SPARK SUMMIT 2017

Spark Compute as a Service @ Paypal

Prabhu
Paypal, Inc.

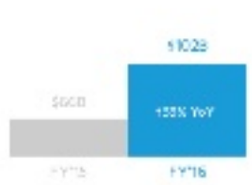
Scale

Paypal Scale

Business

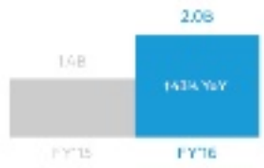
- One of the world's largest internet payment companies
- 203+M active accounts on 200 markets around the world
- PayPal platform includes Braintree, Venmo, Paydiant, PP Credit and Xoom

$354B
Total Payment
up 28% YoY



$102B
Mobile Payment
up 55% YoY

6.1B
Total Transactions
up 24% YoY



2.0B
Mobile Transactions
up 43% YoY

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Paypal Scale

Core Data Platform

15+
Hadoop Clusters

70+PB
Data

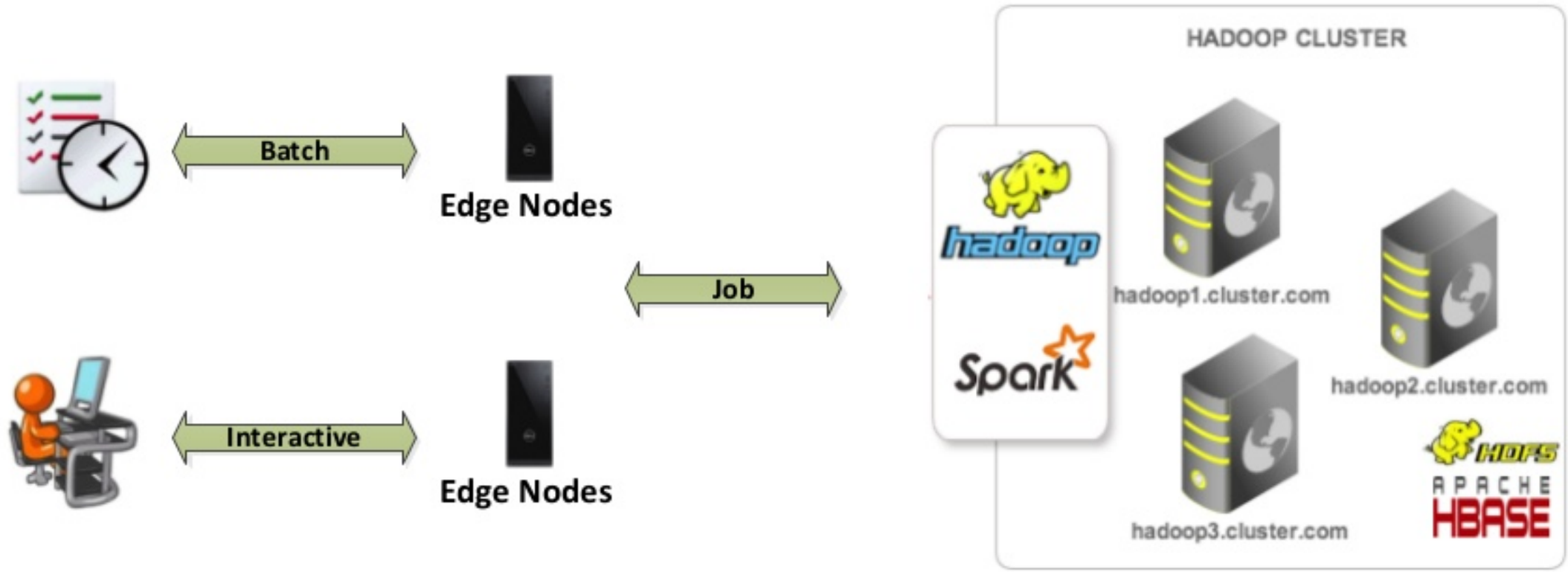
40,000+
Yarn Jobs Per Day

5+
Compute

Spark on Yarn

Spark on Yarn

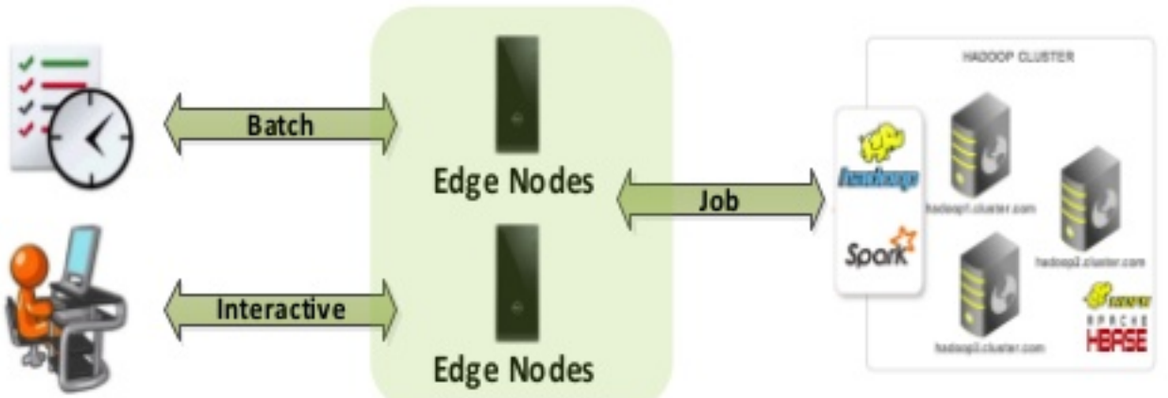
Deployment



Challenges

Challenges

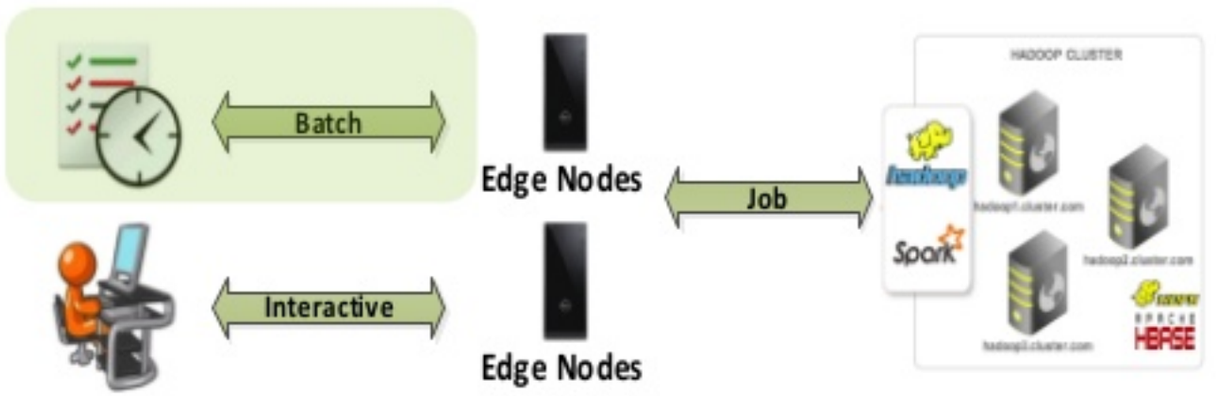
Administrators



- Need extensive support and maintenance for CLI
- Need to deploy entire stack of software
- Need to sync configurations across systems
- Need extensive testing of jobs before any upgrade

