RackSense Features & Specifications -

Wired U – Level Asset Tracking System

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KEY CONTENTS

Introduction to RackSense for Intelligent Datacentre

'RackSense' is an intelligent asset management solution for data centres which provides near-real-time insights about equipment location, temperature and humidity information around the equipment, and its energy consumption. The **RackSense** product line provides a complete hardware & wireless networking platform to enable solutions for use cases such as – asset tracking & safety, capacity planning, facility heat mapping, ghost server detection and reporting, HVAC & CRAC unit automation, etc. These use cases could be deployed across several industry segments such as - Enterprise, Logistics and Warehousing. The current document of **RackSense** is for **Wired U – Level Asset Tracking System** used to track the location of servers/ network equipment in a data center

The Wired U – Level Asset Tracking System consists of:

1. Rack Monitor
2. Asset Tag
3. Slave Gateway
4. Master Gateway

By implementing Vacus's **Wired U – Level Asset Tracking System**, one can easily monitor real–time location status of an asset and temperature and humidity around that asset so as to act on alerts generated by the system for pre-set thresholds for said parameters. This saves operational assets from damage, misplaced and enable optimal functioning.

Rack Monitor (VT-RM-1003)

The Rack Monitor is an intelligent radio unit in the Rack Sense solution. The Rack Monitor consists of two components,

a) Rack Monitor - Asset Strip
b) Rack Monitor - Controller

a) Rack Monitor – Asset Strip

The size of the Rack Monitor Strip can be adjusted according to the rack's dimensions. It starts with a standard size of 14U but can be expanded up to 56U. Attachment to the rack is achieved using a clamp, and a four-pin magnetic connector allows for seamless interaction with the server tag.

The Rack Monitor Strip is designed to provide visual indicators to assist with asset installation and location tracking.

The Rack Monitor Strip is powered through Rack Monitor – Controller.

Furthermore, the Rack Monitor Strip is capable of detecting incidents such as a fall from a significant height or any tampering with the enclosure. Such alerts are promptly relayed to the dashboard for immediate attention.

b) Rack Monitor – Controller

The Rack Monitor Controller manages the asset strip and pinpoints the server's location.

There is also an optional current monitoring module available with the Rack Monitor, suitable for both AC and DC currents. With the correct setup, it has the ability to monitor as many as six clamps.

The Rack Monitor offers flexibility in terms of power sources, functioning with both DC power ranging from 48 to 52V, and AC power at 230V and 50Hz.

Data from the Rack Monitor Controller can be transmitted to the Slave Gateway using either a wired network such as LAN or a wireless network, utilizing the 866 MHz Low Power Proprietary RF Protocol.

Rack Monitor Specifications

OPERATION	
Operating Frequency	866 MHz/ 915 MHz
Typical Transmission Range	Up to 20 meters
Transmit Power	0 dBm
Network Interface & Protocols	CSMA
Encryption used	AES 128-bit
Data Storage	NA

ENCLOSURE DIMENSIONS (42U Rack)	
Case Length	30 mm
Case Width	10 mm
Case Height	1900 mm
Case Weight (with sensor)	200g
Construction	Aluminium
Durability	Tough, impact-resistant and temperature stable
Mounting Options	Clamp type

ENVIRONMENTAL	
Operating Temperature	-20° C to +70° C
Storage Temperature	-40° C to +80° C
Operating Humidity	< 95% RH non-condensing; not recommended for outdoor applications
Sealing	IP 4X

POWER	
Type	AC (230 V, 50 Hz), DC (48 V– 52V)
Current consumption	2 A (Peak)
Power source optional	Supplied with the Enclosure

CURRENT METERING	
C1 – C6	0 to 100A
Measurement Accuracy	0.1 A

Server Tag (VT-ST-1006)

A Server Tag is a device that operates without a battery and is designed to be fastened to items that require tracking. Comprising of a microcontroller and a temperature-humidity sensor, the Server Tag is an essential tool for monitoring various aspects of the tagged items.

Fig. I: Server Tag
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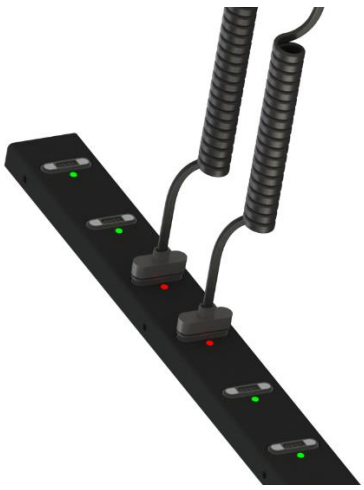
Fig. II: Server Tag backside with Temperature & humidity sensor

Server Tags can be affixed to servers or network equipment either with the aid of 3M tape or by employing a hook, the choice of which depends on the physical characteristics of the equipment in question.



