

Tim Spann and David Kjerrumgaard

こんにちは



# Pulsar Summit Asia 2021

Xin chào

November 20-21, 2021

Using the FLiPN Stack for Edge AI (Flink, NiFi, Pulsar)

# Today's Speakers



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Developer Advocate



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Developer Advocate

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안녕하세요

# FLiP(N) Stack

こんにちは

- Apache Flink
- Apache Pulsar
- StreamNative's Flink Connector for Pulsar
- Apache NiFi
- Java, Python, Go

你好

নমস্তো



# StreamNative Cloud

Powered by Apache Pulsar, StreamNative provides a cloud-native, real-time messaging and streaming platform to support multi-cloud and hybrid cloud strategies.



Cloud Native

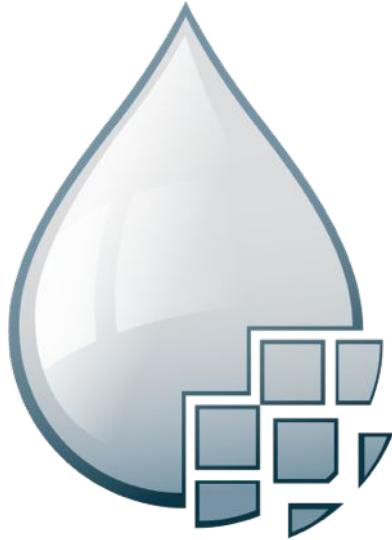


kubernetes  
Built for Containers



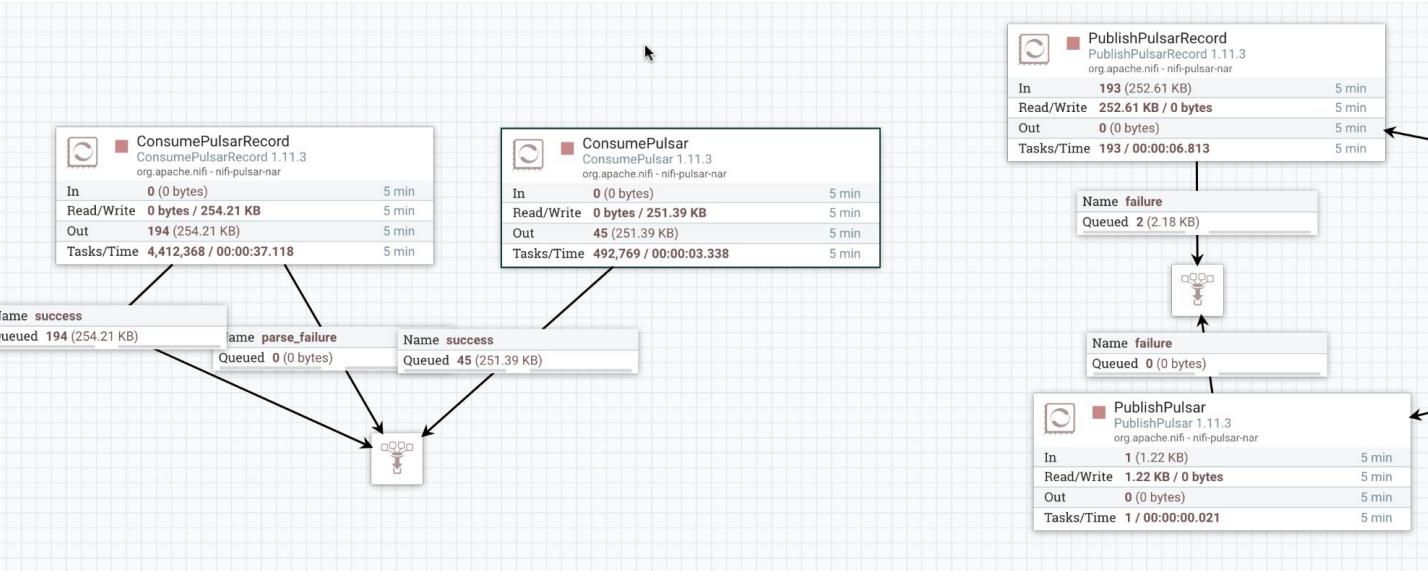
Flink  
Flink SQL

# Why Apache NiFi?



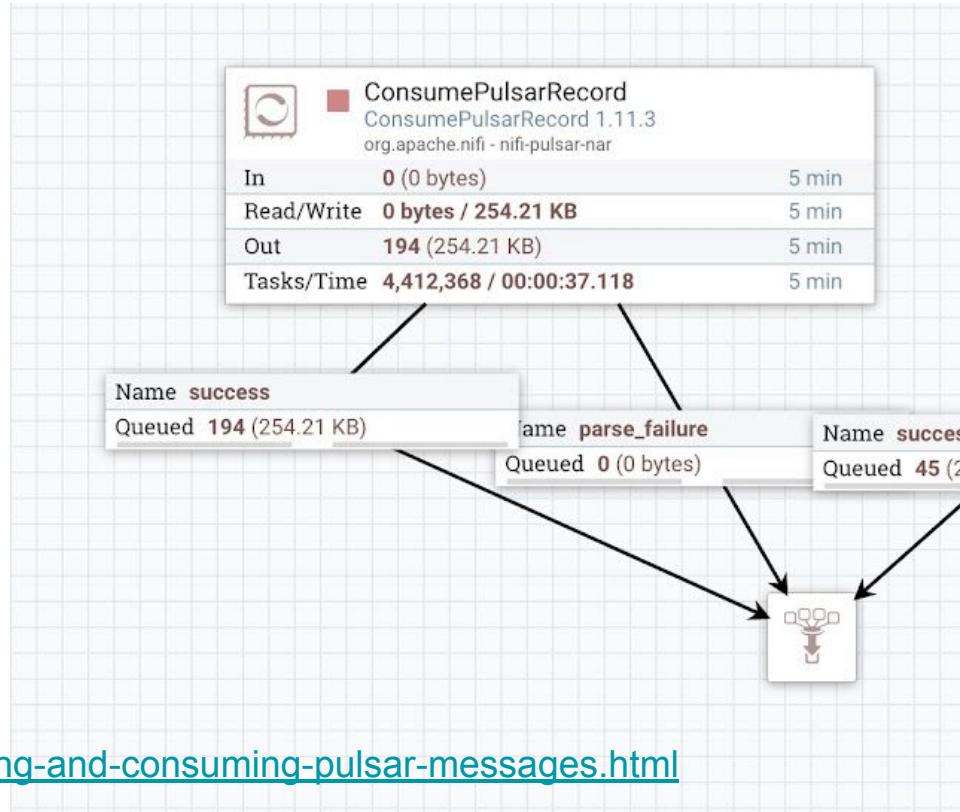
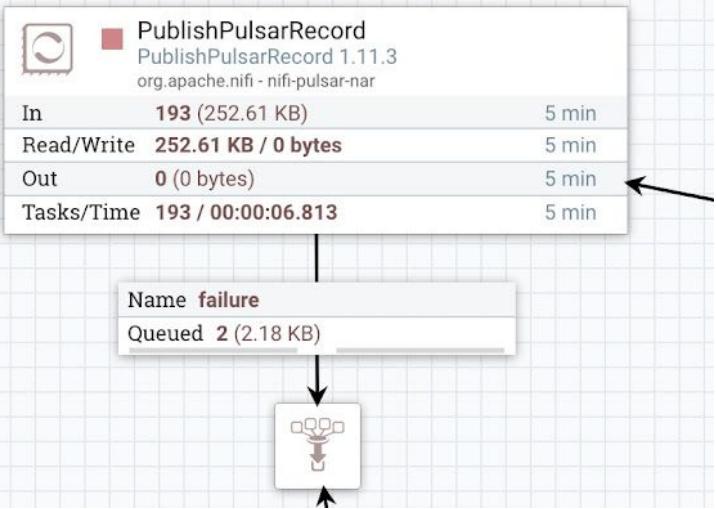
- Guaranteed delivery
- Data buffering
  - Backpressure
  - Pressure release
- Prioritized queuing
- Flow specific QoS
  - Latency vs. throughput
  - Loss tolerance
- Data provenance
- Supports push and pull models
- Hundreds of processors
- Visual command and control
- Over 300 sources
- JSON Flow templates
- Pluggable/multi-role security
- Designed for extension
- Clustering
- Version Control

