Design Principles.

1. Balance the Design

A balanced design is one with visual elements like shape, colour, negative space, and texture equally distributed across the plot. This does not necessarily mean the design should be an exact copy of the other. You can bring out an asymmetrical balance by offsetting bigger graphs and charts with smaller elements.

There are three different types of balances in design:

1. Symmetrical–Each side of the visual is the same as the other
2. Asymmetrical–Both sides are different but still have a similar visual weight
3. Radial–Elements are placed around a central object which acts as an anchor

You will have to figure out which type of balance works the best for your data visualization and apply that.

2. Emphasise the Key Areas

The user's attention should be drawn to the right data points by carefully choosing the size, colours, contrast, and negative space. The goal of the data visualization is to make sure that the important data doesn't go unnoticed and emphasise it helps. Since the attention of a user first falls in the top-left corner of a plot, you should place the important data points there.

3. Illustrating Movement

Movement directs the user's attention in a certain direction, just like emphasis. Your visual elements should mimic movement in an "F" pattern, which is how people read. Starting from top left to right, and gradually down the page.

You could also illustrate movement across the page by using complementary colours that can catch the viewer's gaze and take it across the page. This principle is more applicable to static visualizations. If your data visualization tool is capable of animation and interactive designs, the movement aspect should already be covered.

4. Smart Use of Patterns

Repeated design elements form a pattern. When it comes to visualizing your data, patterns make for a great way to display similar types of information spread across the page as one. If the data on the page is too much for emphasizing, establishing a pattern by using similar colours, chart types and elements are the way to go.

Patterns also make it easier to communicate an anomaly, since any disruption in the pattern will naturally draw the viewer's attention and curiosity. Using patterns is one of the simplest and most effective design principles when it comes to data visualization.

5. Proportion

If you are going to draw a picture of a bird on a tree, the tree will be significantly bigger compared to the bird. In data visualization, the proportion is made up of the size of each element on the page. Proportions in data visualization can indicate the weight of different data sets and the relationship between their values.

If you need to emphasize the importance of a certain data point, all you have to do is to make it bigger than the rest. In addition to this, you should ensure that the chart reflects the interrelationship of various numbers as accurately as possible. For example, if a slice in a pie chart is marked 36%, it should actually use 36% of the area inside the chart.

6. Proper Rhythm

Rhythm is a rather vague design principle that is closely associated with movement. A design is said to have a balanced rhythm when the design elements together create a pleasing movement to the eye. If the design elements like shapes, colours, or proportions together create a "choppiness", you might want to rearrange them to facilitate smooth eye movement across the data.

7. Variety

Variety is an important factor that keeps viewers engaged and interested in your data. It's all about finding ways to visualize your data using different and interesting design elements to avoid repetition. The result will be a data visualization which is not only eye-catching but also helps the viewer retain the information presented for longer.

8. Theme

A unified theme ensures every part of your design is consistent and follows a standard. This should happen naturally if you have taken care of the aforementioned design principles. You can incorporate a theme for your company or based on the niche of the visualization. This helps connect with the user on a deeper level and augments the visual design.

