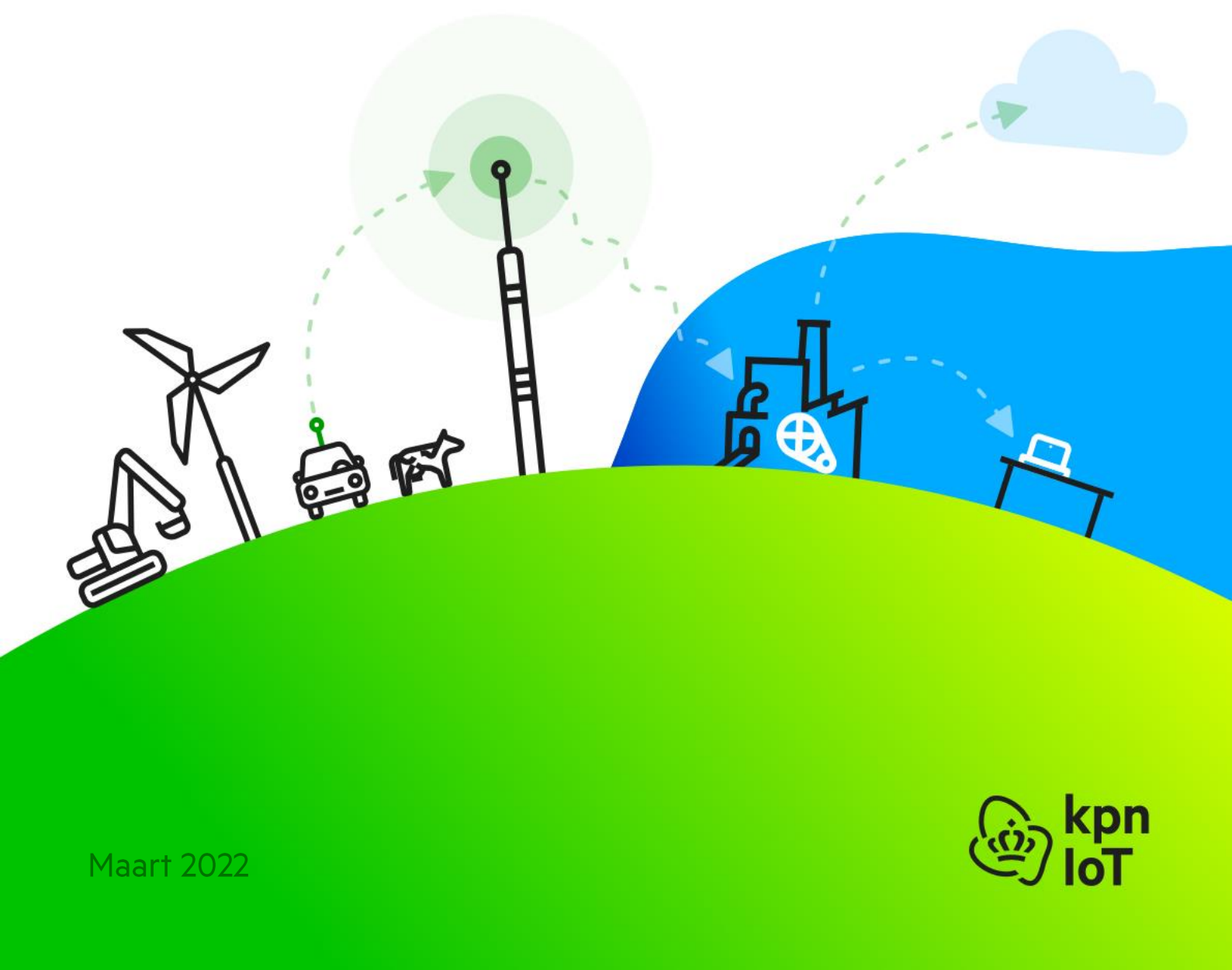


# KPN Things | Explorer

Service description



Maart 2022



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# 1. KPN Things

## 1.1 Introduction

This document describes the KPN Things product and service. We want this document to give you a complete overview of the product content and our service. Please refer to the contracts and the technical documentation that you will find here:

<https://docs.kpnthings.com/home/>.

