INTERNET 2

SHELTON WAGGENER

Senior Vice President, Internet2

TICAL
JULY, 2013

Technology Leadership in Federate World:

The Role of The Next Generation Chief Information Officer in the Cloud

About Me

- Senior Vice President of Internet2
- 20 Years in private sector – Sybase, Octel, Lucent
- CIO of the INS Division at Lucent from 1998-2003
- UC Berkeley 2003-2005 to build Research Computing CIO from 2005-2012
- Past Board Member, Kuali Foundation, Kuali Ready, InCommon, Scholarship Foundation
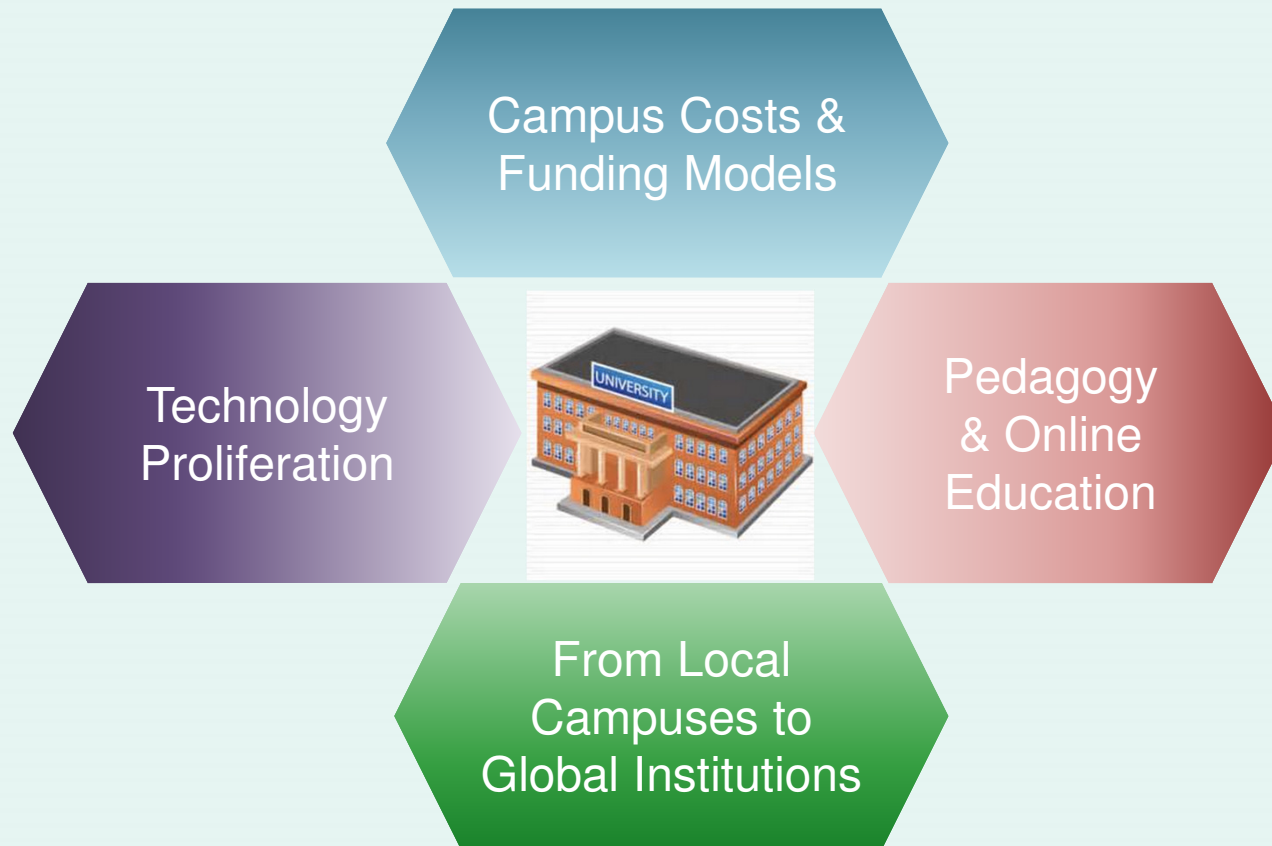
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Above-Campus Services
Shaping the Promise of Cloud Computing for Higher Education

by Brad Wheeler and Shelton Waggener

Illustration by Randy Lyhus ©2009
EDUCAUSE Review, Nov/Dec 2009

Creative Common
Waggener

Recognize Change – In every direction

Campus Costs & Funding Models

Technology Proliferation

Pedagogy & Online Education

From Local Campuses to Global Institutions

"This is a tsunami… The potential upside for this experiment is so big that it's hard for me to imagine any large research university that wouldn't want to be involved."

—Richard DeMillo, Director, Center for 21st Century Universities

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Prepare your campuses community for cloud services by:

- Share experiences, learn from experiences of others
- Take part in exploring and validating solutions
- Learn methodologies, best practices and get help with training and development
- Leverage trusted identity solutions

Cloud Technology Proliferation

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Be prepared for online education which WILL impact your campuses. Change from being technology plumbing to being technology partner:

- Compete with a new breed of online providers
- Implement new higher education solutions more quickly, more easily and with lower risk
- Offer courses and services to broader national and inter_____ markets

Campus Costs & Funding Models

Work across campuses, institutions, nations to align with peer institutions

- Secure best-in-class pricing
- Obtain *customized*, not just *commodity* services
- Eliminate redundant admin/legal costs and efforts
- Mobilize our considerable ingenuity and clout to create our own solutions

FUNDING SHRINKS -$$

FINANCIAL MODELS CHANGE

COSTS RISE +$$
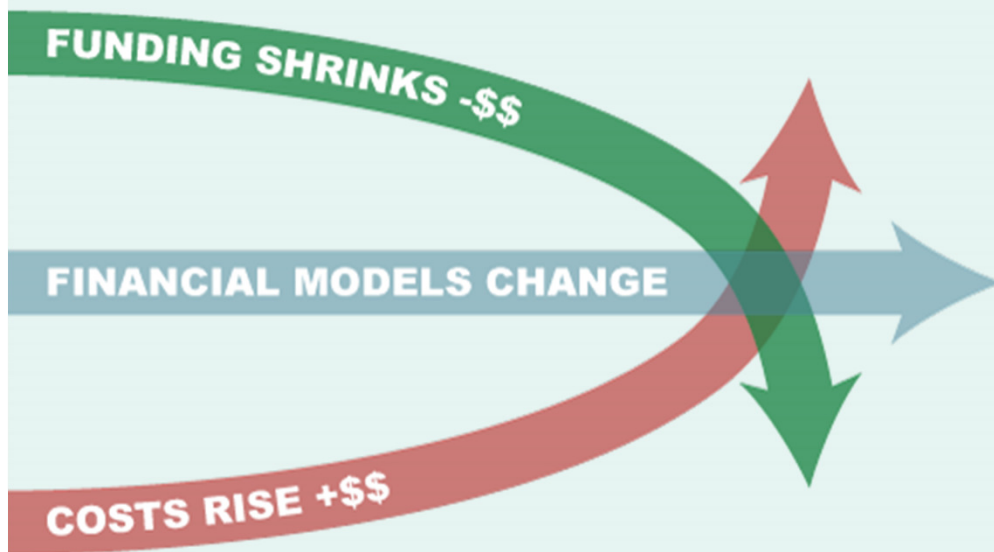
"The cloud computing market will top $241 Billion in 2020."

—Forrester Research 2012, *"Sizing the Cloud"*

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The Cloud (and campuses and learns) will think and act Global. Local matters – when connected globally.

- Leveraging National Research and Education Networks and international exchange facilities for global connections

  - Offering courses and services to broader national and international markets

  - Extending services throughout global R&E community with minimal investment but significant increase in benefit

  - Leveraging connections throughout community for more efficient, effective solutions

