To provide insight for enhancing wealth

Since 1985

Approved by RDSO
Govt. of. India
Ministry of Railways

“R&D”
Recognized by DSIR
Govt. of. India
Vision

‘To provide insight for enhancing wealth’
INSIGHT - refers to TRUTH. Our Vision is to develop Products & Solutions to the Customers which provide truthful information that can optimize & improve the Business Process.

Quality Policy

“We shall provide information technology products/services that exceed customer expectations in their functionality, usability, reliability, performance, adaptability and supportability to achieve market leadership and continual improvement of business performance.”

Mission

To provide freedom of creativity/innovation in exploiting the potential of information technology.

OEM Partner

Gartner

Client for understanding the Technology trends & Market Trends in ICT

CIO Choice – 2017’ Award

30+ Years of Product Expertise by harnessing latest technologies

50,000 SQFT facility for various activities

In-House Manufacturing facility with 100+ Staff

100+ Engineers in Research & Development (R&D)

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Building End-End Smart IoT Solutions

Embedded Systems & Application Software

700+ People

Conceive
Develop
Manufacture
Implement
Support

Conceive
Develop
Manufacture
Implement
Support

Concept
Analysis
Design
S/W & H/W Implementation
Integration
Testing

Assembling
Quality Testing

Installation
configuration

Commissioning
Maintaining

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OUR DEVELOPMENT PROCESS

Design Thinking

- **DESIRE**
  - What value is going to get/give

- **NEED**
  - What can technology do feasibility

- **VIABLE**
  - Viable
  - Sustainable
  - What value is going to get/give

- **SUSTAINABLE**
  - Technology

- **PEOPLE**
  - Desires
  - Needs

- **BUSINESS**

- **FUNCTIONAL INNOVATION**

- **PROCESS INNOVATION**

- **EMOTIONAL INNOVATION**

- **INNOVATION**

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DESIGN CAPABILITIES

Proven Expertise In Building end-to-end IoT Solutions

- Building Systems of Systems
- Algorithms & Analytics
- Access
- Storage
- Edge Processing
- Communicate
- Sense & Control

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MANUFACTURING

Planning and Scheduling and Tracking of orders through ERP

➢ PRODUCTION: 15,000 -SFT AREA
➢ Following standard processes like IPC & J-STD
➢ Detailed planning and scheduling and tracking of orders through ERP
➢ Implementation of seamless tracking and tracing of material, components and products
➢ Just in time Supply Chain
➢ Chain Process to optimize time, cost and improve quality
➢ Automated Testers assuring quality
➢ 5S Implementation
Foot Print

- **12000+** Product deployments
- **9000+** Locations

Service Centers

- **120+** Service Centers

International Footprint @ Sri Lanka, Bangladesh, Poland

Deployment in Railways

<table>
<thead>
<tr>
<th>Products</th>
<th>India</th>
<th>Srilanka</th>
<th>Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signaling Data Loggers</td>
<td>10K</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Networks</td>
<td>200+</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PHMU</td>
<td>800+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BHMS</td>
<td>80+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Electronic Block Instrument</td>
<td>50+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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IT - DRIVING BUSINESS

1. Enterprise Resource Planning
   - Complete Order Tracking
   - Financial Management
   - Products BOMs & Configuration Management
   - Vendor Evaluation
   - Just In Time Procurement
   - Inventory & Tracking
   - Finished Products Tracking
   - Integration with Mobility/Mail Alert

2. Order Management System
   - Auto Integration With ERP
   - Optimized Sale Orders
   - Execution Planner
   - Inventory Projection Tool

3. Cash Flow
   - Control of Inflow and Outflow of Cash
   - Visualize Future Incoming and Outgoing of Cash
   - Mobile Integration

4. R&D Project Planner
   - Leads to Quotation Integration
   - Integration with ERP
   - Mobile and Web Platform
   - Analytics

5. Time Attendance Management System
   - Mobility
   - Web Platform
   - Analytics

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DATA DRIVEN DECISIONS

Collaboration – Share Point

1. Self awareness - just to watch your thoughts, able to see what your thinking & to be aware that u are the creator of these thoughts.

