

NSDI Cooperative Agreements Program

Geospatial Platform Cloud Service Testbed

Final Report

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Final report

Organization: Coeur D'Alene Tribe

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Collaborating Organizations: None

Executive Summary

Despite the many personnel issues of the first six months (we lost both the GIS Analyst and Technician within a month of each other the summer of 2012 who had been assigned this project), we were able to get beyond the testing phase and have a production ArcGIS for Server 10.1 server running in Amazon's EC2 cloud by October, 2012. The move of data up to it had just begun, with the hope to have the majority up on the server sometime in November to begin speed and stability testing against the newly upgraded GIS servers on-site at Coeur d'Alene Tribe's Technology Building.

Project Narrative

This project got off to a rough start the spring of 2012. One of our IT Techs retired in February putting a strain on the IT Department which the GIS Program is a part of. Then, our Network Manager left for another job in March. Our Senior GIS Analyst and GIS System Manager, Berne Jackson, had to fill in as interim Network Manager for the next four months and this diverted him from the project. We lost one of our GIS Techs, Jennifer Grew, in July who had been spearheading this project for our group, and then we lost our other GIS Analyst, Jason Trook, to another job in August. He had also been involved in this project. Consequently, we did not really get started until well into August when Berne Jackson was able to allot some time to the project. We were also not able to spend much time on it in October due to the major hardware and ArcGIS 10.1 software upgrades that Berne Jackson had the responsibility of doing.

We have been trying to attend the biweekly phone/web meetings. These meetings seemed to be aimed at the other CAP grant projects (at least in the early months), and so there was some confusion on our part as

to our participation in the Amazon “sand box” that had been set up to do training and prototyping. Apparently, our project was different than most of the others and we were not supposed to have access to the sand box. We were given credentials to it and so we did some early experimentation there. When it was discovered that we had Amazon incidents there, we were “invited” to leave and get our own Amazon account set up. It took over a month to get this account set up with Amazon and approved through our accounting/contracting system. This should have been relatively easy to do, but because Amazon prefers to use credit cards for payment and we have to pay via purchase orders, I took many e-mails back and forth with our Amazon representative to get the account set up. It also took some time to get access to ESRI’s AMI’s.

While we were waiting for access to the ArcGIS Server AMI’s, Berne Jackson created a Windows/ArcGIS Server EC2 server from scratch and uploaded ESRI software and some data to it for some testing purposes. Also, it would make a good comparison task when the AMI’s and ESRI’s Cloud Builder were available and let us see how Amazon billed for the server time. Generally, he found that building the ArcGIS Server was little different than setting one up on a physical computer. Certainly, the Windows server has different ways of configuring getting through Amazon’s firewall, but overall the experience was similar.

When the ESRI AMI’s became available, Berne Jackson attempted to use the Cloud Builder software, but was unable to get the software to authenticate to the Tribe’s Amazon account. This may take some further help from ESRI to make work. Since it is very simple to create these servers from Amazon’s website, it seems there is little advantage in using the Cloud Builder software. However, if we ever get it to work, it may show us otherwise. Eventually, he built a new EC2 server directly from Amazon’s website using the available ESRI AMI for a Windows/SQL Express ArcGIS 10.1 server. While this came with all of the ESRI software already installed, it still needed to be configured and licensed. The difference between the server built from scratch and the one using the AMI amounted to the time it takes to upload the software and install it, approximately 45 to 60 minutes. So far, we have seen little other advantage to using the ESRI AMI.

We hired a new GIS Analyst, Beau Crawford in December, 2012, and he took over this project. During his time with the project, he continued to maintain the remote servers, moved copies of non-sensitive data to them and experimented with ArcGIS Server services and simple web

mapping. He took the class from ESRI titled, *Systems Architecture Design Strategies*, where he learned a great deal about cloud architecture and GIS including estimating required resources to support specific cloud environments. Unfortunately, he left us for another job in October, 2013, and had little time to use what he had learned to move our GeoCloud project beyond more than just a basic implantation.

Servers built:

- ***CDA Tribe GeoCloud Project***. Original large instance built by Berne Jackson with all of the database and ArcGIS Server software installed from scratch. Drive space: a 30 GB boot and 200 GB data volumes.
- ***CDA Tribe GeoCloud Project From ESRI AMI***. Built from an ESRI ArcGIS Server AMI with a 35 GB boot and 100 GB data volumes on a large instance. A 1 TB volume was added to handle Coeur d'Alene Tribal imagery that was never utilized.
- ***SDE Data in the Cloud***. Instance built by Beau Crawford to test out an extra-large server. It had a 60 GB boot and 10 GB data volumes. It was never fully brought on-line because of cost considerations.

Post project clean up: 4, 250 GB extraneous volumes that had no servers attached to them and no data on them were removed. Also removed was the terabyte volume from the main ArcGIS Server, ***CDA Tribe GeoCloud Project From ESRI AMI***, that was being used for imagery storage. Other clean up involved removing the extra-large image, ***SDE Data in the Cloud***, and its volumes that Beau Crawford had built. Left in place was the original large instance, ***CDA Tribe GeoCloud Project***, which was originally created the summer of 2012.

Next Steps:

This project will most likely not continue past the project period primarily because the Coeur d'Alene Tribe's I.T. Director has strong feelings about tribal government sovereignty and locating Tribal data off-premises "in the cloud." We have some very culturally and litigation sensitive data that she prefers to have under our own physical "lock and key." Currently, we have little need for the "on-demand" and "part-time" features that Amazon's EC2 provides which can provide cost savings over a full time server. Typically, we need servers on 24/7 for the kind of work we do and there is little change in demand on them. Many of the flexibility advantages that EC2 provides we already get from our own virtualized server environment here on our campus using VMware and Hyper-V Server. That being said, I can still see the potential of using cloud services for the Coeur d'Alene Tribe sometime in the future when the technology and (especially) security have improved. For the foreseeable future, we will probably keep our

current Amazon cloud server to use as demonstration servers. As long as they're not costing us much money, we will leave them in our account turned off with minimal volume space.

Feedback on Cooperative Agreements Program

We had issues early in the process some of which was our personnel problems, but there seemed to be great confusion over what we were supposed to do to satisfy the grant. The whole business with the "sand box" was extremely confusing. We were trying to follow the instructions posted on the project web site, and it seemed that every time we talked to anyone, that was the correct thing to do. It wasn't until we lost Jennifer Grew and Jason Trook that we were finally on the correct path. There seemed to be a lot of help out there, but it appeared to be more directed at the Federal participants than us in the early part of the grant. Then later in the summer of 2012 when we finally got our own Amazon account set up, there seemed to be less help for us. There were several times when we requested help from one of the USGS people and we'd not get any response back.