Hortonworks

Apache Slider (incubating)

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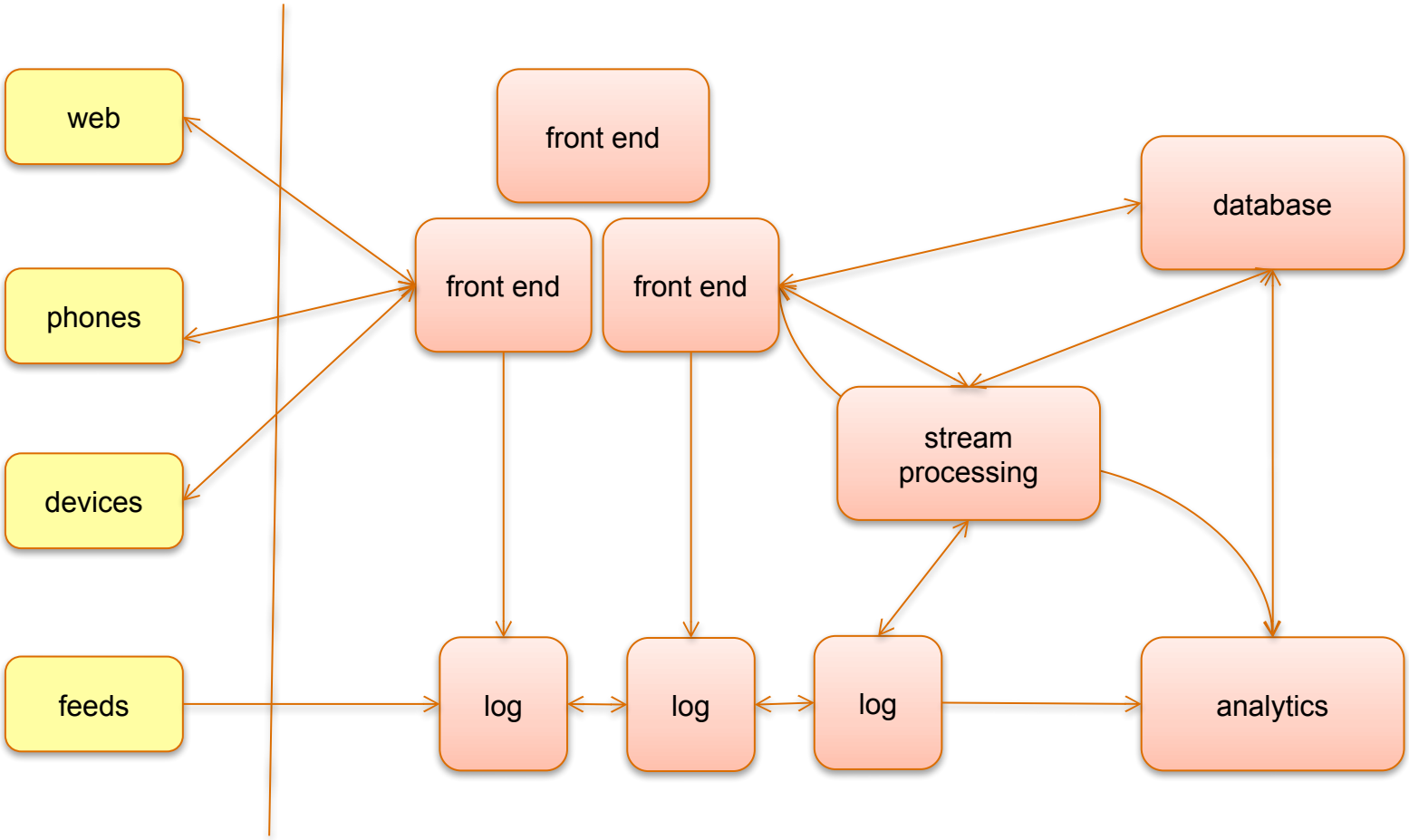
CITY
SPORT

Background: Modern applications



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Fun operational problems

Placement: where to run?

Installation

Configuration & Binding

Client configuration

Lifecycle

- Start/Stop
- Reconfigure
- Scale up/down
- Rolling-restart
- Decommission/Recommission

Failure handing and recovery

Logging

Upgrading

Metrics & Monitoring

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== Getting your code to work across a set of fairly reliable machines

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Apache Slider

Deploying and managing applications on a YARN cluster

http://slider.incubator.apache.org/

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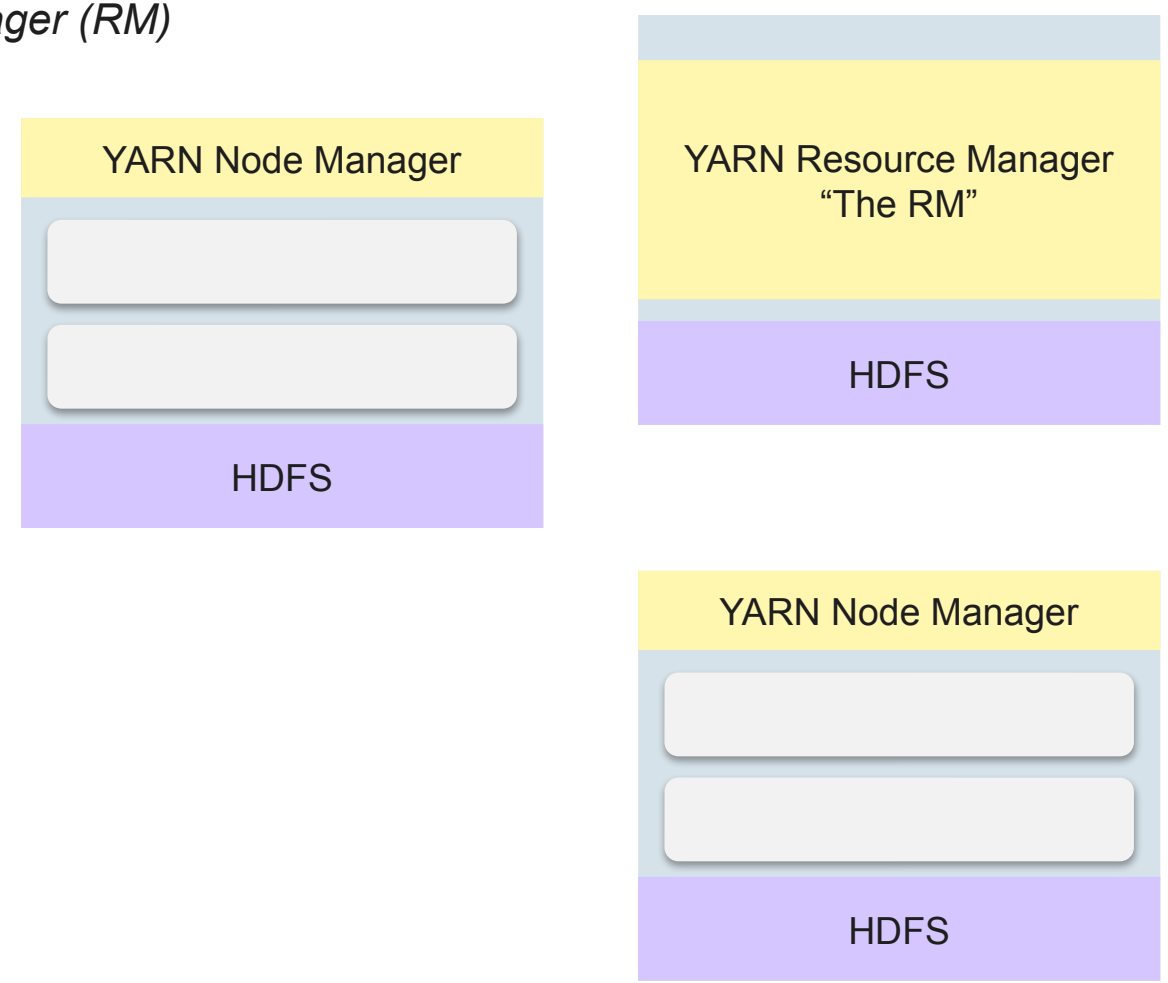
YARN schedules work

