

Desigo CC™
Clik AS
Rand ja Tuulberg Ehitus AS
Caverion
Vamos Automaatika OÜ
AU Energiateenus OÜ
Simplex OÜ
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Telegrupp AS Ainult FSP osa

Desigo ™
'HTS Automaatika OÜ
AutomatiC OÜ
Kaandar OÜ
Controsys OÜ
jt

Intelligence

Performance

Con

EESTI STANDARD EVS-EN 15232-1:2017

Desigo CC provid sight

- Real-time individual objects
- Power eports/trends for smart de
- De location-independent access on multiple disciplines/buildings/plants

CC allows modular functionality and expansion

uitable from small to large and simple to complex buildings
- Based on global communication standards for investment protection
- Granular profiles for representation and functionality
- Seamless expansion in terms of functionality or devices

Desigo CC facilitates targeted adjustments

- Live system access for configuration and incidents
- Intuitive and consistent interface for low training effort
- Powerful workflows for efficiency and conformance
- Automated procedures for relieve from repetitive tasks

- **BACnet**
- Profibus
- LonMark
- EIB, **Konnex**
- TCP/IP
- OPC-Interface
- ....
- ...
- IoT

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This European Standard specifies:

- a structured list of control, building automation and technical building management functions which contribute to the energy performance of buildings; functions have been categorized and structured according to building disciplines and so called Building automation and control (BAC);
- a method to define minimum requirements or any specification regarding the control, building automation and technical building management functions contributing to energy efficiency of a building to be implemented in building of different complexities;
- a factor based method to get a first estimation of the effect of these functions on typical buildings types and use profiles;
- detailed methods to assess the effect of these functions on a given building.

- Alarming and monitoring functions will support the adaptation of the operation to user needs and the optimization of the tuning of the different controllers. This will be achieved by providing easy tools to detect abnormal operation (alarming functions) and by providing easy way to log and plot information (monitoring functions).

EVS-EN 15232-1:2017

EESTI STANDARD

HOONETE ENERGIATÕHUSUS. OSA 1: HOONE AUTOMAATIKA, JUHTSEADMETE JA HOONEHALDUSE TOIME. MOODULID M10-4,5,6,7,8,9,10

4	Ventilation and air-conditioning control		
	This section is for building energy systems that bring air into the building: both ventilation and air conditioning systems. Heating and Cooling of air requires additional heating and cooling devices. Control functions related to heating/cooling systems are defined in sections 1 and 3 resp.		
4.1	Supply air flow control at the room level (e.g. fan on/off)	VENT_RMFLOW_CTRL	M5–5
	Control of supply air flow related to occupancy (availability of air flow, i.e. fan on/off control)).		
	0	No automatic control: The system runs constantly (e.g. manual controlled switch)	
	1	Time control: The system runs according to a given time schedule	
	2	Occupancy detection: The system runs dependent on the occupancy (light switch, infrared sensors etc.)	
4.2	Room air temperature control by the ventilation system (all-air systems; combination with static systems as cooling ceiling, radiators, etc.)	VENT_RTEMP_CTRL	M5–5 / M5–6
	Room air temperature depends on air flow (4.1, 4.5) as well as supply air temperature (4.9). This control function is related to a closed loop controller for the room air temperature acting on the air flow or supply air temperature. It can work with or without an additional static heating system (radiators etc.). Minimum air flow rates are maintained.		
	0	On-off control: fixed air flow rate and fixed supply air temperature at the room level: Room temperature setpoints are set individually.	
	1	Continuous control: either air flow rate or supply air temperature at the room level can be varied continuously ; Room temperature setpoint s are set individually	
	2	Optimized control: Minimum energy demand by optimized control. Both air flow rate as well as supply air temperature at the room level are controlled dependent on heating/cooling load.	
4.3	Coordination of room air temperature control by ventilation and by static system	VENT_RTEMP_COORD	M5–5 / M5–6
	Interaction of the different systems has to be coordinated.		
	0	Interaction is not coordinated, e.g. closed loop controllers are dedicated to each system to maintain the room air temperature independently.	
	1	Interaction is coordinated, i.e. only one system is controlled by a closed loop controller for the room air temperature and the other system conditions the room only to that extent that allows the closed loop controller to benefit from internal and external heat gains.	

Definition of classes		Residential		Non residential	
Ventilation and air-conditioning control					
Supply air flow control at the room level					
0	No automatic control	x			
1	Time control	x	x	x	
2	Occupancy detection	x	x	x	x
Room air temp. control (all-air systems)					
0	on-off control	x			
1	variable control	x	x		
4	Demand control	x	x	x	x
Room air temp. control (Combined air-water systems)					
0	No coordination	x			
1	Coordination	x	x	x	x

D C B A

Supply air temperature control					
0	No automatic control	x			
1	Constant setpoint	x	x		
2	Variable setpoint with outside temperature compensation	x	x	x	
3	Variable setpoint with load dependant compensation	x	x	x	x

Supply air temperature control					
0	No automatic control	x			
1	Constant setpoint	x	x		
2	Variable setpoint with outside temperature compensation	x	x	x	
3	Variable setpoint with load dependant compensation	x	x	x	x
		D	C	B	A

Ventilation and air-conditioning control					
Supply air flow control at the room level					
0	No automatic control	x			
1	Time control	x	x	x	
2	Occupancy detection	x	x	x	x
Room air temp. control (all-air systems)					
0	on-off control	x			
1	variable control	x	x		
4	Demand control	x	x	x	x
Room air temp. control (Combined air-water systems)					
0	No coordination	x			
1	Coordination	x	x	x	x

4.3

Continuous control: either air flow rate or supply air temperature at the room level can be varied continuously ; Room temperature setpoint s are set individually	
Optimized control: Minimum energy demand by optimized control. Both air flow rate as well as supply air temperature at the room level are controlled dependent on heating/cooling load.	
Interaction of the different systems has to be coordinated.	
0	Interaction is not coordinated, e.g. closed loop controllers are dedicated to each system to maintain the room air temperature independently.
1	Interaction is coordinated, i.e. only one system is controlled by a closed loop controller for the room air temperature and the other system conditions the room only to that extent that allows the closed loop controller to benefit from internal and external heat gains.

