The Economics of Big Data & Cloud

Data Driven & Software Defined

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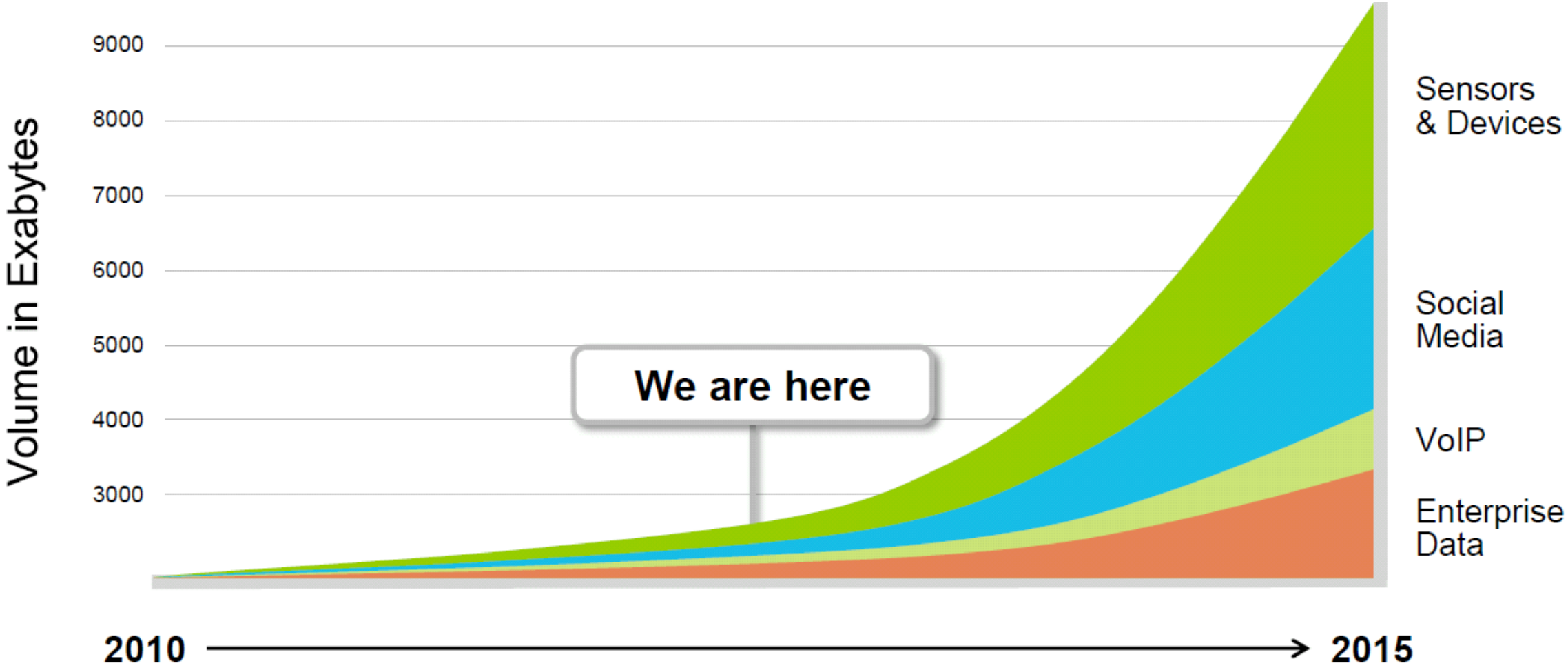
Big Data: This is only the beginning.



Source: IBM Global Technology Outlook, 2012

Why Business Analytics and Big Data Matter…

The Need for Analytics is Pervasive Across Business and Government

Healthcare industry spends $250 - $300 Billion on healthcare fraud, per year. In the U.S. alone, this is a $650 million per day problem.[1]
$60B annual U.S. Medicare fraudulent claims.

The U.S. IRS estimates ***lost government tax revenue of $450B to $500B*** in 2008 due to fraud, and unreported income of $2T[2]. Only 0.0022% annual percentage of taxpayers convicted of tax crimes in the U.S.

$93 billion in total sales is missed each year because retailers don't have the right products in stock to meet customer demand.

