The Gold Standard for Enterprise Computing

Business Analytics on the Ultimate Data Platform

Analyzing *all* the data about customers adds business value

Data Source	Analysis	Business Value

Traditional RDBMS

Analyze all customer records across departments

Complete view of customer value to the company

External Data

Analyze customer sentiment and experience

Attract and retain customers

**Real Time Data**

Analyze customer data as it happens

Personalize customer interaction in real time

DEMO: Gain a 360º view of customers to help improve profitability

- Identify good customers who have made complaints on Twitter

- Combined data from Twitter with mortgage data in the data warehouse

- Build report with Cognos Report Studio to show complete customer profile

02. Business analytics on the ultimate data platform
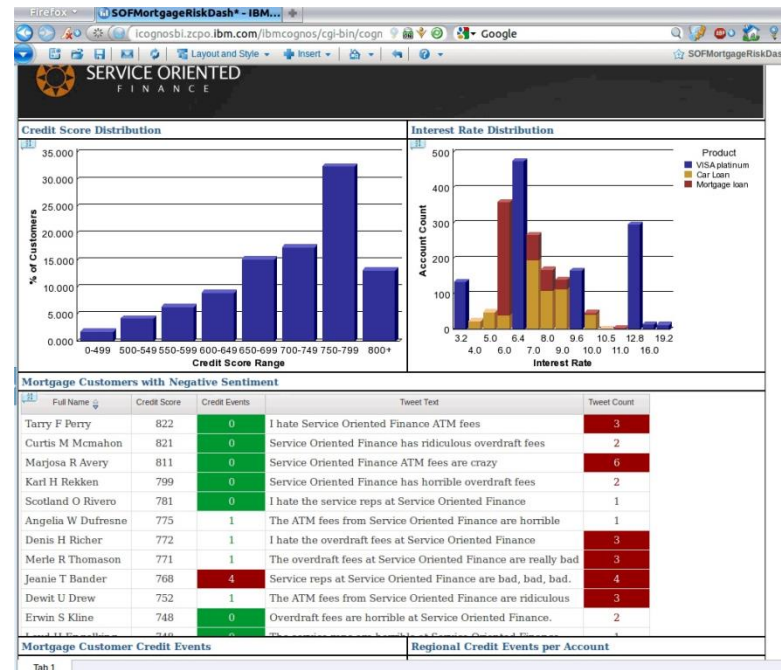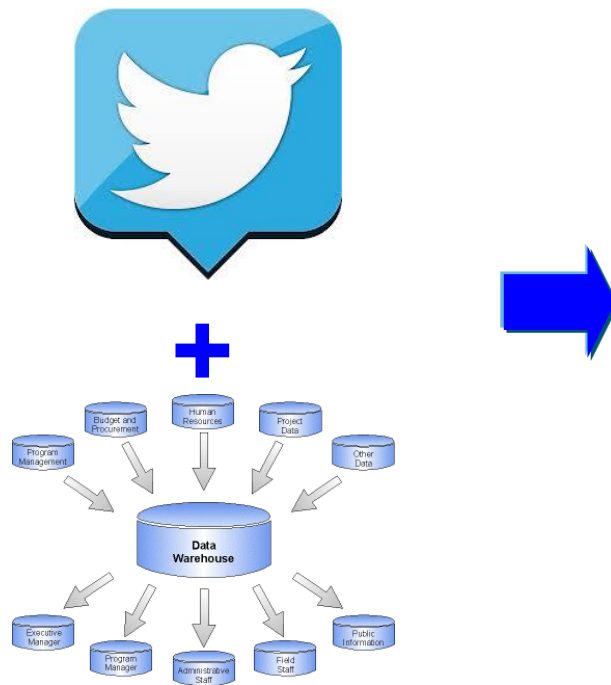
Leading businesses are using IBM analytics to gain a competitive advantage
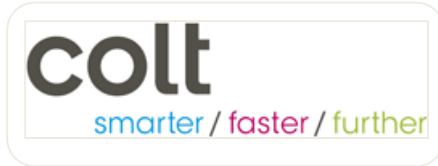
Technology services company **saves USD 1.9M** annually through improved business intelligence

Japanese internet company analyzes and processes 18M transactions/hour, to increase **subscribers by 100**%

Reduced the time to analyze complex GIS data from **days to minutes** - a **98% improvement**

The more analytics a business uses, the better it performs

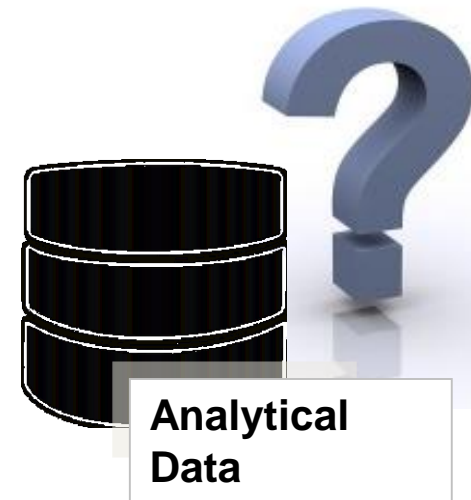Supermarket chain increased annual **revenues by 30%**

Enabled **600 percent growth** in mobile solutions and **200 percent growth** in internet banking

Healthcare alliance improves patient outcomes while **reducing spending by USD 2.85B**

