



Document Scheduling and Distribution System

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1 Executive Summary

Today's application users have advanced reporting requirements, which go beyond accessing data via the web. Users are looking for easy to use self-service reporting capabilities, which includes executing, scheduling, re-printing and forwarding of professional quality reports. Most applications also require that reports are automatically scheduled and distributed to users via email or fax. In addition, there is often a need to provide electronic distribution of documents such as letters, contracts and notifications.

Document Scheduling and Distribution (DSD) System is a self-contained application focused to handle all of the above requirements. It has an intuitive web-based interface, which minimizes clicks, provides advanced filters for all data, and includes statuses and user-friendly error messages.

DSD can be installed as an addition to any existing application to provide an instantaneous self-service reporting portal. DSD is a very cost effective solution because it does not require changes to the existing application while taking full advantage of existing database and reports. Furthermore, integration is minimum and implementation is simple.

DSD is also table driven, which is essential to minimizing ongoing maintenance cost. A table driven parameter page is most significant because it allows creation of new reports without additional coding. Similarly, security can be managed dynamically by setting up user groups, which are granted access to specific reports.

DSD four-tier architecture is robust, scalable, efficient and fault-tolerant. Each tier is 100% scalable, which provides an independent level of load balancing and fault-tolerance. Built in report queues and schedulers provide users with immediate response time while achieving maximum throughput of reports. Normalized relational database tier and object-oriented application tier provide a robust framework, which includes comprehensive error handling and seamless email and web-fax integration.

Currently, Procase is offering this product for free. Only implementation and customization fees apply. The only commitment is that any enhancements in the next year must be performed by Procase.

2 Introduction

Today's application users have very advance reporting requirements, which include:

- o Self-service reporting of real-time data from anywhere
- o Easy to use web-based interface (ie. intuitive "surfing" with fewest clicks)
- o Powerful user-friendly features (eg. context sensitive parameters, advanced filters)
- o Quality layout including fonts, graphics, report and page headers (PDF or HTML)
- o Immediate response time (eg. initiate multiple reports without having to wait for each to complete)
- o Maintain a report history for viewing or re-printing of old results
- o Compose a cover sheet and forward report results to others using email or web-faxing
- o Group reports into packages or load pre-configured packages for easier execution and distribution
- o Schedule reports packages to execute regularly (eg. each Monday at 8 am)

While some users are looking for 100% self-service functionality, others prefer to receive regular updates and reports via email or fax.

In addition to end-user needs, most application owners have a need to distribute various documents to their users. This includes notifications, letters, contracts, bills, and marketing collateral.

Document Scheduling and Distribution (DSD) System handles all of the above requirements with the following functionality:

1. Comprehensive Report and Document Management
2. Advanced Scheduling and Distribution
3. Powerful self-service features
4. Application Admin features to manage and communicate with end-users

DSD is easy to implement and can work with any existing application without incurring the cost of developing any additional interfaces. For most applications, the only integration with the existing application is in the reports, which query the source data. The generated result files are then 100% managed by the DSD. For some applications, another potential for integration is to create custom queries against the source database for specific report parameter lookups. The only potential requirement for an interface is for applications, which have a lot of users and already store all the required contact information in the database. In such cases, a simple interface can be created to feed contact and company information from the source database to DSD.

Once installed and configured, DSD becomes an instantaneous self-service web-portal for the existing application.

3 Application Features

3.1 User Types and Security Levels

The application supports two types of users:

1. Admin User
 - The system is configured with the first admin user who can then create other admin users
 - Will create regular users and assign them to a security group (eg. clerk, manager)
 - Can create private and public documents, packages, contacts and companies
 - Can make public objects visible to a specific security group or to all security groups (assigned to none)

2. Regular User
 - Each user belongs to a single security group
 - Cannot create any users
 - Can only create private documents, packages, contacts and companies
 - Can use public documents, packages, contacts and companies (if not assigned to any security group or assigned to their security group)

3.2 Key Concepts

The application is divided into five major subject areas:

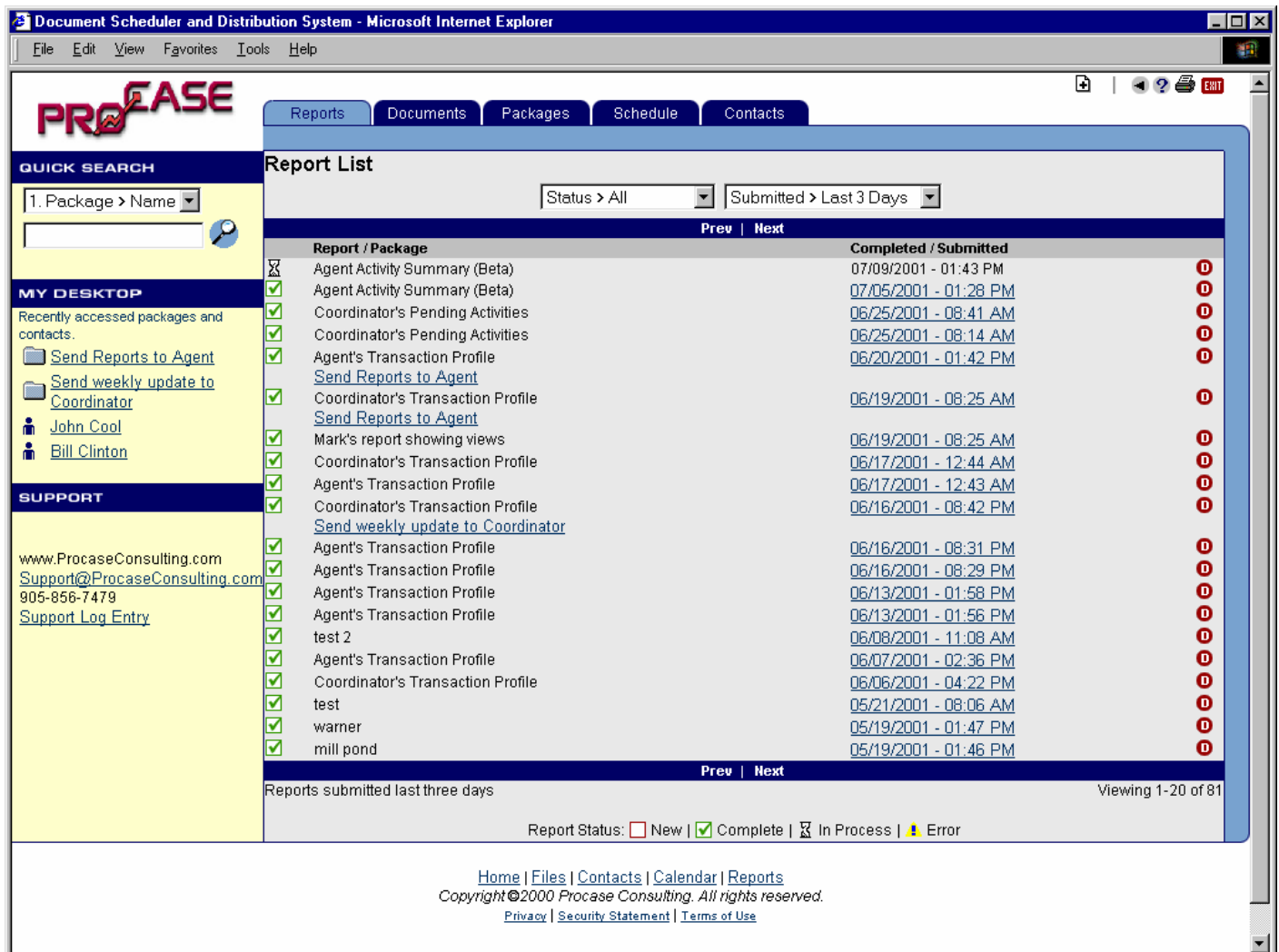
1. Reports
 - Reports are designed by developers to access the source DB
 - Most source systems already have many existing reports
 - DSD simply invokes these reports to produce an output file which is then managed by the application
 - Report management includes scheduling, invoking, queuing, displaying, storing, printing, and distribution
 - Reports and their parameters are configured in the DSD using a 100% table driven module
 - Reports are categorized by report type and are order by a display sequence within the type
 - Parameters can be based on table driven lookups, dynamic queries or even complex procedures
 - An Admin user can run any report, while a regular user can run any report not assigned to any security group or assigned to their security group
2. Documents
 - Document are uploaded into the system so they can be distributed and shared
 - Documents must be given a unique name and must be categorized by a customizable type (eg. contract, invoice, marketing)
 - History of versions is maintained to track document changes over time
 - Documents uploaded by a regular user are private and visible only by that user
 - Admin users can upload public documents which would be visible by all users (according to security rules)
3. Packages
 - Package (similar to a fed-ex package) is a collection of reports and documents to be processed and delivered to a defined list of recipients
 - Recipients and their address information are selected from a list of private and public contacts (according to security rules) or can be defined on the fly
 - Packages include a cover letter which is made up of instructions from the package and each document
 - Processing of a package includes execution of reports and distribution to all recipients via email or web-fax
 - Reports are executed by a scalable, load-balanced process which updates the report job queue with the report status (error, complete), execution time, and a pointer to PDF or HTML output file
 - Packages are distributed by an automated process, which first validates that all the reports are complete and all the recipient information is correct
 - Admin users can define standard packages (templates) which include selected reports and documents
 - Users can copy these templates with a single click and customize to their needs
4. Scheduling
 - Packages can be processed immediately or scheduled upon completion of another package, relative to a specific business event (eg. upon signing of a contract) or at a specific date and time
 - Packages can also be scheduled to recur at regular intervals such as daily, weekly, bi-weekly, or monthly
 - Recurring schedule without recipients is used to run a specific set of reports on a regular basis
 - A package can be re-scheduled when it needs to be re-sent
 - A notify option is used to notify the sender by email upon successful completion of a scheduled package
 - A schedule provides a complete list of all scheduled packages order by due date or completion date
 - Schedule also contains statuses (Due, Late, Completed) and error reporting and tracking for late packages
5. Contacts
 - Contacts created in the system so they can be used as recipients on packages
 - Contacts information includes various phone and fax numbers, emails, address and company information
 - Users can create private contacts and companies
 - Admin users can create public contacts and companies which can be visible by regular users

