# IBM SolutionsConnect 2013

## L'IBM TechSoftware nouvelle génération

**28, 29 et 30 août**

**IBM Client Center Paris**

#solconnect13

*Transformez vos opportunités en succès*

IBM

# IND08P2
# Big Data pour les Telcos

Isabelle Claverie-Bergé

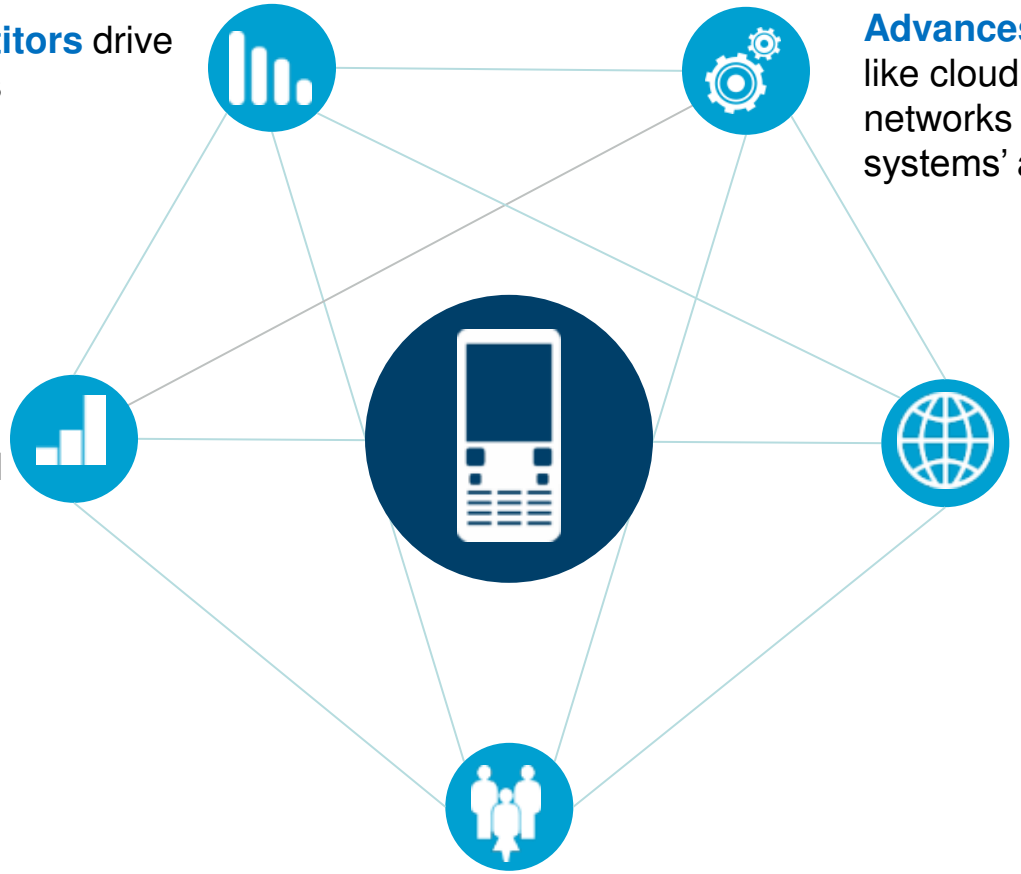
# Agenda

- Introduction : Big data une priorité ?
- Perspective dans le monde des télécommunication
- Les cas d'usage  Big Data
- L'offre IBM : IBM Advanced Analytics plateform
- la démarche : comment y aller
- Quelques réferences clients

# Dramatic challenges are manifested across the communications service provider industry

**Disruptive competitors** drive down profit margins

**Advances in technologies** like cloud and next-gen networks challenge legacy systems' ability to keep pace



**Mobility and data services growth** cause an unprecedented network traffic and data explosion

**Active government involvement** means increasing regulations

**Empowered customers** expect a superior communications experience anywhere, anytime, on any device

# To address these challenges, big data presents a huge opportunity – if service providers can harness it

| Volume | Velocity | Variety |
| --- | --- | --- |
| **50+** billion<br>Call detail records analyzed per day at a CSP | **5** billion<br>Mobile phones in use | **400+** million<br>Tweets per day |
| *Analyze entire Call Data Record volume to deliver reports and ad-hoc analysis on revenue, margins, network traffic and quality* | *Identify and resolve issues leading to poor network performance by analyzing CDRs, Switch, Billing and Network Event Data* | *Analyze social media updates to gain customer insights* |

## Veracity

Establishing the veracity of big data sources

*1 in 3 business leaders don't trust the information they use to make decisions*

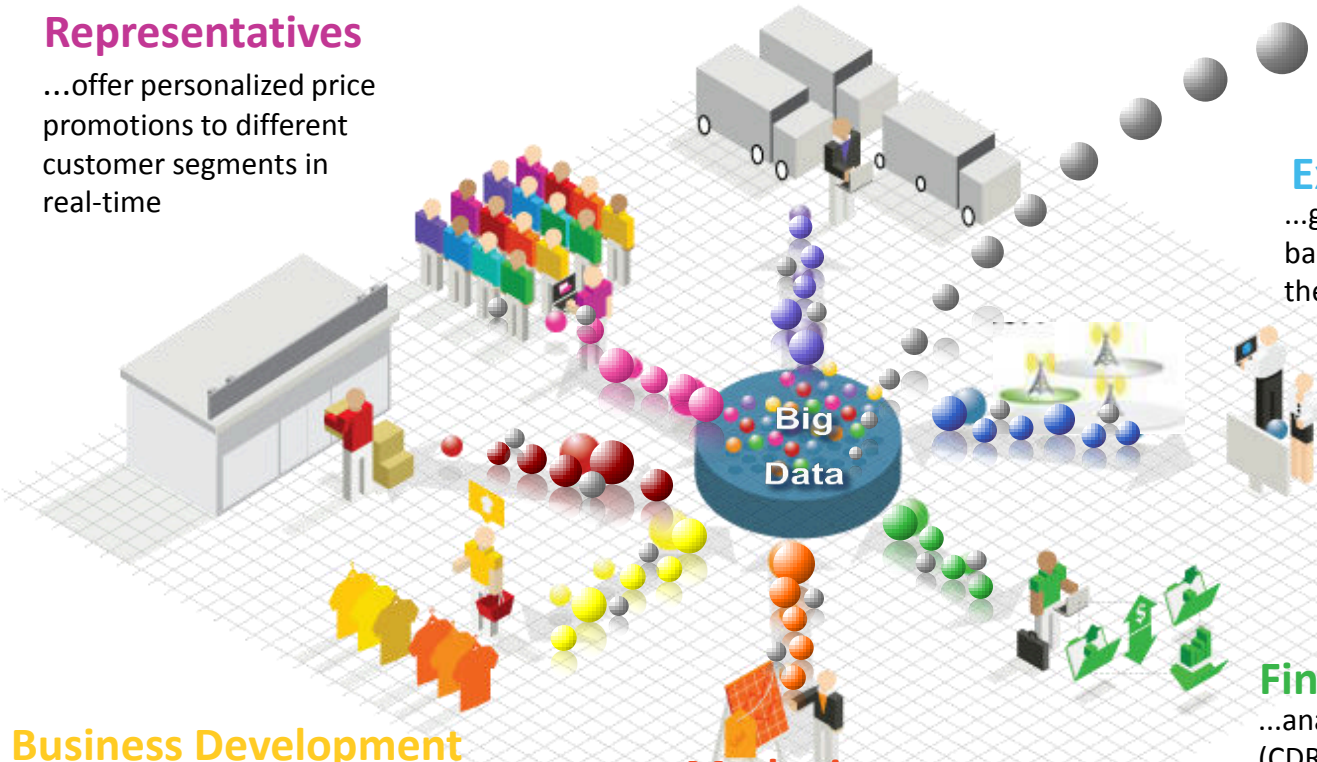
# Big Data can drive profitable growth while keeping costs under control

## Network Operations

...identify network bottlenecks in real-time for faster resolution

## Customer Service Representatives

...offer personalized price promotions to different customer segments in real-time




GPS

Google

facebook

YouTube

twitter

External Data

## Executive Leaders

...get real-time reports and analysis based on data inside as well as outside the enterprise (web, social media etc.)

## Business Analysts

... analyze social media buzz for the new services/offerings to gauge initial success and any course correction needed

## Finance

...analyze all Call Detail Records (CDRs) to identify and reduce revenue leakage due to unbilled / underbilled CDRs

## Business Development

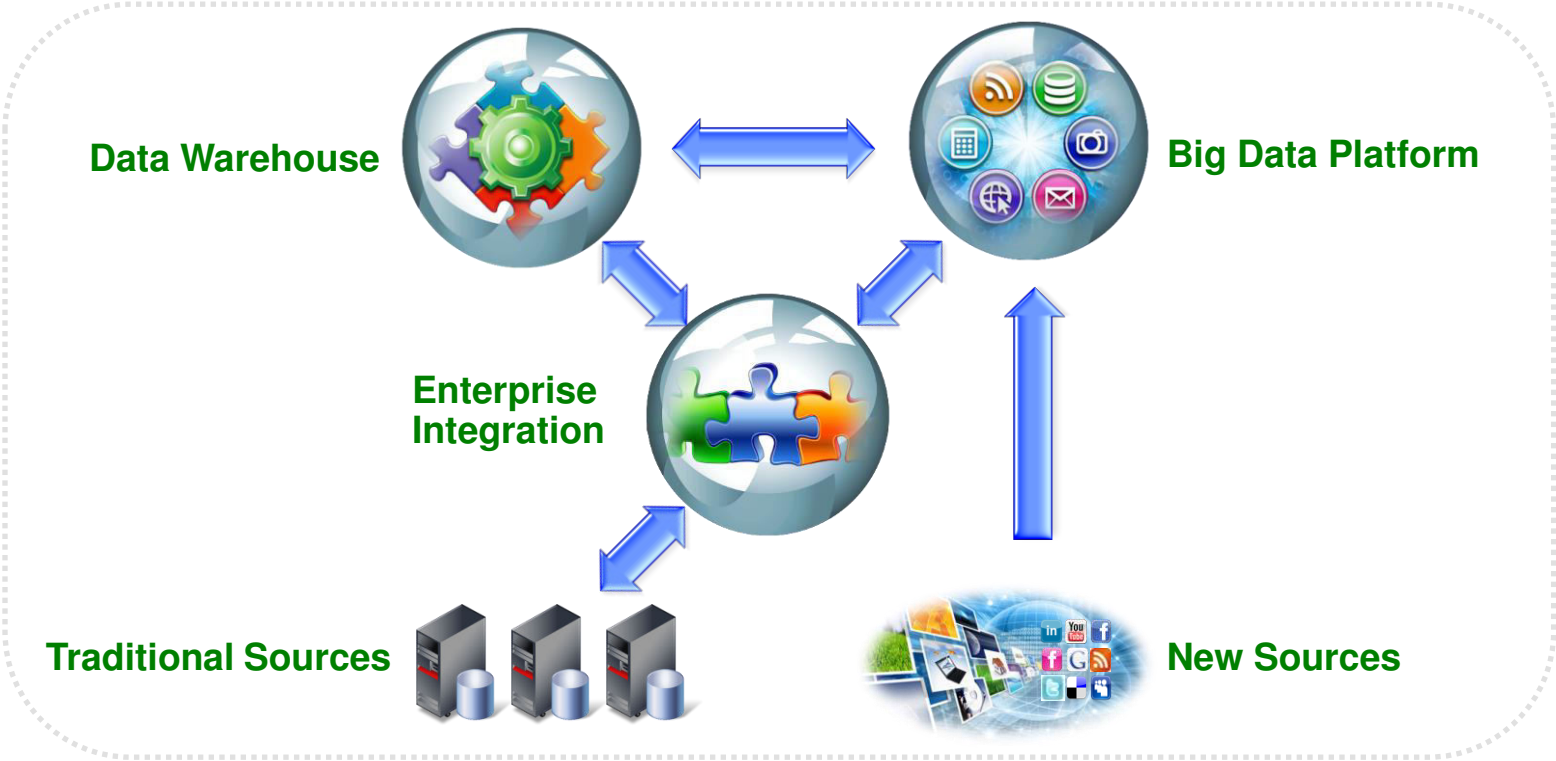
... find and deliver new mechanisms to monetize network traffic and partner with upstream content providers

## Marketing

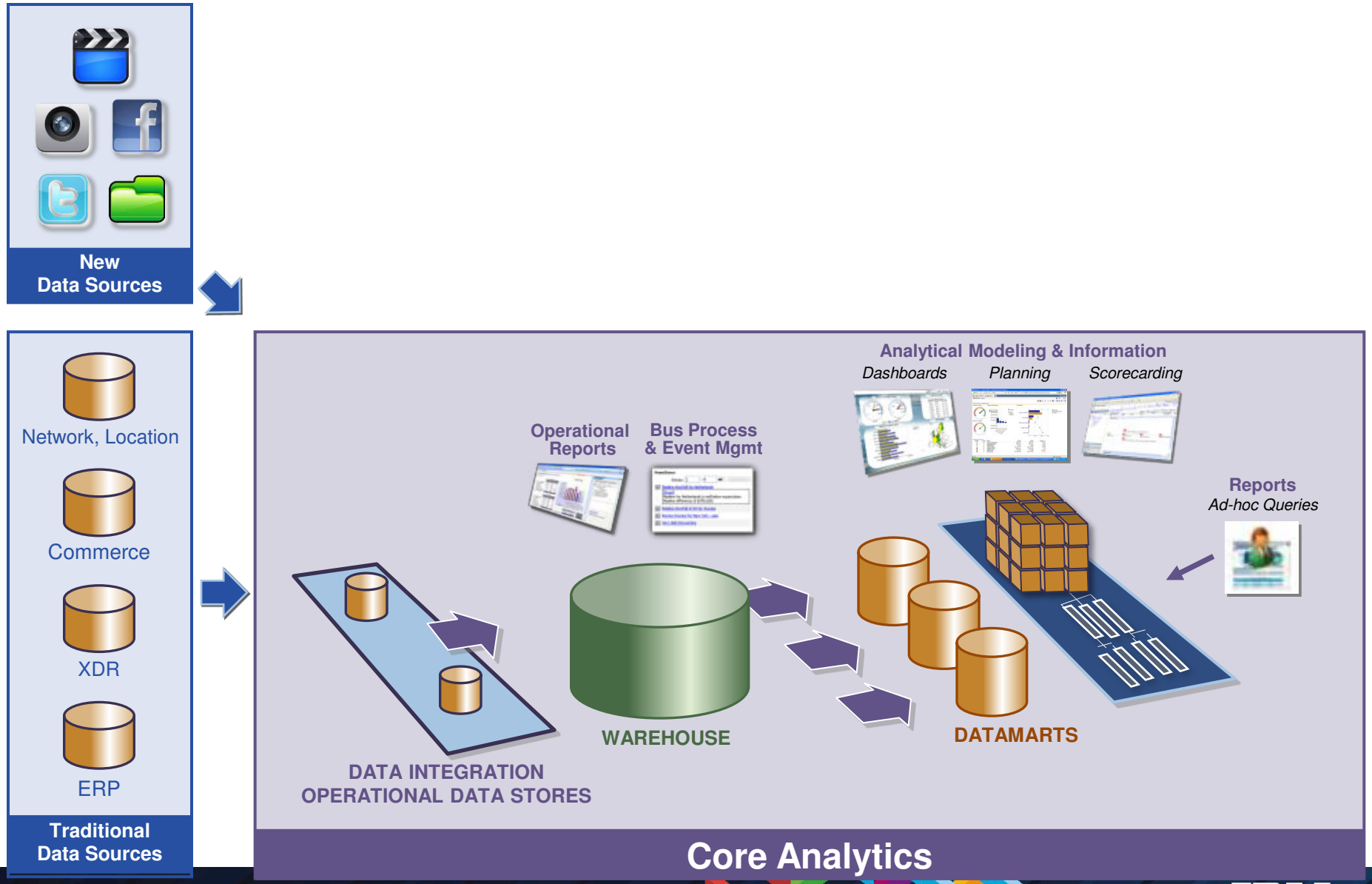
... analyze subscriber usage pattern in real-time and combine that with the profile for delivering promotional or retention offers

# Big Data Platform complements current information architecture for CSPs

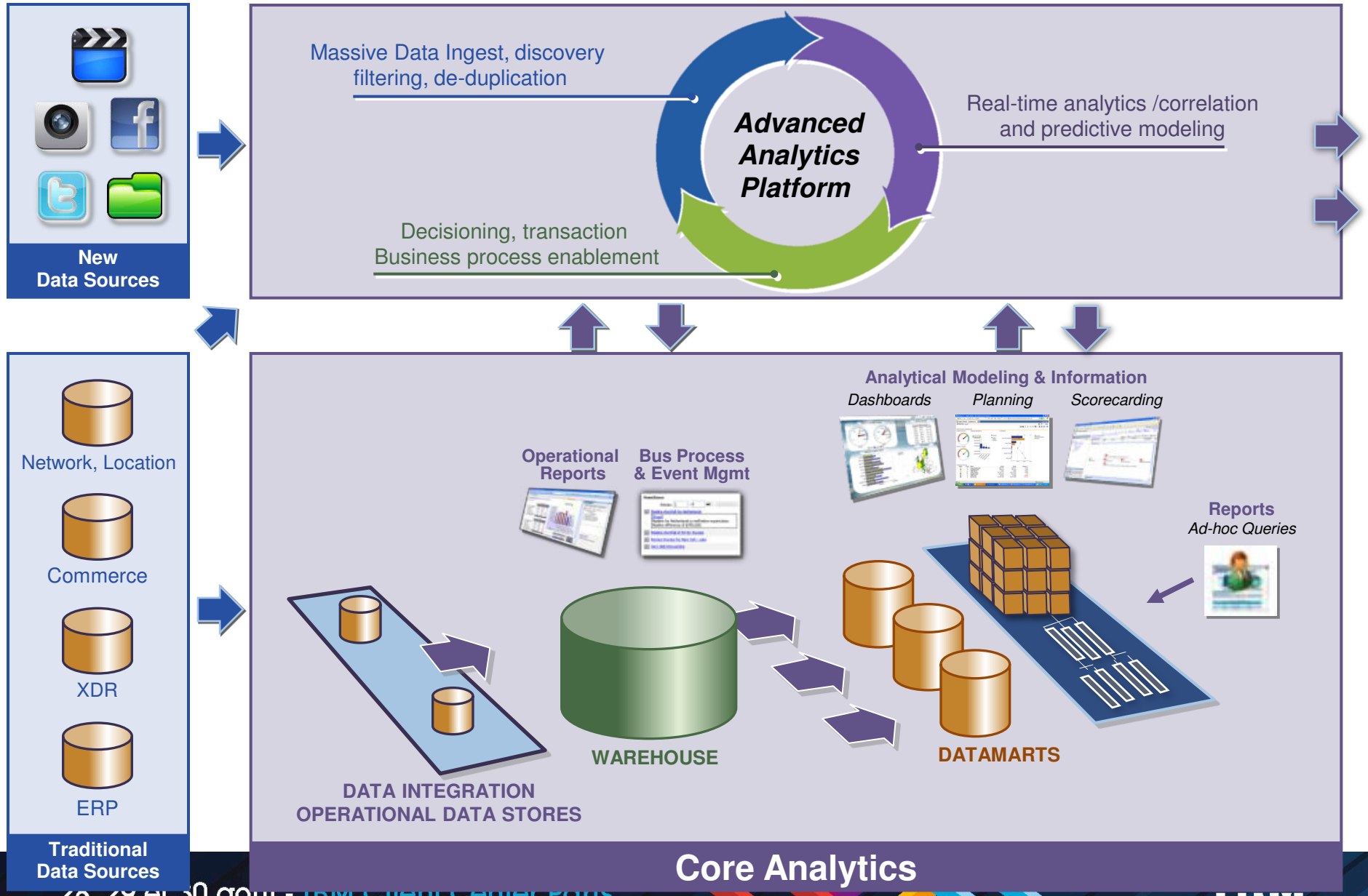
- Big Data becomes a permanent part of CSP's information architecture
- It cannot be a silo – it must be fully integrated in order to leverage its value
- It is easy to deploy and integrate



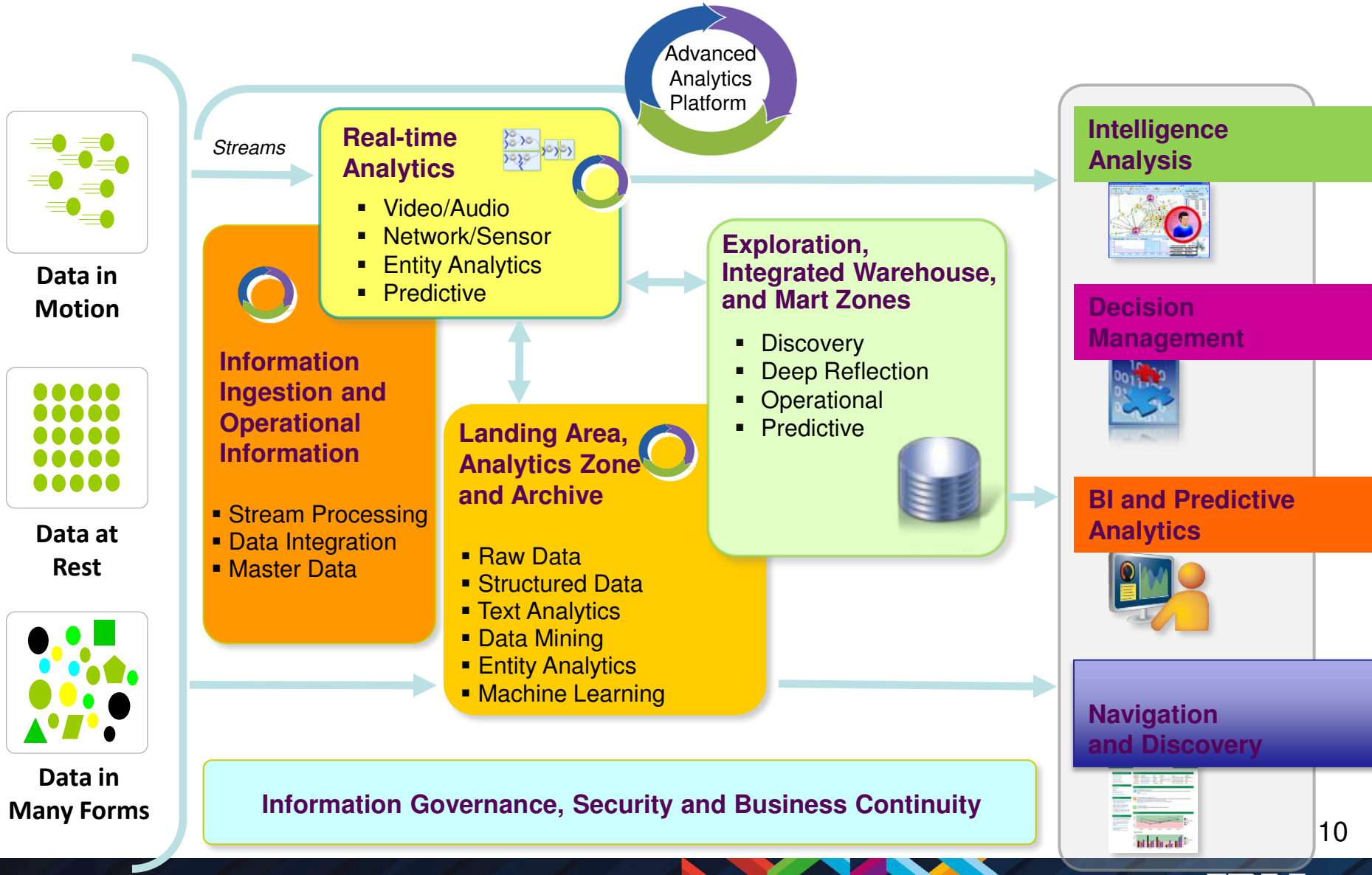
# Bring New Data Sources Into Your Existing BI Environment