### Internet of Things

Our world is becoming more and more digital. Not only we, but also the things around us are becoming more connected. Machines, cars, refrigerators and even agricultural land, dikes and buildings. Practically all “things” can be connected to the internet. Sensors and other special devices are used for this purpose. As soon as these “things” are online, they can communicate. With each other, with their users, with organisations and with other connected parties. That is the Internet of Things (IoT).

All connected “things” produce data. This data provides a large quantity of new information that can be useful for users and organisations. In fact, the data not only provides insight into the current use or process, but can also be used to make forecasts about use in the future. Different data streams can be compared with each other so that patterns can be recognised. The integration of people, machines, processes and data can also improve production processes and customer experiences. The Internet of Things allows you to create new business opportunities and solutions that until now seemed impossible.

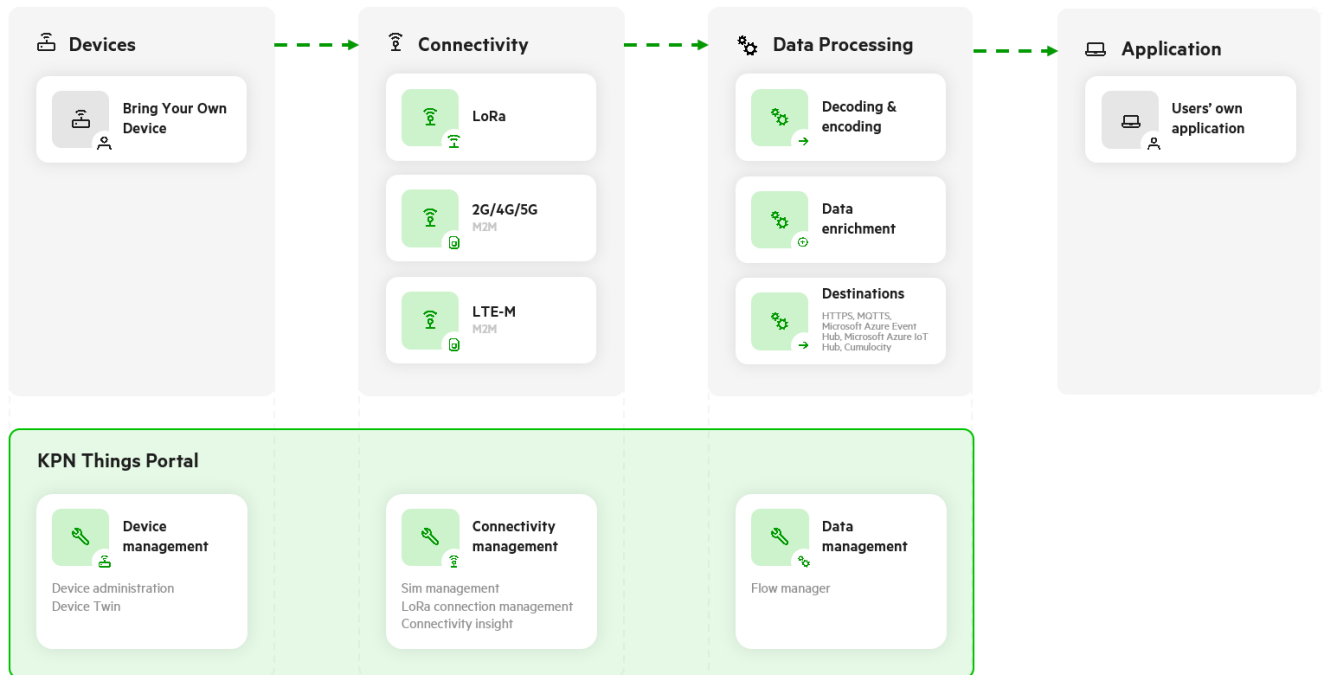
## 1.2 Introduction of KPN Things

The Internet of Things offers many opportunities for organisations. For example, it can help to optimise your processes, increase customer satisfaction and develop innovation (faster). However, developing, establishing and monitoring an IoT solution can be complex. Depending on the application, many different choices have to be made. What are the right IoT devices to select? Which connectivity is suitable for the use case? How can you get your IoT data in the cloud?