- Servers run YARN *Node Managers (NM)*
- NM's heartbeat to *Resource Manager (RM)*
- RM schedules work over cluster
- RM allocates containers to apps
- NMs start containers
- NMs report container health



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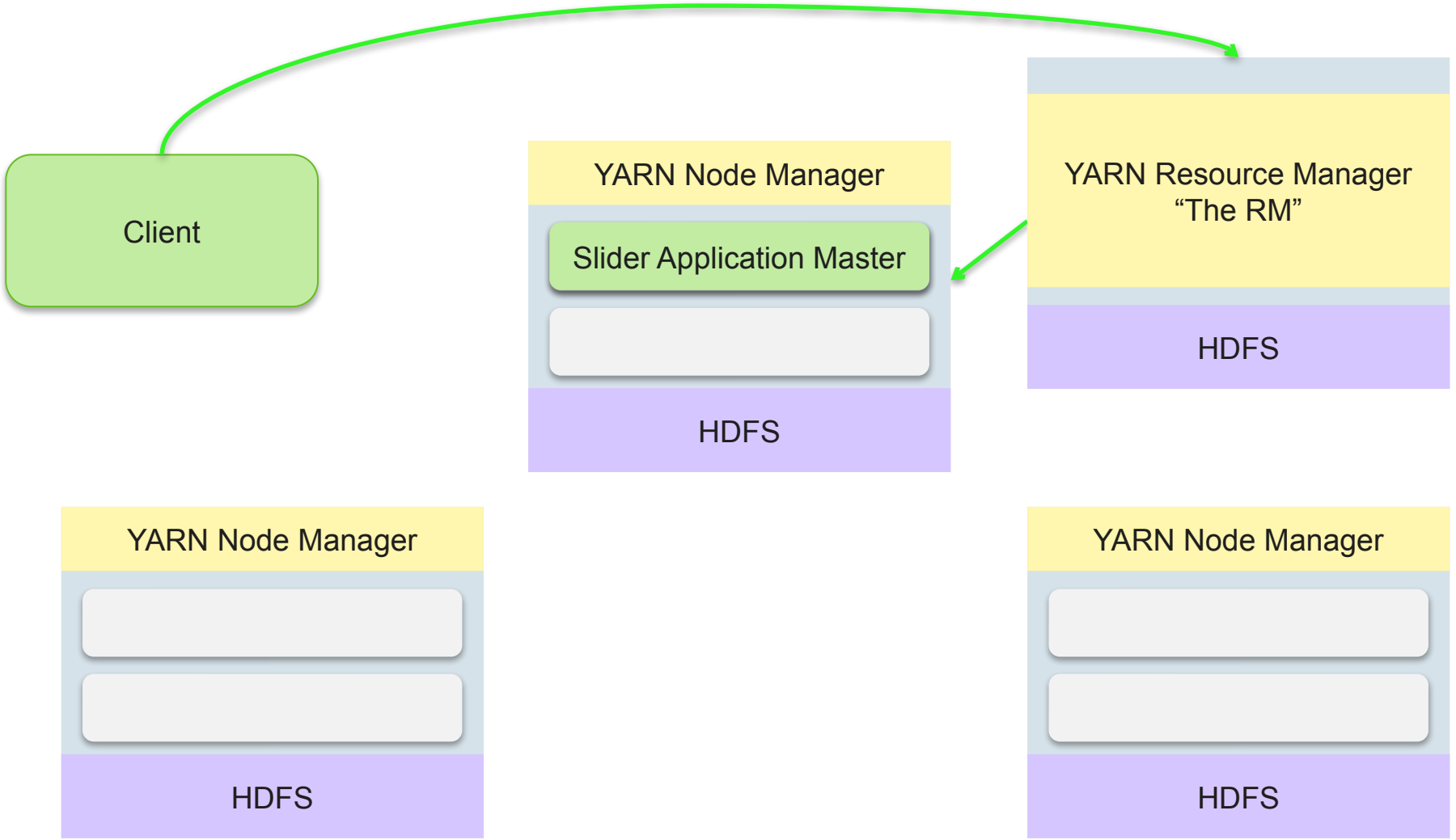
Client creates Slider App Master



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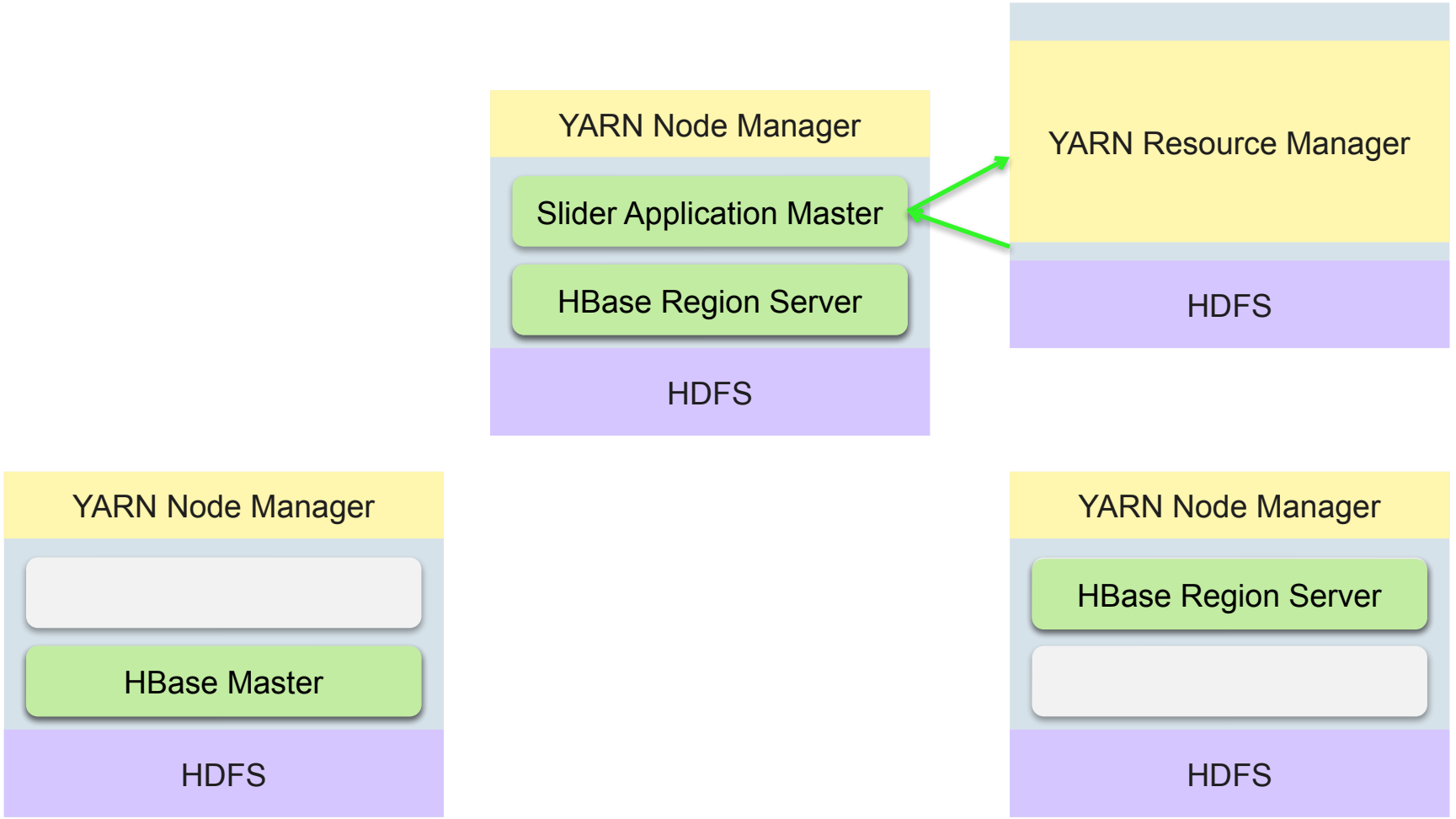
Slider App Master runs the application