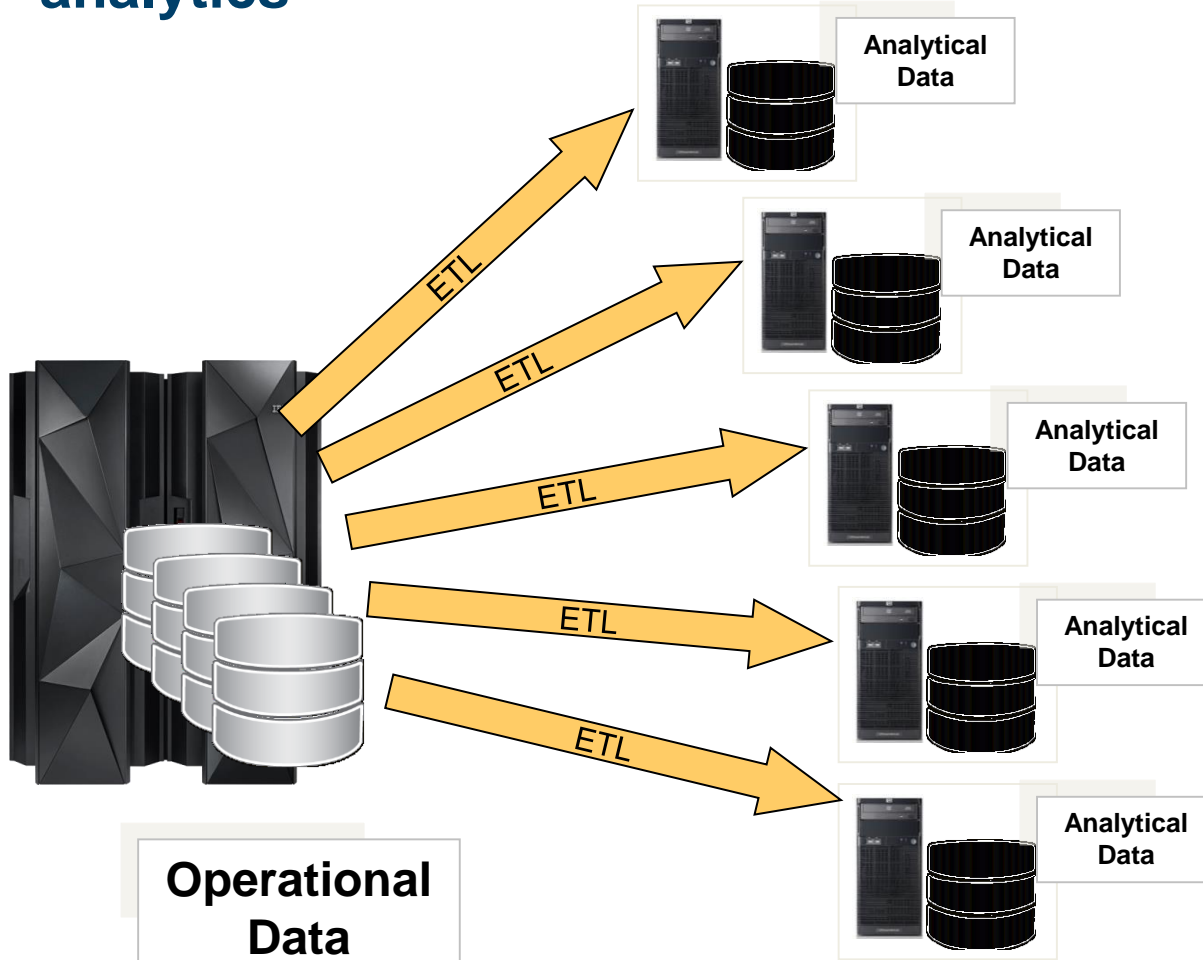# 60-70% of operational data resides on System z…

Operational Data

Analytical Data

Yet, some customers do not perceive
System z as a viable platform
for data warehouse and analytics

So what happens?

02. Business analytics on the ultimate data platform

They adopt an extremely expensive ETL strategy to support analytics

A large European bank:
- 120 database images created from bulk data transfers
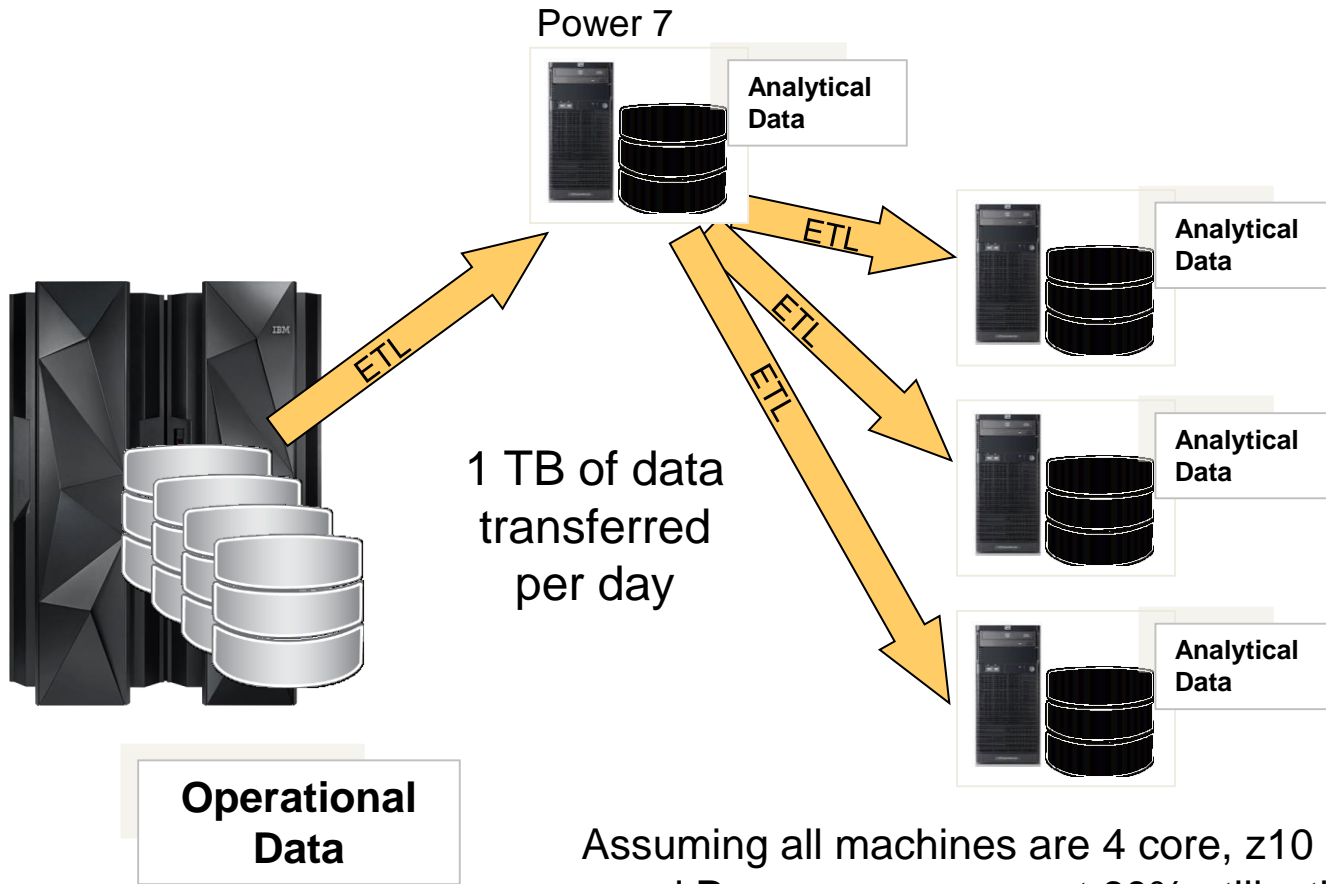- 1,000 applications on 750 cores with 14,000 software titles
- ETL consuming 28% of total distributed cores and **16% of total MIPS**

