TPCC and TPCH Workload

- **Workload Translator.** TPCC requests are translated from key-value operations collected from InnoDB when issuing TPCC workloads. For TPCH requests, translate TPCH SQL command as KV operations

- **Basic idea**. For the call stack of each TPCC request and TPCH SQL query plan, get its generated InnoDB KV operations at scan interface

    - **TPCH Paras. SpaceID(table name) + RowID_start + RowID_end**
    - **Interface.**
        - **index_first():** Retrieve first row in index and return. (for whole table scan)
        - **index_next():** Return next row in index.
        - **index_read():** Find a row based on a key and return.
        - **records_in_range()**: For the given range, how many records are estimated to be in this range.
            - Used by optimizer to calculate the cost of using a particular index.
            - i.e., only retrieve the metadata from the index node.

- **Workloads of TPCH requests used in this evaluation**

Query	Involved tables	involved rows	involved volume (GB)	scan fator	query column	sub_row
1	2	300000000	16.2	96%	L_QUANTITY, L_EXTENDEDPRICE, L_DISCOUNT, L_SHIPDATE	37.5%
2	5,6	91000000	1.98	42.4%, 53.1%	p_type, p_size, p_partkey, p_mfgr, ps_supplycost, ps_suppkey, ps_partkey	32.05%, 13.9%
3	1,4,2	382510000	7.82	37.1%, 44.2%, 42.4%	c_mktsegment, c_custkey, o_orderdate, o_shippriority, l_orderkey, l_extendedprice, l_discount, l_shipdate	6.9%, 22.7%, 32.2%
5	1,4,2	383010000	8.01	48.7%, 56.4%, 50.4%	c_custkey, c_nationkey, o_orderkey, o_custkey, o_orderdate, l_orderkey, l_suppkey, l_extendedprice, l_discount	4%, 22.7%, 28.2%
6	2	300000000	7.8	88%	L_QUANTITY, L_DISCOUNT, L_SHIPDATE	18.7%
7	1,2,4	383010000	8.46	43.2%, 43.2%, 48.9%	c_custkey, c_nationkey, l_year, l_shipdate, l_extendedprice, l_discount, l_suppkey, l_orderkey, o_orderkey	4%, 41.6%, 6.25%
8	1,2,4,5,8	393010000	9.55	6.7%, 47.3%, 32.1%, 75.4	c_nationkey, c_custkey, l_orderkey, l_partkey, l_extendedprice, l_suppkey, l_discount, o_orderdate, o_orderkey, o_year, o_custkey, p_partkey, p_type, s_suppkey	4%, 33.6%, 17.2%, 12.8%
9	2,4,5,6,8	425510000	12.35	1.3%, 45.1%, 38.9%, 56.2	l_suppkey, l_quantity, l_partkey, l_extendedprice, l_discount, ps_supplycost, l_orderkey, o_year, o_orderdate, o_orderkey, s_suppkey, s_nationkey, p_name, ps_suppkey, ps_partkey	41.6%, 12.5%, 39.7%, 16.7%,
10	1,4,2	382510000	11.12	97.7%,89.7%, 86.7%	c_custkey, c_name, c_acctbal, c_address, c_phone, c_comment, o_custkey, o_orderkey, o_orderdate, l_extendedprice, l_discount, l_orderkey	27.3%, 5%, 25.5%
12	4,2	375000000	8.59	75.4%, 65.23%	o_orderkey, o_orderpriority, l_orderkey, l_shipmode, l_shipdate, l_commitdate, l_receiptdate	14.6%, 26.8%
14	5,2	310000000	6.94	56.3%, 49.8%	p_type, p_partkey, l_extendedprice, l_discount, l_partkey, l_shipdate	18.6%, 32.2%
16	5,6	505000000	903.57MB	56.9%,52.1%	p_brand, p_type, p_size, ps_suppkey	25%, 4.5%
17	2,5	610000000	9.98	91.2%, 87%	l_extendedprice, l_partkey, l_quantity, p_partkey, p_brand, p_container	25.5%, 15.4%
18	1,4,2	1210000000	14.7	437.1%, 324.5%, 89.7%	c_name, c_custkey, o_orderkey, o_orderdate, o_totalprice, l_quantity	14.4%, 24.2%, 14.1%
20	8,5,6,2	350510000	6.37	4.4%, 76.2%, 89.7%, 54.5	s_name,s_address, s_nationkey, s_suppkey, p_partkey, p_name, ps_partkey, ps_availqty, ps_suppkey, l_partkey, l_suppkey, l_quantity, l_shipdate	26.8%, 37.8%, 6.7%, 23.5%

TPCH Tables					
Table ID	Tab-Name	ROWS	*SF (50)	avg row length (bytes)	table size (GB)
1	CUSTOMER	150000	7500000	201	1.40
2	LINEITEM	6000000	300000000	149	41.63
3	NATION	25	25	655	
4	ORDERS	1500000	75000000	128	8.94
5	PART	200000	10000000	156	1.45
6	PARTSUPP	800000	40000000	180	6.71
7	REGION	5	5	3276	
8	SUPPLIER	10000	500000	272	0.13

- **Translation Procedure following CH-Benchmark regulation**
    - Based on TPCC tables;
    - Merge TPCH tables into TPCC tables
    - Replace TPCH query predicates by TPCC's

	Relation	CH-benCHmark scaling	Original TPC-H scaling
accessed by OLTP transactions only	WAREHOUSE DISTRICT HISTORY*		
accessed by OLTP transactions and OLAP queries	NEW-ORDER* STOCK CUSTOMER ORDERLINE* (LINEITEM) ORDERS* ITEM (PART)	$9 \times w$ $10 \times w$ $3 \times w$ $300 \times w$ $30 \times w$ $100 \times w$	n.a. n.a. 15 600 150 20
accessed by OLAP queries only	SUPPLIER NATION REGION	1 fixed fixed	1 fixed fixed