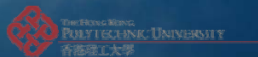


Open Innovation: Opportunities and Collaborations Facilitated By The Cloud

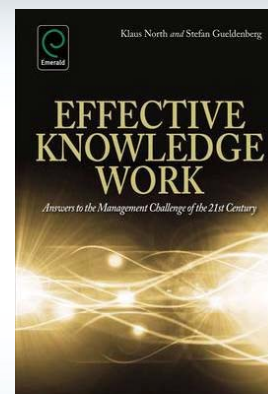
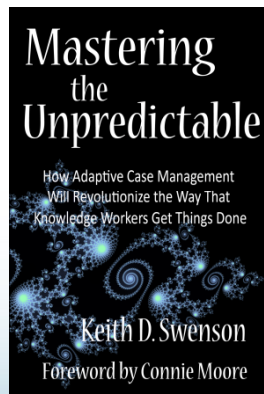
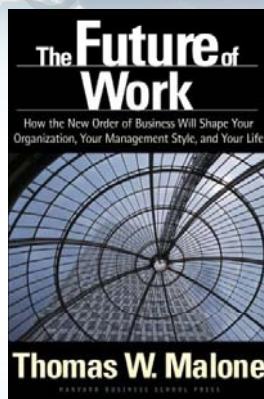
Professor Eric Tsui

Knowledge Management Research Centre

HKPolyU



Recent books on Knowledge Work



Nature of Knowledge Work

- Increasingly less routine, more analytical and need to be more collaborative
- Highly unstructured, unpredictable, disruptive yet often come with a sense of urgency
- Transitions from a product-dominant to a service-dominant logic
- Requires a different set of metrics for performance measurement
- Not only requires data and information but also knowledge and experience of the individual
- Group/Collaborative task execution, decision making and problem solving
- A huge amount of data and information to deal with
- Often more than one way to solve a problem, collaboration, reflection and a learning environment are crucial



POLYTECHNIC UNIVERSITY
香港理工大學

KMRC

知識管理研究中心
Knowledge Management Research Centre

Support for performing Knowledge Work

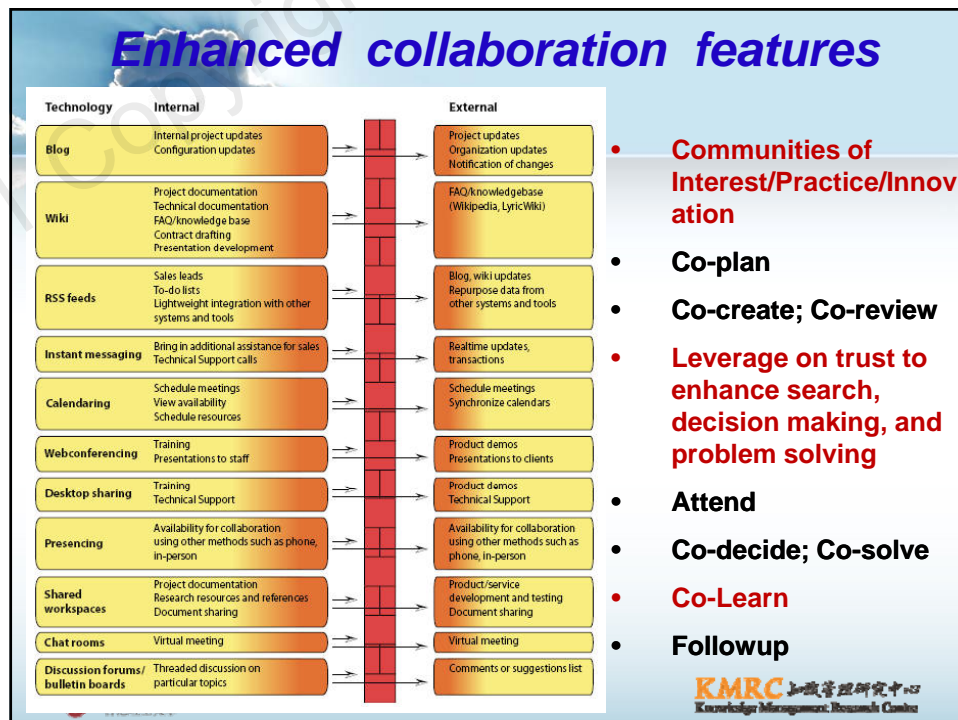
- Automate routine tasks as much as possible
- *Tools to coordinate ad hoc tasks among workers*
- Tools to identify and connect with subject matter champions; codify and share tacit knowledge
- *Tools to discover, aggregate, analyze and visualize document/information/discussion summary, trends, work tasks etc.*
- Leverage on input and preferences from trusted peers
- *Knowledge Repository for keeping core assets*
- Powerful Search mechanisms (proactive, multi-modal, multiple search modes, visualisation,...)
- *Create a Personal and Organizational Learning Environment*
- Personalization (role type, multi-generational workforce, mobile workers, content, tools, networks etc.)