3.3 User Interface

User interface has been designed to be intuitive, user-friendly, consistent, and efficient. Five main tabs along the top of the screen represent the five subject areas. Each tab contains a list page, which displays the most critical information about the subject area and an easy way to get to remaining pages to view, add, edit and delete detail information. The first tab is for Reports because it is the most commonly used function in the system.

The left side of every page provides features to minimize clicks and improve performance. Search feature provides a quick and efficient way to find data in each of the subject areas. Each search brings the user to the corresponding list page with rows that only match the specified criteria. The Recent Items feature provides a quick way for the user to return to a most recently used contact or package. Top right corner of every page provides a consistent set of functions including back, exit, print, help and add functions. Top left part of each page is used for the logo and bottom left can be used for marketing and support contact info.

List pages are limited to a single page of data to improve performance. The current set of records is identified by a count within a total record count. The maximum number of records per page is a customizable system level parameter. Previous and next links are available to scroll thru the list and alphabetical search is provided. Furthermore, each list has additional filters designed to return most commonly requested data.



View pages are used to display all the information related to the main concept and acts as a control panel for easy navigation. For example, View Package page displays package details, report enclosures, document enclosures, recipients and schedule. All this data can be easily accessed from this page.

The screenshot displays the PROCASE web application interface within a Microsoft Internet Explorer browser window. The page title is "Document Scheduler and Distribution System - Microsoft Internet Explorer". The application header includes the PROCASE logo and navigation tabs for Reports, Documents, Packages, Schedule, and Contacts. The main content area is titled "Package: Send Reports to Agent" and includes buttons for Edit, Delete, and Back. Below this, there is a "Detail" section with a description of the package's purpose. The "Event" section contains a table with columns for Task Name, UserName, Due Date, Priority, and Completed. The "Reports" section shows a table with columns for Seq#, Name, and Completed/Submitted. The "Documents" section displays a table with columns for Seq#, Document Name, and Version. The "Recipients" section lists contact information for Seller Agent (Stephanie St. Pierre) and Buyer Agent (John Cool). At the bottom, there are status indicators for Doc & Package Status, Package Types, Report Status, and Event Status, along with a footer containing navigation links and copyright information.

