The Educational Conference For Oracle Techology Users

ODTUG Kscope23

aurora, co june 25-29

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Don't Forget To
Fill Out Your Evals

Fighting Bad PL/SQL & SQL

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26th June 2023

Philipp Salvisberg

Data Engineering Principal

- Database Centric Development
- Model Driven Software Development
- Open-Source Development

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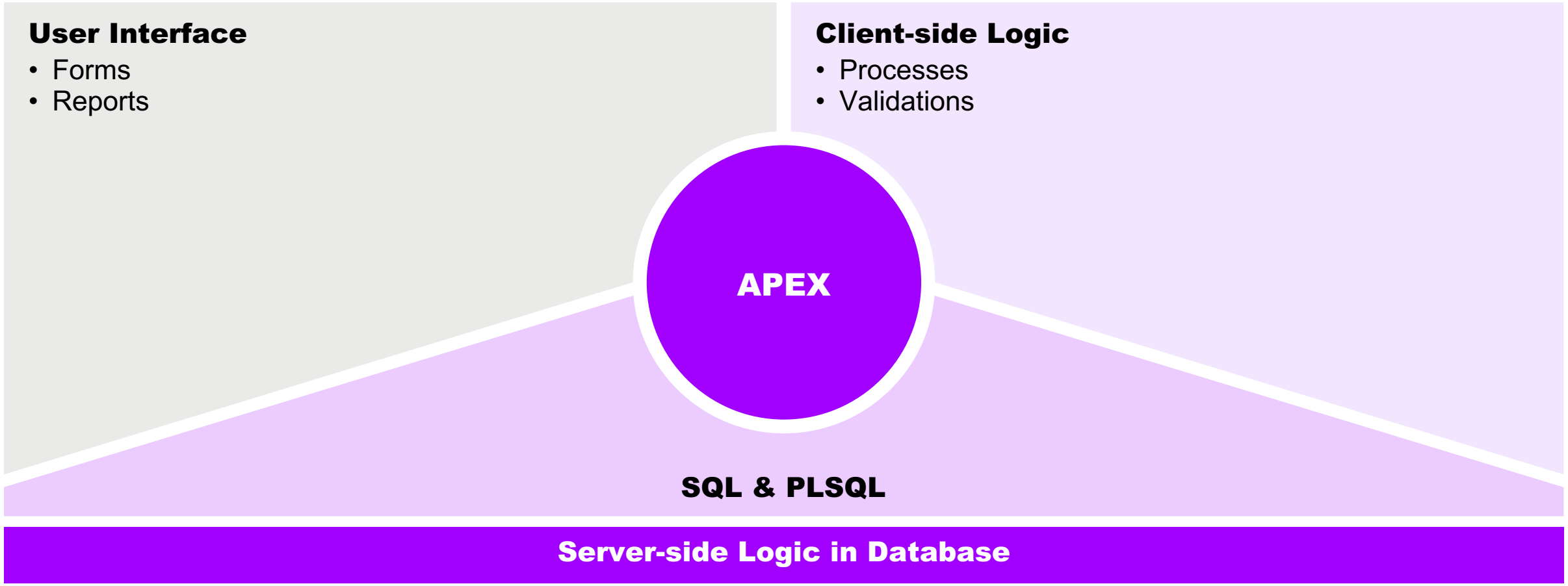
Where Is My Code

Application



SQL

Original Report in APEX

```
select d.deptno, d.dname, …
  from dept d
  join emp e
    on e.deptno = d.deptno
  join salgrade s …
  join …
  join …
 where d.deptno = :p10_deptno
   and …
```

Refactoring

Relational View in the Database

```
create view dept_emp_v as
select d.deptno, d.dname, …
  from dept d
  join emp e …
```

Simplified Report in APEX

```
select d.deptno, d.dname, …
  from dept_emp_v
 where d.deptno = :p10_deptno
```

