

Production Readiness Testing Using Apache Spark

Jag Jayaprakash
Ganesh Tiwari

The Spark Summit logo is centered within a white circle. It features the word "Spark" in a bold, black, sans-serif font, with a stylized orange star above the "k". Below "Spark" is the word "summit" in a smaller, black, sans-serif font. The background of the slide is a solid blue color with decorative elements: a white scalloped shape in the top-left corner, a large circular pattern of fine lines in shades of blue and green behind the logo, and a small blue cloud shape in the bottom-right corner containing the Salesforce logo.

Spark
summit

salesforce

Background: Salesforce App Cloud

FORCE

Model-driven
development
platform

HEROKU

Polyglot platform for
elastic scale

APP EXCHANGE

Enterprise App
Marketplace



LIGHTNING

Visual Development
Platform

THUNDER

Stream & event based
primitives



Background: Apex

STRONGLY TYPED

Direct references to schema objects

LOOKS LIKE JAVA

Acts like database stored procedures

OBJECT ORIENTED

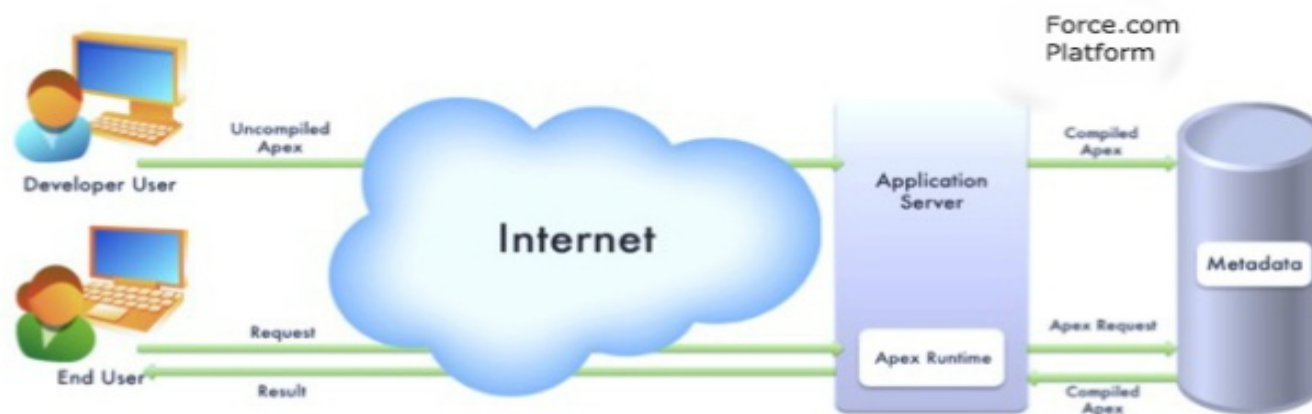
Visual Development Platform

CLOUD HOSTED COMPILER

Interpreted & executed on on multitenant environment

EASY TO TEST

Built-in support for creation & execution of unit tests



Background: Hammer Process (Aka Production Readiness Testing)