5 billion global subscribers in the telco industry are demanding unique and personalized offerings that match their individual lifestyles.[2]

Sources: 1.Harvard, *Harvard Business Review*, April 2010.
2.America's Underground Economy, Richard Cebula

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

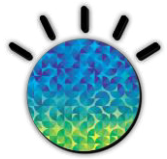
Aerospace & Defense
- Uniform Information Access Platform
- Data Warehouse Optimization

Electronics
- Customer / Channel Analytics
- Advanced Condition Monitoring

Life Sciences
- Increase visibility into drug safety and effectiveness

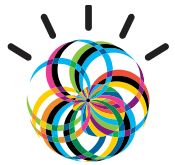
To Differentiate Themselves, Leading Organizations Need to…

Engage customers, citizens & employees as individuals



Smarter Commerce

Smarter Cities



Social Business

Capitalize on Big Data to turn information into insight

Big Data & Analytics

Engage anyone, anytime, anywhere

Mobile

Optimize IT & Business Infrastructure

Expert Integrated Systems

Cloud and Optimized Workloads

Speed delivery of new products and services

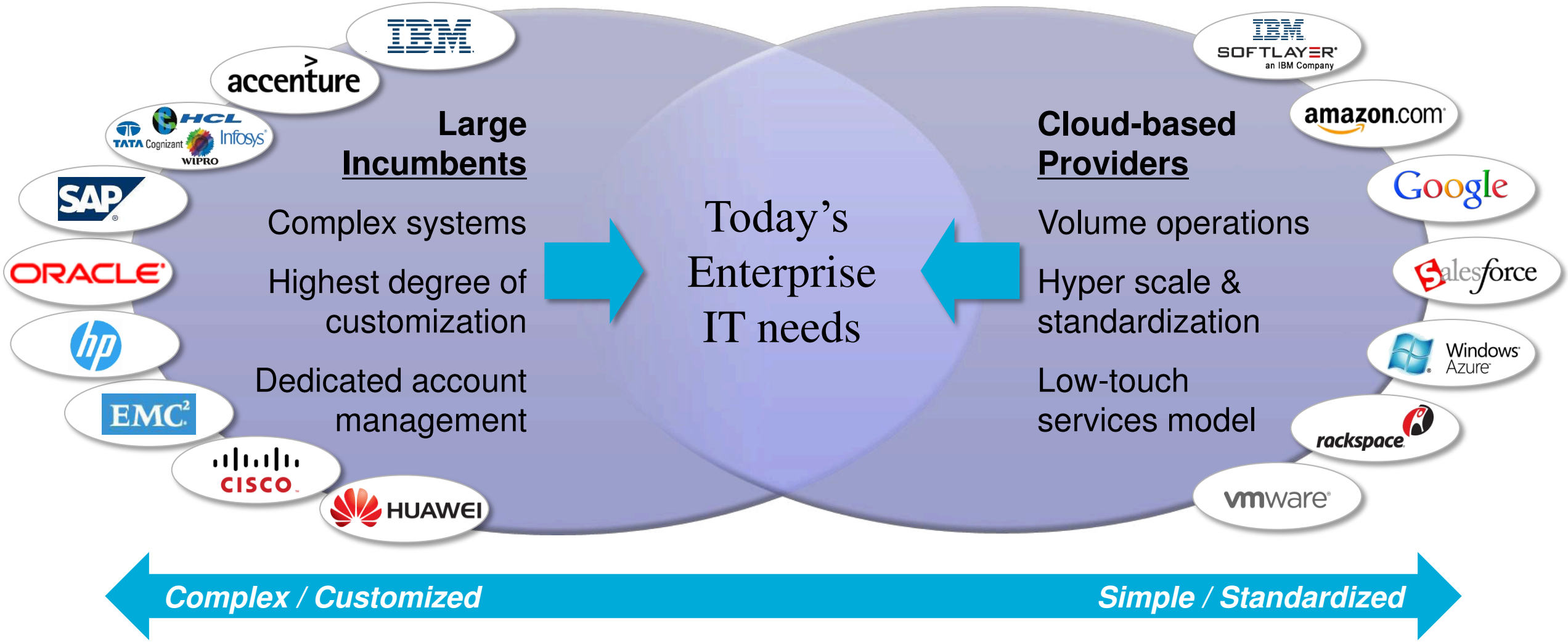
Business Process and Integration

DevOps & Product Development

Manage risk, security and compliance

Security

Infrastructure Matters…



IBM Software capabilities help companies differentiate.

