

Performance Dashboards: Measuring, Monitoring, and Managing Your Business

EDUCATION AND RESEARCH

Wayne W. Eckerson



- **WAYNE W. ECKERSON** is the Director of Research and Services for The Data Warehousing Institute.
- Eckerson has 17 years of industry experience and has covered data warehousing and business intelligence since 1995.
- Eckerson is the author of many in-depths reports, a columnist for several business and technology magazines, and a noted speaker and consultant.
- Eckerson has recently written a book titled, *Performance Dashboards: Measuring, Monitoring, and Managing Your Business* (Wiley & Sons, 2005).
- He can be reached at weckerson@tdwi.org

Course Agenda

- 1. Evolution of Performance Dashboards**
- 2. Why Performance Dashboards?**
- 3. What are Performance Dashboards?**
- 4. Architecting Performance Dashboards**
- 5. Case Studies**
- 7. Costs of Deployment**
- 8. How to Build Effective Metrics**
- 9. How to Design Effective Dashboard Screens**
- 10. Criteria for Evaluating Dashboard Products**

Appendices

- A - Performance Dashboard Trends
- B- Readiness Assessment
- C - How to Ensure Adoption
- D - Performance Dashboard Market Segmentation
- E – Sample Metrics Report

Evolution of Performance Dashboards

The Business Challenge

Decision makers suffer from...

- too much data....
- too little information...
- delivered too late...

to make effective decisions.



Evolution of a Solution

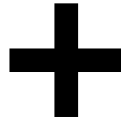
The search for the perfect “business insight system”:

- 1980s
 - *Executive information systems (EIS)*
 - *Decision support systems (DSS)*
- 1990s
 - *Data warehousing (DW)*
 - *Business intelligence (BI)*
- 2000s
 - *Dashboards and scorecards*
 - *Performance management*
- 2010+??

Two Metaphors



Dashboard



Performance Chart



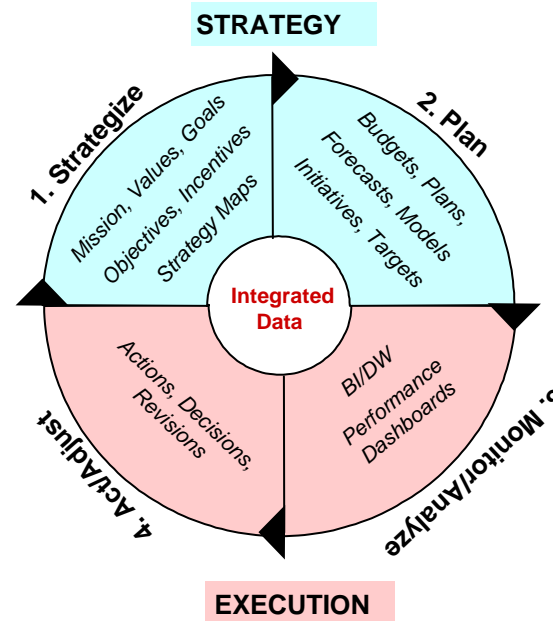
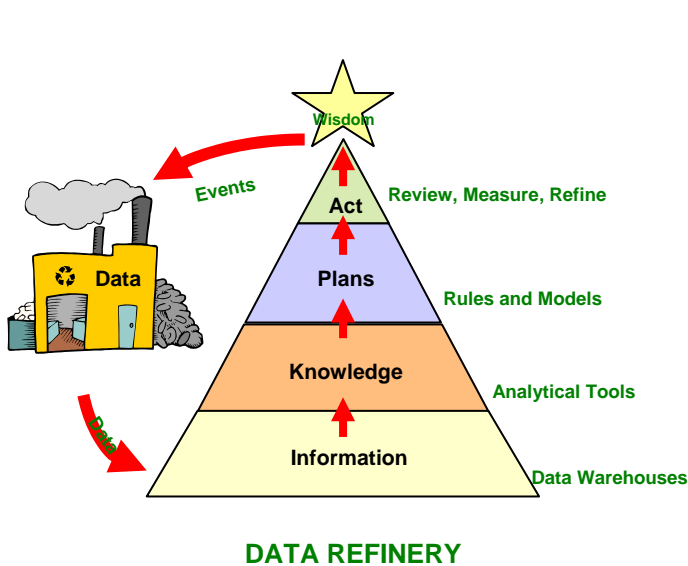
Performance Dashboard

Two Disciplines

Business Intelligence

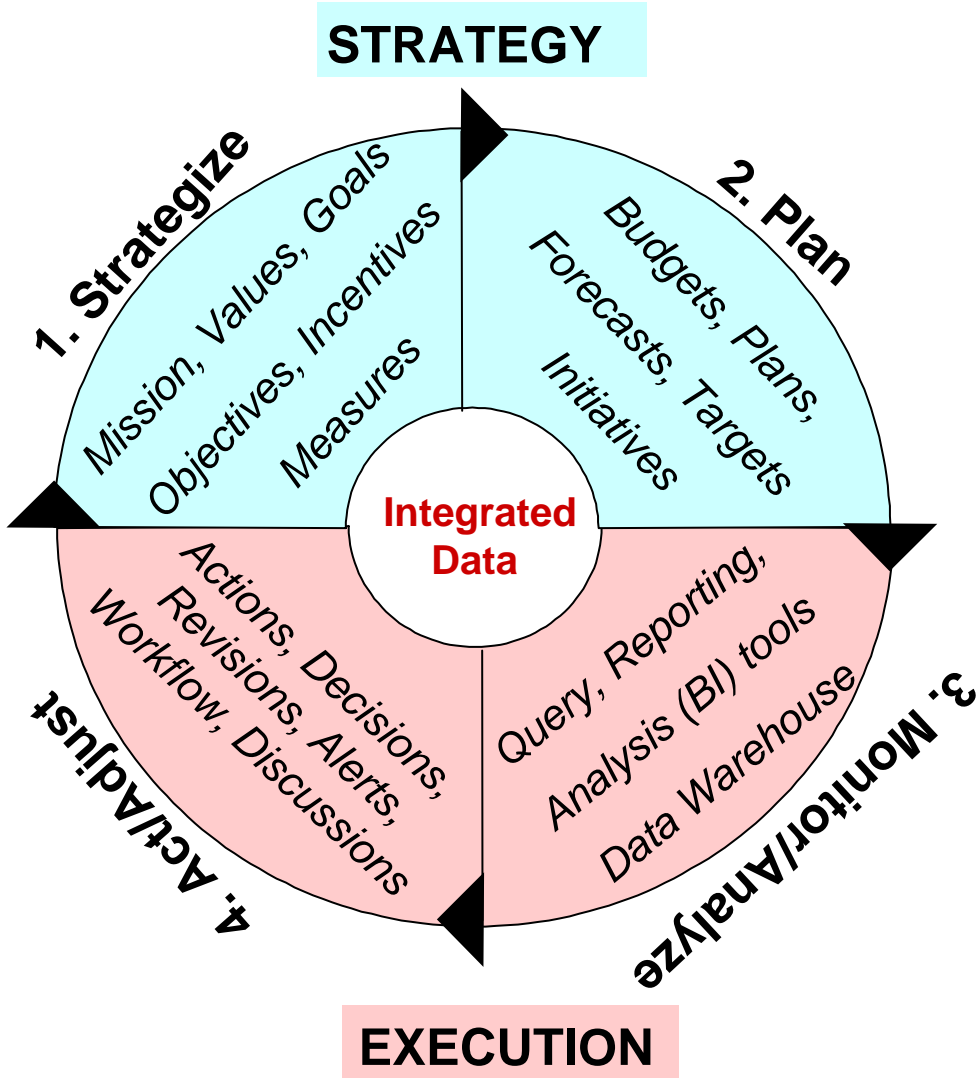


Corporate Performance Management

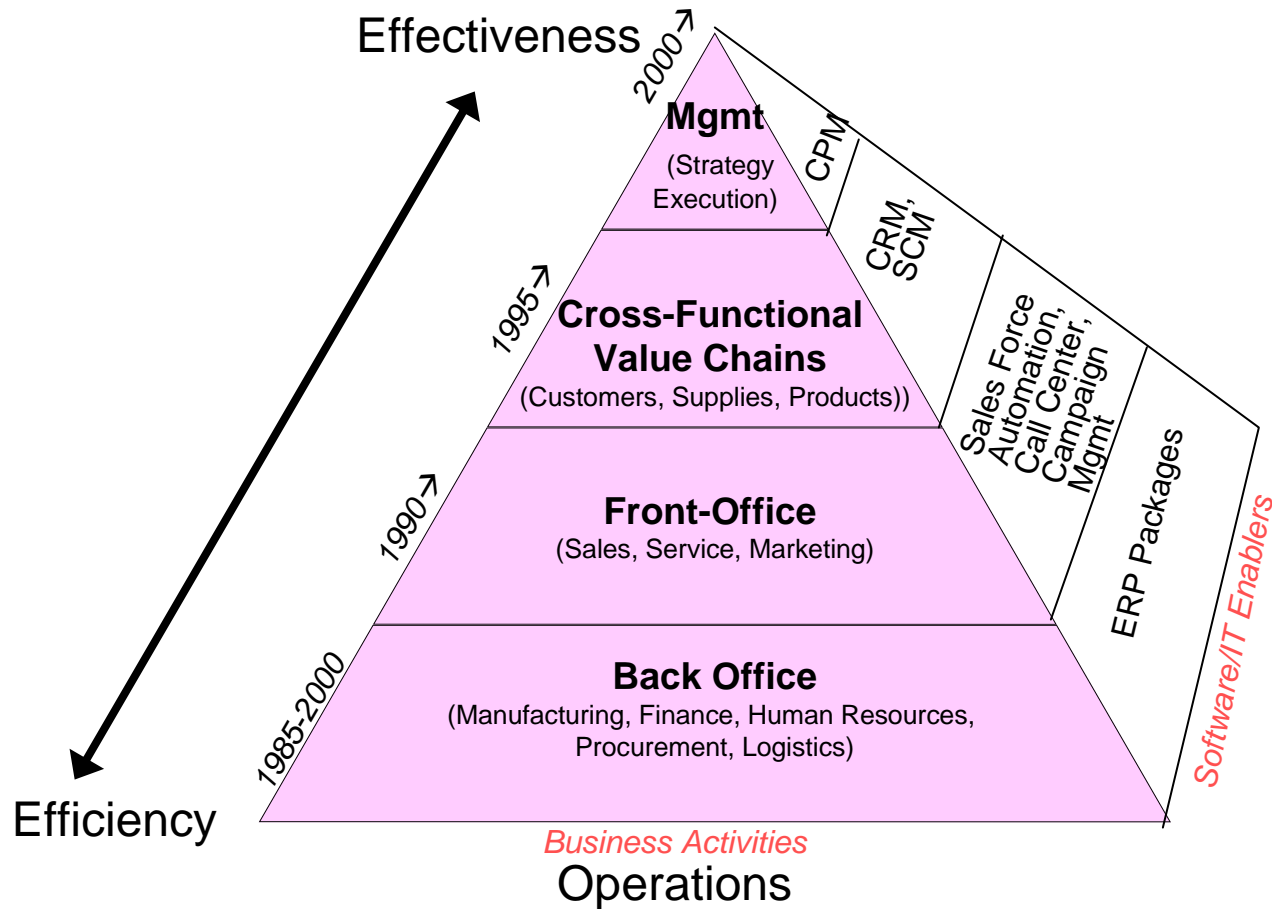


Performance Dashboards

Corporate Performance Management

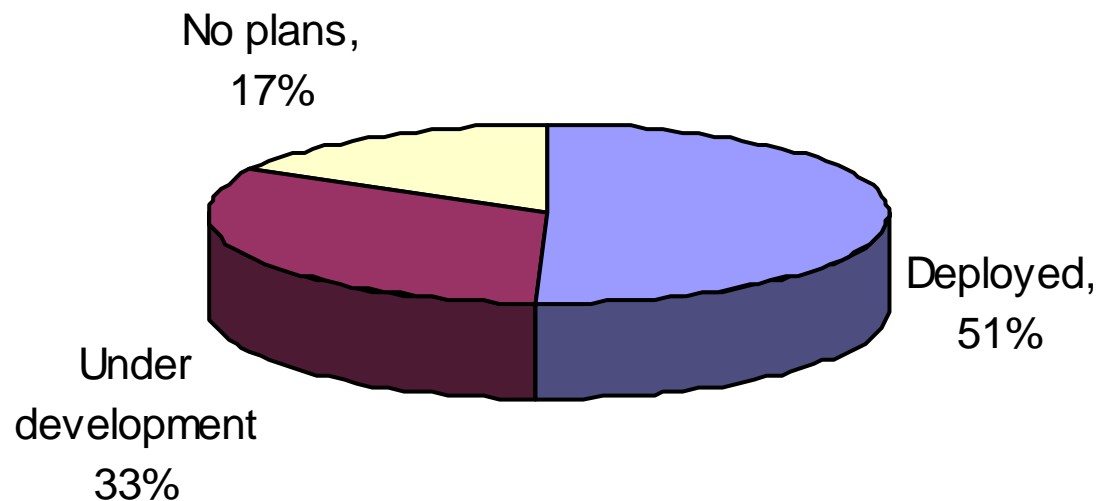


Waves of Software Automation



Why Performance Dashboards?

Status of Performance Dashboards



From Wayne Eckerson, "Development Techniques for Creating Analytic Applications," TDWI, 2005.

Business Week Cover Story

- February 13, 2006

What's On Your Dashboard?



Steve Ballmer
MICROSOFT

Ballmer requires his top officers to bring their dashboards with them into one-on-one meetings. Ballmer zeroes in on such metrics as sales, customer satisfaction, and status of key products under development.



Ivan Seidenberg
VERIZON

Seidenberg and others can choose from more than 300 metrics to put on their dashboards, from broadband sales to wireless defections. Managers pick the metrics they want to track, and the dashboard flips the pages 24 hours a day.



Jeff Immelt
GENERAL ELECTRIC

Many GE executives use dashboards to run their day-to-day operations, monitoring profits per product line and fill rates for orders. Immelt occasionally looks at a dashboard. But he relies on his managers to run the businesses so he can focus on the big picture.



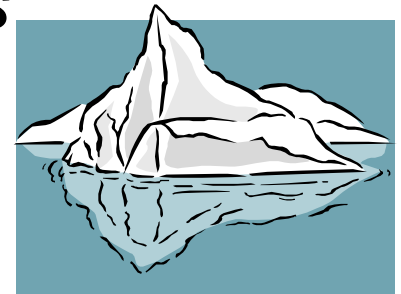
Larry Ellison
ORACLE

A fan of dashboards, Ellison uses them to track sales activity at the end of a quarter, the ratio of sales divided by customer service requests, and the number of hours that technicians spend on the phone solving customer problems.

Tactical Drivers

Resonates with users

- *Monitors status of several areas on one screen*
- *Graphical view of key metrics*
- *Alerts users to exception conditions*
- *Click to analyze and drill to detail*
- *Customized views based on role*
- *Personalized views based on interest*
- *No training required!*



Tactical Drivers (cont.)