# Think Differently by complimenting existing BI environment with IBM's Advanced Analytics Platform (AAP)



# What it looks like  a Advanced Analytics Plateform



# Today's challenges translates into a few focus areas with key business use cases

## Create and deliver smarter services

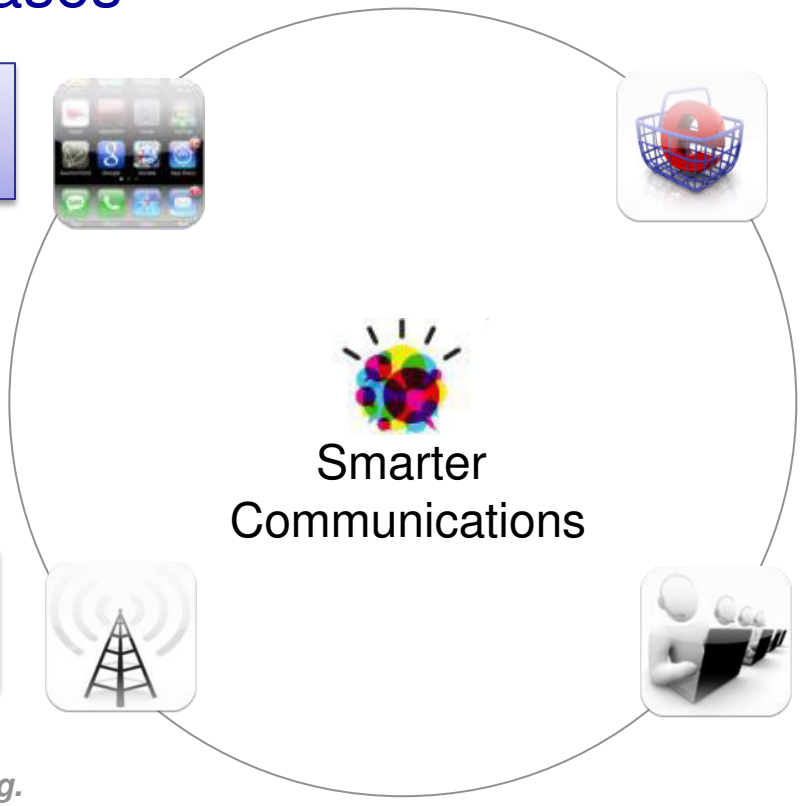
*Stakeholders - Product Management*

- New Products & Services Creation

## Personalize Customer Engagements

*Stakeholders - new business development, monetization, marketing*

- **Customer Data/location Monetization**
- Social Media Insight
- Intelligent Campaigns




## Build smarter networks

*Stakeholders - Network operations, capacity planning.*

- **Network Intelligence**

## Transform operations

*Stakeholders - customer service, sales & marketing operations, finance, fraud prevention*

- **Product Knowledge Hub for Customer Service**
- Optimized Service Assurance
- Revenue Leakage Prevention
- Fraud Detection

***Use cases in blue are the focus for this presentation***

# The value of big data to Personalize Customer Engagements

*More comprehensive understanding of customer leads to greater revenue and lower churn*

Increase Revenue
…by building comprehensive view of customer behavior and preferences by segment across all channels

Increase Customer Intimacy
…by adding social analytics as an additional source of valuable insight

Increase Customer Satisfaction
…with faster and more complete insight into customer experience and service levels

Improve Customer Retention
…by delivering customer retention offers in near real-time

Increase Offer Acceptance
…by analyzing customer usage in real-time

# Improving customer data/location monetization with big data analytics

*Combine customer profile, interaction & usage across all channels (mobile, call center, web, store and landline) to understand customer needs by segment and drive location-specific offers*

**Customer Profile**

**Social Media**

Attitudes, preferences

**Customer Interaction & Usage**

**Location**

Where is the customer

## What Data?

- Demographic profile
- Social media behavior
- Customer interaction and usage (events, web, purchases, call center, etc.)
- Subscriber location

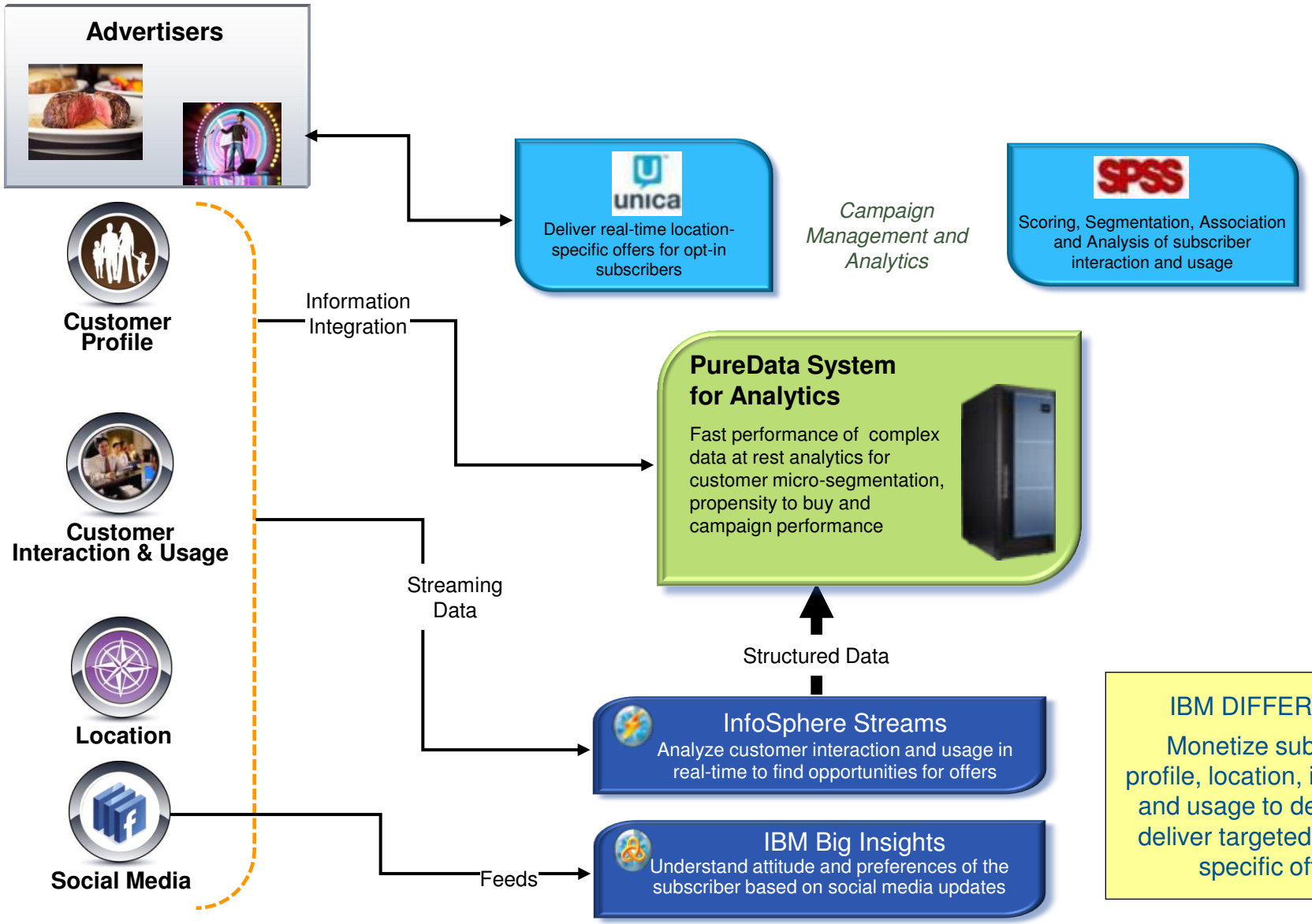
## What Capability?

- Micro segmentation based on interaction and usage
- Score propensity to buy based on comprehensive interaction and usage
- Enable real-time marketing campaigns based on profile, usage and location
- Enable proactive offers based on profile and usage

## What Outcome?

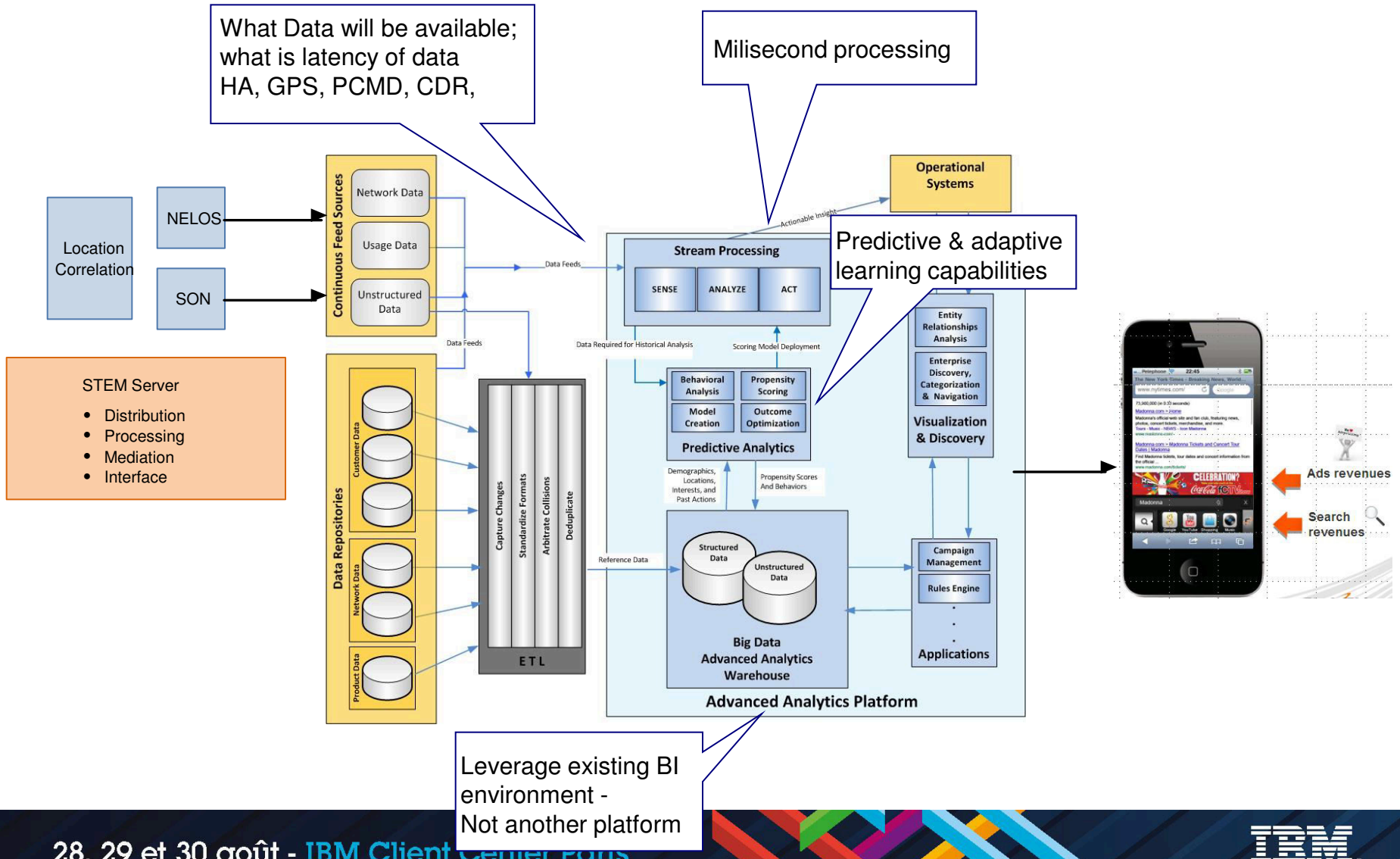
- Monetize consolidated anonymized subscriber data by segment
- Improved offer acceptance for advertising partners
- Increased customer satisfaction with targeted location-based offers for opt-in subscribers

# Customer Data/Location Monetization architecture



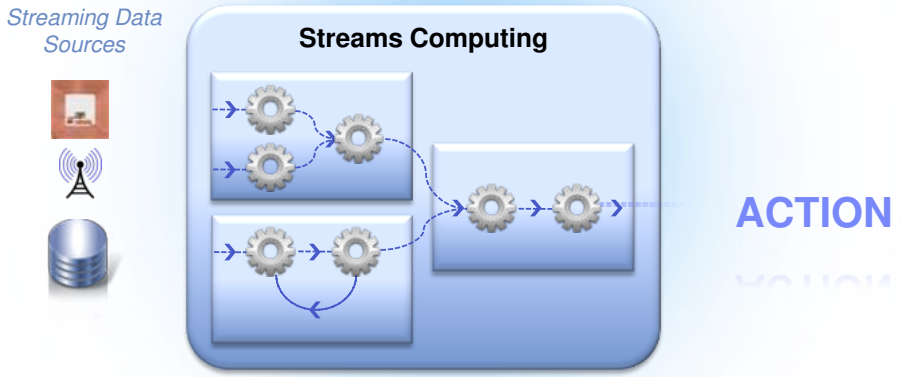
# Location Based Services to Drive Customer Data/Location Monetization

## Typical Architecture

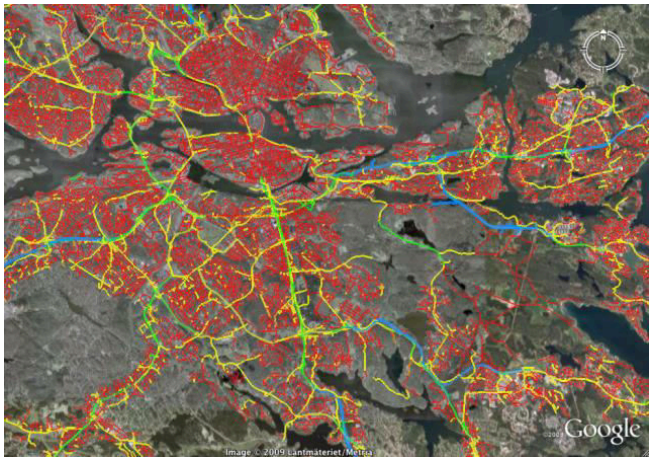


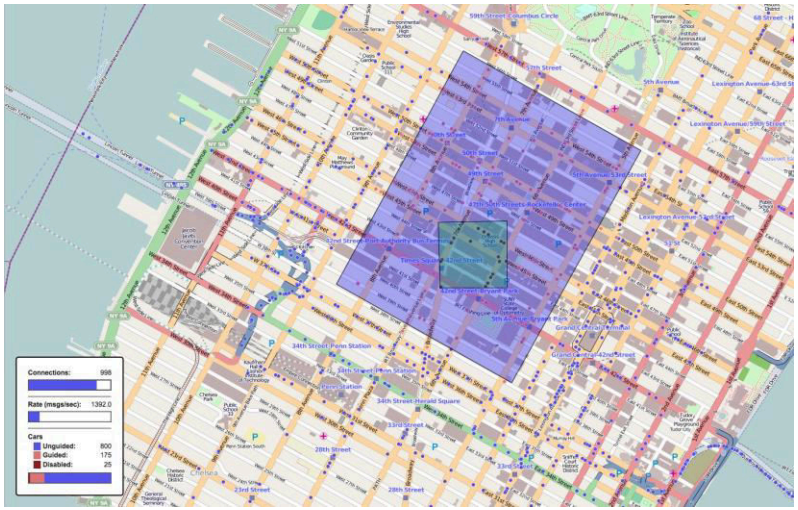
# Analyze Streaming Data to Identify and React to monetization opportunities in real-time

- **Customer Need**
  - Harness and process streaming data sources
  - Select valuable data and insights to be stored for further processing
  - Quickly process and analyze perishable data, and take timely action
- **Value Statement**
  - Significantly reduced processing time and cost – process and then store what's valuable
  - React in real-time to capture opportunities before they expire
- **Customer**
  - Scale to meet the largest service provider's volume (AT&T, Verizon, Vodafone..)

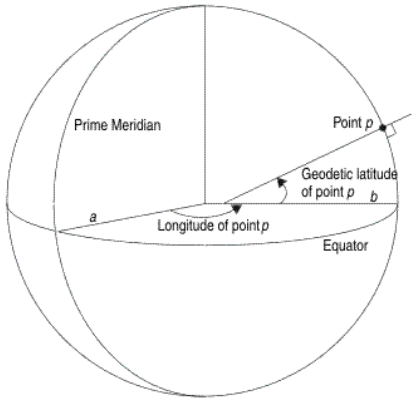


# Geospatial Toolkit

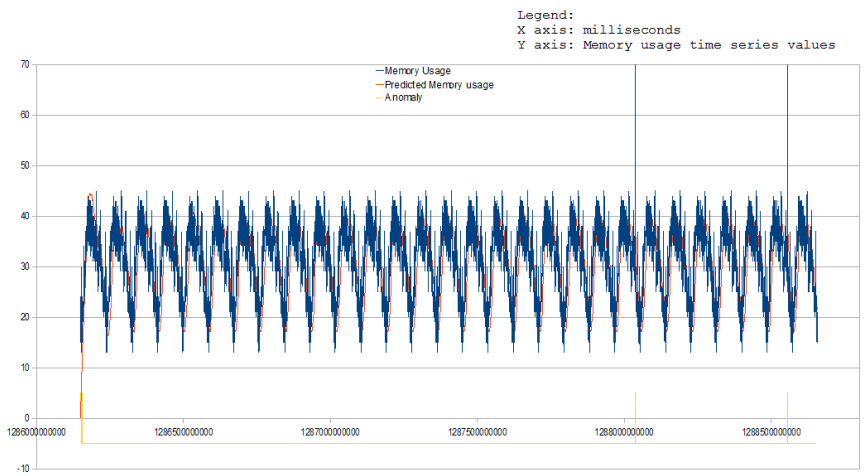


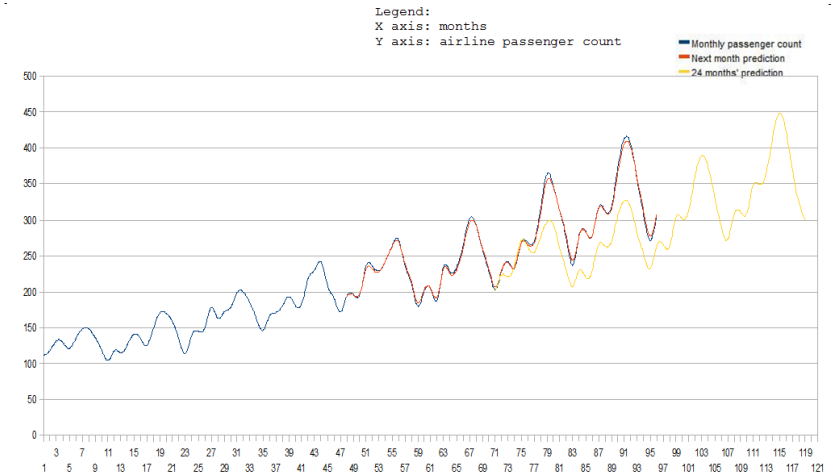
- High Performance Analysis and Processing of Geospatial data
- Enables Location Based Services
  - Smarter Transportation, GeoFencing
- GeoSpatial Data types
  - e.g. Point, LineString, Polygon
- GeoSpatial Functions
  - e.g. Distance, Map point to LineString, isContained etc.



# Time Series Toolkit




*The time series simulates memory consumption from a computer . FMP is used for prediction and anomaly detection*




*Holt Winters algorithm used for predicting next month and next 24 months ahead airline passengers count*

- Find patterns & anomalies and predict future values in real-time
- A rich set of functionality for working with time series data
  - Generation : synthesizing or extracting (e.g. Audio Extract, Wave Generator)
  - Preprocessing : preparation and conditioning (e.g. ReSample, Interpolate)
  - Analysis : statistics, correlations, decomposition and transformation
  - Modeling : prediction, regression and tracking (e.g. Holt-Winters, GAMLearner)

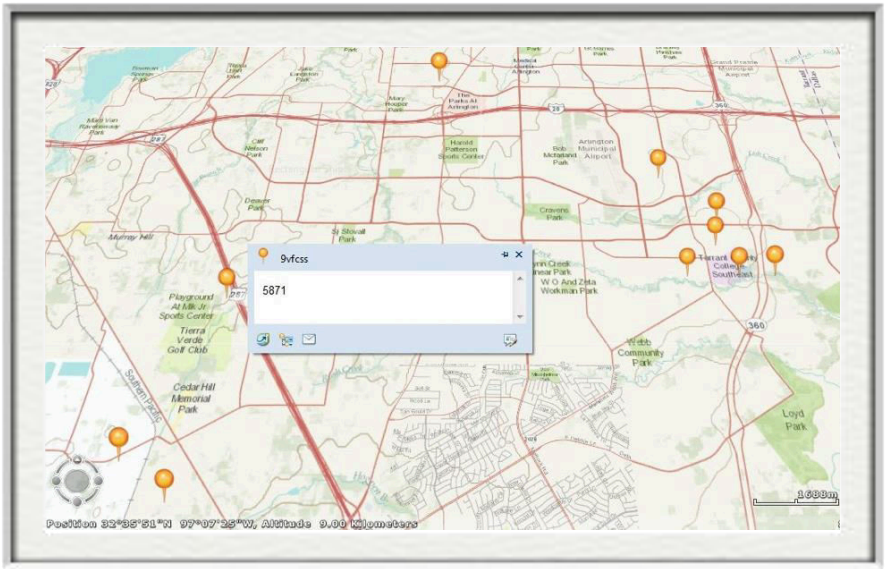
# Buddies, Hangouts, Sofa Surfers

Three areas of analysis were selected for the marketing demonstration

- Subscriber Lifestyles
- Popular Locations
- Subscriber Pairings

Who Are You?
Homebody
Daily Grinder
Delivering the Goods
Globetrotter
Sofa Surfer

10 Top Hangouts




## Best Buddies

| WEEKEND ID | Rank | Night | Morning | Lunch | Dinner | Breakfast | Afternoon | Total Result |
|---|---|---|---|---|---|---|---|---|
| 54796109862 | 1 | 34 | 7 | 11 | 15 | 9 | 12 | 88 |
| 54809186610 | 2 | 33 | 7 | 11 | 15 | 9 | 12 | 87 |
| 30931430322 | 3 | 32 | 7 | 11 | 15 | 9 | 12 | 86 |
| 54802704792 | 4 | 31 | 7 | 11 | 15 | 9 | 12 | 85 |
| 54796392702 | 5 | 29 | 5 | 11 | 15 | 6 | 11 | 77 |

# Buddies - Who do you hang out with

By taking a single ID and matching all other ID that were in the same geohash6 during the same 15 minute interval, we can develop a database of who you are nearby and when

## Best Buddies

| WEEKEND ID | Rank | Night | Morning | Lunch | Dinner | Breakfast | Afternoon | Total Result |
|---|---|---|---|---|---|---|---|---|
| 54796109862 | 1 | 34 | 7 | 11 | 15 | 9 | 12 | 88 |
| 54809186610 | 2 | 33 | 7 | 11 | 15 | 9 | 12 | 87 |
| [illegible] | 3 | 32 | 7 | 11 | 15 | 9 | 12 | 86 |
| 54802704792 | 4 | 31 | 7 | 11 | 15 | 9 | 12 | 85 |
| 54796392702 | 5 | 29 | 5 | 11 | 15 | 6 | 11 | 77 |

| WEEKDAY ID | Rank | Night | Morning | Lunch | Dinner | Breakfast | Afternoon | Total Result |
|---|---|---|---|---|---|---|---|---|
| 54796392702 | 1 | 59 | 6 | 8 | 16 | 12 | 12 | 113 |
| 54809321256 | 2 | 61 | 7 | 12 | 9 | 16 | 6 | 111 |
| 54834528786 | 3 | 57 | 2 | 6 | 13 | 19 | 12 | 109 |
| 54802704792 | 4 | 14 | 7 | 12 | 14 | 19 | 12 | 108 |
| 54796168950 | 5 | 59 | 7 | 3 | 16 | 19 | 3 | 107 |

# The value of big data to transform operations

Reduce average handling time (AHT)
…by providing call center representatives with accurate and relevant product information in a single interface (regardless of the source)

Measure and Improve service levels
…with analysis of real-time network events to identify service issues

# Enabling product knowledge hub for customer service with big data analytics

*Provide customer service representatives with accurate and relevant information with a unified knowledge management interface*

**Vendor device manuals**

**Internal knowledge repositories**

**External web pages**

**App Stores**

**Social Media**

## What Data?

- Vendor device manuals
- Internal knowledge repositories (Drupal, SQL servers, content management solutions etc.)
- External web pages (vendor site knowledge portals)
- App Stores (Blackberry World, Apple App store, Google Play etc.)