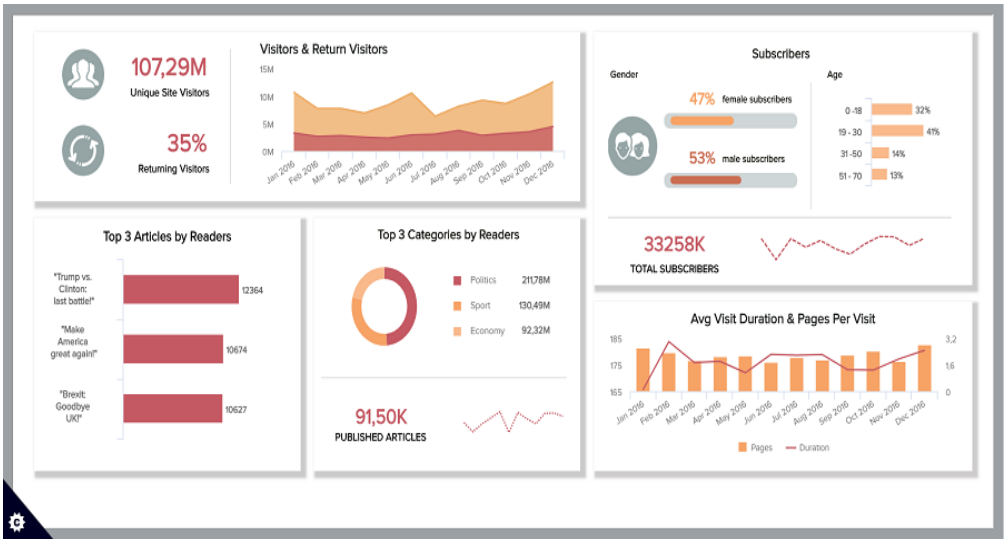
Visualization Dashboard

7 data visualization dashboard examples with stunning graphs that boost educated business decisions.

1. Dundas BI Dashboards

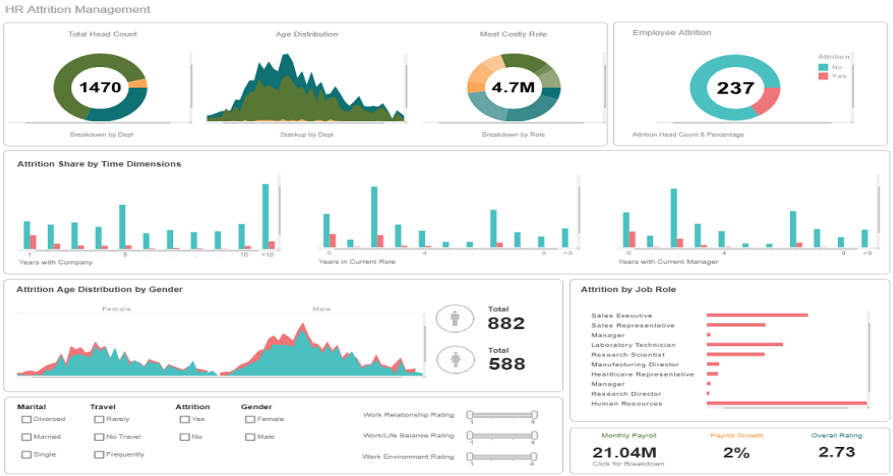
- This is a stunning data dashboard example in the insurance industry. It presents advanced insights so you can aggregate and isolate important information.
- Dundas BI is one of the best BI reporting tools that give you a complete control over your data. Dundas BI dashboards are famous with their in-depth data visualization and an easy-to-use interface.
- With a wide range of smart visualizations and layout choices, you can create pixel-perfect dashboards to perform faster and productive data-driven decision-making.
- Dundas BI has highly-customizable visualizations such as interactive charts, maps, scorecards and much more. In addition, you have granular access over the design elements.
- On their website, Dundas BI provide data dashboards examples in many industries (such as marketing, healthcare, telecom, etc.), so you can learn how the professional dashboard designs should look.

