

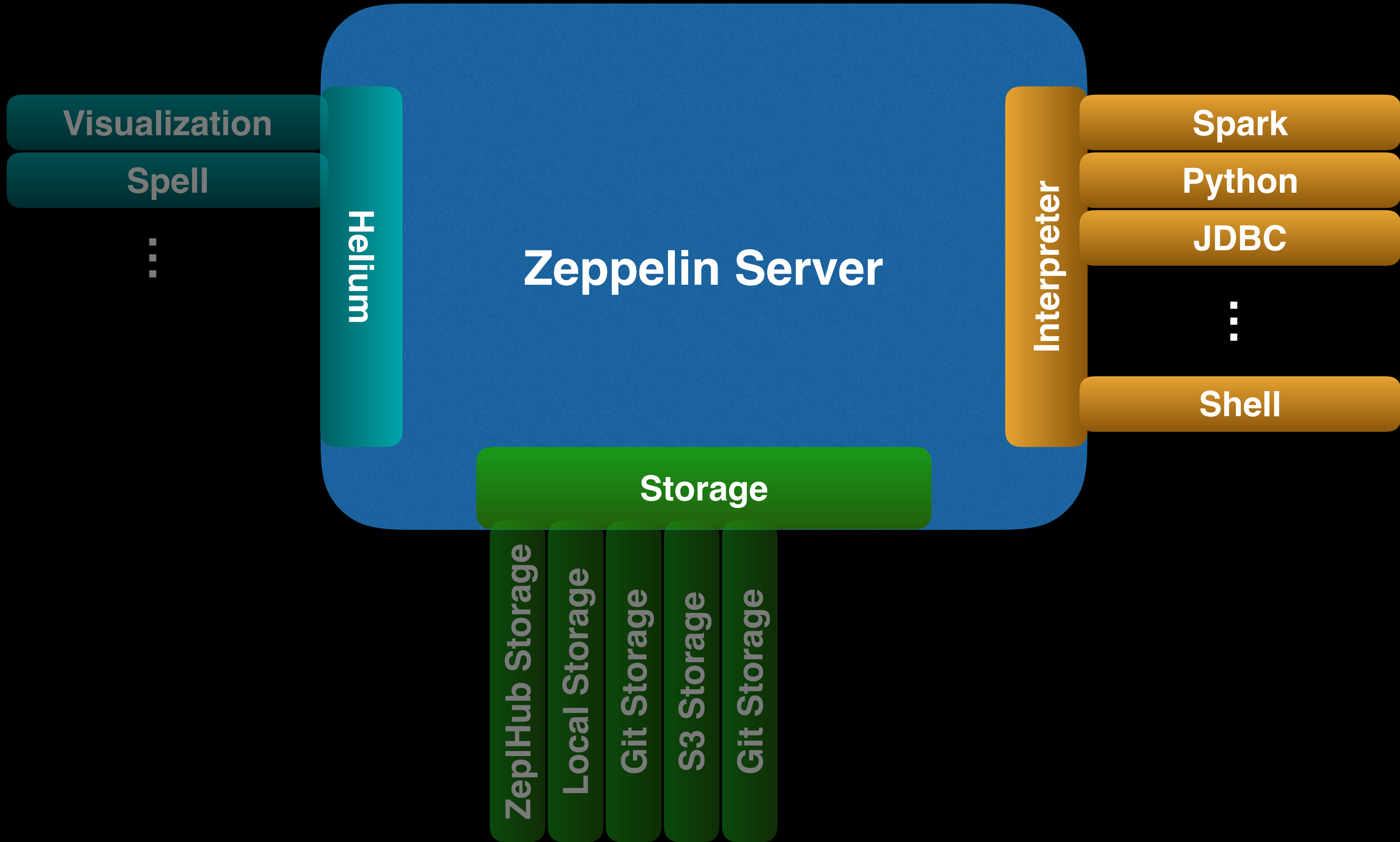
Apache Zeppelin & Cluster

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- SDE @ ZEPL
- PMC member of Apache Zeppelin
- Recently interested in,
 - Enterprise-ready
 - Multi-tenancy
 - Cluster itself

