




a11APEX



# Structuring an APEX Application

Alex Nuijten 🃏

  
a11APEX



a  
allAPEX



@alexnujten

nuijten.blogspot.com

## Notes on Oracle

Oracle Things I Got to Remember Not to Forget

01 September 2016

### RegExp: Constraint to prevent spaces at the beginning or end.

Even though a space is a regular character, the client didn't want spaces at the beginning or end of a string. Any spaces in the middle were fine. Of course this could be handled by the application, but it must also be implemented in the database. Using a check constraint with a regular expression will prevent the end user from entering unwanted data.

To try things out, let's just start with a simple table with a single column.

```
1 create table test  
2 (str varchar2(10));
```

Now the magic part: add a check constraint using a regular expression

```
1 alter table test  
2 add constraint str_chk check (  
3 regexp_like (str, '^[^[:space:]]+[^[:space:]]$')  
4 );
```

The regular expression reads: The string should start (the first caret) with any character which is not in the character class of [:space:], followed by one or more characters (the period) and it should end with (the dollar) any character as long as it's not in the character class of [:space:].

UPDATE - 07-Sept-2016

#### About Me



Alex Nuijten

Follow 281

Self-employed under the name allAPEX, mainly in The Netherlands. Presented at National and International Conferences. Oracle ACE Director for Database Development. Trainer for SQL and PL/SQL. Married, two children, likes to Barbecue.

[View my complete profile](#)

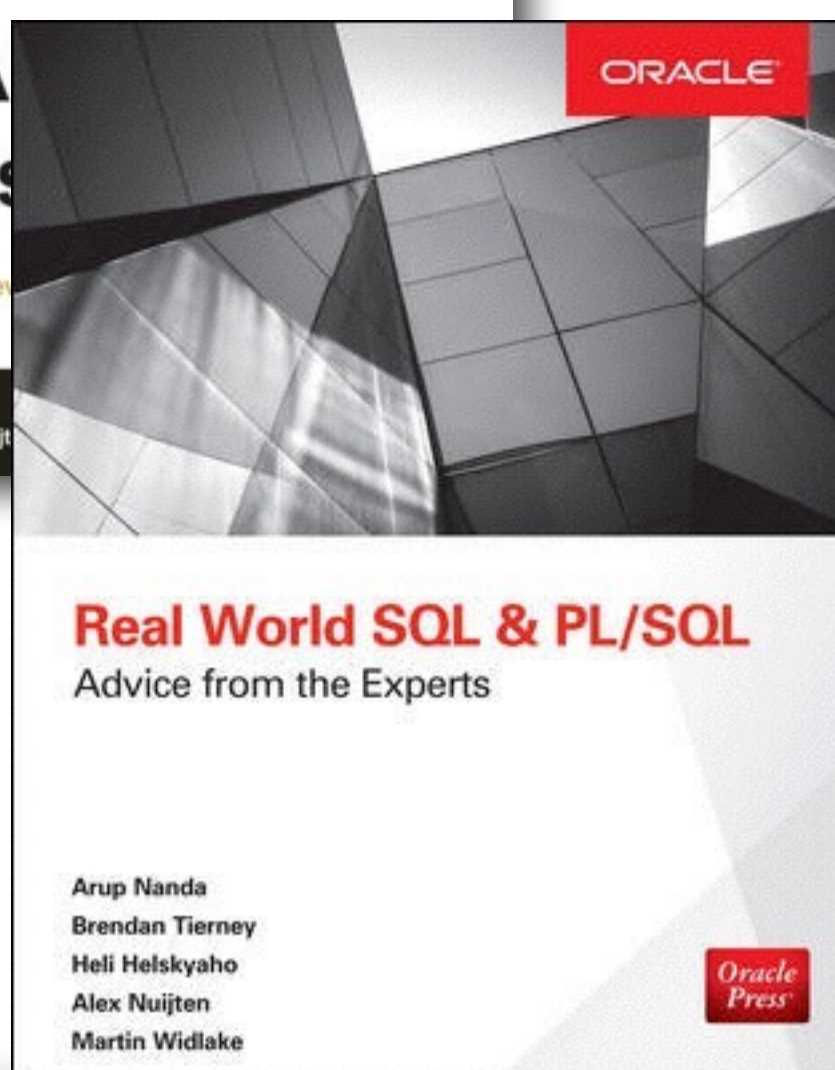
allAPEX



Oracle A  
Practices

Accentuate Oracle APEX de

Learco Brizzi  
Ilona Ellen-Wolff Alex Nuijten



Real World SQL & PL/SQL  
Advice from the Experts

Arup Nanda  
Brendan Tierney  
Heli Helskyaho  
Alex Nuijten  
Martin Widlake

Oracle  
Press









DESIGNER



DEVELOPER





Some Confessions  
My Method  
Share your Thoughts





**HTML**

**CSS**

**JS**











ā'pěks





# My First Time







“With HTMLDB you can create applications so fast, ...”

ODTUG Kaleidoscope 2005, unknown presenter



“...you won't give the end user time to change their mind.”

ODTUG Kaleidoscope 2005, unknown presenter











Object Navigator

ANATIONALITY Find:

Property Palette

Find:

Oracle Application Server Forms Services

File Edit View Favorites Tools Help

Back Search Favorites

Address: http://pc000:8889/forms90/f90servlet

ORACLE

WINDOW1

AUTHOR DETAILS

Authname: Dr.Amal

Aphone: Indian

Aemail: List23

Anationality: American

BOOK INFORMATION

Bookid	Btitle	Subject	LANG	Noofpage	Price	Edition	Ebook	Hardcopy	Publisher
102	Calculus	Maths	ENGL ARABIC	180	45	1	no	yes	Pearson
			ENGL ARABIC						
			ENGL ARABIC						
			ENGL ARABIC						

ANATIONALITY
List Item
Yes
More...
Poplist
Mixed
<Null>
Yes
Yes
<Null>
<Null>
Char
BYTE
20
No
<Null>



Simple Red (Theme 1)



Builder Blue (Theme 2)



Midnight Blue (Theme 3)



Topaz (Theme 4)



Sunrise (Theme 5)



Centered Blue (Theme 6)



Modern Blue (Theme 7)



Orange (Theme 8) \*



Simple Gray (Theme 9)



Sand (Theme 10) \*



Green Spring (Theme 11)



Slate (Theme 12)



Classic Blue (Theme 13)



Simple Green (Theme 14) \*



Light Blue (Theme 15) \*





○ Sand (Theme 10) \*



○ Green Spring (Theme 11)



○ Slate (Theme 12)



○ Classic Blue (Theme 13)



○ Simple Green (Theme 14) \*



○ Light Blue (Theme 15) \*



○ Dark Blue (Theme 16) \*



○ Sapphire (Theme 17)



○ Simplified Gray (Theme 18) \*



○ Red Gray (Theme 19) \*



○ Scarlet (Theme 21)



○ Bluejay (Theme 22)



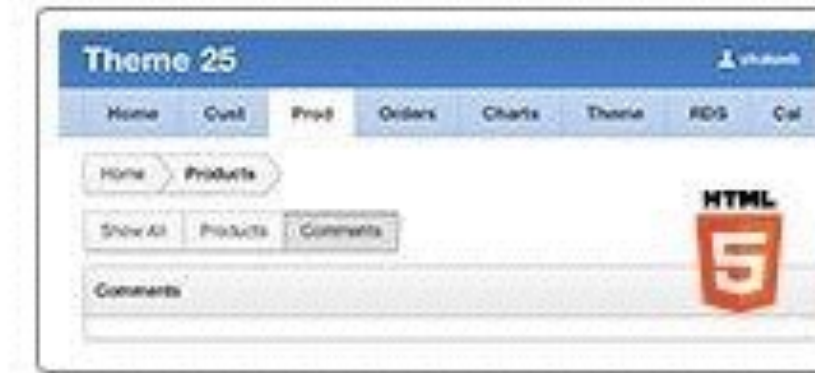
○ Uniframe (Theme 23)



○ Cloudy (Theme 24)



○ Blue Responsive (Theme 25)





\$ 0.00



Everywhere\*

**ORACLE**<sup>®</sup>  
—————  
**DATABASE**



**10<sup>g</sup>**



# Go from prototype to production in minutes.



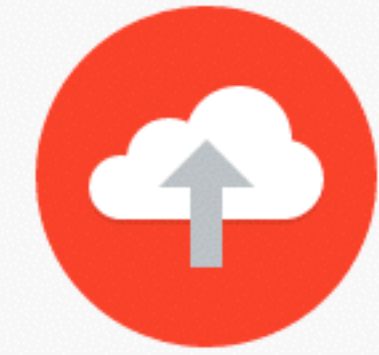
## Develop

Use our modern, intuitive, and powerful browser-based IDE to quickly build and run applications, enabling **easy** iterative development.



## Customize

Powerful and intuitive design tools enable **easy** and extensive customization of your application's UI.



## Deliver

Deployment couldn't be simpler. It is as **easy** as providing your users the URL to your application.

Source: [Apex.Oracle.com](https://apex.oracle.com)





