Integrating Locus Applications with Tableau Using Locus APIs

Integration with other systems, whether on-premises or in the cloud, has become a key wish list item for many EHS software buyers.

Integration lets you take advantage of other tools used by you organization (or available from third parties) to simplify processes, access information, and enhance communication, both internally and externally. Locus main applications (EIM and LP) were designed with the native capability to integrate with other systems.

Some common types of integrations that Locus has successfully implemented are:

- Integrate on-premises systems with cloud EHS software to provide a seamless process
- Integrate with identity providers to enable single sign-on
- Integrate with public API (like EPA or regulatory information providers) for data submittal or private commercial APIs for proprietary content
- Integrate with multiple sources for consolidation and review of disparate data sources (portal integrations)

Further information can be found in the "How to extend your EHS software with integrated systems" Locus white paper.

One of the most requested integrations is to combine Locus applications with business intelligence (BI) software such as Microsoft's Power BI and Salesforce's Tableau Software. These applications, and others like them, consume offline and online data sources and turn the data into visualizations of various types such as line charts, scatter plots, or dot maps. A user can perform further analysis on the data to look for trends and make predictions. The user can also arrange the visualizations into custom dashboards or reports, and then share these with other users.

Organizations with EHS data may already have invested time, money, and effort to create custom visualizations and reports in their business intelligence software. Because EIM and LP both can be integrated with business intelligence software, users can leverage their data stored in EIM and LP and continue to exploit their existing investments in business intelligence software.

This document provides an outline for how to integrate EIM and LP with Tableau.

Locus APIs

A simple integration path between EIM or LP, and Tableau, is to simply export data from the Locus application to Microsoft Excel format. You can then import the Excel file into Tableau as a data source. This method is simple, but the data export is static and will not update if new data are available in the Locus application.

A better approach is to take advantage of the Locus APIs. An API is an Application Programming Interface. You can think of an API as a 'bridge' between two applications. One application makes a request for data to the API, which then passes the request to the other application. The second application returns the data to the API, which returns it in a format the first application can use.

Locus provides an API for both its EIM and LP applications. The APIs are REST APIs; a REST API is simply an API that follows standards needed to operate via the HTTP protocol. In other words, the APIs can be accessed by calling a URL. To use the APIs, you need to include some information in your request, such as the query to run and your Locus login credentials. The Locus APIs then return data in JSON or Odata format, which are standard text-based data formats understood by many business intelligence applications.