2. Second step is to check whether this thinking is the right kind of thinking for me.

3. Third step can I change this thought.

Data Analytics - Power BI
Human Resources & Academic Relations
(RIGHT PEOPLE FOR RIGHT JOB)

- Running **M. Tech (IoT)** Course for JNTU Anantapur
- MOUs with 15+ Engineering and science colleges for faculty and student development programs
- Active member in Board of Studies of Universities in developing academic curriculum
- Collaboration with AP Skill Development Centre & MSME
- Continuous learning program for employees in management and futuristic technologies
- Activity based learning modules
YOUR ONE-STOP DESTINATION FOR
END-TO-END SMART SOLUTIONS

Data Logger System
LC gate warning system
DC track circuit & Point machine health monitoring
Integrated passenger information system
Digital clocks with GPS synchronization
Signal ahead alert system
Wrong operation indication system
System integrity tester
Solid state block proving by axle counter
Battery and Power monitoring

Online Distributed Appliance Control
Energy Information System
Intelligent Sensors
Lighting Control
Access Controls
Indoor Air Quality Monitoring System
Blind Controls
Building Automation

Smart Water Management
Adaptive Traffic Control System
Automatic Number Plate and Signal Violation Detection
Variable Message Signage (LED displays)
Environmental Sensors
Bus Stop and Bus Destination Displays
Public Addressing System
Command Control Centre

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for 24/7 operation
under Harsh Indian Environment Conditions

Digitalization – Define, Build, Deploy and Manage
SMART SIGNALING
**Smart Signaling**

- Improve Average Speed of train by 20%
- Identifies Traffic Bottle-Necks
- Helps Planners To Optimise Train Operations
- Predictive Maintenance of Signalling Assets
- Reduce the Maintenance Cost
- Improve Availability by MTTR & MTBF
- Signaling System Health Monitoring

*To provide insight for enhancing wealth*
Indigenously Designed, Built, Deployed and Maintaining one of India’s Largest IoT Network for Indian Railways
Indian Railways IoT Network

6+ Million Things of Railway Signaling System

Connected to 200+ Command Control Centers across India

22+ Million Records Generated Everyday

12k Products Installed in More than 7k Stations in India

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Our Solutions

10k+
Data Loggers & RTUs

800+
Point Machine Monitoring

40+
Integrated Power Supply Monitoring

80+
Battery Health Monitoring Unit

50+
Block Instruments

800+
Safety Point Alarm Units

200+
Control Centers

IoT Edge System
- Works as a black box for Railway Yard for signalling System
- Capture all relay status and analogue parameters in the relay room

Predictive Maintenance System
- Predicts the failures much ahead by real time analysis of point machine voltages and currents
- Improves MTTR and MTBF of system

Remote Condition Monitoring
- Provides remote condition monitoring of various power supplies with in railway yard
- Identified faulty module in power distribution and informs the railway personnel

Predictive Maintenance System
- Predicts the failures much ahead by real time analysis of battery parameters
- Extends the battery bank life and guarantees backup

SIL-4 Certified
- 2o/o3 Architecture
- Complies to European CENELEC standards
- First in INDIA to develop the product and get approval

Prescriptive Solution
- Eliminates accidents at railroad points through prescriptive alert to station master

S/Ws
- Real-time simulation of yard
- Predictive Maintenance of railway assets
- MIS Reports & Failure Analysis System
- Network Management System

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# Smart Signalling > Solution Areas

## Asset Performance Management
- Remote Diagnosis
- Remote Condition/Health Monitoring
- Predictive Maintenance

## Operations Optimization
- Modeling and Simulation
- Failure Analysis System
- Data driven decision support system
- Process / Workflow optimization

## Fail Safe Systems & Communication
- SIL4 Certified Control System
- SIL4 Certified LED signals
- Interface converters
- Data Aggregation
Smart Signalling > Data Logger

Black Box for Railway Station
Multi Monitor Simulation Networked Data loggers in Vijayawada Division Control Office with prescriptive decision support.
Captures Digital (Relay Status – Controlling, Contactor & Detection) and Analog (Operating & Detection Voltages and Current) parameters.

Analyzes and identifies permanent way-related and signaling & safety faults as they are emerging using AI and ML.

Predictive Maintenance is initiated at right time before any faults occur / Trouble shooting can be more easily integrated into day-to-day operations.

