A White Paper

MOVING LEGACY DATA

TO THE

INDUS PASSPORT SYSTEM

December 1, 2003

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Preface

In the five years since this case study was first written, the field of information technology has continued to evolve with incredible speed. More and more companies are realizing the need to upgrade or move to enterprise software systems to keep their competitive edge. The ongoing breakthroughs in technology combined with the objectives of better, cheaper and faster process solutions continues to challenge companies with what application solution best meets their business needs. As is the nature of purchased IT solutions, the real work begins after the software application has been selected.

OLAV & Co., Inc. has continued to leverage breakthroughs in continued improvement of tools and services to deliver completed projects in the most efficient and timely manner while continuing to focus on factors that will increase client satisfaction. This updated edition introduces new perspectives and an expanded methodology for successfully migrating legacy application data. This edition also increases the focal point beyond the Indus PassPort solution to a broader range of application data migration efforts. OLAV's methodology and experience provides a valuable guide in applying new information technologies to the data migration process through anticipating and offering solutions to many of the data migration problems that commonly derail migration projects.

Moving Legacy Data to the Indus PASSPORT System

A.   INTRODUCTION

This white paper presents what OLAV feels is an effective methodology for successfully migrating legacy application data to an Indus PassPort software system. While it is written with PassPort as the target system, the tools and techniques presented are equally relevant to any large data migration project. This paper was the basis for the Case Study presented at the Indus PassPort User Group meeting in Philadelphia in 1997.

Objectives

The key objectives of this paper are to:

- Present an approach for migrating legacy data

- Discuss the data conversion team, software and environment

- Emphasize the importance of managing PassPort base values

- Highlight other key requirements for a successful PassPort implementation

Contents

OLAV starts by reviewing The Challenges of Implementation of a large, integrated business or enterprise application, focusing primarily on the task of moving data from the legacy system(s) to a new ERP application such as Indus PassPort.

The Weaknesses of the Traditional Methods of data migration will be presented, followed by a recommended Solution Overview.

The Step By Step Data Conversion section lists in a relatively chronological sequence the main tasks of OLAV's data conversion methodology.

The Benefits that will be realized using these tools and techniques, as well as The Results one can expect during the data conversion process help to summarize the advantages of this approach.

Throughout this paper, specific application development software tools, database management systems, reporting tools and connectivity software are discussed. The methodology presented is not specific to these tools and can be implemented using any number of comparable tools. What is of most importance is the use of flexible, high productivity PC-based tools and a database server, as well as an experienced, versatile data conversion team.

B. THE CHALLENGES OF IMPLEMENTATION

Assembling a Data Conversion Team

The best data conversion team is one whose members are well versed in current computer infrastructures, current software tools, legacy ERP systems and processes and possess good communication skills. Members should be familiar with the legacy application, as well as the new application. They should work well together as a team and provide complementary talents to the group. One of OLAV's primary rules is to work cooperatively with all team members, and to solve problems as a team. When there are too many individuals involved in the data conversion process, and/or individuals who are not solely dedicated to the data conversion effort, the implementation results will suffer.

The success or failure of new information technologies is often directly related to the success or failure of an organization's project management of that effort. A wide range of factors should be considered. These should include technical mastery, and behavioral and managerial factors such as leadership style, motivation, maintaining effective working relationships with other project stake holders and team building skills.

Establishing the Data Conversion Environment

The data conversion environment encompasses the hardware, networking protocols and software tools employed by the data conversion team. Exploiting the best features of each component will provide the data conversion team with the rich and flexible tool set required to convert and maintain large amounts of data. Without an integrated environment, resources will be wasted, efforts will be duplicated and data integrity will be compromised.

Extracting/Collecting Data from Various Sources/Platforms

Extracting, storing, cleaning up and maintaining data from the various source systems can be especially challenging. Knowing what information is the most current, and transferring information from various hardware platforms and file formats is an arduous task. Extracting different versions of the same data, storing it in multiple locations and burning up disk space are common pitfalls of the data collection process.

