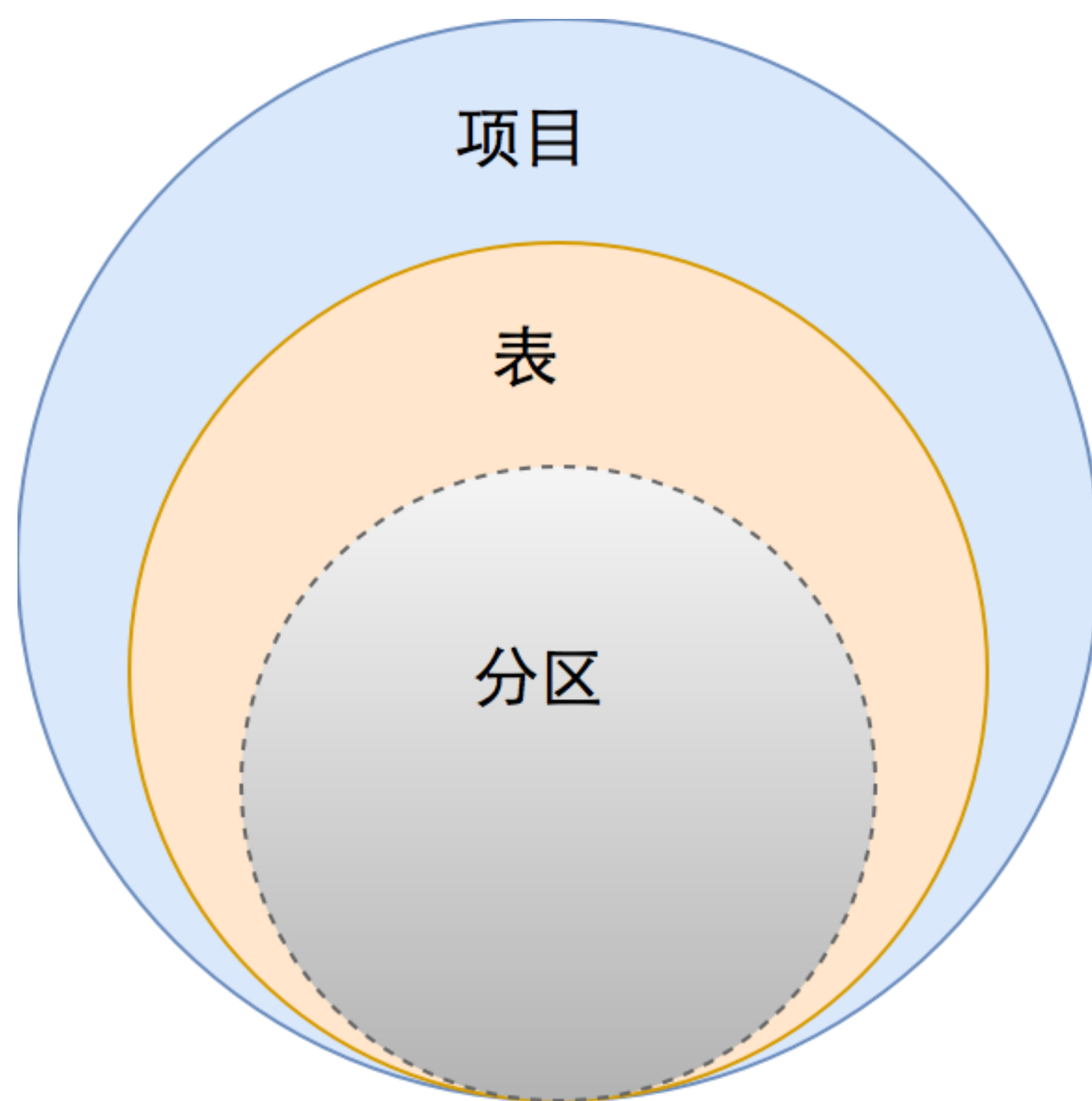


MaxCompute索引优化实践分享

阿里云高级专家 戴谢宁

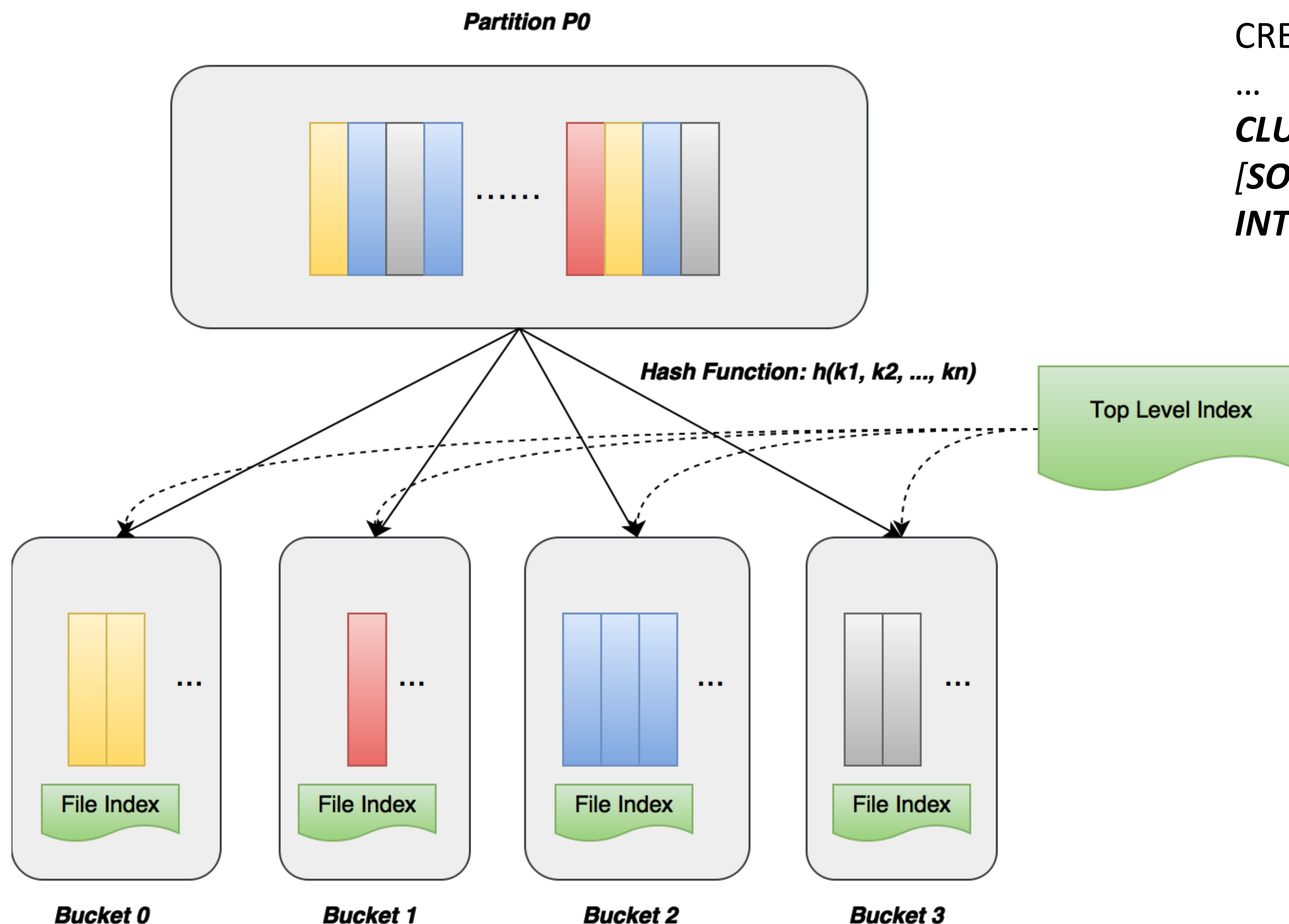
MaxCompute的数据模型



分区下没有定义数据组织方式。

能否通过定义数据分片、排序和索引
提高效率？

哈希分片 – Hash Clustering



CREATE TABLE table_name

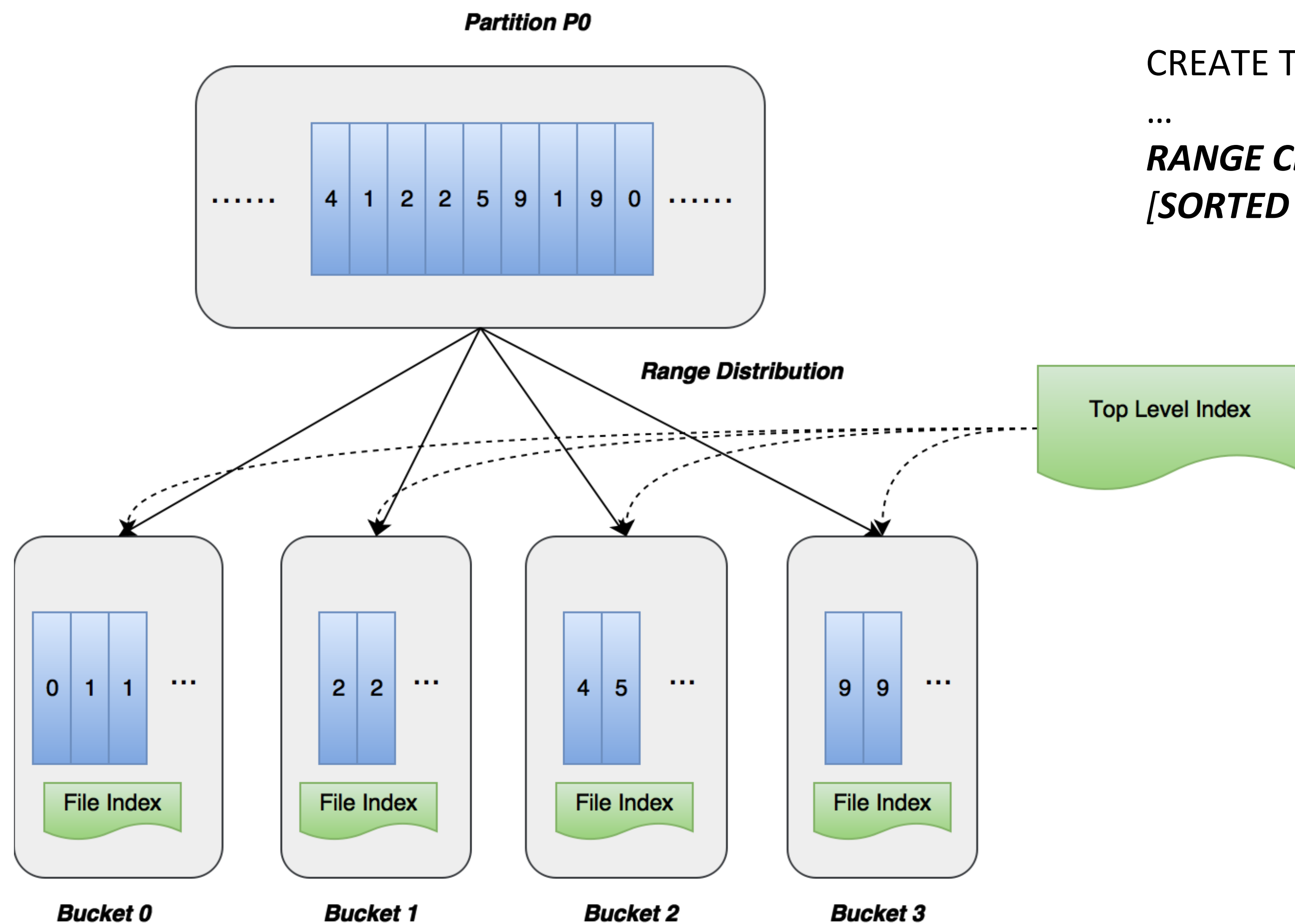
...

CLUSTERED BY (col_name [, col_name, ...])

[**SORTED BY** (col_name [ASC | DESC] ...)]