Rich data

- *Blends data from multiple sources*
- *Both detailed and aggregated*
- *Both historical and real-time*

Empowers workers

- *Focuses users on what's really important*
- *Shows them how their contributions count*
- *Motivates with goals, competition, & incentives*
- *Drives proactive intervention*

Strategic Drivers

Aligns the business

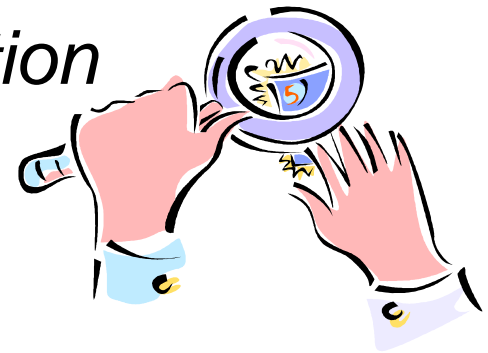
- *Everyone uses the same data*
- *Everyone uses the same metrics*
- *Everyone works toward the same strategy*

Improves communication

- *Tool for communicating strategy*
- *Managers & staff - collaboration*
- *Among departments - coordination*

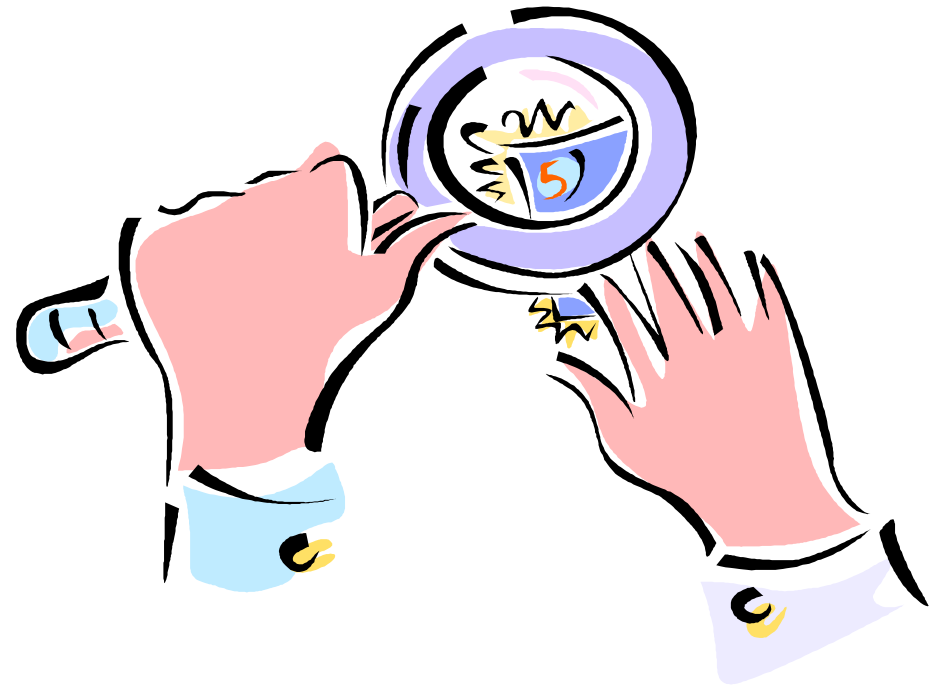
Improves visibility and compliance

- *Fewer surprises*



Strategic Drivers - The “Five Cs”

-  Communicate
-  Compare
-  Collaborate
-  Coordinate
-  Congratulate



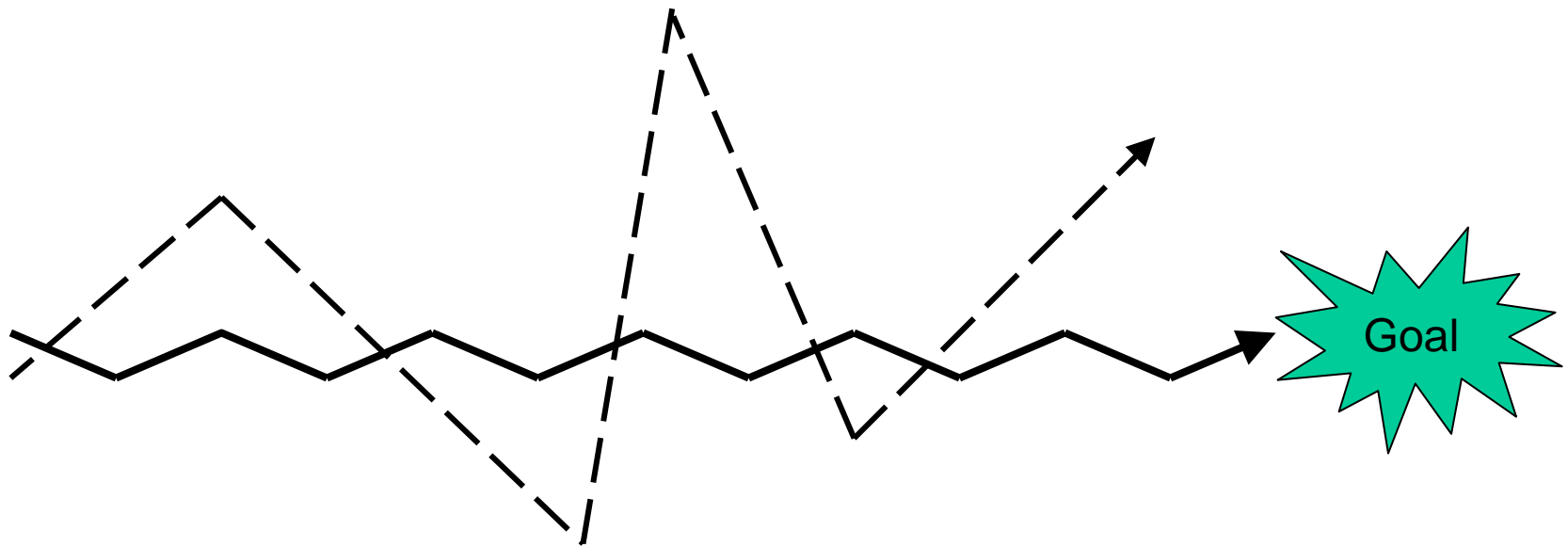
Agent of Organizational Change

Compliance Management Dashboard
Sarbanes-Oxley Compliance

2004 - Q4 | -- All Entities -- | Assessments | Settings

Controls	Confidence	Compliance																																																																																																															
<p>Processes <input checked="" type="radio"/> Status <input type="radio"/> Pct</p> <ul style="list-style-type: none"> ● (CO) COSO / Entity ● (EX) Expenditure ● (FA) Fixed Assets ● (FR) Financial Close & Reporting ● (IM) Inventory Management <p>Business Activities</p> <ul style="list-style-type: none"> ● (CO-CA) Control Activities ● (CO-CE) Control Environment ● (CO-IC) Information & Communication ● (CO-MO) Monitoring ● (CO-RA) Risk Assessment ● (EX-10) Purchasing ● (EX-20) Processing Accounts Payable ● (EX-30) Processing Disbursements ● (EX-40) Maintaining Supplier Master File ● (FA-05) Acquiring Fixed Assets <p>Tasks</p> <ul style="list-style-type: none"> ● (CO-CA-10) Policies & Procedures ● (CO-CA-20) Safeguarding Assets ● (CO-CA-30) Segregation of Duties ● (CO-CA-40) Planning & Budgeting ● (CO-CE-10) Integrity and Ethical Values ● (CO-CE-20) Commitment to Competence ● (CO-CE-30) Board of Directors or Audit Committee ● (CO-CE-40) Management's Philosophy and Operatin ● (CO-CE-50) Organizational Structure 	<p><input checked="" type="radio"/> Show Status <input type="radio"/> Show Pct</p> <p>By Entity</p> <table style="width: 100%; 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Charting a Course



--- Direction without a Performance Dashboard
— Direction with a Performance Dashboard

What are Performance Dashboards?

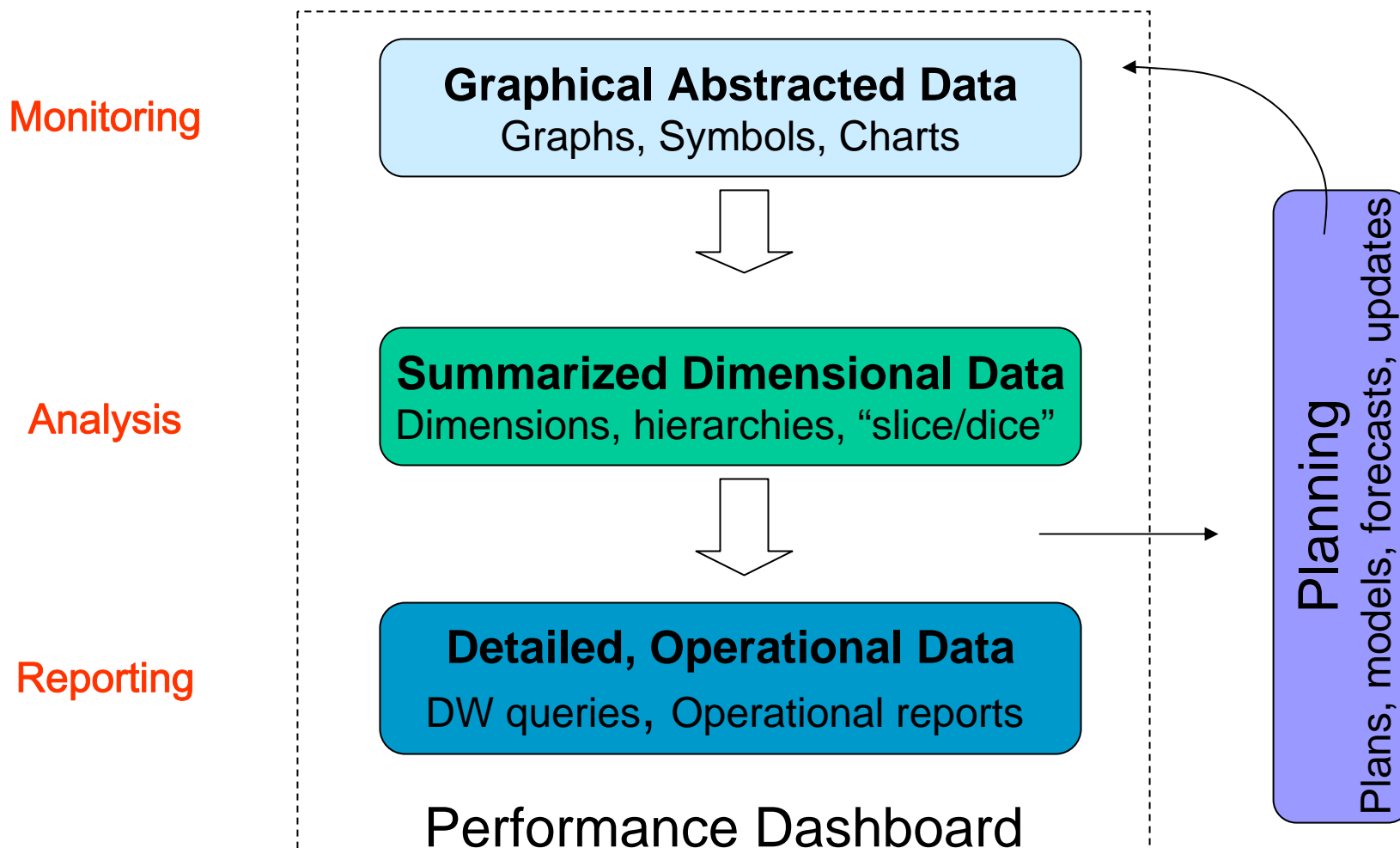
The “Three Threes”

- Three Applications
- Three Layers
- Three Types

Three Applications

	Monitoring	Analysis	Collaboration
Purpose	Convey performance status & trends at a glance	Analyze exceptions and find root cause	Collaborate, plan, and ACT
Elements	<ul style="list-style-type: none"> - Multi-paneled screens - Graphical metrics (i.e. dials, gauges, symbols) - Charts and tables - Status, trend, and threshold indicators - Color-coded, conditional formatting - Alerts: Web-based, email, other 	<ul style="list-style-type: none"> - Drill down/up hierarchies - Pivot and swap out dimensions - Drill through to operational data - Time series, segmentation, predictive, and other analyses - Reporting 	<ul style="list-style-type: none"> - Telephone - Meetings - Email (notification) - Annotations - Threaded discussions - Recommended analysis, actions - Publish to server - Workflow - Triggers, Updates

Three Layers of Information



Dashboard Usage

“Our executives will drill one or two levels down before they call someone who can fix the problem, while our managers will often drill three or four layers down before they make a call.”



- *Thomas Tomlinson, director of BI for Bull Moose Tube, a steel manufacturer in Chesterfield, MO.*

Dashboards vs Scorecards

- Distinct?
- Synonymous?
- Both?

Rule of thumb:
Use whatever term business
users prefer!

Dashboards vs Scorecards

	Dashboard 	Scorecard 
Purpose	Measures current activity	Charts progress
Users	Executives, managers, staff	Executives, managers, staff
Updates	“Right time” feeds	Periodic snapshots
Data	Events	Summaries
Queries	Run against remote systems	Run against local data mart
Display	Charts	Symbols

Dashboards and scorecards are visual interfaces for **monitoring** business performance

Three Types

	Operational	Tactical	Strategic
Focus	Monitor operations	Optimize process	Execute strategy
Emphasis	Monitoring	Analysis	Collaboration
Users	Supervisors+	Managers+	Executives+
Scope	Operational	Departmental	Enterprise
Information	Detailed	Detailed/Summary	Summary
Updates	Intra-day	Daily/Weekly	Monthly/Quarterly
“Looks like a...”	“Dashboard”	“BI Portal”	“Scorecard”

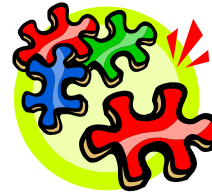
Pretenders to the throne

– *Too Flat*



“A prettified spreadsheet”

– *Too Isolated*



“Another spreadmart”

– *Too Manual*



“Not scalable or sustainable”

– *Too Cheap*



“You get what you pay for!”

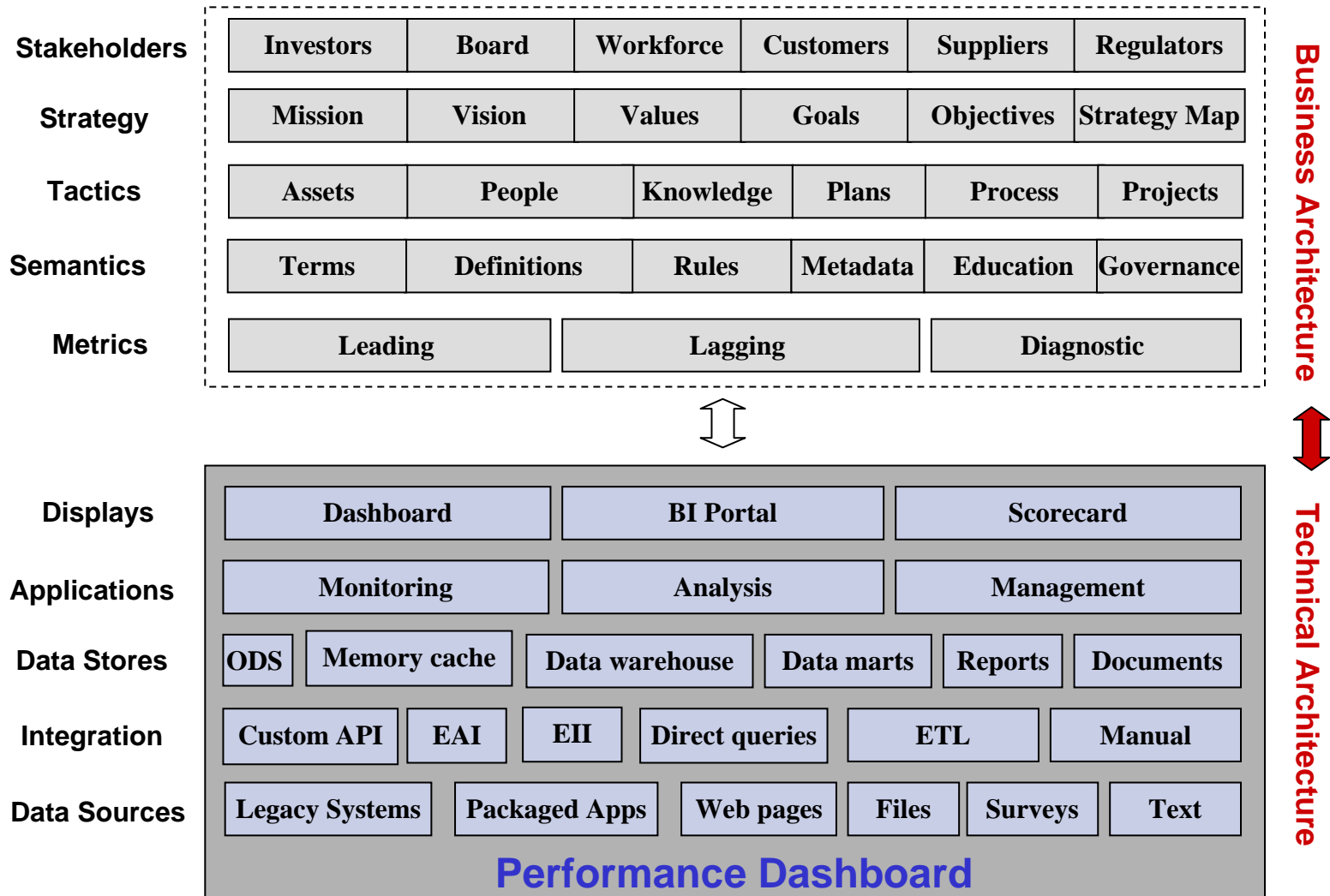
How Do You Architect a Performance Dashboard?

