



IoT Enabled Smart Joint Propeller Shaft (Cross)



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About hIOTron[®]

Hiotron Pvt. Ltd (hIOTron[®]) is an Indian technology corporation focused on development and implementation of Internet of Things based Products and Solutions. Our plug & play modular & industrial hardware & IoT platform allows businesses to securely connect, manage and analyze data from legacy to modern devices or assets.

We develop, manufacture, support, licenses IoT Platform and sell IoT based consumer, industrial electronics & software services. Hence, we provide a complete ecosystem for IoT solutions right from training, design, hardware manufacturing, integration, platform, analytics and support to any business or individual to make their IoT journey simple and successful.

Currently, Very Few companies have the in-house skills and tools to build IOT solutions quickly and cost-effectively whereas our in-house development team is very much expertise in all the major vertical of IOT technology such as custom PCB design/hardware development, embedded software development, device- cloud/network integration, communication/web protocols & IT experts, front- end/mobile app or Web-App development & big-data analyst.

Core Expertise

Connectivity

ModBus, ProfiBus, Profinet, CANBus, RS232/485, Wi-Fi, ZigBee (Star/Mesh), LoRa (868 or 915 MHz), Z-wave, Sub-1, Bluetooth, BLE4.0, IR, NFC etc.

Semiconductor

Freescale, Marvell, Atmel, TI, QUALCOMM, Microchip & Many more.

Communication Channel

Wi-Fi, Ethernet, GSM/GPRS (2G,3G,4G), GNSS, LTE.

Cloud Platforms

AWS, IBM Blue-mix Watson, Azure IoT, Thing-Worx, hIOTron® & Private.

Communication & Queuing Protocols

MQTT, REST, Web-sockets, COAP, XMPP, AMQP.

Databases

Cassandra, MongoDB, Raven DB, MySQL, Oracle, MS-SQL.

Mobile Application

Android, iOS, Windows.

Standards

OPENIoT, HomeKit, Thread, Nest, Alljoyn, Brillo & Weave.

Achievements



**6 Years
in Existence**

**45+
Team Members**

**7+ Project
Managers**

**Completed 350+
Projects**

**21.5K IoT
Devices Deployed**

**For 13+
IoT Applications**

**In 32
Cities**

**Across 5
Countries**

Clientele



End-To-End Solution Architecture

IoT Enabled Smart Joint Propeller Shaft (Cross)

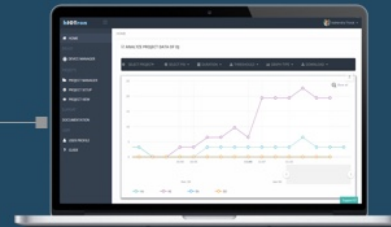
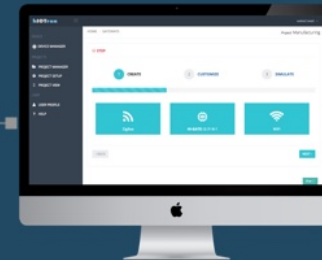
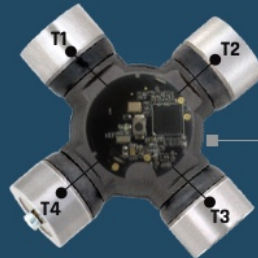
IoT Feature Highlights

1. Real Time Data Monitoring through Cellphone, Tablet and PCs Remotely.
2. Customized rules/Edge analytics on edge for local quick actions.
3. Predictive analytics based on historical data/Data logging/ Customized Reports daily, weekly or monthly.
4. Alerts/Notification in the form message, mail, push notification in mobile phone, tablet or pcs remotely.
5. Predictive, Preventive maintenance/Live vehicle & its parameters tracking.

SENSORS

T1: Temperature Sensor1
T2: Temperature Sensor2
T2: Temperature Sensor3
T2: Temperature Sensor4

Provision for Gyro & Vibration sensor & 2 other sensors with addition of another battery.