Globalization Is a Reality in Education & Research

Global Cloud Working Group

Volunteer charter member National R&E networks representing Europe, Americas, Asia-Pacific, dedicated to the widespread adoption of federated cloud services that benefit the global R&E community
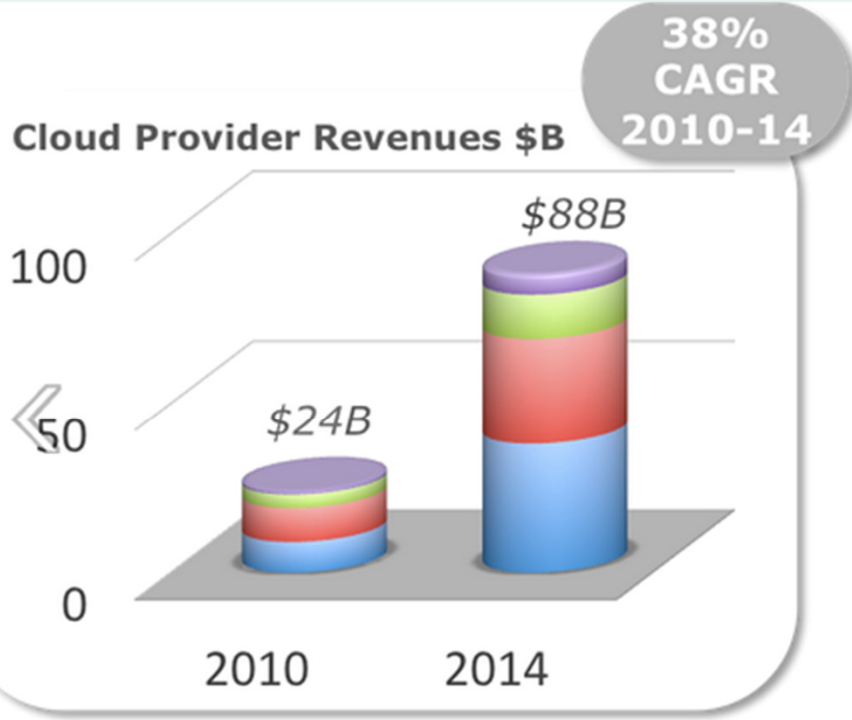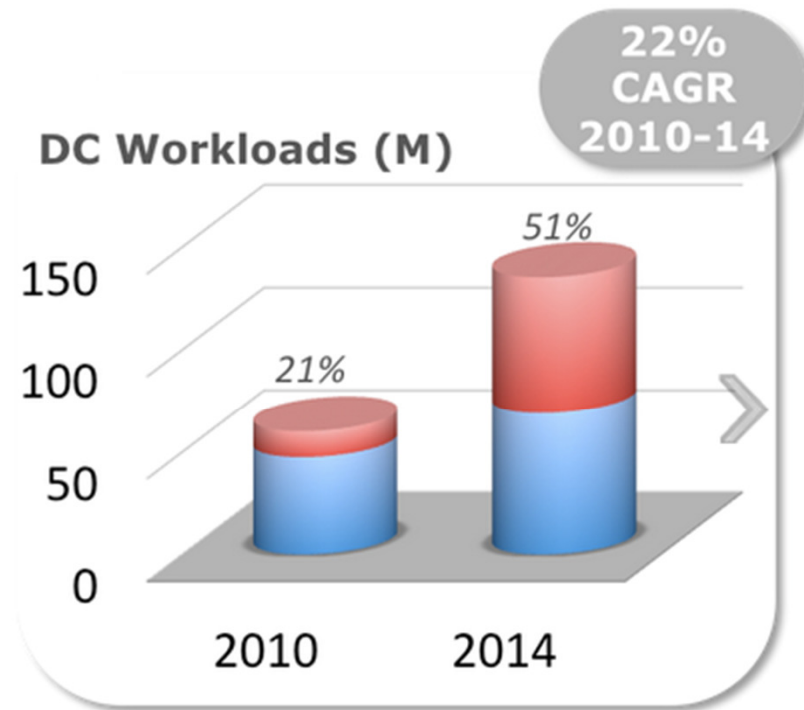
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Why does cloud matter?

Because it will coexist
with traditional
education.

Is your IT team ready?

Yes, the Cloud Market is Growing…

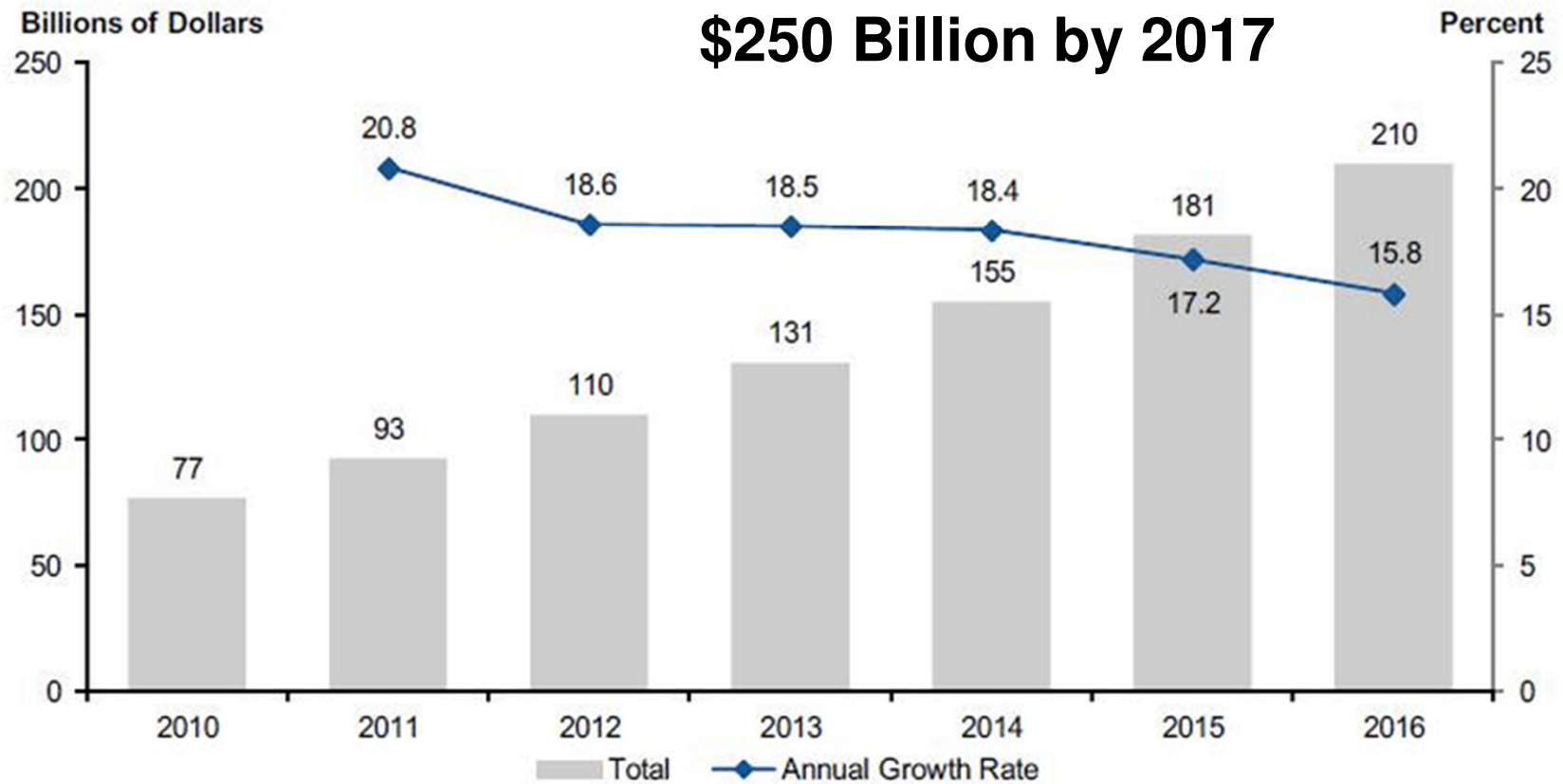**38% CAGR 2010-14**

Cloud Provider Revenues $B

$88B

$24B

100
50
0

2010   2014

VPC   SAAS   IAAS   PAAS

Source: IDC, Gartner, Analysys Mason, Forrester, Cisco

22% CAGR 2010-14

DC Workloads (M)

51%

21%

150
100
50
0

2010   2014

Traditional DC   Cloud

Source: Cisco Cloud Index 2011

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And growing …

Public Cloud Services Market and Annual Growth Rate, 2010-2016

$250 Billion by 2017

Source: Gartner (February 2013)