A large Asian bank:
- One mainframe devoted exclusively to bulk data transfers
- ETL consuming 8% of total distributed core and **18% of total MIPS**

With this strategy, IT costs grow faster than business growth

Source: IBM Eagle Studies

This leads to significant data transfer costs

Power 7

Analytical Data

4 yr. amortized cost summary

System costs = $8.0M
Labor costs = $0.2M
Total   = $8.2M

ETL

Analytical Data

ETL

Analytical Data

ETL

1 TB of data transferred per day

Analytical Data

Operational Data

Assuming all machines are 4 core, z10 runs at 85% utilization and Power servers run at 60% utilization, transfer will burn **557 MIPS** and use **21 distributed cores** *per day*

Source: IBM CPO cost case

02. Business analytics on the ultimate data platform

The best-fit solution – *Move analytics closer to the data*

Full function operational business intelligence AND business analytics on the same platform
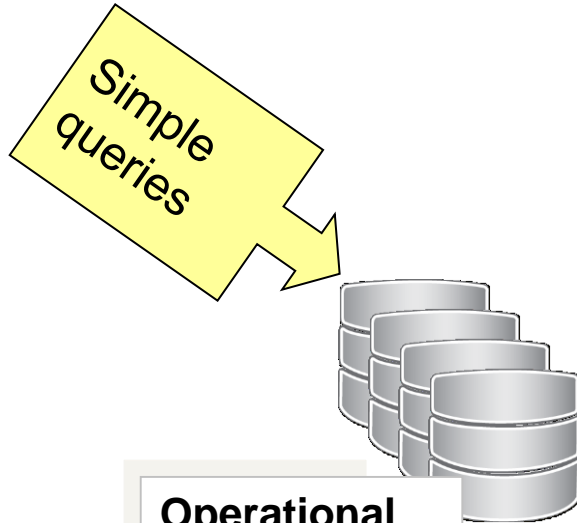
Business Intelligence   **Predictive Analytics**

Operational Data → **Analytics Data**

zEC12
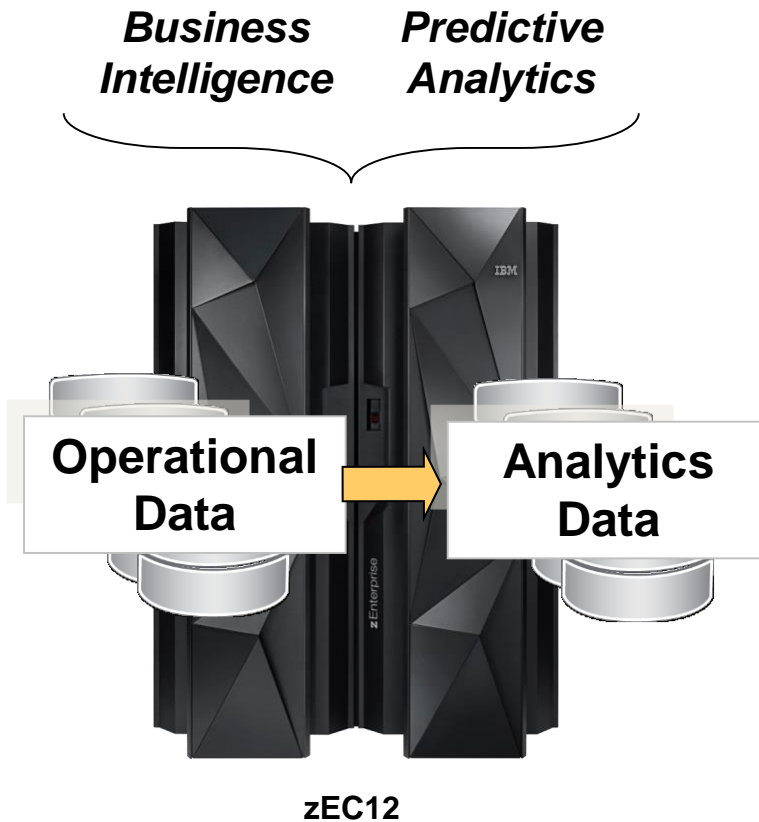
Benefits

- Reduce data transfer costs
- Run analytics in separate partition
- Achieve lowest cost for analytics workloads

