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Updates:

Database Programming with PL/SQL

1-2
Benefits of PL/SQL

ORACLE ACADEMY

Objectives

This lesson covers the following objectives:

- List and explain the benefits of PL/SQL
- List the differences between PL/SQL and other programming languages
- Give examples of how to use PL/SQL in other Oracle products

Purpose

- PL/SQL is a programming language suitable for several tasks involving an Oracle database.
- In this lesson, you learn about the benefits of the PL/SQL programming language and how it compares to other programming languages.
- You also learn how PL/SQL relates to other Oracle products.

Benefits of PL/SQL

There are many benefits to using the PL/SQL programming language with an Oracle database.

- Integration of procedural constructs with SQL
- Modularized program development
- Improved performance
- Integration with Oracle tools
- Portability
- Exception handling

All of these benefits have a major impact on why PL/SQL was developed and how it is used.

Benefit 1: Integration of Procedural Constructs With SQL

The primary advantage of PL/SQL is the integration of procedural constructs with SQL.

- SQL is a nonprocedural language. When you issue an SQL command, your command tells the database server what to do. However, you cannot specify how to do it or how often to do it.
- PL/SQL integrates control statements and conditional statements with SQL. This gives you better control of your SQL statements and their execution.

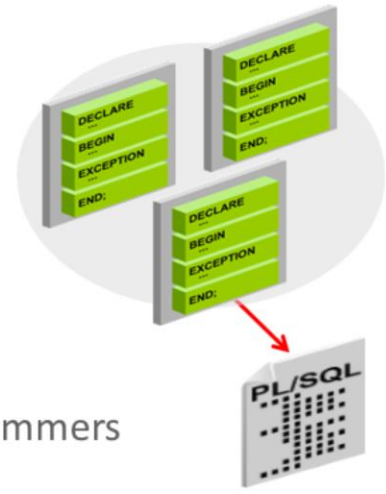
Integration is a fantastic process. You can get your data to accomplish all types of tasks that are needed for businesses.

Benefit 2: Modularized Program Development

- The basic unit in a PL/SQL program is a block. All PL/SQL programs consist of blocks.
- You can think of these blocks as modules and you can "modularize" these blocks in a sequence, or nest them in other blocks.

Good programming practice uses modular programs to break program control into sections that may be easier to understand and maintain.

Benefit 2: Modularized Program Development

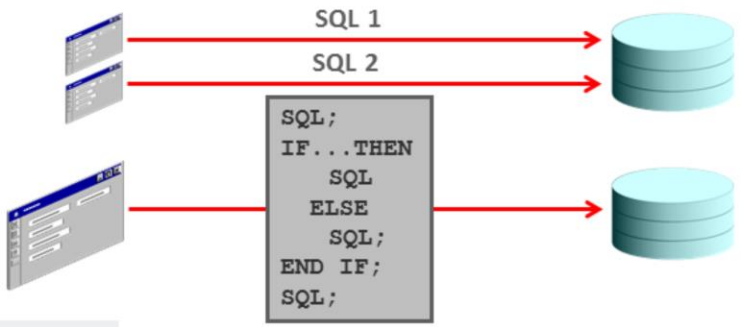


Modularized program advantages:

- You can group logically related statements within blocks.
- You can nest blocks inside other blocks to build powerful programs.
- You can share blocks with other programmers to speed up development time.
- PL/SQL allows you to break down a complex application into smaller, more manageable, and logically related modules increasing ease of maintenance and debugging.

Benefit 3: Improved Performance

- PL/SQL allows you to logically combine multiple SQL statements as one unit or block.
- The application can send the entire block to the database instead of sending the SQL statements one at a time.
- This significantly reduces the number of database calls.



Sending blocks of code to the database, instead of separate lines of SQL code, makes the program process faster.

The following features also result in improved performance:

PL/SQL variables store data in the same internal binary format as the database does, so no data conversion is needed.

