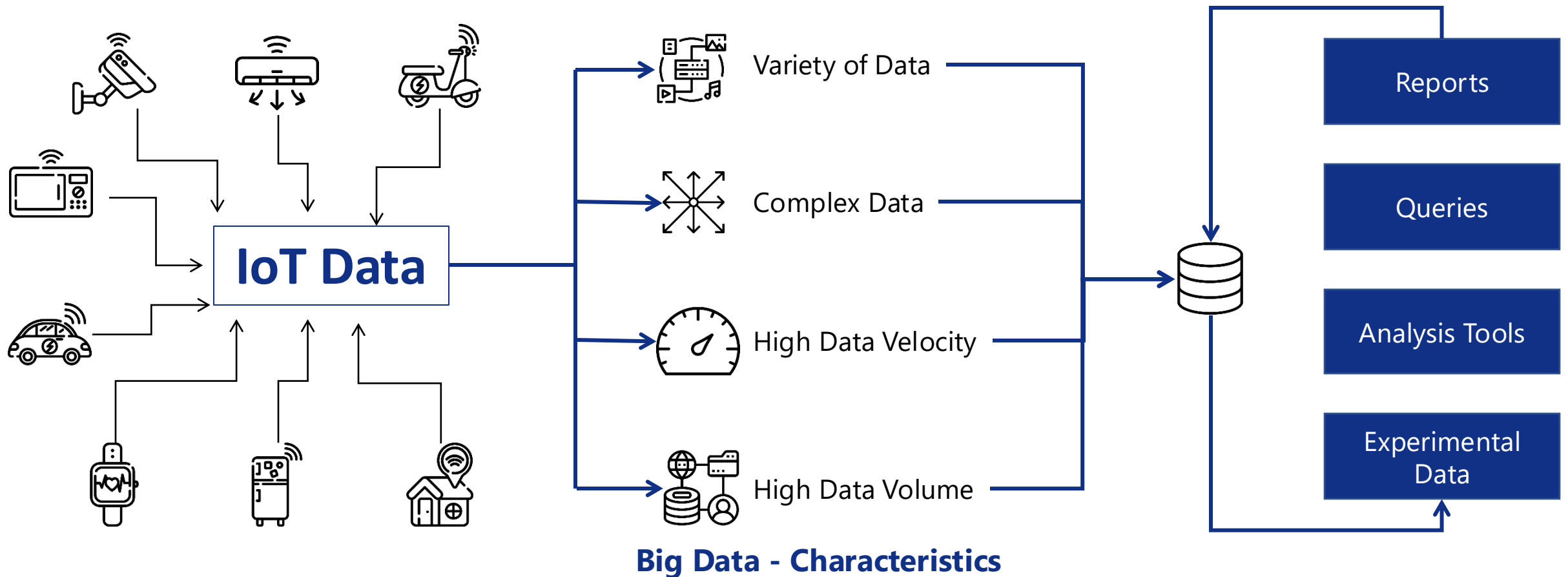
Role definition for buy-in
Laying down business drivers. Planning the maiden launch with critical path prioritized

Security audits during and after Implementation. Enforcing data locations (for GDPR). Setting up Disaster. Recovery policies. Penetrating testing on the devices

Setting up your big data engine



- ✓ Around 4.4 trillion GB of data will be generated by the year 2020 through the Internet of Things
- ✓ More than ten billions of sensors and devices will be connected to the internet
- ✓ All of these devices will gather, analyze, share, and transmit data in real time



Handling challenges in security, compliance and governance



One of the major challenges in the case of IoT is Data Management. Here are some strategies we engage in to address the problem of Data Management on Case to Case Basis



Edge Computing: Processing data near the data source, we make sure that the data leaving the device is of the right format and type. We achieve this by programming the in-device cache to store and run simple and effective transformation commands on the data. This also saves up on the ETL operations later. This is done in tune with business SLAs



Data Governance: We chart out a clear governance policy before embarking on any implementation. The policy, generally inspired from government regulations like GDPR, plans (and later tests) the data security in transit and the location of the data at each time. We plan cloud deployments at a nearby location to ensure that the data doesn't leave the intended fence.



