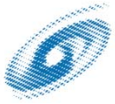
What makes virtual organizations work?

Thomas Finholt
School of Information
University of Michigan

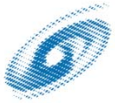
Outline

1. The changing nature of geographically-distributed collaboration
2. Lessons from the past
3. Beyond being there: A research program for virtual organizations
4. Conclusion



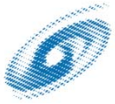
1. The changing nature of geographically-distributed collaboration

- Changes have a history (i.e., practices and technology evolve)
- These changes can be described in terms of:
  - Scale
  - Theoretical orientation
  - Technological paradigm
  - Characteristic research questions



History

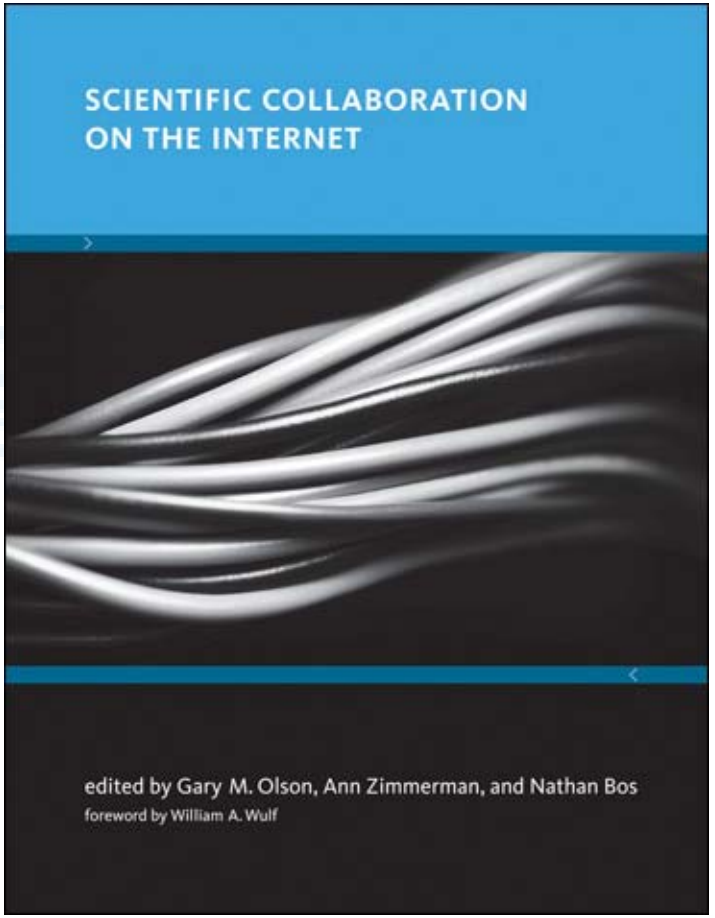
- In terms of distributed work we are at a transition
- Specifically, much of what came before had a traditional antecedent
  - Collaboratory = a laboratory without walls
  - Video conferencing = a long distance face-to-face meeting
- However much of what is emerging has no precedent
  (e.g., crowdsourcing, virtual organization)



Dimension	Past	Future
Scale	Tens to hundreds	Thousands to millions
Theoretical orientation	Social psychological	Sociological or economic
Technology paradigm	CSCW	Social computing
Characteristic research question	“being there”	“beyond being there”

2. Lessons from the past

- Collaboratory research at the University of Michigan
  - Space physics (UARC and SPARC)
  - Earthquake engineering (NEES)
  - Science of Collaboratories (NSF ITR)
- Organized through the Collaboratory for Research on Electronic Work (CREW)
  - Founded in 1997
  - Dozens of faculty, staff and students