2. Data pine Dashboards



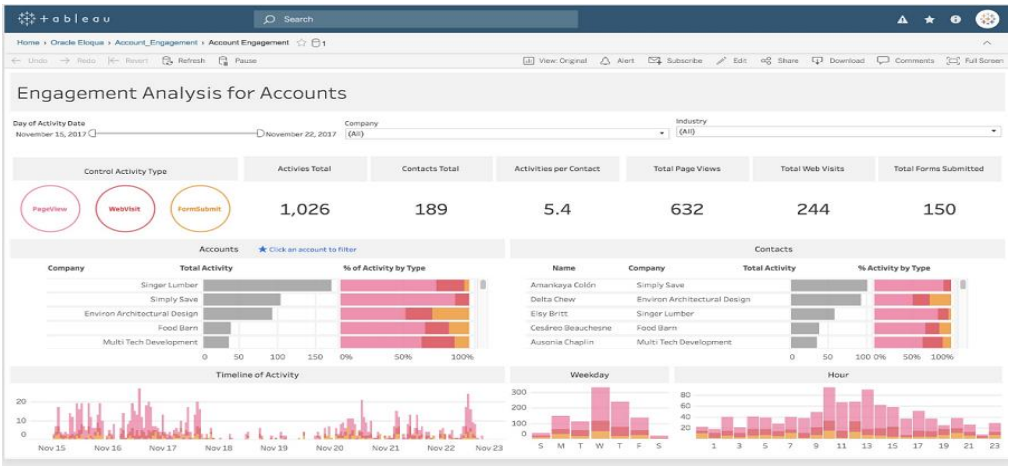
- This is one of the best data dashboard examples in the digital marketing area. As you see, the colors are soft and modest in a stylish design.
- The dashboard clearly present key metrics such as unique site visitors, returning visitors, subscribers, and etc. Datapine perfectly brings together all your data in one interactive dashboard.
- Datapine's is a data analytics and visualization software that makes information discovery very simple. Their dashboards are so simple that you don't need any data scientist skills to understand business information.
- You are able to quickly create modern online dashboards with different types of graphs and compelling charts that you can easily share with anyone you want.

3. InetSoft Dashboard



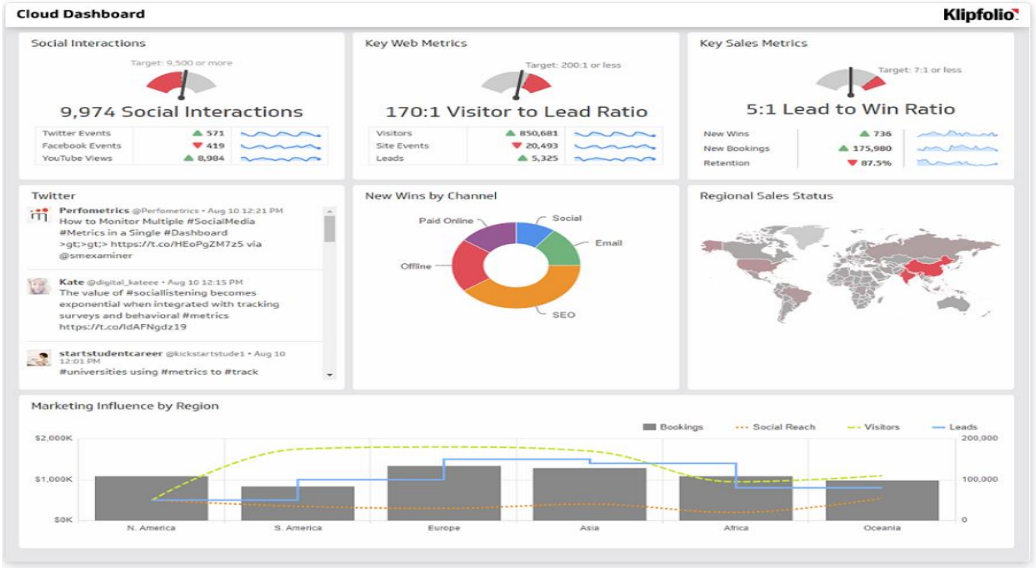
- This InetSoft Dashboard example in HR Attrition Management provides a detailed view of the key metrics and indicators critical for the HR management and control.
- InetSoft Data Intelligence is a powerful data intelligence software that has an outstanding data mashup engine.
- It enables you to create stylish dashboards, pixel-perfect reports, and detailed data visualizations from multiple data sources.
- The best part is so-called automatically wired dashboards. It means all the visual components and inputs are automatically wired together. For example, brushing on one data point in a chart will highlight its correlated data points in all visual components.
- Also, InetSoft's zero-training customization lets users modify their own dashboards and add different charts and types of data.

