Exploring GIS Integration Options for SAP BusinessObjects

Introduction
In conversations with various individuals and businesses over the years, I hear a common question being raised: How do I integrate maps in with SAP BusinessObjects. This is a diverse question with many different answers. In this document, I will introduce the different methods of integration of mapping technologies with standard SAP BusinessObjects reports and analytics. These options include what’s available not only out of the box but also some third party options that I’ve used in the past. Also, I will discuss some mapping options using technologies such as Tom Tom and ESRI as well as custom development from any available mapping source.

Integration Options

SAP / ESRI Direct Integration
The first option that we have is the direct integration between SAP and ESRI with no reliance on 3rd party tools. The direct integration between SAP and ESRI takes many forms. First of all, we have the integration of GIS data with the Dashboards application. SAP and ESRI have a solution that provides an “x1x” file that plugs into the Dashboards application. Using the plugin, dashboard designers can take advantage of fully functional, BI directional maps within the SAP Dashboards application. There is some configuration on both the client and server sides in SAP BusinessObjects.
Also included in the latest versions of SAP Lumira (1.17+) is the ability to add story board components that appear as fully functional maps. The capability is automatically built in to the Lumira interface. However, the only GIS support for ESRI that is available is through ArcGIS Online. This scenario is undesirable for enterprise level applications given issues with data security. The ability to interface with an Enterprise installation of ArcGIS Server is on the roadmap but currently has no projected availability date.

One feature that is highly useful but not very well known is the OpenDocument feature in SAP BusinessObjects. Using OpenDocument, a URL can be crafted that opens and runs a SAP BusinessObjects report or analytic. These links can be embedded within any system that can host a standard hyperlinked URL. To build an OpenDocument report, simply follow the syntax for generating. Reference the OpenDocument product guide in the References section of this document. A typical OpenDocument URL is formatted such as the one below:

http://<servername>:8080/OpenDocument/opendoc/openDocument.jsp?siDType=CUID&iDocID=ARlxUBrOM5BlgR0qfh1vmc

This OpenDocument link will open the report referenced by the CUID in the specified instance of SAP BusinessObjects. The OpenDocument link can access the report directly and use Windows Active Directory with Single Sign On (WinAD with SSO) to authenticate the user’s request. If the user does not have access to this document, they will receive an error message rather than the document itself. This URL can be enhanced to provide a level of control over the report and, most importantly, pass in parameter information from another information system.

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eFashion Story

![Sales revenue by State](image1)

![Quantity sold by City](image2)

![Sales revenue](image3)
From a mobility perspective, the Dashboards plugin is not supported in a mobile environment as the plugin output is based on Flash. However, the visualizations that are created in SAP Lumira and published to either SAP Lumira Server or Lumira Cloud are fully functional on supported mobile devices as they are on supported desktop environments.

**Advantages**
- Native integration between the two systems (no 3rd parties).
- Fully supported by SAP and ESRI.
- Easy for designers to integrate data and build visualizations

**Disadvantages**
- Still a version 1.0 product that needs time to mature.
- Limited to Dashboards and Lumira.

**Centigon Solutions**
The integration of SAP BusinessObjects and ESRI is also possible through the CMaps plugin available from Centigon Solutions. Similar to the SAP / ESRI Dashboards plugin, the CMaps solution is primarily centered on the Dashboards application. The CMaps plugin provides fully functional, BI directional mapping capabilities that is GIS agnostic. This means that the maps are pulled from a source other than ESRI (Tom Tom) and the features are drawn on the map based on data derived from the SAP BusinessObjects data sources supported by Dashboards.
The CMaps plugin has several other features. There is an Extension for the SAP BusinessObjects Web Intelligence tool that provides a mapping extension for existing Webi reports. There is a link between the report content and the embedded map via a report variable. When the value(s) of the variable changes, the map is dynamically updated to include the latest information. The map can be manipulated intuitively using the built-in tools for zooming, panning, and feature discovery. While being a GIS agnostic solution, the plugin also has the capability of connecting to enterprise GIS systems that support the WMS standard. This includes ESRI’s ArcGIS for Server. When publishing a map service, the WMS capability can be enabled at publish time. The associated URL is then used in the CMaps plugin to access the content.

The Centigon Solutions option also has a mobile application that can be configured to provide geographic information on supported mobile devices. Users will be able to take advantage of the same visualizations and features shown on the desktop in the field with a supported mobile device.