**A: UNIVERSAL JOINT
CROSS WITH
BEACON & SENSORS**

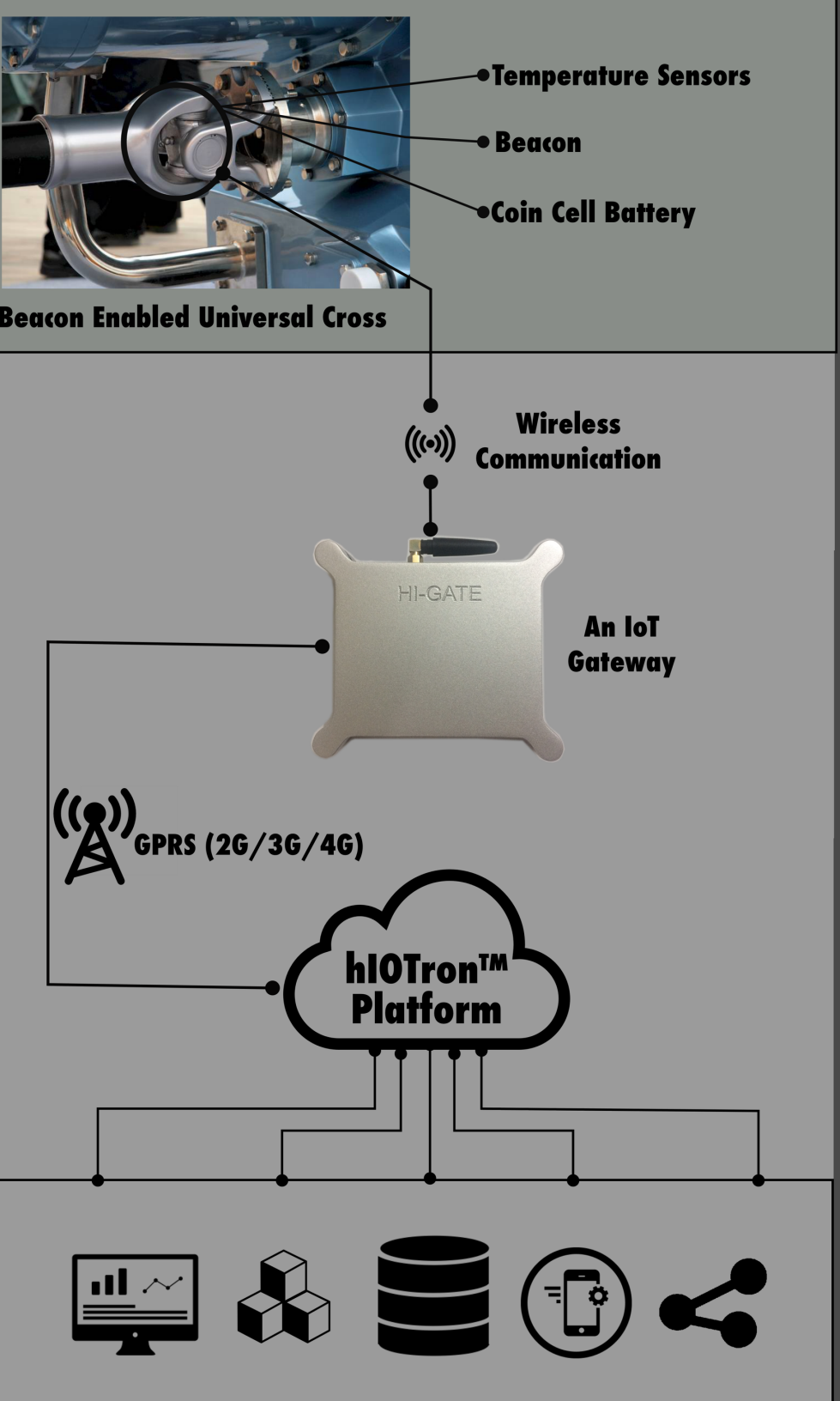
**B: HI-GATE [AN
INDUSTRIAL IOT
GATEWAY]**

