

# Building an Executive Dashboard On Top Of Excel

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## Breakout Information (Hidden Slide)

### ► Building an Executive Dashboard On Top Of Excel

- Has management asked you to create an executive dashboard for them, and then you discover the data exist only in a collection of poorly organized, error-prone spreadsheets? We'll explore this all-too-familiar scenario and present a real-world problem tackled with Performance Manager XI Release 2. If you're considering a dashboard project but can't justify the time and expense to build a data warehouse, this session is for you!
- Print\_Code (please leave for Business Objects use)

## Topics

- ▶ **The Challenge**
- ▶ **The Proposal**
- ▶ **The Process**
- ▶ **The Dashboard**
- ▶ **Lessons Learned**
- ▶ **Q&A**

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## The Challenge – Background

- ▶ **DVD manufacturing process**
  - Technicolor manufactures over one billion DVDs each year
  - For purpose of KPI reporting, the process is broken into
    - Replication
    - Printing
    - Packaging
  - Key cost drivers are raw materials (polycarbonate plastic) and labor
    - Tracking of yield, scrap, and labor utilization is critical!
- ▶ **Organization**
  - Eleven manufacturing and/or packaging plants
  - The plants are organized geographically
    - North America
    - International (Europe and Australia)

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## The Challenge – KPI Reporting

- ▶ **The current monthly KPI report → Excel**
  - Twelve manufacturing key performance indicators (KPIs)
    - Tracked monthly against budgeted targets
    - Regional rollups also tracked and targeted (N.A. & International)
  - One KPI graph per page → over 30 pages total!
  - Large file (2MB+) emailed to approx. 50 recipients
  - Poor visibility of underlying data, i.e. hidden tabs
  - No formal version control or retention of history
  - No year-over-year comparisons
- ▶ **Managed by quality engineering team**
  - Data “wrangling” performed by quality engineering team
  - Bulk of time spent collecting and integrating data
  - Poor use of valuable people

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## The Challenge – The Business’ Request

*“There’s got to be a better way.”*

- ▶ **Better use of Engineering time**
  - Automate the monthly process to create the report
  - Allow Engineers to spend time on analysis vs. data fetching
- ▶ **Better distribution mechanism**
  - Ability to retain all history
  - Common shared corporate repository for the report
  - A more scalable “platform;” i.e. ability to serve more KPIs in the future
  - Ability to securely share reports with customers in the future.
- ▶ **Better content**
  - Drill-down to details
  - Weekly updates, instead of monthly
- ▶ **“And can we have it in six months please?”**

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## The Challenge – What's the Best Approach?

*Is this a good data warehouse candidate?*

- ▶ **The hard work of defining KPIs was already done**
  - Agreement on KPIs amongst business owners, even **globally!**
  - Strong business sponsorship for a better solution
  - Outputs well understood – 12 KPIs
  - Calculations well defined
- ▶ **An inventory of source systems was conducted**
  - 100+ surveys were sent to process managers and IT staff
  - Results captured in an Excel spreadsheet
- ▶ **Results were dismaying**
  - At least **17** disparate source systems were identified
  - Systems ranged from ERP (e.g. SAP) to Access databases
  - None of the systems flowing into existing data warehouses

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## The Challenge – Not a Data Warehouse Project!

- ▶ **Costs for a data warehouse approach were prohibitive**
  - Project costs would easily run into high six or seven figures
  - Coordinating with local application teams in global locales
  - Conforming data across disparate systems performing like processes
- ▶ **Time to deliver not acceptable**
  - Easily a multi-year project
  - Phase-in KPIs and locations incrementally
- ▶ **Huge risk!**
  - Multi-source, multi-location data warehouse project = **high risk!**

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## Topics

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- ▶ The Process
- ▶ The Dashboard
- ▶ Lessons Learned
- ▶ Q&A

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## The Proposal – an “Executive” Dashboard

### *Extreme scope reduction*

- ▶ **No drill-down capability**
  - The business’ understanding and acceptance of this was critical
- ▶ **Extremely limited process automation**
  - Quality engineering would continue to compile the data for the master spreadsheet manually
  - Only the graph creation and publishing steps would be automated
- ▶ **Monthly refresh of dashboard data (i.e. not weekly)**
  - This was consistent with the existing process
- ▶ **Exclusively use the term “Executive Dashboard” within the business and BI team**
  - Concept adopted from Wayne Eckerson’s “Performance Dashboards: Measuring, Monitoring and Managing Your Business” (Wiley, 2005)

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## The Proposal – Back-End Conceptual Solution

