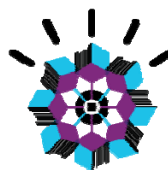




# Delivering Cost-Effective Innovation in Challenging Economic Times

## Introducing Smarter Products for a Smarter Planet

Neeraj Chandra, Vice President, Worldwide Strategy



Smart Products

**Rational.** software

## The reality of living in a globally integrated world is upon us

- Economic interdependencies and future uncertainty
- Increasingly complex supply chains and empowered consumers
- New competitors and fast changing industry dynamics
- Impact of emerging economies
- Energy shortfalls and erratic commodity prices
- Explosion of compute power and embedded technology

***Organizations that design and create products face a world of growing complexity***

### The Need for Progress is Clear

**170 billion**

Kilowatt-hours wasted each year by consumers due to insufficient power usage information

**100 million**

People worldwide pushed below the poverty line by personal healthcare expenditures

**3.7 billion lost hours**  
**2.3 billion gallons of gas**

Annual impact of congested roadways in the U.S. alone

© 2009 IBM Corporation



## The era of one-size-fits-all is over

- A new generation of **smarter products** — embedded with increasingly sophisticated software and instrumentation, able to connect to other devices and respond intelligently to user needs — is transforming the way the world works.
- These products are the building blocks of smarter solutions in every industry, from hospitals to manufacturing to the energy grid.

### 162 million

Almost 162 million smart phones were sold in 2008, surpassing laptop sales for the first time.

### 90%

Nearly 90% of innovation in automobiles is related to software and electronics systems.

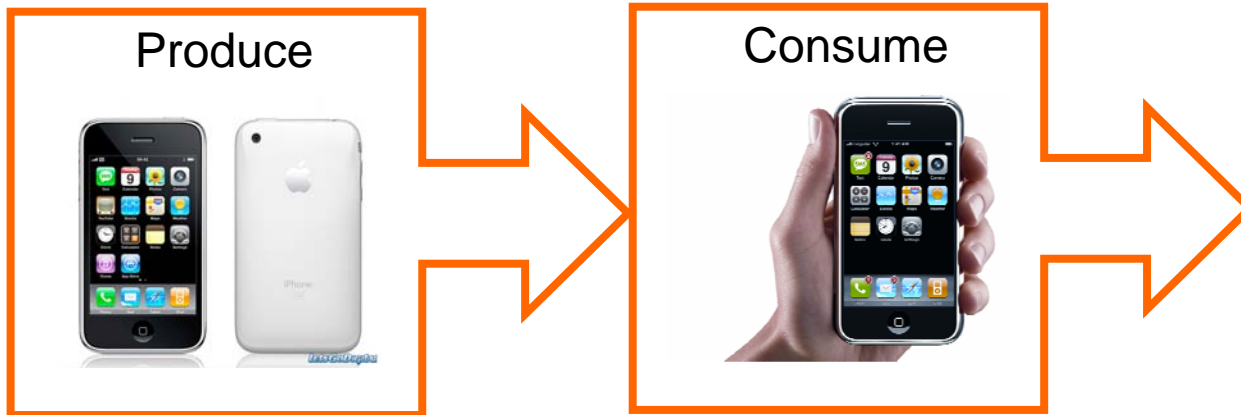
### 1 trillion

Soon, there will be 1 trillion connected devices in the world, constituting an “internet of things.”

Smarter Products require an unprecedented level of coordination between the companies that **produce** the products and their customers who **consume** and **manage** them



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Organizations of the future must build the competencies to **produce** their products – and enable customers to **consume** and **manage** them – in smarter ways...

