

Queryable State

How to Build a Billing System Without a Database

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- Software Engineers with TNG Technology Consulting
- Focus on
 - Distributed Systems
 - Real-Time Processing
- Flink in Production for 1.5 y



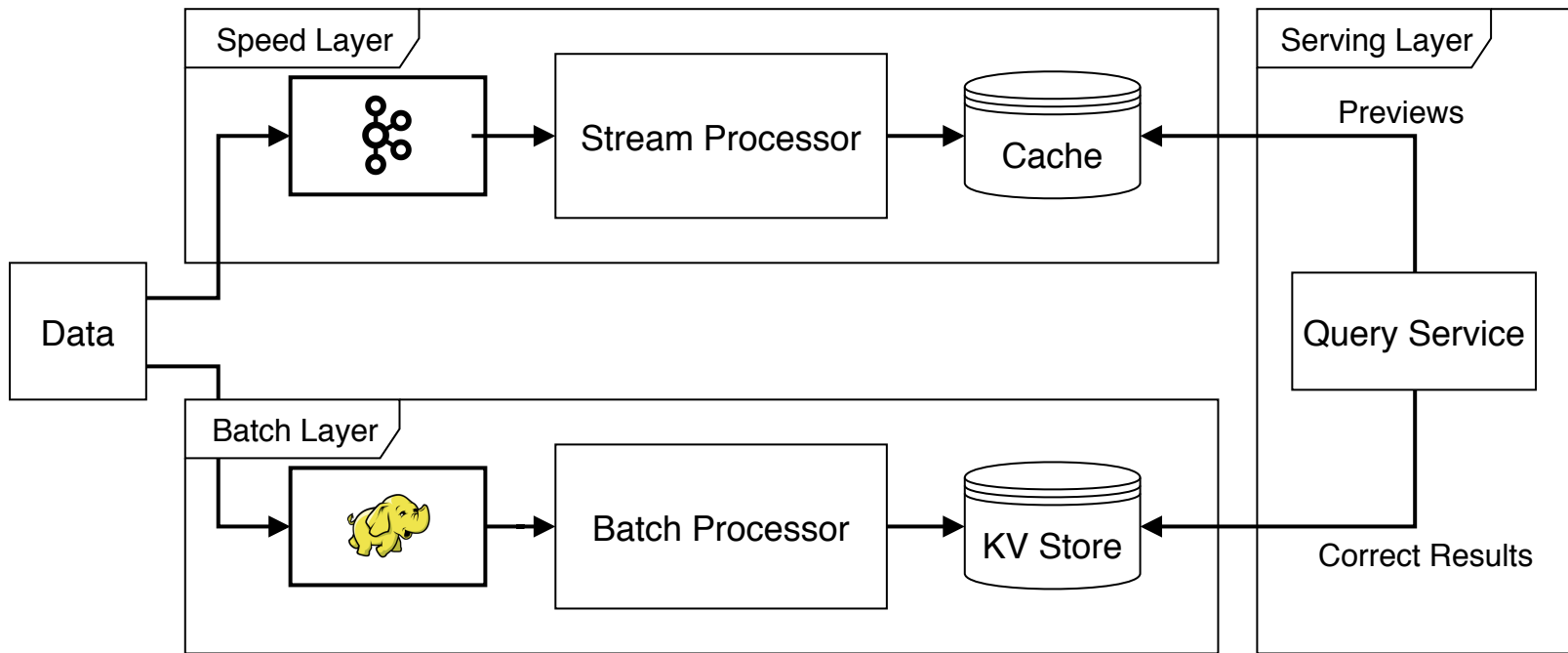
Agenda

1. Intro to Queryable State
2. Use Case: A Queryable Billing System
3. Live Demo of Our Prototype

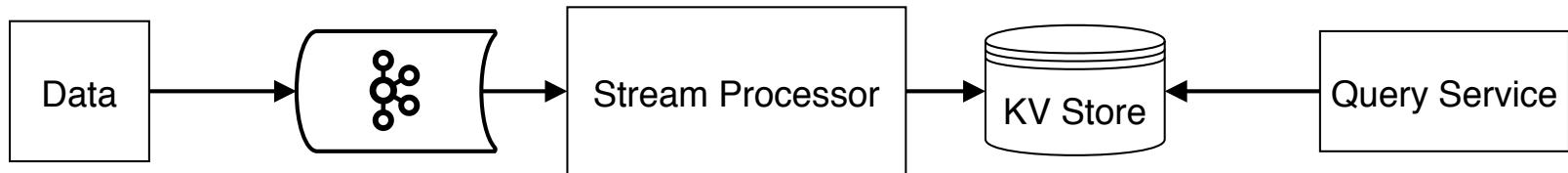
Intro to Queryable State