Sends the captured information to central place.
Remote condition monitoring system allows railways to perform preventive maintenance – increasing the availability of all assets, thereby reducing the number of delays.
Point machine switches the track between two alternative routes and is one of the safety critical signaling element in Railways

- Maximum availability of point is an essential requirement for an efficient rail transport system
- Point machine maintenance is routinely undertaken at fixed intervals (Periodic Maintenance)
- Point related failures are time consuming and most expensive disruptions
- Periodic maintenance is not necessarily adequate
- Real time condition monitoring of point machines enables predictive maintenance and eliminates disruptions to rail services

Fig. A: Typical Point Illustration

Point Machine failures accounts to approx. 50% of total failures related to point
Efftronics deployed Point Machine Remote Condition Monitoring in 800+ locations in India

- System contains
  - Current Sensing
  - Mini logger
  - Event logger
  - Failure Analysis System
- Current Sensing is through Hall Effect Sensor / Isolating current transformer
- Communication is through 2.4GHz ZigBee
Smart Signalling > Point Machine Monitoring

1. Collect fault-free and extreme faulty data.
2. Identify areas of interest using analysis techniques and use them to create rules.
3. Apply those rules to other waveforms and match similar features using a linear score progression to the recorded extreme.

Graph:
- **Peak**
- **Unlocking**
- **Steady**
- **Locking**
  - Faultfree
  - Active fault

40%
Advanced Machine Learning Algorithms classifies the failure. Notifications are sent to Railway maintenance staff.

- Carbon brush worn out
- More current at locking time due to spring
- Obstruction in Point Motor
- More friction due to lubrication problem
- Problem in Unlocking
- Problem in locking position
Battery Health Monitoring System (BHMS) is an intelligent system that monitors battery health & efficiency to provide safe guidance, improve battery performance & reduce maintenance with insight on various parameters.
Where critical power supply required, Battery bank will be a breath taker. But when that bank fails in need, the effect is too high. BHMS will be a saviour in such situations which monitors various health parameters.
For a Battery bank, failure of battery cell is not identified in manual readings, which can be clearly identified and sent as an SMS alert to authorized person with details.

State of charging and battery parameters are tracked in real time and it is possible to enhance the life of battery by controlling charging and avoiding deep discharges.

One failure cell in a battery bank eventually collapses entire bank if not replaced. Condition monitoring helps in identifying the failure cell much ahead.
Benefits

- Reduce bank down time
- Identify failures much ahead
- See live health of each cell
- Extend battery working life
- Know back-up time
- Evidence for Warranty
- State of Charging
- Reduce Maintenance
- Real Time Alarms
- Remote Monitoring
Air Conditioner Health Monitoring Unit helps the user with better availability of air conditioning to ensure long life for temperature critical equipment

**Benefits**

- **Reduced AC down time**
- **Identify Failures**
- **Perfect Temperature**
- **Maintenance Alerts**
- **Real Time Alarms**
- **Remote Monitoring**
SHMU monitors signal lamp current and alerts the user in case of abnormality. These alerts are used for predictive maintenance – by which number of failures can be reduced. Helps in increasing asset availability.
IPS Monitoring system captures the diagnostic data from IPS and send to central place for monitoring remotely.

1. Supervisory Unit captures diagnostic data from IPS and sends to Data logger.
2. Data can be seen in local PC and Test room CMU.
3. Important alarms can be sent as SMS and overall status can be sent to OEM by automatically from Test room.
ESMU monitors the motors driving current and alerts the user in case of abnormality. These alerts are used for predictive maintenance – by which number of failures can be reduced. Also used to reduce the mean time to repair.
ELMU monitors the motors driving current and alerts the user in case of abnormality. These alerts are used for predictive maintenance to reduce number of failures. Also used to reduce the mean time to repair.

- Log Improper Events
- Highly available (99.999%)
- Improve Safety
- Smooth travel
- Reduced Maintenance time
- Real Time Alarms
- Remote Monitoring

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Immediate advice / recommendation on failures as they emerge
Early warning of system degradation before its eventually leads to failure
Enable maintenance staff to have prior knowledge about root cause of failure before attending a site
Improved maintenance planning with proper statistical data
24/7 monitoring and notifications in case of failures / warnings

Remote Condition Monitoring is the way forward for reliable system operation & Reduced delays

Higher Availability  |  Lower Operating Costs  |  Increased Reliability  |  Increased Efficiency  |  Improved Safety
Identified 975 defects of design & implementation of interlocking

Conducted at 48 stations

Software, Hardware development & implementation for System Integrity Test as per Table of Control /Route Control Chart.
By wiring potential free contacts of ELD to data logger and identifying the relays

- Which power the conductors
- Which are powered by the conductors

External defective cable pair responsible for earth fault can be identified by CMU alarms software
Smart Signalling > Control Command Centre

