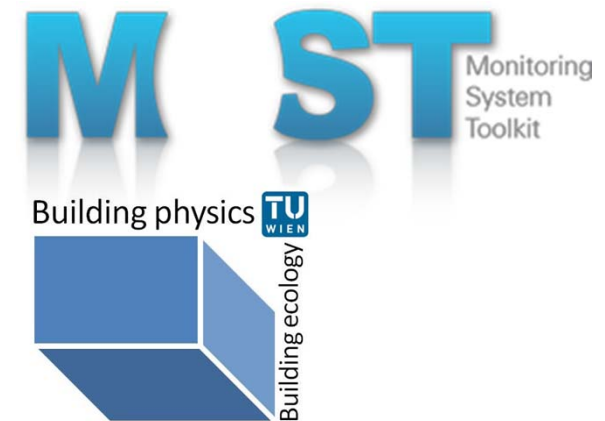
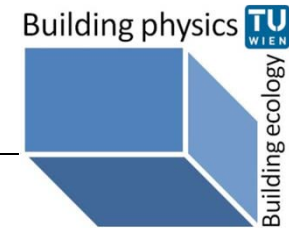


# Recent advances in the development of MOST: an open-source, vendor and technology independent toolkit for building monitoring, data preprocessing and visualization

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Vienna University of Technology, Austria  
[www.bpi.tuwien.ac.at](http://www.bpi.tuwien.ac.at)





# Building Monitoring – Motivation

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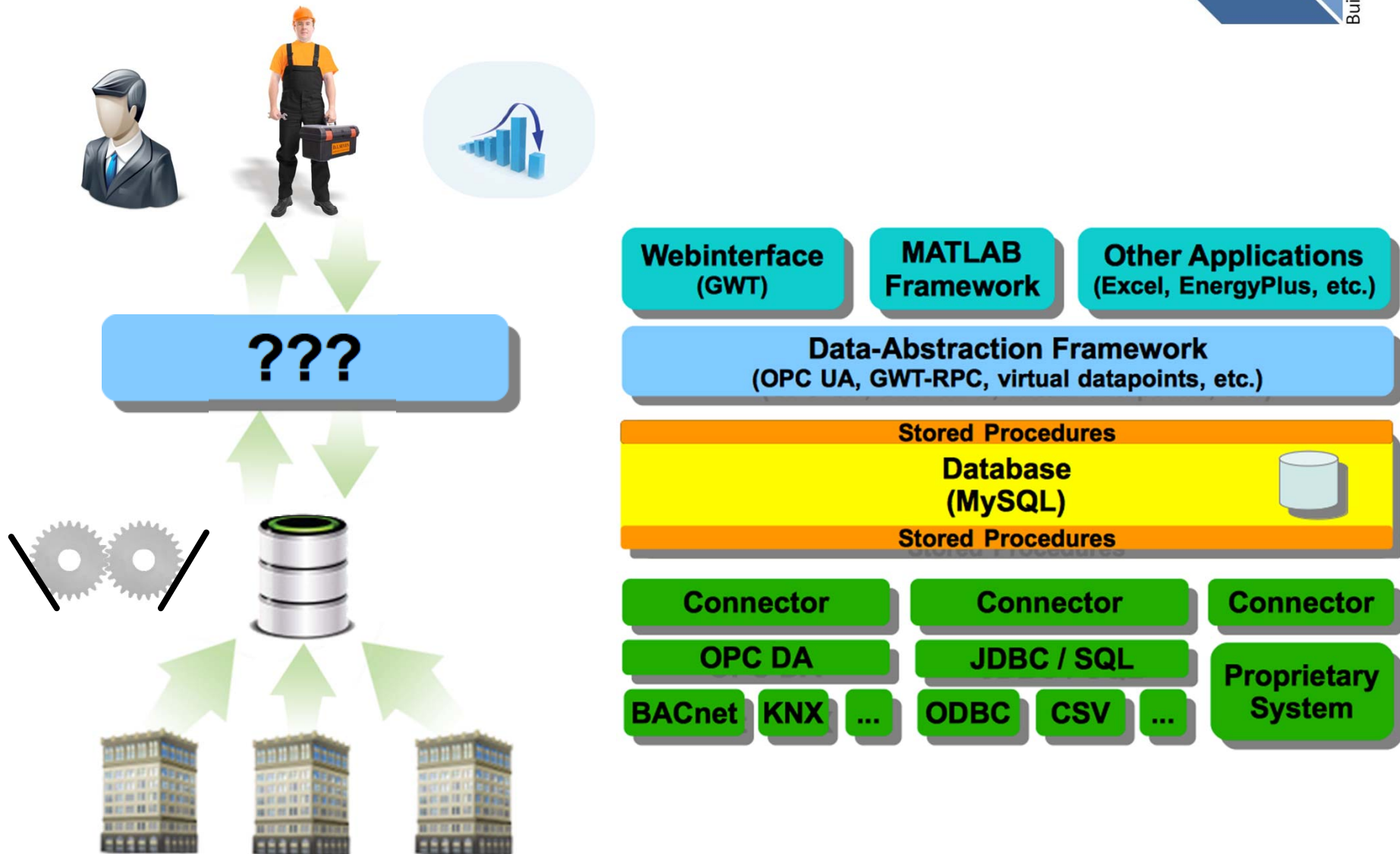
## Status quo

