
# Hail Hydrate! From Stream to Lake Using Open Source

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https://github.com/tspannhw
https://www.datainmotion.dev/
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https://dev.to/tspannhw
https://sessionize.com/tspann/
https://www.slideshare.net/bunkertor

Stream Native

THE LINUX FOUNDATION

# Agenda

Use Case - Populate the Data Lake

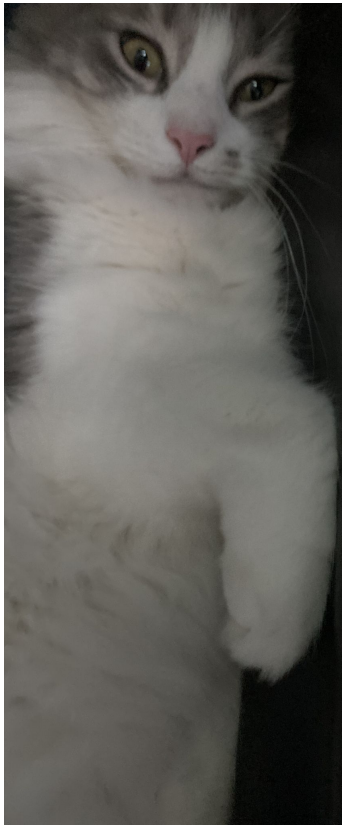
Key Challenges

- Their Impact
- A Solution
- Outcome

Why Apache NiFi and Apache Pulsar?

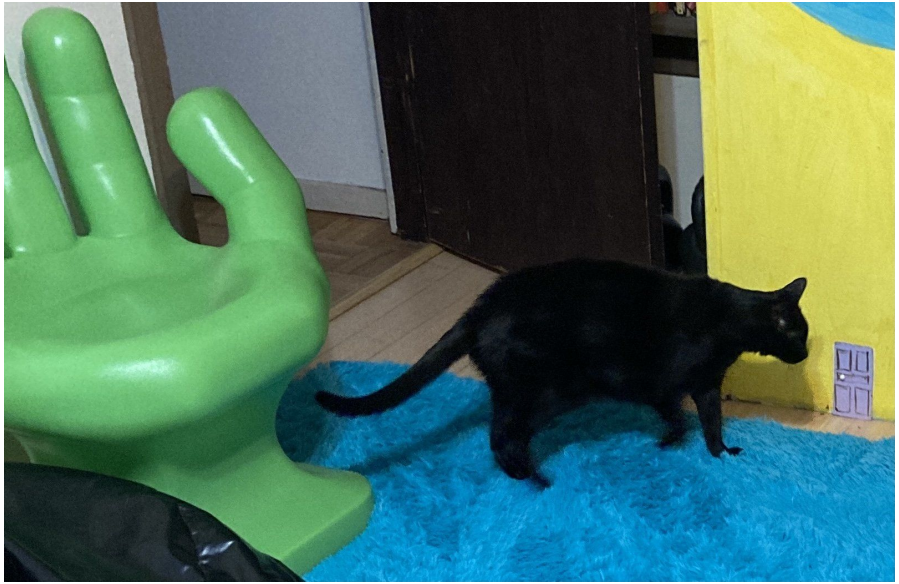
Successful Architecture

Demo



# USE CASE

**IoT Ingestion:** High-volume streaming sources, multiple message formats, diverse protocols and multi-vendor devices creates data ingestion challenges.



# Key Challenges

**Data Ingestion:** High-volume streaming sources, multiple message formats, diverse protocols and multi-vendor devices creates data ingestion challenges.

**Real-time Insights**: Analyzing continuous and rapid inflow (velocity) of streaming data at high volumes creates major challenges for gaining real-time insights.

**Visibility:** Lack visibility of end-to-end streaming data flows, inability to troubleshoot bottlenecks, consumption patterns etc.

# Impact

**Code Sprawl:** Custom scripts over various qualities proliferate across environments to cope with the complexity.

**Costs**: Increasing costs of development and maintenance. Too many tools, not enough experts, waiting for contractors or time delays as developers learn yet another tool, package or language.