IT has often operated as a craft…

Unfortunately its HARD to do IT (as a craft) at SCALE.
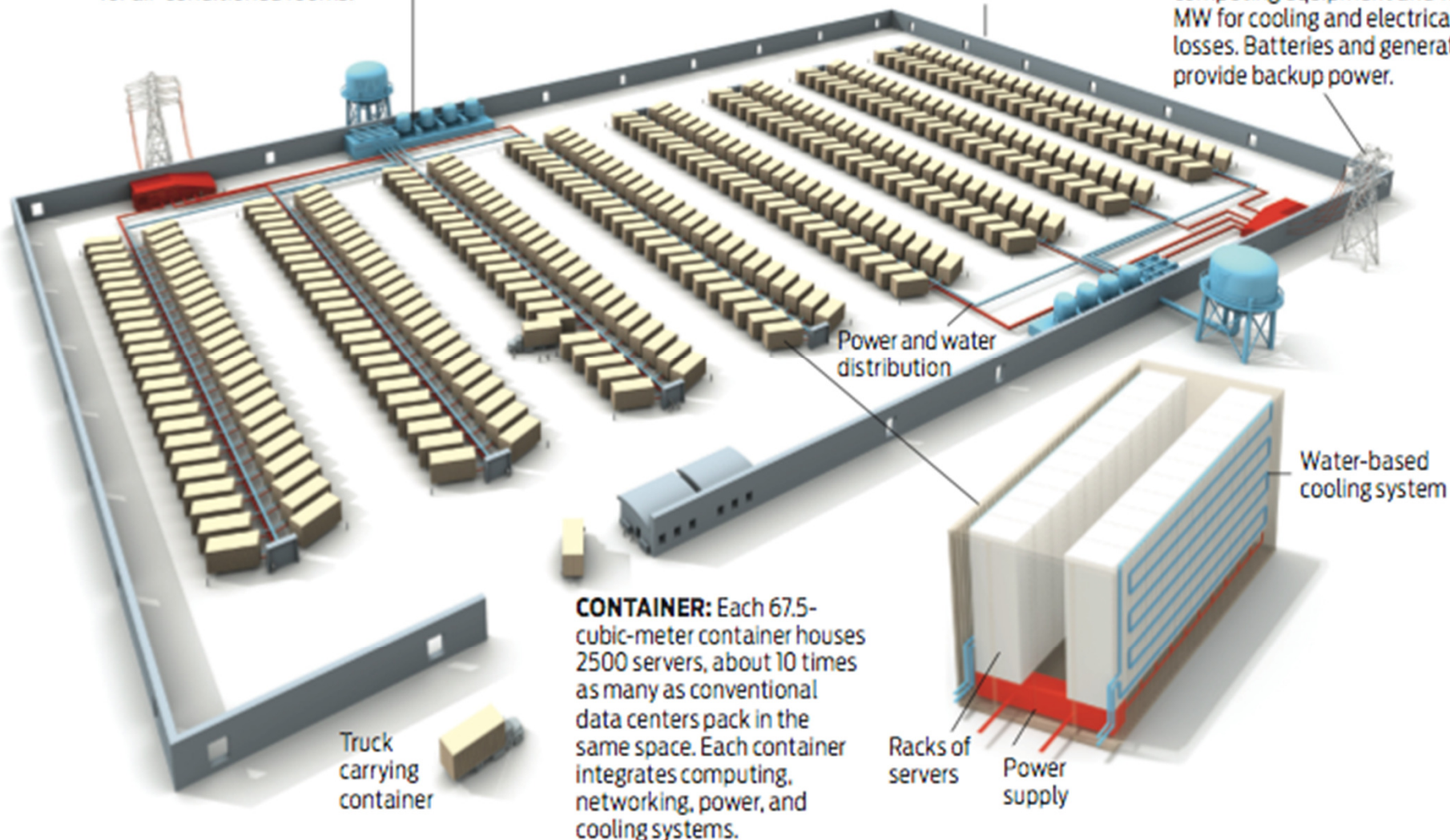
Even when done perfectly – its not CLOUD SCALE

Individually we wont wont be at this kind of scale

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COOLING: High-efficiency water-based cooling systems—less energy-intensive than traditional chillers—circulate cold water through the containers to remove heat, eliminating the need for air-conditioned rooms.

STRUCTURE: A 24 000-square-meter facility houses 400 containers. Delivered by trucks, the containers attach to a spine infrastructure that feeds network connectivity, power, and water. The data center has no conventional raised floors.

POWER: Two power substations feed a total of 300 megawatts to the data center, with 200 MW used for computing equipment and 100 MW for cooling and electrical losses. Batteries and generators provide backup power.

Power and water distribution

Water-based cooling system

Truck carrying container

CONTAINER: Each 67.5-cubic-meter container houses 2500 servers, about 10 times as many as conventional data centers pack in the same space. Each container integrates computing, networking, power, and cooling systems.

Racks of servers

Power supply

How do you start to move
from Craftsmen to the Cloud?

The Craft of Traditional IT

Project Delivery Approach

Waterfall

Software QA / Testing

Mostly manual with little automation

Release Frequency

Two major, two minor per year

Downtime during releases

36-48+ hours per release

Release Deployments

Manual activities on weekends

Support model

Traditional Application Support approach

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Mindset Change

- Automated regression test coverage
- Automated build deployment
- Zero systems downtime deployments
- Bi-weekly releases during business hours
- Business centric support model

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The Future of Agile IT Leveraging Cloud

360 degree view
Take steps knowing impact to all involved

Approach
Step by step approach with checkpoints

Automated processes
Improvement through automation

Awareness
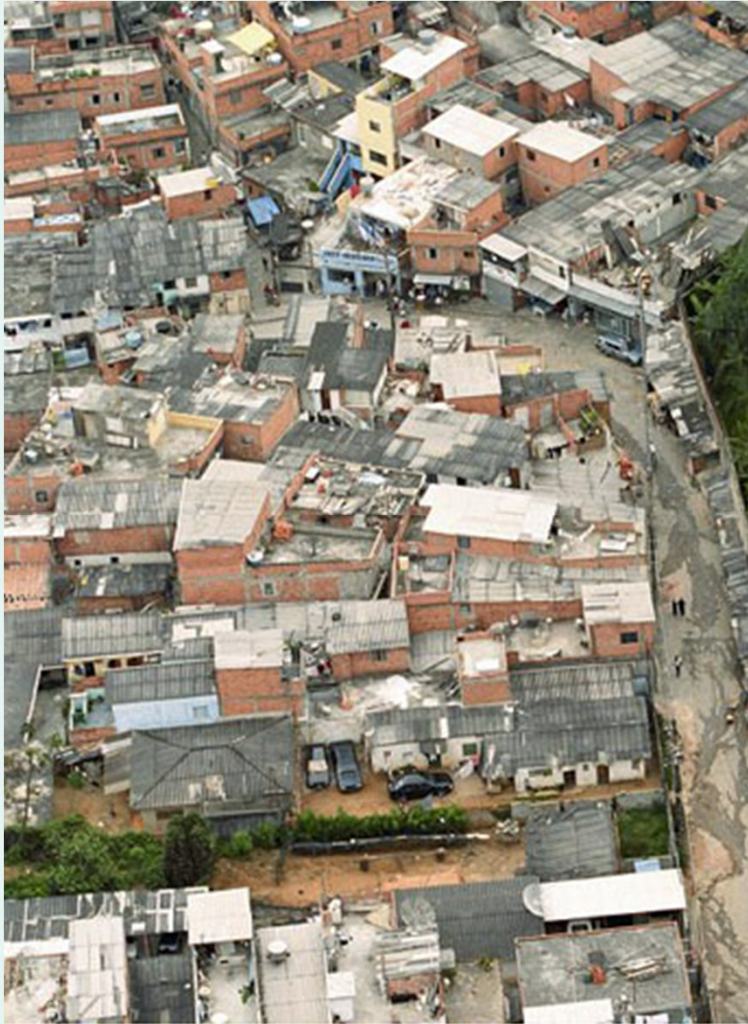Educate your teams on what is possible

