

INTRODUCTION

SpoolOrganizer/400 is a product that will automatically manage your installation's spool entries. Its main functions are:

- Spool Processing**
- Archiving**
- Report Distribution (Bundling)**
- Indexing**
- E-Mail/E-Commerce**

Spool Processing Features

Banner Pages

SpoolOrganizer can wrap desired spool entries with Banner pages for printing. Large block letters for Job name, User name, Spool File name, etc. can be printed, allowing easy separation by operations and users. Users can define different Banner page layouts for different spool entries. A leading page(s), trailing page(s), or both can be specified. The fields printed in big block letters, and other tailoring options can be specified. Leading and trailing pages can be defined differently.

Archive Spool Entries to Tape or Optical

Spool entries can be archived from the Online Database or an outq to Tape or Optical. For more information, refer to "Archiving Features" below.

Duplicate Spool Entries

Specified spool entries can be duplicated and routed to different locations. Unique Banner Page descriptions and other options can be specified for each copy of the spool entry.

Online Database

Spool entries can be placed into the Online Database and kept for a specified amount of time. Spool entries in the Online Database can be queried, displayed, reprinted, and archived. The Online Database can be saved or restored using OS/400 commands. Spool entries in the Online Database are not managed by OS/400 work management, which lowers overall system overhead.

Microfiche

SpoolOrganizer can create a microfiche tape. User Exit programs are provided to customize the tape to your needs. **BDS** shipped Exit programs produce a tape that is accepted without modification by most microfiche companies.

Attribute Change

SpoolOrganizer can change certain spool entry attributes (copies, HOLD, etc.) during processing. SpoolOrganizer will not change the spool entry's data. Thus a spool entry can be tailored to varying printer device requirements, and other requirements.

Send via E-mail

SpoolOrganizer can send spool entries via OS/400 E-mail facilities to remote addresses. For example a

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Monitor can send a reports to a user whose E-mail address is *user@company.com*.

Totally Automatic

No user intervention is required to perform SpoolOrganizer functions. The administrator will set up tasks called Monitors that will monitor specified outqs waiting for spool entries to process. When defining the Monitors the administrator specifies which spool entries to process what operations to perform on them. While waiting for output the Monitors sit in a wait state using no CPU. When output is placed into an outq, the Monitor is awakened by OS/400 instantly and quickly processes the spool entry.

Search for Spool Entries

End users can Query the Online Database or Archive Catalog or Optical Catalog, searching for desired spool entries. Once located, users can display, print, or display/change attributes of matching spool entries. The user can also print part of a spool entry. Query criteria can be saved and then specified on future search commands, and can be requested directly from user applications, displaying the desired spool entries with no intervention.

Global Search for Text

End users can search multiple spool entries, looking for a desired character string. If located, the spool entry identifier, page, line, and print line are printed. Stored Query criteria can be used to specify the spool entries to search. Wild characters, upper/lower case translate, and from/to column options can be specified.

Security

SpoolOrganizer provides operational classes to limit the functions users can perform. Data classes are available which can limit a users ability to display a spool entry's data or change/delete it. Generic classes and a user *PUBLIC are provided to ease administrative set up.

Logging

SpoolOrganizer functions can optionally log the operations they perform to the SpoolOrganizer Log. The log can provide the administrator with two useful functions:

- + Desired spool entries can be traced for auditing, tracking, and accounting purposes.
- + Complete logging can easily be turned on temporarily for problem determination purposes.

The log can be queried by using SpoolOrganizer displays or by using user-written queries. The user can specify which operations to log, such as placing spool entries into the Online Database or Archiving spool entries to Tape or Optical. The user can also specify which spool entries to place into the log, saving space and processing time.

No Application Changes Needed

SpoolOrganizer monitors outqs immediately before they print, which means the application programs you purchased or wrote do not need to be changed. The applications can continue sending output to existing outqs, and SpoolOrganizer will process the output before it prints.

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Archiving Features

SpoolOrganizer provides several features that allow the user to archive spool entries to external media. **Figure 1-1** shows the various options offered, and the SpoolOrganizer commands which perform the functions.

