



The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

YEAR:
2012

STATUS:
Laureate

Organization:
USDA NRCS

Organization URL:
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/home>

Project Name:
Cloud Services Innovation Platform

What social/humanitarian issue was the project designed to address? What specific metrics did you use to measure the project's success?

The project's goal is to provide a robust platform for providing computational cloud services to aid farmers and ranchers in the U.S. in their support of a healthy environment and enable productive use of their land. Conservation tools will use these services to help determine the best course of action for critical issues that affect their business and livelihood. Our focus is on assessing and addressing critical conservation concerns using environmental models hosted on a cost-effective open source infrastructure for development. Compatibility of this open source infrastructure with commercial cloud hosting offerings is critical for successful production level deployment and reliable availability on a stable operational platform. Our project success can be measured in two areas: 1) computational services should be quickly stood up on an open source infrastructure and then moved to a commercial cloud provider, 2) significant cost savings should make this pattern compelling for future development activities. Environmental model computational services applied on a national scale are composed of two basic components, a robust scientific simulation model coupled with the geo-specific data to drive site-specific results. Using the USDA Object Modeling System we were able to stand up three legacy computational scientific models (RUSLE2, WEPS, APEX) within a week for each so we can complete months crafting the data provider services. We are successfully moving these completed computational services to a commercial provider to support a reliable level of service for national availability. Current projections of cost savings to taxpayers make this approach at least an order of magnitude improvement over our current server farm approach.

Please describe the technologies used and how those technologies were deployed in an innovative way. Also, please include any technical or other challenges that were overcome for the successful implementation of the project.

The USDA National Resource Conservation Service (NRCS) has 12,500 planners in over 2,000 field offices that go out into the fields and work directly with farmers and ranchers to help them assess and address critical conservation issues such as erosion using a wide variety of environmental modeling tools. Until recently, all of its 100+ scientific modeling tools were applications that the NRCS distributed to all 12,500 workers' computers individually. This proved to be increasingly costly and ineffective, and in starting in 2009, the NRCS began looking at cloud computing as a means of centralizing resources, cutting costs and providing a more scalable and flexible IT backbone for the agency and its thousands of field workers. The result is now the NRCS's Cloud Services Innovation Platform (CSIP). The CSIP is designed to facilitate the migration of existing scientific modeling applications within NRCS for deployment to any Amazon EC2-compatible Infrastructure-as-a-Service (IaaS) cloud environment. A key component of the CSIP is a computer framework that takes an existing environmental model and turns it into a Web service that can be run in "the cloud" to improve technical assistance to farmers and ranchers. To test this framework, NRCS needed a cloud, and it chose to work with the Eucalyptus open source private cloud software. Using the Eucalyptus-based CSIP, the NRCS has started to demonstrate the power of having its environmental modeling tools be easily accessible as a Web service from the cloud. Imagine, for instance, a situation where a farmer and a NRCS planner can pick up a mobile phone in the field and immediately get answers on soil erosion simply by connecting to modeling services in "the cloud." This kind of capability helps the NRCS deliver better support to farmers and ranchers.

Please list the specific humanitarian benefits the project has yielded so far.

The environmental cloud services are readily available to governmental and non-governmental users. One group that has recognized this opportunity is the NGO Keystone Center (Keystone Center), which is facilitating the use of contemporary tools for linking farmers and ranchers with large market providers. This group is committed to use many of the conservation assessment services and the driving data sources in their field-to-market calculator tool (Keystone-field-to-market) (field-to-market-calculator). The overall premise of this effort is to encourage broad grower involvement while at the same time creating value to growers, consumers, and society in general. If you examine the list of members involved and supporting this effort you can see a lot of heavy hitters in the agricultural market place. This effort already has a strong U.S. national appeal, and is being looked at by other international governments for enhancing their food production systems. Additionally, another NGO, AgGateway, a consortium of businesses serving the agriculture industry formed for its members to achieve the benefits gained when companies collaborate to share information electronically in the agricultural and food supply chains, is also taking advantage of this opportunity. A key data source used to drive these environmental cloud services is the NRCS Land Management and Operations Database (LMOD), which is the standard reference data source of management templates used to deliver conservation to farmers and ranchers. LMOD is providing nationally relevant management scenarios/templates for use by farm management software producers and all the way to tractor builders with integrated electronic components.

Please provide the best example of how the project has benefited a specific individual, enterprise or organization. Feel free to include personal quotes from individuals who have directly benefited from the work.

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