

BASys

A New Setup Tool for Home and Building Automation

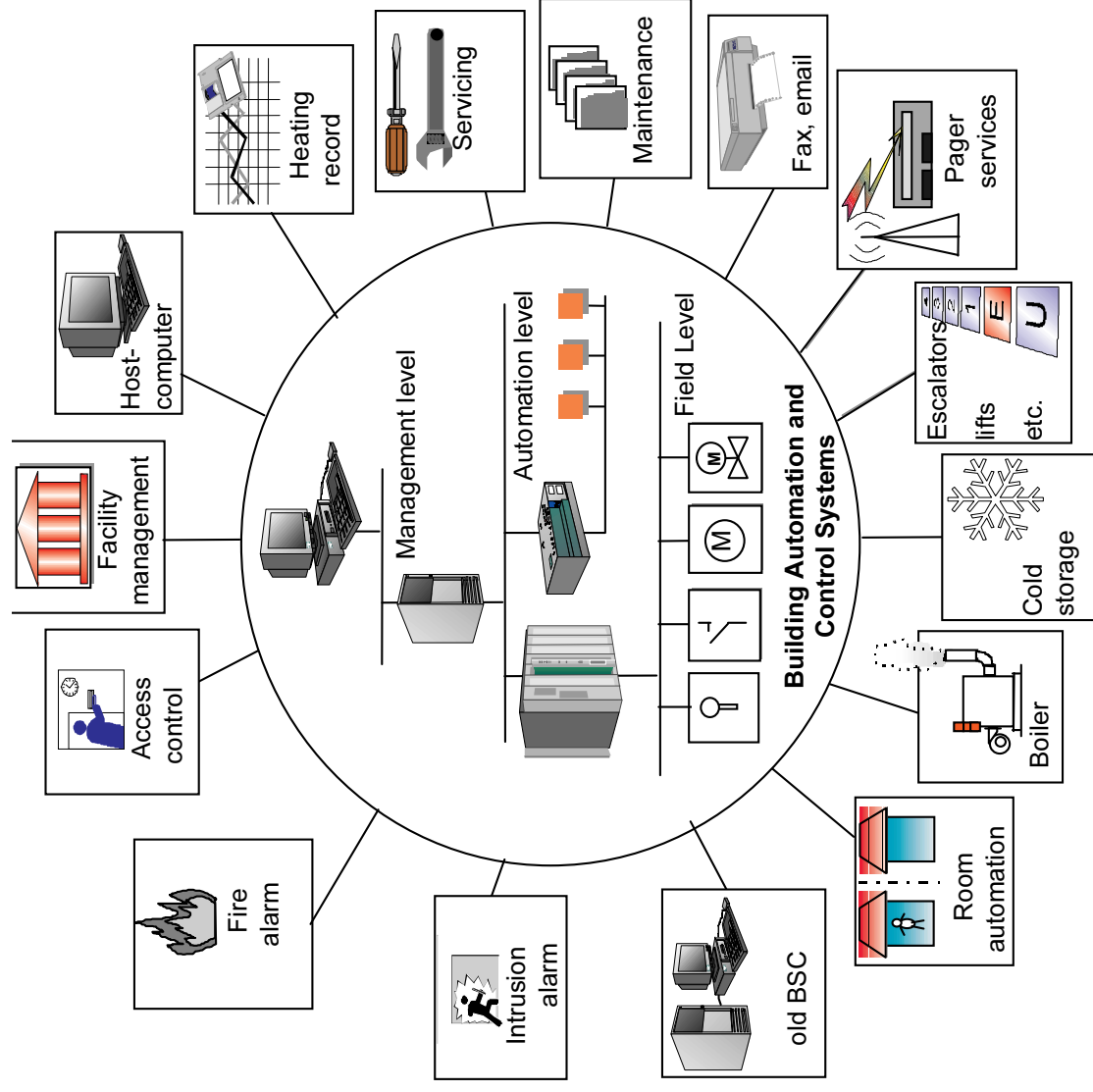
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- Motivation
- Configuration and Setup tools for H&B Automation
- Goals
- Design
- Implementation
- Demonstration
- Conclusion and Outlook

- Diploma thesis at Vienna's University of Technology
- Disadvantages of existing systems:
 - every bus system for building automation comes with its own proprietary configuration software
 - no platform independence
 - incompatible proprietary data formats
 - not "state of the art"
 - not freely available

- System comprehensive user interface for planning and commissioning a building automation network
- Platform independence
- Open extendable data formats based on XML
- Use of “state of the art” software engineering methods:
 - Requirements engineering
 - UML
 - eXtreme Programming
 - Version control with CVS