4. Tableau Dashboards



- This Tableau dashboard example combines a range of actionable data types, professional design with gentle-to-the-eyes colors, and deep analytical view.
- Tableau is one of the leading BI software solutions that aids businesses in visualizing and understanding data.
- It has it all – visually appealing dashboards that are easy to create, collaboration capabilities, visualizations that can be seamlessly imported and shared. And all of this without the need for programming skills.
- The interactive dashboards aid you in discovering hidden insights on the fly. Furthermore, you are able to spot visual trends quickly and reveal everyday opportunities and risks with confidence.
- The more advanced users can perform trend analyses, regressions (such as linear regression models), and correlations for real statistical understanding.

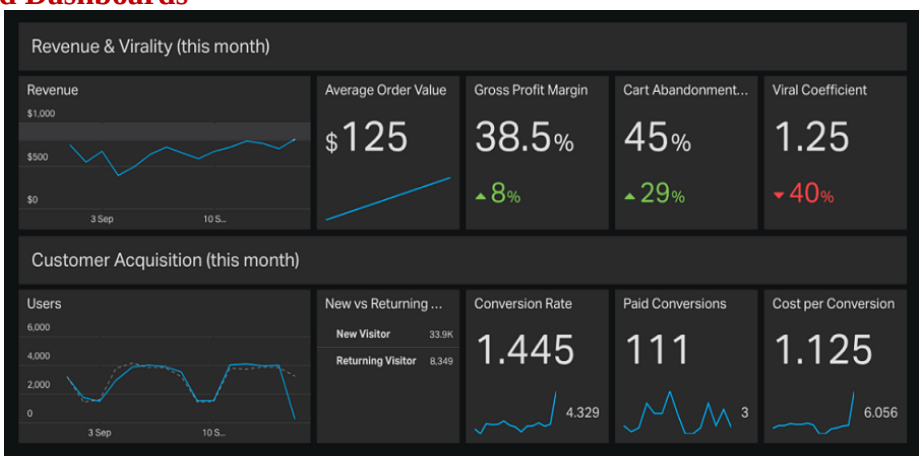
5. Klipfolio Dashboards



- This is a Klipfolio business dashboard example that allows you to monitor the health of your business in real-time on the cloud. It summarizes important information and presents an overall view of business performance to help in making better decisions.
- Klipfolio is a cloud analytics platform for business intelligence dashboards and reports. Their solutions are great examples of how the BI dashboard best practices should be implemented.

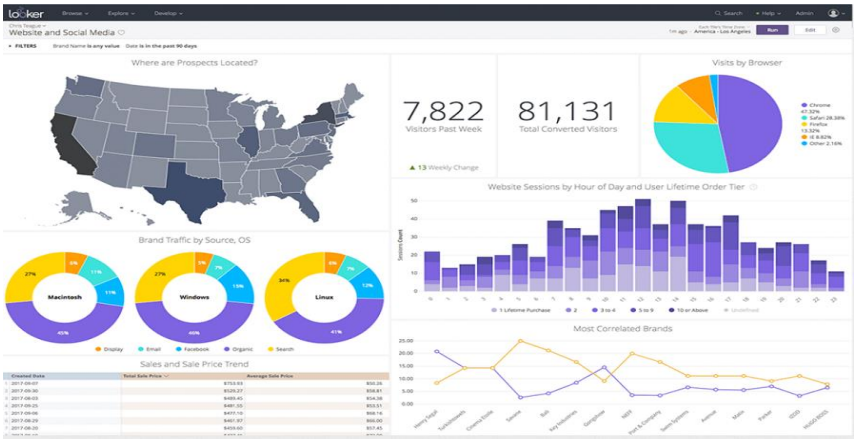
- Klipfolio visualizations and simple dashboards allow you to control your business by monitoring of all your most important data, metrics, and KPIs in one place.
- Trusted by over 50000 data-driven users, Klipfolio provides clear, meaningful, and simple data dashboard examples and templates in any industry – from marketing and sales to healthcare and tourism.