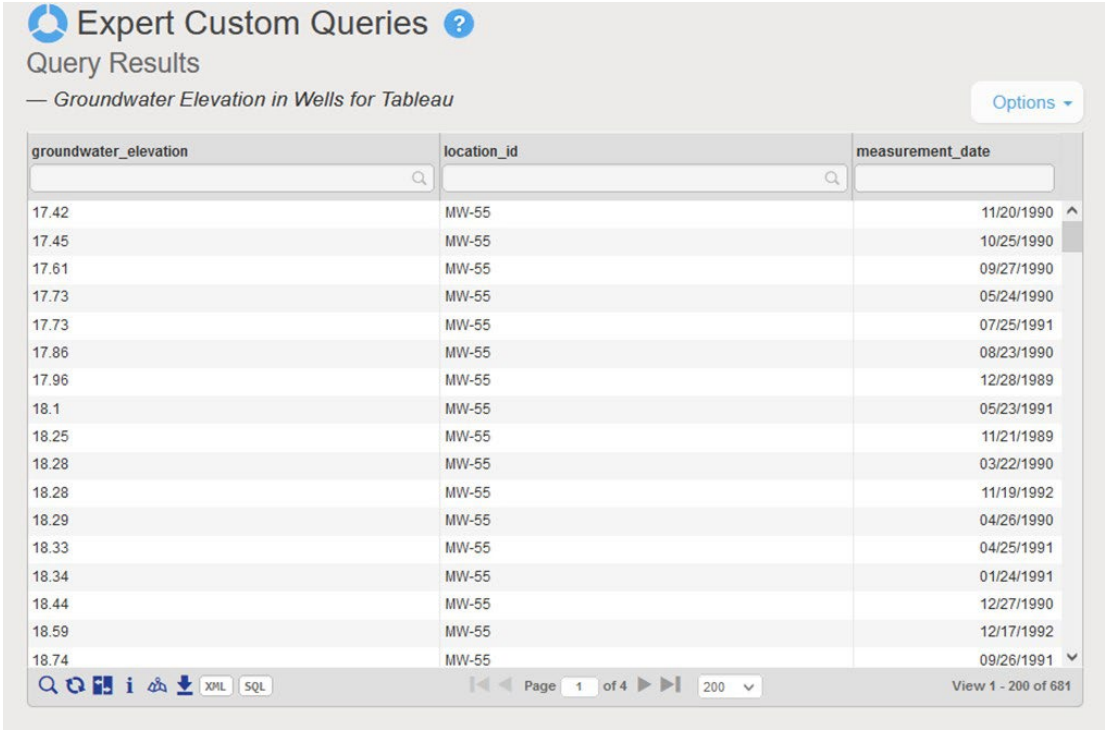
The EIM API is documented here

The Locus APIs return data from a user-defined query in EIM or LP. In EIM, you first create an Expert Query to return the data you want. Once EIM validates the query as standard SQL, the query can be run in EIM and can also be called from the EIM API. In LP, the API returns data from a user-defined data source. You first create a datasource to return data you want. Once the datasource is tested and saved in LP, it can be called from the LP query API.

Because the API is always 'live', your BI applications always refreshes the API calls to show the latest data in EIM. Your visualizations stay current and up to date.

Connecting Tableau to a Locus API

In this example, we use an EIM Expert Query called “Groundwater Elevation in Wells for Tableau.”. This query returns groundwater elevations over ten years for six wells in the EIM Acme demo database.
Here is just a small selection of these issues:



Expert Custom Queries

Query Results

— *Groundwater Elevation in Wells for Tableau*

Options

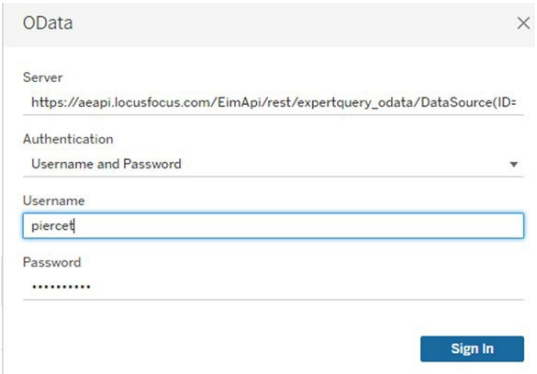
groundwater_elevation	location_id	measurement_date
17.42	MW-55	11/20/1990
17.45	MW-55	10/25/1990
17.61	MW-55	09/27/1990
17.73	MW-55	05/24/1990
17.73	MW-55	07/25/1991
17.86	MW-55	08/23/1990
17.96	MW-55	12/28/1989
18.1	MW-55	05/23/1991
18.25	MW-55	11/21/1989
18.28	MW-55	03/22/1990
18.28	MW-55	11/19/1992
18.29	MW-55	04/26/1990
18.33	MW-55	04/25/1991
18.34	MW-55	01/24/1991
18.44	MW-55	12/27/1990
18.59	MW-55	12/17/1992
18.74	MW-55	09/26/1991

XML SQL Page 1 of 4 200 View 1 - 200 of 681

To use a Locus API in Tableau, you set up an OData API connection. Select OData from the Connect to a Server list on the start screen. **In the dialog that appears, enter the following:**

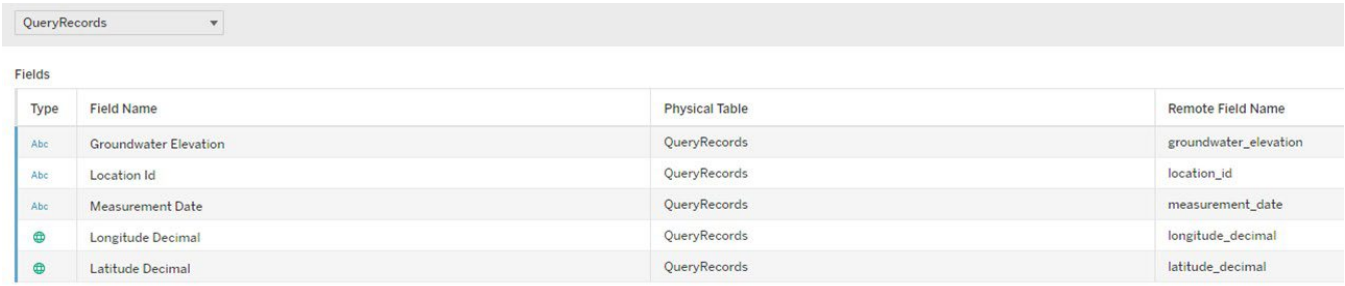
- **Server**: enter the path to the OData EIM API provided to you by Locus. An example is shown below. You need to replace **DB_NAME** with your database name and **RECNO** with the expert query record number.

