Chair for Information Architecture | HS2008

Elective Course Information Architecture

Responsive Environments

Prof Dr Gerhard Schmitt

November 10, 2008

iA
Chair for Information Architecture

Responsive Environments

Overview

- Ubiquitous Computing
- Technologies pervading Space - Examples
- Quality Characteristica
- The changing Relationship with the Environment
- Diplomwahlfach
- Notice L7/L8

Responsive Environments

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Ubiquitous Computing

This paradigm is also described as pervasive computing, ambient intelligence, or more recently, everyware.

When primarily concentrating on the objects involved, it is also physical computing, the Internet of things, haptic computing, and things that think.

Definitions and Principles

‚The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.‘

Marc Weiser, 1991

Definitions and Principles

Ubiquitous Computing is...

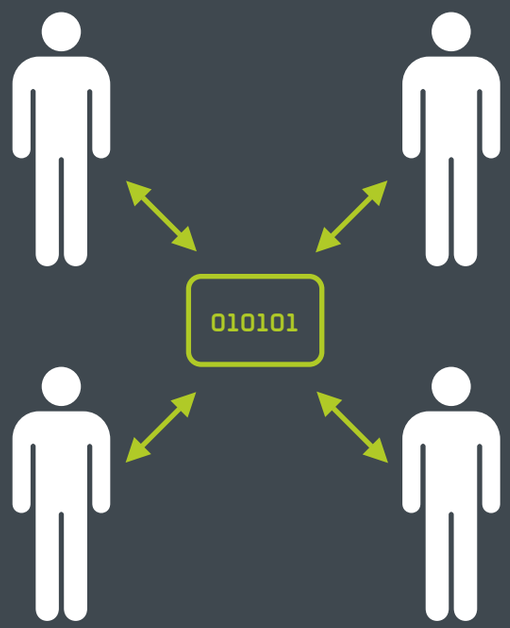
- numerous, casually accessible, often invisible computing devices

- frequently mobile or imbedded in the environment

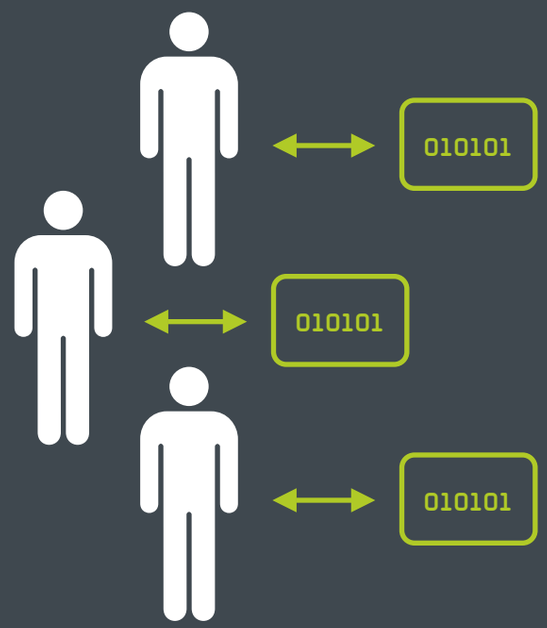
- connected to an increasingly ubiquitous network structure

Development Stages

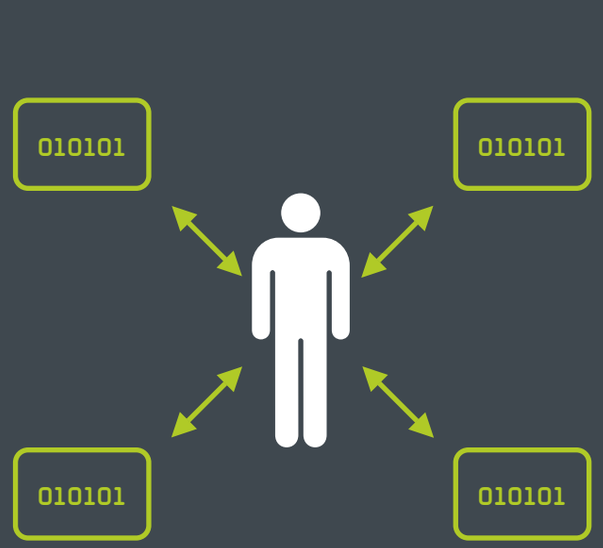
Mainframe-Era:
one computer,
many users



PC-Era:
one computer,
one user



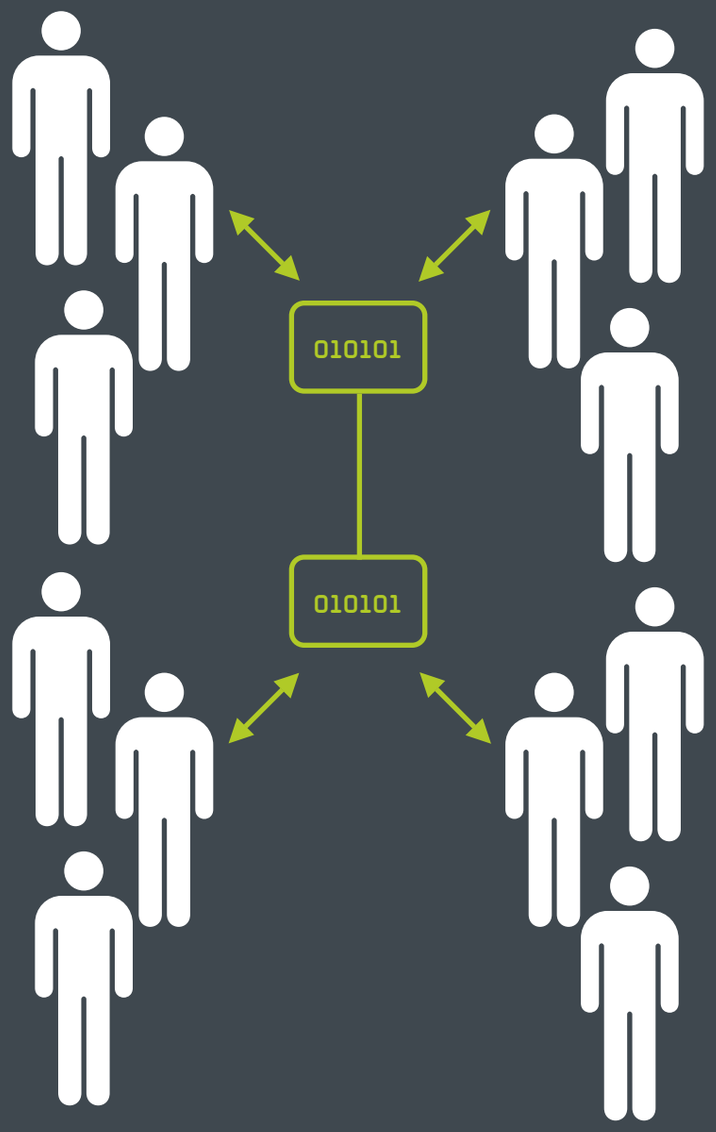
Ubiquitous- Computing:
many computers,
one user



