

Instrumented Environments

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Mon, 10-12 Uhr, Theresienstr. 39, Room E 46

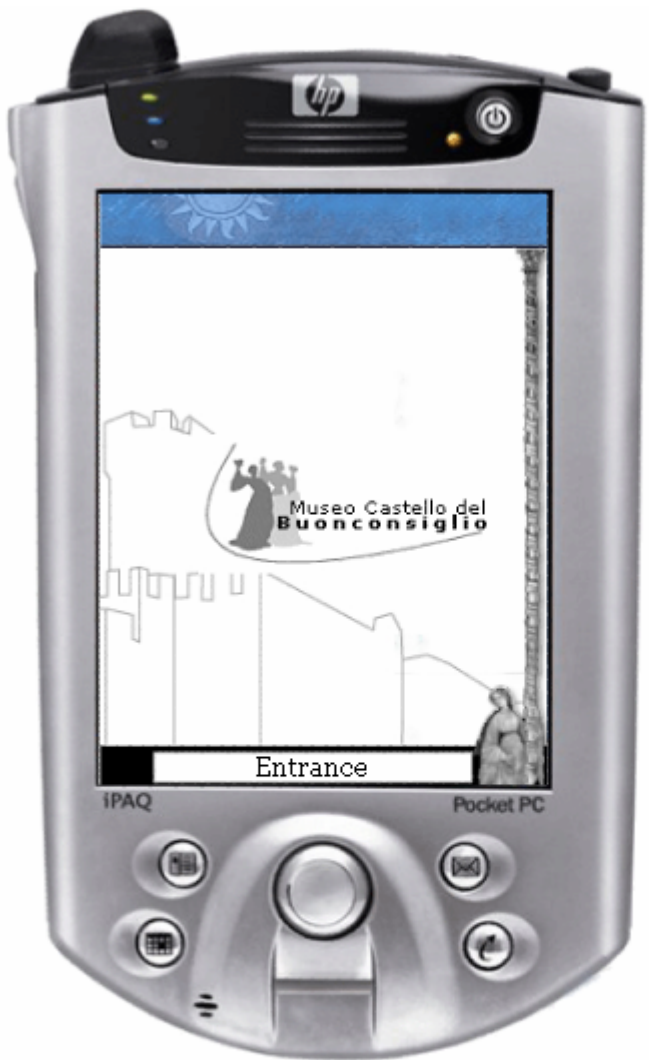


Topics today

- Multimodal interaction
 - Some more examples
 - Multiple modalities
 - Multiple devices

PEACH (DFKI + ITC IRST 2002-2005)

Slides courtesy of Antonio Krüger,
Michael Kruppa



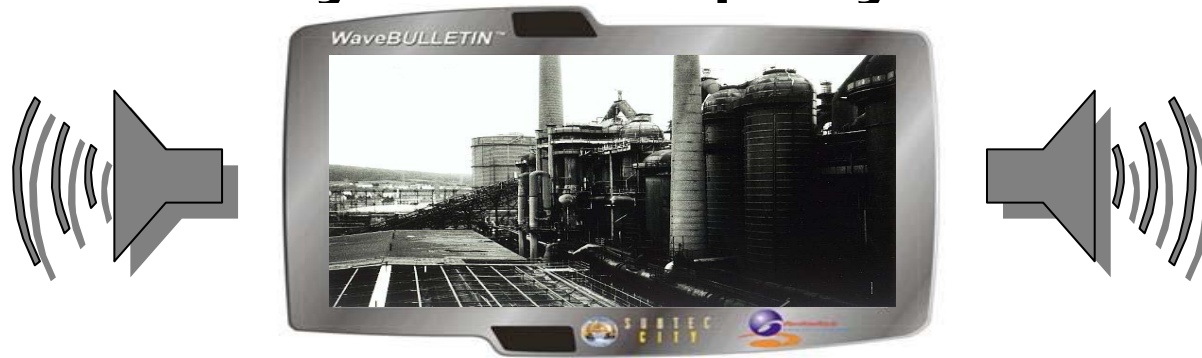
Instructions:

By pressing on one of the Infrared-Beacons, you virtually step in front of an exhibit or Virtual Window.

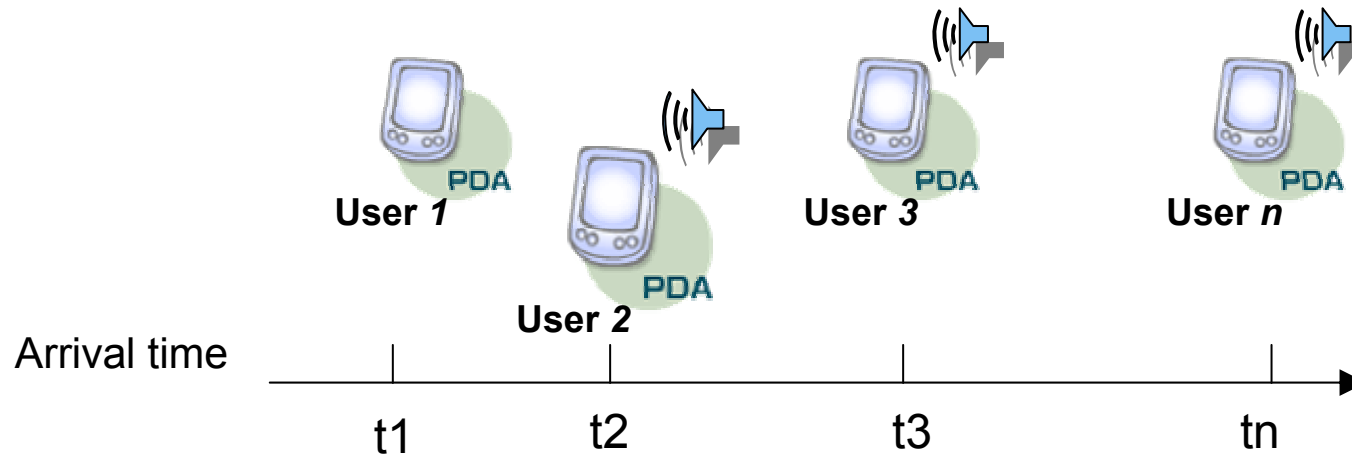
To control a presentation, please press on the Help-, Intro-, or Technical button. While a presentation is running,



Presenting information to multiple users with hybrid displays



Technical or social content tailored to groups or individuals

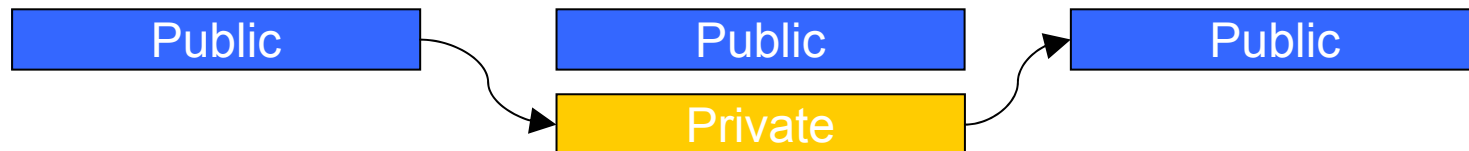


Idea: use private channels to annotate and augment public presentations

Putting the cocktail-party-effect to use

A small user study (following B. Arons, 1992)