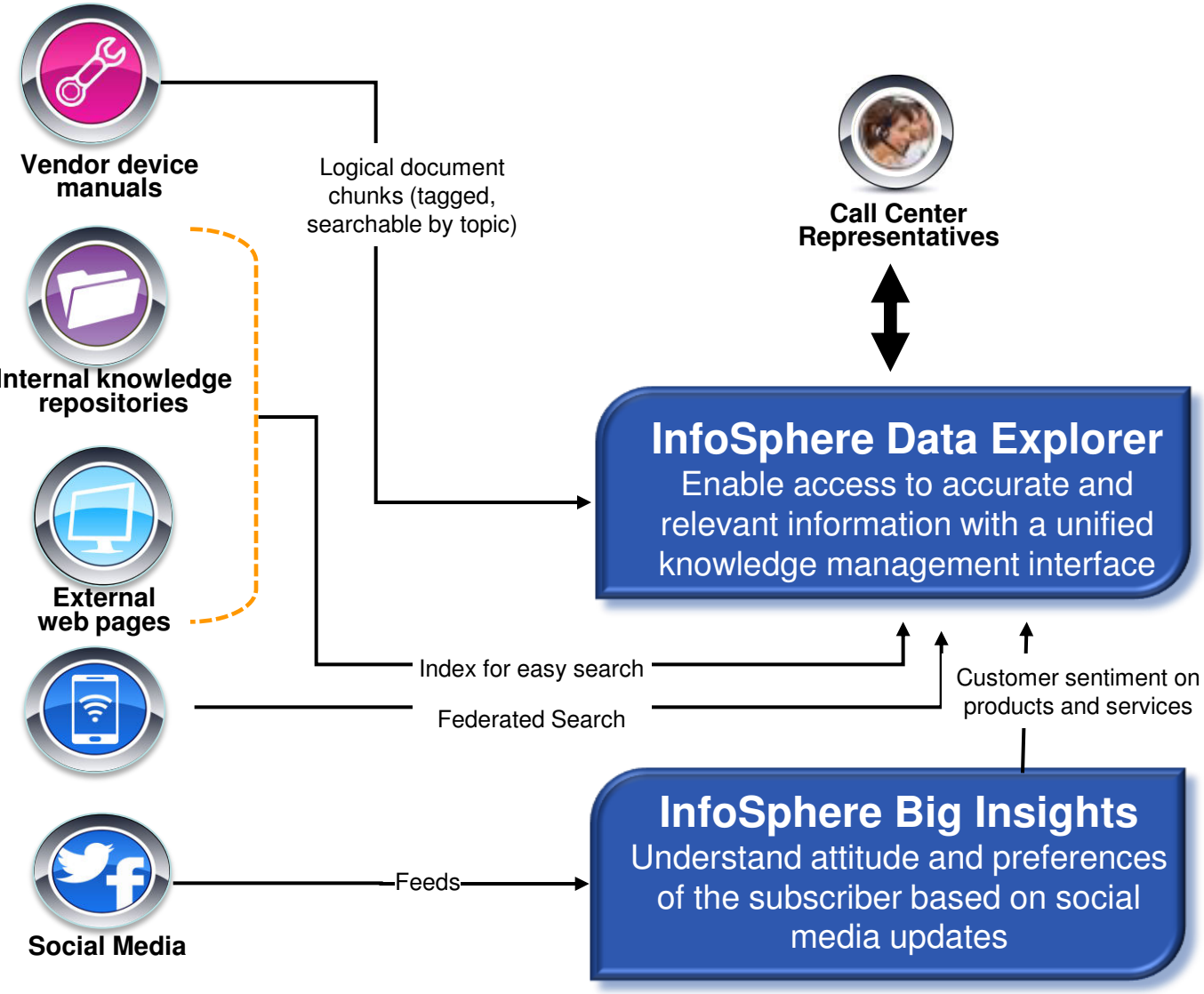
## What Capability?

- Create digestible chunks of information from large device manuals (automated)
- Index multiple internal and external information sources for topic wise search and navigation
- Enable federated search to third party sites such as Blackberry World & Apple App Store

## What Outcome?

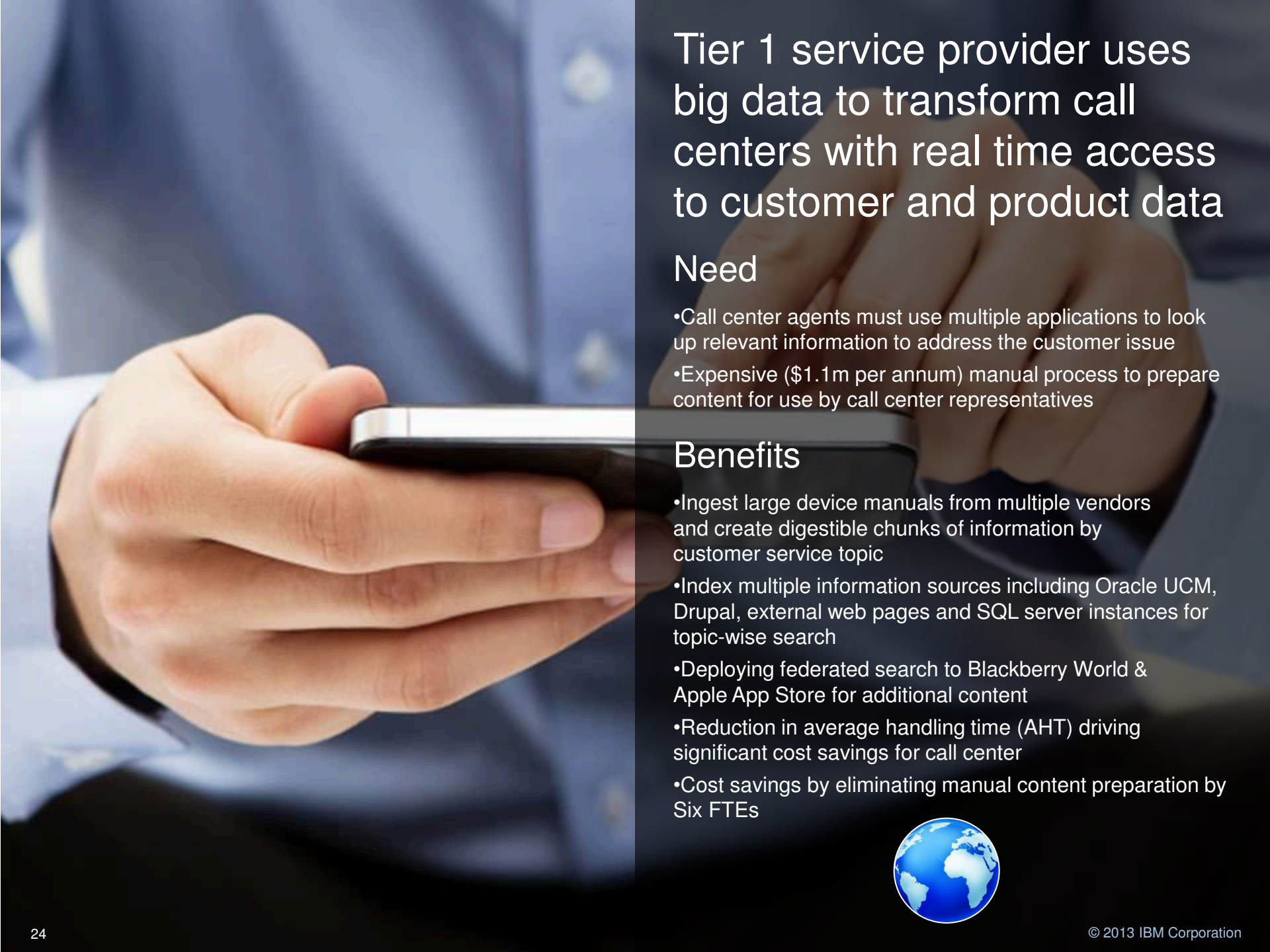
- Reduce average handling time (AHT) for call centers
- Cost savings by eliminating manual process for content preparation
- Increased customer satisfaction with faster resolution of customer query / issue

# Product Knowledge Hub Architecture




IBM DIFFERENCE

Provide a unified knowledge management interface for call center reps with accurate and relevant information



# Tier 1 service provider uses big data to transform call centers with real time access to customer and product data

## Need

- Call center agents must use multiple applications to look up relevant information to address the customer issue
- Expensive ($1.1m per annum) manual process to prepare content for use by call center representatives

## Benefits

- Ingest large device manuals from multiple vendors and create digestible chunks of information by customer service topic
- Index multiple information sources including Oracle UCM, Drupal, external web pages and SQL server instances for topic-wise search
- Deploying federated search to Blackberry World & Apple App Store for additional content
- Reduction in average handling time (AHT) driving significant cost savings for call center
- Cost savings by eliminating manual content preparation by Six FTEs

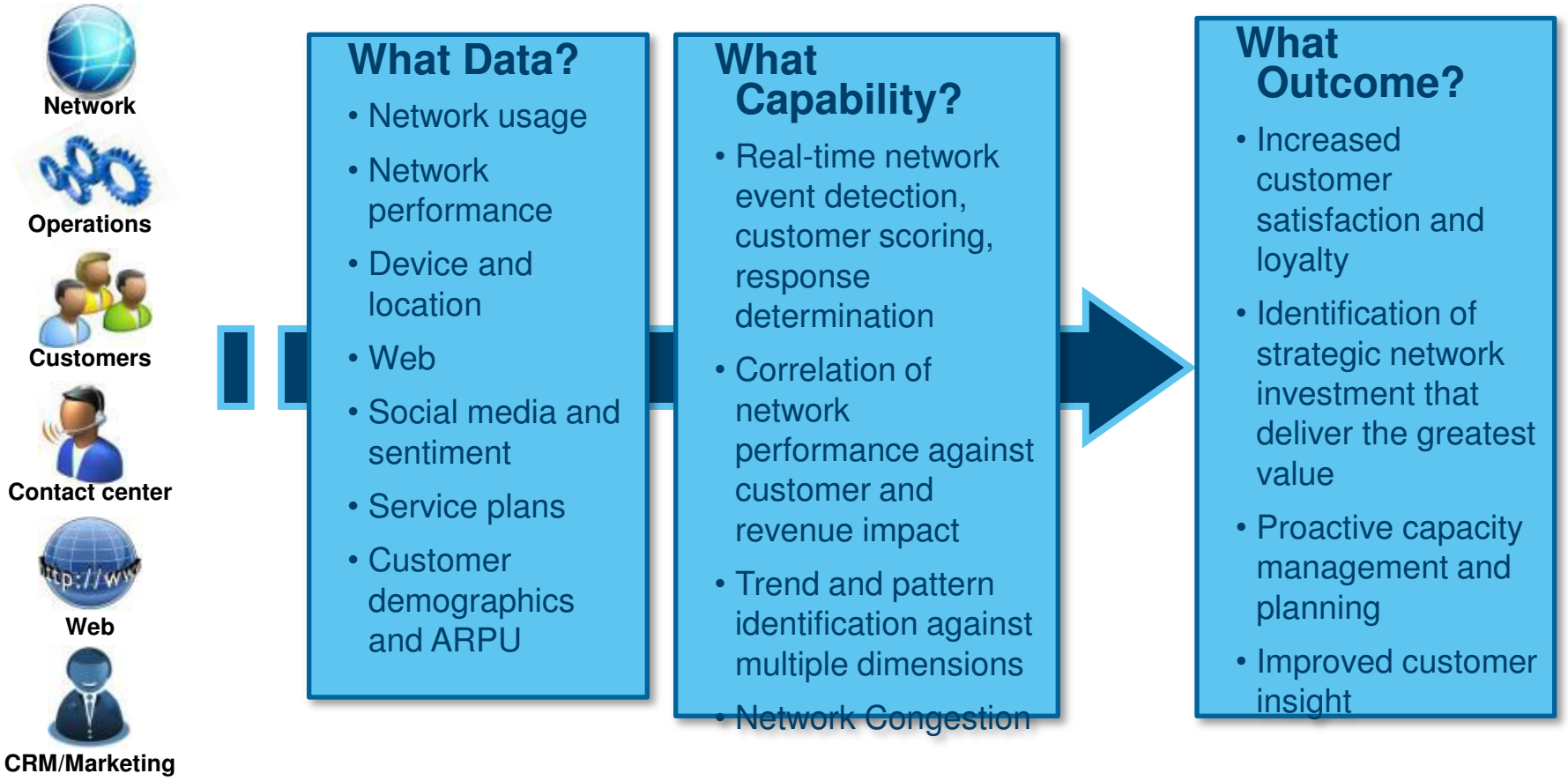
# The value of big data to build smarter networks

Identify and resolve network bottlenecks in minutes
…with rapid analysis of daily volume of billions of call detail records (CDRs), switch, billing and network events

Estimate capacity requirements
…with deep historical analysis of years of call detail records (CDRs), switch, billing and network events

# Network Intelligence

Identify **real time customer interventions and strategic network investment** – based on "just occurred" events and historical trends in usage and **each customer's behavior, sentiment, preferences and profile.**



# T-Mobile uses big data to optimize network performance and reduce costs

## Need

•Needed a solution to store and analyze two years worth of Call Detail Records (CDRs), switch, billing and network event data for over 30 million subscribers to identify and address network bottlenecks

## Benefits

•Analyze over 17 billion events per day to provide over 1,300 users with network Quality of Experience (QoE) analytics, traffic engineering, dropped session analytics as well as voice and data session analytics

•Business users can perform ad-hoc network and traffic analysis to identify performance issues in seconds and address them faster

T-Mobile

# Client success: A leading US wireless provider is exposing customer, network, service and device insights across the entire enterprise

T-Mobile

| | 2007 | 2012 |
|---|---|---|
| Data Feeds | 15 | 400 |
| Applications | 4 | 60 |
| Users | 50 | 1300 |
| Volume | 1.6B | 20B |
| Storage | 100 TB | 2 Petabytes |

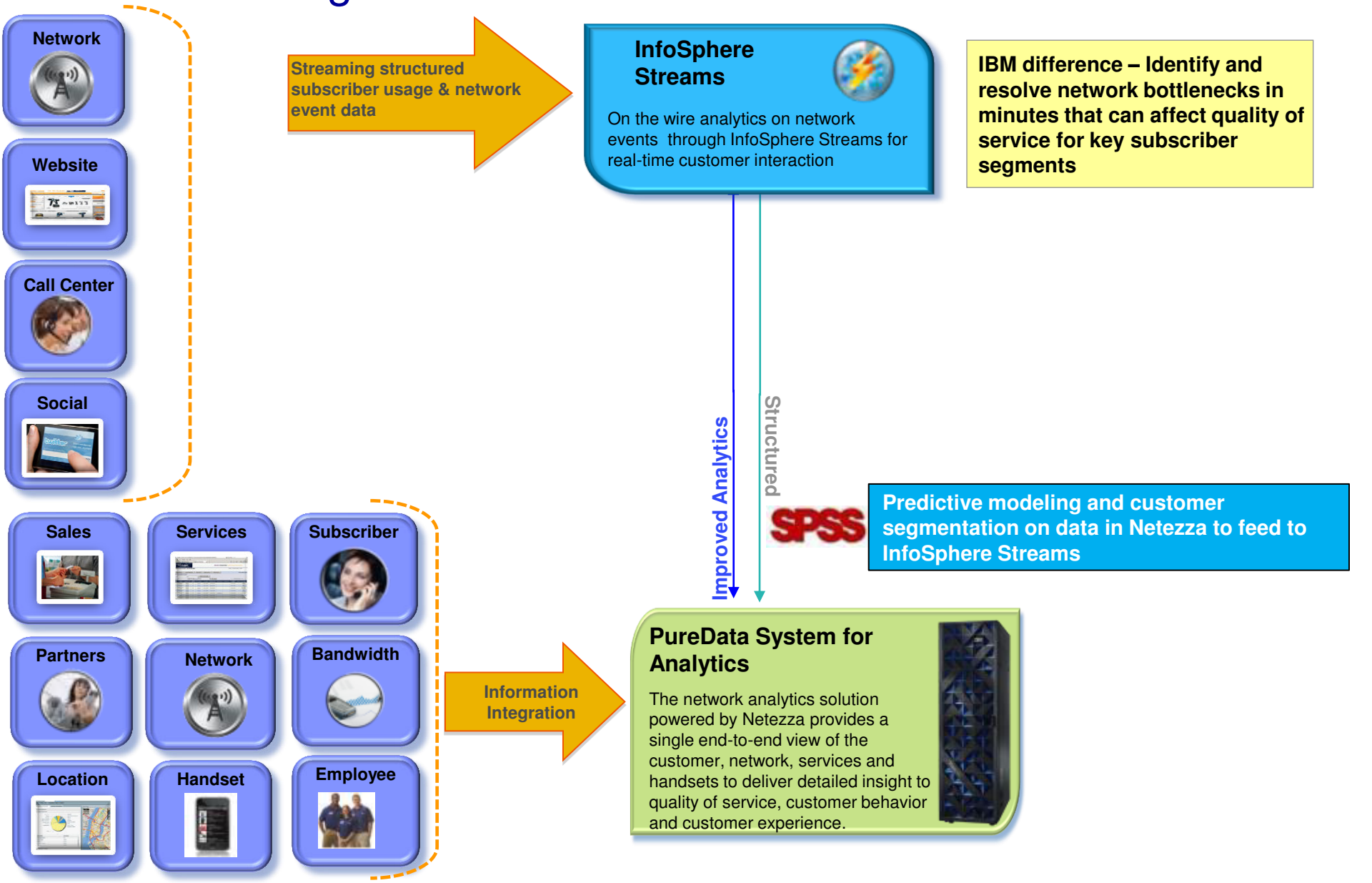
"We've even begun an initiative with social networking analytics and we're able to work with marketing and customer care to work on some fairly real-time interventions to try and prevent churn which is kind of an exciting initiative."

Customer events and activities reported every 15 minutes providing insight into the customer

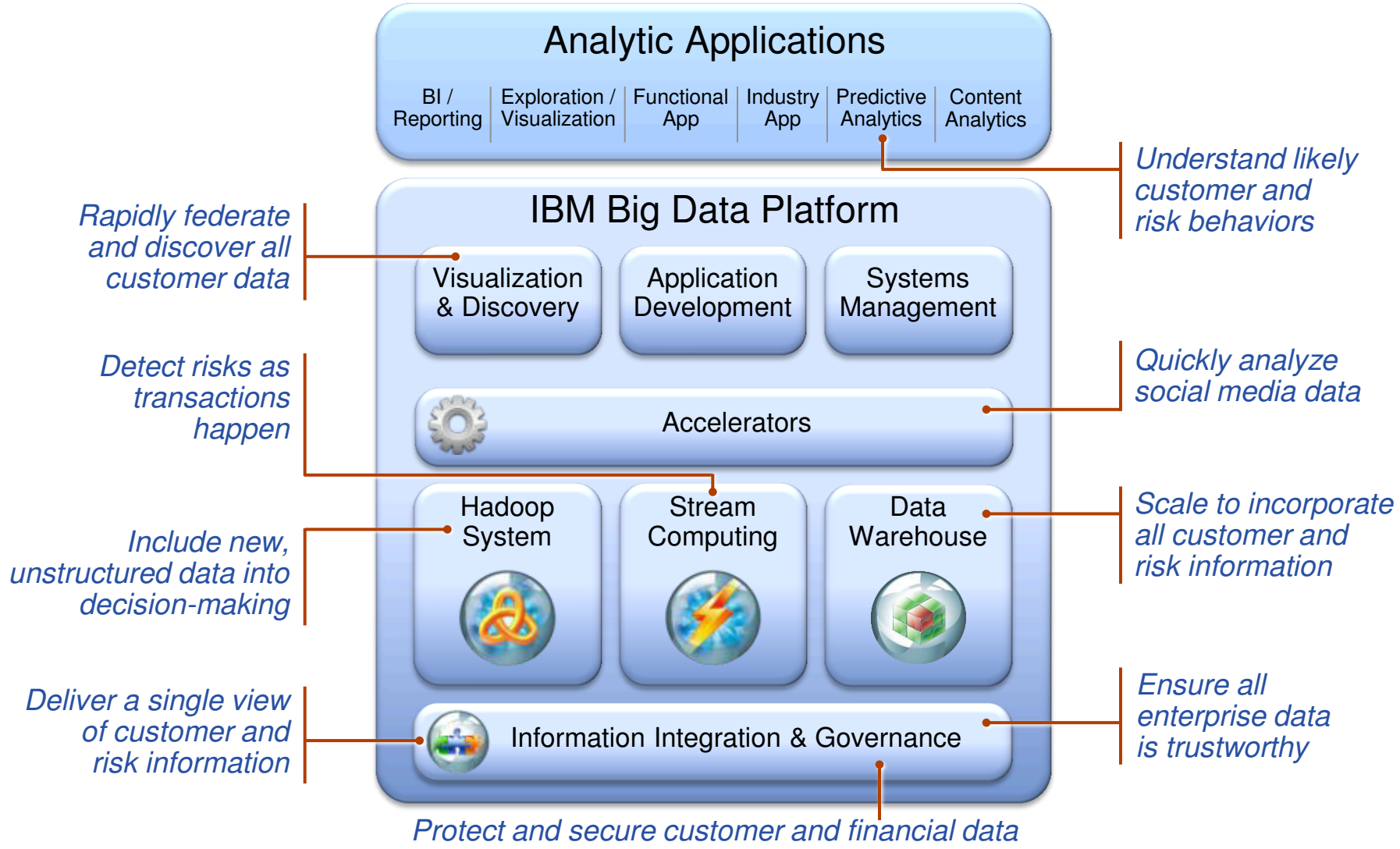
# Benefits of the Network Analytic platform at T-Mobile

