LIMITLESS MONITORING AND MANAGEMENT ROOTED IN INTELLIGENCE.

RADIX™

RADIX IOT FOR OEMs

Radix IoT provides **a turnkey solution for original equipment manufacturers (OEMs) to unify disjointed data from equipment at a global scale**, supporting a myriad of service enablement features such as remote monitoring, control and diagnostics. The Radix IoT platform enables technology of all types, shapes and sizes to become IoT compatible, allowing telemetry data from an array of data systems and equipment to be brought together to drive analytics and services to enhance any product offering.

The Radix IoT solution for OEMs consists of two parts:

Mango Core

Install on your product's embedded hardware, VM, Windows, Linux or Mac at the edge. Allow immediate connectivity of data from your product to the Radix IoT Cloud.

Radix IoT Cloud

Fully managed service allows any product manufacturer to create and deploy a data-driven web-based experience or online offering for their customers.

ROOTED IN INTELLIGENCE

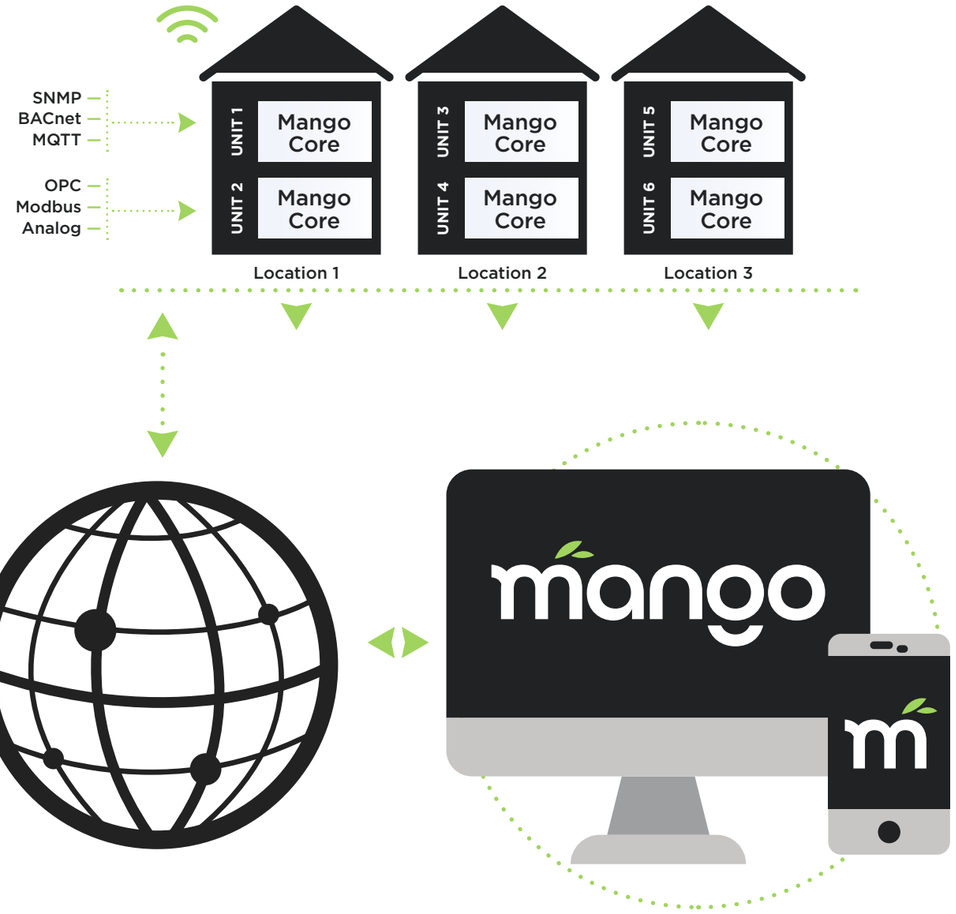
The Radix IoT Platform allows data enablement in any market. From building technology such as roof top units (RTUs) and solar solutions, to lighting systems, even down to a small temperature sensor – we can handle it. In manufacturing we easily integrate into products such as pick and place assemblies, down to individual servo motors. The Radix IoT ecosystem allows any manufacturer of equipment in any vertical to become IoT enabled, opening the door to integration and analytics possibilities that typically would be expensive and time-consuming development efforts, not to mention the long-term maintenance costs of a wide network infrastructure. The Radix IoT Platform helps businesses bring their devices to life, while eliminating the complications inherent in IoT enablement.

