Print Services Facility for OS/390

Download for OS/390

Version 3, Release 1.0

IBM

Print Services Facility for OS/390

Download for OS/390

Version 3, Release 1.0

Contents

Figures

Tables

Notices

References in this publication to products or services of IBM do not suggest or imply that IBM will make them available in all countries where IBM does business or that only products or services of IBM may be used. Noninfringing equivalents may be substituted, but the user must verify that such substitutes, unless expressly designated by IBM, work correctly. No license, expressed or implied, to patents or copyrights of IBM is granted by furnishing this document. You can send license inquiries, in writing, to the IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785, USA.

Programming Interfaces

This publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of PSF for OS/390.

Trademarks

The following terms appear in this publication and are either trademarks or registered trademarks of the IBM Corporation:

- Advanced Function Presentation
- AFP
- AIX®
- CICS
- EDMSuite
- IBM®
- IMS
- InfoPrint®
- IPDS
- MVS®
- MVS/ESA
- NetSpool
- OS/2®
- OS/390®
- PrintManager
- Print Services Facility
- PSF
- PSF for AIX
- S/370
- S/390®
- VTAM

The following terms are trademarks of other companies:

- PostScript is a trademark of Adobe Systems Incorporated.
- NFS is a trademark of SUN Microsystems Incorporated.
- UNIX® is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.
- Windows®, Windows NT®, and Microsoft® are registered trademarks of the Microsoft Corporation.

Year 2000 Ready

Download for OS/390 does not have date dependencies and is therefore Year 2000 ready. When used in accordance with its associated documentation, Download for OS/390 is capable of correctly processing, providing, and receiving date data within and between the twentieth and twenty-first centuries, provided all other products used with Download for OS/390 (including software, hardware, and firmware) properly exchange accurate date data with it.

About This Publication

This publication provides information about Download Version 3 Release 1.0 for OS/390, a licensed feature of IBM Print Services Facility (PSF) for OS/390. This publication was written with the assumption that you are familiar with PSF for OS/390 and with Advanced Function Presentation (AFP) concepts.

Who Should Read This Publication

The information in this publication is directed to several audiences:

- The job submitter on an MVS or OS/390 system who submits a job for processing by Download for OS/390.

- The system programmer responsible for customizing Download for OS/390 on the MVS or OS/390 system.

- The system console operator responsible for starting, stopping, and monitoring Download for OS/390.

- The diagnostician responsible for diagnosing problems.

How This Publication Is Organized

The information in this publication is directed to several audiences:

- The job submitter should read:

  - Chapter 1, Introducing Download for OS/390
  - Chapter 4, Using Download for OS/390 for Printing or Archiving

- The system programmer should read:

  - Chapter 1, Introducing Download for OS/390
  - Chapter 2, Configuring Download for OS/390
  - Appendix A, Checklist of Download for OS/390 Configuration Tasks

- The system console operator should read:

  - Chapter 1, Introducing Download for OS/390
  - Chapter 3, Operating Download for OS/390

- The diagnostician should read:

  - Chapter 1, Introducing Download for OS/390
  - Chapter 5, Diagnosing Errors in Download for OS/390

Related Information

Publications that are referred to in this book or that contain additional information about Advanced Function Presentation (AFP), the MVS operating system, PSF, and related products are listed in the "Bibliography" on page 85.

For additional information about OS/390 and PSF for OS/390, refer to these Web pages:

```
http://www.ibm.com/s390/os390
http://www.printers.ibm.com/pbin-id/go?/pdocs/psf390/home.html
```

To obtain the latest documentation updates for OS/390 base elements and optional features that result from DOC APARs and PTFs, refer to the DOC APARs and ++HOLD DOC Web page:

`http://www.s390.ibm.com/os390/bkserv/new_tech_info.html`

To obtain the latest documentation updates for PSF for OS/390, refer to these members in SYS1.SAMPLIB:

Member	Publication
APSGCUSU	*PSF for OS/390: Customization*, S544-5622
APSGDGNU	*PSF for OS/390: Diagnosis*, G544-5623
APSGDLGU	*PSF for OS/390: Download for OS/390*, G544-5624
APSGMACU	*PSF for OS/390: Messages and Codes*, G544-5627
APSGSECU	*PSF: Security Guide*, S544-3291
APSGUSRU	*PSF for OS/390: User's Guide*, S544-5630

Understanding Syntax Notation

The following rules apply to coding illustrations throughout this publication:

* Uppercase letters are to be coded as shown.

* Variable data is printed in italics. Enter specific data to replace the characters in italics; for example, for PRT(*nnnn*) you could enter PRT(0002).

* Do not enter the following symbols as part of a parameter or option:

    Vertical Bar |
    Underscore ___
    Brackets [ ]

* A vertical bar between two values means that you select one of the values.

* An underscored value means that if an option is not specified, the underscored value, called the default, is used.

* Brackets around a value means that you do not have to select the value.

Summary of Changes

Summary of Changes for *PSF for OS/390: Download for OS/390*, **G544-5624-00**

This publication contains additions and changes to information previously presented in *PSF/MVS: MVS Download Guide*, G544-5294-01, which supports PSF/MVS Version 2 Release 2.0. The technical additions and changes are marked with a revision bar to the left of the changes.

- The name for Version 3.1 of MVS Download is Download for OS/390.

- New software prerequisites are described in "Verifying Prerequisites and Installing Download for OS/390" on page 7.

- Download for OS/390 can now accept either a TCP/IP host name or a dotted-decimal IP address in the routing-control data set. See "Routing Control Statements" on page 28 for a description of the IPADDR parameter.

- The retry interval shown in the examples is shorter, because a shorter retry interval improves performance. See "Routing Control Statements" on page 28 for a description of the RETRYINTV parameter.

- The new sample startup procedure for Download for OS/390 is named APSWAFPD and is installed in SYS1.PROCLIB. See "Sample Startup Procedure" on page 22 for the sample procedure.

- Information about the JES3 initialization parameter PDEFAULT is provided in "DEVICE Statement" on page 19. The PDEFAULT parameter allows you to specify default fonts and a default page definition for Download for OS/390 in the PRINTDEV statement of the Download startup procedure.

- Additional information about accounting information is provided in "Using Accounting Information" on page 37.

- The default for the TRACE parameter in the PRINTDEV statement in the Download startup procedure is changed to YES, so that an internal trace is always started by default. An internal trace assists IBM in diagnosing problems.

- Download for OS/390 can transmit data sets to a Download for OS/390 server shipped with InfoPrint Manager for AIX, which is the strategic replacement for PSF for AIX.

- Download for OS/390 servers shipped with EDMSuite OnDemand can run on UNIX and Windows NT platforms, in addition to AIX platforms.

- The file names on the remote systems now contain a 4–digit year. See "Locating Transmitted Files on Remote File Systems" on page 44 for the format of the names.

- Download for OS/390 transmits the values of additional JCL parameters to the remote system, including DEST=IP:, DUPLEX, OFFSETXB, OFFSETXF, OFFSETYB, OFFSETYF, RESFMT, and PRTQUEUE. See "JCL Parameters" on page 54 for a description of these JCL parameters.

- Additional information about the parameters Download for OS/390 passes to the server on the remote system is provided in "Specifying Printing Parameters to PSF for AIX or InfoPrint Manager for AIX" on page 49.

| • Information about how to transmit data sets containing line-data or mixed-mode
| data with inline resources is provided in "Using AFP Resources for Printing with
| PSF for AIX or InfoPrint Manager for AIX" on page 52.

| • Information about how to modify the shell script on the remote system when
| transmitting MO:DCA-P data with inline resources or special data types, such
| as PostScript or TIFF data, is provided in "Identifying the Data Type for Printing
| with PSF for AIX or InfoPrint Manager for AIX" on page 53.

| • Additional diagnostic information is provided in Chapter 5, "Diagnosing Errors in
| Download for OS/390" on page 71.

| • The chapters are reordered to reflect the order in which tasks are performed.

| • The messages and abend reason codes that Download for OS/390 issues are
| no longer described in this publication. They are described in *PSF for OS/390:*
| *Messages and Codes*.

Chapter 1. Introducing Download for OS/390

Download for OS/390 is a separately-orderable feature of IBM Print Services Facility for OS/390 (PSF for OS/390). Download for OS/390 automatically transmits system output to other systems in the IBM TCP/IP network for printing or archiving by these IBM products: Print Services Facility for AIX, InfoPrint Manager for AIX, and EDMSuite OnDemand. This publication refers to EDMSuite OnDemand as OnDemand.

