

Data Integrity is a Universal Issue

October, 2008

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Presentation Outline

- Data Integrity Is a Universal Issue
 - How Did We Get There..
 - Today's Data Issues
- Data Integrity Affects Business Performance
- Searching for Data is Costly
- Enhancing Data Integrity Is an Opportunity
- Case Study
- Conclusion
- Appendix

“There’s too much data it’s duplicated hundreds of times. The mistake companies make is that they start from the data they have. They need to ask what data their users need and what are the questions they are asking.”

-- Bernard Liautaud, Chairman and CSO, Business Objects

“There’s not one company that doesn’t have a data quality problem. Most companies have about 200 data sources and much of it is poor quality and inconsistent.”

-- Andy Bitterer, Analyst, Gartner

“Many companies don’t do the groundwork. They need to ask what is it they are trying to measure; do they capture that data; and do they have the quality of data to make it meaningful.”

--Mike Pratt, Data Integrity Manager, Business Link London (BLL)

Data Integrity Is a Universal Issue

The average installed storage capacity at Fortune 1,000 corporations has grown from 198 terabytes to 680TB in less than two years. This growth of more than 340% as capacity continues to double every 10 months.

“While consolidation and virtualization strategies rank highly in these companies, the focus should be on bad data.”

-- David Thompson, Managing Director, AXS-One

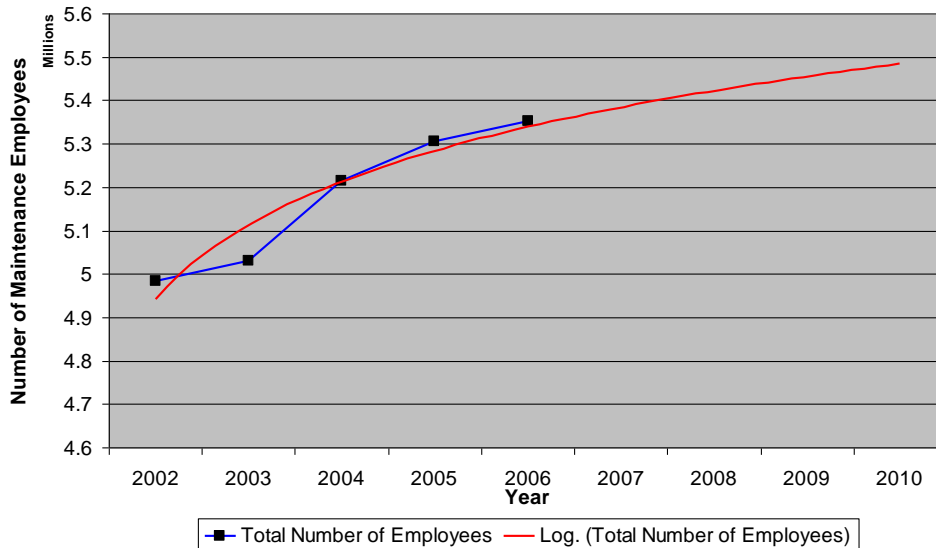
(Report, November 2006, TheInfoPro (TIP). TIP was created by alumni of Gartner, EMC Giga and Bell Labs.)

Data Integrity Is a Universal Issue – Maintenance Employee Growth Rate & Forecast Pay Increases

US industrial maintenance employee entrants is slowing, while pay and employment costs are steadily rising.

(Graph below) US industrial maintenance work force entrants into the field is slowing over time.

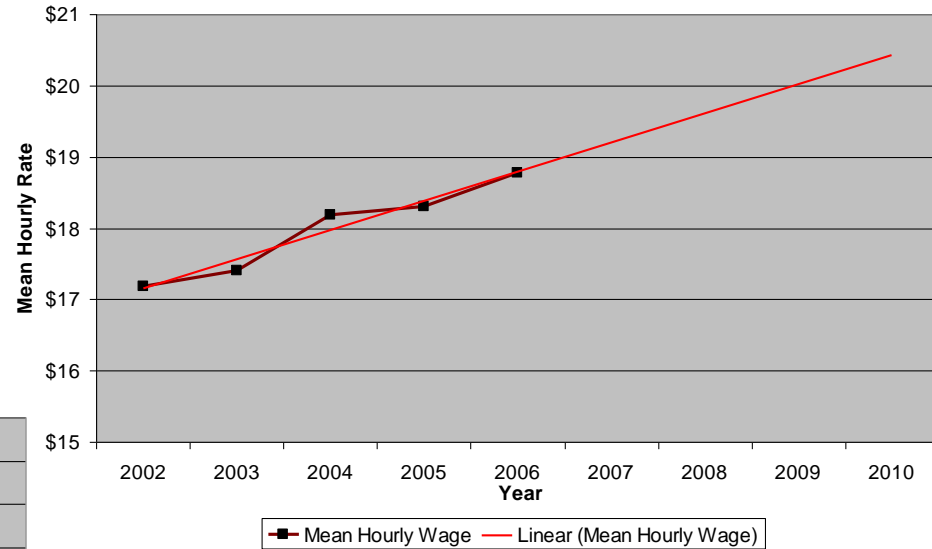
Growth of Maintenance Employees



Sources: US Department of Labor Bureau of Labor Statistics. *Occupational Employment and Wage Estimates*. (May 2006.)

http://www.bls.gov/oes/current/oes_nat.htm#b49-0000

Mean Hourly Rates for Maintenance Employees



(Graph above) US maintenance employee hourly rates and employment costs steadily rise and are forecast to continually increase.

Ernst & Young. *The Aging of the US Workforce: Employer Challenges and Responses*. (2006)

Management Resources Group, Inc. – Proprietary and Confidential

Data Integrity Is a Universal Issue - How Did We Get There..

Too much information exists in too many places with too little organization, application and management.

Poor Data Integrity

- No common technology platform
- No standardized process for Enterprise Asset Management (EAM)
- Data integrity issues – Quality, quantity, integration, accessibility

Hidden Data

- Hidden databases
- Static text field use versus dynamic fields
- Improper completion of required fields
- Erroneous and duplicate information

Limited Data Access

- Accurate and timely decisions compromised
- Limited data management and application
- Limited understanding of existing or meaningful data
- Unfulfilled performance measurements

Possible Integration Results

- Less effective CMMS usage and less complete and efficient integration of EAM systems – Marketing, Supply Chain Management, Work Management
- Lowered end user confidence in their ability to find quality data

Data Integrity Is a Universal Issue - Today's Data Issues..

