RIZING

A BUSINESS CASE FOR SAP GIS INTEGRATION

SAP GIS Integration

RIZING

Author:
Martin Stenzig

Version:
2016

While the different continents analogy makes initial sense, when you dig into the capabilities and uses they look more like different planets.

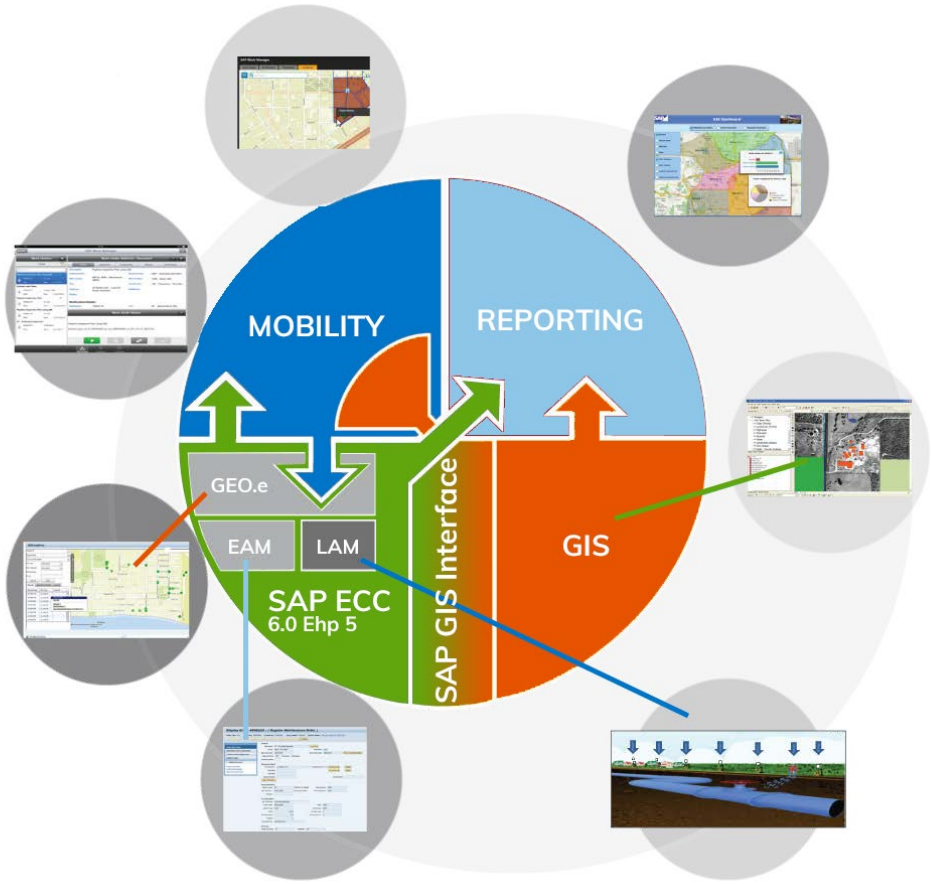
Introduction & Background

For the longest time GIS and SAP EAM were continents all onto themselves. Each contained many little countries but nobody from one continent would talk to anybody from the other, except for the occasional letter from an aunt. This is analogous to the way enterprise applications work in many organizations. While they are often viewed in a similar way, as large software applications, at best they perform different parts of similar tasks. More commonly they do different things, employ different practices, workflows and methods, communicate in different languages and utilize varying modes of governance. While the different continents analogy makes initial sense, when you dig into the capabilities and uses they look more like different planets.

Companies often use GIS and SAP for different purposes even if they are part of the same workflow. At its most basic level, GIS is used to add location to business processes. The majority of business data has a location component and GIS imbeds the “spatial factor” into operations. Companies employ GIS systems to map their assets, and it is the platform for querying infrastructure attributes. It is used as the foundation to build applications for regulatory compliance, integrity management or field activities like asset or environmental inspections. Having a geographic view of these processes makes the solutions significantly more effective. It is imbedded in complicated analyses like risk assessment or financial management because it is the “magic” ingredient that exposes critical, previously unseen, relationships. GIS is in emergency management and control rooms because geography turns complicated data into powerful, vital and quickly understood information. Implementations have proven that GIS improves an organization and makes it easier to operate effectively.

SAP on the other hand manages a separate yet linked series of vital functions. Companies implement SAP for enterprise resource management. It is a powerful solution and when an implementation is complete it can revolutionize almost every major process in an organization. It provides the consistency and captures the details critical to any organization’s business processes. SAP has the functionality to create and maintain an Asset Register which is used as the foundation for enterprise asset management. It defines the process and facilitates the purchasing of materials and then supports critical equipment traceability to eliminate potential disasters. It is the tool that integrates work management with finance and supply chain so that valuable financial decisions can be made and systems can be in continuous operation.

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved.



So why aren't they working together?

If you look carefully at the capabilities of the two system, they appear to be two sides of the same coin. So why haven't people integrated the systems before now? It would seem that they would work better together than apart. The reason is they organize assets in very different ways and the differing philosophies make it hard to integrate content. Let's examine more deeply what this means.

