SAGE Computing Services

Consulting and customised training workshops

Best Practices in Apex Development

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Agenda

- Managing Workspaces
- Templates
- Where to put your code
- Security
- Documenting an Apex application
- Tips and techniques

Designing the Workspace Structure

Single workspace with lots of applications?

Multiple workspaces with small numbers of applications?

- Which developers will work on the applications?
- What schemas do the applications access?
- Do I need to subscribe to objects in a different application?

Recommendations on Naming Standards

Have Them

Naming Standards

- Keep default names for page items where possible, i.e. Pn_COLUMNNAME
- Additional display information use Pn_CONTENTNAME or Pn_CONTENTNAME_DISP
- Application items F_NAME or APP_NAME
- Meaningful name for Page Validations, e.g checkdates, validate_mandatory_items
- Meaningful name for Page Processes, e.g check _dependencies, clear_state, create_event
- Meaningful name for Application Processes, e.g app_check _dependencies, app_clear_state, app_create_event

Naming Standards

- Meaningful name for Page Computations, that indicates the item being set
- Meaningful name for Application Computations, that indicates the item being set, e.g set_surname, set_f_total, set_app_current_id, e.g set_surname, set_total
- Name Lists of Values for the information being fetched, e.g. ORGANISATIONS_LOV, or if the LOV is for a specific page, ORGANISATIONS_P415_LOV
- Use a standard alias for an application, e.g. TM for the timesheet, this can also be used as a prefix to the names of database packages
- Give each page an alias

Some Obvious Stuff

- Use the Wizards where possible
- Go with the product
- Do not hard code formatting attributes
- Never reference an application id

  http://server:port/pls/apex/f?p=TS:CAL:&SESSION.::::
- Do not change Oracle templates/stylesheets/JavaScript files
- Designate ranges of pages for functional areas of the application
- Number everything in increments > 1
- Generate DML using Object Browser

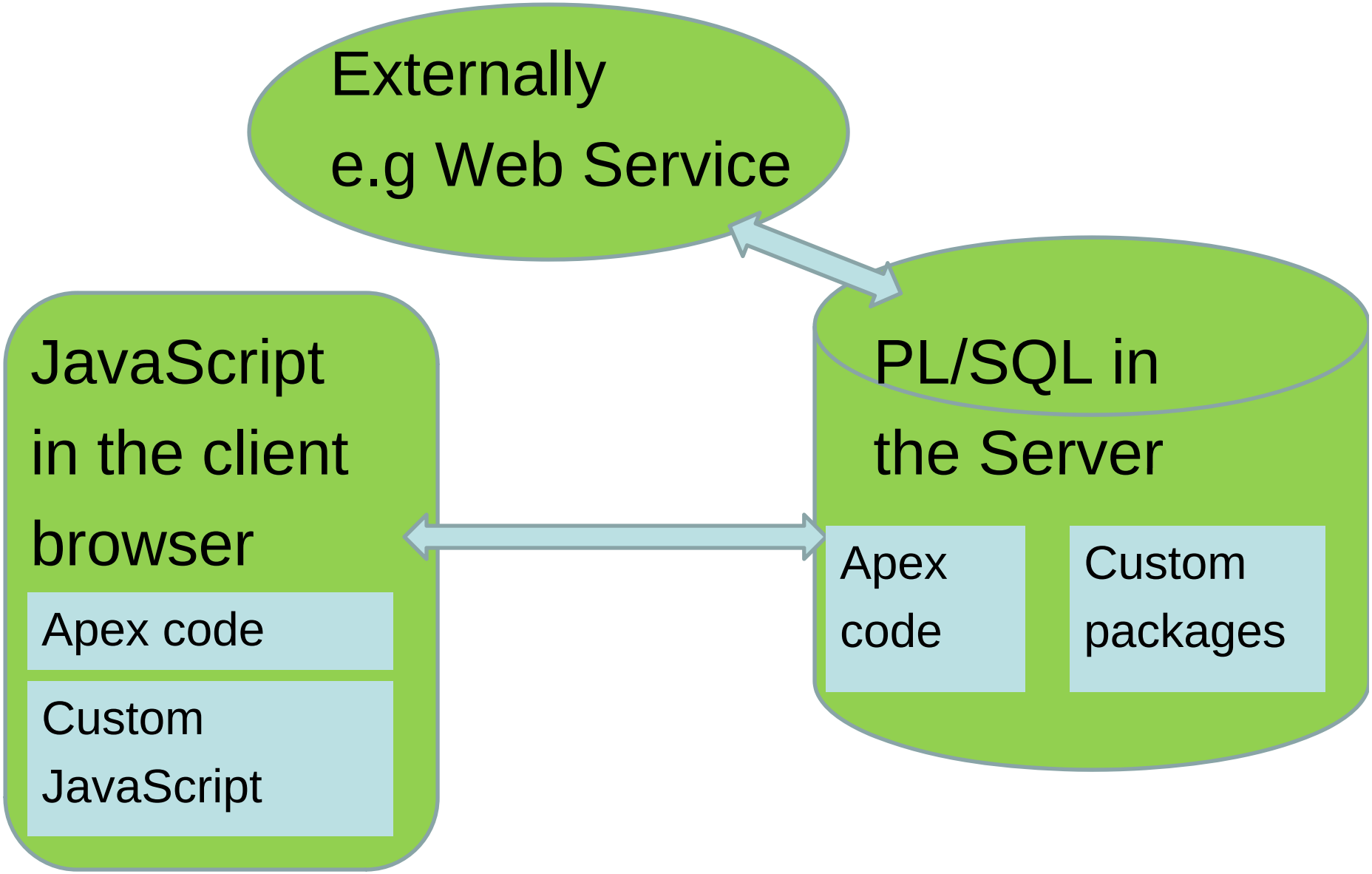
UI Defaults

- Define UI Defaults before creating any pages
- Initial creation only in 3.2
- Bi directional in 4.0

Where to Put your Code

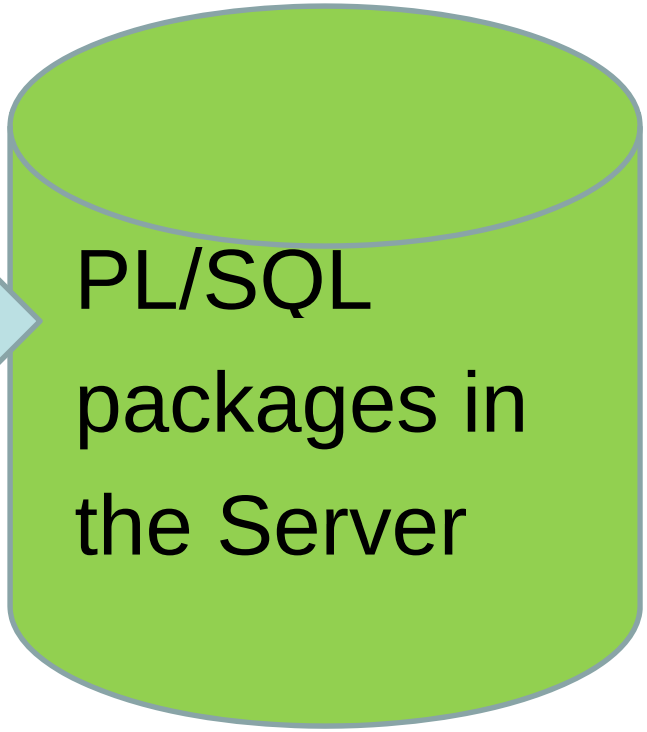
- In a central location where it can get maximum reuse
- In a location that makes application maintenance as easy as possible
- As close as possible to the location where the code will be executed