Metadata Management: Metadata knowledge can allow a malicious attack through data injection. We guard the metadata by encrypting the data at the local hub before it goes to transit, even with the ack-nack signals. We ensure that all non-data communication is also guarded and covered under the VAPT carried out in timely manners.

Handling challenges in IoT interoperability



IoT solutions must integrate with the underlying systems for the data to be fully useful for digital transformation



Using iPaaS: We leverage Cloud-based iPaaS to readily integrate diverse tech stacks into a single managed service. We also provide managed services to tune the infrastructure around the services for cost optimization and business benefit

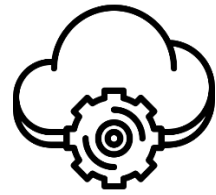


Middleware: e-Zest has extensive experience in working with integrators like Mulesoft. Using Mulesoft's Anytime (running on Mule or EC2), we bring together API management to simple admin operated consoles



Using Cloud deployments: Cloud infrastructure (apart from iPaaS) have services to migrate data, monitor instance health and manage notifications for accurate management. We recommend and leverage that for maximum integrability.

Using Cloud infra for IoT



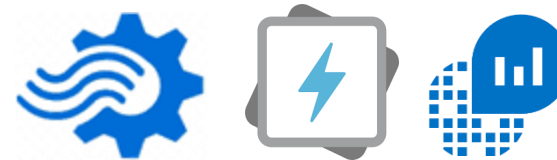
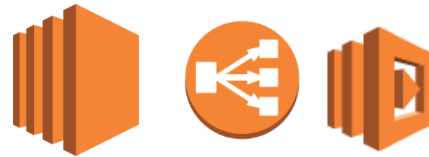
Computation



Analytics



Storage





Platforms & Protocols

- HTTP/MQTT, CoAP, LoRA
- Raspberry Pi
- Arduino
- Beaglbone
- Gallileo
- Microsoft Cognitive Services (CNTK)

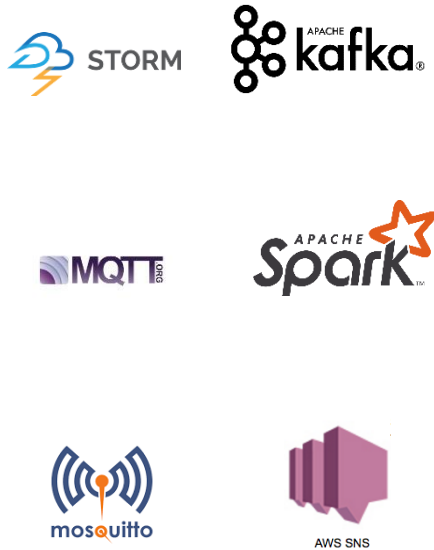
Languages & Frameworks

- Python, .NET, SQL, PowerBI
- Azure and AWS Data Storage
- Android, iOS
- Spring/MVC/Hibernate Framework
- Kaa Project
- Azure and AWS IoT Services
- IBM Watson
- Apache Jmeter
- TestNG
- Extent Reports

Other IoT platforms we use



Stream Processing



Database & Big Data



BI Backend



BI Front End



Tools





IoT Success Stories

IoT based payment devices' management platform

for a manufacturer of industrial products and automated payment solutions in the US



- + *Catered to payment use cases in the US and Europe*
- + *Consolidating all devices under a single IOT enabled enterprise platform*
- + *self service for customers, reducing operational costs by 60%*

Payment processing lifecycle and eco-system for Point of Sale terminals

Developed complete ecosystem for enabling IoT based PoS systems to process all the payments online in the real time.

Integrated with the payment gateway and the payment acquirer in 3 different models of payment processing – directly by payment gateway, through payment acquirer and a combination of payment gateway and acquirer to support distribution of payment.