POLYTECHNIC UNIVERSITY
香港理工大學

KMRC

知識管理研究中心
Knowledge Management Research Centre

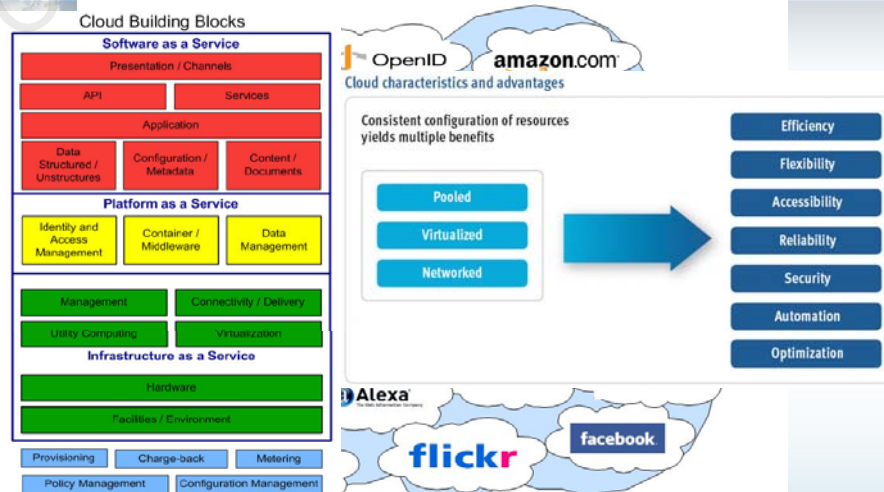


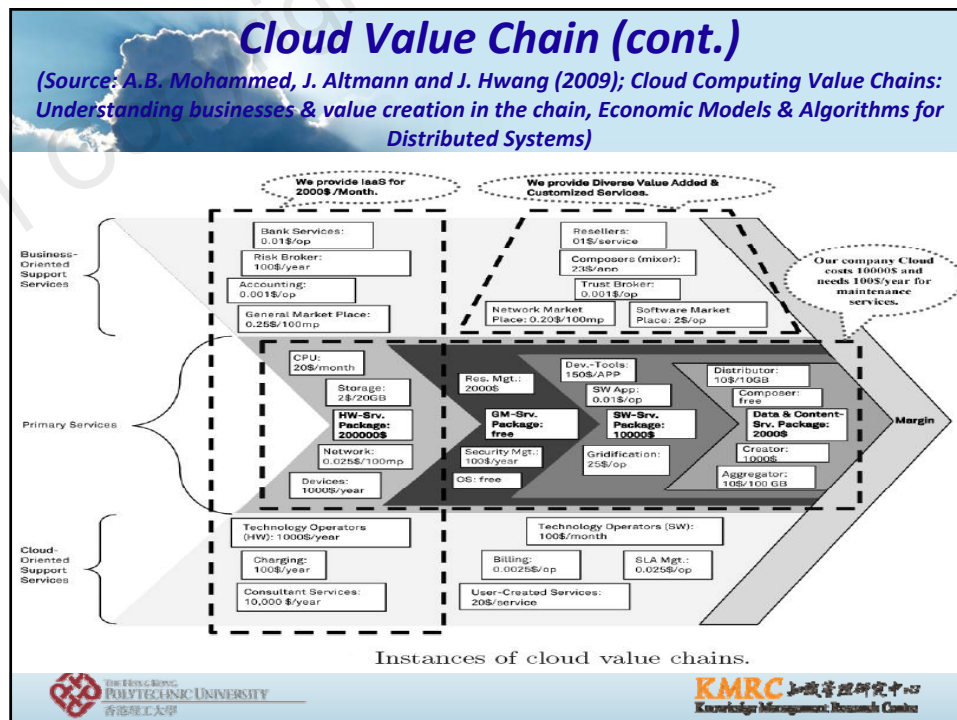
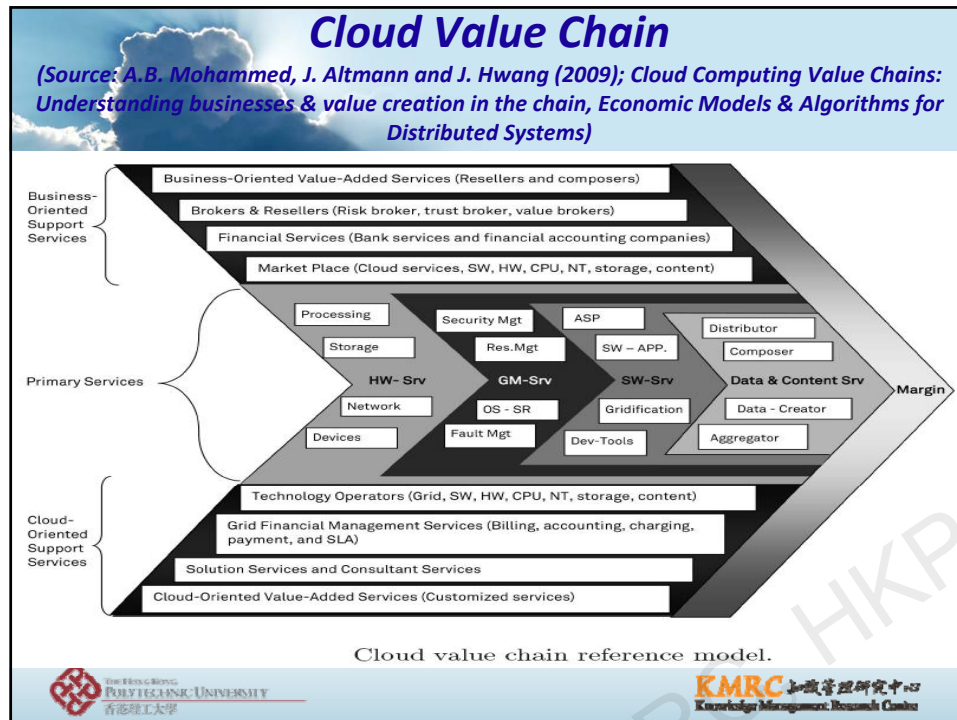
Definition of Cloud Computing

