IOT - CONNECTED MINE, CONNECTED PORT

Intel IoT Group
INTEL’S STRATEGY FOR IOT - ACROSS VERTICALS

CONNECT THE UNCONNECTED

INTELLIGENT, INTERCONNECTED THINGS

AUTONOMOUS, SOFTWARE-DEFINED SYSTEMS
Achieve Operational Excellence

- Connected Plant/Port by non cellular based low Power long range connectivity solution.
- Real time geo location tracking of vehicle movements within a secure personalized network.

People Movement & Safety measure

- In remote and hazardous work location, tracking people’s location and Safety.
- SOS button feature for worker to raise Alarm in case of emergency.

Predictive Maintenance, Asset Theft /leakage monitoring

- Tracking real time conditional monitoring of assets by sensors – Temp, Pressure, Velocity, tilt, Vibration, Fuel level in case of oil tanker/water tanker etc.
- Tracking vehicles real time conditions from vehicle CAN data – Engine Temp, Pressure, RPM, Fuel level, Fuel temperature, Mileage from distance travelled
Connected Port – Logical Architecture

On-Premise or Off-Premise Data Center or Cloud

3rd Party Systems

Network Infrastructure

Cellular / Satellite Wi-Fi Bluetooth 802.15.4

Transportation & Freight Management

Display Sensor Speakers Vehicle bus Ethernet

U/D MCU Vehicle Bus Gateway

Sensor Gateway

Vehicle bus OBD-II dongle

Warehouse & Distribution Management

Ethernet Sensor Actuators

U/D MCU Gateway

Phone

Wearables

Tablet

Gateway

Data Transport Broker Data Ingestion & Processing Persistence & Concurrency

Asset Info, Policies & Metadata

Device Attestation Security, Configuration & Management

Analytics

Compute

Storage

Query

Business Logic & Rules

Services Orchestration

APIs, API Libraries, SDK

Business Portal

Partners

Data Center Management & Security (Monitoring, Auto-scaling, Logging, Eventing)
Connected Mine: Use Case

Customer Problem:

- Extending life of high value assets:
  - Trucks, Tires and other Mining Equipment
  - Create road roughness models

- Transmitting sensor data to cloud for analytics is challenged due to connectivity issues. Wi-Fi and cellular connectivity spotty.

- Sensor data Aggregation

- Local data ingestion even when the connection is spotty

- Local and Cloud Analytics
Connected Mine Solution (Continued)

Gateway
[Intel CPU: Atom, Core, Xeon, FPGA]

GG Core

HW Capabilities API

AWS IoT Device SDK
Sensor Agent
Conn. Agent

AWS Services

Business Applications

Real-time and historical data to analyze route roughness

Instrumented on Truck

Strut Pressure Sensor
GPS Sensor
IMU Sensor
LTE
BLE/WiFi

[Intel CPU: Atom, Core, Xeon, FPGA]
Connected Mine Reference Design

Metrics
- GPS
- 9DOF
- Pressure
- 3g/WiFi signal

Software
- WR Pulsar OS
- AWS GreenGrass

Secure MQTT

Forwarding Data

Real-time data source

GreenGrass performs edge analytics, aggregation, processing and rule engine.

Real-time and historical data to analyze route roughness
Intel - Honeywell Connected Freight Solution launched in May 2017

https://www.youtube.com/watch?v=JL3CoO5z2_I