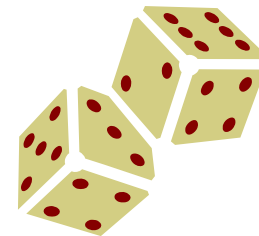
...if they are successful, they will maximize their ability to capture value with **smarter products**



Create new value and innovate faster

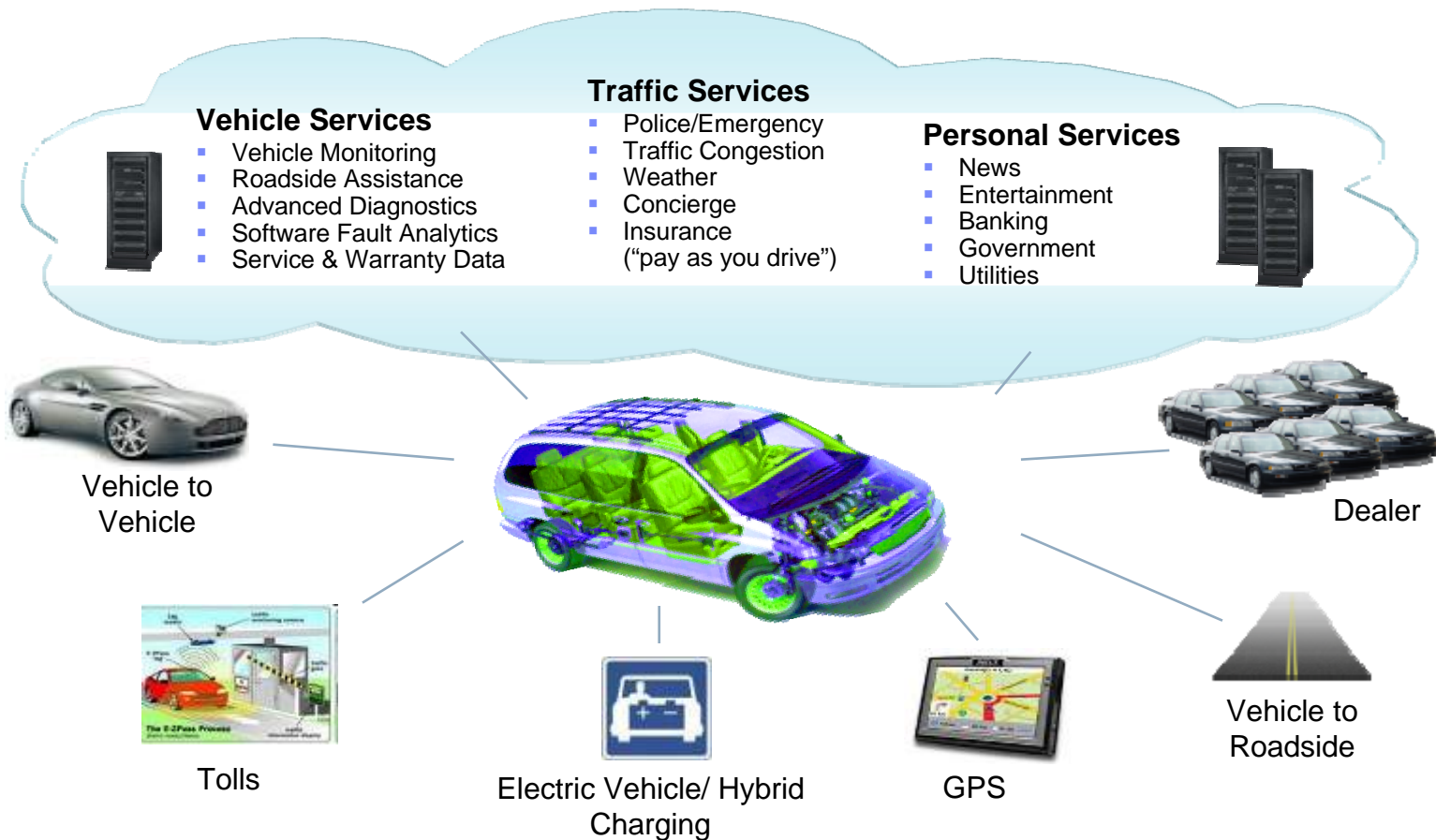


Reduce the cost of development and production



Improve product quality and reduce risk

# Incremental value is created by global interconnection across products, systems, applications and the Internet



*Changes are being driven across the entire supply chain - even to commodity parts that now require sophisticated software & electronics*

