Boost my IoT potential

Datavenue Live Objects

April 2021

What is it about in our times?









Industry 1.0 18th Century

Mechanical Production. Equipment powered by steam and water. Industry 2.0 19th Century

Mass production assembly, lines require labor and electrical energy. Industry 3.0 20th Century

Automated production using electronics and IT Industry 4.0 Today

Intelligent Production incorporated with IoT, cloud technology and big data

The journey from data to Wisdom



Collect the Information

Transform information into Data and transmit them in cloud



Share the data

Store Data into a flexible manner and make it available for applications and users



Analyse

Understand the patterns, make correlations and decide

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Today is available a wide range of connectivity.



On top of the traditional cellular technologies (2G/3G/4G), the LPWA (Low Power Wide Area) technologies include:

- Around 25 non-licensed technologies incl. LoRaWan and Sigfox
- Two licensed technologies: LTE-M and NB-IoT leveraging on 4G coverage

5G will arrive in several waves for IoT :

- In 2020, 5G Enhanced Broadband for high data volume use cases (e.g. cameras, connected cars, also AR/VR...)
- In 2022+, 5G Critical IoT for industry (e.g. automated guided vehicles, real time monitoring of production line)
- After 2025, 5G Massive IoT to manage very large number of devices. LTE-M and NB-IoT will be supported by 5G Massive IoT.

Only non-licensed LPWA won't be supported by the 5G network.

The current complexity is an obstacle for market development (lifetime uncertainty, lack of ubiquity, ...).

Till 2025, 5G is not simplifying the technologies landscape for customers. But today investments, competencies and understanding of IoT go-to-market will sustain 5G.

Range

LPWAs extend coverage vs legacy GSM/LTE to better penetrate buildings and ground

Range is estimated and measured in dB 1 concrete wall = 10 to 15 dB of penetration loss



Sigfox :

- •Messages are repeated 3 times
- Range is improved by macro-diversity
- LoRa :
- Provides adaptive rate/range (based on Spreading Factor levels – SF7 to SF12)
- Range is improved by macro-diversity (one message can be received by several gateways)
- •Messages can be repeated 3 times (for QoS)

LTE-M and NB-IoT coverage gain is related to a reference value of MCL (Maximum Coupling Loss) that is taken at **144 dB** for GSM and LTE for a **reference service (BLER of 10%)**

LTE-M target is to bring extra coverage by repetition +8/9 dB for Mode A +15 dB for Mode B

NB-IOT target is to bring even extra coverage by introducing Narrow-band channel and repetition Target = +20 dB (Absolute MCL 164 dB)(MCL=maximum coupling loss)

PS: whatever range improvement, deep indoor coverage is a challenge. LoRa brings interesting on-demand facilities : nano gateways and repeaters.

Low power technologies - comparison

	Noncell	lular Networks	Cellular	networks
	y sigfox		LTE- 💟	B-lot
MCL (vs 2G)	Good (+3dB)	Good (+4dB) with macro- diversity	Very good (+6/10dB (measured) to +16dB)	Very good (+12dB (measured) to +20dB)
Datarate/ size of message	100bps 12 bytes	From 250bps to 5,4 kbps From 50 to 250 bytes	DL : < 220kb/s UL : < 330kb/s No limit	DL : < 21kb/s UL : < 14kb/s No limit
Latency 📿			Normal Cov =110ms	Normal Cov =1s
Mobility	Low (20 km/h)	Medium Speed (80 km/h)	Connected Mode Speed (300 km/h)	Idle Mode
Battery (water metter case)	<14 years	<20 years	<7 years < 5 years (ext. mode)	< 10 years (estimation under test)
Protocol(s)	Non-IP (API from Networks Server)	Non-IP (API from Networks Server)	IP, SMS VoLTE , Non IP mode (optional)	IP, optional SMS, Later: Non IP Mode
Security 🕖	Medium	Medie	Good (iso 4G)	Good (iso 4G)

LTE-M: the most versatile connectivity for IoT

With some unique advanced features



Thoughts on 50

The world

Higher quality gaming

Harmful radiation, government monitoring and conspiracy theories

meme-generatoricom

5G promises: higher, faster, lower



What makes 5G great again !

5G is **NOT** a "one-size-fits-all" network



mMTC - will inherit I TF-m and

Nb of devices / power cons.

5G New Radio – beamforming



5G New Radio – new frequencies



2G/3G/4G Who leaves first?





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Whatever the IoT
service



Select

LiveObjects – Orange IoT platform



Connect – a full range of connectivity options



Combining state of the art connectivity solutions to meet your specific needs Live Objects manages seamlessly any kind of connectivity

Fixed line & satellite broadband

- High speed data transmission
- Worldwide Secure and reliable network
- Ideal for delivering large amount of data to your data centers
- Satellite adapted for uncovered locations



- IP and SMS
- Global coverage through Orange mobile network and roaming partners
- Ideal for mobile embedded IoT systems
- Wide array of usages from small to large amount of data transmission

LoRa LPWA* network

- Longer battery life (up to 10 years) & reduced battery related costs.
- Adapted to areas with poor cellular network coverage
- Adapted for long life, low cost objects

Local wireless solutions

- Adapted to short range wireless transmission
- Multiple connection protocols: ZigBee, Z-Wave, Bluetooth, WiFi...
- For smart home devices, wearables...

Secure network

Manage the connected devices and enrich data



A secure, cloud-based, M2M-protocol agnostic solution with a multi-suppliers platform

品 Protocols/Gateways

Protocol agnostic solution

- MQTT(s)
- MQTT over Websocket (s)
- **REST/HTTPS**
- SMS
- LoRaWAN
- COAP/LW-M2M
- Geolocation
 - LoRa Macro/TDOA
 - Cellular : SmartSIM

Message Management Device Management

Ensure real time messages management

- Ensure message collection, delivery, filtering & routing :
 - Real-time messaging
 - FIFO (message persistence until delivery)
- Event triggering
- Raw data/messages API



Data Management

Manage massive device fleets

- Inventorv
- Commands
- Configuration
- Firmware download
- Hierarchical Group management
- Campaign management
- Silent devices
- PKI management

Store and manage Data

- Generic and configurable data model
- 2 levels of storage
 - Time stamped
 - Indexed structured data
- Multi criteria complex search requests
- Structured and advanced API

Manage the connected devices and enrich data



Ready for Developers, open to Partners Advanced features to reduce development costs

Developers

- Fully documented API
- LoRa Starter kit
- LTE-M Starter kit
- C SDK for ARM mbed devices
- C SDK on Arduino
- C SDK on Raspberry
- Cloud to cloud (connector) API
- Marketplace

Advanced features

- Data decoding for LoRa/SMS/MQTT
- Email/SMS notification
- HTTP push
- Rule engine : Event/state processing + actions email/SMS/HTTPpush/FiFo
- Geozone management
- Dataviz for administrators (Kibana)
- Billing Statistics API



Orange Assets/partners bundling

- Vendor management
- H1/2019 : SIM network services
- Dataviz connectors: Freeboard, Jyse, Node-Red
- Bl integration : Tableau

Architecture

 2019+ : On premises, Localized Saas

Live Objects position in Orange IoT ecosystem



Functional Overview & Value proposition

Coming next...



Architecture



Time to see how it works !!!