- Enable application queries on real-time data
- Easier to surround data with highest levels of security
- Simplifies management

DB2 for z/OS – the enterprise standard for operational and business analytics

02. Business analytics on the ultimate data platform

DB2 for z/OS is a first class platform for operational business intelligence queries

Simple queries

Operational Data

Credit Card Table ID, Custno, APR, Credit Limit, Balance, Payment, Num_Minm_Payments_ Due, Interest, Fees	**Credit Card Tx Table** ID, TxID, Date, Tx Amount
Banking Tx Table ID, TxID, Date, Tx Amount	**Customer Table** Custno, Name, Address, Age, Gender, …	**Mortgage Table** ID, Custno, Term, Balance, Num_Days_Due.
Banking Table ID, Custno, Checking Balance, Savings Balance, Num_Checks_Bounced	**Auto Loan Table** ID, Custno, Loan Amount, Balance, Num_Payments_Due	**Banking Tx Table** ID, TxID, Date, Tx Amount	**Mortgage Tx Table** ID, TxID, Date, Tx Amount

- z/OS Workload Manager optimizes resource sharing to minimize impact on OLTP performance

- Parallel sysplex yields near-linear scaling and high availability

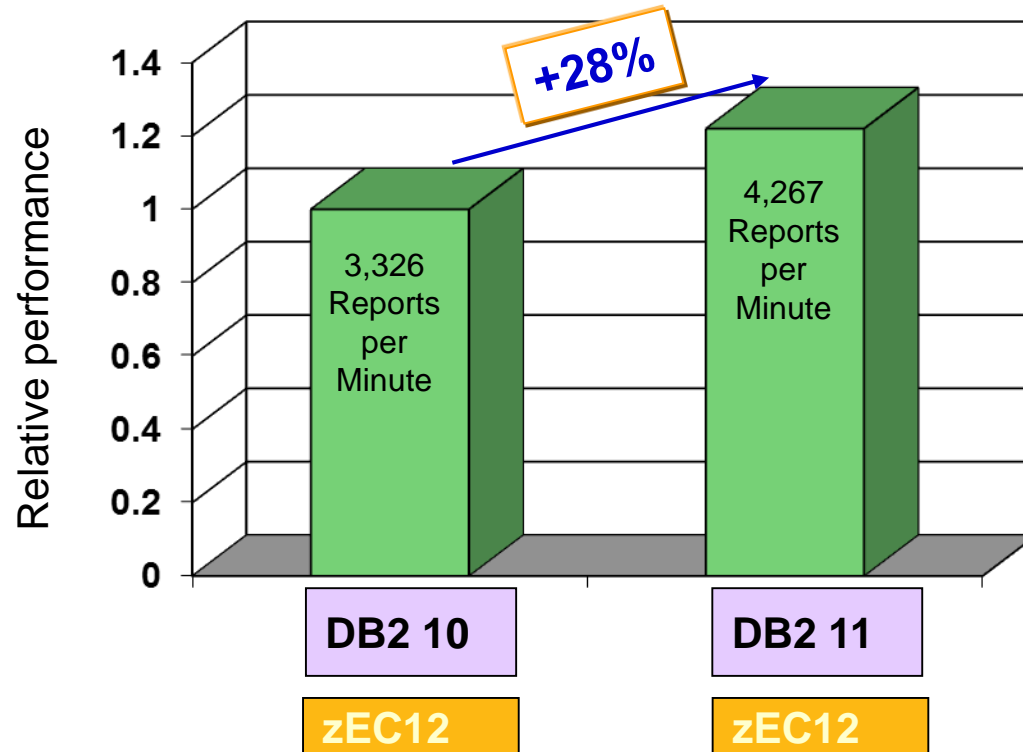- DB2 Cost Based Optimizer provides best access path and query execution plan
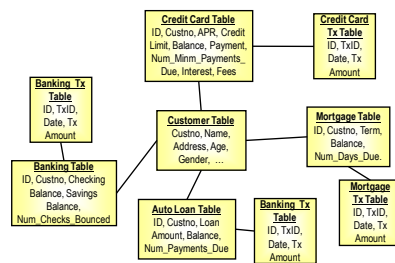
DB2 for z/OS supports up to 20,000 concurrent connections per subsystem

Up to **22%** CPU savings with DB2 11!

zEnterprise EC12

Source: IBM internal study

Upgrade to DB2 11 for z/OS to achieve more operational analytics throughput for the same cost
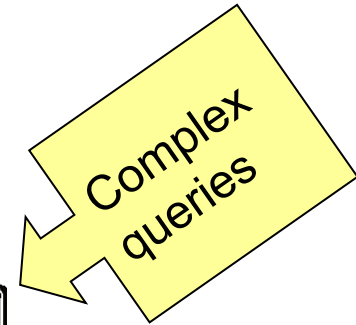

IBM internal analytics workload (BI Day)

Workload consisted of 160,860 Cognos BI Day simple reports. Both tests used 10 CPs and ran at 100% utilization. Results may vary based on customer workload profiles/characteristics.

