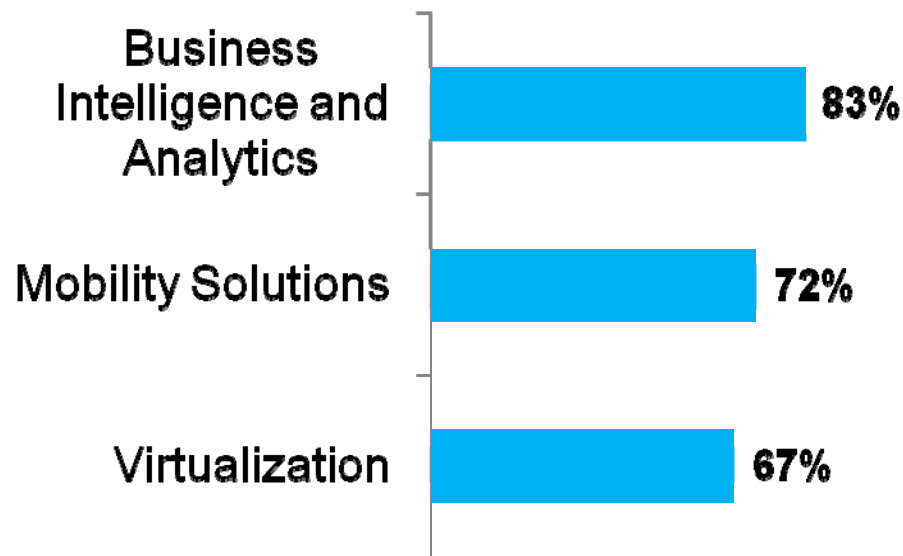# zEnterprise –
The Ideal Platform For Smarter Computing

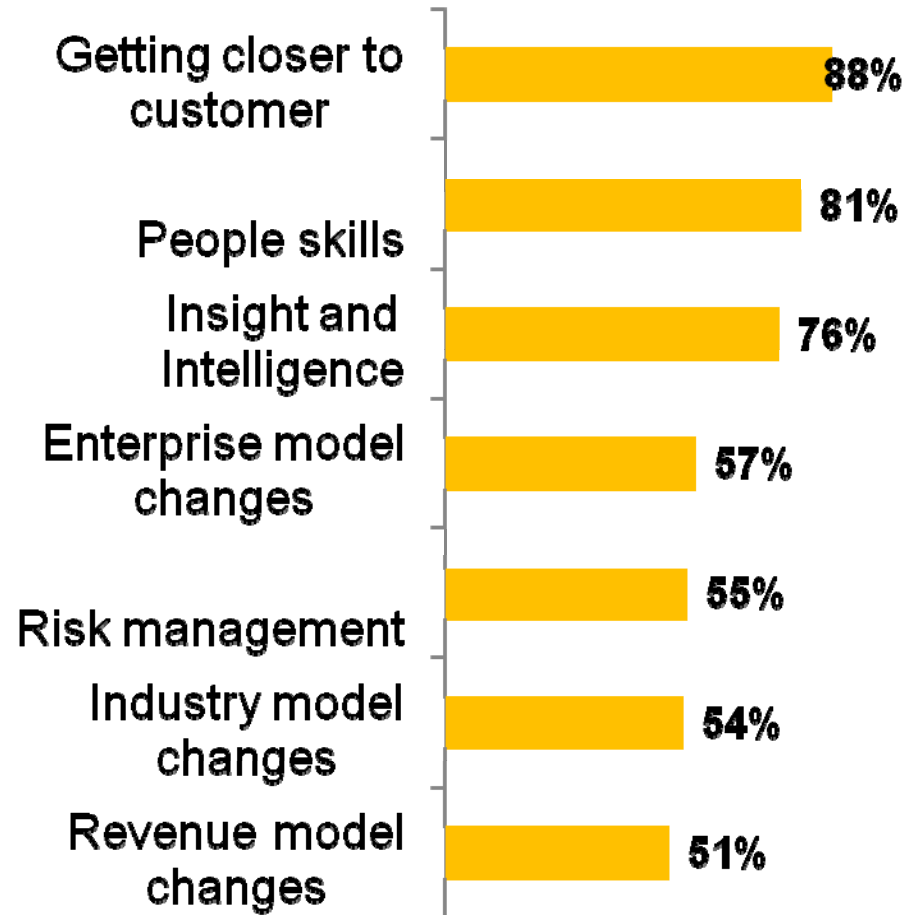## System z – Best Place For Business Analytics

Learning Objectives

- Explain the Benefits of Business Analytics

- Understand the key components of Business Intelligence powered by Cognos and SPSS

