Zebra DevCon 2023

ZEBRA

Building Apps with MWE RFID Reader Management REST APIs

Gary Crean

Building Apps with MWE RFID Reader Management REST APIs

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Agenda

- Next Gen RFID Platform Overview
- MWE RRM APIs
- How To: Upgrade firmware of multiple readers using RRM APIs
- Next Gen RFID Roadmap

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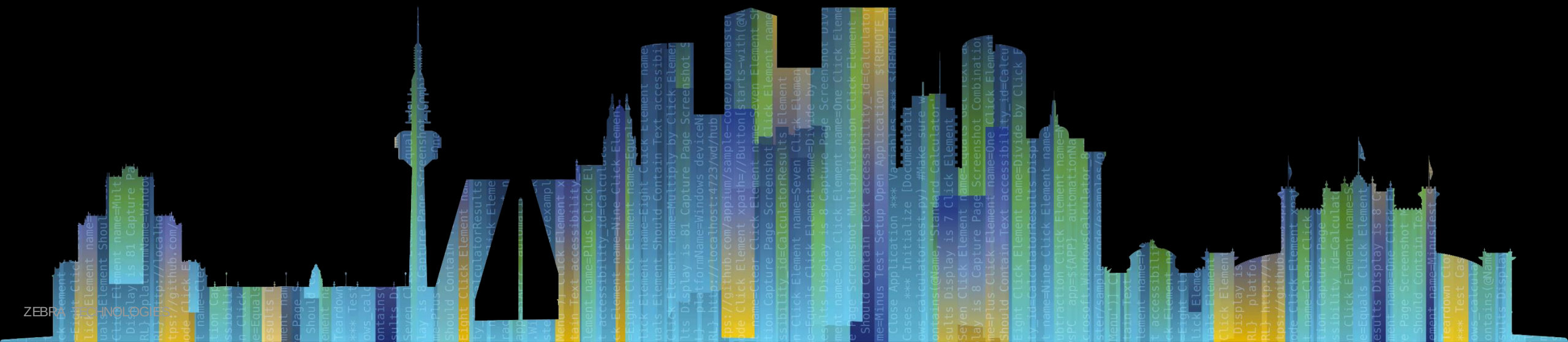
Next Gen RFID Platform Overview



Zebra NextGen RFID Platform

Platform Overview

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RFID Reader Management (RRM)

- **Deploy, monitor, & manage** FX readers and individual ATRs, eventually other IoT Connector devices
- **Push Firmware updates, new Certs, Configs**
- Tell readers where to **send their data** (reads)
- **Monitor Reader status centrally** with a filterable, configurable control screen and simple dashboard

RFID Solution Enablement (RSE)

- Use RFID reads to determine **location of items**
- **Understand Resources** versus Labels/tags
- **Define Workflows**, with expected **path and dwell**
- Capture movement events and path exceptions
- **Publish tracking updates and events** to other apps

Multi-technology Gateway (MTG)

- **Connect** WhereNet, Zebra UWB, and Zebra Mpact **active RFID devices to RRM and RSE**
- Provide a **gateway** to connect non-cloud-ready devices to RRM and RSE
  - For devices we can't control (e.g. third party access points)
  - For low-compute-power devices that can't do cloud secure

Advanced Solution Enablement

- Add **Expansion Packs** for supported vertical market solution sets. e.g.:
- **Retail** = Store Inventory, Loss Detection, etc.
- **Healthcare** = Patient Flow, Biomed Asset, Cart Inv

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Platform Overview

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IoT Connector

AutoID Device Connectors

Enterprise Connectors

Available

Reader Management

Configuration Tools (Zones, Groups)

