

Leverage Excel and Oracle OLAP for Secure and Actionable BI and Ad-hoc Reporting

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Introduction

Excel is the world's most pervasive BI tool and Oracle is the world's number one database. Almost every desktop has at least some version of Excel available to the user. Many users are so familiar with the Excel user experience that in some organizations users prefer to do analysis with Excel rather than their very expensive BI tool – going so far as to use the BI tool just to import data in Excel where they do their analysis. Even Gartner has suggested that IT departments “wave the white flag on using Excel for business intelligence,” a clear indication that Excel is capable of providing business users and analysts the functionality that they need.

Some of the common challenges in enterprise Business Intelligence (BI) are:

- deep analysis, both via ad hoc queries and scheduled reporting,
- visual and trend analysis,
- dashboarding,
- federating data from different sources, and
- providing high-performance aggregative analysis using some form of OLAP server.

Starting with Excel 2007, Microsoft has added a number of features that better enable BI on the desktop. This trend continued for Excel 2010, and continues for Excel 2013.

In this paper, and in the corresponding DOAG 2012 conference session, we elaborate on the BI features of Excel and how best to leverage it for secure, live analysis on Oracle OLAP data.

We cite real-life examples in the conference session from Team Lines, one of Europe's leading oceanic feeder container operators that connects more than 30 ports from the Iberian Peninsula up to the Baltics and deploys about 35 high-quality modern feeder vessels. Team Lines sought just such an Excel solution to securely provide its extended agent and user base with an easy way to perform self-service BI analysis and reporting on harmonized Oracle OLAP data to drive greater operational efficiency.

We present an Oracle recommended solution to a common set of multi-dimensional BI challenges. In particular, the use of a two-tier system composed of:

- Microsoft Excel with its full set of BI client features,
- a client-side “MDX Provider” to handle the MDX query language emitted by BI clients like Excel, and
- Oracle OLAP Option data cubes.

We want to illustrate to DOAG members the connectivity and BI power than can result when all these elements are put together. We discuss key features and advantages of this configuration, including solving the “One version of the truth/spreadmart” problem.

Excel is an Excellent BI Client Application

Excel is a pervasive, key application within the enterprise that is familiar to all key executives. It can import data from many sources, including databases and OLAP cubes. However, some are unaware that it’s a full BI client application capable of deep, multi-dimensional BI queries using cross-tab PivotTables like that shown below.

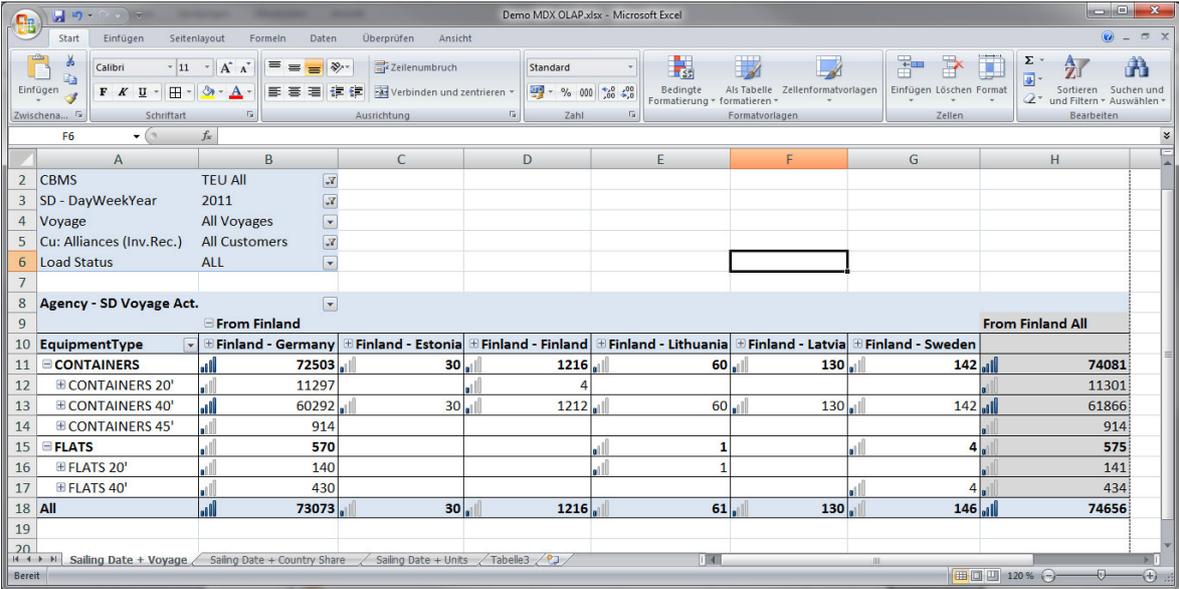


Illustration. 1: Excel PivotTable Example with conditional formatting

Standard BI analysis operations like drilling, filtering, sorting, swapping axes and putting multiple dimensions on a single axis are all supported. So, key business executives and analysts can use it for penetrating, ad hoc analysis and reporting.