Abstract

- Apache Zeppelin Overview - Plug-in, Plug-in, Plug-in
- Interpreter
 - Three Modes - Shared, Scoped, Isolated w/ Local Processes
 - Yarn Cluster Manager - Spark, Livy
 - New Cluster Managers - Mesos, Docker
 - Further issues - Impersonation, Resources Sharing



Interpreter

- 24 interpreters currently
- Gateway
 - To execute code to external services
 - To obtain results from external services
- Separate process to avoid conflict of dependencies
- InterpreterSetting to set env and properties

Interpreter Modes

Demo

Interpreter Modes

	Process	Context	Stop on Note	Stop on Interpreter Page
Shared	1	1	ALL	ALL
Scoped	1	N	One Context	ALL
Isolated	N	1	One process	ALL

Yarn Cluster Manager

- All interpreters in Yarn cluster
- No local process
- (Almost) same behaviors as local process
- Lifecycle manager of Yarn
- Setting “zeppelin.cluster_manager” to “yarn”
- YarnRemoteInterpreterServer

Yarn Cluster Manager

Demo

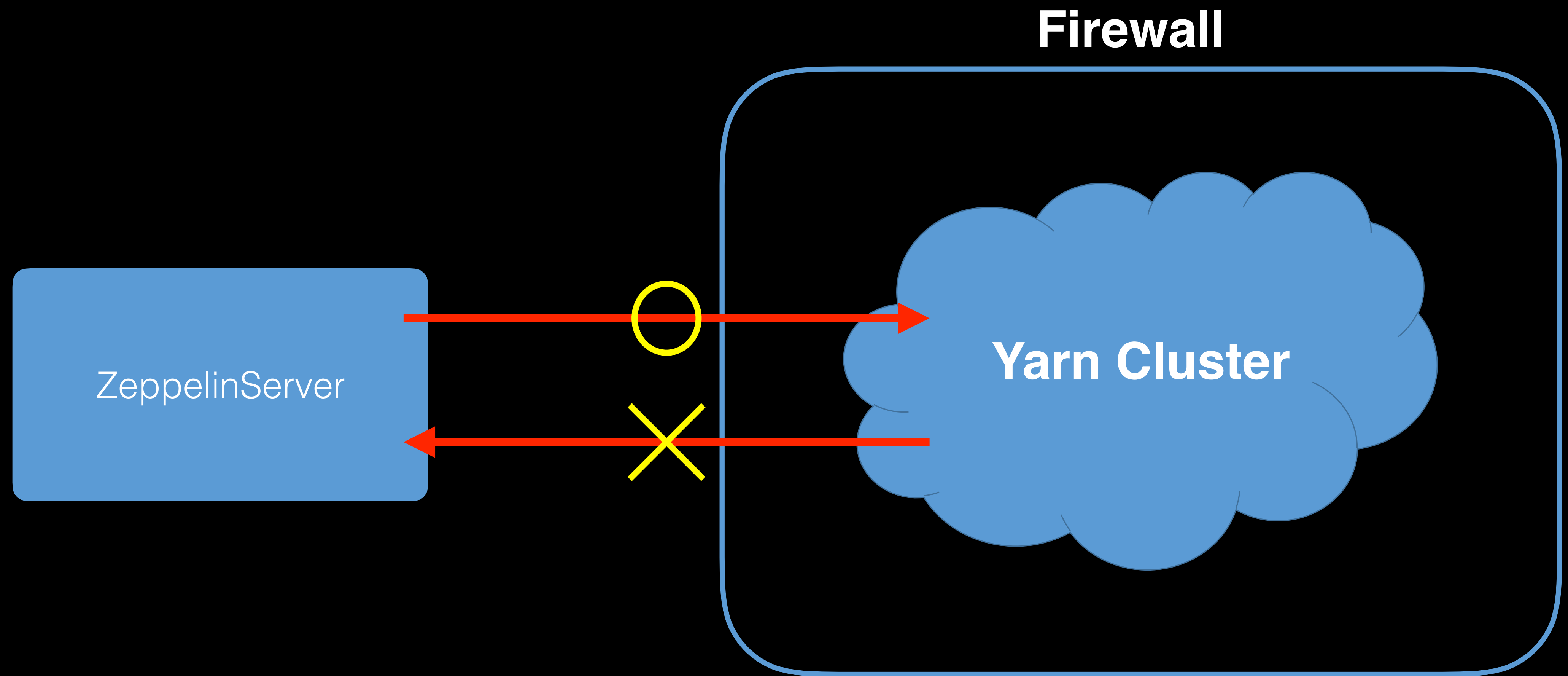
Yarn CM: Spark

- SPARK_HOME and Embedded spark
- “local[*]” and “yarn-client”
- Spark, sql, pyspark, r simultaneously
- Zeppelin.yarn.memory, spark.driver.memory, spark.yarn.amMemory

