

# Industrial IoT Gateway



## Highlights

LoRaWAN Gateway with 8 Channels

MODBUS / PROFIBUS Support

MQTT Protocol Support

Cloud Ready Gateway

Modular Architecture

LoRa



WiFi

PROFIBUS

Modbus



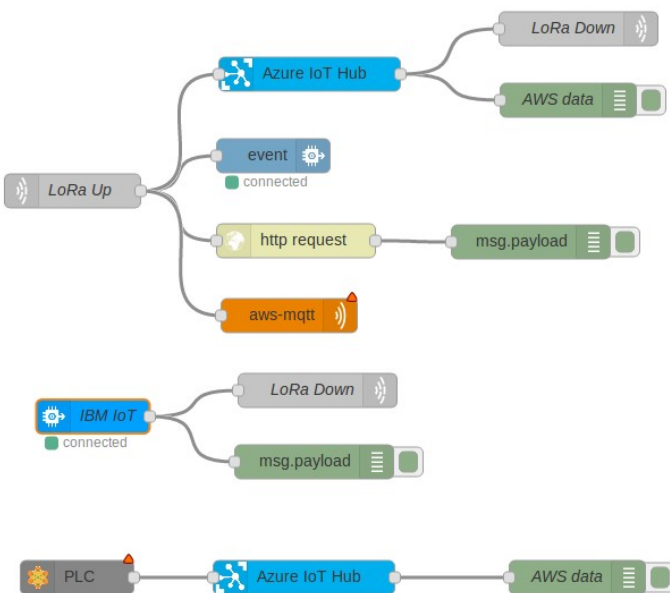
## Gateway with a Modular Architecture

With the ever increasing topologies in the IoT Space ranging from LoRa to Bluetooth to WiFi , there is now a need for a Single gateway adaptable to all . CASCADEMIC IoT Gateway provides the user this adaptability and modularity from software as well as hardware point of views, all the wireless and wired interfaces built on modular architecture. This plug and play architecture greatly reduces the prototype development life cycle and provides developers and integrators with a multitude of options with regard to the feature set of the Gateway.

## Node – Red on the Gateway

The Gateway has a built in Node-RED Application Building environment .

Node-RED is an open-source powerful visual tool for building Internet of Things. It simplifies wiring of hardware devices, API and online services together in a new and interesting way. Node-RED allows an easy way to connect industrial automation controllers to cloud services such as IBM Watson IoT™, and Microsoft® Azure® . These nodes make IoT application development simpler, easier to repeat, and faster to scale up.



## Enabling Cloud Intelligence

The Gateway is built cloud ready and can be integrated with any of the various cloud platforms with minimum effort. With the need for billions of devices to be connected to the internet in the emerging IoT era, the Gateway sits at the intersection by aggregating the various sensor data, device management of nodes with the support for various types of sensors and protocols. System integrators, application developers and embedded developers find great use or this gateway as it helps them in minimizing their time to market, reducing their cost of ownership and bringing about maximum utility from their respective applications.



## Gateway as a LoRaWAN Concentrator

LoRaWAN is a protocol designed for creating large-scale public networks with the Gateway as the heart and brain of the network. LoRaWAN network architecture is typically laid out in a star-of-stars topology in which the Gateways is a transparent bridge relaying messages between end-devices and a central network server in the backend .We have indigenously developed the LoRaWAN network server which manages the data rate and RF output for each end-device individually by means of an adaptive data rate (ADR) scheme. The Gateways enable real time monitoring of the low power LoRaWAN sensor nodes with in the range of 5km.

