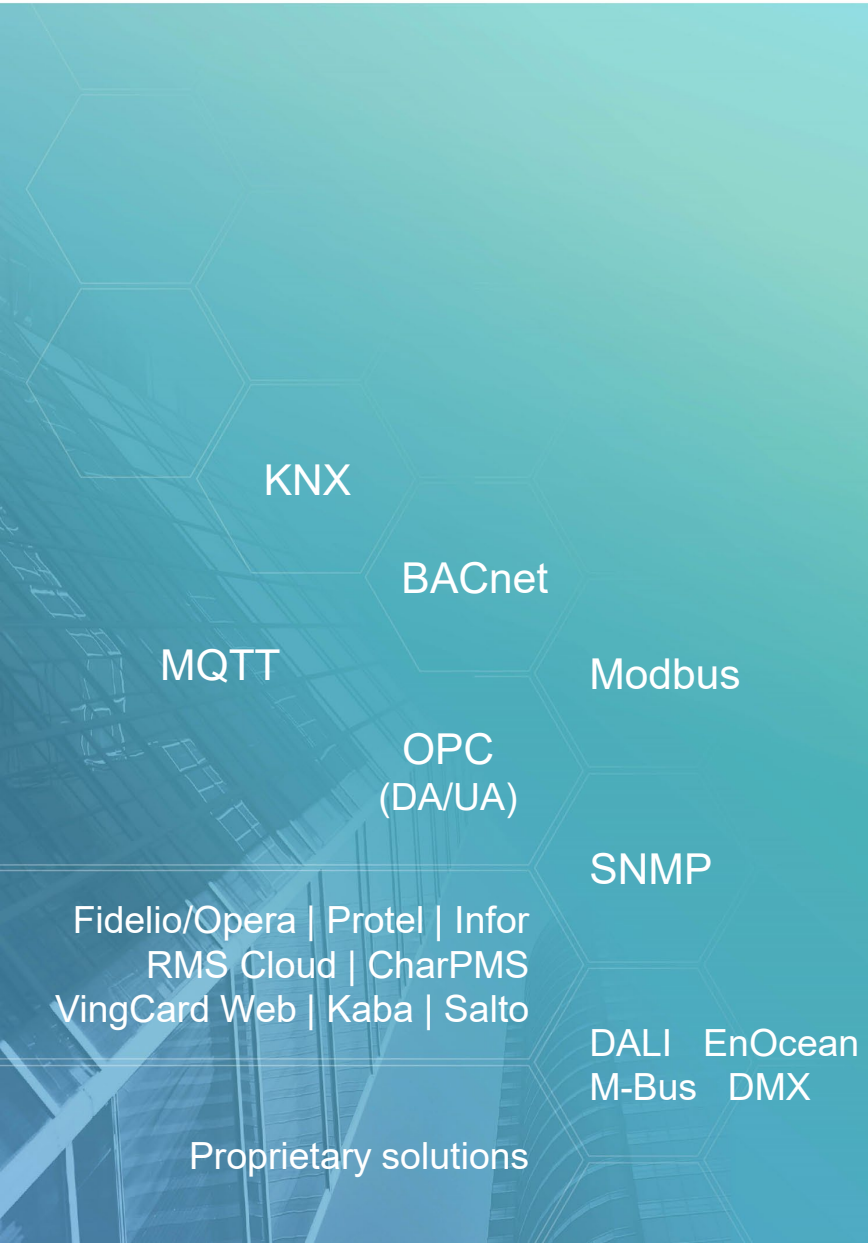
NETx AUTOMATION



All-in-one

Building management software for medium-sized and enterprise building automation projects

Building automation systems

NETxAutomationSoftware GmbH

Austrian, globally active company
–
founded in 2001

Our customers

- Electrical planner
- Electricians
- System integrators

20
years of experience

100+
countries represented

100,000+
projects with over 100,000 data points

6,000+
active licenses

40
intern. sales- and R&D Partner

Software solutions for building automation systems

Management applications: visualization, energy reporting, automatic shading control, lighting control, project support

Integration of heterogeneous building automation networks: building management system platform (BMS Platform), OPC server

Building automation systems

Building Automation Systems (BAS)

aim at improving control and management of mechanical and electrical systems in buildings

