Research and Academic Engagement Benchmarking

David Greenbaum and Jenn Stringer
RTLTC 5/20/2015
Research & Academic Engagement (RAE) Benchmarking

- Benchmarking work overview
- Progress Report
  - LMS: bCourses
  - Research Computing: BRC
  - Research Data Management
  - Content & Collaboration: bConnected
  - Consultation Support
- Strategic Planning
Research & Academic Engagement (RAE) Benchmarking*

Ensure UC Berkeley maintains the highest quality services to support research and teaching by:

- Benchmarking Berkeley technology services with peer institutions
- Developing a set of recommendations around future resource realignment and investments
- Fostering collaboration and a shared understanding across domains and service areas

*Benchmarking framework developed at NYU
RAE Benchmarking Goals

Ensure UC Berkeley maintains the highest quality services to support research and teaching by:

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# RAE Benchmarking

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<tr>
<th>Define</th>
<th>Research</th>
<th>Share</th>
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</thead>
<tbody>
<tr>
<td>Identify Peer Institutions</td>
<td>Gather Benchmarking Data from University Websites</td>
<td>Narrative Summary of Research Findings</td>
</tr>
<tr>
<td>Define Service Areas</td>
<td>Record Data in Worksheets</td>
<td>Group Presentation &amp; Discussion</td>
</tr>
<tr>
<td>Develop Benchmarking Criteria</td>
<td>Follow-up Phone/Email Interviews</td>
<td>One Page Executive Summary</td>
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Berkeley Peer Institutions

- Harvard University
- Stanford University
- Columbia University
- University of Virginia
- New York University
- Massachusetts Institute of Technology
- UC Berkeley
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Peer Benchmarking Report:
Instructional Content Creation
August 16, 2013

Subject Experts
Ben Hubbard, ETS
Zach McHenry, BRCOE
Noah Wittman, IST-API/ETS

Description
Programs, tools, and services that empower faculty to develop digital learning assets (e.g., videos, simulations, online learning modules, etc.) for use in on-campus, hybrid, and/or online courses.

Criteria: Program Coordination, Breadth of Service Portfolio, Customer Experience (Project Management, Instructional Design, Video/Media Production, Platform support and customization), Resources/Facilities, Cost Recovery Model

Overview

<table>
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<tr>
<th>Tier</th>
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<tr>
<td>1</td>
<td>Highly coordinated services (e.g., Office of Digital/Online Learning, Vice Chancellor for Online Learning)</td>
<td>Stanford, MIT</td>
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<td>Broadly available portfolio of services that support content development for online learning initiatives and are clearly communicated to faculty:</td>
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<tr>
<td></td>
<td>Instructional Design</td>
<td></td>
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<td></td>
<td>Course Content/Multimedia Production Support</td>
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<td></td>
<td>Multimedia Production Studio</td>
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<td>DIY Support - Workshops, Training, Equipment Checkout, Software Licensing</td>
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<td>Platform Support &amp; Customization</td>
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<td></td>
<td>Clearly articulated funding model that leverages combination of central funding and revenue generation (no way to know through web-scan, hoping to surface whether this exists through the deep-dive).</td>
<td></td>
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<td>2</td>
<td>Services that support content development for online learning are offered to campus faculty by multiple organizations within the institution and are not closely coordinated or offered under the direction of a single organization.</td>
<td>Berkeley, Harvard, UCLA</td>
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<tr>
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<td>Some resources and services that support content development and online learning are broadly available and</td>
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General Links & Citations
- Chronicle of Higher Education Digital Campus
- 2013 NMC Horizon Report
- ACM White Paper on Online Learning
- Chronicle of Higher Ed Article -- How Worries About Online Education Helped Oust the UVA's President. President advocated for incrementalist approach in contrast to board members sense of urgency outlined here
- Insider Higher Ed Article on now dead California Bill SB520 to Promote Online Education
- UT Report on Technology-Enhanced Education

Criteria: Program Coordination
Extent to which campus has invested in campuswide online learning or digital learning program that coordinates and communicates ICC service offerings.