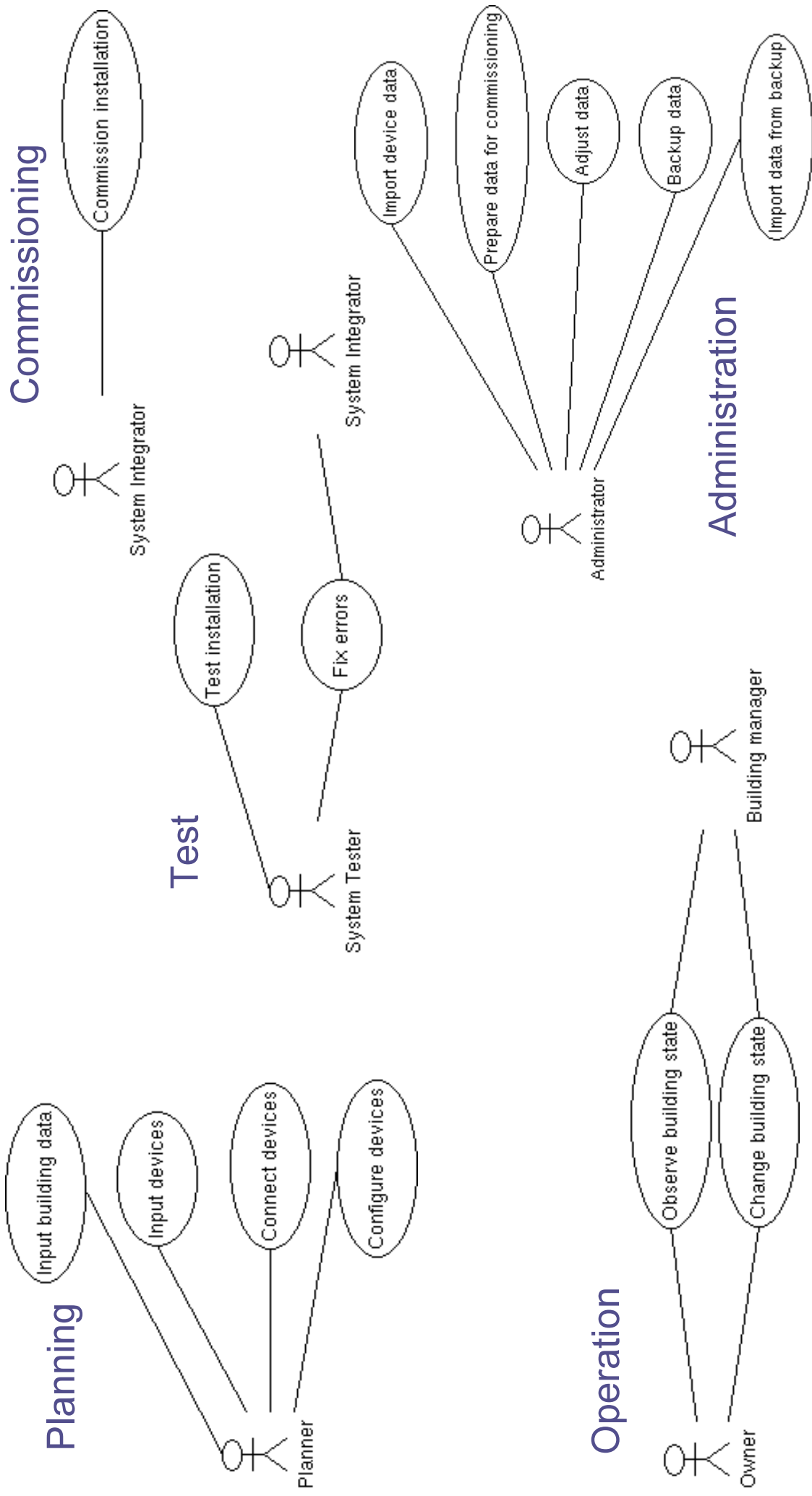
- Installation domain
- Household appliances
- Entertainment electronics
- Information and Communication
- Security and safety domains
- Sundry special domains

