



Apache Flink

Flink 1.16 Preview: Hive SQL 如何平迁到 Flink SQL

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01 迁移的动机

为什么 Flink 要做 Hive SQL 迁移?



离线用户

吸引离线数仓用户，打磨批引擎，螺旋迭代



离线业务开发门槛

降低用户使用 Flink 开发离线业务的门槛



Hive 生态工具

生态是最高的壁垒，融入离线生态。



流批一体

批计算应用不广泛。
推动业界，先统一引擎，后统一 API。

Hive SQL 用户为何迁移到 Flink SQL 上?



统一流批引擎

降低维护成本，提升研发效率



OLAP & 联邦查询

基于 Flink+HQL 快速建设 OLAP 系统，
借助 Flink 丰富数据源，实现强大的联邦查询。



HiveSQL 实时化

降低离线作业实时化改造的成本



流批一体数仓

建设流批一体 SQL 层，
探索流批一体数仓。

02 迁移的挑战

迁移的挑战

兼容

Hive 语法兼容

HiveServer2 协议兼容

稳定性

Speculative Execution

Adaptive Hash Join

性能




























Dynamic Partition
Pruning

元数据访问加速

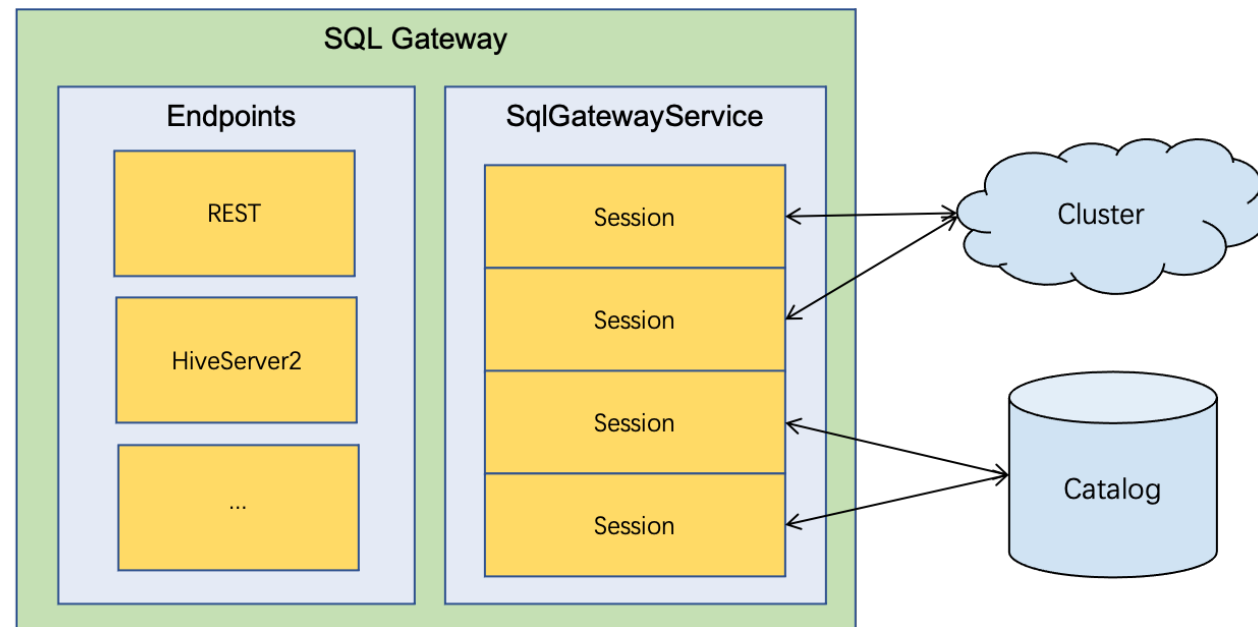
Hive 语法兼容

[FLIP-152](#) & [FLINK-26360](#) : Flink1.16 Hive 语法兼容度从 85% 提升至 **94.1%** ([Hive qtest 12K 测试集](#))

