

## OPERATIONAL FEATURES



**Customizable to Your Needs:** Mango gathers all of your data, from all your locations into a consolidated rational format in the cloud, and harnesses it through powerful built-in alarming and event management.



**Built-in Analytics:** Mango provides a sophisticated event and alarming engine as well as integrated tools for generating trending analytics and perform functions that can be configured through the web interface on the fly to adapt to changes allowing deep data visibility and insight quickly.



**Reporting:** Create custom reports based on your data to meet your exact needs. Reports can be visually represented in any browser or exported to Excel documents. Additionally, reports can be sent via email automatically on timed intervals, or based upon specific events.



**Advanced Schedules with Exception Calendar:** Mango includes a refined scheduling system that can be cloud or edge configured. Schedules can be created at any interval with the ability for exceptions.



**Leading Edge Visualization:** Utilizing leading open source web development technologies, Mango's flexibility provides both a drag and drop editor and code view in standard HTML5 and AngularJS, so that users of varying experience levels can create, modify, or use data on their terms, as well as creating customizable user interfaces and control schemas based on this data.



**Built-in Scripting:** Beyond the built-in alarming and event engine, Mango includes a powerful scripting environment that allows users to write control algorithms or complex calculations.



**Portfolio Manager:** Mango allows integrators and end-users to quickly set up a complete global property portfolio, site-level metrics, or device-level data without the need to build dashboards or resort to complex tagging structures. From KPI overviews to site-level historical graphs and maps - anyone is a data expert with the Portfolio Manager. Using the easy drag-and-drop interface, create tabs of information personalized to individuals' roles and needs, and change them in minutes without touching a line of code.

## KEY DEPLOYMENT FEATURES

**Built-in Protocol Support:** BACnet, Modbus, MQTT, SNMP, DNP3, SQL, CSV Files, HTTP and more – right out of the box, with no need for extra drivers or software tools.

**Data Made to Scale:** Pi-Mesh, the Mango core database technology, is a database designed specifically for the purpose of storing and querying IoT data at scale. This technology benches in at 100x faster in processing most queries compared to traditional database technology and is optimized for handling time-based data critical to most distributed SCADA and BMS solutions. Additionally, this database can handle tens of millions of datapoints both in real-time and historical context. Pi-Mesh is optimized for Mango data, and long-term storage comes at a fraction of the typical storage space required for traditional database solutions. Space is limited only by the size of your chosen database cluster from your provider.

**System Scalability:** Mango can operate at a single site or can scale to tens of thousands of locations. Additionally it supports several deployment models to meet design requirements.

**Hardware Agnostic:** Mango can be installed on a wide variety of edge computing devices, as well as any public or private cloud platform capable of running Linux.

**Vendor Agnostic:** Via the integrated protocol support, Mango is capable of connecting to most existing or new facility equipment and systems, avoiding vendor lock or complications when multiple vendors are necessary.

**Clear Data Ownership:** All data collected can be stored in any cloud infrastructure at your option. In the end all data belongs to you.

**Resilient Autonomous Operation:** Unlike other building management technologies, Mango has unmanned multi-site operation at the heart of the system. Edge site locations running Mango can run autonomously. Automatic data replication via Pi-Link allows the cloud to gain insight about all of the locations. Self-healing history synchronizations and real-time updates occur all behind the scenes. Mango can work natively on cellular networks globally to offer a backup for data uplinks and monitoring in critical applications.

**Servicing:** Mango is made to be easy at any scale. Mango offers a self-service ecosystem that allows you to build and grow at your pace. Radix IoT offers a rich forum and documentation set, including tutorials to learn how it works. Use your hardware and cloud, or ours. Additionally, Radix IoT offers an affordable option for turnkey projects allowing you to get a full system for your specific application running.

**Pi-Link:** Allows events to be run on the edge and in the cloud simultaneously via gRPC. This in conjunction with the Pi-Mesh database technology allows for resilience in operation and data integrity when a connection is lost upstream to the cloud. This is particularly important when communication is limited such as the case when remote cellular, LoraWAN, or satellite are used. Mango at the edge will continue scheduled events and logging and resynchronize upon reconnection. gRPC also increases Edge to Cloud security by using mTLS certificates to easily authenticate connections, all set up in the Mango administration panel.

**CSV / JSON Toolbox:** Mango includes the ability to configure systems through more streamlined and automated processes including JSON and CSV. From devices, tags, and events, everything can be done via a CSV file or JSON, allowing automated operation at scale using tools contractors and enterprise customers are already comfortable with.

**Full RestAPI:** Mango includes a full RestAPI allowing integration to third party solutions such as work order management, asset management, data lakes, and analytics solutions.

## TYPICAL OPERATIONAL MODEL

Mango has several architectural models it can be deployed in. Traditionally – Mango is deployed on several computing appliances such as Radix IoT hardware or comparable computing hardware and then connected to sensing or telemetry equipment at various locations. These 'Edge' instances of Mango then communicate via the internet through a Mango service known as Cloud-Connect to a cloud instance of Mango. (Typically located in a public or private cloud VM.) This model allows for scale of locations into the tens of thousands.