Overview

Figure 1 shows the steps that occur as Download for OS/390 transmits system output from an MVS or OS/390 system to PSF for AIX, InfoPrint Manager for AIX, or OnDemand servers on other systems.
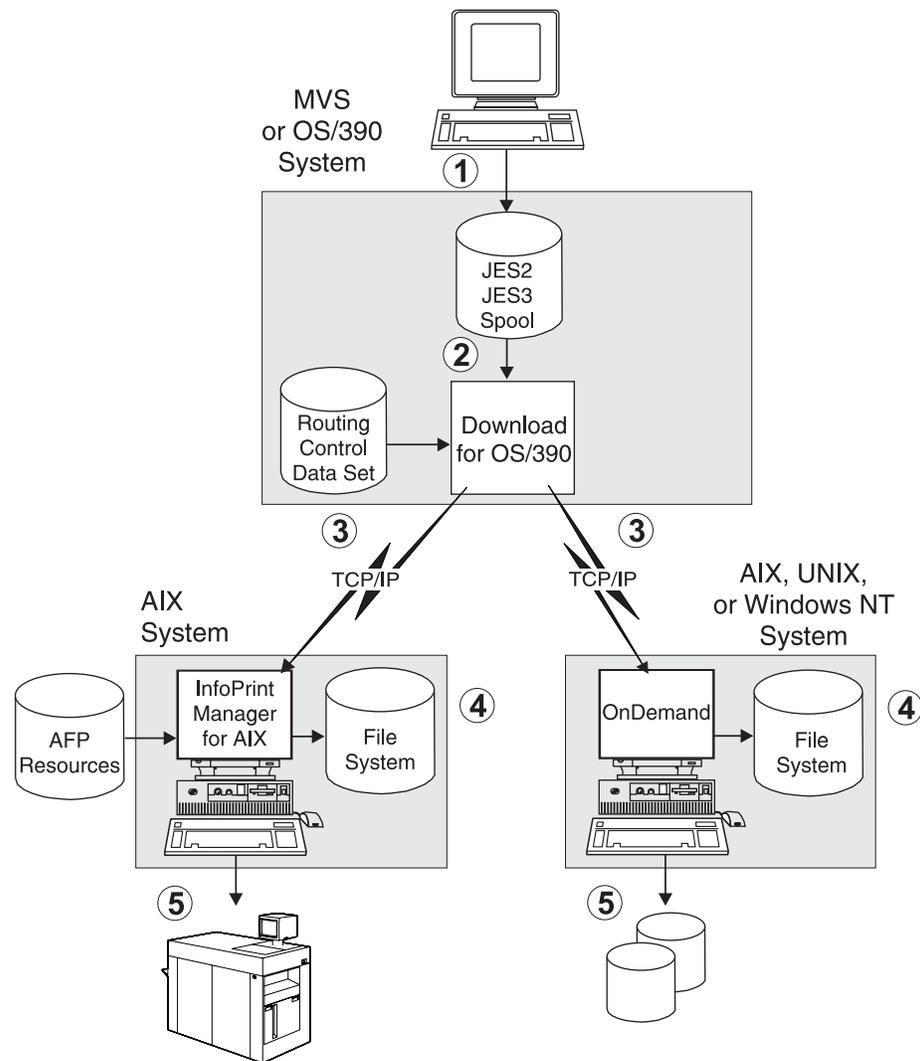
Figure 1. Download for OS/390 System Diagram

Following is a description of the steps shown in Figure 1:

1. Users submit jobs on an MVS or OS/390 system, creating system output on the Job Entry Subsystem (JES) spool in either a JES2 or JES3 environment. The job submitters can specify job control language (JCL) parameters that direct the output data sets to Download for OS/390 and also to a remote system. The data sets can contain any type of data stream.

2. Download for OS/390, running as a JES2 or JES3 output writer, selects output data sets from the JES spool according to installation-defined JES work-selection criteria, such as class, that correspond to JCL parameters specified by the job submitters. Several Download for OS/390 output writers can run at the same time to process a high volume of data.

3. Download for OS/390 transmits the output data sets, with print options that include the JCL parameters, to remote systems in the TCP/IP network. Download for OS/390 uses routing information specified by the installation in a routing-control data set to determine the remote system that is to receive the data. The routing information associates JCL parameters specified by the job submitter (output class, destination, and form name) with the IP addresses or host names of remote systems and receiving servers.

4. The servers receive the data sets into file systems. These IBM products provide servers to receive data from Download for OS/390: PSF for AIX, InfoPrint Manager for AIX, and EDMSuite OnDemand. Several servers may run simultaneously on one system to handle large amounts of transmitted data.

5. The PSF for AIX, InfoPrint Manager for AIX, and OnDemand servers process the received files according to instructions coded by the installation in a shell script. The shell script might be coded to perform the following functions:

   - PSF for AIX or InfoPrint Manager for AIX Server: Print the data on an AFP or non-AFP printer using printing options specified in the associated JCL parameters and using AFP resources accessible to the AIX system. Optionally, a server could save files for subsequent processing.

   - OnDemand Server: Store the data in an application group for subsequent retrieval.

Some highlights of Download for OS/390 are described below.

Automatic Routing

The installation controls the routing of data sets by pairing JCL parameter values with the addresses of remote systems and servers in a routing-control data set. Thus, the routing process can be transparent to the job submitter, requiring little or no modification to existing JCL statements.

High-Speed Data Transfer with no DASD Requirements

Download for OS/390 sends data to the remote system using internal buffers and the TCP/IP socket interface, achieving a high transmission rate with no additional DASD requirements. Thus, Download for OS/390 is suitable for transmitting large amounts of data.

Automatic Error Recovery

When an error occurs during transmission of data from the MVS or OS/390 system to the remote system, Download for OS/390 automatically retries the transmission according to installation parameters. This reduces the need for operator intervention

due to transmission errors. The installation specifies the number of times to retry each failed transmission, as well as how long to wait before retrying the transmission.

Guaranteed Data Integrity

Download for OS/390 verifies that all data has been successfully received by the remote system before deleting a data set from the MVS or OS/390 system. If transmission is not successful after retry, JES holds the data set.

Restart From a Checkpoint

When requested, Download for OS/390 takes checkpoints of a data set being transmitted from the MVS or OS/390 system to the remote system. The requester specifies the interval between checkpoints. After a transmission error, Download for OS/390 retries from the last checkpoint, thereby reducing transmission time for large data sets.

Transmission Notification

When requested, Download for OS/390 notifies the job submitter when a data set is successfully transmitted, held by the system due to an error, or cancelled by the operator.

Seamless System Management

The system operator manages Download for OS/390 with the same Job Entry Subsystem (JES) or System Display and Search Facility (SDSF) commands used to manage PSF for OS/390.

Accounting

Download for OS/390 supports System Management Facility (SMF) accounting by recording the number of bytes transmitted and other processing information in a type-6 record extension.

Chapter 2. Configuring Download for OS/390

This chapter provides a technical overview of Download for OS/390 and describes the tasks the system programmer must perform to configure Download for OS/390 on an MVS or OS/390 system.

A system administrator must also configure the remote system for Download for OS/390, as described in one of the following publications:

- *IBM Print Services Facility for AIX: Print Administration*
- *IBM InfoPrint Manager for AIX: Administrator's Guide*
- *EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers*
- *EDMSuite OnDemand: Installation and Configuration Guide for Windows NT Servers*

Overview

Download for OS/390 consists of a program running on an MVS or OS/390 system and one or more servers on remote systems, such as AIX, other UNIX systems, or Windows systems. Figure 2 shows an overall picture of how Download for OS/390 operates.
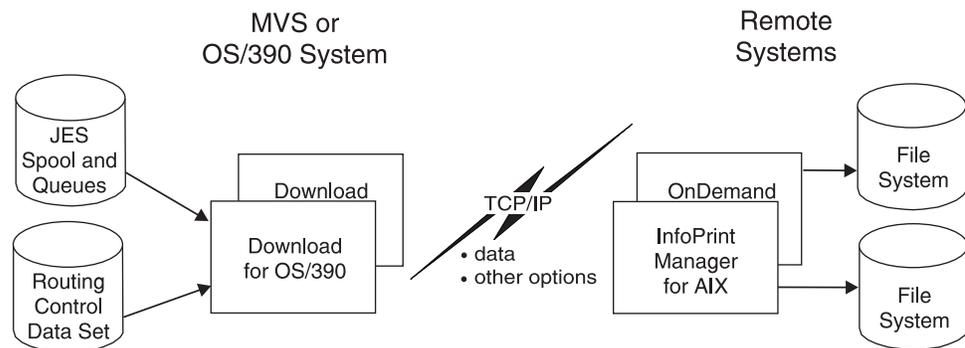
Figure 2. System Overview of Download for OS/390

On the MVS or OS/390 system, Download for OS/390 operates as an output writer, also called a functional subsystem application (FSA), of the Job Entry Subsystem (JES). The Download for OS/390 FSA selects output data sets from the JES spool according to work-selection criteria you define to JES2 or JES3. Several FSAs can run in one functional subsystem address space (FSS).