Engage customers, citizens & employees as individuals

- Commerce
- Smarter City Operations
- Social Collaboration

Capitalize on Big Data to turn information into insight

- Big Data & Analytics
- Data Warehousing
- Information Integration & Governance

Engage anyone, anytime, anywhere

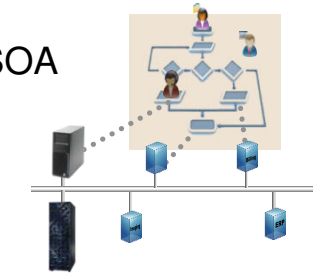
- Mobile Development &Connectivity
- Mobile Insights & Analytics
- Mobile Management & Security

Optimize IT & Business Infrastructure

- Expert Integrated Systems
- Cloud and IT Optimization
- Enterprise Endpoint Management
- Asset and Facilities Management

Speed delivery of new products and services

- Business Process Management
- Connectivity, Integration & SOA
- Application Lifecycle Management



Manage risk, security and compliance

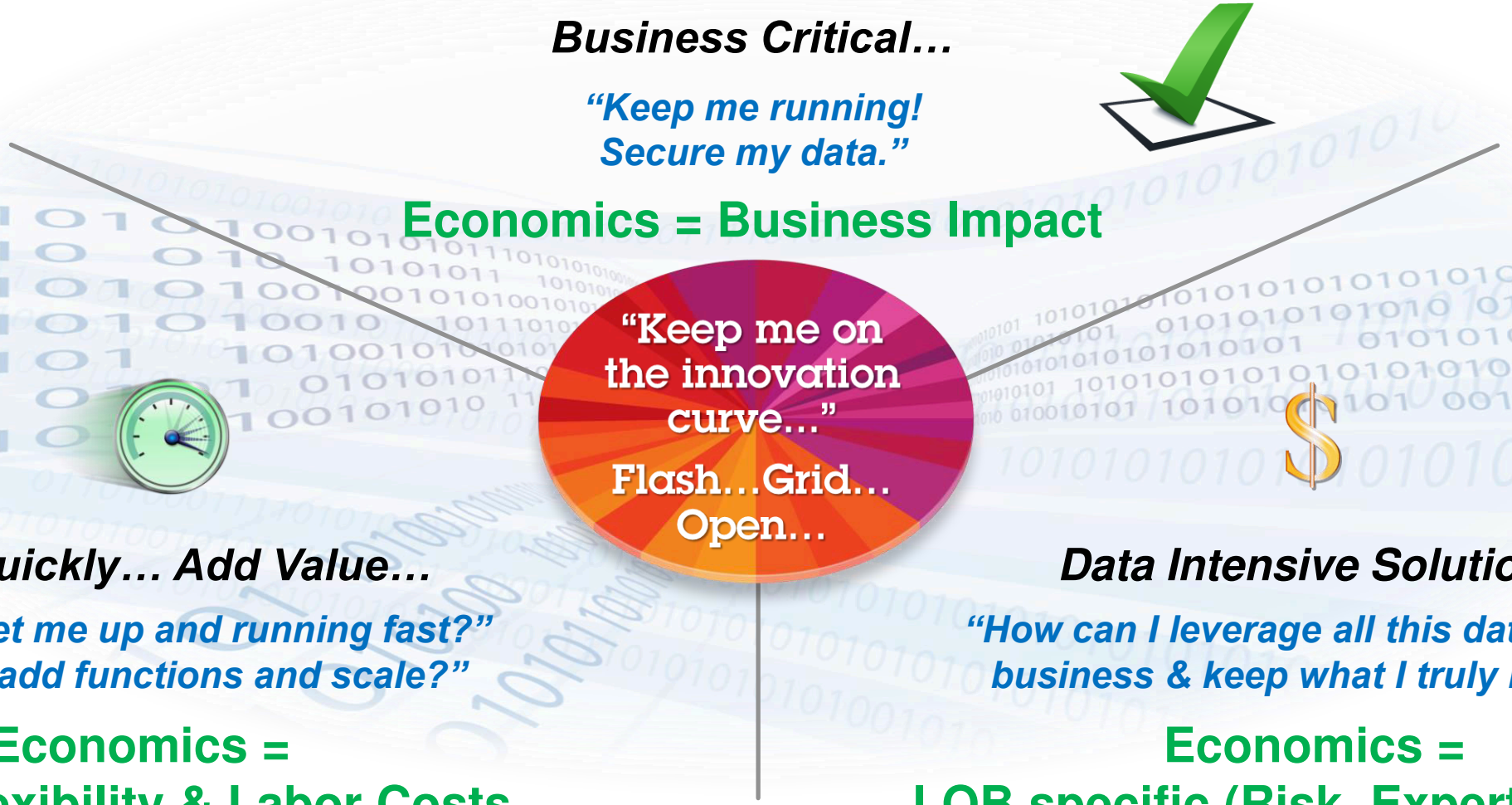
- Application S& Data Security
- Identity and Access Management
- Security Intelligence & Compliance Analytics

