

Information and Communications Technology Committee Annual Report

September 2012

Issues in 2011-12

- Current and Future CUIT Initiatives
 - Moving to the New Courseworks
 - Moving to New Email Provider
- Cloud Computing
- Data Reproducibility Issues
- Distance Learning Initiatives (with Education and Library Committees)
- Digital Humanities and Social Sciences Initiative

- Data Governance Update
 - New ARC Reporting System
- Columbia Student IT Initiatives
 - Open Evaluations
 - Columbia App
 - Research Match Website

Move to New Courseworks (CUIT)

- Transition: Fall '11 – Spring '13
 - Past courses' information will still be available
- New functionality, e.g.
 - Gradebook integrated with SSOL
 - Integration with library reserves
 - Better customizability
 - Better support for collaboration/
communication

- Training workshops, downloadable guide, videos, FAQs
- Slides attached

New Email Provider

- Google and Microsoft considered: Google wins
 - Many Google apps considered: email and calendar essential
 - Block advertising apps
- Issues: privacy, liability, accessibility, HIPAA compliance
- Multiphase migration begins Spring 2013
- Slides attached

Cloud Computing (Roxana Geambasu, CS)

- *Computing paradigm in which data and/or computation is outsourced to a third-party massive-scale, multi-user provider on a pay-per-use basis.*
- Examples: Amazon AWS, Google AppEngine, Microsoft Azure,...
- Issues:
 - How easy to use?
 - How many applications supported?

- Cost for storage
 - Cost for data access
- Should Columbia move to the Cloud?
- Should individual researchers move to the Cloud?
- Slides attached

Data Reproducibility Issues (Victoria Stodden, Statistics)

- **Serious problem:**
 - Researchers describe results but rarely provide data and code that produced them
 - How can fraud be detected?
- Funding agencies and journals concerned
 - NIH and National Cancer Institute recommending open code
 - NSF requires Data Management Plan
 - *Science* requires code submission
-

- What should Columbia do?
 - Provide more support for researchers
 - University of Michigan provides technology guidance, access to computational infrastructure, and support
 - CU's Research Computing Executive Committee and a Shared Research Computing Policy Advisory Committee (SRCPA), chaired by David Madigan (Statistics) to address
- .

Digital Humanities and Social Sciences Initiative

- New collaboration between: History, English, Comparative Literature, Economics, Computer Science, Statistics, ISERP, SIPA, Mailman, QMSS
- Current activities:
 - University Seminar on Big Data and Digital Scholarship, 2012
 - Heyman Seminar, 2012
 - Possible master's program

Data Governance Update: ARC

- Single point of entry for all financial reporting and aid
 - Replaces AP/CAR and DARTS
 - Links directly to PeopleSoft
- New reporting capabilities: more flexibility in customizing reports
- Training challenges

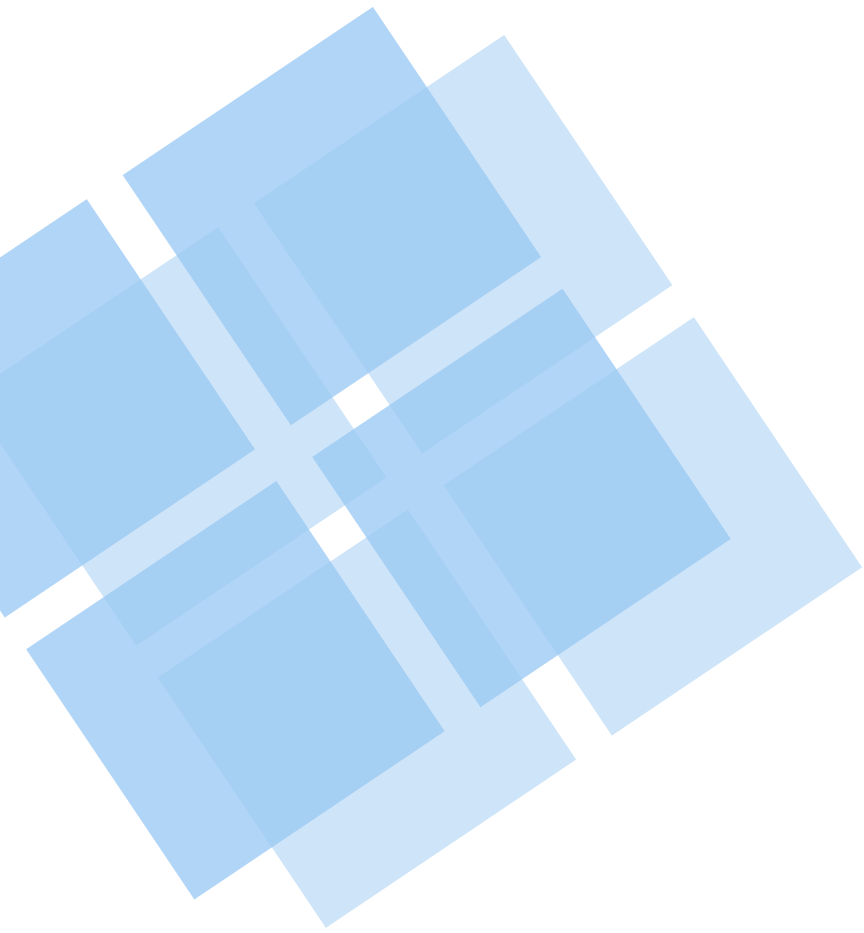
Columbia App (Wei Yao)

- Links to
 - Campus events
 - Calendar
 - CLIO mobile app (permits library search, book renewal)
 - Alerts for free food on campus
 - Campus phone numbers
- Users can submit news items (moderated)
- Columbia history information

- Available from Apple Store

Research Match Website (Rebecca Sealton)

- Matches professors with research project with students who want to work on them
- Launched March 2012
- www.ResearchMatch.ch
- Slides attached



New CourseWorks Project

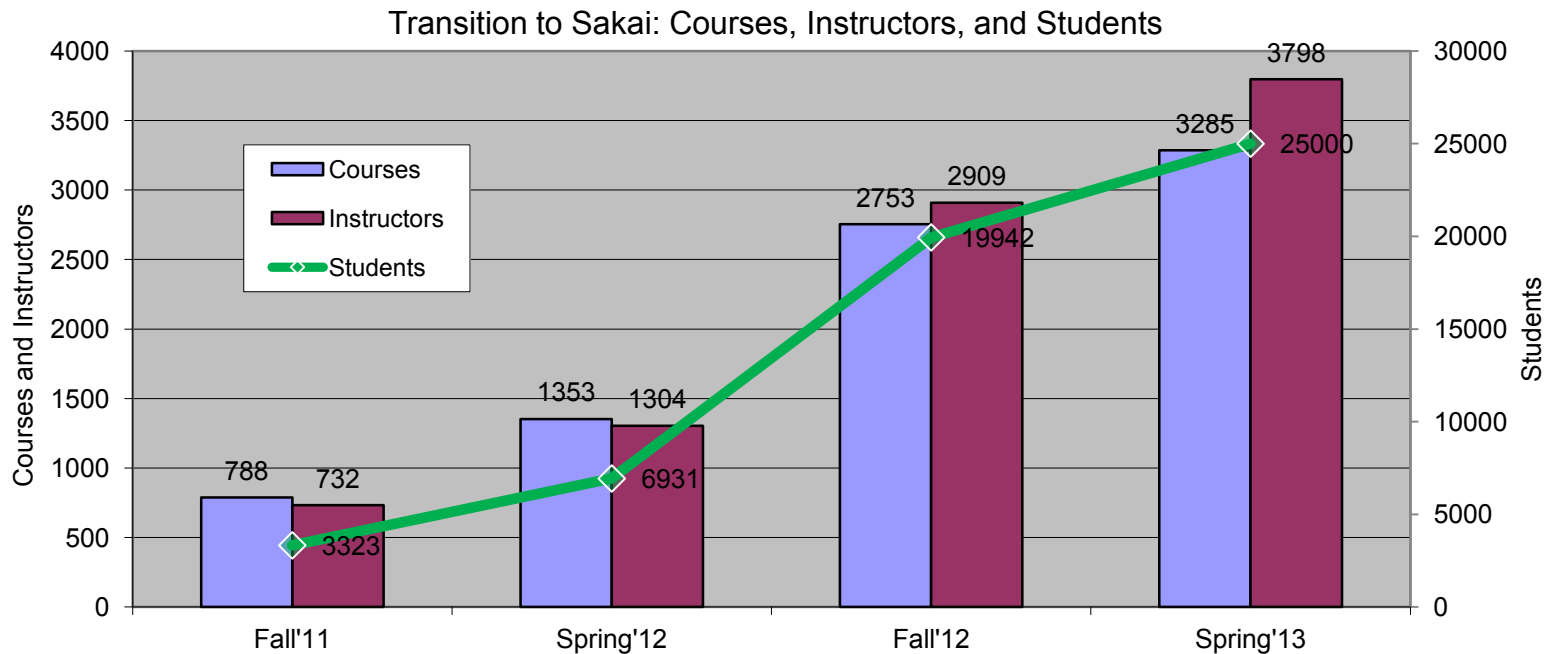
October 2011



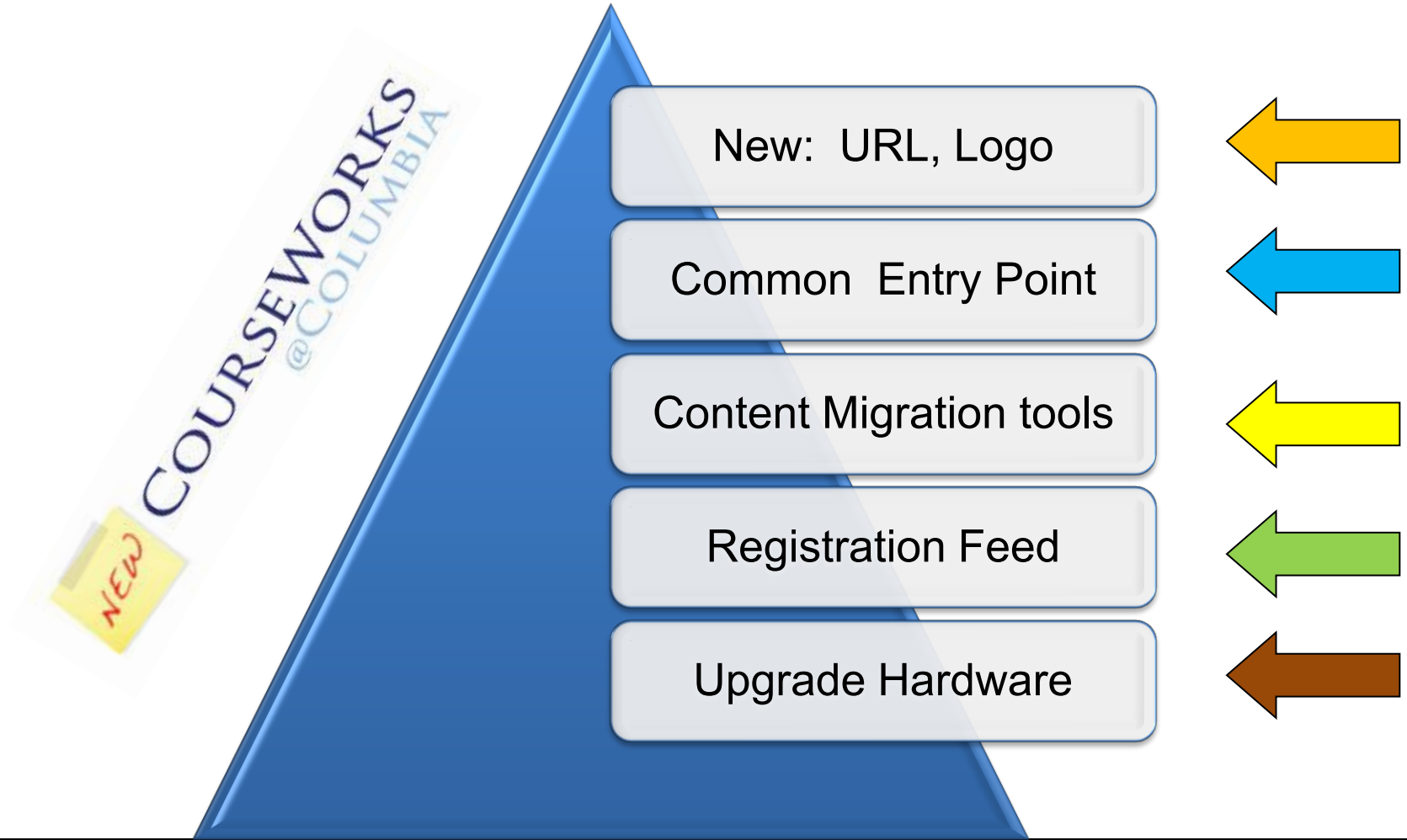
COLUMBIA UNIVERSITY
INFORMATION TECHNOLOGY

