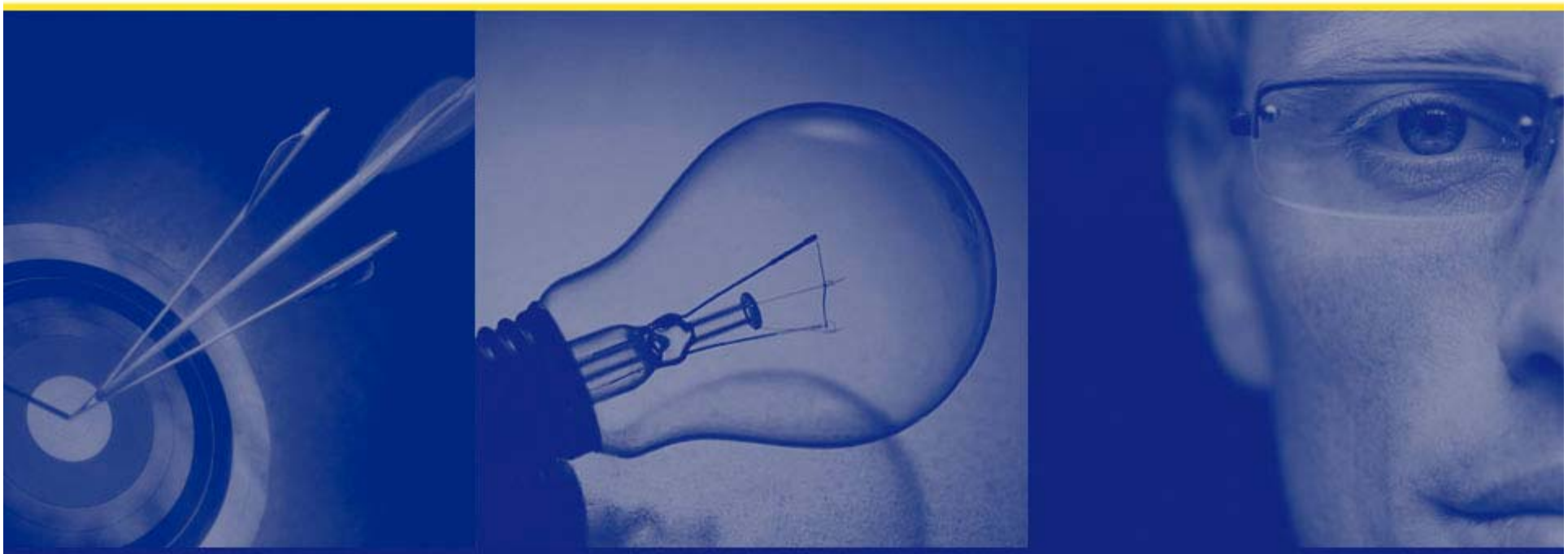
Weird PL/SQL



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How to benefit most from this session

- **Watch, listen, *ask questions*. Then afterwards....**
- **Download and use any of my the training materials, available at my "cyber home" on Toad World, a portal for Toad Users and PL/SQL developers:**

PL/SQL Obsession **http://www.ToadWorld.com/SF**

- **Download and use any of my scripts (examples, performance scripts, reusable code) from the demo.zip, available from the same place.**

filename_from_demo_zip.sql

- **You have my permission to use *all* these materials to do internal trainings and build your own applications.**
  - **But they should not considered production ready.**
  - **You must test them and modify them to fit your needs.**

I Love PL/SQL And...

