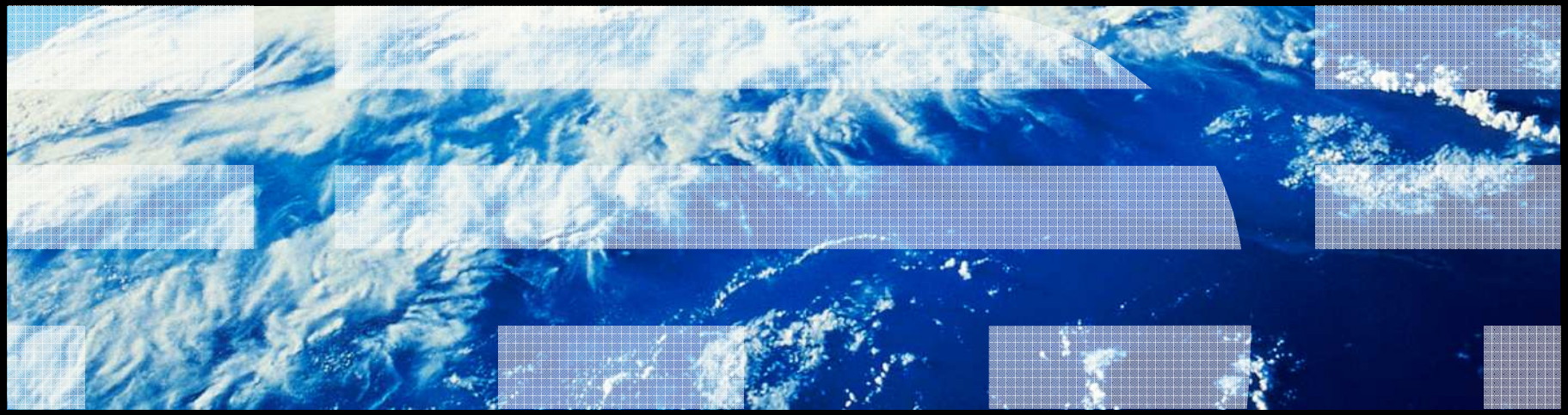
Dr. Shiva Kumar
Vice President,
Enterprise Performance and Industry Analytics

Innovation that Matters – an IBM story



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IBM Research: Global and Vertically Oriented

analytics

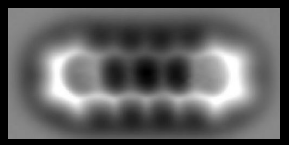
services tools

cloud

Workload-optimized systems & supercomputing

processing

nanotechnology



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Our world is becoming
INSTRUMENTED