PL/SQL

Original Process in APEX

```
declare
   l_comm emphist.comm%type;
   …
begin
   select h.comm into l_comm
     from …
    where e.id = :p20_id;
   if l_comm > 4000 then
      …
   else
      case …
      end case;
   end if;
   :p20_comm := l_comm;
end;
```

Refactoring

PL/SQL Package in the Database

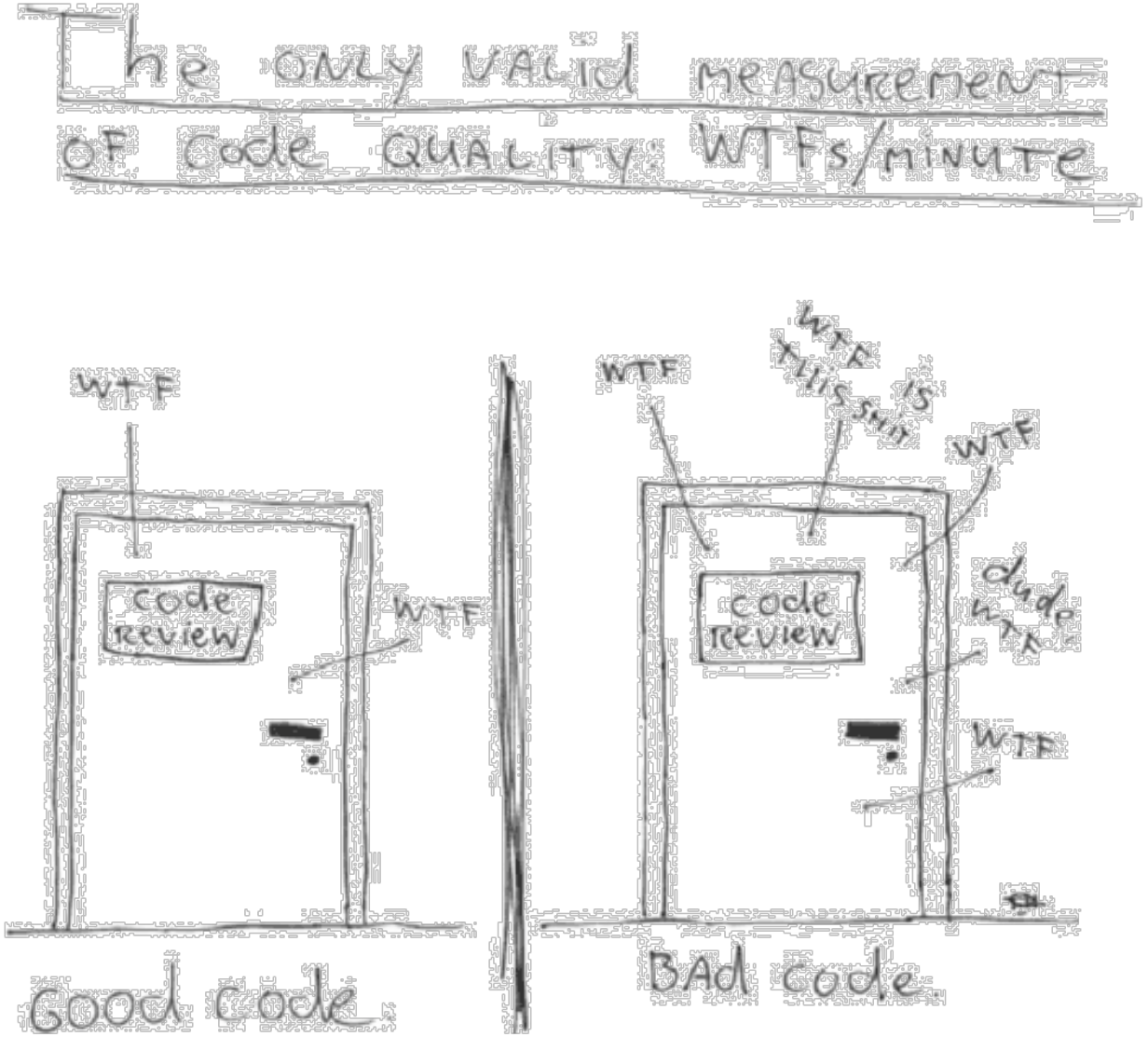
```
create package emp_mgmt is
   function comm(in_id in integer)
   return number is …
end;
create package body emp_mgmt is
   function comm(in_id in integer)
   return number is …
   begin
      …
   end; …
end;
```