INTO number_of_buckets **BUCKETS**

区域分片 – Range Clustering

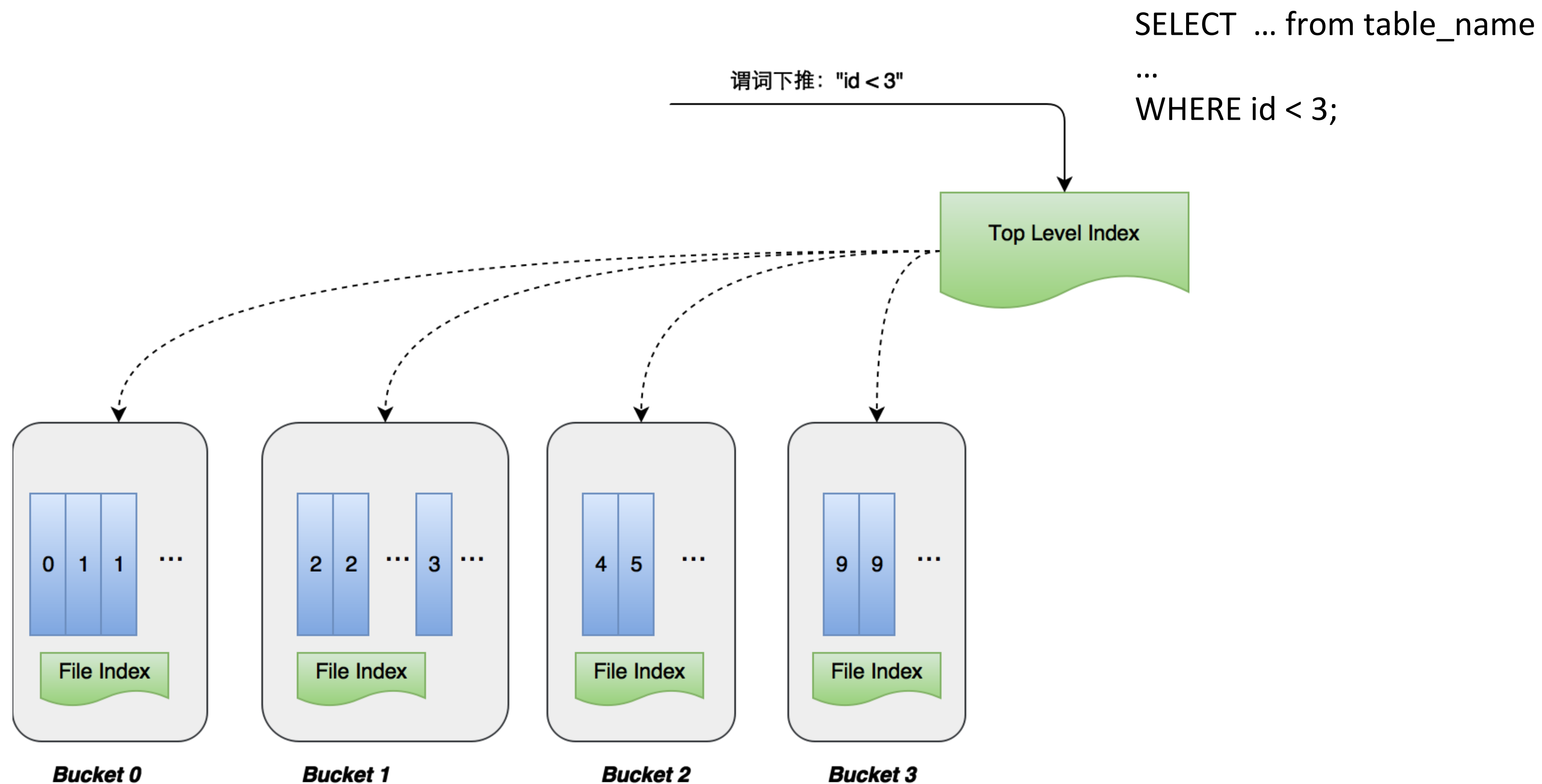


CREATE TABLE table_name

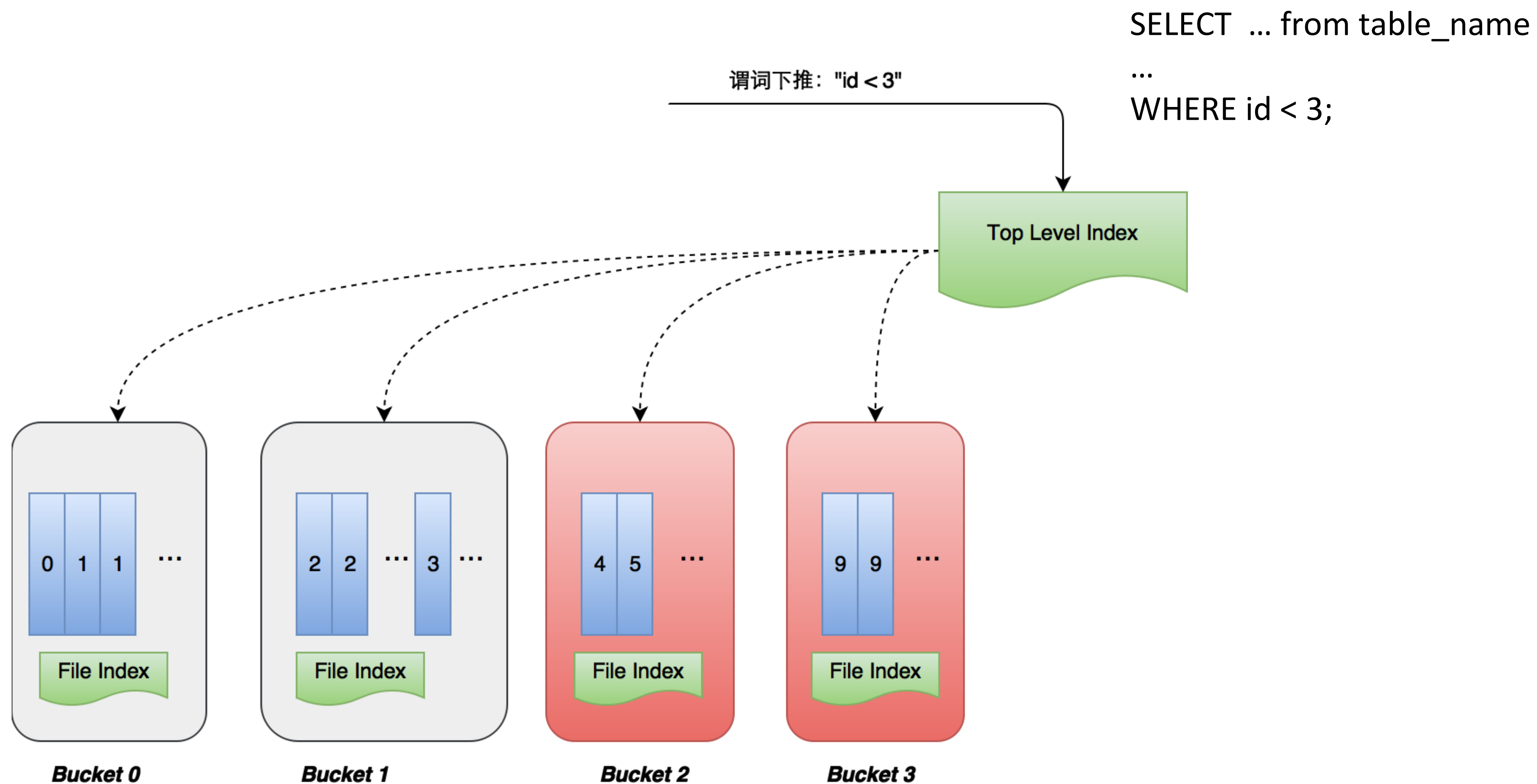
...

RANGE CLUSTERED BY (col_name [, col_name, ...])
[SORTED BY (col_name [ASC | DESC] ...)]

