Cloud Integration
A focused discussion on cloud platforms

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Agenda

- Introduction
- Facts
- Cloud Overview
- Deployment
- IoT
- Automation
- Key Takeaways
Who is ITC3?

• Managed Service Provider
• Cloud Service Interconnect
• Cloud / Hybrid WAN Consulting
CloudFusion
Facts

• Not everyone needs the cloud
• I’m not here to convince you that you do
• You don’t have to convince me that you don’t
What exactly is the cloud?

Cloud Services
Dropbox
Google Drive
Exchange Online/Office 365

Private Cloud
Openstack
Rackspace

Public Cloud
Amazon AWS
Microsoft Azure
Rackspace
On average, cloud users leverage services from 6 different cloud providers.
Cloud Stability

• Cloud reliability has improved
  (Major vendors downtime for 2015 combined from all services)
  • AWS 2 hours and 30 minutes
  • Azure 10 hours and 49 minutes
  • Google 11 hours and 34 minutes
  • IBM 17 hours
So what’s the problem?

• Security concerns are real

• Reachability and reliability to resources is only as good as your Internet connection

• Lack of expertise has emerged as the #1 Challenge
How to solve it

Security concerns are real

- Infrastructure Security
  - Network Firewalls
  - Web Application Firewalls
  - Secure Private Connections from On-Premise Environment
How to solve it

Security concerns are real
- DDoS Mitigation
- Data Encryption
- Dedicated hardware-based crypto key storage
Security concerns are real
• Monitoring and Logging
• Identity and Access Control
• Penetration Testing
To date, there have been very few security breaches in the public cloud — most breaches continue to involve on-premises data center environments.

~ David Mitchell Smith, Gartner Analyst
Reachability and reliability to cloud is only as good as your Internet connection

• Redundant Internet connection from different providers is now considered mission critical
• Implementing DDoS Mitigation
• Distribution of workloads over multiple cloud vendors
So what’s the problem?

Lack of expertise
• Internal training
• Self Study
• MSP Partners
Deployment Considerations

• What are you trying to accomplish?

• How tightly do you want the cloud integrated with your existing environment?

• Are you using cloud for internal operations, or offering services to your customers, or both?
Why are people moving?

- Speed to Implementation
- End to End Security
- Lower Cost
- Ability to Scale
- Global Visibility
- Failure Isolation with Microservices

Power Executives Highlight Urgency:

- 93% Put Big Data analytics in top 3 Priorities
- 31% Make it their #1 Priority
- 50% Urgency driven by Board of Directors

With this sense of urgency, the cloud approach is a key enabler to achieve objectives around Big Data and analytics.
Case Study: GE
Case Study: GE

GE and Capital One endorse AWS at re:Invent

AWS emphasizes cloud for IaaS

GE's Internet of Things Platform to Run on Microsoft's Cloud

GE and Others Shut Data Centers, Move to Amazon, Microsoft — Market Talk

17:07 ET — As big companies such as General Electric shut down more data centers, they’re moving a significant portion of their IT infrastructure to cloud services from Amazon (AMZN) and Microsoft (MSFT). The two companies are continuing to lower prices to gain market share for big enterprise cloud customers. "Enterprise cloud opportunity is massive," said Microsoft CEO Satya Nadella during an earnings conference call with investors on Thursday afternoon. (rachael.king@wsj.com; @sWriter)
Case Study: GE

**Fun facts for the network nerds**

- GE owns the largest privately owned network in the world.
- Their core BGP ASN is 80
- They have exhausted an entire Class A Public IP block
- In their 140 year history, GE had never completed a global network overhaul.
Case Study: GE

• Build a global Hybrid WAN Interconnect
• Shut down 30 datacenters and replace with 8 regional cloud hubs
• Move over 9,000 workloads to public cloud (AWS, Azure)
• Ultimately run 100% of application resources in public or private cloud space
• GE would then sell IC and Cloud services to its business units
GE had to become the largest managed service provider in the world offering services to over 500,000 end users daily.
Data Storage

**s3 Publish & Subscribe**

- File transfer via HTTPS
- S3 Storage Bucket
- S3 Notification Queue
- Source
- GE Firewall
- Completion notification
- s3shuttle

**Java + AWS Native Services**

- Flexible bucket/folder config
- Leverages multipart upload
- STS support w/ AWS SDK
- SNS notification on upload
- SNS notifies SQS queue
- Loosely coupled with SQS
- Simple command line interface
- Optional delivery notification
Automation

Self-Service Web Monitoring

Scalable Automation for the Cloud

- Scalable distributed monitoring
- Integrated ASG & ELB
- Integrated with Nagios XI

- Headless webkit (GhostDriver)
- GUI Recorder – Selenium Builder
- Jenkins/JUnit Capable integration

- Low cost framework
- Compatible with any webdriver client
- Pre-built Nagios alerting/metric capture

Cloud Service CTQ’s

<table>
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<tr>
<th>Cross Business</th>
<th>Migration Acceleration</th>
<th>Cycle Time Reduction</th>
<th>Automation</th>
<th>Cost Benefit</th>
<th>Simplification</th>
<th>Service Status</th>
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</table>

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CLI & Identity Management

Cloud Migration Solution

Racemi Benefits

- Deployed on Source server.
- Secure and firewall friendly.
- Supports Live capture, low overhead, fault tolerant.

