AALBORG UNIVERSITY

Building Informatics

# IKT STØTTET SAMARBEJDE

## IKT i Byggeprocessen

Cand. Scient. Bygningsinformatik/Byggeledelse.
Semester 1, 2010.

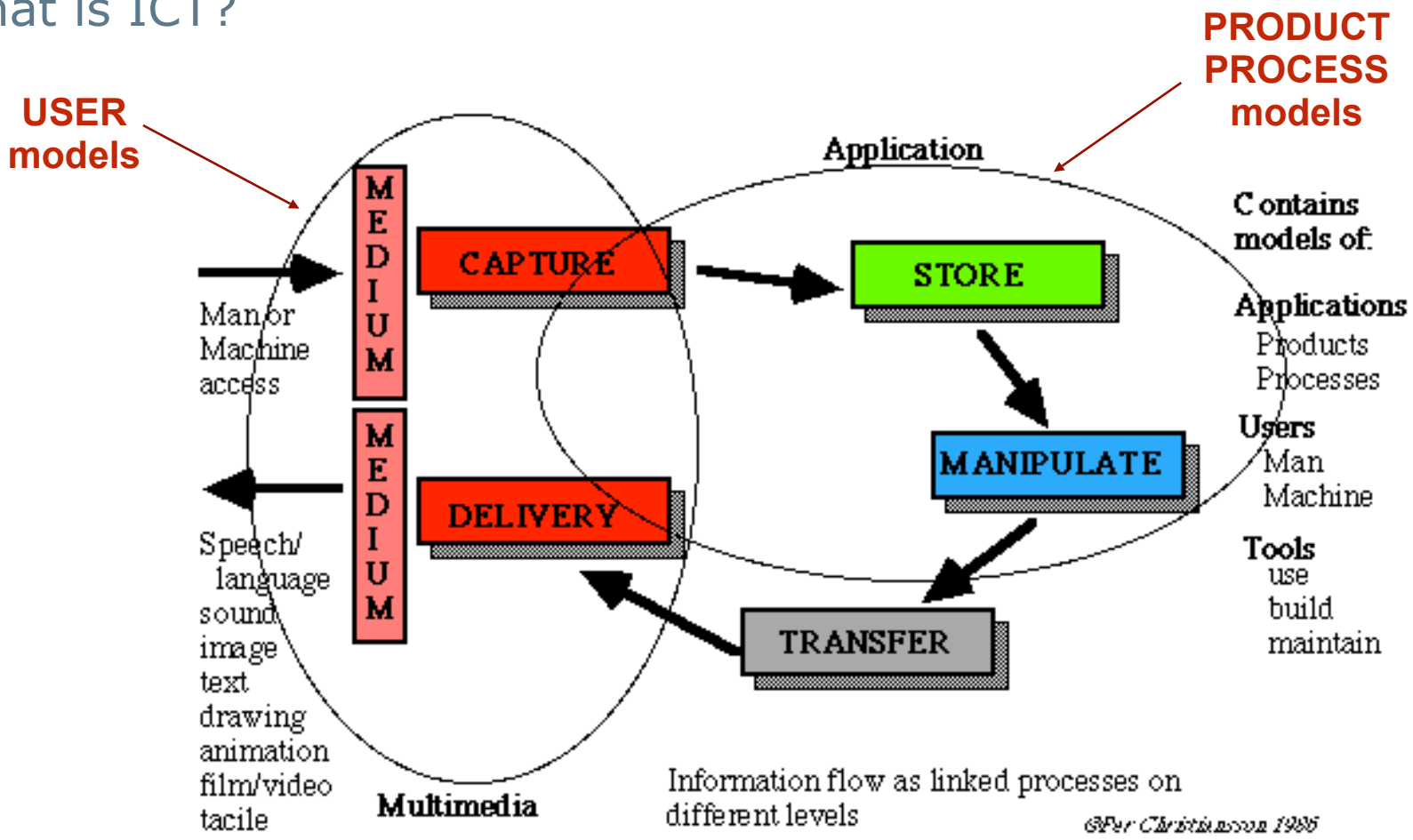
31.3.2010 PC/KS

# CONTENT

- Samarbejdsværktøjer og deres egenskaber.
- Eksempler: Projektwebs, video konferens, applikationsdeling,
  Virtual Reality, MultiMedia...
- Samarbejde på modeller
- IKT aftale

Samspillet mellem projektering og udførelse af bygge- og anægskonstruktioner. Formidling af projektets arbejdsresultater og arbejdsprocesser. Metoder og støtte til organisering af samarbejdet (gruppe projekt, byggeprojekt, arbejdsplads). Ta stilling til aktører, roller, parter og de aftal som skal laves mellem parterna og hvilke BIM modeller som skal indgå og hvordan de kan struktureres

# What is ICT?



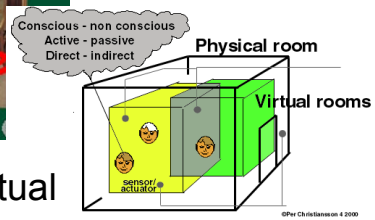

ICT (Information and Communication Technology) may be defined as the technologies to support capture, storage, manipulation, communication and delivery of information on different application levels (from macro to micro scale) and in different contexts such as technological, organisational, and cultural.

# Collaboration

4 parts video conference, 2008

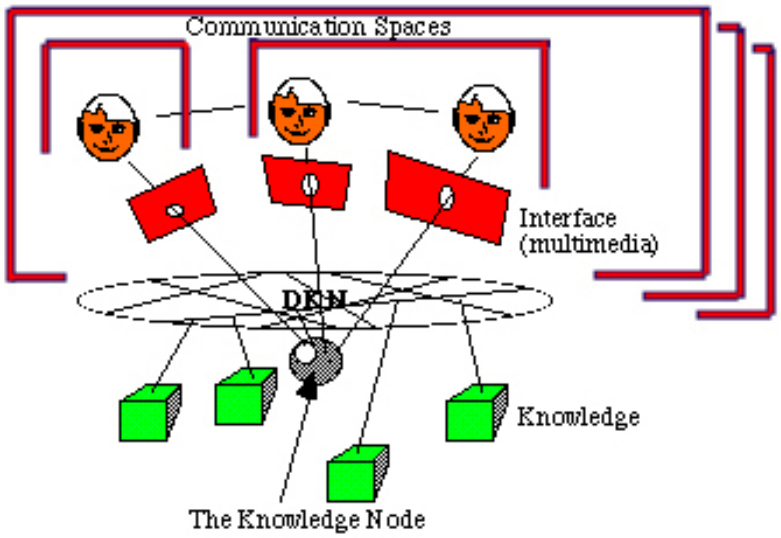

Desktop collaboration

Remote lecture and application sharing between Aalborg and Lund Universities 1999


Flexible workspaces in physical and virtual rooms

# Collaboration Context




- **Participants**; number of, type (persons, agents)
- **Collaboration subject/context & Form of interaction**; design, reviews, purchase, learning, brainstorm, negotiation, discussion,
- **Communication content** to support interaction; e.g. speech, sound, images, music, video, whisper, body language, 3D objects, control information;…..
- **Meeting spaces** and room definitions; physical, virtual, static, dynamic, mobile and combinations.
- **Time** (synchrounous-asynchrounous meetings)
- **Collaboration artefacts**;
- communication channels,
- control and access mechanisms
- user applications, and information containers (Cad, DataWarehouse, simulation..

