

# DATA WAREHOUSE

## DATA DISTRIBUTION SYSTEM (DDS)

### ✧ REQUIREMENTS REPORT ✧

#### SAMPLE DOCUMENT

<b>Prepared by:</b>	<i>Mark Freeman</i>
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<b>Project Sponsor:</b>	<i>George Washington</i>
<b>Project Owner:</b>	<i>Adam Smith</i>
<b>Design Architect:</b>	<i>Tom Jefferson</i>
<b>Project Manager:</b>	<i>Mark Freeman</i>

<b>Phase 1 Define</b>		<b>Phase 2 Plan</b>			<b>Phase 3 Execute</b>				
<u>Phase 0</u>	<u>Phase 1</u>	<u>Phase 2</u>	<u>Phase 3</u>	<u>Phase 4</u>	<u>Phase 5</u>	<u>Phase 6</u>	<u>Phase 7</u>	<u>Phase 8</u>	<u>Phase 9</u>
Project Definition	Project Initiation	Project Requirements	Engineer Approach	Plan the Project	Design and Analysis	Construction	Testing	Implementation	Post Implementation

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# 1 EXECUTIVE SUMMARY

## 1.1 Project Background

Description of events leading up to project TBD.

**Significant steps and data processing activities include:**

- Recent merger with New Company and related systems conversions and integrations.

**In addition, ABC Company has embarked on the following data processing initiatives:**

- Moving data center operations.
- Upgrading the desktop solution with 'workflow' approach featuring more dynamic and integrated data inquiry and reporting features.
- Changing the data file formats received from Source Data Company.
- Additional upgrades to a variety of infrastructure, system software, applications and data distribution channels.

**Impact Considerations:** The conversion of data processing services is anticipated to double the work load on the existing computer and network systems, as well as substantially increase the number of clients receiving data from the Data Warehouse (DW). This estimated 100% increase in activity requires a review of existing capacity utilization to determine if hardware, software and networking changes may be required, as well as an approach to leveraging the existing DW personnel resources to meet the post integration business requirements. Also, the addition of new data processing jobs means that there will be more requirements for handling data Extract, Transform and Load (ETL) functions in the DW.

**Objective for DDS Requirements Document:** The objective of this requirements document is to establish the basis and scope for extensions to the existing DW to create a new capability for a **Data Distribution System (DDS)**.

**The overall goals of this effort are:**

- Establish an approach to help achieve DW productivity gains necessary to support a large increase in data processing and data users.
- Integrating the delivery procedures and components of the DW.

## 1.2 Definition of DDS & Scope

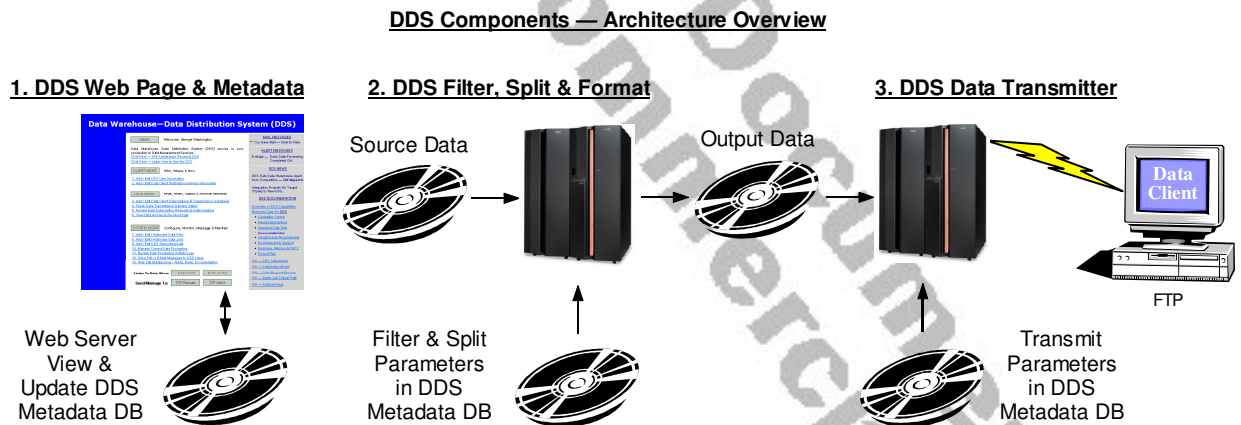
The DDS is an application that centralizes information regarding data distribution, including:

- |                                 |   |
|---------------------------------|---|
| 1. Clients                      | (Users – Data Clients (Internal, External), Administrators)           |
| 2. Destinations                 | (Delivery Point Identification & Security)                            |
| 3. Transfers                    | (Schedule, Transmit Methods, Data Readiness & Delivery Notification)  |
| 4. Jobs                         | (Source Data Processes – ETL, Filter, Split, Sort, Format, Aggregate) |
| 5. Files                        | (Source & Result Names, Content, Format, Locations, Archive)          |
| 6. Current Activity             | (Monitoring)  |
| 7. Historical / Logged Activity | (Auditing)  |
| 8. Requests / Approvals         | (Change Management, Authorization, Project Workflow, Messaging)       |
| 9. Documentation                | (Reference, Education, Training, Support)                             |

The DDS is comprised of three logical components to handle the requirements and functions necessary for information storage, processing and distribution:

- |                                 |  |
|---------------------------------|--|
| 1. Web Page                     | Internet/Intranet Access to DDS Functions and Configuration Metadata |
| 2. ETL – Filter, Split, &Format | Transforming Source Data into Output Data Ready for Delivery         |
| 3. Data Transmitter             | DataSender Function that Sends Output Data to Data Clients           |

The three DDS components are shown in the following diagram:



**DDS Metadata:** The DDS establishes a centralized data store and method for DW data distribution that offers a management tool with the information necessary to automate, to the extent possible, the workflow and delivery processes needed to create, maintain and deliver data to DW clients.

This data store is ‘**metadata**’ in that it describes usage and processing parameters for the actual DW data, and includes all forms of possible database metadata, such as field level data dictionary and data extract logic.

**Client-driven:** The DDS enables client-driven data services by integrating client information and DW data processing. All data client contact and organization information is stored in the DDS, data transmissions are scheduled for each client, and clients are assigned to DW account managers who review requests for data and monitor data delivery processes. There is always a client identity, person or organization, associated with the delivery of data.

**The design and implementation effort includes integration and/or development of the following:**

1. FileSafe application
2. Standard download -- file subscription
3. Custom download -- file subscription
4. Test data download -- file subscription
5. Data file request process
6. Data file delivery options (i.e., FileSafe, DataSvcs, FTP, NFS Copy/Move)
7. Data delivery DDS web site

**DDS Web Site:** The DDS Web based interface enhances the DW infrastructure to provide easy interactive access to DW data delivery capabilities thereby allowing a wide range of users, with or without technical skills, to use the DW facility. The web site for the DDS provides:

- An interface to the DDS data store to view and maintain the DDS metadata
- Handles the client subscription and data request processes
- Seamlessly links to other facilities such as FileSafe and DataSvcs

Based on a user profile, DDS functions and data selection options are required to be dynamically modified to differentiate between administrative and various categories of client end users. Similar to FileSafe, the DDS may also include, if determined to be a requirement, a non-browser based interface for internal use by intranet users to facilitate more complex DDS data maintenance and administration.

