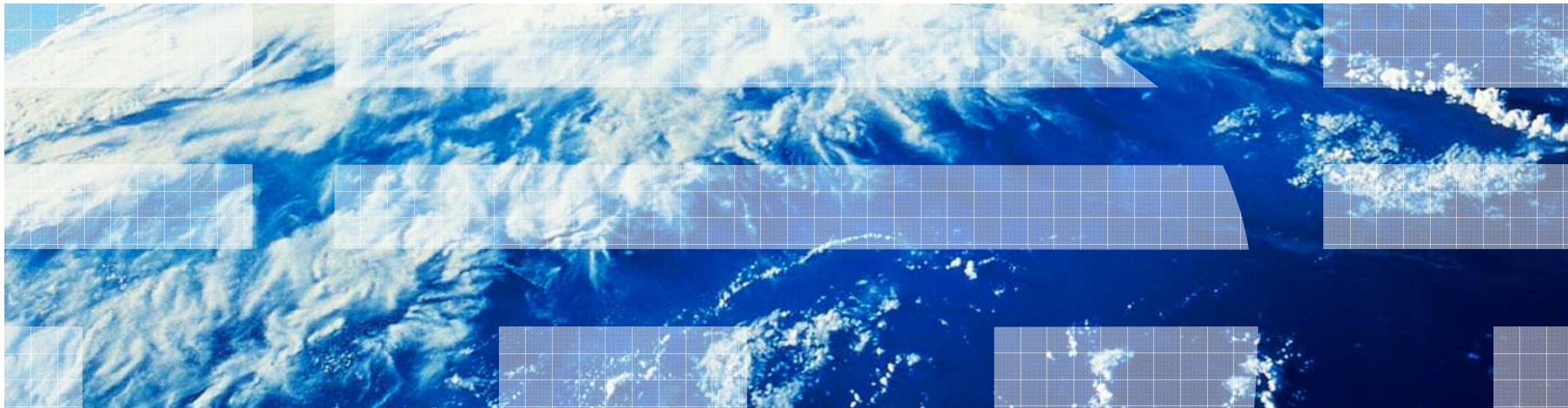




# ***Data Warehouse and Business Intelligence on System z***

*A New Era in Reliable Information*



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# IBM Deutschland Research & Development GmbH

## Overview

- One of IBM's largest Research & Development sites
- **Founded:**  
1953
- **Employees:**  
~2.000
- **Headquarter:**  
Boeblingen
- **Managing Director:**  
Dirk Wittkopp



## Focus Areas

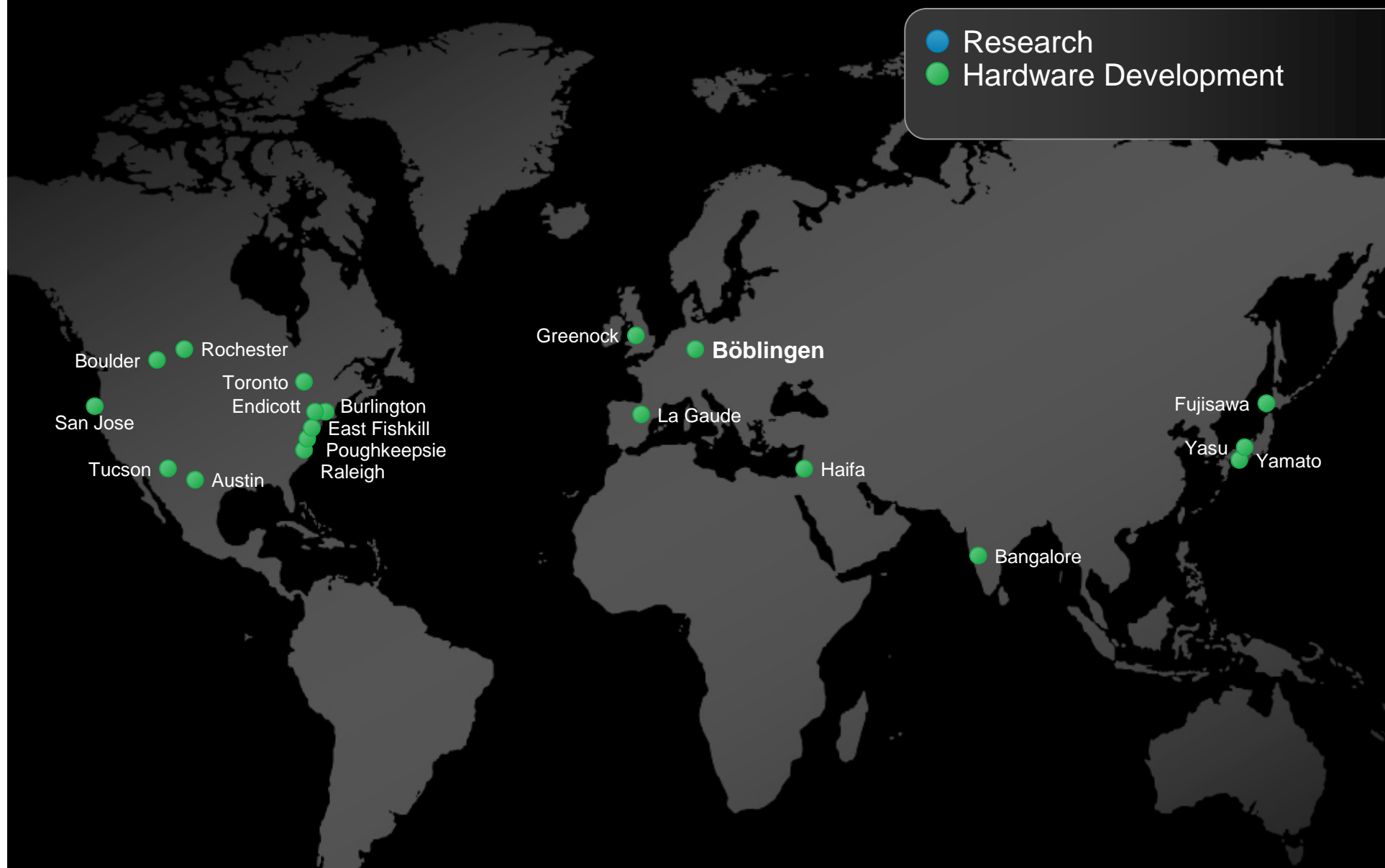
- **Skills:** Hardware, Firmware, Operating Systems, Software and Services
- More than 60 Hard- and Software projects
- Technology consulting
- Cooperation with research institutes and universities



