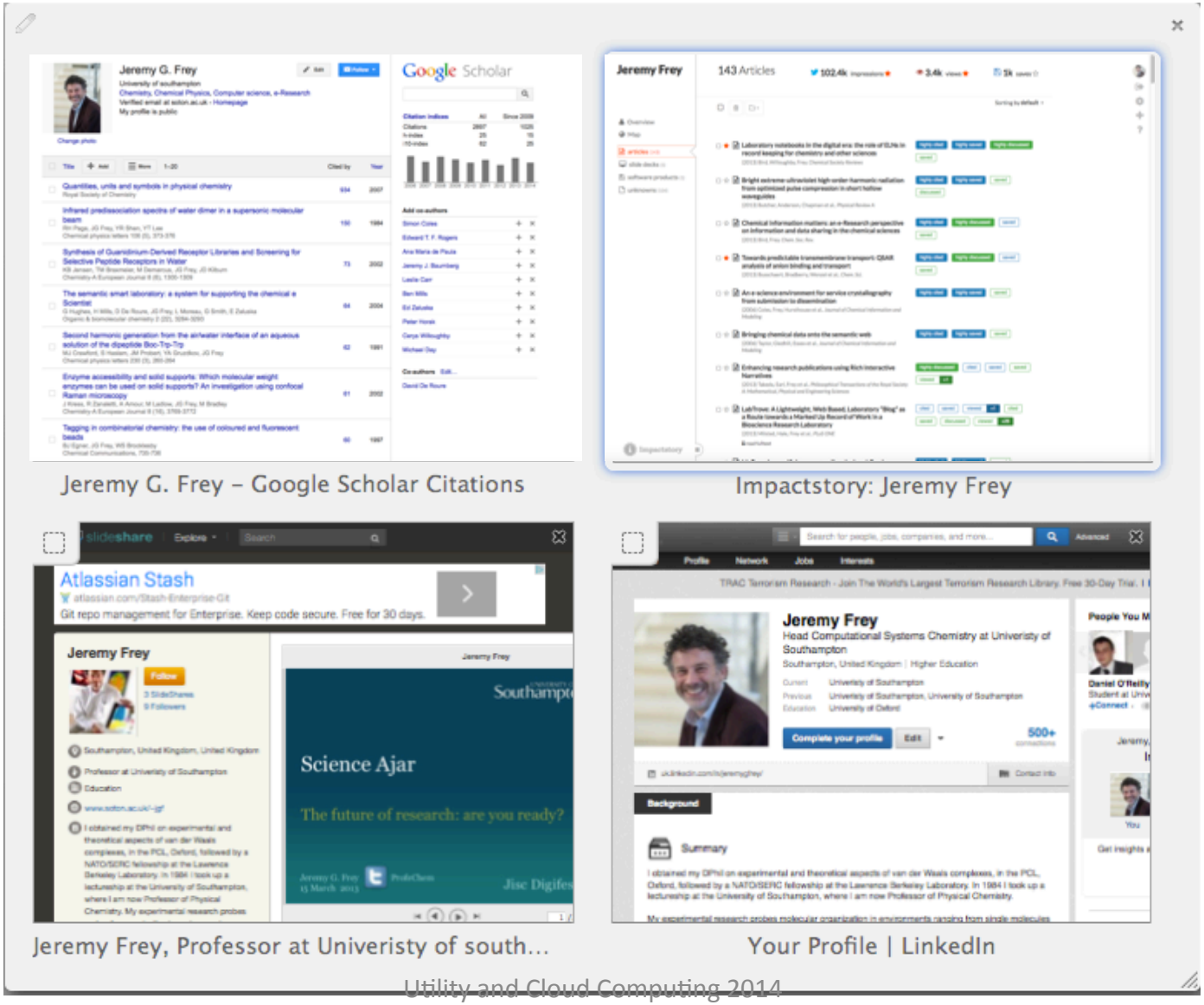
"IT as a Utility: Reality, Aspiration or Myth"

Jeremy G. Frey
University of Southampton
IT as a Utility Network+
RCUK Digital Economy Theme

