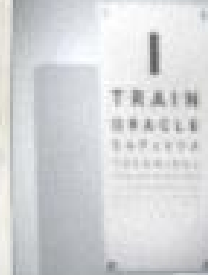




**iTrain, moving
with Technology**



iTrain Education



Fulfilling your Vision



Passionate about iT



**The Complete
ERP Solution**

Harnessing 10g Web PL/SQL

Presented By
Selwyn Stephen
iTrain Education

Harnessing 10g Web PL/SQL

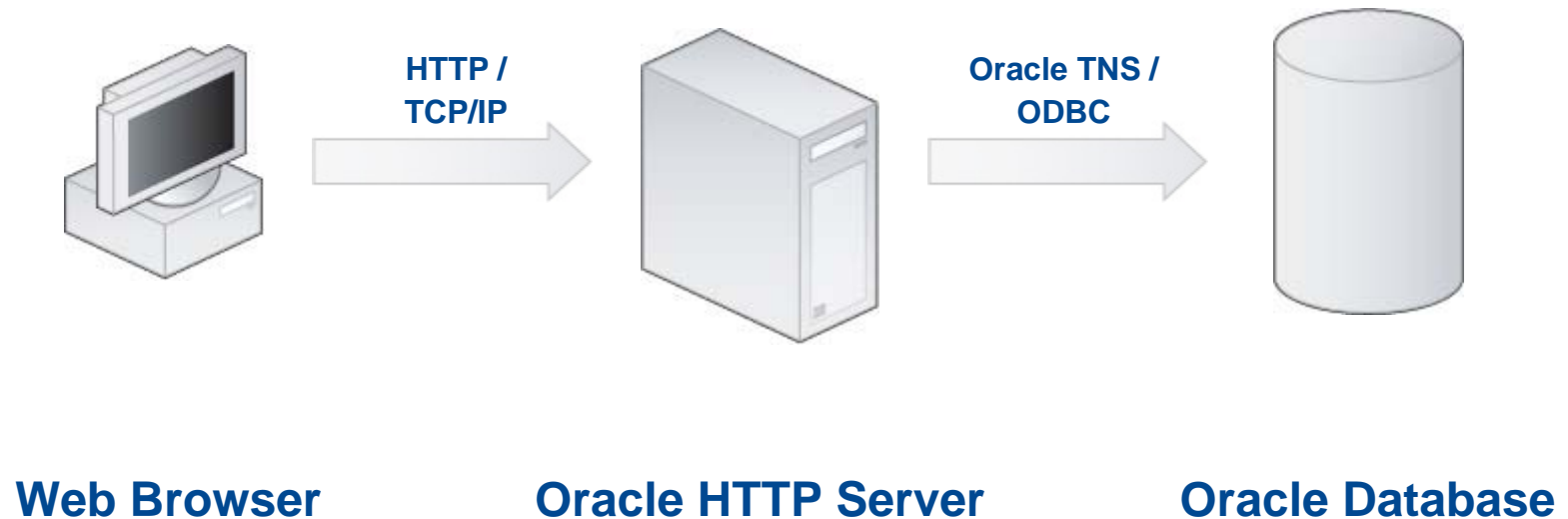
Introduction

- Web PL/SQL Architecture
- MOD_PLSQL
- Web PL/SQL Development Techniques
- Tuning Web PL/SQL Applications
- Security