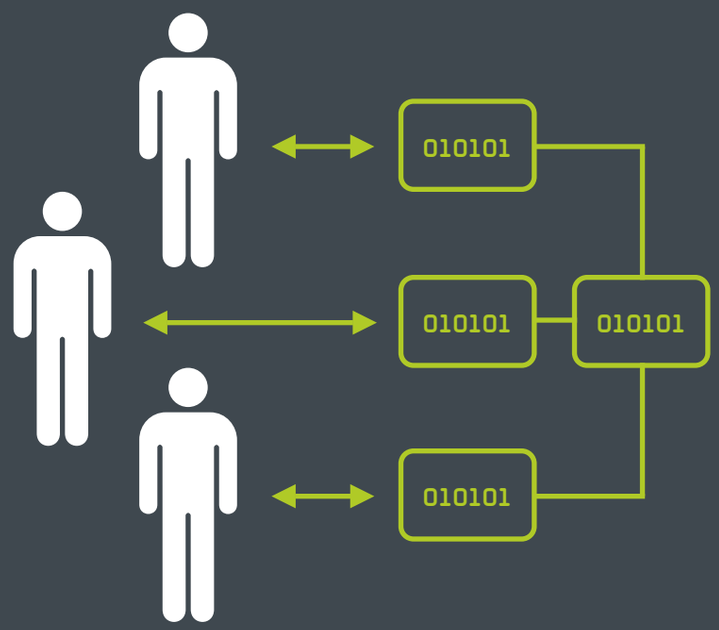
Ubiquitous Computing

Ubiquitous Connectivity

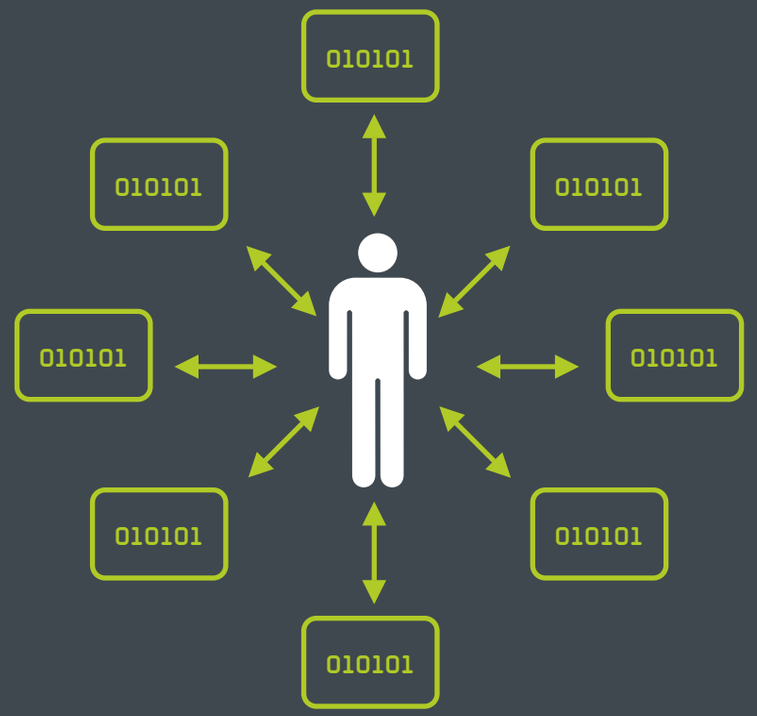
Mainframe-Era:
beginning
connections



PC-Era:
Internet



Ubiquitous- Computing:
Web of objects



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ETH World

ETH Eidgenössische Technische Hochschule Zürich

Goal

Projects

Worlds

Competition

Overview
Phase 1
Phase 2
Jury

05	07	06	02	04	01	03
↑	↑	↑	↑	↑	↑	↑
28	17	49	08	13	11	18
42	01	03	05	10	12	15
21	23	24	25	26	29	31
32	36	38	48	33	34	40
41	04	06	07	20	22	27
30	43	37	09	14	16	39
44	46	47	50	02		

[PREVIEW][ZOOM]

Timetable

News & Links

Jobs

Imprint

PROJECT 3005

1. Prize

Mitlinks AG
Alexandra Papadopoulos
Urs Suter
Rafael Garcia
L'Altro
Cyril Brunner
Jakob Schiratzki
HLS Architeckten
Matthias Hauenstein
ETH Zürich, D-ELEK
Daniel Erni

LQ
HQ

Facts:

28.04.2000
Competition Started
300 parties,30 countries

phase 1
51 contributions submitted

07.2000
phase2
7 contributions selected

08.11.2000
Jury decision

13.11.2000
Public Presentation
of the Winner

Organization:

ETH Zuerich
[Phase 1] Berlin

Invitation to tender:

.pdf, text(0.4 MB)
.pdf low res. (1.5 MB)
.pdf high res. (9.0 MB)

Map Legend:

1. Prize	1
2. Prize	1
3. Prize	1
4. Prize	1
Separate Prize	1
3. Rundgang (2.Ph)	9
3. Rundgang (1.Ph)	1
2. Rundgang (1.Ph)	24
1. Rundgang (1.Ph)	17
Nachrücker	1

ETH World

ETH World Worlds

ETH World

ETH Learning, Teaching, Research, Service World

ETH Student World

ETH Assistant World

ETH Professor World

ETH Department Head World

ETH Administration World

ETH Alumni World

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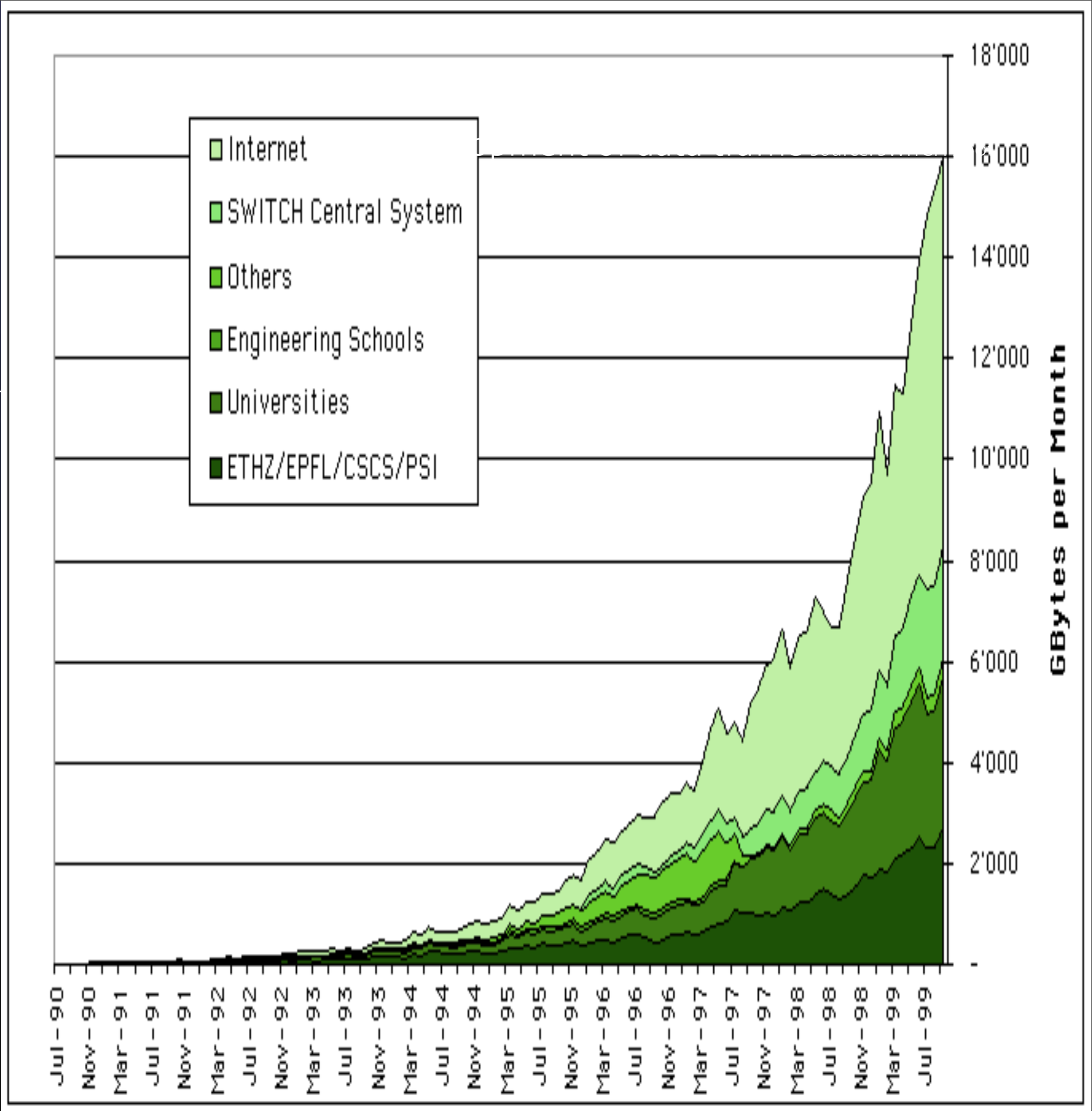
ETH World