6. Geckoboard Dashboards



- Do you like black data dashboard examples? If so, Geckoboard dashboards will impress you with simplicity and clearness.
- This dashboard presents key e-commerce metrics such as revenue and conversations rate, so you can set the right goals to grow your business.
- Geckoboard is a popular real-time business dashboard solution that let you seamlessly broadcast live business metrics, KPIs and goals to your team in an easy-to-understand way.
- With Geckoboard, you can create a TV dashboard in a few minutes with the help of a drag-and-drop interface that makes setup so simple anyone can do it.
- How do Geckoboard dashboards differ? No distractions, no unnecessary complexity, and no room for misinterpretation.
- Your most important metrics are clear and easy-to-understand and report.

7. Looker Dashboard



- This is a Looker Dashboard example in a website and social media analysis that allows you to understand specific aspects of your social media performance and results.
- Looker software provides business intelligence, big data analytics and a 360° view of your customers. The dashboards have powerful interactive visualizations that make deeper analysis simple.
- In no time, you can create beautiful KPI dashboards and easy-to-read reports. Then invite all your users to self-serve, anytime – from any device.
- When it comes to best data dashboard examples, Looker shines with simplicity and beauty.

Data Visualization Tools.

All of the technologies available on the market for data visualisation have something or another feature in common. The first advantage is their simplicity of usage. There are two types of software that you will most likely encounter: those that are easy to use and those that are really difficult to visualise data. Some include good documentation and tutorials and are constructed in user-friendly ways. Others, regardless of their other qualities, are missing in certain areas, excluding them from any list of "best" tools. The one thing you should ensure is that the software can handle large amounts of data and many kinds of data in a single display.
The better software can also generate a variety of charts, graphs, and maps kinds. Obviously, there will be others in the market who present the facts in a somewhat different manner. Some data visualisation tools specialise in a single style of chart or map and excel at it. Those tools are also among the "best" tools available. Finally, there are financial concerns. While a larger price tag does not inherently disqualify a tool, it must be justified in terms of greater support, features, and overall value.

1. Tableau

One of the most widely used data visualization tools, Tableau, offers interactive visualization solutions to more than 57,000 companies.
Providing integration for advanced databases, including Teradata, SAP, My SQL, Amazon AWS, and Hadoop, Tableau efficiently creates visualizations and graphics from large, constantly-evolving datasets used for artificial intelligence, machine learning, and Big Data applications.

The Pros of Tableau:

- Excellent visualization capabilities
- Easy to use
- Top class performance
- Supports connectivity with diverse data sources
- Mobile Responsive
- Has an informative community

The Cons of Tableau:

- The pricing is a bit on the higher side
- Auto-refresh and report scheduling options are not available

2. Dundas BI

- Dundas BI offers highly-customizable data visualizations with interactive scorecards, maps, gauges, and charts, optimizing the creation of ad-hoc, multi-page reports. By providing users full control over visual elements, Dundas BI simplifies the complex operation of cleansing, inspecting, transforming, and modeling big datasets.

The Pros of Dundas BI:

- Exceptional flexibility
- A large variety of data sources and charts
- Wide range of in-built features for extracting, displaying, and modifying data

The Cons of Dundas BI:

- No option for predictive analytics
- 3D charts not supported

3. JupyteR

- A web-based application, JupyteR, is one of the top-rated data visualization tools that enable users to create and share documents containing visualizations, equations, narrative text, and live code. JupyteR is ideal for data cleansing and transformation, statistical modeling, numerical simulation, interactive computing, and machine learning.

The Pros of JupyteR:

- Rapid prototyping
- Visually appealing results
- Facilitates easy sharing of data insights

The Cons of JupyteR:

- Tough to collaborate
- At times code reviewing becomes complicated.

4. Zoho Reports

- Zoho Reports, also known as Zoho Analytics, is a comprehensive data visualization tool that integrates Business Intelligence and online reporting services, which allow quick creation and sharing of extensive reports in minutes. The high-grade visualization tool also supports the import of Big Data from major databases and applications.

The Pros of Zoho Reports:

- Effortless report creation and modification
- Includes useful functionalities such as email scheduling and report sharing
- Plenty of room for data
- Prompt customer support.

The Cons of Zoho Reports:

- User training needs to be improved
- The dashboard becomes confusing when there are large volumes of data.