Platform is an intermesh of several AWS microservices to enable different capabilities of the platform like to-and-fro message exchange with devices, hosting, devops, reporting, dashboarding etc

IoT based payment devices' management platform



About Client: Global leader and innovator in cash and cashless payment products

Situation

- Client has multiple products developed and acquired over decades, each product having its own technology platform
- Business need is to consolidate the technology stack to streamline tech ops across the business
- In this process, the consolidated platform must be IOT enabled as every product line has a roadmap to move towards IOT in next five years

Platform Vision

- The main objective of the client was to create Remote Device Management Capabilities to Reduce Operational costs
- Make customers self sufficient. The new platform will enable the customers to carry out multiple tasks on their own.
- Deliver Real-time Business Insights, Revenue and Device Health
- Establish Universal Device connectivity and Operational Platform

Solution Approach

- We conducted in-depth technical evaluation of competing IOT stacks from Azure, AWS and Open Source stack to evaluate pros-and-cons
- Based on technical assessment, and business assessment by client, AWS IOT was selected as platform for IOT enablement of all product lines
- A two year roadmap was created for development of AWS IOT based device management platform and porting different device families to the platform

IoT based payment devices' management platform



Technology

- AWS IOT
- AWS Cognito, Lambda
- Dynamo DB,
- AWS Kinesis Datastream, Data firehose
- D3.js

Key Platform Features

- Multi-geography Deployment
- Merchant Account Configuration
- Support for multiple customer Segments
- Localization support for all European and North American countries
- Drilldown Dashboards

Key value Additions & Business Benefits

- End-to-end PCI compliant ecosystem
- Multi-location collaboration with hardware and firmware teams
- SAFe implementation to ensure synchronized development and resolution of dependencies across different development tracks (AWS IOT platform, hardware, firmware)

**8000K
Devices**

**500+
Customers**

**Real-time
Connectivity**

**Terabytes
Data Volume**

300

Customers

35000


Sensors sending field data
every 15 minutes

30 million

Records generated by sensors
everyday and processed by
big data engine

A WORLD LEADER IN IRRIGATION TECHNOLOGY

SENSOR DRIVEN WATER & SOIL MANAGEMENT



Delivered a solution driven by real-time data from sensors for a water management software that helps farmers achieve more crop per drop. From soil moisture monitoring to evapotranspiration forecasting and irrigation scheduling, real-time data from sensors in the field are sent to any internet connected mobile device, tablet or computer in an easy-to-use and intuitive interface.

Water & Soil Management



About Client: Client is a US based Fully integrated global food/plant production company and world's second largest irrigation systems provider

Situation

- There was lack of information and means to obtain crucial data of client's fields for irrigation like status of irrigation level, health of field, water amount required etc.
- Current Soil moisture monitoring product which sent information from a field to web based dashboard was facing scalability issues
- This led to wastage of water, improper irrigation and high labor input with low productivity

Solution Approach

- Moved the Website to Azure App Services which acts as a dashboard to showcase all real time sensors data from field
- Implemented Stream Analytics with help of Azure IoT hub to help client filter meaningful data
- Trilio integration for easy sending of alerts to farmers based on threshold values for each parameters related to soil, field and weather.
- Azure Web Jobs and Service Bus ensuring the smooth hybrid connectivity with on premise data

