

Digital Disruptions

Technology Innovations Powering 21st Century Business

Paul Gustafson
Director, Leading Edge Forum

new media

new waves

platform makeover

information transparency

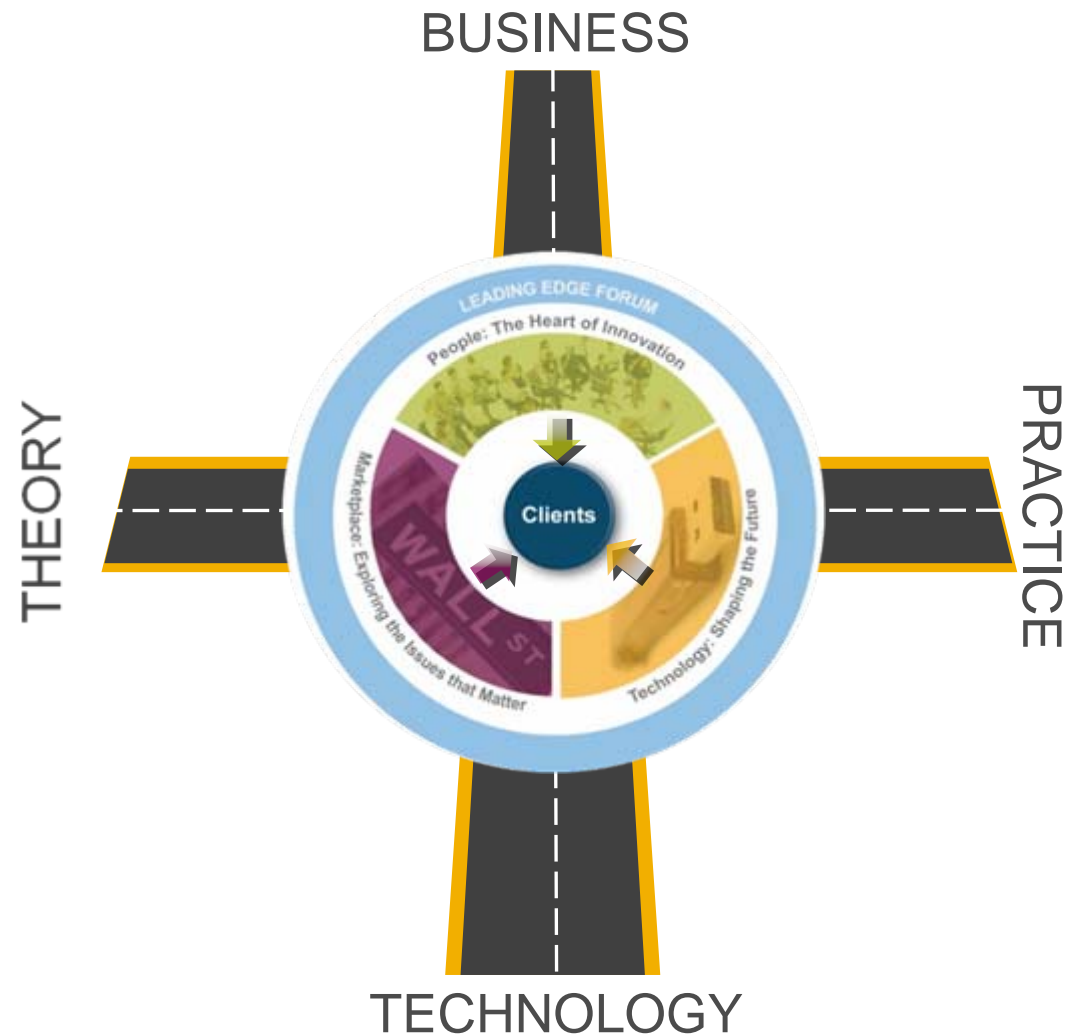
social power

new reality



Leading Edge Forum (LEF)

Community of individuals committed to the pursuit of **thought leadership** and the development of **intellectual capital**, which can be used to advance the management agenda of **how IT can create economic value.**



The intersection of business and technology strategy, bridging theory and practice

LEF Portfolio



People: The Heart of Innovation

Chairman's Award for Excellence
CSC Papers
LEF Associates
Technology & Business Conference

Technology: Shaping the Future

LEF Reports
CSC Grants
Innovation Centers

Marketplace: Exploring the Issues that Matter

LEF Reports
CSC Grants
Innovation Centers

Examining the impact of emerging technologies and related business trends long before they hit the marketplace

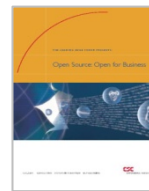
LEF Reports



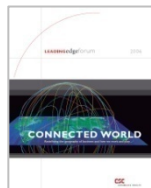
Digital Disruptions: Technology Innovations Powering 21st Century Business, 2008



Digital Trust, 2007



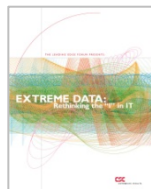
Open Source: Open For Business, 2004



Connected World – Redefining the Geography of Business and How We Work and Play, 2006



Architecture rEvolution: Exploring the Network Effects on Infrastructure, Applications and Business Process, 2003



Extreme Data: Rethinking the “I” in IT, 2005



On the Edge: Exploring Next-Generation Digital Disruptions, 2002

Examining key technologies, best practices and the efforts of our clients, CSC technologists and alliance partners

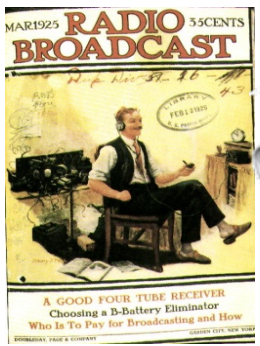
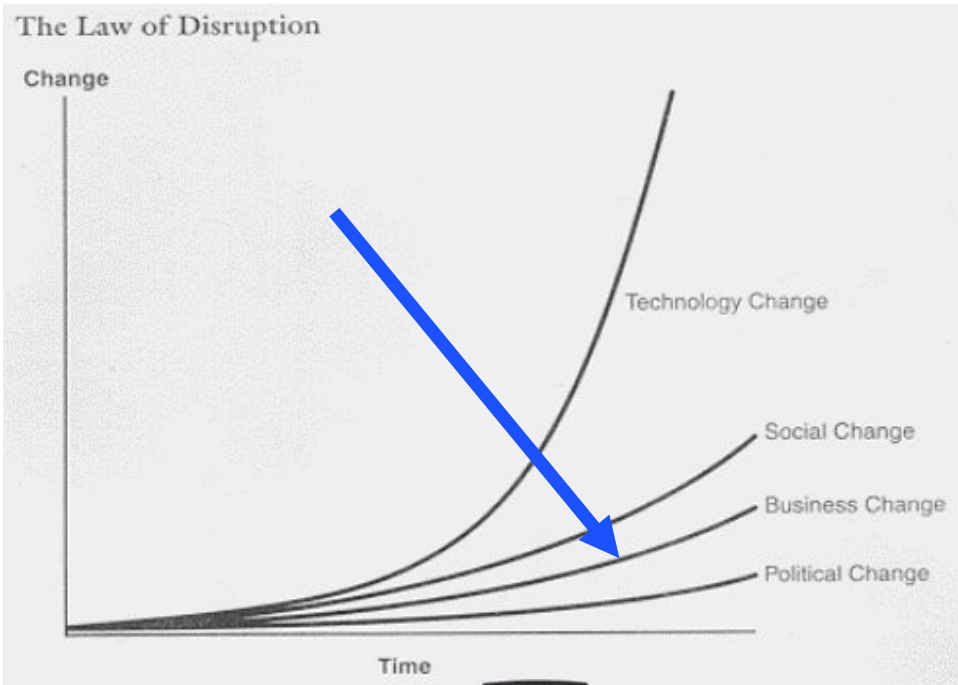
What do these images conjure up in your mind?



Disruptive technologies can completely change the marketplace & society...



Digital Disruptions: "Mother of all Disruptions"



enlarge

AT&T 3:48 PM iRadio

Welcome

Welcome to iRadio 1.0b3

Please report any issues you may encounter that are not listed in the Known Issues below.

E-mail: mewse@subband.com

Known Issues

Quirks in the shoutcast receiving

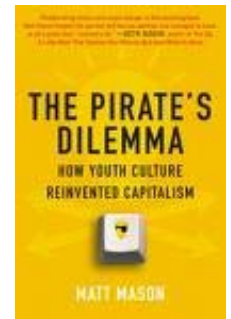
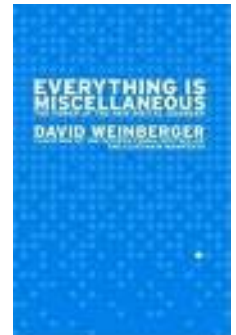
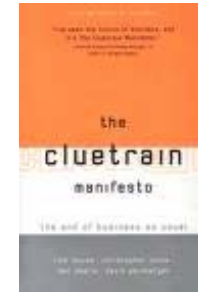
AT&T 3:49 PM iRadio

Station	Signal	Listeners
WBUR 90.9 FM, Boston...	24	1597 M
Power 106 FM Jamaica...	24	559 M
KCRW World News	64	442 M
.977 The Talk Channel	48	381 M
Minnesota Public Radio...	64	316 M
KGO Newstalk 810, San...	24	214 M
Power 106 FM Jamaica...	24	156 M
Comedy Pipe (DEFCON)...	32	133 M
WGBH 89.7 Live Boston...	24	79 M
89.7 WUWM - Milwaukee...	64	70 M
WJCT.ORG NPR NEWS...	48	60 M
1310 KFKA	24	50 M



Digital Technologies are changing the way we get things done:

- Vaporized time, location, physicality.
- We can find, collaborate with anyone, anywhere, anytime.
- We are always on.
- Context is all important.
- Psychographics beats Demographics.
- From filter-then-publish, to publish-then-filter
- From tag-then-file, to-file-then-tag.
- From planning to coordination.
- From taking the people to the problem to taking the problem to the people.
- From gather-then-share, to share-then-gather.
- From wondering who's communicating to seeing it.
- From scatter-gun ads to precise targeting.



