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Discover HDP 2.1

Apache Storm for Stream Data Processing in Hadoop

Hortonworks. We do Hadoop.

Speakers

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Agenda

- **Why Stream Processing?**
- **Overview of Apache Storm**
- **Q & A**

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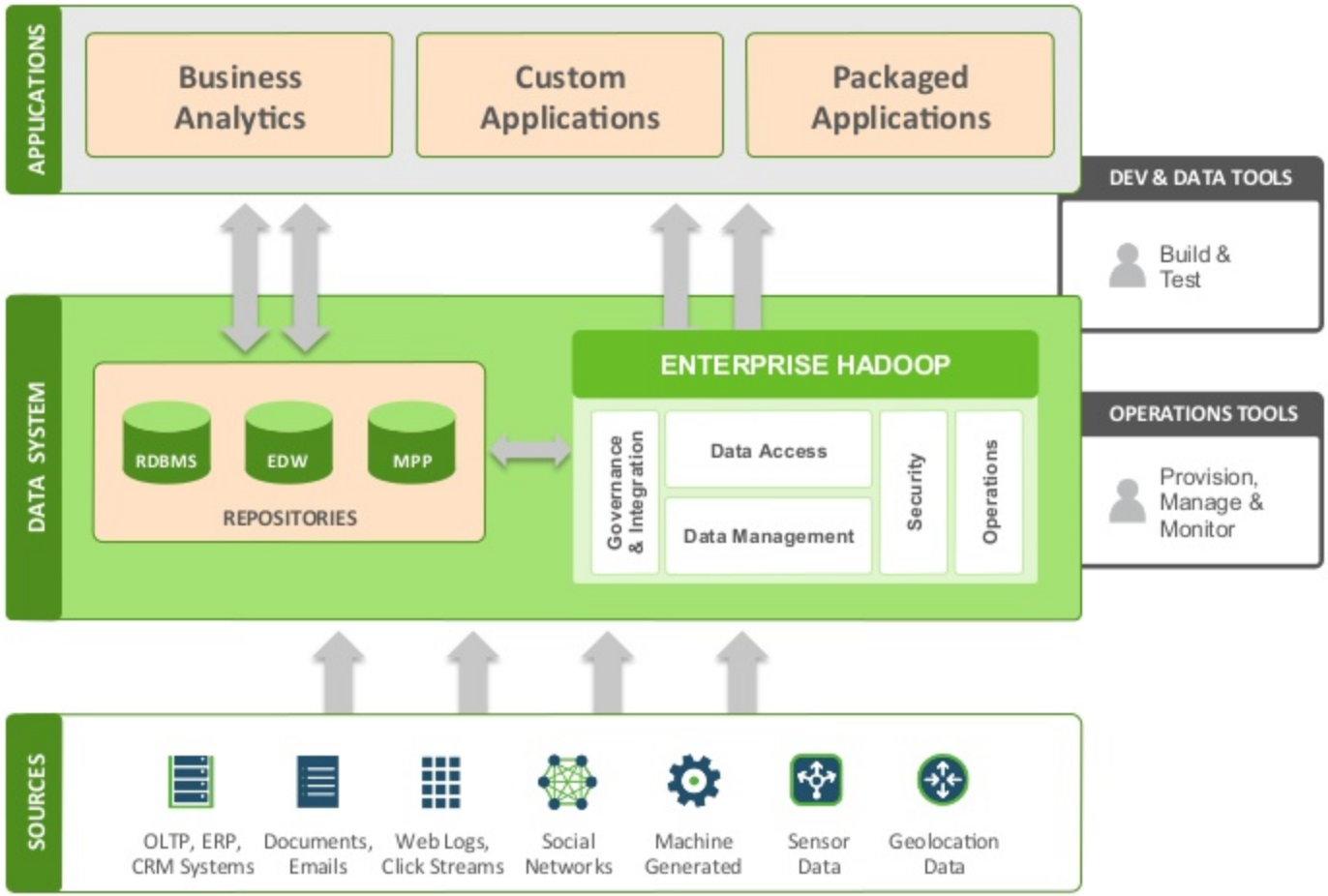
A Modern Data Architecture