<table>
<thead>
<tr>
<th>Tier 1 (robust program)</th>
<th>Tier 2 (significant effort)</th>
<th>Tier 3 (some)</th>
<th>Tier 4 (minimal/none)</th>
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<td>Stanford, Michigan</td>
<td>Harvard, Berkeley</td>
<td>NYU, Michigan, UVa, Columbia</td>
<td>UCSD</td>
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Observations:
- Stanford has Vice Provost for Online Learning
- Stanford also has robust portal around online learning, although ICC services have not yet been clearly defined.
- MIT has Office of Digital Learning, which incorporates MITx, MIT OCW, OEIT (media production services)
- BRCOE is not yet well integrated with other campus services
- UCLA has great Online Instruction Resource Website
- Program driven by clearly articulated goals, values, and pedagogical principles: MIT, Stanford, Open University, BRCOE

Criteria: Instructional Design Services
Services to assist faculty in redesigning existing courses or developing new courses for online, hybrid (partially online, partially face-to-face) and web-assisted (supplement to a traditional course) modes of instruction. This covers learning objectives, platform selection, pedagogical strategies, video/multimedia, content development strategies, student assessment, course evaluation.

<table>
<thead>
<tr>
<th>Tier 1 (robust/exemplary)</th>
<th>Tier 2 (services)</th>
<th>Tier 3 (some online resources)</th>
<th>Tier 4 (minimal/none)</th>
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<tr>
<td>UCLA, Stanford, Berkeley, Columbia, Harvard, MIT</td>
<td>Michigan, NYU</td>
<td>UVa, UCSD</td>
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Research Computing (HPC +)

Subject Experts
Steve Masover, Patrick Schmitz, Chris Hoffman - RIT; Harrison Dekker - Library Data Lab

Description
Includes provision of "traditional" HPC (highly parallelized computing); cloud-based HPC; and high-powered workstations (including VMs) to support computation at a level between a typical desktop/laptop and an HPC cluster or VM array. Secure compute, storage, data transfer, and data archiving are also in scope. Services here are provided for both research and instruction.

Benchmarking Criteria
- **Coordinated program** that includes a suite of coordinated services to support computational research and teaching, including a roadmap for service evolution.
- **Support for diverse computational research techniques**, e.g., 'traditional' HPC, virtual machine arrays, and high-powered workstations (which may be virtualized); as well as data transfer and lifecycle management.
- **Training**: Availability and breadth of training.
- **Documentation**: Availability and breadth of documentation.
- **Consulting services**: Including assessment and advice on aligning research problems/needs to available computational resources; grant writing, hardware and software purchasing, and software design, tuning, and refactoring consultation.

Summary of Findings

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<th>Tier</th>
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<td>1</td>
<td>Strong across all benchmarking criteria</td>
<td>UC San Diego, Princeton, Northwestern</td>
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<tr>
<td>2</td>
<td>Strong in most benchmarking criteria, stronger in some areas than others.</td>
<td>Harvard, Michigan, MIT, NYU, UCLA, Virginia</td>
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<tr>
<td>3</td>
<td>Mixed assessment</td>
<td>Columbia, Stanford, Cornell, UW</td>
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<tr>
<td>4</td>
<td>Weak assessment in most or all areas.</td>
<td>Berkeley</td>
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Strategies for Improvement

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<th>Action</th>
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<td>4 → 2</td>
<td>Build a comprehensive program for research computing that provides a range of services from traditional HPC to cloud VM resources to virtual workstations. Develop a community of consultants who have joint appointments in schools, colleges, centers with RIT. One time investment of approx. $1.2 million and recurring investment of approximately $1.8 million.</td>
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<tr>
<td>2 → 1</td>
<td>Use Berkeley’s strengths in innovation and partnerships with such groups as EECS/Amp Lab, D-Lab, BIDS, and science centers to grow new services in cloud-based HPC and virtual research workstations.</td>
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Who have we presented to?

Internal
- EVCP Steele and VCAF Wilton
- VCTLAPF Koshland and CIO Conrad
- CoHSSD (Council of Human and Social Sciences Deans)
- VC Research Fleming
- CoSED (Council of Science and Engineering Deans)

External
- CNI (Coalition of Networked Information)
- RUCC (Research University CIO Conclave)
- ARL Library Assessment Conference
- EDUCAUSE Workshop
What have we heard?

