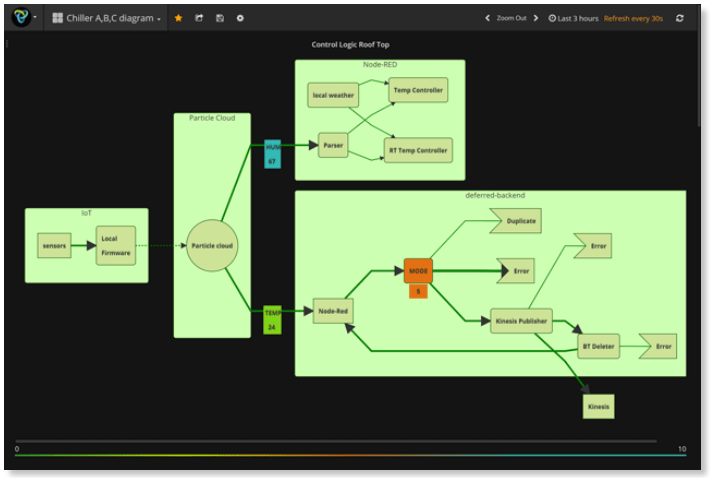
Trillium BMS - control anything online. Easily!

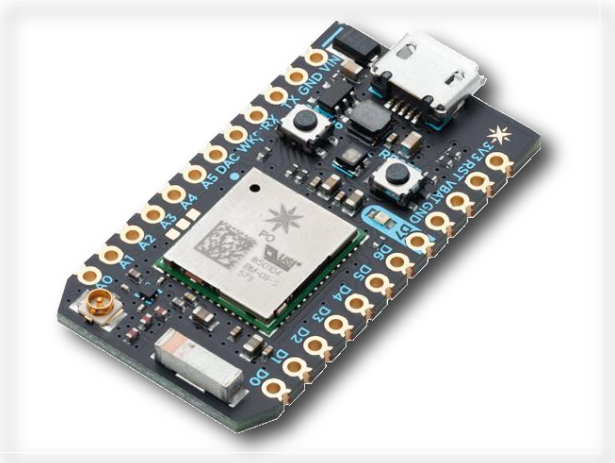
Overview:



Trillium Building Management System is a BMS solution designed to be highly scalable both in size and functionality . It can be as lightweight and easily deployable as required or expandable in advanced functionality and connectivity utilizing for example IBMs Watson Supercomputer for artificial intelligence diagnostic and automatic service dispatch. As opposed to most traditional BMS, because of its open source, non-proprietary design, its expandability is not limited by the offerings of a particular brand or manufacturer. Trillium interfaces between the virtual and the real world with a network of wireless sensors that are capable of monitoring a great variety of parameters such as temperature, humidity, air flow, occupancy, tank levels, fire suppression monitoring, electricity consumption, lighting, and security related parameters.

The Trillium package is built upon three main pillars: the front-end user interface, the backend and cloud data storage, and the physical, real-world data collection.

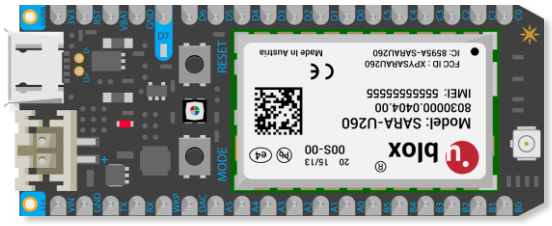
Data Collection and Physical Implementation:



The data collection is primarily built around the Casaria IOT2415 data collection node, featuring one of two third-party Particle modules capable of communicating either through IEEE802.11 b/g/n Wi-Fi or 3G cellular connection (Photon or Electron, respectively) and a powerful ARM Cortex M3 application processor (120 MHz clock frequency, 1MB flash memory, and 128kb RAM). Thanks to its wireless connectivity, the IOT2415 can be firmware upgraded and reprogrammed over-the-air for unlimited future adaptability. As an open-source platform, there are tens of thousands of libraries available in order to adapt the system to virtually any future or legacy interfaces or sensors.

This module serves as the central hub providing the interface to the network, signal conditioning logic (value filtering, scaling), input/output handling through analog and digital I/Os, and virtually all automation and field bus protocols. The application processor contains a very powerful set of 15 hardware communication interfaces (6 USRTs, 3 SPIs, 3 I^2C, 2 CAN, and 1 SDIO). It also features 17 hardware timers, and 2 12-bit digital-analog converters and 3 12-bit analog-digital converters capable of sampling up to 6 million samples per second.