Three Architectures

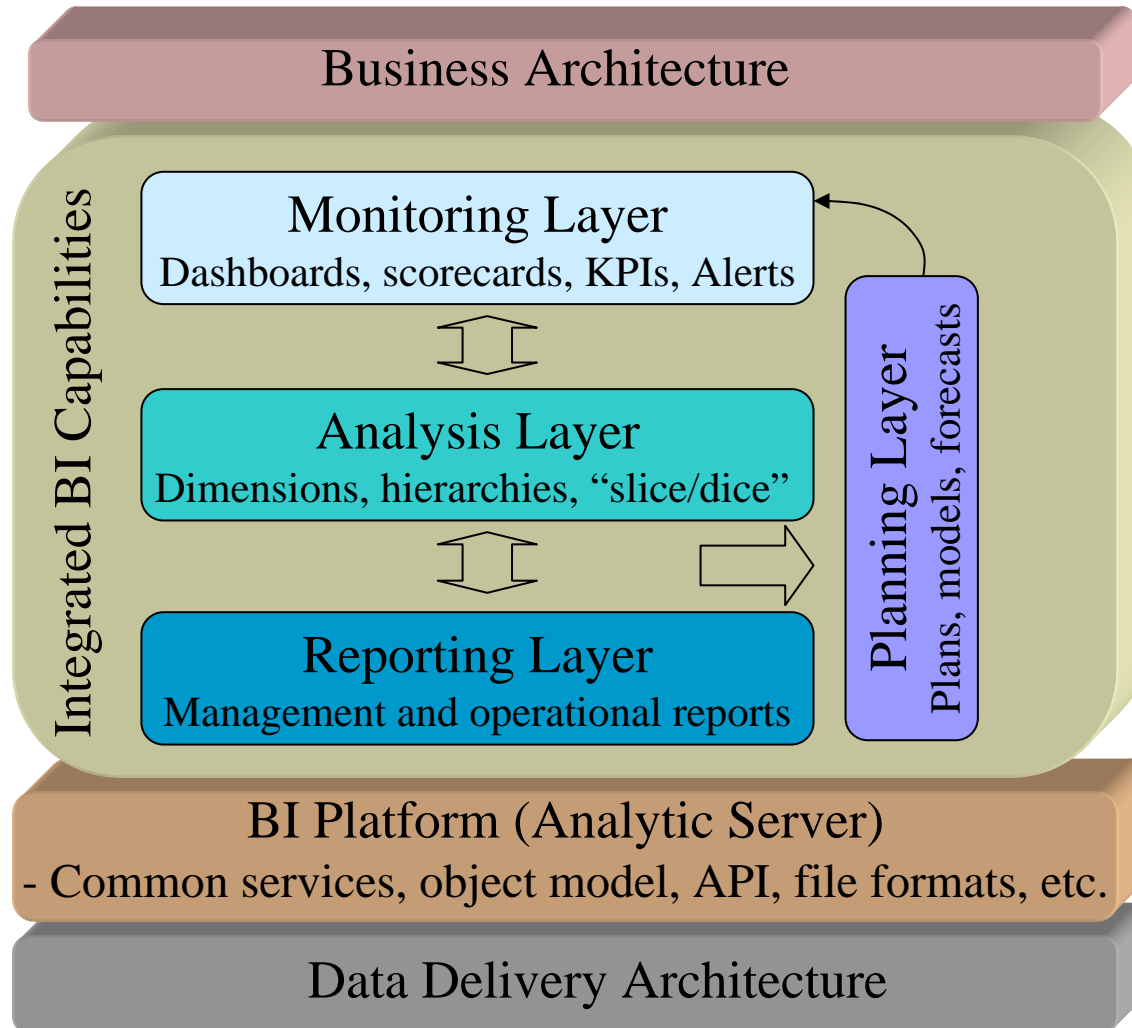


Business Architecture
BI Architecture
Data Architecture

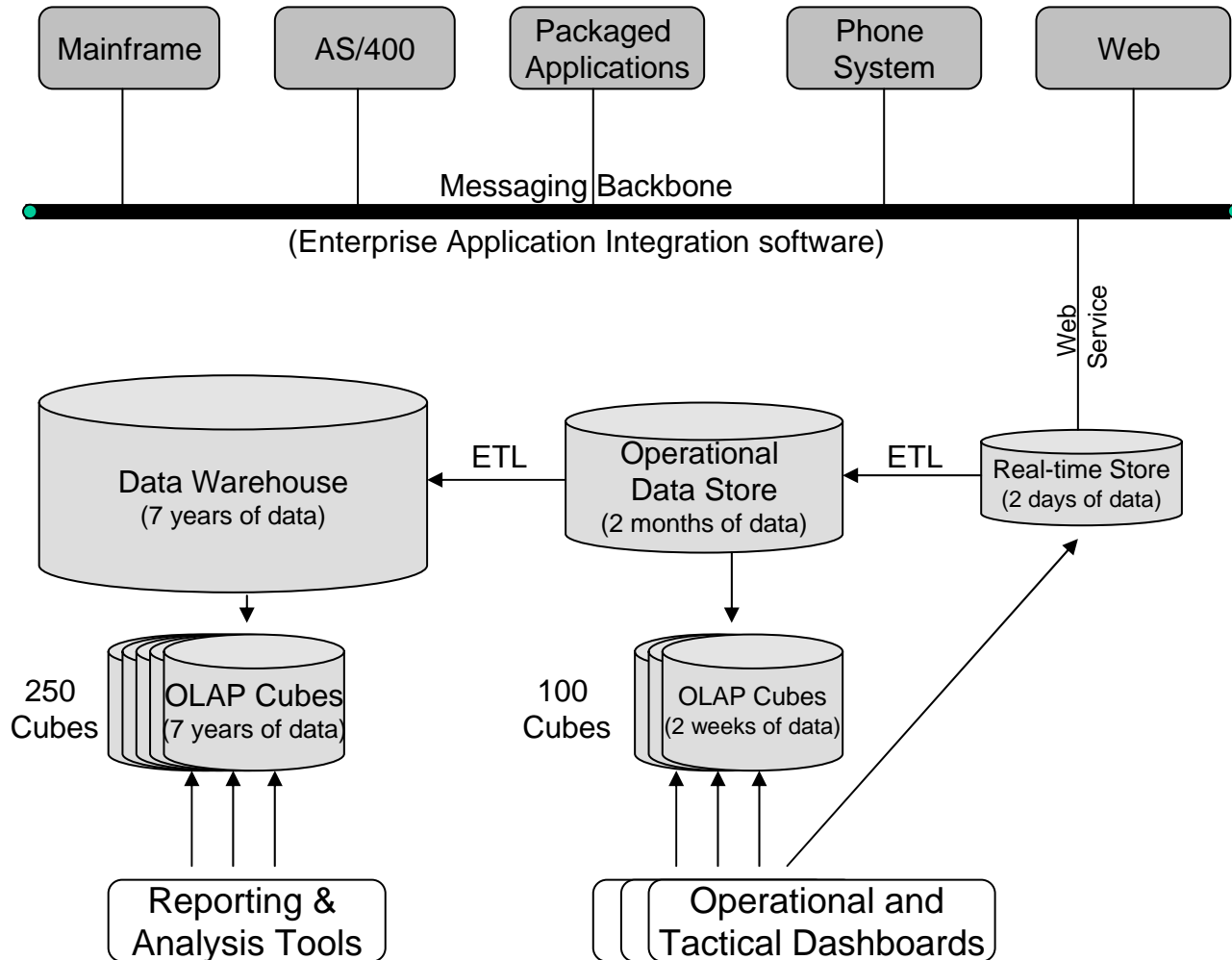
Business architecture



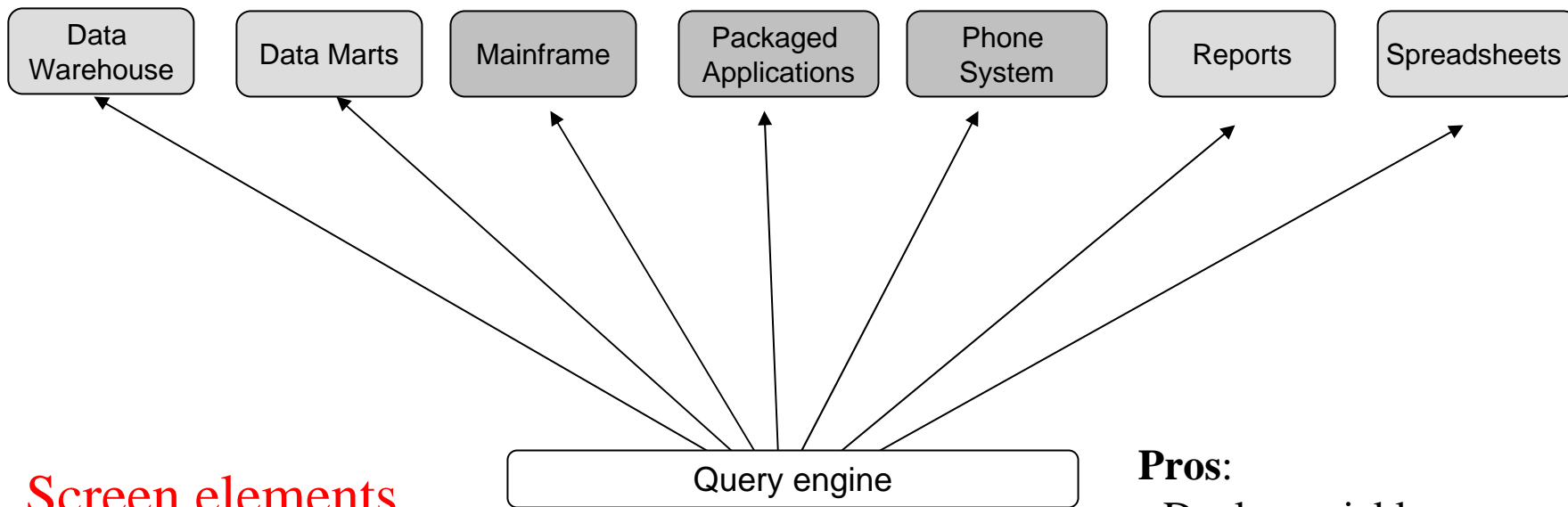
BI Architecture



Data Architecture – Quicken Loans



Direct Query Architecture



Screen elements
linked directly to
individual queries



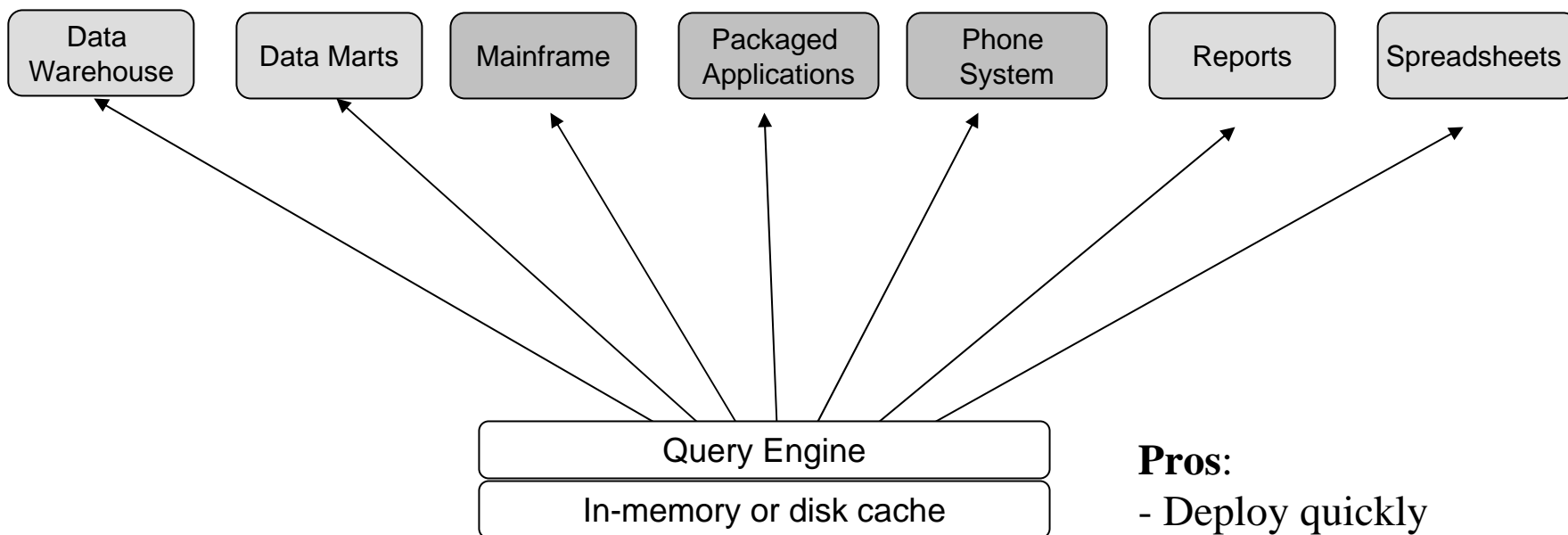
Pros:

- Deploy quickly
- Low cost

Cons

- No depth, limited drill down
- No dimensions
- Hard-wired queries

Query and Cache Architecture



Queries populate a queryable cache



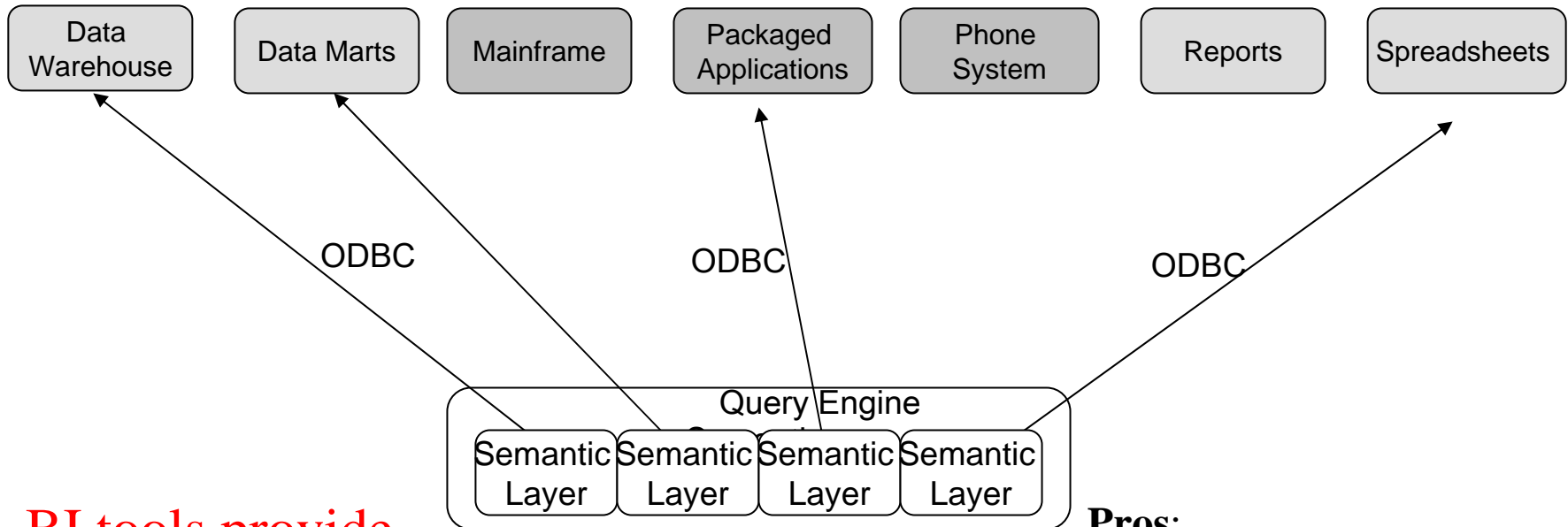
Pros:

- Deploy quickly
- Fast response
- Rapid navigation

Cons

- Static data sets

BI Semantic Layer



BI tools provide query objects that represent a database in business terms for users.