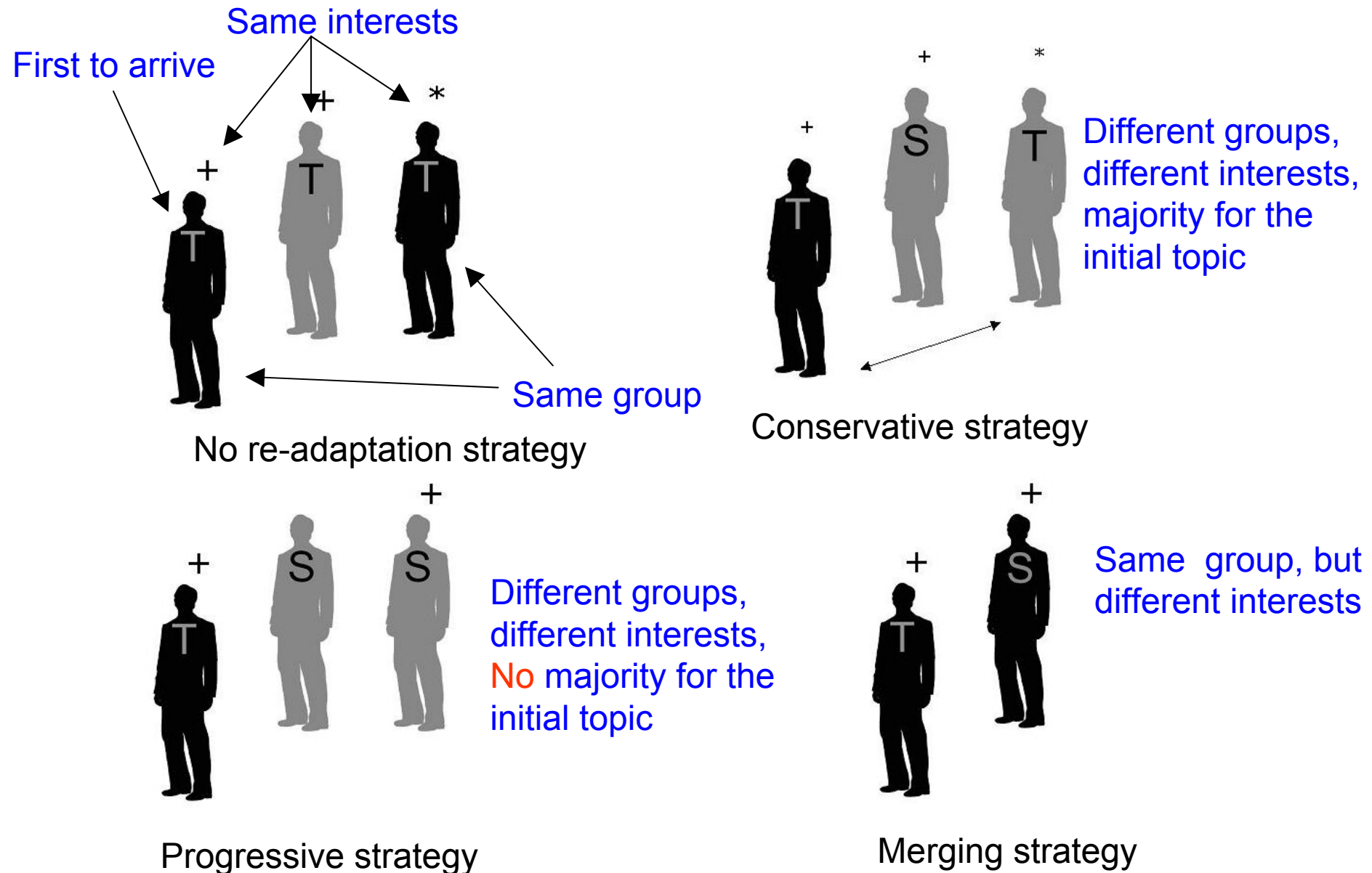
- Setup:**
- Public channel: loudspeakers
 - private audio channel: one ear headphone
 - messages were recorded in mp3 format and played by a desktop computer.
 - public channel: male voice
 - private channel: female voice



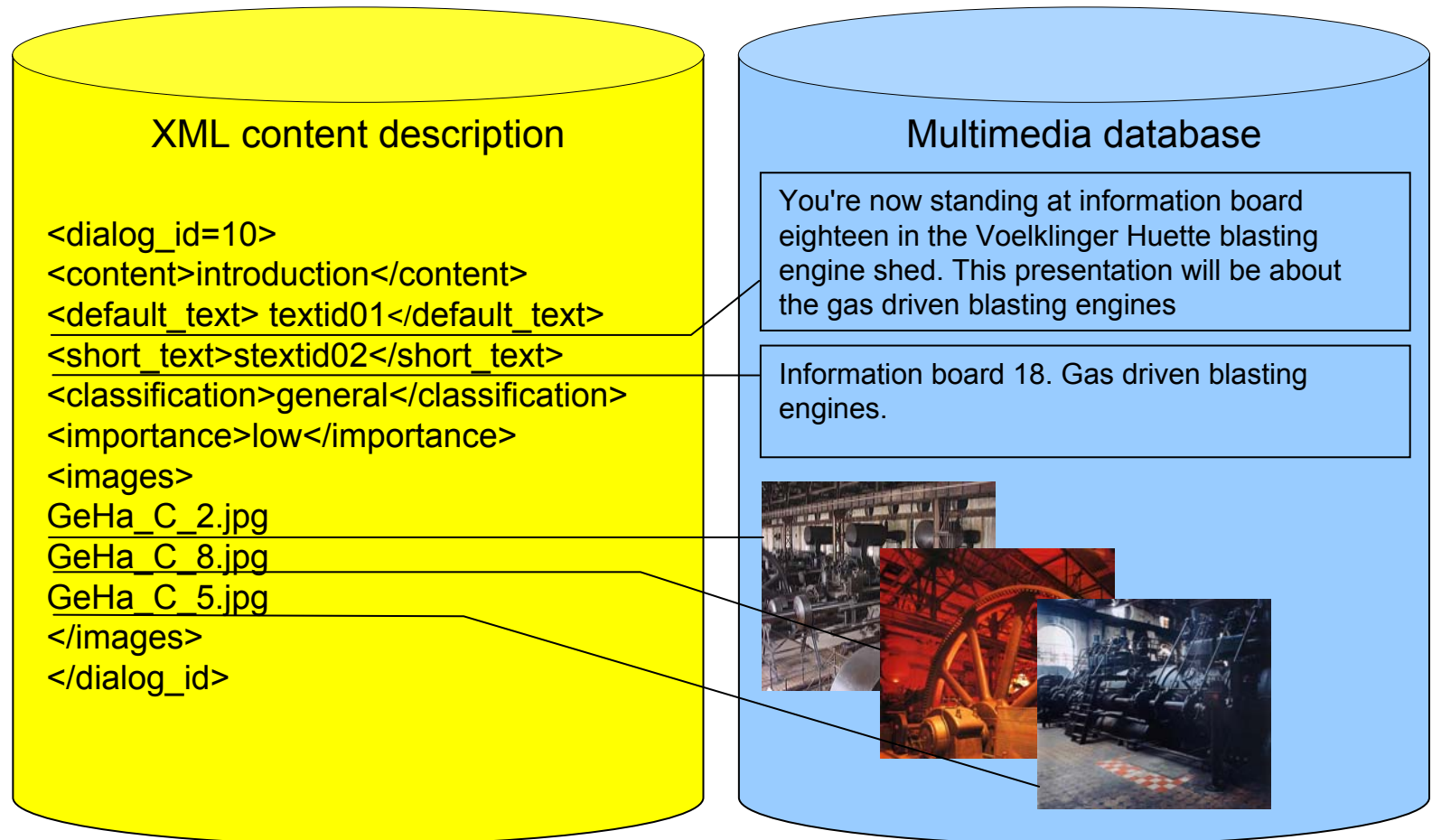
Result: The private channel is well perceived, if:

- it flows well from and back to a public thematic block
- use clearly distinguishable voices for different channels