Easy  
to make  
a mess



...and that's exactly what I did



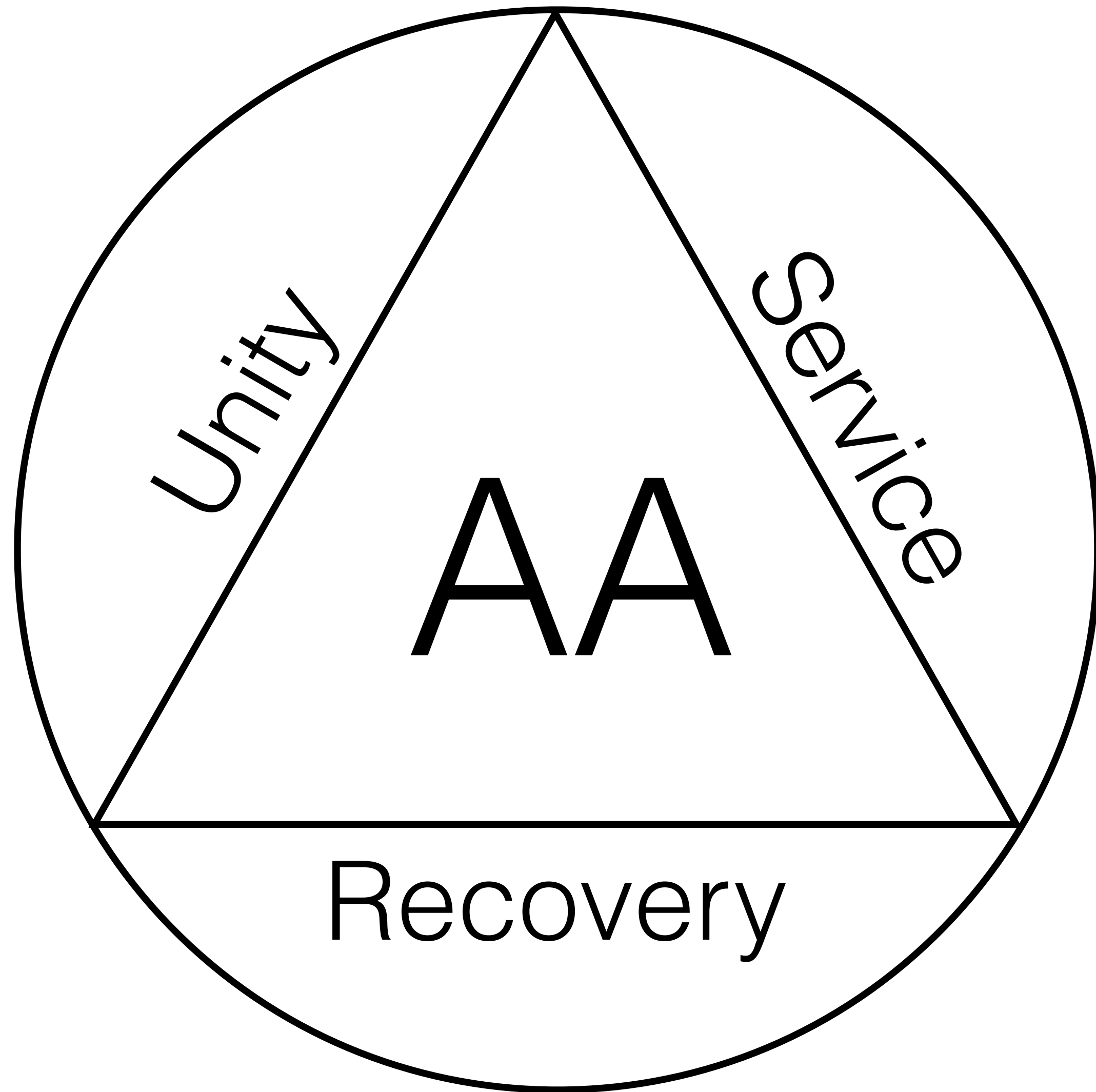
...I created a messy Application



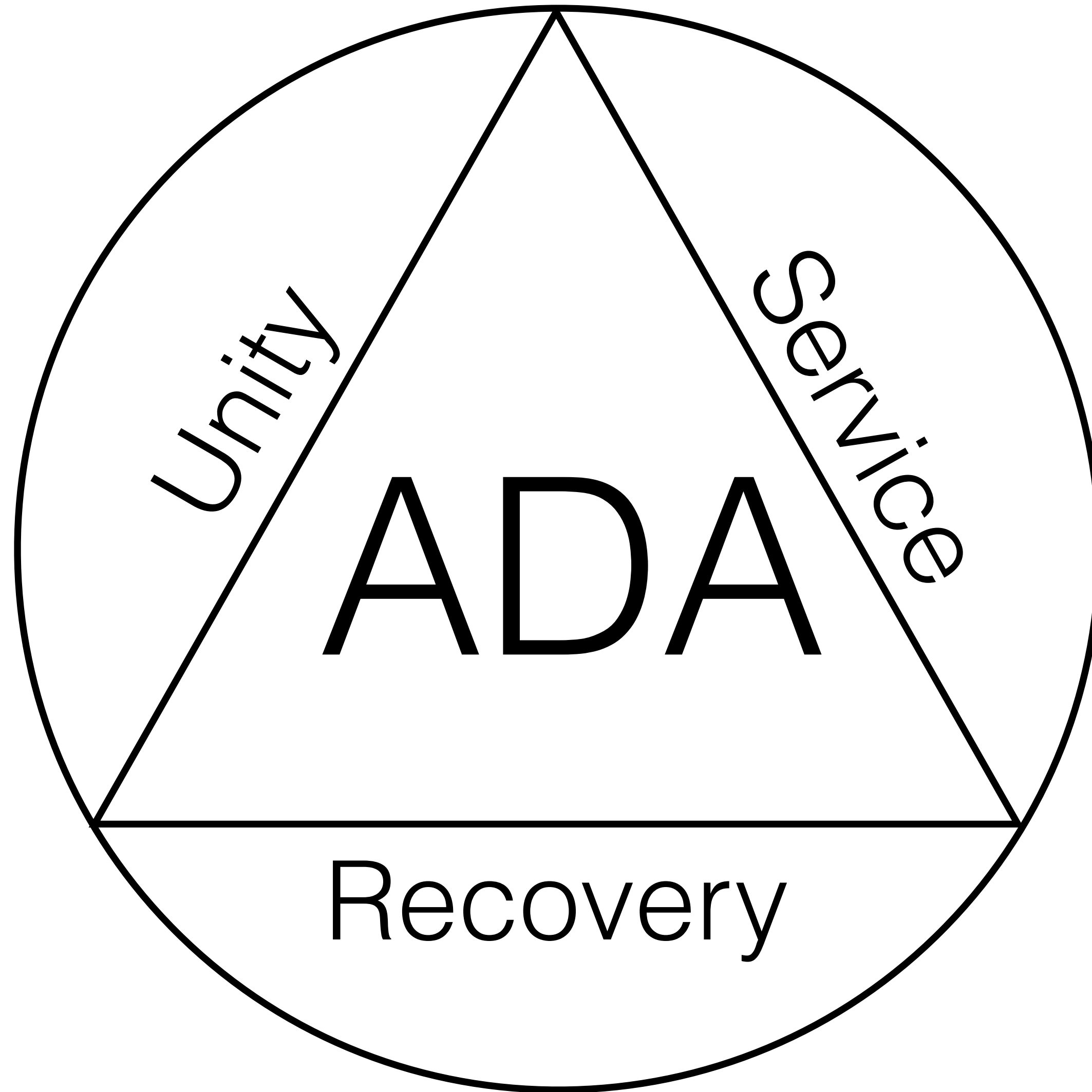
what you might call a



CRAPPLICATION







...and while I'm confessing





Shakeeb Rahman





Oracle Application Express 5

# Universal Theme

Better UI for your apps



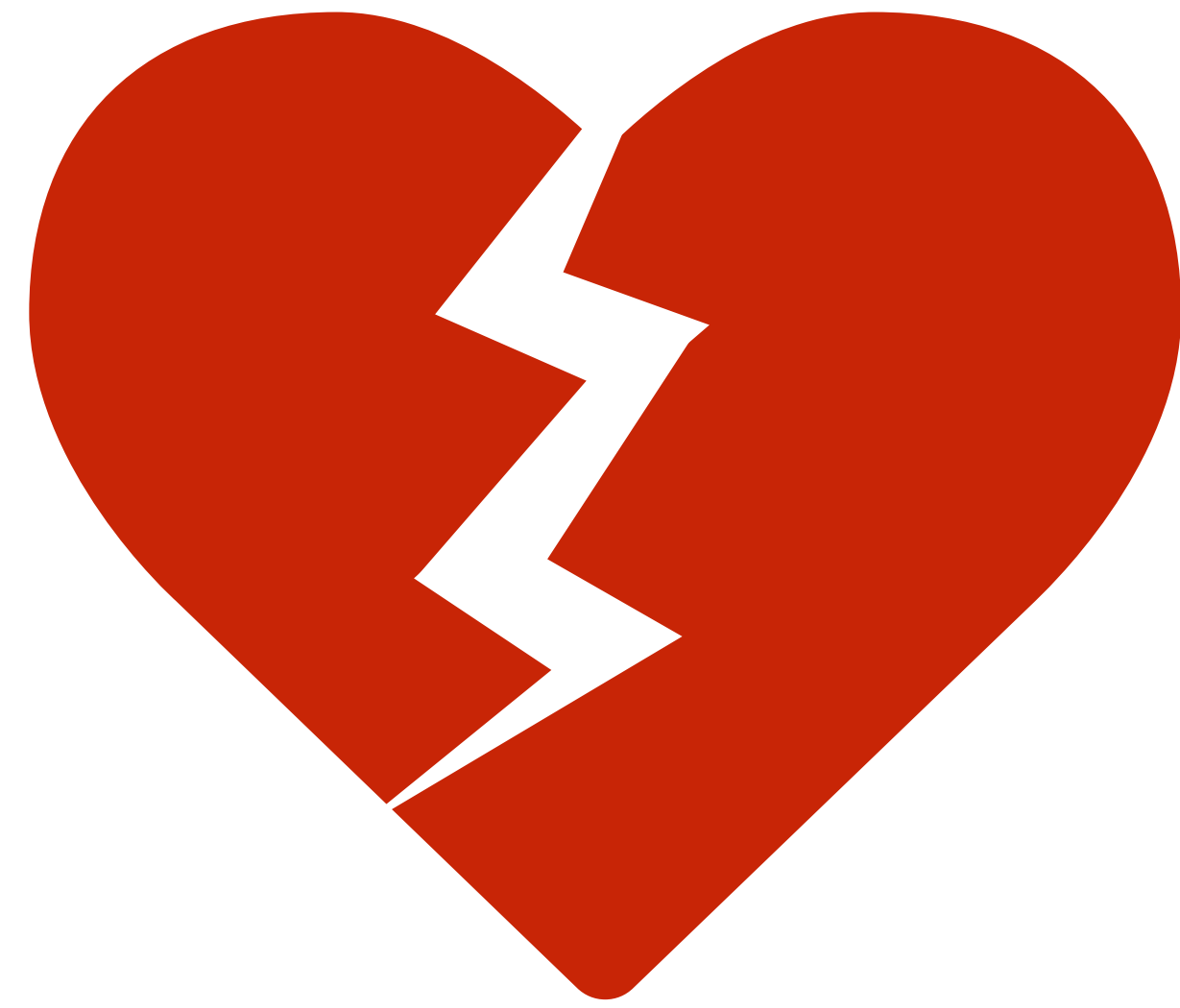
Shakeeb Rahman



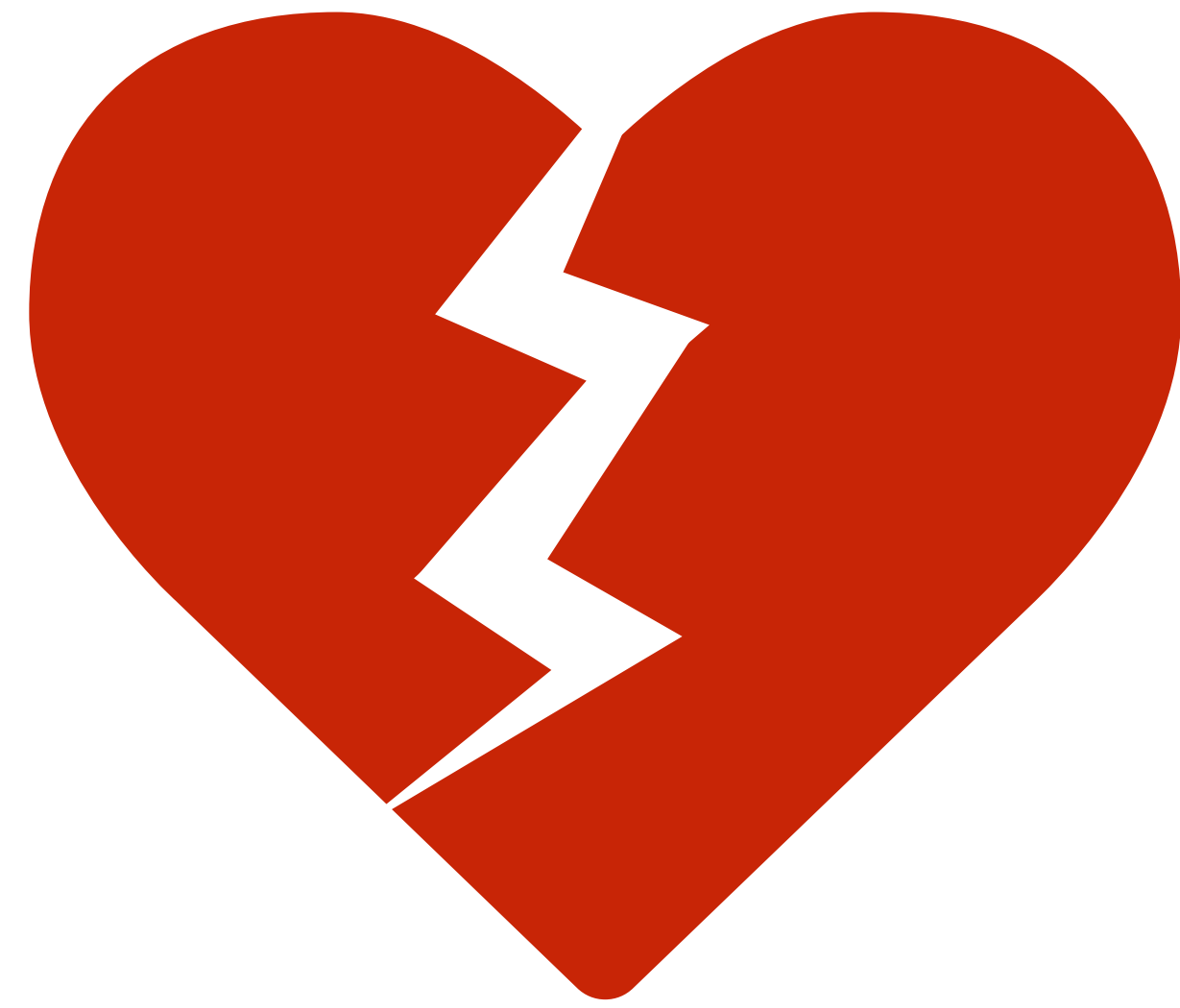


man

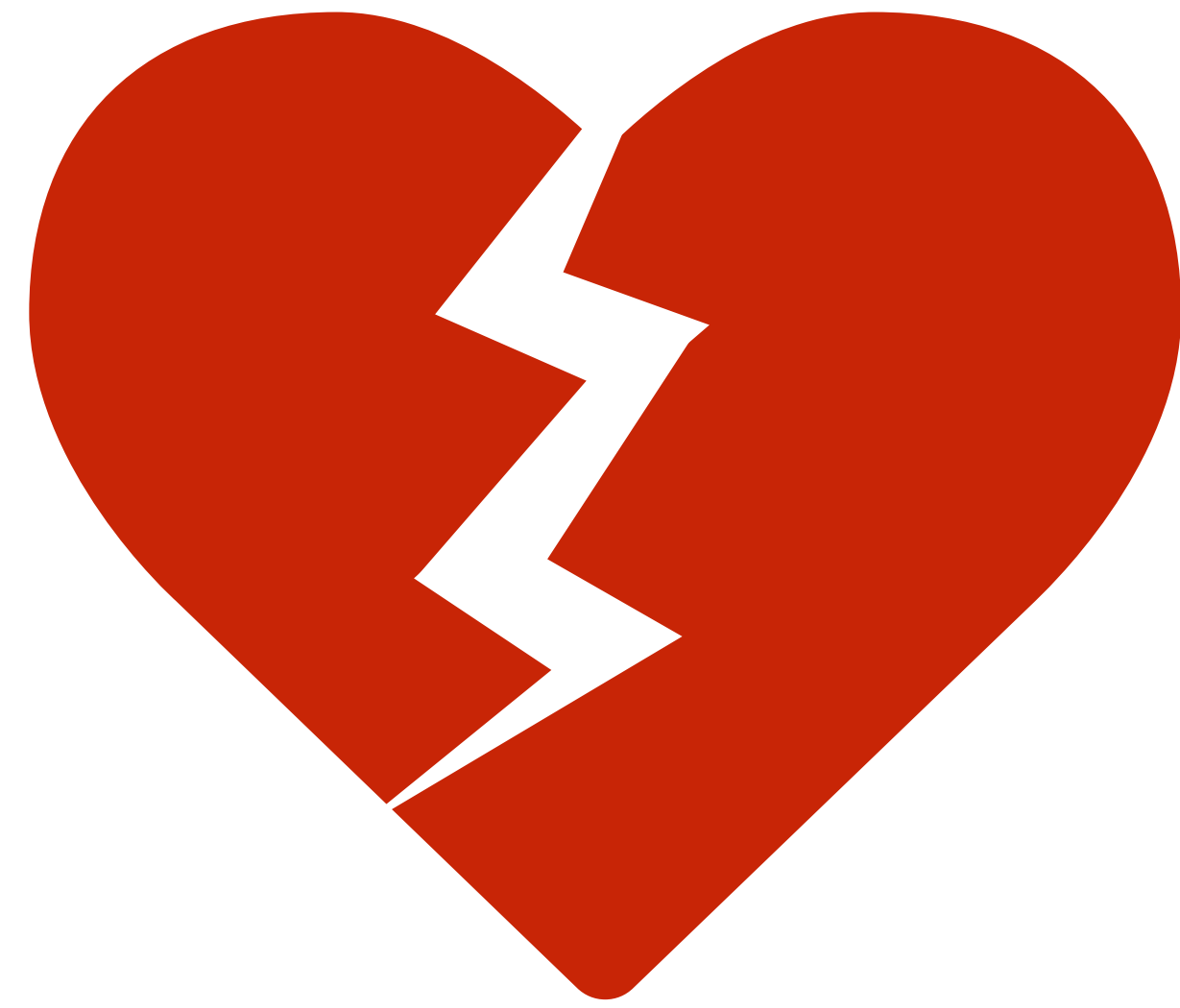














...I'm not alone in creating messy applications

- How to start as a developer
- #\_gener... how to choose APEX (for Managers) - (planned)
- Explanations (planned)

- On 26-Apr-2016 12:10:PM, kkiely said: I think the workaround is: Refresh page, Stay on page, Click Save - No error 🍌
- On 26-Apr-2016 11:09:AM, kkiely said: Is this still relevant for Apex 5? <http://www.inside-oracle-apex.com/ora-02014-cannot-select-for-update-from-view-with-distinct-group-by-etc/>
- On 26-Apr-2016 11:05:AM, kkiely said: I get this error regularly after changing a page item >ORA-02014: cannot select FOR UPDATE from view with DISTINCT, GROUP BY, etc. Most recently it occurred when changing from a checkbox to a radio group. There is no error after changing back to the checkbox. There's no fancy dynamic actions or anything. There's not much else on the page, just a select list that redirects to URL. There are no select for updates.
- On 26-Apr-2016 07:43:AM, jeffydwiloeneto said: Hi guys I want to ask, is it possible if live validation plugin to use in tabular form ?
- On 25-Apr-2016 02:16:PM, maxime\_tremblay said: I'll DM you the details
- On 25-Apr-2016 02:14:PM, maxime\_tremblay said: @iamasgor: I have a working example of what you are

Tags

	Matt Mulvaney Customizing IR with CSS and jQuery CSS, Interactive Report, jQuery <a href="#">Link</a> 25-Apr-2016 17:56:53 by: Juergen Schuster	☆	X
	Daniel Hochleitner Our 50th Plug-in and Daniel's 12th - Create and save a Signature in APEX Plug-ins <a href="#">Link</a> 24-Apr-2016 17:13:09 by: Juergen Schuster	☆	X
	Martin D'Souza New APEX Quiz is out <a href="#">Link</a> 23-Apr-2016 18:53:15 by: Juergen Schuster	☆	X
	Scott Wesley Improving PL/SQL performance in APEX Performance, Plug-ins <a href="#">Link</a> 22-Apr-2016 20:16:53 by: Juergen Schuster	☆	X
	Christoph Ruepprich Color Spectrum in APEX report Reports <a href="#">Link</a> 22-Apr-2016 19:46:15 by: Juergen Schuster	☆	X

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orclapexworld Retweeted

Insum @InsumSolutions  
@dgielis Will there be a recording for those not at #APEXconn16? #orclapex

14h

orclapexworld Retweeted

Svenja Schriever @Sv3nja86  
Be part of @MT\_AG\_ competition. Retweet me like @RoelH #APEXconn16 or Retweet if U love #orclapex #orcl #doag like me



#letswreckthistogether

BECOMING A  
PROFESSIONAL  
**APEX** DEVELOPER



## ORACLE APEX

30%

Search for books, videos and tutorials to learn APEX and get a personal Workspace on [apex.oracle.com](http://apex.oracle.com). **It's free!**

## ORACLE DATABASE

60%

Learn the **basic** principles of the Oracle Database, SQL, and PL/SQL.

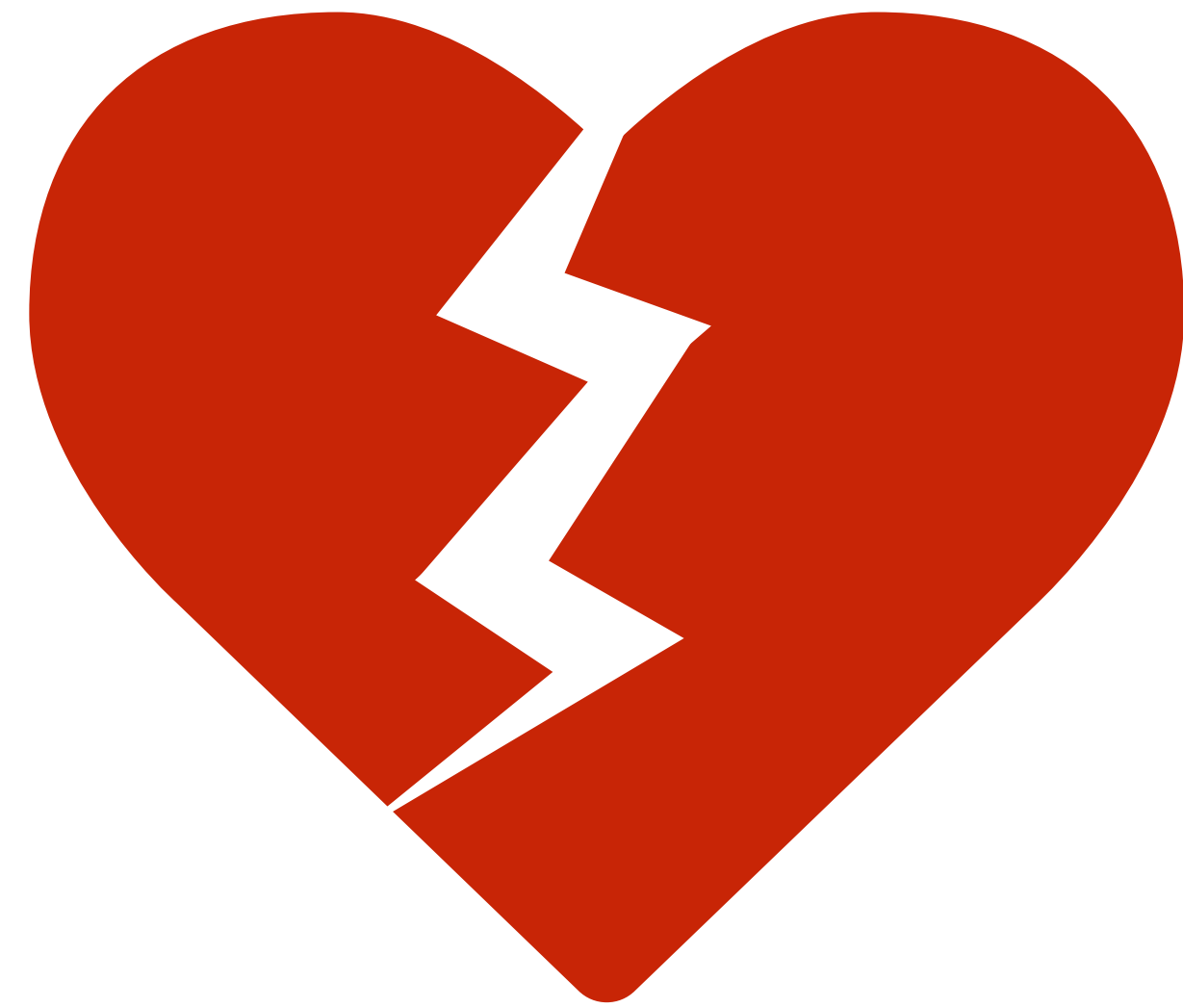
FRONT-END



Mark Hurd  
CEO Oracle







Easy  
Basic  
Generic



Little knowledge does the most damage



- Home
- Customers 7
- Products 10
- Orders 13
- Reports
- Administration

# Customers

Upload Data Create Customer

Search: [ ] Go Actions [ ] [ ] Reset

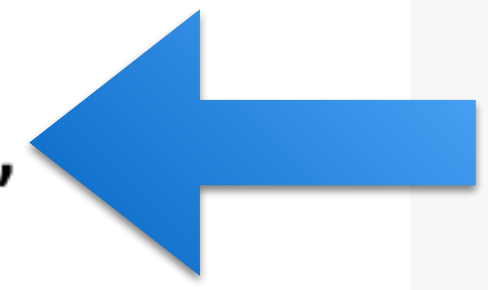
Customer Name	Address	City	State	ZIP Code	Tags
Dulles, John	45020 Aviation Drive	Sterling	VA	20166	
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320	REPEAT CUSTOMER
Logan, Edward	1 Harborside Drive	East Boston	MA	02128	REPEAT CUSTOMER
OHare, Frank	10000 West OHare	Chicago	IL	60666	
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371	
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145	
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096	REPEAT CUSTOMER



# Code Editor - SQL Query




```
1 select customer_id,  
2 cust_last_name || ', ' ||  
3 cust_first_name customer_name,  
4 CUST_STREET_ADDRESS1 ||  
5 decode(CUST_STREET_ADDRESS2, null, null, ', ' || CUST_STREET_ADDRESS2) customer_address,  
6 cust_city,  
7 cust_state,  
8 cust_postal_code,  
9 tags  
10 from demo_customers
```



Cancel

OK





it's all Dynamic SQL

# New Requirement





```
alter table demo_customers
add (cust_rating number (1))
/
```

```
comment on column demo_customers.cust_rating
is
'How do we rate this customer? Score: 0-9'
/
```

```
update demo_customers
  set cust_rating = 5
/
```

```
alter table demo_customers
modify cust_rating not null
/
```

```
alter table demo_customers
add (cust_rating number (1))
/
```

```
comment on column demo_customers.cust_rating
is
'How do we rate this customer? Score: 0-9'
/
```

```
update demo_customers
  set cust_rating = 5
/
```

```
alter table demo_customers
modify cust_rating not null
/
```



```
alter table demo_customers
add (cust_rating number (1))
/
```

```
comment on column demo_customers.cust_rating
is
'How do we rate this customer? Score: 0-9'
/
```

```
update demo_customers
  set cust_rating = 5
/
```

```
alter table demo_customers
modify cust_rating not null
/
```

```
alter table demo_customers
add (cust_rating number (1))
/
```

```
comment on column demo_customers.cust_rating
is
'How do we rate this customer? Score: 0-9'
/
```

```
update demo_customers
   set cust_rating = 5
/
```

```
alter table demo_customers
modify cust_rating not null
/
```



- Home
- Customers 7
- Products 10
- Orders 13
- Reports
- Administration

# Customers

Upload Data Create Customer

Search:  Go Actions Reset

Customer Name	Address	City	State	ZIP Code	Tags
Dulles, John	45020 Aviation Drive	Sterling	VA	20166	
Hartsfield, William	6000 North Terminal Parkway	Atlanta	GA	30320	REPEAT CUSTOMER
Logan, Edward	1 Harborside Drive	East Boston	MA	02128	REPEAT CUSTOMER
OHare, Frank	10000 West OHare	Chicago	IL	60666	
LaGuardia, Fiorello	Hangar Center, Third Floor	Flushing	NY	11371	
Lambert, Albert	10701 Lambert International Blvd.	St. Louis	MO	63145	
Bradley, Eugene	Schoephoester Road	Windsor Locks	CT	06096	REPEAT CUSTOMER

## Sample Database Application - Customer Details



First Name *	<input type="text" value="John"/>	Last Name *	<input type="text" value="Dulles"/>
Street Address	<input type="text" value="45020 Aviation Drive"/>	Line 2	<input type="text"/>
City	<input type="text" value="Sterling"/>	State *	<input type="text" value="Virginia"/>
Postal Code *	<input type="text" value="2016"/>		
Credit Limit *	<input type="text" value="000"/>		
Phone Number	<input type="text" value="703-555-2143"/>	Alternate Number	<input type="text" value="703-555-8967"/>
Email	<input type="text" value="john.dulles@email.com"/>	URL	<input type="text" value="http://www.johndulles.com"/>
Tags	<input type="text"/>		



Cancel

Delete

Apply Changes



## Sample Database Application - Customer Details



First Name \*

Last Name \*

Street Address

Line 2

City

State \*

Postal Code \*

Credit Limit \*

Phone Number

Alternate Number

Email

URL

Tags

Cancel

Add Customer

## Sample Database Application - Customer Details



First Name \*

Last Name \*

Street Address

Line 2

City

State \*

Postal Code \*

Credit Limit \*

Phone Number

Alternate Number

Email

URL

Tags

Cancel

Add Customer



# Sample Database Application - Customer Details

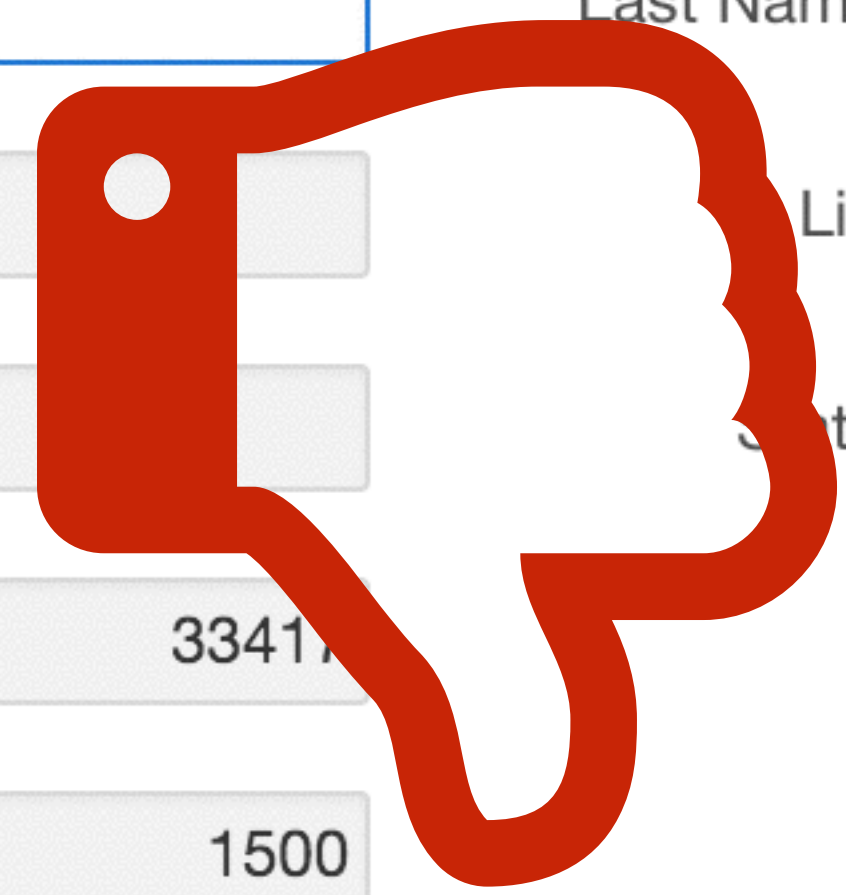


**1 error has occurred**




cannot insert NULL into ("NUIJTEN"."DEMO\_CUSTOMERS"."CUST\_RATING")

First Name *	<input type="text" value="Alex"/>	Last Name *	<input type="text" value="Nuijten"/>
Street Address	<input type="text"/>	Line 2	<input type="text"/>
City	<input type="text" value="West Palm Beach"/>	State *	<input type="text" value="Florida"/>
Postal Code *	<input type="text" value="33411"/>		
Credit Limit *	<input type="text" value="1500"/>		
Phone Number	<input type="text" value="999-999-9999"/>	Alternate Number	<input type="text" value="999-999-9999"/>



Cancel

Add Customer



it's all Dynamic SQL





0 - Page Zero



1 - Sample Database Application



2 - Customers



3 - Products



4 - Orders



5 - Sales by Month



6 - Product Details



7 - Customer Details



8 - Order Confirmation



9 - Application Theme Style



10 - Order Calendar



11 - Identify Customer



12 - Order Items



13 - Customer Map



14 - Order Summary



15 - Help



16 - Sales by Category



17 - Customer Orders



18 - Preferences



19 - Product Order Tree



20 - Product Info



21 - Data Load Source



22 - Data / Table Mapping



23 - Data Validation



24 - Data Load Results



25 - Manage Sample Data



26 - Reports



27 - Sales by Product



28 - Tags



29 - Order Details



30 - Search Results



31 - Sales by State



33 - Administration



35 - Maintain States



38 - Top Users



39 - Page View



40 - Activity Calendar



41 - Data Load Source



42 - Data / Table Mapping



43 - Data Validation



44 - Data Load Results



101 - Login



102 - Feedback



199 - Global Page - jQuery Mobile Smart...