CourseWorks Transition Plan

- 4 term transition starting with Fall'11 academic term
- Transition 3,500 Courses, 3,100 Instructors, and over 25,000 Students
- Each transition term: 800 courses, ~ 800 instructors, ~ 3500 students



System Preparation for Transition



Common Entry Point



Search courses:

By number, title, name

- Current Courses
- Next Semester
- Past Courses
- Search Courses
- User Information
- My Libr. Reserves
- My Evaluations
- Course Controls
- Admin Access
- Manage Shares
- Migrate Content
- Archive Courses
- Submit Grades
- Faculty Support
- Faculty Survey

CURRENT SEMESTER COURSES

Fall 2011 Course Sites			
Course Number	Course Title	Students	Guest Accessible
INTC D5001.081.2011.3	SCI INQ & DECISION MAKING	79	Not Applicable
BIOL W2501.006.2011.3	CONTEMPORARY BIOLOGY LAB	26	Restricted
Reflects Registrar changes through Oct-01-2011 01:12:00AM			
Collaboration Sites (not course-related)			
Site Number	Site Title	Members	Guest Accessible
ADMN 1032.001.2007.3	ACADEMIC SUCCESS PROGRAM	91	Restricted
ADMN 1012.001.2007.2	Teaching Academic - for faculty mentoring	3	Restricted
SNDB A100.002.2003.1	CourseWorks DevTeam Communications Repository	18	Restricted



Transition to NCW has begun starting Term Fall'11

[Faculty Resources](#)

[Student Resources](#)

Course Announcements
(Current semester)

Show past semester announcements

Content Migration: From CW to New CW

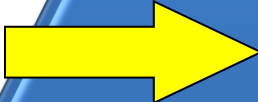


Sections	Uncheck All
Introduction	<input checked="" type="checkbox"/> Yes <input type="radio"/> Intro to Site Info <input type="radio"/> Intro to Syllabus
Syllabus	<input checked="" type="checkbox"/> Yes <input type="radio"/> Syllabus to Syllabus <input type="radio"/> Syllabus to Calendar
Lectures	<input checked="" type="checkbox"/> Yes (only files attached to this section will be migrated)
Assignments	<input checked="" type="checkbox"/> Yes (only files attached to this section will be migrated)
Test & Quiz	<input checked="" type="checkbox"/> Yes
Shared Files	<input checked="" type="checkbox"/> Yes
Discussions	<input checked="" type="checkbox"/> Yes (only files attached to this section will be migrated)

Copy Sections

Transition: Progress Report

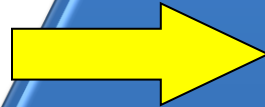
**Transitioned
Schools &
Departments**



- School of Public Health
- School of Dental Medicine
- School of Nursing
- School of Medicine
- School of Social Work
- A&S: Dept. of Anthropology
- A&S: Dept. of Statistics
- A&S: Univ. Writing Program

Transition: Progress Report

Activity Report Card



1200+ Active Courses

292 Early Adopters

200+ Content Migration

638 Courses with Syllabus

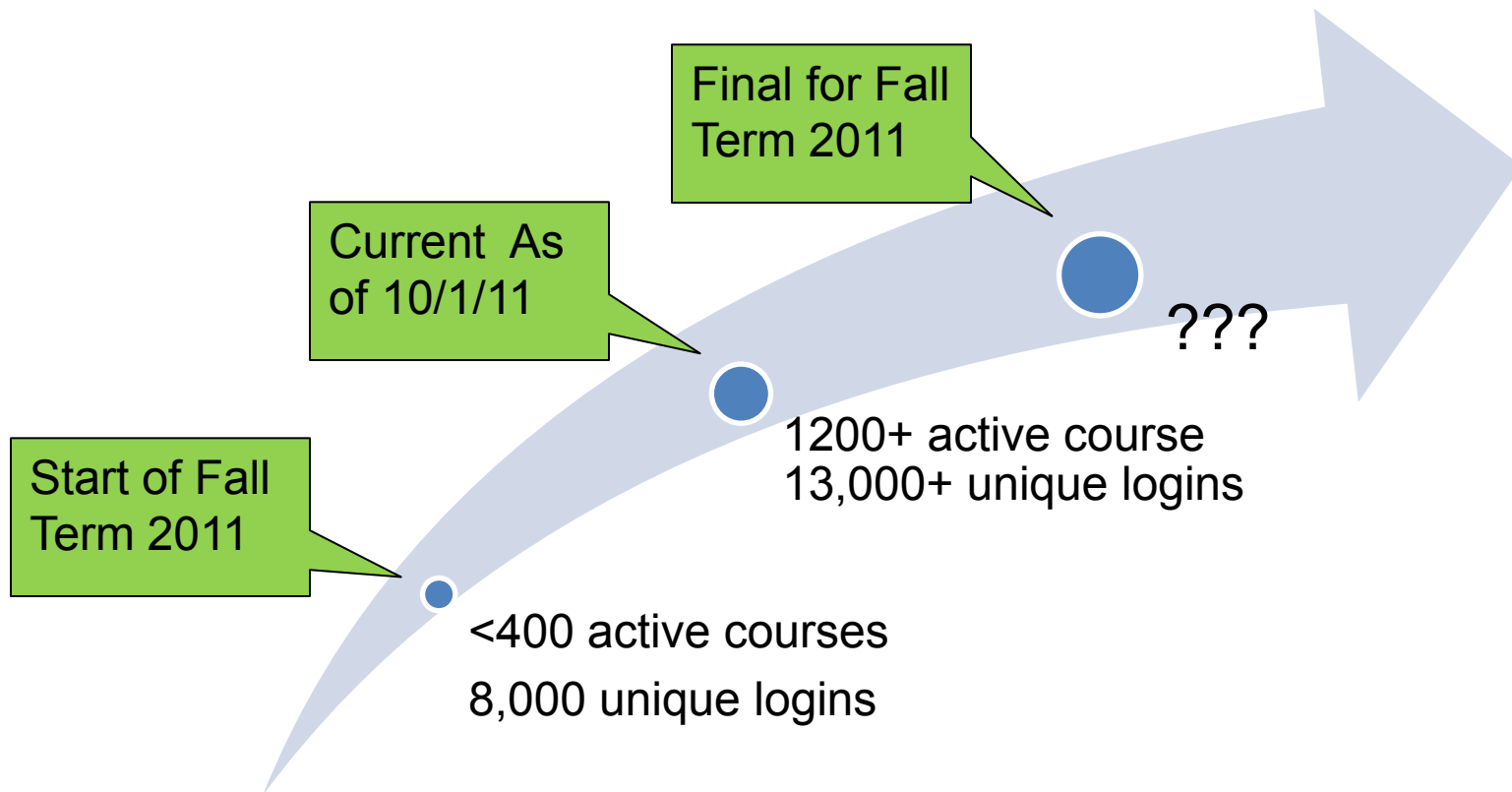
7,000 Sent emails

38,500+ Files Uploaded

Over 13,000 Unique Log-ins

Transition Progress Report

Fall Term 2011 Original Goal = 800 Courses



Who's Next? Transition Spring 2012

Additional
800 Courses

~ 800
Instructors

~ 3,500
Students

Schools

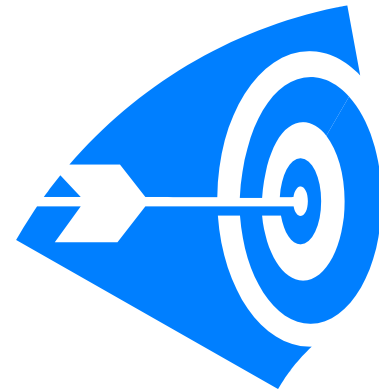
- SIPA
- Architecture
- Journalism
- SEAS

Depts.

- Arts and Sciences:
All smaller
departments

Early
Adopters

- Barnard
- Other: A&S Depts.



What's Coming for Spring Term 2012?

Major Upgrade Dec'11

- Version upgrade
- User Interface improvements
- Additional hardware

System Integrations

- Library reserves
- Research guides
- Grade book – SSOL (May'12)

Administrative Access

- Hierarchy based access
- Edit or View content

**NEW
Features**

What's Coming for Spring Term 2012?

'My' Courses Page

- Consolidate information
- Course, Announcement, Calendar...

Registration – content opening tools

- Content – Syllabus, readings...
- Open to all with UNI or Public

Face book User profile

- View student pictures, search, groups
- Students to upload profile

Guest Access

- Under investigation

**NEW
Features**

Best Practices in New CourseWorks

Best Practice

- Course Content: Starting fresh; migration
- Review new tools: Collaboration, Communication
- Knowledge base at CCNMTL

Recommendations

- Post Syllabus in syllabus section
- Calendar: tests, assignment, meeting times
- Post announcements: course site & email

Standardization / Customization

- School based tool availability and order
- School policies, information and links
- Too much customization ??

Faculty Training Results

Medical Center

21 Workshops
181 Trained
40 Individual Consults
220 Total Instructors & TA's

Morningside

12 Workshops
35 Trained

Social Work

10 Workshops
104 Trained
9 Individual Consults
113 Total Instructors & TA's

Student Training & Tools

Freshman Orientation

- Social Work: 350 students
- Public Health

Weekly Training

- Weekly training sessions
- Medical Center & Morningside campuses
- Students sign up/walk-ins

Tools

- > 35 Video Clips Library
- Quick Start Guides
- Frequently Asked Questions (FAQ's)
- Downloadable Full Training guide



New CourseWorks Communication Plan

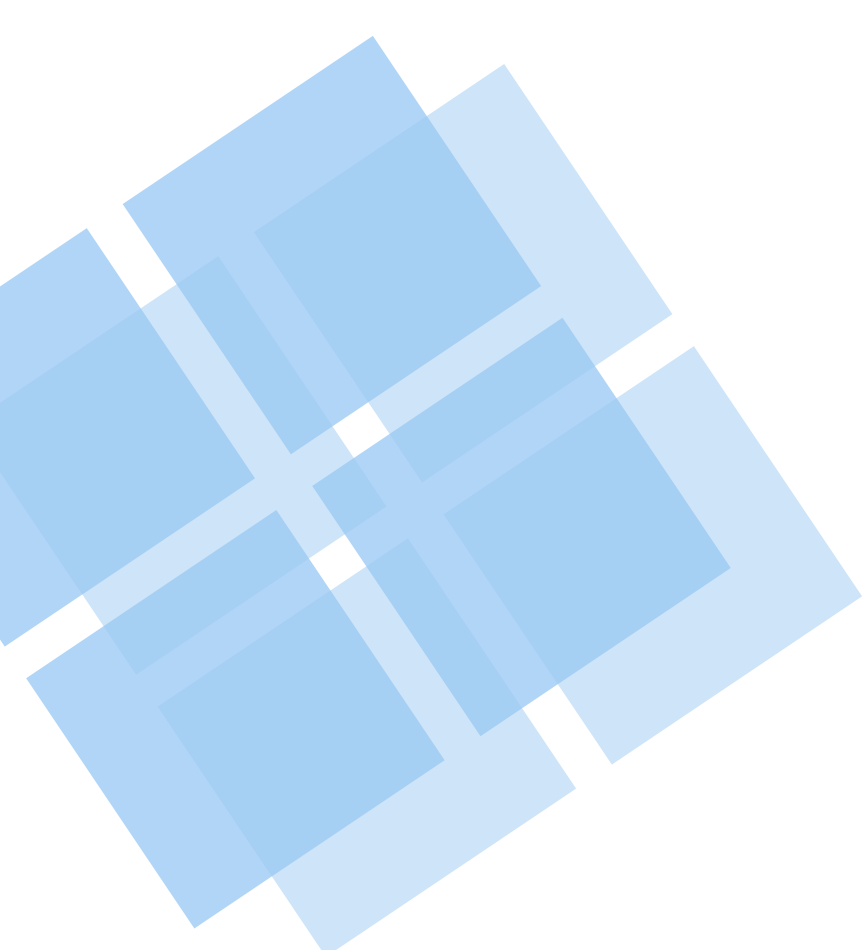
Audience

- Transitioning Schools/Departments
 - Faculty and Staff
 - Students
- Columbia Community
- Advisory Council
- CUIT, CCNMTL, Library Partners