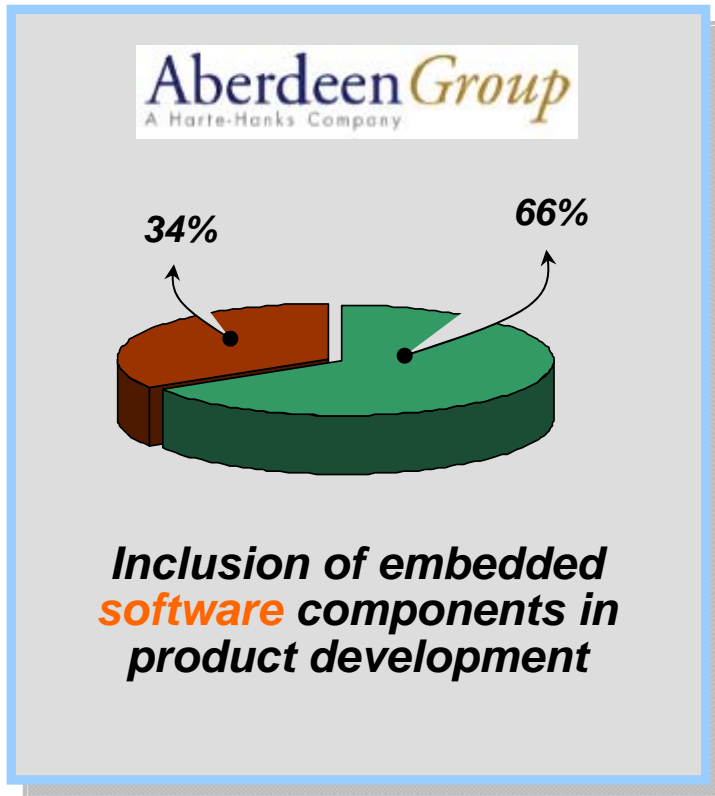




Smarter products are also the building blocks for new solutions across every industry to help transform our planet



# Software is the “invisible thread” in today’s innovation



*“The medical field is highly dependent on **software**, which significantly enhances delivery of patient care”*



*“Like many of the components that make up today's vehicles, the hydraulic hybrid systems are intelligent **software** intensive systems.”*



*“**Software** has evolved from a hidden component driving functionality to the keystone of product differentiation and end-user experience.”*

-- VDC Research

## However, software failures have plagued companies

### ▪ Aerospace Agency

*\$1B prototype rocket self-destructed just 40 seconds after takeoff due to a software bug in the on-board guidance system*



### ▪ MP3 Player Company

*One million owners woke up one morning to find their devices inoperable due to poor leap year handling*



### ▪ Automobile Company

*Sales interrupted until engine control software was updated to better control exhaust system  
50% of warranty costs are linked to software*



### ▪ Medical Device Company

*Had to manage a costly product recall of 42,000 defibrillators due to a software flaw*



***Building a software competency is a business critical imperative in managing cost, risk and the pursuit of innovation!***

# Building a competency in software is challenging

*Overcoming a history of cost overruns, schedule slips and quality issues*



*“Only **34%** of software projects are deemed successful costing over \$300B annually”*



*“**49%** of budgets suffer overruns and **62%** fail to meet their schedules”*



*“**30%** of project costs are due to rework and poor execution of requirements”*



*“**50%** of outsourced projects are expected to underperform”*

*Silos of people, process, and projects*

## Geographic Barriers

- Poor communication
- Language, culture, time
- Process gaps resulting in rework

## Organizational Barriers

- Weak collaboration
- Poor project governance and LOB oversight
- Security of IP

## Infrastructure Barriers

- Incompatible tools
- Unreliable access
- Lengthy on-boarding
- Inflexible integration



# Success may require a transformation in business models for many product development organizations

## Customer Speak!

- **Develop a core competency in software delivery and integrated systems engineering**
- *A proficiency in delivering complex software projects with quality is now an integral element of electro-mechanical development processes*



*“Embedded software is now the key to product differentiation, product reliability and end-user experience”*

