

Cloud Computing and the Paradigm Shift for Assistive Technologies

Gregg C Vanderheiden, Ph.D.

ICDR webinar: Accessible and Assistive Technology,
Telecommunications, the Web and Disability Issues

June 26, 2012



Preview

1. What's the Problem (s)
2. What are the consequences?
3. What is Cloud4all? And GPII?
4. How will they help?
5. What issues, questions, do they raise?
6. What is needed next?



What is the problem ?

Several Problems Actually

1. Access is no longer optional

- Can't go to school without web access and ability to use computers
- Even janitors are now being required to apply online for jobs
- Health care is moving to web
- Safety
- Daily Living

So making ICT accessible to 90% is not good enough anymore – need to reach all.

- Yet today we are actually serving only about 15% of those that need special interfaces
 - Disability
 - Literacy
 - Digital Literacy & ability to deal with complexity
 - Limitations of Aging (such as the inability to remember new procedures from one day to the next)

And the problem is getting worse (aging) - even as resources decrease



User problems

It is all too complicated and expensive

1. Too complicated

- For users
- For Schools
- For libraries and public access points
- For employers

2. AT creates security concerns

- AT looks (and operates) just like Malware –and comes from many sources

3. The cost is too high

- We can't even afford to serve 15%
- Rapid churn of technology (and platforms) means churn in AT to keep up
- Many places have no AT and no access – but laws seek to change that. But who pays?
- But the only other option is people left out. Cut off.

Vendor problems

Our AT capacity is eroding – The old AT Model is breaking down

1. Used to need to provide access to one (or two) platform(s)

- Today a proliferation of platforms (Window, Mac, Linux, iOS, Android, multiple browsers and Web App technologies, social network platforms, and growing.

2. AT Model was based on prices that could cover evaluation, fitting, and support

- iPad/Android tablets -- and apps and app stores -- are driving prices down
- Objective is to sell – not resell. Behavior is to buy and try. (more abandonment?)
- No room for pre or post sale service?

3. AT model can't support all the languages and cultures of people who need access

4. Vendors need help to bring in enough revenue

- ... for real innovation
- ... to cover support
- to address the harder to serve, less lucrative clients

Consequences of these

If we don't solve these

- We will create / expand the digital divide
- We will not be able to afford to serve those we know how to
- Public access points will not be usable by all the public
- Those that have the least and need to use public systems will be the ones that public systems won't work for
- Even when access features are on products they won't be used because it is too complicated to set them up (and restore systems later) (Microsoft experience / study)
- Vendors will struggle and AT will only be available for those groups that are easy and lucrative – and only on the most popular platforms
- AT will lag new technology introduction even more than in past



What is GPII ?

1) Instant, Auto-personalization – based on user needs & preferences

New paradigm for Accessibility

- Accessibility as a built-in or AT service
- Invoke what is needed, anytime, anywhere, on any device.
 - ... based on a user ***needs and preference profile*** store in the Cloud (or on a device).
 - ... and information on the device and its built-in access capabilities
 - ... and assistive technologies available for it
- Matching of users needs and preferences to
 - Materials and Alternate materials
 - Services to automatically transform materials
 - Features in the interface of devices, services, and materials
 - Alternate interfaces (AT) for devices, services and materials
- Not just adjusting bits of interfaces – but completely alternate interfaces
- Also providing ***assistance on demand*** (Human and/or computer)

What would this look like?



GPII and Assistive Technology R&D

2) GPII is also a new paradigm for AT and Built-in Accessibility research, development, sales and support.

New paradigm for AT enabled by a GPII.

- A rich environment of components – mostly open source
- Rich tools to make creating new types of AT faster, cheaper, more reliable
- Human resource pool of user and other expertise
- Tools to facilitate localization to different languages
- Worldwide online market
 - (similar to app store but cross platform and including built-in features)
- Access as a service
 - Pay as you go.
 - Don't pay if it is no longer of use.
 - Promote quality solutions that last.



GPII, Cloud4all, and Raising the Floor

GPII is the Global Public Inclusive Infrastructure

- It is a THING like the Internet
- Right now it is its conceptualization and first realization stage

Cloud4all is an EC FP7 funded project

- Cloud4all is a large scale integrating project focused on building key components of the GPII

Raising the Floor Consortium

- Raising the Floor Consortium -- is an international consortium that includes the Cloud4all partners and others around the world.
- The consortium is focused on Building the GPII and other related goals.

Raising the Floor – International

- Is a non-profit in Geneva Switzerland that is serving as the headquarters for the Raising the Floor Consortium.