- Position Data Warehousing on zEnterprise against Competition

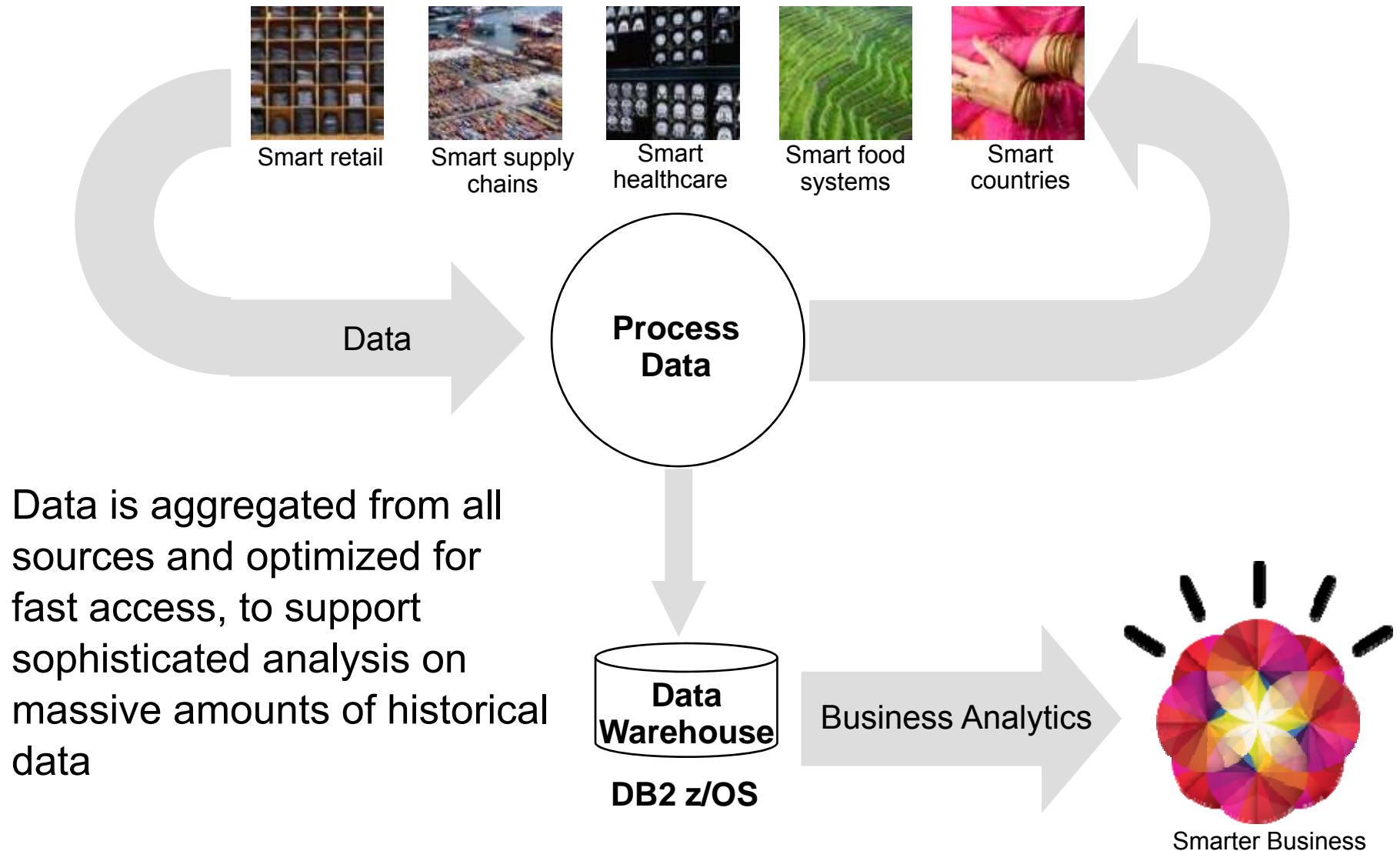# Business Analytics Is Hot And Getting Closer To The Customer Is Top Priority

Business Intelligence and Analytics — 83%

Mobility Solutions — 72%

Virtualization — 67%

Source: 2011 Global Midmarket CIO Study

Getting closer to customer — 88%

People skills — 81%

Insight and Intelligence — 76%

Enterprise model changes — 57%

Risk management — 55%

Industry model changes — 54%

Revenue model changes — 51%

Source: 2010 Global CEO Study

"Our customers want personalization of services and products. It is all about the market of one" – Tony Tyler, CEO, Cathay Pacific Airways

3

Business Analytics Are A Source Of New Business Intelligence In A Smarter Planet

Smart retail

Smart supply chains

Smart healthcare

Smart food systems

Smart countries

Data

Process Data

Data is aggregated from all sources and optimized for fast access, to support sophisticated analysis on massive amounts of historical data