Where Code Will be Executed



Define in Database Packages

Any business logic that manipulates data in database tables



Wrong Approach

Process: 2 of 2 Name: submit_file

Show All | Name | Process Point | C

Name

Page: 19 Upload timesheet

* Name: submit_file

Type: PL/SQL anonymous block

Process Point

* Sequence: 10

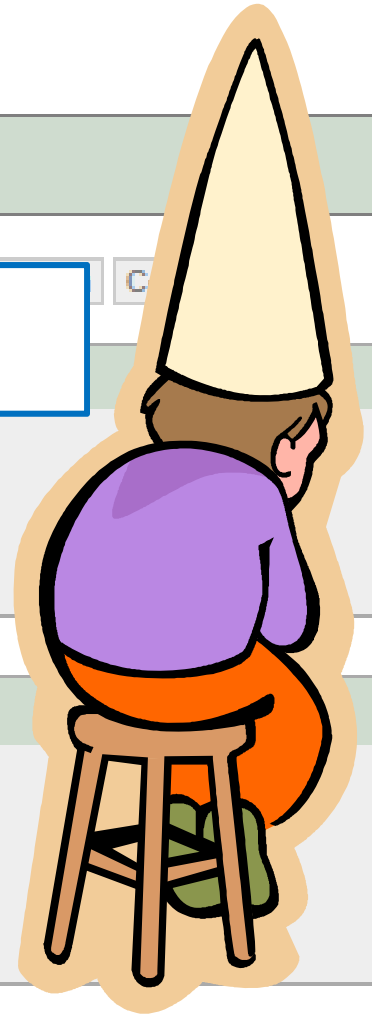
Process Point: On Submit - After Computations and Validations

Run Process: Once Per Page Visit (default)

Source

* Process [Download Source]

```
insert into employee_files
values (:P19_FILE_NAME,:P19_PAR_ID,:P19_COMMENTS);
```



Process: 2 of 2 Name: submit_file

Show All | Name | Process Point | Source | Messages | Conditions | Authorization | Configuration | Comments

Name

Page: 19 Upload timesheet

* Name: submit_file

Type: PL/SQL anonymous block

Right Approach

Process Point

* Sequence: 10

Process Point: On Submit - After Computations and Validations

Run Process: Once Per Page Visit (default)

Source

* Process [Download Source]

```
begin
  emp_utl.create_emp_file(p_filename =>:P19_FILE_NAME,
                          p_par_id   =>:P19_PAR_ID,
                          p_comments =>:P19_COMMENTS);
end;
```

Manipulating Session State

This is OK

Page Validation: 3 of 3 Name: check_dates

Show All | Validation | Error Message | Conditions | Authorization | Configuration | Comments

Validation

Page: 7 Employee Details

* Name: check_dates

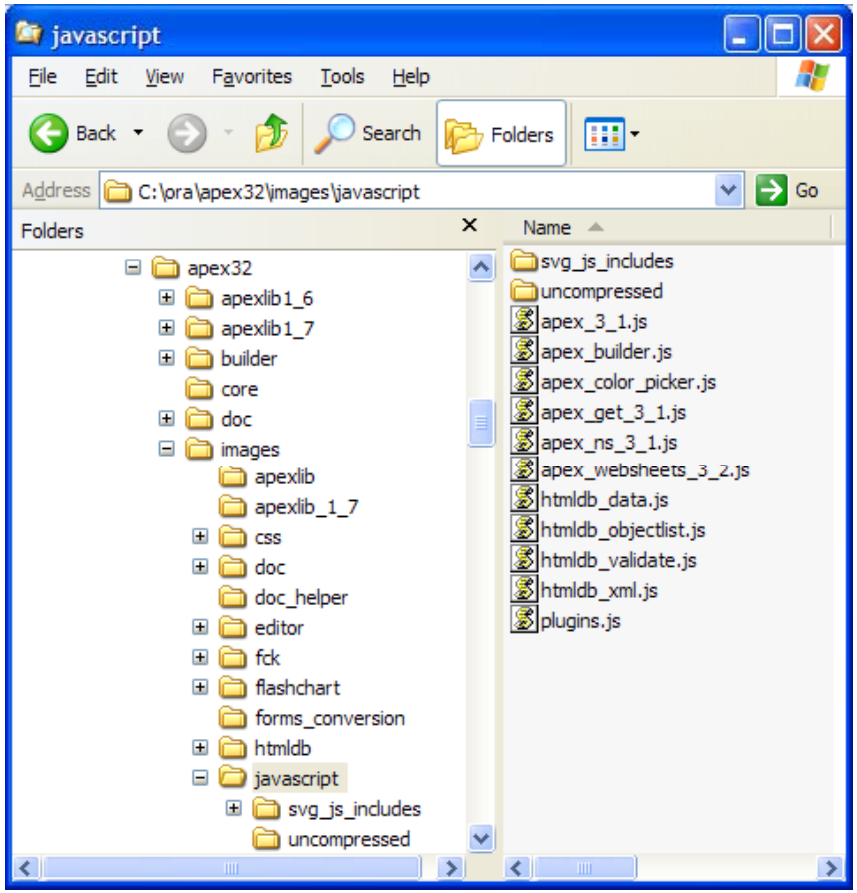
* Sequence: 16

Type: PL/SQL Expression

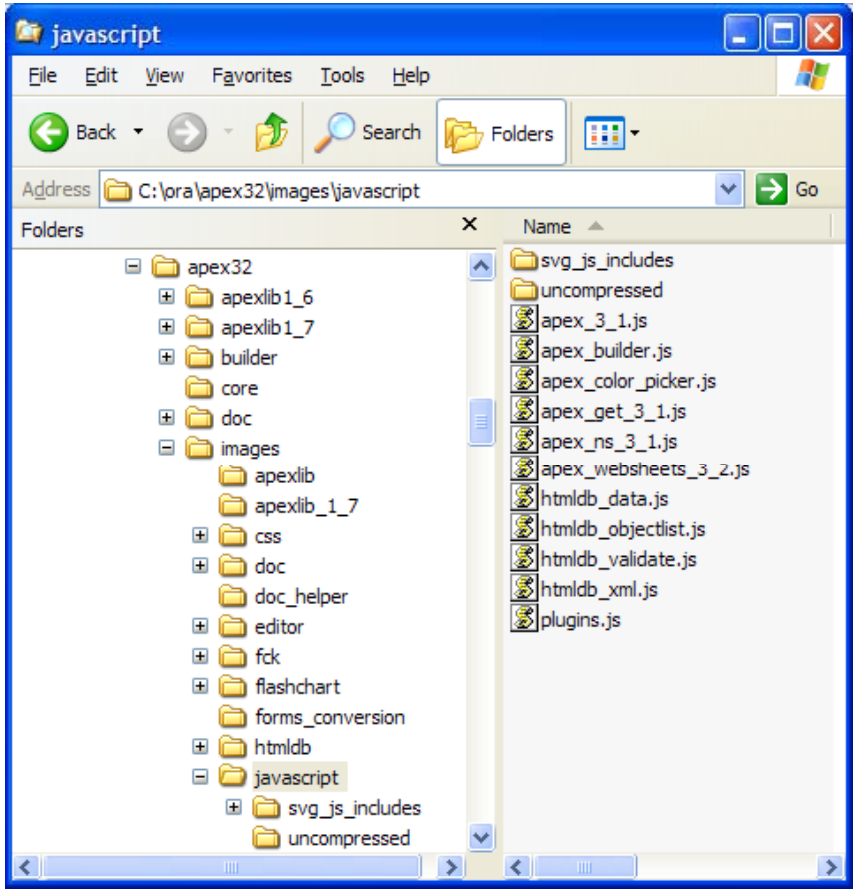
* Validation Expression 1

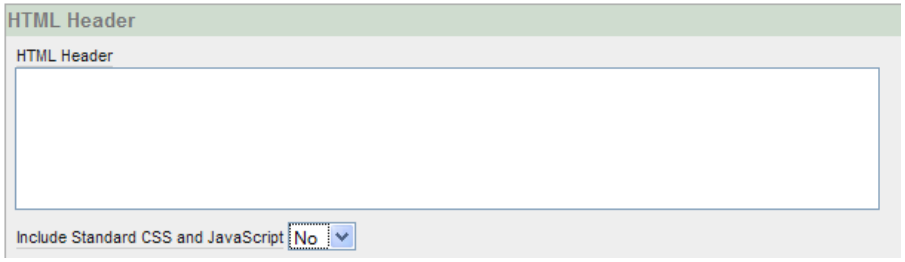
```
TO_DATE(:P7_EFF_FROM) <= TO_DATE(:P7_EFF_TO)
```