- Congestion identification
- Handset distribution and service quality analysis enhanced
- Enhanced Customer Experience Analysis
- Now able to do predictive analysis of churn and capacity needs
- Become the bridge that relates Network to Marketing to Customer Care and Finance

# Network Intelligence architecture



# IBM big data platform tames the information explosion, deepening insight, and improving business outcomes



# Your big data journey – we can help

## *Big data adoption*

**Educate**
Focused on knowledge gathering and market observations

**Explore**
Developing strategy and roadmap based on business needs and challenges

**Engage**
Piloting big data initiatives to validate value and requirements

**Execute**
Deployed two or more big data initiatives and continuing to apply advanced analytics

**Join the business community**

*Validate and realize business value*

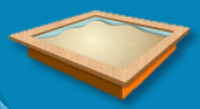

**Big data case studies, whitepapers and IBM Institute for Business Value reports**
ibmbigdatahub.com

**IBM Briefings, Solution Centers**

**IBM Readiness Assessment for Big Data**
- *Prioritized business use cases*
- *Recommend big data platform*

**Solution Design & Proof of Concept**
- *Validate business value of the big data use case*
- *Demonstrate big data capabilities to execute use case*

**Enterprise-wide big data initiatives**
- *Incremental value across multiple use cases*
- *Leverage investment from re-using the same big data platform*
- *Enterprise data platform to support analytics*



**Self-paced learning, exploration with downloads & test environment**
BigDatauniversity.com, YouTube Big Data Channel

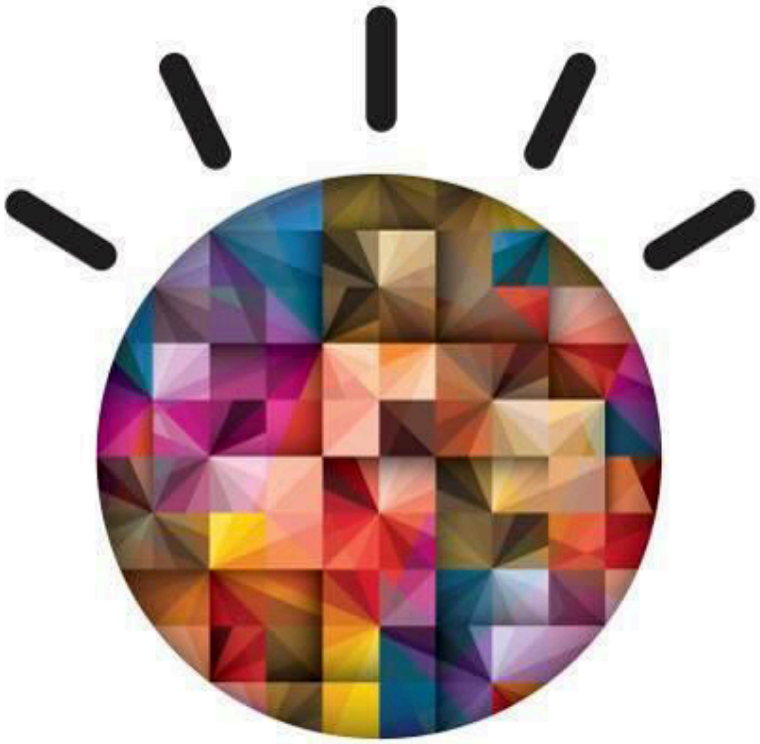
**Join the technical community**

*Learn the technology & gain expertise*

For more information:

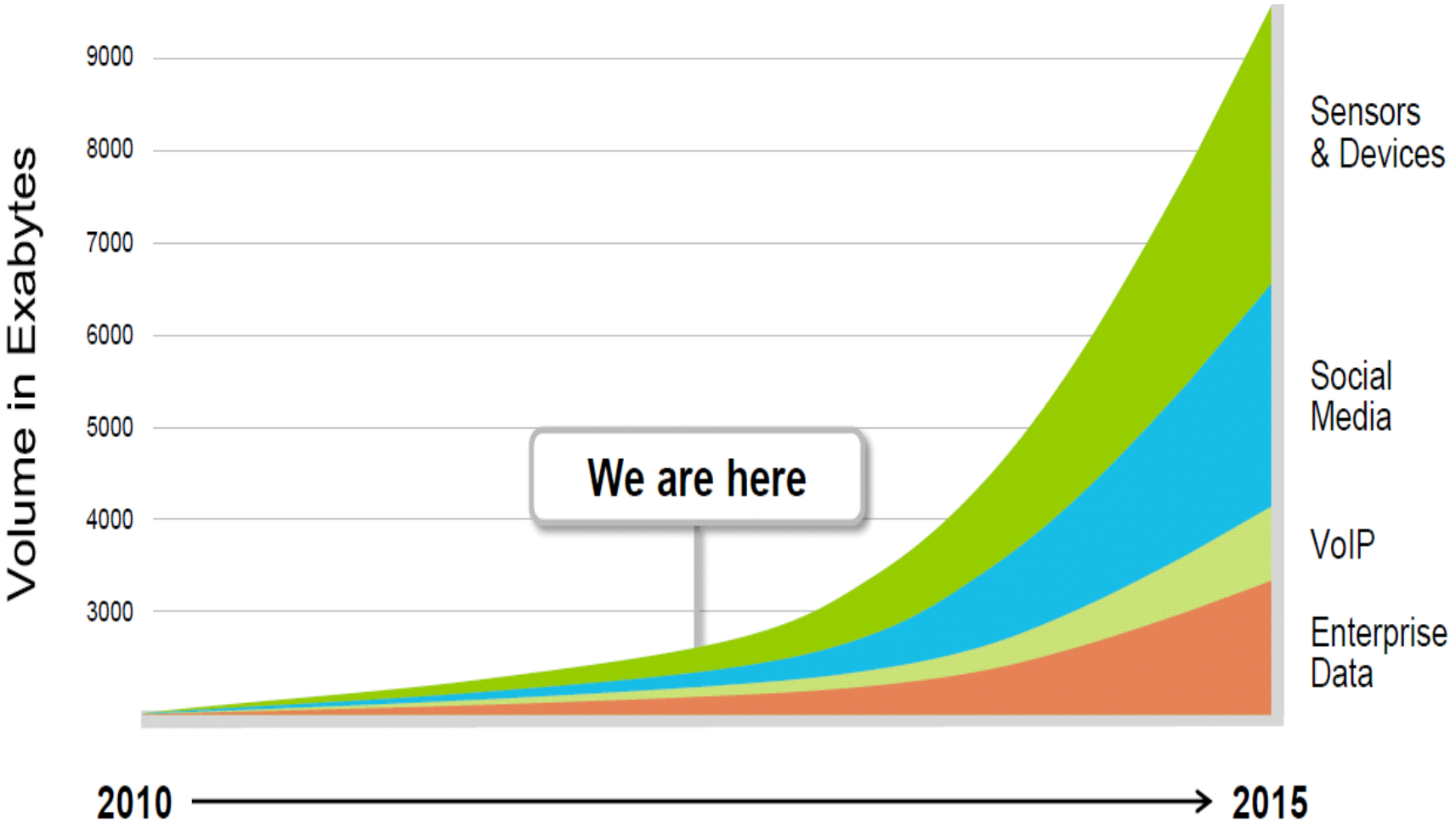
# ibm.com/bigdata

## www.bigdatauniversity.com



#ibmbigdata

# Big Data: This is only the beginning.




Source: IBM Global Technology Outlook, 2012

# **Analytics is expanding** from enterprise data to big data

## Volume

**12** terabytes

of Tweets create daily

Analyze product sentiment

## Velocity

**5** million

trade events per second

Identify potential fraud

## Variety

**100's** video feeds

from surveillance cameras

Monitor events of interest

**350** billion

meter readings per annum

Predict power consumption

**500** million

call detail records per day

Prevent customer churn

**80%** data growth

are images, video, documents…

Improve customer satisfaction

# Telecommunications Perspective

# Every Industry is Leveraging Big Data & Analytics

## Banking

- Optimizing Offers and Cross-sell
- Counterparty Risk
- Contact Center Efficiency
- Payment Fraud Detection

## Insurance

- Claims Fraud
- Customer Retention & Growth
- Catastrophe modeling

## Telco

- Location based Services
- Pro-active Call Center
- Network Analytics
- Smarter Campaigns
- Cross-industry solutions

## Energy & Utilities

- Smart Meter Analytics
- Distribution Load Forecasting/Scheduling
- Condition Based Maintenance
- Create & Target Customer Offerings

## Media & Entertainment

- Business process transformation
- Audience & Marketing Optimization
- Multi-Channel Enablement
- Digital commerce optimization

## Retail

- Actionable Customer Insight
- Merchandise Optimization
- Dynamic Pricing

## Travel & Transport

- Customer Analytics & Loyalty Marketing
- Predictive Maintenance Analytics
- Capacity & Pricing Optimization

## Consumer Products

- Shelf Availability
- Promotional Spend Optimization
- Merchandising Compliance
- Promotion Exceptions & Alerts

## Government

- Crime Prevention & Prediction
- Threat Prediction

## Healthcare

- Measure & Act on Population Health Outcomes
- Engage Consumers in their Healthcare

## Automotive

- Predictive Asset Optimization
- Data Warehouse Optimization
- Preventative Maintenance

## Chemical & Petroleum

- Predictive Asset Optimization
- Operations Surveillance, Analysis and Optimization

## Aerospace & Defense

- Predictive Asset Optimization

## Electronics

- Predictive Asset Optimization

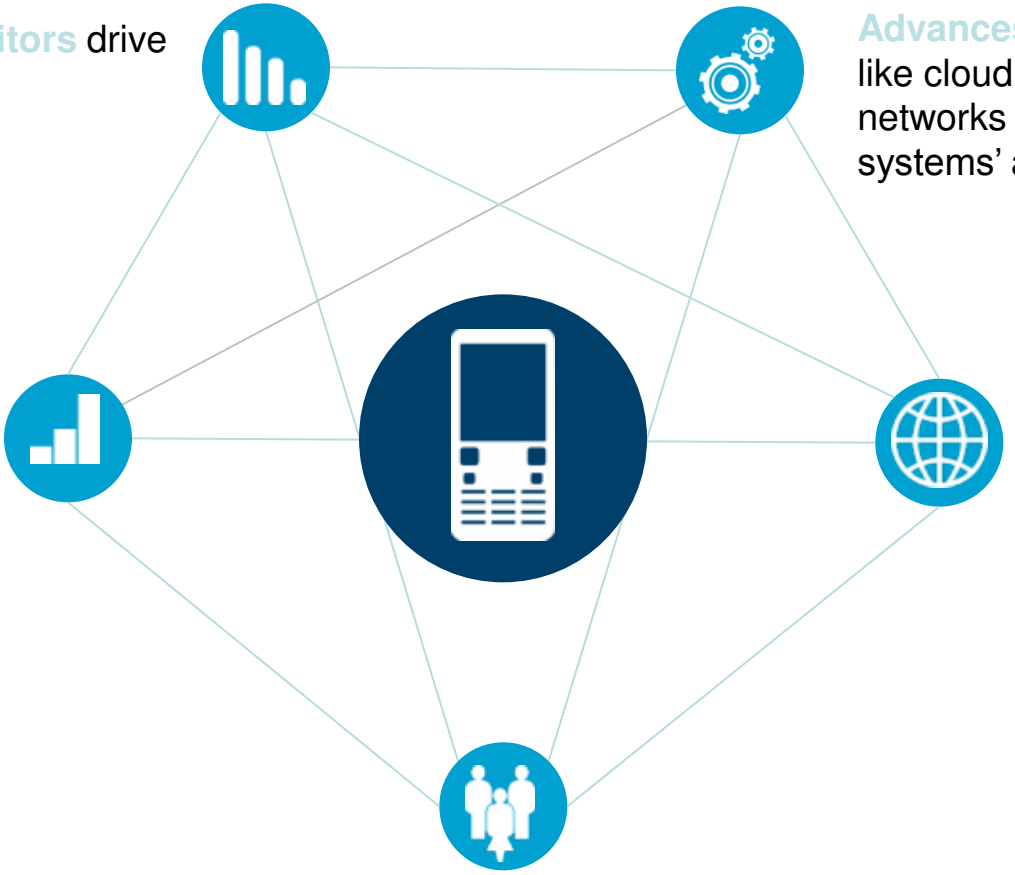
## Life Sciences

- Increase visibility into drug safety and effectiveness

# Dramatic challenges are manifested across the communications service provider industry

**Disruptive competitors** drive down profit margins

**Advances in technologies** like cloud and next-gen networks challenge legacy systems' ability to keep pace



**Mobility and data services growth** cause an unprecedented network traffic and data explosion

**Active government involvement** means increasing regulations

**Empowered customers** expect a superior communications experience anywhere, anytime, on any device

# Service Providers must focus on three key imperatives to ensure future success

## 3 Key Imperatives for Smarter Communications

**Deliver smarter services**
to generate new sources of revenue

**Drive smarter operations**
to achieve operational and service excellence

**Build smarter networks**
to implement and optimize current and next-generation networks

## Smarter Communications Success-Drivers

- Improve the Customer Experience
- Create and Launch Value-added Services
- Monetize New Data Sources

- Transform OSS/BSS
- Optimize Infrastructure
- Manage Information

- Invest in New Network Infrastructure
- Embrace Wireless and IT Convergence
- Develop New Business Models

# Today's challenges translates into a few focus areas with key business use cases

## Create and deliver smarter services

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## Personalize Customer Engagements

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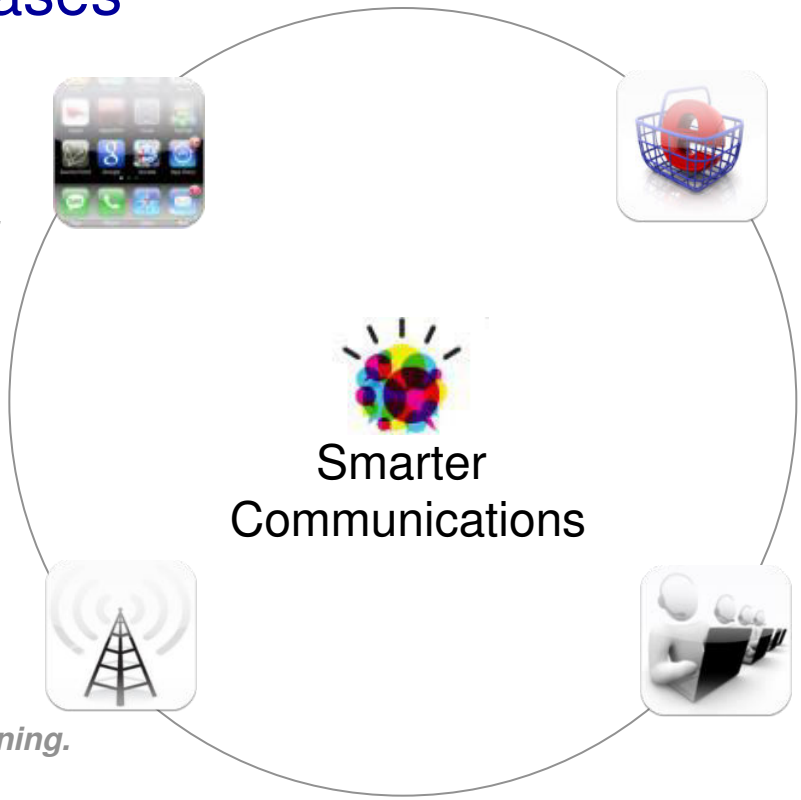


## Build smarter networks

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- Network Intelligence

## Transform operations

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Increase Revenue
…by building comprehensive view of customer behavior and preferences by segment across all channels

Improve Customer Retention
…by delivering customer retention offers in near real-time

Increase Customer Intimacy
…by adding social analytics as an additional source of valuable insight

Increase Offer Acceptance
…by analyzing customer usage in real-time

Increase Customer Satisfaction
…with faster and more complete insight into customer experience and service levels

# Improving customer data/location monetization with big data analytics

*Combine customer profile, interaction & usage across all channels (mobile, call center, web,*
*store and landline) to understand customer needs by segment and drive location-specific offers*

**Customer Profile**

**Social Media**
Attitudes, preferences

**Customer Interaction & Usage**

**Location**
Where the customer

## What Data?

- Demographic profile
- Social media behavior
- Customer interaction and usage (events, web, purchases, call center, etc.)
- Subscriber location

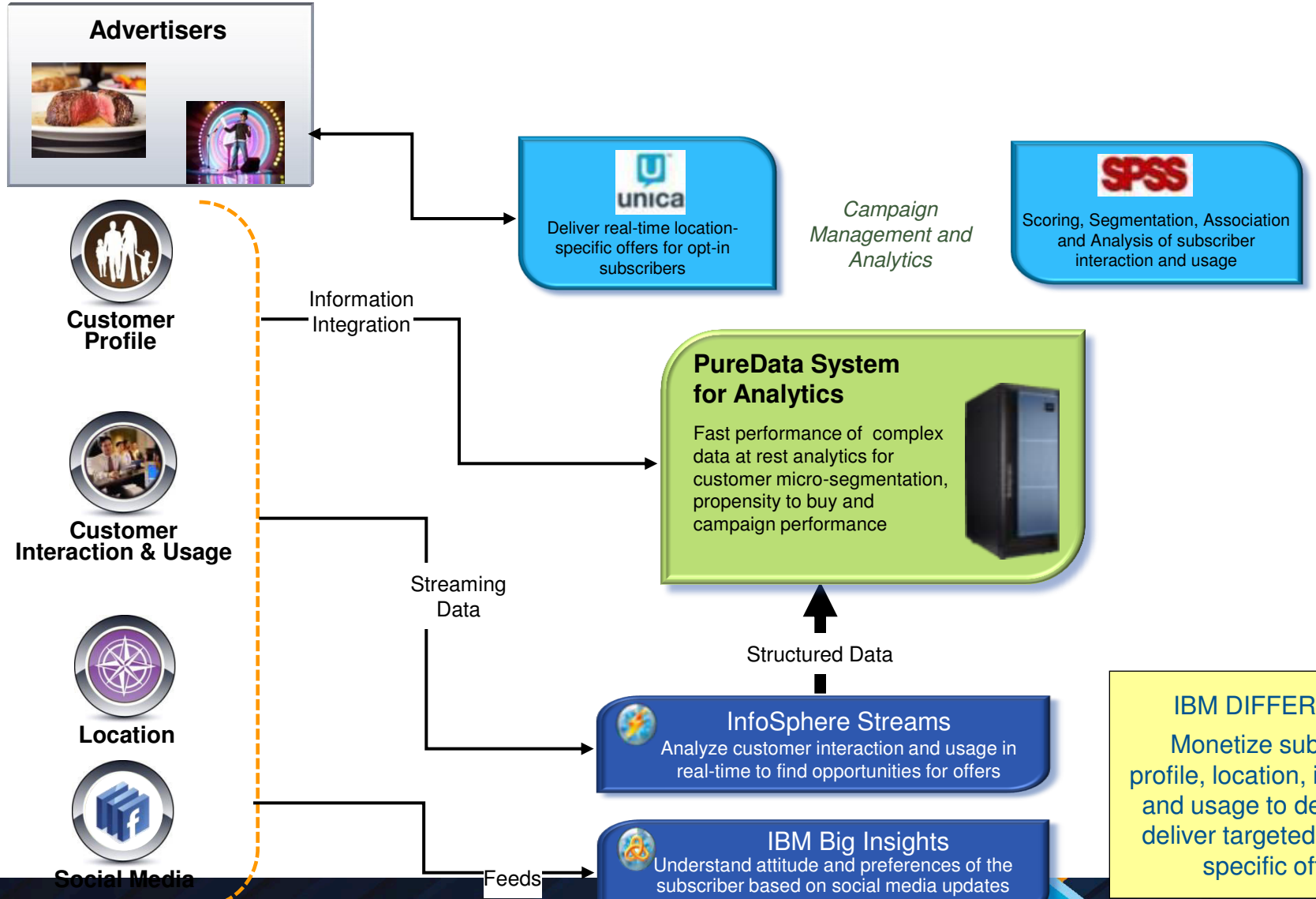
## What Capability?

- Micro segmentation based on interaction and usage
- Score propensity to buy based on comprehensive interaction and usage
- Enable real-time marketing campaigns based on profile, usage and location
- Enable proactive offers based on profile and usage

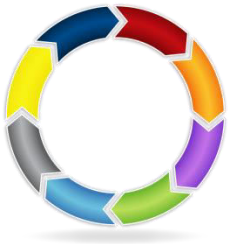
## What Outcome?