# Apache NiFi Pulsar Connector



<https://github.com/david-streamlio/pulsar-nifi-bundle>

# Apache NiFi Pulsar Connector



<https://www.datainmotion.dev/2021/11/producing-and-consuming-pulsar-messages.html>

# Apache NiFi Pulsar Connector

Displaying 12 of 339

pulsar

Type	Version ▲	Tags
ConsumePulsar	1.11.0	PubSub, Consume, Ingest, Get, I...
ConsumePulsarRecord	1.11.0	PubSub, Consume, Ingest, Get, ...
PublishPulsar	1.11.0	PubSub, Message, Pulsar, Apac...
PublishPulsarRecord	1.11.0	PubSub, 1.0, Message, csv, json...
ConsumePulsar	1.11.3	PubSub, Consume, Ingest, Get, I...
ConsumePulsarRecord	1.11.3	PubSub, Consume, Ingest, Get, ...
PublishPulsar	1.11.3	PubSub, Message, Pulsar, Apac...
PublishPulsarRecord	1.11.3	PubSub, 1.0, Message, csv, json...
ConsumePulsar	1.14.0	PubSub, Consume, Ingest, Get, I...
ConsumePulsarRecord	1.14.0	PubSub, Consume, Ingest, Get, ...
PublishPulsar	1.14.0	PubSub, Message, Pulsar, Apac...
PublishPulsarRecord	1.14.0	PubSub, 1.0, Message, csv, json...

## ConsumePulsar 1.11.3 org.apache.nifi - nifi-pulsar-nar

Consumes messages from Apache Pulsar. The complementary NiFi processor for sending messages is PublishPulsar.

# Apache NiFi Pulsar Connector

Controller Service Details

SETTINGS	PROPERTIES	COMMENTS
Required field		
Property	Value	
Pulsar Service URL	pulsar+ssl://gke.sndev.snio.cloud:6651	→
Pulsar Client Authentication Service	PulsarClientOauthAuthenticationService14sn	→
Maximum concurrent lookup-requests	5000	
Maximum connects per Pulsar broker	1	
I/O Threads	1	
Keep Alive interval	30 sec	
Listener Threads	1	
Maximum lookup requests	50000	→
Maximum rejected requests per connection	50	
Operation Timeout	30 sec	
Stats interval	60 sec	
Allow TLS Insecure Connection	false	
Enable TLS Hostname Verification	false	
Use TCP no-delay flag	false	

# Apache NiFi Pulsar Connector

## Controller Service Details

SETTINGS	PROPERTIES	COMMENTS
----------	------------	----------

Required field

Property	Value
Audience	urn:sn:pulsar:sndev:gke
Issuer URL	<a href="https://auth.streamnative.cloud">https://auth.streamnative.cloud</a>
Private key file	file:///Users/tspann/Documents/servers/services/apache-pulsar-2.8.0/sndev-tspann.json
Trusted Certificate Filename	?

<https://github.com/david-streamlio/pulsar-nifi-bundle/releases/tag/v1.14.0>

# Apache NiFi Pulsar Connector to StreamNative Cloud

The screenshot shows the StreamNative Cloud interface. On the left, there's a sidebar with navigation links: International, Organization - sndev, Instance - gke, gke, Tenants, Namespaces, Topics, SQL, Clients, Connector (selected), Manage, Service Accounts, Flink Clusters, Pulsar Clusters, and Instance Setting.

