ResIOT LoRaWAN™ Network Server and IoT Platform v.2.4.773 (01/04/2019)

Include the components:

ResIOT LoRaWAN™ Network Server: Management of the LoRaWAN radio protocol and Gateways Control

ResIOT IoT Platform: management platform for all data and communications

ResIOT Base Station Client: software to be installed on the gateways to allow complete remote control

ResIOT LoRaWAN™ Network Server and IoT Platform Specifications v. 2.4.773	
LoRaWAN™ Protocol	LoRaWAN 1.02 and 1.1
Frequency/ISM Bands/Regional Support	EU 863..870 MHz US 902..928 MHz CN 779..787MHz EU 433 MHz AU 915..928 MHz CN 470..510 MHz AS 923 MHz KR 920. .926 MHz IN 865..869 MHz
LoRaWAN™ Nodes Class	Class A,B,C
LoRaWAN™ Multicast	Yes
Authentication	OTAA, ABP
Adaptive Data Rate Support	Yes, with evaluation through RSSI and SNR
Uplink Messages	Encoded in Hex
Downlink Messages	Yes, with Downlink ResIOT™ Intellqueue™: choice of the gateway for sending downlinks based on latencies and connection types with retry / rotate gateway functions for devices in Class A, B and C. Configurable sending timeout for each message for class C devices

LoRaWAN™ Messages type	Confirmed/Unconfirmed
Channel Management	Advanced: for frequencies that allow it to dynamically send additional channels to all connected devices calculated by the present gateways (requires ResIOT Base Station Client)
LoRaWAN™ MAC Command Support	view *Tab1
Gateways Support	Gateway with ResIOT Base Station Client preinstalled with Tcp/Udp Protocol or Gateway with Semtech Protocol UDP v.1/2
Gateways Software	ResIOT Base Station Client (for gateway ResIOT,MultiTech, Cisco, Aaeon, Lorixone..) (download link resiot.io/en/download) - custom remote channel configuration - automatic reconfiguration of channels for gateways and devices - advanced control of the connection with the network server - advanced watch dog for Gateway hardware / software: Radio card, LTE connection quality, VPN - automatic restart of the system in case of fail - configurable reports and alerts - full monitoring - web interface - with the ResIOT™ Autoprovisioning functionality, the gateway automatically configures itself to the LoRaWAN™ network without the need for other interventions. The gateway is completely manageable remotely. It also has a practical web control interface
Data Adapters & Connectors	Real time, simultaneous and persistent connections with multiple ResIOT™ LoRaWAN™ Network Severs and other connectors: - MQTT Brokers client or server - Websockets client or server - Azure IoT - AWS IoT

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	- Http pusher client or server - Modbus client or server - Snmp Trap Server - MongoDB Pusher - SQL Pusher (Mysql, PostgreSQL, Sql Server)
gRPC JSON REST API	Yes: Integrate ResIOT™ inside any third-party software with any type of languages programming. More than 150 APIs available for the management of devices / gateways / Smart scenes / connectors and variables
Statistics	- Real Time Monitor (Traffic, Signal, timetoair..) - LoRa Traffic Analyzer for advanced management of radio channel occupation with alert - Communication Log - Log
Data retention	Yes
Multi tenant	Yes
User/Policy management	Yes: sharing of gateways and devices among the various users with group and user management
LoRaWAN™ functions for large networks	In installations of large city or industrial networks ResIOT™ supports functions such as device sharing, simultaneous management of different networks with different SLAs, profiling of users with limitations in the use of gateways, traffic and the number of devices that can be used
Dashboard	Yes with widgets: - Maps (Google / Openstreetmaps) : monitoring of gateways and devices on a map for synoptic errors or defects in real time - Real time Charts: Line, Bars, Gauge, Pie , Radar, Polar area with custom design - Buttons: for actions - Table values and notes html

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	- Image with static positioning of sensors for building maps
Web interface	Yes, responsive bootstrap. Full support for Chrome, FireFox and Safari, Edge
App Mobile	IoS, Android
Programmability	ResIOT™ Platform integrates the Lua5.1 scripting language interpreter into the ResIOT™ Smart Advanced Scene. In addition to the standard functions, more than 100 functions have been introduced to integrate with all the devices in the system, for parsing the payloads with hexadecimal management, bytes array, for saving data (eg temperature and humidity with dynamic creation of charts), to send downlinks, manage queues, create alerts, debug and much more
Device management	Manual entry Import from csv file Complete control via Api
Device Data Model	Advanced: possibility to create customized models with fields / events and commands for saving historical data and display them in dashboard in real time. Payload parsing with Lua 5.1 scripting.
Asset management Tracking & Maps	ResIOT™ Dashboard integrates a management system for Openstreetmap™ and Google Maps™ with which it is possible to monitor the position or the path of the devices
IoT preconfigured devices	More than 150 preconfigured devices to simplify use in plug-and-play mode. Some manufacturers: Ascoel, MultiTech, Adeunis, Elsys, etc. With the guided procedure it is possible to quickly connect the devices and immediately start using them without complex payload decoding configurations
Alerts and Notifications	Built-in notification system on events: messages can be sent via email using private SMTP servers, with Telegram™ BOT or displayed directly on the ResIOT™ dashboard. It is also possible