Re-adaptation strategies for public presentations



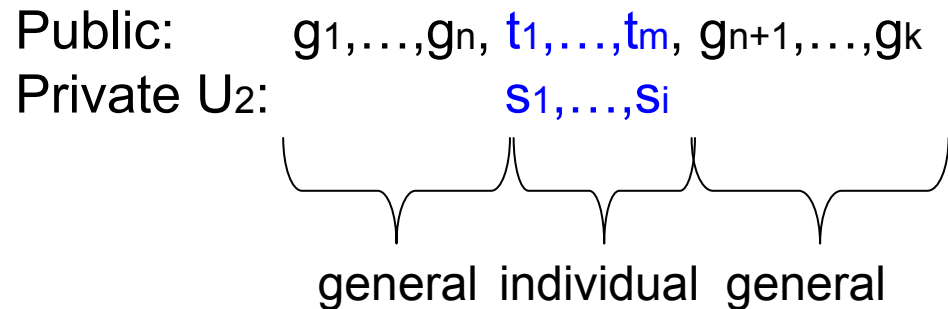
XML-representation of the content



Planning content for hybrid devices

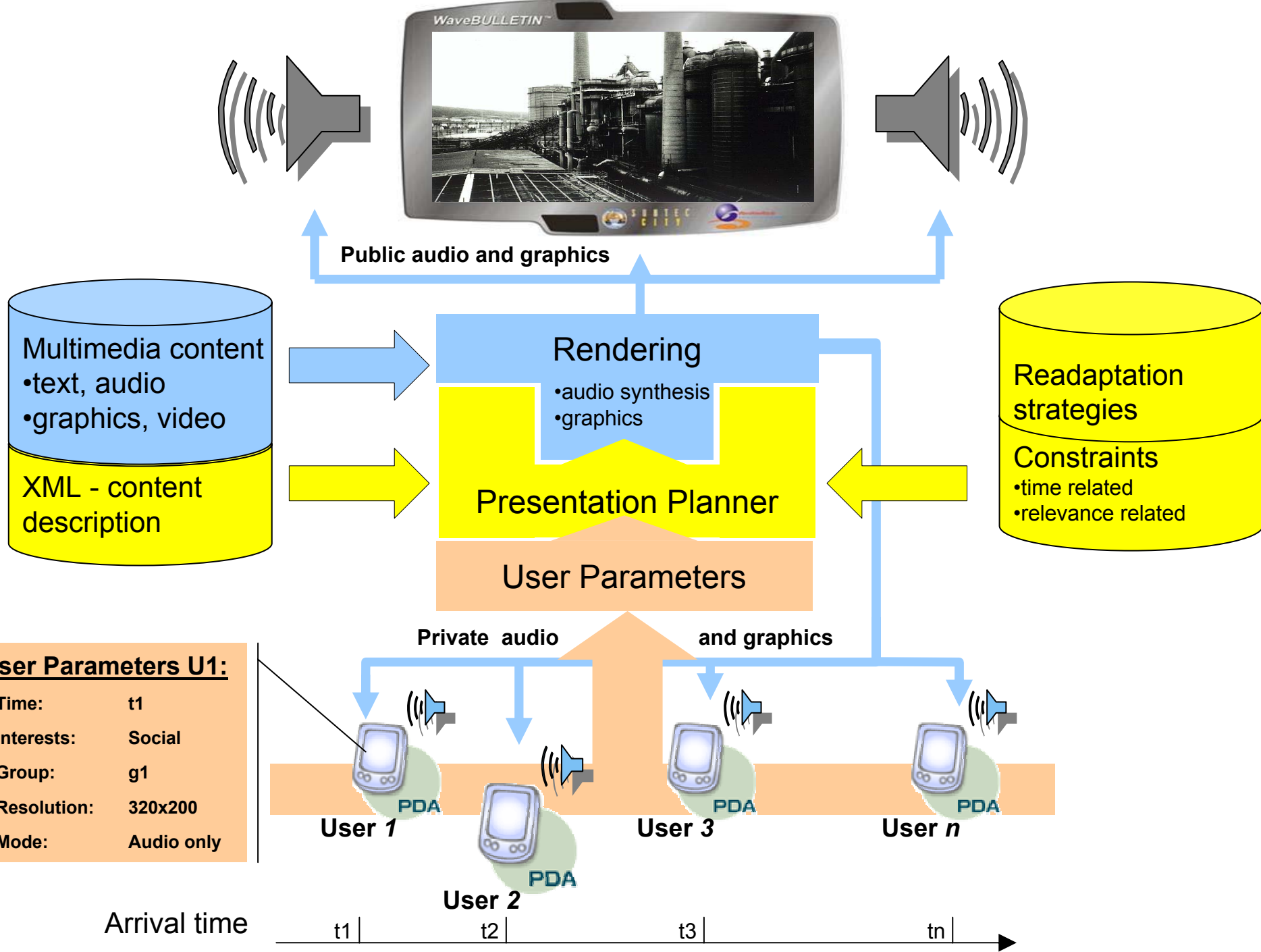
<u>User1 parameters:</u>		<u>User2 parameters:</u>
Time:	T1	T2
Interests:	technical	social
Group:	g1	g2
Resolution:	320x200	320x200
Mode:	both	both

Conservative strategy:



Find a sequence of social dialogue components related to the images such that

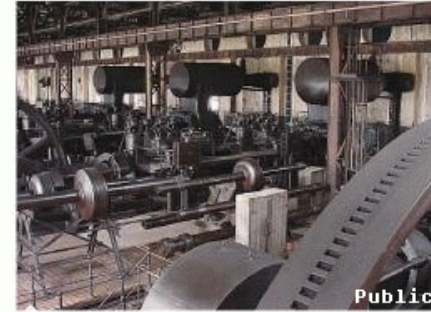
$$T(t_1, \dots, t_m) = T(s_1, \dots, s_i) + \delta$$



t1

You're now standing at information board eighteen in the Voelklingen Old Iron Works blasting engine shed. This presentation will be about the gas driven blasting engines.

The idea of powering a machine with gas only came relatively late. The German engineers Otto and Langen constructed the first gas motor in eighteen seventy eight.



t2

Meta Comment

Short Summary

The gas that drove the giant engines was very poisonous. It escaped into the air from leaky cylinders and gave the workers very severe headaches.

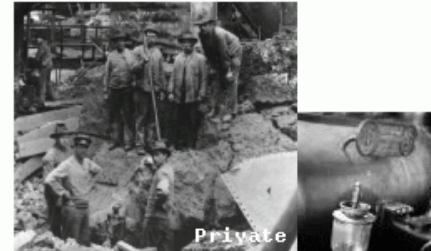
The workers did not have the opportunity in earlier times to escape from the noise and the dirt in their breaktime. They had to constantly supervise their machines.

Meta Comment

The engine is comprised of three parts. The heavy fly wheel is at the front, the actual motor is in the center, and the blast pistons are located behind this in the high casing.

The gas engine has to cope with a very heavy task at the start. It has to bring the giant fly wheel into motion. All the motor power is needed for this wheel with its diameter of nearly eight meters and weight of forty five tons.

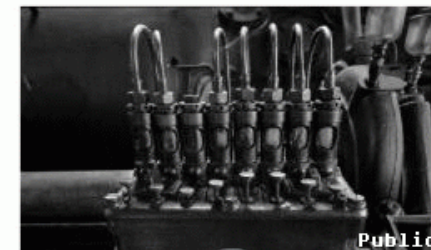
The blast cylinder is located in the rear part of the blasting engine. This creates the mighty air current needed much like an oversized airpump.



t3

In eighteen ninety four the German mechanical engineering works built the first engine powered from blast furnace gas.

In the early days there were many problems with the gas powered engines, as with all technical innovations but the new drive was able to establish itself in the iron and steel industry. The gas engine replaced the steam engine as an energy supplier.

