buildingSMART in Norway
“a Norwegian IFC story and lessons learned”

Jøns Sjøgren
Program Manager buildingSMART-Norway
Chairman IAI Nordic Chapter
Norwegian Homebuilders Association
Today’s “document centric” situation
Some of the challenges with this model

• Within the same domain there is often significant communication errors and loss of project information

• 25-30% of the construction cost is caused by splitting up of processes and lousy communication

• The same information is re-entered on average 7 times in different systems before the building is handed over to owner organization

• Same information is re-created several times by different software
Tomorrows “information centric” model

Architect
Civil Engineer
Building Owner
Facilites Manager
Material Producer
Construction Manager
Controls Engineer
B.S. Engineer
Structural Engineer
The Tower of Babel, by Pieter Bruegel (c. 1525-69)
Why and how to solve the Babylonian confusion in the AEC industry?

GOAL: 
”reduce uncertainty and improve decision making and communication in the BUILDING LIFE-CYCLE”

ENABLERS:

language
• concepts
• words
• definitions
• grammars

enterprise understanding
• Enterprise models
• Enterprise architectures

ICT tools
• shared data models
• shared interfaces
• software

EFFECT:
• ”cheaper and better BUILDINGS and PROJECTS both as constructed, used and maintained”
• improved data and information management
buildingSMART in Norge
- ”develop eCollaboration based on buildingSMART”

buildingSMART Board

IFC in The AEC industry
BIT-Bygg

[Diagram with various logos and text]
Participants

- The Federation of Norwegian Construction Industries
- Association of Consulting Engineers
- Association of Architects
- Norwegian Homebuilders Association
- Norwegian Construction Products Association
- The Organization of Timber and Building Materials Merchants
- Association of Technical Entrepreneurs
- The Norwegian Joinery Manufacturers Association
- Norwegian Master Builder Association
- Standards Norway
- SINTEF/Byggforsk - Norwegian Building Research Institute
- Statsbygg - The Directorate of Public Construction and Property

Funding partners
- Innovation Norway
- Building Cost program
buildingSMART
Objectives

• Define **structure and method** for behavior for tomorrows building- and construction industry
  – nationally and internationally

• Make Norwegian industry **competitive** through optimalised use of technology.

• Be the most important **innovation pillar** in the industry
buildingSMART Work Packages (WP)

• Semantic technologies
  – WP-IFC-IDM (data model and information exchange requirements)
  – WP-BARBi-IFD (ontology project) International Framework for Dictionaries

• eCollaboration & eProcurement
  – WP-Electronic collaboration
  – WP-Product information
  – WP-Changes in business processes
  – WP-eGovernment

• Knowledge based systems (KBS)
  – WP-Knowledge systems

• Norway as player in the global knowledge economy
  – WP-International business development
Implementation arenas for buildingSMART-technology

- Nye A-Hus Hospital
- HITOS STATSBYGG
- The typical Building project

buildingSMART – work packages

- IFC/IDM
- Product-information
- eBusiness
- E-govmnt
- International business
- IFD
- Knowledge Systems
- Change

[Logos of Norges forskningsråd, Byggekostnadsprogrammet, FAM, Innovasjon Norge]
...we are not alone

building SMART is the brand of IAI (International Alliance for Interoperability)

13 Chapters  ~40 Countries  >600 Organisations
Mission IAI

• To define, promote and publish a specification for sharing data:
  • throughout the project life-cycle
  • globally
  • across disciplines
  • between software applications

The Norwegian buildingSMART Project
Goals

• Set the standard for object-based data exchange and sharing of virtual buildings:
  • IFC model
    – create a comprehensive information specification
  • Dictionary
    – use standard names and definitions of properties for IFC extensions
  • Exchange Requirements
    – define information requirements and rules for particular business processes
  • Reference Processes
    – establish standard process descriptions that can be extended for projects
**Enterprise Interoperability Center (EIC)**

**Founding Members**

<table>
<thead>
<tr>
<th>IAI</th>
<th>UniSG</th>
<th>ESI</th>
<th>FHG IPK</th>
<th>DFKI</th>
<th>SINTEF</th>
<th>INSEAD</th>
<th>UNINOVA</th>
<th>IBM</th>
<th>Microsoft</th>
<th>SAP</th>
<th>Troux</th>
<th>INTRACOM</th>
<th>consult</th>
</tr>
</thead>
</table>

[Image of logos for founding members]
104 Member Organisations.  
145 Countries served.  
Local services, global reach.
buildingSMART is about exchange and sharing of information

Building application – E-submission
- Local authority
- Building permit

Knowledge databases
- Best practice
- Specific knowledge
- Company knowledge

Briefing
- Functions
- Estimates
- Budget
- Requirements

Demolishing, re-use
- Renovation
- Demolishing
- Reconstruct

FM Operation
- Renting, sale and use
- Maintenance
- Warranty

BIM software
- Drawings
- Arch, HVAC, EL, CivEng

VRML
- Visualisation

SIMULATIONS
- Indoor climate
- Air, heating
- Lifecycle cost analysis
- Light and acoustics
- Energy use
- Fire and hazards
- Environmental impact
- Life expectancy

Codes and regulations
- Building codes
- Building regulation
- Central authority

Specification
- Specified Bill Of Quantities
- Standardized texts
- Cost estimates

Tendering
- Product databases
- Price databases

Pictures from: Selvaagbygg, DDS, Byggforsk, NBLN University of California, CIFE Stanford, Pythagoras and Oluf Granlund Yo.
"Lessons learned" from Norway

• Start with owners and motivate them by seeing the potential for improved sustainability (less energy consumption, less construction material usage, less waste…)

• Motivate medium-sized software developers through the new business opportunities

• Focus on "seeing is believing" – demonstrate what is possible and stop talking – Just Do It 😊

• Motivate government to see the potential for efficiency and freeing up resources for more value adding activities

• Motivate educational institutions to see the potential for new roles and new ways of providing knowledge
Many Norwegian software vendors support IFC and are contributing to the buildingSMART process.
• building **SMART** is possible now!
• challenges ahead of course, but there is no reason not to get involved
• applications support the key processes and are increasing to widen coverage

Demand IFC import/export from your software vendor