

TABLEAU

Tableau is data analytics software that aggregates, summarizes and visualizes data for mass consumption. It has multiple tiers of licensing, ranging from a server setup that houses the data as well as allowing the front-end analysis piece, down to a free public tool that allows individual data visualizations to be published to the web. What the software does varies quite a bit depending on the organization's license type.

PRO

CON

Users and Sharing

User friendly. It is very easy to create a professional-looking "viz" with only a short period of trial and error.

Requires a lot of testing. Tableau automatically aggregates data – if input structure is incorrectly specified, the "viz" may be displaying averaged values that are not the correct BLS-published values but may not be obviously wrong. Users are proficient at creating something pretty long before they're adept at knowing where errors are likely to occur.

Can be linked directly to database (with some licensing levels).

If users create their own data sources (excel docs, table links), it's possible for data to be fragmented and inconsistent if those documents and extracts are not maintained on the same schedule.

Licensing structure makes it possible to have a lot of users – this opens tools up to people who may not otherwise have them and builds capacity.

Direct links can only be refreshed by users with permissions on the database – this may mean that more users have to be granted access to database.

Tableau can be picky about data structure and formats. For example, you can only create a line chart with a field that's formatted as a date. This means period/year and period text fields must be converted.

Security

Generally, anything in the back-end gets published to the web along with the "viz" even if it's been filtered out of the display. Extracts and data structure should only include releasable data, and people creating those extracts need to know what that means.

Publication

Publishing to the web is seamless.

One-time publications are very easy, but refreshing data in an existing "viz" can be fussy. If data extracts are done incorrectly the viz may break and have to be fixed with every new release and if data and viz are published separately the two processes need to be coordinated carefully.

Mapping capability.

County maps are easy, but more complex maps are not. There are ways to use custom geographies or backgrounds, but they're labor intensive and difficult to learn.

There's no way to pass parameters – all users and links go to the same default start page.

Consistent look and feel.

Someone needs to set standards for organization's users – is there an official color scheme, or a particular width that's appropriate for the state website?

Sits directly in web page – no need to navigate away.

Sharing offline – by email or pdf – requires extra steps.

ARCGIS	
ESRI's ArcGIS is a suite of mapping software that's incredibly powerful. Many of its functions go well beyond what LMI needs and are geared toward utility and transportation companies that have very detailed spatial data. It allows spatial analysis and gives a user much more control over map outputs than simpler tools, but is expensive. It also has several licensing levels, including online mapping and access to supplied data sets.	
PRO	CON
<i>Users and Sharing</i>	
Versions 10 and higher can connect directly to database.	Spatial data is housed separately and maintaining it requires work.
	There's a learning curve for new users.
	Per-user licensing and cost makes it difficult to have many users.
Functions go well beyond visualization and are useful for calculations that may not otherwise be possible.	
<i>Security</i>	
<i>Publication</i>	
Depends on licensing structure.	
Flat maps are very customizable.	Creating static maps is labor-intensive and not very reusable.
Interactive has built-in data sets.	

MICROSOFT REPORTING SERVICES	
Reporting Services comes with Microsoft SQL Server. Tools including tables and charts can be created either in a web application or Visual Studio. While they're seamlessly integrated with the source database, they can't be shared as widely. Creating the tools is labor intensive and requires someone with skills querying data and creating stored procedures, including using parameters.	
PRO	CON
<i>Users and Sharing</i>	
Controls output for end users, reliable and consistently in line with database	Requires a fairly high level of permissions on the database to create
Easy for end users	Learning curve for new creators
Updated immediately when database is updated	
<i>Security</i>	
Direct link to database	Only available to internal users because of permissions
<i>Publication</i>	
Can create export files easily.	

MICROSOFT EXCEL	
Part of Office Suite, Excel is nearly universally used. While its charting capabilities are wonderful, many features have been added in recent versions that users may not know about. Staying up to date and fully leveraging the software requires conscious effort.	
PRO	CON
<i>Users and Sharing</i>	
Everyone has it.	
It can do so much more than most people know. – ie, pivot charts, direct connections to a variety of data sources, nearly infinite chart customization if you drill deep enough.	
Direct editing/creating of values	
<i>Security</i>	
Password protection available	
<i>Publication</i>	
Can be shared directly, or exported to flat pdf format.	Interactive features are security risk and sharing docs directly requires end users to click through ominous messages about the danger of unknown sources.
	No way to limit interactive features – it's possible for an end user to "break" the document.
	Publishing to the web requires download of a file

GOOGLE CHARTS	
PRO	CON
<i>Users and Sharing</i>	
Wide variety of charts available. Not as complete or elegant as Highcharts, but it's free.	You are dependent on Google. If they suddenly change something, which they are often want to do, your chart may not work.
Well integrated with data and many other web support features available from Google such as Google maps.	You must know JavaScript. No point and click development tools.
<i>Security</i>	
	Be careful with confidential data. Generally you are just using Google's JavaScript and CSS, but occasionally, as with mapping applications, you may be sending some confidential data to Google's servers.
<i>Publication</i>	
Good for web sites.	Must have access to Google via the web.

HIGHCHARTS	
PRO	CON
<i>Users and Sharing</i>	
Very flexible web development tool. Has extensive selection of charts and maps. It is a very widely used web standard. If you understand JavaScript, it is a very powerful tool and fairly easy to develop with. It is pure JavaScript, nothing but the JavaScript libraries are required to run it. Even though it is not open source, you do have access to the source code so you can edit and change it if desired.	Not open source, although not as expensive as comparable software. It is free for non-commercial use, but that doesn't include government use.
Cloud version allows non-programmers to create charts. The source for these charts may then be copied and used in any environment where JavaScript will run.	For all but basic functionality, a fee is charged for cloud services. Still you can create basic charts for free and then embellish them for use outside of the Highcharts cloud.
Highly functional, well designed, very few bugs compared to other software.	
<i>Security</i>	
No server element required to run interactive charts. All Highchart functionality is in the web browser. All data used by the chart is a JavaScript JSON object. This may be defined locally or delivered by web service.	Be careful using the chart export (download) feature with confidential or embargoed data. By default it will send export data to export.highcharts.com. You may need to install your own version of the Highcharts export server (available as open source from Highcharts) to support download of chart images, such as png, svg, jpeg, etc.
<i>Publication</i>	
Runs either on top of the jQuery JavaScript framework or with its own standalone framework for users who don't use jQuery. Coexists well in most web page environments.	Refer to above security notes.

DATAZEN

DataZen is a Microsoft product included with their enterprise SQL Server licenses. It's relatively new and Microsoft's long-term intentions for it are unknown. It integrates well with existing databases.

PRO

CON

Users and Sharing

All users are connecting to the same data source, so their dashboards will be consistent

Data connection is a little more challenging than some tools for non-technical staff – may require tech assistance or for users to learn new skills.

Data has to be structured exactly as required for the tool to work. This means WID formats need to be converted.

Once data is connected, layout is very easy.

Not as customizable as some.

Tablet-friendly

No "Powered by [software name]" on the dashboard

Security

Data is housed on your own servers, so your agency retains control and ownership.

Server may need to be separate from the main server to be available to the public – this requires some maintenance and duplication

Publication

Direct database connection means that publication is concurrent with database update.

Because the tool is updated from the database instead of the dashboard/viz display, text options are more limited and may not be able to be updated.

Sits directly in the web page, no need to navigate away.

No data export function

Dashboards are interactive.

Some mapping capability.