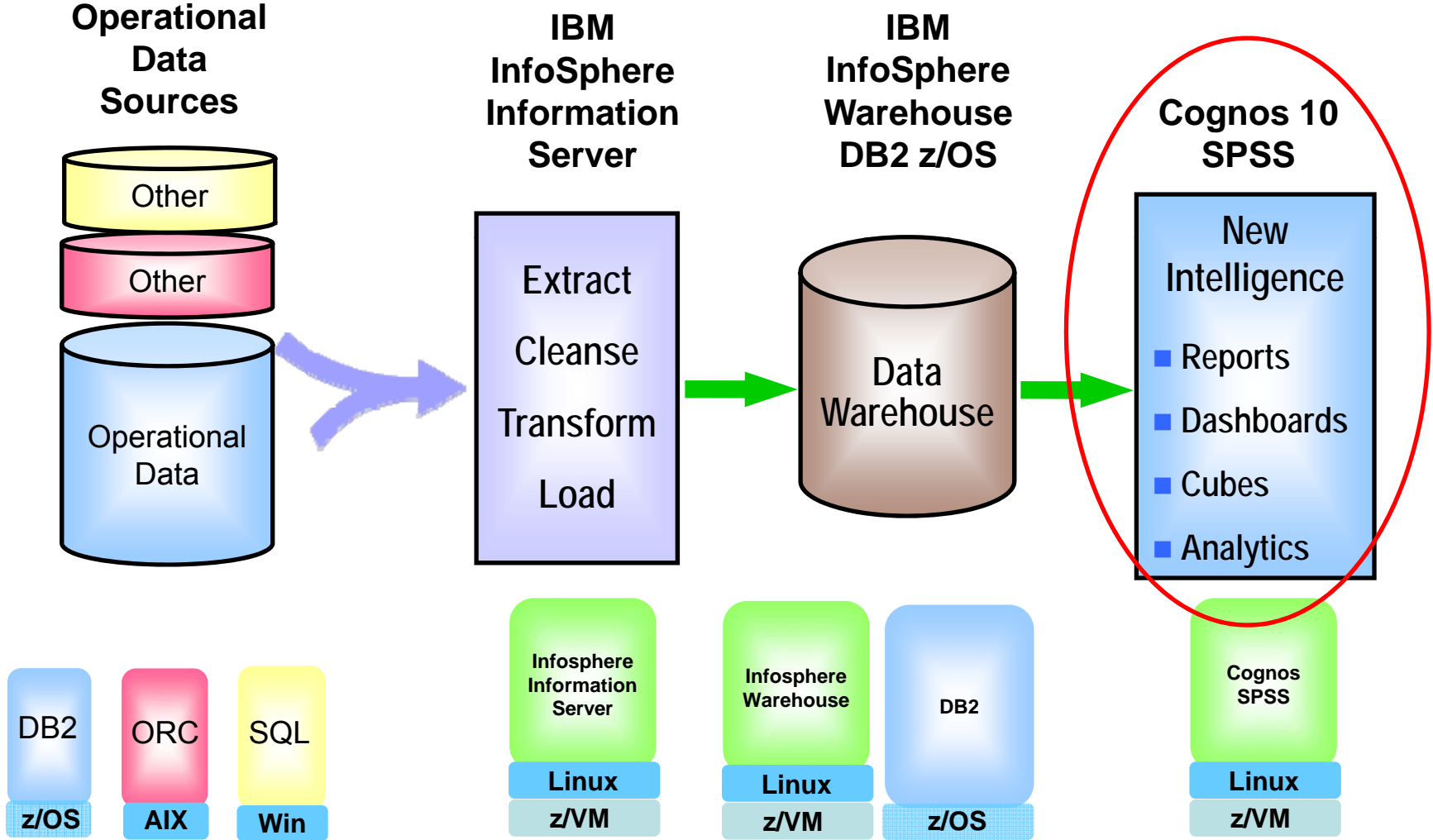**Data Warehouse**

DB2 z/OS

Business Analytics

Smarter Business

Implementing A Business Analytics Solution Involves 3 Primary Steps

- Load data from Operational data stores in frequent intervals into a large unified historical data repository known as a Data Warehouse
  - ▶ Apply Extract, Cleanse, Transform, Load processes
- Create Reports and Dashboards to answer a variety of what-if questions
  - ▶ Run simple, intermediate or complex queries that can take a few seconds, minutes, to several hours to run
- Use Predictive Analytics to gain insights and convert them to actions
  - ▶ Using data from past, score the likelihood of outcomes for future events

zEnterprise Now Provides All Of The Components You Need For A Complete Analytic Solution

Operational Data Sources

Other

Other

Operational Data

IBM InfoSphere Information Server

Extract

Cleanse

Transform

Load

IBM InfoSphere Warehouse DB2 z/OS

Data Warehouse

Cognos 10 SPSS

New Intelligence

- Reports
- Dashboards
- Cubes
- Analytics

DB2	ORC	SQL
z/OS	AIX	Win

Infosphere Information Server
Linux
z/VM

Infosphere Warehouse
Linux
z/VM

DB2
z/OS

Cognos SPSS
Linux
z/VM

Businesses Intelligence Answers Key Questions That Drive A Competitive Edge

How are we doing?	Why are we on/off track?	What should we do next?

**Dashboard
Operational or Strategic**

**Query and Reporting
Exploratory Analysis**

**Analytics
Statistics and Predictive Analytics**

Executive Business Manager Casual Business User Line Manager Business Analyst Financial Analyst

Businesses Benefit By Using An Analytic Approach Over Intuition

40% decline
in homicide rates

600% increase
in cross-sell
campaign

$13.8 Million
in cost savings

1000's of Reps
run their daily business using
IBM Business Analytics

80% decrease
in reporting time on top of
Oracle e-business suite

$200 Million
increase in cash flow

The more analytics a business uses, the better it performs

Create Reports And Dashboards Using IBM Cognos

- **People-centric**
  - ▶ Server based business analytics accessed via browser
  - ▶ Consistent user interface for different analytic activities
  - ▶ Reuse new intelligence assets
  - ▶ Built-in collaboration and social networking
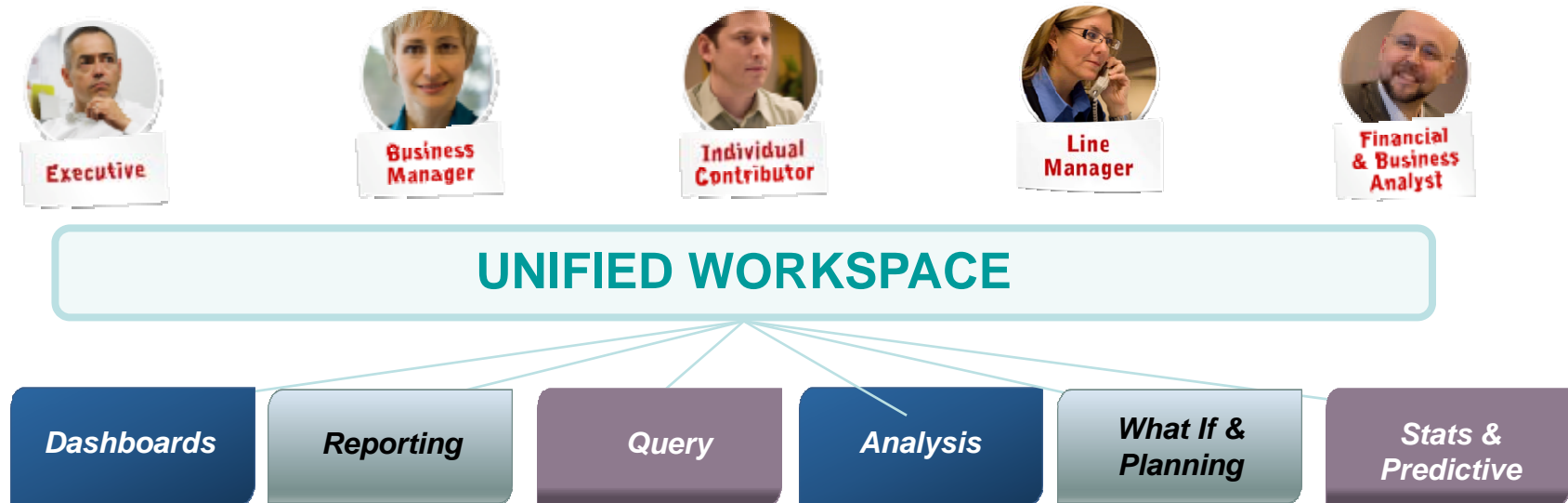 - ▶ Threaded discussions, activities, and notifications