Trends and Themes

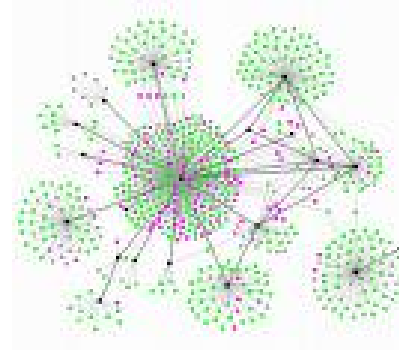
New Media



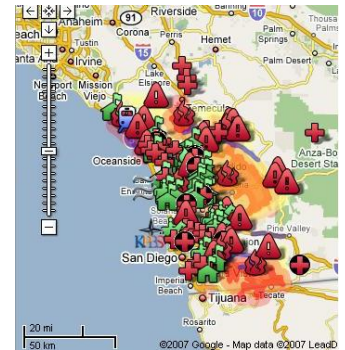
New Reality



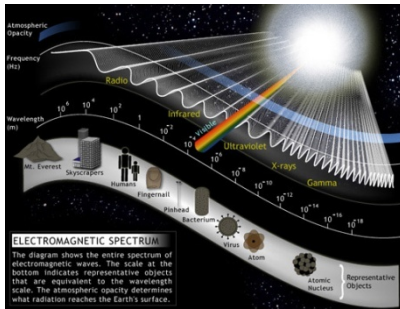
Social Power



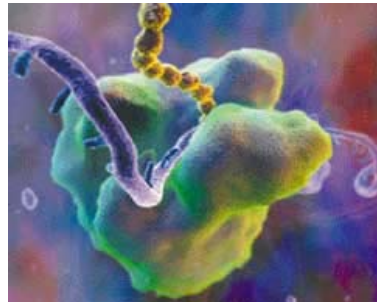
Information Transparency



New Waves



New Platforms



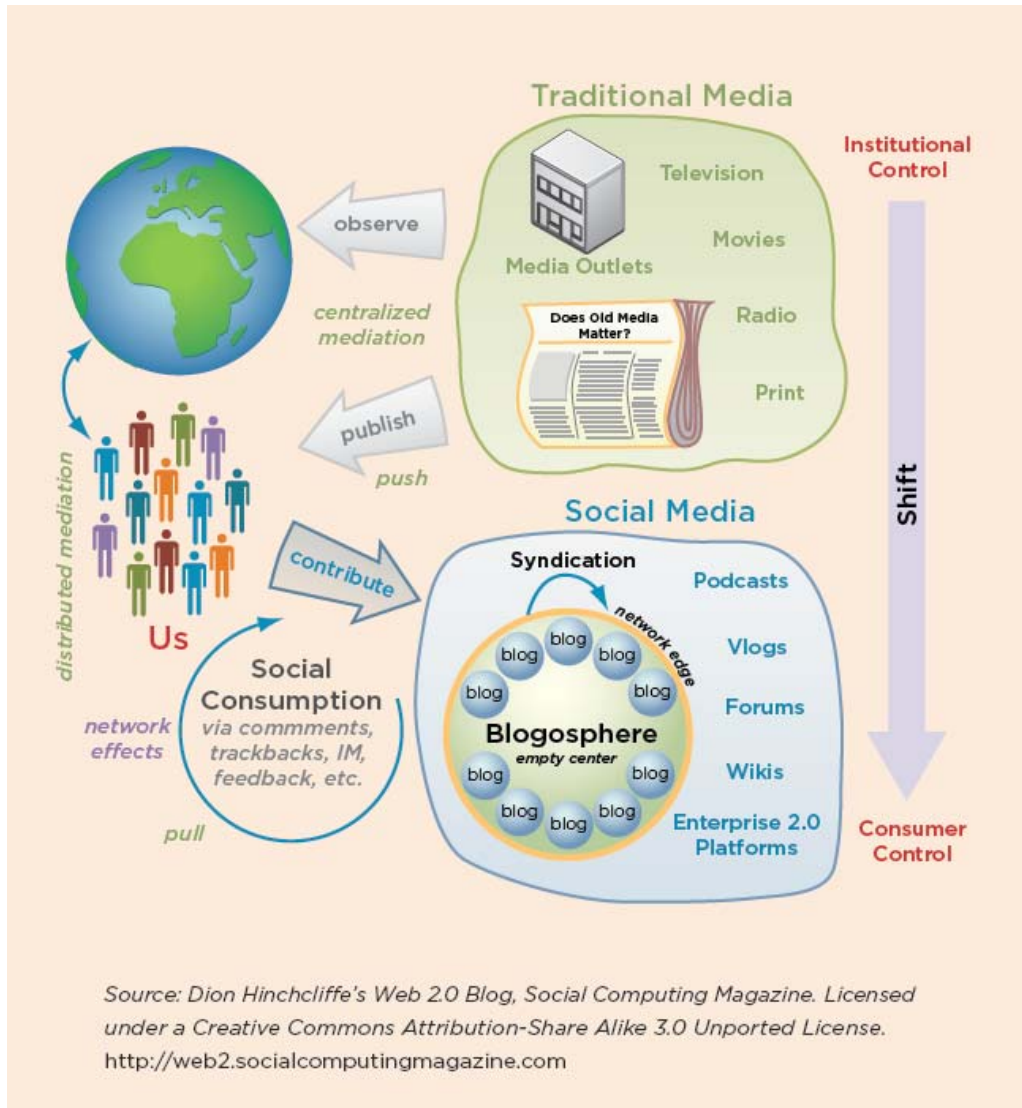
Smart(er) World



Virtual...Personal...Social...Playful...Free...Transparent...Aware...Exponential

New Media

We have met the new media, and it is us



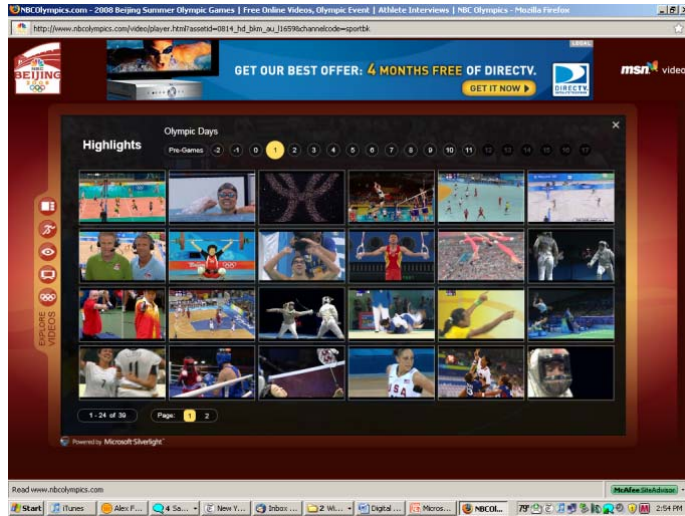
- Participatory
- User-Generated
- Nearly limitless choices
- Manipulable
- Portable; Converging

“The world is changing very fast. Big will not beat small anymore. It will be the fast beating the slow.”

Rupert Murdoch, Chairman and CEO, News Corporation

TV (and Everything Else) on My Terms

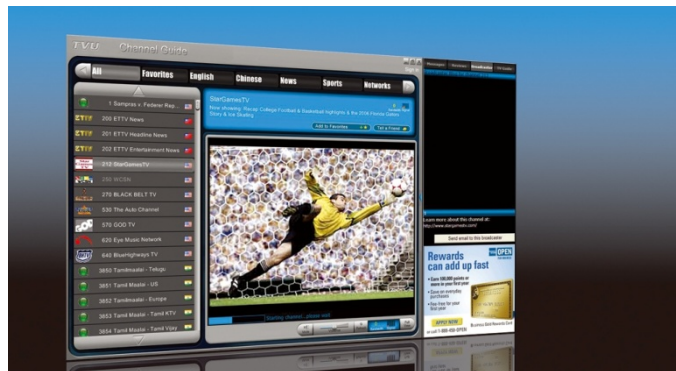
You pick the viewing angle



You make your own rating



You choose the broadcast location



You drive your own product interests



It's all about your voice and where you want it to be heard



DuPont hired advertising agency Denuo, to create short-form videos describing the relevance of DuPont's science innovations to everyday life. Denuo worked with Brightcove to place these "Science Stories" on blogs such as BoingBoing and SEED Network's ScienceBlogs.