4.4	Outside air flow control	VENT_OAFLOW_CTRL	M5–6 / M5–8
	This control function is applied to ventilation systems that allow varying the OA ratio or flow respectively.		
	0	Fixed OA ratio/OA flow: The system runs according to a given OA ratio, e.g. modified manually.	
	1	Staged (low/high) OA ratio/OA flow: depending on a given time schedule	
	2	Staged (low/high) OA ratio/OA flow: depending on the occupancy, e.g. light switch, infrared sensors etc.	
	3	Variable control: The system is controlled by sensors which detect the number of people or indoor air parameters or adapted criteria (e.g. CO_2, mixed gas or VOC sensors). The used parameters shall be adapted to the kind of activity in the space.	
4.5	Air flow or pressure control at the air handler level	VENT_AHUFLOW_CTRL	M5–6 / M5–8
	0	No automatic control: Continuously supplies of air flow for a maximum load of all rooms	
	1	On off time control: Continuously supplies of air flow for a maximum load of all rooms during nominal occupancy time	
	2	Multi-stage control: To reduce the auxiliary energy demand of the fan	
	3	Automatic flow or pressure control without pressure reset: Load dependent supplies of air flow for the demand of all connected rooms.	
	4	Automatic flow or pressure control with pressure reset: Load dependent supplies of air flow for the demand of all connected rooms (for variable air volume systems with VFD).	

Outside air (OA) flow control					
0	Fixed OA ratio/OA flow	x	x		
1	Staged (low/high) OA ratio/OA flow (time schedule)	x	x	x	
	Staged (low/high) OA ratio/OA flow (occupancy)	x	x	x	
	Variable control	x	x	x	x

Air flow or pressure control at the air handler level					
0	No automatic control	x			
1	On off time control	x	x		
2	Multi-stage control	x	x	x	
3	Automatic flow or pressure control (without reset)	x	x	x	x
4	Automatic flow or pressure control (with reset)	x	x	x	x

Supply air temperature control at the AHU level	VENT_AHUSAT_CTRL	M5-5

There might be several supply air temperatures in an air conditioning system: the supply air temperature at the outlet of the AHU, the supply air temperature at the outlet of central re-heaters as well as supply air temperature at the room level (terminal re-heat boxes). This control function is about how to determine the supply air temperature setpoint (in case there is one) at the air handler level not how to control the temperature (e.g. control of heat emission at the water-to-air HX).

0	No automatic control: No control loop enables to act on the supply air temperature;
1	Constant setpoint: A control loop enables to control the supply air temperature, the setpoint is constant and can only be modified by a manual action
2	Variable setpoint with outside temperature compensation: A control loop enables to control the supply air temperature. The setpoint is a simple function of the outside temperature (e.g. linear function)
3	Variable setpoint with load dependent compensation: A control loop enables to control the supply air temperature. The setpoint is defined as a function of the loads in the room. This can normally only be achieved with an integrated control system enabling to collect the temperatures or actuator position in the different rooms

Humidity control	VENT_HUM_CTRL	M6-5 / M7-5

The control of the air humidity may include humidification and/or dehumidificati
Controllers may be applied as "humidity limitation control" or "constant control"

0	No automatic control: No control loop enables to act on the air humidity
1	Dew point control: Supply air or room air humidity is expressed with the d point temperature and reheat of the supply air to bring the relative humid to the setpoint
2	Direct humidity control: Supply air or room air humidity; a control lo enables the supply air or room air humidity at a given setpo is either fixed and predefined by the user or an fluctuating optimal value a minimum energy but within min/max limits of room air condition

Supply air temperature control					
0	No automatic control	x			
1	Constant setpoint	x	x		
2	Variable setpoint with outside temperature compensation	x	x	x	
3	Variable setpoint with load dependant compensation	x	x	x	x

Ventilatsioon
SP seadme tase

Air flow or pressure control at the air handler level					
0	No automatic control	x			
1	On off time control	x	x		
2	Multi-stage control	x	x	x	
3	Automatic flow or pressure control (without reset)	x	x	x	x
4	Automatic flow or pressure control (with reset)	x	x	x	x

BACS üldnõuded 7.3.... 7.6

Detecting faults of technical building systems and providing support to the diagnosis of these faults		BMS_FD	M10-12
0	No central indication of detected faults and alarms		
1	With central indication of detected faults and alarms		
2	With central indication of detected faults and alarms inc functions		
Reporting information regarding energy consumption, indoor conditions		BMS_RPR	M10-12
0	Indication of actual values only (e.g. temperatures, meter values)		
1	Trending functions and consumption determination		
2	Analysing, performance evaluation, benchmarking of indoor environment and energy		
Local energy production and renewable energies		BMS_RES	M10-12
Managing local renewable energy sources and other local energy productions as CHP			

0	No central indication of detected faults and alarms	x	x		
1	With central indication of detected faults and alarms	x	x		
2	With central indication of detected faults and alarms/diagnosing	x	x	x	x

0	Indication of actual values only (e.g. temperatures, meter values)	x	x		
1	Trending functions and consumption determination	x	x	x	
2	Analysing, performance evaluation, benchmarking	x	x	x	x



Local energy production and renewable energies					
0	Uncontrolled generation depending on the fluctuating availability of RES and or run time of CHP; overproduction will be fed into the grid	x	x		
1	Coordination of local RES and CHP with regard to local energy demand profile including energy storage management; Optimization of own consumption	x	x	x	x
Waste heat recovery and heat shifting					
0	Instantaneous use of waste heat or heat shifting	x			
1	Managed use of waste heat or heat shifting (including charging/discharging TES)	x	x	x	x
Smart Grid integration					
0	No harmonization between grid and building energy systems; building is operated independently from the grid load	x	x		
1	Building energy systems are managed and operated depending on grid load; demand side management is used for load shifting	x	x	x	x

Definition of classes							
Residential				Non residential			
D	C	B	A	D	C	B	A

VALGUSTUS

5	Lighting control								
5.1	Occupancy control								
	0	Manual on/off switch	x	x			x			
	1	Manual on/off switch + additional sweeping extinction signal	x	x	x		x	x		
	2	Automatic detection (auto on)	x	x	x	x	x	x	x	
	3	Automatic detection (manual on)	x	x	x	x	x	x	x	x
5.2	Light level/Daylight control								
	0	Manual (central)	x				x	x		
	1	Manual (per room/zone)	x	x			x	x		
	2	Automatic switching	x	x	x		x	x	x	
	3	Automatic dimming	x	x	x	x	x	x	x	x

