Embracing Spark as the Scalable Data Analytics Platform for the Enterprise

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Spark Summit East 2015
How did we get here today?

- “Mixing Structured Data and Analytics with Spark SQL”
  Michael Armbrust
- “Make Simple things simple and complex things possible”
  Alan Kay (by way of Ali Ghodsi Spark Summit 2014 demo)
- Spark write-up went viral on our internal social media platform
I’d Seen the Future in Apache Spark…

- Intuitive language bindings to Scala, Java, Python, R
- Combining relational, functional, iterative APIs all into lazy-evaluation data pipelines
- Storage agnostic
- Lambda closures
- Similar abstraction to GS internal platform’s very successful tabular dataset framework
- Scala was already becoming a viable GS platform
What makes Big Data scalable?

- Elasticity in 3 dimensions:
  - Data Storage = ________________
  - Compute = ________________
  - Users = ________________
Compute Elasticity =

• But first, how many people have...
  – Used a proprietary data analytics framework?
  – Written their own data analytics framework?
  – Wrapped their own framework around Spark?
Don’t wrap Spark!

• Power of Spark is in the API abstractions (e.g., RDD, DataFrame)

• Spark is becoming “Lingua Franca” of Big Data analytics

• Contribute to open source instead of wrapping!
Everyone is building Data Lakes

- Universal data acquisition makes all big data analytics and reporting easier
- Hadoop provides a scalable storage with HDFS
- How will we scale consumption and curation of all this data?
There was a dream that was [Spark]...

- Embrace Spark as the elastic data consumption and curation engine to harness the power of the Data Lake
- All Data Lake datasets available as Spark RDD DataFrames
- Achieve data transformation lineage
  - Data Lake manages DAG of all datasets transformation dependencies
  - Spin up CPU-segregated Spark clusters to compute and store curated data back to Data Lake
What about Integration?

- Embed Spark driver code directly inside JVM applications just like any other Scala library
- Leverage existing SDLC using existing JVM IDE environment instead of spark-submit for easier debugging
- Dynamically deploy code to cluster at run-time with lambda closures and:
  ```scala
  val sc = new SparkContext(conf)
  sc.addJar(JarCreator.createJarFile(JarCreator.getClassesFromClassPath(getClass.getPackage.getName)))
  ```
- Allow multiple applications with different code wavefronts to share Spark Clusters
What are the Integration Challenges?

• Getting machines provisioned to run Spark
• Should Spark and HDFS be run on the same cluster?
  – CPU segregation versus minimizing I/O
  – Data replication for segregation
• Library version synchronization of all open source libraries between Spark, HDFS as well as driver applications
  – Hadoop vendors only offer a partial solution
Is Enterprise Data going to Public Cloud?

• Managed cloud data services can provide:
  – Centralized management of clusters
  – Offer choice of Hadoop/Spark versions
  – Same SQL, Spark client APIs
  – Elastic scale and self-service automation

• Why not Public Cloud for Enterprise Data:
  – Regulation
  – Single Cloud Provider Lock-in
  – Data Encryption
  – User entitlement provisioning
ETL is still the big problem

- Data needs to be ingested into scalable storage
- Each enterprise will build its own Data Lake
- Moving data is HARD!
- A lot of this data is coming from the same external vendors who are dumping their databases to file feeds for each customer
- Lots of resources at each enterprise are spent reconstructing these vendor databases in Data Lakes alongside internal enterprise data
• Managed cloud data services have the market disrupting potential to become **Cloud Data Exchanges**:  
  – “ETL-once” loading of vendor data by vendors  
  – Scalable compute near data with no persistent data movement  
  – Vendors can provision access to their data directly to customers  
  – No need for each enterprise to ETL the same vendor data  
  – Enterprises could then load their data securely alongside vendor data for analytical consumption via standard APIs  
• This kind of game changing managed cloud data service will be what really tips the enterprise public cloud data scale
Takeaways

• Build muscle memory for easier open source contribution
• Think of Spark Client API like ODBC/JDBC
• Embrace don’t wrap Spark APIs to prepare for accelerated move of enterprise data to Public Cloud
we
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