Teaching From the Cloud:
What Elements of Dental Education Should Move to the Cloud?

March 2017
Speakers

• Dana Voss, PMP
  Program Manager
  Internet2

• David Rankin, M.S., PgC Information Assurance, CGCIO
  Assistant Dean for Computing and Information Systems
  University of North Carolina—Chapel Hill, School of Dentistry

• Heiko Spallek, DMD, PhD, MSBA (CIS)
  Professor and Pro-Dean
  University of Sydney, School of Dentistry,

• Lynn A. Johnson, PhD
  Associate Dean for Faculty Affairs and Institutional Effectiveness
  University of Michigan, School of Dentistry

• Mark Genuis, PhD
  CEO, ICE Health Systems
Agenda

• Overview of Internet2 NET+ Program
• Office 365
• Duo Security
• Box
• Eduroam
• LabArchives
• Canvas
• BlueJeans
• ICE Health Systems
• Q&A
Teaching From the Cloud:
What Elements of Dental Education Should Move to the Cloud?

Internet2 NET+ Overview

Dana C. Voss
INTERNET2

Internet2 delivers a diverse portfolio of solutions that leverages, integrates, and amplifies the strengths of its members through every aspect of the organization.

Internet2 delivers to its community through its core components – a secure national network that was built to deliver advanced customized services that are accessed and secured by the community-developed trust and identity framework.

Integrated Trust and Identity Services
InCommon Federation and TIER (Trust and Identity in Education and Research) to develop a standard identity and access management software suite, using existing open-source products like Shibboleth and Grouper – to enhance interoperability with other campuses and services.
INTERNET2 BY THE NUMBERS

315+ Internet2 members
3,500 institutions eligible for NET+ services
93,000+ community anchor institutions
599 InCommon higher education participants
49 TIER Investor Institutions
5
petabytes of traffic on the network every day
30 NET+ services available
43 Regional Network Partners
9 hours – length of time it takes to transfer entire Library of Congress over Internet2 Network
17.2 Tb/s capacity
15,700 miles of dark fiber capacity or 17,500 miles optical fiber infrastructure
250 million dollars in savings possible across all eligible NET+ institutions
80 Industry Partners
Community portfolio of cloud services, by and for research and education
NET+ Program Charter 2012

“Dedicated to the widespread adoption of federated cloud services that benefit the research and education community. In partnership with those we serve, the NET+ program provides simple, consistent and streamlined access to highest value cloud services, community and commercial, offered at the best possible terms and conditions, to all participating institutions.”
Challenges of Procuring Cloud Services

• **Timeliness**: RFP time scales do not align with “cloud speed”

• **Risk Management**: “Click-through” agreements present challenges to university policy

• **Price Variability**: different pricing for different schools; unexpected increases; various volume discount

• **Pilots and Trials**: free trial may exclude that vendor from competitive consideration
Procurement Timeline

CURRENT PROCUREMENT

- Analyze service; prepare RFP
- Analyze RFP responses
- Negotiate contract terms & conditions
- Sign contract

Cloud needs...

NET+: analyze service; negotiate contract; Early adopters

Univ: signs contract
Internet2 Services Hub Lifecycle

Candidate
- Sign Ts&Cs
- Finalize pilot offering

Provisional
- 12 months
- Complete 10 successful pilots
- Review additional requirements

Service Validation
- Complete community vetting
- Continued pilots and subscriptions

Early Adopter
- Critical mass of deployments
- Advisory board approval

General Availability
- Ongoing strategic engagement
What it means to be a NET+ Service

• NET+ Service Validation: comprehensive process involving 3-7 universities
  • Functional Assessment (features/functionality)
  • Legal Agreement: Business model and “Most Favored Nation” pricing
• Security: Completion of the Cloud Controls Matrix (CCM) and SOC2
• Identity: Participation in InCommon & adoption of community standards
• Network: Internet2 R&E network delivery & adoption of community standards
• Accessibility: WCAG AAA and publishing a VPAT
• Roadmap: Engagement with an “Advisory Board” of participating campuses
• Executive Sponsorship: Company executive
Sample Services Available Today to Members

Available NOW with full contracts and community stewardship
2017: Candidate Services In Service Validation

Full NET+ Service Validation Activities Undertaken
Teaching From the Cloud:
What Elements of Dental Education Should Move to the Cloud?

David Rankin
Office 365, Duo Security
What is Office 365?

Office 365 is a cloud-based, off-premises email, calendaring, storage and collaboration suite from Microsoft.

Office 365 joins email, calendar, file storage and Office applications together into one easy-to-access solution.
Why is O365 better?