HVAC

Table A.1 — Overall BAC efficiency factors $f_{BAC,th}$ – Non-residential buildings

Non-residential building types	Overall BAC efficiency factors $f_{BAC,th}$			
	D	C Reference	B	A
	Non energy efficient	Standard	Advanced	High energy performance
Offices	1,51	1	0,80	0,70
Lecture hall	1,24	1	0,75	0,5 [a]
Education buildings (schools)	1,20	1	0,88	0,80
Hospital	1,31	1	0,91	0,86
Hotels	1,31	1	0,85	0,68
Restaurants	1,23	1	0,77	0,68
Wholesale and retail trade service buildings	1,56	1	0,73	0,6[a]
Other types - sport facilities - storage - industrial buildings - etc.		1		

[a] These values highly depend on heating/cooling demand for ventilati

Table A.2 — Overall BAC efficiency factors $f_{BAC,th}$ – Residential buildings

Residential building types	Overall BAC efficiency factors $f_{BAC,th}$			
	D	C Reference	B	A
	Non energy efficient	Standard	Advanced	High energy performance
Single family houses	1,10	1	0,88	0,81
Apartment block				
Other residential buildings or similar residential buildings				

Table B.1 — Minimum BAC function type requirement

			Residential	Non-residential
Automatic control				
1	Heating control			
1.1	Emission control			
	2	Individual room control	x	x
1.2	Emission control for TABS (heating mode)			
	1	Central automatic control	x	x
1.3	Control of distribution network hot water temperature (supply or return)			
	Similar function can be applied to the control of direct electric heating networks			
	1	Outside temperature compensated control	x	x
4.1	Supply air flow control at the room level			
	1	Time control	x	x
4.2	Room air temperature control (all-air systems)			
	1	variable capacity control	x	x
4.3	Room air temperature control (air–water systems)			
	0	No coordination		x
	1	Coordination	x	

7	Technical home and building management			
7.1	Setpoint management			
	0	Manual setting room by room individually	x	
	1	Adaptation from distributed/decentralized plant rooms only		x

			Residential	Non-residential
7.2	Run time management			
	0	Manual setting (plant enabling)	x	
	1	Individual setting following a predefined time schedule including fixed preconditioning phases		x
7.3	Detecting faults of technical building systems and providing support to the diagnosis of these faults			
	0	No central indication of detected faults and alarms	x	
	1	With central indication of detected faults and alarms		x
7.4	Reporting information regarding energy consumption, indoor conditions			
	0	Indication of actual values only (e.g. temperatures, meter values)	x	x

No.	EMS requirements according to EN ISO 50001:2011	BACS for EMS in building
	The organization shall define and periodically review its measurement needs. The organization shall ensure that the equipment used in monitoring and measurement of key characteristics provides data which are accurate and repeatable. Records of	The organization considers suitable, multiplex BACS options to achieve and maintain the measurement and monitoring requirements of the EMS within buildings and specifies: An appropriate energy metering plan for
	calibration and other parameters shall be made.	buildings based on BACS to include an energy data repository for storing all types of energy data. It should include data entered at equal intervals (e.g. measured values for every 15 min, 30 min, or 60 min, etc.) and meter readings and also energy-related factors (operating times, occupancy, etc.). BACS measuring principles including calibration to ensure accuracy, high availability and reproducibility of the energy data and records. BACS activities (more or less online and automated) for measurement and monitoring, e.g.: On-going logging and monitoring of the significant energy use and affected energy factors. Summary of significant energy consumption in form of key figures. Compare actual and expected energy consumption, etc. Intervene when deviations from expected energy consumption occur.

POLE KOHUSTUSLIK ANTUD KONTEKSTIS, ENT SELLEST LÄHTUTAKSE

Fault Detection and Monitoring (BMS_FD)

Detecting faults of building and technical systems and providing support to the diagnosis of these faults.

Specific monitoring functions shall be set up to enable to detect quickly the following faults:

a) Improper operation schedules

This is especially necessary in buildings which are not permanently occupied such as offices, schools.

The monitoring function shall include at the minimum a graph or an indicator highlighting the time where: Fans are on, cooling system is running, heating system is in normal mode, lighting is on.

b) Improper set points

Specific monitoring functions shall be set up to enable to detect quickly improper set points of room temperature.

The monitoring function shall include a graph or an indicator enabling to have a global view of the different set points of room temperature for heating and cooling.

c) Simultaneous heating and cooling

If the system can lead to simultaneous heating and cooling monitoring functions shall be set to check that simultaneous heating and cooling is avoided or minimized.

Fast switching between heating and cooling shall also be detected.

d) Priority to generator(s) having the best energy performance

When several generation systems having different energy performances are used to do the same function (e.g. heat pump and back up, solar system and back up) a monitoring function shall be set to verify that the systems having the best energy performances are used before the others.

Reporting (BMS_RPR)

Information regarding energy consumption, indoor conditions and possibilities for improvement.

Report shall be set to report information regarding energy consumption and indoor conditions.

These reports can include:

a) energy certificate for the building;

b) the monitoring function which shall be used to obtain a measured rating as defined in EN 15603:2008, Clause 7.

Using the on line monitoring function enables to obtain a rating fully in conformity with requirements of EN 15603:2008. Measurements of the meters can be done for an exact year according to 7.2. If a sufficient number of meters is installed the measurements can be done for each energy carrier. Energy used for other purposes than heating, cooling, ventilation, hot water or lighting can be measured separately according to 7.3. The measurement of outdoor temperature enables to perform the correction for outdoor climate defined in 7.4.

The rating can be used to prepare an energy performance certificate designed according to EN 15217;

c) assessing the impact of improvement of building and energy systems

This assessment can be done according to EN 15603:2008 by using a validated building calculation model as defined in Clause 9.

