

## MDM for the Enterprise

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# **Creating a Robust Data Architecture to Support Business Intelligence**

**(Or, “How we accidentally discovered MDM & SOA”)**

Matthew March

VP Corporate Systems/Business Intelligence

Impac Mortgage Holdings





## About the Company

Impac Mortgage Holdings, Inc., through its subsidiaries, operates as a mortgage real estate investment trust (REIT) in the United States. The company acquires, originates, sells, and securitizes various mortgages. The company's operations include long-term investment, mortgage, commercial, and warehouse lending.



Impac Mortgage Holdings, Inc.  
Irvine, California

# Key Business Drivers

- SOX Compliance
- The right people did not have access to the right information at the right time
- Company generates a tremendous amount of data
  - *7 Subsidiaries*
  - *33 Vendor Internal/External Applications/Systems*
  - *4 Internally Developed Applications*
  - *40+ Data Sources*
- Existing data integration, management and reporting solutions were inadequate
- Time to market for integration of new data and delivery of information was lengthy

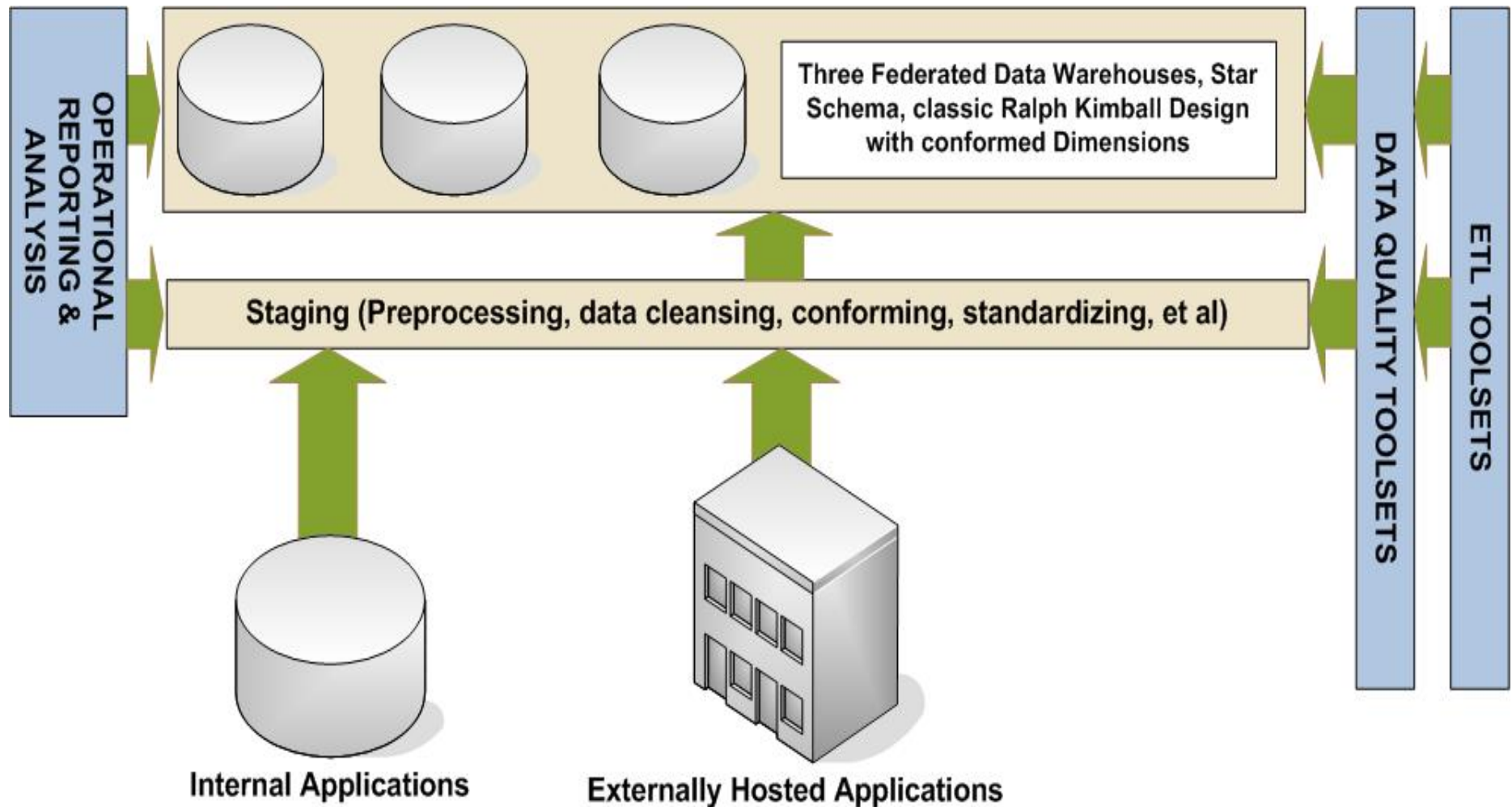


# Scope of Initial Solution and 2005 Deliverables

- Focus was on BI, Reporting & ETL
- RFP and selection of technology including:
  - *Hardware*
  - *Database*
  - *ETL software*
  - *Statistical Analytics Software*
  - *BI Software (Reporting, scorecards/dashboards)*
- Staffing – Mix of vendor resources, existing internal resources and new hires
- Define design methodology, standards and guidelines
- Implementation of hardware, database and software in clustered, failover, redundant solution, including DR
- Rewrite of ETL processes for existing legacy operational data store
- Delivery of three new data warehouses in federated design
- Review, verification, consolidation and migration of existing reports
- Training and deployment program



# Logical Architecture – EOY 2005



## Benefits

- Satisfied immediate SOX requirements
- No audit findings for 2005
- Improved data quality and process reliability within BI Platform
- Retirement of legacy ETL and Reporting Platforms
- Solid foundation for delivery future enhancements & value

## Challenges

- Vision was very tactical
- Source data quality issues still existed
- System integration issues still existed
- Requests to feed OLTP systems from Data Warehouse Data with critical conformed data, such as Borrower
- Governance & Data Management still at infancy