Modern BAS are distributed systems

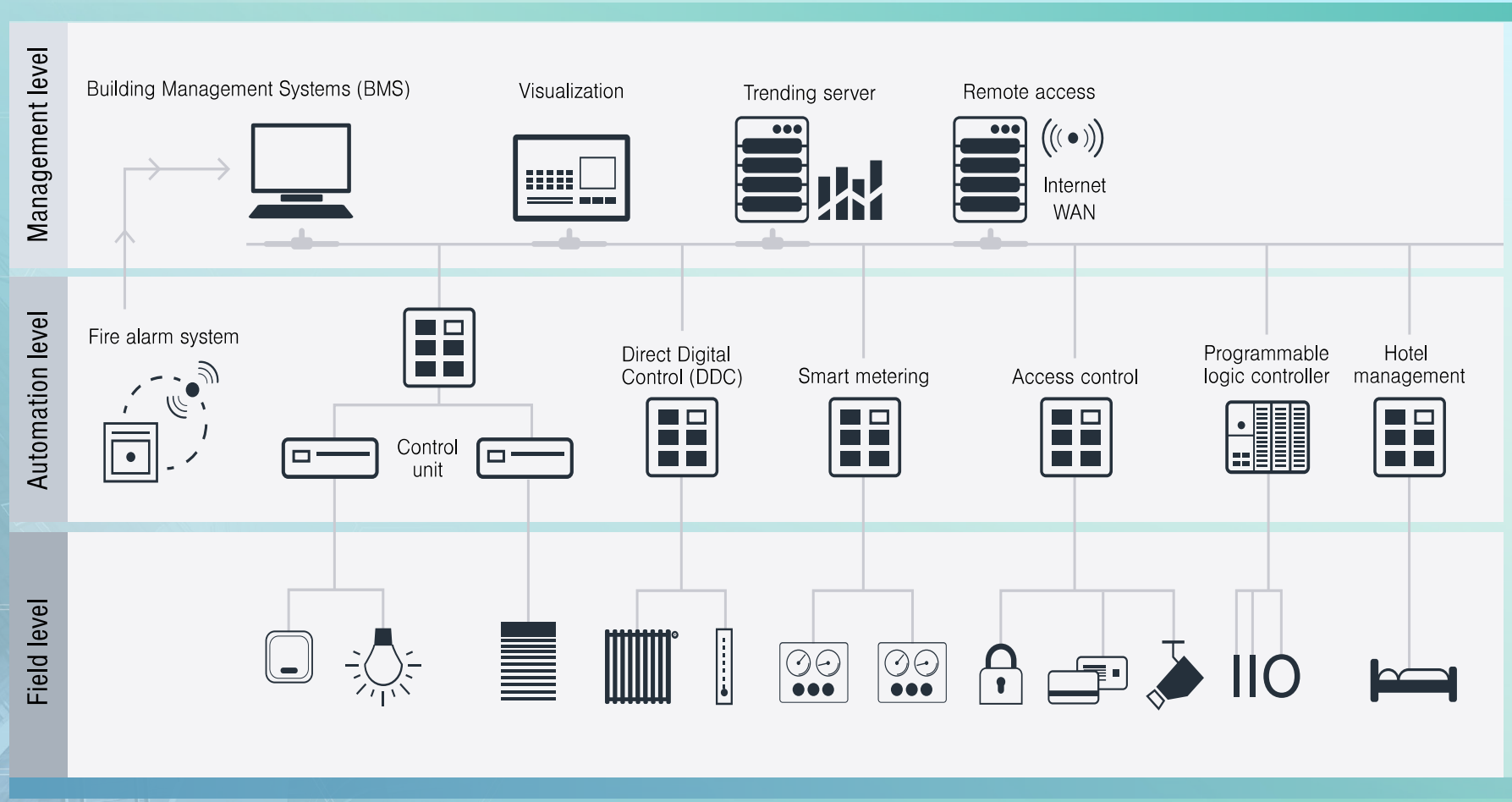
where embedded devices are connected via computer networks to exchange information and data

Core application areas are lighting/shading and heating, ventilation, and air conditioning (HVAC)

Today other application domains are integrated too

- Security systems (access control, CCTV, security alarm systems, ...)
- Safety systems (fire alarm systems, water leakage detection, CO2 monitoring, ...)
- Smart metering and energy management systems
- ...

Building automation systems



Building Management Systems (BMS) are located at the management level to provide management tasks

- Visualization, trending, remote access, alarm management, and other maintenance tasks
- Integration of different subsystems into “all-in-one” solution

Why building automation?

Increase accessibility and usability of the building	Decrease the operational costs	Contribute to environmental protection
Increase user comfort	Decrease costs of maintenance	Decrease energy demand
Safety & Security		Nearly Zero Energy Buildings
Prestige	Decrease costs of used resources (energy efficiency)	Reduce carbon footprint

Increase user comfort

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Prestige		Reduce carbon footprint

"The building shall adapt to the user not the user to the building"

Satisfies the users' desires and needs

Provide applications that let the user feel more comfortable

- **Central control of all building services in an easy way**
  - Visualization on touch panel or smart phone
  - Central commands to turn off light
- **Automatic control functions that are running in background to assist the user**
  - Constant light control
  - Automatic control of blinds and shutters
- **Ambient assisted living**
  - Assist people with disabilities in their daily life

Increase safety and security

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The user shall feel safe and secure within his/her home

Safety applications

- Fire alarm system
- Detection of broken light circuits
- Water leakage detection
- Remote monitoring and control of devices

Security applications

- Access control system
- Security alarm system
- CCTV systems
- Presence simulation

Prestige

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Additional social benefit

“My house, my car,
my building automation system”

Advanced applications

- Control your smart home/building from your smartphone
- Personalized visualization tailored to your desires

Use latest technologies

- Impress your guests with your smart home/building

Decrease operational costs

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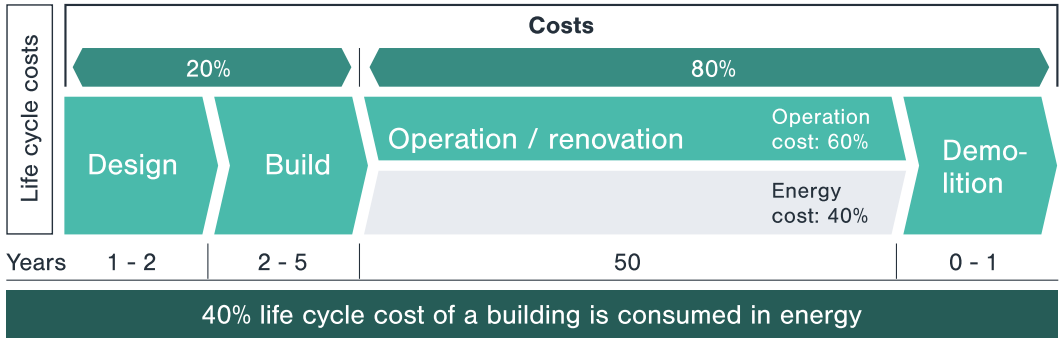

The life cycle of the building has to be considered

80% of overall costs are operational costs!