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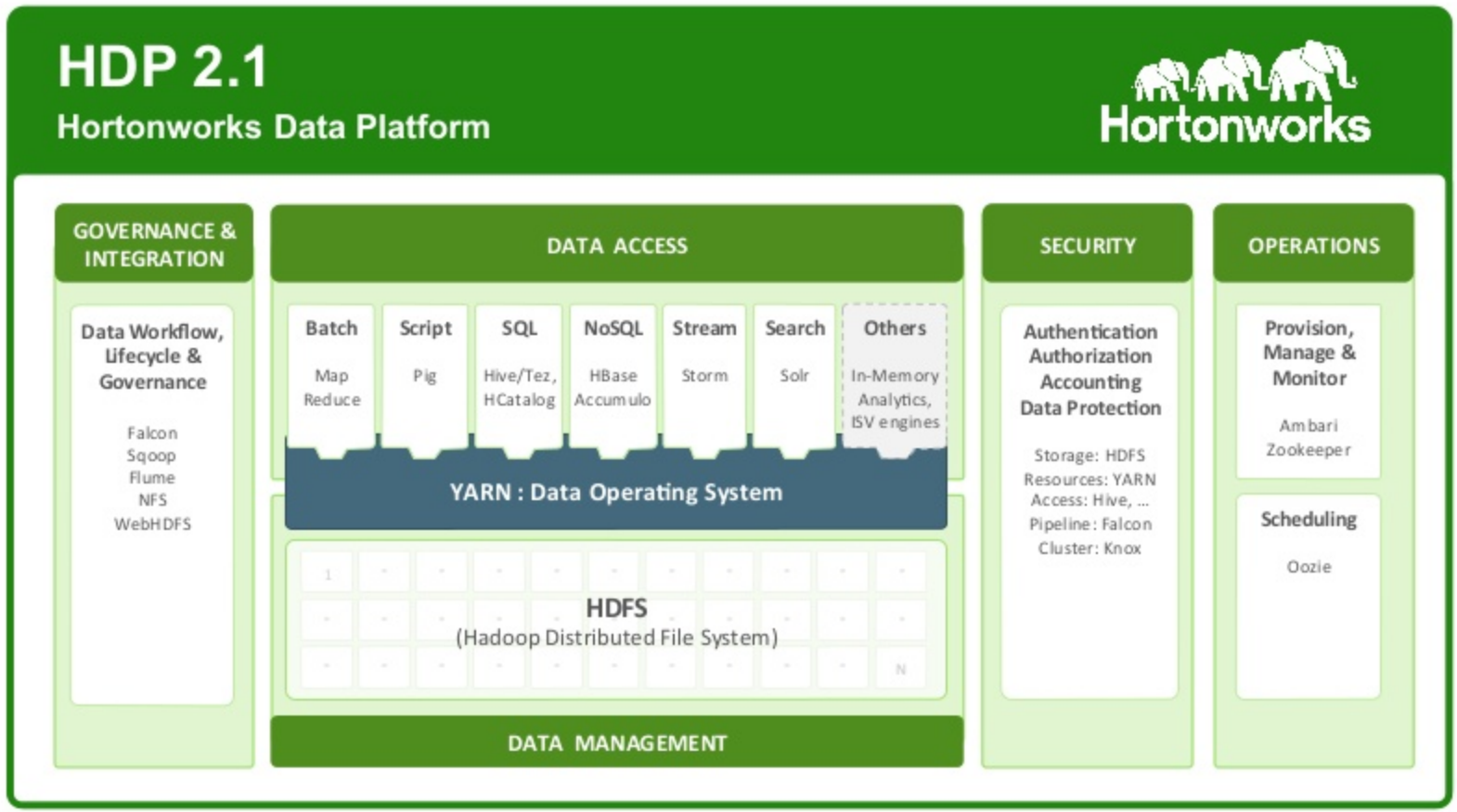
HDP 2.1: Enterprise Hadoop



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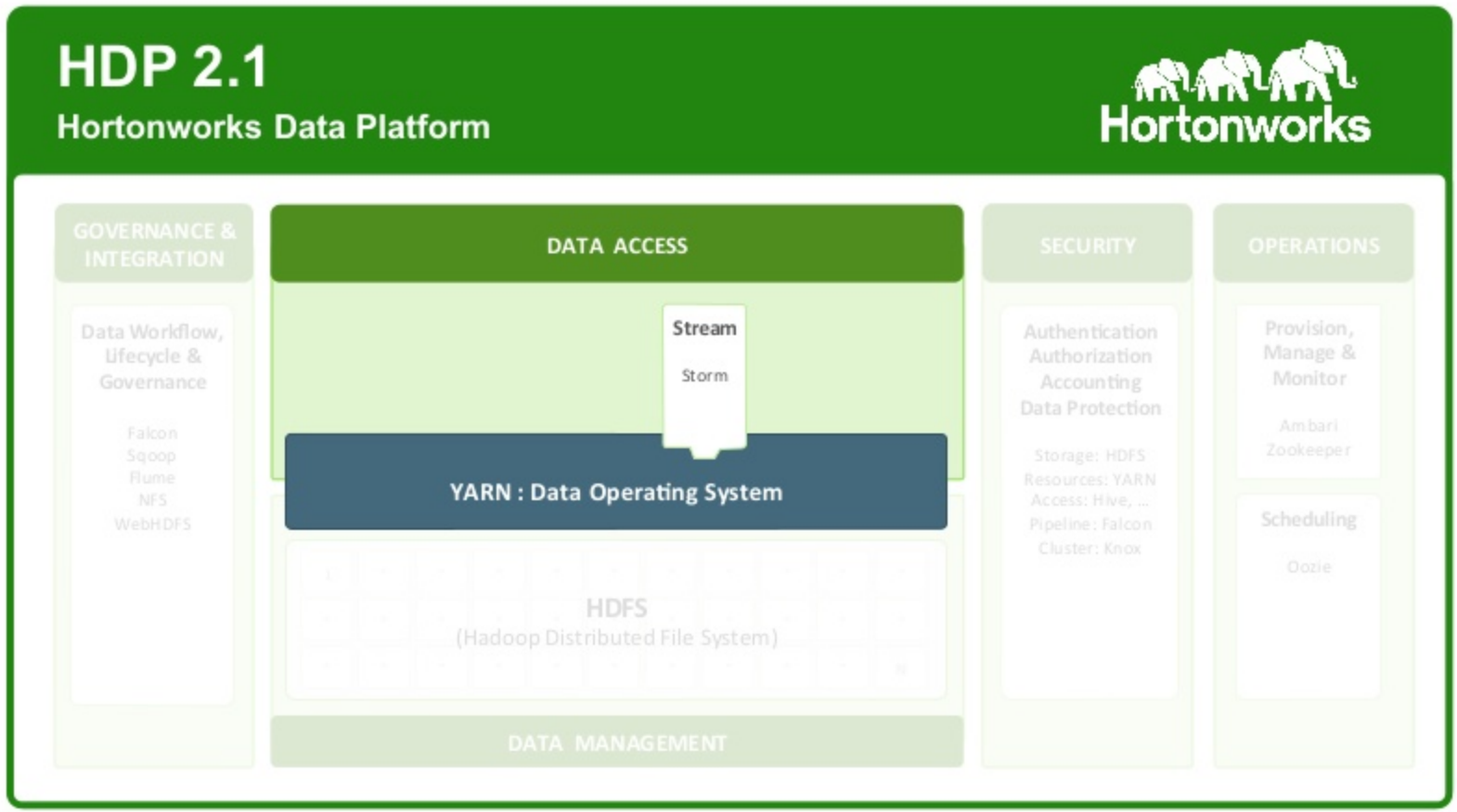
HDP 2.1: Enterprise Hadoop



