# When Rotten Tomatoes Isn't Enough

## Analyzing Twitter Movie Reviews using DataStax Enterprise

**Amanda K Moran**
**Developer Advocate for DataStax**

# What Are We Talking About Today

- What Problem Are We Trying To Solve?
- Introduction to Apache Cassandra
  - What is it?
  - Why do I need it?
- Introduction To Apache Spark
  - What is it?
  - Why do I need it?
- What is Sentiment Analysis?
- How does DataStax Enterprise Analytics Help Us?
- Overview of Demo
- Actual Demo!

# But first… A Little About Amanda


- California Native born in Redlands
- Graduated with MS in Computer Science and Engineering from Santa Clara University in 2012
- Worked as a Software Engineer for 6 years at Lockheed Martin, HP, Teradata, Esgyn and now DataStax as a Developer Advocate
- Apache Committer, PMC Member, and initial contributor to all installation and deployment work for Apache Trafodion
- Keywords: Disney, Cloud, Dogs, Veggies, Linux, Databases, Big Data, Analytics, Testing, and Running

# What Problem Are We *Really* Trying to Solve?

# What Movie Should I See?

- Wouldn't it be great if I could ask 1 million people this question?
- Wouldn't it be great if I could automate this process?
- Data Analytics doesn't have to be complicated!
- We are going to utilize the power of Big Data using
  - Apache Cassandra
  - Apache Spark
  - Spark Machine Learning library
  - Jupyter notebooks
  - Python
  - Twitter Tweets and API
  - Pattern for Sentiment Analysis







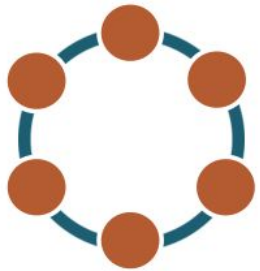
# (Brief) Introduction to Apache Cassandra

# What is Apache Cassandra?


- First developed by Facebook
- Became a top-level Apache Foundation project in 2010
- ***Distributed***, decentralized database
- Elastic scalability -- add/remove nodes with no downtime
- High performance -- very fast
- High availability / fault tolerant -- no single point of failure
- Solves many of the problems faced with a traditional DB for certain workloads

# What is DataStax Enterprise?

- DataStax has been some of the key contributors to the Cassandra project
  - DataStax Enterprise is a commercial product that provides
    - More cool features
    - More QA
    - More support



DATASTAX
The power behind the moment.

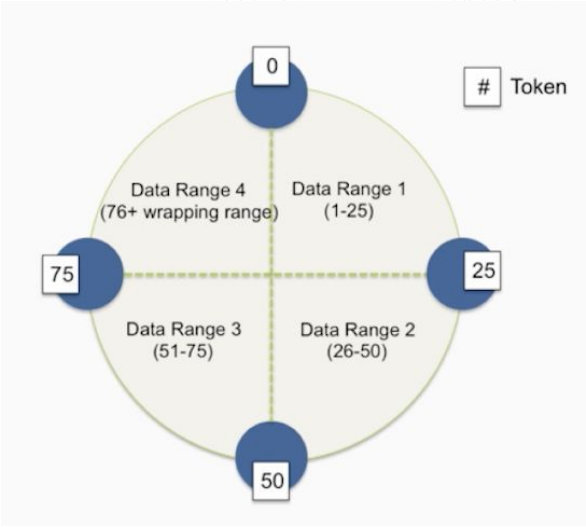
# What Does All This Mean?

- Let's talk about 4 Big Topics:
  - Distributed
  - Replication
  - Elastically Scalable
  - High Availability

Note: Don't forget this is just a brief intro!

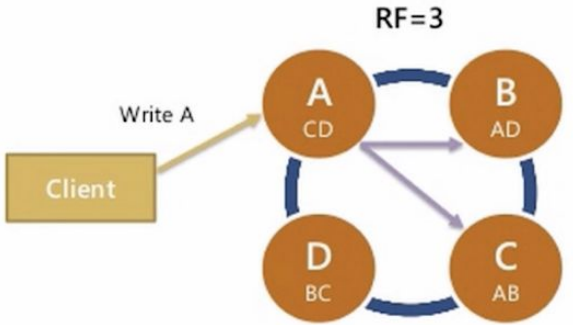
# Distributed

- Every node in the cluster has the same role
  - Really!
  - Cassandra does not have a Master-Worker Architecture
- Any client can connect to any node
  - All nodes are Read and Write ready
- But this is not to say that all nodes contain all data