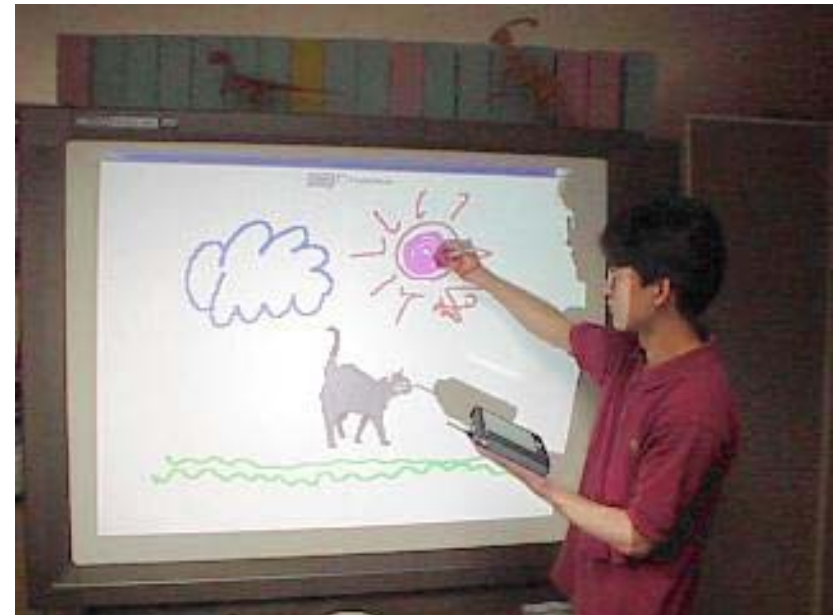


Jun Rekimoto's projects at Sony CSL

Pick-and-Drop

[Video](#)

[Jun Rekimoto, UIST'97](#)

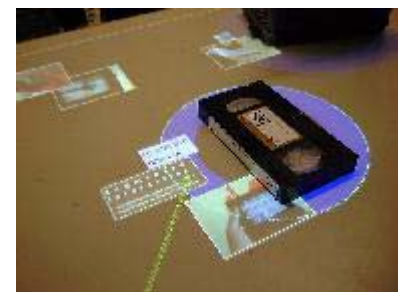
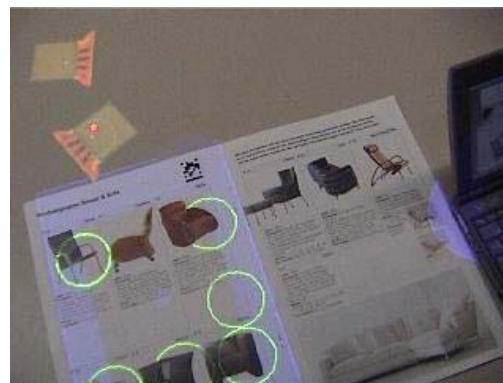


- Extension of Drag-and-drop across devices
- Solution: same pen recognized by both screens
 - Copy and paste data between devices
 - Use PDA as palette and paint on whiteboard

Augmented Surfaces

[Jun Rekimoto and Masanori Saitoh, CHI'99](#)

- Combination of mobile devices and projection surfaces
- Interaction techniques:
 - hyperdragging
 - pick-and-drop
 - pick-and-beam
 - digital attachment
 - interaction objects for tangible interaction
 - Camera-based acquisition of images
 - Selection from physical catalogues

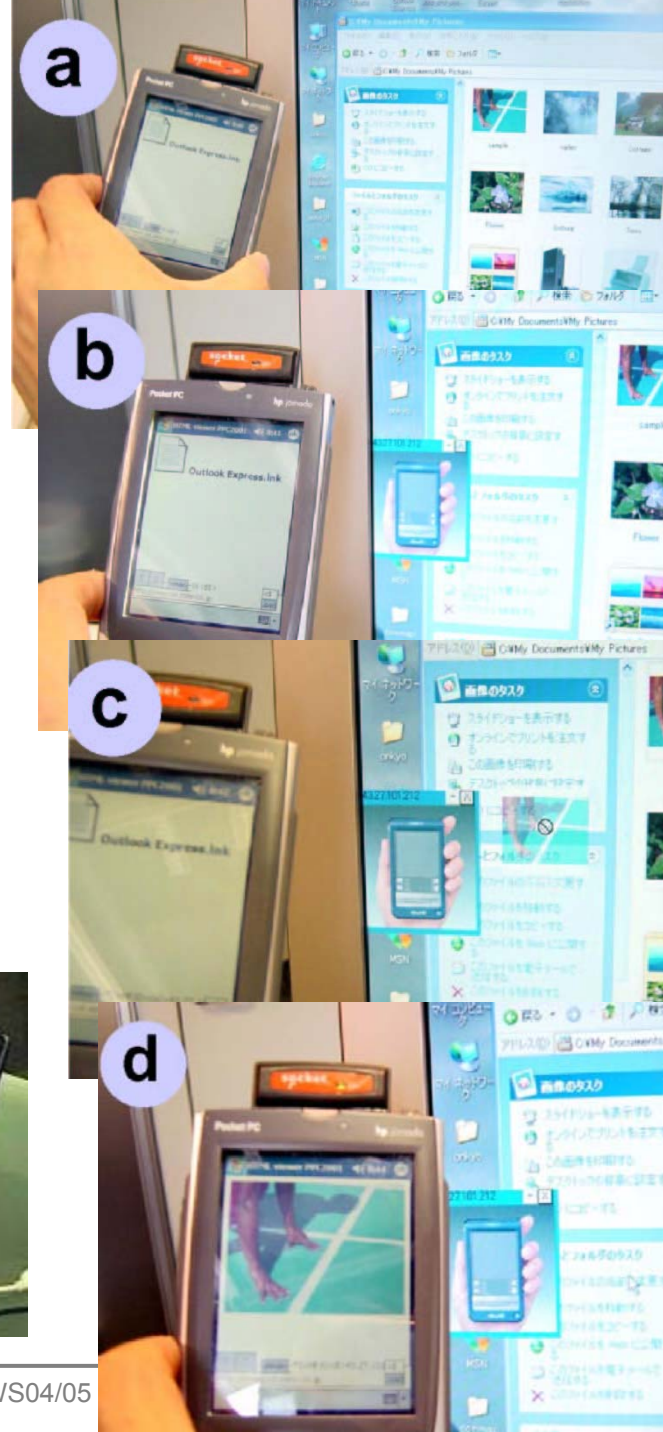


[Video](#)

Proximal Interactions

[Jun Rekimoto, Yuji Ayatsuka, INTERACT2003](#)

- Problem: device pairing
- Solution: Exchange key over close distance channel (IR, RFID, ...)
- Use key on regular network channel
 - to identify devices
 - to secure the connection



SyncTap

[Jun Rekimoto, Yuji Ayatsuka and Michimune Kohno, MOBILE HCI 2003](#)



- Problem: connecting 2 devices without fiddling with settings, menus, etc.
- Solution: synchronous button press/release
 - Very simple and intuitive two-handed action
 - Easy to do for one person
 - Can also be done over the phone
 - Technical problem (common time setting) can be solved