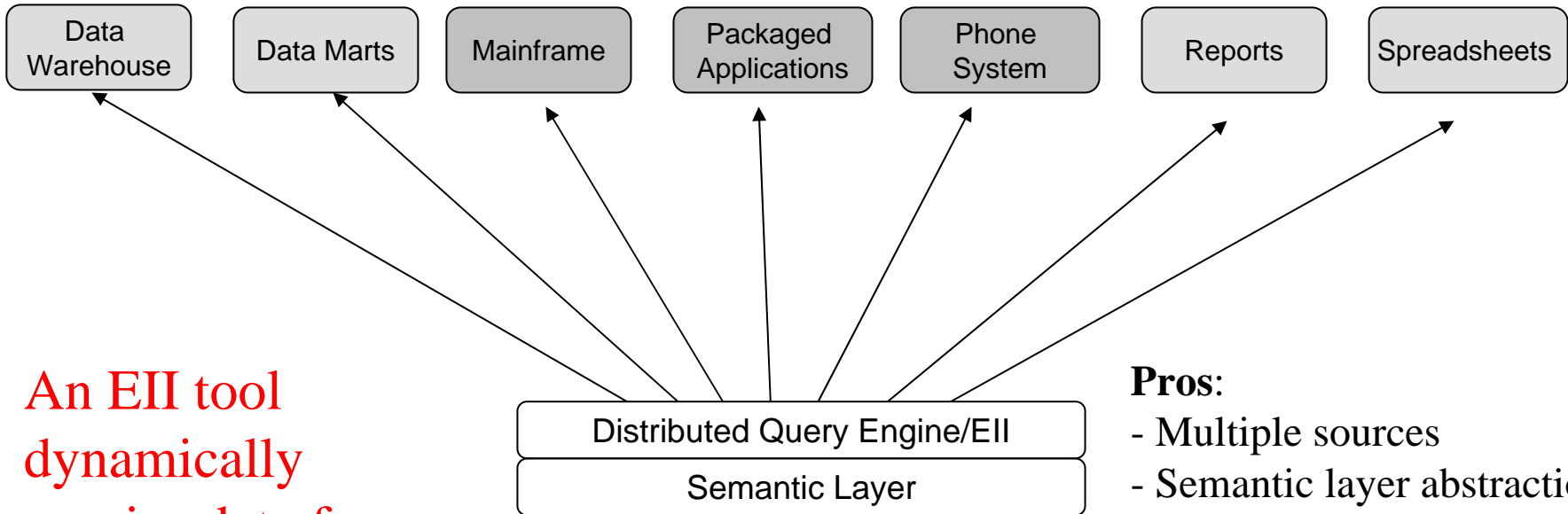
Pros:

- Abstract query objects
- Dimensionalized views

Cons

- Generic ODBC connections
- Primarily historical data in DW

Federated Query Architecture



An EII tool dynamically queries data from multiple sources to populate screen elements.



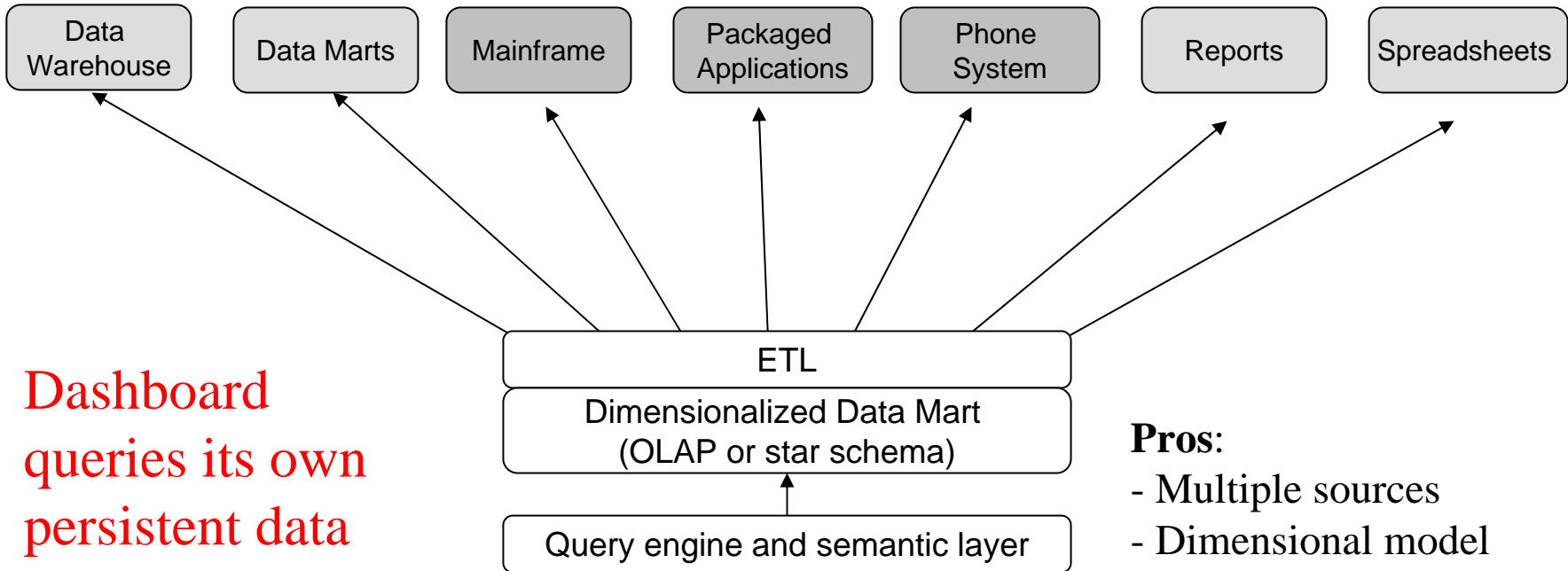
Pros:

- Multiple sources
- Semantic layer abstraction
- Quick to deploy
- Prototype before you persist

Cons

- No history
- Data quality issues
- Complexity

Data Mart Architecture



Dashboard queries its own persistent data mart loaded in batch.

Pros:

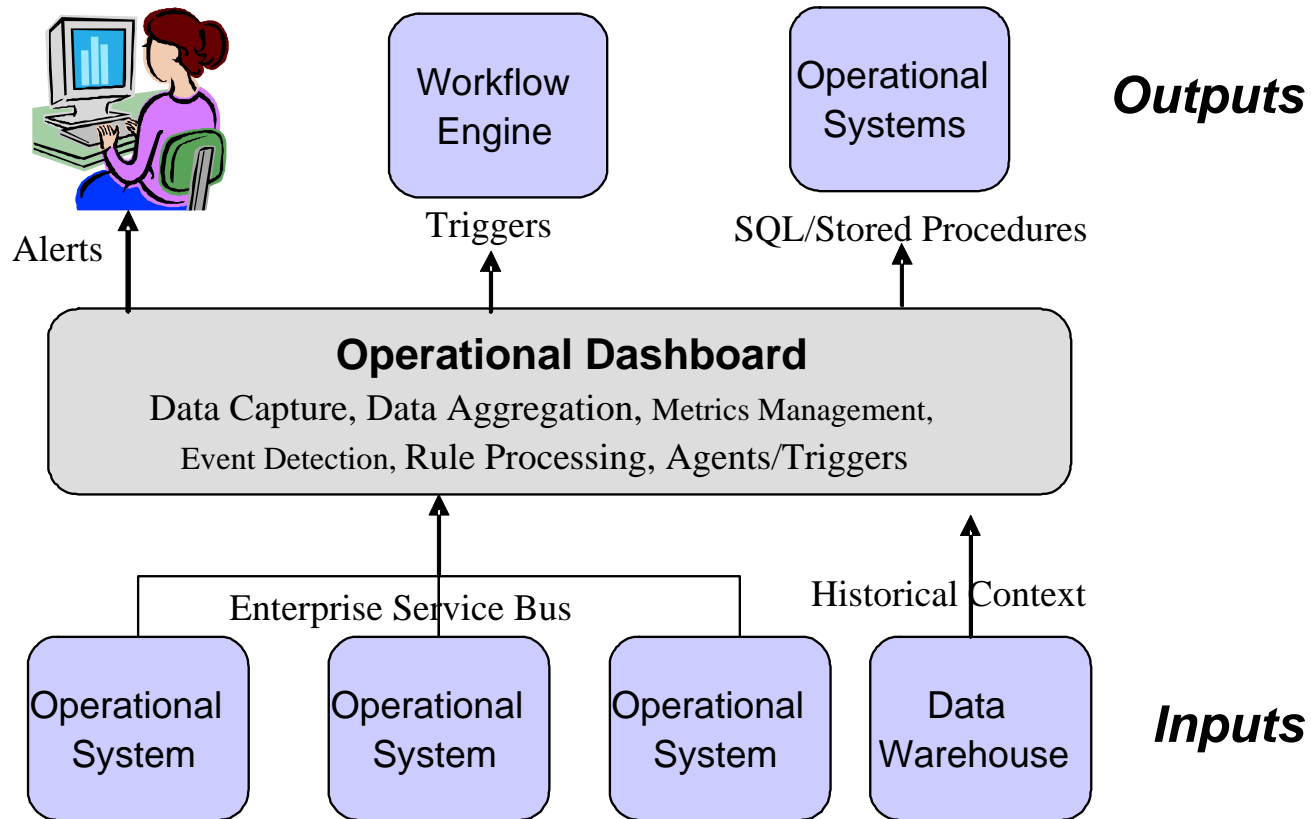
- Multiple sources
- Dimensional model
- Historical context
- Fast complex queries

Cons

- No right time data
- Non-integrated?



Event-driven Architecture



“Manual” Architecture



Use when....

- Data doesn't exist
- Strategy is short-term
- Want to prototype the KPIs
- Executives can't wait

But don't be fooled...

- Permanent prototypes
- No scale, depth, value
- Reputations on the line!

Performance Dashboard Case Studies

Operational Dashboard Case

- Quicken Loans

- The largest U.S.-based online lender
 - *\$12 billion in loans in 2004, 2,500 employees*
 - *Sells mortgages via call center and Web*
- Web Call Center in Livonia, Michigan
 - *500+ “mortgage lenders” on one giant floor*
 - *Disruptions costs millions of dollars an hour*

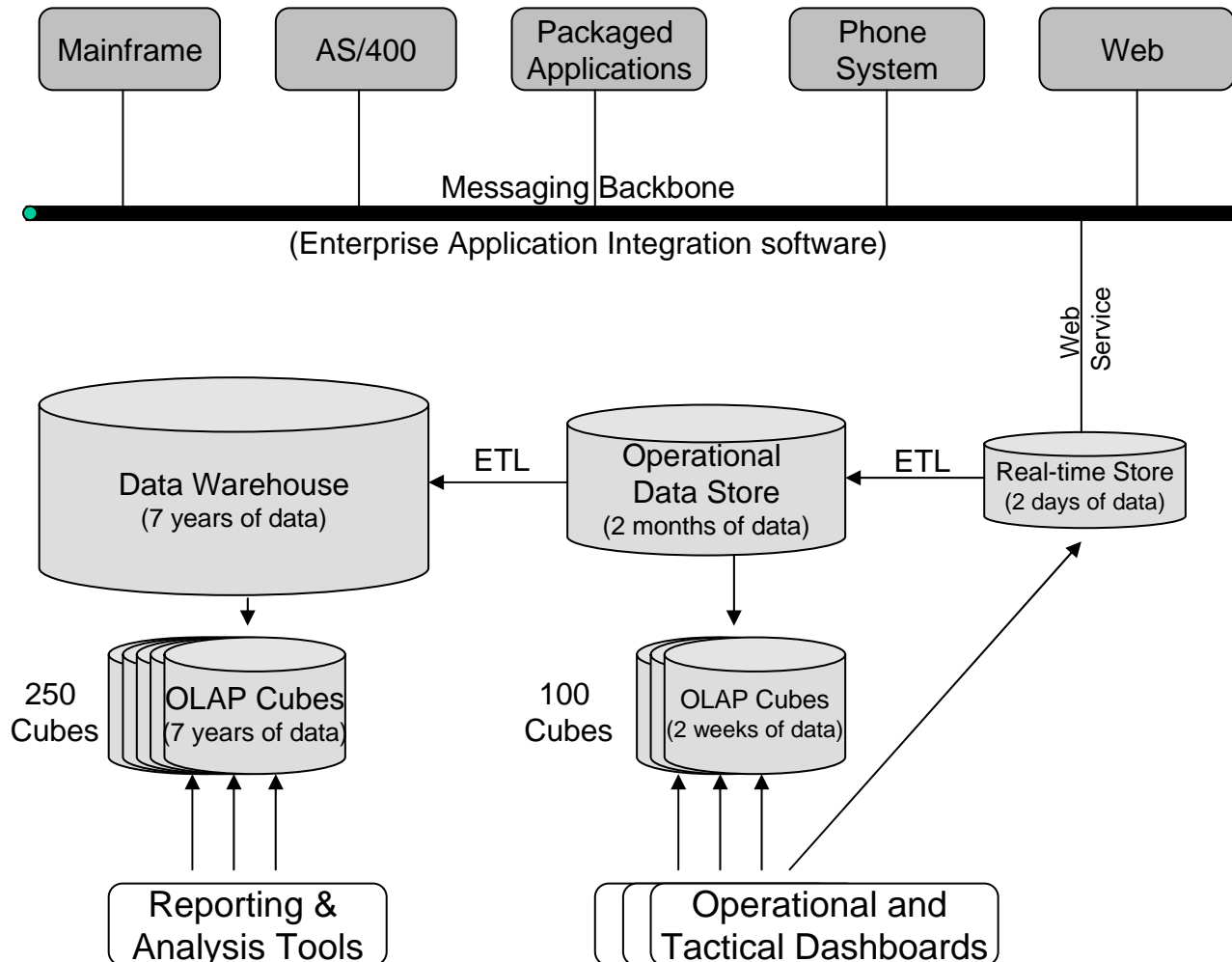
Situation

- Company philosophy/culture
 - *What gets measured, gets approved*
 - *Leverage “velocity as a competitive problem”*
- Information systems – pre-2002
 - *Reports run off operational systems*
 - Run slowly, Deliver obsolete data
 - *Disjointed data for historical analysis*
 - Took three weeks to do 18-24 month analysis
 - *Executives and users very frustrated!*
- Negative view of data warehousing/OLAP