Sub-Tasks				+	...
1.	Unexpected correlate variable \$cor0" when using hive dialect to write a subquery	 CLOSED	luoyuxia		
2.	IndexOutOfBoundsException" when subquery select all field from using hive dialect	 CLOSED	luoyuxia		
3.	Fail to use such expression like if(1= 1, 2, 3)	 RESOLVED	Unassigned		
4.	Improve hive udtf	 RESOLVED	Unassigned		
5.	improve hive udaf	 RESOLVED	Unassigned		
6.	Support "insert directory"	 CLOSED	luoyuxia		
7.	Support read hive variables using the syntax like select \$(hiveconf:select_time)	 CLOSED	luoyuxia		
8.	support hive transform using syntax	 CLOSED	luoyuxia		
9.	Hive dialect supports CLUSTERED BY SORTED BY table	 RESOLVED	luoyuxia		
10.	Hive dialect supports "CREATE FUNCTION USING xxx.jar"	 CLOSED	luoyuxia		
11.	Hive dialect support "LOAD DATA INPATH"	 CLOSED	luoyuxia		
12.	Hive dialect supports "MACRO"	 CLOSED	luoyuxia		
13.	Fail to call hive udf when secondary parameter required constant but pass value like "-1"	 CLOSED	luoyuxia		
14.	Fix IndexOutOfBoundsException for non equality condition exists in left semi join in Hive dialect	 CLOSED	luoyuxia		
15.	Support handle join involving complex types in on condition	 CLOSED	Unassigned		
16.	Fix "schema of both sides of union should match" exception when one side of union select multiple same columns	 CLOSED	luoyuxia		
17.	Fix Incomparable exception between boolean type and numeric type in Hive dialect	 CLOSED	luoyuxia		
18.	Hive dialect supports IS_DISTINCT_FROM	 CLOSED	luoyuxia		
19.	Fix exception for casting timestamp to decimal in Hive dialect	 CLOSED	luoyuxia		
20.	Improve supporting for complex data type for Hive dialect	 CLOSED	luoyuxia		
21.	Fix divide by zero exception in Hive dialect	 CLOSED	luoyuxia		
22.	Supports read Hive table partitioned by decimal type	 CLOSED	luoyuxia		
23.	Fail to call Hive UDAF when the UDAF is with only one parameter with array type	 CLOSED	luoyuxia		
24.	Support partition filter push down when there exists default_partition	 CLOSED	luoyuxia		
25.	Support subdirectories with Hive tables	 CLOSED	luoyuxia		
26.	Hive dialect supports "select current_database()"	 CLOSED	luoyuxia		
27.	Fix fail to count multiple fields exception in Hive dialect	 CLOSED	luoyuxia		
28.	Hive dialect support INTERVAL type	 CLOSED	luoyuxia		
29.	HiveInspectors should use correct writable type to create ConstantObjectInspector	 CLOSED	luoyuxia		
30.	Hive dialect support "tablesample (xx rows)"	 CLOSED	luoyuxia		
31.	Hive dialect support set variable	 CLOSED	luoyuxia		
32.	IndexOutOfBoundsException is thrown when project contains window which doesn't refer all fields of input when using Hive Dialect	 CLOSED	luoyuxia		
33.	Exception will be thrown when over window contains grouping in Hive Dialect	 RESOLVED	luoyuxia		
34.	Hive dialect supports add jar	 CLOSED	luoyuxia		
35.	Hive dialect: "insert overwrite table partition if not exists" will throw exception when tablename is like "database.table"	 CLOSED	luoyuxia		
36.	Introduce operation execution plugin	 CLOSED	luoyuxia		
37.	HiveFunctionWrapper should use UserClassLoader to load class	 RESOLVED	Unassigned		
38.	Support Hive's UDAF which implement GenericUDAFResolver	 CLOSED	luoyuxia		
39.	Hive dialect support "create table like"	 IN PROGRESS	luoyuxia		
40.	Hive dialect supports "reload function"	 IN PROGRESS	luoyuxia		