EVCP Steele and VCAF Wilton:

1. Identify campus priorities for RAE Services
2. Define the current "pain points" for faculty and students
3. Put together the costs of improvement and a "bang for the buck" analysis
4. Identify organizational options that could lead to substantial improvement in service --- e.g., should we consolidate organizations rather than coordinate
5. Identify sequence of improvement in services over time: we can't do all at once; what should we do when
What have we done?

- **Used findings to help prioritize work**
  - Confirmed our investment in online degrees, LMS, HPC
  - Prioritized rationalizing Content & Collaboration services

- **Governance**
  - Reinforced the need to create governance

- **Leverage academic partners**
  - Built the foundation for continued partnership
    - CTL ✧ BRCOE ✧ RIT ✧ IST ✧ Library
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Progress Report: LMS bCourses

- Late Adopters
- The Majority
- Innovators
- Students

Rogers Diffusion Of Innovation Bell

PhotoBizCoach.com
BeateChelette.com
Late Adopters

Measures of Success

Learning Management System Course Sites

- Spring Sites in bCourses: 3438
- Sites in bSpace: 4
- Not hard to use: 70%
The Majority

Learning Management System Teaching Tools

Use of Assignments: +10%
Use of Discussions: +14%
Use of Quizzes: +2%

(based on average for spring terms)
The Innovators

Measure of Success

• 2 instructional innovation projects (so far)
  – Data Cultures (Greg Niemeyer)
  – Collabosphere (Glynda Hull)

• faculty using API’s to build tools themselves
  – Raymond Yee

• 5 custom tools for Berkeley users

• 3 contributions of custom code to Canvas
Students

Measures of Success

Student Satisfaction

86% Satisfied
- Very Dissatisfied
- Dissatisfied
- Satisfied
- Very Satisfied

Student Ease of Use

<5% Hard
- Very Hard
- Hard
- Neither
- Easy
- Very Easy

n = 2000+ students responses to Spring 2015 Satisfaction Survey
Berkeley Research Computing (BRC)

A partnership of the Vice Chancellor for Research, Chancellor, CIO/IST, and the Lawrence Berkeley National Laboratory.
BRC: Success in Year 1

• Began with Institutional cluster - “Savio”: 72 nodes / 1,440 cores.

• “Condo” Model: 10+ research groups from Astronomy, Chemistry, Earth Sciences, Engineering, Political Science, Law, D-Lab make Condo contributions of 92 nodes ($432K) in 9 months, more than doubling Savio to 164 nodes / 3280 cores. A win for research group and campus.

• Launch Free “Faculty Computing Allowance” April 2015: Each faculty members gets up to 200,000 core-hours per year at no cost. We launched this in partnership with Vice Provost for the Faculty to help with Faculty recruitment, retention, and grant applications.

• Adding new hardware for HPC, Big Memory nodes, HTC, GPU, and storage this fiscal year. Approx. 6000-7000 cores.

• Savio on Science DMZ with 100gbps connection and DTN
Research Data Management (RDM)

A partnership of CIO: Research IT and the University Library. Launching program spring 2015.

Source: DataONE primer on data management
Progress Report: C&C bConnected

- Rationalize service offerings
- bCourses Project Sites
- Outreach
- Turn on more services

Log in to email, calendar, share, create, store, and save

Welcome to bConnected! We believe in collaboration. That’s why we provide online communication tools such as bMail, bCal, bDrive, Box, and CalShare for faculty, staff, and students to share information and easily collaborate across campus. Not sure which tool is right for you? View a comparison of your online collaboration options. ✨

### Campus Collaboration Tools

<table>
<thead>
<tr>
<th>Feature</th>
<th>bMail</th>
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<th>bDrive</th>
<th>Box</th>
<th>CalShare</th>
<th>bCourses Projects</th>
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<td>Collaboration</td>
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<td>Tools</td>
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### Collaboration Options

- **bMail**: Free for faculty, staff, students. Unlimited storage, more can be requested.
- **bCal**: Free for faculty, staff, students. Unlimited calendar.
- **bDrive**: Free for faculty, staff, students. Unlimited storage.
- **Box**: Free for faculty, staff, students. Unlimited storage.
- **CalShare**: Free for faculty, staff, students. Unlimited storage.
- **bCourses Projects**: Free for faculty, staff, students. Unlimited storage.

