Cyberinfrastructure Specialists

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Recommendations

- 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*
Experimental Platform to support D/HH Appl

Layer 4
D/HH Communication support environments and tools

Layer 3
Development Tools & Libraries

Layer 2
Grid Services & Middleware

Layer 1
Hardware

Domain-specific Cybertools (software)
Shared Cybertools (software)
Distributed Resources (computation, communication, storage, etc.)
Experimental Platform and Testbed

- Layer 1: existing
- Layer 2: existing
- **Layer 3: new**

  - *Focus on Quality-of-Service (QoS)*
  - *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

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

- 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?)*

- Build a scalable server-based host environment
- Build various clients that interface with the hosting service
- Hire permanent staff
- Build a community of practice
  - Prioritize needs and approaches
Design process

- Iterative design with lots of user involvement
  - User-level “programming” without writing code
- Diversity of scenarios and on-the-fly modification (e.g., widgets placements, feature/service selection)
- UI “smart” customization
  - Accessible by people with differing needs
  - Environment usable at any bandwidth
  - User configurable (machine-driven)
- Just-in-time and just-in-case: practice ahead of time with remote interpreter and other services
Challenges

- Platform independence
  - Technology agnostic, open source, cross platform
  - Bandwidth not evenly distributed: delivery would “scale” from cell-phone to video walls, to supercomputers

- Collection of content
  - Flexible domain taxonomy
  - Intellectual property (who is allowed to see the archives and for how long?)

- When technology fails, what happens?
  - Archiving and back-up plans
  - Administration of environment(s)
Challenges (cont.)

- Ad-hoc accessibility provision
  - it’s not just the classroom
  - Field work, chance conversations, labs, workplace, brown-bag lunch research meetings, etc.

- 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

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"create, deploy, & apply cyberinfrastructure in ways that empower all DHH users and allied education"
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Cyber DHH environment
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Computing & Information Sciences - Domain knowledge & requirements - DHH Cyber-Community

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

June 25-27, 2008
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
Approaches to support D/HH communities

- 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

- Support *workshops to test* different methods and technologies to analyze effectiveness of cybertools
Examples and Scenarios

- **Collaboration environments**
  - RIT collaboration grid: Cross platform
  - ConferenceXP
  - Adobe Connect Captioning Extension
  - Microsoft Office Live Meeting
  - IBM Hosted Speech Transcription Service (INTONATA)

- **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
ConferenceXP

- Platform for real-time high-quality multipoint conferencing
- Example Deployment: UW Professional Masters Program
- Key features of the platform
  - Extensibility
  - Archiving
- Challenges/Future Work
  - Customization for this domain
  - Network infrastructure needs
  - Technical support requirements
  - Not cross-platform
Adobe Connect

- Structured into “pods”
- Instructor sets the size and position of pods
- Favors a mode of communication in which one person is the presenter at any given time
- 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

- **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

- **Microsoft Research (MSR)**
  - Improving speech recognition
  - Translating information between all devices and display sizes
  - Recording experiences
  - Searching through large amounts of data
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

- **Academic settings**
  - Lecture-oriented classroom & seminar style
  - Synchronous & Asynchronous
  - Fixed & Mobile locality

- **Workplace settings**
  - Coops
  - Internships
  - Labs
Philosophical differences

○ What is a classroom?
  • static lecture room
  • classroom of the future is "everywhere"

○ "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