Brightcove provides an Internet TV platform for enterprises to publish on-demand video and other digital media assets online

Start of video features "freeze screen" that encourages users to initiate video play.

OTHER OPTIONS ACCESSIBLE VIA PLAYER MENU

- E-mail to a Friend
- Access Direct Link to Player
- Add to Blogger or Typepad Blog
- Access Embed Code to Post Player to Any Site

Source: Brightcove

BoingBoing: Google replies to reports of data-share with cops in Brazil, India

Previously on BoingBoing:

- More on Orkut and law enforcement: Brazil
- India: Google's Orkut helps cops censor? New cyberterror law...
- Brazilian cops: Orkut used as drug network
- Brazilians outnumber Yanquis on Orkut 2 - 1
- Brazil orders YouTube shut down over celebrity sex video
- Brazil's congress wants to track Internet users

posted by Xeni Jardin at 09:52:35 AM permalink | Other blogs' comments

Advertisement

SCIENCE STORIES

Play Video

00:00 02:45

Join Now!

Support Bloccers' Rights!

MY Yahoo!

Feedburner

Free

NEWSBURST

Add to Google

Add to SiteShuffle

Pluck

MY AOL

Feedounge

Bloglines

PAGERANKS

Bitly browser

NewsAlloy

Living in a New Reality

We will blend physical and virtual reality, improving both

Gaming



Blending Real & Virtual



Virtual Augmentation



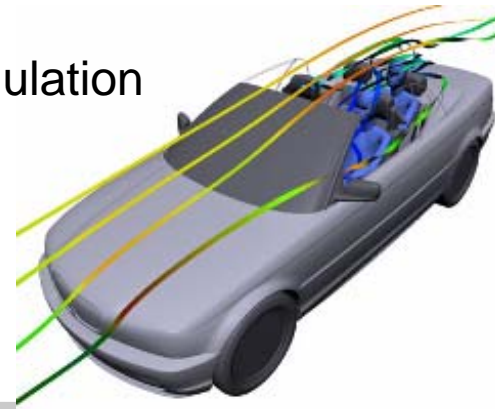
Telepresence



Mapping



Simulation



According to philosopher Immanuel Kant (1724-1804), people can never know reality directly. We are, by design, one layer removed from reality, with our brains synthesizing external stimuli – sights, sounds, smells, tastes and touches – and creating a coherent experience. In other words, we experience the world through a layer of perception.

Virtual Realities incorporate Physical realities

A world of possibilities: Internal collaboration, Distance education, Training, Customer outreach, Product demonstrations, Virtual conferences and events, Shared simulation & experience, Remote monitoring

Photorealistic Augmentation



Shared Experience



Business integration



Source: Sun and Malden Labs

Virtual Worlds for the Enterprise

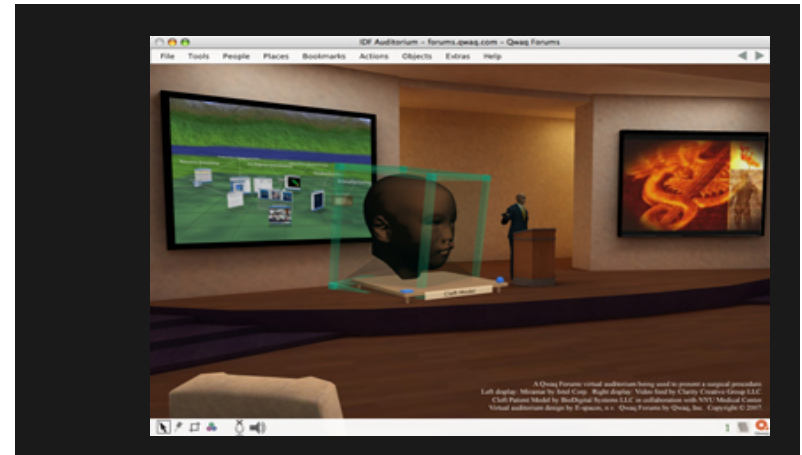
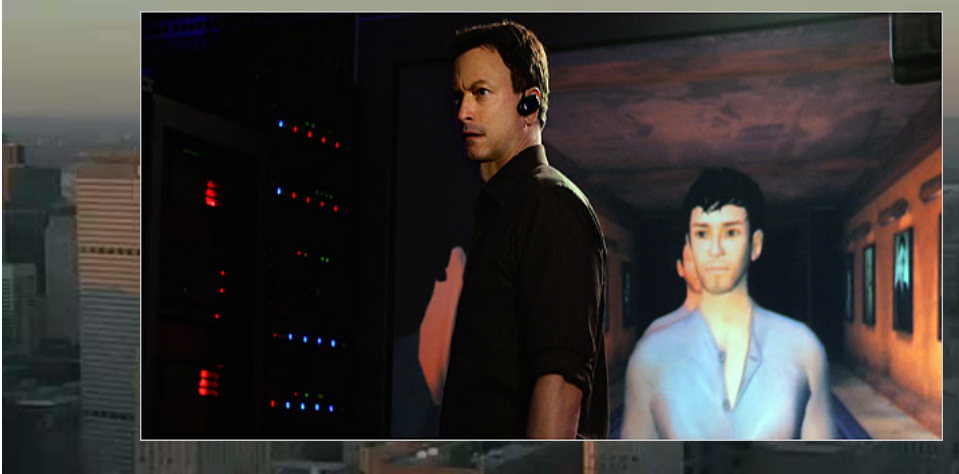


Image source: Intel and Qwaq

Physical Realities Incorporate Virtual Realities

Blended-Reality TV



View the past while living in the present



Extended shopping experience



Iraqi Checkpoint training using virtual humans to learn cultural gestures



Source: <http://www.web3d.org/casestudies/detail/iraqi-checkpoint-training-using-virtual-humans-to-learn-cultural-gestures/>

The result... a New reality

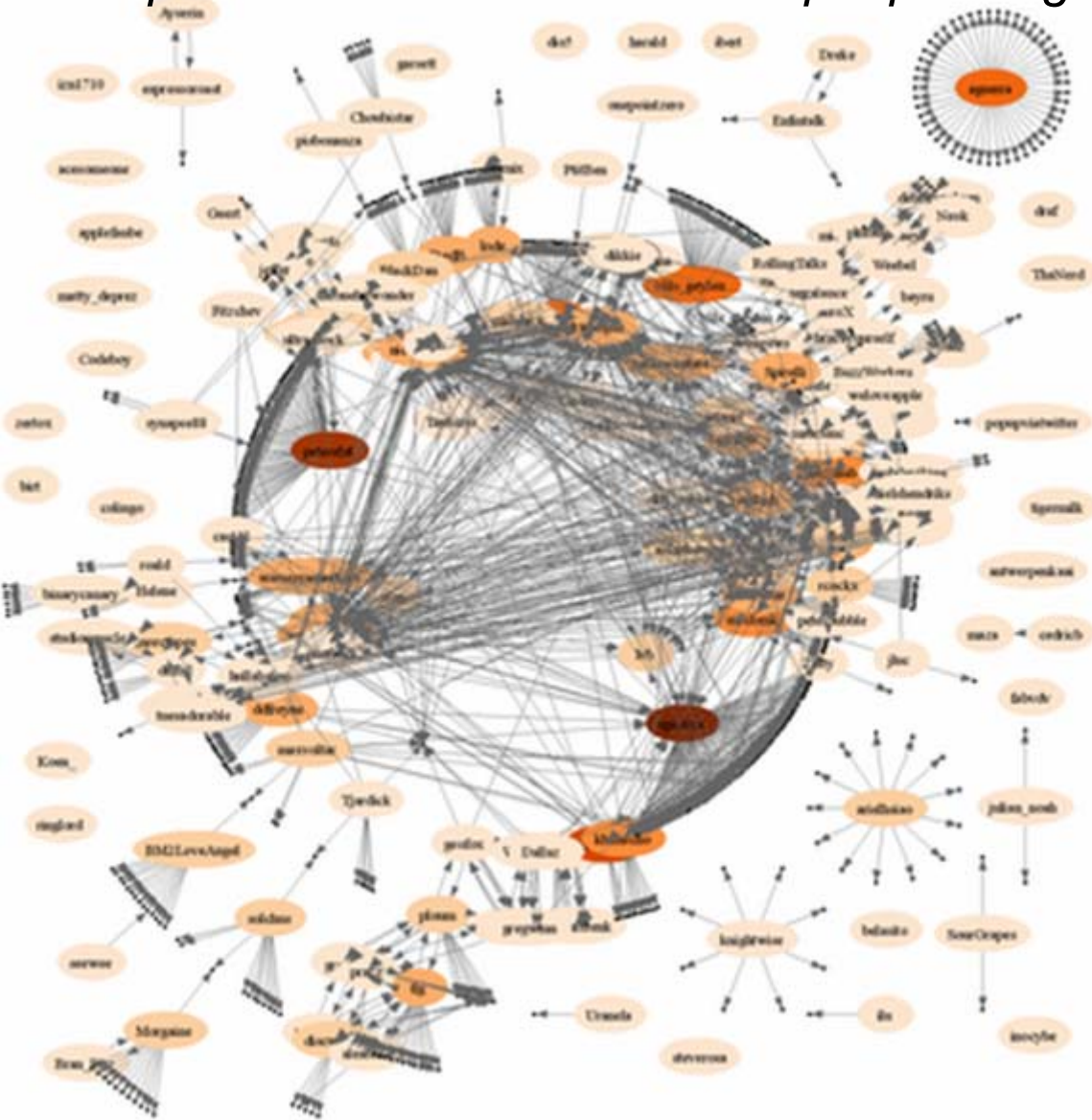
- A new leadership model will emerge that is based more on merit and less on hierarchy
- Virtual worlds will enable new modes of interaction; they are inherently social
- Super-collaborative work skills will be paramount
- Virtual worlds will facilitate experimentation, including new virtual worlds themselves
- Iterative development and co-creation will increase
- Work will become more like a game