**C: HIOTRON IOT™
PLATFORM**

**D: MOBILE APP
& DASHBOARD**

SECURITY LEVEL

PHYSICAL PROTECTION OR FIRMWARE LEVEL SECURITY  SSL/TLS, X.509 SECURE CERTIFICATES

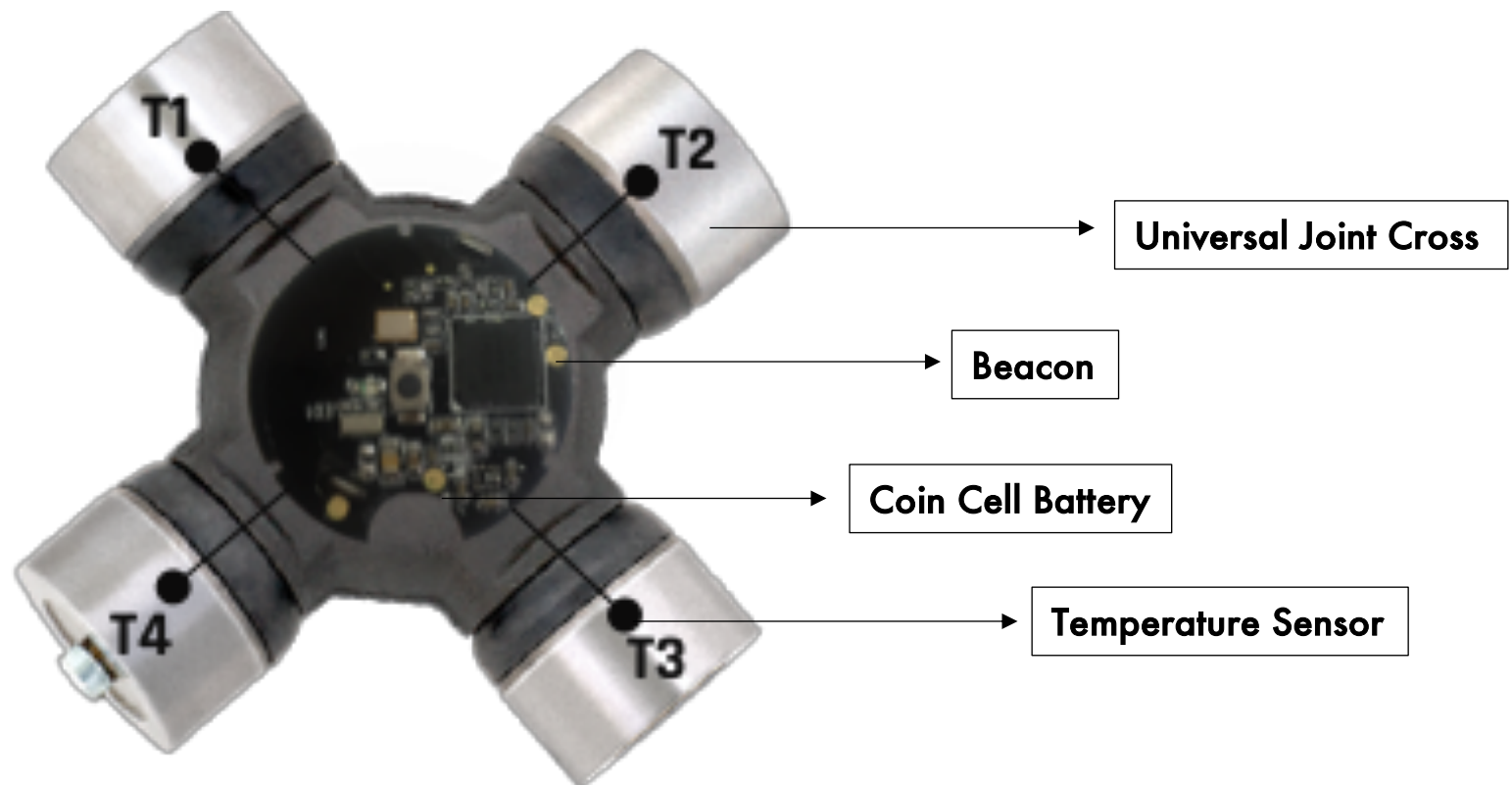


SIEMENS PLC S7-200-TO-HIGATE  HIGATE-TO-PLATFORM  PLATFORM-TO-MOBILE/DASHBOARD

COMMUNICATION LEVEL

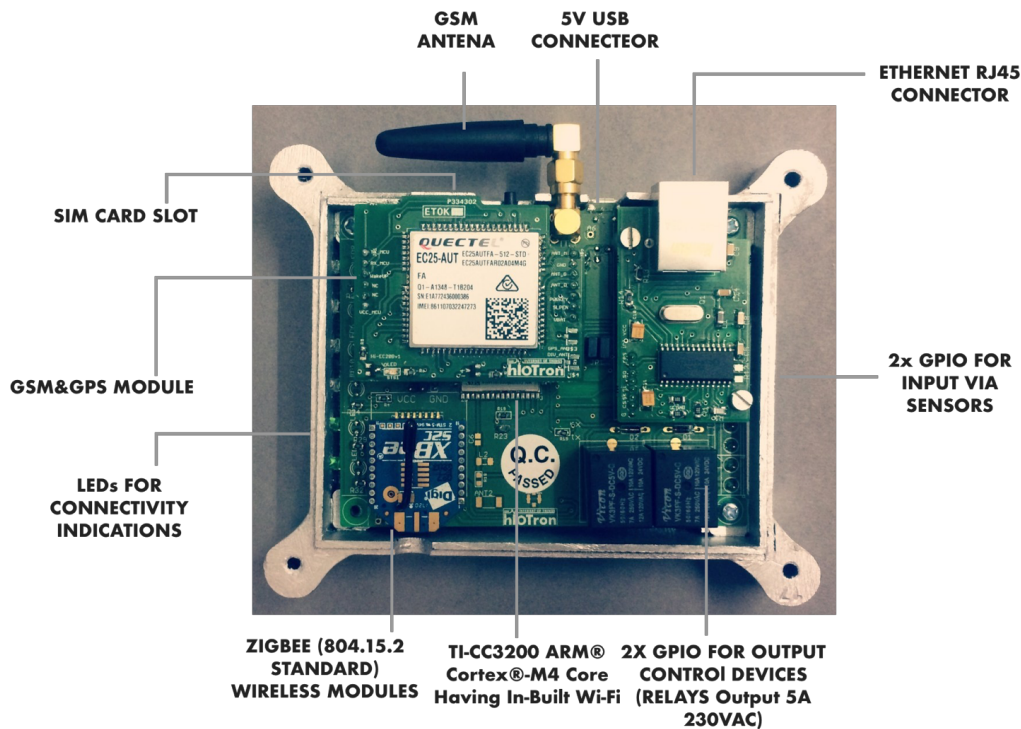
Solution Components

- A. **Universal Joint Cross with Beacon & Sensors** – HI-1824SB will specially be designed for the detection of real time Universal joint Cross temperature which should have operating Temperature Range: -40°C to $+85$, Humidity detection range: $\pm 0.4^{\circ}\text{C}$ and battery life is 1 year & replaceable.



Beacon Technology Overview	
1. Signal transmission frequency	2.400 - 2.4835GHz
2. Protocol standard	Bluetooth 4.0
3. Controller	Cortex-M0 Kernel, 16MHz
4. Memory	256K FLASH ,16K RAM
5. Modulation mode	GFSK
6. Send interval	500mS, adjustable
7. Built in battery	600mAh /3V
8. Communication rate	1Mbps
9. Receiving sensitivity	1Mbps@-85dbm
10. Maximum distance	50 meters, adjustable
11. Service life	1year (can replace battery)
12. Outline size	Customizable (67mm*51mm*15mm) Standard

