



TO: FINANCE COMMITTEE (FC)
FROM: EXECUTIVE DIRECTOR'S OFFICE (EDO)
SUBJECT: HEADWATERS IT INFRASTRUCTURE UPDATE
DATE: NOVEMBER 2, 2018

Request

Headwaters Corporation (Headwaters) is requesting that the FC and/or Governance Committee (GC) approve a one-time Other Direct Costs (ODC) expenditure of \$24,000 in 2018 to partially offset the cost of updating Headwaters IT infrastructure to accommodate storage and backup of Program-related project and remote sensing (GIS) data.

Background

Headwaters contract stipulates that we are responsible for storing and protecting all electronic data generated in performance of our role as the EDO including administrative, technical, and remote sensing data. Approximately 98% of the data on our server system is Program-related and the current system is at maximum capacity. Historically, Headwaters has not charged IT infrastructure expenditures to the Program or included them in our labor multiplier. Headwaters last updated our IT infrastructure in 2014 to accommodate the Program's growing library of remote sensing data. We now store approximately 9 terabytes (TB) on our servers and have resorted to archiving some data on external hard drives. Earlier this year, we asked Headwater's IT service provider (Onset Solutions; Onset) to perform a comprehensive system review and provide system update recommendations.

Infrastructure Update

Onset recommended that Headwaters update our infrastructure to provide 32 TB of usable storage. We estimate that this will provide enough storage to accommodate all existing data and provide the space for an additional four years of remote sensing and other data. The update would retain redundant on- and off-site backup capability to ensure that no data are lost in the event of a disaster that physically destroys server equipment at one of the Program offices as well as cloud backup of the most critical data in case of simultaneous on-site failures. In addition, Onset recommended that we update our firewall, power failure, and wireless network infrastructure. Hardware and software sales quotes total \$27,466. Equipment setup is expected to cost an additional \$2,600. The cloud backup solution has a one-time software cost of \$500 and an ongoing annual cost of approximately \$700 per year. Onset's upgrade proposal and associated sales quotes are attached.

We are requesting the Program consider reimbursing Headwaters for the cost of the updated server and power failure hardware and associated software which totals approximately \$24,000. Headwaters would pay for the cost of the firewall, wireless network updates, all installation costs, and cloud backup subscription fees.



Overview of Proposed Solution:

- Replace the current NAS appliances with two new Dell PowerEdge R540 rackmount servers (they should lay flat on the carts). Current data usage across the company is approximately 9.5TB. The new servers will have approximately 32TB of storage. As configured, there would be no room for future expansion, so if we'd prefer a larger amount of storage, we can configure it with larger drives for an [noticeably] additional cost at this point. Also, as configured, the server will be able to safely lose one operating system drive and two of the data drives before a disaster scenario would occur. We should also be able to "fail over" to the other office in the event of a hardware failure, but it would be subject to the slower access speeds.

The two servers will "sync" with each other using a technology called DFS (Distributed File System). The biggest issue that I'm aware of is that if two people are using the same file at the same time that is housed on different servers (e.g. Denver and Kearney), it can create conflicts. This may or may not be an issue, depending on your workflow. Based on research, this technology scales upward of 100TB.

A quick overview of DFS can be found here: <https://docs.microsoft.com/en-us/windows-server/storage/dfs-namespaces/dfs-overview>

- Install Server 2016 (or 2019 if available) on all production servers and purchase associated licensing. This is a required component of the server installation.
- Purchase new uninterruptible power supplies to protect core network gear.
- Purchase two new Watchguard Firebox T35 firewalls to replace the units nearing end of life.
- Purchase a new Network Attached Storage appliance with 48TB of storage to facilitate on-site backups. Because of the way data is stored, this would most likely be located in the Kearney office.
- Subscribe to a cloud-based backup solution.
- Purchase a new Netgear switch and Ubiquiti access points for the Kearney office. These devices will allow us to route traffic in such a way that internal traffic and guest traffic are completely segregated.



High-level overview of implementation:

1. Install and configure servers (configure storage, install and configure Windows Server 2016 and appropriate roles/features).
2. Migrate core functionality of existing servers (authentication, etc). over to the new servers.
3. Migrate / consolidate file storage. This involves coming up with a new directory structure, most likely under the assumption that there will be a single drive letter, perhaps S: where everything lives for both Denver and Kearney. Also important is consolidating the P: drives from both offices and figuring out what is necessary to link GIS to any necessary resource files.
4. Update drive mappings on client computers.
5. Install wireless in Kearney.

Labor:

The labor associated with this project is included within the cost of our monthly service for Headwaters Corporation. Travel time to the Kearney, NE office from Denver, is not.

Travel proposal:

- Trip Fee (Travel Time, covers both ways): \$1800
- Hotel 2 Nights (\$300 – assumes approximately \$150 per night)
- \$50/day per-diem (\$100 2 Days)
- Mileage (covers both ways): \$400

Summary of One-Time Costs

PC Connection (includes all hardware, software and accessories required to complete objectives): \$27,466.60
Onset Solutions Travel Expenses: \$2,600.00

Total One-Time Costs: \$30,066.60



Summary of Yearly Subscriptions (cloud based backup):

Onset Solutions is recommending Backblaze as the provider for the cloud-based backup solution, which as proposed will back up the contents of the server only. The cost of this service scales based on the amount of data being backed up, which is currently under discussion. Below are some examples:

- 2.5TB to start, plus 50GB growth per month = \$168.75 per year (this is what our current “critical” data set is).
- 10TB to start, plus 150GB growth per month = \$657.75 per year (this is what our current utilization is between Denver and Kearney but includes data that is stored on various external hard drives or that are primarily used as reference data).
- Required third-party software to facilitate backups: Up to \$500 (one-time purchase)