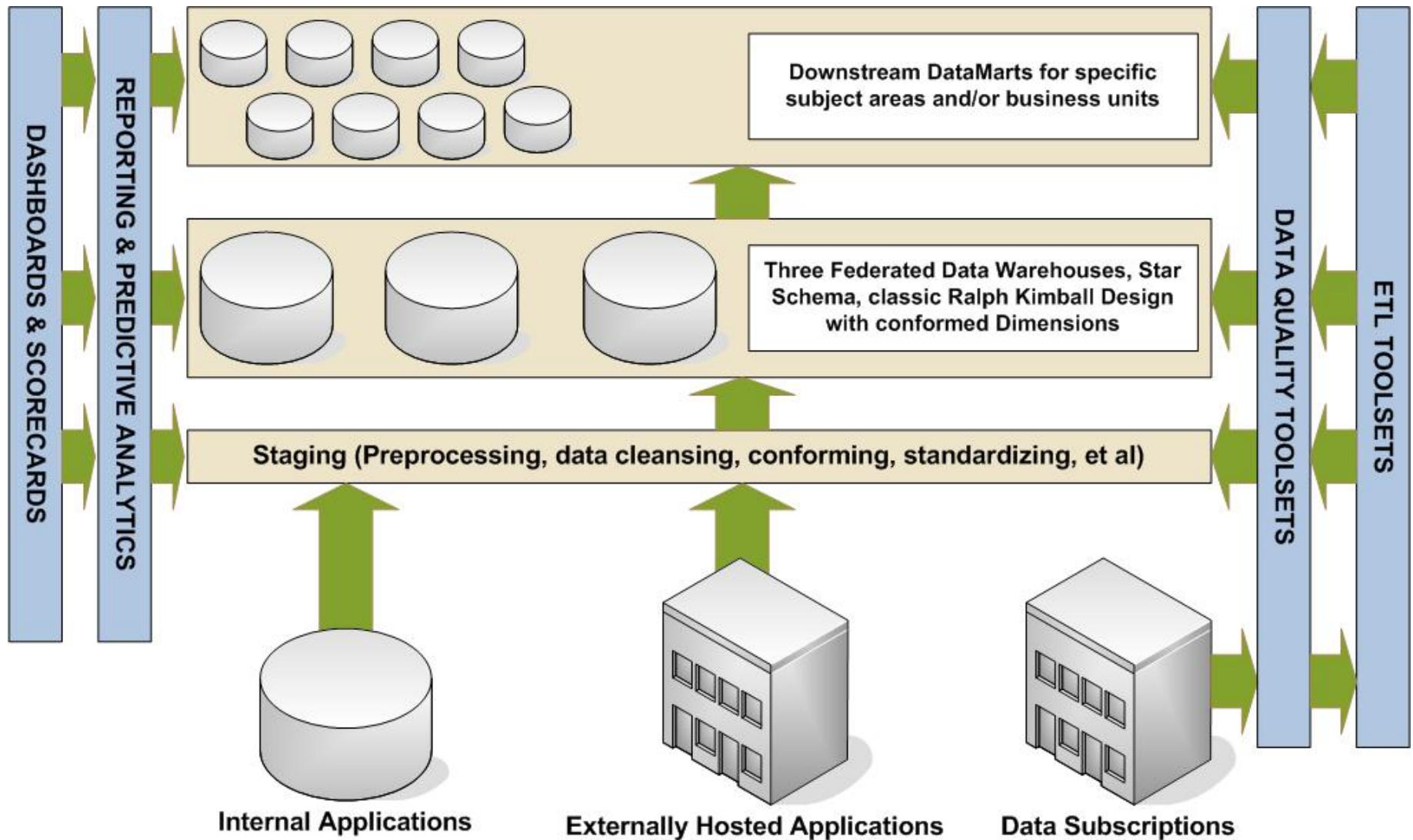
# Key 2006 Deliverables

- Delivery of Dashboards and Scorecards
- Integration of external, third-party data such as
  - *Loan Performance*
  - *Economy.com*
  - *CoreLogic*
  - *Fair Isaacs*
  - *Interthinx*
  - *Geo-spatial & demographic data*
  - *Market indices*
- Life of a Loan analysis across federated data warehouses
- Introduction of Statistical Models and Forecasting
- Automation of existing manual stove-pipe reporting processes across departments and business units
