Rifidi Edge Server
Quick Start Guide

Version 3.5 (Rifidi Edge Server version 3.5)

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Introduction

This guide is intended for users who need to install and configure the Rifidi Edge Server for an Alien or LLRP reader. Within this guide, you will find information about which software to download, an example how to configure the software, and how to verify it is configured correctly. The document is intended to be an introductory document. Specific production setup topics, for example dealing with ROSpec requirements, will not be covered. For advanced topics and further details please see the documentation listed at the end of this document.

Required Hardware

The Rifidi Edge Server requires the following hardware components:

- RFID Hardware:
    - RFID Reader with EPC Gen 2 tags, or
    - Rifidi Emulator
- Server or PC (for running the Rifidi Edge Server)
- Networking Equipment:
    - Router
    - LAN cables or wifi capabilities

Required Software

There are two kinds of software required: the System software (operating system and associated system tools), and the Rifidi Edge Server.

- System Software:
    - Ubuntu Server 12.04 (Raspbian on the Pi), or Windows XP or higher
    - OpenJDK v1.7
    - OpenSSH Server
- Rifidi Edge Server version 3.5

Setup and Configuration – LLRP Reader

This section steps users through connecting the devices to the network, installing the Rifidi Edge Server, and how to check the status of the Rifidi Edge Server background process. It explains users how to create a simple configuration so the Rifidi Edge Server reads from an LLRP reader.

Connecting the Devices

1. Connect your RFID reader to the router, switch or hub, or install Rifidi Emulator (if you don't have a physical reader) on your PC/Server.
2. Connect your PC/Server to your router, switch or hub.
3. Power up your PC/Server and your RFID reader, make sure both devices have LAN connectivity to your router, switch or hub. If you don't have a physical RFID reader, then start up Rifidi Emulator and generate a reader. http://www.transcends.co/www/docs/quickstart_video.html

Install the Rifidi Edge Server

1. Download the Rifidi Edge Server from http://sourceforge.net/projects/rifidi/
2. Doubleclick on the file rifidiserver.exe

Starting the Rifidi Edge Server

The Rifidi Edge server is an executable that starts by doubleclicking on it (rifidiserver.exe in the server directory).

After the edge server is started you can continue with configuration steps via osgi command line, REST interface commands, or the Enterprise Rifidi Management Dashboard. We will first describe configuring a new LLRP reader using this Dashboard interface.

Configuring the Rifidi Edge Server using the Enterprise Rifidi Management Dashboard

The Enterprise Rifidi Management Dashboard enables users to manage, monitor and configure Rifidi Servers, Sensors/Readers and Applications. The key components of the enterprise-wide dashboard that was added with release 3.3 are summarized below.

- Edge Server Node Management – Let's you monitor multiple Rifidi Edge server nodes across the enterprise to see connection states, properties, sensors and applications.
- Sensor Management – Provides an interface to create sensors, monitor sensors' state, manage sensors' properties and dynamically update sensors' execution.
- Rifidi Application Management – Allows you to monitor application states, manage sensor/reader read zones, and update both out-of-the-box business solutions and custom (via SDK) Rifidi sensor/IoT device properties, providing the foundation for a Rifidi Application marketplace.