Our world is becoming
INTERCONNECTED

All things becoming
INTELLIGENT

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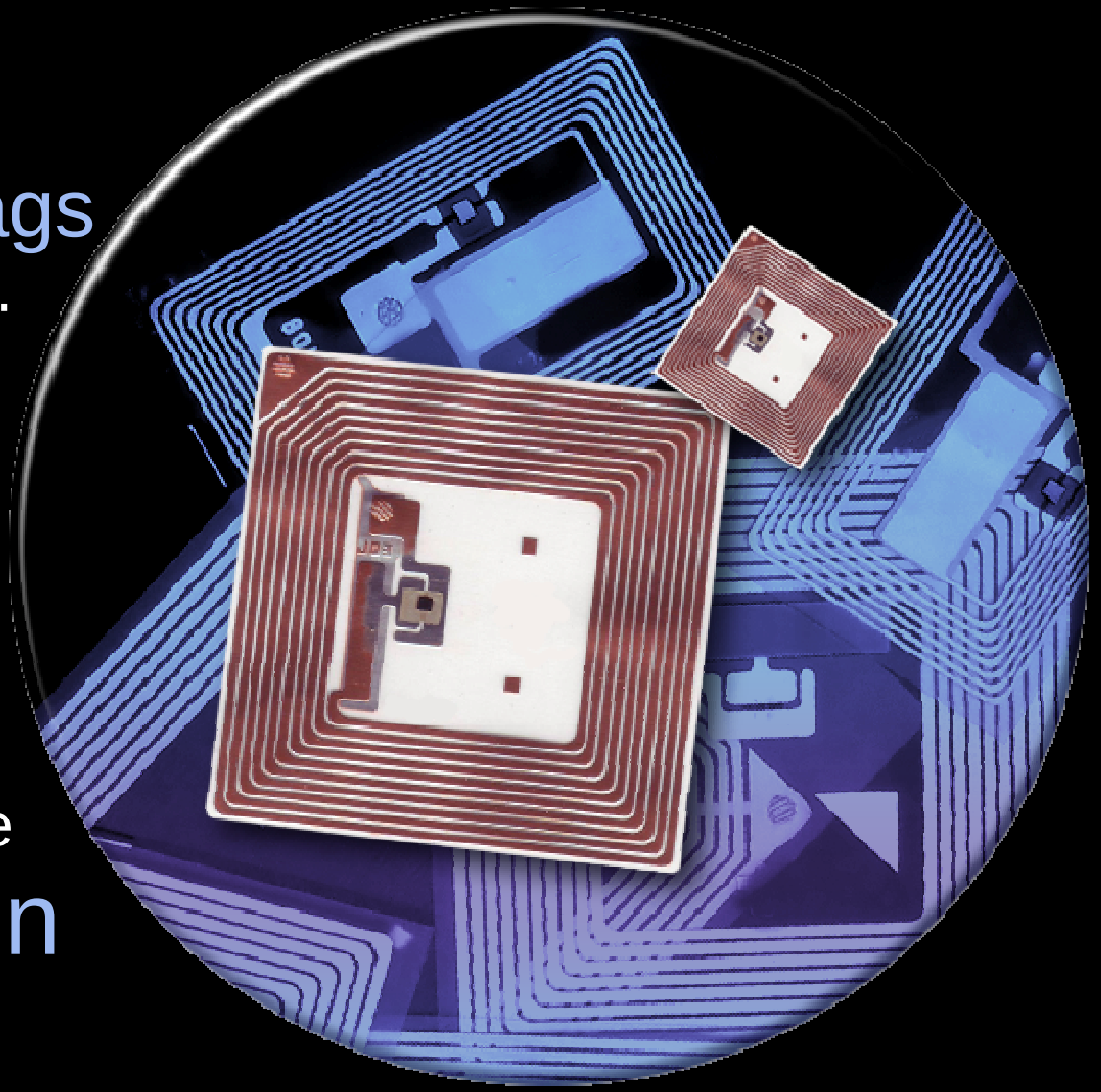
Instrumented

In 2005 there were
1.3 billion RFID tags
in circulation…



… today, there are
30 billion

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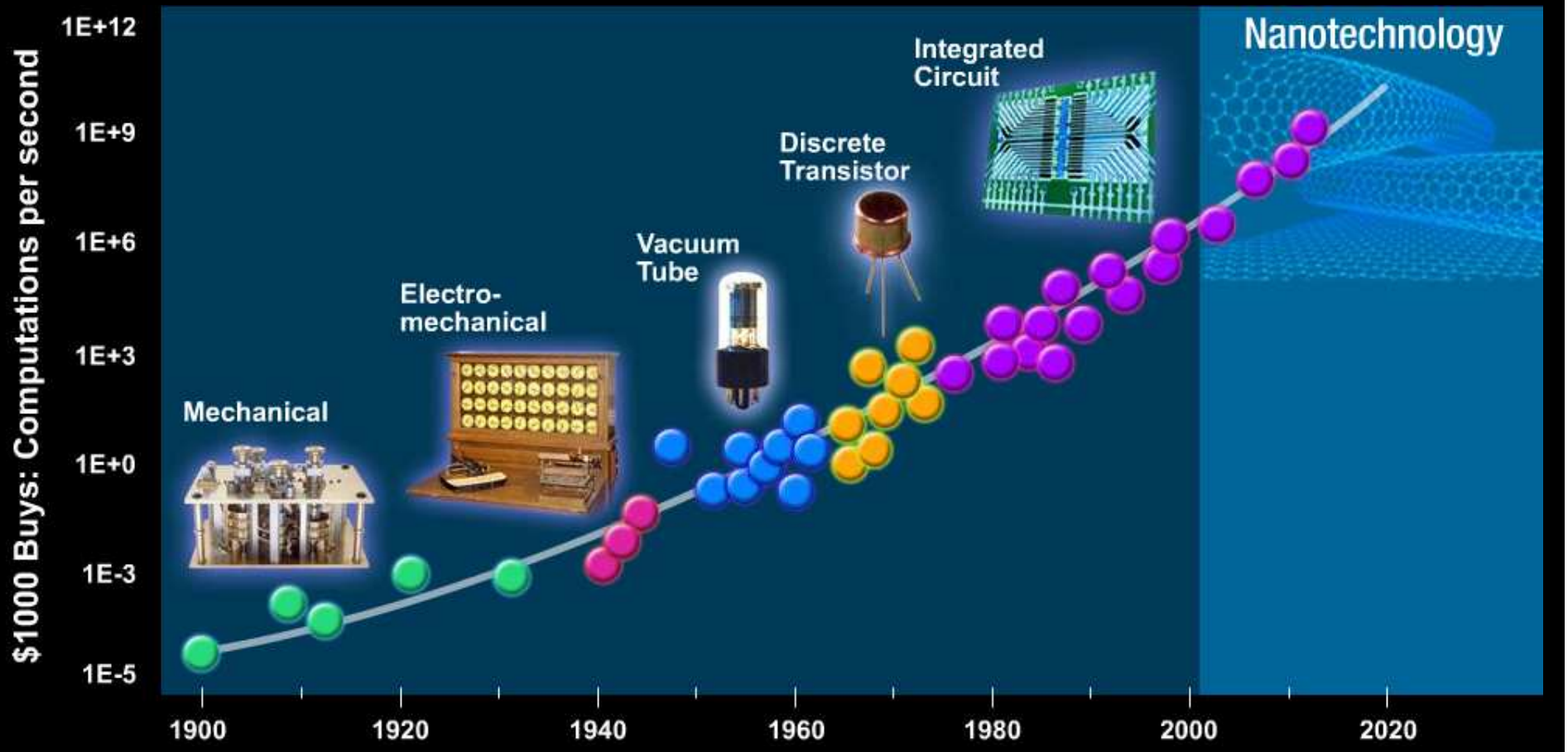
Advances in Technology are Accelerating



