The Shift To Services: IT’s Role Transforming Higher Education
About Me

• 20 Years in private sector – Sybase, Octel, Lucent
• CIO of the INS Division at Lucent from 1998-2003
• Joined UC Berkeley in 2003 to build Research Computing, CIO from 2005-2012
• Chair of UC Systemwide CIO organization
• Board Member, Kuali Foundation, Kuali Ready
• Recently appointed as SVP of Internet2, NET+
Above-Campus Services
Shaping the Promise of Cloud Computing for Higher Education

by Brad Wheeler and Shelton Waggener

Illustration by Randy Lyhus ©2009
EDUCAUSE Review, Nov/Dec 2009
Change is Difficult
Amazing Time of Change

- Pedagogy & Digital
- Funding Models & Supply Chain
- Technology Leap
- Globalization

IT

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Scale – Like we have never seen

The Cloud Scales: Amazon S3 Growth

Peak Requests: 650,000+ per second

Total Number of Objects Stored in Amazon S3

Q4 2006: 2.9 Billion
Q4 2007: 14 Billion
Q4 2008: 40 Billion
Q4 2009: 102 Billion
Q4 2010: 262 Billion
Q4 2011: 762 Billion
Q1 2012: 905 Billion
The power of scale

Education at Scale

Yesterday
• Single Campus with up to 1,000-100,000 students
• Courses with 10-1,000 concurrent students
• Institutions with physical presence in one state & few satellite locations countries.
• Physical locations augmented by digital models

Tomorrow
• Single Institutions with 1M+ learners
• Courses with 1M+ concurrent participants.
• Institutions with physical locations in 50+ countries.
• Partnerships abound
• Choice dominates
The Future is Here - Now

“This is a Tsunami...the potential upside for this experiment is so big that its hard for me to imagine any large research university that wouldn’t want to be involved.”

Richard DeMillo, Director, the center for 21st Century Universities at George Tech. New York Times, July 17, 2012
Amazing Time of Change

- Pedagogy & Online
- Globalization
- Technology Leap
- Funding Models & Supply Chain
Higher Education **Finances** impacted by the global, federal and state level…

The most serious recession since the Great Depression – which has lasting **global** economic effects

The **US federal** fiscal deficit is large, and does not converge for > decade

**States** have large structural deficit, there is a long queue of underfunded “mandates” (K-12, infrastructure, pensions)

**Personal Debt** for education now larger than all but housing - >$1 Trillion US Dollars.

*We face a new reality…*
Amazing Time of Change

Pedagogy & Digital

Funding Models & Supply Chain

Globalization

Technology Leap
It is an online world
Amazing Time of Change

Pedagogy & Digital

Funding Models & Supply Chain

IT

Technology Leap

Globalization
Globalization – It Isn’t only online that’s making the world smaller
Amazing Time of Change

Pedagogy & Digital

Funding Models & Supply Chain

Globalization

Technology Leap
Virtualization+ Mobile = Disruptive Cloud

3 Million iPads in 90 days in 2010

120 Million Tablets in 2012

3 Billion Smartphones in 2014

> 1 Trillion objects at Amazon

Facebook trending to 1 billion accounts
2014 What does Higher Education IT look Like?

- Outsourced?
- Core or Context?
- Bypassed?
- Smaller?
- Invisible?
- Irrelevant?
- Distributed or Centralized?
- Inward or outward Facing?
- Indispensable?
- Buyer or Builder?

Transformed!
Are Your Staff Ready For Services?
Questions

Have you considered what your department/organization/function looks like in three years? Five years?

What type of skills will your team need to enable your institution to adapt and thrive given all these changes?
“...we are seeing the early emergence of a *meta-university* – a transcendent, accessible, empowering, dynamic, *communally constructed* framework of open materials and platforms on which much of higher education worldwide can be constructed or enhanced.”