For the purpose of creating a LLRP reader in Rifidi, we start the dashboard with the following address in the browser: http://localhost:8111/dashboard
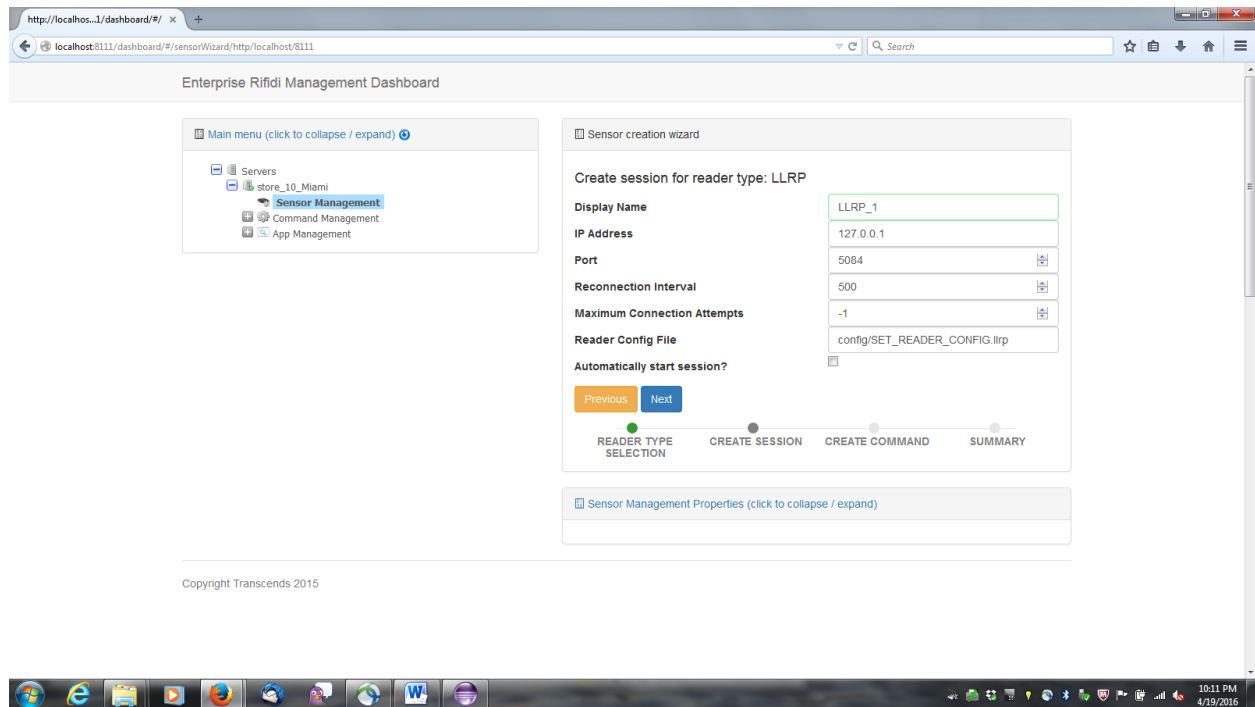
Right click on "Sensor Management" and choose to "Add a Sensor".
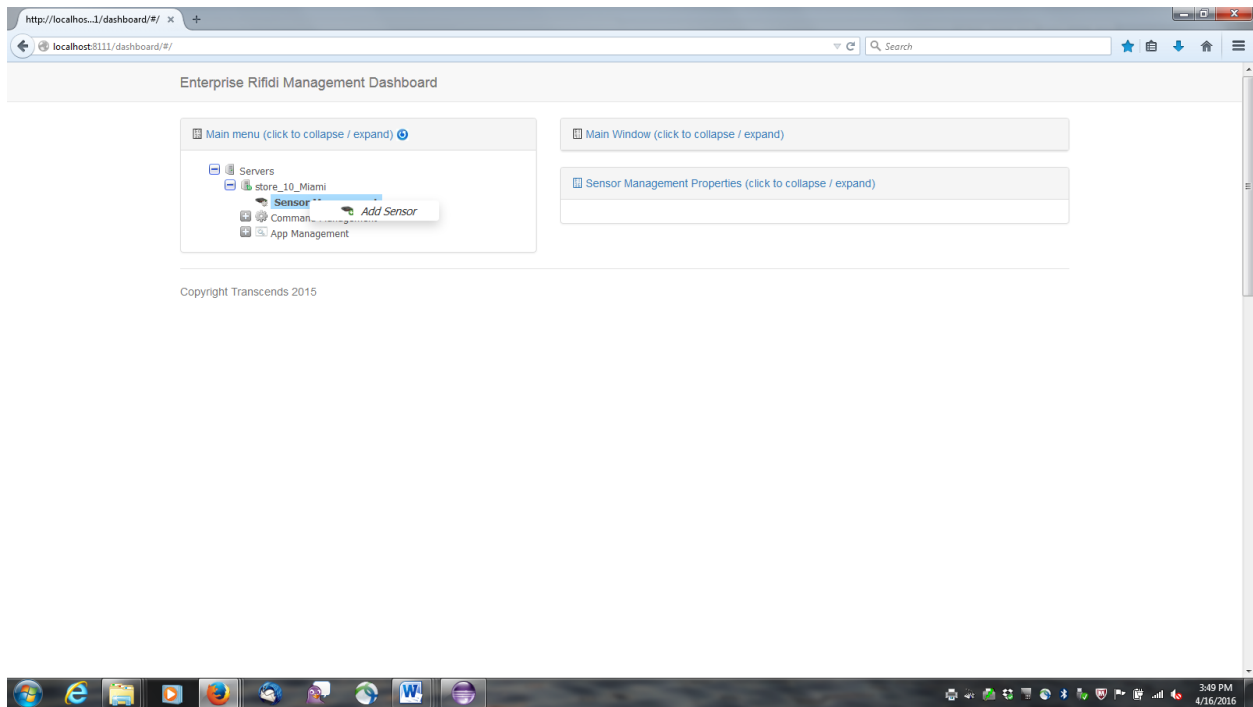
You can now select LLRP for reader type and name your reader, for example LLRP_1, and hit Next.
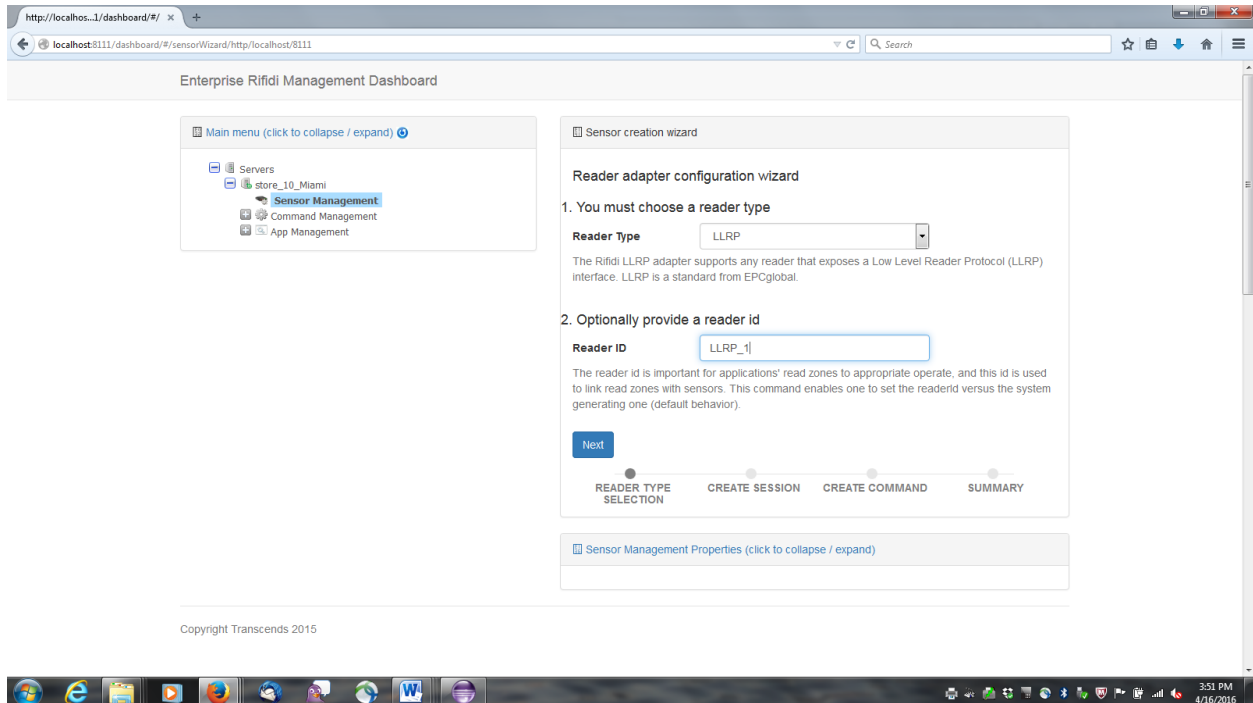