RADIX IOT'S MODEL IS BASED ON SCALE. WE PERFORM WELL WITH ONE DEVICE, BUT TRULY EXCEL AS YOU GROW, WITH DEPLOYMENTS IN THE TENS OF THOUSANDS GLOBALLY.

How do we define an OEM?

Radix IoT supports lots of OEM relationships. To Radix IoT, an OEM is a company that's building a complete product out of components or parts for sale to their respective customer base. The OEM company could develop all those parts or assemble parts into a product for resale either to consumers or businesses. The product may be a stand-alone thing (like a car), or more often a part of a larger solution like HVAC components that would be integrated into a building by their customers, or a solar battery array that is part of a solar installation. Often times these products have a digital nature to them allowing logic and functionality within the product, and there is a desire to impact that logic or understand what the product is doing from a different location so monitoring and management can happen off-site.

An IoT platform is the clear answer to network enable any product into a global ecosystem, and Radix IoT offers the comprehensive tools to allow for this both at the device level, but also a rich set of tools to build the desired customer or company facing solution in the cloud – hassle free. Best of all Mango OS, the Radix IoT operating system, becomes an integral part of your product and labeled as such through private labeling. Mango and the Radix IoT Cloud become major enhancements to your product offering, not replacements.



MANGO, THE FLEXIBLE IOT FRAMEWORK

Mango OS from Radix IoT is an IoT platform enablement package that offers the complete toolkit of parts to create an IoT ecosystem for enterprises. The small software Mango Core is capable of sitting inside of devices within equipment or optionally as an external piece of hardware. The Mango Core facilitates communication with all sensing and control devices within equipment and then works to securely communicate with the Radix IoT Cloud to create real-time analytics, and store data to allow for historical analysis internally or externally. (More on the Radix IoT Cloud later).

The key to the Mango OS Core is simplicity and flexibility to communicate with lots of protocols bidirectionally, while packaging this communication in extremely small packets that can be transported up to the cloud via hardline ethernet, wifi, cellular, or satellite. Mango Core is based on an open hardware platform that runs the Mango OS and hence is almost infinitely scalable up or down. The communication is not just a one-way street.

COMMUNICATIONS BETWEEN THE CLOUD AND MANGO OPERATES BIDIRECTIONALLY, ALLOWING REMOTE DIAGNOSTICS AND CONFIGURATION OF EDGE EQUIPMENT WITHOUT SETTING FOOT ON SITE, EMPOWERING A STREAMLINED DEPLOYMENT EXPERIENCE.

Mango can easily work with PLCs you already have but depending on the architecture can also replace the need for one altogether. The Mango Core can run autonomously, meaning even with a loss of internet connectivity, so long as there is storage where Mango is operating, the Mango will continue to run without any connectivity at all for days, months, or even years. When connectivity is restored, relevant data can be automatically moved to the cloud. Mango's strength goes beyond just its adaptability and integrability into products and is far different than a PLC or SCADA solution. Coupled with the Radix IoT Cloud, the platform can handle vast deployed portfolios of equipment each with potentially many different devices and data points. Mango coupled with the Radix IoT Cloud enables remote monitoring, deployment, control, asset management, analytics, alarming, custom customer experiences (CX) and more, all from a cloud location custom-tailored to any manufacturers' needs through a friendly and intuitive web interface. The platform easily connects to third-party apps, cloud analytics providers, or custom BI services to get even more value out of the connectivity.

KEY FEATURES OF MANGO

Small footprint

The Mango Core easily fits into your offering using either Radix IoT hardware, or optionally a runtime environment that can be installed on most prevailing operating systems, including embedded options.

Zero field setup

Depending on the implementation design, nothing has to be set up in the field to allow for connectivity. Apply power, and your product starts communicating.

Open integration

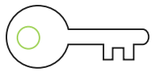
Mango is module-based, allowing protocols and communications methods to be installed at will. Mango easily integrates with most prevailing industry protocols, including but not limited to MQTT, BACnet, Modbus, OPC, open APIs, and dozens more. For custom applications, the Mango open framework allows the development of protocol modules to meet any need quickly.