- **Easy to deploy and manage**
  - ▶ Implemented in Java, runs on WebSphere
  - ▶ Scales up and out across heterogeneous hardware and operating systems
  - ▶ Runs on Linux on System z

User Browser

IBM Cognos server

Query | Report | OLAP
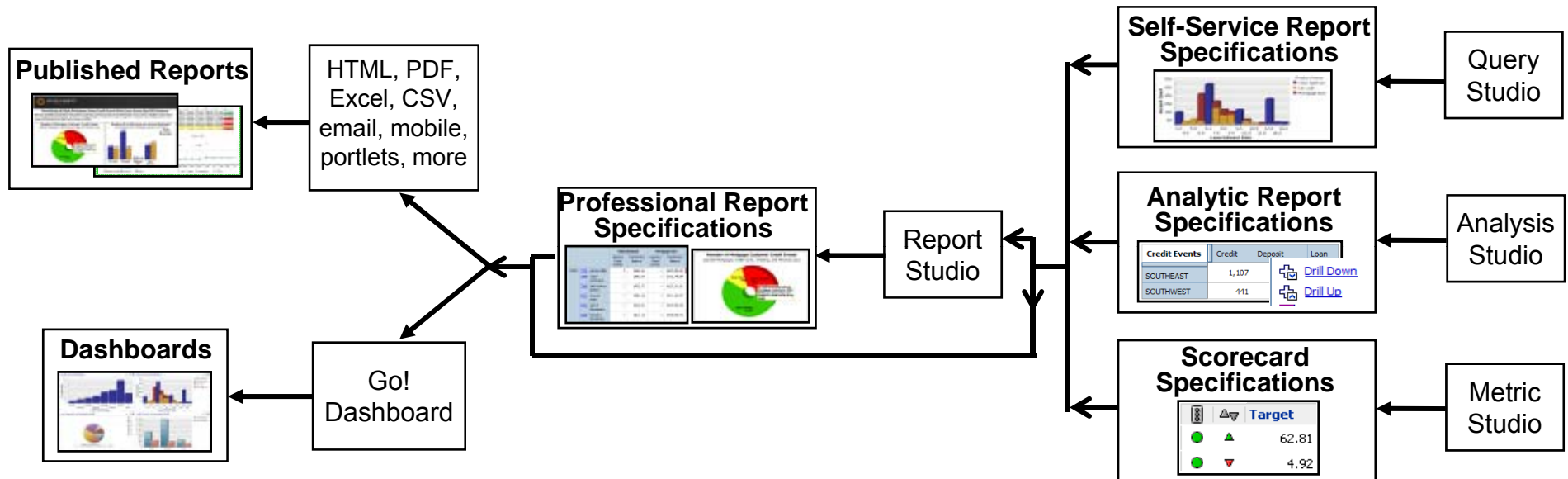
Metadata Model

Data Warehouse
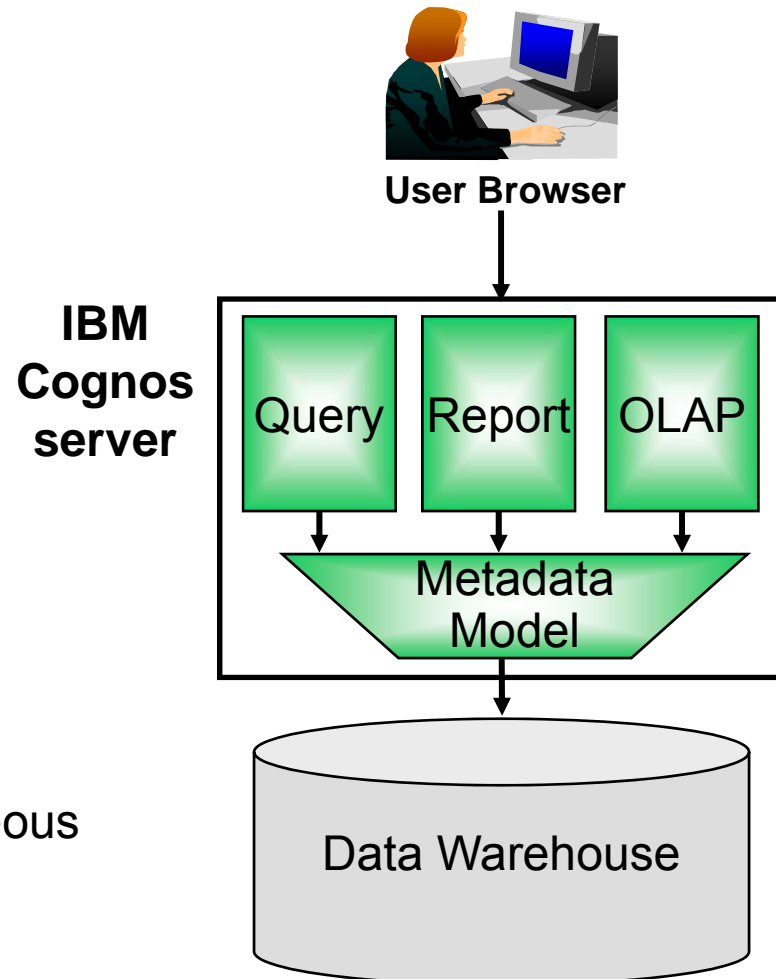
IBM Cognos Provides a Unified Workspace

- All activities from one place, without jumping to different interfaces
  - ▶ Dashboards for summary overview
  - ▶ Reports for tracking progress
  - ▶ Ad hoc queries and drill down for analysis and what if scenarios
  - ▶ Statistics and predictive analysis
- Progressive interaction – Interact and analyze information based on role
- Form decision networks for collaborative business analytics