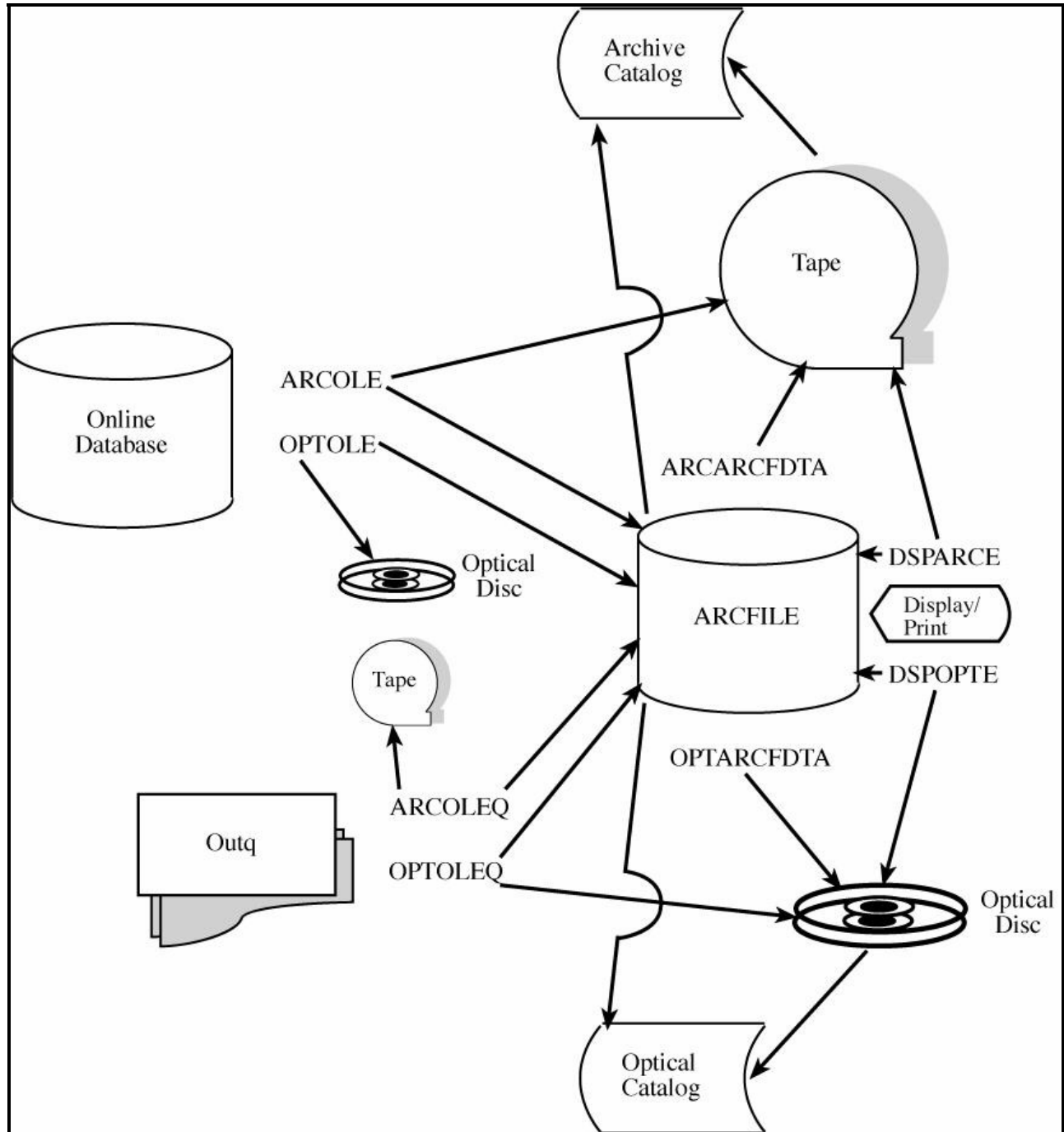


Figure 1-1: Archiving Features

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Archive from Outq

Spool entries can be retrieved from a specified outq and written to tape, Optical disk, or an **ARCFILE**. Spool entries can be selected based on their age (Job Date). Spool entries can be deleted after archived.

Archive from the Online Database

Spool entries can be retrieved from the Online Database and written to tape, Optical disk, or an **ARCFILE**.

Archive to Tape

Spool entries can be written to tape . Multiple archives can be placed on a tape. An archive can span multiple tapes.

Archive to Optical Disk

Spool entries can be written to an Optical Library Dataserver volume. Multiple archives can be placed on a volume. Archives can be placed in subdirectories within the volume. An archive can span multiple volumes.

Archive to an ARCFILE

Spool entries can be written to a SpoolOrganizer **ARCFILE** member, then written to tape or Optical disk at a later time. An **ARCFILE** is a sequential physical file on disk.

Display Archived Spool Entries

Spool entries archived to tape, Optical disk, or an **ARCFILE** can be displayed directly from the external media. The user can display the list of spool entries archived, then display or reprint desired spool entries directly from the external media.

Optical Catalog

Spool entries archived to Optical disk can be tracked in the Optical Catalog. The archived entries can be queried by users at a later time. Information such as the spool entry attributes, date and time of the archive, and volume/path information is maintained by SpoolOrganizer. Users can display or reprint selected spool entries directly from mounted Optical volumes.

Archive Catalog

Spool entries archived to tape can be tracked in the Archive Catalog. The archived entries can be queried by users at a later time. Information such as the spool entry attributes, date and time of the archive, and volume/dataset information is maintained by SpoolOrganizer. Users can select an option to reprint queried spool entries. SpoolOrganizer will automatically fetch the spool entry from the archived tape and print it into the desired outq.

Restore Archived Spool Entries

Spool entries archived to tape or an **ARCFILE** can be restored from the external media. All saved entries, or a subset can be restored. Entries can be restored to the original outq, to a different one, or to the Online Database.

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Report Distribution (Bundling) Features

Bundling Output

Monitors will pass specified spool entries to the Bundle Manager, which will place the spool entries into Bundles. A spool entry can be placed into multiple Bundles. The Bundles can be managed by SpoolOrganizer or displayed/changed by users.

Banner Pages

SpoolOrganizer can wrap Bundles with Banner pages for printing. Large block letters for Job name, User name, Spool File name, etc. can be printed, allowing easy separation by operations and users. Users can define different Banner page layouts for different Bundles. A leading page(s), trailing page(s), or both can be specified. The fields printed in big block letters, and other tailoring options can be specified. Leading and trailing pages can be defined differently.

Partial Print

Only part of a spool entry can be placed into a Bundle. There are several methods to specify to SpoolOrganizer the desired subset of the spool entry:

- + **Start/End of Segment**
- + **Page by Page include/omit**
- + **User Exit Program**
- + **Remaining Bundle**
- + **Remaining All**
- + **Range of Pages**

Multiple segments of a spool entry can be identified and placed into different Bundles, dividing up the spool entry electronically by criteria such as Department ID. The spool entry can also be omitted from a Bundle based on spool data. Also pages not placed into other Bundles can be placed into a Bundle.

Scheduling Features

Bundles can be defined as Hourly, Daily, Weekly, Monthly, Yearly, or Times. The date/time the Bundle is closed, printed, and deleted can be specified. Manual release for printing can be defined. Bundle entries can be defined as required, or optional. The Bundle can be closed when all required spool entries are received, or when the specified Cutoff time arrives. Hold/print options, depending if the Bundle is complete, are provided.

Day of Week Processing

Bundle entries can be included or omitted depending on the day of the week. The number of copies can be specified for each day. A flexible Time Adjustment feature can be specified to allow spool entries processed after midnight to be included in the current day. Job entry, job active, spool file open, and SpoolOrganizer date/time can be used for the time adjustment.

Active Classes

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Bundles or Bundle Entries can be assigned one or more Classes. Operations will set Spool Organizer's Active Classes, changing the Bundle Manager's distribution. For example, certain spool entries need to be distributed to more people during month end processing than the rest of the month.

Send via E-mail

SpoolOrganizer can send Bundles via OS/400 E-mail facilities to remote addresses. For example a Monitor can send a reports to a user whose E-mail address is *user@company.com*.

Security

Bundle security is similar to the Spool Processing security described above.

Attribute Change

Bundle entry attributes can be changed when processed by the Bundle Manager. The options available are the same as described in Spool Processing features above.

