

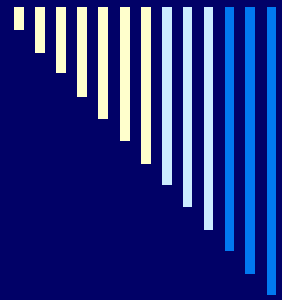
Collaboration Yesterday, Today and Tomorrow



Jill Gemmill
University of Alabama at Birmingham

ViDe and Internet2

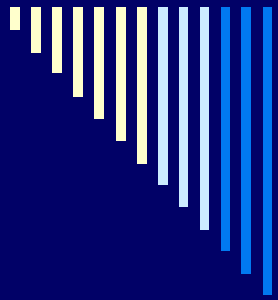




Introduction

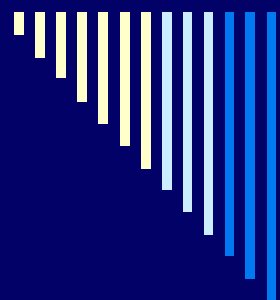
- *“May you live in interesting times”*

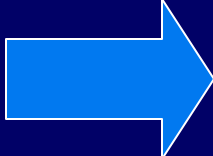




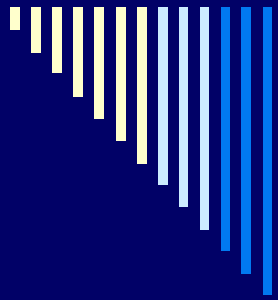
“Interesting”  GOOD

- Many products to choose from
- Rich set of features and functions
- Multiplatform solutions beginning to appear
- Integration with audio and video
- Often browser only

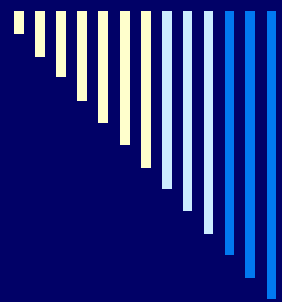


“Interesting”  Not So Good

- ❑ High cost on many; pricing per component
- ❑ Most not standards-based
- ❑ Unique, non-intuitive interfaces
- ❑ Significant training required
- ❑ Often browser only
- ❑ Limited features and functionality at this time
- ❑ Many POTS

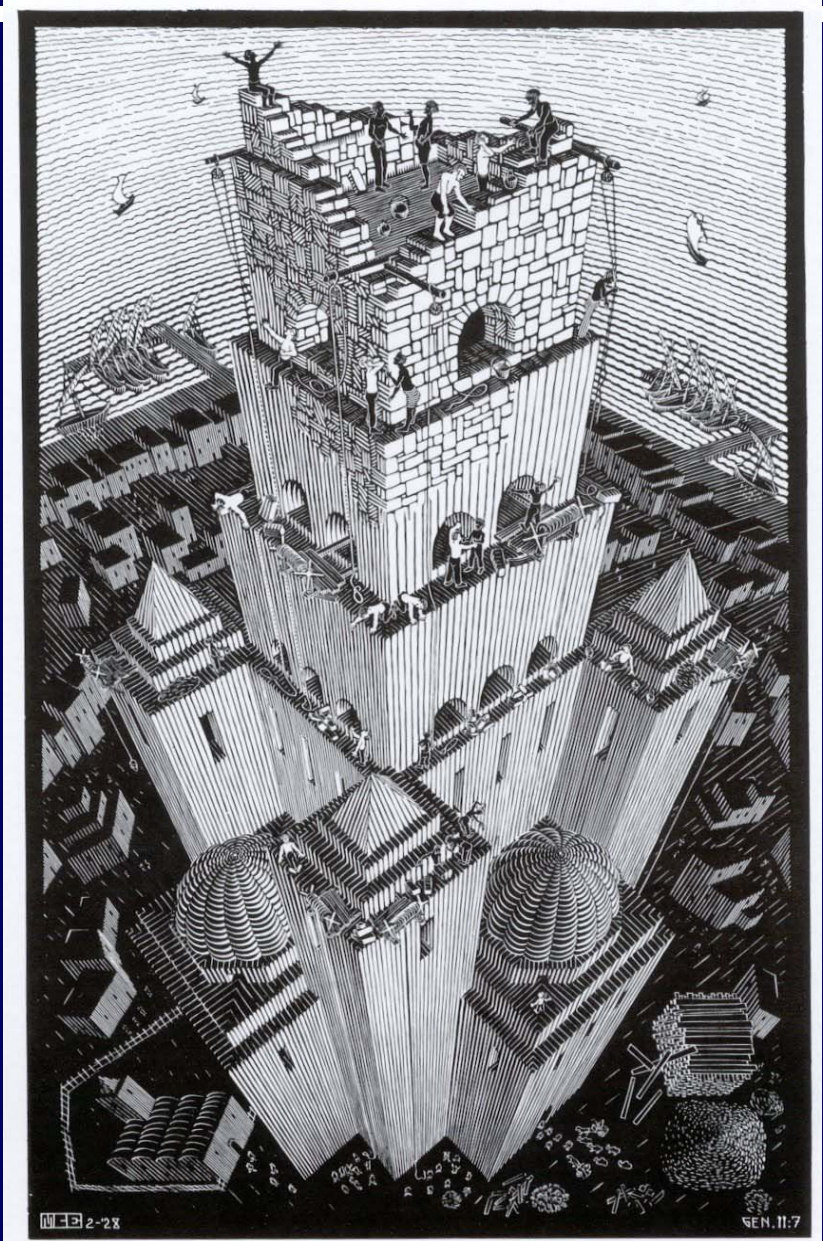


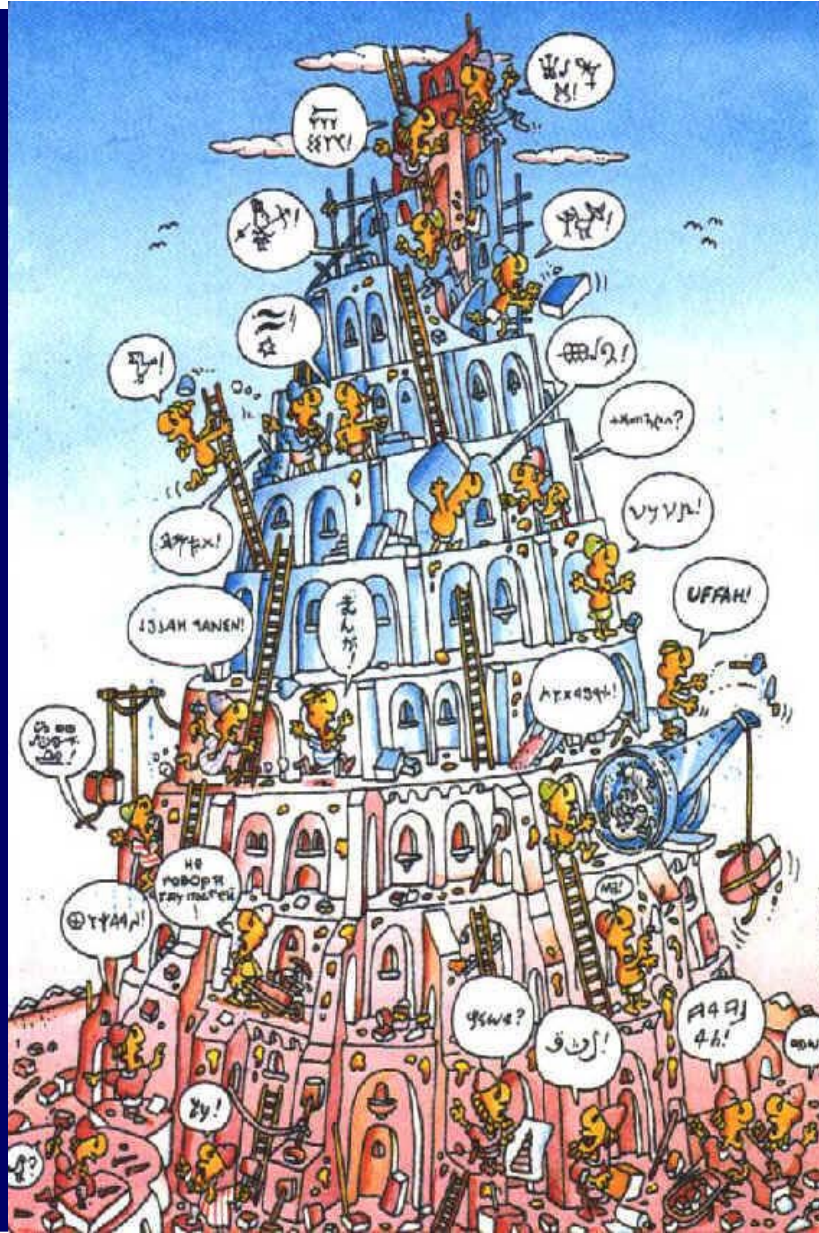
- People have been dealing with Collaboration Issues For a Long Time