Hardware	
Processor	<ul style="list-style-type: none"> <li>NXP i.MX6 SOM</li> <li>ARM Cortex A7 Core based CPU</li> <li>528 MHz / 1.2GHz*</li> </ul>
Memory	<ul style="list-style-type: none"> <li>DRAM , NOR and NAND Flash Memory Standards</li> <li>256 MB RAM*</li> </ul>
Storage	<ul style="list-style-type: none"> <li>SD Card ( Expandable up to 32GB )</li> <li>eMMC Support</li> </ul>
Power Supply	<ul style="list-style-type: none"> <li>9 – 32V DC</li> <li>7.4V, 1100mAh Rechargeable Battery Back Up</li> </ul>
Software	
Operating System	<ul style="list-style-type: none"> <li>UBUNTU 14.04</li> <li>YOCTO LINUX</li> </ul>
Wireless Protocol Support	<ul style="list-style-type: none"> <li>LoRaWAN Network Server and Forwarder</li> <li>MQTT</li> <li>CoAP</li> <li>Firmware over the Air (FOTA)</li> </ul>
Protocol Support	<ul style="list-style-type: none"> <li>MODBUS</li> <li>PROFIBUS</li> </ul>
Security	<ul style="list-style-type: none"> <li>Secure boot</li> <li>128 bit AES</li> <li>SSL / TLS Layer</li> <li>Firewall (IP tables) &amp; IP routing</li> </ul>
Connectivity - Wired	
Serial	<ul style="list-style-type: none"> <li>1 * RS232</li> <li>1 * RS485</li> </ul>
Ethernet	<ul style="list-style-type: none"> <li>2 * 10/100 LAN</li> <li>RJ45 Port</li> </ul>
USB	<ul style="list-style-type: none"> <li>2 * USB 2.0 OTG*</li> <li>1 Debug Serial micro USB</li> </ul>
Peripherals*	<ul style="list-style-type: none"> <li>Analog IO Card</li> <li>Digital IO Card</li> <li>RGB LCD Support</li> <li>HDMI Display</li> <li>Parallel Camera Interface</li> </ul>

\* Custom configuration

## Connectivity - Wireless

LoRaWAN	<ul style="list-style-type: none"><li>• 8 Channel Gateway</li><li>• Operation Band :434 MHz , 868 MHz, 915MHz</li><li>• -142.5dBm sensitivity @300bps</li><li>• 27dBm max output power</li><li>• LoRaWAN Protocol Class A and Class C</li></ul>
Wi-Fi	<ul style="list-style-type: none"><li>• 802.11b/g/n</li><li>• Client and Access Point Mode</li></ul>
Bluetooth Classic / Bluetooth Low Energy	<ul style="list-style-type: none"><li>• BT Version 4.2</li><li>• BLE Support</li><li>• GAP, SDP, SPP, and GATT profile support</li></ul>
WWAN – 3G / 4G / LTE	<ul style="list-style-type: none"><li>• Quad Band GSM ( 850 / 900 /1800/1900 MHz )</li><li>• HSPA+ Data Rate – 42/5.7(DL/UL)[Mbps]</li><li>• LTE – Data Rate – 100/50(DL/UL)[Mbps]</li></ul>