CUSTOMER UNIT TESTS ARE EXECUTED TWICE

in Salesforce secured environment in data centers

1st EXECUTION CALLED THE **BASELINE**

on current production version

2nd EXECUTION CALLED THE **UPGRADED**

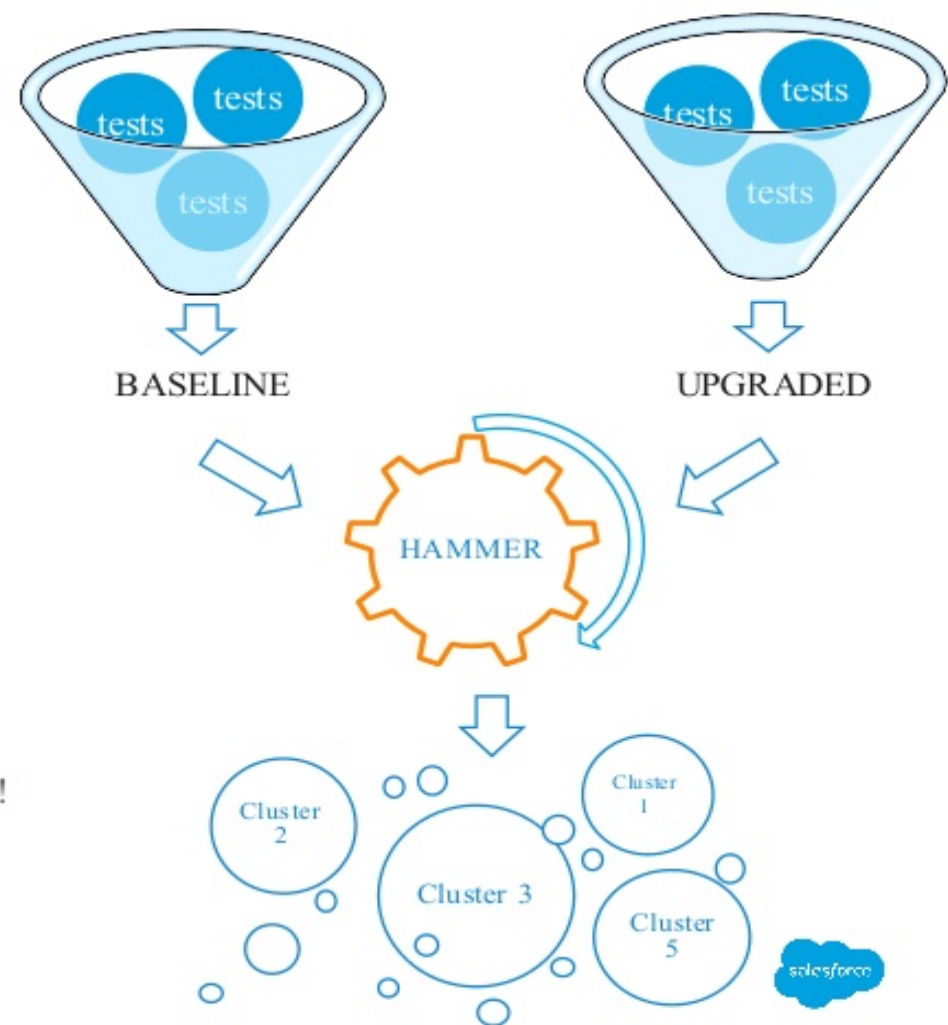
on release candidate version

UPGRADED AND BASELINE RESULTS ARE COMPARED

When a test passes, it should pass in both versions.

When a test fails, it should fail in both versions.

Any other outcome is a potential bug in release candidate version!



Challenges

150+ million customer tests and growing

Infrastructure setup to execute hammer on two different platform versions

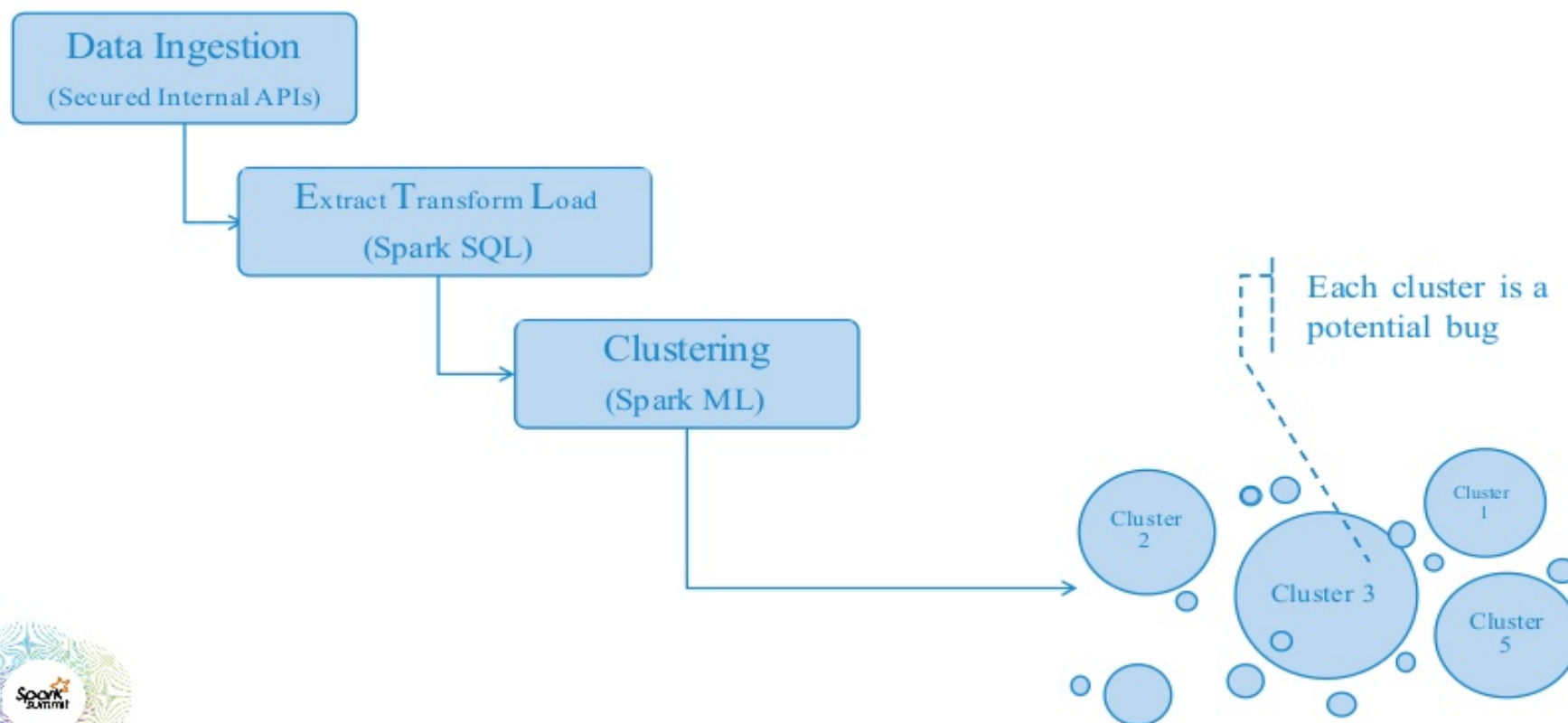
Persist and compare test execution results