# Virtual Spaces

A Virtual Space (VS) may be defined as a mixed reality environment optionally involving many physical spaces and many virtual spaces.

A VS may be set-up within *one* building or *many* buildings placed in the local community or on the other side of the world.

A VS do *not* have to be *stationary* but can e.g. follow a person defined as the immediate surrounding of that person. In this latter case wireless connection to the space is a necessity and maybe a complication in interaction with stationary spaces.

A virtual space may provide service to support *many* kinds of activities.
We may define virtual workspaces supporting collaboration, home health care space with access to distant doctors, different communities of interest or practice, virtual city space for service discovery and access etc.

The *impact* on social behaviour, economics, and personal values due to virtual spaces introduction should continuously be monitored and taken into account.

# Workplaces

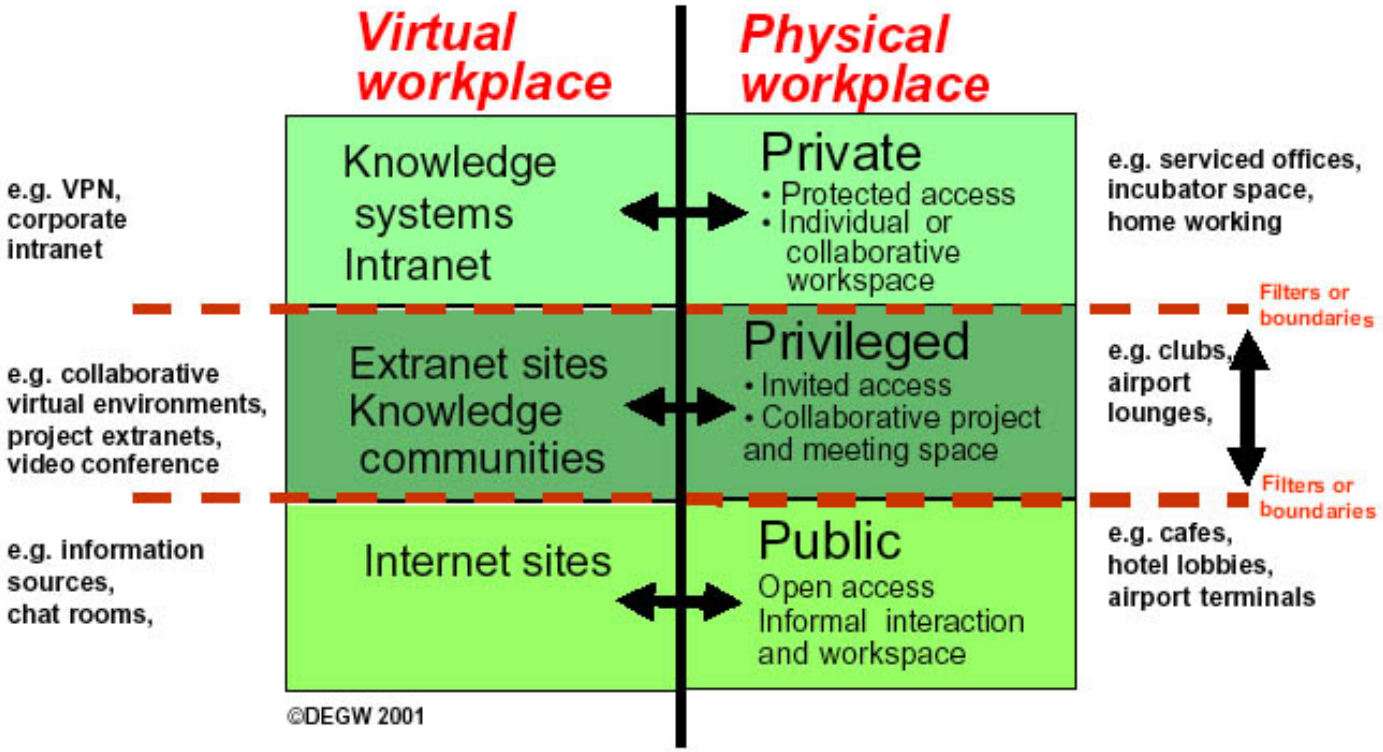


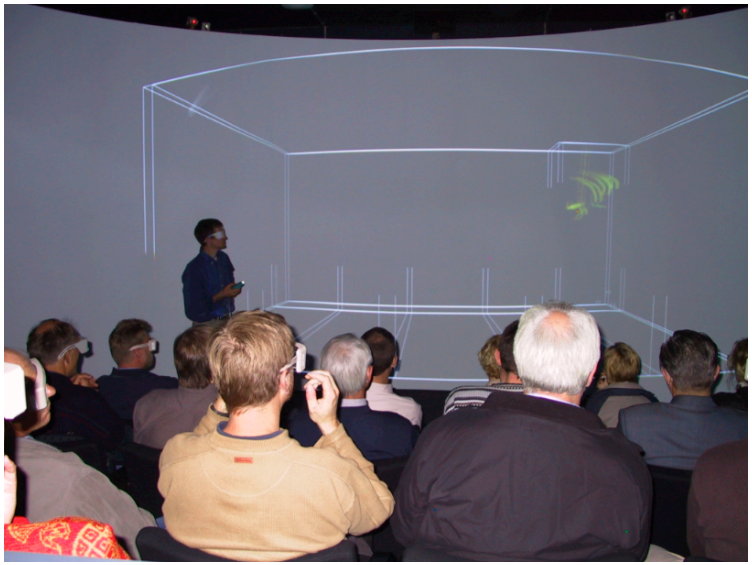

*Figure 1 : SANE Space Environment Model.*
*Source : DEGW 2001*

Status Report on New Ways to Work in the Knowledge Economy. September 2002 (251 pages). Peter Johnston, John Nolan.