After positioning the server within the rack, the user must connect the magnetic end of the server tag to the corresponding U on the Rack Monitor Strip, as illustrated in the figure above.

The Server Tag is also equipped with an additional four-pin magnetic connector, which is used to link other server tags located in the same U. This feature facilitates the tracking of blade servers housed within the same chassis and positioned in the same U.

The system supports the linking of up to 20 server tags.

Server Tag Specifications

ENCLOSURE DIMENSIONS	
Case Length	42 mm
Case Width	25 mm
Case Height	6 mm
Case Weight (with sensor)	80g
Construction	ABS
Durability	Tough, impact-resistant, and temperature stable
Mounting Options	3M tape, hook

ENVIRONMENTAL	
Operating Temperature	-20° C to +70° C
Storage Temperature	-40° C to +80° C
Operating Humidity	< 95% RH non-condensing; not recommended for outdoor applications
Sealing	IP 4X

SENSOR SPECIFICATION	
Temperature Measurement Range	5° C to 80° C
Temperature Accuracy	+/- 1° C
Humidity Measurement Range	0 RH to 100 RH
Humidity Accuracy	+/- 3 RH

Slave Gateway (VT-CT1006)

The Slave Gateway is a collector unit in the RackSense solution. The Slave Gateway collects computed asset tag location data wirelessly from Rack Monitor within range, applies basic filtering algorithm and forwards it to Master Gateway over MQTT protocol.

Slave Gateway consists of one relay socket with a capacity of 230 V, 8A and five I/O pins which can be controlled by software rule engine

Alerts such as falling from a height, tampering of the box are detected by the Slave Gateway and sent to the dashboard.

Features & Benefits:

- Multi-Protocol support for easy integration
- Supports up to 50 Rack Monitors within reception range
- Controllable IO through software
- Tamper alerts

Slave Gateway Specifications

OPERATION	
Operating Frequency	866 MHz/ 915 MHz
Typical Reception Range	Up to 20 meters
Transmit Power	NA
Network Interface & Protocols	MQTT
Encryption used	AES 128-bit
Data Storage	Can store up to 4GB in case of connectivity loss
Certifications	RoHS, CE
Integration Support	Wi-Fi – 2.4GHz & 5GHz – IEEE802.11.b/g/n/ac, Bluetooth 4.2 BLE SNMP v1.0, v2.0 & v3.0, Modbus TCP/IP

ENCLOSURE DIMENSIONS (42U Rack)	
Case Length	141 mm
Case Width	173 mm
Case Height	25 mm
Case Weight (with sensor)	270g
Construction	Polycarbonate
Durability	Tough, impact resistant and temperature stable
Mounting Options	Magnetic Mountings

ENVIRONMENTAL	
Operating Temperature	-20° C to +70° C
Storage Temperature	-40° C to +80° C
Operating Humidity	< 95% RH non-condensing; not recommended for outdoor applications
Sealing	IP 4X

POWER	
Type	AC (230 V, 50 Hz), PoE
Current consumption	2 A (Peak)
Power source optional	Supplied with the Enclosure

Master Gateway (VT-CT1006A)

The Master Gateway is an entry/exit door in the RackSense solution. Master Gateway is a single point of connection for data exchange between DCIM application and a hardware system. Master Gateway supports SNMP and MQTT protocol.

Master Gateway consists of Intel Atom x5-E3940 with 1.8GHz clock. It can take the load of up to 10,000 radio nodes integration over SNMP with a DCIM Application. A master can connect up to 30 of slave gateways* (System Update Rate = 15 secs)

Alerts such as falling from a height, tampering of the box are detected by the Master Gateway and sent to the dashboard.