Low cost entry

Unlike many connectivity solutions, and those offered by legacy frameworks from the BMS space, Mango provides an exceptionally affordable cost of entry into the platform and grows with you avoiding huge capital expenses to get up and running. Additionally, Mango's scaled pricing avoids the complexity of point-counts, allowing a solution to be built without the fear of expensive long-term operational costs.

Industry agnostic

As an IoT platform enabler, the Mango Core can easily be used in a huge range of applications and verticals.



Free of vendor lock

No proprietary controls or sensing hardware required. Mango can work with any telemetry that speaks a known industry language. All data collected can be stored in any cloud infrastructure at your option. In the end all data belongs to you.

Comprehensive & intuitive

Mango coupled with the Radix IoT Cloud offers you complete connectivity, communications, storage, and a robust analytics package all in one place and ready to go.

Secure platform

Security is an evolving topic. Let Radix IoT handle it. Mango follows oWASP guidelines as its base of design. Additionally, Mango undergoes security audits twice a year to assure independent verification. A Radix IoT platform security white paper is available on the radixiot.com website for more information.

WHAT'S THE RADIX IOT CLOUD?

The Radix IoT Cloud is the heart of the OEM solution, offering a truly tailored experience for any company looking to deploy IoT-enabled devices. The Radix IoT Cloud is a fully-managed service from Radix IoT. It allows a customer to deploy a web-based IIoT solution and onboard, connect, and communicate with devices or subsystems near or far.

THE RADIX IOT CLOUD TAKES THE HEAVY LIFTING OUT OF MANAGING THOUSANDS OF GEOGRAPHICALLY SCATTERED DEVICES ALL FROM ONE VIRTUAL LOCATION COMPLETELY AND SECURELY FROM ANY WEB-ENABLED DEVICE.

Beyond just onboarding of thousands of Mango Core devices near and far, the Radix IoT Cloud offers an intuitive management platform to manage this infrastructure no matter what the communications technology. But the real power of the Radix IoT Cloud is in the ability to create web-based applications that use your data for a completely private-labeled experience tailored to your needs and that of your customers; all securely accessible from anywhere globally.

KEY FEATURES OF THE RADIX IOT CLOUD

- 100% web-based web-app framework, allowing administration and end user access (if desired) on demand globally.
- A comprehensive user management system allowing different and customized online experiences for different users or groups of users.
- HTML 5 based customer experience builder allowing complete development and hosting of an interactive web-based product all within one place.
- Comprehensive backend diagnostics tools allowing remote diagnostics and triage of edge locations.
- A sophisticated yet easy to understand alarming and event engine that allows setup of triage points for and notification of problems visually, but also through other communications means such as SMS, email, whatsapp, and more.
- Comprehensive data storage and retention managed by Radix IoT allowing data collected to be used for historical analysis to identify trends or foster concepts such as preventative maintenance.
- Native toolbox of analytics tooling that can be used to generate outcomes for customers and service personnel including trending, watchlists, graphing, customizable live web pages, and a scripting engine for advanced needs.
- Clear data ownership (you own it), and a well-defined RestAPI allowing connection to other analytics services or custom applications to meet any need.

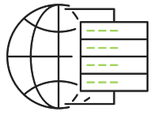
WHY MANGO AND RADIX IOT FOR YOUR PRODUCT?

Mango is a flexible solution that IoT enables anything requiring remote connectivity. Radix IoT is happy to work with manufacturers in any market to help determine if a Radix IoT solution is a fit, and how it best would be deployed. Mango can be found in many products currently including:

- HVAC components
- Solar equipment
- Agriculture products
- Factory automation equipment
- Water management products
- Smart building enablement devices

FROM DEVICE PORTFOLIOS WITH LITERALLY THOUSANDS OF LOCATIONS, TO CUSTOMERS WHO HAVE TENS OF THOUSANDS OF VARIOUS INDIVIDUAL SENSORS, EQUIPMENT, IOT DEVICES AND ASSETS UNDER ONE ROOF, MANGO CAN HANDLE YOUR SOLUTION NEEDS.

THE RADIX IOT ADVANTAGE



Ease of deployment

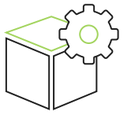
Depending on your product, the development process involves building the Mango Core into the existing hardware you have, or optionally using a Radix IoT hardware device to run the Mango Core. Radix IoT will work with your team to determine the simplest way to do this, while keeping in mind overall product cost impacts.