**Requirements Document:** This document summarizes the current workflow and data processing architecture for the DW and presents a description of how the DDS becomes part of a revised DW workflow and data processing architecture.

**In addition, the following information is provided:**

- A summary of the requirements and business case associated with the development of the DDS.
- A tentative implementation plan outlining several phases for constructing the DDS.
- Functional requirements that need to be addressed to achieve desired business objectives.
- Technical requirements that present architecture options and approaches for achieving data processing capacity, performance, and data transmission objectives. More complete technical specifications will be documented in the Engineering the Approach document.

### **1.3 Requirements Summary & Business Case for DDS**

#### **Requirements & Business Case Key Points:**

**The following improvements offered by the DDS system are important to achieve:**

- Reduce paperwork, keep current documentation, and use online workflow and data approval processes.
- Centralize ETL and data transmission logic and parameters within a single, easily accessible application.
- Ability to offer and handle most client data requests with standardized data sets.
- Integrate client information with technical aspects of DW processes and activity monitoring for client driven solutions.

**The requirements summary and business case addresses the following questions:**

- How does the DDS help handle the increased workload demands of the current merger?
- How can data clients interact with the DDS through a subscription process?
- Can productivity be increased through the use of standard data sets while providing for client satisfaction?
- What implications are there for changes with how data is delivered and distributed by Source Data Co.?
- Can the existing infrastructure of hardware, software and networking support the DDS component?
- Is there a suitable test environment to build and verify the functions of the DDS?
- How can the existing organization develop and support the DDS?
- Can the DDS be the basis for a substantial increase in work from another possible merger?

**These questions are discussed in the following sections:**

- Centralize Documentation, Change Control and Work Flow
- Data Client Subscriptions
- Standard Data Sets
- Source Data Co. Files & Source Data Co. Data Distribution
- Networking & Infrastructure Resource Requirements
- Testing for DDS Development & Changes to DW Processes
- Development & Support Organization
- Scalability Beyond the current Integration
- Requirements Summary

### 1.3.1 Centralize Documentation, Change Control and Work Flow

**Current Process:** The current business practices handle DW requests on a case-by-case basis where the result is often a custom data delivery solution developed and delivered according to each data request. This has led to a large number of batch data ETL jobs and related script, application code and activity log files being produced. Supporting documentation is not always current because documentation has not been centralized by a strict change control procedure. The end result is an architecture that is 'command line' driven where DW processes are accessible only to development technicians and can be best described as defined 'by the code'.

The current architecture is well organized around standard shell scripts and ETL tools, and data processes seem to be functioning efficiently. However, the components of data jobs and related information remain in pieces, require investigation to review and assemble, are not readily accessible from a client view point, and generally are not able to be used in the current state for any attempt to streamline or automate procedures. Instead of being data-driven, each new DW job results in more script, configuration, application and log files.

**Documentation Research & Repository Requirement:** Substantial time has been spent by the current integration team to research and document the large number of DW processes. Similar information is being collected for the target company's systems to aid in their conversion. This information is necessary to support reviews of the batch processing cycle, data format changes for Source Data Co.'s new data files, guiding the move of the operations center to its new location, testing for new development, and numerous other activities.

An immediate requirement is to assemble into one repository the information that has been collectively gathered, but remains in a number of separate spreadsheets, Source Data Co. database files, Word documents, in system applications such as BatchScheduler, directories containing Unix scripts and configuration files, and as stored procedures in the DW. By coordinating the information collection into a single data store, all members of the current integration team will be able to easily find, review and use important data about DW file processing and data extracts, and new members of the integration team will be able to gain immediate access to essential data.

A design requirement for building the DDS is to review the collected data and establish a metadata model for the DDS that includes all data elements, and then use the information to populate the DDS metadata database. Some data gaps may need to be filled in to complete a first version of the DDS.

**Change Control & Workflow Requirement:** Because resources are being made available to make a careful examination of all processes, this is an opportune time to be sure that the current documentation effort is recorded effectively and a change control management policy is put into place along with the DDS. Change control procedures normally require that all new processes put into production are recorded, and given the large number of new processes that will be put into production as part of the current integration, it is important that all of the operational information collected is made a part of the DDS.

A change control procedure and group is integral to the workflow process and essentially authorizes jobs in the DW environment. A requirement of the DDS is to capture data requests into the DDS metadata using a standard form made available through the DDS web page, and to then direct such requests as needed to the DW team for review and approval. This approach should produce consistent information collection and would record all DW initiatives, from inception through production, for easy access, team coordination and online tracking.

**Requirement & Benefit Summary:** As part of the creation of the DDS, the building of a central metadata data store for DW operations that integrates client and data processing information is an essential requirement that will increase productivity for the current conversion development and testing effort, support operations personnel, and become, on a continuing basis, an online data request and fulfillment workflow management solution.

For example, if the DDS was now in place, the DDS system could produce a list and immediately notify all data clients affected by changes in DW data deliveries due to the Source Data Co. conversion, be able to route data client feedback to the DW team regarding the impact on 'down stream' applications, and help plan for changes.

### 1.3.2 Data Client Subscriptions

In the context of defining the DDS, a 'data client' refers to any person, place, organization, or computer that receives data from the DW.

The process of requesting, being authorized and obtaining data from the DW is collectively referred to as a data 'subscription'. A data client is also a 'subscriber'.

#### **Clients as Data Subscribers Requirement:**

**Using the DDS web site, data clients should be able to:**

- Request data from the DW.
- Review existing data processing done on their behalf.
- Retrieve archival data when made available.
- Adjust data formatting and transmission parameters associated with their data subscriptions.
- Update contact information so change notices and other DW news and information notifications can be sent out quickly.

A requirement for the DDS is to review, approve and provide for several types of users, from system administrators, application owners and internal IT developers who update data elements relevant to the data distribution process, to internal and external data clients that interface with the web site and can initiate data requests, adjust data transmission parameters (subject to an approval process), review transmission activity, documentation and other information the DW makes available.

#### **Anticipated types of data clients include:**

- Administrator (super user)
- Development (programmers & data analysts)
- Client Account Manager (assigned to End User Clients)
- End User Client
- Client End User Administrator
- Client End User

To the extent we can automate, organize, standardize and simplify the interaction of the DW team with data clients, the workload of the DW team will become more efficient and be able to handle increased work loads.

This requirement provides the capability to be client-driven, and the functionality to achieve this requirement can be enhanced over time to match the priorities of DW services, data client demand and new opportunities.

The more client-driven the DW becomes, the more productive the DW group will be. It will also be more likely that the underlying architecture is scalable both in terms of personnel requirements and for managing the number and type of data processes.

**Data Distribution Parameters Requirement:** The expansion from the current merger means that a much larger number of DW clients will need support. By taking the approach of using a parameter driven DDS solution, DW will be able to replace hard coded solutions.

