



AWS Government, Education, and Nonprofits Symposium
Washington, DC | June 24, 2014 - June 26, 2014

Amazon AWS@ND

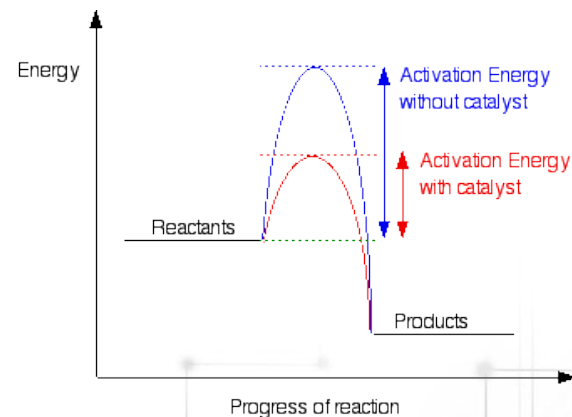
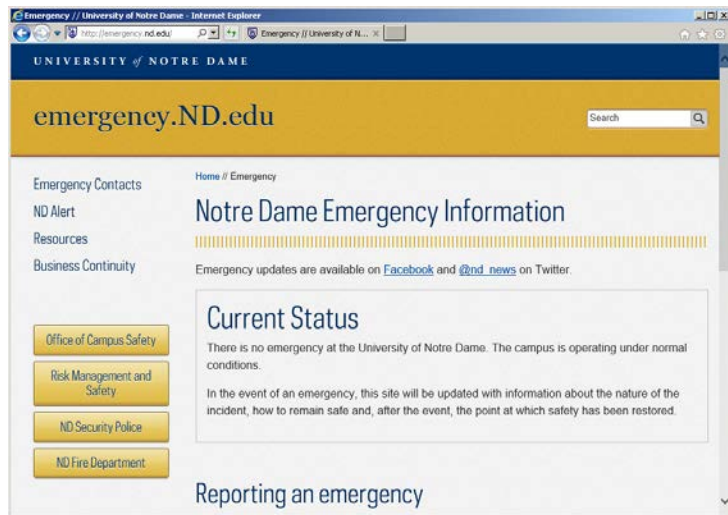
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Catalyst



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Intro to AWS



**AWS Builds CRM
During our initial
meeting!**



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Moving www.nd.edu to AWS

- Initial move/test took three days (10/2012)
- Test results were great
- Reduced complexity/cost
- Site goes live 1/2013



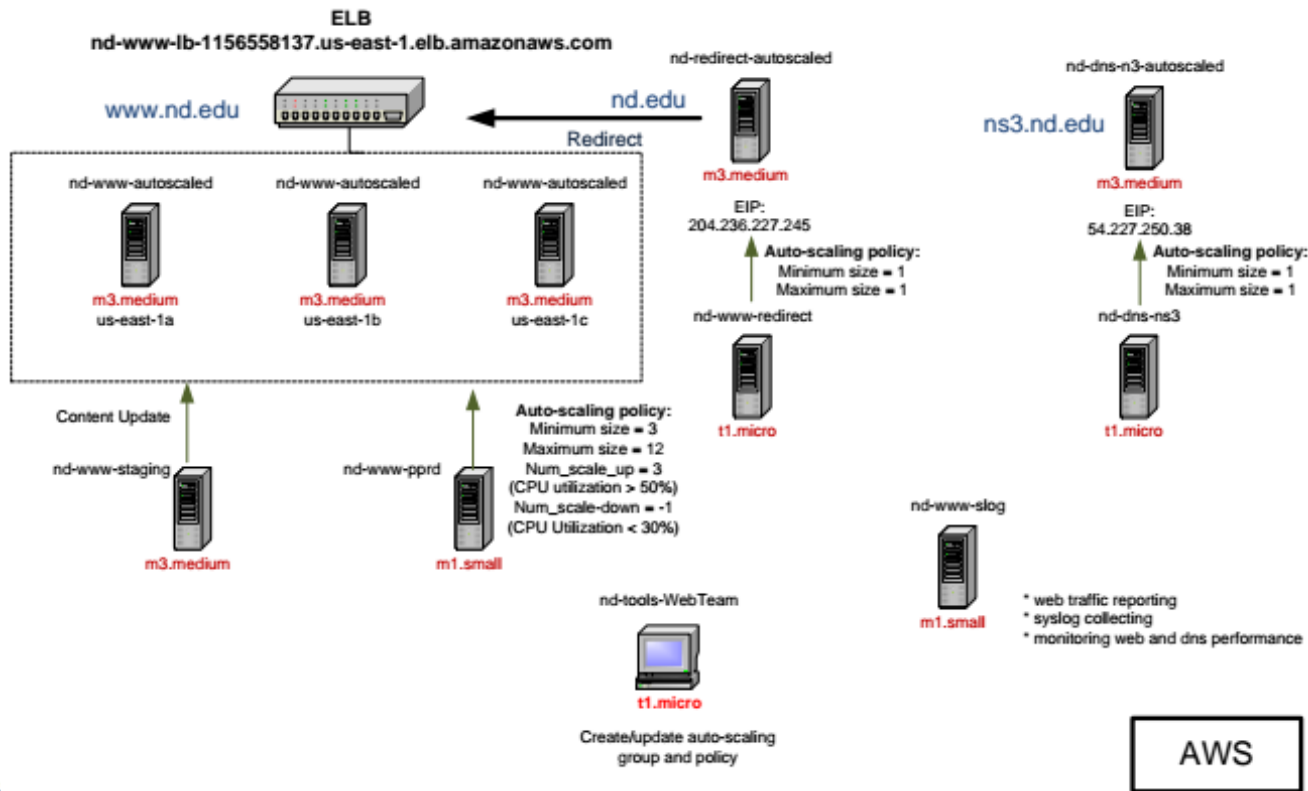
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Success!