Alert & Monitoring

Available

Solution Enablement

Historical Data

Dwell and Cycle Time Measurement

Visualisation and Mapping

Reporting & Data Entry

Q1 '24

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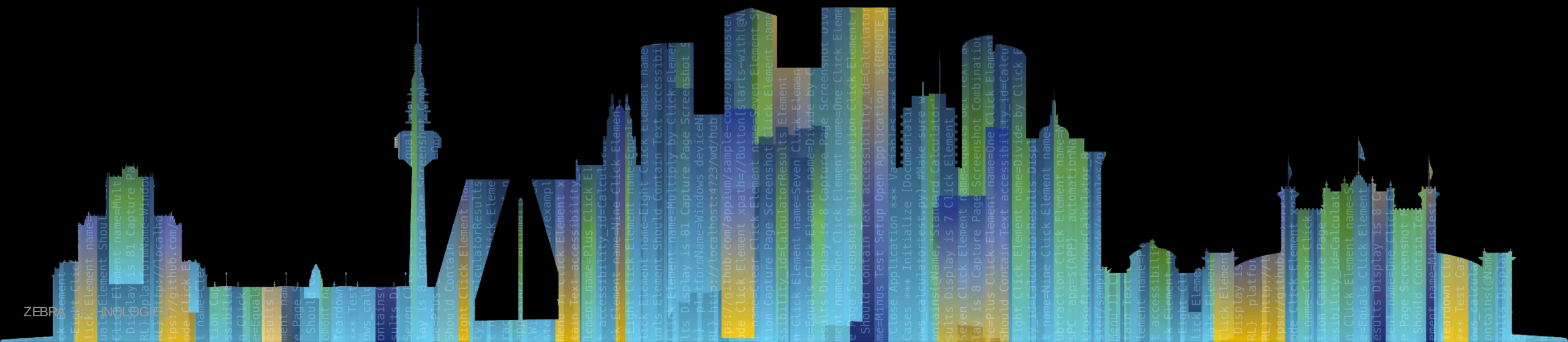
MWE RFID Reader Management REST APIs



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MWE RFID Reader Management

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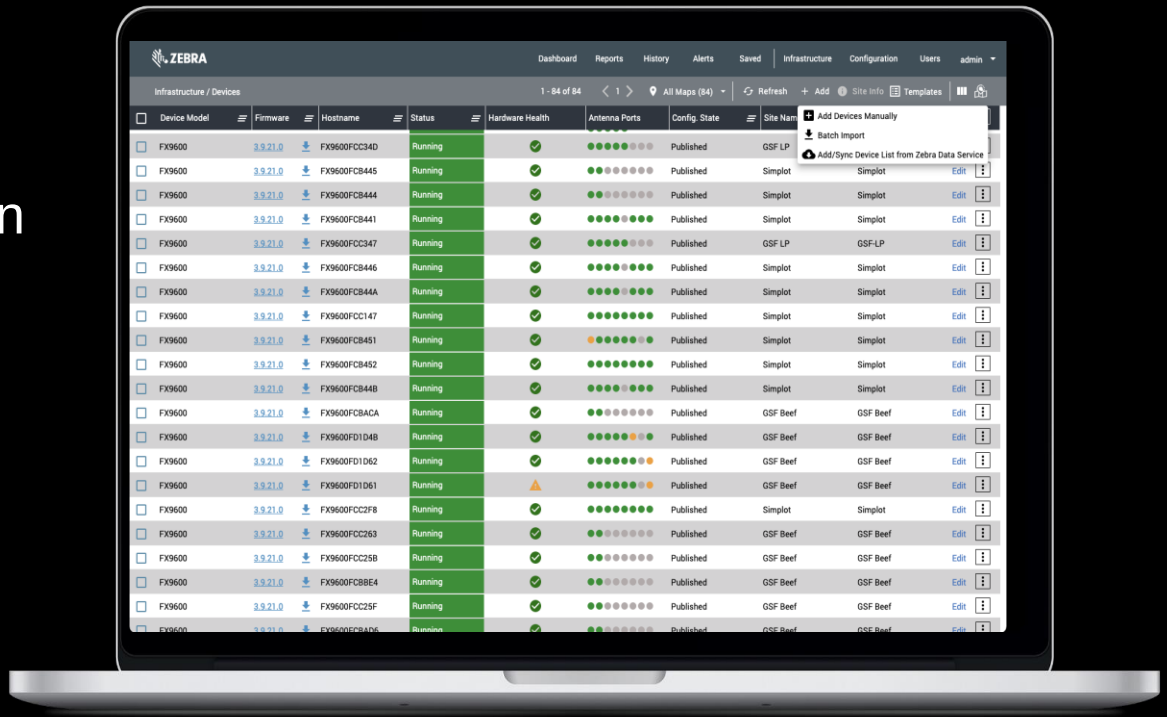
Why use MWE RFID RRM?