Reasons for ETH World: Development of data transfer

Source:
SWITCH 2001 http://www.switch.ch



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ETH World

Special Focus

ETHWorld

http://www.ethworld.ch

Wearable Technology in ETHWorld

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ETH World

Information Technology

"the use of electronic means to facilitate the execution and coordination of tasks"

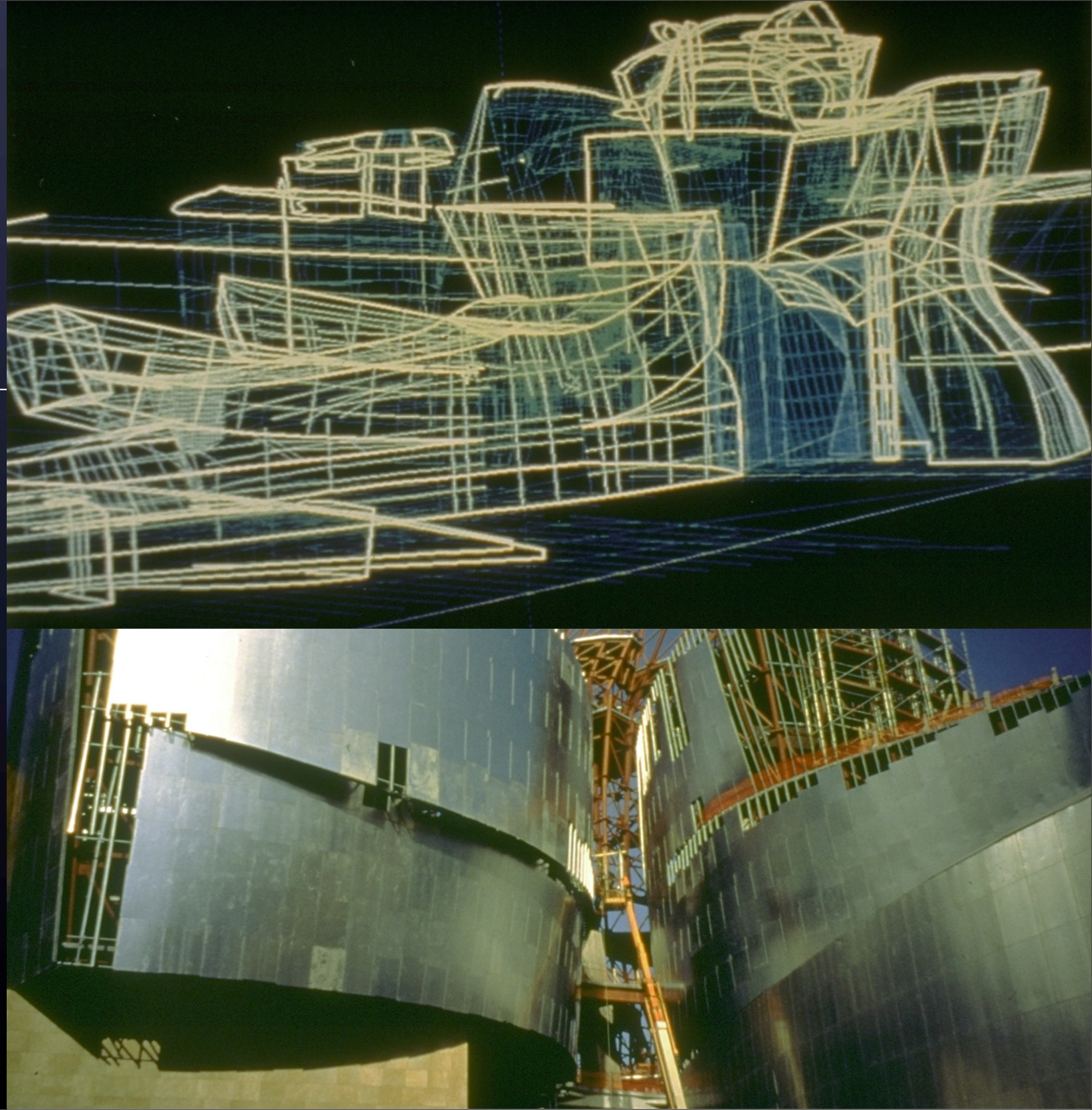
Examples in ETHWorld

Tasks: attending lectures, access documents, access spaces, etc.

Coordination of tasks: group discussions, research collaboration, etc.