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	to send messages through ResIOT™ Smart Scene or Advanced Scene Lua5.1
Infinity Automation	With ResIOT™ Smart Scene and ResIOT™ Advanced Scene with Lua 5.1 scripting language, you can build and setup all kinds of automation between IOT LoRaWAN™ devices, Low Power Wide Area Network or standard protocols Tcp, Http, Curl devices See manual: docs.resiot.io Scheduling: It is possible to schedule any type of event or action at configured intervals
Storage System	PostgreSQL (Linux or Windows) or SQLite (only ARM) Redis
Internal Message Queue Software	MQTT protocol versions 3.1 and 3.1.1: Mosquitto,RabbitMQ, EMQX, VerneMQ, HiveMQ.. Google Pub/Sub
Support for multiple instances High availability and scalability	Yes
OS	Linux Ubuntu 64bit 16.04 LTS Ubuntu 64bit 18.04 LTS Debian 8+ Windows 64 bit 7/8/10 Server 2008/2012/16/19 Arm/Linux
Upgradable	Yes, with Live Update functions
Software Live Update	Yes, automatic updates even scheduled at certain times

LoRaWAN Mac Commands Support (*Tab1)

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CID	Command	Transmitted by		Description
		End Node	Gateway	
0x01	ResetInd	x		Used by an ABP device to indicate a reset to the network and negotiate protocol
0x01	ResetConf		x	Acknowledges ResetInd command
0x02	LinkCheckReq	x		Used by an end-device to validate its connectivity to a network
0x02	LinkCheckAns		x	Answer to LinkCheckReq command. Contains the received signal power estimation indicating to the end-device the quality of reception (link margin)
0x03	LinkADRReq		x	Requests the end-device to change data rate, transmit power, repetition rate or channel.
0x03	LinkADRAns	x		Acknowledges the LinkADRReq.
0x04	DutyCycleReq		x	Sets the maximum aggregated transmit duty-cycle of a device
0x04	DutyCycleAns	x		Acknowledges a DutyCycleReq command
0x05	RXParamSetupReq		x	Sets the reception slots parameters
0x05	RXParamSetupAns	x		Acknowledges a RXParamSetupReq command
0x06	DevStatusReq		x	Requests the status of the end-device

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0x06	DevStatusAns	x		Returns the status of the end-device, namely its battery level and its demodulation margin
0x07	NewChannelReq		x	Creates or modifies the definition of a radio channel
0x07	NewChannelAns	x		Acknowledges a NewChannelReq command
0x08	RXTimingSetupReq		x	Sets the timing of the of the reception slots
0x08	RXTimingSetupAns	x		Acknowledges RXTimingSetupReq command
0x09	TxParamSetupReq		x	Used by the Network Server to set the maximum allowed dwell time and Max EIRP of end-device, based on local regulations
0x09	TxParamSetupAns	x		Acknowledges TxParamSetupReq command
0x0A	DlChannelReq		x	Modifies the definition of a downlink RX1 radio channel by shifting the downlink frequency from the uplink frequencies (i.e. creating an asymmetric channel)
0x0A	DlChannelAns	x		Acknowledges DlChannelReq command
0x0B	RekeyInd	x		Used by an OTA device to signal a security context update (rekeying)
0x0B	RekeyConf		x	Acknowledges RekeyInd command
0x0C	ADRParamSetupReq		x	Used by the Network Server to set

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				the ADR_ACK_LIMT and ADR_ACK_DELAY parameters of an end-device
0x0C	ADRParamSetupAns	x		Acknowledges ADRParamSetupReq command
0x0D	DeviceTimeReq	x		Used by an end-device to request the current date and time
0x0D	DeviceTimeAns		x	Sent by the network, answer to the DeviceTimeReq request
0x0E	ForceRejoinReq		x	Sent by the network, ask the device to rejoin immediately with optional periodic retries
0x0F	RejoinParamSetupReq		x	Used by the network to set periodic device Rejoin messages
0x0F	RejoinParamSetupAns	x		Acknowledges rejoinParamSetupReq

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