Simplified Process in APEX

```
:p20_comm := emp_mgmt.comm(:p20_id);
```

Software Quality

Code Reviews



Source: http://www.osnews.com/story/19266/WTFs_m

Tips

Source: https://www.youtube.com/watch?v=IhE4pTprQ4E

PL/SQL & SQL Coding Guidelines

PL/SQL & SQL Coding Guidelines

main

About

Introduction

Naming Conventions

Coding Style

Language Usage

Complexity Analysis

Code Reviews

Tool Support

Appendix

The Oracle Database Developer community is made stronger by resources freely shared by experts around the world, such as the Trivadis Coding Guidelines. If you have not yet adopted standards for writing SQL and PL/SQL in your applications, this is a great place to start.

Table of contents

Foreword

Steven Feuerstein

Steven Feuerstein
Senior Advisor
Insum Solutions

Coding Guidelines are a crucial part
fact, that code is more often read th written
efforts to ease the work of the read which is not necessarily the author.

I am convinced that this standard may be a good starting point for your own guidelines.

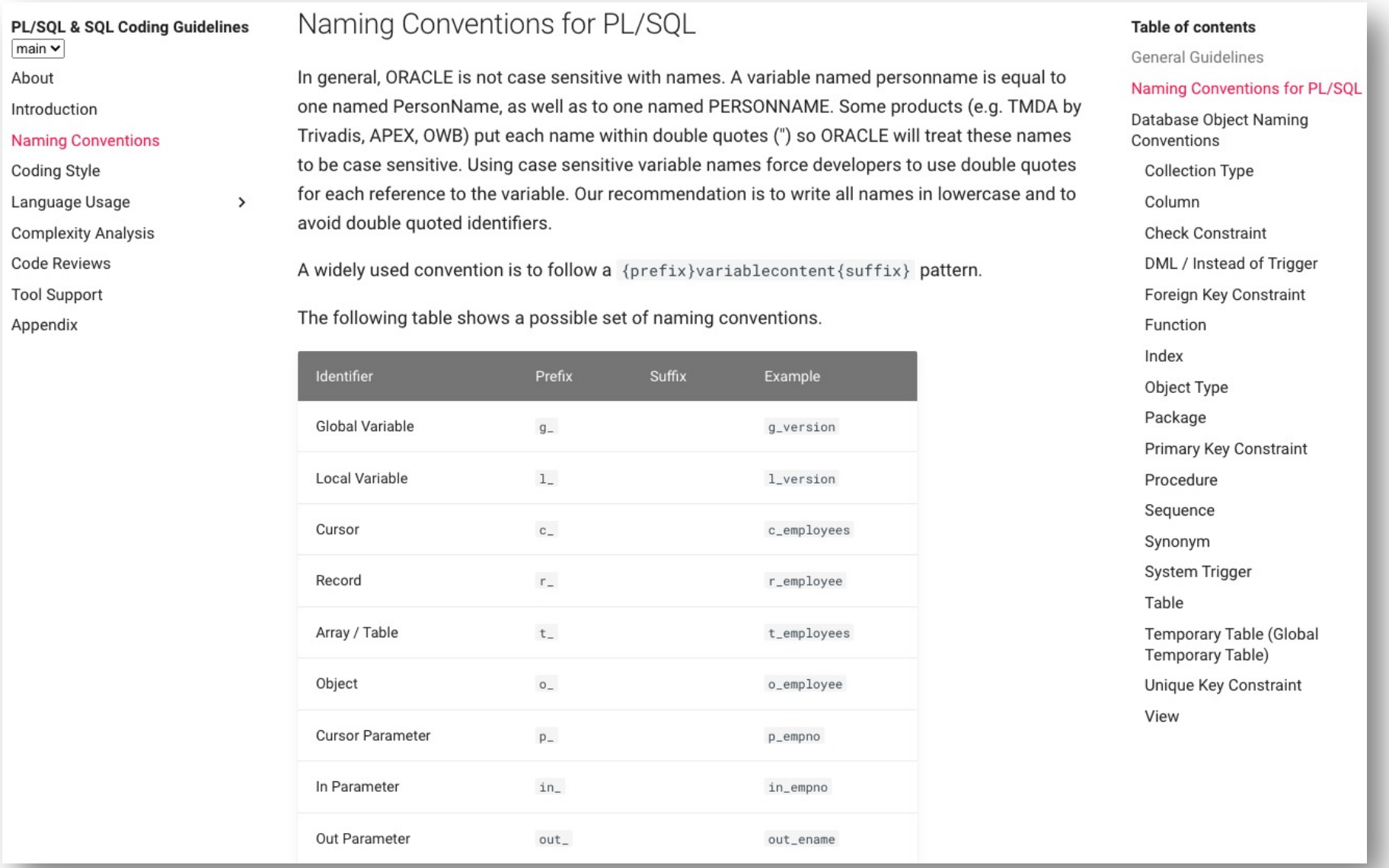
Roger Troller
Senior Consultant
finnova AG Bankware