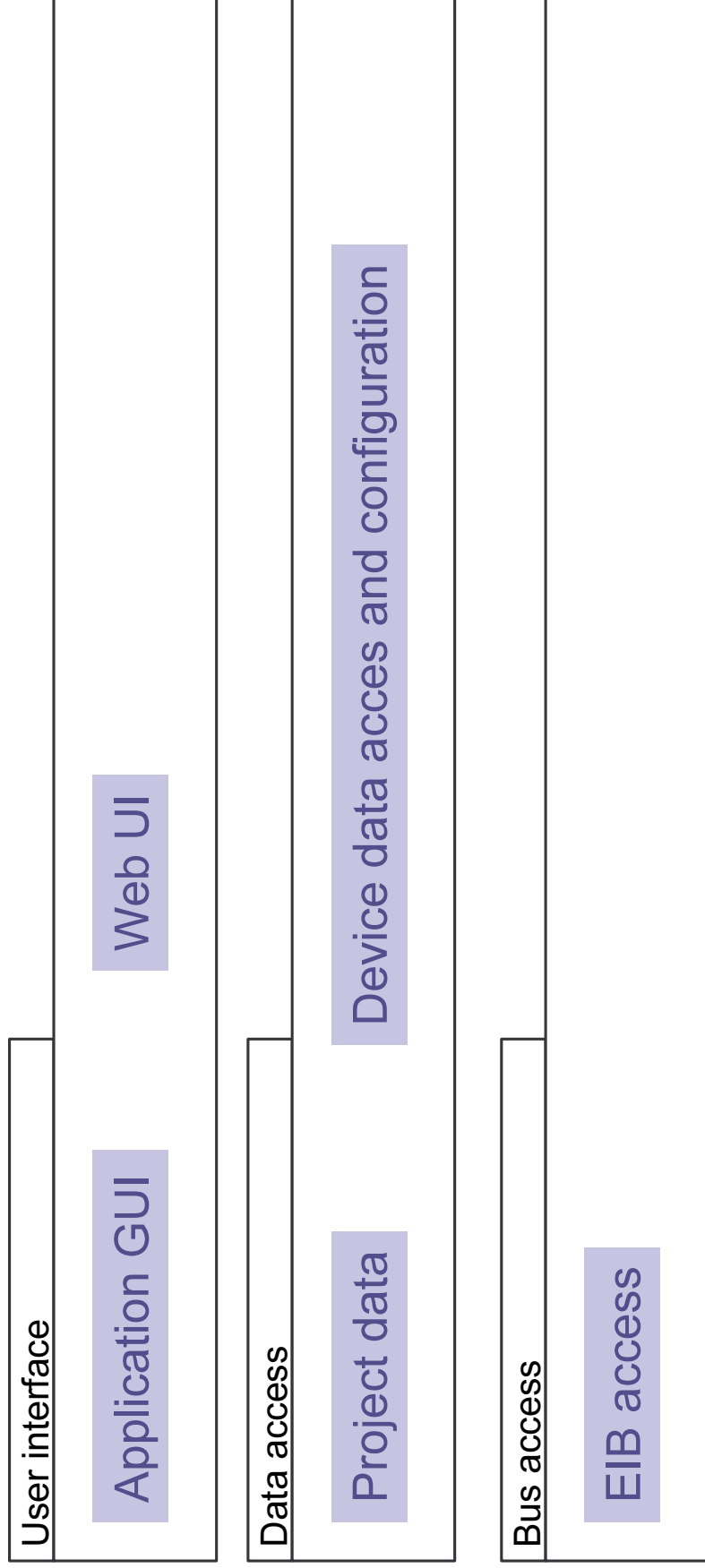


- To include the whole set of devices found in today's homes and buildings is an endless job (i.e. too hard, too expensive to realize with the given tools).
 - no compatibility between the device classes
 - no standards ready
- In the future sensor devices may change
 - tablet PCs
 - speech recognition
 - presence detectors
 - ...

How can the software system be prepared for the future requirements as good as possible ?

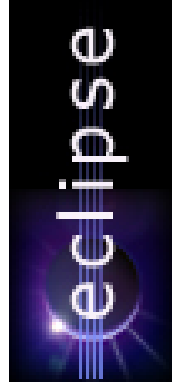
- Actuators are still needed in the future for
 - switchable lamps
 - dimmable lamps
 - valves for HVAC control
 - blinds
- The new system starts with these 4 elementary types to do automation planning
- Actuators are result of the device type
- Sensors are result of the actuator type





- The system is written in pure JAVA
 - huge (and ready to use) suite of libraries
 - platform independence
 - XML support
 - ...
- Use of design patterns
- Software component technology
- Separation of client and server functions in class design
- Easy to enhance
- Implemented features in the first version:
 - All data is stored in XML format
 - Structural planning of a building automation
 - EIB as first supported bus system