The Tower of Babel

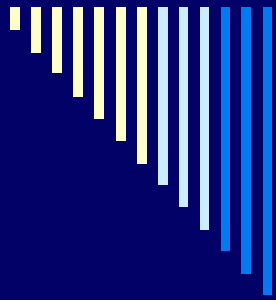
□ About 4000 BCE



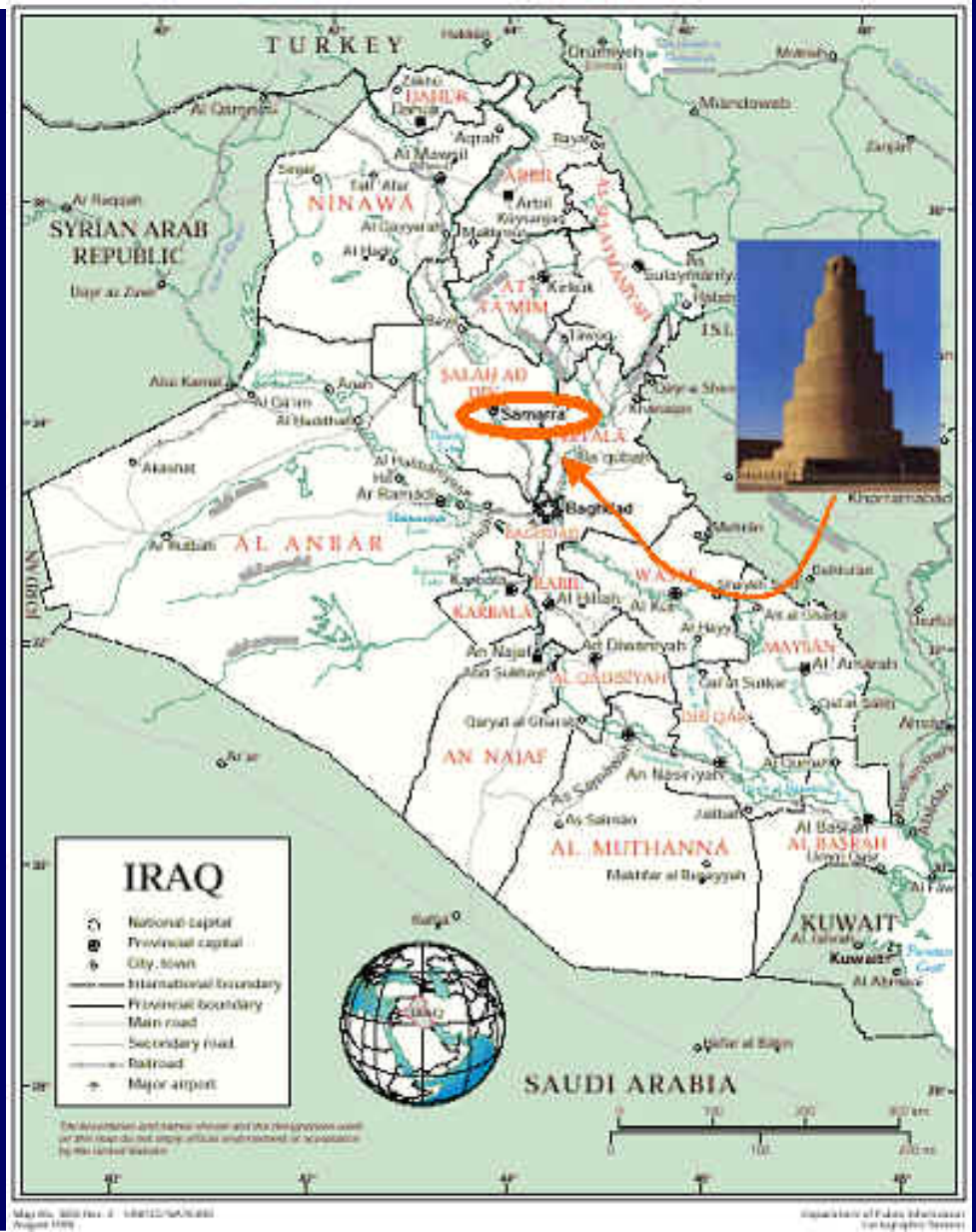


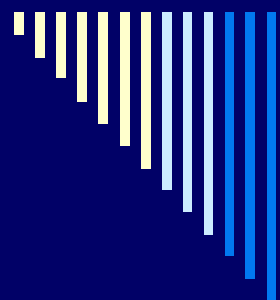
The
Consequences
?

An end to
easy
Collaboration



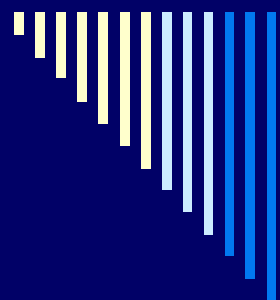
Still Having Difficulties At That Location





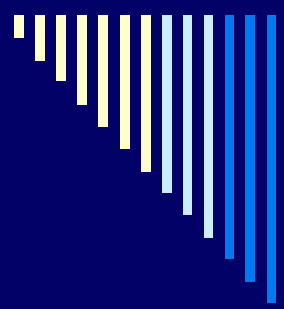
Knowledge Navigator

- Big Vision of Technology-Aided Collaboration has been around for awhile
- (Quicktime Movie)



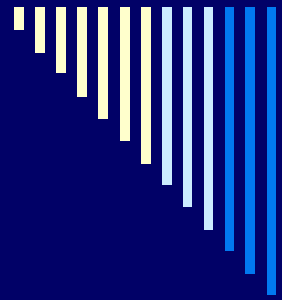
Knowledge Navigator - 1987

- Concept described by former Apple Computer CEO John Sculley
- Published 1987 in his book, *Odyssey*
- *And – 15 years later, we're not there yet*



Why does technology-aided collaboration remain a difficult problem?

- Involves communication among PEOPLE ; since when has working with people been easy?
- Each scientific field has its own methods, vocabulary, etc., as do instruction, business meetings, and collaborations in the humanities and social sciences. SIMILAR, but NOT THE SAME.
- Sometimes it takes a long time to understand ~~how to make best use of a technology~~



OUTLINE

- Quick history of collaboration concepts and technologies
- What does collaboration mean, anyway?
- What technology is available today and how to evaluate it ?
- The role of Middleware in building collaboration tools for Virtual Organizations



Quick History of Collaboration Tools

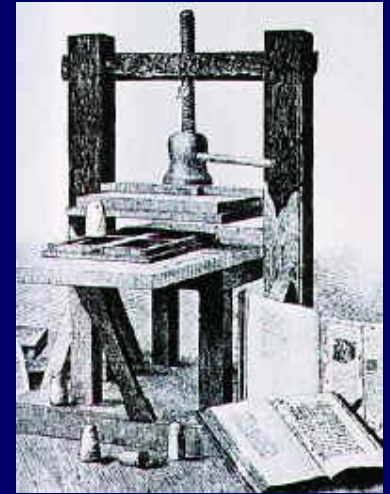


□ Writing : 3200 BC (Sumerian cuniform)

Quick History of Collaboration Tools



- Writing 3200 BC (Sumerian cuniform)
- Printing Press (Gutenberg 1450)



Quick History of Collaboration Tools



- Writing 3200 BC (Sumerian cuniform)
- Printing Press (Gutenberg 1450)
- Photography (Daguerre 1839)



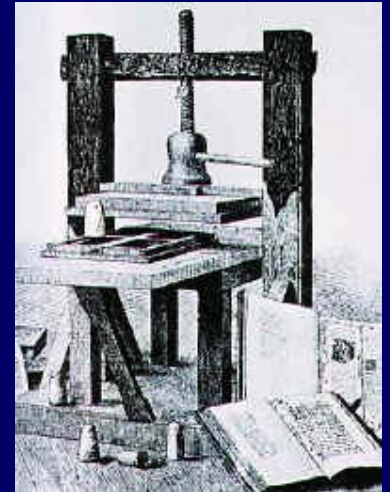
Quick History of Collaboration Tools

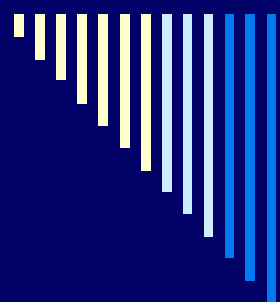


- Writing 3200 BC (Sumerian cuniform)
- Printing Press (Gutenberg 1450)
- Photography (Daguerre 1839)



- Telephone (Bell 1876)





Collaborative Tools Not Always Greeted with Early Enthusiasm

- *"This 'telephone' has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." -- Western Union internal memo, 1876.*

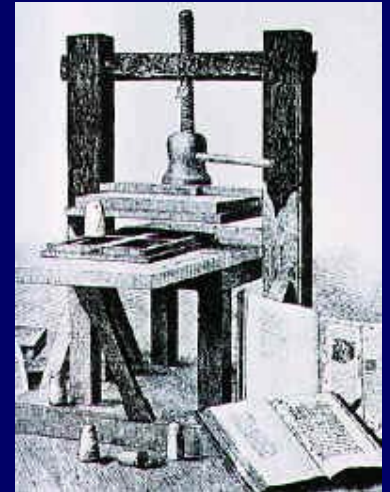
Quick History of Collaboration Tools

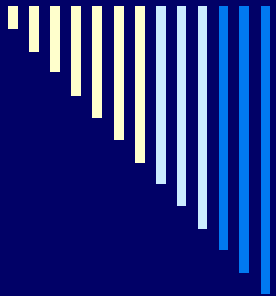


- Writing 3200 BC (Sumerian cuniform)
- Printing Press (Gutenberg 1450)
- Photography (Daguerre 1839)



- Telephone (Bell 1876)
- Phonograph (Edison 1877)

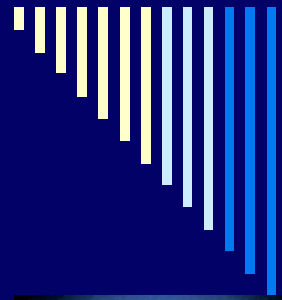




Collaborative Tools Not Always Greeted with Early Enthusiasm

- “The end of books”.