Measure
Develop & use SMART metrics

Teamwork
Involve all teams required for successful change

Thinking about IT at scale

Each of us can individually :
Buy or Build

then
Assemble,
Test,
Integrate,
Protect,
Maintain,

Yet even with thousands of us we wont achieve scale, just duplication

Thinking about it at scale

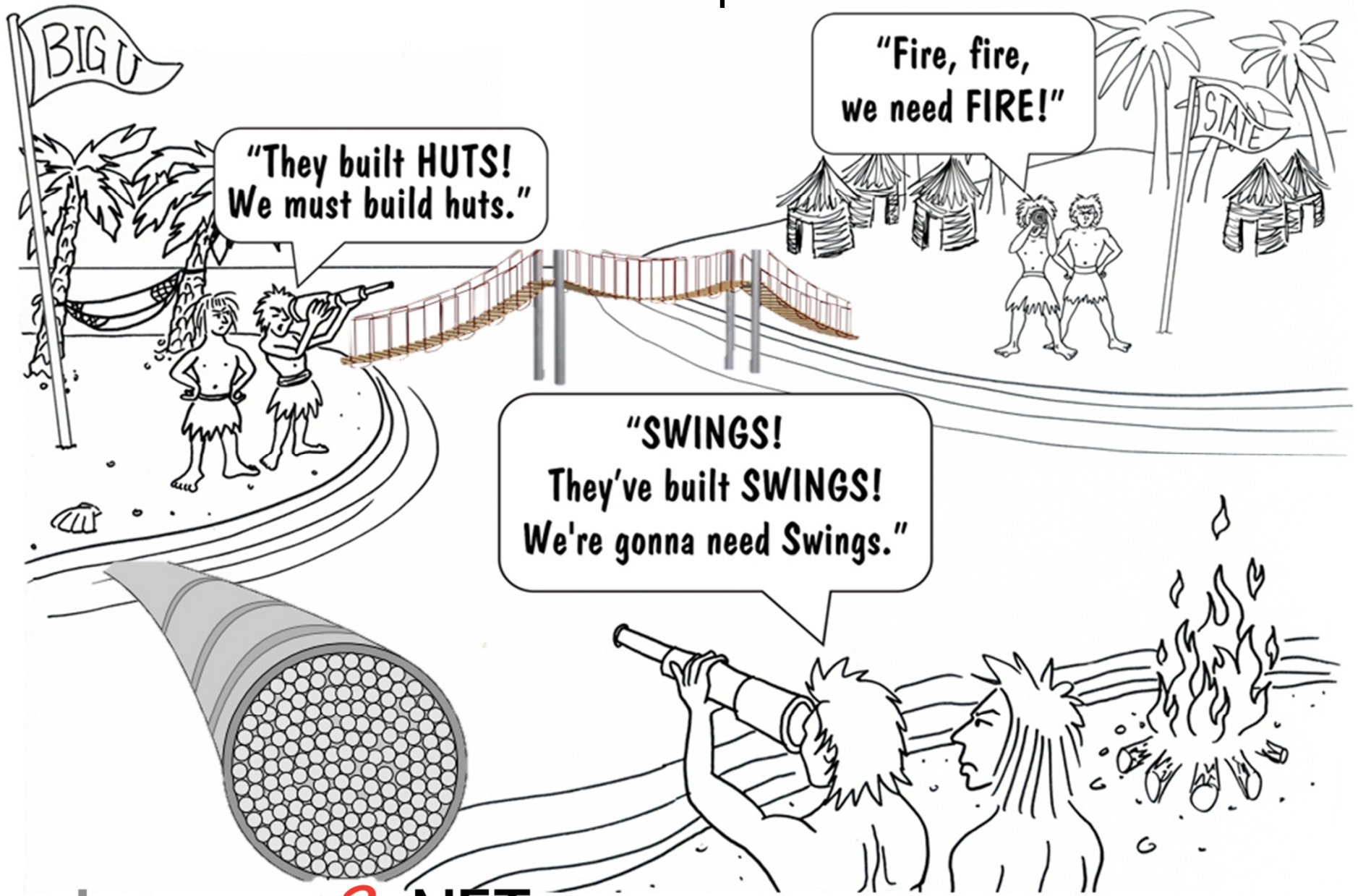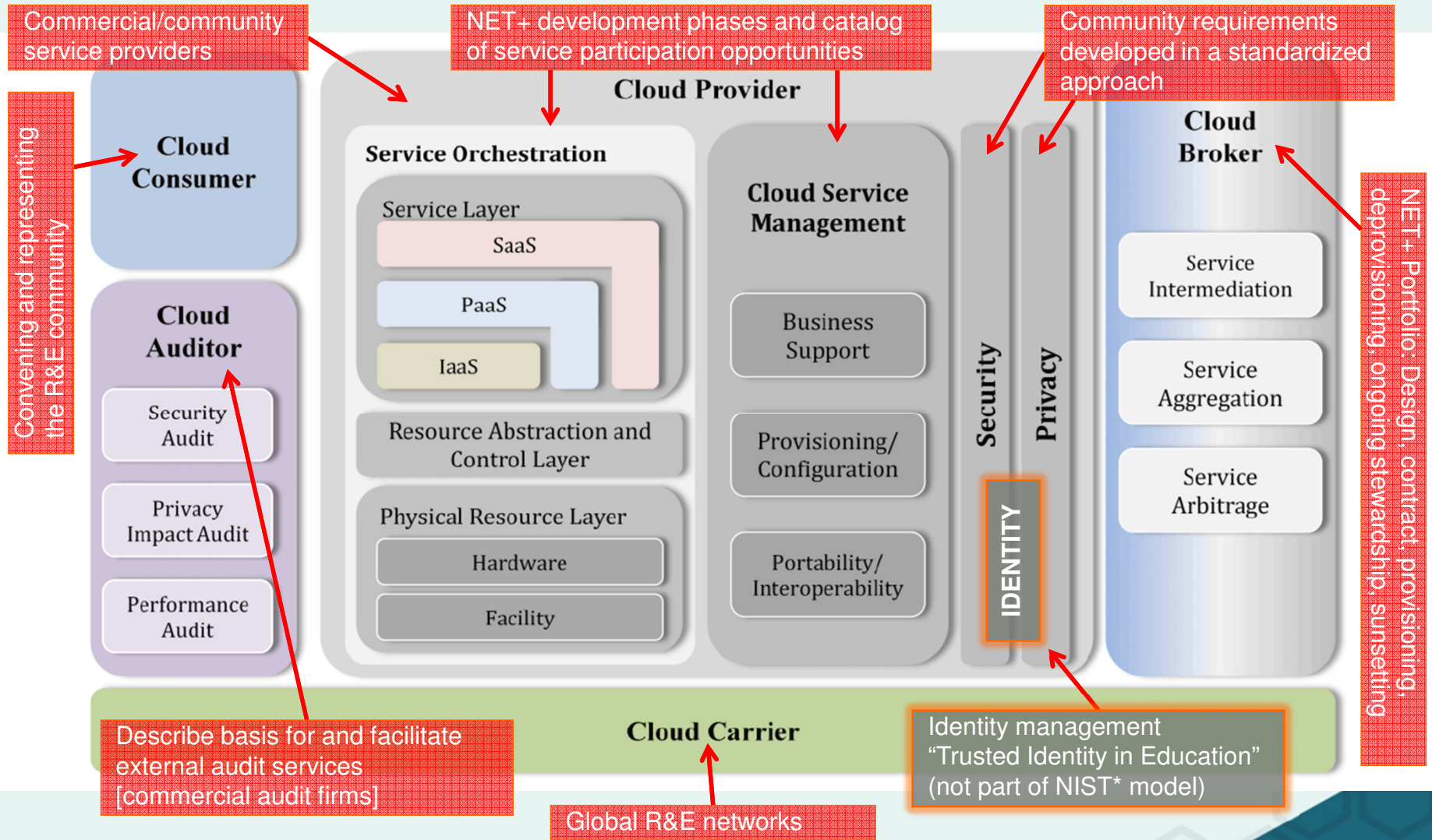| OR Universities can leverage our networks to jointly:

Share Designs,
Acquire Assembly,
Speed Testing
Integrate Valid Sources,
Protect Critical Data,
Maintain Less,
Deliver More

By Using Cloud Services at GLOBAL Scale | Each of us can individually :
Buy or Build

then
Assemble,
Test,
Integrate,
Protect,
Maintain,

Yet even with thousands of us we wont achieve scale, just duplication |

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Cloud and Custom environments can coexist

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But we MUST AVOID Duplication

Cloud Services *with a Firm Foundation*

Commercial/community service providers

NET+ development phases and catalog of service participation opportunities

Community requirements developed in a standardized approach

Convening and representing the R&E community

Cloud Provider

Cloud Consumer

Service Orchestration

Service Layer

SaaS

PaaS

IaaS

Resource Abstraction and Control Layer

Physical Resource Layer

Hardware

Facility

Cloud Service Management

Business Support

Provisioning/ Configuration

Portability/ Interoperability

Security

Privacy

IDENTITY

Cloud Broker

Service Intermediation

Service Aggregation

Service Arbitrage

Cloud Auditor

Security Audit

Privacy Impact Audit

Performance Audit

NET+ Portfolio: Design, contract, provisioning, deprovisioning, ongoing stewardship, sunsetting

Describe basis for and facilitate external audit services [commercial audit firms]

Cloud Carrier

Identity management "Trusted Identity in Education" (not part of NIST* model)

Global R&E networks

*Source: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

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Internet2 100G infrastructure topology

Internet2 NET+

What it **is not**	What it **is**
a buyer's club	*services tailored for R&E, with special pricing and business terms*
a marketing system where providers sell to higher education	*a process where providers help shoulder the risk as partners*
primarily about price	*primarily about delivering value to both higher ed and providers*
a one-way street	*a collaboration to increase rewards and reduce overhead*
driven by one campus, country, NREN or provider	*driven by the real needs of research universities to benefit all*
delivered over unreliable networks	*delivered over the most advanced networks around the world*

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Criteria for consideration of NET+ Providers

- Can the services scales at least nationally?

- Can it be delivered over global R&E networks?

- Develop a business model that scales globally and serves significant portion of community?

- Will provider work with community to meet unique R&E needs today and into the future?

- Adopts R&E federated identity standards?

- Commits to community's Security, Privacy, Compliance, and Accessibility needs?

