City of Carlsbad
Web Mapping in the Amazon Cloud

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Background

• Carlsbad GIS provides web mapping to external and internal customers
• Software is ArcGIS for Server and Rolta OnPoint, JSAPI/HTML5/Silverlight maps (14 map services)
• Seeking better performance than existed internally
Test Solution – Amazon Cloud Computing

- Implement our web mapping component to the Amazon cloud product to test:
  - Performance
  - Ease of maintenance and administration
  - Cost
Preliminary Steps

• Created EC2 (elastic compute cloud) account with Amazon
• Set up billing via purchase order rather than credit card
• Determine which configuration of Amazon Machine Image (AMI) needed
• With Amazon account number, requested that Esri make available the selected AMI
Preliminary Steps (cont.)

• AMI contained pre-configured assemblage of:
  – ArcGIS for Server
  – ArcSDE for workgroup/SQL Express 2008 R2
  – ArcGIS desktop license (Standard)

• ArcGIS web adaptor required our install

• Activated the virtual server’s components with existing and evaluation licensing
Preliminary Steps (cont.)

- We requested evaluation licensing for ArcGIS for Server on Amazon EC2
- Used an existing ArcGIS for Desktop Standard license
- SQL Express from Esri (10 GB)
- Requested test copy of Rolta OnPoint
- Ran cloud testing while still operating on-site
Data Loading

- Moved data to Amazon instance using Citrix Sharefile (cloud-based file sharing app)
- Replicated data using “Register Existing Data Option”
- Used Geodata Service to maintain replication between onsite SDE and SDE (SQL Express) on Amazon instance
Security

• Rolta OnPoint software can’t use built-in Esri security (ArcGIS Server’s security??
• Solution: build a Virtual Private Network (VPC)
• Puts the EC2 instance within city’s network, protected by our internal measures
Virtual Machine Instance Sizing/Pricing

• Original configuration:
  – General purpose, large instance, 8GB memory, 2 CPU (using ½ of our license)
  – On-demand pricing structure (‘full-price’)
  – Running 24/7
  – Technical support license

• Ran uninterrupted August 2012 to September 2013
Virtual Machine Instance Sizing/Pricing (continued)

• Planned new configuration (September 2013):
  – General purpose, extra-large instance, 15GB memory, 4 CPU (using 100% of our license)
  – Reserved instance (one-year term) pricing structure (40-50% reduction in per hour cost)
  – $1,280 upfront setup cost for one year
  – AWS support – Business (level 3 of 4) 10% of monthly charges
Cost Information (monthly)

- On-demand hourly pricing ($0.384)
- Data storage charge ($0.105/GB-month)
- Data transfer charge ($0.11/million I/O requests)
- Technical support ($100)
- VPC charge ($0.05/VPN connection-hour)
- Average invoice = $500/month
Reserved Instance Pricing

• Purchase one-year or three-year contract
• Discounted rate (40 – 65%), with set-up fee
• Overall savings if enough hours are used to defray set-up fee
• Sell surplus hours in Reserved Instance Marketplace
Everything was going great, and then we hit a bump

• Chronology of events:
  – Thursday 9/19/13 – launched the extra-large instance, but could not connect to it via user console; logged ticket
  – Tried repeatedly to launch new instances, but could not connect
  – Monday 9/25/13 – lost connection to our production server; logged more tickets
Amazon Technical Support

• Amazon did unspecified and unannounced infrastructure upgrades around Sept. 18
• Technical support says problem is too complex to solve quickly - best bet is to re-build production instance from original AMI
• However, when attempting to launch recovery instance, we can’t access server console
The Fix

- Outage is going on two weeks with no resolution in sight from Amazon
- All web mapping for internal and external customers are down (14 map services)
- Solution: built new on-site VM with same configuration as production server in cloud; create web server – 5 days.
- Back in service Tuesday 10/1
Conclusion

• On-site in VM environment
• Sell remaining reserved instance time or clawback set-up fee
• Search and evaluate more local cloud providers with explicit Service Level Agreements
• Be prepared to do all technical work that Esri provides in provisioning their AMIs
Questions?