Data Economics…

Business Critical…

"Keep me running!
Secure my data."

Economics = Business Impact



Start Quickly… Add Value…

"Can you get me up and running fast?"
"Can I add functions and scale?"

Economics =
Speed, Flexibility & Labor Costs

Data Intensive Solutions

"How can I leverage all this data for my business & keep what I truly need?"

Economics =
LOB specific (Risk, Expertise, etc.)

Why Flash…

In the last 10 years:

CPU Performance **8 - 10x** increase

DRAM Speed **7- 9x**

Network Speed **100x**

Bus Speed **20x**

…and everything waits

Source: IBM and Industry Estimates

All-Flash Economics… *Data Infrastructure Matters*

Sprint

*Speeding responses to **exploding call center volumes** to deliver customer care & boost retention*

Kroger

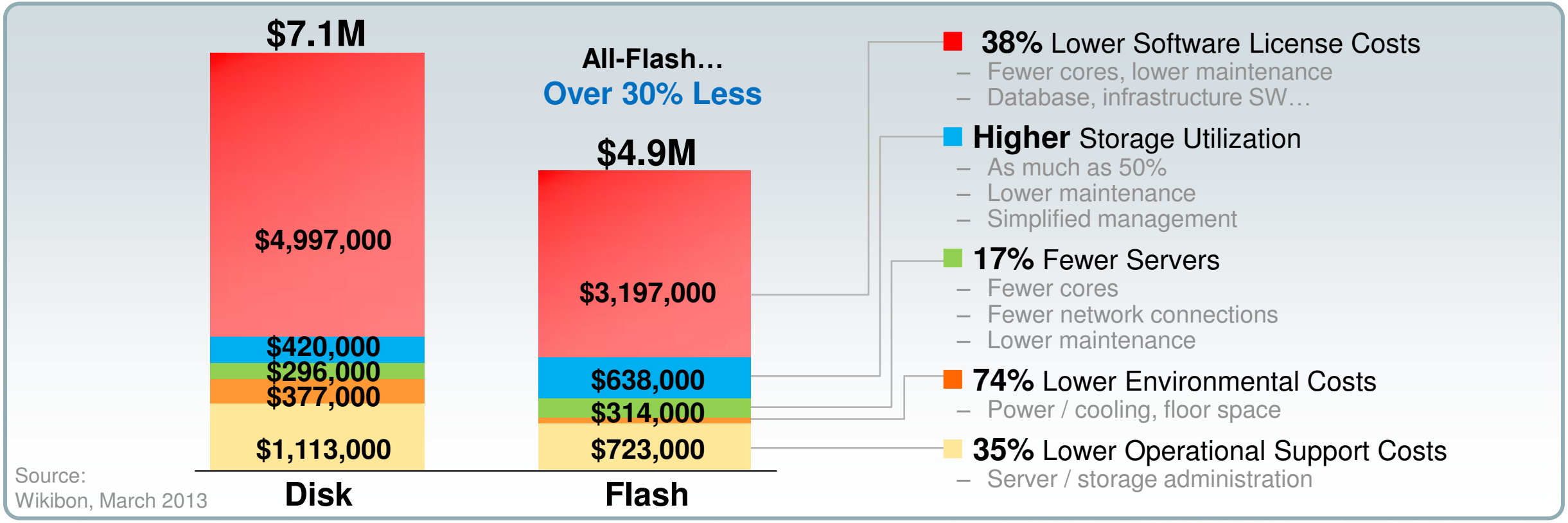
*10X performance gains for **retail platform** databases*