The development of the DDS data distribution capability requires building metadata to handle data transmission related information which is used to route data output to appropriate destinations. DDS data distribution parameters are also required to include various data transformation operations to filter, split, sort and re-format output data.

A requirement to dynamically build and submit jobs for ETL data processing steps now hard coded in separate UNIX shell scripts and related applications is not a direct requirement to handle data distribution which is focused on the delivery of finished output data.

However, considering that many DW jobs involve similar data conversion and extraction steps, the overall requirement to have the DDS metadata encompass and enable all ETL and data distribution steps involved in taking source data and delivering it to data clients would provide a totally integrated and standard approach to managing the DW.

**Requirement & Benefit Summary:** The DDS requires the capability to allow for client data subscriptions. The focus is more efficient client service and fulfillment, with a benefit of establishing a basis for client self service, which may reduce support personnel while promoting advanced data services capabilities. It should be noted that for DW clients, a data subscription is not necessarily based on any period of time with start and end dates, nor is a fee associated with the subscription; however these subscription elements should be retained to accommodate future requirements, which may include data distribution that does require time and cost factors.

### 1.3.3 Standard Data Sets

A key approach to improving the productivity of the DW Distribution system is to promote the use of standard data files and have clients use these files instead of custom data extracts.

**Required format categories for standard data sets include:**

- Source Data Co. data.
  - Accounts
  - Positions
  - Account Balances
  - Transactions
  - Holdings
- Standard data formats.
  - Record Layouts and Target Applications TBD

**Required versions of standard data sets can include:**

- Delta files which contain daily change, activity or transaction records
- Cumulative delta files, which contain a group of daily files for a period of time
- Master files that include all current records for static (non-transaction) files
- Master files that contain all current and historical records for a period of time

**Additional format requirements include support for other common applications:**

- Contact managers -- GoldMine, ACT, Outlook, Lotus Notes
- Desktop software -- Microsoft Excel (delimited with header)

**Required data frequency for standard files includes:**

- Daily
- Weekly
- Bi-Weekly
- Monthly
- Quarterly
- Annual
- Prior Year Historical

**Standard data files are made available in the following formats:**

- ASCII pipe delimited
- ASCII comma delimited
- ASCII fixed field width
- EBCDIC fixed field format

Note: For now, it has been determined that data files will include data only, with no header or trailer records, except as may be required for data files for specific target applications.

Note: Providing data in XML format is not planned yet, but may become a requirement.

### **Filtering and splitting of standard data files based on business entities:**

- Channel
- Sub-Channel
- Sub Firm
- Division
- Region
- District
- Complex
- Branch

**Note: Aggregating, house holding, sorting, merging, encoding and other transformation requirements still being determined.**

An additional requirement is to provide data files to replace files delivered by Data Download capability, which is a feature of the legacy desktop application and will not be directly supported by the new desktop. The current plan is to offer the standard file formats via the FileSafe as replacement data files for the Data Download files.

### **Data Download Standard Subject Files include:**

- Client Master File -- Name & Address
- Positions
- Account Balances
- Initial Holdings
- Daily Transactions
- Security Master

By moving clients to standard data formats, we can stop running jobs associated with custom data extracts, reduce the overall processing load on the DW systems, and control the amount of system documentation and customer service support.

**Impact of Conversion to Standard File Formats:** Existing clients that must use the new standardized data formats will most likely need to make changes to their systems. A review of each client receiving custom data extract(s) is required to determine the degree of benefit and impact such changes would make.

### **Each client data extract job should be reviewed to determine:**

- Who the client organization is and their relationship.
- Why the client receives the data and how the data is used.
- The amount of processing time & resources that can be saved by delivering a standard data file instead of running the client specific job.
- If converting to a standard data file will eliminate any data the client requires (gap analysis).
- If the client is capable of changing their system(s) to receive the standard data.

Priority should be placed on 'standardizing' clients that use the most resources, where standard data can provide all of the data requirements, for clients that can revise their applications, and small clients not supporting DW resources.

Part of the process of converting clients to standardized data involves the deployment of the DDS, which will provide clients a facility that helps to understand, use and subscribe to standard data sources, as well as make requests for additional data.

**Requirement & Benefit Summary:** The bottom line for moving clients to standard data sets and DDS is that this is an essential component of increasing the DW productivity in order to provide for growing data processing demands,

and leads to leveraging the existing resources to be able to handle an increased number of clients that otherwise would require additional resources, especially if client requests for data continue to result in custom data extracts.

Note, the exact productivity gains achieved by moving clients to standardized data formats, in terms of the number of jobs, run time savings, and effect, if any, on the critical path for the batch cycle end time, is still to be determined.

The primary business objective achieved by moving clients to standard data is to minimize the impact of a growing client base on personnel resources.

A secondary business objective is to achieve shorter data turn around times and speed-up data deliveries by reducing the number of data jobs and the total time taken for the nightly batch cycle.

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### 1.3.4 Source Data Co. Files & Data Distribution

#### Requirements associated with the introduction of Source Data Co. input data files to the DW:

- **Changing Data & Record Layouts:** Source Data Co. is implementing their own form of data standardization by offering and requiring the use of Source Data Co. source data. This data is delivered in pipe delimited ASCII format instead of fixed width EBCDIC. One requirement is to replace the DW Cobol conversion programs that transform EBCDIC to ASCII (and provide for other data transformations) with new data transformation tools capable of handling the new Source Data Co. files.
  - **The DDS has as a requirement the capability to include the new transformation tools and metadata developed to process the Source Data Co. files.**
  - **A determination is still to be made as to the continuing need to deliver EBCDIC data files, and a possible reverse conversion from ASCII to EBCDIC to support older mainframe clients.**
- **Two basic strategies exist for handling the new Source Data Co. data formats:**
  - Re-arrange the Source Data Co. data back to the current format to avoid re-programming of all processes designed for the current Source Data Co. data delivery formats; or
  - Update transformation and load processes to work with the new Source Data Co. layouts.

**The Source Data Co. conversion project team is determining the approach and related requirements, which the DDS will incorporate once development for the Source Data Co. files is complete.**

- **Source for Standardized Data Sets:** Source Data Co. data represents part of Source Data Co.'s solution to pass standard data to clients, and in turn the DDS has as a requirement the capability to pass these files directly to clients.

For clients looking to maintain local databases of Source Data Co. data to support local Source Data Co. applications, being able to pass along data in the Source Data Co. format is valuable and may eliminate some data currently sent by the DW for essentially the same purpose.

- **Filtering & Splitting:** An additional requirement of the DDS is the capability to filter Source Data Co. files based on data client access privileges which ensures confidentiality of data, particularly data from external firms that is not to be provided to internal groups.
- **Cumulative & Historical Data:** A requirement to provide access to cumulative and/or historical data for incremental delta data, such as daily activity records, either through archival data copies using files with client and date naming conventions, or dated archival files that can be filtered by client on-demand.