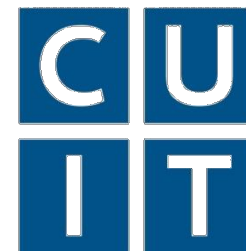
Tools:

- Email campaign for transitioning schools
- Links to Existing CourseWorks and CUIT website
- Student orientation & focus group outreach
- Rolling information screens in Kent Hall
- New CourseWorks news blog just going live



Cloud Email Options

October 2011



COLUMBIA UNIVERSITY
INFORMATION TECHNOLOGY

Common Solutions Group: Email RFP

- Consortium of 30 top research universities
- Banded together to increase negotiating power
- Addressed common University concerns about privacy, data storage, etc.



Current Email/Calendar Services at Columbia

CubMail aka Cyrus

- 80,000 users; “free” basic email

CUIT Outlook aka Exchange

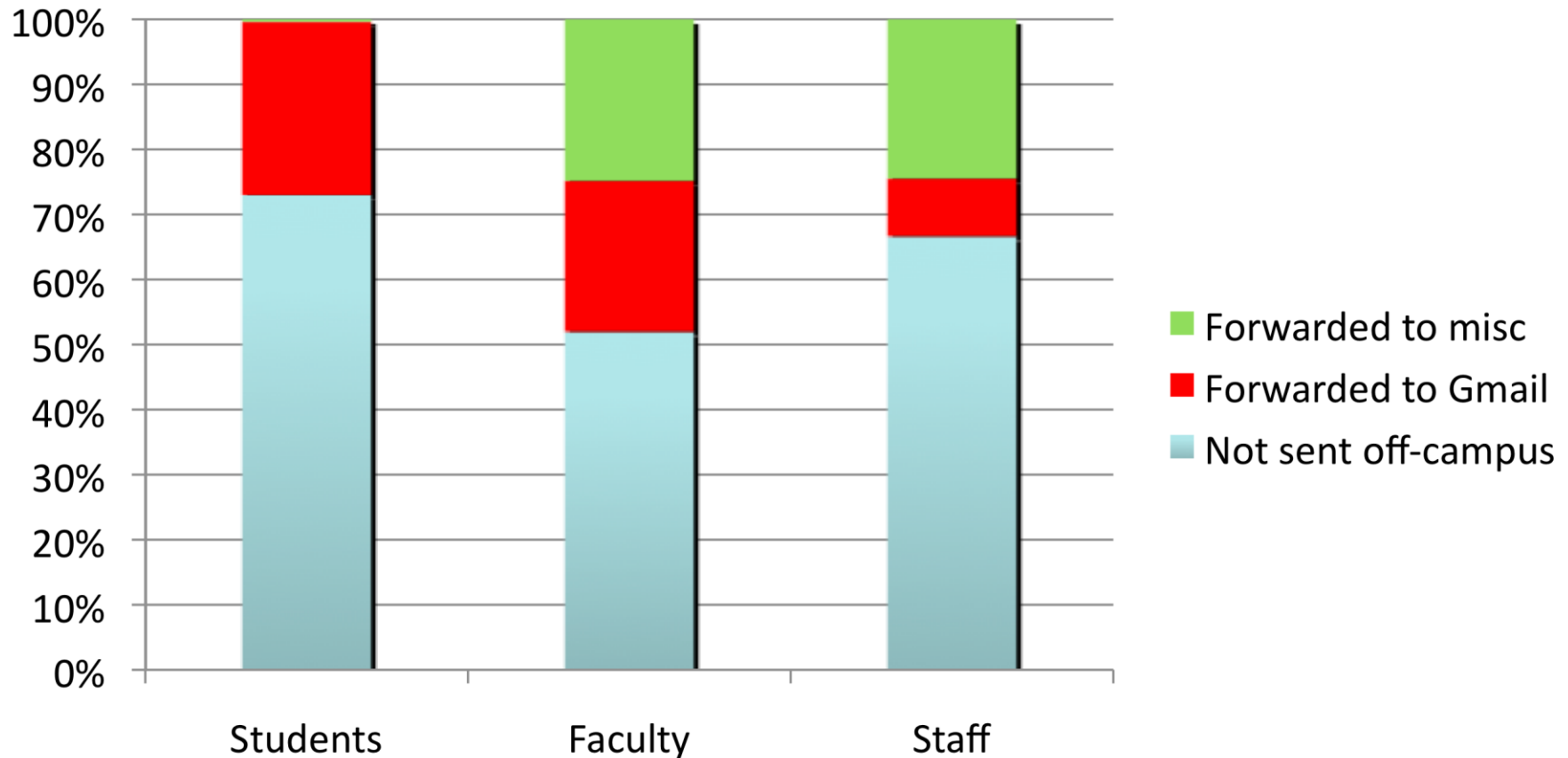
- 3,000 users; fee-based email and calendaring

15 (or more) other email & calendar systems

- Departmental email e.g. CUMC, General Counsel
- A few departments already using Google



30% of Columbia email users auto-forward all email to email systems outside Columbia



Stats as of May 2011. Does not reflect individuals using Gmail or other systems who do not explicitly forward their @columbia.edu mail to those systems.

Comparison of Google and Microsoft



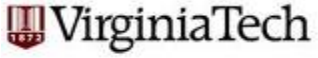
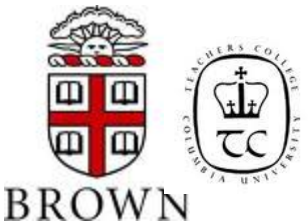
- Designed and built for **cloud-based** computing; available 7 years
- Extensive functionality and **modern** user interface
- **Preferred solution** by most students
- Enables **collaboration** via Google Docs
- **Robust calendar** including delegation and “office hours”
- Chat and voice/video **built into** the side bar of the email application



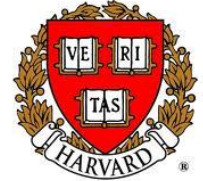
- New replacement to product based on **legacy software**; released to market in Summer 2011
- **Basic** functionality of Outlook web access
- **Not likely to sway** students from Google
- Document editing limited to **one user** at a time
- MS Outlook **desktop required** for calendar delegation
- **Limited** “extras”

Sampling of Academic Institutions Who Have Outsourced Some Email

Google



Cornell University



Microsoft

Live@edu or moving to Office365



Dartmouth College



Duke University

Features in Scope for Google Implementation

Must-have Apps

Email, Calendar

Other Apps we hope to support

Docs, Groups, Sites, Talk, Mobile

Consumer Apps

Blogger, Maps, Picasa, Reader, Voice, YouTube

Blocking of Advertising Applications

Data Mining, Subpoenas, Privacy

Contract includes protections regarding...

- Privacy, data mining
- Subpoena notification
- Data transfer and storage
- Liability



Accessibility

- Collaboration = Everyone
- National Federation of the Blind
- Google efforts
- Legal requirement vs Aspirational goals
- Desktop clients for email and calendar



HIPAA Compliance – Later

- Health Insurance Portability and Accountability Act
- PHI: Private Health Information
- BAA: Business Associates Agreement



Potential Implementation Approach

Evolve toward Google as universal email/calendaring/collaboration solution for Columbia through multi-year phased migration

Start with Undergraduates

- Phase 1: 1,000 undergraduates – aggressively begin spring 2012
- Phase 2: Remaining 6,900 undergraduates – aggressively fall 2012

Potential: All Morningside Students – beginning spring 2013

Faculty and Staff – Under evaluation

HIPAA-Covered Schools, Individuals – TBD

All subject to contract negotiations and implementation planning



Cloud Computing: Benefits and Challenges

Roxana Geambasu
Assistant Professor in the CS Department

What Is Cloud Computing?



- *“It’s stupidity. It’s worse than stupidity: it’s a **marketing hype** campaign.”*

Richard Stallman, Free Software Foundation founder

- *“I have not heard two people say the same thing about it [cloud]. There are **multiple definitions** out there of ‘the cloud’”*

Andy Isherwood, HP’s Vice President of European Software Sales



Outline

- Historical view of cloud computing
- Current offerings
- Cloud benefits
- Cloud challenges
- Summary

- One caveat: this talk is about cloud computing in general, not about Columbia-specific issues with cloud computing
 - You may ask me about Columbia-specific needs, but you'll have to give me full context



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Around 1995: The Web's Scaling Challenge

- The Web and e-commerce were gaining popularity
 - E.g., in 1996 eBay grew from 41,000 to 341,000 users!

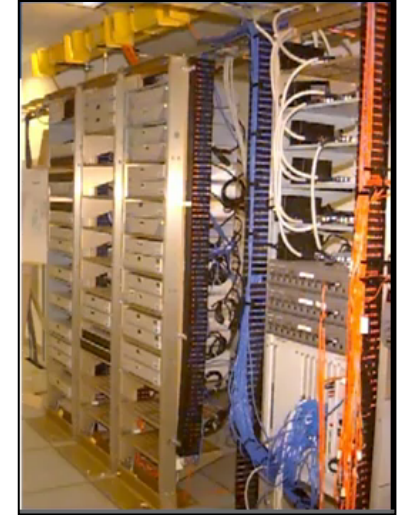


- Biggest challenge: **How to scale to increased load?**
- 1995 response: **Big, expensive supercomputers**
 - E.g., eBay used Sun E-10000 “supermini”
 - 64 processors @250MHz, 64GB RAM, 20TB disk
 - Price: **~\$1M**



1996: Clusters of Commodity Computers

- Berkeley idea: build scalable Web sites on top of many interconnected small, cheap machines
 - These networks are called clusters (or datacenters)
 - First demonstration: Inktomi



1996: Berkeley cluster
(32 Sun SPARC stations)

- All companies started to build and grow their own clusters
 - Like the early days of electricity, when everyone built their own generator

Early 2000s: The Management Challenge

- Managing big clusters is extremely difficult!
 - Hard to **program** distributed systems
 - Hard to build reliable and scalable systems
 - Hard to **administer** lots of machines
 - Hard to architect large networks
- A few select companies solved challenges by building **primitives for programming & administering large clusters**
 - Scalable and reliable storage: Amazon S3, Google Bigtable
 - Scalable computation systems: Google MapReduce
 - Performance diagnostic tools
 - Temperature regulators
 - ...

Mid 2000s: Three Valuable Commodities

- Companies had three valuable commodities:
 1. **Expertise** for operating large datacenters **at low cost**
 2. **Complex software** to help program/manage datacenters
 3. Enormous **excess capacity** (due to peak-load provisioning)
- Companies starting monetizing these commodities by renting them to outsiders on a **pay-for-what-you-use** basis
- And so, “Cloud Computing” was born

Cloud Computing

- My definition:

- Computing paradigm in which data and/or computation is outsourced to a third-party massive-scale, multi-user provider on a pay-per-use basis.*

- Examples:

- Amazon AWS: storage and computing
- Google AppEngine: Web hosting
- Microsoft Azure: storage and computing
- Google Apps: email, calendar, documents
- Salesforce.com: customer relationship management
- ...