When creating the session you should enter the reader name as the display name, its IP address and decide how often Rifidi should try to reconnect if the connection to the reader gets disrupted. A value of '-1' means infinite number of retries. You can choose to use the default reader configuration file. Depending on your use case you might want the Rifidi reader to start up every time Rifidi is started (if so, checkmark "Automatically start session?".
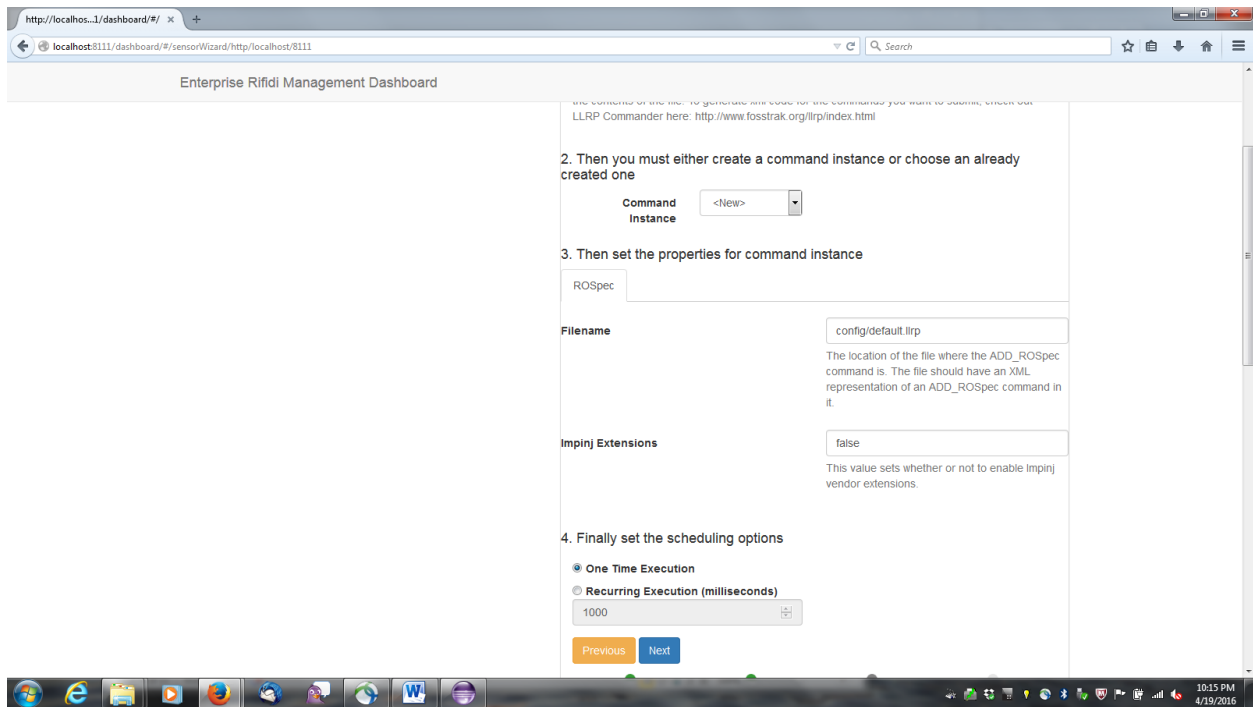