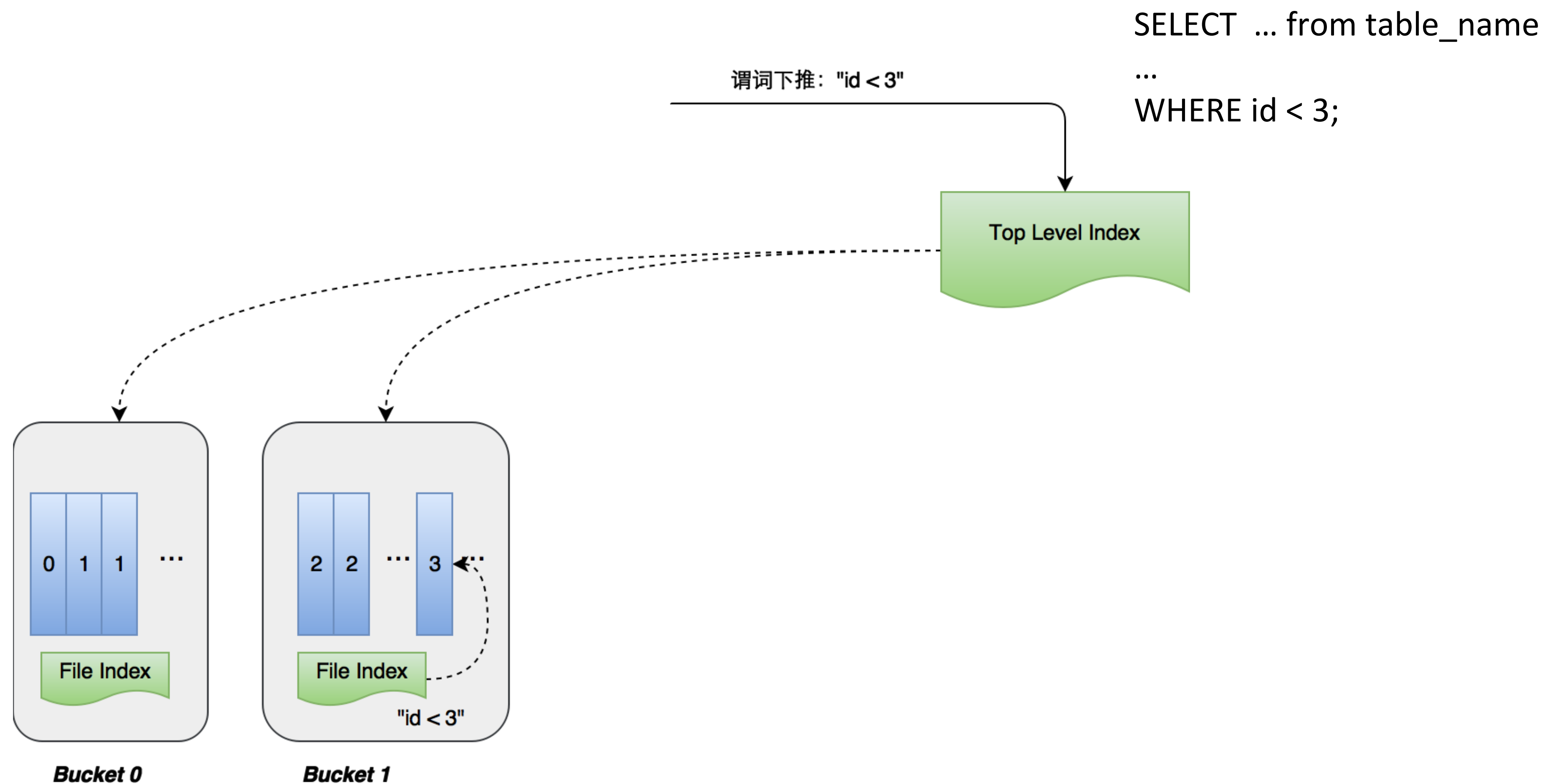
基于索引的查询优化



基于索引的查询优化



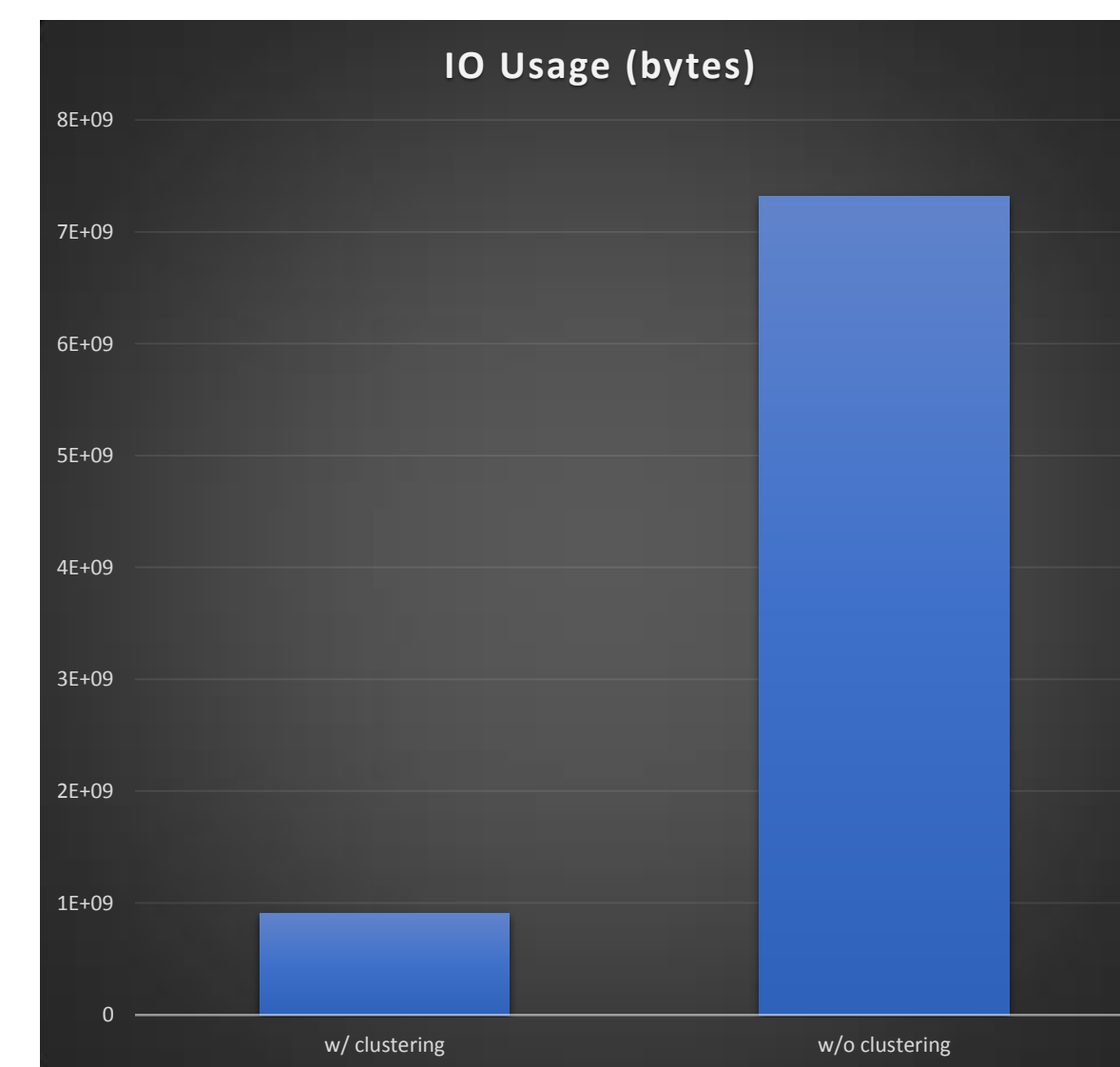