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An application consists of

"Application Package"

JSON configuration files: YARN resources + config

Data persisted in HDFS

Placement history in HDFS

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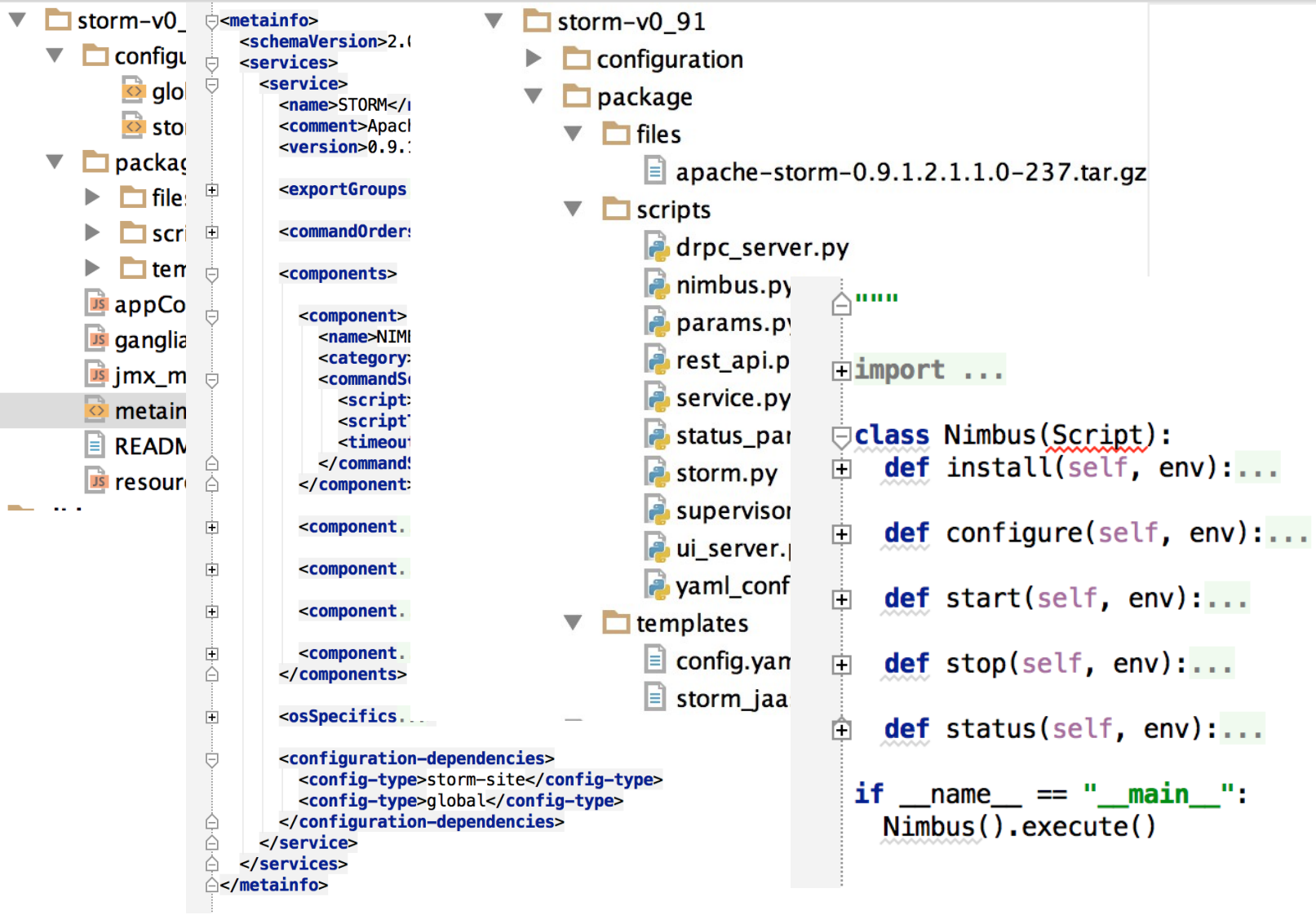
App Package: zip + XML + .py + bin



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Metainfo

```
<metainfo><services><service>
 <name>HBASE</name>
 <version>0.96.0.2.1.1</version>
  <exportGroups><exportGroup>
   <name>QuickLinks</name>
   <exports><export>
    <name>org.apache.slider.jmx</name>
    <value>http://${HBASE_MASTER_HOST}:${site.hbase-site.hbase.master.info.port}/jmx</value>
  </export></exports></exportGroup></exportGroups>
  <commandOrders><commandOrder>
   <command>HBASE_REGIONSERVER-START</command>
    <requires>HBASE_MASTER-STARTED</requires>
   </commandOrder></commandOrders>
  <components><component>
   <name>HBASE_MASTER</name>
   <category>MASTER</category>
    <minInstanceCount>1</minInstanceCount>
     <commandScript>
       <script>scripts/hbase_master.py</script>
     </commandScript></component></components>
</service></services></metainfo>
```