KPN Things allows you to build your IoT solution in a modular way. You can select several building blocks that are necessary to create your IoT solution in a way that is suitable for your situation. In so doing, you can set up a working IoT solution easily, quickly and reliably. KPN Things offers the possibility to use all your IoT solutions at the same time and manage them from one environment. With KPN Things, you can choose one of our ready-made total solutions or select only the building blocks you need to set up your IoT solution.

KPN Things offers the following building blocks:

● Part of KPN Things Explorer ○ Do It Yourself



## Devices

KPN Things Explorer offers the possibility to connect a wide range of your own Devices.

## Connectivity

We define connectivity as the connection solution that ensures that the data from the devices goes “somewhere”, for example, to a processing platform. Or a database. Would you like an hourly update and the ability to see movements in real time? Or rather every minute or every hour? We translate your requirements into connection forms with our connectivity solutions.

There are various solutions that offer different options, for example, in terms of the battery lifespan of your devices, the quantity of data that you can send, the speed provided by the network and the number of messages that you can send per hour. In addition to these differences, each form of connectivity has its own unique characteristics.

## Data Processing

Data Processing enables you to easily process, configure, save, enrich and send IoT data to any (cloud) platform or endpoint. Data Processing consists of various components, such as decoders and encoders, APIs and data destinations and platform destinations. The decoders allow different sensors to communicate with each other and ensure that the various data formats are translated into one format. The API connections encrypt your data in such a way that it can be sent securely to other sources or applications. And you can then easily read the collected data on any desired platform with platform connectors. As a result, each IoT application can be realised on the cloud platform of your choice. All of the Data Processing components are easy to combine with each other, but can also be used individually, depending on how you want to use them.

## Applications

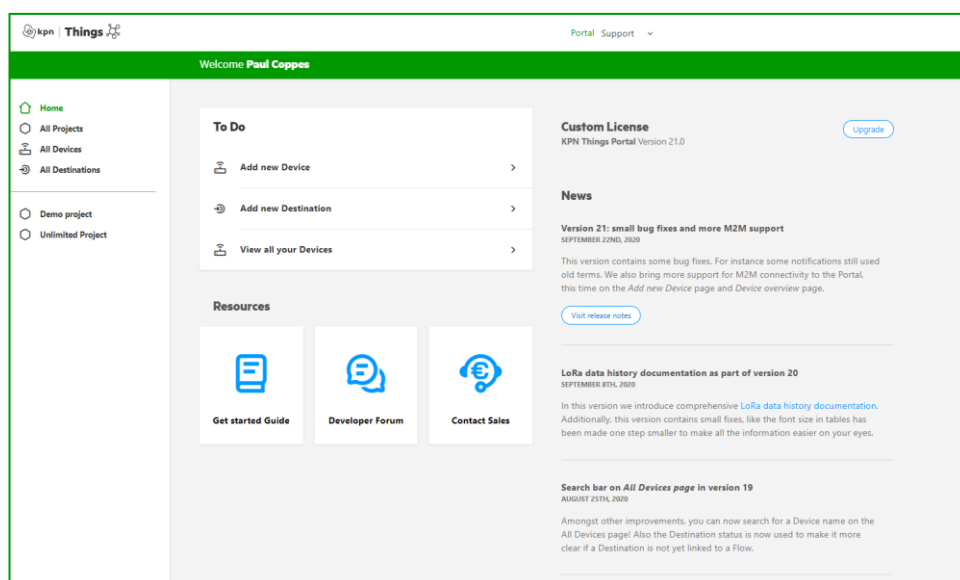
KPN Things Explorer offers the possibility to link a wide range of your own applications.