Live Objects

Live Objects, a secure Datavenue platform for your objects and data

Want to manage your range of objects? Safely collect and store the data of your connected objects ?

https://liveobjects.orangebusiness.com/#/liveobjects



Device management

- ✓ Provisioning
- ✓ Configuration changes
- ✓ Firmware updates**
- Sending commands



Message management

- ✓ IoT protocols (MQTT**, Rest, LoRa®*, SMS**)
- Other protocol on demand CoAP (beta)
- IoT networks (2/3/4G, LoRa®*, LTE-M, NB-IoT)
- Collect messages in real time



Data management

- ✓ 1 year storage for interrogation
- Timeseries indexation
- Message decoding**
- Multi criteria search with Flasticsearch**

Developers ecosystem

Fully documented APIs, Code, SDK, Youtube channel, technical support

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Live Objects				_	Live Objects Support	Ν
Ø FAQ	The complete Dat	avenue Live Objects E	Development Guide		Ask the community Stack overflow is a collaborative question and are Here you can ask Live Objects API related question	no anne la guing the angre an laga
Developer guide	Live Objects documentation is available	able online or can be downloaded as PDF.			Consult Stack Overflow	
🗷 User guide	Open documentation	Download as PDF		_		Indee " Recharcher Q.
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	Developer guide	To connect your objects, send and	manage your data, and many other videos to o	come!	Contact our commercial team	Aujourdhui neus silotis veus eustaue e Bus
	25 User guide	Live Objects on YouTube			_	
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	SDK & code samples	Live Objects				Prototype and build your connected object
	Ø Postman	0.00				To backly not easily protecting poor conversit: Splates, discours the development boards validated by Owney and prev of althouse Development PAS (BACK). Keep forces on your service and your uners, we take case of the real
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		User guide	Code samples	Python	Cithuda	By the hardware or use Personal resource on Danch buffery our Ordenator to there to Deby your devices at your wno companies baseds Use Operator averages and part and a second to the operator and the second to the operator and the second to
		{ } Swagger	mbed QS library	mbad 08	Github	Orange explorer LoRa® kit
		SDK & code samples	mbed OS samples and demo	mbed OS	Github	In collectrice with Workship, Orange is providing a development band that allow as you clack prototyping of bit dejects and services using Laket velowaky.
		A Bastana	SDK and code samples	Arduino	Github	
		Postnan	SDK and code samples	Linux/Raspberry	Github	+ Strategie and a state of the LOPE strategies + LoPE strategies and the LoPE strategies - LoPE strategies and the LoPE strategies
		Tutorials	Starter kit LoRa	Arduino	Github	And And And And And And And And And



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Datavisualization

₽ ≣	Portal Data tab	Inside Live Objects: list of all received payloads
€≡ _	Portal Widgets	Inside Live Objects: graphs and maps of device values
©≡ _	Kibana	Inside Live Objects: tool to analyze data and build simple & advanced dashboards
©≡ _	Node-red	Above Live Objects : easy graphical tool to prototype simple dashboards and share them
Ŭ≡ _	Freeboard.io	Above Live Objects: easy graphical tool to create simple dashboards and share them
Û≣ _	JYSE	Above Live Objects: easy graphical tool to build in drag and drop simple or advanced dashboards
©≡ _	Bespoke development	Above Live Objects: turnkey application developed by integrator using Live Objects MQTT or REST APIs

Dashboard

eranger Dashboard Devices Data Configuration			
Parc activity Sensing Labs - Franck 🕀	evices Data Configuratio	on.	Prototype 😭 😰 🕟 🔒 ZZZ Equipe LOM 🗸
Devices status Add a cust	om dashboard sing Labs - Franck 🕀		👫 🥒 🏛 C Add a widget
	Last Temperature	Last Hygrometry	Nb GW
	27.25 °C	59 %	2
	Last mesure : 06/26/2019 11:48 AM Source : <u>Sensing Labs de Franck</u>	Last mesure : 06/25/2019 11:48 AM Source : <u>Sensing Labs de Franck</u>	Last mesure : 06/25/2019 11:48 AM Source : <u>Sensing Labs de Franck</u>
	Temperature 7 days ▼ Temp 28 24 22 06/19/2019 06/20/2019 06/21/2019 06/19/2019 06/21/2019 06/22/20 ■ Sensing Labs de Franck Ø	Last 7 days < < > >> >>	Localization

Personalized dashboards with Widgets



- Linked to a user
- Several dashboards possible per user
- Only tenants with datamanager (not available for express accounts).
- Value : display the last value returned by a device
- Curve : display line charts for a value from a list of devices (up to 10)
- Map : display a map of a list of devices (up to 10) with their last value

Important : to create a widget the selected devices must have sent data at least once.

Personalized dashboards with Widgets

Edit a widget					
Widget name *	V1				
Widget type *	8°C Value	M Line chart		🔊 Map	🕢 Value
	alt water many				
Device selection *	Device name	Device ID		Device stream ID	•
	Explorer2	urn:lo:nsid:lora:0004A	30B00203F08	urn:lora:0004A30E	300203F08!uplink
	Change of device	Customize the IDs used			
Data to display *	metadata.network.lora.rss	il	× •		
Unit	Enter a unit of measure (e)	x: °C. %)			
Widget size					
					matadata patur
					metadata.netwo
					Iocation {2}
					▼ value {6}
					CO2 (ex:
					doorOper
					hygromet
					pressure
					revmin (e

Kibana : visualization

Aggregates, done by ElasticSearch and presented in Kibana graphical elements

- Buckets : grouping the indexed data into *n* buckets according to :
 - time intervals
 - value intervals
 - a field value, partly or fully
 - a geographic coordinate
 - customized filters
- Buckets are generally the first dimension in graphs
 - 1 graph bar per bucket, or 1 pie-chart slice per bucket
- Metrics : computing a unique value per bucket
 - amount of data in the bucket
 - average, sum, min or max of one field
 - occurrence number of one field
 - value distribution
- Metrics are generally the second dimension in graphs
 - bar height, pie-chart slice width

Kibana : create a dashboard



Node-red : graphical prototyping tool


Node-red : graphical prototyping tool

Free (open source, Apache license) PC, public-hosted, or private-hosted deployment

Training test platform: https://nodered.kermit-noprod-b.itn.intraorange

Kermit with pre-built Docker and /data persistent volume and \$HOME=/data



then open "Install" tab , search "node-red-dashboard" and install it

Freeboard.io

6803 rpm	HYDROMÉTRIE	
	toto	
freeboard MES DONNÉES		FULLSCREEN L SHARE O CLONE

Freeboard.io



Then choose and configure your widgets





IoT use cases



- maintenance
- Worker safety
- Optimize inventory
- Kaizen (flow optimization)
- Smart Grids

- access in buildings
- Energy savings & efficiency
- Security
- Metering
- Parking
- Lighting
- Waste management

- inventory
- Automatic re-• ordering
- Alerts when out of stock
- with chronic diseases (post hospitalization or therapeutic educational programs)
- Connect medical devices
- Proof of patient compliance

- for passengers by informing them of the time they will have to wait & of traffic issues
- Remote maintenance on vehicles
- Productivity enhancement

- driving behavior
- Tele assistance
- Monitor risks related to health insurance & create pay-asyou-live models
- Monitor risks related to home insurance

Smart Agri

Wineyard – Jidvei / Frontier Connect

Business needs	Technical needs	Expected results
Track production costs in quasi-real time.	Monitoring in real time of field activities.	Fuel and spare parts economy, regular inspections.
Production forecast (quality and volume).	Monitoring pedoclimatic factors.	Lowering losses due to incorrect treatments
Compliance with national regulation (Electronic wine certificate – end of 2020).	(satellite images & drone). Vario – treatments	Controlling the quality and volume of the grapes production
	Machine learning/Al	Electronic wine certificate.
	Automation/Robotization	Lowering the consumption of substances, fertilizers and water.
		Optimizing production cycle

Smart Agri

Wineyard – Jidvei / Frontier Connect



ORO Services:

- LoRaWan network dedicated to Jidvei
- IOT Orange platform LiveObjects
- Solar power in 5 locations

Frontier deliverables:

- Real Time Kinematics Base stations
- GPS & RTK trackers with LoRa modem
- BLE tags for auxiliary
- Teraseya weather stations
- Teraseya Smart Agri Platform

Air quality monitoring – lasi Municipality/ uRADMonitor

Business needs	Technical needs	Expected results
Improving the quality of life in lasi.	Monitoring in 22 points of PM 2.5 and PM 10 particles, etc,	
Improving communication with the inhabitants.	Obtaining the green map of the city,	
Local administration digitization	Dashboard with the measured values.	
	Mobile application.	