Application Info

Publish an URI

Commands have dependencies

Contains components

Commands are implemented as scripts

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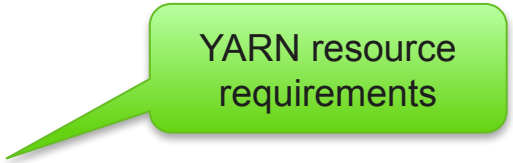
resource.json (in HDFS)

```
{
  "schema": "http://example.org/specification/v2.0.0",
  "metadata": {
  },
  "global": {
  },
  "components": {
    "HBASE_MASTER": {
      "yarn.role.priority": "1",
      "yarn.component.instances": "1",
      "yarn.memory": "1024",
      "yarn.vcores": "1",
    },
    "slider-appmaster": {
    },
    "HBASE_REGIONSERVER": {
      "yarn.role.priority": "2",
      "yarn.component.instances": "1"
    }
  }
}
```



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app_config.json

```
{
    "application.def": "/slider/hbase_v096.zip",
    "java_home": "/usr/jdk64/jdk1.7.0_45",

    "site.global.app_log_dir": "${AGENT_LOG_ROOT}/app/log",
    "site.global.app_pid_dir": "${AGENT_WORK_ROOT}/app/run",

    "site.global.hbase_master_heapsize": "1024m",
    "site.global.ganglia_server_host": "${NN_HOST}",
    "site.global.ganglia_server_port": "8667",
    "site.global.ganglia_server_id": "Application1",

    "site.hbase-site.hbase.tmp.dir": "${AGENT_WORK_ROOT}/work/app/tmp",
    "site.hbase-site.hfile.block.cache.size": "0.40",
    "site.hbase-site.hbase.security.authentication": "simple",
    "site.hbase-site.hbase.master.info.port": "$
{HBASE_MASTER.ALLOCATED_PORT}",
    "site.hbase-site.hbase.regionserver.port": "0",
    "site.hbase-site.hbase.zookeeper.quorum": "${ZK_HOST}",

    "site.core-site.fs.defaultFS": "${NN_URI}",
}
```

Configurations needed by Slider

Named variables

Variables for the application scripts

Site variables for application

Allocate and advertise

Named variables for cluster details

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create, start, stop, destroy

```
$ slider create hbase1 --resources resources.json --template config.json

$ slider list

$ slider status hbase1

$ slider stop hbase1

$ slider start hbase1

$ slider destroy hbase1
```


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Dynamic application resize

```
slider flex hbase1
  --component HBASE_REGIONSERVER 2
```


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Registry lookup (YARN-913)

```
$ slider resolve --path ~/services/org-apache-slider/storm1

{ "type" : "JSONServiceRecord",
  "external" : [ {
    "api" : "http://",
    "addressType" : "uri",
    "protocolType" : "webui",
    "addresses" : [ {
      "uri" : "http://nn.example.com:46132"
    } ]
  }, {
    "api" : "classpath:org.apache.slider.publisher.configurations",
    "addressType" : "uri",
    "protocolType" : "REST",
    "addresses" : [ {
      "uri" : "http://nn.example.com:46132/ws/v1/slider/publisher/slider"
    } ]
  } } ]
}
```

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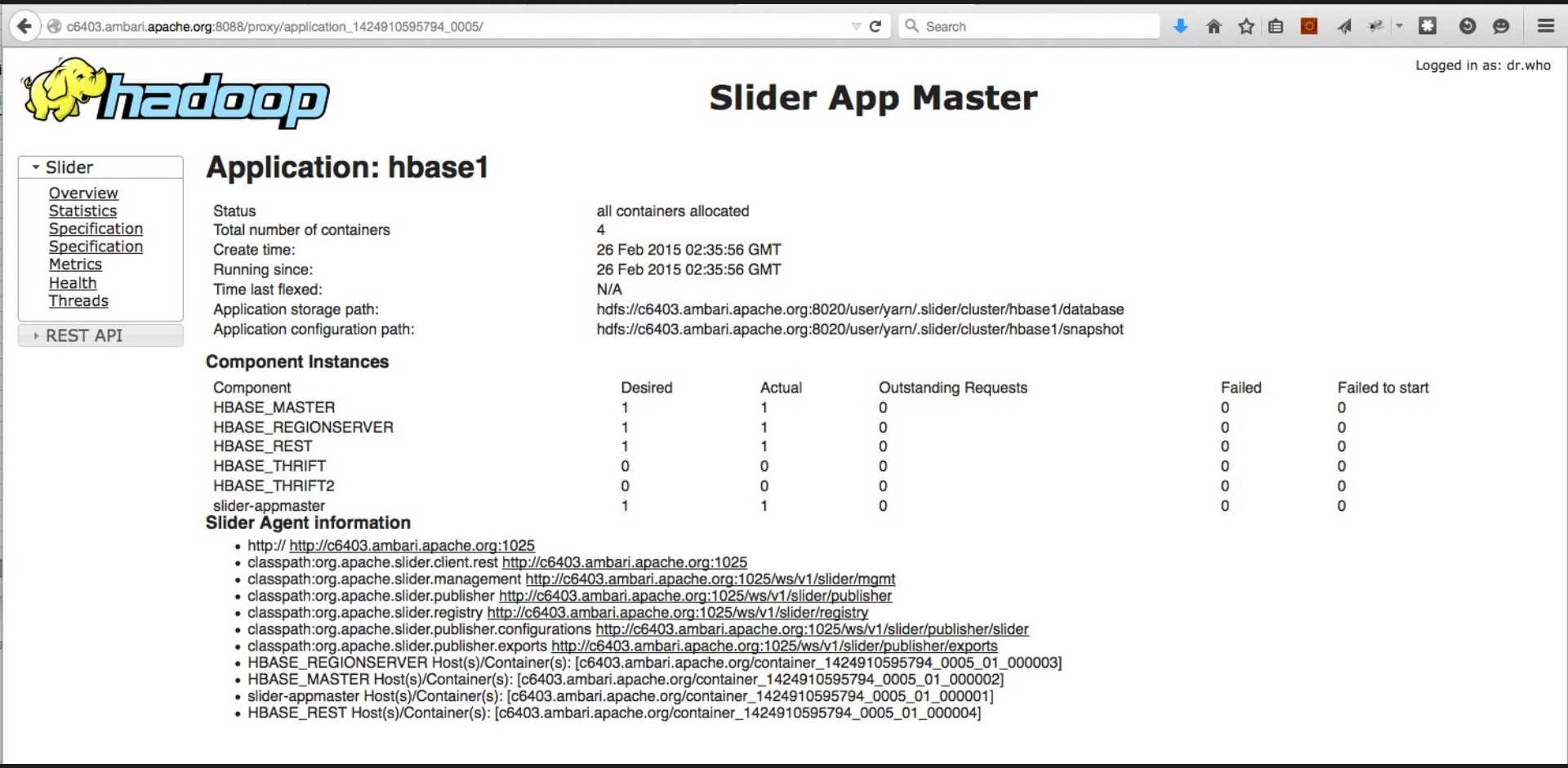
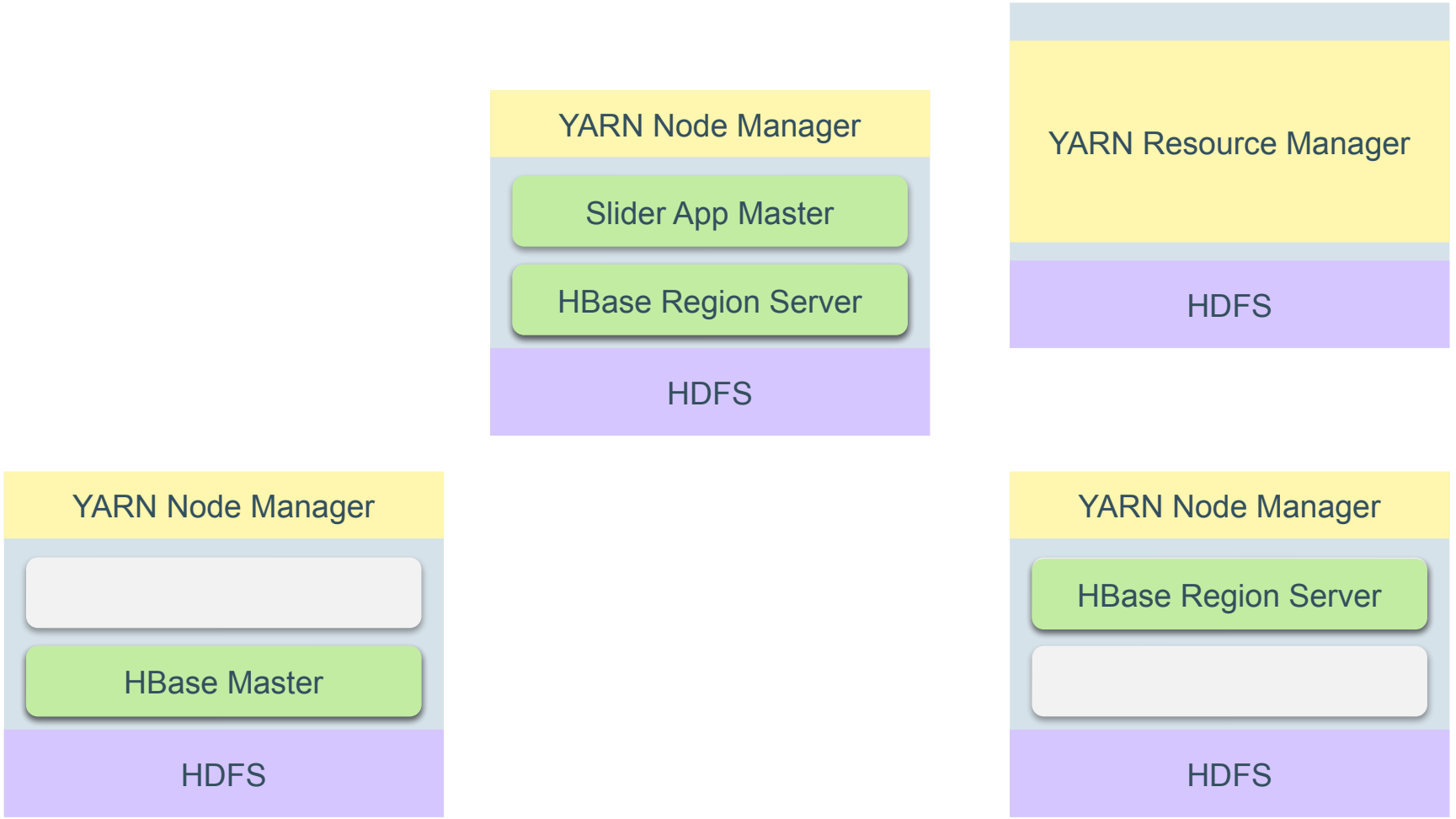

