Intro + …….. MANSI

Online analytical processing (OLAP) is a system that organises and facilitates complicated analysis of huge commercial databases. It can be used to run sophisticated analytical queries without causing transactional systems to malfunction.

***CLASSIFICATION OF OLAP TOOLS***

*1. MOLAP*

Multidimensional Online Analytical Processing is what it stands for. It uses multidimensional arrays to store data and necessitates pre-computation and data storage in the cube.

*2. ROLAP*

ROLAP stands for Relational, and the 'R' in ROLAP stands for Relational. As a result, ROLAP's full name is Relational Online Analytical Processing. The fact that the data is kept in relational databases is a key characteristic of ROLAP.

*3. HOLAP*

Hybrid Online Analytical Processing is what it stands for. By merging the qualities of MOLAP and ROLAP, HOLAP overcomes their weaknesses. So, how does it all come together? It integrates information by separating database data into relational and specialised storage.

**OLAP in Microsoft Azure**

Data from OLTP systems like Azure SQL Database is replicated into an OLAP system like Azure Analysis Services in Azure. Users can connect to Analysis Services servers using data exploration and visualisation tools like Power BI, Excel, and third-party choices, which enable highly interactive and visually rich insights into the modelled data. SQL Server Integration Services, which can be executed using Azure Data Factory, is commonly used to orchestrate the movement of data from OLTP to OLAP.

In Azure, all of the following data stores will meet the core requirements for OLAP:

*         SQL Server with Columnstore indexes
*         Azure Analysis Services
*         SQL Server Analysis Services (SSAS)

For business intelligence applications, SQL Server Analysis Services (SSAS) provides OLAP and data mining features. SSAS can be installed on local servers or hosted on an Azure virtual machine. Azure Analysis Services is a fully managed service that offers many of the same benefits as SSAS. Azure Analysis Services may connect to a variety of data sources in your company, both in the cloud and on-premises.

Clustered Column Store indexes are suited for OLAP workloads and are available in SQL Server 2014 and above, as well as Azure SQL Database. However, starting with SQL Server 2016 (including Azure SQL Database), you can use updateable non clustered column store indexes to do hybrid transactional/analytics processing (HTAP). HTAP allows you to run both OLTP and OLAP queries on the same platform, eliminating the requirement to store multiple copies of your data and the need for separate OLTP and OLAP systems. See Get started using Column store for real-time operational analytics for further details.

**Microsoft Business Intelligence Tools**

Business intelligence (BI) is a collection of theories, processes, structures, and technologies that transform unstructured data into actionable information for business objectives.

The goal of business intelligence is to manage massive amounts of unstructured data in order to find, develop, and create new opportunities. It implies that visuals are a more effective means of describing something than words. The pictorial explanation is considerably easier for the human mind to comprehend than the academic one. Data mining, online analytical processing, querying, and reporting are all part of business intelligence.

**Microsoft BI Tools**

The Microsoft BI platform includes of the most useful tools, all of which are controlled through a user-friendly interface. Microsoft SQL Server, Microsoft SharePoint, and Microsoft Office are the three solutions that make up the platform.

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**PowerPivot and SQL Server Analysis Services (SSAS)**

PowerPivot and SSAS are two modern Microsoft business intelligence technologies. Microsoft does not have a BI product at the moment, but it provides a motivation for consumers to upgrade to MS Office 2010 or MS Office 2013 and supports the concept of self-service BI. The Microsoft BI stack is made up of a number of tools and components, including Excel 2013 and SQL Server Analysis Services, as well as Microsoft PowerPivot. Many firms use BI consultants to help consumers get MS Excel Dashboards. PowerPivot's back-end API is only available as part of the SharePoint and SQL Server packages. This means that in order to combine all of these moving elements, enterprise users will need consultancy services.

**Business Intelligence Semantic Model (BISM)**

Aside from Excel, SSAS, SSRS, and PowerPivot, Microsoft released a new roadmap that includes a new BISM model in Analysis Services that will power Crescent (an upcoming Microsoft Data Visualization technology) as well as other Microsoft BI front end experiences like Excel Dashboards, Reporting Services, and SharePoint Insights.