Available November 2008 from MIT Press

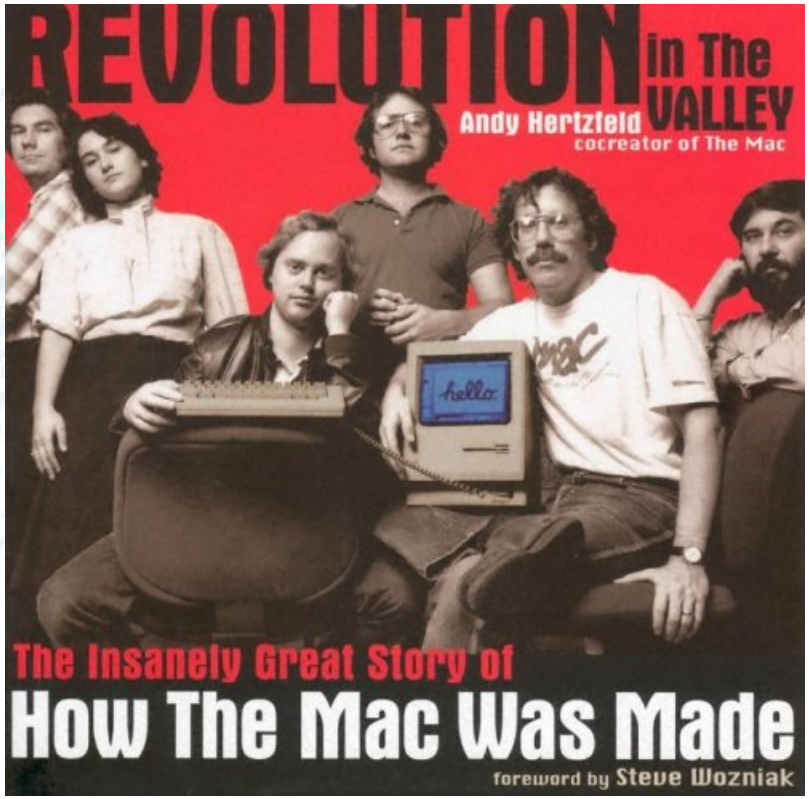
Anticipate cultural differences

Domain scientists

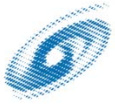
- Power distance
  - Hierarchical
  - Bias toward seniority
- Individualist
  - “individual genius”
  - Solo PI model
- Masculine
  - Adversarial
  - Competitive
- Uncertainty avoidance
  - Highly skeptical of new technologies
  - Extremely risk averse