A widely adopted, formal definition comes from the National Institute of Standards and Technology:

“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

Cloud building blocks (Oracle) & benefits (EMC)







Commonly addressed operational & research issues

- Security / Privacy, Data location, compliance, identity management
- Data migration & integration
- Interfacing legacy systems
- Service Level guarantee & legal ambiguity
- Customisation of vendor-specific tools & applications
- Portability of applications across clouds (especially PaaS & SaaS)
- Performance measurement
- Discovery, de-duplication and selection of services & data
- **Data Analytics**
- Paradigmatic change to OPEX model, work style and workplace
- Cloud exit strategy



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Centre

Opportunities brought about by the cloud



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Centre

Aim beyond the primary set of benefits?

Cloud characteristics: OPEX model, Ubiquity, Scalability, Connectivity across platforms, wide range of services, cheap/perpetual storage, accessible by the masses



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



KMRC 知識管理研究中心
Knowledge Management Research Center

Immediate & Secondary benefits

- Upgrade management
- Spams and virus threats
- Value-add functions provide by a S-a-a-S &/or P-a-a-S providers
- Integrated data management
- **Enterprise Knowledge Cloud**

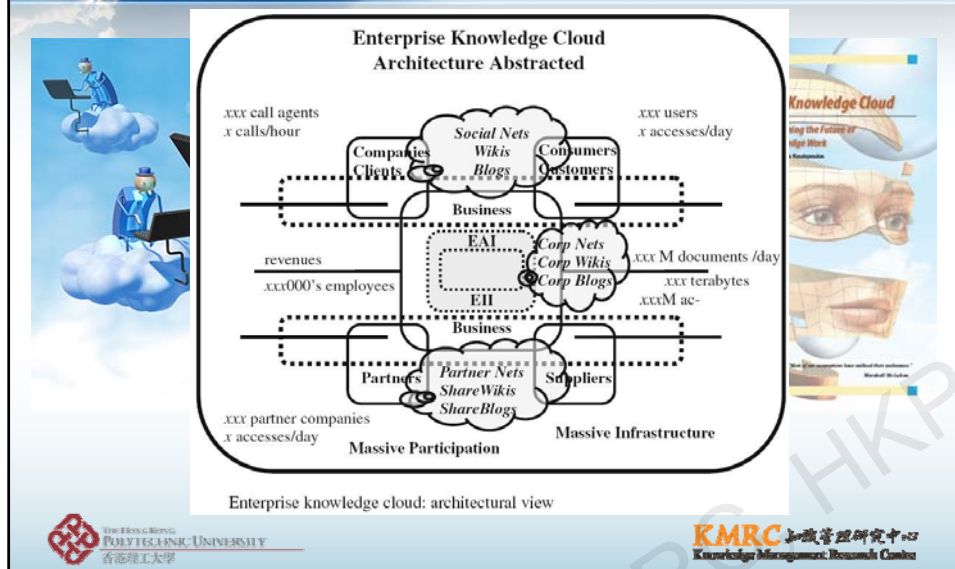


THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Center

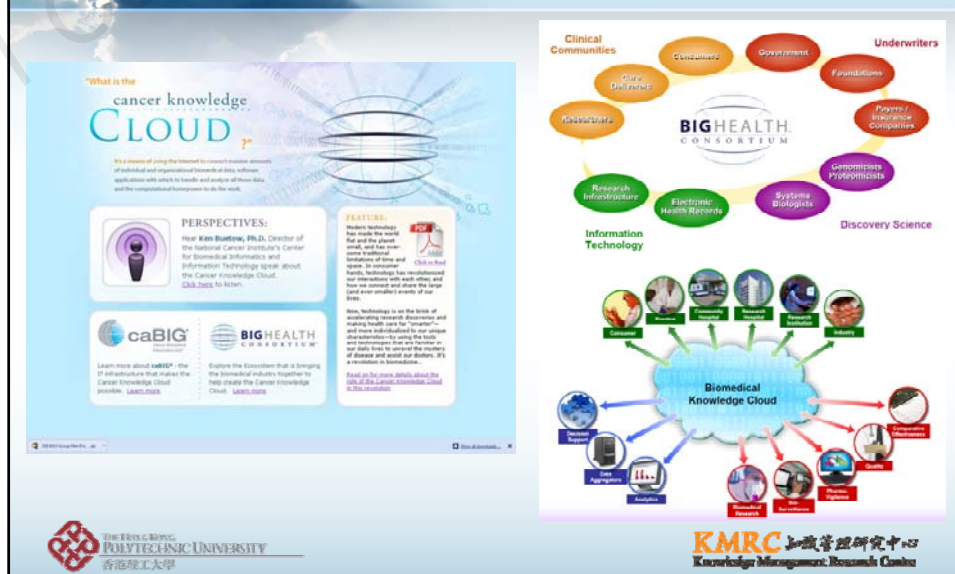
Enterprise Knowledge Cloud

(Source: Delic & Riley, 2010)

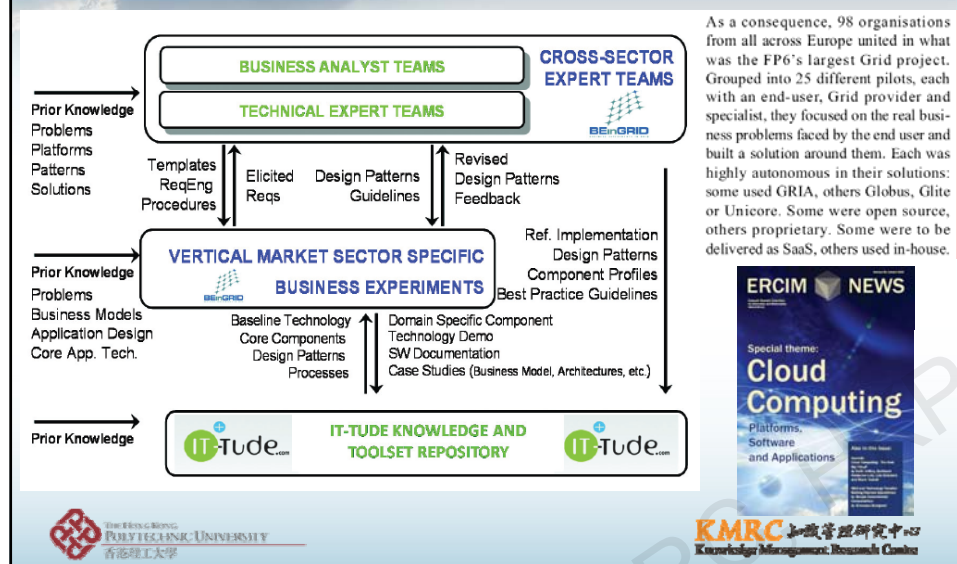


Biomedical Knowledge Cloud

(Source: Ken Buetow, National Cancer Institute, USA, 2009.)



IT-Tude project (Source: ERCIM News, October, 2010)




Opportunities brought about by the cloud

Cloud characteristics: OPEX model, Ubiquity, Scalability, Connectivity across platforms, wide range of services, cheap/perpetual storage, accessible by/to the masses



Think Outside The Box The Cloud is Disruptive



The Cloud as some backend resources

Intelligent Knowledge Cloud with massive data, problem solving skills (processors & human), plus dynamic computational power

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Center

Cloud Intelligence

(Sources: Nova Spivack, presenter at The Singularity Summit, 2010 & Tom Koulopoulos, author of The Knowledge Cloud eBook & presenter at ILA 2010)

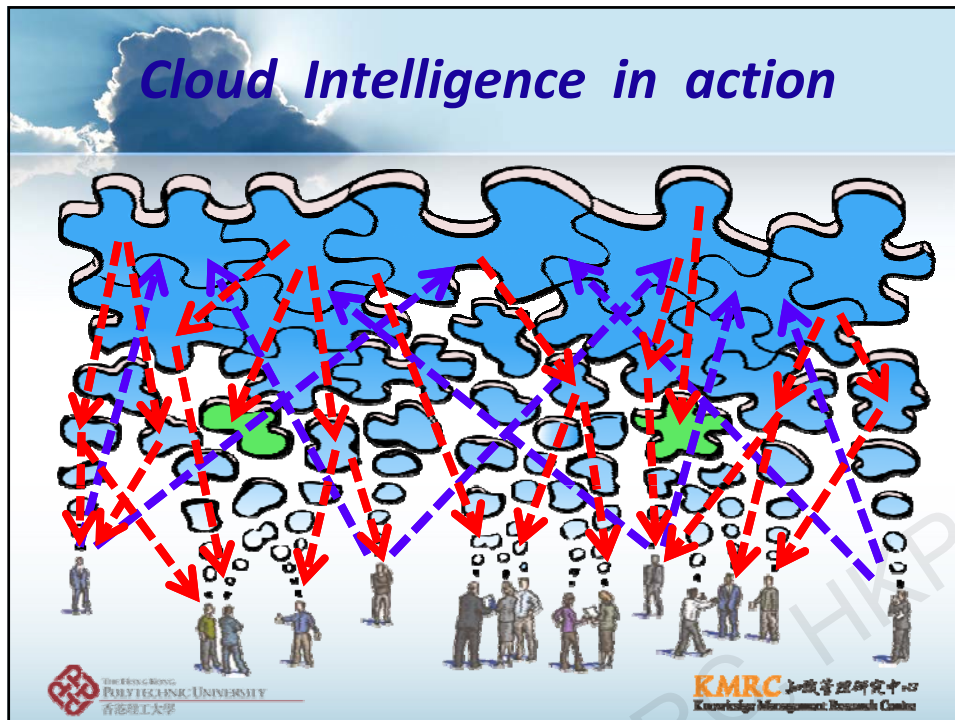
- Collective intelligence**
 - Crowds -> Groups -> Meta-selves
- Re-factoring**





THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Center



Cloud logic *defined*

The term "cloud logic" refers to logical inference systems that reside at remote servers rather than on client machines. Remote inference systems can distribute logical inference tasks over many cores at remote sites or distribute inference tasks across widely distributed machines and collect the results together to complete a client's query.

(Source: John Fisher,
<http://www.csupomona.edu/~jrfisher/cs515/cloudlogic.html>)

The slide defines "cloud logic" as logical inference systems residing on remote servers. It explains that these systems can distribute inference tasks across many cores at remote sites or across widely distributed machines to complete a client's query. The source is cited as John Fisher's website. Logos for The Hong Kong Polytechnic University and KMRC are at the bottom.

Cloud Intelligence elaborated

1. Decompose a problem into smaller ones for parallel processing (aka Grid Computing)
2. Discover new knowledge embedded in very large structured and unstructured datasets (aka Big Data)
3. (Re-)Prioritise tasks and resources for high gain areas/applications (at the *algorithmic* and *resource allocation* levels)
4. Intelligent Allocation/Diversion of resources to meet demand
5. Elicit human input based on problem complexity (aka Web 2.0 & "Human-as-a-Service"), individually, group or on a massive scale



Source: www.ibmssystemsmag.com



KMRC 知識管理研究中心 = IS
Knowledge Management Research Center

Amazon Mechanical Turk

Human Intelligence Tasks

amazon mechanical turk
Artificial Artificial Intelligence

Already have an account?
Sign in as a Worker | Requester

Your Account | **HITS** | Qualifications

Introduction | Dashboard | Status | Account Settings

Mechanical Turk is a marketplace for work.
We give businesses and developers access to an on-demand, scalable workforce.
Workers select from thousands of tasks and work whenever it's convenient.
74,997 HITS available. View them now.

Make Money by working on HITS

HITS - Human Intelligence Tasks - are individual tasks that you work on. [Find HITS now.](#)

As a Mechanical Turk Worker you:

- Can work from home
- Choose your own work hours
- Get paid for doing good work

Find an interesting task → **Work** → **Earn money**

[Find HITS Now](#)

or [learn more about being a Worker](#)

Get Results from Mechanical Turk Workers

Ask workers to complete HITS - Human Intelligence Tasks - and get results using Mechanical Turk. [Register Now](#)

As a Mechanical Turk Requester you:

- Have access to a global, on-demand, 24 x 7 workforce
- Get thousands of HITS completed in minutes
- Pay only when you're satisfied with the results

Fund your account → **Load your tasks** → **Get results**

[Get Started](#)

Amazon Mechanical Turk (cont.)

The screenshot shows the Amazon Mechanical Turk interface. At the top, there's a header with the Amazon Mechanical Turk logo and navigation links like 'Your Account', 'HITs', 'Qualifications', and '23,668 HITs available now'. Below the header, there's a search bar and a list of HITs. The list includes tasks such as 'Find a product page URL', 'Verify Restaurant Websites', 'Is this a real post? Please decide if the image is a website', 'Find offensive content images (CAUTION: This HIT may contain offensive content. Worker discretion is advised.)', 'Locate Bots', 'Find Restaurant Web Addresses', 'Verify the Correct Category for 8 Electronic Products', and 'Answer Questions in your Own Words'. Each HIT entry shows the requester, HIT expiration date, time allotted, reward, and the number of HITs available.

Requester	HIT Expiration Date	Time Allotted	Reward	HITs Available
Requester: user112	Oct 6, 2010 (1 day 8 hours)	5 minutes	\$0.25	7017
Requester: Cultura Labs	Oct 13, 2010 (6 days 23 hours)	60 minutes	\$0.07	4361
Requester: Cultura Labs	Oct 11, 2010 (4 days 23 hours)	5 minutes	\$0.02	4420
Requester: Cultura Labs	Oct 13, 2010 (6 days 20 hours)	7 minutes	\$0.02	3489
Requester: Cultura Labs	Oct 11, 2010 (4 days 19 hours)	10 minutes	\$0.05	1342
Requester: Cultura Labs	Oct 13, 2010 (6 days 23 hours)	60 minutes	\$0.07	1879
Requester: Cultura Labs	Oct 13, 2010 (6 days 13 hours)	60 minutes	\$0.05	1242
Requester: Cultura Labs	Oct 13, 2010 (6 days 15 hours)	60 minutes	\$0.25	1210

At the bottom of the page, there are logos for The Hong Kong Polytechnic University and KMRC (Knowledge Management Research Center).