Tests are executed highly secured data centers

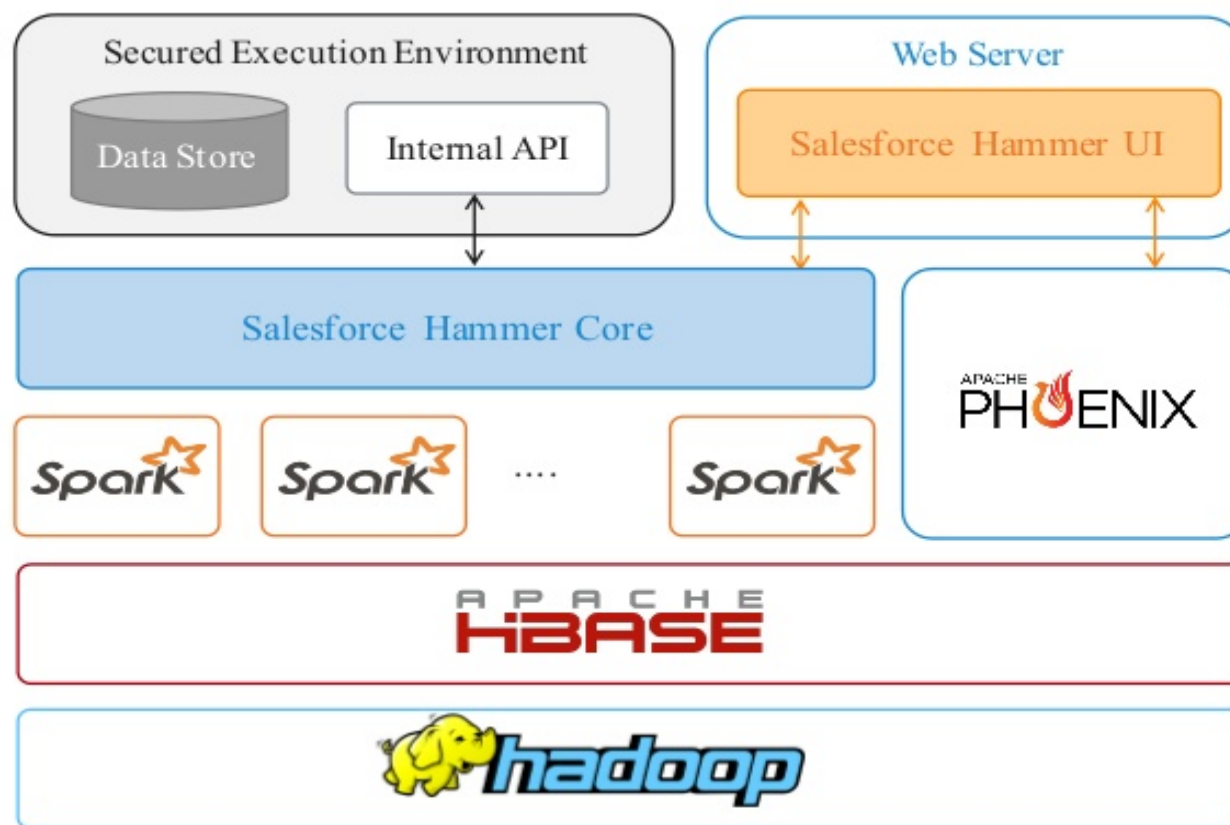
Internal SLA to keep these mammoth efforts to under 3 weeks