Apex JavaScript Code



Apex JavaScript Code





Your JavaScript Code

Page

Page Name: EMPLOYEES
Title: EMPLOYEES
HTML Header: <script language="JavaScript"
HTML Body:
Help Text: No help is available for this
Page Group:

Template:
Header Text:
Footer Text:
Build Option:
Authorization:
Cached:

Wrong Approach

Show All | Name | Display Attributes | Header and Footer | HTML

HTML Header

HTML Header

```
<script language="JavaScript1.1" type="text/javascript">
<!--
function getMinMax (jobId, minSal, maxSal)
{
  var minSalObj = document.getElementById(minSal);
  var maxSalObj = document.getElementById(maxSal);

  var ajaxRequest = new
                    htmldb_Get(null,&APP_ID.,'APPLICATION_PROCESS=getRange',0);
   var job = html_SelectValue(jobId);
  ajaxRequest.add('P2_JOB_ID', job);
  ajaxResult = ajaxRequest.get();
  if (ajaxResult)

    { var salArray = ajaxResult.split("|");
       minSalObj.value = salArray[0];
```

Your JavaScript Code

HTML Region on Page 0

Right Approach

Identification

Page: **0 Common_Page**

Title: JavaScript Routines — exclude title from translation

Type: HTML Text

Static ID:

Region Attributes:

User Interface

Template: No Template

Sequence: 31

Display Point: Page Template Body (3. items above region content)

Column: 1

[Body] [Pos.1] [Pos.2] [Pos.3] [Pos.4]

Region HTML table cell attributes:

Source

Region Source

```
<script src="#IMAGE_PREFIX#javascript/sage_lib.js" type="text/javascript">
</script>
```

Your JavaScript Code

Reference in the Page Templates

Right Approach

Definition

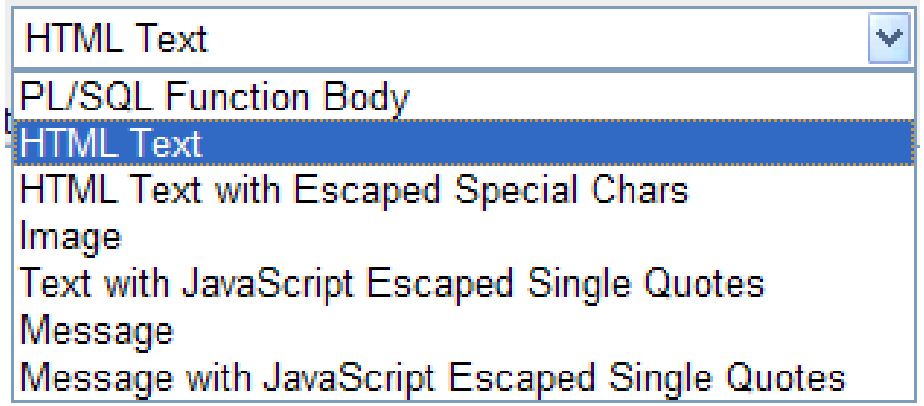
* Header

```
<html lang="&BROWSER_LANGUAGE.">
<head>
<title>#TITLE#</title>

<script src="#IMAGE_PREFIX#javascript/sage.js" type="text/javascript"></script>

<link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_12/theme_3_1.css" type="text/css" />
#HEAD#
</head>
<body #ONLOAD#>#FORM_OPEN#
```

Note that if you have multiple Page Templates you will need to reference the library in each one

Use Shortcuts

- Commonly used pieces of code or text



- Use
  - To substitute text into a Javascript routine
  - In HTML associated with regions, including the source of html regions and header and footer text of any region.
  - In region templates
  - In item label attributes
  - Item default values

Example

JavaScript Shortcut

PL/SQL Shortcut

Defining Substitution Strings

- You can define substitution strings in the Application Definition

Substitutions

Substitution String	Substitution Value
COMPANYNAME	Sage Computing Services
DISPLAYTITLE	Timesheet Application

- Reference the substitution strings in a template

Footer

```
#REGION_POSITION_05#
#FORM_CLOSE#
Company: &COMPANYNAME.
Application: &DISPLAYTITLE.
</body>
</html>
```

Using the Database

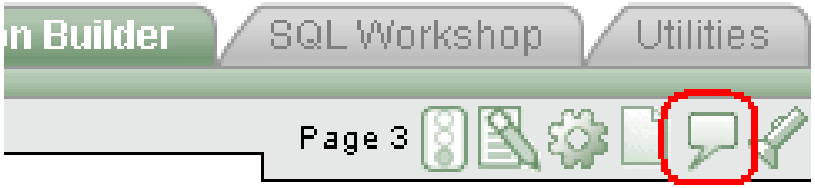
- sys_parameters table
- Function util.getparam
- Create application items to store the values
- Create Computations to populate the application items from the database using the packaged function
- Reference the application items in a template
- Provide the values for application or page properties