Crowdsourcing in the cloud: Elance, oDesk, uTest & Livework

The screenshot displays four crowdsourcing websites: Elance, oDesk, uTest, and Livework.
Elance: Features a 'Hire Online Workers. Get the Job Done.' banner with statistics like '33,065 programmers', '\$18,943 designers', and '\$336,602,366 developers'.
oDesk: Promotes 'Remote staffing for long-term work' with a 'Pay-oDesk' button and a 'Watch the oDesk Video' link.
uTest: Offers 'On-demand testing' with a 'uTest Express' section.
Livework: Focuses on 'Outsource Business Tasks To Teams of On-Demand Workers' with options to 'Answer thousands of emails', 'Call thousands of sales prospects', and 'Process millions of forms'.
 At the bottom, there are logos for The Hong Kong Polytechnic University and KMRC (Knowledge Management Research Center).

Knowledge Centres in the Cloud: Kaggle & Quora

The 20 Most Innovative Startups In Tech

Kaggle is a network of 17,000 PhD-level people that help each other solve impossible problems

Company: Kaggle
 Founders: Anthony Goldbloom
 Location: San Francisco, CA
 Funding: \$11 million Series A from Index Ventures, Khosla Ventures, SV Angel, and others

Why it's innovative: NASA, Deloitte, and The University of Michigan have all turned to Kaggle's pool of 17,000 PhD-level scientists to solve complex problems and create winning models.

It uses the collective knowledge of some of the world's smartest people to make vast improvements in the world, from AIDs research to mapping dark matter in outer space.



The 20 Most Innovative Startups In Tech

Quora is a Q&A site that's answered by experts, not idiots

Company: Quora
 Founder: Adam D'Angelo, Charlie Cheever
 Location: Palo Alto, CA
 Funding: ~ \$11 million at \$86 million valuation

Why it's innovative: Quora re-imagined Internet search and answers. It created a platform where credible industry experts are happy to respond to the average Joe and share what they've learned.

It's the only place on the web where users can get advice from people they admire and respect.



Quora co-founders Adam D'Angelo (L) and Charlie Cheever (R).



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



知識管理研究中心
Knowledge Management Research Center

More examples of Knowledge-as-a-Service (KaaS) (Source: Jerry Bishop, 2011)

- www.mob4hire.com
- www.interneteyes.co.uk
- www.clickworker.com
- www.cloudflower.com
- www.microtask.com
- Projects.csail.mit.edu
- www.logodesignguru.com
- www.logomyway.com
- Funsat.eecs.umich.edu
- www.gwap.com
- www.innovationexchange.com
- www.innocentive.com
- www.cloudcrowd.com
- www.1sky.org
- www.sparked.com
- www.samasource.org
- www.crowdvoice.org
- www.kiva.org
- Answers.yahoo.com
- www.quora.com



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



知識管理研究中心
Knowledge Management Research Center

Cloud Marketplace: SpotCloud



Cloud computing
A market for computing power

The Economist

The awakening



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大学



SpotCloud Technology

Buyers → **SpotCloud Market** (Price, Location, Quality) ← Sellers

Customers select from global pool of providers & upload custom VM based applications to SpotCloud

Approved VMs are automatically distributed to providers

Providers Define VM Price, Location, Capacity Quota and Hardware Templates

Built on Google App Engine and the Enomaly ECP platform (as well as other cloud infrastructure platforms in the near future), SpotCloud is an easy to use, structured cloud capacity marketplace where service providers can sell their excess computing capacity to a wide array of buyers and resellers.


SpotCloud Workflow

1. Buyers deposit an initial credit into the SpotCloud platform. (Pay as you go model)
2. Buyers create a VM appliance using the Enomaly SpotCloud package builder
3. Then upload a "VM" appliance using the SpotCloud management interface
4. Sellers can dynamically define hardware profiles, location information, duration of available capacity and associated resource costs.
5. Buyers select providers based on a cost and location.
6. VMs are automatically delivered to sellers "cloud" infrastructures where the VM packages are run according buyers requirements.
7. SpotCloud monitors and debits buyers on an hourly utility basis with a notification sent when credits drop below minimum threshold.
8. At the end of the month, sellers are paid directly for any capacity utilized via the SpotCloud marketplace.


