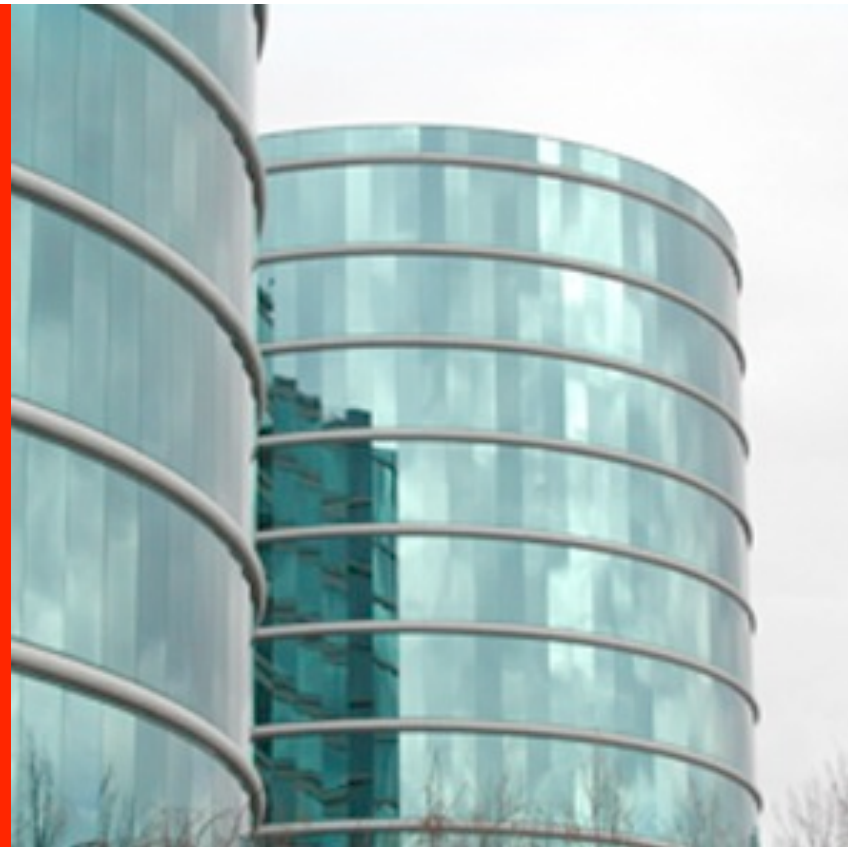


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## **Error Handling and Plug-In Improvements in Oracle APEX 4.1**