02. Business analytics on the ultimate data platform

DB2 for z/OS is also optimized for data warehouse queries

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

- DB2 Cost Based Optimizer decides best execution plan for each query
  - Complex queries decomposed into operations that execute in parallel
  - Queries may be automatically rewritten to take advantage of pre-computed query tables
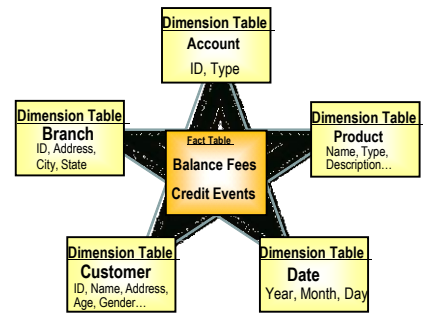
Complex queries

Analytical Data

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

Up to **40%** CPU savings with DB2 11!

zEnterprise EC12

Dimension Table
Account
ID, Type

Dimension Table
Branch
ID, Address, City, State

Dimension Table
Product
Name, Type, Description...

Fact Table
Balance Fees
Credit Events

Dimension Table
Customer
ID, Name, Address, Age, Gender...

Dimension Table
Date
Year, Month, Day

Source: IBM internal study

IBM

Add IBM DB2 Analytics Accelerator to speed up deep analytics queries

- A workload-optimized, blade-based appliance based on Netezza Technology that runs queries in seconds versus hours

- Integrated with DB2 for z/OS, and transparent to applications

  - Storage integrated into the hardware rack

  - Pre-load data from DB2 for z/OS at over 400GB/hr

  - Maintain a single copy of data in Accelerator and update incrementally

  - System z workload management works across the Accelerator

- Drives down the costs of data warehousing and business analytics

zEC12

IBM DB2 Analytics Accelerator

IBM DB2 Analytics Accelerator executes complex queries significantly faster

Query	DB2 (Secs)	DB2 + Analytics Accelerator (Secs)	Speed Up	Rows Reviewed	Rows Returned
Query 1	9,540	5	1,908x	2,813,571	853,320
Query 2	8,220	5	1,644x	2,813,571	585,780
Query 3	4,560	6	760x	8,260,214	274
Query 4	4,080	5	816x	2,813,571	601,197
Query 5	4,080	70	58x	3,422,765	508
Query 6	3,180	6	530x	4,290,648	165
Query 7	3,120	4	780x	361,521	58,236
Query 8	2,640	2	1,320x	342,529	724
Query 9	2,520	193	13x	4,130,107	137

Actual customer results, October 2011

DEMO: DB2 Analytics Accelerator

Compare DB2 BI Day query processing using the IBM DB2 Analytics Accelerator

02. Business analytics on the ultimate data platform
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zEnterprise is optimized for business analytics

Standalone Pre-integrated Competitor V3

IBM zEnterprise with Analytics Accelerator

Quarter Unit

DB2 v10

z/OS
2 GP+ 1 zIIP

IBM DB2 Analytics Accelerator (with N2001-10)

zEC12

Unit Cost (3yr TCA) $481/RpH

Workload Time (mins)	1,318
Reports per Hour (RpH)	7,337
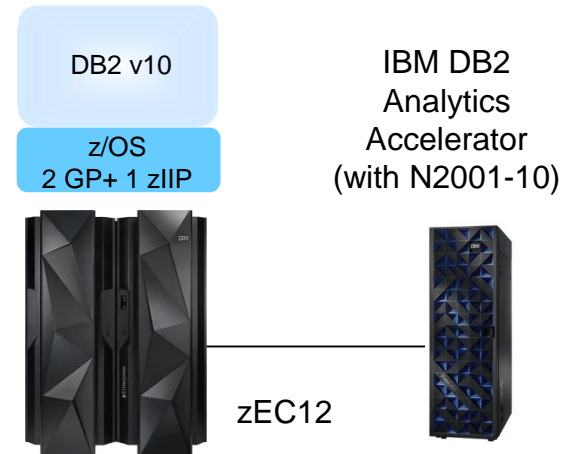
Unit Cost (3yr TCA) $46/RpH

Workload Time (mins)*	148
Reports per Hour (RpH)	65,338

9x performance
10x price performance!

Source: Customer Study on 10TB BIDAY data running 161,166 concurrent reports. Intermediate and complex reports automatically redirected to IBM DB2 Analytics Accelerator for z/OS. Results may vary based on customer workload profiles/characteristics. Note: Indicative 9710 pricing only internal to IBM, quotes to customer require a formal pricing request with configurations.

02. Business analytics on the ultimate data platform

zEnterprise is optimized for business analytics

Traditional Data Warehouse Competitor

6650H

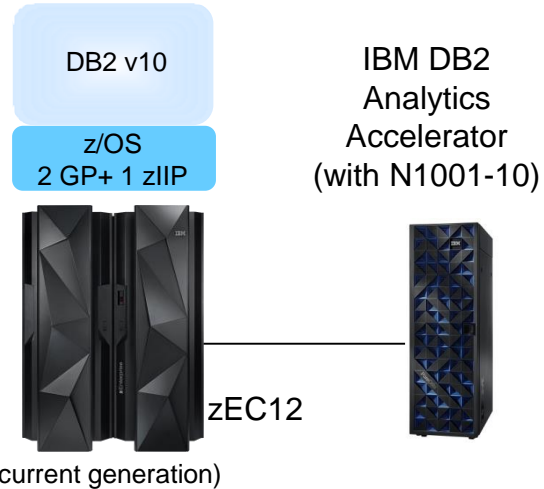(current generation)

IBM zEnterprise with Analytics Accelerator

DB2 v10

z/OS
2 GP+ 1 zIIP

IBM DB2 Analytics Accelerator (with N1001-10)

zEC12

(current generation)

Unit Cost (3yr TCA) **$330K/QpH**

Workload Time (secs)*	1,591
Queries per Hour (QpH)	9

Unit Cost (3yr TCA) **$10K/QpH**

Workload Time (secs)*	61
Queries per Hour (QpH)	236

26x performance
33x price performance!

Customer Study on 10TB BI Day data running 161,166 concurrent reports. Intermediate and complex reports automatically redirected to IBM DB2 Analytics Accelerator for z/OS. Results may vary based on customer workload profiles/characteristics.