● Research



- Research
- Hardware Development

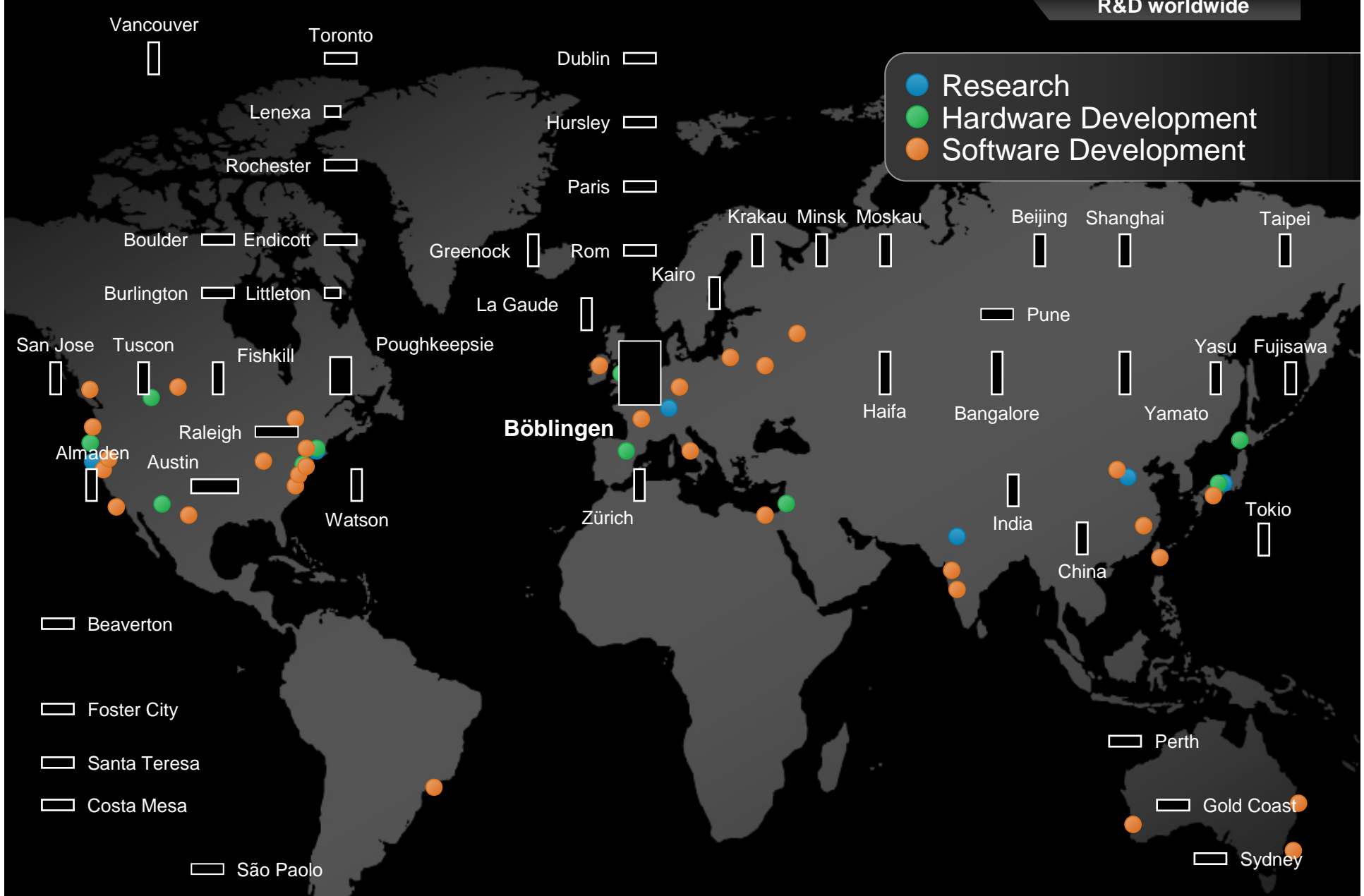


- Research
- Hardware Development
- Software Development



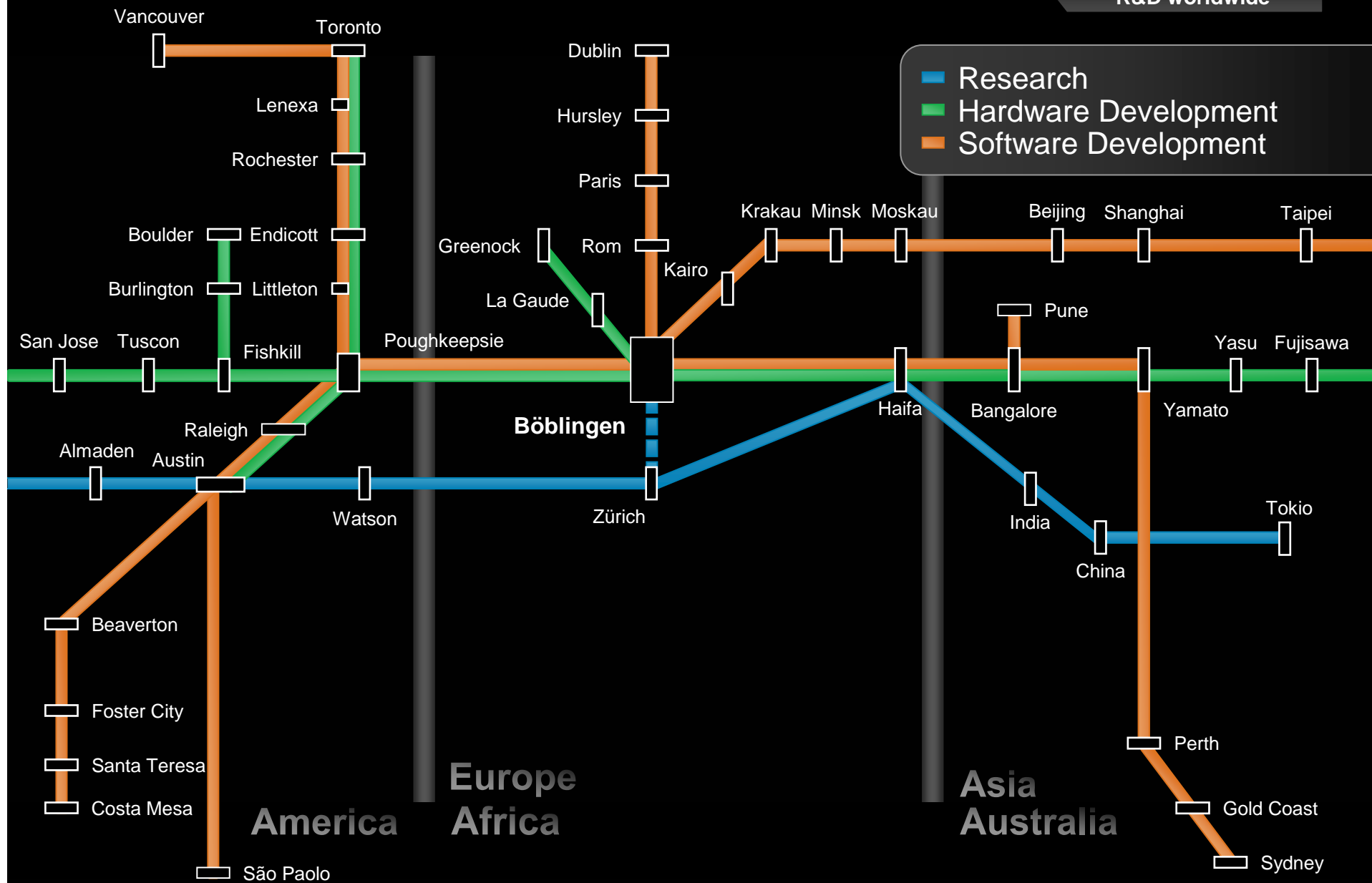
### R&D worldwide

- Research
- Hardware Development
- Software Development



### R&D worldwide

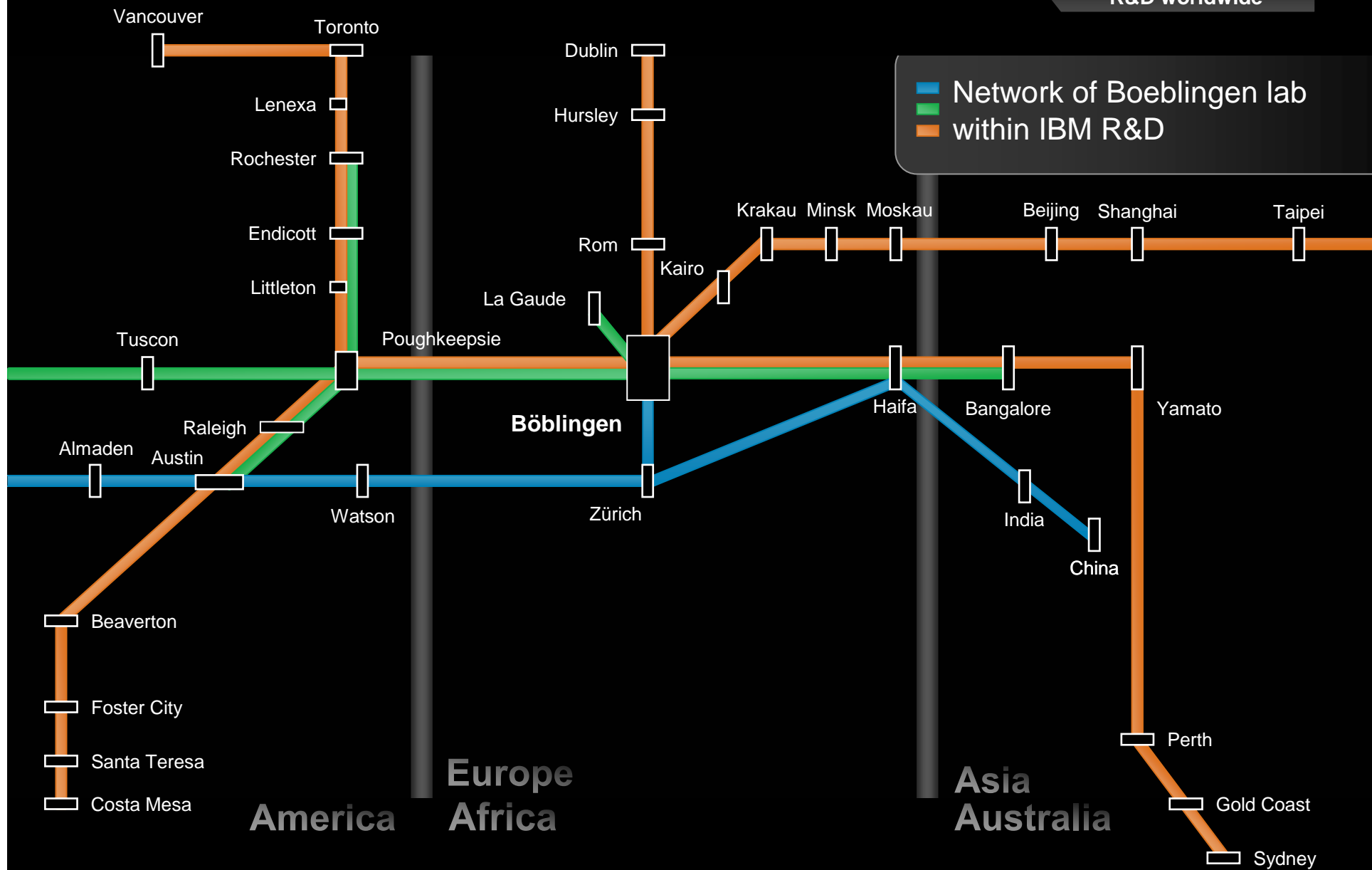
- Research
- Hardware Development
- Software Development





### R&D worldwide

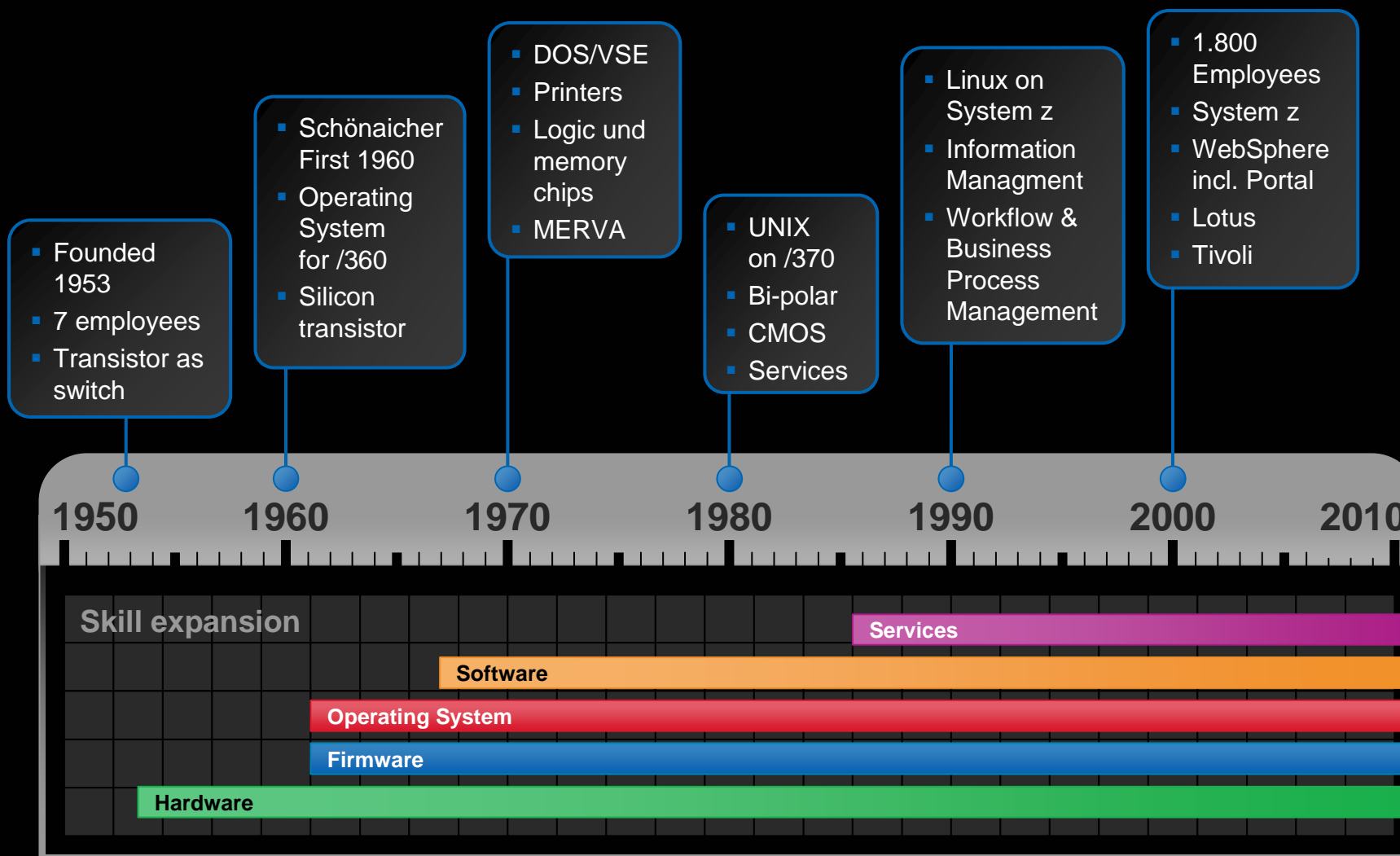
■ Network of Boeblingen lab  
■ within IBM R&D



# Development Portfolio

Software	<b>Tivoli. software</b> <ul style="list-style-type: none"> <li>TSAM / Cloud Computing</li> <li>System Automation</li> <li>Technology Cntr for SAP</li> <li>Business Continuity</li> </ul>	<b>Lotus. software</b> <ul style="list-style-type: none"> <li>Mashup Center</li> <li>Quickr</li> <li>Web 2.0 Technology</li> </ul>	<b>WebSphere. software</b> <ul style="list-style-type: none"> <li>Process Server</li> <li>Portal Server</li> <li>Premises Server</li> <li>WBI for Financial Networks</li> </ul>	<b>Information Management</b> <ul style="list-style-type: none"> <li>Information Platform &amp; Solutions</li> <li>Enterprise Content Mgmt.</li> <li>Data Mgmt. and IM Tools</li> </ul>	<b>Services</b> <ul style="list-style-type: none"> <li>TMCC Customer &amp; Sales Support</li> <li>IBM Executive Briefing Center</li> <li>Lab Services</li> <li>Technology Studies</li> </ul>
	<b>Operating System</b> <ul style="list-style-type: none"> <li>Virtualization/ Open Hypervisor</li> <li>Linux on System z</li> </ul>	<ul style="list-style-type: none"> <li>z/VM</li> <li>z/VSE</li> <li>System Management</li> </ul>	<ul style="list-style-type: none"> <li>z/OS Workload Manager</li> <li>SoFS/SoNAS</li> </ul>		
	<b>Hardware &amp; Firmware</b> <ul style="list-style-type: none"> <li>Server/OEM Microprocessors</li> <li>Simulation Technology</li> </ul>	<ul style="list-style-type: none"> <li>Blade Design</li> <li>System z Firmware</li> </ul>	<ul style="list-style-type: none"> <li>Hybrid Systems</li> </ul>		

# History of the Research & Development Lab





The smarter planet starts here.