**A separate requirement with respect to Source Data Co. is the distribution of data by Source Data Co. directly to clients, which may become a responsibility of the DW. The following is a summary of this situation:**

- **Requirement to Handle Source Data Co. Data Distribution:** Source Data Co. Systems currently provides custom data extracts directly to data clients, and has indicated a desire to eliminate that data processing service and have the DW handle those data extracts and deliveries. The Manager of the DW believes that taking on this additional work can be delayed, perhaps indefinitely, however, the technical architect for the DW, mentioned that he is receiving inquiries from clients being told Source Data Co. is planning to end transmission of data to them. Regardless of timing, it seems the DW team needs to document the clients and data delivery requirements currently handled by Source Data Co. and other IT groups, and add to the capacity planning analysis and DDS design the results of a review of this data delivery requirement.

**Requirement & Benefit Summary:** The move to use Source Data Co. input files means DW has as a requirement to support and offer Source Data Co.'s new file standards to data clients. The DDS will be required to help distribute these files, and, when the time comes, to incorporate the data clients currently serviced directly by Source Data Co.. In addition, the effort to use Source Data Co. files has required a significant amount of research on DW data usage, and much of this information is required to be captured and used by the DDS as metadata.

### 1.3.5 Networking & Infrastructure Resource Requirements

**Data Transmission Requirement:** The DDS is required to handle the data transmission methods used across a fairly complex network, which is currently in the process of expanding with the addition of new systems. Currently, data transfers are initiated by separate batch job streams, with BatchScheduler providing the primary central control over batch job execution, and separate log files are created for each job stream.

**With the DDS, data transmission parameters stored in the DDS metadata are required to execute data transmissions based on the DDS detecting that output data is ready to deliver, either through the presence of an output file and/or an output control file.**

The current integration will require the DDS to distribute data to more clients and more destinations. This means an increased load on network data transmission methods such as the FileSafe, FTP, NFS and other protocols and delivery services, both in terms of increased disk space to hold data files, communication bandwidth and transmission delivery execution processes.

**Monitoring & Tracking Requirement:** A requirement for the DDS tool is to monitor and track data transmissions to clients, and log the date, time, duration, size, file names, destination identifiers such as IP numbers, and successful completion codes to the DDS metadata data store. The DDS web site is required to provide transmission tracking log information so that data clients can confirm delivery of data.

**An open issue is the ability to track data deliveries by outside delivery services, like DataSvcs, which provides FTP deliveries to external data clients. How to obtain the DataSvcs transmission logs for the DDS is to be determined.**

**DataSender Function Requirement:** The DDS data routing and transmission capability represents a significant advancement from the current approach where individual data jobs incorporate data transmission in hard coded scripts and other means by the DW architect, has started the process of separating data distribution from data conversion and extraction through a function called DataSender. The function allows a single function call in a UNIX shell script to look-up move/copy parameter values in a metadata text file and to use those values to control the transfer of output data files. FTP is not yet supported, and a small percentage of scripts use the DataSender function. The DDS effort would expand on the DataSender capability and include support for all transmission types, and also have a requirement to use a web based front end, or an intranet application, to define, maintain and review data transmission parameters which are stored in a metadata database for DataSender.

**Transmission Volume Requirements:** According to one preliminary requirements document, anticipated transmission requirements are for 300-400 file transfers per day and between 150-200 gigabytes of data. It is likely that many more file transfers will be necessary, especially if the Data Download functionality is converted into a

feature of the FileSafe application, if the DDS is also used to manage data distribution currently handled by the Production System Reporting function (which sends output from SQL data extracts to the FileSafe for client pick-up), and if all of the files sent directly by the Source Data Co. are handled by the DW.

Note, documentation for any bottlenecks or capacity concerns with data transmission, including total number of files, total amount of data, and connection times required to transfer data, is still to be collected.

**Metadata & Other DDS Infrastructure Requirements:** The requirement for the DDS metadata data store to maintain data client subscription and data transmission information that is accessible by browser based Internet and Intranet users is similar to the FileSafe application which uses the Oracle ODS database. One technical implementation approach is for the DDS to be an extension, and integrated with, the infrastructure built for FileSafe, and therefore follows the architecture being drawn up for the FileSafe implementation. The DDS is required to monitor and manage data distribution for jobs running on the DW DB2 environment, and therefore is required to interact with either the BatchScheduler job scheduler and or directly with job scripts or job logs.

A more advanced approach would require that the DDS incorporates directly the ability to execute code to convert files for file operations and run data extracts from the DW without BatchScheduler or traditional UNIX shell scripting. Although out of scope at this point, it is not inconceivable that the DDS could also monitor and manage data distribution for jobs running on the ODS databases.

The infrastructure requirement of the DDS depends on the final determination of the DDS functions and how many data job and interface responsibilities the DDS application supports. Given the large number of existing data jobs and file distributions, it is envisioned that the DDS will follow an evolutionary development process with phases that may expand infrastructure requirements. For now, to support client subscriptions and a web site, and to begin interacting with data distribution via functions like DataSender, the hardware and software in place for the combination of the DW and the FileSafe network should provide the needed contact, storage and distribution points.

**Requirement & Benefit Summary:** As the number of clients increase there will be more potential problems that could occur at any one time, and the DDS is required to quickly monitor and track DW jobs, delays, transmission failures, and the resolution of client problems and issues. In effect, the DDS pulls in a number of initiatives already in place or being planned, and should make use to the extent possible of existing coding, UNIX utilities, job scheduling tools and logic that exist and work satisfactorily.

The challenge is building the DDS while current production initiatives continue to follow existing methods, which make little to no use of centralized metadata parameters, and testing and proving the DDS capabilities vs. established approaches. For now, the DDS should exist within the production environments being built and should not require more investment in infrastructure. However, should more processing and transmission capacity be required, then the architecture can be extended with network servers to handle work otherwise running on the IBM computer.

### 1.3.6 Testing for DDS Development & Changes to DW Processes

The test environments for development of DW and FileSafe applications should be adequate to test DDS functions. Additional considerations may be necessary as DDS functions are developed and changes are made to the network.

### 1.3.7 Development & Support Organization

One of the biggest challenges to implementing the DDS is organizational. The DDS, by definition 'central', means touching many points, both in terms of joining end points for data distribution, and also in terms of DW groups, application owners, client channel coordinators, etc. With many groups and many concurrent projects, having a DDS capability is a powerful business objective, but since the DDS is not currently in place, it is not just a matter of moving a DDS to a new location or converting file structures like for Source Data Co..

The DDS requires collecting the information brought together as part of the many current projects and organizing that information into a useful metadata data store supporting DW data processing and data distribution. This part of the DDS project involves the functional requirements to meet the business objectives for the metadata data store, data client subscription process, and web site access for the DDS.

The DDS also requires new technical requirements to monitor, manage and execute data processing jobs and handling data file transfers. This part of the DDS project is the parameter driven dynamic job execution and file transmission 'robot' capability that uses the DDS metadata, which holds the unique information and values from the current system, and can eventually achieve the requirement to either generate shell and transmission scripts, or replace them, depending on the strategic decisions we make.