- No **comprehensive Data Collection**
- No appropriate
  - **Preprocessing**
  - **Aggregation**
  - Software Interfaces for **Batch Processing**
- No **Real-Time Data Access**
  - **Information Loss/** never used

## What we want

- **Continuous Reports**
- **Live Performance Visualization**
- **Fault Detection**
- **Reccomendations for Operation**
- **Personal Feedback**

# Monitoring System Toolkit



# Framework

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- Google Web Toolkit
  - Plain Java -> converted to platform optimized JavaScript
- User Interface Library
  - **No** dedicated user interface
  - **Reusable** components
- Drag and Drop
  - **Primary** interaction method
  - **Highlighting** of droppable areas
- **Modular**
  - Use cases



# 3D-Viewer

- Use cases
  - Lead user within 3D building model
  - Datapoint location
  - Visualize critical information

**M ST** Monitoring System Toolkit **TU WIEN** TECHNISCHE UNIVERSITÄT WIEN Vienna University of Technology

Logged in: GSOC Derr

**Desktop**

**Charts**

**Feedback**

**Export**

**3D**

**Load Model**

Transparency

Expose

Zoom

**Warning**

There are no errors!

Pan Rotate

**Views**

Default | Front | Side | Top  
Set View to Datapoint

**Zonenhierarchie (IFC)**

Project (Project)

Site (Site)

BPI\_05 (Building)

Ground Floor (BuildingStorey)

First Floor (BuildingStorey)

Second (BuildingStorey)

Floor (BuildingStorey)

