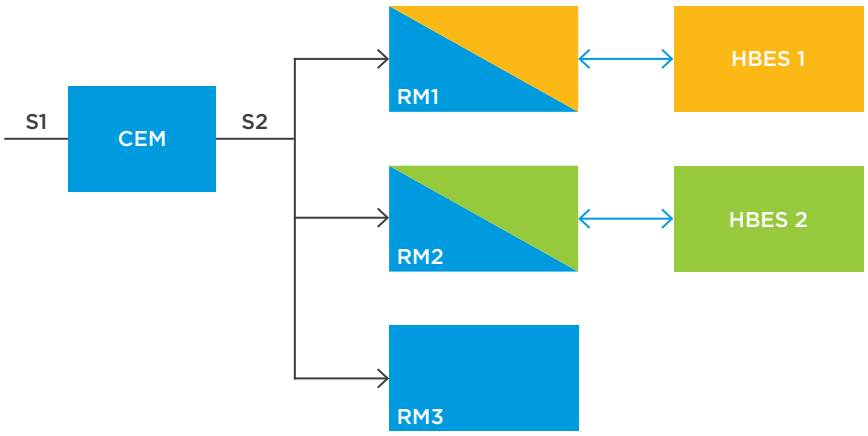
Energy Management Standardisation



- ***CEM** = Customer Energy Manager*
- ***RM** = Resource Manager*
- ***HBES x** = Home and Building Electronic Systems solutions (based on any type of protocol)*
- ***S1** = interface to grid*
- ***S2** = interface between CEM and RMs*

As already explained in the beginning of this Journal, KNX is actively involved in helping shape the EN 50491-12-x standard series. Part 2 of this standard will specify which data will be exchanged between the Customer Energy Manager (CEM) and the Resource Managers (RM) at the premises. This standard is being developed by the Working 18 of the CENELEC Technical Committee TC205.
The Customer Energy Manager (CEM) is the central brain in the installation, aware of the energy needed by devices (in case only consuming) or the energy made available by devices in the building (in case producing). Examples of devices consuming could be e.g. heating/cooling systems or an e-car, of devices producing e.g. photovoltaic systems. Storage systems can also be included in the Energy Management of the CEM.
The energy flexibility of a device (or even a collection of devices) is abstracted towards the CEM as RMs. In other words, the RM informs the CEM about the possible energy consumption/production patterns over time, after which the CEM controls the available RMs according to different strategies. Such strategies could be optimized according price information received from the grid or could be optimized so as to consume a maximum of own produced energy, before energy is drawn from or injected into the grid. For this and depending on the type of RM, the CEM can use different control types, i.e. :

- **Power curtailment-based control:** restrict power or consumption to a hard limit;
- **Power profile-based control:** shifting the power in time;
- **Operation mode-based control:** restricting power or consumption to a number of different levels (operation modes);
- **Fill rate based control:** for devices that have the ability to store or buffer energy

In view of the multitude of existing protocols that could be used to communicate between a device and the respective RM or between a RM and the CEM, the EN 50491-12-2 only lays down the data exchanged between the CEM and the RMs. The standard thus does not lay down the protocol to be used nor how the data shall be coded (e.g. XML, JSON, ...). This is left up to the market.

In sum, there are a number of different ways the EN50491-12-2 standard could be implemented based on KNX:

