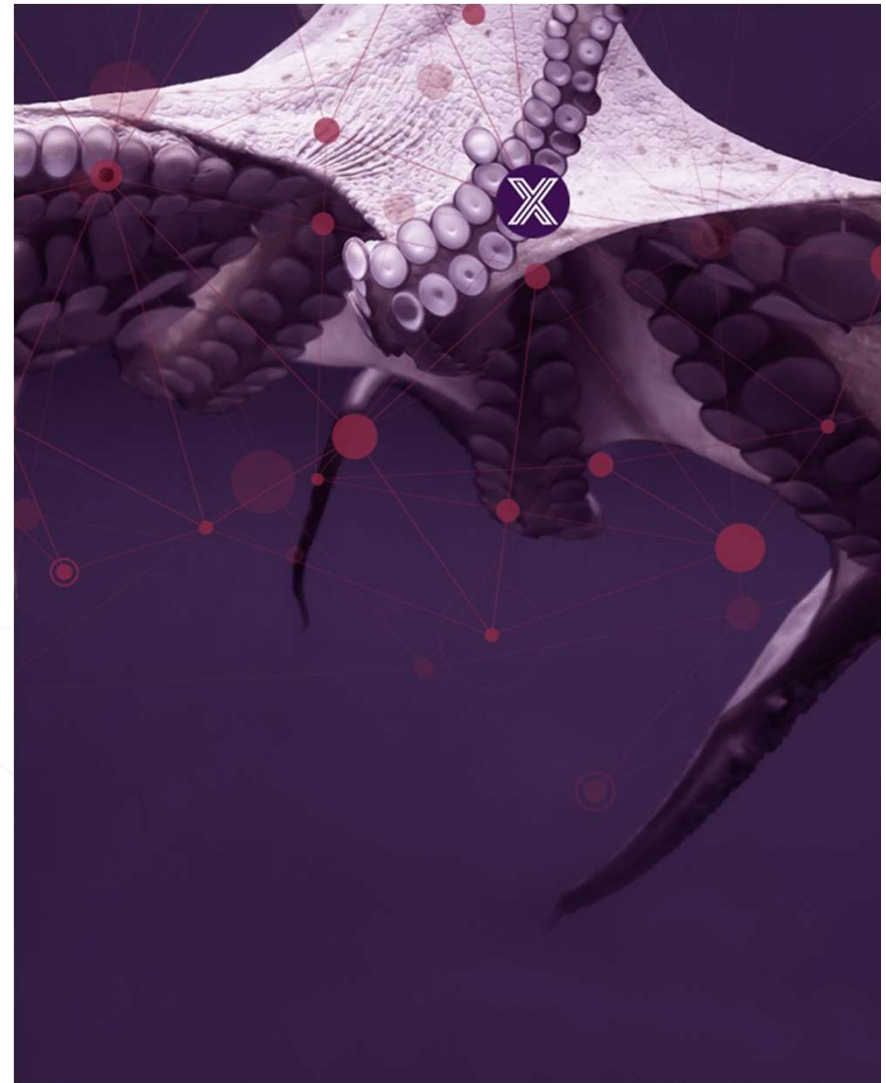# EDGE X FOUNDRY™

**Vertical Solutions Working Group**

June 9, 2020

Camilo Dennis (Intel) – camilo.a.dennis@intel.com
Henry Lau (HP) – henry.lau@hp.com

edgexfoundry.org | 🐦 @edgexfoundry

EDGE X FOUNDRY

# LF Antitrust Policy Notice

EdgeX Foundry meetings involve participation by industry competitors, and it is the intention of the Linux Foundation to conduct all of its activities in accordance with applicable antitrust and competition laws. It is therefore extremely important that attendees adhere to meeting agendas, and be aware of, and not participate in, any activities that are prohibited under applicable US state, federal or foreign antitrust and competition laws.

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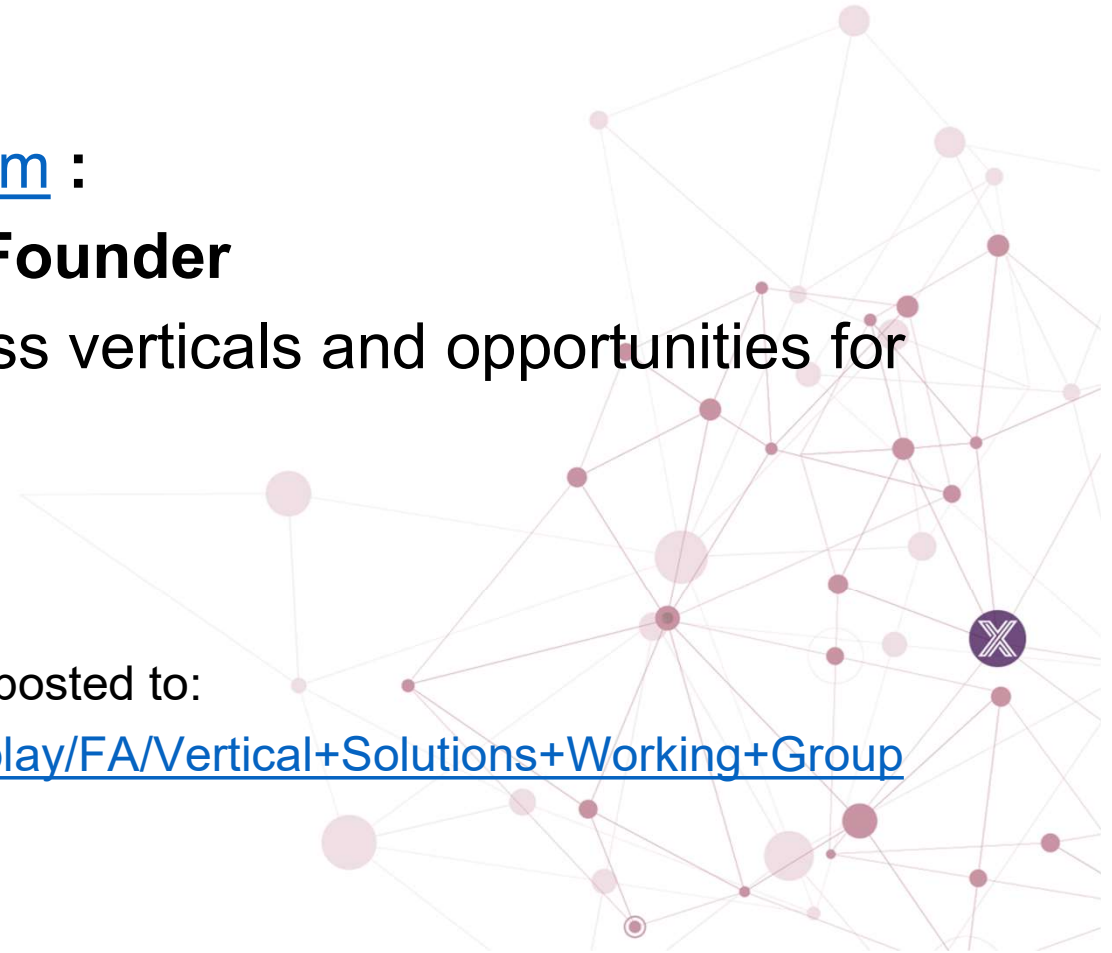
**Agenda**