Solution

- Right-time data warehousing architecture
 - *1 year at \$1 million*
 - *Trickle fed OLAP cubes*
 - *Existing ESB*
- Different dashboards for different users
 - *Dashboard ticker – mortgage specialists*
 - *Kanban reports – Sales managers, TV monitors*
 - *Managerial dashboards – Call center managers*
 - *Analytical dashboards/BI tools – Analysts*
- Metrics
 - *Phone statistics, Number and quality of leads, Sales pipeline, Web traffic, Commissions, products mix*

Quicken Loans Architecture

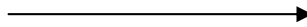


Dashboard Ticker

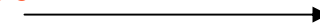
Personal and group
metrics updated daily



Personal and group
metrics updated instantly



Personal forecasts updated
every 15 minutes



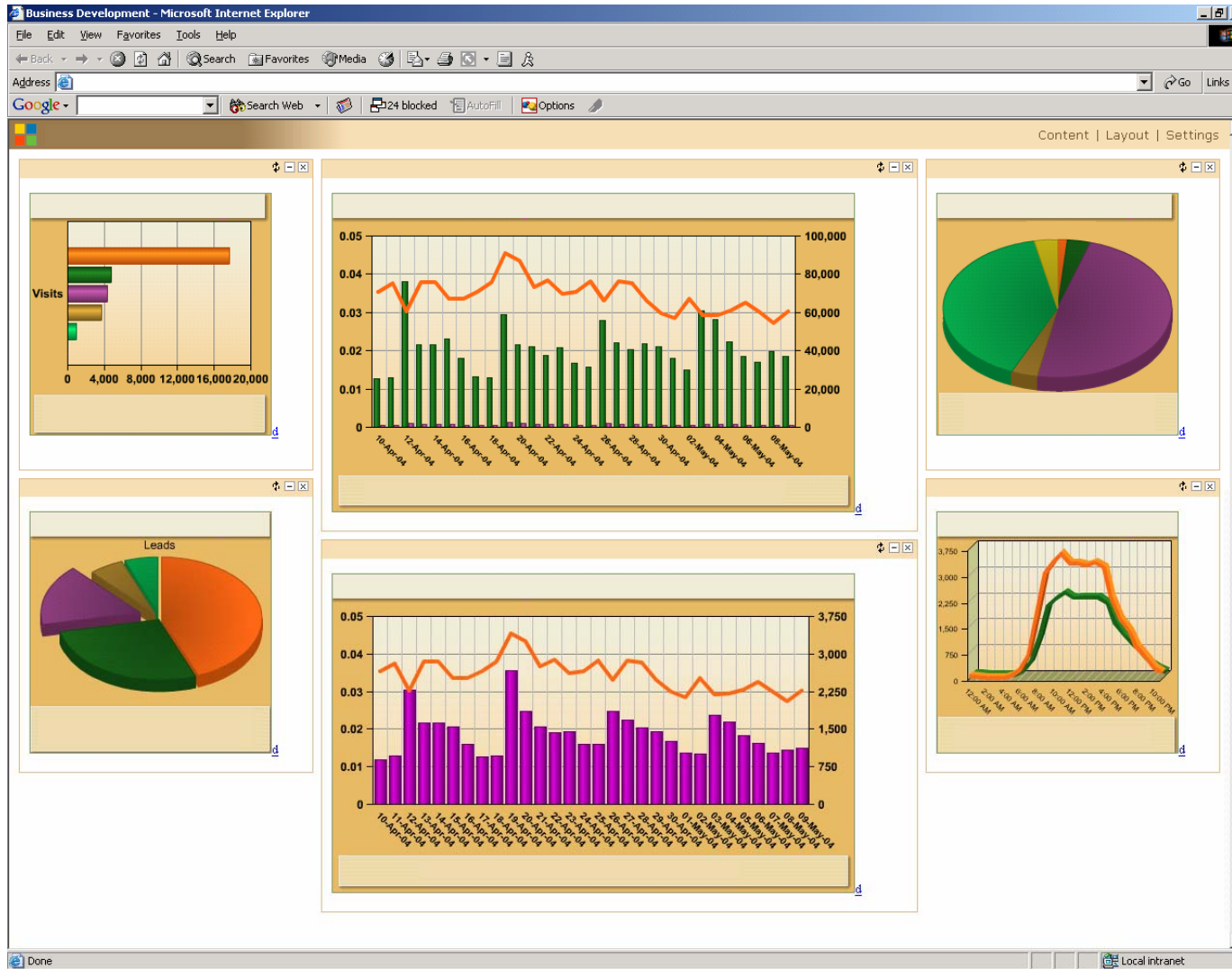
User ID: MyUserName			
Team: MyTeamName			
Name: MyName			
Date: 3/30/2005			
Data Source 1		12:30PM	
Today			
Measure 1	●	1 for	\$710,000.00
Measure 2	●	2 for	\$186,000.00
Measure 3	●	4 for	\$558,100.00
Measure 4	●	3 for	\$482,700.00
MTD			
Measure 5	●	43 for	\$6,872,275.00
Measure 6	●	42 for	\$5,864,275.00
Measure 7	●	44 for	\$6,212,775.00
Measure 8	●	43 for	\$7,339,800.00
Data Source 2		12:15PM	
Today			
Measure 1			7
Measure 2	●		24
Measure 3	●		23
Measure 4	●		6
Measure 5	●		4
Measure 6	●		2
Measure 7			0
Measure 8			8
Measure 9			5
Measure 10			13
Data Source 3		7:30AM	
MTD (7 Day Lag)			
Measure 1	●		40.59 %
Measure 2	●		14.76 %
Measure 3	●		14.02 %
Measure 4	●		12.55 %
Measure 5	●		6.64 %

Kanban Report

Date: 17-Dec-04

	Metric 1	Metric 2	Metric 3	Metric 4	Metric 5	Metric 6	Metric 7	Metric 8	Metric 9	
Employee 1	1,187	855		25	23	21	9	4	8	20
Employee 2	86	86		1	2	7				
Employee 3	63	59		3		2	1	1	1	8
Employee 4	25	25		2	2	1	1		1	
Employee 5	102	61		3	5					
Employee 6	52	42		2	3					2
Employee 7	165	81		3	1					
Employee 8	196	111		2	1					
Employee 9	59	57			5	3			4	1
Employee 10	100	49		3		1				
Employee 11	99	93		1		3		1		3
Employee 12	48	43		1		1	5			2
Employee 13	44	39		3		1		1	1	
Employee 14	46	45		1	2	1	1			
Employee 15										
Employee 16	28	18			2	1	1	1		4
Employee 17	74	46							1	

Managerial Dashboard



Tactical Dashboard Case

International Truck and Engine

- \$9.7 billion manufacturer of trucks, buses, diesel engines, and parts based in Illinois
- Key business issues:
 - *Market reality: Global competition, new regulations, emerging markets*
 - *Goals: 1) \$15b in revenues 2) reduced costs, 3) improved quality, 4) reduced risk*

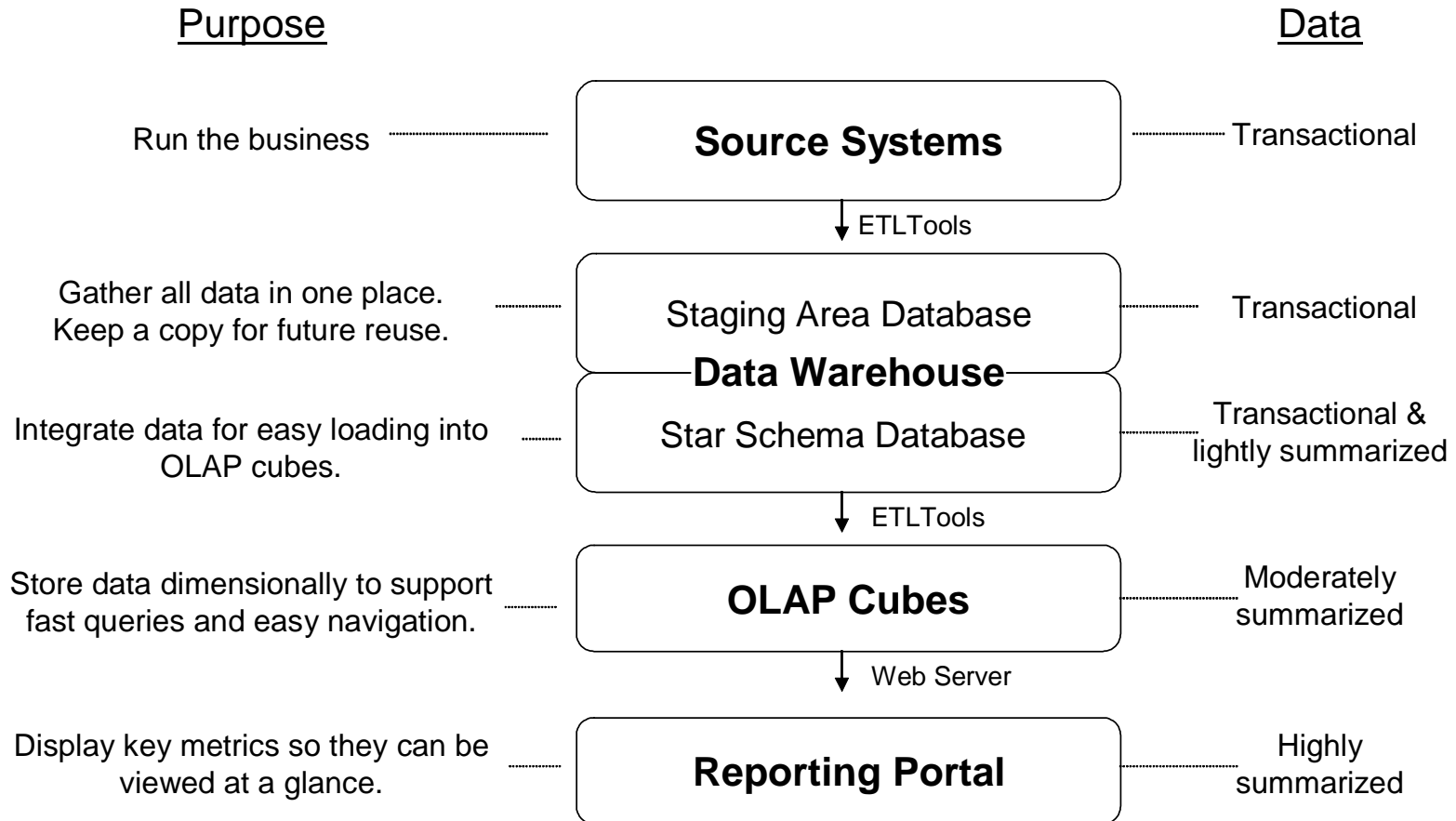
Situation

- Finance department goals in 2001:
 - *Provide access to financial information any time*
 - *Focus on analysis rather than data collection*
 - *Deliver proactive rather than reactive analysis*
 - *Use financial data as a predictive tool for decisions*
- Programs
 - *Accelerate closing of books*
 - *Standardize company's information infrastructure*
 - *Replace legacy systems with packaged applications*
 - *Implement a Web-based "reporting portal."*

KBI Portal

- Purpose
 - *Deliver actionable information to financial analysts*
- Scope
 - *Spans 32 source systems across five divisions*
 - *130 key business indicators, updated daily*
 - *Supports 500 financial executives, managers, and analysts*
- Upshot
 - *Bridges gulf between finance and operations*
 - *Replaces hodge-podge of paper reports*
 - *Saves analysts time creating custom reports*
 - *Shuts down dozens of reporting systems*

Architecture



Monitoring Layer

http://brkaspno/kbi/source/frames.asp - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://brkaspno/kbi/source/frames.asp

Key Business Indicators (KBI)
KBI Site Enterprise Data Warehouse

My KBIs Truck Engine IFG Corporate Parts

Welcome Jim

Truck-Financial Metrics

▲ Total Truck

▲ VCGAAP Net Sales, Truck 03/31/2003

▲ VCGAAP Total Engineering, Truck 03/31/2003

Truck-Online Documents

- Cost of Poor Quality 03/14/2003
- Daily Production & Delivery Metrics 03/28/2003
- Inventory Turns Initiative 03/14/2003
- Monthly Financial Package 03/14/2003
- Net Price Realization Analysis 03/10/2003
- Peel the Onion 03/17/2003
- Regional Customer View 03/28/2003
- Starks Truck and Off-Highway Ledger 03/04/2003
- U.S. Indexed Pricing Trends 03/10/2003
- World Wide Net Order Receipts 03/31/2003

Truck-Operational Metrics

▲ Total Truck

▲ North American Chargeouts 03/31/2

▲ Total Factory Shipments 03/31/2

▲ Total Retail Deliveries 03/31/2

Truck-Stoplights

▲ Total Truck

✓ Total Monthly Net Orders vs. Production Status 03/31/2003
7,059 is NOT Between 0 AND 0

Engine-Engineering Support Documents

- Operating Statement by Department 03/07/2003
- Operating Statement G/L Detail 03/07/2003

Local intranet

Start Office Calendar - Microsof... http://brkaspno/... 2003BPAppFormat... 9:03 AM

Analysis Layer

The screenshot displays a web browser window with two overlapping pages. The background page is titled 'Key Business Indicators (KBI)' and 'Enterprise Data Warehouse'. The foreground page is titled 'Truck Unit & Sales Analysis' and 'Truck Unit & Sales Analysis'.

The 'Truck Unit & Sales Analysis' page features a navigation bar with 'Go', 'Help', and 'Exit' buttons. Below this is a toolbar with 'Detail', 'Excel', 'Print', and 'Refresh' buttons. The main content area includes a chart titled 'Factory Invoiced' and a data table.

Factory Invoiced Chart Data:

Fiscal Year	Actual
2002 11 NOVEMBER	6,575
2003 03 MARCH	7,134
2003 07 JULY	6,807
2003 03 MARCH	7,350

Table Data:

Scenario	2002 12 DECEMBER	2003 01 JANUARY	2003 02 FEBRUARY	2003 03 MARCH
Actual	6,575	7,134	6,807	7,350

The right-hand side of the application shows three additional charts under the heading 'Truck-Operational Metrics':

- Total Truck:** North American Chargeouts (03/31/2). A bar chart showing monthly data from Nov to Sep with a legend for Plan, Ford, and Actual.
- Total Factory Shipments:** (03/31/2). A bar chart showing monthly data from Nov to Sep with a legend for Actuals.
- Total Retail Deliveries:** (03/31/2). A bar chart showing monthly data from Nov to Sep.