# Pioneering work 1968


(from http://sloan.stanford.edu/MouseSite/1968Demo.html) "On December 9, 1968, Douglas C. Engelbart and the group of 17 researchers working with him in the Augmentation Research Center at Stanford Research Institute in Menlo Park, CA, presented a 90-minute live public demonstration of the online system, NLS, they had been working on since 1962 .....This was the public debut of the computer mouse. But the mouse was only one of many innovations demonstrated that day, including hypertext, object addressing and dynamic file linking, as well as shared-screen collaboration involving two persons at different sites communicating over a network with audio and video interface

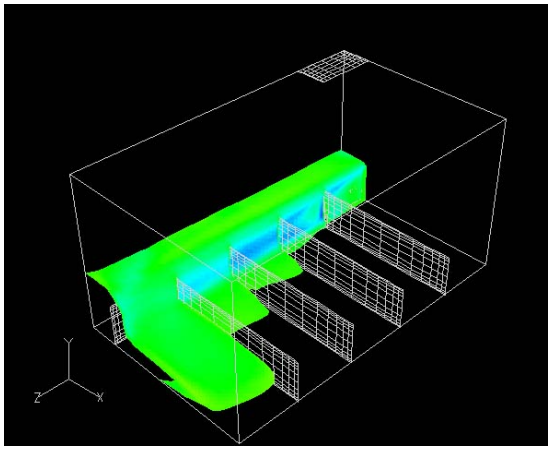
# Virtual Reality




Panorama

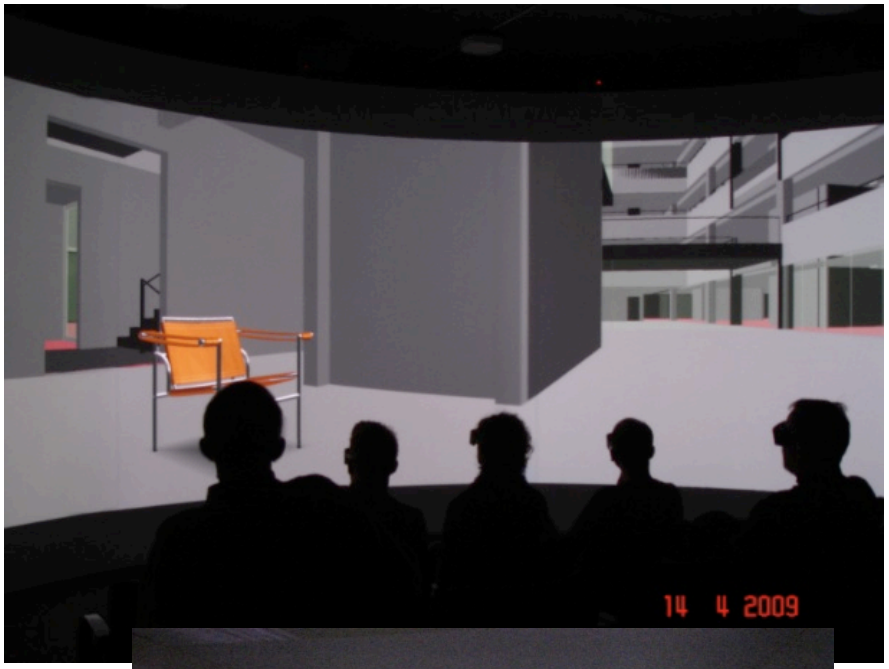

CAVE

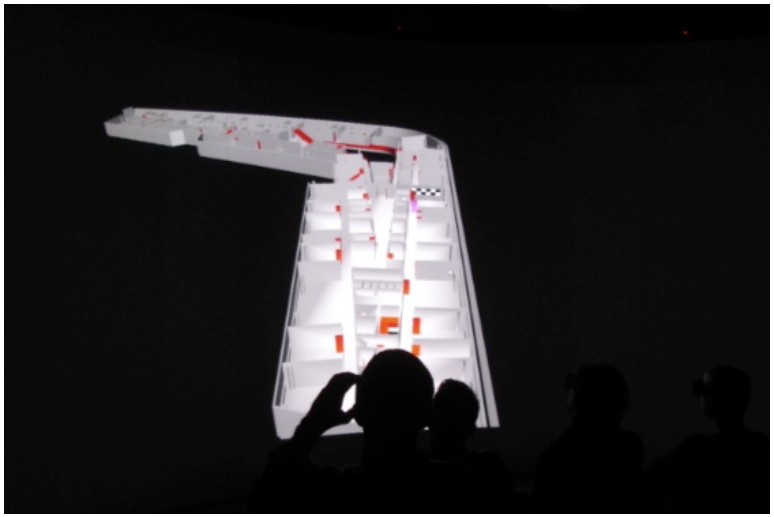
# Virtual Reality



Video

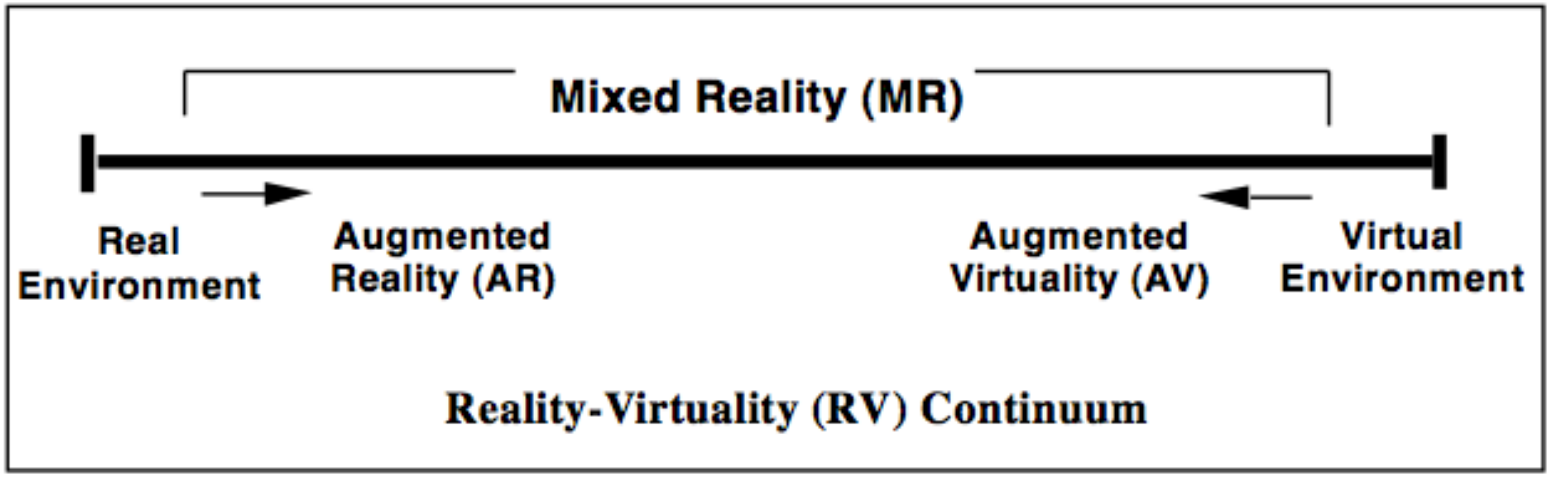