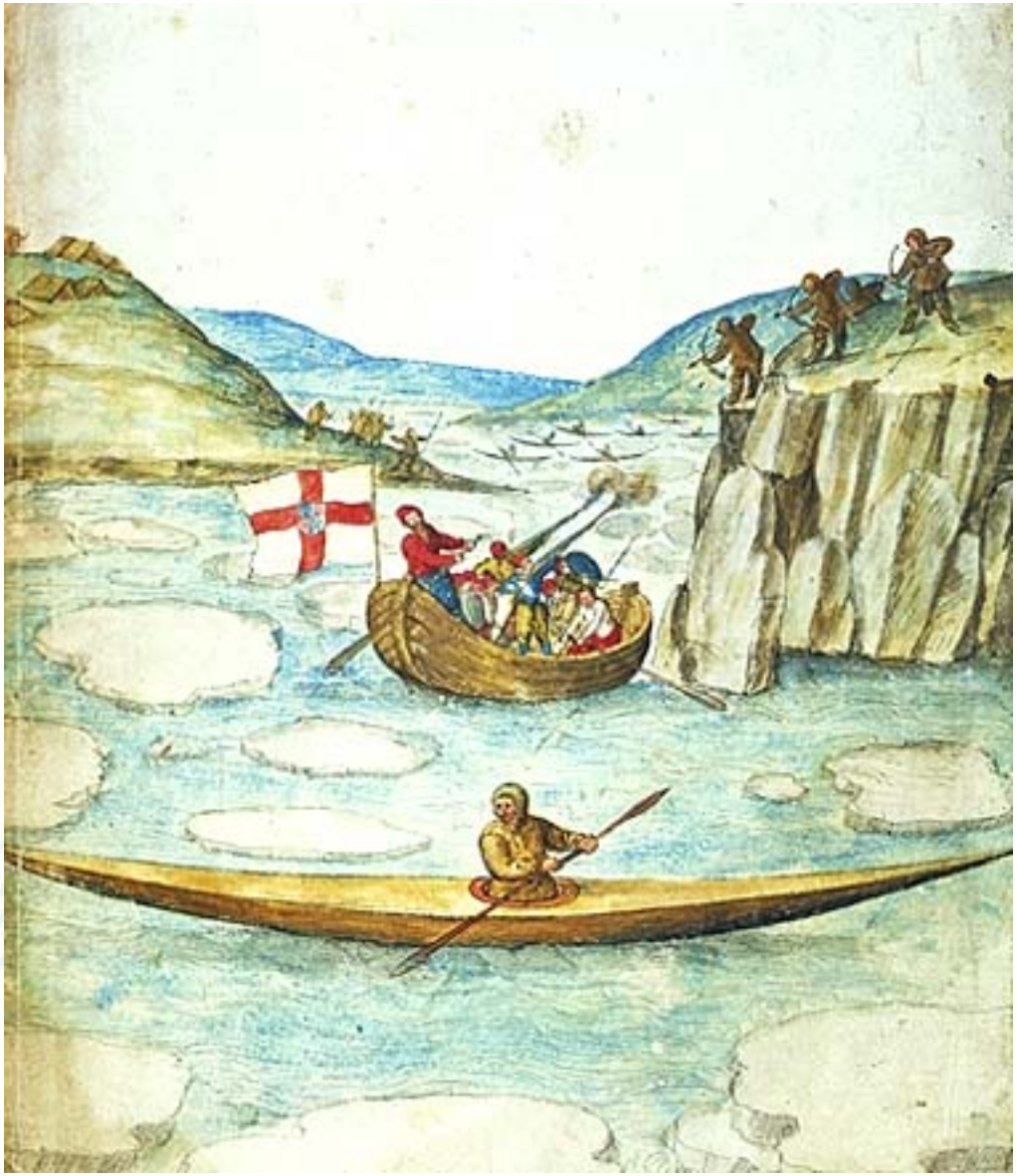
CI developers

- Power distance
  - Egalitarian
  - Bias toward talent
- Collectivist
  - Use the Internet to create worldwide communities
  - Project model
- Masculine
  - Adversarial
  - Competitive
- Uncertainty avoidance
  - Extremely open to new technologies
  - Extremely risk seeking