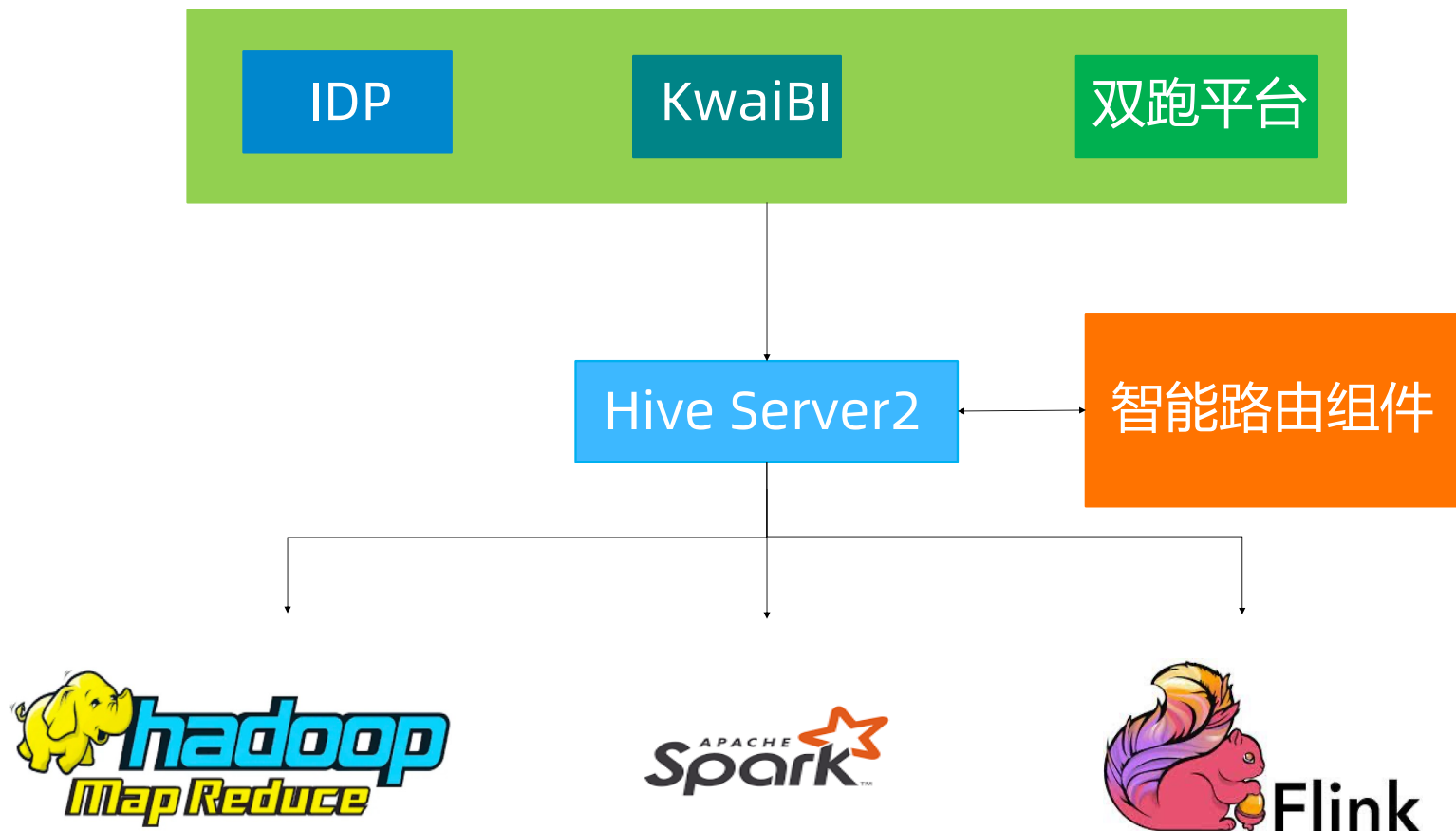
Sub-Tasks				+
1.	Case when would be translated into different expression in Hive dialect and default dialect	 RESOLVED	Unassigned	
2.	A redundant scan could be skipped if it is an input of join and the other input is empty after partition prune	 OPEN	luoyuxia	
3.	Take parquet metadata into consideration when source is parquet files	 OPEN	luoyuxia	
4.	Specify hash/sort aggregate strategy in SQL hint	 CLOSED	ZhuoYu Chen	
5.	Specify hash/sortmerge join in SQL hint	 OPEN	luoyuxia	
6.	Remove useless aggregate function	 OPEN	godfrey he	
7.	Batch get statistics of multiple partitions instead of get one by one	 RESOLVED	tartarus	
8.	Cannot join hive tables with different column types	 CLOSED	Unassigned	
9.	Unexpected aggregate plan after load hive module	 OPEN	luoyuxia	
10.	UnsupportedOperationException would thrown out when hash shuffle by a field with array type	 CLOSED	dalongliu	
11.	CalcOperator CodeGenException: Boolean expression type expected	 RESOLVED	Unassigned	
12.	Flink doesn't support Hive primitive type void yet	 CLOSED	luoyuxia	
13.	Hive Dialect support implicit conversion	 RESOLVED	luoyuxia	
14.	Unexpected rexnode : org.apache.calcite.rex.RexFieldAccess	 RESOLVED	Unassigned	
15.	CodeGenException: Unable to find common type of	 RESOLVED	Unassigned	
16.	Failed to get Hive result type from org.apache.hadoop.hive.ql.udf.generic.GenericUDAFPercentileApprox	 RESOLVED	Unassigned	
17.	Field #1: values VARCHAR(2147483647) ARRAY does not exist for expression index(\$0, 0)	 CLOSED	Unassigned	
18.	throw NPE if multi MAPJOIN hint union all	 CLOSED	luoyuxia	
19.	Support Insert Multi-Table	 CLOSED	luoyuxia	
20.	Support Hive bucket table	 IN PROGRESS	luoyuxia	
21.	Flink supports all modes of Hive UDAF (PARTIAL1, PARTIAL2, FINAL, COMPLETE)	 OPEN	luoyuxia	
22.	Min aggregate function support type: "ARRAY".	 RESOLVED	Unassigned	
23.	Flink batch support for Hive StorageHandlers	 OPEN	luoyuxia	
24.	Hive dialect fails using union map type	 OPEN	luoyuxia	
25.	Add Hive partition when flink has no data to write	 CLOSED	tartarus	
26.	Fix Hive sink not write a success file after finish writing in batch mode	 CLOSED	tartarus	
27.	Allow user to configure whether to enable sort or not when it's for dynamic partition writing for HiveSource	 CLOSED	luoyuxia	