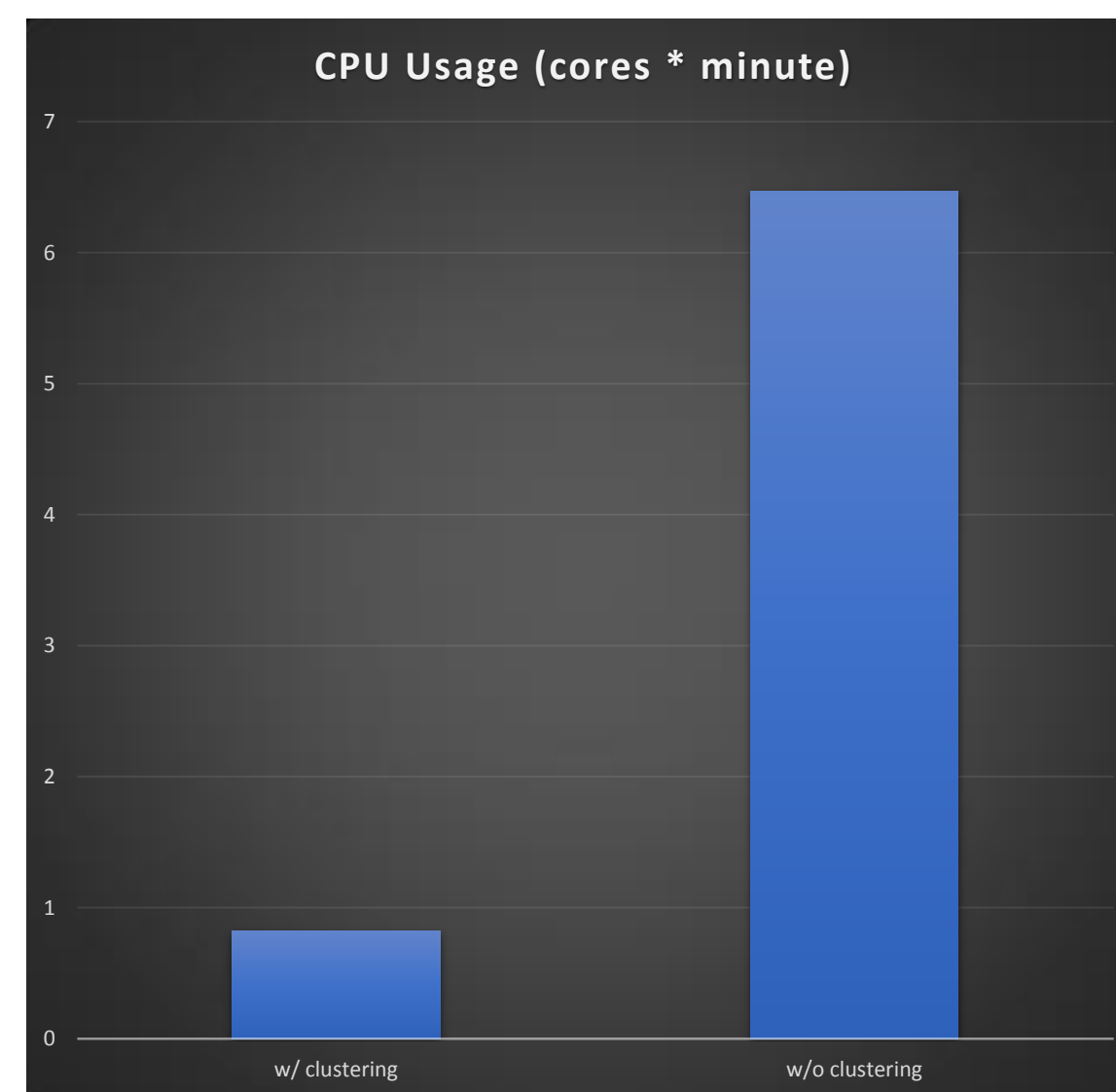
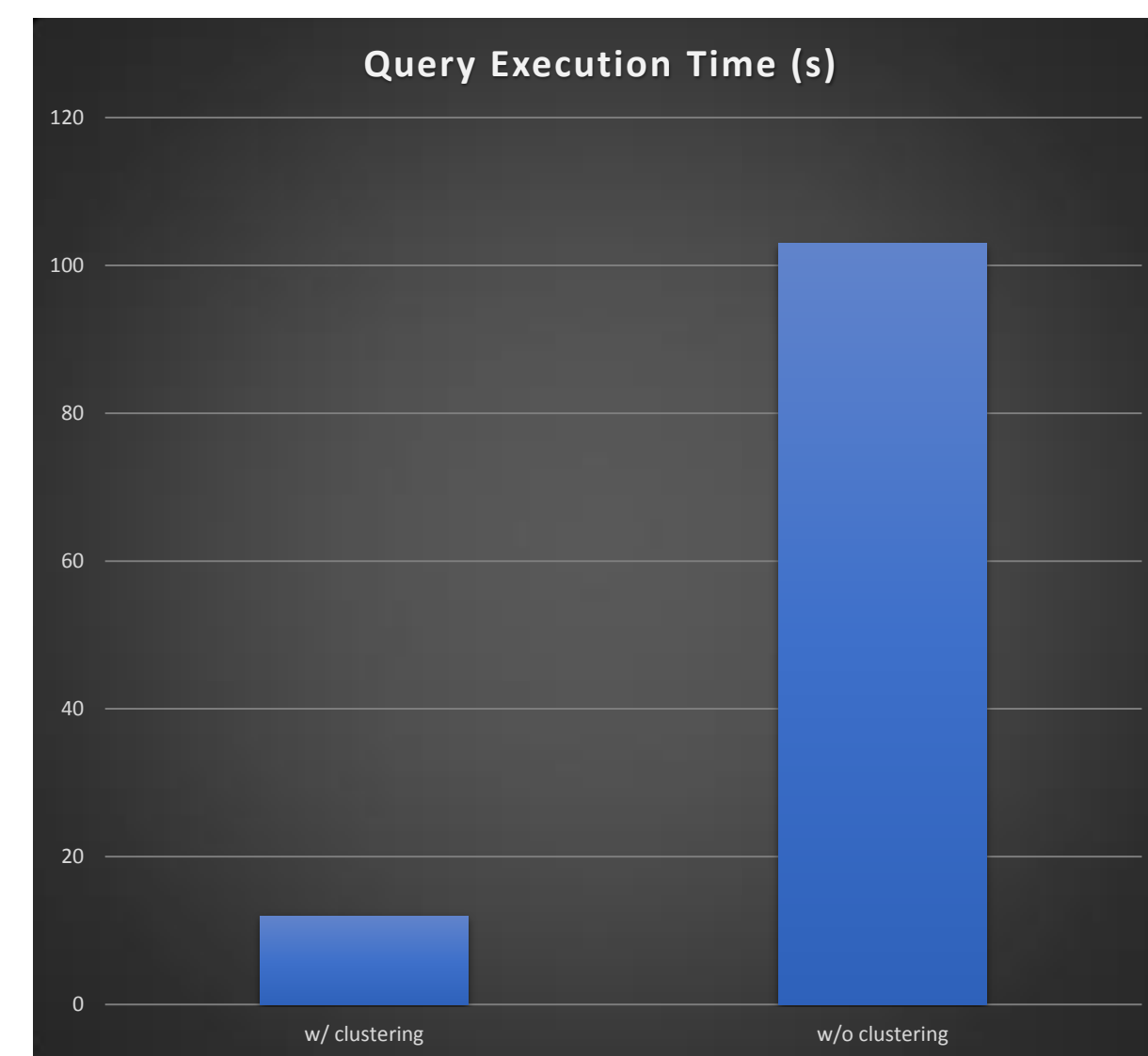
基于索引的查询优化