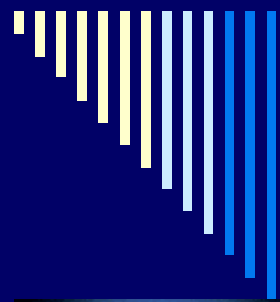




Quick History of Collaboration Tools



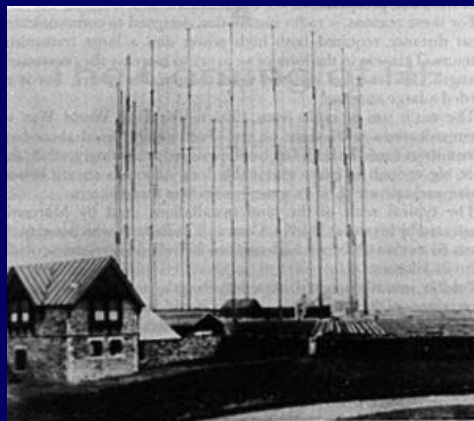
- Movies (Lumiere 1895)



Quick History of Collaboration Tools (slide 2)



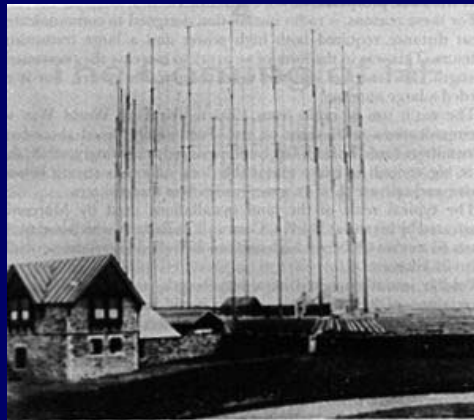
- Movies (Lumiere 1895)
- Wireless (radio)
(Tesla 1891 or Marconi 1895)



Quick History of Collaboration Tools (slide 2)



- Movies (Lumiere 1895)
- Wireless (radio) (Tesla 1891 or Marconi 1895)



- Video Conferencing (Bell PicturePhone 1956)

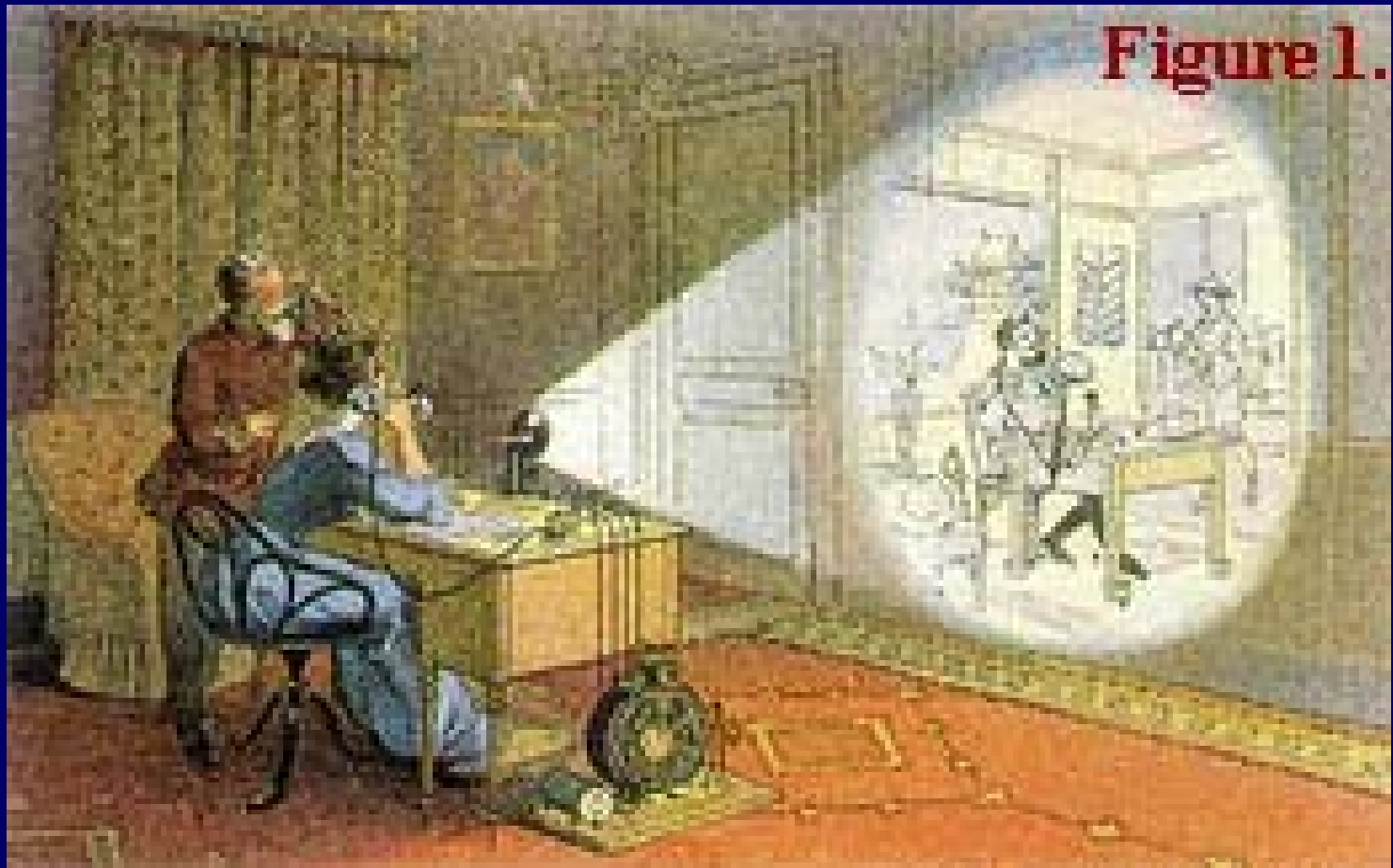


A picture phone? Well here's a Bell Labs experimental model that works. As a home or office item, it's a ways in the future. However, telephone people have brought it to the point where it requires only one more ordinary telephone line in addition to the one that carries your voice. It's possible to get the picture of the person you're calling by dialing his number. Of course, the picture switches at both ends of the line must be turned on. If either one is off—no picture. The picture phone is still undergoing development as something for the future.

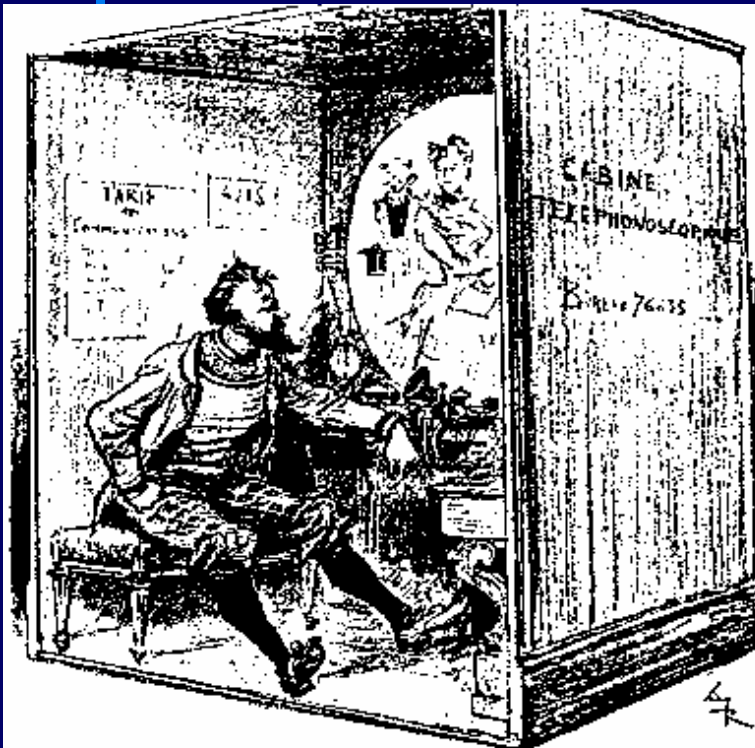
The PicturePhone Story: 1964 NY World's Fair Debut



An old Idea, now ready for the market.....



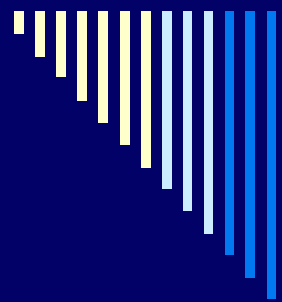
Albert Robida *Journal Telescopique*



(ABOVE) *Telephonoscopique* kiosks are to be found on every street-corner in the better neighbourhoods throughout France in the mid-twentieth century. Not only can you speak with your distant friends and loved ones in all the corners of the Empire, you can also see them at the same time. An intriguing forecast and aptly titled *le télé*.



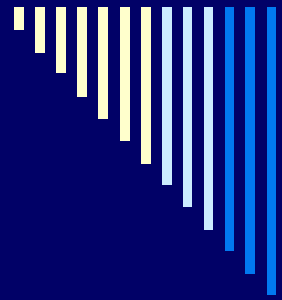
(ABOVE) Frustrated and enraged at obtaining so many crossed visual lines, a man hurls a chair at *le télé*. An observation by Robida that while tremendous strides may be made in technology, human behaviour changes not in the slightest.



Early Enthusiasm Does Not Guarantee Success

FIFTY YEARS AGO people communicated over distances mainly by letters and telegrams, and used streetcars, railroads, and ships for travel to see each other. Gradually telephone usage increased until it is today the most common means of communication, and the automobile and jet airplane now provide most of the transportation we use to get together for face-to-face conversation. I predict that before the turn of the century Picturephone will similarly displace today's means of communication, and in addition will make many of today's trips unnecessary.