### 1.3 For each IoT-case

[Here you can find all the possibilities of KPN Things.](#) You can use Applications to visualise your IoT data in a dashboard so that you can also actually use your data. For this purpose, you can use standard applications specially developed by KPN or you can request us to build a customised application for your specific purposes and requirements. the modules Devices, Connectivity and Data Processing for this purpose. If you have developed devices yourself or purchased them at a partner, then you can purchase the modules Connectivity and Data Processing – and possibly Applications – and connect them to your devices. [If you prefer complete peace of mind and want to purchase a so-called end-to-end service, then our ready made KPN Things total solutions, such as KPN Material Management or KPN Fill Rate Management, are perfectly suited for you.](#) No matter what requirements, technical skills or business needs you have, a suitable IoT solution can always be put together with KPN Things.

#### KPN Things Portal

In order to be able to configure and manage the selected IoT solution(s), you obtain access to the KPN Things Portal. You can configure and manage your own IoT solution through this portal. The portal also provides insight into the operation of the solution and gives you the possibility to resolve problems or disruptions. KPN Things is offered as an as-a-service managed product. The service and the portal can be accessed through regular internet browsers on computers, tablets or smartphones.



### 1.4 Characteristics of KPN Things

#### Plug and play

The standard KPN Things building blocks are fully tuned to each other so that you can quickly and easily realise a new IoT solution. It is also easy to add IoT devices and data can be quickly connected using standardised data destinations.

#### Modular

You choose what your IoT solution looks like. All you have to do is select the building blocks that are best suited for your application.

#### Flexible and scalable

KPN Things allows the management of multiple IoT solutions from one environment. You can easily upscale and downscale the devices and connections used so that the solution always fits perfectly with your current needs.

#### IoT-data where you want it

You connect the IoT data where you want it using the data destinations and platform connectors. For example, you can connect to the KPN Things application development platform, your own cloud environment or your own applications.

**Secure**

Of course KPN Things ensures that all of your data is completely secured from device to application. KPN applies strict security requirements for this purpose. Please read the KPN Security Policy (KSP) via <https://ciso-ksp.kpnnet.org/> for more information about these security requirements.

**24/7 support**

With KPN Things Explorer you can ask all your questions via the Forum.

**Self service**

KPN Things Explorer enables you to start small, scale at your own pace and set up your IoT solution completely autonomously as you wish.

## 2. KPN Things building blocks specifications

The components of the service are described in detail in the following chapters. The different components are shown below.

Onderdeel	KPN Things	KPN Things Explorer
Devices	Optional	BYO Device (SDK)
Connectivity	Standard	Standard
Data Processing	Standard	Standard
Applications	Optional	N/A

### 2.1 Devices

With KPN Things Explorer you can use your own Devices. KPN certified devices can be found in the [KPN Device Catalogue](#).

### 2.2 Connectivity

In order to be able to be used, the data that is generated by the IoT devices must ultimately end up at an end application, such as, for example, the KPN Material Management application. The first step is that the data is sent from the IoT device to the Data Processing building block. Some form of connectivity is required for this purpose. KPN Things offers the following options:

#### 2.2.1 LoRa

LoRa stands for Low Power Long Range. Since 2016, KPN was one of the first providers in the world to offer national LoRa network coverage. KPN built a LoRaWAN network based on the LoRa protocol established by the LoRa Alliance. LoRa was specially developed for the connection of large quantities of inexpensive, energy efficient IoT devices that work on batteries. Because LoRa network technology only makes limited contact with your devices, the batteries of your devices using LoRa only have to be charged or replaced after a number of years. This feature makes LoRa connectivity suitable for applications with all types of material and simple IoT solutions with sensors. The network removes significant barriers such as high costs and high energy use. In this way, battery-powered IoT devices can be connected in a cost-efficient manner.

Availability of the KPN LoRa network is defined as the average percentage of time that the KPN LoRa service is operational. The availability includes manual shut-downs of the radio-cell during incidents. The availability of the KPN LoRa service is 99,6%.