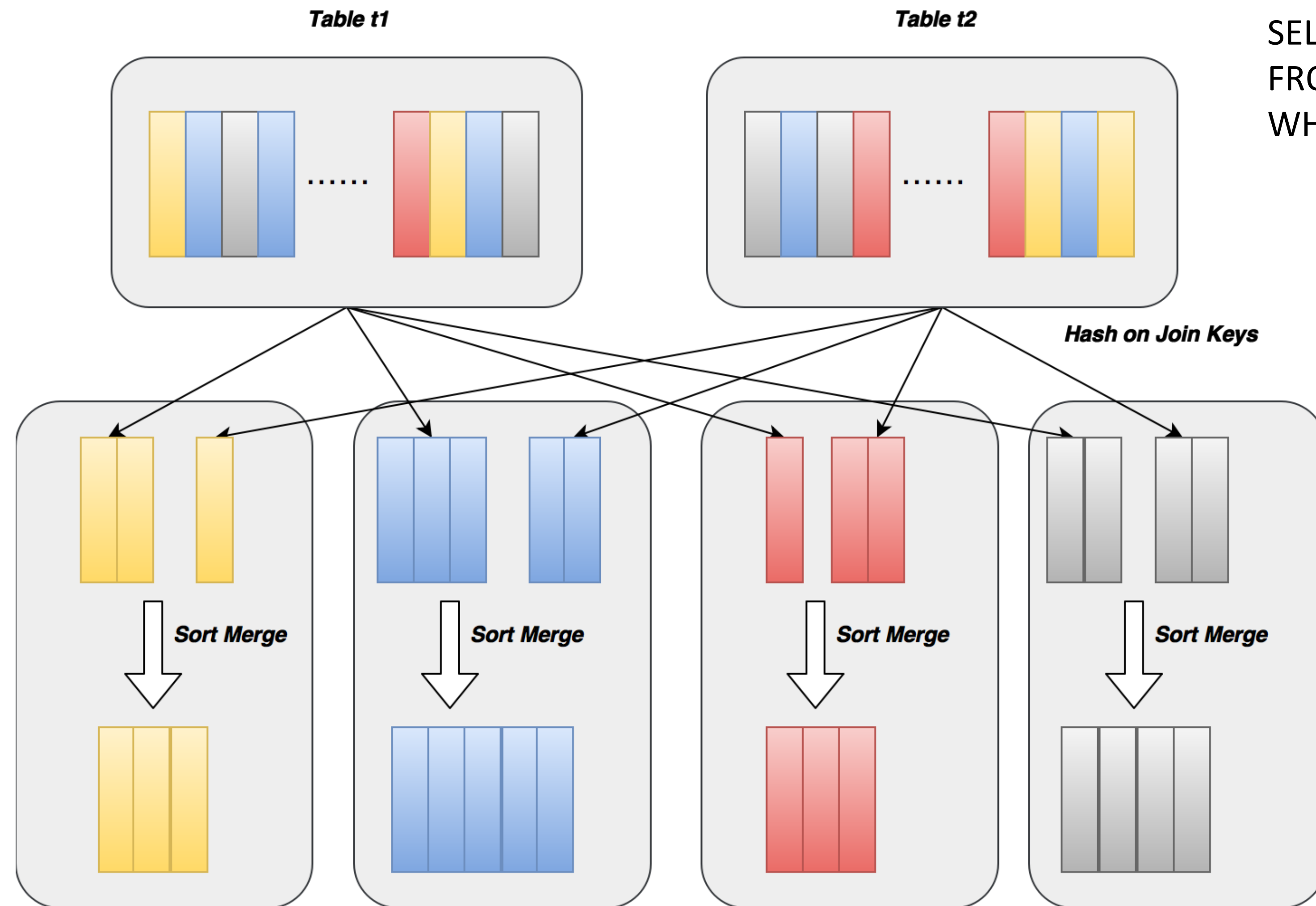
查询优化性能对比

TPC-H Q6 on 100GB dataset

```
select sum(l_extendedprice * l_discount) as revenue
from tpch_lineitem l
where l_shipdate >= '1994-01-01' and l_shipdate < '1995-01-01'
and l_discount >= 0.05 and l_discount <= 0.07
and l_quantity < 24;
```