**Delays:** Decreasing user satisfaction and delay in project delivery. Missed revenue and opportunities.

# Solution

**Data Ingestion:** Apache NiFi is the one tool handle high-volume streaming sources, multiple message formats, diverse protocols and multi-vendor devices.

**Variety of Data**: Apache NiFi offers hundreds of OOTB connectors and a GUI that accelerates flow developments. With Record Processors that convert types in a single fast step.

**Visibility:** Apache NiFi provenance provides insights, metrics and control over the entire end-to-end stream across clouds.

# Outcome

**New Applications:** Enablement of new innovative use cases in compressed timeframe.  No more waiting for data to arrive, Data Analysts and Data Scientists focus on innovation.

**Savings**: Cost reduction thanks to technologies offload, reduced consultant costs and simplification of ingest processes.

**Agility:** Reduction of new data source onboarding time from weeks to days.  More data in your data warehouse now.

# FLiP Stack for Cloud Data Engineers - ML

## Multiple users, frameworks, languages, clouds, data sources & clusters

CLOUD DATA ENGINEER

- Experience in ETL/ELT
- Coding skills in Python or Java
- Knowledge of database query languages such as SQL
- Experience with Streaming
- Knowledge of Cloud Tools

CAT

- Typical User
- No Coding Skills
- Can use NiFi
- Questions your cloud spend
- Expert in ETL (Eating, Ties and Laziness)
- Edge Camera Interaction

Function Mesh

https://functionmesh.io/

AI / Deep Learning / ML / DS

- Can run in Apache NiFi
- Can run in Apache Pulsar Functions
- Can run in Apache Flink
- Can run in Apache Flink SQL
- Can run in Apache Pulsar Clients
- Can run in Apache Pulsar Microservices
- Can run in Function Mesh

