

# Spark on IBM Platform Computing Technology

Jun Feng Liu  
liujunf@cn.ibm.com

# IBM Platform Computing

- Start with HPC background
  - Platform LSF
  - Platform Symphony
  - Customers: Financial, Manufacture, Electronic design
- Expertise on
  - Cluster resource management
  - Heterogeneous workload co-existing and scheduling
  - Distribution System & Computing
- Enter into big data world
  - Mapreduce
  - Spark
  - Etc
- IBM Spark services
  - Bluemix
  - OpenPower Cloud (Supervessel)
  - Power Cloud (POK)

# On demand Spark cloud services

- Dedicate Cluster
  - Runs spark as standalone model
  - No Resource manager
  - Service offer by node numbers
  - Service availability (restart, zookeeper)
- Challenge
  - How to isolation
    - Normally runs on Docker & VM
  - How to provision
    - Leverage OpenStack or similar technology to provision cluster
  - How to scale
    - Monitor the resource utilization
    - Dynamic add new node into cluster
  - How to shrink
    - Mostly trigger by user because of SLA
  - How to store data
    - HDFS co-existing with Spark cluster
    - Separated storage services (data locality)

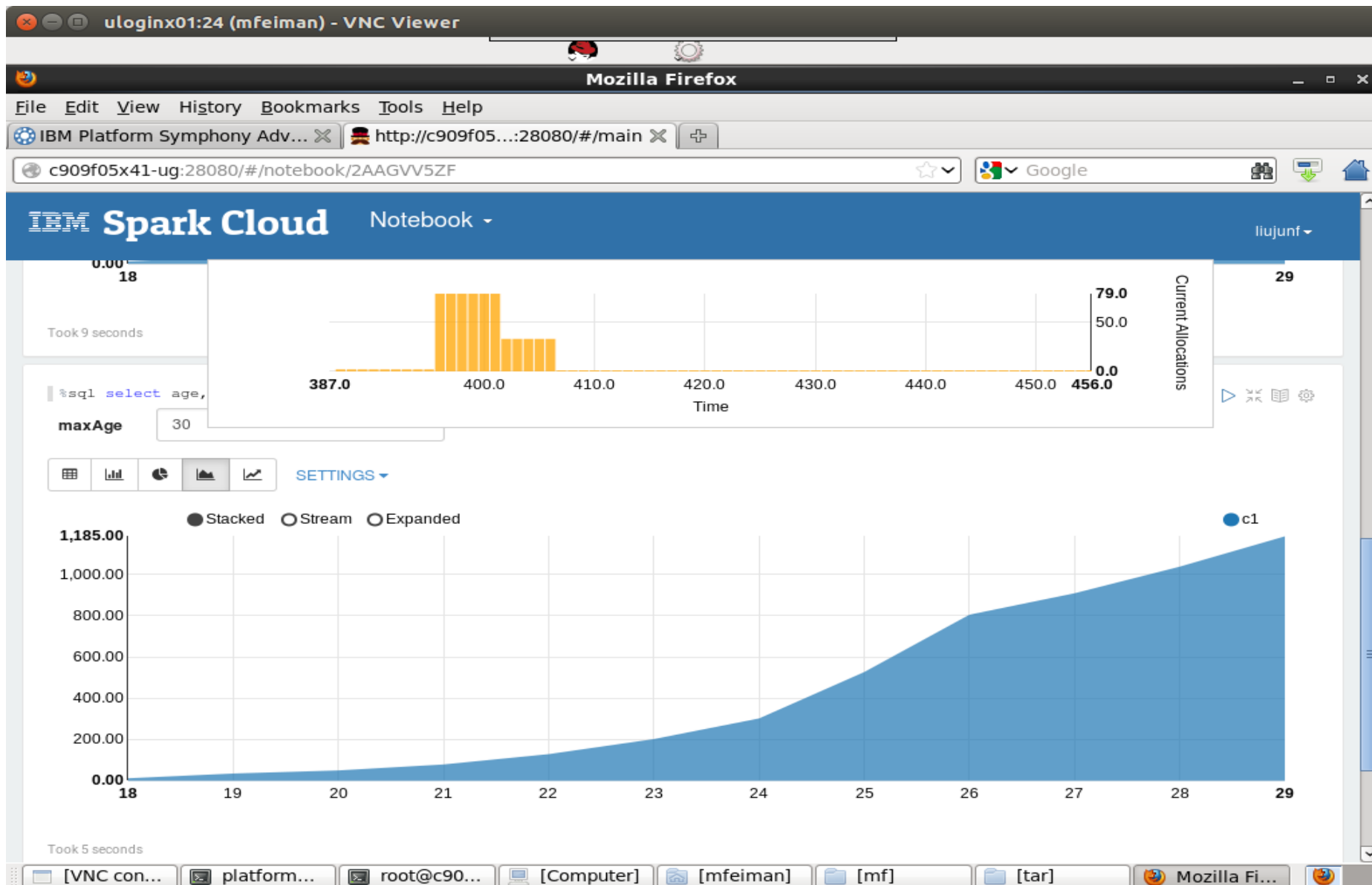
# On demand Spark cloud services

- Spark on YARN or Mesos
  - Leverage Resource Manager
  - Dynamic Start executor
  - Mix work load on same clusters
  - Service cloud based on Resource level
  - Service availability (retry)
- Challenge
  - How to isolation
    - Could be Docker or VM or user level
  - How to provision
    - Pre-deploy the cluster, but let resource manage decide where and when to start them
    - User level isolation
  - How to scale
    - Fine grained – v.s - Coarse Grained
  - How to shrink
    - Depends on resource manager
    - Reclaim consideration ( driver? Executors? Dependencies services?)
  - How to store data
    - Shared HDFS with all tenant
    - Separated storage services

# On demand Spark cloud services

- Spark on Platform Symphony
  - Notebook, Batch and Streaming (Scala and python)
  - Fine grained scheduler based on Job and tasks in Realtime
  - Scheduling based on data locality and tasks types
  - Improve the memory utilization based on tasks types
  - Heterogeneous workload co-existing and scheduling