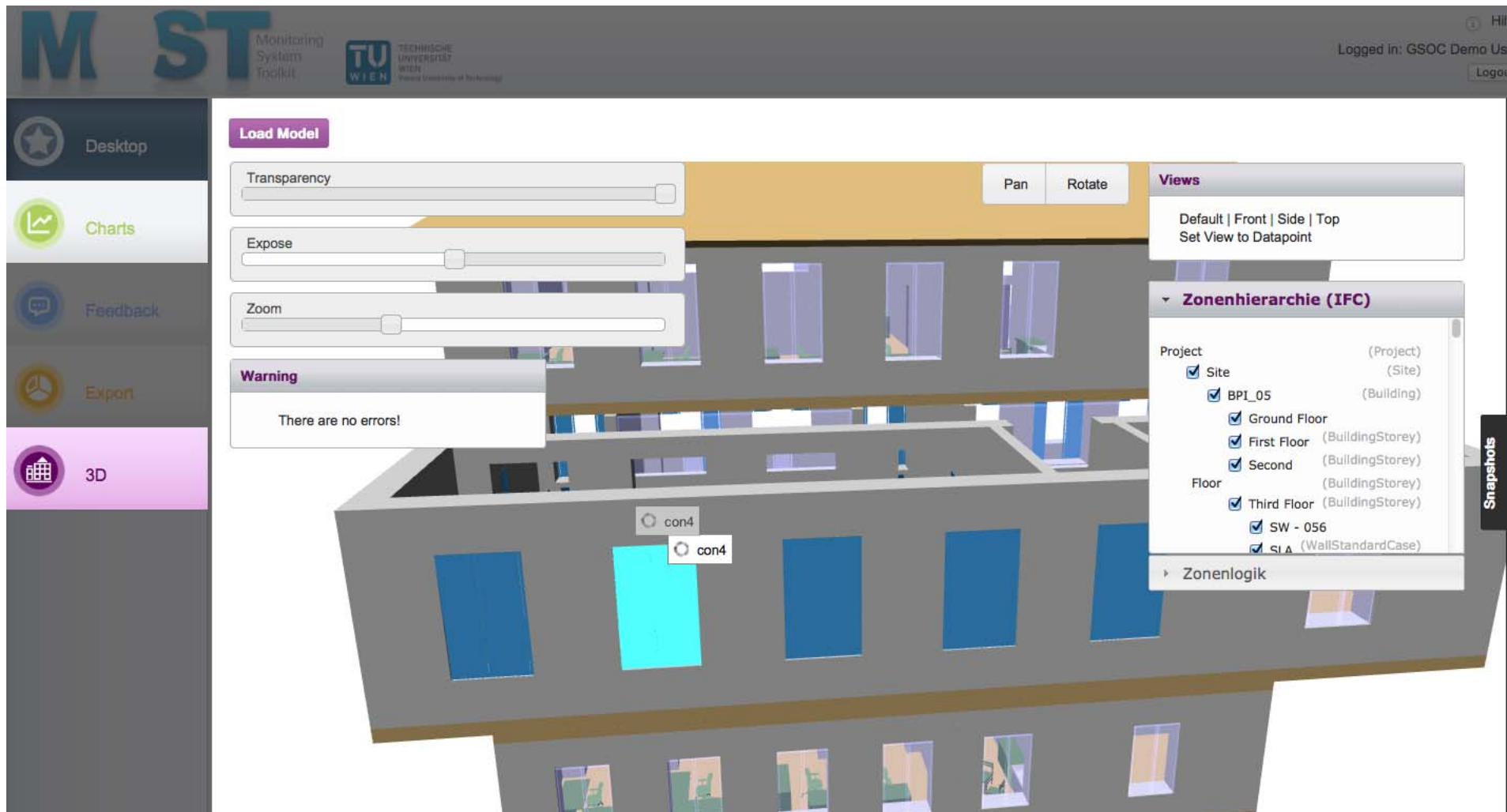
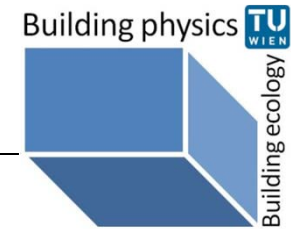
SLA - 011 (Slab)

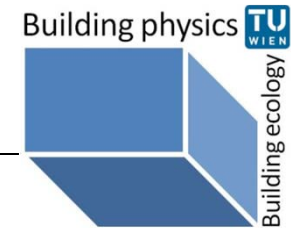
SLA - 012 (Slab)

SLA - 013 (Slab)

