

*Unlocking Smart Building KNX IoT Connectivity*

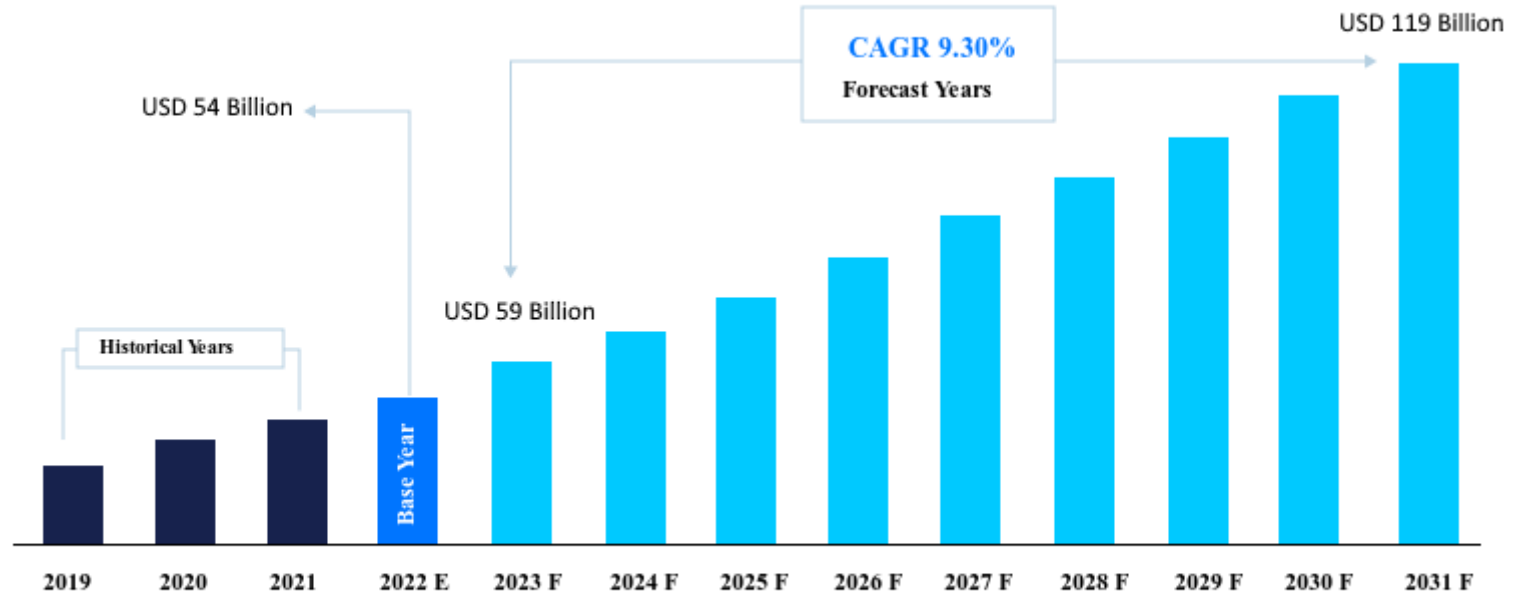
# Agenda

- Why KNX
- KNX IoT
- Configuration Tool: ETS
- Overall System
- Digital twins & KNX
- Summary
- Further reading

# Why KNX

# Why KNX?

## Biggest building automation protocol ~40% mkt share



# KNX - What is it?

- 30+ years in market
  - 500+ manufacturers, >8k products, 190 countries
- **Specs are worldwide standards (ISO/IEC 14543)**
  - Adopted as EN 50090 (EU), ANSI/ASHRAE 135 (US), GB/T 20965 (CN)
- **Twisted pair cabling**
  - e.g. separate (green cable) wiring between the devices
- **Distributed publish subscribe**
  - Devices listen & publishes data on the wire
  - One component failing does not bring the installation down
- **Configuration tool (ETS)**
  - Developed & supported by KNX
  - 500 Training centres, >100k installers

# KNX IoT

# KNX IoT - What is it?

Addition to KNX TP/IP, e.g. enhancing KNX with:

- IPv6 based communication
  - Runs over existing IT transports:
    - such as *Thread*, Wi-Fi, PoE & Ethernet
    - no green wires needed anymore!
- **Secure by design: Secure communications mandated**
  - Can even run over public ethernet: end to end encryption of all data
- **Semantic equivalent to KNX TP and IP**
  - No change in how to use & configure the devices