Excel is Microsoft’s premier BI client against Microsoft Analysis Services. But if you have much of your data in Oracle, you’ll learn that it is easy to use Excel’s native BI analysis features inexpensively and directly against your multi-dimensional data in Oracle OLAP.

Since Excel is a key BI component for Microsoft, each version (2003, 2007, 2010 and 2013) has more and more powerful Business Intelligence (BI) features. The example below just touches the surface of insightful dashboarding in Excel.

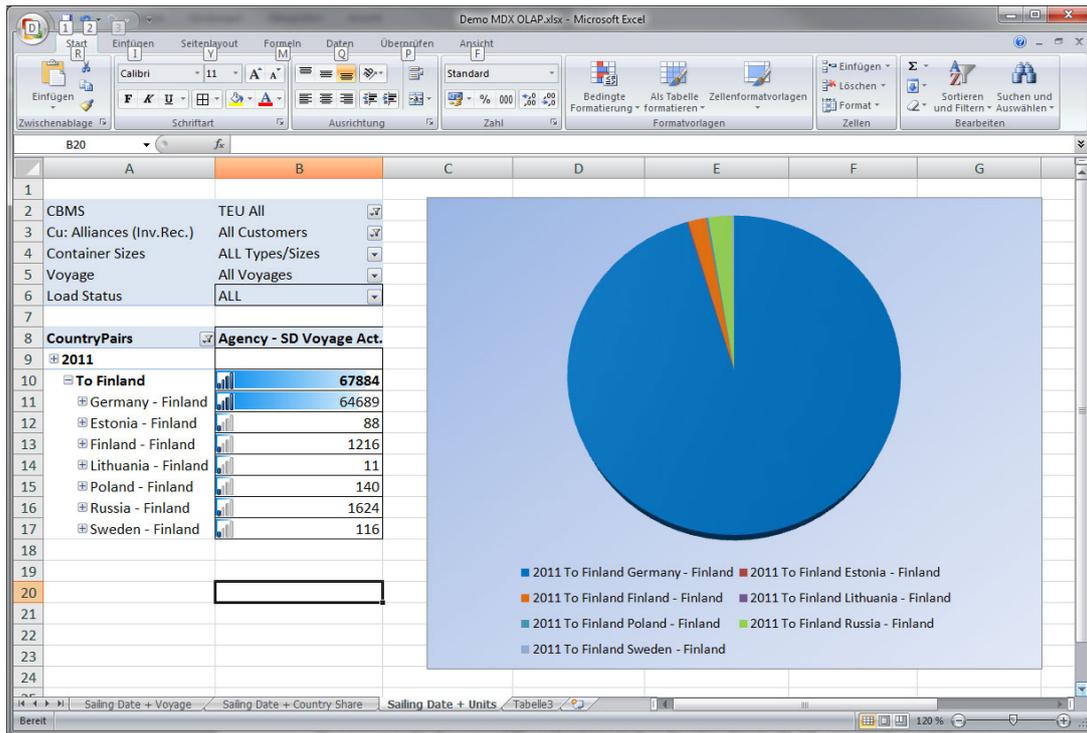


Illustration. 2: Excel PivotTable with basic in-cell conditional formatting and corresponding diagram

The above example shows in-cell conditional formatting using data bars proportional to the cell value. And, you can use either PivotCharts, or underlying Oracle OLAP features to portray data. Additional conditional formatting will be highlighted further below.

Finally, Excel updates from an external data source can be user controlled and immediate. New data is automatically added to past history, added to summaries and shares/rankings, and dashboard features re-scaled/re-drawn. IT need not be involved.

The Excel user interface is familiar to millions of business users. And, many users are already familiar with Excel PivotTables' very friendly BI interface. Drilling is as simple as clicking on a '+'. There is no need for extra training on a special Excel add-in, nor a completely new BI client application.

The solution enables users to securely feed Excel PivotTables with live enterprise data.

What Is MDX and ODBO?

When Microsoft Excel does ad hoc BI queries on an OLAP cube, it uses a standard OLAP query language called "Multi-Dimensional eXpressions" (MDX). The MDX query language is used by almost all dimensional/analytical applications including Microsoft Excel, SAP Voyager, Cognos, MicroStrategy, Bissantz DeltaMaster and many others. Though some architectures, including Microsoft's Analysis Services, use an expensive and complex-to-maintain mid-tier server, it doesn't need to be the case.