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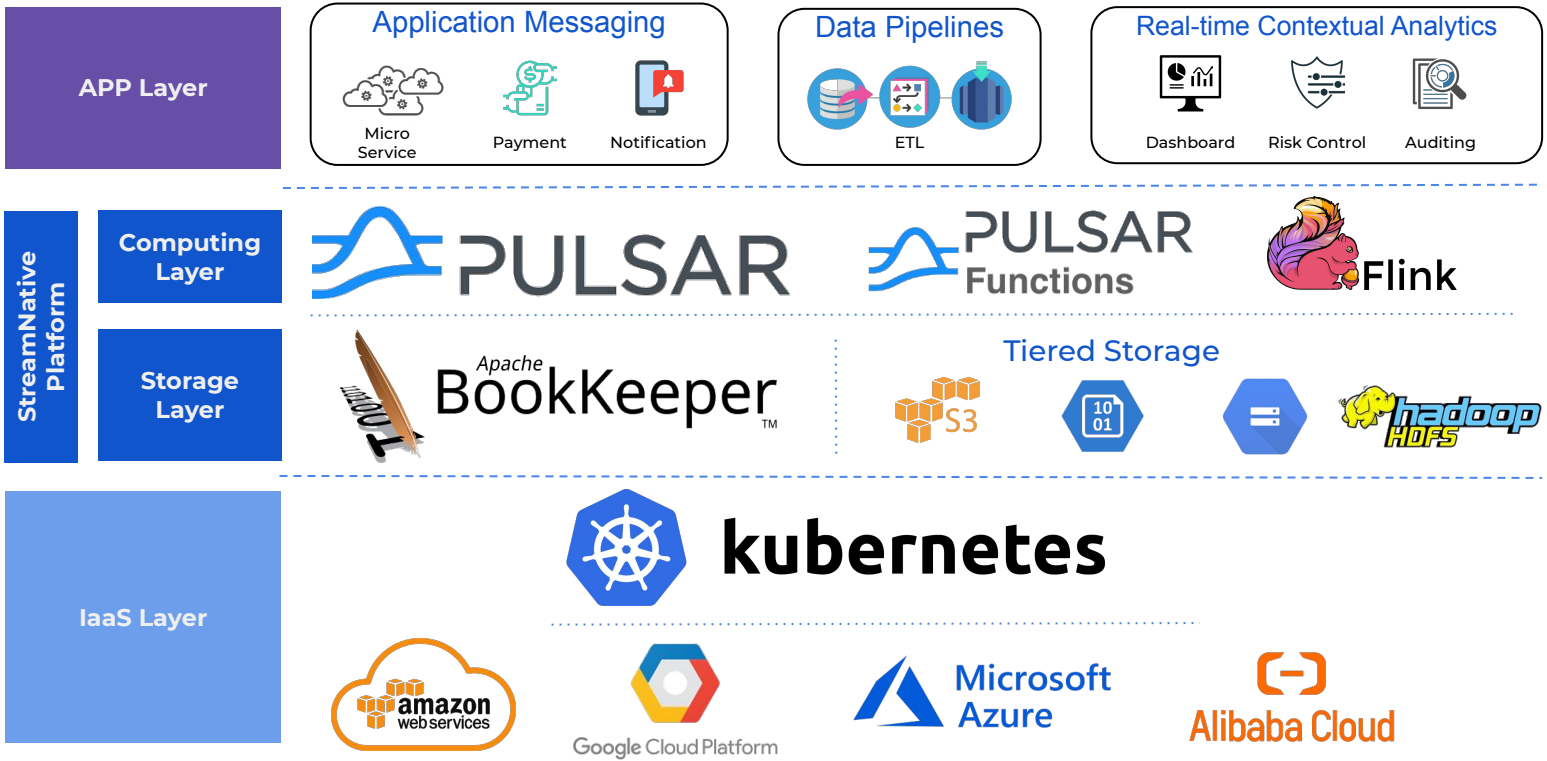
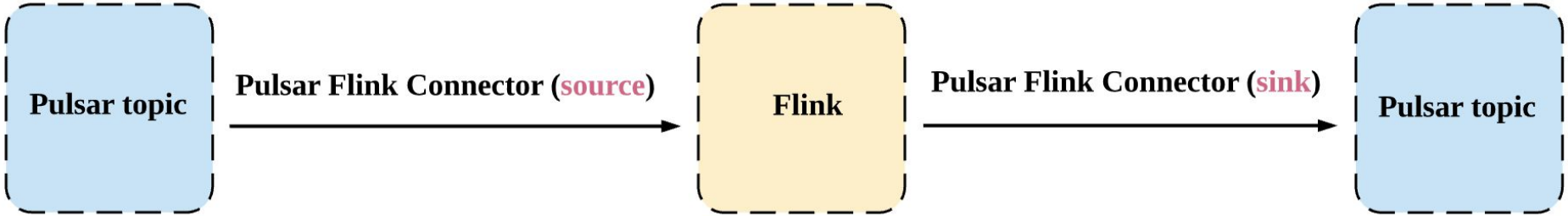
# StreamNative Solution



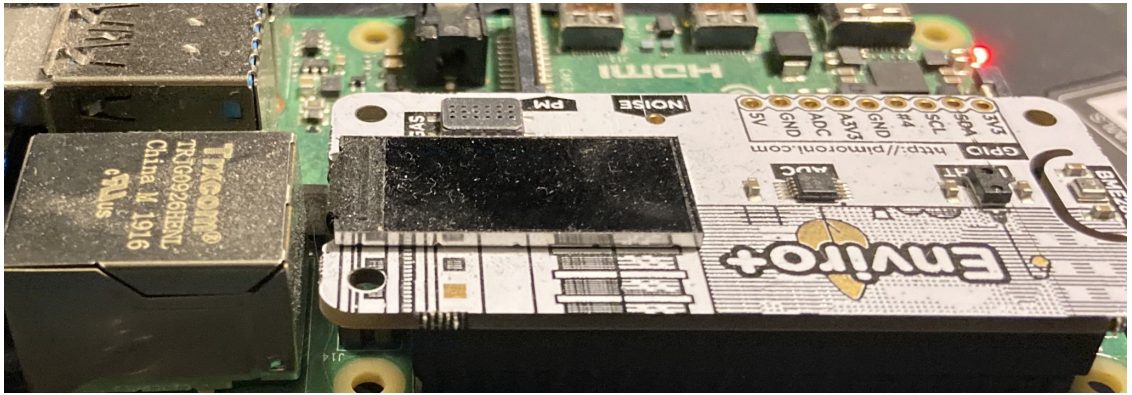
# FLiP Stack (FLink -integrate- Pulsar)