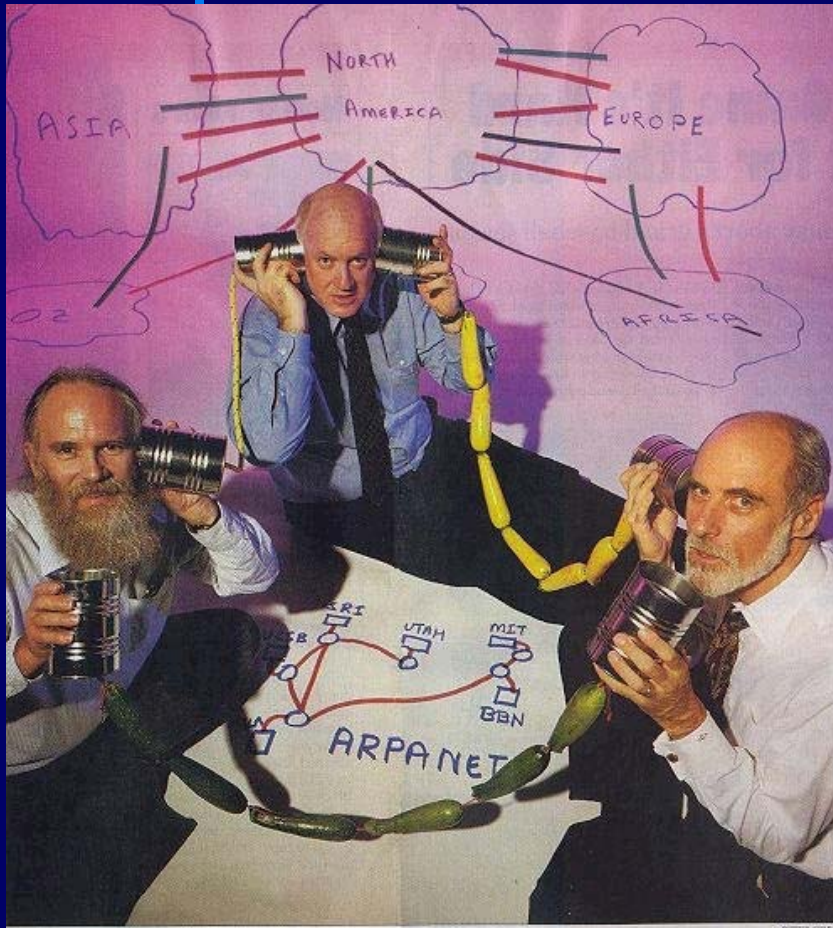
Bell Lab prediction, 1969



Quick History of Computer-Aided Collaboration Tools

- oNLine System (NLS) 1968
Doug Englebart, Stanford
- (25engel.ram)

Quick History of Computer-Aided Collaboration Tools

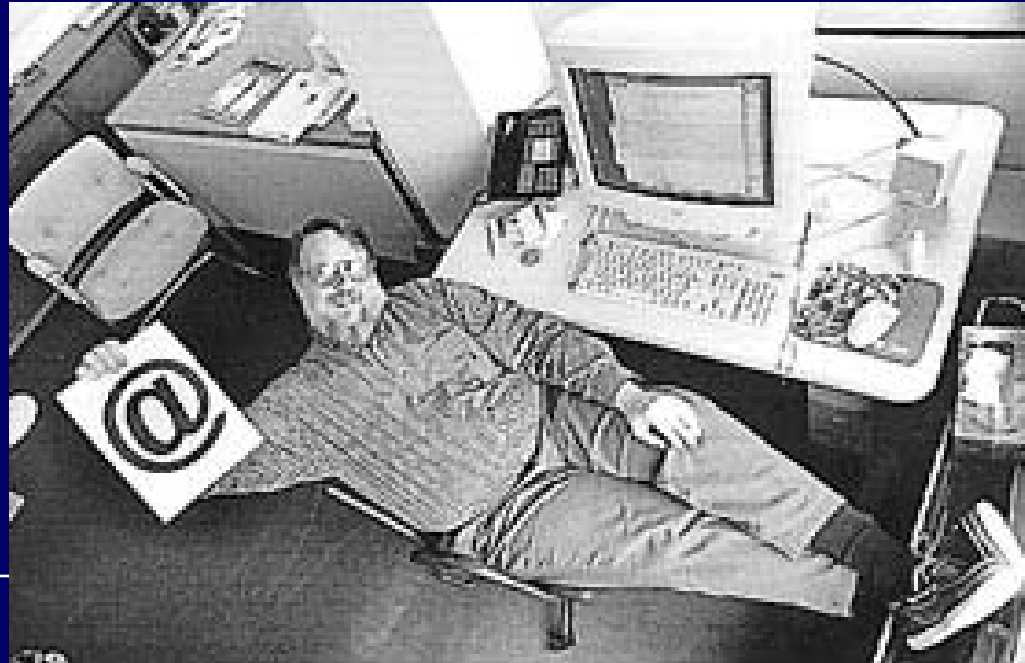


□ ARPANET 1969

- John Postel
- David Crocker
- Vint Cerf

Quick History of Computer-Aided Collaboration Tools

- Killer App #1: Email
(Ray Tomlinson 1971)
“The first use of network email announced its own existence.”



Quick History of Computer-Aided Collaboration Tools

- Graphical User Interface (1984 - \$2495)
- Note: Useability and “User-Friendly” are important.



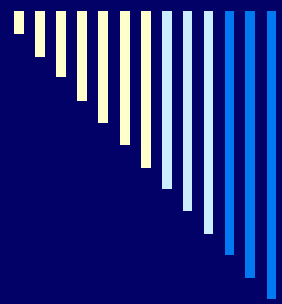


Quick History of Computer-Aided Collaboration Tools

- Collaboratory
(Bill Wulf, NSF CISE, 1989)

“A Collaboratory is a ... 'center without walls' in which the nation's researchers can perform their research without regard to geographical location - interacting with colleagues, accessing instrumentation, sharing data and computational resources, and accessing information in digital libraries.”

Example: [DOE Environmental Molecular Sciences Laboratory](#)



Quick History of Computer-Aided Collaboration Tools

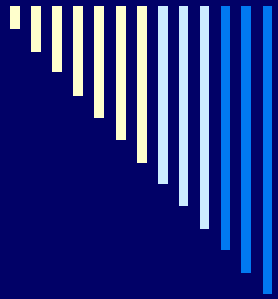
- World Wide Web

(1990 Time Berners-Lee @ CERN)

Berners-Lee related how difficult it was ten years ago when he was demonstrating the Web for the first time. Viewers seeing him progress from one document to another by clicking on links were nonplussed -- it's when the system scales that the advantages may be reaped.

- Total number of web sites in the world in 1990 = 1.

- 2000- Semantic Web, WC3, and XML



MBONE

- 1992 - LBNL
- Group to Group Communication

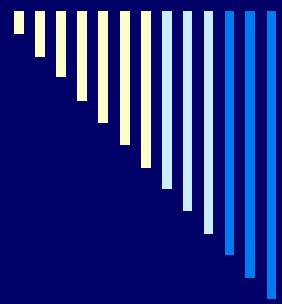
Color videophone 1992



1992 Videophone 2500

This is the world's first full-color, motion videophone that works over ordinary telephone lines. With it, callers can see and hear for the cost of a voice call.

□ *“Never give up,
never surrender!”*



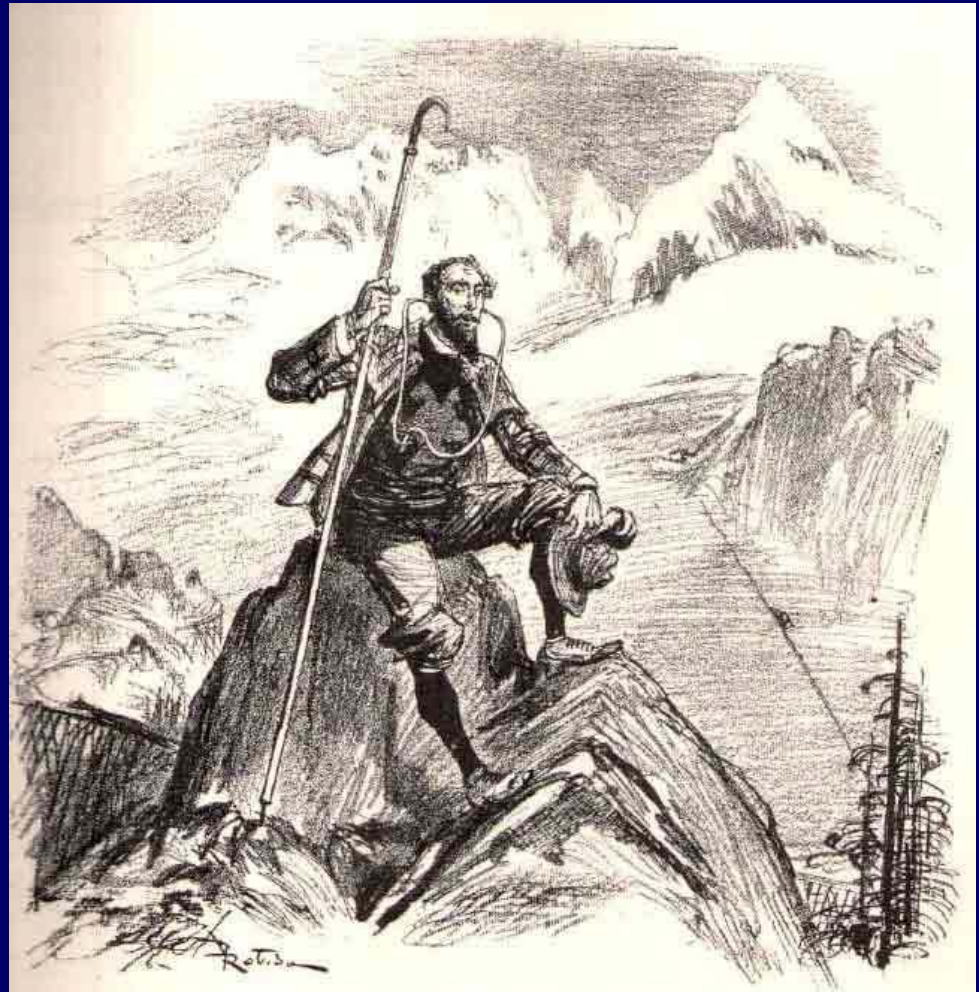
Quick History of Computer-Aided Collaboration Tools