- More storage
- Better collaboration options
- Stronger physical and digital security for your information
- 24/7/365 accessibility from anywhere with network connectivity
- Complements the technology environment at UNC-Chapel Hill
- Office applications are automatically updated from the cloud
### What are the features?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Office 365</th>
<th>Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Storage</td>
<td>50 GB plus unlimited archive storage space</td>
<td>2 GB</td>
</tr>
<tr>
<td>File Storage</td>
<td>1 TB of OneDrive Storage</td>
<td>None</td>
</tr>
<tr>
<td>File Sharing</td>
<td>Yes, with those internal to UNC</td>
<td>No</td>
</tr>
<tr>
<td>File Collaboration</td>
<td>With Microsoft Online Apps using SharePoint and/or OneDrive</td>
<td>None</td>
</tr>
<tr>
<td>Licenses for Office Installations</td>
<td>5 on desktop computers (including personal devices) 5 on mobile devices (tablets and smartphones)</td>
<td>1 per work machine (no personal devices)</td>
</tr>
<tr>
<td>Automatic Updates for Office</td>
<td>Yes, all Office applications updated from the cloud</td>
<td>No</td>
</tr>
</tbody>
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Why Now?

- Demand from campus for file storage and collaboration tools
- Successful pilot migrations
- We have (limited) funding to help support the migration
When is this happening?

Jan/Feb Preparation Activities
- OneDrive Sensitive Data Sharing – Internal
- Microsoft External Sharing SOW
- OneDrive/SharePoint Sensitive Data – External
- Communications Strategy
- Early IT Migration
- Hiring and Training of Additional Staff

Migration Activities
- Athletics
- Department of Health & Safety
- Facilities
- Finance & Administration
- Kenan-Flagler
- SEAA
- Student Affairs
- UNC General Administration
- University Counsel

March Administration & Academic Migrations
- Admissions
- Arts and Science Administration
- College of Arts and Sciences
- FPG Child Development Inst.
- School of Dentistry
- School of Law
- School of Pharmacy
- School of Public Health
- School of Social Work

April Academic Migrations
- Centers
- Programs
- Research
- School of Nursing
- School of Medicine - Non Clinical

May Academic Migrations
- Allied Health (SOM)
- School of Medicine - Clinical
- School of Pharmacy

June Academic Migrations
- HR/Office of Vice Chancellor
- Office of Provost
- Office of the Chancellor
- University Development Office
- Communications and Public Affairs
- WUNC-FM

Mailboxes Migrated
- Jan/Feb: 5500
- March: 8,800
- April: 4,000
- May: 8500
- June: 1800
DUO
2-step verification
What is 2-step verification?

• 2-Step Verification adds a second step to the verification process.
  • This can be something you have, such as an ATM card, cell phone or something that is part of you, such as a fingerprint.
  • At the University, we use a mobile phone, landline phone, or tablet to provide the second step (it’s your choice as to which device you use).
How does this work?

One time only: Register for two-step verification using app, text, or telephone call.

Go to a place in the system that requires verification → Click the link to verify → Receive a notice on the app, a text message, or a phone call.

For the app, click a button. For text, enter the code sent to you. For phone call, press any key. → Now you can access the sensitive information.
Duo Demonstration
Heiko Spallek
Professor and Pro Dean
Faculty of Dentistry
University of Sydney

heiko.spallek@sydney.edu.au

+ 61 439 320 490

Box Subscribers (138)

Alabama A&M University
Augusta University
Ball State University
Baylor College of Medicine
Baylor University
Berea College
Bob Jones University
Brandeis University
Bridgewater College
California State University - Chico
California State University - Fresno
California State University - Fullerton
California State University - Northridge
California State University - San Marcos
Caltech (California Institute of Technology)
Carnegie Mellon University
Case Western Reserve University
Clemson University
College of William and Mary, The
Cornell University
Dartmouth College
DePaul University
DePauw University
@Pitt: File Servers ➔ Box Cloud Storage

Problem:
- $12,000/year file servers
- IT support for shared drives
- sponsored accounts needed for external collaborators

Solution:
- 2014: full conversation to Box
- 4 TB of school storage + 50 GB per user (later unlimited)
- robust protections for institutional information
- $2,000/year
Beyond storage ... Box Notes

How to Join Meeting:
Click to join: https://meet.uth.edu/invited.sf?id=669550128
Dial in number: 713-486-6338
Call ID: 669550128#

You can either use your computer (screensharing and audio) or join by phone using the Dial in number.