Using the monitoring functions enables to take into account the actual values regarding climatic data, internal temperature, internal gains, hot water use, lighting use, according to EN 15603:2008, 9.2 and 9.3;

d) energy monitoring

The TBM monitoring function can be used to prepare and display the energy monitoring graphs defined in EN 15603:2008, Annex H;

e) room temperature and indoor air quality monitoring

Monitoring function can be used to provide report regarding air or room operative temperature in the rooms as well as indoor air quality. For buildings which are not permanently occupied these functions shall differentiate occupied and non occupied buildings. For buildings which are heated and cooled the report shall differentiate cooling and heating periods.

The reports shall include the actual value as well as reference values such as set points for example.

TBM is covered by prEN 16947-1:2015 and FprCEN/TR 16947-2:2015.

Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2012/31/EU on the energy performance of buildings

The building automation and control systems shall be capable of:

(a) continuously monitoring, logging, analysing and allowing for adjusting energy usage;

(b) benchmarking the building's energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for the faciliti or technical building management about opportunities for energy efficiency improvement; and

(c) allowing communication with connected technical building systems and other appliances inside the building, and being interoperable with technical building systems across different types of proprietary technologies, devices and manufacturers.

Desigo CC

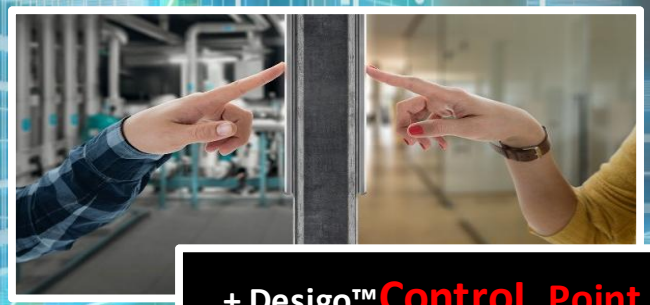
Topologies

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Ingenuity for life



+ Desigo™ ControL Point

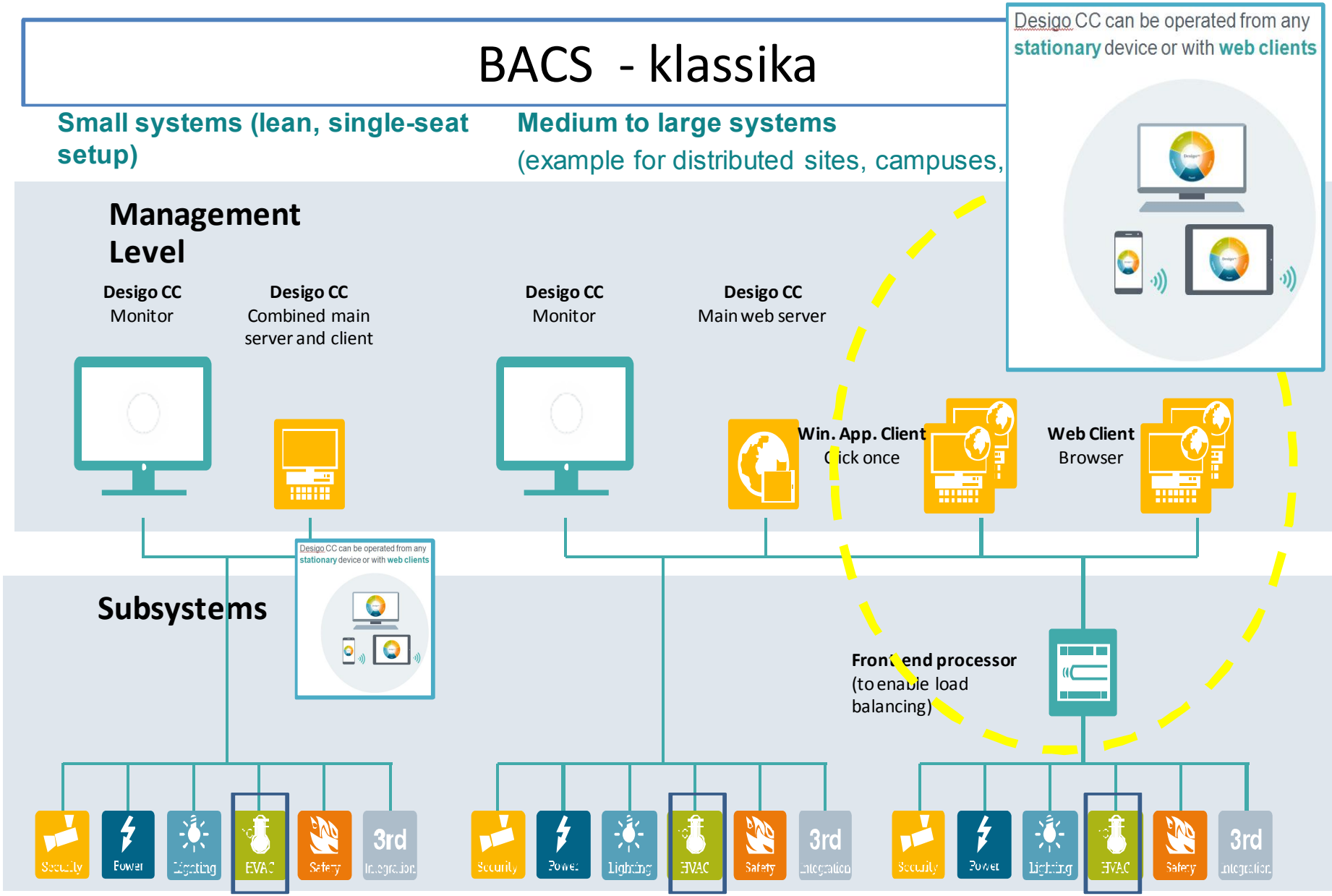
One building. Different users.