**Development & Support Requirement:** Programming development for the DDS is currently designated for the programming staff. A development plan can be found under the planning section. Development for the DDS can parallel application development efforts for the FileSafe, and the development and support effort for DDS and FileSafe could be combined for a long term program.

Metadata data collection and analysis is tentatively designated for a data analyst who has already spent time working on the DDS project and developed preliminary metadata models for the DDS, as well as an issue point list for data transmission using the DW architect's DataSender function.

A roster for attending weekly progress meetings is to be determined, and should be based on relevant organizational touch points during the course of design and development.

A requirement for the DDS is to review, approve and provide for several types of users, from system administrators, application owners and internal IT developers, who update data elements relevant to the data distribution process, to internal and external data clients that interface with the web site and can initiate data requests, adjust data transmission parameters (subject to an approval process), review transmission activity, documentation and other information the DW makes available.

### **1.3.8 Scalability Beyond the Current Integration**

A requirement of the DDS is to 'put data distribution information in one place' and facilitate access and use of the information to support growth for the DW.

#### **Scalability points applicable to the DDS:**

- Leveraging existing personnel resources to handle more data clients and data jobs.
- Make future network changes and integration efforts easier by creating an approach that can be used to define and 'port' over new data clients.
- Create a tool to allow for interaction between DW team members and data clients thereby increasing communication, understanding and development efficiencies.
- Support data processing productivity by working to replace custom data jobs with standard data deliveries.

The DDS is a central information and control capability which can serve as the 'hub' or 'master control' for an expanded physical architecture where work is divided across 'spokes' or computation clusters to handle significant increases in scale and work load.

### 1.3.9 Requirements Summary

The following is a summary of requirements and reasons associated with the DDS:

REQUIREMENTS	REASONS
• Meet Company SLA's	• Load Increase of 100+% for New Integration Work
• Centralize Functions for Data Distribution	• Support for Legacy & Current Data Distribution
• Enhance Data Processing Capabilities	• Scalability & Source Data Co. Conversion
• Offer Standard Data Sets by Subject Areas	• Reduce the Number of Custom Data Extraction Jobs
• Offer Standard Data Sets for Cross-Subject Areas	• Standardize Queries for HR and Payroll
• Filter, Sort, Aggregate, Encode, Reformat	• Transformations Frequently Required
• Split, Merge, Purge	• Client Confidentiality, Access Privileges, Regulation
• Encrypt, Access Control, Access Log	• Client Confidentiality and Regulation
• Centralized Job Management / Master Console	• Simplify & Unify Access to Job Components
• Reduce Redundant Job Scripts & Code	• Fewer Job Paths, Scripts, ETL Programs, Files, Logs
• Data Readiness / Event Driven	• Process Data as Soon as Possible vs. Time Schedule
• Jobs are Reviewed & Documented	• Reduce Dependencies, Run Times, Batch Window
• Logs are put in a Data Base for Easy Review	• Problems are Resolved Quickly
• Performance Metrics are Automatically Computed	• Run Times vs. Data Volume Controlled
• Customer Information is Integrated for Service	• Client Focus -- Know Who to Talk to for Service
• Multiple Users See & Manage the Same Way	• Team Approach for Consistent Practices
• Reduced Training Time	• Fewer Parts & Pieces to Learn with Less Tech Focus
• Data Transmissions are Grouped by Destination	• Fewer Transmission Jobs to Manage or Fail
• Centralized Function can be Cloned & Distributed	• Architecture Can be Copied for Scalability

Additional improvements and benefits are detailed throughout this document.

### 1.4 Requirements -- Mission Objectives & Critical Success Factors

Requirements Summary & Critical Success Factors associated with the DDS:

- **Organize Metadata:** Successfully collecting and organizing the metadata into a database model that effectively represents and interacts with DW job and transmission streams.
- **Construct Database & Front-End:** Building an easy to use front-end for the DDS data store so users are able to update, access and use the DDS as part of the development and operations procedures of the DW. The front-end must help users see and find value for the DDS capability.
- **Data Currency:** Keeping the DDS continuously up-to-date by updating the DDS for all DW changes affecting information in the DDS.
- **Technology Integration:** Integrating database and front-end GUI technology with command line UNIX batch job tools such as shell scripts, Awk, and SyncSort to obtain the best characteristics of both.
- **Transmission Support:** Can integrate with 3<sup>rd</sup> party transmission applications such as FTP, and internal applications like FileSafe and other locations.
- **Data Flexibility:** Can store information about data inputs and data transformation requirements to create a variety of data output formats. Ideally, to create a data delivery tool to quickly implement custom/semi-custom data inquiries to reduce acquisition and integration time for new data clients.
- **Capacity Handling:** Can handle required number of data transfers and throughput in timely manner. Can offer back-up or alternative data routing capability when needed.
- **Network Reconfiguration:** Able to inventory and quickly change data destinations and data transmission methods and security requirements to reflect changing network topology.

- **Shared Workflow:** Putting data request, processing and monitoring steps into a shareable, online environment that enables team review, input and approval steps as case may require, and can be accessed and used by customer service help desk personnel.
- **Data Standards:** Standardizing data file content, processing and delivery to leverage infrastructure and personnel resources while meeting SLA commitments as data client base and data job requirements expand.
- **Internet Access:** Connecting the DDS to the Internet and providing for data client access.
- **Client Focus:** Using the client visible side of the DDS to improve customer service, communications to clients from the DW team, and to promote and drive new business. Essentially incorporating and enabling operations with business development.
- **Team Support:** Obtaining the DW team 'buy-in' needed to see the DDS as an integral work tool and an improved work approach over current methods.

The mission objectives and requirements will be achieved through diligent research, documentation and organization of data client requirements, a detailed review of the DW batch processes, development and testing of the DDS application improvement measures, working closely with clients to develop their capabilities to work with the DW and DDS facility offering standardized data sets, and coordinating with related groups such as the reporting and decision support team, FileSafe and DataSvcs groups.

## 1.5 Project Plan & Phases

The overall time frame for the DDS project is concurrent with other current integration development and implementation projects.

The DDS project encompasses a progression of steps which can be organized as follows:

<u>December</u> <u>2004</u> & <u>January</u> <u>2005</u>	<p style="text-align: center;"><u>PROJECT DOCUMENTATION &amp; ORGANIZATION</u></p> <ul style="list-style-type: none"> <li>• Business Requirements – Review Concept, Decide on Scope, Plan</li> <li>• Functional Specifications – Translate Requirements to Functions</li> <li>• Engineering the Approach (Technical Design) -- Implementation Details</li> <li>• Project Team – Establish Team, Roles, Meetings, Touch Points</li> </ul>
	<p style="text-align: center;"><u>GATHER METADATA – CLIENT, JOB, TRANSMISSION</u></p> <p>Access, Excel, Word Documentation</p> <ul style="list-style-type: none"> <li>• Online Directories / Logs / Scripts / Code / Names</li> <li>• Batch Scheduler, SyncSort, PowerMart, FTP, NFS</li> <li>• FileSafe, Email Archives</li> <li>• Request and other Desk Forms</li> </ul>
	<p style="text-align: center;"><u>ORGANIZE METADATA – BUILD DATA MODEL</u></p> <ul style="list-style-type: none"> <li>• Identify Tables, Elements, Relations, Keys, ID's</li> <li>• Identify Codes for Types, Categories, Facts</li> <li>• Define User / Administrator / Usage / Security Level / Login Logic</li> <li>• Define Activity Logging / Status Tracking / Archive Pointers</li> <li>• Define Data Request Workflow, Routing and Alert Logic</li> <li>• Obtain Permissions to Build Data Model in Test Area</li> <li>• Build Tables (first pass) in Test Area</li> </ul>