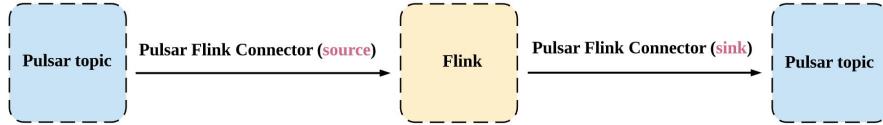
In the center, a message from [tim.spann@streamnative.io](#) is displayed. The message was sent at 3275:24. The message content is a JSON object:

```
{"noNamespaceSchemaLocation":null,"version":1.0,"credit":"NOAA's National Weather Service","credit_URL":"http://weather.gov/","image": {"url":"http://weather.gov/images/xml_logo.gif","title":"NOAA's National Weather Service","link":"http://weather.gov/","suggested_pickup":"15 minutes after the hour","suggested_pickup_period":60,"location":"Houston Intercontinental Airport, TX","station_id":"KIAH","latitude":29.9844,"longitude":-95.36074,"observation_time":"Last Updated on Oct 19 2021, 4:53 pm CDT","observation_time_rfc822":"Tue, 19 Oct 2021 16:53:00 -0500","weather":"Mostly Cloudy","temperature_string":"80.0 F (26.7 C)","temp_f":80.0,"temp_c":26.7,"relative_humidity":56,"wind_string":"Southeast at 11.5 MPH (10 KT)","wind_dir":"Southeast","wind_degrees":140,"wind_mph":11.5,"wind_kt":10,"pressure_string":"1016.5 mb","pressure_mb":1016.5,"pressure_in":30.02,"dewpoint_string":"63.0 F (17.2 C)","dewpoint_f":63.0,"dewpoint_c":17.2,"heat_index_string":"81 F (27 C)","heat_index_f":81,"heat_index_c":27,"visibility_mi":10.0,"icon_url_base":"http://forecast.weather.gov/images/wtf/small/","two_day_history_url":"http://www.weather.gov/data/obhistory/KIAH.html","icon_url_name":"bkn.png","ob_url":"http://www.weather.gov/data/METAR/KIAH.1.txt","disclaimer_url":"http://weather.gov/disclaimer.html","copyright_url":"http://weather.gov/disclaimer.html","privacy_policy_url":"http://weather.gov/notice.html"}
```

The message text at the bottom of the screen reads:

Updated on Oct 19 2021, 4:53 pm CDT "observation\_time\_rfc822": "Tue, 19 Oct 2021 16:53:00 -0500", "weather": "Mostly Cloudy", "temperature\_string": "80.0 F (26.7 C)", "temp\_f": 80.0, "temp\_c": 26.7, "relative\_humidity": 56, "wind\_string": "Southeast at 11.5 MPH (10 KT)", "wind\_dir": "Southeast", "wind\_degrees": 140, "wind\_mph": 11.5, "wind\_kt": 10, "pressure\_string": "1016.5 mb", "pressure\_mb": 1016.5, "pressure\_in": 30.02, "dewpoint\_string": "63.0 F (17.2 C)", "dewpoint\_f": 63.0, "dewpoint\_c": 17.2, "heat\_index\_string": "81 F (27 C)", "heat\_index\_f": 81, "heat\_index\_c": 27, "visibility\_mi": 10.0, "icon\_url\_base": "http://forecast.weather.gov/images/wtf/small/", "two\_day\_history\_url": "http://www.weather.gov/data/obhistory/KIAH.html", "icon\_url\_name": "bkn.png", "ob\_url": "http://www.weather.gov/data/METAR/KIAH.1.txt", "disclaimer\_url": "http://weather.gov/disclaimer.html", "copyright\_url": "http://weather.gov/disclaimer.html", "privacy\_policy\_url": "http://weather.gov/notice.html"}