Trusted Identity in Education

Community-developed identity and access management framework of trust enables:

- Secure, streamlined sharing of protected resources

- Consolidated management of user identities and access

- Delivery of an integrated portfolio of community-developed solutions
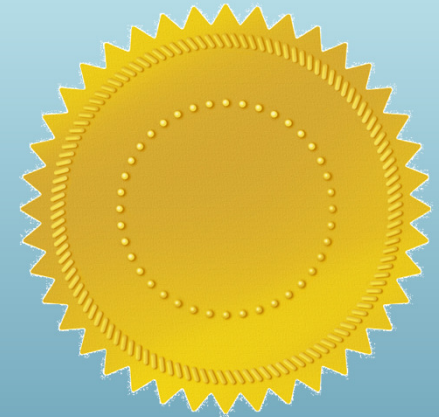
The standard for over 500 higher education institutions—*and counting!*
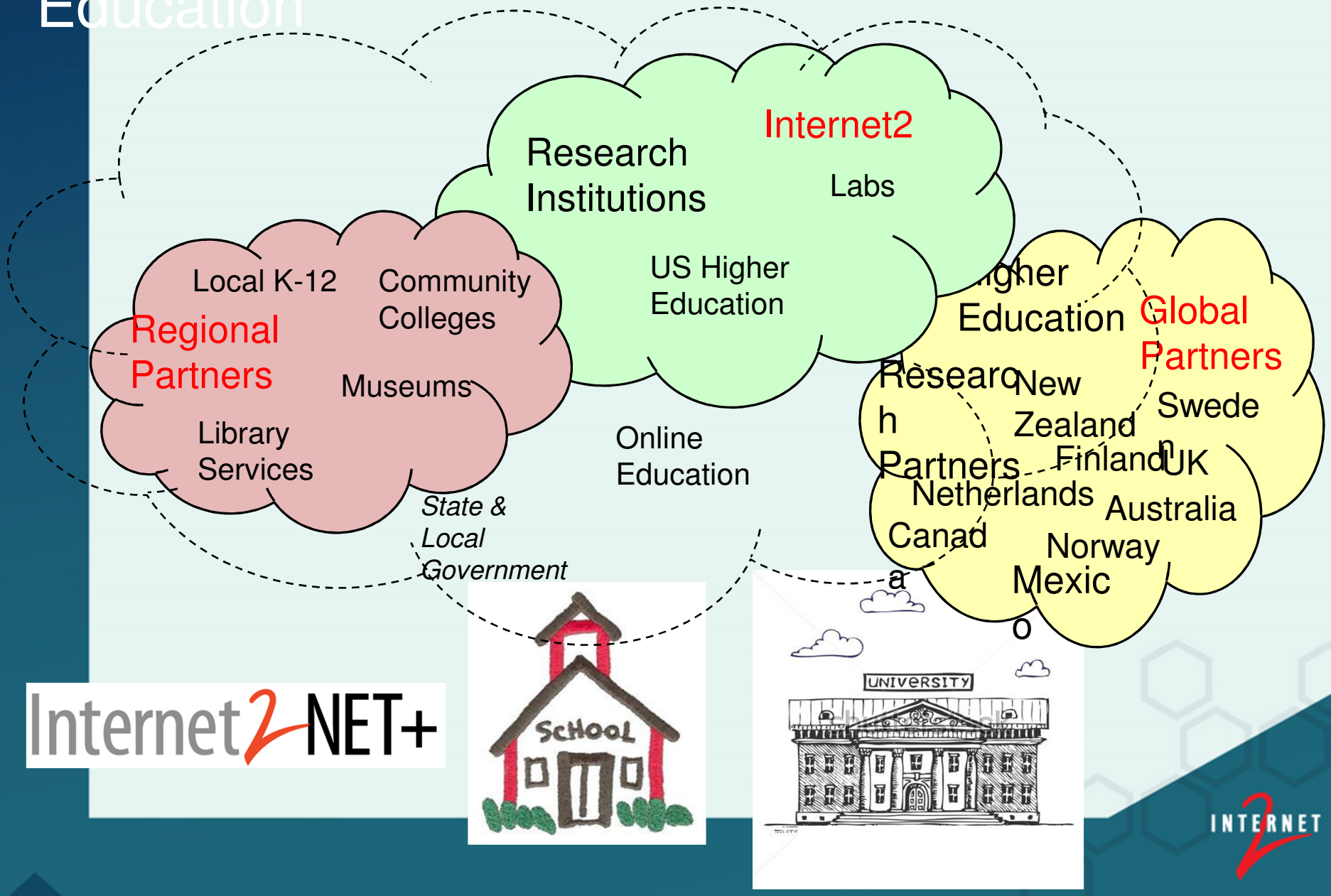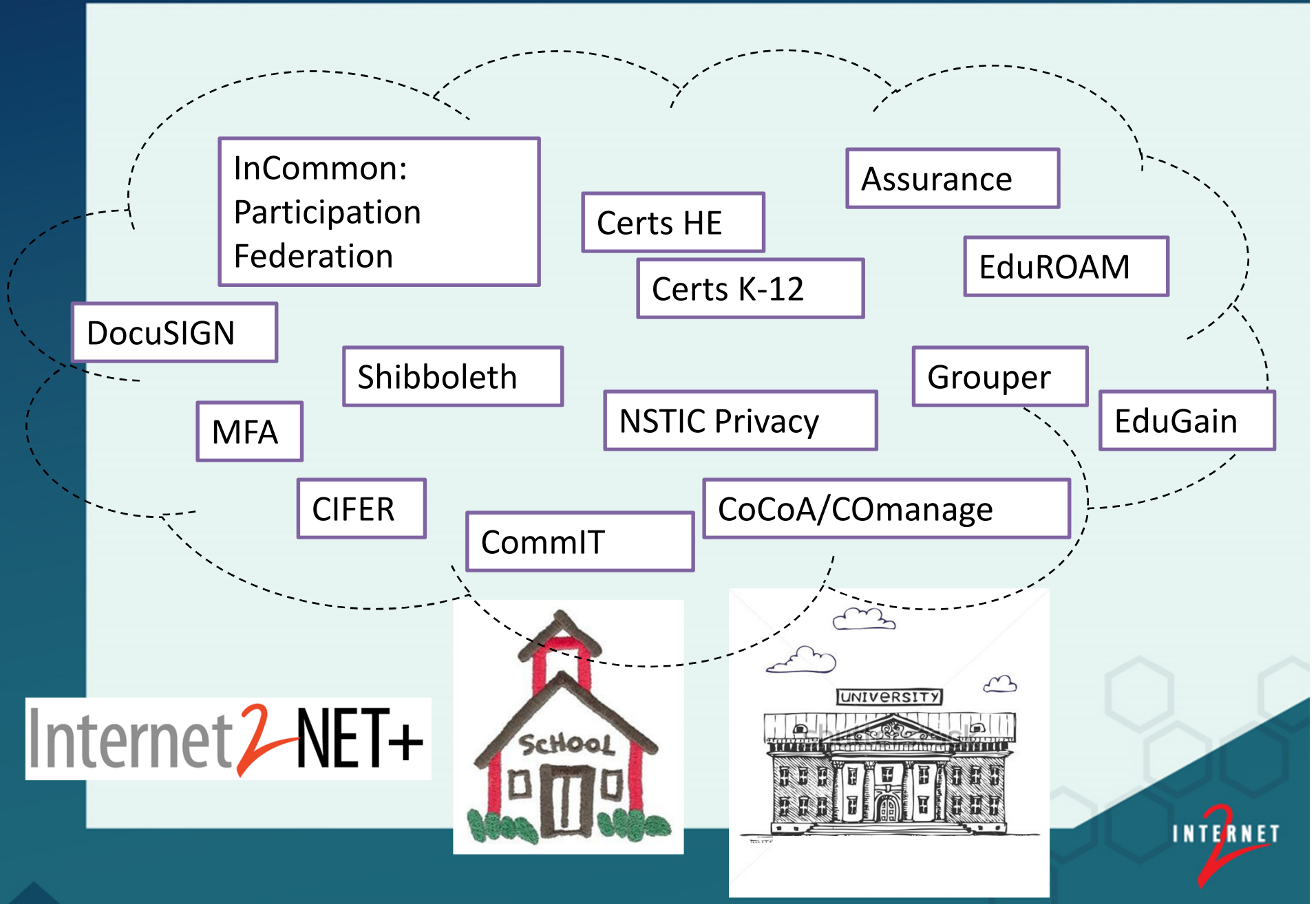
InCommon®
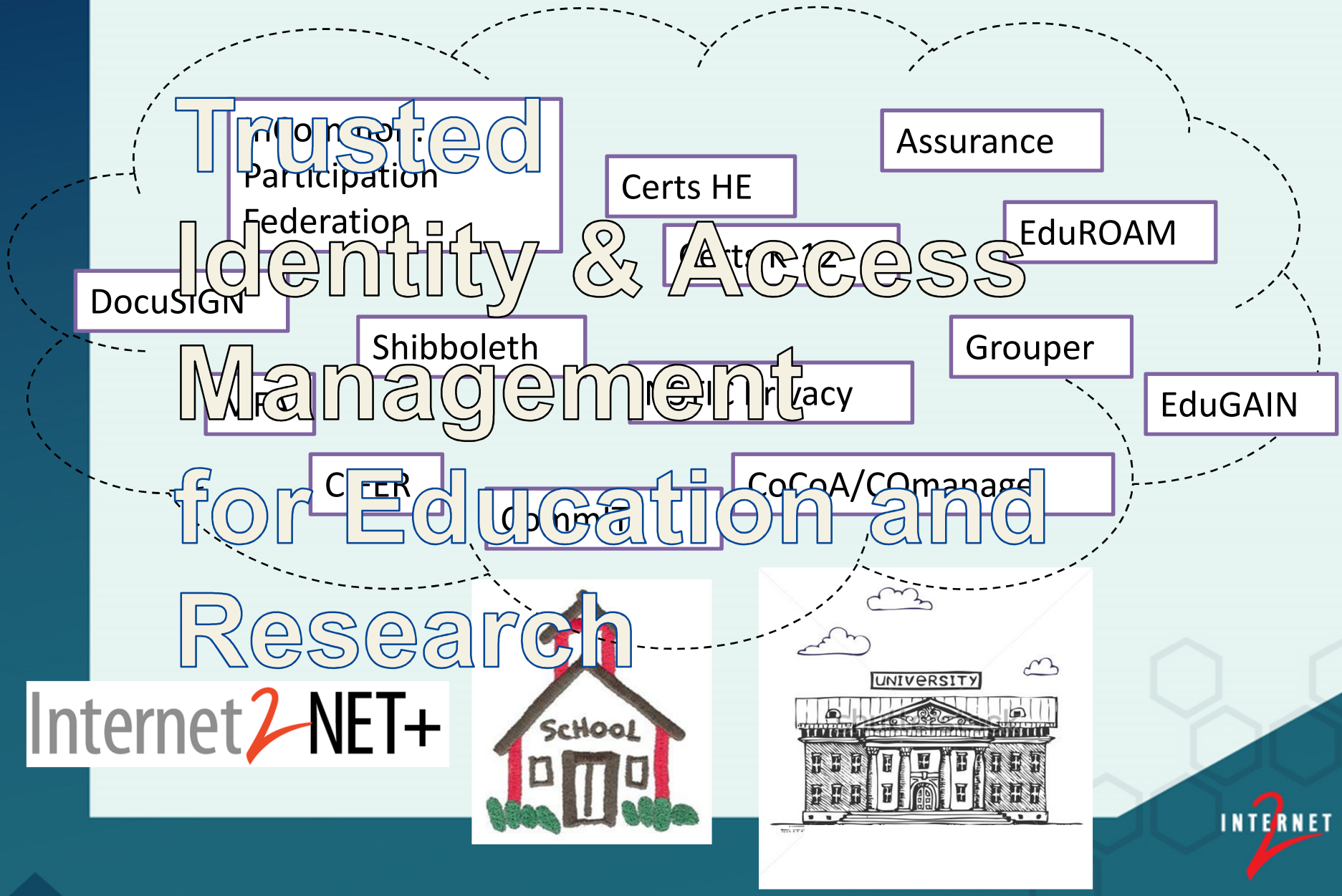
Shibboleth®   **Grouper™**   **COmanage™**