Challenges

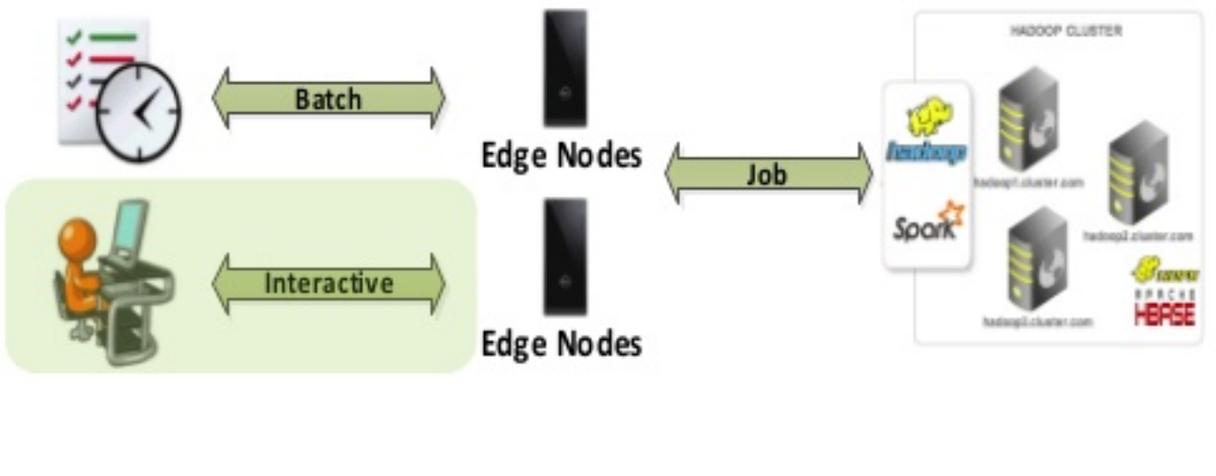
Developers



- No REST-friendly
- No low-latency/sub-seconds execution
- No cache sharing across jobs
- No modularity and easy-restartability

Challenges

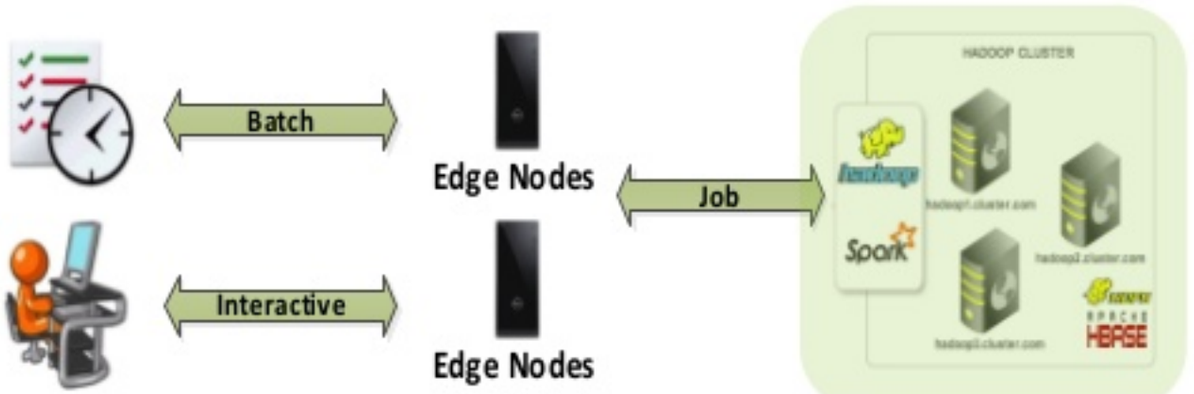
Analysts/Scientists



- No easy way of interactive applications
- No multi-tenancy support and private workspace
- No direct spark sql execution
- No Kerberos integration

Challenges

Operations/Security



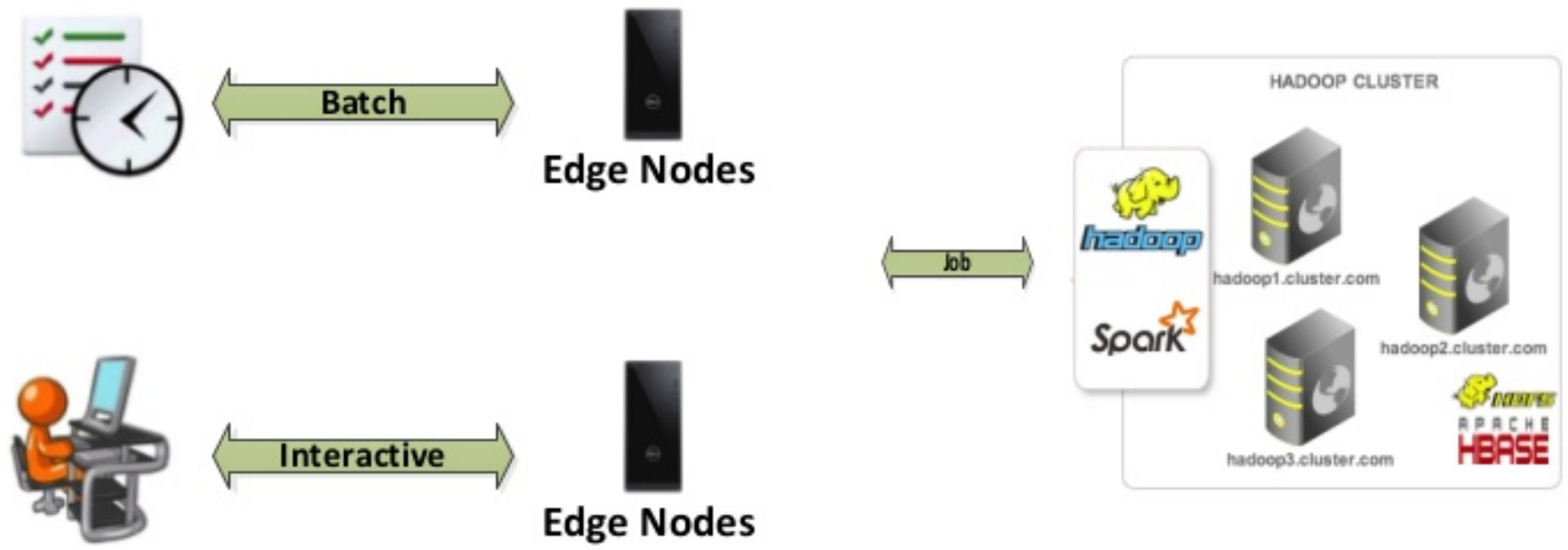
- Different ways of jobs execution and coding standards
- No uniform logging, monitoring and alerting
- Limited audit and control
- No statement level history or metrics