LoRa is a connectivity variant which is based on radio communication. This can always be influenced and disturbed by external factors. Because with LoRa in many cases there is no confirmation in the communication (i.e. there is no confirmation that messages are received), there can be situations that a message is not received. This way of communication, without confirmations, is chosen in many cases to improve the battery life of the device.

#### LoRa Geolocation (included as standard with KPN Things Explorer)

LoRa Geolocation enables the network to calculate where an IoT device is located based on a message from that device. That means you can establish a first position with an average accuracy of 20-200 metres (outdoors). If necessary, you can add local location solutions to your devices, such as BLE (Bluetooth Low Energy) or RF (Radio Frequency), in order to achieve the so-called “last mile” of your location.

As described, the accuracy of LoRa-Geolocation may vary. The following is to be expected:

- The location of stationary devices is more accurate than that of moving;
- The location of slowly moving devices is more accurate than that of fast moving devices;
- The location of devices in rural area's is more accurate than that of devices in urban area's;
- High rise buildings have a negative influence on the accuracy;
- With indoor use of devices the availability and accuracy of localization will be reduced;

- Near the Dutch borders the accuracy will be reduced because of fewer available LoRa gateways for localization.

To define a location with LoRa-Geolocation a device should be able to contact at least 3 LoRa gateways. When fewer gateways can be contacted no localization information or less accurate information is available. In this last case localization will take place based on Received Signal Strength Indication (RSSI), which will provide an accuracy up to 500m<sup>2</sup>.

### Countries available for LoRa connectivity

The use of the Connection is permitted in case of LoRa: Netherlands

#### 2.2.2 The use of the Connection is permitted in case of LoRa: Netherlands M2M

M2M connectivity enables machines, objects and people to exchange (real time) informatie with systems and applications. In addition, IoT devices send the necessary data with a SIM card via the KPN network. KPN offers a reliable, secure and comprehensive supply of M2M networks, such as 2G and 4G. You are always connected with a KPN M2M solution. If desired, you can also remain connected abroad with all of your M2M equipment due to our roaming facilities.

KPN Things M2M provides you with a pre-configured APN (Access Point Name). Therefore, you do not have to set up and manage one of these yourself. KPN Things M2M also provides a secure IPsec (Internet Protocol Security) tunnel so that your M2M traffic does not run via the open internet. From KPN Things Data Processing, you can process your M2M data and send it securely to one of our or your own applications. More information about this subject is located in the Chapter 2.3 Data Processing.

You need a KPN Things SIM card in order to have M2M devices communicate with KPN Things. This card guarantees a secure connection between your devices and KPN Things. Your M2M device with KPN Things SIM card is fully protected from the (regular) internet. Only KPN Things can communicate with your devices and vice versa. Because the connection from your devices to KPN Things goes completely through our systems, data communication can occur without transport encryption (SSL [Secure Sockets Layer]). In particular, we build on the encryption that is already in our M2M network. As a result, your device is more energy efficient with KPN Things M2M than a normal M2M device.

### Countries available for M2M connectivity

The use of the Connection is permitted in case of M2M in the following countries:

EU	
Belgium	Luxembourg
Bulgaria	Malta
Cyprus	Martinique
Denmark	Mayotte
Germany	Netherlands
Estonia	Norway
Finland	Austria
France	Poland
French Guyana	Portugal
Gibraltar	Reunion
Greece	Romania
Guadeloupe	Saint Barthelemy
Hungary	Saint-Martin (French part)
Ireland	Slovenia
Iceland	Slovakia
Italy	Spain
Kosovo	Czech Republic
Croatia	United Kingdom



EU	
Latvia	Sweden
Liechtenstein	Switzerland
Lithuania	

### 2.2.3 LTE-M

LTE-M is an energy efficient version of LTE (Long Term Evolution) (4G) with a lower maximum speed. As a result, LTE-M is an inexpensive and energy efficient form of LTE connectivity. LTE-M provides you with reliability and stability at a lower price per device. The batteries of your devices using LTE-M will have to be charged or replaced within a number of years (depending on frequency and size of the battery). This fact makes LTE-M connectivity particularly suitable for applications in, for example, worldwide transport.