Without formatting data for a particular printer, Download for OS/390 transmits output data sets to one of several remote systems in the IBM TCP/IP network according to routing criteria you define to Download for OS/390 in a routing-control data set. In the routing-control data set, you specify:

- Routing criteria that correspond to JCL parameters of class, destination, and form name
- The address of the remote system and server to which data sets matching the criteria are to be transmitted

With each data set, Download for OS/390 transmits options that contain values the job submitter has specified in JCL parameters; you may specify default values for some of these JCL parameters. For example, you can specify default AFP resource names.

On the remote system, a PSF for AIX, InfoPrint Manager for AIX, or OnDemand server program saves each data set in one of the file systems specified by the system administrator when starting the server program. After saving each data set, the server invokes an installation-defined shell script that performs functions defined by the AIX installation, such as printing or archiving the files. The server passes to the shell script a parameter list containing JCL parameters specified by the job submitter and other job and file information. The shell script can translate these parameters into PSF for AIX or InfoPrint Manager for AIX printing options or into OnDemand options.

PSF for AIX and InfoPrint Manager for AIX supply sample shell scripts for Download for OS/390. These shell scripts print received files using the printing options specified in the JCL parameters. The AIX system administrator can create other shell scripts.

Client/Server Relationship

Download for OS/390 uses the client/server model for communication between the MVS or OS/390 system and AIX systems, as shown in Figure 3.

- Download for OS/390 running on the MVS or OS/390 system is the *client*. The client initiates the TCP/IP connection and sends data to the AIX system.

- The PSF for AIX, InfoPrint Manager for AIX, or OnDemand program receiving data on the AIX system is the *server*.
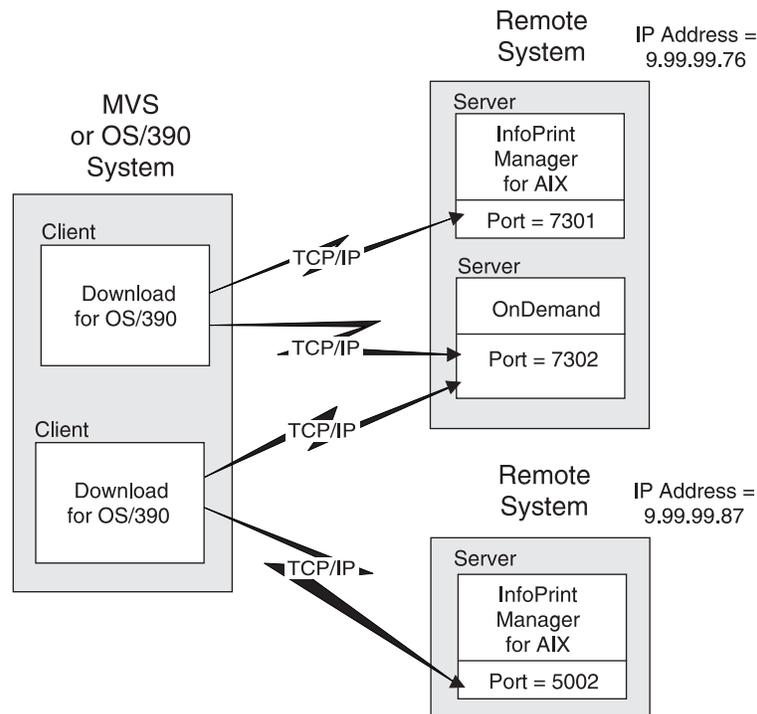
Figure 3. Client/Server Relationship of Download for OS/390

As shown in Figure 3, a Download for OS/390 FSA can transmit data to more than one remote system, although each FSA can transmit only one data set at a time. Any one server can receive data from more than one client, again receiving one data set at a time. Multiple servers can run on the remote system, and servers for PSF for AIX, InfoPrint Manager for AIX, and OnDemand can run on the same system.

As shown in Figure 3 on page 6, each PSF for AIX, InfoPrint Manager for AIX, or OnDemand server waits for data at a different socket address. The socket address identifies both the Internet-Protocol (IP) address of the AIX system and the port number at which the server waits for data.

Download for OS/390 initiates a TCP/IP connection to the target AIX server when Download for OS/390 has data to transmit and disconnects after receiving confirmation from the server that the data has been completely transmitted. If requested, both the client and server perform checkpointing of data.

If all data is not completely transmitted, Download for OS/390 retries the transmission at the retry interval and for as many times as you have specified in the routing-control data set. If still unsuccessful, Download for OS/390 returns the data set to JES to be held by the system.

Configuration Tasks

The tasks for configuring Download for OS/390 on the MVS or OS/390 system are:

1. Verify software prerequisites and install the Download for OS/390 program.

2. Plan the Download for OS/390 functional subsystem.

3. Define the Download for OS/390 functional subsystem in a JES2 or JES3 environment.

4. Create a startup procedure for each Download for OS/390 functional subsystem.

5. Specify routing-control information to Download for OS/390.

6. Write an exit routine to pass additional parameters to server, if necessary.

7. Update installation accounting programs, if necessary.

8. Update the Program Properties Table.

These tasks are described in the following sections. See Appendix A, "Checklist of Download for OS/390 Configuration Tasks" on page 77 for a checklist of the configuration tasks.

Verifying Prerequisites and Installing Download for OS/390

Before you install the Download for OS/390 feature tape, ensure that the MVS or OS/390 system is at or above the following levels:

- MVS/ESA 5.2 or OS/390 Version 1 Release 1.0, or higher.

- MVS TCP/IP Version 3 Release 2.0 or higher, or OS/390 e-Network Communication Server.

  If you use TCP/IP Version 3 Release 2.0, you must apply the PTFs associated with the following APARs:

– PQ07866
– PQ13154
– PQ17052

If you use OS/390 Version 2 Release 5.0 with e-Network Communication Server, you must apply the PTFs associated with the following APARs:

– PQ13154
– PQ17052

If you use OS/390 Version 2 Release 6.0 with e-Network Communication Server, you must apply the PTFs associated with APAR PQ17052.

- PSF for OS/390 Version 3 Release 1.0.

Ensure that the Download for OS/390 servers are at or above the following levels:

- PSF for AIX Version 2 Release 1

- InfoPrint Manager for AIX Version 2 Release 1.0. To use these parameters that Download for OS/390 transmits to the server, you need InfoPrint Manager for AIX Version 3 Release 1.0: **-oduplex**, **-offsetxb**, **-ooffsetxf**, **-ooffsetyb**, **-ooffsetyf**, **-oresfmt**.

- EDMSuite OnDemand Version 2 Release 2

Refer to the *Download for OS/390 Program Directory* for instructions on installing the Download for OS/390 program.

Planning the Download for OS/390 Functional Subsystem

The Download for OS/390 feature, like PSF for OS/390, operates as a JES functional subsystem. A functional subsystem is an extension of JES, which runs in its own address space. For more information about JES functional subsystems, refer to the *JES Initialization and Tuning Guide* for your system.

Because Download for OS/390 performs a very different function from the printer-driver function performed by PSF for OS/390, Download for OS/390 operates as a separate functional subsystem (FSS), as shown in Figure 4. Even though your installation has already defined one or more FSSs for PSF for OS/390, you must define a separate FSS for Download for OS/390.
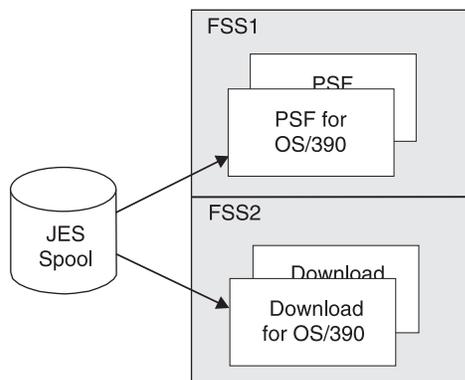
Figure 4. Relationship Between PSF for OS/390 and Download for OS/390 Functional Subsystems

Within the FSS defined for Download for OS/390, the Download for OS/390 program runs as a functional subsystem application (FSA), using the support facilities of the FSS to communicate with JES. Several Download for OS/390 FSAs can run in the same FSS.