c6403.ambari.apache.org:8088/proxy/application_1424910595794_0005/
Search
Logged in as: dr.who
hadoop
Slider App Master
Slider
Overview
Statistics
Specification
Specification
Metrics
Health
Threads
REST API
Application: hbase1
Status all containers allocated
Total number of containers 4
Create time: 26 Feb 2015 02:35:56 GMT
Running since: 26 Feb 2015 02:35:56 GMT
Time last flexed: N/A
Application storage path: hdfs://c6403.ambari.apache.org:8020/user/yarn/.slider/cluster/hbase1/database
Application configuration path: hdfs://c6403.ambari.apache.org:8020/user/yarn/.slider/cluster/hbase1/snapshot
Component Instances
Component Desired Actual Outstanding Requests Failed Failed to start
HBASE_MASTER 1 1 0 0 0
HBASE_REGIONSERVER 1 1 0 0 0
HBASE_REST 1 1 0 0 0
HBASE_THRIFT 0 0 0 0 0
HBASE_THRIFT2 0 0 0 0 0
slider-appmaster 1 1 0 0 0
Slider Agent information
http:// http://c6403.ambari.apache.org:1025
classpath:org.apache.slider.client.rest http://c6403.ambari.apache.org:1025
classpath:org.apache.slider.management http://c6403.ambari.apache.org:1025/ws/v1/slider/mgmt
classpath:org.apache.slider.publisher http://c6403.ambari.apache.org:1025/ws/v1/slider/publisher
classpath:org.apache.slider.registry http://c6403.ambari.apache.org:1025/ws/v1/slider/registry
classpath:org.apache.slider.publisher.configurations http://c6403.ambari.apache.org:1025/ws/v1/slider/publisher/slider
classpath:org.apache.slider.publisher.exports http://c6403.ambari.apache.org:1025/ws/v1/slider/publisher/exports
HBASE_REGIONSERVER Host(s)/Container(s): [c6403.ambari.apache.org/container_1424910595794_0005_01_000003]
HBASE_MASTER Host(s)/Container(s): [c6403.ambari.apache.org/container_1424910595794_0005_01_000002]
slider-appmaster Host(s)/Container(s): [c6403.ambari.apache.org/container_1424910595794_0005_01_000001]
HBASE_REST Host(s)/Container(s): [c6403.ambari.apache.org/container_1424910595794_0005_01_000004]

