



From GIS to Location Intelligence

From Science to Big Data to Business Opportunity

Joe Francica
Managing Director, Location Intelligence solutions

@joefrancica
Joe.Francica@pb.com

Pitney Bowes today.

We're a global technology company offering innovative **physical + digital** products and solutions that enable commerce.

90% of the Fortune 500 and more than 1.5 million small and medium-sized businesses in approximately 100 countries around the world rely on products, solutions and services from Pitney Bowes.

- Acquired Group 1 Software in 2004
- Acquired MapInfo 2007

Be Location Intelligent with MapInfo Pro

The graphic features two curved, overlapping bands. The upper band is a solid blue color, while the lower band is a darker blue with a white wavy pattern. The text 'MapInfo Pro' is positioned on the right side of the lower band.

MapInfo Pro

From Data Collection to Analytics

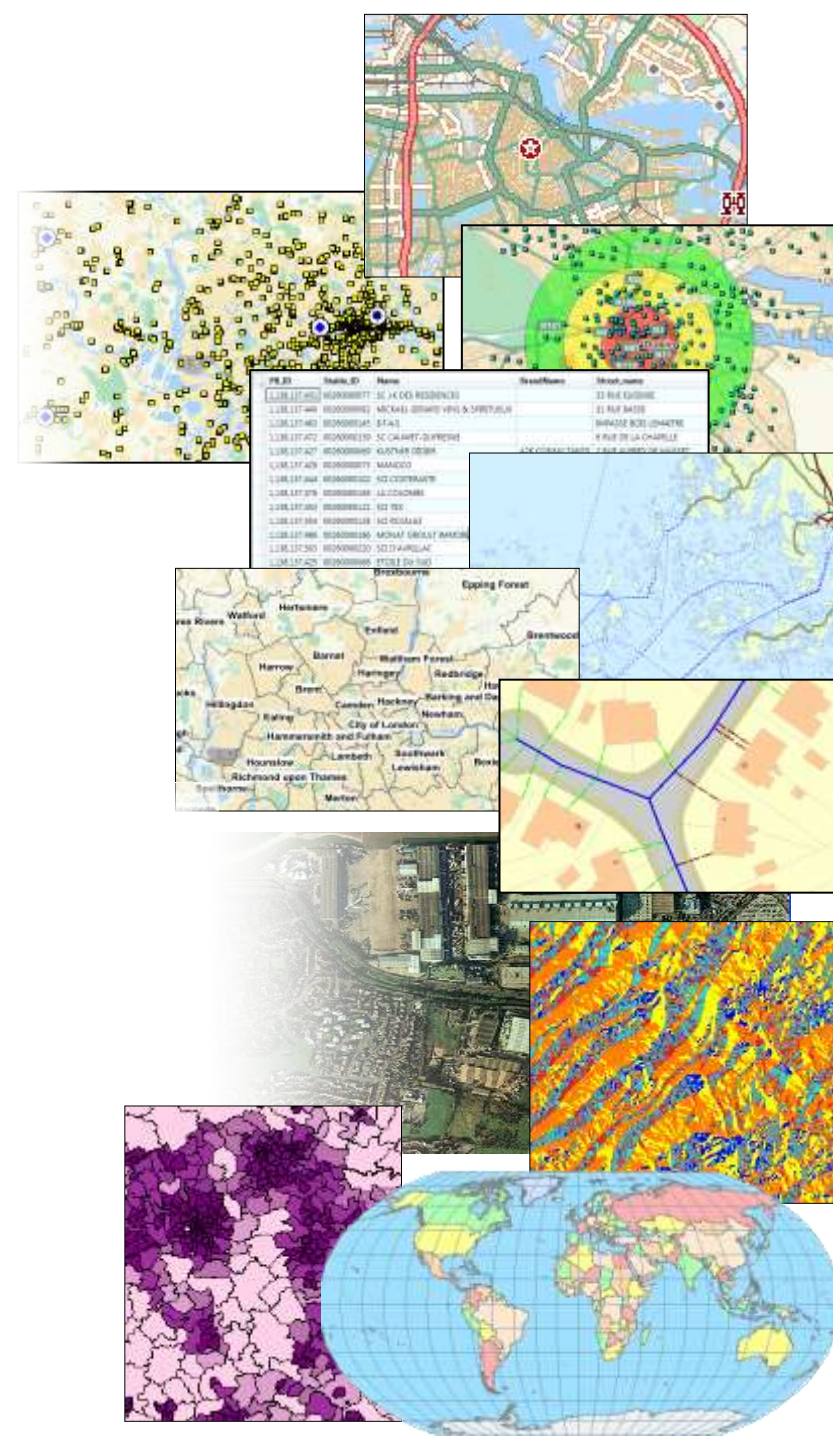
**70% of the time...
GIS is Data Collection**



Only 30% is Spatial Analytics

From Data Collection to Analytics

**Flip the workflow to...
70% of time
should be Analytics
...and finding
Answers to Spatial
Queries**



Mapping & Spatial
Analytics display and
analyze proximity
relationships, impossible
to see in pie charts and
other graphic
treatments...

... the results lead to new
business insights we
describe as...

