Summit to Create a Cyber-Community to Advance Deaf and Hard-of-Hearing Individuals in STEM (DHH Cyber-Community)

June 25-27, 2008

Cyberinfrastructure Specialists

Group Members

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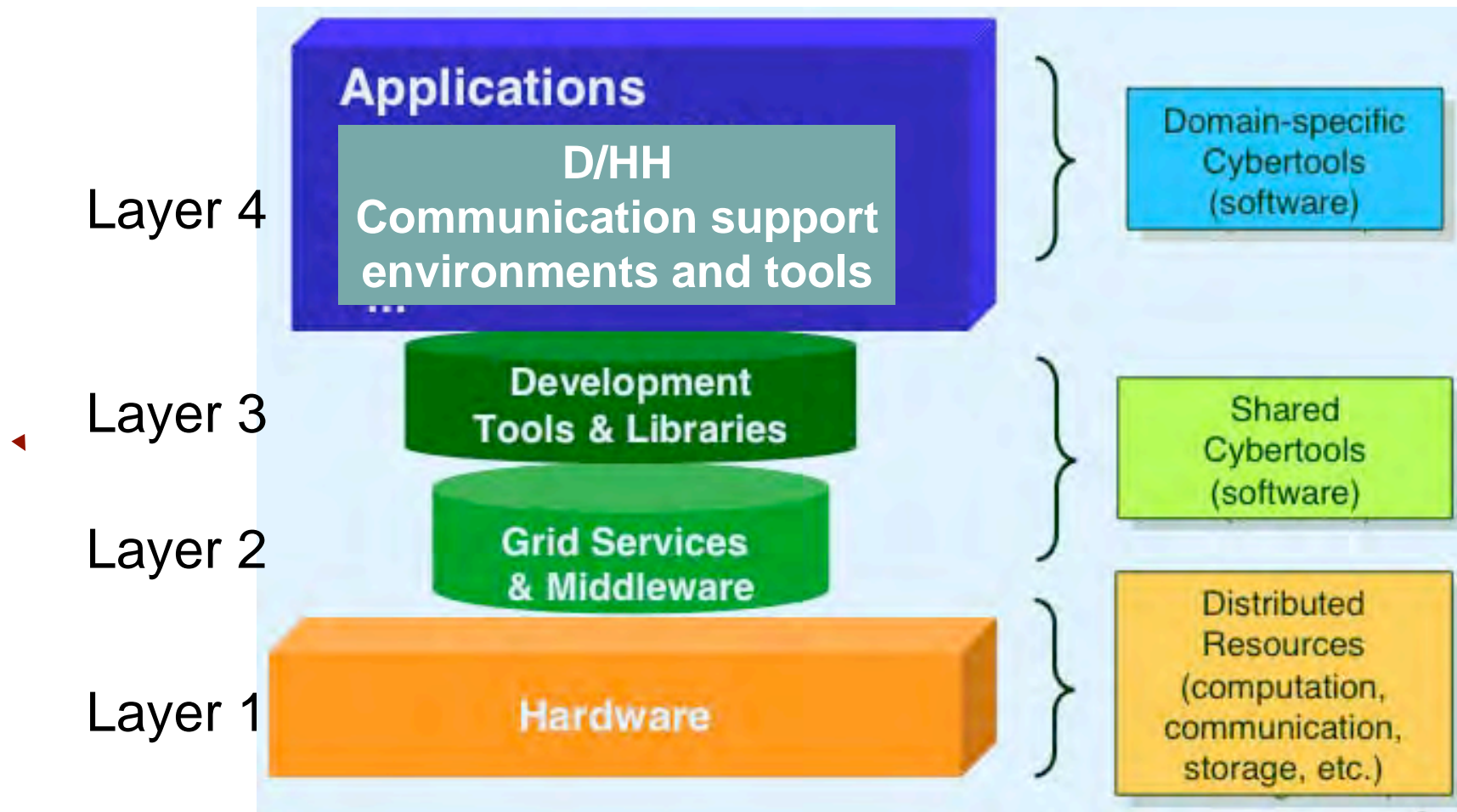❖ George Tilson

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Recommendations

o Create an *Experimental Platform and Testbed* for developing state-of-the-art cyber environments to support D/HH STEM students, faculty, and other stakeholders.

- Requirements gathering

- Design process

- Challenges

- *We are NOT developing the ultimate application but providing the building blocks for others to experiment and build applications to fit their needs*

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Experimental Platform to support D/HH Appl

Applications

D/HH Communication support environments and tools

...