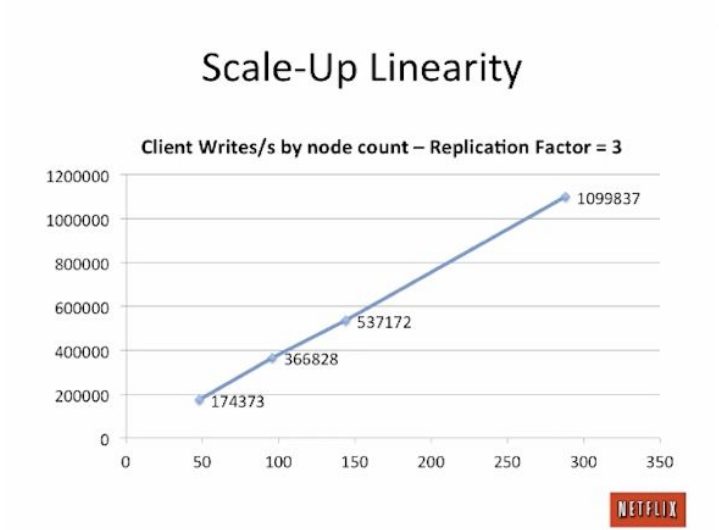
# Replication

- To be able to survive a node going down data must be copied to other nodes
- The Replication Factor (RF) is set by the user
  - 1-Number of nodes in the Cluster (not recommended)
- The data is asynchronously replicated
  - Automatic
  - Peer-to-peer communication



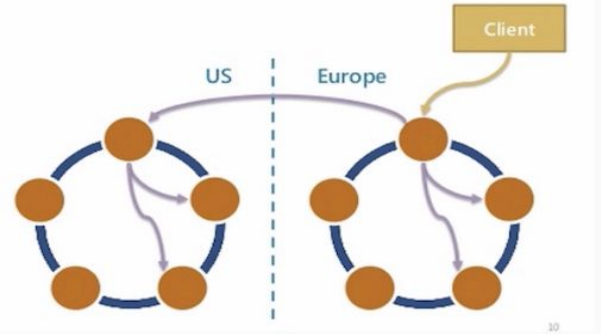
# Elastically Scalable

- As more nodes are added, performance increases linearly
- You can scale up or down with no downtime
  - Not even a restart!
- Reads and Writes both scale



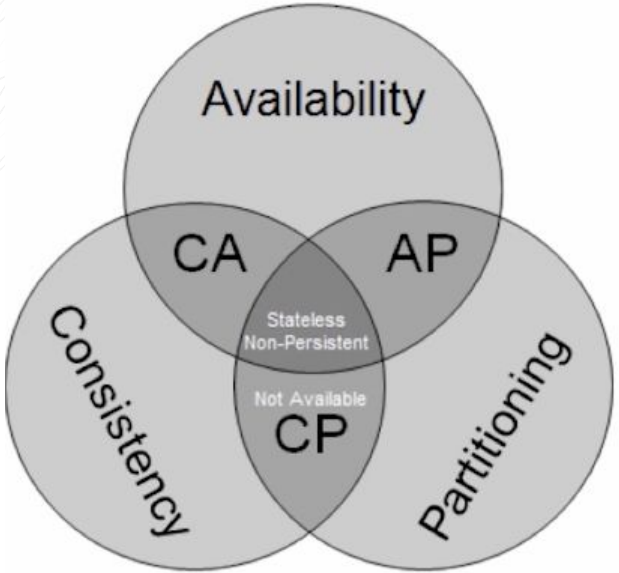
# High Availability

- The lack of a Master node allows for high availability
  - No single point of failure
- Replication allows nodes to fail and data to still be available
  - Cassandra expects nodes to fail and doesn't panic
- Multiple Data Center support is out of the box



# One Small Trade Off

- The CAP Theorem
  - Availability
  - Consistency
  - Partitioning
- You can't have it all --Impossible
  - Cassandra chooses to have eventual consistency as the default
  - But you can prioritize consistency over availability
    - Consistency levels are configurable!



# Why Do I Need Cassandra?

- Think about your application:
  - Do you have Big Data (a lot of it!)?
  - Do you need to be able to read/write fast?
  - Do you need to be able to scale up/down easily?
  - Do you need High Availability?
  - Do you need multiple data center support?
    - Multi-cloud/hybrid cloud support?

If you application needs any of these things, you want to consider Cassandra!