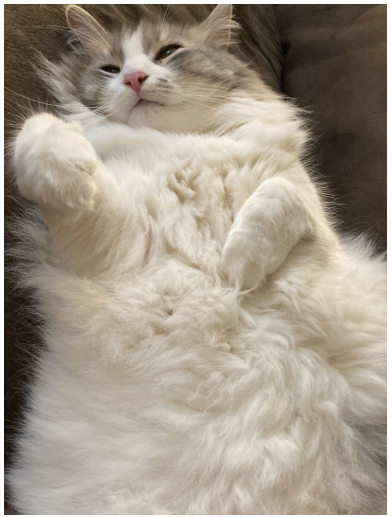



https://hub.streamnative.io/data-processing/pulsar-flink/2.7.0/

# What is Apache NiFi?

**Apache NiFi** is a scalable, real-time streaming data platform that collects, curates, and analyzes data so customers gain key insights for immediate actionable intelligence.

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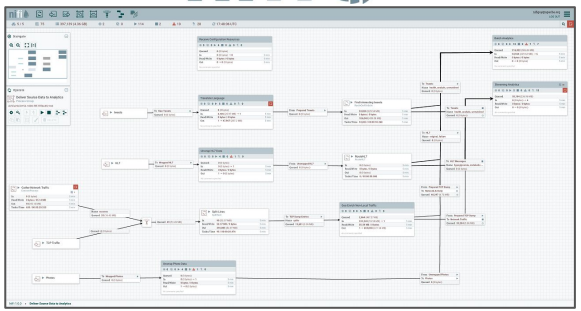
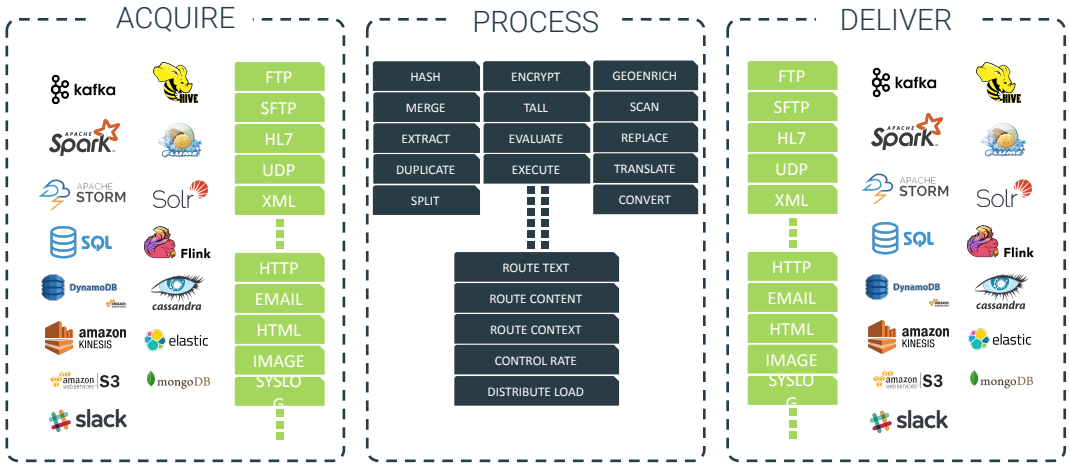
# Apache NiFi