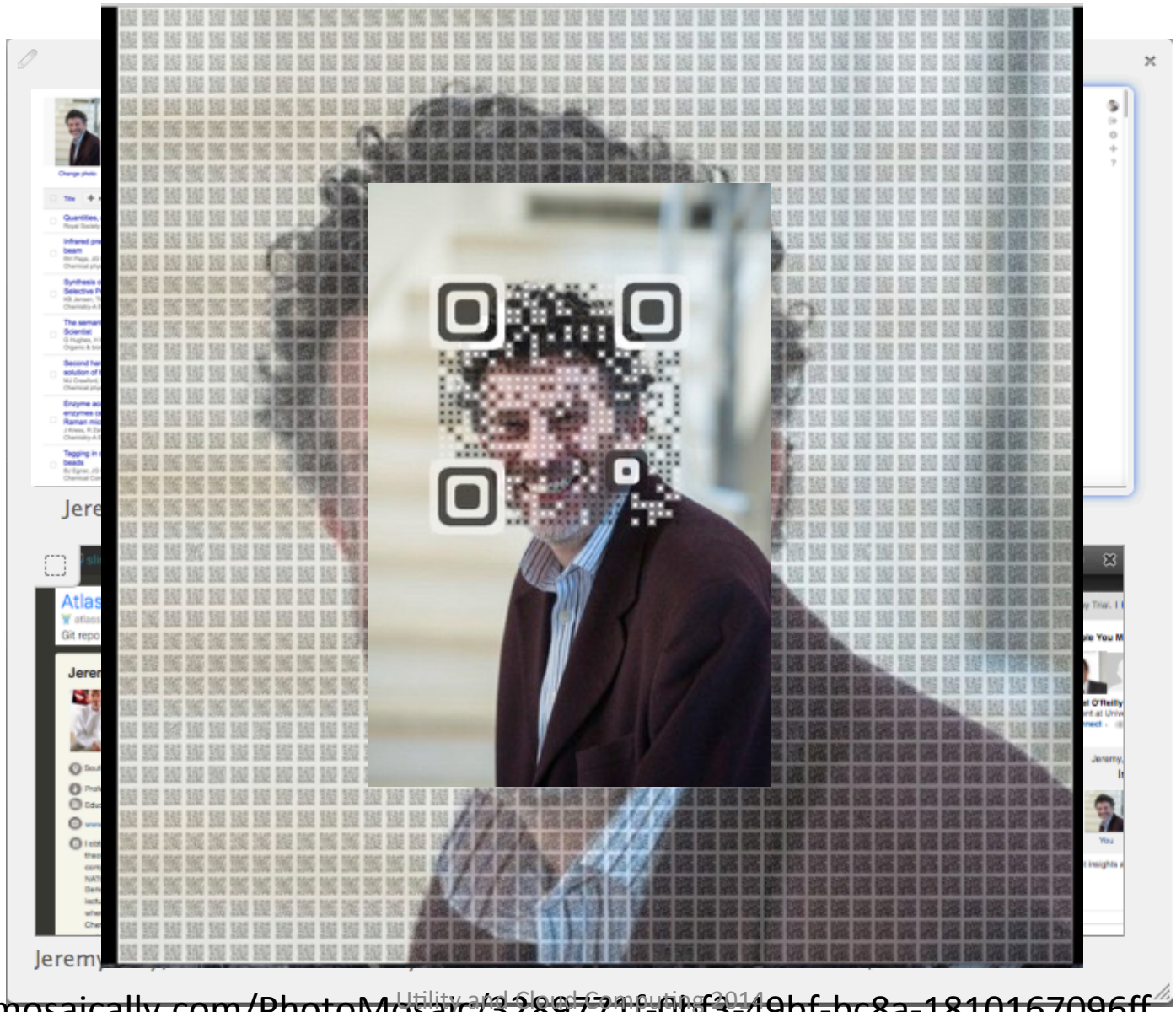
My Talk

- Introduction (Who am I)
- The IT as Utility Network+ (ITaaU)
- “Utilities”
- “Data as a Commodity”
- “Research as a Utility”
- The Future

A Chemist's Digital Aura



A Chemist's Digital Aura



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INTRODUCTION

Citizen Researcher

Gemini
Auriga
Canis Minor
Taurus
Orion

Gemini
Auriga
Canis Minor
Taurus
Orion

Is it all a Myth?

IT AS A UTILITY NETWORK+

IT as a Utility

funded under Research Council UK's Digital Economy theme

The Digital Economy vision is of the transformational impact of digital technologies on all aspects of life.

What are we?

IT as a Utility (ITaaU) is one of the 4 sub-themes of the RCUK Digital Economy programme. The ITaaU Network purpose is to promote and enhance the community interested in this aspect of the DE programme and help co-ordinate activities in this area.

Introduction: partners & collaborators

- **PI and Co-Is:**
  - Jeremy Frey, PI (University of Southampton)
  - Gerard Parr (University of Ulster)
  - Mark Sandler (QMUL)
  - Richard Mortier (University Nottingham)
  - Mike Surridge (University of Southampton)
- **Advisory group:**
  - ustwo
  - IBM
  - BT
  - Thales
  - Microsoft
  - BBC Reseaerch
  - Cabinet Office
  - DSTL
  - Zenotech
  - Cambridge & Newcastle Universities

Steve Brewer – Network Coordinator (University of Southampton)

ITaaU & Digital Economy

- What was the task of the IT as a Utility Network^{+} ?
- Need to bring together a very diverse set of people
  - From network infrastructure
  - Middleware
  - Software
  - Through to users
- **Design**

The Digital Economy and ITaaU

The Cloud

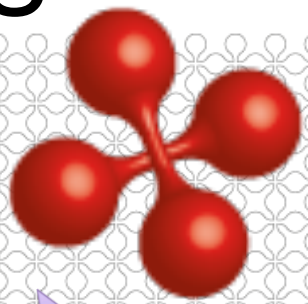
cloud computing

traditional utilities

sensors & actuators

food security

3D printing



"Network+ smart spaces/ smart cities"

"apps are the new taps…"

The Digital Economy

"tangible Interfaces"

libraries of the future

data-driven science

electronic lab notebooks

telecommunications

- Apps for Healthcare – 7 May, 2014
- User Experience/User Interface Design Workshop – 8 May, 204
- Delivering Food Security: from the Cloud to the App – 13 May, 2014
- Data as a Utility, Analytics as a Service – 9 June, 2014
- ITaaU Community Conference, Southampton – 19-20 June, 2014
- Business transformation - Edinburgh – 30 September – 1 Oct, 2014
- DE2014 – London – December 3-5, 2014
- Cloud workshop @ UCC2014 – London, December 8-11, 2014

Workshops

We plan several types of workshops for the ITaaU:

- Network: Community Scale Workshop / Conference
- Facilitated Focussed Workshops and Sandpits
- International Best Practice Exchange Workshops

IT AS A UTILITY - REALLY

Utilities

- *"If the utility model were adequate, the challenges to cloud computing could be solved with electricity-like solutions—but they cannot.*
- *The reality is that cloud computing cannot achieve the plug-and-play simplicity of electricity, at least, not as long as the pace of innovation, both within cloud computing itself, and in the myriad applications and business models it enables, continues at such a rapid pace."*
- *"corporations don't need a 'Chief Electricity Officer' and a staff of highly trained professionals …"*

Brynjolfsson, E., Hofmann, P. & Jordan, J. Cloud computing and electricity. *Communications of the ACM* **53**, 32–34 (2010)