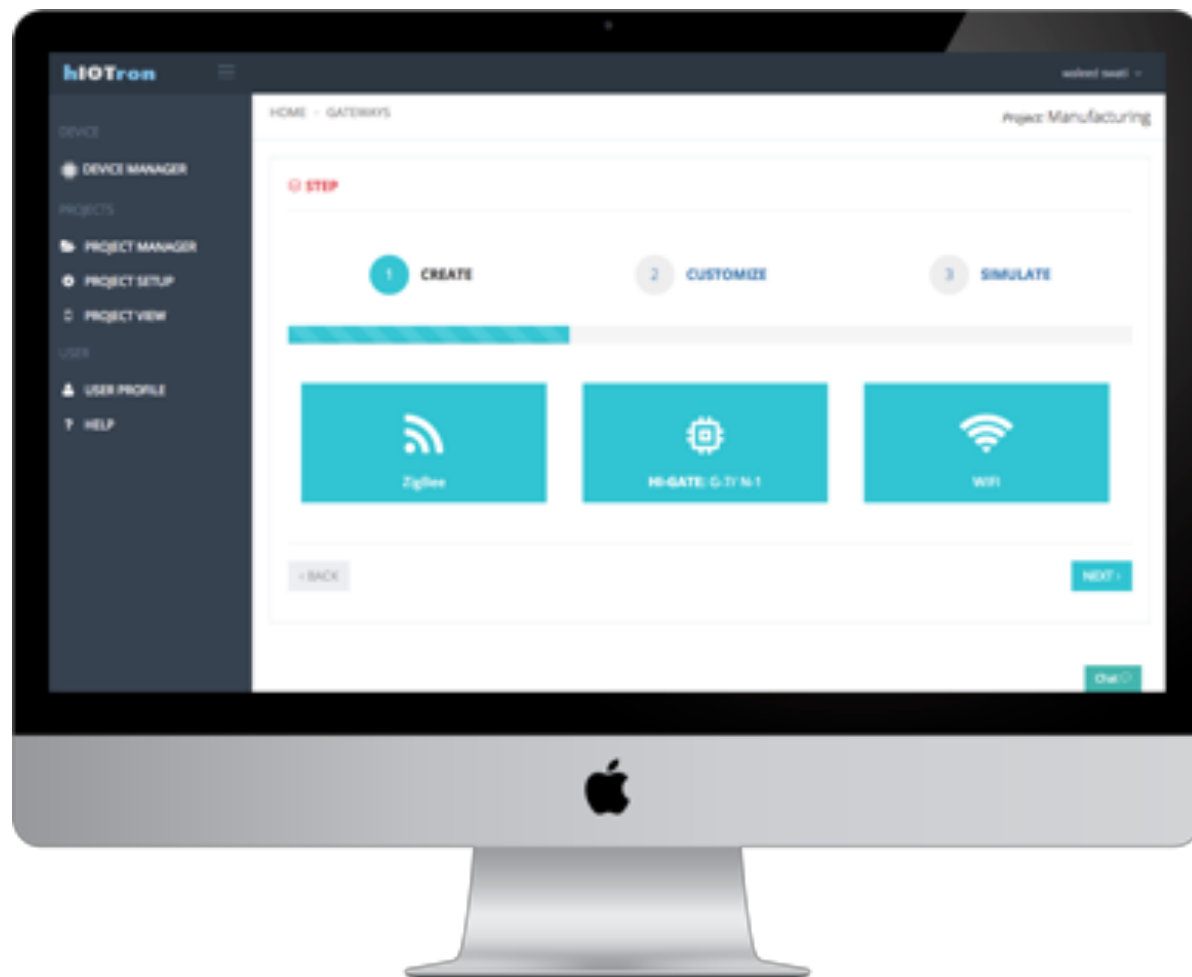
B. **Hi-Gate** - Hi-1610IG is smart tracker act as a main central unit which is perfectly suitable for vehicle tracking application powered through truck battery, having blue-tooth (Beacon) for local and GSM for cloud connectivity with in-built GNSS module to precisely track the vehicle position. It is also equipped Li-ion for battery in case of power failure for 2-3 days & EEPROM & RTC to store the records in case of network failure.