- Formal launch of Master Data Management





# Logical Architecture – EOY 2006



# Benefits

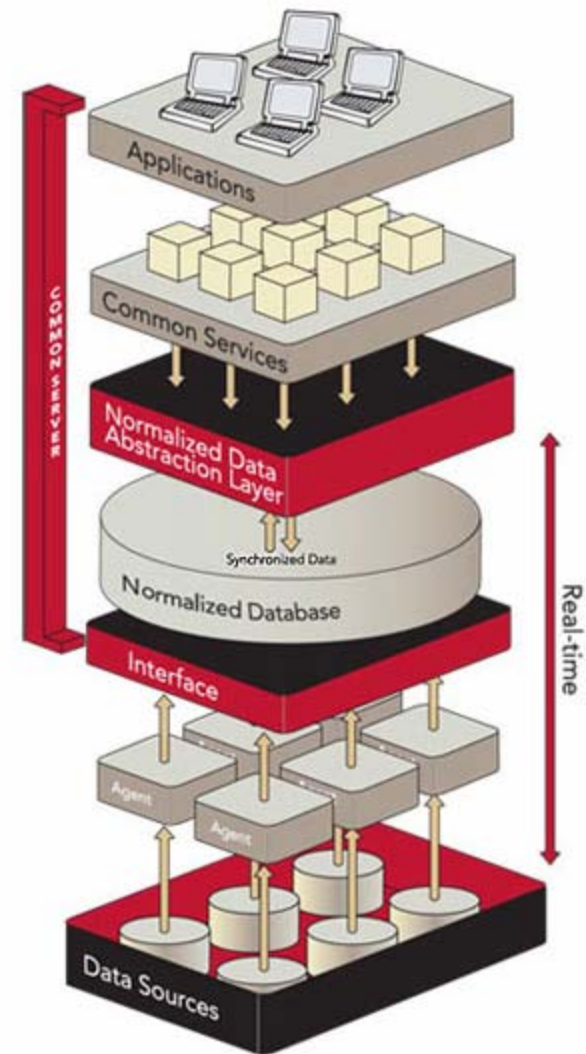
- Introduction of Hub data architecture to support improved system and data integration
- Improved Governance & Data Management
- Faster time to market for information and integration projects
- Integration of external data subscriptions
- Life of a Loan Analysis
- Statistical Analysis & Predictive Analytics