  https://aeapi.locusfocus.com/EimApi/rest/expertquery_odata/DataSource(ID=**DB_NAME**)/ExpertQuery(Recno=**RECNO**)/



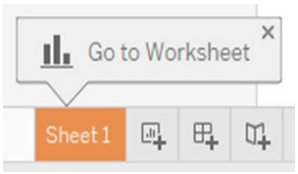
- **Authentication**: select ‘Username and Password’
- **Username**: enter your EIM username
- **Password**: enter your EIM password

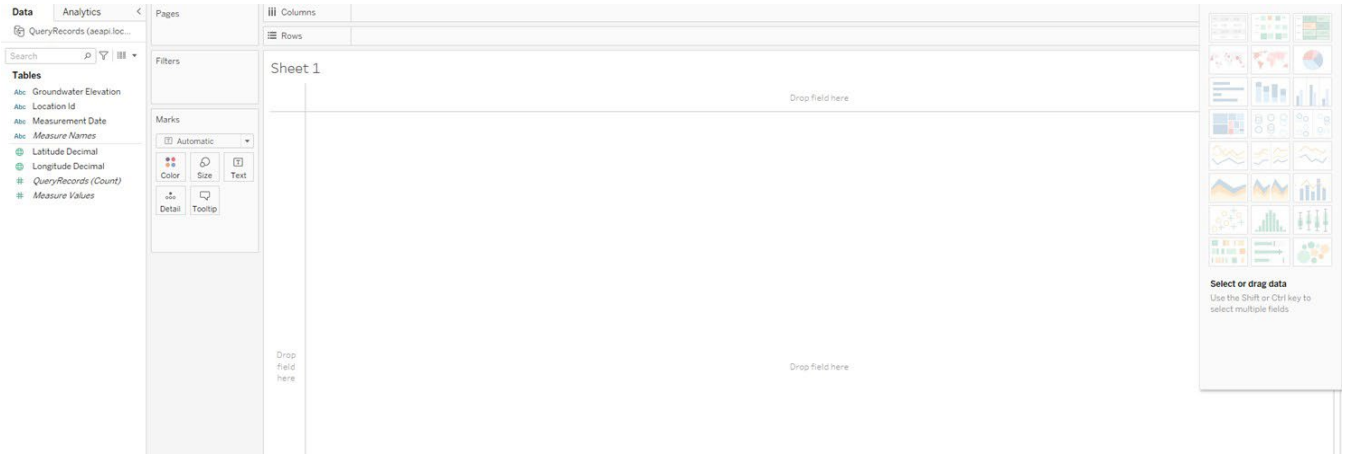
Tableau then connects to the EIM API and shows a list of all the columns in the returned query.



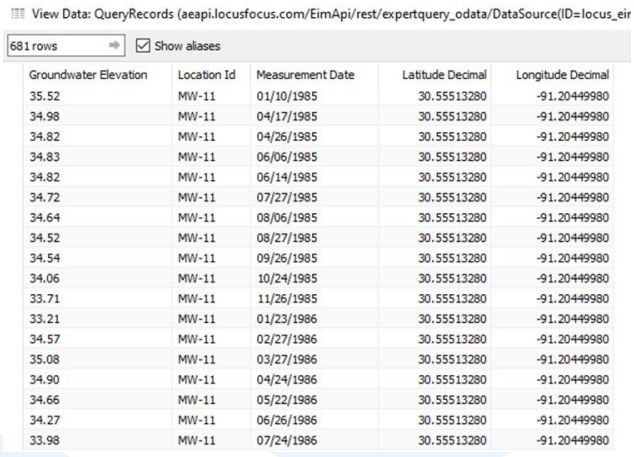
Type	Field Name	Physical Table	Remote Field Name
Abc	Groundwater Elevation	QueryRecords	groundwater_elevation
Abc	Location Id	QueryRecords	location_id
Abc	Measurement Date	QueryRecords	measurement_date
🌐	Longitude Decimal	QueryRecords	longitude_decimal
🌐	Latitude Decimal	QueryRecords	latitude_decimal

To see the data, you must create a new worksheet using the button at the bottom. Tableau opens a new worksheet and loads the data source from the API.





To preview the query results, right click on the data source name ‘Query Records’ (or whatever your query name is) at the top of the Data tab and select ‘View Data.’. Tableau shows youdisplays all the data records returned from your EIM API call to the Expert Query.