<http://raisingthefloor.org>





para la cooperación e integración social de personas con discapacidad



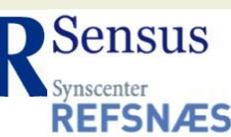
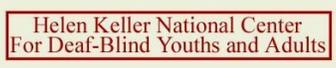
supporting blind and partially sighted people



서울대학교 SEOUL NATIONAL UNIVERSITY



Deutsches Forschungszentrum für Künstliche Intelligenz GmbH



School of Communication, International Studies and Languages



Key components of GPII

Will something help me?
What?

User Awareness

Users find out something exists for them.

Eval Wizard

Users can find out which types of things help them

Pref & Perm Profile/Server

Users can store need & preference info for later use

GPII Marketplace

Find all existing solutions, at once commercial & free

Recommender

Users can use profile to find just what helps them

Getting access automatically, anywhere, on any device

Run-Time Fitter

Prefs, permissions and context used to determine best fit

Anywhere Delivery

Any access features needed for fit delivered anywhere

Run-time Tailor

Built-in + any delivered are auto-adjusted

Auto Caption Description +

Automatically finds captions/descriptions etc. for user

Assistance On Demand

User can call up any assistance any-where

Tools to make it easier, lower-cost to create & market new solutions

Development Tools/Environ

Developers have a rich development environment for AT

Parts Store

Free & commercial parts to speed dev and lower costs

Rich Expertise Resource

Infrastructure to make it easy to provide AOD service

AOD Service Infrastructure

Infrastructure to make it easy to provide AOD service

GPII Marketplace

Developers can quickly, efficiently market worldwide

Cloud4all expected results

First working GPII Architecture

Set of Common Preference and Context terms for use in

- Metadata for solutions
- User Needs & Preference Profiles
- Commercial product settings files

Ontologies and tools for managing Metadata and User Needs and Preference Profiles

A Federated repository of solutions

Matching Algorithms for User Needs and Available Solutions



Cloud4all expected results

and 16 – 20 Implementations of Cloud4all/GPII

Auto-configuration from User Profile

Built-in accessibility

- **Computer OSs** (Microsoft Windows, Linux)
- **Web browsers** (IE, Firefox)
- **Phones** (Android smartphone, Java Feature Phone, PC phone -Allan eC)
- **Embedded devices** (Microsoft Surface, H&W Kiosk, Smart house, DTV)

Providing and/or converting Web content into a form appropriate for the receiver

- **Websites and Web applications** (UI Options, EasyOne)
- **Social network App**

Assistive technologies that follow you anywhere

- **Cloud/Online based assistive solutions** (WebAnywhere, SAToGo, Maavis (new))
- **Downloadable ATs** (Read Write Gold, SuperNova)



Potential Impact

Potential of the Cloud based accessibility

- **Simplify accessibility**
for users, schools, public access points, organisations, governments, etc.
- **Increase built-in accessibility**
to provide ubiquitous access that is natural, doesn't have a stigma, and doesn't 'tax' individuals with disabilities
- **Grow the market for Assistive Technologies (ATs) and services,**
in order to serve more people, lower costs, and increase motivation to innovate and invest in accessibility
- **Facilitate international, public-private, private-private and cross sector collaboration**
in order to lower costs, to reduce duplication and to accelerate innovation
- **Increase the number of new ideas and products that make it to market**
and make it easier and much less expensive to market them internationally
- **Ubiquitous accessibility** (anywhere, any device access)



Key Issues

Key issues in implementing something like Cloud4all/GPII

- **Privacy**
- **Security**
- **User Control**
- **Policy needed to support it**
 - **Funding for basic infrastructure (roads not cars)**
 - **Change from funding assistive technologies as products to funding them as services**
- **Vendor and Market disruption/evolution**



Future Research Needs

Further R&D needs on the additional modules of the whole GPII.

- Just like the first heart valve should not be the last – once we get a working GPII it will not be done.
- And there are all the components that Cloud4all is not addressing – including some key for developers.

Will something help me?
What?



Getting access automatically, anywhere, on any device



Tools to make it easier, lower-cost to create & market new solutions



- User's trust and confidence in cloud based technologies in general
- Extending and integrating the Cloud4all/GPII concept into Internet of Things (IoT)
- Tight integration of the adaptive user interfaces concept and the GPII concept
- Adaptation of the interfaces / environments based on needs and preferences of multiple people at the same time (classroom, home, any shared environment)
- Much greater depth into Web 2.0 content adaptation (including new web interfaces)
- Accessibility-service Mash-Ups (automatic generation of new interfaces on-the-fly to address unmet needs or environments.)
- Exploration of ways to move from purchase to lease or renting accessibility and AIs
- Disruption Studies in Assistive technologies (from iPad et al and from Cloud4all)
- Piloting of Cloud4all/GPII in real life and large scale environments



Cloud based accessibility

Thank you