**RFRain -** https://rfrain.com **:**

**Danny Akaoui, CEO & Founder**

- RFID use cases across verticals and opportunities for EdgeX community

Meeting recording & slides to be posted to:

https://wiki.edgexfoundry.org/display/FA/Vertical+Solutions+Working+Group

# RFRain

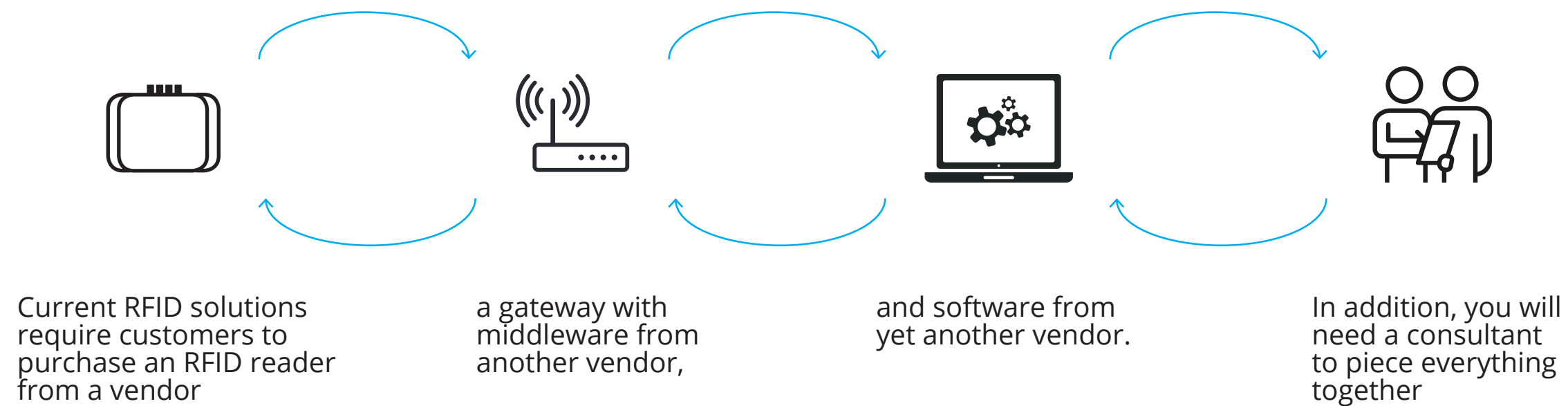World's first **Plug & Play Smart Readers with pre-integrated Software**

# PRESENTATION OVERVIEW

**1**. Company and RFRain Solution Overview

**2**. Products & Solutions

**3**. Key Implementations

**4**. RFRain and Edge X Road Map

**RFRain**

# PIECEMEAL HARDWARE

The current way RFID is implemented is hindering the growth of RFID and IoT

Current RFID solutions require customers to purchase an RFID reader from a vendor

a gateway with middleware from another vendor,

and software from yet another vendor.

In addition, you will need a consultant to piece everything together

RFRain

# PIECEMEAL HARDWARE

The current way RFID is implemented is hindering the growth of RFID and IoT

**This becomes costly and complex**



Current RFID solutions require customers to purchase an RFID reader from a vendor

a gateway middlew... another ve...

...ware from ...other vendor.

In addition, you will need a consultant to piece everything together

RFRain®

# SOLUTION

**Plug-and-Play Smart Reader: Reader, Gateway and Software in one device**

RFRain replaces the complex, expensive RFID systems with just one product that is also a hardware and software platform, the RFR-RAIN-4-SMART. The RFR-RAIN-4-SMART is a 4-port RFID reader that combines a reader, gateway and patented RFRain Zone Manager software in one single device. Eliminating the need of piecemeal hardware and making it easy to build scalable RFID solutions.



**VS.**

RFRain
Starting at $899

Competitors
Starting at $30K

# MARKET POSITION

| | RFRAIN | ALIEN | ZEBRA | IMPINJ |
|---|---|---|---|---|
| | RFR-RAIN-4-SMART | ALR-F800-X | FX7500 | R420 |
| Self Optimizing | No | Yes | Yes | Yes |
| PoE Transmit Power | World's Highest | World's Highest | World's Highest | World's Highest |
| Max Read sensitivity | -81.5 dBm | Not published | -82 dBm | -84 dBm |
| Protocol | RCI compliant & RFRain Extended REST API | ARP/LLRP | LLRP | LLRP |
| Operating System | Linux | Linux | Linux | Linux |
| Emissary | Yes. Gateway RFR-GW | Yes | Yes | Yes |
| Memory | 4 GB RAM 64 GB Flash & expandable | 1GB RAM 2 GB Flash | 256 MB RAM 512 MB Flash | 64 MB RAM 64 MB Flash |
| # of Antenna | 4 | 4 | 4 | 4 |
| GPIO | Yes. RFR-RAIN-4-SMART-ADV | 4 in / 8 out (Isolated) | 2 in / 3 out (Isolated) | 4 in / 4 out (isolated) |
| LLRP | No | Yes | Yes | Yes |
| Data Interface | Ethernet with POE support, WIFI, Cellular | LAN, RS232, USB Host, USB Console | Ethernet with POE support | RS232, Ethernet |
| True Plug & Play | Yes | - | - | - |
| Software Suite | Yes. RFR-ZoneManager Software | - | - | - |
| Database Included | Yes | - | - | - |
| Alarms & alerts | Yes | - | - | - |
| Fast Track Option | Yes. 100 mph | - | - | - |
| Cloud Support | Yes | - | - | - |
| Camera | Yes | - | - | - |
| GPS | Yes | - | - | - |
| Battery Supported | Yes | - | - | - |

# CLIENTS

# AWARDS & PATENTS



**RFRain voted "Top 10 Enterprise Asset Management Solution Providers 2018"**

CIO Application Magazine



**Nominated top 10 "Best New Product 2020"**

RFID JOURNAL AWARDS

# 2

**Method Patents** for our RFID system and 6 continuation in part applications to be filed

![RFRain]