- Monetize consolidated anonymized subscriber data by segment
- Improved offer acceptance for advertising partners
- Increased customer satisfaction with targeted location-based offers for opt-in subscribers

# Customer Data/Location Monetization architecture

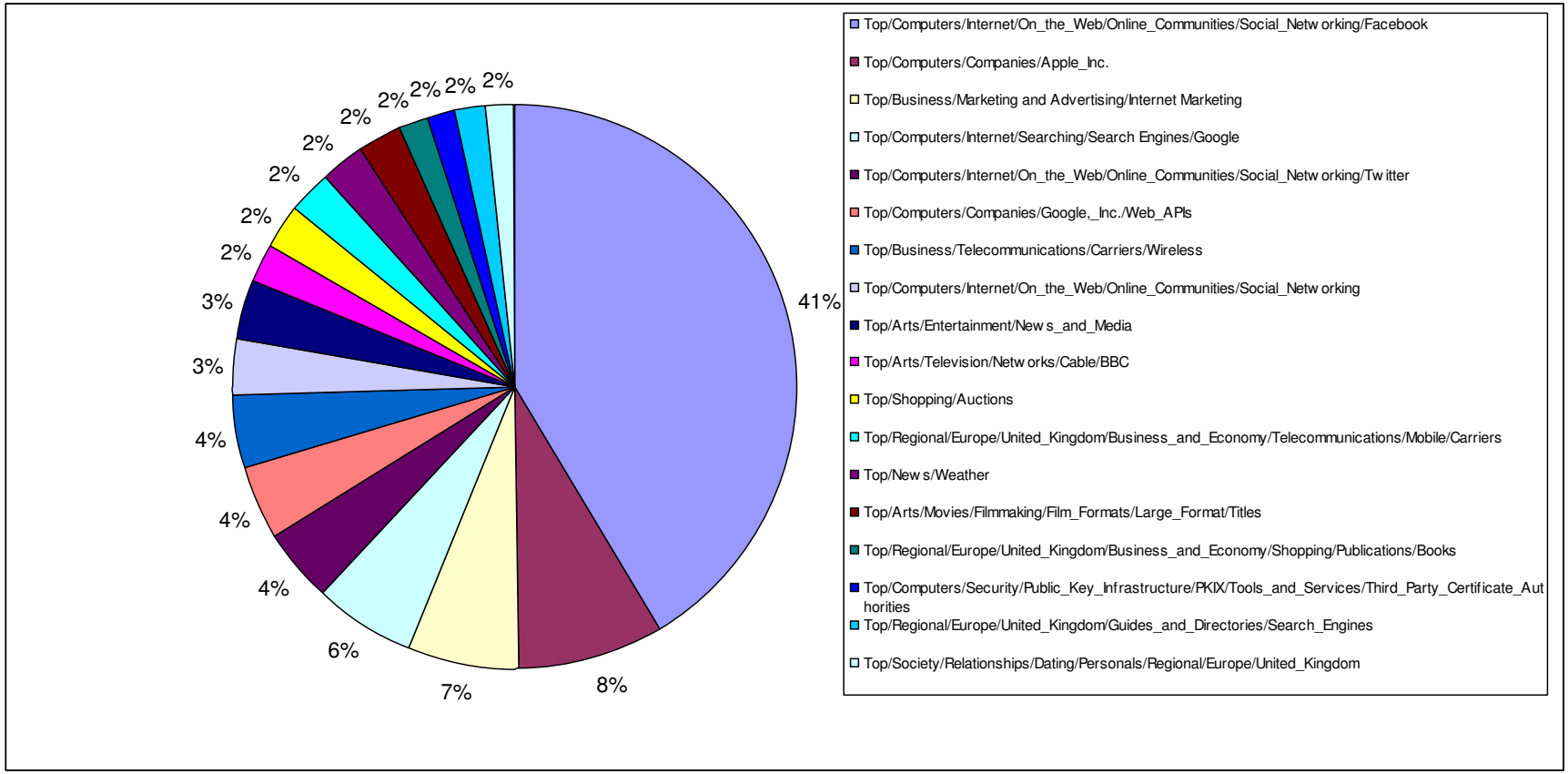


# Customer Micro-segmentation

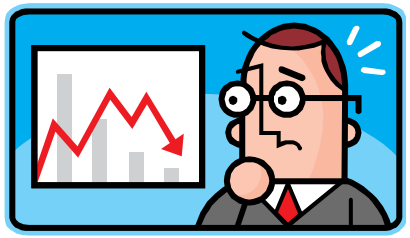


- The goal: understanding trends and interests of specific user segments and developing targeted websites, content and apps e.g., sport, tourism…
- Communication Service Providers (CSP) use static, multi purpose, marketing segmentation of customers, which is not effective
- Segments are defined only once or twice and therefore cannot reflect a propensity change, or commercial intent
- Moreover, current segments are too broad which lead to blanket actions which will not suit all customers
- By understanding how customers use their phones, we allow highly personalized marketing interactions
- We use Web browsing and application data to learn ad-hoc data-driven micro segments aimed specifically to perform for a given action/offer.
  - Web data is representative of customer tastes and interests and it is current, and up-to-date

# Example of interests for a particular user segment



# Churn Reduction



- Creating new propensity models for churn reduction and services cross selling
  - Adding new Key Performance Indicators (KPIs) to churn models based on user's interests and data consumption
- Examples:
  - a higher propensity to churn is shown for heavy users of social media sites. The reason: an attractive package proposed by a competitor including free Facebook access
  - a higher propensity to churn is shown for soccer fans. The reason: a competitor proposing SMS updates with match scores
- This new data allows to considered churn factors that were overlooked
- Might be applied using Infosphere Streams

# Targeted Advertisement

- Big Internet companies earn billions through the monetization of the knowledge they have of their customers
  - e.g. Google AdSense, Facebook advertisements
- CSPs share the same type of knowledge but it is encoded into network traces and logs
- We allow to decipher this information and make it actionable for advertisement purposes
- Being able to answer advertiser requests like: “who are your top 100.000 customers who are interested in financial products?”
- This information can coupled with spatio-temporal information for even more efficient advertisement
- Might be applied using Infosphere Streams

# URL Analysis- Extract Implicit User Profile


Data Cleansing

analysis

**URL Analysis:** for each user, report the most meaningful interests to describe her profile.

loans music cooking banking

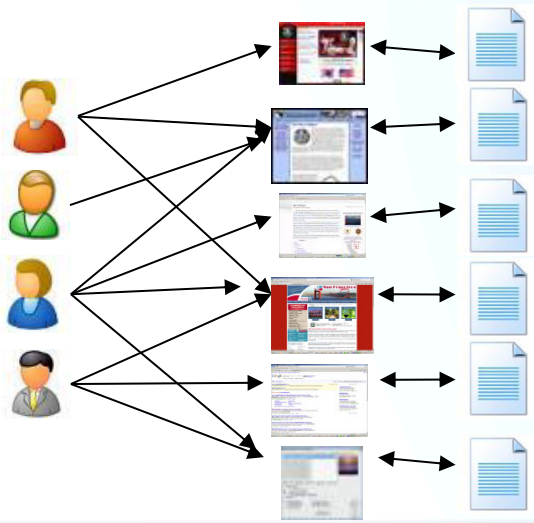
Large scale analysis

Update users profiles

Consume

**Adaptive user segmentations:** create new users segmentation by clustering similar interests

# How URLs are transformed in Concepts



{docid: d1, wwpokec.azet.sk}

{docid:d2, http://news.yahoo.com/recall-news-215006441.htm}

{docid: d3, www.youtube.com}

ODP-
Business/Marketing_and_Advertising
/News_and_Media

WIKIPEDIA
Product recalls

# Different URLs Types

- General URL syntax is:
  - scheme://domain:port/path?query
- Domain-Level URL:
  - scheme://domain
    - E.g., www.cnn.com
- URL-Level URL
  - scheme://domain/path
  - Query-Path :
    - Those URLs include query (search terms) and usually are coming from search engines (google, yahoo, internal search).
    - E.g., http://www.bing.com/search?q=809+area+code
  - Title-Path:
    - Those URLs usually represent articles.
    - E.g., http://news.yahoo.com/obama-romney-where-stand-issues-184344925.html,
  - Others:
    - E.g., http://www.planetminecraft.com/resources/projects/

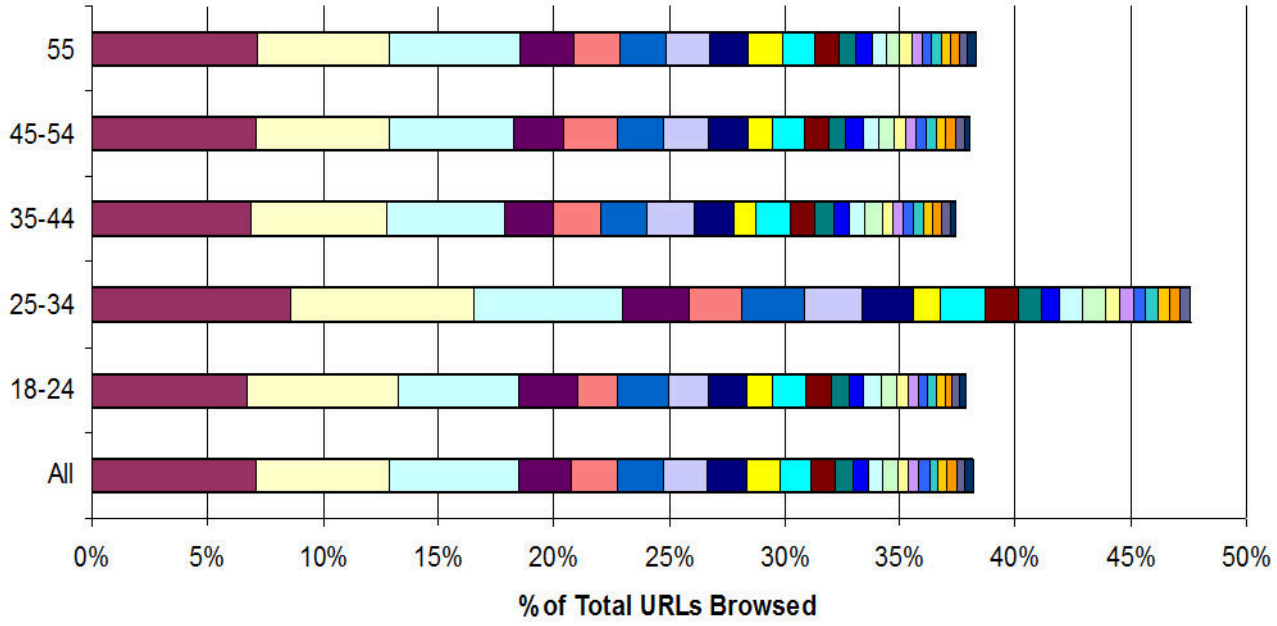
# Example of User Profile

| Userid | Category | Agent type | Date | Count |
|---|---|---|---|---|
| 012013a474b | Arts/Entertainment/News_and_Media | AndroidBrowser | 2011-09-26 | 22 |
| 012013a474b | Arts/Radio/Internet/Directories | AndroidBrowser | 2011-09-27 | 15 |
| 012013a474b | Reference/Maps/Google_Maps | BlackberryBrowser | 2011-09-27 | 14 |
| 012013a474b | Arts/Entertainment/News_and_Media | AndroidBrowser | 2011-09-27 | 13 |

- Top-4 categories for userid “012013a474b”, aggregated by *Category, Agent type* and *Date*, ranked by *Count*.
- Other KPIs can be computed.

# Demographic Analysis Example

- Top Level browsing behaviour does not vary widely by age group
- 25-34 year olds concentrate a higher proportion of their browsing in the “top categories”




- **Analysing only the top 100 browsing categories it is possible to identify clear preferences by Male and Female customers**
- **Top ten categories remain the same for Men and Women, though the ordering varies slightly**
- **Those categories for which there are significant differences between men and women:**

| Male | Female |
|---|---|
| News & Media | Online Shopping |
| Sports | Health & Medicine |
| Football | Cinemas |
| Autotrader | Personal Finance |
| Adult Content | |
| Mobile Gaming | |

# Segmentation based on browsing behaviour

### *Casual Browsers*

- Largest Group yet only 3% of browsing and rarely active on data
- Typically browses few categories and in very few locations, so perhaps at home/work only
- Few Smartphones – mostly using WAP

### *Heavy Infrequent*

- Use data only a few days per week though in a wider range of locations
- Social Networking and WAP dominate browsing categories but longer tail of diverse interests
- Blackberry handsets are popular in this group but there are few smartphones

### *Heavy Browsers*

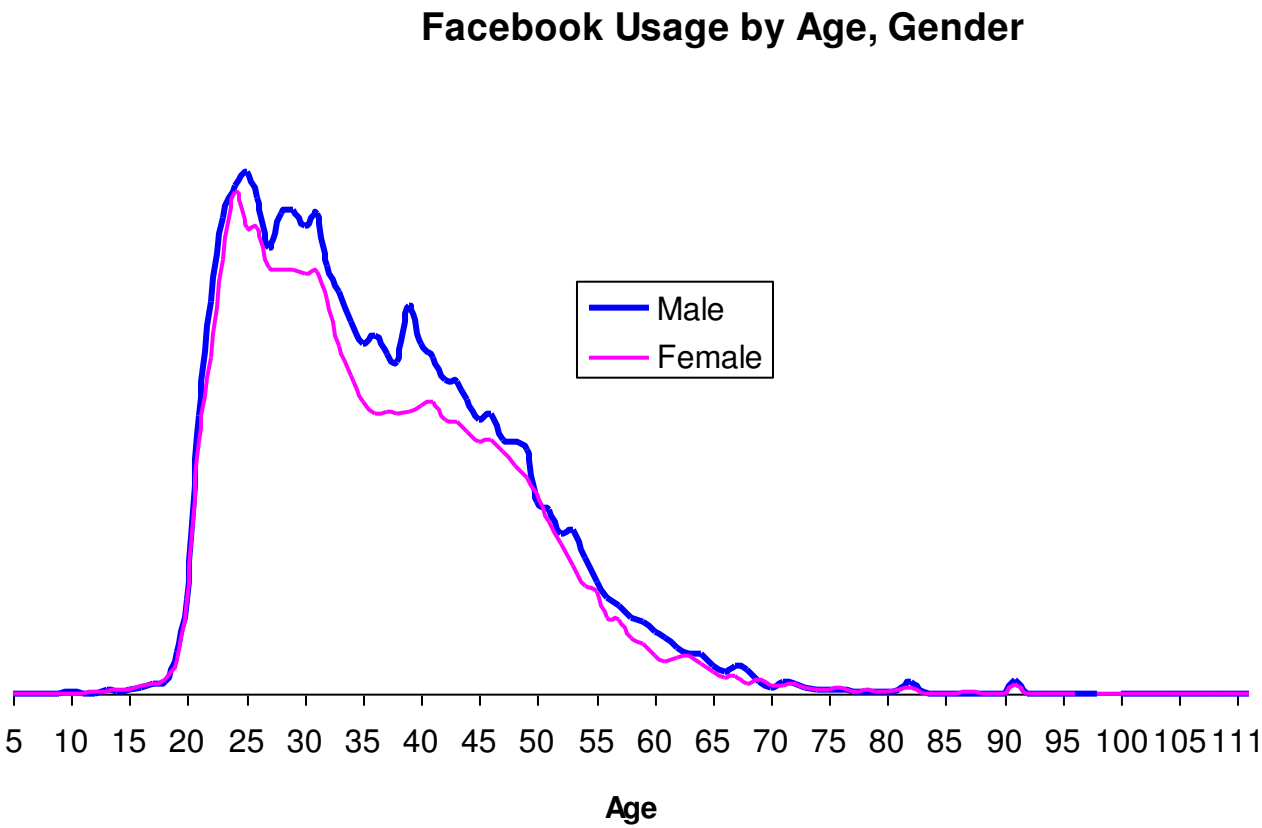
- Second largest group for the largest share of browsing
- Very similar to Heavy Infrequent in terms of browsing diversity but far more active, more often and in more places
- Most have Smartphones; Blackberry and HTC popular handsets

### *Intense*

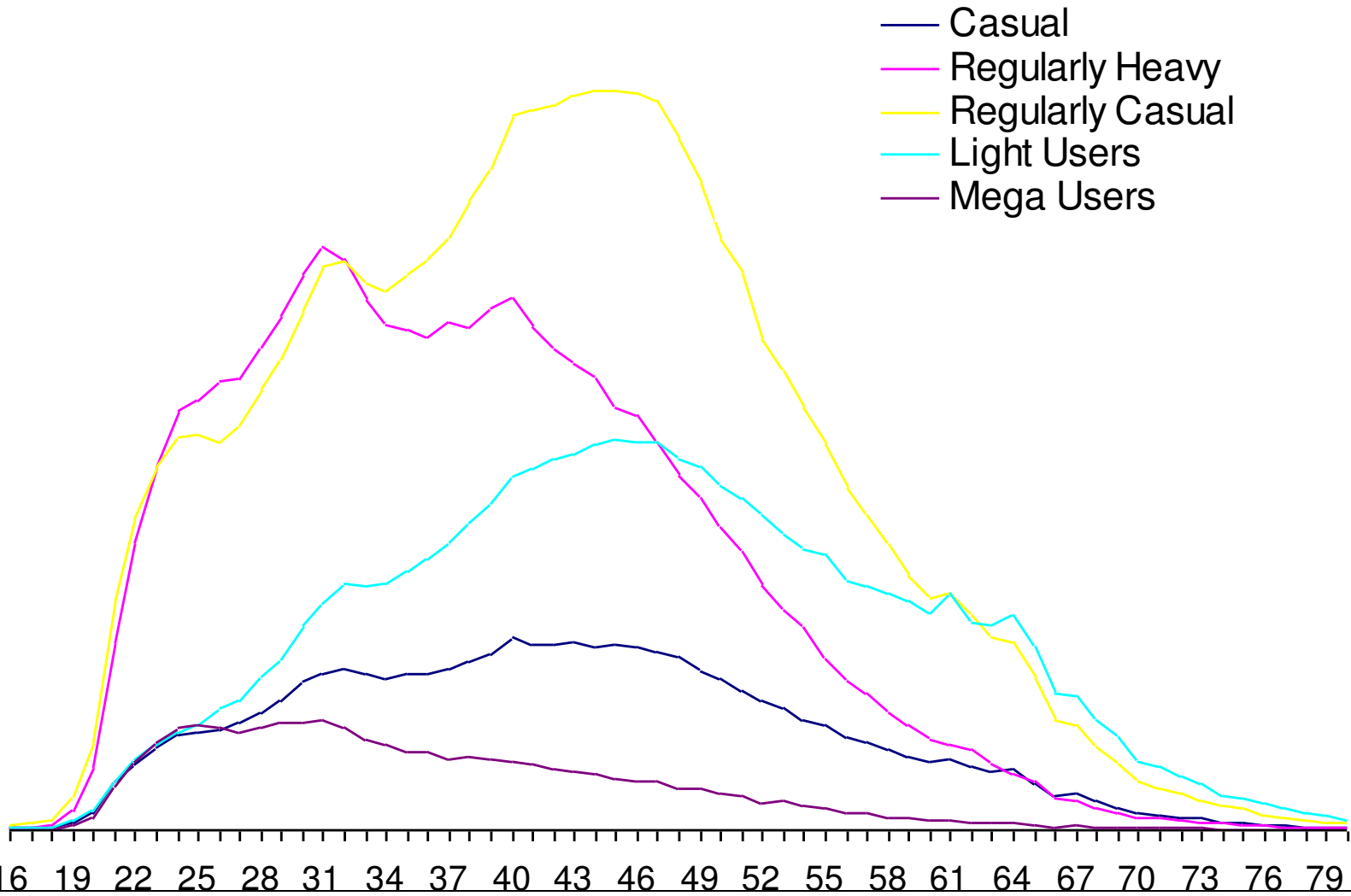
- Small minority of MSISDN that browse often and in large volumes, accounting for 42% of all browsing
- Wide diversity of content and over many locations
- Almost all on Smartphones; HTC Wildfire most popular device

## *Expanding on Age and Gender Preferences within Categories*

- Combining previous analyses enables us to get deeper understanding of customer preferences within the major browsing categories, for example:

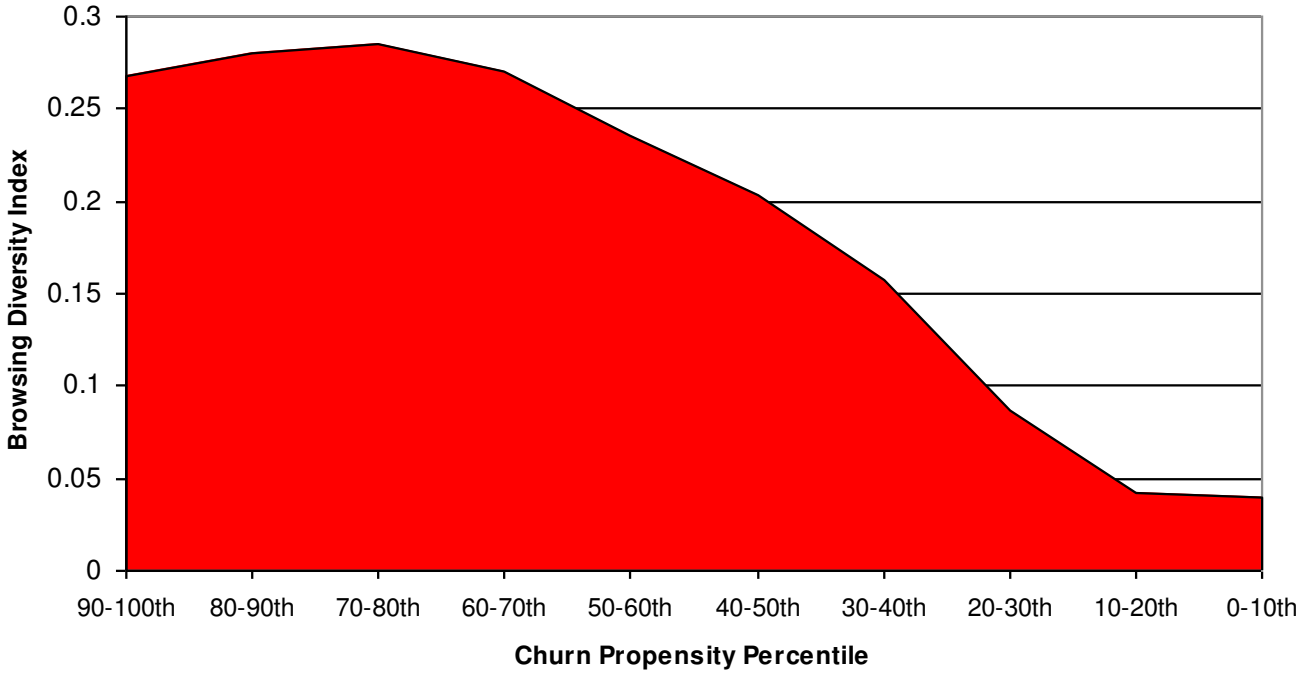


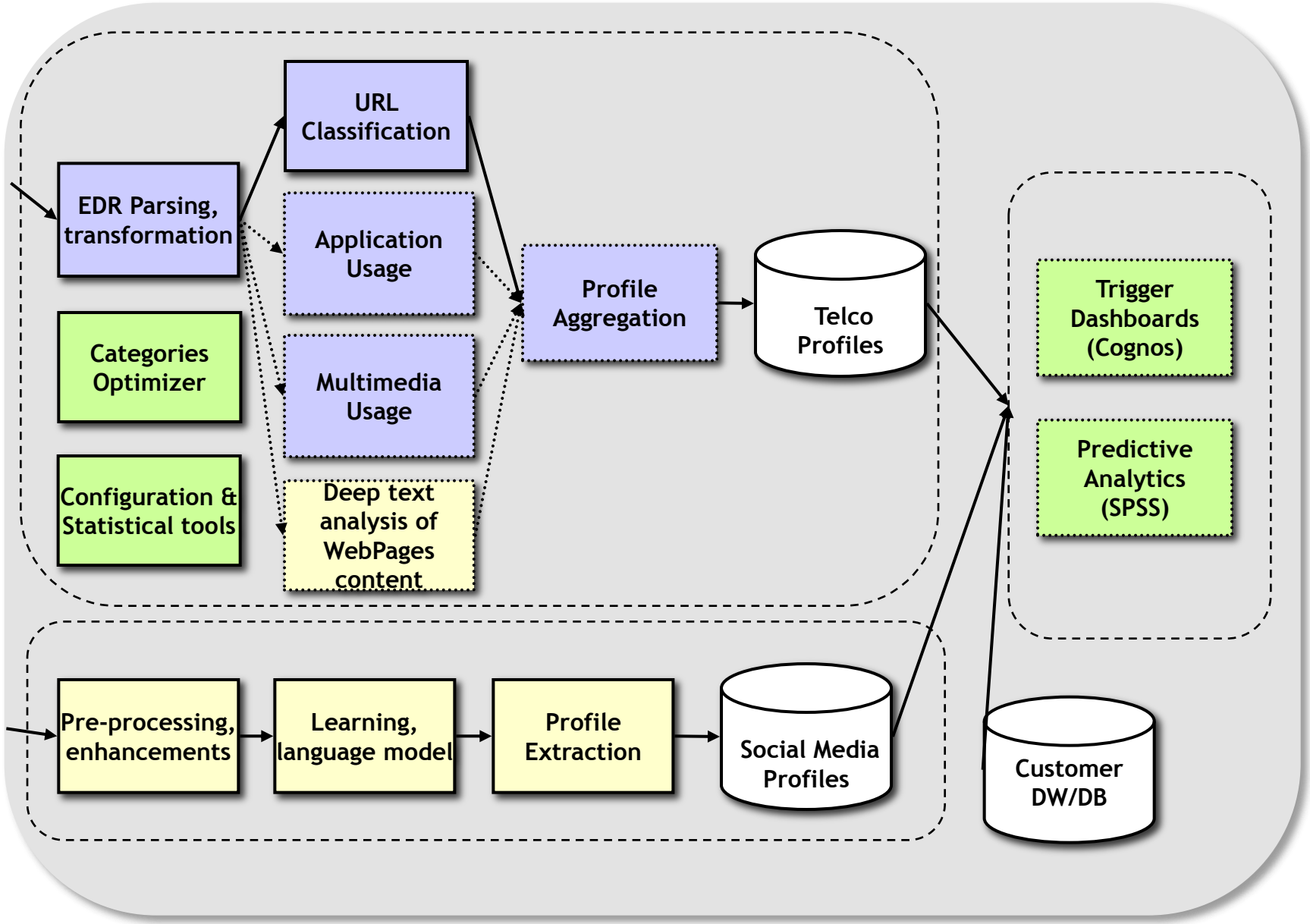
## *Age Distribution of PostPay Clusters*