Local




Virtual Reality (VR) in Panorama and Cave

# The Mixed Reality

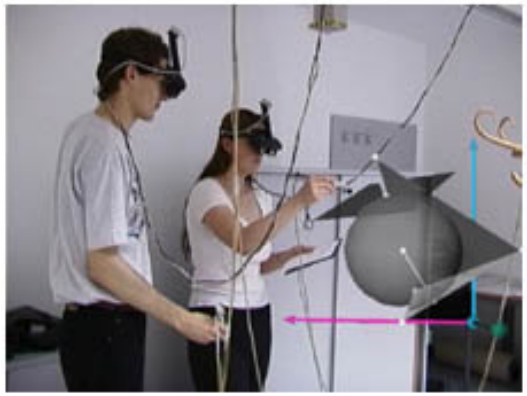


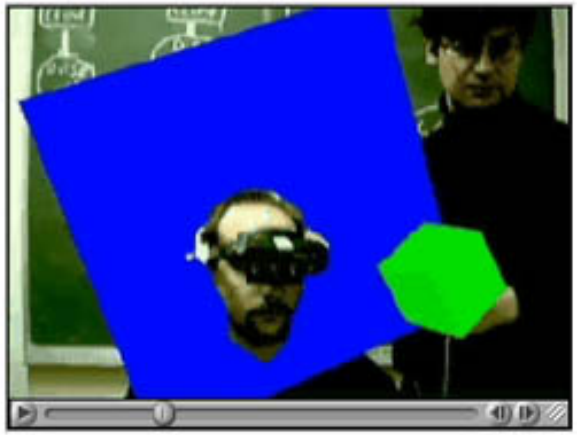

"Simplified representation of a RV Continuum." (Milgram et.al., 1994)

# Augmented Reality

Video

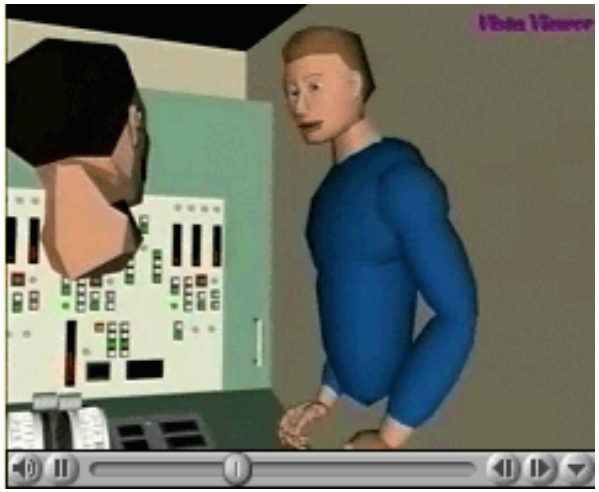

Video Local





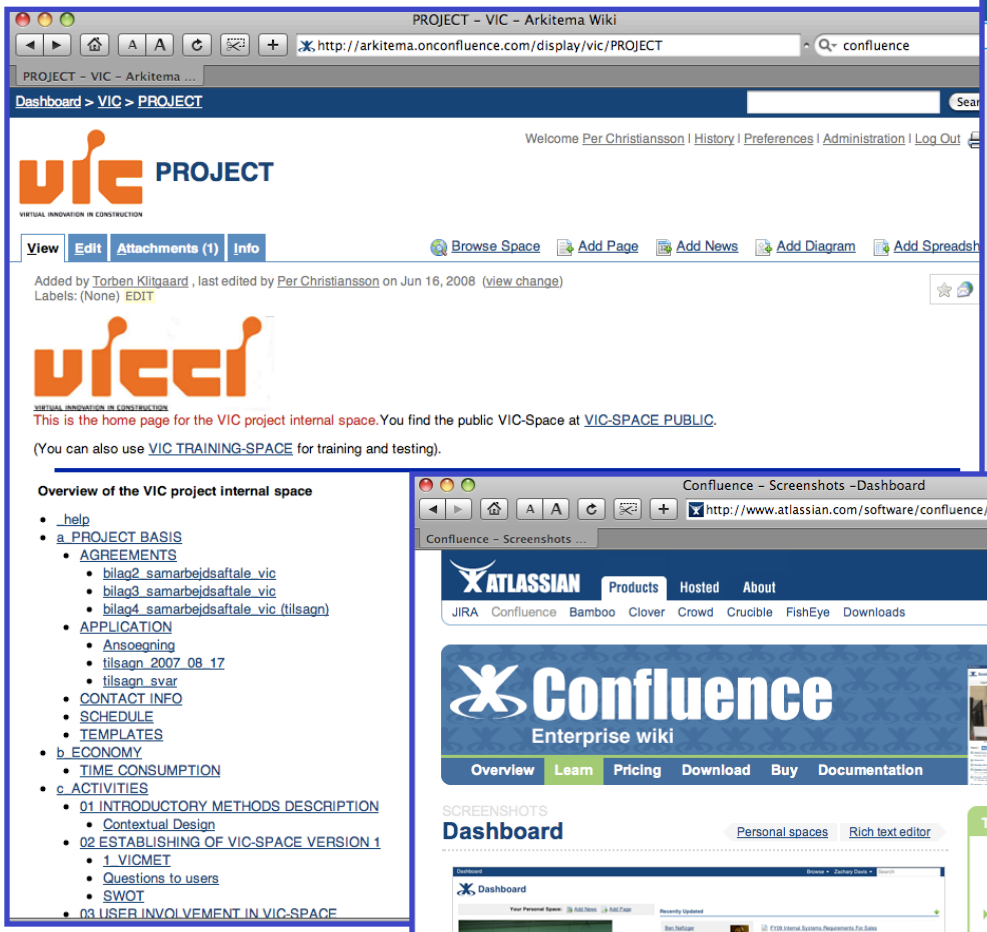
Mixed reality different degree of mix between real world and virtual world

# Virtual Reality Tutors and Training



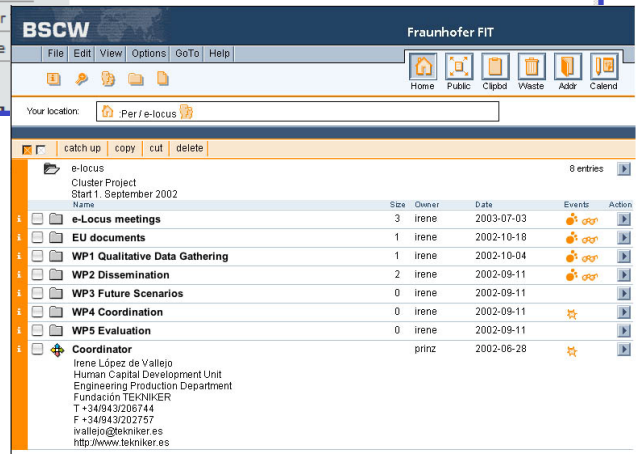
Agents can be used in Virtual Reality environments (virtual classrooms, operational environements, etc.). See for example the Steve agents developed at Center for Advanced Research in Technology for Education (CARTE), Lockheed AI Center and USC Behavioral Technology Laboratories (University of Southern California) http://www.isi.edu/isd/VET/vet.html. Virtual environments for training [local]