Air quality monitoring - lasi Municipality/ uRADMonitor



ORO services:

- Public LoRaWan Network
- IOT Orange Platform– LiveObjects
- Dashboard Smart City ORO
- Sensors deployment

uRAD deliverables:

- Air quality sensors A3
- uRADMonitor platform
- Dashboard uRADMonitor
- Android App

Waste Management – Salubris Iasi/ Electra

Business needs	Technical needs	Expected results
Optimizing operational costs.	Video surveillance of the collecting points.	Lowering operational costs.
Improvement quality of the waste – accurate waste separation.	Video surveillance of the garbage truck while loading.	Improvement of the quality of service through right in time operations.
Customers satisfaction improvement.	Realtime tracking of the degree of filling of garbage can.	Identifying citizens who didn't collect selectively.
	5 years lifespan of the filling monitoring devices	

Waste Management - Salubris Iasi/ Electra/ FullComm



ORO Services:

- Public LoRaWan network
- LTE-m network
- M2M
- IOT Orange platform LiveObjects

Livrabile Electra:

- Waste management devices with LoRaWan and LTE-M
- Waste management server

Livrabile FullCom:

- IP camera with SIM

Resources:

1. Devices:

- <u>https://www.robofun.ro/</u>
- <u>https://docs.pycom.io/</u>

2. Platforms:

- <u>https://liveobjects.orange-</u> business.com/#/liveobjects
- <u>https://azure.microsoft.com/en-</u> us/services/iot-hub/
- 3. Dashboards:
 - <u>https://grafana.com/</u>
 - <u>https://www.elastic.co/kibana</u>
- 4. Software:
 - LiveObjects Postman scripts examples
 - GitHub resources for LiveObjects

- 5. 5G:
 - https://www.etsi.org/technologies/5G
- 6. 5G Edge Computing:
 - <u>https://bscw.5g-</u> ppp.eu/pub/bscw.cgi/d397473/EdgeCo mputingFor5GNetworks.pdf
- 7. 5G Use cases and performance model:
 - <u>https://www.5g-ppp.eu/wp-</u> <u>content/uploads/2014/02/5G-PPP-use-</u> <u>cases-and-performance-evaluation-</u> <u>modeling_v1.0.pdf</u>

Thanks

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Apendix 1

Live Objects presentation slides User administration API keys admin Device Management Data Management

- Decoders and queues
- Rules
- Notifications
- Analyse and search

Live Objects user profiles

Account / tenant view

«	Account	
Account	Account information	s
🛃 Users	Name	demolo
🍳 Api keys	Live Objects ID	5c658359e31f5f57f786b162
Message bus	Creation Date	02/14/2019
Firmwares	Country	FR
Contraction Decoders		
	My profile	
	Login	formationlo
	Email	olivier.matheret@orange.com

Create a user

x	Register a	user			
Account	User inform	ation		*1	required
Users	Login *	enter a login			
Api keys	Email *	enter a email			
Message bus	Profile	🗿 User 🔵 Admini	strator O Customized		
Firmwares	Roles	Name	Description	Reading	Writir
-		Bus access	Message Bus access using MQTT or HTTP	~	~
2 Decoders		Bus Configuration	Routing Keys and Message Queues management	~	
		Account	Account configuration	~	
		Data Processing	Data Decoders and Events Processing management	~	
		Data	Collected Data Access	~	
		User	Users management		
		Device Access	Device mode MQTT access	~	
		Logs	Activity Logs access	~	
		Connector Access	Connector mode MQTT access	~	2
		Device	Device management	~	
		API Key	API Keys management	Image: A start of the start	

orange Datavenue
Live Objects
Please activate your account
Hello,
The administrator of the demolo Live Objects account has created you an user account with this email address.
In order to activate your account, please finish its creation by setting your password
In order to activate your account, please finish its creation by setting your password by clicking on link below. This link is valid 1 month.
In order to activate your account, please finish its creation by setting your password by clicking on link below. This link is valid 1 month.
In order to activate your account, please finish its creation by setting your password by clicking on link below. This link is valid 1 month.
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In order to activate your account, please finish its creation by setting your password by clicking on link below. This link is valid 1 month. Activate my account Password update enter the new password confirm the new password Password must: contain at least 3 one uppercase letter
In order to activate your account, please finish its creation by setting your password by clicking on link below. This link is valid 1 month. Activate my account Password update enter the new password confirm the new password Password must: contain at least one uppercase letter contain at least one lowercase letter contain at least one lowercase letter

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Live Objects API Key management

List API keys

orange"	Dashboard	Devices	Data	Configura	tion				Prototype	\$?≣	>	å Fi	ranckCł	nez0ra	nge 🗸
Configu	ration > Api keys	8														
~				Api key	/S 4 api keys											
*	Account			Traffic is	limited. See offer details	s										
**	Users					-					+	Add	lc			Ť.
a,	Api keys											S	-		-	
					Name		Active	F	Profile		La	ast activ	vity			
=⊻	Message bus				App OAB		Enabled	c	Customized		8 1	minutes a	igo			
	Firmwares				App OAB 2		Enabled	c	Customized		6 (days ago				
¢\$	Decoders				Clé Campaign		Enabled	c	Customized		aj	/ear ago				
					Jyse		Enabled	с	Customized		6 (days ago				
				¢	1										20	•

Create an API key Roles : see technical documentation for details

Profile	MQTT Device ()	Application Customized		
Roles	Name	Description	Reading	Writing
	User	Users management Assign USER_R and USER_W roles		
	API Key	API Keys management Assign API_KEY_R and API_KEY_W roles		
	Bus access	Message Bus access using MQTT or HTTP Assign BUS_R and BUS_W roles		~
	Bus Configuration	Routing Keys and Message Queues management Assign BUS_CONFIG_R and BUS_CONFIG_W roles	~	~
	Campaign	Managment of massive operations on a set of Devices Assign CAMPAIGN_R and CAMPAIGN_W roles		
	Data	Collected Data Access Assign DATA_R and DATA_W roles		~
	Data Processing	Data Decoders and Events Processing management Assign DATA_PROCESSING_R and DATA_PROCESSING_W roles	~	~
	Device	Device management Assign DEVICE_R and DEVICE_W roles		
	Device Access	Device mode MQTT access Assign DEVICE_ACCESS role		
	Account	Account configuration Assign SETTINGS_R and SETTINGS_W roles		
	Kibana	Kibana access Assign KIBANA_R role		

4.4. Role

A <u>Role</u> can be attributed to an <u>API key</u> or <u>user account</u>. It defines the priviledges of this user or API key on Live Objects.

Important Notice : Some features are only available if you have subscribed to the corresponding option, so you may have the proper roles set on your user but no access to some features because these features are not activated on your tenant account.

The currently available roles and their inclusion in Admin or User profiles:

Role Name	Technical value	Admin profile	User profile	Priviledges
API Key	API_KEY_R	x	x	Read parameters and status of an API key.
API Key	API_KEY_W	x	x	Create, modify, disable an API key.
User	USER_R	x	x	Read parameters and status of a user.
User	USER_W	х		Create, modify, disable a user.
Settings	SETTINGS_R	x	x	Read the tenant account custom settings.
Settings	SETTINGS_W	x	x	Create, modify tenant account custom settings.
Device	DEVICE_R	x	x	Read parameters and status of a Device (aka Asset).
Device	DEVICE_W	x		Create, modify, disable a Device (aka Asset), send command, modify config, update ressource of a Device.
Device Campaign	CAMPAIGN_R	x	x	Read parameters and status of a massive deployment campaign on your Device Fleet.
Device Campaign	CAMPAIGN_W	x		Create, modify a massive deployment campaign on your Device Fleet.