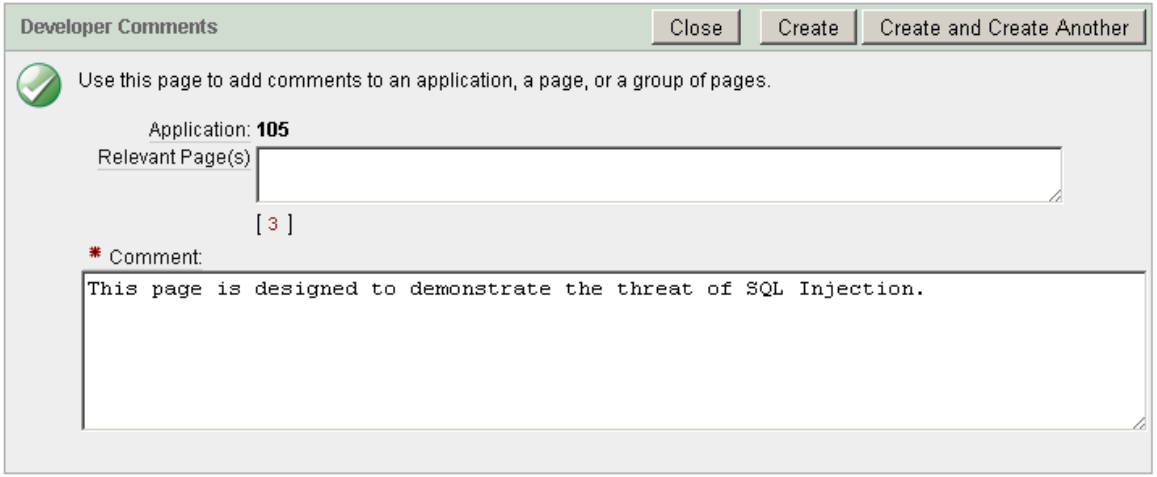
Example

Storing Reference Information in the Database

Documenting an Apex Application

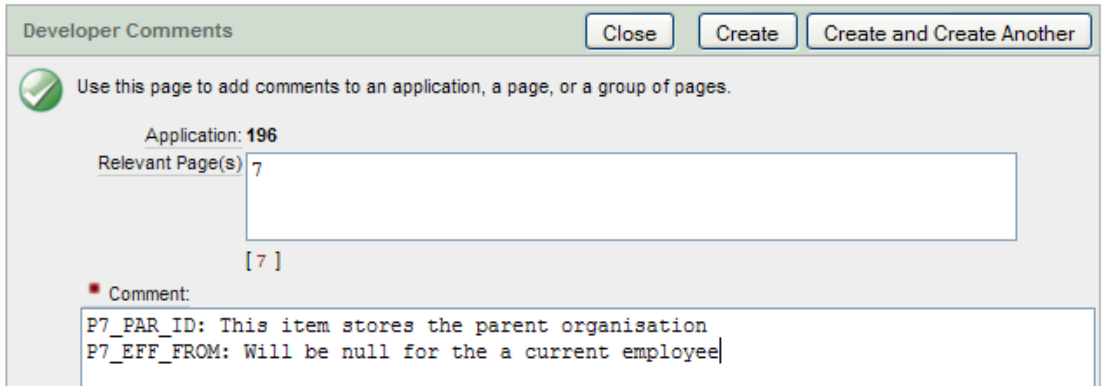
- Apex is Largely Self Documenting
- Document exceptions
- Commenting pages
  - Purpose (if its not obvious)
  - Anything weird about the page design /coding
  - Modification History





Documenting an Apex Application

- No documentation lower than page level
- Prefix page comment with component /item name



- You can then search the comments for references to a particular component

What Every Developer Wants to Hear

- Do not comment unnecessarily
- The application is stored in Oracle database tables – query them

Where to Locate Files

- #IMAGE_PREFIX#

  virtual directory where your files are physically located
- #WORKSPACE_IMAGES#

  files that have been uploaded into the Apex repository
- #APP_IMAGES#

  files that have been uploaded into the Apex repository for a specific Application

Example

Determining the File Location Dynamically

Backup

- **Application backups**

  Part of your regular database backup

  Are you sure the DBA backs up the DEV database?

  Do you really want to have to grovel to the DBA to get the whole database back?