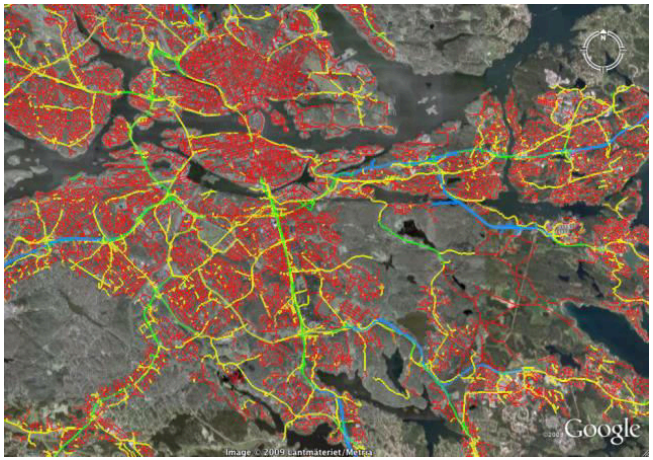
# There is a correlation between browsing diversity and churn propensity in Prepay customers

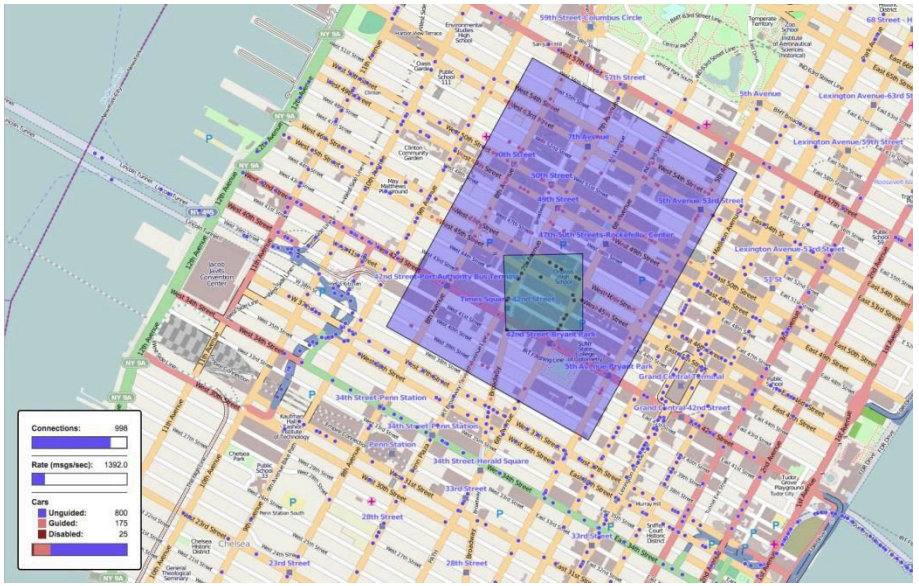
- Each MSISDN in Consumer PrePay has been allocated a Churn Percentile score
- Comparing each percentile group's top categories shows that Churn Percentile seems to be correlated positively with increasing variety of categories browsed
- This could lead to discovery of churn indicators in Phase 2



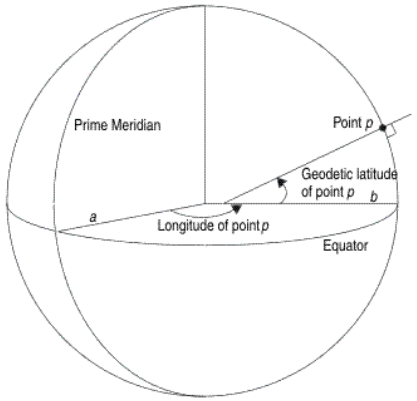

Mobile Usage Data
EDR Parsing, transformation
URL Classification
Application Usage
Multimedia Usage
Deep text analysis of WebPages content
Categories Optimizer
Configuration & Statistical tools
Profile Aggregation
Telco Profiles
Trigger Dashboards (Cognos)
Predictive Analytics (SPSS)
Social Media Data
Pre-processing, enhancements
Learning, language model
Profile Extraction
Social Media Profiles
Customer DW/DB
InfoSphere Streams/ InfoSphere BigInsights
InfoSphere BigInsights

# Geospatial Toolkit




- High Performance Analysis and Processing of Geospatial data
- Enables Location Based Services
  - Smarter Transportation, GeoFencing
- GeoSpatial Data types
  - e.g. Point, LineString, Polygon
- GeoSpatial Functions
  - e.g. Distance, Map point to LineString, isContained etc.



**Deliver smarter services**
to generate new sources of revenue

# Value of big data to transform operations

Reduce average handling time (AHT)
…by providing call center representatives with accurate and relevant product information in a single interface (regardless of the source)

Measure and Improve service levels
…with analysis of real-time network events to identify service issues

# Enabling product knowledge hub for customer service with big data analytics

*Provide customer service representatives with accurate and relevant information with a unified knowledge management interface*


## What Data?

- Vendor device manuals
- Internal knowledge repositories (Drupal, SQL servers, content management solutions etc.)
- External web pages (vendor site knowledge portals)
- App Stores (Blackberry World, Apple App store, Google Play etc.)

## What Capability?

- Create digestible chunks of information from large device manuals (automated)
- Index multiple internal and external information sources for topic wise search and navigation
- Enable federated search to third party sites such as Blackberry World & Apple App Store

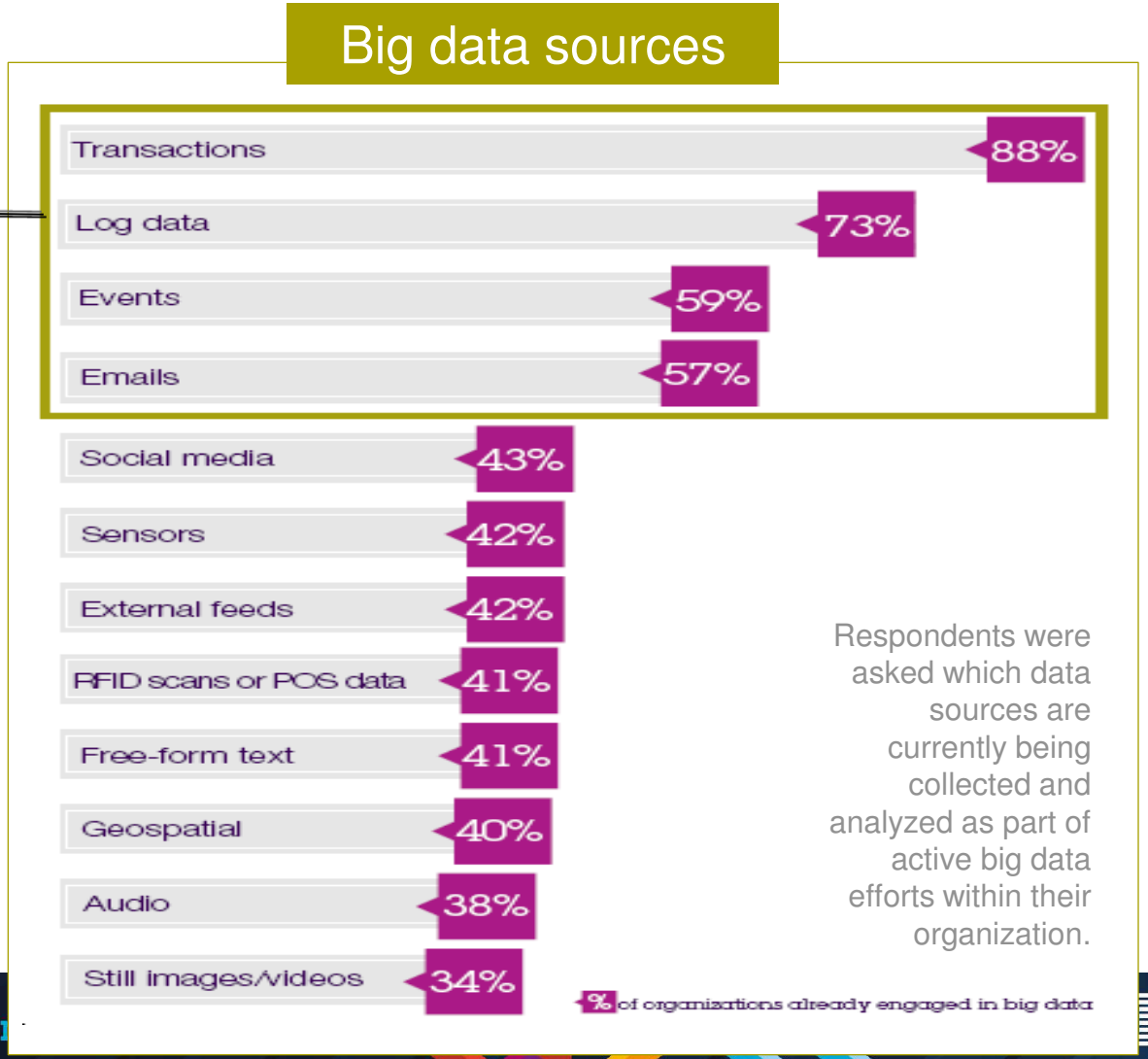
## What Outcome?

- Reduce average handling time (AHT) for call centers
- Cost savings by eliminating manual process for content preparation
- Increased customer satisfaction with faster resolution of customer query / issue

# Which Data for “Big Data” ?

The data sources being used by other Big Data initiatives gives indication of where initial effort being expended

Initial Focus has been internal data



# Why are Telcos interested in Big Data/Advanced Analytics?

## Analyze Information in Motion

- Real-time promotions
- Cyber security
- Click-stream analysis
- CDR processing
- IT log analysis
- RFID tracking & analysis

## Analyze a Variety of Information

- Social media/sentiment analysis
- Geospatial analysis
- Brand strategy
- Early warning system
- Market analysis
- Video analysis
- Audio analysis

## Analyze Extreme Volumes of Information

- Transaction analysis to create insight-based product/service offerings
- Fraud modeling & detection
- Risk modeling & management
- Social media/sentiment analysis
- Environmental analysis

## Discovery & Experimentation

- Sentiment analysis
- Brand strategy
- Ad-hoc analysis
- Model development
- Hypothesis testing
- Transaction analysis to create insight-based product/service offerings

## Manage and Plan

- Operational analytics – BI reporting
- Planning and forecasting analysis
- Predictive analysis
- …

# The Big Data / Advanced Analytics shift represents huge opportunity to generate new outcomes

## Volume (ability to process for use)

Grab the <5% of tweets of interest in 12 terabytes of tweets created everyday

Harness the Network data in real time.

## Velocity (at the speed of business)

Identify potential fraud in millions of XDR and Network events in seconds

Analyze up to 500 million Call Detail Records per day for revenue assurance

## Variety (enrich correlations / outcomes)

Correlate with location, advertising, contract and consumer information for delivery of new services.

Harvest insight from the 80% of new data growth coming from email, documents, images, video and social media

# Overview of Selected Big Data Use Cases

# Location Based Services

***Outcome: Deliver relevant and timely location based services including promotional offers to customers while respecting their privacy preferences***

**Owners:** Marketing, Advertizing Partner Development

**Business Problem**

- Customers want to opt-in for the right level of location data sharing in exchange for value
- Deliver timely, localized offers from the service provider and partners based on location, mobility profile, purchase history and preferences

**Technical Challenges**

- Need to analyze constant stream of location data for millions of subscribers to identify and deliver targeted offers
- Create and update mobility profiles for subscribers to identify patterns such as habitual places (where I am on weekdays versus weekend) and habitual journeys

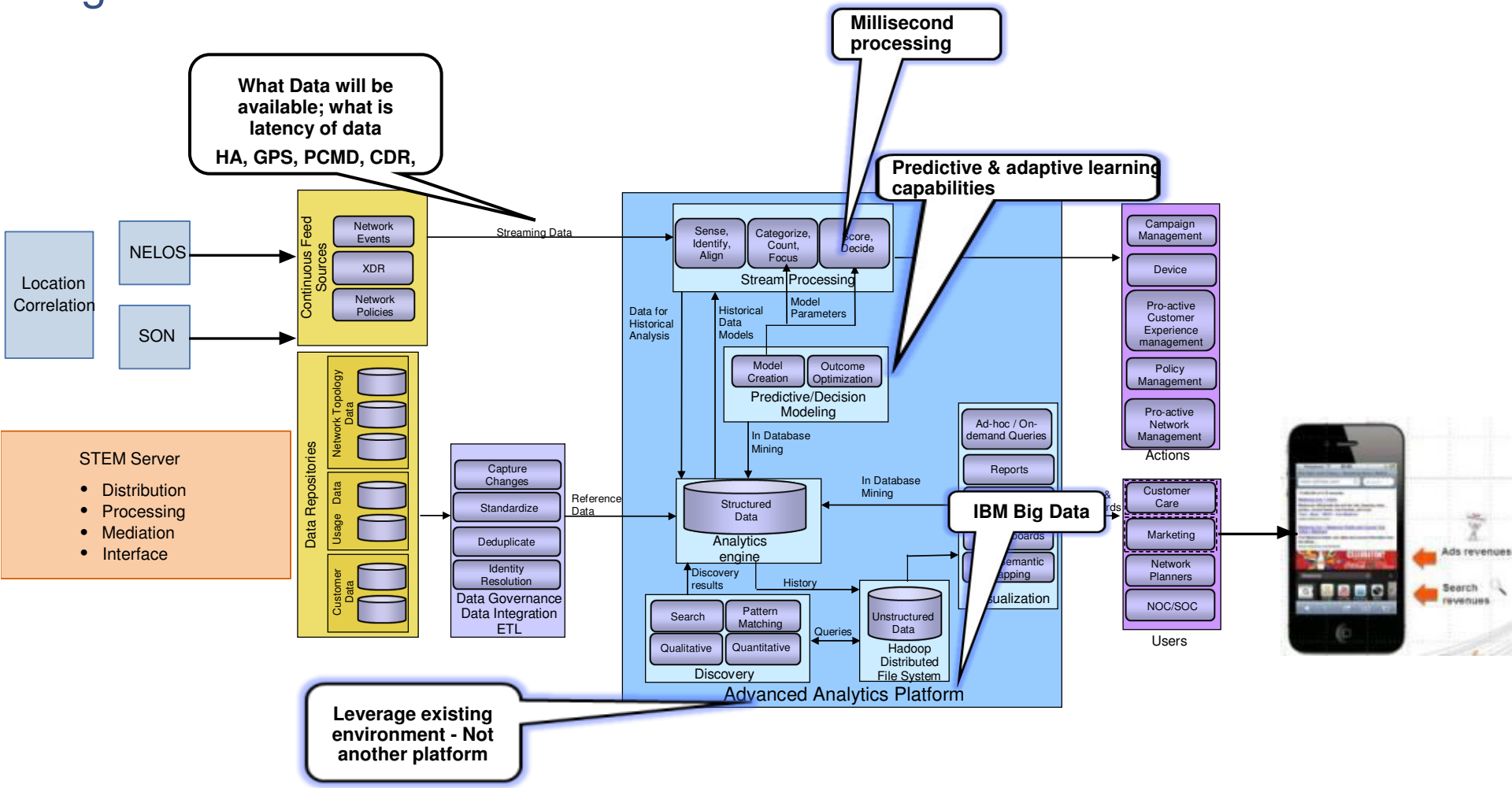
**Key questions to consider for applicability of use case to your business**

- Are you looking to improve revenue with targeted offers based on subscriber's location?
- Do you have tools that allow subscriber's to manage their preferences for how their location data should be used?
- Are your advertizing partners asking for higher acceptance rates for their offers presented via your network?

**Solution:**

- Create a secure registry for subscribers, allowing them to grant permission for their location data for compelling offers (opt-in)
- Create and maintain mobility profiles by subscriber and by groups (friends, colleagues etc.)
- Allow advertizers to deliver targeted offers to the subscribers in real time based on their location, mobility profile, purchase history and preferences

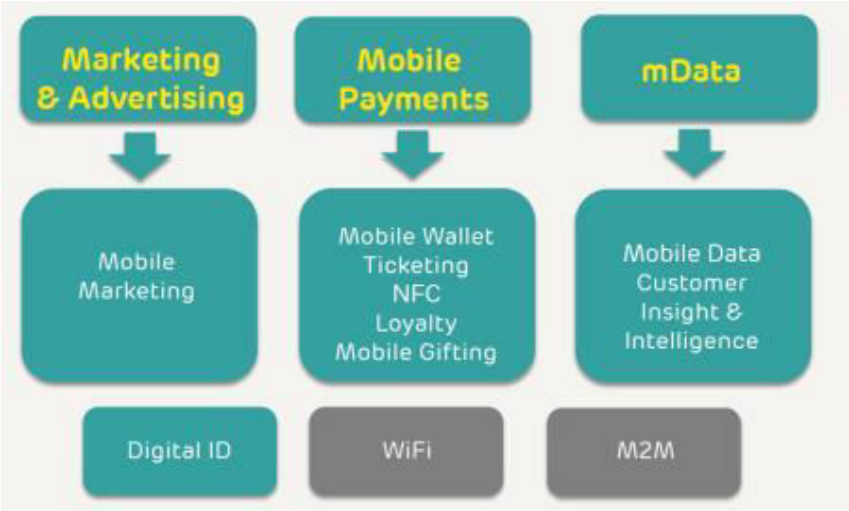
# Big Data Use case: Location Based Services - LBS




Location Based Services represent Extraordinary opportunity for Service providers to add new revenue stream

# Telecommunications New Business Models & Services powered by Big Data Use Cases: Example

## Everything Everywhere – New Business




## Everything Everywhere - New Business Firsts


**ecommunications can leverage IBM's Industry based solutions to differenti themselves in the marketplace, and grow new revenue streams.**

# Voice & Data Fraud

***Outcome: Identify and take action on fraudulent data activity on the network***

**Owners:** Fraud Analysis & Prevention

**Business Problem**

- Lost revenue due to illegal tethering to device as well as rooted device allowing illegal hotspot usage
- Unable to detect and prevent fraudulent usage in real time

**Technical Challenges**

- Proliferation of multiple mobile devices including smart phones, iPad/tablets, personal wifi hotspot devices result in massive amount of data generated
- Need to analyze the mountain of data in real time to identify and prevent unauthorized device tethering as well as fraud

**Key questions to consider for applicability of use case to your business**

- Are you looking to identify fraudulent data activity on the network in real time?
- Do you have tools for business users to visualize, investigate and analyze potential fraudulent activity?
- Do you have capability to predict future fraudulent activity based on past data?

## Solution:

- Real-time scoring, classification, detection and action on fraudulent network activity with **InfoSphere Streams**
- Support historical analysis and model creation for fraud detection with **SPSS & InfoSphere Streams**
- Deploy behavioral scoring models from analysis for Fraud detection with **SPSS & Netezza**
- Visualize, investigate, report on fraudulent activity with **i2**

# Summary of anonymized references for Fraud Prevention Deployments with IBM i2 Fraud Analytics

- Leading Telecommunications Provider
  - US and UK i2 user groups
  - US: Fraud and cyber investigations
    - Vendor fraud
    - Revenue-generating service fraud
    - Cyber identity theft and large vendor sub-contacting situations

- Leading Phone Manufacturer
  - Investigative Analytics Group, Corporate Security
  - External cyber threats and internal threats that affect customers
    - Employee data
    - Malware analytics
    - Phishing analytics

- Global Mobile Phone Provider
  - Credit card fraud involving pay-as-you-go phone accounts

# Smarter Campaigns

***Outcome: Deliver real-time promotional and churn prevention offers based on subscriber usage combined with subscriber profile, channel interaction & billing data***

**Owners:** Marketing, Sales

## Business Problem

- Need to increase revenue via more effective marketing campaigns for existing subscriber base
- High churn rate among pre-paid customers – need to detect when customer balance is depleted and make compelling offers to retain the customer

## Technical Challenges

- Billions of Call Detail Records (CDRs) generated daily – traditional BI solutions unable to analyze CDRs in real-time to tailor promotional offers

## Key questions to consider for applicability of scenario to your business

- Can you analyze subscriber usage in real-time to identify opportunities for a real-time promotional offer?
- Can you detect when pre-paid subscriber's balance is depleted and combine that with subscriber profile to create tailored promotion in real-time?
- Do you have tools to analyze subscriber response to campaigns to determine subscriber propensity to buy and tune future offers?