## Information Management Development, SWG



**Udo Hertz**

Director of  
Information Management  
Development Boeblingen

## Information Management



### Skills

- Database Expertise for DB2 & Informix
- Database Performance Tools & Utilities
- Data Warehousing
- SAP Integration Technology
- Enterprise Content Management Expertise for IBM Content Management Suite
- eMail Compliance solutions
- Data Mining, Text Search & Text Analytics

### Products/Projects

- Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS
- InfoSphere Warehouse Edit.
- IBM Info. Server SAP Packs
- DB2 for SAP
- IBM Content Collector
- IBM Compliance Warehouse
- CommonStore for SAP

### Services

- Information on Demand Center of Excellence
- Customer Support for Special Technology Projects
- Data Management ISV Solutions Enablement
- DB2 Community with Universities



## Contact

- Feel free to call us any time!
- **Via your Sales contact, Technical Field Sales,**
- **or call us directly:**

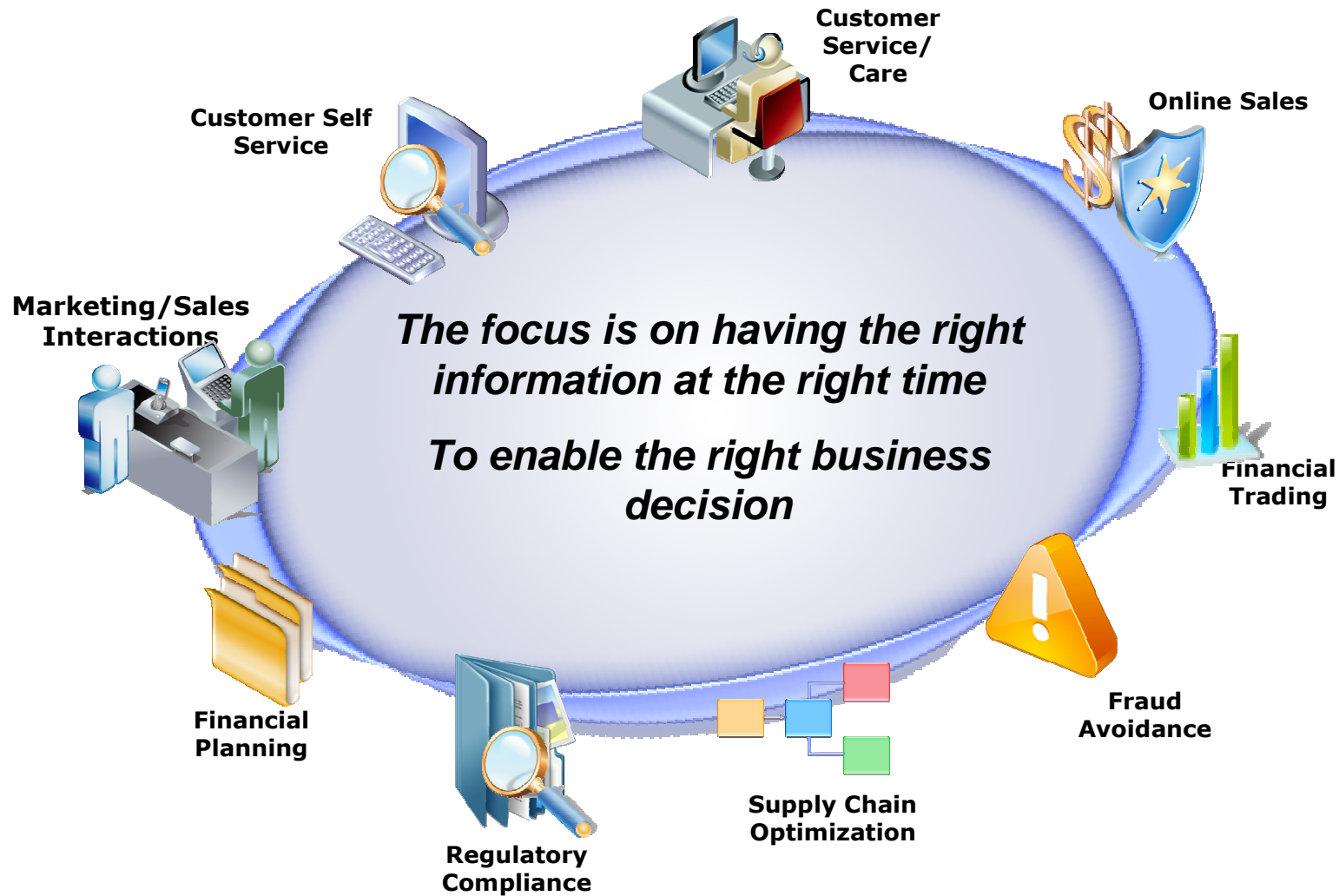


**Dirk Johann**  
*IT-Architect*  
*Center of Excellence*  
*Data Warehouse on System z*

*Schoenaicher Str. 220*  
*D-71032 Boeblingen*  
*Germany*  
*phone +49-7031-16-2627*  
*mobile: +49-170-2240953*  
*email: dirk.johann@de.ibm.com*

# Applications are Moving to Optimized Business Processes

Creating a New Set of Requirements



*Providing the Right Information .....*

*To the right person, at the right time –*

*... Changes The Way We Do Business*

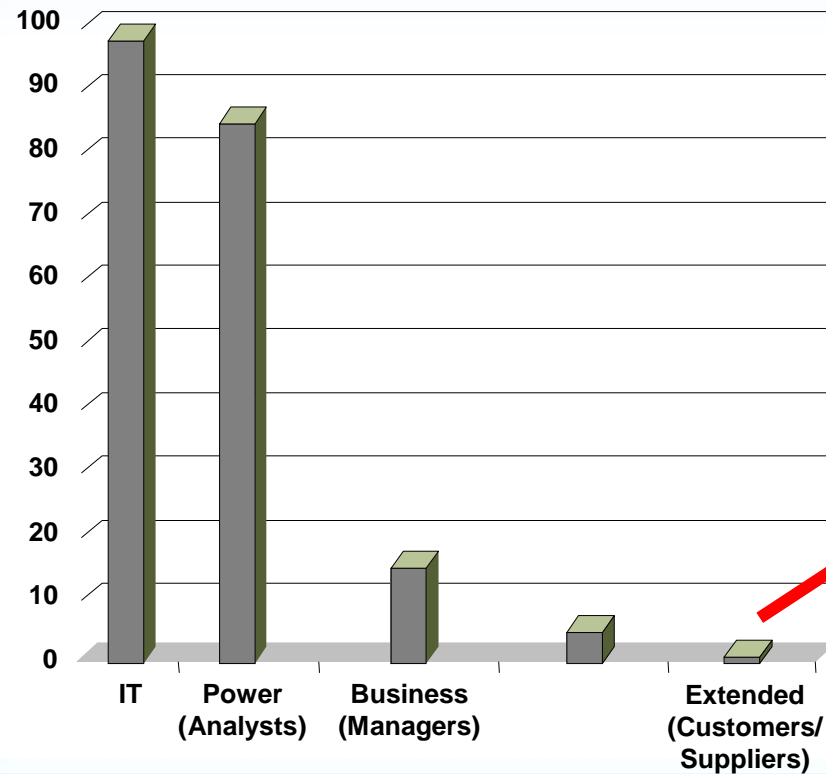
*Delivering Information When it has the Most Impact*

Traditional Warehousing		Operational Business Intelligence
Caring for high value customers		<b>Identifying seats for rerouted passengers due to flight delays before the flight arrives</b> <i>----- Transforms Travel and Transportation</i>
Crime statistics and reporting		<b>Identifying related incidents and potential suspects prior to arriving at the crime scene</b> <i>----- Transforms law enforcement</i>
Customer Analysis		<b>Understanding relevant customer info to identify cross sell and up sell opportunities &amp; improve value of sale at the point of sale</b> <i>----- Transforms sales effectiveness</i>
Insurance fraud analysis & reporting		<b>Identifying potentially fraudulent claims prior to approval and payment rather than after the fact</b> <i>----- Transforms insurance fraud</i>

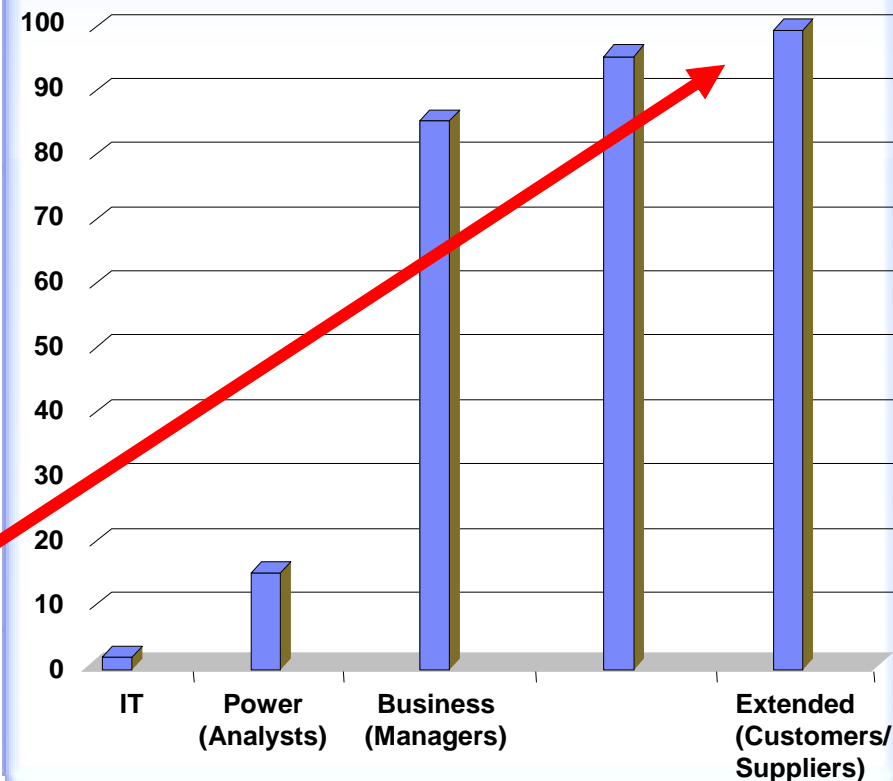


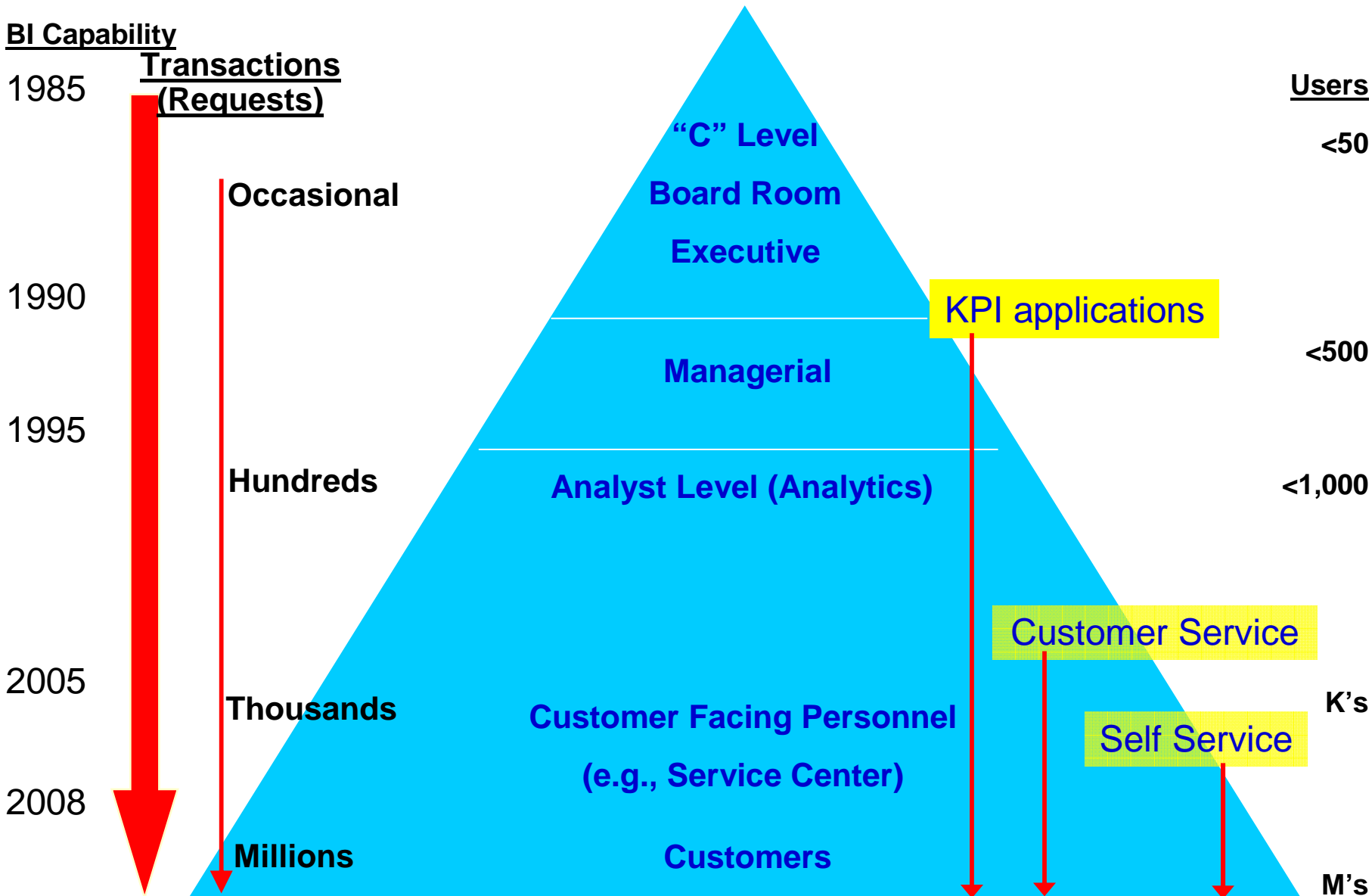
# Getting the Information to Where it Provides the Most Value