Building SCaaS

Spark Compute Platform

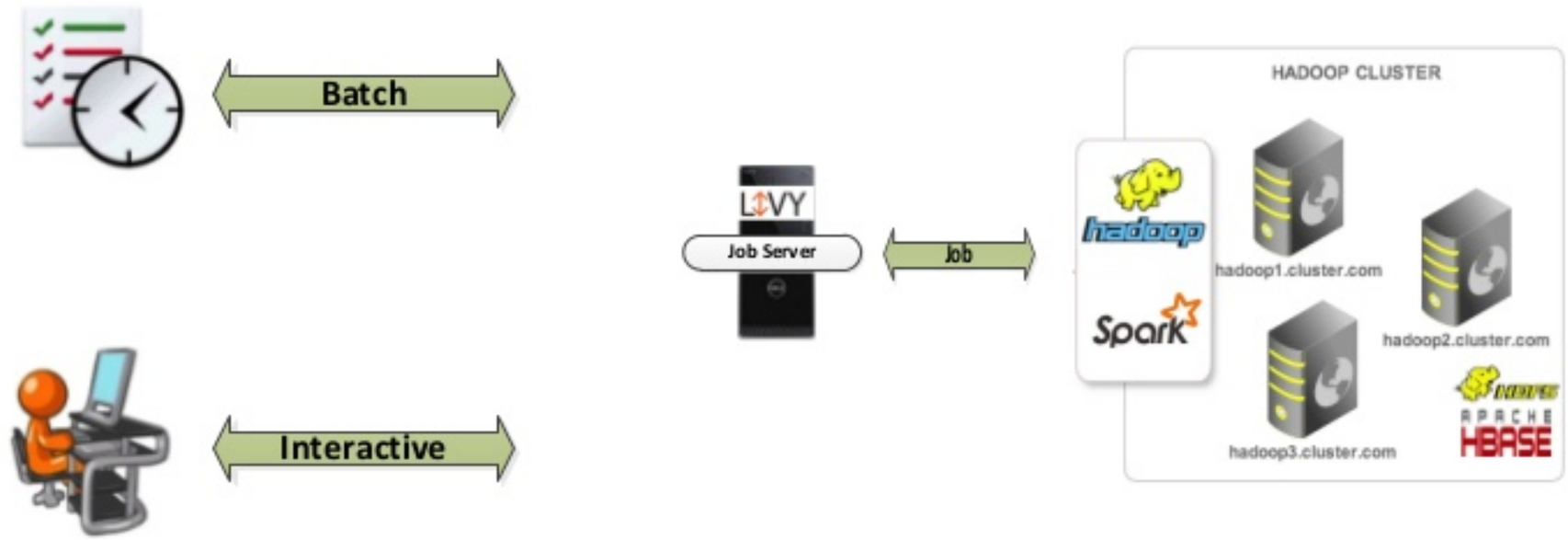
Building SCaaS

Where we started!



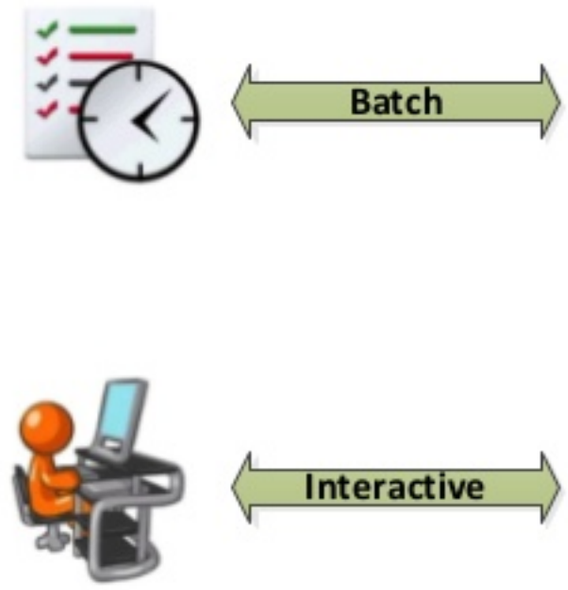
Building SCaaS

Adding REST Job Server



Building SCaaS

Adding HA and Enhance Livy

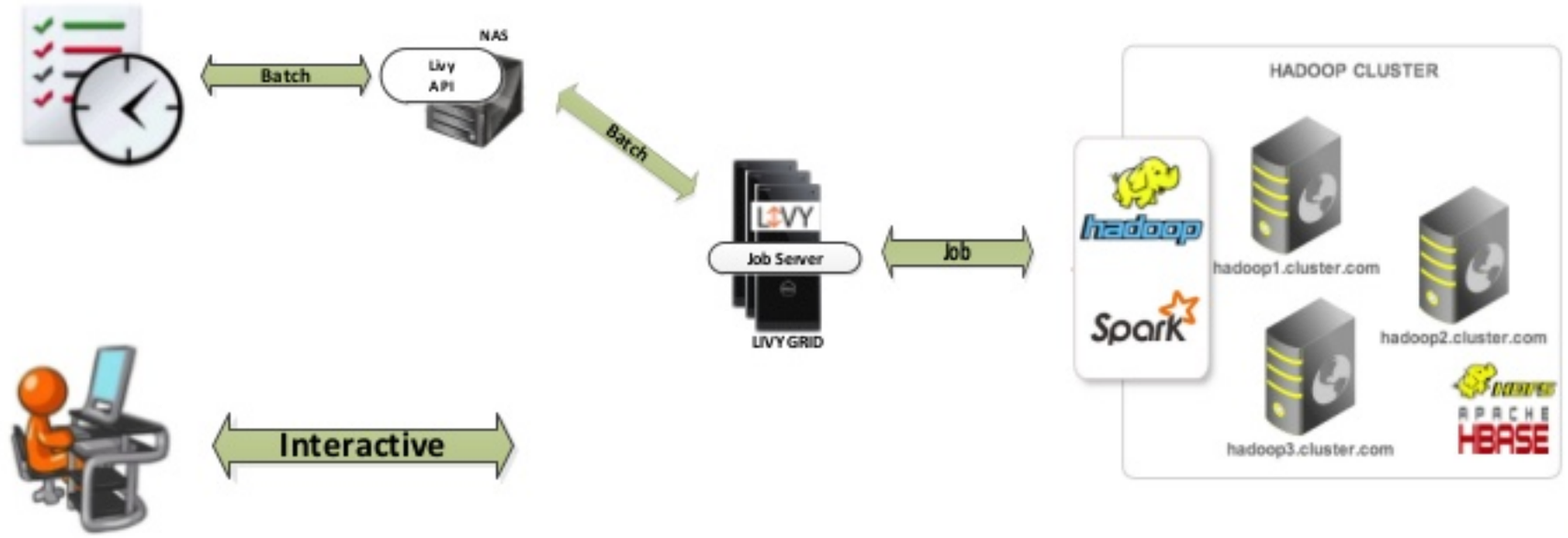


PayPal Livy Version

- ✓ Multi-Nodes High Availability
- ✓ Kerberos Authentication Changes
- ✓ SQL Interpreter
- ✓ Session Manager Enhancements
- ✓ Session GC Improvements
- ✓ Plug-in Logger
- ✓ Yarn Poll Re-architecture
- ✓ Multiple Spark Versions Support
- ✓ White/Black list User Authentication
- ✓ Dockers
- ✓ Hbase Support
- ✓ Flink/Beam Support

Building SCaaS

Adding Livy API and Utilities



Batch Utilities

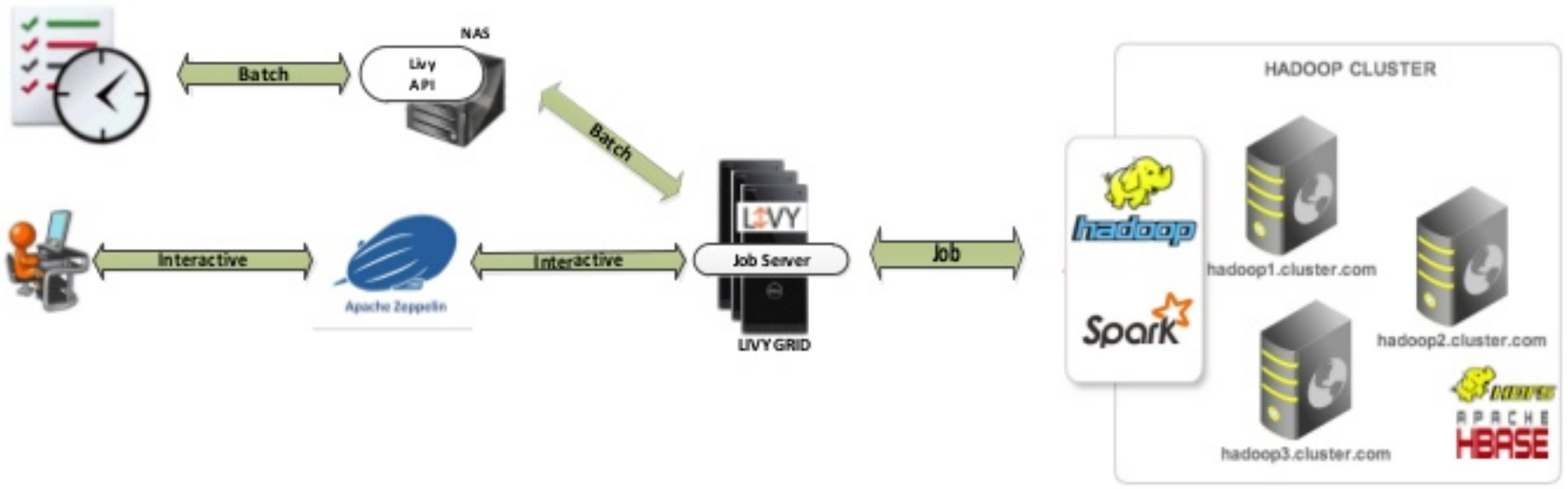
- ✓ startSparkBatch
  - ✓ stopSparkBatch
  - ✓ listSparkBatch
- ✓ startSparklingWater
  - ✓ stopSparklingWater
- ✓ startSparkSql
  - ✓ stopSparkSql
- ✓ startSparkSession
  - ✓ execSparkFile
  - ✓ execSparkCode
  - ✓ stopSparkSession
  - ✓ listSparkSession
- ✓ livy-spark.jar