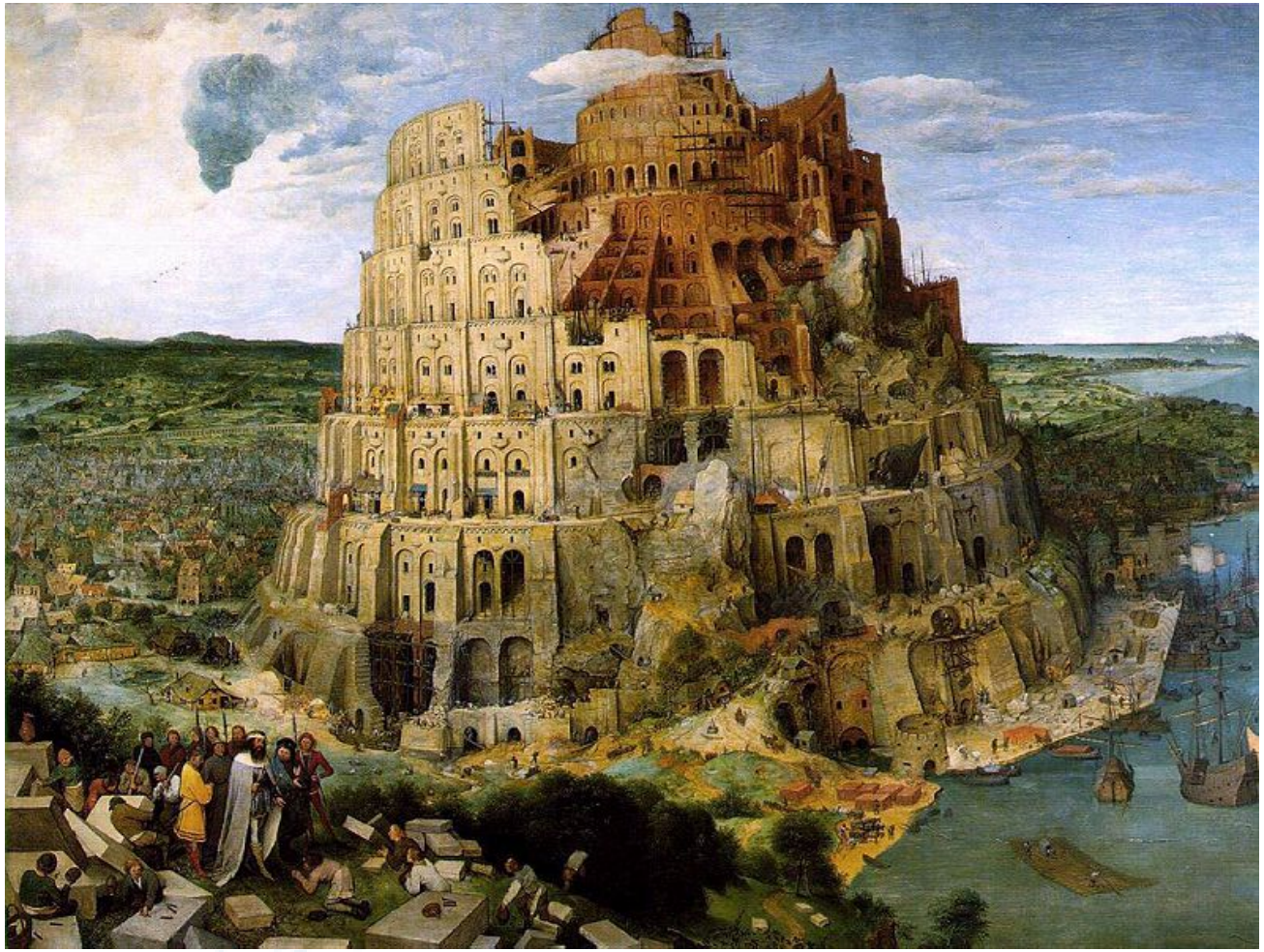


Plan for first contact





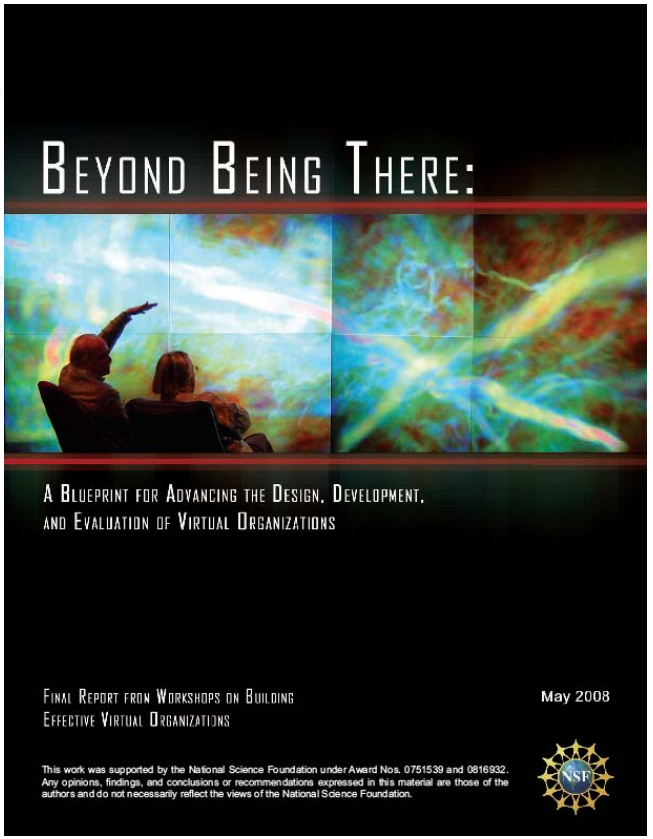
Communicate



Seek common ground

3. Beyond being there: A research program for virtual organizations

- NSF workshop on virtual organizations
  - September 2007
  - 42 invited participants
    - Technical
    - Social science
- Building Effective Virtual Organizations
  - January 2008
  - 200 participants
- Virtual Organizations as Socio-technical Systems
  - NSF program run by the Office of Cyberinfrastructure
  - Awards made summer 2008



http://www.ci.uchicago.edu/events/VirtOrg2008/VO_report.pdf

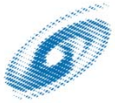
It can be tough to recognize successful innovations

- First efforts are often awkward hybrids
- It is hard to know where the seeds of greatness might lie...