Advantages
- Easy to build fully functional maps into dashboards & Webi reports
- Visualizations are extensible to mobile devices
- Lots of online resources to help anyone learn the tool
- Relatively inexpensive to purchase and maintain

Disadvantages
- Reliance on a 3rd party tool
- Limited to Dashboards only. Web Intelligence has an extension that links in Dashboards.
Galigeo

The SAP BusinessObjects / ESRI GIS solution is the most fully featured solution available. Built from a robust solution from APOS, the Galigeo BI*Where solution provides seamless integration of ESRI data into SAP BusinessObjects Crystal Reports, Web Intelligence and Dashboards. Users can easily integrate data from standard SAP BusinessObjects data sources into maps fed from an enterprise ESRI system. Linking content between the two systems happens within the SAP BusinessObjects interface with little or no technical knowledge required.

The Web Intelligence interface allows user to embed fully functional maps within a standard report. The report is then linked through the Webi interface to a selected mapping service hosted in an ESRI system. Users can interact with the map using standard mapping functionalities such as zoom, pan and select. The Web Intelligence solution also provides more advanced analytic capabilities such as distance rings, buffer rings, drive time and distance polygons as well as heat mapping and temporal analysis of time based datasets.

The Dashboards integration is similar to those provided by SAP / ESRI and Centigon Solutions. A plugin is added to the system that interfaces with an ESRI server and serves those visualizations within the Dashboard interfaces on the desktop. This is only available on desktops as the solution is Flash based and therefore incompatible with mobile devices.
The SAP BusinessObjects Crystal Reports solution provides a Flash based map embedded within the report and linked to the data being displayed. When the report is refreshed then the map is updated to display the desired information.
Advantages
- The most robust feature set available
- Integrates fully functional maps with Web Intelligence, Crystal Reports and Dashboards
- Advanced analytics features directly inside of the map in the tools

Disadvantages
- Reliance on Galigeo for future upgrades
- Pricing can be expensive relative to other solutions

Explorer Geospatial
As of SAP BusinessObjects 4.0 FP3, SAP has introduced a concept of geospatial visualizations along with Exploration Views. Using geospatial objects, an Information Space developer can create a facet that is spatially aware by using either a related latitude / longitude pair or a city, county, state or country dimension. Once a geospatial facet is created and used in Explorer, the mapping component becomes available and the facets and measures can be visualized on a simple map. These visualizations can be drilled up or down geographically and the associated measures will be re-aggregated. These mapping visualizations can be projected into an Exploration View to build on demand, ad hoc dashboards.

Advantages:
- Out of the box functionality with the Explorer application
- No reliance on 3rd party tools
- Extensible to mobile devices via SAP BI Mobile application
- Easy configuration during the Information Space creation

Disadvantages:
- Requires the full SAP BusinessObjects Platform with Explorer
- Limited to only Explorer. Maps are not available in other tools on the desktop.

Web Intelligence Mapping
The SAP BusinessObjects Web Intelligence application has the ability to display fully functional maps only within the SAP BI Mobile application. These Web Intelligence reports are created using a data set that includes latitudes and longitudes and other points of interest (POI) data. Next, the block containing the coordinates and POIs is named appropriately (i.e. map_lt2_ln3_poi1). Finally, the Webi report is made available to the SAP BI Mobile application in touch mode. The specially named block will be interpreted on the mobile device as a fully functional map.

Advantages:
- Out of the box functionality with Web Intelligence reports
- Little known but powerful geographic representation of data
- Fully functional, mobile GIS data to accompany charts and tables

Disadvantages:
- Only available in the SAP BI Mobile application not on the desktop
- Slight learning curve on how to build, test and deploy this option
SAP / ESRI SDK

Out of the box, the ESRI GIS system has available several software development kits (SDKs) that span a range of technologies to suit an array of development shops. Some of these are Silverlight, JavaScript, iOS and Android. Using the JavaScript SDK, mapping interfaces can be built and embedded into Web Intelligence to provide fully functional maps similar to those made possible by the Galigeo integration for Web Intelligence.

Advantages:
- Complete control over the mapping applications

Disadvantages:
- Development effort falls on the internal development teams
- Requirements must be gathered and the solution developed and tested

Conclusion

As you can see, there are many options for GIS integration into the SAP BusinessObjects platform. There are many new features of GIS out of the box currently available and also on the development roadmap from SAP. In the meantime, there are third party options and custom development capabilities that provide advanced geographic visualization and analysis of data within the various tools in the SAP BusinessObjects suite of applications. Understanding the tools available along with the advantages and disadvantages of each will hopefully assist you in understanding the correct method for your needs.

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