Location Intelligence

The realization is that ALL companies need to “think spatially” by employing Spatial Analytics

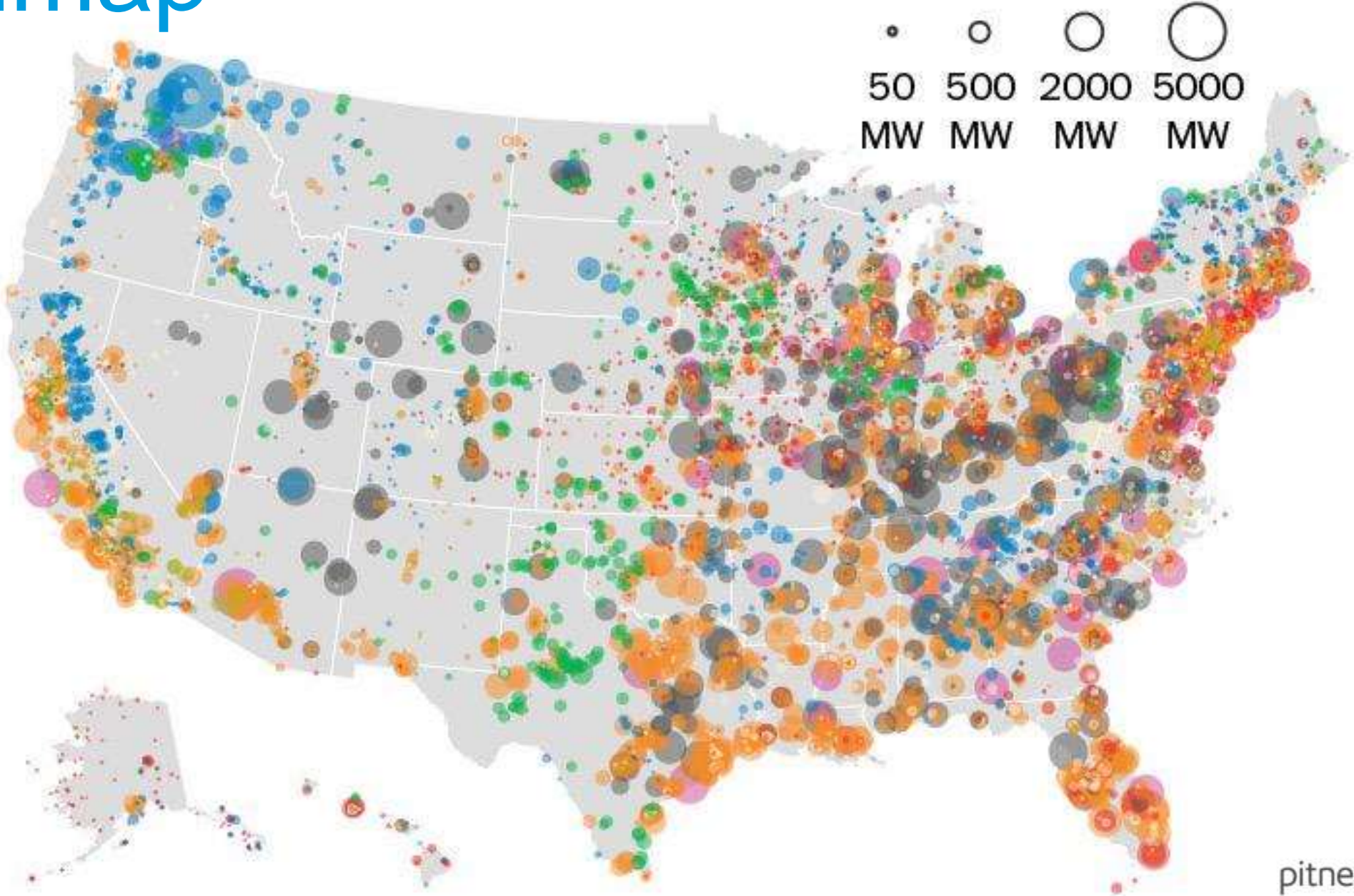
In reality ... we all ask the “WHERE” questions every day

Location
Intelligence
“answers” the
“where”
questions



#coolmap

#coolmap



**Maps &
Imagery
are not
always
the
Answer**

The Answer is...

A silhouette of an offshore oil rig is centered in the image against a warm, orange-hued sunset sky. The rig's complex structure, including its derrick and cranes, is clearly visible against the bright background. The dark sea is visible at the bottom of the frame.

#drillhere



#locatehere

In business today...clients want the answer...

... that means integrating business data with location-based data

...Organizations are using tools that organize data better and faster.

First ... Recognize the explosion of location-based data

Internet of Things



Soon everything will be connected.

- Automobiles
- Medical monitoring
- Energy consumption
- Asset tracking
- Building information
- Home appliances
- Personal fitness
- Smart meters

Mobile



Nearly 2 billion smart phones will ship globally by 2018.

