

TTPS

## Transportation

### Preventive Maintenance System IoT Services to Tuticorin Thermal Power Station.

## Business Scenario

Tuticorin Thermal Power Station is Called as TTPS which is located in Tuticorin District of Tamil Nadu state – India. For TTPS, Coals are coming from various parts of the Country and abroad through Tuticorin Port Trust (Surface Transport). From Harbor point to TTPS Coal Handling Plant (CHP) they use conveyor belts or Heavy Duty Transport Vehicles. Inside Coal Handling Plant (CHP), TTPS Engineering Division use Heavy Duty Equipments to Load, Move and Unload the Coal to the desired destination point inside the Production Plant Unit. The Heavy Duty Equipments are working in 35 to 40 Degree Celsius Temperature.

## Problem Arena

The TTPS Engineering Division Maintenance Team is having their office in TTPS and this location is 3 KM away from the coal Handling Plant. The Equipment operators if anything happens to the Engine and when the equipment is down , they would communicate to the Engineering team over phone and TTPS Maintenance Team would take minimum 15 minutes time reach the problem spot. Then Maintenance team would initiate Trouble Shooting process, Check the Requirements of parts and availability of spares to complete the work. The entire problem-solving lifecycle takes 3 hours / 3 Days / 3 weeks / 3 Months depends on the severity level. The Current problem solving technique consumes more time to diagnose which increases the Equipment down Time, increases the Maintenance Cost and Certain Level of Production loss.

## Functional Solution Methodology

1. Heavy Duty Equipments should be fitted with suitable sensors measuring Water Temperature, Oil Temperature, Oil Pressure, RPM and Hour Meter Readings and these Sensor Devices using HTTP / MQTT Protocol, transfers the data into Local or Remote Receiving systems by using (LoRaWAN) Low Range Wide Area Network.
2. LoRaWAN is the license free frequency bands, sends low data volume at low frequency and Highly Secure data transfer by Transport Layer Encryption which helps to transfer data from Sensor to Local or Remote Receiving System and then to SAP Cloud environment.
3. These Remote sensing data are compared with Equipment Threshold values if there is any variation that would generate Event Management System.
4. The Event Management Scenarios would perform Proactive Analysis that would Initiate the new level of insights such as Trouble Shooting, Alerts and Escalation Processes.

5. The Alert would raise the voice Alarm (Siren) to stop the equipment on time to avoid major damages. Besides Alerts would generate next plan of action check list to verify and perform the desired work to the Engineering team creating separate workflows.
6. Then the Engineering team completes the tasks, conduct trial run and watch the Dashboard parameters and then release the Equipment to the Production team.
7. The above points that we discussed Sensor Data Process, Proactive Analysis of new variable data that provides new level of insights (Alerts & Escalations) that induces Maintenance Team interact in real problem area which increases the business productivity. This is called as Machine Learning.

### Technical Solution Strategy

1. Heavy Duty Applications are fitted with Sensors. Sensors are transmitting data to Local Server or SAP Cloud System using LoRaWAN – Low Range Wide Area Network
2. SAP Cloud Platform IoT services and SAP Edge Services that enable Powerful Micro services, extending the Intelligent Enterprise to the Edge.
3. Essential Business Function Service provides Business Context (Data and Process) at the Edge.
4. Streaming Services analyze IoT Data streams in Real-Time based on business logic.
5. Predictive Analytics Services deploy, execute and update predictive analytical models at the edge.
6. Streaming Service continuously analyzes the data and sends score as an Event to the Streaming Service.
7. The Streaming Service applies business rules and drives an action.
8. The Action is fulfilled by system generated tasks
9. Maintenance Team gets the Alert and Escalations performs the auto generated jobs, completes the Trial run and release the Equipment to the Operator.

### Business Values:

1. TTPS has an Automation Process for conducting Preventive Maintenance System.
2. Reduces Equipment Down time
3. Reduces Maintenance Cost
4. Preventive Maintenance System induces Quality Maintenance Support that increases Productivity.