CAD Collaboration in the Cloud

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The Challenges Managing Design Files

CAD files are complex.

Working with common office documents created in Microsoft 365 or Google Workspace is relatively easy, but files like CAD drawings and BIM models are different. An example is DWG files containing CAD drawings, which usually have **complex relational structures**. On top of that, BIM files can often be **very large**. Authoring applications, like AutoCAD, use various mechanisms to enable collaborative work among multiple internal and external contributors, and they must carefully coordinate to avoid version conflicts. For architecture and engineering firms, these content assets are critical to the company's mission.

While CAD files are the primary example used here to illustrate the challenges of working with complex files in the cloud, similar challenges apply to many other applications, including:

- Navisworks, Civil 3D, and other Autodesk applications
- Adobe Premiere Pro, InDesign, and Dreamweaver
- Bentley Systems applications
- Interlinked PDFs
- Complex interlinked Excel models

Egnyte natively supports all these applications and their unique requirements. This **application awareness** is one of the strengths that makes Egnyte the preferred solution for managing mission-critical content in industries such as Architecture, Engineering, and Construction (AEC), Financial Services, and Media & Entertainment.

Many of these authoring applications are desktop-based, primarily used on Windows or MacOS personal computers. Because many predate the cloud, they initially built their own mechanisms for enabling collaborative work in on-premises environments, relying on local file servers, NAS devices, or Internet-connected filers. These mechanisms handle linking, versioning, and file locking operations to ensure seamless collaboration.

However, when files are moved into most cloud environments, the local file system-dependent operations often fail to function properly. That's why many organizations have yet to transition these workloads to the cloud—due to the complexities involved in working with specialized authoring applications.

Egnyte is unique because it has done the work necessary to support such specialized operations within the Egnyte Content Cloud seamlessly.

This document explores some of these unique challenges and explains how Egnyte handles them. The primary example used here is AutoCAD, but much of the functionality described also applies to other applications from Autodesk, Adobe, Bentley, and more.

CAD Files in the Cloud

While many cloud collaboration solutions claim to support CAD files, what they actually mean is that they can store them. However, storing CAD files in the cloud and working with them in the cloud are two completely different things. Can you open the files directly from the cloud folder, or do you have to download them first? This distinction greatly impacts productivity, team efficiency, and the likely reword resulting from versioning errors.

Egnyte excels at CAD collaboration in the cloud by providing native capabilities that handle the complexities of DWG files and the often massive BIM files, addressing their relational structures and the specialized behaviors these applications require.

Let's take a closer look at how Egnyte enables efficient, secure, and cloud-ready collaboration for CAD and BIM files.

Working with Massive Files

It's no secret that CAD files can be large, and BIM files can be enormous, with sizes in the gigabyte range not uncommon. Working with such massive files in the cloud presents significant productivity challenges, especially due to network latency—mainly when working over a slow connection.

Egnyte tackles this issue with **edge caching**—a virtual cache appliance that automatically loads the most frequently used files into local storage. This hybrid architecture combines the benefits of cloud collaboration with on-premises-like performance, making it a practical solution for users working in an office or a field location, such as a construction site.

For users working from home or on the road, who typically don't carry a cache appliance, Egnyte Desktop provides **desktop-level caching**, which includes sophisticated capabilities such as:

- **Range downloads**: Empowers users to start working with a document immediately after only a small portion has been downloaded instead of waiting for the entire document to load.

- **Delta sync**: A sophisticated handling of edits where only the changed portion of a document is uploaded rather than the entire document.
- **Adaptive streaming** (beta): Allows users to work with massive files where only a portion of the file is downloaded to the desktop device rather than the entire file. This feature, similar to online video streaming, makes it possible to work with files that might not even fit on the device.
- **Block awareness** (beta): Enables working on a block level rather than file level, which significantly speeds up working with massive files. For example, opening a large 100-slide PowerPoint file on slide 70 only requires downloading the block that contains that slide, rather than all 70 slides.
- **Persistent caching** (beta): All cached files and file blocks are retained in the cache when the application closes and restarts. That way, users can start working with a file in the office and continue working on it later from a hotel or home without repopulating the cache.

In addition to caching, Egnyte's embedded viewer allows users to preview files without downloading the entire file, which comes in handy for those who want to browse through CAD drawings before downloading. This **file previewer** feature works in a browser and on the mobile app, making it especially useful for working with large drawings on the go. The mobile viewer includes many advanced capabilities, including zoom, rotate, and measurement functions.

Egnyte's **Specialized File Handler** provides viewing capabilities for complex BIM files, with features like file search, geolocation search, and file preview with functions to rotate, zoom, orbit, and measure, and 360-degree previews on mobile devices.