- Each user generates 60 gigabytes of data each year, detailing:
 - Where consumers shop
 - Where they go
 - When they go
 - What they purchase

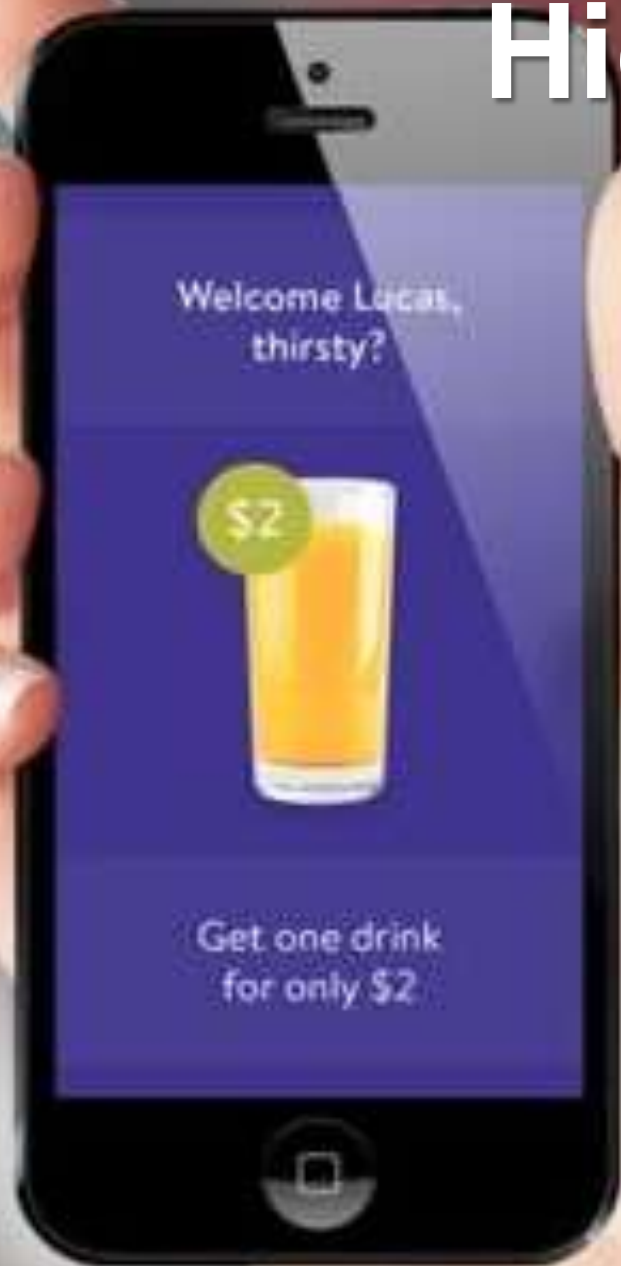
Social media and e-commerce



72% of online adults visit Facebook at least once a month, creating data around:

- Relationships
- Hometowns and jobs
- Preferences
- Interests
- Locations and check-ins

High location accuracy



**85% of top 100
retailers will
deploy
beacons by
2016**

Opera Mediaworks study 1/20/2015.