Copy/paste the key, it appears only once!



Device key : test it in the Android simulator







Live Objects Device Management

List the devices (general or specialized view)

orange: Dashboard Devices Data	Configura	tion			Prototyp	e?≣	🕞 🔒 Franc	ckChezOrange +
All devices (except LWM2M)						+ Add	device	Mass import
«	All dev	ices						
Devices	Add filt	ers						٩
All devices Slovakia demo	0 select	ed device / 11 devic	ces.		✓ Activate	× Deaction	Image: Status Image: Status	
franceromania		Name 🔻	Device ID 🔺	Group 🔻	Tags	Connectivity	Status	Last comm. ▼
test devices SMS		Auto-created devi ce (mqtt / urn:lo:n sid:android:35732 9073120059)	um:lo:nsid:android:35 7329073120059	/demo	demo	ΜΩΤΤ	Offline	03/10/2019 5:28:09 PM 3 months ago
		Auto-created devi ce (mqtt / urn:lo:n sid:android:35732 9073120059PRIM ARY)	urn:lo:nsid:android:35 7329073120059PRIM ARY	/demo	primary	ΜΟΤΤ	Online	06/25/2019 11:03:33 AM a few seconds ago

LoRa objects provisioning

Unitary provisioning : portal

- Profile
 - specific to the manufacturer if available
 - otherwise : Generic_classA_RX2SF12
- Decoder
 - specific to the model if available
 - can be created on-demand
 - otherwise : can stay blank
- DevEUI
- AppEUI / AppKey
- Tags & properties
- Group
- Connectivity options :
 - depending on the commercial offer : TDOA and/or Acknowledgments

Name			Tags		
enter a name					
Profile *			Connectivity options		
enter a profile	•	0			
Decoder			Group		
select a decoder	•]	root		
DevEui *			Properties		
enter a device EUI in hexadecimal format			Enter property label	Enter property value	•
Device ID					
urn:lo:nsid:lora:	Personalize				
AppEui *					
enter an application EUI in hexadecimal format					
AppKey *		_			
enter an application key in hexadecimal format		?			
Default StreamId					
umlonsidilora	Personalize				

LoRa specific parameters

DevEui	Unique and permanent identifier of each sensor (MAC equivalent Address). This number is assigned to the LoRa sensor by its manufacturer in a slot managed and awarded by the IEEE. The DevEUI is stored in the sensor.
AppEui	Identifier of the embedded application in the sensor. The exact use of this parameter can still evolve in the next versions of the LoRaWAN standard. The AppEUI is stored in the sensor at the time of its manufacturing (by default) or later, at the time of its personalization.
АррКеу	Unique secret key stored in each sensor and shared with LoRa network. This 128-bit key is the primary encryption key that is used to create other NwkSKey and AppSKey session keys.

Geolocation for LoRa

TDOA can be activated on the account.

TDOA to be activated on the devices :

in the device identity by batch, in the device list

TDOA needs at least

3 macro-gateways

excluding nano-gateways, repeaters, and lora-anywhere

non-aligned

Se	ection update	(2 devices)			× 🕯 🛛	a 🔉 🕯	IZO
Con	ectivity options	Geolocatio	on TDOA				
_					_		
	Be advised that t	his modification w	ill be applied to all s	elected devices.	⊢ Add d	evice	Mai
L			Car	ncel Up	date		
			Car	ncel Up	date		
7400 T	illers ted devices / 18 device		Car	ncel Up	date		
2 sele	itters sted devices / 18 device	6.	Car	Activate	date X Deactivate	(<mark>; / ;</mark>	2
2 sele	itors zted devices / 18 device	s	Car	Activate	Adate X Desctivate	(* / t	2 I Net
2 sele	itters zteci devices / 18 device DevEui	s. Name T	Car Group 🔻	Activate	date X Deactivate Status	Last comm. V	Net
2 sele	ters ted devices / 18 device DevEui	s. Name ▼	Car Group ▼ /	Activate	K Desctivate Status Activated	(→) → = Last comm. ▼ 05/22/2019 3:08:40 PM	Net sigi
2 sele	itors ted devices / 18 device DevEui	s. Name 🔻	Car Group ▼ /	Activate	X Deactivate Status Activated	Last com. ~ 05/22/2019 3:08:40 PM a month ago	Net sigi
2 sele	ters ted devices / 18 device DevEul	a. Name ▼	Cat Group ▼ / /Test interne	Activate Tags	X Deactivate Status Activated O Registered	Last comm. ~ 05/22/2019 3:08:40 PM a month ago 02/08/2019	Net sigi
2 sele	DevEui	a. Name ▼	Car Group ▼ / /Test Interne	Activate Tags	date X Deactivate Status @ Activated O Registered	Last comm. 3:08:40 PM a moth ago 02/08/2019 3:28:38 PM 5:88:38 PM	Net sig
2 sele	teris teel devices / 18 device DevEui	s. Name ▼	Car Group ▼ / /Test Interne	Activate Tags	Ante X Deactivate Status @ Activated O Registered	Comm. ▼ 05/2/2019 3/08/30 PM 3/08/30 PM 5/month age	Net sigi



type: lora-tdoa provider: lora-tdoa

MQTT / SMS objects provisioning

MQTT (auto-provisionning is possible) :

- NameSpace + ID
- Description

SMS :

- SIM-card phone number
- Server phone number (contract-depandant)
- Decoder

Common fields:

- Name
- Tags (x10) & Properties (x10)
- Group

Multi-connectivity option: using API

1	
	"connector": "sms",
	"nodeId": "33601201201",
	"enabled": true,
	"status": "ONLINE"
}	,
{	
	"connector": "mqtt",
	"nodeId": "urn:lo:nsid:sensor:temp001",
	"enabled": true,
	"status": "OFFLINE",
	"lastContact": "2018-03-02T15:57:23.772Z"
}	

					the second se
0 Information					* required fie
Namespace *					
envsensors					0
ld -					
moisture1					0
Name					
Moisture sensor 1					
Description					
Enter a description of the device					
Group					
root					-
Taos					
modelA ×					
Properties					
room		302B		Oursel	• 1
room		302B		Cancel	egister
room MGTT LoRa SMS Ø Information	* requi	302B	E Custom Parameters	Cancel	egister
room MOTT LoRa SMS 0 Information Name	* requi	302B	E Custom Parameters Tage modela 3	Cancel	egister
room MOTT LoRa SMS 0 Information Name alarmT	" requi	302B	∑ Custom Parameters Tags modek X 	Cancel	egister
room MOTT LoRa SMS 0 Information Name alarmT Server phone number *	° requi	302B	2: Custom Parameters Tago modelà X Grap root	Cancel	egister
room MOTT LoRa SMS 0 Information alarmT Server phane number * 20259	, sedin	a02B	E Custom Parameters Taga modela X Group root	Cancel	egister
room MOTT LoRa SMS 0 Information Atem T Server phone number * 20259 Decoder	, sedo	a 302B	E Custom Parameters Tags modelA X root Properties	Cancel R	e t
room MOTT LoRa SMS O Information Name alarmT 20229 Deceder No decoder	" requir	302B	2 Custom Parameters Tegs model X Group root Popentes room	Cancel R	egister
room MOTT LoRa SMS 9 Information Name atarmT Server phone number * 20259 Deceder No directedar MotiON *	• requi	ed field	∑ Custom Parameters Tage modelA X Croup root Poperfes room	Cancel R 3028	• ff
room MOTT LoRa SMS O Information Name alarmT Server phone number * 20259 Deceder Arc decoder MSDQ+* S365544332211	• requi	age field	Z: Custom Parameters Tags modelA X root Properties room	Cancel A	egister
room MGTT LoRa SMS O Information Mane alaramT Serve phone number * 20259 Deceder No decoder MISDN * 305564332211 Decedo	, sedop E	302B	E Custom Parameters Tags model& X root Properties room	Cancel R 302B	• I egister
room MGTT LoRa SMS O Information alarm T Server phone number * 20259 Deceder MISDR + 308554232211 Decide ID	* require * B Personalize	ed field	E Custom Parameters Tegs model X Group root Propenties room	Cancel R	egister
room MOTT LoRa SM5 O Information Name alarm T 20259 Deceler Ale decodur MISBON * 3365544332211 Decele ID 300544332211 Deceled ID	require v j Personalize	ed field	E Custom Parameters Tags modela X Group root Properties room	Cancel 1	egister

