Business Benefits From Microsoft SQL Server Business Intelligence Solutions

How Can Business Intelligence Help You?

PTR Associates Limited

www.ptr.co.uk

Contents

Copyright @ 2015

Business Benefits From Microsoft SQL Server Business Intelligence Solutions

As data stores get bigger and bigger the process of analysing such vast quantities of data becomes more and more challenging. A simple SELECT statement and an Excel Spreadsheet is just not enough. Business Intelligence solutions are becoming more and more widespread as a solution to the modern demands of data analysis.

Typical data analysis needs of businesses include:

- Historic financial performance to measure actual achievements
- Key Performance Indicators to identify how close to or far away from goals the business may be
- Trends in data to assess what might happen in the future, how to lay out a store or which potential clients to target in a marketing campaign

Typical system needs are:

- Minimum impact on system performance
- Fast delivery of information to those that need it
- Accurate and up to date information
- Centralised management of data and information
- Zero duplication of data or effort

Copyright @ 2015

Microsoft SQL Server offers a complete family of services addressing all of the above and much more, and PTR offers a suite of Business Intelligence training courses focusing on the Microsoft solution.

This training courses aim to:

- Provide an overview of the concepts of Business Intelligence
    - Data collection
    - Data Analysis
    - Information Reporting
- Provide a demonstration of the capabilities of the Microsoft SQL Server Business Intelligence Services
    - Integration Service (SSIS)
    - Analysis Service (SSAS)
    - Reporting Service (SSRS)
    - PowerPivot For Excel
- Provide an insight to what Business Intelligence might be able to do for you and your organisation
- Help you to understand what knowledge you or your team will require to implement such a solution.

Following are the courses that PTR offer:

- Introduction to SQL Server Business Intelligence
- Implementing SQL Server Reporting Services
- Implementing SQL Server Analysis Services
- Implementing SQL Server Integration Services
- Introduction to Programming with MDX
- Excel PowerPivot

So if you are new to business intelligence, where do you start?

Read on ……

Copyright @ 2015

First Step – Get an Overview

For someone completely new to the business intelligence world it would be recommended that the Introduction to SQL Server Business Intelligence course is attended first as this would give an overview of business intelligence concepts along with and insight into the capabilities of the product suite and a demonstration of these key capabilities.

Second Step - Reporting

For someone completely new to business intelligence. But already involved in producing simple reports and management information through SQL queries and/or Excel spreadsheets a good starting point would be the (SSRS) SQL Server Reporting Services***.***

One of the problems with driving reports from Excel is that the data will invariably be duplicated and amended as spreadsheets are copied among colleagues. Unless SQL queries are directly embedded within the spreadsheets the data is also immediately out of date from the moment it is imported into the spreadsheet. Although Excel offers many features to prevent alterations to spreadsheets these are often not implemented.

By implementing the SQL Server Reporting Service reports can be designed and created by skilled report authoring staff and deployed centrally through a web service. They will be tamper proof as a centralised security system allows restrictions to be place on access, execution and modification.

It is also very easy to bring data from multiple sources into a single report and from sources such as SQL Server and non SQL Server databases (eg. Oracle), SQL Server OLAP Cubes, XML data sources and many other ODBC and OLEDB accessible sources.

As well as coping with multiple data sources information can be represented in list, tabular, matrix and chart forms within the same report.

Once deployed to a central report repository reports can be accessed by a chosen user population through an out of the box web front end or through integrated URL access in business applications. Using the out of the box web front end (Report Manager) users can then browse the report, print the report or export the report to a variety of formats including PDF, Excel, Word, HTML.

The (SSRS) SQL Server Reporting Services will cover both the design and creation skills required to build simple and complex reports, as well as the management/administrative skills required to deploy, secure and manage business reports. It will also provide an insight into the levels of customisation available. Delegates attending this course will be able to return to their business and very quickly demonstrate the value of powerful and centralised reports by implementing their new skills in their own business environment.

