Calculating *the* Cloud

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Determining the true cost of hosting servers in the Cloud

OVERVIEW

Low costs, ease of use, scalability, minimal infrastructure requirements, and "pay-for-use" approach make hosting servers in the cloud an attractive proposition.

However, there are other factors such as bandwidth limitations, security concerns, and service availability requirements which institutions must consider when assessing the potential benefits of Infrastructure as a Service (IaaS) offerings.

In an effort to assess the value of hosting servers in the cloud, Dartmouth College initiated a study to determine the true cost of IaaS offerings.

The study resulted in two useful decision-making tools:

- **Decision Tree**
- **Cloud Metrics**

Decision Tree

1. SENSITIVE DATA

Does the server house, transmit, or process sensitive data such as:

- **Personally Identifiable Information (PII)**
- **Protected Health Information (PHI)**
- **Institutional or Personal Financial Records**
- **Academic Records**
- **Sensitive Intellectual Property or Research Data**

2. MISSION CRITICAL APPS

Is the server running a mission-critical application or service?

3. UPLOADS REQUIRED

Does the server require large and frequent uploads?

4. OS NOT SUPPORTED

Does the server require an operating system not supported by the selected Cloud provider?

5. LICENSING ISSUES

Are there software licensing issues which could prevent a server from running in the Cloud?

- **USB dongle**
- **License manager IP restrictions**

6. RETENTION POLICIES

Are there data retention policies which require on-site and/or long-term data archives for the server?

7. ACCESS REQUIRED

Is physical access to the server required?

8. CONNECTIONS REQUIRED

Does the server need to be connected to peripheral devices or a Storage Area Network (SAN)?

YES?
reconsider

NO?
consider

Cloud Metrics

SERVER COSTS

- **Server Memory Requirements**
- **Server Processing Requirement**
- **In-house Standalone Server**
- **In-house Virtual Servers**
- **Cloud charges for server instance**

STORAGE COSTS

- **Amount of Storage Needed**
- **Cost of In-house vs. Cloud Storage**
- **Costs for out-of-band uploads to the Cloud**
- **Cost of In-house Backups vs. in the Cloud**

BANDWIDTH COSTS

- **Costs of bandwidth per GB: in-house and Cloud**
- **Server bandwidth usage for external and on-campus traffic**
- **Network latency: in-house and Cloud**

RISKS

- **Cloud provider employees have access to your server**
- **Limited auditing capabilities**
- **Minimal network security controls**
- **Limited control of address and namespace**
- **Internet accessible web-based console to control server instances**

About the Cyber Security Initiative

The CSI is focused on projects aimed at improving the security of the College's information systems. By coordinating research interests with practical concerns, the initiative has resulted in a number of innovative tools and procedures currently in use on production systems.

http://www.dartmouth.edu/comp/security/CSI