- **We all love PL/SQL.**
- **But we all know there are ways in which it could be improved.**
  - And I will be pointing to lots of such ways in this seminar.
- **I created ILovePLSQLAnd.net to make it easy for PL/SQL users to influence the future direction of the language.**
- **Please use it!**

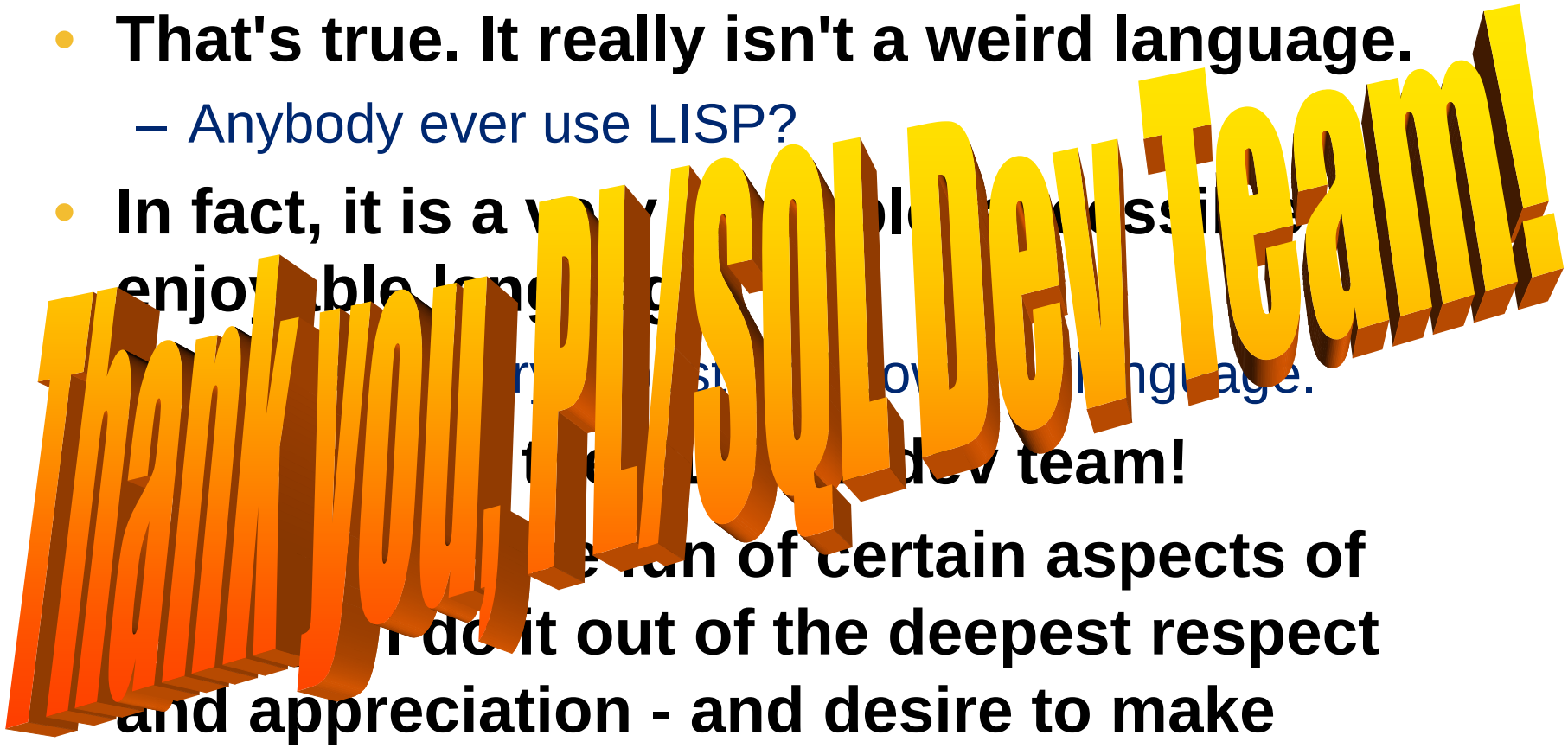
http://www.ILovePLSQLAnd.net

The agenda

- C'mon, PL/SQL is *not* weird.
- SQLERRM and DBMS_OUTPUT.PUT_LINE
- Error codes: positive, negative, either, both?
- The built-in string parsing program - NOT!
- VARCHAR2 memory allocation
- VARRAY - what kind of varrying is that?
- $IF I understood $IF I would be amazing!
- The mystery of "reserved words" in PL/SQL
- Where's my line number?
- Where's my program name?
- Zero length strings and NULL
- %ROWTYPE and %TYPE

C'mon, PL/SQL is *not* WEIRD!