- A KNX controlled heating or cooling system could continue to be operated as is currently the case (e.g. based on Twisted Pair and using KNX Group Communication). However, for instance, a resource manager module could be included in a KNX control panel that could calculate the energy profile of the KNX controlled heating or cooling system based on the received group communication and communicate this via KNXnet/IP to a KNXnet/IP enabled CEM.
- A KNX IoT Gateway could include a resource manager functionality, which abstracts the entire underlying KNX installation as regards needed energy. Via the KNX IoT Type 3 interface this energy need could be communicated to the CEM, also including a Type 3 interface. The data could be encoded as KNX standardized JSON-LD data.
- A charging station could include a KNX IoT Type 3 interface, which communicates the KNX standardised JSON-LD data directly the KNX IoT CEM.
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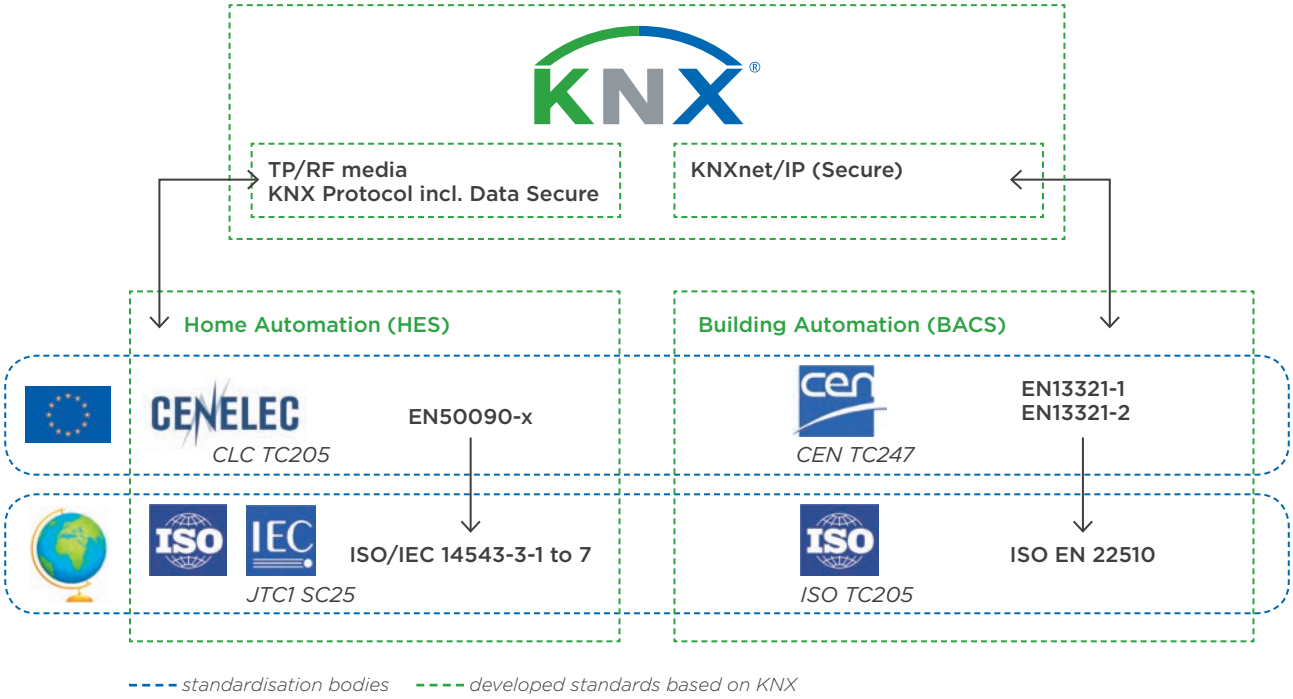
KNX Secure becomes International Standard



As is probably well-known to anyone dealing with KNX, KNX has been a worldwide standard for more than a decade. This standard, ISO/IEC 14543-3-1 to 7- documenting the KNX media (TP/RF) as well as the protocol - has been approved in the Joint Technical Committee between ISO and IEC, i.e. JTC1 and in its Subcommittee SC25. This standard bases on the European Standard series EN 50090-x, as was originally developed by the European Standardization body CENELEC. The scope of the SC25 subcommittee is however limited to Home Electronic Systems (HES), strictly speaking the standard is thus only applicable to home automation, so not to the building automation domain, in spite of the fact that KNX is also a popular system in the commercial building market.

Since the early days of KNX, KNX has also been active in European Standardisation for Building Automation. In the Technical Committee TC247 of the European Standardisation body CEN, KNX became a standard as early as 2003. For making KNX also a standard for Building Automation and Control Systems (BACS), the CEN Technical Committee decided to simply reference the EN50090-x series as EN 13321-1. In this committee, also other technologies like LON and BACnet have been standardized as respectively EN ISO 14908-x and EN ISO 16484-5 and -6.

At the time when KNX developed the KNXnet/IP technology, i.e. created the possibility to encapsulate KNX information also in IP messages, KNX decided to standardize this directly in CEN TC247.

It was felt that this technology could perfectly bridge in building automation the world between the KNX technology used at room automation level with the world of superordinate building management and energy management systems. The KNXnet/IP technology thus became a building automation standard in Europe as EN13321-2, enabling such applications as remote configuration, remote operation, fast interface from LAN to KNX and vice versa and WAN connection between KNX systems.

Since then, attempts were made to also internationalise this EN13321-2 standard.

The international counterpart of CEN TC247 committee is ISO TC205, where only the BACnet protocol has been standardised as ISO 16484-5 and -6.

KNX however convinced the Technical Management Committee of ISO to allow the national committee of Germany to submit the KNXnet/IP technology for international standardisation, which has now resulted end of November 2019 in the publication of the EN ISO 22510 standard. This finally rubber stamps the situation in the field, where BACnet and KNX are unquestionably the most popular protocols used in the building automation sector, often used side by side in projects, both having their individual strengths.

As icing on the cake, during the internationalisation of the KNXnet/IP Technology, KNX extended the EN13321-2 standard with the latest evolutions of the technology to become KNX IP Secure, i.e. the KNX solution to authenticate and encrypt messages on IP using AES128 encryption algorithms. By doing so, KNX can now flaunt the first manufacturer and application independent security standard for building automation.