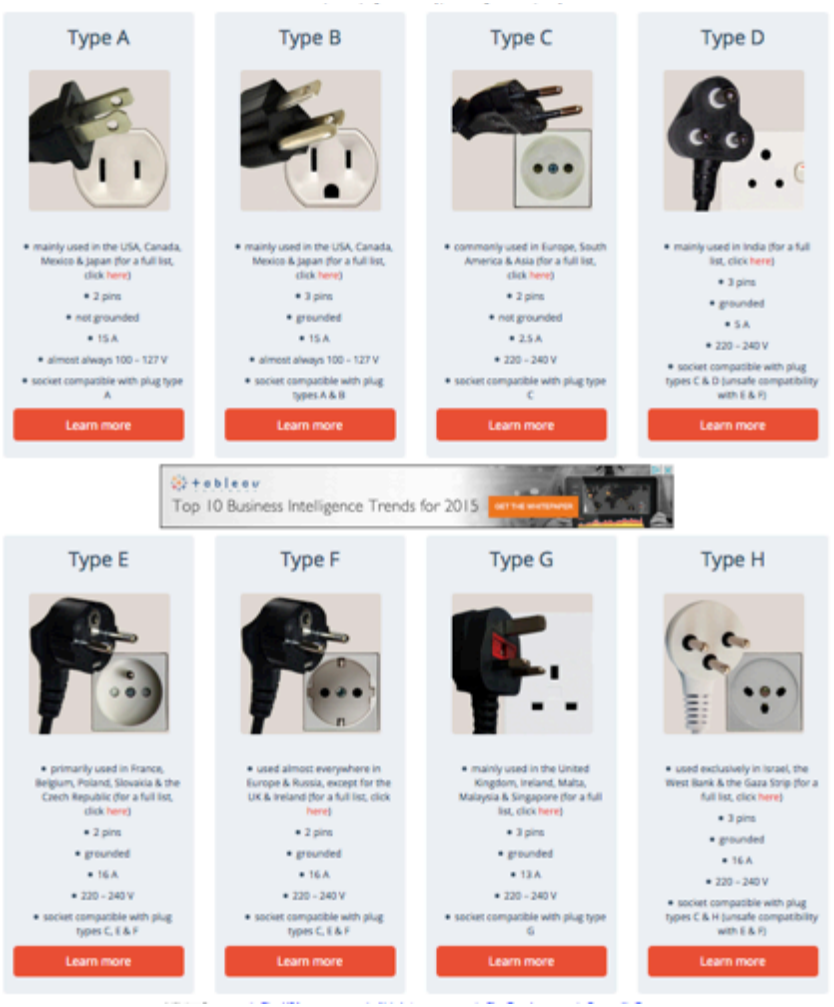
Utilities

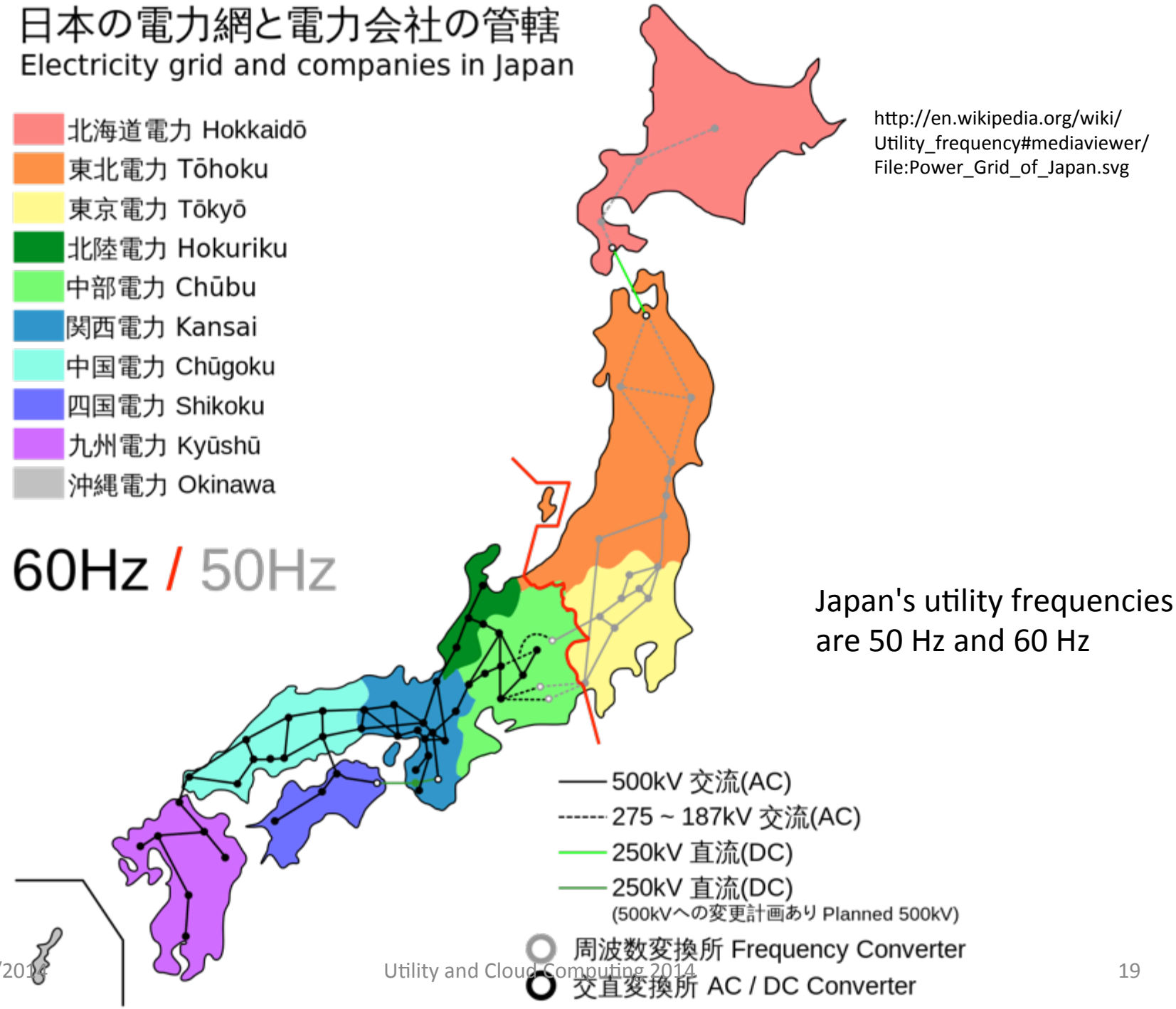
- **Necessity**. The extent to which customers depend upon the service on a daily basis
- **Reliability.** The presumption that, according to Rappa, "temporary or intermittent loss of service may cause more than a trivial inconvenience"
- **Usability.** Simplicity at the point of use; for example, users do not need to know how electricity powers lights at the flick of a switch
- **Utilization rates**. Coping with peaks and troughs in customer demand, using for example, innovative pricing models that incentivize an even spread of demand