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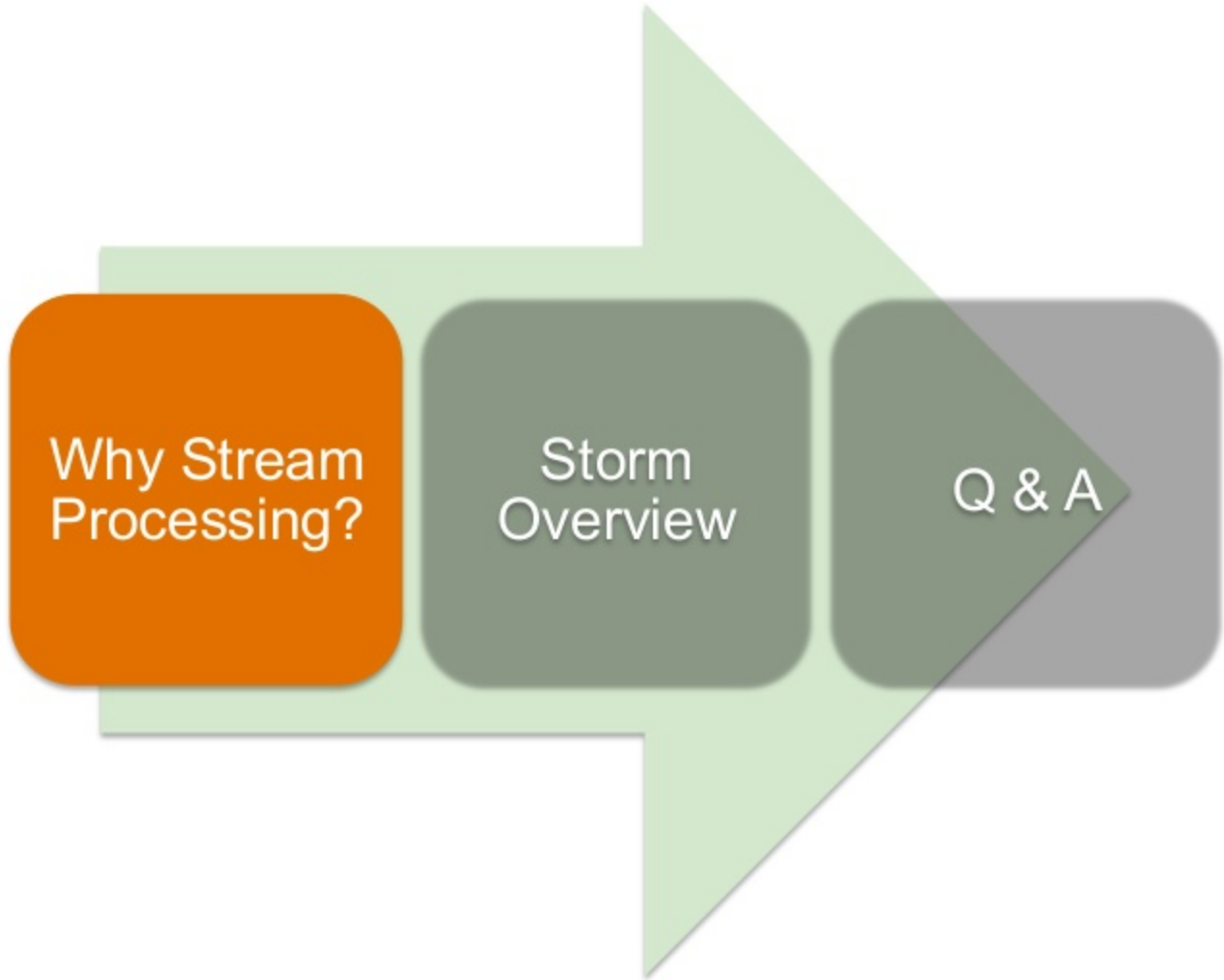

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Why Stream Processing IN Hadoop?