Evolution of Streaming Architecture

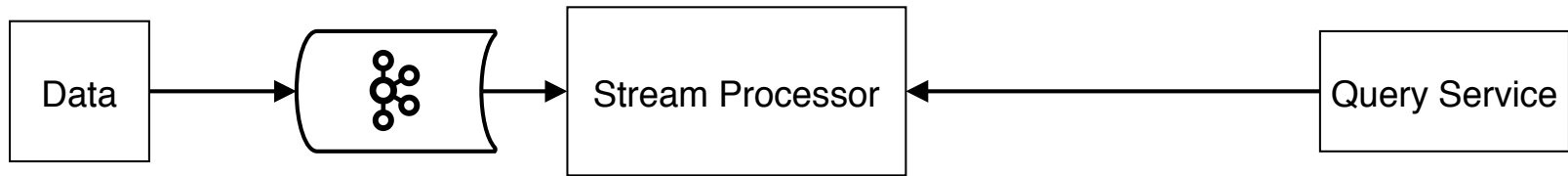
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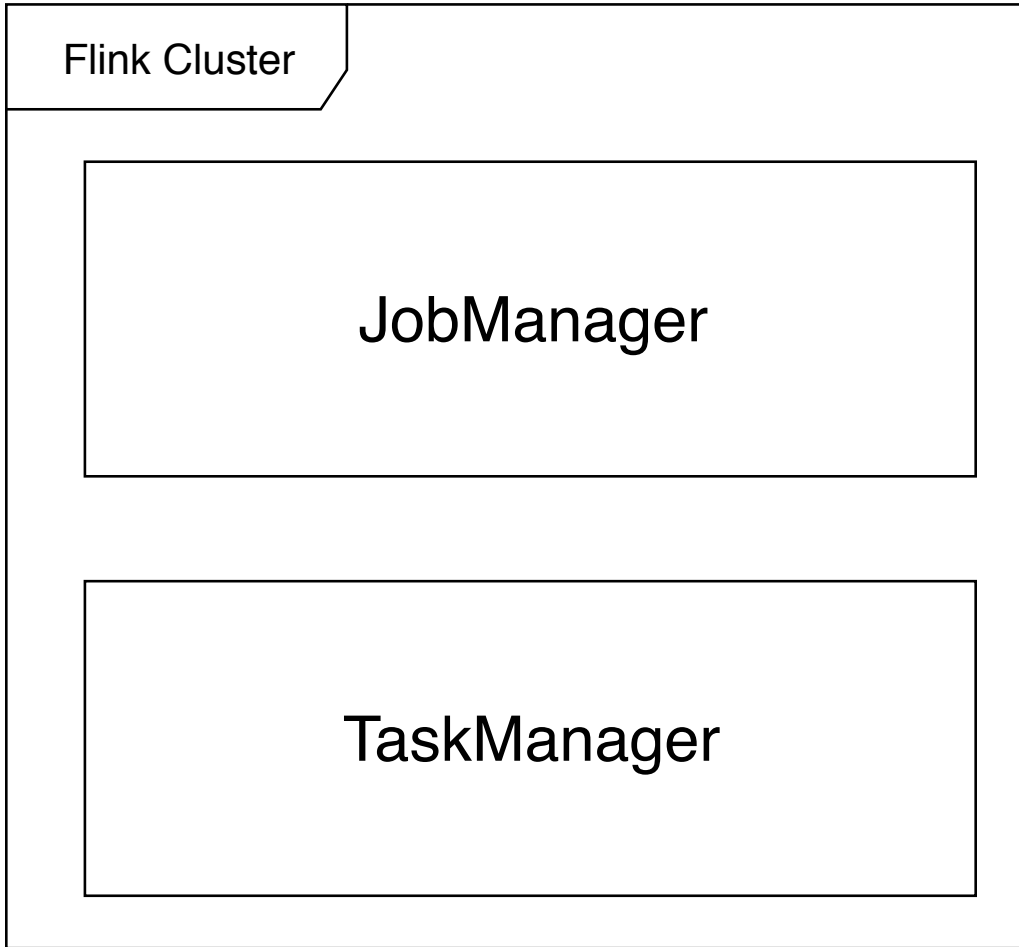
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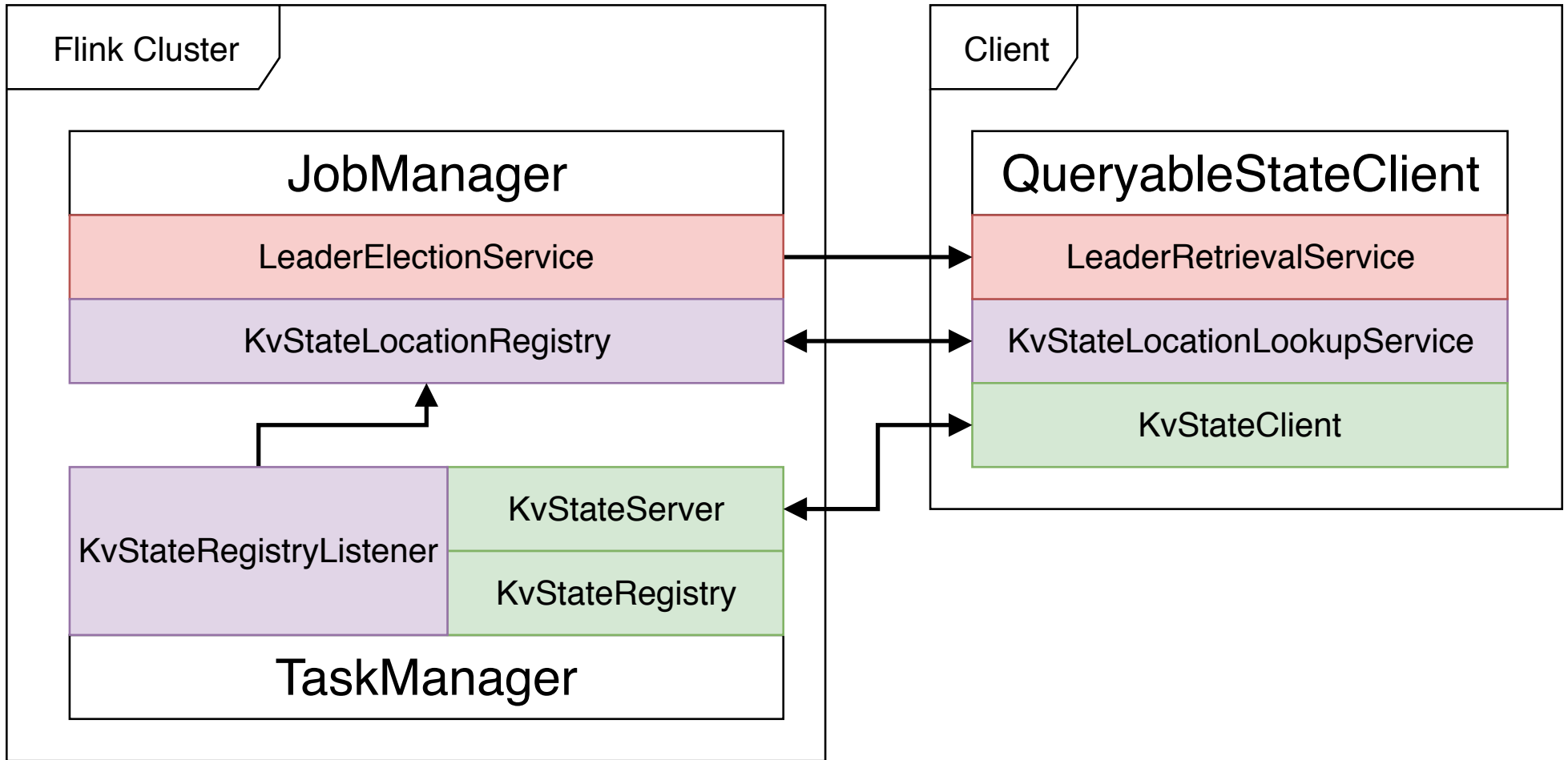


