

TPC-H

Database Performance Test





TPC-H

Source: <http://www.tpc.org/tpch/default.asp>

v. 2.18.0

Conditions:

- Plain install. No tuning
- Fair + Optimal conditions for both technologies
- Commodity (No high-end HW)

"The TPC Benchmark™H (TPC-H) is a decision support benchmark. It consists of a suite of business oriented ad-hoc queries and concurrent data modifications. The queries and the data populating the database have been chosen to have broad industry-wide relevance. **This benchmark illustrates decision support systems that examine large volumes of data, execute queries with a high degree of complexity, and give answers to critical business questions.**"

Results overview

Query Number	Data Volume (GB)	Oracle Enterprise Edition 19.3 (Q2 2019) 24 vCPUs 100 GB RAM 8x50GB Disks	Tibero 6 FS7 (CS_1808 Q3 2017) 12 vCPUs 50 GB RAM 8x50GB Disks
1	110	10m (worst) - 5m 08s (best)	3m44s (worst) - 2m 41s (best)
2	110	6m 24s	4m 46s
3	30	1m 34s	58s
4	118	4m 22s	3m 42s



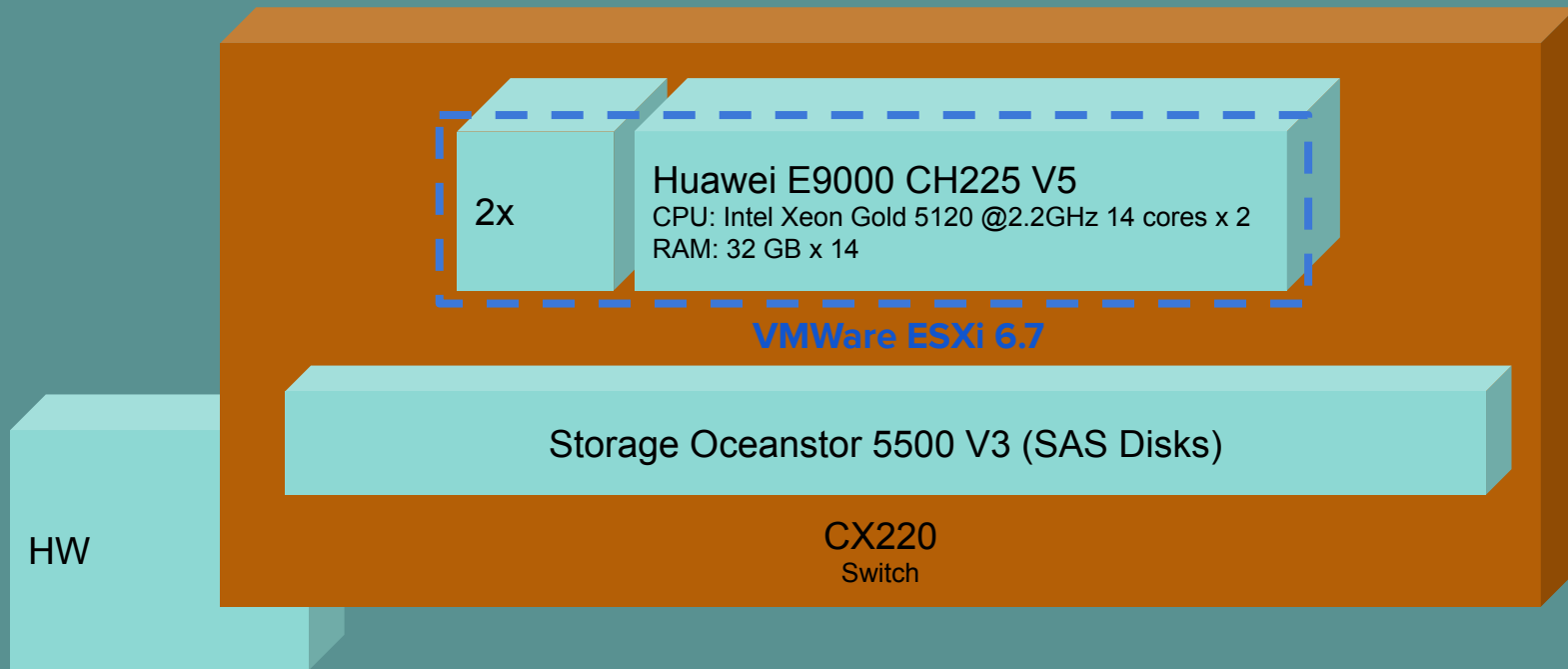
The bigger the data, the bigger the difference in favour of Tibero Database