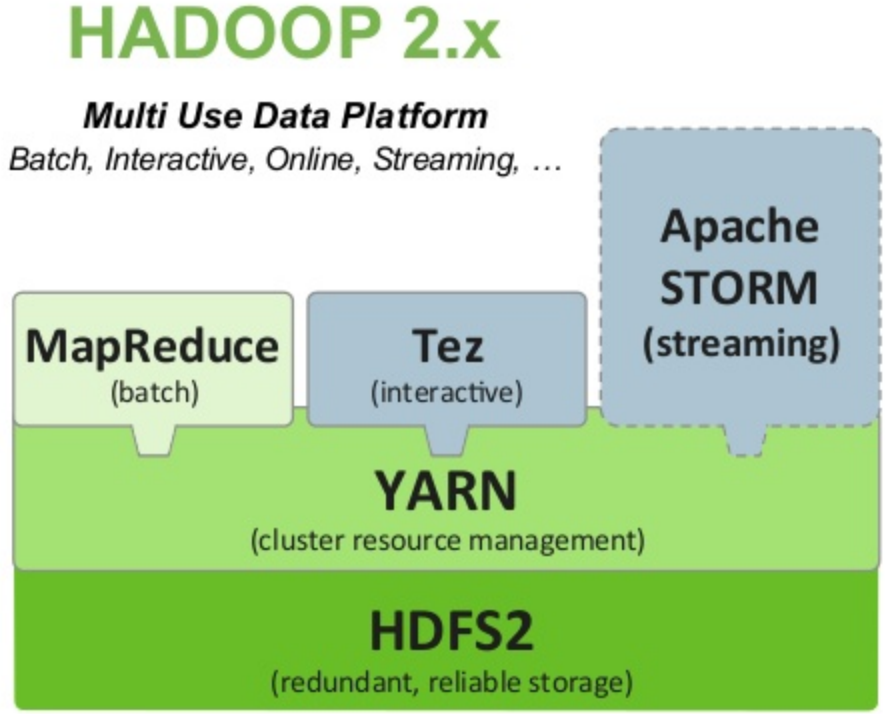
Stream processing has emerged as a key use case

What is the need?

- Exponential rise in real-time data
- Ability to process real-time data opens new business opportunities

Why Now?

- Economics of Open source software & commodity hardware
- YARN allows multiple computing paradigms to co-exist in the data lake



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Why Apache Storm?

Open source real-time event stream processing platform that provides fixed, continuous & low latency processing for very high frequency streaming data

Highly scalable	• Horizontally scalable like Hadoop • Eg: 10 node cluster can process 1M tuples per second per node
Fault-tolerant	• Automatically reassigns tasks on failed nodes
Guarantees processing	• Supports at least once & exactly once processing semantics
Language agnostic	• Processing logic can be defined in any language
Apache project	• Brand, governance & a large active community

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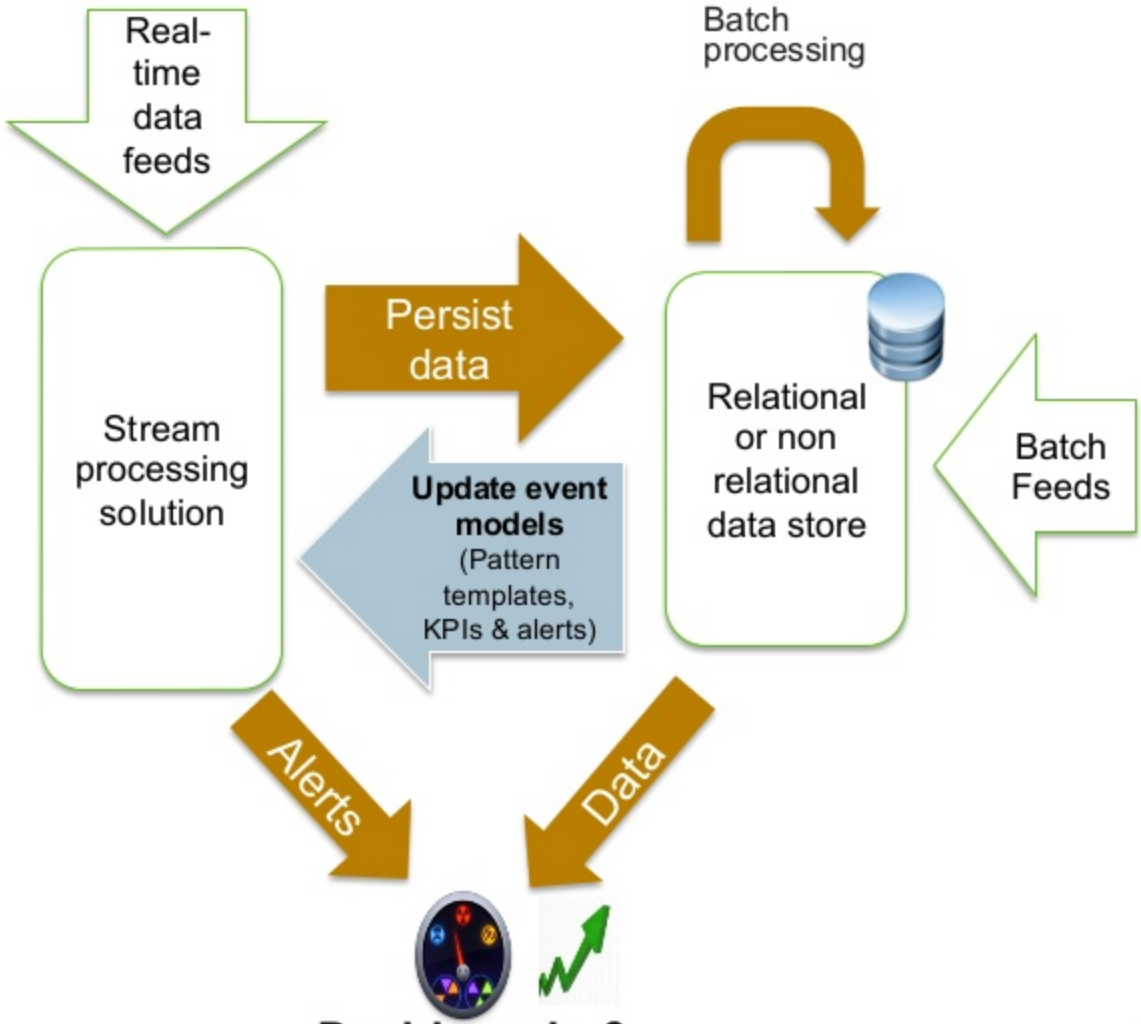
Typical Stream Processing Flow