Source: Kurzweil 1999 – Moravec 1998

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Interconnected

There will be more than **5 billion** mobile phone subscriptions worldwide by the end of 2010

Mobile ***Internet*** users reached 450 million in 2009, **expected to more than double by 2013**

Combined spending on consumer and business mobile applications will top **$25 billion** worldwide by 2014

In some countries, such as India, **more mobile phones are in use than there are people using them**

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Hyper-growth Wireless Demands Will Drive New Opportunities

Mobile Internet

- Smart Phone and Mobile Entertainment applications will drive >**10 to 30x** mobile traffic in next 6 years
- Wireless industry will need to transform existing voice-oriented network to content- oriented network

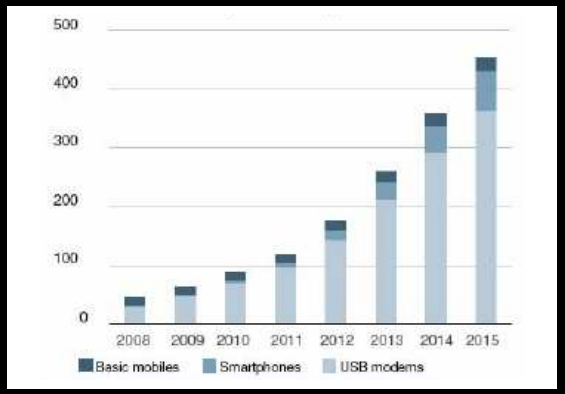
M2M / Smarter Planet

- M2M communication has become an multi-billion fast growing market, and will continue to grow **4x** in 5 years
- Emerging Smart Grid, Public Security, Telematics 2.0 will drive broadband M2M growth

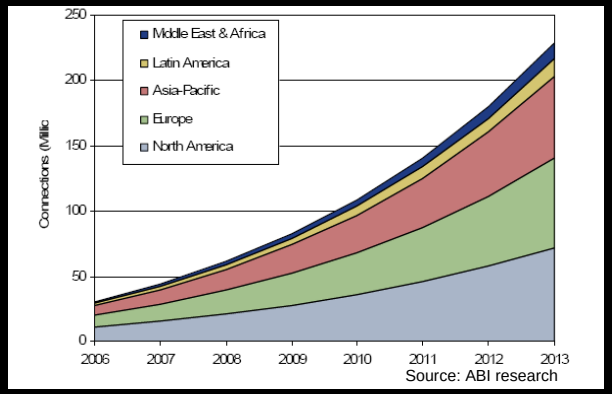
Enterprise Wireless

- **70%** of mobile traffic will happen in-building
- Femtocell / picocell covering wireless in-door will grow >**10x** in the next 5 years
- The volume of 4G femtocell / picocell will drive down the cost impacting wireless in enterprise

