
CS –32

**Data Warehousing with
SQL Server 2012**

**05. Deploying and Configuring
SSIS Packages, Consuming Data in
Data Warehouse**

Overview of SSIS Development

- Before we begin the discussion of the Integration Services tools, you should be familiar with some Integration Services concepts to help you create Integration Services packages successfully from the very beginning.
- This is not a comprehensive overview of the Integration Services architecture and object models; we discuss only concepts that are relevant to the use of the Integration Services tools.

Overview of SSIS Development

- Those concepts include the following.
 - ❑ Packages
 - ❑ Control Flow
 - ❑ Data Flow
 - ❑ Connection Managers
 - ❑ Package Configuration
 - ❑ Property Expressions
 - ❑ Data Sources and Data Source Views

Overview of SSIS Development

- A package presents a unit of work that address a business requirement.
- The package is the Integration Services object that you save, manage, or run.
- In SQL Server 2005 Integration Services introduces the concepts of control flow and data flow in packages.

Overview of SSIS Development

- A control flow consists of the tasks and containers. The tasks perform specific types of work such as executing SQL statements or sending email messages, and the containers define repeating subsets of the control flow or group subsets of the control flow to make the package easier to manage.

Overview of SSIS Development

- The tasks and containers are usually connected by precedence constraints that specify the sequence in which tasks and containers are executed and the conditions that must be satisfied to run the next task or container in the control flow.
- A data flow consists of sources that extract data, transformations that modify data, and the destinations that load the data into data stores.

Overview of SSIS Development

- To connect to the data stores, a package uses connection managers. The connection managers are defined when you create the package. From the definition, the Integration Services runtime creates a connection at run time.
- When you construct a package, you configure properties of the connection managers, control flow and data flow items in the package, as well as the package itself..

Overview of SSIS Development

- Frequently, a package must be configured differently for each environment to which you deploy it.
- For example, the connection string of connection managers may require updating to specify a different server, the location, the location of the data sources it accesses may change, and so forth.

Overview of SSIS Development

- Integration Services provides package configurations to support this common scenario. Package configurations make it possible to dynamically update properties at run time.
- A configuration is a name/value pair that maps a property and a value.

Overview of SSIS Development

- The configurations are stored outside the package in XML files, Database Engine tables, variables, or Registry entries.
- When the package is run the value from the configuration replaces the value of the mapped-to property within the package. The values of the properties are not changed permanently.

Overview of SSIS Development

- **You can set property values of packages and package objects in two different ways:** directly by setting the value of each property, or indirectly by using property expressions.
- An expression, mapped to a property, is called a property expression.

Overview of SSIS Development

- You build property expressions by using the operators and functions that the Integration Services expression language provides variables.
- When the package is validated, which occurs when you save the package, the evaluation results of the property expressions replace the original values of properties.

Overview of SSIS Development

- A data source is a connection reference that you create and save outside a package, and then use as a source is a connection managers to a package.
- A data source represents a simple connection to a data store and therefore makes all tables and views in the data store available to the package.

Overview of SSIS Development

- A data source view is built on a data source.
- It can contain only selected database objects and it can be extended with calculated columns that are populated by custom expressions, new relationships between tables, and queries.

Overview of SSIS Development

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- In Integration Services, data sources and data source views are saved within the package definitions of the packages in which they are used.

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To deploy a project to the Integration Services Server:

- Open the project in Visual Studio, and then From the Project menu, select Deploy to launch the Integration Services Deployment Wizard.

OR

- In SQL Server Management Studio, expand the Integration Services > SSISDB node in Object Explorer, and locate the Projects folder for the project you want to deploy. Right-click the Projects folder, and then click Deploy Project.

To deploy a project to the Integration Services Server:

■ OR

- Click Integration Services catalog to select a project that has already been deployed to the SSISDB catalog.
 - Complete the wizard.

Deploy Packages to Integration Services Server

- The Incremental Package Deployment feature introduced in SQL Server 2016 Integration Services (SSIS) lets you deploy one or more packages to an existing or new project without deploying the whole project.
- Deploy packages by using the Integration Services Deployment Wizard.