- **That's true. It really isn't a weird language.**
  - Anybody ever use LISP?
- **In fact, it is a v[illegible] enjo[illegible]**
  - [illegible]
  - **t[illegible] dev team!**
  - **[illegible]n of certain aspects of [illegible] do it out of the deepest respect and appreciation - and desire to make PL/SQL even better!**



PL/SQL - the *Really* Readable Language

- **Let's compare Java and PL/SQL....**

```
public class Hello {
    public static void main (String [] args) {
       System.out.println ("Hello World!");
       }
}
```

```
CREATE OR REPLACE PROCEDURE hello (
IS
BEGIN
   DBMS_OUTPUT.PUT_LINE ('Hello world!');
END hello;
```

- **PL/SQL isn't as powerful as Java, but it's *much* easier to write - and understand!**

SQLERRM and DBMS_OUTPUT.PUT_LINE

- **SQLERRM returns the error text for the specified error code.**
  - If none is provided, then SQLCODE is assumed.
- **But SQLERRM might *truncate your error message!***
  - Currently at 512, earlier at 255.
- **255...255...what does that number remind us of! Ah, yes: DBMS_OUTPUT.PUT_LINE**
- **So use DBMS_UTILITY.FORMAT_ERROR_STACK instead!**

sqlerrm.sql

Error codes: positive, negative, either, both?

- **We all know that Oracle errors are negative.**
- **Well, except for 1 and 100.**
  - Hey, that NO_DATA_FOUND is pretty strange all by itself!
- **Oh, and error codes saved by SAVE EXCEPTIONS.**
- **And error codes saved by DBMS_ERRLOG**
- **At least the EXCEPTION_INIT pragma has it straight - more or less.**

STANDARD package in RDBMS\Admin:
stdspec.sql stdbody.sql

bulkexc.sql **dbms_errlog*.*** **exception_init.sql**

More on errors: the price of laziness - or is it cost-cutting?

- **It's as if someone at Oracle calculated that declaring new exceptions cost $74 each.**
  - Larry: "Save $1B in costs this year!"
  - Developers: "OK, we won't declare new exceptions."
- **And so we have "recycled" exceptions:**
  - NO_DATA_FOUND: pure confusion
  - VALUE_ERROR: sub-message text

excquiz6*.sql
value_error_demo.sql

The built-in string parsing program - NOT!

- **Surely any robust programming language provides a program to parse a delimited string.**
  - And PL/SQL is no exception....
- **Well, sort of. Oracle gave us:**

DBMS_UTILITY.COMMA_TO_TABLE

- **String cannot be NULL - raises error!**
- **Only parses comma-delimited strings.**
- **Every element in the list must be a *valid PL/SQL identifier.***
  - You can't make this stuff up!

commatotable.tst
sqlerrm.sql

Parsing programs to the rescue

- **Well, the main thing is that *you* should not have to write these algorithms over and over yourself.**
- **So here are some options:**
  - parse.pkg - parse any delimited string, returns a collection of type defined in package.
  - str2list.pkg - parse any delimited string, returns a collection based *on your own type*.
  - Regular expressions

parse.pkg
str2list.pkg
str2list2.pkg

VARCHAR2 memory allocation

- **Memory for VARCHAR2 variables is only allocated as needed, right?**
  - *Variable-length* strings!
- **OK, then which of the following variables consume the most memory?**

```
DECLARE
   l_var1   VARCHAR2 (32767);
   l_var2   VARCHAR2 (4050);
   l_var3   VARCHAR2 (500);
BEGIN
   l_var1 := 'a';
   l_var2 := 'a';
   l_var3 := 'a';
END;
/
```

l_var3

VARRAY - what kind of varrying is that?