Every line you don't write, is a line you don't have to maintain

Code is more often read than written

Source: https://trivadis.github.io/plsql-and-sql-coding-guidelines/main/

Naming Conventions



PL/SQL & SQL Coding Guidelines

main

About
Introduction
Naming Conventions
Coding Style
Language Usage
Complexity Analysis
Code Reviews
Tool Support
Appendix

Naming Conventions for PL/SQL

In general, ORACLE is not case sensitive with names. A variable named personname is equal to one named PersonName, as well as to one named PERSONNAME. Some products (e.g. TMDA by Trivadis, APEX, OWB) put each name within double quotes (") so ORACLE will treat these names to be case sensitive. Using case sensitive variable names force developers to use double quotes for each reference to the variable. Our recommendation is to write all names in lowercase and to avoid double quoted identifiers.

A widely used convention is to follow a `{prefix}variablecontent{suffix}` pattern.

The following table shows a possible set of naming conventions.

Identifier	Prefix	Suffix	Example
Global Variable	`g_`		`g_version`
Local Variable	`l_`		`l_version`
Cursor	`c_`		`c_employees`
Record	`r_`		`r_employee`
Array / Table	`t_`		`t_employees`
Object	`o_`		`o_employee`
Cursor Parameter	`p_`		`p_empno`
In Parameter	`in_`		`in_empno`
Out Parameter	`out_`		`out_ename`

Table of contents

General Guidelines
Naming Conventions for PL/SQL
Database Object Naming Conventions
- Collection Type
- Column
- Check Constraint
- DML / Instead of Trigger
- Foreign Key Constraint
- Function
- Index
- Object Type
- Package
- Primary Key Constraint
- Procedure
- Sequence
- Synonym
- System Trigger
- Table
- Temporary Table (Global Temporary Table)
- Unique Key Constraint
- View