The next screen asks for input in order to create the reader command. If you want to use a file in which your ROSpec is defined, select LLRP-ADD_ROSPEC-File for the command type. If you are not reusing an existing command choose "<New>" for command instance. There is a default llrp file for the ROSpec available which is located in "config/default.llrp". As the scheduling option choose "One Time Execution", then hit Next.
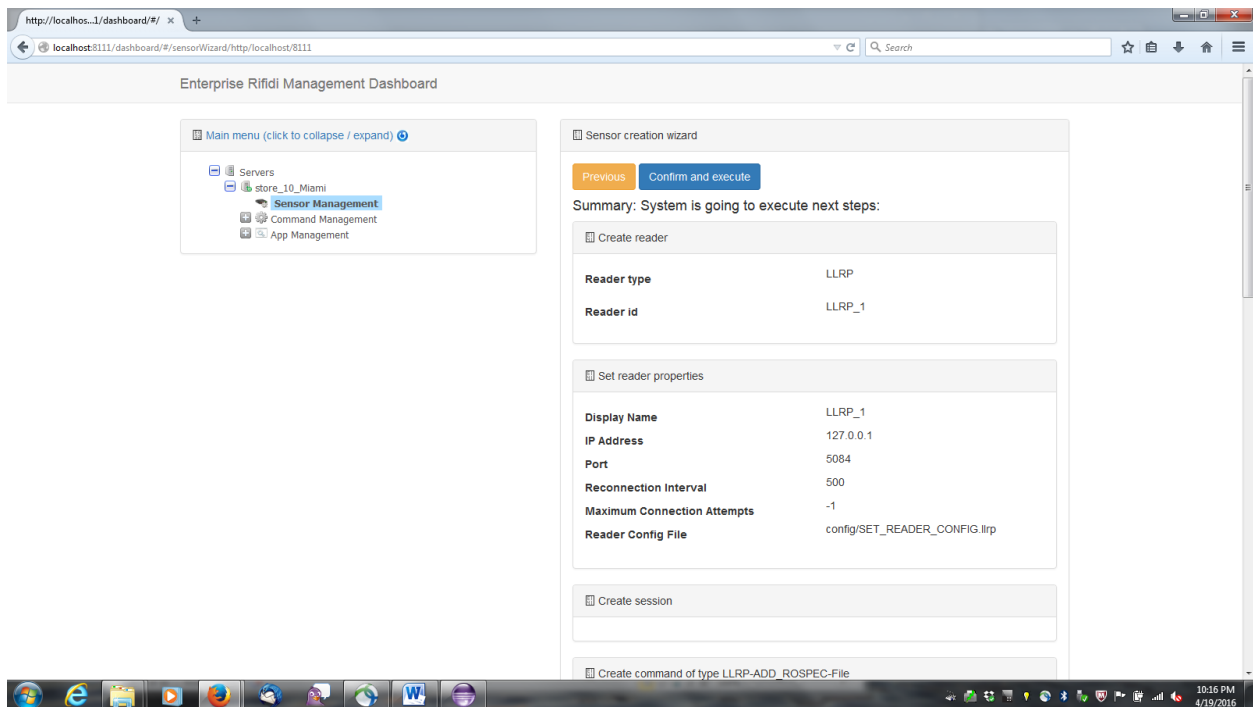
The next screen displays all your selections for review.

