

Remote Diagnostics and Predictive Maintenance System

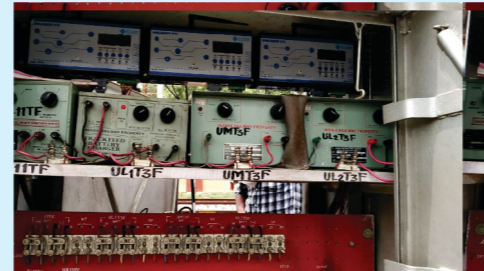
As per RDSO Guideline: RDSO/RDPM/FRS/2021



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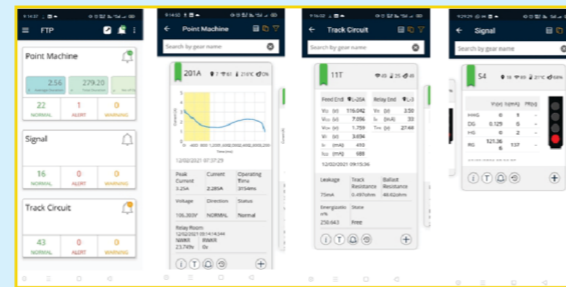
Alarms & Reports

- Automated Work Order based on the Asset Utilization and Health
- Threshold-based alarms
- Prediction of failure with chances of failure % and possible cause of failure
- Asset Utilization Report
- Health Report



Solution Features

- Cloud-based Machine Learning model
- IoT platform for integration of any assets
- Cross-platform application available for windows / Linux / Android / iOS / macOS
- Web-Based Yard layout
- Push Notification based alarms
- Alarms Integrated with WhatsApp & Telegram



What we Monitor?

Point Machine	OFC	Signals	Track Circuit
SSDAC	MSDAC	IPS	Battery
Signaling Cable	Relays	EI	DL

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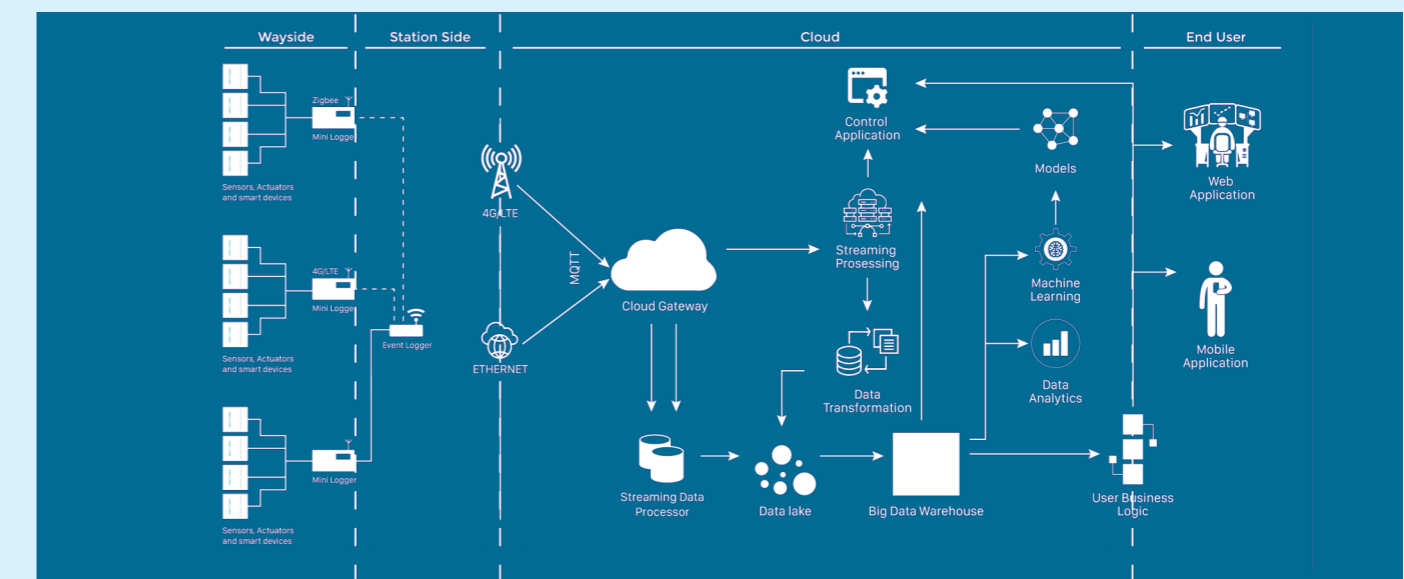
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Overview