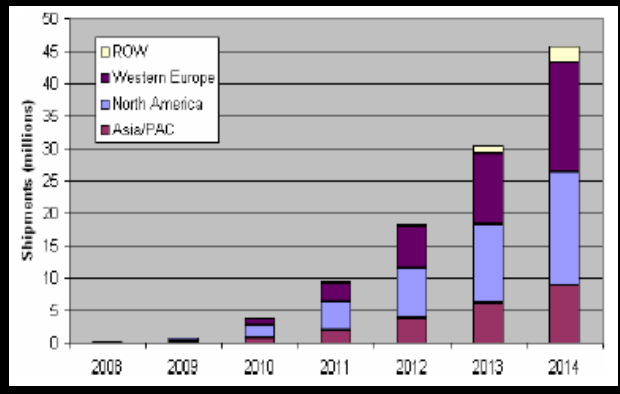
Mobile traffic per customer by device (Mb/month}



Total cellular M2M connections by region, world market, forecast: 2006 to 2013



Total wireless shipments by region, world market, forecast: 2008 to 2014



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Growth Through Customer Focus and New Mobile Services

India's largest private sector telecom operator needed to implement and deliver new services rapidly and cost-effectively to provide competitive differentiation and strengthen its customer relationships

Impact

- Added 2.5 million new customers per month
- Improved cross-selling
- Optimized business processes and infrastructure through flexible, standardized integration framework
- Flexible pricing model avoids major increases in capital expenditures

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Mobile Financial Applications are Modifying Consumer Behavior

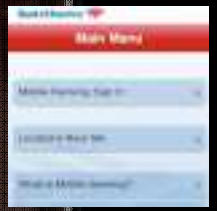
Mint
Securely access your financial data anytime

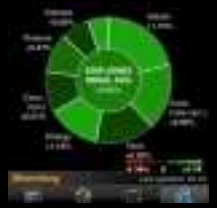
E*Trade Mobile
get quotes, track prices, see portfolios, and even execute trades

MasterCard's ATM Hunter
Find the nearest ATM

LoanShark
calculate loan costs, compare interest rates, repayment terms, and amortization.

BoA
Mobile banking or locate their nearest ATM





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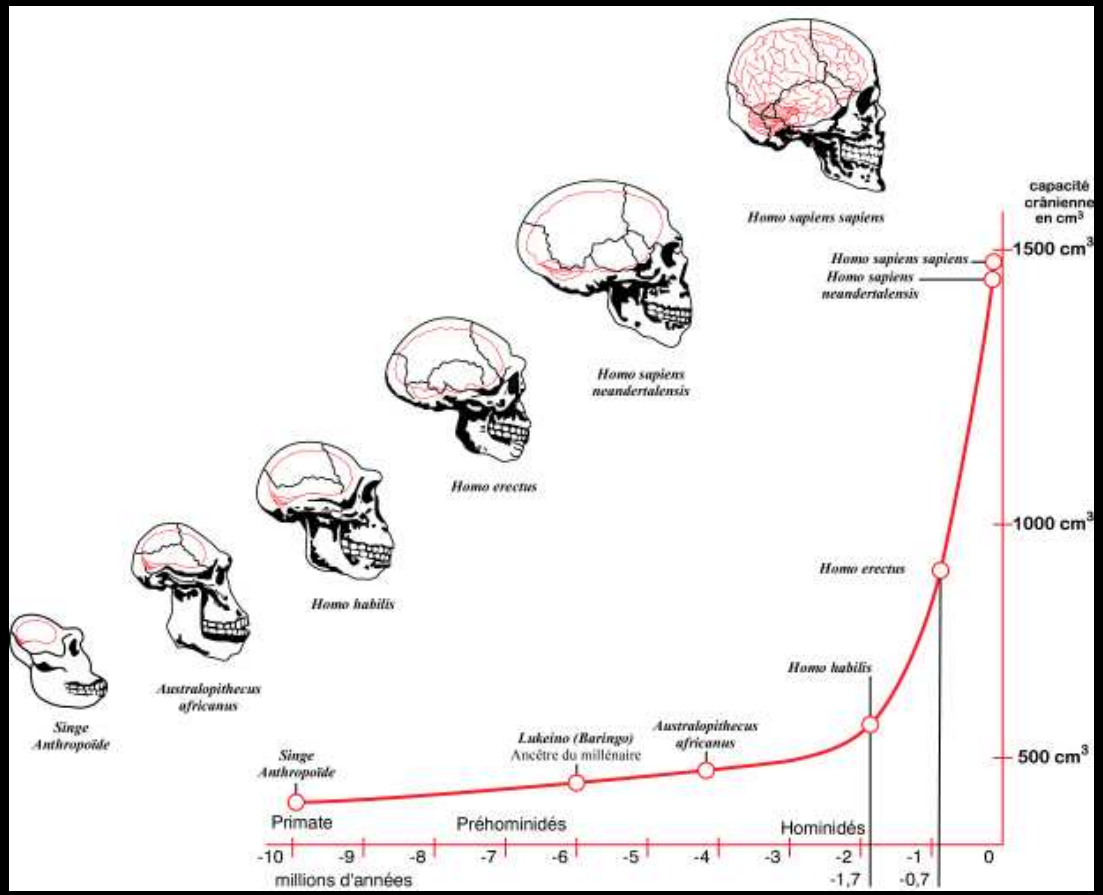
Intelligent