APACHE NIFI registry

Advanced tooling to industrialize flow development
(Flow Development Life Cycle)




- Over 300 Prebuilt Processors
- Easy to build your own
- Parse, Enrich & Apply Schema
- Filter, Split, Merger & Route
- Throttle & Backpressure

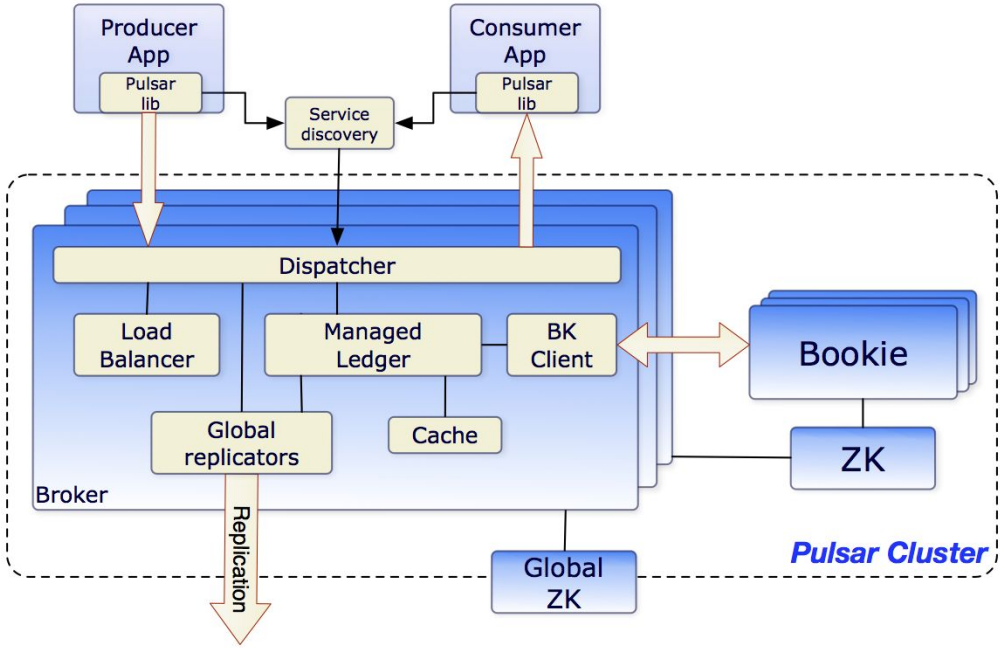
- Guaranteed Delivery
- Full data provenance from acquisition to delivery
- Diverse, Non-Traditional Sources
- Eco-system integration

# What is Apache Pulsar?

**Apache Pulsar** is an open source, cloud-native distributed messaging and streaming platform.


# Apache Pulsar

- Pub-Sub
- Geo-Replication
- Pulsar Functions
- Horizontal Scalability
- Multi-tenancy
- Tiered Persistent Storage
- Pulsar Connectors
- REST API
- CLI
- Many clients available
- Four Different Subscription Types
- Multi-Protocol Support
  - MQTT
  - AMQP
  - JMS
  - Kafka
  - ...