► Zonenlogik

# 3D-Viewer





# Chart

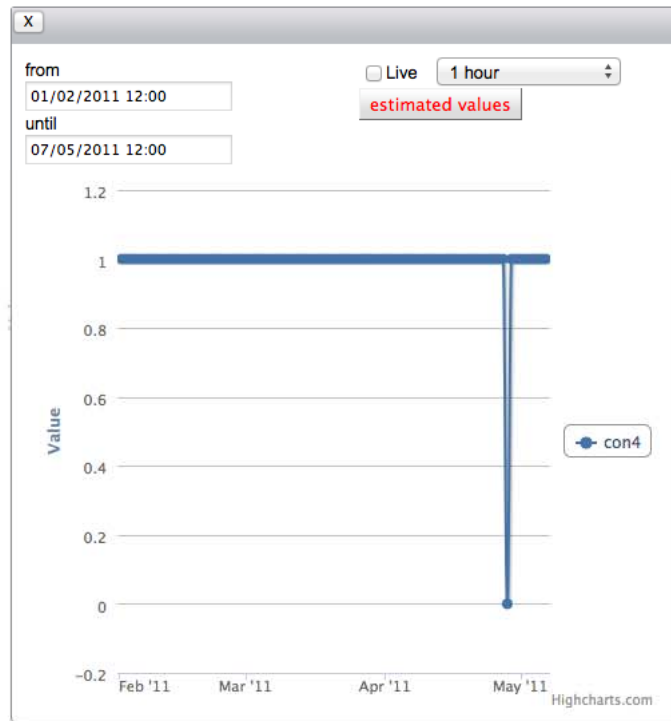
- Desktop
- Charts
- Feedback
- Export
- 3D