- Costs of maintenance
- Costs for energy and resources

Decrease operational costs of maintenance

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Central Building Management System (BMS)

Central point of control using visualization and SCADA applications

Enhanced applications that increase of efficiency of maintenance

- Improve the maintenance interval of devices by monitoring operating hours
- Location-based services for finding defective devices
- Alarm management with messaging service
- Trending and monitoring of data points

“All-in-one” solution: many different systems – one Application

- Reduced personal costs for maintenance
- Reduced training costs
- Reduced costs for software maintenance

Decreasing energy costs

Increase accessibility and usability of the building	Decrease the operational costs	Contribute to environmental protection
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Safety & security	Decrease costs of used resources (energy efficiency)	Nearly Zero Energy Buildings
Prestige		Reduce carbon footprint

A major part of the operation costs are energy costs

- Electricity
- Heating
- Water
- ...

Buildings must use the available resources in an efficient way in order to decrease costs

- Energy management
- Smart metering
- Smart building
- Smart city

Enviromental protection

Increase accessibility and usability of the building	Decrease the operational costs	Contribute to environmental protection
Increase user comfort	Decrease costs of maintenance	Decrease energy demand
Safety & security	Decrease costs of used resources (energy efficiency)	Nearly Zero Energy Buildings
Prestige		Reduce carbon footprint

Today energy-efficient buildings are a must!

- Regulated by law!
- 2002/91/EU, 2010/31/EU: Energy performance of buildings directive
- EN-15232: Energy performance of buildings: Impact of building automation, controls, and building management
- Other directives and national regulations exist too

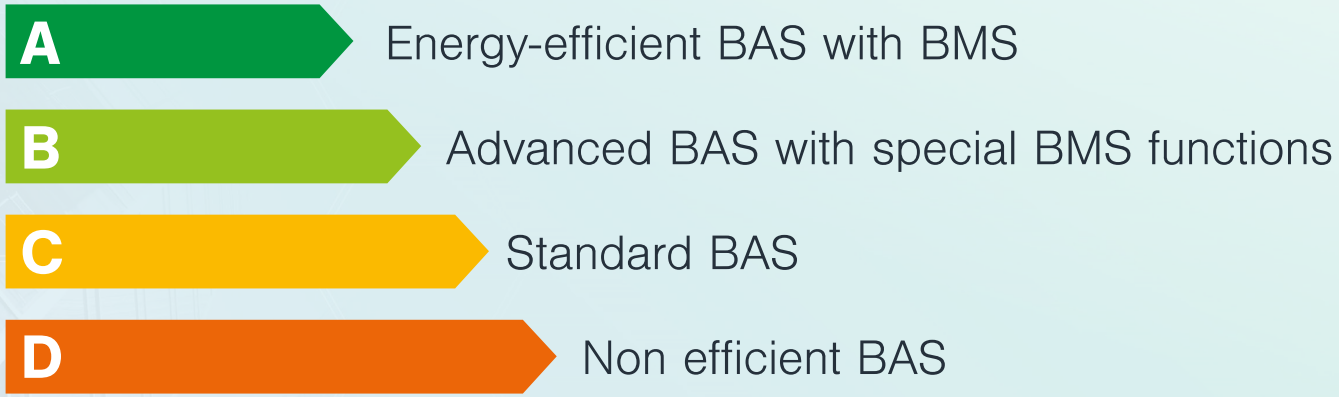
Modern buildings must be sustainable and energy-efficient

- Decrease energy demand
- Decrease carbon footprint
- Use renewable energy resources
- Nearly Zero Energy Building (NZEB)
- Nearly Zero Emission Building

Impact of BAS and BMS

EN 15232: Impact of building automation, controls, and building management

Defines different classes for energy performance of building



Class A and B are not possible without BAS and BMS!

Increasing energy efficiency

Increase in the energy efficiency of buildings has two advantages	How can the energy efficiency of building be improved?
• Decrease the energy costs and thus the operational costs • Contributes to environmental protection	$C = \frac{D}{\eta}$ C ... $Consumption$ D ... $Demand$ n ... $Performance$

Increase performance

Acting on the performance of equipment and processes	Use the best available technologies
$C = \frac{D}{\eta\uparrow}$ C ... $Consumption$ D ... $Demand$ n ... $Performance$	• LED • Substituting heating devices with poor efficiency • Use ventilation systems (enthalpy recovery, ...)

Decrease demand

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Improving the consumption habits of the users

Use smart metering to show the user the actual consumption (know2reduce)

$$C = \frac{D\downarrow}{\eta}$$

C ... $Consumption$
D ... $Demand$
n ... $Performance$

Core application areas	Today other application domains are integrated too	Modern BAS are distributed systems

Using building automation

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Get a high reduction of the demand actively

Depending on

- the real use (presence, schedules, special needs, ...)
- external conditions (temperature, light, humidity, ...)
- bioclimatic criteria (orientation, position of the sun, shadows)