Deploy Packages to Integration Services Server

- On the Select Source page, switch to Package Deployment model. Then, select the folder which contains source packages and configure the packages.
- Complete the wizard. Follow the remaining steps described in Package Deployment Model.
- Deploy packages by using SQL Server Management Studio.

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Planning SSIS Package Execution :

- Use the Execute Package Utility to run Integration Services packages.
- The utility runs packages that are stored in one of three locations:
 - Microsoft SQL server database,
 - The SSIS package store, and
 - The file system.
- This user interface, which can be opened from SQL package, store and the file system.

Planning SSIS Package Execution :

- This user interface, which can be opened from SQL Server Management Studio or by typing **dtexecui** at the command prompt, is an alternative to running packages by using the **DTExec** command prompt tool.
- Packages execute in the same process as the **dtexecui.exe** utility.
- Because this utility is a 32-bit tool, package run by using **dtexecui.exe**

Planning SSIS Package Execution :

- In a 64-bit computer, you should test the command in 64-bit mode by using the 64-bit version of **dtexec.exe** before deploying or scheduling the commands on a server.
- The Execute Package Utility is a graphical user interface for the **DTEXec** command prompt tool.
- The user interface makes it easy to configure options and it automatically assembles the command line that is passed to the **DTEXec** command prompt tool when you run the package from the specified options.

Planning SSIS Package Execution :

- The **Execute Package Utility** can also be used to assemble command lines that you use when running **DTEXEC** directly.

- **To open Execute Package Utility in SQL Server Management Studio**

1. In SQL Server Management Studio, on the **View** menu, click **Object Explorer**.

Planning SSIS Package Execution :

2. In Object Explorer, click Connect, and then click Integration Services.
3. In the Connect to Server dialog box, enter the server name in the Server name list, and then click Connect.
4. Expand the Stored Packages folder and subfolders. Right - click the package you want to run, and then click Run Package.

Introduction to Business Intelligence

- What is Business Intelligence?
 - Business Intelligence is the set of processes, technologies, and tools that help an organization to transform raw data into meaningful and useful information for business analysis. It is used to identify business needs and determining solutions to business problems.

Introduction to Business Intelligence

- **What is the need for Business Intelligence?**
- Below are some of the major benefits of Business Intelligence in any Organization.
 - Get deeper insights in business operations, Identifying new opportunities and implementing an effective strategy based on insights can provide businesses with a competitive market advantage and long – term stability.

Introduction to Business Intelligence

- ❑ Business Intelligence Provides historical, current and predictive views of business operations.
- ❑ Sales and marketing – Understanding the profitability of customer segments and answers to valuable questions like,
 - Which type of customers should an Organization target?
 - Which are my most profitable campaigns per region?

Introduction to Business Intelligence

- What is the most profitable source of sales leads and how has that changed over time?
- Improve Productivity and efficiency
- Informed decision making
- Improve Customer Service and satisfaction
- Streamline budgeting and planning
- Financial decisions based on results for important questions like
- What is the full cost of new products?

Introduction to Business Intelligence

- Common Functions of Business Intelligence are :
 - ❑ Reporting
 - ❑ OLAP (Online Analytical Processing)
 - ❑ Data Mining
 - ❑ Process mining
 - ❑ Complex event processing
 - ❑ Business performance management
 - ❑ Text mining, predictive analytics and prescriptive analytics.

Introduction to Business Intelligence

■ Stages of BI

- There are five stages of BI.

- **Data Sourcing**

- Defining the data to be loaded into the system.

- Usually BI applications gather data from a data warehouse.

- **ETL**

- Extracting the source data and transforming per business rules and loading into the Data Warehouses.

Introduction to Business Intelligence

- **Data Warehousing :**
 - Storing transformed data into various Data warehouses types and making it available for business analysis.
- **Data Analysis :**
 - Applying various techniques like data mining, text mining, process mining to identify trends and patterns in business operations.

Introduction to Business Intelligence

- **Decision Making :**
 - Based on the reports, dashboards and alerts from previous stage, making valuable business decisions and bench marking future growth.