## Solution:

- Analyze subscriber usage in real-time, combine that with the profile and billing data to make promotional offers in seconds with **InfoSphere Streams**
- Analyze historical data for subscriber usage and behavior with **PureData System for Analytics**
- Analyze subscriber response to various promotional offers to predict future behavior and tune promotional offers with **SPSS**

# Globe gaining tactical agility with smarter promotions

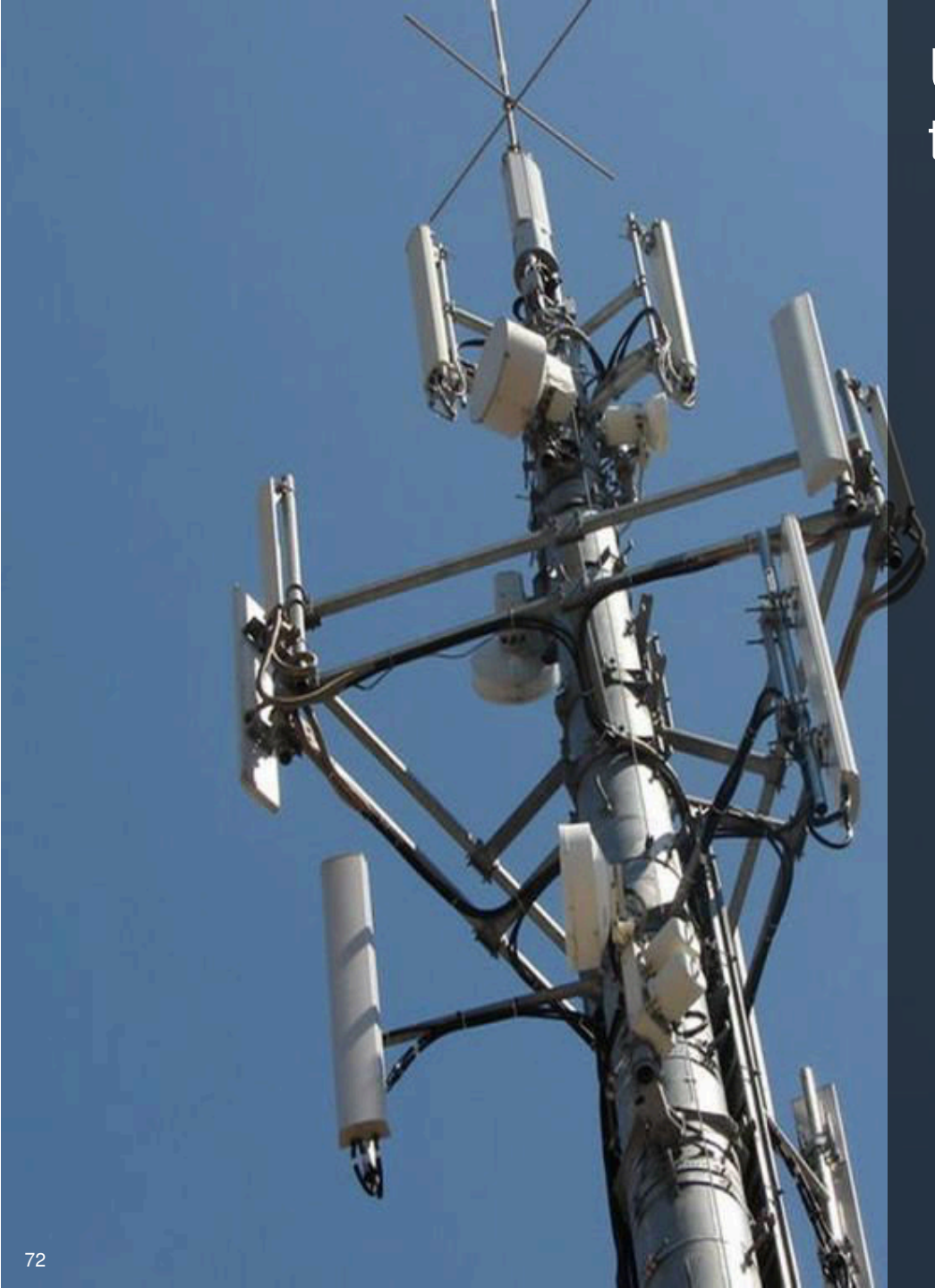
## Need

- Globe Telecom, the number two provider of mobile communications services in the Philippines, realized that it needed to reach a new level of agility in the creation and management of promotional service offerings, if the company was to thrive in its intensely competitive market.

## Benefits

- Leveraging information gathered from handsets, Globe is able to identify the optimal service promotion for each customer—and the best time to deliver it.
- Expected one-year payback period and more than 95% reduction in time and cost of developing new promotions.
- 600% increase in promotion effectiveness.

Globe



# Ufone uses real-time analytics to reduce customer churn

## Need

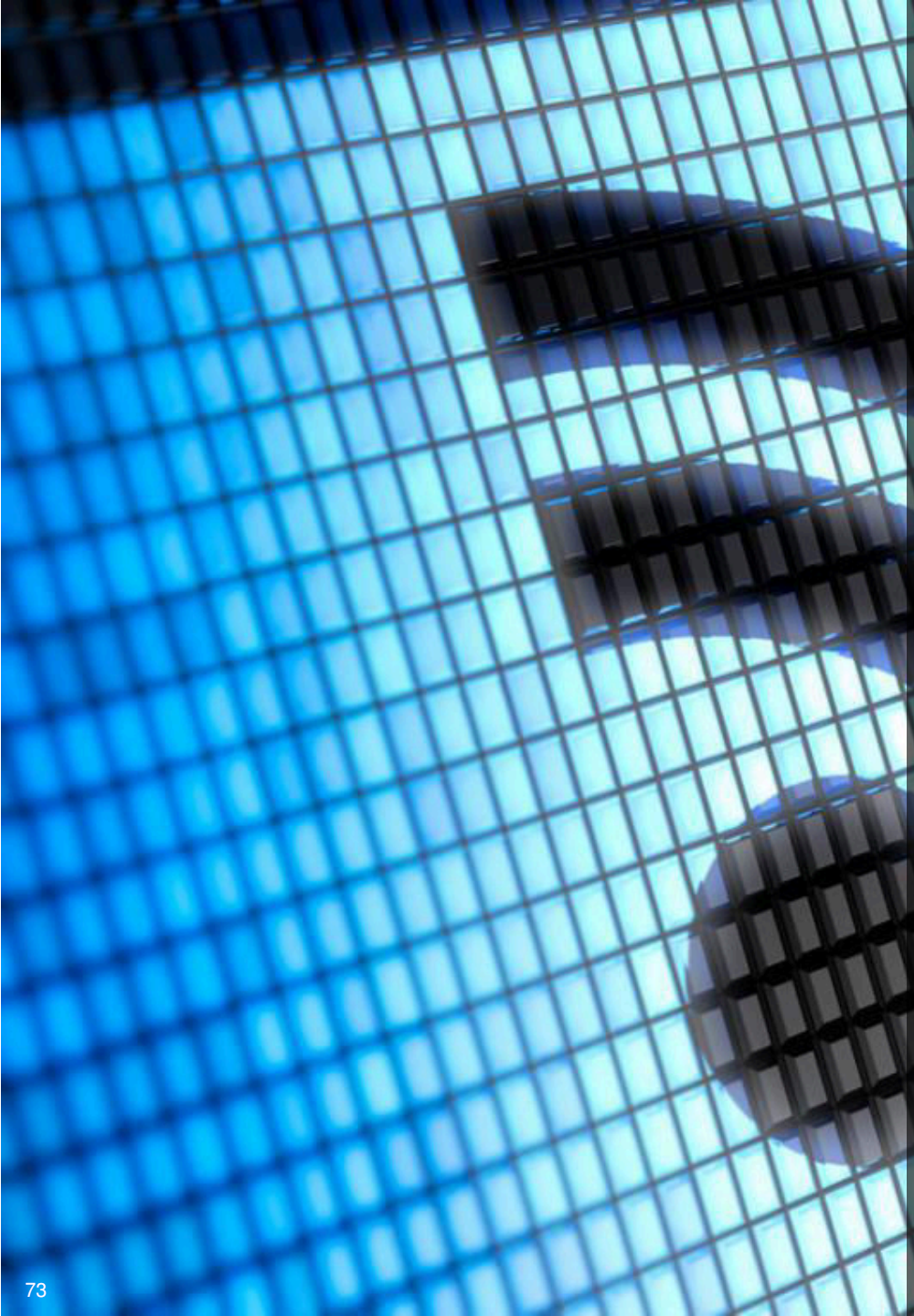
- Difficulty in managing marketing campaigns
- No direct ability to correlate campaigns with earned business
- Execute a successful marketing campaign base on real time customer insights

## Solution Components

- IBM InfoSphere Streams, Cognos Business Intelligence, SPSS Modeler, Unica Campaign
- IBM Power Systems: Power 795; Power Systems running AIX 6

## Benefits

- Analyzed customer call detail records (CDRs) and created customer profile segmentation .
- Data is streamed and analyzed real-time, offer is given to clients in a timely manner
- Campaign response time improved from 25% to 50%, improving CDR analysis from 1 day to 30 seconds and customer churn reduced by 15 to 20%



# XO Communications uses PureData System for Analytics to improve customer experience

## Need

- XO Communications, LLC needed to monitor and improve customer experience; identify and reach out to at-risk customers and prevent churn

## Solution

- Integrated Data Warehouse for the enterprise powered by PureData System for Analytics to analyze all customer call related data

## Benefits

- Recovered USD 5 Million in revenue in first 30 days
- Saved more than USD11 million for first year; current savings at USD 15 million per year
- Reduced data load times from 7-10 days to less than 1 day
- Reduced complex query times from over an hour to 10 minutes

# XO Customer Testimonial – Chris Payne, Senior manager of Business Intelligence, XO Communications


**Source - http://youtu.be/bdJu1Pt374g**

**IBM as a partner**

"The thing that I have been most impressed with IBM is their willingness to partner with us, not only just sell us products that can help us accomplish a lot of our goals. They have a legitimate interest in helping us be successful with

**About new features in PureData Systems**

"If you look at the new PureData Systems' additional features - these features are targeted for us"

**Performance Improvements**

"With Netezza appliance, we are able to load data that was taking 7 to 10 days in a single day and actually get results *(of analysis)* that same

"Query times were also much faster. Some of our query times that would take an hour are now taking 10 minutes."

**Savings**

"Within first 30 days, we had actually recovered 5 million revenue."

"First year we deployed we saved 11.2 million dollars. "

"Subsequently, each time we revised that model we have done better. Our most recent model has produced over 15 million dollars worth of annual savings."

# Network Analytics

***Outcome: Identify and address network performance issues leading to customer churn; lower the cost of operating network and network analytics***

**Owners:** Network Engineering, Customer Retention

**Business Problem**

- Efficiency - operational cost structure and performance
- Growth - explosion in volumes and data with 3G and LTE (4G)
- Competition - customer retention, segmentation and customer profitability
- Agility - new service time to market, real time responses to customers

**Technical Challenges**

- Mediated and un-mediated CDRs– volumes, complex event detection, correlation, deduplication, real-time KPIs
- Signaling data – very large volumes requiring normalization and consistent universal access
- Data replication, storage costs becoming unmanageable
- Unable to support higher order solutions – fraud, real-time offers, etc
- Huge cost/performance improvements in the revenue generating stream

**Key questions to consider for applicability of use case to your business**

- Are you able to load and analyze CDRs, switch, billing and network event data fast enough to support network optimization?
- Do your applications struggle to meet SLAs due to increased data volume?
- Are you able to control costs associated with increased data volumes?

## Solution:

- Analyze CDR data in real-time as it flows off the network to detect critical network events (congestion, outage etc.) with **InfoSphere Streams**
- Store and analyze years of CDRs, switch, billing and network event data to provide network Quality of Experience (QoE) analytics, traffic engineering, dropped session analytics as well as voice and data session analytics with **PureData System for Analytics (powered by Netezza)**

# T-Mobile uses big data to optimize network performance and reduce costs

## Need

•Needed a solution to store and analyze two years worth of Call Detail Records (CDRs), switch, billing and network event data for over 30 million subscribers to identify and address network bottlenecks

## Benefits

•Analyze over 17 billion events per day to provide over 1,300 users with network Quality of Experience (QoE) analytics, traffic engineering, dropped session analytics as well as voice and data session analytics

•Business users can perform ad-hoc network and traffic analysis to identify performance issues in seconds and address them faster

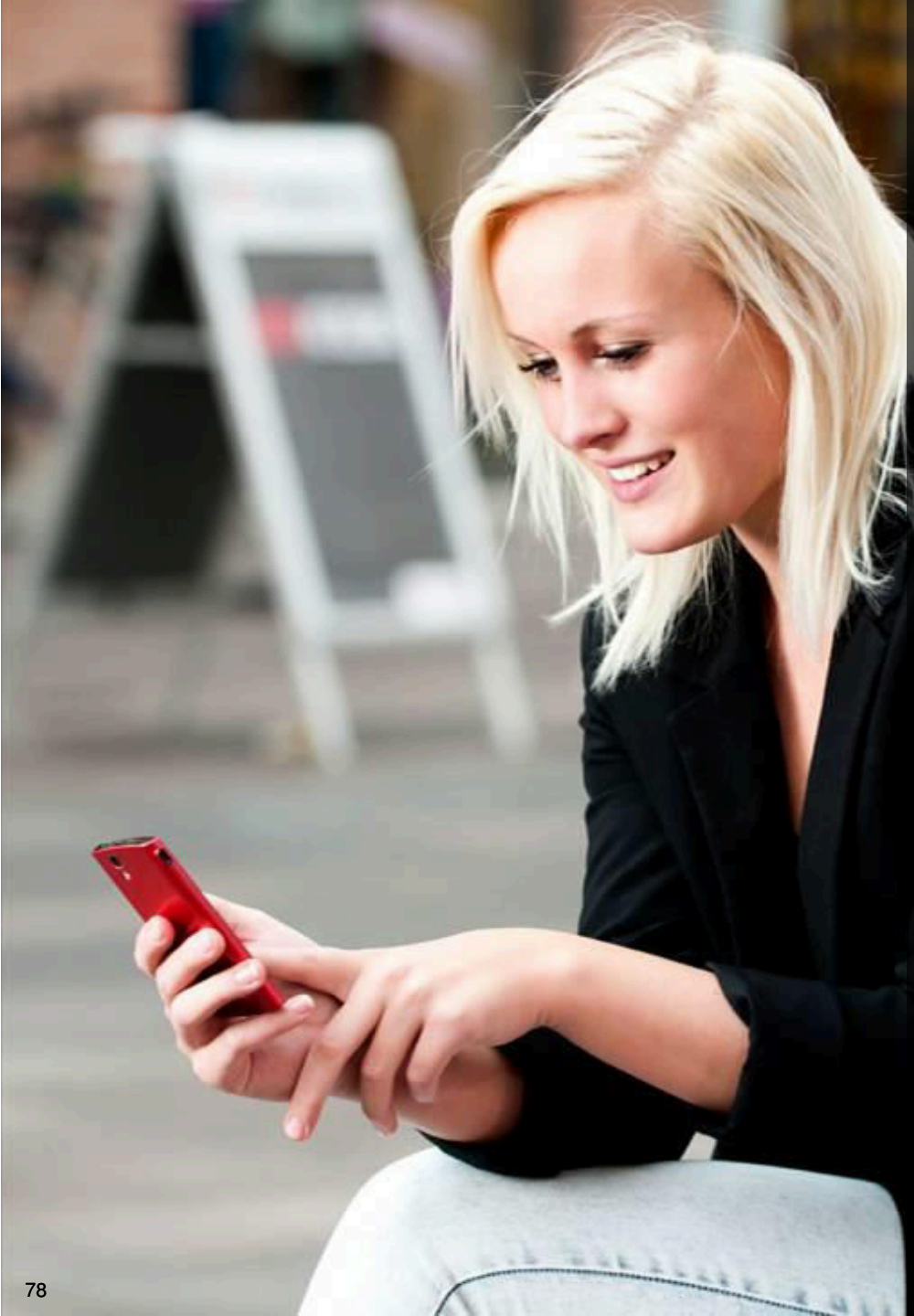
T-Mobile

# Results – In T-Mobile's own words


http://www.ibmbigdatahub.com/video/t-mobile-network-engineering-success-scale-ibm-netezza

Webinar – Making Big Data Analytics Pay: T-Mobile makes the business case for Big Data analytics in Telco

http://pro.gigaom.com/webinars/netezza-making-big-data-analytics-pay/



# Sprint improves business insight with IBM® InfoSphere® Streams

## Need

- A solution to perform efficient, near-real-time analytics in order to help drive more meaningful decision making. Sprint wanted to gain strategic insight into the needs of its customers.

## Benefits

- Increased transaction capacity by 90 percent
- Enabled informed, near-real-time strategic decision making
- Created cost savings through consolidation of legacy solutions

Sprint

# Sprint – Big Data and Analytics with InfoSphere Streams

***Customer Testimonial – Von McConnell, Director of Innovation & Advanced Labs***


**Source - http://www.youtube.com/watch?v=eg8KSLAZ2HM**

## IBM InfoSphere Streams at Sprint

"So what we are trying to do now is take all the systems we have – and we have so many systems – (*and understand)* how these systems work together, how they are different, how they interact together. What we are doing with IBM is work with their *(InfoSphere)* Streams product, and first be able to capture some of this data

## Goal

"Our goal is to take the analytics that we have and apply it to everyday use cases that helps improve customer quality, help improve customer experience, reduce churn, reduce error rates in the

"The goal is to look forward in predictive mode – make adjustments in real-time : that's really what we are trying to do from the network side with big data."

## Business Value

"We are going to put real-time intelligence and control back into the network. We are now able to see the transactions, we are able to make minute details and shifts on the data just out the gate. We have had almost a 90% increase in capacity right out of the bag."

# Customer Data/Location Monetization

***Outcome: Deliver targeted advertisements/offers in real-time to achieve higher acceptance rate, revenue and profits***

**Owners:** CEO, CMO, CFO, CIO & IT

**Business Problem**

- Drive additional non-subscriber revenue from existing customer base
- Improve offer acceptance rates for advertizing partners with personalized, location specific & context sensitive ads

**Technical Challenges**

- Very large volumes of structured and unstructured data about customer profile & search/interaction history (Billions of transactions per day!)
- Tens of thousands of customer micro-segments
- Must serve search context and location-specific ads to millions of subscribers in 10 ms or less

**Key questions to consider for applicability of scenario to your business**

- Is monetizing customer data a priority for your organization?
- Are you combining customer interaction across multiple communication channels with basic profile to drive targeted advertising in real-time?
- How many customer segments do you currently use for advertizing? Can your current system re-assign customer to a different micro-segment based on new search/interaction history in real-time?

**Solution:**

- Analyze search/interaction history across all channels (mobile smart phone, cable/satellite box, web searches and social media interactions (Twitter, Facebook etc) to identify customer micro-segment and target ads with **InfoSphere Streams**
- Analyze and model historical data to measure campaign success rate, predict client behavior and tune future campaigns with **Netezza and SPSS**

# European service provider uses big data to analyze and monetize mobile call, search and location data

## Need

•Advertisers needed to identify target customers (who is likely to buy, who is likely to watch) and create compelling value propositions to expand market share and revenue

## Benefits

•Identified most likely buyers and users through analysis of mobile web logs for mobile TV, automobile and mobile cinema segments

•Analyze mobile web logs and advertising logs to identify distinct customer segments

•Identify key characteristics of the target segment (age, gender, income level, geographic area, smart device type *such as Android vs. iPhone* etc.)

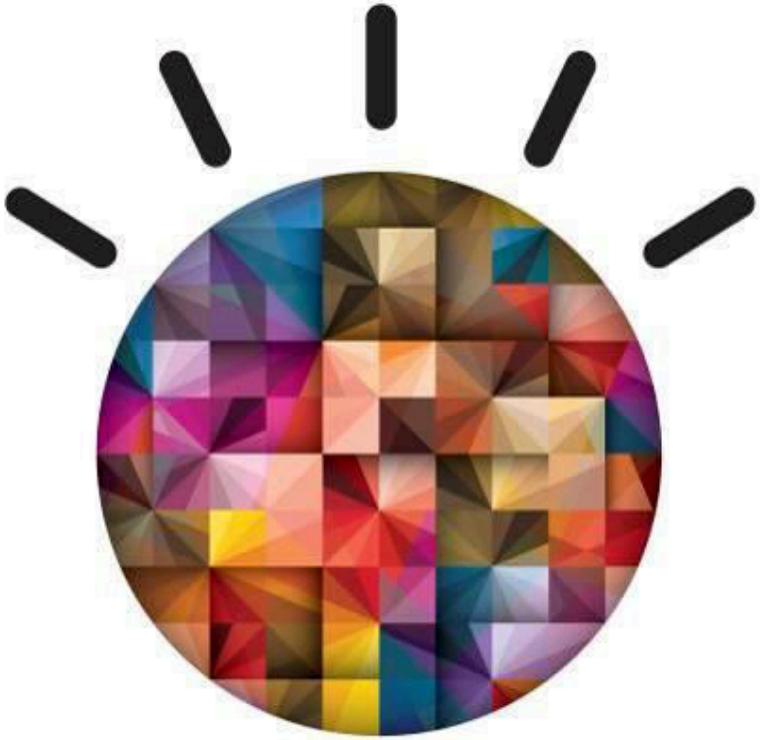
•Roll out and measure effectiveness of mobile ad campaigns to target segments

# IBM Big Data / Advanced Analytics Value Proposition

| | |
|---|---|
| 1 **All Telco Data** | Combine Network Data (usage, performance, capacity), Billing Call Detail Records, Subscriber, Channel, Policy, Device, Social etc. |
| 2 **At Scale** | Ability to manage the stored Petabytes of data and incoming billions of records per day |
| 3 **At Speed of Business** | Ability to process data and analytics in real time and close to point of origination to support emerging use cases such as Location Based Services (LBS) and Machine to Machine (M2M) |
| 4 **Only IBM** | Only IBM can deliver the complete end to end technology and skills to capture quickly the new ERA value of Telco Big Data |

For more information:

# ibm.com/bigdata



#ibmbigdata

# Every Industry Can Leverage Analytics and Big Data.

## Banking

- Optimizing Offers and Cross-sell
- Customer Service and Call Center Efficiency

## Insurance

- 360˚ View of Domain or Subject
- Catastrophe Modeling
- Fraud & Abuse

## Telco

- Pro-active Call Center
- Network Analytics
- Location Based Services

## Energy & Utilities

- Smart Meter Analytics
- Distribution Load Forecasting/Scheduling
- Condition Based Maintenance

## Media & Entertainment

- Business process transformation
- Audience & Marketing Optimization

## Retail

- Actionable Customer Insight
- Merchandise Optimization
- Dynamic Pricing

## Travel & Transport

- Customer Analytics & Loyalty Marketing
- Predictive Maintenance Analytics

## Consumer Products

- Shelf Availability
- Promotional Spend Optimization
- Merchandising Compliance

## Government

- Civilian Services
- Defense & Intelligence
- Tax & Treasury Services

## Healthcare

- Measure and Act on Population Health Outcomes
- Engage Consumers in their Healthcare

## Automotive

- Advanced Condition Monitoring
- Data Warehouse Optimization

## Chemical & Petroleum

- Operational Surveillance, Analysis & Optimization
- Data Warehouse Consolidation, Integration & Augmentation