- North-/southbound connectivity
- Clients for all preferences and needs

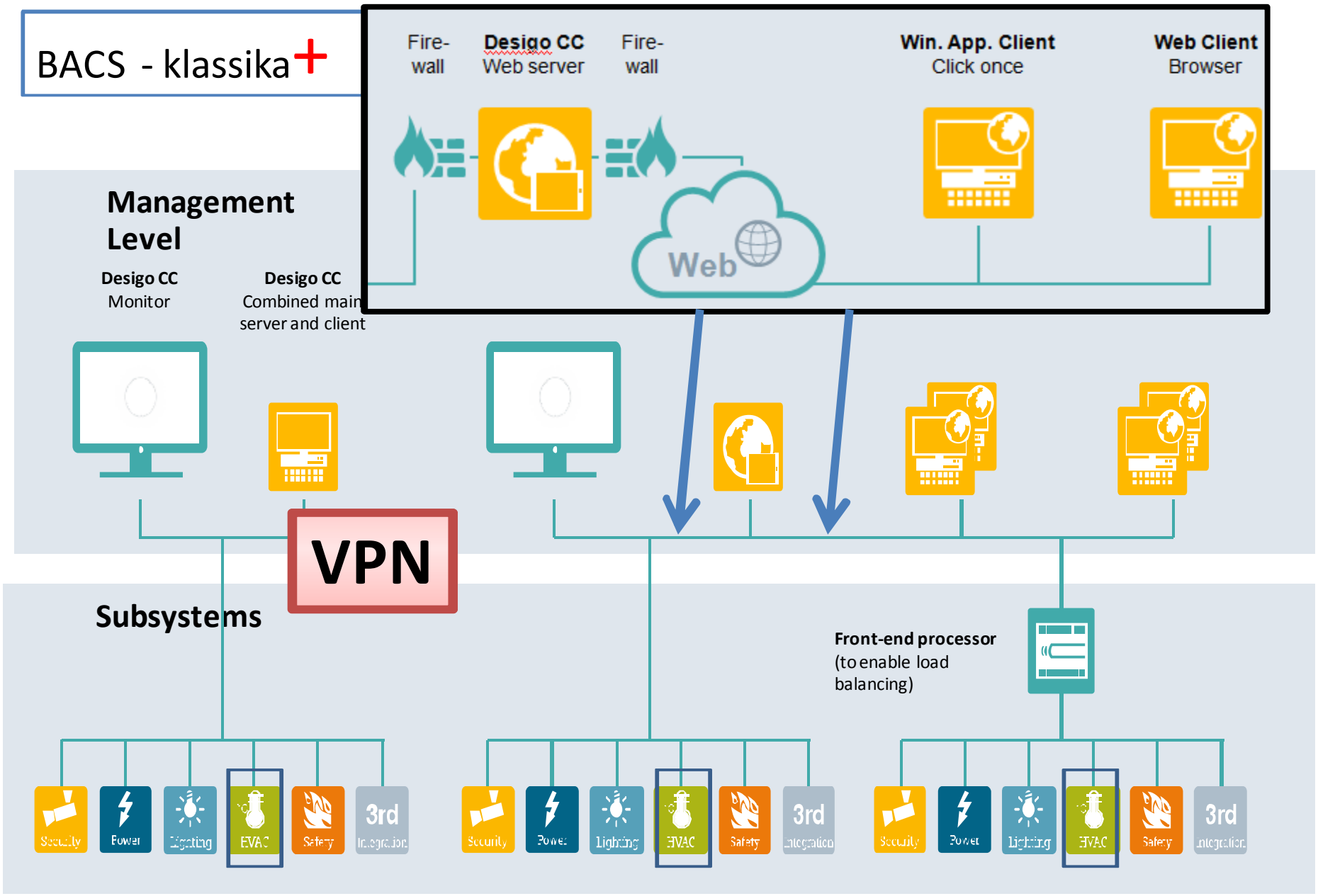
When cyber security is a must

- Suitable for all system sizes
- Multiserver architecture
- Distributed configurations
- Portfolio

BACS - klassika



BACS - klassika+



Klassika "–" Näiteks Desigo building management

Simplify your building management tasks



Monitor and operate



Program your schedule



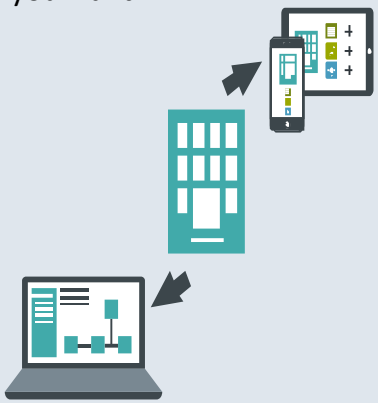
Make trends and reports



Manage alarms

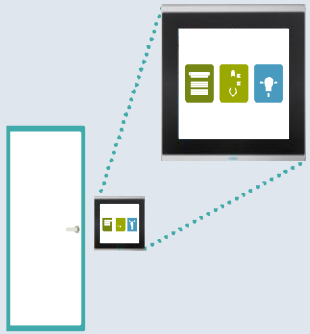
Access your building whenever you want

Desigo Control Point,
you can **securely access** your building with multiple devices from **wherever**, **whenever** you want



Enhance your room comfort

Desigo Control Point offers efficient and intuitive operation of all kinds of rooms



Monitor energy usage to achieve additional savings

Desigo Control Point dash-boards allow you to show your building's energy usage

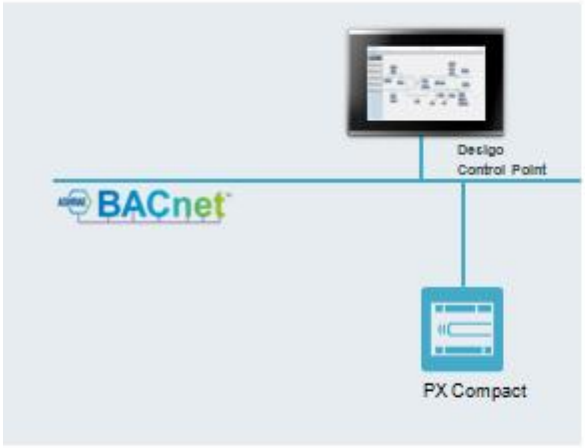




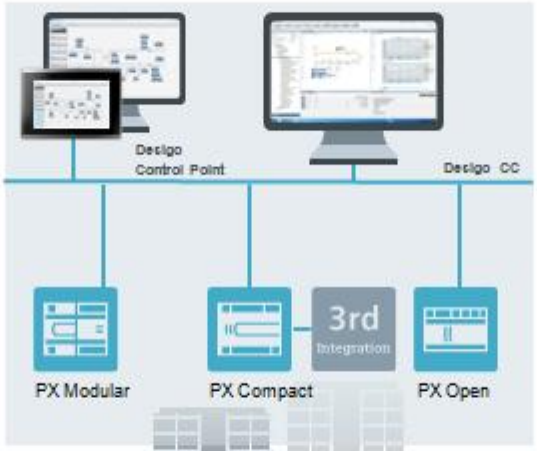
Vt ka https://www.siemens.com/global/en/home/products/buildings/automation/desigo/building-management/control-point.html