# Project webs



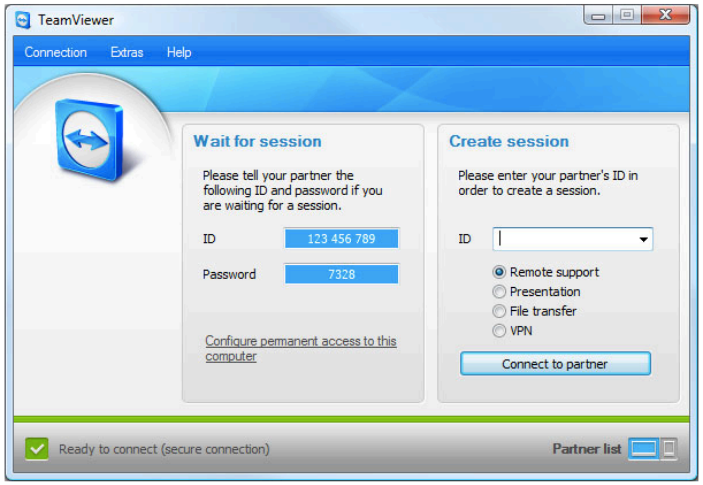


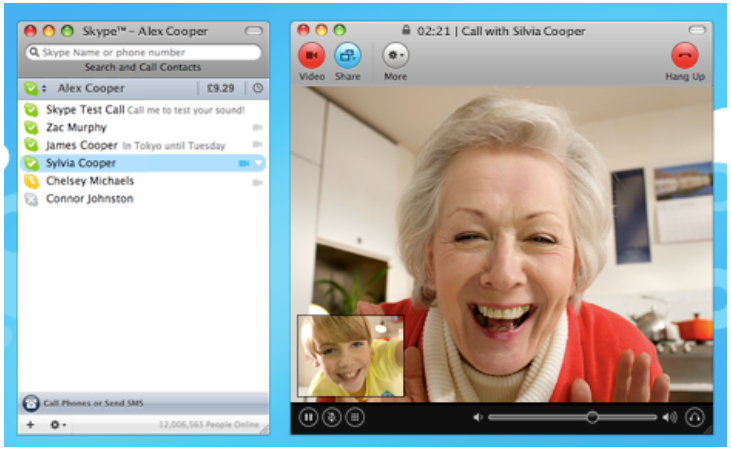


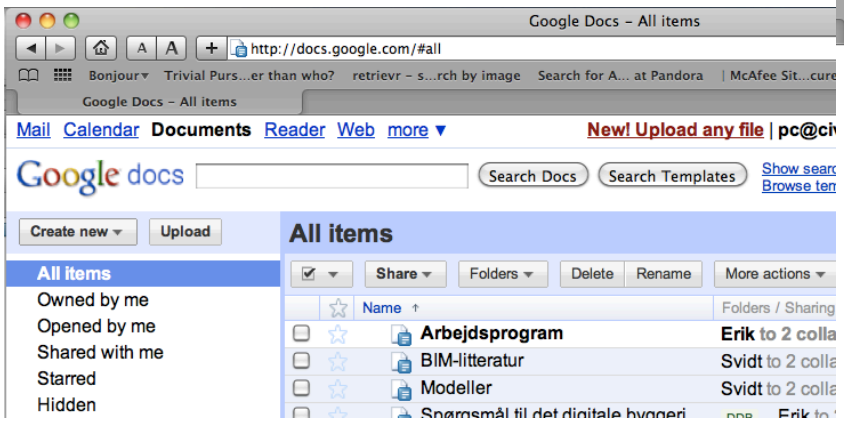



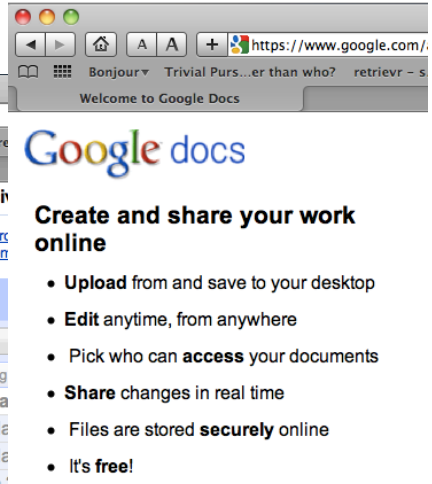

Web based document management and collaboration tools

# Synchronous Collaboration Tools



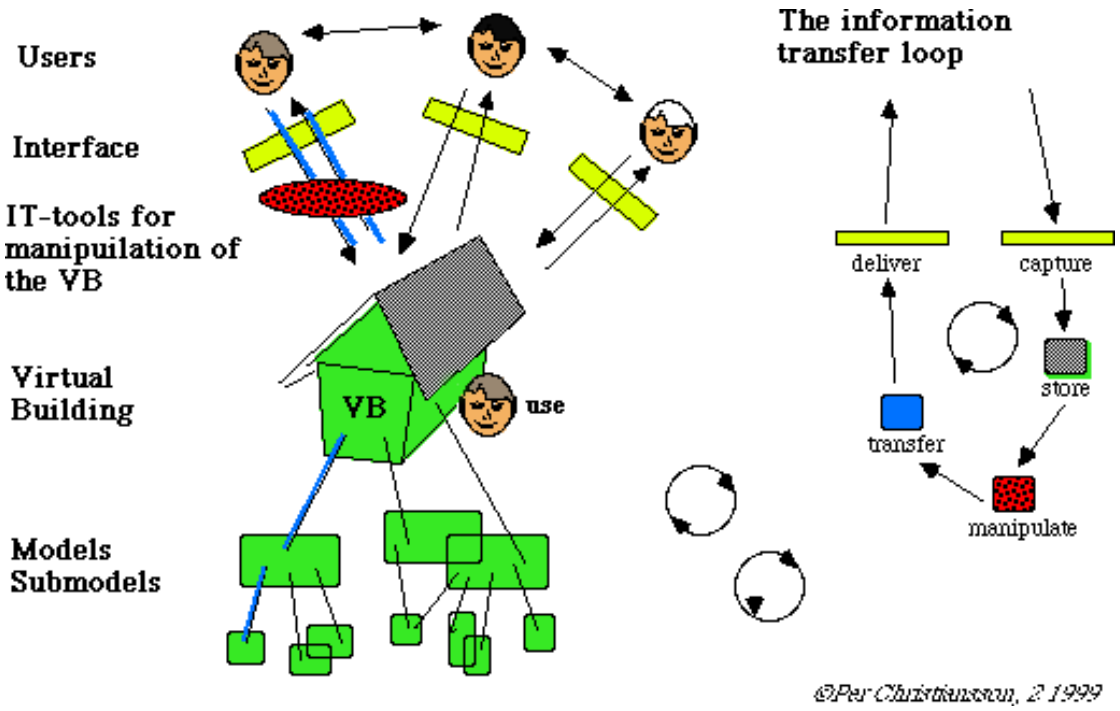




Application sharing
Remote Desktop
Video
Sound
Chat
Multiple users
Telephone
....