*How will this “Executive Dashboard” work?*

- ▶ **Use the master Excel spreadsheet as a data source**
  - Sheet to be maintained by quality engineering team
  - IT to assist in enhancing the spreadsheet with macros or similar
- ▶ **Data pushed to the BI team as a text file**
  - Include all supporting metrics, not just KPI ratios
  - Take KPI ratios pre-calculated from the spreadsheet
  - Take KPI aggregates pre-calculated from the spreadsheet
- ▶ **“Lite” data staging in the BI environment**
  - A very simple data model to stage the data from the spreadsheet
  - Use Informatica to move the data

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## The Proposal – Front-End Considerations

- ▶ **Standalone dashboard tool was considered**
  - Another vendor’s stand-alone dashboard tool was considered
  - Performance Manager XI was chosen because of its integration in BusinessObjects XI
  - Platform standardization is a key strategy of the BI program
  - We want a single platform where users can access all BI content: dashboards, reports, ad hoc query, etc.
- ▶ **Dashboards or Scorecards?**
  - Although we were not using a Balanced Scorecard methodology, we still required the functionality of Performance Manager XI scorecards
  - Comparison of actual KPI values against target goals

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## The Proposal – Front-End Conceptual Solution

- ▶ **BusinessObjects Performance Manager XI**
  - Dashboard analytics
  - Goal analytics
- ▶ **BusinessObjects Web Intelligence XI**
  - Used for linked, auxiliary reports, if needed
- ▶ **Risk → This would be the team's first experience with BusinessObjects XI**
  - Lots to learn!

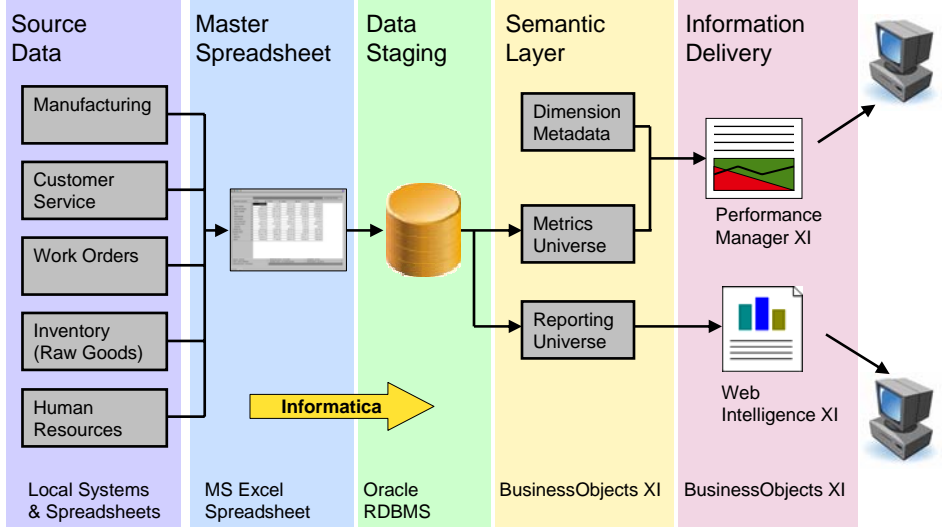


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## The Proposal – Conceptual Architecture



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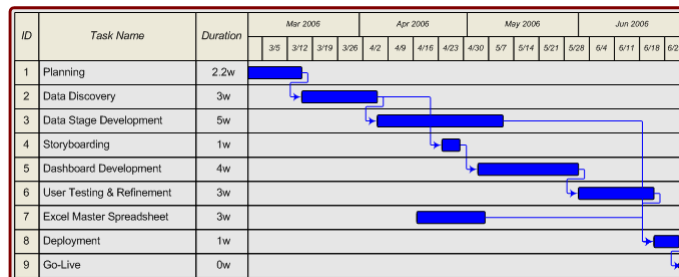
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## The Process – Timeline Planning

*How to plan in uncharted territory?*

- ▶ **Planned Schedule**
  - Four month project
  - Time to learn new tools and platform “baked” into schedule
  - Storyboarding to server as “functional requirements” for front-end
  - User acceptance testing (UAT) and refinement phase was critical



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## The Process – BI Resources

### ▶ BI resources

- BI analyst/developer
  - Design data staging area
  - Design and build Business Objects universes, metrics, and goals
  - Design and build dashboard and reports
- Back-end developer
  - Build data staging area
  - Build Informatica mappings
  - Create refresh schedules for Performance Management objects
- BI administrator
  - Create environments (test and production)
  - Create security model and user accounts
- BI project manager (PM)
  - Assist quality engineer in building master spreadsheet

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## The Process – Business Resources

### ▶ Business resources

- Engineering managers
  - Storyboarding
  - UAT
- Project champions
  - High-level requirements
  - UAT
- Quality engineer
  - Subject matter expert on source spreadsheet data
  - Build master spreadsheet with assistance from BI PM
- Sample users
  - UAT

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## The Process – Dashboard Design

