The Information Systems Engineering Department (ISED) at Southwest Research Institute® (SwRI®) has the database engineering skills and knowledge to perform sophisticated data model design and development. To implement Large Scale Data Management systems, ISED performs:

- Detailed analysis of legacy systems
- Consideration of specific functional requirements, migration requirements, and future business process models
- Complete life cycle data modeling
- Implementation of necessary external interfaces
- Application of architectural considerations

Legacy Systems

One of the main challenges of Large Scale Data Management is the analysis and migration of legacy systems with antiquated database engines, varying data structures, and a variety of external data sources. ISED has extensive experience in formulating and implementing solutions to accommodate the migration and replacement of outdated systems.

ISED staff members are technically proficient with a vast array of modern database technologies and have prior experience with database technologies in use for several decades. ISED engineers and computer scientists are able to bridge the gap between the legacy system and the intent of the functionality of the future system in order to produce an efficient and correct implementation.

Core Requirements

ISED computer scientists and engineers are experienced in eliciting functional and migration requirements and transforming these requirements and business rules into the full life cycle of data models. This life cycle generally comprises:

- Construction of a conceptual data model that maps concepts, abstractions, and relationships which are representative of the client's business needs
- Detailed analysis of functional requirements resulting in development of a logical data model where specific data elements and relationships are described in detail without regard to physical implementation
- Transformation of this logical data model into a physical data model to account for physical constraints and requirements such as architectural issues, matters of security, ease of maintenance, and performance criteria

ISED experience spans a variety of modeling tools (e.g., Oracle® Designer, ERwin Data Modeler) and database engines (e.g., Oracle®, Sybase®, MS SQLServer, MySQL®).

Connectivity

Large Scale Data Management typically involves connectivity to external database interfaces and access to a wide variety of data sources to be imported into the future system. This external communication between databases is implemented via connectivity gateways (e.g., ODBC) to allow disparate database engines to migrate, share, or exchange information. In addition, legacy systems have evolved to import data from various sources such as spreadsheets, documents and ASCII delimited files. ISED staff members are technically proficient with these and other emerging technologies and are able to incorporate these types of required functionality into resultant systems.

System Implementation

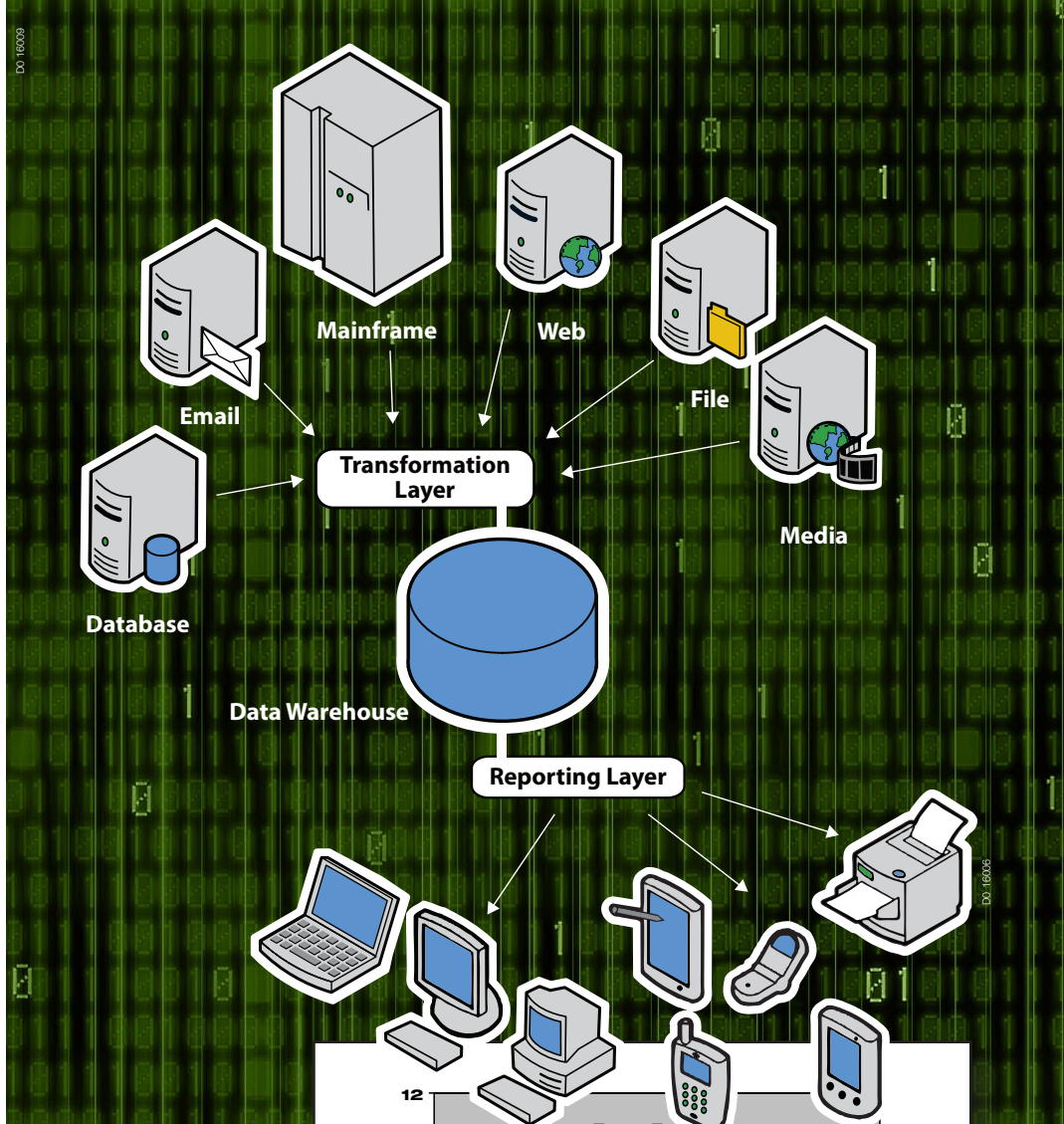
Large Scale Data Management implementation of the resultant system involves a number of considerations including:

- Target architecture
- Availability requirements
- Recovery strategies
- Data integrity
- Security issues
- Performance metrics
- Archival and historical data access

ISED staff members are adept with a broad spectrum of architectural implementations, including Service Oriented Architecture (SOA) and Client-Server. Our engineers are well equipped to deploy enterprise data systems into these various architectures. ISED computer scientists and engineers implement high demand and high availability data management systems (e.g., Real Application Clusters, Fail Safe) and a variety of back-up and recovery methods.

Data integrity issues are dealt with by careful data and structural gap analysis, domain identification, and primary key mapping. Security levels are implemented directly into the physical data model through an appropriate combination of user access, role assignments, and data view creation. To accommodate performance metrics, system hardware is specified and advanced performance techniques are used.

The resultant physical data model can include a variety of auditing, archival, and historical data schemes. In addition, most Large Scale Data Management systems will have separate database instances for purposes of transaction management, reporting, warehousing, and data archival.



Southwest Research Institute®

Large Scale Data Management

The Information Systems Engineering Department at SwRI is committed to reliably producing the highest quality work through a proven systems engineering process. Our commitment to excellence is evident through our appraised attainment of Level 5 within the Software Engineering Institute's (SEI) Capability Maturity Model Integration (CMMI®). This distinction is held by a limited number of American companies and even fewer applied research and development institutions.

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