- **Build and manage “value chains” across multiple industries, stakeholders and segments**
- *A discipline in delivering “systems of interacting systems” is critical, especially since no single organization owns the full “system”*



*“We must enable unprecedented speed of development and clarity of communications with teams and partners around the globe.”*

- **Excel at managing rapidly evolving and increasingly complex requirements across the product lifecycle**
- *Managing traceability, accountability and change across multiple stakeholders, regulations and standards is fundamental for success*



*“With so many requirements and constraints, managing the volume itself becomes a much bigger challenge”*



## Best-in-class product development teams are those that build a core competency in software delivery

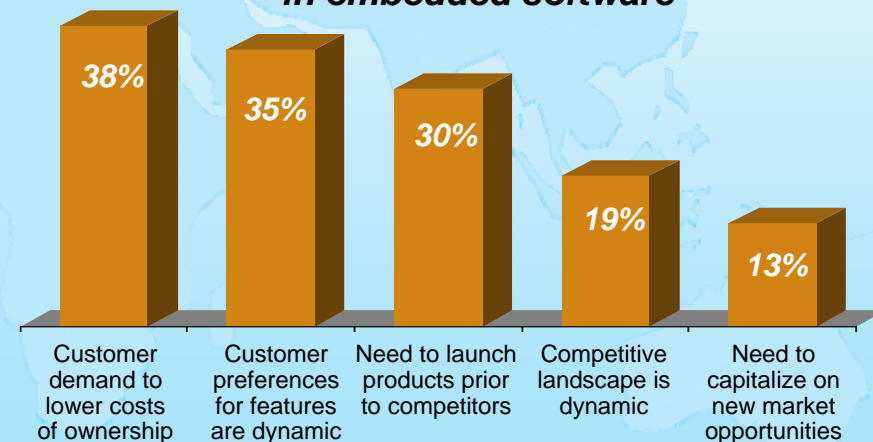
### Best-of-class produce results:

- **19%** more likely to meet revenue targets than the industry average
- **4.4x** more embedded software than competitors
- **50%** fewer defects in embedded software
- **25%** decrease in product development time

*“Companies successfully addressing the challenges **are reaping the benefits with higher profitability** – an impressive accomplishment given the current economy.”*