- KNX IoT specification has been written using IETF technology:
  - Transport layer: IPV6 using CoAP
  - Payload formatting: using CBOR
  - Security using SPAKE and OSCORE
- Includes a KNX IoT Router specification to communicate between TP & IoT devices
  - No need for proprietary Gateways to map proprietary addresses to IP address/port





# Configuration Tool: ETS

# ETS 6.2+ support for KNX IoT



- Adding Devices to KNX IoT area/line
- Linking similar as TP devices

Linking:

- TP <-> IoT

Needs:

- KNX IP router
- KNX IoT router

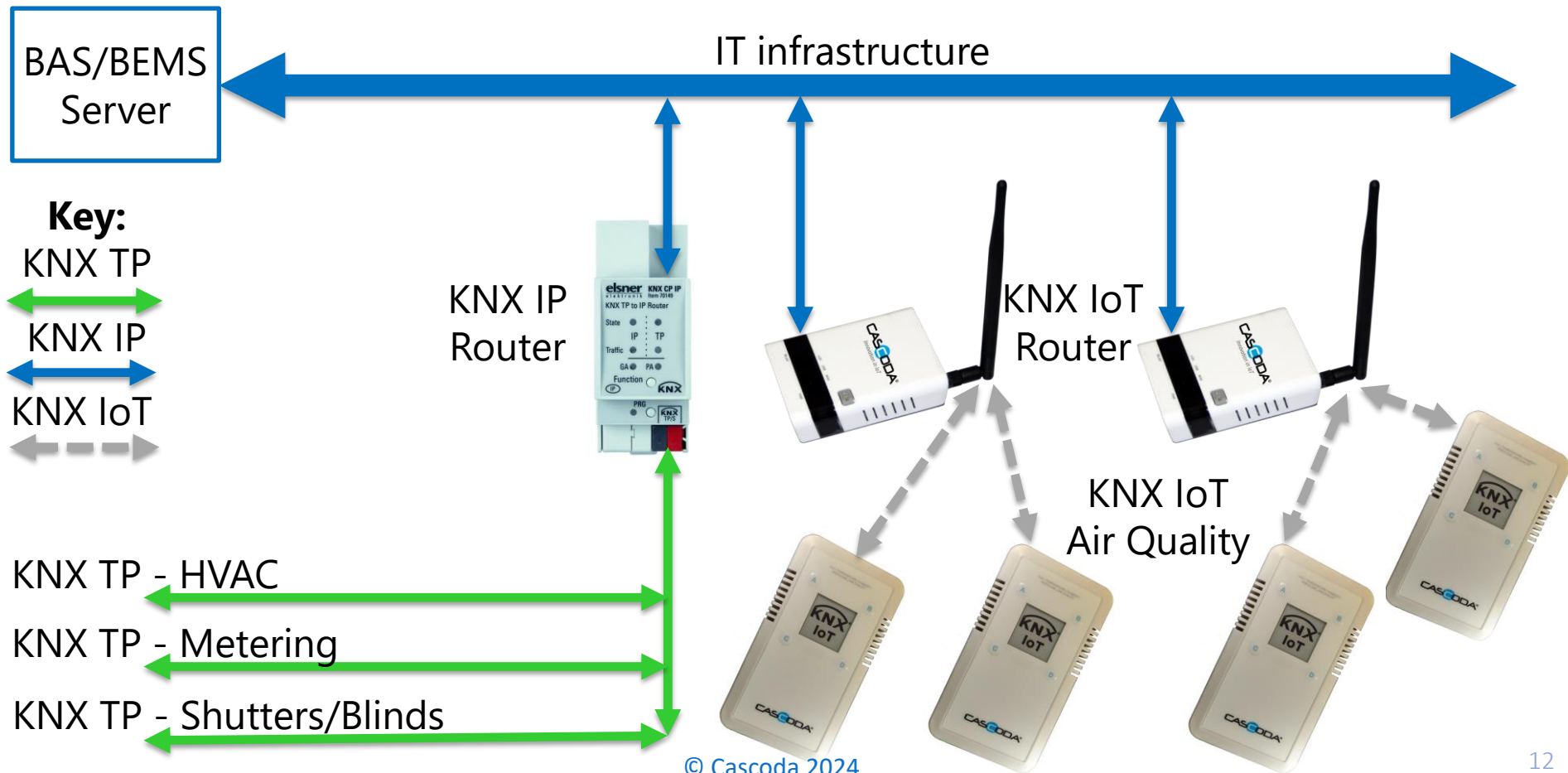
The screenshot displays the ETS 6.2+ software interface for configuring a KNX IoT system. The main window is titled 'L&B TP - IoT In...' and shows a project structure on the left with folders for 'Buildings', 'Search Folders', and 'Trades'. The central pane shows a table of devices with columns for 'Se', 'Address', 'Room', 'Descriptive Application Program', 'Adr', 'Prg', 'Par', 'Grp', 'Cfg', 'Manufacturer', 'Order Num', and 'Product'. The table lists several devices, including 'KNX CP IP', 'Switching, Staircase 4-fold', 'Push button 6f / Plus', 'KNX IoT router', and 'KNX Relay Click'. The bottom pane shows a table of channels with columns for 'Se', 'Number', 'Name', 'Object Function', 'Linked with', 'Other Linked', 'Length', 'C', 'R', 'W', 'T', 'U', 'Data Type', and 'Priority'. The table lists four channels, including 'OnOff R1', 'InfoOnOff R1', 'OnOff R2', and 'InfoOnOff R2'. The bottom right corner of the interface includes the text '© Cascoda 2024'.