KPN makes every effort to enter into as many roaming agreements as possible in order to ensure a future of worldwide LTE-M coverage. Since 2020, agreements have been made for LTE-M roaming with France, Switzerland, Belgium and the United States. Negotiations with other countries are still ongoing.

## 2.3 Data Processing

The Data Processing module within KPN Things gives you the option to process, enrich and forward your data to any desired (cloud) platform or endpoint. KPN understands that you possibly already use your own cloud platform, where you want your IoT solution to “land”. That is why KPN Things is set up as open as possible. It enables you to configure and manage your IoT application with KPN Things and to (also) have the IoT data land on your own cloud platform. You can then add intelligent applications and processes in your cloud environment.

### 2.3.1 Decoders

KPN Things offers device decoders in order to reduce the complexity of data management. All incoming data that is generated by the IoT devices can be decoded in KPN Things. The contents of IoT messages are often compressed, as a result of which a translation step is required in order to be able to interpret the data. Because IoT devices generate and send data in various formats or languages, it is important to make this IoT data universal so that it can be processed, enriched and (whether or not combined) forwarded to connected applications. A decoder ensures that IoT data messages in KPN Things are sent in a standard way to SenML. This makes it possible to manage the IoT chain more simply and makes it easier to add new IoT applications in the future. SenML is a (JSON) data format that is easy to understand for systems as well as for people. The decoding of the data is optional, if desired, data is forwarded to your solution uncoded.

#### Location services

- o Location determination based on a LoRa message that is added to a measurement

### 2.3.2 Forwarding data

When you want to have sensor data be a part of your data processing processes, this IoT data will be sent to applications, CRM/ERP systems or storage solutions. KPN Things Destinations enables your IoT data to be delivered easily to the proper location. KPN Things has generic data destination and destination with which your data can be sent to (cloud) platforms. The destination can be configured per flow. Several destinations can be activated at the same time. You configure the destinations, after which KPN Things forwards the sensor data with all of the proper parameters to your endpoints.

#### Data destinations

The KPN Things platform has the following generic destinations in order to guarantee maximum flexibility:

##### HTTPS

The HTTPS data destination provides you with a way to forward information from KPN Things to your server via an HTTPS connection. You configure the HTTPS destination to send data to your HTTPS endpoint.

### **MQTT(S)**

Have KPN Things deliver your IoT data to your MQTT data broker. Use MQTT destination to have KPN Things make a connection with your data broker.

### **Platform destinations**

There are many IoT-specific platforms available where IoT data can be processed. KPN Things provides connections for a number of commonly used cloud platforms. These connections ensure a simple connection between KPN Things and the relevant platform. The following platform destinations are currently available:

- o KPN Things Application (Cumulocity IoT)
- o Microsoft Azure Event Hub
- o Microsoft Azure IoT Hub

A platform destination can:

- o Connect devices to the cloud platform by creating devices
- o Send data on behalf of the devices to the cloud platform
- o Send commands to the devices from the cloud platform

## 3. KPN Things Portal

The KPN Things Portal is the portal with which you configure and manage your IoT solutions yourself. This portal is accessible everywhere via a web browser and therefore always provides you with a view of your solution.

The main functionalities of the KPN Things Portal are:

- Project Management
- Data Management
- Device Management
- Connectivity Management

### 3.1 Project management

KPN Things Project Management functionalities allow you to set up and manage your various IoT projects. You can set up different stages per project or per program so that you can manage all of your IoT devices in one environment. You can set up different and separate data destinations for each project and create different flows. Flows are individual data flows in which you define how a specific data flow must be treated and routed. Per product you get by default 1 project.

### 3.2 Data management

KPN Things Data Management functionality enables you to configure a solution from the portal in such a way that the data is converted from the devices with the proper decoder, that the proper services are activated and that the data ends up in the proper location.