Outline

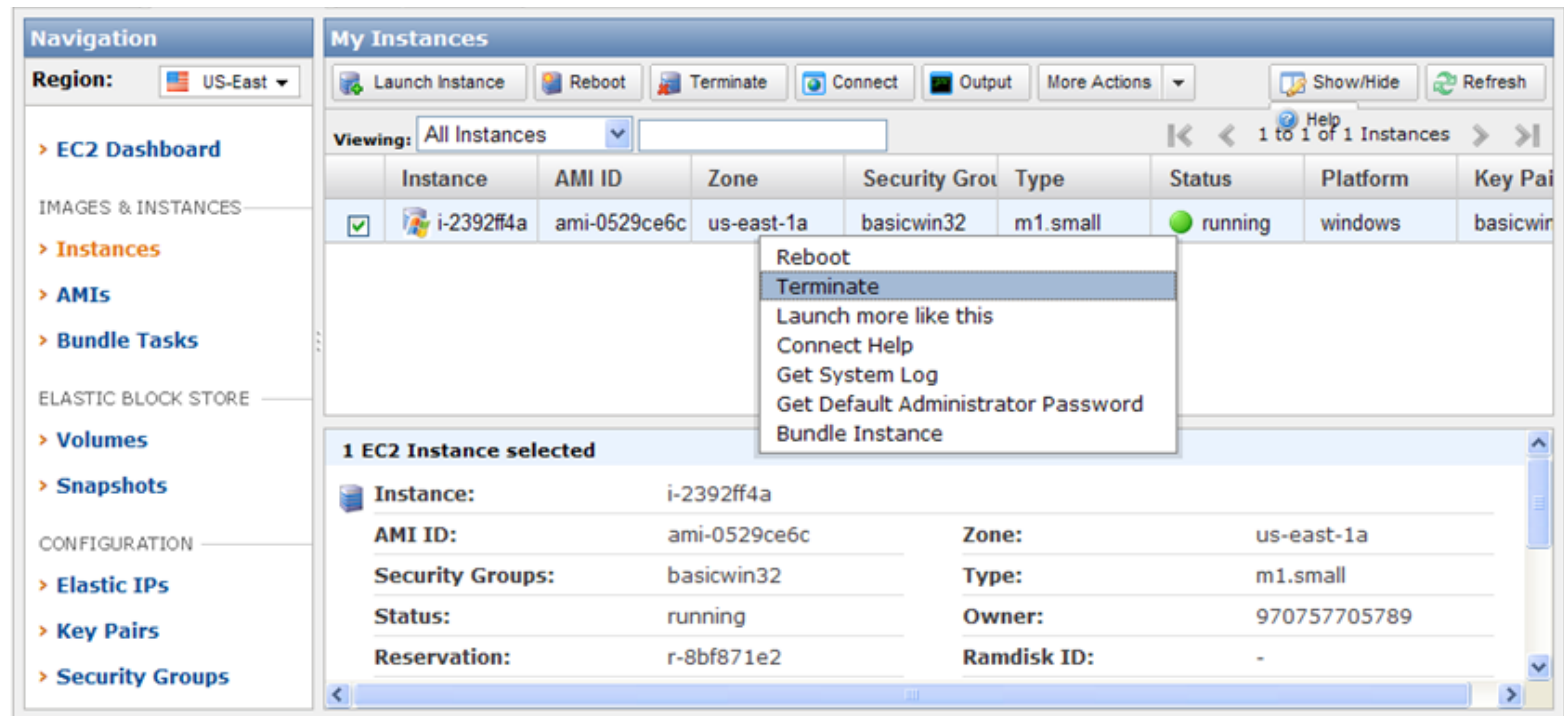
- Historical view of cloud computing
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Amazon AWS

- **S3**: reliable and scalable distributed storage
 - **Storage cost**: \$0.10 per GB-month
 - **Access cost**: \$0.10 per 1 million I/O requests
 - **Network cost**: \$0.12 per GB out of Amazon, \$0 in/within Amazon
- **EC2**: rent virtual machine (VM) instances to run **any software** on an OS of your choosing
 - **CPU cost**: \$0.085-2.00 per CPU-hour
 - **Network cost**: as above
- Example use for Columbia:
 - Host Web site, email server on Amazon EC2
 - Back up data to Amazon S3

Example: Using EC2

- Bundle apps, libraries, data into Amazon Machine Image (AMI)
- Upload AMI to Amazon S3
- Use Web console to configure security, network access for VM
- Choose OS, start VM instances based on your AMI
- Monitor & control VMs via Web console or APIs



The screenshot displays the Amazon Management Console interface for EC2 instances. The left sidebar shows navigation options like 'EC2 Dashboard', 'Instances', and 'AMI's. The main area, titled 'My Instances', shows a table with one instance selected. A context menu is open over the instance, listing actions such as 'Reboot', 'Terminate', and 'Launch more like this'. Below the table, a summary card for the selected instance is visible.

Instance	AMI ID	Zone	Security Gro	Type	Status	Platform	Key Pai
<input checked="" type="checkbox"/> i-2392ff4a	ami-0529ce6c	us-east-1a	basicwin32	m1.small	running	windows	basicwir

1 EC2 Instance selected

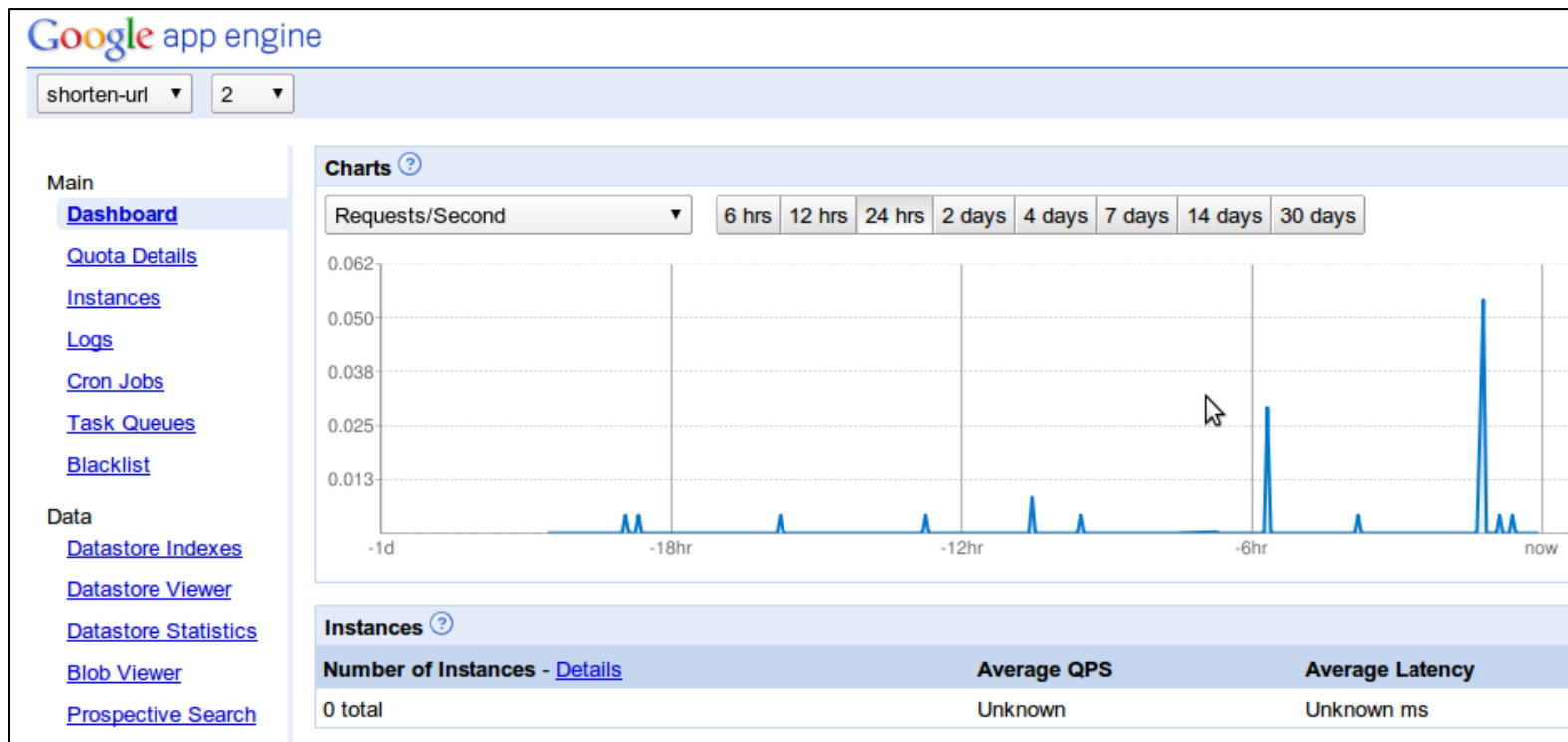
Instance:	i-2392ff4a	Zone:	us-east-1a
AMI ID:	ami-0529ce6c	Type:	m1.small
Security Groups:	basicwin32	Owner:	970757705789
Status:	running	Ramdisk ID:	-
Reservation:	r-8bf871e2		

Google AppEngine

- Web hosting infrastructure, exclusively targeted at Web apps
 - Not suitable for general purpose computing as with AWS
- You create your Web site and submit the code to Google
- Google will take care of the rest:
 - Web server infrastructure
 - Reliable storage
 - High availability (i.e., restart failed servers)
 - Load balancing
- Example use for Columbia:
 - Run Web site on the AppEngine

Example: Using AppEngine

- Download AppEngine development kit
- Develop Web site code locally with kit (Python or Java)
- Submit code to Google
- View logs, data, usage from the Web console



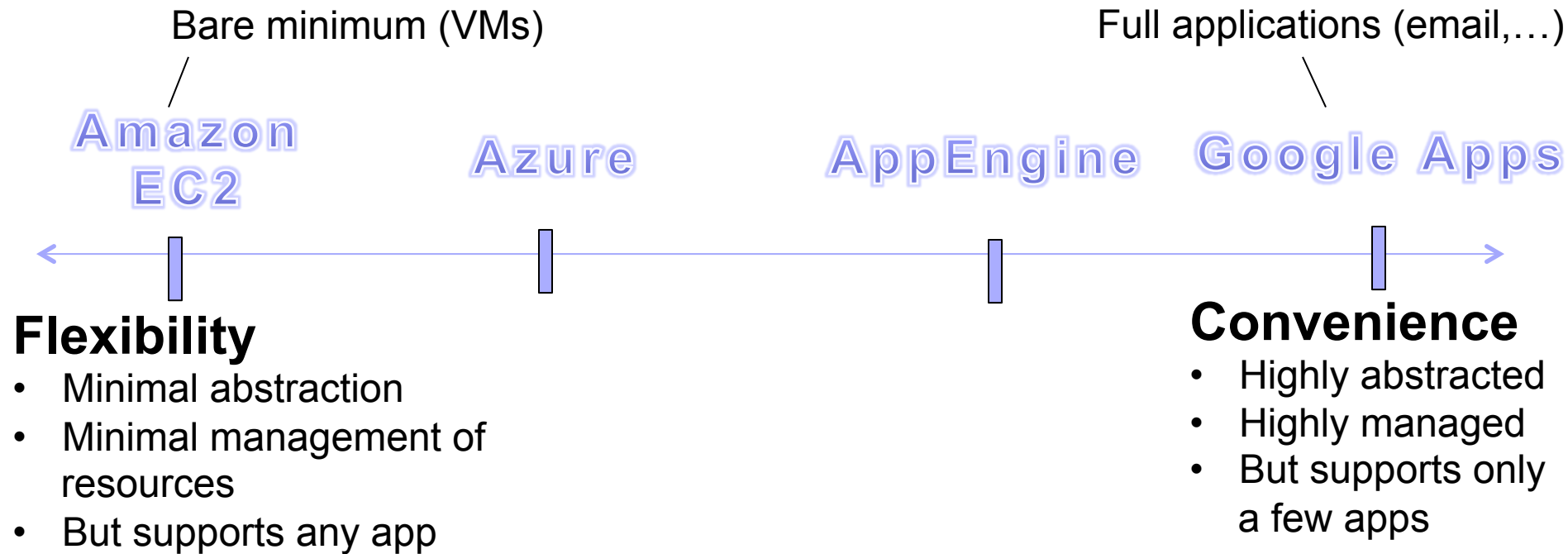


Google Apps for Businesses

- Hosted Gmail, calendar, docs reachable under your domain
 - E.g.: gmail.cs.columbia.edu
- Example benefits for Columbia:
 - Sharing, collaboration
 - Efficient access to emails, calendars, docs from anywhere in the world
 - Reliability and high-availability

How Do These Compare?