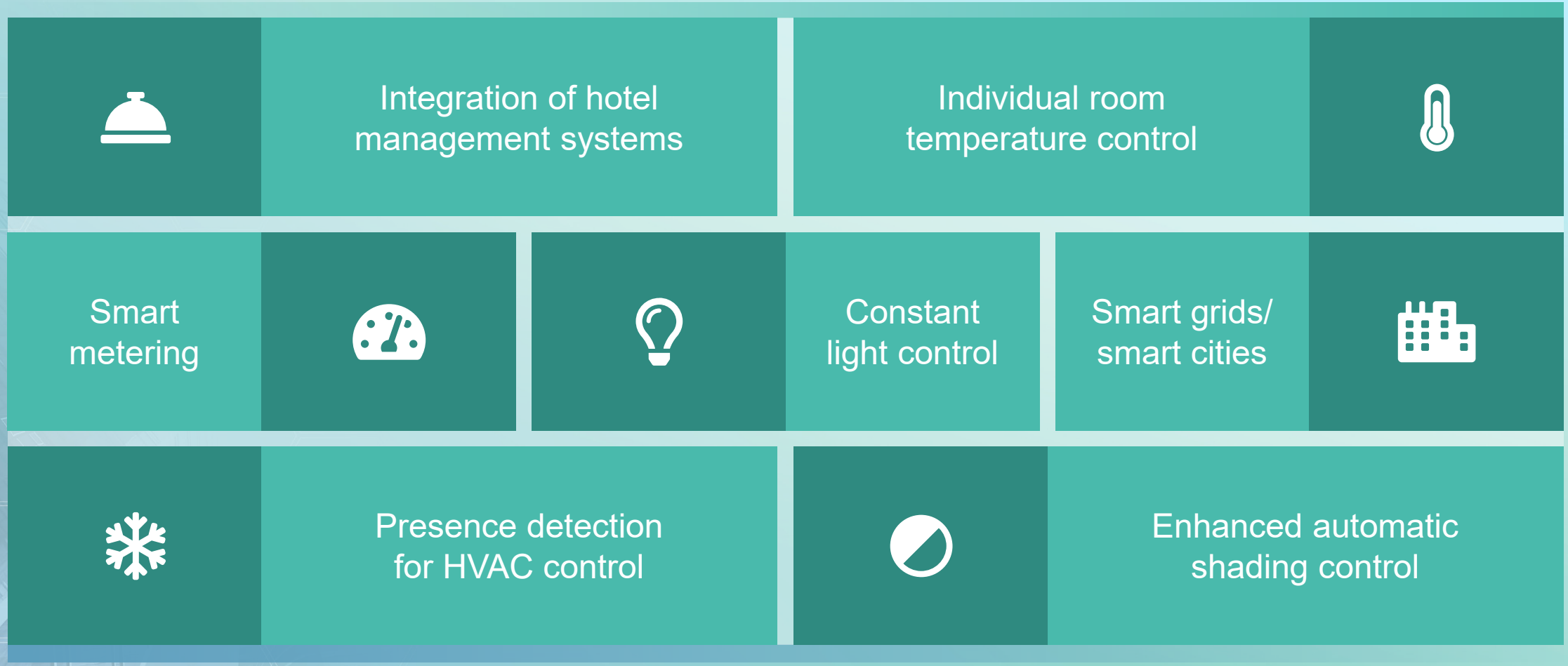
$$C = \frac{D\downarrow\downarrow}{\eta}$$

C ... $Consumption$
D ... $Demand$
η ... $Performance$

Use BAS to provide enhanced applications that decrease the demand actively

- Key component is BMS that has global view of all sub-systems, devices, and data
- Integration of subsystems and aggregating data and information to provide advanced applications

Enhanced applications: examples



Constant light control

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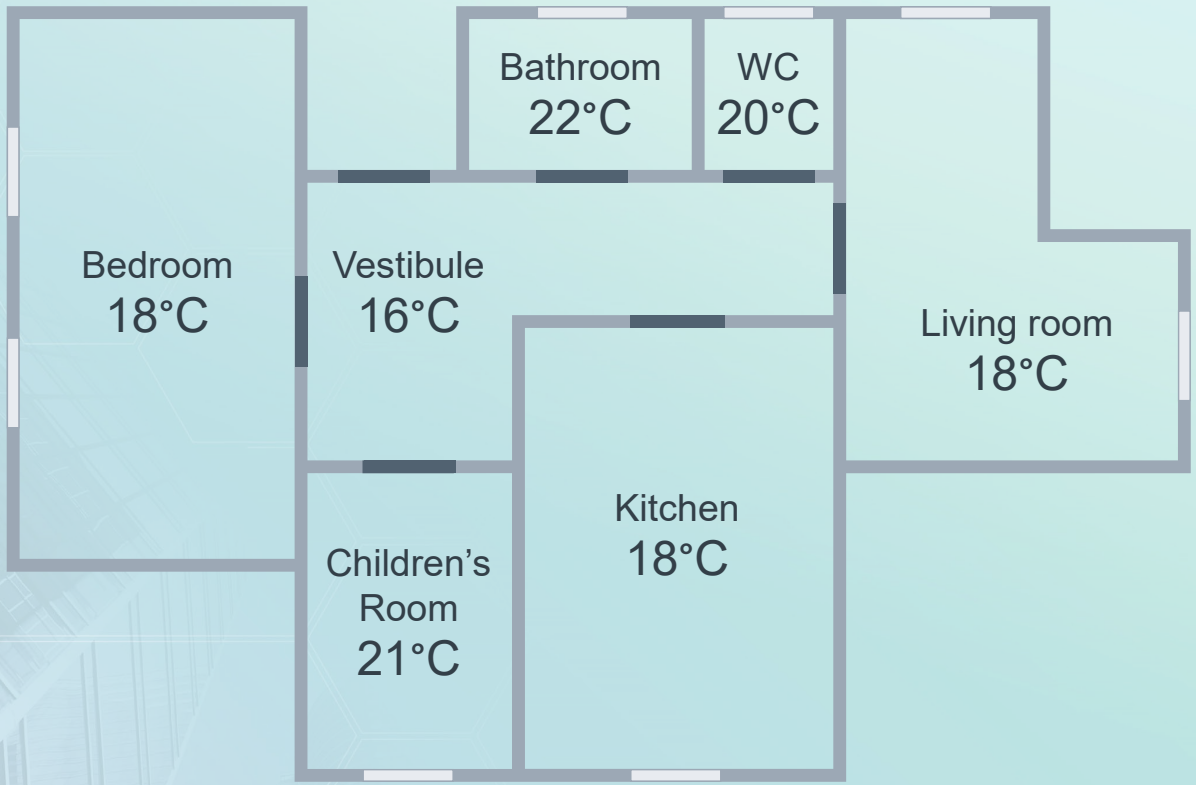
10:00 am	16:00 pm	19:00 pm
		