# Challenges

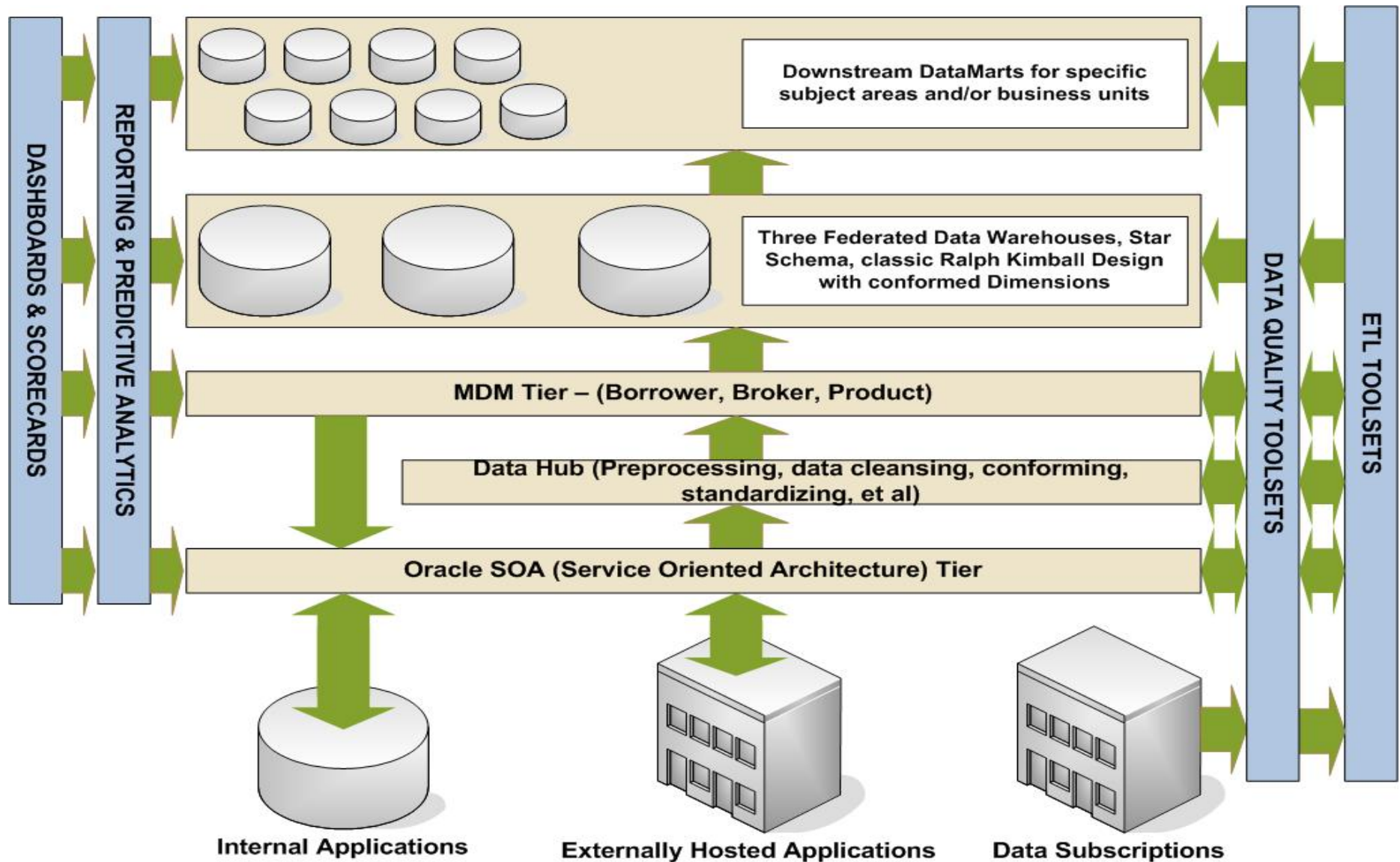
- No consolidated view of a Borrower, Broker or Product (Loan Programs) across disparate applications and external market data
- Data Quality between source systems
- Timely correction of data quality within source systems
- Lack of workflow/messaging platform between systems/processes