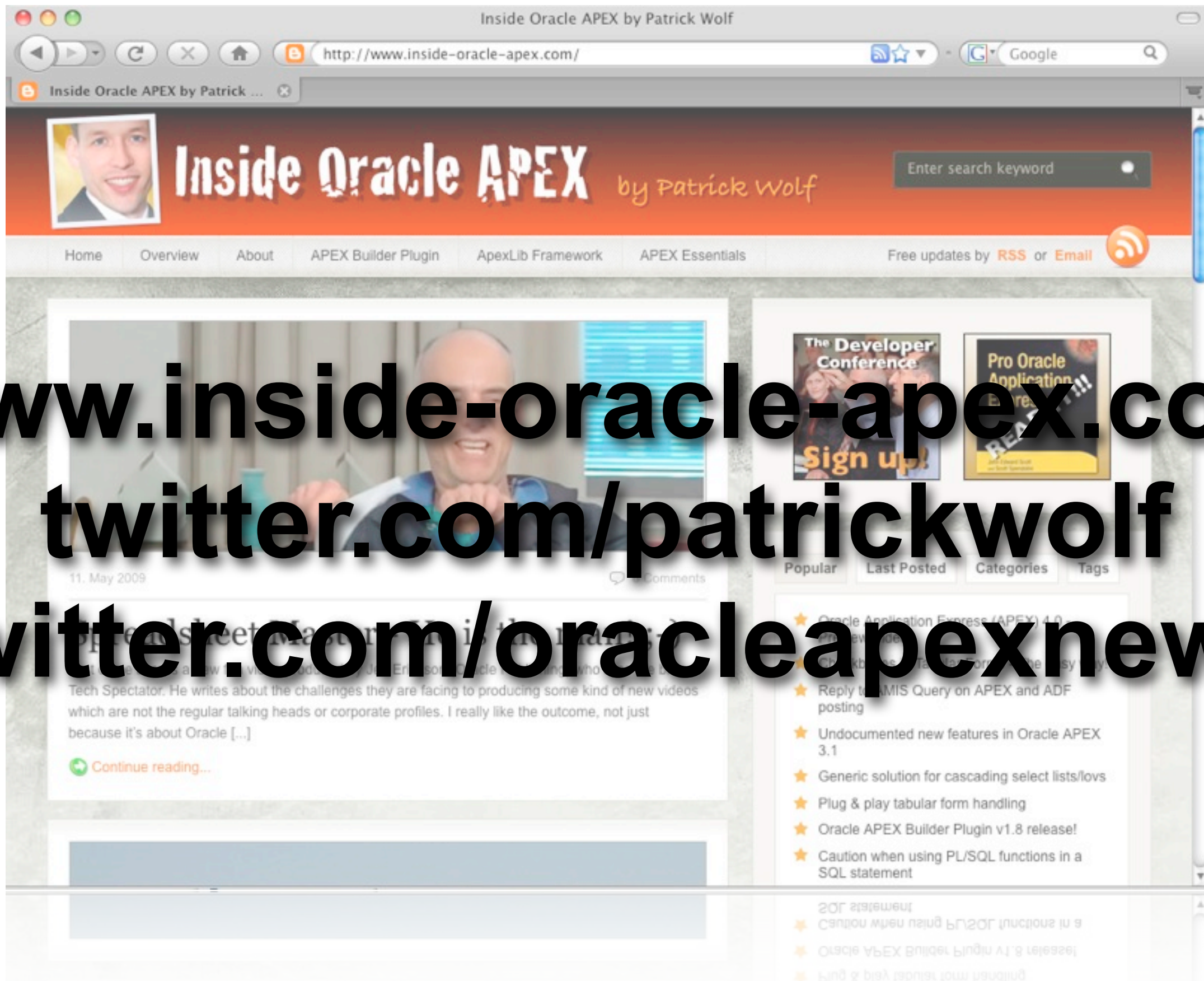
Patrick Wolf

Principal Member of Technical Staff - Database Tools



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# Error Handling Improvements

ORA-20505: Error in DML: p\_rowid=20, p\_alt\_rowid=DEPTNO, p\_rowid2=, p\_alt\_rowid2=. ORA-00001: unique constraint (PATRICK.DEPT\_DNAME\_UK) violated



Error Unable to process row of table DEPT.

OK

ORA-20503: Current version of data in database has changed since user initiated update process. current checksum = "2ABF238959C5DCFC2E61E9E5F7E82474" application checksum = "F2278CC4AE4CF44144FE06CF4E2328E4"



Error Unable to process row of table DEPT.

OK

ORA-20505: Error in DML: p\_rowid=30, p\_alt\_rowid=DEPTNO, p\_rowid2=, p\_alt\_rowid2=. ORA-20111: Not a valid department location! ORA-06512: at "PATRICK.DEPT\_T1", line 3 ORA-04088: error during execution of trigger 'PATRICK.DEPT\_T1'



Error Unable to process row of table DEPT.

OK



- **Overwrite System Message**
- **Error Display Location**
- **Error Handling Function**
- **Error Logging**
- **Change Message**
- **...**

# Error Display Location

## Messages

### Process Success Message

Action Processed.

### Process Error Message

Error message display location

Inline in Notification

Inline in Notification

On Error Page

## Conditions

When Button Pressed - No Button Condition -

### Condition Type

- Select Condition Type -

[PL/SQL] [item / column=value] [item / column not null] [request=e1] [page in] [page not in] [exists] [none] [never]

# Error Display Location

Sample Application

[Print](#) [Feedback](#) [Logout](#)

Home	Customers	Products	Orders	Reports	
------	-----------	----------	--------	---------	--

**1 error has occurred**



- ORA-00001: unique constraint (PATRICK.TEST) violated

Dept

Cancel

Delete

Apply Changes

Dname SALES

Loc DALLAS

# Overwrite System Message

Sample Application

Welcome: DEMO

ORA-20503: Current version of data in database has changed since user initiated update process. current checksum = "2ABF238959C5DCFC2E61E9E5F7E82474" application checksum = "F2278CC4AE4CF44144FE06CF4E2328E4"



Error Unable to process row of table DEPT.