HiveServer2 协议兼容



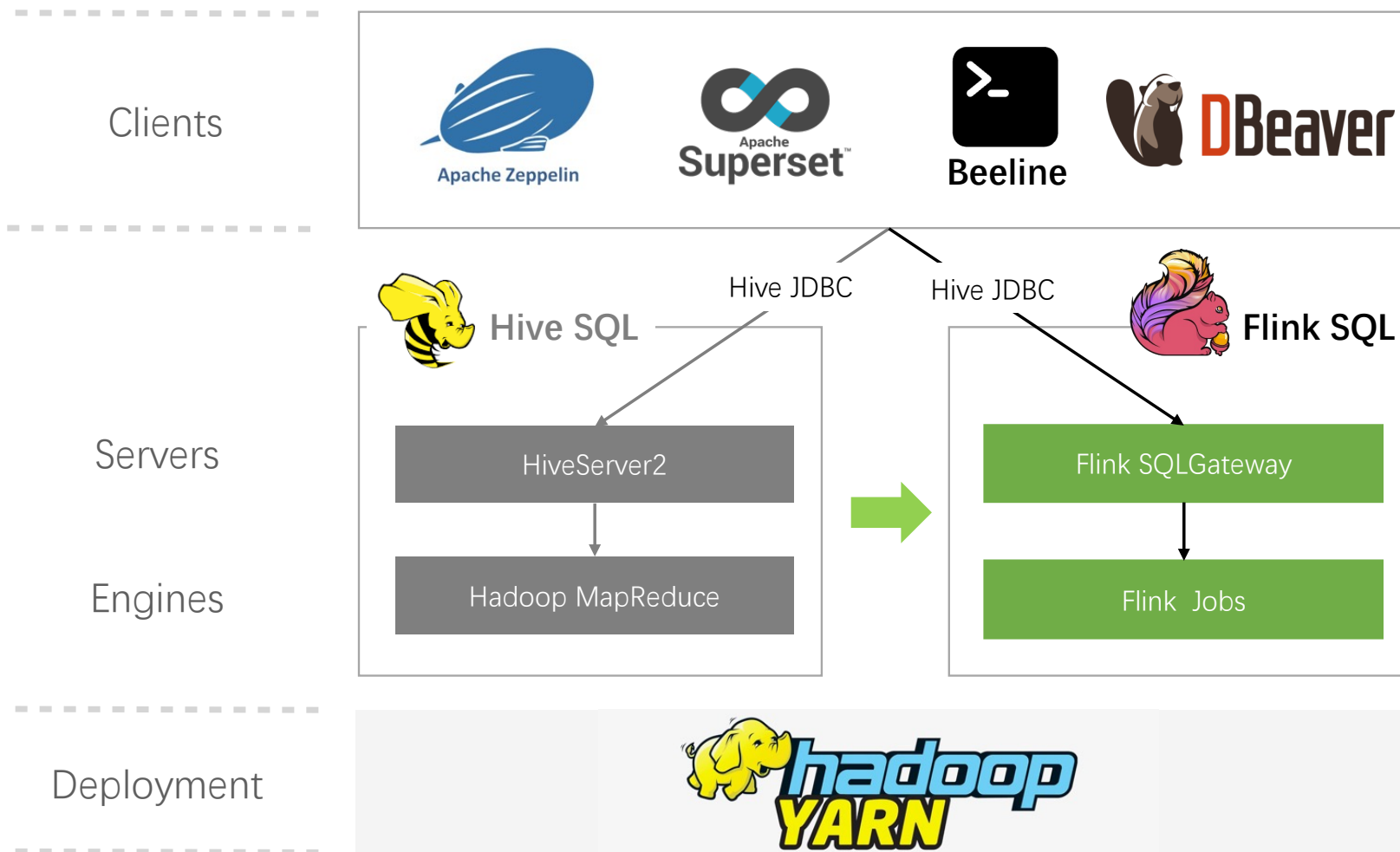
03 如何迁移

HiveSQL 迁移在快手的实践



04 Demo

Demo1: Hive SQL 如何迁移到 Flink SQL?