Queryable State



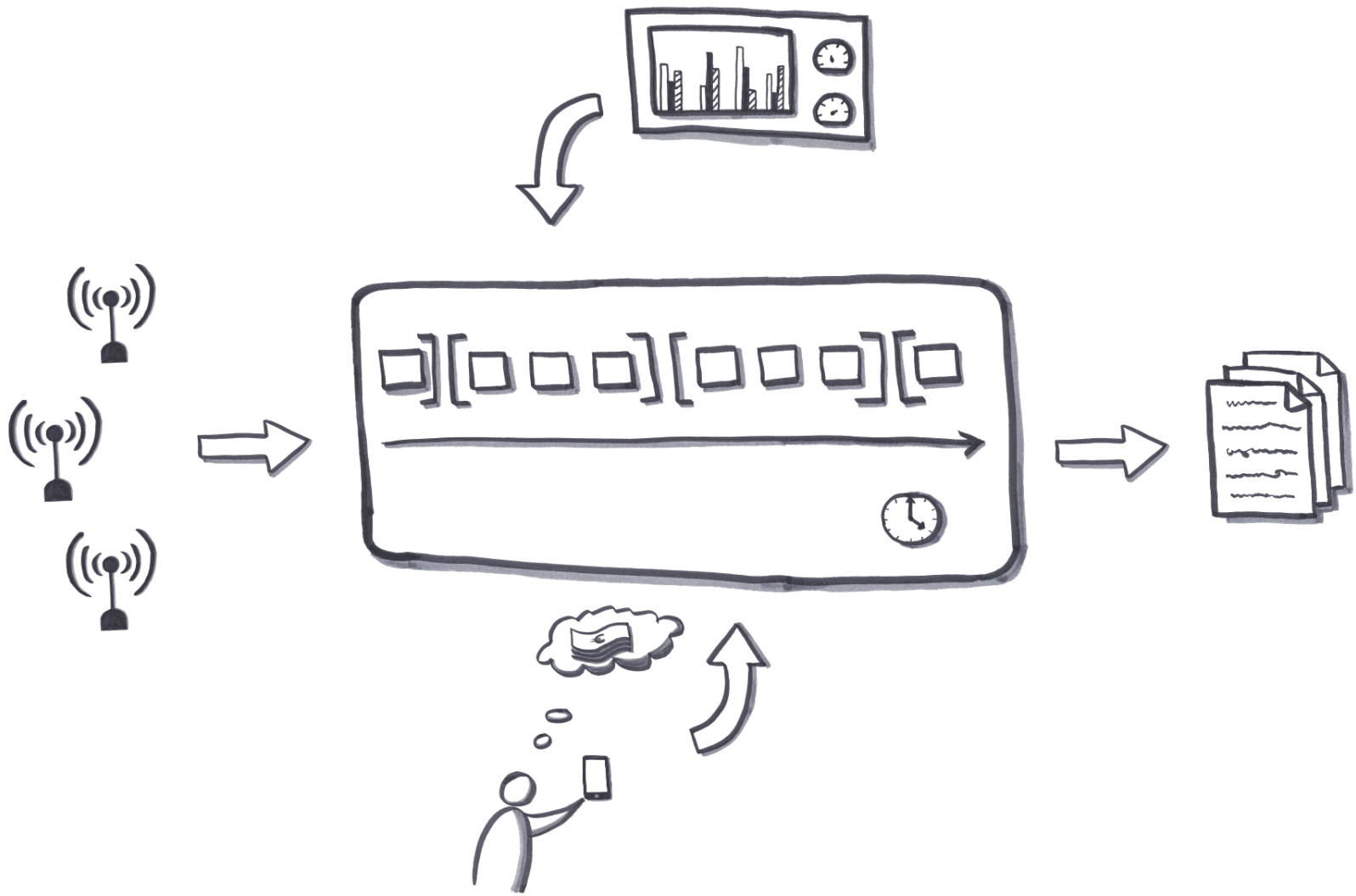
Implementation in Flink





Use Case: “Queryable Billing”