– Michelle Boucher, Aberdeen Group

### Top 5 pressures driving improvements in embedded software

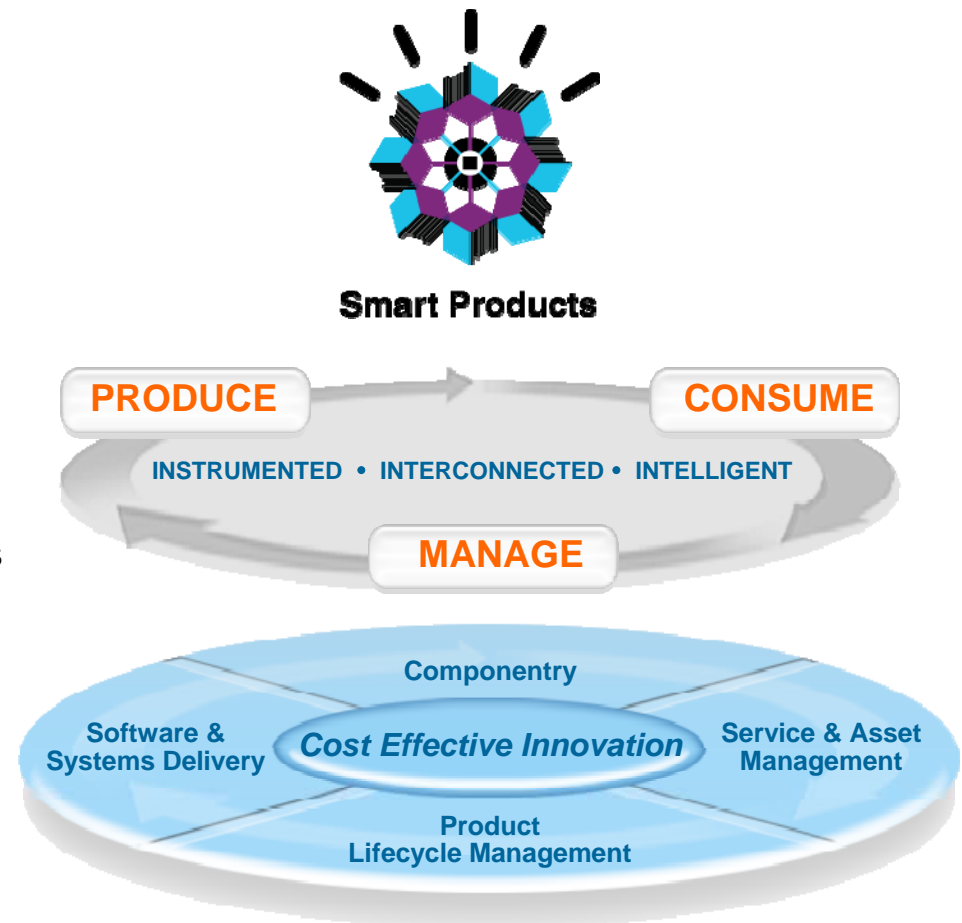


Source: “Embedded Systems Development”, Aberdeen Group, March 2009

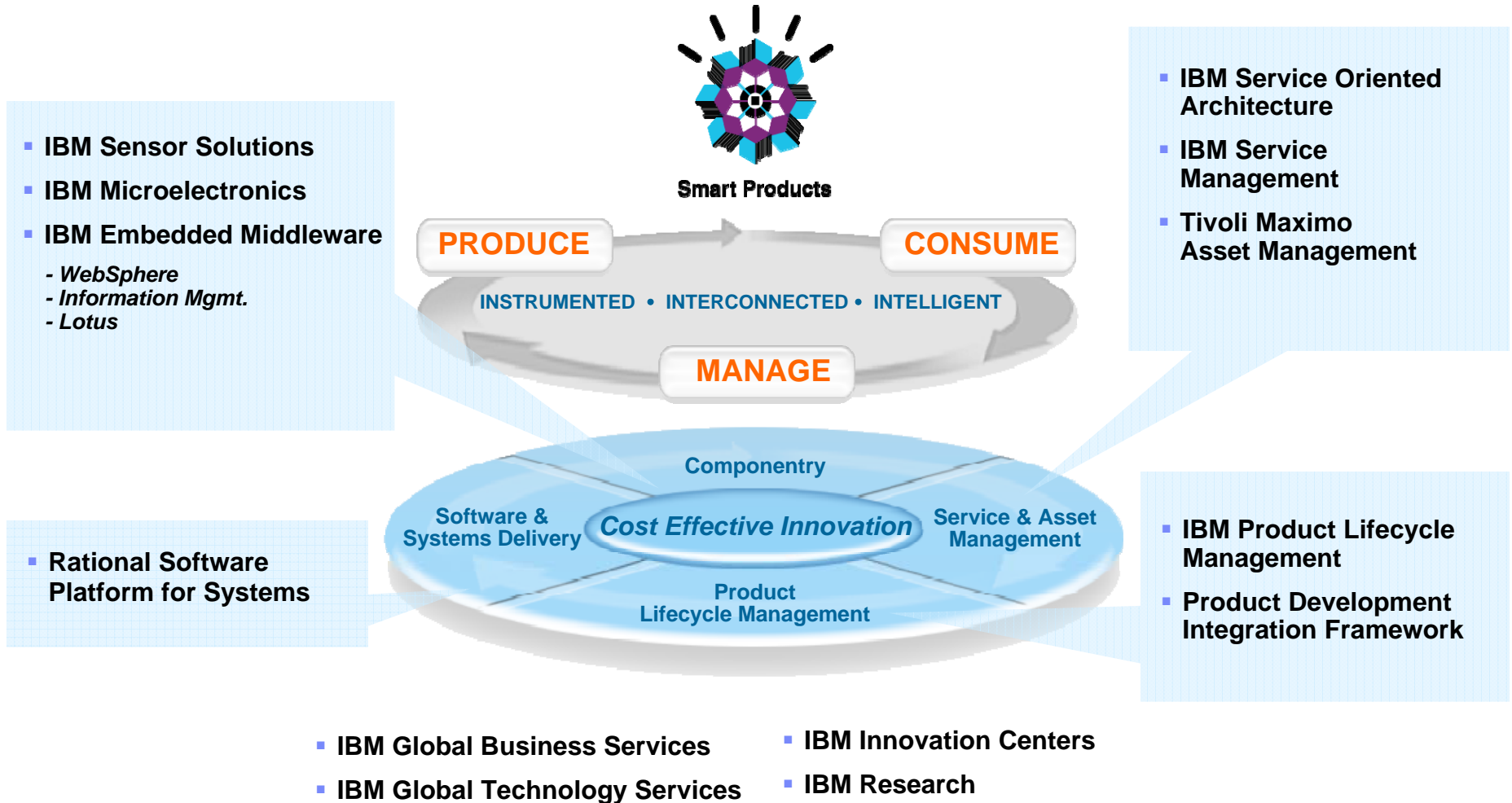


# Achieving cost-effective innovation requires a broad, encompassing **framework** for delivering smart products

- Helps product manufacturers and IT organizations **produce** increasingly smarter products to meet the unique needs of their customers