High volume of transactions

Big Data

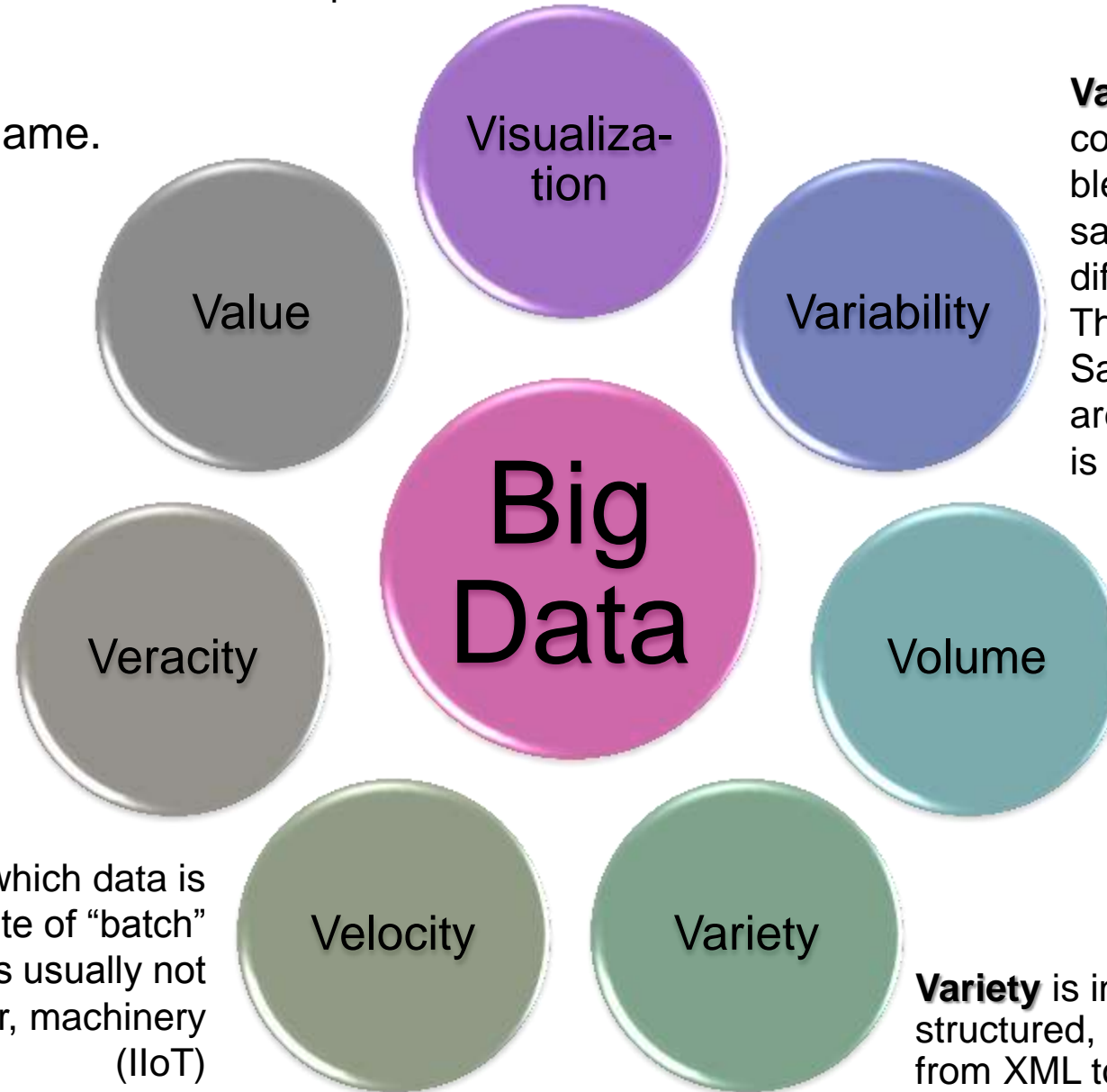
7 V's of big data

Visualization is critical in today's world. Using charts and graphs to visualize large amounts of complex data is more effective in conveying meaning than spreadsheets and reports chock-full of numbers and formulas... **but maps are cool too!**

Value is the end game.

Veracity ... making sure the data is accurate, which requires keeping the bad data from accumulating. The simplest example is contacts that enter your marketing automation system with false names and inaccurate contact information. How many times have you seen **Mickey Mouse** in your database?

Velocity is the speed in which data is accessible...the opposite of "batch" ...now if it's not real-time it's usually not fast enough; e.g. Weather, machinery (IIoT)



Variability .. different from variety. A coffee shop may offer 6 different blends of coffee, but if you get the same blend every day and it tastes different every day, that is variability. The same is true of data. Ex. Satellite imagery capturing the same area everyday (i.e. change detection is important)

Volume is how much data we have – what used to be measured in Gigabytes is now measured in Zettabytes (ZB) or even Yottabytes (YB). IoT is creating exponential growth in data. Mobile phones, telematics, social media is exploding

Variety is inclusive of unstructured or structured, plus many different types of data from XML to video to SMS.

Our clients clamored for Big Data solutions. They came to us with use cases. We filled their needs.

Big Data solutions put new insights well within reach.

Go bigger.



Easily process enormous datasets with solutions that run **natively in Hadoop.**

Go faster.



Processes that once took hours or days can now be **completed in a matter of minutes.**

Make discoveries.



New spatial analytics and capabilities can now be implemented.

