%flink.pyflink

**# Step 1**

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS website\_visit""")

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS tmpclickstream""")

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS tmpimpressionstream""")

st\_env.execute\_sql("""DROP TABLE IF EXISTS clickstream""")

st\_env.execute\_sql("""DROP TABLE IF EXISTS impressionstream""")

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS tmpctrstream""")

st\_env.execute\_sql("""DROP TABLE IF EXISTS ctrstream""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE website\_visit (

`browseraction` STRING,

`site` STRING,

`rowtime` TIMESTAMP(3) METADATA FROM 'timestamp',

WATERMARK FOR rowtime AS rowtime - INTERVAL '0' SECOND

)

WITH (

'connector' = 'kinesis',

'stream' = 'ticker',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE tmpclickstream (

`rowtime` TIMESTAMP(3),

`clickcount` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'clickstream',

'aws.region' = 'us-east-1',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE tmpimpressionstream (

`rowtime` TIMESTAMP(3),

`impressioncount` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'impressionstream',

'aws.region' = 'us-east-1',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TABLE clickstream (

`rowtime` TIMESTAMP(3),

`clickcount` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'clickstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TABLE impressionstream (

`rowtime` TIMESTAMP(3),

`impressioncount` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'impressionstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE tmpctrstream (

`time` BIGINT,

`ctr` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'ctrstream',

'aws.region' = 'us-east-1',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TABLE ctrstream (

`time` BIGINT,

`ctr` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'ctrstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

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%flink.ssql

**-- Step 2**

select \* from website\_visit;

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%flink.pyflink

**# Step 3**

st\_env.execute\_sql("""INSERT INTO tmpimpressionstream

SELECT

TUMBLE\_START(rowtime, INTERVAL '10' SECOND) AS rowtime,

COUNT(\*) AS impressioncount

FROM website\_visit

WHERE browseraction='Impression'

GROUP BY

TUMBLE(rowtime, INTERVAL '10' SECOND)""")

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%flink.ssql

**-- Step 4**

select \* from impressionstream;

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%flink.pyflink

**# Step 5**

st\_env.execute\_sql("""INSERT INTO tmpclickstream

SELECT

TUMBLE\_START(rowtime, INTERVAL '10' SECOND) AS rowtime,

COUNT(\*) AS clickcount

FROM website\_visit

WHERE browseraction='Click'

GROUP BY

TUMBLE(rowtime, INTERVAL '10' SECOND)""")

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%flink.ssql

**-- Step 6**

select \* from clickstream;

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%flink.pyflink

**# Step 7**

st\_env.execute\_sql("""INSERT INTO tmpctrstream

SELECT unix\_timestamp(cast(t1.rowtime as string)) as `time`, ROUND((t2.clickcount / t1.impressioncount \* 100), 1) as ctr

FROM impressionstream t1 INNER JOIN

clickstream t2

ON unix\_timestamp(cast(t1.rowtime as string)) = unix\_timestamp(cast(t2.rowtime as string))""")

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%flink.ssql

**-- Step8**

select \* from ctrstream;

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%flink.pyflink

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS tmpdestinationstream""")

st\_env.execute\_sql("""DROP TABLE IF EXISTS destinationstream""")

st\_env.execute\_sql("""DROP TEMPORARY TABLE IF EXISTS tmpanomalydetectionstream""")

st\_env.execute\_sql("""DROP TABLE IF EXISTS anomalydetectionstream""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE tmpdestinationstream (

`time` BIGINT,

`ctr` DOUBLE,

`score` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'destinationstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TABLE destinationstream (

`time` BIGINT,

`ctr` DOUBLE,

`score` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'destinationstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TEMPORARY TABLE tmpanomalydetectionstream (

`rowtime` TIMESTAMP,

`ctrpercent` DOUBLE,

`anomaly\_score` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'anomalydetectionstream',

'aws.region' = 'us-east-1',

'format' = 'json'

)""")

st\_env.execute\_sql("""CREATE TABLE anomalydetectionstream (

`rowtime` TIMESTAMP,

`ctrpercent` DOUBLE,

`anomaly\_score` DOUBLE

)

WITH (

'connector' = 'kinesis',

'stream' = 'anomalydetectionstream',

'aws.region' = 'us-east-1',

'scan.stream.initpos' = 'TRIM\_HORIZON',

'format' = 'json'

)""")

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%flink.pyflink

**# Step 9**

st\_env.execute\_sql("""INSERT INTO tmpanomalydetectionstream

SELECT to\_timestamp(from\_unixtime(`time`)) as rowtime, ctr as ctrpercent, score as anomaly\_score

FROM tmpdestinationstream

WHERE score>1""")

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%flink.ssql

**-- Step 10**

select \* from anomalydetectionstream;

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