The Human Brain has expanded capacity over time

- Growth driven largely by extent of social interaction
- Minimal impact of ecology or environment



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Information Explosion

Data is growing 60% compound annually – that's

6 trillion bytes/second

In 3 years, IP traffic is expected to total more than a trillion gigabytes – that's

1,000,000,000,000,000,000

Medical images comprise **30%** of all data

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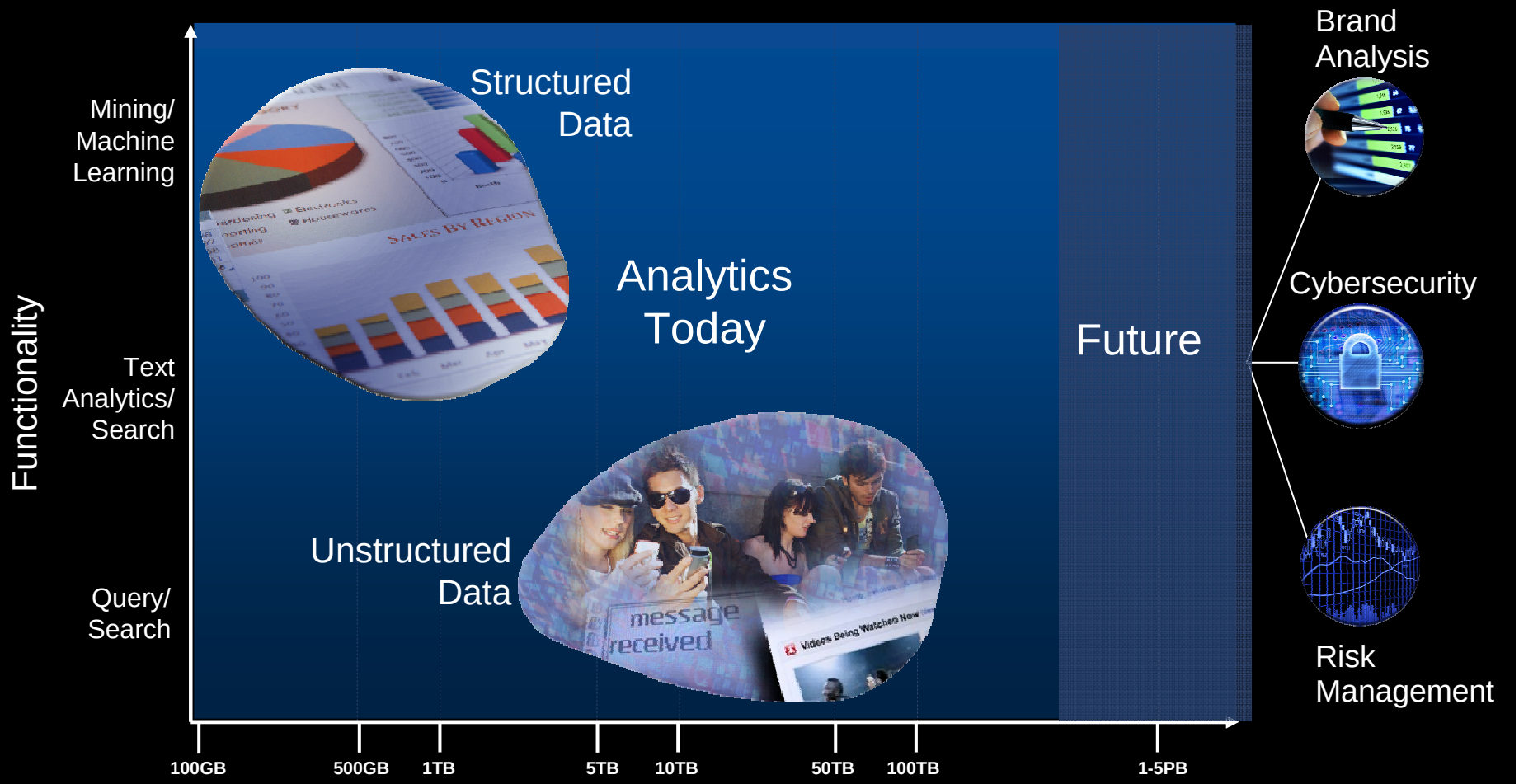
Massive Scale Analytics Landscape