Data is not static and its integrity affects business performance.

- Many companies simply think business intelligence tools will solve all their problems without thinking about the quality of the data the tools will draw upon.

(Mike Pratt, speaking at a business intelligence vendor Business Objects' customer conference, Cannes, May 2006)

- The average middle manager spends about 2hrs a day looking for data they need, according to a study by Accenture. "Managers have too much information, do too little sharing," says Study.

Kolbasuk McGee, Marianne. Information Week. (January 3, 2007)

- "Brain Drain", the increasing number of retirees resulting in a massive skills gap introduces a new level of concern regarding the management of data.
 - More than 80% of US manufacturers face a shortage of qualified craft workers.
 - Today, a wealth of skills and experience have begun to disappear from the job market.

National Association of Manufacturers, The Manufacturing Institute and Deloitte & Touche. *Keeping America Competitive: How a Talent Shortage Threatens US Manufacturing.* (2003)

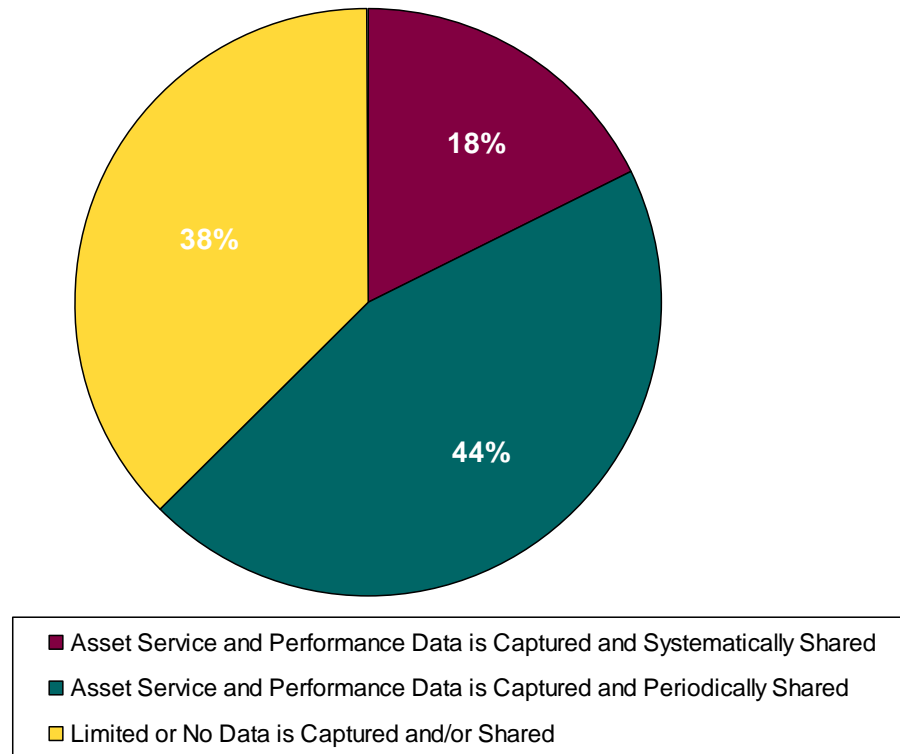
The European Commission, Eurostat. *HRI Fortnight Report.* (May 12, 2004)

Data Integrity Is a Universal Issue - Today's Data Issues..

Only top performers gather and share data. How can you improve upon what's not collected, shared, organized, managed or measured?

- Less than 20% of organizations regularly capture and share data about asset performance with all parties involved, including third-party service providers.
- Roughly 80% of organizations either gather no data at all, or they capture and share data with other interested constituents only sporadically. (See figure right)
- ***In contrast, 73% of best-in-class companies consistently gather and share data with all service and maintenance stakeholders.***

