HELLO, WE ARE

# functional

## KQL Tauchkurs

Big Data Realtime Pipelines on Azure

www.functional.team

HELLO

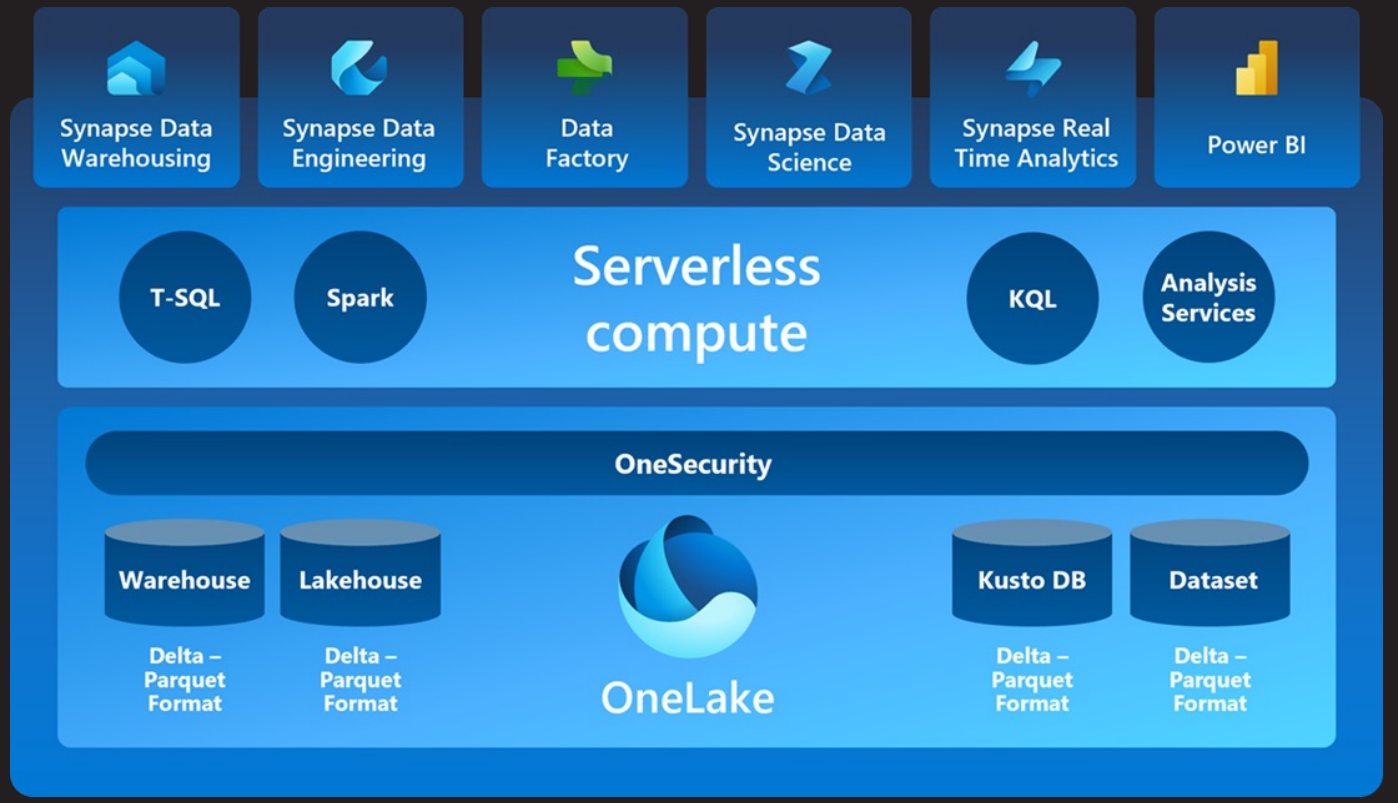
# We are functional

We are a cloud consulting and software engineering boutique – specialized in Azure.

We augment teams to design, build and operate modern applications that are data-intense and cloud-native.

We are a new generation company:
skilled, employee-owned and purpose-driven.

