

Fighting Bad PL/SQL & SQL with VS Code

Philipp Salvisberg
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Timer?

Welcome



Philipp Salvisberg

Founder, Owner and CEO of Grisselbav GmbH

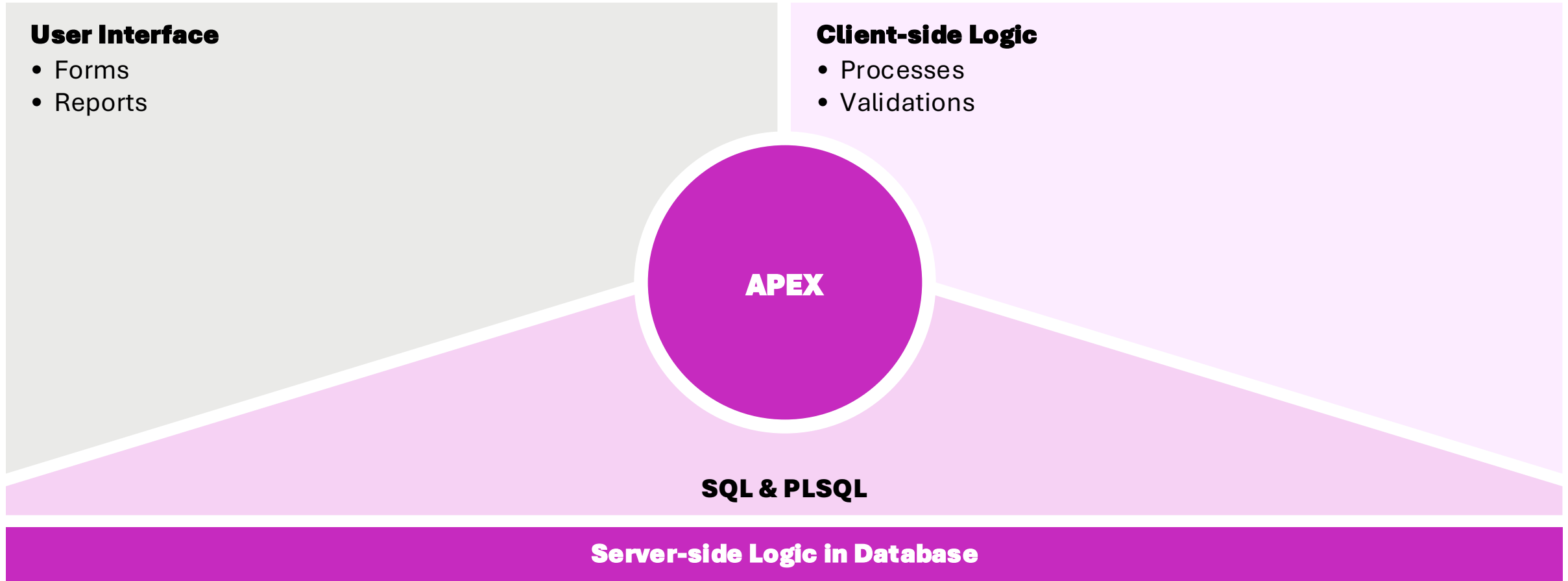
- Database-centric Development
- Model-driven Software Development
- Open-Source Development

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<https://www.salvis.com/blog/>

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 DB

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

Simplified Report in APEX

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

PL/SQL

Original Process in APEX

```
declare
  l_comm emp_hist.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 DB