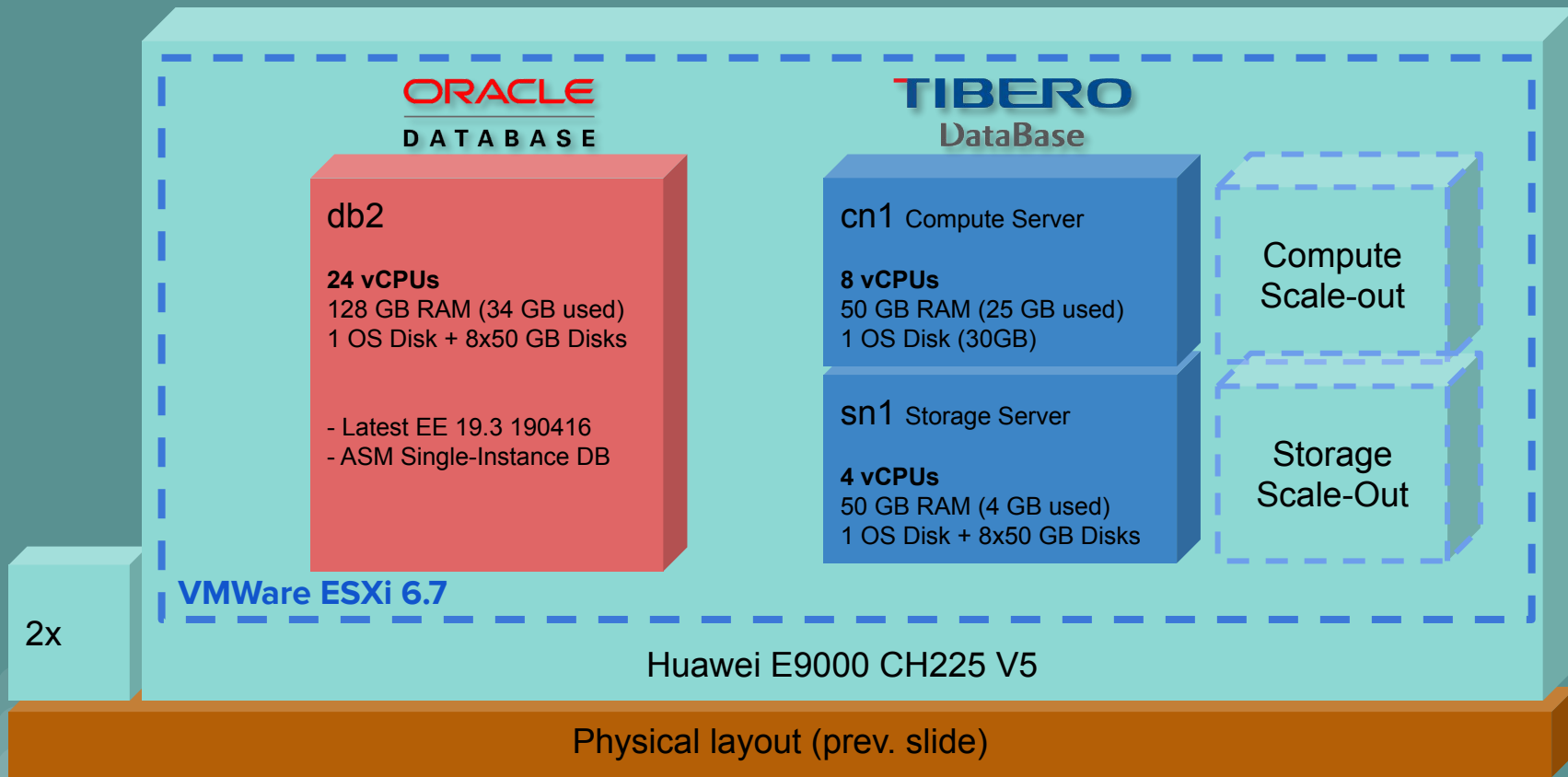
Architecture & Deployment specifications



Physical architecture layout



Logical architecture layout



TPC-H

1. Preparation
2. Data Generation
3. Loading Process
4. Migration from Oracle to Tibero
(to have exactly 100% same data = randomly generated)



TPC-H Preparation Steps

1. Download the latest TPC-H generator
2. Compile it
3. Generate the data
4. Load the data to Oracle (Create Dir, Create External Tables, Load)
5. Migrate to Tibero (T-Up, Connect Source & Target, Click Migrate)
6. Run Statistics (DBMS_STATS) on both systems