# Smart Reader Series

World's first Plug & Play
RFID Smart Readers

# SMART READER SERIES

## Designed to meet the needs of every vertical in IoT

### RFR-RAIN-4-SMART
SMART READER

WORLD'S FIRST PLUG & PLAY RFID READER
FIT FOR MOST RFID APPLICATIONS

### RFR-RAIN-4-SMART-ADV
ADVANCED READER

SPECIFIC-DESIGNED FOR MOBILE
APPLICATIONS & ACCESS CONTROL

### RFR-RAIN-1-HANDHELD
HANDHELD READER

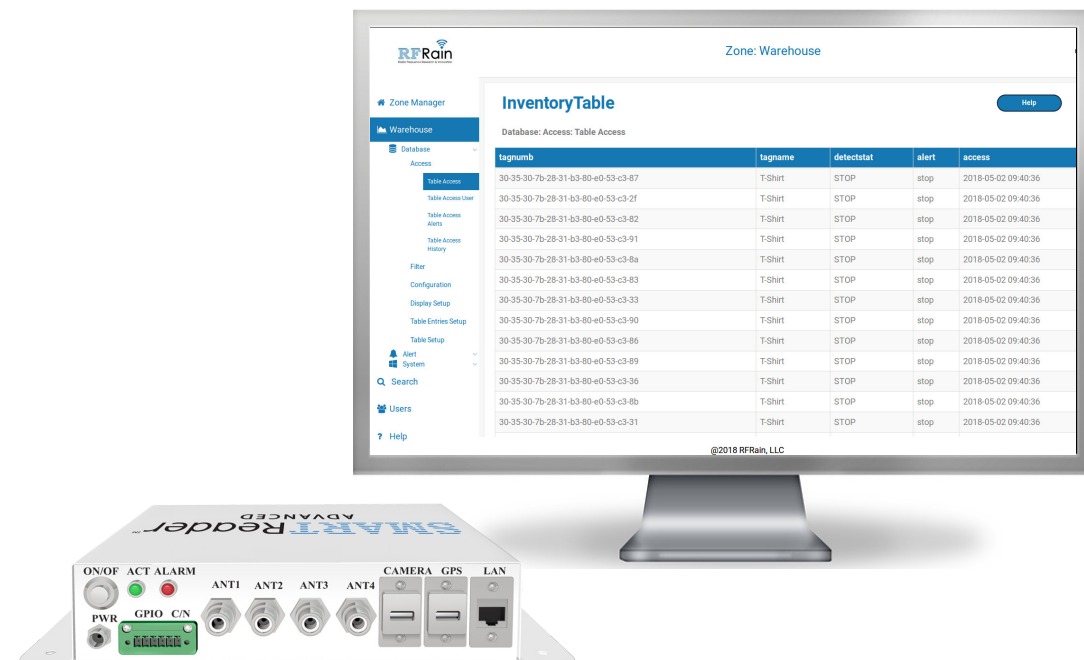SPECIFIC-DESIGNED FOR MANUAL RFID
READING

# SMART READER ADVANCED

## HARDWARE

- 4 Antenna Ports
- Ethernet Port
- WIFI, cellular optional
- 4 configurable GPIO ports
- 2 Host USB Ports
  Supports: Camera & GPS, extended storage
- Power Push button for safe shutdown & restart
- Up to +31.5 dBm
- 1,820 mAh Li-ION Battery (1h)
  expandable up to 12,000 mAh
- Read range: 80 ft
- Read Speed: 100 mph
- Read rate: 750 tags/sec
- 4 GB RAM
  64 GB Flash & expandable

## SOFTWARE

- Zone Manager pre-installed
- Zone Manager Enterprise Cloud

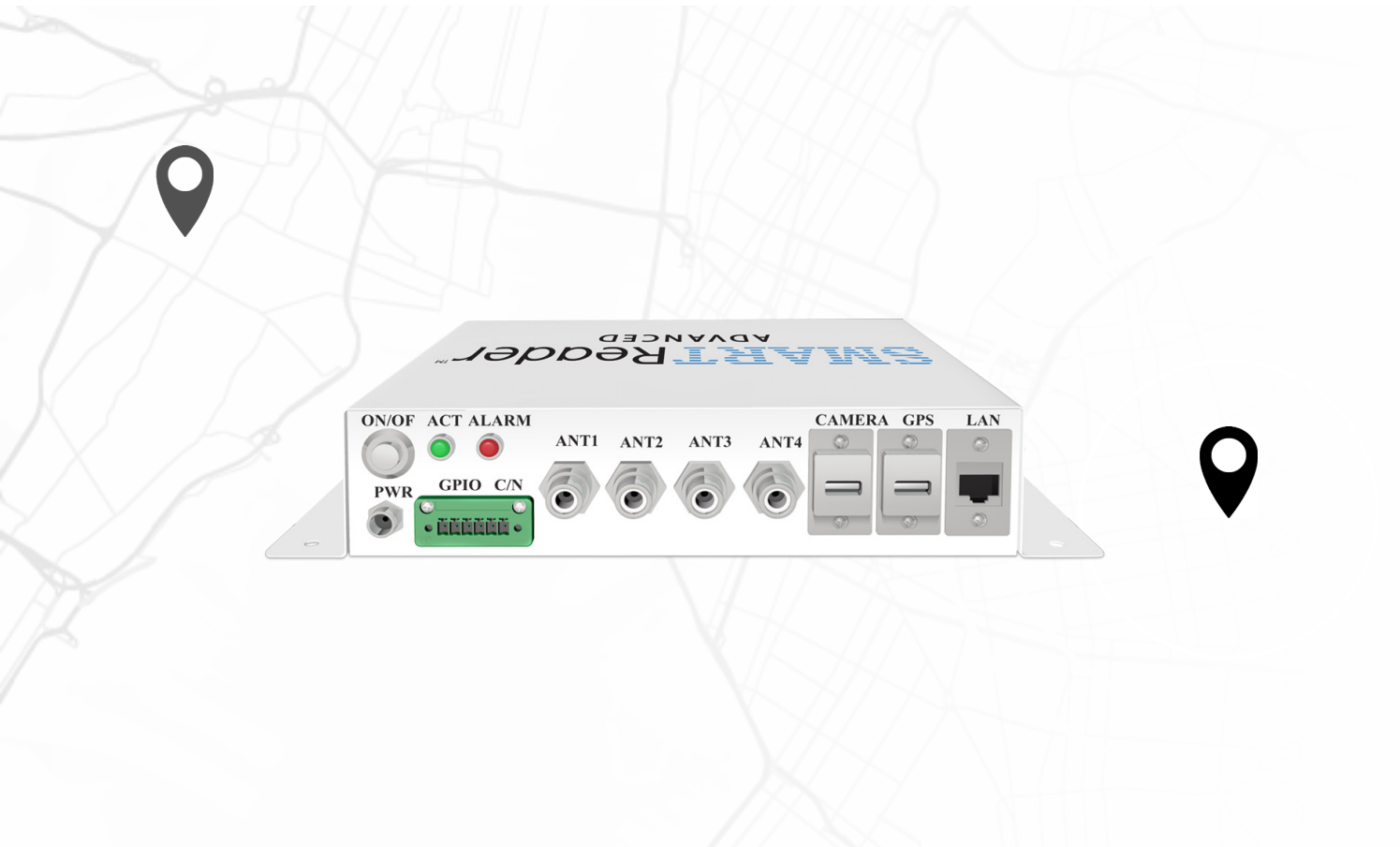# HIGH-PERFORMANCE RAIN RFID READER



## Plug-and-Play Smart Reader:
## Reader, Gateway and pre-installed software in one device

The RFR-RAIN-4-SMART-ADV is a 4-port RFID reader that combines a reader, gateway and software in one single device. Access and control the reader from any browser using the built-in UI, the Zone Manager and start reading tags instantly - no programming required.

## Incredible RF performance
## with high-density mode and fast-read mode

Powered by the R2000 chip, The RFRain Advanced Reader (RFR-RAIN-4-SMART-ADV) covers a tag read distance that is over 80 feet with 9 dBiL antenna. The RFR-RAIN-4-SMART-ADV supports tag read speeds for moving objects up to 100 mph. Further, the 1,820 mAh built-in Li-on battery keeps the reader running when a moving vehicle or a forklift experiences frequent stops.