VION CORPORATION

***Actionable intelligence** for government agencies in 5 seconds vs. minutes…*

REUTERS

*Shrinking **order handling for financial transactions** from hours to minutes; 10X throughput jumps*



Source:
Wikibon, March 2013

Cloud Economics… *Data Infrastructure Matters*

Zero Downtime
for Hardware and Software Upgrades

Zero Labor
for Configuring, Provisioning, and Resource Optimization

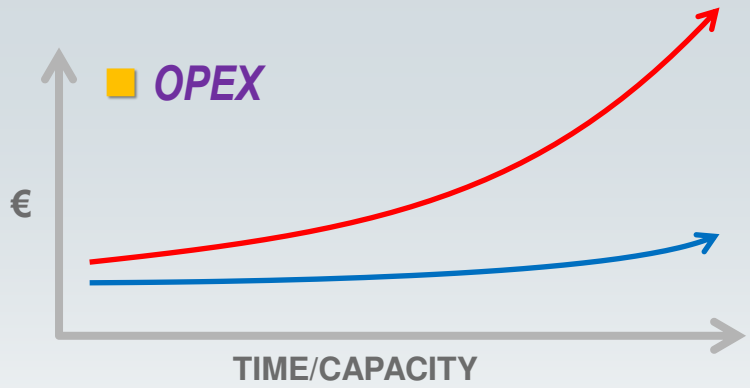
IBM XIV

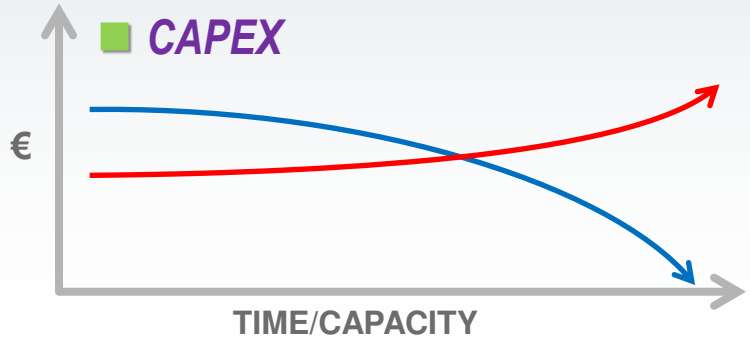
Zero Impact
to Infrastructure for Variable Service Level Agreements or Qualities of Service

Cloud Economics… *Data Infrastructure Matters*

Commodity Storage

- **Lower Entry Costs; Inefficient at Scale**
- **Increasing Complex & Inefficient for Cloud and Big Data Needs**





Cloud Optimized Storage

- **Fewer, Lower Skilled Administrators**
  - Simplified management
  - Lower skills required
- **Fewer Servers & Network Connections**
  - Fewer cores & connections
  - No need for Fibre Channel SAN
- **Higher Storage Utilization**
  - Deliver SLAs with increased utilization
- **Lower Software License Costs**
  - Fewer cores
  - Database, infrastructure, SW
- **Lower Environmental Costs**
  - Power / cooling, floor space

ebay

Guaranteed SLAs *Across Diverse Workloads with XIV*

niu know how

700TB ***Managed by One-half Administrator*** *with XIV*

EllisDon

Energy Cost Reduced *by 50%... Admin: a Few Hours per Week*

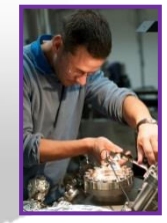
The Hartford

No Longer Juggling *LUNs to Avoid Hot Spots...*

Data Innovation… *A Boy and his Atom☺*

Future All-Flash Systems

- 19nm technology…
- Sub-µsecond latency and extreme durability via Signal Processing & Error Correction



IBM Research

Hyper-scale File Systems

- Billions of Files
- Petabytes of Data
- Unified Name space
- Flash to Disk to Tape

Distributed Cooperative Caching

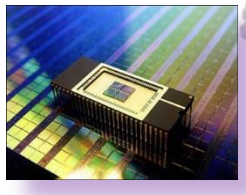
- Data & cache placement across Servers and SANs
- VM mobility with disaster recovery & availability