Fully realized cloud solution

Using the Radix IoT managed service environment, you can build out your ecosystem on your own using Mango. Additionally, Radix IoT offers professional services to allow for a turnkey solution to be delivered right to you. Either way, Mango is made to adapt to the changing dynamics of your business over time.

Integration

Mango integrates with any equipment speaking a known industry language, so there's no rip and replace of existing technology. The Mango Core is made to be lightweight and fit into your application (not replace it). Mango is fully customizable to your specific requirements, no matter what field you're in.



Service programs

Looking for a completely hands-off experience? Not a problem. Radix IoT offers service programs to help with everything from initial setup to ongoing changes, and uptime SLAs.

WHY RADIX IOT CLOUD WITH MANGO?

Saves time

Mango can be deployed quickly and easily with few set-up costs to start delivering benefits to your customers faster. Why re-invent the wheel? Get your latest features to your end user faster by bypassing the long and arduous development journey.

Saves on OpEx

A sliding scale pricing model based on deployments, not points, allows for constant and clear monthly pricing that scales with the growth of your product deployments.

Saves on CapEx

Whether turnkey or building it on your own, the Radix IoT Platform pricing model allows you to know your costs upfront, and even set up an amortization schedule for professional services to allow for affordable upfront pricing and deployment with no surprises.