```
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;
```

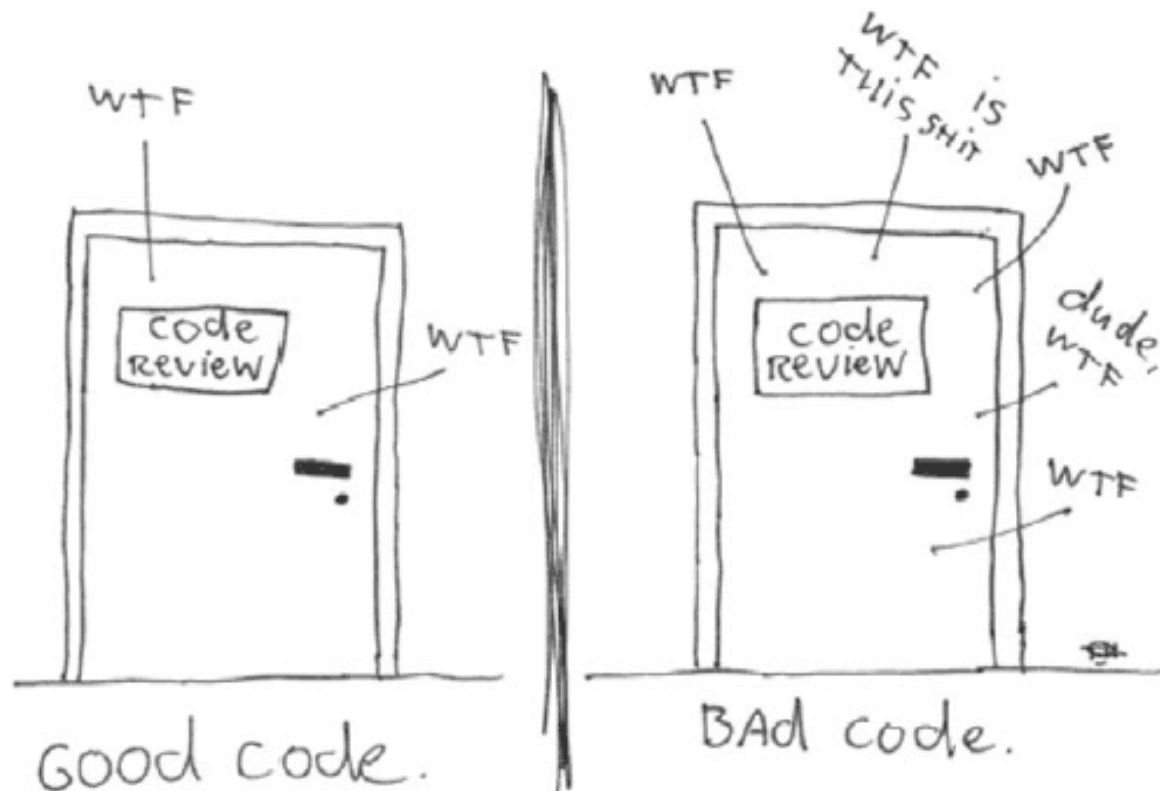
Simplified Process in APEX

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

Software Quality

Code Reviews

The ONLY VALID MEASUREMENT
OF CODE QUALITY: WTFs/MINUTE



Tips



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

PL/SQL & SQL Coding Guidelines

PL/SQL & SQL Coding Guidelines

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About

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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.

Steven Feuerstein

Steven Feuerstein
Senior Advisor
Insum Solutions

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Foreword

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

Code is more often read than written



Coding Guidelines are a crucial part of the development process. In fact, that code is more often read than written. It is a good idea to make efforts to ease the work of the reader, 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

Naming Conventions

G-9102 FREE

Warning ?

Always follow naming conventions for local variables.

✗ Non-Compliant Example

```
1 declare
2   some_name integer;
3 begin
4   null;
5 end;
6 /
```

✓ Compliant Solution - ★★★★★