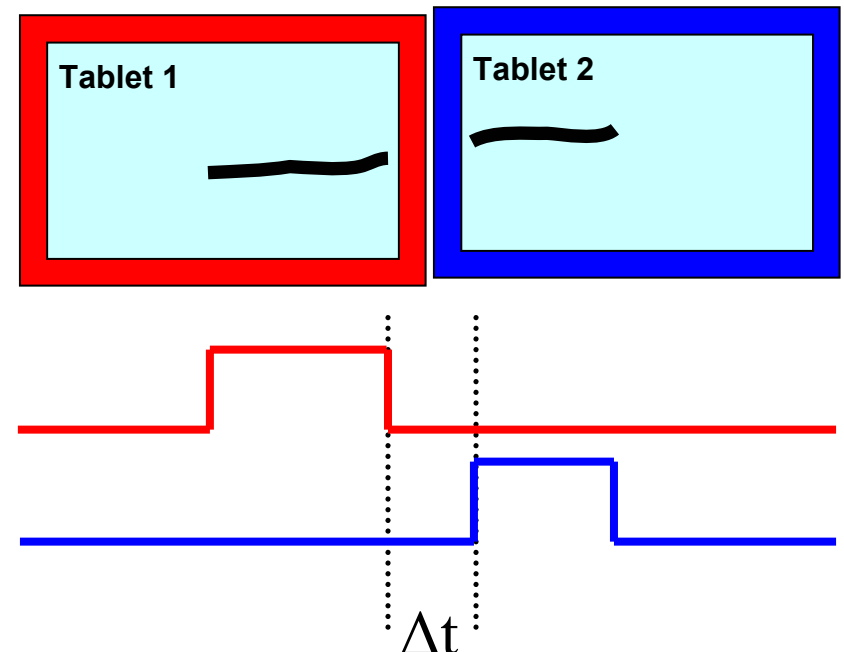


Ken Hinckley's projects at Microsoft Research

Stitching

[Hinckley, K., Ramos, G., Guimbretiere, F., Baudisch, P., Smith, M., AVI 2004](#)

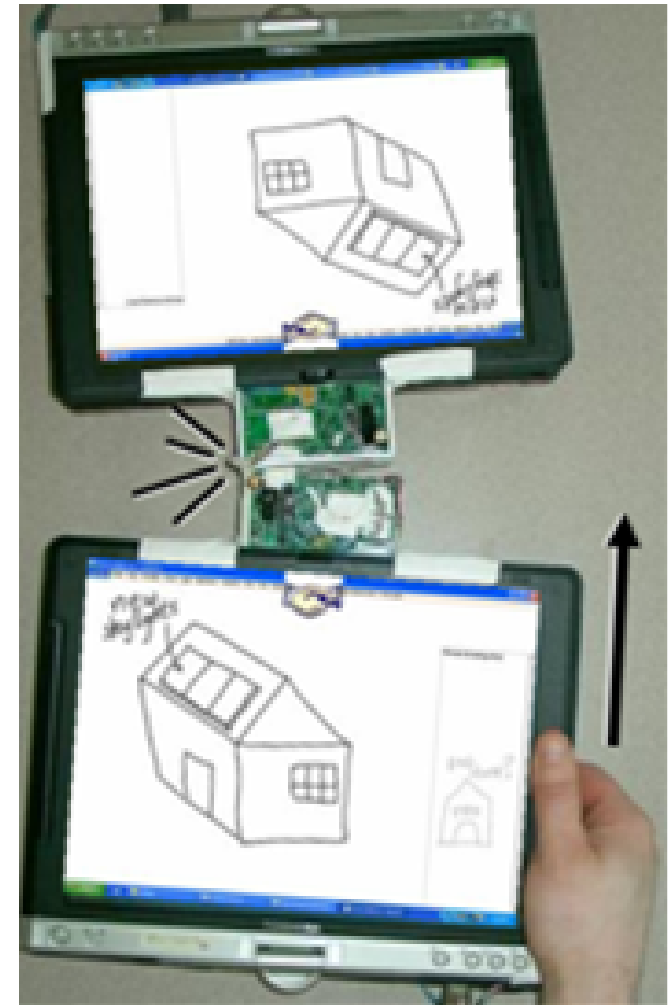
- Problem: connect two screens for interaction across them
- Solution: pen gestures across screens
 - Drag and drop across screens
 - Using one screen to control second
 - Combine Screens



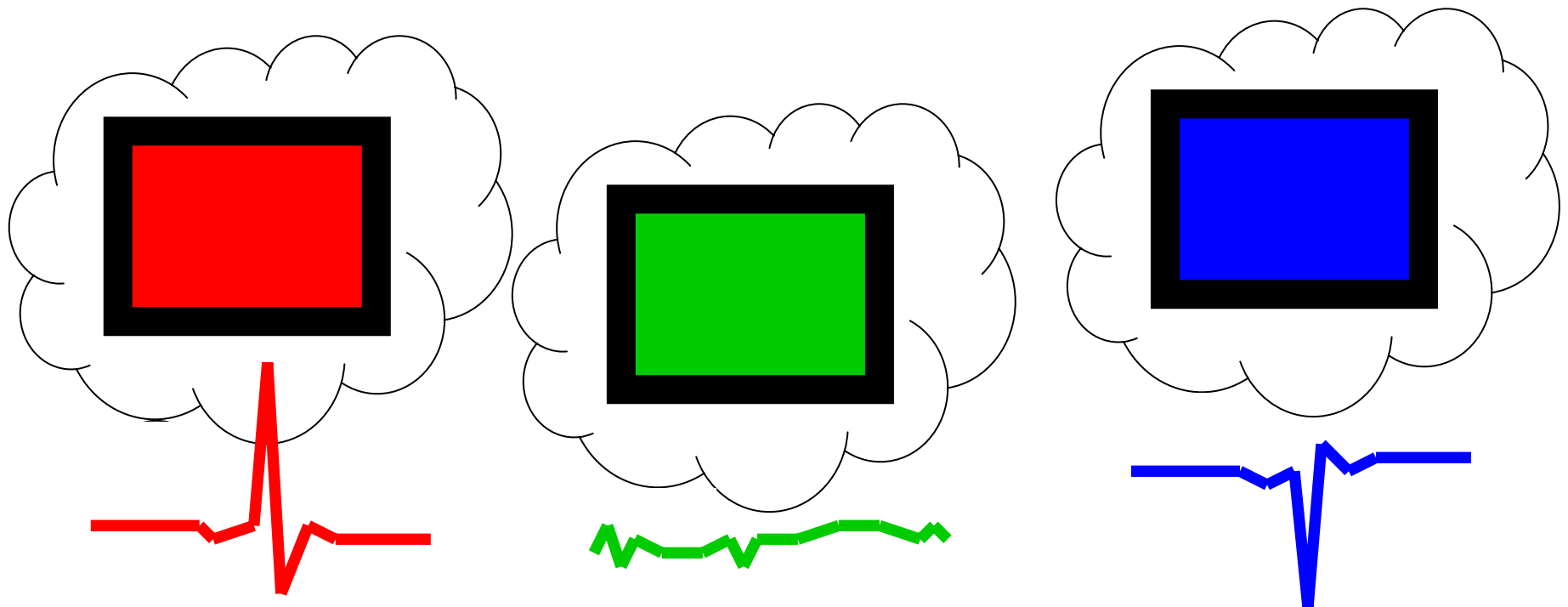
Synchronous Gestures

Hinckley, K., [UIST 2003](#), [Ubicomp 2003](#)

- Tablets equipped with acceleration sensors, sensing
 - Tilting of the device
 - Vibration
- Interaction technique:
 - bump devices together to connect
 - Pour information from one to the other
- Following slides courtesy of Ken Hinckley