KMRC 知識管理研究中心
Knowledge Management Research Center

Opportunities & impact of CC on

1. Business Process Management
2. Taxonomy building & maintenance
3. E-Discovery on Big Data
4. IT Service Management (ITSM)
5. Personal & Group Learning

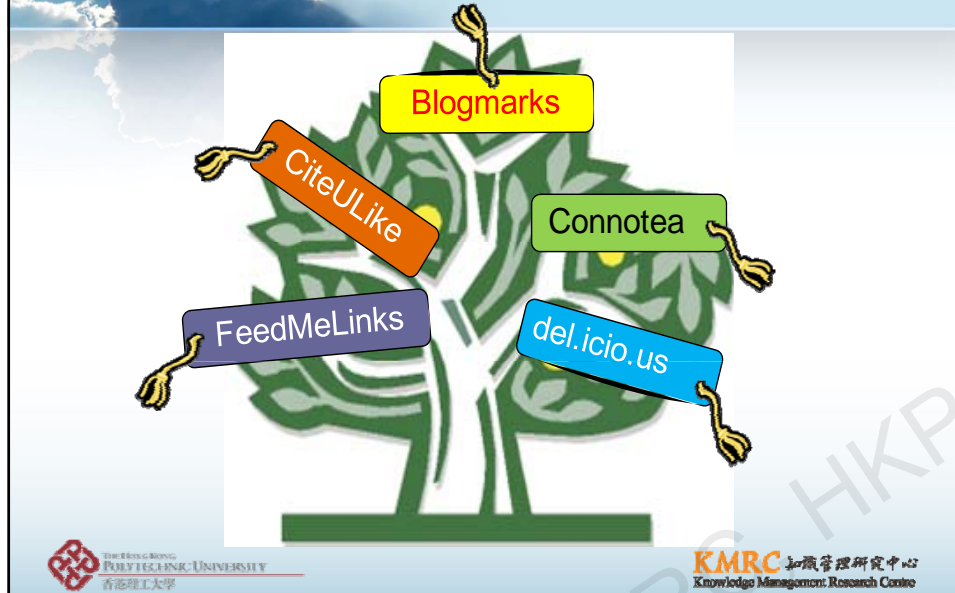


THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大学



KMRC 知識管理研究中心
Knowledge Management Research Center

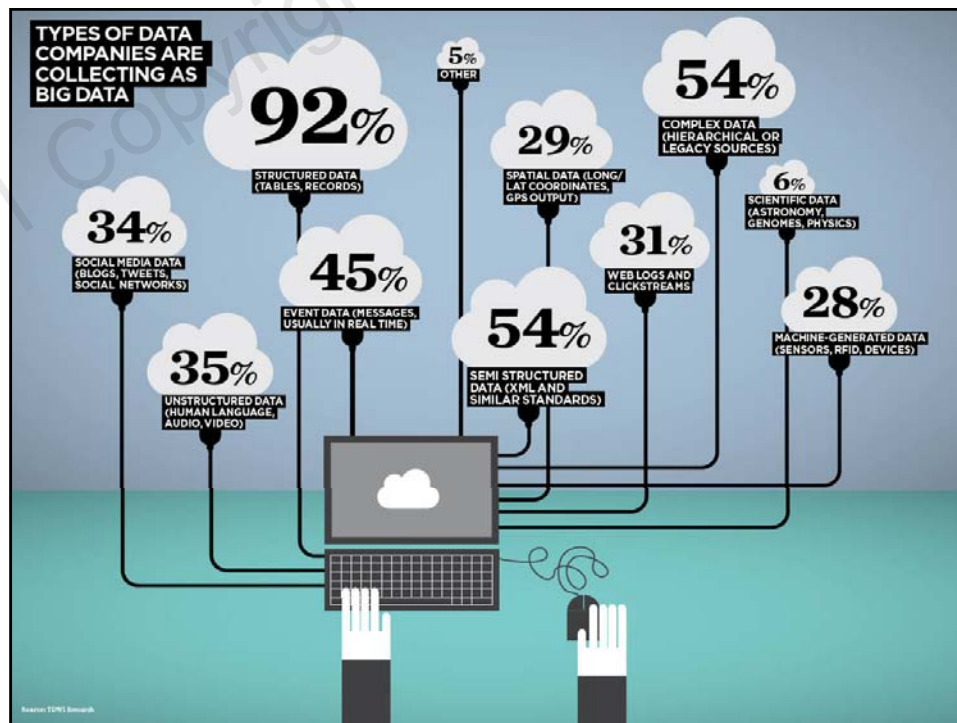
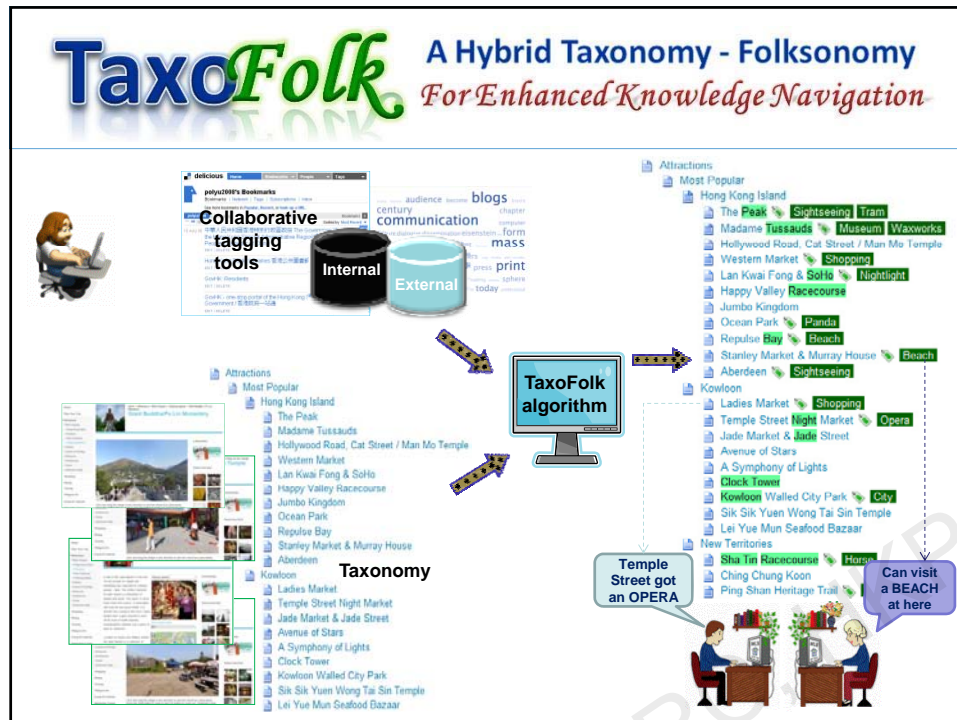
Use of Social Bookmarking and Mashups to enhance knowledge navigation