# Collaboration support tools

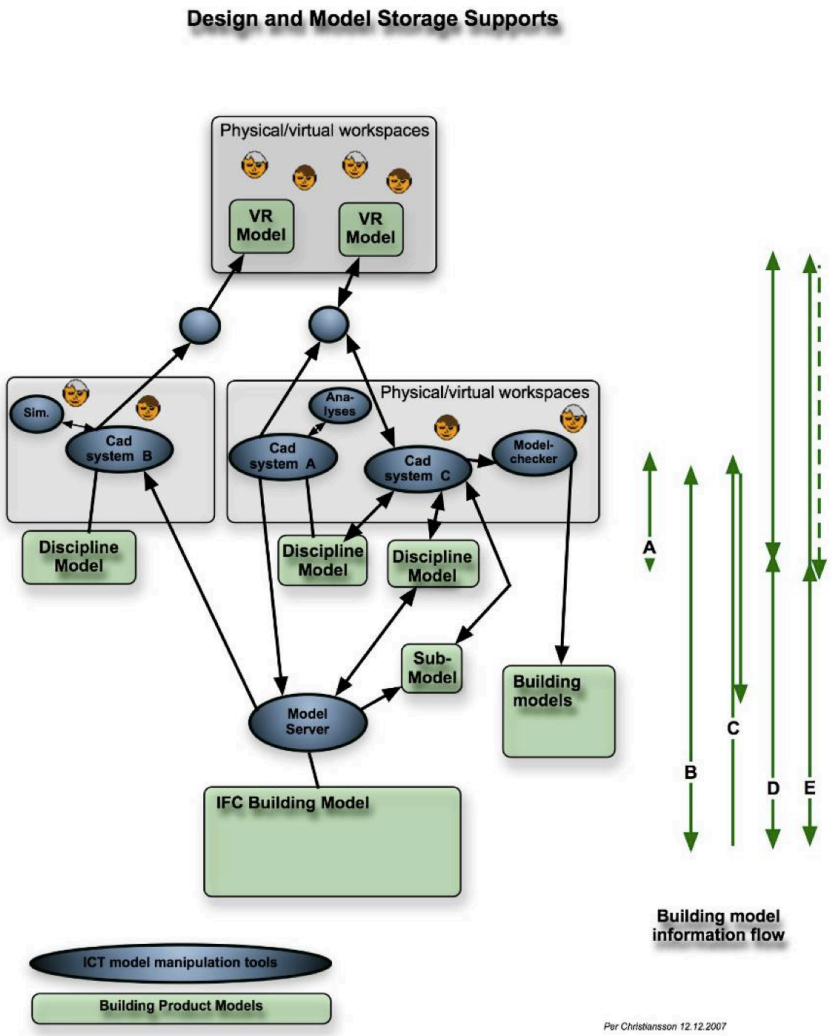
- Teamviewer, http://www.teamviewer.com/. Desktop sharing over Internet.
- Adobe Connect. "Beyond web conferencing". http://www.adobe.com/products/connect/.
- VR4MAX. http://www.vr4max.com/. "VR4MAX Extreme for Windows brings you high-end multi-pipe visualization technology. Link multiple PCs into a cluster and provide output for your virtual reality cubic rooms, panoramic rooms, immersive tables/desks, high-resolution image walls, and multiple desktop monitors. VR4MAX Extreme supports both active and passive stereo projection and a variety of tracking and pointing devices.I want to... "
- Google Docs. http://docs.google.com/ "Create and share your work online. Create, edit and upload quickly. Import your existing documents, spreadsheets and presentations, or create new ones from scratch. Access and edit from anywhere. All you need is a Web browser. Your documents are stored securely online. Share changes in real time. Invite people to your documents and make changes together, at the same time. It's free -- you don't pay a nickel.
- iChat. http://www.apple.com/ichat. Multiple user video communication, chat, and desktop sharing.
- SKYPE (Internet phone, video communication, chat) http://www.skype.com/
- Netmeeting. Microsoft. (Application sharing, white board sharing, etc. using a server) http://www.microsoft.com/windows/netmeeting/. With Netmeeting you can share applications (and the whole desk-top), sketch together (and use individual pointers), sen files, chat, video connection two at time, and remotely control another computer).
- Groove. http://www.groove.net. (Peer-to-peer platform). 'In Groove, you and the users you invite meet in virtual shared spaces where you select tools that let you interact in many different ways: instant messaging ,live voice, file sharing, pictures, threaded discussion, free-form drawing, outlining, video.'
- Yahoo Messenger. http://messenger.yahoo.com/.
- BCSW (file handling on the Internet). http://bscw.gmd.de/
- Lotus Notes (messaging and collaboration system) http://www.lotus.com/.
- CU-SeeMe, 1992 Macintosh, 1994 Windows (Cornell University)
- .....

# The Virtual Building and the ICT loop



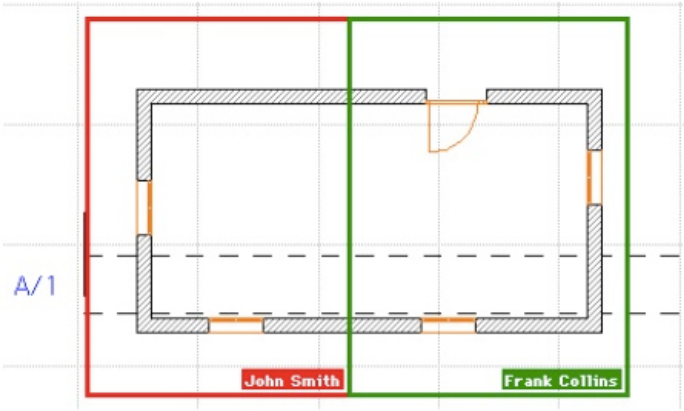

Designers etc *communicate/collaborate* and *access* and *manipulate* building product and process *models*.

# Models of Buildings




Building product models can today be stored shared and distributed and used in more or less mixed reality environments.

# Cad model collaboration



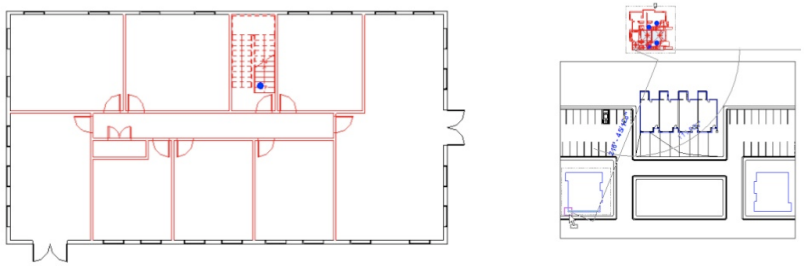

**ArchiCAD**
Teamwork, Hotlinks, Data Exchage, Consultation

Team roles: Administrator, Team Leader, Teammate, Mark-Up and View Only.

The part of the shared project reserved by a Teammate is called a Workspace.

