KNX IoT 1.0

KNX Web Services

KNX IoT 1.0 –
Standardised KNX Web Services

KNX has recently released a KNX Standard extension for KNX web services. The standardised application layers enable improved interoperability when general IT systems interact with the KNX system. This gives software applications on a higher abstraction level a uniform interface to interact with KNX, paving the way for further innovations in software applications on the IP network side.

Goals

Web services ease the implementation process and increase the interactions possibilities. It is expected that this will boost the availability of even more integration solutions with for example ERP systems, hotel book keeping systems, alarm systems, EV installations, smartphones, etc.

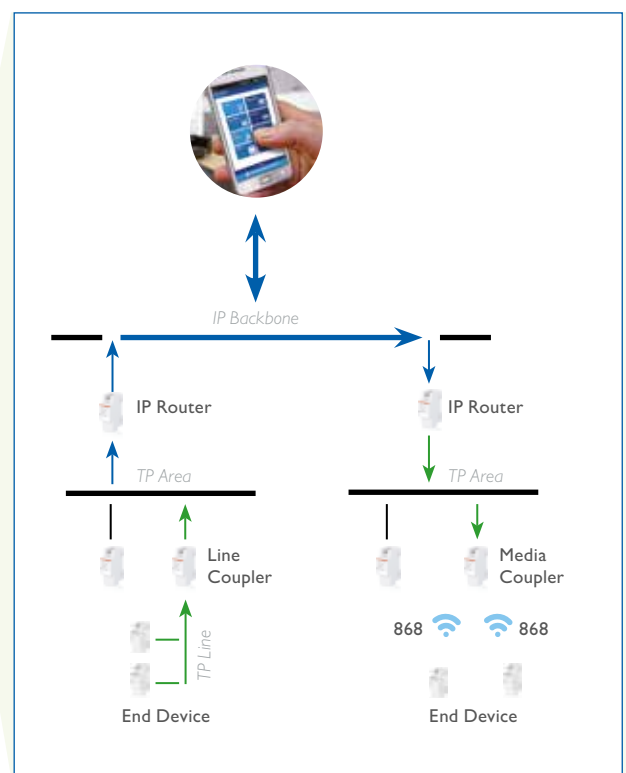## Difference with already standardised KNXnet/IP

It is true that KNXnet/IP is fully specified and specifications are freely available: however, KNXnet/IP was created for other use cases, i. e. connecting buildings to one another, creating a fast backbone for an underlying KNX TP system and remote management. In practice, the KNXnet/IP binary protocol is also used to create visualisation software, however this requires more software effort because of the specific need to implement the protocol.

The main difference with KNXnet/IP is that the web services protocol is based on HTTP. In this way, it is easier to implement in systems outside the KNX ecosystem. The RESTful way of interacting removes the needs for applications to constantly monitor the KNX installation themselves. Web browsers can use web services directly, they are unable to directly speak KNXnet/IP.

Connectivity over the internet is more convenient with HTTP, transporting HTTP over the internet is much easier as this can be secured with less complex solutions than full VPN tunnels (e. g. with SSL reverse proxy, this can be added directly on the gateway devices by manufacturers).

## CONTENT OF THE KNX WEB SERVICE SPECIFCATIONS

Information model (IM)

KNX web services provide a higher level of abstraction. The connecting application doesn't need to know how KNX operates. The IT application can interact with KNX in a RESTful way without having knowledge about KNX itself. In this way, not the entire ETS project needs to be shared with every connecting application. For example, the system can request the status of 'bedroom / night lamp' instead of having to know the group address that implements that functionality. Tags can be used to add extra metadata with key/value pairs to describe the available functionality.

Application layers

The specification foresees three web service flavours to ease the integration with existing systems: oBIX, BACnet/WS, OPC/UA. All are based on a single information system that create a uniform mapping of the information from the project. This information can then be used as the basis for the gateway to translate web services into KNXmessages.
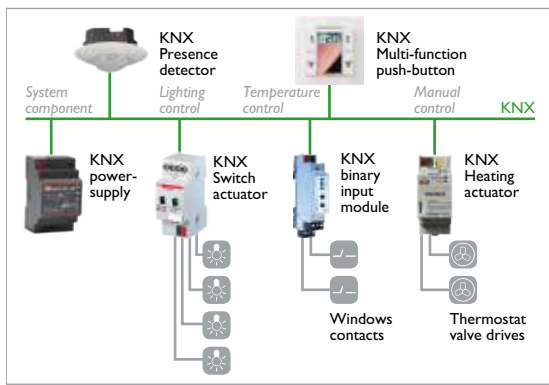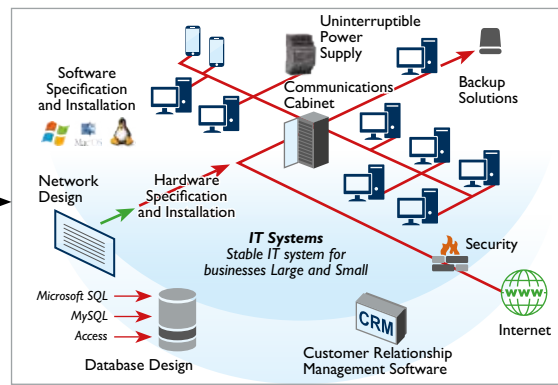
KNX Network		KNX Gateway	IT Systems