You don’t need to be an IT expert

OEMs don’t need to create complete development teams, they can focus on their unique knowledge and Radix IoT will help deploy a platform where that knowledge is displayed.

DATA DRIVEN PRODUCTS BASED ON IOT DATA

Service scheduling

The ability to get ahead of maintenance and schedule service calls that are efficient, well-planned and not emergencies saves time and money by limiting expensive last-minute truck rolls, not to mention the preservation of uptime.

Preventative maintenance

Real-time information alerts management to risks so they can be addressed before they become expensive disasters. Historical information allows the scheduling of maintenance before problems even crop up.

Scale & security

Mango has been successful in answering the monitoring needs of customers with enormous portfolios of buildings, devices and assets. Scale is not an issue. Constant security audits and following oWASP guidelines keeps the security of your data ever in the forefront of development protocols.

Optimization & customization

Up-to-the-minute plus historical data enables optimization and continuous improvement to environmental monitoring, energy conservation, even space utilization. Mango is so flexible that it can be custom-tailored to meet the needs of any unique business. Screens and reports can also be created to answer the questions of individual stakeholders and departments.

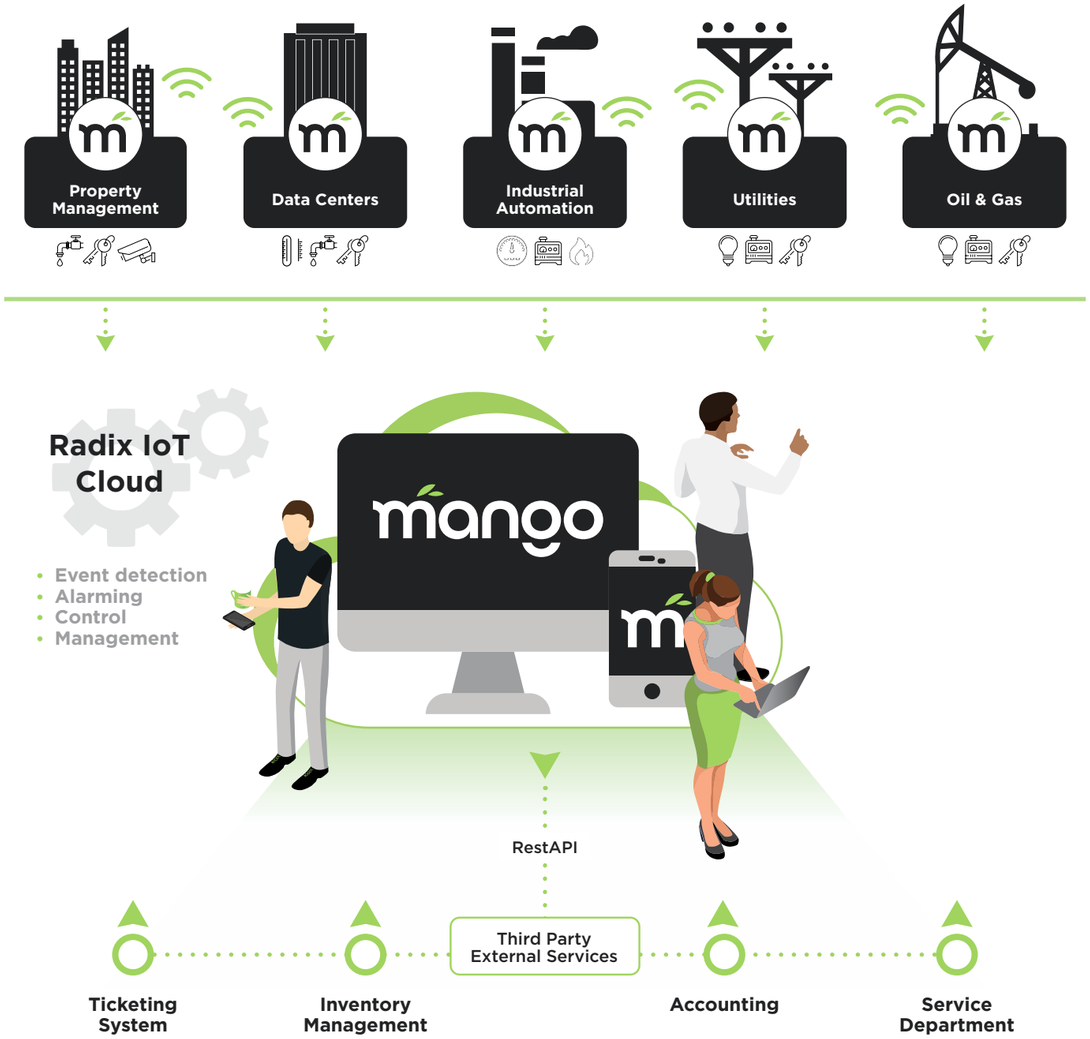
A TYPICAL RADIX IOT OEM APPLICATION DESIGN