- Easily deploy readers without complex tools
- Immediately see and monitor status and condition of your readers
- Push or roll back updates to configuration or firmware to any or all of your readers, worldwide
- Point your readers output to your existing data collection applications
- Supports all Zebra Passive RFID readers using modern read-to-cloud protocols - leverages IOT Connector features/formats



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MWE RFID Reader Management API

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What can I do with the MWE RRM APIs?

- Manage and control RFID reader via REST calls (GET,POST, PATCH, DELETE)
- Manage users and groups on MWE RFID.
- Manage and maintain reader configurations such as operating mode, data endpoint, etc.
- Perform operation on a device (start, stop, config, mode)
- Bearer token authorization

Commands *(add, remove, update, query)*

- Auth/Access: Login, Users, Groups, Roles
- Devices
- Device Configuration
- Device Tasks
- Files

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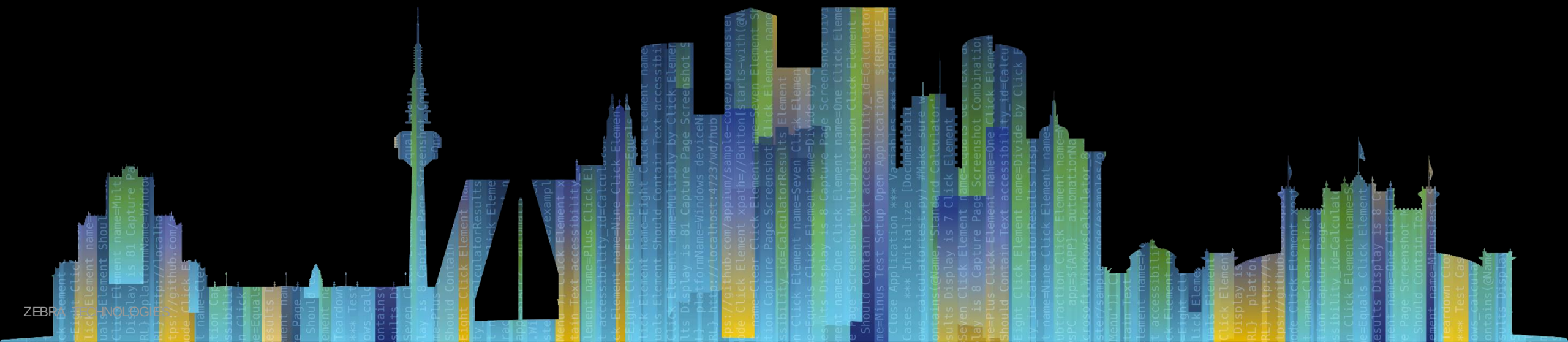
How To: Upgrade firmware of multiple readers using RRM APIs



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HOW TO: Apply firmware updates to multiple readers using the RRM APIs

- Login/token access
- Upload firmware file
- Get Site Id
- Check firmware version
- Update firmware for all readers at a site
- Check the status of the task to confirm that FW update is completed

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How to: Login and obtain bearer token

Example POST

POST: `https://<hostname>/trifecta/v1/login`

BODY:

```
{
"userName": "user1",
"password": "password1"
}
```

Example Response

```
{
"access_token": "ey…10"
}
```

- The access_token should be used for all subsequent API calls in the Authorization header as a bearer token
- Token is valid for 12 hours
- RRM can be configured to use a customer provided identity-server

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How to: Upload Firmware File

EXAMPLE POST

POST: `https://<hostname>/trifecta/v1/files`

BODY: `form-data`

Key	Type	Value
file	File	File to upload
fileName	Text	Name of file
fileVersion	Text	Version of file
deviceModel	Text	Device Model file is appropriate for (ATR7000, FX9600, FX7500)
description	Text	Description of the file
fileType	Text	Type of file (firmware, app, certificate, generic)

RRM API File Commands

- Add File
- Remove File
- Update File Properties
- Query File Properties By ID
- Query File Properties By Device Model
- Query File Properties By Device Model and File Type
- Get File by file ID
- Query All File Properties

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How to: Upload Firmware File

EXAMPLE RESPONSE


```
{
    "apiName": "taskmgr API",
    "version": "0.2.0",
    "error": "",
    "code": 200,
    "message": "OK",
    "count": 11787,
}
```


RESPONSE FORMAT

Name	Value	Required/ Optional	Description
status	Object	Required	See Status Response Object
results	Object	Required	
URL	String	Required	URL to get File information