Utilities

- **Scalability**. Benefits of economies of scale, with larger providers typically realizing lower unit costs that can be passed on to customers
- **Service exclusivity**. Government intervention that encourages the emergence of a monopolistic provider may be a benefit when utilities have significant setup costs or a particular requirement for scale
- Paul Miller builds upon Michael Rappa's original research from the IBM Systems Journal (2004,
- http://insights.wired.com/profiles/blogs/utilities-commodities-and-the-evolution-of-iaas-markets#ixzz3LVjXlZT5

The Grid……Standards!





http://en.wikipedia.org/wiki/Utility_frequency#mediaviewer/File:Power_Grid_of_Japan.svg

Japan's utility frequencies are 50 Hz and 60 Hz

http://commons.wikimedia.org/wiki/File:ISS-30_Ice_floes_along_the_Kamchatka_coastline.jpg

Minimizing and Managing Uncertainty

What IT offers Utilities

- Utility service providers that recognize the higher-value role their services can play in their customers' lives will have an easier time improving satisfaction, reducing costs and consumer churn, and expanding business opportunities.

- Read more: http://insights.wired.com/profiles/blogs/how-the-information-economy-is-changing-your-utility-service#ixzz3LVlebUdV

Amazon App Store
Android App Store
Apple App Store
Apps are the new Taps
http://pixabay.com/p-203855/?no_redirect

Pipes & Platforms

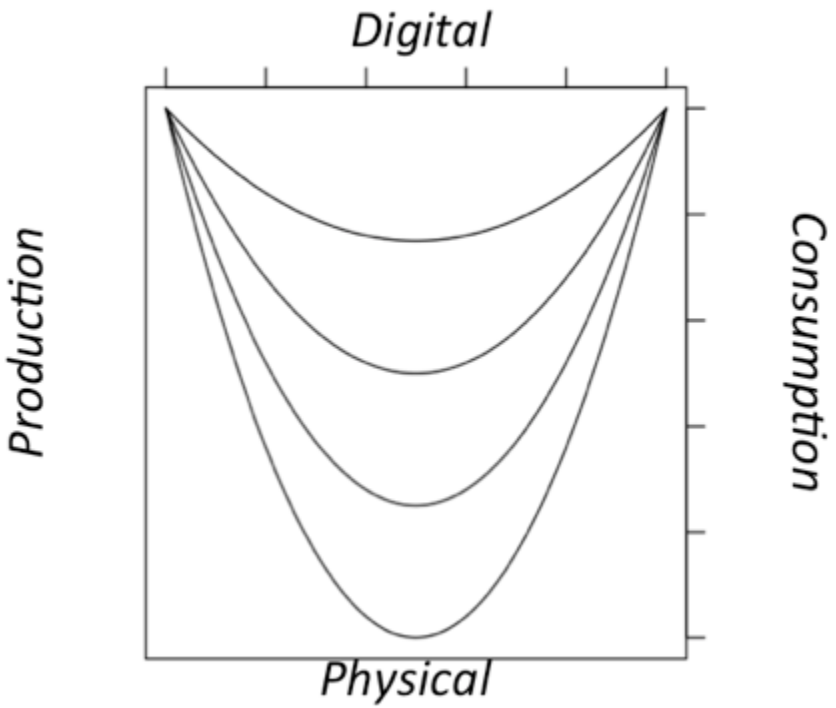
- How well do we support diversity and accessibility?
- How much does the "Platform" need to know about us?

http://www.townshendaudio.com/wp-content/uploads/2012/11/Townshend-hifi-Platform-Seimic-Isolation-980x360.jpg

Data is the new Spice

How Digital

- To what extent is a business digital?
- Born digital, transported digital, consumed digital….
  - Entertainment industry
- Many industries are still about actual physical products
  - Food



MARINE SCIENCE

Ocean observatory project hits rough water

Problems with data management challenge US effort to monitor seas in real time.

BY ALEXANDRA WITZE

From the waters off western North America to the seas surrounding Greenland, US oceanographers have nearly finished deploying hundreds of sensors, moorings, gliders and other equipment that make up an ambitious US$386-million effort to establish the world's biggest interactive portal to the oceans. Through the Ocean Observatories Initiative (OOI), set for completion by May 2015, anyone could watch the climate changing in the North Pacific or an underwater volcano erupting in real time.

But even as the final instruments splash into the sea, the project has hit a snag. After spending $37 million to develop state-of-the-art software to manage live data, the OOI has terminated that contract — shifting responsibility for 'cyberinfrastructure' from the University of California, San Diego (UCSD), to a group based at Rutgers University in New Brunswick, New Jersey.