Executive · **Business Manager** · **Individual Contributor** · **Line Manager** · **Financial & Business Analyst**

UNIFIED WORKSPACE

Dashboards | **Reporting** | **Query** | **Analysis** | **What If & Planning** | **Stats & Predictive**

Reuse Prior Assets In New Deliverables

Published Reports

HTML, PDF, Excel, CSV, email, mobile, portlets, more

Professional Report Specifications

Report Studio

Self-Service Report Specifications

Query Studio

Analytic Report Specifications

Credit Events	Credit	Deposit	Loan
SOUTHEAST	1,107		Drill Down
SOUTHWEST	441		Drill Up

Analysis Studio

Dashboards

Go! Dashboard

Scorecard Specifications

	△▽	Target
●	▲	62.81
●	▼	4.92

Metric Studio

- Author once, consume anywhere

- All analytic assets share a common metadata model and a common multilingual report specification

- Ensures consistent information and enables reuse across platform functions

11

Miami Dade County Runs Cognos On Linux On System z

Requirements:

- Demand for BI has really taken off
  - New Federal reporting requirements
  - Every new system, every new solution, every new application is having a business intelligence component
- Multiple Cognos 8 BI deployments
- Wanted an enterprise BI standardized solution, but
  - Needed higher capacity – grow from approx 400 to 1000 users
  - Do more with less - less researchers, less software, less hardware, same staff
  - Had available IFL's on System z

Results:

- 11 days to move from distributed to System z deployment model for Cognos 8 BI
  - Quickly and easily meet new requirements
- Consolidate multiple BI deployments on to a single platform
- Single point for BI administration
- Consolidate multiple disparate data sources
- Ensure 99.999% availability
- Offer a complete disaster recovery plan
- Additional green savings

SPSS Enables Customers To Predict Future Events And Drive Better Business Outcomes

Capture

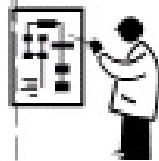Data Collection delivers an accurate view of customer attitudes and opinions

IBMSPSS Data Collection

Predict

Predictive capabilities bring repeatability to ongoing decision making, and drive confidence in your results and decisions

IBM SPSS
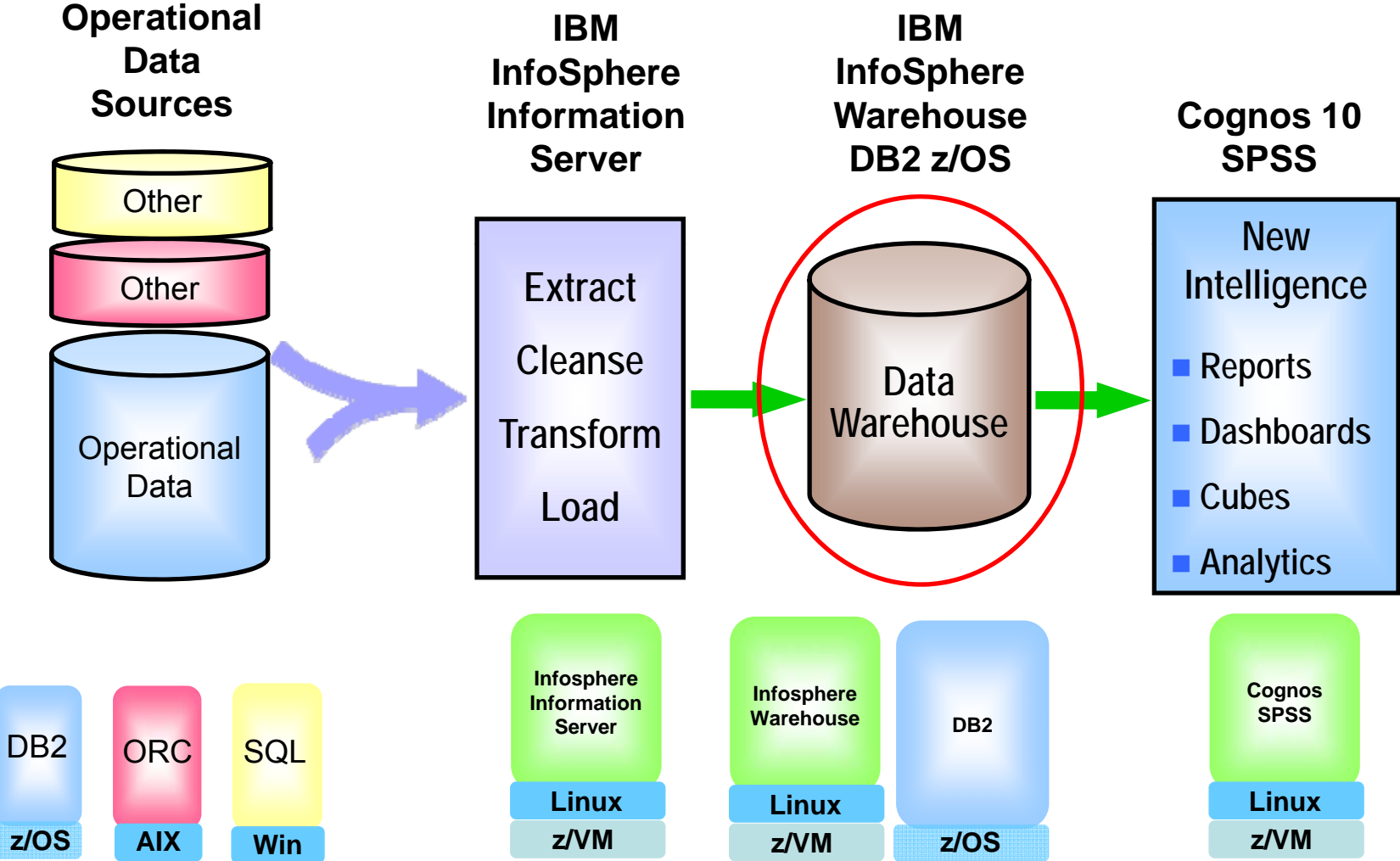Statistics*/Modeler*/Text Analytics