Defining & Controlling Base System Values

The installation of the PassPort system loads the base tables with initial values which contain system defaults (i.e., test data and other example values). These initial values are often referred to as "seed data." At some point after the installation, one must review the seed data, and decide which values are appropriate, and which are not to an installation. Most importantly, these values must be controlled so they are not accidentally changed during the implementation.

Defaulting Values

Also important is the ability to define default values for elements required by the new system when there is no corresponding legacy data. When creating the load files, the default values should be included. Their definition; however, should be kept out of the load program software to allow easy modification of default values.

Client Participation/Involvement During Data Conversion

One of the most effective ways to involve the end-user in the data conversion process is to display actual legacy system data through the PassPort panels. The challenge is getting converted legacy data and the associated PassPort base system values load in a timely fashion so the users can experience the new application with their data.

Completing an Effective BPI Process

The Business Process Improvement phase provides an excellent opportunity to begin the definition of base system values. When the various functional departments involved in the PassPort implementation go through the BPI process, a method of capturing the base values required for each functional area is required, and coordination and review across multiple BPI groups must be managed and controlled to prevent overlaying or redefinition of code values. The OLAV methodology dramatically enhances the BPI process by using client-specific data during the BPI process.

Maintaining Review & Sign-Off of Data

During the base system definition and the legacy data conversion, the values should be reviewed by the client and signed off as being correct and complete. This is essential for tracking what data has been converted and what data still remains. This is a significant component of the overall project schedule.

The PassPort system includes over 1,000 data tables. Reviewing which tables should be emptied, which tables require data loading and which tables should be left untouched should also be documented.

Load Planning/Project Planning

When the time to load production data approaches, the data conversion team should know as precisely as possible which load programs must be run serially and in what order, and which ones are candidates for parallel execution. The team should have documented, based on previous test loads, the elapsed time required for each step in the data conversion process, including extract, cleanup, load file preparation, data file movement and transfers, load program execution, error recovery and any other steps in the process. When there is a production load window defined in terms of hours, not weeks, every minute counts, and

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knowing the status of the load at every step along the way is absolutely essential.

Managing Multiple Regions

A typical implementation will consist of multiple PassPort regions including development, test, conversion, training, pre-production (QA) and possibly others. Maintaining consistent data across these different environments, especially the PassPort base values and code tables, is important throughout the life of the project. A method to refresh any of the regions with a quality (i.e. reviewed and approved) set of base data, including tailored security definitions, preferences and simple and custom code table entries, is essential.

Data Integrity/Referential Integrity

As with any large, integrated database application, periodic integrity checks should be performed. Before preparing the load files and starting the load process, the team should verify that the load data has both referential and domain integrity. This will prevent errors during the load operation.

Loading the Data (Inserts, Error Analysis, Load Programs)

Loading data into PassPort requires the use of load programs and direct table loads, as well as database utilities. Procedures must be established to load base system values, execute the load programs in the correct sequence and capture and review any error conditions encountered during the loads. A strategy for error recovery must be developed and tested.

System Testing and Checkout

Once the data has been loaded, the system should be tested to validate not only the converted legacy data, but the base system data as well. This includes simple and custom code tables, preferences, security and PassPort options. A final referential integrity check is also essential.

C. <u>WEAKNESSES OF THE TRADITIONAL METHODS</u>

It has been our experience in past implementations of large application systems that traditional methods are not the most effective means of establishing the system base values, or extracting, manipulating and loading legacy data. Some of the areas in need of improvement are:

- Separate (inconsistent) methods used per PassPort Functional module

- Separate (inconsistent) methods used by different team members

- Multiple copies / versions of data

- DASD space management

- PassPort Region Synchronization and Control

- Inadequate control over base values

- Inadequate control over multiple regions

- Unmanageable data extract process

- Mainframe outages / slowdowns

- Inflexible, low-productivity tools

- Rigid, inefficient conversion environment

- Integrity checking too late in the process

- Security definition and testing too late in the process

- Late start for user acceptance

- Late start for communicating data cut-off dates with the end-user community

D. SOLUTION OVERVIEW

First Things First: Clearly Define the Scope and Expectations of Project

Before starting any project, several things need to be discussed and clearly stated so that the project team can meet the expectations for the project. The team must document the high-level strategy of what the project is trying to accomplish so that all parties can understand the resources and systems involved. Once the scope of the project has been agreed to, each party needs to assign one Project Manager /Representative to manage the overall communications and to create an agreed upon process for status reporting and issue resolution.

