C&S Companies

C&S Eliminates CAD Latency, Improves Performance with Panzura

Geographically distributed design and development teams are widespread in all Architecture, Engineering, and Construction (AEC) firms to facilitate proper matching of the talent pool with growing project demands. However, challenges associated with providing seamless access to CAD project data across dispersed teams often create excessive amounts of infrastructure and management complexity with sub-optimal results or productivity loss. C&S turned to Panzura to solve its remote Revit, Civil 3D, and CAD modeling performance issues by implementing a distributed cloud file system with centralized, redundant, offsite cloud storage, thereby allowing architects and designers to work as if they are local.

C&S Companies (C&S), founded in 1968, has more than 450 employees providing engineering, architecture, planning, environmental, and construction services to clients through a 13-office, distributed network stretching from California to New York. C&S provides services to local, state, and federal governments; industry and manufacturing; and private businesses.

Customer Challenge

Business Requirements and Storage Complexity: Decentralized to Centralized and Beyond

Storage centralization, file sharing, and data protection were priorities for C&S. In 2005, C&S decided to move from a decentralized storage model across all its sites to a centralized model. Benefits were obvious, but performance suffered. In 2006, C&S was one of the first to purchase a Riverbed Steelhead WAN optimization device to speed up applications, but problems persisted. In addition, the company found data management and protection to be a challenge on its centralized EqualLogic SAN, which had grown to more than 11TB. Disk-to-disk backup, with a remote disaster recovery and business continuity solution, was high on the wish list but continually postponed due to cost and complexity.

With Panzura, C&S saw the following immediate results:

- Latency eliminated – 150x performance improvement
- Cold transfers – 20 min to 90 seconds
- Warm transfers – 20 min to 8 seconds
- Inherent data protection with cloud redundancy

Mounting CAD Challenges and Network Complexity: Bandwidth and Latency

Key to the success of C&S is the ability to quickly access complex project data files, regardless of the office in which they reside. Common applications in use were Revit, Civil 3D, and Bentley MicroStation. With a centralized model, most application data movement was between Syracuse and a remote site, but also included some peer-to-peer sharing across sites. C&S had a MPLS network between sites, with bandwidth varying between 6 Mbps and 10 Mbps. All Internet access was through Syracuse and there was a 30 Mbps limit on the bandwidth to the Internet, thereby making Syracuse a potential bottleneck. Latency ran 30-90 ms from Syracuse but as little as 10 ms between some sites.

Latency and lack of bandwidth were killing user productivity and without any acceleration technology, it would take more than 20 minutes to open a file. With Steelhead, application speeds improved noticeably and C&S was able to address network bandwidth issues. However, latency persisted and it still took a long time to open a file, which led to remote applications timing out — the problem wasn't bandwidth, it was the "Remote File System".

The CAD "File Open" Monster on the WAN*

The pain of a centralized IT infrastructure is felt most acutely in complex, vertically integrated projects (as seen in Civil 3D) that include many, maybe thousands, of files requiring thousands more file system transactions, such as opens, lookups, locks, closes, and unlocks. This commonly is referred to as the "File Open" problem

in the AEC community* and C&S was no different. As the company discovered, more than 90% of the delay was associated with numerous round-trips being made to the data center for specific file operations. The farther the office, the more acute the problem. Users went through dramatic changes in their workflows in an attempt to circumvent the problem but the problem continued and, over time, the frustration became unbearable. Something had to change and a new approach was in order.

Chosen Solution — Distributed Cloud File System with Cloud Storage

C&S turned to Panzura to solve its remote CAD performance and data management problems. C&S deployed a single distributed cloud file system with eight controllers in a NAS configuration at each one of its major sites, with all data securely stored and archived on Amazon's S3 storage. Storage costs now are OPEX, based on usage. With free uploads to Amazon, and downloads minimized by Panzura caching and deduplication technology, network transfer costs are minimized to less than $100 per month. A lightweight synchronization protocol keeps everything consistent and in-sync across the entire system. Each site owns and operates a true distributed cloud file system with LAN speeds for edge users. Presently, C&S has a SharePoint Index Server working in unison with Panzura at the company's Syracuse headquarters. As most company data is ingested at this site, C&S was able to build out the metadata search index for all data across eight sites. Latency has been reduced dramatically and the "file open problem" is a thing of the past.

> *"A key to our success is the ability to quickly access complex project data files, regardless of the office in which they reside. We have a 10-megabit MPLS network and had implemented WAN optimization, but only Panzura made it possible for our workers to access complex data files at LAN speeds from any of our offices."*
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> **—Eric Quinn, IT Manager at C&S Companies**

Measurable Results

With Panzura deployed, latency issues have been just about eliminated. The first read of a remote file takes less than one minute, with subsequent reads requiring only a few seconds. File sharing across sites now happens in real time, boosting productivity and reducing time to job completion. The standard practice under the old infrastructure that saw locations working on day-old copies of data has changed to instantaneous updates.

Item	CA to NY	AZ to NY
File Size	1.5 MB	1.5 MB
Round Trip Latency	68 ms	66 ms
WAN Bandwidth	10 Mbps	9 Mbps
Time to Open Directly	22 min	16 min
Open Over Cold WAN Optimized Link	24 min	17 min
Open Over Hot WAN Optimized Link	20 min	15 min
Open with Panzura	8 sec	8 sec

End users noticed an immediate difference without having to alter their workflow. Application integration went smoothly and included all highly used items such as Revit, Civil 3D, and Bentley MicroStation, amongst others. Presently, C&S is on a path to completely eliminate tape backups from its global IT environment, relying entirely on cloud redundancy and Panzura recoverability. With Panzura's frequent global snapshot and real-time replication capabilities, data always is securely stored and protected.

C&S now has the system it requires today, but also knows this system can scale easily as the company grows. For its end users, the solution design was exactly the right fit. For any CAD environment using a centralized storage model, Panzura provides a unique and valuable solution. No other solution comes close to providing the performance of reading and writing at LAN speeds.

* For more information, please read the Panzura White Paper: CAD Theory of Operation and Best Practices.

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