Technical Overview	
1. Modular Bluetooth	Work as a BLE scanner to communicate with Universal joint Cross equipped with Beacons.
2. Modular GSM	Provision for 2G, 3G & 4G network.
3. Internal GNSS	Global positioning system/Global Navigation Satellite System.
Hardware Overview	
4. RTC	Real time clock to store data with time logs.
5. EEPROM (256MB)	Memory to store 15-20 days records in case power or network failure.
6. Li-ion battery	2700MAH battery backup in case of power failure
7. Internal GNSS antenna	An antenna used for GPS connectivity. Integrated into FM device PCB. Does not have external connector.
8. External GPRS antenna	An antenna used for GSM connectivity having external SMA connector.
9. Charging/Discharging circuit	Charge & discharge internal battery through mains automatically.
10. Over voltage protection	Protect device through over voltage from mains.

<p>❖ GSM</p> <ul style="list-style-type: none"> ❑ Quad-band 900/1800 MHz; 850/1900 MHz ❑ GPRS Multi-Slot Class 12 (up to 240 kbps) ❑ GPRS Mobile Station Class B ❑ SMS (text/data) 	<p>❖ BLUETOOTH</p> <ul style="list-style-type: none"> ❑ Bluetooth® specification V4.0 ❑ Bluetooth® transceiver fully compliant with Bluetooth® specification V4.0 for external peripherals: ❑ Configuration via Bluetooth®
<p>❖ GNSS</p> <ul style="list-style-type: none"> ❑ Tracking: 33/ 99 acquisition channels ❑ -165 dBm sensitivity ❑ Hot start <1s ❑ Warm Start < 25s ❑ Cold start < 35s ❑ NMEA-183 protocol ❑ GPS, GLONASS, GALILEO, BEIDOU, SBAS, QZSS, DGPS, AGPS ❑ Accuracy < 3m <p>❖ CASING & OTHER</p> <ul style="list-style-type: none"> ❑ IP54 Enclosed (Limited protection against dust ingress & fully against splash water from any direction.) ❑ Ambient Temperature Range: -40 °C to 85 °C. 5% to 95% (non-condensing) 	<p>❖ INTERFACE</p> <ul style="list-style-type: none"> ❑ 1 Digital Input ❑ 1 Analog Input ❑ 2 Digital Open-collector Output (connecting external relays) ❑ Bluetooth® specification V4.0 ❑ Power supply (+5) V DC with overvoltage protection ❑ Internal high gain GSM antenna ❑ Internal high gain GNSS antenna ❑ external 2700 mAh Li-ion back-up battery ❑ Dimensions: L(130mm) x W(115mm) x H(36,5mm) ❑ 6 Status LEDs ❑ Micro Sim Card Port ❑ Micro USB Port

- c. hIOTron IoT™ Platform** – An IoT (Middleware) Platform delivers a comprehensive platform as a service (PaaS) for rapidly designing, developing, deploying, and operation of vehicle real time data monitoring & tracking with predictive, preventive & other business-related analytics.