ETH World

All Digital: Advanced use of IT at any stage implies that all tasks in all linked stages are executed in



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They are central to ETHWorld

Access beyond the desktop

Mobile, wireless components

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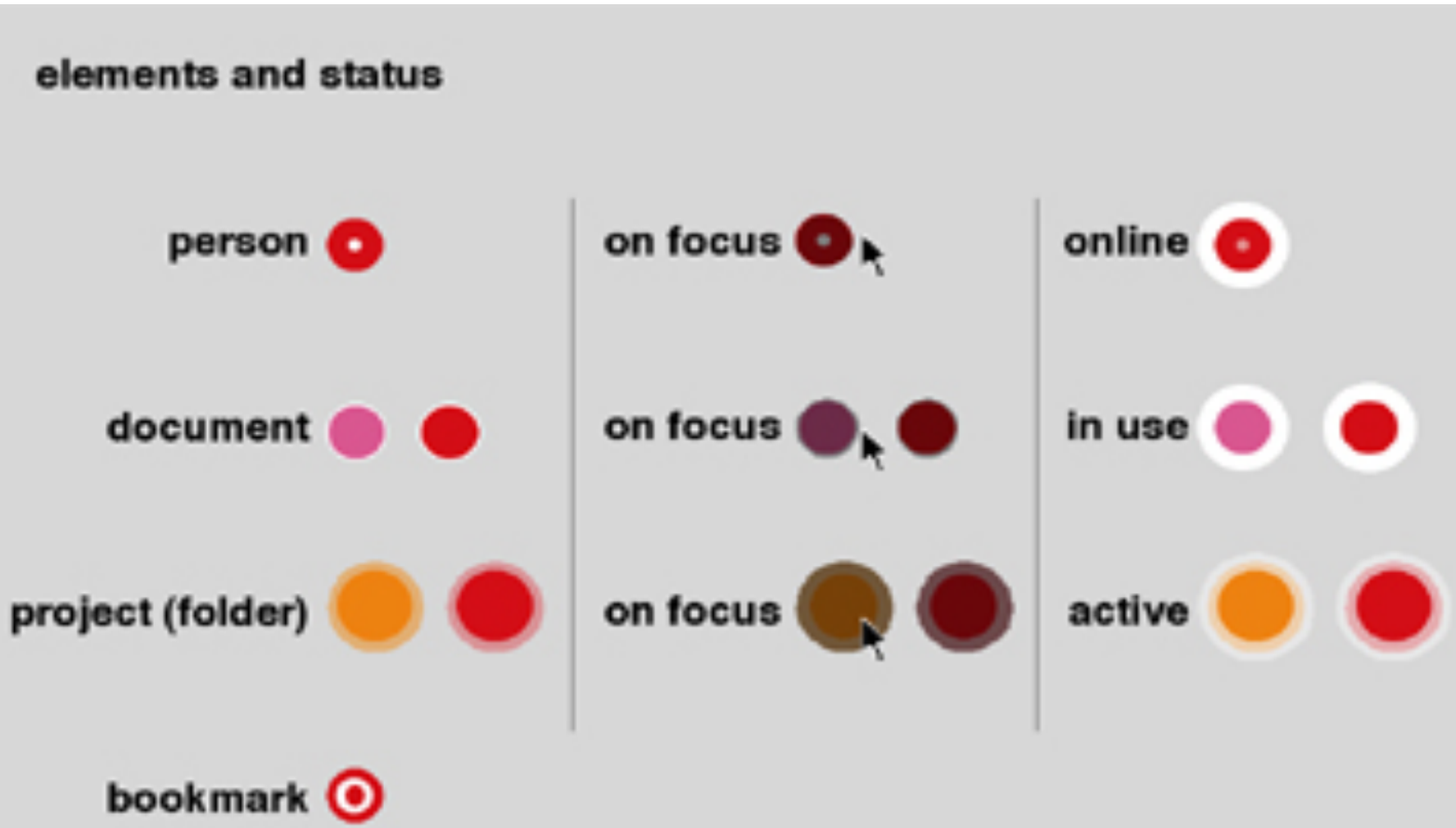
ETH World

ETHWorld structure

Identity of the user (wearable computing)

Interface (glue that puts everything together)

Large databases about ETH and the World (administration & content)



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ETH World

Swatch watches (Swisshouse)

Swissair e>card

Industry applications

Swisshouse: registration of visitors using Swatch watches

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ETH World

From “carry-on” towards “wearable”

From big to small…

- Wireless lapt computer
- PDA
- Smart card
- Watch
- Pin
- Textiles
- etc

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Levels of Input

Human: active interfaces (keyboard, stylus, voice, etc.)

Sensors: passive interfaces (temperature, time, external signals, etc.)

Constant signal, preprogrammed

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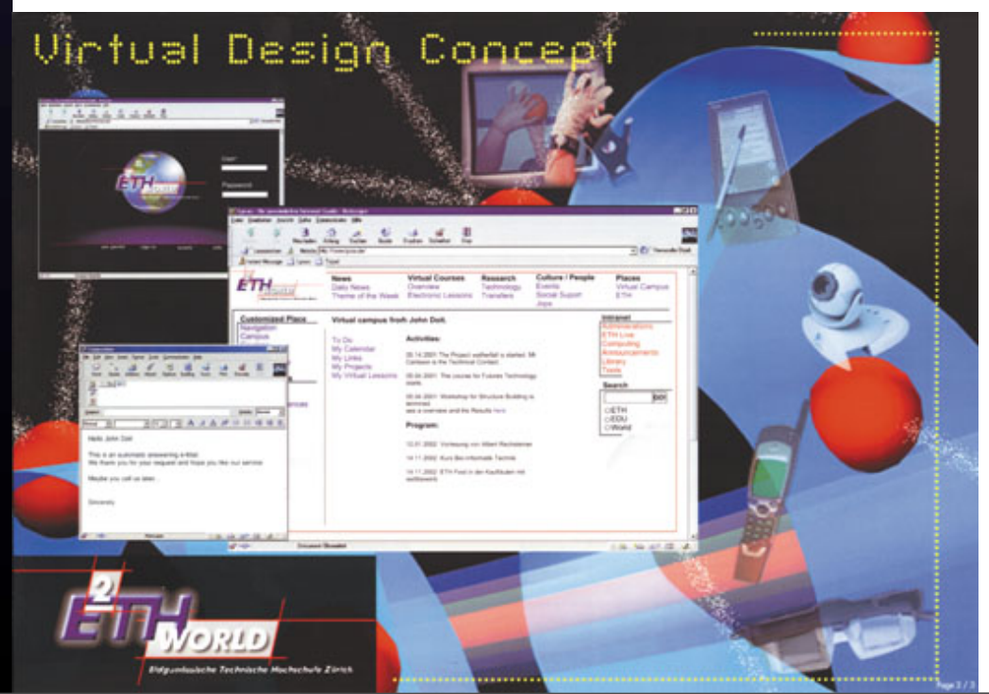
Challenges...

- Miniaturization
- Functionality
- Design
- Security
  - Stolen identity
  - Access to databases



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ETH World

communication and knowledge transfer

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ETH World presence
a wearable device?

Each member of the ETH community will have the opportunity to receive a mobile device: *The ETHworld presence*

ETHworld presence will be a tool to access ETHworld and its global community. It will contain a personal Web server and will allow direct interaction with ETHworld's physical facilities.

A built-in radio interface like Bluetooth and UMTS will allow communication with ETHworld, all existing equipment (laptop, workstation, cellular telephone, or PDA), and the ETHworld accessories. Connected with the accessories, the ETHworld presence will become a complete mobile communication and collaboration device.