While a GIS uses our existing geographic references, historically SAP used a hierarchy with functional locations and equipment. Equipment is an individual element that can be installed at a particular location. A valve or a meter is an example of equipment. Functional locations are elements of a technical, structure not geographic. This is when something is organized by a means other than geography like a business process, cost center, or management team. A pipeline system could be a functional location. While they can represent a logical group, nothing inside it is assigned a geographic position. It is essentially a cloud. We know it exists on paper but we can't say where it is.

SAP works well when it is used on plant-based asset structures. Manufacturing plants, treatment plants, electric sub stations, gas compressor stations and rail stations to name a few. These are complex, highly complicated and integrated structures where geography is difficult to define. Traditionally, these are objects that GIS has struggled to model. Even if a GIS is 3D-capable, it is time consuming to create and maintain the compact infrastructure and even harder for a human to visualize it effectively.

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved.

If we move to more geographically distributed/defined assets such as oil field pumps, park benches, manhole covers, hydrant or electric poles the GIS performs well. This is where SAP experiences challenges. While it can be used to complete a specific action, like an inspection, it only understands individual locations and can't be used for more complex tasks like:

- How does the technician get there or where is it located?
- How many assets fall within this geographic boundary?
- How many similar work orders are nearby my current location?

The situation becomes significantly more complicated when you are working with real world infrastructure that has a linear or network relationship. These types of systems are all around us. Good examples are oil pipelines, railroad tracks, water mains, gas transmission and distribution pipes, electrical transmission lines and feeders or simply a road. While SAP packaged these as functional locations, the GIS uses either a geometric network or a linear referencing system.

What are Geometric Networks and what is Linear Referencing?

Utilities and pipelines have fundamental principles that require spatial management systems. Regardless of the sector they work in, utilities move a product from a source to a customer. This is key as it is the basis of their business. These systems are often a complicated, branching network of infrastructure. To model this complexity in GIS utilities commonly use a geometric network.

A geometric network is a set of connected lines (edges) and points (junctions) that are used to represent the system. In an Esri geodatabase these geometric features are paired with connectivity rules. The rules are used to characterize and model the behavior of the common network infrastructure. For example, "flow" can be modeled from a source to a sink. It can also define what the infrastructure is capable of, like in the case of a reducer where the infrastructure joins pipes of different sizes and reduces capacity. It is used to create networks found in water, electric and gas distribution systems and requires a GIS.

Operators of linear assets like transmission pipeline, electric transmission or railways also send a product from a source to an end point but there are fewer customers and the delivery system is more direct with higher capacity. Where a utility has highly-branched infrastructure, transmission assets essentially go from point A to B. We call this a linear system.

In a GIS, a linear system is most commonly referred to a grouping of lines used to represent horizontal infrastructure. An example of these types of systems is highways or transmission pipeline systems. The linear system differs from a geometric network in several key ways. First, while it is interconnected, a linear system does not need the connectivity rules found in the geometric network. Flow is important to distribution systems because there can be a significant number of interconnected pipelines and movement is necessary for product delivery. A transmission system is often a simple single pipeline (or a looped system), and a highways only has the flow of traffic. Flow does not have to be solved for because it is understood. Second, these systems are heavily monitored; inspections generate geographically-specific data, and the data can be extremely dense. For example, inline inspections in the pipeline community or axel units for road or condition assessments both of which can generate significant amounts of geographically located data. To properly locate this information they use a measurement system called Linear Referencing.

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved.

Linear referencing is a process where a location is created using relative positions along a measured linear feature. A good example is the "stations" used in the pipeline industry. Distances are given as measures along the feature and are used to locate events along it. In the GIS community these are called linear events/ranges and they represent pipeline coatings, property ownership or sections of rail or roads. Measurements along features are called measures and are used to specify point events like signs, valves or dents. A GIS is essential to manage this infrastructure.

Where is the Problem?

If a GIS can manage the geographic information and SAP manages its content, where is the problem? Many of an organization's management workflows have evolved to a point where both systems are required. An example is asset management where information about the asset is stored in BOTH systems. To use the information you need a way to tie the data together. Linear referencing and geometric networks are ways for a GIS to effectively represent features with detailed, geographically-located information. Geography is the basis of the system but SAP does not understand or use geography. Functional locations are an effective way to segregate information hierarchically in SAP but a GIS doesn't understand them. Alternately, unique IDs or asset codes can be used to join information but these linkages are difficult to create, enforce, and maintain between the two systems. For the past 20 years we have been in a stalemate.

SAP recognized the problem users were facing with linear-referenced features and geometric networks. It was clear that what these customers needed was a way to store and use location (either network or linear) from within SAP. To address this issue, and as part of its Enterprise Asset Management suite, SAP has released a new software solution called Linear Asset Management (LAM) that now imbeds a linear measurement system into SAP. In addition there is a services solution called Geo.e. Geo.e is GIS functionality made available within the SAP world to provide true geographic location to SAP content. The stalemate has ended!

What is the business case for integration?