## User Interfaces

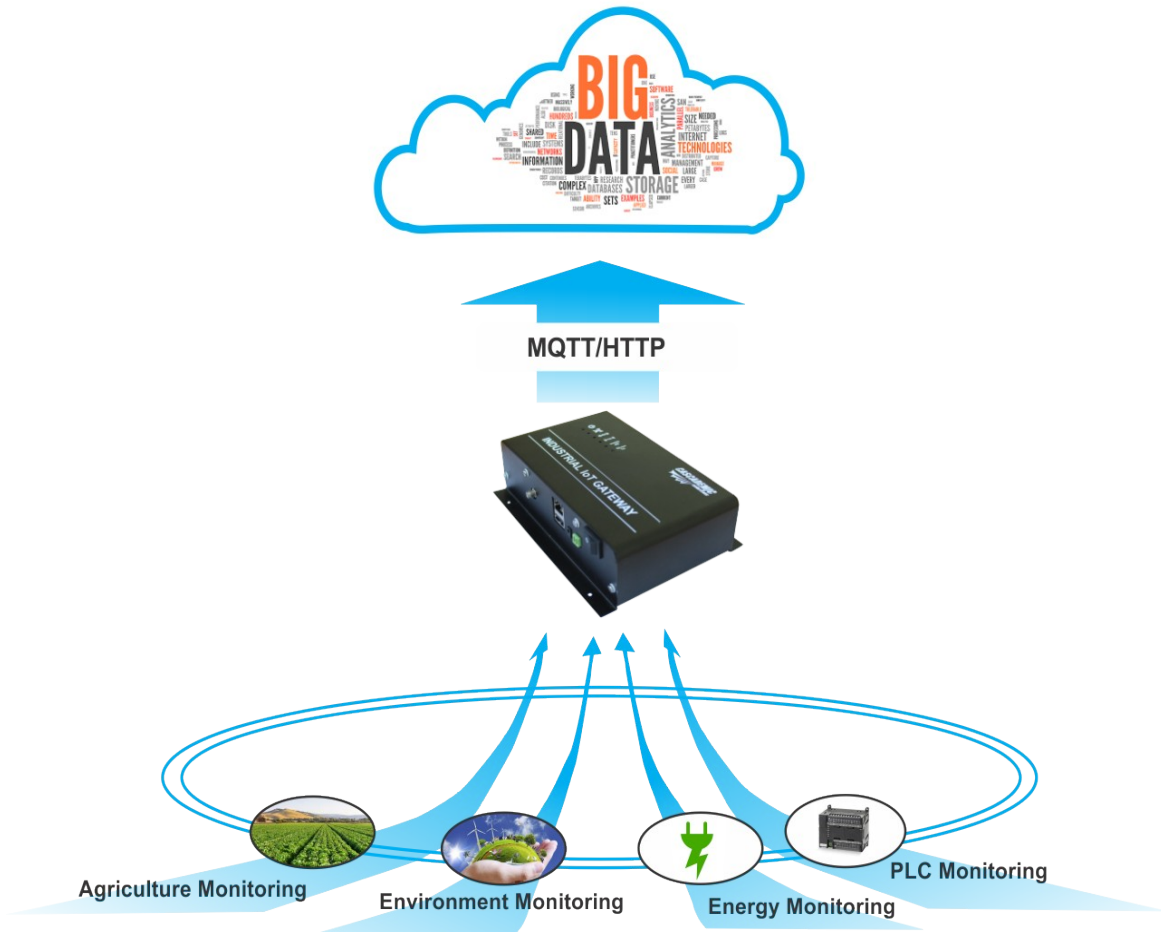
LED	<ul style="list-style-type: none"><li>• Power Status LED</li><li>• Public Network Connection Status</li><li>• LoRa TX /RX</li><li>• Wired Interface Connectivity Status</li><li>• System Error</li></ul>
Power Switch	<ul style="list-style-type: none"><li>• On / Off Power Switch</li></ul>
Reset	<ul style="list-style-type: none"><li>• System Reset Switch</li></ul>

## Environment Parameters

Operating Temperature	<ul style="list-style-type: none"><li>• 0deg.C to +50deg.C</li><li>• -30deg.C to +70deg.C</li></ul>
Storage Temperature	<ul style="list-style-type: none"><li>• -40deg.C to +85deg.C</li></ul>
Relative Humidity	<ul style="list-style-type: none"><li>• 5% to 95% Non Condensing</li></ul>

## Mechanical Parameters

Dimension	<ul style="list-style-type: none"><li>• 19X11.5X4.5mm</li></ul>
Tamper Proofing	<ul style="list-style-type: none"><li>• Yes</li></ul>
Weight	<ul style="list-style-type: none"><li>• 900grm</li></ul>
Chassis	<ul style="list-style-type: none"><li>• MS sheet metal enclosure</li></ul>
Mounting	<ul style="list-style-type: none"><li>• Wall mount, Table top, Din rail</li></ul>



## Enabling Industry 4.0

The digital era being highly disruptive in the Industrial space, has shaken up the business models and the core business of many industries. Smart Machines continually share information about current stock levels, problems or faults, environment parameters in industries, change in orders and demand levels. The processes and the input output ports controlled by the Programmable Logic Controller(PLC) drives the complete supply chain and in turn the revenues of efficiency of the industries. CASCADEMIC Gateway is instrumental in the monitoring of these PLC's with real time analysis and the feedback helps in boosting efficiency and optimizing throughput times, capacity utilization and quality in development, production, marketing and purchasing.

## Smart Agriculture

With agriculture being the backbone of the economy of many developing nations, there is always a need to reduce the operational cost and maximize the productivity and profits from the farm. CASCADEMIC Gateway acts as a LoRaWAN Concentrator along with Soil moisture and Temperature sensor nodes, Ambient Temperature and Humidity parameters are monitored across farm area and the data is transmitted in real time to the Gateway and then on to the cloud where there is considerable amount of analytics done based on the type of crops and the amount of water needed, this analysis is then fed to the Drip irrigation system to control and provide the optimum condition of soil for efficient growth of crops.



Industrial IoT Gateway



Energy Monitoring Solution



LoRa Connectivity Solution

# Innovation towards Embedded Planet

Cloud Connectivity Solution



Environment Monitoring



Thermal Printer



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