- Key differentiators: **level of abstraction** presented to the developer, which trades either flexibility or convenience



- Any other cloud offerings you might be interested in?



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Cloud Benefits

■ Quality-of-service benefits:

- Scalable and reliable building blocks and applications
- In some sense, increased reliability (geographic replication)
- In some sense, increased security (let experts configure)

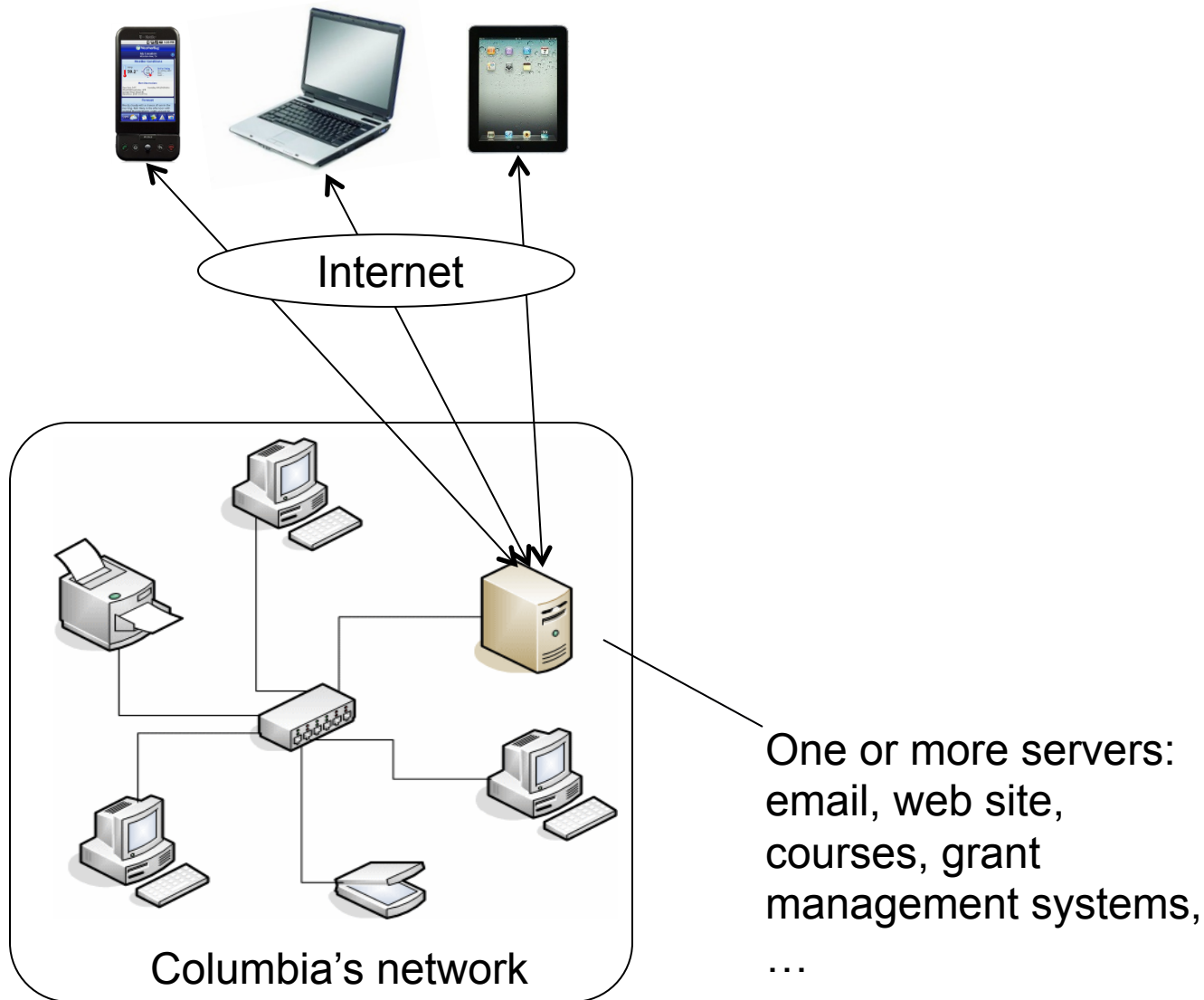
■ Economic benefits:

- Lower costs due to economies of scale
- No up-front hardware costs
- No overprovisioning

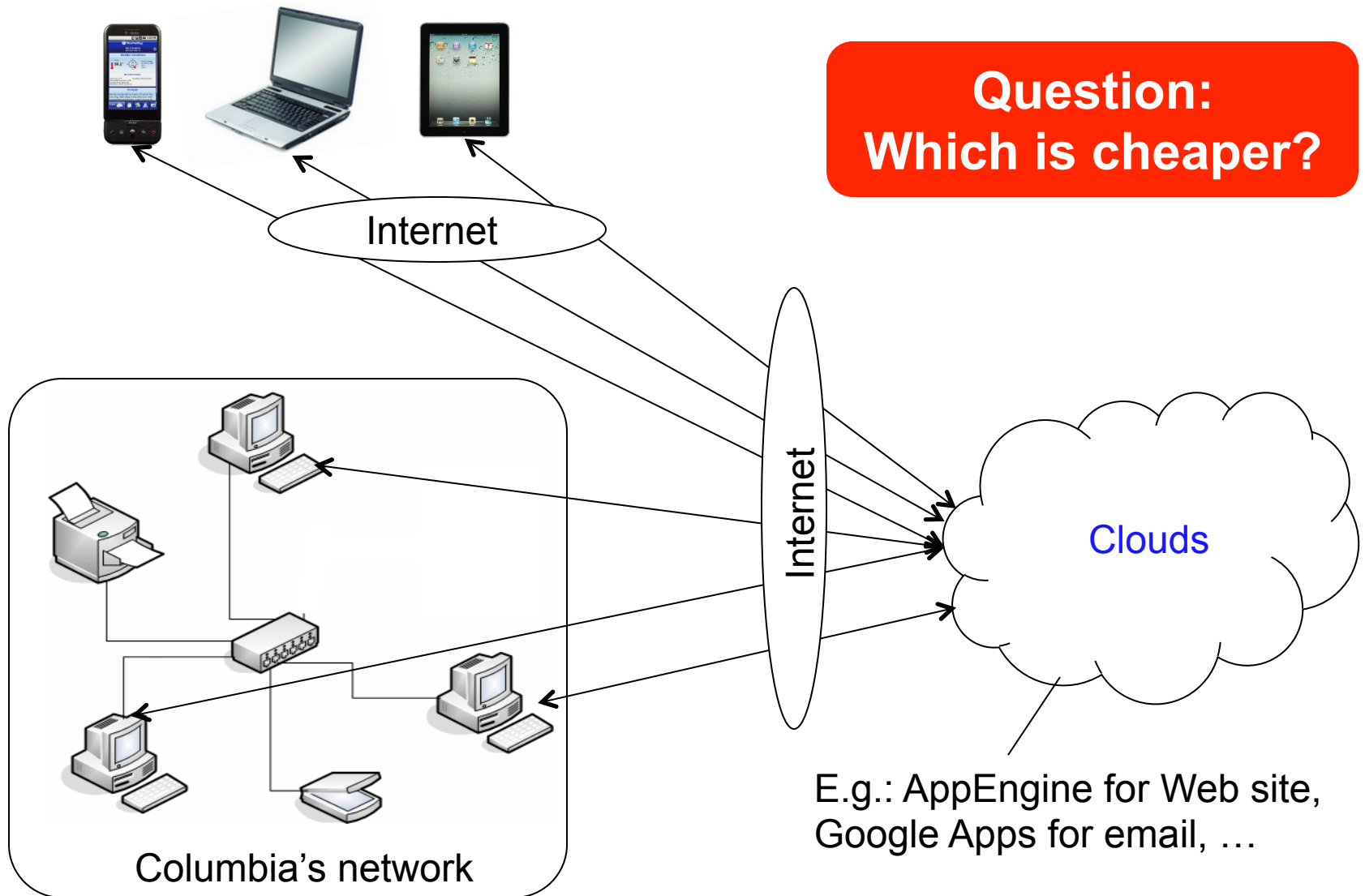
■ Next: Is moving to the cloud worth it purely for economics?

- Results and graphs are taken from a techreport/talk by Radu Sion, Stony Brook (I did **not** validate them!)