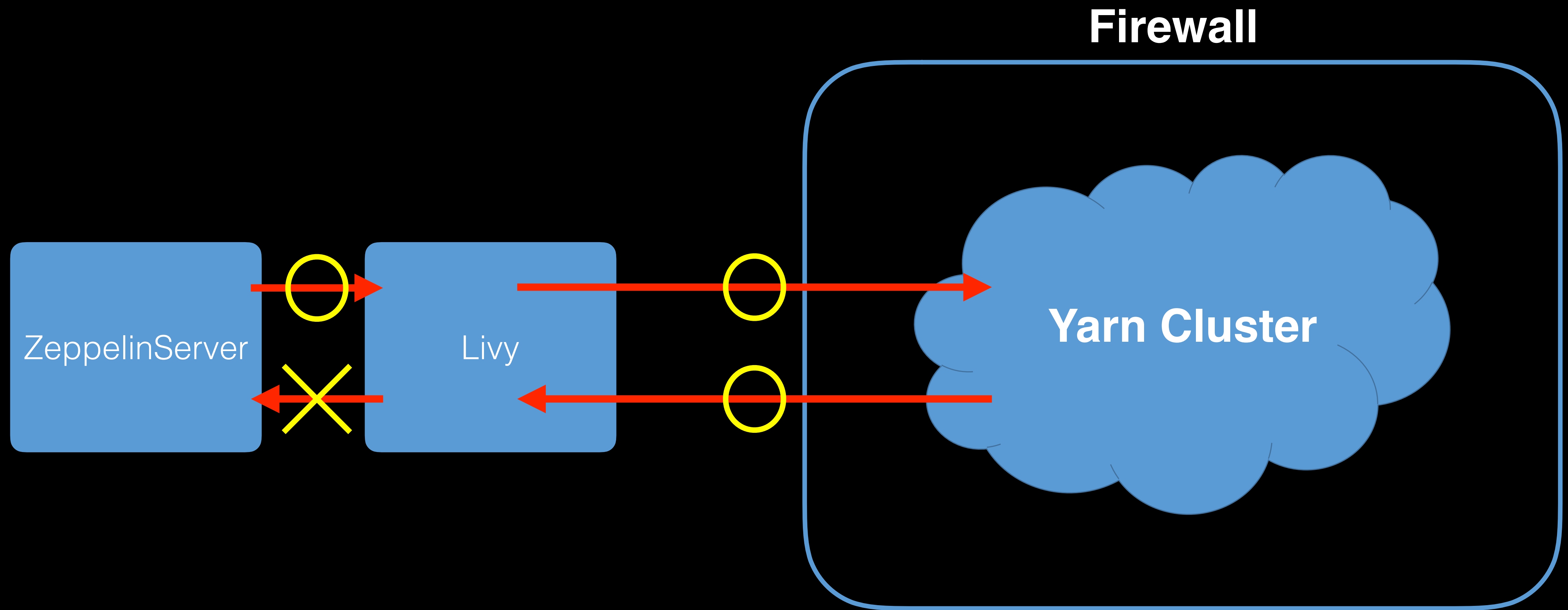
Yarn CM: Livy

- Firewall
- Usage of Resources
- Compatibility

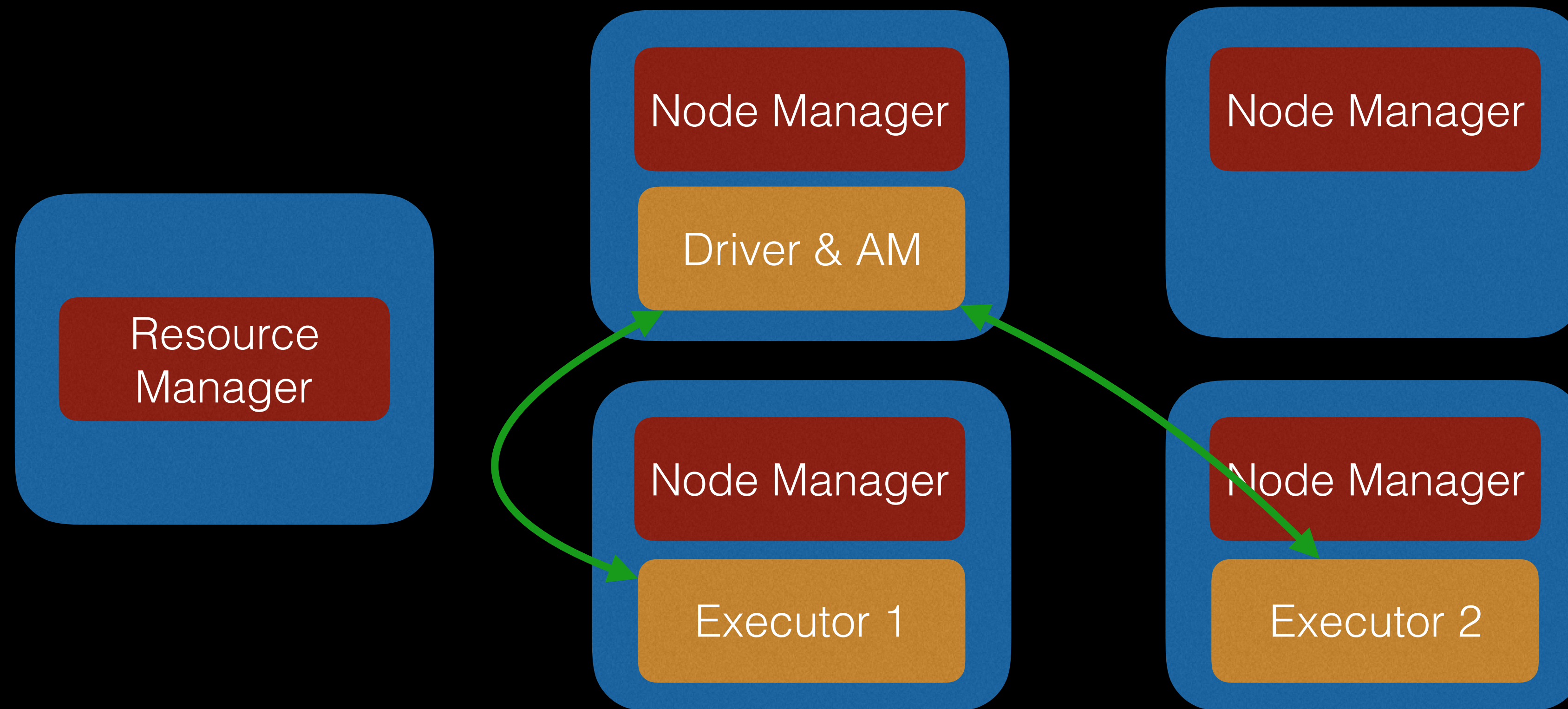
Yarn CM: Livy - Firewall



Yarn CM: Livy - Firewall