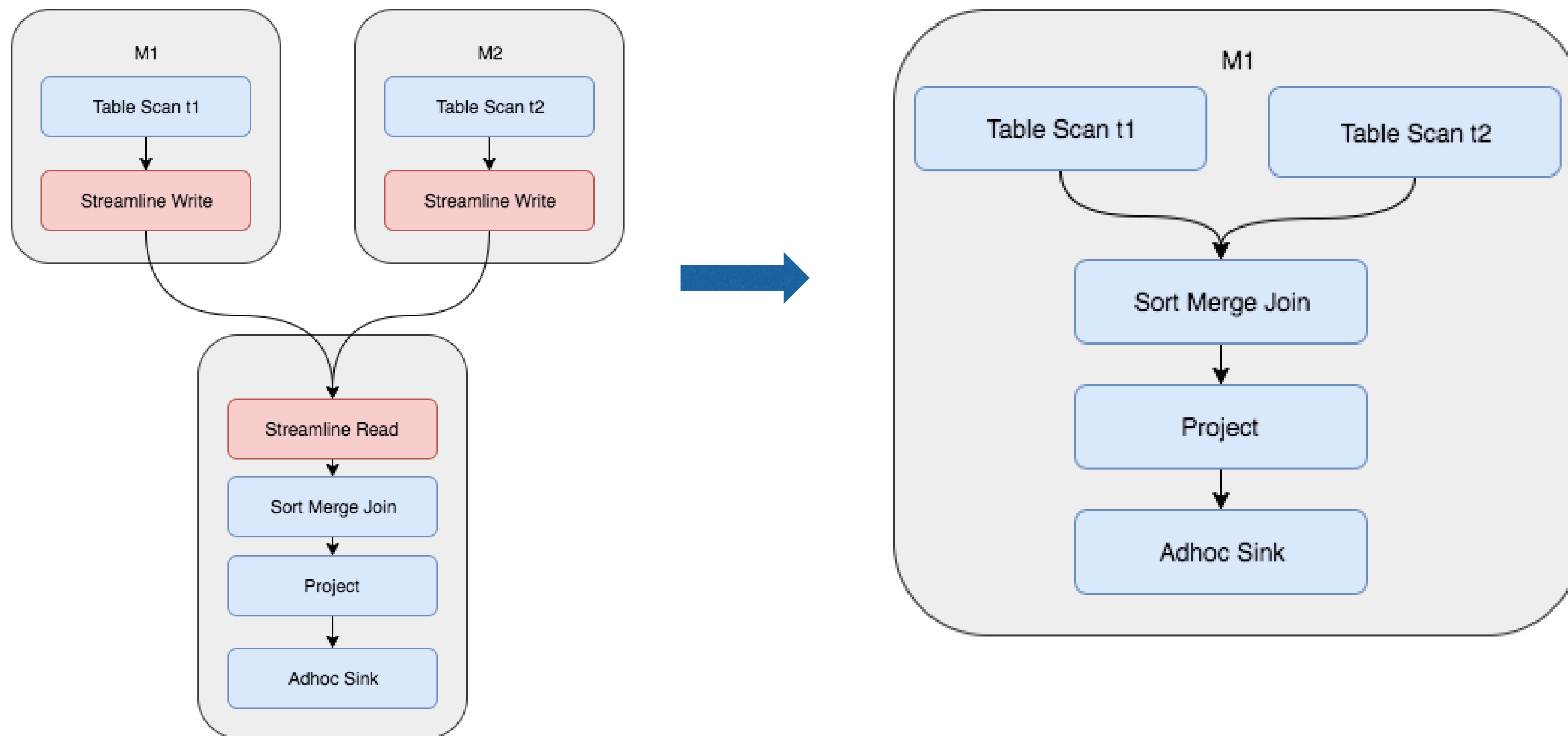


Join优化



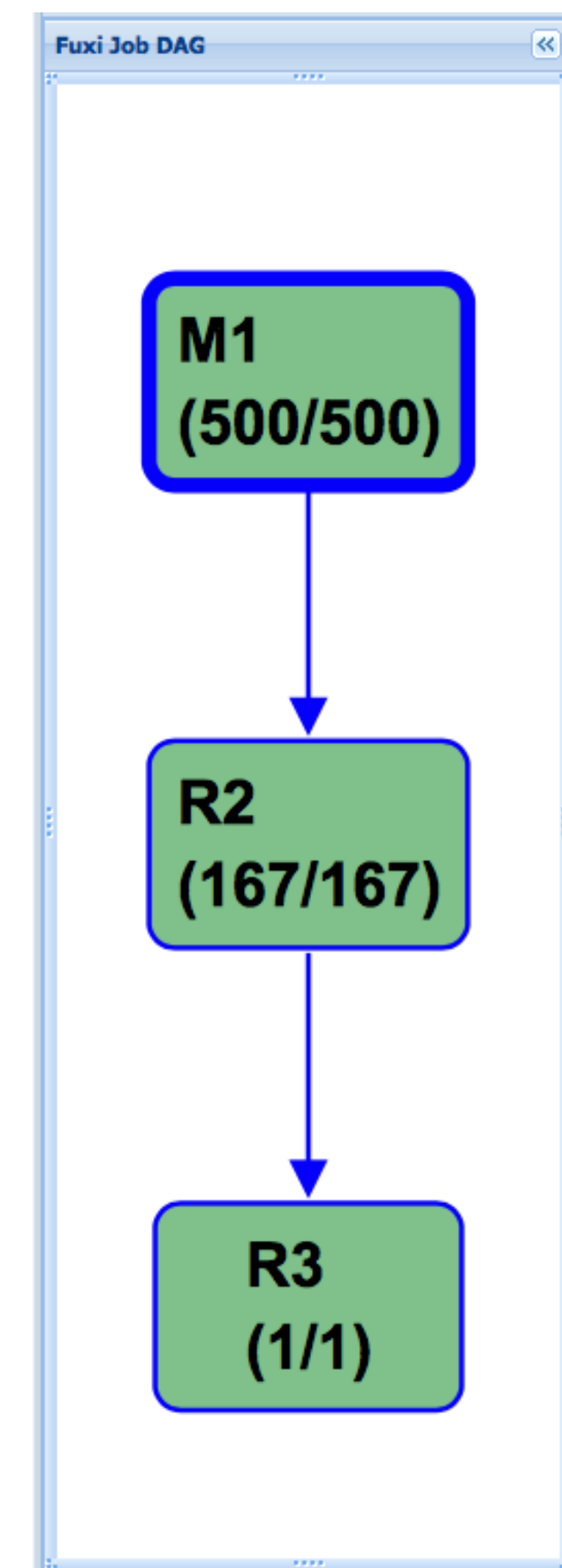
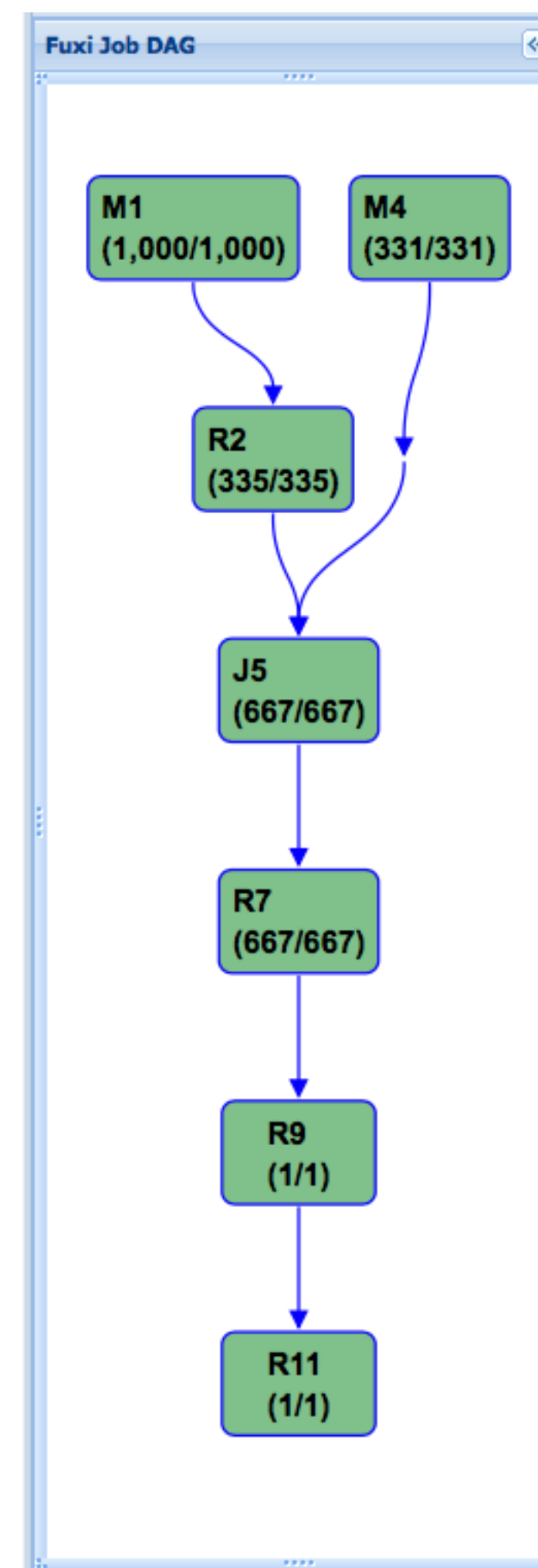
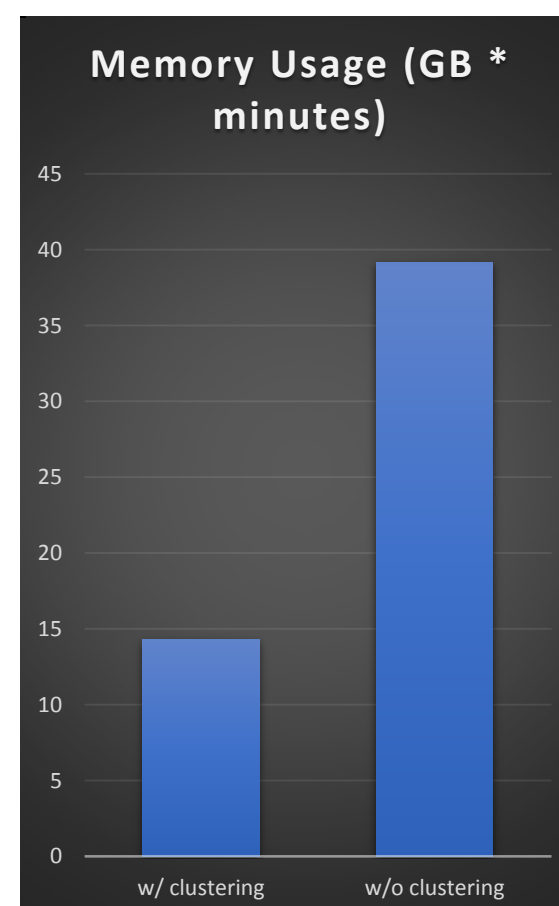
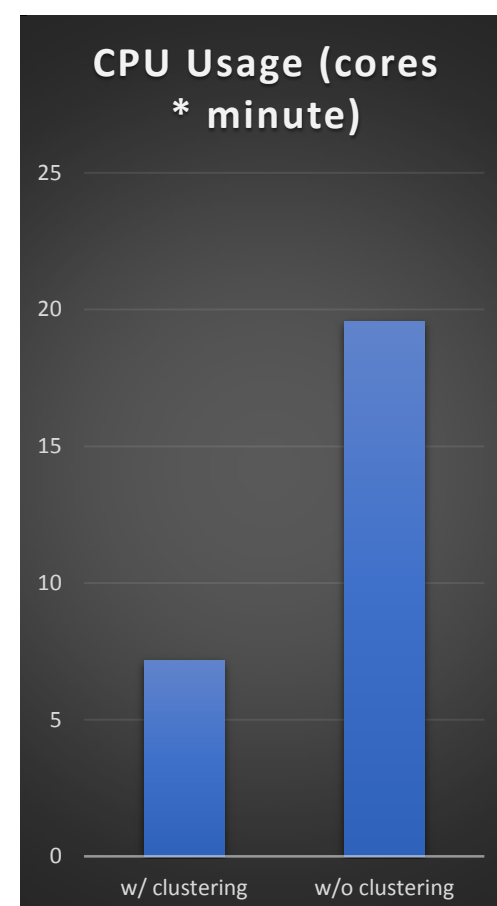
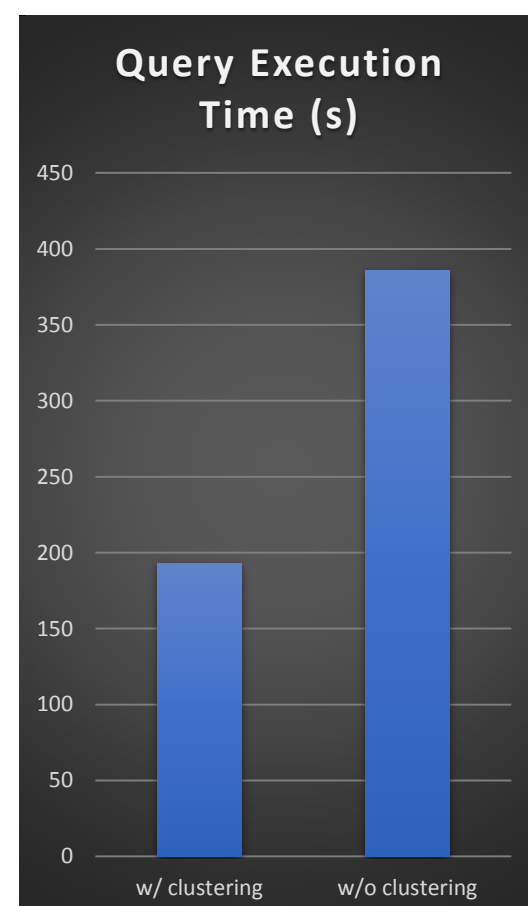
```
SELECT t1.id, t1.name, t2.name  
FROM t1, t2  
WHERE t1.id = t2.id;
```


