



Necessities of OLAP Visualization

OLAP increases the number of users leveraging business intelligence. With the power in more hands, it is vital to ensure that the data is visualized in a way that makes sense to reduce the chance of poor decisions based on a misunderstanding.

By Gregory A. Quirk, Marketing Manager, Klipfolio Inc.

Introduction to OLAP

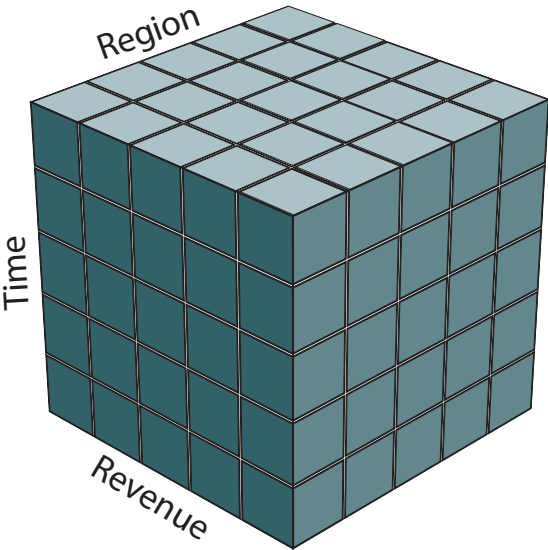
Business Intelligence (BI) is a rapidly growing method for understanding data to make informed decisions regarding company performance. In the past, few people had access to information to make decisions. This limited the ability for non-management employees to improve business processes and improve performance.

Even managers who had access to the information had to wait for a business intelligence analyst to compile the data and provide them with a report, which created delays and made it difficult to make timely decisions that affected daily operations.

But that was the past. Today, few companies fail to see the value in BI to reduce costs, increase revenues, and mitigate risk or, for that matter, the point in keeping the information held within a tight group of managers.

As BI capabilities increased, new methods for analyzing data were created. One such method is Online Analytic Processing (OLAP). The method was first performed in a product called Express in 1970, but it was not introduced as an actual term until 1993 by Edgar Codd. OLAP gained popularity in 1998 when Microsoft released the first OLAP server called Microsoft Analysis Services.

OLAP is a very powerful method for processing data. In its simplest form it is a data structure designed to analyze multi-dimensional relationships to provide information. However, that definition does not explain the benefits of OLAP. There are a number of advantages achieved through implementing an OLAP structure.



Simple 3-Dimension OLAP Table

🕒 Time	🌐 Region
🕒 Time	💰 Revenue
🌐 Region	💰 Revenue
🌐 Region	🕒 Time
💰 Revenue	🌐 Region
💰 Revenue	🕒 Time

Compilation of 3-Dimension Data in Tables

First, OLAP stores data in a unique way. An OLAP “cube” is created with many relationships between the different data sources. A rudimentary example would be a three-sided cube storing revenue, time, and region. While it would be possible to create multiple tables to store this information, it would require as many as six separate tables (if you wanted to sort by each available category) to analyze the data in every way possible. And this is a simple cube with only three dimensions.

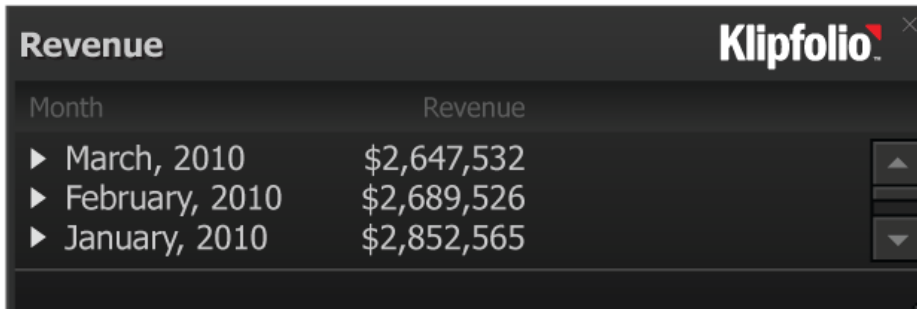
OLAP cubes are not limited to only three dimensions, and each additional dimension would add a factorial of new tables to store the data using tables. Adding in just one more category would require 24 tables using traditional methods, and five categories would require an astounding 120 tables!