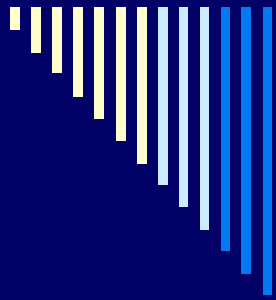
- Killer App #2: Graphical Web Browser
(Marc Andreesson, NCSA, Mosaic 1993)



Mobile Communications

- The very first “walkman”





An Evolutionary Table

CUSEeMe

Cornell (1992)
Reflectors

T.120

NetMeeting (1995/6)

VCON MeetingPoint

RadVision DCS

SGIMeeting

Lotus Sametime

SunForum

MeetingOne

PictureTel LiveLan

RadVision DCS

Whiteboard/Chat/IM

Netscape Conference (1997)

Voxphone

MERCI (TeleDraw)

e/pop

VRVS

(1996)

Remote Control

VNC (1998)

Timbuktu

RealVNC

Custom/Hybrid

Tango (1998)

Habañero

AG Dist. PowerPoint

Ezenia Placeware

ThinAnywhere

UARC/SPARC

Information on this slide contains gross estimations

based on rapidly changing technologies in a large market.

(From: Mary Trauner, I2 Commons Training)



An Evolutionary Table

Wiki

Wiki Wiki (1998)

Twiki

AG

Virtual Venue
(1998)

Shared Browsers

Hipbone (1999)

SurfNChat

ZofX

PowerCall

WebAnytime

CuSeeMe (2001)

JAVA/Javascript

Habanero

JCE

mDesk

Brainshark

iMeet

JAMM

MeetingPlace

Peer to Peer (P2P)

Jxta (2001)

Groove (1999)

Virtual Classroom/ Desktop/Office

WebOffice (2002)

WebEx

Elluminate vClass

HorizonLive

Raindance

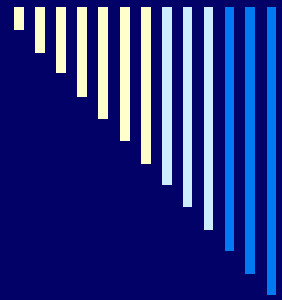
eMeeting

PictureTalk

Information on this slide contains gross estimations

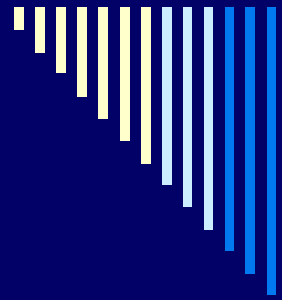
based on rapidly changing technologies in a large market.

(From: Mary Trauner, I2 Commons Training)



OUTLINE

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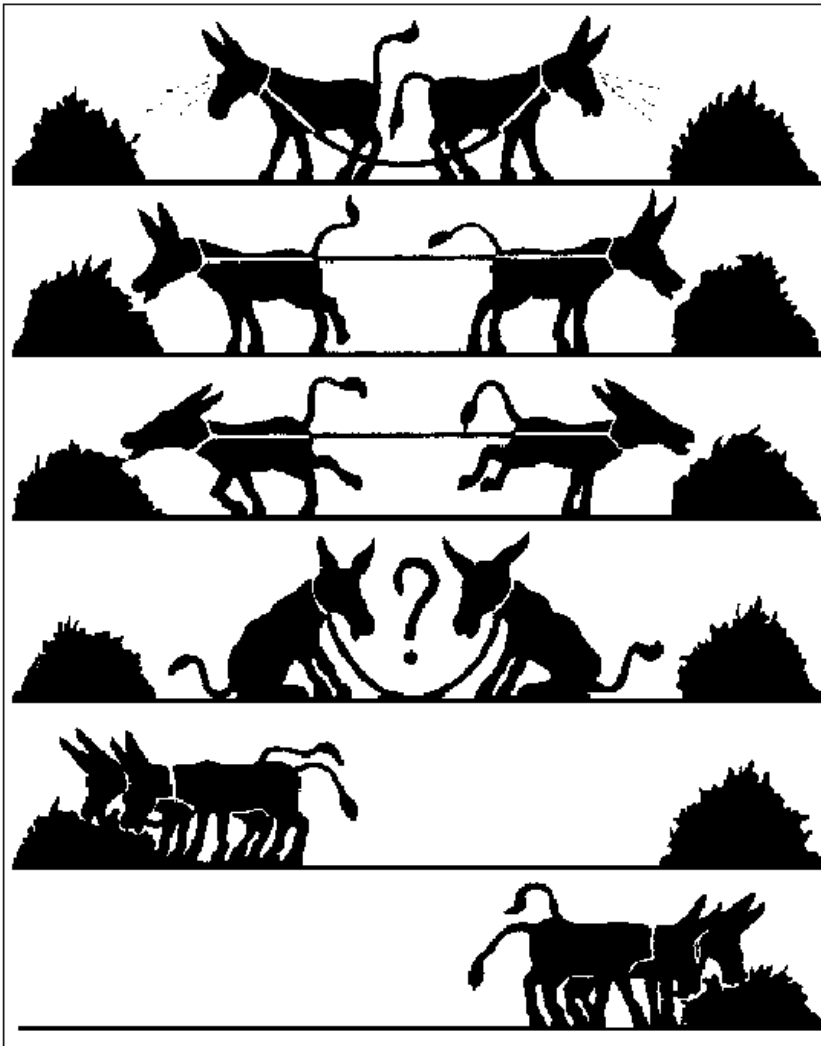


What's the Model?