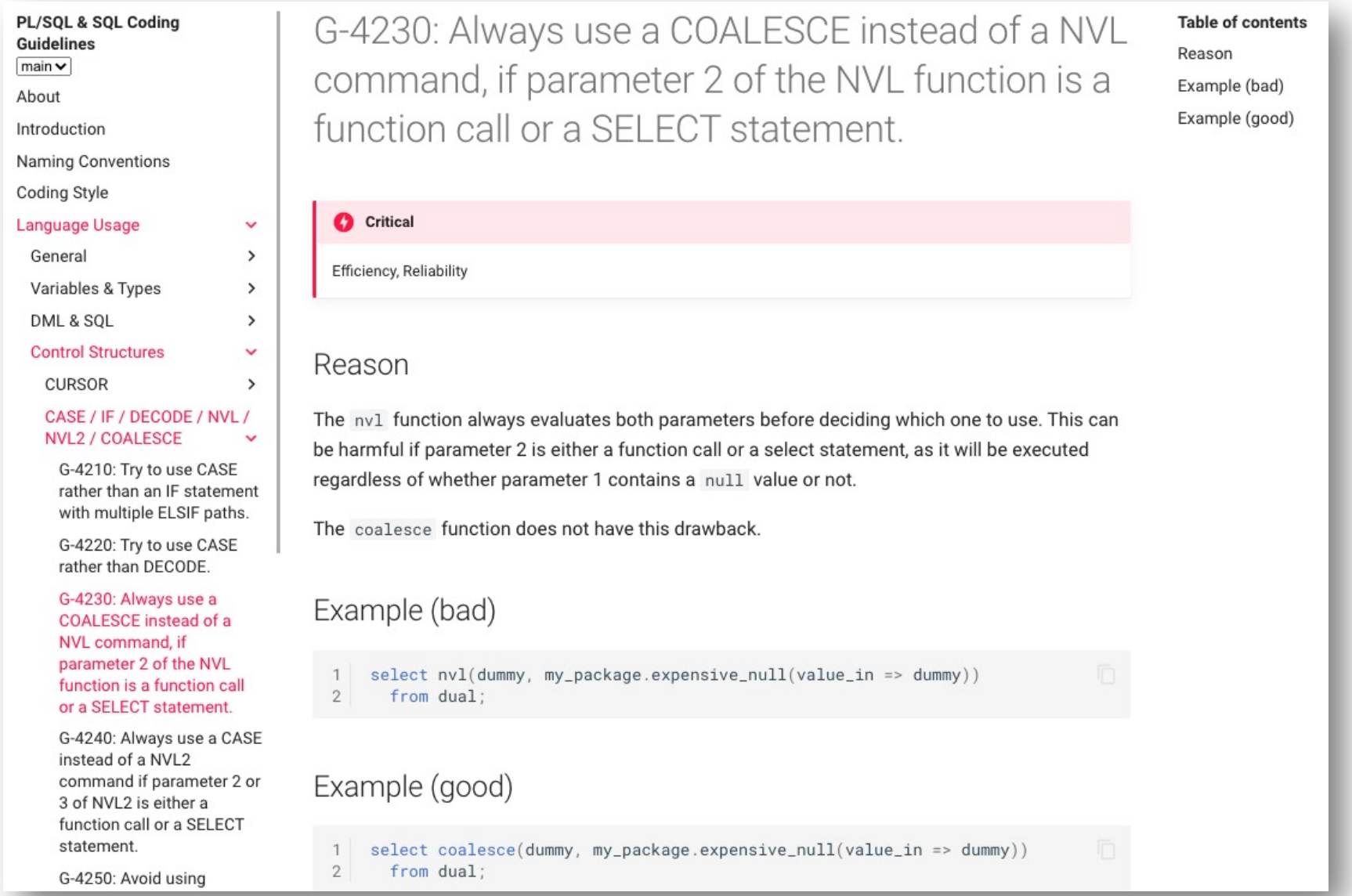
Source: https://trivadis.github.io/plsql-and-sql-coding-guidelines/main/2-naming-conventions/naming-conventions/