Features & Benefits:

- SPOC for 3rd party application integration
- Supports up to 10000 radio nodes
- Multiprotocol Support for integration
- Tamper alerts

Master Gateway Specifications

OPERATION	
Operating Frequency	866 MHz/ 915 MHz/ 2400 MHz
Typical Reception Range	NA
Transmit Power	NA
Network Interface & Protocols	Ethernet & MQTT
Encryption used	AES 128-bit
Data Storage	NA
Certifications	RoHS, CE
Integration Support	SNMP v1.0, v2.0 & v3.0

ENCLOSURE DIMENSIONS (42U Rack)	
Case Length	141 mm
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ENVIRONMENTAL	
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Sealing	IP 4X

POWER	
Type	AC (230 V, 50 Hz), PoE
Current consumption	2 A (Peak)
Power source optional	Supplied with the Enclosure

Rack Monitor Deployment SOPs:

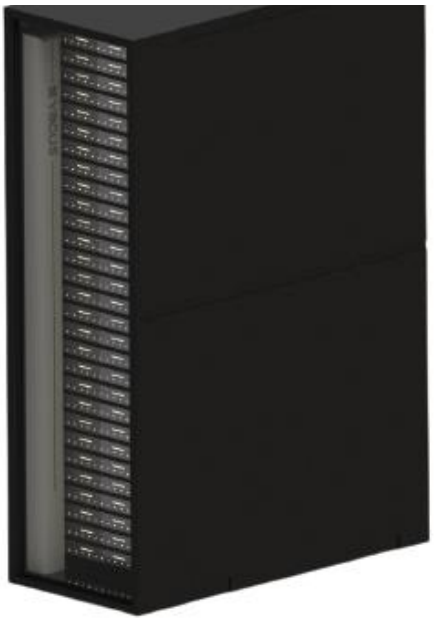

Fig-I: Recommended Rack Monitor mounting position on the left side of a Rack

Asset Tag Deployment SOPs:

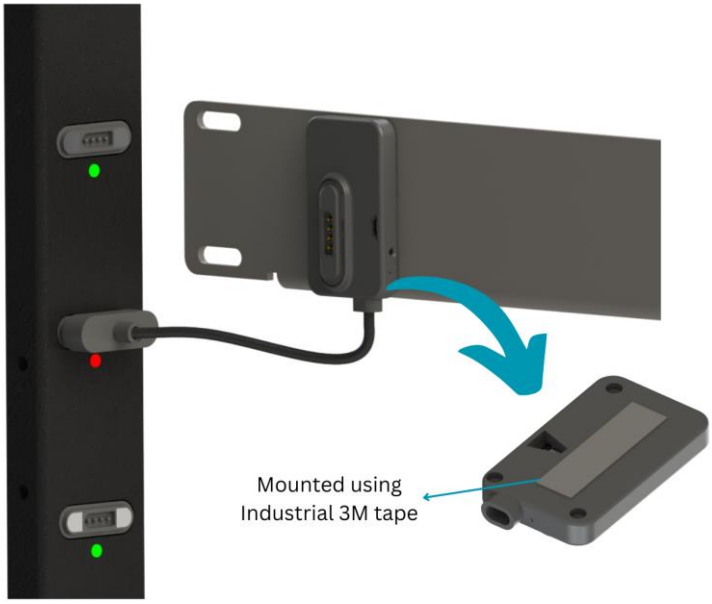

Fig-II: Asset Tag is attached to the underside of server using a 3M adhesive tape or a hook

Slave Gateway Deployment SOPs:

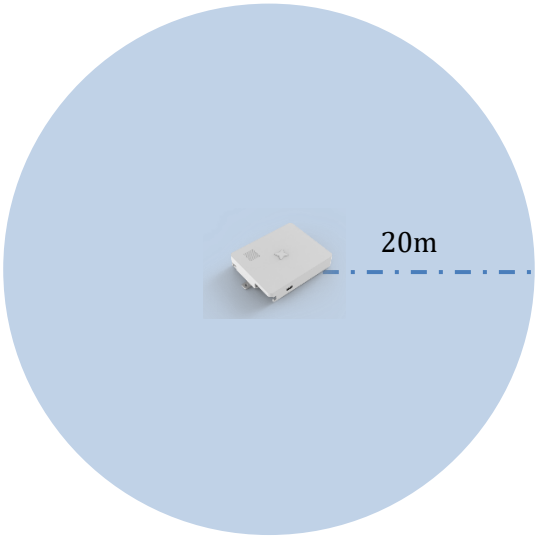

Fig-III: Slave Gateway showing circle of reception

Fig-IV: Recommended Slave Gateway mounting position at height between 2.5m to 4.5m from the floor.

A Note – Impact of RackSense on Enterprise Wi-Fi network used for IT communication.

The influence of the environmental sensor on the IT Wi-Fi network is determined by three key aspects:

i. The strength of the wireless transmission
ii. The proximity to the source of the emission
iii. The kind of equipment located in the transmission path.

Vacus Tech's RackSense product line, however, does not utilize any Wi-Fi band. The connection between the server tag and the rack monitor strip is wired, ensuring there is no radiation surrounding the server.