# GPS TRACKING



## GPS Tracking

The RFR-RAIN-4-SMART supports GPS localization. Pinpoint the exact wherabouts of your assets with GPS coordinates. Utilizing RFID and GPS for accurate real-time location tracking of goods on vehicles, school buses or trucks.
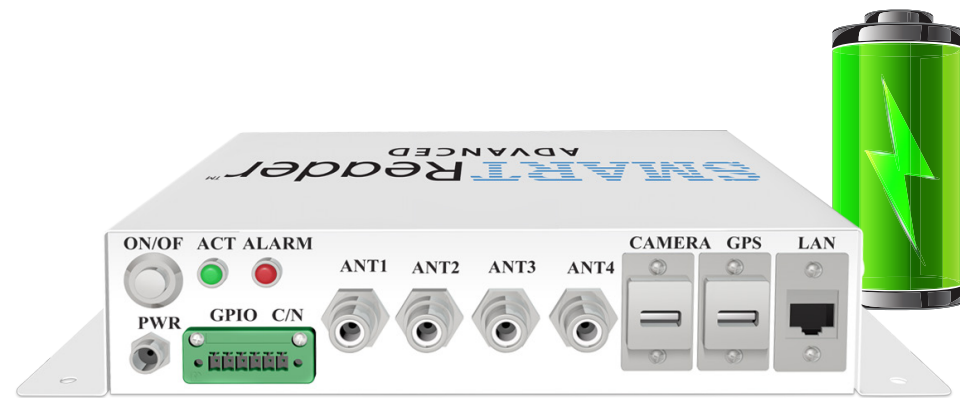
# CAMERA INTEGRATION



## Camera Enabled

Through remote viewing, the RFRain camera adds accuracy and security to you connected IoT solutions. The RFR-RAIN-4-SMART-ADV supports a 1MP autofocus color camera that easily capture photos and videos in low light conditions. Combined with RFID, Its high security, and accuracy meet the needs in user identification, and enhanced item traceability.

The RFR-RAIN-4-SMART-ADV supports up to two USB Cameras with 1MP autofocus

# MOBILE CAPABILITY

## Internal Battery

The RFR-RAIN-4-SMART-ADV comes with an internal 1,820 mAh Li-ION battery that allows to track goods or people in moving vehicles that experience frequent stops. In effect, the battery prevents data-loss during transit.

This RFR-RAIN-4-SMART-ADV has optional 12,000 mAh for 8,5 hr of uninterrupted usage.

## Ethernet, WIFI, Cellular

The RFR-RAIN-4-SMART-ADV stores the data from the moving vehicle to the Zone Manager Enterprise Cloud software using WIFI, LAN or cellular.

# ACCESS CONTROL

## Remote Access Control

The GPIO slot on the new advanced reader combines RFID and access control capabilities. Therefore, access will be automatically granted to any person or object who present a valid RAIN RFID tag at an access point.

# RFRAIN SMART HANDHELD



## HARDWARE

- Hardwired - No Bluetooth pairing
- 8.5 dBi circularly polarized antenna
- Up to +30 dBm
- Indy R2000
- Read range: 20+ ft
- Read rate: 750 tags/sec
- 12,000 mAh Li-ION Battery (8,5h)
- 4 GB RAM
- IP 67 rating
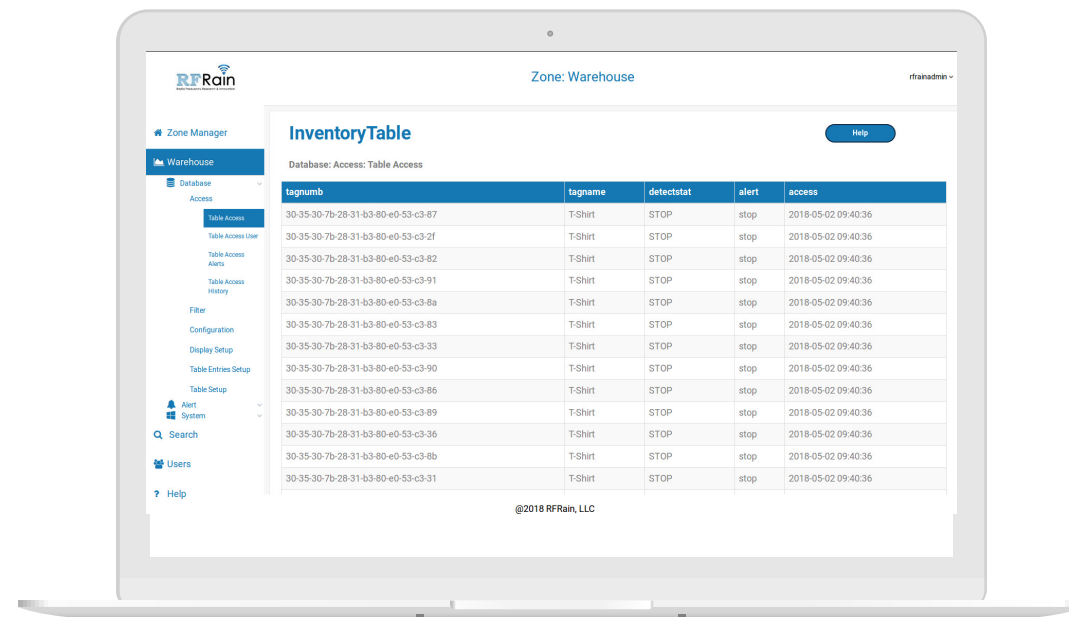- Supports iOS and Android devices

## SOFTWARE

- RFRain Zone Manager mobile application
- RFRain Zone Manager Enterprise Cloud
- RAIN Communication Interface (RCI)

# ZONE MANAGER SOFTWARE

All-in-one solution -
Saving system integrators time and money
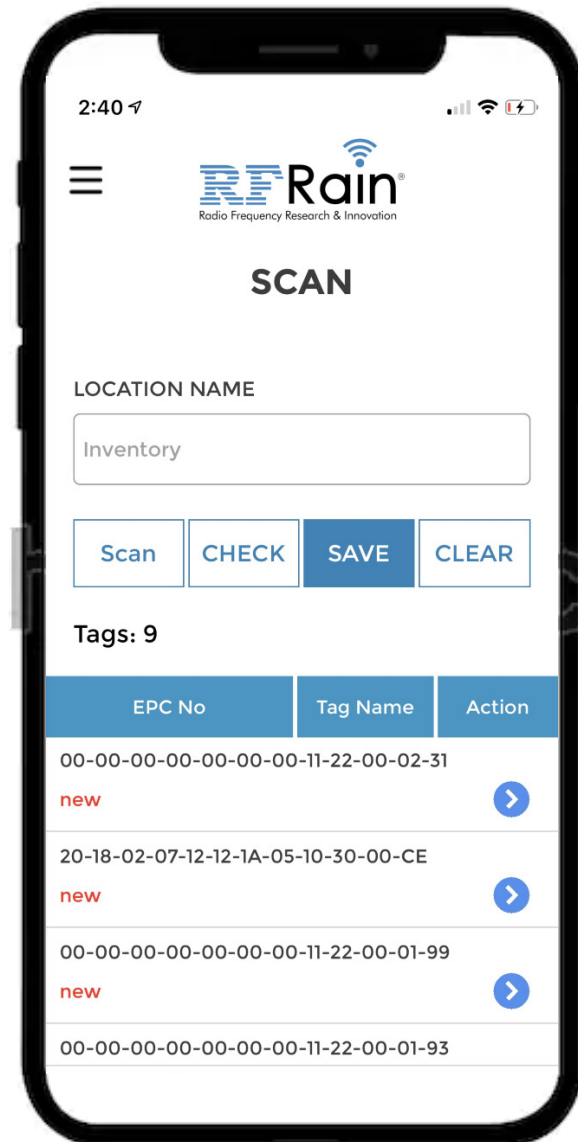on development

# ZONE MANAGER SOFTWARE



## Asset & Inventory management software platform

The RFR-ZM™ Zone Manager software is an advanced web-based control center that comes pre-installed on the RFR-RAIN-4-SMART-ADV reader. The RFRain Zone Manager offers simple, scalable and secure software to fully control the RFRain solution using a single browser from small stand-alone systems to fully integrated solutions.