Web PL/SQL Architecture

Web PL/SQL Architecture

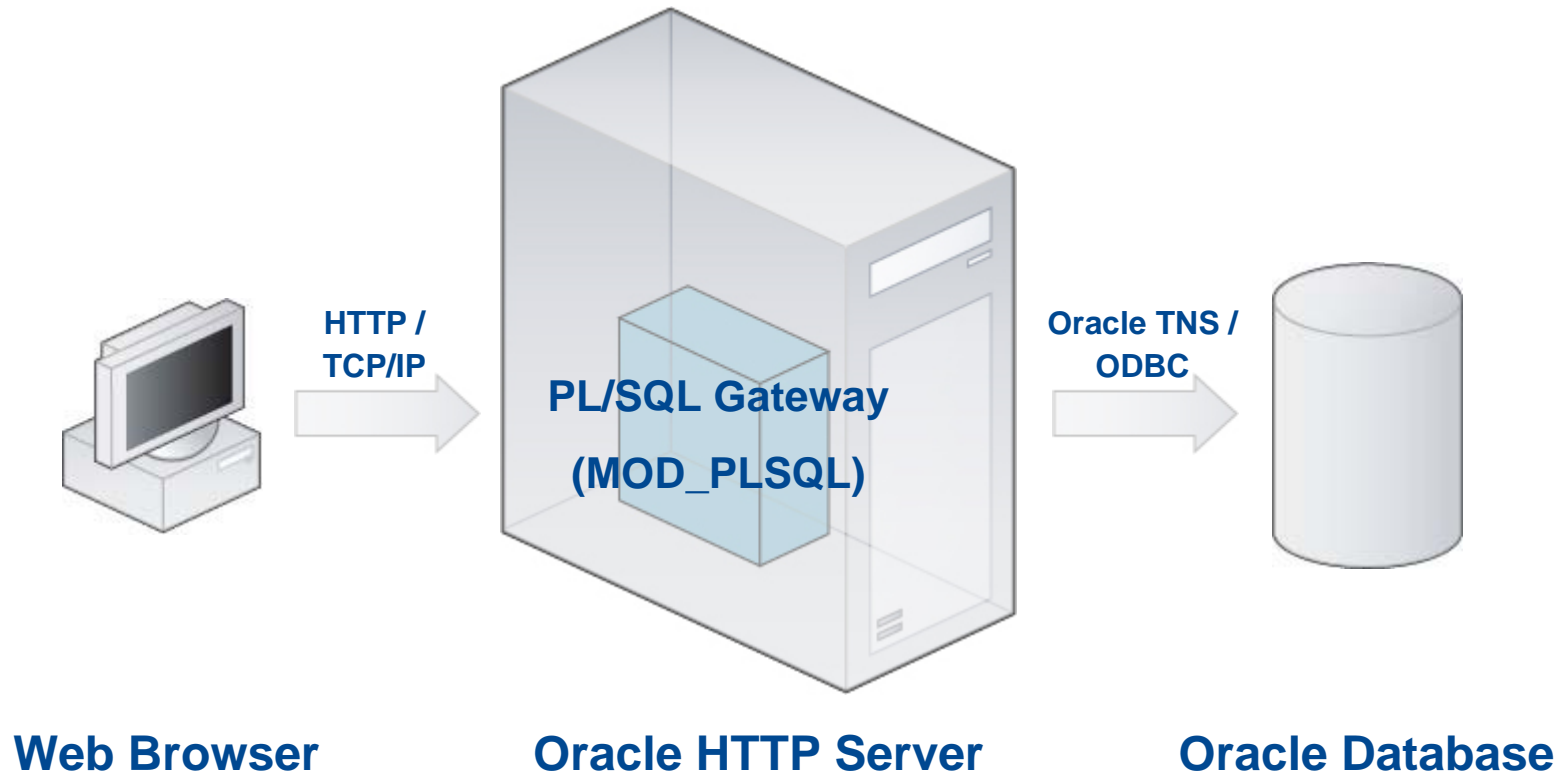
- A Client Web Browser
- A Web Server (Oracle HTTP Server)
- A Database Server