Logging

Bundling functions can optionally log the operations they perform to the SpoolOrganizer Log. The log can provide the administrator with two useful functions:

- + Desired Bundles and their spool entries can be tracked for auditing, tracking, and accounting purposes.
- + Complete logging can easily be turned on temporarily for problem determination purposes.

The log can be queried by using SpoolOrganizer displays or by using user-written queries. The user can specify which operations to log, such as placing spool entries into the Online Database or Archiving spool entries to tape. The user can also specify which spool entries to place into the log, saving space and processing time.

Totally Automatic

Once defined, Bundles can collect spool entries, print them, and delete them with no user intervention. Search/display functions are available to allow manual operations to Bundles.

Indexing Features

SpoolOrganizer can retrieve specified values from entries and store them in an index. For example, customer numbers can be collected from Invoice reports and indexed. Many options are available to make the collection process totally automatic. Users can query the index to find desired information. Once the desired value is located the user can display or print the spool entry or parts of it.

Automatic Data Collection

The administrator specifies which spool entries to look at, and the desired information in them to retrieve. The specified Monitor will search each matching entry, retrieve the desired values and place them into an

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index.

Value Selection

The administrator can specify a line and column range to inspect. Single or multiple values per page can be extracted. The following relationships can be specified:

- + **EQ (=)**
- + **LT (<)**
- + **GT (>)**
- + **CT (contains)**
- + **NE (not =)**
- + **LE (<=)**
- + **GE (>=)**

Values are selected if they satisfy the relation and are within the specified page/column range.

Qualifying Relations

Up to **5** qualifying relations can be specified to further check the value before placing it into the index. Qualifying relations further check the line where the value was found to minimize the amount of unwanted values collected. For example, matches can be skipped if there are blanks in columns **1** thru **10** on the line.

Numeric Values

Specifying a numeric value allows SpoolOrganizer to perform custom edit checks to the data before placing it into the index. Storing the true numeric value makes end user queries more organized. Decimal points can be a dot or comma. Commas, floating dollar signs, and other editing characters can be removed. Minus signs, **CR** symbols, and parentheses will convert the value to negative for sorting purposes. Non-numeric values will be discarded. Numbers can be up to **18** digits, with up to **5** decimal positions.

Character Values

Specifying a character value allows the user to ignore Upper case differences. Character strings can be up to **50** positions long.

Index Query

Once values are placed into an index, users can search them to locate desired information. The search screen allows up to 15 relations, ANDed or ORed together. Relations can be **EQ, NE, GT, LT, GE, LE** or **CT (char only)**. Upper case differences and wild card characters can be specified for character queries. Results can be narrowed by Job date ranges. The results can be sorted by Job date or value. The result list can be ordered ascending or descending.

Display or Print Results

Once a list of matching values is displayed, the user can display a result. The spool entry containing the value is shown, positioned to the page and line where the result is located. The user can scroll thru the entire spool entry. The user can also print the entire spool entry; print the page where the result value is located, or print ranges of the spool entry. **Note:** Spool entries located in the Archive Catalog can only be printed.

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Stored Search Specifications

Once a query is defined (relations, job date range, sort and order locations), it can be saved for future use. The saved name has two parts, Name and user ID, allowing multiple users to freely assign names to their stored searches. *PUBLIC can be assigned to the user ID, allowing anyone to use the search. A default search can be assigned to each user, or *PUBLIC.

Online Database, Archive/Optical Catalog

SpoolOrganizer automatically maintains the location of the spool entries contain the index values. The user can select the locations to be searched. The index is updated if SpoolOrganizer moves the base spool entry to another location (ARCOLE cmd, etc.). The index entries are automatically deleted when the base spool entry is deleted from the OLDB, Archive/Optical Catalog.

Monitoring an Outq

A SpoolOrganizer Monitor is a task that monitors an outq and processes spool entries placed into it. The Monitor performs two types of functions: It passes specified spool entries to the Bundle Manager for Report Distribution (described below), and it performs the automatic Spool Processing functions. When output is placed into the source outq the Monitor is awakened instantly by the system.