Key value Additions & Business Benefits

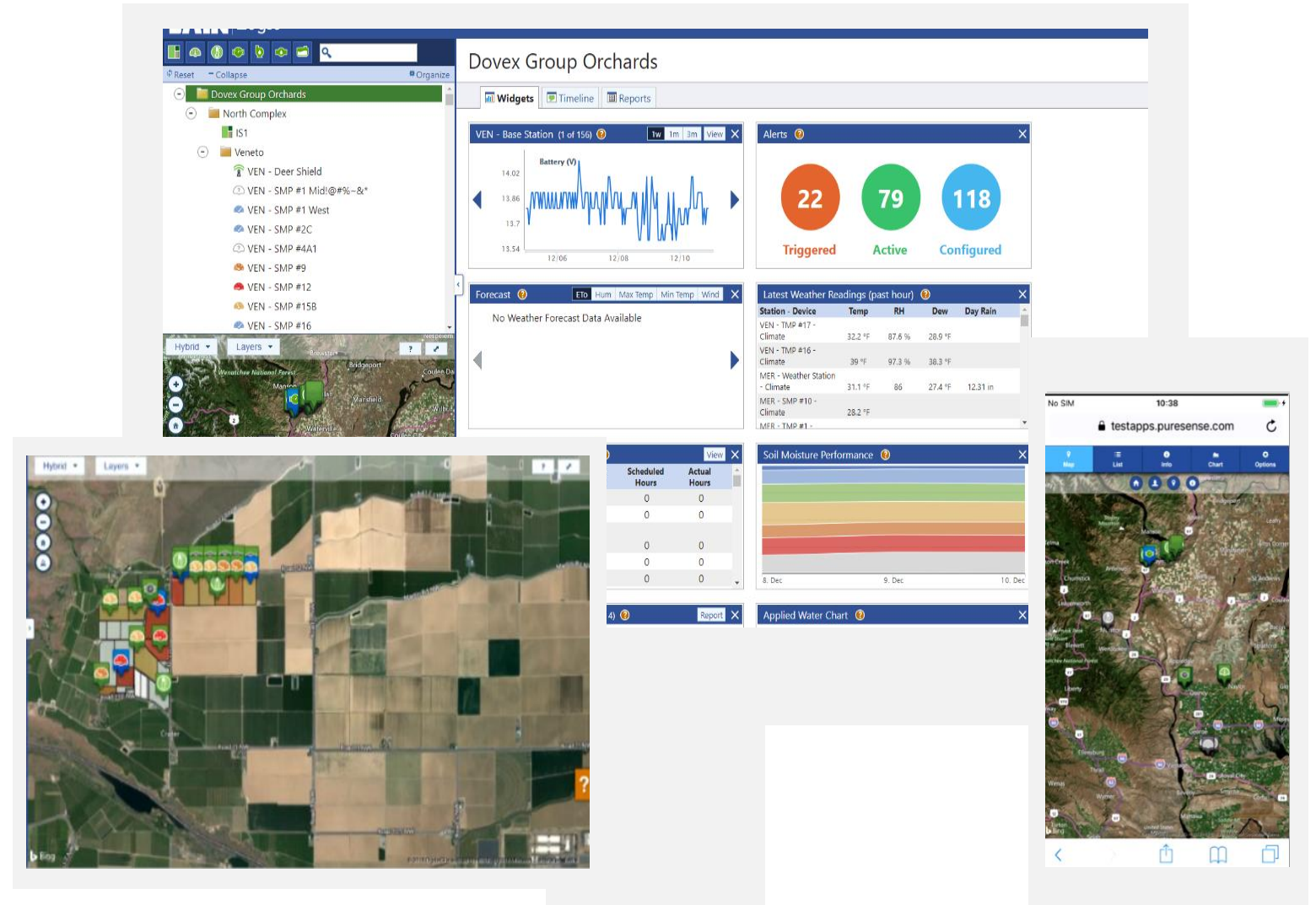
- Got rid of on premise infrastructure and additional cost to maintain the environments
- Azure PaaS helped reducing the overall expenditure on infra and maintenance
- Increase in ROI by 35%
- 50% Reduction in wastage of water
- 38+ million sensors readings processed
- 55% increase productivity & 25% growth in YoY sales

Water & Soil Management

Screens

Technology

- Microsoft VSTS
- Azure (IoT Hub, Service Bus, Web Jobs Storage)
- Trillio
- .NET + SQL





Real time data is captured at
a very high frequency of 200
records/sec



Offline data capture with 99%
uptime assurance



Domain agnostic solution
which can be used based
user needs

A LEADING ENTERPRISE-GRADE MOBILITY SOLUTIONS PROVIDER

IOT ENABLED SMART CASES

Built an IoT solution which offers wide range of sensor data like Environmental parameters at real time as well as at custom rate defined by the users and with its configurable design can be used for capturing and storing the transactional data/parameters

IOT DEVICE MANAGEMENT AND REPORTING

Designed and developed a big data platform to manage IoT enabled smart cases for enterprises. It also provides intuitive dashboards for capturing the data collected by IoT devices

IoT enabled Smart Cases



About Client: Client is a US based company pioneer in innovating and manufacturing modular platforms for the enterprise market