*The dashboard is not a query tool!*

### ▶ New paradigm for the BI team

- The dashboard is **not** a query and analysis tool; definitely not OLAP!
- Information at-a-glance
  - Minimal on-page filtering
  - Limited drill-down (slice lists only)

### ▶ Ground rules for the dashboard design

- Clean and clear interface
- Maximize screen “real estate”
- Use only out-of-the box features – no customization, no SDK
- Use the most effective visualizations, regardless of “glitz” factor
- As a guide, we used Stephen Few’s “Information Dashboard Design: The Effective Visual Communication of Data” (O’Reilly, 2006)

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## The Process – Storyboarding

### ▶ Requirements gathering and documentation

- Traditional requirements gathering and documentation not effective
- Captured requirements with *storyboarding*, inspired by “Enterprise Dashboards, Design and Best Practices for IT,” Shadan Malik (Wiley 2005)

### ▶ Storyboarding process (four days)

- In-person, daily meeting with business → **lots** of white board space
- Captured all ideas on the white boards (digital photos for “archival”)
- Explicitly document out-of-scope functionality
  - Keep a running list for possible future enhancements
- Analyst builds skeleton prototypes in prep for the next meeting

### ▶ Dashboard layout and navigation flow → done!

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## The Process – Creating Metrics and Goals

- ▶ **Build metrics universe on top of the data stage**
  - A second universe was built for Web Intelligence reporting
- ▶ **Create dimension metadata for “slices”**
  - Time dimension – fixed, monthly increments
  - Site dimension – captured in the data stage and universe
- ▶ **Build metrics**
  - Select a measure from metrics universe
  - Select an aggregation function, select site and time dimensions
- ▶ **Build goals**
  - Select a metric (created in previous step)
  - Write a query against the metrics universe to return goal data

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## The Process – Options for Analytics

- ▶ **Functional requirements will drive choice of analytics**
  - Comparison of actual values to target goals
  - Trending, i.e. several months of history at a glance
  - Comparison between plants not of primary importance
- ▶ **Candidate analytics**
  - Goal analytics
  - Goal lists
  - Metric trees
  - Traffic lights
  - Thermometers
  - Speedometers



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## The Process – Choosing Effective Analytics

*Too many options!!*

- ▶ **Most analytics didn't display multi-month trends**
  - Speedometers, etc. look great, but no trend information is shown
  - Metric trees showed causal relations, but trends were more important
- ▶ **Interactive metric trends**
  - Displaying goal information not automatic
  - Lots of analytical functionality, but at the price of clarity and space



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## The Process – Final Steps

- ▶ **Create and save analytics**
  - Primarily a formatting task
- ▶ **Position analytics on dashboard**
  - Simple drag-and-drop procedure
- ▶ **Administrative tasks**
  - Setup users, groups, and security
    - Simplest possible access model → a **single** group!
  - Create process and schedule to refresh
    - Metrics, goals, and analytics all require monthly refresh
    - Process is cumbersome because each object is managed separately

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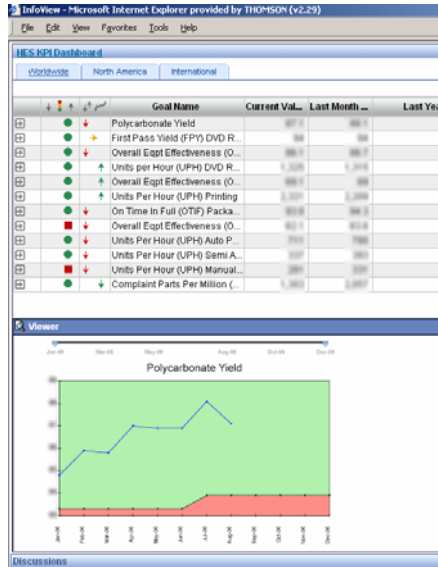
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## The Dashboard – Logon Page

- ▶ **Quick-Look goal list**
  - Perfect level of detail for top management
  - Summary view of worldwide KPIs
  - Similar page provided for North America and international KPIs
- ▶ **Associated viewer**
  - Clicking on a KPI brings its analytic into the viewer



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## The Dashboard – the Goal List

Traffic lights for goal comparison, plus trend arrows

HES KPI Dashboard

Worldwide North America International

	Goal Name	Current Value	Last Month Value	Last Year Value
● ↓	Polycarbonate Yield	97.1	96.1	
● →	First Pass Yield (FPY) DVD Replication	94	94	
● ↓	Overall Eqpt Effectiveness (OEE) DVD Replication	95.1	95.7	
● ↑	Units per Hour (UPH) DVD Replication	1,225	1,215	
● ↑	Overall Eqpt Effectiveness (OEE) Printing	95.1	95	
● ↑	Units Per Hour (UPH) Printing	2,227	2,209	
● ↑	On Time In Full (OTIF) Packaging	93.8	94.3	
■ ↓	Overall Eqpt Effectiveness (OEE) Auto Pack	93.1	93.8	
● ↓	Units Per Hour (UPH) Auto Pack	715	708	
● ↓	Units Per Hour (UPH) Semi Auto Pack	327	321	
■ ↓	Units Per Hour (UPH) Manual Pack	289	291	
● ↓	Complaint Parts Per Million (PPM)	1,883	1,887	

