

Electronic file storage for PNWRS RMAⁱ

This document provides recommendations for the storage and sharing of electronic files supporting work at PNWRS FIA/RMA. This is intended to provide recommendations and examples, recognizing that individual business units may have additional requirements and recommendations for their teams where the data is not specifically intended for working across multiple organizational groups.

Overview

At PNW we utilize four generally recognized data filing and sharing systems.

- Network Attached Storage Device (NAS)
 - Locally managed network storage device (1 in Alaska, 1 in Portland)
 - Access via Windows Explorer via mapped drives
 - Originally intended for local storage of GIS and other large-data items which required faster access times than other documents and files
- SharePoint
 - Corporate solution providing locally managed internet portals for information sharing
 - Multiple team, project or other emphasis sites
 - New sites can be requested and old sites retired as needed
- Content DB
 - Corporate solution for storing and retrieving shared documents
 - Repository for all documents which are kept under rules for records retention
 - Accessible via a file system like user interface (O-drive), WebUI (via Citrix as of 2014) or an FTP service
 - Not directly accessible from applications running via Citrix
 - Executables and database applications, such as MS Access, should not be run directly from the Content DB
- Electronic Filing System (EFS)
 - A standard Windows Distributed File System, generally referred to as the T-drive. Data is stored and recalled on the T-drive essentially the same way it would be on the user's local drive or a local server drive.
 - Originally intended for large-data storage, such as GIS shape files
 - Direct access to files and folders possible from applications running in Citrix

Things have changed since the CIO first published its planned implementation of the Content-DB, which was intended to be the sole corporate repository for documents and files.¹ User experiences quickly demonstrated that GIS data like shape files and geodatabases were slow to access and were frequently corrupted. The solution for this was to use a more typical distributed file system, (T-drive), for GIS data and supporting documents, images and files, as well as other large-data items requiring remote access. Access times for GIS data and images proved to be a problem when editing over the wide area network (WAN) between duty stations and the Kansas City data center (MCI). As a result, NAS drives were approved at some locations for storage of this data to improve access times.

SharePoint was later introduced to the Forest Service giving users at the local level the ability to quickly set-up web based sites for information sharing. SharePoint site owners have been given tools and a great deal of flexibility for customizing internal pointing sites. SharePoint sites provide a simple way to share documents, create discussion groups, assign and track tasks and a myriad other uses. It is fast becoming a preferred environment for sharing and project tracking.²

¹ <https://ems-team.usda.gov/sites/fs-int-ecm/SitePages/Content%20DB%20and%20EFS.aspx>

² PNW FIA IM is working with the CIO to obtain use of MS Project Server in SharePoint to expand sharing capabilities.

Recommendations

There are some preliminary factors to consider when considering a broad based file storage and data management plan: speed of access, ease of access, intended audience (broadly shared or narrow workgroup), permanent documents versus final documents, user access permissions and applications used to access the information.

SharePoint

SharePoint sites are available to Forest Service business units, teams and projects. Once an end user has attended a brief, on-line information session, setting up a site is simple. The available site templates provide the ability to share documents, use pre-defined or custom lists, set-up automated workflows, create, update and follow tasks and much more.

- Site Owners have the ability to grant and manage read-only, read-write and site maintenance permissions. Once the site is in place, there is no need to open a help desk ticket to grant access to new team or project members.
- SharePoint sites are highly customizable. Much of the work to generate new pages, upload and download documents, create and manage lists, etc. is supported directly with the built-in tools. More advanced customization can be performed through the 'free' SharePoint Designer utility.
- SharePoint supports drag-and-drop making it simple to move documents from your local drive to the SharePoint site.
- Files like Microsoft Word documents and Excel Spreadsheets can be edited directly on the site via cloud based Microsoft Applications (Office 365 cloud computing apps).
- Site templates are available to choose from when requesting a new site. These install commonly used applications for Team Collaboration, Projects, Blogs and Wiki's, etc.
- Links to other sites or file locations (on the content db or EFS) can be placed on the SharePoint site.

We recommend each business area or 'Team' in RMA have at minimum a team site in SharePoint. It is quick and easy to share information that is regularly updated or needed for reference and access can be as broad or narrow as the team decides. The sites are highly customizable to meet the teams' needs.³

Content DB (O drive or WebUI)

This is the location stated by the CIO as the preferred location for shared documents and files, with the exception of GIS data and similar large data files.

- Database applications such as MS Access can be stored here, but should never be directly run from here
- When documents are opened directly from the O' drive, a copy is made to the local cache. Edits are synced back to the master document.
- When accessing content using WebUI, searches can return results even to folders the user lacks access permission to. This is an advantage over other filing systems. If a needed document is discovered in a folder the user does not have access to, a permissions request can be submitted to the help desk or the user can contact the document owner.
- When accessing content using WebUI, bookmarks can be saved to folders or documents.
- Large files can be moved to and from the Content DB using ftp.