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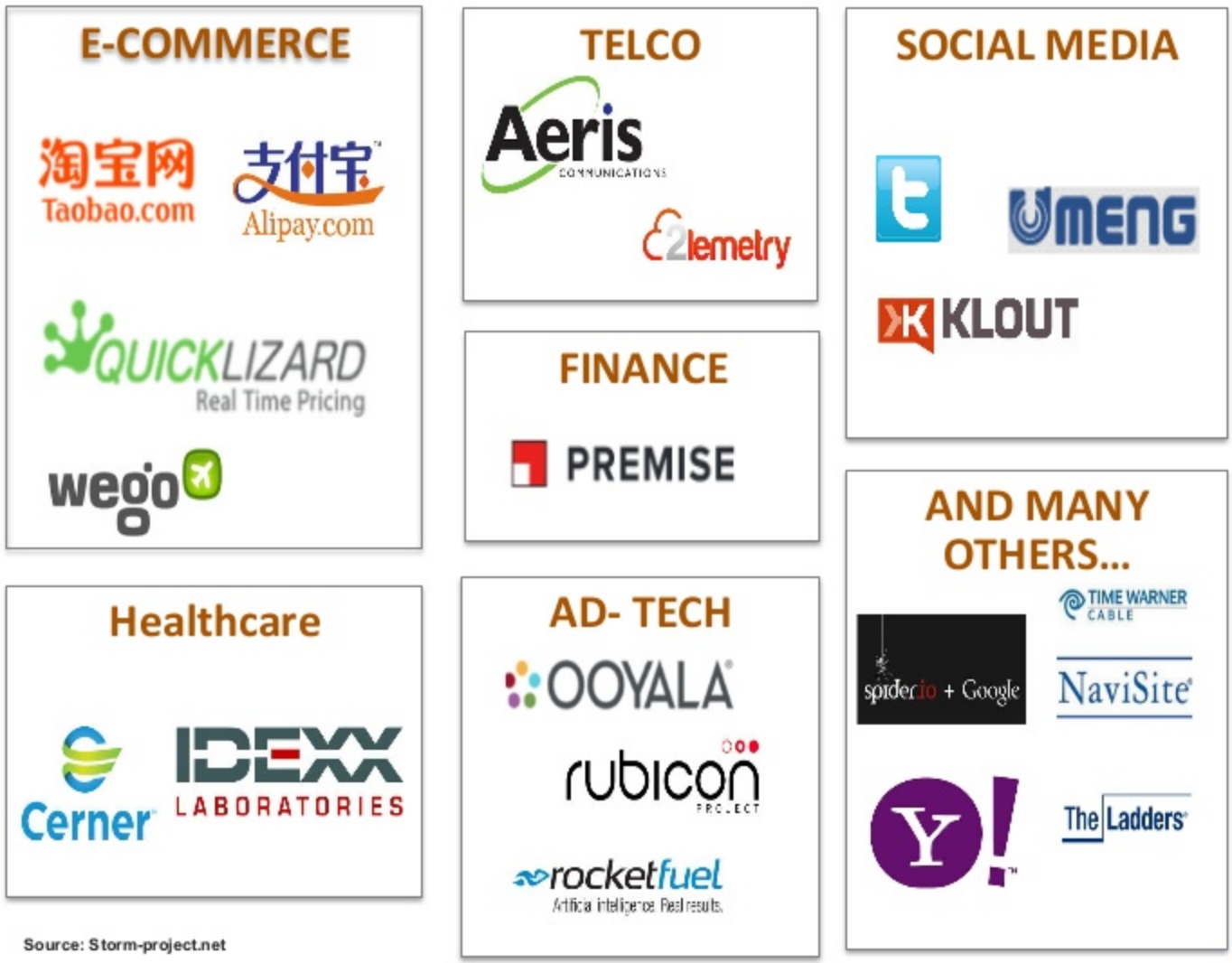
Who is Using Storm today?



Source: Storm-project.net

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Patterns Driving Most Streaming Use Cases

Sentiment **Clickstream** **Machine/Sensor** **Server Logs** **Geo-location**

Monitor real-time data to…

	Prevent	Optimize
Finance	- Securities Fraud - Compliance violations	- Order routing - Pricing
Telco	- Security breaches - Network Outages	- Bandwidth allocation - Customer service
Retail	----	- Offers - Pricing
Manufacturing	- Machine failures	- Supply chain
Transportation	- Driver & fleet issues	- Routes - Pricing
Web	- Application failures - Operational issues	- Site content