Consumption estimation: 33% of installed capacity	Consumption estimation: 57% of installed capacity	Consumption estimation: 100% of installed capacity

Constant light control

In 14 hours (8:00 am to 22:00 pm) only 55% of the installed power used

Presence detection as additional input	Decreases energy consumption (between 30% and 40% of savings)
Increases user comfort	Required for Class A

Individual room temperature control

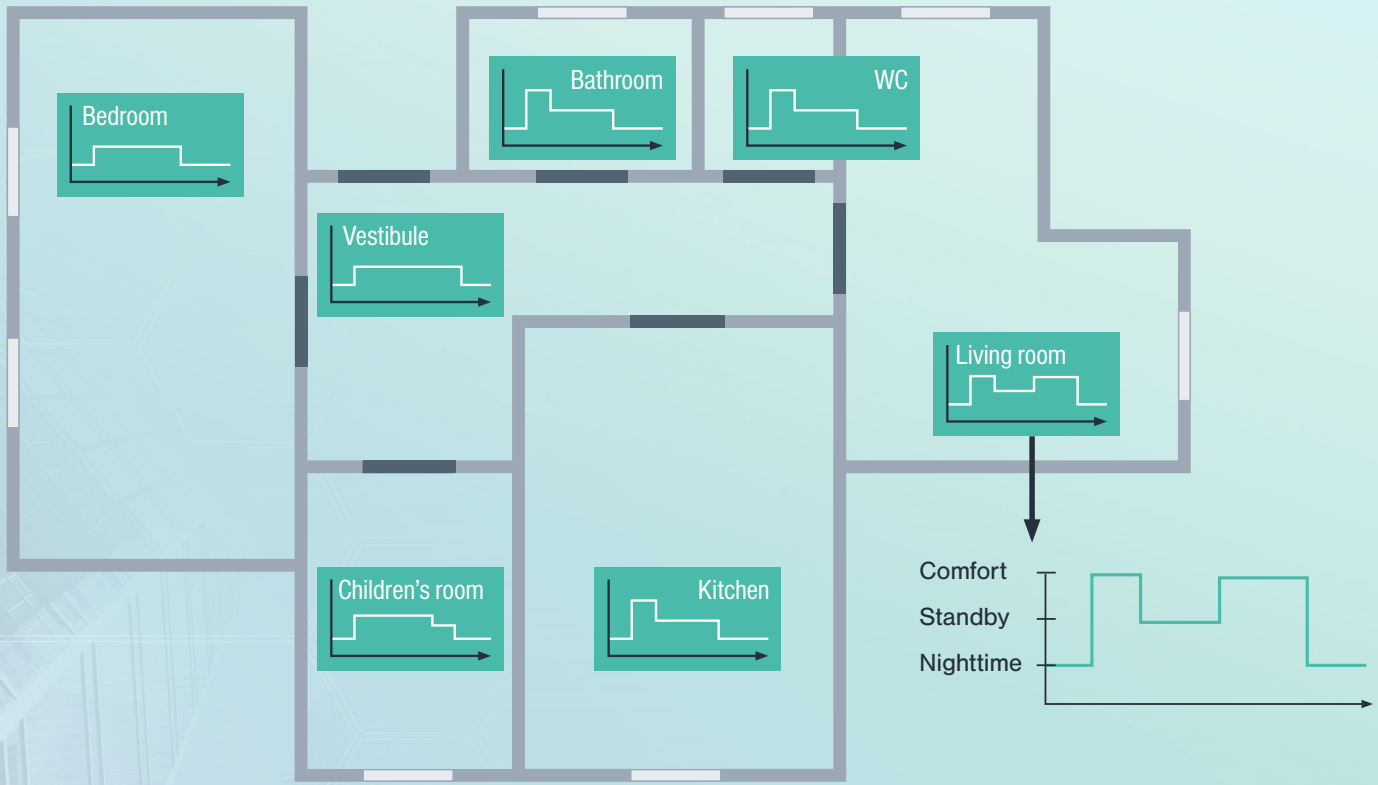


Decreases energy consumption
(about 30% of savings)

Increases user comfort
(each habit can set
its own set point)