5. Google Charts

- One of the major players in the data visualization market space, Google Charts, coded with SVG and HTML5, is famed for its capability to produce graphical and pictorial data visualizations. Google Charts offers zoom functionality, and it provides users with unmatched cross-platform compatibility with iOS, Android, and even the earlier versions of the Internet Explorer browser.

The Pros of Google Charts:

- User-friendly platform
- Easy to integrate data
- Visually attractive data graphs
- Compatibility with Google products.

The Cons of Google Charts:

- The export feature needs fine-tuning
- Inadequate demos on tools
- Lacks customization abilities
- Network connectivity required for visualization.

6. Visual.ly

- Visual.ly is one of the data visualization tools on the market, renowned for its impressive distribution network that illustrates project outcomes. Employing a dedicated creative team for data visualization services, Visual.ly streamlines the process of data import and outsource, even to third parties.

The Pros of Visual.ly:

- Top-class output quality
- Easy to produce superb graphics
- Several link opportunities

The Cons of Visual.ly:

- Few embedding options
- Showcases one point, not multiple points
- Limited scope

7. RAW

- RAW, better-known as RawGraphs, works with delimited data such as TSV file or CSV file. It serves as a link between data visualization and spreadsheets. Featuring a range of non-conventional and conventional layouts, RawGraphs provides robust data security even though it is a web-based application.

The Pros of RAW:

- Simple interface
- Super-fast visual feedback
- Offers a high-level platform for arranging, keeping, and reading user data
- Easy-to-use mapping feature
- Superb readability for visual graphics
- Excellent scalability option

The Cons of RAW:

- Non-availability of log scales
- Not user intuitive

8. IBM Watson

- Named after IBM founder Thomas J. Watson, this high-caliber data visualization tool uses analytical components and artificial intelligence to detect insights and patterns from both unstructured and structured data. Leveraging NLP (Natural Language Processing), IBM Watson's intelligent, self-service visualization tool guides users through the entire insight discovery operation.

The Pros of IBM Watson:

- NLP capabilities
- Offers accessibility from multiple devices
- Predictive analytics
- Self-service dashboards

The Cons of IBM Watson:

- Customer support needs improvement
- High-cost maintenance.

9. Sisense

- Regarded as one of the most agile data visualization tools, Sisense gives users access to instant data analytics anywhere, at any time. The best-in-class visualization tool can identify key data patterns and summarize statistics to help decision-makers make data-driven decisions.

The Pros of Sisense:

- Ideal for mission-critical projects involving massive datasets
- Reliable interface
- High-class customer support
- Quick upgrades
- Flexibility of seamless customization

The Cons of Sisense:

- Developing and maintaining analytic cubes can be challenging
- Does not support time formats
- Limited visualization versions.

10. Plotly

- An open-source data visualization tool, Plotly offers full integration with analytics-centric programming languages like Matlab, Python, and R, which enables complex visualizations. Widely used for collaborative work, disseminating, modifying, creating, and sharing interactive, graphical data, Plotly supports both on-premise installation and cloud deployment.

The Pros of Plotly:

- Allows online editing of charts
- High-quality image export
- Highly interactive interface
- Server hosting facilitates easy sharing

The Cons of Plotly:

- Speed is a concern at times
- Free version has multiple limitations
- Various screen-flashings create confusion and distraction.

11. Data Wrapper

- Data Wrapper is one of the very few data visualization tools on the market that is available for free. It is popular among media enterprises because of its inherent ability to quickly create charts and present graphical statistics on Big Data. Featuring a simple and intuitive interface, Data Wrapper allows users to create maps and charts that they can easily embed into reports.

The Pros of Data Wrapper:

- Does not require installation for chart creation
- Ideal for beginners
- Free to use

The Cons of Data Wrapper:

- Building complex charts like Sankey is a problem
- Security is an issue as it is an open-source tool.

12. Highcharts

- Deployed by seventy-two of the world's top hundred companies, the Highcharts tool is perfect for visualization of streaming big data analytics. Running on Javascript API and offering integration with jQuery, Highcharts provides support for cross-browser functionalities that facilitates easy access to interactive visualizations.