Copyright @ 2015

Third Step – Analysis Services

Reports are the client facing side of Business Intelligence, but behind the scenes the data needs to be retrieved securely and efficiently from a company's various data sources.

Data Analysts may need to carry out complicated analysis of business data in order to make key business decisions or recommendations. This often involves complex aggregations of data on very large data sets, analysing business data by different groupings such as geographic performance, product/service performance, customer performance, staff performance, calendar based performance. SQL queries can be extremely slow when processing grouped, aggregate data that spans many tables in a relational database. A solution to this can be to implement a Data Warehouse and OLAP cubes.

A Data Warehouse in simple terms is a centralised collection of all corporate data organised into a much flatter relational database structure, resulting in a more analysis oriented design and far fewer tables. They are essentially read only and would be batch updated from various live data sources.

An OLAP cube is a multidimensional representation of business data stored in a completely different storage structure to a relational database, but drawing data from a Data Warehouse relational database. In the OLAP cube aggregate values (sums, minimums, maximums, averages, counts) can be defined/stored as well as the data that gives this grouped data meaning (customers, geographic regions, products, time based). OLAP cubes are designed to handle aggregate data very efficiently on very large data sets. OLAP Cubes can also be developed to include complex business Key Performance Indicators, and complex derived data calculations.

OLAP cubes can be browsed directly using client tools such as Excel in a pivot table style, or can be used as a data source for SQL Server Reporting Services where information needs to be presented in a more structured manner. OLAP cubes can be queried using an MDX query language.

Tabular PowerPivot/Data Models provide a team based rather than corporate business intelligence solution. Read the PowerPivot – Business Intelligence For All article for further information on Microsoft Business Intelligence solution differences.

Tabular Models can be stored in an Excel workbook (Power Pivot) or on an Analysis Services instance configured in Tabular Mode (Tabular Models). These models can be browsed directly using Excel via pivot tables and charts. PowerPivot/Tabular Models can be queried with the DAX language.

The Microsoft SQL Server Analysis Services solution also caters for analysts wishing to identify business trends to assist with better product selection, store and website layouts, predicting target customers, forecasting and detecting fraudulent activities.

Copyright @ 2015

SQL Server Analysis Services Course

The (SSAS) SQL Server Analysis Services covers an overview of data warehouse terminology and architecture and then provides the foundation skills required to design and build OLAP cubes. It will also introduce the concepts of data mining and will show how client tools such as Excel can be used to access OLAP data. Delegates attending this course will be able to return to their business and assess how OLAP cubes and Analysis Services could benefit their own business environment and for those who already have well designed data warehouses in place will be able to launch into a project to develop the OLAP cube infrastructure to facilitate efficient and complex aggregate analysis on their business data. It should be noted, however, that this course does not cover formal Data Warehouse design concepts and methodology, only an overview of concepts, and if no existing data warehouse is available further training and preparation may be required. It should also be noted that to implement the more complex features of OLAP cube design, such as Key Performance Indicators and Calculations, MDX scripting plays a very big role and this course only provides an introduction to the MDX language, so again further training and preparation may be required.

This course is the start of a long journey into the world of multidimensional data design and analysis.

SQL Server Analysis Services Tabular Mode Course

The (SSAS) SQL Server Analysis Services Tabular Mode covers the foundation skills required to design and build Tabular models. It will introduce the components of a tabular model and guide delegates through importing data into the model, creating relationships between tables in the model and extending the model through creation of column expressions and calculated fields (measures). Attendees will learn the basics of the DAX language used to build both simple and complex column expressions and calculated fields. MDX provides a rich library of functions to carry out simple derived value tasks through to constructing sophisticated time intelligence based expressions to generate parallel period values, parent aggregations and more.

Copyright @ 2015

Multidimensional Expression (MDX) Language

As mentioned in the previous paragraph MDX scripting plays a very big role in the design and creation of advanced cube features such as Key Performance Indicators (KPIs) and Calculations. It is also an essential language where cubes are to be used as a source for reporting and complex querying, rather than access in a simple manner via a graphical cube browser.