Scenario: Columbia Moves to the Cloud



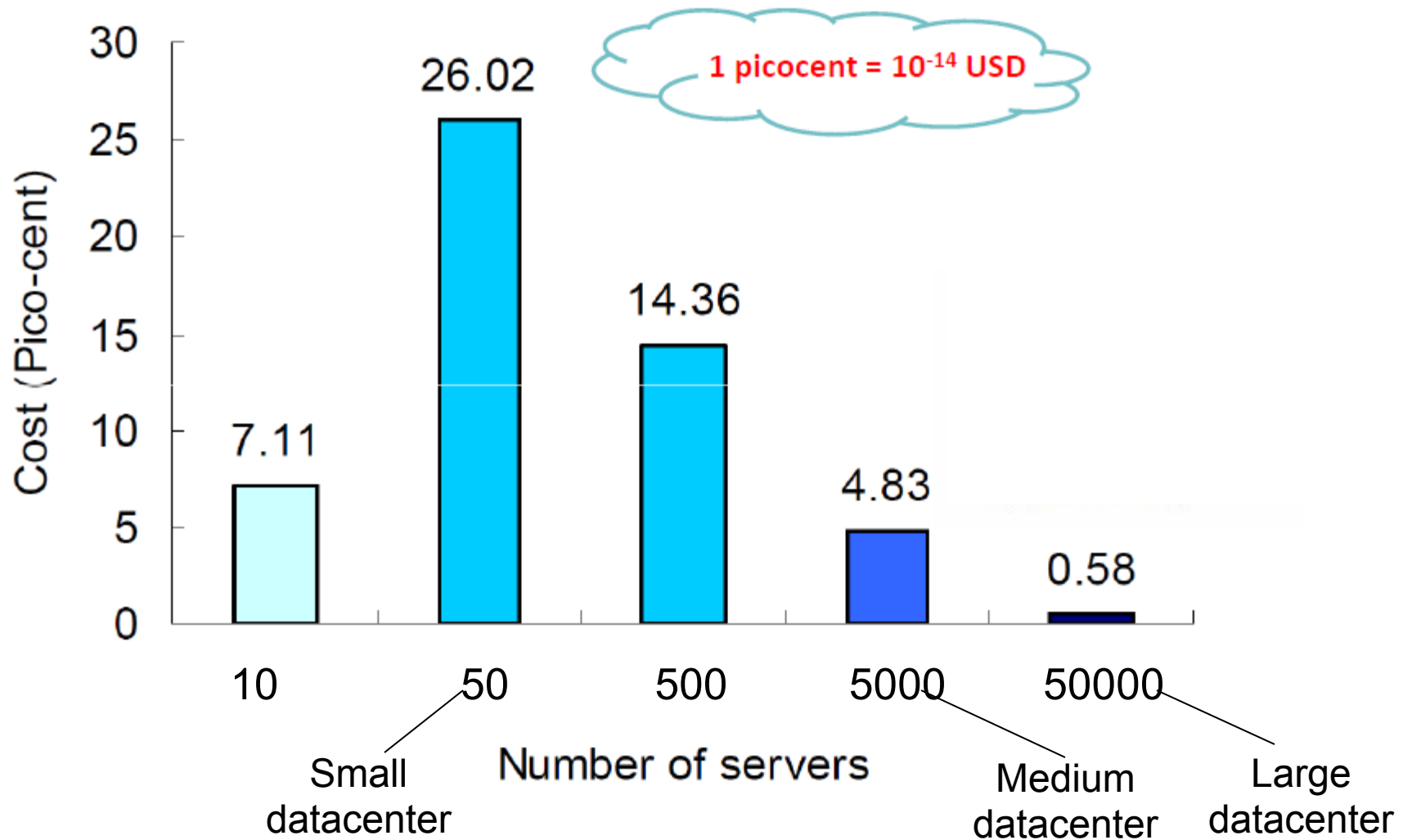
Scenario: Columbia Moves to the Cloud



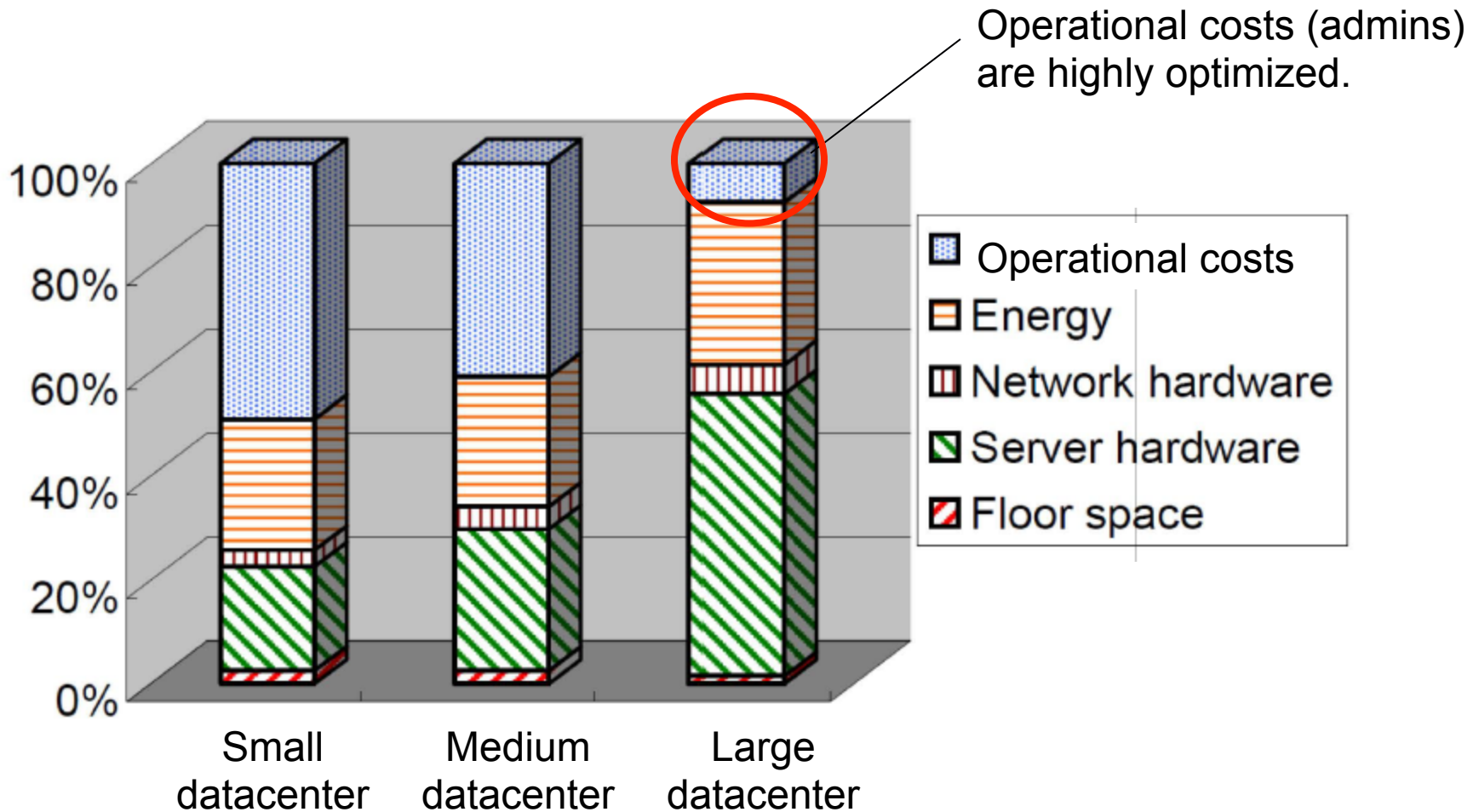
Economies of Scale

- Clouds' advanced management expertise and software drive computing costs down
 - Storage, computing, networking costs
- Example cost savers in the cloud:
 - Custom hardware
 - High CPU utilization
 - Efficient cooling
 - High power usage efficiency
 - Preferential network deals
 - ...

Economies of Scale: CPU Costs



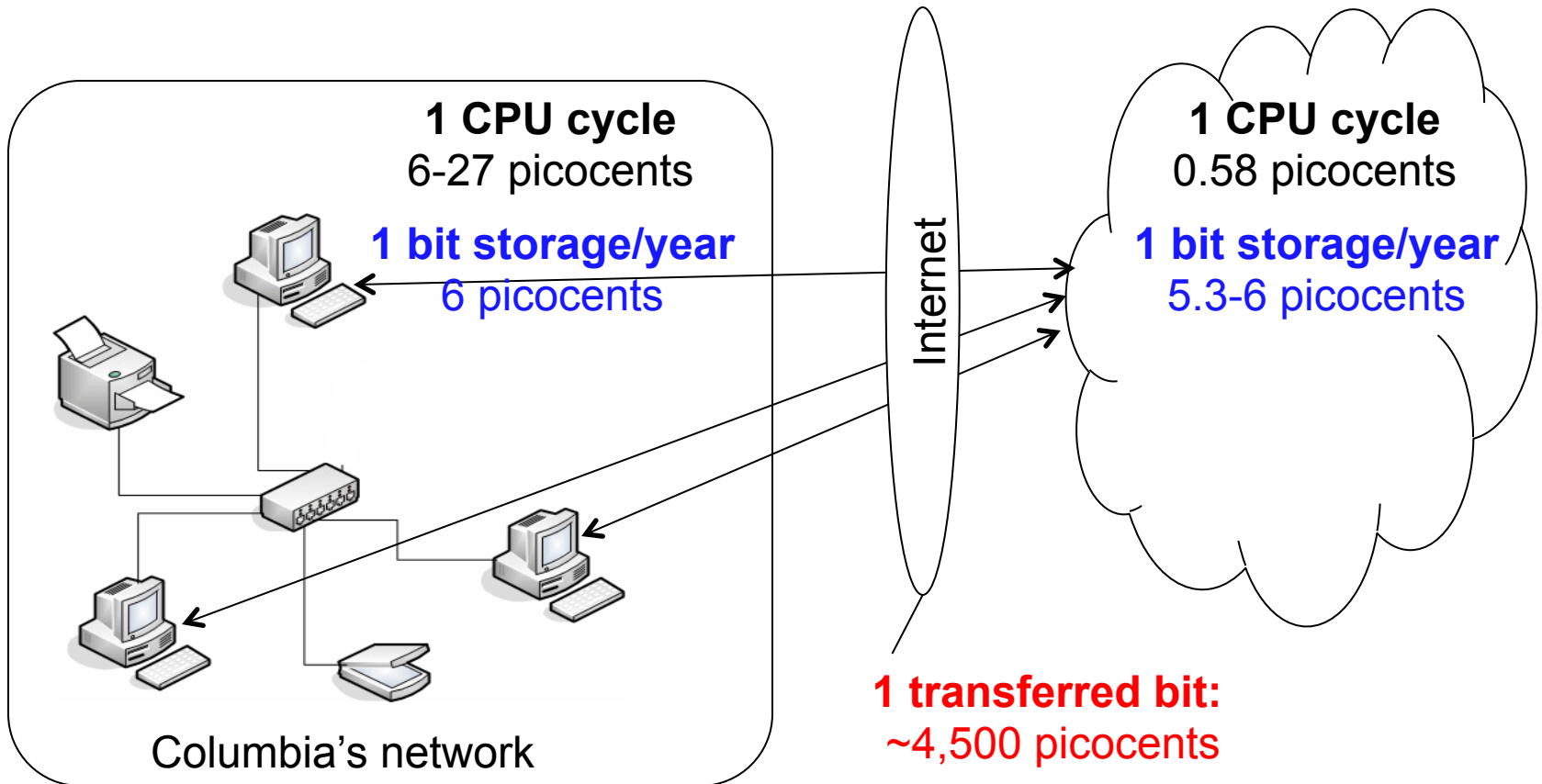
Economies of Scale: CPU Costs Breakdown



So, Is It Worth It?

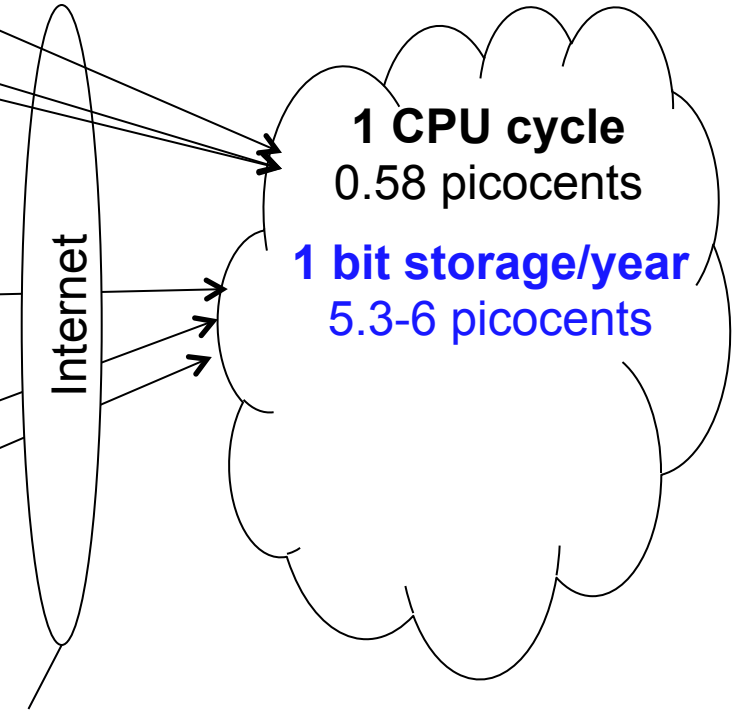
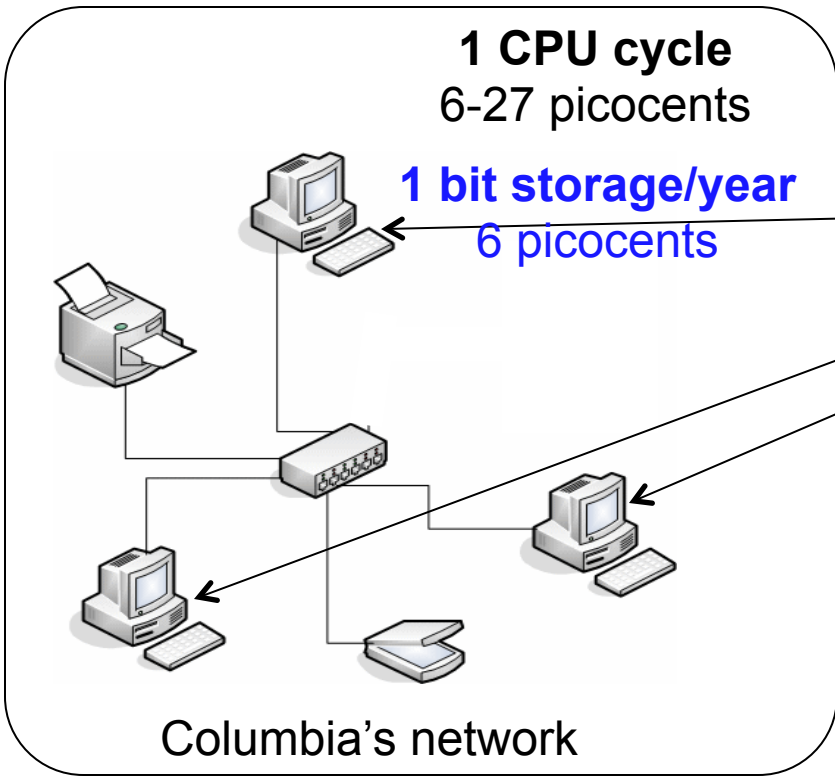