02. Business analytics on the ultimate data platform
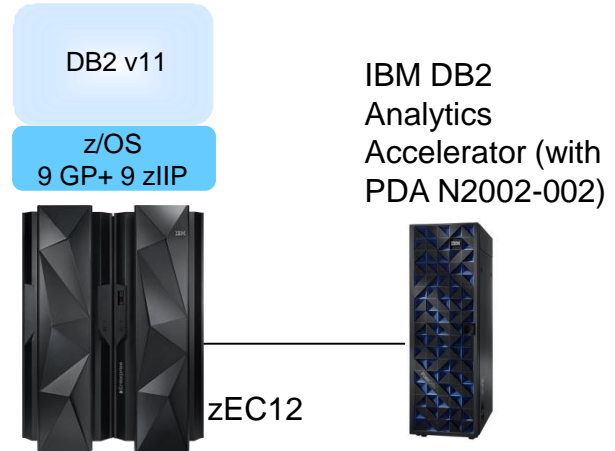
IBM ☀

zEnterprise is optimized for business analytics

In-memory Database Competitor
40 Intel Westmere cores
512GB RAM
8x900 HDDs
1.2TB SSD

IBM zEnterprise
with Analytics Accelerator

DB2 v11

z/OS
9 GP+ 9 zIIP

IBM DB2
Analytics
Accelerator (with
PDA N2002-002)

zEC12

Unit Cost (3yr TCA) **$72/RpH**

Workload Time (mins)	302
Reports per Hour (RpH)	32,020

Unit Cost (3yr TCA) **$10/RpH**

Workload Time (mins)*	24
Reports per Hour (RpH)	402,915

13x performance
7x price performance!

Results may vary based on customer workload profiles/characteristics. * Results projected from IBM DB2
Analytics Accelerator V4.1 with N2002-002 hardware and DB2 11 for z/OS on zEC12-710 hardware

02. Business analytics on the ultimate data platform

Swiss Mobiliar uses IBM DB2 Analytics Accelerator to deliver actionable insights

Swiss Mobiliar
Insurance & Pensions

Need:

Cost-effective way to deliver complex analysis for eligibility and excess requirements for insurance products

Solution:

Implemented DB2 Analytics Accelerator and zEnterprise to provide transaction processing and analytics workloads in a cost-effective solution
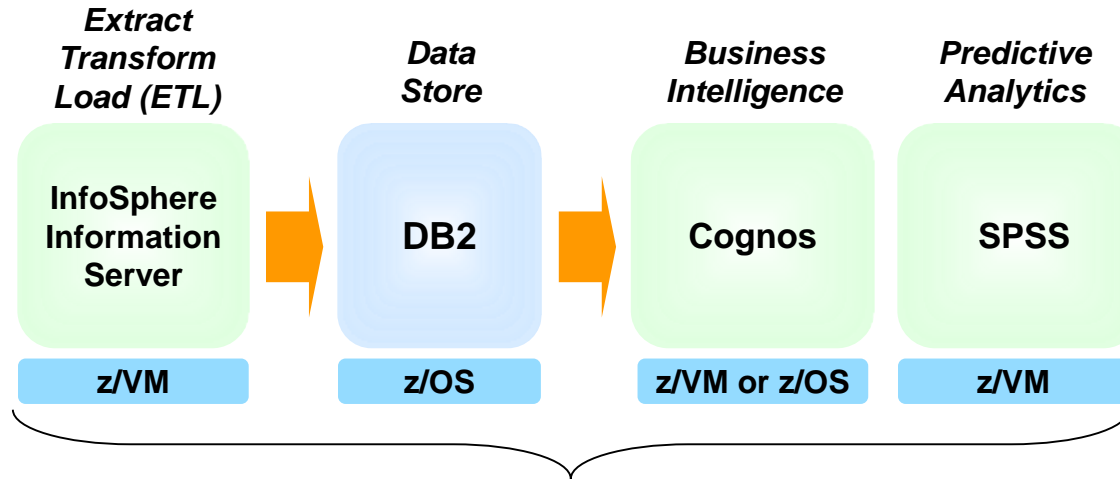
50%
of the queries performed 100 times faster

20 seconds
to complete queries that took 5 hours

> " *IBM DB2 Analytics Accelerator enables us to support the additional workloads that come with business growth without activating more cores on the mainframe.* "

02. Business analytics on the ultimate data platform

Run a complete portfolio of operational and analytics software on IBM zEnterprise EC12

Extract Transform Load (ETL)	*Data Store*	*Business Intelligence*	*Predictive Analytics*
InfoSphere Information Server	**DB2**	**Cognos**	**SPSS**
z/VM	**z/OS**	**z/VM or z/OS**	**z/VM**

IBM zEnterprise Analytics System 9700 –

A comprehensive packaged solution including hardware, OS, and business analytics software

FastStart Service Pack

**Data Integration Pack**

Data Analytics Pack

zEnterprise

IBM DB2 Analytics Accelerator

Business analytics answer key questions and drive a competitive edge

Descriptive Analytics:

- Insight into what has happened

- Provides reports/dashboards
  - Aggregate and drill-down on data using different dimensional attributes such as by date, geography, demographics, etc.