Layer 4

Domain-specific Cybertools (software)

Development Tools & Libraries

Layer 3

Shared Cybertools (software)

Grid Services & Middleware

Layer 2

Hardware

Layer 1

Distributed Resources (computation, communication, storage, etc.)

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Experimental Platform and Testbed

o Layer 1: existing
o Layer 2: existing } ☛ *Focus on Quality-of-Service (QoS)*

o **Layer 3: new** } ☛ *Focus on Quality-of-Experience (QoE)*

- **A combination of open source and proprietary building blocks**

- **Remote services for DHH community provided by vendors (Adobe, MS, IBM, Sun, etc.)**

- **Permanent admin and support staff**

Requirements gathering

o Investigate how technology can assist problem diagnosis and resolution (e.g., workarounds to existing networking problems)

o Take a two-step development track:

1. Technology for short-term deployment (**what can be done now**)

2. Long-term work (**what may be possible in 5-10 years?**)

Requirements gathering (cont.)

1. **Short-term activities (*what can be done now*)**

   - Document and improve the use case scenarios

   - Explain the Everywhere, Anytime Education paradigm

   - Use existing commodity technologies as part of demonstrations

   - Develop guidelines for deployment

   - Use ***social computing*** to automate discovery of groups of users and Cyberinfrastructure/services that they use

Requirements gathering (cont.)

2. **Long-term (*what may be possible in 5-10 years*?)**

   o Build a scalable server-based host environment

   o Build various clients that interface with the hosting service

   o Hire permanent staff

   o Build a community of practice

   o Prioritize needs and approaches

Design process

o Iterative design with lots of user involvement

- User-level "programming" without writing code

o Diversity of scenarios and on-the-fly modification (e.g., widgets placements, feature/service selection)

o UI "smart" customization

- Accessible by people with differing needs
- Environment usable at any bandwidth
- User configurable (machine-driven)

o Just-in-time and just-in-case: practice ahead of time with remote interpreter and other services

Challenges

o Platform independence

- Technology agnostic, open source, cross platform

- Bandwidth not evenly distributed: delivery would "scale" from cell-phone to video walls, to supercomputers

o Collection of content

- Flexible domain taxonomy

- Intellectual property (who is allowed to see the archives and for how long?)

o When technology fails, what happens?

- Archiving and back-up plans
- Administration of environment(s)

Challenges (cont.)

o Ad-hoc accessibility provision

- it's not just the classroom

- Field work, chance conversations, labs, workplace, brown-bag lunch research meetings, etc.

o Universal design

- Make provision available to ALL users (notes, captions, signs, speech output, etc.)

- Crowdsourcing: if there is something wrong with, for example, archived captions, end users should be allowed to submit suggested edits for a "moderator" to review and approve.