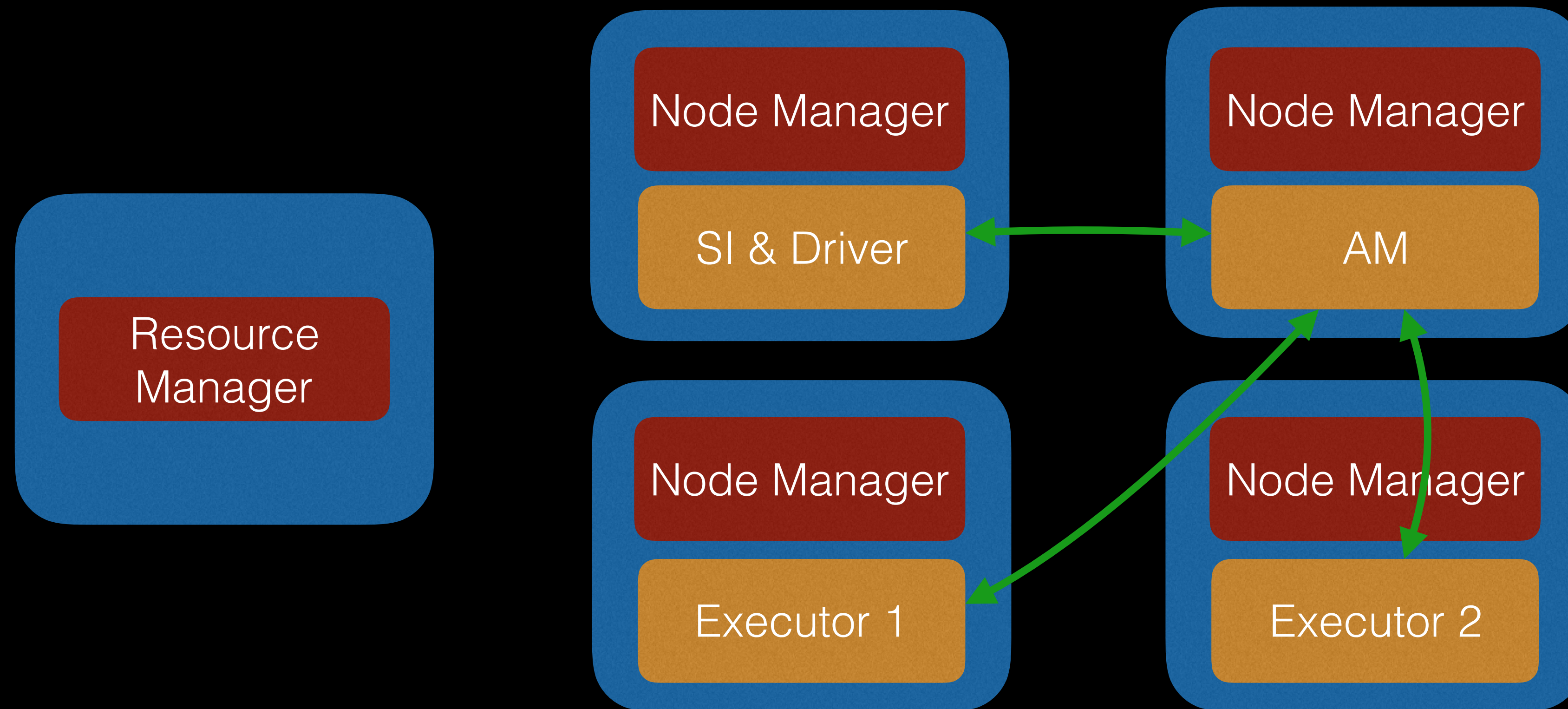


Yarn CM: Livy - Resource Usage



Spark's yarn-cluster mode

Yarn CM: Livy - Resource Usage



yarn-client mode in Yarn Cluster Manager

Yarn CM: Livy - Compatibility

- Zeppelin
 - > 1000 lines of code in SparkSubmit.scala
 - > 500 lines of code in RemoteInterpreterYarnProcess
- Livy
 - Only check a new version needed
 - less than Zeppelin's Yarn Cluster Manager