The Pros of Highcharts:

- State-of-the-art customization options
- Visually appealing graphics
- Multiple chart layouts
- Simple and flexible

The Cons of Highcharts:

- Not ideal for small organizations.

13. Fusioncharts

- Fusioncharts is one of the most popular and widely-adopted data visualization tools. The Javascript-based, top-of-the-line visualization tool offers ninety different chart building packages that integrate with major frameworks and platforms, offering users significant flexibility.

The Pros of Fusioncharts:

- Customized for specific implementations
- Outstanding helpdesk support
- Active community

The Cons of Fusioncharts:

- An expensive data visualization solution
- Complex set-up
- Old-fashioned interface.

14. Power BI

- Power BI, Microsoft's easy-to-use data visualization tool, is available for both on-premise installation and deployment on the cloud infrastructure. Power BI is one of the most complete data visualization tools that supports a myriad of backend databases, including Teradata, Salesforce, PostgreSQL, Oracle, Google Analytics, Github, Adobe Analytics, Azure, SQL Server, and Excel. The enterprise-level tool creates stunning visualizations and delivers real-time insights for fast decision-making.

The Pros of Power BI:

- No requirement for specialized tech support
- Easily integrates with existing applications
- Personalized, rich dashboard
- High-grade security
- No speed or memory constraints
- Compatible with Microsoft products

The Cons of Power BI:

- Cannot work with varied, multiple datasets

15. QlikView

- A major player in the data visualization market, Qlikview provides solutions to over 40,000 clients in 100 countries. Qlikview's data visualization tool, besides enabling accelerated, customized visualizations, also incorporates a range of solid features, including analytics, enterprise reporting, and Business Intelligence capabilities.

The Pros of QlikView:

- User-friendly interface
- Appealing, colorful visualizations
- Trouble-free maintenance
- A cost-effective solution

The Cons of QlikView:

- RAM limitations
- Poor customer support
- Does not include the 'drag and drop' feature.

16. Infogram

- Infogram is one of the most popular software programmes on the internet today. It is a web-based tool for creating infographics and visualising data. It is primarily intended to assist all users in quickly and simply creating interesting and interactive reports, infographics, and dashboards with data-driven information and captivating images. This particular solution provides customers with over 550 maps and 35 charts, 20 ready-made design templates, numerous pictures and icons, a drag-and-drop editor, and other features. Even someone who is new to the sector may quickly learn how to utilise this programme.
- It has a simple editor that allows users to modify the colours and styles of their visualisations, add corporate logos, and adjust the display choices. In addition, the users will be granted the right to use over a million icons, GIFs, and photos in their visualisations. Users may add connections to generate traffic to their website using interactive charts, which allow audiences to examine data using Infogram tabs. Reports that are interactive and shareable may also be developed and incorporated, with metrics to measure audience interaction.

17. ChartBlocks

- ChartBlocks selects the appropriate data segment to create a chart and manages the whole import process. It may import information from virtually any source. It enhances many sharing options that set the chart on the website and instantly share it. It contains hundreds of

customization and design choices that influence various aspects of the chart. The Wizard feature selects and selects the appropriate data for the chart using the basic chart design wizard. ChartBlocks' data import capabilities enable data to be swiftly imported from any source. It aids in the import of proper data from the target source and the creation of the chart. And all of this happens in a matter of minutes. To create a chart, no code is necessary.

- It allows for the creation of a chart in minutes, as well as the use of a chart designer and the selection of hundreds of chart kinds, which may be adjusted as needed. It can also gather data from nearly any source and use it to make visualisations. The data import wizard walks you through each step of the procedure. It easily embeds charts into any website of your choice and distributes them.
- The same sharing functionality is available in the built-in social media sharing tools. It is known to interface directly with Facebook and Twitter. It also has a function that allows the charts to be exported as editable vectors and graphics.