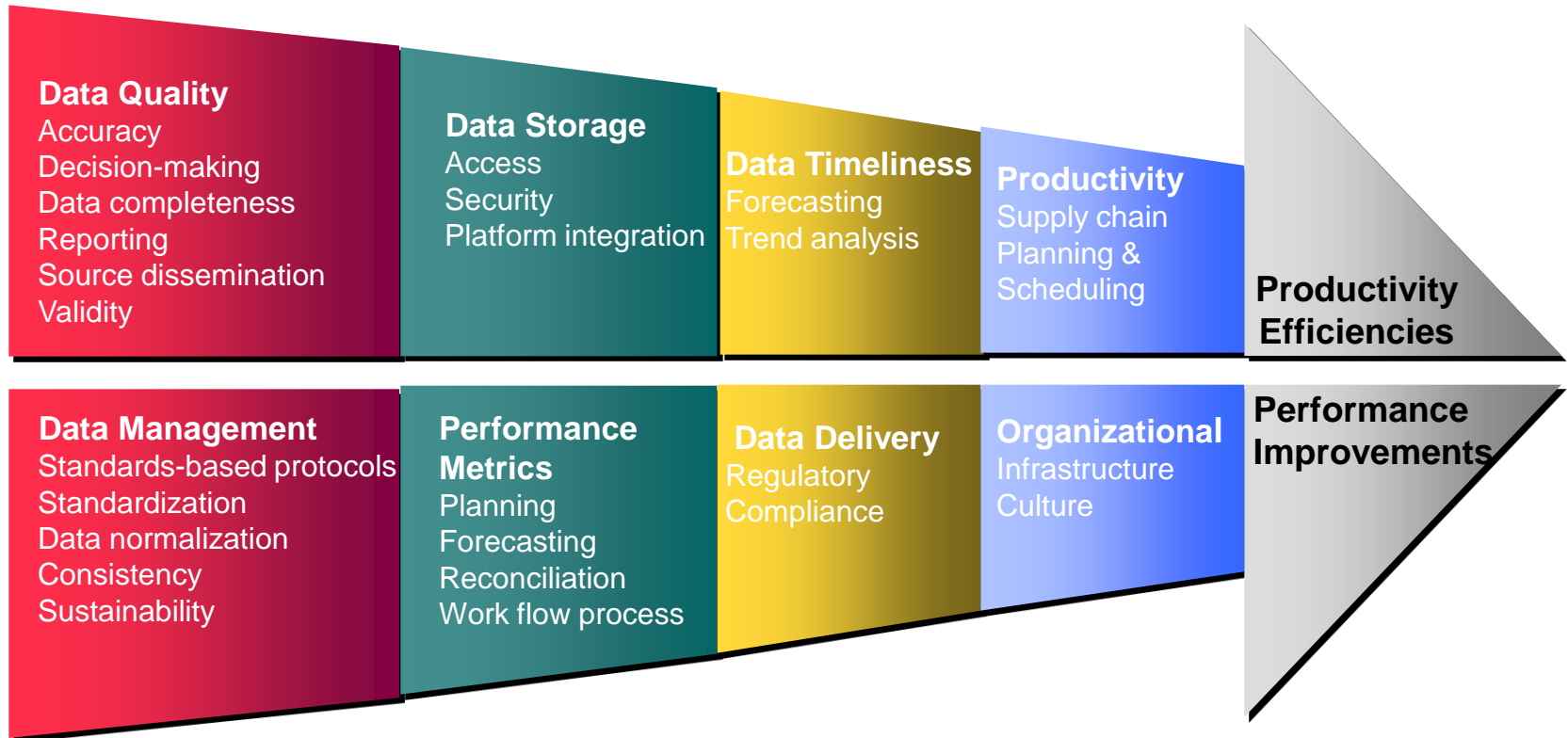
Data and Information Access Practices



Source: Aberdeen Group. *Collaborative Asset Maintenance Strategies, Redefining the Roles of Product Manufacturers and Operators in the Service Chain*. 2006 Survey (300 qualified respondents surveyed about the importance of service and maintenance activities in asset intensive industries.)

Data Integrity Affects Business Performance

All data drivers powering business performance rely on sound data integrity to boost productivity and performance.



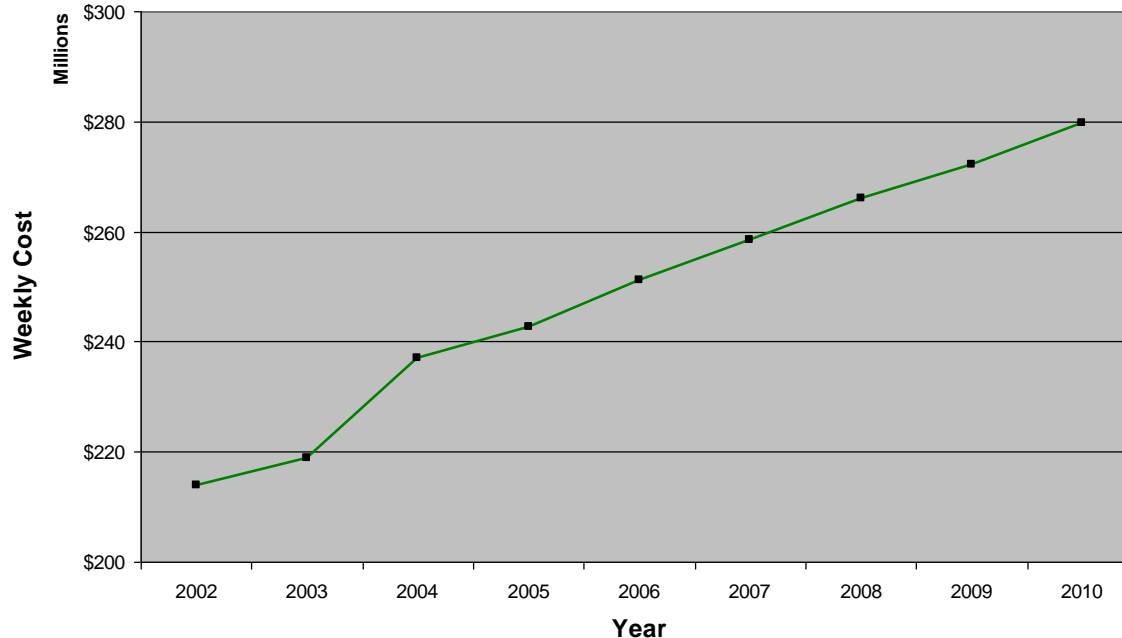


YOUR POINTING AT IT WON'T HELP - THE COMPUTER RECORDS SHOWS NONE IN STOCK.

Searching for Data is Costly

\$251M is lost weekly across the maintenance sector.

Weekly Cost for 30-minute Daily Data Search for
Entire Maintenance Sector



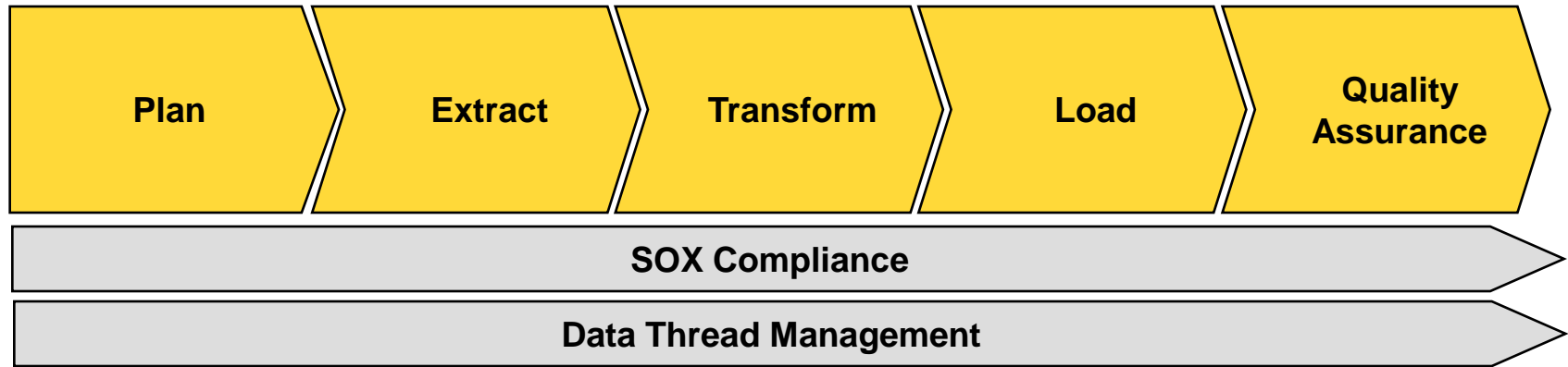
Let's assume that in an average day a maintenance employee spends 30 minutes searching for needed data or loses 30 minutes using inaccurate data. If all maintenance employees were to lose 30 minutes per day, in one week's time, over **\$251M** would be lost across the entire maintenance sector. Combining the number of US maintenance employees and hourly pay increases forecast (slide 4), in this example, for the US alone, we can estimate the weekly cost associated with inaccurate data.