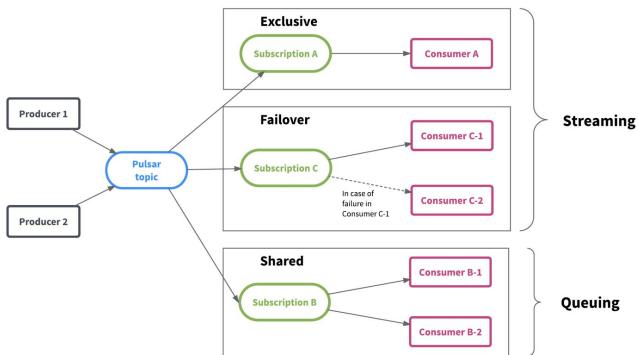
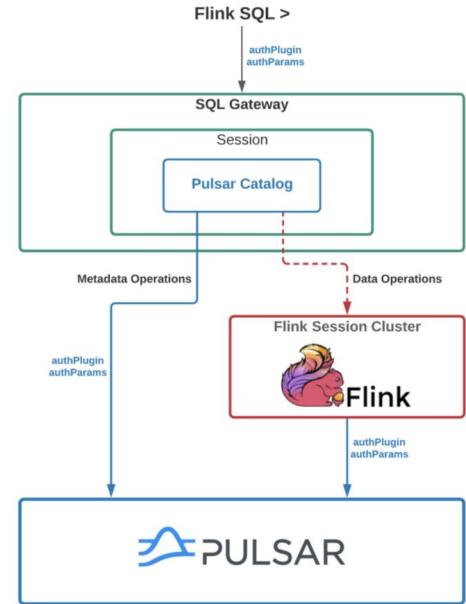
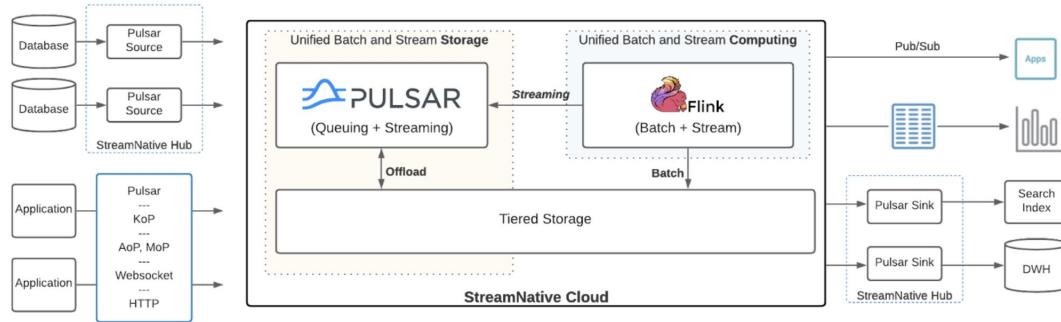
# Why Apache Flink?



The screenshot shows the Apache Flink Dashboard interface. At the top, it displays the job name 'xenodochial\_noce' with a green status, start time '2021-04-07 10:08:37', and duration '36:56m 21s'. Below this, there are tabs for Overview, Exceptions, Timeline, Checkpoints, and Configuration. The Overview tab shows a detailed flow diagram of the job's execution. The job starts with a 'Source: kafkaSource: weather' step, followed by a 'Map: weather' step, which then feeds into a 'Window Process: window2' step. This is followed by a 'Map: weather' step and a 'Sink: Pulsar' step. The 'Window Process' step is highlighted in blue. On the right side of the dashboard, there are sections for Task Metrics, Job Metrics, and Task Progress. The Task Progress section shows a single task with a progress bar at 100%, indicating successful completion.