OK

# Overwrite System Message

Home Application Builder SQL Workshop Team Development Administration

Home > Application Builder > Application 100 > Shared Components > Translate > Text Messages > Create / Edit Page 31

**Message** Cancel Create

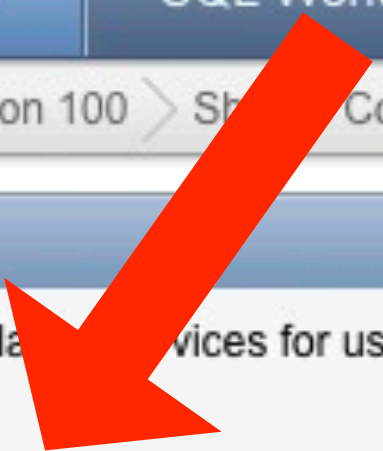
Messages are designed to provide translation services for use in PL/SQL.

Application: **100 Sample Application**

\* Name

Language

\* Text (Example: Tax: %0 Total amount %1)





# Overwrite System Message

Home

Customers

Products

Orders

Reports

**1 error has occurred**

- Can't save changes, because the data has been updated by somebody else.

Dept

Cancel

Delete

Apply Changes

Dname RESEARCH|

Loc DALLASy

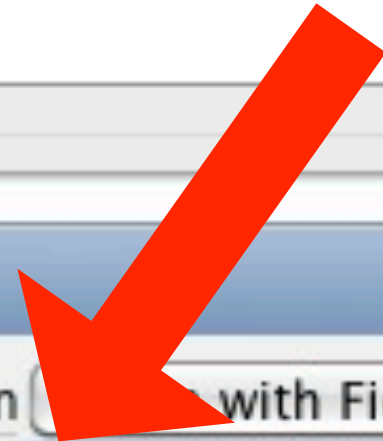
# Error Handling Function

Restrict to comma separated user list (status must equal Restricted Access)

## Error Handling

Default Error Display Location (with Field and in Notification)

Error Handling Function



## Global Notification

Enter message to be displayed in page #GLOBAL\_NOTIFICATION# substitution string.

# Error Handling Function

```
function error_handling_function (  
    p_error in apex_error.t_error )  
    return apex_error.t_error_result
```

# Error Handling Function

```
type t_error is record (  
  message          varchar2 (32767) ,  
  additional_info  varchar2 (32767) ,  
  display_location varchar2 (40) ,  
  association_type varchar2 (40) ,  
  page_item_name   varchar2 (255) ,  
  region_id        number ,  
  column_alias     varchar2 (255) ,  
  row_num          pls_integer ,  
  is_internal_error boolean ,  
  apex_error_code  varchar2 (255) ,  
  ora_sqlcode      number ,  
  ora_sqlerrm      varchar2 (32767) ,  
  error_backtrace  varchar2 (32767) ,  
  component        wwv_flow.t_component  
)
```

# Error Handling Function

```
type t_error_result is record (  
    message          varchar2(32767) ,  
    additional_info  varchar2(32767) ,  
    display_location varchar2(40) ,  
    page_item_name   varchar2(255) ,  
    column_alias     varchar2(255)  
)
```



# Error Handling Function

```
create or replace function error_handling_function (
    p_error in apex_error.t_error )
    return apex_error.t_error_result
is
    l_result apex_error.t_error_result;
begin
    l_result := apex_error.init_error_result (
        p_error => p_error );

    return l_result;
end error_handling_function;
```

# Error Handling Function

```
if p_error.is_internal_error then
  if p_error.apex_error_code <>
    'APEX.AUTHORIZATION.ACCESS_DENIED'
  then
    l_reference_id := log_error (
      p_error => p_error );
    -- Change the message to the generic error
    -- message which doesn't expose any sensitive
    -- information.
    l_result.message :=
      'An unexpected internal application ' ||
      'error has occurred. Please get in ' ||
      'contact with XXX and provide ' ||
      'reference# ' || l_reference_id ||
      ' for further investigation.';
    l_result.additional_info := null;
  end if;
end if;
```

# Error Handling Function

```
-- Use inline error display on all pages except page
-- 351 which is a tabular form with apex_item.xxx
-- calls
if apex_application.g_flow_step_id <> 351 then
    l_result.display_location :=
        case
            when l_result.display_location =
                apex_error.c_on_error_page
            then
                apex_error.c_inline_in_notification
            else
                l_result.display_location
        end;
end if;
```

# Error Handling Function

```
if p_error.ora_sqlcode in ( -1, -2091, -2290,  
                           -2291, -2292 )  
then  
    l_constraint_name :=  
        apex_error.extract_constraint_name (  
            p_error => p_error );  
begin  
    select message  
        into l_result.message  
        from my_constraint_lookup  
        where constraint_name = l_constraint_name;  
-- not every constraint has to be in our  
-- lookup table  
exception when no_data_found then null;  
end;  
end if;
```