Desigo PX
Scalable functionality for individual customer requirements

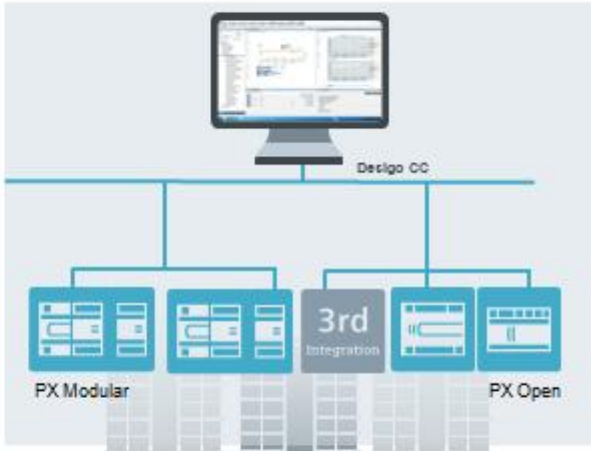
SIEMENS
Ingenuity for life



From small ...



... to medium ...



... to large plants and projects



System controller for ...

- mapping 3rd party to **BACnet**
- trend functions
- alarming
- time scheduling
- process communication via BACnet

Available Integration Solutions

- Modbus (master or slave)
- M-bus
- KNX
- LonWorks
- SCL (Script Control Language)

Desigo Control Point is also suitable for use in large projects





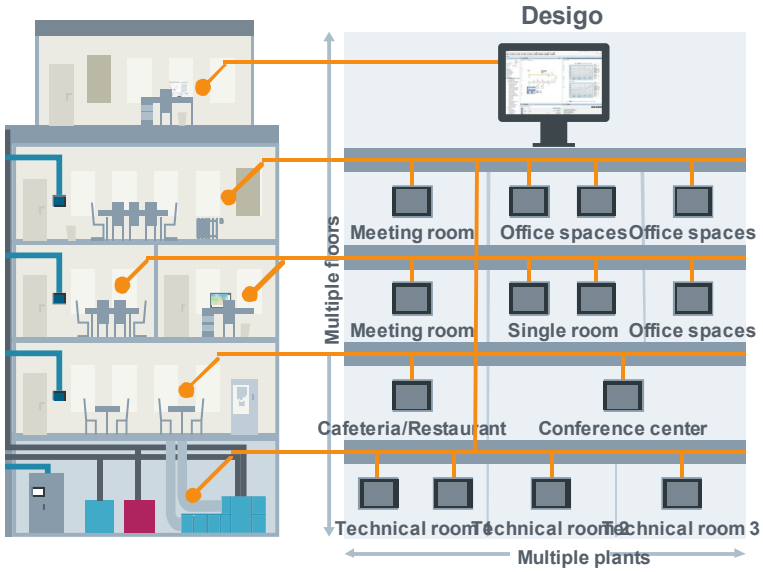






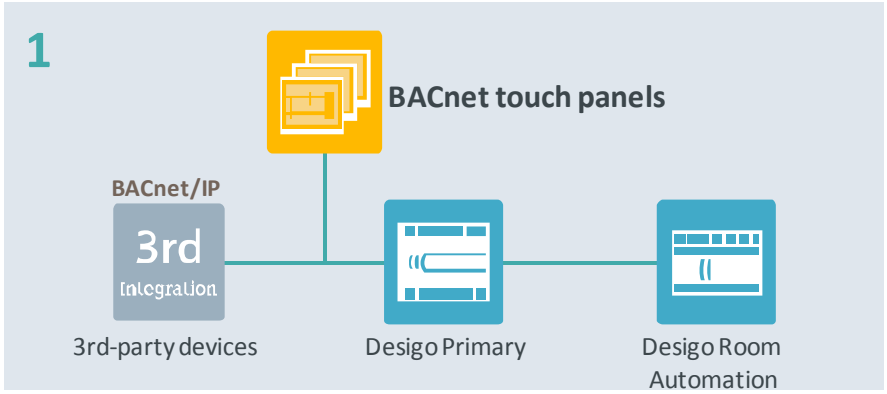
- Local Web Operation
- Local Plant Operation
- Remote Operation
- Energy Monitoring
- _____
- _____

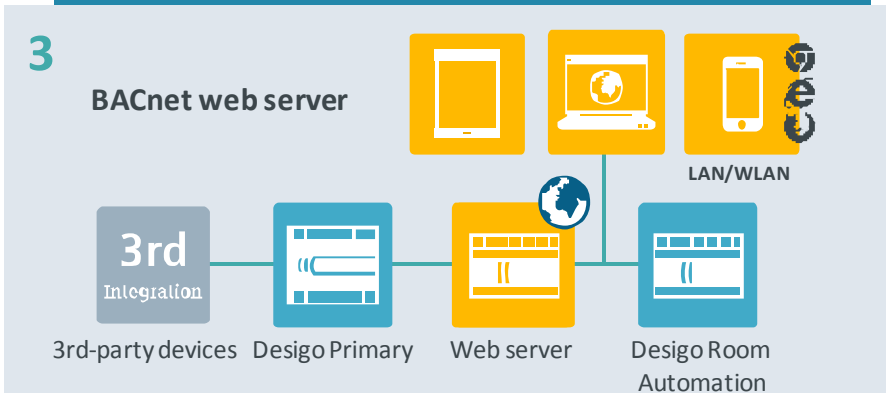
Desigo Control Point
offers local and remote operation of rooms and plants in large projects, while Desigo CC is used for building management.