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Transportation can also be improved using instrumentation and analytics – Japan example

Radio Beacon : 3,042 units (2010)
Optical Beacon : 31,853 units (2008)

Parking lot Info. etc..

Japan Road Traffic Information Center

VICS center

2499.7MHz 64Kbps | **infrared 1Mbps** | **NHK FM MUX'd 16Kbps**

VICS
- traffic jam
- regulation
- obstacles
- parking lot
- est. drive time

Fixed sensors:
Covers 10% of roads over 5.5m wide

Interval (example)
Sampling: 3-5s
Communication: 2-3min

Floating Car Data
- vehicle ID
- location
- velocity
- acceleration
- etc.

telematics

Services
- G-Book (TOYOTA)
- InterNavi (HONDA)
- CarWings (NISSAN)

ETC
- DSRC / 5.8GHz
- 1Mbps (ASK)
- 4Mbps (QPSK)

V-V Communication
- DSRC / 700MHz

Sensor
- Doppler
- mmWave

future w/ DSRC
- music, video
- VICS

ETC: Electronic Toll Collection system
DSRC: Dedicated Short Range Communication
VICS: Vehicle Information and Communication System

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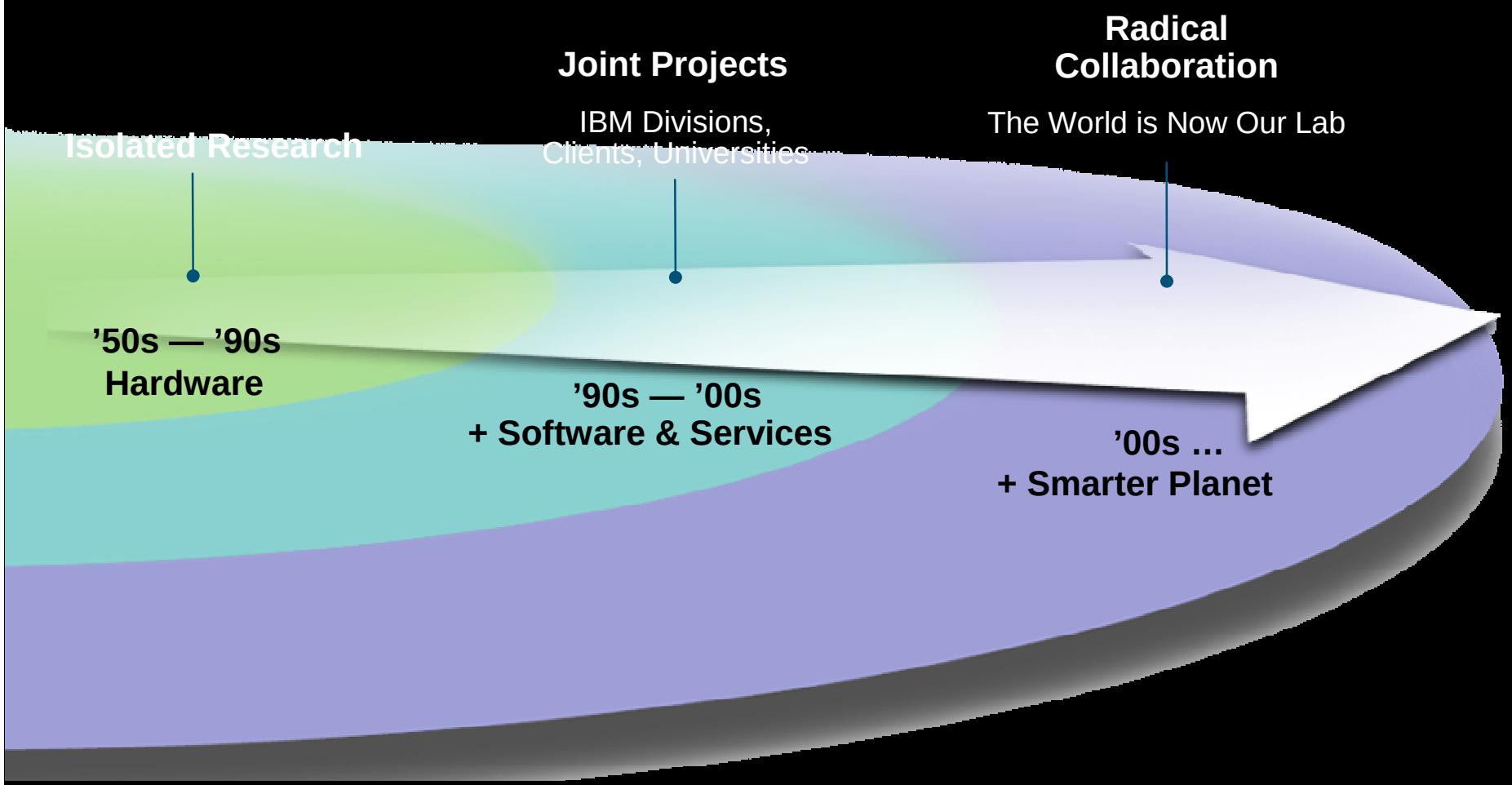
The Eras of IBM Research



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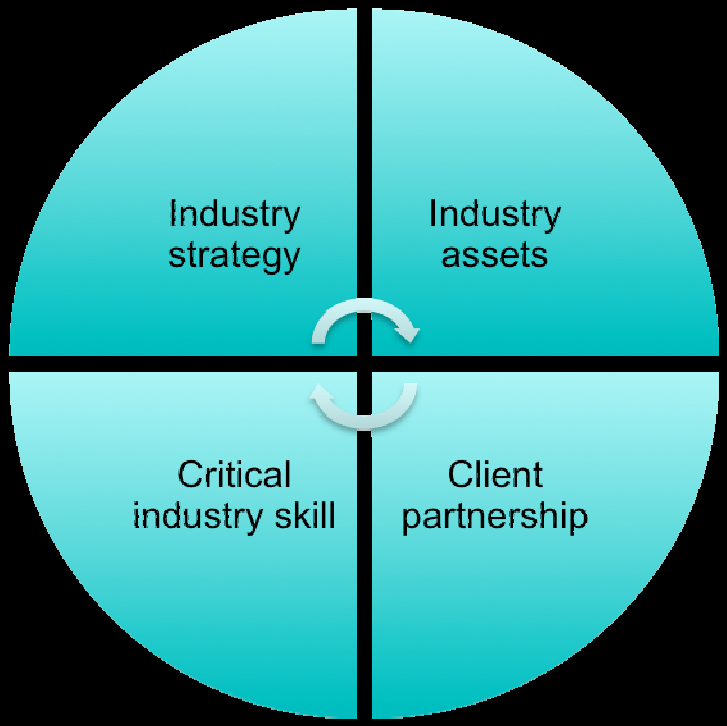
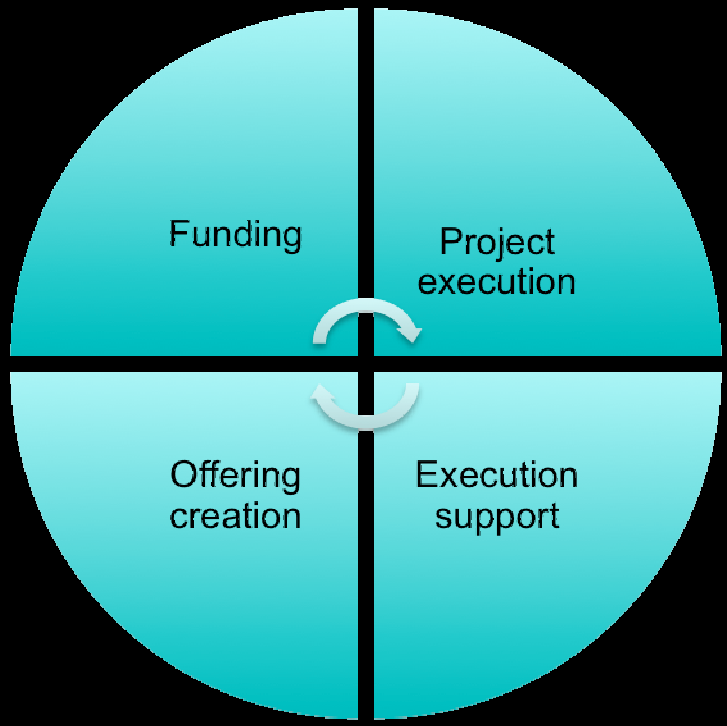
Approach to increase impact of Industry teams in IBM Research