Interactive Utilities

- ✓ livy-spark

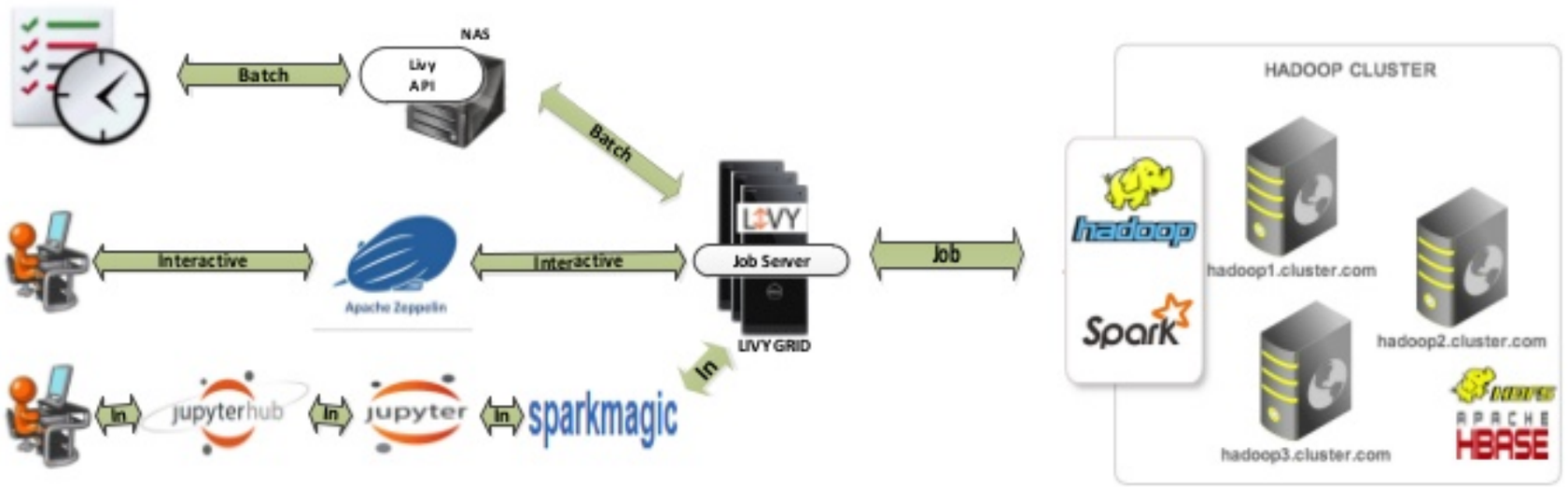
Building SCaaS

Adding Zeppelin



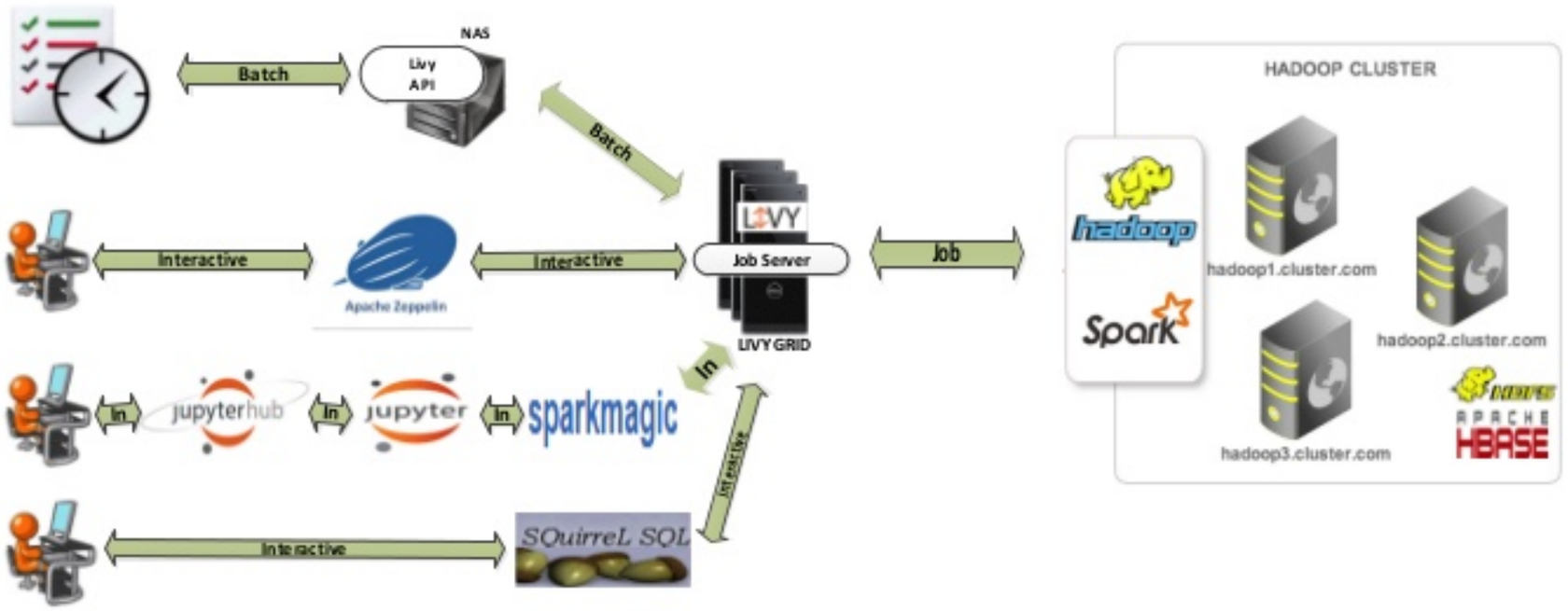
Building SCaaS

Adding Jupyter