Detail Transaction Layer

Truck Unit & Sales Analysis - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://brkaspno/trkuntsa/source/vin_list.asp

Truck Unit & Sales Analysis
Details
Enterprise Data Warehouse

Go Help Exit

Analysis Details
3/31/03 9:50:29 AM

Metric: Factory Invoiced
UOM: Vehicle Count
Plant: CHATHAM ASSEMBLY PLANT

Timeframe: 2003 03 MARCH
Scenario: Actual

Vin Number	Job Number	Order Number	Order Date	Company Location	Business Model	Model 5	Customer	Sales Operation	TSR	Factory Invoiced
2HSCDAH24C082293	082293	707212B	2/20/03	020	9200	L9217	TOYS-R-US	667949	142	1
2HSCDAH44C082294	082294	707212B	2/20/03	020	9200	L9217	TOYS-R-US	667949	142	1
2HSCDAH64C081079	081079	704042A	1/31/03	020	9200	L9217	SALEM TRUCK LEASING IN	830810	142	1
2HSCDAH64C082295	082295	707213B	2/20/03	020	9200	L9217	TOYS-R-US	667949	142	1
2HSCDAHRX4C083002	083002	707213B	2/26/03	020	9200	L9217	TOKMAKJIAN LIMITED 2	257147	920	1
2HSCDAPN04C082844	082844	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN14C082836	082836	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN24C080092	080092	707680B	2/24/03	020	9200	L9217	WHITLEY MOBILE HOMES,	846519	222	1
2HSCDAPN24C082845	082845	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN34C082837	082837	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN34C082840	082840	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN54C082838	082838	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN54C082841	082841	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN74C082839	082839	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN74C082842	082842	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAPN94C082843	082843	707680B	2/24/03	020	9200	L9217	MOTOR CARGO INC. - 200	737460	226	1
2HSCDAXN84C080906	080906	703473F	1/31/03	020	9200	L9217	AIM LEASING COMPANY	000114	223	1
2HSCDAXNX4C080003	080003	701911F	1/27/03	020	9200	L9217	AIM LEASING COMPANY	000114	223	1

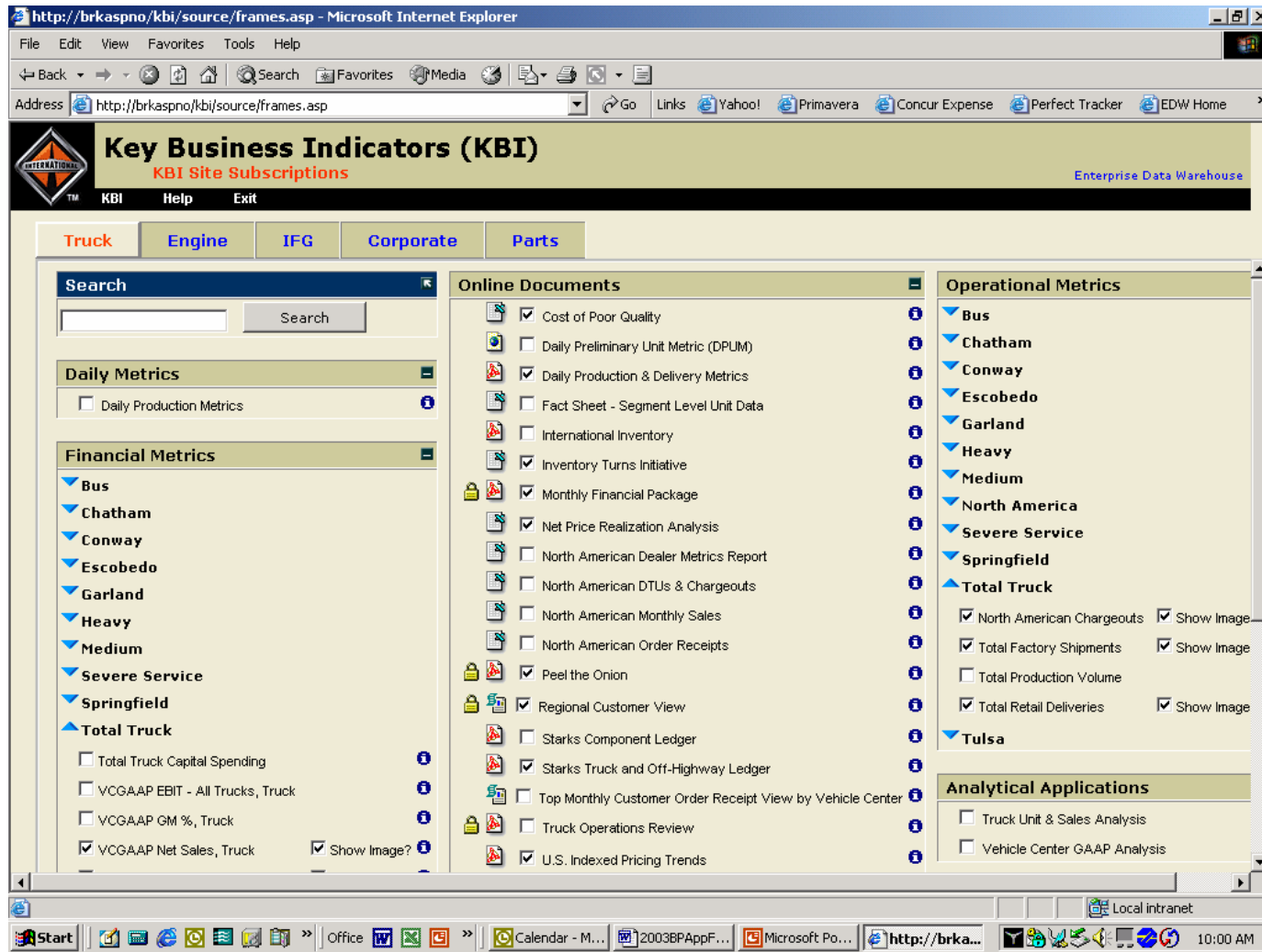
Done

Local intranet

Start Office Inbox... 2003... Micro... http://... http://... Truc... 9:51 AM

Click any VIN to expand full page order/build report

Personalization



Key Business Indicators (KBI)
KBI Site Subscriptions
Enterprise Data Warehouse

KBI Help Exit

Truck Engine IFG Corporate Parts

Search

Search

Daily Metrics

Daily Production Metrics

Financial Metrics

- Bus
- Chatham
- Conway
- Escobedo
- Garland
- Heavy
- Medium
- Severe Service
- Springfield
- Total Truck
 - Total Truck Capital Spending
 - VCGAAP EBIT - All Trucks, Truck
 - VCGAAP GM %, Truck
 - VCGAAP Net Sales, Truck

Show Image?

Online Documents

- Cost of Poor Quality
- Daily Preliminary Unit Metric (DPUM)
- Daily Production & Delivery Metrics
- Fact Sheet - Segment Level Unit Data
- International Inventory
- Inventory Turns Initiative
- Monthly Financial Package
- Net Price Realization Analysis
- North American Dealer Metrics Report
- North American DTUs & Chargeouts
- North American Monthly Sales
- North American Order Receipts
- Peel the Onion
- Regional Customer View
- Starks Component Ledger
- Starks Truck and Off-Highway Ledger
- Top Monthly Customer Order Receipt View by Vehicle Center
- Truck Operations Review
- U.S. Indexed Pricing Trends

Operational Metrics

- Bus
- Chatham
- Conway
- Escobedo
- Garland
- Heavy
- Medium
- North America
- Severe Service
- Springfield
- Total Truck
 - North American Chargeouts
 - Total Factory Shipments
 - Total Production Volume
 - Total Retail Deliveries
- Tulsa

Analytical Applications

- Truck Unit & Sales Analysis
- Vehicle Center GAAP Analysis

Local intranet

Office | Calendar - M... | 2003BPAppF... | Microsoft Po... | http://brka... | 10:00 AM

Metadata

Resource Information - Microsoft Internet Explorer

Address: http://brkaspno/common/includes/ResourceInfo.asp?r=2534

Cost of Poor Quality

Resource Information Enterprise Data Warehouse

General | Description | Abstract

ID: 2534

Name: Cost of Poor Quality

Resource Type: Report Owner: Firks, Jim R

Weight Factor: 0 Last Updated: 3/14/03 9:12:41 AM

Report Type: Excel (xls) Report Frequency: Manual

Location: http://brkaspno / corporate / rpt032

Server Web Directory

Secure Active Display

Purge Graphic

Subject Area: Corporate DSS: None

Start | Office | Inbo... | 2003... | Micro... | http:... | Microsof... | Reso... | 9:55 AM

Strategic Dashboard Case

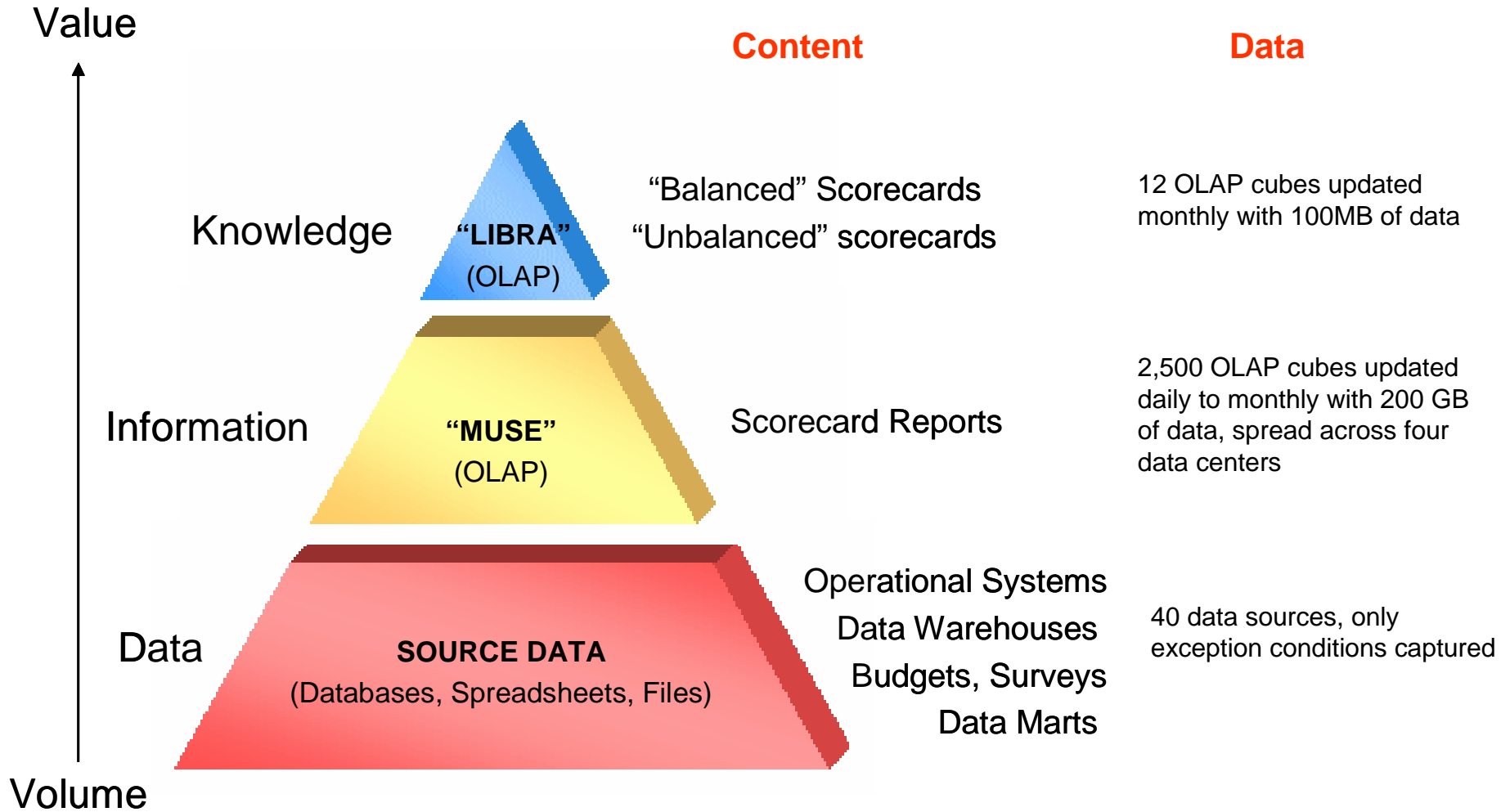
Hewlett-Packard TSG

- HP Technology Services Group
 - *Provides consulting, support services, and software globally for HP*
 - *\$12 billion division of Hewlett Packard*
- Situation
 - *Dozens of overlapping reporting systems with inconsistent metrics*
 - *No consistent means of measuring regional and business unit performance against company objectives and holding individuals accountable*

Solution

- HP Performance Measurement and Management System (PMMS)
 - *Executive scorecard (LIBRA) deployed to EMEA region in 2001, then globally thereafter*
 - *Cascaded down multiple levels in each region*
 - *Implemented unified reporting system underneath (MUSE)*
- Upshot: \$26 million cost-savings in 3 years on \$1m expenditure
 - *\$8.6 million – Shut down dozens of report systems*
 - *\$10.6 million – Reduced time spent looking for reports*
 - *\$1.3 million - Training users on BI tools, etc.*
 - *Raised customer satisfaction scores, lowered missed service-level commitments, correlate to revenue*

PMMS Architecture



Monitoring Layer

Libra 5 ==>make a contribution every day.If it doesn't contribute, it doesn't leave the garage - provided by T&I

PMMS solutions myPMMS Feedback & Support Help Administration

load BSC & Metric load Metric only

to be applied (summary)

solution details <<
 Libra version 5
 HPS WW BSC

To load a different solution in Libra use the 'PMMS solutions' button in the main toolbar (top left corner).

selected BSC View & Metric <<
 ~default HPS Scorecard (12)
 L06 HPS IT Simplification

To select another BSC view and/or metric switch to the 'selection' tab.

Dimension limitation <<
 selected Dimensions
 Business: HP Services
 Geography: HP WorldWide
 Mode: Live
 Source: All Source

To change your Dimension limitation switch to the 'dimension' tab.

User details
 Forms (Admin only)

Libra v5 -- pmms.hp.com

~default HPS Scorecard

[HP Services] [HP WorldWide] [Live] [All Source]

definition print export mail comment

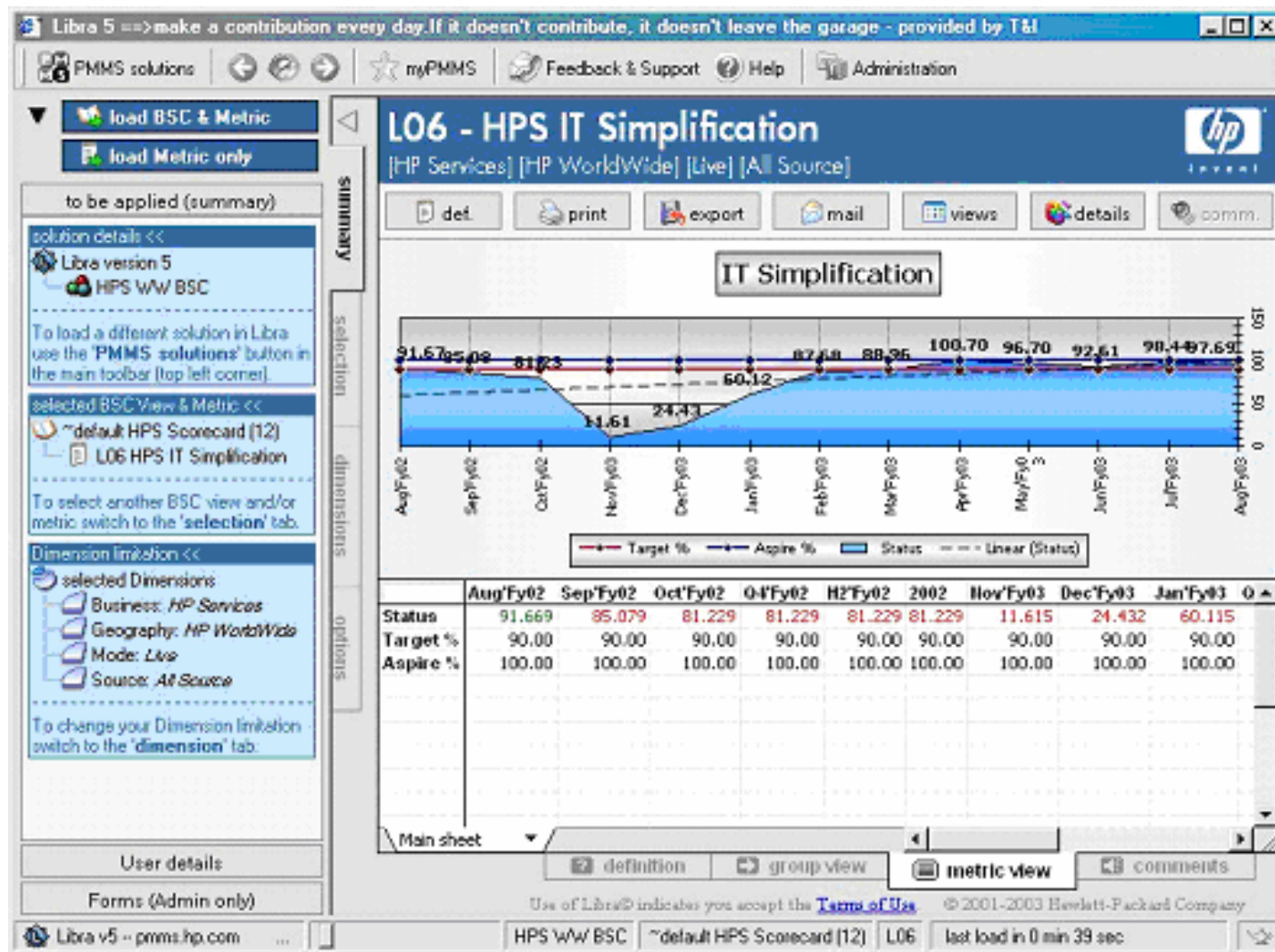
			Feb	Mar	Apr	Q2	H1	May	Jun	Jul	Q3	Aug	Q4	H2	2003
Customer															
C01	HPS L1 Customer Overall Sat	%	→	→	→	↑	↓	→	→	→	→	→	→	→	↓
C01a	HPS L1 Customer Loyalty Index	%	→	→	→	→	→	→	→	→	→	→	→	→	↑
C03	CS L3 Customer Overall Satisfaction %	%	↓	↑	↑	↓	→	↓	↓	↓	↓	↑	↓	↓	→
C40	MS L3 Customer Satisfaction Index	%	→	→	→	→	→	↓	n/a	n/a	↓	n/a	n/a	↓	→
Finance															
F01	Orders vs Targets \$	%	↓	↑	↓	↓	→	↓	↑	↑	↑	↓	↓	↓	→
F02	Revenues vs Targets \$	%	↓	↑	↑	↑	→	↓	↑	↑	↑	↓	↓	↓	→
F03	CM - Net Profit	%	↑	↑	↓	↑	→	↓	↑	↓	↓	↓	↓	↓	→
Internal															
I02	COS % of Revenues	%	↑	↑	↓	↓	→	↓	↑	↑	↑	↓	↓	↓	→
I03	Operating Expenses vs Targets	%	↑	↓	↓	↑	→	↑	↑	↓	↓	↑	↑	↓	→
Learning & Innovation															
L01	HPS Employee Headcount	#	↑	↓	↑	↑	→	↓	↓	↑	↓	↑	↑	↑	→
L01a	HPS Employee Attrition Rate	%	↓	↑	↓	→	→	↓	↑	↑	↑	↓	↓	↑	→
L06	HPS IT Simplification	%	↑	↑	↑	↑	↑	↓	↓	↑	↓	↓	↓	↓	↑