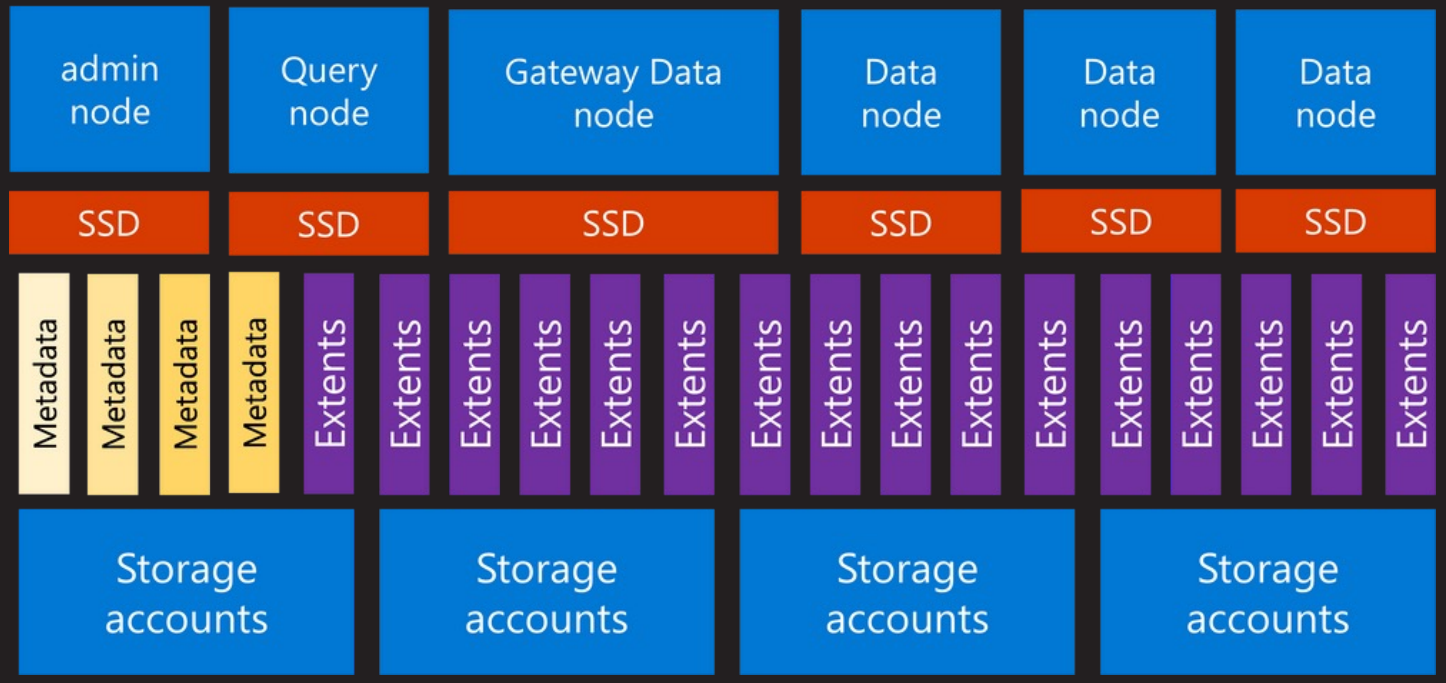
# Lake Diving

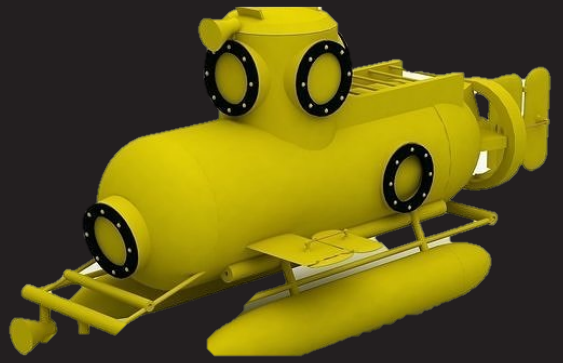





https://learn.microsoft.com/de-de/fabric/get-started/microsoft-fabric-overview