Code Style

```
begin
  for rec in (
    select r.country_region as region,
           p.prod_category,
           sum (s.amount_sold) as amount_sold
      from sales s
      join products p
        on p.prod_id = s.prod_id
      join customers cust
        on cust.cust_id = s.cust_id
      join times t
        on t.time_id = s.time_id
      join countries r
        on r.country_id = cust.country_id
     where calendar_year = 2000
     group by r.country_region,
           p.prod_category
     order by r.country_region, p.prod_category
  )
  loop
    if rec.region = 'Asia' then
      if rec.prod_category = 'Hardware' then /* print only one line for demo purposes */
        sys.dbms_output.put_line('Amount: ' || rec.amount_sold);
      end if;
    end if;
  end loop;
end;
/
```

```
begin for rec in (select r.country_region as region, p.prod_category,
sum (s.amount_sold) as amount_sold from sales s join products p on p.
prod_id = s .prod_id join customers cust on cust .cust_id = s.cust_id
join times t on t.time_id= s.time_id join countries r on r.country_id
= cust .country_id where calendar_year=2000 group by r.country_region
, p . prod_category order by r . country_region , p . prod_category )
loop if rec.region = 'Asia'  then if rec . prod_category = 'Hardware'
then /* print only one line for demo purposes */  sys . dbms_output .
put_line('Amount: '||rec.amount_sold );end if; end if; end loop; end;
/
```

Guidelines



PL/SQL & SQL Coding Guidelines

main

About
Introduction
Naming Conventions
Coding Style
Language Usage
General
Variables & Types
DML & SQL
Control Structures
CURSOR
CASE / IF / DECODE / NVL / NVL2 / COALESCE
G-4210: Try to use CASE rather than an IF statement with multiple ELSIF paths.
G-4220: Try to use CASE rather than DECODE.
G-4230: Always use a COALESCE instead of a NVL command, if parameter 2 of the NVL function is a function call or a SELECT statement.
G-4240: Always use a CASE instead of a NVL2 command if parameter 2 or 3 of NVL2 is either a function call or a SELECT statement.
G-4250: Avoid using

G-4230: Always use a COALESCE instead of a NVL command, if parameter 2 of the NVL function is a function call or a SELECT statement.

Table of contents
Reason
Example (bad)
Example (good)

Critical

Efficiency, Reliability

Reason

The `nvl` function always evaluates both parameters before deciding which one to use. This can be harmful if parameter 2 is either a function call or a select statement, as it will be executed regardless of whether parameter 1 contains a `null` value or not.

The `coalesce` function does not have this drawback.

Example (bad)

```
1  select nvl(dummy, my_package.expensive_null(value_in => dummy))
2    from dual;
```

Example (good)

```
1  select coalesce(dummy, my_package.expensive_null(value_in => dummy))
2    from dual;
```

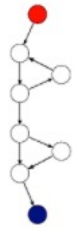
Source: https://trivadis.github.io/plsql-and-sql-coding-guidelines/main/.../g-4230/

Complexity Analysis

$$M = E - N + 2P$$

where

- M = cyclomatic complexity
- E = the number of edges of the graph
- N = the number of nodes of the graph
- P = the number of connected components.



Take, for example, a control flow graph of a simple program. The program begins executing at the red node, then enters a loop (group of three nodes immediately below the red node). On exiting the loop, there is a conditional statement (group below the loop), and finally the program exits at the blue node. For this graph, $E = 9$, $N = 8$ and $P = 1$, so the cyclomatic complexity of the program is 3.

```
1  begin
2     for i in 1..3
3     loop
4        dbms_output.put_line('in loop');
5     end loop;
6     --
7     if 1 = 1
8     then
9        dbms_output.put_line('yes');
10    end if;
11    --
12    dbms_output.put_line('end');
13 end;
14 /
```


Source: https://trivadis.github.io/plsql-and-sql-coding-guidelines/main/5-complexity-analysis/complexity-analysis/

db* CODECOP

CODING TO GO

A PRODUCT BY trivadis
Part of Accenture

FUNCTIONALITIES AND BENEFITS

db* CODECOP

Automated analysis of PL/SQL code

Determining essential software metrics (like McCabe's cyclomatic complexity or the Halstead metric)