- Let's look at some



COLLABORATION



Human Interaction

Real-time
Communication



Workflow



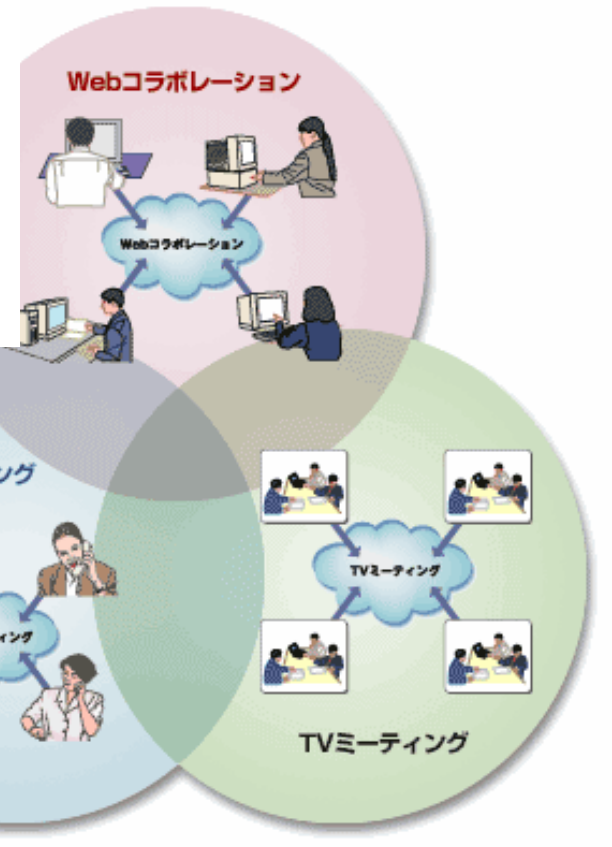
Collaboration

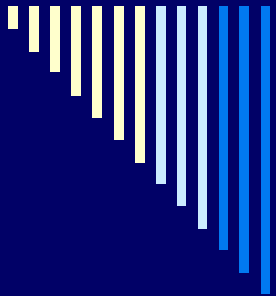


Teamwork



Connecting People and
Processes





□ Oracle



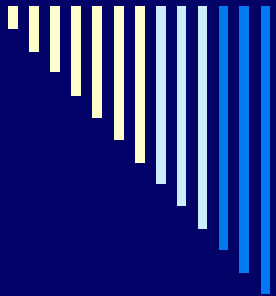
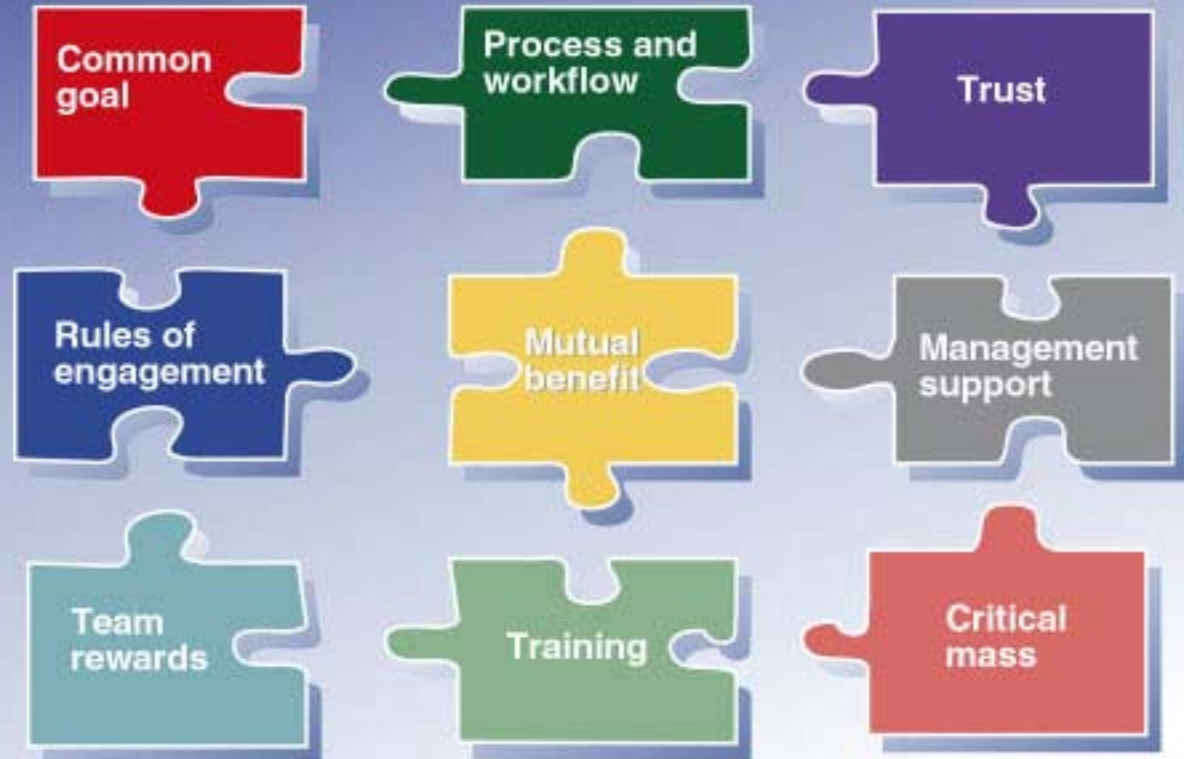
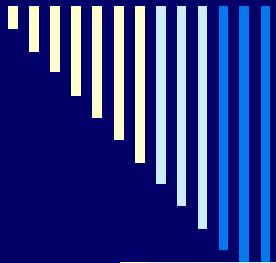
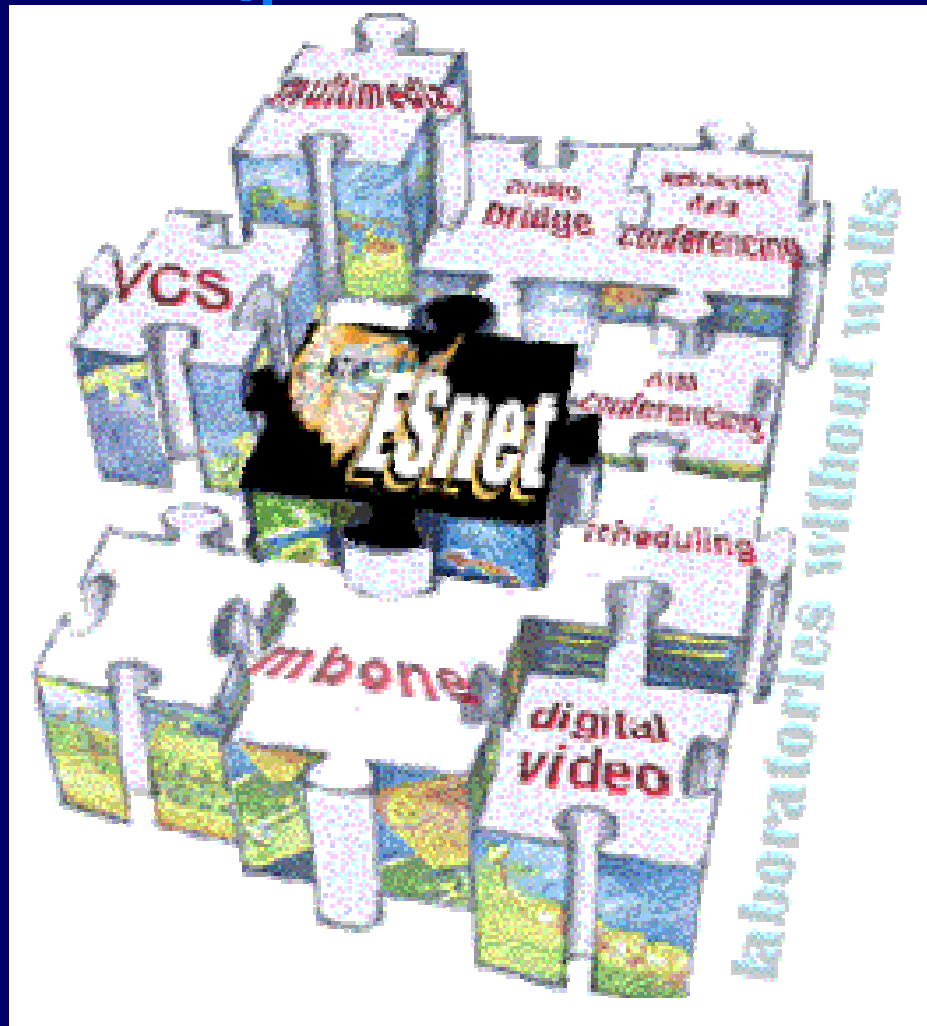
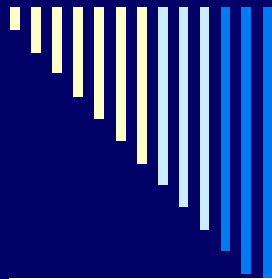


Figure 2
Elements of Successful Collaborations

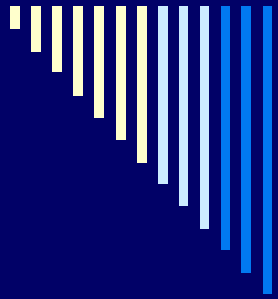


C U L T U R E O F S H A R I N G





- *“Like pieces in a puzzle, ESnet collaboration tools are integrated ‘on-the-fly’ creating a virtual environment.”*



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What is Collaboration? Desirable Functionality?

- A “third stream” in addition to audio and video
- A shared electronic document
- A view of an electronic workspace
- A shared interface to a running application
- A one-time, impromptu or planned engagement
- A persistent, group electronic workspace
- Synchronous or asynchronous

(From: Mary Trauner, I2 Commons Training)



What is Collaboration?

Features & Functions ?

- Whiteboard
- Chat or Instant Messenger
- Shared Documents (Still Image)
- File Transfer
- Shared Applications
- Remote Control
- Pointers
- Surveys, Polling, Quizzing
- Recording
- Telephone and/or VC Bridges
- Video Streaming
- Animation Support
- Chair Control
- Scheduling and Timers
- Agendas for Meetings, Classes
- Announcement Boards
- Participant List, Status panels
- Management Console
- Directories
- Logging, Tracking
- Security
 - Authentication
 - Encryption
- Shared Repository, Meeting/Class Archives

(From: Mary Trauner, I2 Commons Training)



What is Collaboration? (Minimal) Standards ?

Standards ??

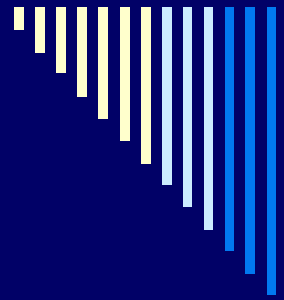
□ T.120

- Layered, Network Independent
- P2P Communications
- 8K channel
- NetMeeting (now dead product)
- No development of standard

□ ITU-T H.239 (July 2003)

- supports one or more parallel streams for sharing data and presentations
- Defines multiple channels (video, audio, or data.) and their “role” (Live, Presentation).
- Limited Implementations

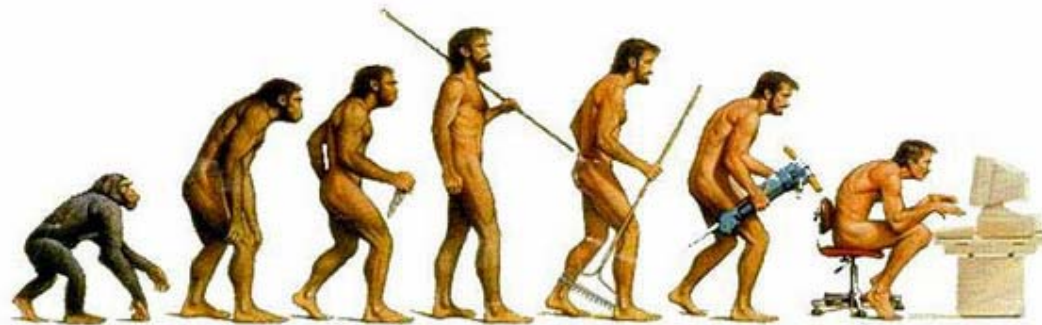
(From: Mary Trauner, I2 Commons Training)

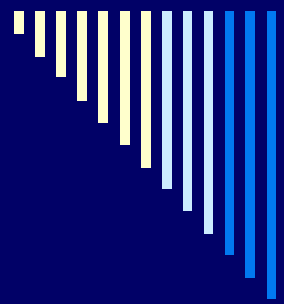


Perhaps Easier to Understand From Social Interaction Model

- Show and Tell (one to many)
- Person to Person (a “team”)
- Group to Group (a set of teams)
- A Meeting ?
- Sitting around in the Lab working ?
- Doing an experiment together?
- How does your collaboration do its work?

Does the Tool Feel like Progress or Not?