If you have already defined an FSS and FSA for PSF for OS/390, see "Differences Between a PSF for OS/390 and Download for OS/390 FSS" on page 12. You can modify your existing JES initialization statements and PSF startup procedure to create JES initialization statements for the Download for OS/390 FSS and FSA and a Download for OS/390 startup procedure.

The following sections describe planning decisions to consider before coding the JES2 or JES3 initialization statements and writing a startup procedure:

- How many functional subsystems (FSS) and functional subsystem applications (FSA) to create
- What region size to define for each FSS
- What JES work-selection criteria to specify for each FSA
- What default checkpoint interval to specify for each FSA
- What default printing options to specify for each FSA

Defining Multiple Functional Subsystems

For improved throughput and more efficient use of system resources, you can define more than one FSA within an FSS. You also can define more than one FSS. Use Table 1 to determine the maximum number of FSSs and FSAs that are supported.

Table 1. Number of FSSs and FSAs Supported	
Number of FSSs	2000 maximum
Number of FSAs per FSS	64 maximum (see Note)
Note: The actual number of FSAs per FSS may be limited by the amount of storage each Download for OS/390 FSA requires below the 16 megabyte line. See "Selecting a Region Size" to determine how much virtual storage size each FSA requires.	

Selecting a Region Size

The region-size requirements for each Download for OS/390 FSS depend on:

- Whether the trace option is active
- The number of FSAs supported by the FSS

Table 2 shows the minimum storage required for Download for OS/390.

Table 2. Minimum Storage Required for FSS and FSAs		
FSA	**Below 16 Megabyte**	**Above 16 Megabyte**
The **first** FSA in an FSS	1M below 16M	11M above 16M
Each **additional** FSA in the FSS	.65M below 16M	.25M above 16M

An installation option that can affect storage requirements is the size of the trace table. The default is 128K per FSA. Refer to *PSF for OS/390: Diagnosis* for more information on tracing.

You specify the amount of below-the-line storage required by each Download for OS/390 FSA on the EXEC JCL statement of the startup procedure, as described on page 23.

Defining Work-Selection Criteria

You define work-selection criteria for each Download for OS/390 FSA during JES initialization. These criteria determine which output data sets the Download for OS/390 FSA selects from the JES2 or JES3 spool.

JES2 and JES3 allow you to specify numerous work-selection criteria, which correspond to JCL parameters. See the appropriate *JES Initialization and Tuning Guide* and *JES Initialization and Tuning Reference* for your system for information about the possible criteria. Some work-selection criteria that you might consider for data sets to be processed by Download for OS/390 are:

- Output class of the data set
- Form name
- Destination name

Following are some considerations for selecting work-selection criteria:

- Do not specify destination name as a work-selection criterion if job submitters will need to specify the DEST=IP JCL parameter. This is because job submitters cannot specify a destination name in the DEST JCL parameter when they specify the DEST=IP JCL parameter. See "JCL Parameters" on page 54 for information about the DEST=IP parameter.

- In a JES3 environment, specify form name as a work-selection criterion if you specify form name as a selection criterion in the routing-control data set. This is because JES3 does not pass the form name to the Download for OS/390 FSA unless you specify form name as a work-selection criterion.

You specify the work-selection criteria for each Download for OS/390 FSA on a parameter of a JES initialization statement:

- WS parameter of the JES2 (*nnnn*) statement
- WS parameter of the JES3 DEVICE statement

Requesting Checkpointing

When requested, Download for OS/390 takes data-set checkpoints at specified intervals during transmission of a data set from the MVS or OS/390 system to a remote system. At these checkpoints, Download for OS/390 requests that both JES and the receiving server record checkpoint data. Checkpointing data enables Download for OS/390 to retransmit the data set to the server from the last checkpoint, if a transmission error occurs.

Download for OS/390 restarts transmission of a data set from a checkpoint on two occasions:

- When a transmission error occurs, and you requested retry in the routing-control data set

- When Download for OS/390 selects a data set that has been previously checkpointed by Download for OS/390

Selecting a Checkpoint Interval

Download for OS/390 supports checkpointing at intervals of a specified number of seconds. If you are familiar with the PSF for OS/390 FSA, you know that it supports checkpointing at intervals specified in either seconds or number of pages. Because Download for OS/390 does not transmit data as pages, Download for OS/390 checkpoints in timed intervals only. If you or the job submitter request checkpointing at page intervals, Download for OS/390 ignores the request.

Consider the following impacts to performance when selecting a checkpoint interval as the system default:

- If the interval number is too low, resulting in many checkpoints, performance may be reduced due to the checkpointing overhead.

- If the number of seconds between intervals is too high, retransmission of large amounts of data may reduce performance.

IBM recommends that you request checkpointing as the default to improve performance in the event of transmission errors. A starting interval of 30 seconds is recommended. If you experience very few transmission errors, consider increasing the checkpoint interval.

Specifying the Checkpoint Default

Checkpointing can be requested in two ways:

- Job submitters request checkpointing for an output data set in the CKPTSEC parameter of the OUTPUT JCL statement.

- You request checkpointing as the default for each Download for OS/390 FSA on a parameter of a JES initialization statement:

    - CKPTSEC and CKPTMODE parameters of the JES2 PRT(*nnnn*) statement
    - CKPNTSEC parameter of the JES3 DEVICE statement

Defining Default Printing Options

With each data set it transmits, Download for OS/390 transmits parameters that are specified by the job submitter on either the DD or OUTPUT JCL statement. You can specify default values for some of the printing options, namely:

- Data-check blocking option
- Font names (up to four)
- Name of the form definition
- Name of the page definition

In some cases, you might not want to define defaults on the MVS or OS/390 system:

- If Download for OS/390 transmits data sets to an OnDemand server, you do not need to specify defaults for printing.

- If Download for OS/390 transmits data sets to a PSF for AIX or InfoPrint Manager for AIX server, the AIX system administrator may want to specify a default in the shell script executed by the server or in some other manner.

Specifying Defaults in JES2

You can specify defaults for printing options on JES2 initialization statements PRINTDEF and PRT(*nnnn*) and on the PRINTDEV statement of the FSS startup procedure.

To specify *no* defaults in a JES2 environment, code the JES2 and PRINTDEV statements as shown in Table 3.

Table 3. Specifying No Defaults in JES2.			
Option	**PRT(*nnnn*) Statement**	**PRINTDEF Statement**	**PRINTDEV Statement**
Data Check Blocking	Not applicable	Not applicable	Omit DATACK parameter
Fonts	UCS=0	Omit NIUCS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Omit FCB parameter	Omit NIFCB parameter	Omit PAGEDEF parameter

Specifying Defaults in JES3

You can specify defaults on JES3 initialization statements (OUTSERV and DEVICE) and on the PRINTDEV statement of the FSS startup procedure.

To specify *no* defaults in a JES3 environment, code the JES3 and PRINTDEV statements as shown in Table 3.

Table 4. Specifying No Defaults in JES3.			
Option	**DEVICE Statement**	**OUTSERV Statement**	**PRINTDEV Statement**
Data Check Blocking	Not applicable	Not applicable	Omit DATACK parameter
Fonts	Specify PDEFAULT CHARS and omit CHARS parameter	Omit CHARS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Specify PDEFAULT FCB and omit CARRIAGE parameter	Omit CARRIAGE parameter	Omit PAGEDEF parameter

Differences Between a PSF for OS/390 and Download for OS/390 FSS

The functional subsystem for Download for OS/390 is similar to the functional subsystem you may already have defined for PSF for OS/390. Thus, you can use similar JES initialization statements to define an Download for OS/390 FSS and FSAs, and your Download for OS/390 startup procedure can be similar to the

existing PSF startup procedure. You must give the Download for OS/390 FSS and FSAs different names and make modifications in the areas described below.

JES Work-Selection Criteria

You must specify different JES work-selection criteria for the Download for OS/390 FSA than for the PSF for OS/390 FSA. For example, if class A is the criterion for the PSF for OS/390 FSA, specify a different class or a different work-selection criterion, such as destination, for the Download for OS/390 FSA.

Checkpointing

Specify checkpointing by seconds rather than pages because Download for OS/390 only supports checkpointing by seconds:

- In JES2, specify the CKPTSEC parameter instead of CKPTPAGE. Also specify the CKPTMODE=SEC parameter.

- In JES3, specify the CKPNTSEC parameter instead of CKPNTPG.

Printer Options

Several JES parameters allow you to specify printer-specific options. Because these parameters do not apply to a Download for OS/390 FSA, remove the following parameters from the JES2 or JES3 initialization statement.