Second, OLAP queries can be quickly processed. This is a vital aspect, especially for operational business intelligence. The value of BI is to make decisions, often in a real-time environment, that impact an organization. If a query takes a lengthy amount of time, the value of the data is reduced because it cannot be acted upon soon enough. For example, if a call center is updated on call volume daily it is most likely too late to make a change to affect your service level agreement. Whereas getting call volume every few minutes allows managers to call employees back from coffee breaks or encourage employees to wrap up calls faster to handle someone on hold.

OLAP additionally provides a way to make data available to a broader audience. This helps to decentralize the decision making of the organization and allows for more ideas to be presented to improve the organization. While internally OLAP data is much more complex to set up and store, from a user point of view it is much easier to use.

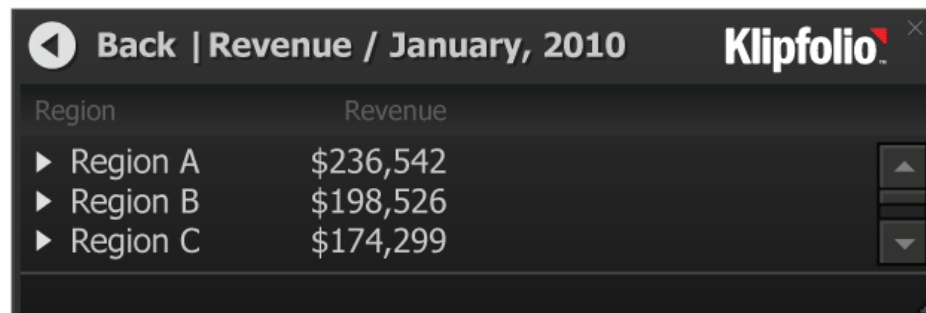
OLAP Visualization Examples

Taking the example above of revenue by time by region, there are a number of ways that this information can be queried and portrayed. In one case, you might want total revenue by time, and then the ability to drill down into specific regions to understand how each area is performing. By creating an OLAP structure this query can be quickly and easily accomplished.



A screenshot of a Klipfolio dashboard window titled "Revenue". It displays a table with two columns: "Month" and "Revenue". The data is as follows:

Month	Revenue
▶ March, 2010	\$2,647,532
▶ February, 2010	\$2,689,526
▶ January, 2010	\$2,852,565

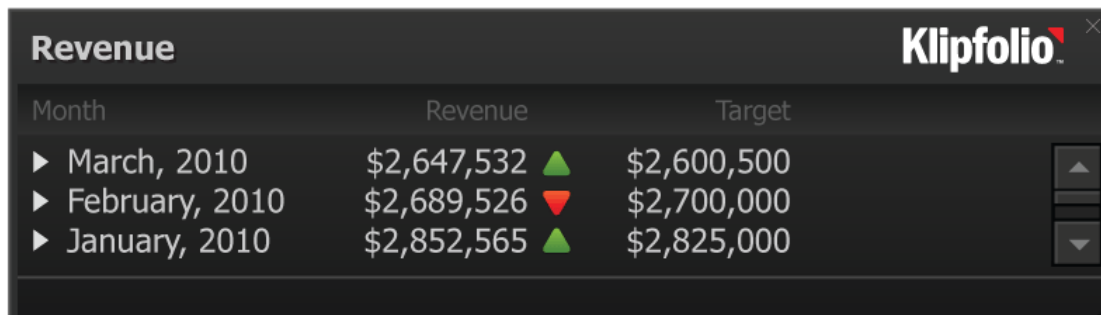


A screenshot of a Klipfolio dashboard window titled "Back | Revenue / January, 2010". It displays a table with two columns: "Region" and "Revenue". The data is as follows:

Region	Revenue
▶ Region A	\$236,542
▶ Region B	\$198,526
▶ Region C	\$174,299

OLAP data showing revenue by time and then revenue by region

There is substantial value in being able to visualize the data in this manner. First, it is easy for the end user, who may not be aware of the complexity behind the data, to understand what is being portrayed and make informed decisions. Indicators, such as a green arrow up or a red arrow down, can clearly demonstrate changes in performance. Alerts can be created to let users know when certain thresholds are met, such as shortfalls in monthly or quarterly budget targets.