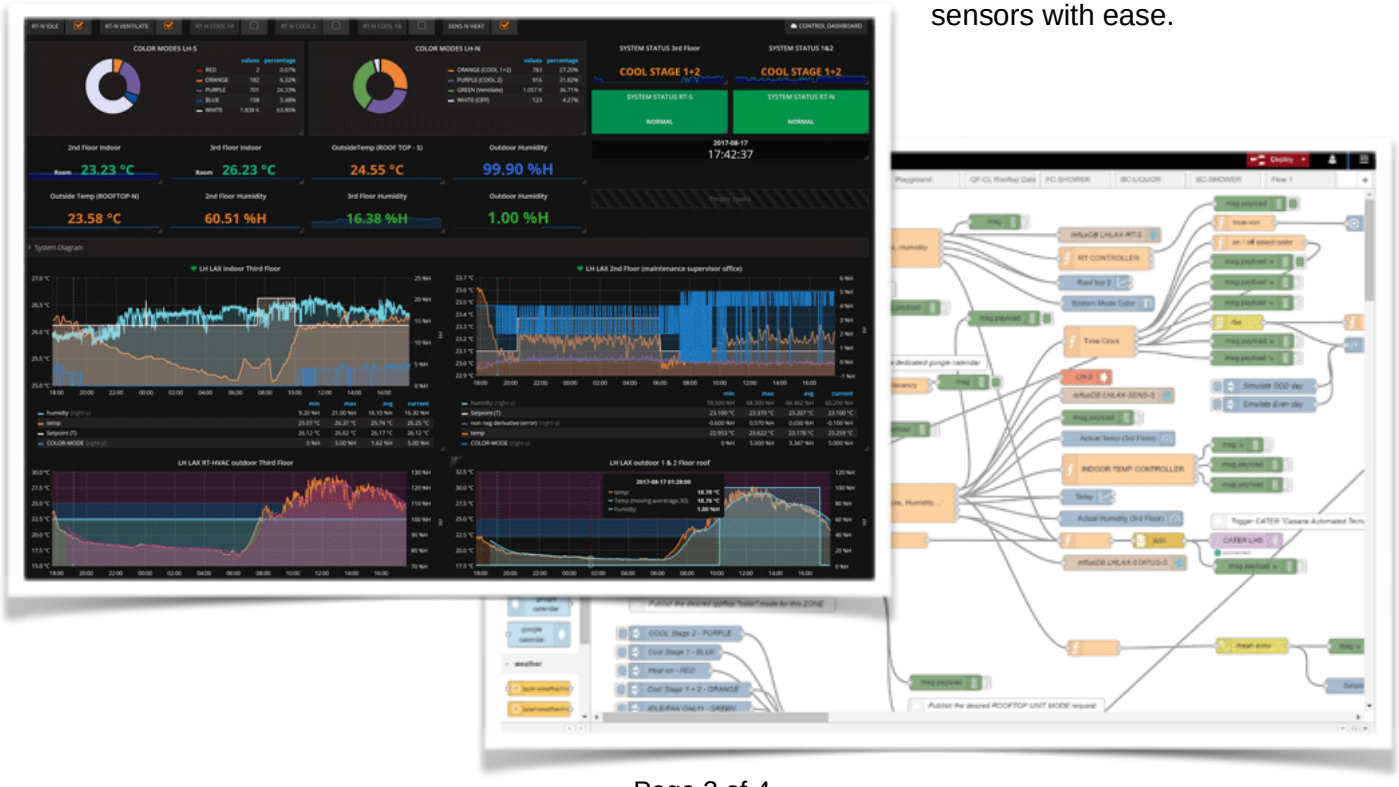
The standard analog inputs are capable of accommodating process values represented as 0…10V, 0…20mA, 4…20mA analog measurement values. The digital interface is capable of communicating through protocols such as 1-Wire, Bacnet, C-Bus, DeviceNet, LonWorks, and Rockwell DF1 using physical interfaces such as RS232, RS485/422/423, and CAN. The outputs provide localized automation/control based on input



ELECTRON (pin compatible) enables 3G communication

conditions or use remote control or parameter adjustments such as temperature control, fan on/off, fan speed, etc.

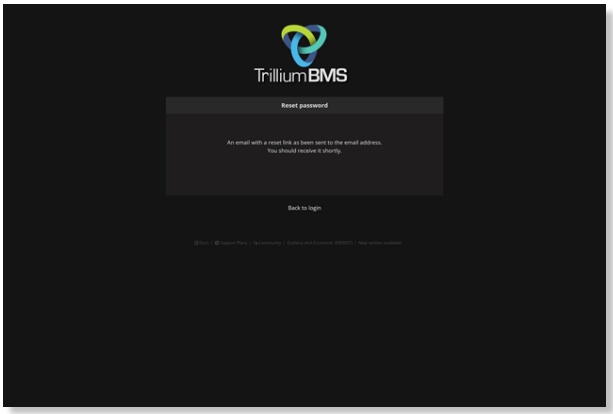
All that's needed to install/deploy the Trillium on site is the IOT2415, a wireless access point with Internet gateway, and a power supply (5V DC … 120VAC). A single IOT 2415 costs less than $200 and can handle up to 32 different sensors with ease.