AGENDA

1. Review of previous minutes and documents from 03/02/2016 Phone Meeting:
Minutes (can be edited): https://pitt.box.com/s/zn29fsc8h6b35o9ib63chkh8ro38ab9me
Motion to approve the minutes: PDF version:

Updated COHRI Visions, Mission

- Action Item: put on Website
- Action Item: Heiko will create

2. Follow-up plan with individuals who signed up/interested in COHRI workgroups

Dolph: Edu topics / interest:
- e-portfolios
- clinical grading
- etc.
- Action Item: Dolph will contact people who expressed interest.
- Action Item: Joe
Beyond storage … Collaboration

88 collaborators from 9 institutions
Beyond storage … on all devices
Beyond storage … edit online

Application for ADEA Council of Sections (ADEA COS) Program Fund

Program Coordinator Contact Information
Ana Neumann, DDS, MPH, PhD
Chair, ADEA Section for Dental Informatics
Director of Dental Public Health
Associate Professor, Department of General Practice and Dental Public Health
UT Health | The University of Texas Health Science Center at Houston - School of Dentistry
Suite 5423
7500 Cambridge
Houston, Texas 77054
Telephone: 713-486-4079
Fax: 713-486-4108

Funding Request Total
• Requested Amount (maximum of $3000): $2025
• Has this topic been previously presented (at ADEA)? No

Section I: Program Information
Program Title: Teaching From the Cloud: What Elements of Dental Education Should Move to the Cloud?

Program Description:
It can be exciting to ponder how mobile cloud-based platforms will transform the next generation of dental education—but also intimidating and confusing. Mastering the new technologies associated with collaborative online platforms while simultaneously satisfying institutional standards can be a major challenge.
Meet security and compliance requirements

What Types of Data Can I Store on Box?

Box provides robust security for the data you store. However, due to federal, state, and local laws and University policies and standards, it should not be used to store, collect, or share certain types of regulated and sensitive data. This includes data regulated by HIPAA and GLB. Please keep in mind that you are responsible for safeguarding University of Pittsburgh data stored on the computers, devices, and online services you use.

Box uses state-of-the-art technology and industry best practices for data encryption during transit to and from the Box cloud, as well as while stored within Box. For this reason, we recommend you use only the Box Web interface (http://pitt.box.com) or official Box apps to transfer data securely to Box. If you use an app for Box that has been developed by a third party, you should take steps to ensure that the app transfers data using a secure method.
<table>
<thead>
<tr>
<th>Data Type</th>
<th>Permitted</th>
<th>Not-Permitted</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-confidential or general business</td>
<td></td>
<td></td>
<td>Data that does not include any information which could be used to identify the individuals involved in the research.</td>
</tr>
<tr>
<td>De-identified human subject research</td>
<td></td>
<td></td>
<td>Data that does not include any information which could be used to identify the individuals involved in the research.</td>
</tr>
<tr>
<td>Sensitive identifiable human subject research</td>
<td></td>
<td></td>
<td>Any individually identifiable research data containing sensitive information such as information about mental health, genetics, alcohol and drug abuse, or illegal behaviors.</td>
</tr>
<tr>
<td>Student educational records (FERPA)</td>
<td></td>
<td></td>
<td>Grades, student transcripts, degree information, disciplinary records, and class schedules.</td>
</tr>
<tr>
<td>Protected health information (ePHI-HIPAA)</td>
<td></td>
<td></td>
<td>Any unique identifying attribute, characteristic, code, or combination that allows identification of an individual, and that is combined with medical or health information. Examples include, but are not limited to, date of birth, date of death, email addresses, telephone numbers, and device ID numbers.</td>
</tr>
<tr>
<td>Social Security Numbers</td>
<td></td>
<td>123-45-6789</td>
<td></td>
</tr>
<tr>
<td>Gramm Leach Bliley (GLBA) student loans application information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment card information (PCI)</td>
<td></td>
<td></td>
<td>Cardholder name, account number, expiration date, verification number, and security code.</td>
</tr>
<tr>
<td>Export controlled research (ITAR, EAR)</td>
<td></td>
<td></td>
<td>Data containing research on things such as chemical and biological agents, satellite communications, certain software or technical data, and work on formulas for explosives.</td>
</tr>
<tr>
<td>FISMA data</td>
<td></td>
<td></td>
<td>Any government data that is regulated by the Federal Information Management and Security Act, including VA data, FDA data, and Medicare data.</td>
</tr>
</tbody>
</table>
Security & Accessibility

Are my files and data safe on U-M Box?

