INFRASTUCTURAL SECURITY MONITORING & ENGERY MANGEMENT SOLUTION

Supermicro's IoT Gateway Servers Teamed with Archimedes A150 System

Executive Summary

SuperMicro paired with Archimedes Controls to provide turn-key facility management systems which help reduce downtime and operating expenses of IT/computing environments. These systems provide monitoring utility in any locations whether that be co-lo, cloud, edge, micro, or enterprise and provide end-to-end monitoring and control of energy and environment for any space or asset. And with its Archimedes 100% wireless sensors and SuperMicro's preconditioned servers, these solutions can be installed in almost any environment and quantity allowing for high granularity of data, and even more importantly, higher fidelity in building automation and control. As a result, SuperMicro and Archimedes control's joint offerings are not only increasing in popularity in datacenters, but also is used in industrial automation, agriculture, food storage, healthcare, transportation, and more.

SuperMicro and Archimedes' one-stop wireless and cloud solution offers infrastructural visibility, transparency and control with granularity to server, shelve and rack levels accurately in real time which are critical aspects for managing cloud and IT infrastructure not only for enterprise CIOs and ITs but also for industrial IoT, automation and control, agriculture and food safety, healthcare, transportation as well as un-manned remote building/facility control and management.

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SUPERMICRO

As a global leader in high performance, high efficiency server technology and innovation, we develop and provide end-to-end green computing solutions to the data center, cloud computing, enterprise IT, big data, HPC, and embedded markets. Our Building Block Solutions® approach allows us to provide a broad range of SKUs, and enables us to build and deliver application-optimized solutions based upon your requirements.

Challenges

SUPERMICRO | ARCHIMEDES

SYS-E100-12T

A150 Controller & A150 Sensor

SuperMicro's SYS-E100-12T Edge Server and Archimedes Controls' A150 Wireless IoT Sensors and Controller

With the complexity of today's cloud and IT infrastructure including facilities, power systems and distributions, environmental control, IT and computing equipment which are usually located in many different locations globally, a reliable and cost-effective physical security and environmental monitoring and management system is a critical part of the entire network infrastructure operating in five 9s up-time.

Common Challenges

When it comes to selecting and deciding an infrastructure monitoring system, IT and FM professionals are usually facing the following obstacles:

- **An integrated monitoring solution that provides all physical security monitoring needs to protect not only the operational environment but also valuable IT assets in many locations globally.**
- **A physical security monitoring system that does not require to alter the existing infrastructure and interrupt networking operation when it is being installed and provisioned.**
- **The monitoring system must provide flexibility to protect investment for long term for upgrade and expansion.**
- **A system solution that supports multi-site and global operation for the entire organization operating in different time zones.**
- **A secured system that operates alone and does not connect anything into any portion of customer's network.**
- **A one-stop shop that offers hardware sensors, gateways, cloud servers and connectivity.**
- **The last but not the least, a reliable, easy to manage and cost-effective solution with latest technology from a trusted partner that can be relied on for many years.**

The Solution

SuperMicro-Archimedes' cloud and wireless sensor based A150 system solution consists two main hardware bases – wireless sensors network and a dedicated IoT cloud server for each customer with an option for backup server. Each wireless sensor includes a built-in temperature and humidity sensor and two external ports accepting the following sensing probes:

- Extended Range Temperature and Humidity Probe: for applications beyond normal environmental monitoring, such as industrial temperature/humidity oven automation, manufacturing process data recording, greenhouse monitoring, etc.

- Access Probe: for monitoring door open/close status such as rack/cabinet access door, closet door, building window and entrance door, etc.

- Tamper probe: for monitoring unauthorized vibration and tempering (vibration, shake, tilt, move, etc.) of valued assets.

- AC or DC Current Probe: for monitoring AC or DC electrical current for real time power consumption, power wire overheating without breaking the line and inserting a current meter.

Figure1: Sample figure or caption text with sample image

- Water Leak Detection: for a path of 10 ft to 100 ft., if there is any water or specific liquid greater than 1" diameter along any portion of the sensing rope, then a warning message will be generated to alert the user. The Water Leak sensing probe can be placed and fixed on floor (either wood or concrete), around a water pipe joint, around a window or a door, underneath of a rack/cabinet, etc. where water leak is a concern.

- Others: custom sensing probes are available upon request.

Each Controller includes an optional built-in air pressure detector and an optional airborne particle monitor. It also serves as a gateway for the wireless sensors and external probes. Each controller supports up to hundreds of wireless sensors. Multiple controllers also form a wireless meshed network with sensors to provide redundancy. All sensing probes above support both the wireless sensor as well the controller.