Package: Send Reports to Agent

Detail

Package: **Send Reports to Agent**
 Description: As part of RealtyAssist's service to you, I'm pleased to provide you with this periodic transaction update. Please let me know of any questions or needs you have, and thank you again for your business.
 Completed:

Event

Task Name	UserName	Due Date	Priority	Completed
<input checked="" type="checkbox"/> SAGENT Progress Reports	WSORIA	07/05/2001	1	07/05/2001

Reports

Seq#	Name	Completed/Submitted
<input checked="" type="checkbox"/> 1	Agent's Transaction Profile	7/5/2001 12:00:15 AM
<input checked="" type="checkbox"/> 2	Agent Activity Summary	7/4/2001 12:00:15 AM

Documents

Seq#	Document Name	Version
<input type="checkbox"/> 1	California Sales Contract	7/8/2001 12:20 AM

Recipients

Contact	Delivery	Courier	Ref#
Seller Agent > Stephanie St. Pierre	stpierrere@aol.com		
Buyer Agent > John Cool	1-619-574-5916		

Doc & Package Status: Complete | Incomplete
 Package Types: Inbox Package | Outbox Package
 Report Status: New | Complete | In Process | Error
 Event Status: Incomplete | Complete | Late | To be determined | Cancel | Error

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Pop-up pages provide a convenient way to edit data without losing the context. For example, adding a report to a package.

The screenshot shows the ProCase web application interface. The main window displays a package titled "Package: Send Reports to Agent" with a description: "As part of RealtyAssist's service to you, I'm pleased to provide you with this periodic transaction update. Please let me know of any questions or needs you have, and thank you again for your business." The package is marked as "Completed".

A "Create New Report" pop-up window is open, allowing the user to add a new report to the package. The form includes the following fields and options:

- Report Category: All
- Available Reports: Agent Activity Summary (Beta)
- Parameters for Agent Activity Summary (Beta):
 - Report Job Name: Agent Activity Summary (Beta)
 - Package Name: Send Reports to Agent
 - Sequence In Package: 2
 - Contact: A.Tobin
 - Range: 30 Days
 - Prepared By: Alton Miller
 - Submission: Now Hold as New

Buttons for "Save", "+New", and "Cancel" are visible at the bottom of the pop-up window.

In the background, a table with columns "Priority" and "Completed" is visible, showing a row with priority 1 and completion date 07/05/2001. Another table with columns "Courier" and "Ref#" is also partially visible.

3.4 User Functionality

The following functional hierarchy identifies all the DSD functions:

1. Login
 - 1.1 Login – username, password and forgot password added to the calling page (eg. Home page)
 - 1.2 Invalid Login – request new password based on email or contact support
2. Reports
 - 2.1 Reports List - list the reports executed by the user (allow delete)
 - 2.2 Submit Report – select a report, enter report parameters, and submit for execution
3. Documents
 - 3.1 Documents list – list the private and public documents and their current version (regular user can only delete private documents)
 - 3.2 Add document – define a new document and upload the document, admin can define public documents
 - 3.3 Edit document – edit document attributes or upload a new version of a document
 - 3.4 View document – view a document and all its versions or delete versions
4. Packages
 - 4.1 Packages List - list the regular and recurring packages created by the user (allow delete)
 - 4.2 Load package – load a template package
 - 4.3 Add package – define a new package, admin can define public packages
 - 4.4 Add document enclosures – select documents to include (always current version)
 - 4.5 Add report enclosures – add reports to execute during package processing
 - 4.6 Add recipients – select contacts as a recipients and verify distribution information
 - 4.7 Schedule package – add an event to schedule the package
 - 4.8 Edit package – edit package information
 - 4.9 Edit document enclosure – edit instructions or display sequence within the package
 - 4.10 Edit report enclosure – edit display sequence within the package
 - 4.11 Edit recipient – edit distribution information
 - 4.12 Edit schedule – edit event to re-schedule package or change the recurring aspect
 - 4.13 View package – view package or delete document enclosures, report enclosures, recipients, or schedule
5. Schedule
 - 5.1 Events List - list of all the scheduled packages (allow delete)
6. Contacts
 - 6.1 Contacts List - list the private and public contacts (regular user can only delete private contacts)
 - 6.2 Add contact – define a new private contact, admin can define public contacts
 - 6.3 Edit contact – edit contact information
 - 6.4 View contact – view contact information
 - 6.5 Company List - list the private and public companies (regular user can only delete private companies)
 - 6.6 Add company – define a new contact, admin can define public companies
 - 6.7 Edit company – edit company information
 - 6.8 View company – view company information, contains a tab for company contacts
7. Issue Log
 - 7.1 Add Issue Log – ability to report a bug, request or suggestion
 - 7.2 Edit Issue Log – ability to add extra context information when an unexpected error is encountered