The shift is meant to help the OOI finish construction on time and on budget by next spring, and is likely to delay the start of data streaming by only a few months. Still, it is making some oceanographers anxious, given the project's broad scope. Data from its observatories are likely to dominate US oceanography for the next 25 years — the OOI's planned lifetime.

The project, funded by the US National Science Foundation, is intended to be for the oceans what earthquake and volcano monitors are for the land: a way to allow real-time glimpses into the currents, marine life and chemistry in the deep sea. It will scrutinize a few select patches of ocean in exhaustive detail, using instruments attached to cables and on free-sailing gliders to measure temperature, salinity, chemistry and other key oceanographic parameters. The network's scattered locations include a cabled sea-floor observatory off the coast of Oregon; sets of instrumented moorings off the US east and west coasts; and

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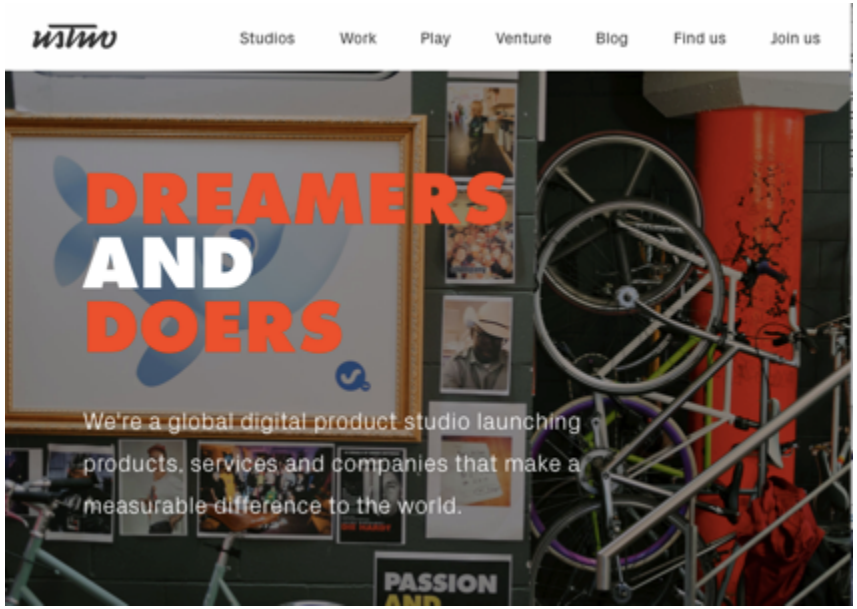
http://www.nature.com/news/ocean-observatory-project-hits-rough-water-1.16406

INTERFACES

Human - IT Interaction

- The interfaces are key
- Design is the way forward
  - Human/Computer
  - Human/Data
  - Human/IT
  - Human / Human!
- ITaaU/ustwo UX workshops



ustwo

Users and Suppliers

Mass Customization

ttp://en.wikipedia.org/wiki/
Mobile_phone_accessories#mediaviewer/
File:CellPhoneCoverDisplay.jpg

Dropbox Steps Up to Rescue Us From Corporate Software

BY MARCUS WOHLSEN 12.03.14 | 6:30 AM | PERMALINK

Share 285 Tweet 295 +1 10 Share 72 Pin it

Dropbox co-founder and CEO Drew Houston. Ariel Zambelich/WIRED

Usability is the key

http://www.wired.com/2014/12/dropbox-steps-rescue-us-corporate-software/

THE PUBLIC

Crowd shaping

2. CROWD SHAPED

The connected crowd comes of age in 2014.

In 2014, more people will pool their data, their profiles, their preferences, in groups (small and big) to shape new goods and services.

Via social media, histories, ecommerce, endless read/watch/play lists, smartphone GPS services and more, connected consumers are creating vast profiles and data trails that relate to everything from their music preferences to their daily movements. No news there.

Now 2014 will see two certainties:

1. **The technologies that facilitate the creation and passive sharing of those data streams will become ever more ubiquitous (yes, we'll say it, *Google Glass*).**
2. **Consumer expectations are amplified – *yet again* – by that ubiquity.**

Meaning the connected crowd comes of age, via

Two kinds of CROWDSHAPING to watch (and run with):

- **SMALL CROWDSHAPING: Real-time shaping (and reshaping) of a service around the preferences of the people in an office, a restaurant, on a plane: any space *right now*.**
  Consumers might not care about the tech that makes CROWDSHAPING possible, but they will care about increased relevance – via the accommodation of their own preferences – and a novel mode of discovery via the newly-experienced preferences of their peers. See how CheckinDJ (below) delivers both.
- **BIG CROWDSHAPING: Services intelligently reshaped by the aggregated data on the preferences or behavior of large numbers of consumers.**
  One next step for good, old-fashioned crowdsourcing. Consumers get a more functional, efficient service shaped not by opinions of the crowd, but around the way people really behave. And – unlike with many existing crowdsourced solutions – they get it *effortlessly*, via passive sharing of their data. That's what

Crowd Shaping

CheckinDJ

Crowdshaped playlists match patrons' tastes

CheckinDJ is a crowdsourced jukebox that arranges a venue's music playlist to match the overall taste of its current patrons. Users register online or via an app, and enter their favorite music genres. Once at a participating venue, they use an NFC-enabled device to check-in. The playlist at the venue automatically adjusts to reflect their taste. Individuals can earn influence points by syncing the app with their social networks, and by checking in with groups of friends. The platform was developed by UK-based Mobile Radicals.

Kutsuplus

On-demand minibus service calculates optimal route for those on-board

Following a successful pilot scheme, October 2013 saw Helsinki's transport authority increase its on-demand minibus service Kutsuplus. The service allows Helsinki residents to request a minibus via their cell phone, choosing a start and end destination. Each bus can carry nine passengers. Users can opt for a private journey or a shared ride, with Kutsuplus calculating the quickest routes for multiple drop-offs. Rides cost EUR 3.50 plus EUR 0.45 per kilometer (USD 4.70 / 0.60).