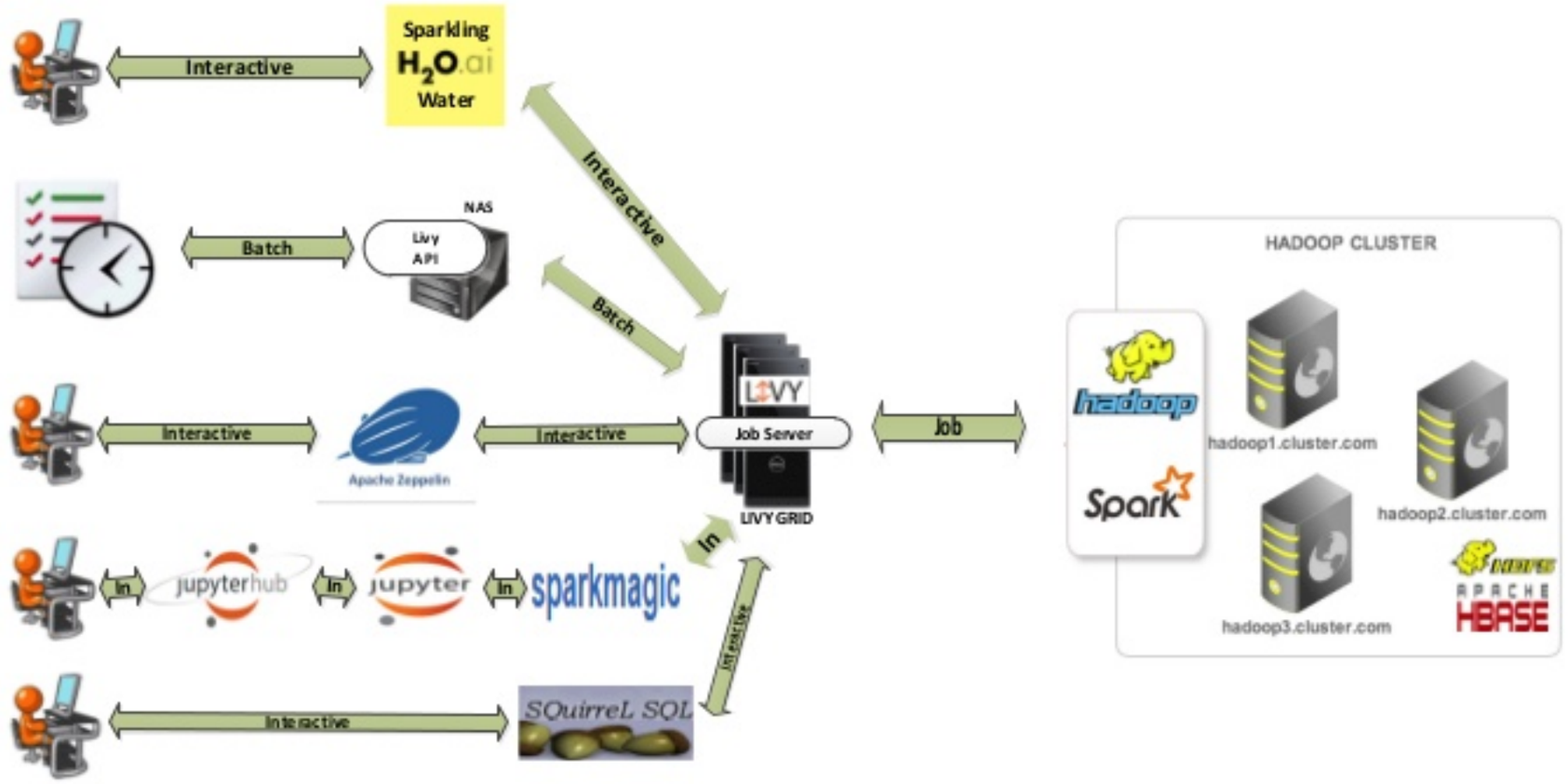
Building SCaaS

Adding SQL Client



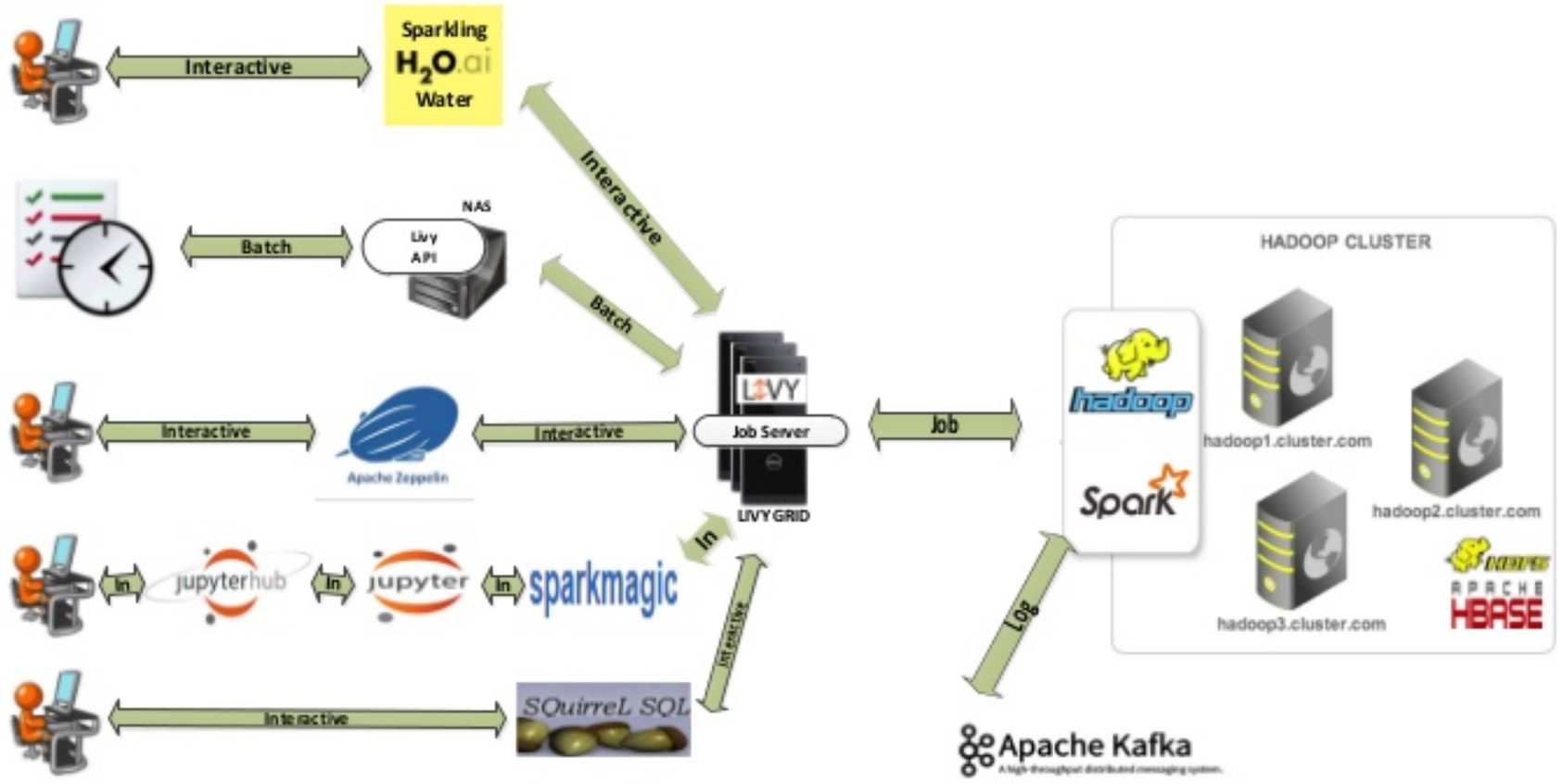
Building SCaaS

Adding Sparkling Water



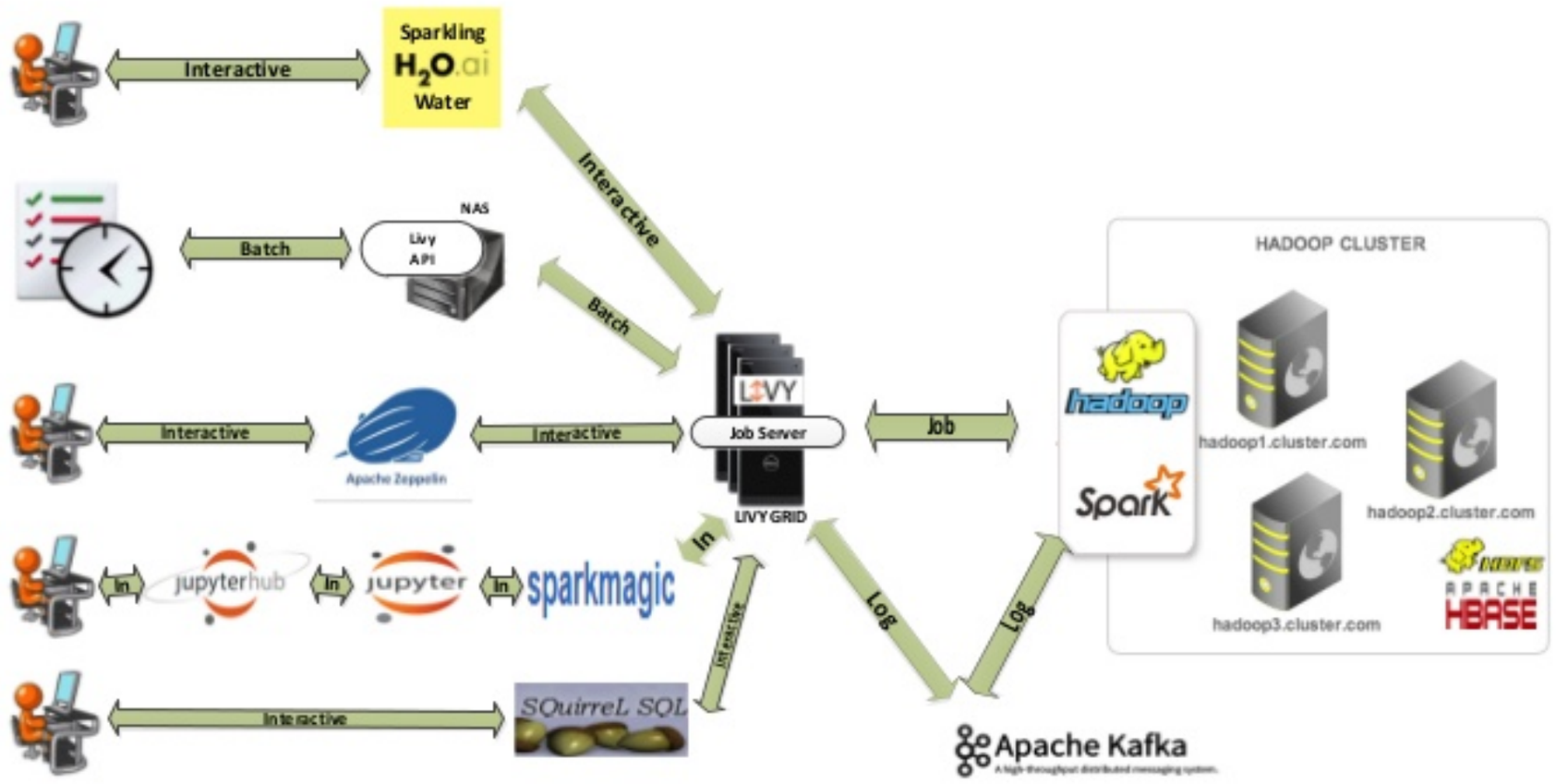
Building SCaaS

Adding Spark Logger