Charles King's "horseless carriage" (1896)
Detroit, Michigan

Source: American Automobile Manufacturers Association, http://www.automuseum.com/carhistory.html

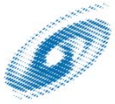
Virtual radical collocation



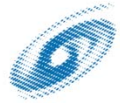

SCHOOL of INFORMATION
Territory
MICHIGAN
INDIANA

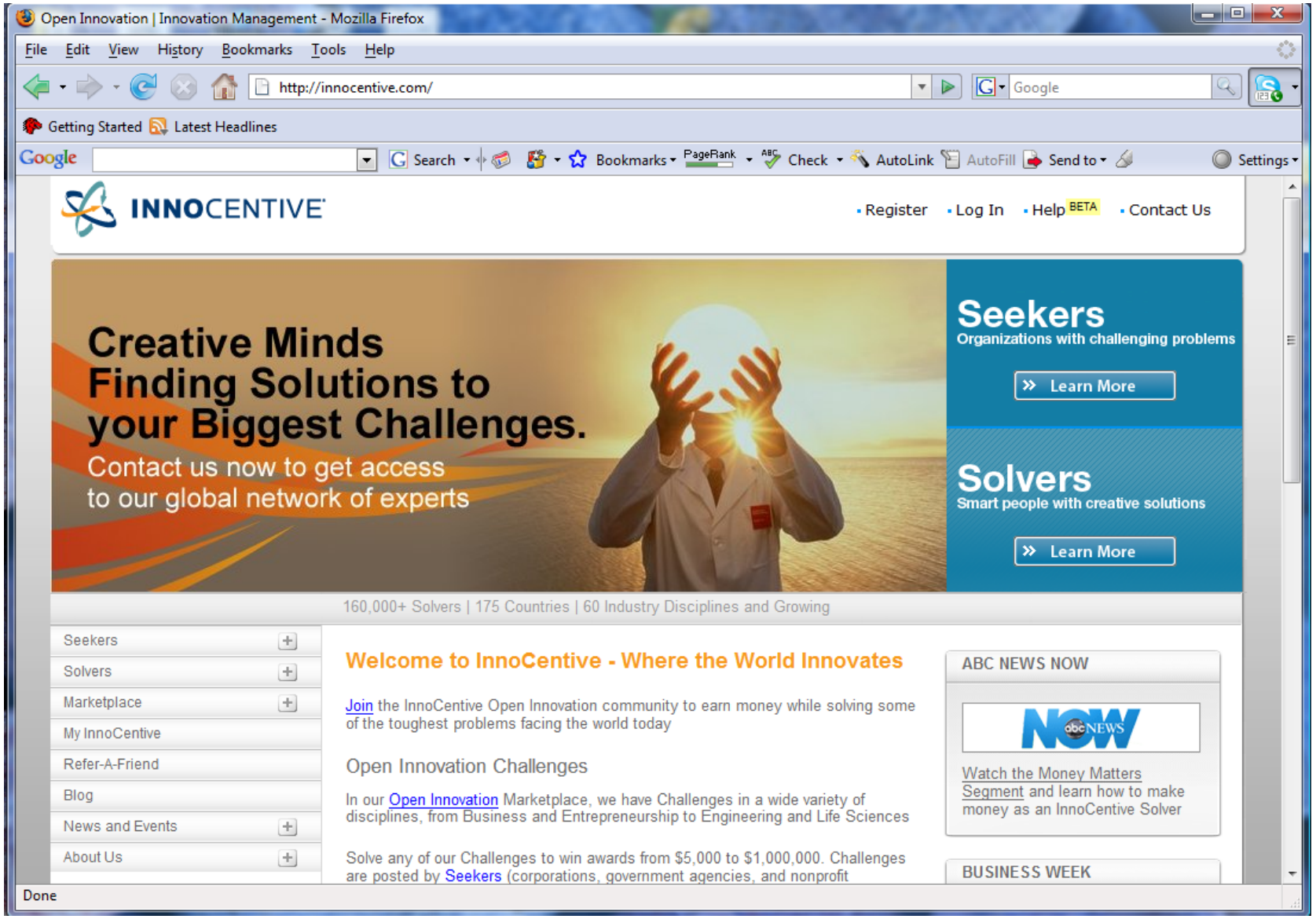
Unique aspects of virtual radical collocation