Act

Unique deployment technologies and methodologies maximize the impact of analytics in youir operation

IBM SPSS
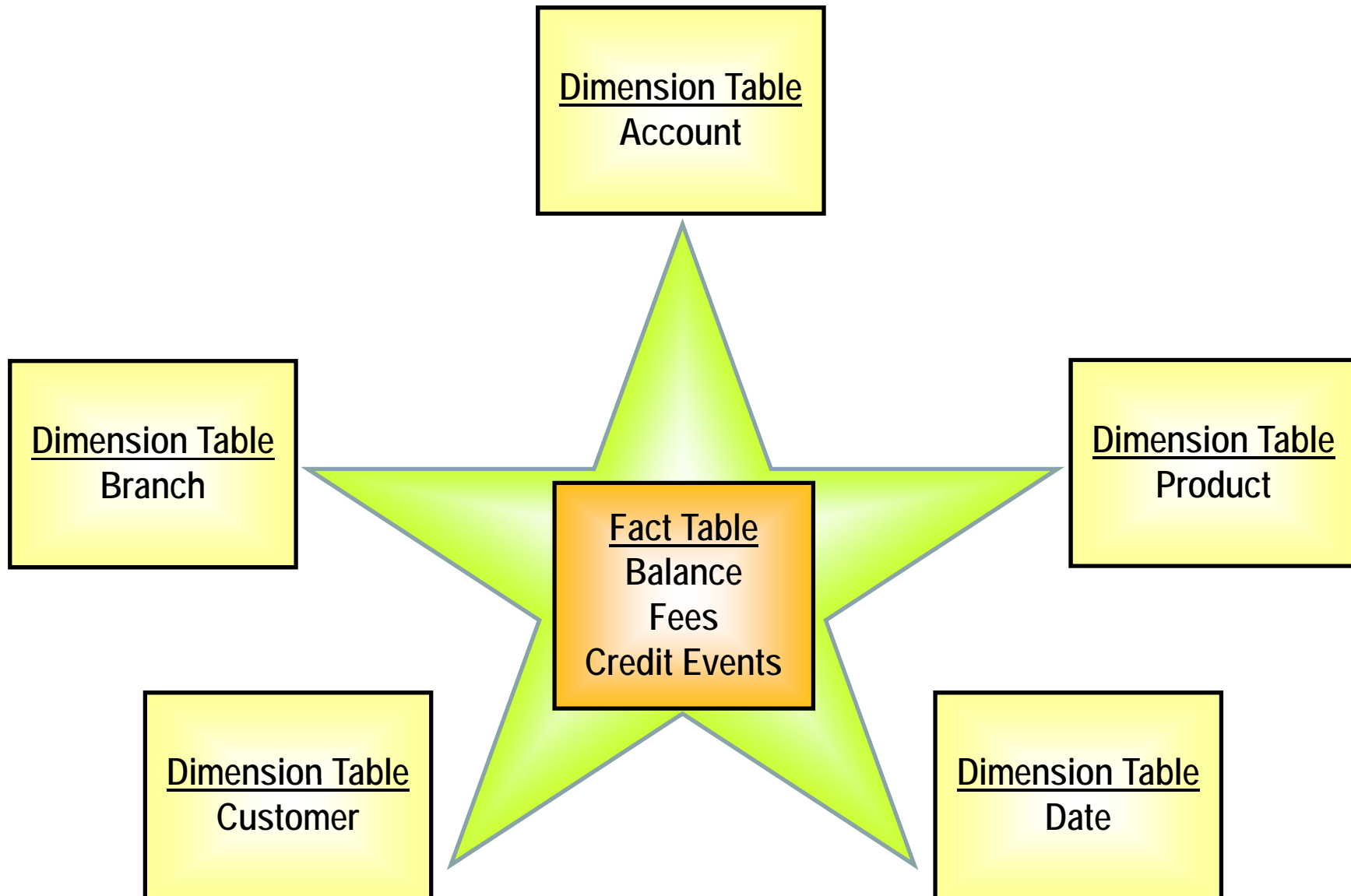Decision Management
Collaboration & Deployment *

Text Analytics

Data Mining

Statistics

Platform

Pre-built Content

Attract

Up-sell

Retain

* Runs on Linux on Systemz

The Data Warehouse Is At The Heart Of A Business Analytics Solution

Operational Data Sources

Other

Other

Operational Data

IBM InfoSphere Information Server

Extract

Cleanse

Transform

Load

IBM InfoSphere Warehouse DB2 z/OS

Data Warehouse

Cognos 10 SPSS

New Intelligence

- Reports
- Dashboards
- Cubes
- Analytics

DB2
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Infosphere Information Server
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Infosphere Warehouse
Linux
z/VM

DB2
z/OS

Cognos SPSS
Linux
z/VM

Data Warehouses Typically Organize Data In A Star Schema Format

Dimension Table
Account

Dimension Table
Branch

Dimension Table
Product

Fact Table
Balance
Fees
Credit Events

Dimension Table
Customer

Dimension Table
Date

DB2 For z/OS Is Optimized For Data Warehouse Workloads

- Data Warehouse Workloads typically include a mix of simple, intermediate and complex queries

- Data is partitioned to increase parallelism and compressed to increase I/O performance

- DB2 for z/OS Cost Based Optimizer decides best execution plan for each query
  - ▶ Simple queries typically assigned to a single processing thread
  - ▶ Complex queries may be decomposed into operations that execute in parallel
  - ▶ Queries may be automatically rewritten to take advantage of pre-computed partial results in materialized query tables (MQT)

- Result: Optimum Throughput

z/OS Is Optimized For Data Warehouse Workloads

- More processors, memory and cache than other enterprise servers provides high concurrency

- I/O offloaded to the Dedicated I/O Sub-system

- Parallel Sysplex clustering designed for near linear scaling

- Hardware compression

- Optimized resource sharing for mixed queries with WLM

- DS8000 delivers high storage bandwidth with caching

- Unmatched scalability

- Systematic Disaster Recovery

- Attractive pricing with IBM Smart Analytics Solution 9700

Add IBM DB2 Analytics Accelerator For Even More Optimization

What is a IDAA?