Required for Class B

Presence detection for HVAC control



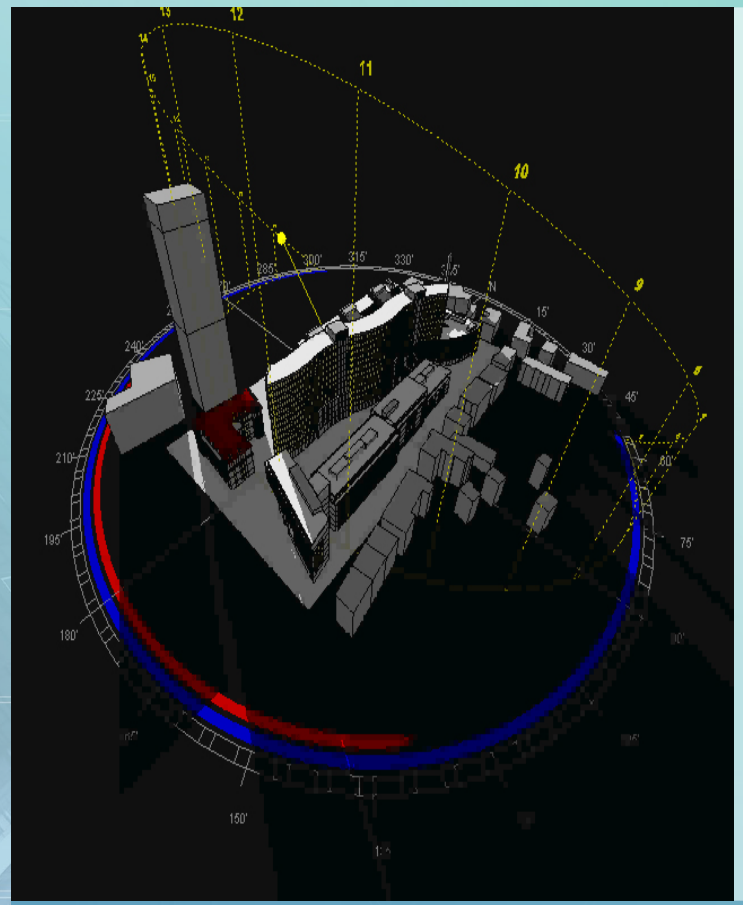
In addition to individual room control

Presence (or even amount of people) within a room controls the HVAC system

- Presence detector of lighting control can be reused

Required for Class A

NETx Shutter Control - enhanced automatic shading control



3D model of building + neighbor building and surrounding environment

Simulation to calculate optimal position of blinds and their slats

Current weather data + additional inputs are used together with simulated data to control blinds in real time

Decreases energy demand for HVAC system

Increases user comfort

Required for Class B and Class A

Integration of hotel management systems

Check-in/check-out information can be used to control HVAC system of hotel rooms

- Check-in -> HVAC control is set to “Comfort Mode”
- Check-out -> HVAC control is set to “Eco Mode”

Decreases energy consumption

Increases user comfort

Smart metering

Measurement of the consumption value of the used energy resource is the basis for all energy management applications

- Monitoring for smart metering data (improving the
- consumption -> know2reduce)

- Analysis and comparison of smart metering data
- (identifying saving measurements, cost calculation)

- Reacting on smart metering data (e.g. load balancing)

Smart metering data is important input for smart grids

Smart cities

Integration of different technologies, systems, and application domains

Interconnection via Wide Area Network (WAN)

Interact with smart grid, offer interfaces to the grid

Focus on the total building environment (NZEB,. ..)

Involve all field which effect living, citizens, …

Challenges for providing BMS solutions

Enhanced applications can only be provided if all subsystems are connected to BMS

- Integration is of utmost importance

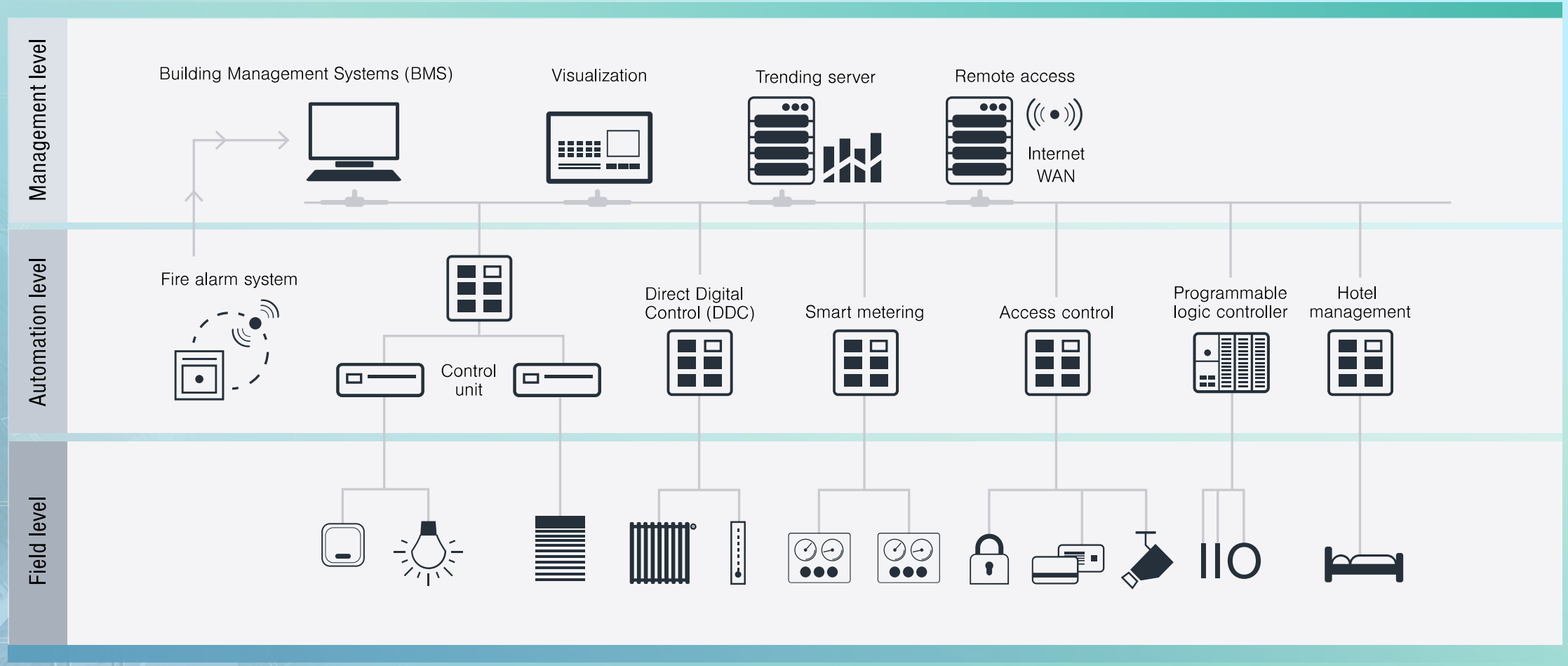
Building automation systems are Heterogeneous