- Create advantages of physical proximity at a distance
  - Peripheral participation
- Add new capabilities
  - Multi-megapixel visualization
- Therefore:
  - Benefits of collocation (e.g., realistic and natural communication)
  - Benefits of dispersion (e.g., access to data and expertise not available locally)



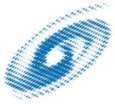
Crowdsourcing



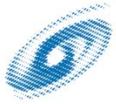

Open Innovation | Innovation Management - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://innocentive.com/
Google
Getting Started Latest Headlines
Search Bookmarks PageRank Check AutoLink AutoFill Send to Settings
INNOCENTIVE
Register Log In Help BETA Contact Us
Creative Minds
Finding Solutions to
your Biggest Challenges.
Contact us now to get access
to our global network of experts
Seekers
Organizations with challenging problems
Learn More
Solvers
Smart people with creative solutions
Learn More
160,000+ Solvers | 175 Countries | 60 Industry Disciplines and Growing
Seekers
Solvers
Marketplace
My InnoCentive
Refer-A-Friend
Blog
News and Events
About Us
Welcome to InnoCentive - Where the World Innovates
Join the InnoCentive Open Innovation community to earn money while solving some of the toughest problems facing the world today
Open Innovation Challenges
In our Open Innovation Marketplace, we have Challenges in a wide variety of disciplines, from Business and Entrepreneurship to Engineering and Life Sciences
Solve any of our Challenges to win awards from $5,000 to $1,000,000. Challenges are posted by Seekers (corporations, government agencies, and nonprofit
ABC NEWS NOW
Watch the Money Matters Segment and learn how to make money as an InnoCentive Solver
BUSINESS WEEK
Done