"Play will be to the 21st century what work was to the last 300 years of industrial society — our dominant way of knowing, doing and creating value." Pat Kane, The Play Ethic

Social Power

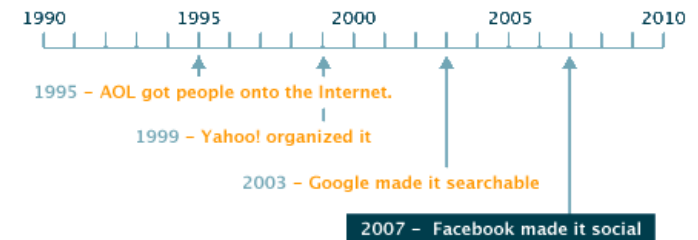
The power inherent in connected people surges



Twitter Friends van Belgische Twitteraars

“How many times in your life do you have a chance to fundamentally change the way people communicate”

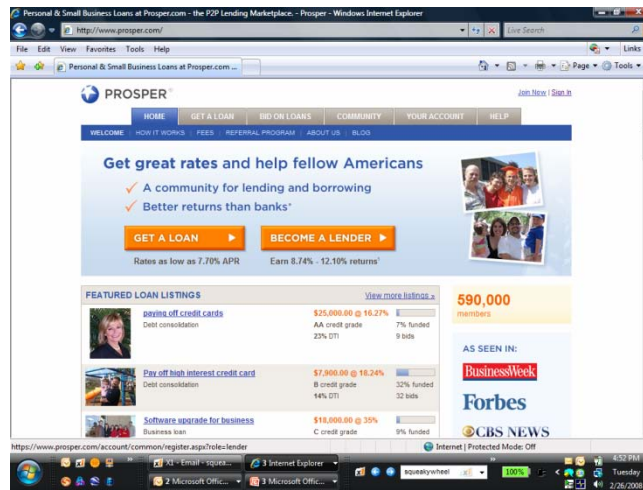
Mark Zuckerberg in 2006 on turning down Yahoo billion dollar offer for Facebook he launched from his Harvard dorm room in 2004.



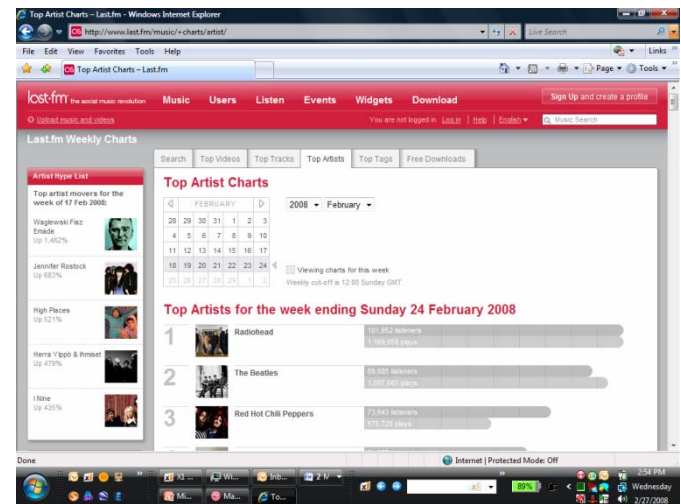
Source: http://datamining.typepad.com/data_mining/images/2007/04/08/twitter20070405.png

Socially infused Business Models

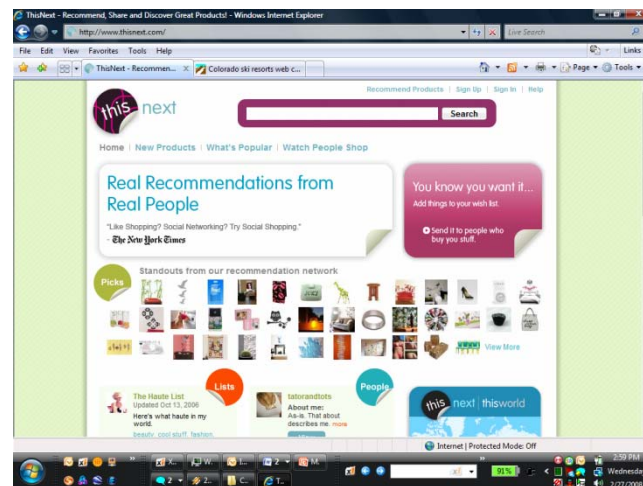
Social network lending



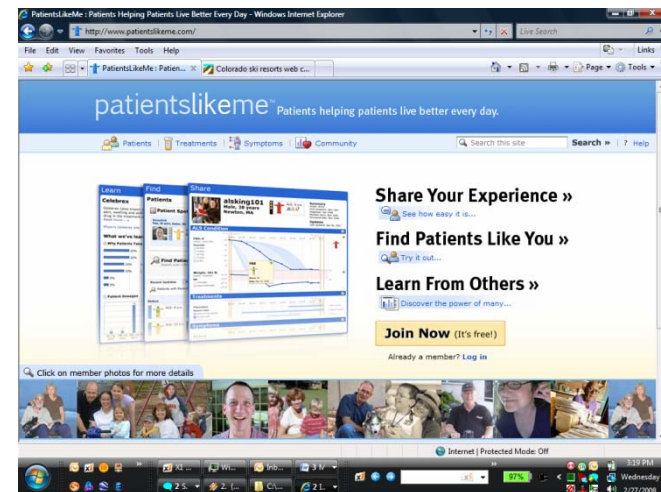
Social network listening



Social network shopping



Social network healthcare



Social networks become the hub of the workplace

The screenshot shows a NewsGator user profile for John Worrell. The profile includes a bio, a photo, and various activity feeds such as 'Recent Activity', 'User Status', 'Tags', 'Favorite Subscriptions', 'John Worrell Recommendations', 'External Widget', 'My Public Flickr Photos', 'Organization Hierarchy', and 'My Communities'. The 'My Communities' section lists several groups related to Alzheimer's research, nanotechnology, and pharmaceutical R&D.

Source: NewsGator

“We are at the intersection of content and people, helping people discern what’s most relevant to whom”

J.B. Holston, CEO of NewsGator Technologies.

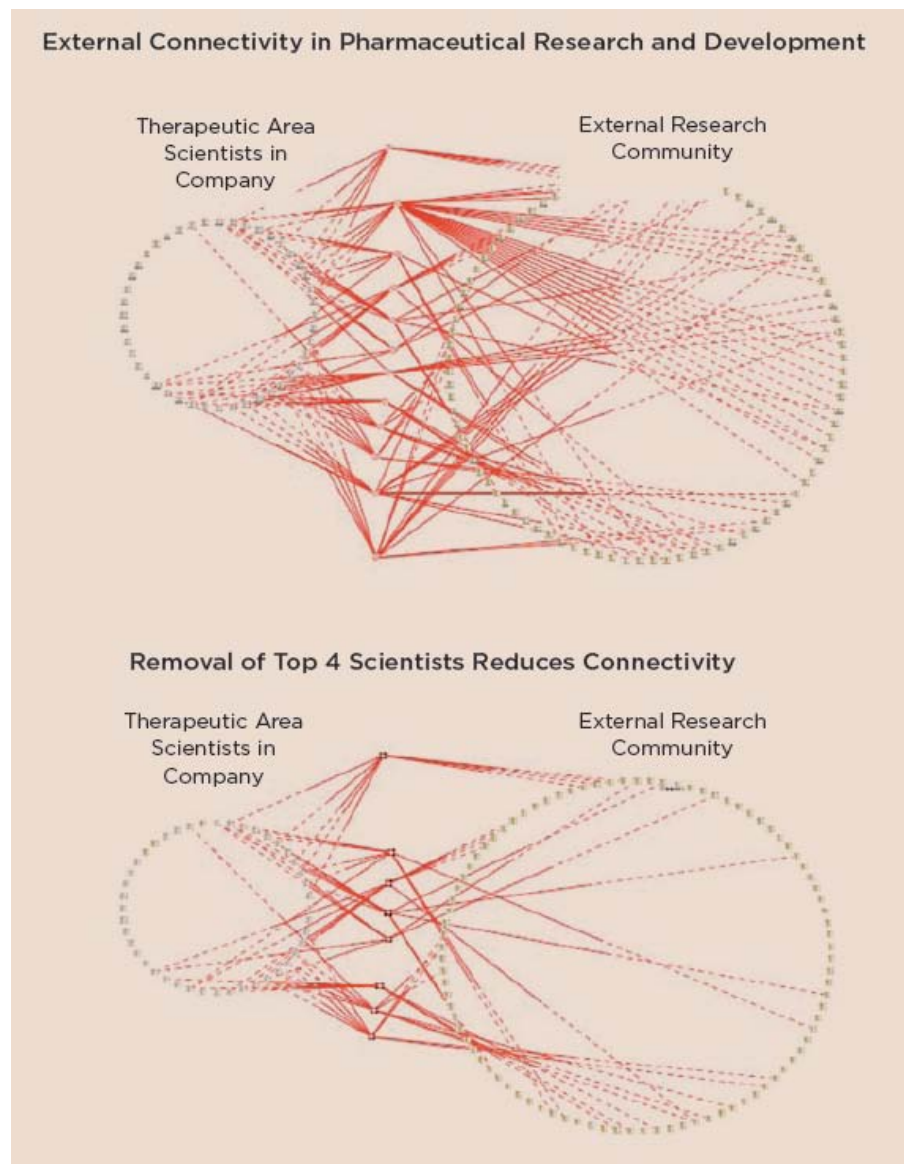
The Ties that Bind

Social network analysis illustrates how when a few strong connections in a social network are severed, many more connections disappear.