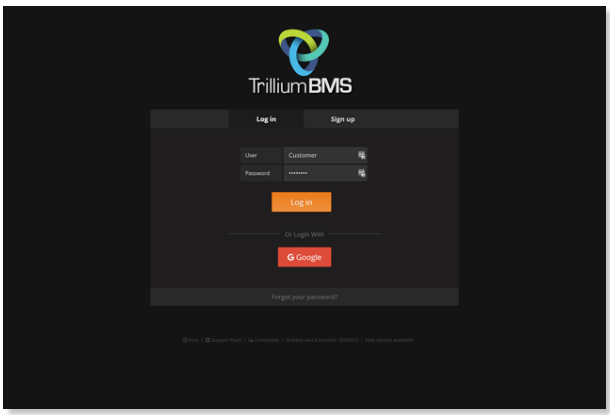


Cloud Data Storage and Backend

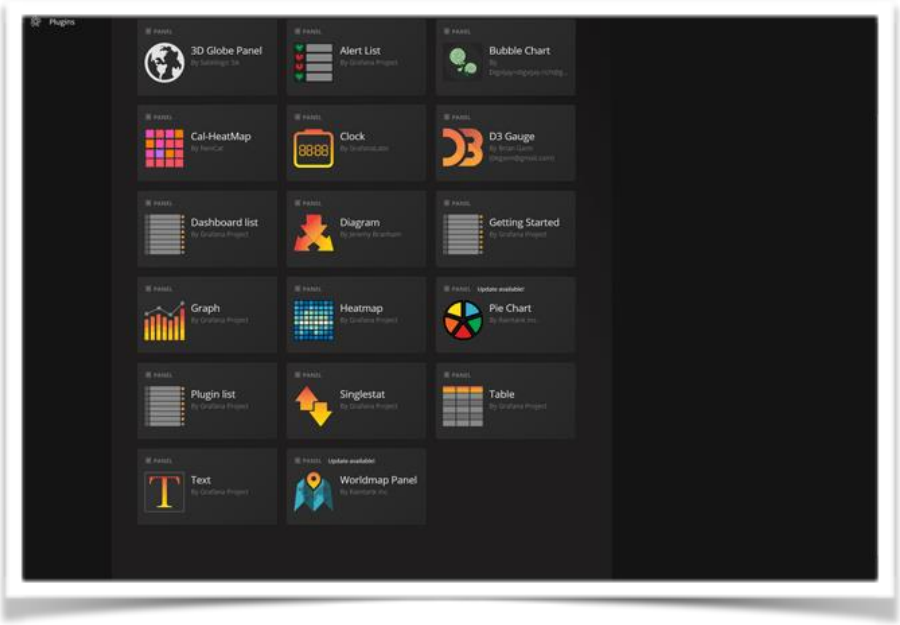
Trillium BMS is entirely based on open, non-proprietary architecture and is 100% cloud (Internet) based. It is available with full redundancy and infinitely scaleable multi-server/multi-core, with expandable redundant storage volumes providing practically unlimited storage. Aside from its wireless IOT sensor network, no local hardware is ever required. There are no costs for hardware, administration, backup, upgrades, local hardware, and software maintenance - period. The cloud hosted backend spans 4 core services/servers: InfluxDB Time series database (particularly powerful for time based data samples such as the ones encountered in BMS circumstances), Grafana presentation framework, Node-red IOT graphical programming tool, and graphical user interface for visualization and control (GUI) via Freeboard or Node-red with fully customizable (Javascript) basic to medium complexity GUI components.

Frontend and Graphical User Interface





From a user perspective, a single uniform and easily customizable menu system provides authentication (incl 2-factor), access to all BMS features, help system, and integrated user support system with support ticket system. Full integration in Casaria's eSUPPORT system and ERP software suite is available and configurable alarms can be set up to trigger a support request/technician dispatch automatically (currently in beta). All features are accessible by any Web browser from virtually any computer, tablet, or smartphone.



Dashboards are custom designed with intuitive panels expandable with custom plugins

Crisp high resolution graphics rendered in any browser (fully interactive AJAX/Javascript/gobased\ architecture