Hammer Core: A Functional Overview



Hammer: The Architecture



Data Preparation (ETL): Using Apache SparkSQL

Example of typical test execution result

	Transformation	Output
Baseline : Expected: 10, Actual: 10 Upgrade : Expected: 10, Actual: 10	PASS - PASS	NOT A BUG
Baseline : NullPointerException: Attempt to de-reference a null object Upgrade : NullPointerException: Attempt to de-reference a null object	FAIL - FAIL	NOT A BUG
Baseline : Expected: 10, Actual: 10 Upgrade : NullPointerException: Attempt to de-reference a null object	PASS - FAIL	FOR FURTHER ANALYSIS
Baseline : Expected: 10, Actual: 21 Upgrade : Expected: 10, Actual: 51	FAIL - FAIL'	FOR FURTHER ANALYSIS



Spark Machine Learning Pipeline

Designed to operate on records marked “FOR FURTHER ANALYSIS”

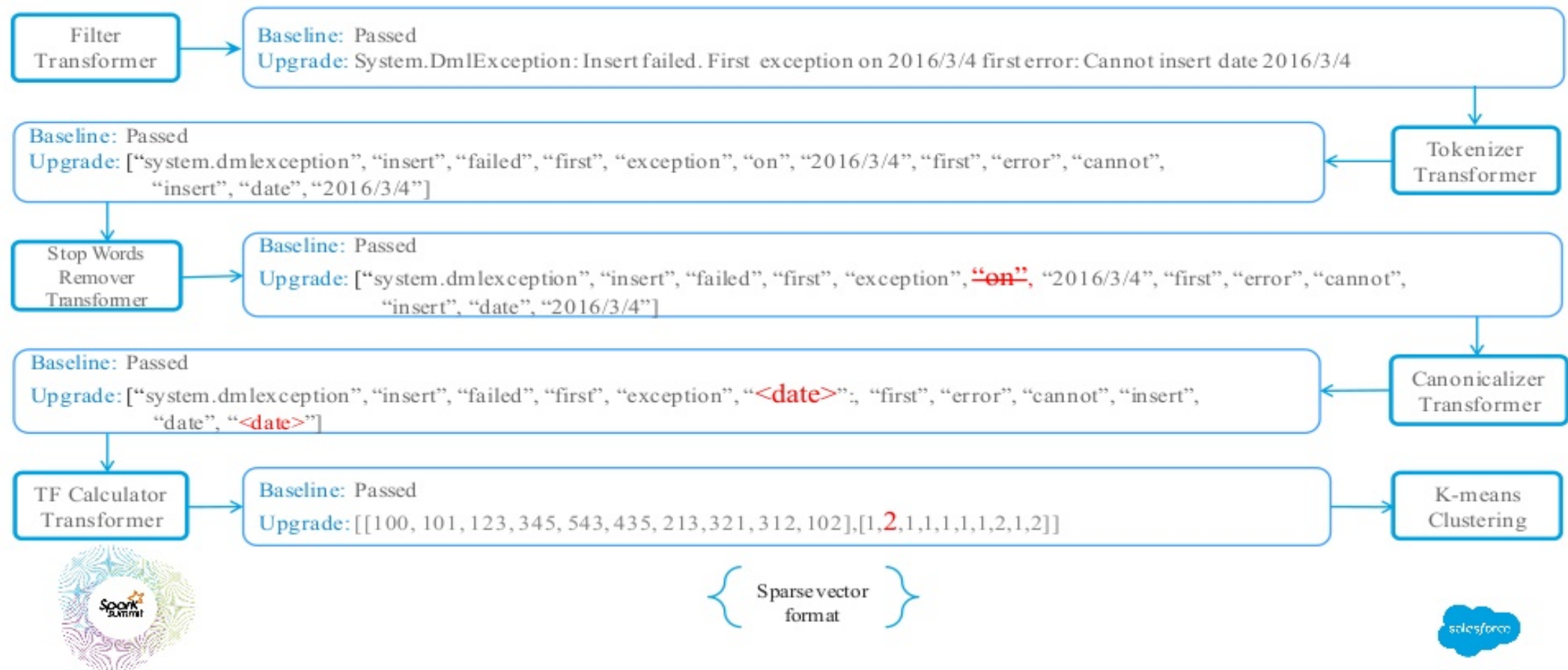
Group test failure records into K Clusters

Each cluster is a potential bug in Salesforce App Cloud platform

Enables inspection of cluster to determine if it's a bug or not



Clustering Using Apache Spark Machine Learning



Accomplishments

In Extract Transform Load process -

Test Records Analyzed	Old Hammer Engine (hours)	New Hammer with Spark (minutes)	Speed Improvement
241K	7.5	9	97.9 %
562K	7.8	13	97.2 %
269K	8	11.5	97.6 %
242K	11.2	10	97.9 %
394K	14.2	20	97.0 %
374K	12.5	12	98.4 %



Accomplishments

In Clustering Analysis -

Fewer clusters to
analyze

Well formed clusters
yielding to good quality
bugs

Speed – On an average
clustering took 40 minutes to
complete for 100K+ records



Q & A



thank you

