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IoT Gateway

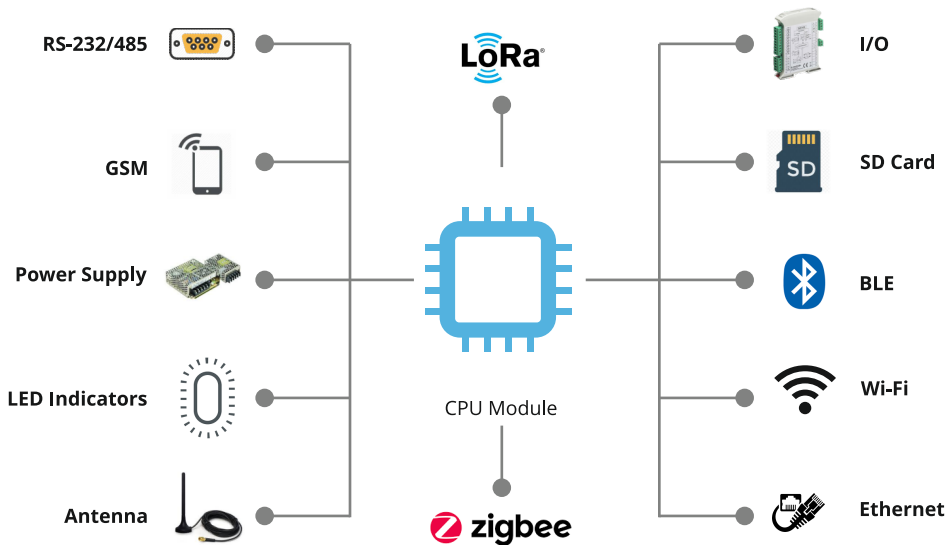


*Edgelytics IoT
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● www.edgelytics.in

IoT Gateway

Edgelytics IoT Gateway's modular design offers flexibility to support multiple communication interfaces as required. The high level design mentioned below helps explain this point -



Supported in base version

Can be Supported

Supported in High-end version

IoT gateway is an electronic or embedded device that acts as a bridge between on-site devices/equipments like sensors/loggers/programmable controllers and server hosted on-site or in the cloud. The number of interfaces gateway supports typically determines the type and number of on-site devices it can be interfaced with and also its applications and end usage.

- Supports interfaces like BLE, Wi-Fi, Ethernet and Bluetooth. Additionally, interfaces like ZigBee, LORA or any particular interfaces can be provided if required. In general the gateway design is flexible enough to customize it to accommodate client requirements
- Can be connected with data Loggers, energy meters, and programmable logic controllers (PLC) over serial or Ethernet interface using communication protocols like Modbus, BACNet or proprietary protocols (if protocol document is available/provided)
- Can communicate with Analog/Digital Sensor Hubs where individual sensors (temperature, pressure, flow) are aggregated and connected with Gateway over serial bus (SPI) or I2C.
- Offers enough space and computing power to implement Edge Analytics
- Supports MQTT, HTTP (REST) and TCP-IP to communicate with cloud platforms like AWS, Microsoft Azure, GE Predix and others

IoT Gateway



Gateway Specifications

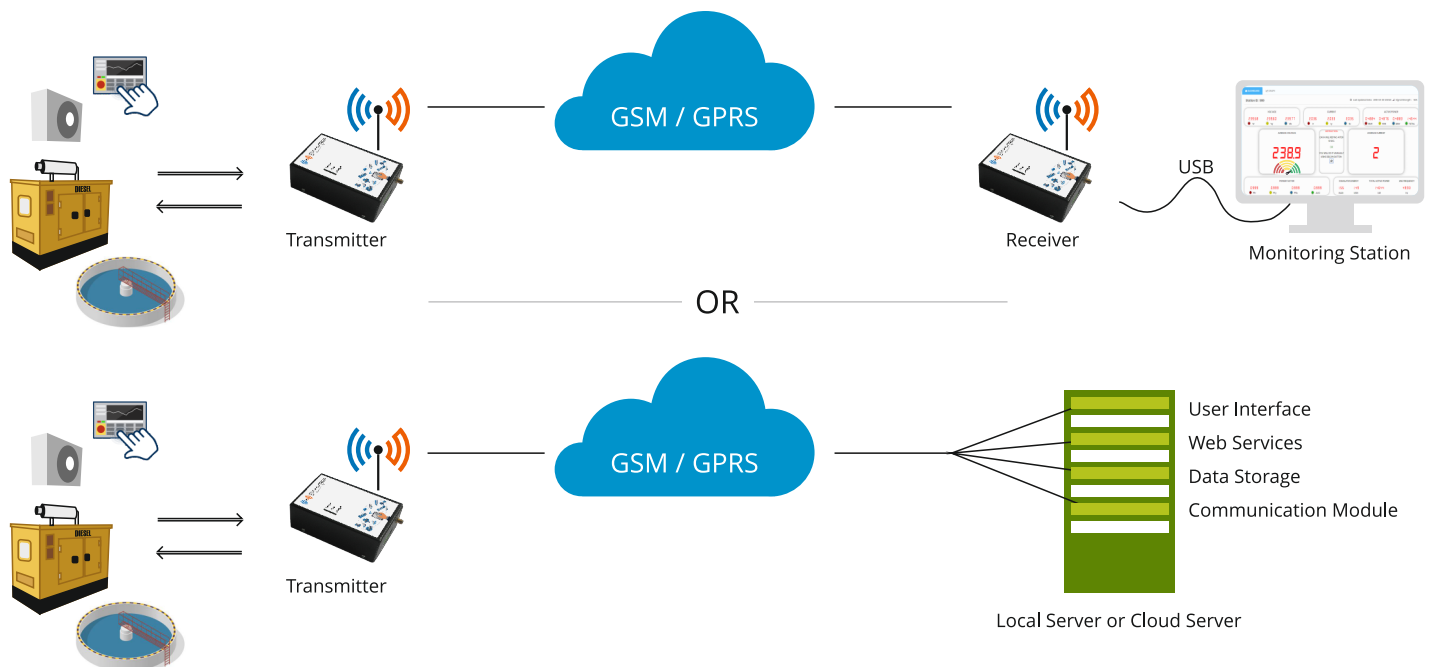
Processor	ARM based
On chip Flash Memory	330 KB
On chip RAM	32 KB
External Serial Flash	120 MB
Firmware Upgrade	Firmware Over The Air (FOTA)
Power	AC Power (110 - 240V, 50 -60 Hz) or 8-36 V DC / AC
Cellular	Quad Band GSM – 850 MHz, 900 MHz, 1800 MHz and 1900 MHz
Operating System	Embedded Real Time OS (RTOS)
Connectors	Power, RS 485 Communication and Antenna
LEDs (Alert Notification)	Communication, GSM network status, Power Status
Server Communication	HTTP, TCP-IP, MQTT
Server Security	SSL
Communication Protocol	CANBUS, MODBUS RTU
Operating Temperature	0 to 70 DegC
Humidity	5% to 90%
Vibration	BS EN 60068 -2-6, 2G for 8-500Hz
Hardware Protection	Over Current Cut Off 1.5 Amp, Watchdog Timer, Reverse Polarity, Load Dump 120 Volts
Switch	Always on
Antenna	GSM Quad Band External Magnetic antenna (3m length)
Enclosure	MS (can be customized as per client needs)
Store and Forward on reconnection	Yes
Ethernet	No (can be provided if client needs it)
Wi-Fi	No (can be provided if client needs it)
External Memory (SD Card)	No (can be provided if client needs it)