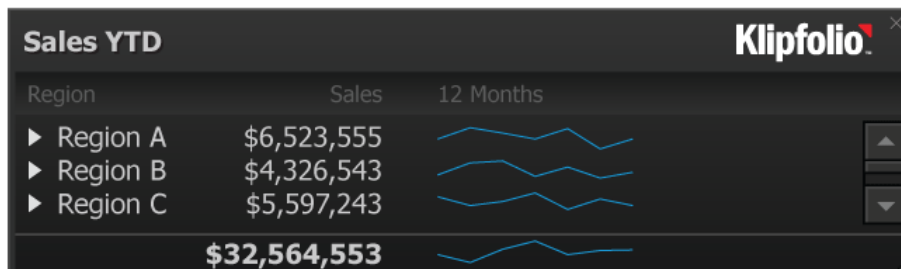
A screenshot of a Klipfolio dashboard window titled "Revenue". It displays a table with three columns: "Month", "Revenue", and "Target". The data is as follows:

Month	Revenue	Target
▶ March, 2010	\$2,647,532 ▲	\$2,600,500
▶ February, 2010	\$2,689,526 ▼	\$2,700,000
▶ January, 2010	\$2,852,565 ▲	\$2,825,000

OLAP data showing visualization indicators for revenue by time

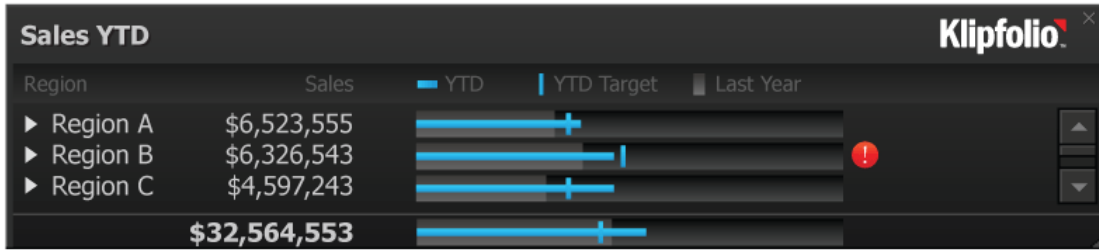
Second, the data can be used as a jumping point to perform further queries. Instead of being limited to the information and visualization that the database administrator or business intelligence expert provides, by using an OLAP structure more queries can be easily performed. For example, an executive may want to see total sales figures for the company. But the regional sales manager may want to see how a specific region is doing, and then more specifics on how each sales team in the region is performing to ensure individual targets are achieved. In this situation the initial information provided, total sales for the company, is a jumping point to gather further information.

Previously this would require a specific query which would be created by a business intelligence expert. However, with the advent of OLAP, and drill down and drill across concepts, these questions can be quickly and easily answered by a non-technical user without intervention.



OLAP data showing visualization for regional sales as a jumping point to look at store sales

Finally, the user can compare the results to the key performance indicators (KPIs) that have been created. KPIs are a way to gauge the success of the activity and are what companies use to determine the success or failure of a project. By implementing easily understood visualizations, users can gauge their performance compared to the KPIs. For example, if the budget target for a region is set, a bar graph could be created to show where revenue is compared to the target.



OLAP data showing KPI visualization for sales by region with an alert signifying that Region B is below the YTD target

Summary

There have been many advances in business intelligence capabilities over the past few years which have greatly expanded the value of BI within organizations. The addition of OLAP methods, with the ability to perform multi-dimensional queries and an interface that is easy to use without extensive IT knowledge, has proliferated BI throughout the enterprise and decentralized decision making power. But with the power in the hands of more individuals, it is more important than ever to ensure that data is visualized and understood; contextually, timely, and above all, profoundly simple.

About the Author

Gregory Quirk is the marketing manager at Klipfolio Inc., an Ottawa enterprise dashboard software vendor that helps accelerate business decision-making through real-time awareness of key performance metrics. He can be reached at gquirk@klipfolio.com