## Aerospace & Defense

- Uniform Information Access Platform
- Data Warehouse Optimization

## Electronics

- Customer / Channel Analytics
- Advanced Condition Monitoring

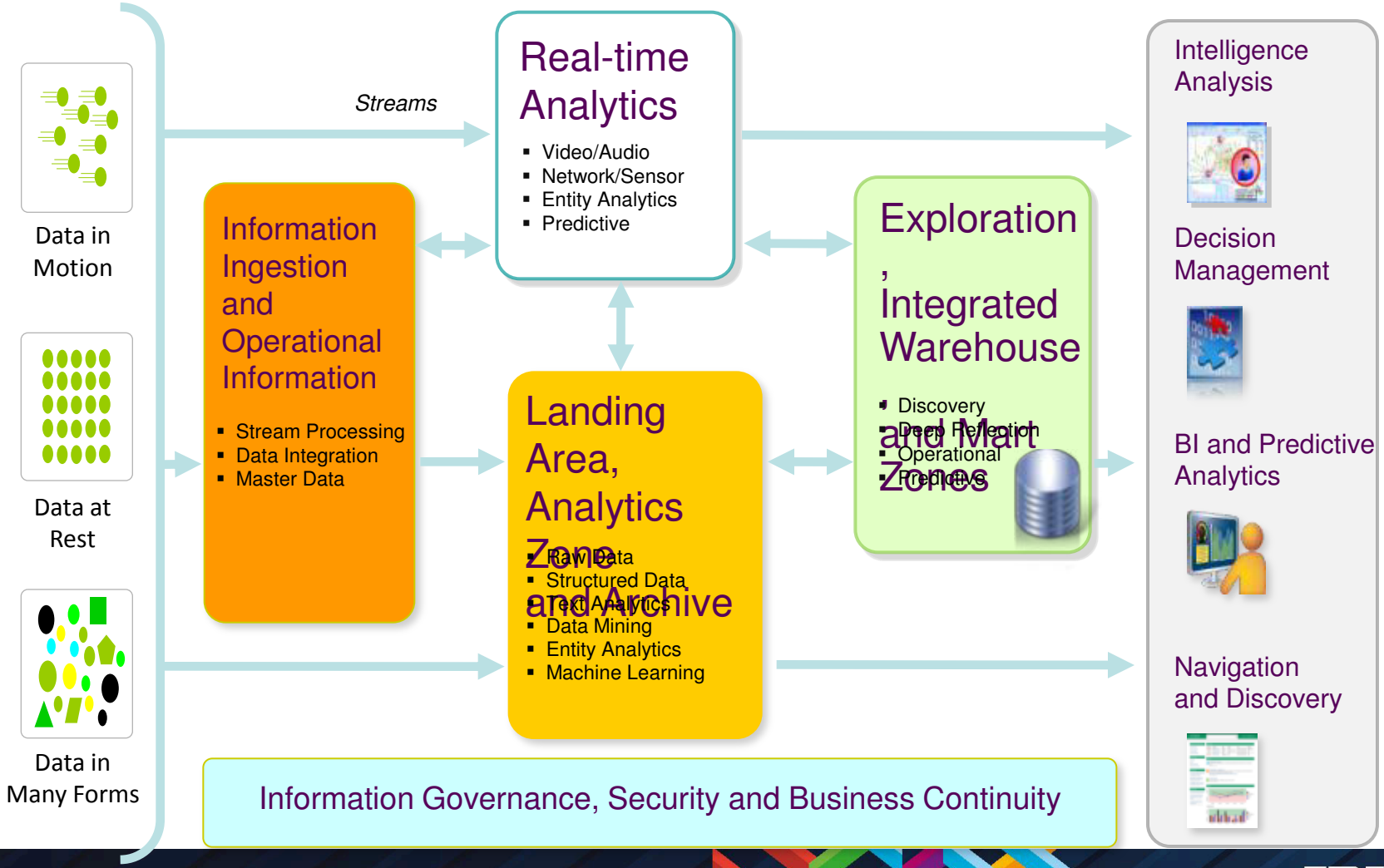
## Life Sciences

- Increase visibility into drug safety and effectiveness

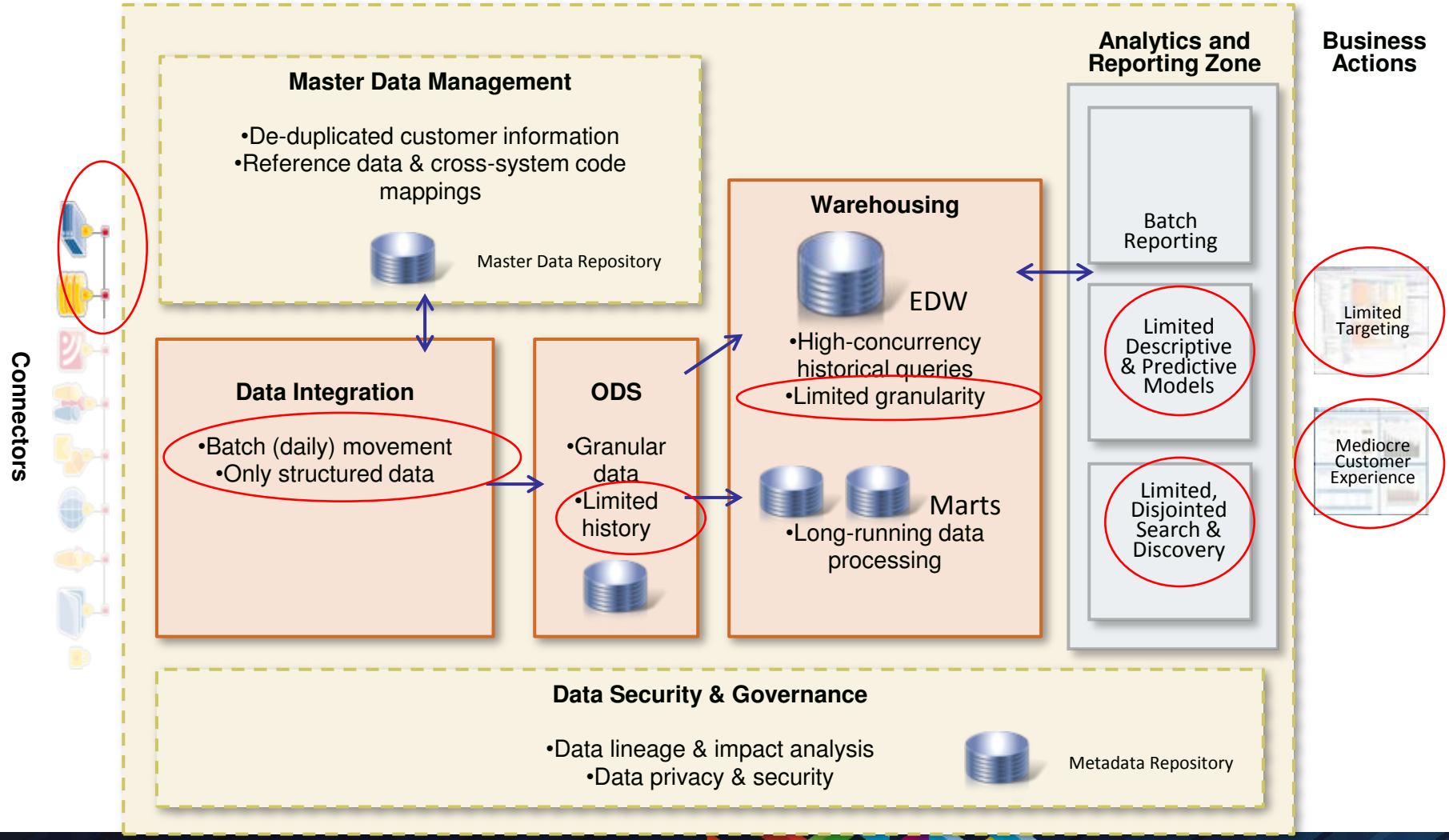
Exploiter les big data

# Faire évoluer les architectures d'aujourd'hui

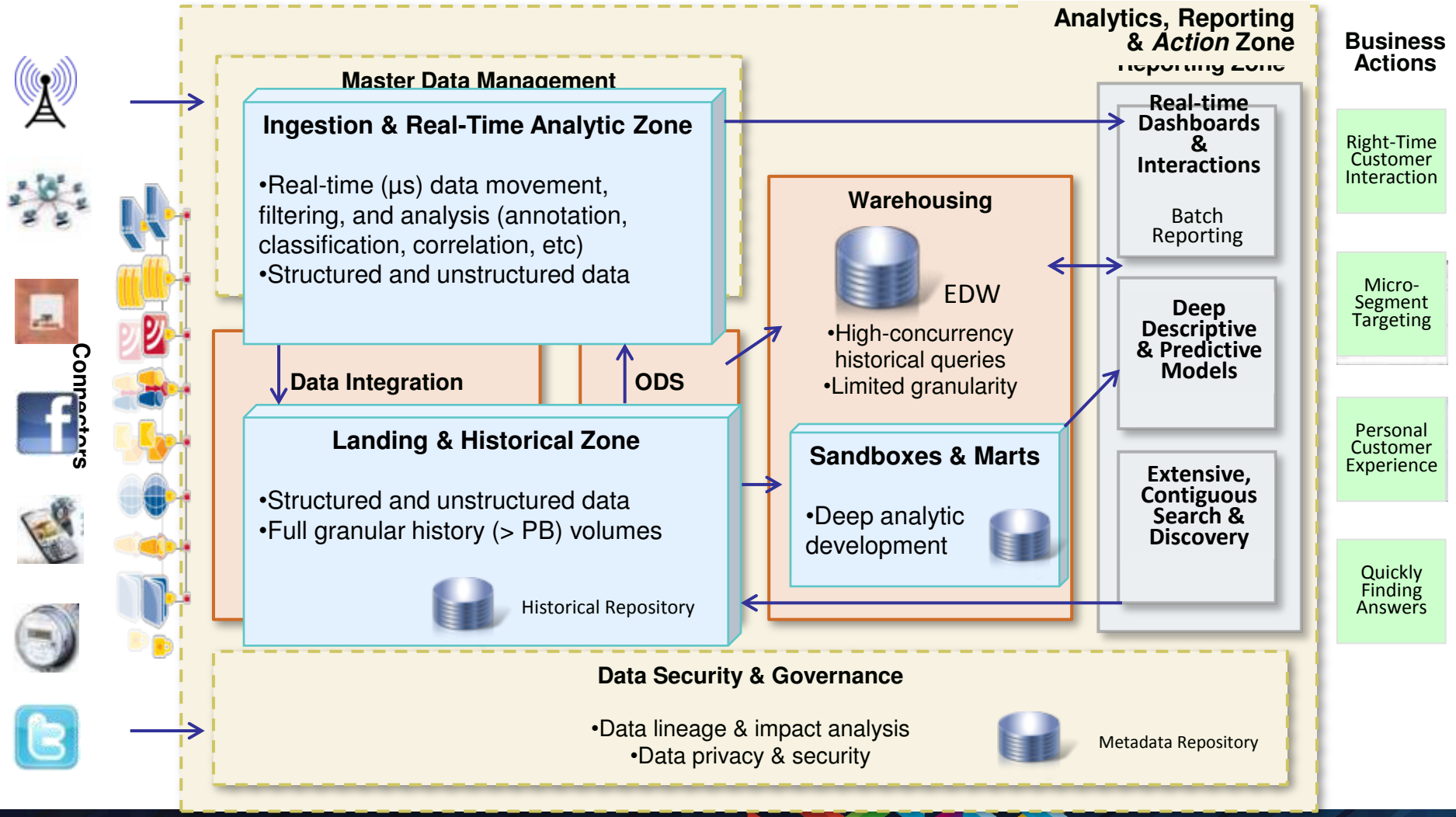
# New Architecture to Leverage All Data and Analytics



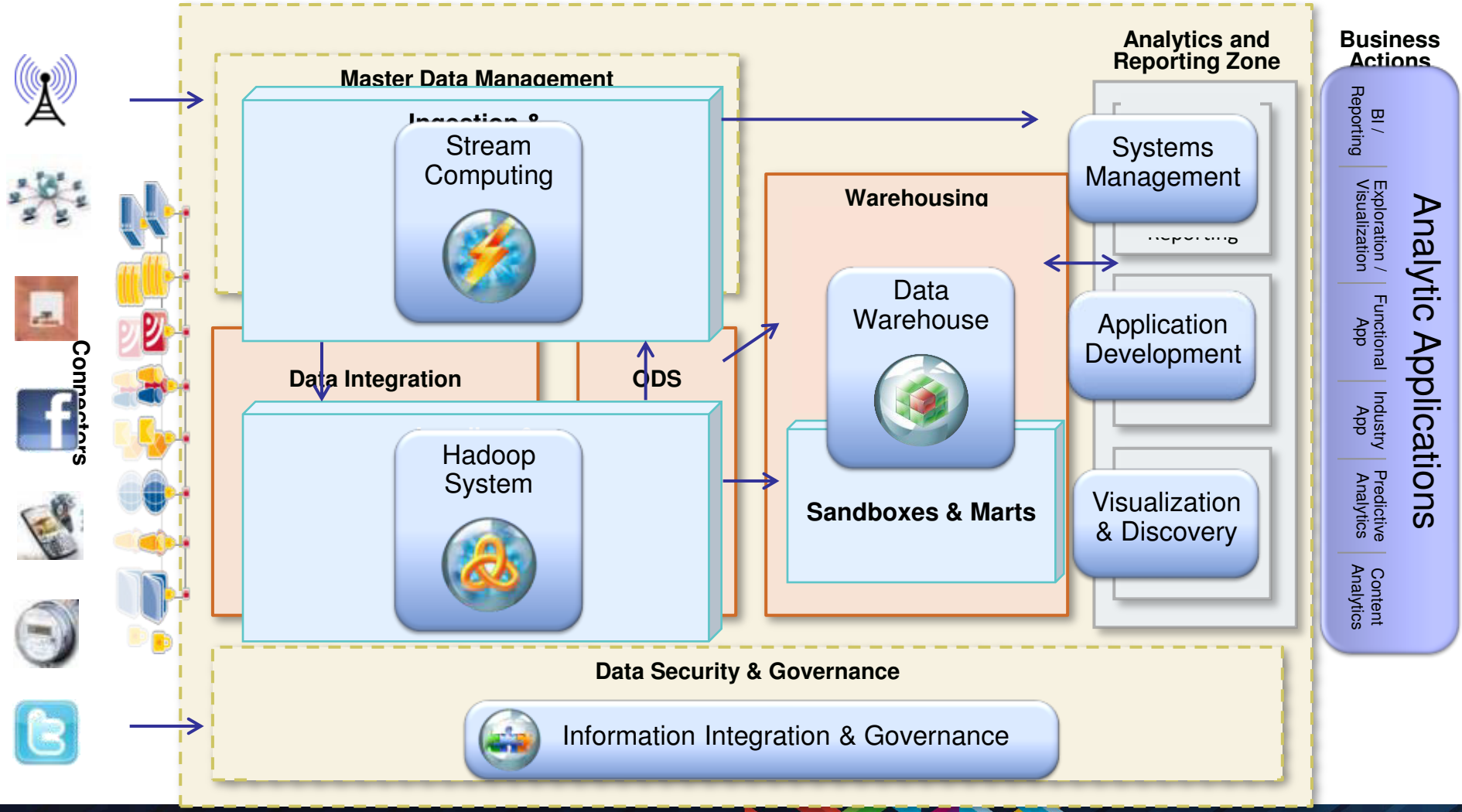
# The warehousing & analytic environment of most organizations today



# How organizations are expanding and evolving their architecture



# IBM provides the complete platform to support this evolution



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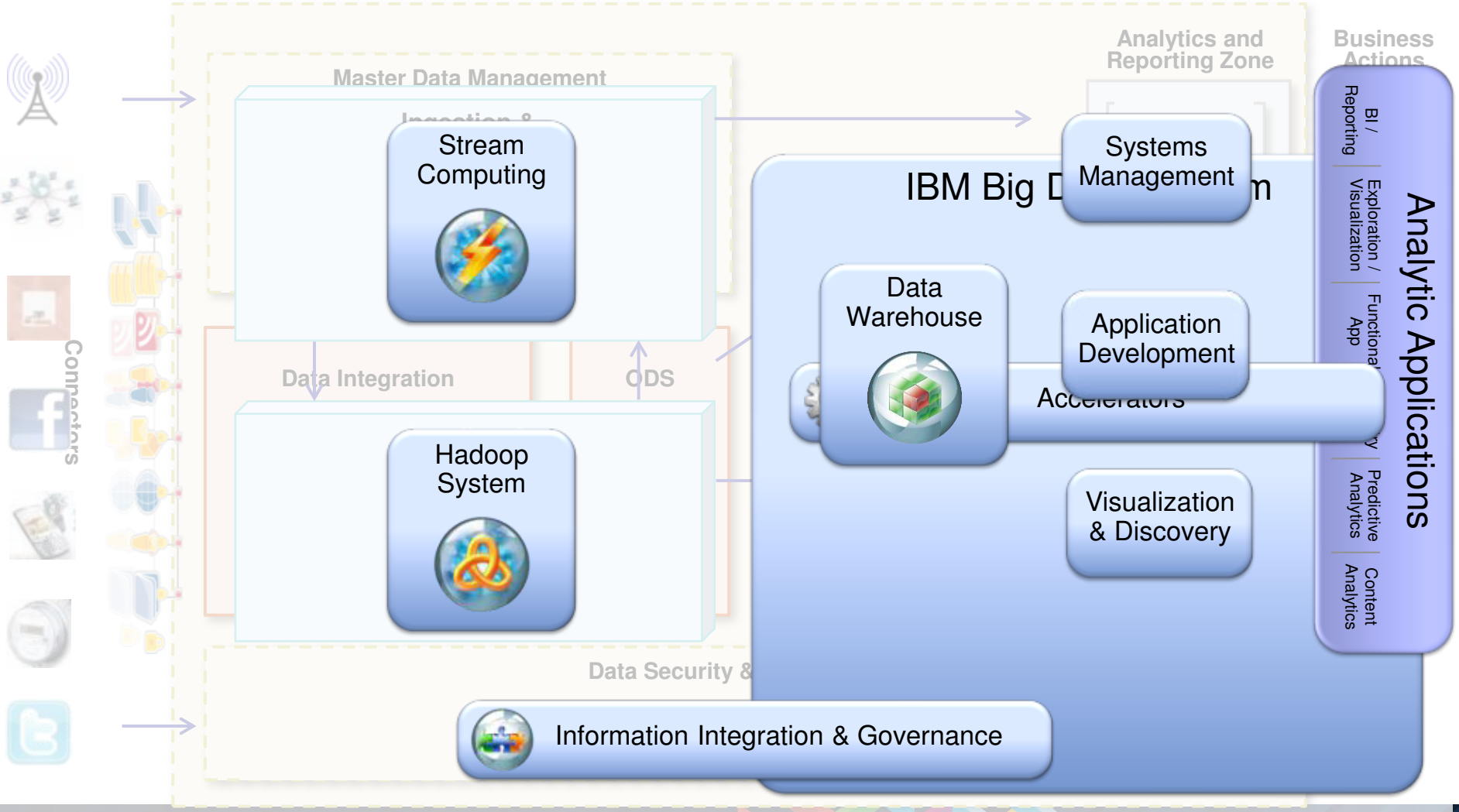


# Entry points are accelerated by products within the big data platform

1 – Discover, understand and navigate all big data sources

Data Explorer (Vivisimo)

2 – Take advantage of streaming data and find the valuable insights

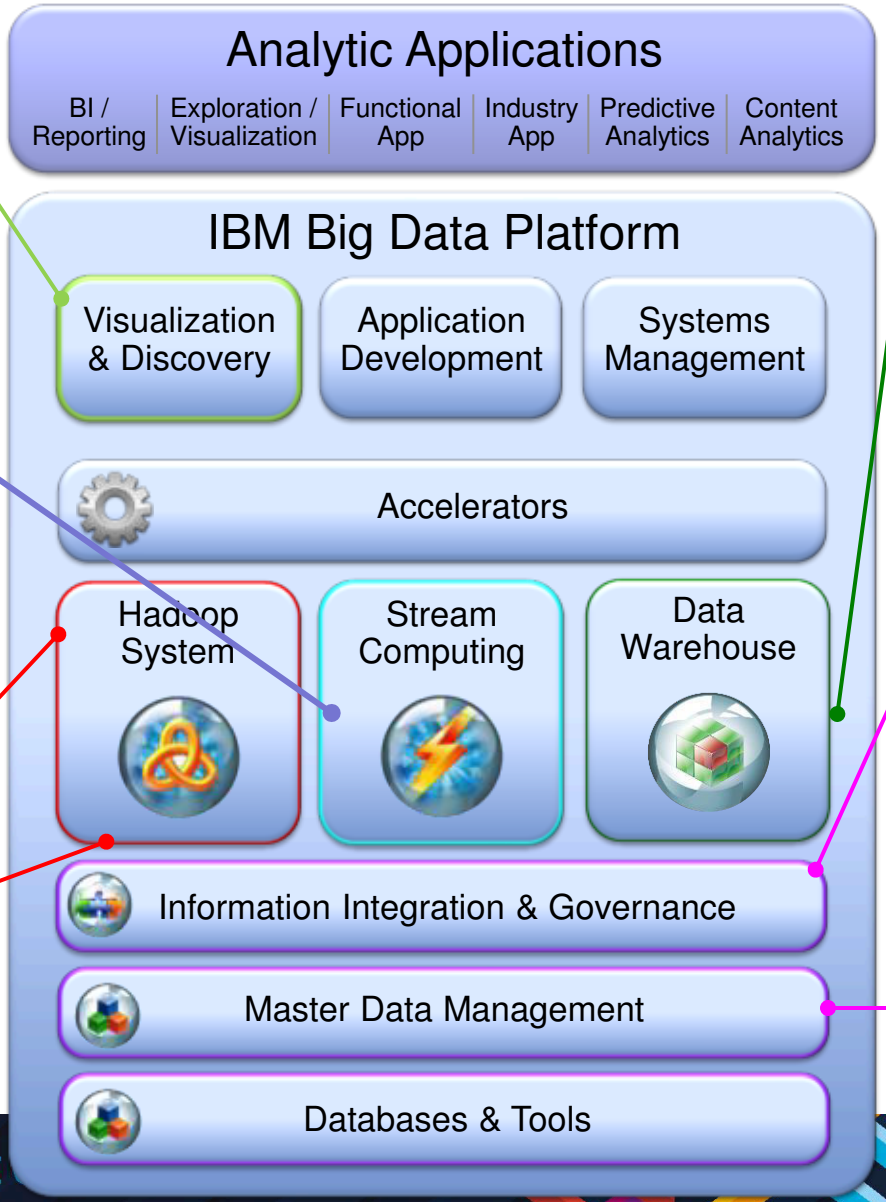
InfoSphere Streams

3 - Extend your data warehouse to incorporate new data types

InfoSphere BigInsights

4 – Reduce the cost of your data warehouse by utilizing Hadoop

InfoSphere BigInsights




5 – Optimize infrastructure to lower cost and improve performance

PDA/PDOA (Netezza/ISAS)

6 – Establish and maintain an accurate, secure and trusted view of all available data

InfoSphere Information Server & Optim

7 – Manage and leverage trusted customer and product information

InfoSphere MDM


Thank You
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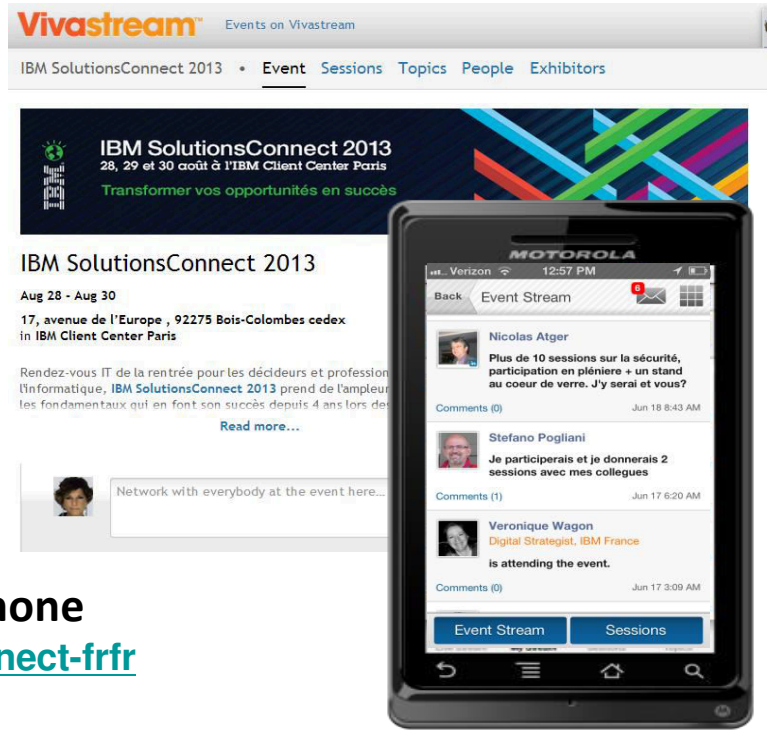
- Développez votre réseau
- Découvrez les experts sur les sujets qui vous intéressent
- Echangez avec les speakers et les experts
- Regardez qui participent aux sessions pour lesquelles vous êtes inscrits
- Evaluez les sessions auxquelles vous êtes inscrits

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