Cloud & DevOps Program
Vision and Strategy

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Agenda

- Cloud & DevOps Values
- Harvard’s Cloud & DevOps Vision
- Program Approach
- Program Organization
- Migrating Applications
- Migrating Staff
- Training Opportunities
- Get Involved
Cloud & DevOps Values

### Benefits of the Cloud

Migrating key Harvard Community information technology solutions to the cloud doesn’t just improve efficiency and optimize cost — it also enables our systems to work more reliably in ever-shifting circumstances.

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Agility with Quality</th>
<th>Cost</th>
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<tbody>
<tr>
<td>• Managed System Updates</td>
<td>• Application Team Self-Service</td>
<td>• Economies of Scale</td>
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<td>• Automated Failover</td>
<td>• Deployment Automation</td>
<td>• Utility: Pay as You Go</td>
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<td>• Disaster Recovery</td>
<td>• Focus on IT Solutions</td>
<td>• Elastic Capacity: Pay for Use</td>
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Harvard’s Cloud & DevOps Vision

The Vision for the Cloud & DevOps Program

To improve HUIT’s delivery of information technology solutions to the Harvard Community, we will employ new methodologies, tools, and processes that will enable us to simplify and deliver higher-quality solutions with improved robustness and resiliency in a more timely manner.

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<tr>
<th>Objectives</th>
<th>Guiding Principles</th>
<th>Key Performance Indicators</th>
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<tr>
<td>1. Develop training to transition staff from administrator roles to cloud and DevOps engineering roles</td>
<td>1. We are committed to staff growth and development as we pursue program goals</td>
<td>1. Percentage of HUIT employees who have successfully completed Cloud &amp; DevOps training</td>
</tr>
<tr>
<td>2. Lead staff transition process and create an empowered, service-focused culture</td>
<td>2. We ensure close collaboration between the program and other HUIT teams to maintain high levels of existing services</td>
<td>2. Percentage of total apps migrated to cloud providers</td>
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<td>3. Implement application design and deployment patterns to maximize consistency, quality, and reliability</td>
<td>3. Improving deployment methods and processes are as important as the technologies we use</td>
<td>3. Improved app availability from monitoring (uptime percentage)</td>
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<tr>
<td>4. Migrate existing app workloads with a goal of 75% of existing compute from on-premise data centers to the public cloud</td>
<td>4. Consistent architectural and design patterns are critical to achieving enterprise-level results</td>
<td>4. Successful DR testing processes in place — average time to recovery for migrated applications</td>
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<td>5. Establish operational toolsets and processes to ensure operational effectiveness, awareness, and partnership with service teams</td>
<td>5. Communicating with all employees, partners, and customers is crucial to program awareness and understanding</td>
<td>5. Percent deployment rollbacks</td>
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<td>6. Cost of deployment solutions compared with onsite measurement</td>
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### Program Organization: Teams

#### Cloud Operations Team

*Build integrated tool suite managing capacity, performance, and availability of services across environments.*

- Work with Integrated Monitoring to create cloud ops roadmap
- Align tools with integrated monitoring and industry best practice
- Perform ongoing analysis and optimize cloud-deployed workloads for performance, availability, and cost
- Create and evolve HUIT cloud training plans
- Create tools/dashboards for business and service team reporting
- Manage cloud CMDB
- Matrix-manage embedded operations engineers

#### DevOps Platform Team

*Provide embedded expertise and a highly automated platform to simplify and streamline delivery of app functionality.*

- Work with development community to understand requirements for build, deploy, test, and provision processes
- Introduce best practices, patterns, reference implementations, code, and tools in support of software deployment automation
- Create a DevOps services definition for HUIT service catalog
- Create and evolve DevOps services roadmap
- Matrix-manage embedded DevOps engineers within service teams
- Define cloud integration patterns in partnership with EA

#### Cloud Architecture Team

*Provide strategic leadership for the development of agile, cost-effective cloud solutions.*

- Create and evolve cloud sourcing strategy
- Create and evolve cloud selection framework
- Map app portfolio to cloud selection framework
- Manage enterprise contracts for cloud
- Optimize cloud costs and manage cloud billing
- Create and evolve cloud services roadmap
- Create cloud services definition for HUIT service catalog
- Report metrics and KPIs

#### Cloud Migration Team

*Migrate apps from on-premise facilities to external cloud providers, build internal capabilities, and transition staff.*

- Perform app inventory; create/manage migration plan
- Liaise with app business and technical owners
- Tech assessments and cloud optimization recommendations
- Mentoring and support for new, transitioned resources
- Support app migration and ongoing operations of transitioned apps
- Enable end-state resource migration to service teams
- Create executive program reports
Program Approach: The Big Picture
# Program Approach: Cloud & DevOps Milestones

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**Pre-Implementation**
- Cost, Tagging, SP Framework

**DevOps v. 1.0**
- Pattern (Java, Tomcat, Python, GUnicorn)
- CDP

**Cloud v. 1.0**
- Logging & Monitoring
- Auditing

**Network v. 1.0**
- AWS Connectivity & IP Mgmt

**Wave 1 Migration (25 Apps)**
- Java/Tomcat Apps
- Python/GUnicorn Apps
- RDS/Oracle Apps
- RDS/MySQL Apps
We are committed to moving 25 applications by the end of FY15.