Software



- Free Java IDE

Umbrello



- UML editor for Linux/KDE 3

JUnit

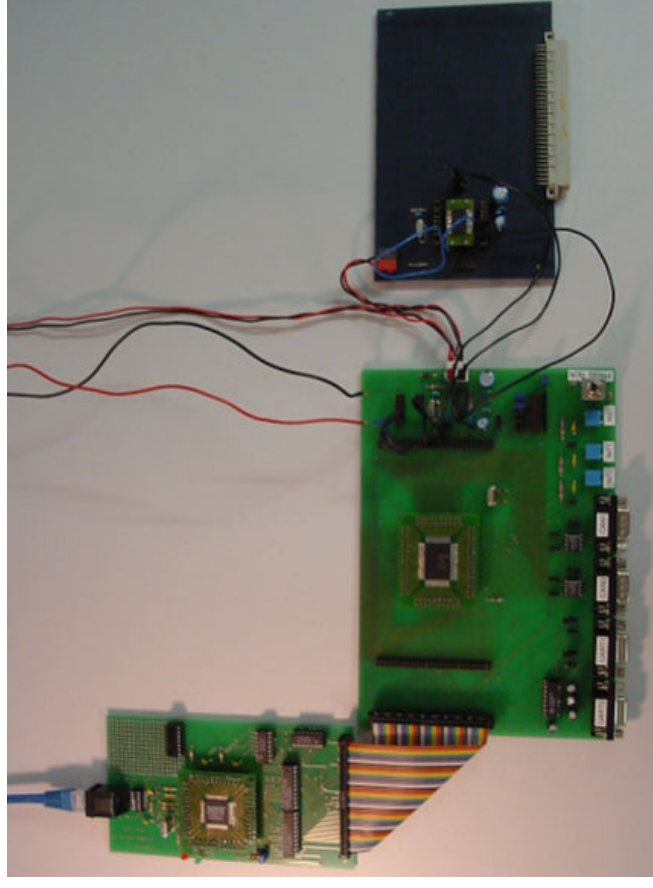
- Java testing framework