Web PL/SQL Architecture

PL/SQL Gateway

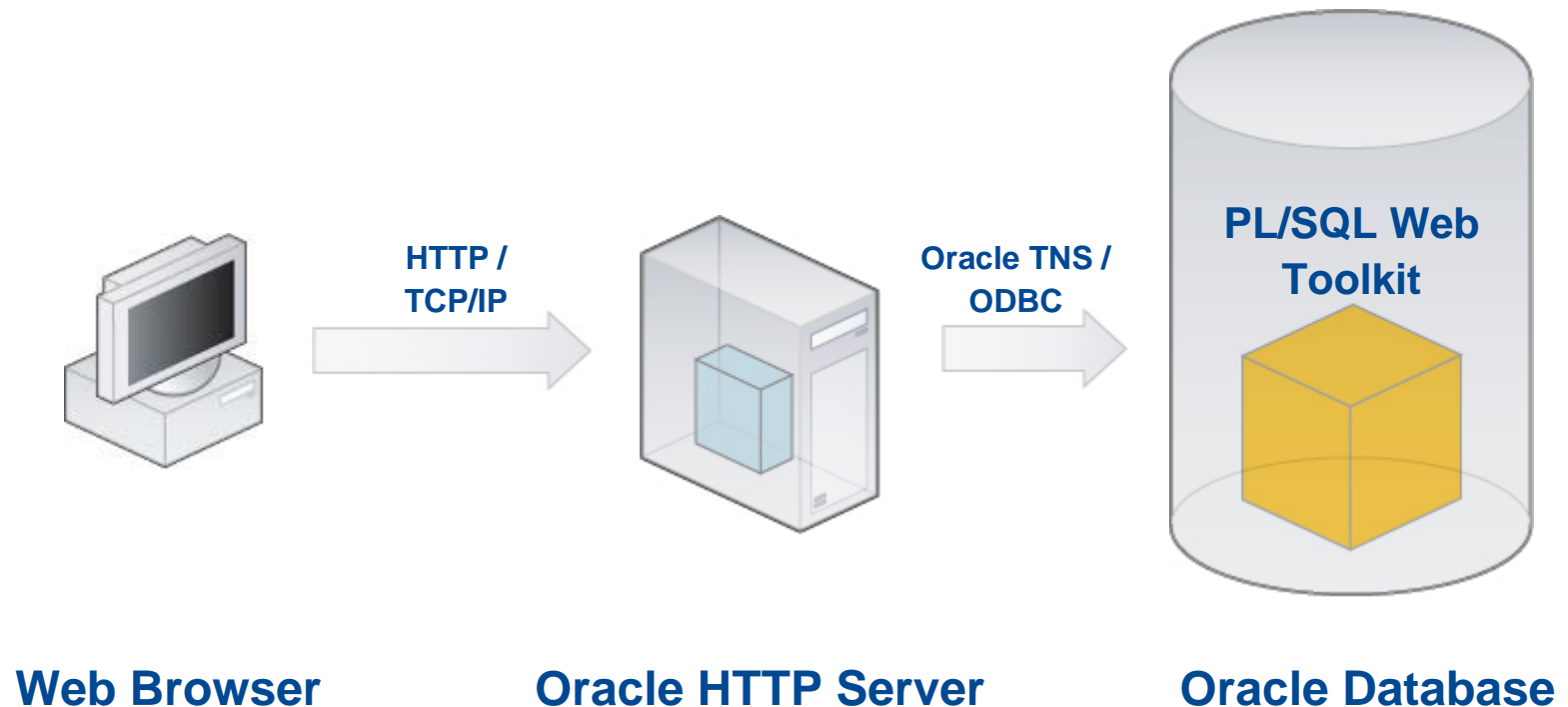
- The mechanism by which PL/SQL stored program units can process specific HTTP requests and responses through a web browser URL