- Unified computing engine
- Batch processing is a special case of stream processing
- Stateful processing
- Massive Scalability
- Flink SQL for queries, inserts against Pulsar Topics
- Streaming Analytics
- Continuous SQL
- Continuous ETL
- Complex Event Processing
- Standard SQL Powered by Apache Calcite

# Flink + Pulsar (FLiP)



<https://flink.apache.org/2019/05/03/pulsar-flink.html>  
<https://github.com/streamnative/pulsar-flink>  
<https://streamnative.io/en/blog/release/2021-04-20-flink-sql-on-streamnative-cloud>

# Using NVIDIA Jetson Devices With Pulsar

## DEMO TIME

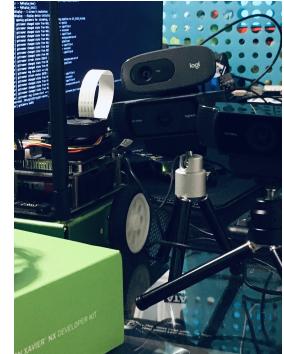
<https://github.com/tspannhw/minifi-xaviernx/>

<https://github.com/tspannhw/minifi-jetson-nano>

<https://github.com/tspannhw/FLiP-Jetson>

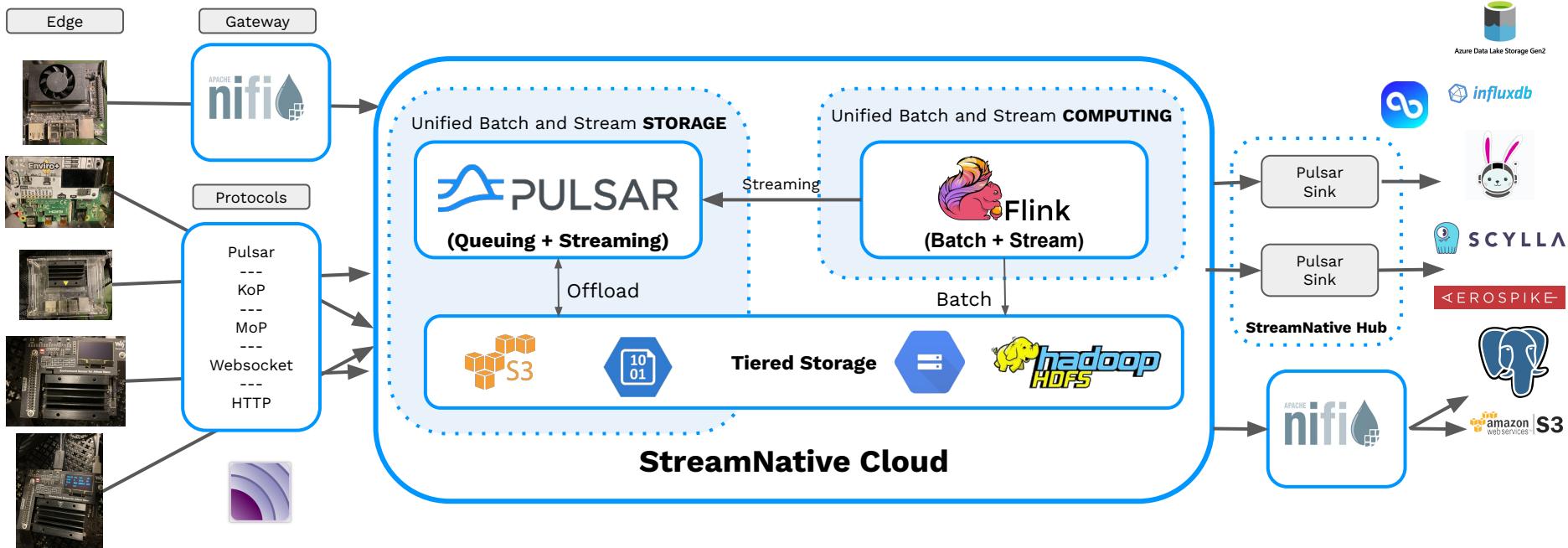
<https://github.com/tspannhw/Flip-iot>

<https://www.datainmotion.dev/2020/10/flank-streaming-edgeai-on-new-nvidia.html>



# End-to-End Streaming FLiPN Edge AI Application

Apache Flink - Apache Pulsar - Apache NiFi <-> Devices - GPU/TPU - Python/Go/Java