When a BI Developer constructs a PowerPivot application, the model included within the workbook is a BI Semantic Model as well. When you publish a workbook to SharePoint, the model is stored on an SSAS server and made available to other apps and services like Excel Services and Reporting Services.

**Data Integration or ETL (Extract, Transform and Load) Pipeline**

One or more types of applications may be used by an organisation to meet the needs of its many functions. When discussing the design and development of a Data Warehouse as part of a Business Intelligence System, we must also outline data gathering techniques from all source systems and their integration into a data warehouse.

**SQL Server Integration Services (SSIS)**

Microsoft SQL Server Integration Services (SSIS) is a component of the SQL Server platform and an ETL platform for enterprise-level data integration and data transformation solutions. Through integration, cleansing, profiling, and administration, SSIS helps to maintain data security by providing a consistent and unified view of data from various source systems. For exceptionally fast data integration scenarios, SSIS provides a quick and flexible ETL framework with in memory transformation capabilities. SSIS includes various built-in components for connecting to common data sources (RDBMS, FTP, Web Services, XML, CSV, EXCEL, and so on), as well as a robust set of data transformation components.

       Analysis

After you've constructed the Data Warehouse and the data integration components have loaded data into it, you'll need to create an OLAP multi-dimensional structure. SSAS (SQL Server Analysis Services) can be used to make data available for analytics and reporting in the Microsoft Business Intelligence system. Online analytical processing (OLAP) and data mining features for business intelligence applications are provided by SSAS, a leading OLAP tool. SSAS pre-calculates, summarises, and stores data in a highly compressed format, allowing for exceptionally quick reporting and predictive analysis, as well as interactive exploration of aggregated data from many perspectives.

       Data Mining

SSAS data mining models can aid in the discovery of rules, patterns, and trends in data. Users can then figure out why things happen and forecast what will happen in the future. SSAS already includes a number of data mining algorithms as standard features. SSAS also allows you to assign KPIs (Key Performance Indicators) to your SSAS cube in order to assess company performance over time in comparison to a predetermined target as represented in the cube data. SSAS cubes are used to give front-end reporting in most cases. These cubes consolidate data and optimise query results using cache management techniques. Predefined queries provide a faster response time than summarising data from the underlying data sources each time a user searches it.

       Information Delivery

Multiple reporting tools can be used to assess the data from different perspectives or dimensions once the SSAS cubes (multi-dimensional structure) have been completed and supplied with data from the Data Warehouse.

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**SQL Server Reporting Services (SSRS)**

SQL offers a comprehensive set of ready-to-use tools and services for creating, deploying, and managing reports for businesses. Programming tools in Reporting Services allow you to enhance and personalise the reporting functionality. You can produce tabular reports as well as many types of chart, graph, map, and geographic reports. Scorecard reports based on KPIs can also be developed.

Users can define and execute ad-hoc reports from a standard data model using PowerPivot, Power View, Excel services, and SSRS. Users can evaluate reports in a customizable manner using the SSAS cube, based on the revealed measurements and dimensions.

**SAP BusinessObjects Reporting Tools**

SAP BusinessObjects BI 4 is a SAP solution that includes reporting apps and tools that analyse and report on data from SAP BW and SAP HANA. Reporting and dashboarding tools are included in the business objects reporting tool kit.

Business users can utilise these reporting interfaces to produce reports and dashboards using data from SAP HANA in the form of tables or information views. The following is a list of reporting tools included in the SAP BusinessObjects BI 4 package:

*         SAP Lumira
*         Web Intelligence
*         SAP Crystal Reports
*         Design Studio
*         Dashboard designer
*         Universe Designer (IDT/UDT)
*         BusinessObjects Explorer
*         Analysis Office

The reporting tools connect to SAP HANA in one of two ways: through a direct OLAP connection or through a relational indirect semantic layer (universe building).

Except for Web Intelligence, Dashboard Designer, and Crystal Report Enterprise, all tools employ the OLAP connection mechanism.