### Key Features

- **General Collaboration**: Collaborate with others within and outside of campus.
- **Specialized Collaboration**: Collaborate with dedicated groups for specific projects.

### Storage Limits

- **bMail**: Unlimited storage.
- **bCal**: Unlimited calendar.
- **bDrive**: Unlimited storage.
- **Box**: Unlimited storage.
- **CalShare**: Unlimited storage.
- **bCourses Projects**: Unlimited storage.

### Off-Campus Collaboration

- **bMail**: Accessible from anywhere with a computer or mobile device.
- **bCal**: Accessible from anywhere with a computer or mobile device.
- **bDrive**: Accessible from anywhere with a computer or mobile device.
- **Box**: Accessible from anywhere with a computer or mobile device.
- **CalShare**: Accessible from anywhere with a computer or mobile device.
- **bCourses Projects**: Accessible from anywhere with a computer or mobile device.

### Security

- **bMail**: All data is encrypted in transit and at rest.
- **bCal**: All data is encrypted in transit and at rest.
- **bDrive**: All data is encrypted in transit and at rest.
- **Box**: All data is encrypted in transit and at rest.
- **CalShare**: All data is encrypted in transit and at rest.
- **bCourses Projects**: All data is encrypted in transit and at rest.
Progress Report: Consultation Support

- A need for greater consultative support for teaching and research
- A recognition that academic partners need to work together
  - CTL/ETS/BRCOE retreat
  - CTL Teaching Consultation Survey
  - RIT Consultation Summit
  - Exploring collaborative service model in “ETS” Service Space in Dwinelle

Should we create shared mechanisms for consultation referrals? (n = 28)

| Yes, 68% | Maybe, 29% |
Partnerships: Consulting

EECS

Faculty Engagement

iTRIS

Center for Information Technology Research in the Interest of Society

ETS

Berkeley Educational Technology Services

BERKELEY LAB

Lawrence Berkeley National Laboratory

amplab

UC BERKELEY

GEOSPATIAL INNOVATION FACILITY

Center for New Music and Audio Technologies

IST

UC BERKELEY Institute for Data Science

Center for Teaching and Learning

Vice Chancellor for Undergraduate Education

UC Berkeley School of Information

Berkeley Seismological Laboratory

Library

University of California
Strategic Planning

How do we use this moving forward?
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NSF Vision of Campus and National Cyberinfrastructure

- High Performance Computing
- Data
- Networking and CyberSecurity
- Software

People
Questions and Discussion?
End of RTLTC Deck

sides below for reference.
What have we heard?

Survey to Faculty and Deans:

In order to help prioritize our future campus investments, please rate the following services below based on campus needs over the next 2-3 years.

These services follow the same order as listed in the RAE Service Area Definitions.

1) Research
2) Teaching and Learning
3) Enabling Services

1 lowest priority - 5 highest priority

RESULTS
What have we heard?

**Instructional Content Creation**
Program with dedicated service-space to support faculty in development of digital learning assets (e.g. videos, simulations, online learning modules, etc.) for use in on-campus, hybrid, and/or online courses through services such as: course design and instructional development, content production and DIY support, platform support, tools development and integration, rights management support.

1 2 3 4 5

Lowest Priority  •  •  •  •  Highest Priority

**Learning Management System (LMS)**
Campus services that deliver online systems specifically designed for the delivery and communications of course content, online engagement between students and instructors, and the management of student work in support of face to face and hybrid classes.

1 2 3 4 5

Lowest Priority  •  •  •  •  Highest Priority
Who Responded to Date n=71

African American Studies
Ag and Res Econ
Anthropology
Art History
City and Regional Planning
Classics
Demography
Economics
English
ERG
ESPM & ARE
Ethnic Studies
Film and Media Studies
French
Geography
Haas
History

History of Art
iSchool
LAEP
Law
Linguistics
Music
NST
Performance Studies
PMB
Psychology
Rhetoric
Graduate School of Education
Sociology
TDPS
UCB-UCSF Joint Medical Program,
School of Public Health
What have we heard?
(includes PhD students and Assistant Faculty)
Survey Priorities (so far)