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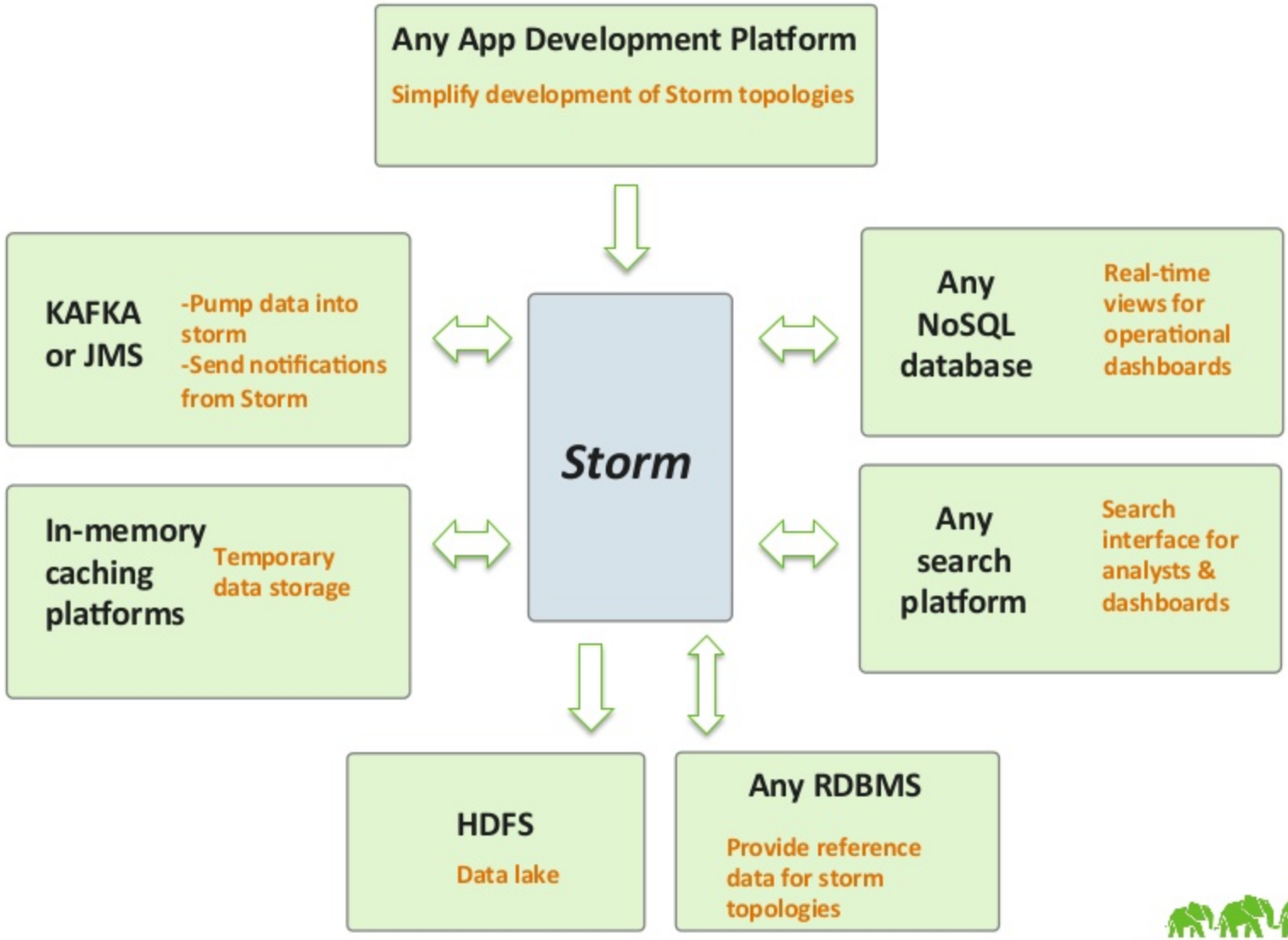
A Key Storm Benefit: Flexibility



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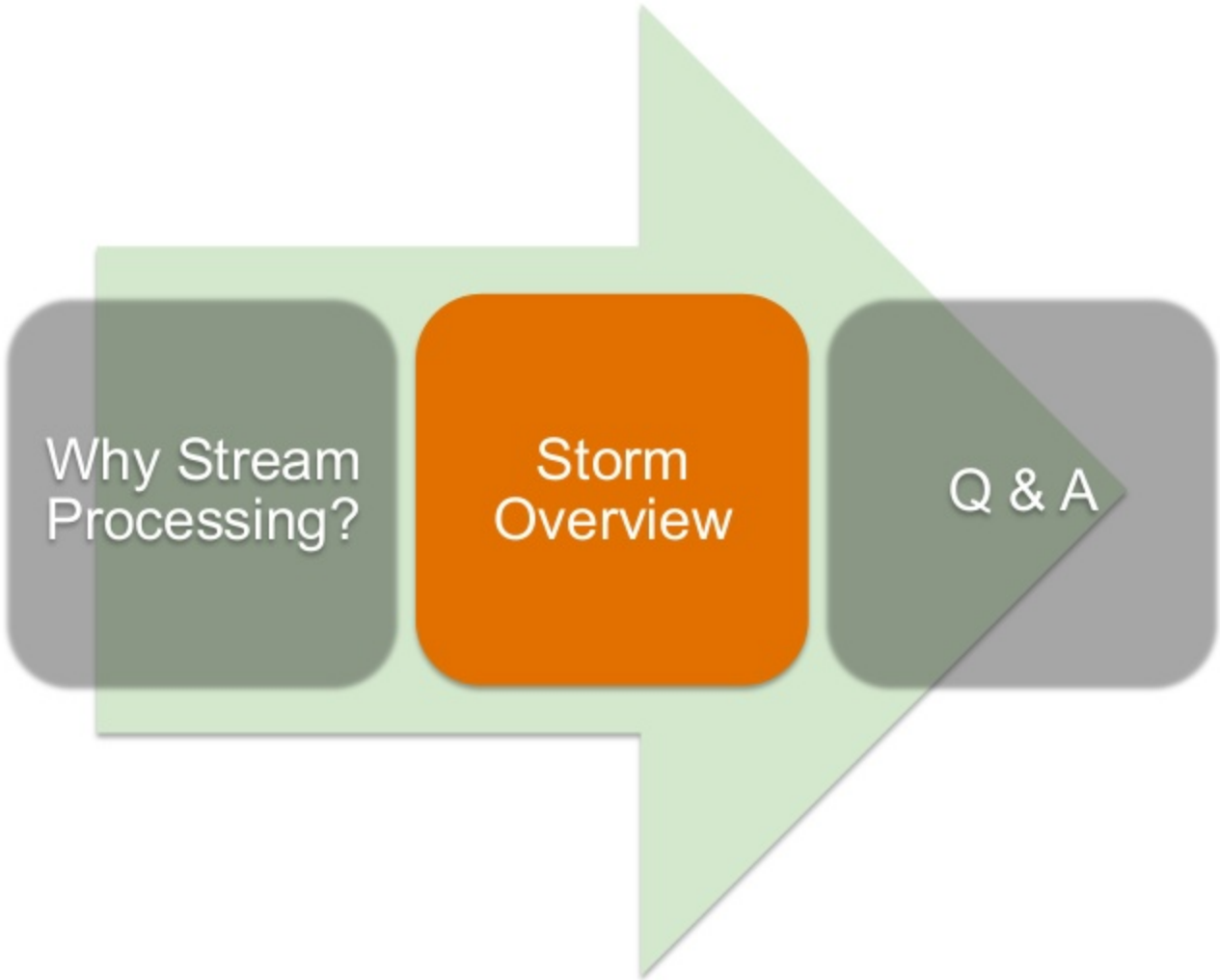