- Top illustration shows that 12 scientists in a therapeutic area of a pharmaceutical company hold the bulk of the connections to academia.
- Bottom illustration shows how the removal of the top four scientists cuts external connectivity by half (72 out of 142 interactions).

Some 80 percent of the organization's interactions with academia are one-on-one, making management concerned not with whom the scientists are connected to but how to manage these critical sources of knowledge should key scientists leave.

Source: Rob Cross



Information Transparency

What is observed by one will be known to all.

Who you are? fingerprints, iris scans, face recognition, voice analyzers, gait analyzers, typing analyzers, DNA tests, ID cards

Where are you? GPS, cameras

What you are doing? Twitter, MSN Messenger, AIM, ICQ

What you are working on? oDesk

What you are holding? RFID tags, QR bar codes

What you are sharing? social networks

What others are collecting? data aggregator sites

What others think? Opinion web sites

What's in your house? eBay, webcams

What's in the world's knowledge repository? Google, Yahoo

What's the price? sites like Farecast that compare prices

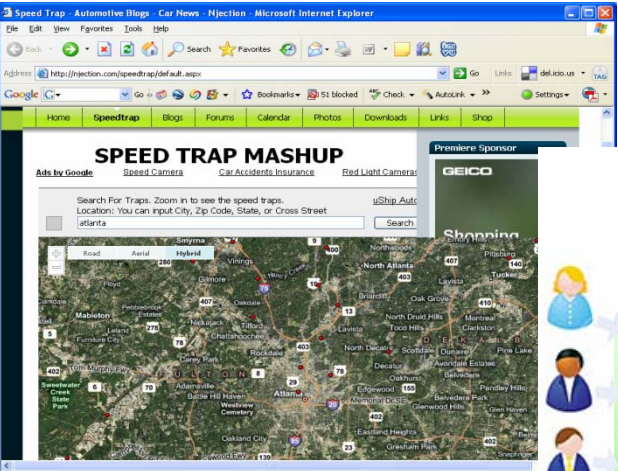
Who are my friends? social networks

What's the code? open source

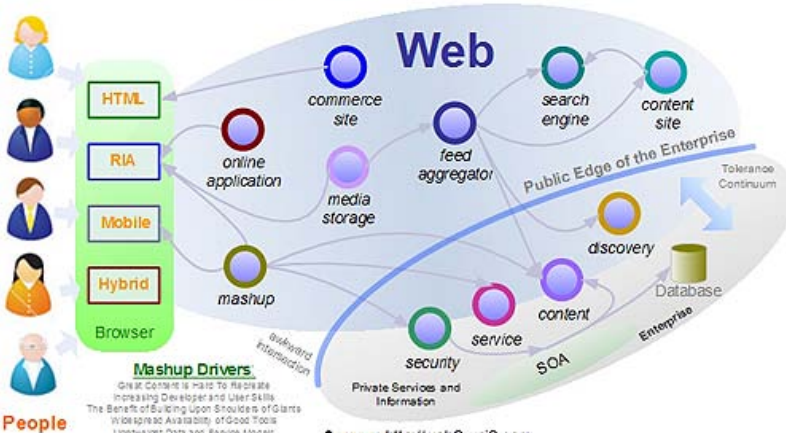
“There are no secrets in
a wired society”

John Taylor, former
CTO, Dupont

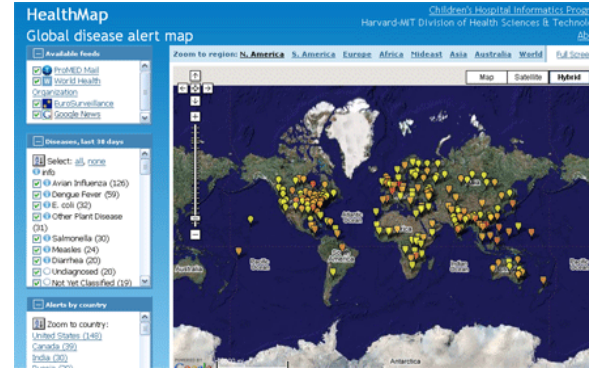
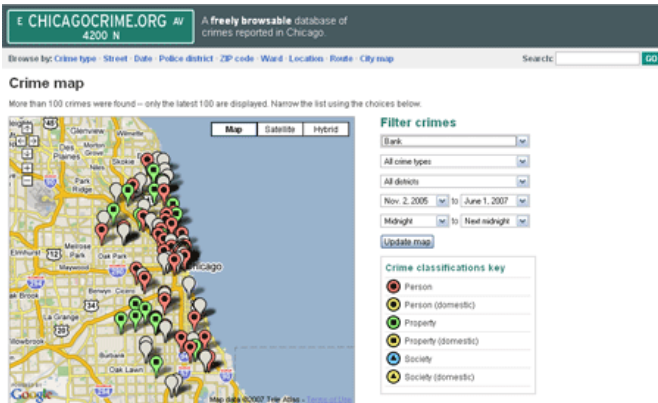
Some are serving it up, some opening it up, others are mashing it up and others are connecting the dots



The Mashup Ecosystem: Flourishing In An Increasingly Nurturing Environment

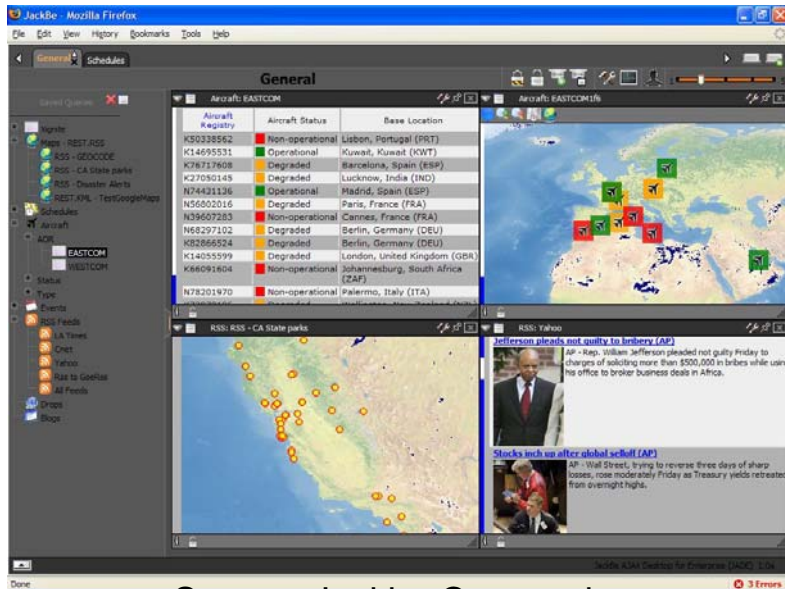


source: <http://web2.wsj2.com>



For Business, Illuminating Operations is Key

Mashups for the Enterprise



Source: Jackbe Corporation

The U.S. Defense Intelligence Agency created a mash-up called Overwatch to make intelligence gathering and analysis more timely. The Overwatch platform enables end users to create a current, customized view of a particular situation based on multiple intelligence data sources

Using RFID sensor information to avoid disaster

In this underground silver, lead and zinc mine in Cannington, Australia, the small truck on the right needs to get out of the way of a large front-end loader approaching. The truck needs to reverse until the front-end loader can safely pass. The inset shows a collision between a light vehicle and a haul truck. The difficult traffic conditions in the mine are being addressed with an RFID system that works underground and lets drivers know when vehicles are approaching



Web 2.0

The screenshot shows a YouTube video player with the title "Web 2.0 ... The Machine is Us/ing Us". The video is currently playing, showing a hand writing "Text" on a whiteboard. The video has 6,652,338 views and a rating of 4.5 stars from 19,933 ratings. The page includes a search bar, navigation tabs (Home, Videos, Channels, Community), and a sidebar with a channel profile for "mwesch" and a list of other videos from the same channel. The browser address bar shows the URL "http://www.youtube.com/watch?v=6gmP4nk0EOE".

