

OpenWorld 2016

Querying Hadoop/HDFS from PL/SQL

CON6359

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MTI
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A large, stylized white cloud shape is centered on the slide. To its left and right are several smaller white circles of varying sizes, some with a slight 3D effect. A thin white line extends from the top right of the cloud.

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Agenda

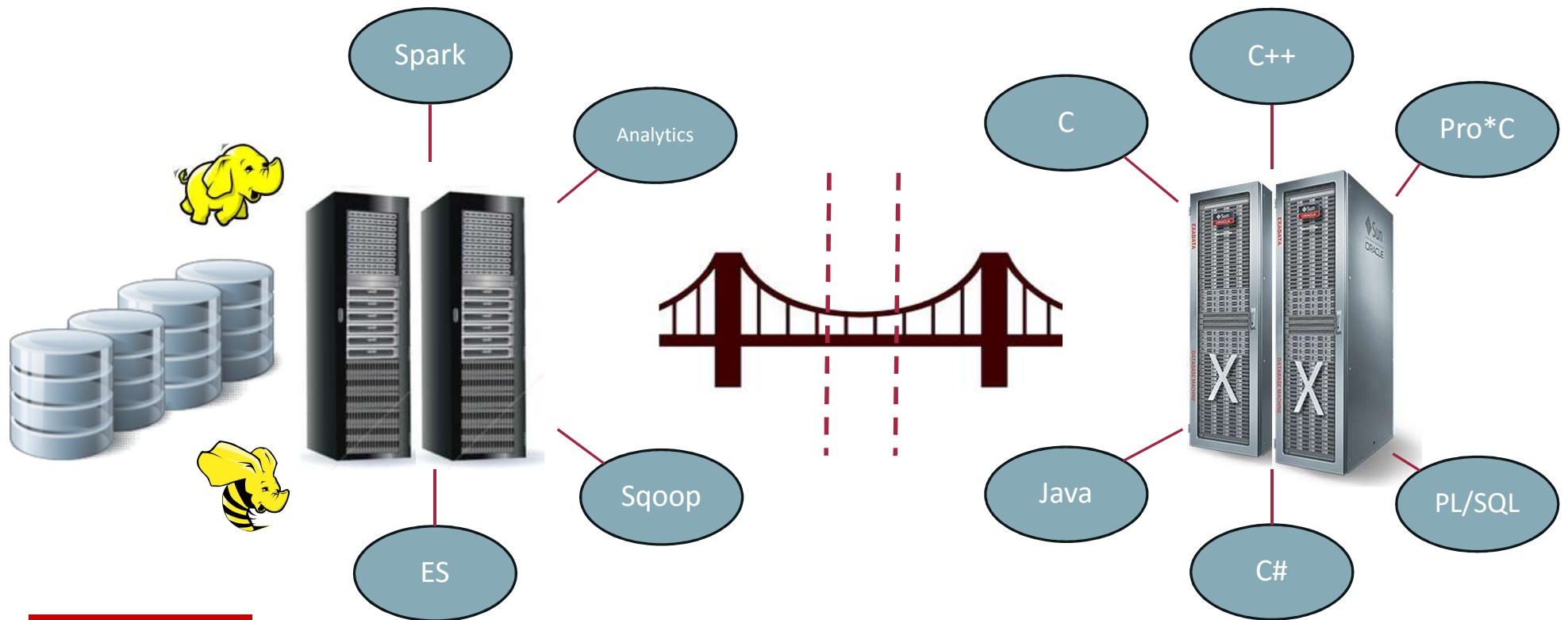
- 1 The Real-World
- 2 The Problem
- 3 The Solution
- 4 Considerations
- 5 Questions

Let's get started

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- 2 The Problem
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The Real-World