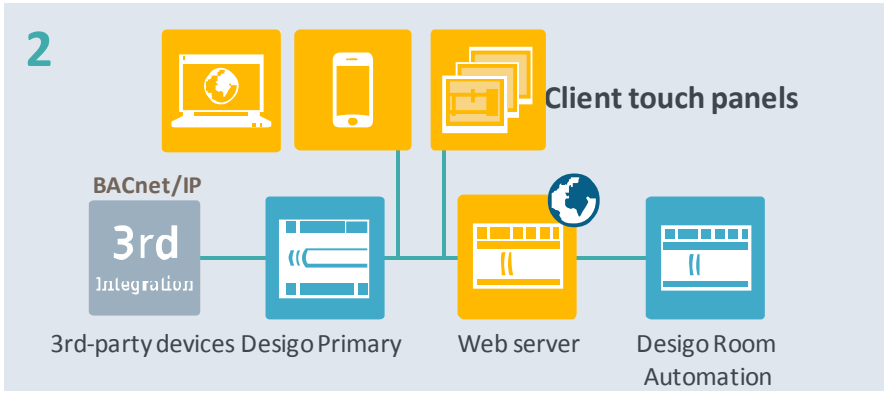


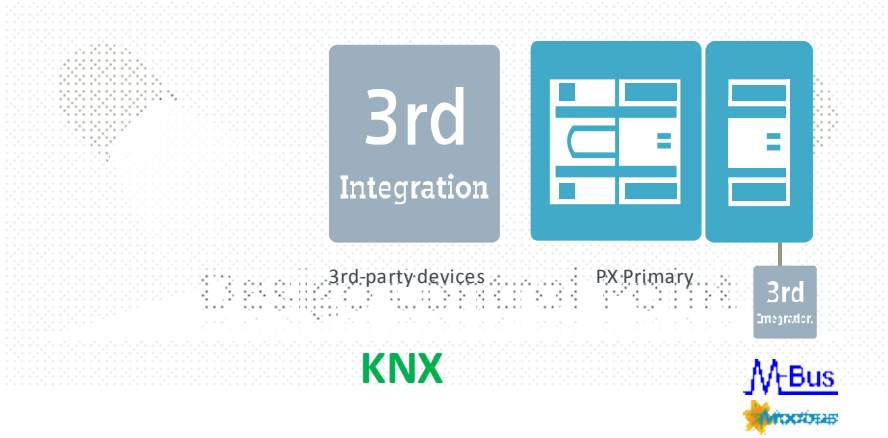
Topologies Desigo CC Control Point?

No extra costs for web operation







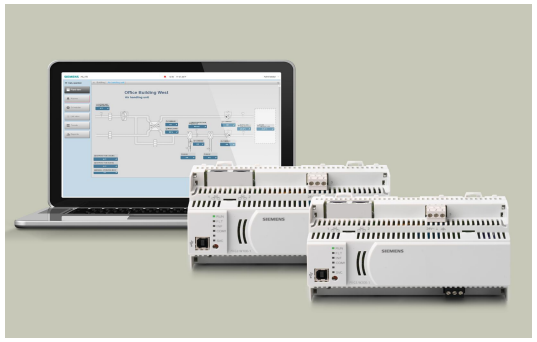




BACnet touch panels



Client touch panels



BACnet web server

Key features of Desigo Control Point …



in terms of building management:

- Generic operation of all objects and properties
- Standardized user interface
- User administration (add, delete, change)
- User access rights for data point commanding
- Scheduler operation
- Online/offline trend
- Alarm viewer
- Alarm and event history
- Alarm routing
- Animated plant graphics
- Heating curve
- Energy dashboards





- Support when using 3rd-party devices
- Standard dashboard templates for public and technical audience
- Presentation of costs and building's peak demand
- Long-term archiving of data
- Real-time monitoring and historic benchmarking
- Typical interfaces for water, energy, and power meters (weather information, webcams, etc.)

in terms of room operation:

- Operation of …
  - lighting, shading, and HVAC equipment
  - conference rooms, office spaces, and floors, etc.
- User interface optimized for room users
- User interaction concept aligned with QMX7
- Standard templates with different resolutions for meeting rooms and office spaces