ETH World

Not everything will be miniaturized

Digital displays and interaction spaces will become part of the physical architecture

The middle will disappear

ETH World

Goals and Milestones in 2000

International competition for the design of ETH World infostructure

Begin of phase 1 ETH World pioneer projects

Planning of prototype wireless learning and working environment

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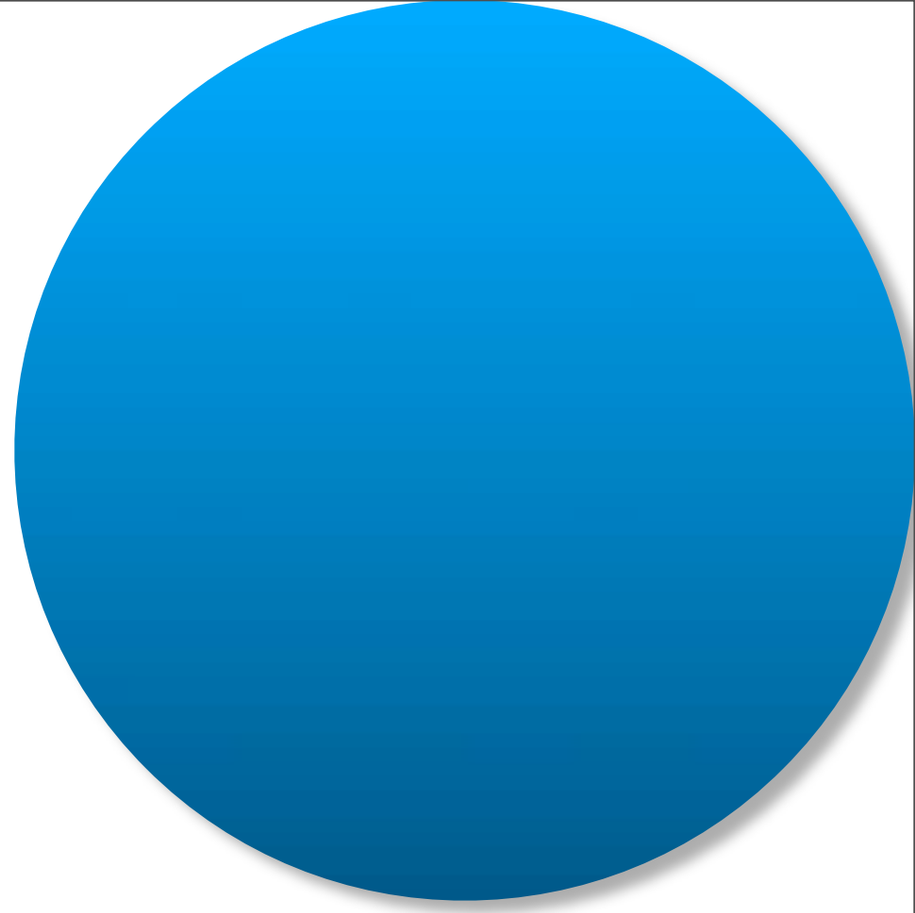
The Projects in 2001



Neptun

Wireless LAN

Infostructure projects II: Focussed on the direct needs of ETH World as result of the competition

Implementation of competition results I

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Envisioned Projects in 2002

Infostructure projects III: Focussed on the direct needs of ETH World

Implementation of competition results

Neptun II: Portables for all

ETH World GRID: Research support

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Financing

If at all possible, the costs for the coming three years should not be deducted from the core Research and Teaching budget of ETH Zürich , but from:

- Gains from deregulation in electricity supply
- Gains from deregulation in communication supply
- Building construction budget

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Probable consequences

Re-definition of the status and need for research facilities

Re-definition of the status and need for teaching facilities

Changes in the role of the computing services

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Conclusion - 1

The university of the future will consist of a physical part and a rapidly growing virtual part. Together, they will form the new reality

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Conclusion - 2

Future infrastructure planning must consider the virtual part of the university as an integral part from the beginning

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Conclusion - 3

Probable consequences:

- Development of a new type of communication
- Long-term gains
- Short-term costs

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Conclusions - 4

Regionalism will grow

The importance of physical architecture and physical presence will increase as a result of de-materialization and virtualization

The human being will increasingly be the focus of the development

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Conclusions - 5

ETH World's main goal:

Make ETH the most attractive – physical and virtual - place to study and do research

www.ethworld.ch

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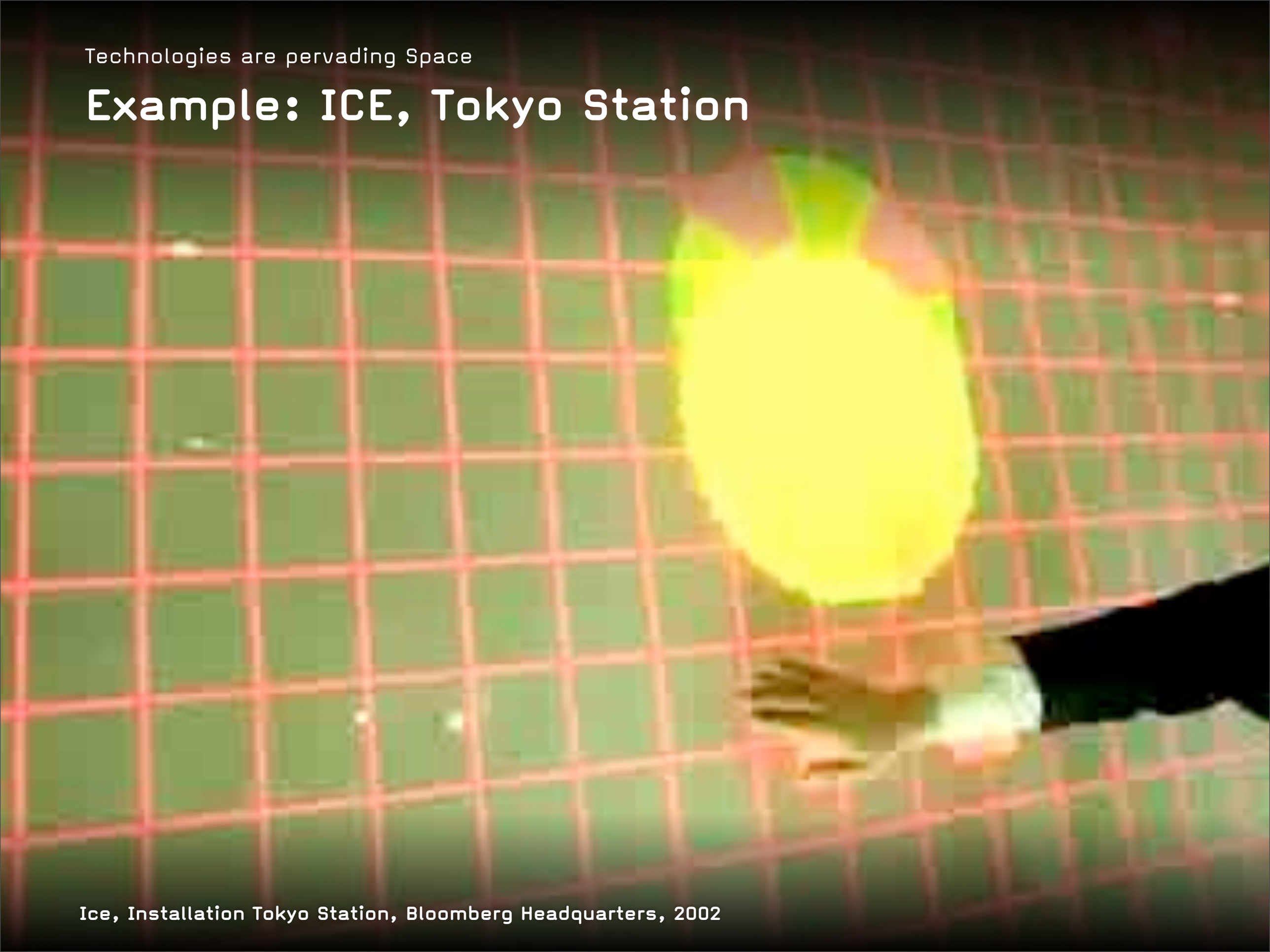
Technologies are pervading Space