- Apps were prioritized based on application team availability and technical patterns (Java/Tomcat, Apache/LAMP)
- Remaining ~50 Wave 1 apps will be evaluated after first 25 are migrated

### Migrating Applications: Wave 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Applications</th>
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<tr>
<td>IAM</td>
<td>Account App, App Admin, CAS Auth Engine, Claim App, Create/Manage ID</td>
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<tr>
<td>IAM</td>
<td>FindPerson API, Harvard LDAP, IdDB, Identity Service API, PIN2 Bridge</td>
</tr>
<tr>
<td>INF</td>
<td>OID</td>
</tr>
<tr>
<td>ATS</td>
<td>QlikView (7), ACE, Muse, OARS, Course Catalog</td>
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<tr>
<td>ATS</td>
<td>Cross Registration, Winter Break</td>
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<tr>
<td>LTS</td>
<td>Presto, Feedback</td>
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<tr>
<td>DR</td>
<td>Aleph (LTS), IAM, PeopleSoft (POC)</td>
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Migrating Applications: The Process

Phase A: Planning

**Step 0:** Prepare for Application Migration

**Step 1:** Hold Initial Engagement Meeting

**Step 2:** Perform Architectural Discovery

**Step 3:** Create Migration Schedule

**Step 4:** Perform Cost Comparison

**Step 5:** Conduct Kick-off Meeting

Phase B: Execution (Iterative Process)

**Step 1:** Replatform/Remediate Application

**Step 2:** Integrate Application

**Step 3:** Migrate Environments

**Step 4:** Validate App & Complete Migration

Phase C: Operation & Optimization

**Ongoing:** Implement, Monitor, Optimize, Repeat

**Ongoing:** Decommission and Optimize Infrastructure
Migrating Staff

The program uses a repeatable, criteria-based process to identify and transition HUIT staff into new roles.

In Wave 1, 19 team members have migrated into the program to support process definition, technology selection, and app migrations.
## Training Opportunities

Visit [https://huitcloud.talentlms.com](https://huitcloud.talentlms.com) for courses including ...

### Agile Training
Scrum & DevOps in Practice: Immersive Agile Training

### ITIL Certification
- HP: [http://tinyurl.com/hp-itil-cert](http://tinyurl.com/hp-itil-cert)

### AWS Essentials
AWS Essentials ([lynda.com](http://lynda.com))
- HUIT AWS Training Sessions: [http://cloud.huit.harvard.edu](http://cloud.huit.harvard.edu)

### AWS Free Self-Paced Labs: Introductions
- Elastic Block Store (EBS)
- Simple Storage Service (S3)
- Elastic Compute Cloud (EC2)
- Identity and Access Management (IAM)
- Elastic Load Balancing (ELB)
- Relational Database Service (RDS)
Training Opportunities

Visit https://huitcloud.talentlms.com for courses including ...

**AWS Programmatic Language Track**
- Git Workshop (Self-Taught)
- Introduction To Python ([codecademy.com](http://codecademy.com))
- Version Control Workshop (Self-Taught)
- Up-Running-Bash-Scripting ([lynda.com](http://lynda.com))

**AWS DevOps In-Person Bootcamp (Instructor: Leo Zhadanaovsky of AWS)**
- CloudFormation
- Jenkins
- CodeDeploy
- EC2 Container Service
- Scripting using the AWS CLI
- Monitoring & notification tools: NewRelic, CloudWatch, Splunk, SNS

**AWS DevOps Engineer Certification**
- Sample Q&A for AWS Associate Solutions Architect Certification
- AWS Certified DevOps Engineer Professional Level Exam Guide
- AWS Certified DevOps Engineer Exam — Professional (Beta)

**Cloud Operations (COPS) Track**
- What Is New Relic?
- New Relic University
- Splunk App Administration for Enterprise Security 3.1 (Virtual)
- Searching & Reporting: Splunk 6 (Virtual)
- Advanced Searching & Reporting: Splunk 6 (Virtual)
Training Opportunities

Sample progress report for the Agile track:

Too often teams will send one or two individuals to be trained, expecting them to return and impact team performance. That expectation could be compared to a sports team sending one or two individuals to practice, and then... more.

38 assigned learners · 20 completed learners · 1 instructor

Overall

- Course assignments
- Course completions

Learners

- Not started
- In progress
- Complete

32%
53%
16%
Get Involved

Play a part in the Cloud & DevOps program! Check out these important dates, info sources, and training opportunities:

• Cloud & DevOps Big Group: **March 13**
• Cloud & DevOps Open House at 50 Church Street: **March 28**
• Training:
  – Devops/AWS Training Day: **March 17**
  – Scrum & DevOps in Practice: Immersive Agile Training: **March 30-31**
• Websites:
  – HUIT Training Portal: [https://huitcloud.talentlms.com](https://huitcloud.talentlms.com)
  – HUIT Cloud Website: [http://cloud.huit.harvard.edu](http://cloud.huit.harvard.edu)
Thank you!