Develop execution priorities by Industry

Execute against priorities to deliver impact





Establish management system to ensure impact

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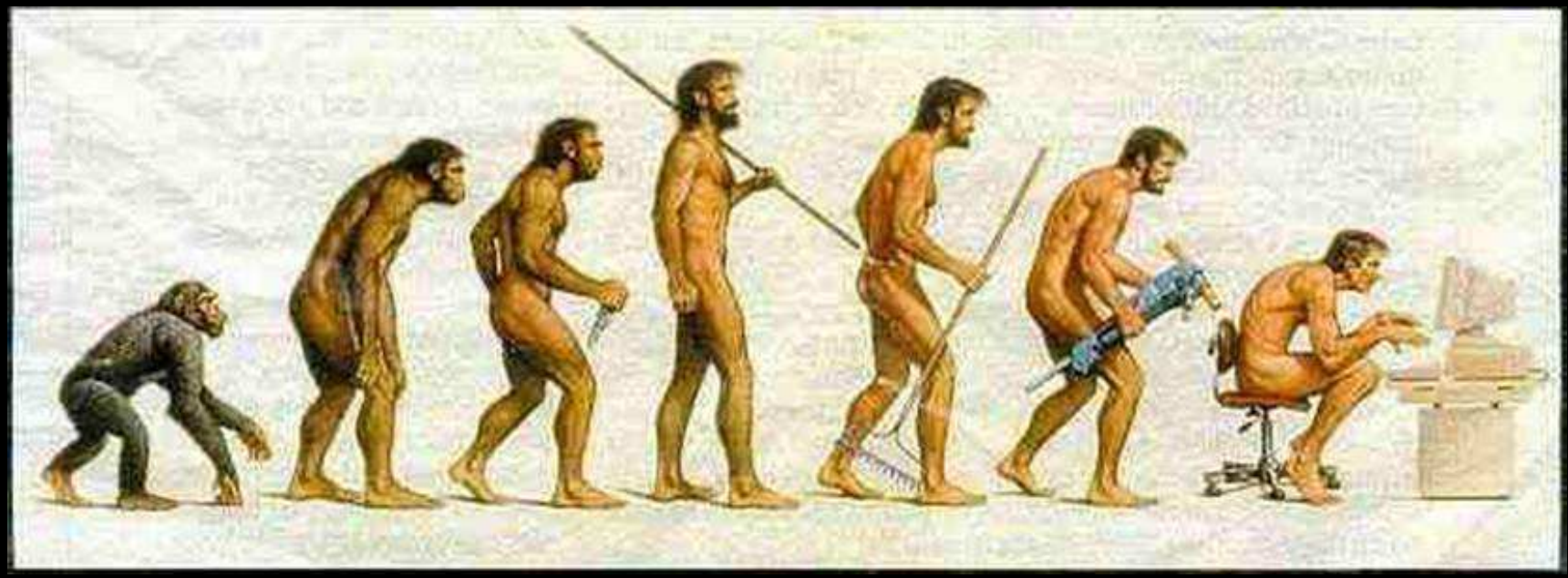
Evolution and Innovation



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