The Data Conversion Project Manager will complete and deliver a Project Plan for the data conversion to the client point of contact. This plan will include the high-level scope, estimated duration and budget, assumptions, risks and communication and change control processes. Signing of the contract and agreement to the plan initiates the beginning of the data conversion project.

Develop a Schedule to Succeed

The Data Conversion Project Manager will work closely with the client's Project Manager to develop the project schedule, estimate duration and dates, as well as assign appropriate resources. The Data Conversion Project Manager will report weekly against the Project plan and schedule.

Build a Small, Integrated Data Conversion Staff

The Data Conversion team should be a small team, ideally no more than five to seven people. One or two team members should be primarily responsible for legacy data extracts and the resulting extract files. Two to four people should be dedicated to data mapping, legacy data cleanup, data conversion and data consolidation. One individual should be responsible for managing the data warehouse, importing converted data and preparing the load files.

Team members should also be cross-trained to provide extended support in any of the data conversion areas should any team member be unavailable.

The team members should possess a wide variety of skills including both PC and mainframe programming skills, legacy system knowledge, as well as PassPort knowledge, experience in data manipulation, data transfer between multiple platforms, SQL and other database language skills, good planning, problem determination and communication skills.

The data conversion team should include access to business subject matter experts and to an IT resource. These resources are critical to the data mapping efforts and will require the authority to make data decisions. These decisions will build the foundation of the data being

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converted out of the legacy system. There are times in the schedule where the subject matter expert will be required 100%, such as data mapping sessions and testing. This will allow a quick turn around, as well as early detection and resolution to any issues arising from data mapping decisions.

The members of the data conversion team should be dedicated solely to data conversion. It is imperative that project stake holders and team members understand data conversion is not a part-time job.

Establish Database Server Repository (Warehouse)

Establish a data repository or warehouse on a database server accessible by all team members. Database servers such as Sybase SQL Server, Microsoft SQL Server, Oracle, DB2 and Informix are good candidates for managing the data warehouse. They are powerful, relational databases with broad connectivity to mainframe and midframed PC platforms.

The tables defined to the database server should be exact replicas of the PassPort tables. This allows definition of a complete replica of all tables used by PassPort, including legacy data as well as security, preferences, simple and custom code tables and all other base tables.

Having this "single copy of the truth" provides the data conversion team with tremendous opportunities for data integrity checking, loading and refreshing multiple PassPort regions, and controlling all data values.

A file server may also be required to store the large extract files from the legacy systems and maintain them in their original format.

Setup Local/Wide Area Network

The ideal data conversion environment is a local (or wide) area network. It will need to support File Transfer Protocol (FTP), mainframe access (TN3270), E-Mail, Portal and connectivity to necessary file and database servers. Early accessibility to this network is key to the success of meeting the project schedule, and is critical to possible use of actual client legacy data in the Business Process Review/Redesign efforts.

Exploit PC-Based, Multi-User Tools

Moving legacy data off the mainframe to network-based PCs and file servers makes it available to a number of very powerful and highly productive software tools. These range from spreadsheets and reporting tools to sophisticated database management and application

development tools. Most of these tools provide integrated access to database servers using ODBC, SQL Links and other SQL Connectivity options.

Once legacy data extract files reside in this PC environment, these powerful tools can be effectively used to convert, clean-up, consolidate and transform data. Ad hoc queries can be performed and analysis reports can be quickly generated. Data can be imported and exported by the PC tools, and when necessary, programs may be quickly developed or customized to transform or load data.