√ Comes pre-installed on the RFR-RAIN-4-SMART-ADV readers. No software to install

√ Store data locally on-premise or securely in cloud

√ Setup and receive text or email alerts such as expiration date, present or missing assets and more

√ Multi-level secure access

√ Configure the database, smart readers, and monitor your inventory & assets in real-time using any browser

√ Scalable platform, configure and control one or multiple readers

√ GPS location information, image capture with RFID using the RFR-CAM, access control and more features available

√ Complete Rest API SDK's available for software and web developers

√ Connects directly to the RFR-ZM-ENT™ cloud real-time data access from anywhere

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# ZONE MANAGER MOBILE

## Plug into a power source & Start reading tags immediately

The RFR-RAIN-1-HANDHELD comes with the Zone Manager iOS mobile software that allows you to turn the reader on and start reading tags immediately. The tag data can be *streamed directly to a server on-premise or in the RFRain cloud*.

## Three modes

**SCAN**
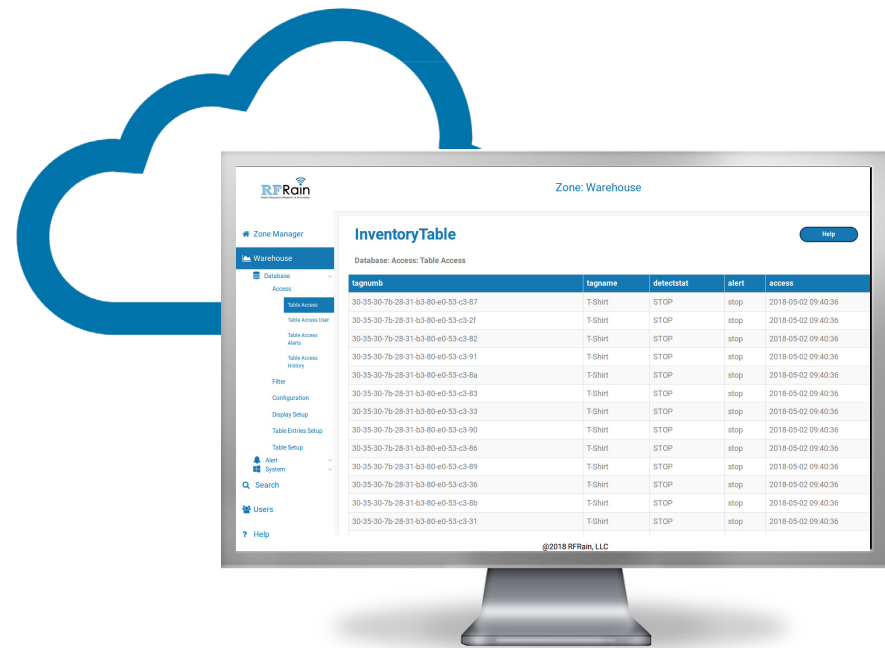Point the reader in the desired direction and detect tags

**CHECK**
Check in the cloud whether current tags are present, missing, or new tags

**SAVE**
Save directly to the cloud the exact location with GPS coordinates of the new tags.

# ZONE MANAGER ENTERPRISE CLOUD



## Monitor assets, anywhere and on any device.

The RFR-ZM-ENT™ Zone Manager Enterprise offers simple, scalable and secure cloud-based software solutions to track your assets in real-time from anywhere in the world. All the benefits and features from the Zone Manager with access to and management of unlimited amount of readers.

√ Asset Visibility Capture asset information from multiple Advanced Smart Readers and multiple sites in real-time

√ Secure Access. Admin and User access by company name for added security

√ Configure, access, and support your data in real-time using any browser

√ Image Recognition through RFID. Process image content from Motion sensor videos and images captured through the camera and RFID events on the Advanced Smart Reader

√ GPS. Process GPS information captured through GPS and RFID events on the Advanced Smart Reader

√ Enable doorway access through the Cloud using the access control and RFID events on the Advanced Smart Reader

√ Send receive custom email/text alerts and push notifications to users based on RFID events on the Advanced Smart Reader

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# KEY IMPLEMENTATIONS

## DRIVING EFFICIENCY WITH RFID

# RETAIL

## INBOUND & OUTBOUND

Speed up deliveries and fulfillment while ensuring accurate loading and unloading of shipments with RFRain Smart Readers installed at the entrance and exit of warehouses to read tags on shipped items and delivery vehicles.

## WAREHOUSING

The RFRain RFR-RAIN-1-HANDHELD reader is a high-performance mobile reader that is optimized for fast and accurate inventory management on the warehouse floor. Quickly and efficiently walk the entire floor and scan thousands of tags at once based on your location and store the data automatically in the Zone Manager Enterprise.

## INVENTORY MANAGEMENT

Stocktaking: fast and accurate inventory scanning on the retail floor or in the retail stock location with RFRain RFID at 99% read accuracy versus 60-70% with barcode.

# RETAIL







### SMART FITTING ROOMS

Smart fitting rooms: gain insight on what items are left behind. With The RFRain Smart Reader installed in the fitting room, retailers can track how often an item is left behind, and track customer purchasing behaviors to adapt sales tactics. Enable smart mirrors.

### SMART FRIDGE

Inventory managment: keep track of the product inventory in the fridge in real-time. Further, the Smart Fridge can be used as a stand-alone system that allows customers to purchase items when opening the fridge and removing an item from the shelf.

### ACCESS CONTROL

RFID can be used for access control for security purposes. Smart cards, fobs and wristbands can be used as digital keys. Each employee can be given access to different areas. Control entry to authorized personnel only.

# SUPPLY CHAIN

Increase visibility and automate asset and inventory management. RFRain's RFID solutions for real-time item tracking can revolutionize supply chains and logistics, bringing unparalleled levels of accuracy, efficiency and business intelligence followed by immediate and significant cost savings.



### Inbound and Outbound

Track shipment goods arriving or departing. Verify the correct shipment using the RFRain RFR-RAIN-4-SMART RFID reader installed on loading dock doors.



### Asset Location Tracking

Identify the location of assets in the warehouse. Automate materials tracking for efficient storage and quick retrieval using the RFRain RFR-RAIN-4-SMART-ADV reader and a camera on a forklift, without needing an Active RTLS implementation.