- Normal and emergency operation simplified
- Auto-scaling handles BCS Championship
- Cloudfront, better performance, lower cost
- Pre-scale for stadium press release



Nd.edu: What did it take?



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Nd.edu Learning Curve

- Apex node nd.edu must be DNS A-Record
- Local URL path dependencies need to be fixed
- Sites coupled with campus needed to be relocated
- Support for multi-AZ
- Cloudfront will require us to make design changes



Now that we see the future...

- Develop a plan for ND AWS governance
- Roles, Responsibilities, Processes
- Build out infrastructure
 - Domain, monitoring, logging, IP space, VPNs
 - Understand and test controls like security groups
- Wow! The web migration is already legacy (EC2 Classic)





Governance and Processes



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Learn by doing

- Use projects to build AWS expertise
 - Conductor Content Management for Dept. Websites
 - ModoLabs Kurogo – Mobile proxy
 - CAS/Shib/Directory/Domain – AAA
 - Server and Filesystem Backup



Departmental Website Move

- ~400 websites moved from leased equipment at colocation site to AWS
- 3,676,266 views by 961,739 people per month



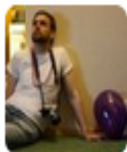
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Leveraging IaaS

- Employ Elasticache
- Switched from MySQL server to RDS
- Began process to enable scaling
 - Externalize data in EBS ... then ... S3
- Utilize sub-account to simplify sysadmin permissions and billing



The Result



Alec Hipshear @xionon · Mar 25

Conductor is so much faster i'm actually afraid it's broken and nobody noticed

dropbox.com/s/h4v4a2ctqpzk...

/cc @snijim @BrandonRich #DevOpsND

 View photo

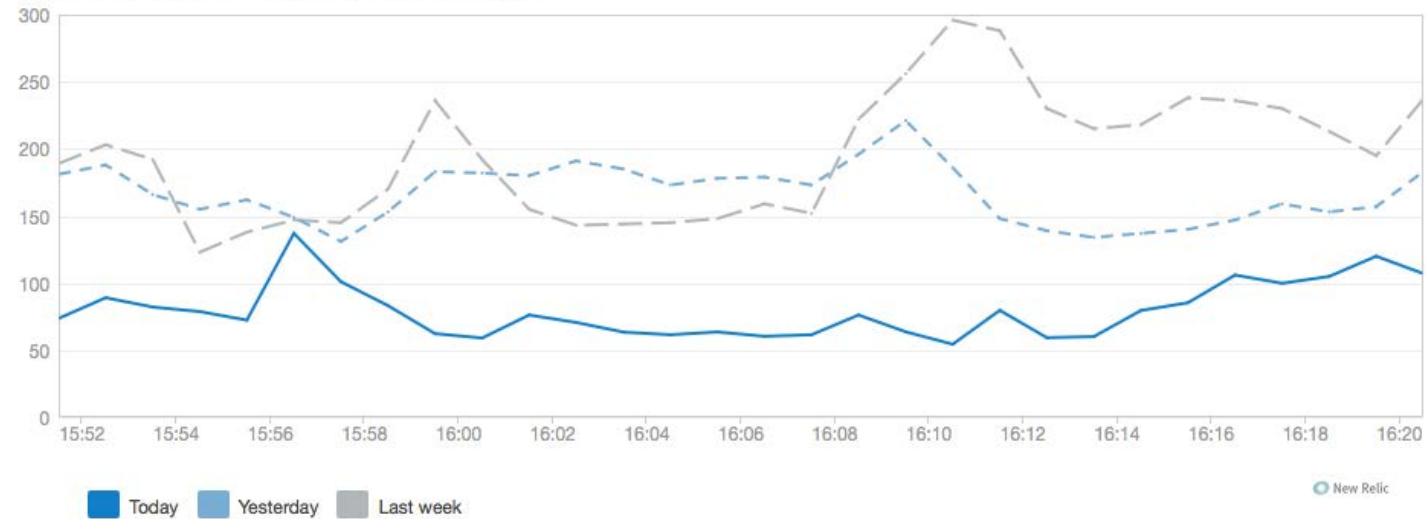
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App server historical average response time (ms)