KNX manufacturers can now create gateways similar to KNXnet/IP devices, that however form a gateway from the KNX system towards HTTP. A lot of proprietary gateway devices towards HTTP already exist, now manufacturers can add the specified and standardised way for HTTP interaction to allow more services to make use of this interaction method. In this way, a more common way to access KNX installations is offered.

Principle

The technical principle of the KNX IoT solution is here briefly explained; a gateway maps the "KNX project" to the "internet". The picture adjacent shows the access to the gateway at runtime. The mapping of ETS project data into the format of the Information Model is ensured by the ETS App *Web service exporter* and is used to *configure* the Web service gateway.

On the left hand side of the picture, operation panels, building management systems, smartphone and others communicate via web services with the gateway.

In this way, the app of a web client (here represented as the internet globe) is able to search data in the web service gateway with unified text telegrams.

On the right hand side of the picture, the well known KNX protocol is depicted. In order to be able to detect from the side of the IP infrastructure the parameters of the KNX system, the ETS project needs to be exported (uploaded) into the KNX WS-Gateway.

For this purpose the new ETS App is available. The KNX installer has the possibility to export all project data or only parts of it. When doing so, the parameters have to be clearly marked. Also supplementary data can be exported.

Conclusion

Open Data Exchange is a key success factor for upcoming IoT systems – including KNX IoT – next to (seamless) interoperability.

By KNX IoT, building automation or smart home makes a tremendous step towards the virtual world of the internet. It becomes simpler to use building automation data for automated functions, to present values and states of a KNX installation via the internet and to evaluate them. Just think of sensor values and consumption data of energy usage, which can help to optimise the energy management. The open data exchange between IT systems and building automaton systems enables improved applications with considerable multiple benefits.
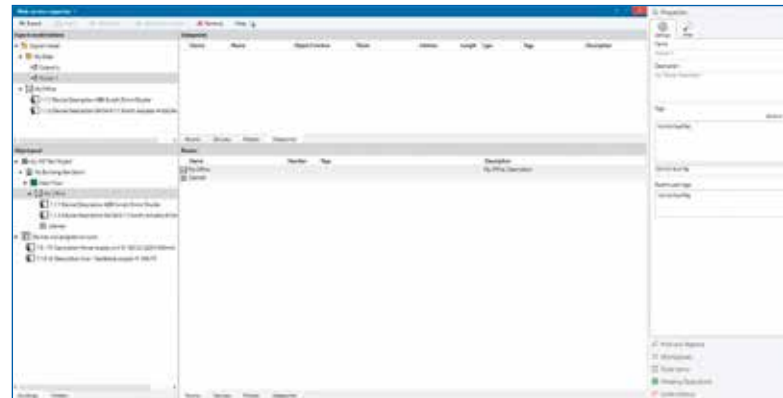
ETS App "Web service exporter"
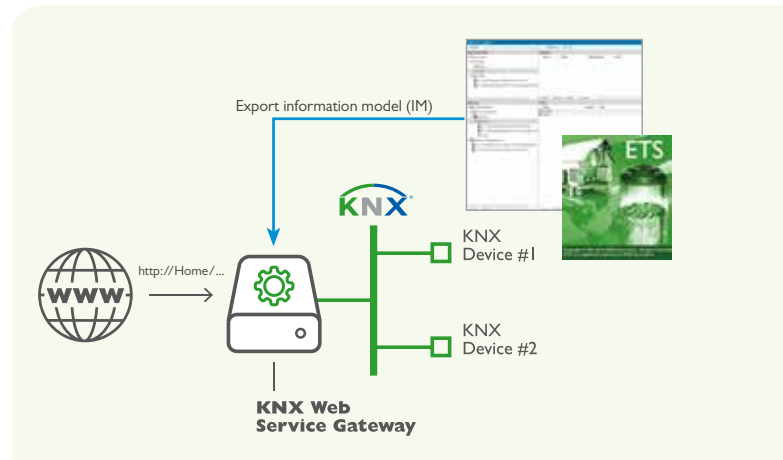
HOW TO START?

To make the specifications come alive KNX Association has created a KNX Web services gateway technology demo to demonstrate the practical usage of oBIX web services. This comes with an ETS App Web services exporter that aids in creating the information model. This demo can be used to learn more about the working of KNX web services and is available – free of charge – in the KNX online shop (https://my.knx.org/).

Please note that this gateway showcase requires significant setup work and is not an actual product. It is meant to provide more insight into the specifications by making them more concrete.

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