While there are many ways that the integration of SAP and GIS can advance an organization, the business case is based on integrated asset management. Asset management is an information intensive process with a multi-department workflow. It is also a critical key to the success of any organization whose business is based on their equipment such as oil and gas, utilities or transportation.

Asset management is an information intensive process with a multi-department workflow.

One of the largest costs, and the single largest introduction of risk, is the use of multiple systems to manage asset data. Let's review. The life of an asset begins with purchasing. When it is ordered and received the first record is created in SAP. An asset is then assigned to a functional location but often this is a new record, not a reallocation of the purchased equipment. Parallel to this, an asset also is born in the GIS system when design or as-built drawings are converted into features. This asset is given a geographic and linear location. It is rare that these two individual records are merged into one. Two systems results in two or more records. As the life of the asset continues the separation is reinforced. Assigned work lives in SAP, the results of the work live in GIS. Cleaning this up is hard to do. Data inconsistencies propagate through the systems and there are no easy ways to identify and remove the erroneous data.

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved.

The business case is based on the benefits and prospective savings within asset management. The savings don't occur at the beginning of the asset's life. Records are created the same way but connected so that a purchased asset goes into operations and so do the records. It is one record in SAP. In the GIS, the asset is placed from as-built drawing and then connected with the SAP records. In this connection process linkages are built between the two systems. Each application understands and has access to the other systems information.

Examples of the benefits are:

- Elimination of system inconsistencies
- The reduction or elimination of redundant data transfer
- Ability to identify a clear system of record and the supporting systems
- Define a system of maintenance
- Automatic synchronization SAP and GIS
- Elimination of the manual (re)entry of data (which can occur several times)

Once the system is in place the pay offs are endless. Here are some examples of how it improves workflows and operations:

Materials Traceability

This is a function that is hard to complete if the life of an asset is managed in different systems. It is difficult to trace a product from purchase, through construction and into operations if the asset bounces between different systems each creating different records. When the two systems are associated using location, the information is linked. An SAP user can select purchase records and follow material transitions all the way to its location in the field. A field operator can use a mobile solution to determine when a piece of equipment was purchased, from whom, when it was installed, and when maintenance was performed. An office user can trace equipment from purchase through to operations. In addition, the geographic location/map is available to any user. The integration produces significant savings. Without an integrated system, staff is required to manually trace products between various systems. This expense occurs every time material is traced.

Audits

Regulatory or compliance audits are labor intensive. The time required to locate and expose records is greatly reduced when GIS and SAP are integrated. It is even more powerful when a Document Management System also is integrated. In a pipeline scenario, the GIS interface, a map, is used to locate the specific infrastructure that is being questioned. The GIS then uses its attribute information to answer questions about the condition, last inspection results, location of HCAs (High Consequence Areas), or the current class. As the questions dig deeper, SAP inspection and related activity dates are accessed directly from the GIS using the map. In a fully integrated environment, documents stored in a document management system also are accessible from the map interface. Using the power of the joined system, the questions are answered in a timely and professional fashion. While this is valuable in an audit, it also can be used in investigations of pipeline integrity and similar processes in other industries.

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved.

Mobility

In the past companies have built unconnected applications to perform either SAP maintenance or GIS activities in the field. The tight integration of these applications creates an environment where a single field solution satisfies the needs of both systems. Use cases for this exist in equipment or facility inspections, environmental investigations, compliance assessments, land development, risk, and integrity work. While a single solution provides significant savings, there are also secondary benefits. Fewer things to implement means a shorter implementation period, reporting comes from a single platform, training requirements are reduced, and there is no need for multiple hardware platforms for a mobile team. In addition, no interfaces have to be developed to move field data and measurements into multiple systems.

Operations and Executive Dashboards and Reporting

Exposing information to the operations and executive teams is the overarching goal of all IT teams. These are decision makers and they need current information to effectively run/manage the organization. While these groups crave access to content, they are not likely to use complicated solutions. An integrated system gives them timely access to information. A map based interface, coupled with functionality deployed as widgets, is an easy-to-build, easy-to-use product. A system with these features is more productive as compared to vendor-specific options. They also serve as the perfect foundation for situational intelligence portals because they are cost effective and can be stood up quickly for emergency operations.

Business Workflows and Accessibility of Information

Most organizations have an extensive number of business workflows. These can vary from purchasing processes or project governance to maintenance, and regulatory inspections. Often, different portions of the workflow are completed by different people, using different applications. A unified system means that different people can use either the same systems to complete a process, such as a single online web interface, or different solutions knowing that behind the scenes the information is going to be integrated. In either case the savings can be significant. In addition, integrated content can be exposed to all areas of the organization. Regardless of the team or location, a single point of access is less costly for both IT and the business.

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

RIZING

rizing.com | eam@rizing.com

© 2019 Rizing LLC or a Rizing LLC affiliate company. All rights reserved. This document is provided for information purposes only, and the contents are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Rizing, Rizing HCM, and other Rizing products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Rizing LLC or a Rizing affiliate company in the United States and other countries. All other product and service names mentioned are the trademarks of their respective companies.