Example: ICE, Tokyo Station

Ice, Installation Tokyo Station, Bloomberg Headquarters, 2002

Technologies are pervading Space

Example: ICE, Tokyo Station

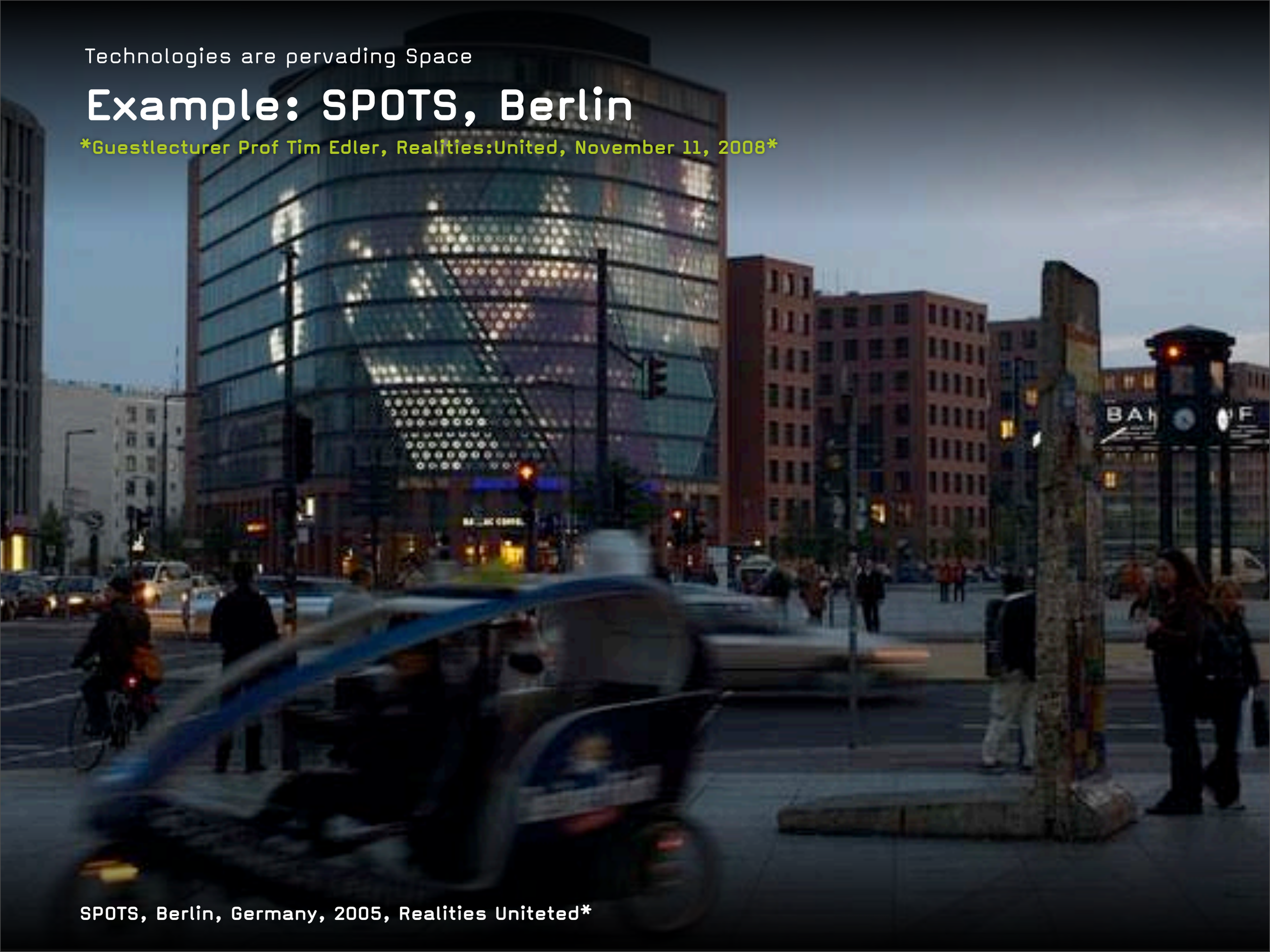


Ice, Installation Tokyo Station, Bloomberg Headquarters, 2002

Technologies are pervading Space

Example: SPOTS, Berlin

Guestlecturer Prof Tim Edler, Realities:United, November 11, 2008



SPOTS, Berlin, Germany, 2005, Realities Uniteted*

Technologies are pervading Space

Example: SPOTS, Berlin

Guestlecturer Prof Tim Edler, Realities:United, November 11, 2008

SPOTS, Berlin, Germany, 2005, Realities Uniteted*

Technologies are pervading Space

Example: Colour by Numbers, Stockholm

Colour by Numbers, Stockholm, Sweden, 2006 Erik Krikortz, Milo Lavén and Loove Broms

Example: Colour by Numbers, Stockholm

Colour by Numbers, Stockholm, Sweden, 2006 Erik Krikortz, Milo Lavén and Loove Broms

Technologies are pervading Space

Example: under scan, Nottingham, UK

under scan, Relational Architecture, Nottingham, UK, 2006, Rafael Lozano-Hemmer

Example: under scan, Nottingham, UK

under scan, Relational Architecture, Nottingham, UK, 2006, Rafael Lozano-Hemmer

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General Quality Characteristics

We identify five goals of ubiquity, with regards to a service. These goals may be satisfied to varying degrees based on user needs and operating conditions.

- Availability
- Transparency
- Seamlessness
- Awareness
- Trustworthiness

Quality Characteristics

Availability

Ideally, a ubiquitous service should be available context independent.

The service should be also available regardless of changes in user status, needs, and preferences.

Quality Characteristics

Transparency

A good tool is an invisible tool, meaning that the tool does not intrude on the user consciousness.

The user focuses on the task (not the tool)
so that she or he can achieve more intuitively and with ease without requiring constant attention and awareness of the underlying technology.

Quality Characteristics

Seamlessness

The capability of providing an uninterrupted service session under any connection with any device.

The system will recognize the user wherever she or he logs on, on any system, with any equipment, at any time, with the applications in a given state and have them adapt in the best possible way given these surrounding conditions.

Quality Characteristics

Seamlessness

Ubiquitous devices extend the human senses by providing greater awareness of the surrounding environment.

By blending into the physical world, ubiquitous computing bridges the gap between the end-user and her or his surrounding.

Quality Characteristics

Trustworthiness

Mutual trust must be established between different entities in a ubiquitous environment in a sense that each entity is assigned a trust value based on its behavior.

An entity can be a device, a service or a user.