STATUS RESPONSE OBJECT

Name	Value	Required/ Optional	Description
apiName	string	Required	Name of the API requested
version	string	Required	Version of the API
error	string	Required	More detailed description of error if any
code	integer	Required	HTTP Code (for example, 200)
message	string	Required	HTTP message (for example, OK)
count	integer	Required	Number of requests to the API
pagination	object	Optional	See Pagination Object

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How to: Get Site Id

Query Sites

Returns an array of sites

Example Query

GET: `https://<hostname>/trifecta/v1/ui/lcs/sites/`

Response

```
[
    {
        "_id": "111111111111111111111111",
        "name": "Default"
    },
    {
        "_id": "64f87c8c1c1c90580d250700",
        "name": "Site1",
        "location": "50.41698, -46.2425",
        "lat": 50.41698100336984,
        "long": -46.242496998799524,
        "groupMembership": []
    }
]
```

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How to: Check Firmware Version

Query Devices by Site

Example Query

GET:

```
https://<hostname>/trifecta/v1/devices?$siteId=1234567890
```

Response Format

Multiple Devices Response Object

Name	Value	Required/ Optional	Description
status	Object	Required	See Status Response Object
results	Array	Required	See Device Object

Device Object

Name		Value	Required/ Optional	Description
deviceId		string	Required	Unique identifier for device (not available when creating or updating a device)
deviceModel		string	Optional	Device Mode type (ATR7000, FX9600, FX7500, SNAP)
serialNumber		string	Optional	Serial Number of the device
siteId		string	Optional	Unique Identifier for the site of the device
name		string	Optional	User-supplied name for the device
network		object	Optional	See Table 20 Network Object on page 25
position		object	Optional	Position of the device in relation to its site x
	x	number		
	y	number		
	z	number		
antennas		array	Optional	Array of antenna objects. See Table 21 Antennas Object on page 25
lastSeen		string	Optional	Timestamp of the last time the system was in contact with the device (not available when creating or updating a device)
lastStatus		object	Optional	See Table 22 Last Status Object on page 26 (not available when creating or updating a device)
state		object	Optional	State of the device (added, initialized, running, stopped, updating, rebooting, failure) (not available when creating or updating a device)
configId		string	Optional	Unique Identifier for the device configuration
version		object	Optional	See Table 27 Version Object on page 31
region		object	Optional	See Table 28 Region Object on page 31
orientation		object	Optional	Orientation of the device in relation to its site
	raw	number		In degrees
	pitch	number		In degrees
	yaw	number		In degrees
hostName		string	Required	Default Device Hostname (required when creating a device)
gpioStatus		object	Optional	Array of GPIO Status objects. See Table 29 GPIO Status Object on page 32

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How to: Check Firmware Version

Version Object

Name	Value	Required/ Optional	Description
readerApplication	string	Required	Version of the reader application
radioAPI	string	Required	Version of the radio API
radioFirmware	string	Required	Version of the radio firmware
radioControlApplication	string	Required	Version of the Radio Control Application
readerOS	string	Optional	Version of the reader Operating System
readerHardware	string	Required	Version of the reader hardware
readerBootLoader	string	Required	Version of the reader bootloader
readerFileSystem	string	Required	Version of the reader filesystem
cloudAgentApplication	string	Optional	Version of the Cloud Agent Application

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How to: Update Firmware for All Devices at a Site

Device Task Actions: update, reboot, install, start, stop, set-led

Example POST – Add Task

POST:

`https://<hostname>/trifecta/v1/devices/tasks`

BODY Format: Task Object

Tasks can be applied by: Site, Device Model, Device ID (1 or more)

Task Object

Name		Value	Required/ Optional	Description
id		string	Required in Response	Unique identifier for the task
description		string	Optional	Description of task
devices		array	Optional	Array of device ids to perform the task
startDateTime		string	Optional	ISO 8601 format of local server time to begin the task. If not provided, the task begins immediately
fileId		string	Optional	File Identifier of the file to use when using update or install action
action		string	Required	Action to take (update, reboot, install, start, stop, set-led)
status		string	Required	Status of task (In progress, Complete, Pending)
enabled		bool	Required	Indicates if the task is currently enabled
siteId		string	Optional	Site Identifier of the site to apply to task all devices
deviceModel		string	Optional	Device Model upon which to perform the task (ATR7000, FX9600, FX7500)
params		object	Optional	
	color	string	Optional	Used when action is set-led to set the LED color
	flash	bool	Optional	Used when action is set-led to set enable/disable flashing LED
	seconds	integer	Optional	Used when action is set-led to indicate the duration of the set-led action