As a final step select "Confirm and execute".

Then scroll up and review if you can see success messages:
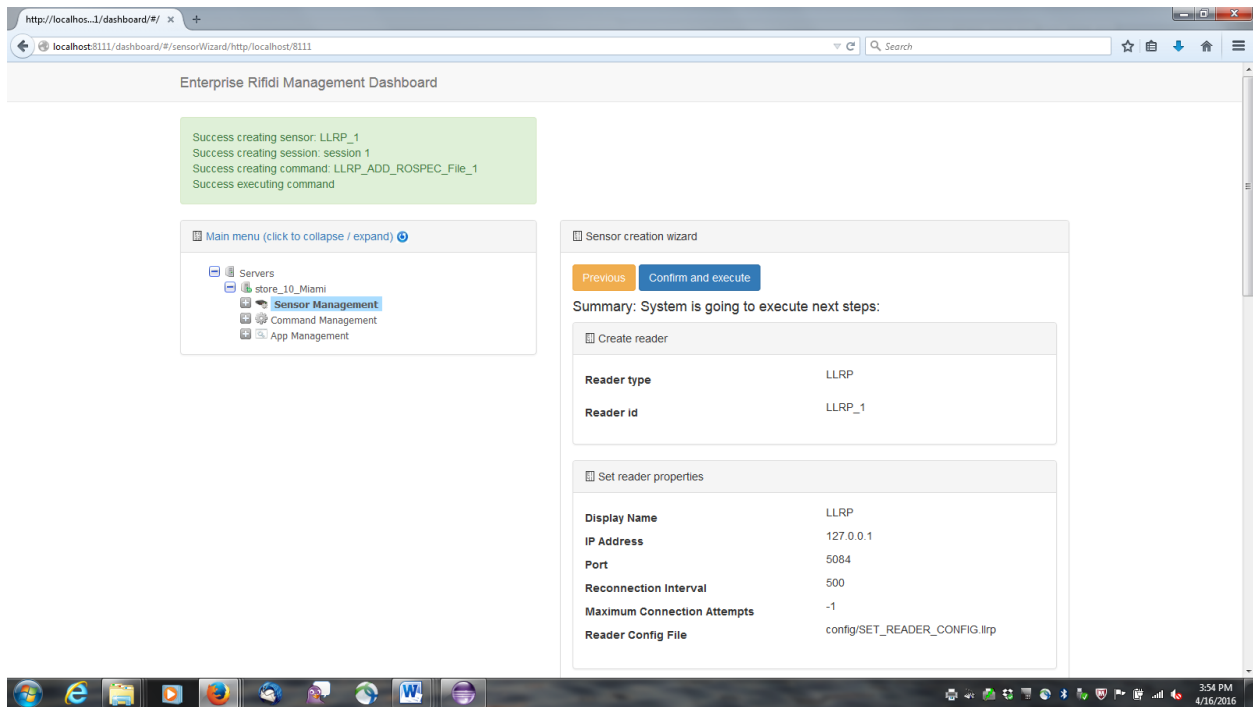
If the creation was successful go to the Sensor Management level and expand on your new reader. If your physical (or emulated) reader is connected, you can start the session and start utilizing the new reader.
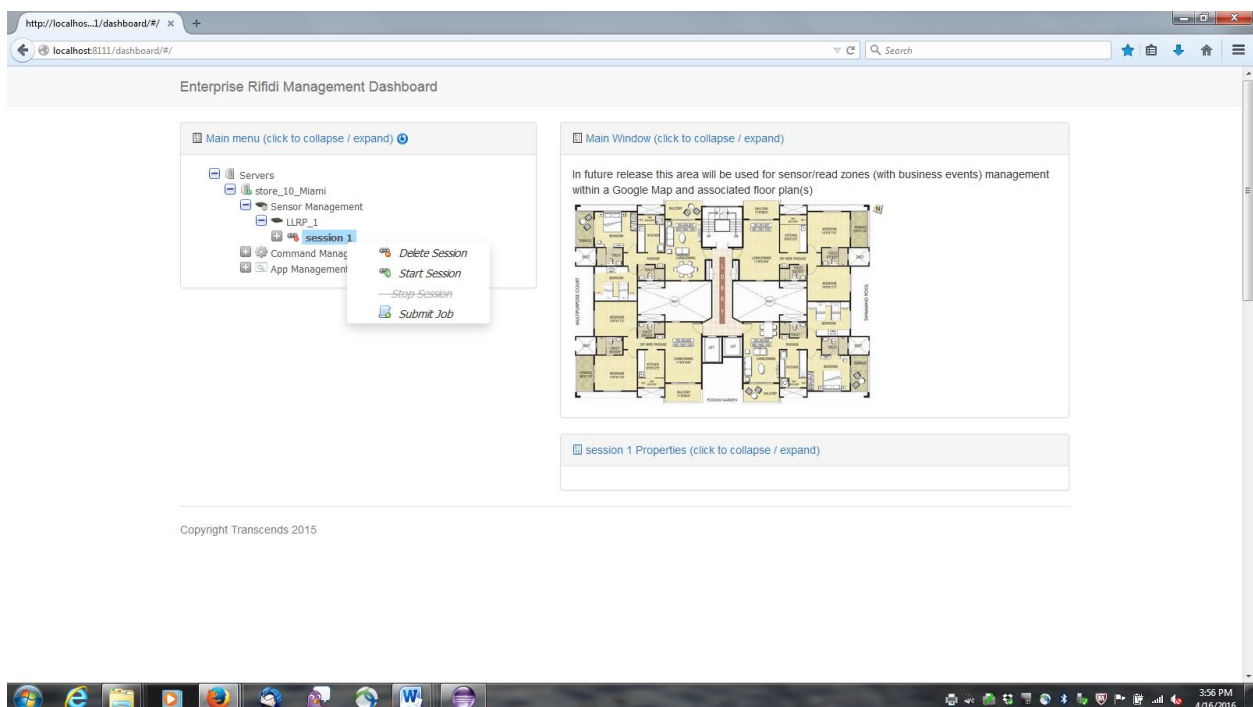
Configuration – Alien Reader