JES2 PRT(*nnnn***) Statement**	**JES3 DEVICE Statement**
BURST	BURST
COPYMARK	COPYMARK
FLASH	FEATURES
MARK	FLASH
NPRO	HEADER
SEP	NPRO
SEPDS	STACKER
UNIT	XTYPE
	XUNIT

See "Defining a JES2 Functional Subsystem" on page 14 or "Defining a JES3 Functional Subsystem" on page 17 for the JES parameters that apply when you define an FSS and FSAs for Download for OS/390.

Printing Defaults

When you define an FSA, you can specify defaults for several printing options. However, to transmit a data set to an AIX system for either printing or archiving, you may not want to specify defaults on the MVS or OS/390 system. See "Defining Default Printing Options" on page 11 for more information.

Also, note that the names of resources, that is, page definitions, form definitions, and fonts, are case-sensitive on the AIX system; however, the resource names specified in JCL statements, JES statements, or in the startup procedure, are all translated to upper-case characters.

Startup Procedure

The startup procedure must specify a different program entry point for Download for OS/390 and include a DD statement for the routing-control data set. The PRINTDEV statement is optional, and many of the parameters on the PRINTDEV statement do not apply. See "PRINTDEV Parameters" on page 24 for the PRINTDEV parameters that do apply.

Defining a JES2 Functional Subsystem

To define a functional subsystem for Download for OS/390 in a JES2 environment, code these JES2 initialization statements as part of JES2 initialization:

- One FSS(*fss_name*) statement to define each functional subsystem (FSS)
- One PRT(*nnnn*) statement for each functional subsystem application (FSA) under control of the FSS

Sample JES2 Initialization Statements

Figure 5 shows sample JES2 statements for one FSS named DOWNLOAD and one associated FSA named PRT0001.

```
FSS(DOWNLOAD) PROC=APSWAFPD,HASPFSSM=HASPFSSM,AUTOSTOP=YES

PRT(0001)  CKPTSEC=30,CLASS=R,START=NO,
           FSS=DOWNLOAD,MODE=FSS,PRESELCT=YES,
           PRMODE=(LINE,PAGE,SOSI1,SOSI2),
           TRKCELL=YES,UCS=0,WS=(CL)
```

Figure 5. Sample JES2 Initialization Statements. These statements are commonly found in the initialization-deck member of SYS1.PARMLIB. Continuation characters are not shown.

The following section describes the JES2 initialization statements shown in Figure 5, including some additional parameters that you might want to specify for a Download for OS/390 FSS and FSA.

Note: For detailed descriptions of each of the parameters, refer to *JES2 Initialization and Tuning Reference*.

FSS(fss_name) Statement

The FSS(*fss_name*) initialization statement is optional but recommended. If you omit it, JES2 generates a default FSS when an FSA is started.

Each FSS must have a unique name, specified as a 1 to 8 character name. In the example, the FSS name is DOWNLOAD. This FSS name must match the FSS name in the PRT(*nnnn*) statement for each associated FSA.

The FSS statement contains the following parameters for Download for OS/390:

PROC=*procedure_name*
Specifies the name of the procedure for starting this FSS. This parameter is required.

AUTOSTOP={YES | <u>NO</u>}
Specifies whether or not the FSS address space is to be stopped automatically if all FSAs under control of the FSS are stopped.

This parameter is optional; if you omit it, the default is NO.

HASPFSSM= <u>HASPFSSM</u>
Specifies the JES load module to be loaded into the FSS address space.

This parameter is optional. For Download for OS/390, either omit the parameter or specify the default value of HASPFSSM.

PRT(nnnn) Statement

A PRT(*nnnn*) statement is required to define each FSA. *nnnn* can be from 1 to 4 numeric characters. Each FSA must have a unique name, specified as PRT(*nnnn*). In addition to the PRT(*nnnn*) format, Download for OS/390 accepts the PRINT*nn* and PRINTER*n* formats.

The PRT(*nnnn*) statement contains the following parameters:

CKPTMODE={PAGE | SEC}

Specifies whether checkpointing is to be based on the number of pages (PAGE) or on time (SEC). For Download for OS/390, specify CKPTMODE=SEC because Download for OS/390 checkpoints only at timed intervals.

This parameter is optional. If you omit CKPTMODE but specify the CKPTSEC parameter, with or without CKPTPAGE, Download for OS/390 checkpoints by time. If you omit the CKPTMODE and the CKPTSEC parameters, Download for OS/390 does *not* checkpoint unless requested by the job submitter.

CKPTSEC={*nnnnn* | 0}

Specifies the number of seconds to elapse between checkpoints of a data set being transmitting to the AIX system. The value must be between 0 and 32767. This value does *not* cause checkpointing during printing on the AIX system. The recommended starting value is 30 seconds.

This parameter is optional. If you omit it, the default is 0, meaning that Download for OS/390 does not checkpoint data sets unless the job submitter specifies a checkpoint value on the OUTPUT JCL statement for the data set.

{CLASS | QUEUE}=(*classes*)

Specifies the output classes processed by this FSA. List all classes to be selected by this FSA; do not separate each class with a comma. If you designate CL or Q as a work-selection criterion on the WS parameter, the FSA selects data sets whose class matches one of the values specified here.

This parameter is optional. If you omit it and do not specify CL or Q as a work-selection criterion, this FSA selects data sets with any output class.

FCB=*pagedef_name*

Specifies the 1 to 4 character name of a default page definition. Do *not* code the P1 prefix of the page definition; Download for OS/390 adds the P1 prefix when passing the name of the page definition to the AIX system. This name is translated to upper case.

This parameter is optional. If you omit it, JES2 determines the default page definition from the NIFCB parameter of the JES2 PRINTDEF statement. If no default is specified on the PRINTDEF statement, the default is that specified on the PRINTDEV statement in the FSS startup procedure.

FORMS=(*form_names*)

Specifies the 1 to 8 character form names processed by this FSA. List from 1 to 8 different form names that can be selected by this FSA; separate each form name with a comma.

If you designate F as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches one of the values specified here.

This parameter is optional. If you omit it and do not specify F as a work-selection criterion, this FSA selects data sets with any form name.

FSS=_fss_name_

Specifies the name of the FSS associated with this FSA. This parameter is required.

MODE=FSS

Specifies that the FSA is managed by an FSS. This parameter is optional. The default is FSS if you code the FSS parameter.

PRESELCT={YES | NO}

Specifies whether output data sets are preselected for this FSA. This parameter is optional. If you omit it, the default is YES.

PRMODE=(_processing_modes_**)**

Specifies the data-set processing modes supported by this FSA. Separate the modes with commas. List all PRMODE values to be accepted by this FSA, because the FSA will process only data sets with a mode that matches one of the values specified in this parameter:

LINE	Specifies that data sets containing line data are selected
PAGE	Specifies that data sets containing MO:DCA-P data are selected
SOSI_n_	Specifies that data sets with the shift-out/shift-in processing mode of SOSI1 or SOSI2 for double-byte fonts are selected
installation-defined	Specifies any mode that your installation has defined.

Specify both LINE and PAGE for FSAs that are to transmit both types of data sets.

This parameter is optional. If you omit it, the default is LINE.

ROUTECDE=(_destinations_**)**

Specifies the destinations processed by this FSA. List from 1 to 4 different destination names that can be selected by this FSA; separate each destination name with a comma. If you designate R as a work-selection criterion on the WS parameter, the FSA selects data sets whose destination matches one of the values specified here.

This parameter is optional. If you omit it and do not specify R as a work-selection criterion, this FSA selects data sets with any destination.

START={YES | NO}

Specifies whether or not JES2 is to automatically start this FSA whenever JES2 starts. If you specify START=NO, the operator must start the FSA.

This parameter is optional. If you omit it, START=YES is the default.

TRKCELL={YES | NO}

Specifies whether track-cell despooling is to be used with this FSA. You specify the size of the track cell, in terms of buffers, in the TRKCELL parameter of the JES2 SPOOLDEF statement. For improved performance, IBM recommends that you specify TRKCELL=YES on this statement and TRKCELL=5 on the JES2 SPOOLDEF statement.

This parameter is optional. If you omit it, the default is NO.

UCS={*font_name* | 0}
Specifies the 1 to 4 character default font name. 0 specifies that no default font is passed to Download for OS/390.

This parameter is optional. If you omit it, JES2 determines the default font from the NIUCS parameter of the PRINTDEF statement or, if NIUCS is not specified, from the PRINTDEV statement of the startup procedure.