- Visualize data using interactive charts, graphs, maps and other objects
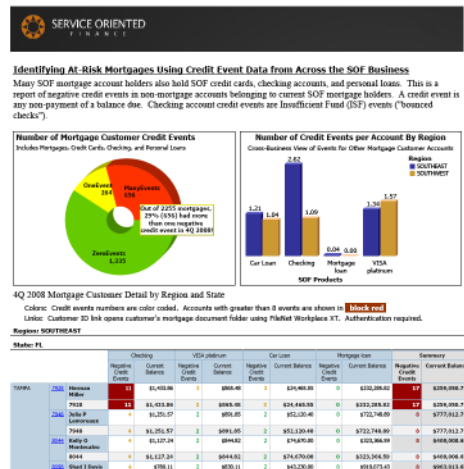
Predictive Analytics:

- Predicts what might happen

- Provides scores that helps in optimized decision support
  - Build models using historical data and mathematical algorithms such as clustering or classification

- Some models provide rules that can be integrated into business processes


IBM Cognos Enterprise
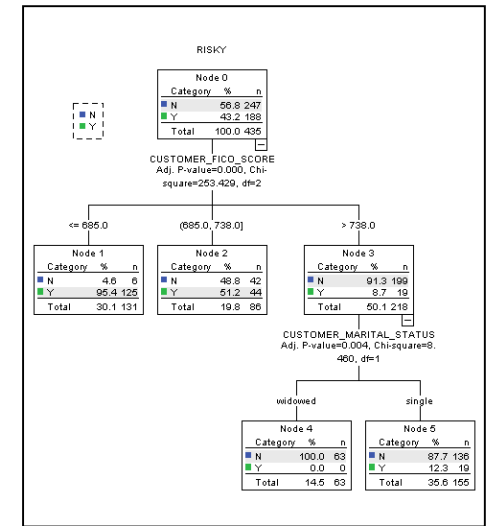
IBM SPSS Statistics and Modeler

IBM Blue Insight uses System z platform to deploy an internal private analytics cloud
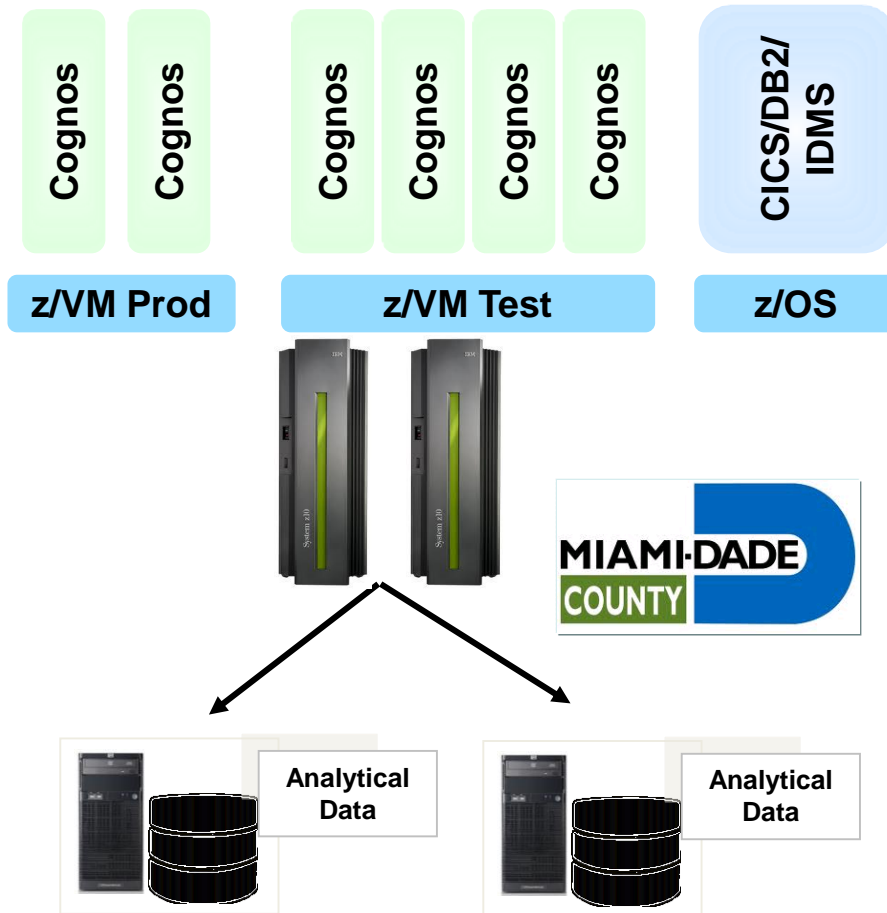
Project Scope

- Consolidated 390+ reporting projects onto zEnterprise running Cognos BI
- Today, supports over 200K users and generates over 2M reports/quarter
- Savings of over 74K sq. ft. floor space and 30K MWh energy; user cost reduced 90%
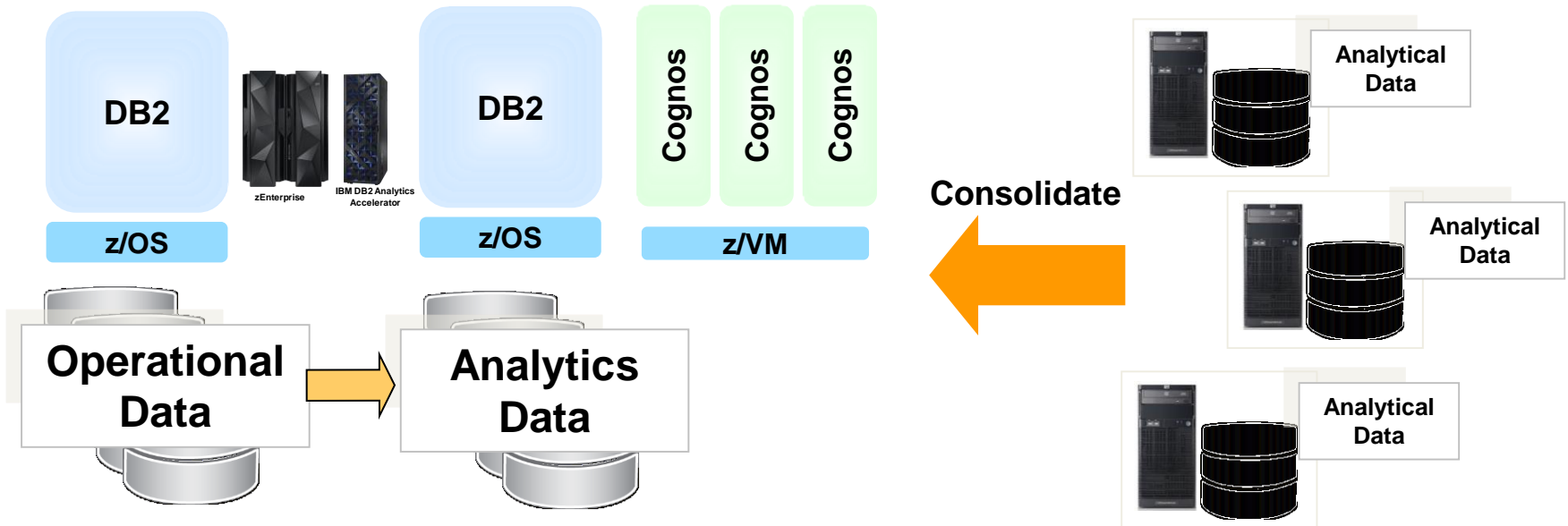
> "Our commitment to informed decision-making led us to consider private **cloud delivery of Cognos via System z**, which is the enabling foundation that makes possible **+$25M savings over 5 years**."
>
> -- IBM CIO Office