Policy-based Key & File Encryption

- Enables Multi-tenancy and Secure Deletion

Storage Class Memory

- Low-cost, fast, non-volatile



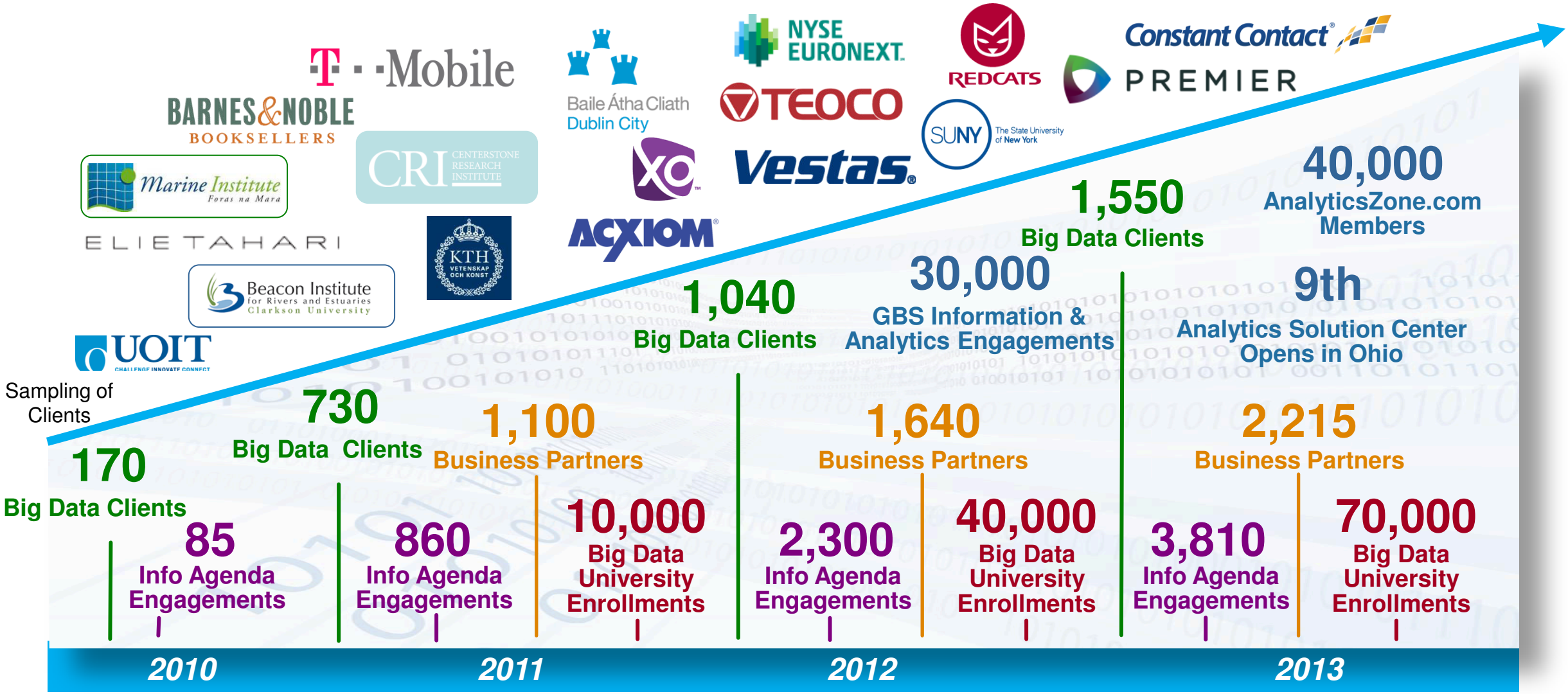
Phase Change Memory

- From optical disks to semiconductors
- Leading candidate for SCM

Information Lifecycle Management Across Clouds

- Transparently migrate across clouds
- Security, integrity, & resilience
- Flexibility to switch between cloud providers seamlessly

IBM Big Data: Delivering Better Economics



Source IBM. All numbers are cumulative.

possible

Software Defined Storage *Here Today… Ready for Tomorrow*

Software Defined Storage 1.0

Virtualize and Optimize

Software Defined Storage 2.0

Open, Extensible and Industry-led

Software Defined Storage 3.0

Open, Analytic and Application Driven