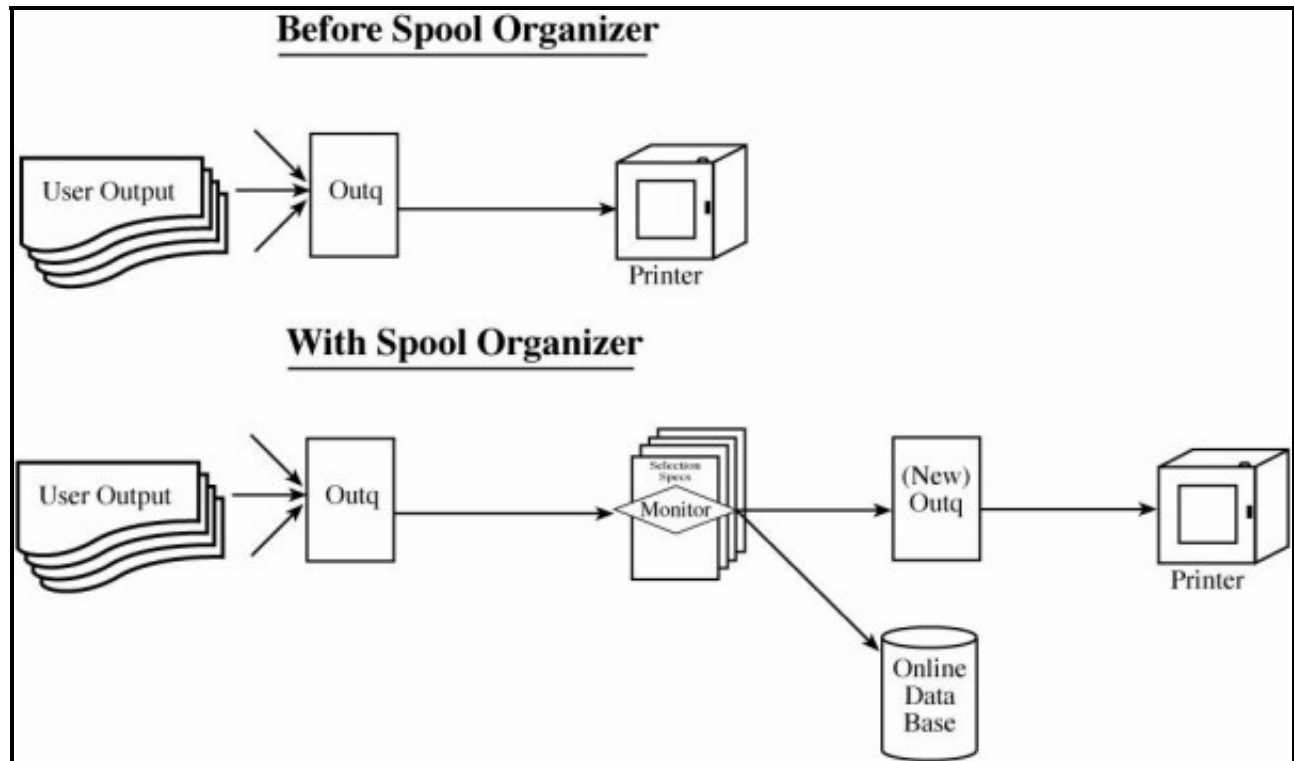


Figure 1-2: Processing Spool Entries with a Monitor

The user will probably want SpoolOrganizer to process certain spool entries differently than others. To do

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this, multiple Selection Specs can be specified for each Monitor. Monitors will load their selection specs into memory when they start. Each selection spec has a "Selection Criteria" part to tell the Monitor which spool entries to process, and a "Processing Options" part to tell the Monitor what to do with the spool entry it selects. **Note:** The Monitor description also has a "Processing Options" section, which tells it what to do with a spool entry that does The Monitor (via selection specs) can use the following as test criteria to select a spool entry for processing:

- + **Job name**
- + **Job user ID**
- + **Spool file name (i.e. QPJOBLOG, etc.)**
- + **Spool file number**
- + **Form ID (i.e. *STD)**
- + **Print file User Data**
- + **Group profile name**
- + **Minimum pages**

Multiple Monitors can be active concurrently (Each Monitor monitors an Outq). Because SpoolOrganizer consumes no CPU while waiting for spool entries, and the processing time for each spool entry is small, all user printers can be monitored without considerable system overhead.

Processing Options Performed by the Monitor

Once a spool entry is selected for processing the following options can be performed by the Monitor:

Place into Online Database

The spool entry is placed into the Online Database. Users can access the spool entry (if authorized) once it is placed into the Online Database. Access options are:

- + **Display**
- + **Display Attributes**
- + **Change Attributes**
- + **Print**

The amount of time the spool entry is kept in the Online Database, and the amount of time the entry is tracked by SpoolOrganizer (in the Archive Catalog, or Optical Catalog) after it is archived to tape is assigned at this time. Spool Entries traced in the Optical Catalog can be displayed online as long as the Optical Disk is mounted. For example, the spool entry can be kept online for 30 days, then tracked for 2 years. Security access codes, which a user needs to access this spool entry in the Online Database, are also assigned at this time.

Move to Outq

The spool entry can be moved to a specified outq. Typically the target outq is attached to a printer. Thus SpoolOrganizer can process spool entries before they are printed. Banner Pages can be attached to the spool entry and spool entry attribute changes can be performed at this time.

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Duplicate a Spool Entry

Copies of the selected spool entry can be made and sent to the outqs specified in a list called the Outq Distribution List. Please note that this function is independent of Report Distribution (Bundling). There is no limit to the number of outq's in the outq distribution list. The copies retain the original spool entry's attributes (except Job Number and Spool File Number). Thus multiple locations can receive their own copy of a spool entry without having to rerun a job. The original copy is moved to the first outq in the list. Banner Pages can be attached to the spool entry and spool entry attribute changes can be performed at this time.

Send via E-mail

Copies of the selected spool entry can be sent to users on the Internet using OS/400 E-mail facilities. Multiple recipients can be specified.

Delete/Hold the Spool Entry

The selected spool entry can be deleted or held without being moved. For example, the user can specify that all spool entries with a Spool File Name of **QPJOBLOG** will be deleted after being placed into the Online Database.

Selecting Spool Entries to Display

Once the spool entry is placed into the Online Database, end users can access the spool entry. The user can search the Database by specifying search criteria. Spool entries which match the search criteria will be displayed for the user to select. The user can access the displayed spool entries by performing one of the following tasks:

- + **Display the spool entry**
- + **Print the spool entry**
- + **Display the spool entry attributes**
- + **Change the spool entry attributes**

The user can use the following attributes as search criteria to locate a spool entry:

- + **Job name**
- + **Job user ID**
- + **Job number**
- + **Spool file name**
- + **Forms ID**
- + **Spool file User Data**
- + **User Remark**
- + **Job Date**
- + **Group Profile**
- + **Outq and Outq Library**
- + **Number of Pages**

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The User remark field is supplied by the Monitor when the spool entry is placed into the Online Database. The user can specify the following operations to test the above attributes:

- + **Equal** (EQ)
- + **Not equal** (NE)
- + **Greater than** (GT)
- + **Less than** (LT)
- + **Greater than or equal to** (GE)
- + **Less than or equal to** (LE)
- + **Contains** (CT)

For example the user can retrieve all spool entries with Job User ID equal to MAB. Up to 15 tests can be specified, each can be ANDed or ORed together. For example, the user may specify Job name equal to MAB AND Form ID not equal to *STD.

The user can specify the field used to order the spool entries which match the query. Any of the fields used for searching can be specified. The order can be Ascending or Descending.

Two forms of a wild card function are available to the end user:

- + **Single character:** The underscore character "_" matches any single character. For example, A_B matches ABB, AXB etc. It does not match AB, AXXB, etc.
- + **Multiple character:** The asterisk character "*" matches any number of characters. For example, A*B will match AB, AXB, AXXB, etc.

The wild card characters can only be used with the EQ keyword. Multiple occurrences of each form can appear in a single test. For example, the user can specify A*B*CD_F as search criteria. The user can specify if upper/lower case differences are to be ignored during the test. For example, abc is equivalent to ABC.

The format of the list of spool entries displayed as a result of a search can be defined by the administrator. For example, some users may wish to see the User Data attribute on the list display, and others may not. The administrator can define Heading Descriptions to control the fields displayed. The Heading description can be specified on the **DSPOLE** (display online entries) command.

The selection criteria can be saved by the user for later use. The **DSPOLE** (display online entries) command can specify the stored selection criteria, allowing spool entries to be accessed directly from a user menu. Each user can have their own set of selection criteria. Security officers can view other user's saved selection criteria.