200 - Mobile Home Page



201 - Customers



202 - Maintain Customer



203 - Products



204 - Maintain Product



205 - Orders



206 - Maintain Order



207 - Maintain Order Item



208 - Reports



209 - Customer Orders



210 - Sales by Category



211 - Sales by Product



212 - Sales by Category / Month



213 - Sales by State



214 - Tags



215 - Order Calendar



216 - Create Order



217 - Select Items



218 - Order Summary



219 - Order Calendar



226 - Create Order



255 - Orders



1001 - Login Page






 1
 

Edit Application Properties



Shared Components



Utilities



Export / Import

Create Page >



Customers



3 - Products



4 - Orders



5 - Sales by Month

Tasks

Delete this Application >

Copy this Application >

Recently Edited Pages

5. Sales by Month

27. Sales by Product

17. Customer Orders

4. Orders

38. Top Users

3. Products

2. Customers

39. Page Views



Search


Search


demo\_customer



Search

Close

Case sensitive 

Current page only 



Search  Case sensitive  Current page only 

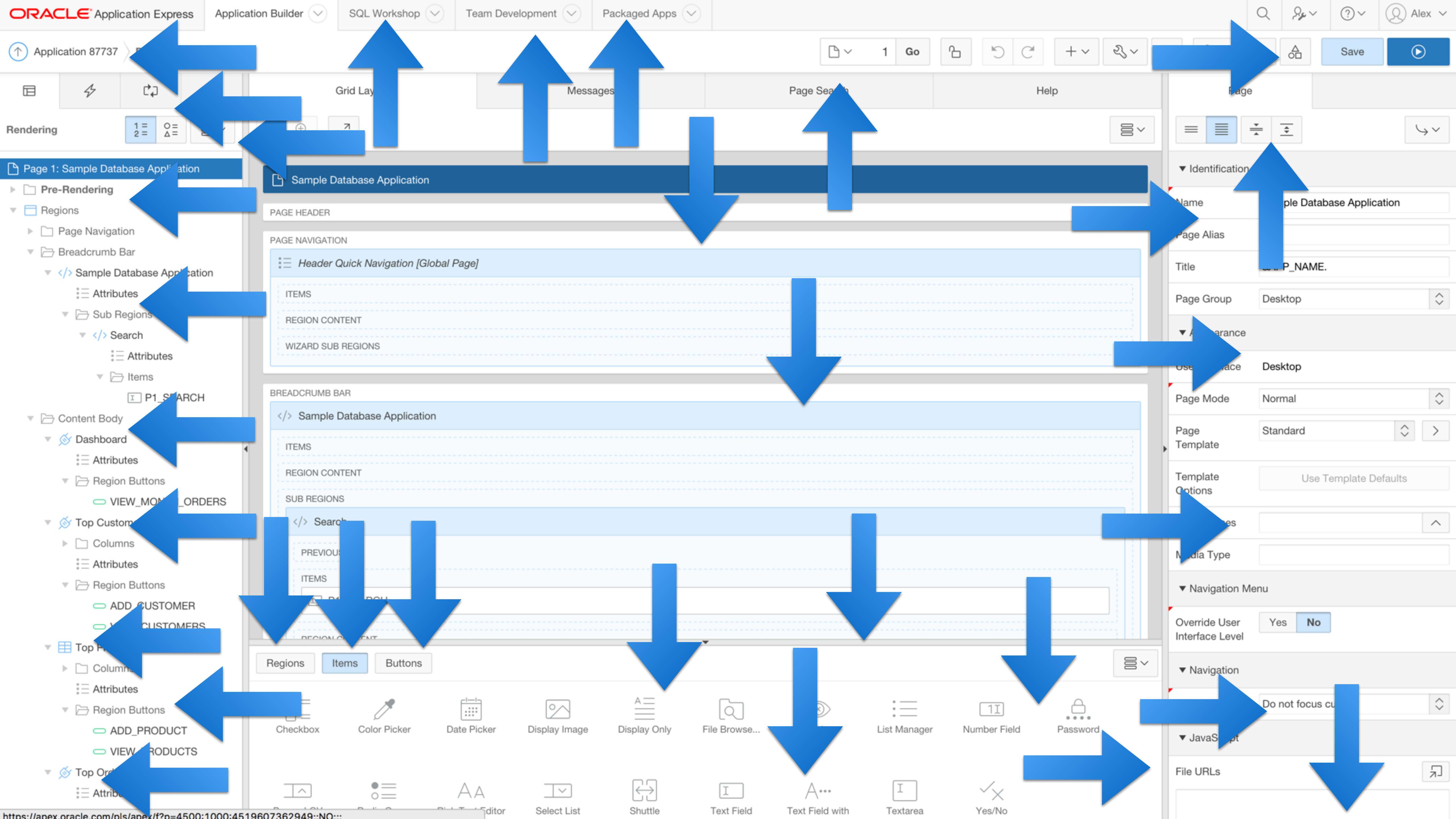
Applications &gt; 87737 - Sample Database Application &gt; Pages &gt; 1 - Sample Database Application &gt; Regions &gt; Dashboard

Attribute	Region Source (Identifies the source of the region, reference Region Source Type)
Value	<pre> select   'Monthly Sales' as label,   '\$'    trim(to_char(nvl(sum(o.order_total),0),'999G999G999G999G990')) as value,   'f?p='    :APP_ID    ':4:'    :APP_SESSION    ':::4,RIR:IRGTE_ORDER_DATE:'    :P1_THIS_MONTH as url from demo_orders o where order_timestamp &gt;= to_date(to_char(sysdate,'YYYYMM')  '01','YYYYMMDD') union all select   'Monthly Orders' as label,   trim(to_char(count(distinct o.order_id),'999G999G999G999G990')) as value,   'f?p='    :APP_ID    ':4:'    :APP_SESSION    ':::4,RIR:IRGTE_ORDER_DATE:'    :P1_THIS_MONTH as url from demo_orders o where order_timestamp &gt;= to_date(to_char(sysdate,'YYYYMM')  '01','YYYYMMDD') union all select 'Total Products' as label,   trim(to_char(count(distinct p.product_name),'999G999G999G999G990')) as value,   'f?p='    :APP_ID    ':3:'    :APP_SESSION    ':::' as url from demo_product_info p union all select 'Total Customers' as label,   trim(to_char(count(*),'999G999G999G999G990')) as value,   'f?p='    :APP_ID    ':2:'    :APP_SESSION    ':::' as url from DEMO_CUSTOMERS </pre>
	<input type="button" value="View"/>

Applications &gt; 87737 - Sample Database Application &gt; Pages &gt; 1 - Sample Database Application &gt; Regions &gt; Top Customers

Attribute	Region Source (Identifies the source of the region, reference Region Source Type)
	SELECT





Search  Case sensitive  Current page only 

Applications &gt; 87737 - Sample Database Application &gt; Pages &gt; 1 - Sample Database Application &gt; Regions &gt; Dashboard

Attribute Region Source (Identifies the source of the region, reference Region Source Type)

```

select
  'Monthly Sales' as label,
  '$' || trim(to_char(nvl(sum(o.order_total),0),'999G999G999G999G990')) as value,
  'f?p=' || :APP_ID || ':4:' || :APP_SESSION || ':::4,RIR:IRGTE_ORDER_DATE:' || :P1_THIS_MONTH as url
from demo_orders o
where order_timestamp >= to_date(to_char(sysdate,'YYYYMM')||'01','YYYYMMDD')
union all
select
  'Monthly Orders' as label,
  trim(to_char(count(distinct o.order_id),'999G999G999G999G990')) as value,
  'f?p=' || :APP_ID || ':4:' || :APP_SESSION || ':::4,RIR:IRGTE_ORDER_DATE:' || :P1_THIS_MONTH as url
from demo_orders o
where order_timestamp >= to_date(to_char(sysdate,'YYYYMM')||'01','YYYYMMDD')
union all
select 'Total Products' as label,
  trim(to_char(count(distinct p.product_name),'999G999G999G999G990')) as value,
  'f?p=' || :APP_ID || ':3:' || :APP_SESSION || ':::' as url
from demo_product_info p
union all
select 'Total Customers' as label,
  trim(to_char(count(*),'999G999G999G999G990')) as value,
  'f?p=' || :APP_ID || ':2:' || :APP_SESSION || ':::' as url
from DEMO_CUSTOMERS

```

Applications &gt; 87737 - Sample Database Application &gt; Pages &gt; 1 - Sample Database Application &gt; Regions &gt; Top Customers

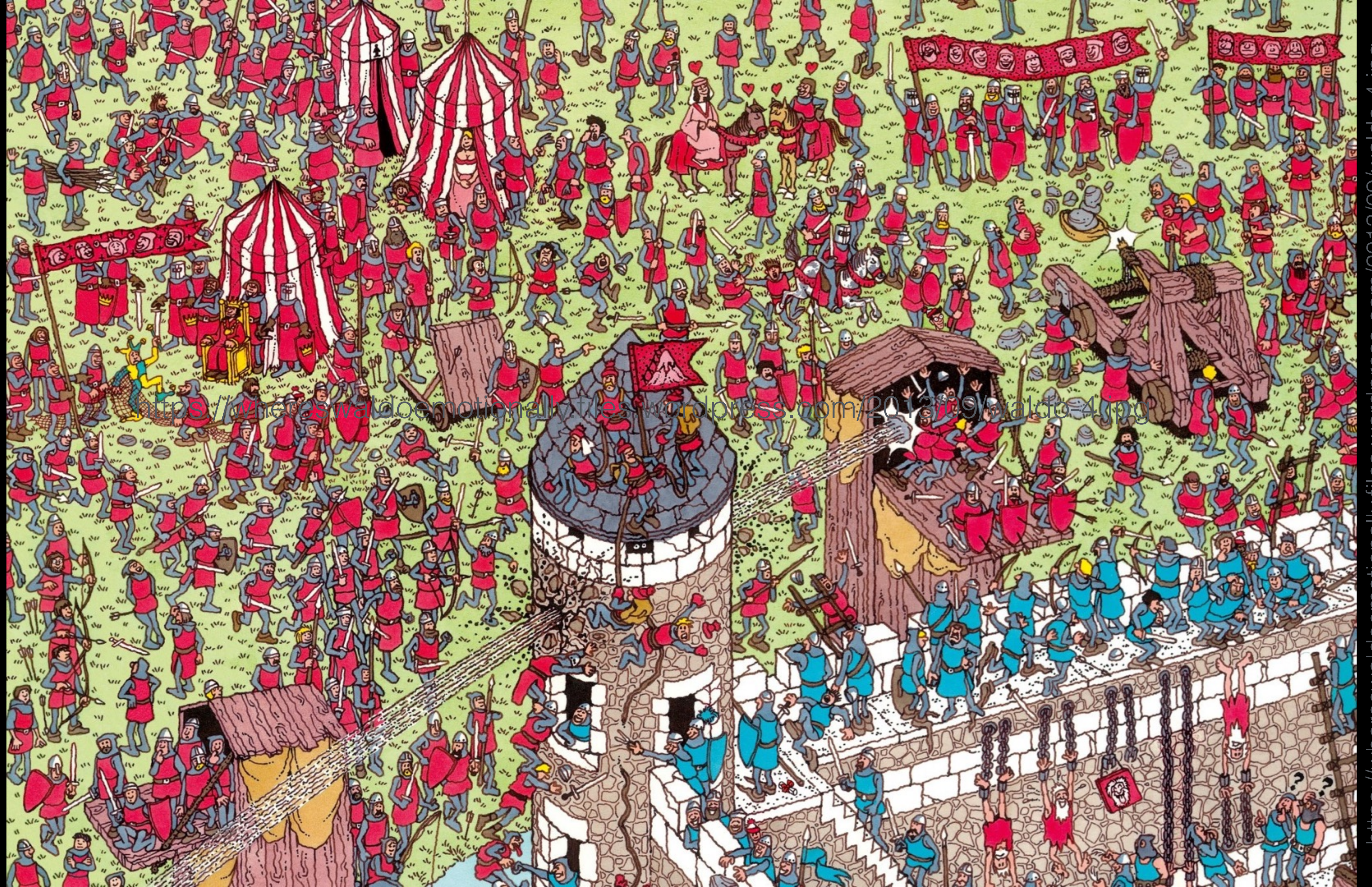
Attribute Region Source (Identifies the source of the region, reference Region Source Type)

SELECT









<https://whereswaldoemotionally.files.wordpress.com/2013/09/waldo-4.jpg>









Easy  
to make  
a mess



Ich bin ein















] 10%



90%





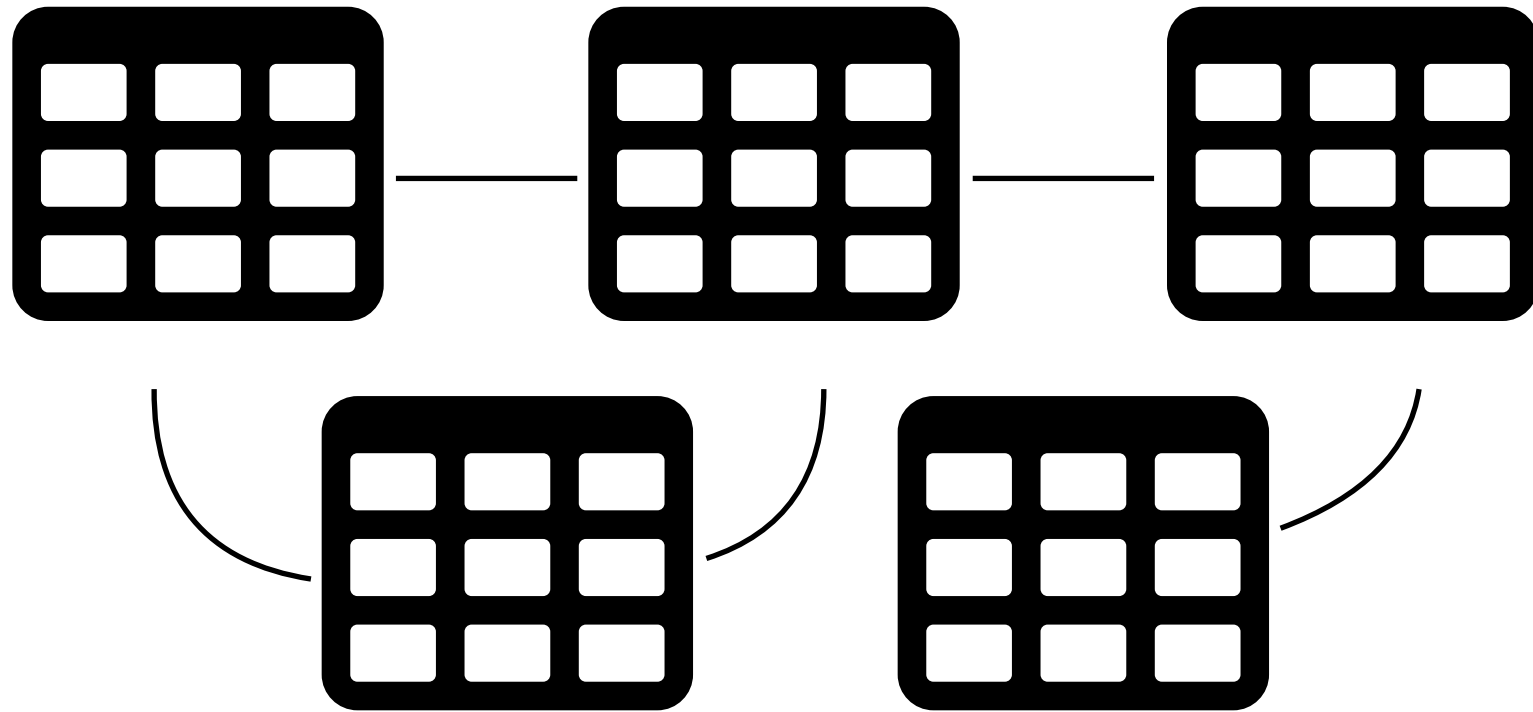






Views

Packages







Page Alias

Page Groups

Never Access Tables Directly

One or More Views per Page

Only Calls to Packages



Page Alias

Page Groups

Never Access Tables Directly

One or More Views per Page

Only Calls to Packages

<APP\_ALIAS><Page Nr>

STRUCT1234



0

999

General Purpose

1000

6999

Main Application

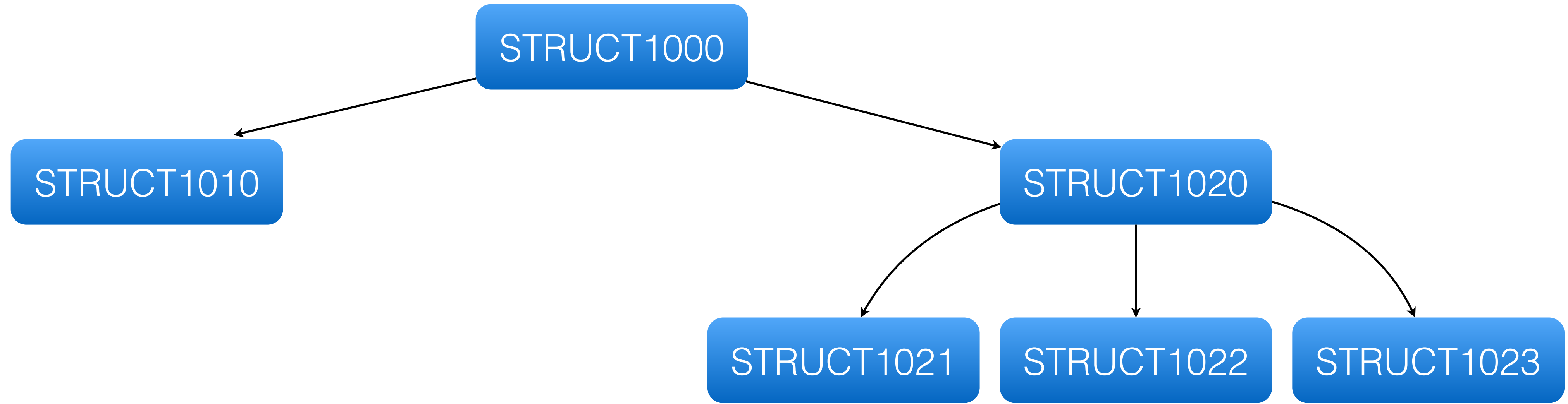
7000

8999

Reporting

9000

Maintenance, Configuration





STRUCT1000 release 1.0 Set Screen Reader Mode On

```
select page_alias
       from apex_application_pages
       where application_id = :APP_ID
             and page_id = :APP_PAGE_ID
```



# Application Computation

Show All

Item

Frequency

Computation

## Item

Application: **81456 Structured** ?

Sequence  ?

\* Computation Item  ^ ?



## Frequency

Computation Point  ?

## Computation

Computation Type  ?