We've detailed the reporting tools or applications that are part of the SAP BusinessObjects BI Platform (client tools bundle) in this section:

**1. SAP Lumira**

SAP Lumira is a self-service data visualisation tool that allows users to connect directly to the SAP HANA database, generate visualisations, stories, and reports, transform data, and construct ad-hoc dashboards.

It connects to the SAP HANA database using the BICS connection driver and SQLDBC as the programming language.

**2. SAP Crystal Reports**

SAP Crystal Reports is a Windows-based utility for making printouts and publishing reports like sales invoices and sales orders reports, among other things. Crystal reports got their moniker because of their crystal clear and pixel perfect images.

To connect to the SAP HANA database, Crystal reports employ JDBC/ODBC connectors and SQL as the interface language.

**3. SAP Design Studio**

SAP Design Studio is a dashboard design tool that lets users construct interactive reporting apps and dashboards. It's an advanced-level design tool that uses a BICS connection to communicate with the SAP HANA database using the SQLDBC language.

SAP NetWeaver BW and SAP HANA platforms require complete compatibility and support for Design Studio. It also has the ability to programme on the server side.

**5. Analysis Office (OLAP)**

Analysis Office is a self-service data analysis application that focuses on multi-dimensional data. It uses an OLAP connection to the SAP HANA database or SAP BW that is established via BICS connector and SQLDB language.

Users can connect to OLAP data sources and combine data from many OLAP sources.

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**6. Explorer**

Explorer is an information-discovery or exploration tool that allows users from throughout the organisation to access data and get new insights from it. The Explorer tool uses a JDBC connector and SQL language to connect to the SAP HANA database via an OLAP connection.

**7. Universe designer (IDT/UDT)**

In the case of indirect (relational) connections made with reporting tools like WebI (Web intelligence) and Dashboard Designer, Universe Designer provides a platform for designing an intermediary layer on top of the SAP HANA database.

Universes are semantic layers that turn data from non-SAP relational and OLAP data sources into business-specific data. Instead of directly accessing the database, the reporting tools use data from the universe models.

A universe can be created in one of two ways: using an Information Design Tool (IDT) or with a Universe Design Tool (UDT).

A universe is a semantic layer that allows us to manage data in a variety of ways, including as applying filters, parameters, creating and removing objects, business layer views, predefined queries, aggregation, variable mapping, and so on.

After a semantic layer or universe is created, it is published to the Business Objects Server Repository, where it may be used by reporting tools like Web Intelligence and Dashboards. Both IDT and UDT use JDBC or ODBC connections to communicate with the database using SQL.

**8. Web Intelligence**

Web Intelligence is a sophisticated reporting tool with features such as ad-hoc reporting, detailed reporting, query panels, and more. WebI uses the IDT tool to access data from semantic layers via universes.

On top of a non-SAP data source, the semantic layer creates. You can access numerous data sources with IDT, while only one data source may be accessed at a time with UDT.

**9. Dashboard designer**

Dashboard Designer is a dashboard design tool included in the SAP BusinessObjects BI4 package. It gives customers pre-designed dashboard templates that they can use to create static or dynamic charts and visualisations for their dashboards.

Dashboard designer also uses universes to link to data sources.

**Connections in SAP BusinessObjects Reporting Tools**

All of the SAP BusinessObjects reporting tools we've covered so far connect to the database layer via a relational or OLAP connection.

When a user needs to access traditional data tables, a relational connection is formed. Only semantic layers established by IDT or UDT can be used to make relational connections.

An OLAP connection, on the other hand, is required if you need to retrieve multi-dimensional data cubes. In contrast to the relational connection, which is an indirect connection, it is a direct connection to the business layer of the data model.

These connections allow a user to access SAP HANA data tables or information views.

**Conclusion**

Online analytical processing is a type of computer processing that allows sophisticated analytical queries to be executed quickly. It's an important aspect of corporate intelligence, with extensive data mining and trend analysis capabilities. OLAP allows you to quickly analyse large amounts of data from several perspectives.

That was all there was to know about OLAP and tools. We hope you find the information presented here to be useful.

Do you have a question about OLAP and TOOLS? Please feel free to share your thoughts in the comments area.