Displaying a Spool Entry

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A spool entry can be displayed on the screen by authorized end users. Spool entry type *SCS, *IPDS, and *AFPDS can be displayed. The following functions are available to the end user when displaying a spool entry:

- + **Partial Print.** The user can print desired parts of the displayed output to a specified outq. The user can specify a range, giving the starting page/line number and the ending page/line number. A column range can be specified. The created spool entry will have the same attributes as the original spool entry, except for job name and job user.
- + **Send via E-mail.** The user can send parts of the displayed output to an E-mail Address. The user can specify a range, giving the start page/line number and the ending page/line number. A column range can be specified.
- + **Horizontal split screen.** The user can split the screen into an upper and lower session. Two spool entries (or the same entry twice) can be displayed at one time. All functions except the Partial Print function can be performed on either the top or bottom session. The two sessions act independently of each other. Thus the user can scroll down through the bottom session while the top session remains fixed. The user can reposition the split line number to accommodate the data being displayed.
- + **Vertical split screen.** The user can split the screen into a left and right half. The user can specify the screen column to place the vertical split, the leftmost position to display of the left half, and the leftmost position to display of the right half. Thus the user can have on the screen data beyond column 80 (or 132). Both halves remain in sync; the right and left halves will always show the same lines of data. The upper and lower sessions are independent and can have different vertical split statuses.
- + **Search forward or backward.** The user can easily search forward or backwards for text. Both are performed simply by pressing a command key (F16=Forward, F17=Backward). The next occurrence of the text in the scan window is located, the line that contains the string is displayed at the top line of the session's window, and the position where the string starts is displayed. The windowing status is not changed by the search. Text that is within column limits can be searched for. Upper and lower case differences can be ignored.

The following control commands are processed by the display function.

- + **W (Window)** Horizontally positions the line of output on the display. The value can be relative (plus or minus) or absolute. For example W50 will cause the line of output to be displayed starting at print column 50. W+10 causes the displayed output to shift left 10 characters.
- + **P (Page)** Positions the first line of the desired page at the top line of the display session. The values can be relative (plus or minus) or absolute.
- + **T (Top)** Positions the first line of the spool entry at the top line of the display session.
- + **B (Bottom)** Positions the last line of the spool entry at the top line of the display session.

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- + **+/- (Plus/Minus Records)** Positions the spool entry up or down the specified number of print records. Each non-blank print line is considered a print record.
- + **n (Record Position)** Positions the nth print record of the spool entry at the top line of the display session. For example a value of 1 will position to the top of the spool entry.

Archive the Online Database to Tape or Optical

Spool entries in the Online Database can be archived to Tape or Optical Disk. The user can archive all spool entries, or only expired spool entries. Each spool entry placed into the Online Database is given an expiration date by the Monitor. Archiving places selected spool entries in the Online Database onto tape or optical and optionally removes the entries from the Online Database. Entries placed in the Optical Catalog can be processed Online as long as the Optical Disk is mounted. After the Optical Disk is removed, the Catalog can track the Optical Disk until it is remounted.

A record of the spool entry can be kept in the Archive/Optical Catalog so that the spool entry can be easily located. Selected attributes of the spool entry are retained, as well as the date/time archived, the archive volume ID, and the file label within the volume. The amount of time the spool entry is tracked by SpoolOrganizer in the Archive/Optical Catalog is assigned by the Monitor when the spool entry is placed into the Online Database.

The user can specify which spool entries are to be archived, using selection specifications similar to those used to search for spool entries to display. See "Selecting Spool Entries to Display" above for a description of the selection operations available to the user. Thus a user can organize their archived spool entries for easy retrieval.

Display Archived Spool Entries from Tape or Optical

Using the **DSPOPTE** or **DSPARCE** commands, the user can display the spool entries that have been archived to a Tape or Optical. A screen appears which shows the date/time the archive was performed, the number of spool entries that are contained within the file label being displayed, and a list of all the spool entries within the file label. The user can scroll through the list of entries. The following options can be selected for each displayed spool entry.

- + **Display.** The spool entry can be displayed on the screen. See "Displaying a Spool Entry" above for a description of the features of the display function. Thus the user can verify the selected spool entry as the one desired before processing it further.
- + **Print.** The spool entry can be printed to the specified outq. The original spool entry's attributes, including Job Name and User ID will be maintained.
- + **Return to Online Database.** The spool entry will be placed into the Online Database for

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processing by users.

- + **Display attributes.** The spool entry attributes can be displayed on the screen.

Restore Spool Entries from Tape

Using the **RSTARCE** command, the user can restore spool entries that were saved using the **ARCOUTQ** or **ARCOLE** commands. All spool entries, or a subset can be restored. The user can use the following attributes to limit the spool entries restored:

- + **Job name**
- + **Job user ID**
- + **Job number**
- + **Spool file name**
- + **Forms ID**
- + **Spool file User Data**
- + **Group Profile**
- + **User Remarks**
- + **Job Date**
- + **Outq and Outq Library**

The User remark field is supplied by the Monitor when the spool entry is placed into the Online Database. The spool entries can be restored to their original outq, or can be restored to another outq.

The **ARCOUTQ** and **RSTARCE** commands provide a simple, system wide spool entry backup utility.

Creating a Microfiche Tape

Using the **FCHOUTQ** command, the user can create a tape to be used by microfiche companies. The **FCHOUTQ** command processes all spool entries in the outq. For each spool entry processed, a user exit program is called and the spool entry's attributes and the first 100 print lines are provided. Thus the microfiche tape can be tailored extensively by the user. Four user exit programs are provided.

Global Search for Text Strings

The user can search multiple spool entries for a given text string. The user specifies the selection criteria to use, and the text string to search for. Only spool entries that match the selection criteria will be selected. The selection process is similar to selecting spool entries to display. See "Selecting Spool Entries to Display" for a description of the features of the selection process. A list of the spool entries that match are printed. The spool entry's attributes and the page/line and column the string is located are given. Spool entry types ***SCS**, ***IPDS**, and ***AFPDS** are supported.

