What Would Google Do ....

Ulf Andreasson

7th Oct 2014
... what would Google do?
Data is doubling in size every two years
GFS
BigTable
M.C. Srivas, CTO and Co-founder

- Ran one of the major search infrastructure teams at Google, 80,000 nodes
- GFS, Map/Reduce, BigTable and Dremel
- Wanted to evolve Hadoop – simplicity, performance and reliability
- JIRA’s – needed architectural changes
- EMC bought into this before the product was released
- Future: DB, RT, BORG, etc …
- CV:
  - Google
  - Spinnaker Networks (NTAP): built the industry’s most scalable and fastest single-box NAS filer
  - Transarc (now IBM): managed the Andrew File System (AFS) engineering team
Architecture Matters
Architecture Matters

Data protection & security

Open standards for integration

High Performance

Multi-tenancy

Security

Operational & Analytical

Architecture Matters
MapR: The Best In-Hadoop NoSQL Database

- NoSQL Table-style Store
- Apache HBase API
- Integrated with Hadoop

The most scalable, enterprise-grade, NoSQL database that supports online applications and analytics

Other Distros

MapR M7

Disks

Tables/Files

Disks

ext3/ext4

JVM

HDFS

JVM

HBase

Disks

Other Distros

MapR M7

The most scalable, enterprise-grade, NoSQL database that supports online applications and analytics
HBase Apps: High Performance, Consistent Low Latency

YCSB Mixed (50% Update-50% Read) Test (10 Nodes)
Source: 2TB (1K RowSize)
Read Latency ONLY: 10-sec Moving Average & y-Axis Cap=400msec

Elapsed Time (360sec = 6 min)

- Other Distributions HBase (μsec)
- MapR M7 (μsec)
World Record Performance

NEW MINUTESORT WORLD RECORD

1.65 TB
IN 1 MINUTE
298 NODES

PREVIOUS RECORD: 1.6 TB
with 2200 nodes

Previous Record

MapR: With a Fraction of the Hardware
Architecture

Random R / W

(WORM)
Architecture

8k/16GB/256MB

(128MB/128MB/128MB)
MapR-FS
scalability

HDFS

MapR-FS

POSIX

interoperability
The Power of the Open Source Community
MapR Distribution for Hadoop

APACHE HADOOP & OSS ECOSYSTEM

- ZooKeeper
- Oozie
- Hue
- Pig
- Hive
- Impala
- Shark
- Drill
- Tez
- Flume
- HttpFS
- Cascading
- Solr
- Juju
- Mahout
- MLLib
- Knox
- Sentry
- Sqoop
- Whirr
- HBase
- MapReduce
- YARN
- Storm
- Spark Streaming
- Spark
- Falcon

- High availability
- Data protection
- Disaster recovery
- Standard file access
- Standard database access
- Pluggable services
- Broad developer support
- 2X to 7X higher performance
- Consistent, low latency
- Ability to logically divide a cluster to support different use cases, job types, user groups, and administrators
- Enterprise security authorization
- Wire-level authentication
- Data governance
- Ability to support predictive analytics, real-time database operations, and support high arrival rate data

Enterprise-grade

Interoperability

Performance

Multi-tenancy

Security

Operational

© 2014 MapR Technologies
## High Availability (HA) Everywhere and OOTB

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
</table>
| No NameNode architecture | • Distributed metadata can self-heal  
                          | • No practical limit on # of files                                           |
| MapReduce/YARN HA     | • Jobs are not impacted by failures  
                          | • Meet your data processing SLAs                                             |
| NFS HA                | • High throughput and resilience for NFS-based data ingestion, import/export and multi-client access |
| Instant recovery      | • Files and tables are accessible within seconds of a node failure or cluster restart |
| Rolling upgrades      | • Upgrade the software with no downtime                                       |
| HA is built in        | • No special configuration to enable HA  
                          | • All MapR customers operate with HA                                         |
History of MapR-DB

- 2011-2013: 50% of support calls were for HBase
- May 2013: MapR M7 Edition released
  - Integrated tables and files for Hadoop
  - Consistent low latency and high stability for HBase applications
- 2013-2014: Reached inflection point at which majority of customers buy MapR-DB (M7 Edition)
- Sept ’14: MapR-DB breaks 100 Million data points/sec ingest speed
- Customers require easier onramp for streaming applications
- MapR is now bringing MapR-DB to MapR M3, the Community Edition
MapR DB a.k.a. M7 - No HBase Master or RegionServers

- No extra daemons to manage
- One hop to data
- Unified cache
- No JVM problems
## Interactive SQL-on-Hadoop: You Choose!