When compared to the relatively rigid and inflexible mainframe environment, the PC and network environment is ultimately much more suited to the dynamic nature of data conversion efforts.

Develop Generic, Cross-Platform Data Transfer File Format

When moving data between various platforms and software packages, it is highly desirable to develop a generic data transfer file format that can be read and written by all software tools employed for data conversion. This implies that all data will be represented in character format (packed and binary fields will be converted to character format) and that field delimiters are standard.

A portable file format should also include the table/file definition for each file. This information can be used by various data conversion programs and import/export utilities to check for changes in file/table structures.

Extract Legacy Data, Clean Up and Store in Conversion Data Warehouse

Legacy data should be extracted to flat files in either a delimited format or a fixed format. Delimited formats tend to minimize space requirements. Numeric fields, date fields and packed fields should be converted to character formats. Files should be extracted in their entirety, including all rows and all columns without any filters.

Using PC-based tools, including spreadsheets, databases, and ad-hoc query tools, legacy data is cleaned up, consolidated, and mapped into the target table format. The data files are exported in the portable file format and imported into the data warehouse.

Once in the conversion data warehouse, minor data corrections may still be made, and default values for missing data are established. Additionally, warehouse tables can be easily viewed, sorted, queried and reported against. End-user review and sign-offs for each table are also maintained in the data warehouse.

Document Review Process

As individual tables are reviewed and approved by the data conversion team and functional-user department(s), their review status should be recorded, along with the review date and

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reviewer's initials and comments. This provides an audit trail documenting the data conversion process.

An audit trail should also be maintained for simple code values (stored in TIDCVVAL), as well as all preference settings.

Use Tools throughout the BPI Process

The Business Process Improvement (BPI) process is a critical step in both understanding the functionality of the PassPort application, as well as the beginning of making decisions about simple and custom PassPort code tables, preferences and security settings. As these decisions are made and values identified, they should be stored and maintained in a PC-based tool, and loaded into the PassPort system at the end of each BPI session, or more frequently as required. Comments should also be maintained with each set of values identifying which BPI group defined the values, along with any clarifying notes or explanations. The BPI tool manages the decisions and values defined by multiple BPI groups, to identify possible conflicts arising among the groups. This allows immediate resolution during the BPI process rather than in post-BPI discovery, with the untimely identification of problems.

E. DATA CONVERSION – STEP BY STEP

What follows is a checklist of the main data conversion steps and the key tasks associated with each. They are presented in (mostly) chronological order. Items listed in brackets [] refer to specific tools, protocols and databases, used by OLAV, but not required. Any software that provides similar functionality may be employed in this solution.

Project Scope

Project Management and Project Stake Holders agree upon the scope of the project

Project Schedule

Produce a Conversion project schedule and merge this with the overall PassPort Implementation schedule [Microsoft Project]

Setup Warehouse (Server) Environment

Setup analysts workstations on a Local Area Network

Install and configure SQL database server [Microsoft SQL Server]

Install warehouse management tool [Paradox Client/Server]

Configure SQL Connectivity options [TCP/IP, Borland SQL Links, ODBC]

Install legacy data cleanup tools [Pick, Paradox Runtime, Visual Basic, Microsoft Access]

Define Data Warehouse

Import PassPort meta data from DB2 or Oracle system tables

Create PassPort tables in data warehouse

Create supporting tables in warehouse (required by warehouse tools)

Data Mapping Sessions

Appoint functional users and an IT Lead to the data mapping team(s)

Generally there is a team for each PassPort Functional business area being implemented

A formal data mapping methodology should be utilized for these sessions

Identify mapping session facilitator(s)

Obtain signoff of the final mapping results, but understand that some (limited) mapping changes will occur as the Business Process reviews continue and, later as system cycle testing points out new business realities.