Taxonomy + Folksonomy

Taxonomy	Folksonomy	Taxonomy Hybrid Models
Central Control	Democratic Creation	Central control with continuous user input
Top-down	Bottom-up	Meet in the middle
Meaning to the author	Meaning to the reader	Cater for the growing community
Tedious process for making changes	Just do it	Suggestions, additions, deletions with governance models
Accurate	Good enough	Community validated and tested
Navigation	Discovery	From navigation to discovery by leveraging mass input
Restrictive	Expansive	Flexible and evolving
Defined Vocabulary	Personal Vocabulary	Community Vocabulary

Dow Jones Factiva & Michael Sampson

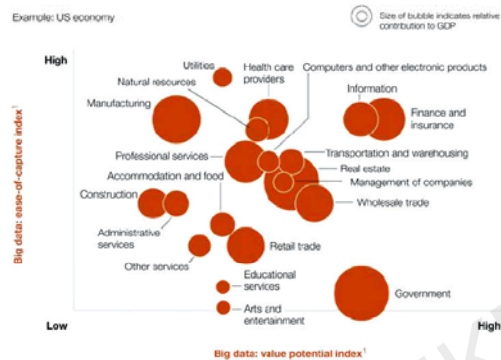


The era of Big Data



The ease of capturing big data's value, and the magnitude of its potential, vary across sectors.

Example: US economy



¹ For detailed explication of metrics, see appendix in McKinsey Global Institute full report *Big data: The next frontier for innovation, competition, and productivity*, available free of charge online at mckinsey.com/ghi.
Source: US Bureau of Labor Statistics; McKinsey Global Institute analysis

The Hong Kong
POLYTECHNIC UNIVERSITY
香港理工大學

KMRC 知識管理研究中心
Knowledge Management Research Center

Singapore's Smart Traffic Cloud (Source: FutureGov, Dec 2010)

SMART TRAFFIC CLOUD ROAD TESTED

Singapore is trialing a traffic management system that could improve the monitoring of the citystate's roads by using geo-location data captured from drivers' smart phones.

GPS sensors in drivers' smart phones can determine the location, direction of travel and speed of vehicles, and the data, captured in real-time, is hosted on a cloud platform that the Land Transport

Authority can use to monitor – and predict – traffic conditions.

"It would be very costly to deploy sensors all over the city. We only have sensors on highways and major roads, so why not make use of GPS sensors in drivers' mobile handsets?" said Dr Lim Hock Beng, Programme Director, Intelligent Systems Centre, Nanyang Technological University, who leads the research team behind the initiative.

The smart traffic cloud platform, a joint effort by LTA, NTU, the Infocomm Development Authority and SingTel, will be available for government and private sector service providers to use the data to develop location-based services.

Singapore has been working in collaboration with the University of Berkley, which is testing the same concept in the San Francisco Bay area.

ASIA PACIFIC
futureGOV
The Hong Kong
POLYTECHNIC UNIVERSITY
香港理工大學



KMRC 知識管理研究中心
Knowledge Management Research Center

S-a-a-S: IDEAS Revenue Management System



IDEAS Revenue Management Solutions utilizes a Software-as-a-Service (SaaS) business model. It provides rapid, cost-effective implementation, a protective layer of support for an uninterrupted flow of information and decisions, and on-demand experts focused on optimizing revenues in unexpected circumstances.



The Intelligent Hotel




THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學




KMRC 知識管理研究中心
Knowledge Management Research Centre


The Crowd To Cloud Journey




Co-Evolution (MetaWeb)




Co-Creation (e.g Cloud Apps)




Collaboration (e.g. Web 2.0)



Cooperation (e.g Crowdsourcing)



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



KMRC 知識管理研究中心
Knowledge Management Research Centre

President Hu on China's service innovation

Hu Jintao, President of China, stated at the country's top academic conference in June, 2010, "*The rapid development of Internet, cloud computing, Internet of things, knowledge services and intelligent services offers a powerful tool and a favorable environment for service innovations.*"



Source: CCID Consulting, 23 Dec 2010