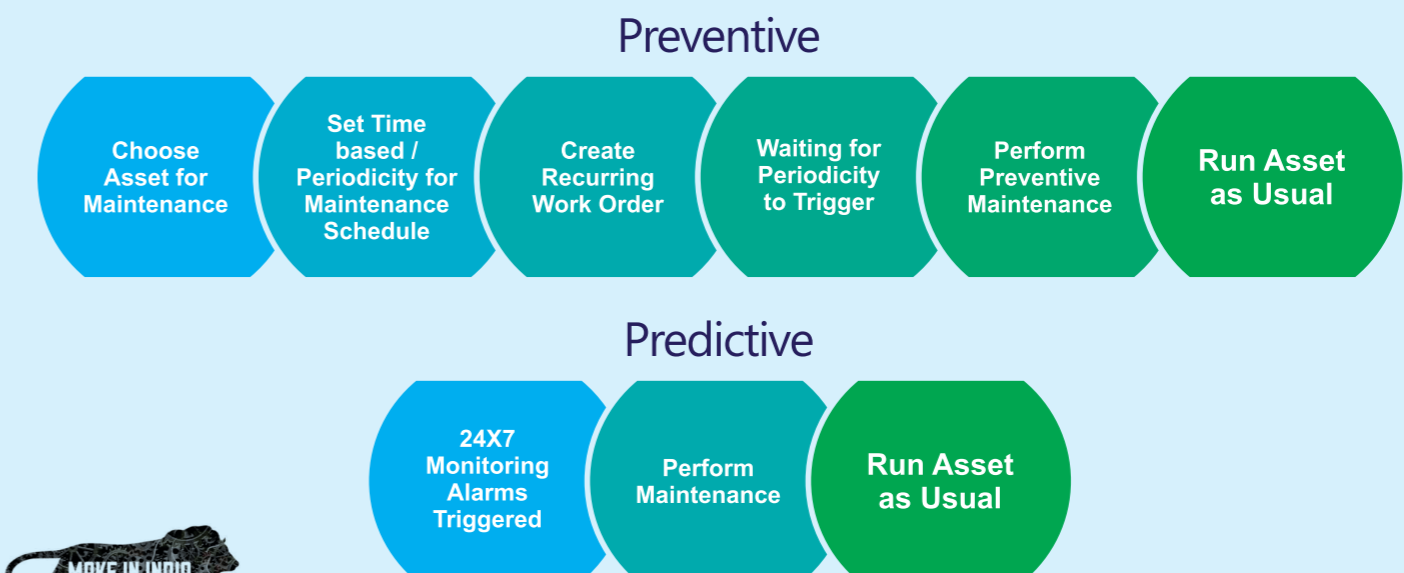
The objective of implementing the Remote Diagnostic and Preventive Maintenance system is to assist the maintenance team in taking appropriate maintenance action in advance to prevent the failure of signaling gears.

The remote diagnostics with 24x7 monitoring of signaling gears will help reduce the mean time to repair and aid maintenance staff in rectifying the signal failures.

The Centralized data collection and analysis with the help of advanced computing and machine learning will help predict systems/gears that are likely to fail.



Moving from Preventive to Predictive



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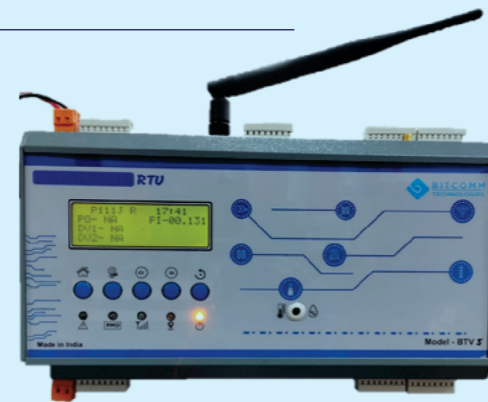


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Solution Component

Remote Terminal Unit

RTU Unit can be installed in the outdoor location box where it continuously measures the voltage and current of different gears. The microprocessor unit of the RTU is an intelligent unit that processes the data within milliseconds and sends them to the station gateway unit as well as in the cloud immediately. The communication module inbuilt in the RTU transfer the data wirelessly to its gateway. Wireless media are Zigbee / LoRa / LTE / Wif



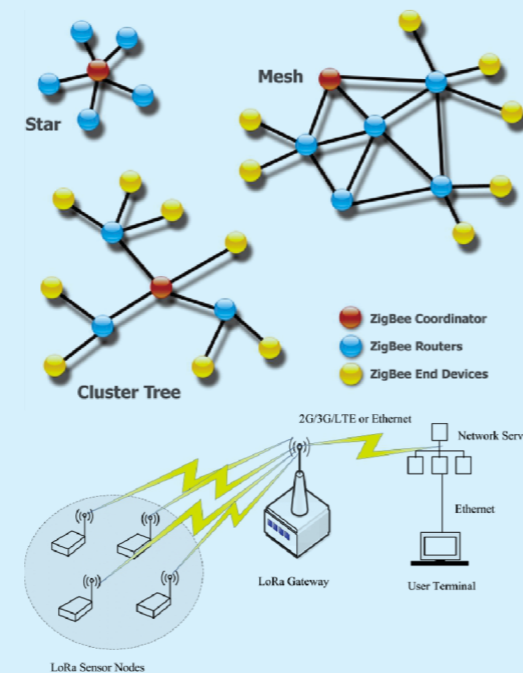
Sensors and Transducers

It is very important to measure the voltage and current with isolation. For the voltage Galvanically isolation method is used and for current non intrusive current sensors are used. Vibration sensors, Humidity, Temperature Sensors are also used for monitoring the health of assets.