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The Community: Global Research and Education

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Research Institutions

Labs

US Higher Education

Regional Partners

Local K-12

Community Colleges

Museums

Library Services

Online Education

State & Local Government

Higher Education

Global Partners

Research Partners

New Zealand

Sweden

Finland

UK

Netherlands

Australia

Canada

Norway

Mexico

Internet2 NET+

SCHOOL

UNIVERSITY

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Scope of Internet2's Identity "CommIT"ments

Scope of the "CommITments"

Trusted Identity & Access Management for Education and Research

- Participation Federation
- Assurance
- Certs HE
- EduROAM
- DocuSIGN
- Shibboleth
- Grouper
- EduGAIN
- Privacy
- CIFER
- CoCoA/COmanage
- Internet2 NET+

Range of Services – Consolidated Process & Delivery

| Identity & Access Management | Infrastructure, Platform, Security | Software as a Service | Video, Voice and Collaborations | Digital Content for R&E |

Delivered via next-generation, high-speed R&E global networks

Built on federated identity and integration architectural standards

Administered via global agreements, contracts and provisioning

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Cloud Service Lifecycle

Sponsorship by
Internet2 members

Subscription by
members and through regional and global partners to qualified entities

Designed by
participating campuses, providers and Internet2

All delivered at global scale, tailored to R&E needs, and benefitting all participating institutions.

Inquiry

Research Incubator

Evaluation

Service Validation

Early Adopter

OPEN General Availability

Sunset

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Internet2 NET+

cloud service lineup expands
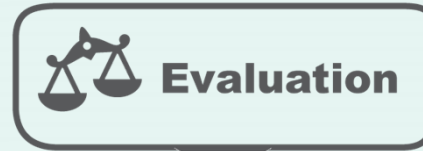
	Spring 2012	Spring 2013
Inquiry	(NA)	2+
Evaluation	(NA)	7
Service Validation	6	14
Early Adopter	8	6
General Availability	2	4
Sunset	(NA)	0

18 services

34 services

Research Incubator

Spring 2012	Spring 2013
2	1

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Internet2 NET+

Growing Ecosystem of NET+ Services & Providers

"We are seeing the…emergence of a meta-university—a…dynamic, communally constructed framework of open materials and platforms on which much of higher education worldwide can be constructed or enhanced."

—Charles M. Vest, President Emeritus, MIT

Regional and Global Partners

Voted on top service priorities - Top 10 services selected to deploy first

SERVICE	LEAD	STATUS
Adobe Connect	CUDI	Completed SV in US. ON HOLD
Amazon AWS	Internet2	In SV. Expect EA July
Box	Internet2	Agreement done. AARNET ready
Canvas	UWash	EA in June
Evernote	SURFnet	Inquiry
Evogh	CalTech	In SV. TBD Cancel and Replace
Microsoft 365	JANET	EA in US
Microsoft Azure	JANET	GA- New. 2 Subscribers in US
vCloud (Dell)	Clemson	Evaluation. Expect SV Summer 2013

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Growth in subscriptions through NET+

Net+ Services

InCommon Participation (,000)

2,500 — 2,000 — 1,500 — 1,000 — 500 — -

1,966
1,710
1,487
1,293
1,239
878
675
484
166

2009 2010 2011 2012 2013 2014 2015 2016 2017

Certificate Service (,000)

3,500 — 3,000 — 2,500 — 2,000 — 1,500 — 1,000 — 500 — -

3,133
2,725
2,369
2,029
2,060
1,490
968
128

2009 2010 2011 2012 2013 2014 2015 2016 2017

Box Revenue before flow-through (,000)

8,000 — 7,000 — 6,000 — 5,000 — 4,000 — 3,000 — 2,000 — 1,000 — - — (1,000)

6,500
5,250
4,085
3,282

2009 2010 2011 2012 2013 2014 2015 2016 2017

"Program success is based on rapid revenue growth. Here are three examples of services in "general availability.""

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Community cloud challenges

- Every [campus/network/country] thinks it can do better than the others—*but we can't succeed by going it alone*

- Sales efforts divide and conquer

- Providers lack executive sponsorship to make things work

- There's a temptation to customize legal agreements in this new area

- Procurement policies and laws vary considerably and are based on pre-cloud concepts

- Cloud security/privacy still evolving—*but we can't afford to wait for perfection*

- Must move beyond simple federated identity to provisioning and deprovisioning identity and access at scale

- Must coordinate across timezones and resources to move faster and remain efficient

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Cloud Success takes more than technology

CHANGE MANAGEMENT

COMMUNITY

INTEGRATION

TEMPLATES

POSITION DESCRIPTIONS

SKILLS

BEST PRACTICES

REPOSITORIES

TRAINING: RISK CONTRACTS

DEVELOPMENT: CLOUD ELEMENTS

What are the components of Cloud Proud™?

CULTURAL CHANGE:
Recognize that moving to the Cloud is NOT just buying new technology.

PARTICIPATION:
Every member of your campus community will be involved. So *GET* them involved.

CHANGE MANAGEMENT: Planned

COMMUNITY: Coordination

INTEGRATION: Identity & System

TEMPLATES: Per Service

POSITION DESCRIPTION: Shared

SKILLS: New Jobs and Careers

BEST PRACTICES: Shared

REPOSITORIES: Documentation

TRAINING: Risk Contracts

Internet2 NET+

How can campuses prepare for the cloud?

1   Create campus strategy for internal and external cloud services

2   Shift from culture of central control to one of sharing, reuse, and value-added differentiation

3   Evaluate Internet2 NET+ portfolio, examine *your* portfolios, consider which projects could benefit from NET+ scale

4   Develop campus identity solution built on open standards

5   Support service competition choices—*but constrained, not unlimited choices*

6   Start implementing cloud-ready language *now* in all contracts

7   Create "cloud first" culture by partnering with legal and procurement teams, restructuring internal processes and policies with the cloud in mind

Princeton Archway, courtesy of Queerbubbles, Wikimedia Commons

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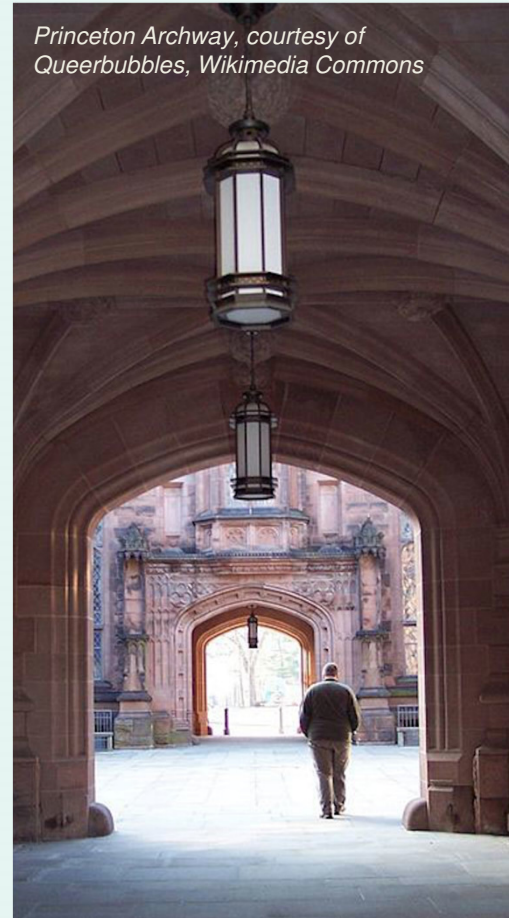
IT is hard. Work together to make Cloud easier.