Requirements





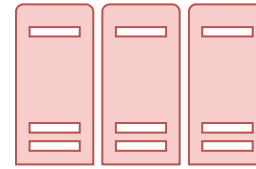
Correctness



Robustness

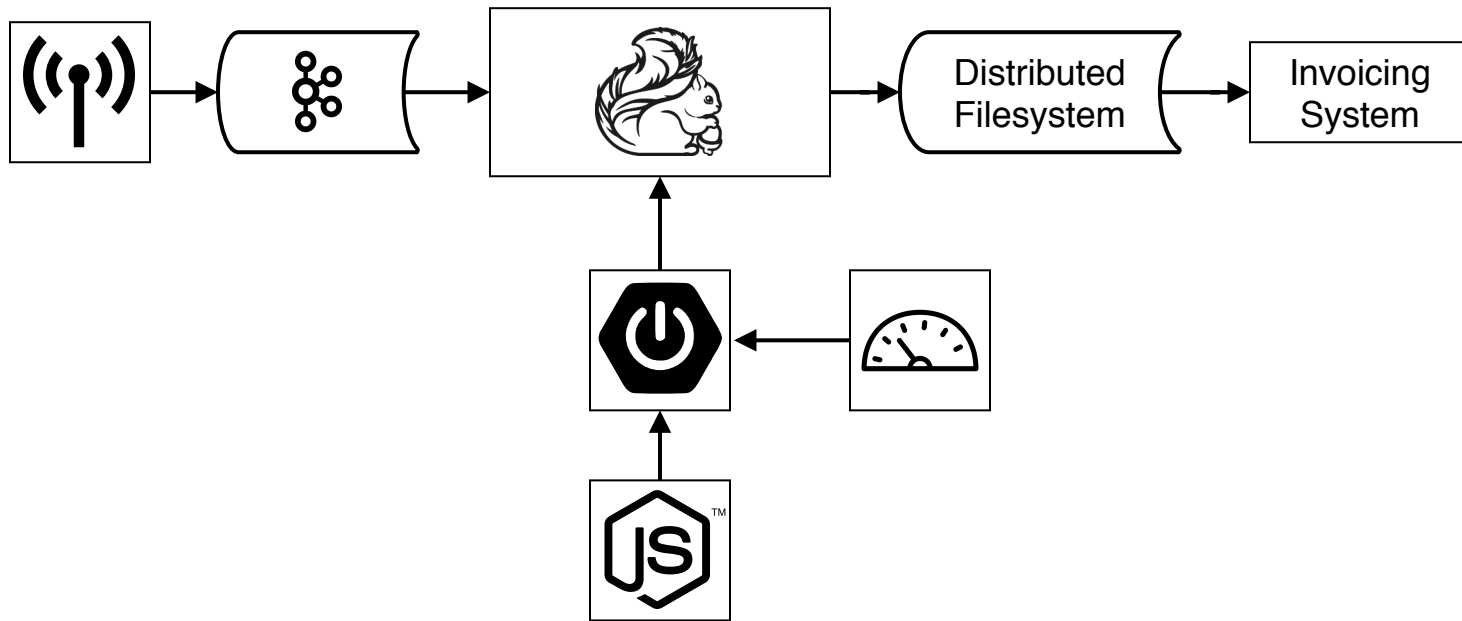


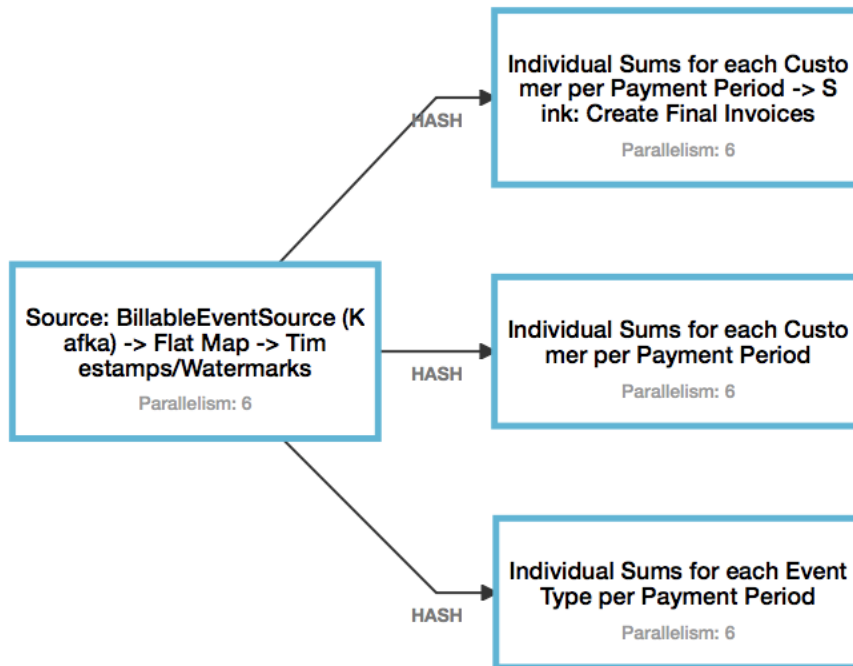
Availability



Scalability

Architecture





- Events from Kafka
- Final Invoices
 - TimeWindow with FoldFunction
 - BucketingSink
- Previews
 - TimeWindow with FoldFunction
 - CountTrigger.of(1)
 - Queryable State in WindowFunction

Demo

Requirements

- Invoices
- Live Updates
- Correctness
- Availability
- (Scalability)
- Robustness
 - Late Events
 - TaskManager
 - JobManager
 - Sink

Invoice Generation

Requirement		Demo
Invoices		✓
Live Updates		
Correctness		(✓)
Availability		
Robustness	Late Events	✓
	TaskManager	
	JobManager	
	Sink	

Live Updates

Requirement		Demo
Invoices		✓
Live Updates		✓
Correctness		(✓)
Availability		
Robustness	Late Events	✓
	TaskManager	
	JobManager	
	Sink	

TaskManager Failure

Requirement		Demo
Invoices		✓
Live Updates		✓
Correctness		(✓)
Availability		(✓)
Robustness	Late Events	✓
	TaskManager	✓
	JobManager	
	Sink	

JobManager Failure

Requirement		Demo
Invoices		✓
Live Updates		✓
Correctness		(✓)
Availability		(✓)
Robustness	Late Events	✓
	TaskManager	✓
	JobManager	✓
	Sink	

Failure of Downstream Systems

Requirement		Demo
Invoices		✓
Live Updates		✓
Correctness		✓
Availability		((✓))
Robustness	Late Events	✓
	TaskManager	✓
	JobManager	✓
	Sink	✓

Current Limitations

- Native Support for Queryable State in Windows
- Improvements of Client API
- State Size
- Availability in Case of Job Failures

Questions?

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Slides & Code

 [knaufk/queryable-billing](https://github.com/knaufk/queryable-billing)

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