WS=(*work_selection_criteria*)
Specifies the work-selection criteria for this FSA; separate each value with a comma. Refer to the *JES2 Initialization and Tuning Reference* for the valid values and defaults. For an Download for OS/390 FSA, consider the following values:

CL | Q Specifies that the FSA selects only those data sets with the same class as specified in the CLASS or QUEUE parameter of this statement.

R Specifies that the FSA selects only those data sets with the same destination name as specified in the ROUTECDE parameter of this statement. If job submitters will need to specify the DEST=IP JCL parameter, do not specify this work-selection parameter. This is because job submitters cannot specify a destination name in the DEST JCL parameter when they specify the DEST=IP JCL parameter. See "JCL Parameters" on page 54 for information about the DEST=IP parameter.

F Specifies that the FSA selects only those data sets with the same form name as specified in the FORMS parameter of this statement.

This parameter is optional but recommended. If you omit it, the FSA selects output data sets for processing according to default work-selection criteria.

Defining a JES3 Functional Subsystem

To define a functional subsystem for Download for OS/390 in a JES3 environment, code these JES3 initialization statements as part of the JES3 initialization processing for the MVS or OS/390 system:

- One FSSDEF statement to define each functional subsystem (FSS)
- One DEVICE statement to define each functional subsystem application (FSA) under control of the FSS

Sample JES3 Initialization Statements

Figure 6 on page 18 shows sample JES3 statements for one FSS named DOWNLOAD and one associated FSA named PRT0001.

```
FSSDEF,FSSNAME=DOWNLOAD,PNAME=APSWAFPD,TYPE=WTR

DEVICE,CARRIAGE=(YES,6),CHARS=(YES,60DB),
       CKPNTSEC=30,DTYPE=PRTAFP1,
       FSSNAME=DOWNLOAD,
       JNAME=PRT0001,JUNIT=(,SYS1,UR,ON),
       MODE=FSS,PM=(LINE,PAGE,SOSI1,SOSI2),
       WC=(R),WS=(CL)
```

Figure 6. Sample JES3 Initialization Statements. These statements are commonly found in the initialization-deck member of SYS1.PARMLIB. Continuation characters are not shown.

The following section describes the JES3 initialization statements shown in Figure 6, including some additional parameters that you might want to specify to define an Download for OS/390 functional subsystem.

Note: For detailed descriptions of each of the parameters, refer to *JES3 Initialization and Tuning Reference*.

FSSDEF Statement

The FSSDEF initialization statement is optional but recommended. If you omit it, JES3 generates a default FSS when an FSA is started. The FSSDEF statement contains the following parameters for Download for OS/390:

FSSNAME=*fss_name*
  Specifies the name of this FSS. Each FSS must have a unique 1 to 8 character name. This FSS name must match the FSS name in the DEVICE statement for each associated FSA.

  This parameter is required.

MSGDEST={*msgdest* **|** <u>42</u> **| JES |** *nnn***}**
  Specifies routing information for messages concerning this FSS. This parameter is optional; if you omit it, the default is 42.

PNAME=*procedure_name*
  Specifies the name of the procedure for starting this FSS.

SYSTEM=*system_name*
  Specifies the JES3 processor on which the FSS will run. This parameter is optional. JES determines the default from the DEVICE statement.

TERM={YES | <u>NO</u>**}**
  YES specifies that the FSS will terminate if the JES3 global address space is terminated by a *RETURN or *DUMP operator command. This parameter is optional; if you omit it, the default is NO.

TYPE=WTR
  Specifies that the FSS is an output writer. This parameter is required.

DEVICE Statement

A DEVICE statement is required to define each FSA. The DEVICE statement contains the following parameters:

CARRIAGE=({<u>YES</u> | NO},*pagedef_name*)
Specifies the JES default page definition.

YES	Specifies that the page definition can be changed during writer execution.
NO	Specifies that the page definition cannot be changed during writer execution.
pagedef_name	Specifies the 1 to 4 character name of the page definition be used as a default. Do *not* code the P1 prefix of the page definition; Download for OS/390 adds the P1 prefix when passing the page definition name to the AIX system.

| This parameter is optional. If you omit it, JES3 determines the default page
| definition from the CARRIAGE parameter of the JES3 OUTSERV initialization
| statement. If you omit the CARRIAGE parameter in the OUTSERV statement,
| the default is 6, that is, page definition P16. If you do not want JES3 to supply
| a default page definition to Download for OS/390, specify the PDEFAULT FCB
| parameter.

CHARS=({<u>YES</u> | NO},*font_name*)
Specifies a 1 to 4 character default font name.

| This parameter is optional. If you omit it, JES3 determines the default font from
| the CHARS parameter of the JES3 OUTSERV initialization statement. If you
| omit the CHARS parameter of the OUTSERV statement, the default is GS10. If
| you do not want JES3 to supply a default font value to Download for OS/390,
| specify the PDEFAULT CHARS parameter.

CKPNTSEC=*nnnnn*
Specifies the number of seconds to elapse between checkpoints of a data set being transmitting to the AIX system. The value must be between 1 and 32 767. This value does *not* cause checkpointing during printing on the AIX system. The recommended starting value is 30 seconds.

This parameter is optional; if not specified, Download for OS/390 does not checkpoint data sets unless the job submitter specifies a checkpoint value on the OUTPUT JCL statement for the data set.

DGROUP=*destination_name*
Specifies a 1 to 8 character destination name processed by this FSA. If you designate destination as a work-selection criterion on the WS parameter, this FSA selects data sets that match the value specified here.

This parameter is optional. Specify this parameter only if you specify destination as a work-selection criteria on the WS parameter.

DTYPE=PRTAFP1
Specify PRTAFP1 as the device type for an Download for OS/390 FSA. This parameter is required.

DYNAMIC={YES | <u>NO</u>}
Specifies whether JES3 is to start and stop this FSA dynamically.

YES   Specifies that JES3 is to start this FSA whenever work is available for it. JES3 stops this FSA, and deactivates the address space when no work is available.

NO   Specifies that the operator is to start and stop this FSA. Specify NO to keep the address space active between transmission of data sets.

This parameter is optional. If you omit it, the default is NO.

FORMS=({<u>YES</u> | NO},_form_name_**)**
Specifies the form name processed by this FSA.

NO	Specifies that the form name cannot be changed during writer execution.
YES	Specifies that the form name can be changed during writer execution.
_form_name_	Specifies the 1 to 8 character name of the form to be processed by this FSA. If you designate FORMS as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches the value specified here.

This parameter is optional. If you omit it and do not specify forms as a work-selection criteria, this FSA selects data sets with any form name.

FSSNAME=_fss_name_
Specifies a unique FSS associated with this FSA. This value must match the value coded for the FSSNAME parameter in the corresponding FSSDEF statement.

This parameter is optional. If you omit it, the default is the name of this FSA, as specified in the JNAME parameter.

JNAME=_fsa_name_
Specifies the unique 1 to 8 character name of this FSA. This parameter is required.

JUNIT=(_devnum,main,msgdest_**[,{<u>ON</u> | OFF}])**
Specifies:

devnum	For Download for OS/390, do _not_ specify a device address; use a comma as a position holder.
main	The name of the processor to which the device is attached.
msgdest	Routing information messages about the FSA.
<u>**ON**</u> **| OFF**	Specifies whether the device is initially online or offline.

This parameter is required.

PDEFAULT={<u>NONE</u> | CHARS | FCB | CHARS,FCB}
Specifies whether or not JES3 is to use certain JES3 default values during FSS processing or ignore them. If JES3 ignores the default values, Download for OS/390 uses default values for CHARS, PAGEDEF, or both, that are defined in the PRINTDEV statement. See "PRINTDEV Parameters" on page 24 for information about the PRINTDEV statement.

	NONE	Specifies that JES3 is to use JES3 default values for font name (UCS or train) and page definition name (FCB or CARRIAGE); Download for OS/390 does not use the CHARS and PAGEDEF values specified in the PRINTDEV statement.
	CHARS	Specifies that JES3 is to ignore the JES3 default value for font name (UCS or train); Download for OS/390 uses the CHARS value specified in the PRINTDEV statement.
	FCB	Specifies that JES3 is to ignore the JES3 default value for page definition name (FCB or CARRIAGE); Download for OS/390 uses the PAGEDEF value specified in the PRINTDEV statement.
	CHARS,FCB	Specifies that JES3 ignores the JES3 defaults for both font name (UCS or train) and page definition name (FCB or CARRIAGE); Download for OS/390 uses the CHARS and PAGEDEF values specified in the PRINTDEV statement.