```
1 declare
2   l_some_name integer;
3 begin
4   null;
5 end;
6 /
```

Parameters

Use parameters to customize the rule to your needs.

Parameter	Description	Default Value
ObjectTypes	Comma-separated list of unqualified database object types. If empty, the installed object types are used.	,
CollectionPattern	Regular expression pattern for PL/SQL local variables of type array/table.	(?i)^t_[a-z0-9\$_#_]+\$
ObjectPattern	Regular expression pattern for PL/SQL local variable of SQL object type.	(?i)^o_[a-z0-9\$_#_]+\$
CollectionTypes	Comma-separated list of unqualified database collection types. If empty, the installed collection types are used.	,
LocalVariablePattern	Regular expression pattern for PL/SQL common local variables.	(?i)^l_[a-z0-9\$_#_]+\$
RecordPattern	Regular expression pattern for PL/SQL local variables of type record.	(?i)^r_[a-z0-9\$_#_]+\$
CursorPattern	Regular expression pattern for PL/SQL local variables of type cursor.	(?i)^c_[a-z0-9\$_#_]+\$

Coding 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 = 2022
    group by r.country_region,
             p.prod_category
    order by r.country_region,
             p.prod_category
  ) loop
    if rec.region = 'Europe' then
      if rec.prod_category = 'Tennis' 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=2022 group by r.country_region
, p . prod_category order by r . country_region , p . prod_category )
loop if rec.region = 'Europe' then if rec . prod_category = 'Tennis'
then /* print only one line for demo purposes */ sys . dbms_output .
put_line('Amount: ' || rec.amount_sold );end if; end if; end loop; end;
/
```

Rules

G-4230 FREE

Warning ?

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

Performance Control

Rule Details

Severity Level

 Critical ?

Quality Area

[Reliability](#) ?

Fixing times

1 mins
[Quick Fix](#) | [Local-easy](#) ?

Database Support

OracleDB (v9.0.1 +)

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

 Non-Compliant Example

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

 Compliant Solution - ★★★★★

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

Complexity Analysis

PL/SQL & SQL Coding Guidelines

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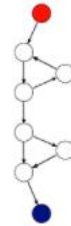
Code Reviews