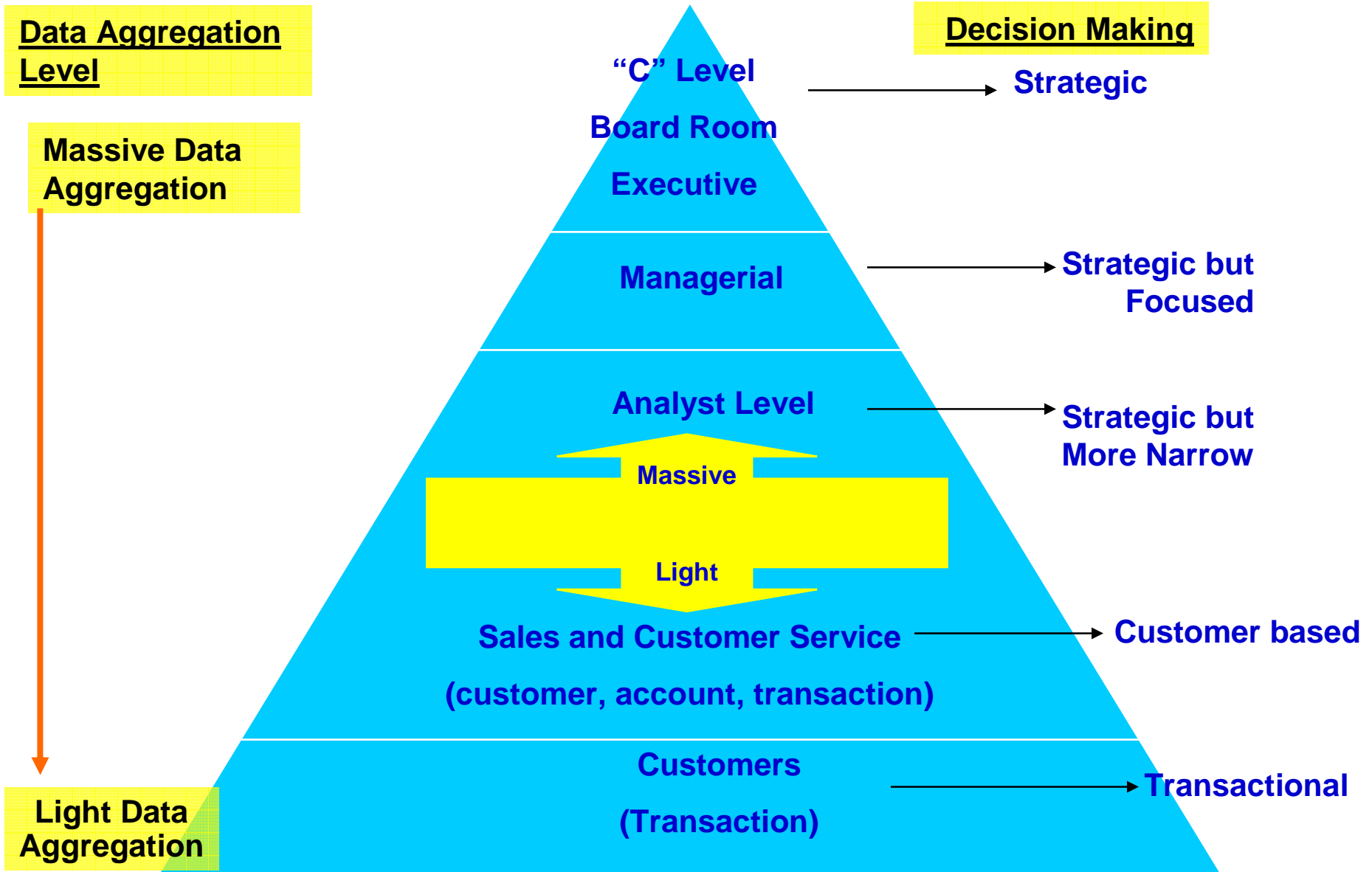
**Who is using business intelligence tools today?**



**Who can get most value out of business insights?**







## The Three Levels of Business Intelligence

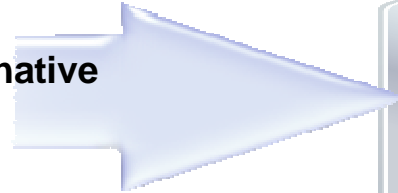
(regarding to Claudia Imhoff)

**System z  
Sweet Spot**

	Strategic BI	Tactical BI	Operational BI
Business focus	Achieve long-term business goals	Manage tactical initiatives to achieve strategic goals	Manage and optimize daily business operations
Primary users	Executives & business analysts	Executives, analysts & LOB managers	Analysts, LOB managers and users, and operational processes
Time-frame	Months to years	Days to weeks to months	Intra-day
Data	Historical data	Historical data	Real-time, low-latency & historical data

# Why System z for Data Warehousing?

The operational data is native to the System z



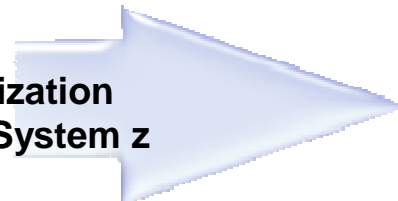
- *Using the data locally lowers data latency, movement, and transformation enabling decisions to be driven with the most-current information.*

New BI trends map well to the strengths of DB2 for z/OS and System z



- *Core System z strengths map well to new Dynamic Warehouse and Operational BI initiatives that are driving the need for: mixed workload support, lower latency, increased reliability, availability, security, and compliance in a Warehouse DBMS.*

Consolidation and virtualization trends benefit from core System z strengths



- *Virtualization strengths of System z enable the consolidation of diverse application servers, to a single server, allowing for centralization and standardization of DW and BI environments.*

IBM specialty processors and the new z10 offer new ways to manage costs



- *zIIPs and IFLs are driving down hardware and software costs; DW/BI can make excellent use of these processors, ultimately driving cost advantages. Z10 processors are delivering excellent speeds and feeds, at lower cost.*

# Common Data Center Challenges

*Increasing complexity*



*Energy and cooling problems*



*Rising costs*



**The problems are not just in IT**

# The Need for Information On Demand

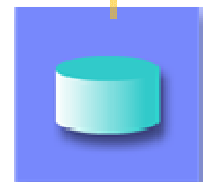
*Business needs demand a strategic, centralized approach*

## People and Processes

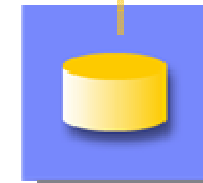
Applications Applications Applications Applications Applications



*Trusted Information  
Centralized  
In Context  
Flexible Architecture*



Transactions



Documents

**60%+ of CEOs:**  
*Need to do a better job leveraging information*

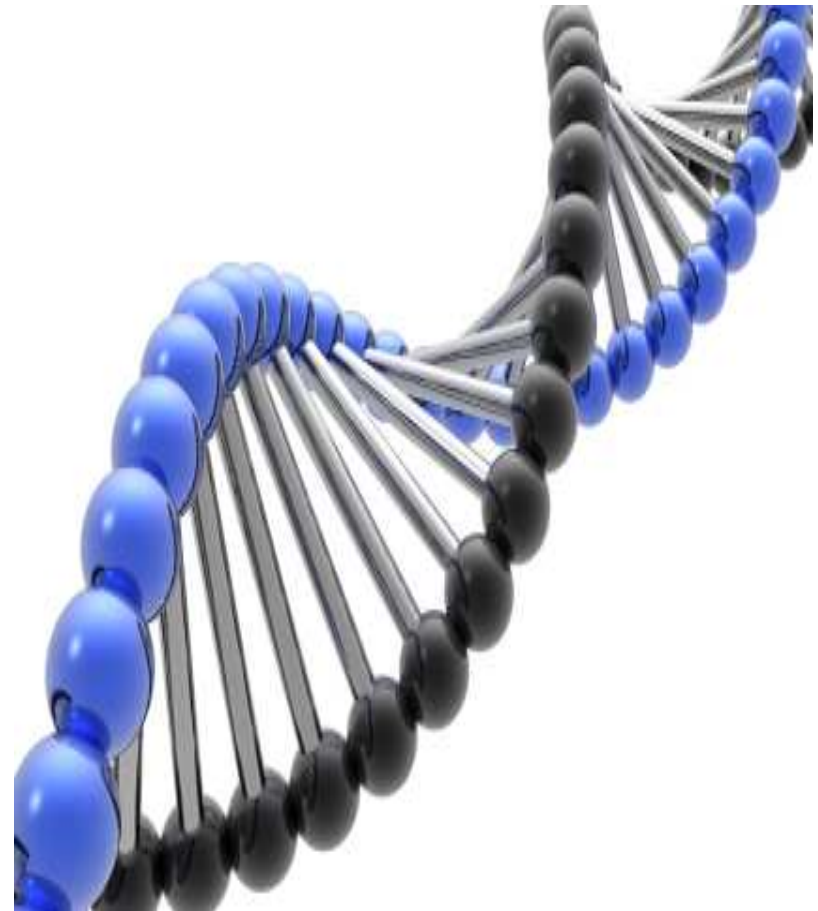
One source to access,  
One source to maintain  
One source to secure  
for information

**70% of employee time:**  
*Spent searching for relevant information*

## Server Architecture Genetics

*Consider the Heritage of the Server Platform that you use to simplify your IT*

- **x86 systems**
  - Key value proposition: end-user autonomy
  - “Ctl-Alt-Del” not a problem for a single-user system
- **UNIX systems**
  - Key value proposition: processor speed
  - Sweet spot: engineering/scientific computing
- **Mainframe systems**
  - Key value proposition: mixed workloads and high I/O workloads
  - Delivering high degrees of efficiency, availability, workload management, security



Virtualization technology can be significantly constrained or compromised by the underlying system architecture.