Enhancing Data Integrity Is an Opportunity

Improved data integrity and data management results are critical to overall business performance, but require transformational change.

- Achievable benefits include the following:
 - Increased asset through-put
 - Decreased operations and maintenance costs
 - Integrated and leveraged data platforms, reduced redundancy, and data integrity
 - Normalized and scalable data management across an enterprise
 - Improved asset performance and reliability
 - Decreased inventory levels and costs
 - Efficient employment force time usage
 - Improved work process efficiency
 - Improved supply chain management
 - Enhanced and sustainable master data
 - Improved regulatory reporting
 - Increased revenue and return on assets (ROA)
 - Increased shareholder returns

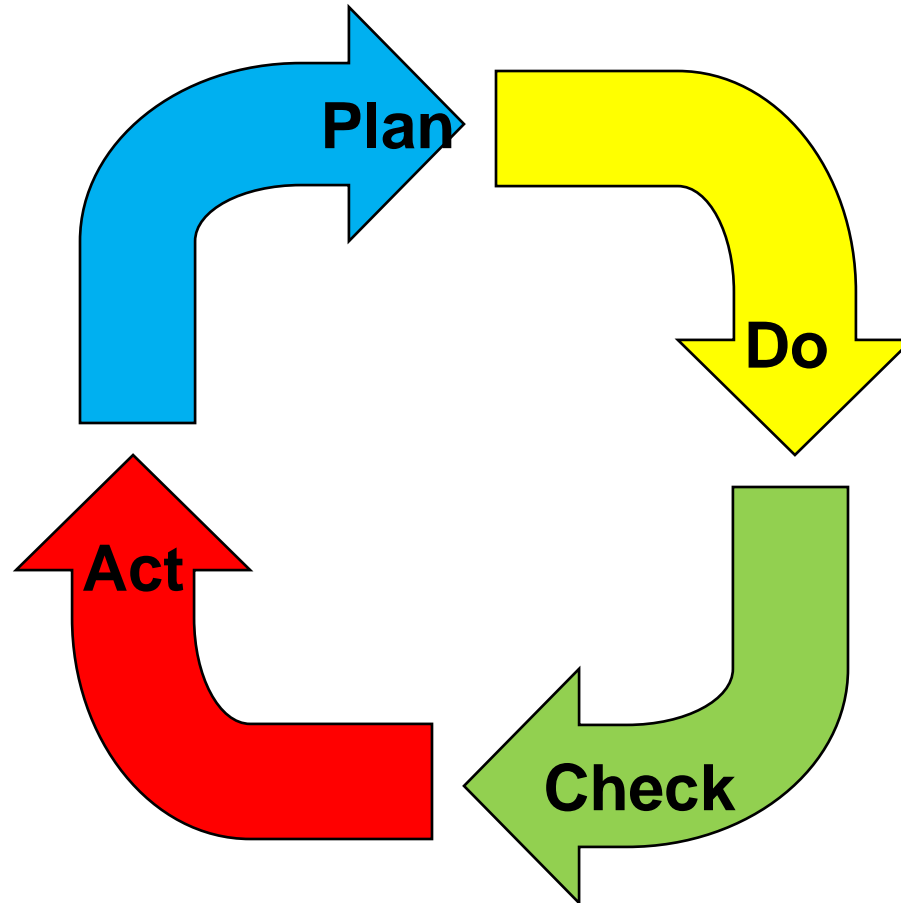
MRG Baseline Approach – Data Conversion Objectives



- **Plan:** Develop all required strategies, definitions, project plans, roles and responsibilities definitions and rule sets required for complete data conversion.
- **Extract:** Move all required data elements from legacy systems into staging databases for processing.
- **Transform:** Convert, cleanse and enhance the required data elements for archiving and target system loading.
- **Load:** Upload cleansed and readied data elements into target system.
- **QA:** Perform predetermined testing to validate conversion success and data integrity.
- **SOX Compliance:** Define, develop and monitor all required SOX control points throughout the data conversion process as required.
- **Data Thread Management:** Execute the objectives, on time and within budget, of the data thread team as aligned with the overall project charter.

The Shewhart Cycle

The learning organization follows the Shewhart Cycle of Continuous Improvement:



Source: The American Society for Quality, 1999, The ASQ Handbook. Pages 13-14

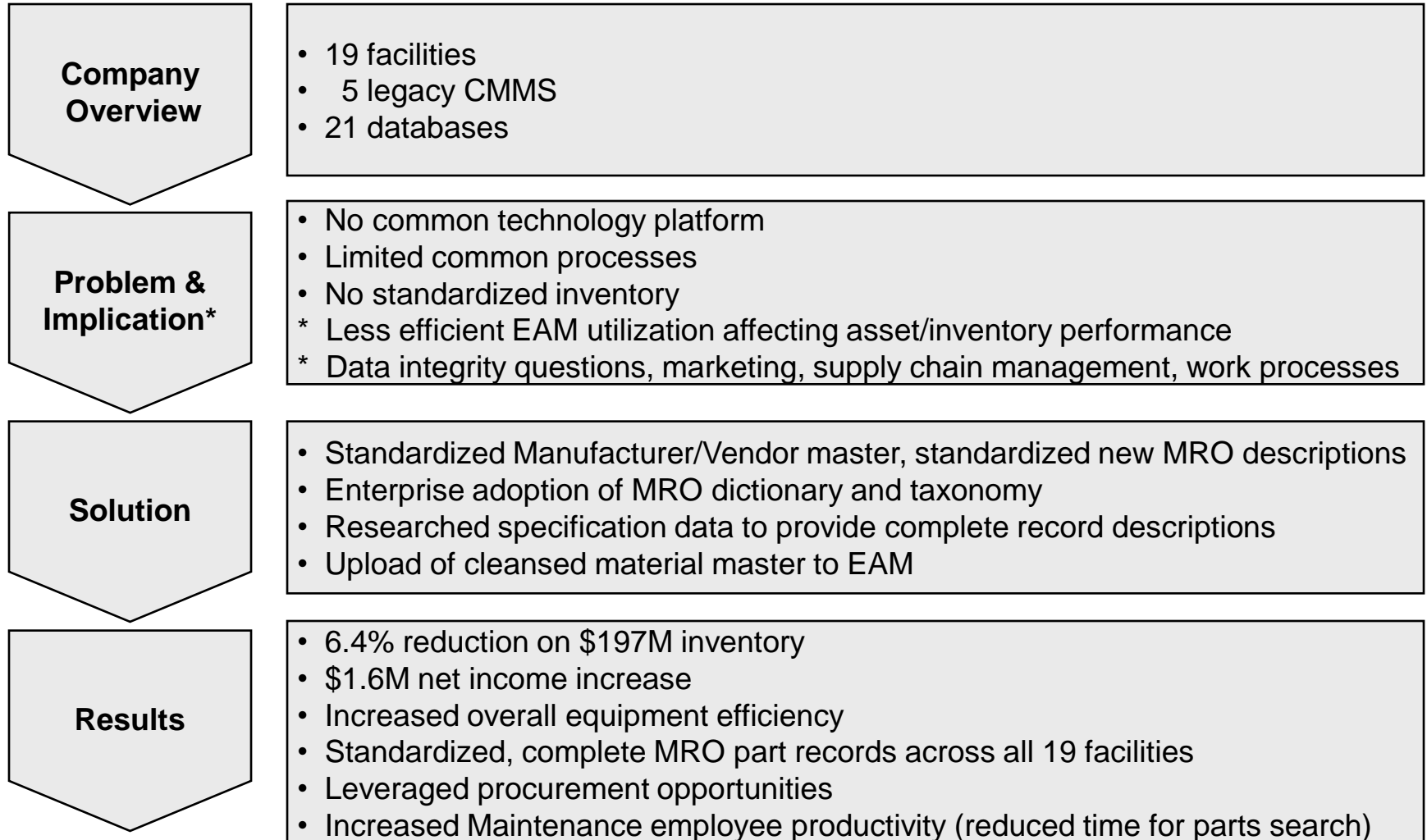
Maintaining Data Integrity

- Business process must be re-engineered or established to identify and resolve data integrity issues
- The workforce must be trained and engaged in making changes or additions, correcting errors, and maintaining data integrity

Case Study

Data integrity contributes to increased net income and decreased inventory.

In 2005, a multi-fuel and technology energy company faced the following:



Conclusion

An organization's architecture, technology, systems, and processes may be unique...Data integrity, access, integration, and sharing of data remains an issue across all industries and business units.

- Data is a valuable enterprise asset. It is the foundation and the lifeblood of an enterprise, but data is not static and must be managed.
- Stakeholders and decision-makers must have confidence in data integrity to operate in a high-performance environment.
- US maintenance employee growth rates are slowing due to the aging population, while business and employment costs are rising steadily. Data integrity becomes more important because of this “brain drain.”
- An enterprise can achieve improved productivity and operational efficiency, greater customer satisfaction, and increased enterprise agility, all leading to high performance by better managing data and addressing bad data integrity issues.

QUESTIONS

Appendix

- Common Definitions
- MRG Baseline Approach - Data Conversion
 - Overall Conversion Objective
 - Data Conversion Data Team
 - Typical Conversion Environment
 - Data Conversion Objectives
 - Data Conversion Plan Phase
 - Data Conversion Extract Phase
 - Data Conversion Transform Phase
 - Data Conversion Load Phase
 - Data Conversion Quality Assurance
 - Data Conversion Sox and Project Management

Common Definitions

- **Data**
 - Factual information as (measurement or statistics) used as a basis for reasoning, discussion or calculation.*
- **Integrity**
 - The quality or state of being complete or undivided: Completeness.**
- **Data integrity**
 - Ensuring that the data is "whole" or complete.
 - The condition in which data is identically maintained during any operation, such as transfer, storage, and retrieval.
 - The preservation of data for their intended use.
 - Relative to specified operations, the *a priori* expectation of data quality.
 - Assurance that data can only be accessed and altered by those authorized to do so.

* Source: <http://webster.com>

** Source: http://en.wikipedia.org/wiki/Data_integrity

Common Definitions Continued

- **Standard**

- Something setup and established by authority as a model, example or rule for the measure of quantity, weight, extent, value, and quality.

- **Protocol**

- A code prescribing strict adherence to correct etiquette and precedence
- A set of conventions governing the treatment and especially the formatting of data in an electronic communications system or EAM.

- **Sarbanes – Oxley**

- The Sarbanes-Oxley Act of 2002 (Pub. L. No. 107-204, 116 Stat. 745, also known as the Public Company Accounting Reform and Investor Protection Act of 2002 and commonly called **SOX** or **Sarbox**; is a US federal law signed into law on July 30, 2002 in response to a number of major corporate and accounting scandals.***