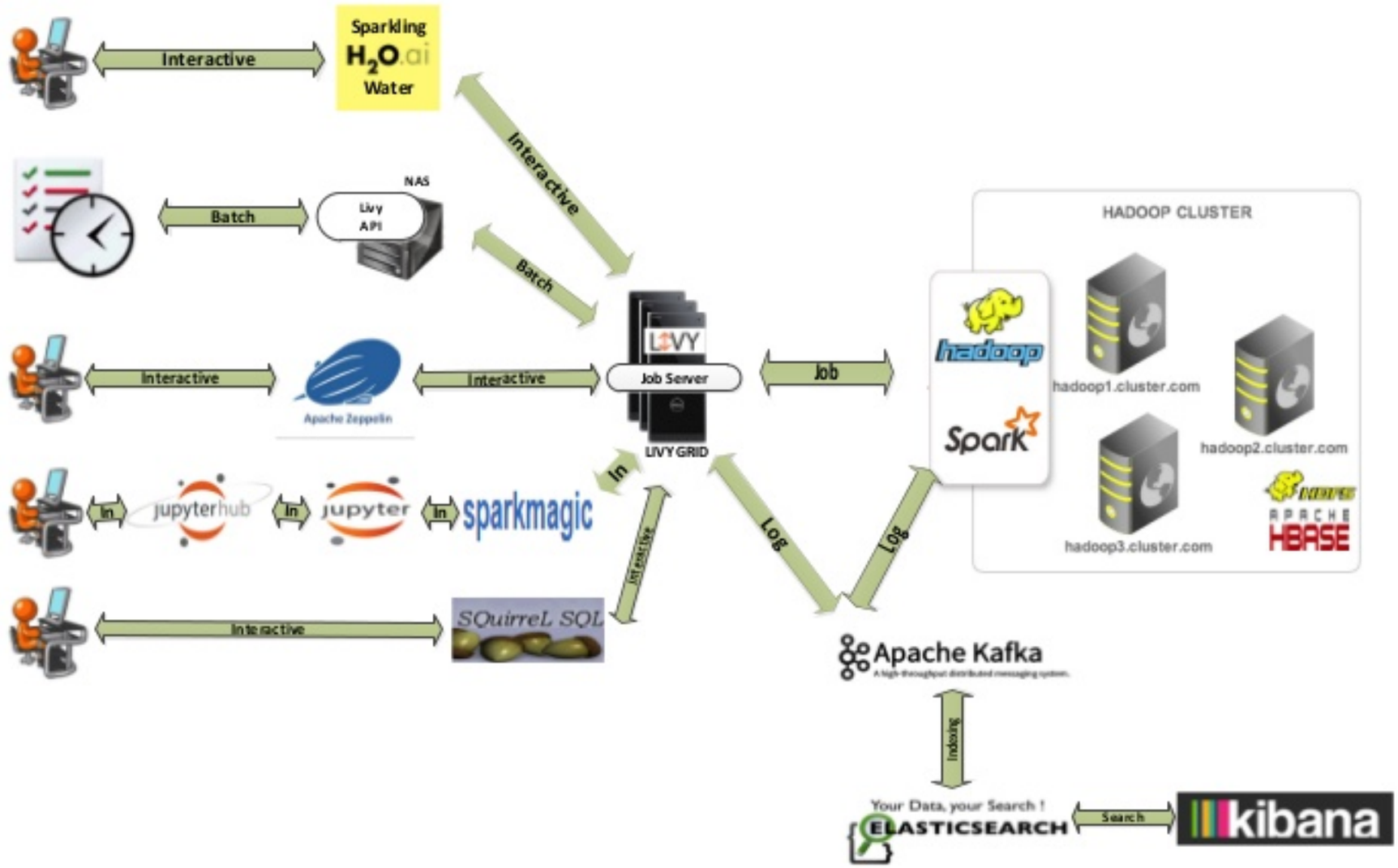
Building SCaaS

Adding Livy Logger



Building SCaaS

Adding Search Engine



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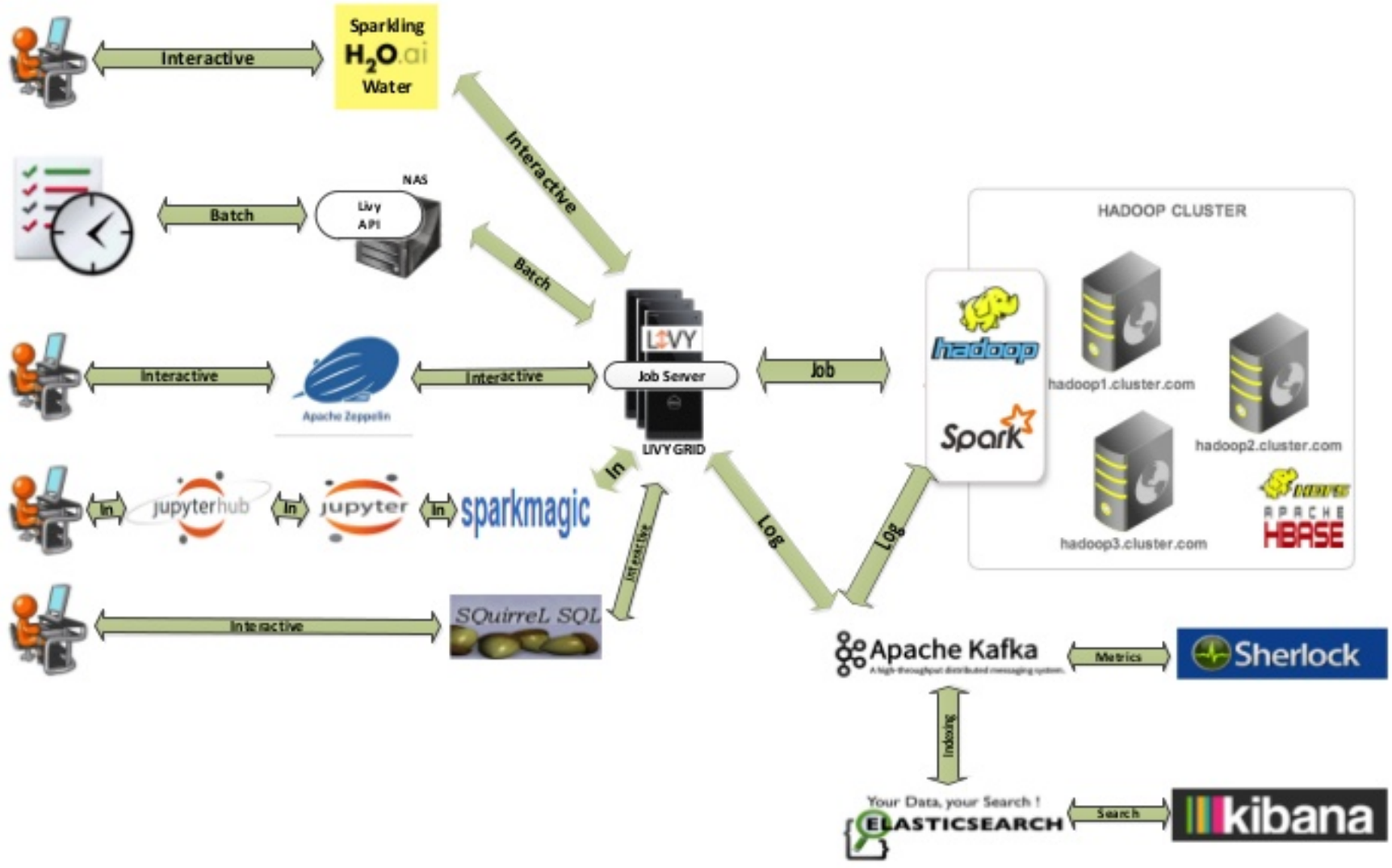
