The University of Washington

Washington, USA

Key Facts:

Industry: Facilities Management

Problem: Manually translating and loading updated Autodesk AutoCAD® drawings into an Esri® Geodatabase® on a regular basis is time-consuming and unreliable.

Solutions: FME® Desktop

Results: Automated updates to the campus Geodatabase allows the team to focus on integrating operations with the GIS and improves decision making through rich data translation and data validation processes.

Summary

The facilities management team at the University of Washington wished to implement an automated process for accurately updating AutoCAD floor plan drawings into a seamless, 2.5D, multi-campus Geodatabase. Using FME Desktop they were able to efficiently translate the CAD files into their GIS and validate that changes were processed correctly. This automated system saves time allowing them to focus on developing ways to use the GIS, and also ensures decisions are based on the most accurate information.

The Organization

Located on 643 acres in Seattle, the University of Washington, founded in 1861, is one of the oldest public universities on the west coast of the United States. It has grown into a multi-campus university with branches in Tacoma and Bothell, educating approximately 50,000 students annually.

The University of Washington campus consists of over 500 buildings located in Seattle.

The Situation

The facilities management team at the University of Washington maintains an impressive 21+ million square feet of campus floor space. The campus consists of over 500 buildings that have recently experienced rapid growth from 1,100 to over 1,500 floors in a three year period. Instead of using a Computer Aided Facility Management (CAFM) system, they chose Esri ArcGIS for space occupancy reporting. Each space is accurately represented in an Autodesk AutoCAD drawing. They are stitched together and loaded into a seamless, 2.5D multi-campus Geodatabase. These drawings are critical to accurate space management and it is essential that the Geodatabase is updated regularly to reflect any changes. Originally accomplished through a time-consuming manual process they wished to develop a more automated update system so they could devote time to integrating operations with the GIS.

The Challenge

A revised, automated system was developed that used a combination of Autodesk Vault - the AutoCAD document management system - and a Python script. The Vault periodically identified altered drawings in the more than 1,500 files and copied them to a processing server. The Python script periodically scanned the processing server and was meant to transform and reload updated drawings into the Geodatabase - and it is here where they encountered problems.

During the drawing reload process, the system would only get through 15-20 of the files before hitting a fatal error and aborting. The complexity of the code made it difficult to determine whether the problem was a bug or the sheer volume of data being thrown at the system. In any event, it was clear that they needed to take a different approach to automating the extract, transform and load (ETL) step.

Another concern was data validation and ensuring that the incremental update process never resulted in "missing" floor spaces in the ArcGIS model of the campus.

> *"For this interior space project, FME was the only tool that allowed us to solve two important data challenges. First, FME transformers make it simple to perform complex geometry manipulation, and second, FME makes it easy to handle attribute and geometry differences between CAD and GIS formats. It helps us reliably stitch together over 1500 CAD drawings into a seamless enterprise Geodatabase."*
>
> – Steve Grise,
> Solution Architect
> at Vertex 3 Inc.

The Solution

At the suggestion of Steve Grise, Solution Architect at Vertex 3 Inc., the team investigated the use of FME to automate the ETL portion of the process. As it had a reputation for specializing in "spatial" ETL they were intrigued. After being shown just some of what it could do with CAD to GIS data conversion they immediately switched gears and began using FME Desktop.

Python is still used to periodically scan the processing server for altered drawings but now it calls FME as a subprocess and feeds the AutoCAD files as a parameter to the workspace. From there FME's leading spatial ETL capabilities are engaged and the drawings are transformed, stitched back together and loaded into the Geodatabase.

FME's data validation capabilities are employed before loading the transformed files. If FME identifies any errors, they are reported back to the team and the process is halted. If there are no errors, the new versions are published to the Geodatabase - their final destination.
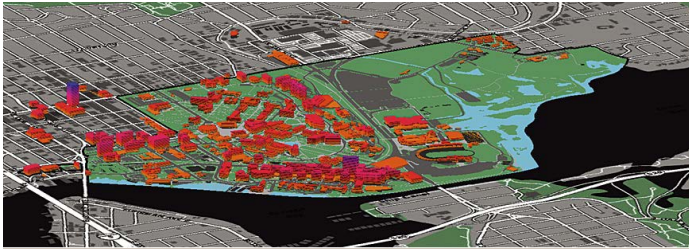
A 2.5D depiction of the University of Washington campus in ArcScene with the floors colour coded by schematic elevation.

Benefits

FME's simple graphical interface enables the team to quickly configure workspaces and visualize each component of the workflow. They can easily monitor what is occurring and make adjustments without any coding. Once set up, the FME portion of the overall process progresses significantly faster than its Python predecessor, and without failing part way through. A benefit to productivity - the team can now spend more time on developing new ways to integrate operations into the GIS and use it to its full potential.

Using FME, the team also has more confidence in their decisions. FME's advanced spatial data transformation capabilities ensure that all analysis is based on data of the highest quality and accuracy. Data's richness is preserved during the CAD to GIS translation, any issues are quickly fixed, and they can validate that the change to the floorplan was processed correctly.

What They're Saying

"We were able to create an FME workspace that did exactly what I needed, in less time than Python," **says Aaron Cheuvront, CAD/GIS Program Manager at the University of Washington.** *"In addition to the time savings, we were also able to add in features I didn't even know were available."*

Learn More

To find out how FME technology can help you address your data interoperability and distribution challenges, or to download a free evaluation copy of FME, visit **www.safe.com**.