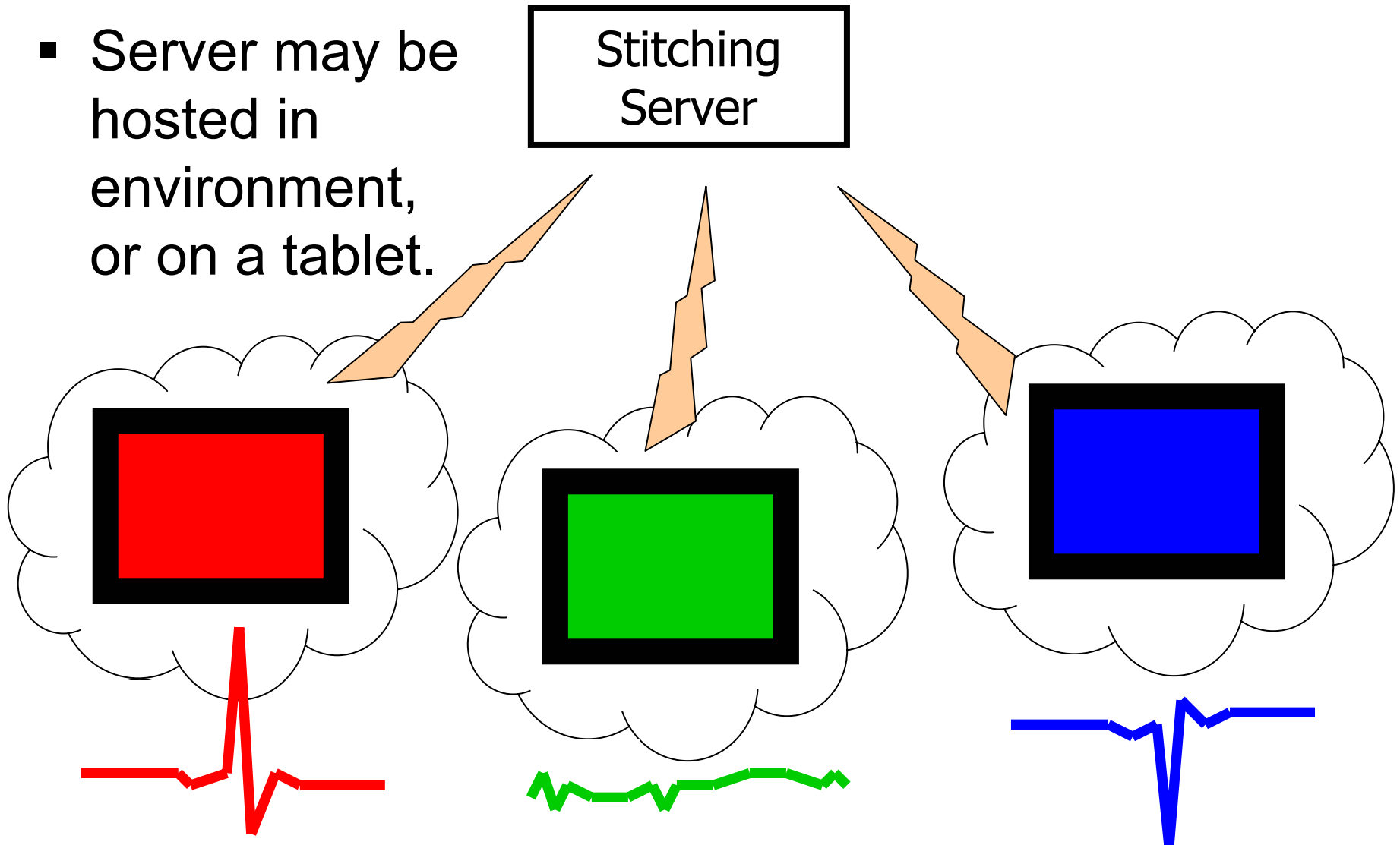


How Do Synchronous Gestures Enable Wireless Matchmaking?