INTERNET2®

Unleashing new waves of global discovery, together.

BACKUP SLIDES ON SERVICE STATUS

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Example: NET+ Contractual Relationships – Type B1

Service Provider

Internet2

Business Agreement

1. SP invoices Internet2 at wholesa
2. Internet2 invoices Member
3. Member pays Internet2
4. Internet2 pays SP at wholesale

Enterprise Customer Agreement "Member"

Qualified Organization*

Terms of Service Agreement/AUP

Faculty, students, staff
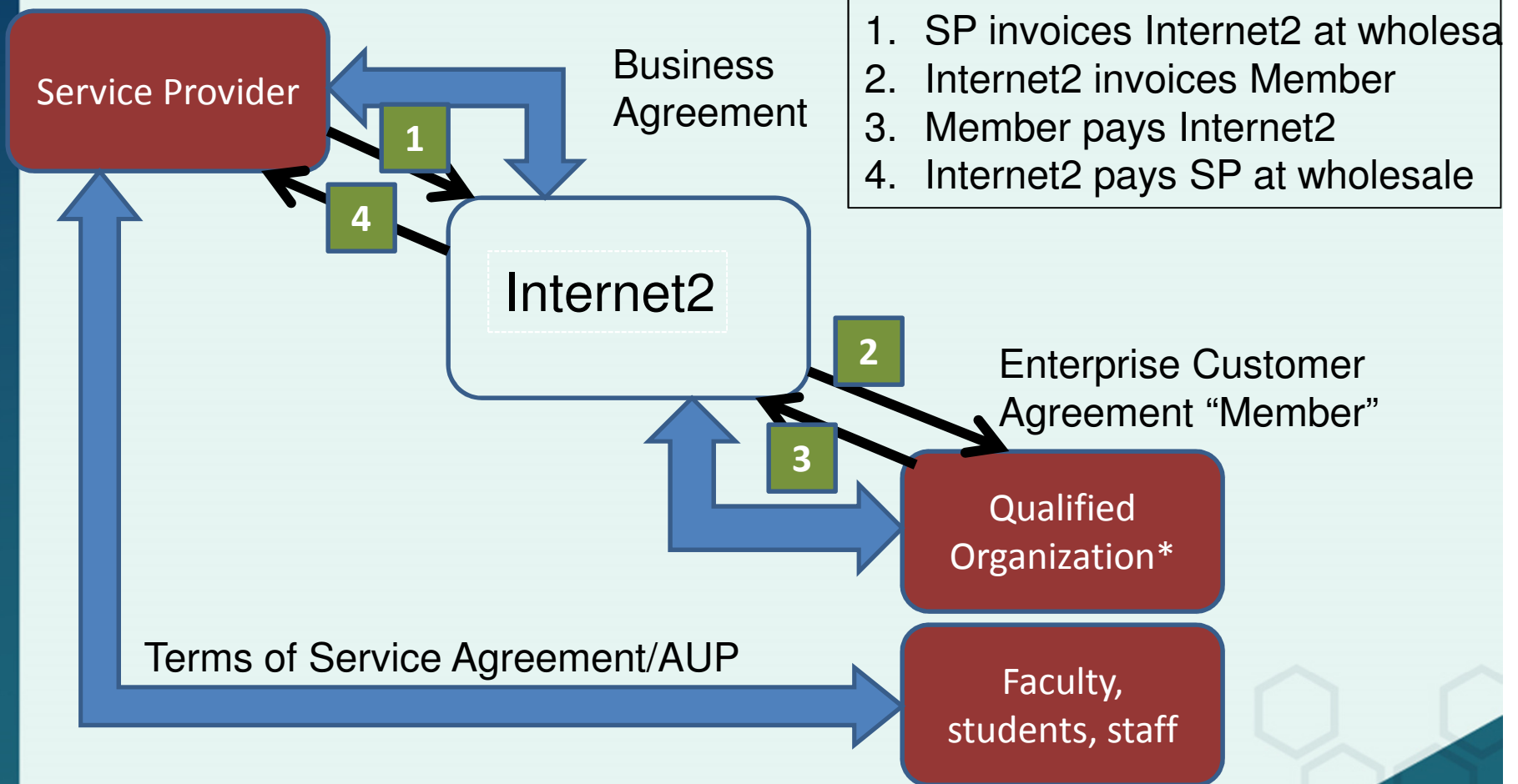
* Qualified Organization agreed upon with each SP

Amazon Web Services

Area: Infrastructure, Platform, and System Security as a Service

Solution: Amazon Web Services

Provider: DLT Solutions and Amazon Web Services

Sponsor: University of Virginia

Service Validation

Status

- Aggregation and volume discounts
- User friendly self-service portal to provision services
- InCommon integration
- Network peering
- Pilot program to reduce data transfer costs

Next Steps

Finalize business model and legal agreements

Internet2 NET+

Box

Area: Infrastructure, Platform, and
System Security as a Service
Solution: Storage and collaboration service
Provider: Box
Sponsor: University of California, Berkeley

OPEN **General Availability**

Status
- 40+ universities
- Network peering being upgraded to 10G
- First phase of accessibility development complete
- New pricing tiers for smaller schools

Next Steps
Updated agreement & regional / global partner

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Canvas

Area: Software as a Service: Academic, Research, and Administrative
Solution: Learning Management System
Provider: Instructure
Sponsor: University of Washington

Early Adopter

Status

- Service validation complete
- InCommon integration
- Discounted and waterfall pricing
- Custom end user terms of use
- Other status item

Next Steps

Open to Early Adopters in May 2013

Internet2 NET+

CrashPlan PROe

Area: Infrastructure, Platform, and System Security as a Service

Solution: Endpoint backup for faculty, staff, students

Provider: Code 42 Software

Sponsor: Multiple Universities

Service Validation
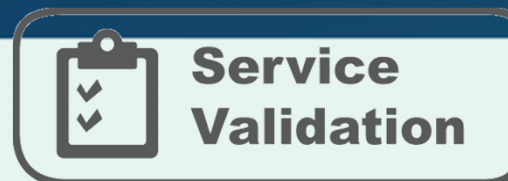
Status
- Service validation underway
- InCommon integration
- Network connection to Internet2 in progress
- Legal agreement under review
- Universities testing and deploying service already

Next Steps
Finalize business model and contract to enable early adopter signups

Internet2 NET+

DocuSign

Area: Trusted Identity in Education: Identity and Access Management
Solution: Electronic signature
Provider: DocuSign
Sponsor: Temple University

Service Validation
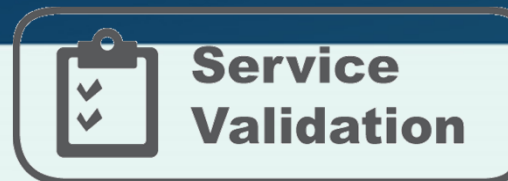
Status

- Service validation will kick-off in May
- InCommon integration planned
- Network connection being assessed
- Integrations with other NET+ services planned

Next Steps

Develop customized business model

Internet2 NET+

Fuze

Area: Video, Voice, and Collaborations as a Service

Solution: HD Videoconferencing

Provider: FuzeBox

Sponsor: Saint Louis University

FUZEBOX®

SAINT LOUIS
UNIVERSITY

Service Validation

Status

- Service validation underway
- Open to additional participants
- InCommon integration planned
- Network connection under review

Next Steps

Develop custom pricing and business model

Internet2 NET+

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Office 365 Education

Area: Software as a Service: Academic, Research, and Administrative

Solution: Office desktop suite in the cloud and cloud productivity platform

Provider: Microsoft

Sponsor: Colorado State University and University of Florida

Service Validation

Status
- Customized contract
- Additional no-cost support options
- InCommon testing being planned
- Online community of practice site will be established

Next Steps

Move to Early Adopter phase in next 2-3 months

Internet2 NET+

Internet2 NET+ Splunk

Area: Software as a Service: Academic, Research, and Administrative
Solution: Machine data analysis
Provider: Splunk
Sponsor: Multiple Universities