- **Oracle offers three kinds of collections**
  - Associative Array
  - Nested table
  - Varray, a.k.a, "Varrying array"
- **That's weird enough, all by itself, really.**
- **But what I find truly odd is the use of the name "varrying array".**
- **It is the *least varrying* of all the different types of collections!**

associative_array_example.sql
nested_table_example.sql
varray_example.sql
collection_of_records.sql

$IF I understood $IF I would be amazing!

- **Have you ever used the $ syntax added to PL/SQL in Oracle10g Release 2?**
- **It looks *very weird*.**
- **But it is *very useful*.**
- **With conditional compilation, you can....**
  - Write code that will compile and run under different versions of Oracle (relevant for future releases).
  - Run different code for test, debug and production phases. That is, compile debug statements in and out of your code.
  - Expose private modules for unit testing.

cc_version_check.sql
cc_debug_trace.sql
11g_emplu.pkg

The mystery of "reserved words" in PL/SQL

- **What will happen when I run this code?**

```
DECLARE
   PLS_INTEGER    VARCHAR2 (1);
   NO_DATA_FOUND   EXCEPTION;
BEGIN
   SELECT dummy
     INTO PLS_INTEGER
     FROM DUAL
    WHERE 1 = 2;

   IF PLS_INTEGER IS NULL
   THEN
      RAISE NO_DATA_FOUND;
   END IF;
EXCEPTION
   WHEN NO_DATA_FOUND
   THEN
      DBMS_OUTPUT.put_line ('No dummy!');
END;
```

excquiz5.sql

Exploring the STANDARD package

- **Much of what we consider to be the base PL/SQL language is defined in the STANDARD package.**
  - One of two "default" packages; the other is DBMS_STANDARD.
- **You can view the contents of the STANDARD package (and other "supplied" packages by visiting the appropriate variation of:**

```
$ORACLE_HOME/Rdbms/Admin
```

Where's my line number?

- **An exception is raised.**
- **I trap it and log the error.**
- **I want to see the line number on which the error is raised.**
- **If I am not yet on Oracle 10g Release 2, I am *totally out of luck.***
- **Keep up with Oracle, though, and then you can take advantage of DBMS_UTILITY.FORMAT_ERROR_BACKTRACE**
  - Call it *every time* you log an error!

Backtrace.sql
Quest Error Manager -
www.ToadWorld.com - Downloads

Where's my program name?

- **DBMS_UTILITY.FORMAT_CALL_STACK answers the question: "How did I get here?"**
- **DBMS_UTILITY.FORMAT_ERROR_BACKTRACE answers the question: "Where did my error come from?"**
- **But in both cases....if the program in question is located inside a package, I don't see the name of that subprogram.**
- **Please, Oracle, give me my program name!**
  - Heck, and my overloading, while you are at it.

Zero length strings and NULL

- **A NULL string and a zero length string ('') are supposed to be treated the same way inside Oracle.**
  - And for the most part it is true.
- **But when it comes to**

ORA-06502: PL/SQL: numeric or value error: NULL index table key value

- **You can get some rather *weird* behavior!**
  - Especially on Oracle11g....

null_index_value.sql
zero_length_string.sql

%TYPE *and* %ROWTYPE?

- **I have enormous respect for the PL/SQL team.**
  - Not only are they are all smarter than me, they are *real* computer scientists. I am an amateur by comparison.
- **And their design of the PL/SQL syntax is for the most part very elegant and minimalist.**
- **But why do we have to have both %TYPE *and* %ROWTYPE?**

So I hope you now agree with me...

- **PL/SQL can be a little bit weird sometimes.**
- **But it is still a truly elegant and straightforward language.**
- **Those features make it, in turn, accessible and productive.**
- **And that's why so many of us have achieved *personal success*, and have implemented so many *successful applications* with the PL/SQL language.**