Everyone tries to solve problems but ultimately we are just pulling against one another.
NET+ Cloud Service
Market Size

“Cloud Computing Market Will Top $241 Billion in 2020”
Forester Research 2012 “Sizing the Cloud”

The Internet2 Net+ Approach

Coordinate existing Internet2 beyond & network initiatives

• Develop a technical and business model for above-the-network services
• Leverage the network, middleware initiatives and federated authentication within a unified services organization

Develop new programs with third-party vendors exploring:

• Alternative specifications
• Interoperability requirements
• Service level definitions
• Business services and pricing models
Scope of NET+

Cloud Computing

Infrastructure:
- Compute
- Block Storage
- Network

Platform:
- Object Storage
- Identity
- Runtime
- Queue
- Database

Application:
- Servers
- Monitoring
- Content
- Collaboration
- Communication
- Finance

Laptops
Desks
Phones
Tablets
NET+ Service Development

**Research Evaluation**
Internet2, service provider, and university studies an offering to determine whether suited for a NET+ service

**Service Validation**
Sponsor and group of universities work with service provider and Internet2 to define the NET+ service

**Early Adopter**
Universities begin using the NET+ service and continue working with Internet2 and service provider to develop it further

**General Availability**
NET+ service open to eligible universities and quarterly Advisory Board meetings continue informing roadmap
## Internet2 NET+ Services: Fall 2012

<table>
<thead>
<tr>
<th>Research &amp; Evaluation</th>
<th>Service Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Microsoft - Big Data Genomics</td>
<td>• Crashplan – (Remote Backup)</td>
</tr>
<tr>
<td>• Microsoft – Big Data “Long Tail”</td>
<td>• Dell – (Virtual Desktop)</td>
</tr>
<tr>
<td>• HP – High Performance Cluster</td>
<td>• Pearson eText (Volume Discount)</td>
</tr>
<tr>
<td>• eText 1: Coursload/McGraw-Hill</td>
<td>• SHI – (Linux Servers)</td>
</tr>
<tr>
<td>• eText 2: CourseSmart/Pearson</td>
<td>• Splunk – (Big Data Analytics Software)</td>
</tr>
<tr>
<td>• CenturyLink-Savvis (Linux Servers) **</td>
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**RED:** NEW Open for Sponsor / SV campuses  **GREEN:** NEW- Team in place.  **BLACK:** Open for Sponsor/ SV Campus
## Internet2 NET+ Services: Fall 2012

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<th>Early Adopter</th>
<th>General Availability</th>
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<tbody>
<tr>
<td>• Amazon AWS (Cenic)</td>
<td>• Box (File Collaboration)</td>
</tr>
<tr>
<td>• Aastra (Voice over IP Phone)</td>
<td>• Comodo (Web/Personal Certificates)</td>
</tr>
<tr>
<td>• Desire2Learn (Lecture Capture)</td>
<td>• Adobe (Connect)</td>
</tr>
<tr>
<td>• Evogh (Desktop Video Conference)</td>
<td>• DuraSpace (Research File Storage)</td>
</tr>
<tr>
<td>• Instructure (Canvas LMS)</td>
<td>• Merit Storage (File Storage)</td>
</tr>
<tr>
<td>• Solution Design Group</td>
<td>• Merit Email (Email Service)</td>
</tr>
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**RED:** NEW Open for Sponsor / SV campuses  
**GREEN:** NEW- Team in place.  
**BLACK:** Open for participation
Service Validation Process

**ROADMAP:**
- TECHNICAL
- FUNCTIONAL

**SECURITY:**
- STANDARD
- ASSESSMENT

**CONTRACT:**
- LEGAL
- BUSINESS

**DEPLOYMENT:**
- DOCUMENTATION
- SUPPORT

**NET+SERVICE**
1. Service Tuned for HE
2. Quarterly Plan
3. Security Information Published & Peer Reviewed.
4. Master Contract: Provider & Internet2 in Place
5. Customer Contract: Campus and Internet2 in Place
6. Waterfall /Special Pricing
7. Best Practices and FAQ
8. Crowd Sourced Support
9. SLA and Escalation
10. Exit Strategy
Essential Tool for the New Normal

- Achieve more...
- Serve our mission...
- Favorable economics (over time)...
- Align institution to external environment...
"They built HUTS! We must build huts."

"Fire, fire, we need FIRE!"

"SWINGS! They've built SWINGS! We're gonna need Swings."

2012 Vince Cannon
Thank you – Shel Waggener
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