### 3.3 Device management

KPN Things Device Management enables you to store all relevant information from your devices. As a result, you can easily register, manage and administer all of your devices. Moreover, you always have a reliable and complete overview of all of your IoT devices.

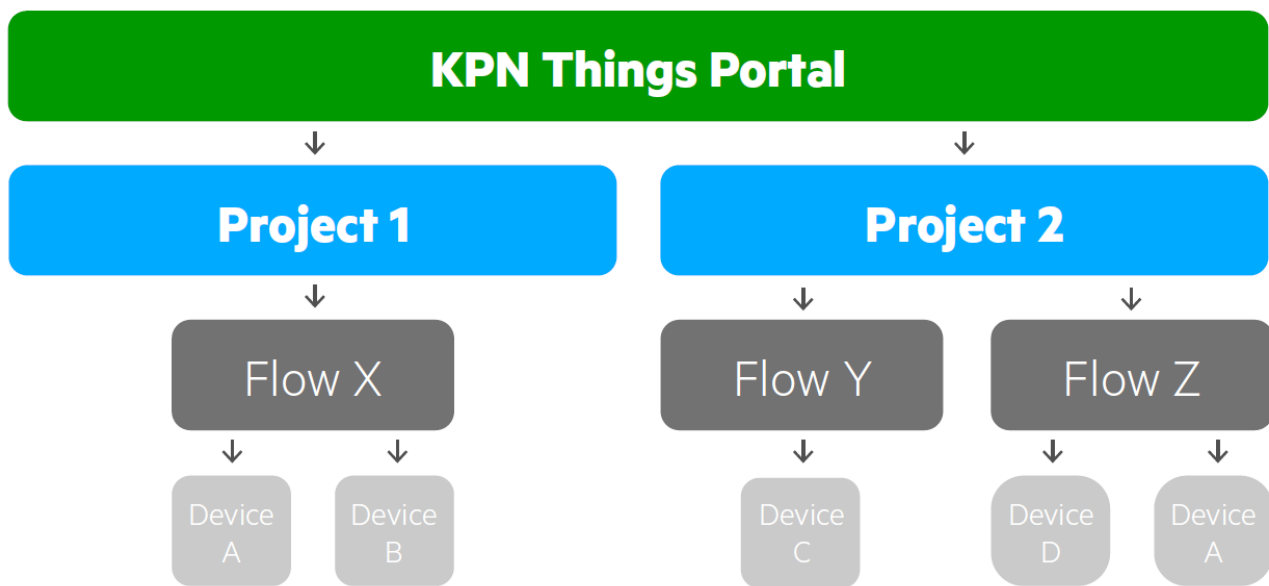
KPN Things developed a hierarchy in order to manage your IoT solution as well as possible. The hierarchy is constructed of all of the components that are critical in developing an IoT solution. For example, you can create flows for different applications.

#### 3.3.1 Device-administration

- Register and manage devices
- Place devices in flows
- Configure data processing for devices

Device Administration enables you to easily register your own devices and manage all of the connected devices. You always have a reliable and complete overview of all of your IoT devices in the KPN Things Portal.

Devices can be grouped with Device Management. Each product that you purchase can be found as an IoT project within the KPN Things environment. Devices can be grouped in flows within a project. These flows can be used for administration purposes, but they can also be used to set up a different data processing configuration for various groups of devices. How to set up the Device Management module in the KPN Things Portal is shown in the diagram.



### 3.4 Connectivity management

Connectivity Management in the KPN Things Portal enables you to manage the available connectivity. For example, you use it to activate or deactivate a connection. Connectivity Management in the KPN Things Portal also provides the status of the connectivity.

The KPN Things Portal is under continuous development. Visit [docs.kpnthings.com/portal](https://docs.kpnthings.com/portal) for more information about the functionalities.

## 4. Criteria and implementation

### 4.1 Criteria

#### 4.1.1 Device and system requirements

##### **Device requirements**

If you want to use devices that are not offered by KPN or that are not included in the KPN Device Catalogue, KPN sets a number of conditions for this. It is important that the devices have the correct certification for access to the networks. This reduces the risk of the device interfering with the operation of the network.

