

RIZING

SAP COMPATIBLE UNIT INTEGRATION WITH GIS



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Compatible Units are master CU Library records that are a combination of the Labor, Material, Tools, and Resources required to simplify, standardize, and automate the planning, estimating, and cost accounting of Construction and/or Maintenance work.

Introduction and Problem Statement

An integration project between SAP and GIS will typically revolve around ensuring that an organization's assets and spatial information are in sync between the two core systems. In turn, this alleviates many of the common pain points related to manually maintaining data for the same asset in two independent systems, including data inconsistencies, process inefficiencies, and decentralized data governance. The efficiencies introduced to the asset master data management business process are realized with the introduction of a single System of Data Entry in which the data is captured, validated, and automatically disseminated to the enterprise systems that utilize the data. In short, the data is entered into the system and validated once, eliminating the need to manually maintain the same data in SAP and GIS.

The good news is that process efficiencies and data governance can be applied even further upstream in the asset data management process. This paper will explore building integration points between GIS and SAP during the design process of new construction work, utilizing SAP Compatible Units (CU) to establish design templates passed through the interface to GIS design software, enabling organizations to standardize construction designs and automatically generate SAP Work Orders with pre-populated material requirements and labor estimates once a design is approved and issued for construction. Many of the examples used in this paper will be related to the utilities industry where we have integrated CUs with the ArcFM product, however the concept of a design interface can be used in any industry or organization that seeks to combine standardized construction templates into their construction design process.

Background

One of the corner stones of the interface described in this document is the SAP Compatible Unit and it is important to understand what a CU is as well as the role it plays in the design process. Compatible Units are master CU Library records that are a combination of the Labor, Material, Tools, and Resources required to simplify, standardize, and automate the planning, estimating, and cost accounting of Construction and/or Maintenance work. For example, a CU Record combines standardized and repetitive units of work for certain technical objects, such as:

Install / Remove a 40 FT Class 5 Wood Utility Pole

Install / Remove / Relocate a 25KVA Pole Mount Transformer

Alone, the CU functionality allows SAP users to take advantage of the features listed above, however, engineering groups within a utility, pipeline, rail, or other organization whose assets are spread across a large geographic area do not typically use SAP as their primary design tool for the vast majority of their capital projects. In most cases, a CAD or GIS application is used to create and test new designs using a graphical or mapping interface along with specialized design tools. These design applications often have built in functionality similar to CUs, however the system of record for materials, work, and the costs associated with those objects, is SAP. Organizations find themselves completing designs in their design application and once approved, the materials, resources, and location information are manually keyed into SAP as components of a new Work Order. This leads to busy work for a designer/planner and, even worse, introduces all the potential errors that can happen when a human is introduced into the data entry process. Building an interface between these two systems will not only allow the design software to pull in material and labor costing from SAP for accurate estimating of projects but can drive the automated creation of SAP Work Orders as designs are approved for construction.

Solution

Once the decision has been made to integrate the design application with SAP, there are a few questions that need to be thought through as part of the interface design process:

- Have standard construction templates been defined?
- How will construction templates be shared between SAP and the design software?
- Does the design tool need material availability awareness?
- What information does the design application need to provide SAP to drive the creation of a Work Order?
- What events trigger the interface?



In addition to the technical questions, business processes will also need to be analyzed to determine the impact of the interface on the existing business processes and vice versa.



Business Process Questions to Ask

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| 1 | Which steps in the business process trigger the interface? |
| 2 | How will exceptions to the standard business process, like storm events, be handled? |
| 3 | What is the impact of the change on the users? |
| 4 | Will there be more, less, or different work? |
| 5 | Will there be additional roles and responsibilities? |

The answers to these questions will drive the design of the interface and, although each interface we have built has been slightly different, the core remains largely unchanged from engagement to engagement. An example of one such solution is the integration of ArcFM designer with SAP Compatible Units. In this implementation, the CU library from SAP was shared with ArcFM Designer, making available relevant CU objects for the GIS user to place on the map during the design process. Once a construction design is completed, the interface uses a series of statuses sent between SAP and GIS to trigger the update of the CU Design as well as the creation and release of a Construction Work Order and Construction Measure. This allows SAP to generate accurate estimates based on graphical design work completed in GIS.

Once the design is released for construction from the GIS side, the Construction Work Order is updated to match the GIS design in terms of material and labor requirements, and is ready to be scheduled and dispatched using the Multiple Resource Scheduling (MRS) functionality in SAP (or any other integrated scheduling and dispatching application for that matter). The Work Order Operations are assigned down to the Work Center Crews that will be executing the work and eventually dispatched based on crew and material availability.

As part of this specific implementation, mobile devices configured with SAP Work Manager were issued to field construction crews. As the crew members close out the work order operations, the field user can specify whether or not the new assets were constructed "As Designed" or if there were modifications to the design in the field, requiring redlines to be submitted in the work package for use in the As-Built data entry process. This status is passed to ArcFM, associated with the design, and referenced by the GIS analyst during the as-built processing. If the status from the field comes in "As Designed", then the GIS user simply needs to submit the job as complete and let the automated interface between SAP and GIS pick up the new assets and create them in SAP. However, if the status comes into ArcFM as "Redlines Required", the GIS user knows to review the redline document and modify the geometry and associated object data as illustrated in the redline document before posting the session to production and sending the changes to SAP through the SAP-GIS interface. With the data coming in from GIS, SAP can create a final As-Built CU Design and SAP Equipment records are automatically created/changed for each CU Record in the design that have a Reference Equipment assignment.