# Is it a lake, really?

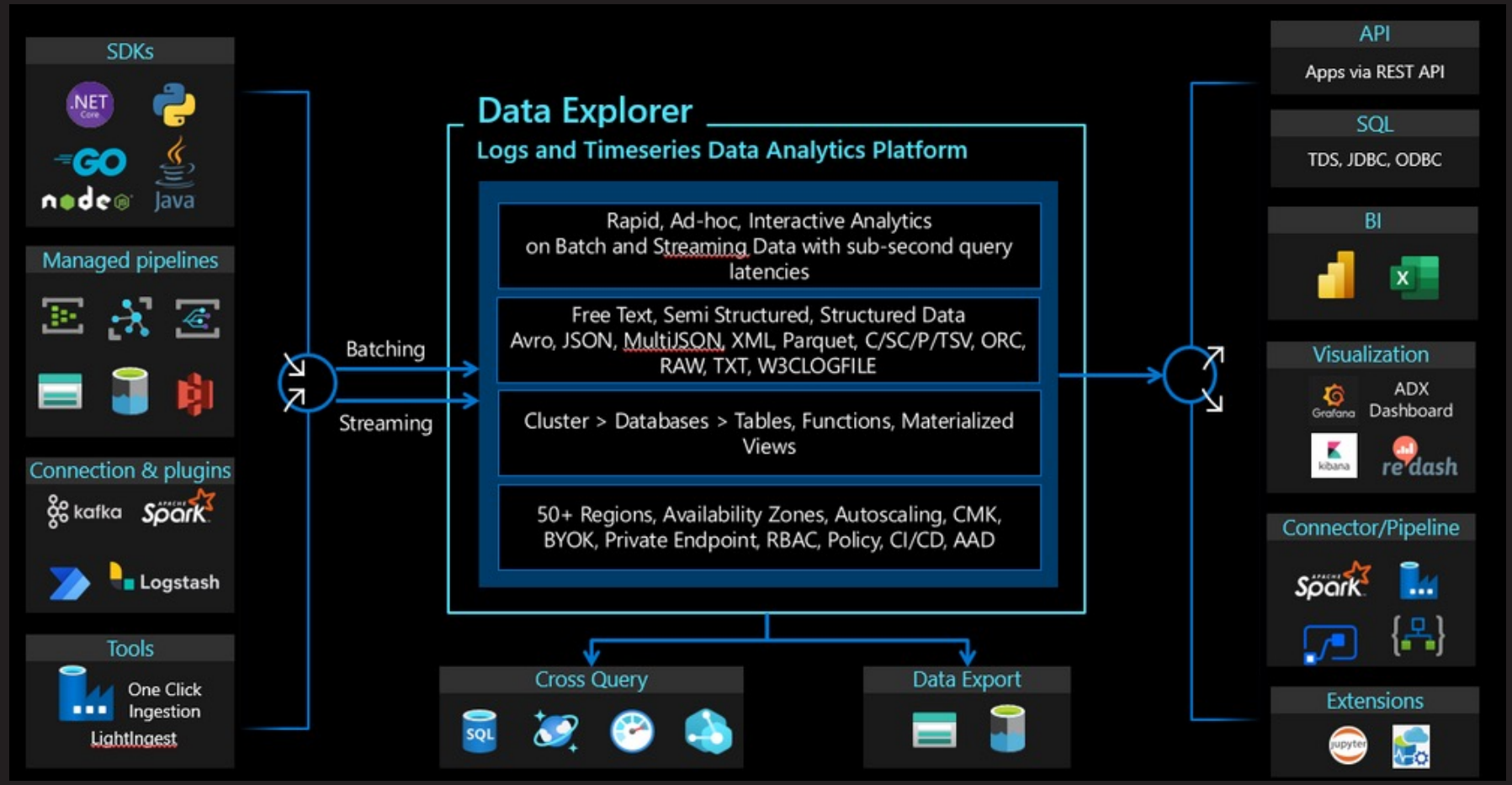




Sources: https://techcommunity.microsoft.com/t5/azure-synapse-analytics-blog/demystifying-data-explorer/ba-p/3636191