YouTube - Web 2.0 ... The Machine is Us/ing Us

http://www.youtube.com/watch?v=6gmP4nk0EOE

myFUNAMBOL Portal iTunes 7.4 Download Free iTunes...2 Download Apple Yahoo! Google Maps YouTube Wikipedia News (352) Popular

Worldwide (All) English Sign Up QuickList (0) Help Sign In

Broadcast Yourself™ Home Videos Channels Community

Search Videos advanced Upload

Web 2.0 ... The Machine is Us/ing Us

Text

From: **mwesch**
Added: January 31, 2007
[\(more info\)](#)
Subscribe

Final version now available! <http://youtube.com/watch?v=...>
<http://mediatedcultures.net> Web 2.0 in just under 5 minutes. This is the 2nd draft, and I plan on doing one more final draft. Please...

URL: <http://www.youtube.com/watch?v=6gmP4nk0EOE>

Embed: `<object width="425" height="344"><param name="`

More From: mwesch

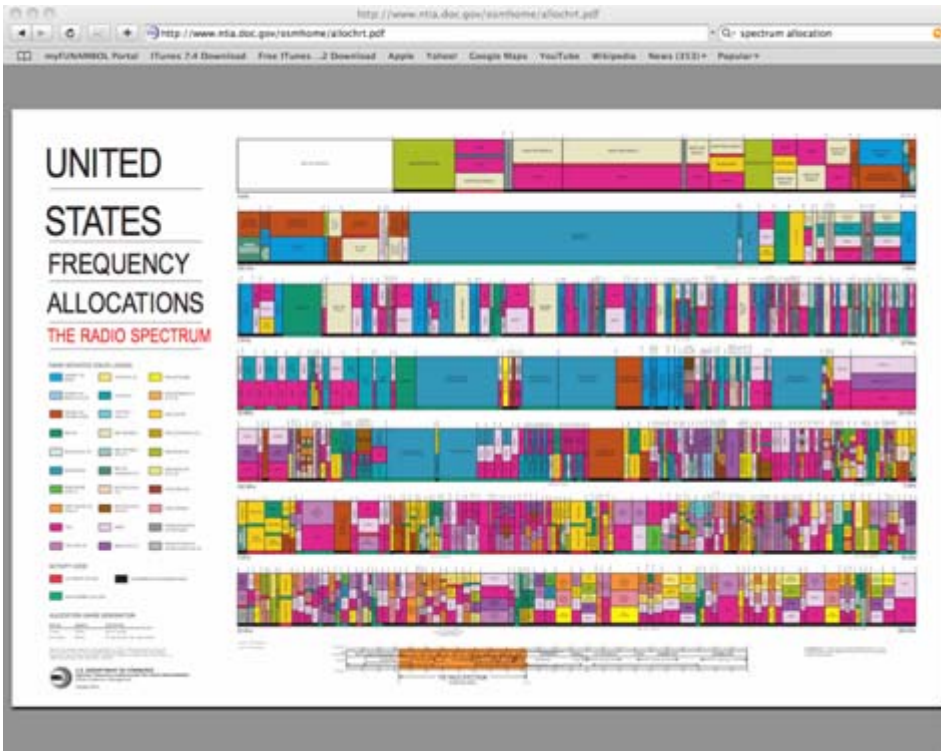
- An anthropological introduction to YouTube**
55:34 From: mwesch
Views: 324,206
- A Portal to Media Literacy**
01:08:12 From: mwesch
Views: 25,355
- Twitter and the World Simulation**
04:40 From: mwesch
Views: 46,410
- Information R/evolution**
05:28 From: mwesch
Views: 337,049
- A Vision of Students Today**
04:44 From: mwesch
Views: 2,711,027
- Introducing our YouTube Ethnography**

Related Videos

xxx

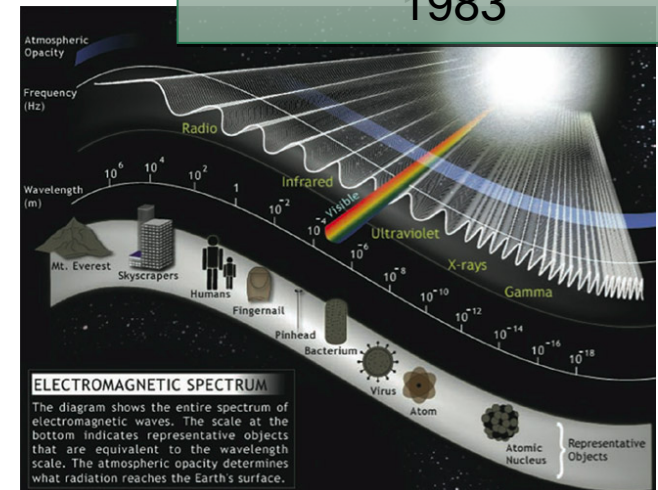
New Wave of Waves

The sky is not the limit as spectrum goes digital.



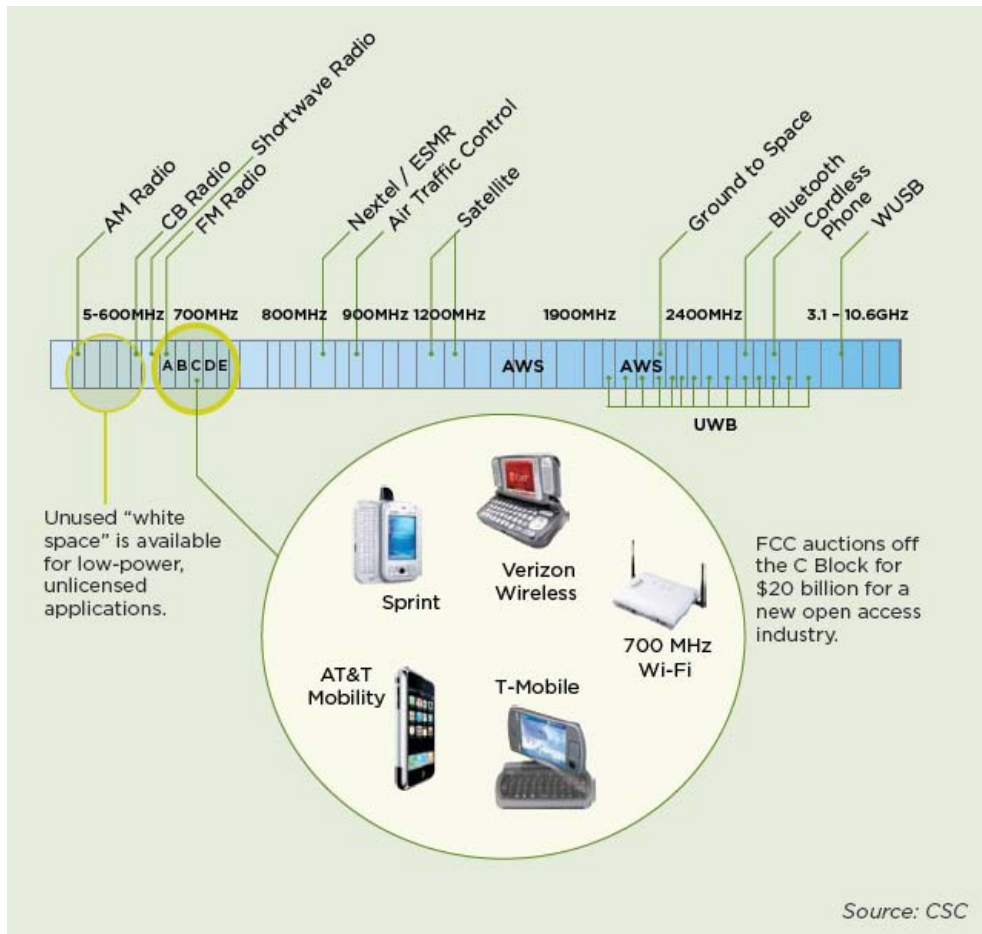
Richard Feynman,
1983

“Interference only happens at a receiver, usually due to bad design.”
David Reed, MIT



Source: <http://www.windows.ucar.edu>

Spectrum opens up in the 700MHz Band



The FCC has called the 700 MHz band “beachfront property,” a valuable scarce resource providing a foundation for building innovative new products and services

Airwaves Battle Pits Dolly Parton Against Google



Left: Andrew Harnar/Getty Images, Right: Stephen Lovekin/Getty Images
Eric E. Schmidt, the chief executive of Google, and Dolly Parton are two of the many combatants in a dispute over the nation's airwaves.

“We are eight days away from a vote that could transform the way we connect to the Internet,” he wrote. “The time for study and talk is over. The time for action has arrived.”

If the spectrum is set free, Ms. Parton says, chaos could reign on Broadway — in the form of static and other interference.

The 700 MHz band’s five blocks (A-E) were auctioned off for a mix of commercial and public safety uses, both proprietary and open. The big winners were Verizon Wireless, which spent roughly \$9.4 billion for C-, B- and A-block licenses, and AT&T Mobility, which spent \$6.6 billion for B-block licenses. In total, the auction earned \$20 billion.