Service Validation

Status

- Service validation beginning in May
- Business model under development
- Waterfall pricing for the community
- Subscriptions billed through Internet2

Next Steps

Finish business model discussion and contract review

Internet2 NET+

Vidyo

Area: Video, Voice, and Collaborations
as a Service
Solution: Personal telepresence
Provider: Vidyo and ID Solutions
Sponsor: Arizona State University

Service Validation

Status

- Service validation finishing up
- Pricing and business model nearly finalized
- Accessibility testing
- InCommon development
- Network integration

Next Steps

Open to Early Adopters in May 2013

Internet2 NET+

Adobe Connect

Area: Software as a Service: Academic, Research, and Administrative

Solution: Web conferencing platform for web meetings, eLearning, and webinars

Provider: Adobe

Sponsor: Case Western

Service Validation

Status

- Functional Validation complete
- Security Assessment in progress

Next Steps

Finalize contract

Internet2 NET+

Desire2Learn Capture

Area: Software as a Service: Academic, Research, and Administrative

Solution: Lecture capture and webcasting solution

Provider: Desire2Learn

Sponsor: Tulane University

Service Validation

Status

- Functional validation complete
- Security assessment in progress

Next Steps

Early Availability targeted for Q3, 2013

Internet2 NET+

eduroam

Area: Trusted Identity in Education: Identity and Access Management

Solution: International Internet access for participating institutions

Provider: Internet2 and Anyroam

Sponsor: University of Tennessee Knoxville

THE UNIVERSITY *of* TENNESSEE **UT**
KNOXVILLE

INTERNET2®

ANYROAM™

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

Early Adopter
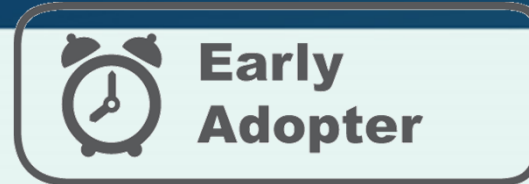
Status
- Open – Internet2 members and other non-member organizations
- NSF Grant requirements being fulfilled by Anyroam
- Participation and non-member pricing complete

Next Steps
Finalizing Customer Agreement for full availability by Summer 2013

Internet2 NET+
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E-Content

Area: Content Services: eText, Research, and Academic Content

Solution: Pilot series to evaluate technology and business models as textbooks evolve from paper to electronic form

Provider: Several

Service Validation

Status

- Fall 2012: 27 institutions
- Spring 2013: 18 institutions
- Fall 2013: kick-off meetings, legal

Next Steps

Exploring options for moving from pilot to Net+ services

COURSELOAD

CourseSmart®

Mc Graw Hill Education

EDUCAUSE

Internet2 NET+

ICE Health Systems

Area: Software as a Service: Academic, Research, and Administrative

Solution: Dental system for higher education

Provider: ICE Health Systems

Sponsor: University of Michigan

Service Validation

Status

- SV Participation closed
- Business Agreement in progress
- Security Assessment in progress
- Steering committees created for Clinical User Interface, Billing/Financials, Education

Next Steps

General Availability as-is by Fall 2013 as feature enhancement work continues with input from Service Validation institutions

Internet2 NET+

Merit Network, Inc.

Area: Infrastructure Platform and

Security as a Service
Software as a Service: Academic,
Research, and Administrative

Solution: Hosted infrastructure and
application services

Provider: Merit Network, Inc.

Cornell University

FRESNO STATE
Discovery. Diversity. Distinction.

General Availability
OPEN

Status
- Open
- Internet2 member and InCommon participation required
- Higher education only
- Institutions testing many solutions before final implementation

Next Steps
Partnering effort with webinars

Internet2 NET+

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AT&T Synaptic Storage and Compute

Area: Infrastructure Platform and System Security as a Service

Solution: Cloud-based on-demand storage and compute services scaled for academic, and administrative needs

Provider: AT&T and Florida Lambda Rail

Sponsor: None

Evaluation

Status

- Participation is Open
- Intrenet2 member not required - InCommon participation required
- Open to all qualified research and education institutions

Internet2 NET+

CenturyLink Savvis

Area: Infrastructure Platform and System Security as a Service

Solution: Savvis Virtual Private Data Center Services and Savvis Management Console

Provider: CenturyLink/Savvis

Sponsor: Florida State University

Evaluation

Status
- Participation is Open
- Continued evaluation of services and identification of use cases

CenturyLink™ Government

THE FLORIDA STATE UNIVERSITY

Internet2 NET+

Dell Cloud On-Demand

Area: Infrastructure Platform and
System Security as a Service

Solution: Multi-tenant Infrastructure-as-a-
Service (IaaS) hosted in secured
Dell datacenters

Provider: Dell

Sponsor: Indiana Univeristy

Service Validation

Status

- Participation is Closed
- InCommon participation required
- Higher education only is pending

INDIANA UNIVERSITY

DELL

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DuraCloud

Area: Infrastructure Platform and System Security as a Service

Solution: Preservation and accessibility of irreplaceable documents, imagery, and videos

Provider: DuraSpace

Sponsor: University of Virginia

Early Adopter

Status

- Participation is Open
- Business agreement nearing completion

DURASPACE™

UNIVERSITY of VIRGINIA

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Fischer Ignite-Federation Service

Area: Trusted Identity in Education: Identity and Access Management

Solution: Hosted, virtual identity provider service that satisfies the IdP related requirements for joining the InCommon Federation

Provider: Fischer

Sponsor: None

FISCHER ™
INTERNATIONAL

Evaluation

Status

- Participation is being determined
- No Internet2 Membership required, InCommon required
- Open to qualified high education and research institutions

Internet2 NET+

IU – Compute-Cluster-on-Demand

Area: Infrastructure Platform and System Security as a Service

Solution: HPC computing time by leveraging IU's access supercomputing cloud resources.

Provider: Penguin Computing and IU

Sponsor: Indiana University

INDIANA UNIVERSITY

Evaluation

Status

- Participation is being determined
- InCommon participation required
- Not only for Higher Education - K20, as well as U.S. FFRDCs.

Internet2 NET+

Kaltura

Area: Video, Voice, and Collaborations as a Service

Solution: Open Source Online Video Platform

Provider: Kaltura

Sponsor: Open

Inquiry

Status

- Participation is Full
- Membership/participation requirements still to be determined
- High Education only

Kaltura
open source video

NCSU/IBM VCL

Area: Infrastructure Platform and System Security as a Service

Solution: Open source "Virtual Computing Lab" services (cycles and management) for the Internet2 community

Provider: NCSU and IBM

Sponsor: George Mason University

Service Validation

Status

- Participation is Open
- Service Validation kicked off in October 2012

Internet2 NET+

SeeVogh

Area: Video, Voice, and Collaborations as a Service

Solution: Simplified interface, high-end, video collaboration

Provider: Evogh

Sponsor: University of Maryland Baltimore County

Early Adopter

Status
- Participation is Open
- InCommon integration completed
- Business agreement nearly completed

EVOGH Inc.

UNIVERSITY OF MARYLAND BALTIMORE COUNTY · U M B C · 1966

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INTERNET2

SHI International

Area: Infrastructure Platform and System Security as a Service

Solution: Highly secure VMWare solutions, seamless bursting to cloud, delivered directly through the R&E Network

Provider: SHI
Sponsor: Pending

Evaluation

Status

- Participation is Open

- Major enhancements is on-going

- Currently in proof-of-concept evaluation with another university

- Business agreement nearly completed

Internet2 NET+

Solution Design Group

Area: Software as a Service: Academic, Research, and Administrative

Solution: Track and monitor service provider contracts and performance metrics

Provider: Solution Design Group

Sponsor: University of Maryland Baltimore County

Service Validation

Status

- Participation is Open
- Kick off in September 2012

Tivli

Area: Video, Voice, and Collaborations as a Service

Solution: Provider of IPTV solutions to the College and University marketplace

Provider: Tivli

Sponsor: Yale University

Evaluation

Status

- Participation is Open
- InCommon participation required
- Higher Education only

Internet2 NET+

Windows Azure

Area: Infrastructure Platform and System Security as a Service

Solution: Large data initiatives, such as genomics, can save on bandwidth charges, shifting those resources toward direct research-related activities.

Provider: Microsoft

Sponsor: University of Washington

Early Adopter

Status

- Participation is Open
- Internet2 membership not required - InCommon participation required
- Open to all educational and research institutions

So Get Your Campuses Thinking NET+

1 Create campus strategy for internal and external cloud services

2 Shift from culture of central control to one of sharing, reuse, and value-added differentiation

3 Evaluate Internet2 NET+ portfolio, examine *your* portfolios, consider which projects could benefit from NET+ scale

4 Develop campus identity solution built on open standards

5 Support service competition choices—*but constrained, not unlimited choices*

6 Start implementing cloud-ready language *now* in all contracts

7 Create "cloud first" culture by partnering with legal and procurement teams, restructuring internal processes and policies with the cloud in mind

Princeton Archway, courtesy of Queerbubbles, Wikimedia Commons

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