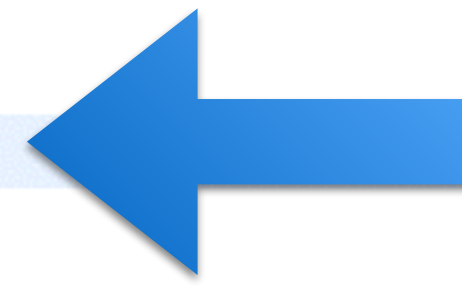
\* Computation

```
select page_alias
  from apex_application_pages
 where application_id = :APP_ID
       and page_id = :APP_PAGE_ID
```

\* Body ?



```
1 <div class="t-Body">
2   #SIDE_GLOBAL_NAVIGATION_LIST#
3   <div class="t-Body-main">
4     <div class="t-Body-title" id="t_Body_title">
5       #REGION_POSITION_01#
6     </div>
7     <div class="t-Body-content" id="t_Body_content">
8       #SUCCESS_MESSAGE##NOTIFICATION_MESSAGE##GLOBAL_NOTIFICATION#
9       <div class="t-Body-contentInner">
10        #BODY#
11      </div>
12      <footer class="t-Footer">
13        &APP_PAGE_ALIAS.
14        #APP_VERSION#
15        #CUSTOMIZE#
16        #SCREEN_READER_TOGGLE#
17        #REGION_POSITION_05#
18      </footer>
19    </div>
20  </div>
21 </div>
```







Structured



Home



Charts and Reports



Maintenance

# Home

STRUCT1000 release 1.0 [Set Screen Reader Mode On](#)



Page Alias




Page Groups




Never Access Tables Directly




One or More Views per Page

Only Calls to Packages



-  Home
-  Charts and Reports
-  Maintenance

-  Home
-  Charts and Reports
-  Maintenance

-  Home
-  Charts and Reports
-  Maintenance



Run Application



Supporting Objects



Shared Components

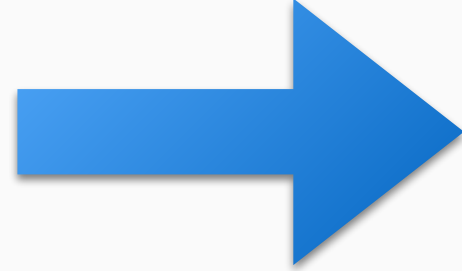


Utilities



Export / Import





Page Specific Utilities	
Cross Page Utilities	>
Page Groups	>
Region Utilities	>
Button Utilities	>
Item Utilities	>
Computation Utilities	>
Validation Utilities	>
Process Utilities	>
Dynamic Action Utilities	>
Branch Utilities	>
Interactive Report Utilities	
Saved Reports	>
Subscriptions	>

**Page Groups**

Page Assignments

Pages by Page Group



Go



Actions ▾



Charts and Reports (0)



Home (0)



Maintenance (0)

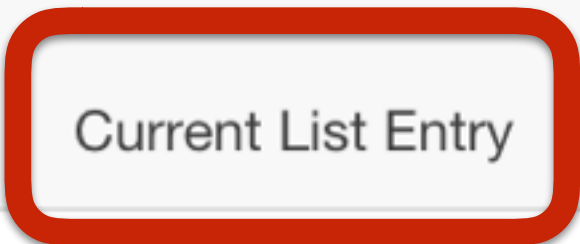


```
function page_in_group(  
    p_app_id      in number  
    ,p_page_id    in number  
    ,p_page_group in varchar2  
    )  
    return boolean  
is  
    l_retval boolean;  
    l_dummy  number;  
begin  
    begin  
        select 1  
            into l_dummy  
            from apex_application_pages  
            where application_id = p_app_id  
                  and page_id    = p_page_id  
                  and page_group = p_page_group;  
        l_retval := l_dummy = 1;  
    exception  
        when no_data_found then  
            l_retval := false;  
    end;  
    return l_retval;  
end page_in_group;
```

```
function page_in_group(  
    p_app_id      in number  
    ,p_page_id    in number  
    ,p_page_group in varchar2  
    )  
    return boolean  
is  
    l_retval boolean;  
    l_dummy  number;  
begin  
    begin  
        select 1  
            into l_dummy  
            from apex_application_pages  
            where application_id = p_app_id  
                and page_id      = p_page_id  
                and page_group   = p_page_group;  
        l_retval := l_dummy = 1;  
    exception  
        when no_data_found then  
            l_retval := false;  
    end;  
    return l_retval;  
end page_in_group;
```



< > List Entry



Show All

Entry

Target

Current List Entry

Conditions

Authorization

Entry

List: Desktop Navigation Menu ?

Parent List Entry - No Parent List Item - ?

Sequence 10 ?

Image/Class ^ ?

Attributes ^ ?

Alt Attribute ?

\* List Entry Label Home ?

## Current List Entry

List Entry Current for Pages Type

PL/SQL Expression



List Entry Current for Condition

```
page_in_group (  
  p_app_id => :APP_ID  
  ,p_page_id => :APP_PAGE_ID  
  ,p_page_group => 'Home'  
);
```

One for each  
Page Group



# Create a Page



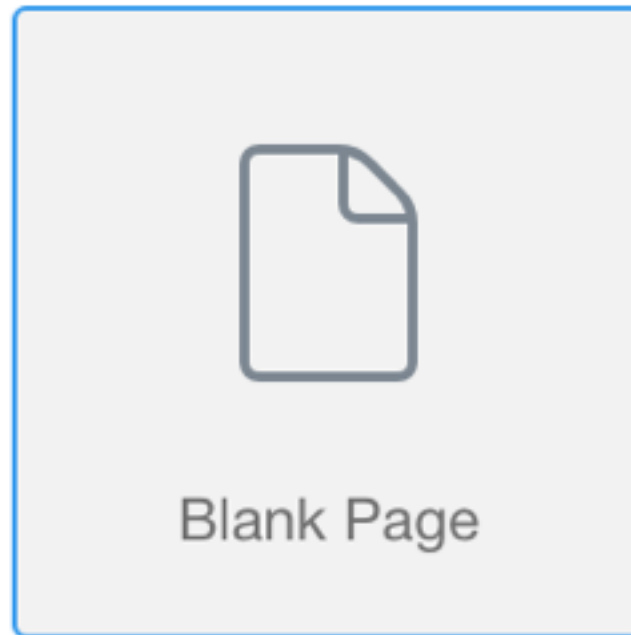
Application

81456 - Structured 

\* User Interface

Desktop  

Select a page type: 



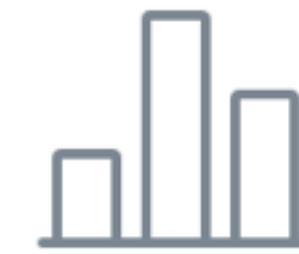
Report



Form



Plug-ins



Chart



Map Chart



Tree



Calendar



Wizard



Data Loading



Cancel

Next >

# Create a Blank Page



## Page Attributes

\* Page Number  ?

\* Name  ?

\* Page Mode  ?

Page Group  ?

Breadcrumb  ?

## > Optional Static Content Regions



Cancel

Next >



▼ Identification

Name

Home

Page Alias

STRUCT1000


Title

Page Group

- Select -
- Charts and Reports
- ✓ Home
- Maintenance

▼ Appearance

 Home

 Charts and Reports

 Maintenance





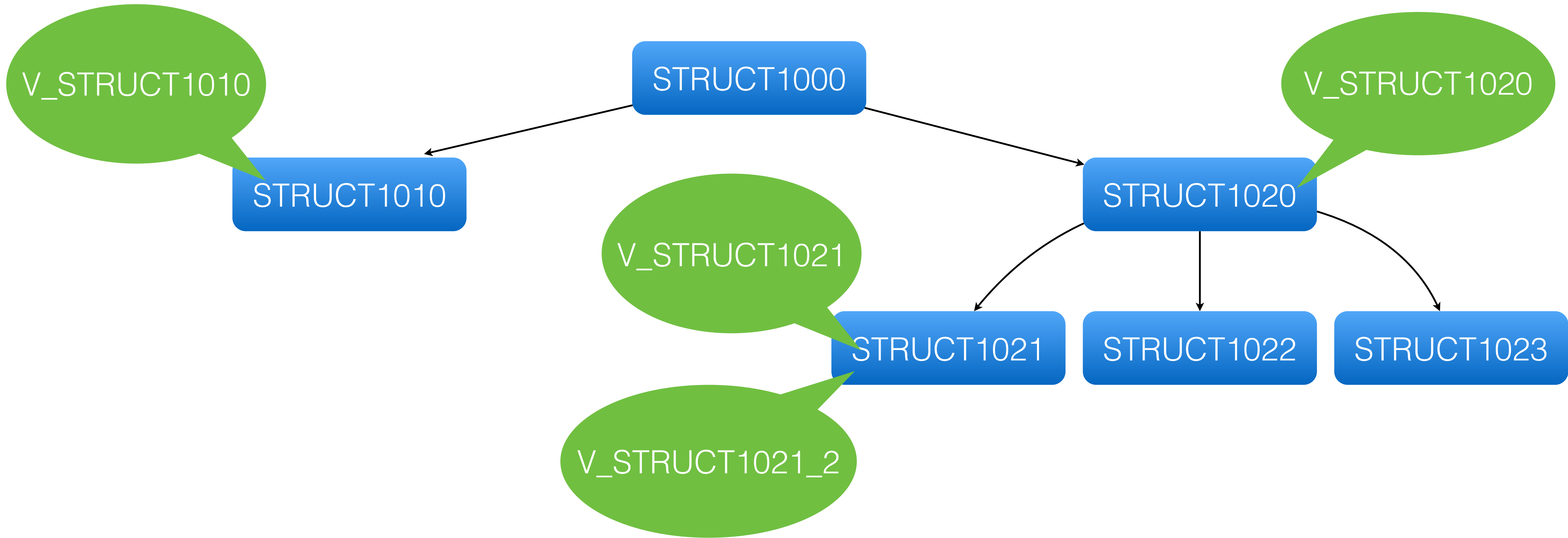
Page Alias

Page Groups

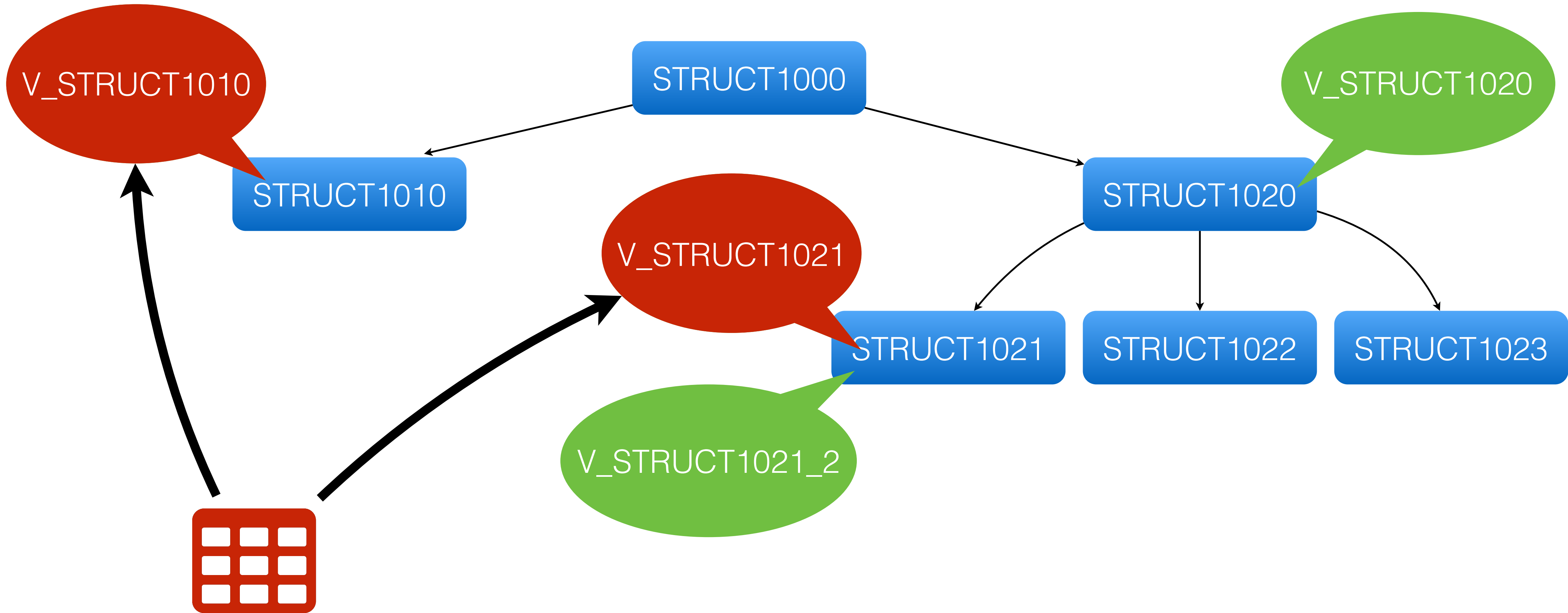
Never Access Tables Directly

One or More Views per Page

Only Calls to Packages









0 - Page



1 - Sample Database Application



2 - Custom



3 - Product



4 - Order



5 - Sales by



6 - Product Detail



7 - Customer Detail



8 - Order Confirmation



9 - Application Theme Style



10 - Order Calendar



11 - Identify Customer



12 - Order Items



13 - Customer Map



14 - Order Summary



15 - Help



16 - Sales by Category



17 - Customer



18 - Preferences



19 - Product Order Type



20 - Product Info



21 - Data Load Source



22 - Data / Table Mapping



23 - Data Validation



24 - Data Load Results



25 - Manage Sample Data



26 - Reports



27 - Sales by Product



28 - Tags



29 - Order Details



30 - Search Results



31 - Sales by State



33 - Administration



35 - Maintain Sites



38 - Top Users



39 - Page Views



40 - Activity Calendar



41 - Data Load Source



42 - Data / Table Mapping



43 - Data Validation



44 - Data Load Results



101 - Login



102 - Feeds



199 - Global Page - jQuery Mobile Smart...



200 - Mobile Home Page



201 - Custom



202 - Maintain Customer



203 - Product



204 - Maintain Product



205 - Orders



206 - Maintain Order



207 - Maintain Order Item



208 - Reports



209 - Customer Orders



210 - Sales by Category



211 - Sales by Product



212 - Sales by Category Month



213 - Sales by State



214 - Tags



215 - Order Calendar



216 - Create Order



217 - Select Items



218 - Order Summary



219 - Order Calendar



226 - Create User



255 - Order



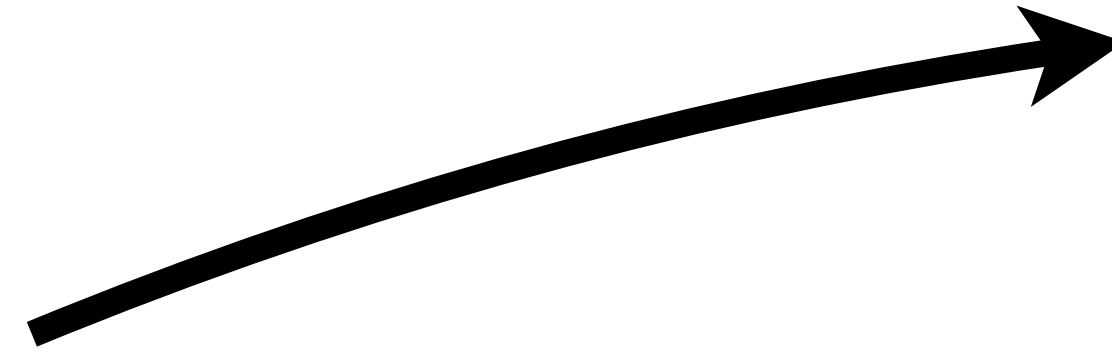
1001 - Login Page



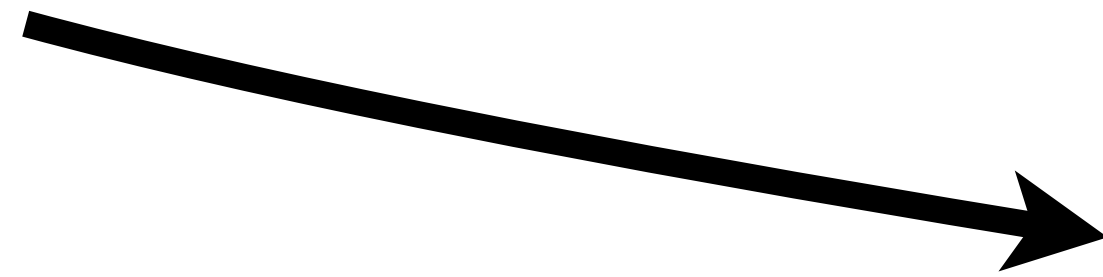


Reports: Read Only Views

Regular Views



Simple Views

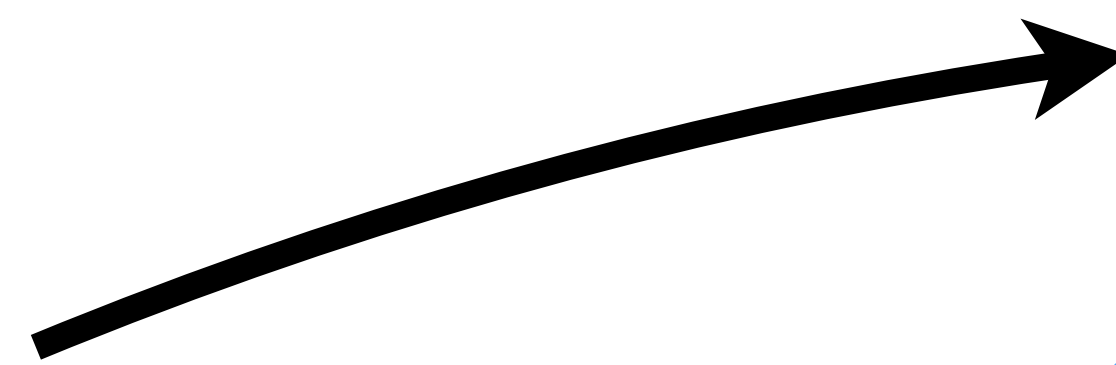


Complex Views





# Regular Views

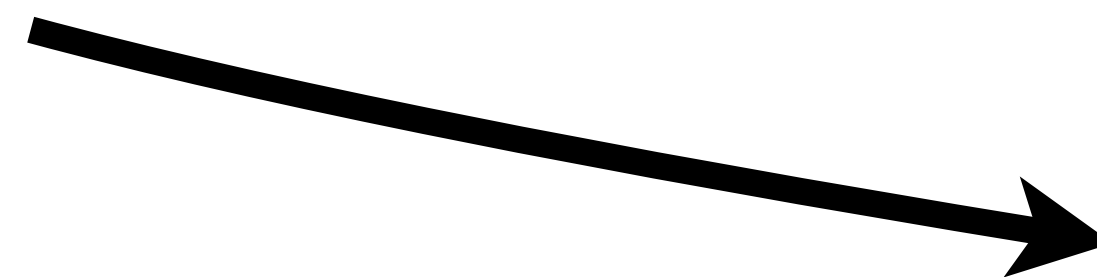


Simple Views

They're Easy

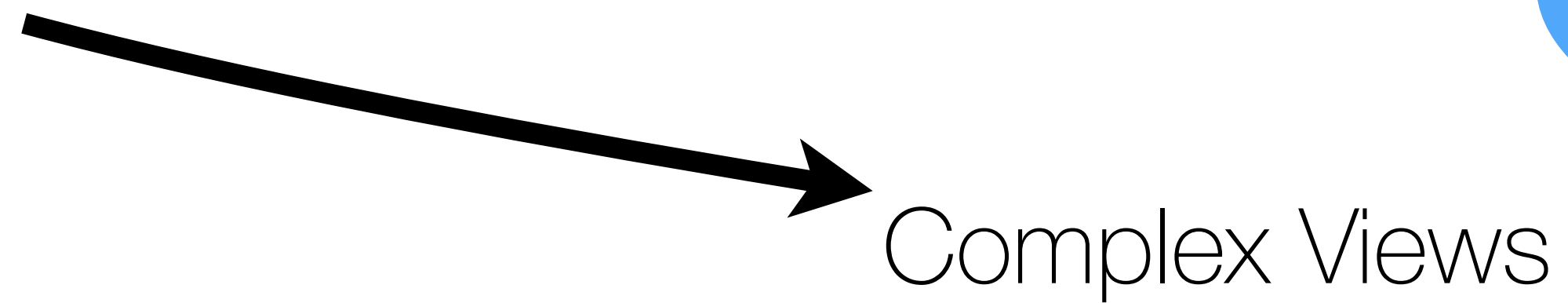
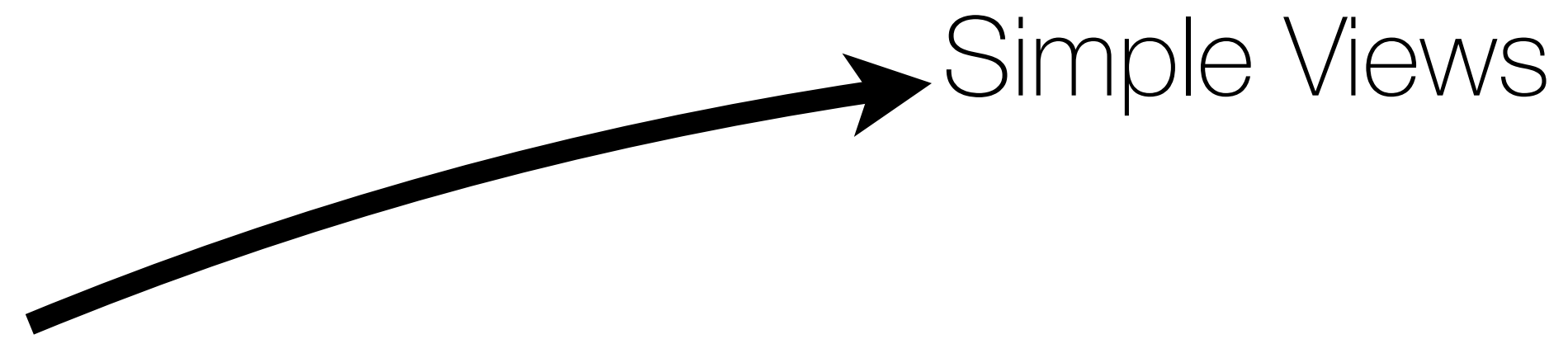
With Check  
Option