Year-over-year comparison will start in 2007

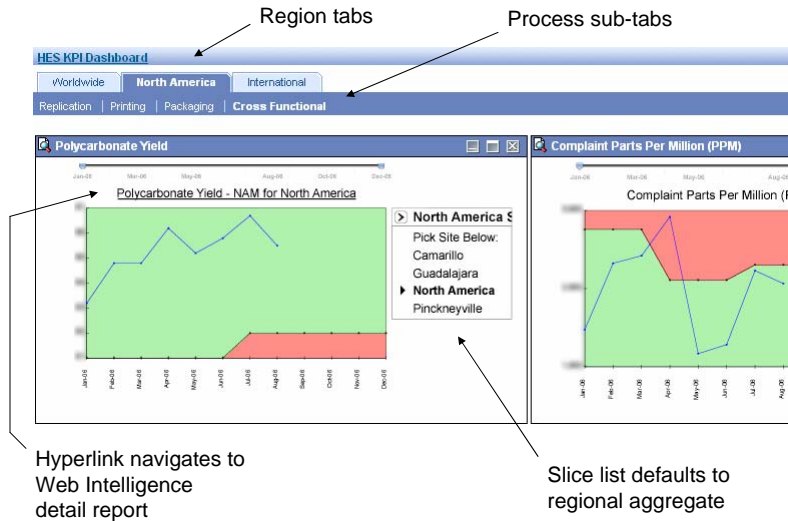
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## The Dashboard – Goal Analytics

Goal analytics organized by region and by process



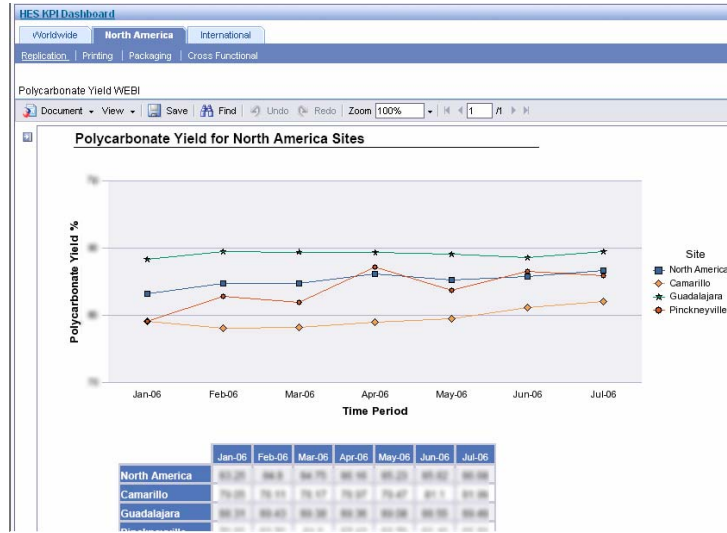
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## The Dashboard – Web Intelligence Detail Report

*The Web Intelligence report for printing and site-by-site detail*



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## Lessons Learned – What Worked

- ▶ **Ongoing business input and support**
  - Good sponsorship, motivated business
  - Kept business involved throughout development
    - Prototyping prior to project launch
    - Storyboarding
    - UAT and refinement phase
- ▶ **Small, cohesive BI team**
  - Combining the analyst and dashboard developer roles
  - Flexible software development and management of dependencies
  - Development was very efficient → 60 person-days total effort
- ▶ **Confining scope to well-defined, agreed upon KPIs**
  - Strong business ownership of KPIs and data quality
  - No time was exhausted discussing KPI definitions
  - Clear scope

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## Lessons Learned – What Didn't Work

- ▶ **Adopting dashboard thinking took time**
  - Paradigm shift for BI team – the dashboard is not a query tool
  - What helped
    - Getting team buy-in, one person at a time
    - Stephen Few's text was a helpful guide
- ▶ **Learning new tools “on-the-job”**
  - Learning the nuances of the tool while simultaneously building the application
  - The BusinessObjects XI platform is very different from Version 6.5
- ▶ **Refreshing Performance Management XI objects**
  - Business Objects is improving this functionality

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## Q&A

- ▶ **Questions**
  - William Lay, BI Program Manager, Technicolor/Thomson
  - I will repeat questions to ensure everyone can hear
- ▶ **Contact information**
  - Email: [william.lay@thomson.net](mailto:william.lay@thomson.net)
  - Tel: +1 (310) 699-1609

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