# Key 2007 Deliverables

- 2007 Delivery of Master Data Management Tier & Service Oriented Architecture framework to retrofit EDI/EII across the enterprise
- Business Activity Monitoring in near real-time between key systems and introduction of decision support workflow, event driven activity and alerting
- Improved data quality between applications and closed-loop processing/data validation between systems
- Successful integration of new systems, applications and data through M&A activities



# Logical Architecture – EOY 2007



## Benefits

- Mature data-driven organization with effective data management, governance and stewardship
- Single source of Borrower, Broker and Product information in a publish/subscribe model
- Data Quality improved across the enterprise and data quality issues identified and users notified in near-real time
- Major Merger/Acquisition well-executed using new framework

## Challenges

- New technology & methodology
- Changes to scope/architecture over three years resulted in re-work and additional time/expense
- Cost Benefit Analysis & Budget/Project Approval

# ROI Study Results



**ROI 165%**

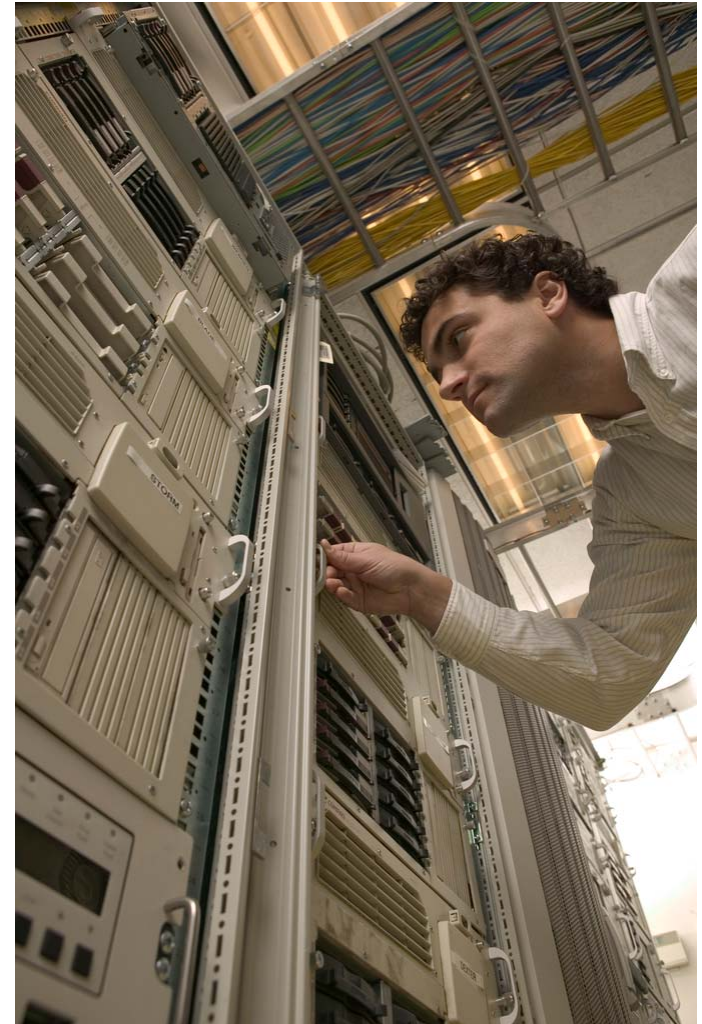
**Payback – 1 Year**

| <b>FINANCIAL ANALYSIS</b>                        | <b>Year 1</b> | <b>Year 2</b> | <b>Year 3</b>    |
|--|---------------|---------------|------------------|
| Net cash flow before taxes                       | 2,442,970     | 5,206,670     | 5,036,670        |
| Net cash flow after taxes                        | 1,335,885     | 2,717,735     | 2,632,735        |
| <b>Annual ROI - direct and indirect benefits</b> |               |               | <b>165%</b>      |
| Annual ROI - direct benefits only                |               |               | 10%              |
| <b>Net present value (NPV)</b>                   |               |               | <b>3,599,819</b> |
| <b>Payback (years)</b>                           |               |               | <b>1.00</b>      |
| Average annual cost of ownership                 |               |               | 1,187,986        |
| 3-year IRR                                       |               |               | 126%             |



# Architecture - Hardware

- HP Itanium Blade Server Technology for Database and Application Servers
- Operating Systems – HP-UX and Windows 2003
- Development, Test, Stage and Production Environments
- Production designed as clustered, fail-over, redundant
- Architecture included “hot” disaster recovery solution



# Architecture - Software

- Database – Oracle 10g R2
- ETL Software – Business Objects Data Integrator