A workload-optimized, blade-based appliance add-on

Deeply integrated with DB2 for z/OS and transparent to applications

Significantly speeds up the response time for a wide variety of complex queries

*Drives down the costs of data warehousing and business analytics*

What's new?

- System x blade customized with Netezza Technology
- Massively Parallel Processing Architecture with data partitioned across multiple disks, each matched with a CPU
- Incorporates streaming architecture based on Netezza's patented data filtering using Field Programmable Gate Arrays (FPGAs)
- Tuned for delivering fast query response times for a wide variety of decision workloads
- Uses efficient data filtering by early SQL projections
- Storage integrated into the hardware rack
- Supported on DB2 for z/OS v9 or DB2 for z/OS v10 running on a z114 /z196

Breakthrough Technology Enabling New Opportunities

IDAA Leverages Massively Parallel Processing To Speed Up Complex Queries

Fact Table
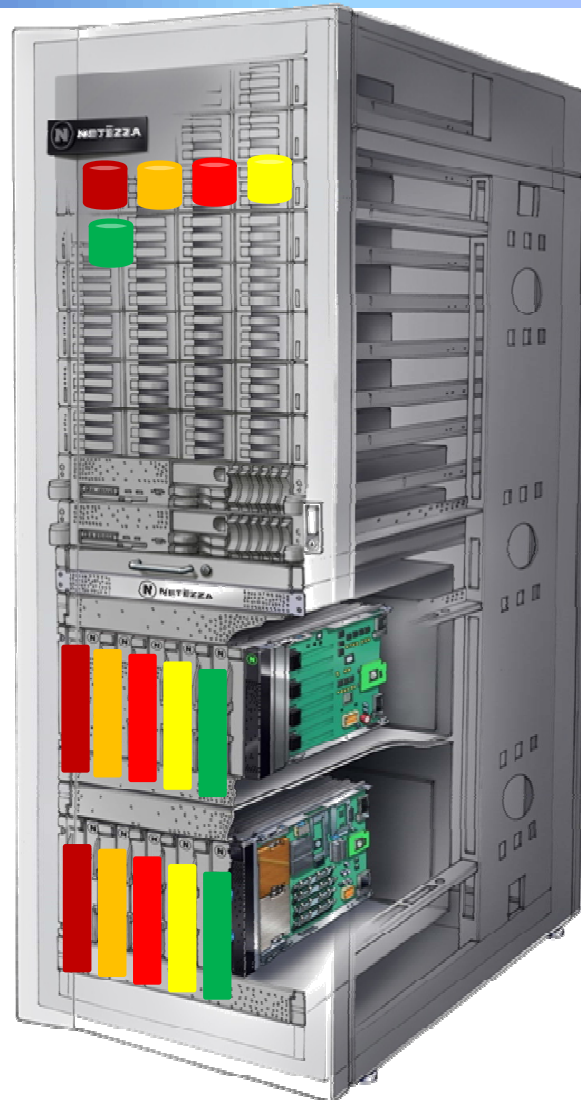
Storage

SMP Hosts

Data Filtering Processors

CPU

Partitioning data into physical disks and assigning dedicated processors to each disk – throughput scales linearly with partitions

"…when something took 24 hours I could only do so much with it, but when something takes 10 seconds, I may be able to completely rethink the business… ", SVP, Nielsen

Outstanding Customer Results With IDAA

Query	Total Rows Reviewed	Total Rows Returned		DB2 Only			DB2 with IDAA			Times Faster
				Hours	Sec(s)		Hours	Sec(s)		
Query 1	2,813,571	853,320		2:39	9,540		0.0	5		1,908
Query 2	2,813,571	585,780		2:16	8,220		0.0	5		1,644
Query 3	8,260,214	274		1:16	4,560		0.0	6		760
Query 4	2,813,571	601,197		1:08	4,080		0.0	5		816
Query 5	3,422,765	508		0:57	4,080		0.0	70		58
Query 6	4,290,648	165		0:53	3,180		0.0	6		530
Query 7	361,521	58,236		0:51	3,120		0.0	4		780
Query 8	3,425.29	724		0:44	2,640		0.0	2		1,320
Query 9	4,130,107	137		0:42	2,520		0.1	193		13

Actual customer results, October 2011

Customers Are Excited About Business Analytics On zEnterprise

DB2 Analytics Accelerator: "we had this up and running in days with queries that ran over 1000 times faster"

DB2 Analytics Accelerator: "we expect ROI in less than 4 months"

Cognos BI for System z "We didn't have to justify a higher cost for putting this on the mainframe, *it was cheaper!*"

Analyst Claudia Imhoff "the industry pendulum in swinging towards centralization and there is no better platform than the mainframe"
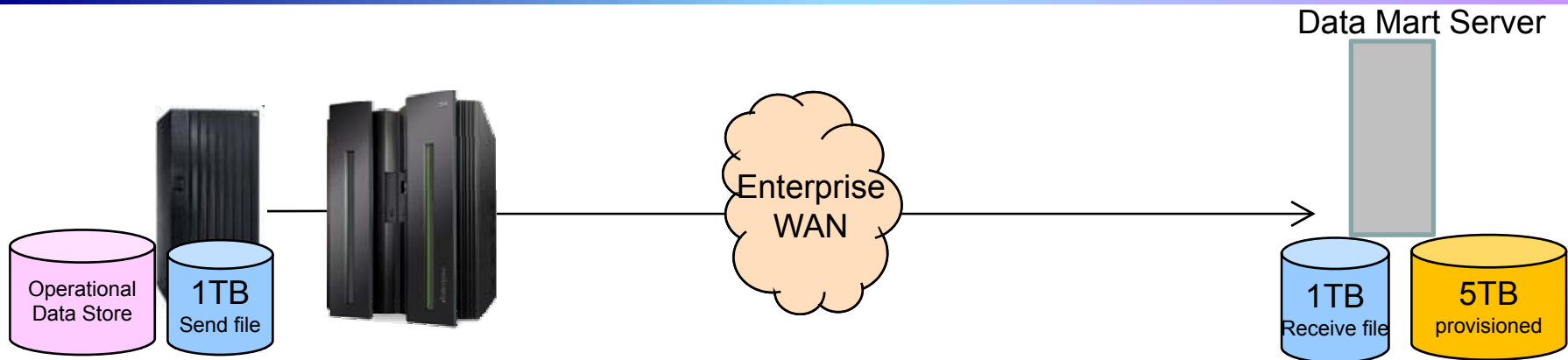
System z Is The Foundation For Business Analytics