Typical On-Site Deployment Scenario

IoT Gateway typically connected to one or multiple industrial equipments (like HVACs, Diesel Generator Sets, Water Treatment Plants) and/or process monitoring instruments (such as PLCs, PID Controllers, Data Loggers). IoT Gateway communicates with on-site equipments and instruments and passes on the data, either raw or processed, to the server. Server can be hosted on site or in the cloud as per client preference. The diagram below also demonstrates SMS based communication between two IoT Gateways, one acts as transmitter and the other as receiver. The receiver gateway collects the data from "one or several" gateways and provides the data to PC based software/server.

This is how the companies are initiating digital transformation or migrating to Industry 4.0 to integrate operational data with manufacturing execution systems for pro-active decision making.



IoT Gateway Applications

DG Set Monitoring

Gateway communicates with electronic controller fitted inside DG Set Panel to periodically collect the important parameters like voltage, current, power, power factor and diesel level. Gateway then processes and sends these parameters to central server over GSM/GPRS. The end user accesses the server to view reports, alarms, trends and other useful screens to monitor DG Set operations. Operations and Maintenance team members benefit from this as they can anticipate the problem by paying attention to alarms and parameter trends. The DG Set Manufacturer has become proactive in planning site visits, optimizing service requests and replenishing inventory at regional offices. This has resulted in customer appreciation and saving of O&M costs by 10%.

HVACs/Chillers Monitoring

Gateway connects with HVAC Controller over RS-485 to periodically collect, process and format the data to be sent over to Cloud based monitoring system using GSM/GPRS. The cloud based monitoring allows the multi-national HVAC/Chiller manufacturer to monitor geographically distributed chillers round the clock. The aim is to optimize O&M costs and improve CRM by being proactive in handling customer requests

Waste Water Treatment Project

This is a turnkey project to reclaim the water. The solution consists of valves, flow meters, pH sensors, reagents, dispensing pumps, IoT gateway and cloud based monitoring software. The herbal/organic reagent based process is designed to reclaim 96% - 98% of water. Gateway tracks the process by collecting parameters and sends them to the cloud using GSM/GPRS. The cloud based system allows to calculate amount of water reclaimed which is then used for billing. The herbal reagents required to maintain pH and treat waste water needs periodic replenishing, which the cloud based system manages easily for both the end user and outsourced O&M team.

IoT Gateway is a device that acts as a bridge between two entities; at one end there are the process/shop-floor devices & equipments and on the other end locally/centrally hosted monitoring system. IoT Gateway is used in monitoring industrial assets like DG Sets, HVACs/Chillers, Water Treatment Units or boilers can also be monitored. IoT Gateway when used for monitoring industrial assets also referred as IIoT Gateway (Industrial IoT) and the vertical is typically known as IIOT (Industrial IoT)

Here is a typical end-to-end IoT Gateway based application for monitoring of DG Set.

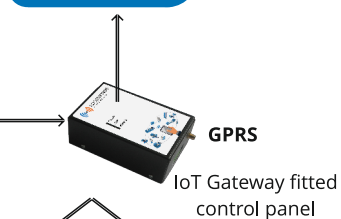
At Customer Site

Engine Parameter data to servers through Vendor Cloud Services

Diesel Generator



SMS to customer and service dealer in case of Low Fuel

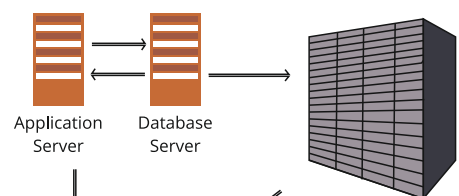


Email to Service Dealer

FIRE WALL

At Service Company Site

Public IP / Domain S/W



Critical Alerts converted to Serv Req in CRM. E.g. Low fuel, Overheating



24x7 HelpDesk

Help Desk monitors and follow-up with Service Dealers for actions



Website

to Monitor & Control

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