<http://www.nytimes.com/2008/11/04/technology/internet/04-wireless.html>

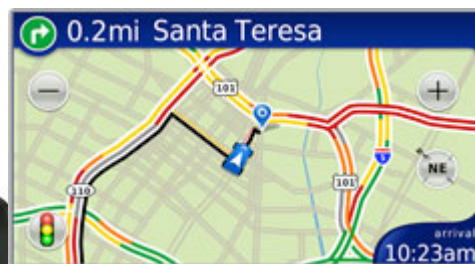
Spectrum shatters completely as radios goes digital

- An SDR ...
 - ... is a radio communication system.
 - ... can tune to any frequency band.
 - ... can transmit or receive any modulation.
 - ... does all these things by means of software.
- An SDR performs significant amounts of signal processing in a general-purpose computer instead of using specialized dedicated radio hardware.
- The goal of SDR technology is to produce a radio that can receive and transmit virtually any existing or new form of radio protocol just by running new software.
- Cognitive radio, one step beyond SDR's, dynamically finds and uses “unused” parts of the spectrum, resulting in a more efficient use of this limited resource
- This will be incompatible with today's approach of dividing up and allocating spectrum, and developing separate infrastructures to utilize specific assigned frequencies.



Spectrum is no longer a scarce resource, with one person's use rivaling another person's use, but a resource that is not depleted with use (and, in fact, expands) Lawrence Lessig

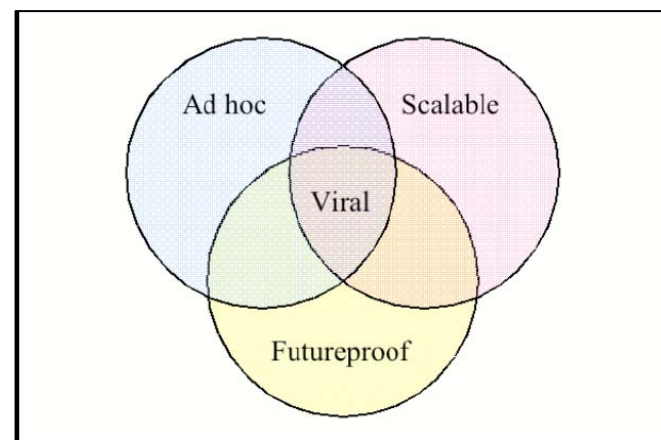
Viral gets contagious



The Dash Express gathers traffic information from the Dash Driver Network and combines it with other sources of traffic data to provide you with the most accurate picture of what's happening on the routes you're travelling



The XO creates a self-organizing network with other XOs, and the network strengthens as XOs are added. The network deliberately extends connectivity to places that were previously unconnected, such as schools and homes in Africa



Instead of reserving wireless for special applications that require mobility, we view it as the norm. We anticipate a time when wires are the special case, needed primarily for power distribution.

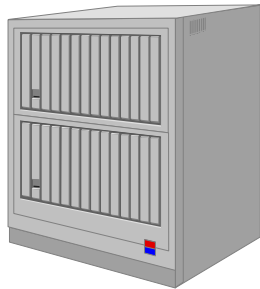
Andrew Lippman and David P. Reed

Platform Makeover

This is not your father's computing platform

Alan Kay's Computing Paradigms

Institutional



Personal



Intimate



And today's "hyper-connected" world is stressing the platform once again

Person to Person



- Europe – mobile phones now outnumber people (103% penetration)
- Global mobile IM grew 33% 2H06
- King.com Game Network Grows 138% in One Year
- XO/OLPC

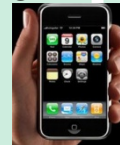


Source: Nortel & CSC

Person to Machine

By 2010, worldwide:

- 4-fold growth in Internet Commerce to 100B transactions
- 1-2 billion A-GPS-enabled handsets
- 100 million iPods sold (market to double 2005 – 2010)
- iPhone; netcentric app platform
- Google phone launch in Fall 2008



Machine to Machine



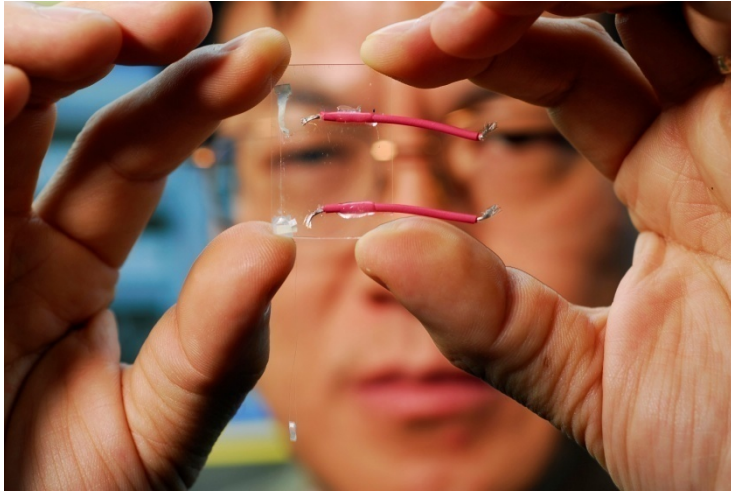
- 98% of all CPUs today are embedded (by 2010 – 14 billion connected, embedded devices)
- 70%+ of all 2007 cars in U.S. have iPod connectivity
- Sensor pocket in Nike shoes