Import PassPort Original Base Data into Data Warehouse

Import PassPort Data Dictionary – TIDDDMST & TIDDDELE

Import the PassPort panel definitions from *.SYM files

Import TIDCVVAL and Preference tables into warehouse

Note: PassPort architecture tables are not imported into the warehouse and will remain in PassPort as installed

Extract all Data from Legacy Source(s)

Clean up as much data as possible in the legacy system

Create flat files in character format – unpack numerics

Include all rows, all columns – don't filter

Store on network file server

Establish a schedule and the procedures necessary for periodic legacy extracts

Manually Enter Data in PC-Based Data Collection Tools

Create spreadsheets for simple data entry tasks

Build database applications for more complex data entry tasks

Use multi-user network applications whenever possible

Distribute standalone applications if required

Use for collecting Contract, Employee, Equipment, Vendor, etc. information not available in electronic formats

Import captured data into data cleanup tools if necessary

Import "clean" data directly into data warehouse

Loading the TIDBLOB Table

Load the required word-processed documents, spreadsheets, and other information into the TIDBLOB table. OLAV has developed a unique automated software tool to mass-load this information directly into the TIDBLOB PassPort table.

Cleanup/Consolidate Data

Use multi-user PC tools to analyze and clean up data

Write small programs for repetitive tasks

Provide user interface to assist/review clean-up effort

Generate reports for user review and approval

Can be used for all types of data, both base data and converted data

Export data in portable data transfer format

Import Cleaned-Up Legacy Data into Data Warehouse

Import data into warehouse via data transfer format

Import Manually Entered Data into Data Warehouse

Import data from spreadsheets, database applications and text files directly into data warehouse

Define PassPort Security Matrix

Import security matrix from spreadsheet

Reorganize spreadsheet data into PassPort table format

Export security definitions into portable data transfer format

Define and Review PassPort Base Tables & Values in Data Warehouse

Update and review Preferences definitions and document review date and comments

Import security definition files via portable data transfer format

Update and review simple code values (TIDCVVAL) and document review date and comments

Update and review custom code tables and document review date and comments

Review and document table load action (i.e. load, empty, ignore) for each table with comments

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Define and Review Application Values in Data Warehouse

Update and review base application tables containing:

- Company, facilities, departments
- Buildings, units
- Financial, GL, cost centers, cost elements, bank
- Users, employees, agents
- Equipment types
- System codes
- Additional custom code tables
- Additional simple code values (TIDCVVAL)
- Preferences

Define and Review Default Values

Define default load values for missing data (i.e., dates, PassPort id, etc.)

Generate default value report

Generate Review Summary (Audit) Reports

Print audit reports for Preferences

Print audit reports for simple codes (TIDCVVAL)

Print audit reports for custom code tables

Print audit reports for Element to Panel Where-Used

Verify Data Integrity

Check referential integrity

Check domain integrity

Check data format integrity

Check major balancing routines

DB2/Oracle Table Inventory (SYSTABLE to CREATE TABLE Comparison)

Create Load Files (By PassPort Region)

Update GENARG and TIMESTAMP fields

Update TIDNMBRS

Select single table, group of tables or all tables for load file inclusion

Create DB2/Oracle insert statements

Create Load program files

Verification & Validation of Converted and Loaded Data

Conversion team members pre-review the loaded data prior to turning over to the functional-user team members.

Functional-user team members verify and validate that loaded legacy data was converted using agreed upon data mapping rules and that the correct data was loaded (Inventory quantities/Work Order steps/Purchase Order line item quantities, etc.).

Show functional-user team members that their legacy system data was fully converted into the PassPort tables through balancing. Balancing documents are used for legacy data that conforms to counts and totaling. For example, totals that can be "balanced" include inventory quantities and extended dollar values; open purchase order quantities and extended dollar values; and for nuclear sites, radiation dosage tracking totals. Balancing documents are used in addition to the Verification & Validation reports.