Device import (SMS and LoRa)



Generate a CSV or a XLSX template			
Connectivity	🔘 LoRa	◯ SMS	
Generate a LoRa template	Empty template	O Pre-populated template	
Devices quantity *	-		
Profile	Select a profile		-
Activation mode	Select an activation n	node	-
Connectivity options	Select connectivity op	ption(s)	-
Decoder	Select a decoder		•
Group	Select a group		•
Tags	Add tag(s)		
Properties	Property key	Property value	•
File type	O csv	C XLSX	

Device import (SMS and LoRa)

1.Prepare a file		2.Import file sele	action 3.Imp	ort	
Select a CSV or	XLSX file 💡				
ov lora_import_sa	mple_legacy(1).csv (4 devices)	×			
Number of devices det	tected 4				
Number of errors dete	oted 0				
Number of warnings d	letected 1				
File row 📥	Column 🔻	Severity 🔻	Details		
2	lora_encoding	Warning	decoder does not exist		
				Cancel Previous Next	
			1.Prepare a file	2.Import file selection	3.Import
			Import the devices		
			ev lora_import_sample_legacy(1).c	csv	
			Number of devices ready to be imported	4 devices LoRa	
					Cancel Previous
6 Orange in	iternal				

Manage a device hierarchy

Create new groups into the tree

EN 🔻 Orange Business Services Orange Partner 😭 💴 🕟 🔒 FranckChezOrange 🕶 Dashboard Devices Data Configuration Simulation Prototype Live Objects Devices > Managed/MQTT > france • Managed/MQTT Das t 🖿 France Devices Devices > M Campaigns Cam Add filters All devices Add subgroup 1 device. France ▼ France / Edit Paris Paris Delete Romania · Romania Namespace Bucarest -Name Id 💌 Group Tags Bucan Auto-created dev android .../paris ice (mgtt / um:lo: nsid:android:000

Move devices into the tree

aboard <mark>Devices</mark> Da aaged/MQTT	Move	selectio	n to			×		FranckChe	zOrange +
aigns	Destinatio	n	select a grou	qu					0
			root france paris romania				c	a B	â
st	N	lame	bucare	st Id ▼	Group	Tags	Status	Last contact	Path
	A d N e	uto-created evice (mqtt / tQTT_FX_Cli nt)	mqtt	MQTT_FX_Client	1		Offline	2 months ag o	direct
	A d d d d d	uto-created evice (mqtt / miloinsidian rold:000000 00000000)	android	00000000000000000	/paris		Offline	5 minutes ag o	direct
	A d	uto-created evice (mqtt / m:lo:nsid:an roid:123456 89012345)	android	123456789012345	7		Offine	2 months ag o	direct
	M A	uto-created	android	357329073120059	7	teatest	Online	20 hours ago	C Feedb

2 sets of APIs to manage groups

You can create/update/delete/list groups

Device management - Groups - V1 : Group management	Show/Hide List Operations Expand Operations
GET /api/v1/deviceMgt/groups	List registered groups
POST /api/v1/deviceMgt/groups	Create a new group
DELETE /api/v1/deviceMgt/groups/{groupId}	Delete a specific group
GET /api/v1/deviceMgt/groups/{groupId}	Get a specific group
PUT /api/v1/deviceMgt/groups/{groupId}	Update group inventory

You can assign groups to the devices

Device	e management - Inventory - V1 : Devices inventory	Show/Hide List Operations Expand Operation	s
GET	/api/v1/deviceMgt/devices	List registered devices statu	5
POST	/api/v1/deviceMgt/devices	Create a new device into the device manage	e.
DELETE	/api/v1/deviceMgt/devices/{deviceld}	Delete a devio	2
GET	/api/v1/deviceMgt/devices/{deviceld}	Get a devio	e
RATCH	/api/v1/deviceMgt/devices/{deviceld}	Update a devio	e

Information is visible in device metadata

Get th	e asse	ts information		
GET 🗸		https://liveobjects.orange-business.com/api/v0/assets?size=25	Params	Send 💙 Save 🗡
Pretty	Raw	Preview JSON V		📋 🔍 Save Response
262 -	{			
263		"namespace": "android",		
264		"id": "0000000000000",		
265		"creationTs": 1519761829362,		
266		<pre>"name": "Auto-created device (mqtt / urn:lo:nsid:android:00000000000000)",</pre>		
267		"description": "This device was auto registered by the connector [mqtt] with :00000000000000]",	h the nodeId [urn:lo:nsid:android
268		"tags": [],		
269		"properties": {},		
270		"lastUpdateTs": 1529420837399,		
271		"connected": false,		
272		"path": [],		
273		"metadata": {},		
274		"groupId": "AmsL3f".		
275		"groupPath": "/france/paris"		
276	}			

Assign a group

Assign "/romania" group to the device : urn:lo:nsid:mqtt:URN:LO:NSID:SENSOR:TESTFLGAPPOAB00000

PATCH V https://liveobjects.orange-business.com/api/v1/deviceMgt/devices/urn:lo:n:	sid:mo	qtt:	URN:L Params		Send 🗸	Save	~						
Authorization Headers (3) Body Pre-request Script Tests			Orange Business Services Orange Partner	Config	guration Simulation			Prototype	, "	? P	🔒 Fra	anckChezOran	EN +
● form-data ● x-www-form-urlencoded ● raw ● binary JSON (application/json)	ř												
<pre>1 - { 2 "id": "urn:lo:nsid:mqtt:URN:LO:NSID:SENSOR:TESTFLGAPPOAB00000", 3 "name": "Test device", 4 "device", 5 "device",</pre>			Managed/MQTT									+ Add de	evice
5 - "group": { 6 "id": "M3IlpO",			Devices	t 🖿	Romania								
7 "path": "/romania" 8 }			Campaigns	Ad	dd filters								۹
9)			France Remember	0 :	selected device / 2 devices.						C		Î
		1	- Too Ilaina		Names Name	bace Id T		G	roup T	St. Fags 🔻	atus	Last contact ✔ Pa	ath
	/				Auto-orea android ted devic e (mqtt / u milo:nsid: android:1 23456789 012248	1234	56789012345	/ee	omania	•	Offline	37 minutes a clin go	eat
					Test devic mqtt e	URN	LO:NSID:SENSOR:TES	TFLGAPPOAB00000 /rc	omania	•	Offine	a minute ago dire	wot

Check the current state



Activate / deactivate a device


LoRa: Send a business order / remote configuration

«	t_ Confort1 - ur	n:lo:nsid:lora:A81758FFFE0347F0			â
Monitoring					Send Cancel
1 Identity	Register new comm	and			
Uplink	Port *				
Downlink	100				•
🛓 Logs	Confirmed?	adecimal *			- 1
Confirmed means	CAFEBABE				
not received by device					Sent means "sent to the network" not ser to the device
	_				
		From To		+ Add comm	and 🖉 🦘 🔤
		Date	Paylo	oad Statut	Port
3 Orange internal		07/07/2019 4:34:39 PM	CAFEI	BABE Sent	100