*** Source: http://en.wikipedia.org/wiki/Sarbanes-Oxley_Act

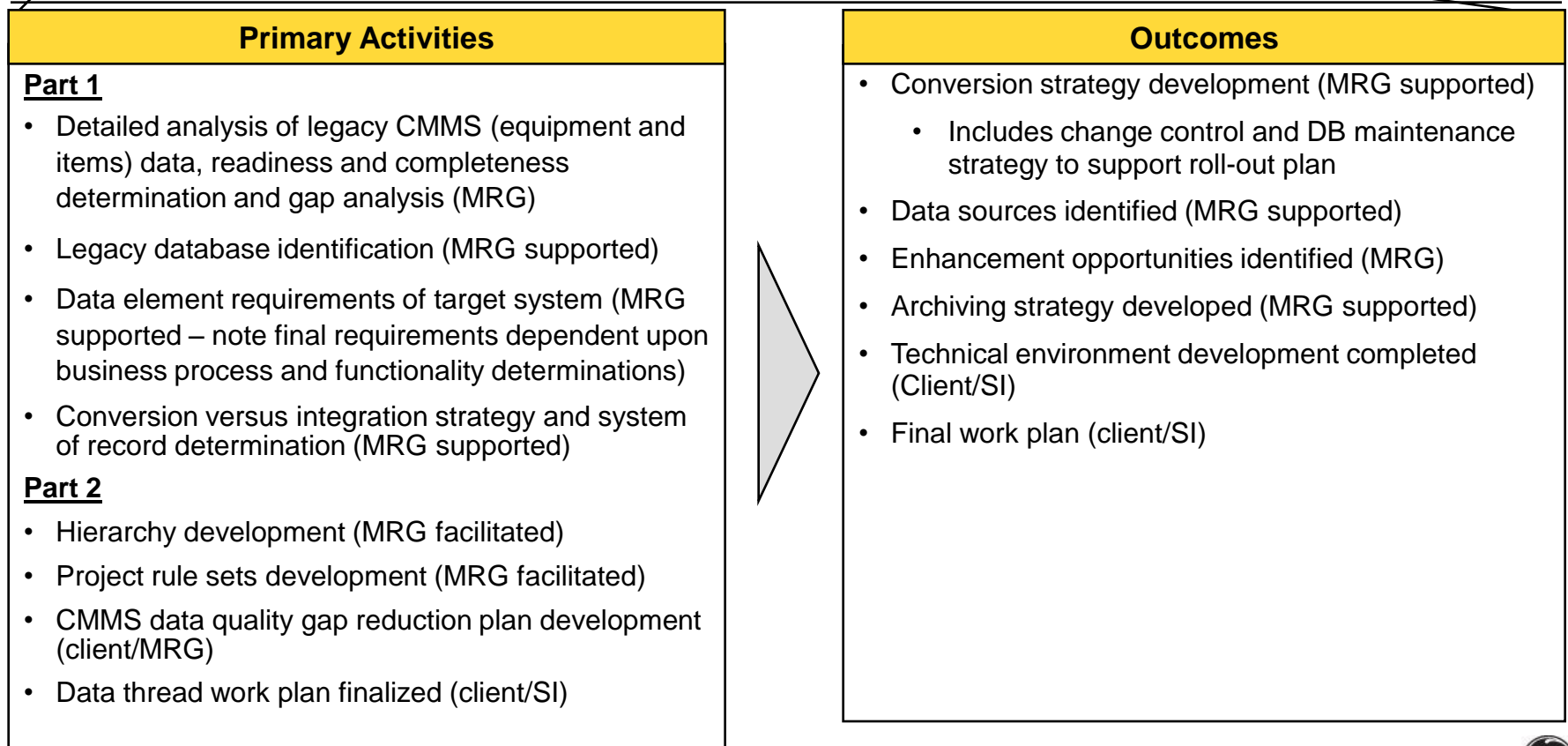
MRG Baseline Approach – Overall Conversion Objective

Populate the target EAM/CMMS with all required data elements which have been properly cleansed, enhanced, standardized, and formatted utilizing legacy system data, MRG content libraries and physical data collection methods. This will allow for proper utilization of all desired functionality of the target system in order to achieve top-quartile performance.

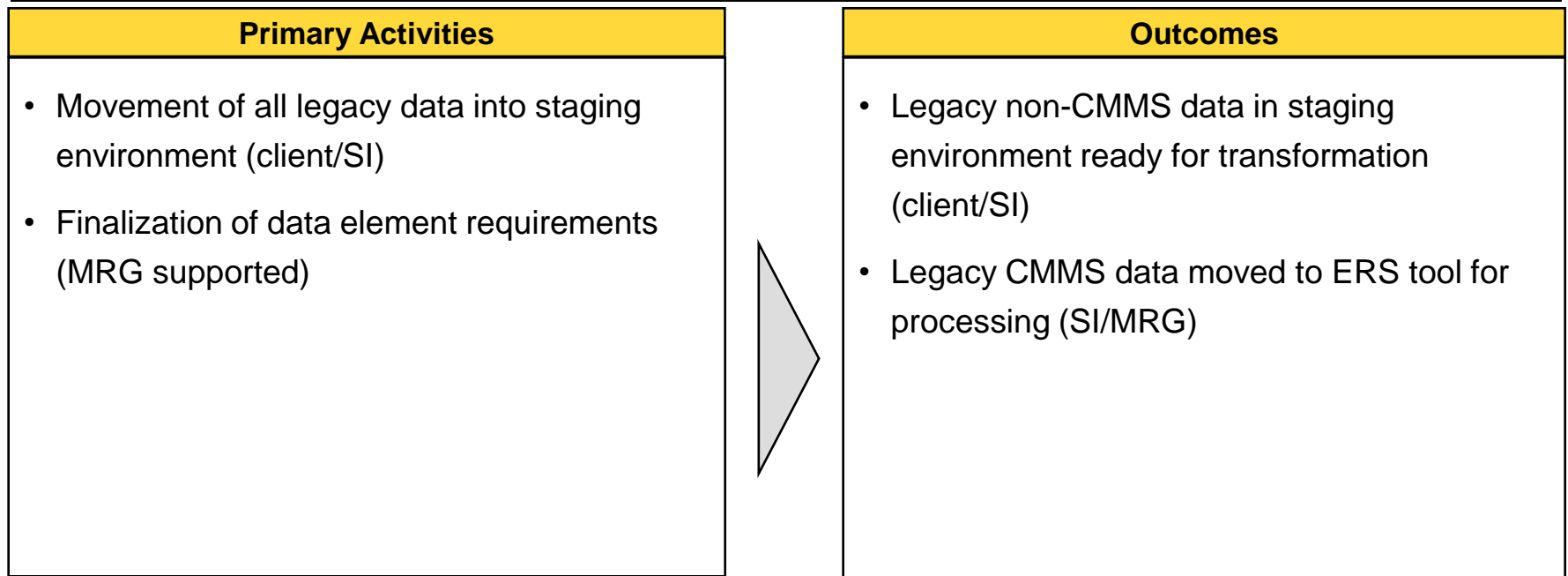
MRG Baseline Approach – Data Conversion Team