## 1.4 Project Plan & Phases (cont.)

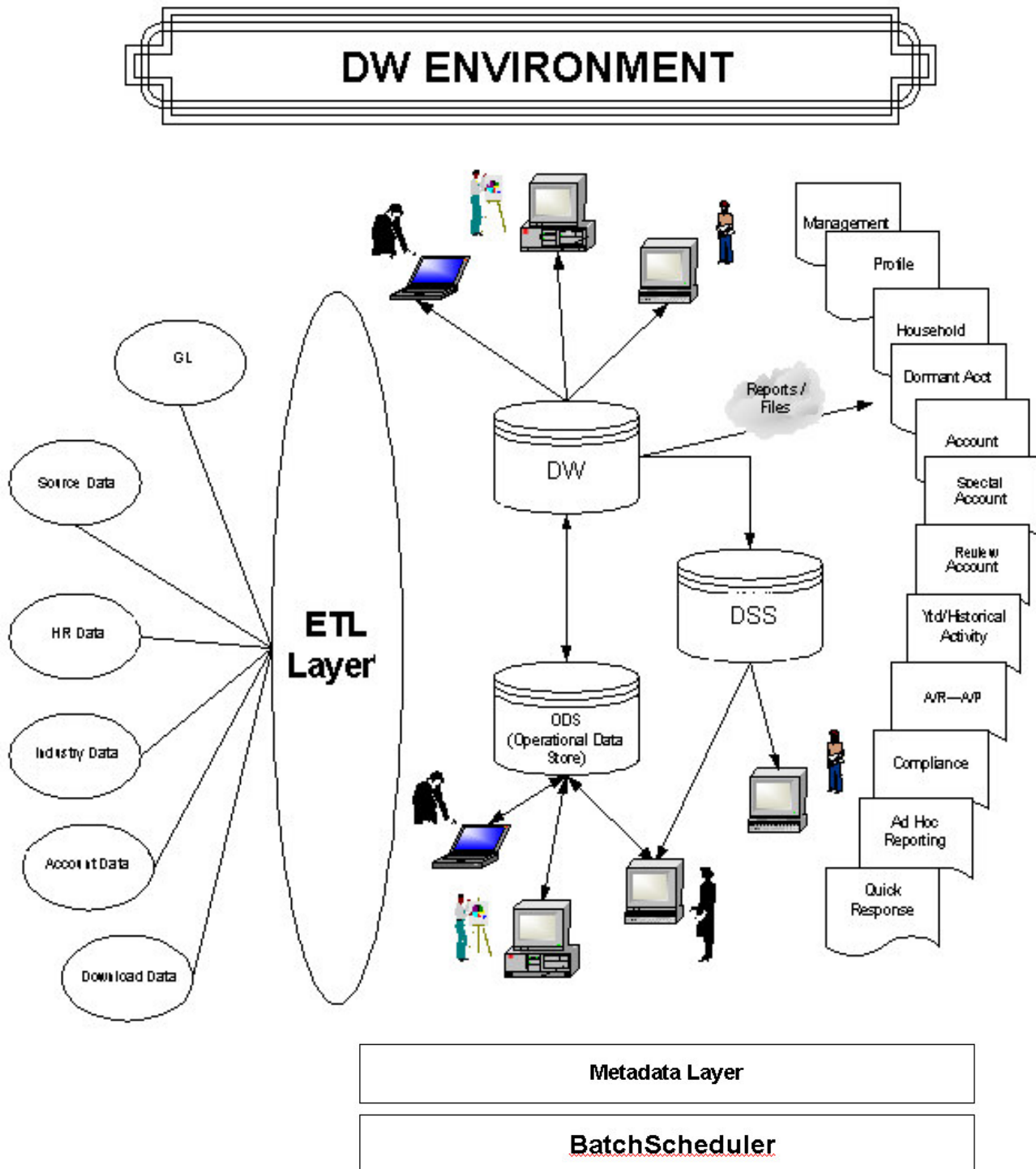
<p><b>2</b></p> <p><u>January, February &amp; March 2005</u></p>	<p style="text-align: center;"><u>BUILD DDS – TRANSMISSION &amp; ETL PROCESSES</u></p> <ul style="list-style-type: none"> <li>• DataSender Function – Complete programming for all transmission types (FTP/NFS) and enter relevant transmission parameters</li> <li>• LogData Function – Create generic function to send job/date/time/message stamp to DDS database</li> <li>• Test / Convert Existing Scripts to use DataSender; Determine Gaps</li> <li>• Document DataSender</li> <li>• FormatData Function – Create generic calling function for pre-load data transformations handled by SyncSort, Awk, C++, Cobol, PowerMart, new File Split and Filter function, and other ETL logic as may apply.</li> <li>• Extract Data Function – Create generic function/pointer for DW extracts (complexity, approach TBD/optional)</li> </ul> <p style="text-align: center;"><u>BUILD DDS – LOAD METADATA</u></p> <ul style="list-style-type: none"> <li>• Import Data – Move data from Access, Excel, DataSender and other configuration files and file pointers to Oracle. Manual gap fill and clean-up. First pass to support building of GUI and reporting.</li> <li>• Review/Update Data Model – Make table revisions as needed.</li> </ul> <p style="text-align: center;"><u>BUILD DDS – BUILD WEB SCREENS</u></p> <ul style="list-style-type: none"> <li>• ASP Infrastructure – Re-use/Clone Existing back-end infrastructure or designated alternative and new infrastructure objects to generate HTML interaction with Oracle – S.</li> <li>• Design Web Page – Web page standards layout, navigation, features</li> <li>• Web Screens: DDS Client User – Content/Authorization, Subscription (What, When, Where, How Report) – View, Add, Edit, Delete, Data Request (Form), Log/Status Review, Content Review – DW Admin. Alerts/News/ Documentation, Feedback – Contacts/Messaging</li> <li>• Non-Browser Screens: Need TBD (FileShare uses Visual Basic Admin.)</li> </ul> <p style="text-align: center;"><u>BUILD DDS – CREATE TEST PLAN</u></p> <ul style="list-style-type: none"> <li>• Create Test Plan – Unit test, Integration test, User Acceptance test.</li> </ul>
<p><u>April 2005</u></p>	<p style="text-align: center;"><u>BUILD DDS – COMPLETE INITIAL BUILD &amp; TEST</u></p> <ul style="list-style-type: none"> <li>• Complete Programming</li> <li>• Update Data – Review metadata, apply updates and fill gaps</li> <li>• Finish Web Content – Complete initial web content</li> <li>• Documentation – Do documentation &amp; training presentations</li> <li>• Review / Test DDS – Unit test, Integration test, User Acceptance test.</li> </ul>
<p><u>May 2005</u></p>	<p style="text-align: center;"><u>DDS VERSION #1 TO PRODUCTION</u></p> <ul style="list-style-type: none"> <li>• Complete Programming of DDS Version #1</li> <li>• Review / Test DDS – Unit test, Integration test, User Acceptance test.</li> </ul>

# 3 PROJECT REQUIREMENTS

## 3.1 Operational Requirements

### 3.1.1 Expected Operational Environment

The following diagram provides an overview of the DW environment.