**Search**

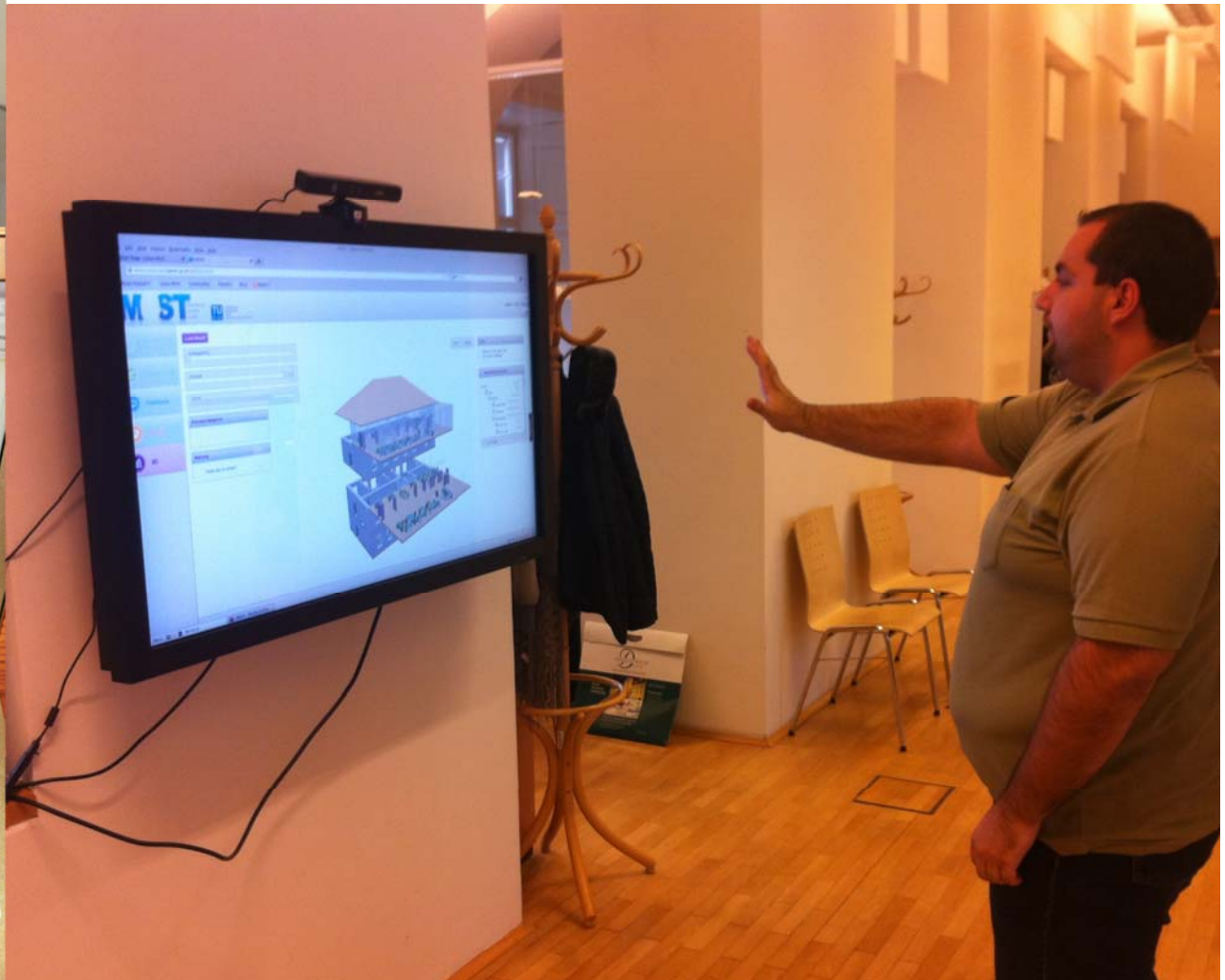
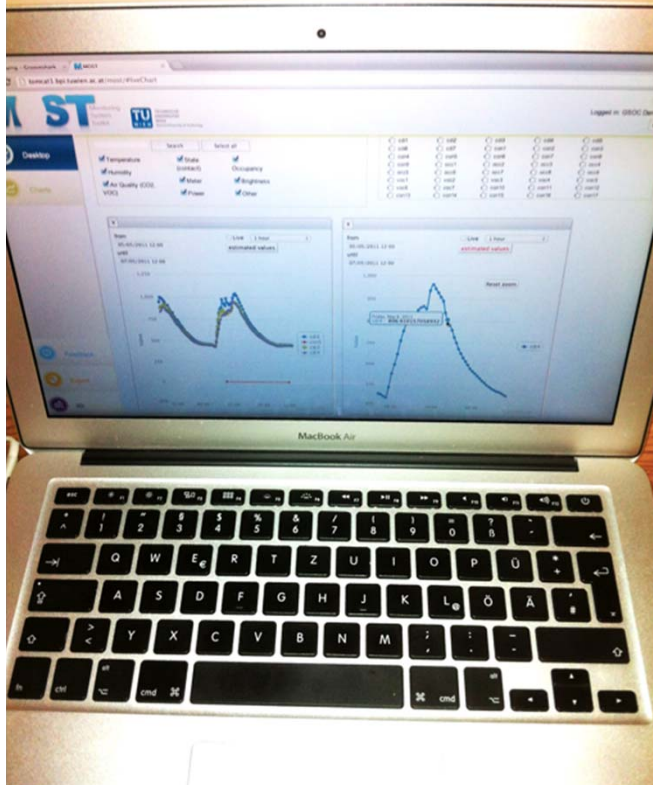
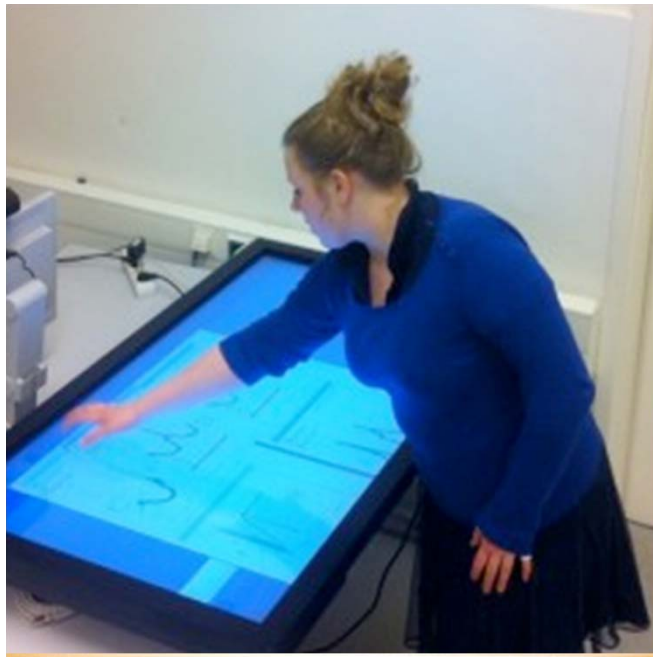
Temperature   
  State (contact)   
  Occupancy  
 Humidity   
  Meter   
  Brightness  
 Air Quality (CO<sub>2</sub>, VOC)   
  Power   
  Other