---

## *The Modern Server - the Mainframe*

- **Designed for high availability and responsiveness**
- **Maximum throughput per unit cost**
- **Tight centralized control for**
  - Security
  - Stability / Change Management
  - Backup / Recovery
  - Auditability
  - Resource / Cost Management and Accounting
- **Simplified and low cost operations and administration**



*... with the same functions, capabilities, skill requirements  
and end-user experience as on other platforms*

## Data Warehousing & Business Intelligence Trends

- Enterprises are becoming Information on Demand businesses
  - *Information as a strategic asset*
- Collocating data with operational systems on System z
  - *Minimizes data duplication & movement*
  - *Improves control and availability for critical business information*
- Operational Business Intelligence
  - *Requires rapidly turning raw data into business information*
- Information as a service (SOA) initiatives
  - *Requires “utility class” reliability and availability*
- BI platform standardization
  - *Reduce loose collection of individual BI tools*
  - *BI platform accessed via a browser-based thin client*



## Data Warehousing on System z

- *A large portion of today's operational data resides on the mainframe*
  - *DB2 zOS, The world's largest known TP database*
  - *IMS - A transactional workhorse for very large workloads.*
  - *VSAM -Data behind some of the largest banking applications in the world!*
  
- *BI is moving to the strengths of the z platform*
  - *Secure, scalable, highly reliable (99.999 available)*
  - *Operations become dependent on the data warehouse*
  
- *Powerful and Mature Workload Management for mixed workloads*
  - *Demands drive the need for high speed and low latency, blurring the lines between DW and OLTP database characteristics*

**z/OS**      **availability**  
**integrity**

*“The mixed workload performance will become the single most important performance issue in data warehousing “*

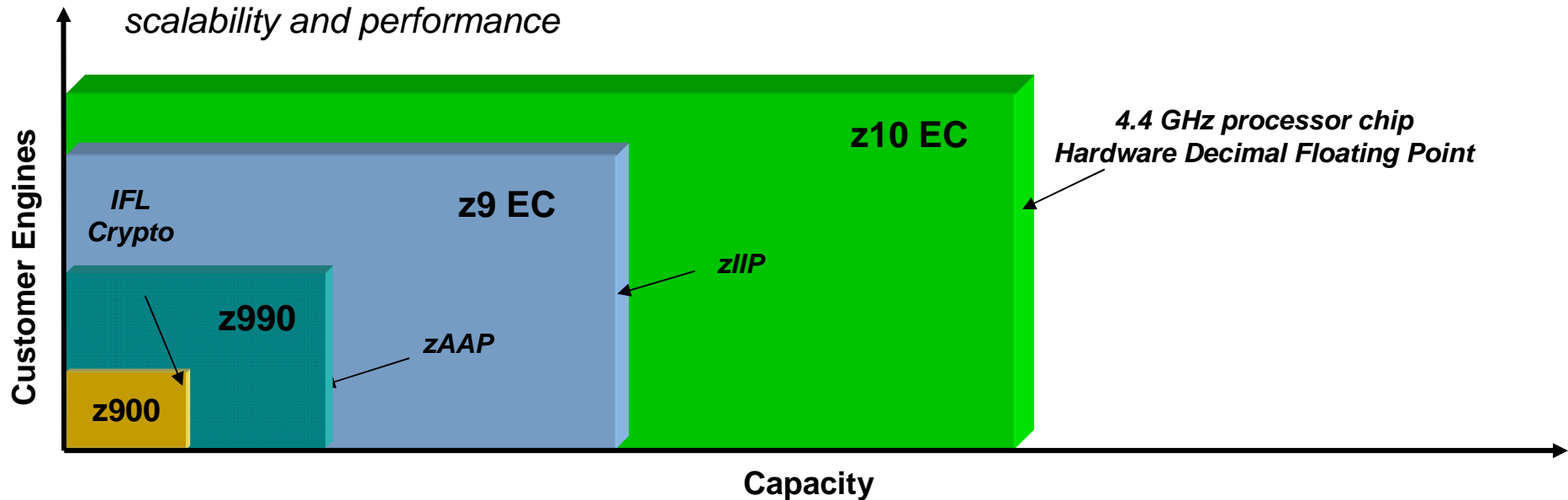
*Source:  
Gartner Data Warehouse magic  
Quadrant, December 2008*

*–The **transactional DBMSs** have an edge that challenges the data warehousing DBMSs*

*–Source: Garner Data Warehouse magic Quadrant, 2006*

## Improved server performance and scalability with faster and more processors and improved dispatching synergy

- The z10 EC delivers on average 50% more performance in a n-way configuration
  - The uniprocessor is expected to deliver 62% more performance than z9™ EC uniprocessor \*
- The z10 EC 64-way offers 70% more server capacity than the largest z9 EC\*\*
- Introducing HiperDispatch for improved synergy with z/OS® operating system to deliver scalability and performance



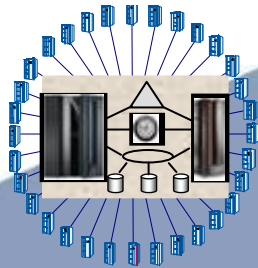
### **Significant capacity for traditional growth and consolidation**

\* LSPR mixed workload average running z/OS 1.8 - z10 EC 701 versus z9 EC 701

\*\* This is a comparison of the z10 EC 64-way and the z9 EC S54 and is based on LSPR mixed workload average running z/OS 1.8

# Driving Value Up and Cost Down

## *Evolution of Specialty Engines*



**Internal Coupling Facility (ICF) 1997**

- Centralized data sharing across mainframes



**Integrated Facility for Linux (IFL) 2001**

- Support for new workloads and open standards



**System z9 Application Assist Processor (zAAP) 2004**

- Designed to help improve resource optimization for z/OS Java technology-based workloads



**IBM System z9 Integrated Information Processor (zIIP) 2006**

- Designed to help improve resource optimization for eligible data workloads within the enterprise

## The Cost of Ownership

*Recognizing the 'Hidden' Operational Costs of Computing*

- Management and administration
  - *'However, the costs of supporting and managing these complex environments and infrastructures have soared, and now far outweigh the customer's expenditure on new systems themselves'*  
© Software Strategies 2005 11
- Security breaches
  - More Than 90% Of Companies Expose Sensitive Data  
Reconnex Insider Threat Index August 2005
  - Businesses Reluctant To Report Cyber Attacks  
2005 CSI/FBI Computer Crime and Security Survey
  - One In Four Identity-Theft Victims Never Fully Recover  
Nationwide Mutual Insurance Co. Survey July 2005
- Downtime
  - *Cost of downtime can vary by industry and can range from hundreds of thousands to millions of dollars per hour*  
©Robert Francis Group. All Rights Reserved 2005



***IBM Mainframe solutions are a cost effective alternative to large server farms of commodity servers, providing high availability, security and lower TCO***

## The Other Hidden Costs – “Going Green”

***Three issues that are becoming major items in the IT budget:***

- 1. Floor space**
- 2. Power Consumption**
- 3. Cooling Requirements**

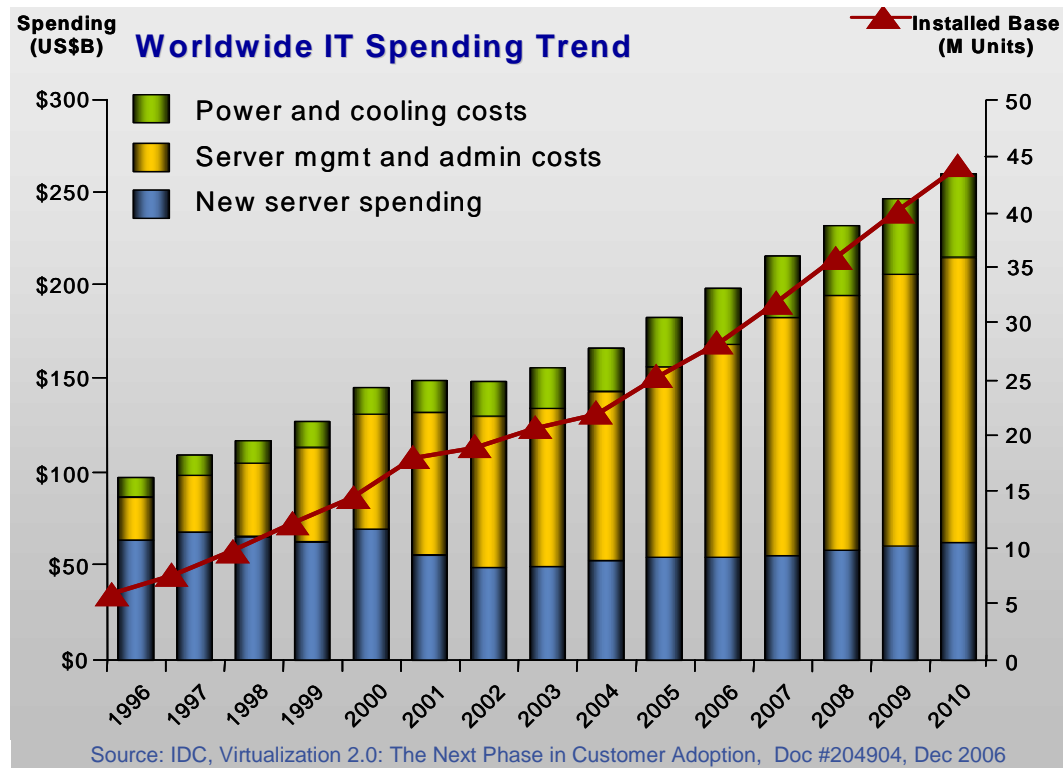


*"In a market where green computing, consolidation and virtualization are at the forefront of every CIO's agenda, the IBM System z mainframe represents a solid alternative to distributed platforms,"*

*Justin Steinman, Vice President of Solutions and Product Marketing, Novell.*

## Cost effective alternative to masses of commodity servers

- *Management/Administration costs are already exceeding new server spending*
- *Power and energy costs growing dramatically*



### 2000 –

Raw processing “horsepower” is the primary goal, while the infrastructure to support it is assumed ready



### 2006 –

*Raw processing “horsepower” is a given, but the infrastructure to support deployment is a limiting factor*



## Power and Cooling vs The Competition

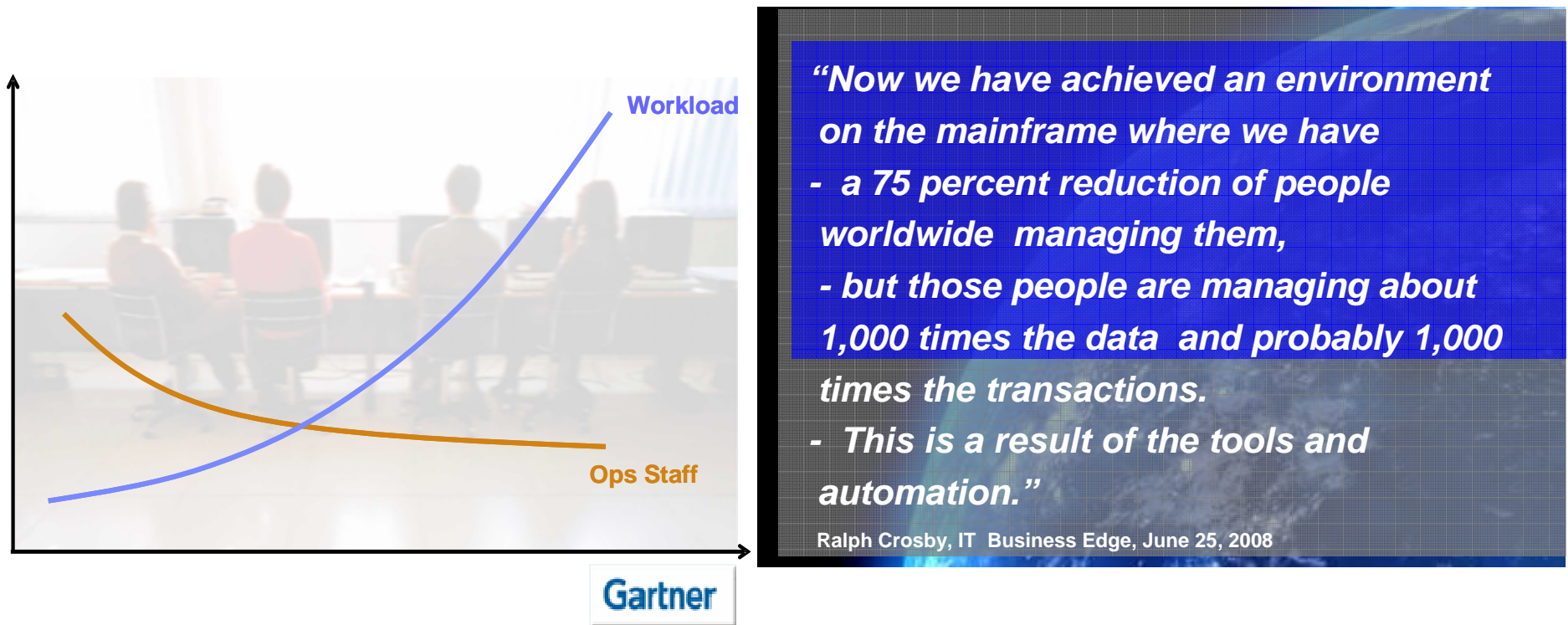
*z10 mainframes can outperform HP Superdomes on power consumption by a factor of 2.5x or greater. The key is the capacity of the machine to run work in the industry's leading virtual and automated enterprise systems environment, not just comparing a single frame z10 to a single frame HP Superdome.*

	One System z10 EC 	Four 64 Way HP Superdomes 
<u>ENERGY COSTING</u>		
Server Steady State Watts	<b>18,425</b>	<b>86,744</b>
Watts Required to Cool the Servers	<b>11,055</b>	<b>52,046</b>
TOTAL WATTS POWER & COOLING	29,480	138,790
TOTAL COST FOR POWER & COOLING	<b>\$25,824</b>	<b>\$121,580</b>

*An IBM System z10 EC has the equivalent capacity of nearly 1,500 x86 servers with an 85% smaller footprint and up to 85% lower energy costs.*

## Boost your departments productivity:

by managing excess growth and complexity with System z10 BC  
*Use System z10 BC to increase your enterprise's productivity*



***Mainframe data center staffing levels have not significantly changed despite large increases in workload volumes.***

# IBM System z- designed for the 21<sup>st</sup> century

- Trusted Platform for SOA

- *IMS 10 XQuery and Web services enhancements ease data service delivery*
- *DB2 9 pureXML for seamless and efficient integration of XML & relational data*



IMS Is How You Run 100 Million Transactions a Day

- Industry's Highest Level of Availability & Scalability

- *Unmatched availability for "utility class" information access*
- *Rapid and non-disruptive scalability for variable mission critical Requirements*



100% availability of information for 10 consecutive years

- Unmatched Risk and Compliance Management

- *New security capabilities for greater control and business flexibility*
- *Improved auditing and accountability*



"DB2 9 for z/OS simplifies our security process..."