Communication

Wireless Communication is the effective method of communication. It can be established using wireless - Zigbee an open source 2.4 Ghz Mesh networking system or LoRa an open source 868Mhz Star Networking system. 4G /LTE is the cheapest low maintenance widely used communication system in the field of IoT



Field Gateway

Field Gateway work as a data collector or concentrator which receives the encrypted data from field IoT Devices and transfer it to Edge Computer



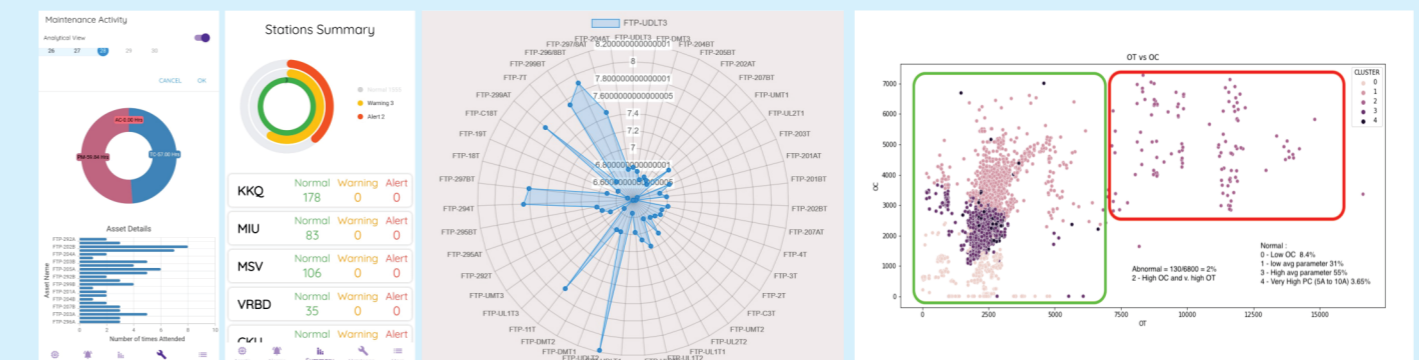
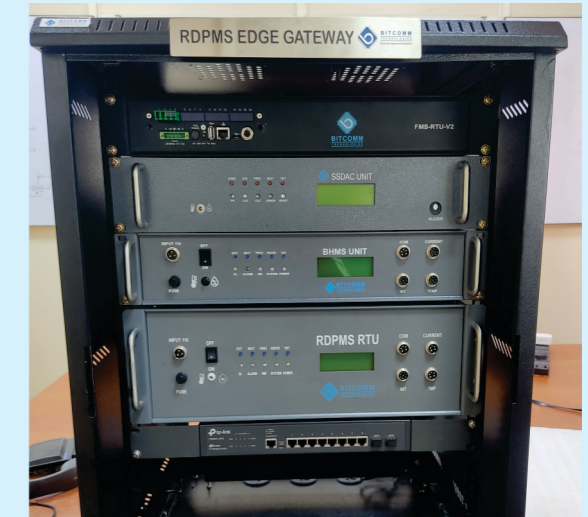
Solution Component

Edge Computer

Edge Computer process the data in real me and gives analytics and first level alarms to the maintainers. Edge computer is also capable to connect with third party applications via API/Protocol Converters/Data port. Edge Computer pushes the data to central cloud /server for higher level of data processing and analytics.

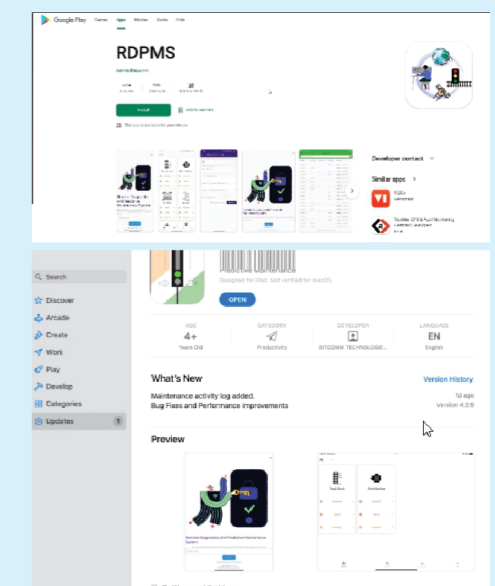
Cloud / Central Software

Cloud Software enables the higher processing of the raw data with the help of machine learning and artificial intelligence and provides unified access to all the connected IOT device. With additional computational power gives more precise and accurate alarms to the users.



Maintenance Terminal / Mobile Application

Maintenance Terminal at station to view history of data, alarms, configuration and analyzed the data with the help of edge software. Android /IOS based Mobile application for easy access of the data from anywhere through connected internet. Real time push notification gives more details of the failure occurred.



Outdoor

Point Machine / Signals Track Circuits - DC & AC Battery Chargers / Axle Counters / Relays / Signaling Cables

Indoor

EI System via Diagnostics Ports / Data Logger Identified Relays / Earth Leakage Detector IPS / Battery / Block Instrument Error Codes from AXLE Counter Reset Box