BI clients emit MDX through the Windows ODBO interface. The "MDX provider" software that implements this interface can, alternately, simply reside locally on the Excel PC rather than a mid-tier

server. A suitably-written MDX provider can decode and forward the multi-dimensional queries to any appropriate source, such as a high-performance Oracle OLAP cube.

The Simba MDX Provider for Oracle OLAP, shown below, is the **Oracle recommended** MDX Provider for general BI connectivity to Oracle OLAP data cubes.

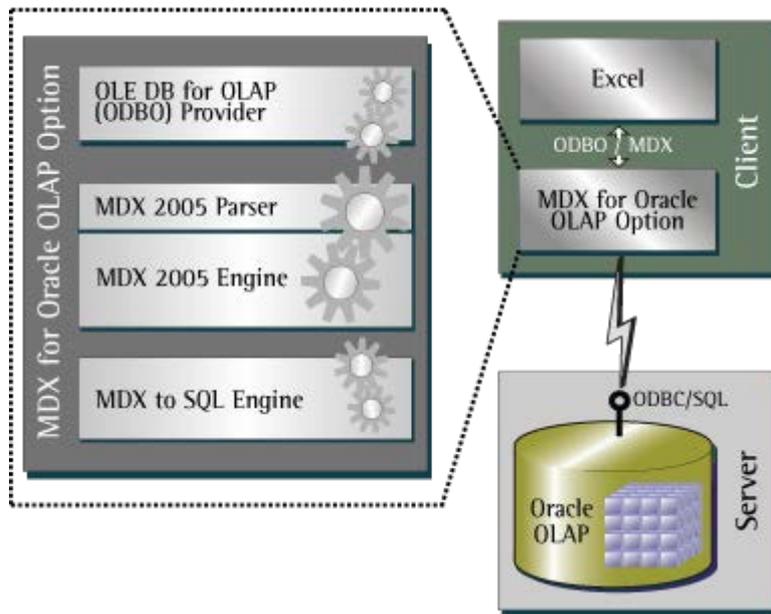


Illustration. 3: Simba MDX Provider for Oracle OLAP architecture

Oracle OLAP Cubes

Oracle Database Enterprise Edition has an OLAP Option that hosts a complete and sophisticated multi-dimensional OLAP system. It's designed to answer multi-dimensional queries extremely fast. Importantly, your data remains in the Oracle Database, protected by standard Oracle security. There's no need to extract data into a mid-tier server for analysis, and thus no need to manage extra systems and security associated with a mid-tier solution. Oracle OLAP Option includes Oracle's powerful, built-in calculation engine – which can be further accelerated by Exadata hardware – that processes massive amounts of data in seconds to deliver lightning-fast BI.

Putting It All Together

To connect multi-dimensional BI applications such as Excel to Oracle OLAP, you simply need the Simba MDX Provider for Oracle OLAP. The MDX Provider is installed on a user's PC to enable direct, live access to Oracle OLAP cubes. It's as easy to install as a database driver. And, it's invisible during all BI operations (unlike awkward Excel "add-ins" found in other platforms that add extra menus and additional unfamiliar windows).

Solution Benefits

Business executives and CIOs prefer this solution for a variety of reasons:

- the simplicity of the solution – neither a mid-tier server, nor mid-tier administration and security is required;
- the feature/price ratio;

- the ability of users to update data immediately from the database, and query immediately in previously unthought-of ways;
- the solid foundation of Microsoft and Oracle technologies.

More on BI with Excel and Oracle

Excel has great features for conditional formatting. This includes many types of graphs, data bars, coloring and icon sets. Here is an example of data bars and colored icon sets.