### Inventory Management

The RFRain RFR-RAIN-1-HANDHELD reader is a high-performance mobile RFID reader used for manual processing of pallets in the warehouse to take a full inventory.

# HEALTHCARE

# Smart Cabinet with Access Control
## Item Tracking using RFID

√ **Eliminating stock-outs and expired products**
Items in the cabinet with affixed RFID tags are automatically scanned. The reader stores data about what items are present, how many are present and the expiration date of each product.

√ **Access Control & camera integration**
The RFRain Smart Cabinet grants access to Authorized staff only with a mobile app. A motion-sensor camera captures images enabling detailed item traceability and accountability that includes the time an item was removed, which item was removed, and who removed it for detailed auditing.

√ **Customize Alerts**
When an item is removed from the shelf, it is automatically updated in the Zone Manager. Receive text or email notifications when items go missing, expiration dates occur.

√ **Ease of implementation** Only one advanced reader is used to build a Smart Cabinet. It's plug-and-play capability will reduce the cost of an RFID implementation.

**RFRain**

# ACCESS CONTROL

# Doorway Access Control
## Door Access & Personnel Tracking using RFID

√ **Time & attendance automation**

The RFR-RAIN-4-SMART-ADV readers are installed at door entry ways with a smart lock. The readers pick up RFID signals from the tag, with information relayed back to the Zone Manager Software. These signals produce real-time location data, that show when an employee is checked in

√ **Access Control**

Remote unlocks grant access to authorized personnel only to restricted areas. A smart lock that you equip on your doors that communicates wirelessly with the Zone Manager Enterprise allows you to remotely unlock your doors without needing a physical key.

√ **Receive text alerts and email notifications for unusual activity**

√ **Add Camera Surveillance/ Camera Integration**
Customers can enhance security with the RFRain Smart Camera comes with the the Zone Manager™ software on the Advanced Reader. Users can access the captured data in the Zone Manager Enterprise™ for in-depth auditing. Admins receive visual snapshots of unlock events of which user actually went through the door at the time of an unlock event.

√ **Ease of implementation** Unlike any other RFID readers in the market, our Smart Readers come with pre-installed Zone Manager software, eliminating the need of additional software. Our Plug-and-Play system is designed for easy installation and programming that will reduce the cost of an RFID implementation.

**RFRain**

# AVIATION

# **Baggage Tracking**
meet IATA R753 compliance
99.9% accuracy

√ **Real-time bag location with RFID**

The RFR-RAIN-4-SMART-ADV reader detects the bag tag and stores the tag information & location data directly in the Zone Manager Enterprise server in real-time using a WIFI network or LAN. The baggage information can then be easily retrieved through REST API's by the baggage control system of the airport.

√ **Enhances Bag tracking with image recognition**

Image recognition can enhance data gathered from the baggage handling system, and provides airlines with accurate data about checked baggage such as bag attributes.

√ **Ease of implementation**

Only one advanced reader is used at the conveyor belt or belt loader.

√ **ROI** An Advanced Smart Reader with software is around $3,000 versus a typical RFID reader at $50,000

RFRain

# RFRain & EDGE X

## DRIVING EFFICIENCY WITH RFID

# RFRAIN MAKES PLUG & PLAY SMART READERS AND SOFTWARE

RFRain has developed the most advanced Plug and play readers on the market with proprietary software. The RFID Smart Reader combines several data capture technology with cloud platform.
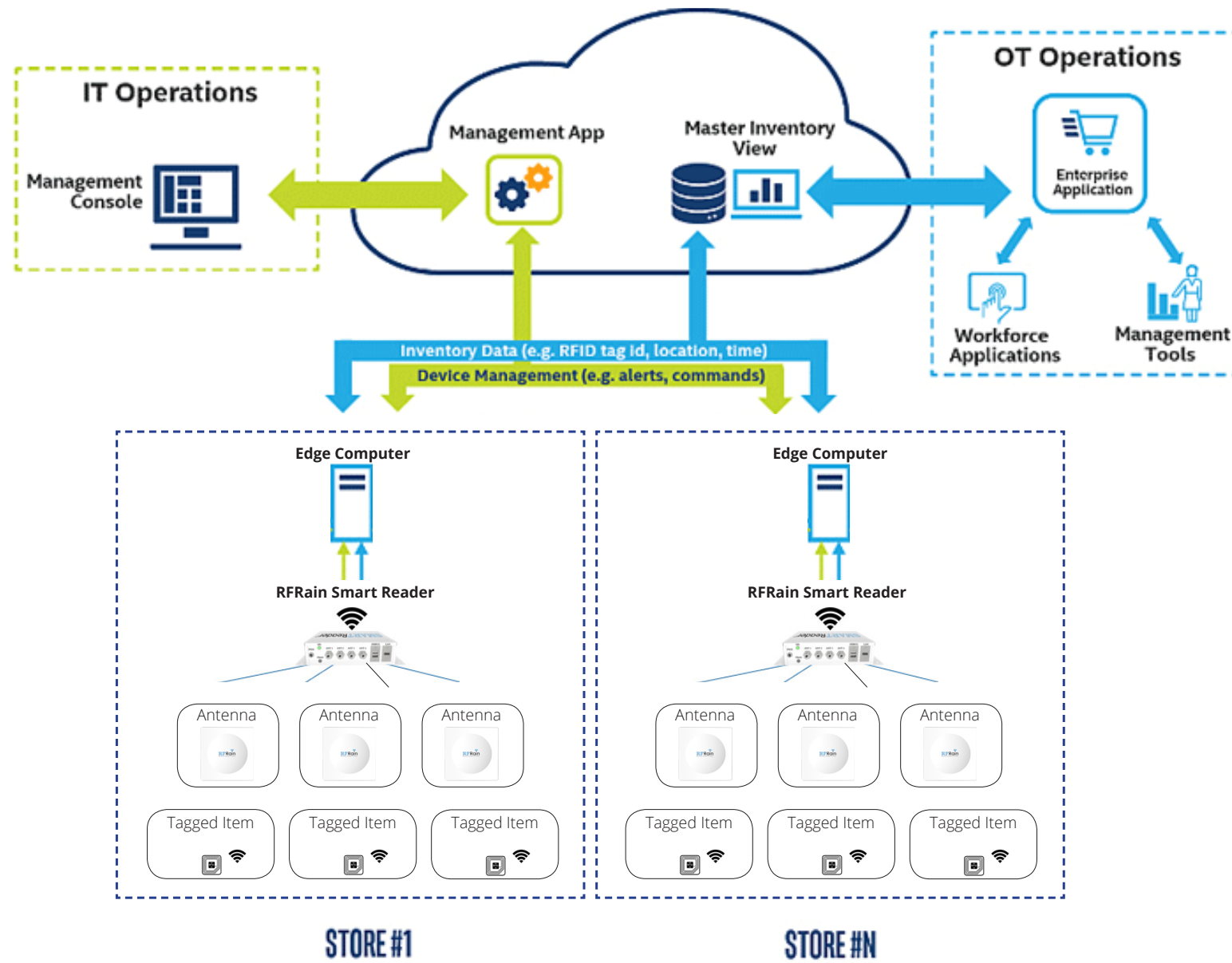
Antenna    Antenna    Antenna    Antenna