Commercially Supported Hadoop Distributions

Apache Hadoop

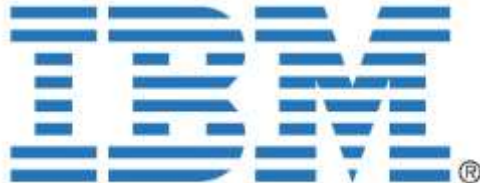
cloudera®



Hortonworks



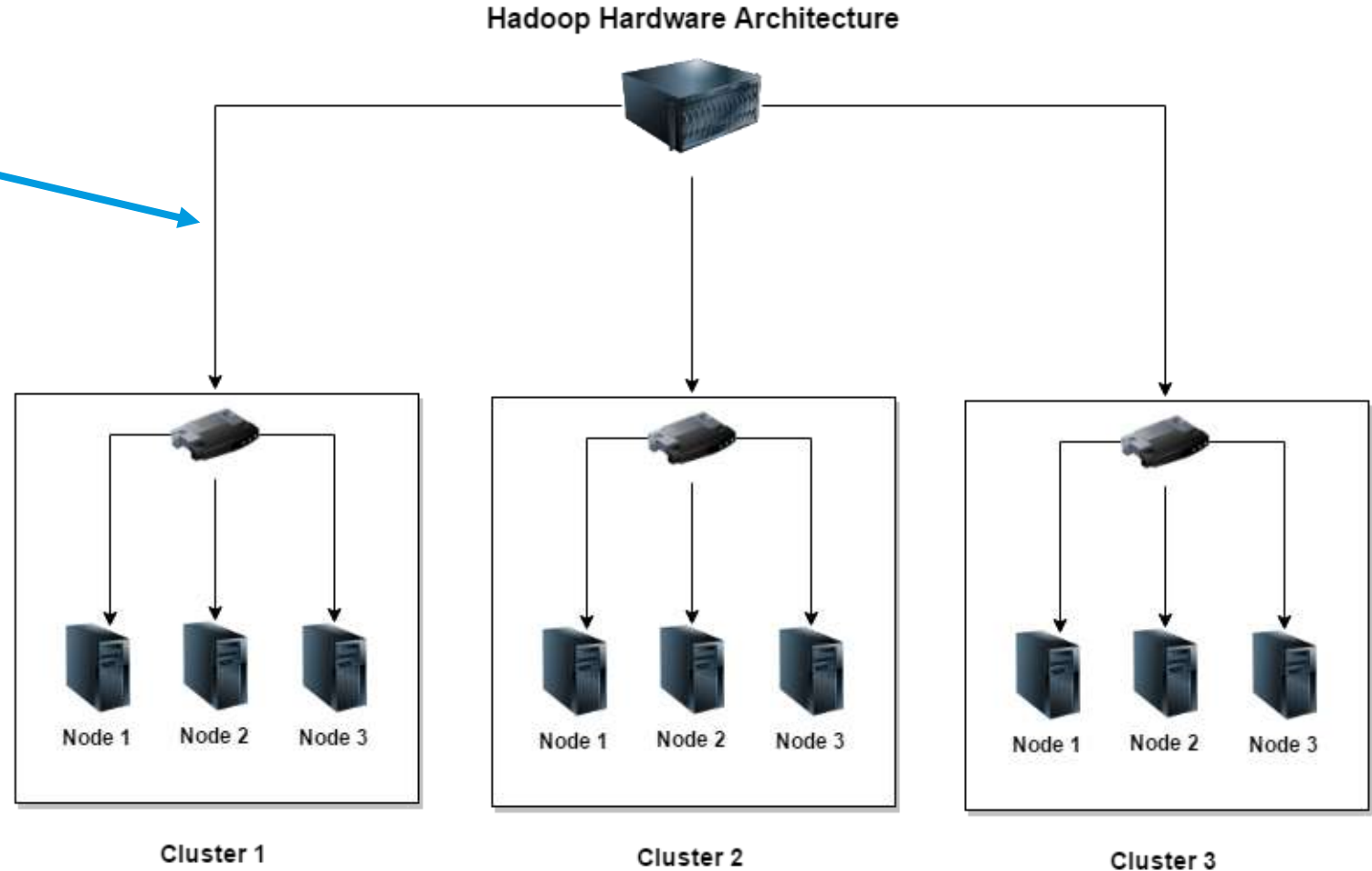
MAPR



Pivotal™

What is Hadoop?

- Hadoop is an open source technology
- It allows you to split data and processing across lots of low cost machines.
- Pitney Bowes can use this technology to run our spatial processing against very large volumes of data very quickly.



Spectrum Spatial Modules for Big Data support MapReduce, Hive UDF and Spark-based implementations.



Module

Features

Spectrum™ Geocoding for Big Data

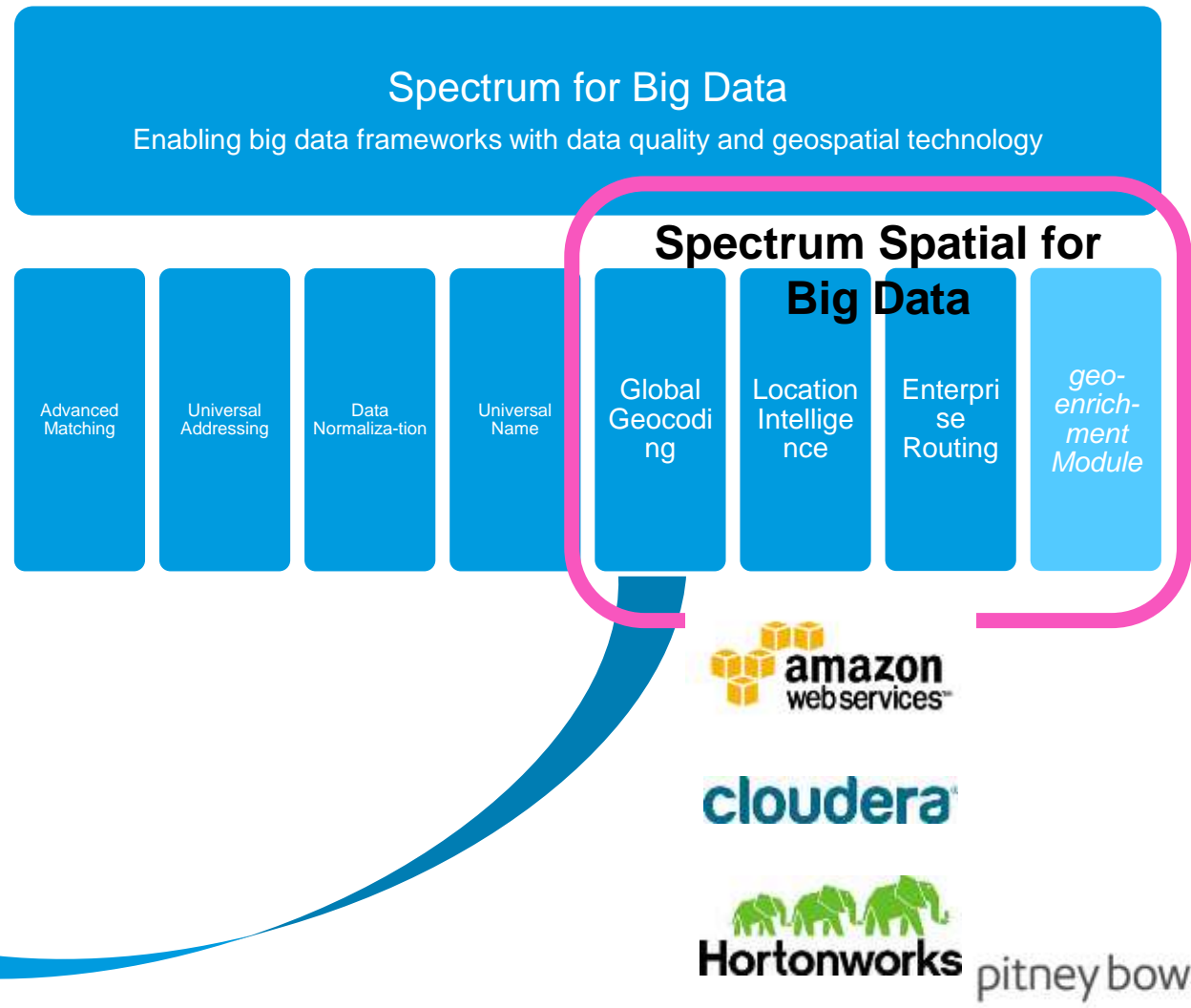
- Global forward geocoding
- Global reverse geocoding
- 145 countries at street level of better
- 245 total countries supported at variety of accuracy levels