Yarn CM: Livy

	Pros	Cons
Yarn CM	<ul style="list-style-type: none">• One-way firewall• No additional server	<ul style="list-style-type: none">• No yarn-cluster• Two AMs on yarn-client• Custom spark-submit
Livy	<ul style="list-style-type: none">• Yarn-cluster• Vanilla spark-submit	<ul style="list-style-type: none">• Bi-directional firewall• Additional server

New Cluster Manager

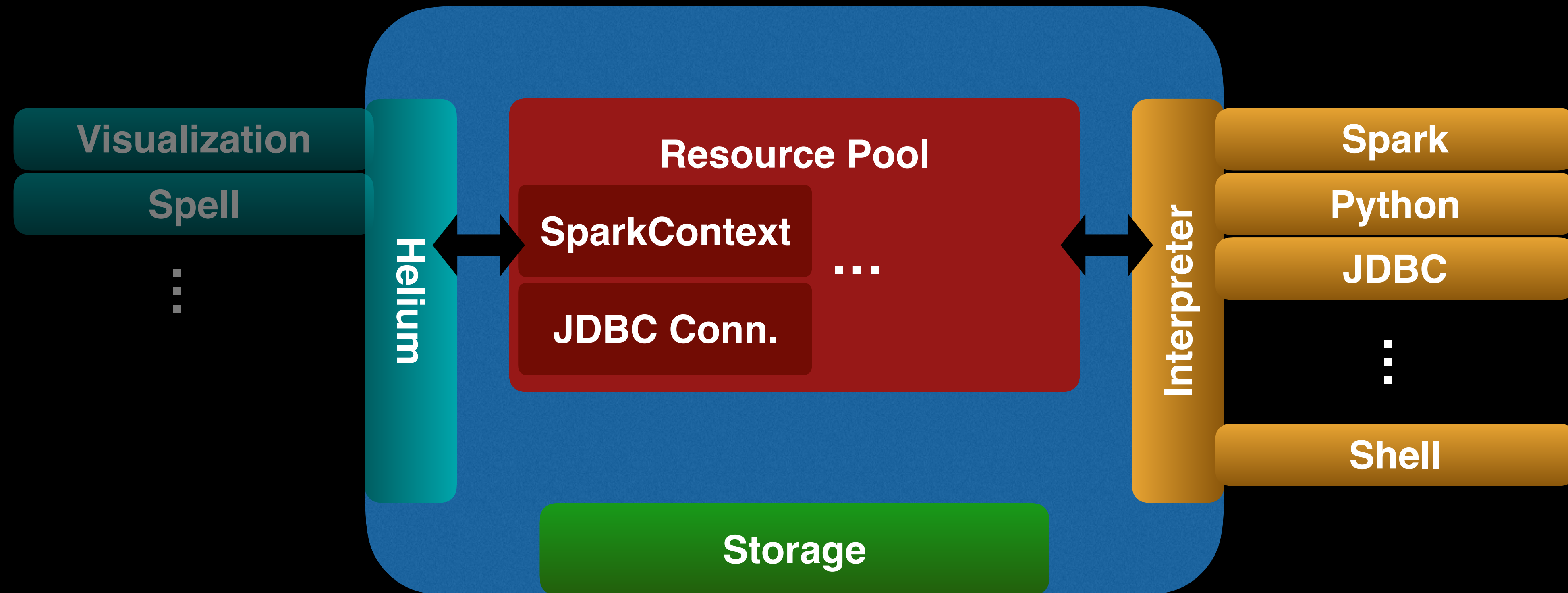
```
public abstract class ClusterManager {  
    public abstract void start();  
    public abstract void stop();  
    public abstract RemoteInterpreterProcess createInterpreter(String... s);  
    public abstract void releaseResource(String id);  
}
```

- Only four methods
- RemoteInterpreterProcess should provides host and port for thrift
- Mesos, docker

Impersonation

- Different ways of implementations
 - JDBC's properties vs. Hadoop's UserGroupInformation
- Different point to be adopted
 - Process vs. application
- Different starting point
 - Shiro or not
- Need to provide an unified way

Resource Sharing



Question or Opinion