Quality reports of source codes incl. recommendations for action

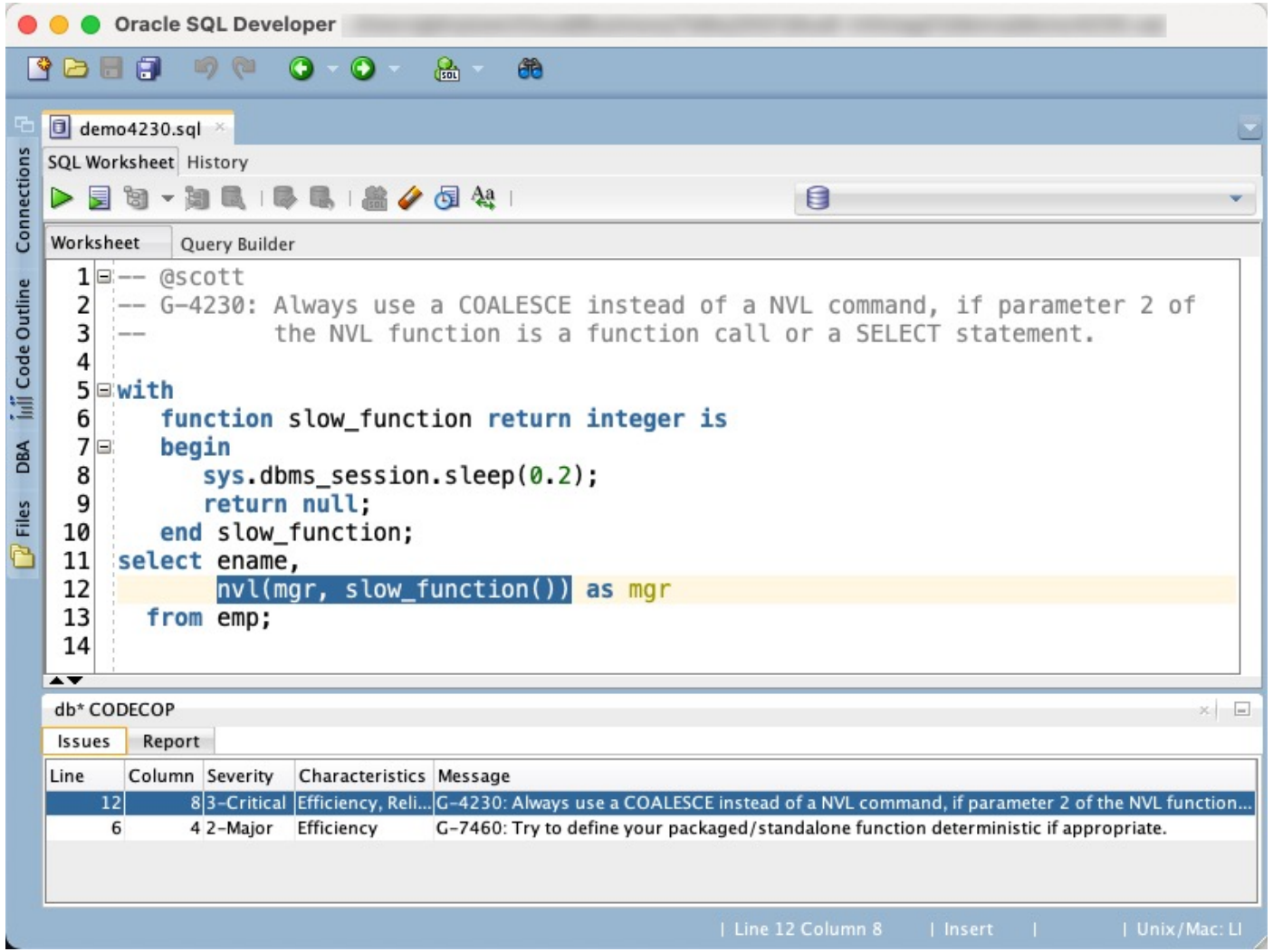
SQL Developer Extension and SonarQubeTM plugin

BENEFITS

- Early detection of errors and undesirable developments
- Shorten development cycles
- Seamless integration into SQL Developer, into existing environments for static code analysis and into build management tools
- Execution outside the development environment and integration into automated processes possible via command line