Se	Address	Room	Descriptive Application Program	Adr	Prg	Par	Grp	Cfg	Manufacturer	Order Num	Product
1.1.0			KNX CP IP	✓	✓	✓	✓	✓	Etner Elektronik GmbH	70149	KNX TP to IP Router
1.1.1			Switching, Staircase 4-fold	✓	✓	✓	✓	✓	MDT technologies	AKS-0416...	AKS-0416.03 Switch Actuator 4-fold, 4SU, 1...
1.1.2			Push button 6f / Plus	✓	✓	✓	✓	✓	MDT technologies	BE-TA55P...	BE-TA55P6.01 Push button 6-fold / Plus
1.2.0			KNX IoT router	✓	✓	✓	✓	✓	CASCODA	0006	KNX IoT router
1.2.1			KNX Relay Click	✓	✓	✓	✓	✓	CASCODA	0005	KNX Relay Click
1.2.2			KNX Switching example	✓	✓	✓	✓	✓	KNX Association	KNXSwitc...	KNX Switching example

Se	Number	Name	Object Function	Linked with	Other Linked	Length	C	R	W	T	U	Data Type	Priority
1		OnOff R1	IN url/p/1 dpa.417.61	0 New main gro...		1 bit	C	-	W	-	U	switch	Low
2		InfoOnOff R1	OUT url/p/2 dpa.41...	0 New main gro...		1 bit	C	R	-	T	-	switch	Low
3		OnOff R2	IN url/p/3 dpa.417.61	0 New main gro...		1 bit	C	-	W	-	U	switch	Low
4		InfoOnOff R2	OUT url/p/4 dpa.41...			1 bit	C	R	-	T	-	switch	Low

# Overall system

# KNX TP system + KNX IoT Air Quality



# Digital Twin & KNX

Projects can be created off line by ETS:

- Device behaviour is already standardized
  - It can facilitate simulation a end device
  - Virtual devices simulate the actual end device
- Using the ETS configuration tool to configure a virtual setup can emulate a building automation system
  - Multiple (different behaviours) virtual devices
  - Hardware IoT Router(s) and IP Routers for backhaul

# Summary

# Summary

- **KNX IoT uses IPv6**
  - IT infrastructure carries KNX IoT
  - Native support for Thread-mesh and ultra-low-power sleepy devices
- **KNX IoT interoperates seamlessly with existing KNX TP (wired) & KNX IP infrastructure**
  - KNX IoT uses IP Routers not Gateways
    - Gateways are proprietary as standards between protocols are weak
- **Commissioning and configuring is done by ETS, made & supported by the KNX association for 30+ years**
  - All 8,000 KNX devices ever certified can be configured & interoperate
- **Digital Twinning**
  - Virtual Devices, KNX IoT Routers & IP Routers already exist  
.....possibility for future collaborative work!



# Further Reading

# Further Reading

## **KNX Today Articles:**

[KNX IoT: Part 1 – an introduction](#)

[KNX IoT: Part 2 – the advantages of Thread](#)

[KNX IoT: Part 3 – the fundamentals of KNX IoT devices](#)

[KNX IoT: Part 4 – the architecture of KNX IoT devices](#)

[KNX IoT: Part 5 – creating a heterogeneous installation by using a KNX IoT Router](#)

[KNX IoT: Part 6 – using Thread for KNX IoT](#)

[KNX IoT: Part 7 – the open-source KNX IoT stack](#)

## **YouTube Videos:**

[KNX IoT with KNX Classic Interoperability Demo with ETS6](#)

[Packet Sniffer Quality Metrics](#)

# Contact us



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