CPU: **Yes**
Storage: **Yes**
Network: **Not always**



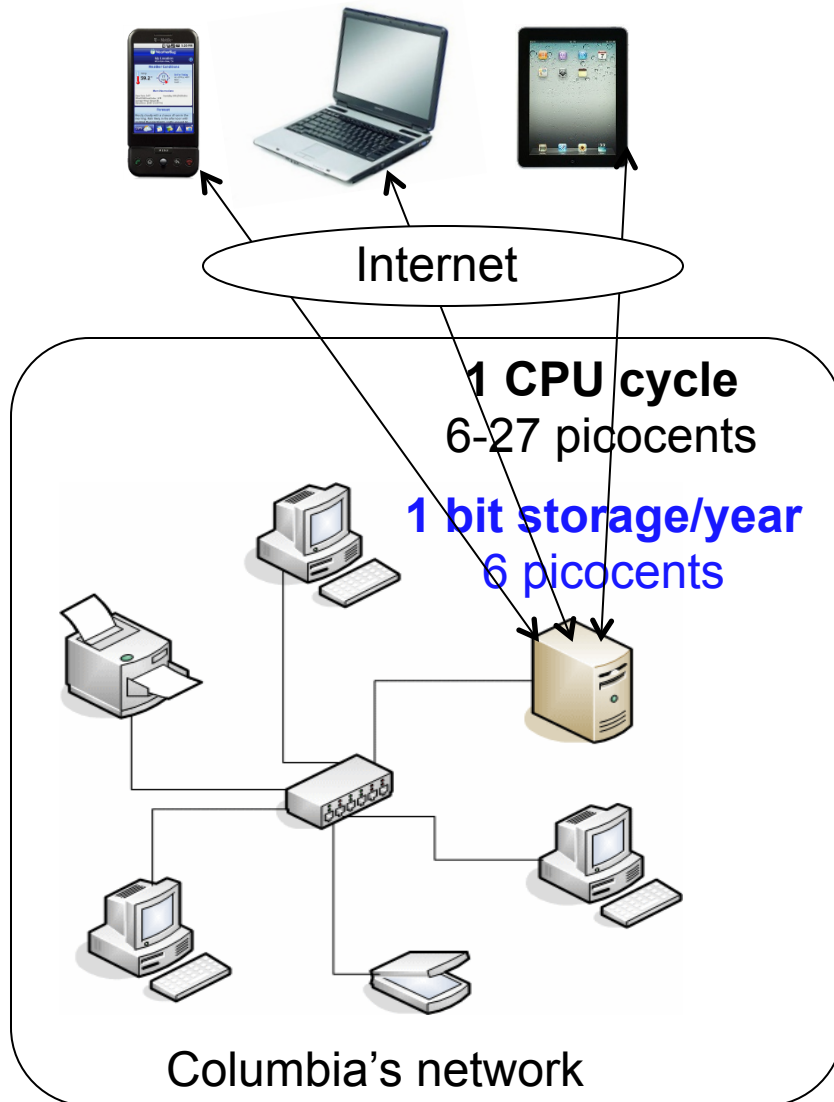
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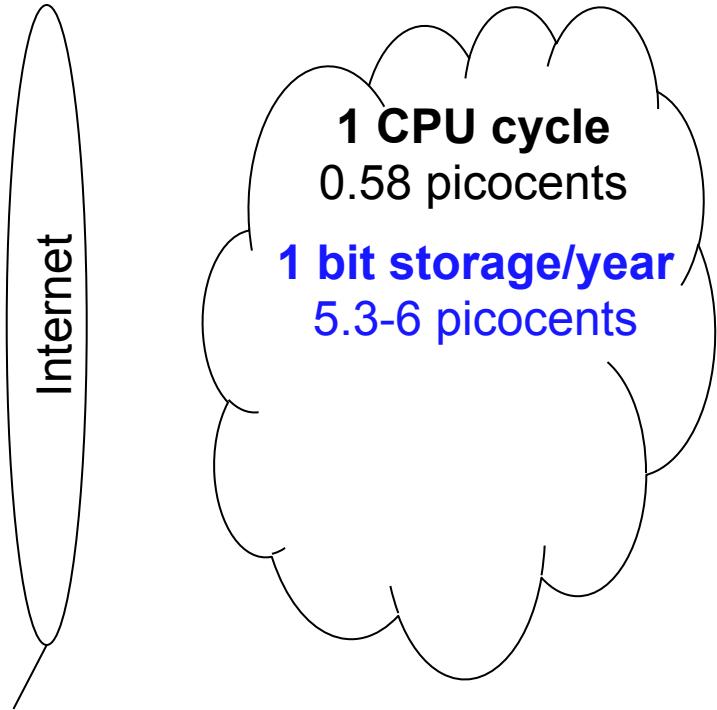


1 transferred bit:
~4,500 picocents

So, Is It Worth It?



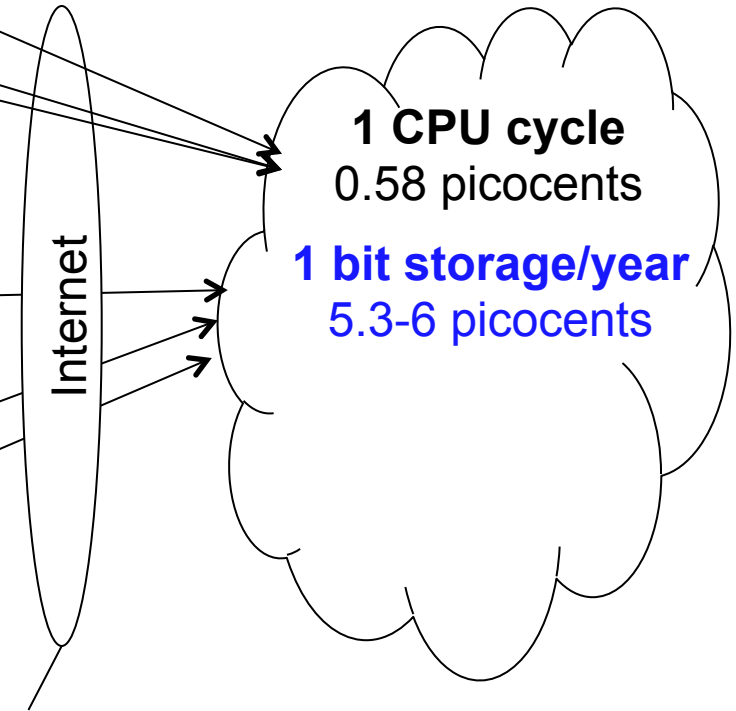
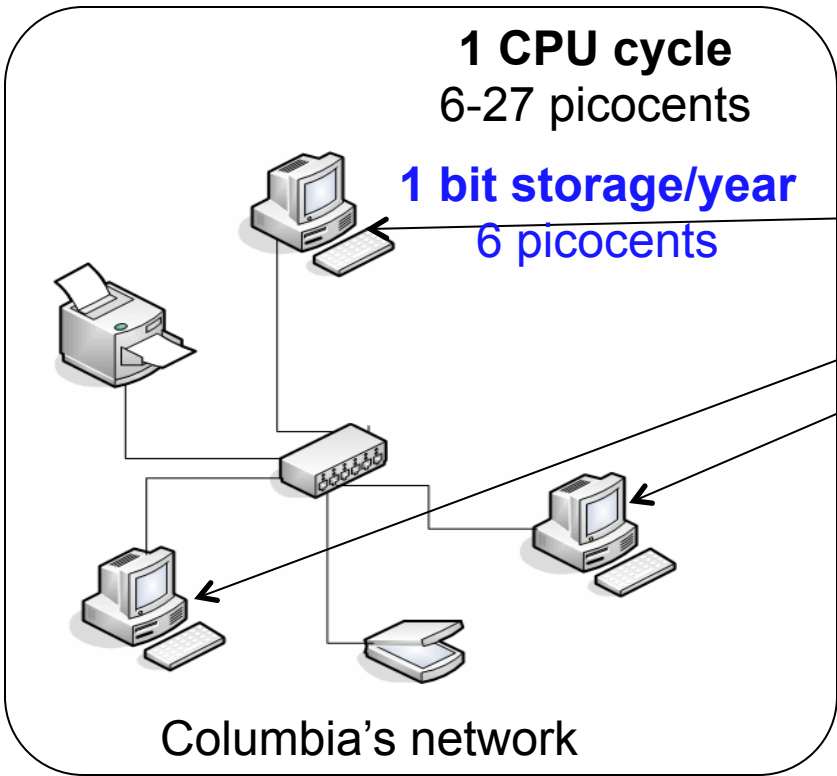
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1 transferred bit:
~4,500 picocents

So, Is It Worth It?

CPU: **Yes**
Storage: **Yes**
Network: **Not always**



1 transferred bit:
~4,500 picocents

When Is Moving to Cloud Worth It?

- When you're computing a lot and transferring little
- When you're accessing a lot from outside Columbia's network
- When you value other benefits of clouds...

- Intuitive examples:
 - Backup might be worth it, if not frequently accessed
 - Cloud-based file system is probably not worth it
 - Email might be worth it, since users don't access much
 - Web site might be worth it, since intuitively there might be more external users than internal ones (?)

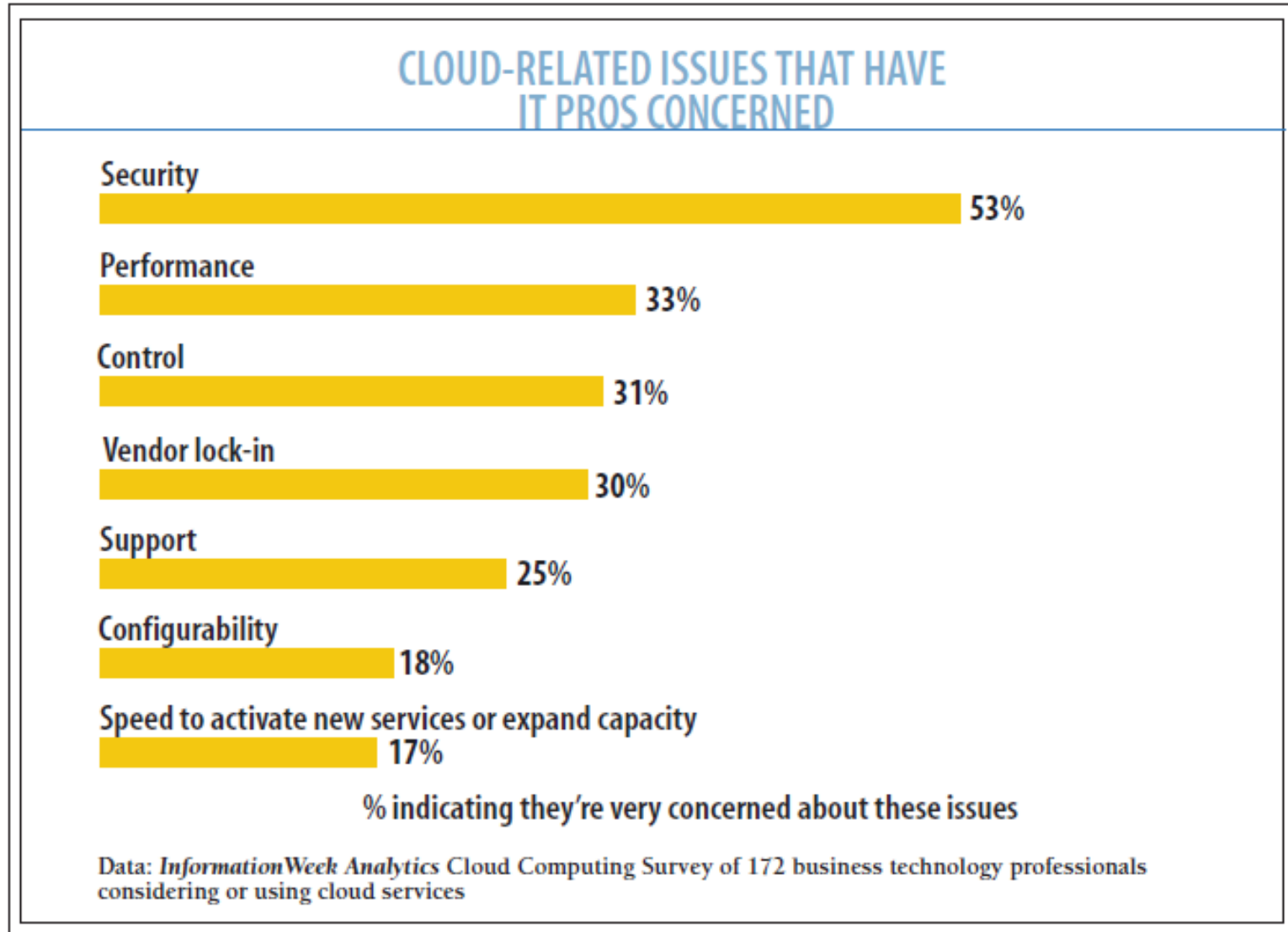
- Bottom line: back-of-the-envelope calculations are needed if economics is a major incentive for cloud move