Reservations can be made on any or all stories, layers, sections/elevations, detail drawings, camera/animation paths, layouts, physical area defined by a rectangular or polygonal marquee.

File: cad_ac_manual.pdf



**Revit**
Sharing Projects (page 717)

Project size. Team size, Team memeber roles, Default workset visibility.

Setting up worksets.

Linking Building Models and Sharing Coordinates (page 771)

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# Model Server, Solibri

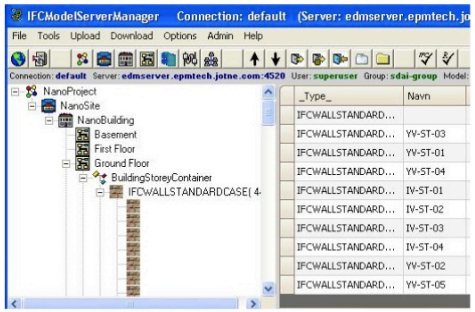



*Figure 15 – IFC containment structure (left) and selected wall objects (right) shown in MSM*

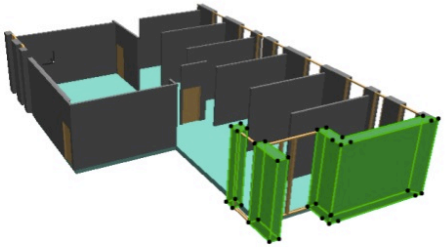
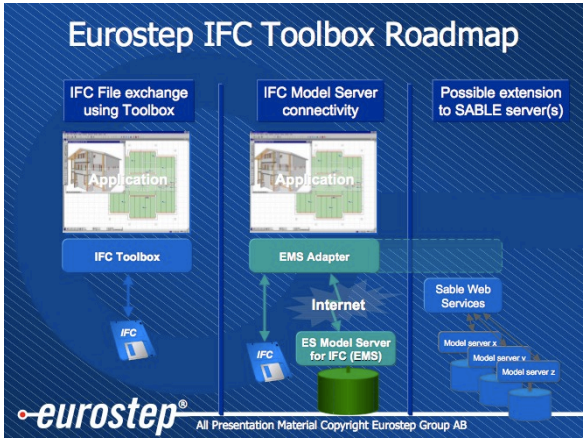
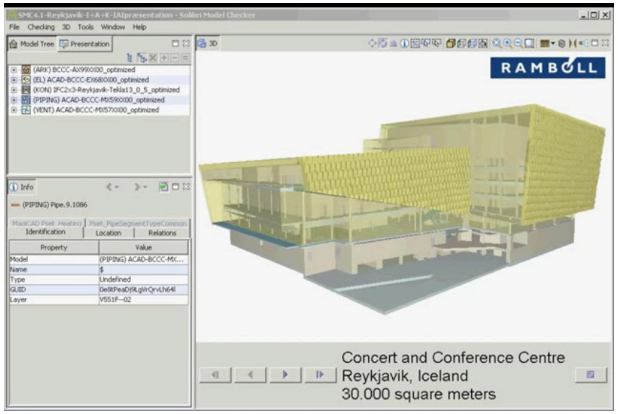


*Figure 16 – The walls which has been changed regarding thickness and material layers*

**Modelserver**
Referense: "Use of IFC Model Servers. Modelling Collaboration Possibilities in Practice". Aalborg University, Aarhus School of Architecture



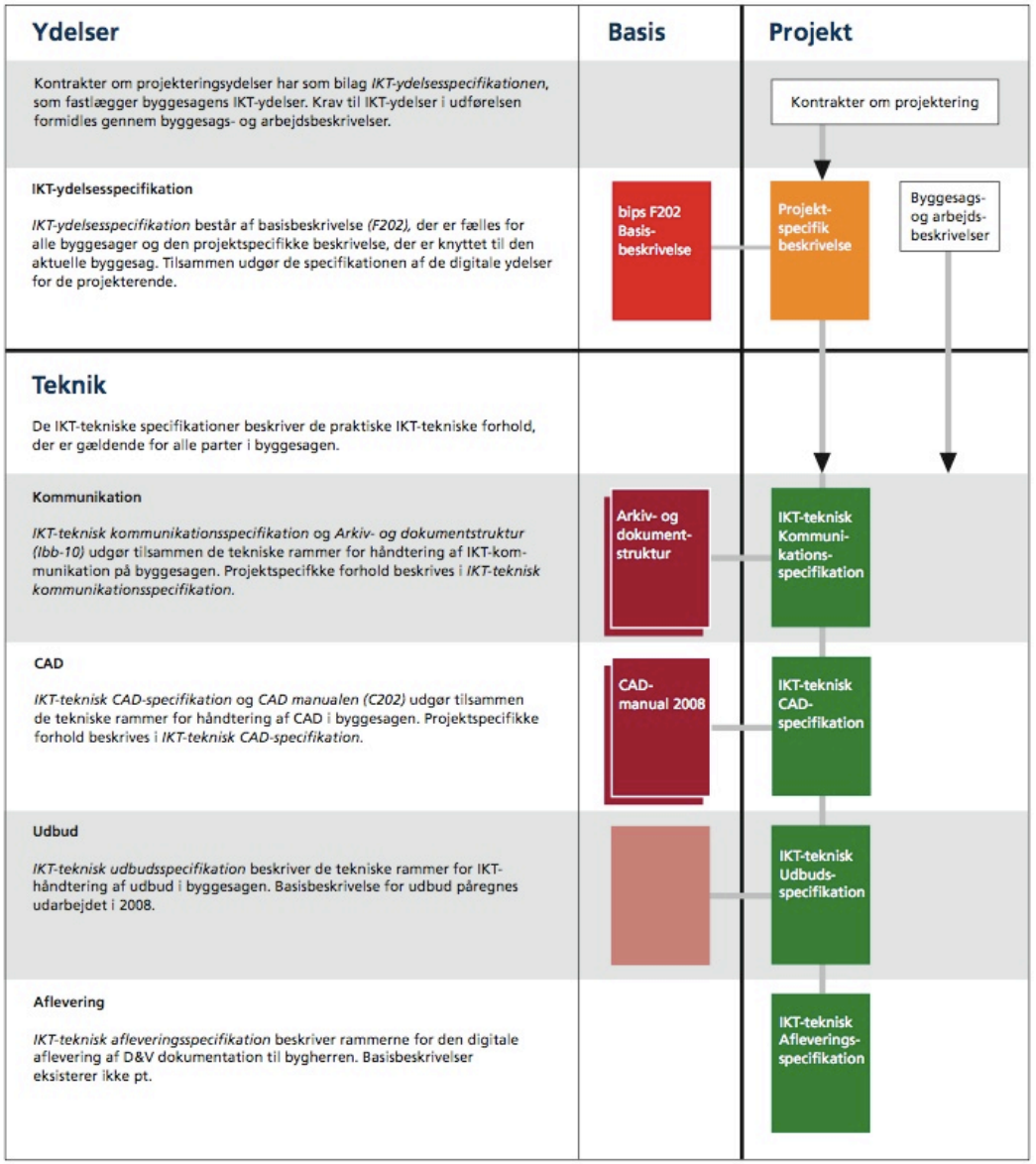

Eurostep modelserver and SABLE Workshop, Patrick Houbaux, September 2003.