  - Service level based on slot numbers
- Challenge
  - How to isolation
    - Application based (user based) isolation
    - LxC and docker is option
  - How to provision
    - Platform Symphony Advance Service controller, or Apache Ambari
  - How to scale
    - Tenant users balance the resource based on policy
    - Scaling drive by scheduler and workload
    - Real time adjust resource boundary based on job type
    - grouping spark driver and executor
  - How to shrink
    - Executor reduce the resource when tasks number go down
    - Share extra slots with Mapreduce, LSF and other workload
    - Smart Reclaim & Maintains Reclaim
  - How to store data
    - Shared HDFS with all tenant (better data locality)
    - OpenStack Swift

# IBM InterConnect & Strata Demo



# IBM Bluemix Snapshot

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REGION: US South

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## Apache Spark Starter

IBM

The IBM Starter for Apache Spark helps data scientists and data analysts deliver insights and business outcomes through interactive analytics powered by IPython Notebooks, Apache Spark, and Object Storage.

VERSION  
0.1

TYPE  
Boilerplate

[VIEW DOCS](#)

Apache Spark ...

Object Storage

Apache Spark

Powerful Interactive Analytics Environment - IPython Notebooks are a simple but powerful environment that makes it easy for data scientists and data analysts to perform interactive analytics by combining text, rich media, and code execution into a single environment. The combination of IPython Notebooks, Apache Spark, and Object Storage deliver a complete and integrated experience for data scientists and analysts when performing interactive analytics. The object storage service simplifies data management while the IPython Notebook exposes the full power of Python and Apache Spark's Spark SQL and Spark Streaming programming models.

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### Pick a plan

Monthly prices shown are for country or region: United States

Plan	Features	Price
✓ Default	Run one or more apps free for 30 days (375 GB-hours free, shared across Bring Your Buildpack and Community runtimes).	\$0.07 USD/GB-Hour

This is a service plan for the IBM Bluemix Platform runtime.