The Mango Core is a single software that gets deployed on a piece of hardware in the field to allow for control and management from afar. The power in Mango however is that this field instance can then communicate to the Radix IoT Cloud, allowing remote control and operation of thousands of field devices from a central location.

MANGO'S CLOUD CONNECT TECHNOLOGY ALLOWS LARGE DEPLOYMENTS TO SECURELY SEND DATA TO THE RADIX IOT CLOUD BIDIRECTIONALLY, ELIMINATING THE COMPLEXITY OF CONFIGURATION AND PORT MANAGEMENT.

A key tenant of the architecture is that data is collected and trended from within the Radix IoT Cloud. All edge Mango OS instances can be commissioned, set up, modified, monitored, and managed from the cloud. A key advantage to this architecture is that with Mango running at the edge, all logic and data is retained and continues to operate should there be a loss of connectivity between the edge and the cloud, and resynchronizes once the connection has been restored, eliminating any data disparity caused by the loss of connectivity.

From the cloud, a custom-tailored online experience can be built using all of the data available to visualize the online experience you desire for your customer.



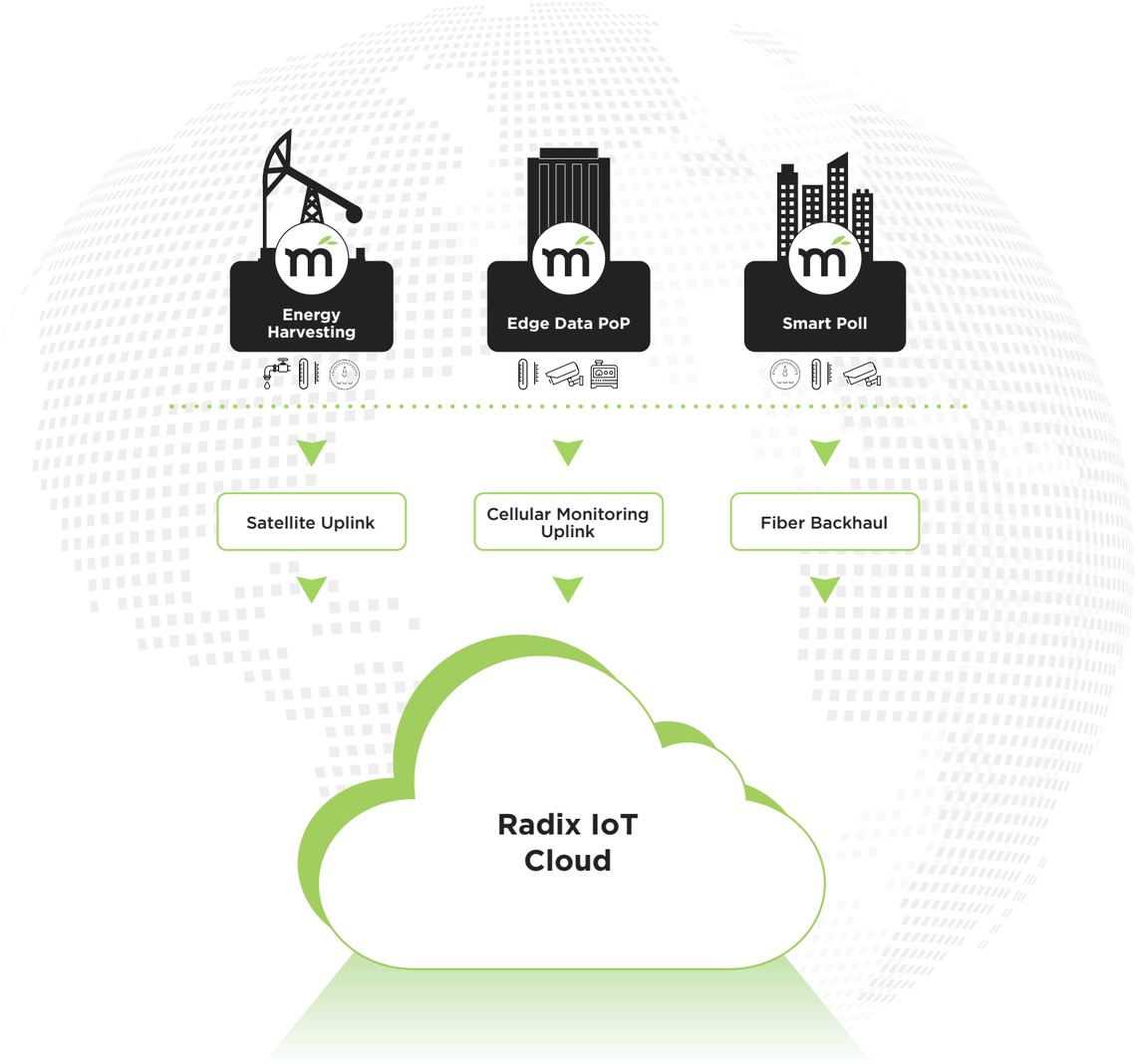
COMMUNICATION METHODOLOGIES

Radix IoT scales with your needs and strives to seamlessly fit into any product design. Several infrastructure models can exist to communicate with devices. Mango OS can easily adapt to high bandwidth needs for things like video analytics down to tightly constrained infrastructure desires.

Typical communications methods

- Hardline ethernet (High bandwidth applications, low latency)
- Wifi (High bandwidth applications, low latency)
- 3G (Constrained legacy)
- 4G LTE (High bandwidth applications)
- 5G (High bandwidth applications, low latency)
- Inmarsat Satellite (Constrained throughput, high latency)

Radix IoT can help with design in applications of communications technologies to meet the needs of the application. Radix IoT has significant experience in both hardware and software to accommodate communications in some of the most challenging applications globally.



HVAC EQUIPMENT

Service programs can be a complicated business, especially when dealing with HVAC equipment. Often it's desired to allow users of the equipment to monitor or at least be notified when something is out of tolerance, and then allow a choice to be made to roll a truck to fix it, and/or order a part before sending a truck.