# (Small) Introduction to Apache Spark

# What is Apache Spark?

- "Apache Spark is a unified analytics engine for large-scale data processing" --https://spark.apache.org
- 100 times faster than Hadoop for analytics
  - Utilizes in-memory processing
  - Amazing parallelism
- Machine Learning library -- Spark MLlib

# Why Do I Need Spark?

- Think about your application:
  - Do you have Big Data?
  - Do you need High Availability?
  - Do you need analytics at lightning speed?
  - Do you need a simple way to get insights into your data?

If you application needs any of these things, you want to consider Spark!

# What is Sentiment Analysis?

# What is Sentiment Analysis?

- Sentiment Analysis at a high level is very simple
- Natural Language processing and text analytics to determine if a word or sentence
  - Positive
  - Negative
  - Neutral
- This is easy to understand, but difficult for machines to learn how to do!

# How does DataStax Enterprise Analytics Help Us?

# Cassandra vs DSE Analytics

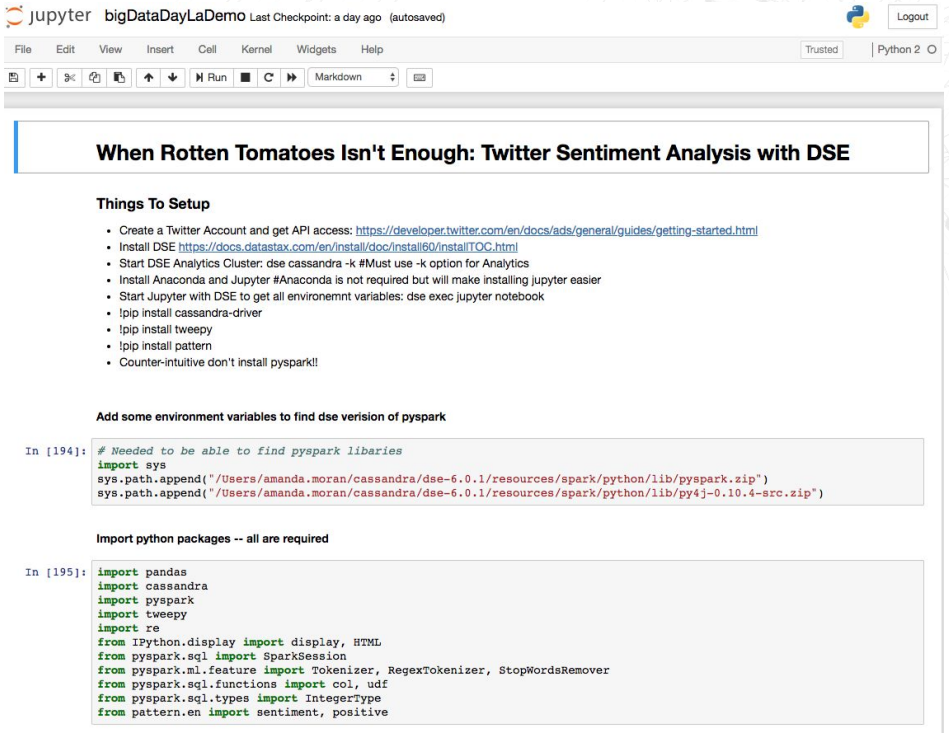
| | Cassandra | DSE Analytics |
|---|---|---|
| Spark integration | No -- connectors available | Yes |
| High Availability | HDFS, Spark Resource Manager | No Single Point of Failure |
| Support | Jira, emails, google! | Dedicated support |
| Deployment | Manual installation | DSE Ops Center |

One unified platform to do all this complex work!

# Demo Overview

# Analyzing Twitter with DSE Analytics and Jupyter

- Local DSE Analytics Setup
- Local Jupyter Setup
- Pull twitter data on a movie title
- Clean up the tweets
- Insert into Cassandra
- Create Spark Dataframe
- Use Spark ML
- Sentiment Analysis with Pattern
  - Gives positive/negative
- Take average of these scores
- Should I see this movie??



# Demo

**cassandra, Spark, Python, Jupyter Notebooks, Cassandra Python driver, Tweets, Twitter API, and Pattern**

# Information and Links

- Get this demo: https://github.com/amandamoran/bigdatadayla
  - More analytics to come!
- Learn more about Cassandra: https://academy.datastax.com/
- Learn more about Spark: https://spark.apache.org/
- Learn more about DataStax: https://www.datastax.com/
- Follow me on Twitter: @AmandaDataStax
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