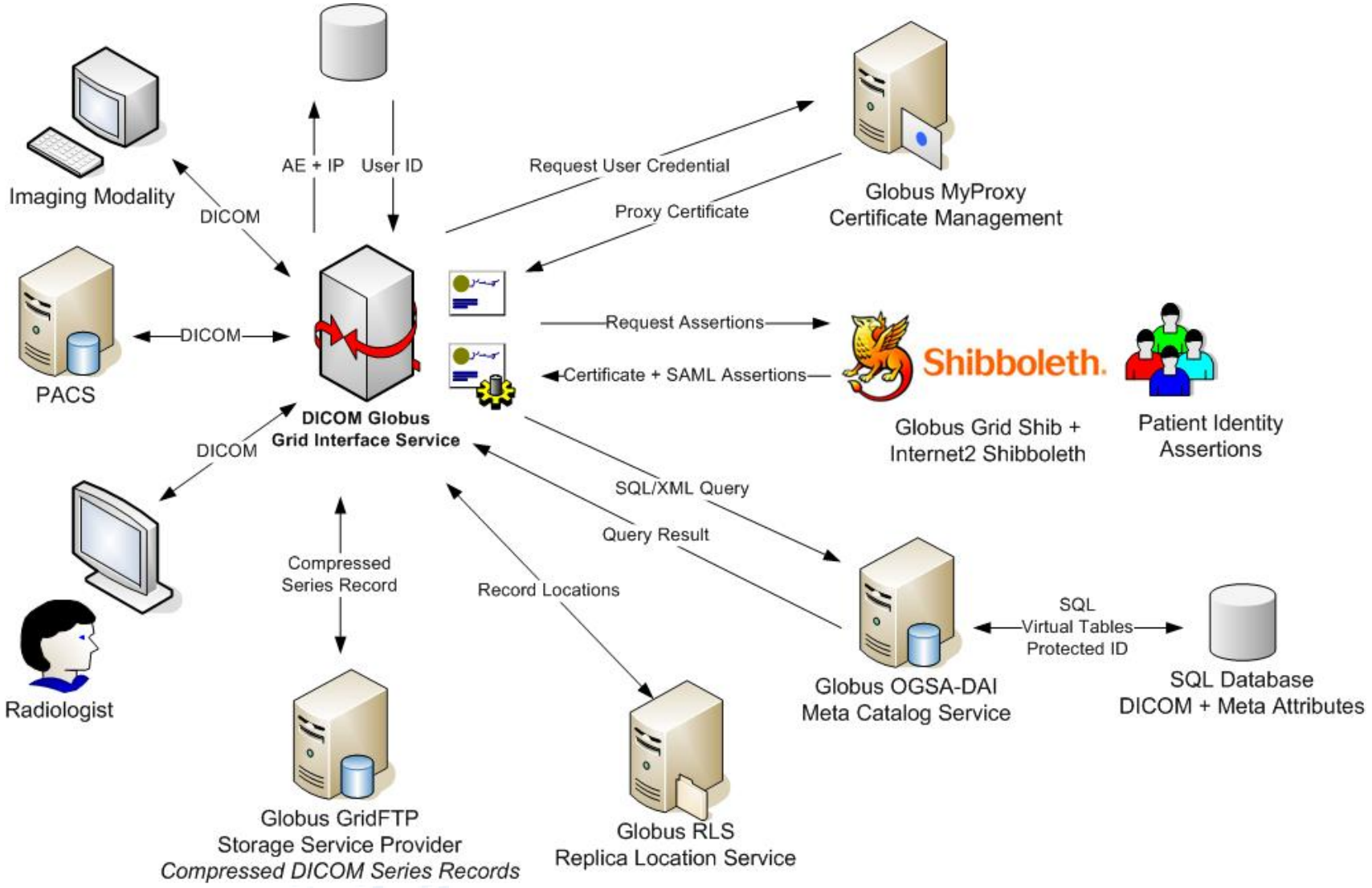
Unique aspects of crowdsourcing

- We don't know who is going to do the work
- Effort is contributed voluntarily
- Therefore:
  - Signaling (i.e., of task content) is important in order to attract the right kind of workers
  - Incentives are important in order to motivate workers (i.e., what is gained by doing the work)