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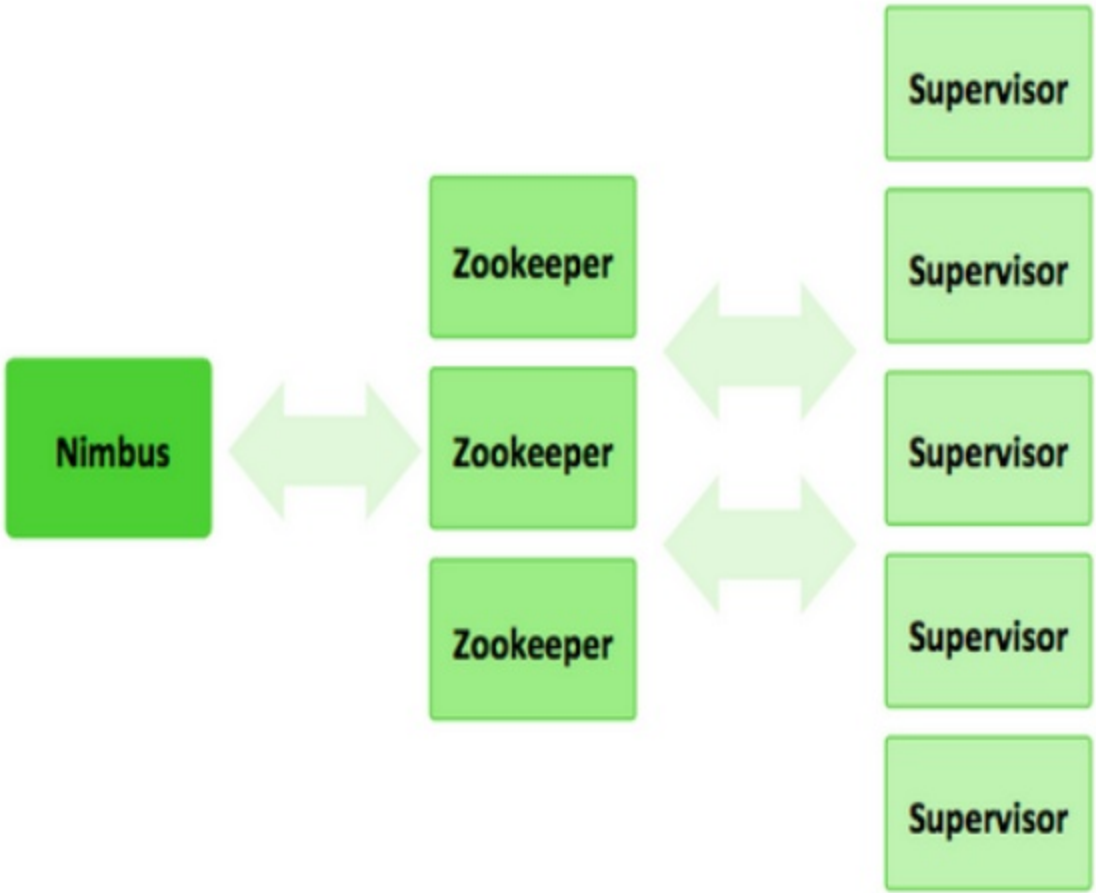
Storm Architecture



Nimbus(Management server)
- Similar to job tracker
- Distributes code around cluster
- Assigns tasks
- Handles failures

Supervisor(Worker nodes):
- Similar to task tracker
- Run bolts and spouts as 'tasks'

Zookeper:
- Cluster co-ordination
- Nimbus HA
- Stores cluster metrics
- Consumption related metadata for Trident topologies