### 3.6.9 GUI-1 – DDS Web Site Home Page

The DDS uses a web based interface to maintain the DDS metadata to support the client, data request, data scheduling and data delivery information in the DDS.

An example home page for the DDS:

**Data Warehouse—Data Distribution System (DDS)**

**HOME** Welcome: George Washington

Data Warehouse Data Distribution System (DDS) service is your connection to Data Management Services.

[Click Here — DW Architecture Review & DDS](#)  
[Click Here — Learning to Use the DDS](#)

**CLIENT MGMT** What, Where & How

[1. Add / Edit DDS User Information](#)  
[2. Add / Edit Data Client Distribution Details Information](#)

**DATA MGMT** What, Where, Status & Archive Retrieval

[3. Add / Edit Data Client Subscriptions & Transmission Schedules](#)  
[4. Check Data Transmission Delivery Status](#)  
[5. Review Data Subscription Request Authorizations](#)  
[6. View Data Archive & Re-Send Data](#)

**SYSTEM MGMT** Configure, Monitor, Message & Maintain

[7. Add / Edit / Authorize Data Files](#)  
[8. Add / Edit / Authorize Data Jobs](#)  
[9. Add / Edit DDS Supporting Data](#)  
[10. Manage Current Data Processing](#)  
[11. Review Data Processing Activity Logs](#)  
[12. Send DW or E-Mail Messages to DDS Users](#)  
[13. Web Site Maintenance - Alerts, News, Documentation](#)

**Links To Data Sites:** [FILE SAFE](#) [DATA SVCS](#)

**Send Message To:** [DW Manager](#) [DW Admin](#)

**MAIL MESSAGES**  
\*\* You Have Mail — Click to View

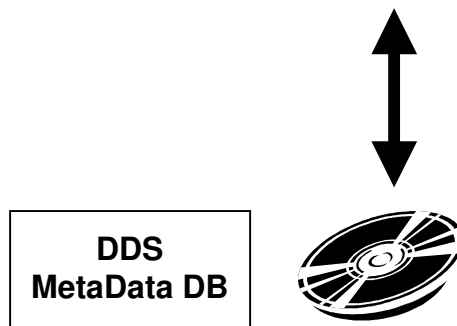
**ALERT MESSAGES**  
5:15AM — Daily Data Processing Completed OK

**DDS NEWS**  
DDS Sets Data Warehouse Apart from Competition — *DW Magazine*  
Integration Projects On Target Thanks to New DDS...

**DDS DOCUMENTATION**  
[Overview of DDS Capabilities](#)  
[Business Case for DDS](#)

- [Centralize Control](#)
- [Client Subscriptions](#)
- [Standard Data Sets](#)
- [Source Data Files](#)
- [Infrastructure Requirements](#)
- [Development & Support](#)
- [Summary, Mission & CSF's](#)
- [Project Plan](#)

[DW — DDS Data Model](#)  
[DW — Distribution Model](#)  
[DW — Data Request Process](#)  
[DW — Patch Job Critical Path](#)  
[DW — Select Areas](#)



### 3.6.11 Functional Requirements for DDS Web Home Page (cont.)

#### Requirements for the DDS web site home page:

Req. ID	Description	Priority
GUI-1-F1	<b>Intranet/Internet Access:</b> Ability to access the DDS home page by intranet and internet. This requirement is the same as having and sharing the infrastructure used by FileSafe, with an initial screen for internet data clients to choose to work with either the DDS or FileSafe. The current URL is only used to access FileSafe after a data client login.	High
GUI-1-F2	<b>Login:</b> Ability to authorize the data client to use the DDS application through a user login. This requirement is the same as for FileSafe, and uses the ODS security application authorization process.	High
GUI-1-F3	<b>User Typing:</b> Ability to differentiate users between DW administrators, data client administrators, internal data clients and external data clients. Currently, FileSafe has a table with contact information for data clients. Either the FileSafe data client user table is expanded for the DDS, or the DDS maintains another user table with all of the data client profile information the DDS requires. User typing affects which functions are allowed on the DDS web site (data client end users do not see DW System Management functions), and is used in the DDS to control data ETL and delivery functions requiring any mandatory filtering and splitting of data files, as may apply, to maintain data confidentiality.	High
GUI-1-F4	<b>DDS Data Client Subscriptions:</b> Ability to present data lists and entry forms to select, add and edit metadata in the DDS used to define data clients, data client destinations and transmission methods and data delivery schedules. Detailed functional requirements described below for related client, data destination, and data scheduling screens.	High
GUI-1-F5	<b>Data Delivery Status:</b> Ability to display data delivery status from DDS activity logs and to indicate late data deliveries. Allows for search criteria to list delivery status for data clients, destinations, transmission methods, file names, SLA times. Detailed functional requirements described below for status screen.	High
GUI-1-F6	<b>View Data Requests:</b> Ability to display data subscription requests, send a message to DW client account manager, assign action steps and respond to and approve (set active vs. inactive) new or changed data schedules and destinations. Display should be data client specific for data clients and allow for displaying all client requests for DW administrators. Detailed functions described below for other screens.	Medium
GUI-1-F7	<b>View &amp; Re-Send Archive Data:</b> Ability to display archived data for data client and to re-send a selected data file based on current data subscription and client destination parameters. Detailed functions described below for archived data screen.	Medium
GUI-1-F8	<b>Define &amp; Authorize Data Files:</b> Ability to view and define data files transmitted by the DDS. Files can be designated as standard files that all DDS data clients can select from and request a subscription to or custom data files assigned to a specific data client or data client list. File definition includes file name, frequency of update, content type, format types allowed, sort/filter/aggregate/split/transform Yes/No indicators and field specifications used in DDS component #2 (filter and split), and batch	High