Web PL/SQL Architecture

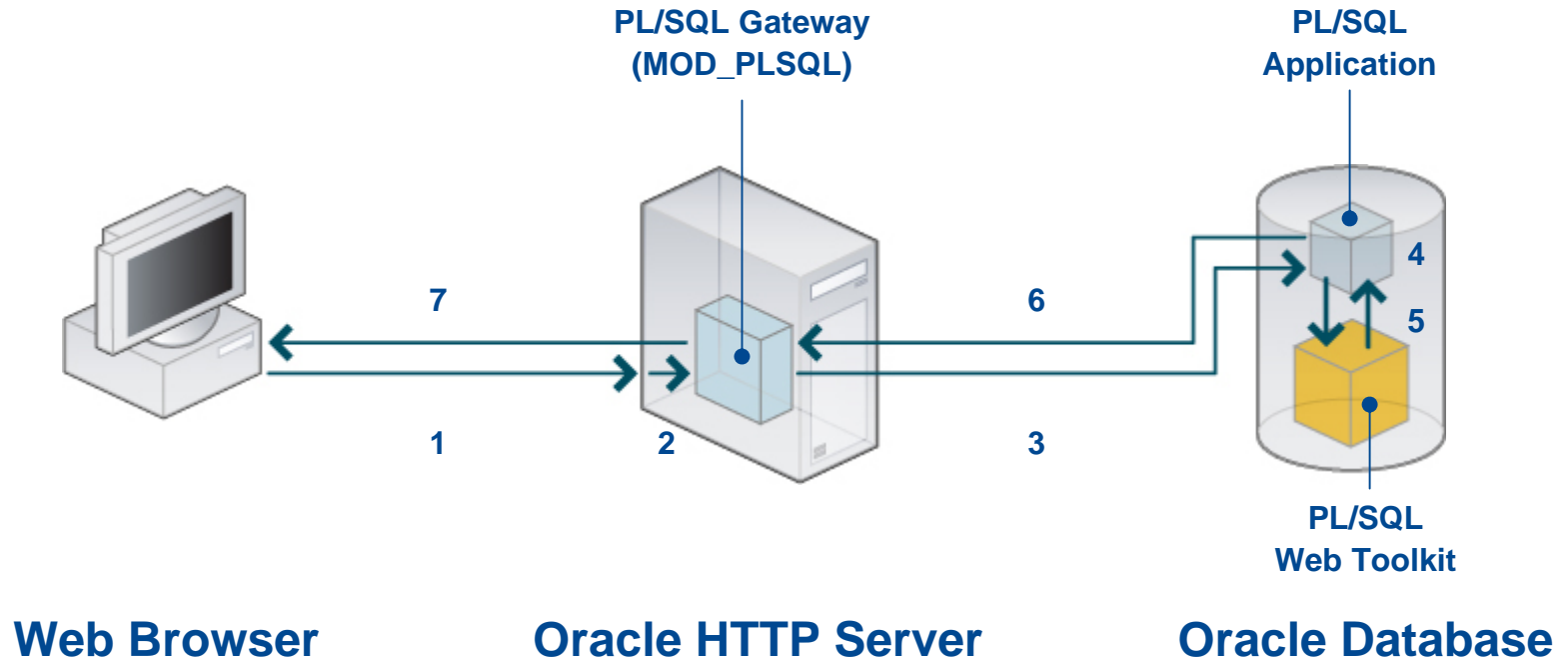
PL/SQL Web Toolkit

- A set of SYS owned PL/SQL packages stored in the database that allow the development of web PL/SQL applications



Web PL/SQL Architecture

Processing Client Requests



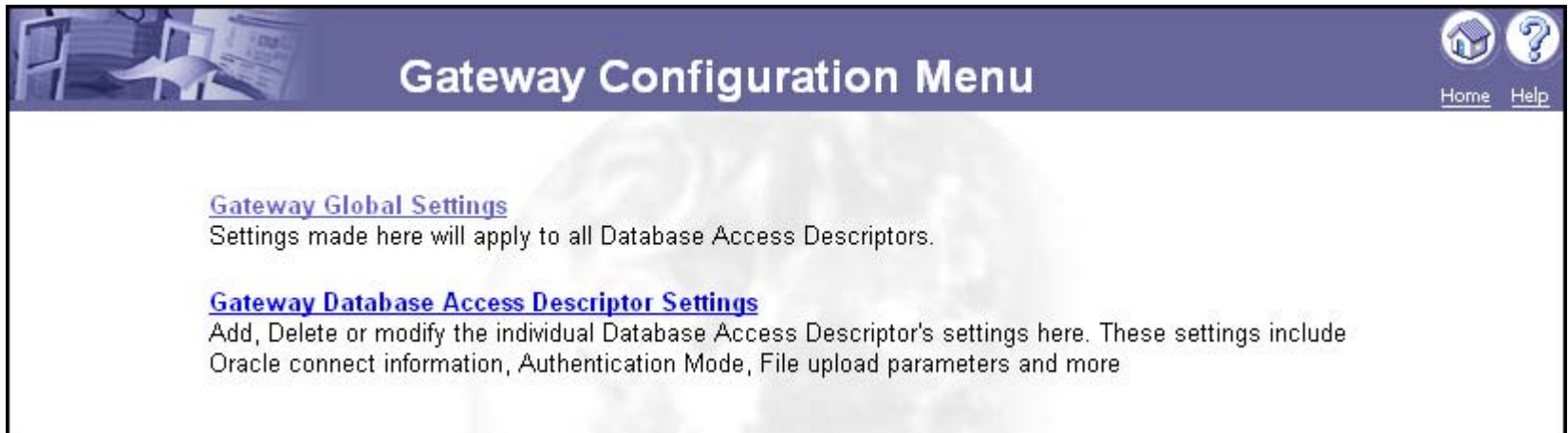


MOD_PLSQL

MOD_PLSQL

Database Access Descriptors (DAD)