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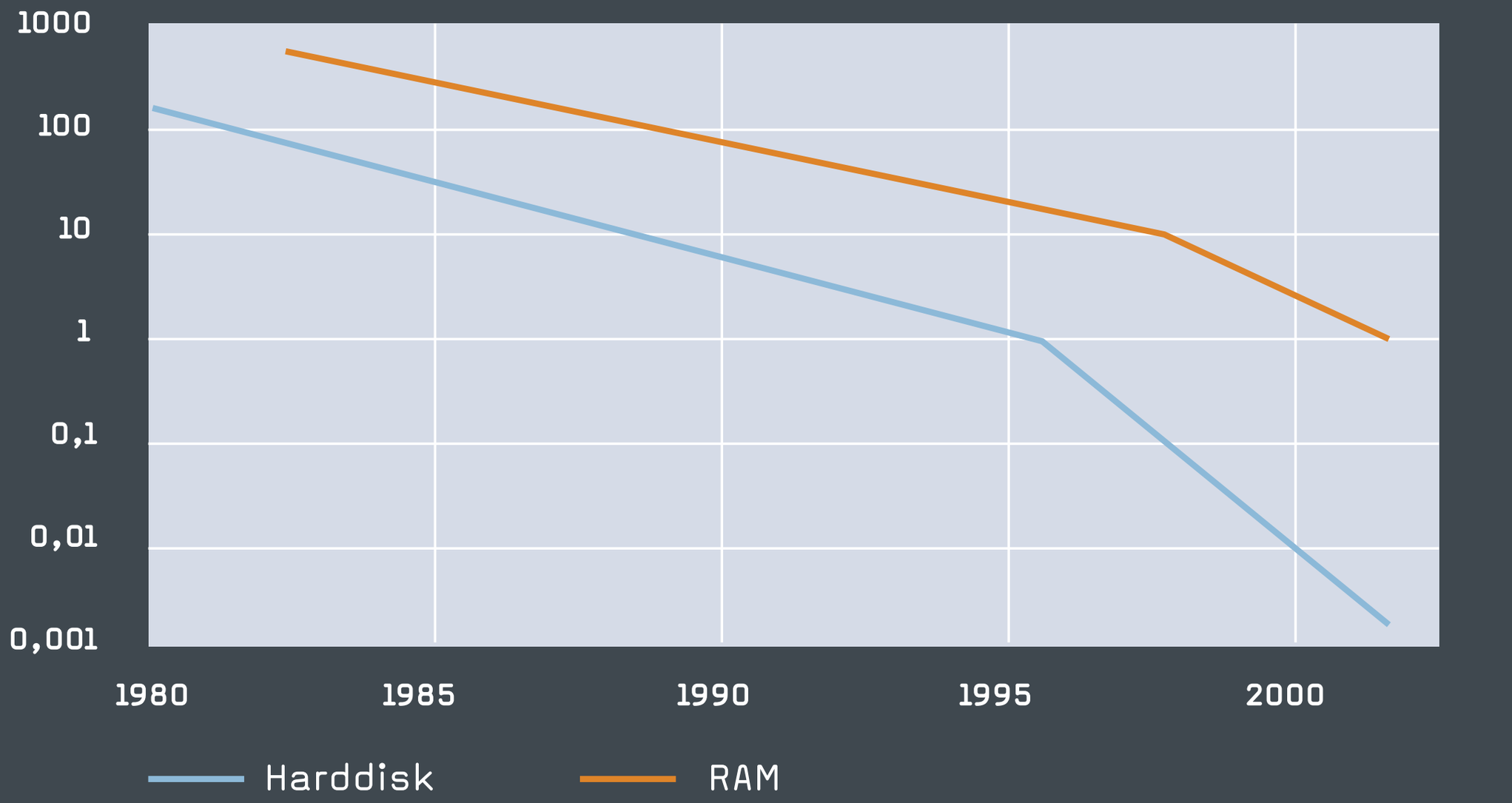
The changing Relationships to the Environment

From GUI to smart Space

	Virtual	Physical
Foreground	Graphical User Interface (GUI)	Haptic Interface
Background	Ambient Interface	Inhabitable Interface (smart space)

The changing Relationships to the Environment

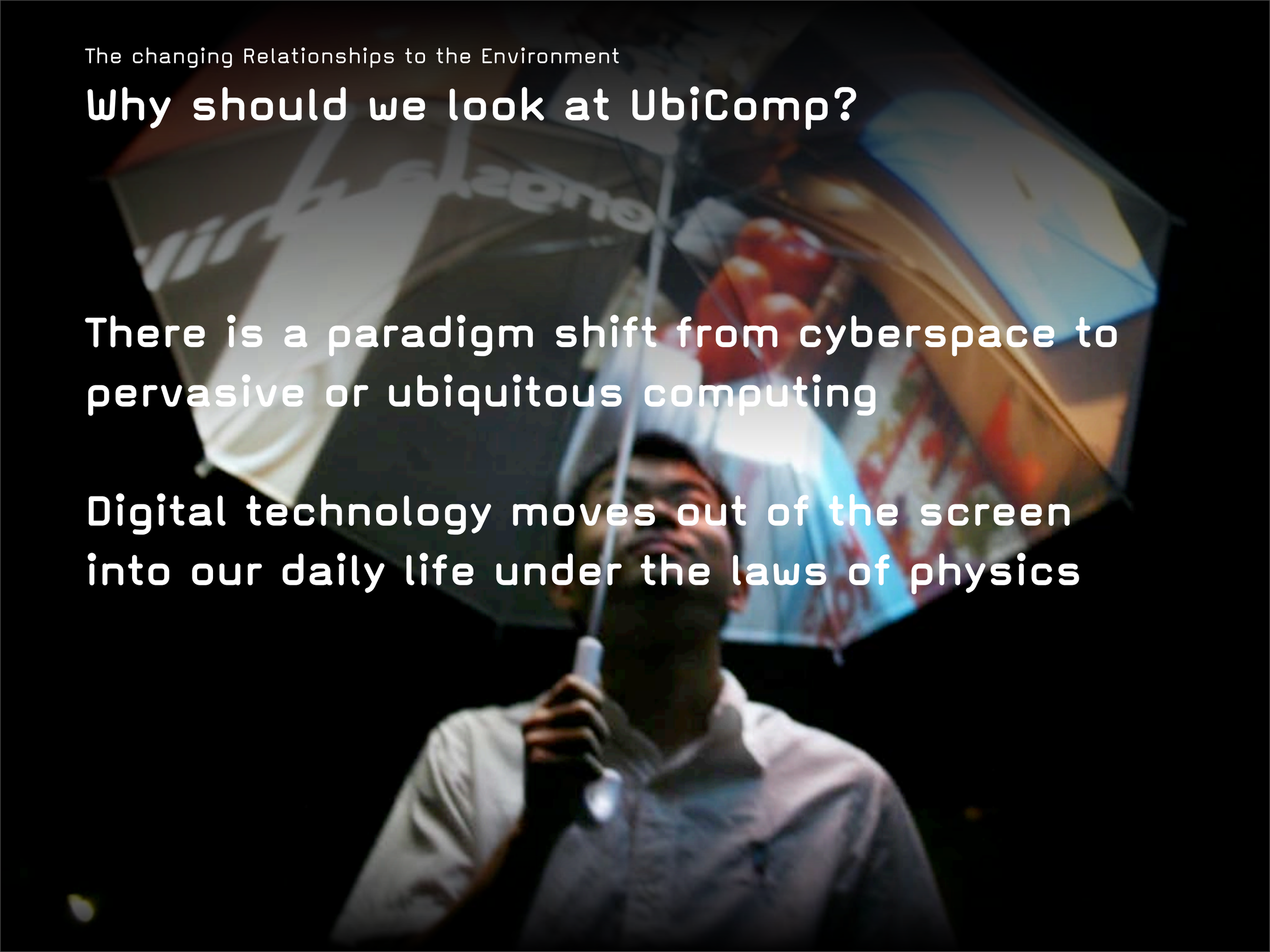
Price Trends of Memory in US-Dollar/MByte



Source: Elgar Fleisch, Friedemann Mattern (Hrsg.), Das Internet der Dinge, Springer Verlag, 2005

The changing Relationships to the Environment

Why should we look at UbiComp?