18. D3.js

- With Data-Driven Document, you can use any browser to bind data to a DOM in a document, allowing you to manipulate documents from anywhere. Transforming data involves selecting selections of nodes and manipulating them individually. You can easily change and alter node attributes, register event listeners, change nodes, alter HTML or text content, and access the document's underlying DOM by working with functions of data (styles, attributes, and other properties). You can associate operations (updates, additions, and deletions) with nodes to improve performance. You can build new functions using the function factory, as well as using the graphical primitives included. Geographic coordinates can be retrieved using a function as opposed to a constant. Properties can be reused by having data bound to the documents.

- It uses HTML, SVG and CSS to create graphics from data, for example generating a table in HTML from data. Using animated transitions and high performance, you can easily visualize data in bar charts and graphics, support large amounts of data, and enjoy dynamic interaction and animation in a 3D environment with large amounts of data.

- Chart.js is a popular JavaScript charting toolkit that is open source. It is a Data Visualization Software that will help you visualise data. Because it is open-source, it is maintained by the entire community. It has support for eight various types of charts, including pies, lines, and bars. The good news is that all of these are really responsive. All you have to do is put up your chart, and the library will make sure it is readable. It has 53.7k GitHub stars and a strong ecosystem providing wrappers for Vue, React, Ember, and more frameworks. The library draws the charts on the browser canvas. It is an independent project with numerous community contributors. Chart.js provides eight different types of chart bar charts, but also bubble charts, scatter charts, line charts, and polar charts.

20. Grafana

- Grafana open source is a free and open source visualisation and analytics tool. It enables you to query, display, alert on, and examine metrics, logs, and traces stored everywhere. It includes tools for transforming time-series database (TSDB) data into informative graphs and visualisations.
- It also has a Graohana cloud component. It is an OpenSaaS logging and metrics platform that is highly available, quick, and fully controlled. The program provides all of the features you love about Grafana, but Grafana Labs hosts and manages the program for you.
- Grafana Enterprise is Grafana's commercial edition, which offers capabilities not present in the open source version. Grafana Corporate includes enterprise data sources, sophisticated

authentication choices, expanded permission restrictions, 24x7x365 support, and core team training.

21. Chartist.js

- Chartist.js is an online application that allows you to build highly customizable responsive charts that highlight important data and construct a library or libraries. Chartist.js encapsulates the given data in a library for usage in a user-friendly framework. Chartist.js is now used to create libraries in a variety of projects, including Chartist JSF (Java Server Faces Component), node chartist (node package for server-side charts, ng-chartist.js (Angular Directive), Table press Chartist (WordPress/ tablepress extension), Ember - cli - chartist (Ember Addon), react chartist (react component), etc.
- Chartist.js is user-friendly since it is compatible with a variety of browsers, making it simple to work with any of them. The browsers enable the use of several remarkable capabilities, such as general browser support, sophisticated CSS animations, SVG animations, multi-line labels, with SMIL, and responsive option override.
- These are critical properties that every browser wants to have in order to provide reliable information. These capabilities allow Chartist.js to create charts that have an animation component, making them presentable and simple to read.

22. Sigma.js

- Sigma is a JavaScript library for drawing graphs. It enables developers to incorporate network exploration into rich online applications and makes it simple to publish networks on websites.
  - The Sigma.js layout is fantastic.
  - It enables individuals to follow up with interest as soon as possible.
  - Sigma.js's performance is currently satisfactory.
  - Sigma.js support is fantastic and quite helpful.
  - Good software must be tried.

23. Polymaps

- Polymaps, a collaboration between Stamen and SimpleGeo, is a free JavaScript library for image and vector tiled maps that use SVG. The library enables the creation of interactive and dynamic maps in web browsers, as well as the rapid display of datasets and support for a broad range of visual presentations for vector data (tiled). Cartography from CloudMade, OpenStreetMap, Bing, and other image-based web map suppliers is supported by Polymaps. It can load data at all scales and works well for displaying information from the country level down to the local level. It displays information using Scalable Vector Graphics (SVG), which allows users to simply create data design using CSS rules. This also saves users from having to learn new scripts because they may do the majority of jobs using scripts to which they are already accustomed.