This task is an iterative task that is performed multiple times from the first test load and through the production load

Validation is against the mapping rule documents and the extracted legacy data

Functional Leads sign off on the final conversion V&V

Produce a Final Project Documentation Package

Produce a final documentation package to be presented to the client's project manager. This package serves as an "auditable trail" of the entire project. The final documentation package, generally on a CD-ROM, should contain these entries:

- Contents and Conversion Process Overview

- Data Mapping Specifications (by PassPort Functional module)

- Client input spreadsheets and cross-reference files

- PassPort Data Loader Input Files

- Conversion Balancing and Audit Trail Reports

F.   BENEFITS OF USING THIS METHODOLOGY

Data Integrity

Data integrity must be maintained throughout the data conversion process to help ensure error-free loads and a stable production system. Maintaining all converted legacy data, base system tables, simple and custom code tables, preferences and security tables in an integrated data warehouse powered by a relational database management system provides the ability to guarantee data integrity well before the PassPort load process begins. Problems can be identified early, and corrections made in the warehouse, thereby minimizing errors during the data load phase.

Interactive Business Process Improvement (BPI) Support Using Client Legacy Data

Enhancing the BPI process by loading actual company legacy data dramatically improves the effectiveness of the BPI process, and minimizes overlaying of PassPort code values as multiple functional groups participate in BPI sessions. By maintaining the simple and custom code tables in the data warehouse, the BPI region can be refreshed at anytime with the latest and greatest BPI data, and any other regions can be refreshed at the same time, which helps keep training, testing and QA regions up to date.

Although some ERP implementations use test data during the BPI process, the BPI process can proceed much further when using actual client data. Because of the large size of ERP systems, reviewers can only envision a limited number of operations without the real data in view. An initial full load of client data prior to the BPI process (based on the knowledge of an experienced data conversion staff) can save at least 10% in cost during a project. The cost reduction results from minimizing rework, minimizing post-production problems, minimizing user frustration, and maximizing user acceptance.

Documented Review Process

Maintaining the review status and associated comments of each application data table, simple and custom code tables, security and preference tables and PassPort base tables ensures that all tables have been reviewed. Tables may be marked for loading or emptying, or simply skipped.

Without this audit, certain tables and/or values may be missed, while others may be reviewed more times than needed.

Responsiveness/Rapid Turnaround

Using PC-based, multi-user tools enables the data conversion team with flexible, powerful, integrated software resulting in the highest productivity throughout the data conversion phase.

Portable Environment

Once the legacy data has been moved to the PC/network environment, the data conversion environment remains fairly independent of the mainframe. With today's powerful laptop computers, the entire legacy data can be loaded and transformed on a single Quality Controlled laptop.

Training with Client Data

What better way to educate PassPort users than with their own data. It brings relevance to the training tasks by showing them how their data will look in the new system. In addition to the application data, the security profiles can be loaded into the training region in advance, providing the added benefit of enabling further testing, de-bugging and validation of the security profiles, prior to production.

All in all, training with end user data and the proper security profiles will provide a much more effective training environment and a positive learning experience for the students.

When the student finally becomes a production user the PassPort application will behave exactly as they were taught. This results in no surprises and significantly increases user acceptance!

Shorter Data Conversion/Implementation Cycle

Eliminating many of the traditional steps in defining and maintaining data in a multi-region environment will dramatically reduce the time spent converting data and loading multiple regions. Supporting the BPI process with integrated tools, loading education regions with client data, maintaining end-user review audit trails and eliminating data redundancy all help shorten the overall implementation cycle. Data conversion will no longer be on the critical path, and project costs will be lower than historical costs.

"Single Copy of the Truth"

The data conversion warehouse contains all of the data necessary to reload an entire PassPort region. It is the only source of this data, and all changes required to any data is made in the data warehouse.

Broad, Consistent Support for Multiple Regions

Since all PassPort regions are loaded from a single data warehouse, synchronization is maintained between all regions. The importance of properly synchronized PassPort regions has been demonstrated many times during system testing and other "expected results" verification periods.