There is a paradigm shift from cyberspace to pervasive or ubiquitous computing

Digital technology moves out of the screen into our daily life under the laws of physics

The changing Relationships to the Environment

Why we should look at UbiComp

Statement 1/5

Many developments in information and communication technology originally invented for industries have later become part of our daily lives - and will continue to do so.

The changing Relationships to the Environment

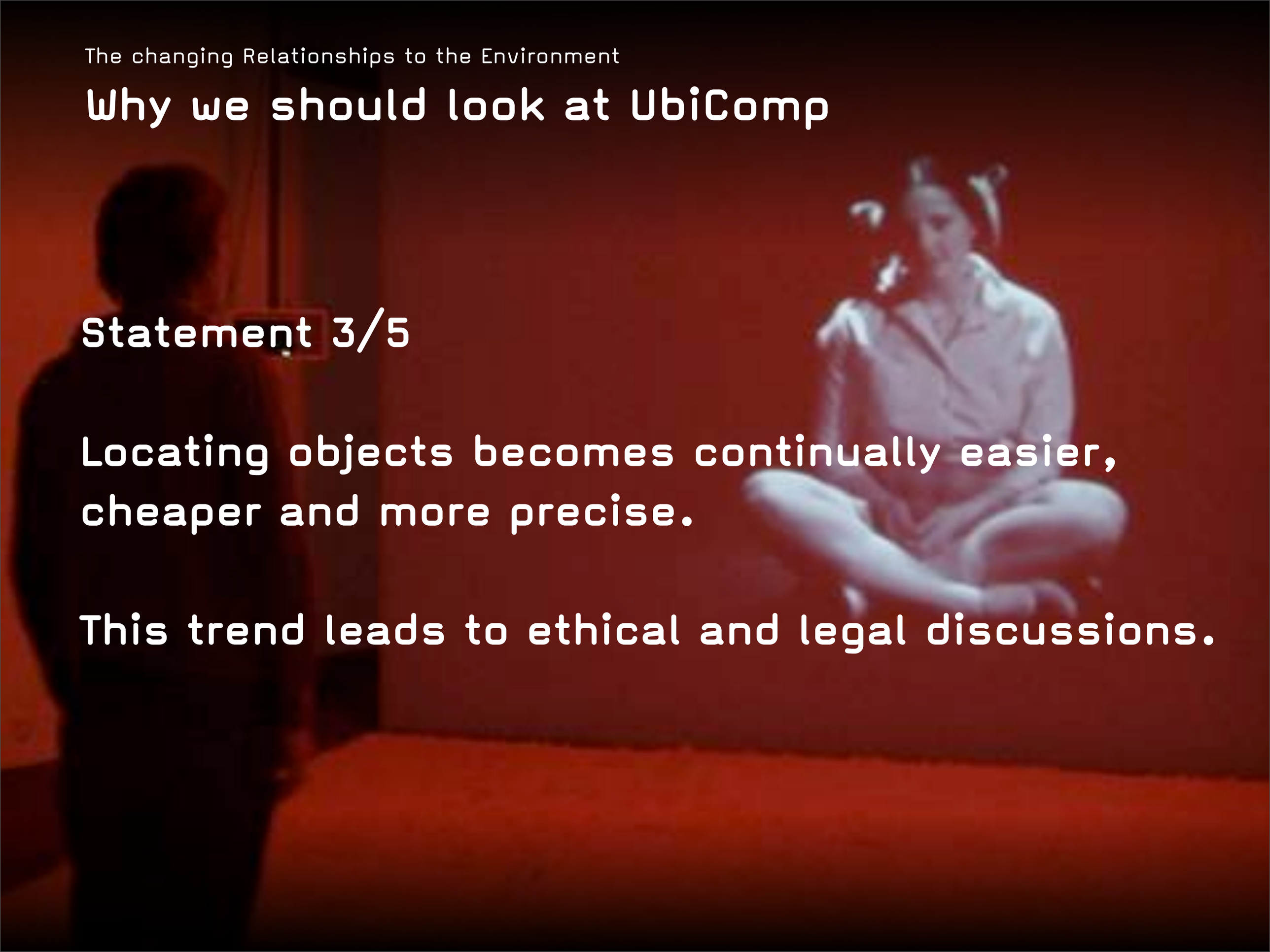
Why we should look at UbiComp

Statement 2/5

Many everyday objects become ‚smart‘ by adding information technology to collect, save, use and exchange data.

The changing Relationships to the Environment

Why we should look at UbiComp



Statement 3/5

Locating objects becomes continually easier, cheaper and more precise.

This trend leads to ethical and legal discussions.

The changing Relationships to the Environment

Why we should look at UbiComp

Statement 4/5

Smart everyday objects, ‚Ambient Intelligence‘ and an ‚Internet of Things‘ enable additional benefits.

The changing Relationships to the Environment

Why we should look at UbiComp

Statement 5/5

Collecting everyday life data results in huge challenges - for technology, economy and society.

The changing Relationships to the Environment

Why we should look at UbiComp?

Ubiquitous Computing is already here!

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Wahlfacharbeit

Are you interested in writing a Diplomwahlfacharbeit in an Information Architecture relevant topic?

Your contact

Sandra Wipfli

wipfli@arch.ethz.ch

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Notice

Building HPT
Room C103

L8 / 17.11.2008
The Digital Ornament
Dr Kai Strehlke

L9 / 24.11.2008
Interactive Architecture
Prof Tim Edler, Berlin

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Podcast Information Architecture

http://www.ia.arch.ethz.ch/teaching/teaching-08/

Chair for Information Architecture

Sources

05: http://nist.gov/pc2001
10: AD, 4Dspace, Interactive Architecture, wiley.com
11: http://www.youtube.com/watch?v=4IbAQ1K8X94
12: http://www.spots-berlin.de/de/galerie/impressionen.php?col=0&expo=104
13: http://www.youtube.com/watch?v=047K74N0UQM
14: http://www.colourbynumbers.org/
15: http://www.youtube.com/watch?v=_nIpyou31vg
16: http://www.lozano-hemmer.com/imagrlh/rpics/uscan/1_girl_05_seq1.tif
17: http://www.youtube.com/watch?v=GQxLcxQAvOY
28: http://www.ubicomp.org/ubicomp2006/11.jpg
29-34: unknown source
35: http://www.flickr.com/photos/sveinhal/2676746354/