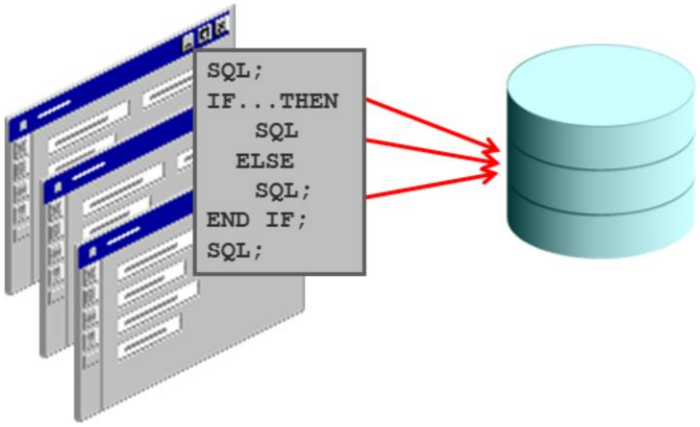
PL/SQL is executed in the same memory space as the Oracle server and therefore there is no communications overhead between the two programs.

PL/SQL functions can be called directly from SQL.

A special kind of PL/SQL procedure, called a trigger, can execute automatically whenever something important happens in the database.

Benefit 4: Integration With Oracle Tools

PL/SQL is integrated in Oracle tools, such as Oracle Forms Developer, Oracle Report Builder, and Application Express.



Oracle has tools for various tasks and PL/SQL is integrated into these tools.

Benefit 5: Portability

- PL/SQL programs can run anywhere an Oracle server runs, regardless of the operating system and the platform.
- PL/SQL programs do not need to be tailored for different operating systems and platforms.

Benefit 5: Portability

- You can write portable program packages and create libraries that can be reused on Oracle databases in different environments.
- You can even anticipate those differences and establish instructions to run a specific way given a specific environment.

Linux

HP Tru64

IBM z/OS

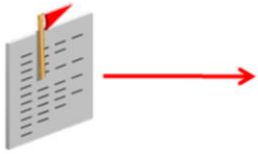
Solaris

Benefit 6: Exception Handling

- An exception is an error that occurs when accessing a database.
- Examples of exceptions include:
  - hardware or network failures
  - application logic errors
  - data integrity errors, and so on.
- You can prepare for these errors by writing exception handling code.
- Exception handling code tells your application what to do in the event of an exception.

Benefit 6: Exception Handling

- PL/SQL allows you to handle database and program exceptions efficiently.
- You can define separate blocks for dealing with exceptions.



If no data is found then…
If too many rows are found then…
If an invalid number is calculated then…

- In this way, your application can handle the error, communicating the problem to the user, without causing a system crash.

PL/SQL Compared to Other Languages

	PL/SQL	C	Java
Requires Oracle database or tool	Yes	No	No
Object-oriented	Some features	No	Yes
Performance against an Oracle database	Very efficient	Less efficient	Less efficient
Portable to different operating systems	Yes	Somewhat	Yes
Ease of learning	Relatively easy	More difficult	More difficult

PL/SQL requires an Oracle database or tool. You cannot create a PL/SQL program that runs all by itself. C and Java programs do not require an Oracle database to run or compile. You can develop standalone programs using Java and C.

PL/SQL has included some object-oriented features such as abstract data types, multi-level collections, encapsulation, function overloading, and inheritance. Java is an object-oriented programming language and C is not.