Key Players	Typical High Level Roles
Client technology group & system implementer	<ul style="list-style-type: none"> • Provides data thread lead/ management • Provides technical access to legacy data • Provides subject matter expertise for client legacy systems and databases • Provides proper staging and archiving environment • Provides subject matter expertise (SME) for all non-CMMS data (HR, FI, etc.) • Provides final design of all conversion strategies and plans • Provides all direct contact with production data (extracting and loading)
MRG	<ul style="list-style-type: none"> • Provides SME to design data structure and proper interpretation of CMMS legacy data (assets, items, PMs, BOMs, job plans, etc.) • Provides access to proprietary CMMS libraries for data enhancement • Provides field engineering for physical data enhancement as required • Provides detailed data analysis for improved purging, archiving and converting strategy of CMMS data • Provides tools for staging CMMS data
Client/auditor SOX compliance group	<ul style="list-style-type: none"> • Provides overall compliance guidelines and SME to the data team • Provides insight into specific control point requirements based on materiality of individual processes
Vendor representative	<ul style="list-style-type: none"> • Provides SME on the specific application being used • Provides detailed understanding of the minimum data requirements for the specific application • Overall SME for data team

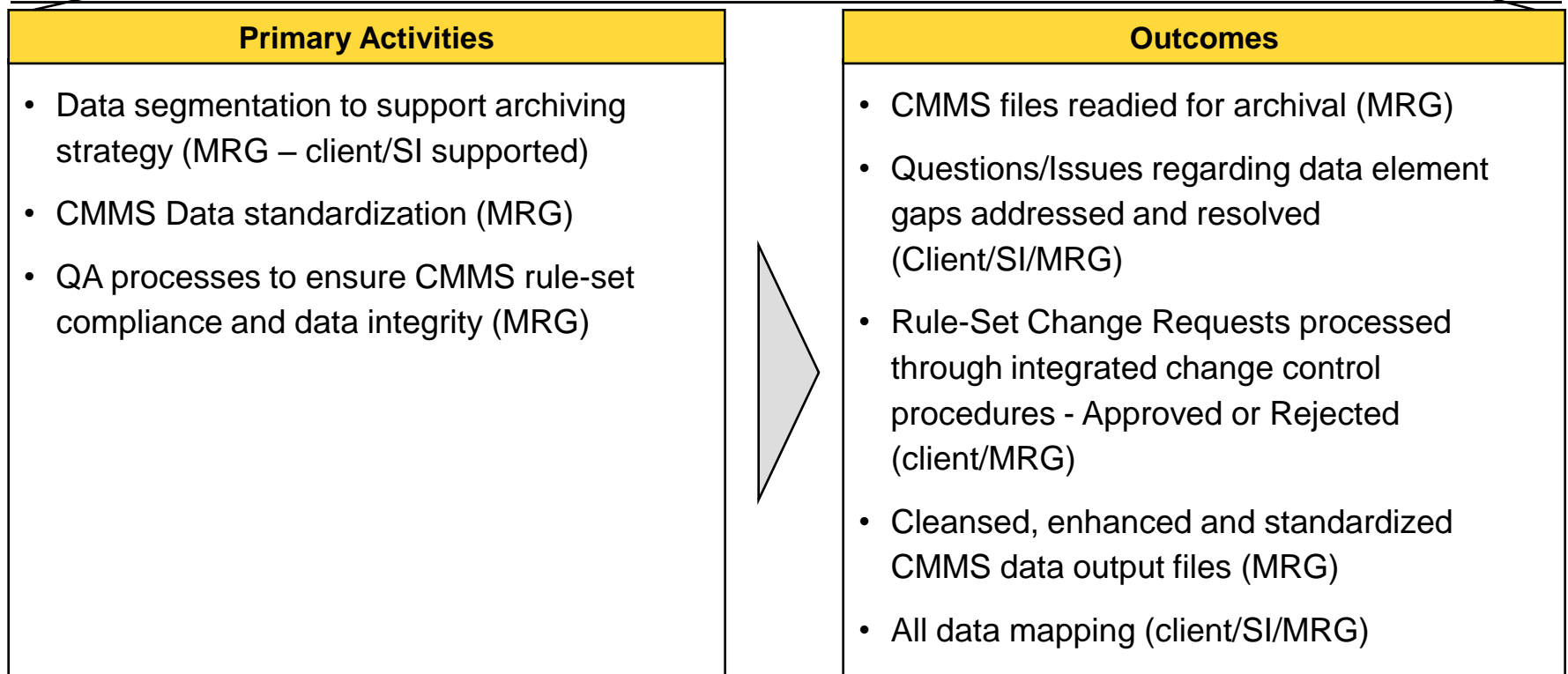
MRG Baseline Approach – Data Conversion Plan Phase



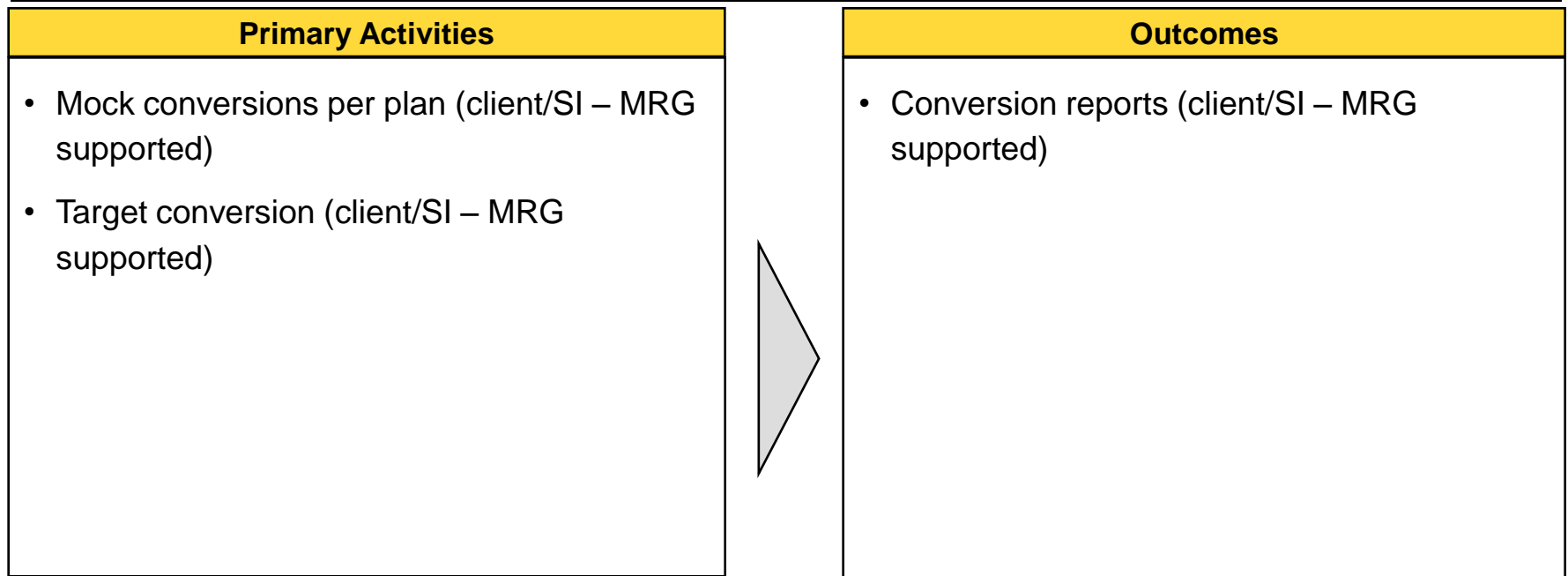
MRG Baseline Approach – Data Conversion Extract Phase