  Export the Application daily

- **Page backups**

  Export a page before significant work

  If you stuff up try export as of 5 mins ago

Page Zero

- Page 0 items appear on all pages

  Navigation

  Breadcrumbs

  Task lists

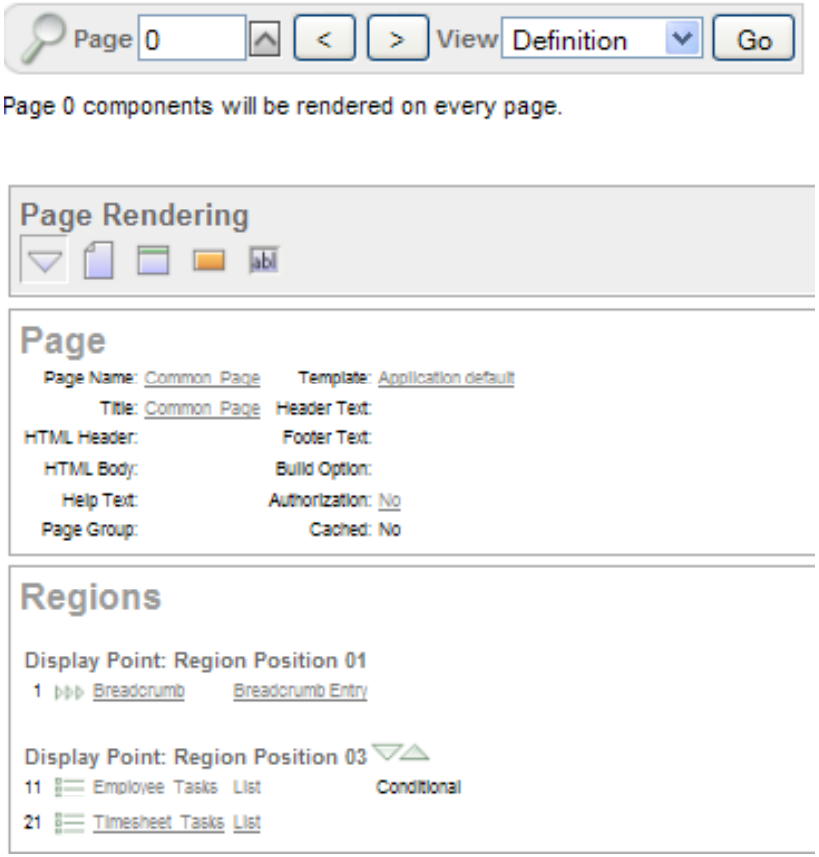
  Contact details

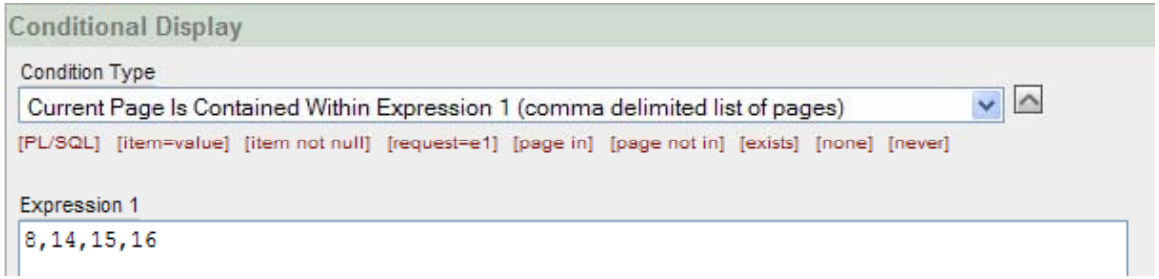
  Copyright/Privacy text

Example – Task Lists

- Multiple tasks lists
- Each applies to a set of pages

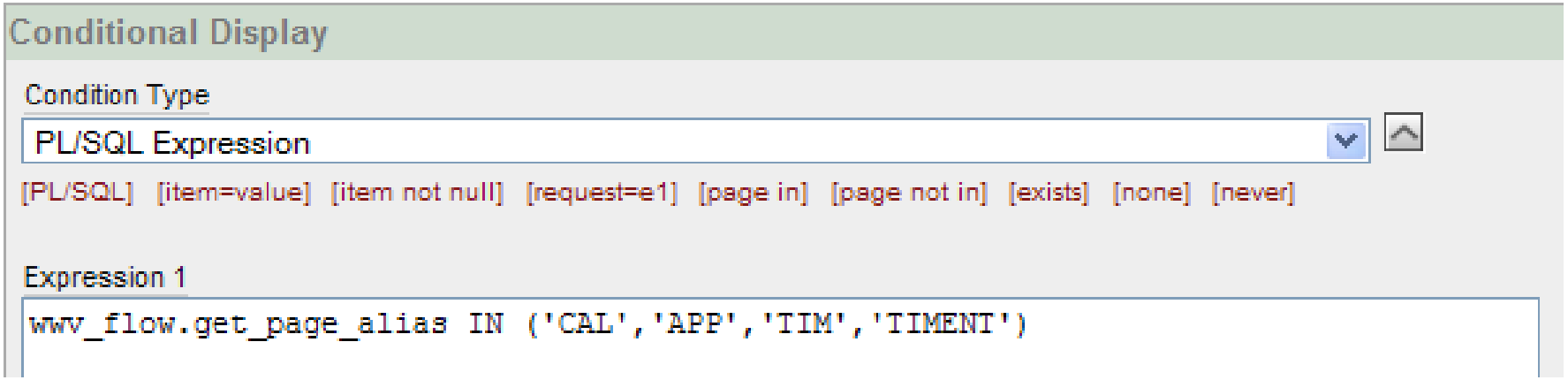
This can be hard to maintain





Example – Task Lists

- **Avoid Using Page Numbers**



Example – Task Lists

- **Using a Page Attribute**

Comments

Comments

```
Generated by calendar wizard.08-OCT-2004 10:30:16
<TASK_LIST>TIMESHEET_TASKS<\TASK_LIST>
```

```
FUNCTION get_page_comment
RETURN apex_application_pages.page_comment%type
IS
  v_page_comment apex_application_pages.page_comment%type;
BEGIN
 SELECT page_comment
 INTO   v_page_comment
 FROM   apex_application_pages
 WHERE  application_id = nvl(v('APP_ID'),196)
 AND    page_id = nvl(v('APP_PAGE_ID'),8);

 RETURN v_page_comment;

END  get_page_comment;
```

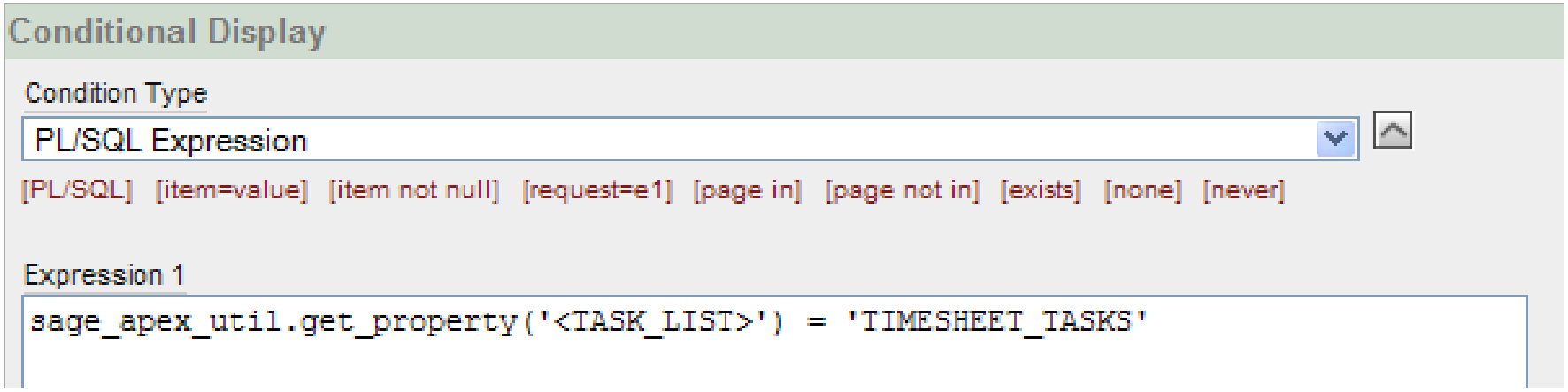
Example – Task Lists

- **Get the information you want from the comment**

```
FUNCTION get_property(p_property in varchar2)
RETURN varchar2
IS
  v_property      varchar2(1000);
  v_page_comment   apex_application_pages.page_comment%type   := get_page_comment;
BEGIN
  v_property := substr(v_page_comment,instr(v_page_comment,p_property)+11,
                                      instr(v_page_comment,replace(p_property,'<','<\'))
                                      - (instr(v_page_comment,p_property)+11));

  RETURN v_property;
END get_property;
```

Example – Task Lists

- Use the property to set the conditional processing of the Task List on Page 0



Common Processing

- Page 0 has no processing
- Define Computations and Processes at Application Level

Firing of the process is dependent on the page number
Fires for large numbers of pages

On Load: Before Header (page template header)
On Load: After Header (page template header)
On Load: Before "Body" Region(s)
On Load: After "Body" Region(s)
On Load: Before Footer (page template footer)
On Load: After Footer (page template footer)
On Submit: After Page Submission - Before Computations and Validations
On Submit: After Page Submission - After Computations and Validations

+ a Condition

Firing of the process is dependent on the page specific information
Fires for small numbers of pages

On Demand: Run this application process when requested by a page process.

Invoke from specific pages

Custom Styles

- Define your styles in your own .css file

sage_styles.css - Notepad

File Edit Format View Help

```
.SageHomePageTitle{color:#7b9cbd; font-size:28px; font-weight:bold;}
```

- Reference your stylesheet in a page template or Page 0

```
<html lang="&BROWSER_LANGUAGE.">
<head>
<title>#TITLE#</title>
<link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_10/theme_V3.css" type="text/css" />
<link rel="stylesheet" href="#IMAGE_PREFIX#themes/theme_10/sage_styles.css" type="text/css"
/>
```

- Refer to the style in custom text

Source

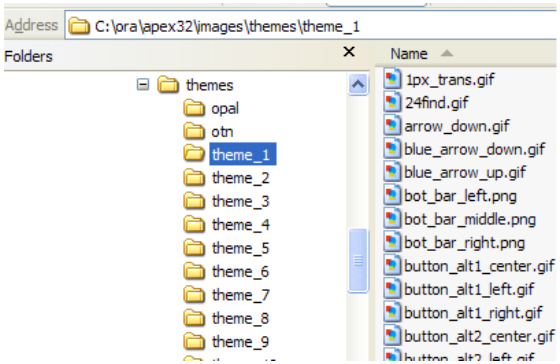
Region Source

```
<div class="SageHomePageTitle">Welcome to the Timesheet Application</div>
```

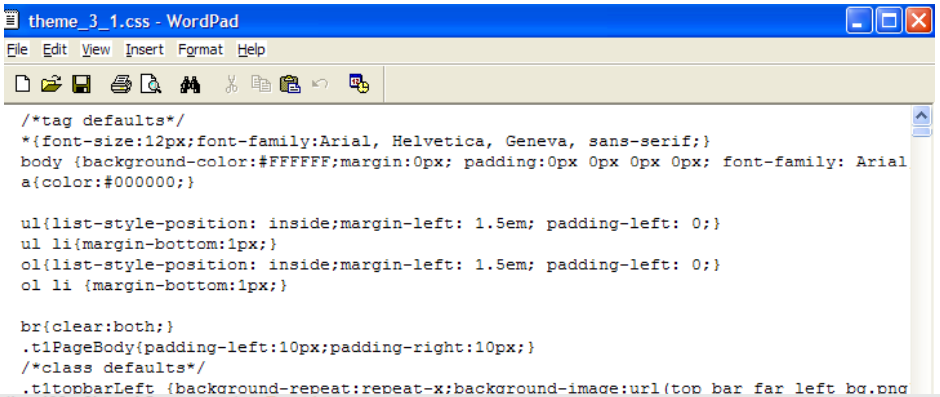
Themes and Templates

- Create your own Theme - Even if you don't think you want to make any changes
- A theme comprises:

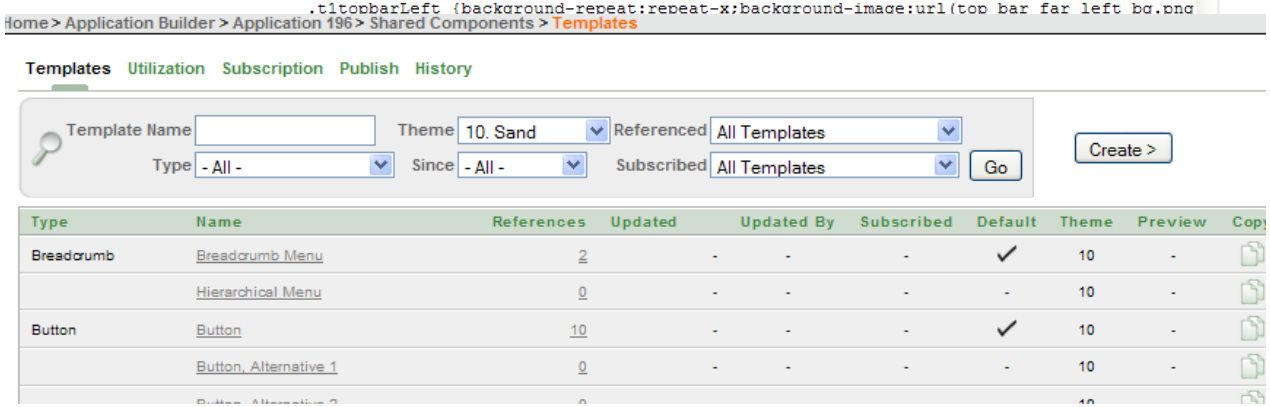
Images in the file system



A theme specific stylesheet in the file system

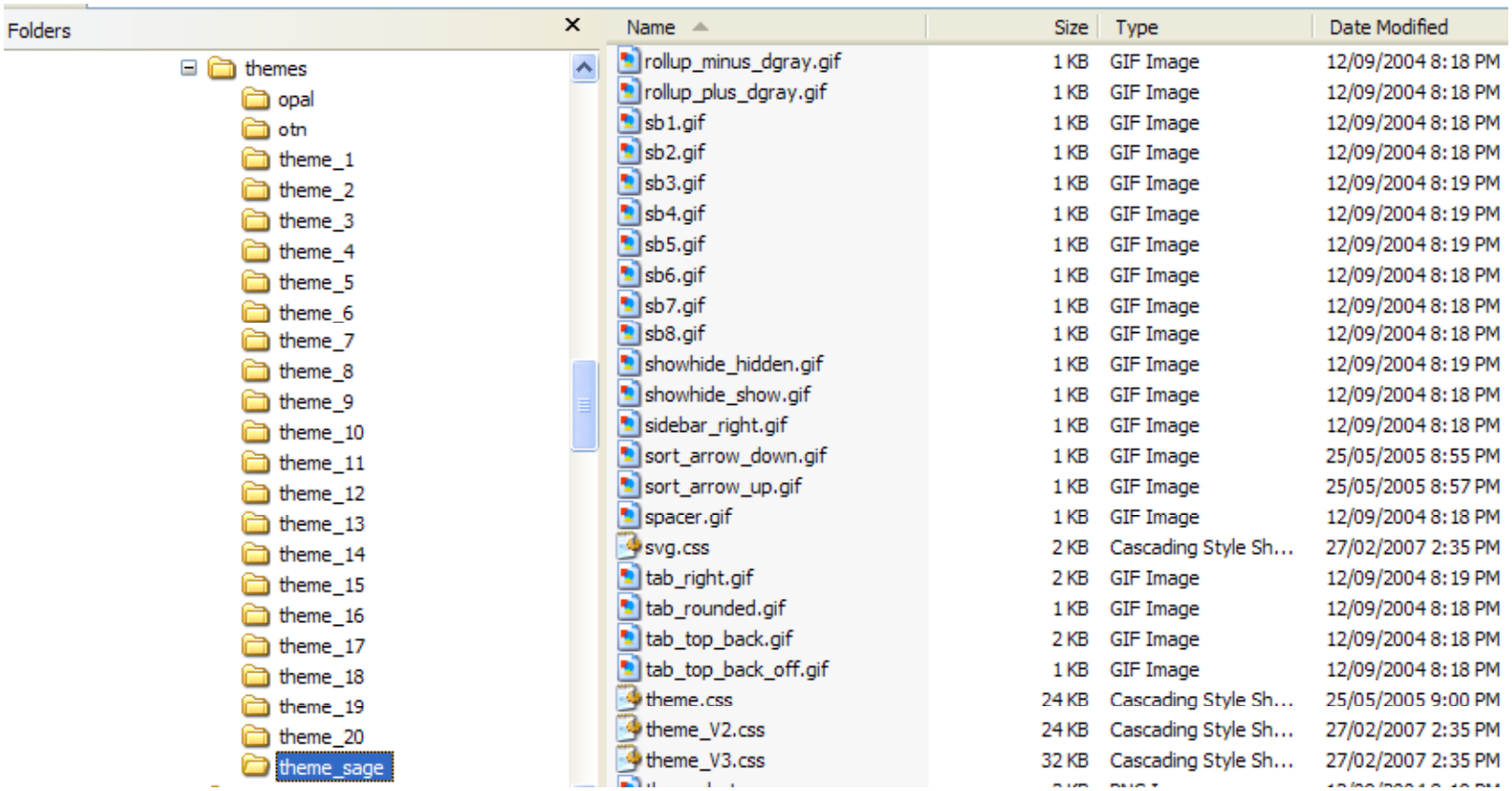


A set of Templates



Themes and Templates

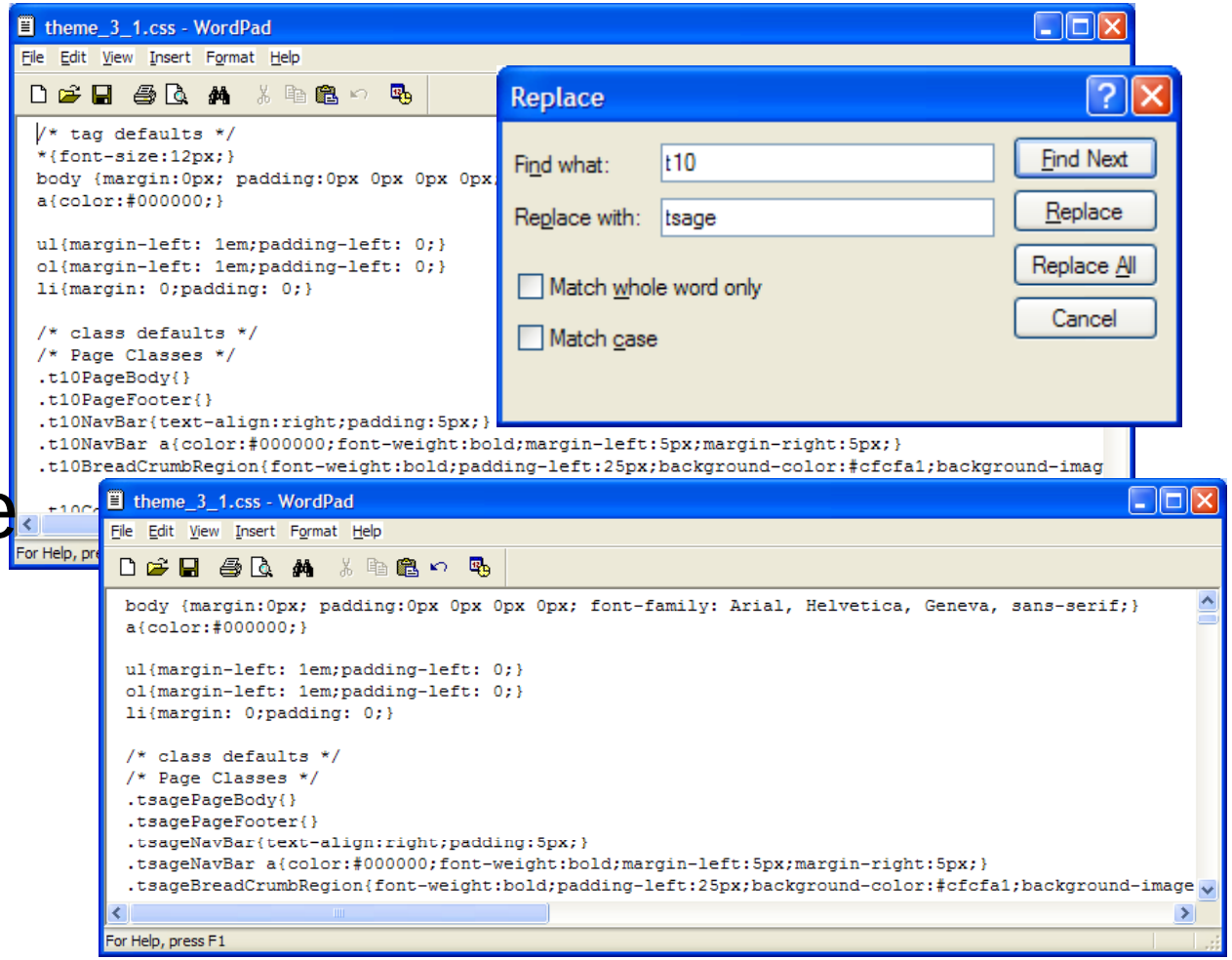
- Copy the theme directory structure that most closely matches your requirements