Tool Support

Appendix

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     /
```

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

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Halstead Metrics

Calculation

McCabe's Cyclomatic Complexity

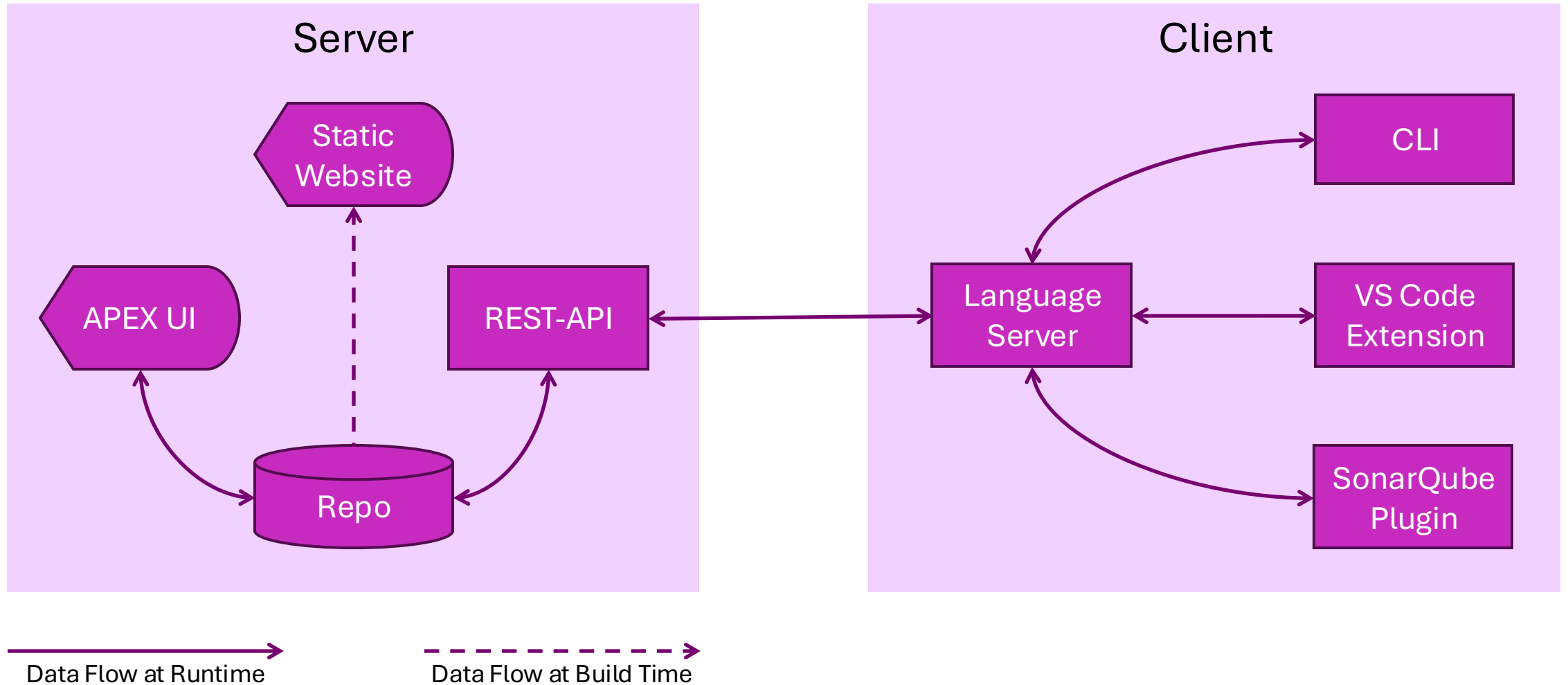
Description

Calculation



dbLint

dbLint Architecture



Subscription Plans

united codes. Products ▾ dbLinter About Benefits Pricing Rules Resources & Support ▾ Log In

Home Products dbLinter

Team Size for Essential & Professional: 5

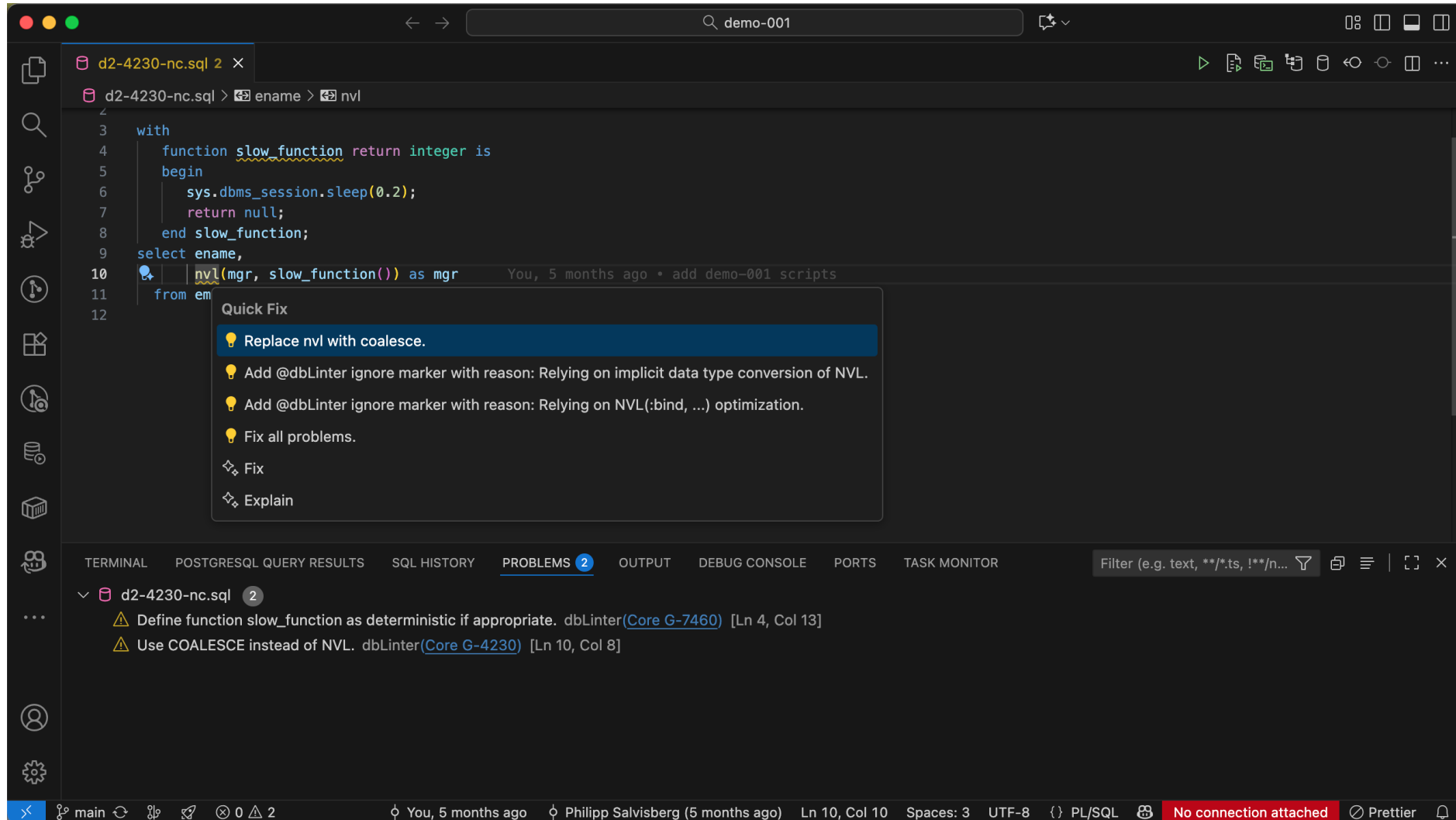
1 10 20 30 40 50

Most Popular

Anonymous Free	Starter €0	Essential €250/month	Professional €400/month
For a trial without sign-up	For occasional development	For efficient development	For the highest quality standards
✓ Basic problem detection ✓ Popular rule subset ✓ View explanations and examples ✗ Custom configuration	✓ All anonymous features ✓ Custom personal configuration ✓ SQL based tests	✓ Everything in Starter ✓ Share team configurations ✓ Quick fixes ✓ CI/CD pipeline with the CLI ✓ Team member management	✓ Everything in Essential ✓ SonarQube integration ✓ Create custom rules ✓ Import/export configurations