MQTT: device parameters

orange	Dashboard Devices Data	Con	nfiguration Simul	ation		Pr	rototype	?≣	٢	8	Training	doc	-
Live	e Objects												
Devices	a → MQTT → france → paris → and	droid /	123456789012345PRI	IMARY > Parameters									
~		Liv RIN	/e Objects Ar MARY)	ndroid demonstrator ((android / 123	34567	89012345F)					
0	Identity												
@	Status					~	Send changes		් Re	set ch	nanges] C	2
¢	Parameters		Id	Value	Value timestamp	Status	Last contact	Tar	get valu	Je			
Þ	Commands		logLevel	Info [STRING]	a minute ago	✓	a minute ago	Info [STF	RING]				
٩	Firmwares		updateRate	7 [INT32]	10 minutes ago	~	10 minutes ago						
			< 1 >								2	20	•

MQTT: Remotely apply parameters on devices

Edit device	parameter			×			
Туре	STRING			•			
Value	Info						
			Cancel Upda	ite			Orange F 🖬 😝 ఈ ♦ 📚 ♦ 📚 45% ■ 19:29 Image: Second s
	_						DÉCONNECTER
					 Send change 	S Reset changes	Configuration
	ld	Value	Value timestamp	Status	Last contact	Target value	Rafraichissement : 10 second(s)
	logLevel	Info [STRING]	2 minutes ago	× .	2 minutes ago	Info [STRING]	Niveau de log : Info
	updateRate	<i>5</i> [INT32]	2 minutes ago	0	2 minutes ago	10 [INT32]	Letermetrie Auto
							19% —
							@ 8936 rpm

Localisation

Paramètres

Auto

Ressources

0

MQTT: Send a command on a device

			Orange F 🖬 🔁 🗛 🛷 🕏 л	44% 🛢 19
MANAGED/MQTT >	android / 357329073120059 > Re android / 357329	egister new command	LO Asset	
Status	Register new command		DÉCONNECTER	
Parameters	Namespace	android	Configuration	
Commands	Id	357329073120059	C Rafraichissement : 10 second(s)	
Firmwares	Event	buzzer	Niveau de log : Info	
	Payload	enter the command payload non base64 encoded (ex: RC:98:A:1:AZ:EZE	EZA) Télémétrie Aut	ю
	Data	{"key1":"\"string_value1\"","key2":"int_value2"}	107°	-

Simuler

Ð

Ressources

.

Paramètres

SMS devices

Orange Bus	iness Services Orange Developer							EN
orange	Dashboard <mark>Devices</mark> Data C	configuration			Protot	pe a	\diamond	olivier_002 🗸
Live C	Objects							
Devices >	SMS							
SMS	•					+ Add	device	Import
»	All devices							
	Add filters							Q
	0 selected device / 1 device.				✓ Activate	Ceactivate	C	
	MSISDN	Name 🔻	Group 📥	Tags	Server phone number	Status		Last comm. ▼
	33631942177		1		20259	Online		02/14/2019 4:34:59 PM a day ago
	< 1 >							20 ~

SMS : adding a device

Choose the SMS server used by the device (prov the offer setting of the a	visioned in account)			Choose a payload contains private de customer himself,	decoder. The list ecoder (created by the or public (available for
	Information	* required field	≆ Custom Parameters	all customers)	
	Name		Tags		
	enter a name		enter tags		
	Server phone number *		Gr up		
	select a server phone number	-	root	▼	
	Decoder		Properties		
	select a decoder	-	Enter property label Enter p	property value	
	MSISDN *				
	example: 33655443322	×			
	Device ID				
	um:lo:nsid:sms:	Personalize			
	Default Streamid				
	um:lo:nsid:sms:	Personalize ?			
Type the msisdn of the device with the international prefix (without « + »)				Cancel Create	

- Decoders and queues
- Rules
- Notifications
- Analyse and search

Live Objects Data management

Data management

Available tools

	FIFO	Retrieve my data in a business application using MQTT or Rest via queues (FIFO)
R	Decoders	Create or use decoders to structure and index object data
	Data management	Perform Complex Queries (BI) on my indexed data with Elastic Search
©≡ _	Event/state processing	Create rules for triggering alerts on object data sent to the business application
30	Notifications & Event to Action	Live Objects or the business application can send SMS, email or push Http notifications following an event
	Silent devices	Create alarms on unexpected device behavior

Message queues : FiFo

Benefit : it guarantees that the messages are delivered to the Application. Messages are stored in a queue on disk until consumed and acknowledged (7 days max)



Fifos don't replicate messages for each consumer : if 2 business applications consume the same Fifo, each of them will share a random distribution of the messages

Decoders

Apply to any MQTT / LoRa / SMS device



3 kinds of decoders available



Event rules

3 event types :

Simple Event Processing

- To trigger on values or metadata
- Cut in 3 steps:
 - detection of a triggering value : matching rule
 - rule that defines the event triggering : firing rule
 - triggering inhibitor for interval repeats : firing guard

State Processing

• To trigger on all state changes (based on values)

Activity Processing

To trigger after a device inactivity during a given duration

Optional action after triggering an event : Event 2 Action

Automatic actions on events : Event to Action

Make an HTTP Push for all incoming data

¢	Routing rules						
Messages			+ Add a routing r	ue]C (> () mm			
	9 routing rules						
1, Routing	Name	Source	Destination	Status			
	publish new lora d	ata to fif lora	smartopnursery	Enabled			
	Data > Routing > Add	a rule → Name					
	1.Name		2.Source		3.Actions		
	Give a name to	your routing rule				- 1	
					0	Mart	
		1.Na	ime	2.Source		3.Actions	
		1.Na Set a	me selection filter for messages	2.Source	1 0	3.Actions	
		1.Ne Set a O All	me selection filter for messages	2.Source you wish to route) A filtered selection of messa	1 ~	3.Actions	

viewing the data on the portal

orange [®]	Dashboard Devices Data	Configuration Alarm	15	•	Prototype 🔒	<pre>{ "metadata": { "metadata": { "connector": "mqtt", "source": "unr:lo:nsid:adroid:357320073120059RIMARY" }, "stream1": "adroid:973200731200599RIMARY", "created": "adl, "accreated": "addroid: "adroid: "adroid</pre>
Data >	Messages					"lst": 48.80242), "model": "demo",
~		Messages				"id": "SB&abba7676276746433344", "value": {
0	Messages), "timestamp": "2018-09-04115:55:54.7402", "tags": null
ਭਾਂ ਸ	FIFO	From 🗂 DD/M	M/YYYY HH :	MM : SS 📋 To	DD/MM/YYYY) H : MM : SS
÷	Activity Logs	Add filters				Q Show details C 🛱
		Date	Source	Stream	Value	Tags
		06/25/2019 11:39:15 AM	clientId : urn:lo:nsi d:android:864041 035071645PRIMA RY	android86404103507 1645PRIMARY	{ "revmin": 8195, "CO2": 681, ygrometry": 89, "temperature": }	"doorOpen": false, "h <u>ye</u> 118, "pressure": 1203 <u>iacquesPhone</u> Q

historical search





curl -X GET

--header 'Accept: application/json' --header 'X-API-KEY: xxxxxxxxxxxxxxxxxxxxxxxxxxxxx 'https://liveobjects.orange-business.com/ api/v0/data/streams/android357329073120059?limit=100'

searching with ElasticSearch

Data n	nanagement data search : A	Pls to search through injected data Show/Hide List Operations Expand Operations
POST	/api/v0/data/search	Query an Elasticsearch Domain Specific Language request
POST	/api/v0/data/search/hits	Query an Elasticsearch Domain Specific Language request and get only hits result



Elasticsearch is a distributed, JSON-based search and analytics engine designed for horizontal scalability, maximum reliability, and easy management.

https://www.elastic.co/guide/en/elasticsearch/reference/current/index.html

Apendix 2

Good tools to be used by an IoT developer. Postman MQTT Box MQTT Fx MQTT-Spy Simulators





Shared collection

Postman

91

https://documenter.getpostman.com/view/1510363/live-objects-training-publish/7TJCtGP

