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

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Test Solution – Amazon Cloud Computing

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

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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

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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

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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

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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

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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

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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

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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

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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

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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

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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

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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

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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

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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

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Questions?