Configuring the Rifidi Edge Server for communication with an Alien Reader (Push Mode) using the Command Line Interface

An Alien reader can – as any supported reader – be configured via the Rifidi Enterprise Management Dashboard. However, we are here also showing the command line interface as an example.

After you see rifidi start messages type in the command "apps":

```
apps
0:Rifidi App: AppService:ReadZones <STARTED>
1:Rifidi App: AppService:SensorStatus <STARTED>
2:Rifidi App: AppService:UniqueTagInterval <STARTED>
3:Rifidi App: AppService:StableSet <STARTED>
4:Rifidi App: AppService:LimitStableSet <STARTED>
5:Rifidi App: AppService:UniqueTagBatchInterval <STARTED>
6:Rifidi App: AppService:GPIO <STOPPED>
7:Rifidi App: AppService:Serial <STOPPED>
8:Rifidi App: AppService:Tags <STARTED>
9:Rifidi App: AppService:TagGenerator <STARTED>
10:Rifidi App: Monitoring:ReadZones <STARTED>
11:Rifidi App: Monitoring:Tags <STARTED>
12:Rifidi App: Monitoring:SensorStatus <STARTED>
osgi>
```

You see all the applications that are available. Some are running ("STARTED"), some are stopped.

In order to verify that tags can be read from your reader, you need to perform several steps. As an example we will use an Alien reader that is emulated on the same machine (localhost). When using a network with a router, you need to use the appropriate IP address instead of localhost.

```
osgi> createreader Alien IpAddress 127.0.0.1 Port 20000
NotifyAddressPort 54321 NotifyPort 54321
Reader Created with ID Alien 1
```

Next, you create a session:

```
osgi> createsession Alien_1
Session created: Alien_1:1
```

For this particular reader, we will schedule a recurring command so the Reader pushes tag information to the Rifidi Edge Server. We create a new Alien-Push command, set the appropriate properties and submit the command to the session:

```
osgi> createcommand Alien-Push-Start
Command Configuration Created with ID Alien_Push_Start_1

osgi> setproperties Alien Push Start 1 NotifyAddressPort 54321
```

```
Properties for Reader Alien_Push_Start_1
    NotifyAddressPort : 54321

osgi> setproperties Alien_Push_Start_1 NotifyPort 54321
Properties for Reader Alien_Push_Start_1
    NotifyPort : 54321

osgi> setproperties Alien_Push_Start_1 NotifyAddressHost 127.0.0.1
Properties for Reader Alien_Push_Start_1
    NotifyAddressHost 127.0.0.1

osgi> executecommand Alien_1 1 Alien_Push_Start_1 -1
Session not in processing state. Command will be executed when
session connect:
Alien_Push_Start_1
Command submitted.
```

Start the session and save the configuration so that it will automatically start after the edge server is stopped and restarted again:

```
osgi> startsession Alien_1 1
Session Alien_1:1 started

osgi> save
Configuration Saved!
```

Now check which tags are within the readzone:

```
osgi> currenttags Alien_1
TAG READ EVENT:
    tag:1100bee9ffe0073e8c0d3519|readerID:Alien_1antennaID:0|timestamp:
    1369011070000
TAG READ EVENT:
    tag:120e07a330f6f1106f344f5e|readerID:Alien_1antennaID:0|timestamp:
    1369011070000
osgi>
```

In this example there are 2 tags within the reader's read range.