definition group view metric view comments

Use of Libra© indicates you accept the [Terms of Use](#) © 2001-2003 Hewlett-Packard Company

HPS WW BSC ~default HPS Scorecard (12) L06 last load in 0 min 39 sec

Analysis Layer



Analysis Layer (cont.)

Make available offline | not | chart | drop zones | unified scales | months | quarters | snapshots

LIBRA analyse view

Business Mode Source
 Services Trial All Source

Year Quarter Month
 2003 2004

Super Region	Region Major	Region Minor	Operating Expenses %	Target %	Aspir. goal	Operating Expenses %	Target %	Aspir. g
EMEA	EMEA Other		99.1	100.0	95.0	97.1	100.0	95.0
	Total		99.1	100.0	95.0	97.1	100.0	95.0

PivotTable Field List

Drag items to the PivotTable list

- I03
 - Totals
 - Aspir. goal
 - Aspire Expenses K\$
 - Expenses K\$
 - Operating Expenses
 - Pmms Load Date
 - Target %
 - Business
 - Geography
 - Mode
 - Source
 - Time

Add to Row Area

Reporting Layer

MUSE v2.20 - @HM standard reporting - provided by T&I

definition - export - print - snapshots - drill - Questions

Overall Satisfaction

Organisation - Period -
All Organisations, All Times

0.900/910

		very dissatisfied	somewhat dissatisfied	neither satisfied nor diss	
Country	Process	Weighted %	Weighted %	Weighted %	Nr
Austria	ASP		0.26%	2	
	Installation				
	Off Site	3.13%	5.94%	75	98
	On Site	2.56%	4.90%	42	61
	Remote with Parts	1.45%	4.25%	5	6
	Remote with Phone	3.77%	7.64%	61	98
	Total	3.22%	6.44%	185	283
Belgium		3.64%	6.55%	197	315
Bulgaria				10.22%	7
Croatia			1.05%	1	1
Czech Republic		3.24%	2.32%	70	183
Denmark		3.66%	9.10%	317	303
Egypt		12.96%	8.20%	2	10
Finland		5.16%	7.50%	187	390
France		3.61%	5.60%	659	1219
Germany		3.62%	7.12%	831	1510
Greece		4.60%	3.09%	110	286
Guadeloupe		7.27%	8.15%	2	7
Hungary		2.58%	3.12%	106	263
Iceland		4.03%	4.35%	7	18
Ireland		3.18%	4.57%	44	111
Israel					

MUSE v2.20 | done! | CSI.NET n/a

Rohm & Haas

- Company
 - *\$8 billion global chemicals manufacturer*
- Impetus
 - *CFO restructures finance to improve efficiency*
 - *Eliminate spreadmarts – offer consistent metrics*
- Time and cost
 - *First iteration: 12 months, \$500k*
 - *Subsequent dashboards (12): \$100k*
- Tools – Custom built
 - *SAP Portal, SAP Web Application Developer*
 - *Runs against SAP BW with Hyperion data imported*

ROH 51.94 0 0% 20min delay

Search Phonebook for GO



My Edge | My Work | Collaboration | HROnline | Portal Admin | Finance | **Management Reporting** | My A&S | My AFC | My CIS | My CBT | My Monomers | My CF

The Pulse | PM Reliability Metrics | Supply and Demand Planning | **Executive Dashboard** | My BW Reports | Logistics Freight | Opportunity Analysis

Finance

Detailed Navigation

- Introduction
- ▼ Scorecard
 - **Finance**
 - People
- Top 10 Analysis
- ▼ Financial Reporting

Alert:

View: Month:

Business Group:

Business Unit:

SBU:

Region:

Current Selections:

- Standard GP-** Detailed Drill-downs and Plan Comparisons
- Sales/GP Pulse-** MTD and Daily Sales
- Run Rate-** Quarterly Run Rate

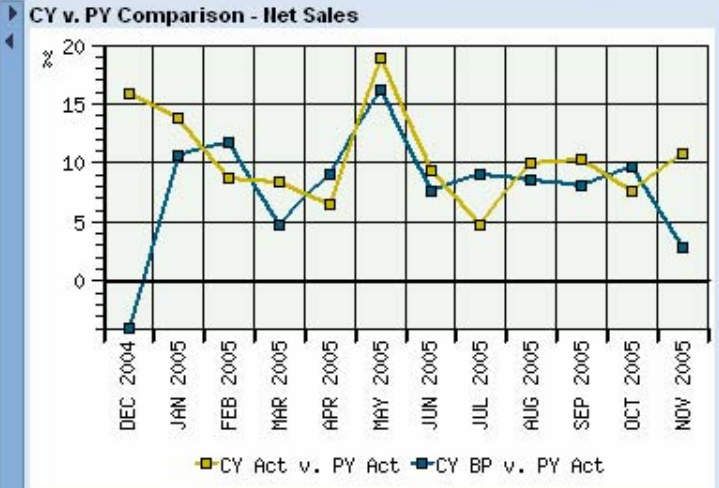
▶ **People Data is now available for March 2006** (Apr-10)

▶ **Preliminary financials have been loaded for March 2006** (Apr-05)

Summary View Data in 000's. Variances: [Fav/(Unfav)]

KPI	PY% Alert	2005 Act.	2005 BP	2005 Fcst.	2004 Act.	2005 v. BP	2005 v. Fcst.	CY v. PY	% 2005 v. BP	% 2005 v. Fcst.	% CY v. PY
Volume KGS	△	246,953 KG	243,835 KG	228,907 KG	248,640 KG	3,118 KG	18,046 KG	(1,688 KG)	1.3 %	7.9 %	(0.7 %)
Net Sales	●	\$ 684,313	\$ 635,232	\$ 659,428	\$ 617,109	\$ 49,082	\$ 24,885	\$ 67,205	7.7 %	3.8 %	10.9 %
Gross Profit	●	\$ 200,344	\$ 195,555	\$ 195,855	\$ 197,378	\$ 13,149	\$ 17,758	\$ 37,466	6.7 %	9.3 %	21.9 %
Gross Profit %	●	29.4 %	30.8 %	29.7 %	31.9 %	(29 bp)	154 bp	275 bp			
S & A Expenses	△	\$ 84,098	\$ 84,280	\$ 87,313	\$ 83,335	\$ 182	\$ 3,214	(\$ 763)	0.2 %	3.7 %	(0.9 %)
R & D Expenses	■	\$ 24,235	\$ 23,255	\$ 23,950	\$ 21,656	(\$ 980)	(\$ 285)	(\$ 2,579)	(4.2 %)	(1.2 %)	(11.9 %)
OPBT	●	\$ 112,000	\$ 112,000	\$ 112,000	\$ 112,000	\$ 25,735	\$ 28,896	\$ 39,214	35.8 %	42.0 %	67.1 %
OPBT %	●	16.4 %	17.8 %	17.0 %	18.1 %	295 bp	384 bp	480 bp			
Working Capital	△	\$ 2,267,754	\$ 2,322,359	\$ 2,283,642	\$ 2,222,780	\$ 54,605	\$ 15,888	(\$ 44,974)	2.4 %	0.7 %	(2.0 %)
Cycle Time (Days)	●	128.7	129.8	127.4	131.2	1.1	(1.3)	2.5	0.8 %	(1.0 %)	1.9 %

Trend / Periodic Comparison Chart Type:



ROH 51.94 0 0% 20min delay

Search Phonebook for GO



- My Edge | My Work | Collaboration | HROnline | Portal Admin | Finance | **Management Reporting** | My A&S | My AFC | My CIS | My CBT | My Monomers | My CF
- The Pulse | PM Reliability Metrics | Supply and Demand Planning | **Executive Dashboard** | My BW Reports | Logistics Freight | Opportunity Analysis

Finance

Detailed Navigation

- Introduction
- Scorecard
 - Finance**
 - People
 - Top 10 Analysis
- Financial Reporting

- ▶ **People Data is now available for March 2006** (Apr-10)
- ▶ **Preliminary financials have been loaded for March 2006** (Apr-05)

Summary View

Decomp: **S & A Expenses**

Data in 000's.

Legend

Metric	% Alert
2005 Act.	2004 Act.

S & A Expenses	
\$ 84,098	\$ 83,335

Total Selling Exp.	\$ 40,321	\$ 42,453
Total Admin. Exp.	\$ 43,777	\$ 40,882

Trend / Periodic Comparison

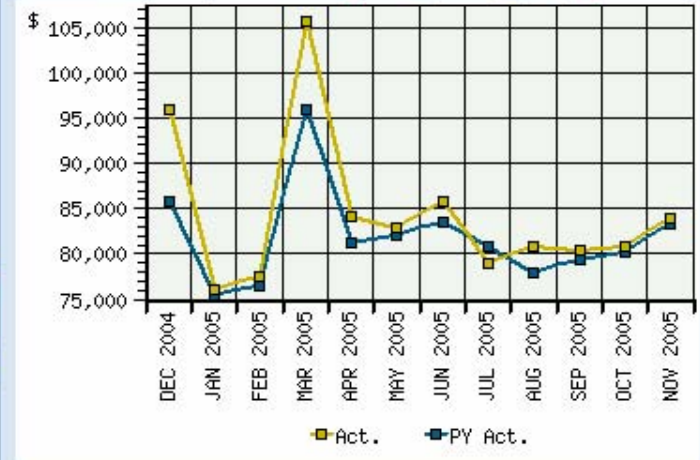
Rolling 12 Months

Variance Contributors

Summary / Margin Trend

Chart Type: Rolling Year

Periodic - S & A Expenses CY: BP: Fcst: PY:



CY v. PY Comparison - S & A Expenses



Alert: Prior Year

View: Monthly | Month: 11/2005

Business Group: (All)

Business Unit: (All)

SBU: (All)

Region: (All)

Current Selections:

Finance Summary - Addl.

Account Detail

Run Rate - Quarterly Run Rate

Railroad Company

- Impetus
 - *Automate daily performance report (paper)*
 - 120 page report, 45 measures, 4 levels, all locations
 - Reduce time spent analyzing data
- Time and Cost
 - *First iteration: 7 months and \$500k*
 - *Current view: 1.5 years and \$1M*
- Tools
 - *Existing: Teradata, Essbase, Alphablox, ESRI*
 - *New: Treemap software (~\$2k)*

DAILY PERFORMANCE MAP

Overview

<-15% >15%

Date: June Date Range: Last Year Yardstick: BNSF System All Measures:

SAFETY		ICP VELOCITY MEASURE		TRAIN STATISTICS		CAR CYCLE	
Reportable Injuries	June / 200000 Hrs	Loco Miles / Day	Coal Cycle Index	GTM	Units / Train	Velocity for Terminals Car	Hours Per 1000 Miles
Lost & Restricted Duty Days	Lost & Rtd Days / 200000 Hrs	Merch Car Miles / Day	Ag Car Miles / Day	GTM %Change: 11.04			
Rail Equipment Accidents	RM Equip Acc / Mill Train Mile	VM Stack Transit Days	VM Trailer Transit Days	GTM:	94,195,801		
REVENUE & UNITS		CREW STARTS		Crew Starts		CAR INVENTORY	
Net Revenue		Crew Starts		GTM:		84,833,390	
Units	Net RPU	Crew Starts		Variance:		9,362,411	
ON-TIME PERFORMANCE		LOCOMOTIVE		TRAIN PERFORMANCE		TERMINAL	
On-Time Performance	Velocity	Usage	% Wins - Originating Trains	% Wins - Terminating & Thru Trains	Actual Dwell Hrs (Normal)	Inventory Turnover	
OTP +/- 24 Hrs	OTP - 24 Hrs Early	Utilization %	Dwell	Loads - Gath / Dir Connection	Empty - Gath / Dir Connection	Loads - Intermodal Connection	Empty - Intermodal Connection
		Availability %	MDBF				

Full Screen

GEOGRAPHIC DISPLAY

Please make a selection...