Failures



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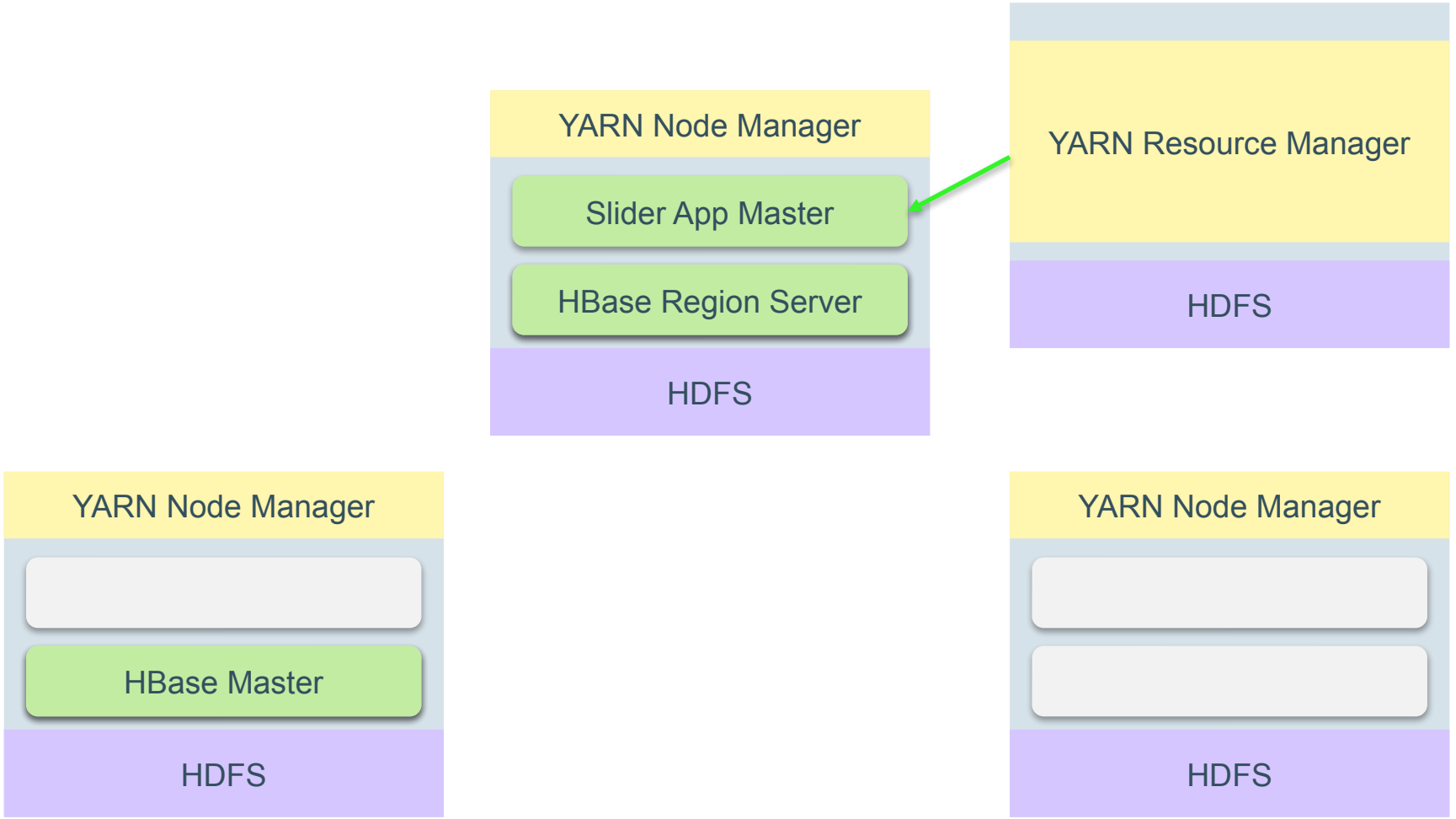
YARN notifies AM



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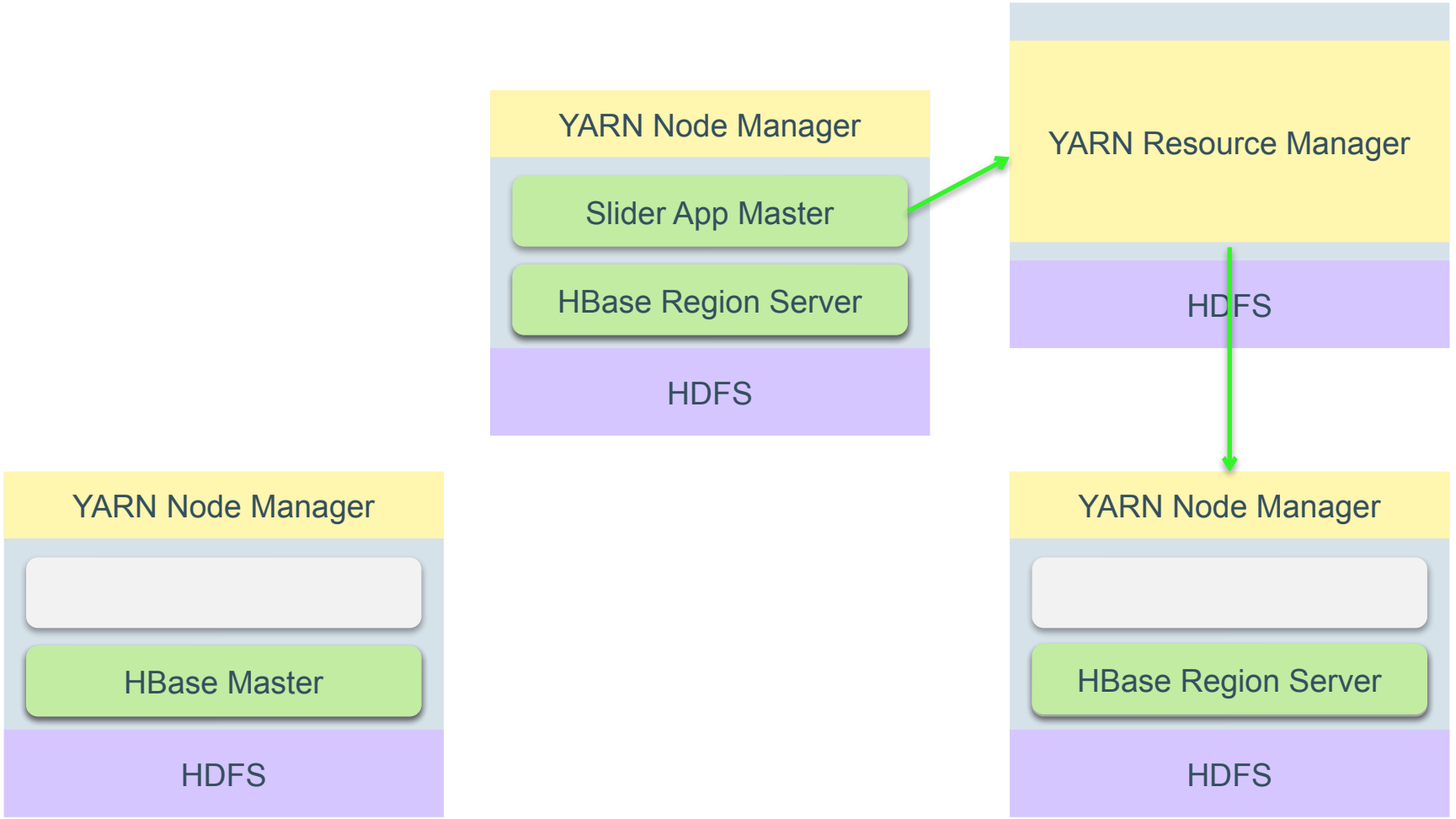
AM requests replacement



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AM Restart –rebuild state

Persisted in HDFS	Rebuilt	Transient
Specification resources.json &c	**NodeMap** model of YARN cluster	**Event History** application history
ComponentHistory persistent history of component placements	**Component Map** container ID -> component instance	**Container Queues** requested, starting, releasing

```
ctx.setKeepContainersAcrossApplicationAttempts(true)
```


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Hadoop 2.6 features we like

- ✓ Labelled nodes & queues
- ✓ Log aggregation
- ✓ Container retention over Application Master restart
- ✓ Service registration & discovery
- ✓ Kerberos token renewal
- ✓ Windowed Application failure tracking