Situation

- Client manufactured a smart-case with cloud-connected sensors case that measure shock, vibration, temperature etc.
- Key challenge was to develop a mobile based IoT solution to host multiple sensors based on user's needs
- The data had to be captured and reported based on the device owner and their subscription at the rate of as fast as 10 records per second - implementing MQTT protocol for reliable data transfer

Solution Approach

- The platform exposed a wide range of APIs that could be utilized to access the data captured by smart-case and reflected in custom web or mobile apps.
- Custom mobile apps leveraged the smart-case APIs whereas custom web apps leverage the Server REST APIs.
- SDK – Android and iOS SDK for 3rd party developers
- API development – API set for third parties to develop their custom solution
- Web App – Web based data reporting and analytics portal
- DevOps support – Defining Infrastructure architecture, deployment and maintenance

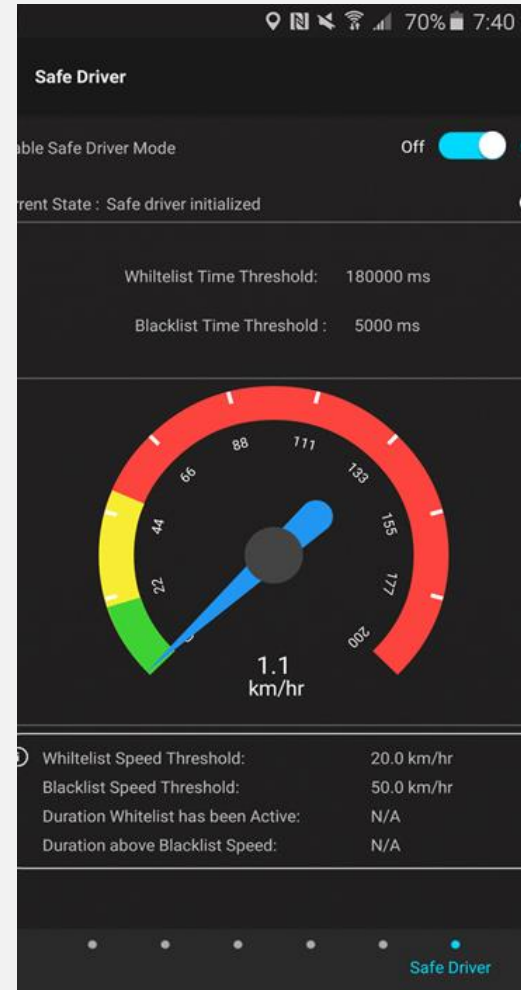
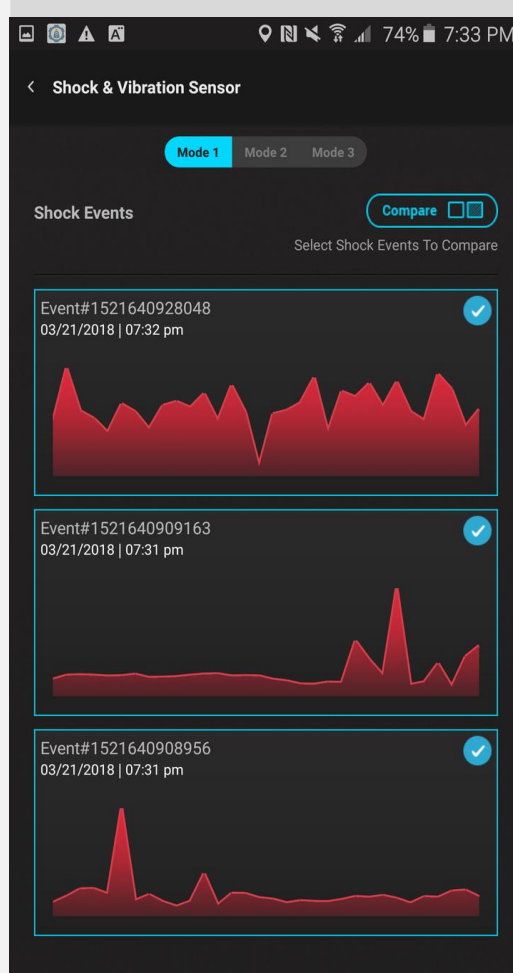
Key value Additions & Business Benefits