Different solutions, for different requirements

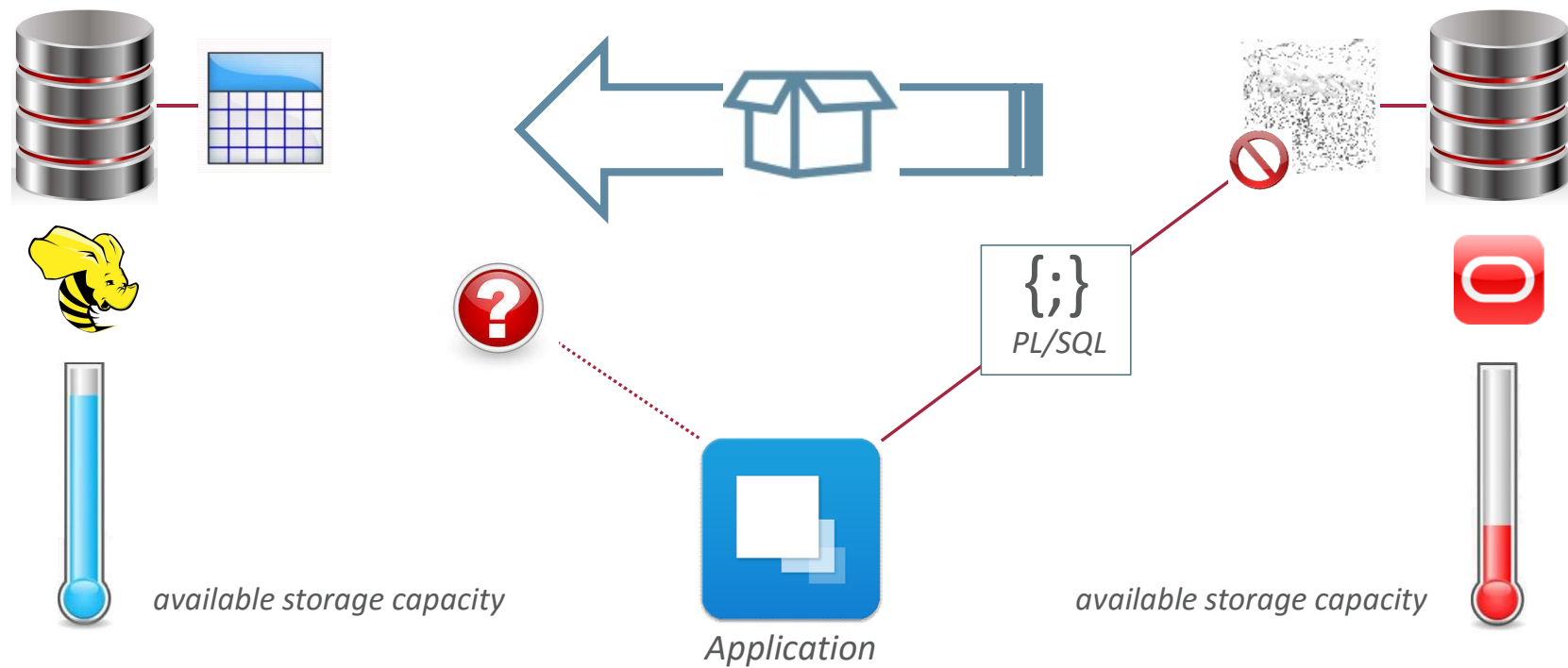


Moving on

- 1 The Real-World
- 2 The Problem
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The Problem

Changes

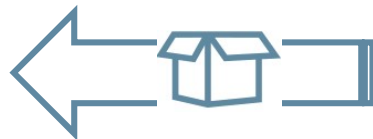


The Problem

Example



```
$ beeline -u jdbc:hive2://hive.corp.com:10000 \  
-n oracle -w welcome1.passwd  
  
0: jdbc:hive2://localhost:10000> desc user_log;  
+-----+-----+-----+  
| col_name | data_type | comment |  
+-----+-----+-----+  
| stamp    | date      |         |  
| account  | string    |         |  
| message  | string    |         |  
+-----+-----+-----+
```



```
SQL> desc SCOTT.USER_LOG
```

| Name | Null? | Type |
|---------|----------|----------------|
| STAMP | NOT NULL | DATE |
| ACCOUNT | | VARCHAR2(30) |
| MESSAGE | | VARCHAR2(4000) |

```
create view user_log_monthly  
as  
select stamp,  
       account,  
       message  
from scott.user_log  
where stamp between sysdate - 30  
       and sysdate;
```

```
procedure user_report( p out xmltype ) is  
begin  
    for rec in ( select account,  
                      message  
                  from scott.user_log  
                  order by account ) loop  
        ...  
    end user_report;
```