- Lowest Operating Cost

- *Reduced operating costs through z/OS and zIIP engine exploitation*
- *Superior environmental efficiency - power, cooling, and space*



First National Bank Omaha

"\$2M yearly savings moving to System z. It's revolutionary. It paid for itself in a year"

## *Top 10 Reasons for DW on System z*

10. DB2 for z/OS
9. Consolidation through Virtual Partitioning
8. Administration Costs
7. Disaster Recovery
6. Environmentals - power, cooling , foot print
5. Where the data resides - Hipersockets
4. Mixed Workload
3. Security
2. Availability
1. Total Cost of Ownership



## System z – Scalable and secure data serving



- Centralized data serving for the enterprise
- A common view of data updated in real time
- The Scalability and flexibility to be responsive
- Underpinned by availability and security
- Enablement of zIIP specialty engine helps reduce cost
- DB2 for z/OS over 100 enhancements in V8 / V9

### SMART IS: Data on a grand Scale



### IBM – The 50TB Study:

- Load and compress four million rows per second
- Scan up to 300 billion rows in an hour
- Prioritize critical queries above longer queries in workload
- Compress data and indexes by up to 60%-

# Adding the IBM InfoSphere™ Advantage

*Delivering Trusted Information for Business Optimization*

- Easily deployable, integrated platform
- Value acceleration
- Simplified scalability at lower cost
- Industry-specific acceleration
- Broadest and deepest integration
- Protection for your investment

## **Business Optimization**

Business Intelligence  
& Performance Management

**InfoSphere™**  
software

Information Integration,  
Warehousing, & Management

*Flexible Architecture*

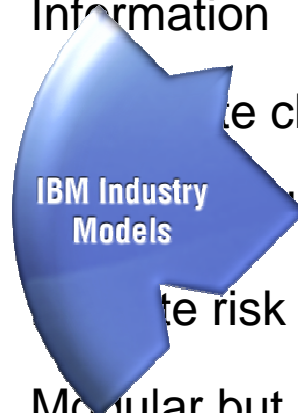
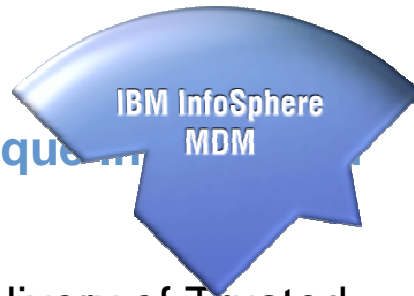
Data Management    Content Management

## The IBM InfoSphere Vision on System z

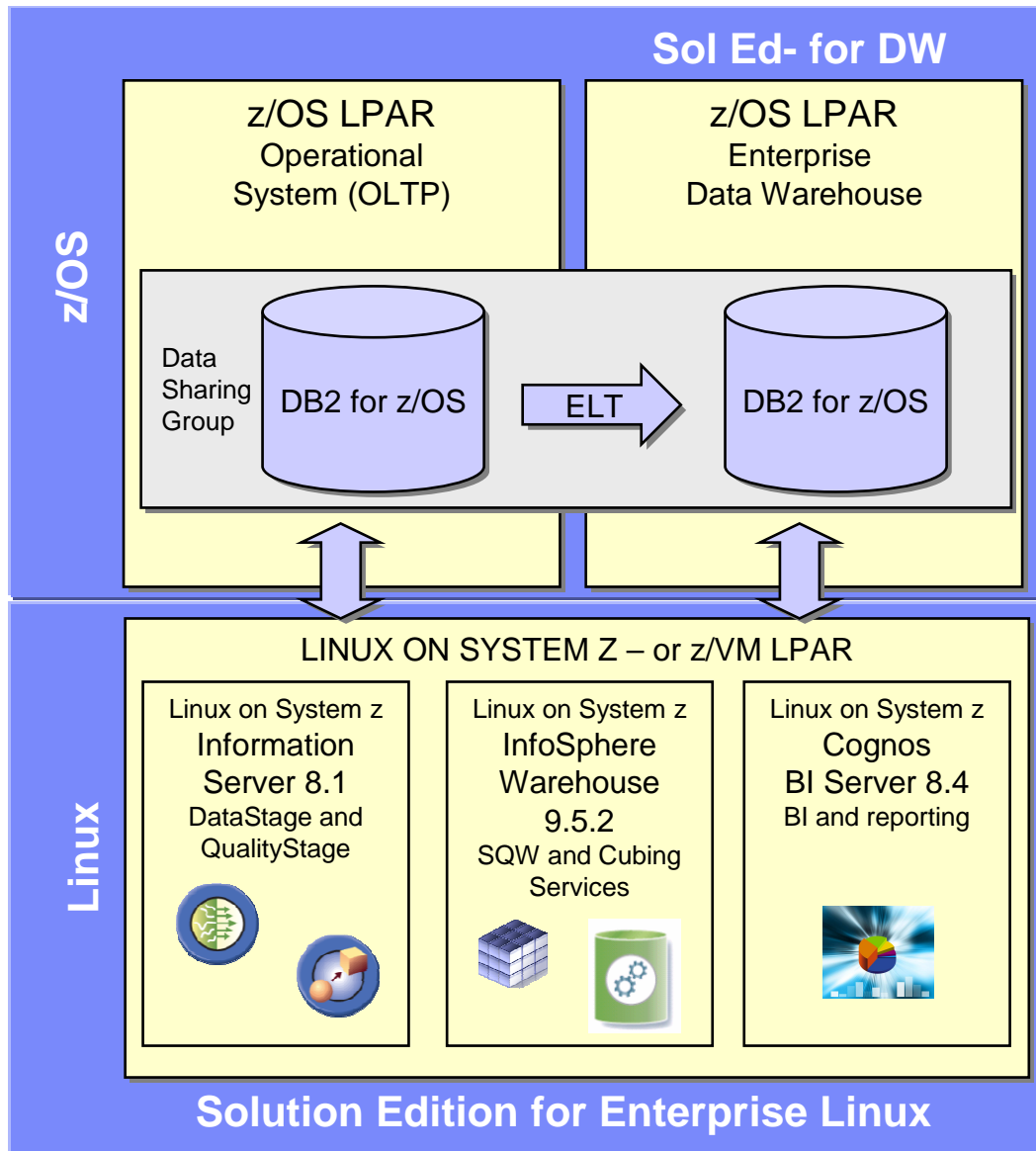
### An Industry Unique Platform

- Simplify the delivery of Trusted Information
- Maximize client value
- IBM Industry Models Collaboration
- Minimize risk
- Modular but Integrated
- Scalable – Project to Project

**InfoSphere**



# Ultimate Consolidation Opportunity

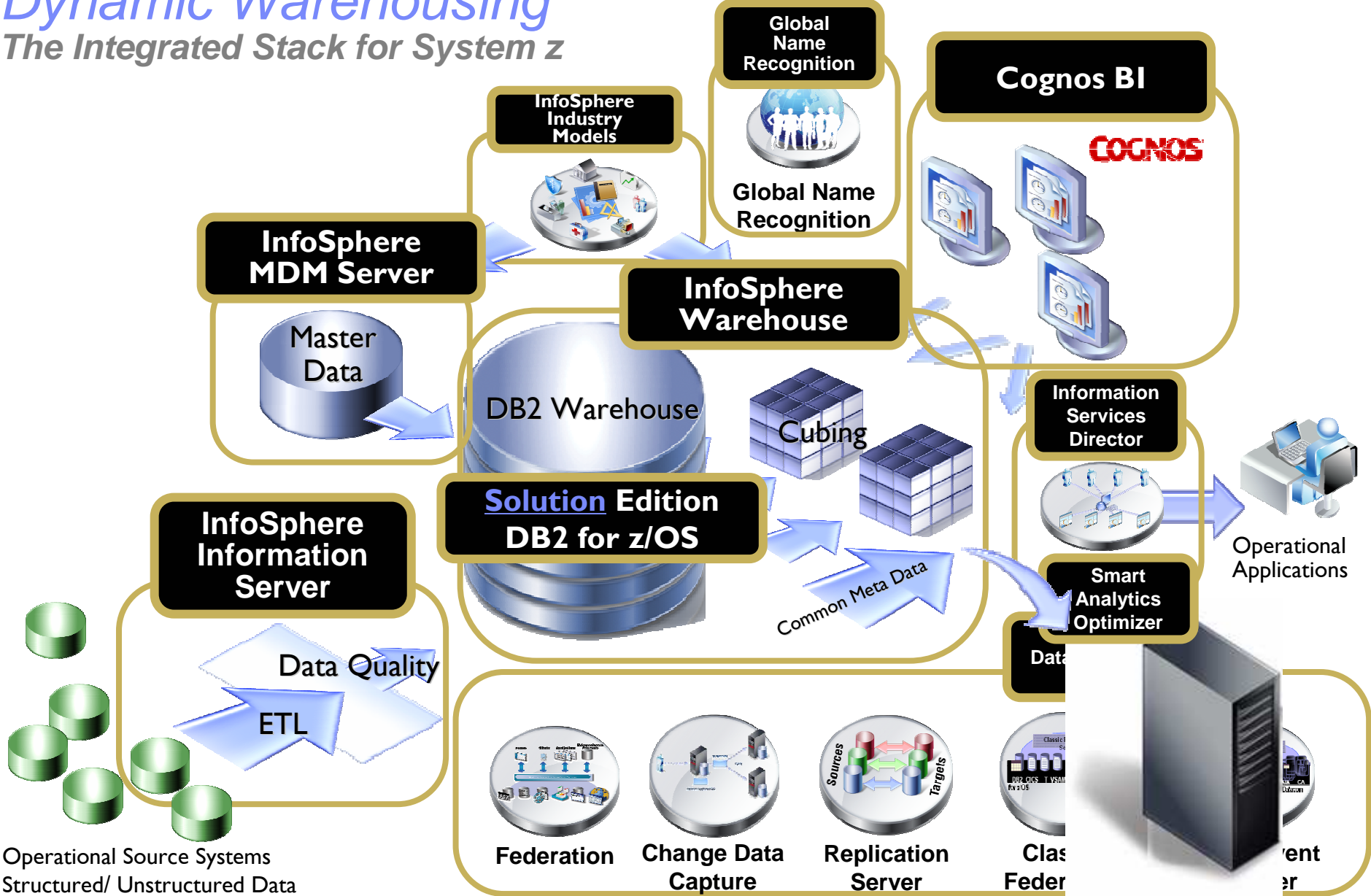


- Consolidation of mission-critical data on System z
- Leveraging existing environment:
  - ,high availability,
  - security
  - Backup/recovery
  - governance procedures
  - as well as skills
- Efficient data movement within a data sharing group (no network)
- Performance and TCO improvements through cubing services (data marts) and DB2 enhancements
- Complex transformations and data quality are driven on Linux on System z with Information Server