- A MOD_PLSQL request uses a virtual path containing a Database Access Descriptor (DAD) which locates the correct PL/SQL stored program unit to execute
- DAD creation is done within the Gateway Configuration Menu which is accessed through a web browser
http://servername:7778/pls/admin_/



The screenshot shows a web browser window with a dark blue header. On the left, there is a small image of a computer workstation. The header text reads "Gateway Configuration Menu". On the right side of the header, there are two circular icons: a house icon labeled "Home" and a question mark icon labeled "Help". Below the header, the main content area is white and contains two sections of text. The first section is titled "[Gateway Global Settings](#)" and states "Settings made here will apply to all Database Access Descriptors." The second section is titled "[Gateway Database Access Descriptor Settings](#)" and states "Add, Delete or modify the individual Database Access Descriptor's settings here. These settings include Oracle connect information, Authentication Mode, File upload parameters and more".

MOD_PLSQL

Database Access Descriptors (DAD)

When adding a default DAD (blank configuration) the following simple Information is required:

- Database Access Descriptor Name
- Schema Name
- Oracle User Name
- Oracle Password
- Oracle Connect String
- Authentication Mode

MOD_PLSQL

Invoking MOD_PLSQL

An example URL:

[http:// www.itraineducation.co.uk / pls / training-courses / uk_training.home](http://www.itraineducation.co.uk/pls/training-courses/uk_training.home)



Protocol



Server Address



Virtual Path contains
PL/SQL Gateway (pls)
and DAD name



Program Unit

A virtual path is referenced within the URL when invoking web PL/SQL pages and is often indicated by *pls/dadname* and can be changed within the DAD configuration file located within:

- ORACLE_HOME / Apache / modplsql / conf / dads.conf



Web PL/SQL Development Techniques

Web PL/SQL Development Techniques

PL/SQL Web Toolkit



iTrain Education
Connecting People with
Business and Technology

- PL/SQL Web Toolkit
 - Provides PL/SQL developers with a comfortable platform to develop web applications
 - Stored program units created directly within the database with only basic HTML knowledge required

Web PL/SQL Development Techniques

PL/SQL Web Toolkit Packages

- HTP
 - Generates standard HTML tags
- OWA_CACHE
 - Enables PL/SQL Gateway cache feature
- OWA_COOKIE
 - Allows sending, retrieving and deleting of HTTP cookies
- OWA_UTIL
 - Utilities to handle HTTP headers, correct date formats and dynamically generated SQL
- OWA_SEC
 - Provides an interface for custom authentication

Web PL/SQL Development Techniques

PL/SQL Web Toolkit



- For example, the following procedure will generate a basic web page:

```
CREATE OR REPLACE PROCEDURE web_page
AS
BEGIN
    HTP. HTMLOPEN;                <html >
    HTP. HEADOPEN;               <head>
    HTP. TITLE(' My Web Page' ); </ti tle></ti tle>
    HTP. HEADCLOSE;             </head>
    HTP. BODYOPEN;              <body>
    HTP. HEADER(1, ' Hello World' ); <h1></h1>
    HTP. BODYCLOSE;             </body>
    HTP. HTMLCLOSE;            </html >
END;
```



- The commonly used HTP.PRINT procedure can also be used to achieve the same output (its alias is HTP.P):

```
CREATE OR REPLACE PROCEDURE web_page2
AS
BEGIN
    HTP.P(' <html >
        <head>
        <ti tle>My Web Page</ti tle>
        </head>
        <body>
        <h1>Hel l o Worl d</h1>
        </body>
        </html >' );
END;
```

Web PL/SQL Development Techniques

PL/SQL Web Toolkit



- A simple data retrieval example:

```
CREATE OR REPLACE PROCEDURE empl_oyees
AS
    CURSOR c_empl_oyees IS
    SELECT *
    FROM empl_oyees;
BEGIN

    FOR i IN c_empl_oyees LOOP
        HTP.P(i.first_name || ' ' || i.surname || ' <br/>');
    END LOOP;

END;
```

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)



iTrain Education
Connecting People with
Business and Technology

- PL/SQL Server Pages (PSP)
 - Allows HTML developers to develop web application UI to be embedded with PL/SQL scripts (scriptlets)
 - PSP file (.psp) contains standard HTML tags alongside PSP directives, declarations and scriptlets.
 - loadpsp utility is used to compile into stored procedure