The example above illustrates the efficiencies gained with the CU integration with GIS through the absence of data entry within the SAP environment. If CUs are properly configured ahead of time, and SAP and GIS are properly integrated with products like Rizing's Mercury Interface, there is very little need to manually enter data in SAP during the as-built process. There are certainly exceptions to this for things like serialized data or technical object characteristics that are not referenced in GIS and cannot be programmatically determined, but for the most part, data entry on the SAP side becomes minimal.

Other Considerations

Definition of CU Templates

The scope of this paper doesn't cover the maintenance of a CU library so a deep dive into CU creation and maintenance will not be covered here. However, it is recommended that prerequisite or parallel effort be made to define standard construction templates if none already exist. In addition, best practice dictates that a process be in place to continually analyze and update construction templates based on trending in planned vs. actual costs as well as changing construction standards and practices. If this process does not exist, every effort should be made to establish one before spending time and effort integrating these systems as accurate estimates are a huge part of the benefits gained from the integration.

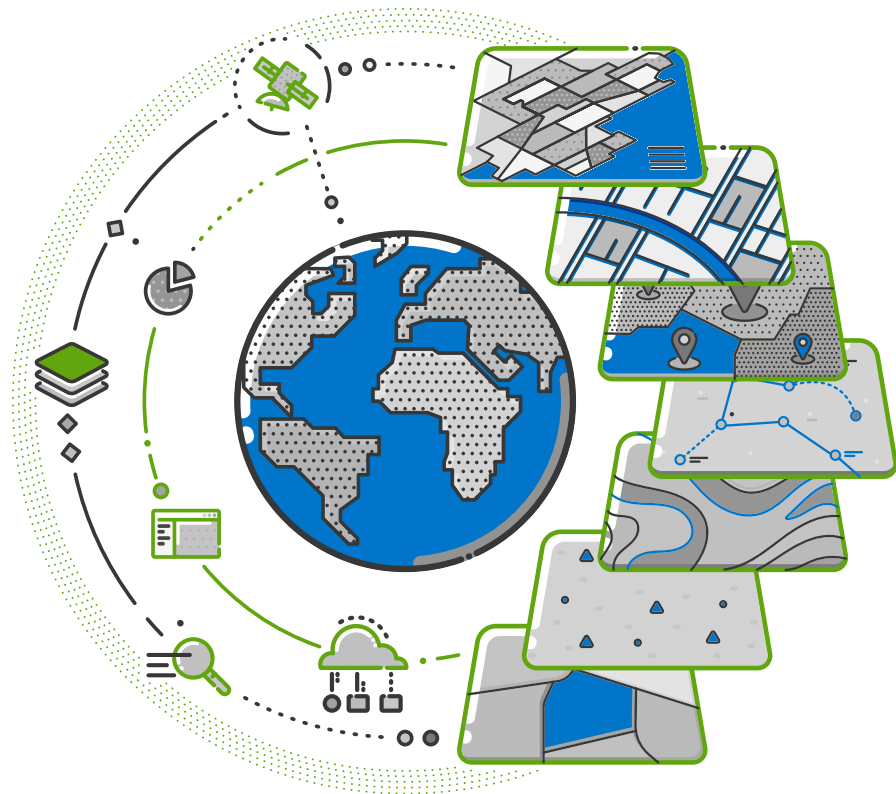
Complexity of CU Library

An approach that we take with us to every project is to keep things as simple as possible, only adding complexity when absolutely necessary. This approach should be taken when building the CU Library. As part of the implementation outlined above, we built a CU Library with the basic CU elements that are used by the Engineering and Construction organization, and utilized the ArcFM Designer to maintain the more complex assemblies, or groupings of CU objects. One example of an assembly might be a utility pole that may have a specific crossarm configuration, with specific insulators based on the primary voltage sizing. Although we could build a CU assembly for this specific configuration, it becomes a huge effort to maintain all valid pole/crossarm/insulator configurations within the CU Library. Once you head down that road you may find yourself with 1 Pole type X 5 Crossarm configurations X 10 Insulator configurations of size & phases which comes out to 50 Assembly Variations that need to be maintained in SAP for a single 40 foot Class 5 wood pole installation. If you turn around and hang one specific type of transformer off that same pole, you double the Assembly variations. We have witnessed organizations that go down this path and end up having to manage millions of CU records. In short, we found that the assembly variations are best handled in the ArcFM Design tool while, behind the scenes, the interface is simply sending all the individual CU Library CUs that comprise the complex assembly. This allows organizations to keep the CU library simple and clean, minimizing the effort to maintain the CU Library while still reaping the benefits of CUs.



Conclusion

In summary, integrating SAP CU functionality with a GIS based graphical design tool like ArcFM, allows an organization to take advantage of all the benefits that stem from standardizing construction practices. This includes standardized design templates, accurate and easy to generate estimates, job status transparency, increased data governance through the use of a single system of entry, and faster turnaround times between construction complete in the field and the data updated in the two core systems of record. As a direct result of these benefits, organizations will find that reporting becomes easier and more accurate, GIS and SAP data analysts spend their time monitoring and fixing data issues rather than being mired in a backlog of manual as-built data entry, and the process of meeting internal and customer project based budgetary constraints is more easily managed through the production of highly accurate and integrated estimation process.



For more information on SAP Compatible Unit integration with GIS, contact us today!

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