Chrome文件编辑视图历史记录书签用户标签页窗口帮助

hive_to_flink_demo - ZeppelinZeppelinRUNNING Applications

localhost:8080/#/interpreter

无痕模式

其他书签

Zeppelin

NotebookJob

Search

anonymous

my_hive %my_hive

editrestartremove

Option

The interpreter will be instantiated Globally in shared process

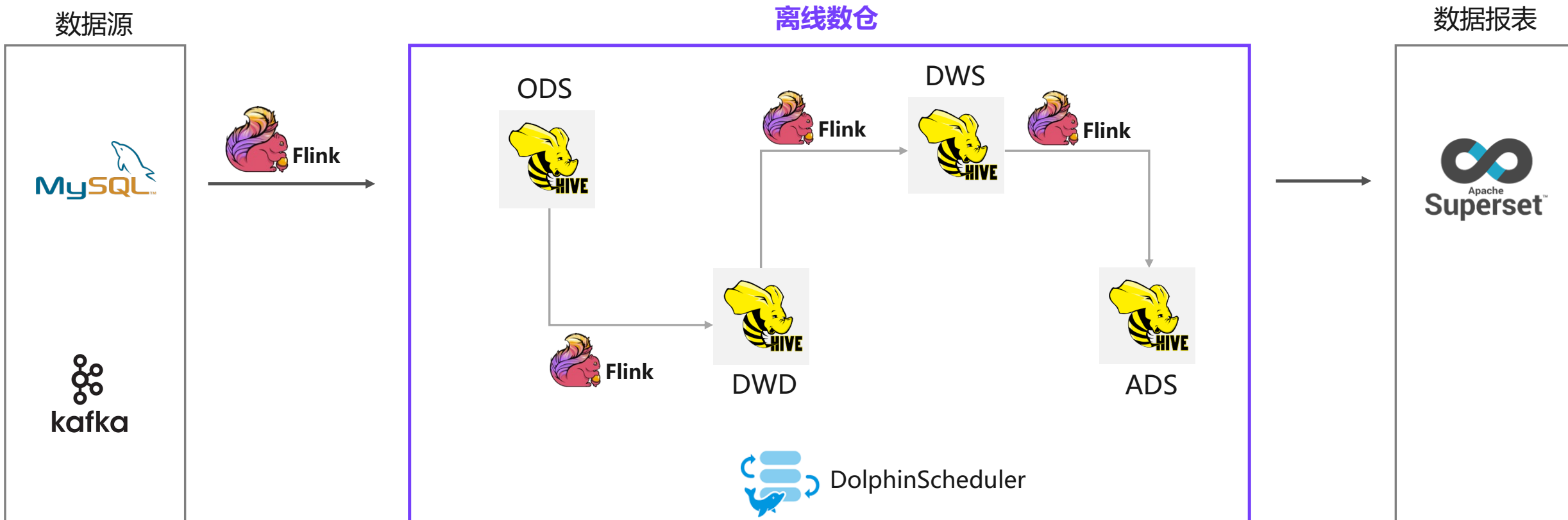
☐ Connect to existing process

☐ Set permission

Properties

Name	Value	Description
default.url	jdbc:hive2://master-1-1.c-90455001729a5e68.cn-hangzhou.emr.aliyuncs.com:10000/tpcds_bin_proc?	The URL for JDBC.

Demo2: 如何基于 Flink 快速搭建离线数仓?



创建数据源

请输入关键字

#	数据源名称	所属用户	数据源类型	数据源参数	描述	创建时间	更新时间	操作
1	store_sales	admin	HIVE	点击查看	-	2022-09-23 02:16:45	2022-09-23 06:23:14	编辑 删除

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05 未来规划

未来规划

01

提升 Batch **稳定性**和**性能**,
追齐主流批计算引擎

02

数据湖分析,
高效Batch读写湖存储,
提供湖上数据查询/管理语法
(AS OF, UPDATE/DELETE, CALL)

03

Flink Batch **生态建设**,
如 RSS、血缘管理等

Thanks