Crowds….

IBM

Using cell phone data to improve bus routes in Africa

During May 2013, IBM's Dublin research lab used cell phone data to aid the re-design of bus routes across Abidjan, the Ivory Coast's largest city. Researchers used time and location data – collected from calls and SMS – to assess commuters' frequent routes and then compared these to the existing public transport infrastructure. According to the data, there were 65 possible improvements that could reduce travel time by 10%.

1 **crowdshaping**

The act of reshuffling a gathering of people at a media event to downplay or accentuate certain demographics for the purpose of sending a particular message.

Michelle Obama's staff was caught crowdshaping at a recent Carnegie-Mellon appearance. In fact, one coordinator was even heard to say, "We need more white people here!"

To an Asian girl: "We're moving you, sorry. It's going to look so pretty, though."

by Mike in Maine April 15, 2008

6 -1 Shop

Re-imagining Scientific Research

A “Social Machine” of experienced researchers, technology & information

Library as an example system

Effects on the Institution, Building and Personnel

- The replacement of traditional services by IT utilities;
- Opportunities to exploit IT to provide new value-add services;
- The potential for changing and new roles for librarians, such as information management, curation, and training.

http://en.wikipedia.org/wiki/George_Peabody_Library#mediaviewer/File:George-peabody-library.jpg

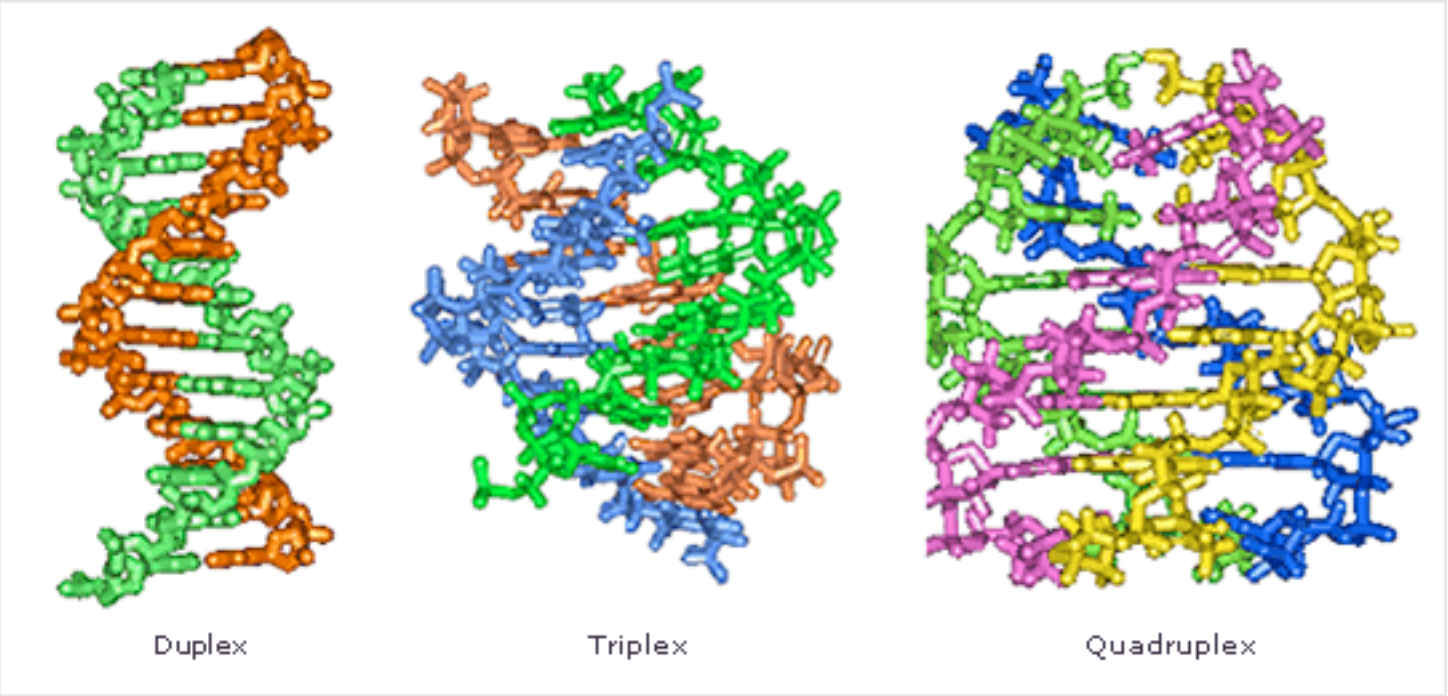
Scientific Data Value Chain

- Does the Web currently/have the potential to disrupt or support the data value chain?

http://www.dreamingnewmexico.org/food/ff-local-foodshed

Research as Utility?