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)

- Directives
 - Programming language
 - Name of procedure

```
<%@ page language="PL/SQL" %>
```

```
<%@ pl sql procedure="employees_psp" %>
```

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)

- Declaratives
 - Similar to the declaration section of a PL/SQL block of code

<%!

```
CURSOR c_employees IS  
SELECT *  
FROM employees;
```

```
v_firstname employees.firstname%type;  
v_surname employees.surname%type;
```

%>

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)

- Code Block (Scriptlet)

- Any executable code terminated with a semi-colon

```
<% FOR i IN c_employees LOOP %>
```

```
<% END LOOP; %>
```

- Expression Block

- A single PL/SQL expression resulting in a string.

```
<%= i . firstname %>&nbsp;   <%= i . surname %><br/>
```

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)



iTrain Education
Connecting People with
Business and Technology

```
<%@ page language="PL/SQL" %>
<%@ pl sql procedure="employees_psp" %>
<%!
    CURSOR c_employees IS
    SELECT *
    FROM employees;
%>
<html >
<head>
<title>Employees</title>
<body>
<% FOR i IN c_employees LOOP %>
<%= i.first_name %>&nbsp;   <%= i.surname %><br/>
<% END LOOP; %>
</body>
</html >
```

- loadpsp is a command line utility which compiles the PSP file as a stored procedure within the database

loadpsp -replace -user user/password@connect_string psp_file_name

- -replace
 - Specifies 'create or replace' during procedure compilation
- -user
 - Username, password and optionally connect string for where the stored procedure is stored and executed
- psp_file_name
 - The name of the PSP file containing code for the web page

Web PL/SQL Development Techniques

PL/SQL Server Pages (PSP)



iTrain Education

Connecting People with
Business and Technology

```
CREATE OR REPLACE PROCEDURE empl oyees_psp  AS
  CURSOR c_empl oyees  IS
  SELECT *
  FROM  empl oyees;
BEGI N
  http. prn(' html >
  <head>
  <ti tle>Empl oyees</ti tle>
  <body>' );
  FOR i  IN c_empl oyees  LOOP
  http. prn( i. fi rstname );
  http. prn(' &nbsp;' );
  http. prn( i. surname );
  http. prn(' <br/>' );
  END LOOP;
  http. prn(' </body>
  </html >' );
END;
```

Web PL/SQL Development Techniques

PL/SQL Web Toolkit vs PL/SQL Server Pages

- PL/SQL Web Toolkit
 - Generate HTML pages from a stored program unit by using the HTP and OWA_* packages
 - Used for large amounts of PL/SQL which will generate formatted output
 - Can generate any type of stored program unit (package, procedure, function)
 - PL/SQL code with HTML embedded in it
- PL/SQL Server Pages
 - Used for large amounts of HTML which will include dynamic content generated from PL/SQL
 - Generates stored procedures only
 - HTML code with PL/SQL embedded in it

Tuning Web PL/SQL Applications

Tuning Web PL/SQL Applications

- PL/SQL tuning
- Connection Pooling
- PL/SQL Gateway Cache
 - Validation based cache
 - Expiry based cache

Security

Authentication Modes

- Basic authentication
 - This method is useful for public information within your web application. The user credentials for access to the database are stored within the DAD. The user is not required to log in.
 - Authentication is performed at the database level.

Security

- Custom authentication
 - Invokes a user defined authorisation function within the application
 - The authorisation function can be stored in different locations depending on the type of custom authentication required
 - Global OWA
 - Same authentication function for all users and procedures
 - Custom OWA
 - Different authentication function for each user and for all procedures

Summary

Summary

- Developing web PL/SQL applications incorporate the use of the PL/SQL Web Toolkit package
- The PL/SQL Web Toolkit can be used to create stored program units directly within the database.
- PL/SQL Server Pages allow the separation of dynamic content from presentation. The PSP file is loaded into the database for compilation
- Tuning web PL/SQL applications can be performed within the application or Oracle HTTP Server
- Configuring MOD_PLSQL security allows additional user authentication



iTrain Education
Connecting People with
Business and Technology

iTrain Education Stand 4

Selwyn Stephen