Data Synchronisation between all stakeholders of the system

Data archiving, Reports, Escalation
Signals

RDSO Approved

2-way LED stencil route indicator

4-way LED stencil route indicator

Single digit Route indicator

Double digit Route indicator

Main Signals

A - Markers

Route indicator

Shunt Signals

Calling on

Long Visibility

Energy Saving

Maintenance Free

SIL-4 Certified

Quality & Reliability
Solid State Block Proving by Axle Counter

- Fail Safe as per CENELEC
- SIL – 4 Certified
- 2 o/o 3 Architecture
- RDSO APPROVED
Leverage technology - Railways to meet their challenges

- **Auto charting** throughout India
- **Decision Support System** provision to controller
- **Predictive Maintenance System** for all railway signaling assets
- **Analytics as a Service**
- Enable **Integrated timetable** system for Indian Railways
- Identify traffic bottle necks - **Suggest best solution to reduce journey times by 20%**
Smart Signalling > Summing up

1. Zero accidents
2. Efficient operations
3. Identifies traffic bottlenecks
4. Remote Condition Monitoring
5. Predictive Maintenance
SMART CITIES
Smart Cities > Smart Water
Current problems

- Potability
- Limited Supply
- Wastage
- Uneven Distribution

OBJECTIVES

- To ensure right quantity of water daily to the public at right time
- To ensure right quality of water to be distributed daily
- To reduce cost of per unit water
- Uniform distribution
- Total Accountability
- Continuous Monitoring
- Reports & Records

Smart Cities > Smart Water
Reduction in Unaccounted For Water

<table>
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<tr>
<th>Plant Outflow (MGD)</th>
<th>Sum of all the reservoirs</th>
<th>UFW per day (MGD)</th>
<th>UFW</th>
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<td>32.3 %</td>
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<tr>
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<td>2.45</td>
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<td>7.07</td>
<td>1.73</td>
<td>19.7 %</td>
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<td>9.13</td>
<td>7.33</td>
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<td>7.51</td>
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<td>0.42</td>
<td>5.5 %</td>
</tr>
</tbody>
</table>

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Smart Cities > Smart Water > Analytical Insights

Area Wise Distribution

Demand vs. Supply

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Monitoring of Tank Cleaning

Chlorination of Water

High Demand Reservoir

Meeting Required Demand
To improve the Quality of life by improving Quality of living spaces

To prevent the negative effects of pollution on nature and our lives too

To communicate safety measures with public during environmental disasters

OBJECTIVES

Rainfall
Air Temperature
Soil Moisture
Leaf Wetness

Measured Parameters

Relative Humidity
Atmospheric Pressure
Wind Speed & Direction
Visibility

and more....

Current problems

Over Pollution

Health Effects

Environmental Disasters

Quick Weather Forecasting, Analysing & Passing Information To Public

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Smart Cities > Environment Monitoring
Smart Cities > Environment Monitoring > Use cases

Urban Flood Monitoring System

Agricultural Weather Station

Indoor Air Quality Monitoring
Smart Cities > Intelligent Transportation System

CURRENT PROBLEMS

Accidents
Traffic Congestion
Environmental impacts and energy consumption
Public transport inadequacy

OBJECTIVES

To ensure safe journey with increase in operational efficiency
To provide ultimate control over city traffic system
To provide real-time information for better customer services

Adaptive Traffic Signals
Variable Message Signage
Bus Destination displays
Solar Blinker
Public Address System
Bus-stop displays
ATCS adapts to real time traffic patterns to optimize the traffic flow by dynamically changing the green split timings.

A solution for a smooth and safer journeys

1. Detectors monitors traffic
2. Algorithms compares to current plan
3. Change timings as per demand
Smart Cities > Adaptive Traffic Signal System

Benefits

- Reduce Accident Rates
- Increase Travel Speeds
- Reduce Stops, Delays & Queues
- Increase Operational Efficiency
- Real Time Information management
- Create a platform for sharing traffic to other systems
- Environment friendly
Elements of ATCS

1. Vehicle detector
2. Edge Application
3. Master Controller
4. LED Signal Lamps
5. Countdown Timer
6. Adaptive Algorithm
7. Web Interface
8. Real-time Reports
9. ML based forecasting
10. API Services
Deep Learning Camera captures volume, speed, vehicle classification, queue length
**Edge Application** at every junction of Master Controller Unit receives & process the detectors data.
All junctions data routed and analysed at Command Control Centre Server
Machine learning algorithms change the Signal timing patterns based on demand.
Signal timings are updated at junctions based on demand
Gandhinagar Smart City, India’s first smart city, and the second planned city after Chandigarh. Efftronics ATCS played a major role in solving the most vulnerable traffic problems and leads to the Vision of the city of being an equitable urban centre that provides a high quality of life to all its citizens.