- SOA Platform – Oracle Fusion Middleware, BPEL
- Business Intelligence Software – Business Objects XI R2 Enterprise
  - *Web Intelligence*
  - *Dashboard Manager*
  - *Set Analysis*
  - *XCelsius*
  - *Knowledge Accelerator*
- Statistical Analysis – SAS
- Data Cleansing – FirstLogic





# Architecture – Staffing/Resource Model

2005 – 12 Resources (6 FTE, 6 Contract)

2006 – 6 Resources (6 FTE)

2007 – 8 Resources (5 FTE, 3 Offshore)

- **New hires**
- **Existing internal FTE's**
- **Vendor Resources – Oracle, HP, Microsoft and Business Objects**
- **Professional Services – Oracle, Business Objects**
- **Offshore Resources**



# Architecture – Competency Centers

- **Technical Design Governance**

- *IT VP Business Intelligence*
- *Senior Internal Technical Staff*
- *Vendor/Industry Experts*

- **Data Governance Committee**

- *Executive Sponsor*
- *Co-Chairpersons (Business / IT)*
- *Legal Department*
- *Business Experts*
- *IT Technical Staff*



# Architecture (40+ Data Sources)

## Internal Systems/Applications

- *Automated Underwriting System*
- *Loan Origination Application*
- *Loan Servicing System*
- *Warehouse Lending Platform*
- *Telephony applications*
- *Financial Applications*
- *Etc...*

## Externally hosted Systems/Applications

- *Loan Servicing Partners*
- *CoreLogic*
- *Interthinx*
- *MERS*
- *Salesforce.com*
- *Etc...*

## External data subscriptions

- *Loan Performance*
- *Economy.com*
- *GeoSpatial Data*
- *Market Indices*
- *Fair Isaacs*
- *Etc...*

## Refresh Frequencies

- *Real-Time*
- *Near Real-Time*
- *Hourly*
- *Nightly Batch*
- *Monthly*
- *Quarterly*
- *Annually*

# Other Key Considerations

- **Design Methodology**
- **Governance**
- **Program/Project Management**
- **Data Quality**
- **Information Security**
- **Reliability of Solution**
- **Operational Support**
- **On-going Life Cycle Management**
- **Migration Path**
- **Deployment Strategy and Training**
- **Documentation**
- **Marketing**



# What would we have done different?

- **Implemented MDM/SOA before design, development and implementation of the Enterprise Data Warehouse and Business Intelligence Solutions**
- **Explored other MDM Software Vendors**
- **Engaged MDM SME/Consultancy for design, best practice and milestone reviews**



## Additional Information

### Business Objects Case Study

<http://www.businessobjects.com/company/customers/spotlight/impac.asp>

### Nucleus Research ROI Study

[http://www.businessobjects.com/pdf/company/h20\\_business\\_objects\\_roi\\_case\\_study\\_-\\_impac\\_funding.pdf](http://www.businessobjects.com/pdf/company/h20_business_objects_roi_case_study_-_impac_funding.pdf)