Just follow the  
Wizard



Complex Views

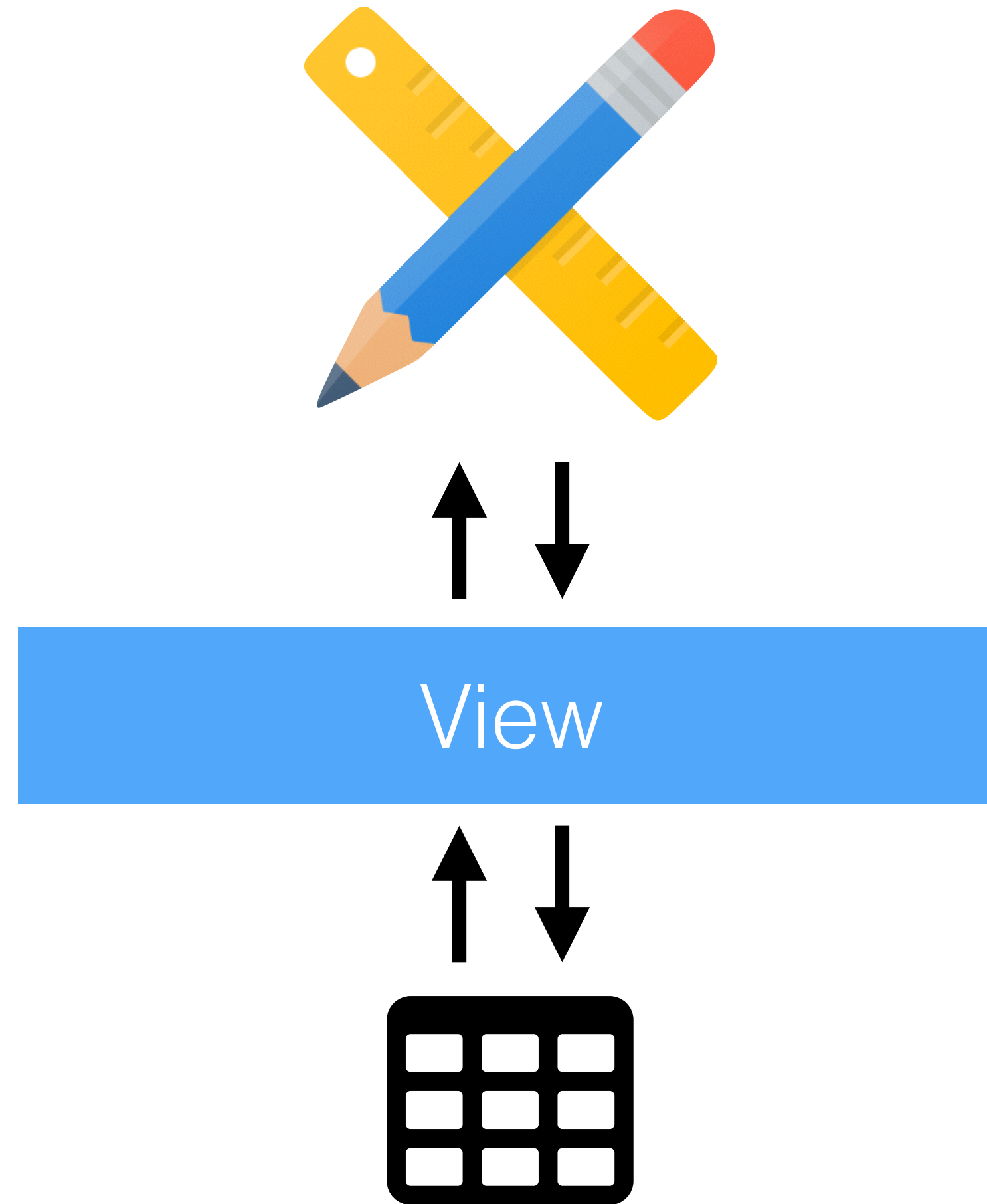
# Regular Views



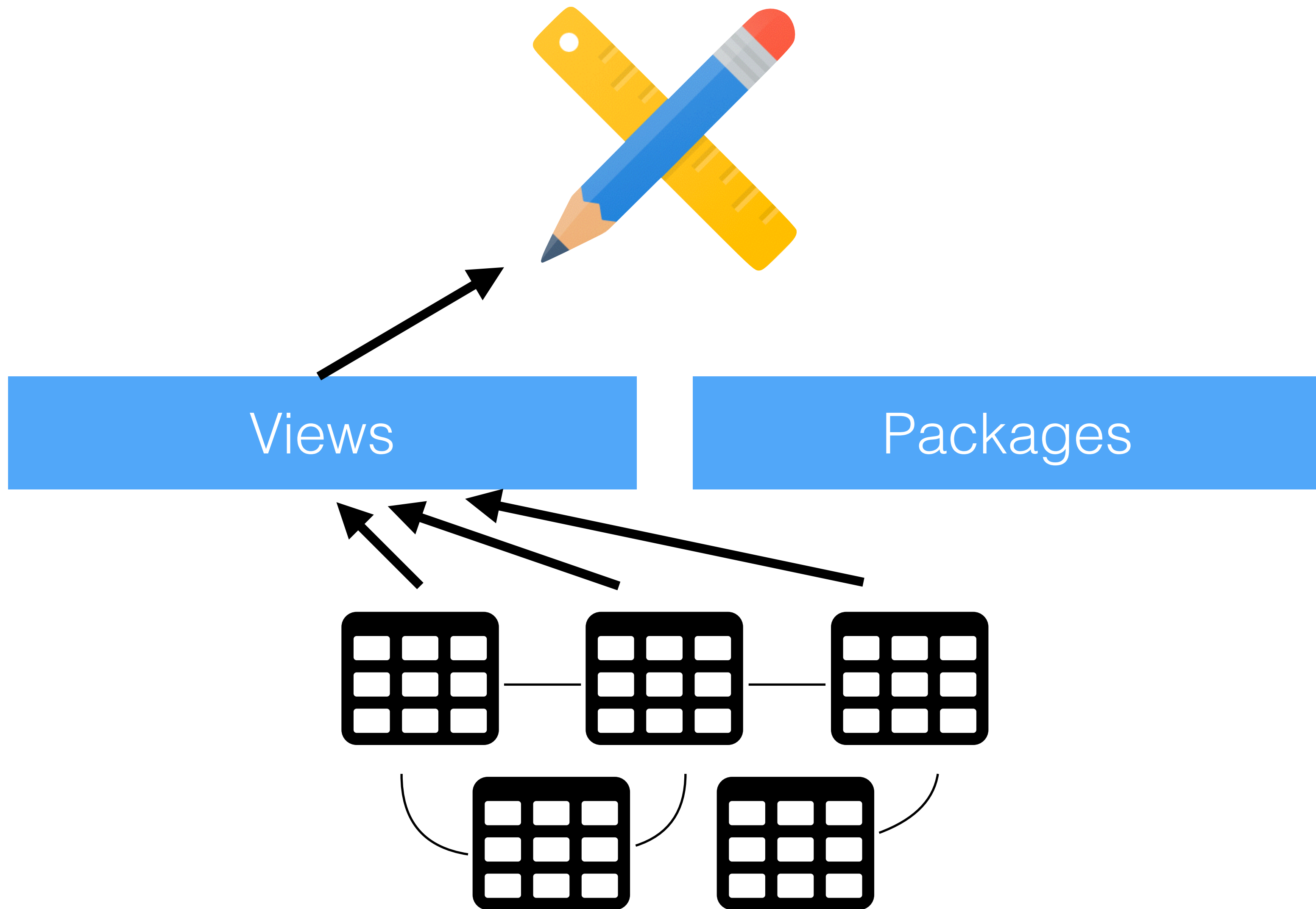
They're Harder

Replace DML  
Processes



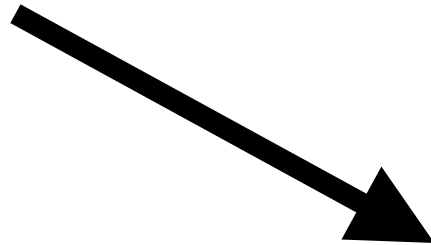


# Complex Views



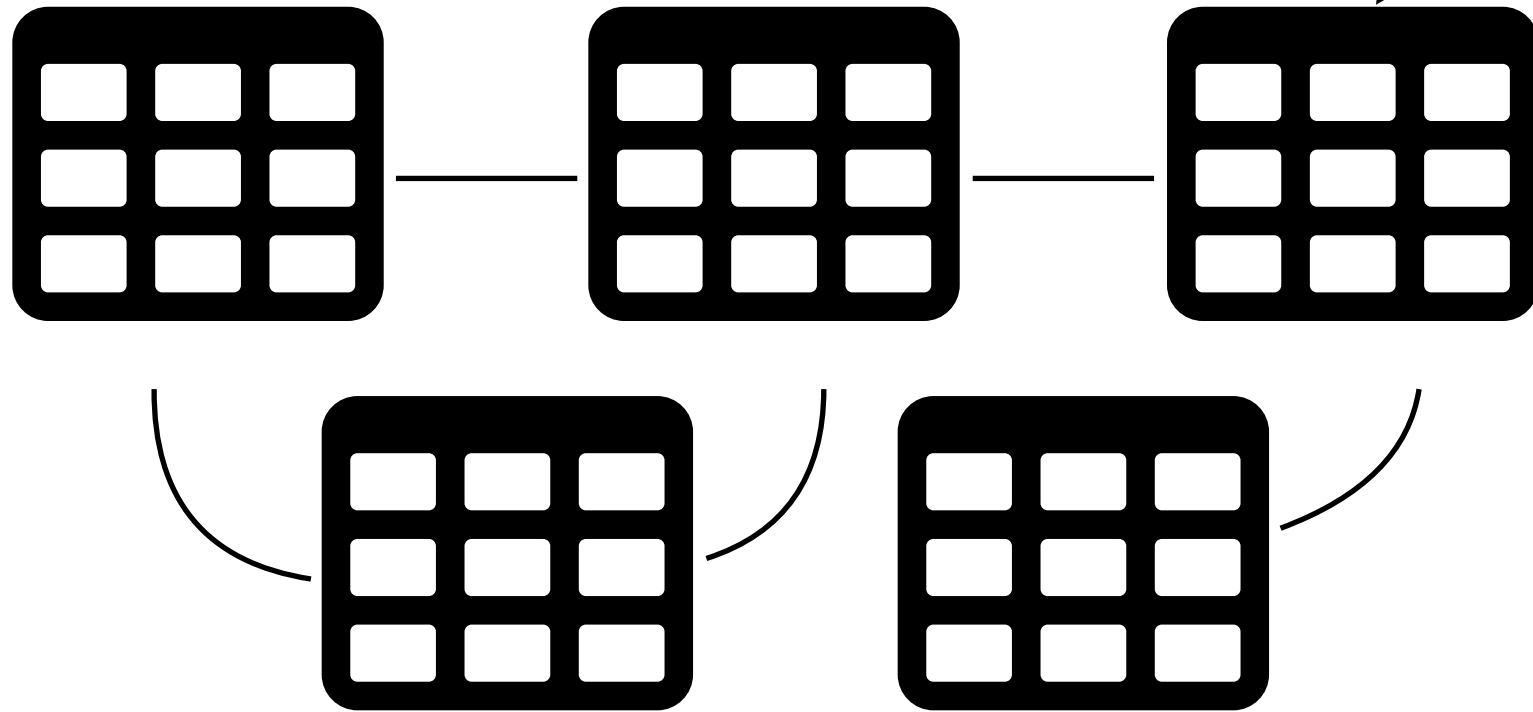
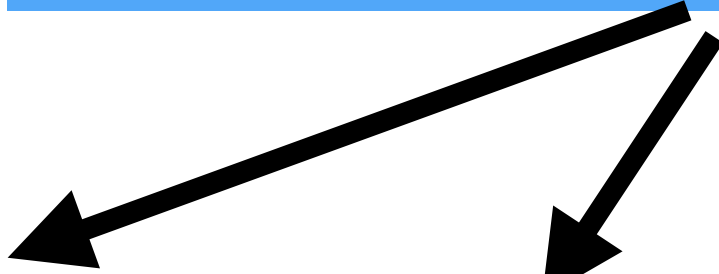


# Complex Views



Views

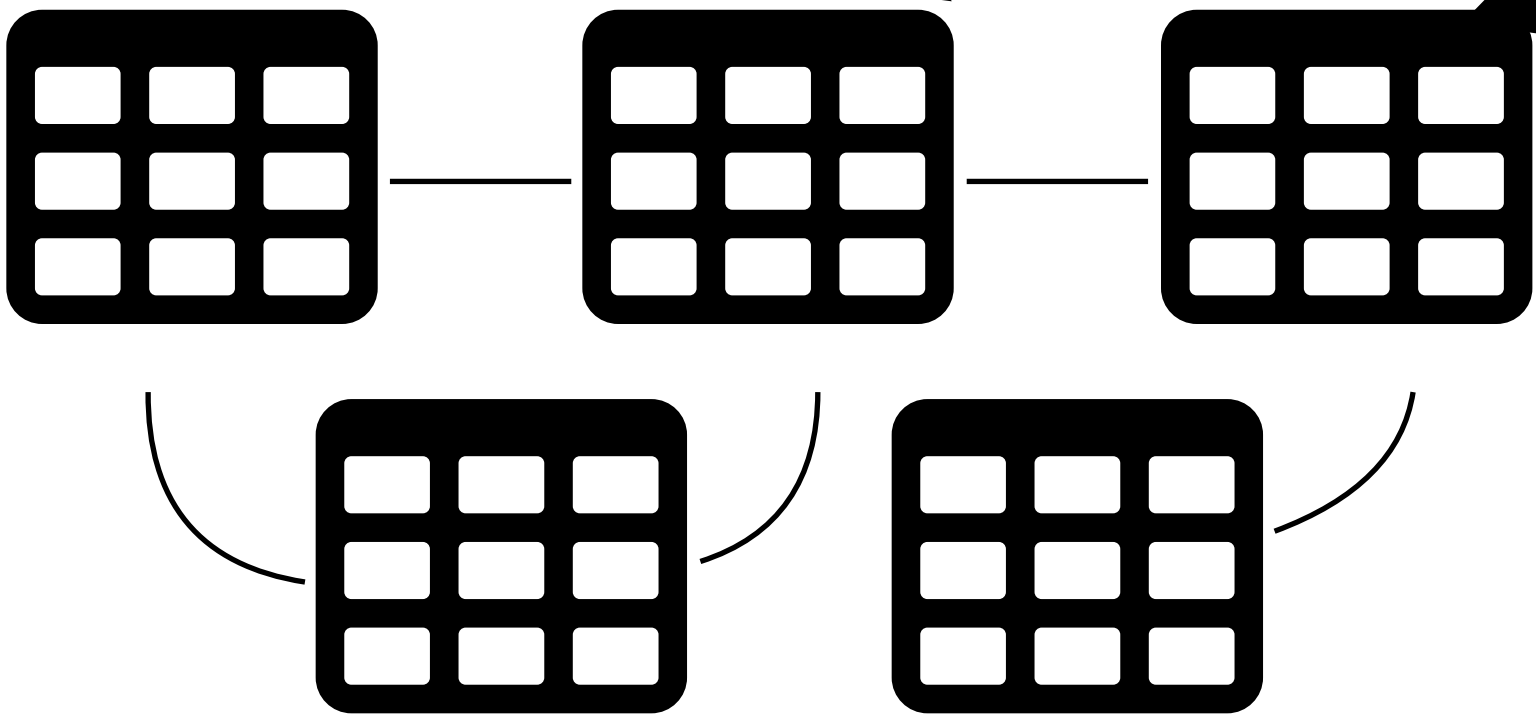
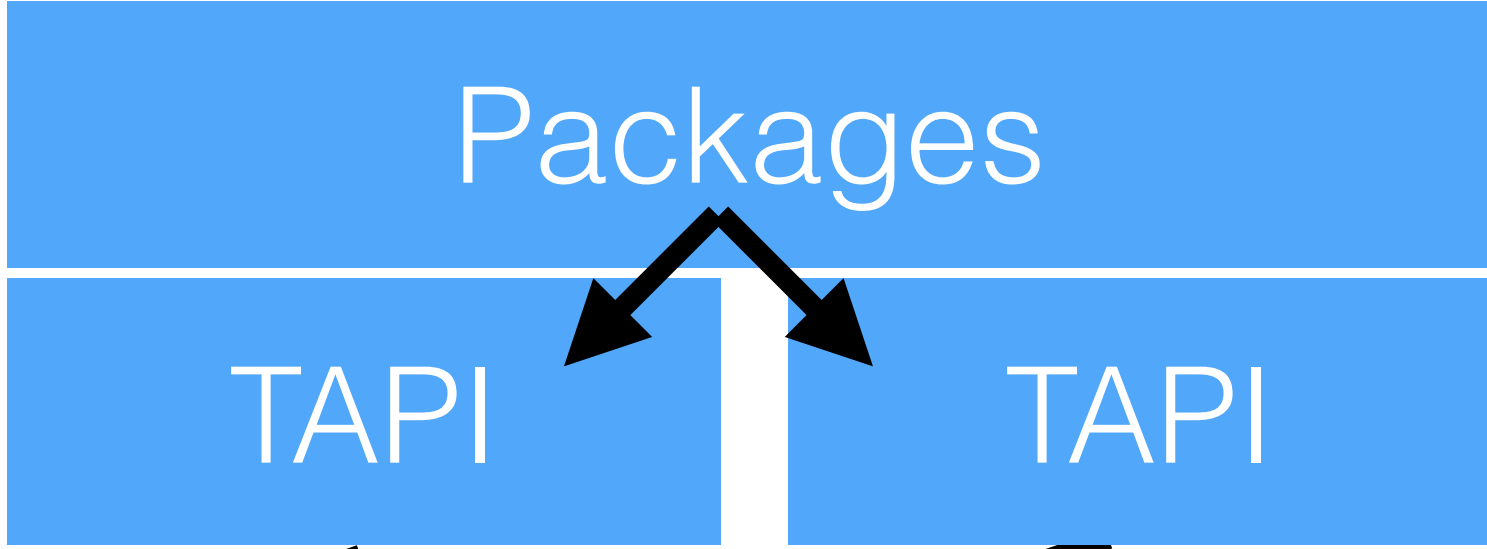
Packages