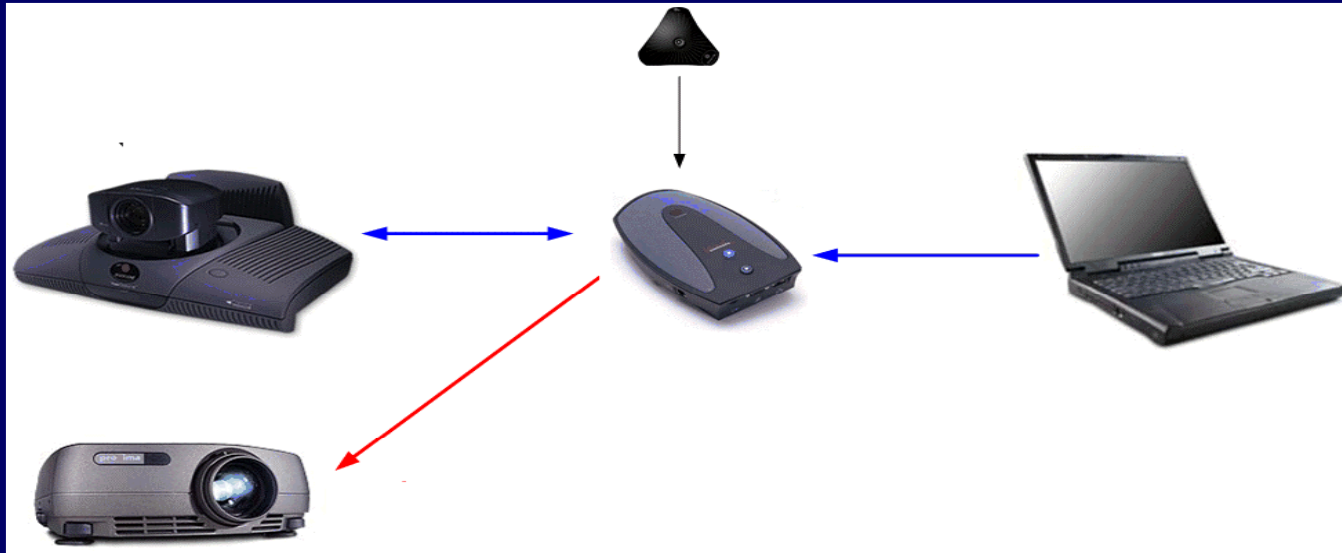




Today's Technology Falls into Three Broad Classes of Collaborative Applications

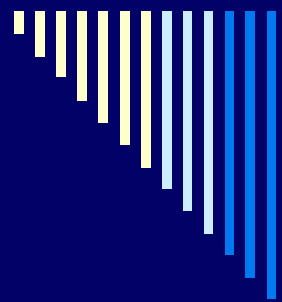
- Remote Display
 - Interactive Collaboration
 - Persistent Virtual Space
-

Remote Display Approach: *“Show and Tell”*



Polycom Visual Concert

(From: Mary Trauner, I2 Commons Training)



Interactive Collaboration Approach

Share a desktop or a window to:

- Co-browse the web
- Jointly work on whiteboard diagrams
- Jointly update a document

Share a running application to:

- Jointly steer its operation
- Provide support or training on its use
- Troubleshoot problems
- Use valuable, limited resources

Interactive Collaboration Approach

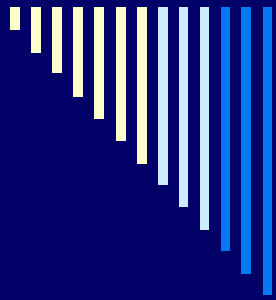
The screenshot shows the vClass Virtual Classroom interface. The main window is titled "vClass Virtual Classroom - BIGTENUUNIVERSITYMEETING". It features a menu bar (File, View, Tools, Window, Help) and a toolbar. On the left, there is a "Participant Info" panel with a list of participants (Mary Trauner (Me)), a "Direct Messaging" panel with a "Send" button, and an "Audio" panel with "ON THE AIR" indicator and microphone/speaker icons. The central area is a "Whiteboard - Main Room" with a "Public Screen 1" and a "Follow Moderator" button. The whiteboard displays two images: a blackboard and a whiteboard, connected by a double-headed arrow. Below the images are two video feeds. A "Calculator" window is open in the bottom right, showing a graph of a parabola and mathematical input fields.

The screenshot shows a session control panel titled "Session - mtrauner". It includes a "Call" button, a status section indicating "IN CALL" with "TO: 192.168.0.122" and "DURATION: 41:03". Below this is a "Participant" list showing "sip:192.168.0.1...". Control buttons include "CLOSE CALL", "MUTE", "VOLUME" (with a slider), "MEDIASPACE", and "SHAREAPP". At the bottom, it shows "Show Contacts", "192.168.0.118", and "1 party".

The screenshot shows a presentation slide titled "Volume Buttons" from POLYCOM. It features a video feed of a woman on the left and a list of instructions on the right. A remote control image is shown below the instructions.

- Use to control the volume level that you hear from the far site
- This does not effect how loud you are to the far site

(From: Mary Trauner, I2 Commons Training)



Persistent Virtual Workspace

- **With remote collaborators, in a virtual workspace:**
 - **Use capabilities of interactive data collaboration**
 - **Collaborate over time on a project or activity**
 - **Maintain the work record: documents, discussion, digital objects, notes, outlines**

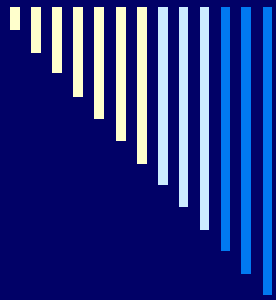
(From: Mary Trauner, I2 Commons Training)

Persistent Virtual Workspace

- Groove
- AG
- VRVS?

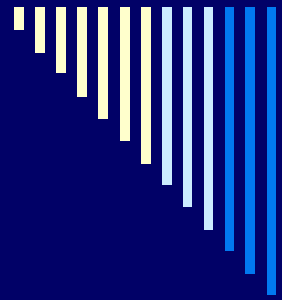
The screenshot displays a Groove workspace window titled "DMNS IT Seminar - Web Browser - Groove". The window is divided into several sections:

- Browser Window:** Shows a web browser with the address bar at `http://it.iu.edu/itseminars.html`. The page content includes:
 - Information Technology Seminar Series**
 - Sponsored by the Office of the Vice President for Information Technology
 - Spring 2002**
 - Seminars designed to present technical details of various information technology projects throughout Indiana University
 - Advanced Networking Initiatives**
 - Dave .lent, Group Manager, Data Operations
- Left Panel:** Contains an "Invite" button, a list of users under "Active" (Doug Pearson), "Online", and "Not Online" (bhinesly, cjgolden, Curto, furia, Joe Stevens, Leroy@iupui, vicops), and "Suspended".
- Conversation Panel:** Shows a chat log with messages:
 - Hello Doug are you there
 - Doug Pearson: 3/13/02 9:28 AM
 - Polycom hosed, rebooting
 - furia: 3/13/02 10:11 AM
 - back in a minute
 - Joe Stevens: 3/13/02 10:19 AM
 - be right back..
- Bottom Panel:** Includes a "Conversation" section with "Hold-to-Talk" and "Hide Chat" buttons, and a "Navigate Together" checkbox.



Today

- ❑ Access Grid
- ❑ Virtual Rooms VideoConferencing System
- ❑ Microsoft Research Learning Experience Project ([Conference XP](#))
- ❑ ViDeNet & Global Dialing Scheme
- ❑ H.350 Directory Services for Multimedia
- ❑ Internet2 Commons
- ❑ Microsoft Live Communication Server (SIP)
- ❑ Presence and Instant Messaging (XMPP or SIMPLE)



Something New: 2000's Social Software

- *"software that supports self-organizing communities"*
 - *Blogs and Wikis*
 - *photo & playlist sharing*
 - *Games*
-

http://www.opencroquet.org/



```
//open up the debug file, change it to...
if ((debugFile = fopen("debug.txt", "a")) == NULL)
    Interpreter::Print("Fatal Error: We failed.");
return 0;
fpAs("Plugin-in-...");
debugFile);
```

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Home

ABOUT CROQUET

- Introduction
- FAQs
- Screenshots
- Whitepapers
- User Guide
- Related Projects

CROQUET TECHNOLOGIES

- Architecture
- Programmer Guide
- Croquet License
- Downloads

COMMUNITY

- Core Ed Partners
- List Servers
- Who to Contact



WHAT IF...

...we were to create a new operating system and user interface knowing what we know today, how far could we go? What kinds of decisions would we make that we might have been unable to even consider 20 or 30 years ago, when the current set of operating systems were first created?

...we could collaborate with one another in an online dimension to create or simulate anything we wanted to?

...we had the robustness of a 3D immersive technology, the diversity of the Internet, and the degree of social interaction we have in the real world?

Enter Croquet.

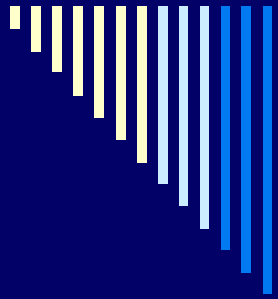
EVENTS LISTING

| M | T | W | T | F |
|------|---|---|---|---|
| | | | | |
| 7 | 8 | 9 | | |
| 14 | | | | |
| 21 | | | | |
| 28 | | | | |
| 2004 | | | | |

CS 2005 CALL FOR PAPERS:

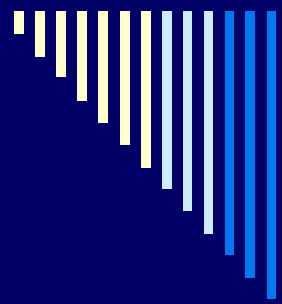
The Third International Conference on Creating, Connecting, and Collaborating through Computing has put out a call for papers.