—essential for all long-lived YARN services

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Managed Slider

From a CLI to an embedded library

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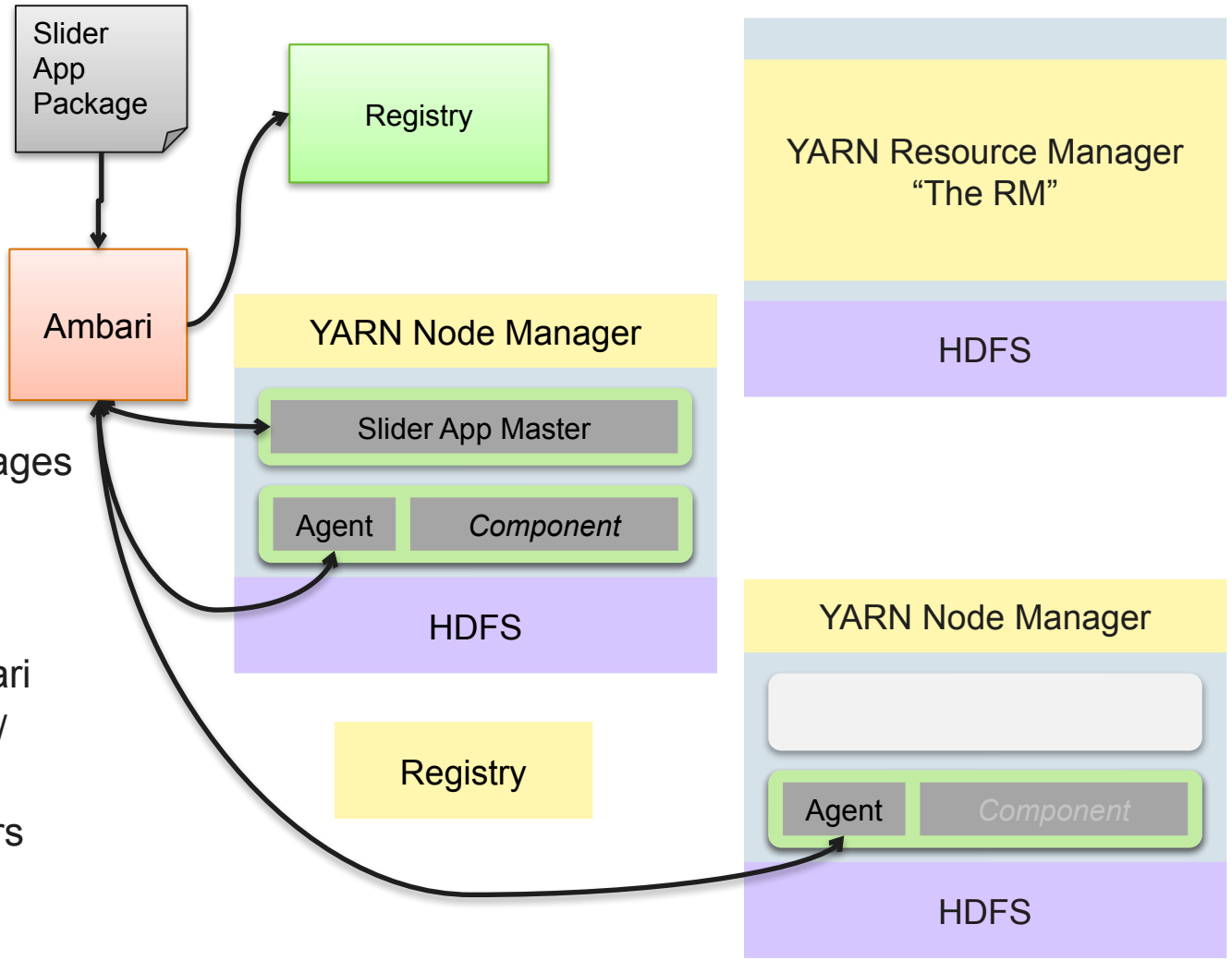
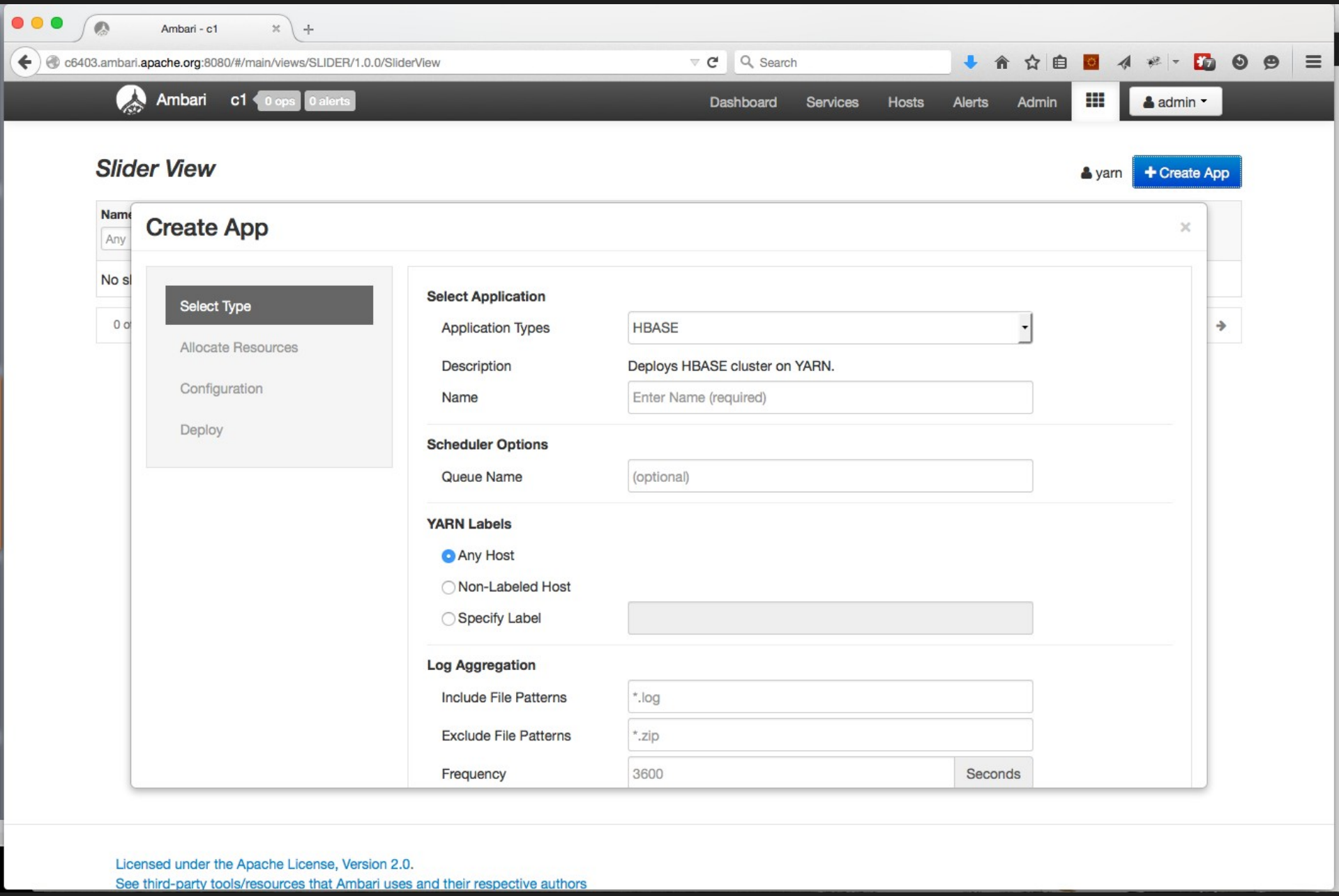
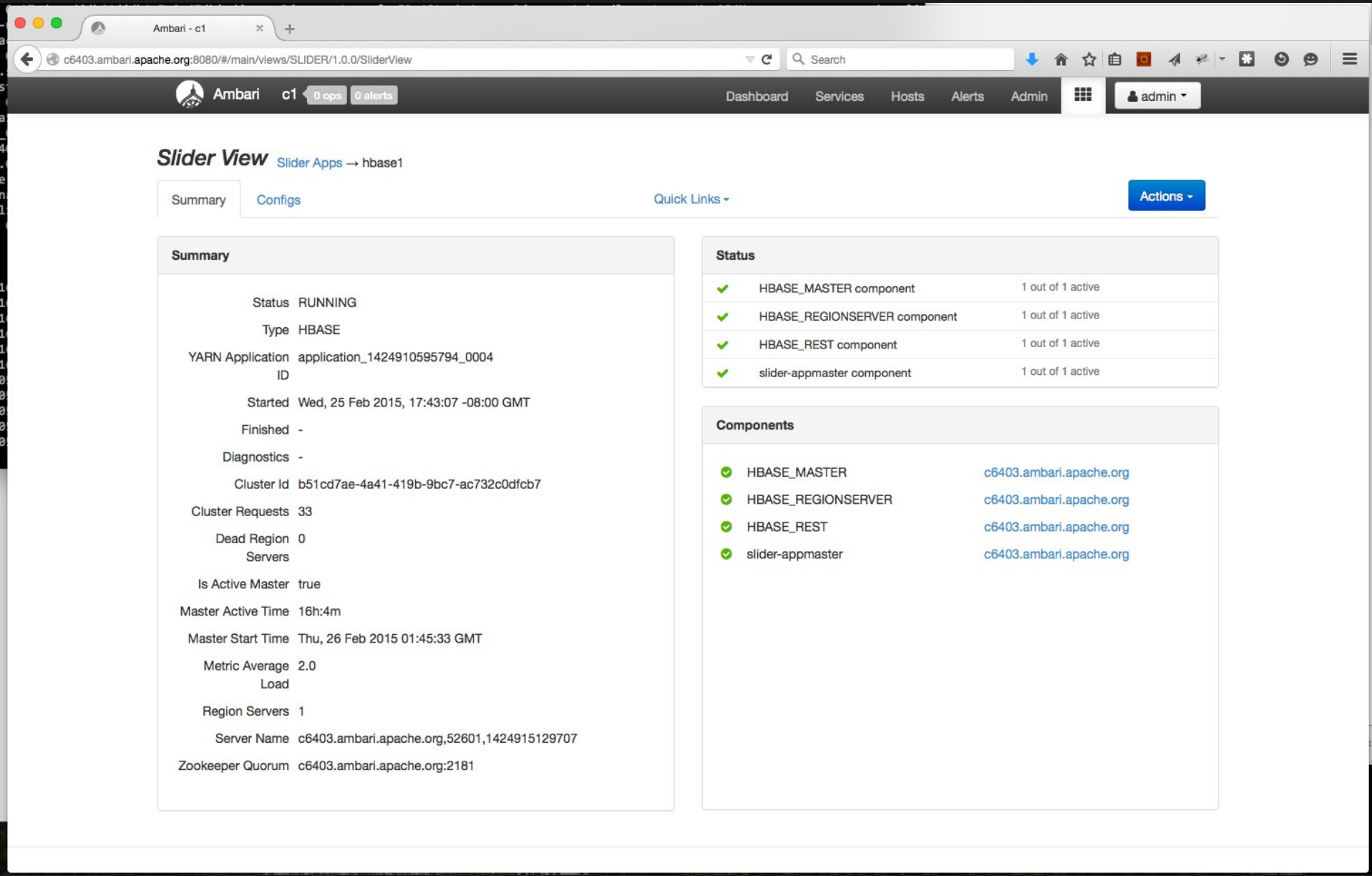
Managed Slider