Box adheres to the highest industry standards for security at every level and commits extensive resources to the design, implementation, monitoring, and maintenance of its security infrastructure, including:

- Data encryption
- Administrative auditing
- Password policy enforcement and AD/LDAP integration
- Role-based access controls
- Password- and time-based file sharing

Learn more on the Box Security web page.

Can I use U-M Box with sensitive data that is covered by laws and standards such as HIPAA, FERPA, FISMA, GLBA and PCI?

U-M Box provides robust security for sensitive university data. However, due to federal, state, and university laws, policies and standards, it should not be used to collect, process, store or share certain types of Sensitive Regulated data; this includes data regulated by ITAR/EAR, FISMA and PCI.

Student educational records regulated by FERPA, GLBA (read about GLBA Compliance at U-M), HIPAA and Sensitive Human Subject Research data may be collected, processed, stored or shared in Box.

If you store sensitive data on your Box account and access Box data with a mobile device, we recommend that you enable the mobile app passcode lock in the Box app settings on your mobile device.
Eduroam (education roaming) is the secure worldwide federated network access service developed for the international research and education community.
Eduroam
@ The University of Sydney
LabArchives is a leading web-based Electronic Lab Notebook (ELN) application that is used by thousands of scientists throughout the world (including two Nobel Prize winners) to store, organize, share, and publish their laboratory data.

Service Type: Software as a Service
Phase: Early Adopter
Eligible Subscribers: Internet2 Member
Sponsors: Cornell University
Email: dvoss@internet2.edu
Contact: Dana Voss
LabArchives @ Sydney

ENOTEBOOKS

eNotebooks (formerly Electronic Lab Notebooks, or ELNs) provide you with a collaborative working tool suitable for both internal and external collaborators. eNotebooks can be used in any discipline and are a great option for curating, storing and sharing working documents, procedures, observations, conclusions, notes, images and data files.

Features

- **Searching** - eNotebooks are designed to be searched by keyword or tag.
- **Sharing and collaboration** - Connect to more researchers and provide access to your research data by choosing to share all or part of your eNotebook within your research team, external collaborators, even with the public.
- **Research data management** - eNotebooks promote good practice by keeping protocols, observations and digital data all in one place.
- **Portability** - Access your electronic notebook anywhere, anytime, from almost any device.
- **Record keeping** - eNotebooks are a source of evidence of responsible research conduct, inventorship and authorship for patents and research publications.
- **Secure** - LabArchives eNotebook is secure, password-protected and has been independently certified by ICT data security consultants. Access to the eNotebook is via UniKey, and can be restricted to the notebook owner or authorised members of the research team.
- **Free** - LabArchives eNotebook is free for staff, students and affiliates.
Teaching From the Cloud: What Elements of Dental Education Should Move to the Cloud?

Lynn Johnson, PhD
- Single Sign-on
- Transparent pricing
- Robust legal agreements
- Validated security

Logos:
- Box
- Amazon Web Services
- LastPass
- BlueJeans
- Eduroam
- LabArchives
- Canvas
What is Canvas?
What is Canvas?
### Formative Lab Practicals

- **519 Formative Practical 1: Caries Excavation**
  - Due Oct 23, 2015 at 2:30pm

- **519 Formative Practical #2: Class III Prep**
  - Due Nov 24, 2015 at 3pm

- **519 Formative Practical #3: Class III Restoration**
  - Due Nov 24, 2015 at 3pm

### Reflection Pass/Fail component

- **Student-Generated Study Plan for Caries Removal**
  - Closed | Due Oct 27, 2015 at 1pm

- **Student Generated Study Plans for Class III Prep/Restorations - Copy**
  - Closed | Due Dec 4, 2015 at 12pm

### Summative Lab Practicals

- **519 Summative Lab Practical #1 Rubber Dam**
  - Due Oct 30, 2015 at 2:30pm | 100 pts

- **519 Summative Lab Practical #2 Form 1 Prep**
  - Due Oct 23, 2015 at 2:30pm | 42 pts

- **519 Summative Lab Practical #3 Caries Removal**
  - Due Nov 6, 2015 at 4pm | 100 pts
Canvas Activity - Winter 2017 Term*

- Courses: 5,070
- Teachers: 5,051
- Students: 38,580
- Assignments: 49,156
- Discussion Topics: 41,312
- Files Uploaded: 229,487

Activity by Date

Activity by Category

*Does not include School of Medicine terms
- Single Sign-on
- Transparent pricing
- Robust legal agreements
- Validated security

logos:
- Box
- Amazon Web Services
- Canvas
- LastPass
- BlueJeans
- Duo
- Eduroam
- LabArchives
What is BlueJeans