Spectrum™ Location Intelligence for Big Data

- Find the nearest
- Point and polygon
- Spatial join
- Distance to point, shape, line

Spectrum™ Routing for Big Data

- Global route generation/isochrone/isodistance
- Walk time/drive time
- Point-to-point calculations



Use Case: Subscriber Verified Coverage Map Increases Customer Acquisition

Spectrum Spatial for Big Data
organized 19 billion call records of
true subscriber interactions into
950 million hexagons grids in only
36 minutes...

It used to take 14 days...



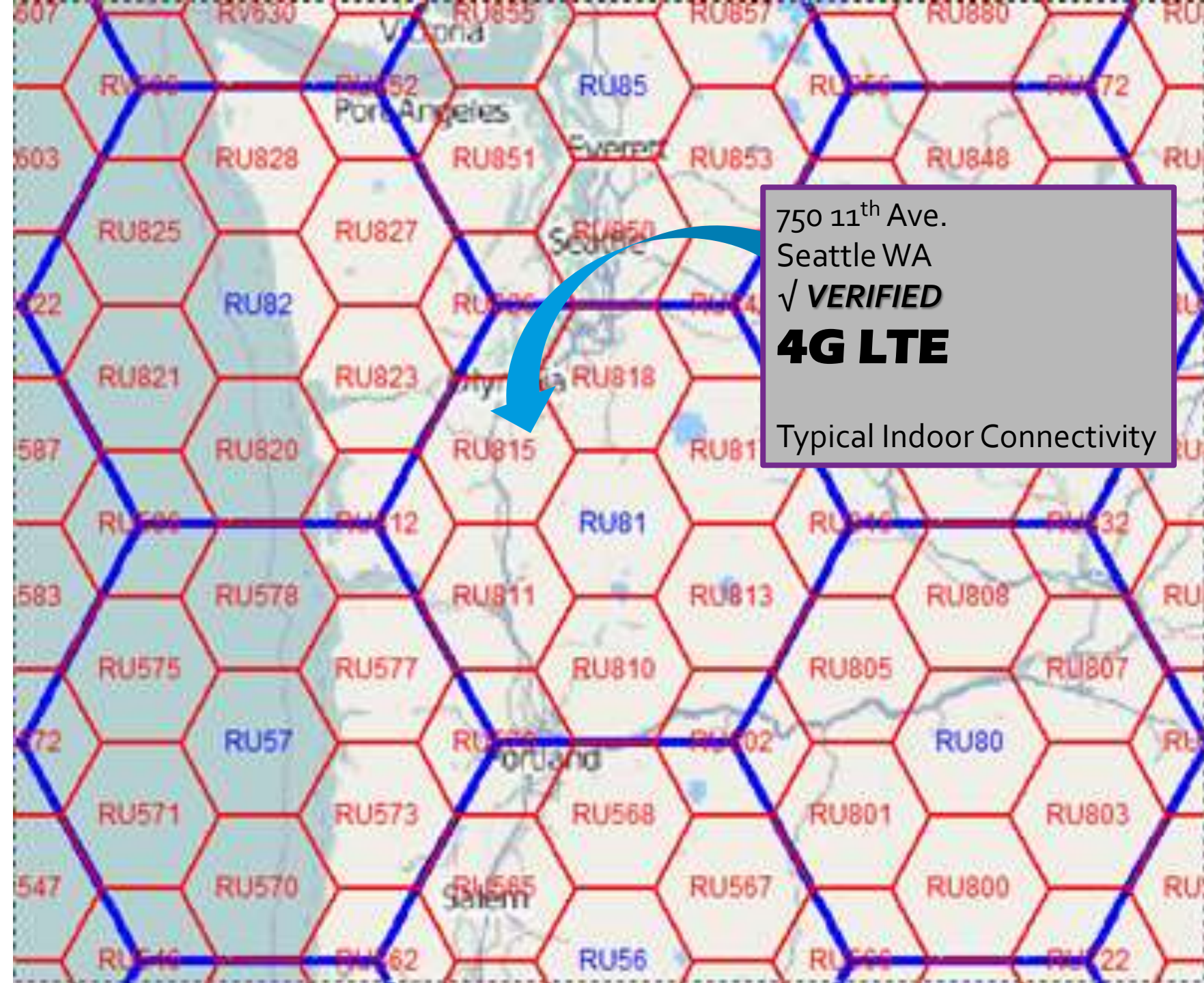
Use Case: Subscriber **Verified Coverage Map** Increases Customer Acquisition