Dashboards



Benefits

End customer

Easy monitoring and optimization of energy consumption

Appealing display of the most interesting information

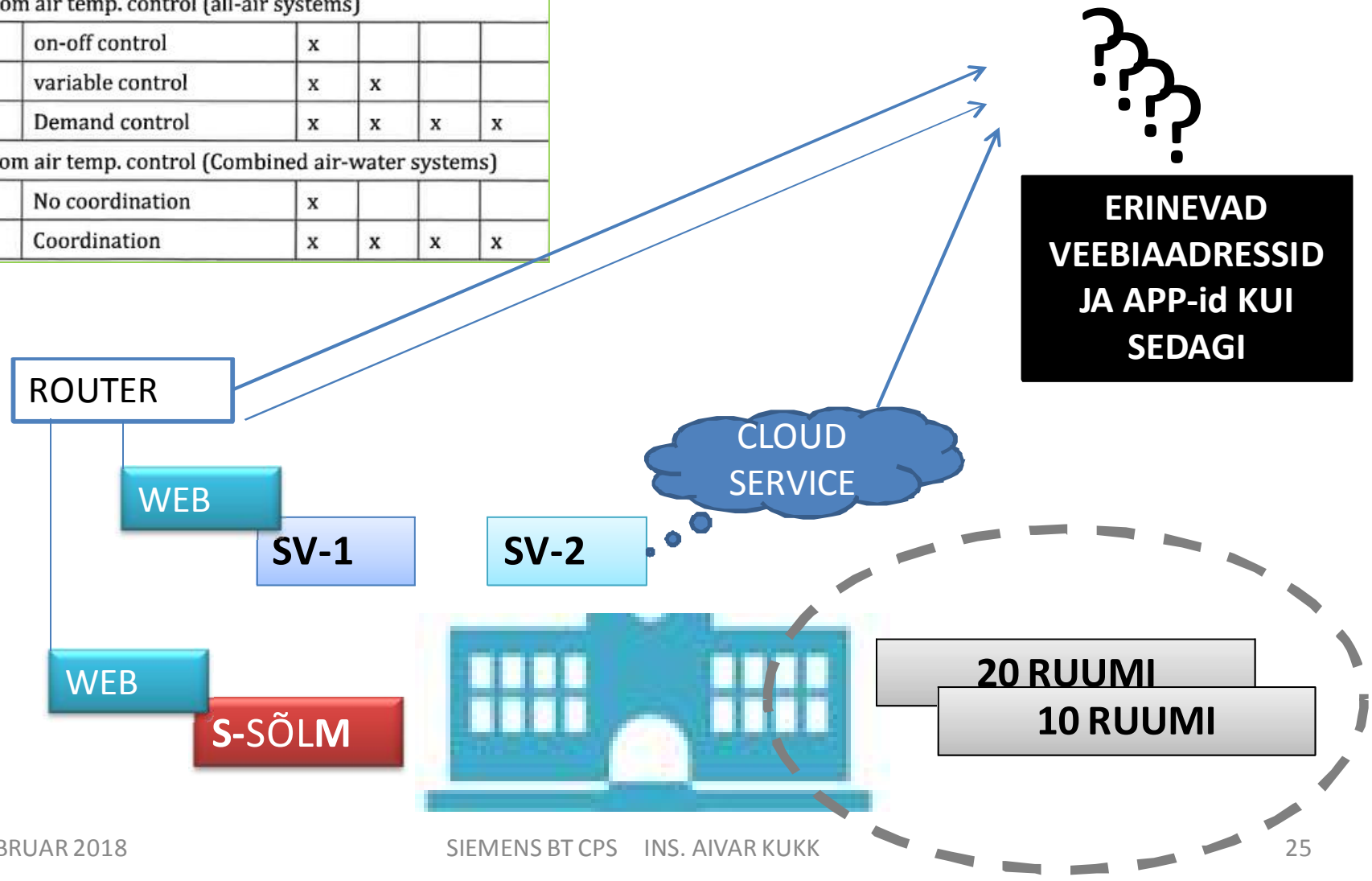
Engineers

Highest flexibility to provide customer-specific user interfaces with the same tool

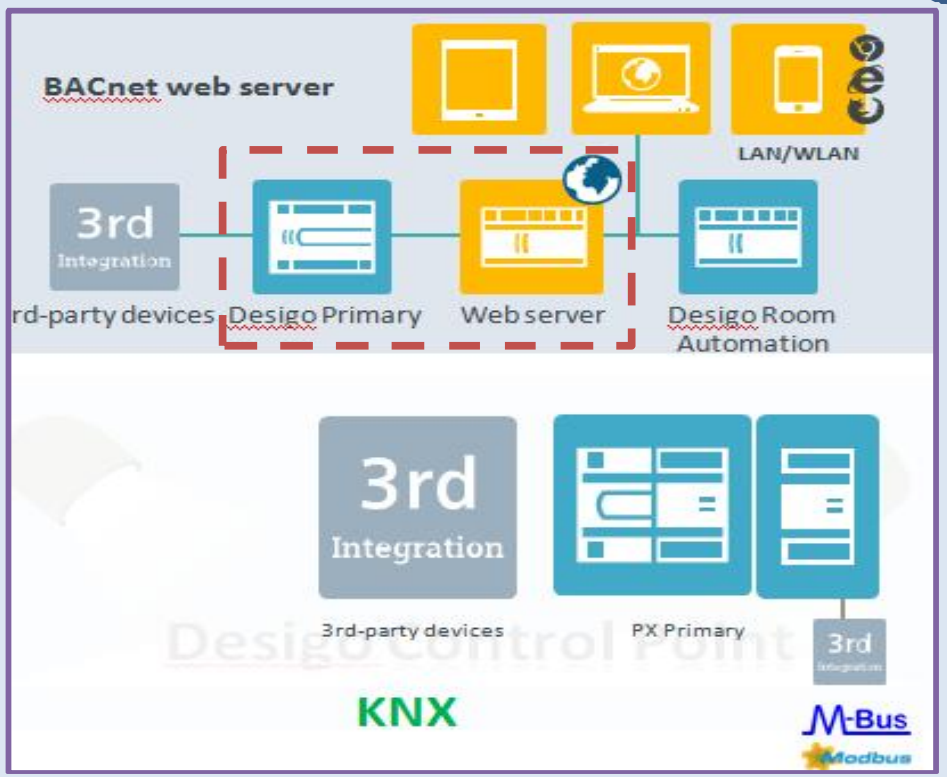
- Standard template to display and compare energy consumption
- Comprehensive selection of graphic, configurable components

Ventilation and air-conditioning control					
Supply air flow control at the room level					
0	No automatic control	x			
1	Time control	x	x	x	
2	Occupancy detection	x	x	x	x
Room air temp. control (all-air systems)					
0	on-off control	x			
1	variable control	x	x		
4	Demand control	x	x	x	x
Room air temp. control (Combined air-water systems)					
0	No coordination	x			
1	Coordination	x	x	x	x

Vaata ka: EKVY seminari materiale:
Energiatõhusa hoone kavandamine ja rajamine
- fookuses hooneautomaatika 24.11.2017
http://www.ekvy.ee/et/component/framework/event/history/show/103



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Room air temp. control (Combined air-water systems)					
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Eesti ehituspraktikast

KEK *–mõõdetul kulul põhinev energiamärgis, ainult küte taandatakse normaalaastale kraadpäevade abil, muus osas võrdub üks ühele mõõdetud kuluga*

ETA *– energiaarvutus ehk arvutuslik energiamärgis hoone standardkasutusel ja vastava tarkvaraga (energia - simulatsiooniga) arvutatud energiatõhususe tõendamiseks*

KEK *(mõõdetul kulul põhinev energiamärgis)*
– on esitamiseks kahe aasta pärast hoone valmimisest.

Kas Teie projekt ja hoone on toimiva automaatika osas tagamas ETA-na lubatut?

Pretsedendid kohtupraktika osas veel puuduvad.

Credex § 29. aruandlus

Toetuse saaja, on kohustatud ühe osana aruandest esitama ... Rekonstrueerimise projekti lõppemisele järgneva kalendriaasta mõõdetud tarbimisandmete baasil koostatud elamu energiamärgise pärast projekti elluviimist

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