We recommend using the Content Database (O drive) for storage of all final documents which may be needed in the future by persons or groups other than the document owner. If you are also running a related SharePoint site, you can add links to the documents. Executable application files and database applications should not be run directly from the Content DB, which presents obvious risks if they are stored there.

³ The PNW RMA IM team will be creating a template to provide a standard layout and, (aka look-&-feel) for team sites and project sites to provide a common navigation.

Electronic Filing System (EFS or T drive)

The CIO has defined the T drive as a place to store GIS or other large data items. There are advantages to using the T drive for certain other documents and files.

Consider carefully before deciding to move large quantities of documents from their current locations on the T drive to the O drive.

- For documents undergoing review or revision, shared between multiple people or team, does it make sense to move them to SharePoint until they are final?
- Would it make more sense to leave them on the T drive until they are final?
- If they are part of a collection of documents, does it make more sense to leave them together on the T drive where people are used to looking for them? (There are 12 years of field guides which were pulled from various locations and consolidated in one, standardized set of folders.)
- Are there links in the documents which will break if moved, or are there outside documents or web/SharePoint pages which point to the current location? These should be addressed at the time a document or file is moved.

Documents or file types that may be frequently accessed and/or edited from within Citrix such as MS Project, MS Word and MS Excel are not readily accessible if they are on the O drive.

- Applications in Citrix can be used to directly navigate to files or documents on the T drive, but not the O drive. For individually licensed products, like MS Project, this could represent a cost savings opportunity. MS Project files can be written to and recalled from the T drive from within Citrix.
- MS Word documents and MS Excel spreadsheets can be edited directly on a SharePoint site if the document is stored there versus on the T drive or the O drive.
- MS Access supported databases can actually be created in SharePoint, making file sharing easier.
- In a draft document titled “Interim Content Repository Guidance,” (last revised August 2014), the CIO states clearly that the Content DB and SharePoint are the preferred filing locations for documents and files, except for GIS and other large data items or applications which do not work well in either of these.

“Microsoft SharePoint and Oracle Content DB (better known as the O-Drive) provide our employees with 2 different locations for filing content. The deployment of these two products is a milestone for the Forest Service. We encourage all employees to utilize them for storing content, team collaboration and information sharing purposes. The Enterprise Content Management Team in the Chief Information Office has written an interim guide addressing where and how to store content.”⁴

Network Attached Storage Device (NAS Drive)

The CIO defined the purpose of the approved NAS drives to be for local storage of GIS and GIS related data and documents. Other large data items such as photo’s or GIS imagery seem to fit the purpose as well. At PNW the PFSL NAS has taken on some additional purposes, such as storage of commonly used application packages and printer drivers. It makes sense to keep the installation packages that on the NAS drive as it removes the need for multiple individuals pulling the large files across the network. Drivers for new printers, scanners, etc. are sometimes difficult to locate on the FS network and having them on the local NAS helps to ensure that the same versions are available to all in the local organization. The NAS has not proven to be an efficient data storage location for access from remote areas or offices.

⁴ [DRAFT Interim Content Repository Guidance](#)

Summary

The following are recommended guidelines for document and file storage.

SharePoint

- Use to collaborate on documents going through review and revision. Store documents here that are used by local teams but do not require outside access and long term storage for legal record keeping. These might include team work plans, task lists, discussion boards, local policy and planning documents, etc.
- Use links to reference additional documents stored on the O drive or T drive.
- Use for Project documents and collaboration, (having a defined beginning & ending with a unique outcome or product).
- Additional recommendations for using SharePoint as a file repository will come up as we learn more about using the system.
- SharePoint files cannot be directly shared with persons outside the USDA network

Content DB (O drive)

- Preferred corporate repository for final documents
- Entire structure is searchable for documents, even if they are in folders they user does not have current access to. This is helpful for locating documents which may have been stored in Staff folders, but have a broader audience.
- Applications and databases should not be directly run from the Content DB.
“Group Content: The default location for storing group content is in your Program, Project and/or Staff folders on the O-Drive. Groups interested in utilizing SharePoint collaboration features may request a SharePoint Team/Project Site. All reference documents should be stored on the O-Drive.” (Interim Content Repository Guidance, Aug 2014)

Electronic Filing System (EFS or T drive)

- Intended for storage of large data files and GIS related data
- Directly accessible for documents from applications in Citrix
- Performance of MS Access applications, launched from within Citrix, using files on the T drive, perform exponentially faster than when accessed from locally launched MS Access applications pointing to the same files.

Network Attached Storage Device (NAS)

- Originally intended for locally editing of GIS data. Provides rapid file access from the local office.
- Has proven to have additional benefits for local storage of other large file types, images, application installation packages, etc.
- Was not intended as a solution for data and documents which are shared across a wide area.