MDX is a complex language offering a SELECT statement and a scripting language and the only thing it has in common with SQL is that it has a SELECT statement, but the MDX SELECT statement is a completely different SELECT statement to the SQL SELECT statement. The function library and scripting statements are also completely different to SQL.

The Introduction to SQL Server MDX course provides a more in depth coverage of the MDX language. If you will be involved in any of the following then this course will be of benefit:

- Cube Design & Customisation
    - Creation and maintenance of Key Performance Indicators (KPIs)
    - Creation and maintenance of Calculations (new members, named sets, generating forecast measures)
- Querying Of Cubes
    - Writing MDX scripts to interrogate cubes
- Reporting on Cube Data
    - Writing MDX queries as datasets for SQL Server reports (SSRS reports)
    - Parameters Reports and MDX datasets
- Exporting Data From A Cube
    - MDX queries as SSIS package sources

Copyright @ 2015

Fourth Step – Integration Services

Business Intelligence requires a lot of data to be moved from one place to another. A typical data flow would be:

- Data moves from a live data source to a Staging Database
- Data moves from a Staging Database to a Data Warehouse
- Data moves from a Data Warehouse to an OLAP Cube

And these data movements will have to take place on a repeated and ongoing basis as live data is continually changing. To keep the data moving some king of ETL (Extract Transform Load) service is required.

Microsoft provides the Integration Services for this purpose. This service enables simple or complex packages to be created to manage the whole process of exporting data from one place, manipulating or transforming it to make it suitable for its next destination, and importing the transformed data into a destination. These packages can then be deployed to a central location for automatic scheduling or manual execution.

Invariably data from one source is in a completely different style and format to another and when trying to centralise corporate/business data it involves many manual processes to transform the multiple sources into a common format. It then often requires another complex set of steps to get the data to its final destination.

The Integration Service caters for pre-import steps such as FTP transfers, target database preparation, email notifications and much more. It also caters for the fact that data may need to be converged from many places into a single table providing a large library of built in transformation operations such as data conversion, lookups, sorts, conditional operations, derived column operations, and if there isn't a function to do what you need it allows you to create your own logic through VB.NET scripts. You can even create your own custom .NET tools to add to the collection.

The (SSIS) SQL Server Integration Services Course introduces the skills required to design and create simple and complex packages, as well as the skills required to deploy packages to central locations and manage the access and execution of these packages. Delegates attending this course will be able to return to their business and very quickly demonstrate the value of automating data transfers and transformations.

Copyright @ 2015

Course Synopses

Synopsis for (SSRS) SQL Server Reporting Services Course

Delegates attending PTR's SQL Server Reporting Services course will learn how to use SQL Server Reporting Services (SSRS) to design, create, deploy, secure and manage reports.

The course provides a fundamental understanding of the components of a SQL Server Reporting Services deployment exploring its basic architecture and terminology. You will learn how to create tabular, matrix, chart and list reports that employ datasets based on ad-hoc queries and stored procedures. As you progress you'll learn to add custom expressions, custom functions and format your reports, implement shared data sources, interactive sorting, drill-down capabilities, and create parameter based reports using the Report Designer.

Reports including gauges, indicators, spark lines and maps will also be introduced. The course will introduce both the Visual Studio (SQL Server 2008 Business Intelligence Studio for SSRS 2008R2 and SQL Server Data Tools for SSRS 2012 and 2014) project environment and ReportBuilder 3.0 application for creating, saving and deploying reports.

The latter part of the course covers the deployment, management and customisation of Reporting Services projects components and saving of reports, data sets and data sources to the SSRS repository. In this section you will learn how to manage security and access to reports through user roles and accounts. You will also learn how to schedule the execution and caching of reports, and automate the delivery of reports in selected render formats. An introduction to the concepts of accessing reports using URL access and the Reporting Services Web Service API, and the application integration options provided by SSRS will be provided to serve as a taster of how your reports might be integrated into your own applications.

This course is suitable for delegates working with all versions of SQL Server from SQL Server 2008 through to SQL Server 2014.