Building SCaaS

Adding Monitoring/Alerting



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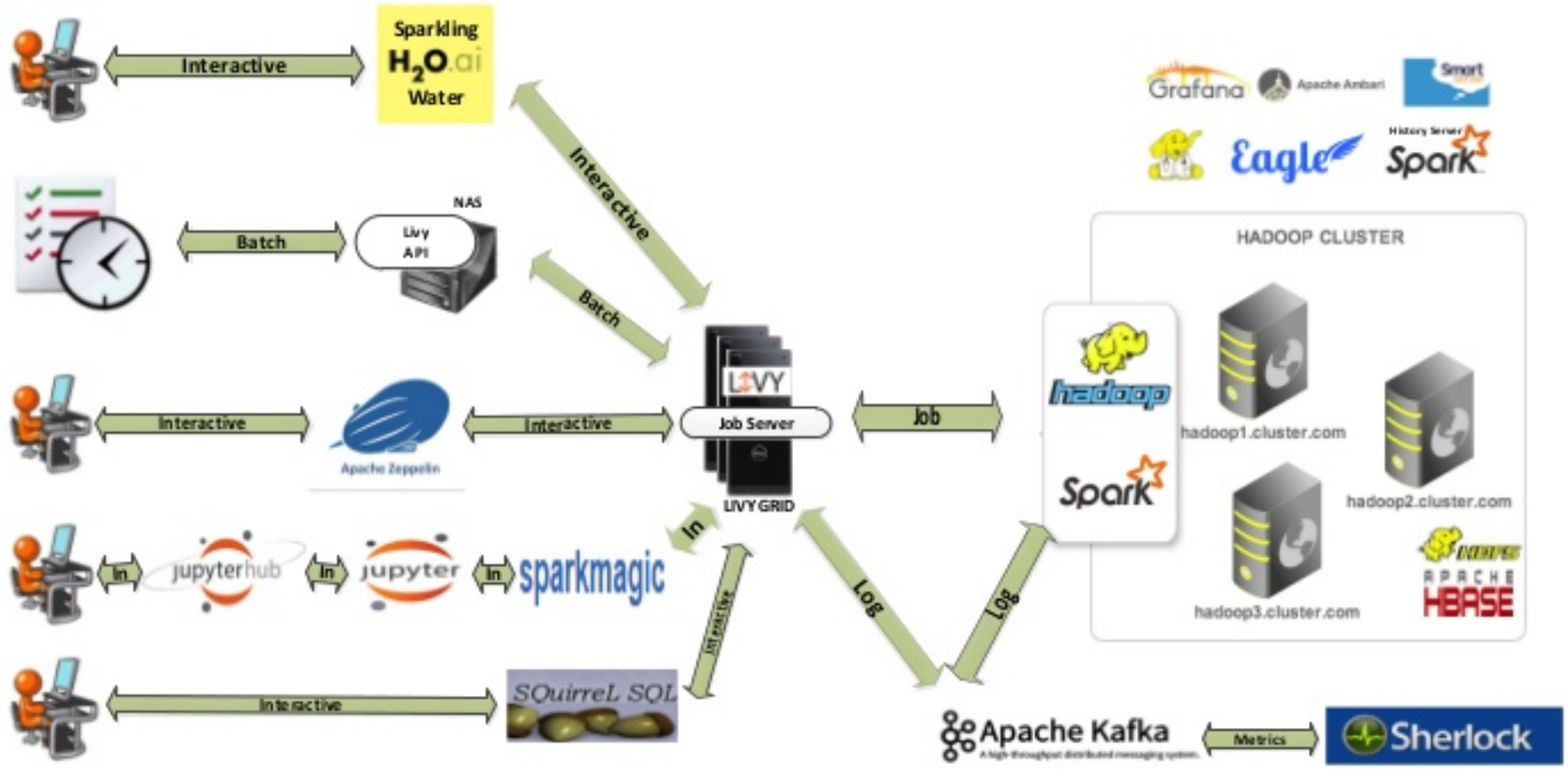
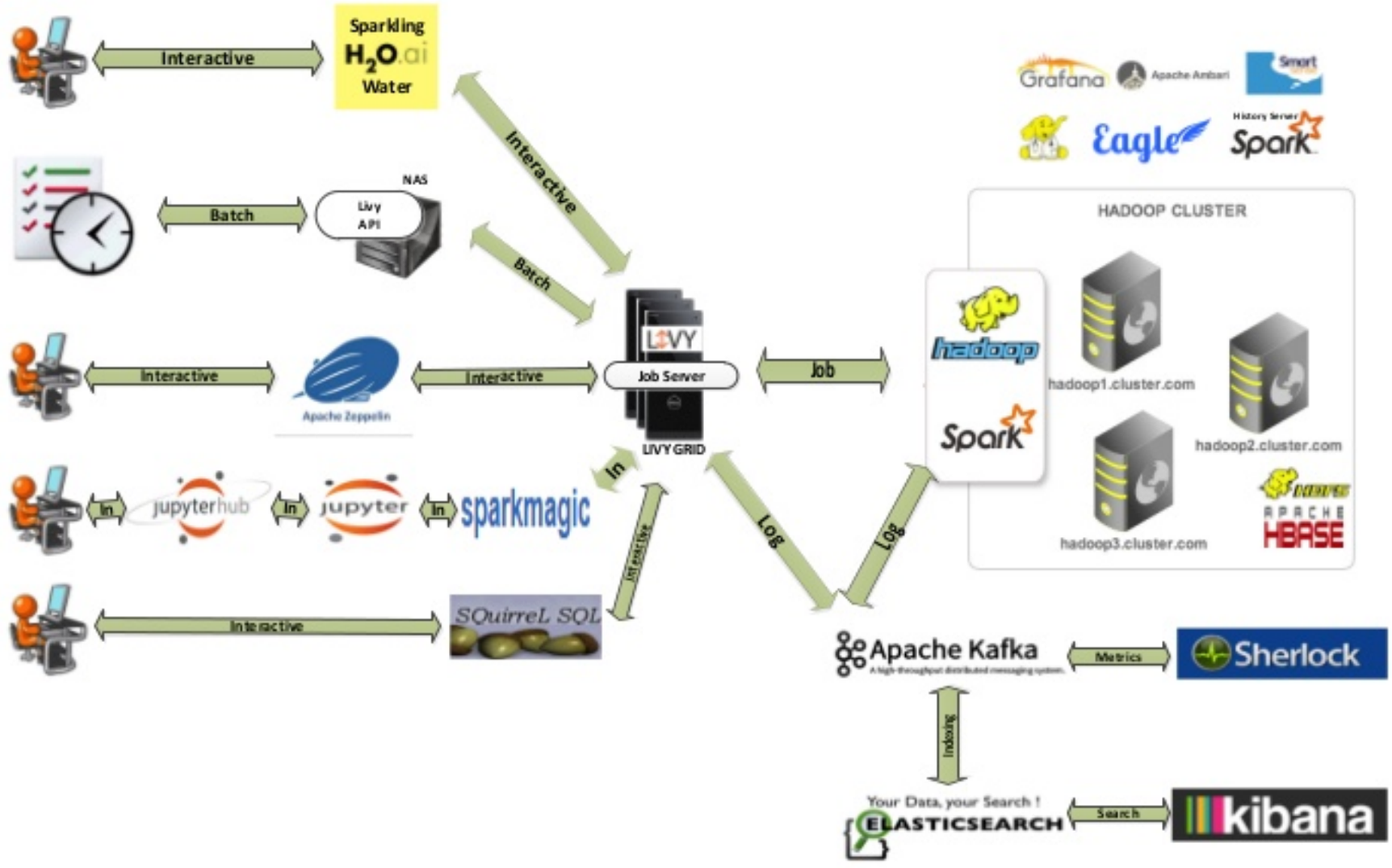
Building SCaaS