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Security

Only authorized users can perform the above functions. Only users with a matching access code can display, print, or process a spool entry. The following classes of users are available:

- + **U (User)** A user is authorized to search for spool entries, display or print authorized spool entries, and globally search spool entries for text.
- + **O (Operator)** An operator has all user authority plus the ability to Archive spool entries, retrieve archived spool entries, purge the archive catalog, and start or stop Monitors.
- + **S (Security Officer)** A security officer has all operator authority plus the ability to define users, Monitors, and other SpoolOrganizer definition options.

A special profile ***PUBLIC** can be specified to simplify the administration of users. It serves as a default authority for all users. Each spool entry in SpoolOrganizer can have up to 10 security access codes attached to it. In order to display or print a spool entry the user must have a matching access code. When creating a User ID, up to 25 access codes can be specified. To simplify the implementation, generic access codes can be specified for both the spool entry or the user ID. For example if a spool entry has ABC and XYZ access codes attached to it, a user with an AB* could access the spool entry. There are two types of accesses:

- + **Read.** The user can display or print the contents of the spool entry.
- + **Change.** The user can perform all Read functions plus change the spool entry's attributes, or delete the spool entry.

Bundling Output

The SpoolOrganizer Bundle Manager is a task which receives spool entries from Monitors and places them into user defined Bundles. It also closes, prints and deletes Bundles at their assigned date/time. A Bundle is opened when its first spool entry is received. At this time the Bundle manager assigns a Cutoff date/time using Bundle Descriptions. The Bundle remains open until all of its required entries are received or the Cutoff time arrives. The Bundle is then Closed and placed into a **HELD** or **WAITPRT** (wait for print) status, depending on the Bundle Description. If held, a user must manually release the Bundle for printing. Otherwise the Bundle is assigned a print time using its Bundle Description. When the print time arrives the Bundle Manager routes the Bundle to the assigned outq. Banner pages and spool entry attribute changes are performed, and the Bundle is assigned a delete date/time at this time. The Bundle is deleted by the Bundle Manager when its delete date/time arrives.

Defining a Bundle consists of the following components:

- + **Bundle Description**

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+ **Bundle Entries**

- Selection Criteria
- Processing Options
- Partial Print Options

Bundle Description

Options that define the overall Bundle are specified here. Some of the options are:

+ **Outq/E-mail destination**

The outq where the Bundle will print or the E-mail destination.

+ **User ID**

The user that "owns" the Bundle. This user has all security rights to the Bundle. Printed spool entries will have this OS/400 user ID in their attributes.

+ **Cutoff/Print/Delete times**

Specifies the values used to calculate processing date/times. See "Bundle Scheduling Features" below for more information.

+ **Hold/Release when closed**

The Bundle can be held or released for printing when it is closed. Separate hold/release options can be specified for complete and incomplete Bundles.

+ **Banner Pages**

Specifies the Banner page Description to use when printing.

+ **Hold on Outq**

Specifies that all of the spool entries in the Bundle will be held in the outq when printed.

Bundle Entries

Each spool entry that will make up the Bundle is described.

Selection Criteria

The selection criteria tells SpoolOrganizer which spool entry(s) to retrieve and place in the Bundle as this entry. Specify the Monitor and a Selection Specification. The selection spec functions the same as a Monitor selection spec (see above for more information).

Processing Options

Many options exist which tell the Bundle Manager what to do with spool entries it receives. Some of the options follow:

+ **Multiple Entries**

The Bundle can keep the first, last, or all spool entries if more than one is received before the Bundle is closed.

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+ **Required Entry**

The user can specify that the entry must be received before the Bundle is closed.

+ **Signal New Bundle**

A spool entry received can force the Bundle Manager to close its existing Bundle and start a new one.

+ **Day of Week Processing**

See below for details of this option.

+ **Attribute Change**

Certain spool entry attributes (copies, HOLD) can be changed by the Bundle Manager when the Bundle is printed.

Partial Print Bundle Entries

The Bundle Manager can place only part of the spool entry into a Bundle. The administrator describes the desired subset of the spool entry using one of the following Partial Print Specifications:

Start/End of Segment

The user can specify absolute start/end page numbers, or specify character strings in the spool data to test for to determine the start and end of the desired segment. For example, the user may define a department number in the report heading to test for. Multiple tests can be performed, and the tests can be ANDed or ORed together. Tests can be equal, not equal, contains, greater than, etc. starting/ending line numbers, from/to columns, and upper/lower case translate options can be specified for each test.

Page by Page Include/Omit

The user can test each page of the spool entry to determine if the page will be included in the desired subset. The included pages do not need to be contiguous. The test options to determine if a page is to be included are the same as in Start/End of Segment described above.

Remaining Page (Bundle)

The user can take pages of a spool entry that were not placed into other Bundles and place them into a Bundle. Only entries processed by the Bundle Entry within this Bundle will be selected.

Remaining Page (ALL)

The user can take pages of a spool entry that were not placed into other Bundles and place them into a Bundle. Entries processed by all Bundle Entries will be selected.

Range of Pages

Similar to Start/End of Segment. The difference is that the entire spool entry is printed with the PAGERANGE parameter set to the segment's start and end page values.

User Exit Program

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SpoolOrganizer can call a program written by the administrator to determine the desired subset of the spool entry. Each page is passed to the user exit program. The user exit program can look at the data in the page and tell SpoolOrganizer what to do with the spool entry. The exit program can specify the Start/End of segment, pages to include, keep the entire spool entry, or omit the entire spool entry.

A single spool entry can be placed into multiple Bundles, thus automatically dividing the spool entry into many segments. The following options are available:

+ **Start/end lines and columns**

When using compare data, the user can pinpoint the location of the spool data to compare. For example the user may wish to use a department code in the heading lines of a report for comparison.

+ **Ignore upper/lower case**

The user can ignore upper/lower case differences when performing the compare.

+ **Include last page**

The user can specify if the specified end of segment is the last page wanted or the start of unwanted pages.

+ **Include/Omit**

If the start page/data is not matched, the spool entry is not included into the Bundle.

Bundle Scheduling Features

The Bundle Manager has much flexibility when describing the flow of Bundles through SpoolOrganizer, and the degree of automation desired. In general, the user specifies the Cutoff, print, and delete times.