4 System Administration Features

DSD has a comprehensive table driven system administration module, which facilitates efficient and cost effective maintenance.

1. Lookups

Lookups are used as validation and to provide pick lists for many attributes in the application. Lookups are organized by type to simplify management. DSD current lookup types are System, Report, Document, Package, and Contact. Within each type, there could be any number of lookups. For example, Contact lookups include gender, phone type, title, prefix, and others, while Document lookups include document type and document extension. Each lookup has one or more valid values. For example, phone type values are home, business, cell, or toll free, while document extension values are PDF and DOC.

2. Report configuration

The most important system administration function is to configure reports. The first step is to define report attributes such as name, type and security group. The second step is to define all the attributes for each report parameter. This includes, parameter name, label, display sequence, data type, size, format mask, default value and pick list. The pick list can be based on a standard lookup, a select statement, or a stored procedure. This configuration is then used to generate a dynamic report parameter page for the users.

3. Error handling and tracking

DSD has a comprehensive error management module to handle errors in any of the four application tiers. System and application errors are detected and replaced with table driven user-friendly error messages before they are displayed to the user. Expected error messages are displayed in the current page. Unexpected error message are displayed in a standard Unexpected Error Message page and are logged in the Issue Log table. User has an opportunity to provide additional error tracking information, which is also stored in the Issue Log table. This information has proven to be invaluable in helping developers reproduce and fix bugs efficiently. In addition, DSD is enabled to utilize Windows Application Event Log for low-level error tracking and debugging.

4. System Parameter Settings

To increase flexibility and to tune performance, a lot of DSD functionality is parameterized and table driven. These parameters control many aspects of the application such as the number of rows to display on list pages, frequency of execution of various schedulers, and frequency of purge processes.

5 Architecture

DSD is a component-based application framework that provides a scalable, fault-tolerant and open architecture. The architecture utilizes four tiers (Web, Application, Report and Database) for scalability and load balancing.

Front-end web servers are using Active Server Page technology in conjunction with COM+ components written in Visual Basic 6.0 running on Windows 2000 IIS 5.0. Web servers are able to support dynamic load balancing using Microsoft NLB to provide best possible performance and to guarantee site availability in case some of web servers go down. Application tier servers use COM+ components written in Visual Basic 6.0 running on Windows 2000. These servers are able to provide fault tolerance resistance through Microsoft Component Load Balance CLB as a part of Application Center. Report servers can run Oracle Reports or Crystal Reports. Database server runs on Oracle 8i and can be clustered to provide fault tolerance. If required, the database can be converted to SQL Server. All internal component communication is based on XML protocol and connection to the database is made using ADO 2.5.

DSD architecture is flexible to the point that it can be installed on any number of servers. The most cost-effective solution is to install the DSD database as an additional schema in the existing database (if this does not pose a security breach). The following configuration alternatives should be considered for the remaining 3 tiers:

Number of Win2K Servers	Application Usage	Configuration
1	Small-Medium number of concurrent users and reports	Install 3 remaining tiers on a single server
2 (recommended)	Medium-High number of concurrent users and reports	Install web server and application server on 1 st server Install reports server on 2 nd server
3	High number of concurrent users and reports	Install each tier on a separate server

5.1 Architecture Diagram