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How to: Update Firmware

Example RESPONSE – Add Task

Name		Value	Required/ Optional	Description
status		Object	Required	See Status Response Object
results		Object	Required	
	URL	String	Required	URL to get task information

Status Response Object

Name	Value	Required/ Optional	Description
apiName	string	Required	Name of the API requested
version	string	Required	Version of the API
error	string	Required	More detailed description of error if any
code	integer	Required	HTTP Code (for example, 200)
message	string	Required	HTTP message (for example, OK)
count	integer	Required	Number of requests to the API
pagination	object	Optional	See Pagination Object

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How to: Check Status of Firmware Update

Example Query

```
https://<hostname>/trifecta/v1/devices/tasks?$siteId=1234567890
```

Response Format

Multiple Tasks Response Object

Name	Value	Required/ Optional	Description
status	Object	Required	See Status Response Object
results	Array	Required	See Device Object

RRM API Task Commands

- Add Device Task
- Remove Device Task.
- Update Device Task
- Query Device Tasks by Task ID
- Query Device Task History by Task ID
- Query Device Tasks by Device.
- Query Device Tasks by Site.
- Query Device Tasks by Device Model..
- Query Device Tasks by Status.
- Query Device Tasks by Action...
- Query Device Tasks by Device Model and Site.
- Query All Device Tasks.

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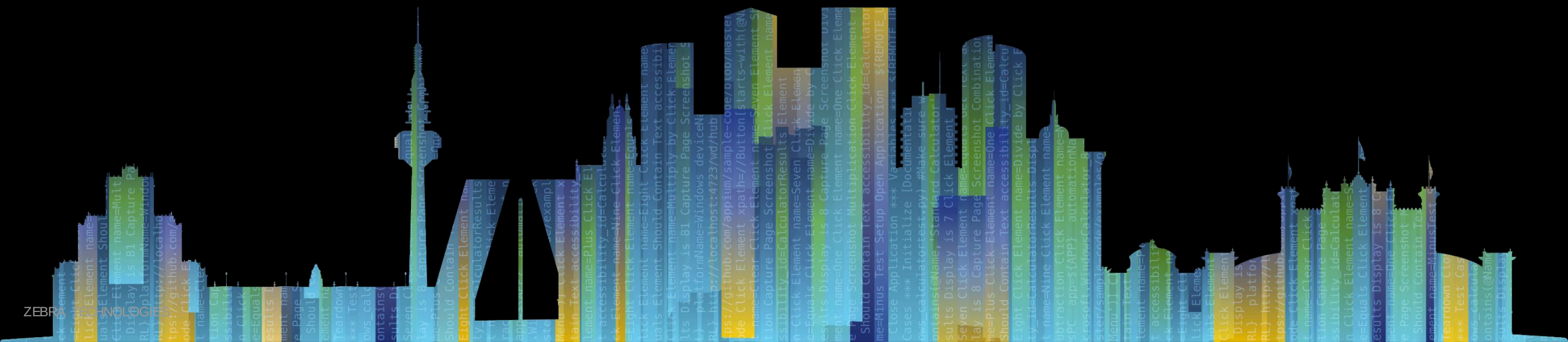
Next Gen RFID Roadmap



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Platform Software Roadmap

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RRM 1.1 (H1 2024)

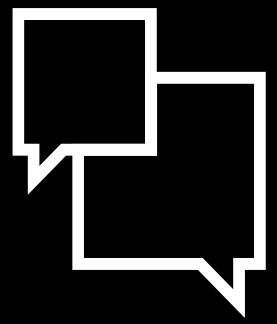
- microUI architecture allows faster updates more specific optimization, better compatibility
- Improved site manager makes designing sites for RFID RTLS easy, fast, reliable
- ATR-optimized configuration screens
- Custom reader modes and a week-scheduler for automatic changes
- Ability to manage on-reader apps
- Support for ZS300 Temperature Tags
- License enforcement

RFID Reader Management Resources

Product Information

Product Documentation on Zebra.com

RFID Reader Management API Guide



Questions

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Thank You