# Dynamic Warehousing

The Integrated Stack for System z



## Data Warehousing capabilities that Exist Today for System z

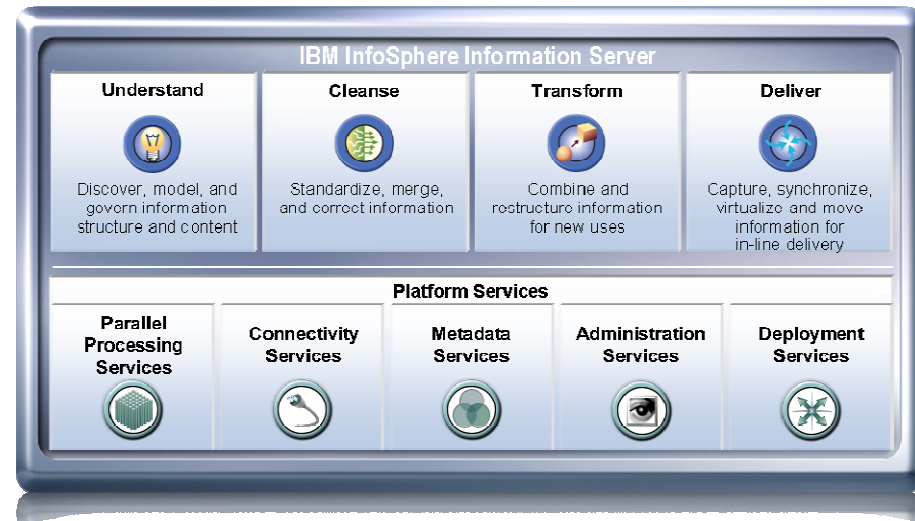
- **Database Management**
  - DB2 z/OS V8 & V9 EDW Base
    - Functional and performance enhancements
    - DB2 family compatibility – including MQTs
    - Concurrent query-utility execution – eliminates many planned outages
- **Performance Optimization**
  - Data Partitioning: Range Partitioning, Data Sharing
  - Workload Control: WLM, IBM Director
  - Deep Compression: Hardware/Software compression, Data Compression, Index Compression (V9)

### ***Supporting Products:***

- **Data Movement and Transformation**
  - Information Server (zLinux)
  - QualityStage, DataStage (zOS) DataStage (MVS)
  - WS II Classic Federation, WS Classic Event Publishers, Distributed DBMS Event Publishers, BatchPipes for OS/390, DB2 Unload/Load Utilities
- **Analyze/Report**
  - Cognos 8 BI, QMF, DataQuant, SAFR (formally Geneva ERS)
  - Partner offerings from Hyperion, Business Objects, MicroStrategy, SAS, IBI
- **Modeling and Design**
  - Rational Data Architect
  - Industry Data Models
  - Master Data Management Server
- **Administration and Control**
  - IBM Tivoli Omegamon XE for DB2 Performance Expert on z/OS, DB2 Query Monitor, Optimization Service Center (V9)

# InfoSphere Information Server for Linux on System z

- Complete Information Server on System z
- Native Parallel Processing
- Native Data Access
- Easy SOA Enablement
- Low cost IFL Engine



System z<sup>®</sup>  
The value of the mainframe



*Fast access to large volumes of data across the mainframe*

---

## *IBM Information Server for Linux for System z*

### *Benefits of this hybrid architecture*

#### Significant cost savings

- z/OS MIPs consumption dramatically reduced vs. USS or MVS approaches
- Minimizes impact on other z/OS software costs
- All Job Processing is on zLinux (except the z/OS data access)
- MIPs charged at IFL rate ... NOT z/OS rate
- DB2 workload on z/OS can qualify for offload to ZIIP specialty engines

#### **High performance z data connectivity**

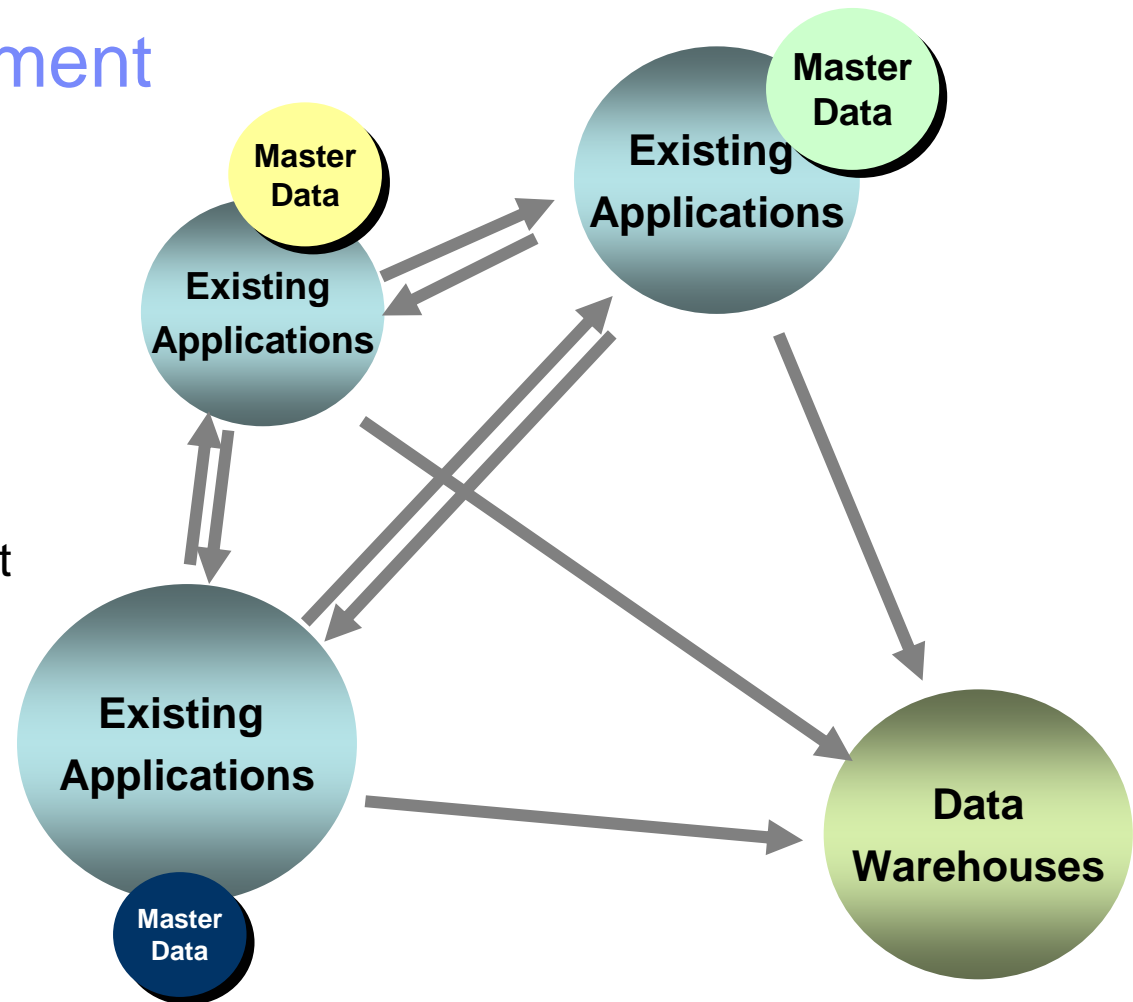
- Batch Pipes for DB2 load, DRDA to DB2 over hipersockets
- SQL to Classic over hipersockets
- Integration with MQ and therefore with the Data Event Publishers

#### **Seamless integration with other IBM Information Server platforms**

- Same operational architecture and metadata Repository
- Eliminates deployment issues
- Maintains value of DataStage for z/OS investments

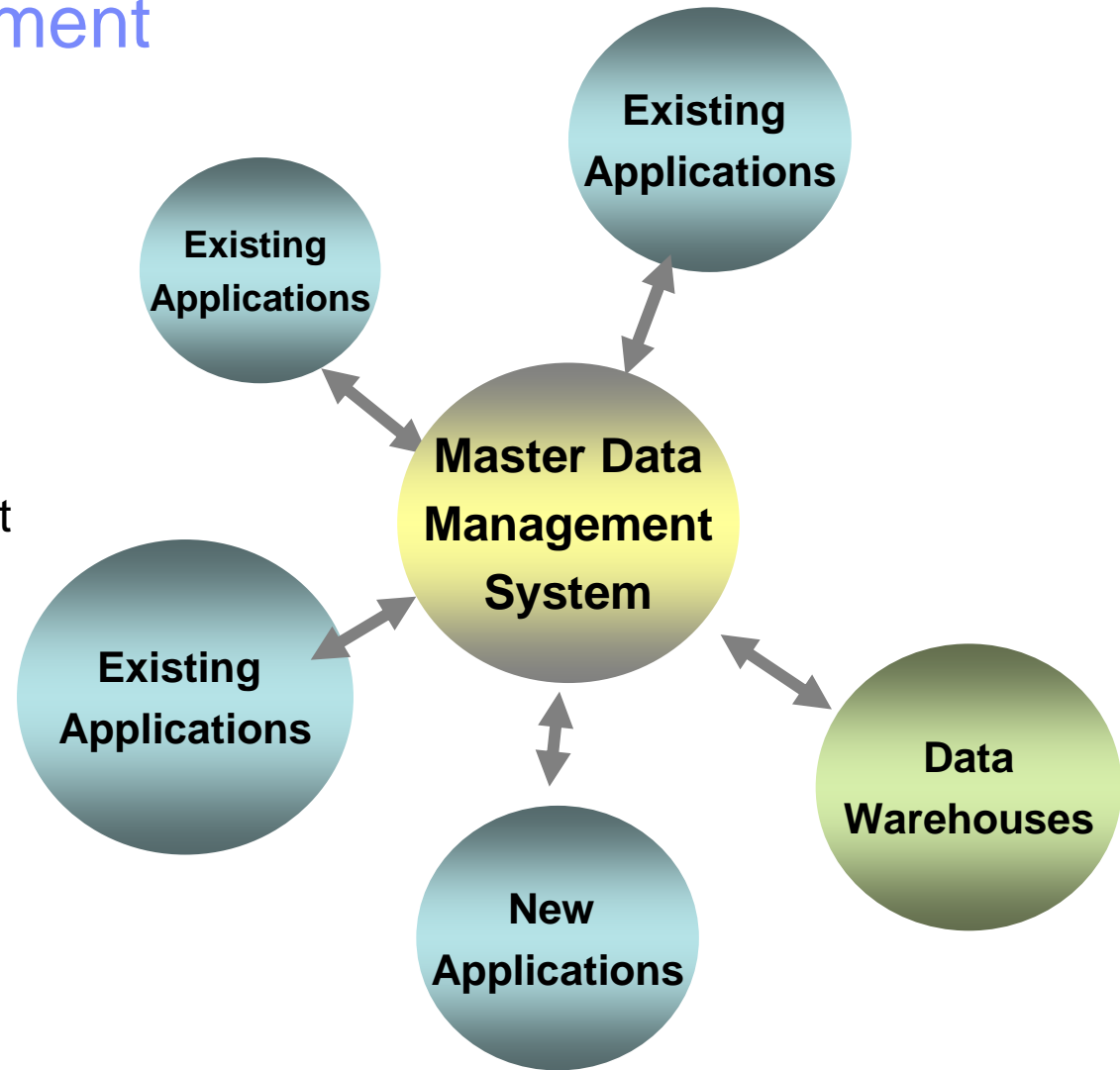
## Benefits of Master Data Management

- Decouples master information from individual applications
- Becomes a central, application independent resource
- Simplifies ongoing integration tasks and new app development
- Ensure consistent master information across transactional and analytical systems