Themes and Templates

- Edit the stylesheet for the current Apex version

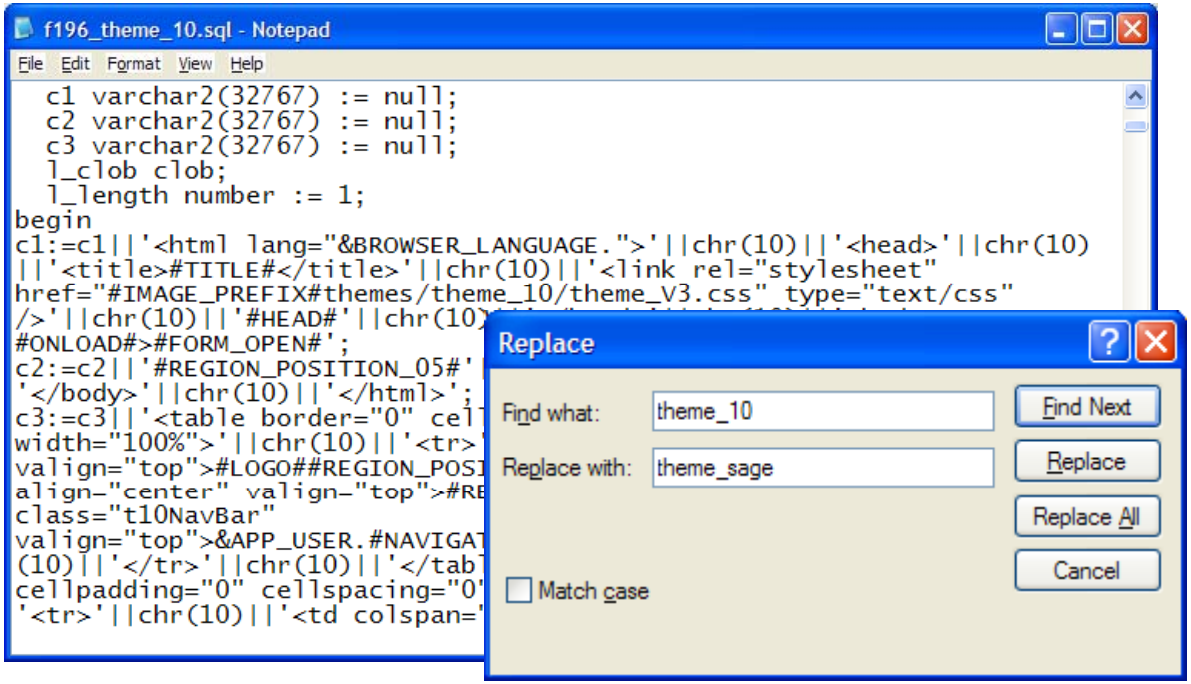
Replace all instances of the old theme name with your custom name



Themes and Templates

- Export the standard Apex theme you are using to a file

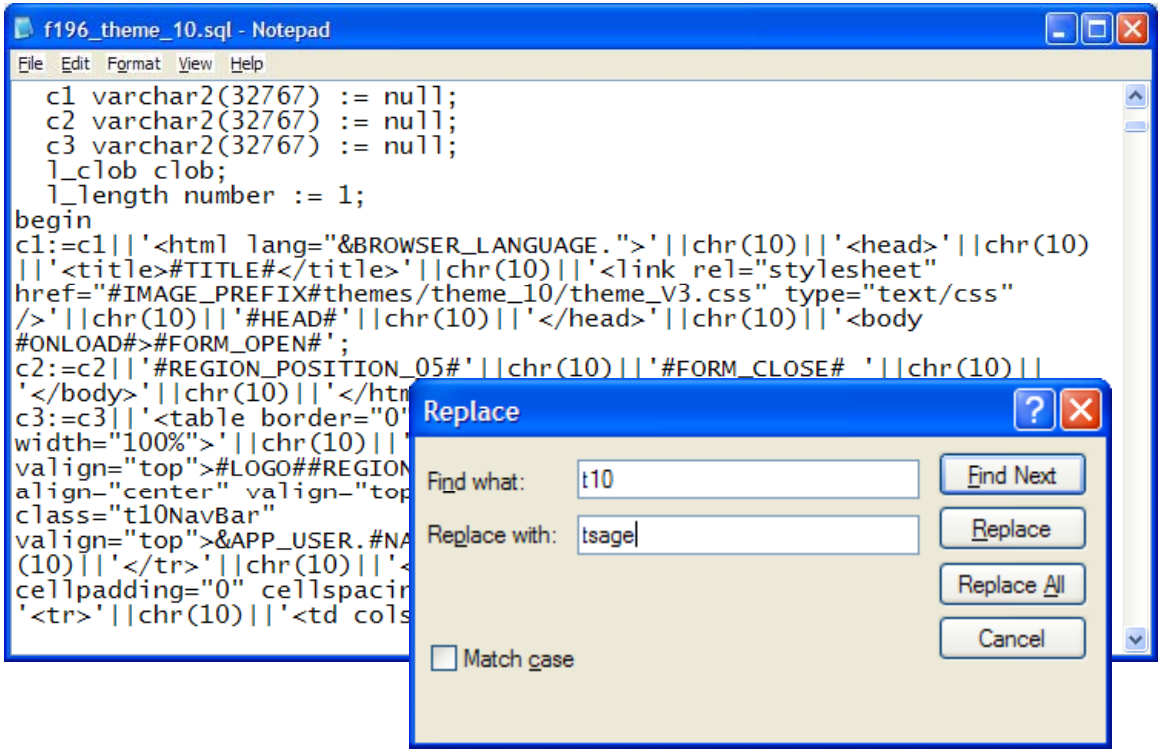
Replace any references to the original theme directory with your custom directory