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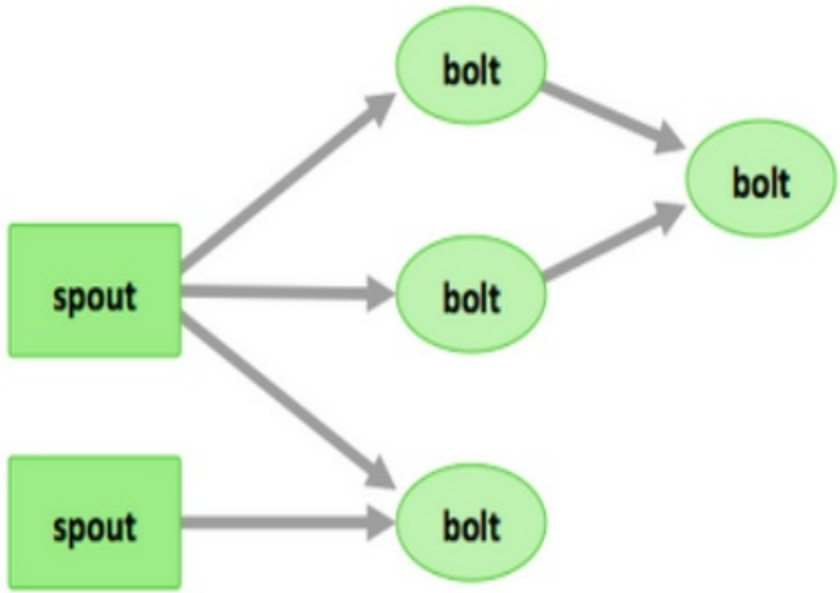
Basic Storm Concepts



Tuple: Most fundamental data structure and is a named list of values that can be of any datatype

Streams: Groups of tuples

Spouts: Generate streams.

Bolts: Contain data processing, persistence and alerting logic. Can also emit tuples for downstream bolts

Tuple Tree: First tuple and all the tuples that were emitted by the bolts that processed it

Topology: Group of spouts and bolts wired together into a workflow

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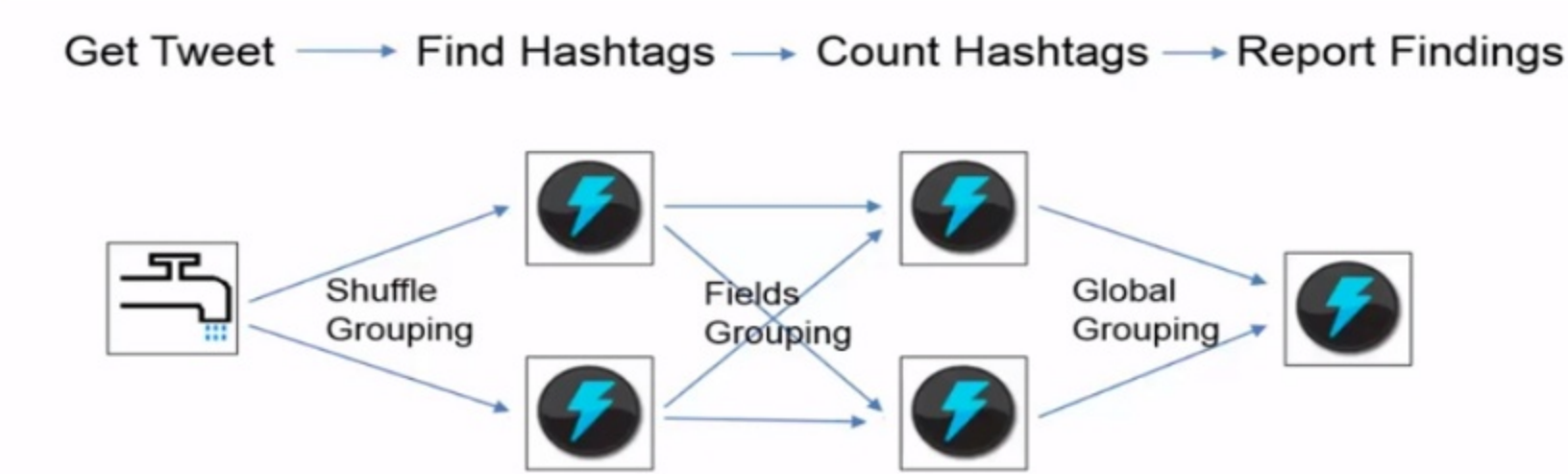
Storm Topology



Kafka Spout
"reader"

Bolt
"normalizer"

HashTagNormalizer.java

Removes non-alphanumeric characters, extracts hashtag values and emits them.

Bolt
"enumerator"

HashTagEnumerator.java

Keeps track of how many instances of each hashtag have occurred.

Bolt
"reporter"

ResultsReporter.java

Regularly creates a report and uploads it to Amazon S3.

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What is Trident?

Provides exactly once processing semantics in Storm using real-time batch processing

Core concept: process a group of tuples as a 'batch' rather than process tuple at a time like core Storm

Provides a 'higher level abstraction' for Storm operations like what cascading does for MapReduce

All Trident topologies are automatically converted into core Storm concepts (Spouts & Bolts)

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Key Trident Concepts

Spouts and Tuples

- Remain the same as core Storm topologies

Transactions

- Way of tagging tuples together so they can be processed with exactly once semantics

Batches

- All tuples tied to the same transactionID form a batch

Partitions

- Segments of a batch that are guaranteed to process their tuples in order.
- Multiple partitions in a given batch can/will be processed in parallel

Streams

- Series of batches form a stream (just like series of tuples form a stream in core Storm)

Operations

- The higher level abstraction for processing tuples are called ‘operations’
- Multiple inbuilt operations available for joins, grouping, aggregations & filtering

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Apache Storm and Apache Ambari

Apache Ambari is now integrated with Apache Storm

- Install Storm with Ambari
- Monitor Storm services with Ambari

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