TPC-H

Download & Compilation

[Download the latest TPC-H generator.](#)

1. Unzip into the target machine
2. Compile it !!
3. Generate:
Data is generated to a filesystem

(Ensure you have enough GBs free)

```
mkdir tpch
unzip -q <tpc_h.zip>
cd tpch/<version>/dbgen/
cp makefile.suite makefile
```

```
"edit" makefile
```

```
CC = gcc
DATABASE = ORACLE
MACHINE = LINUX
WORKLOAD = TPCH
```

```
make
```

```
./dbgen -h
./dbgen -v -s 128 #128GB data
```



Load data

1. Create DIRECTORY
2. Create External Tables
3. INSERT as SELECT from Ext. Tab.

```
CREATE TABLE lineitem_ext (L_ORDERKEY NUMBER(10), L_PARTKEY
NUMBER(10), L_SUPPKEY NUMBER(10), L_LINENUMBER NUMBER(38),
L_QUANTITY NUMBER, L_EXTENDEDPRICE NUMBER, L_DISCOUNT
NUMBER, L_TAX NUMBER, L_RETURNFLAG CHAR(1), L_LINESTATUS
CHAR(1), L_SHIPDATE VARCHAR2(10), L_COMMITDATE VARCHAR2(10),
L_RECEIPTDATE VARCHAR2(10), L_SHIPINSTRUCT VARCHAR2(25),
L_SHIPMODE VARCHAR2(10), L_COMMENT VARCHAR2(44)) ORGANIZATION
EXTERNAL ( DEFAULT DIRECTORY tpch_dir ACCESS PARAMETERS (
RECORDS DELIMITED BY NEWLINE BADFILE 'bad_%a_%p.bad' LOGFILE
'log_%a_%p.log' FIELDS TERMINATED BY '|') MISSING FIELD VALUES ARE
NULL) LOCATION ('lineitem.tbl') NOPARALLEL;
```

```
CREATE TABLE TPCH2.H_LINEITEM (l_orderkey NUMBER(10) NOT NULL,
l_partkey NUMBER(10) NOT NULL, l_suppkey NUMBER(10) NOT NULL ,
l_linenumber INTEGER NOT NULL , l_quantity NUMBER NOT NULL,
l_extendedprice NUMBER NOT NULL, l_discount NUMBER NOT NULL, l_tax
NUMBER NOT NULL, l_returnflag CHAR(1) NOT NULL, l_linestatus CHAR(1)
NOT NULL, l_shipdate DATE NOT NULL, l_commitdate DATE NOT NULL,
l_receiptdate DATE NOT NULL, l_shipinstruct VARCHAR2(25) NOT NULL,
l_shipmode VARCHAR2(10) NOT NULL, l_comment VARCHAR2(44) NOT NULL);
```

```
14:25:30 SQL> insert /*+ append*/ into tpch2.h_lineitem
14:27:23 2 select L_ORDERKEY, L_PARTKEY, L_SUPPKEY, L_LINENUM
STATUS, to_date(L_SHIPDATE, 'YYYY-MM-DD'), to_date(L_COMMITDATE,
SHIPMODE, L_COMMENT from lineitem_ext;
commit;
```

```
768046938 rows created.
```

```
Elapsed: 01:16:17.13
```

```
15:43:41 SQL>
```

```
Commit complete.
```

Migrate data Oracle to Tiberio

We migrate from one database to another database to ensure that exactly 100% of the data is inside both databases.

As it is the easiest to migrate from Oracle to Tiberio.

We simple use T-Up for this task.

The screenshot displays the T-Up application interface. A 'Migration Report' dialog box is open, showing a list of 15 processed jobs. Below it, a 'Migrating Source to Tiberio' dialog box shows the progress of the migration, currently at 0%. The progress dialog includes a table with the following data:

Current Schema	"TPCH2"(1/1)
Current Stage	Migrating table data
Stage Progress	(1/9) "H_NATION" complete
Start Time	Thu May 23 18:15:49 CEST 2019
Current Time	Thu May 23 18:17:20 CEST 2019
Created Objects	11

Below the progress table, there is a list of data migrators:

Data Migrator 0	"H_PARTSUPP" 3.6%
Data Migrator 1	"H_CUSTOMER" 5.6%
Data Migrator 2	"H_NATION" 100%
Data Migrator 3	