It may be faster, but now its half the
cost😊



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Shibboleth®

CAS



InCommon®



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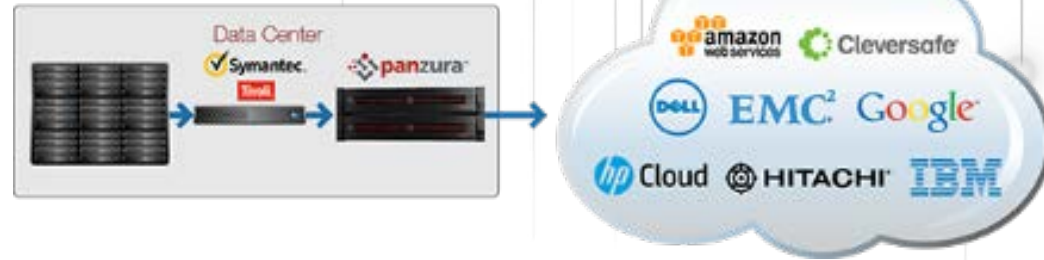
AAA in the cloud

- High Availability for off campus users
- Auto failover with Route 53
- AWS based domain controller and 389 Directory
- Client Gateway VPN for Sync
- PostgreSQL RDS



Backup to S3

- Evaluating Panzura
- Plan on migrating backups to S3
- 300 TB of Data, 10Gbps I2 Internet
- Reduce on premise equipment at significant savings



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Issues and Challenges

- DNS
- Automating everything
- Organizing Security Groups and VPCs
- Don't simply re-cast the Datacenter
- Changing roles for sysadmins and engineers



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Culture Shift

- Optimizing for Cost, it's everyone's responsibility
- “Think in AWS”
- Engineer at the highest level of abstraction
- Do you really have more control and security on-site?
- What, if anything, really needs to be local.
- Value isn't linked to managing equipment



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Benefits for ND

- “Stand on the shoulders of giants”
- Eliminate over-provisioning
- Revisit and streamline operations
- Greater agility using a DevOps approach
- DR/BC greatly simplified



Manage the Transition

- Are three AZs really enough???
- What needs to be backed up, to where???
- Do we need a single panel multi-vendor Hybrid Cloud self-service portal?
- One VPC or One Hundred VPCs?
- Is vendor lock-in a problem???
- AWS is a platform, a toolset, not outsourcing



Big Wins

- Reduced Cost at the expense of Higher Performance
- AWS makes the hard stuff easy
 - Multi-AZ, HA failover between on premises DC and AWS
- Leverage AWS's ongoing innovation
- Ultimately, no project team wants to go back

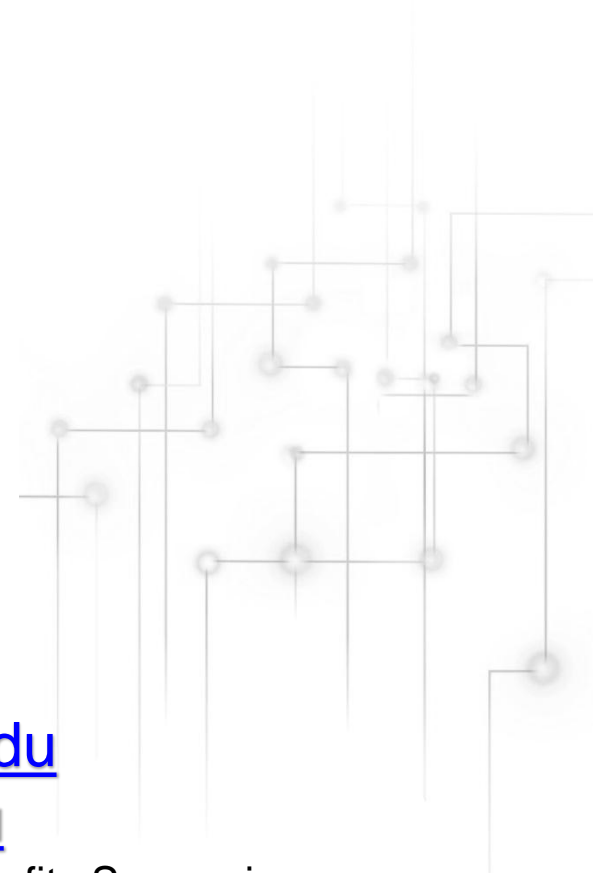


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Our next steps

- Expand projects, focus on broadening capability
- Develop Strategy and Vision
 - Financial analysis, use cases, barriers to adoption, benefits of AWS, Risks, etc.
- Move to a Cloud First model, based on experience and analysis





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