LIVE OBJECTS TRAINING PUBLISH	PUT Save or update an action policy	Sample Request Save or update an action policy
Introduction Push Data from Lora Devices Rule Engine Firing Rules Event to actions POST Create a new action policy GET List action policies DEL delete an action policy	https://liveobjects.orange-business.com/api/v0/event2action/actionPolicies/f 3a1f839-31fc-4f80-a7d2-f13f0ae7041a The id field is mandatory in the path but is optional in the payload. In a case where an id is specified in the payload it must match the id specified in the path. Otherwise an HTTP 400 will be issued. Restricted to API keys with at least one of the following roles : DATA_PROCESSING_W.	<pre>curlrequest PUT \ url https://liveobjects.orange-business.com/api/v0/event: header 'Accept: application/json' \ header 'Content-Type: application/json' \ header 'X-API-KEY: {X-API-KEY}}' \ data '{ "name": "Test EventToAction app Android updated", "enabled": false, "triggers": {</pre>
 Matching rules State processing Device Management Firmware management 	HEADERS Accept application/json Content-Type application/json X-API-KEY {{X-API-KEY}}	
Campaign Management	<pre>BODY "eventRuleIds": ["b87900ce-16f8-4b37-a723-78d23635ab1 ^], "actions": { "emails": [{"cc": ["franck.lelong@orange.fr"], "cci": "subjectTemplate": "Hygro < 80 &</pre>	

MQTT Box : install/configure a client Mqtt/WebSocket, admin install

MOTIBOT

Accueil Applications Jeux Musique Films et TV		s		Client Settings He
	MQTT Client Name	MQTT Client Id	Append timestamp to MQTT client id?	Broker is MQTT v3.1.1 compliant?
MQTTBox	TestFranck	app:575b5a67-2f2c-4c4e-b2f1-b8b17 🖇	No No	✓ Yes
workswithweb • ★★★★	Protocol	Host	Clean Session?	Auto connect on app launch?
Ce produit est installé.	mqtt / tcp	v liveobjects.orange-business.com:1883	✓ Yes	✓ Yes
Lancer Épingler au menu Démai	Username	Password	Reschedule Pings?	Queue outgoing QoS zero messages?
+ Offre des achats in-app	application	••••••	✓ Yes	✓ Yes
	Reconnect Period (milliseconds)	Connect Timeout (milliseconds)	KeepAlive (seconds)	
	1000	30000	10	
	Will - Topic	Will - QoS	Will - Retain	Will - Payload
	Will - Topic	0 - Almost Once v	No No	
me : « application » ord : Live Objects API Key		Save	Delete	
ext: liveobjects.orange-business.com:1883 ocket: ws://liveobjects.orange-business.com:8	0/mqtt			
S (1- or 2-way authentication): : liveobjects.orange-business.com:8883				

Subscribe to topics, ex : Application : « fifo/testFifo »

MOTIBOT

MQTT Box

MQTTBox	
MQTTBox Edit Help	
Image: Menu Image: Menu Image: Menu <th>Add subscriber</th>	Add subscriber
test LD - mqtt://liveoDjects.orange-Dusiness.com:1883	
Topic to subscribe	★ fifo/testFifo
fifo/testFifo	
QoS 0 - Almost Once v Subscribe	{"streamId":"android3573290731200 59PRIMARY","timestamp":"2019-06- 25T08:36:16.217Z","location":{"lat":4 8.80121,"lon":2.29413},"model":"de mo","value":{"CO2":499,"doorOpe n":false,"hygrometry":59,"pressure": 999,"revmin":5333,"temperature":8
{"streamId":"android3573290731200 59PRIMARY","timestamp":"2019-06- 25T08:36:16.217Z","location":{"lat":4 8.80121,"lon":2.29413},"model":"de mo","value":{"CO2":499,"doorOpe n":false,"hygrometry":59,"pressure": 999,"revmin":5333,"temperature":8 3},"tags":["primary"],"extra":{"DT":"T-	3},"tags":["primary"],"extra":{"DT":"T- system","airport":"gatwick"},"metada ta":{"source":"urn:lo:nsid:android:35 7329073120059PRIMARY","group": {"id":"rEb7JR","path":"/demo"},"con nector":"mqtt","network":{"mqtt":{"cl ientId":"urn:lo:nsid:android:3573290 73120059PRIMARY"}}}
system","airport":"gatwick"},"metada ta":{"source":"urn:lo:nsid:android:35 7329073120059PRIMARY","group":	<pre>qos : 0, retain : false, cmd : publish, dup : false, topic : fifo/testFifo, messageld : , le ngth : 521, Raw pavload : 123341151161</pre>

MQTT Fx : install/configure a client

Matter Matter Market	QTT Fx : insta HTTP proxy, no w	all/configure a rebsocket, admin ins	client tall	
Welcome to the ho	ome of MQTT.fx	LO - Application - Prod LO - Bridge - Prod LO - Device M2M Eclipse local mosquitto	Profile Name LO - Application - Prod Profile Type MQTT Broker	
The JavaFX based MQTT Client MQTT.fx is a MQTT Client written in Java based on Eclipt Download MQTT.fx	Elit Connection Profiles M2M Eclipse Test LO local mosquitto Ceneral C	Profile Name Test LO Broker Address liveobjects.orange-business.com Broker Port 1883 Client ID MQTT_FX_Client Generate User Credentials SSL/TLS Proxy Last Will and Testame onnection Timeout 30 Geep Alive Interval 60 Clean Session ✓ Auto Reconnect ✓	Image: Second	Generate
User name : « application » Password : Live Objects API Key		Max Inflight 10 MQTT Version V Use Default		Cancel OK Apply
Plain text: MQTT: liveobjects.orange-business.co SSL/TLS (1- or 2-way authentication): MQTTS: liveobjects.orange-business.	om:1883 com:8883	Clear Subscription Hist	Ilate a device: ne : « json+device »	

MQTT-Spy *mqtt/websocket, tls, portable, no-admin installation, proxy support*

Special patched version for portable and proxy support:

MOTSPY

https://github.com/ olivm-fr/ paho.mqtt-spy/ releases

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MQTT-Spy : install/configure a client Full guide: https://github.com/olivm-fr/paho.mqtt-spy/raw/master/0-examples/README.docx

Connection name	Orange Live Objects	Conn	ectivity Security Proxy L	ast Will Publications Subscriptions Log Other
Configuration mode (perspective)	Detailed - all properties	auth.	TLS/SSL mode	CA certificate 👻
		User	Protocol	TLSv1.2
Connectivity Security Proxy Last Will	Publications Subscriptions Log Other	<u>è</u>	CA certificate file	O:\LiveObjects\DigiCertSHA2SecureServerCA.crt
Protocol version	MQTT (auto-resolve)	TLS		
Server URI(s) [e.g. localhost or mybroker:1883]	liveobjects.orange-business.com Default 💌	Conr	ectivity Security Proxy	Last Will Publications Subscriptions Log Other
Client ID [keep it unique to avoid disconnections]	Length = 21/23	Pro	xy type	HTTP
Clean session	Connection timeout [s] 30	1	Hostname	my-proxy-pac.mycompany.org
Reconnect on failure	Keep alive interval [s] 30		Port	3128
Resubscribe on failure	Reconnection interval [s]		Username	mycomp\user123 Hint: use "domain\username" for corporate proxies
Connectivity Security Proxy Last Will Pub	lications Subscriptions Log Other		Password	Predefined
Enable user authentication		-		Ask before connecting
Sn Predefined	application	Conne	ectivity Security Proxy Last W	/ill Publications Subscriptions Log Other
Ask before of	onnecting	Auto	o-open at start-up	
		Auto	o-connect when opened	\checkmark
Password Predefined		Auto	o-subscribe when opened	\checkmark
Ask before co	onnecting	Max [ke	messages stored eps new messages and deletes old]	5000
		Min	messages per topic	10
		Mes	sage content formatter	Pretty JSON 🔹 📖