Higher Priority

- Software Licensing
- Technology Enhanced Teaching
- Data Analysis
- Res. Computing: HPC+
- Res. Data Management
- Video Web Conferencing
- Web Publishing

Lower Priority

- Linked Open Data
- Survey Research Support
- Portals / Aggregators
- Scholarly Networking
- Online Course and Degree Programs
# Technology Enhanced Teaching: Sample 3 year roadmap

<table>
<thead>
<tr>
<th>Service</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online Courses</strong></td>
<td>Establish a unified service and support program and online presence. Coordinate key groups. (i.e., BRCOE, MOOCLab, ETS, Library, CTL, COE/EECS, etc.). Allocate 1.0 FTE in FY15 to coordinate these efforts.</td>
<td>Create a service and dedicated space with staff that offers common good services for faculty developing online courses and content as outlined in the larger Digital Instruction plan.</td>
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<tr>
<td><strong>Learning Management Systems &amp; Support</strong></td>
<td>Articulate and document the LMS service within the IT service catalog. Extend support hours.</td>
<td>Improve ecosystem of Integrations by leveraging Canvas Open Source, LTI enabled architecture.</td>
<td>Support a greater percentage of faculty bCourses pedagogy tools (e.g. quizzes, content modules, etc.)</td>
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<tr>
<td><strong>Instructional Content Creation</strong></td>
<td>Establish a coordinated service and support program with key entities (i.e., BRCOE, ETS, Library, CTL, COE/EECS, etc.).</td>
<td>Create a dedicated space that offers common good services for faculty developing digital content. <strong>One-time purchase of specialized equipment and software ~150K.</strong></td>
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</tr>
<tr>
<td><strong>Technology Enhanced Teaching &amp; Learning</strong></td>
<td>Develop or strengthen partnerships among ETS, IST, SAIT, CSS-IT, DSP, CTL. <strong>Allocate Instructional Technologist 1.0 FTE in FY15.</strong></td>
<td>Allocate additional Instructional Technologists in FY16. Test support for a shared funding model 50/50 that embeds them in departments similar to Stanfords ATS program.</td>
<td>Implement program that embeds additional Instructional Technologists in departments with shared funding approach.</td>
</tr>
</tbody>
</table>
| **Digital Instruction Program**              | ● Allocate 1.0FTE to coordinate effort.  
     ● Foster active partnership between ETS, BRCOE and CTL. | ● Build out Faculty Digital Lab in Dwinelle or Moffitt.  
     ● Allocated additional FTE as needed.  
     ● Build departmental partnerships | ● Implement departmental “Partner Program” |
### 3 Year Roadmap for New Research Services

<table>
<thead>
<tr>
<th>R-Service</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRC / HPC+ (see details)</td>
<td>Design</td>
<td>Rollout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Data Mang.</td>
<td>Plan</td>
<td>D/Rollout</td>
<td>Rollout</td>
<td>Rollout</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>Plan</td>
<td>Design</td>
<td>Rollout</td>
<td>Rollout</td>
</tr>
<tr>
<td>Data Visualization</td>
<td>Plan</td>
<td>Plan</td>
<td>Design</td>
<td>Rollout</td>
</tr>
<tr>
<td>Preservation and Archival</td>
<td>Plan</td>
<td>D/Rollout</td>
<td>Rollout</td>
<td>Rollout</td>
</tr>
<tr>
<td>Linked Open Data</td>
<td>Assess</td>
<td>Assess</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Research Applications</td>
<td>Plan</td>
<td>Design</td>
<td>Rollout</td>
<td>Rollout</td>
</tr>
</tbody>
</table>
## 3 Year Roadmap for Major Partnerships

<table>
<thead>
<tr>
<th>Partner</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRC Community</td>
<td>Design</td>
<td>Rollout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-Lab: Social Sciences</td>
<td>Plan</td>
<td>D/Rollout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Humanities</td>
<td>D/Rollout</td>
<td>Rollout</td>
<td></td>
<td></td>
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<tr>
<td>BIDS</td>
<td>Plan</td>
<td>D/Rollout</td>
<td></td>
<td></td>
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<tr>
<td>Museum Informatics</td>
<td>Reset</td>
<td>Rollout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others / TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others / TBD</td>
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