# Error Handling Function

```
if      p_error.ora_sqlcode is not null
  and l_result.message      = p_error.message
then
  l_result.message :=
    apex_error.get_first_ora_error_text (
      p_error => p_error );
end if;
```



# Error Handling Function

```
if      l_result.page_item_name is null
  and l_result.column_alias    is null
then
  apex_error.auto_set_associated_item (
    p_error          => p_error,
    p_error_result => l_result );
end if;
end if;
```

# Plug-ins Reloaded



# Using Plug-ins





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D E M O N S T R A T I O N

# Using Plug-ins





**39 Item Types**

**24 Region Types**

**15 Dynamic Action**

**6 Process Types**

**= 89 Plug-Ins**





**[apex.oracle.com/plugins](https://apex.oracle.com/plugins)**

**[www.apex-plugin.com](https://www.apex-plugin.com)**

A stack of newspapers is shown from a high-angle perspective. The top page is a light cream color and features the words "LATEST NEWS" in a large, bold, black serif font. The text is arranged in two lines: "LATEST" on the top line and "NEWS" on the bottom line. The stack of papers is thick, and the edges of many pages are visible. A faint, semi-transparent watermark "iStockphoto" is visible across the middle of the stack.

LATEST  
NEWS

**In Version 4.1**



# Best Practice



**Learn from existing  
plug-ins!**

**[apex.oracle.com/plugins](https://apex.oracle.com/plugins)**

**[www.apex-plugin.com](https://www.apex-plugin.com)**



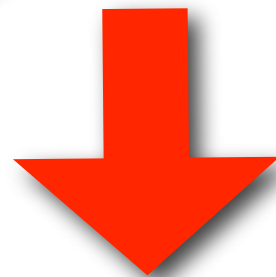
**Don't reinvent the  
weel!**

**[plugins.jquery.com](http://plugins.jquery.com)**



**Copy 3rd party files if you  
modify them**

**jquery.rating.js**



**apex.jquery.rating.js**



# Put JavaScript code and CSS code in external file



**Use a package and  
external JavaScript files  
during development**



**Be aware of different  
jQuery versions!**

```
(function ($) {  
    ...  
    $('#something').css('color', 'red');  
    ...  
})(apex.jQuery);
```

# Remove Complexity





**Security!**  
**Security!**  
**Security!**



# Prevent XSS Attacks

**Escape any output!**  
**Make it secure by default!**

```
sys.htf.escape_sc(l_data_value)
```

```
apex_plugin_util.escape (  
  p_value => l_data_value,  
  p_escape => p_item.escape_output  
);
```

## Standard Attributes

### Attributes:

- Region Source is SQL Statement
- Region Source is Plain Text
- Region Source Required
- Has "Page Items to Submit" Attribute
- Has "Escape Special Characters" Attribute

## Security

Authorization Scheme

- No Authorization Required -

Escape Special Characters

Yes



# Escape JavaScript Attributes

## Use `APEX_JAVASCRIPT`





**Validate submitted data**

**Use validation callback**



# AJAX calls

**Don't transmit sensitive  
meta data of plug-in**



**Avoid DBMS\_SQL**

**Use APEX\_PLUGIN\_UTIL  
package**

# Use DBMS\_ASSERT



# Get it complete



# Read Only and Printer Friendly mode

# Accessibility



# **Translateable**

## **Use APEX\_LANG package**

# Help Text for attributes

# Deployment



# Minify JavaScript and CSS files

[developer.yahoo.com/yui/  
compressor/](http://developer.yahoo.com/yui/compressor/)



# Provide Contact Info

# License

**GPL, MIT, ... Use same as included 3rd party uses**

# Installation file



**Provide all files**

**Use directory structure of  
Oracle provided plug-ins**

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John Scott, Dietmar Aust, Martin D'Souza, Doug Gault, Dimitri Gielis, Roel Hartman, Michael Hichwa, Sharon Kennedy, Denes Kubicek, Raj Mattamal, Dan McGhan, Francis Mignault, and Anton Nielsen

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Raj Mattamal and Anton Nielsen

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# Sharing







The Oracle logo, featuring the letters 'O', 'R', and 'A' in a stylized, serif font. The 'O' is a large, light gray letter. The 'R' is a smaller, red letter with a thick, flowing script-like stroke that loops around the 'O' and the 'A'. The 'A' is a large, light gray letter. The logo is centered on a white background.

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