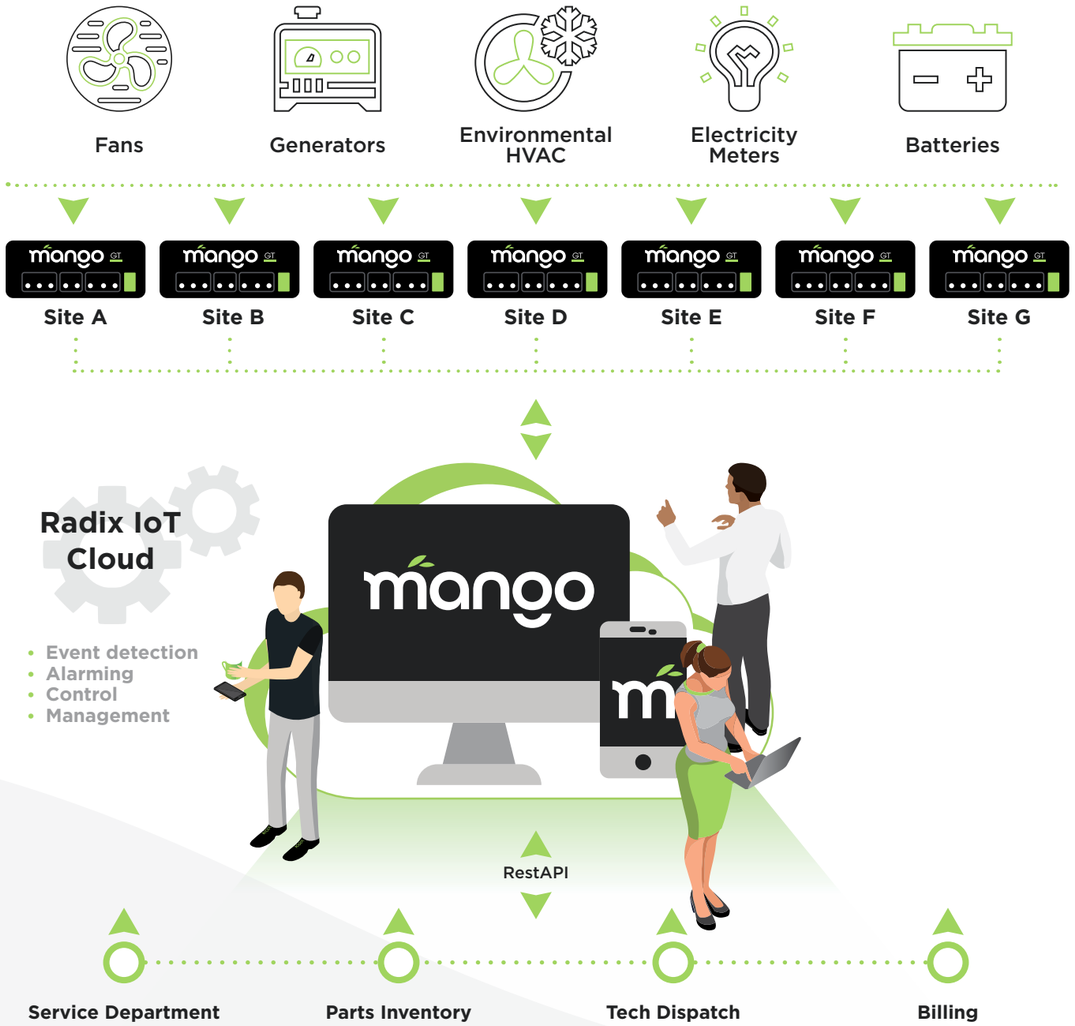
Benefits for OEMs

HVAC equipment manufacturers benefit from smart enabled devices by enabling on demand service programs to be built as well as support service contracts from afar. Easily diagnose problems remotely instead of rolling trucks to identify problems - allowing parts to be ordered and the technician to be properly equipped upon arrival to address issues; shortening service calls and eliminating the need for multiple site visits.

Additionally, OEMs can offer enriched analytics based on collective customer bases to allow for more predictive maintenance models to be built out across many installations based on the large volume of connected data (from many customers) across the enterprise.

End user benefits

Mango coupled with the Radix IoT Cloud allows any equipment manufacturer to gather runtime metrics as well as historical data to allow for problems to be identified and customers to be notified of issues. Additionally, this central control enables customers to access a user-friendly application on their phone or computer to make alterations or see the current efficiency status of their physical plant. All of this can be a value added service provided to customers and offers a superior offering to standalone ecosystems.