Introduction to Reporting

- This approach is oriented to those users who need to have regular access to the information in an almost static way.
- For Example,
 - Suppose a local health authority must send to its state offices monthly reports summing up information on patient admission costs.
 - The layout of those reports has been predetermined and may vary only if changes are applied to current laws and regulations..

Introduction to Reporting

- ❑ Designers issue the queries to create reports with the desired layout and “freeze” all those in an application. In this way, end users can query current data where they need to.
- ❑ A report is defined by a query and a layout. A query generally implies a restriction and an aggregation of multidimensional data.

Introduction to Reporting

- For Example,
 - You can look for the monthly receipts during the last quarter for every product category. A layout can look like a table or a chart (like, diagrams, histograms, pies, and so on).
- A reporting tool should be evaluated not only on the basis of comprehensive report layouts, but also on the basis of flexible report delivery systems.

Introduction to Reporting

- ❑ A report can be explicitly run by users or automatically and regularly sent to registered end users.
- ❑ For example,
 - These types of reports can be sent by e-mails.
- ❑ Always keep in mind, that reports existed long before data warehouse system came to be reports have always been the main tool used by managers for evaluating and planning tasks since the invention of databases.

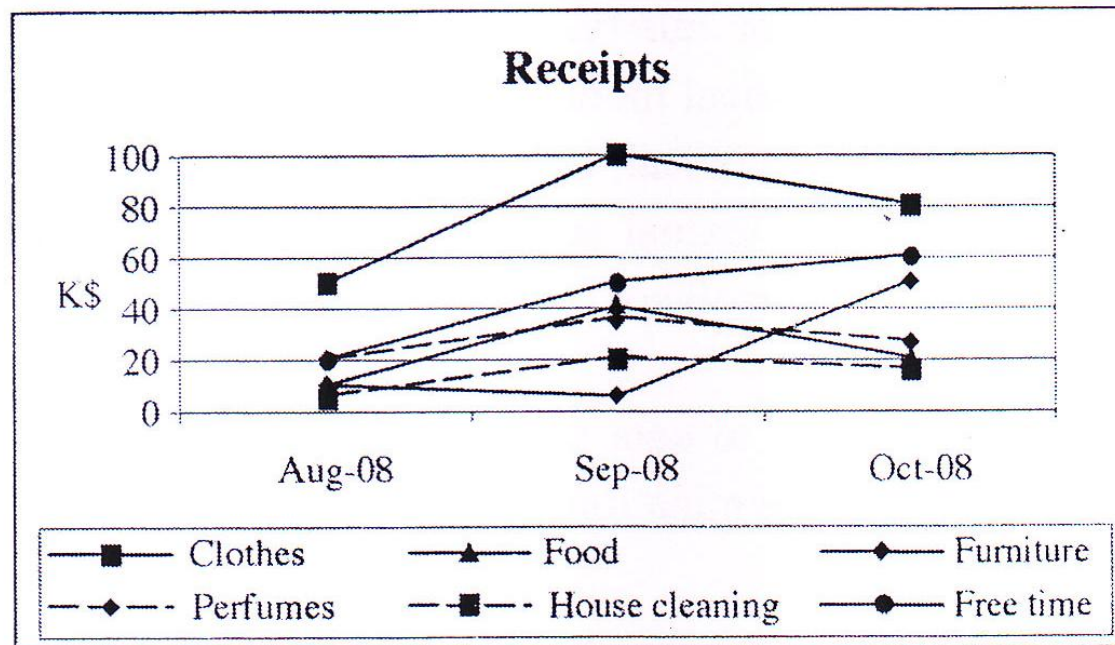
Introduction to Reporting

- However , adding data warehouses to the mix is beneficial to reports for two main reasons :
 - First : They take advantages of reliable and correct results because the data summed up in reports are consistent and integrated.
- In addition, data warehouses expedite the reporting process because the architectural separation between transaction processing and analyses significantly improves performance.

Introduction to Reporting

- Sample of Data warehouse report.