# ...or a system of rivers?




https://techcommunity.microsoft.com/t5/azure-synapse-analytics-blog/demystifying-data-explorer/ba-p/3636191

# Chaining

- **SQL**

```
SELECT count(distinct DBName) FROM 'servermetrics.csv' WHERE SQLMetrics='read_latency_ms' and Value > 30000;
```

- **Bash**

```
cat servermetrics.csv | awk -F'"' '{if($2=="read_latency_ms" && $4>30000)print $16}' | sort | uniq | wc -l
```

- **Powershell**

```
gc ./servermetrics.csv | ConvertFrom-Csv -Delimiter "," | where {($_.SQLMetrics -EQ 'read_latency_ms') -and ($_.Value -GT 30000)}
                                                        | select -unique -Property DBName | measure | % { $_.Count }
```

- **KQL**

```
servermetrics | where SQLMetrics == "read_latency_ms" and Value > 30000 | distinct DBName | count
```

# 80% of the queries you'll need

```
CUR_ServerMetrics | take 10
```

```
CUR_ServerMetrics | where Timestamp between (datetime(2022-05-01) .. datetime(2022-05-02))
```

```
CUR_ServerMetrics | summarize avg(Value) by SQLMetrics, SQLInstance, MetricType
```

```
CUR_ServerMetrics | join kind=leftouter (ServerLocations) on $left.DBName==$right.Server
```

```
CUR_ServerMetrics | project MetricType, Wert=Value, Zeit=Timestamp
```

```
CUR_ServerMetrics | extend host = extract_json("$.host", tostring(tags));
```

```
CUR_ServerMetrics | render linechart
```

# Build a pipeline from separate queries

```
CUR_ServerMetrics
| where Timestamp between (datetime(2022-05-01) .. datetime(2022-05-02))
| where SQLMetrics == "read_latency_ms"
| join kind=leftouter SQLServerLocation on $left.DBName==$right.Server
| project Timestamp, Region, Value
| summarize avg(Value) by Region, bin(Timestamp, 1min)
| render linechart
```

# Functions are “stored queries”

```
.create-or-alter function FN_AvgReadLatencyByRegion(start:datetime, end:datetime) {
  CUR_ServerMetrics
  | where Timestamp between (start..end)
  | where SQLMetrics == "read_latency_ms"
  | join kind=leftouter SQLServerLocation on $left.DBName==$right.Server
  | project Timestamp, Region, Value
  | summarize avg(Value) by Region, bin(Timestamp, 1min)
}
```

# Swimming upstream

| SQLMetrics | Value | MetricType | Timestamp | Host | MeasurementDbType | SQLInstance |
|---|---|---|---|---|---|---|
| active_workers_count | 23 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| context_switches_count | 5,383,892 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| current_tasks_count | 24 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| current_workers_count | 42 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| is_idle | 0 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| is_online | 1 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| load_factor | 28 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| pending_disk_io_count | 0 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| preemptive_switches_count | 1,242,337 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| runnable_tasks_count | 0 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |

# Swimming upstream

| SQLMetrics | Value | MetricType | Timestamp | Host | MeasurementDbType | SQLInstance |
|---|---|---|---|---|---|---|
| active_workers_count | 23 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| context_switches_count | 5,383,892 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| current_tasks_count | 24 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| current_workers_count | 42 | sqlserver_schedulers | 2022-05-07 04:38:40.01... | adx-vm | AzureSQLDB | adx-sql-server |
| is_idle | 0 | sqlserver_sched | | | | |
| is_online | 1 | sqlserver_sched | | | | |
| load_factor | 28 | sqlserver_sched | | | | |
| pending_disk_io_count | 0 | sqlserver_sched | | | | |
| preemptive_switches_count | 1,242,337 | sqlserver_sched | | | | |
| runnable_tasks_count | 0 | sqlserver_sched | | | | |


```
"{""max_wait_time_ms"":13,""resource_wait_ms"":123,""signal_wait_time_ms"":1177,""wait_time_ms"":1300,""waiting_tasks_count"":82501}","sqlserver_azuredb_waitstats","{""host"":""adx-vm"",""measurement_db_type"":""AzureSQLDB"",""replica_updateability"":""READ_WRITE"",""sql_instance"":""adx-sql-server"",""database_name"":""azure-sql-db2"",""wait_type"":""PAGELATCH_SH""}","2022-05-07T04:38:40.0871012Z"
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```
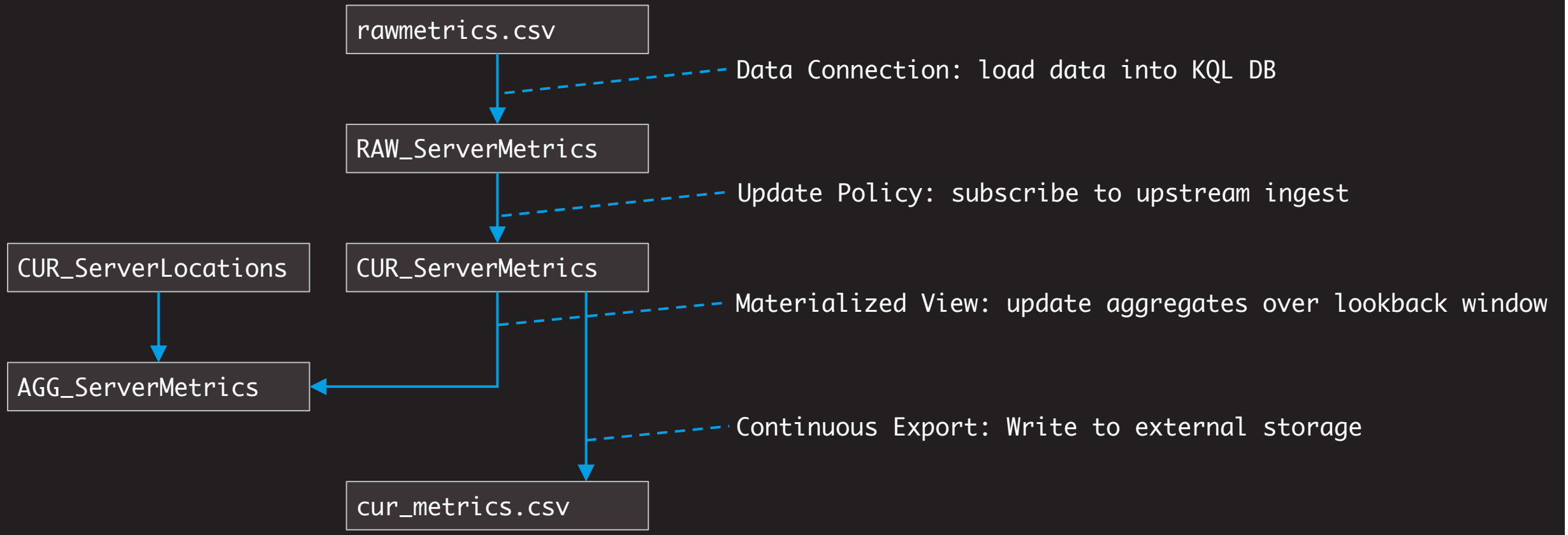

# Propagate ingests to trigger transformations



# KQL: common query operations

```
.create-or-alter function FN_TransformRawServerMetrics() {
  RAW_ServerMetrics
  | mv-expand fields
  | mv-expand kind=array fields
  | project
    SQLMetrics=fields[0],
    Value=todouble(fields[1]),
    MetricType=tostring(name),
    Timestamp=timestamp,
    Host=tostring(['tags'].host),
    MeasurementDbType=tostring(['tags'].measurement_db_type),
    SQLInstance=tostring(['tags'].sql_instance),
    tags
}
```

THANK YOU FROM

# functional

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