This course assumes no prior knowledge of SQL Server Reporting Services. This course does assume prior knowledge of the SQL language to the level of the PTR SQL Server Database Querying course.

For further details see the full course outline for this course.

Copyright @ 2015

Synopsis for (SSAS) SQL Server Analysis Services Course

In this course, you will learn how to use Microsoft SQL Server Analysis Services (SSAS) to design and implement Multidimensional OLAP cubes to support Business Intelligence (BI) solutions. You will learn about the Microsoft SQL Server Visual Studio development environment (SQL Server 2008 Business Intelligence Development Studio (BIDS), SQL Server 2012/2014 Data Tools) for design, creation and deployment of SQL Server BISM (Business Intelligence Semantic Model) Multidimensional Mode projects, and SQL Server Management Studio for the management of Multidimensional databases.

The course will take delegates through building a multidimensional cube in its simplest form through to extending the features within the cube by implementing MDX calculations, Key Performance Indicators (KPIs), Actions and Dimension/Cube Intelligence. The main emphasis of the course is on the design and creation of cubes, but basic administration and security of cubes are also covered.

Delegates will learn about dimensions (regular, snowflake, degenerate, role play), attributes, hierarchies (attribute and user-defined), relationships (regular, reference, fact, many to many) and members. They will also meet the MDX query and scripting language and gain an understanding or working with cells, tuples and sets, extracting measure values by slicing and dicing with tuples and sets defined on an axis or in a slicer.

This course also covers the deployment and management of cubes and multidimensional databases.

Finally delegates will be introduced to analysing and interacting with cubes from Excel, and the concepts of data mining.

This course is suitable for delegates working with all versions of SQL Server from SQL Server 2008 through to SQL Server 2014.

This course does not require any prior experience with Analysis Services 2008/2012/2014. It is assumed that delegates have working experience with SQL Server 2005, 2008, 2012 or 2014 and basic relational database concepts such as tables, queries, and indexing.

The MDX language plays a very important role in cube design, being the language used to customise the cube with calculations, KPIs and actions. It is also the language used to create a dataset within SSRS (Reporting Services). This course only overviews the basics of the MDX language. To extend knowledge of the MDX language delegates can go on to attend the Introduction to SQL Server MDX course.

For further details see the full course outline for this course.

Copyright @ 2015

Synopsis for (SSAS) SQL Server Analysis Services Tabular Mode Course

With SQL Server 2012 Microsoft introduced a second deployment option for Microsoft SQL Server Analysis Services (SSAS), the Tabular Mode.

SSAS Tabular Mode provides a Team Business Intelligence solution suitable for smaller organisations who perhaps don't need, or don't have the resource for, a full blown Corporate Business Intelligence solution such as that offered by the Multidimensional Mode. Tabular Data Models are created instead of Multidimensional Cubes.

Excel 2010 introduced the PowerPivot add-in which provides a Personal Business Intelligence solution (self-contained data models within an Excel workbook). As the limits of working in an Excel workbook are exceeded, or greater needs to share PowerPivot models emerge, businesses may wish to migrate the PowerPivot Data Models to SSAS Tabular Mode.

In this course, you will learn how to use Microsoft SQL Server Analysis Services (SSAS) to design and implement Tabular PowerPivot Models to support Business Intelligence (BI) solutions. You will learn about the Microsoft SQL Server Visual Studio development environment (SQL Server 2012/2014 Data Tools) for design, creation and deployment of SQL Server BISM (Business Intelligence Semantic Model) Tabular Mode projects, and SQL Server Management Studio for the management of Tabular Models.

Delegates will be introduced to the concepts of Transactional Relational Databases, Data Warehouse Relational Databases, other sources of data, and Tabular (PowerPivot) Models fundamentals, becoming familiar with terminology such as Tables, Data Sources, Relationships, Hierarchies, Calculations & Measures. The course will take delegates through building a Tabular Model in its simplest form through to extending the features within the model by implementing DAX calculations and measures, and Key Performance Indicators (KPIs). The main emphasis of the course is on the design and creation of Tabular Models, but basic administration and security of models are also covered.