Production Data Warehouse for Reporting

Building a data warehouse for the data conversion effort paves the way for a production data warehouse. Since the data conversion warehouse contains a mirror of the PassPort data tables, it can be used in the production environment to support ad hoc query and reporting activities. This will offload processing from the legacy mainframe-DB2 or Unix-Oracle environment to the data warehouse. Depending on the end-user requirements, the data warehouse can be refreshed as needed.

Provides a Tool to Aid in the Migration to Newer PassPort Releases

By maintaining a one-to-one mapping between the data warehouse tables and the PassPort tables in both the current release and the new release, the task of re-mapping and moving data is greatly simplified. The majority of the data analysis and scoping effort can be automated via software tools. The migration task then becomes one of evaluating the differences between the releases.

G. THE RESULT

Meeting the Project Completion Date

Using high productivity tools and the data warehouse approach allows the data conversion team to focus on a single set of data in a single environment. Data inconsistency errors will be reduced, regions will be stable and synchronized, the BPI process will be highly effective and the training environment will represent the production environment. This eliminates many of the project-delaying interruptions that threaten project completion dates.

Provide a Quality Data Platform in PassPort

By maintaining a single copy of the truth, the quality and integrity is maintained and in fact improved as additional data is added to the warehouse. Since PassPort regions are loaded directly from the data in the warehouse, they will contain the most current and consistent information all the time.

Prevent Project Cost Overruns

Project cost overruns due to implementation delays are avoided by:

- Improving the BPI process
- Maintaining the most current PassPort data in the training, testing, quality assurance, and development regions
- Significantly reducing the number of mistakes, rework, and duplication of effort throughout the data conversion phase.

Additional costs incurred due to post production data problems will also be greatly reduced.

About The Authors

Eric W. Jonassen

Mr. Jonassen has provided consulting services to utility clients for more than 23 years. As a Senior Consultant to Engineering Planning and Management, Inc. (EPM), he managed senior engineering and software development personnel on numerous projects. Mr. Jonassen used his Master's Degree in Nuclear Engineering and extensive software development experience to design and develop a fully integrated nuclear data management system. Applications within this system are currently at use at a third of the nuclear power plants in the country. These applications include Plant Equipment, Records and Document Control, Maintenance and Operations, Health Physics, Electrical Cable and Raceway with Fire Protection Appendix R Analysis and Inventory Control.

Mr. Jonassen's unique understanding of data flow issues has enabled him to manage all aspects of data loading activities, including data source determination and consolidation, development of data loading tools, configuration of data loading hardware, mapping data to correct destination and ensuring compliance to QA procedures. Mr. Jonassen's extensive experience on large database applications, as well as having managed more than 100 comprehensive data loads has resulted in him developing a highly effective methodology for mass loading data into large systems. Mr. Jonassen has recently completed working on the catalog conversion for the Indus PassPort implementation at a large nuclear utility company.

Kent R. Gustafson

Mr. Gustafson has provided over 20 years of computer systems experience, much of it supporting the implementation of large, integrated database applications including inventory and materials management systems. As a Senior Consultant and Client Support Manager for Cullinet Software, Inc., he provided both technical and management support services for Cullinet's database and application clients. Mr. Gustafson has taught advanced courses and provided consulting services in subjects ranging from online application design to database performance and tuning. As Director of Marketing for Cullinet Software, Mr. Gustafson was responsible for all aspects of product marketing for Cullinet's VAX product line.

Mr. Gustafson designed and developed a client/server-based maintenance parts catalog used at a major nuclear utility company to organize and re-write the descriptions for over 300,000 parts. He also developed an integrated materials management system with electronic routing and approval used for both commercial and quality-related inventory at a nuclear power plant. His additional software development experience includes designing and developing a PC-based inventory analysis software package used by Fortune 100 companies to analyze and optimize their maintenance inventory.

For More Information

For more information regarding this presentation, or other OLAV products and services, please visit OLAV's website at http://www.olav.com, or e-mail OLAV at Eric_Jonassen@olav.com.

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