Complex Views

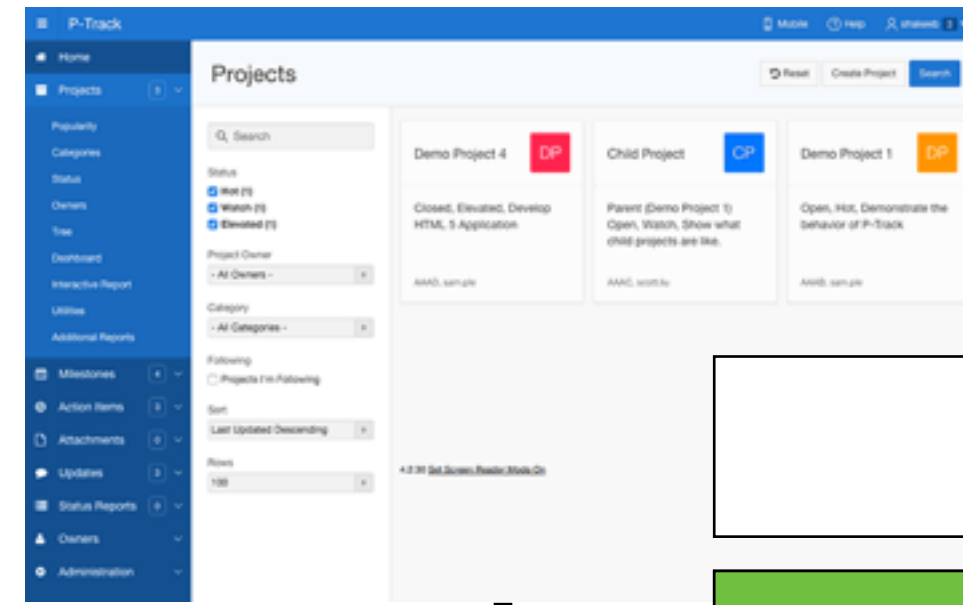


Views



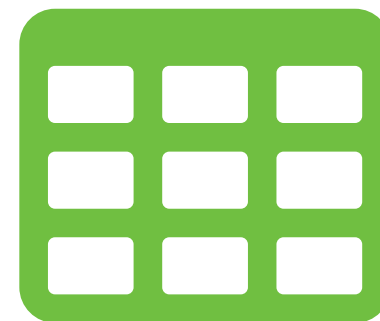


Lost Update



Scott

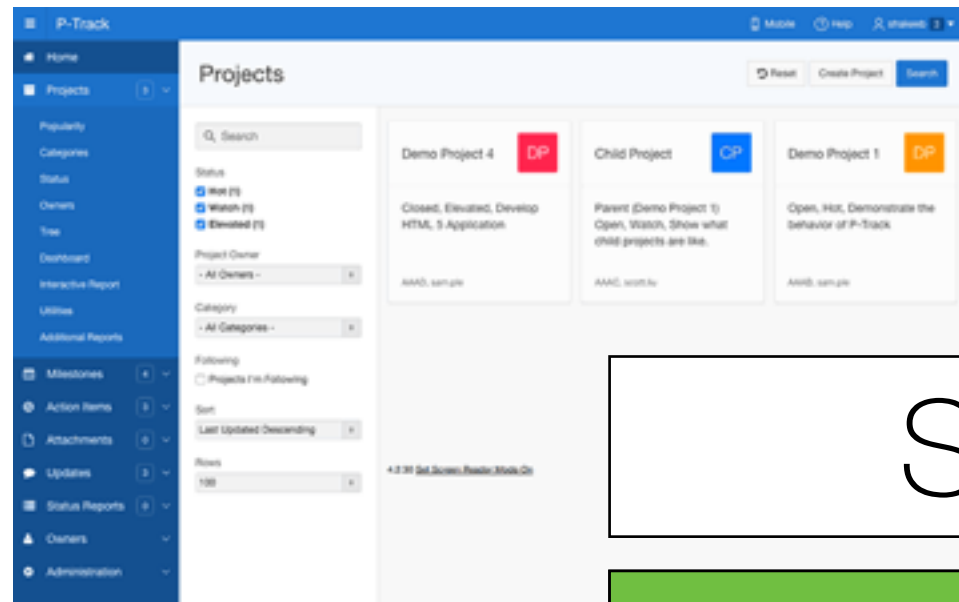
Deptno: 20



Scott

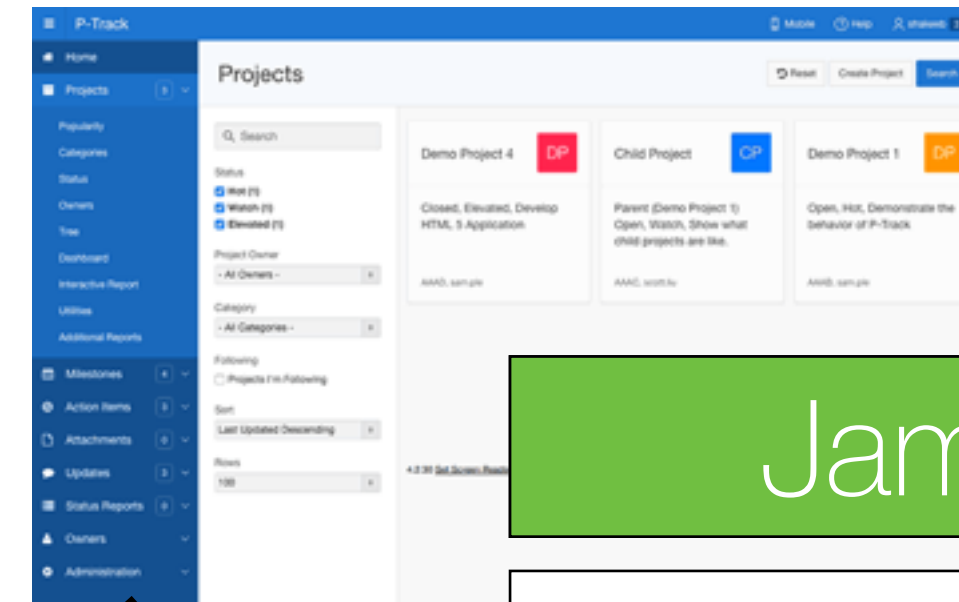
Deptno: 20





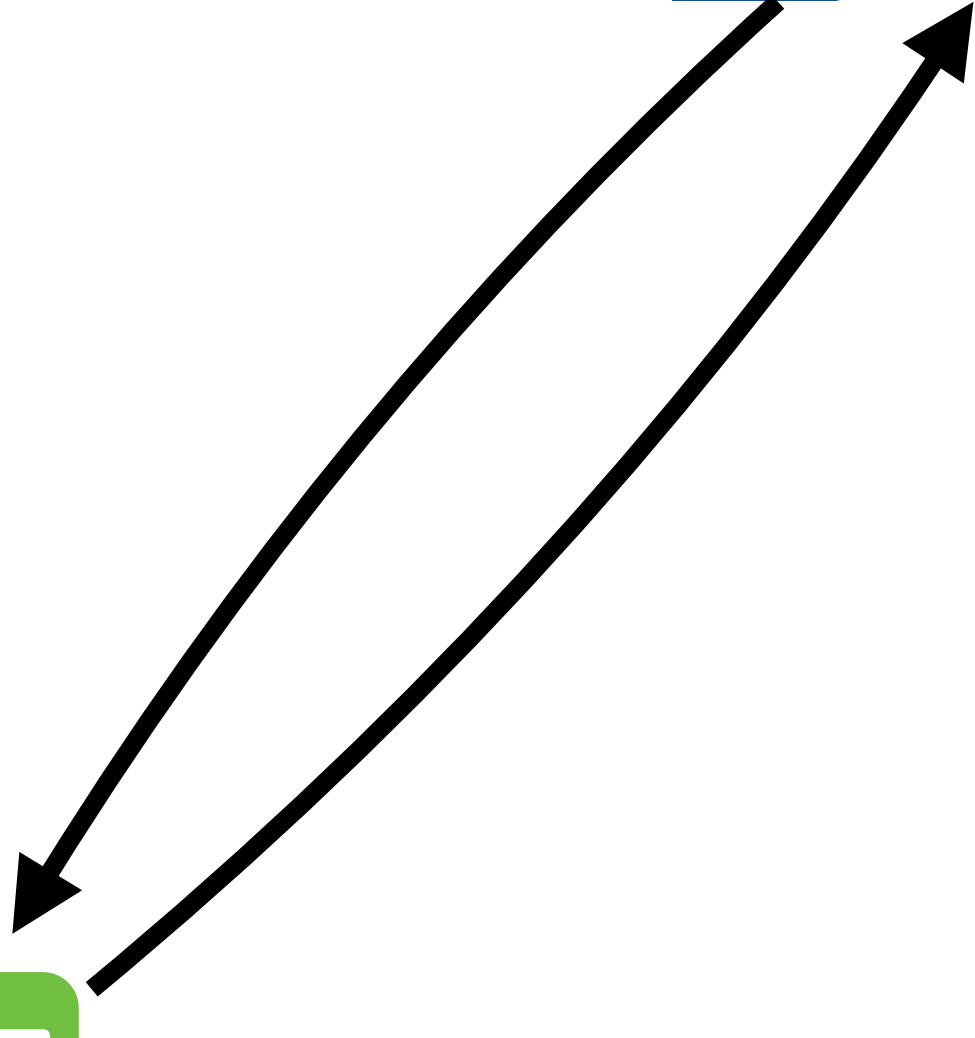
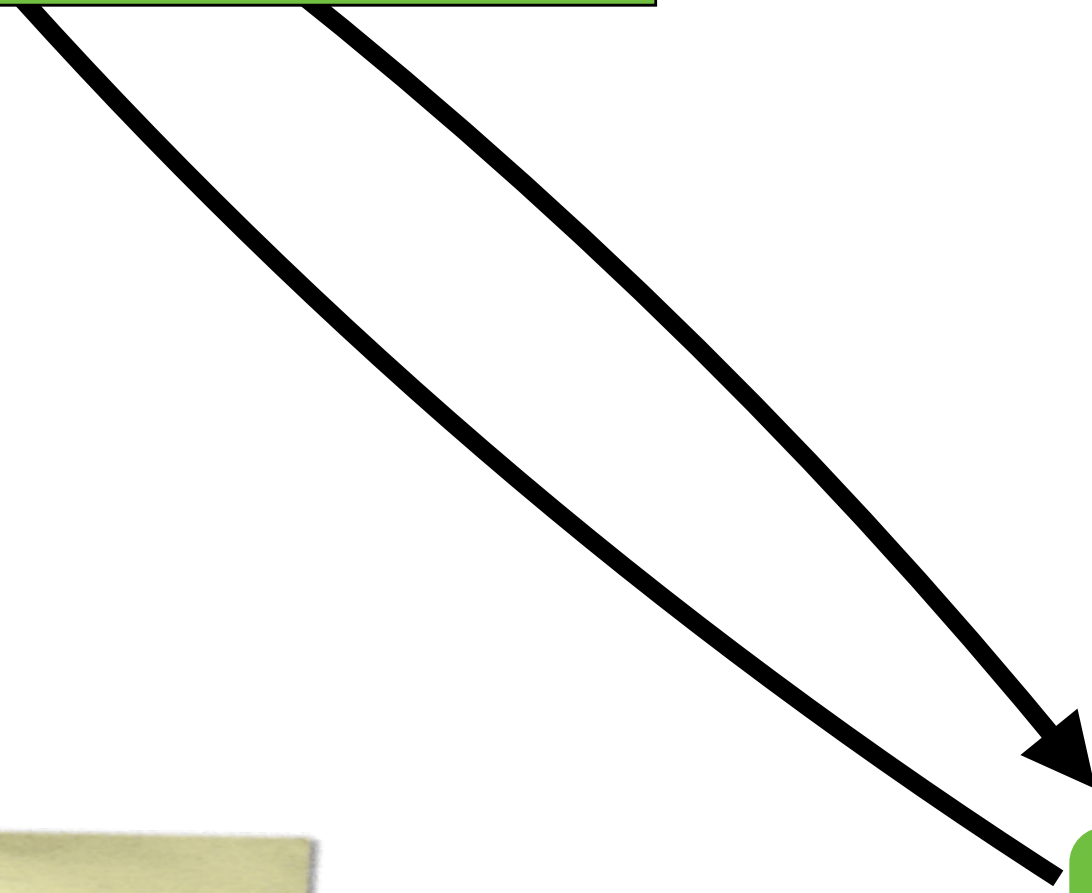
Scott

Deptno: 20



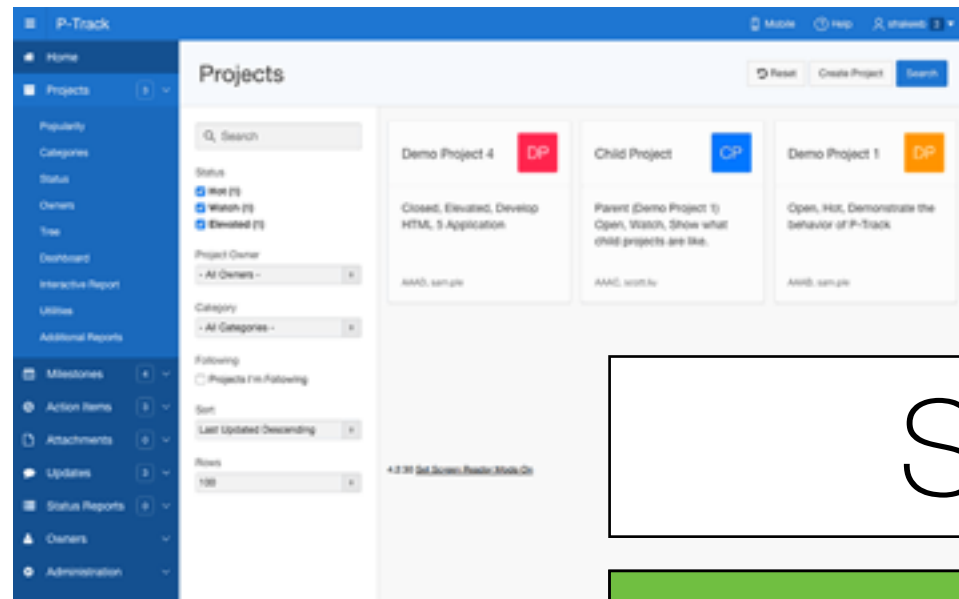
James

Deptno: 10



James

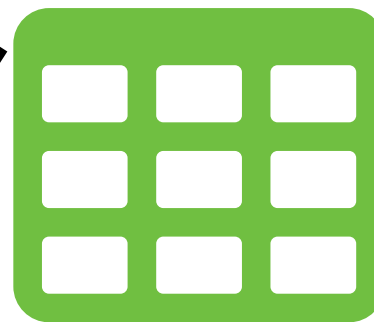
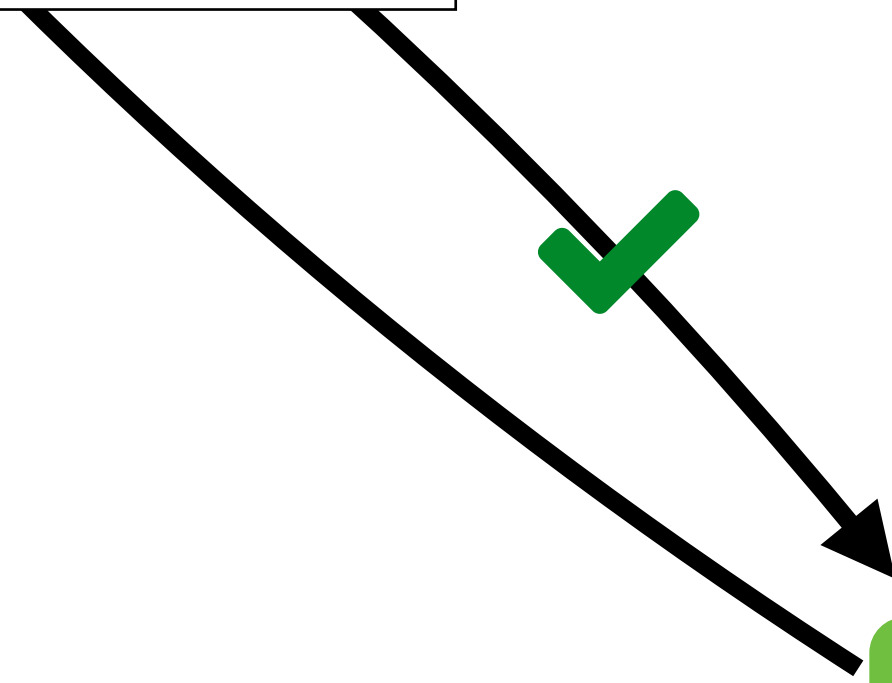
Deptno: 10



Scott

Deptno: 20

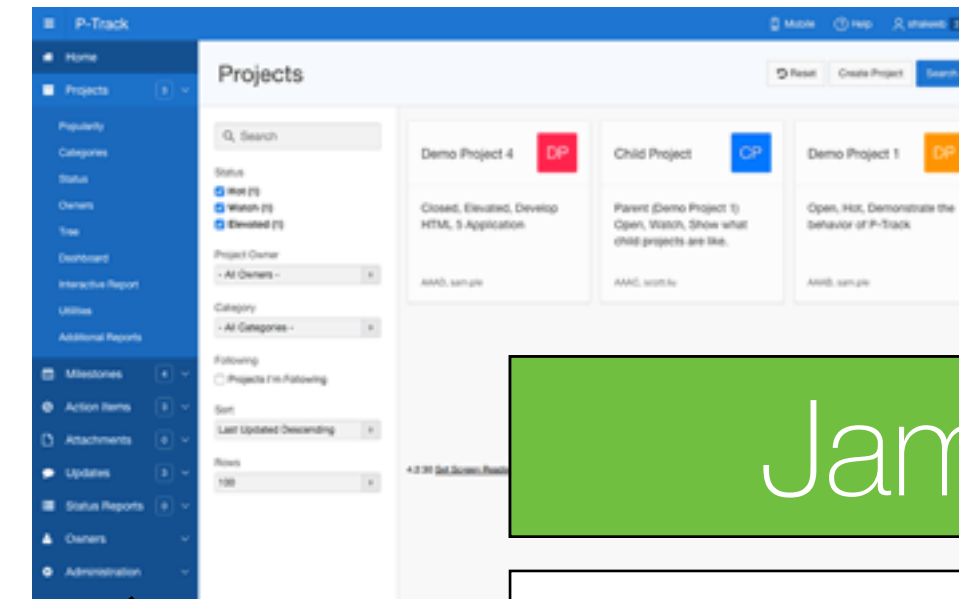
MD5: AB42



Scott

Deptno: 20

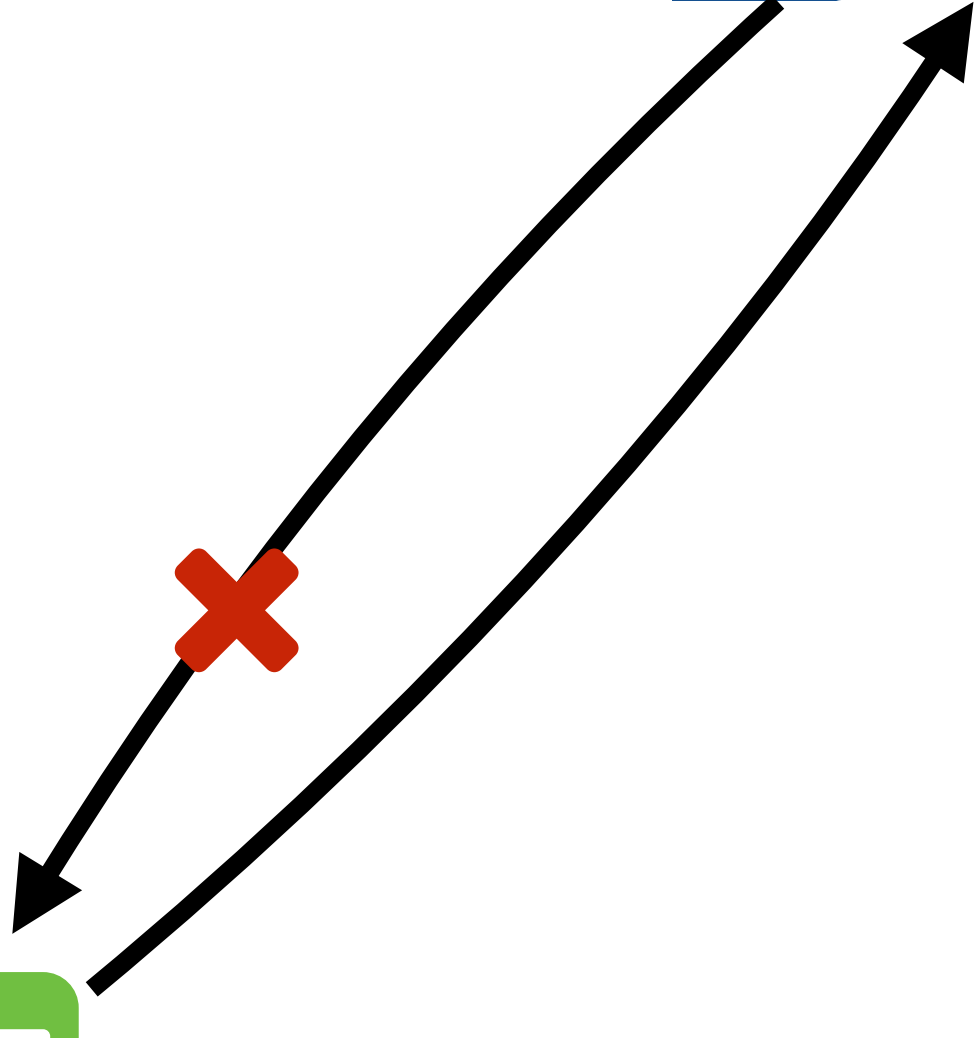
MD5: CF65



James

Deptno: 10

MD5: AB42







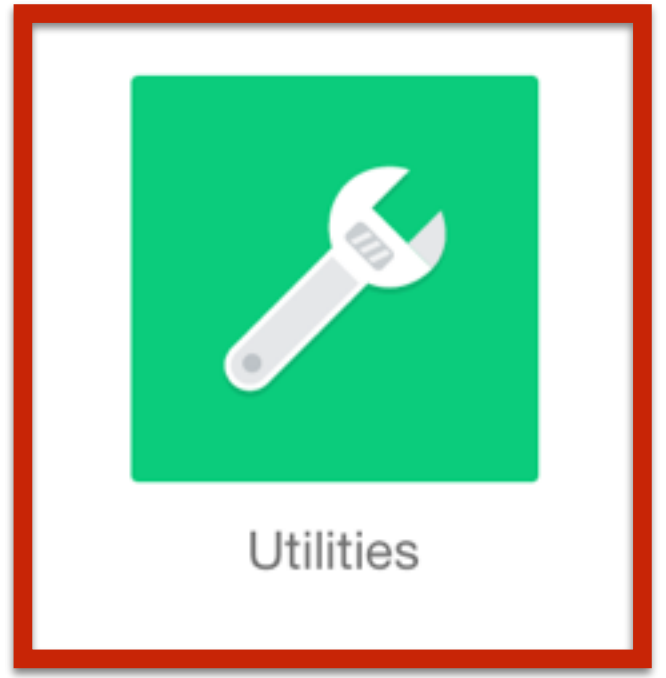
Object Browser



SQL Commands



SQL Scripts



Utilities



RESTful Services

Utilities

Utilities



**Data Workshop**

Load and unload data using text files, XML, or a spreadsheet.