Core Drivers for Cloud computing, Virtualization & Multicore

Tomorrow's New Materials and Computing Sciences

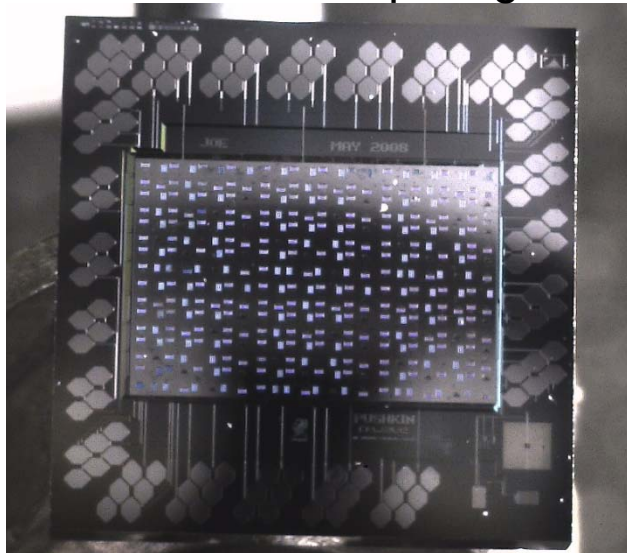
Nano computing



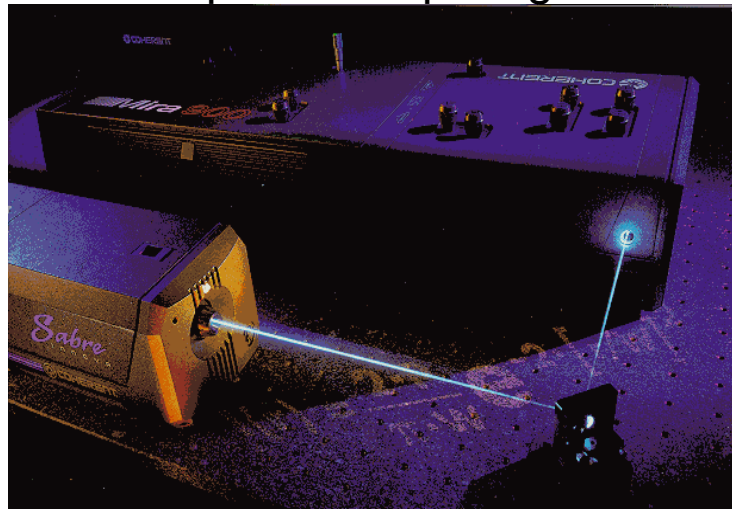
Molecular (DNA) computing



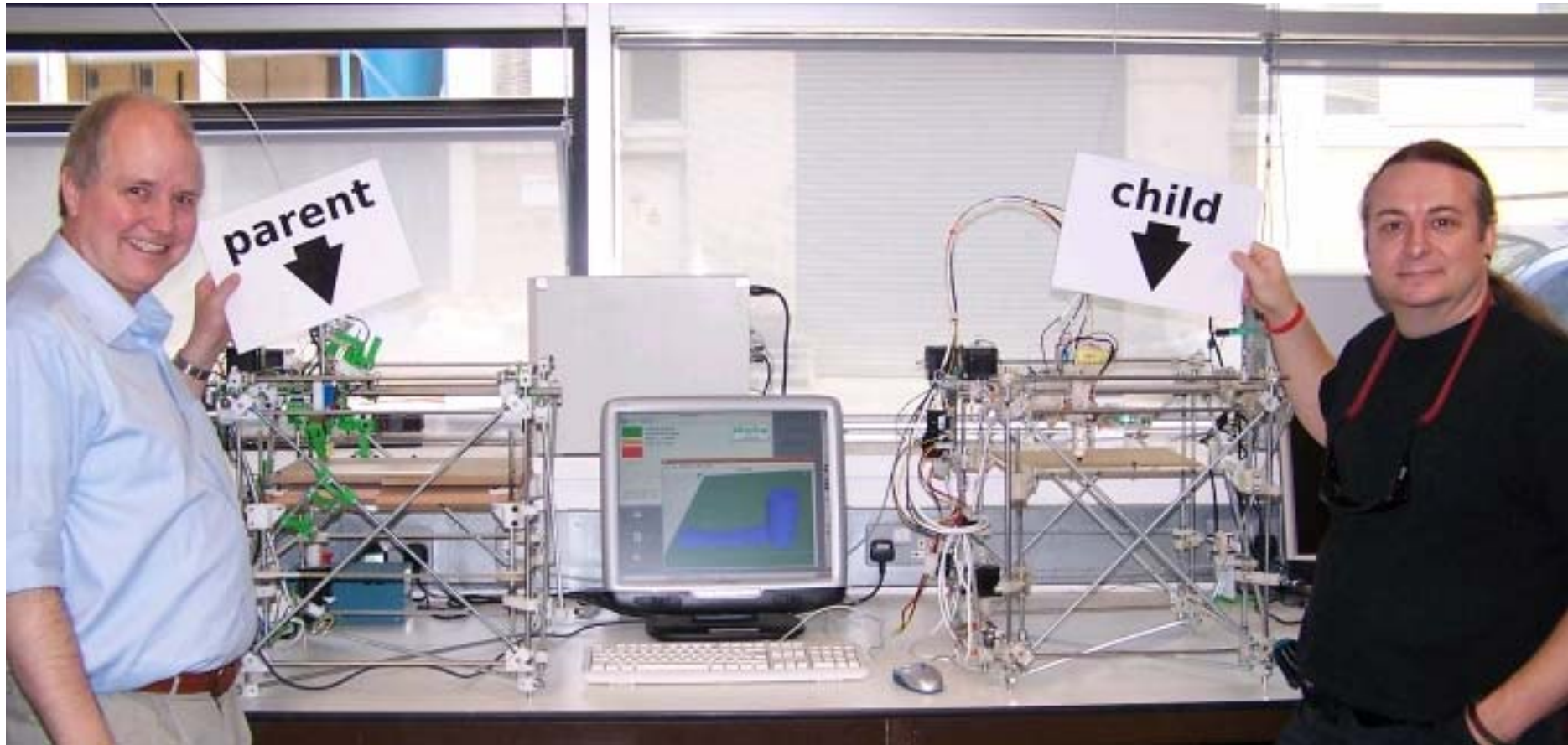
Quantum computing



Optical computing



Reprap makes its first working replicated 3D Printer copy!



"Think of RepRap as a China on your desktop."

Chris DiBona, Open Source Programs Manager, Google Inc., 8 April 2008.

Source:<http://reprap.org/bin/view/Main/WebHome>

Smart(er) World

Smarter everything makes us smarter everywhere

Evolution of Computer Power/Cost

MIPS per \$1000 (1998 Dollars)

Million

1000

1

1
1000

1
Million

1
Billion

1900 1920 1940 1960 1980 2000 2020 Year

Brain Power Equivalent per \$1000 of Computer

Human

Monkey

Mouse

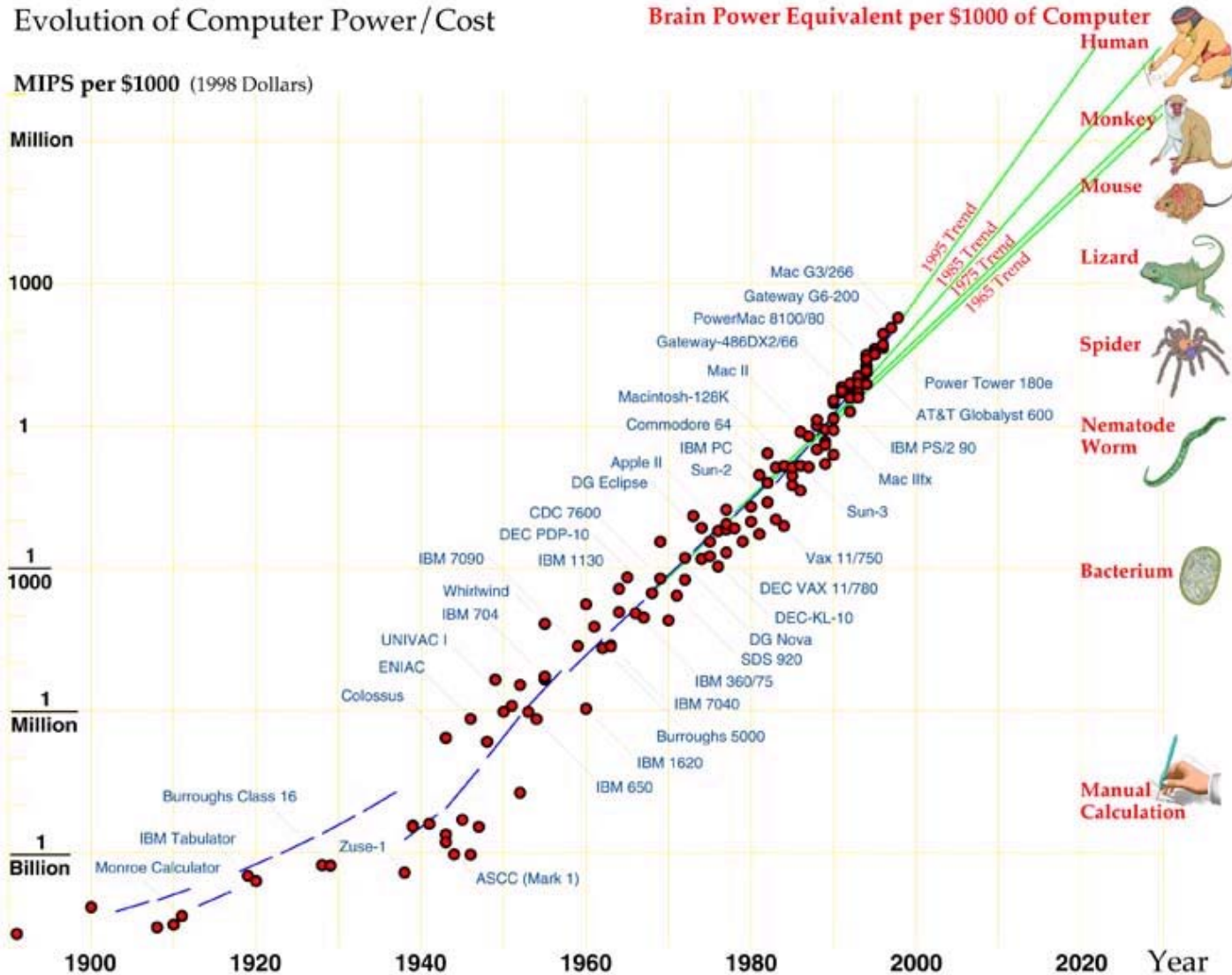
Lizard

Spider

Nematode Worm

Bacterium

Manual Calculation



Source: Ray Kurzweil

Smart(er) World

Smarter everything makes us smarter everywhere

Smart technology approaches human cognition when it:

- senses and recognizes patterns as humans do
- appreciates the semantics – the meaning – of the patterns it perceives, be they text, speech, special or situational
- proactively associates and correlates data based on grasped meaning
- leverages real-world background information to assimilate new data – i.e., learns
- reasons from what it learns
- makes common-sense recommendations and predictions
- makes decisions and acts on behalf of humans

Virtual agents to the rescue



Cybertwin lets users craft sophisticated online agents that can chat when you're not available.



LOT Polish Airlines uses a conversational agent from InteliWISE to provide information about on-board services, frequent flier program, check-in, tickets and reservations, baggage transport, and travel to other countries.



WIRED

Brain-Computer Interfaces



Emotiv Systems and NeuroSky makers of Brain-Computer Interfaces -- devices that facilitate operating a computer by thought alone -- claim the technology is poised to jump from the medical sector into the consumer gaming world in 2008; they've released BCI-based software-development kits. Many scientists worry that users brains' might be subject to negative effects.



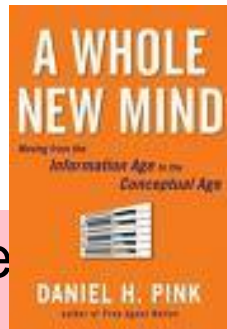
Returning to our Roots



- Conversational Communication
- Relationships
- Do it yourself
- Entertaining Each Other
- Informing Each Other
- No Secrets
- Word of Mouth
- Reputation is Key
- Participatory Government
- Non-market Economy
- Non-proprietary Economy

“Now the M.F.A. (Master Fine Arts) is the new M.B.A.”

Daniel H. Pink, [A Whole New Mind](#)





**THE RAILROADS
boomed, crashed,
and then had a
golden age**

What is going on, like all deep change, is slow, almost unnoticeable. But it is not the mere adoption of computing, nor the building of an information infrastructure. It is something more profound—the building of a neural system for the economy. It parallels the Industrial Revolution, whose machines provided energy sources—a muscular system, if you like—for the economy. Of the two revolutions, the digital one will turn out to be deeper. And it is still only beginning.

W.Brian Arthur
Santa Fe Institute

Lessons for the Enterprise

- You can't stop the technology.
- Watch the consumerization movement
- The balance of power has swung to the customer.
- Expect chaos for a while.
- Set yourself up to collaborate.
- Find where you can add value and automate/outsource everything else.
- Just get started.
- Deal openly and honestly with your constituents.
- Address issues fast.
- Don't fret about loss of control, just make more money.
- Massively customize, and/or let your customers do so.
- Help customers create their own vehicle.

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LEADING
EDGE
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2008

DIGITAL DISRUPTIONS

new media

new waves

platform makeover

information transparency

smart(er) world

social power

new reality

Thank you!

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