Cutoff date/time

Specifies the date and time the Bundle is to quit collecting spool entries. Several methods of specifying the date are provided:

- + **Daily:** The Bundle will close each day, at the time specified.
- + **Weekly:** The Bundle will close at the specified day of the week i.e. Friday), at the time specified.
- + **Monthly:** The Bundle will close at the specified day of the month (i.e. the 31st), at the time specified.
- + **Yearly:** The Bundle will close at the specified month/day (i.e January 10th), at the time specified.
- + **Hourly:** The Bundle will close each hour, at the minute specified.
- + **Times:** The Bundle will close at the specified times each day. Up to 12 times can be specified.
- + **Hold/Release:** The Bundle can be held or scheduled for print when closed. Separate options exist for complete and incomplete Bundles.

Print date/time

The user can specify the number of days to hold the closed Bundle before printing, and the time to print.

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Delete data/time

The user can specify the number of days to keep the Bundle before it is deleted.

Bundle Day of Week Feature

The Bundle Manager can include/omit spool entries based on the day of the week. For example, a Bundle Entry can be assigned 3 copies on Monday, zero copies on Tuesday (do not include the spool entry) and 1 copy all other days. When testing for the day of the week, a Time Adjust feature is provided. This allows output that does not complete by midnight to be included in the proper day's work. The adjustment can logically move the end of the day forward or backwards up to 23 hours. For example, you can specify 7:00 AM as the logical end of day for one spool entry's purposes, and 5:00 PM for another. The time SpoolOrganizer uses to make this comparison can be specified as follows:

Job entry

The date/time the job entered the system, via **SBMJOB**, sign on, etc.

Job active

The date/time the job begins executing.

Spool file open

The date/time the application program opens the spool entry.

SpoolOrganizer

The date/time a SpoolOrganizer Monitor processes the spool entry.

Bundle Active Class Feature

The Bundle Manager can include/omit spool entries based on an assigned Class. The Active Classes are set by Operations personnel. Only Bundle Entries with Classes that match one of the Active Classes will collect spool entries. Up to 10 Classes can be specified on the Bundle Description or Bundle Entry Description. A special Class, ALL, specifies that the Bundle or Entry is always active.

Active Classes can be used to allow different Bundles to collect spool entries during different periods of activity. For example, the administrator can specify Bundles that are only active during month end processing. These Bundles would not collect entries unless the Month End Class (i.e. MON) is set active.

Displaying Active Bundles

The user can work with active Bundles in the system. The Bundles can be searched for by specifying the following search criteria:

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- + **Bundle Name**
- + **User ID**
- + **Status**

The **WRKACTBDL** (work with active Bundles) command can specify the above search criteria, allowing desired Bundles to be accessed directly from a user application menu. The user can perform the following functions on the displayed Bundles:

- + **Display spool entries in the Bundle**
 - Display spool data**
 - Display spool attributes**
- + **Display Bundle Descriptions and Bundle Entry**
- + **Change or delete Bundles or their entries**
- + **Hold, print, or reopen Bundles**

SpoolOrganizer Logging Feature

SpoolOrganizer can optionally write certain events and operations performed to the SpoolOrganizer Log. Users can query the log by using a query supplied by SpoolOrganizer, or write their own query applications. The log can be used for Spool Entry Tracking and Accounting, and Problem Determination. Tasks which can optionally perform logging are:

- + **Monitors**
- + **Online Database Archive/Purge Operations**
- + **Archive Catalog and Optical Catalog Add/Purge Operations**
- + **Bundling Functions**
- + **Indexing Functions**
- + **User Online Database Operations**
- + **User Active Bundle Operations**

The information recorded in the log varies depending on the type of log entry. In general the following information is recorded:

- + **Date/time of the entry.**
- + **Sender's Job Name, User, and Number.**
- + **Operation being performed.**
- + **Function issuing the request (Monitor, Bundle Mgr, etc.).**
- + **The Bundle Entry Name or Monitor Selection Spec Used.**
- + **The Spool Entry processed (Job/User/Num, File/Num).**
- + **Misc Information depending on type of request.**
- + **Spool Entry Attributes**

The Administrator can specify which Monitors, Bundle Manager or Index Manager functions to log.

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Additional options may be specified, allowing the Administrator to selectively decide which events should be logged within each function. If specified, the following events can be logged:

- + **Start Up (Monitors, Bundle Mgr and Index Mgr)**
- + **End of Processing (Monitors, Bundle Mgr and Index Mgr)**
- + **Errors or warnings issued (Monitors, Bundle Mgr and Index Mgr)**
- + **Resetting of the input data queue (Bundle Mgr and Index Mgr)**

The Administrator can also specify which operations performed to the Online Database are to be written to the SpoolOrganizer/400 Log. If specified, the **ARCOLE, PUROLE, ARCRCFDTA, OPTOLE, OPTARCFDTA, DSPARCE** (OLDB Add Only) and **DSPOPTE** (OLDB Add Only) commands will log their operations. If logging is active, the commands will log the following operations:

- + **Archive to backup media**
- + **Addition to the Online Database (DSPARCE & DSDPOPTE only)**
- + **Deletion from the Online Database**

The Administrator can also specify which operations performed on the Archive/Optical Catalog are written to the SpoolOrganizer/400 Log. If specified, the **ARCOLE, ARCRCFDTA, PURARCCAT, OPTOLE, OPTARCFDTA** and **PUROPTCAT** commands will log their operations. If logging is active, the commands will log the following operations:

- + **Addition to the Archive/Optical Catalog**
- + **Deletion from the Archive/Optical Catalog**

E-mail Features

SpoolOrganizer can optionally send spool entries via E-mail to Internet users. For example, a report can be sent to **user@ibm.net**. SpoolOrganizer uses the OS/400 Mail Server Framework to send to E-mail addresses. Tasks which can send spool entries via E-mail are:

- + **Monitors**
- + **Bundling Functions**
- + **BDS Display a Spool Entry Operations**
- + **CL Commands**
EMLSPLE

The spool entry is placed into the mail as either an inline part or an attachment. Attachments can be in the following formats:

- + **Text**
- + **Adobe PDF (Acrobat Reader)**
- + **Microsoft Excel**
- + **CSV (Spreadsheet, Database)**

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- + **TSV (Spreadsheet, Database)**

Monitors

The user can specify an E-mail Specification on the Monitor Default Processing Options or on Monitor Selection Criteria Processing Options. This allows the administrator to specify only certain spool entries processed by the Monitor will be sent via E-mail. See below for a description of E-mail Specifications.