DPR ALL MEASURES



Geography	06/21/06 Wed	06/22/06 Thu	06/23/06 Fri	06/24/06 Sat	06/25/06 Sun	06/26/06 Mon
BNSF System	3,052,305.84	3,232,482.01	3,275,095.61	3,472,822.12	3,424,113.33	3,038,113.33
Central	1,224,583.19	1,302,580.62	1,291,546.27	1,326,295.41	1,357,235.04	1,204,113.33
North	683,281.11	729,780.43	765,053.46	838,481.08	805,504.13	701,113.33
South	475,060.54	499,120.52	449,442.44	497,565.23	462,874.82	433,860.63

Goal Status - Microsoft Internet Explorer

Corporate ICP Goal Status

as of 06/26/2006

Asset Utilization (Velocity)

	DAILY	MTD	QTD	YTD	PERIOD	GOAL
LOCO MILES PER DAY	279.7	286.6	286.6	287.4	QTR	303
AG CAR MILES PER DAY	174.1	184.9	184.9	169.3	QTR	188.4
MERCH CAR MILES PER DAY	119.3	116.6	116.6	112.6	QTR	118.2
COAL CYCLE INDEX WEEKLY	140.0	136.5	136.5	139.8	QTR	125
INTERMODAL - STACK TRANSIT DAYS	5.4	5.1	5.1	5.3	QTR	5.2
INTERMODAL - TRAILER TRANSIT DAYS	2.8	2.7	2.7	2.7	QTR	2.6

Safety

	DAILY	MTD	QTD	YTD	PERIOD	GOAL
FREQUENCY RATIO		1.6		1.32	ANNUAL	1.15
SEVERITY RATIO		11.31		27.37	ANNUAL	37.44

GTM - Daily Performance Report Measures Updated thru 07/26/2006

BNSF System: 94,195,801 Last Year: 84,833,390 %Change: 11.04

-18.0% Click to Toggle Color Scheme +18.0%

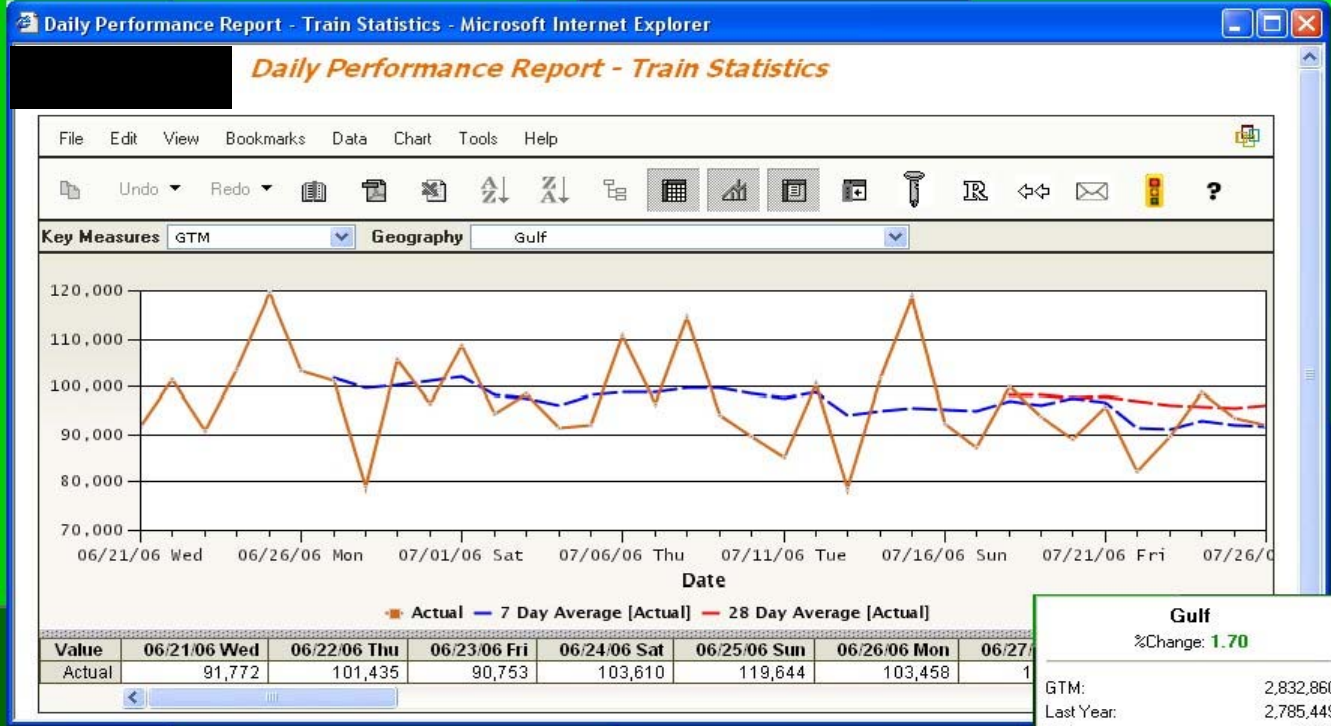
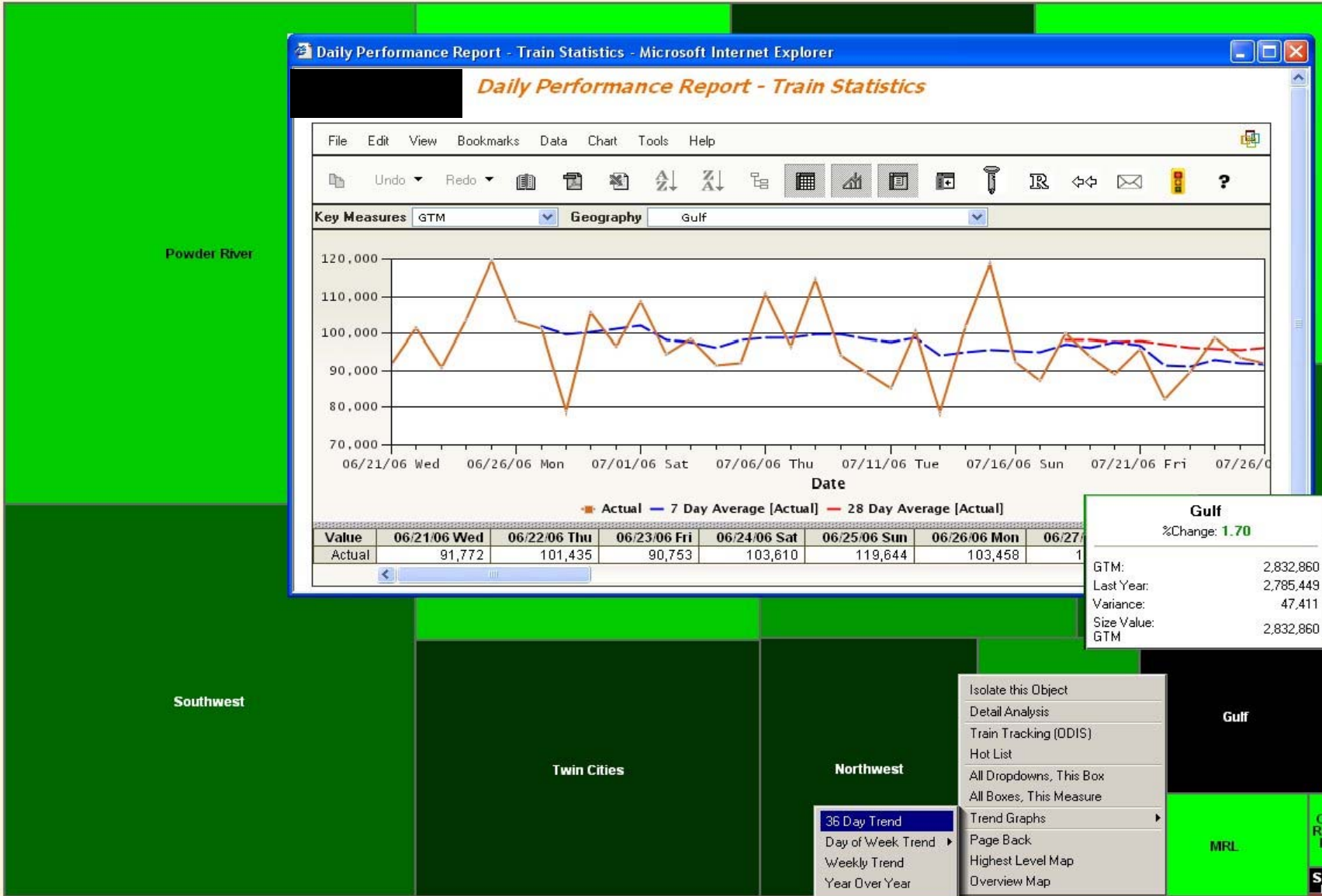
Total Drawn: 16 of 16

Measure: Date: Date Range: Yardstick: High Level: Low Level:

Click: Filter:

Find: Filter:

Best 5 Filter:
 Worst 5 %:
 Other Region
 Misc
 63.31%
 MRL
 28.16%
 Nebraska
 20.86%
 Kansas
 19.30%
 Powder River



Gulf
%Change: **1.70**

GTM: 2,832,860
 Last Year: 2,785,449
 Variance: 47,411
 Size Value: 2,832,860
 GTM

- Isolate this Object
- Detail Analysis
- Train Tracking (ODIS)
- Hot List
- All Dropdowns, This Box
- All Boxes, This Measure
- Trend Graphs
- Page Back
- Highest Level Map
- Overview Map

- 36 Day Trend**
- Day of Week Trend
- Weekly Trend
- Year Over Year

Search

Start Date:

06/24/2006

End Date:

06/24/2006

ATM

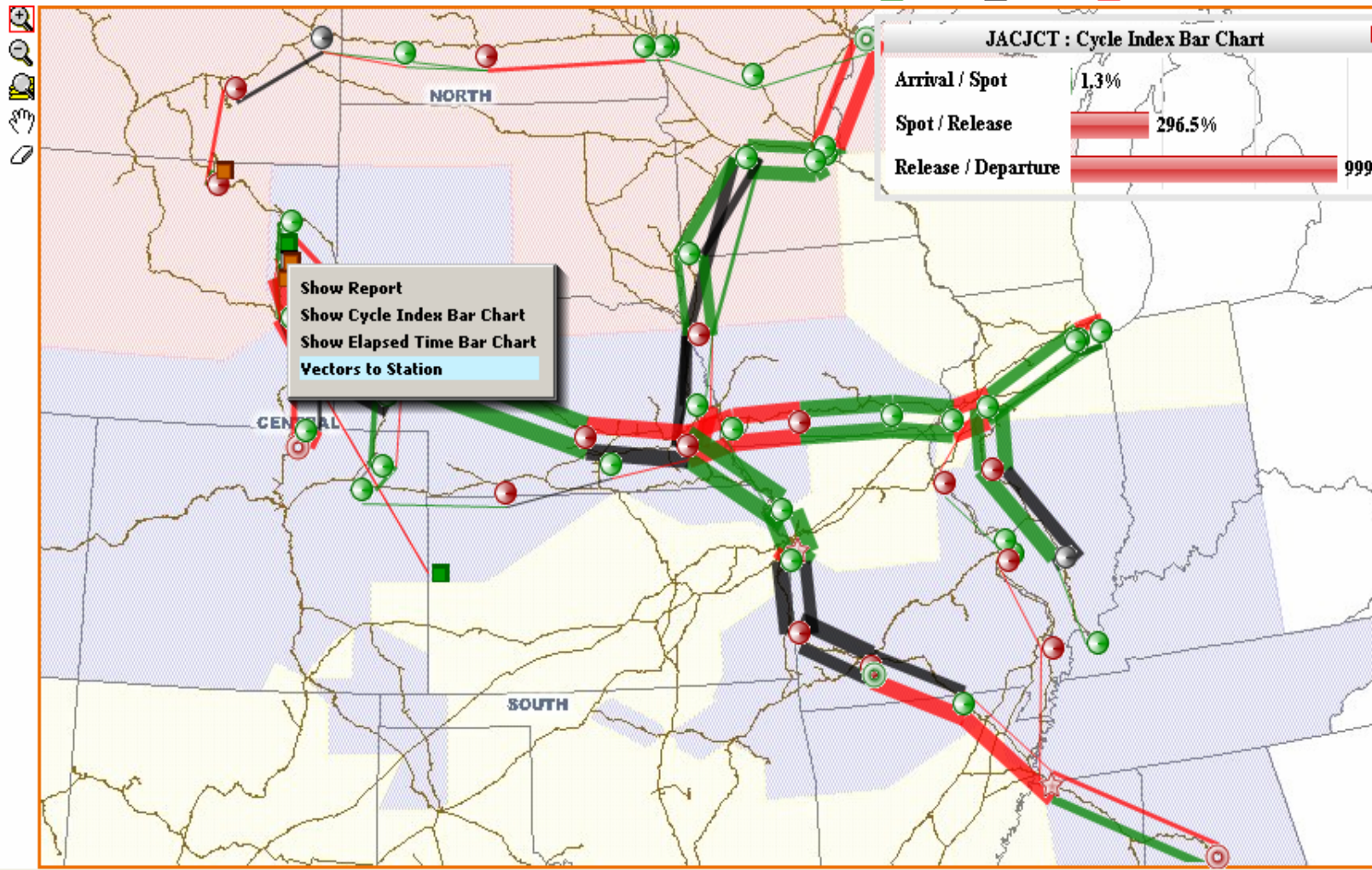
All Utilities

Loaded / Empty

Show Interchange

Refresh Map

Legend: Mine Utility Intermediate Interchange | Cycle Index %: < 100% 100-125% >125%



- Impetus - 1998
 - *Dueling spreadsheets in weekly sales meetings*
- Time and cost
 - *First iteration: 6 months, \$200k*
 - *Became basis of BI and EDW initiative*
 - 25,000 users, thousands of reports, 40 dashboards
- Tools
 - *Lotus Notes (email, disconnected, unstructured)*
 - *Web portal for mid-level managers*

End to End Business Process

WW CEO Dashboard:
 Updated **daily**, this report shows data as of: **8-Mar-2002**
 IBM Sample Data

Analysis

Data as of	Sales Management Metrics						Key Financial Indicators					
	2Q2002		1Q2002		1Q2002		Revenue		February 2002 Forecast 1Q		PTI	
	Validated Pipeline	Qualified Pipeline	Load \$M		Ships \$M	Vols	(Planned currency rates)		(Planned currency rates)		(Planned currency rates)	
	%VP Tgt	%VP Tgt	Firm+FDE b/(w) f'cast QTD	WTD	b/(w) f'cast QTD	Link	\$M	B/(w) YTY	E/R	B/(w) Bgt	\$M	B/(w) YTY
28-Feb	28-Feb	04-Mar	04-Mar	04-Mar		05-Mar	05-Mar	05-Mar	05-Mar	05-Mar	05-Mar	
Server Group	47%	82%				\$2,443	4%	22%	0pts	\$810	22%	
zSeries	X36%	56%	X (\$20)	✓ \$15	X (\$14)	Vols	\$1,333	6%	16%	X (1pts)	\$555	11%
pSeries	✓ 56%	64%	✓ \$23	✓ \$2	✓ \$6	Vols	\$555	X (2%)	24%	2pts	\$444	77%
iSeries	50%	66%	X (\$15)	X (\$5)	X (\$12)	Vols	\$444	4%	21%	0pts	\$22	11%
xSeries	44%	61%	✓ \$7	X (\$2)	✓ \$6	Vols	\$111	4%	17%	2pts	(\$11)	55%
Storage Leads = SPD+NAS			Storage Load = SPD only									
SSG	✓ 52%	62%	X (\$12)	X (\$2)	X (\$7)	Vols	\$1,000	15%	20%	0pts	\$222	22%
PSG Load is PCD only												
PSG	47%	71%	✓ \$91	✓ \$49	✓ \$45	Vols	\$3,333	✓ 1%	7%	1pts	\$99	77%

Dashboard designed to allow management by exception. Requires agreement across the enterprise on thresholds.


Software

Data as of	2Q2002			1Q2002			Revenue		February 2002 Forecast 1Q		PTI	
	Validated Pipeline	Signings	Revenue Coverage	Signings	Revenue Coverage	(Planned currency rates)		(Planned currency rates)		(Planned currency rates)		
	%VP Tgt	B/(w) track	B/(w) track	B/(w) track	B/(w) track	\$M	B/(w) YTY	E/R	B/(w) Bgt	\$M	B/(w) YTY	
28-Feb	01-Mar	01-Mar				05-Mar	05-Mar	05-Mar	05-Mar	05-Mar	05-Mar	
Services												

1Q2002		Revenue		February 2002 Forecast 1Q		PTI	
Customer Signings	Commercial Signings	Coverage		(Planned currency rates)		(Planned currency rates)	
%Attainment	%Attainment	\$M	B/(w) YTY	E/R	B/(w) Bgt	\$M	B/(w) YTY

Body of message



 **WW Dashboard Analysis: CEO Dashboard**
 This report shows data as of: **22-Feb-2002**
 IBM Sample Data

Order Load Information:

- **Storage:**
- All areas significantly below historical range

Services:

- Closed 7 yr. deal worth \$xB with XYZ.

Technology

- Revenue coverage and Shipments below historical range

Report Information

Who to contact? Jagdish D Sinha/Somers/IBM

Report data notes

Related reports
(click on title to open)

**Simple text based inputs.
Updated as required.**

Body of message

Contact Information

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