A PRODUCT BY trivadis

db* CODECOP for SQL Developer – Demo

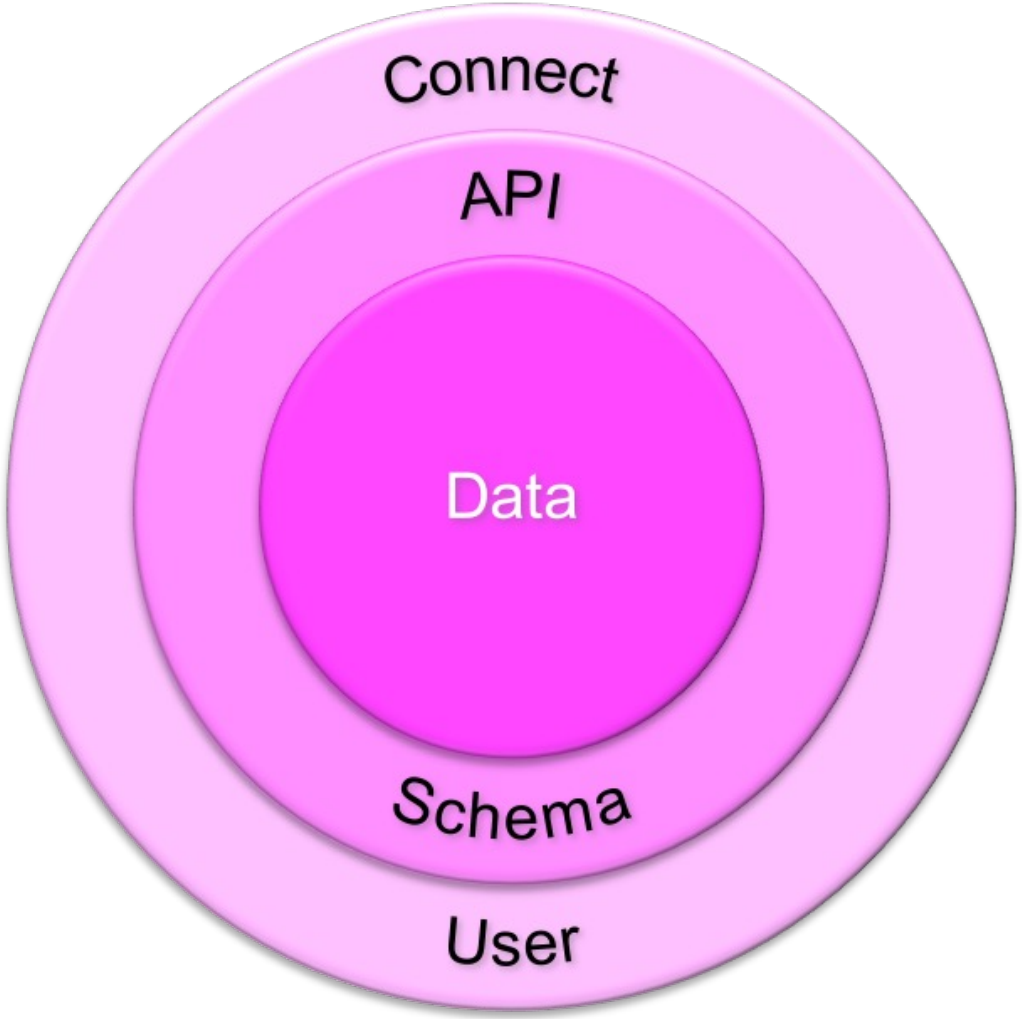


- Format (G-1050 / G-4320)
- G-1080
- G-2150
- G-3185
- G-4230 (G-7460)
- G-4250
- G-5080
- G-7810
- G-9010
- G-9501
- G-9600-9603

Download: https://github.com/Trivadis/plsql-cop-sqldev

Where Is My Code Again?

SmartDB & PinkDB – Two of a Kind



Data is more often read than written

Consistent data simplifies the work of consumers

More information: https://www.salvis.com/blog/2018/07/18/the-pink-database-paradigm-pinkdb/

Thank You

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