Transitioning to the Cloud

What you need to know before you go...

Mark Flahan and Matt McCracken
What is the cloud?

Amazon Web Services

Google Cloud Platform

Microsoft Azure
Electricity generation, transmission, and distribution

- Power plant generates electricity
- Transmission lines carry electricity long distances
- Distribution lines carry electricity to houses
- Transformer steps up voltage for
- Neighborhood transformer steps
- Transformers on poles step down electricity before it enters houses

But really explain it...
Cloud Options Explained

- **Traditional On-Premises**
  - Applications
  - Data
  - Runtime
  - Middleware
  - O/S
  - Virtualization
  - Servers
  - Storage
  - Networking
  - Client Manages

- **Infrastructure as a Service**
  - Applications
  - Data
  - Runtime
  - Middleware
  - O/S
  - Virtualization
  - Servers
  - Storage
  - Networking
  - Client Manages

- **Platform as a Service**
  - Applications
  - Data
  - Runtime
  - Middleware
  - O/S
  - Virtualization
  - Servers
  - Storage
  - Networking
  - Vendor Manages in Cloud

- **Software as a Service**
  - Applications
  - Data
  - Runtime
  - Middleware
  - O/S
  - Virtualization
  - Servers
  - Storage
  - Networking
  - Vendor Manages in Cloud

**Customization; higher costs; slower time to value**

**Standardization; lower costs; faster time to value**
The “cloud” is just technology infrastructure sold as a service.

- AWS is the world’s largest cloud provider with 44% market share. In second place is Microsoft Azure, with 8% market share.
- Why should I “cloud”?
  - Infinitely scalable
  - Pay for what you need/as you go
  - Frankly, they datacenter better than you can
  - Offering “managed” components for building solutions
• And other things you have heard nerds talk about.
“Yeah, but no one needs that stuff for GIS.”

- You are, almost certainly, using AWS every day
  - ArcGIS Online
  - Netflix
  - iCloud
- GIS solutions need data
- GIS solutions need to scale up...sometimes unexpectedly
- GIS solutions need to be highly available
- **GIS solutions don’t need to require elaborate planning and $**
Advantages of Cloud

• Trade capital expense for variable expense
• Benefit from massive economies of scale
• Stop guessing about capacity
• Increase speed and agility
• Stop spending money running and maintaining data centers
• Go global in minutes
Some examples...

- Asset Management in AWS!
- ArcGIS GIS Server in AWS!
- Custom GIS applications in AWS!
- Hosted editing environment!
Lambda

AZ511.gov
Arizona Traveler Information

ArcGIS Online
Enterprise in the Cloud
- 22 GIS Servers
- 7 Database Servers
- 66TB of HDD space consumed
- 150 ArcGIS Desktop Users
- 500 Web Services
- 18 Applications
- AZ 511 (up to 1 million hits/month)
- 500 AGOL maps
Enterprise GIS

- 2 GIS Servers
- 2 Database Servers
- 250 GB DIS Data
- 5 ArcGIS Desktop Users
- 3 month roll out...
Desktop in the Cloud
### Performance Increase - ArcMap Draw Times

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Prem → On Prem Workstation</td>
<td>45 seconds</td>
</tr>
<tr>
<td>AWS → On Prem Workstation</td>
<td>50 seconds</td>
</tr>
<tr>
<td>AWS → AWS Workspace</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>
Performance Increase Imagery Draw Times

<table>
<thead>
<tr>
<th>Service</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Prem Web Service</td>
<td>20 - 30 seconds</td>
</tr>
<tr>
<td>AWS Web Service</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>
Automated Deployment

- Cloud Formation
- Continuous integration
- Build servers
- Red/Green Servers
Tips

- Calculate Time for Standard Maintenance (savings)
- Go whole hog or not
- Prepare and plan
- Define Operations (Core Services and legacy underused applications)
- Data formats & Data storage = $$$
- How much history do you need?
Cost Considerations

• Separate out DEV/QA/PROD
• Turn off when you don’t need it
• Data Storage Strategy
• Re-format Imagery
• Calculate Labor Reduction (Soft Costs)
Q&A

Mark Flahan
Enterprise GIS Architect
mflahan@azdot.gov
602-712-6832

Matt McCracken
Geospatial Transportation Practice Leader
Matt.mccracken@timmons.com
804-433-2981