# ALL DATA - ANYTIME - ANYWHERE - ANY CLOUD

TXT

XML

CSV

JSON

SQL

APACHE nifi

Multi-ingest

Merge

Priority

Flink

PULSAR

SQL

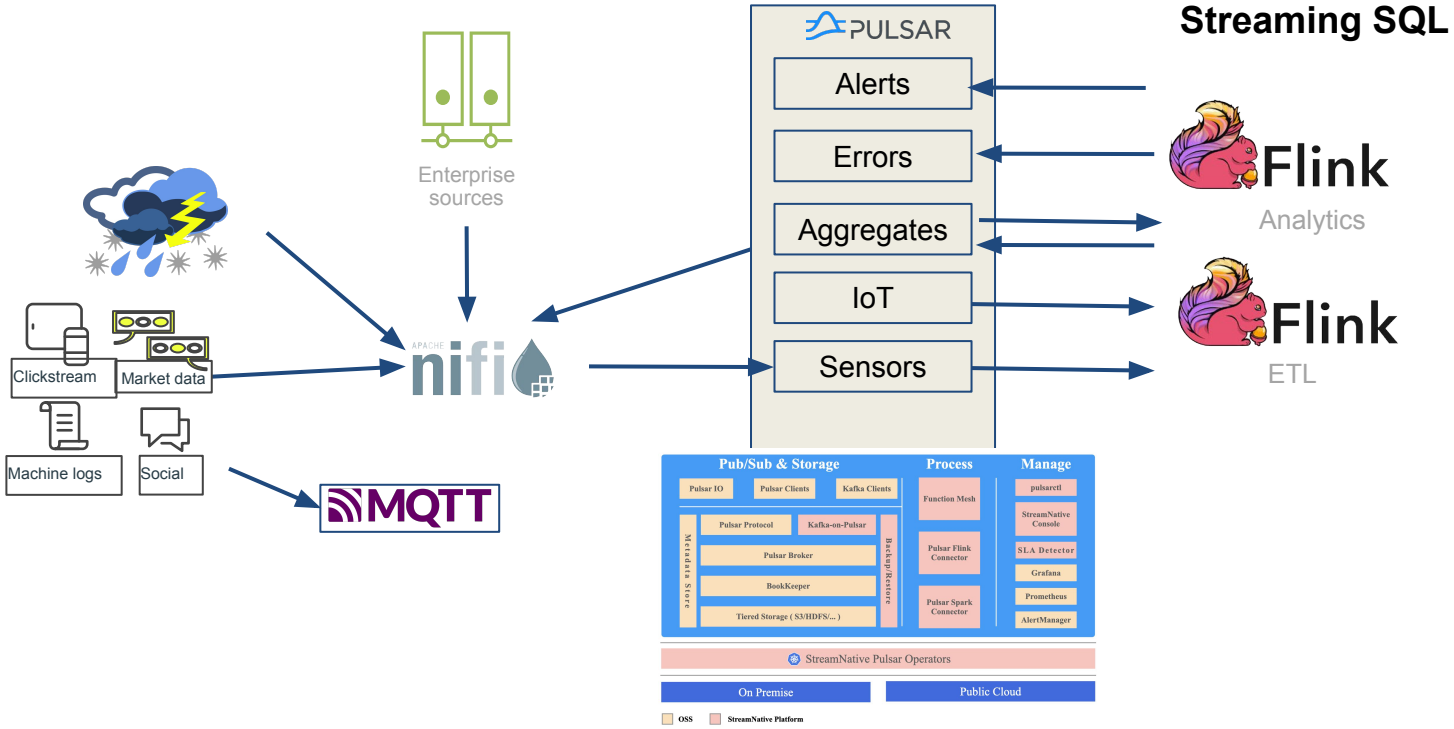
Data Analyst

Data Analyst

jupyter

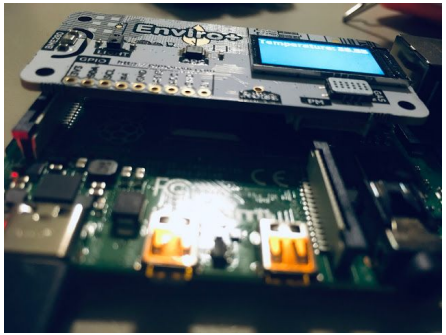
Data Scientist

# End to End Streaming Codeless Pipeline



# Show Me Some Data

{"uuid": "rpi4_uuid_jfx_20200826203733", "amplitude100": 1.2, "amplitude500": 0.6, "amplitude1000": 0.3, "lownoise": 0.6, "midnoise": 0.2, "highnoise": 0.2, "amps": 0.3, "ipaddress": "192.168.1.76", "host": "rp4", "host_name": "rp4", "macaddress": "6e:37:12:08:63:e1", "systemtime": "08/26/2020 16:37:34", "endtime": "1598474254.75", "runtime": "28179.03", "starttime": "08/26/2020 08:47:54", "cpu": 48.3, "cpu_temp": "72.0", "diskusage": "40219.3 MB", "memory": 24.3, "id": "20200826203733_28ce9520-6832-4f80-b17d-f36c21fd8fc9", "temperature": "47.2", "adjtemp": "35.8", "adjtempf": "76.4", "temperaturef": "97.0", "pressure": 1010.0, "humidity": 8.3, "lux": 67.4, "proximity": 0, "oxidising": 77.9, "reducing": 184.6, "nh3": 144.7, "gasKO": "Oxidising: 77913.04 Ohms\nReducing: 184625.00 Ohms\nNH3: 144651.47 Ohms"}


# Weather Streaming Pipeline

Weather

| location | observation_time | credit | credit_url | image |
|---|---|---|---|---|
| Abingdon, VA | Last Updated on Oct 27 2020, 11:55 am EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Ada, Ada Municipal Airport, OK | Last Updated on Oct 27 2020, 10:55 am CDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Adrian, Lenawee County Airport, MI | Last Updated on Oct 27 2020, 11:53 am EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Adrian, Lenawee County Airport, MI | Last Updated on Oct 27 2020, 12:53 pm EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Afton WY, WY | Last Updated on Oct 27 2020, 9:55 am MDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Aiken Municipal Airport, SC | Last Updated on Oct 27 2020, 11:55 am EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Ak-Chin Regional Airport, AZ | Last Updated on Oct 27 2020, 9:55 am MST | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Akron Canton Regional Airport, OH | Last Updated on Oct 27 2020, 12:51 pm EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Alabaster, Shelby County Airport, AL | Last Updated on Oct 27 2020, 10:53 am CDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Albert Whitted Airport, FL | Last Updated on Oct 27 2020, 12:53 pm EDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |
| Albuquerque, Double Eagle II Airport, NM | Last Updated on Oct 27 2020, 10:55 am MDT | NOAA's National Weather Service | http://weather.gov/ | MapRecord{{link=http://weather.gov, title=NOAA's Nati |

< 1 2 3 4 5 >

weather map


# Connect with the Community & Stay Up-To-Date

- Join the Pulsar Slack channel - *Apache-Pulsar.slack.com*
- Follow @streamnativeio and @apache_pulsar on Twitter
- Subscribe to Monthly Pulsar Newsletter for major news, events, project updates, and resources in the Pulsar community

# Deeper Content

- https://www.datainmotion.dev/2020/10/running-flink-sql-against-kafka-using.html
- https://www.datainmotion.dev/2020/10/top-25-use-cases-of-cloudera-flow.html
- https://github.com/tspannhw/EverythingApacheNiFi
- https://github.com/tspannhw/CloudDemo2021
- https://github.com/tspannhw/StreamingSQLExamples
- https://www.linkedin.com/pulse/2021-schedule-tim-spann/
- https://github.com/tspannhw/StreamingSQLExamples/blob/8d02e62260e82b027b43abb911b5c366a3081927/README.md

# Deeper Content

- https://github.com/tspannhw/FLiP-SQL
- https://github.com/tspannhw/StreamingSQLExamples
- https://github.com/streamnative/pulsar-flink
- https://www.linkedin.com/pulse/2021-schedule-tim-spann/
- https://github.com/tspannhw/SpeakerProfile/blob/main/2021/talks/20210729_HailHydrate!FromStreamtoLake_TimSpann.pdf
- https://streamnative.io/en/blog/release/2021-04-20-flink-sql-on-streamnative-cloud
- https://docs.streamnative.io/cloud/stable/compute/flink-sql

 **@PaasDev**  **timothyspann**

**https://www.pulsardeveloper.com/**

Announcing

# Flink SQL on StreamNative Cloud

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# OPEN SOURCE SUMMIT