- **Objective:** Proving Quality of Service through Crowdsourced Subscriber Records
- **Requirements:**
 - Conflated 19B Location Records (90 Days of Data) to 950M Shapes. Attributes included Calls, SMS, and Data Sessions
 - Ancillary Data Sources from INRIX and Ookla
 - Example Fields include: device_id, time, lat/lon, gps, accuracy, RSSI (signal strength), RSSP, and more
- **Processes**
 - 56 Machines
 - 8 CPU Cores
- **Result:** Processing Time of **36 minutes**
- **Output:**
 - Created Enterprise Map Consumed by Public website, retail, call center, network.



“Verified Coverage Map” Solution for a Telco

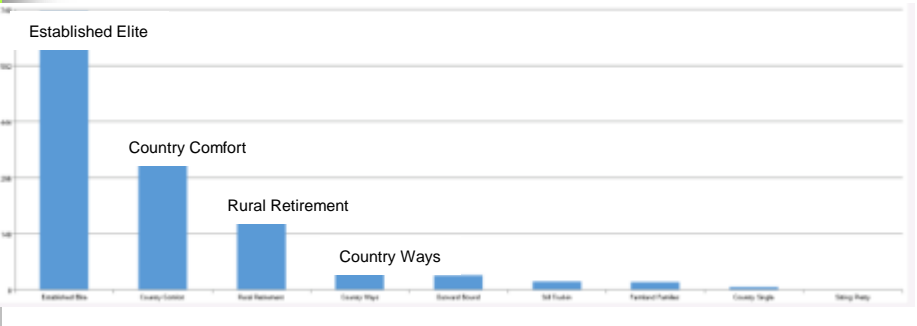
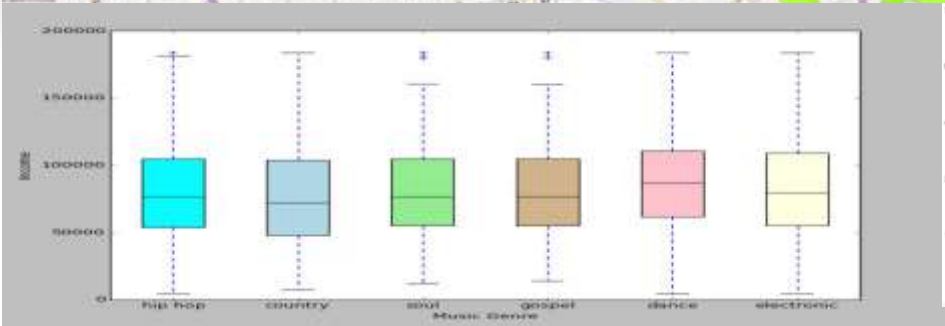
The industry's first and only customer data verified coverage map



Use Case: Location Context Enrichment for a Mobile Service Provider

Where were people listening to music using the App?

- Geocode 1 billion mobile points
 - Create: Spatial-join to attributes
 - **Result:** 12 million POI-polygons in 30 min
- (20 nodes EMR on AWS)