	job name reference. Detailed functions described below for authorize data file screen.	
GUI-1-F9	<b>DDS ETL Batch Job Editor:</b> Ability to add and edit batch data jobs using the DDS web site and metadata. This function stores batch job script code and writes the script code as a report. This function centralizes job script code into the DDS metadata, allows for editing of the job scripts with a browser interface, and allows for quick review of data jobs associated with data files.	Medium
GUI-1-F10	<b>DDS Supporting Data Maintenance:</b> Ability to add and edit supporting data for the DDS. Supporting data includes fact tables for items such as client type, client list codes, client list type codes, follow-up codes, action codes, news and documentation category codes, etc.	Medium
GUI-1-F11	<b>DDS Batch Job Manager:</b> Ability to track running data jobs and to stop and restart DW jobs. This function may include building an interface to the BatchScheduler batch scheduler with the BatchScheduler API.	Medium
GUI-1-F12	<b>DDS Job Process Logs:</b> Ability to display ETL job logs. Allows for search criteria to list logs based on job name, file name, data client, data destination and SLA time. Detailed functional requirements described below for data processing log status screen.	Medium to High
GUI-1-F13	<b>DW or E-Mail Mail Broadcast:</b> Ability to broadcast either DW 'mail' messages or e-mail to one, a client list, or all data clients with a message the DW administrator enters. DW mail is a type of client follow-up.	Medium
GUI-1-F14	<b>DW Customer Service DW Mail Send:</b> Ability for data client to click on links on the home page to create and send DW 'mail' messages to either the data client DW account manager or DW administrator. This messaging feature is internal to the DDS and is not email.	Medium
GUI-1-F15	<b>DW Mail Alert:</b> Ability to detect DW 'mail' messages for a user and to put a link on the DDS home page for user to view and respond to mail messages with the web site. DW mail is a type of client follow-up.	Medium
GUI-1-F16	<b>Alert Messages:</b> Ability to post DW administrator alert messages with a link to explanations to the web site. Alert messages either stored as a news category in the news table (see below) or in a similar but separate table.	Medium
GUI-1-F17	<b>DW News:</b> Ability to post DW news messages and links to the web site. News messages have a start and end display date, time, subject line, unlimited text, expiration date, priority code (1-5), subject category code, and web link to original news story. A separate news screen can list news by category, priority and date/time. Expired news is not listed; no purge process required.	Medium
GUI-1-F18	<b>DW Documentation:</b> Ability to post DW documentation messages and links with paths to downloadable documents to the web site. Documentation stored either as a news category or in a separate table with the same supporting definition fields as news (see above).	Medium
GUI-1-F19	<b>Links to Other Data Sites:</b> Ability to seamlessly link to other data sites: FileSafe and DataSvc(TBD).	Medium
GUI-1-F20	<b>DDS Web Site Stats:</b> Ability to track data client usage of the DDS web site such as number of logins and date of last login. Webtrends package.	Medium

### 3.6.10 GUI-2 – User / Data Client Definition Screen

The DDS web site is required to add and edit DDS user / data client information:

- **Search for DDS User:** DW and data client administrators can search for and view a listing of data client / user records, then select a data client / user record to edit. Data client administrators can only see data clients within the same organization. End user data clients do not need to search but are instead either allowed to add or edit their user record.
- **Add / Edit DDS User:** All DDS users are required to have a user record which specifies:
  - Client Type, client Organization and DW Account Manager assignment
  - Client contact information – name, address, phone, fax, email, pager, etc.
  - Client comments – free form unlimited text
- **Add / Delete Client Lists:** Users can be associated to DW defined lists / groups, such as business channels and hierarchies, or any logical list or group of users. Screen shows list / group assignments with add/delete function buttons.
- **Add / Edit / Delete Data Client Destinations:** Data clients are users that receive data sent to delivery destinations using a transmission protocol. Existing delivery destinations are listed with add/edit/delete function buttons. Changes to delivery destinations generate data requests that must be approved by the DW unless the changes are made by a DW administrator.
- **Add / Edit / Delete Data Client Schedules:** Data clients receive data based on data delivery schedules. Existing schedules are listed with add/edit/delete function buttons. Changes to schedules generate data requests that must be approved by the DW unless the changes are made by a DW administrator.
- **DW Mail, Data Requests, Contact Log:** The DDS supports an internal DW ‘mail’ function, as well as handling data requests and tracking follow-up and contact with data clients, all types of DDS message information, which is listed from the select user with related function buttons to link to the DW mail, data request and contact management screens (TBD).

An example DDS user / data client screen layout:

Enter Search Criteria for DDS User	
View / Select From List of DDS Users	
User Type & Account Manager	User Account Assignment Add Delete
User Organization	Data Client Destinations Add Edit Delete
Enter / Edit User Contact Information  Add Save Delete	Data Client Transmission Schedules Add Edit Delete
	DW Mail Messages, Requests, Follow-Up and Contact Log DW Mail Requests Contact Log
	Comments View / Edit



**Requirements for the DDS data client / user web screen:**

Req. ID	Description	Priority
GUI-2-F1	<p><b>View List of Data Clients / Users:</b> If the current user is a DW administrator, then a full list of existing data clients is displayed with user and organization name. If the current user is a data client administrator, then a list of users for the data client's organization is listed. If no data clients other than the currently logged in user exist, then no view list is displayed. If a list is displayed, the user can:</p> <ul style="list-style-type: none"> <li>• Select Data Client / User to Edit</li> <li>• Add a New Data Client / User (automatic User ID assigned)</li> <li>• Delete a Data Client / User (authority for this TBD)</li> </ul>	High
GUI-2-F2	<p><b>View, Add or Edit Client Type:</b> Assign a data client / user type as:</p> <ul style="list-style-type: none"> <li>• Administrator (super user)</li> <li>• Development (programmers)</li> <li>• Client Account Manager (assigned to End User Clients)</li> <li>• End User Data Client</li> <li>• Non-End User Data Client</li> <li>• Client End User Administrator</li> </ul>	High
GUI-2-F3	<p><b>View, Add or Edit Data Client Account Manager:</b> Assign an account manager user to data client. The account manager is responsible for a data client.</p>	High
GUI-2-F4	<p><b>View, Add or Edit Data Client Organization:</b> Assign an organization to the data client. Either pick from a list of already defined organizations or add a new organization.</p>	High
GUI-2-F5	<p><b>View, Add or Edit Data Client / User Contact Information:</b> Enter data client / user name, department, address, phone, fax, email, pager, and to be determined contact profile data.</p>	High
GUI-2-F6	<p><b>View, Add or Edit Data Client / User List Assignments:</b> Assign data client / user to any specific user defined list(s) and list type(s) for use with business channel hierarchies, data file authorization, email broadcasting and future cross-user functions.</p>	High
GUI-2-F7	<p><b>View, Add or Edit Data Client Data File Authorizations:</b> View data files authorized for the data client based on approved data transmission schedules. Authorize data files for a data client using this screen, or assume data subscriptions provides authorization once subscription requests are reviewed and approved by DW administrator or client manager – approach TBD during Engineering document.</p>	High
GUI-2-F8	<p><b>View, Add or Edit Data Client Transmission Schedules:</b> View data delivery schedule for the data client and either add a new data delivery schedule or edit an existing schedule using the scheduling screen. Schedule information shown on this screen can be either summary or detail (TBD).</p>	High
GUI-2-F9	<p><b>View, Add or Edit User Follow-Up / Contact Records (data requests &amp; general contact log):</b> View data request, follow-up and contact log and either edit existing entries or add new ones.</p>	Medium
GUI-2-F10	<p><b>View, Add or Edit User Comments:</b> View and update any comments relating to the data client / users. Supports unlimited text. (Admin only)</p>	Medium