Receipts (K\$)	Oct. 2008	Sep. 2008	Aug. 2008
Clothes	80	100	50
Food	20	40	10
Furniture	50	5	10
Perfumes	25	35	20
House cleaning	15	20	5
Free time	60	50	20



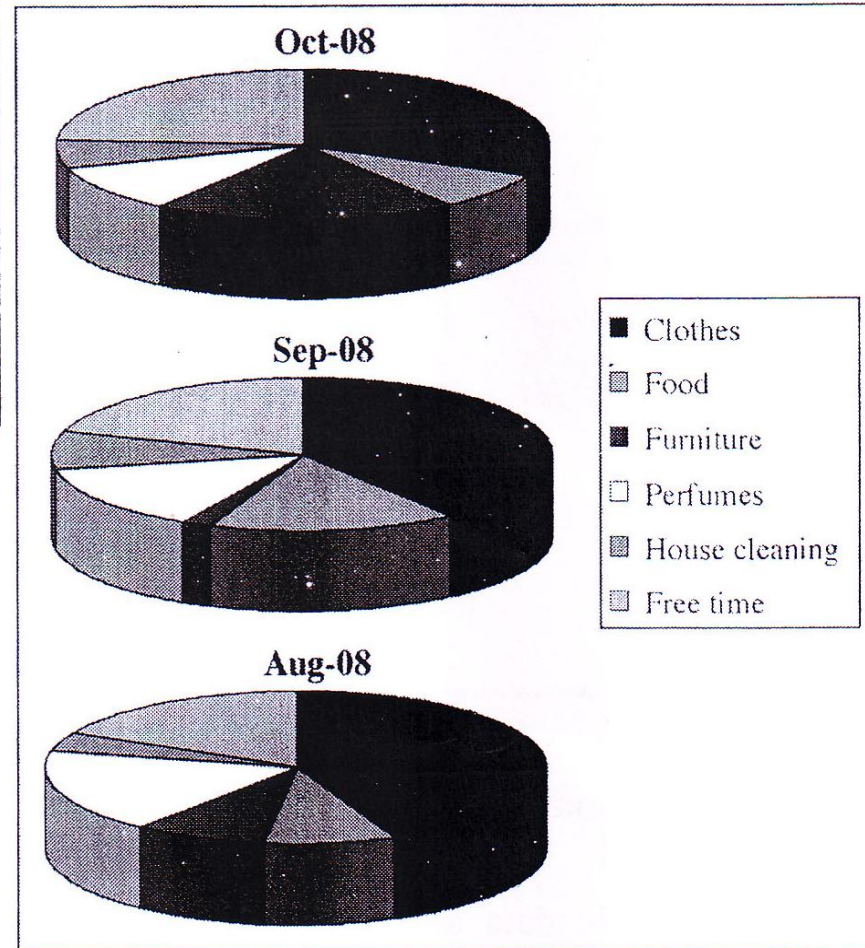
**LINE
Chart**

Introduction to Reporting

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3D Pie Chart



Introduction to Data Analysis :

- Data analysis is a process of inspecting, cleansing, transforming, and modeling data with the goal of discovering useful information, informing conclusions, and supporting decision – making.
- Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, while being used in different business, science, and social science domains.

Introduction to Data Analysis :

- In today's business, data analysis is playing a role in making decisions more scientific and helping the business achieve effective operation.
- Data mining is particular data analysis technique that focuses on modeling and knowledge discovery for predictive rather than purely descriptive purposes, while business intelligence covers data analysis that relies heavily on aggregation, focusing mainly on business information.

Introduction to Data Analysis :

- In statistical applications, data analysis can be divided into descriptive statistics,
 - Exploratory data analysis (EDA), and
 - Confirmatory data analysis (CDA).
- EDA focuses on discovering new features in the data while CDA focuses on confirming or falsifying (ખોટી વાત) existing hypotheses (પૂર્વધારણા).