- Provided a wide range of sensor data like Environmental parameters at real time
- Data encryption algorithms deployed to ensure passing / syncing of all sensitive data to server securely, thus increasing security by 40%

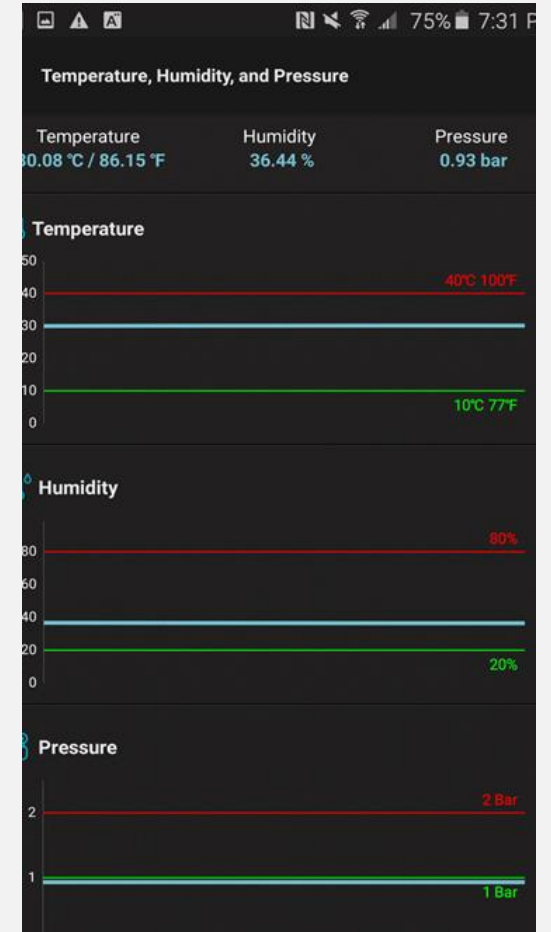
IoT enabled Smart Cases

Technology

- Android, iOS
- Java, MySQL
- AWS cloud and Services
- Kafka, Storm
- Apache Spark, LDAP



Screens





Prevent Incidents



Maximized accuracy and
efficiency



Automated processes and
ensured regulatory
compliance

US BASED SPECIALISED CONSTRUCTION COMPANY

IOT Enabled connected worker safety platform

Delivered an IOT based connected worker platform by using various sensors and devices. The solution built on AWS IOT platform enables Administrator to track the complete worker flow from onboarding onto the job, tracking the workers while on job and offboarding. The platform uses ultra wide band devices to track whether the worker has entered any danger zone marked on the floor plan loaded. The Floor plans were loaded onto the Forge Viewer using BIM360 APIs. Also, multiple sensors were used to track various environmental parameters like humidity , temperature. Solutions like AWS Kinesis, IoT Rule engine, AWS Lambda and Big Data solutions were used to parallelly process the live data stream received from the IOT enabled devices. The solution helped on reducing the safety cost as it reduced the incidents at workplace and also ensured regulatory compliances

IOT Enabled connected worker safety platform



About Client: Client is a US Based specialized construction company

Situation

- The client wanted an end to end solution right from Onboarding the workers, tracking their work and off-boarding them
- The client wanted a system to automatically notify the concerned authority in a situation where a worker could be in danger
- The key challenge was to set up the safety infrastructure with various IOT sensors and track real-time live data streams coming from the sensors

Solution Approach

- The solution enables Administrator to track the complete worker flow from onboarding onto the job, tracking the workers while on job and off-boarding
- The platform uses ultra wide band devices to track whether the worker has entered any danger zone marked on the floor plan loaded
- Also, multiple sensors were used to track various environmental parameters like humidity , temperature
- Solutions like AWS Kinesis, IoT Rule engine, AWS Lambda and Big Data solutions were used to parallelly process the live data stream received from the IOT enabled devices