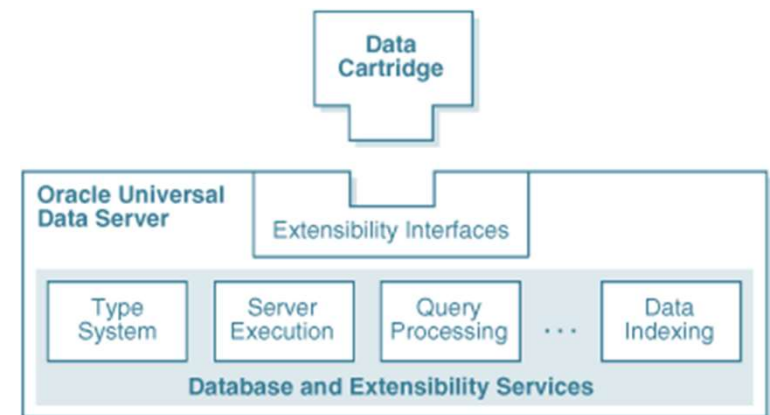
Next

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The Solution

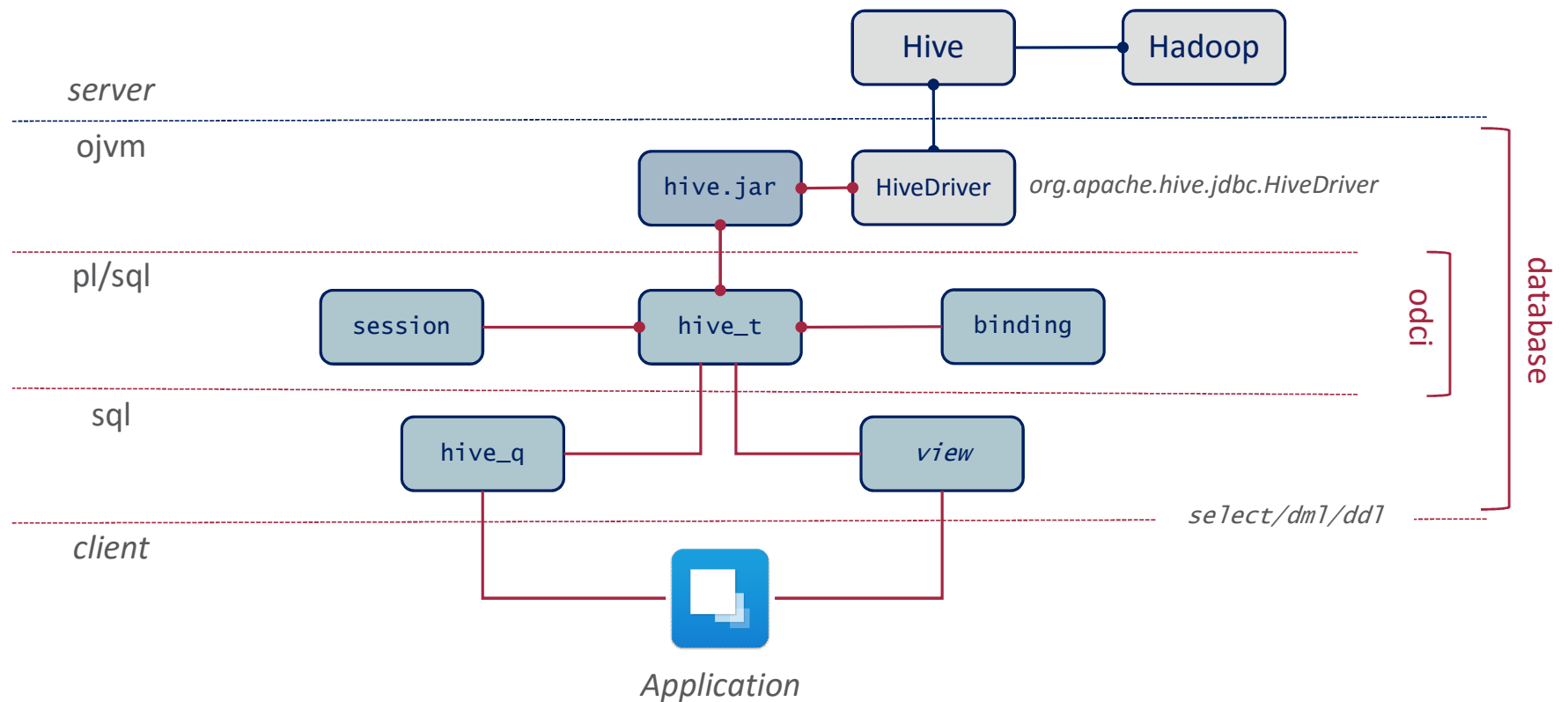
Introduction

- Presenting Hive-ODCI
 - Built on Oracle Data Cartridge Interface
 - Inspired by DBPrism and internal projects using ODCI
- Initial Requirements
 - Dynamically access Hadoop/Hive within the Oracle 12c RDBMS
 - Allow for First-Class Oracle objects
 - Leverage existing RBAC
 - Support active Bind variables
 - User defined, Static or Saved
 - Support Oracle SQL and PL/SQL
 - Easy to use, for Developers and Administrators