Eurostep modelserver præsentation, http://iai-forum.teknologisk.dk/22224
[28155_Reykjavik_DK.wmv - 15 MB]

# IKT aftale

bips F102, **Byggeriets IKT-specifikationer, anvisning** - juni 2008.
Formålet med denne anvisning er, at understøtte byggebranchens parter i den digitale håndtering af byggeprocessen. Anvisningen er en udbygning og erstatning af de hidtidige anvisninger for IKT-aftaler - CAD-projekt-aftale 2005 C205, 3D CAD projektaftale 2006 og Erhvervs- og Byggestyrelsens IKT-aftale.




**Kravkonfiguratorn**. AAU\Per, PC7531.
http://www.driftsdata.dk/
"Kravkonfiguratoren er et praktisk redskab til at specificere det konkrete indhold af digital aflevering både under byggesagens forløb og ved byggeriets afslutning. Såfremt der i byggesagen anvendes en projektweb, kan det aftaltes, at data alene gøres tilgængelige på denne.

Kravkonfiguratoren henvender sig primært til den professionelle bygherre og driftsherre, som stiller bygherrekrav om digital projektering og som selv arbejder objektbaseret med digitale driftssystemer. Kravkonfiguratoren lægger dermed op til, at projekteringen er gennemført med anvendelse af objektbaseret bygningsmodel, hvilket dog kan fravælges"

# Referenser

Christiansson P, 2001, "Experiences from Using Internet Based Collaboration Tools". 'Konference om Arkitekturforskning og IT'. Proceedings Conference on Architectural Research and Information Technology. Nordic Association for Architectural Research. Arkitektskolen i Aarhus 27.-29. april 2001. (pp. 103-112). http://it.civil.aau.dk/it/reports/r_aaa_2001.pdf

Byggeriets IKT-specifikationer anvisning F102. BIPS. (66 pp.)
[Education/reports/f102_spec_bips.pdf]

RevitArchitecture2009. MetricTutorials. '20. Sharing Projects' (pp. 717-737), 'Linking Building Models and Sharing Coordinates' (pp.771-799). [Education/reports/cad_re_manual.pdf]

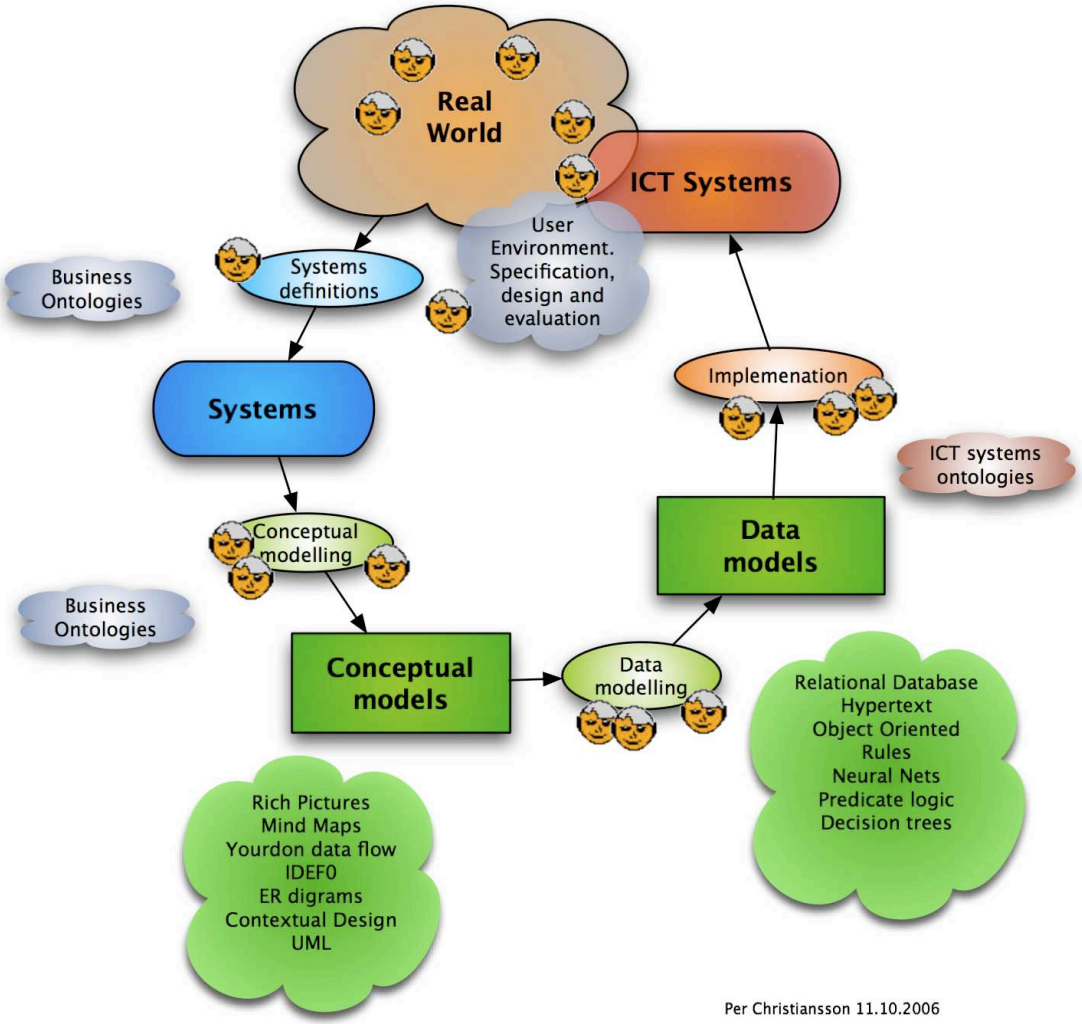
ArchiCad Reference Guide. Graphisoft. Collaboration (Teamwork) (pp. 459-481).
[Education/reports/cad_ac_manual.pdf]

Jørgensen, K. A., Skauge J., Christiansson P., Svidt K., Sørensen K. B., Mitchell J. (2008) "Use of IFC Model Servers. Modelling Collaboration Possibilities in Practice". Aalborg University, Aarhus School of Architecture, and University of New South Wales. May 2008. (60 pp.). http://it.civil.aau.dk/it/reports/2008_Ifc_model_server.pdf

END

http://it.civil.aau.dk

# System Development




In the *real world* we identify activities, things, processes, context, and persons.

The real world can be described as (interrelated) *systems* (no de-facto structure is available today) to accomplish different *functions* e.g. a comfort system to provide personal living and working quality, personal transport system, load carrying building system, escape system, and communication systems (collaboration, knowledge transfer, mediation, virtual meeting).