Cyberinfrastructure Development
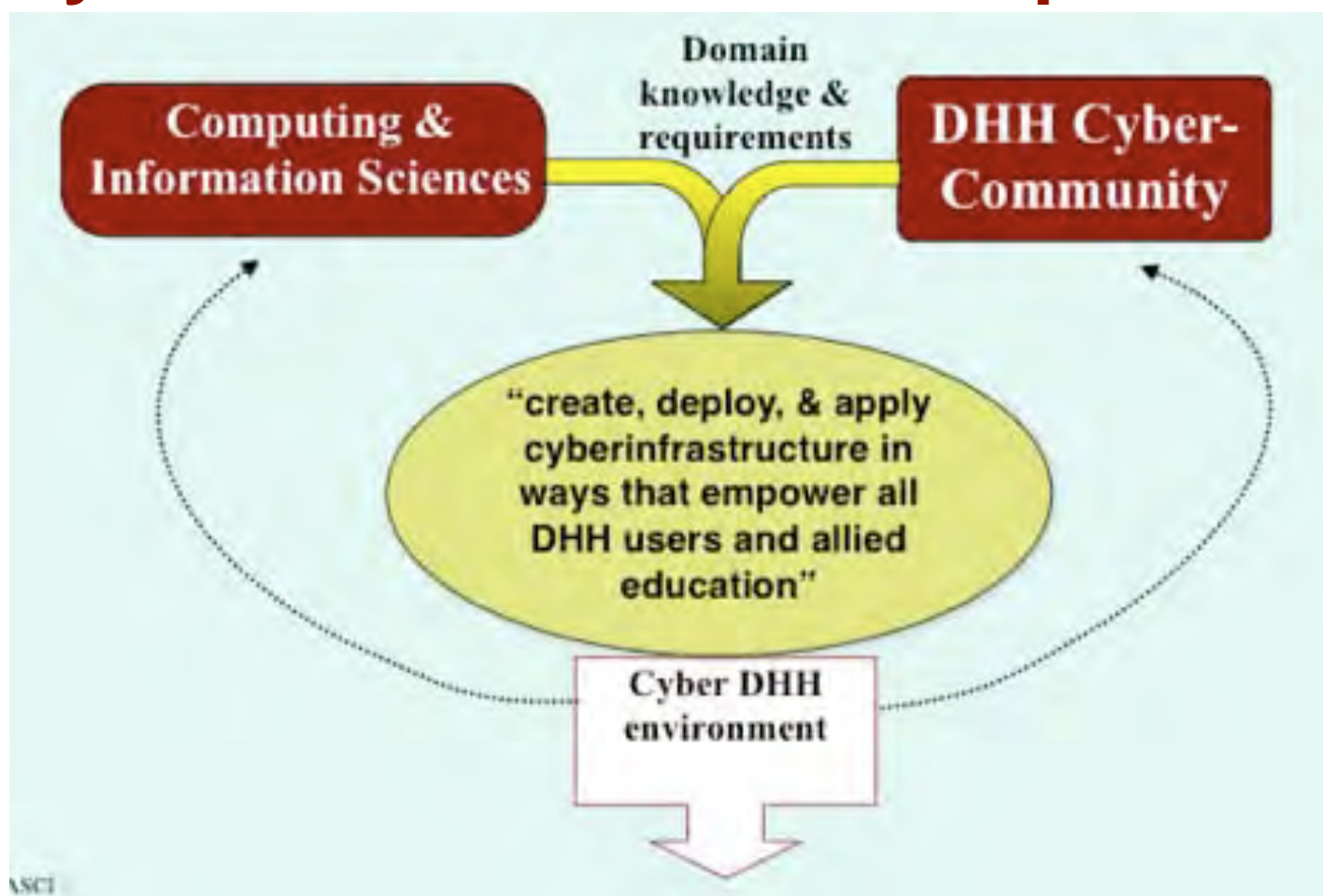
Services needed for D/HH students:

o *Collaboration environments*
for multipoint teaching: unlimited, extensible, open, real-time interactive as well as asynchronous, high quality video, etc.

- Ensure effective design of environments

- High Performance Architecture: High bandwidth, Low latency, Advanced Protocols

- Authentication, authorization, service discovery, location sensing, mobile

- Real-time automatic captioning, Radio transmission (cochlear, hearing aid), Signing transmission hi-qual/3D

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Approaches to support D/HH communities

o Develop approaches, methods and techniques to enable ***exchange of information*** among users

- Identify key building blocks into a framework for d/hh computing environment

- Develop and make accessible cybertools based on domain-specific vocabularies

- Integrate multimedia solutions to facilitate interoperability across platforms

- Supplement existing facilities and provide system integration, operation, and administration

o Support ***workshops to test*** different methods and technologies to analyze effectiveness of cybertools

Examples and Scenarios

o **Collaboration environments**

- RIT collaboration grid: Cross platform

- ConferenceXP

- Adobe Connect Captioning Extension

- Microsoft Office Live Meeting

- IBM Hosted Speech Transcription Service (INTONATA)

o **Settings**

- Academic

- Workplace

RIT Collaboration Grid

12 "CyberPortals" connecting RIT communities on and off-campus with high quality life sized, persistent, public, audio and video

- 7 Colleges of RIT
- National Technical Institute for the Deaf
- Center for Integrated Manufacturing Studies
- Student Alumni Union
- Library

- High Tech Incubator
- President's House
- Kosovo
- Croatia
- Dubai

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ConferenceXP

o Platform for real-time high-quality multipoint conferencing

o Example Deployment: UW Professional Masters Program

o Key features of the platform

- Extensibility
- Archiving

o Challenges/Future Work

- Customization for this domain
- Network infrastructure needs
- Technical support requirements
- Not cross-platform

Adobe Connect

o Structured into "pods"

o Instructor sets the size and position of pods

o Favors a mode of communication in which one person is the presenter at any given time

o It is possible to conduct an entire meeting in text chat, but this is not the favored method for delivering primary course content

Microsoft Office Live Meeting

o Accessibility Labs

- Adaptive UI optimized for specific person (layout & content)

- Improving usability of assistive technology

- Comm Types: ad-hoc, structured, mobile, across disabilities

- Accessibility requirements for MS coom. products & dev. tools

o Microsoft Research (MSR)

- Improving speech recognition

- Translating information between all devices and display sizes

- Recording experiences

- Searching through large amounts of data

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IBM Hosted Transcription Service