<table>
<thead>
<tr>
<th>Feature</th>
<th>Drill 1.0</th>
<th>Hive 0.13 with Tez</th>
<th>Impala 1.x</th>
<th>Presto 0.56</th>
<th>Shark / Spark SQL</th>
<th>HP Vertica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Files</td>
<td>Yes (all Hive file formats)</td>
<td>Yes (all Hive file formats)</td>
<td>Yes (Parquet, Sequence, …)</td>
<td>Yes (RC, Sequence, Text)</td>
<td>Yes (all Hive file formats)</td>
<td>Yes (all Hive file formats)</td>
</tr>
<tr>
<td>HBase/M7</td>
<td>Yes</td>
<td>Yes</td>
<td>Various issues</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Schema</td>
<td>Hive or schema-less</td>
<td>Hive</td>
<td>Hive</td>
<td>Hive</td>
<td>Hive</td>
<td>Proprietary or Hive</td>
</tr>
<tr>
<td>SQL support</td>
<td>ANSI SQL</td>
<td>HiveQL</td>
<td>HiveQL (subset)</td>
<td>ANSI SQL</td>
<td>HiveQL</td>
<td>ANSI SQL + advanced analytics</td>
</tr>
<tr>
<td>Client support</td>
<td>ODBC/JDBC</td>
<td>ODBC/JDBC</td>
<td>ODBC/JDBC</td>
<td>ODBC/JDBC</td>
<td>ODBC/JDBC</td>
<td>ODBC/JDBC, ADO.NET, …</td>
</tr>
<tr>
<td>Large joins</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Nested data</td>
<td>Yes</td>
<td>Limited</td>
<td>No</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td>Hive UDFs</td>
<td>Yes</td>
<td>Yes</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Transactions</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Optimizer</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Yes</td>
</tr>
<tr>
<td>Concurrency</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
<td>Yes</td>
</tr>
</tbody>
</table>
MapR: The Top Ranked Current Offering

“MapR Technologies provides a comprehensive NoSQL key-value offering that integrates tightly with Hadoop and HBase big data environments”
MapR: The Top Ranked Current Offering

“The score speaks for itself. MapR has added some unique innovations to its Hadoop distribution, including support for Network File System (NFS), running arbitrary code in the cluster, performance enhancements for HBase, as well as high-availability and disaster recovery features.”
Industry Leaders Choose MapR for the Cloud

Amazon EMR is the largest Hadoop provider in revenue and # of clusters
http://aws.amazon.com/elasticmapreduce/mapr/

Google chose MapR to provide Hadoop on Google Compute Engine
https://cloud.google.com/solutions/hadoop

Deploying OpenStack?
MapR is partnering with Canonical and Mirantis on OpenStack support.
Google Capital bet on MapR …

“Google understands that the best experience comes form the best product that is engineered without any prejudice” … understands the power of combining open source and proprietary technology !!!

“We’ve been impressed by MapR’s reliability, performance and data protection — all capabilities that their customers report as reasons they chose MapR. Beyond the products and technology, MapR has a great management team that has built a strong, growing and attractive business,” said Gene Frantz, general partner at Google Capital. 


Google Capital doesn’t invest in that many companies, in fact, before today there were only six. And when they do invest, they’re hardly silent partners. “We have the capability to use our money, our time, our effort, our expertise, our brain power, and the Google brand to help build great companies,” said David Drummond, chairman of Google Capital

Company Profile

- Founded in 2009
- Deep management bench with extensive analytic, storage, virtualization and open source experience
- Worldwide presence
  - Engineering & Support in San Jose, CA and Hyderabad, India
  - Sales and field engineering in US, UK, France, Germany, Sweden, Singapore, Japan, Korea, Australia
- 1000s of deployments including
  - 14+ of Fortune 100 companies
  - 500+ paying customers
Thank You

@sn00fy / @mapr  
maprtech  

mapr-technologies  
MapR  

ulf@mapr.com  
maprtech
100B AD AUCTIONS per day
Fortune 100 Retailer

45M SHOPPERS analyzed each month
360° Customer View

5PB

CUSTOMER DATA
Largest Biometric Database in the World

1.2B PEOPLE

NAME: 
DOB: 
UID. No: 

© 2014 MapR Technologies
Thank You

@sn00fy / @mapr  
maprtech

mapr-technologies  
MapR

ulf@mapr.com  
maprtech