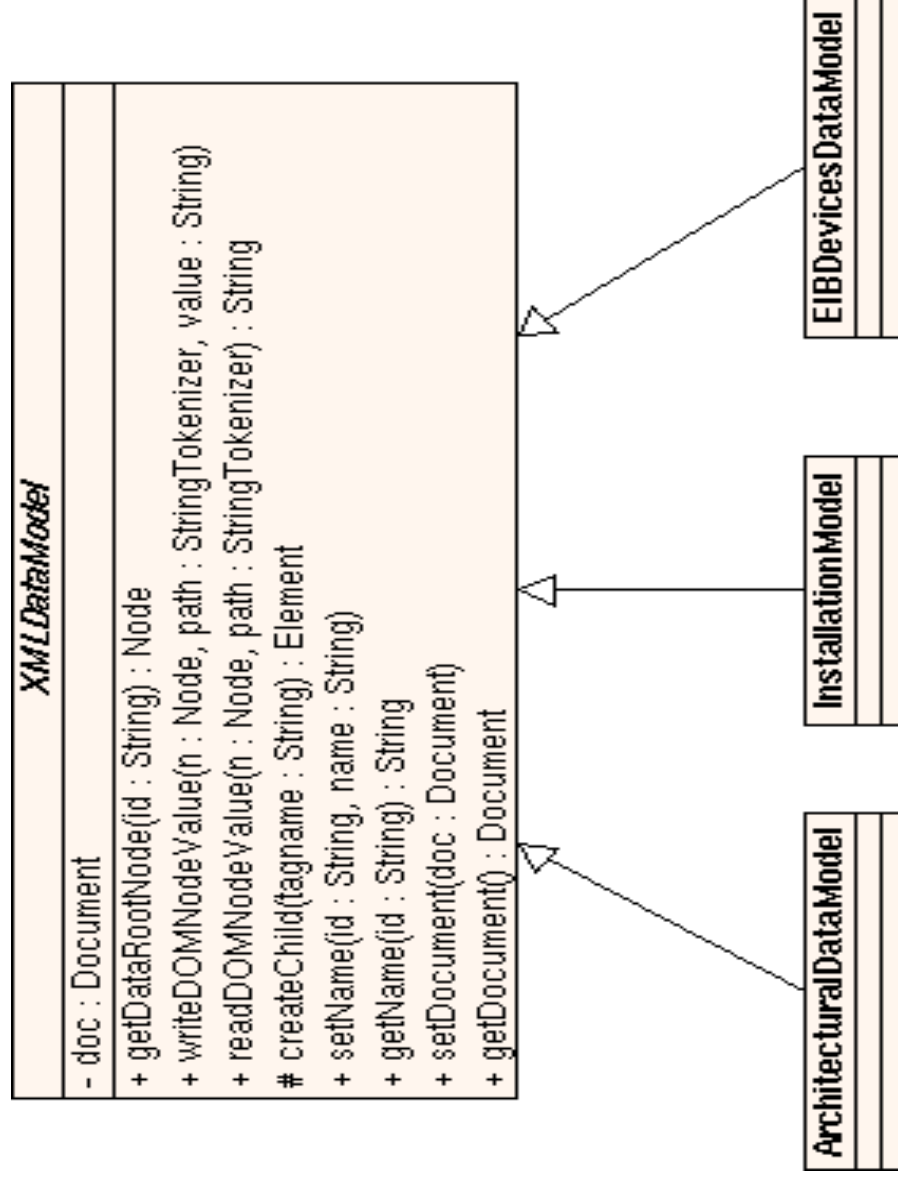
- Outputs advances debugging messages

Hardware

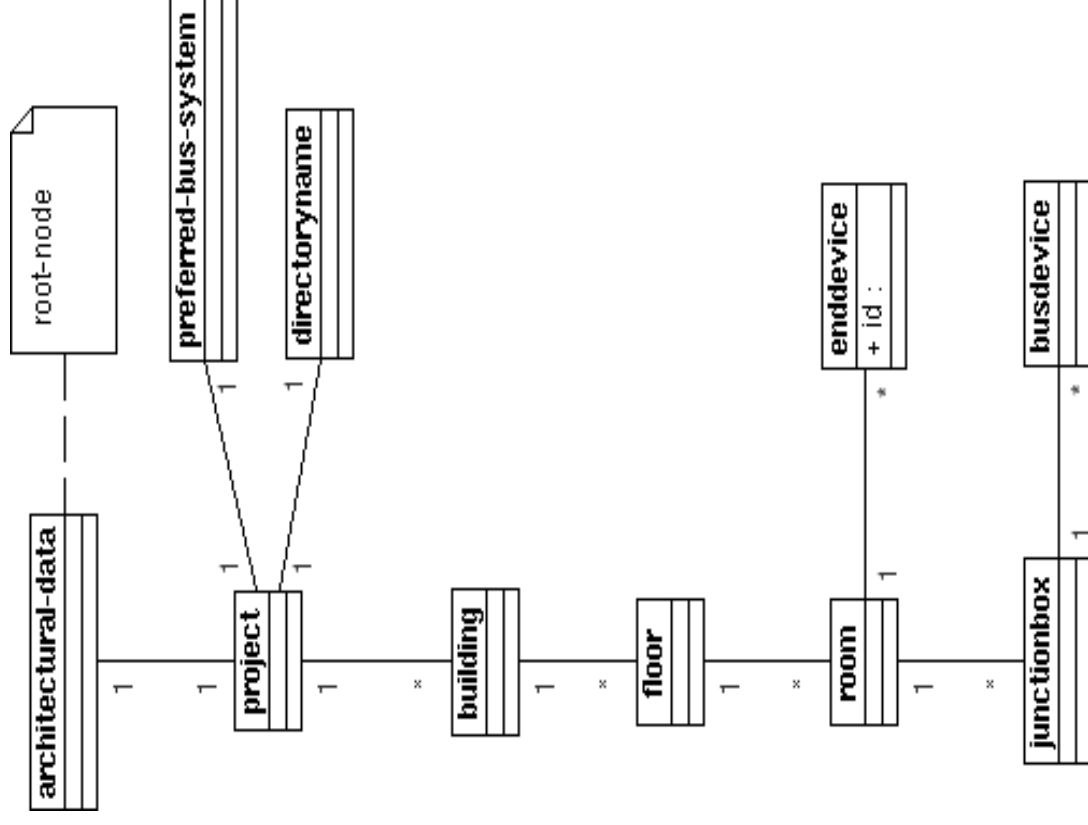
- Embedded EIB-Ethernet gateway
- UDP/IP based