Key value Additions & Business Benefits

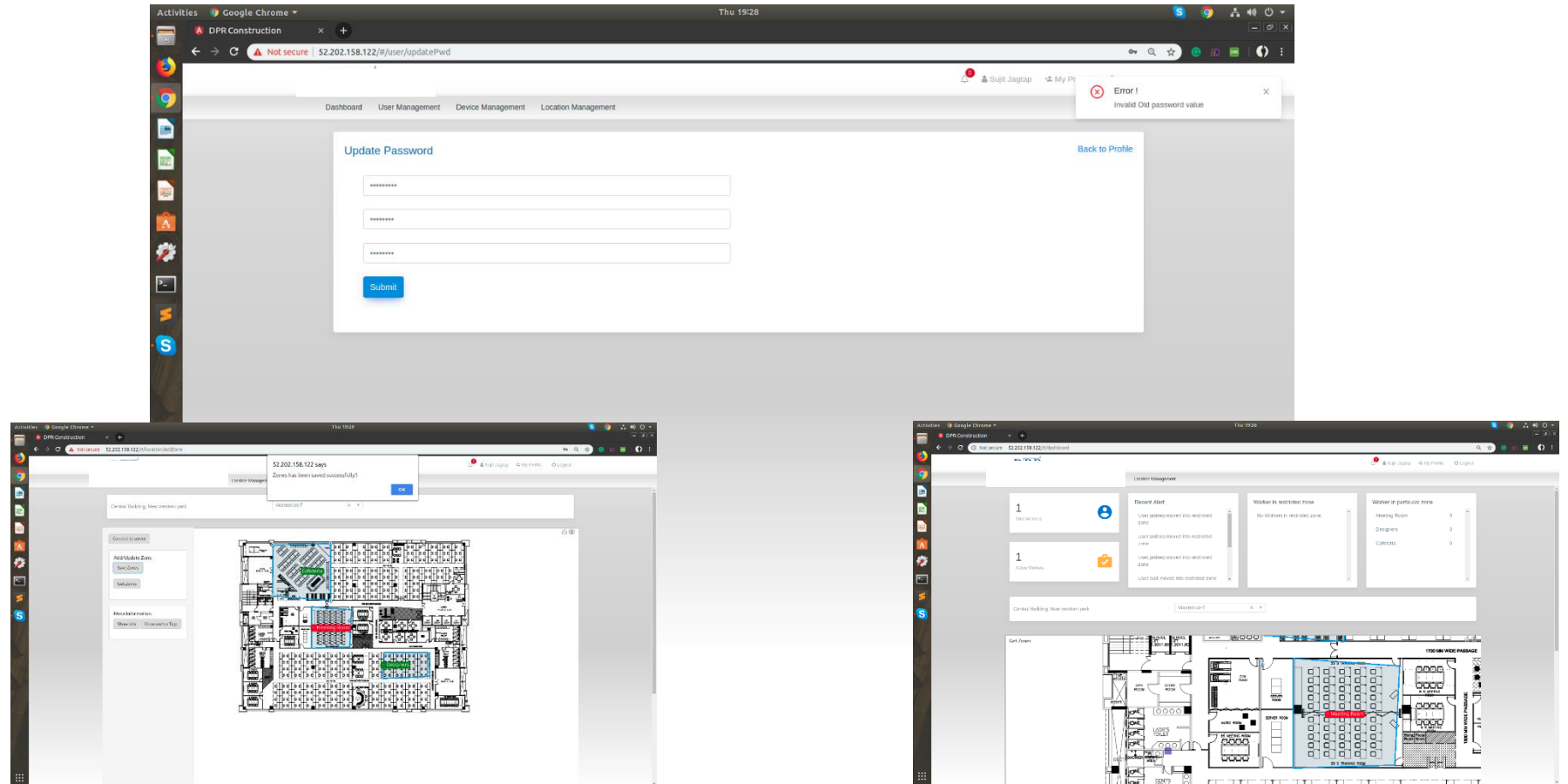
- Prevented n number of incidents from causing serious casualties and monetary losses
- Maximized the accuracy in onboarding and Off-boarding
- Automated Processes and ensured regulatory compliance

IOT Enabled connected worker safety platform



Technology

- AWS Kinesis,
- IoT Rule engine,
- AWS Lambda
- Big Data
- BIM360 APIs



Screens



*Our
Presence*

Thank You