MOTSPY

MQTT-Spy : install/configure a client as device Full guide: https://github.com/olivm-fr/paho.mqtt-spy/raw/master/0-examples/README.docx

Connection name [auto-generated if = client ID@server URI]	Orange Live Objects
Configuration mode (perspective)	Detailed - all properties
Connectivity Security Proxy Last Will	Publications Subscriptions Log Other
Protocol version	MQTT (auto-resolve)
Server URI(s) [e.g. localhost or mybroker:1883]	liveobjects.orange-business.com
Client ID [keep it unique to avoid disconnections]	urn:lo:nsid:simu:00-1 Length = 21/23
Clean session	Connection timeout [s] 30
Reconnect on failure	Keep alive interval [s] 30
Resubscribe on failure	Reconnection interval [s]

User name	Predefined	json+device

 Scripted publications 	' Scripted publications					
Script r	ame	Source	Repeat	Status	Messages	Last published
LiveObjects device1		Script folder		Not started		
LiveObjects xconnector1	े Start	Script folder		Not started	0	
	Stop					
 Subscriptions and received message 	Copy script location to clipboard					0
	Delete	•				~
Para All	Set script directory					
No messages	✓ Include subdirectories (recursive)		Show lat	test 🚺 🔶 🖣		Search 🔀 Tools 🔹
Торіс	Refresh list			Retained Q	oS Time	

MOTSPY

MQTT connection with devices

	MQTT without TLS/SSL	MQTT with TLS/SSL
API key with only DEVICE_ACCESS right	AUTHORIZED	AUTHORIZED
API key with DEVICE_ACCESS right and additional rights	• FORBIDDEN	AUTHORIZED

 \rightarrow To prevent the API KEY retrieval on non secure connection. The hacker could use it to delete devices, users or other API keys.

Android simulator

	Live Objects Business	* * * * 4 ≗
		Add to Wishlist
Live Objects Asset	Live Objects Asset	
CONNECTION	Connection Profile	
onfiguration	Server Orange M2M Prod. * Protocol MQTT w/ SSL *	
Refrest: 6 second(s)	Credentials	
Log level Info	Login Details	
elemetry Auto	Client M android: 359041003857129PRIMARY	
r -⊗ n.⊚	API Key 68/277274554465389X621163sss27654	
/ith this application you	can demo and try Live Objects.	
/ith this application you	can demo and try Live Objects.	

https://play.google.com/store/apps/details?id=com.orange.lo.assetdemo

iOS simulator (beta for iOS 12+)

〈 Live Objects device simulator



Device simulator for Live Objects

Thank you for using this app to simulate an actual IoT device, with multiple signal waves and publications to the Live Objects device and data platform. You first need to sign-up/in at our portal:

liveobjects.orange-business.com

Once your account and API_key are configured via the Live Objects portal, please set your credentials in this app settings form. Just play with sliders in manual mode or watch the signal waves in auto mode.

any question or feedback?

Let's get in touch! We'd be happy to hear about your experience and start a conversation to enhance and improve this app.

© 2019 Orange IoT team - made in 🚺 with 😡

ţĊ}	Live Object	s device simulator	ů					
MQT								
Upda	Update rate 5							
Log d	etails level		INFO					
Configu	ration subscribed f	rom dev/cfg/upd topic						
TELEM	ETRY							
Telem	netry mode	manual	\bigcirc					
ŀ	20.0°C							
\bigcirc	65.8%							
(للأ م)	317 rpm							
	395 ppm							
\bigcirc	947 mBars							
•	door	open	\bigcirc					
\bigcirc	47.27350, -2.213	385 GPS	\bigcirc					
Values	published to dev/da	ta topic						

https://testflight.apple.com/join/klZrw88o

MQTT-Spy simulator data publishing only

 Publish message 						
 Scripted publications 	_					0
Scipted publications	ript name	Source	Repeat	Status	Messages	Last published
.iveObjects device1		Script folder		Not started	0	-
veObjects xconnector1	Start	Script folder		Not started	0	
-	Stop					
Subscriptions and received me	Copy script location to clipboard					0
	Delete	•				
Para New All	Set script directory					
lo messages	✓ Include subdirectories (recursive)		Show late	est 🚺 💠 🖨	🕨 📦 🙀 Se	earch 🔀 Tools 👻
	Refresh list			Betsized D 0		

https://github.com/olivm-fr/paho.mqtt-spy/tree/master/0-examples

Java device sample

data publishing + commands + parameters + firmware + FiFo

3		try {
Ļ		// create and fill the connection options
		MqttConnectOptions connOpts = new MqttConnectOptions();
		<pre>connOpts.setCleanSession(true);</pre>
		<pre>connOpts.setPassword(API KEY.toCharArray());</pre>
		<pre>connOpts.setUserName("json+device"); // needed to publish as a device</pre>
		connOpts.setKeepAliveInterval(30); // 30 seconds, to keep the connection with Live Objects
		String server;
		if (SECURED) {
		<pre>server = "ssl://liveobjects.orange-business.com:8883";</pre>
		<pre>connOpts.setSocketFactory(SSLUtils.getLiveObjectsSocketFactory());</pre>
		}
		else {
		<pre>server = "tcp://liveobjects.orange-business.com:1883";</pre>
		}
		// now connect to LO
		MqttClient mqttClient = new RegulatedMqttClient(server, CLIENT_ID, new MemoryPersistence(), sleepAfterPublishMillis: 500);
		<pre>mqttClient.connect(connOpts);</pre>
		<pre>System.out.println("Connected to Live Objects in Device Mode" + (SECURED ? " with TLS" : ""));</pre>
		if (HANDLE_CONFIGURATION) {
		DeviceConfig configHandler = new DeviceConfig(mqttClient);
		configHandler.publish();
		configHandler.subscribeToConfigChanges();
	<u> </u>	1

https://github.com/olivm-fr/LiveObjectsMqttDeviceSample/

Orange IoT Platform technical directions 2020+



Integrate IoT Core to leverage more connectivity assets for IoT services Integrate major 3rd party actors to provide E2E technology stack for IoT Services



Advanced Analytics => Major clouds integration

• Azure IoT, AWS, Google (end 2020): Connectors to ease projects with customers using these cloud solutions

Application enablement

Iothink-Kheiron: allow to quickly build & deploy end to end solutions

IoT edge

• Eurotech & Technilog validated, available for bespoke offers

IoT Core

- Value proposition: Reliable and secure data collection
- Smooth integration of existing assets
- Location service becoming core feature
- AI powered QoS
- AI powered security / security features

Live Objects

- Sharp positioning in Data collection and Device man., increased by opensource integration (Kibana, Node-RED)
- New geographies (MEA, WIN)

Malima

- Global and National roaming, Multi-MNOs features
- LTE-M
- eSIM

Co-existence aspect





5G NR with in-band NB-loT and LTE-M

Existing deployment of LTE-M and NB-IoT will co-exist with new 5G NR carrier

Mobile IoT Devices already deployed will continue to operate in the same band and under the same radio network as now.

5G – Data Gravity Concept.



In mobile networks, Applications (Apps) run in smartphones

Services run in the Operator's Core Network (IMS Services) or in Internet (commonly in Public clouds)

Apps and Services are therefore very 'far away' from each other as perceived from a time point of view (e.g., typically more than 50-100 ms).

This is because exchanged data have to travel through a set of networking entities and devices (e.g., aggregation points, IP routers, Peering routers, Interconnection hubs).

It is not uncommon that the links to these devices can get congested, and therefore it is impossible to guarantee any end-to-end Quality of Service (QoS) or throughput..

5G slicing serving in SmartGrid Applications



Is 5G Dangerous?

It depends on frequency and energy

Is 5G Dangerous?


Is 5G Dangerous?

2G/3G/4G/5G use only Non-lonizing radiation