Tagged Item    Tagged Item    Tagged Item    Tagged Item

Unlimited Tagged items

Zone Manager in
Browser (over wifi)

RFR-Cloud

Zone Manager in Browser

3rd Party Apps

Enterprise Zone Manager Server

**1.** Antennas/reader read tagged items
Data is stored in a database in the reader

**2.** Monitor and control the readers using
the Zone Manager from any browser

**3.** Access data from anywhere in
the world with the RFRain Cloud
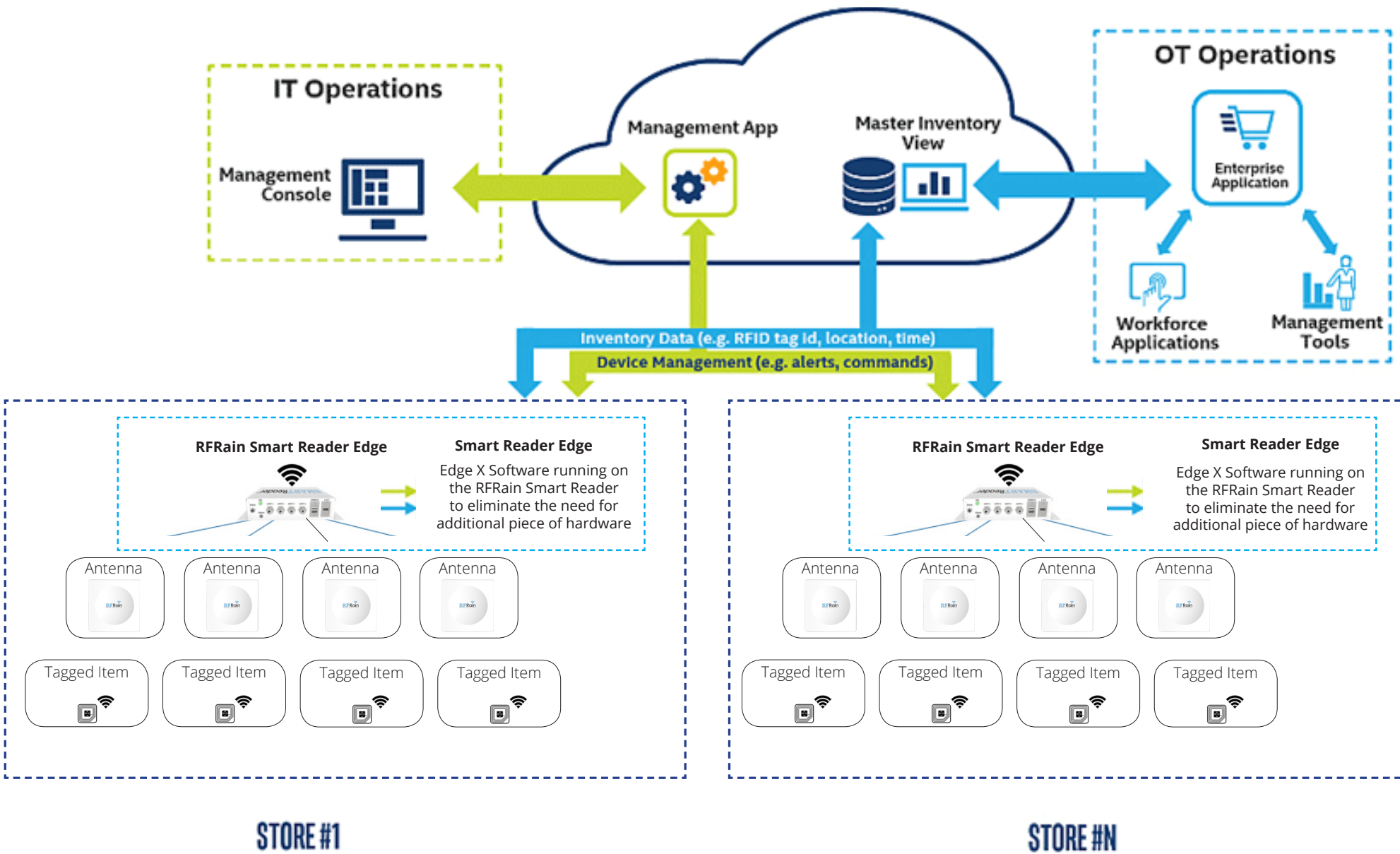
RFRain

# RFRAIN & EDGE X



OPTION 1: **streams the data live from the smart Reader Edge Computer to the cloud.**

*RFRain Smart Reader*

- Zone Manager Smart Reader stores data in its own database
- keeps history information,
- determines movement of assets,
- sends push notifications from the gateway ,
- allows any device to get real-time asset information on the Edge Computer
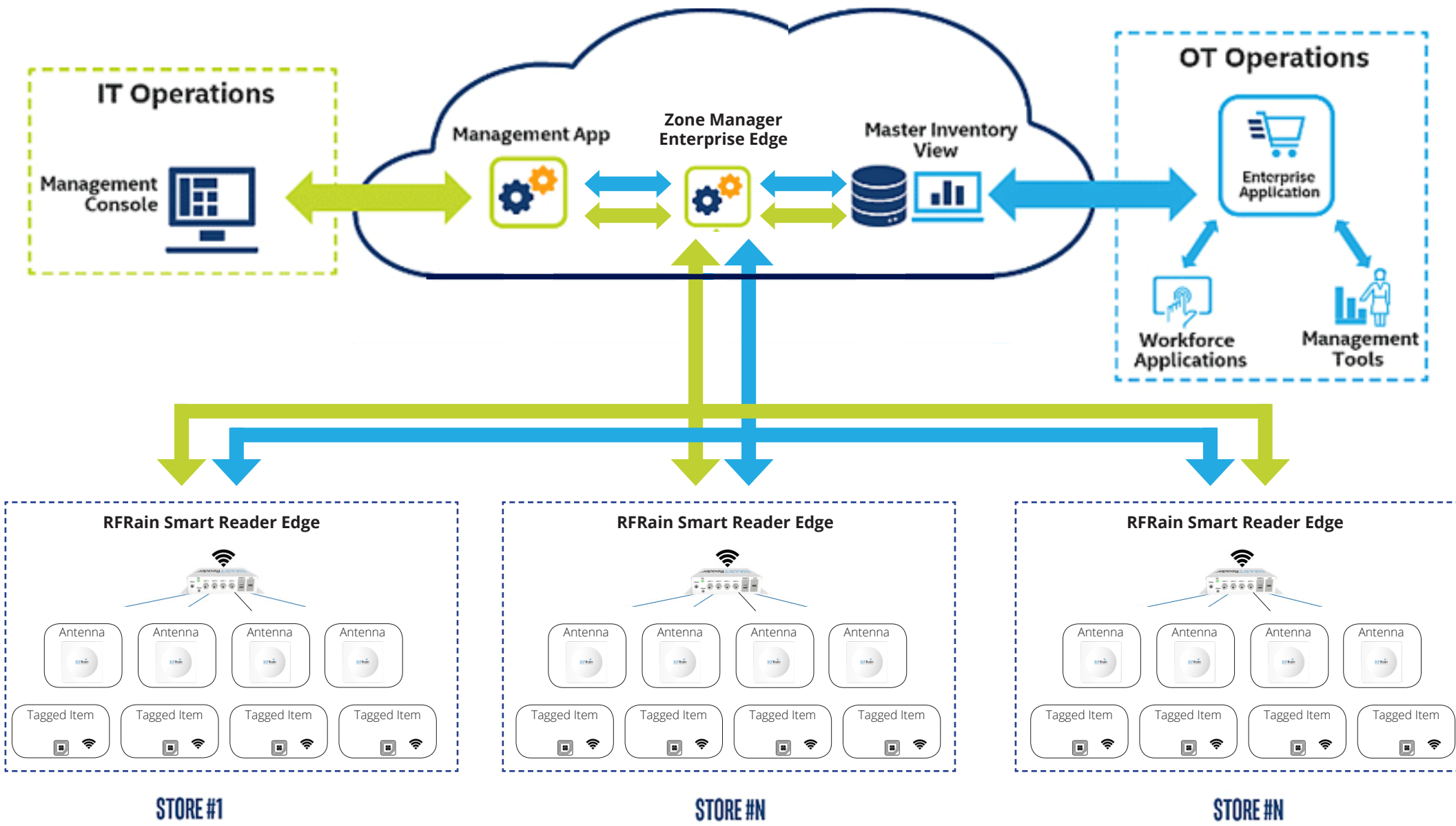
RF Rain®