- Cross-platform—works across most protocols
- Up to 100 endpoint connections (laptop, tablet, smartphone, telepresence system, and phone)
- High-resolution videoconferencing (720p)
- High-resolution content sharing (1080p)
- Single-Sign On
- Business Associate Agreement
- Data Protection Agreement
- End-to-end encryption
My Recent Uses of BlueJeans

- Host virtual guest speakers
- Broadcast Research Day speaker
- Hold thesis defense globally
- Initial faculty interviews
- Preparing ADEA and IADR presentations
  - IADR: London UK, Sydney Australia, Calgary Canada, Ann Arbor MI
- Teach when traveling
- Collaborative research/projects

Secret Tool: http://www.timeanddate.com/worldclock/meeting.html
<table>
<thead>
<tr>
<th>Feature</th>
<th>BlueJeans</th>
<th>Hangouts (Google)</th>
<th>Lync / Skype (Microsoft)</th>
<th>GoToMeeting (Citrix)</th>
<th>WebEx (Cisco)</th>
<th>Zoom</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAA</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>No. Participants</td>
<td>100</td>
<td>15</td>
<td>250</td>
<td>100</td>
<td>25 /100</td>
<td>25, 50 or 100</td>
</tr>
<tr>
<td>SSO</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
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<tr>
<td>Record Mtg</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Screen Sharing</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
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</table>
Blue Jeans at U-M
March 1, 2015 – February 29, 2016

We Connected:
55,577 Meetings
188,652 People
114 Countries
2,515 Cities

We Achieved:
7,073,411 Minutes
= 117,890 Hours
= 4,912 Days
= 13.46 Years
of Continuous Streaming

60,785,549 Miles Spanned
Enough to circle the globe more than 2,441 times, saving over $9.2 million in travel costs

3,624 Recordings

11,271 Metric Tons of Emissions Saved
Equivalent to taking nearly 2,400 cars off the road for a year

Then & Now:
Meetings

Minutes

944,551

Ways We Connected:
66,696 by Browser
36,151 by Room Systems
33,039 by Telephone
8,502 by Mobile
44,264 by Other Devices

All information provided by BlueJeans.
Teaching From the Cloud:
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One Vendor’s Perspective
From Pain to Gain...for ALL

An uniquely involved project...with a uniquely exciting outcome

○ Created a profession-specific solution from scratch
○ Internet2 Required Transparency in Relationship
  ■ Cost structure and term
  ■ Business structure
  ■ Service levels
  ■ Support levels
  ■ Business associates agreement (shared liability)
  ■ Ongoing governance of the community on the product
From Pain to Gain...for ALL

Guiding Requirements

- Efficient Clinical Experience
- Support learning
- Service schools and private practice
- Dynamic data access
- Support research standards
- Excellence in communication and collaboration
- Exceed security regulations
- Foremost software engineering practices
- Robust interoperability
From Pain to Gain...for ALL

ONGOING - Launch, Celebrate, Research, further Innovation to EXTEND the EHR

- ONGOING - Development and Continuous improvement
- Security Reviews & Legal Agreement
- Architecture
- Requirements Documentation
- Company Selection

EHR Innovations

- Single sign-on
- Mobile access
- Removal of swipes
- Global standards for diagnostics, caries classification...
- Fully Interdisciplinary with direct governance from faculty
- Upgrades every two weeks
- ISO 27001 security certification
- Epic Integration
- Lexi-Comp Integration (Updated medication Index)
- Full Telehealth system built within the EHR
- Extensive integration with Google Glass 2
- Daily Data Warehousing
- Guarantee performance through automatic addition of server power
Going to IADR?

Be sure to join us for our seminar

- **How Cloud Electronic Health Records (EHR) Support Research**
- Thursday March 23, 2017
- 2:00 - 3:30pm
  - Dr. Johnson, Dr. Spallek, Dr. Pitts, Dr. Genuis
For More Information...

- Collaboration for Health IT
  - Collaboration4HIT.org
- Internet2
  - Dana Voss: dvoss@internet2.edu
- University of North Carolina - Chapel Hill
  - David Rankin: david_rankin@unc.edu
- University of Sydney
  - Heiko Spallek: heiko.spallek@sydney.edu.au
- University of Michigan - Ann Arbor
  - Lynn Johnson, lynjohns@umich.edu
- ICE Health Systems
  - Mark Genuis, mgenuis@icehealthsystems.com
Q&A

• Who has used these technologies and how well did they work?
• What recommendations do you have for others?