### Create an app:

Space:

dev

Name:

Enter new app name

Host:

Enter host

Domain:

stage1.mybluemix.net

Selected Plans:

Apache Spark Starter

Default

Object Storage

Free Beta

Apache Spark

Free

[CREATE](#)

## Spark on Open Power (Super Vessel)

- Open Power Cloud drive by China Research lab (Super Vessel)
  - Help University and OpenPower alliance to develop application
  - Launch the spark as-a-Service on Super vessel
  - Right now is based on standalone spark cluster
- Discussing to move to Spark on Symphony platform
  - Similar architect that Spark on Bluemix
  - Promote the solution on Open Power ecosystem



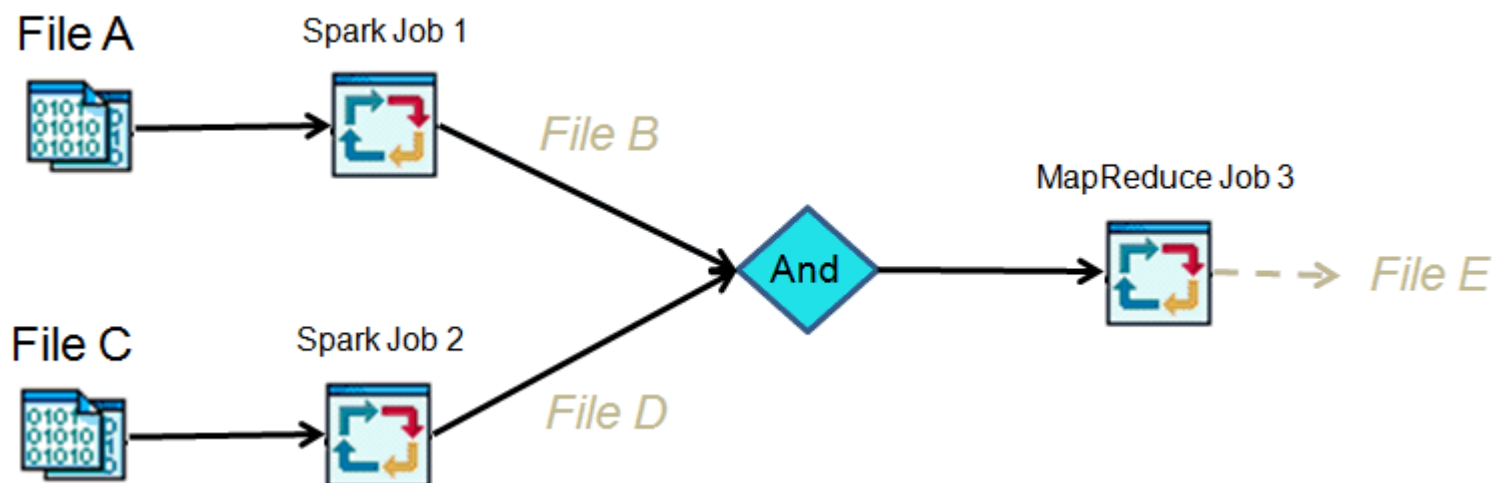


# Super vessel user cases

- Public Spark Services
  - Notebook interface to support Scala and Python
  - User request spark services instance
  - Takes one slot from the system by default
  - Auto-scaling drive by workload and share the same cluster
  - Auto-scaling the cluster node by open stack
- Private Spark Services
  - Professor can make a pre-defined cluster for their students
  - Each student keep one tenant on the cluster
  - Use notebook finish the research work.

# Life Science App on Spark

- ADAM is the open source life science solution based on SPARK
- Platform have good customer based on the domain
- Connected with ADAM originator Tim during Spark 2015
  - PPM offer a work-centric view
  - Hybrid work load on EGO
  - Mapreduce, Spark and LSF



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