- Enables businesses to **consume** and integrate smarter products as the building blocks for more customized solutions
- Assists organizations in deploying new capabilities to **manage** value from their investments in smarter solutions
- Delivers best practices for delivering solutions that are increasingly **intelligent, instrumented, and interconnected** while controlling cost and mitigating risk



# ...complemented by a broad array of capabilities for producing, consuming and managing smart products





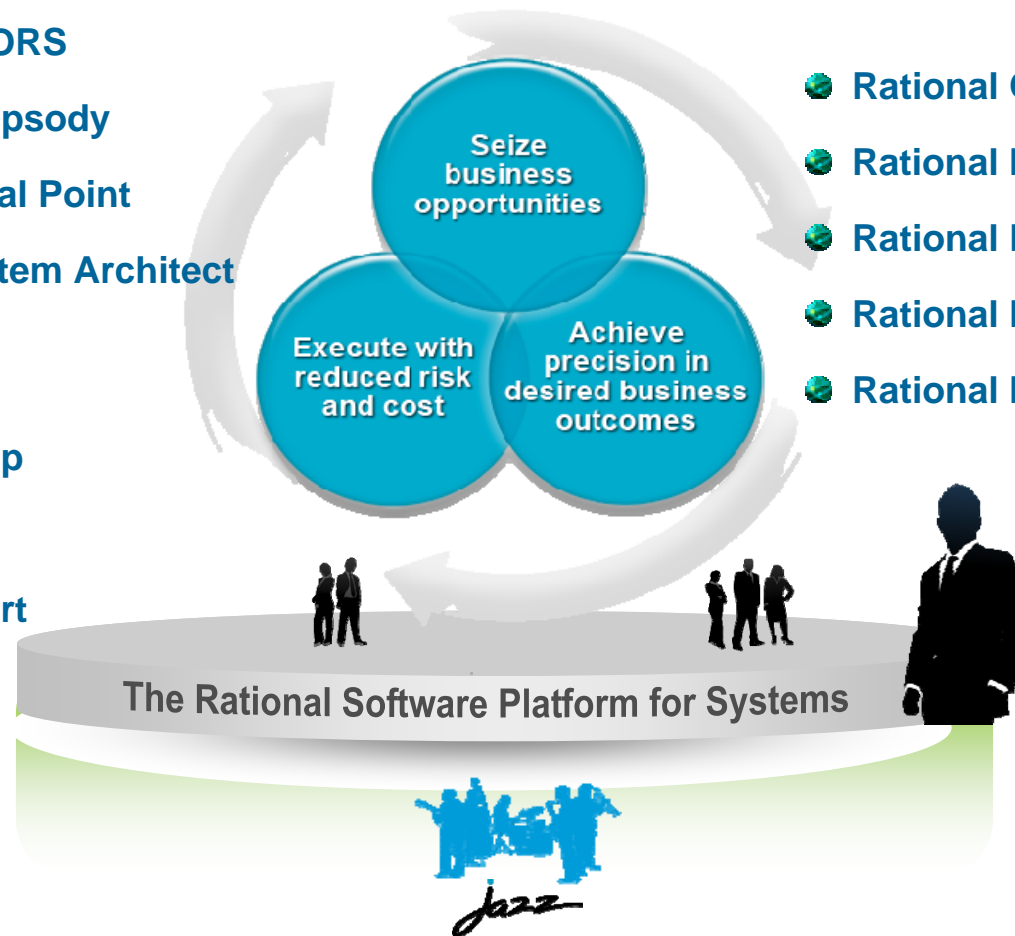
# ...with a core foundation of Software Delivery assets