Triple Helix
University/Government
/Industry



Quadruplex
University/Government/
Industry/3rd Sector

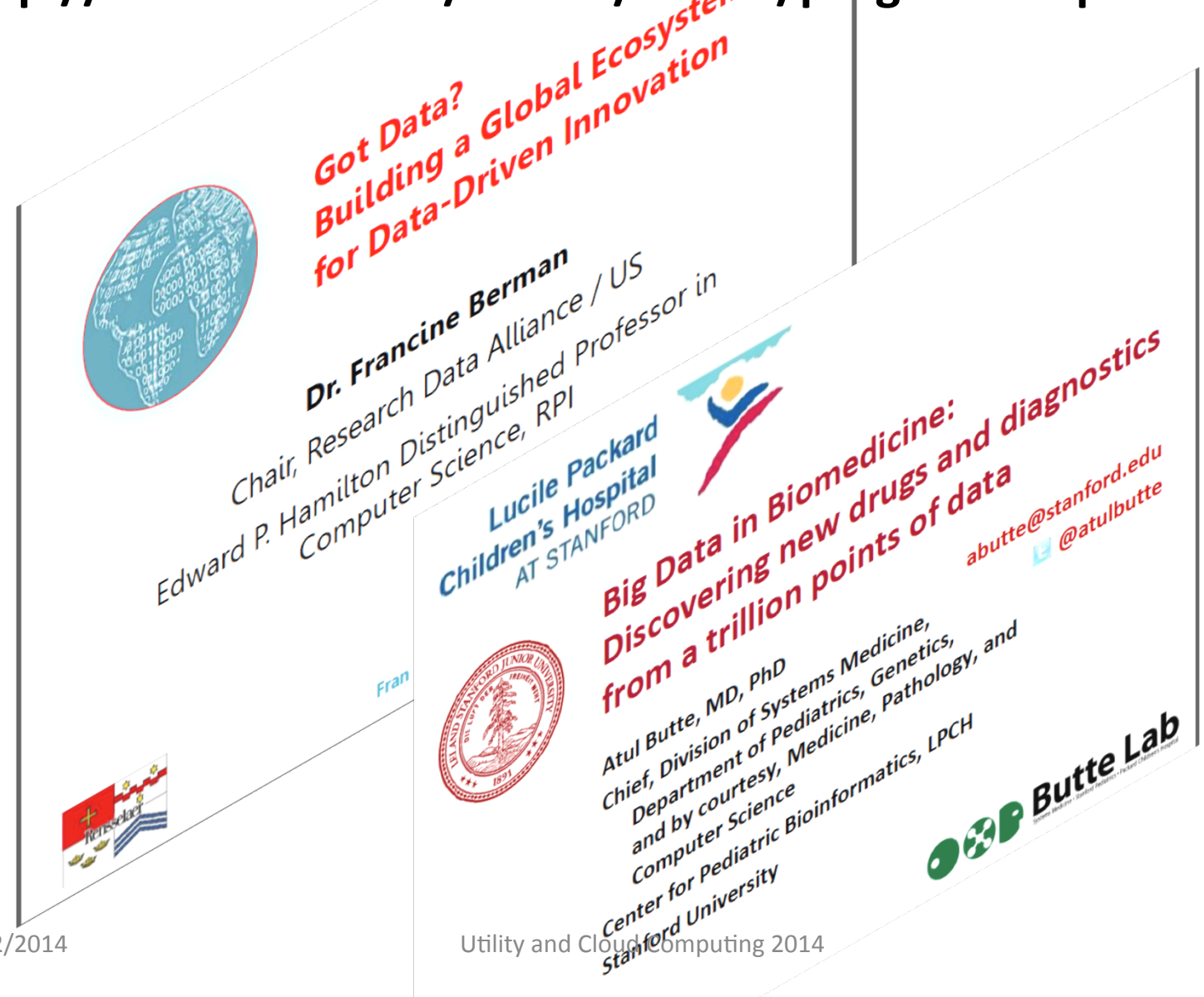
http://www.konan-fiber.jp/english/research/description_01.html