- 60-70% of operational data resides on System z*

- Copying data from System z to another platform for data warehouses or data marts
  - ▶ Is costly
  - ▶ Can be inefficient
  - ▶ Takes longer to update
  - ▶ May create data disparities
  - ▶ Introduces security concerns

- System z offers a fully integrated, holistic solution from operational data to business analytics

* Source http://www.ibmsystemsmag.com/mainframe/trends/whatsnew/The-Mainframe-at-a-Crossroads/

Duplicating Very Large Data Off The Mainframe To A Data Mart Is Costly

Data Mart Server

Operational Data Store | 1TB Send file

Enterprise WAN

1TB Receive file | 5TB provisioned

Cost of storage - send file $12.33/GB x 1,024 GB	$13K	Storage acquisition cost **$123K**	

Cost of storage - receive file $18/GB x 1,024 GB	$18K
Cost of storage - data mart $18/GB x 5,120 GB	$92K

System z Storage Admin $5.88/GB/yr x 1,024 GB	$6K	Annual storage admin cost **$61K**	

Distributed Storage Admin $8.99/GB/yr x 6,144 GB	$55K

System z CPU extract $1.38/GB x 1,024 GB x 365	$515K	On Premises Network $0.0024/GB x 1,024 GB x 4 hops x 365	$3.6K	Distributed CPU cost load $0.39/GB x 1,024 GB x 365	$146K
System z CPU cost FTP $0.58/GB x 1,024 GB x 365	$217K	Off Premises Network $0.29/GB x 1,024 GB x 2 hops x 365	$217K	Distributed CPU cost FTP $0.05/GB x 1,024 GB x 365	$17.5K
System z extract labor $4.67/job x 365	$1.7K			Distributed load labor $14.00/job x 365	$2.55K
System z FTP labor $2.94/job x 365	$1.1K				

Annual Transfer Costs
$1.1M

Data Mart analysis costs not included
Based on IBM internal study

Save 75% By Consolidating Proliferating Data Marts On zEnterprise

$97/RpH

$96/RpH

Web Front End

OLTP Repository 700GB	Operational Data Store 700GB

New Data

Data Marts 350GB — **Copy #1**

Data Mart

Data Mart

$97/RpH

Local Database 350GB — Copy #2

Excel analysis

Data Mart

Data Mart

$97/RpH

Data Mart 350GB — Copy #3

Public

Data Mart

$97/RpH

Dev Copy 140GB — Copy #4

Development and test

Data Mart

Duplication of 700GB costs:

- ▶ 4 servers
- ▶ 4 data base licenses
- ▶ 1,190 GB storage
- ▶ 424 TB of ETL transfers per year
- ▶ Proliferation increases cost and management complexity

IBM Smart Analytics System 9700 – A Comprehensive Package For Business Analytics

- Extend the qualities of service, inherent in the z/OS environment to ensure the availability and security of data
- Hardware/OS
  - ▶ IBM zEnterprise z196 technology
  - ▶ IBM System Storage DS8800 Intelligent Disk controller
    - − Large controller cache and 3 Tier disk offering
  - ▶ z/OS 1.12
- Unique Software
  - ▶ DB2 10 for z/OS
  - ▶ Cognos 10 BI (Linux on System z)
  - ▶ InfoSphere Warehouse (Linux on System z)
  - ▶ SPSS Modeler (Linux on System z)
- Optional Components
  - ▶ IBM DB2 Analytics Accelerator
  - ▶ Solid State drives, integrated within DS8800
    - − Easy Tier to identify and migrate "hot data" to SSD

Infosphere Warehouse Cognos SPSS

DB2 for z/OS

z/VM

z/OS

Storage

Storage
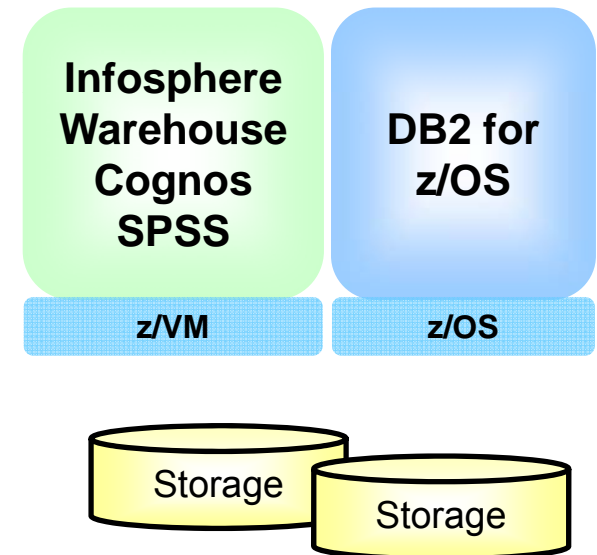
zEnterprise Provides An Excellent Base For All Data Needs

- Operational and warehouse data co-located on z196 for optimal performance

- Exploits IBM DB2 Analytics Accelerator optimized for complex queries

- Cognos supports a common metadata model and report specification, and provides 100% browser-based access

- SPSS predictive analytics provides actionable insights versus hindsight

- Systematic disaster recovery and backup strategies

- Qualities of Service

- Competitive Price