# Deeper Content

- <https://github.com/tspannhw/EverythingApacheNiFi>
- <https://github.com/streamnative/pulsar-flink>
- <https://www.linkedin.com/pulse/2021-schedule-tim-spann/>
- <https://github.com/tspannhw/SpeakerProfile/>
- <https://streamnative.io/en/blog/release/2021-04-20-flink-sql-on-streamnative-cloud>
- <https://docs.streamnative.io/cloud/stable/compute/flink-sql>



@PaasDev



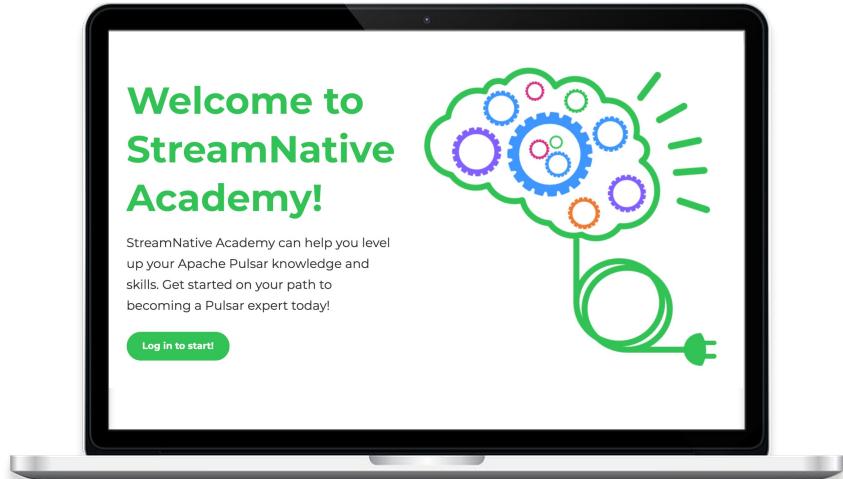
timothyspann

<https://www.pulsardeveloper.com/>



# Now Available On-Demand Pulsar Training

[Academy.StreamNative.io](https://Academy.StreamNative.io)



Platform Engineer [Remote]

📍 San Francisco

Platform Engineer (Flink/Spark) [Remote]

📍 San Francisco

Product Engineer - Cloud [Remote]

📍 San Francisco

Platform Engineer (Flink/Spark) [Remote]

📍 San Francisco

Product Engineer - Cloud [Remote]

📍 San Francisco

Sr. Product Manager [Remote]

📍 San Francisco

# We're Hiring

[streamnative.io/careers/](https://streamnative.io/careers/)

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

- Join the Pulsar Slack channel - [Apache-Pulsar.slack.com](https://Apache-Pulsar.slack.com)
- Follow [@streamnativeio](https://twitter.com/streamnativeio) and [@apache\\_pulsar](https://twitter.com/apache_pulsar) on Twitter
- [Subscribe](#) to Monthly Pulsar Newsletter for major news, events, project updates, and resources in the Pulsar community

# Interested In Learning More?



## Resources

[Flink SQL Cookbook](#)

[The Github Source for Flink SQL Demo](#)

[The GitHub Source for Demo](#)



## Free eBooks

[Manning's Apache Pulsar in Action](#)

[O'Reilly Book](#)



## Upcoming Events

**[Feb/2022] ScyllaDB Summit**

# Let's Keep in Touch!



**Timothy Spann**  
Developer Advocate



@PassDev



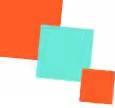
<https://www.linkedin.com/in/timothyspann>



<https://github.com/tspannhw>



<https://bit.ly/32dAJft>



안녕하세요

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THANK YOU FOR  
WATCHING



你好



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Pulsar Summit Asia 2021



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