## *The Rational Software Platform for Systems*

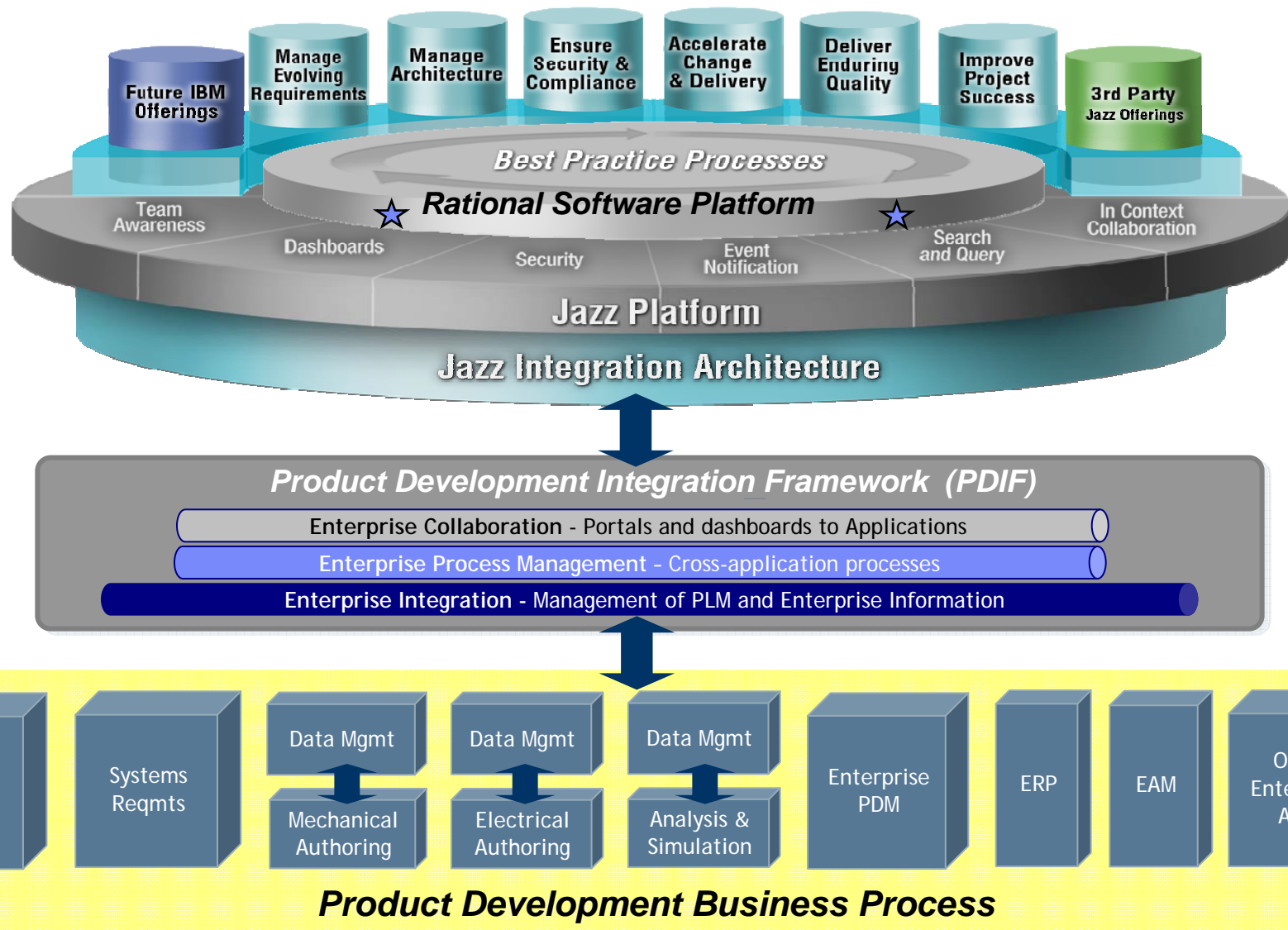
- Rational DOORS
- Rational Rhapsody
- Rational Focal Point
- Rational System Architect