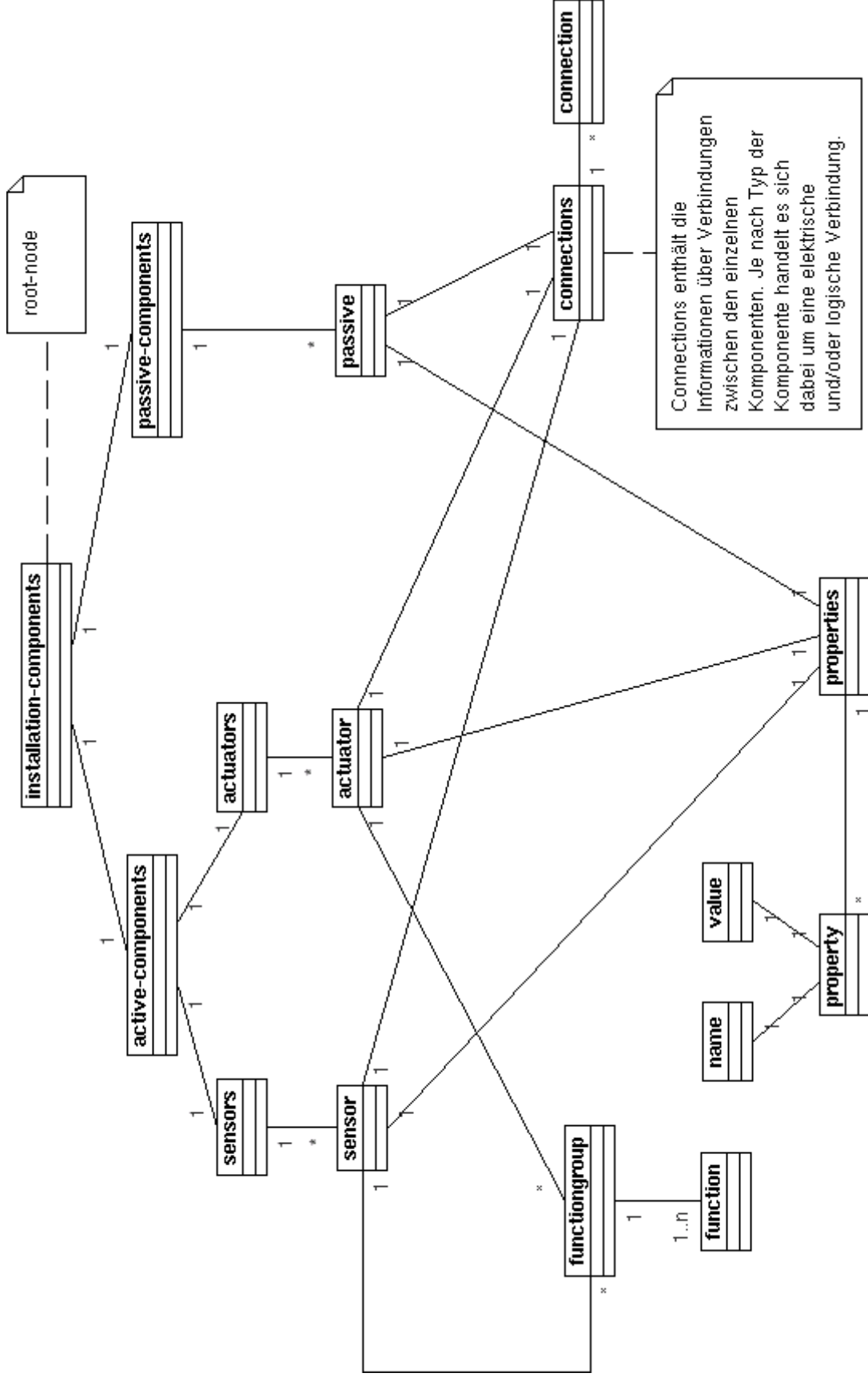
- Direct access to XML Document Object data (DOM) is difficult
- XMLDataModel class encapsulates DOM access
- In BASys three separate data models (XML files) are used for storing architectural, installation specific and EIB device specific data