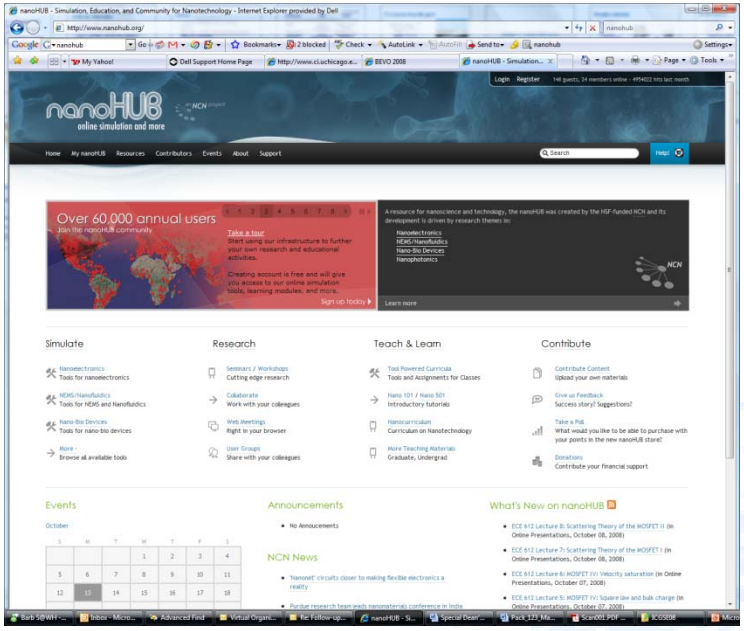
Delegation of organizational work

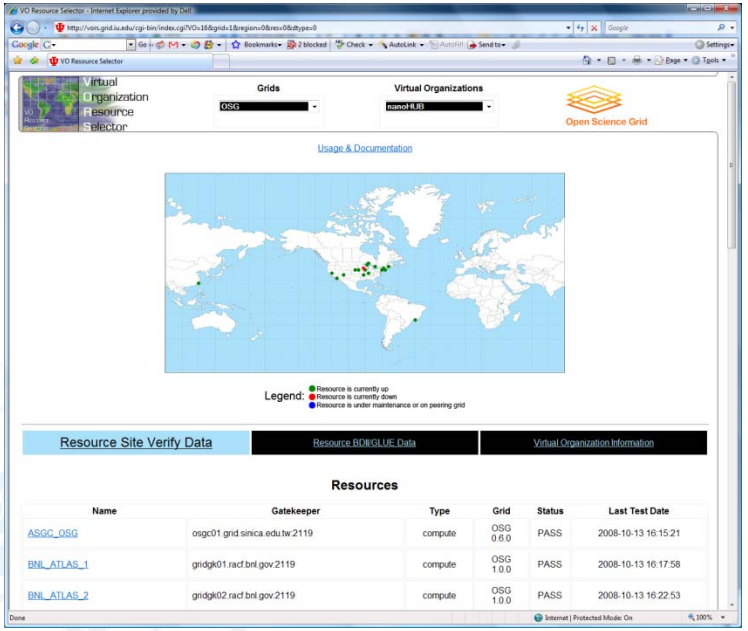


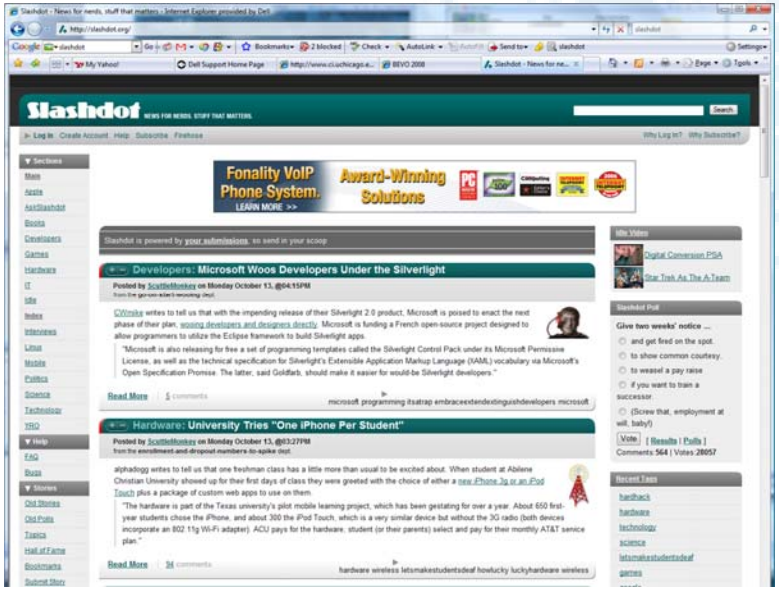


MEDICUS Project (federated medical images)

http://dev.globus.org/wiki/Incubator/MEDICUS


nanoHUB
online simulation and more
Over 60,000 annual users
Simulate
Research
Teach & Learn
Contribute
Events
Announcements
What's New on nanoHUB
NCN News


Virtual Organization Resource Selector
Grids
Virtual Organizations
Open Science Grid
Usage & Documentation
Legend:
Resource Site Verify Data
Resource BDII/GLUE Data
Virtual Organization Information
Resources
Name
Gatekeeper
Type
Grid
Status
Last Test Date
ASGC_OSG
osgc01.grid.sinica.edu.tw:2119
compute
OSG 0.6.0
PASS
2008-10-13 16:15:21
BNL_ATLAS_1
gridgk01.racf.bnl.gov:2119
compute
OSG 1.0.0
PASS
2008-10-13 16:17:58
BNL_ATLAS_2
gridgk02.racf.bnl.gov:2119
compute
OSG 1.0.0
PASS
2008-10-13 16:22:53


Slashdot
Fonality VoIP Phone System.
Award-Winning Solutions
Developers: Microsoft Woos Developers Under the Silverlight
Hardware: University Tries "One iPhone Per Student"


TERAGRID
Extensible Terascale Facility
UC/ANL
PSC
NCSA
PU
NCAR
IU
ORNL
SDSC
TACC

Unique aspects of delegating organizational work

- Much of the attention in virtual work has focused on technology and process to support social ties
- An alternative course is the use of technology to supplant social ties
- Therefore:
  - Think of this as organizing without the work of organizing
  - Questions of who to trust, who is permitted to use resources, who pays -- are managed by middleware

4. Conclusion

- Group work is an inevitable fact of organizational life – so the earlier lessons continue to apply
- What has changed is that geographically-distributed work now encompasses a broader continuum of activities, from intensive team projects to crowdsourcing
- Emerging modes of contribution and participation are not as amenable to intentional technology choice or organizational design
- Full exploitation of emerging paradigms will require:
  - More research on “choice architecture” and the design of incentives
  - More research on mechanisms for delegating aspects of organizational work to systems, such as trust relationships