Introduction to Data Analysis :

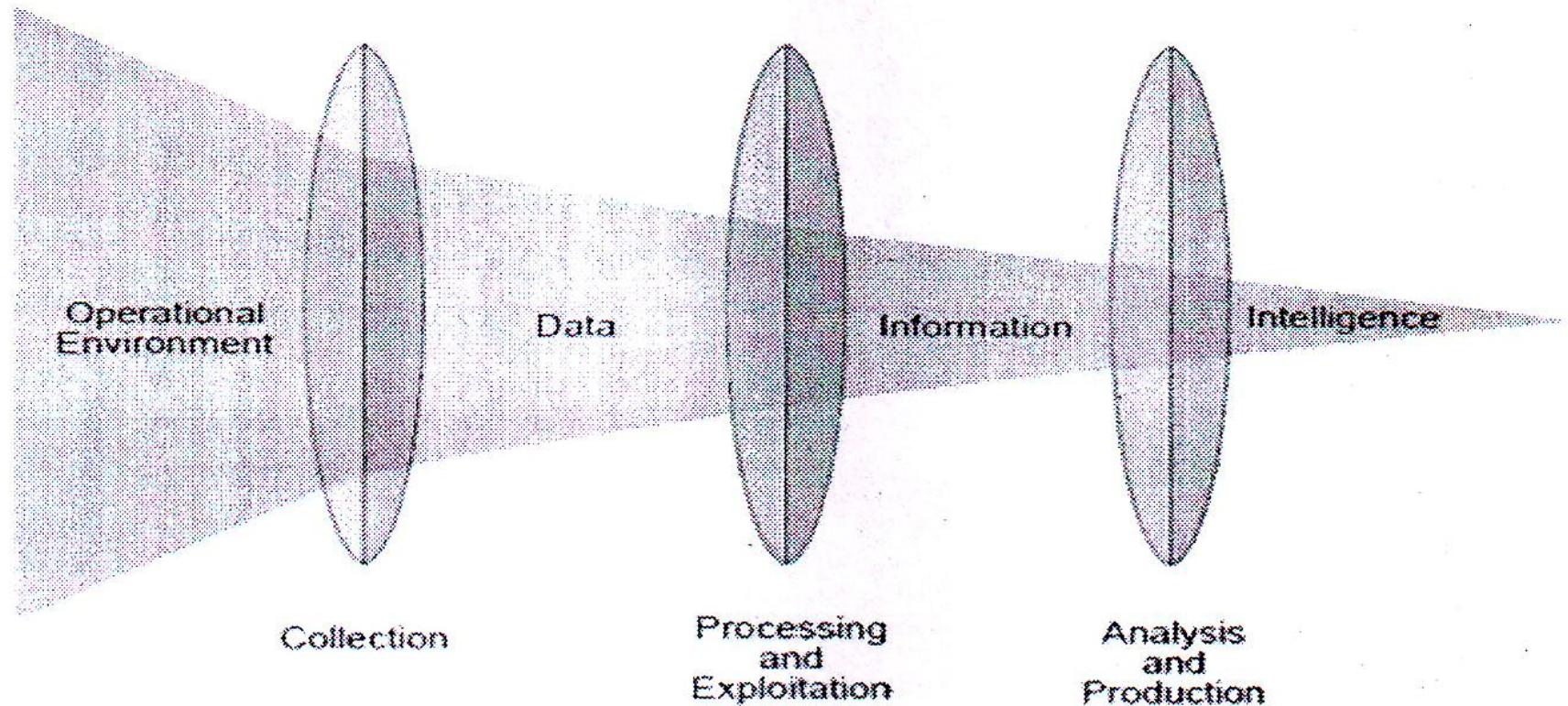
- Predictive analytics focuses on application of statistical, linguistic, and structural techniques to extract and classify information from textual sources, a species of unstructured data.
- All of the above are varieties of data analysis.

Introduction to Data Analysis :

- Data integration is a precursor (पुरोगामी) to data analysis, and data analysis is closely linked to data visualization and data dissemination (प्रसारण).
- The term data analysis is sometimes used as a synonym for data modeling.

Introduction to Data Analysis :

- Relationship of Data, Information and Intelligence



Financial Data Analysis

- The financial data in banking and financial industry is generally reliable and of high quality.
- Which facilitates the systematic data analysis and data mining.
- Here are the few typical cases:
 - Design and construction of data warehouses for multidimensional data analysis and data mining.
 - Loan payment prediction and customer credit policy analysis.

Financial Data Analysis

- ❑ Classification and clustering of customers for targeted marketing.
- ❑ Detection of money laundering and other financial crimes