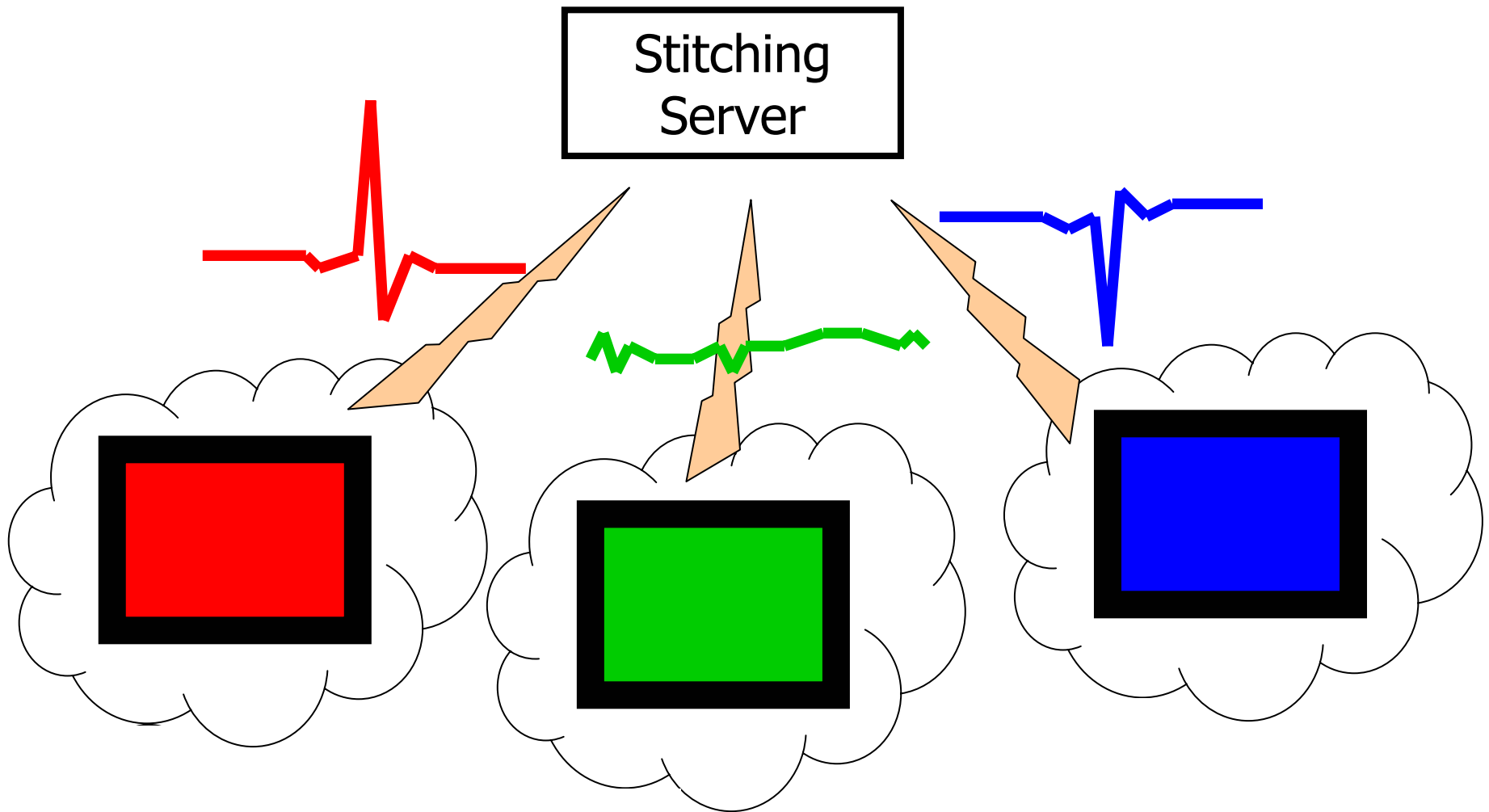


Participating Devices Connect to Server

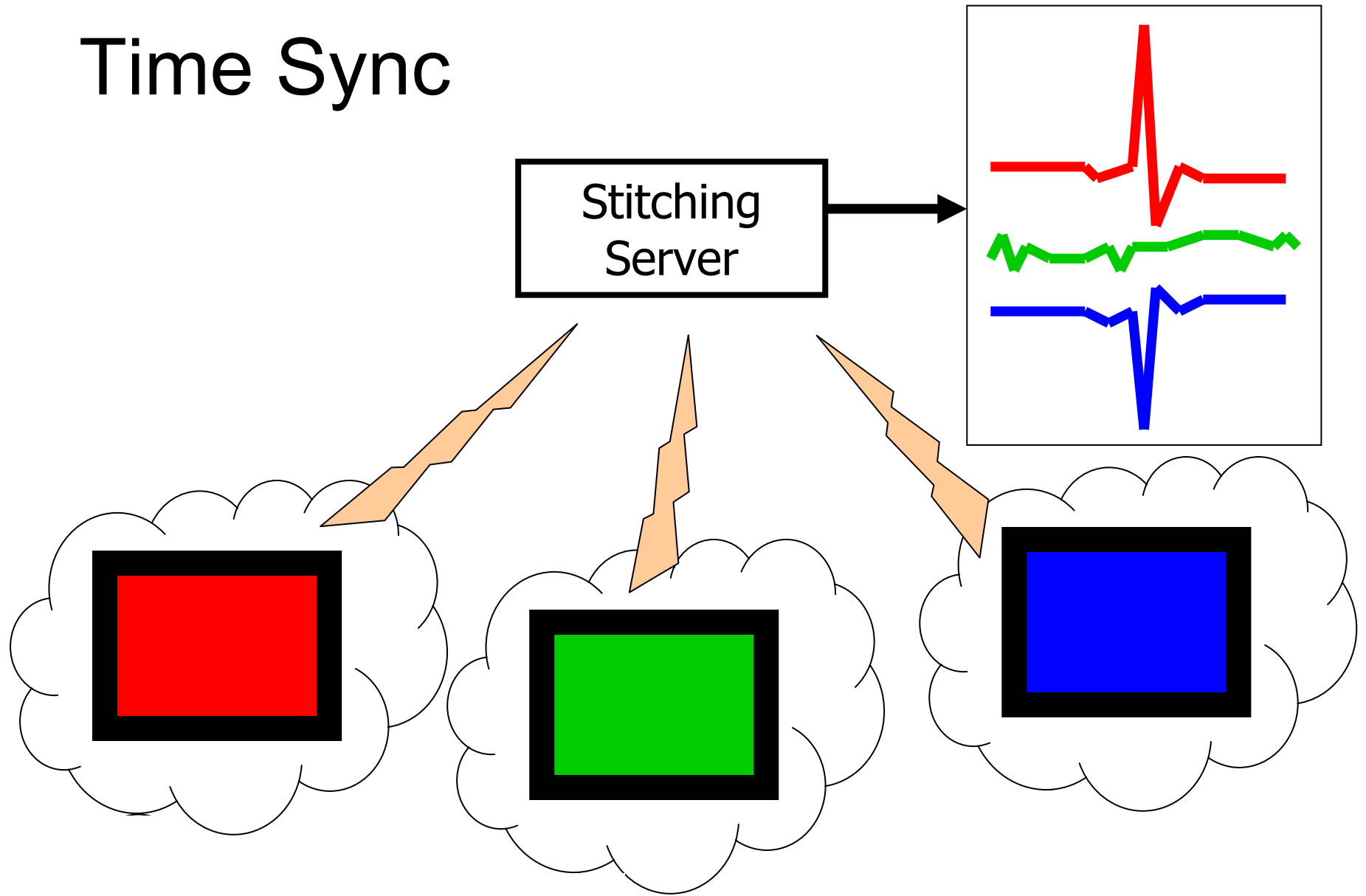
- Server may be hosted in environment, or on a tablet.