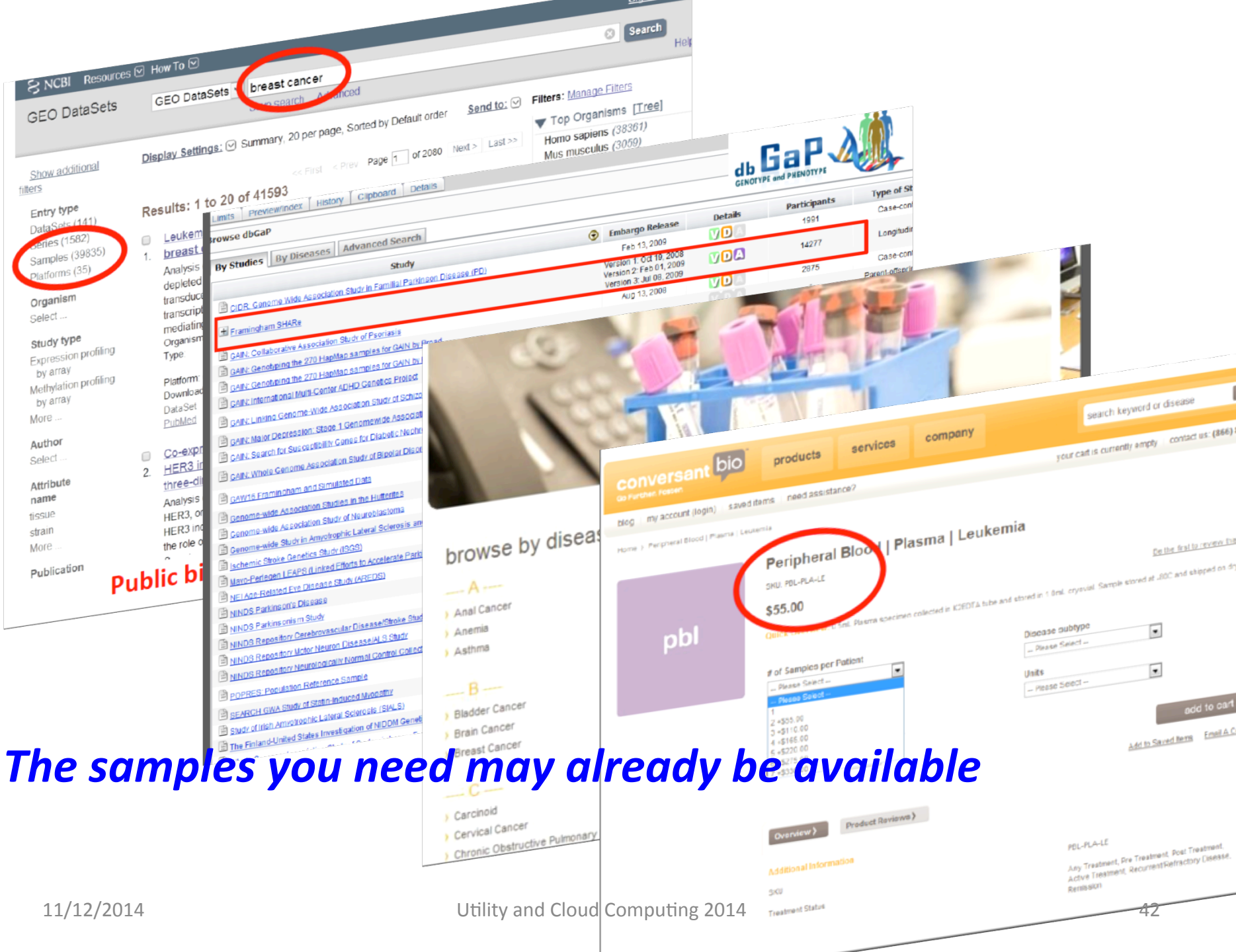
Laboratory as a Utility

- Do I need a lab?

IDCC 2014 Meeting San Francisco

http://www.dcc.ac.uk/events/idcc14/programme-presentations





The samples you need may already be available

THE AUTOMATED LAB

Start-up firms say robotics and software that autonomously record every detail of an experiment can transform the efficiency and reliability of research.

http://www.nature.com/polopoly_fs/1.16429!/menu/main/topColumns/topLeftColumn/pdf/516131a.pdf

The Matrix or Lego Movie

FUTURE

Capitalization of Research

- Capital is available but recurrent (people) costs are difficult)
- Increasing Automation
- Increasing use of IT
- But actually works against a service model

PHILOSOPHY

What we don't know

Michael Shermer enjoys a reminder that cutting-edge research is a step into the unknown.

At a press conference in 2002, Donald Rumsfeld, then US secretary of defence, used epistemology to explain US foreign entanglements and their unintended consequences. "There are known knowns; there are things we know we know. We also know there are known

Firestein introduces the concept of ignorance by contrasting the public's perception of science — as a systematic process — with a scientists'

MARTIN O'NEILL

Click for Article Access Options

"In theory, there is no difference between theory and practice. But, in practice, there is."

Unknown (possibly Yogi Berra or Manfred Eigen)

SKILLS

Skills

- Skills we need are story telling skills not data mining skills
- DE 2014 Keynote Humby
- **The Narrative**

"We have lots of information technology. We just don't have any information."

Education

http://www.theonion.com/articles/report-increasing-number-of-us-toddlers-attending,37145/

Report: Increasing Number Of U.S. Toddlers Attending Online Preschool

NEWS IN BRIEF · Science & Technology · Education · Kids · ISSUE 50•40 · Oct 9, 2014

Share on Facebook 16.8K Share on Twitter 1.3K 161

WASHINGTON—Saying the option is revolutionizing the way the nation's 3- and 4-year-olds prepare for the grade school years ahead, a Department of Education report released Thursday confirmed that an increasing number of U.S. toddlers are now attending online preschool. "We found that a growing number of American toddlers are eschewing the traditional brick-and-mortar preschools in favor of sitting down in front of a computer screen for four hours a day and furthering their early psychosocial development in a virtual environment," said the report's author, Dr. Stephen Forrest, who said that the affordability

IT??

49° Great day to get you some

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HP Unveils Non-Computer For Those Who Don't Need A Computer

NEWS · Science & Technology · Our Annual Year 2011 · ISSUE 47·50 ISSUE 47·19 · May 14, 2011

Share on Facebook 16.5K Share on Twitter 1.3K 129

A customer tries not using his new non-computer.

PALO ALTO, CA—Hewlett-Packard announced Friday the release of the first-ever non-computer, a fully unusable device specially designed to address the demands of individuals who have absolutely no need to own a computer.

CEO Léo Apotheker told reporters the non-computer was a long-overdue innovation that would finally allow consumers with zero interest in computers to enjoy all the benefits of not having one.

Man's Whole Job Undoing Handiwork Of Self-Checkout Machine

NEWS IN BRIEF · Science & Technology · Jobs · Technology · ISSUE 50·42 · Oct 22, 2014

Share on Facebook 18.0K Share on Twitter 519 107

SIOUX FALLS, SD—Admitting that he basically just stands there until one of the stations starts blaring "unexpected item in bagging area," local supermarket employee Andy Berenson reported

ITAAU NETWORK+

2015 events

- Food Standards Agency workshop
- UX boot camp with ustwo, Shoreditch - 11 Feb
- Health care, well being and cloud for business – Newcastle with SiDE
- Media production platforms for collaboration
- Seed Library - pilot project
- Data as a Utility – Bournemouth University
- Emerging economies – sharing and learning
- Community Conference – Southampton, 6-7 July
- Music as a model for collaboration and cooperation
- Hackathon for devices and gadgets – what next?

Join the ITaaU Network+

- Web: www.itutility.ac.uk
- Mailing list: http://jiscmail.ac.uk/itutility
- Hashtag #itaaun
- Twitter: SteveITaaU
- Facebook page: http://www.facebook.com/ITutilityNetwork
- Email: info@itutility.ac.uk
- LinkedIn group: IT-as-Utility-Network

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  - Statistics/ Mathematics
- Funding
  - University of Southampton, Chemistry
  - EPSRC, RCUK, JISC/Jisc, IBM, Microsoft, TSB, Lonza

Thank you for listening

collection. All rights reserved.
rker Book of Technology Cartoons.

Trust me Mort - no electronic communications superhighway, no matter how vast and sophisticated, will ever replace the art of the schmooze