Appendix I - Content Database and the Electronic Filing System

When the Forest Service initially implemented the Content DB it was intended to be the primary repository for all files and documents other than GIS data and documents supporting GIS projects. GIS and other large data items were to be stored on the T-drive (EFS). Lessons learned over time have driven changes from the end-user community.

- When running applications such as MS Office or ArcGIS from within the Citrix environment, files and documents can be stored and recalled directly from folders on the T-drive. Files and folders on the O-drive cannot be “directly” accessed from within Citrix applications.
- Making connections to files and folders on the O-drive has generally been more problematic than accessing those same files and folders on the T-drive. As a result, users have formed work habits deemphasizing use of the O-drive.
- When database applications like MS Access are run directly from the O-drive, there have been frequent instances of data corruption. CIO support staff have recommended against ever running database applications directly from the O-drive

For an in-depth discussion on the file structure and intended uses of the Content DB and Electronic File System, refer to the document “FOREST SERVICE STANDARD FILE STRUCTURE, Forest Service Enterprise Data Center” at <http://cdb.fs.usda.gov/content/dav/fs/Reference/FSWeb/BusOps/CIO/EGIS/documents/FSStandardFileStructure.pdf>.

Appendix II – Examples of Existing Document and File Storage for PNW-RMA

QA Database (IRAM)

- **Working File in .zip format**
 - T:\FS\RD\PNW\Science\RMA\Project\Inventory\Applications\PNWFIADB\QA_PNWFIADB\{(2013, 2014, etc.)
- **Final 2012 database**
 - NAS -- \\166.6.217.26\pnw_pfs\Project_Shared\PNWFIADB\PNWFIADB_2012
 - O:\RD\PNW\Science\RMA\Project\Inventory\Applications\PNWFIADB\PNWFIADB_2012

Annual Inventory Field Guides

Additional copies of manuals for 2000 through 2014 are located on the NAS.

- O:\RD\PNW\Science\RMA\Project\Inventory\Documentation\AnnualInventory\2013\FieldManual
- O:\RD\PNW\Science\RMA\Project\Inventory\Documentation\AnnualInventory\2014\FieldManual
- O:\RD\PNW\Science\RMA\Project\Inventory\Documentation\PeriodicInventory\Oregon_Eastern_1987\field_manual

Project Documents and Reports

- T:\FS\RD\PNW\Science\RMA\Project\Inventory\Documentation\AnnualInventory\2013
- T:\FS\RD\PNW\Science\RMA\Project\Inventory\Documentation\AnnualInventory\2014
- T:\FS\RD\PNW\Science\RMA\Project\Inventory\Documentation\AnnualInventory\2015
- T:\FS\RD\PNW\Science\RMA\Project\Inventory\AK\Annual\Database

Tally Data Files

GIS Data and Imagery

Note: RMRS, SRS and NRS appear to have GIS Data stored in the same file tree as some of the regions on the T drive at T:\FS\Reference\GIS

- (NAS) U:\fs-gis-rs-apps
- (NAS) U:\lidar

PFSL NAS

Contains too broad an assortment of files and folders to delineate in this document

Application Installation Packages and Device Drivers

Appendix III – Requests for Drives, Folders, Permissions or SharePoint Sites

To request NAS drives, folders on the O' or T' drives or changes to folder access permissions

https://usdaforestsservice.custhelp.com/app/answers/detail/a_id/31415

To request new SharePoint sites

<https://ems-team.usda.gov/sites/fs/Site%20Pages/Home.aspx>

(To request access to a SharePoint site, contact the site owner or administrator directly.)

To request a new folder on the O-drive or on the T-drive, contact the help desk

https://usdaforestsservice.custhelp.com/app/answers/detail/a_id/34057/kw/o%20DRIVE%20PERMISSIONS

Definitions

O-Drive is often used to refer to the enterprise Content Database storage system, (Content DB or cdb). This will appear in Windows Explorer as if it were a standard file system, but it is actually a large, complex database system spread across multiple drives and servers. Documents and files stored in the Content DB can also be accessed via a web interface, WebUI. (Since the migration to the USDA domain in 2014, WebUI is now launched from within Citrix.)

T-Drive refers to the Enterprise File System, (EFS). Even though the data is actually spread across multiple servers and drives, it functions like the system of folders and files on your local computer. This appears in Windows Explorer as a standard file system.

Networked Attached Device (NAS) is essentially a single large hard drive combined with its own network connection hardware and software interfaces. It operates like a mini-server of sorts and is maintained locally, (1 in Portland and 1 in Alaska).

ⁱ This document has been compiled from various sources including Forest Service corporate publications and messages, previous PNW documents and related messages and notes.