The conference will take place on January 28-30, 2005 at Shiran Kaikan, Kyoto University, Kyoto, Japan.



OUTLINE

- Quick history of collaboration concepts and technologies
- What does collaboration mean, anyway?
- What technology is available today and how to evaluate it ?
- The role of Middleware in building collaboration tools for Virtual Organizations



Middleware (NSF Middleware Initiative)

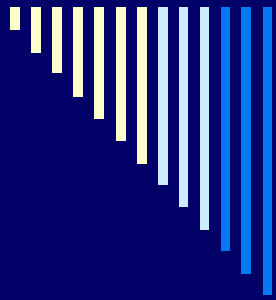


- ❑ Directories
 - ❑ Authentication – Who Are You?
 - ❑ Authorization – What are you allowed to do in this system?
 - ❑ Federated Administration
 - Cooperating Institutions agreeing to trust other federation members to identify their own community
 - Enabling Cross-Institutional Authorization
-
- (GRIDS)



In Practice....

- Provision resources appropriate for the application
 - Mailbox, entry in database, Grid Mapfile entry.....
 - Support for Guest accounts is **REQUIRED**
 - Unaffiliated, lagging home infrastructure....
 - Don't need to call sysadmin to share stuff on my desktop
 - Non-Intrusive Security requires functional middleware
-

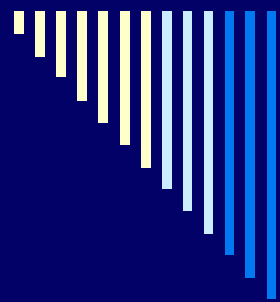


**NSF ANI-0330543 “NMI Enabled Open
Source Collaboration Tools for Virtual
Organizations”**

PI: Jill Gemmill

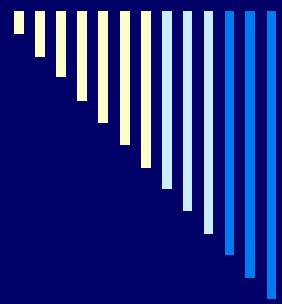
co-PI's John-Paul Robinson, David L. Shealy

Duration: 09/15/2003-8/31/2005



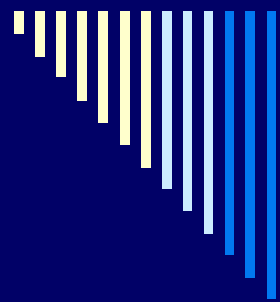
The Challenge is not to create the “Universal Collaboration Tool”

- Create a SYSTEM ENVIRONMENT into which tools that YOU find useful can be added
- Your selected set should function seamlessly
 - Single sign on
 - Data access across applications
 - Some common look & Feel
 - Shouldn't matter which computer houses the tool

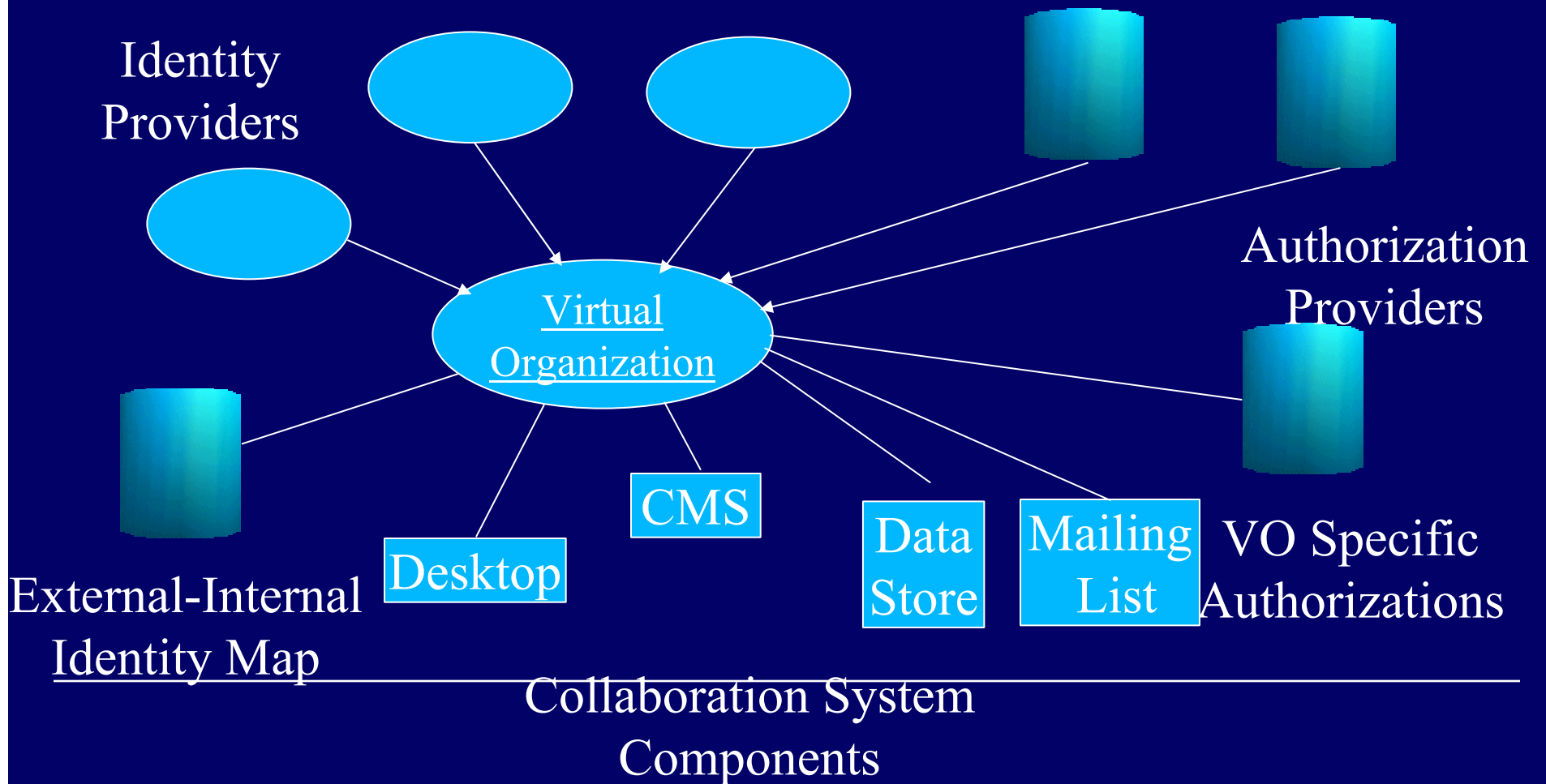


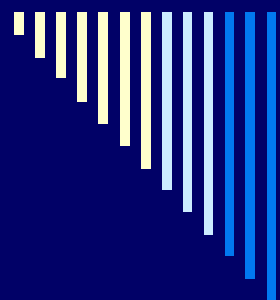
Virtual Organization Collaboration Space

- ❑ Collaboration Spaces Can Be Instantiated by Institutional Members
- ❑ Membership Available to Anyone—Solves “I have no infrastructure” problem”
- ❑ Collaboration Space Built from Component Applications
- ❑ Component Applications function as Integrated System Environment



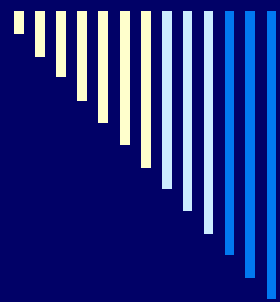
Collaboration System Sketch





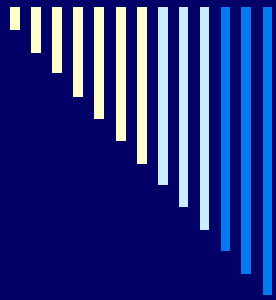
System Integration

- Common Identity
- Unified Authentication Interface
 - WebISO, Desktop Login
- Unified Authorization Definitions
- Configurable User Interface
 - Consistent Look-and-Feel
 - Templating Systems Help
- Consistent Object Abstraction



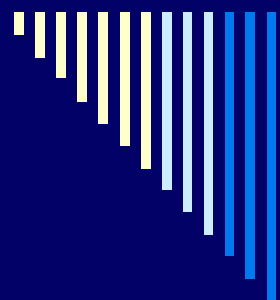
Don't Portals Do All This?

- Yes, but may be only one component of system
 - Force Single Point of Access
 - Do Provide Integration Internally
 - Require Support for Specific Portal Interface Standard
 - Convenient to Reuse Components and not Recode
 - Shouldn't VO have flexibility to pick tools that they like?
-



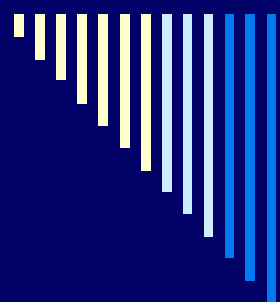
Consistent Object Interface

- ❑ Enables sharing data between systems
- ❑ Referencing data is desirable
- ❑ Don't require importing Data before it can be managed
- ❑ Can improve meaningful authorizations
- ❑ Each component needs to map ownership rules to internal object representation



Our Prototypes

- UAB-GridCA
 - Cross-certified via Bridge for SURAGrid
- VO Collaboration Station
 - Members = mailing list subscribers
 - Guest accounts
 - Shibboleth used to authorize read/write access
 - Enables “I am my own VO” as well as “officially designated” VO’s.



"Facing Tomorrow's Problems Today: Best Practices and New Techniques for Internet-Based Video"



- THE 7th ANNUAL SURAVIDE
DIGITAL VIDEO CONFERENCE
- March 28-31, 2005
Atlanta, GA
Georgia Institute of Technology

<http://www.vide.net/conferences/spr2005/>