# RFRAIN & EDGE X



**OPTION 2: The Smart Reader is the Edge Computer**

*RFRain Smart Reader Edge*

- Eliminate the need for an additional server.
- Stream the data directly to the cloud.
- Communicate with the Inventory API and the Management API

# RFRAIN & EDGE X



OPTION 3: **The Zone Manager Enterprise streams the data live from the smart Reader Edge Computer to the cloud.**

*Zone Manager Enterprise Cloud*

- Allows full configuration of the reader
- stores the data in real time
- stores video with RFID events
- Stores GPS information
- No fee associated with accessing the data in the cloud
- full access control capabilities included

*RFRain Smart Reader Edge*

- Zone Manager Smart Reader stores data in its own database
- keeps history information,
- determines movement of assets,
- sends push notifications from the gateway ,
- allows any device to get real-time asset information on the Edge Computer

# ABOUT US

**RFRain is driven to continuously innovate** and bring new advancements to the RFID industry with its Smart Reader technology, making RFID an easy-to-use and affordable technology.

In the couple of years that we have been in the RFID space,
we achieved the following:

- Created the World's First Plug-and-Play Smart Reader, Smart Reader Advanced and Smart Reader Handheld that are each unique in the industry

- Earned multiple patents on the Zone Manager software and Zone Manager Enterprise cloud platform for RFID

- Reduced the cost of owning a RAIN RFID system

- Simplified the installation and deployment of a RAIN RFID system

- Deploying hardware and software solutions years ahead of the market

- All our readers are FCC, CE certified

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rfrain.com

# Meeting Dial-in

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One tap mobile
+16699006833,,132889142# US (San Jose)
+16465588656,,132889142# US (New York)
Dial by your location
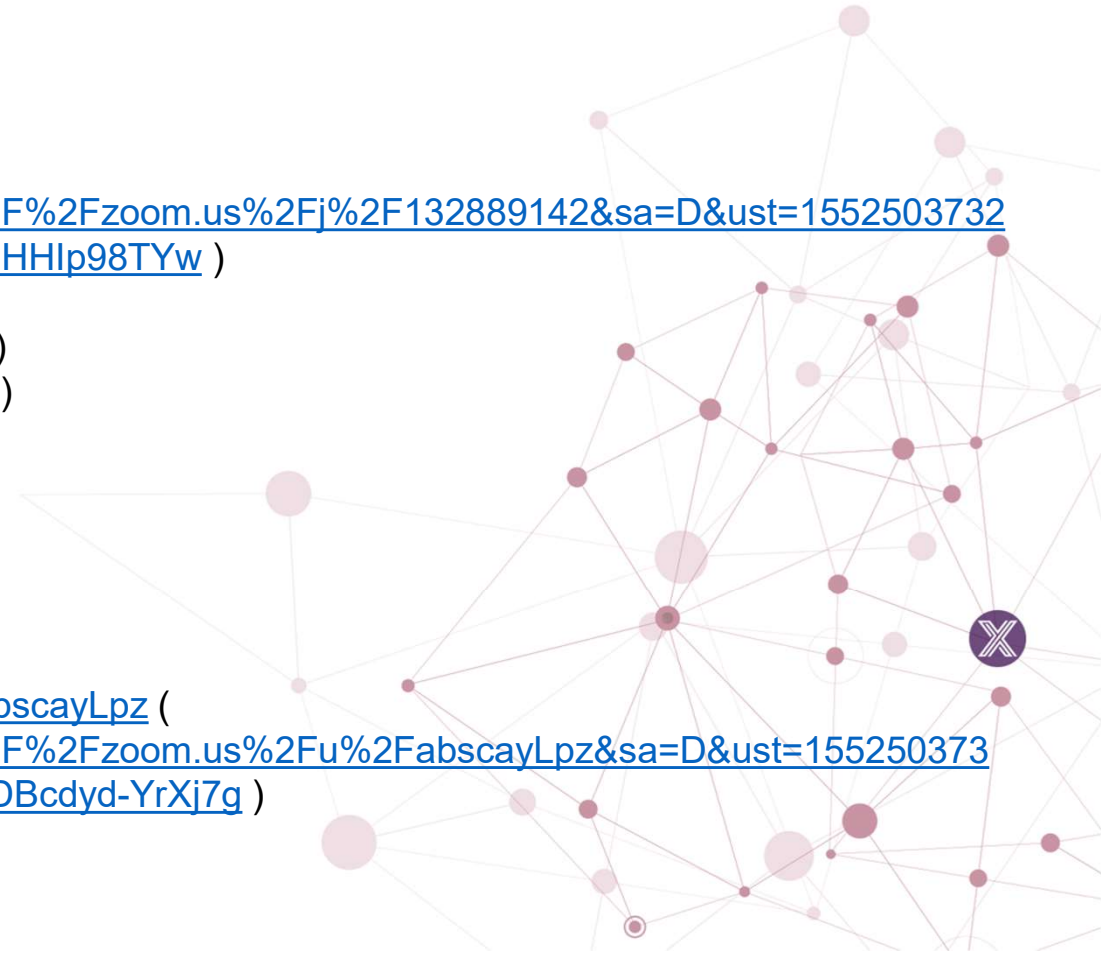+1 669 900 6833 US (San Jose)
+1 646 558 8656 US (New York)
855 880 1246 US Toll-free
877 369 0926 US Toll-free
Meeting ID: 132 889 142
Find your local number: https://zoom.us/u/abscayLpz (
https://www.google.com/url?q=https%3A%2F%2Fzoom.us%2Fu%2FabscayLpz&sa=D&ust=1552503732499000&usg=AFQjCNEMKuQdf-1HfMXI0DBcdyd-YrXj7g )

**EDGE X FOUNDRY™**

Thank you