Themes and Templates

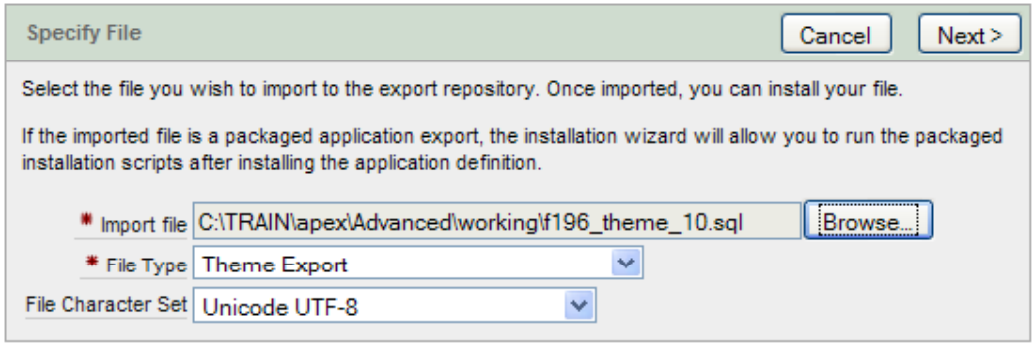
- Export the standard Apex theme you are using to a file

Replace all references to t10 with tsage

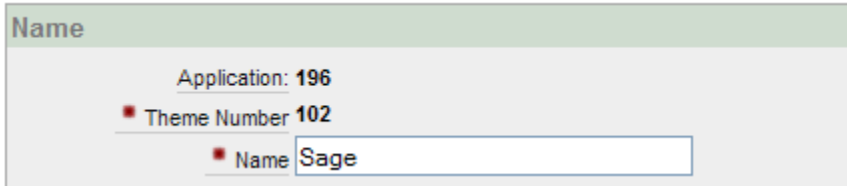


Themes and Templates

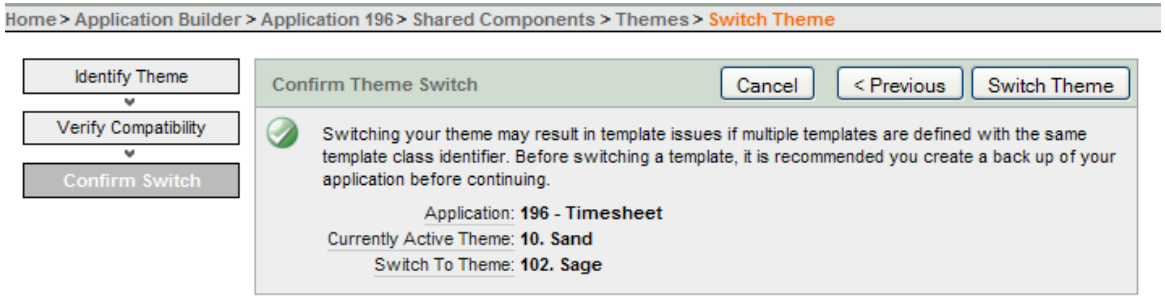
- Import the edited theme file



- Edit the theme and changes its name



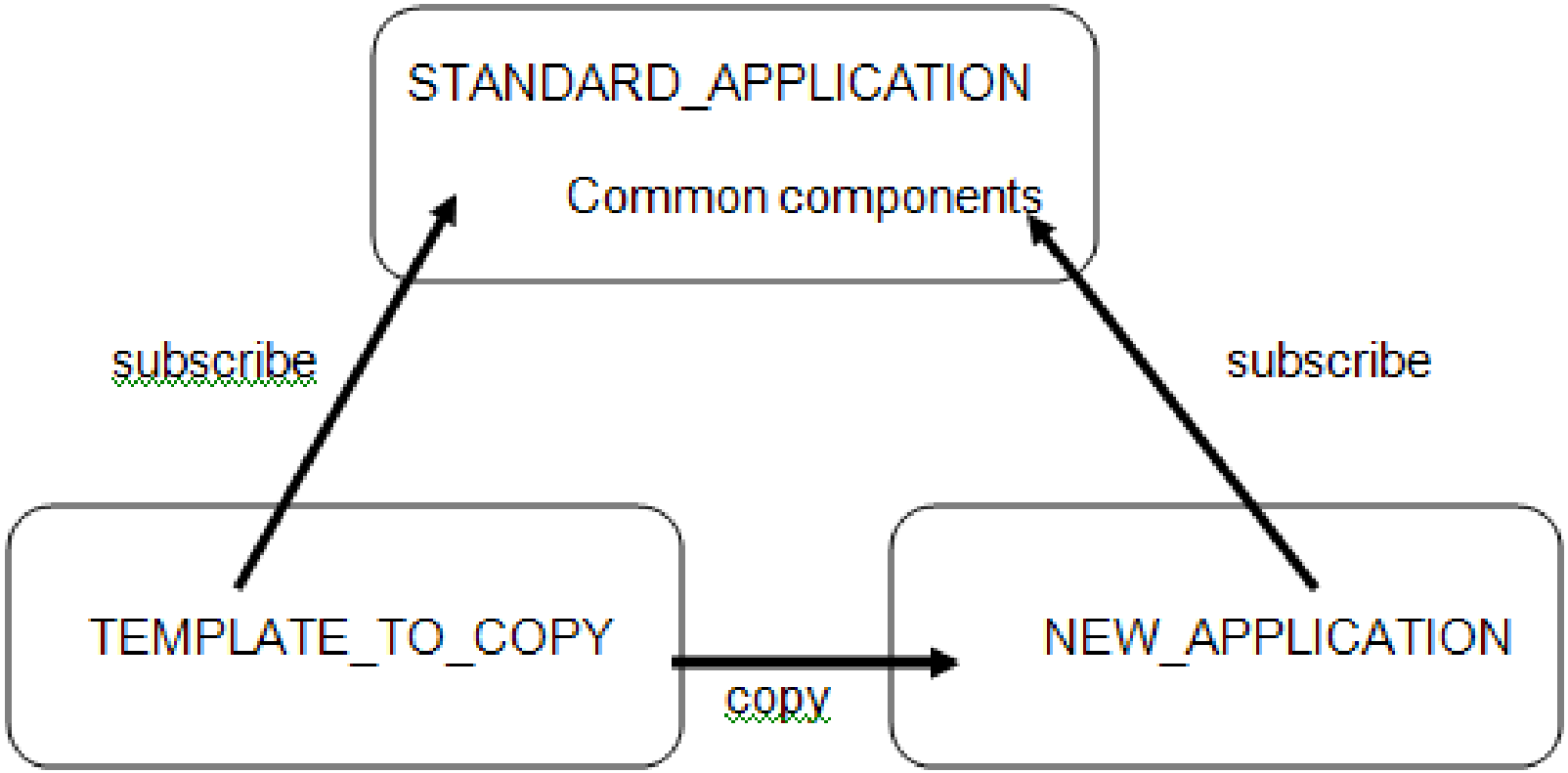
- Switch to the new theme



Security

- Do a security audit before releasing to test
- Use bind variables to avoid SQL injection
- Escape all uploaded data
- Use session state protection
  - Do not allow application items to be changed from the URL
  - Use checksums on pages
- Do not use embedded PL/SQL gateway for internet apps
- Use runtime only environment
- Use 0 session id for public applications
- Use report to check password items
- Consider DB features such as VPD and encryption

Standard Application



Creating a Standard Application

- Create STANDARD_APPLICATION.
- Add all common components that can be subscribed to
- Copy STANDARD_APPLICATION to TEMPLATE_TO_COPY
- Subscribe the objects in TEMPLATE_TO_COPY to those in STANDARD_APPLICATION
- Add any components that cannot use subscribe to the TEMPLATE_TO_COPY application

Example

A Standard and Template_to_copy application

Check Your Application

- Use Patrick Wolf's Apex essentials to check the application
- www.oracleapex.info

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Questions?

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penny@sagecomputing.com.au

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(Unrepentant Marketing)

Register for the Next

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Advanced course:

8th – 9th December

Call in at the Sage Computing Services exhibition booth, or contact Penny

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