Join优化



TPC-H Q4

```
select o_orderpriority, count(*) as order_count from tpch_orders o join
(select distinct l_orderkey from
(select * from tpch_lineitem where l_commitdate < l_receiptdate) tab1) tab2
on tab2.l_orderkey = o.o_orderkey
where o.o_orderdate >= '1993-07-01' and o.o_orderdate < '1993-10-01'
group by o_orderpriority order by o_orderpriority limit 99999;
```



应用实例 – 淘宝交易记录查询

Detail for [console_query_task_1499582232924]

refresh

Fuxi Job DAG

Main Content

Fuxi Jobs Summary JSONSummary

Fuxi Job Name: odps_fighting_20170709063713214ga2gsoc51_SQL_0_0_0_job_0

	TaskName	Fatal/Finished/TotalInstCount	I/O Records	FinishedPercentage	Status	StartTime	EndTime	Latency(s)	TimeLine
1	M1	0/1,111/1,111	42,746,219,196/26	100%	Terminated	2017-07-08 23:37:32	2017-07-08 23:39:20	00:01:48	

M1

(1,111/1,111)

M1

SmartFilter Failed(0) Terminated(1111) All(1111) Long-Tails(0) Latency chart Latency: {"min":"00:00:39","avg":"00:00:56","max":"00:01:25"}

	FuxiInstance	IP & Path	StdOut	StdErr	Debug	Status	FinishedPercentage	StartTime	EndTime	Latency(s)	TimeLine	Tool
0	M1#1013_0	10.184.45.218,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:46	00:01:11		扁鹊
1	M1#1020_0	10.184.52.116,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:34	00:00:59		扁鹊
2	M1#1028_0	11.178.30.83,0...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:31	00:00:56		扁鹊
3	M1#1034_0	10.184.49.75,0...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:21	00:00:46		扁鹊
4	M1#1039_0	11.178.23.129,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:24	00:00:49		扁鹊
5	M1#1060_0	10.184.53.200,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:26	00:00:51		扁鹊
6	M1#1061_0	10.184.49.209,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:22	00:00:47		扁鹊
7	M1#1063_0	11.178.27.132,...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:28	00:00:53		扁鹊
8	M1#1071_0	11.178.23.29,0...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:33	00:00:58		扁鹊
9	M1#1077_0	10.184.39.69,0...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:30	00:00:55		扁鹊
10	M1#1078_0	10.195.251.23...				Terminated	100%	2017-07-08 23:37:35	2017-07-08 23:38:40	00:01:05		扁鹊

第 1 页,共 45 页 Per Page: 25 显示 1 - 25条, 共 1111 条

应用实例 – 淘宝交易记录查询

Detail for [console_query_task_1499581828425]

refresh

Fuxi Job DAG

Main Content

Fuxi Jobs Summary JSONSummary

Fuxi Job Name: odps_fighting_20170709063028673g527lk64_SQL_0_0_0_job_0

	TaskName	Fatal/Finished/TotalInstCount	I/O Records	FinishedPercentage	Status	StartTime	EndTime	Latency(s)	TimeLine	查看
1	M1	0/4/4	10,000/26	100%	Terminated	2017-07-08 23:31:24	2017-07-08 23:31:30	00:00:06		

M1 (4/4)