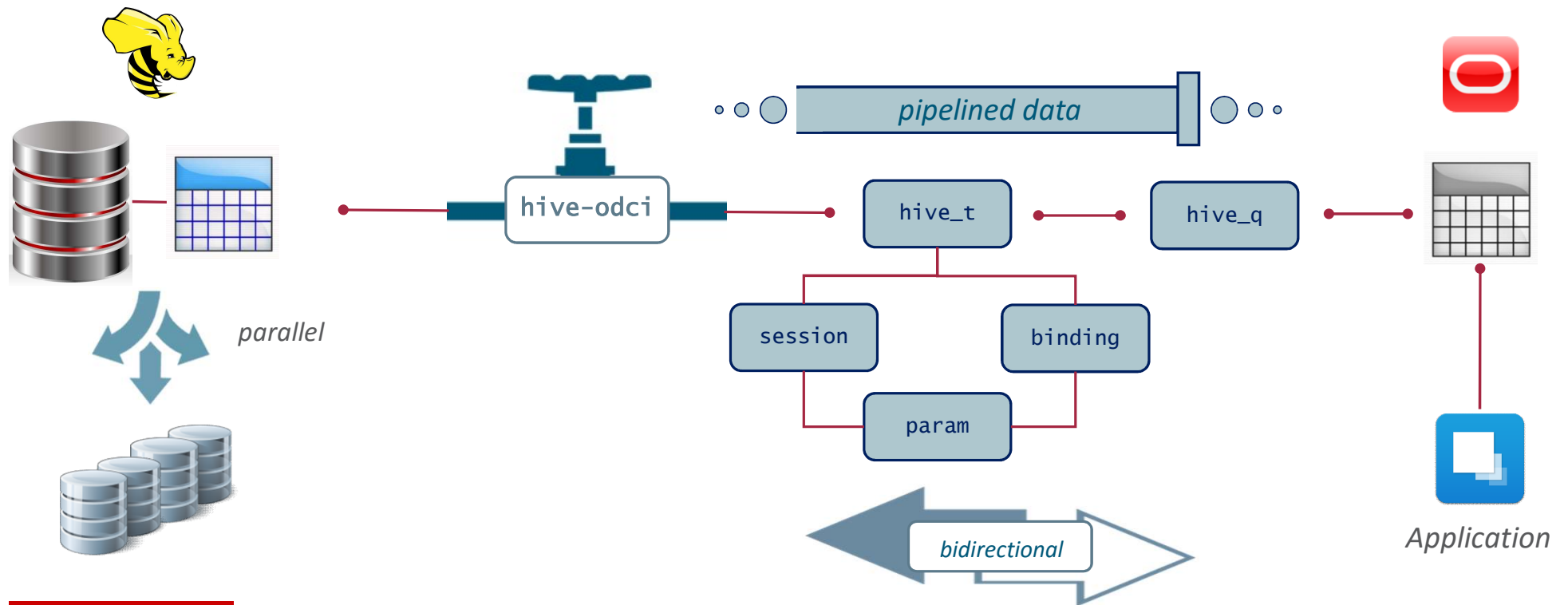
The Solution

Overview