This parameter is optional. The default is NONE.

MODE=FSS
Specifies that this FSA is managed by an FSS. This parameter is required.

PM=(processing_modes**)**
Specifies the data-set processing modes supported by this FSA. Separate the modes with commas. List all PRMODE values to be accepted by this FSA because the FSA will process only data sets with a mode that matches one of the values specified in this parameter:

LINE	Specifies that line-format data sets are selected
PAGE	Specifies that composed-page data sets are selected
SOSIn	Specifies that data sets with the shift-out/shift-in processing mode of SOSI1 or SOSI2 for double-byte fonts are selected
installation-defined	Specifies any mode that your installation has defined.

This parameter is optional. If you omit it, the default is LINE,PAGE.

WC=(classes**)**
Specifies the output classes processed by this FSA. List all classes to be selected by this FSA; separate each class with a comma. If you designate CLASS as a work-selection criterion on the WS parameter, this FSA selects data sets that match the values specified here.

This parameter is optional. If you omit it, this FSA selects data sets with any output class.

WS=(work_selection_criteria**)**
Specifies the work-selection criteria for this FSA; separate each value with a comma. Refer to the *JES3 Initialization and Tuning Reference* for the valid values and the default.

For an Download for OS/390 FSA, consider the following values:

CL	Specifies that the FSA selects only those data sets with the same class as specified in the WC parameter of this statement.

Specifies that the FSA selects only those data sets with the same
destination name as in the DGROUP parameter of this statement. If job
submitters will need to specify the DEST=IP JCL parameter, do not
specify this work-selection parameter. This is because job submitters
cannot specify a destination name in the DEST JCL parameter when
they specify the DEST=IP JCL parameter. See "JCL Parameters" on
page 54 for information about the DEST=IP parameter.

| **F** Causes JES3 to pass the form name specified as a JCL parameter to
the Download for OS/390 FSA. If you specify form names as selection
criteria in the routing-control data set, also specify this parameter so
that the Download for OS/390 FSA can inspect the form name.

This parameter is optional but recommended. If you omit it, the FSA selects
output data sets for processing according to default work-selection criteria.

Creating a Startup Procedure

Before starting a Download for OS/390 FSS, you must create a cataloged startup
procedure. The startup procedure identifies:

- Program name, region size, time-out value, and tracing parameters.

- Location of the routing-control data set. You can specify a different
  routing-control data set for each FSS.

- Defaults for printing with PSF for AIX or InfoPrint Manager for AIX, such as
  page and form definitions, fonts, and data-check option. You can define
  different defaults for each FSA. See "Defining Default Printing Options" on
  page 11 for more information on defining defaults to JES.

Include the startup procedure in a library known to either JES2 or JES3. Refer to
the appropriate *JES Initialization and Tuning Guide* for your installation for more
information on procedure libraries.

Sample Startup Procedure

| Figure 7 shows a sample Download for OS/390 startup procedure for an FSS with
| one FSA. The same sample procedure is provided in SYS1.PROCLIB.

| The JES2 initialization statements for this FSS are shown in Figure 5 on page 14;
| the JES3 initialization statements are shown in Figure 6 on page 18. The startup
| procedure name is APSWAFPD and the FSA name is PRT1.

```
//APSWAFPD PROC
//STEP01   EXEC PGM=APSKAFPD,REGION=4096K,TIME=NOLIMIT,PARM=(,INTR)
//ROUTFILE DD DISP=SHR,DSN=MVSDLOAD.ROUT.FILE
//PRT1     CNTL
//PRT1     PRINTDEV CHARS=(60DB),      /* DEFAULT FONT SET          */
//             PAGEDEF=V06483,         /* PAGEDEF DEFAULT           */
//             FORMDEF=A10110,         /* FORMDEF DEFAULT           */
//             DATACK=UNBLOCK,         /* REPORT ALL DATA-CHECK     */
//             TRACE=YES               /* TURN TERNAL TRACE ON      */
//PRT1     ENDCNTL
```

Figure 7. Sample Startup Procedure

Notes:

1. This sample JCL assumes that the Download for OS/390 programs are in a data set that is part of the standard system search order; if this is not the case, include a STEPLIB statement to identify the data set.

2. To use a Print Parameters (APSUX15) exit routine, include a STEPLIB statement to identify the data set containing the exit, unless the data set is part of the standard system search order.

Startup Procedure JCL Statements

This section describes the statements and parameters shown in Figure 7 on page 22.

proc_name **PROC**
Names a catalogued procedure. *proc_name* must match the procedure name in a JES initialization statement for this FSA:

- PROC parameter of the JES2 FSS(*fss_name*) statement
- PNAME parameter of the JES3 FSSDEF statement

label **EXEC**
PGM=APSKAFPD,REGION=size**,TIME=NOLIMIT[,PARM=(**FSSddname**,{ INTR | FULL})]**
Invokes the Download for OS/390 program. This statement is required.

PGM=APSKAFPD	Specifies the Download for OS/390 program entry point.
REGION=size	Specifies the amount of below-the-line storage required by this FSS. See "Selecting a Region Size" on page 9 for more information.
TIME=NOLIMIT	Specifies TIME=NOLIMIT to prevent TIMEOUT abends.
PARM=(FSSddname**,{INTR | FULL})**	Specifies tracing values. See "Using the PSF Trace Facility" on page 71 for more information about tracing.

	FSSddname	Specifies the name of a DD statement defining the output data set in which to record FSS trace output. For information about allocating this data set, see "Allocating an FSS Trace Data Set" on page 73.
	INTR	Specifies an internal trace. To start an internal trace during FSS initialization, also specify TRACE=YES on the PRINTDEV statement; because TRACE=YES is the default, you can omit the TRACE=YES parametert. INTR is the default value.
	FULL	Specifies an FSA full external trace. To start a full external trace during FSS initialization, also specify TRACE=YES on the PRINTDEV

ROUTFILE DD DISP=SHR,DSN=_data_set_name_
Specifies the routing-control data set that Download for OS/390 uses to transmit data sets to a remote system and server. Specify DISP=SHR to allow more than one FSS to access this data set.

This DD statement is required.

_fsa_name_ **CNTL**
Specifies the beginning of optional program control statements for an Download for OS/390 FSA. Repeat the CNTL, PRINTDEV, and ENDCNTL statements for each FSA under control of the FSS.

> _fsa_name_   Specifies the FSA name. The FSA name on the CNTL statement must match the label on the subsequent PRINTDEV and ENDCNTL statements. The name must match the FSA name specified in a parameter of the JES initialization statement for this FSA:
>
> - The name of the JES2 PRT(_nnnn_) statement
> - The JNAME parameter of the JES3 DEVICE statement

This statement is optional. Specify CNTL, PRINTDEV, and ENDCNTL statements only if you want to specify PRINTDEV parameters.

_fsa_name_ **PRINTDEV** _parameters_
Specifies default printing parameters, turns tracing on or off, and requests a conditional dump.

> _fsa_name_   Specifies the FSA name.
>
> _parameters_   See "PRINTDEV Parameters" for a description of the PRINTDEV parameters.

This statement is optional.

_fsa_name_ **ENDCNTL**
Specifies the end of the program control statements for the FSA.

> _fsa_name_   Specifies the FSA name.

This statement is optional.

PRINTDEV Parameters

PRINTDEV parameters allow you to define default printing options for all data sets transmitted by an FSA. You can also set internal PSF tracing on or off and request a conditional dump. The PRINTDEV parameters are:

CHARS=(_font_names_**)**
Specifies up to four font names that Download for OS/390 is to transmit to the remote system for each data set if the job submitter does not specify a CHARS or UCS value. Each font name must be from 1 to 4 characters, separated by commas. The font names are translated to upper case. This parameter is optional.

In a JES2 environment, if you specify this parameter, do not specify other default values during JES2 initialization in the UCS or NIUCS parameters; if

you specify other default values to JES2, Download for OS/390 transmits the JES2 default value.

| In a JES3 environment, if you specify this parameter, also specify the
| PDEFAULT CHARS parameter in the DEVICE statement for the FSA; if you
| don't specify the PDEFAULT parameter, Download for OS/390 transmits the
| JES3 default value.

Example:

```
CHARS=(60DB)
```

DATACK={BLOCK | UNBLOCK | BLKCHAR | BLKPOS}
Specifies the data-check exceptions the printer reports to PSF for AIX or InfoPrint Manager for AIX.