- Many different technologies are used
- Each technology has its characteristics and its own way to represent and process control data
- Integration is a complex task

Sophisticated BMS solution is necessary

BMS is mandatory for Class B and Class A of EN 15232

Building Automation



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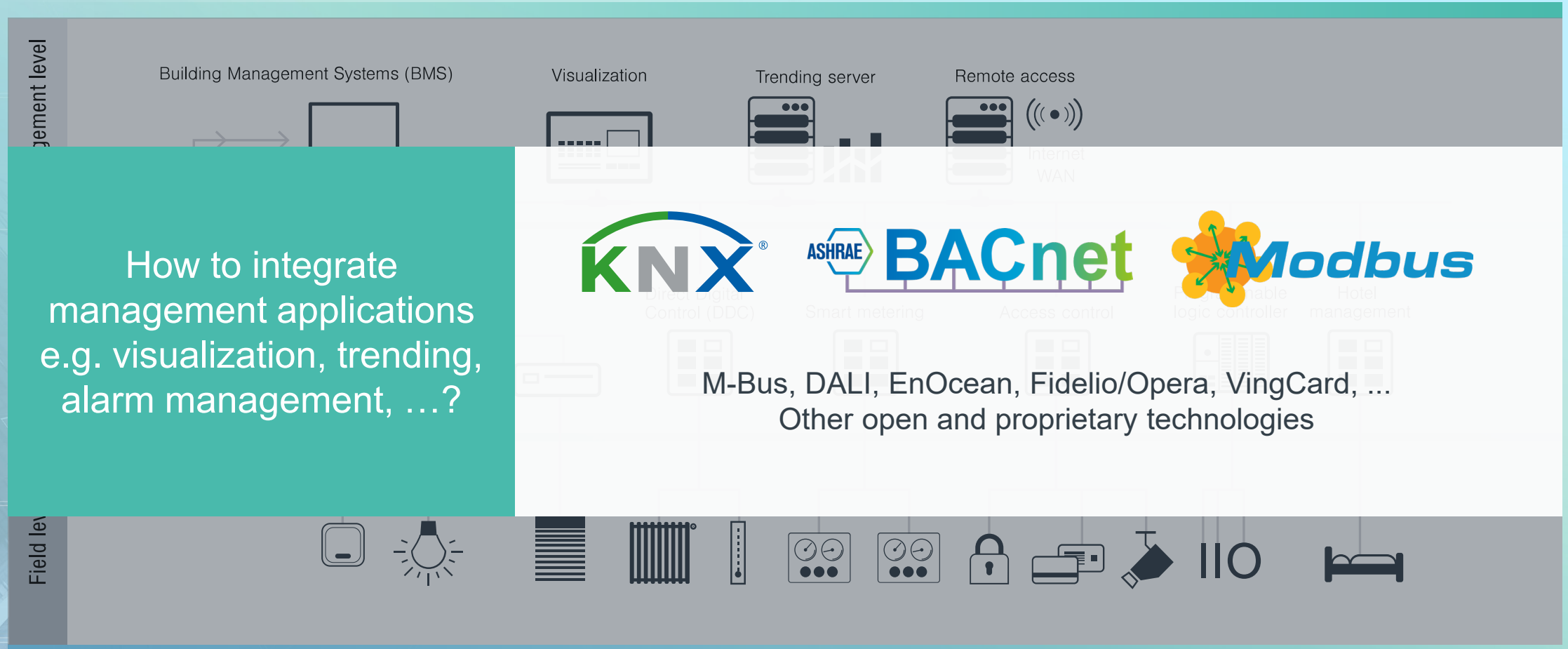
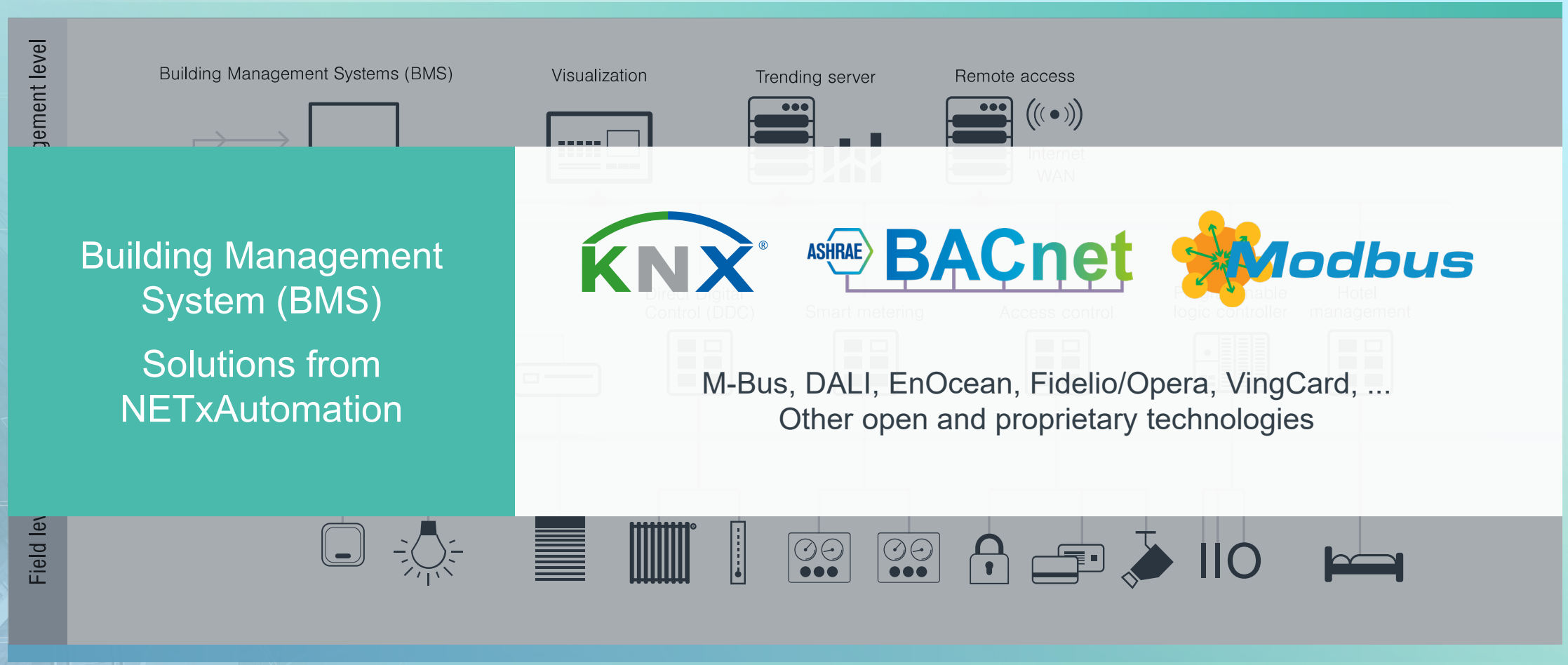
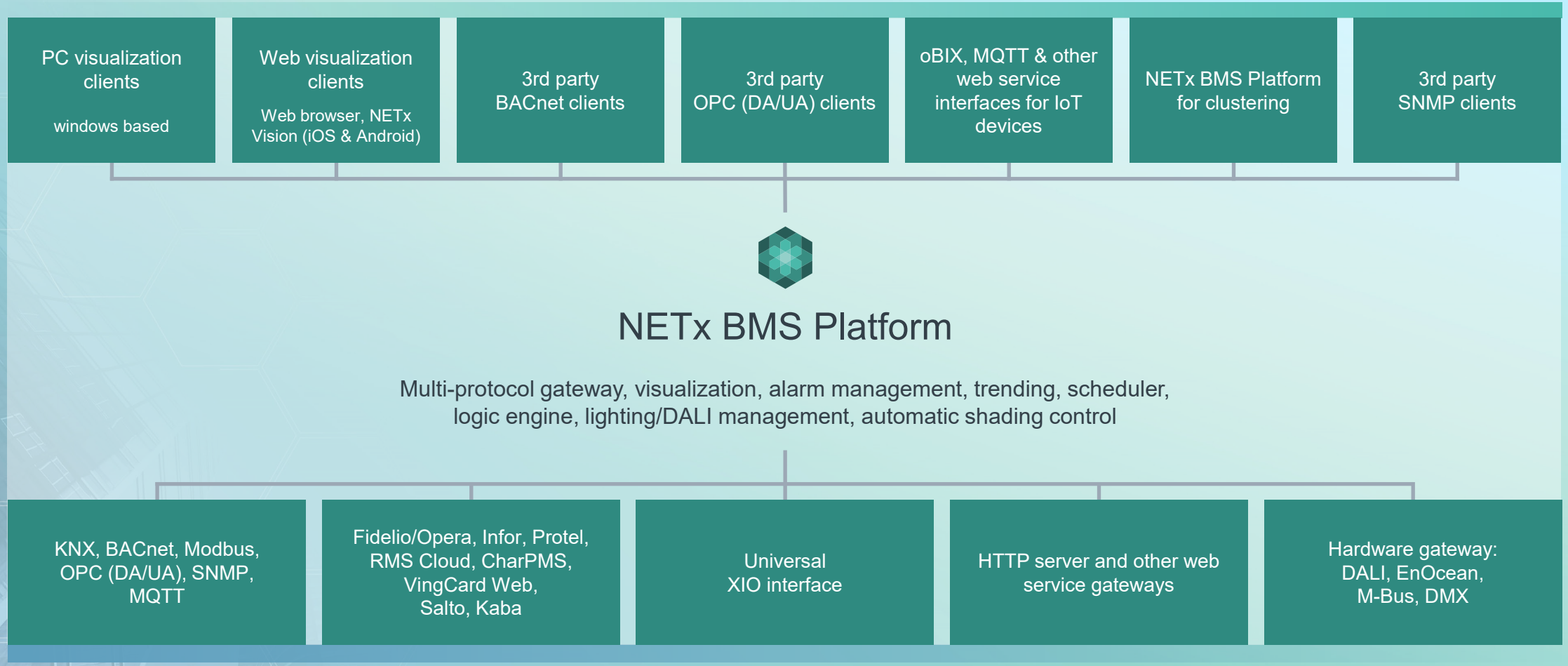


Building Automation



NETx BMS Platform



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