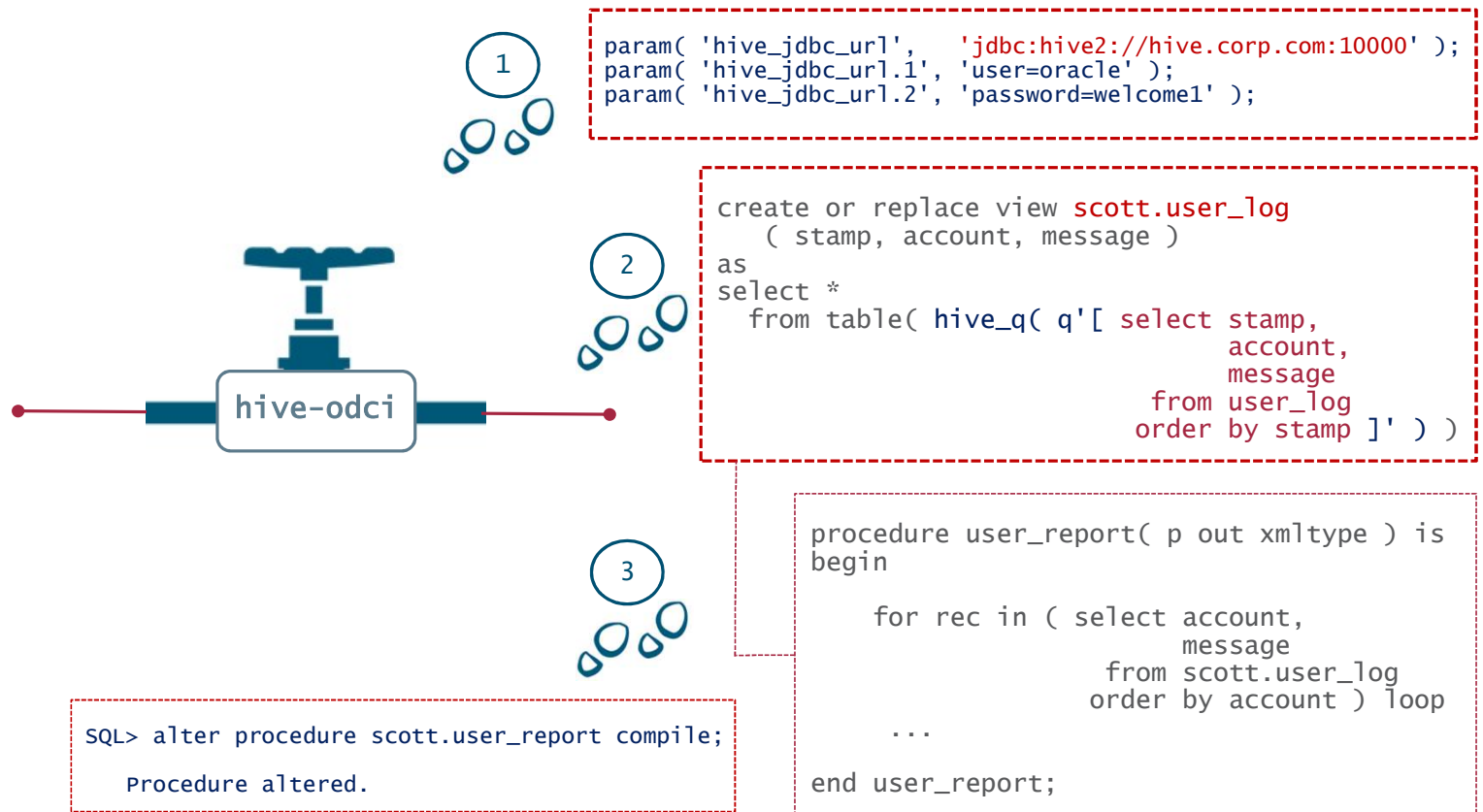
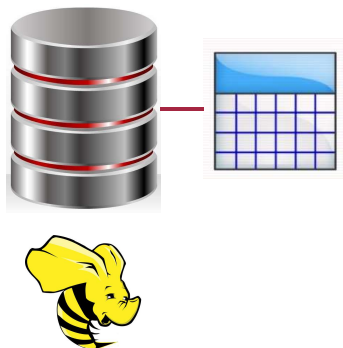
The Solution