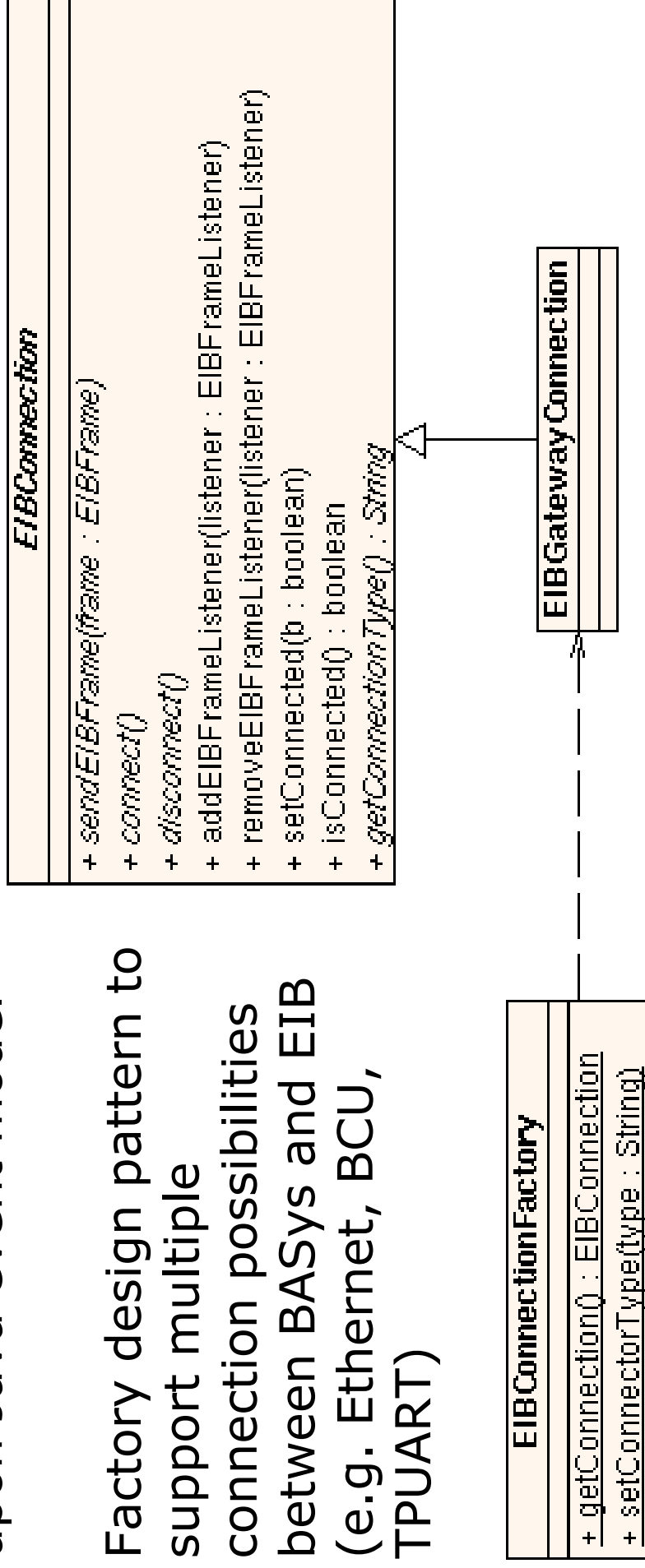
- Separation of architectural and installation data
- No installation data without structural building data
- External tools (e.g. CAD programs) can be used to create architectural and structural data
- CAD input is not yet supported in BASys prototype