Bundles

A Bundle can be sent to E-mail addresses described in an E-mail Spec (See below) instead of an outq.

BDS Display a Spool Entry Operations

The BDS Display a Spool Entry has the ability to send a spool entry to E-mail users. An optional Note can be attached to the message and the message can be kept in the Sent Mail Log.

CL Commands

The SpoolOrganizer **EMLSPLE** (E-Mail a Spool Entry) command can send a specified spool entry in an outq to one or more E-mail users. The **EMLSPLE** command can be entered from an OS/400 command line or placed into user-written programs. Up to 50 recipients can be specified, or a data file containing the list of recipients can be entered. An E-Mail Specification (described below) is specified, allowing many options to be setup in advance. Many E-mail Spec options can be overridden by the command.

E-mail Specification Features

The E-mail Specification describes to SpoolOrganizer tasks certain options to take when sending the spool entry. The available options are:

- + **From Name and Address**
- + **To Name and Address**
- + **Additional To Name/Addresses to send to**
- + **Bcc Name and Address**
- + **Additional Bcc Name/Addresses to send to**
- + **Subject**
- + **Sent Mail Log Options:**
 - + **Retention Period**
 - + **Security access codes**
- + **An optional preceding Note**
- + **Note as separate Part**
- + **Spool entries as separate Part**
- + **Part attachment type**
 - Inline**
 - Attached unformatted**
 - Adobe PDF**
 - Microsoft Excel**
 - CSV (spreadsheet & database)**

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TSV (spreadsheet & database)

- + Attachment Name and Type
- + Encryption Options

From Name and Address

Specifies the From Address and optionally the From Name. This will appear on the message as: *from-name* <*from-address*> or *from-address*.

To and Bcc Name and Address

Specifies the recipient Address and optionally Name. To addresses will appear on the message as: *to-name* <*to-address*> or *to-address*. Bcc (Blind Carbon Copy) address will not appear in the message header.

Additional To/Bcc Names and Addresses

Specifies a distribution list that will also receive the message. To address will appear on the message as: *to-name* <*to-address*> or *to-address*.

Subject

Specifies the subject area of the message.

Sent Mail Log Options

SpoolOrganizer can optionally keep the message in its Sent Mail Log. If kept, options such as the retention period and security can be specified.

Optional Preceding Note

Specifies up to 5 lines that will precede the spool entry in the message.

Note as separate Part

Specifies if the Optional Note is to be a separate part of the message.

Spool entries as separate Part

Specifies if each spool entry is to be a separate part of the message.

Part Attachment Name and Type

Specifies the attachment name and type to assign to the attachment file.

Encryption Options

Specifies if encryption is to be performed and the password to use, and other options.

E-mail Sent Mail Log

SpoolOrganizer/400 can optionally keep sent E-mail in a log. Users can search the log and display their sent mail using the **DSPSNTML** command and resend their mail if desired. The **PURSNTML** (purge send

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mail) command is provided to clear the log. Optional Security classes are provided to secure send E-mail.

Move Spool Entries to IFS Directory

SpoolOrganizer/400 can move spool entries to an IFS directory. Once in the IFS directory other tasks can access the entries. For example if OS/400 HTTP server is set up, Internet users can access the spool entries in the IFS directories using web browsers. FTP clients can also access IFS files created by SpoolOrganizer. The moved spool entries can be written in the following formats:

Text

Adobe PDF

Microsoft Excel

HTML

CSV (Database or Spreadsheet)

TSV (Database or Spreadsheet)

The created files can be encrypted, requiring a password for the user to access. The following SpoolOrganizer commands can be used by the user to move spool entries to an IFS directory:

DIROUTQ Command

The **DIROUTQ** command moves the spool entries of one or more outqs to an IFS directory. An effective date test can be used to narrow down the spool entries moved. Spool entries can be deleted after they are moved.

DIRSPLE Command

The **DIRSPLE** command moves a single spool entry to an IFS directory.

Web Browser Access

Internet users using a web browser such as Microsoft Internet Explorer can access SpoolOrganizer/400 functions. A TCP connection to the Internet and an OS/400 HTTP server must be set up to do this. Spool Organizer functions available to web browsers are:

Display Online Entries

Work with Active Bundles

Displayed spool entries or Bundle Entries can be downloaded into the PC or browser session in the following formats:

Adobe PDF

HTML

Microsoft Excel

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CSV (Comma separated values)

TSV (Tab separated values)

Text

Internet users, like AS/400 green-screen users, must be defined to Spool Organizer and have proper security clearance to access Spool Organizer functions and spool entries.

Spool PDF Overlay/400™ Interface

Spool Organizer can use the features of Spool PDF Overlay/400™ product if it is installed. Spool PDF Overlay/400 is a separate product from BDS that provides the additional features when creating Adobe PDF files, such as:

Overlays

Images

Multiple Fonts

Refer to Spool PDF Overlay/400 documentation or contact BDS for more information on its features. The following Spool Organizer functions can utilize Spool PDF Overlay/400 features when creating a PDF:

Monitors (Email)

Bundles (Email)

Spool Entry Display (Email)

EMLSPLC cmd

DIRSPLC, DIROUTQ cmds

Web Browser functions (Email)

DSPSNTML cmd (resend Email)

Refer to the Spool Organizer documentation for more information.

IASPs and Multiple Spool Organizer Instances

Spool Organizer product libraries can be placed onto Basic and Independent ASPs, giving the Administrator great flexibility. Multiple instances of Spool Organizer can be running within an LPAR. Each Spool Organizer instance is independent of the other instances.

Spool Data Encryption to Hard Disk, Backup Devices

Spool Organizer optionally can encrypt spool entry data segments when writing data to I-O devices during the following operations:

- Online Database

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- Archives to Tapes, Optical Disks and ARCFILes
- Bundling
- Email Sent Mail Log

Spool Organizer uses the industry standard AES encryption. This insures that sensitive user data contained in spool entries is not stored in a clear format when residing on disk drives or backup units.

Acknowledgements

The following third party products have been incorporated into Spool Organizer:

Flate - Flate is an industry-standard compress/decompress algorithm written by Jean-loup Gailly and Mark Adler. BDS has adopted their code to run on the AS/400 platform. The Adobe PDF format supports Flate. You can contact them at <http://www.gzip.org/>.