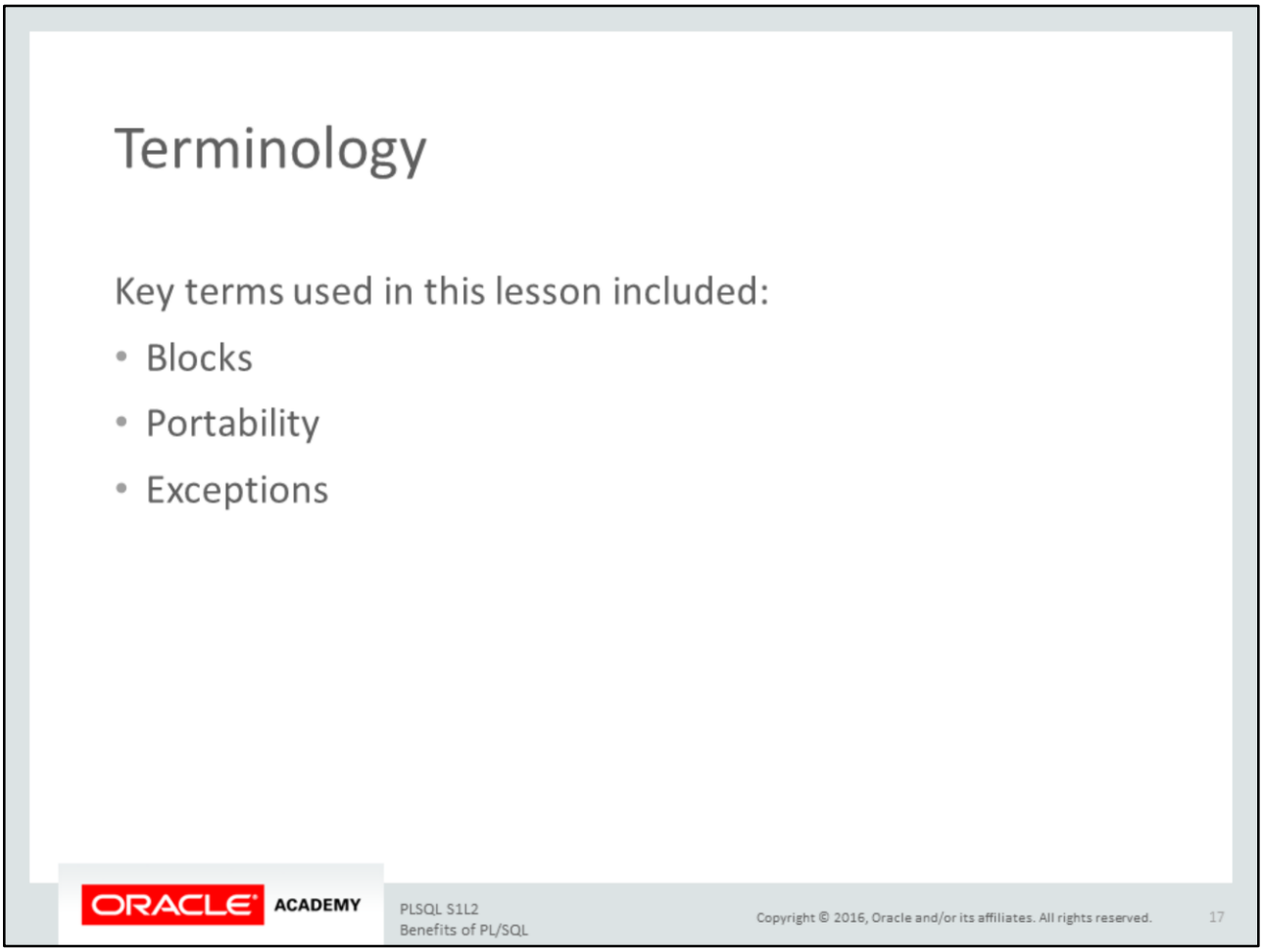
PL/SQL is tightly integrated with an Oracle database and is therefore highly efficient when accessing data. Java and C are less efficient because they are not as integrated with the database.

PL/SQL is compatible with Oracle databases on different operating systems. Java also is highly portable. Different C compilers and libraries are not 100% compatible on different operating systems.

PL/SQL is relatively easy to learn in relation to Java and C.

PL/SQL in Oracle Products

Oracle Product	PL/SQL
ORACLE DATABASE 11g	You can write PL/SQL code to manage application data or to manage the Oracle database itself. For example, you can write code for updating data (DML), creating data (DDL), generating reports, managing security, and so on.
ORACLE APPLICATION SERVER 10g	Using the Web Application Toolkit, you can create database-centric web applications written entirely or partially in PL/SQL.
ORACLE DEVELOPER SUITE 10g	Using Forms Builder and Reports Developer, Oracle's client-side developer tools, you can build database-centric web applications and reports that include PL/SQL.
ORACLE Application Express	Using a Web browser you can develop web applications that include PL/SQL.



Blocks – The basic unit of PL/SQL programs; also known as modules.

Portability – The ability for PL/SQL programs to run anywhere an Oracle server runs.

Exceptions – An error that occurs in the database or in a user's program during runtime.

Summary

In this lesson, you should have learned how to:

- List and explain the benefits of PL/SQL
- List differences between PL/SQL and other programming languages
- Give examples of how to use PL/SQL in other Oracle products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