The 'Migration Report' dialog box contains the following text:

```
=====  
Processed jobs : 17  
1. sequence "TPCH2"."TR_SEQ" created  
2. table "TPCH2"."H_PARTSUPP" created  
3. table "TPCH2"."H_CUSTOMER" created  
4. table "TPCH2"."H_NATION" created  
5. table "TPCH2"."H_ORDER" created  
6. table "TPCH2"."H_LINEITEM" created  
7. table "TPCH2"."H_REGION" created  
8. table "TPCH2"."H_SUPPLIER" created  
9. table "TPCH2"."H_PART" created  
10. table "TPCH2"."TR" created  
11. "TPCH2"."H_NATION" data transfered (25/25)  
12. "TPCH2"."H_CUSTOMER" data transfered (19200000/19200000)  
13. "TPCH2"."H_REGION" data transfered (5/5)  
14. "TPCH2"."H_SUPPLIER" data transfered (1280000/1280000)  
15. "TPCH2"."H_PARTSUPP" data transfered (102400000/102400000)  
=====  
Connect
```

Run table statistics (DBMS_STATS)

```
[SID=tac0 tiberocn1:~/tpch/2.18.0_rc2/dbgen/queries]$ sqls
tbSQL 6
TmaxData Corporation Copyright (c) 2008-. All rights reserved.
Connected to Tiberocn1.
SQL> EXEC DBMS_STATS.gather_table_stats('TPCH2', 'H_LINEITEM', estimate_percent => 15);

PSM completed.
SQL> SQL> SQL> SQL> SQL>
SQL>
SQL>
SQL> exit
Disconnected.

22. 192.168.3.44 cn1 ([root_huawei])

13:30:04 SQL> EXEC DBMS_STATS.gather_table_stats('TPCH2', 'H_LINEITEM');

PL/SQL procedure successfully completed.

Elapsed: 00:17:14.24
13:48:45 SQL> 13:48:45 SQL>
13:49:40 SQL>
13:49:40 SQL>
13:49:40 SQL> exit
Disconnected from Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0
[oracle@db2 tpch]$ pwd
/home/oracle/tpch
[oracle@db2 tpch]$ sqls

SQL*Plus: Release 19.0.0.0.0 - Production on Fri May 24 15:09:16 2019
Version 19.3.0.0.0

Copyright (c) 1982, 2019, Oracle. All rights reserved.

32. 192.168.3.47 db2 ([root_huawei])
```

The background is a solid orange color. In the top-left corner, there are three vertical bars of varying heights, each composed of several overlapping semi-transparent orange circles. In the bottom-right corner, there are four vertical bars of increasing height from left to right, each also composed of several overlapping semi-transparent orange circles.

SQL Queries



Before executing each query.

```
-- Only for Tiberio DB.  
ALTER SESSION SET _STORAGE_PROCESSING = Y;
```

```
alter system flush shared_pool;  
alter system flush buffer_cache;
```

```
set timing ON time on  
set autot TRACE
```



#1

```
select /*+ monitor */ sum(l_extendedprice * l_discount) as revenue
from tpch2.h_lineitem
where l_shipdate >= date '1996-01-01'
and l_shipdate < date '1996-01-01' + interval '1' year
and l_discount between 0.06 - 0.01
and 0.06 + 0.01 and l_quantity < 24;
```



#2

```
select count(1)
from tpch2.h_lineitem
where l_shipdate >= date '1996-01-01';
```




#3

```
select count(o_orderkey)
from tpch2.h_order
where o_totalprice between 100000 and 200000;
```



#4

```
select
  sum(l_extendedprice * (1 - l_discount)) as promo_revenue
from
  tpch2.h_lineitem,
  tpch2.h_part
where
  l_partkey = p_partkey
and l_shipdate >= date '1994-09-01'
and l_shipdate < date '1994-09-01' + interval '1' month;
```



6 Reasons:

Why companies had chosen Tibero Database?

- **DBA:** Oracle DBAs does not need re-train. All-inclusive model, more features to add value.
- **Devs:** PL/SQL code "Lift-and-Shift": Meaning 1 Source Code is valid for 2 DBs
- **Higher Application Value** with no licensing concerns (more security and [better HA](#))
- Reduce costs, >70% Licensing + ≈50% HW costs (very important in the Cloud env.)
- Reduce risks. **Unpredicted changes from Oracle** regarding licensing or Cloud compliance.
- **Flexibility** (Any Cloud, Any Virtualization System, Containers, ...) = FREEDOM !!

Thanks!

Contact us if you want us to share with you the full TPC-H Procedure
for the preparation of this PoC and the performance results

contact@knowtrade.eu