Configuring the Rifidi Edge Server for communication with an Alien Reader (Push Mode) using the REST Interface

Instead of the Rifidi command line interface you can use the REST interface that Rifidi offers starting with version 3.1. In the example below we are using the same data as in the previous section, but the REST interface. First, we create the logical reader.

```
http://localhost:8111/createreader/Alien/lpAddress=127.0.0.1;Port=20
000;NotifyAddressPort=54321;NotifyPort=54321

;check if reader exists:
http://localhost:8111/readers
```

Next, you create a session:

```
http://localhost:8111/createsession/Alien_1
osgi> createsession Alien 1
```

For this particular reader, we will schedule a recurring command so the Reader pushes tag information to the Rifidi Edge Server. We create a new Alien-Push command, set the appropriate properties and submit the command to the session:

```
http://localhost:8111/createcommand/Alien-Push-Start

http://localhost:8111/setproperties/Alien_Push_Start_1/NotifyAddress
Port=54321

http://localhost:8111/setproperties/Alien_Push_Start_1/NotifyPort=54
321

http://localhost:8111/setproperties/Alien_Push_Start_1/NotifyAddress
Host=127.0.0.1

http://localhost:8111/executecommand/Alien_1/1/Alien_Push_Start_1/-1
```

Start the session and save the configuration so that it will automatically start after the edge server is stopped and restarted again:

```
http://localhost:8111/startsession/Alien_1/1

http://localhost:8111/save
```

For more details on these commands please see the wiki.

Configuration – Thinkify Reader

This section describes how to create a simple configuration so the Rifidi Edge Server reads from a Thinkify USB reader. The configuration is the same for Thinkify TR50 and TR200 readers. Rifidi's readertype is called "Thinkify50" and works also for Thinkify TR200 readers. Ensure that the correct Thinkify driver is installed on your machine. Connect the reader to a USB port of the machine the Rifidi Edge Server is installed on and find out which COM port you are using. In our example below we are using COM4.

Starting the Rifidi Edge Server

The Rifidi Edge server is an executable that starts by doubleclicking on it (rifidiserver.exe in the server directory). After you see rifidi start messages type in the command "apps":

```
apps
0:Rifidi App: AppService:ReadZones <STARTED>
1:Rifidi App: AppService:SensorStatus <STARTED>
2:Rifidi App: AppService:UniqueTagInterval <STARTED>
3:Rifidi App: AppService:StableSet <STARTED>
4:Rifidi App: AppService:LimitStableSet <STARTED>
5:Rifidi App: AppService:UniqueTagBatchInterval <STARTED>
6:Rifidi App: AppService:GPIO <STOPPED>
7:Rifidi App: AppService:Serial <STOPPED>
8:Rifidi App: AppService:Tags <STARTED>
9:Rifidi App: AppService:TagGenerator <STARTED>
10:Rifidi App: Monitoring:ReadZones <STARTED>
11:Rifidi App: Monitoring:Tags <STARTED>
12:Rifidi App: Monitoring:SensorStatus <STARTED>
osgi>
```

You see all the applications that are available. Some are running ("STARTED"), some are stopped.

Configuring the Rifidi Edge Server for communication with a Thinkify Reader

In order to verify that tags can be read from your reader, you need to perform several steps. First we will create the reader on the edge server.

```
osgi> createreader Thinkify50 Port COM4
Reader Created with ID Thinkify50_1
```

Next, you create a session:

```
osgi> createsession Thinkify50_1
Session created: Thinkify50_1:1
```

For this particular reader, there is no command to issue. All you need to do is to start the session and start reading tags:

```
osgi> startsession Thinkify50_1 1
Session Thinkify50_1:1 started
osgi> save
Configuration Saved!
```

If the reader is not connected to the specified COM port, you will get an error message. Also check if the reader was created successfully and is connecting to the reader:

```
osgi> readers
ID: Thinkify50_1
    session (1): Thinkify50Session: COM4 (PROCESSING)
```

If the session does not show status "PROCESSING" but "CREATED" then the reader is not connected and won't be able to read tags. Make sure the correct COM port is specified and the Thinkify driver was installed.

Now check which tags are within the readzone:

```
osgi> currenttags Thinkify50_1
TAG READ EVENT:
    tag:1100bee9ffe0073e8c0d3519|readerID:Thinkify50_1antennaID:0|times
    tamp:1369011070000
TAG READ EVENT:
    tag:120e07a330f6f1106f344f5e|readerID:Thinkify50_1antennaID:0|times
    tamp:1369011070000
```

In this example there are 2 tags within the reader's read range.

Similar to the Alien and LLRP examples before, also the Thinkify reader can be configured using the REST interface. Detailed documentation for the REST interface commands can be found on the wiki.