02. Business analytics on the ultimate data platform

Miami-Dade County runs IBM Cognos on business class mainframes

- Cognos
- Cognos

z/VM Prod

- Cognos
- Cognos
- Cognos
- Cognos

z/VM Test

CICS/DB2/IDMS

z/OS

MIAMI-DADE COUNTY

Analytical Data

Analytical Data

- ▪ Moved Cognos BI deployment from Intel servers to System z in 11 days
  - – Consolidated multiple deployments to a single platform
  - – Consolidated multiple disparate data sources

- ▪ Single point for BI administration

- ▪ Added a complete disaster recovery plan

- ▪ Easily met requirements for growth, 24x7 availability and TCO savings

"We have users from 25 County Service departments with almost 2000 users consuming and creating reports with stable environments on System z"

- Jaci Newmark, Miami-Dade County

Predictive analytics helps businesses run smarter

Turn a Call Center in a Profit Center

A large Dutch financial services company generated **$30 Million in incremental sales** when 1M calls generated 180,000 suggestions, leading to 22,000 new sales.

Prevent crime before it happens

A large city in the US optimized deployment of police resources, **reducing homicides by 35%** year over year, and robberies by 20%.

Turn clients into advocates

A large Swiss telecom adopted a client retention approach based on satisfaction – and **reduced churn from 14% to 2%.**

Reduce the cost of claims

A large US insurer maximized and accelerated their collections process, achieving an **ROI of 403% with payback in 3 months**.

# DEMO: Use predictive analytics to better understand and proactively address customer dissatisfaction

Problem: A bank is dealing with unhappy customers

- Use Cognos Active Report with RAVE visualization to zero-in on most common complaints (ATM charges and overdraft fees)

Solution: Use predictive analytics to better characterize customers

- Target these customers differently to improve their satisfaction levels

1. Load data from Data Warehouse on DB2 for z/OS into SPSS Statistics

2. Select good customers based on high credit scores tweeting negatively about ATM fees or overdraft fees

3. Run Decision Tree to discover rules for characterizing customer complaints about overdraft and ATM fees
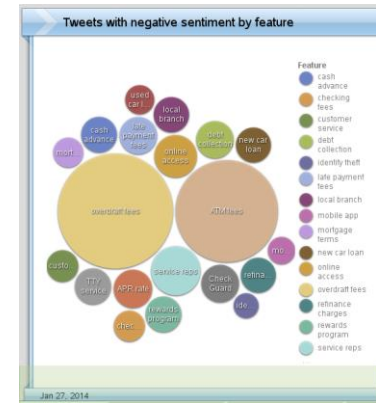
Key features with negative sentiments
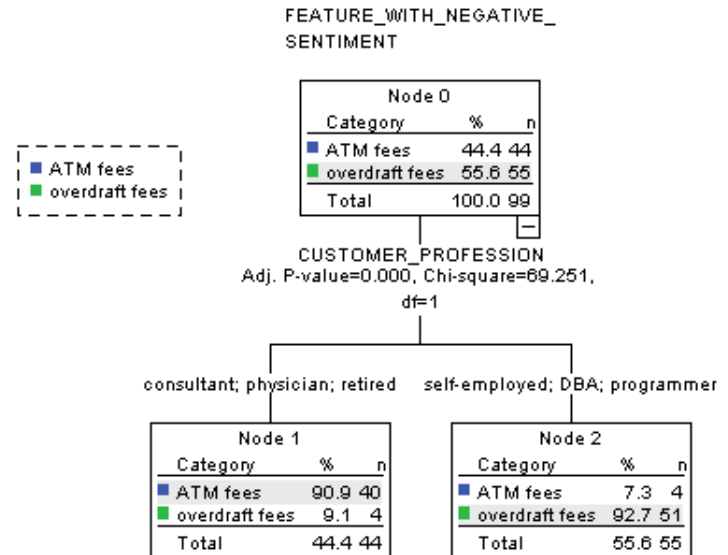
Run end-to-end analytics on zEnterprise to reduce costs and improve reliability

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

- zEnterprise offers a fully integrated, optimized analytics solution on one platform
  - From operational data to business analytics

- Consolidating data warehouses on zEnterprise with DB2 Analytics Accelerator can reduce costs by over 90%

- Cognos adds unmatched descriptive intelligence

- SPSS adds unmatched predictive intelligence

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

02. Business analytics on the ultimate data platform