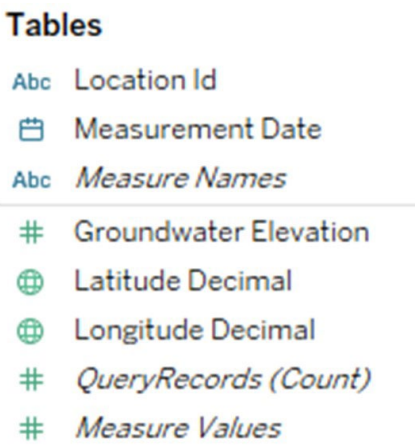
Groundwater Elevation	Location Id	Measurement Date	Latitude Decimal	Longitude Decimal
35.52	MW-11	01/10/1985	30.55513280	-91.20449980
34.98	MW-11	04/17/1985	30.55513280	-91.20449980
34.82	MW-11	04/26/1985	30.55513280	-91.20449980
34.83	MW-11	06/06/1985	30.55513280	-91.20449980
34.82	MW-11	06/14/1985	30.55513280	-91.20449980
34.72	MW-11	07/27/1985	30.55513280	-91.20449980
34.64	MW-11	08/06/1985	30.55513280	-91.20449980
34.52	MW-11	08/27/1985	30.55513280	-91.20449980
34.54	MW-11	09/26/1985	30.55513280	-91.20449980
34.06	MW-11	10/24/1985	30.55513280	-91.20449980
33.71	MW-11	11/26/1985	30.55513280	-91.20449980
33.21	MW-11	01/23/1986	30.55513280	-91.20449980
34.57	MW-11	02/27/1986	30.55513280	-91.20449980
35.08	MW-11	03/27/1986	30.55513280	-91.20449980
34.90	MW-11	04/24/1986	30.55513280	-91.20449980
34.66	MW-11	05/22/1986	30.55513280	-91.20449980
34.27	MW-11	06/26/1986	30.55513280	-91.20449980
33.98	MW-11	07/24/1986	30.55513280	-91.20449980

Before you continue, you need to review the data columns and edit their data types, if needed. Dates and numbers may come into Tableau as text values, so you need to fix that.

In the Tables section of the Data tab, you will see all the data columns. Make these changes:

- Right click 'Groundwater Elevation' and select 'Convert to Measure'
- Right click 'Groundwater Elevation' again and select 'Change Data Type > Number (decimal)'
- Right click 'Measurement Date' and select 'Change Data Type > Date' (because otherwise Tableau adds times, but this column in EIM only stores the date value).

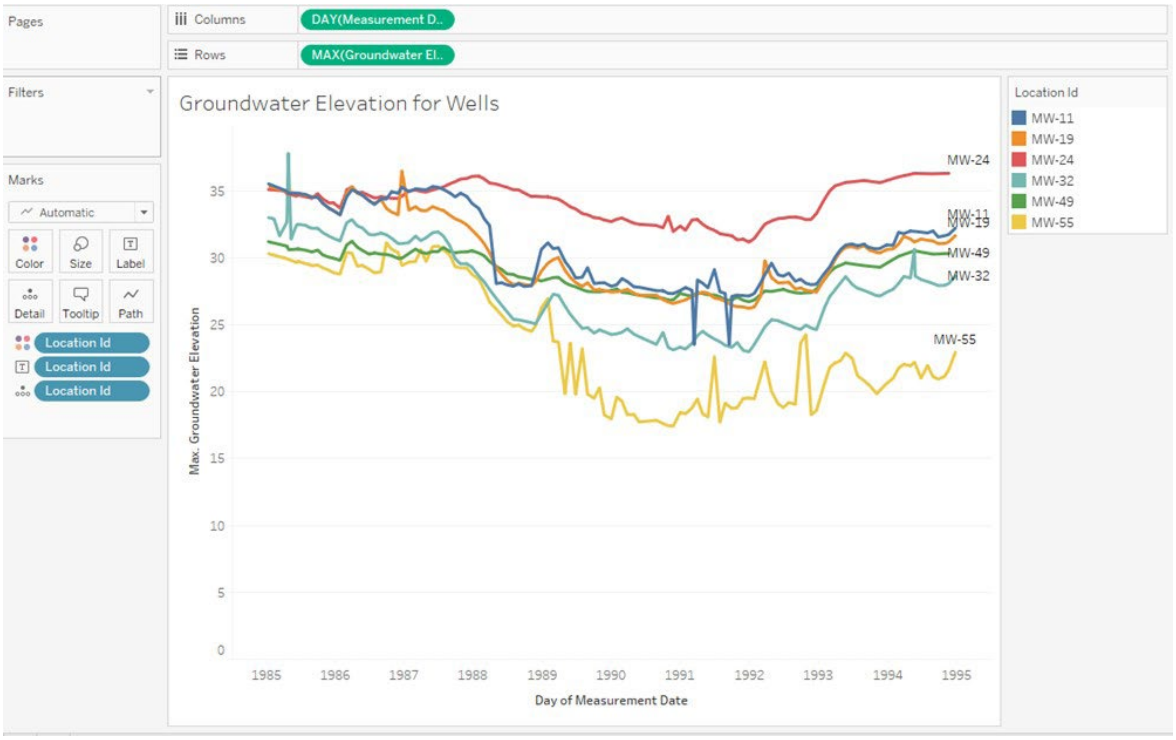
When done, your Tables section should look like this.