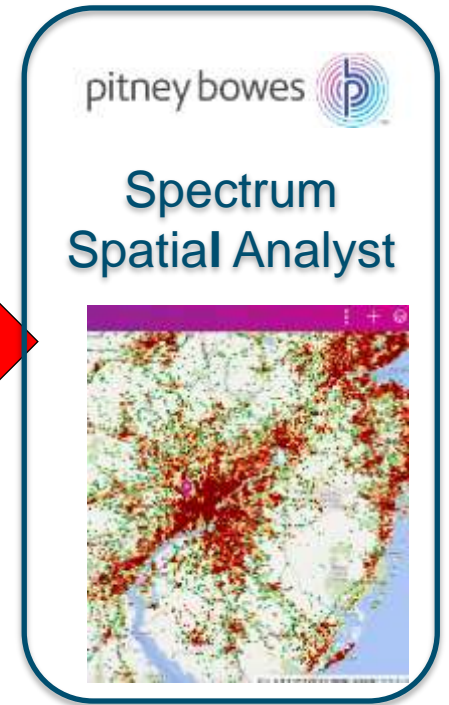
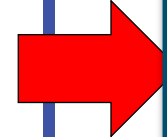
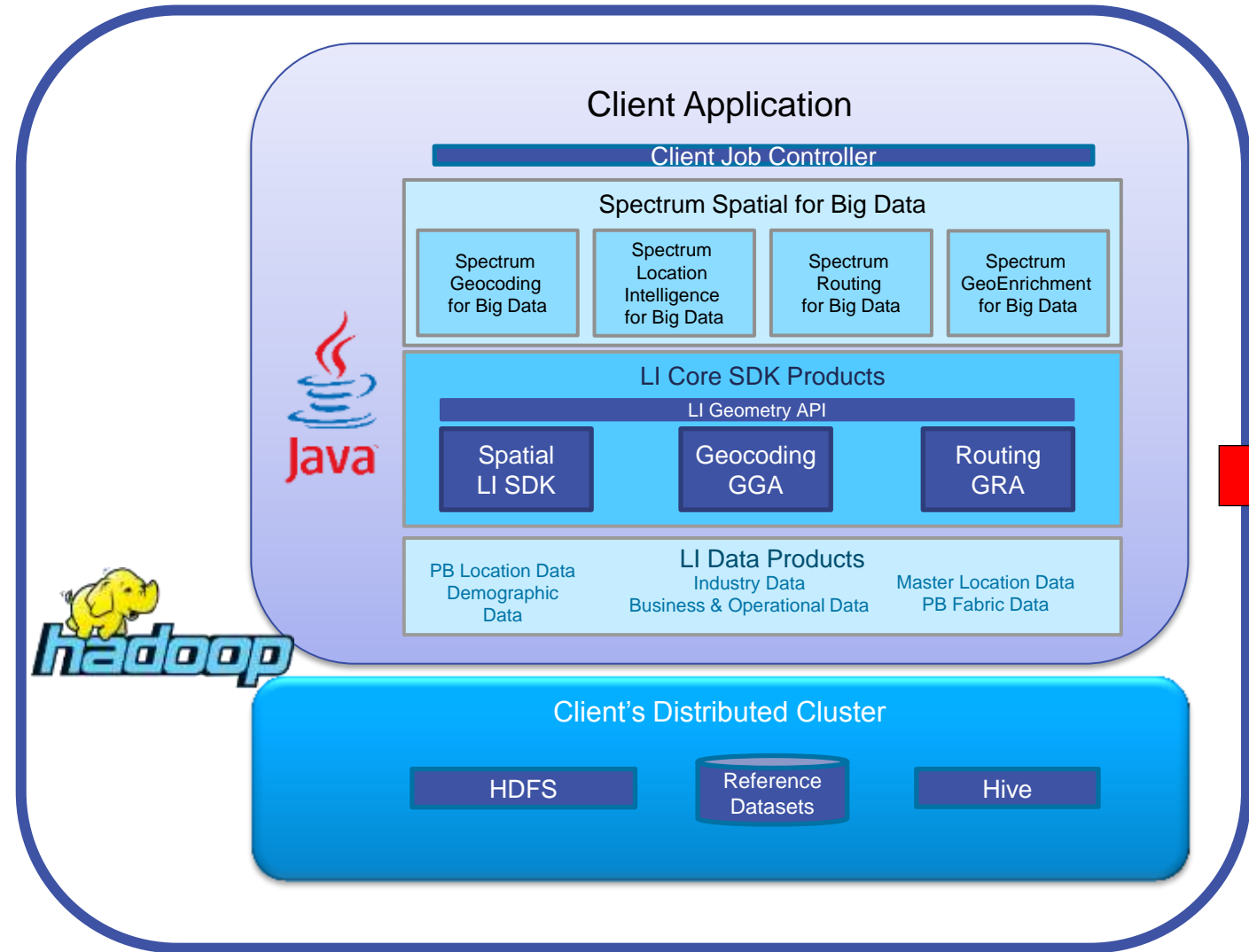
Spectrum Spatial for Big Data

Embedded Geospatial Capabilities

- Spatial Cleansing
- Spatial Data Processing and Aggregation
- Spatial Query and Join
- Geocoding and Reverse Geocoding
- Routing Analytics (Driving & Pedestrian)
- Entire Data Catalog is 'Big Data Ready'

Technology Integration

- Pre-built Map-Reduce wrappers
- Pre-built Spark components
- Extended Hive UDFs
- Core SDK APIs
- Sample applications
- Integrated with Spectrum Big Data Ingest/Extract
- Data Quality



Big Data Driven Spatial Analytics & Visualization Engine

Spatial Data Lake is a highly scalable geospatial analytics platform for enterprise to process, manage and visualize location-base data.

APPLICATIONS

- Device Analysis Map
- Network Analysis Map
- Personalized Analysis Map

DEVELOPER APIS

- Raster Map API
- Vector Map API
- Event & Data API

DATA SCIENCE T

- Spatial Data A
- Spatial Data V
- Spatial Data C

Sometimes ... the map or
satellite images is not the answer

DATA

It's all about ...

Data Is the New Water



Thank you.

Joe Francica
Pitney Bowes
Joe.Francica@pb.com