Technical Features

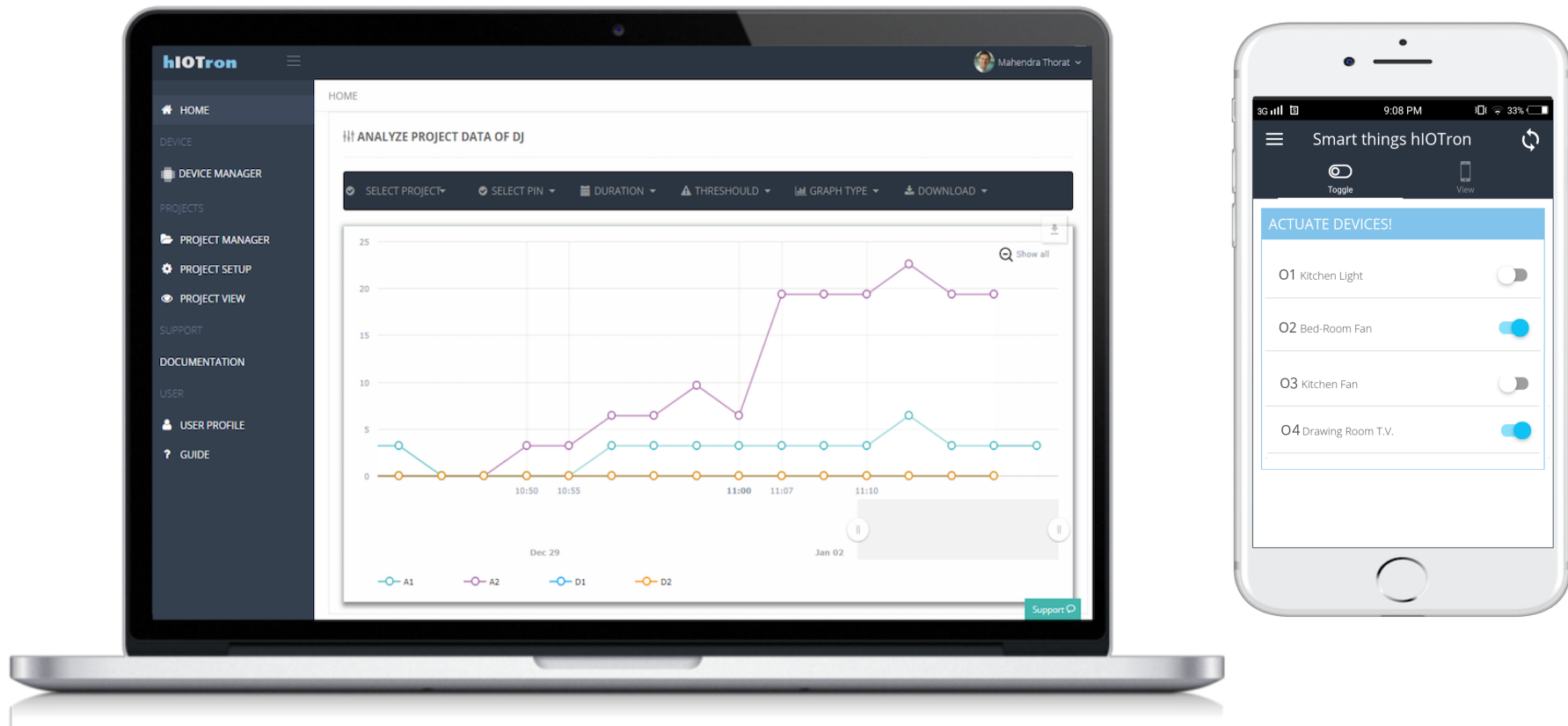
- ❖ **Device Connectivity** – Web based Platform manages seamless device connectivity & configuration from platform to gateway (Out-Bound Connectivity Protocols: Wi-Fi, Ethernet & 2G/3G/4G/LTE modem) & gateway to wireless/wired end node (In-Bound Connectivity Protocols (Wired – Serial, I2C, SPI, RS232/485, Mod-Bus & CAN) & (Wireless – BLE4.0, ZigBee, Z-Wave, Lo-Ra, Sub-1, RF)) & Vice versa.
- ❖ **Device Management** – Platform IoT Device Management makes it easy for you to manage your connected devices at any scale with right authentication & authorization process. Organize & Manage your Hub (gateway) & Nodes in hierarchical structure based on its category which help to search/edit/remove devices in bulk.
- ❖ **Basic/Advance Edge Analytics Models** –Platform supports multiple Anomaly Detection Models to filter data based on event or time & perform some actions (if assigned any) at edge before it reaches to cloud to eliminate the round-trip latency of an actionable insight. In a production environment, same filtered events can be mapped with notifications/switching models to make the process automatic through cloud.
- ❖ **Basic/Advance Analytical Models** – Platform provides a spectrum of analytics that enable you to start quickly and realize value immediately and visualize your device real time or historical Raw, Formatted & Formulated (Application category based) data in charts/graphs/bars in well-organized way with multiple filters like project/data/ time/threshold/download options
- ❖ **Data Storage** – Platform stores last 90 days device generated data for any application which is directly in-sync with heart-beat interval (data update period from device to platform) period (default 10 minutes). For example- if Heart-beat interval kept 5 minutes then storage duration will also become half 45 days. For any customization in storage please contact.