Equal access to information == meaning must be to be conveyed by any combination of modalities
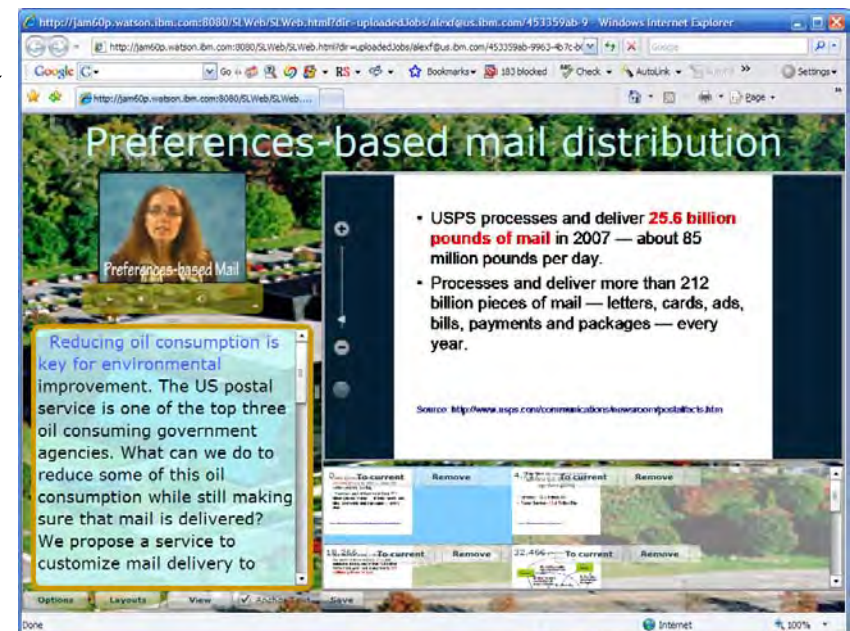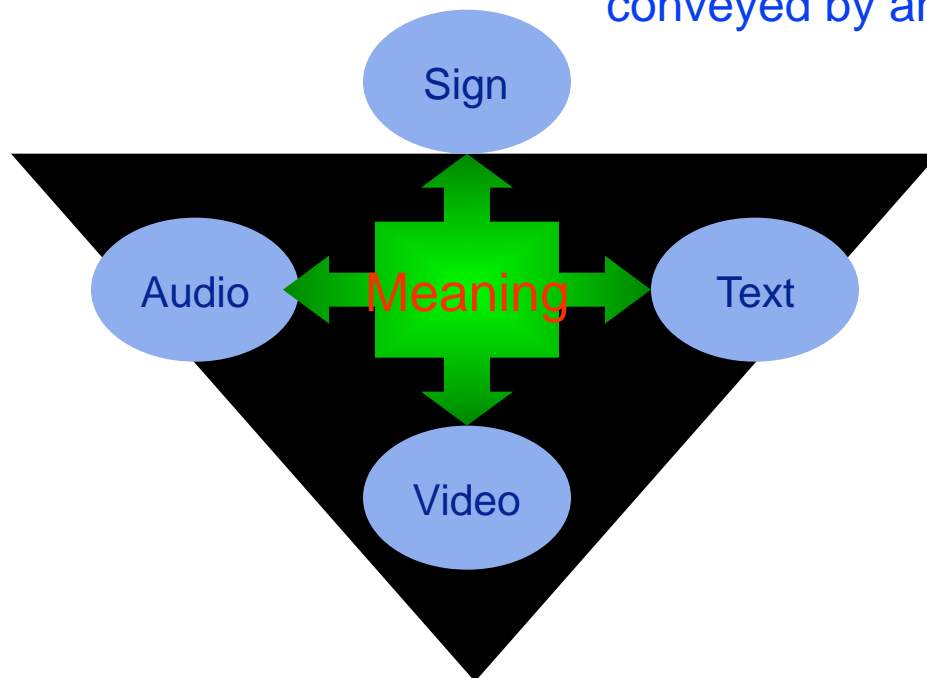
IBM Hosted Transcription Service is currently focusing on Audio/Video/Text triad.

Scenarios

o **Academic settings**

- Lecture-oriented classroom & seminar style

- Synchronous & Asynchronous

- Fixed & Mobile locality

o **Workplace settings**

- Coops

- Internships

- Labs

Philosophical differences

o **What is a classroom?**

- static lecture room

- classroom of the future is "everywhere"

o **"Everywhere, Anytime Education" Scenarios**

- Internships

- Research almost always not conducted in a lecture room

- Individual meetings, Small ad hoc research groups, Large and small group discussions

- Brown-bag lunch research meetings