Optimierte Anlagenplanung mit BIM
Building Information Modelling

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Tomorrow is Shaped by Yesterday

• BIM is a direct response to the dynamic changes that are occurring in buildings and construction.
• Creating an environment and infrastructure that can adapt as technologies and people evolve.
The Past 50 Years Are Accelerating Changes

**Fire safety and security**
- Fire and gas detection
- Extinguishing
- Evacuation
- Access control
- Intrusion detection

**Danger management**
- Safety and security systems
- Fire safety systems

**Integrated safety and security management**
- Intelligent Response
- IT convergence
- Security convergence

**Smart Buildings**
- Enhanced management

**Building monitoring**
- Heating, ventilation, air conditioning control
- Functional controllers

**Building automation**
- Building automation
- Building management
- Building control

**Building performance**
- Energy management
- System integration (TBS)
- Home automation
- Green buildings
- Remote-controlled building management

**Smart Buildings**
- Green applications
- Intelligent buildings
- Green buildings
Speed of Change

0 1 2 4 8 16 32 64 128 256
The holistic view

Planning
Construction
Integration
Commissioning
Operation
Rebuild

Operation
Optimization
Energy Conservation
Obsolescence
Future proofing our buildings - Change is the Only Constant

- Changing Demographics
- Changing Technology
- Changing Expectations
- Changing Budgets
- Changing Players
- Changing …. 
BIM
Building Information Model

- Efficient buildings live@l+b
- BACnet
- CABA
- enOcean alliance
- KNX
- BACnet
- Open metering system
- unknown source internet
BIM is very present in press and conferences

BIM in the press...

Digitaler Rück bei Bau- und Gebäudetechnik

Die bei Internationalen Bauprojekten bereits erfolgreich eingesetzten Planungsmethoden Building Information Modelling (BIM) erlangen momentan große Aufmerksamkeit in Deutschland. Die Technologie ermöglicht es, dass also früher Aufgaben in einer Projektphasenfolge durchgeführt werden, die in der Vergangenheit für öffentliche Kritik genannt wurden. Entscheidend für eine effiziente Nutzung von BIM in der Projektplanung ist ein enges Team von Experten aus allen erforderlichen Bereichen.

The BIM hub counts more than 30 global conferences & events in the month of May only

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Name</th>
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<tbody>
<tr>
<td>3 May</td>
<td>BIM World Congress 2015</td>
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<td>31 May</td>
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Bessere Mut zur Lücke statt 100 % Perfektion

What is BIM?

It's a method
BIM = Build twice

Virtual

Physical

Simulation

PreFab
Industry 4.0

Die Evolution zu Industrie 4.0 in der Produktion

Quelle: DFKI (2011) / frei verwendbar © Siemens AG
Example of modern ship yards

Fotos: Werksotos Meyer-Wert Pappenburg
BIM is a method along planning, a building data model to document, simulate, construct & operate buildings.

<table>
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<th>4D</th>
<th>5D</th>
<th>6D</th>
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<tr>
<td>(3D Model)</td>
<td>(Schedule)</td>
<td>(Cost)</td>
<td>(Building Lifecycle Information)</td>
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- **eLibrary:**
  - Who?
  - When?
  - Where?
  - How much?

Dimensions of the data model... more to come!
Level of Detail in 3D-CAD
Virtual Reality 1
Virtual Reality 2
Virtual Reality 3
Virtual Reality 4
BIM is changing product documentation requirements
BIM Objects
Products have be present in the CAD-system
optimized plant engineering and construction

only with

coordination, collaboration and live cycle focus
Parallel development in plan and build phase will significantly reduce realization time

Source: CIFE Stanford
BIM optimizes collaboration by connecting people, information and processes

Today’s and tomorrow’s collaboration models…

- Today’s projects are made up of **many participants**, playing **different roles**
- Each participant has **own goals**, agendas and priorities.
- Each participant uses **different tools, formats and standards**

BIM can become the enable of real collaboration

Source: Graphisoft / Building smart
Building Information Modeling

- **Parameterized** digital modeling
- Components of the building are represented as **objects**, can have relations, etc.

- Models are used for e.g.
  - Energy calculations
  - Clash detection
  - Cost calculation
  - Construction planning
  - etc.
Example: Clash Detection
Clash Avoidance Process

1. Ask Yourself:
   1. Am I empowered to make the decision?
   2. Does the issue involve code compliance?
   3. Does solution require engineering?
   4. Do I have right of way?
   5. Does it impact the Facility Users?
   6. Is this the best cost effective solution?

2. After going through the questions can I solve the clash myself?
   - Yes: Have meeting, resolve clashes.
     1. Does issue involve code compliance?
     2. Does solution require engineering?
     3. Who has right of way?
     4. What criteria leads to who has right of way?
     5. What is the best cost effective solution?
   - No: Define what Trade Partners are impacted

3. Define what Trade Partners are impacted
4. Create resolution proposal to show impacted Trade Partners
5. Immediately contact Trade Partners that are impacted to resolve
6. Does resolution interfere with more trades?
   - No: Bring solution to team
   - Yes: Clash Solved!
Cable trays and the war of pipes
Today's building processes …
Building twice
Virtual planning – physical construction
Speed of Change

0 1 2 4 8 16 32 64 128 256
Are we fast enough?
Questions?