Example



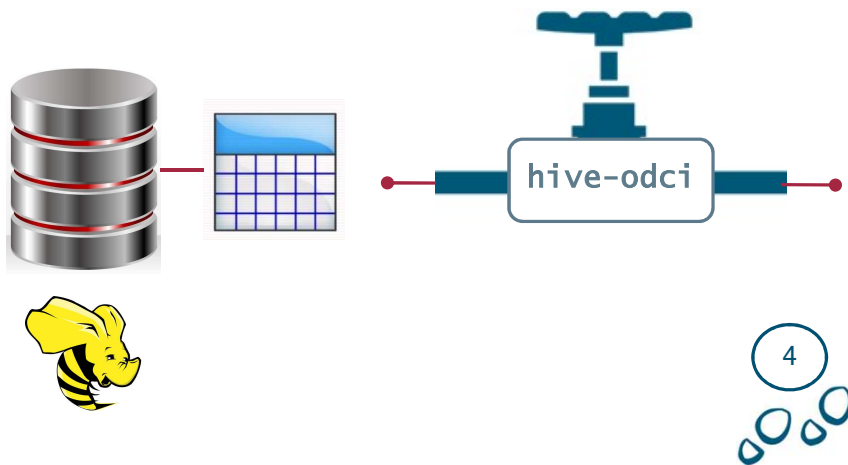
The Solution

Example



The Solution

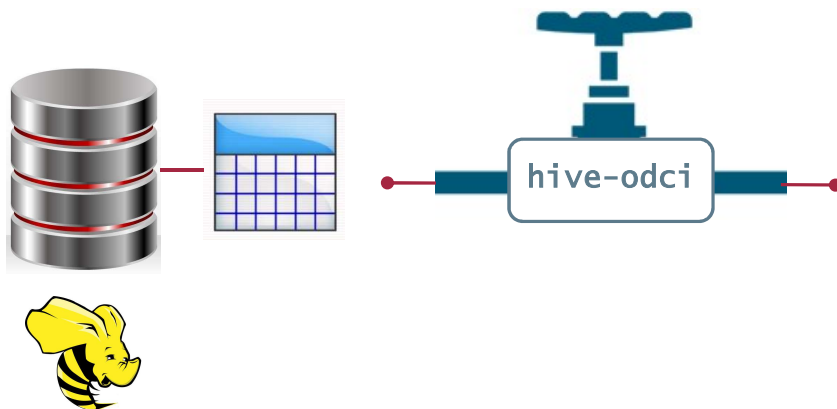
Example



```
create or replace view scott.user_log_monthly
(
    stamp,
    account,
    message
)
as
select *
from table( hive_q( q'[ select stamp,
                           account,
                           message
                           from user_log
                           where stamp between ? and ? ]',
hive_binds( hive_bind( to_char( sysdate - 30,
                                'yyyy-mm-dd' ),
                        1 /* type_date */,
                        1 /* ref_in */ ),
hive_bind( to_char( sysdate, ,
                    'yyyy-mm-dd' ),
            1 /* type_date */,
            1 /* ref_in */ ) ) )
```

The Solution

Example



```
create or replace trigger scott.user_log_dml
  instead of insert or update or delete on scott.user_log
  for each row
declare
  cmd varchar2( 4000 );
  bnd hive_binds := hive_binds();
begin
  if ( inserting ) then
    cmd := q'[ insert into user_log
                ( stamp, account, message )
                values
                ( ?, ?, ? ) ]';

    bnd.extend;
    bnd( bnd.count ) := hive_bind( to_char( :new.stamp,
                                              'yyyy-mm-dd' ),
                                   hive_binding.type_date,
                                   hive_binding.ref_in );

  elsif ( updating ) then
    ...
  end if;

  hive_remote.dml( cmd, bnd );
end user_log_dml;
```



Wrapping it up

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Considerations

In Oracle

- Become familiar with the Hive-ODCI API
 - Read the documentation
 - Ask questions and test, test, test
- Use session isolation whenever possible
 - Particularly authentication, set at the session not the system
- Lean on your experience and your DBA Team
 - Keep signatures consistent
 - Change code if necessary
 - Become familiar with the DB wait events

Considerations

In Hive

- Analytics over in-line views
 - Review queries and use common sense
- Leverage the CBO and gather statistics
- Use best practices
 - ORCFile - Optimized Row Columnar File format, highly efficient Hive data storage
 - Apache Tez - Extensible framework for high performance batch and interactive processing, coordinated by YARN, it improves MapReduce by dramatically improving speed, while maintaining ability to scale
 - Vectorized queries - Hive feature that greatly reduces the CPU usage for query operations like scans, filters, aggregates, and joins, which involves metadata interpretation in the inner loop of execution code paths.
- Lean on your experience and your BDS Team

Considerations

Reach out

- If you have questions, concerns or comments
 - Feel free to contact me
- Available on Github
 - <https://github.com/nvanwyen/hive-odci>
 - <https://github.com/nvanwyen/hive-odci/releases/latest>
- Contact
 - nvanwyen@mtihq.com

That's it

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