**Generate DDL**

Generate scripts for all or selected database objects within a schema.



**Methods on Tables**

Generate API scripts for DML operations on specified tables.



**Object Reports**

Access numerous reports on tables, exceptions, security, objects and PL/SQL code.



**Schema Comparison**

Show differences between database objects in two different schemas.



**Query Builder**

Build queries graphically by adding tables into a panel, and selecting columns to return.



**User Interface Defaults**

Specify layout properties to consistently generate items / columns across pages and applications.



**About Database**

Review database details. Note: A Database account granted the DBA role is required.



**Database Monitor**

Run database activity reports. Note: A Database account granted the DBA role is required.



**Recycle Bin**

Restore database objects that have been dropped.






# Create Package on Tables



Name

\* Package Name

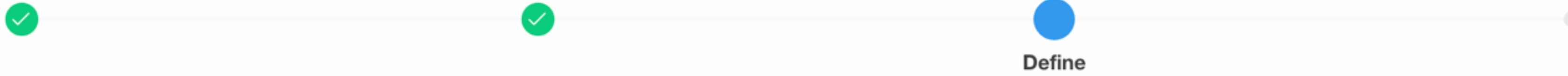
Preserve Case 



Cancel

Next >

# Create Package on Tables



Schema: **NUIJTEN** ?

Package Name: **TEST\_PKG** ?

Table 1	<input type="text"/>	^	?
Table 2	<input type="text"/>	^	?
Table 3	<input type="text"/>	^	?
Table 4	<input type="text"/>	^	?
Table 5	<input type="text"/>	^	?
Table 6	<input type="text"/>	^	?
Table 7	<input type="text"/>	^	?
Table 8	<input type="text"/>	^	?
Table 9	<input type="text"/>	^	?
Table 10	<input type="text"/>	^	?

Specify the tables for which you wish to generate a PL/SQL package-based application program interface (API).



# Create Package on Tables



Confirm

Please confirm your request.

Create PL/SQL package "**TEST\_PKG**" with the following procedures:

[\[Show Specification\]](#) [\[Show Body\]](#) [\[Download Specification\]](#) [\[Download Body\]](#)

Subprogram	Description
ins_demo_customers	use to insert data into <b>DEMO_CUSTOMERS</b> , primary key needs to be supplied
upd_demo_customers	use to update data in <b>DEMO_CUSTOMERS</b> identified by primary key(s)
del_demo_customers	use to delete data from <b>DEMO_CUSTOMERS</b> based on primary key(s)
get_demo_customers	use to retrieve data from <b>DEMO_CUSTOMERS</b> based on primary key(s)



Cancel

Create Package

```
-- build MD5 function for table "DEMO_CUSTOMERS"  
function "BUILD_DEMO_CUSTOMERS_MD5" (  
    "P_CUSTOMER_ID" in number,...  
) return varchar2 is  
begin  
    return apex_util.get_hash(apex_t_varchar2(  
        "P_CUST_FIRST_NAME",  
        "P_CUST_LAST_NAME",  
        "P_CUST_STREET_ADDRESS1",  
        "P_CUST_STREET_ADDRESS2",  
        "P_CUST_CITY",  
        "P_CUST_STATE",  
        "P_CUST_POSTAL_CODE",  
        "P_CUST_EMAIL",  
        "P_PHONE_NUMBER1",  
        "P_PHONE_NUMBER2",  
        "P_URL",  
        "P_CREDIT_LIMIT",  
        "P_TAGS",  
        "P_CUST_RATING" ));  
end "BUILD_DEMO_CUSTOMERS_MD5";
```



```
-- build MD5 function for table "DEMO_CUSTOMERS"  
function "BUILD_DEMO_CUSTOMERS_MD5" (  
    "P_CUSTOMER_ID" in number,...  
) return varchar2 is  
begin  
    return apex_util.get_hash(apex_t_varchar2(  
        "P_CUST_FIRST_NAME",  
        "P_CUST_LAST_NAME",  
        "P_CUST_STREET_ADDRESS1",  
        "P_CUST_STREET_ADDRESS2",  
        "P_CUST_CITY",  
        "P_CUST_STATE",  
        "P_CUST_POSTAL_CODE",  
        "P_CUST_EMAIL",  
        "P_PHONE_NUMBER1",  
        "P_PHONE_NUMBER2",  
        "P_URL",  
        "P_CREDIT_LIMIT",  
        "P_TAGS",  
        "P_CUST_RATING" ));  
end "BUILD_DEMO_CUSTOMERS_MD5";
```

```

-- update procedure for table "DEMO_CUSTOMERS"
procedure "UPD_DEMO_CUSTOMERS" (
    "P_CUSTOMER_ID" in number, ...
    "P_MD5"          in varchar2    default null)
is
    "L_MD5" varchar2(32767) := null;
begin
    if "P_MD5" is not null then
        for c1 in (
            select * from "DEMO_CUSTOMERS"
            where "CUSTOMER_ID" = "P_CUSTOMER_ID" FOR UPDATE
        ) loop
            "L_MD5" := "BUILD_DEMO_CUSTOMERS_MD5" (
                c1."CUSTOMER_ID", ... );
        end loop;
    end if;
    if ("P_MD5" is null) or ("L_MD5" = "P_MD5") then
        update "DEMO_CUSTOMERS"
            set "CUSTOMER_ID"          = "P_CUSTOMER_ID"
                ...
            where "CUSTOMER_ID" = "P_CUSTOMER_ID";
    else
        raise_application_error (-20001, 'Current version of data in database has changed since user
initiated update process. current checksum = '''||"L_MD5"||'', item checksum = '''||"P_MD5"||''.'.');
    end if;
end "UPD_DEMO_CUSTOMERS";

```



```

-- update procedure for table "DEMO_CUSTOMERS"
procedure "UPD_DEMO_CUSTOMERS" (
    "P_CUSTOMER_ID" in number, ...
    "P_MD5"          in varchar2    default null)
is
    "L_MD5" varchar2(32767) := null;
begin
    if "P_MD5" is not null then
        for c1 in (
            select * from "DEMO_CUSTOMERS"
            where "CUSTOMER_ID" = "P_CUSTOMER_ID" FOR UPDATE
        ) loop
            "L_MD5" := "BUILD_DEMO_CUSTOMERS_MD5" (
                c1."CUSTOMER_ID", ... );
        end loop;
    end if;
    if ("P_MD5" is null) or ("L_MD5" = "P_MD5") then
        update "DEMO_CUSTOMERS"
            set "CUSTOMER_ID"          = "P_CUSTOMER_ID"
                ...
            where "CUSTOMER_ID" = "P_CUSTOMER_ID";
    else
        raise_application_error (-20001, 'Current version of data in database has changed since user
initiated update process. current checksum = ''' || "L_MD5" || ''', item checksum = ''' || "P_MD5" || '''.');
    end if;
end "UPD_DEMO_CUSTOMERS";

```

```

-- update procedure for table "DEMO_CUSTOMERS"
procedure "UPD_DEMO_CUSTOMERS" (
    "P_CUSTOMER_ID" in number,...
    "P_MD5"          in varchar2    default null)
is
    "L_MD5" varchar2(32767) := null;
begin
    if "P_MD5" is not null then
        for c1 in (
            select * from "DEMO_CUSTOMERS"
            where "CUSTOMER_ID" = "P_CUSTOMER_ID" FOR UPDATE
        ) loop
            "L_MD5" := "BUILD_DEMO_CUSTOMERS_MD5" (
                c1."CUSTOMER_ID", ... );
        end loop;
    end if;
    if ("P_MD5" is null) or ("L_MD5" = "P_MD5") then
        update "DEMO_CUSTOMERS"
            set "CUSTOMER_ID"          = "P_CUSTOMER_ID"
                ...
            where "CUSTOMER_ID" = "P_CUSTOMER_ID";
    else
        raise_application_error (-20001,'Current version of data in database has changed since user
initiated update process. current checksum = '''||"L_MD5"||'', item checksum = '''||"P_MD5"||''.'.');
    end if;
end "UPD_DEMO_CUSTOMERS";

```



```

-- update procedure for table "DEMO_CUSTOMERS"
procedure "UPD_DEMO_CUSTOMERS" (
    "P_CUSTOMER_ID" in number, ...
    "P_MD5"          in varchar2    default null)
is
    "L_MD5" varchar2(32767) := null;
begin
    if "P_MD5" is not null then
        for c1 in (
            select * from "DEMO_CUSTOMERS"
            where "CUSTOMER_ID" = "P_CUSTOMER_ID" FOR UPDATE
        ) loop
            "L_MD5" := "BUILD_DEMO_CUSTOMERS_MD5" (
                c1."CUSTOMER_ID", ... );
        end loop;
    end if;
    if ("P_MD5" is null) or ("L_MD5" = "P_MD5") then
        update "DEMO_CUSTOMERS"
            set "CUSTOMER_ID"          = "P_CUSTOMER_ID"
                ...
            where "CUSTOMER_ID" = "P_CUSTOMER_ID";
    else
        raise_application_error (-20001, 'Current version of data in database has changed since user
initiated update process. current checksum = ''' || "L_MD5" || ''', item checksum = ''' || "P_MD5" || '''.');
    end if;
end "UPD_DEMO_CUSTOMERS";

```

```

-- update procedure for table "DEMO_CUSTOMERS"
procedure "UPD_DEMO_CUSTOMERS" (
    "P_CUSTOMER_ID" in number,...
    "P_MD5"          in varchar2    default null)
is
    "L_MD5" varchar2(32767) := null;
begin
    if "P_MD5" is not null then
        for c1 in (
            select * from "DEMO_CUSTOMERS"
            where "CUSTOMER_ID" = "P_CUSTOMER_ID" FOR UPDATE
        ) loop
            "L_MD5" := "BUILD_DEMO_CUSTOMERS_MD5" (
                c1."CUSTOMER_ID", ... );
        end loop;
    end if;
    if ("P_MD5" is null) or ("L_MD5" = "P_MD5") then
        update "DEMO_CUSTOMERS"
            set "CUSTOMER_ID"          = "P_CUSTOMER_ID"
                ...
            where "CUSTOMER_ID" = "P_CUSTOMER_ID";
    else
        raise_application_error (-20001,'Current version of data in database has changed since user
initiated update process. current checksum = '''||"L_MD5"||'', item checksum = '''||"P_MD5"||''.'.');
    end if;
end "UPD_DEMO_CUSTOMERS";

```





Page Alias

Page Groups

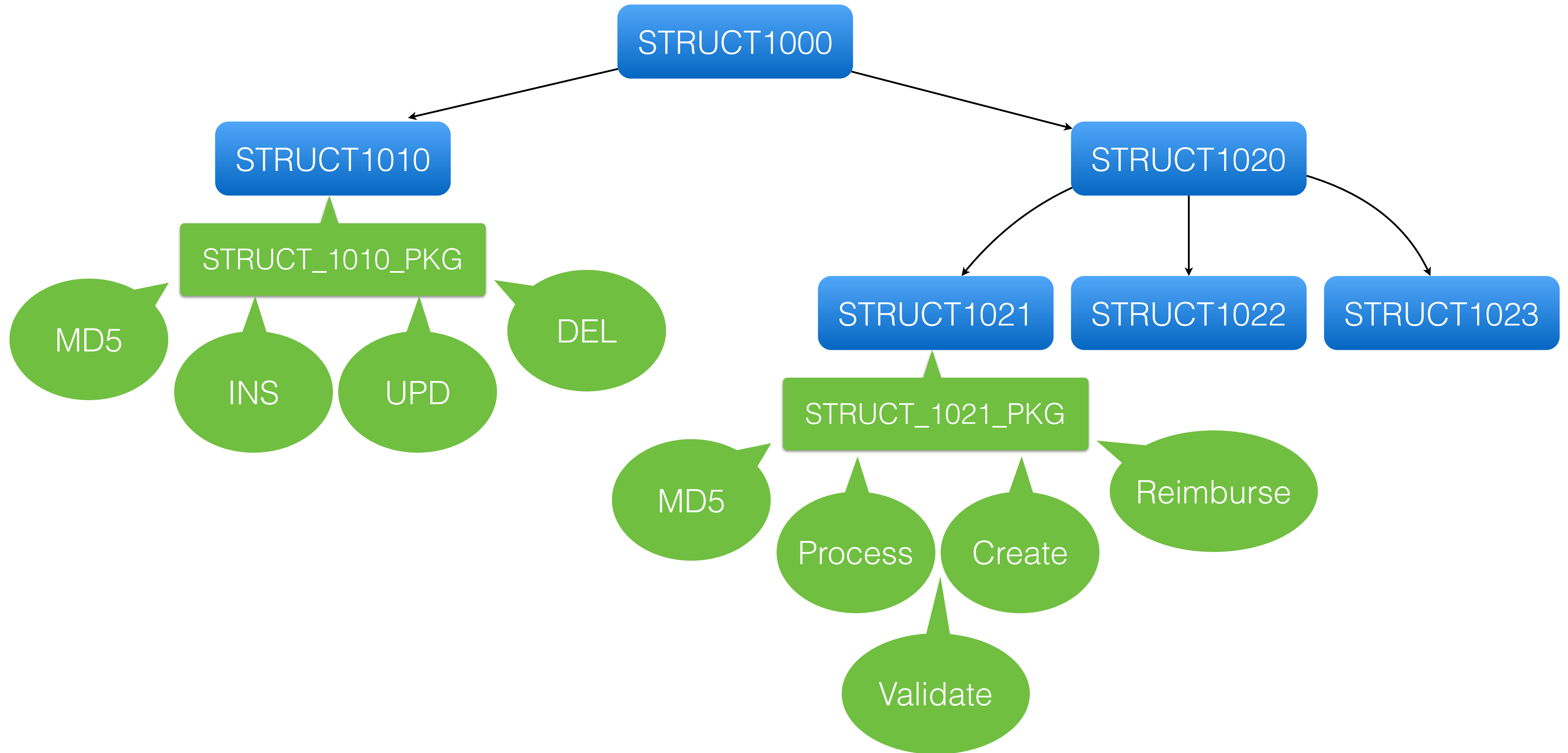
Never Access Tables Directly

One or More Views per Page

Only Calls to Packages

obvious





STRUCT\_UTIL\_PKG

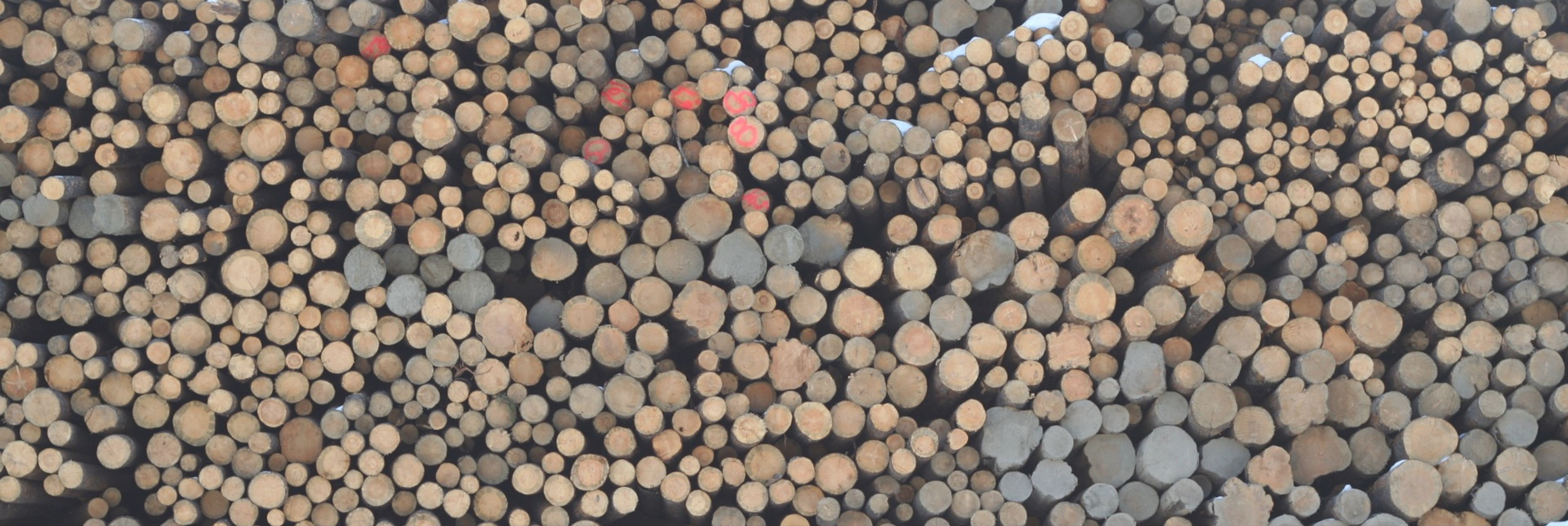
PAGE\_IN\_GROUP

...