Outline

- Historical view of cloud computing
- Current offerings
- Cloud benefits
- **Cloud challenges**
- Conclusions

Challenges



Clouds Weaken Data Control and Transparency

- Does the cloud **retain** the data for longer than you wish?
- How control do you have on your data's **privacy**?
- Does the cloud respond to **subpoenas** with your data?
- **Where** is the cloud storing my data?
- How **reliably** is it storing it – how many replicas?
- What do you do if (when) cloud provider goes **bankrupt**?
- Does the cloud enforce all the **legal policies** you are required to comply with (SOX, HIPAA)?
- Upon a **cloud failure**, you are powerless

- Lots of research on these issues (mine included), but few practical (albeit costly) solutions
 - Some of these may only be enforceable by law



Outline

- Historical view of cloud computing
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- Cloud challenges
- **Summary**



Summary

- Cloud computing brings some clear advantages
 - Robust building blocks to construct scalable systems
 - Simplified management, fewer headaches
- Clouds can be extremely profitable for certain applications
 - But might be expensive for others, depending on footprint
- Huge challenges arise, particularly with respect to degree of control and transparency
- In my opinion, clouds will happen, it's just a matter of time and legislation
 - Just like the electricity grid happened



My Question to You

- What are Columbia's needs and worries?

Acknowledgements

Slides:

- History slides inspired by a talk by Armando Fox, UC Berkeley
 - <http://inst.eecs.berkeley.edu/~cs10/sp11/lec/20/2011-04-11-CS10-L20-AF-Cloud-Computing-6up.pdf>
- Economics slides & results from talk by Radu Sion, Stony Brook
 - <http://www.cs.sunysb.edu/~sion/research/cloud.costs.04x.pdf>
- Some slides inspired by a talk by Anh M. Nguyen, UIUC
 - http://www.im-nguyen.com/files/Cloud_Computing_Infrastructure.ppt

Images:

- EC2, AppEngine console screenshots are from (respectively):
 - <http://kishorekumar62.wordpress.com/2009/04/14/i-am-on-the-amazon-ec2-cloud/>
 - <http://javascript.training.free.fr/AppEngine/appengine.html#landing-slide>
- Columbia network picture is from:
 - <http://www.functionx.com/networking/Lesson01.htm>

www.ResearchMat.ch

The quick and easy way for students and professors to find successful project collaborations

Problem

- Students have trouble finding appropriate projects
 - No centralized mechanism
- Professors frequently dissatisfied with students in their labs
 - Too many applications from less qualified students
 - Too few applications from more qualified students
 - Lab website information time-consuming to maintain
- Columbia
 - 27,600 students
 - 3,600 faculty

High Throughput Sequencing for Comprehensively Cataloging Variants

While most of the current genetic data is based on SNP markers, DNA sequencing has been increasing in throughput and cost-effectiveness out-pacing Moore's law. We have been developing and applying computational methods to tackle this torrent of sequence data. Specifically, we have refined models of genomic coverage in worm resequencing data, observing they fit a Gamma distribution, rather than a Poisson model. We further developed a novel method for sequencing of DNA from pools of individuals. The method designs overlapping pools, so that an individual carrier of a discovered variant can be traced through the intersection of such pools. Error Correcting Codes make such pool designs robust to experimental and statistical error. [Read more](#)

Somatic vs. Germline Genetic Variation and Its Effect on Cancer

Cancer is a genetic illness of cells. Somatic lineages suffer loss and gain of parts of the genome. As somatic copy number changes occur randomly, but may be sometimes selected for in tumorigenesis, we are investigating the allele specificity of this selection, i.e., the connections between an individual's germline genotype and the observed copy number changes in the tumor's somatic genotypes.

Contact person: [Ninad](#)

A word about updates and backward compatibility: Ideally, this page would be always up to date. However, in practice it is overhauled on occasion, and then left as it is. During the current update (Oct. 2008), I found it refreshing, humbling and overall educating to reflect on my research interests as I wrote them down [in August 2006](#).

Project contact person graduated

Contact person: [Ninad](#)

A word about updates and backward compatibility: Ideally, this page would be always up to date. However, in practice it is overhauled on occasion, and then left as it is. During the current update (Oct. 2008), I found it refreshing, humbling and overall educating to reflect on my research interests as I wrote them down in August 2006.

Project listing last updated 2008

ResearchMat.ch Website

- Centralized, searchable Columbia University project listing
- Professors can update, delete projects
- Launched March 14, 2012
- 40 projects in 8 departments
- 262 registered users
- 1,117 unique visitors

ResearchMat.ch^{Alpha}

We're a quick and easy way to match students and professors for the most successful project collaborations.

[Check it out! »](#)

Winner: Best Business Model at Columbia Devfest 2012!

Why Us?

Students don't spam professors about projects, and professors get quality students. Students, go ahead and search for your dream opportunity. Professors, make projects visible to the best students all over the university and get the talent you've been looking for. Everybody wins.

Peer Advising

Want us to add something you're interested in? Not sure what to apply for? We work closely with faculty and can address any questions you might have. Let us know at ras2198@columbia.edu.

Latest Project

Research in studying the evolution of videos on YouTube and other depositories, by tracing the recurrence of shots and frames "borrowed" from prior videos. Additionally, some research in the conce...

[View details »](#)



IEEE

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Add New Project

Video Understanding

Computer Science
9 hours/week
Points Course Credit

Research in studying the evolution of videos on YouTube and other depositories, by tracing the recurrence of shots and frames "borrowed" from prior videos. Additionally, some research in the conceptual categories of visual objects and events that can be learned--particularly since classifiers are easily confused if the training examples do not overlap in semantics (e.g., truck versus bus) but overlap in visual appearances.

Edit Project

View

Sports Analytics

Statistics
5-15 hours/week
\$12-18 Per Hour

Sports Analytics Research at Columbia Business School

- When: 35 hrs/week during summer, start immediately 8-15 hrs
- Compensation: \$12-18/hr depending on background
- Faculty Advisor: Casey Ichniowski, Columbia Business School

- Job Duties: Data Cleaning, Data Visualization, Statistical Analysis, Database Management

- Description: Empirical research in sports economics and player/team performance metrics. Opportunities to do server side scripting and front end design. Build web applets and interactive graphics to analyze data. Experience in computer programming and/or statistical packages is VERY desirable.

- Background: Undergraduate (preferably undergrads) with strong GPA and SAT scores. Looking for applicants with

Kichwa Sustainable Forest Management, Earth and Environmental Sciences

Mariana Vergara, Organization & Leadership

Research Area

Multidisciplinary

Commitment

Contact Us

Prerequisites

We will be training the participants, please contact us for more information

Compensation

Volunteer

Contact

miv2105@columbia.edu

Summary

This initiative aims to build upon and strengthen the members of the Kichwa community to be leaders of sustainable forest management in their region, inspiring others to follow in their footsteps. This initiative is designed in three stages: 1) Survey of the land, giving the Kichwua community the legal rights to own their lands; 2) Eco-tourism and Natural Medicine initiative; giving the Kichwua community a livelihood; and 3) World Dignity University (WDU) to establish a branch at the Kichwua communities. This sustainable way of preserving the rainforest is through the entrustment of the Kichwua community. Currently, the Constitution of Ecuador protects indigenous people, the Amazon rainforest and their rights. But, unfortunately these indigenous populations do not know how to interact with the current system in order to preserve the Amazon rain forest.

How: As argued by Heron and Reason (1997, p. 283) "having a critical consciousness about our knowing necessarily includes shared experience, dialogue, feedback, and exchange with others." Through action reflection collaborative inquiry, we are looking for ways to identify how to develop this initiative. This type of collaborative action inquiry is co-inquiry.

In order to deal with the mental demands of modern life, adults thinking needs to continue to evolve through higher level of consciousness. All of us (indigenous people, scholars, students, and practitioners) to co-create a sustainable mechanism to protect the environment.

Where: In the Ecuadorian rain forest, we will begin with a pilot with Indigenous communities.

Edit Project

Delete Project

New project

Title

Research area

Compensation

Contact

Commitment

Department

Summary

Prerequisites

Registration

At this time, ResearchMat.ch is exclusive to members of the Columbia community with a valid Columbia email address. Please check your email to confirm your account after registration.

* full name

* email

* password

* password confirm

* school affiliation

eg. SEAS, CC, GS, etc.

* department

Position

Undergraduate

Sign up

Short-term Goals

- Comprehensive, official matching system for on-campus projects and jobs available to Columbia students
 - OK Cupid-like suggestion algorithms
 - Easily searchable by criteria important to students
 - Not only for academic research
- Efficient filter of student applicants
- Automatic reminders to update projects
- Partnerships with as many Columbia groups as possible

Sign In!

Email

Password

Remember me

Sign in

[Sign up](#)

[Forgot your password?](#)

[Didn't receive confirmation instructions?](#)

Attention Current Users

Can't sign in? We are now requiring that all users confirm their accounts with a valid Columbia email address. If you have not done this, please click [here](#). You should receive an email with a link to verify your account.



Can't sign in? We are now requiring that all users confirm their accounts with a valid Columbia email address. If you have not done this, please click [here](#). You should receive an email with a link to verify your account.

Long-term goals

- Expand to other universities to facilitate inter-institutional collaboration
- Professors have many dormant, unfinished projects. Matching labs with one another may prevent duplicate research efforts and allow a higher percentage of projects to become publishable

Team and Established Partnerships

- Rebecca Sealfon, M.S. 2012, Computer Science. ras2198@columbia.edu
- Ryder Moody, B.S.E. 2014, Computer Science. rlm2155@columbia.edu
- Alex Poon, former intern at OMGPOP and Con Edison, former lead developer at Appetude. alex@researchmatch.ch
- Yong Kwon, M.B.A. 2013. ykwon13@gsb.columbia.edu

Current Sponsors:



What the Senate can do

- Senate sponsorship increases outreach effectiveness
 - Affiliation and funding
 - Senate logo on website
 - ResearchMatch as a recognized Senate initiative
- We are 100% volunteer effort right now
- Please encourage faculty, staff in your departments to post projects
- Please tell other students about ResearchMatch