SOLAR EQUIPMENT

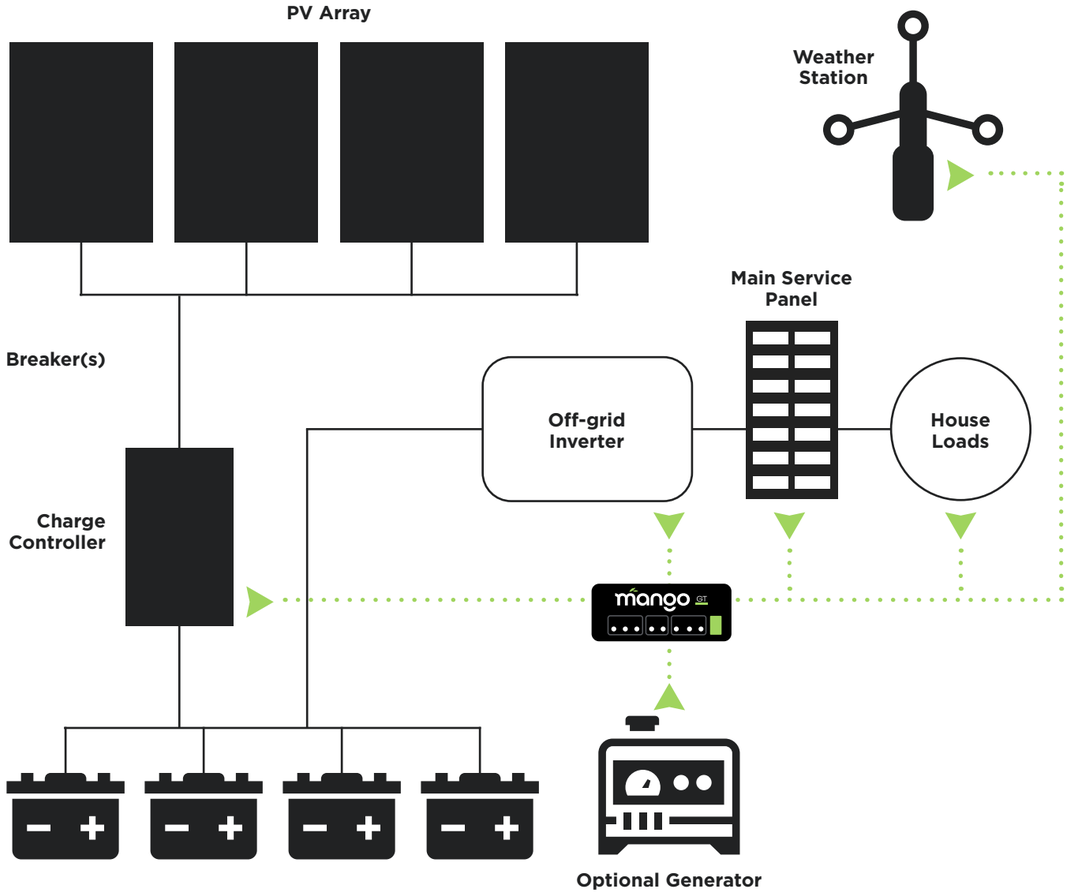
In January 2021, Radix IoT joined forces with Renewable Energy Integration Group, (REIG) to launch REvolution IoT, a software platform that includes a custom version of Mango OS software. REvolution delivers monitoring and management insight to mid and large-scale solar installations, pertaining to production, alerting, maintenance and more, to reduce inefficiencies and costs, and maintain uptime.

Benefits for OEMs

REIG brings solar PV industry expertise, hardware, reputation and customer know-how to the partnership, while Radix IoT supplies a monitoring software platform that seamlessly integrates with their technology, bringing actionable data to their customers – at scale - without the long process of software development.

End user benefits that can be monetized by OEM

REIG's solar customers gain a unified look at all their data, and real-time remote monitoring, management and control, which will reduce costs, improve efficiency, and help manage assets. With production insights and customized reporting, they can compare expected production to actual results, for further analysis and improvement. Because of the sheer size and complexity of utility-scale solar installations, Mango was the logical choice to deploy quickly and scale easily. Key to keeping the solar installations reliable is real-time alarming, which alerts staff to potential failure or out of threshold data, and remote triaging of problems, so that changes can be made for more dependable uptime, avoiding potential service interruption and loss of revenue. Historical analytics will also inform long-term improvements.



MANGO OS FROM RADIX IOT WILL ENHANCE YOUR PRODUCT, REDUCE YOUR INVESTMENT IN NEW TECHNOLOGY DEVELOPMENT AND EMPOWER YOU TO DELIVER MORE TO YOUR CUSTOMER, FASTER.

RADIX™

RadixIoT.com
14555 N. Dallas Parkway #125
Dallas, TX 75254

info@radixiot.com
+1 (833) 248-2691

@RadixIot

V.07.2021