- Reduced travel times by **12-20%**
- More friendly to environment **10-20%**
- Less waiting time **20-40%**
- Reduce Number of stops in a corridor by **15-30%**

Based on TTI and Model estimates from www.sim-air.org
Using advanced machine learning, system shall learn the number plates, and violations. The system will also improve its performance by continuous learning. The system is trained by the Indian number plate recognition. The solution provides various video analytics like
1. Automatic number plate recognition
2. Red Light Violation
3. Wrong Route Direction
4. No helmet detection
### Variable Message Signage

**Purpose**: Outdoor / Indoor

**Color**: Single / Bi-color / Full Color

**Pixel Pitch**: 6mm / 7.62mm / 10mm / 12mm / 16mm / 20mm

**Compliance**: EN 12966

**Interface**: Ethernet / GPRS

**Protocol Support**: NTCIP

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IP Based Controller (GPRS optional)
Multi-zone audio Amplifier
Centralized control of junction PA systems
APIs for integration

Smart Cities > PA System
E-Mark Certified
Easy configuration of routes from central server
Automatic Next Stop display and announcement
Dynamic route changes from Dashboard Controller

Solar Powered
200mm / 300mm Roundels
Configurable Flashing Rate
IP65 outdoor use
Elements of ITS central server

- Adaptive Traffic Control System Application and Predictive Algorithm
- Public Address System Application
- Passenger Information System Application
- Variable Message Signage Application
- Video Analytics
- Accident Analysis Dashboard
- Vehicular Density Analytics
Smart Cities > ITS Command Centre

Web interface for control of ITS components

Live Status of ITS components

Junction Synchronization
Safe movement of pedestrians

Signals control based on traffic and priority

Integrated Command Control Centre

- Reduction of Travel times by 15%
- Pollution Reduction
- Increased safety and comfort
Smart Buildings

Life made Easy, Secure & Smart
One of the best R&D organizations for high efficient LED lighting design in INDIA

**INDUSTRIAL DESIGN**
Industry best practices & processes that lead to a fully functional prototype with lumen guarantee

**OPTICAL DESIGN**
Selection of appropriate optical parts using practical experience & theoretical knowledge with philosophy “light in air is useless”

**THERMAL DESIGN**
Ensuring reliability of every lighting product to survive hot Indian environment conditions through proper thermal design

**ELECTRONIC DESIGN**
Advanced system level designs, KNX compatibility and smart controls

**MECHANICAL DESIGN**
Rugged mechanical enclosure design with high level ingress protection and durability
Smart Buildings > Lighting Solutions

Light Fixtures

Lighting Solutions

Smart Solutions
Smart Buildings > Lighting Solutions

Indoor Lighting

Outdoor Lighting
Smart Buildings > Smart Controls

Member of

KNX

Energy efficiency
Comfort
Flexibility
Safety & security

The worldwide STANDARD for home and building control

KNX Members

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Smart Buildings > Smart Controls

- Appliance control through mobile app
- Eliminates energy wastage
- Scheduling for appliances control
- Real-Time monitoring & recording of appliances usage
- Simple & easy appliances operation in remote locations
- Password protection for High priority appliances
Smart Buildings > Indoor Air Quality Monitoring

IoT Solution to track how healthy our living/work spaces are

- **Parameter**
  - **Temperature**: -40 to +85°C
  - **Humidity**: 0 to 100% Rh
  - **Volatile Organic Compounds**: 10 to 1000 ppb
  - **Carbon Dioxide**: 400 to 10000 ppm
  - **Carbon Monoxide**: 0 to 1000 ppm
  - **PM2.5**: 0 – 200 µg/m³
  - **Ozone**: 10 – 1000 ppb

* Optional

- **Track Air Quality Parameters**
- **Real-Time Alerts**
- **Ventilation Controlling**

"Better Air Quality → Healthy Workspaces → Better Productivity"
EMS collects and organizes energy consumption information and presents it as meaningful & actionable insights i.e., energy conserving opportunities (ECOs).