### 4.2 Device provisioning

If the Customer uses own devices, the devices must be prepared and/or configured using their own staff (among other things: configuration of devices, installation of SIM cards).

### 4.3 Own IoT hardware

If the Customer is responsible for the IoT Devices, the following provisions shall apply;

- The Customer is responsible for the purchase and maintenance of own hardware (not supplied by KPN) and any other equipment and additional services required to establish a Connection to the Service, gaining access to the Service or otherwise use the Service.
- The Customer shall ensure that its own hardware complies with legal requirements and industry specific standards. The (financial) consequences of the use of non-compliant equipment are at the risk and expense of the Customer. The functionality of the Customer's own hardware may differ, which may have implications for the use of parts of Services.
- The Customer is also responsible for maintaining the security of its own hardware, the customer account, files and passwords (including, but not limited to, administrator and user passwords), and the Customer is fully responsible for all use of Services (and all related costs), even if this takes place without his permission or consent or without his knowledge.
- If the Customer delivers the devices, the communication modules must be certified. This means that M2M devices must be GCF-compliant and LoRa devices must be LoRa Alliance certified. Pre-implementation testing is crucial because it reduces the potential need for recall or changes after distribution.
- The Supplier requires that the modem must be GCF-certified in all its own hardware that is used in combination with a SIM card (GCF = Global Certification Forum). The Supplier may require the Customer to comply with further requirements with regard to the software on the equipment. In that case, the Supplier must inform the Customer accordingly. The Customer is always responsible for such certification at any time. Uncertified hardware cannot and will not be accepted on the network. If its own hardware has not been certified within six (6) months of signing the contract, the Customer shall pay a fee to the Supplier of all relevant costs incurred by the Supplier due to the Customer's conclusion as a result of non-compliance with the certification requirements, including loss of income by the Supplier.
- If a Connection is terminated, the Customer is responsible for possible further traffic or (mobile) use of the own hardware. If the hardware continues to attempt to connect (again) to the Network, the Supplier will inform the Customer of this. The Customer must have resolved this situation within one (1) calendar month after notification. If the Customer fails to do so, the Supplier is entitled to charge the Customer the monthly bundle costs that apply to the terminated Connection. This fee will always be increased by 10% per month until the Customer has resolved this situation.

##### **System requirements for using the application**

- o KPN Things Application, the IoT platform used by applications, does not support Internet Explorer as browser

- KPN Things Portal, where you manage your settings and applications, is available via the internet in a web browser

#### 4.3.1 Maintenance

Maintenance on a regular basis is necessary in order to keep our services up-to-date, secure and reliable. KPN performs maintenance as much as possible without you noticing it. The service, however, can sometimes be briefly interrupted for purpose. New releases for functionalities become available every other week on Tuesday morning between 9.00 a.m. and noon.

#### 4.3.2 Tarifs and payment

The agreed rates are laid down in the agreement file. Invoicing occurs in the following month. Invoices are sent to the indicated receiving e-mail address. The KPN Things rate structure consists of one-time rates and monthly rates:

##### **One-time rates**

KPN charges one-time costs for the purchase of the SIM cards. These costs are detailed further in the agreement.

##### **Monthly rates**

KPN Things charges monthly rates for the number of (active) connections. These rates are detailed further in the agreement.

## 5. Service

This chapter describes the service provided by KPN Things.

### 5.1 Support

As part of the KPN Things Explorer service, KPN provides support via our [Business Forum](#). This is the place to ask all your questions. We will get back to you as soon as possible.

#### 5.1.1 Security

You want your data to be safe and that no unauthorised persons have access to it. Throughout the organisation and across all of its services, KPN applies security requirements that form the KPN Security Policy (KSP). Each service provided by KPN is checked against the KSP from purchase through release. KPN Things therefore also complies with the KSP. The service components, Devices, Connectivity, Data Processing and Applications have also been verified individually. The solution as a whole is also verified. As a result, you can be certain that your data is secure within the entire service and its components.