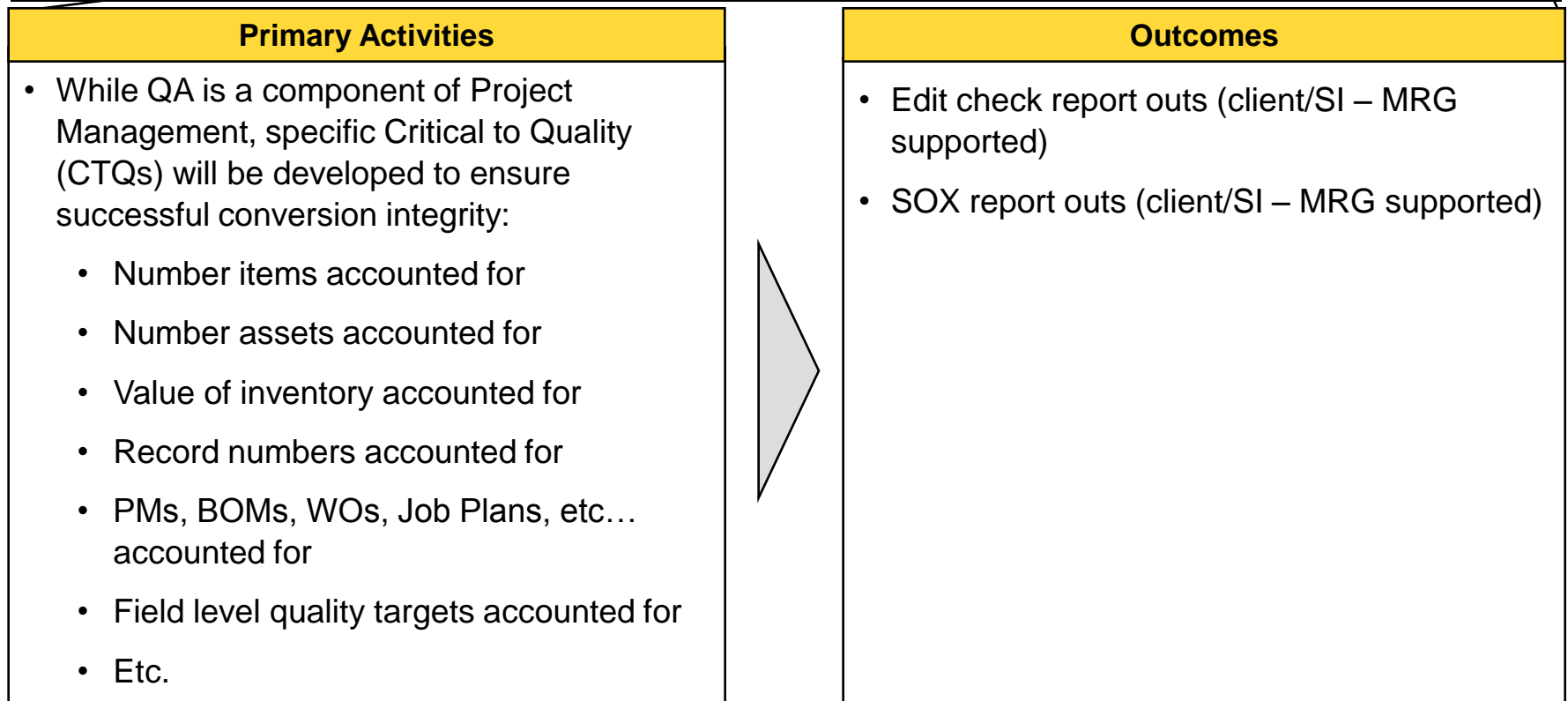
MRG Baseline Approach – Data Conversion Transform Phase



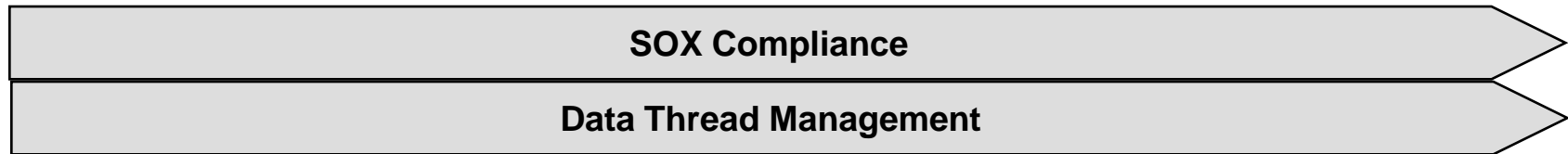
MRG Baseline Approach – Data conversion Load Phase



MRG Baseline Approach – Data Conversion Quality Assurance



MRG Baseline Approach – Data Conversion SOX and Project Management



Primary Activities
<ul style="list-style-type: none">• Identification of all SOX requirements (SOX team/business process team and MRG supported)• Identification and agreement on SOX control points required (SOX/BPT/MRG supported)• Resource, budget and work plan management (client/SI)• Risk management, communications, issue management, governance structure development, business case development and management and procedural development (client/SI/PMO and MRG supported)



Outcomes
<ul style="list-style-type: none">• All control points identified and developed (MRG supported)• SOX control status reports (MRG supported)• Thread status reports (MRG supported)• Data Thread policy and procedural manual (client/SI/PMO – MRG supported)