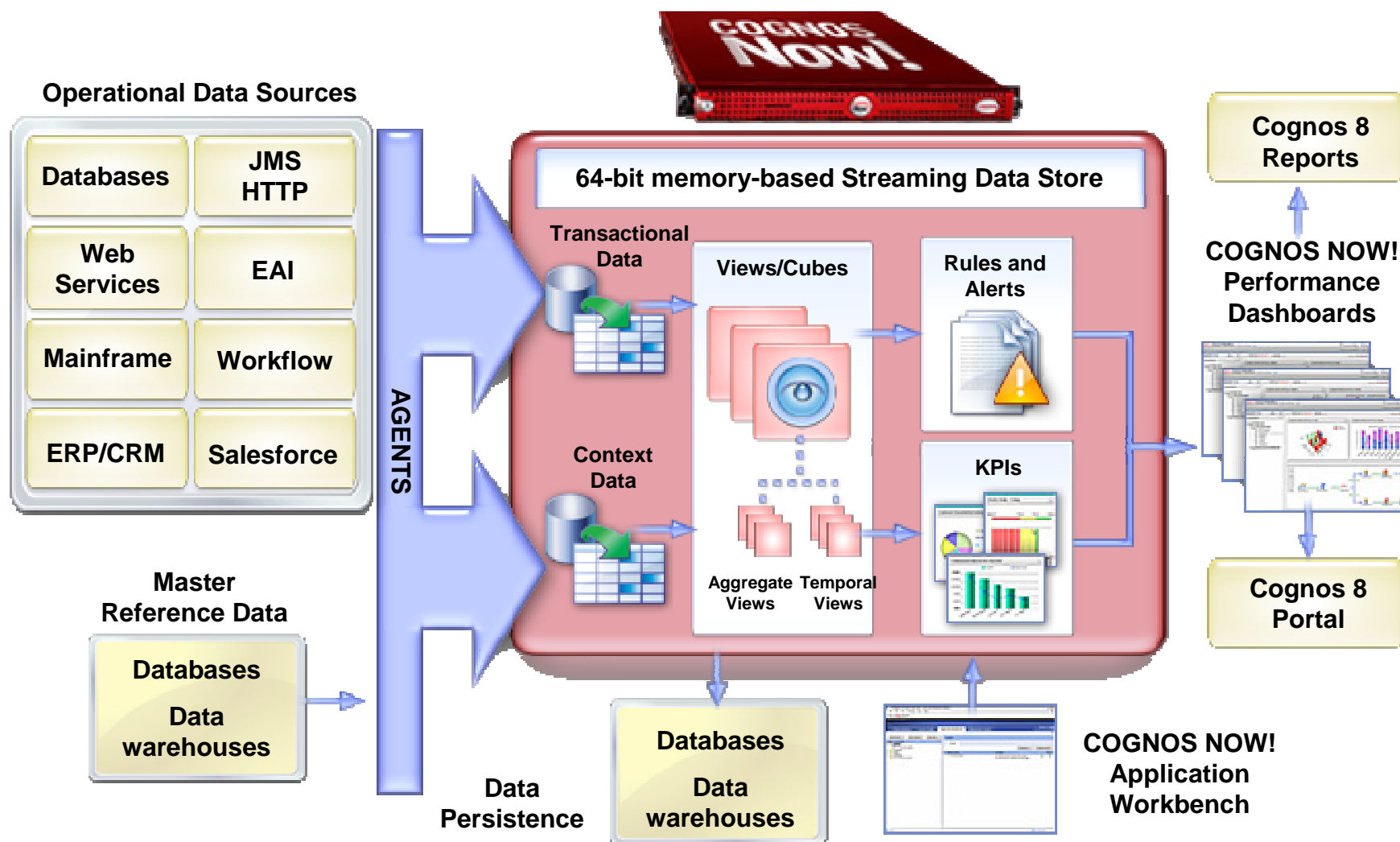


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# Operational Business Intelligence with Cognos Now!



## Customer Outlook for Mainframe Industry

### Annual Worldwide Mainframe Industry Survey

1,000+ large mainframe customers

#### Highlights of the survey include:

- Respondents consider mainframes as critical to service oriented architecture and web services initiatives as a data hub and transaction server
- 74% of respondents do not believe they can successfully move mission critical workloads to a distributed platform at any cost
- So....
  - How critical is your data warehouse?
  - How critical is your companies future?



## *Field Management System (FMS) Success Story – IBM is using Cognos 8 BI for Linux on System z, and here's why:*

### ▪ **Requirements:**

- Rapid deployment and migration needed
- Scalable architecture
- 270 concurrent users capability
- <60 second report response time
- 24x7 WW access requirement – No unplanned outage
- Data currently on DB2 LUW (AIX) environment – over 10TB in warehouse information
- LDAP authentication thru Bluepages

### **Results:**

- System LIVE after 4 months (Migration, Devt and Test)
- Cognos 8v4 with DB2 9 FP1, WAS 6.1.0.17 cluster implementation for failover
- Supports 40,000+ User community
- Handling Territory Analysis, Weekly Reporting, Monthly Achievement reports
- Fewer reports yet more information available to sales team – federating information from multiple data sources

***FMS: Used to track sales attainment and revenues***

## Smart Analytics in action at IBM

**The Smart Analytics Cloud enables IBM to deliver business intelligence with greater efficiency across the enterprise.**

- Establishes a corporate strategy for service delivery of BI.
- Reduces the time and cost to deliver BI to new divisions and departments.
- Maintains current departmental business processes, corporate security and compliance.
- Maximizes departmental budgets by subscribing to standard services.
- Private cloud solution implementation offers economies of scale and flexibility.

### **Compelling results:**

- Consolidating >20 multi-product, departmental BI deployments to Cognos 8 BI on System z.
- Deploying a private cloud to support >200,000 named users across our global workforce.
- Realizing value from >60 data sources across IBM.
- 1 petabyte of data

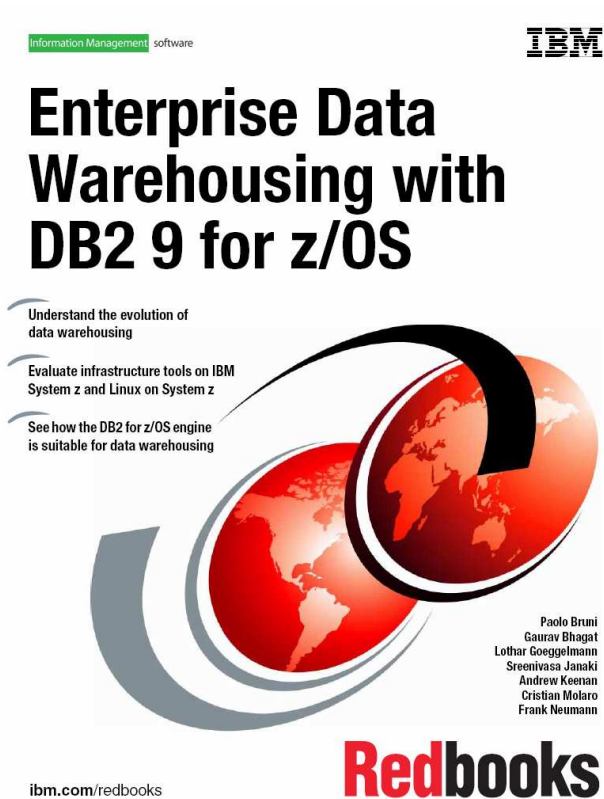
**SMART IS:** Delivering Business Intelligence with greater efficiency across the corporation



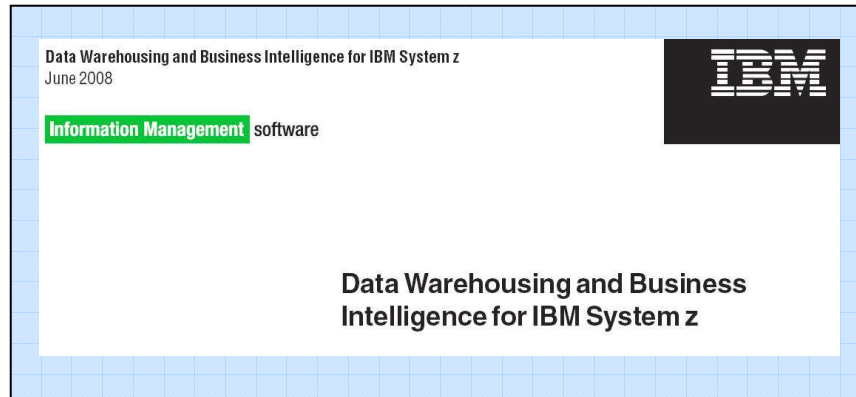
### **Customer Quote: CIO OFFICE:**

“Our commitment to informed decision making led us to consider private cloud delivery of Cognos via System z, which is the enabling foundation that makes possible >\$20M savings over 5 years.”

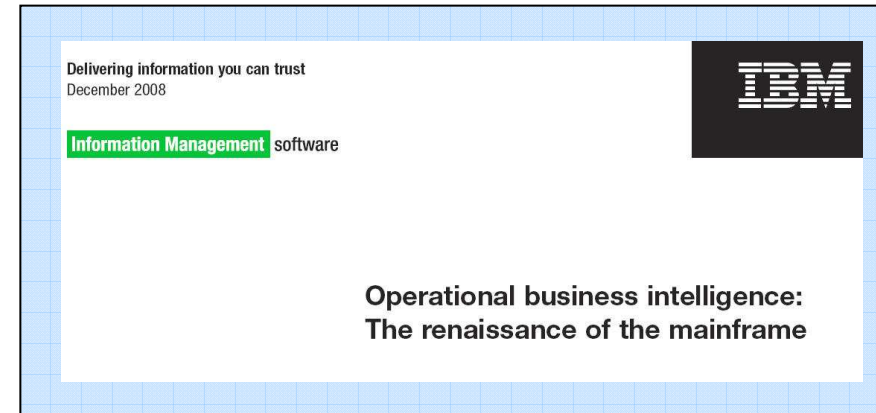
# What is available on System z & **How** to implement



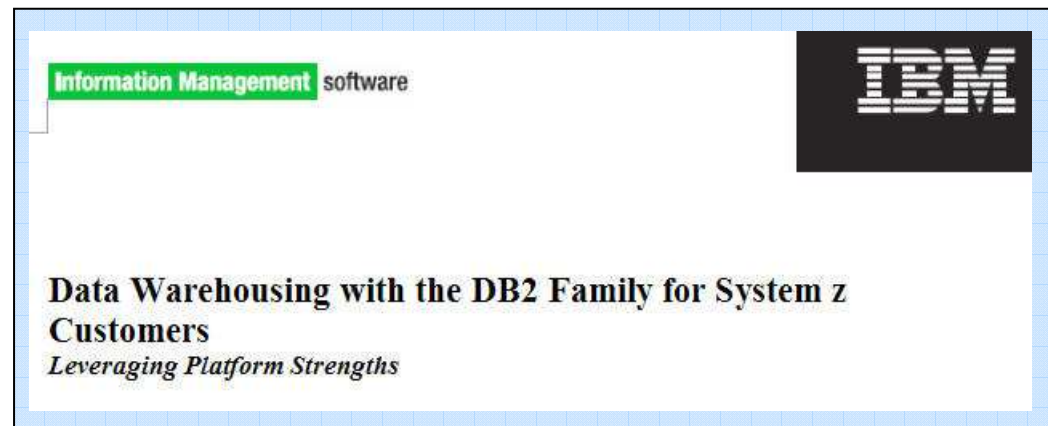
## Recent papers



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## Some key Redbooks



- Enterprise Data Warehousing with DB2 9 for z/OS
  - <http://www.redbooks.ibm.com/abstracts/sg247637.html>
- 50 TB Data Warehouse Benchmark on IBM System z
  - <http://www.redbooks.ibm.com/redbooks.nsf/RedpieceAbstracts/sg247674.html>
- DB2 for z/OS: Data Sharing in a Nutshell
  - <http://www.redbooks.ibm.com/abstracts/sg247322.html>
- System Programmer's Guide To: Workload Manager
  - <http://www.redbooks.ibm.com/abstracts/sg246472.html>
- Workload Management for DB2 Data Warehouse, REDP-3927
  - <http://www.redbooks.ibm.com/abstracts/redp3927.html>

## Other recent articles in the press



- **Enhanced Query Parallelism with zIIP processors**
  - February 2008
  - <http://www.ibmssystemsmag.com/mainframe/enewsletterexclusive/18822p1.aspx>
- **Operational BI and System z**
  - March 2008
  - <http://www.ibmssystemsmag.com/mainframe/enewsletterexclusive/19475p1.aspx>
- **Business Intelligence's New Look: IBM extends its BI portfolio with Cognos 8 BI for Linux on System z**
  - July / August 08
  - <http://www.ibmssystemsmag.com/mainframe/julyaugust08/features/20870p1.aspx>
- **Take the Reins - An Information On Demand Strategy helps deliver a competitive edge for today's businesses**
  - July / August 08
  - <http://www.ibmssystemsmag.com/mainframe/julyaugust08/coverstory/20860p1.aspx>



- **Three part series: Myths of Doing BI on the mainframe**
  - [http://www.dmreview.com/issues/2007\\_53/10002140-1.html](http://www.dmreview.com/issues/2007_53/10002140-1.html)
  - [http://www.dmreview.com/issues/2007\\_54/10002171-1.html](http://www.dmreview.com/issues/2007_54/10002171-1.html)
  - [http://www.information-management.com/issues/2007\\_55/10014861-1.html](http://www.information-management.com/issues/2007_55/10014861-1.html)
- **Data Warehousing With DB2 for z/OS ... Again!!!**
  - June/July 2008
  - <http://zjournal.com/index.cfm?section=article&aid=1013>



**Thank You**