M1

SmartFilter Failed(0) Terminated(4) All(4) Long-Tails(0) Latency chart

Latency: {"min": "00:00:02", "avg": "00:00:02", "max": "00:00:02"}

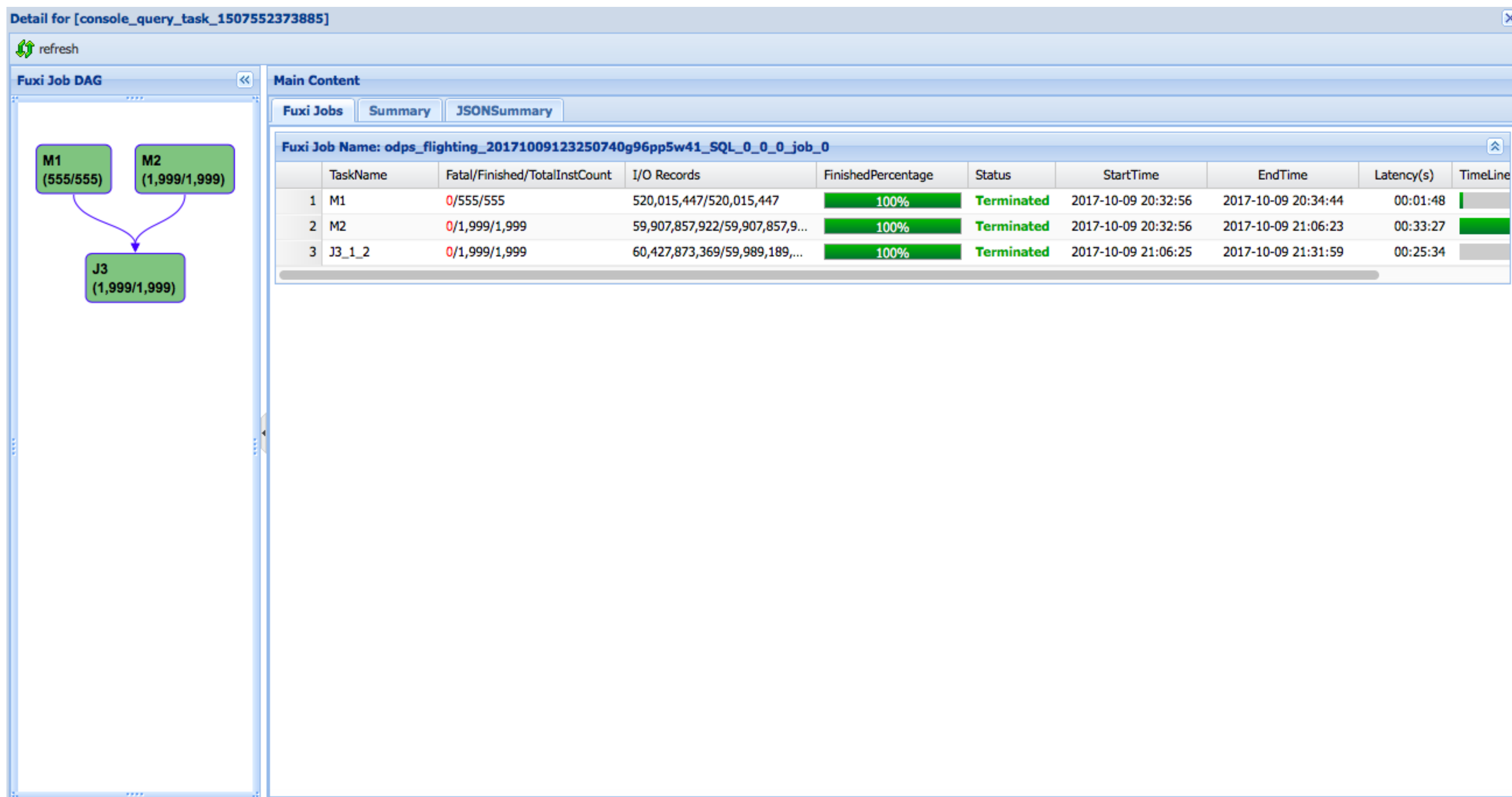
	FuxiInstance	IP & Path	StdOut	StdErr	Debug	Status	FinishedPercentage	StartTime	EndTime	Latency(s)
0	M1#0_0	10.184.52.245,Odps/odps_fighting_20170709063...				Terminated	100%	2017-07-08 23:31:27	2017-07-08 23:31:29	00:00:02
1	M1#1_0	11.178.42.26,Odps/odps_fighting_201707090630...				Terminated	100%	2017-07-08 23:31:27	2017-07-08 23:31:29	00:00:02
2	M1#2_0	11.178.24.87,Odps/odps_fighting_201707090630...				Terminated	100%	2017-07-08 23:31:27	2017-07-08 23:31:29	00:00:02
3	M1#3_0	10.184.52.155,Odps/odps_fighting_20170709063...				Terminated	100%	2017-07-08 23:31:27	2017-07-08 23:31:29	00:00:02

第 1 页, 共 1 页

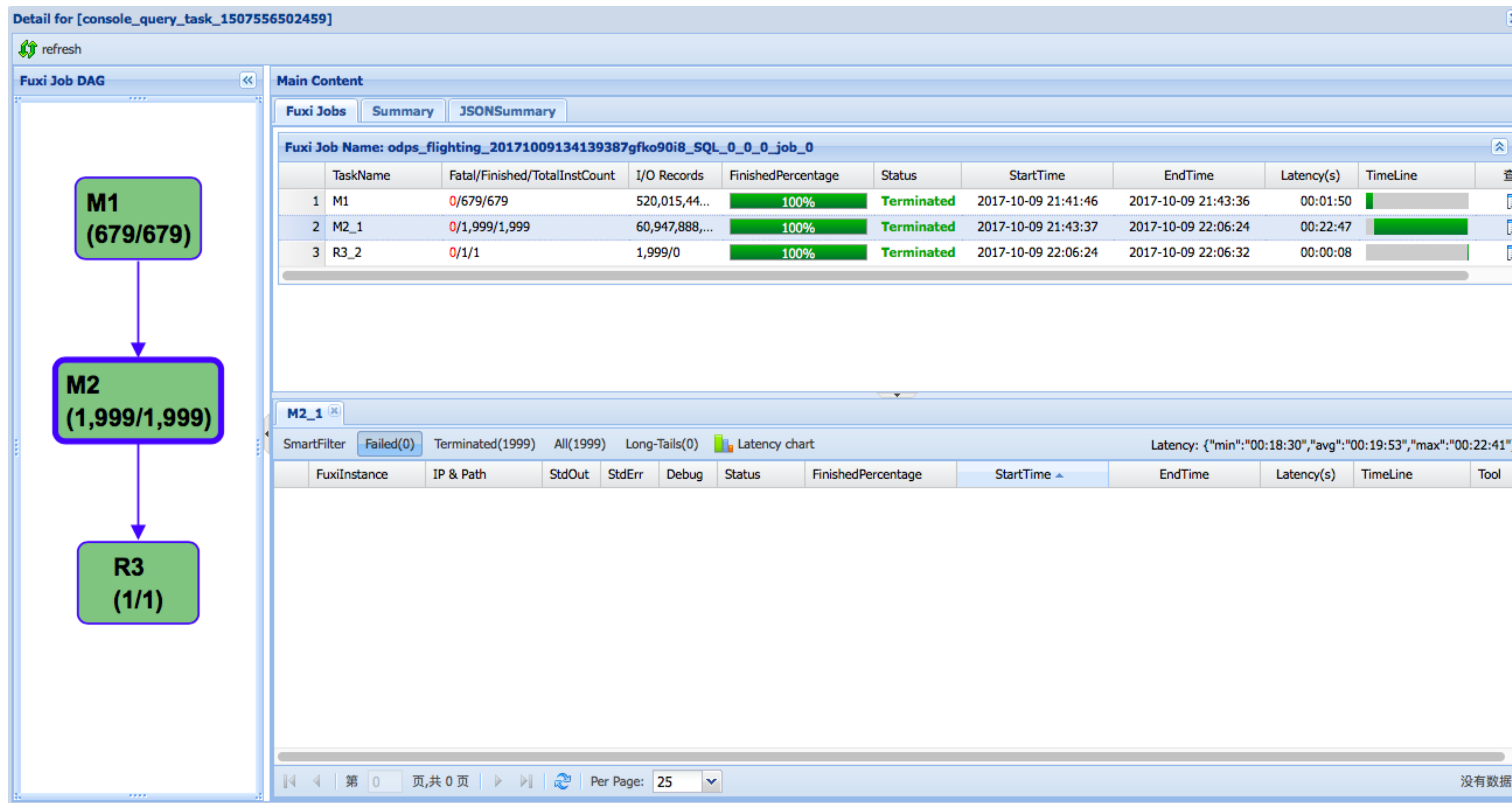
Per Page: 25

显示 1 - 4 条, 共 4 条

应用实例 – 淘系交易表增量更新



应用实例 – 淘系交易表增量更新



总结

- 通过对数据进行分片和排序，并建立索引，MaxCompute可以更好的理解数据。
- 查询条件谓词下推，减少了表扫描的IO量，以及运行时过滤操作的时间。
- 利用数据分片和排序特性，直接避免了多次对数据Shuffle的操作，简化了执行计划，节约资源，节省时间。

THANK YOU

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