1. Capture information in real time through smart meters or energy loggers
2. Bring energy information to central place through wired / wireless
3. Analyse energy parameters on the fly and derive insights
4. Act through data-driven decisions and optimize by implementing energy conservation measures
Smart Buildings > Energy Management System

Distribution Panel & Multi Function Meters / Energy Loggers

- 16-Port IoT gateway
- RS485 Modbus
- Ethernet / GPRS / Wi-Fi

Energy Management Platform with Analytics Engine

Integration with Enterprise Systems

Dashboard and Reports

Alerts and Notifications
- slack
- pagerduty
- VictorOps
- OpsGenie
- email
- SMS
- webhook
- Push Alerts
System enables real-time location visibility and actionable intelligence of people across the facility to make better decisions, drive process improvements and optimize the value in their operations.
Smart Buildings > Asset Tracking System

Automate organization's fixed asset tracking for improved check-in/check-out processes, faster auditing, and error-free reporting.

- Easy-to-Use Interface
- Centralized Role-Based Security
- Eliminate Manual Tracking
- Data Customized for Your Context
- Easily Build Reports

Valuable Equipment
Laptops
Machinery
Furniture

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Clock System Synchronizes all the activities within the Organization

- Master Slave Configurations for uniform time
- GPS Time reference for accuracy
- All other systems in the network can also synchronize through NTP with master
Smart Buildings > Remote Work Monitoring System

Monitor the work from remote place
Resolve Site Conflicts remotely
Improve productivity
Time Lapse

45W Solar Panel
300mm Amber LED blinker
Detachable Stand

Work Monitoring System with Image Sensor and Battery backup

Monitor the work from remote place
Resolve Site Conflicts remotely
Improve productivity
Time Lapse
IoT Backend Solutions powering Digital Enterprise
IOT Solutions > Access Control System

1. Design of IoT device for Access Control
2. Manufacturing of IoT Devices
3. Remote Monitoring of Devices
4. Updates for Enhancements

- Firmware upgrade over the Air
- Reduce Maintenance
- Remote Monitoring
- Improve Availability
All the Optimization in the world doesn’t matter if the asset is down

85% equipment fails in spite of calendar maintenance – aviation company

63% of scheduled maintenance is unnecessary – automation vendor
Are they relevant?
IOT Solutions > Asset Performance Management

- Corrective Maintenance
- Predictive Maintenance
- Condition based Maintenance
- Periodic Maintenance

Event Criticality:
- Too Early
- Too Late

Maintenance Costs:
- Corrective Maintenance
- Predictive Maintenance
- Periodic Maintenance
- Condition based Maintenance

Availability:
- Preventive Maintenance Strategies
W H E N

O

W H Y

an asset will fail and **WHAT** to do?

Giving time to plan
IOT Solutions > Our offering

- IoT Edge Devices
- Gateways
- Cloud
- Analytics on AI / ML
- Front end Applications
- Third Party Integration

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IoT Solutions > IoT Devices and Gateways

Third Party Integration

Front end Applications

Analytics on AI / ML

Cloud

Gateways

IoT Devices
for assets & sensors

Digitize
any physical parameter

Edge Processing
to create actions in the field

Gateways / RTUs / Dataloggers
for connecting IoT devices

Connectivity
wired / wireless, short / long range, various protocols

Protocols
TCP/IP, MODBUS, CAN, MQTT etc.

Digitize any physical parameter to create actions in the field.
IOT Solutions > Cloud

- Third Party Integration
- Front end Applications
- Advanced Analytics (AI/ML)
- Cloud
- Gateways
- IoT Edge Devices

Cloud

Data Ingestion
Data Processing
Data Storage
API Integration

Amazon Web Services
Microsoft Azure
ServiceNow
ServiceMax
IOT Solutions > Advanced Analytics (AI/ML)

- Third Party Integration
- Front end Applications
- Advanced Analytics (AI/ML)
- Cloud
- Gateways
- IoT Edge Devices

- Data Pattern Identification
- Image and Video Analytics
- Predictive Modeling
- Feature Engineering
- Data Exploration
- Automated Insights
IOT Solutions > Front End Applications & Integration

Third Party Integration

Front end Applications

Analytics on AI / ML

Cloud

Gateways

IoT Edge Devices

Desktop and Mobile Applications

Web based Applications

Visualization of Data

Alerts and Notifications

Configure IoT devices and Gateways

Integration with Field service management S/Ws
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<th>Smart Buildings</th>
<th>Smart Cities</th>
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<tbody>
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<td>Ramakrishna Housing</td>
<td>Ford</td>
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<tr>
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<td>Rail Vikas Nigam Limited</td>
<td>Various House Holds</td>
<td>Amara Raja</td>
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