of course fully instrumented

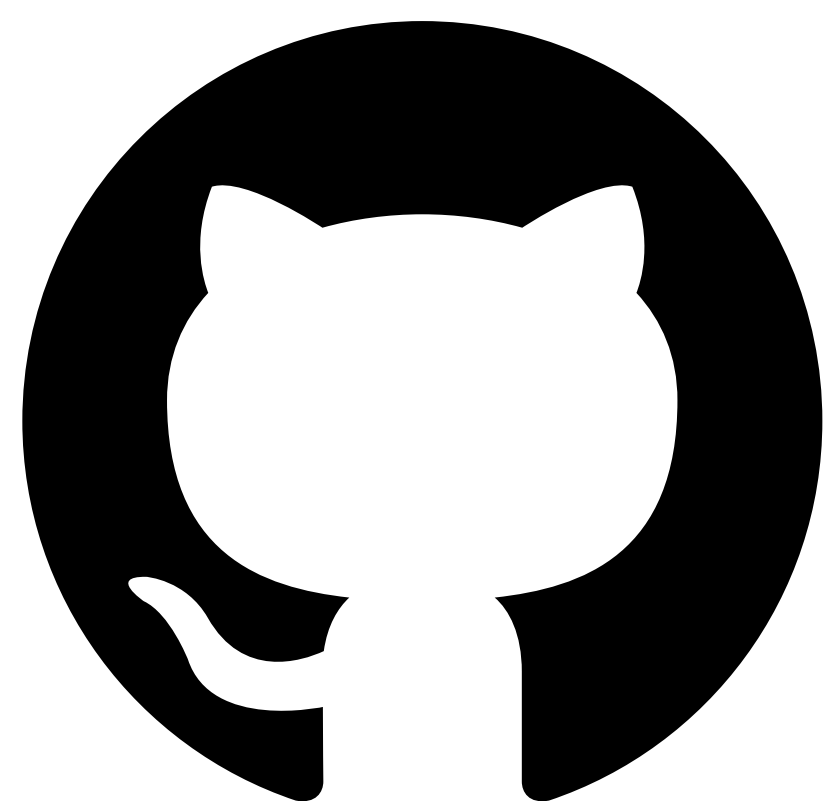




# Logger







<http://www.oraopensource.com/>



Page Alias

Page Groups

Never Access Tables Directly

One or More Views per Page

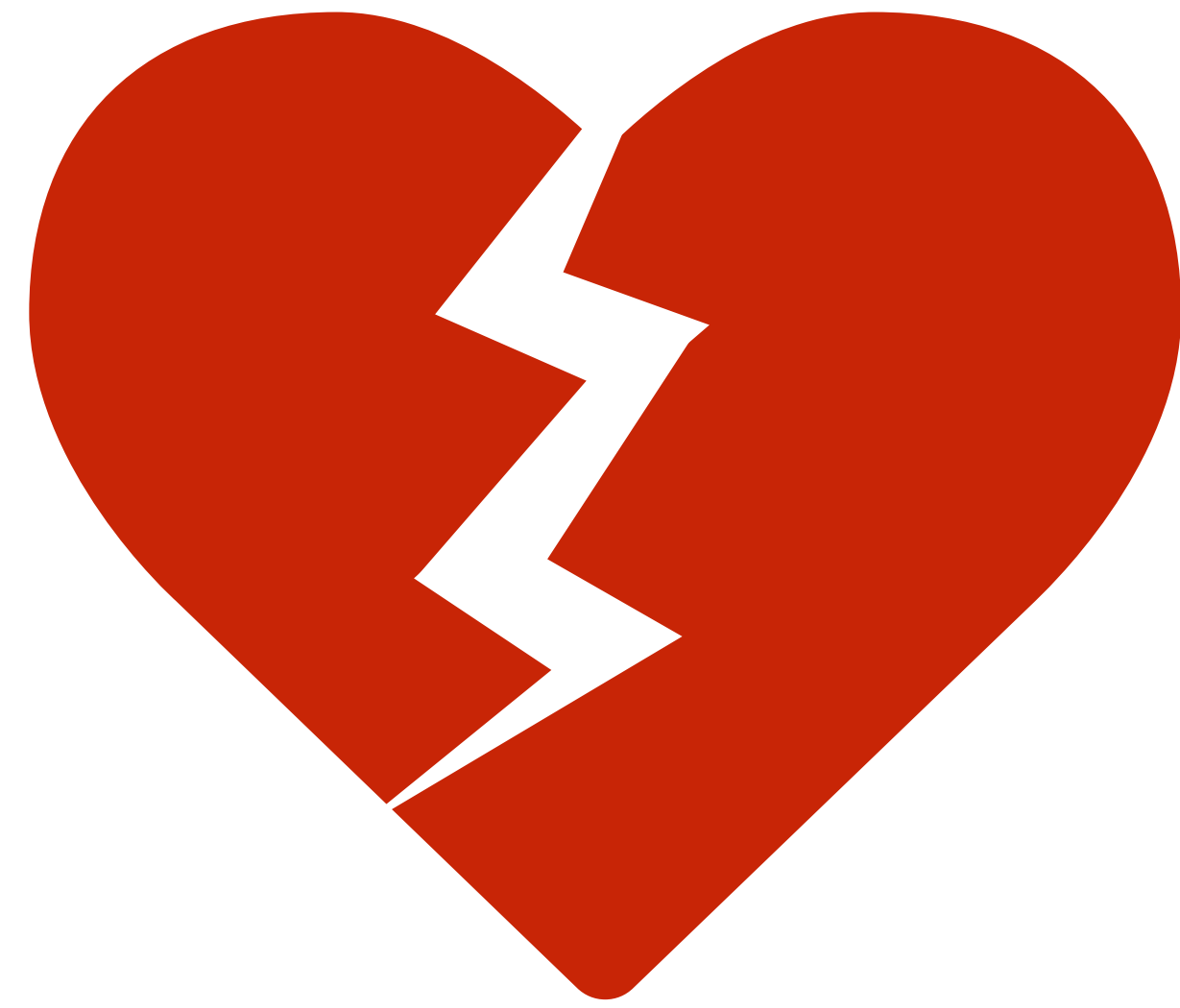
Only Calls to Packages

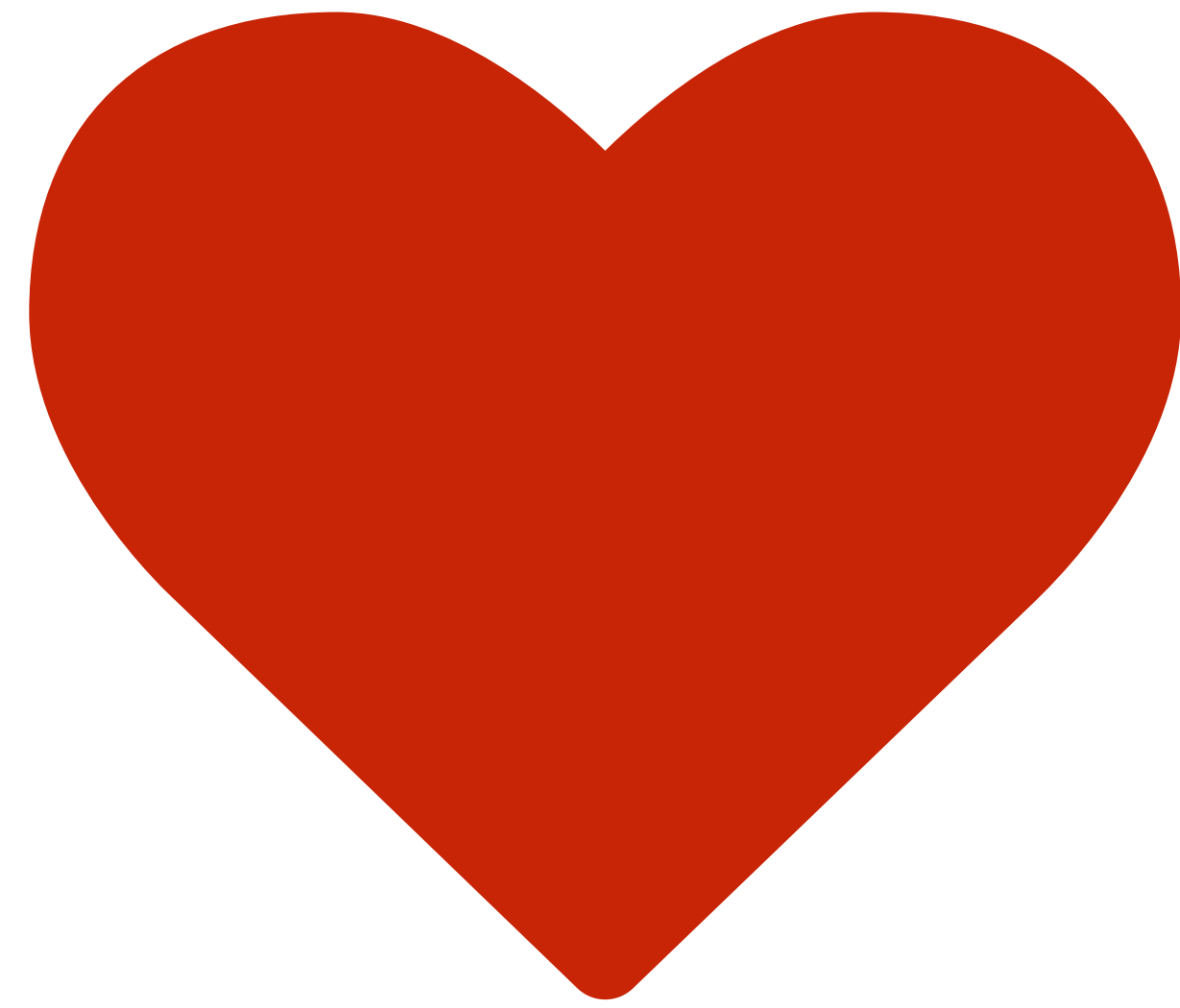




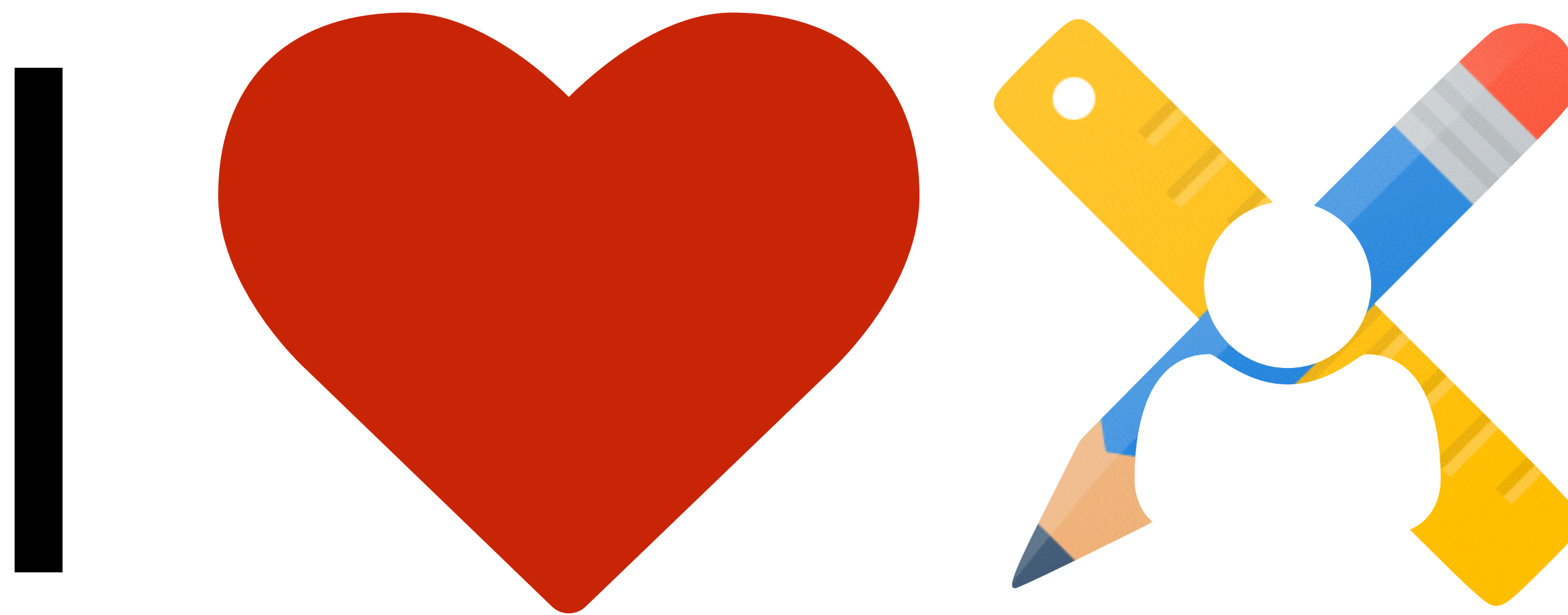
...one final confession



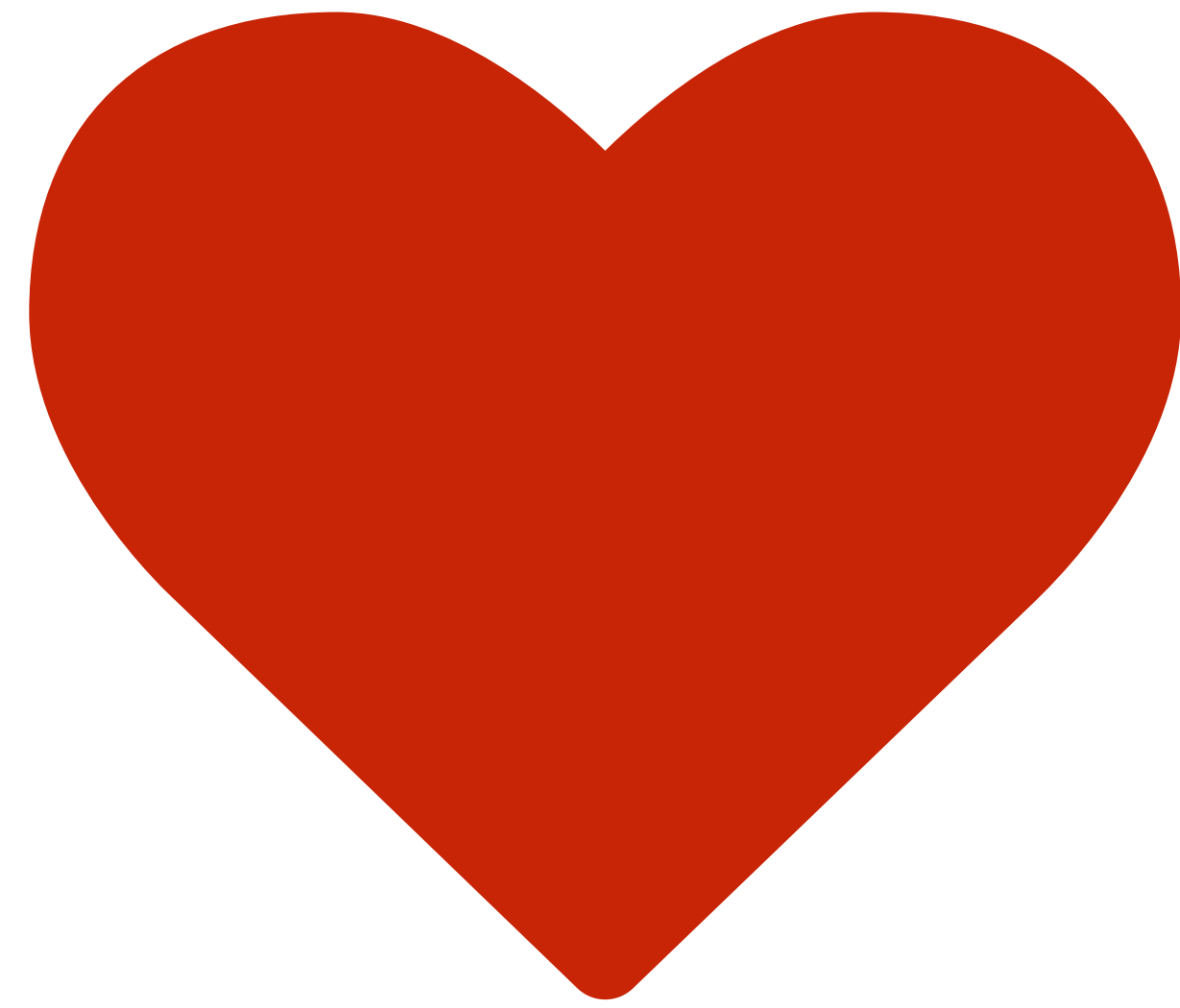




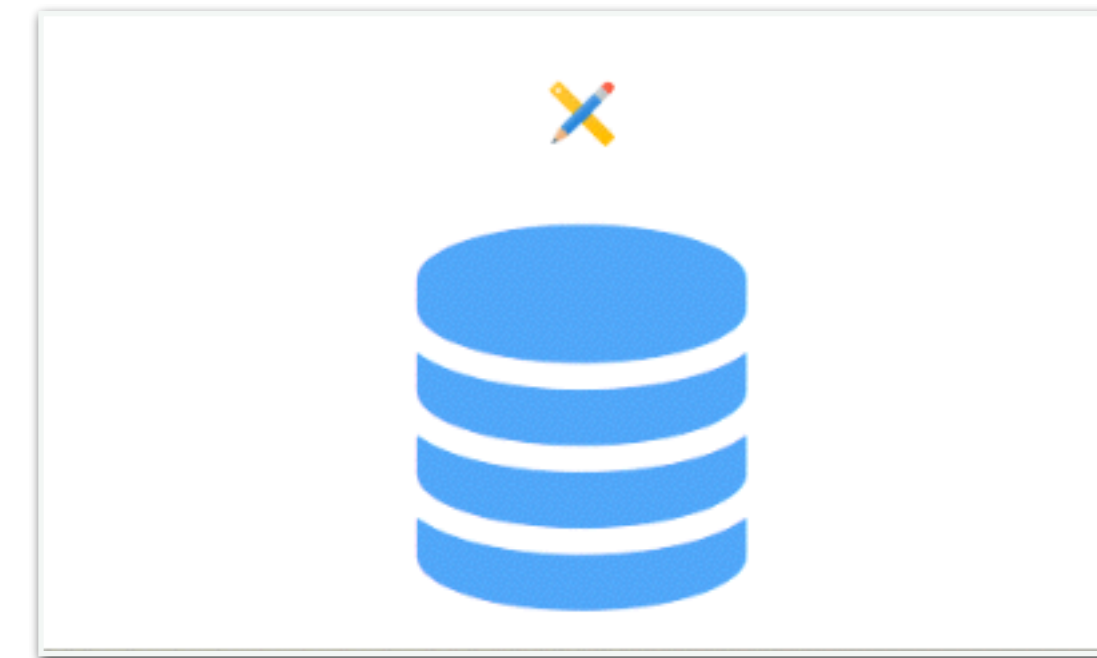




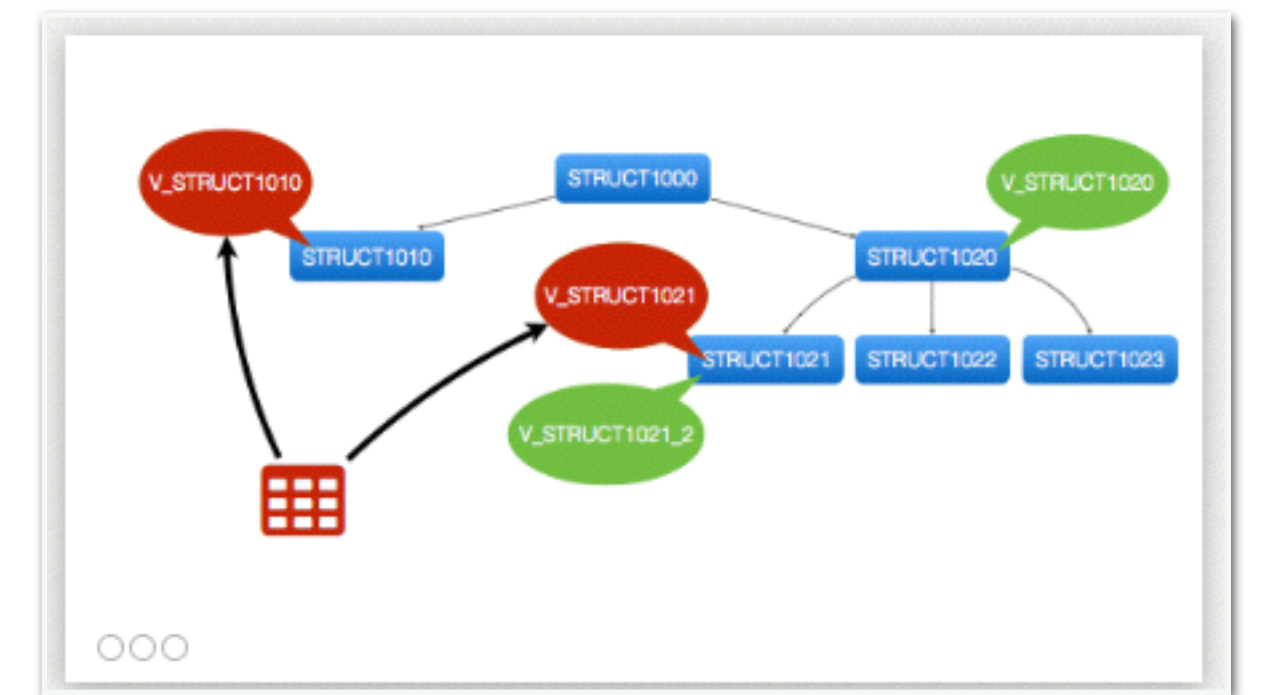
#letswreckthistogether



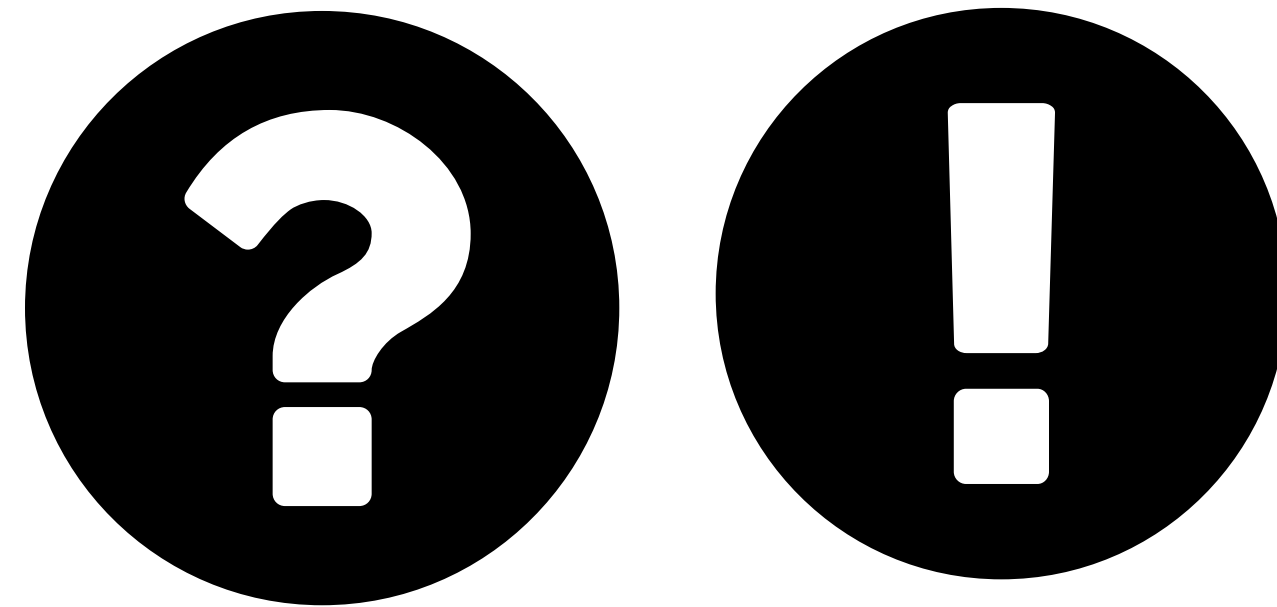




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Alex Nuijten