- Ambari imports app packages
- Starts the AM
- Interacts with AM to start containers
- Agents register with Ambari
- Ambari sends commands/ receives results
- YARN manages containers
- Info pulled from registry


Ambari - c1
c6403.ambari.apache.org:8080/#/main/views/SLIDER/1.0.0/SliderView
Search
Ambari
c1
0 ops
0 alerts
Dashboard
Services
Hosts
Alerts
Admin
admin
Slider View
yarn
+ Create App
Create App
Select Type
Allocate Resources
Configuration
Deploy
Select Application
Application Types
HBASE
Description
Deploys HBASE cluster on YARN.
Name
Enter Name (required)
Scheduler Options
Queue Name
(optional)
YARN Labels
Any Host
Non-Labeled Host
Specify Label
Log Aggregation
Include File Patterns
*.log
Exclude File Patterns
*.zip
Frequency
3600
Seconds
Licensed under the Apache License, Version 2.0.
See third-party tools/resources that Ambari uses and their respective authors


Ambari - c1
c6403.ambari.apache.org:8080/#/main/views/SLIDER/1.0.0/SliderView
Search
Ambari
c1
0 ops
0 alerts
Dashboard
Services
Hosts
Alerts
Admin
admin
Slider View
Slider Apps → hbase1
Summary
Configs
Quick Links
Actions
Summary
Status RUNNING
Type HBASE
YARN Application ID application_1424910595794_0004
Started Wed, 25 Feb 2015, 17:43:07 -08:00 GMT
Finished -
Diagnostics -
Cluster Id b51cd7ae-4a41-419b-9bc7-ac732c0dfcb7
Cluster Requests 33
Dead Region Servers 0
Is Active Master true
Master Active Time 16h:4m
Master Start Time Thu, 26 Feb 2015 01:45:33 GMT
Metric Average Load 2.0
Region Servers 1
Server Name c6403.ambari.apache.org,52601,1424915129707
Zookeeper Quorum c6403.ambari.apache.org:2181
Status
HBASE_MASTER component 1 out of 1 active
HBASE_REGIONSERVER component 1 out of 1 active
HBASE_REST component 1 out of 1 active
slider-appmaster component 1 out of 1 active
Components
HBASE_MASTER c6403.ambari.apache.org
HBASE_REGIONSERVER c6403.ambari.apache.org
HBASE_REST c6403.ambari.apache.org
slider-appmaster c6403.ambari.apache.org

March 2015: 0.70-incubating

- security tweaks
- REST API (R/O by default)

April/May 2015: 0.80-incubating

- Rolling Upgrades
- Package definition in files, not zip
- Co-processor installation
  (package on package)
- Placement v2

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http://slider.incubator.apache.org/

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