Adding Standard Tools



Building SCaaS

Here, you go! The SCaaS Framework



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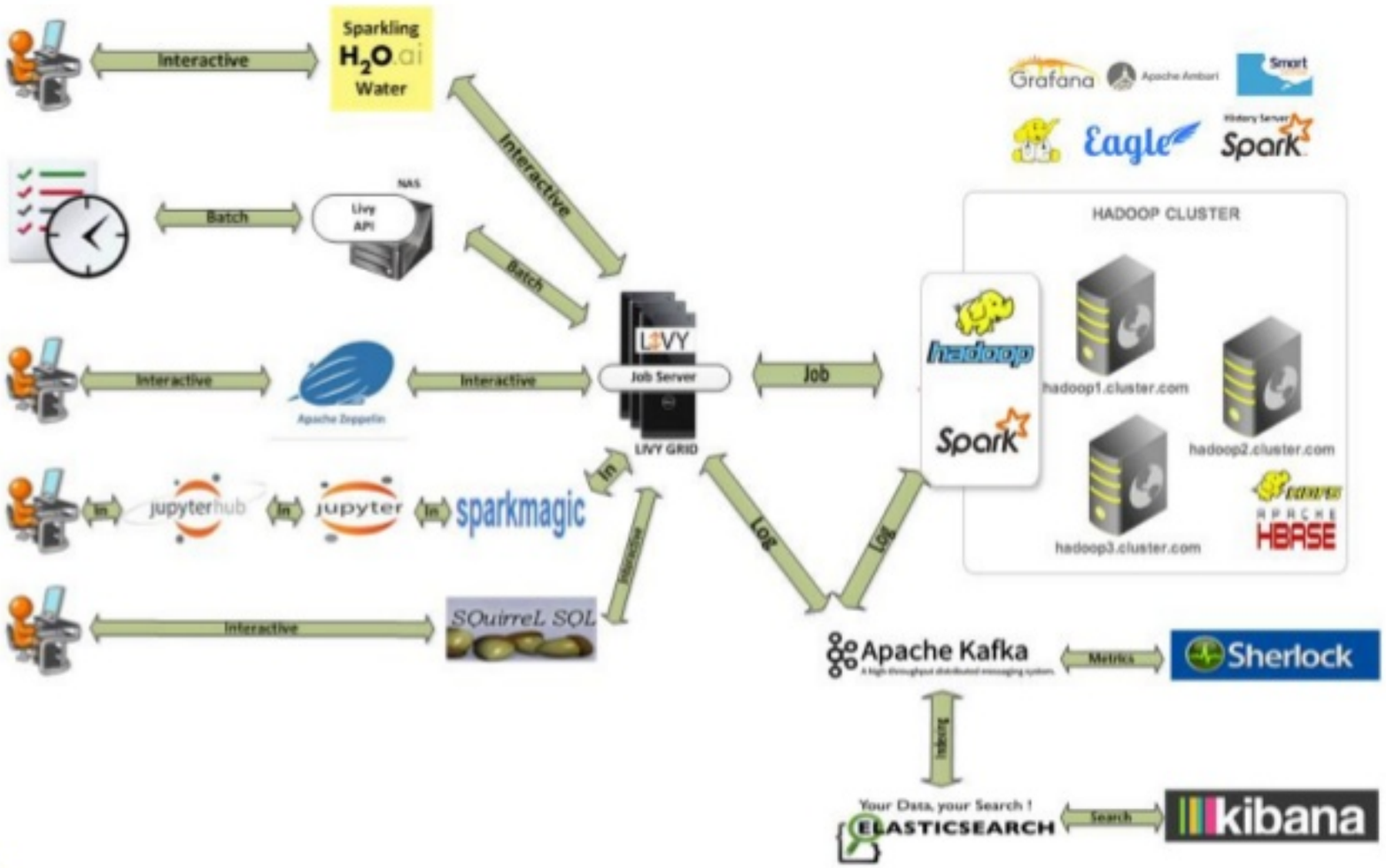
SCaaS

Benefits

SCaaS

Benefits



Administrators

- ✓ Less maintenance on CLI
- ✓ Deploy software stack only on Job Server
- ✓ Configurations at one place
- ✓ Easy platform/software upgrade

Developers

- ✓ REST-friendly and Docker-friendly
- ✓ Low-latency/sub-seconds execution
- ✓ Sharing cache across jobs
- ✓ Modularity and easy restartability

Analysts/Scientists

- ✓ User friendly interactive applications
- ✓ Multi-tenancy and Private workspace
- ✓ Direct spark sql execution
- ✓ Kerberos Support

Operations/Security

- ✓ Standardized coding and unified execution
- ✓ Uniformed logging, monitoring and alerting
- ✓ Fine-grained audit
- ✓ Complete statement level history and metrics

SCaaS Demo

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Thank You