At this point, you can make many visualizations with Tableau. The simplest to make with this sample data is a line chart. Perform the following actions:

- Drag 'Measurement Date' to the Columns box and pick 'Day May 8, 2015' from the drop-down list to use the full date in the chart
- Drag 'Groundwater Elevation' to the Rows box and pick 'Measure (Maximum)' from the drop-down list to use the maximum value for each date
- Drag 'Location ID' to the Detail box to create a line for each location
- Drag 'Location ID' to the Color box to color-code the lines and create a legend for the locations
- Drag 'Location ID' to the Label box to label the lines
- Click the 'Sheet 1' title and change it to 'Groundwater Elevation in Wells'
- Make sure the drop down below 'Marks' says 'Line' and not 'Automatic.'

Your finished chart should resemble the following:

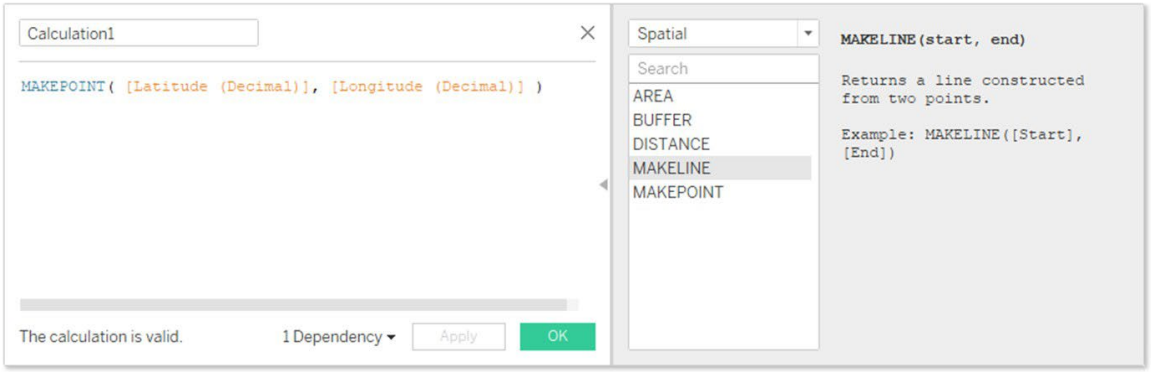


From here you can create dashboards and stories and share or publish your visualizations.

As a second example, here is a bar graph created in Tableau with an EIM API call to the 'Maximum Benzene Result by Year for Tableau' Expert Query. This query returns the maximum benzene result for six wells for a ten-year period.

As a further illustration, here is a map showing the well locations for the bar chart above.

For this map, your data source must include Latitude Decimal and Longitude Decimal columns, and you must add a calculated field using MAKEPOINT that generates the points for the map.



There are many clear benefits to integrating modern software tools such as EIM, LP, and Tableau wherever you can in your EHS processes. Even if some integrations are only optional for your needs, consider the added value to your organization in simplifying your EHS software implementation, maximizing other available resources, and improving the reliability and accuracy of data sources driving your EHS decisions. Integrations are sometimes initially perceived as an optional feature, but you should consider making it a requirement for your EHS software based on these benefits. And as new integration tools increasingly become available, you'll find more value in having a system that can use them to their full advantage.

Ready to get started?

We hope we have demonstrated the importance of integrating with other systems to maximize the returns on your software investments and improve your environmental data management. Our team welcomes the opportunity to discuss APIs and third-party integrations with you.

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