GET STARTED	SIGN UP FREE	Cost Breakdown: Users 1-5: 5 × €50 €250 €3,000/year for 5 users CONTACT SALES	Cost Breakdown: Users 1-5: 5 × €80 €400 €4,800/year for 5 users CONTACT SALES

Source: <https://newsite.united-codes.com/products/dblinter/>

dbLinter for VS Code – Demo



Download: <https://marketplace.visualstudio.com/items?itemName=Grisselbay.dbLinter>

Demonstrated Rules

dbLinter

philipp salvisberg

Configuration \ demo-001

Save

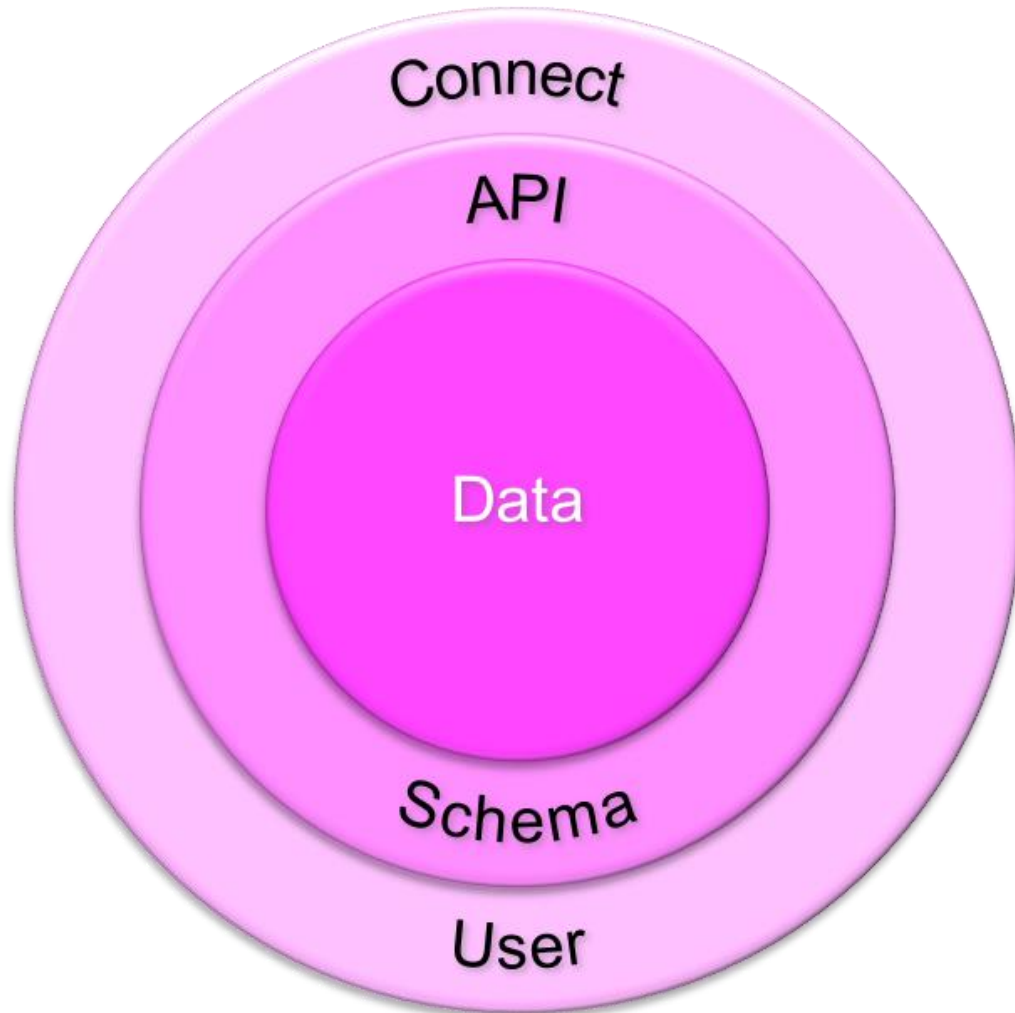
Show All Include/Exclude Connection Details Rules Parameters Ignore Test Results

☐	Rule Name ↑≡2	Rule Title	Tenant ↑≡1	Enabled
☐	G-1030	Avoid defining variables that are not used.	Core	☒
☐	G-1080	Avoid using the same expression on both sides of a relational comparison operator or a logical operator.	Core	☒
☐	G-1920	Avoid syntax errors.	Core	☒
☐	G-2150	Avoid comparisons with NULL value, consider using IS [NOT] NULL.	Core	☒
☐	G-3185	Never use ROWNUM at the same query level as ORDER BY.	Core	☒
☐	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.	Core	☒
☐	G-4250	Avoid using identical conditions in different branches of the same IF or CASE statement.	Core	☒
☐	G-4320	Always label your loops.	Core	☒
☐	G-5080	Always use FORMAT_ERROR_BACKTRACE when using FORMAT_ERROR_STACK or SQLERRM.	Core	☒
☐	G-7460	Try to define your packaged/standalone function deterministic if appropriate.	Core	☒
☐	G-7810	Never use SQL inside PL/SQL to read sequence numbers (or SYSDATE).	Core	☒
☐	G-9010	Always use a format model in string to date/time conversion functions.	Core	☒
☐	G-9501	Never use parameter in string expression of dynamic SQL. Use asserted local variable instead.	Core	☒
☐	G-9600	Never define more than one comment with hints.	Core	☒
☐	G-9601	Never use unknown hints.	Core	☒
☐	G-9602	Always use the alias name instead of the table name.	Core	☒
☐	G-9603	Never reference an unknown table/alias.	Core	☒
				Total 17

see also: <https://dblint-rules.united-codes.com/severity-levels/blocker/>

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

Thank you!

