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Cloud Presentation Thursday Morning June 2015

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Cloud Computing and F&A



Cloud Computing

- **Cloud computing refers to resources that deliver hosted services over the Internet**
 - Much like power plants and the power grid – you get electricity as a commodity rather than having to generate it yourself
- **Cloud services include computing power, data storage, software**
- **Cloud services can be public, private or hybrid**
- **Some Advantages of clouds**
 - On-demand/self-service – others manage the asset, you simply use it
 - Elasticity – can scale up or down as needed
 - Pay only for what you use
 - Ideal for numerous applications that are highly parallel (e.g., transactions)
- **Some Disadvantages of clouds**
 - One doesn't control the resource (e.g., as in campus computing centers)
 - Must move data, sometimes over long distances (big issue for huge data)
 - Cloud computing isn't for everyone (e.g., not suitable for certain applications such as weather models)

The Issue at Hand

- **Researchers have multiple options for meeting their computing needs, but for simplicity, consider the three principal ones**
 - **Use of on-campus resources, e.g., centralized centers or departmental server farms**
 - **Use of Federally-sponsored off-site services, e.g., NSF supercomputing centers**
 - **Use of Commercial cloud services**
- **The cost models for each are different, as is the treatment of F&A**

On-Campus Resources #1: Comp Cntr.

- **Owned and operated by the institution, which bears the total cost of ownership**
 - Hardware, software, space, power, cooling, network infrastructure, staff
 - Sometimes researchers contribute, e.g., by purchasing storage, additional servers
 - F&A might be included depending upon charging structure
- **Researchers typically see such facilities as freely provided by the institution (expectation) and do not contribute F&A when they purchase equipment, though F&A can enter in other ways through grants**

On-Campus Resources #2: Workgroup

- **Owned and operated by department or research group**
 - Hardware, software, staffing through some combination of direct charges and recharge centers
 - F&A might be included depending upon costs & charging structure
- **Researchers see these as costs to their grants and try to maneuver to avoid F&A**
 - University provided space, electricity
 - Hardware purchases > \$5K

Federally Operated Centers

- **Owned and operated by institutions but supported via Federal grants (e.g., the National Center for Supercomputing Applications at the University of Illinois)**
- **Time is provided free of charge to grantees based upon competitive proposals for resource allocations that are separate from underlying research grant proposals**
- **Typically focused on mid- to high-end users and often requires university resources for data analysis, viz**
- **F&A not involved in the computing service**

Off-Campus Commercial Cloud Resources

- **Owned and operated by for-profit private companies**
 - **Examples include Microsoft Azure & Office 365, Amazon AWS, Google App Engine**
- **From a grant perspective, all costs are rolled up into the service fee and are considered direct costs, subject to F&A**
- **Faculty see cloud computing as an off-campus purchased service, arguing for either no F&A recovery or the off-campus rate to incentivize the use of clouds**
- **Competing arguments exist regarding total cost of ownership and clouds and generally are situation-dependent**
- **The real issue is cost per computed result**
- **The University of Washington has a new policy that waives F&A for all purchased external cloud computing services**

Issues and Options

- **Does cloud computing warrant a special policy across the Federal government?**
- **Does a possible analog exist in genomic arrays?**
- **Some options**
 - **Waive F&A entirely on all commercially purchased cloud services**
 - **Exclude cloud services from MTDC**
 - **Charge only the Administrative component of the F&A rate to cloud services**
 - **Others...**

Where We Are Today

- **Develop a set of overarching principles...for example...**
 - Agencies should get the most computing value per dollar
 - Researchers should be able to use the most appropriate resources
 - Institutions should be able to recover appropriate costs and operate using the models most effective to their needs
- **Although NSF conducted a survey about cloud computing usage, we do not have sufficient information to inform a policy**
- **Thus, we recommend working with AAU, COGR, and APLU to develop a survey that gathers needed information on a variety of issues, ranging from usage and costs to projected needs across disciplines and service/cost trajectories from providers**

Where We Are Today

**To: Hunter Rawlings, AAU; Peter McPherson, APLU; Tony DeCrappeo, COGR
From: Randy Bryant, OSTP; Kelvin Droegemeier, U Oklahoma; Dan Reed, U Iowa**

Dear Hunter, Peter, and Tony:

We are an ad hoc group investigating the financial and other administrative implications of using cloud computing services to meet research needs in higher education. Industry is seeing great benefits in cloud computing in terms of cost savings and flexible availability. Companies ranging from small startups to Fortune 500 corporations have found it advantageous to rent computing as a service, rather than making large capital investments in equipment and then managing and paying for personnel to operate their computing facilities.

Potentially, cloud computing services could also greatly benefit university researchers. Based on informal observation, it appears that the rate of adoption by the university community is fairly small. We recognize that cloud computing in the context of research is quite complex, involving a broad range of needs and options, software packages, and support infrastructure. It's hard to know whether the lack of adoption is due to the need for university researchers to have more specialized equipment, financial disincentives due to the federal rules for indirect cost recovery, or a lack of awareness.

We would like to work with your organizations to better understand the possible roles of cloud computing in university research, and to devise strategies to reduce any unwarranted barriers to adoption while also not introducing inappropriate or unnecessary financial or administrative burdens. We would like to start by conducting a survey of the chief research officers at AAU and APLU schools, because it is clear that insufficient data exist upon which to base informed decisions regarding cloud computing policies. The proposed survey would be an important step in collecting such data.

We would appreciate your cooperation with this effort, and we welcome and guidance and advice you would like to provide us.

Randy, Kelvin, and Dan