Appendix

Configuration – LLRP Reader (command line interface)

This section describes how to create a simple configuration so the Rifidi Edge Server reads from an LLRP reader. Precondition is that the user followed the steps of connecting devices and installing the Rifidi Edge Server described above in the Alien section.

Starting the Rifidi Edge Server

The Rifidi Edge server is an executable that starts by doubleclicking on it (rifidiserver.exe in the server directory). After you see rifidi start messages type in the command "apps":

```
apps
0:Rifidi App: AppService:ReadZones <STARTED>
1:Rifidi App: AppService:SensorStatus <STARTED>
2:Rifidi App: AppService:UniqueTagInterval <STARTED>
3:Rifidi App: AppService:StableSet <STARTED>
4:Rifidi App: AppService:LimitStableSet <STARTED>
5:Rifidi App: AppService:UniqueTagBatchInterval <STARTED>
6:Rifidi App: AppService:GPIO <STOPPED>
7:Rifidi App: AppService:Serial <STOPPED>
8:Rifidi App: AppService:Tags <STARTED>
9:Rifidi App: AppService:TagGenerator <STARTED>
10:Rifidi App: Monitoring:ReadZones <STARTED>
11:Rifidi App: Monitoring:Tags <STARTED>
12:Rifidi App: Monitoring:SensorStatus <STARTED>
osgi>
```

You see all the applications that are available. Some are running ("STARTED"), some are stopped.

Configuring the Rifidi Edge Server for communication with an LLRP Reader (Push Mode) using the Command Line Interface

In order to verify that tags can be read from your reader, you need to perform several steps. As an example we will use an LLRP reader that is emulated on the same machine (localhost). When using a network with a router, you need to use the appropriate IP address instead of localhost.

```
osgi> createreader LLRP IpAddress 127.0.0.1 Port 5084
Reader Created with ID LLRP 1
```

Next, you create a session:

```
osgi> createsession LLRP_1
Session created: LLRP_1:1
```

For this particular reader, we will schedule a recurring command so the Reader pushes tag information to the Rifidi Edge Server. First we create a new LLRP-Configure command:

```
osgi> createcommand LLRP-Configure
Command Configuration Created with ID LLRP_Configure_1
```

Then we set the properties for the command so it becomes a Push command, and the ID of the ROSpec will be '1'. We also submit the command:

```
osgi> setproperties LLRP_Configure_1 TriggerType PUSH ROSpecID 1
Properties for Reader LLRP_Configure_1
        TriggerType : PUSH
        ROSpecID : 1
osgi> executecommand LLRP_1 1 LLRP_Configure_1 -1
Session not in processing state. Command will be executed when
session connects: LLRP_Configure_1
Command submitted.
```

Alternatively to using an LLRP_Configure property, we can create and submit the Stop command:

```
osgi> createcommand LLRP-Push-Stop
Command Configuration Created with ID LLRP_Push_Stop_1
osgi> setproperties LLRP_Push_Stop_1 ROSpecID 1
Properties for Reader LLRP_Push_Stop_1
        ROSpecID : 1
osgi> executecommand LLRP_1 1 LLRP_Push_Stop_1 -1
Session not in processing state. Command will be executed when
session connects:
 LLRP_Push_Stop_1
Command submitted.
```

In either case, after the above commands have been created and waiting to be executed, we need to start the session and save the configuration so that it will automatically start after the edge server is stopped and restarted again:

```
osgi> startsession LLRP 1 1
```

```
Session LLRP_1:1 started
osgi> save
Configuration Saved!
```

Check if the reader was created successfully and is connecting to the reader:

```
osgi> readers
ID: LLRP_1
     session (1): LLRPSession: 127.0.0.1:5084 (PROCESSING)
            Single-Shot Command(0): LLRP_Configure_1
```

Now check which tags are within the readzone:

```
osgi> currenttags LLRP_1
TAG READ EVENT:
    tag:1100bee9ffe0073e8c0d3519|readerID:LLRP_1antennaID:0|timestamp:1
    369011070000
TAG READ EVENT:
    tag:120e07a330f6f1106f344f5e|readerID:LLRP_1antennaID:0|timestamp:1
    369011070000
```

Configuring the Rifidi Edge Server for communication with an LLRP Reader using the REST Interface

When configuring an LLRP reader you can use the REST interface, instead of the command line interface. The example flow is described on the wiki.

References

For detailed information about how to configure and run the Rifidi Edge Server or for other configurations for the Rifidi Edge Server, please see the Rifidi Edge Server User's Guide. For information about how to develop and export applications, please see the Rifidi Edge Server Developer's Guide. Additional information can be found on the Rifidi Wiki and the Rifidi Forums.