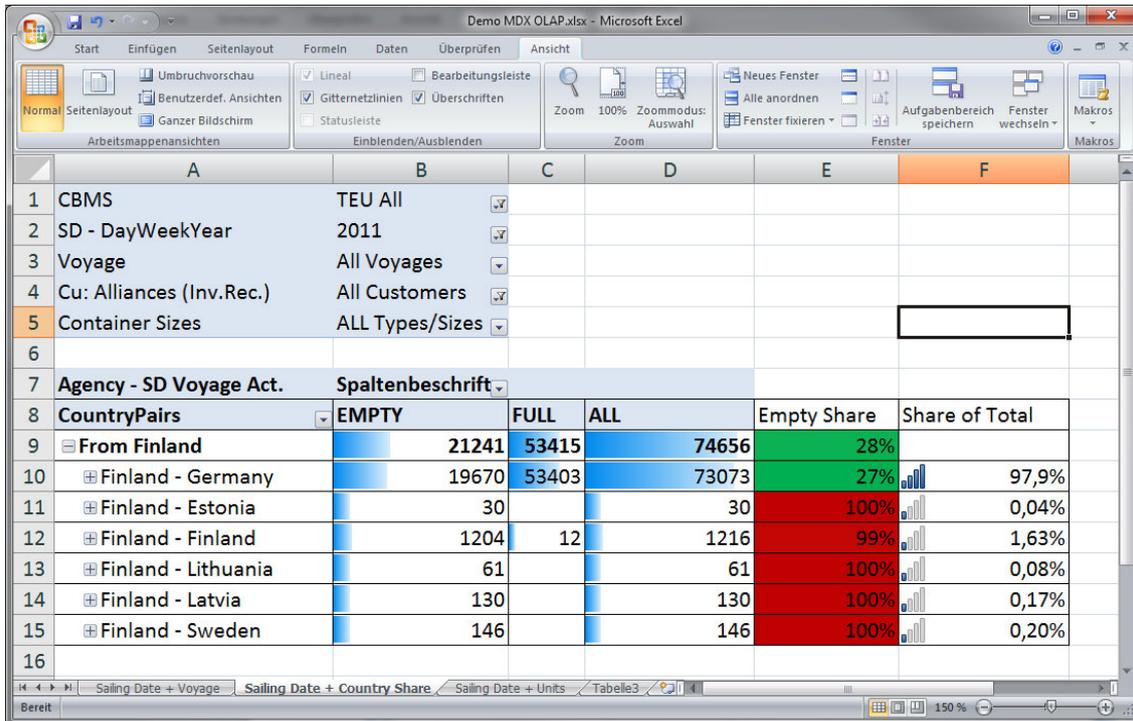


Illustration. 4: Examples of in-cell conditional formatting in Excel PivotTables for visual data representation

The above example shows a set of customer data, based on an OLAP cube “Agency – SD Voyage Act.” – Actual (realized) figures about transported volumes from the local Shipping Agency perspective (Export). Data bars (in-cell graphs), one of Excel’s many built-in, in-cell conditional formatting options, highlight shares of empty containers, and color scales (another easy visual conditional formatting option) indicates focus areas based on user-set criteria and business metrics.

Excel 2010, among other new features, included ‘sparklines’ that allow a single cell to contain a small actual trend graph. Excel 2013 adds even more core BI features such as improved charting capabilities, improved drill-up and drill-down and the addition of timelines for richer visual data presentation.

One Version of the Truth

The fear some organizations have of using Excel as a BI tool is based on the fact that some people use it to analyze a copy of the data, rather than maintaining a live connection to source data such as Oracle Database OLAP cubes. When data is just copied from the data warehouse or OLAP cube, it then becomes disconnected in mailed around spreadsheets. The user no longer knows how accurate and current the data still is. Spreadsheets that contain data of indeterminate age, origin and veracity are

often termed 'spreadmarts.' Spreadmarts can be dangerous if decisions are made based on out-of-date or inaccurate information.

The key to using Excel as an effective and user-friendly BI tool is to ensure users can maintain a hot connection to the data warehouse. Excel can communicate directly to Oracle Database OLAP cubes using Simba MDX Provider for Oracle OLAP. Rather than saving a copy of the data, Excel spreadsheets can instead save connection information that allows users to refresh the data each time the spreadsheet is opened – each with their own database userid and password if necessary to adhere to corporate security policies. This ensures that all viewers of the spreadsheet, the reports and the dashboards have current and accurate information. The result is one version of truth throughout the enterprise – which is exactly what a BI tool is supposed to deliver.

As noted, the Simba MDX Provider for Oracle OLAP is not an Excel add-in in the traditional sense. There is no added set of Excel menus with new, unfamiliar commands. Nor do you have to use an add-in's query builder. Instead, it's a quick driver install, allowing users to then operate against Oracle OLAP cubes using Excel PivotTables exactly like was intended by native Excel.

Resources and Additional Information

- [Video: "Using Microsoft Excel with Oracle 11g Cubes," presented by Bud Endress, Director of Product Management, Oracle OLAP at Oracle](#)
- [Tutorial: "Oracle by Example – Using Microsoft Excel with Oracle 11g Cubes"](#)
- [Video: "How to configure Microsoft Excel to connect to Oracle Database OLAP Option"](#)
- [Video: "Learn how to use Microsoft Excel 2010 Sparklines for easy, in-table dashboarding and trend analysis on Business Intelligence data"](#)
- [Information on Oracle Database OLAP Option](#)
- [Information on Simba MDX Provider for Oracle OLAP](#)

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