An introduction to the DAX language will provide an insight into extending data models by adding simple aggregate type measures and calculations to the model through to complex Time-Intelligence based measures, such as parallel period calculations, year to date, month to date, etc.

This course also covers the interrogation of Tabular Models from Microsoft Excel 2010/2013 through Pivot Tables and Charts, and the use of Tabular Models as data sources for SQL Server Reporting Services (SSRS).

This course is suitable for delegates working with SQL Server 2012 and SQL Server 2014.

There are no specific pre-requisites for this course, but delegates attending this course would benefit from having some basic Excel pivot table and chart skills, and where data is to be drawn from relational databases some SQL querying experience would be advantageous.

For further details see the full course outline for this course.

Copyright @ 2015

Synopsis for (SSIS) SQL Server Integration Services Course

Delegates attending this course will have requirements to implement SQL Server Integration Services (SSIS) to export and import data between mixed data sources, catering for simple exchanges and more complex requirements involving transformation of data before it reaches its destination (such as in the cases of loading a Data Warehouse).

Delegates will learn how to carry out data cleansing tasks such as de-duplicating and fuzzy lookups, converge heterogeneous data sources through transformations such as merge and union, split single data sources into many with transformations such as conditional split, handle multiple import files with containers such as for and foreach loops, and much more.

In this course you will learn about the Microsoft SQL Server Visual Studio development environment for design, creation and management of SSIS packages, and work with Control and Data Flows to build workflows to extract, transform, and load data using a variety of data sources, transformations, and destinations. You will also become familiar with SSIS package management and package deployment along with learning to write solid code using debugging, error handling, and logging techniques.

This course, along with the PTR (SSAS) SQL Server Analysis Services course, helps to prepare delegates for the Microsoft 70-463 exam: Implementing a Data Warehouse with Microsoft SQL Server 2012. This exam credits towards MCSA and MCSE certifications. It should be noted, however, that all course attendances should be complemented by reference to the skills measured by the exam, a period of self-study and test exams before sitting the actual exam.

This course is suitable for delegates working with all versions of SQL Server from SQL Server 2008 through to SQL Server 2014

This course assumes no prior knowledge of SQL Server Integration Services. This course does assume prior knowledge of SQL Server 2008, 2012 or 2014 database environments and the use of SQL Server Management Studio for development and administrative tasks.

You should be familiar with database querying using SQL to the level of the PTR SQL Server Database Querying course.

For further details see the full course outline for this course.

Copyright @ 2015

Synopsis for Introduction to SQL Server MDX Course

The MDX language is both a query and scripting language implemented in the SQL Server Analysis Services (SSAS) Multidimensional world.

The MDX SELECT statement is used to query cube structures extracting measures for dimension members and hierarchies.

The MDX scripting statements are used to customise cubes with calculations and KIPs, and to script creation of session objects to satisfy complex querying of existing cubes.

This course provides the fundamental skills required to query cubes using the MDX SELECT statement and customize cubes with the MDX scripting language and functions.

At the end of the course delegates will be able to confidently query existing cubes as well as create their own measures and named sets derive information from stored cube data and aggregations.

The course covers the most commonly used set of MDX functions and scripting statements and provides the first step in a career of writing MDX statements and scripts. The course covers versions of SQL Server Analysis Services up to an including SQL Server 2012.

This course provides the fundamental skills required to query cubes using the MDX SELECT statement and customize cubes with the MDX scripting language and functions. At the end of the course delegates will be able to confidently query existing cubes as well as create their own measures and named sets derive information from stored cube data and aggregations.

The course covers the most commonly used set of MDX functions and scripting statements and provides the first step in a career of writing MDX statements and scripts. The course covers versions of SQL Server Analysis Services up to an including SQL Server 2012.

There are no specific pre-requisites for this course, but a general awareness of cube terminology might be beneficial.

For further details see the full course outline for this course.

Copyright @ 2015