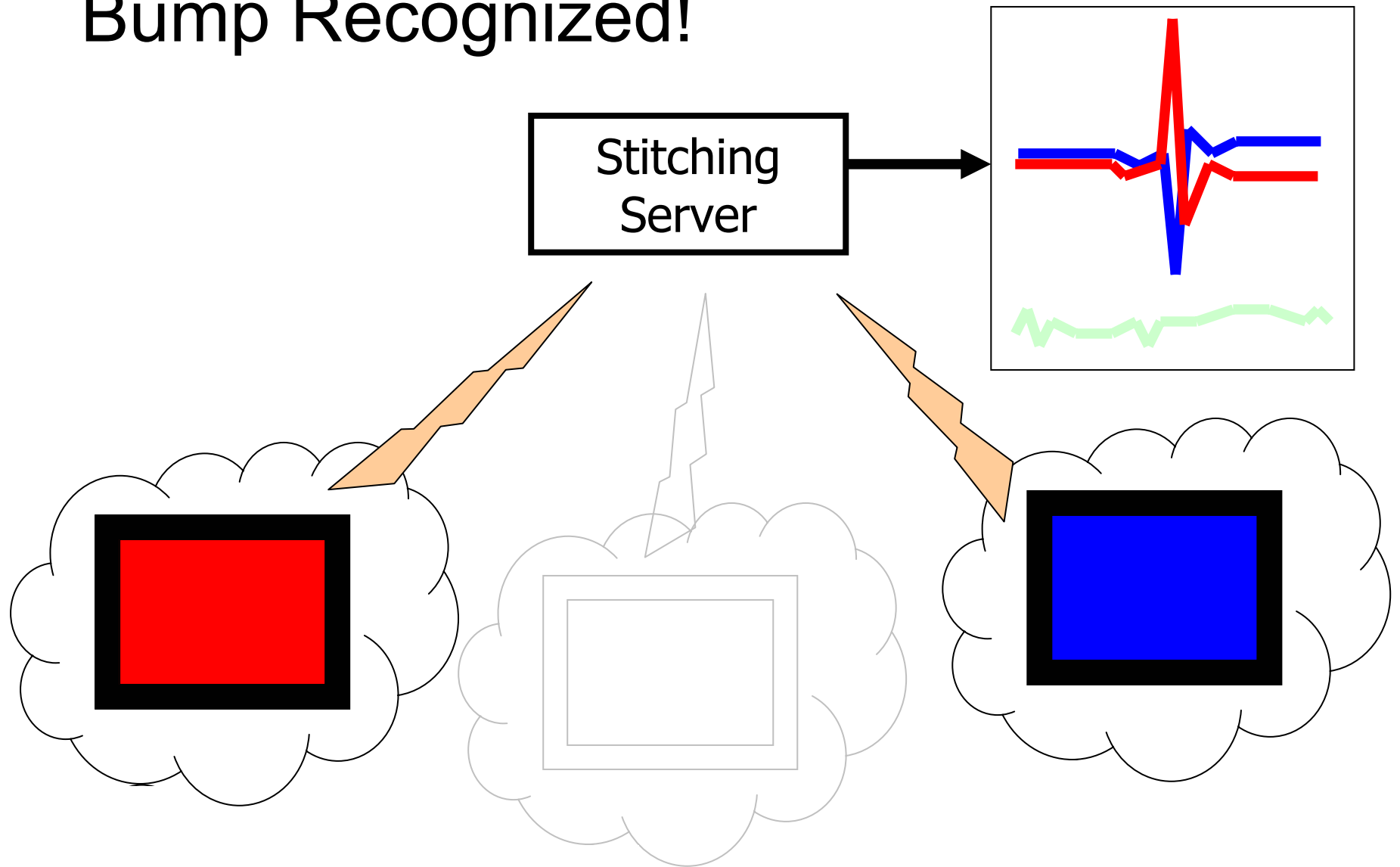
Send Sensor Data to Server



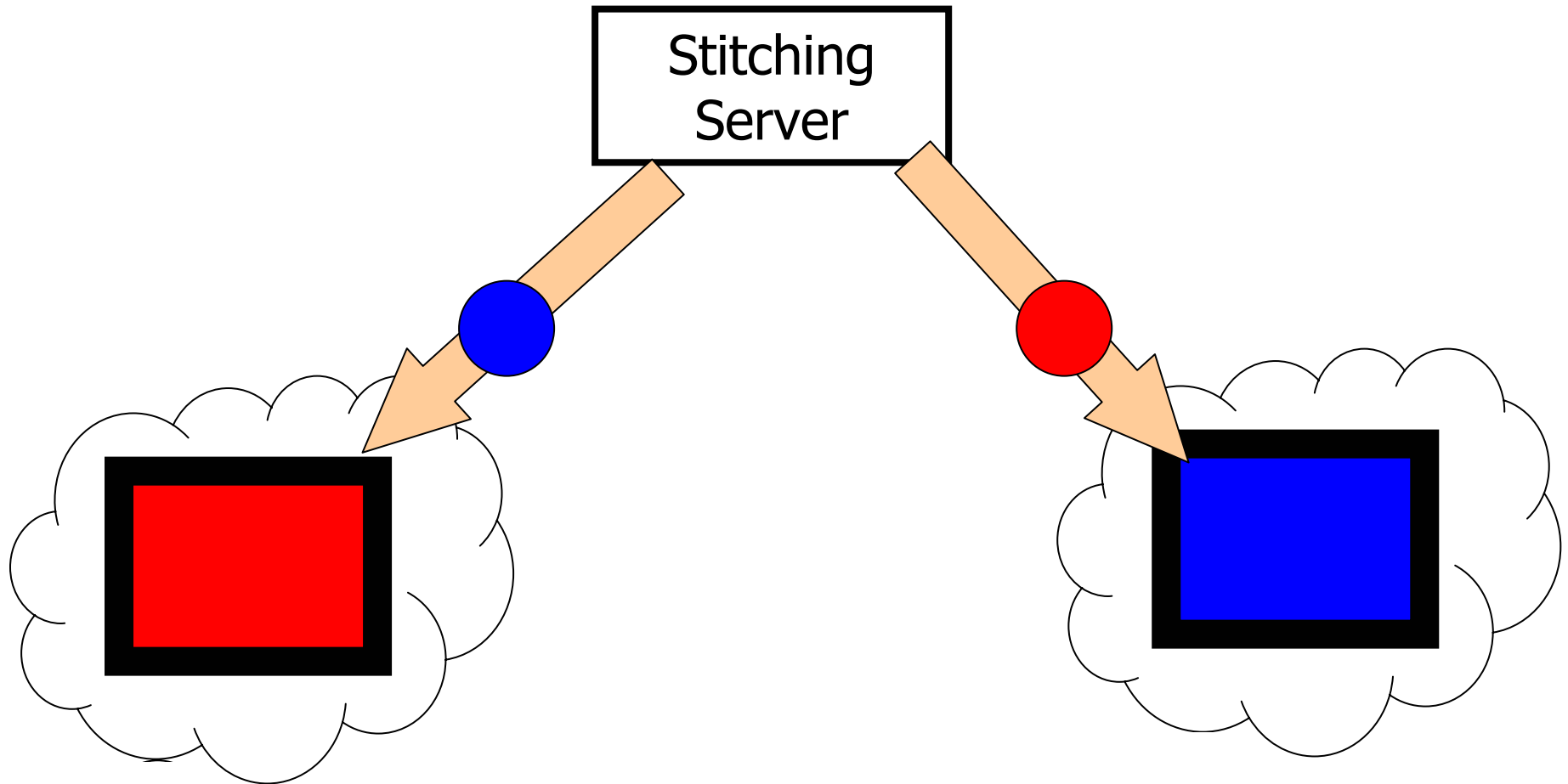
Time Sync



Bump Recognized!



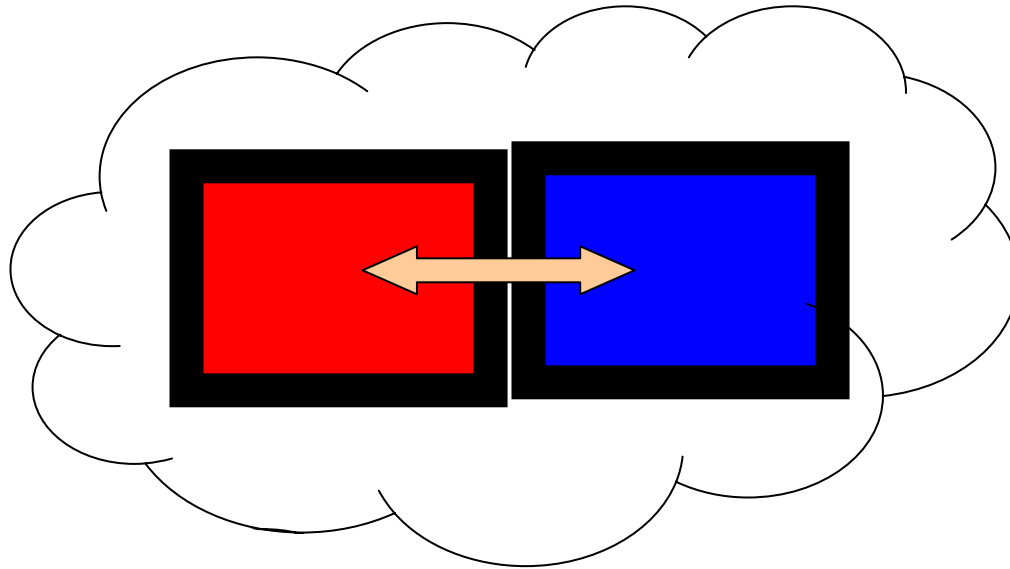
Server Gives Partners Each Other's IP Address



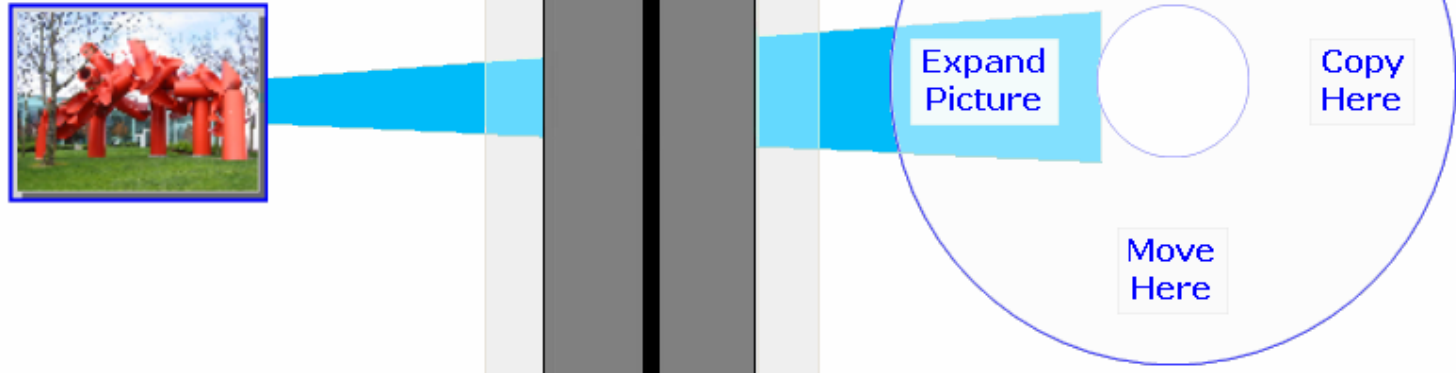
- Alternatively can have “private” connection via Stitching Server

Connect to Peer & Link Displays

Stitching
Server



Establish and Relax



- Users want to *Establish* a connection, but then *Relax* increasing social tension by quickly exiting

[Video long](#)
[Video short](#)

Next week

- A few words on SW infrastructures for IE
- If you took an exam about this lecture, what would I ask?
- If you did a Projektarbeit or Diplomarbeit with me, who could be your advisor?

LMU instrumented room

- In the basement of Amalienstrasse 17
- 12-15m²
- Steerable projector
- Augmented desk
- Back projection wall display
- Conventional displays
- Mobile devices
- Cameras
- Microphones
- RFID/IrDA/BT sensing
- Setup will begin Feb
- Topics for
 - Projektarbeiten
 - Diplomarbeiten
- Ideas for a cool name?
 - SUPIE: Saarland University Pervasive IE
 - Now: MUPIE ??? No!

