Alluxio (formerly Tachyon)

Open Source Memory Speed Virtual Distributed Storage

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About Alluxio

• Team
  – Alluxio Creators and Top Developers/Committers (all top 8 committers).

• Investors

ANDREessen HORowitz
Performance Trend: Memory is Fast

- RAM throughput increasing exponentially
- Disk throughput increasing slowly
- Memory-locality key to interactive response
Price Trend: Memory is Cheaper

Source: jcmit.com
The Big Data Ecosystem Today

Computational Frameworks
- Spark
- MapReduce
- Flink
- Zeppelin
- Presto
- ...

Storage Systems
- S3 (Amazon)
- GCS (Google)
- Swift
- HDFS
- GlusterFS
- ...

Native File System Interface
Hadoop Compatible FS Interface
Native Key-Value Interface
FUSE Compatible FS Interface

ALLUXIO
What is Alluxio?

- Alluxio: Memory Speed Virtual Distributed Storage
- Enables Virtualized Data Across Multiple Types of Storage
Open Source Alluxio System

• The fastest growing open source project in big data
• Over 250 contributors from over 100 organizations
Alluxio Benefits

• Flexibility
  – Enable new workloads across any storage systems
  – Unified Name Space enable application to access data in any storage system

• Agility
  – Work with the framework of your choice
  – Work with the storage of your choice

• Performance
  – High performance data access

• Cost
  – Grow Storage and Compute independently

• Any application accesses any data from any storage at memory speed.
New Features

• Tiered Storage
• Transparent Naming
• Unified Namespace
• Native Amazon S3, Google Cloud Storage, Open Stack Swift, Alibaba OSS integrations
• Fuse Connector, K/V Interface
• One Command Cluster Deployment
• Metrics Reporting
The Storage Tier Hierarchy

MEM

SSD

HDD
Automatic Data Migration

- Data can be evicted to lower layers if it is “cooling down”
- Data can be promoted to upper layers if it is “warming up”
Transparent Naming

- Applications can transparently and efficiently interact with remote storage through Alluxio.
- Applications do not need to use different APIs for interacting with different storage systems.
Unified Namespace

- Applications can read and write different storage systems
- Decouples data location from application
Use Cases

• Accelerate access to remote storage
• Share data across jobs at memory speed
• Transparently manage data across different storage systems
• Framework: Spark
• Under Storage: Baidu’s File System
• Storage Media: MEM + HDD
• 200+ nodes deployment

Baidu Queries Data 30 Times Faster with Alluxio
• Framework: Spark
• Storage Media: MEM
• Improvement from Hours to Seconds

Making the Impossible Possible with Tachyon: Accelerate Spark Jobs from Hours to Seconds

Barclays Data Scientist Gianmario Spacagna and Harry Powell, Head of Advanced Analytics, describe how they iteratively process raw data directly from the central data warehouse into Spark and how Tachyon is their key enabling technology.
• Framework: Spark Streaming & Hive
• Under Storage: HDFS & Ceph
• Storage Media: MEM + HDD
• 200 nodes deployment
• Alluxio enables previously impossible jobs to finish
• 300x Performance Improvement
Contacts

• Alluxio Project: www.alluxio.org
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• Development: www.github.com/Alluxio/alluxio
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Thank You