Handling the Complexity of Relational Files

A typical structure of a design isn't a single file. Instead, it's a relational file with multiple cross-linked drawing files that combine separate scopes of work to support project collaboration. AutoCAD refers to them as external references or "**xrefs.**" They make it possible to link drawing "sheets" across multiple files—such as structural, plumbing, HVAC, electrical, etc.—to create a "**sheet set**" for a project.

Sheet sets are necessary when working on a file server that doesn't have any concept of links. However, the xrefs managed in **Sheet Set Manager** have limited functionality in Autodesk Docs and will not work automatically in most third-party cloud environments.

Egnyte has added intelligent logic to ensure xrefs work natively, enabling seamless cloud collaboration for AutoCAD users. Since files can be opened directly from cloud folders, all collaborators work on the same dataset, keeping projects on track and preventing costly rework.

Because Egnyte's repository functions as a distributed file system in the cloud, it handles the xref links without any modifications. Egnyte creates virtual drives accessible via a letter drive, behaving just like a file server drive on a local network. Customers appreciate that no changes are needed when they migrate their existing project files into Egnyte—the **mapped letter drives** ensure relationships continue to work seamlessly.

Finally, Egnyte supports AutoCAD notifications that notify the "master user" that an xref has changed. The notifications appear as a pop-up at the bottom of the screen, prompting the master user to refresh the xrefs accordingly. Egnyte makes sure that the AutoCAD **xref notifications** work seamlessly in the cloud.

Collaborating Across Distributed Teams

CAD collaboration relies on various operations that AutoCAD offers to ensure multiple users can work on different files that are part of the same project without conflicting edits. This is particularly critical when collaborating with external stakeholders, often working with external users from multiple firms simultaneously.

AutoCAD has built its own mechanism to handle file locking to ensure that two users don't make conflicting changes to the same file at the same time. For that, AutoCAD uses temporary DWL files that monitor the locking together with information about who locked the file, when it was locked, etc. When moving such files to the cloud, this mechanism doesn't work natively. Egnyte has incorporated **support for DWL files** within its native AutoCAD files support.

Egnyte's **automatic locking** ensures that files are automatically locked upon opening, preventing users from accidentally overwriting each other's edits—there is no need to check out (or lock) the file manually. When working from a cache, Egnyte ensures that these locks immediately propagate back to the cloud and any other cache involved in the same project. This sophisticated **locking propagation** enables efficient and productive CAD collaboration for distributed teams without version conflicts.

Egnyte has implemented similar mechanisms to handle other AutoCAD operations that have been built for a file system environment and that don't natively work in the cloud, including export batch plots or AutoCAD's **versioning mechanism**. AutoCAD saves a new version by

deleting one and replacing it with a new one – a process that would lead to losing the versioning history in the cloud. Egnyte intercepts these operations and makes sure that the new version is added to the existing content object.

Another special treatment was required to prevent AutoCAD's **temporary files** from being uploaded to the cloud, which would negatively impact the system's performance and unnecessarily consume bandwidth and storage.

Other Autodesk applications use similar operations that require special support when executed in the cloud. This makes it possible to work with CAD, BIM, and other complex files in the cloud rather than just store them.

Application Certification

While such special operations are specific to AutoCAD, many other Autodesk applications—such as Navisworks, Civil 3D, and Inventor—behave similarly. Applications from vendors like Adobe, Bentley, and Esri also exhibit many atypical behaviors that differ from simple Microsoft 365 apps. To properly support these applications in a cloud repository, Egnyte Content Cloud ensures compatibility with all these specialized operations. Today, Egnyte conducts rigorous testing to certify its support for such applications.

Summary

Handling Microsoft or Google files is relatively simple and widely supported, but most content solutions struggle when used for specialized desktop applications in the cloud. Sure, they can store CAD files, but **storing CAD files is a completely different workload than working with them**.

Egnyte handles the complexities of CAD natively in the Egnyte Content Cloud. Customers appreciate that the shift is completely transparent when migrating their workloads from an on-premises file server into Egnyte. They don't need to change their workflows or alter their behavior. After the migration, what was a G: drive on a file server becomes a G: drive in Egnyte, and everything works identically. No retraining is required. It just works.

That's why Egnyte is the content solution of choice for businesses that rely on complex mission-critical content such as CAD drawings, BIM models, and media files.

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Egnyte combines the power of cloud content management, data security, and AI into one intelligent content platform. More than 22,000 customers trust Egnyte to improve employee productivity, automate business processes, and safeguard critical data, in addition to offering specialized content intelligence and automation solutions across industries, including architecture, engineering, and construction (AEC), life sciences, and financial services. For more information, **visit www.egnyte.com.**

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