Each controller also provides three (3) general purpose IO ports and one analog input port. These general-purpose IO ports can be remotely programmed via ARCOS for either digital input or digital output, either active high or active low, or analog input for interfacing with 3rd party sensing and controlling devices. Dry relays are available for controlling 3rd party devices (such as alarms, flashlights, auto-dialers, etc.) when IO ports are configured as digital output and connected to one or more of the alarm triggering conditions.

In addition, a wireless AC current sensor is available for the controller. The wireless sensor monitors and sends current and wire temperature data to the controller directly. It operates using energy harvesting technology so battery is not needed.

A150 system also supports IP based security cameras as part of the total security solution. Any camera captured videos or pictures are sent and saved in ARCOS for email/SMS warning notification, remote reviewing, archiving and reporting.

Cloud software ARCOS offers a wide variety of functions and capabilities including monitoring in dashboards and 3D heatmap, histograms, data tables, warning recording and reports, CRAC performance and data center PUE monitoring.

Main Applications

Data Center and Edge Security

- Per-user, per-rack and security protected environmental, assets and access monitoring.
- Reduces the number of on-site visits.
- Secures and provides detailed health information about the edge data center's environment and physical security.
- Protects remote IT equipment operating conditions under 24 x 7 x 365 surveillance.
- 10-year battery operated wireless sensors.
- Integrated IP security cameras.
- Warnings and alarms notification and records.
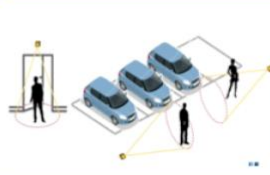
Industrial Controls & Automation

- Temperature and humidity monitoring.
- Water leak detection monitoring.
- Real time power consumption monitoring.
- Metal detection or separation for structural monitoring.
- Vibration, tamper, shake, move, tilt detection for physical security.
- IP security cameras.
- Pre-set warning triggers and notification.
- Analytics and AI tools for data analysis and prediction.
- 3rd party devices support.
- Historic data recording for audit and compliances.

Agriculture & Food Safety

- Mission critical temperature and humidity monitoring.
- Airborne particle counts and air quality PM1.0, PM2.5 and PM10 for nearby wildfire monitoring
- Smoke detection.
- Liquid level monitoring for fuel and any liquid tanks and storages
- Water leak detection.
- Tamper and break-in detection
- 2G, 3G, 4G/5G cloud-based
- Data access from anywhere in the world.
- 24x7 automatic monitoring, recording and warning messaging.
- Analytics and AI tools for analysis and prediction.

Environmental & Transportation

- Temperature and humidity monitoring.
- Airborne particle counts and air quality PM1.0, PM2.5 and PM10.
- Smoke detection.
- Explosive gas detection.
- Water leak detection.
- HVAC performance monitoring.
- Metal detection or separation for structural monitoring.
- Vibration, tamper, shake, move, tilt detection for physical security.
- Traffic flow analysis.
- Parking garage/lot safety and security
- Automated parking assistance.

KEY BENEFITS

- High fidelity high granularity environment security monitoring. Highly accurate monitoring of ambient air temperature, humidity, airflow speed, air pressure and air-quality plus all physical security measures via wireless sensors. These sensors can be deployed at any and multiple locations for rack level, sub-rack level, even specific blade/server level granularities.

- Wireless plug-n-play sensors. All sensors are wireless and battery operated with guaranteed 10 years of battery life. These sensors can be installed in seconds and used immediately allowing for true rapid plug-n-play deployment. Sensed data is transmitted wireless using proprietary radio frequency communication to a base station that can connect directly to the cloud or local area networks.

- Remote management and IT asset tracking via cloud software. Highly robust cloud-based software that allows operators to access real-time and past-time physical and environmental monitoring data. Data available in variety of formats including 3D visualizations, graphs, tables, etc.

- Multi-facility management. If desired, data center operators with multiple deployments, can manage all of their deployments on the same A150 account or software platform. These deployments can be subdivided in any way the operator sees fit (e.g., individual racks in a co-lo or racks across multiple co-los).

- Advanced reporting on energy/environmental metrics.
  In addition to automated alerts for hazards and faults, the A150 software can also generate tailored advanced energy/environmental reports. These include analyses on Power Use Effectiveness (PUE), HVAC performance parameters including airflow indices, cooling indices, rack power and usage, etc. Data from other devices or the operator may be needed and integrated for some of these reports.

Conclusion

Supermicro's IoT focused servers are the ideal workhorses for any smart building infrastructure. Archimedes Controls 100% wireless sensors and cloud software perfectly compliment and build on-top of Supermicro computing hardware to provide a turn-key security, energy, environment, and asset management system that is a plug-n-play, efficient user experience.