**Data point output**

<input type="radio"/> cdi1	<input type="radio"/> cdi2	<input type="radio"/> cdi3	<input type="radio"/> cdi4	<input type="radio"/> cdi5
<input type="radio"/> cdi6	<input type="radio"/> cdi7	<input type="radio"/> con1	<input type="radio"/> con2	<input type="radio"/> con3
<input type="radio"/> con4	<input type="radio"/> con5	<input type="radio"/> con6	<input type="radio"/> con7	<input type="radio"/> con8
<input type="radio"/> con9	<input type="radio"/> occ1	<input type="radio"/> occ2	<input type="radio"/> occ3	<input type="radio"/> occ4
<input type="radio"/> occ5	<input type="radio"/> occ6	<input type="radio"/> occ7	<input type="radio"/> occ8	<input type="radio"/> occ9
<input type="radio"/> voc1	<input type="radio"/> voc2	<input type="radio"/> voc3	<input type="radio"/> voc4	<input type="radio"/> voc5
<input type="radio"/> voc6	<input type="radio"/> voc7	<input type="radio"/> con10	<input type="radio"/> con11	<input type="radio"/> con12
<input type="radio"/> con13	<input type="radio"/> con14	<input type="radio"/> con15	<input type="radio"/> con16	<input type="radio"/> con17





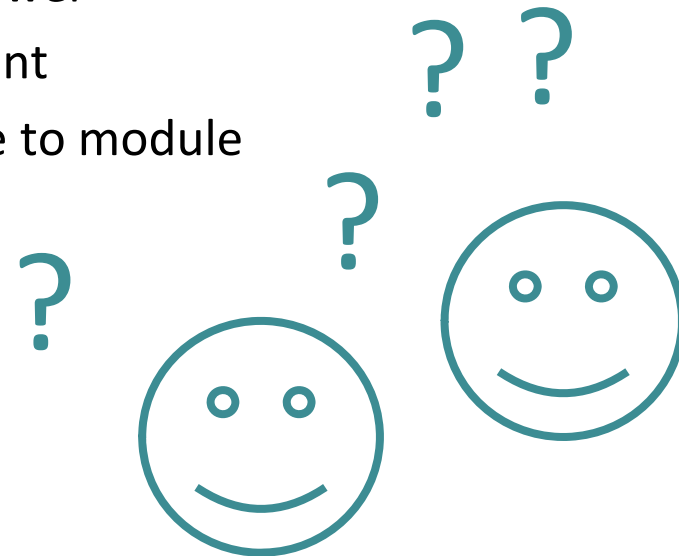


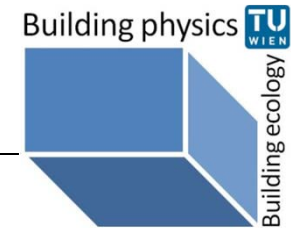


## Outlook – Usability Study

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- Different User Groups
  - Mouse / Keyboard
  - Touch
  - Gesture
- Tasks
  - Select datapoints within the 3D-Viewer
  - Create chart plot of certain datapoint
  - Drag and Drop widget from module to module
- Usability Guidelines
  - Sustainable
  - Analysis of Input Process





## Outlook - Data

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- NoSQL
  - Big data tables
- Complex datatypes
  - Building models
- RESTful Webservice for MOST
  - Datapoints
  - Zones
- Moving towards Service Integration
  - BIM
    - BimServer
  - 3rd Party Services
- Optimize Model Transmission
  - Processing
    - Image Pyramids

## Conclusion

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- BIMsurfer 2012
  - <http://bimsurfer.org>
- BIMserver 2012
  - <http://bimserver.org>
- Highcharts JS 2012
  - <http://www.highcharts.com>
- Open-Source / Creative Common License
  - <http://most.bpi.tuwien.ac.at>