- Rational Quality Manager
- Rational Publishing Engine
- Rational Build Forge
- Rational Harmony
- Rational MCIF for Systems

- Rational Team Webtop
- Rational Insight
- Rational Team Concert
- Rational Synergy and Change
- Rational ClearCase and ClearQuest



# ...and an end-to-end Product Development Framework



# Customer Success: Create and sustain market demand

## *Hydraulic hybrid delivery vehicles - Eaton & UPS*

### What's smart?

- Innovative technology for urban delivery trucks in stop-and-go traffic
- Smart software to optimize energy usage and reduce greenhouse gases

### Smarter business outcomes

- 60-70% increase in fuel economy, according to EPA
- 40% reduction in CO<sub>2</sub> emissions

### How Rational enables smarter products

- Software modeling to optimize system performance
- Automatic generation of in-vehicle software code



*"The suite of Rational tools, including Rhapsody, DOORS, ClearCase and ClearQuest, provides Eaton an integrated software framework that allows us to deliver innovative products more quickly and efficiently."*

# In aerospace and defense, software helps build smarter, more interconnected systems

## What's smart?

- Ruggedized computer systems for unmanned aerial vehicles (UAVs)
- Interconnectivity with on-board and ground systems

## Smarter business outcomes

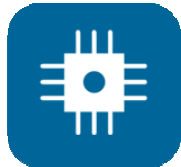
- Unmanned aircraft increase precision; reduce risk of casualty
- Speed, reliability and accuracy of onboard systems allow unmanned aircraft to fly 30 hours at altitudes of >50k ft



## How Rational enables smarter products

- Manage requirements and change across multiple product variants
- Reuse software components to increase reliability and reduce costs

# The World is Changing...



Our world is becoming

**INSTRUMENTED**



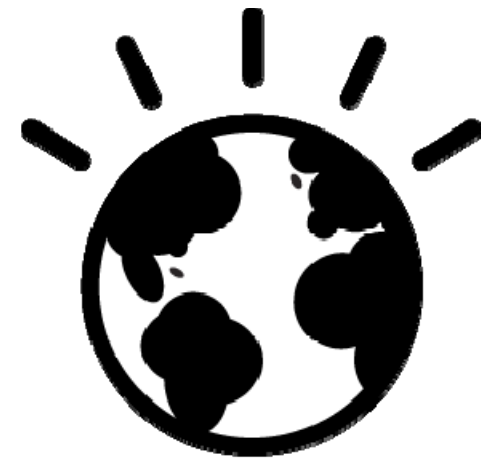
Our world is becoming

**INTERCONNECTED**



Virtually all things, processes and ways of working are becoming

**INTELLIGENT**



Let's build a smarter planet

***How will you deliver competitive differentiation in this environment?***



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## Executive summary

*Helping businesses deliver smarter products that are intelligent, instrumented and interconnected*

- Consumers and businesses are **connecting in new ways** with products that fuse software, electronic and mechanical engineering technology
- The result is **more intelligence** to make better decisions, use resources more efficiently and improve quality of life
- These 'smart products' have **profound implications** for companies who must now build a core competency in systems and software
- IBM provides the components and capabilities to help clients make this **transformation**