- ❖ **Reporting Tools** – Platform allows user to visualize real time & historical data along with time/event-based mail reporting feature for overall (combined) or each & every pattern of data in PDF format. [excel format reporting also available with data filtering option].
- ❖ **FOTA (Firmware over the air)** – Platform maintains the record of every version (Newly or Previous) of firmware of devices associated to it which allows you to update gateways & its associated nodes new firmware one by one or all in one in single click.

Enterprise Features

- ❖ **Open APIs for Custom UI Models & Business Logics** - Access of REST APIs in JSON/string format allows you to embed raw data anywhere in the form custom visualizing model as per business logics or branding requirement.
- ❖ **Logo/Theme Branding** - Partners can serve hIOTron IOT platform as their own IoT platform to their clients with logo & theme branding features.
- ❖ **White Label Custom URL Branding** - Partners can also serve hIOTron IOT platform as their own IoT platform with completely white label branding option right from their custom logo to URL.

D. Dashboard & Mobile application – Multiple user role level mobile Application & Dynamic Dashboard/Web-app access fully sync with each other.



Solution Features

- ❑ Real-Time Data Monitoring & Vehicle Tracking – Monitor vehicle mechanical parts parameter like universal joint Cross surrounding temperature & Track the location of your vehicle online in real-time. Choose from the following maps: Google, Satellite, OSM etc. View additional information about the tracking objects: seats vacant or occupied, travel history etc.
- ❑ Notifications – Get instant if unofficial pick up done by driver or conductor: know when the object enters or exits geo-zone, know if it is speeding and stopovers. Get SOS alarms if it has been stolen as well as turn on/off the engine easily. Get notifications to your iPhone, Android or Windows devices, via e-mail, mobile App or SMS.
- ❑ History and Reports – Download and review reports in different formats: XLS, PDF, CSV, TXT. Reports include various information by date and GPS tracker name including: driving hours, stopovers, distance traveled, fuel consumption, temperature history and many more. Detailed and group reports are also available.
- ❑ Geofencing – Geofence feature allows to set up geographic boundaries around areas that have specific interest for you. Receive automated alerts when the object enters or leaves marked boundaries.
- ❑ POI & Tools – With Points of Interest (POI) tool you can add markers at the locations, such as: gas station, a hotel, a restaurant, etc. Also, you can name the place and add description. You can also use tools for calculating distances between places on the map.

Development Phases

Turnkey Projects in 14-16 weeks

Proof of Concept -Done



Phase 01

Quick Proof of Concept (POC) or made engineering prototype to prove end-to-end solution concept and did live testing on the vehicle to get real time insights.

Customization Level-1 & 2 - Done



Phase 02

Customized Hardware, Software & everything as per solution requirement till production prototype was not ready by doing 4-5 times real live testing on the vehicle.



Phase 03

Production - Done



Phase 04

Finally started Hardware Production & Separate server setup/Dashboard/Mobile Application for further business or preventive or predictive analytics.

Industrial Testimonial

"It is clear that the power and capability of the hIOTron IoT platform is immediately applicable to address the requirements of even the largest scale cyber physical systems in commercial and government applications. "hIOTron is a technological tour de force."

Ibrahem Jabour
CEO & Co-founder
Tahkom Company
Riyadh, Saudi Arabia



"BAGIC and hIOTron are pushing the frontiers of Logistic solutions to empower private and public sector organizations to uncover valuable and actionable insights."

Praveen Kadam, Vertical head:
Connected Ecosystem at
Bajaj Allianz General
Insurance Co. Ltd.



"Our additional investment in hIOTron reflects our ongoing confidence in the company's unmatched capabilities, best-in-class technical team, and significant growth potential. hIOTron is transforming industries, creating competitive advantages for its customers, and generating significant, measurable social impact in important areas such as healthcare and energy."

Parimal Shah | Vice President |
International Operations MK Jokai
Agri Plantations Pvt. Ltd.



"We approached hIOTron to develop TM-Black BOX which can simply communicate to cloud using GSM to accurately deliver the arcade games card swap & tickets/coin counts. We really surprised with the level of service right from custom PCB designed to the custom enclosures with entire software stack covered so smooth & easily for such a complex task."

Anup Tapadia,
Founder & Chief Technology
TouchMagix™





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