- Simple Command line interface
- Supports security delegation via AWS Identity and Access Management (IAM) and AWS STS services.
- Capture once, deploy many.
Lifecycle Management

Upgrade EC2s to the next gen

- AWS
- VPC
- Windows Automation Server
- Outdated Generation
- Latest Generation
- M1
- M3
- C1
- C4

Optimize Performance & Reduce Cost

- IDs instances that can be upgraded to the next EC2 generation
- Builds communication email
- Leverage AWS PowerShell SDK
- Scheduled monthly against QA and Dev
- New EC2 gens offer better performance at reduced cost
- Upgrades C1 → C4, M1 → M3, M2 → R3
- Continuously ensures Cloud VMs operate at most efficient and effective levels
- Upgraded 73 QA + 29 DEV last month
Auto-Scaling

Downsize underutilized EC2s

- AWS
- VPC
- Windows Automation Server

Underutilized instance → Rightsized instance

2xLarge → xLarge
xLarge → Large
Large → Medium
Medium → Small

Maximize efficiency

- Pulls “underutilized” EC2s from AWS Trusted Advisor report, monthly
- Leverage AWS Powershell SDK
- What is underutilized?
  - <10% CPU utilization for 14 days
  - <5MB network I/O for 4 days or more
- Scheduled against Development envs today
- 96 machines downsized
- Cost Savings

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Provisioning

**Automated Access Provisioning**

- AWS
- Windows Automation Server
- New instances
- Credential Management SQS
- Active Directory
  - Create OU for Application
  - Create HPA group for App
  - Add users to group
  - Create GPO to provide/enforce HPA access

**Hands free Active Directory**

- Provides immediate access to new Windows and Linux builds
- Enables personal account use
- Leverages AWS Powershell SDK, AWS SQS
- Runs every 15 minutes
- Processed 891 instances to date
- Streamlines operations
- Delivers full Active Directory automation
- Sets patching windows based on environment
- Best practice enterprise automation
Realistic Expectations

Step change in performance

Apps Moved in 2014

What did we change?

Agile Execution Mechanism YTD

52 Week Journey effort

26 Sprints

Every 2 Weeks completions

Cloud Party after 2-3 Sprints reviews

9 Product Streams driving execution
Navigating the Roadblocks

**Management**
- **Preparation**
  - Pre-work and timeline coordination for future success
- **Planning**
  - Take into consideration application upgrades and team schedules

**Team Composition**
- **Wing to Wing**
  - Evolve siloed workers to be cross-functional

**Apps to Pipeline**
- **SME Partnership**
  - Leverage SME to build migration funnel and force prioritization
- **Social engineering**
  - Ask the right questions to stretch the scope of discussion
- **Capability & Functionality**
  - Incentivize movement through next generation cloud-aware toolsets

**Third Party Vendors**
- **Validate**
  - Confirm that licensing supports cloud
- **Educate**
  - Demystify cloud for vendors
- **Collaborate**
  - Partner with vendor on application migration
Lessons Learned

Automate, then Automate More
Everything we do is with automation in mind, from deployment to operations. This is the only way to survive at scale.

Embrace Agile
From organization structure to project management, everything we do is with agile principles in mind.

Work Instead of Workflow
Embracing automation has allowed our employees to concentrate on doing work, instead of filling out workflows.

Security at Every Layer
Fully utilizing the security provided in the public cloud allows us to have confidence in a multi-tenant world.

Bias toward action
Everyone has a reason not to move to cloud. Our mission is to find more reasons why we should.

Encourage (calculated) Risks
Celebrate failure. Talk about pivots. Continuously examine new tools. This leads to rapid innovation resulting in progress.

Collaboration - Embed Security & Risk teams, CIO + CTO + Corp partnership
Transformation – Rebuild technology skill

Cloud Aware – Rehosting is OK if it maximizes margin, agility, resilience & performance
Pipeline – A pipeline of 50+ will ensure
Case Study: You
Disaster Recovery

Practically everyone can benefit from the cloud when it comes to DR
Disaster Recovery

Did you know that in AWS you only have to pay for an instance when it’s turned on and running?
Data analytics
Big Data Crunching Simplified
Salt River Project
Salt River Project
Salt River Project
AT&T NetBond

Verizon SCI
(Secure Cloud Interconnect)
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What if you follow GE, Pearson, AT&T, and Verizon’s model and become a managed service provider for your customers?
ACME Lan

User Subnet

All resources one hop away

Utility Managed Router

Server 1 - AWS

Server 2 - Azure

Server 3 - Google
Why does this matter?

So what’s the problem?

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Energy United
Campbell Creek Project
IoT Trusted Advisor
Recent Internet Outage
The Internet of ransomware things...

HUNGRY? Pay up and I’ll unlock my door!

ON STRIKE UNTIL YOU SEND MONEY TO MY HACKERS.

20 BUCKS IN MY PAYPAL ACCOUNT OR I’LL ONLY BREW DECAF!

I’LL BE BURNING THE TOILET IF YOU DON’T GET ME SOME DOUGH!

THE NEXT TIME YOU LEAVE, IT’LL COST YOU 100 BUCKS TO GET BACK INTO THE HOUSE, UNLESS YOU GIVE ME $75 NOW!

MY ALARM SYSTEM IS GOING TO GO OFF RANDOMLY THROUGHOUT THE NIGHT, UNLESS YOU “DONATE”.

WIRE MY HACKER $100 OR I’LL REVERSE MY MOTOR AND BLOW DIRT ALL OVER THIS PLACE!

YOUR DIRTY DISHES CAN WAIT, I’M BUSY MINING BITCOINS.

EXCUSE US WHILE WE PARTICIPATE IN A DDOS ATTACK.

I’LL START YOUR CAR, BUT ONLY TO TAKE YOU TO YOUR BANK TO MAKE A TRANSFER.

SEND ME $25 OR I’LL TELL EVERYONE ON YOUR SOCIAL NETWORK THAT YOU WERE STUPID ENOUGH TO BUY AN INTERNET-CONNECTED BROOM!

IF YOU DON’T SEND US CASH, YOUR REPUTATION WILL BE IN THE TRASH.
Q&A

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