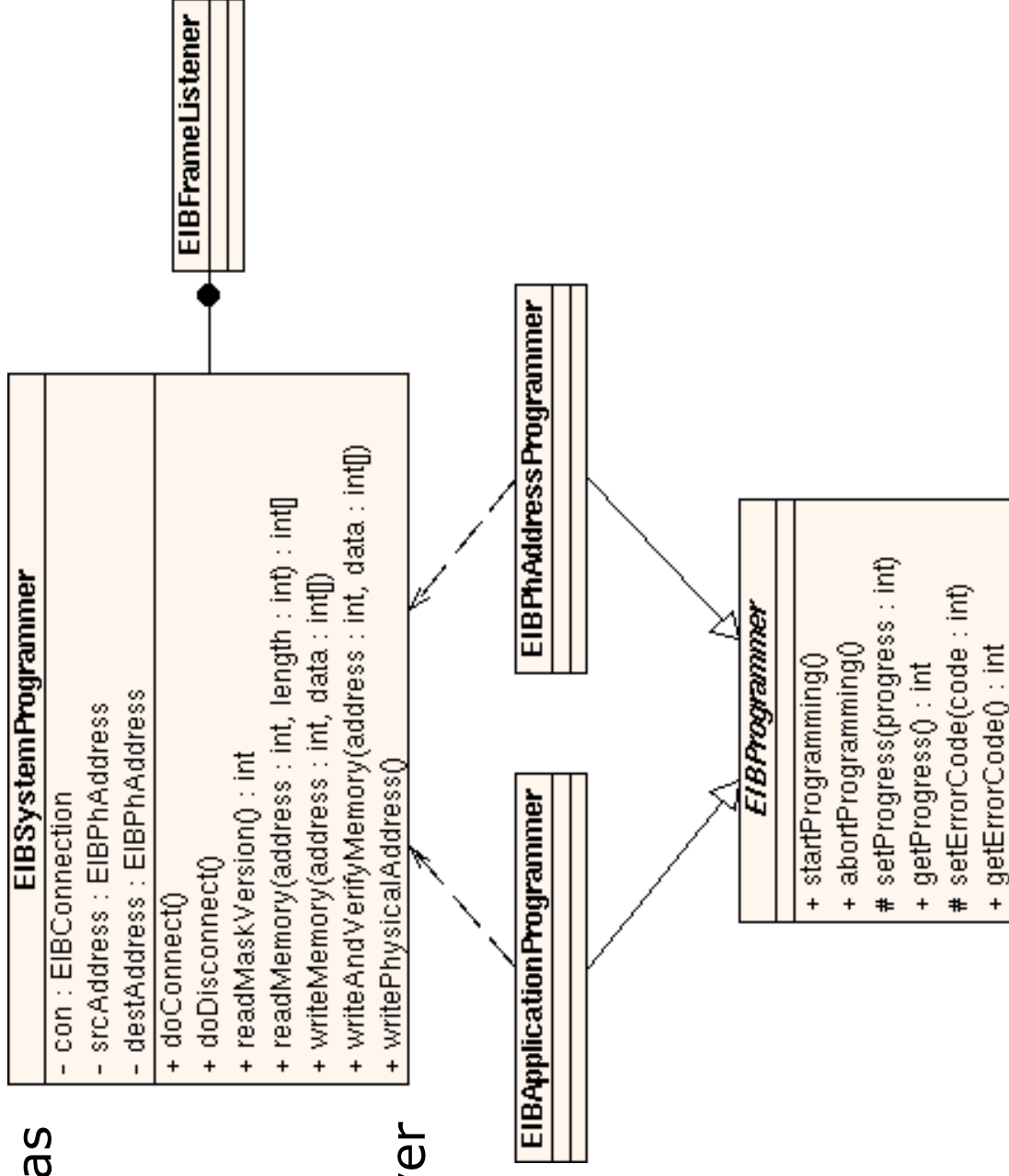
Installation Data Model



- EIB data receiving based upon Java event model
- Factory design pattern to support multiple connection possibilities between BASys and EIB (e.g. Ethernet, BCU, TPUART)



- Programming is realized as separated thread
- EIBSystemProgrammer class encapsulates programming details and realizes EIB transport layer functions



BASys 2003 - TU Wien
 Datei Bearbeiten Inbetriebnahme EIB Diagnose Test Datenverwaltung Hilfe

Struktuelle Ansicht
 Gebäude Stockwerk Raum Verteilerkasten Schaltbare Lampe Dimmbare Lampe Ventil Jalousie Sensor

Seminarraum

Installierte Geräte

Name	Gerätetyp	Bussystem	Zugeordneter Ak...	Installationsort	Hersteller	Aktortyp	Aktor Funktionsg...	Adresse(n)
Küche	Schaltbare Lampe	EIB	Aktor 1	Verteiler	ABB	AT/S4.16.1.4f-...	Ausgang A	0/257
Wohnzimmer	Schaltbare Lampe	EIB	Aktor 1	Verteiler	ABB	AT/S4.16.1.4f-...	Ausgang B	0/258
Vorzimmer	Schaltbare Lampe	EIB	Aktor 1	Verteiler	ABB	AT/S4.16.1.4f-...	Ausgang C	0/259
Garage	Schaltbare Lampe	EIB	Aktor 1	Verteiler	ABB	AT/S4.16.1.4f-...	Ausgang D	0/260
Sensor Wohnzimmer...	Sensor	EIB	Sensor 1	Verteiler	ABB	ET/S 6.230.1 6f...	Eingang A/B - K...	0/258

Verteilerkästen

Name
Verteiler

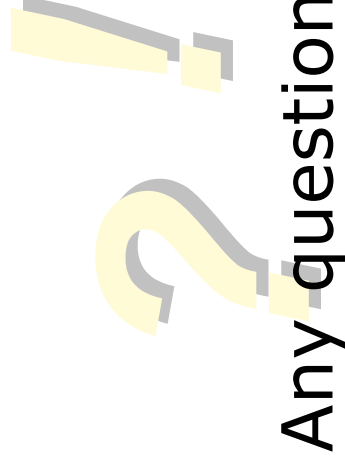
Busgeräte

Name	Hersteller	Aktortyp	Bussystem	Physikalische Adresse

Status: Bereit.

- Support of
 - different ways to connect to the EIB
 - multiple bus systems
- CAD data support for intuitive planning and installation
- Project data version control
- EIB connection with a server process (EJB ?)
- Connection of kitchen devices, HiFi, ...
- Access for mobile devices

- BASys makes the planning and commissioning of a building automation easy
- Open data formats for future enhancements
- First system designed to support more than one automation bus
- BASys can be the headstone for a comprehensive automation of *all* devices in a modern building.
- Lots of work has to be done, join us...
<http://www.basys2003.org>



Any questions?