BLOCK	Specifies that the printer will not report data-check exceptions.
UNBLOCK	Specifies that the printer will report all data-check exceptions.
BLKCHAR	Specifies that the printer will not report invalid-character exceptions. (The printer will report only print-positioning exceptions.)
BLKPOS	Specifies that the printer will not report print-positioning exceptions. (The printer will report only invalid-character exceptions.)

This parameter is optional. If you omit it, Download for OS/390 does not transmit a default data-check option to the remote system.

Example:

```
DATACK=UNBLOCK
```

DUMP=([reason_code **| ABD0**nnnn**][,**msgid**,**count**])**
Specifies a conditional dump of the FSS address space when a reason code, restartable abend, or message occurs. See "Using the PSF Dump Facility" on page 75 and refer to *PSF for OS/390: Diagnosis* for more information about this parameter.

This is an optional parameter. If you omit it, no conditional dump occurs.

Example:

```
DUMP=(,APS994I,1)
```

FORMDEF=formdef_name
Specifies a default form definition. Omit the F1 prefix from the name of the form definition. The name of the form definition is translated to upper case.

This is an optional parameter. If you omit it, Download for OS/390 does not transmit the name of a default form definition to the remote system.

Example:

```
FORMDEF=A10110
```

PAGEDEF=pagedef_name
Specifies a page definition name that Download for OS/390 is to transmit to the remote system for each data set if the job submitter does not specify an FCB or PAGEDEF value. Omit the P1 prefix from the name of the page definition.

The name of the page definition is translated to upper case. This parameter is optional.

In a JES2 environment, if you specify this parameter, do not specify another default value during JES2 initialization in the FCB or NIFCB parameters; if you specify another default value to JES2, Download for OS/390 transmits the JES2 default value.

In a JES3 environment, if you specify this parameter, also specify the PDEFAULT FCB parameter in the DEVICE statement for the FSA; if you don't specify the PDEFAULT FCB parameter, Download for OS/390 transmits the JES3 default value.

Example:

```
PAGEDEF=V06483
```

TRACE={YES | NO}

Specifies whether Download for OS/390 is to record trace data starting at initialization. Download for OS/390 performs the trace specified in the PARM parameter. If you do not specify the PARM parameter on the EXEC statement, Download for OS/390 records internal trace data only. See Chapter 5, "Diagnosing Errors in Download for OS/390" on page 71 for more information on using traces.

This is an optional parameter. If you omit it, the default is YES.

Example:

```
TRACE=YES
```

Specifying Routing Information

Download for OS/390 uses installation-defined routing criteria to determine a remote system and server for each data set. You define routing criteria and the associated remote systems and servers in a routing-control data set accessible to Download for OS/390 on the MVS or OS/390 system.

Download for OS/390 transmits an output data set to only one server. To transmit an output data set to more than one system or server, the job submitter must specify multiple OUTPUT JCL statements, thereby creating multiple output data sets. On each OUTPUT statement, the job submitter must specify different routing criteria, corresponding to the different target servers.

Defining Routing Criteria

The routing criteria you specify correspond to the following JCL parameters, which the job submitter specifies on either the DD or OUTPUT statements:

- CLASS - output class
- DEST - destination
- FORMS - form name

You can specify these routing criteria individually or as a set. For example, suppose you want to route data sets to different Download for OS/390 servers on different systems. You might define class and destination values as shown in Table 5 on page 27.

Table 5. Sample Routing Criteria		
Criteria	**AIX System**	**Server**
CLASS=1 and DEST=PSF6000	AIX system 1	InfoPrint Manager for AIX server
CLASS=1 and DEST=ONDEMAND	AIX system 1	OnDemand server
CLASS=2 and DEST=PSF6000	AIX system 2	InfoPrint Manager for AIX server
CLASS=2 and DEST=ONDEMAND	AIX system 2	OnDemand server

The class and destination values shown are only examples. You might want to define simple routing criteria that match the JCL values already specified by the job submitters. For example, if data sets to be transmitted to a particular server are submitted with a unique output class, specify that output class as the routing criterion for that server.

Defining Socket Addresses

You identify each target Download for OS/390 server by the socket address at which the server waits for data. The socket address identifies both:

- The internet address (IP address) of the remote host
- The port number through which the target server communicates with TCP/IP

The administrator of the remote system assigns the socket address, using port numbers that are not reserved or used by other applications on the target system. The valid range of port numbers is: 5001 through 64000. However, avoid 5001, 8251, and 8253, which PSF for AIX and InfoPrint Manager for AIX use for other purposes.

Download for OS/390 running on the MVS or OS/390 system and the PSF for AIX, InfoPrint Manager for AIX, or OnDemand server must use the *same* port number when communicating with each other. The PSF for AIX, InfoPrint Manager for AIX, or OnDemand administrator specifies the port number of the server when starting the server. The commands to start the PSF for AIX, InfoPrint Manager for AIX, and OnDemand servers are described in *IBM Print Services Facility for AIX: Print Administration*, *IBM InfoPrint Manager for AIX: Administrator's Guide*, *EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers*, and *EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers*.

Allocating the Routing-Control Data Set

If you have defined more than one Download for OS/390 functional subsystem (FSS), you can create a different routing-control data set for each FSS. You identify the routing-control data set when you start each FSS.

The routing-control data set is a sequential file with:

- Record format (RECFM) of fixed block
- Logical record length (LRECL) of 80

The name of the DD statement identifying the data set must be ROUTFILE. See the description of the ROUTFILE DD statement on page 24.

Sample Routing-Control Data Set

| SYS1.SAMPLIB contains a basic routing-control data set in member APSWRCF.
| You can copy the APSWRCF sample to a sequential data set and modify it for your
| installation. Figure 8 shows this routing-control data set.

```
DEST=destid,                    /* Matching criterion - destination
CLASS=q,                        /* Matching criterion - class
IPADDR=nn.nn.nn.nn,             /* Target IP address
PORTNUM=nnnn;                   /* Target port number
```

Figure 8. Routing-Control Data Set in SYS1.SAMPLIB

Figure 9 shows a sample routing-control data set with two routing statements and
optional parameters. The values shown are for example only and are not
recommended values.

```
/******** Name of the TCP/IP Address Space ****************************
TCPNAME=TCPIP;
/******** Routing Criteria #1 ****************************************
CLASS=QR,                 /* All data sets with CLASS of Q or R
DEST=PSF6000,             /* and with destination PSF6000
IPADDR=dept01.mysystem    /* Transmit to remote system at this address
PORTNUM=5002,             /* Transmit to the server at this port number
RETRYNUM=3,               /* Retry 3 times if transmission fails
RETRYINTV=60;             /* Wait 60 seconds between retries
/******** Routing Criteria #2 ****************************************
CLASS=QR,                 /* All data sets with CLASS of Q or R
FORMS=BILLS,              /* and with form name BILLS
     RECEIPTS,            /* or form name RECEIPTS
IPADDR=9.99.201.35,       /* Transmit to the remote system at this address
PORTNUM=7302,             /* Transmit to the server at this port number
RETRYNUM=3,               /* Retry 3 times if transmission fails
RETRYINTV=60;             /* Wait 60 seconds between retries
```

| *Figure 9. Sample Routing-Control Data Set*

Routing Control Statements

You code two types of control statements in the routing-control data set:

- One TCP/IP statement. The TCP/IP statement identifies the name of the
  TCP/IP address space in the MVS or OS/390 system.

- Multiple routing statements. Each routing statement associates a set of routing
  criteria with the socket address of a remote target system and server.

  Usually, you would define one routing statement for each server; however, if
  you want to route data sets with varying combinations of criteria to the same
  server, you can code more than one statement per server.

The TCP/IP statement contains one parameter:

TCPNAME=_tcpip_name_**;**
  Specifies the 1 to 8 character job-name of the TCP/IP address space. Usually
  the job-name is TCPIP, but it may have been changed by your installation.

This statement is optional. If you omit it, the default is TCPIP.

Figure 10 summarizes the parameters of a routing statement.

```
[CLASS=classes]
[DEST=destination_names]
[FORMS=form_names]
 IPADDR=host_address
 PORTNUM=port_number
[RETRYINTV={retry_interval | 0}]
[RETRYNUM={number_of_retries | 0}]
[SEND_REC_LENGTH={YES | NO}]
```

Figure 10. Parameters of the Routing Statement

The parameters of the routing statement are:

CLASS=classes

Specifies up to 8 class values. Each class is 1 alphanumeric character. Do *not* separate the class values by commas. Download for OS/390 compares each value specified to the value on the CLASS parameter of the DD or OUTPUT JCL statement.

This parameter is optional; however, if you do not specify CLASS, you must specify either DEST or FORMS, or both. If you omit CLASS, Download for OS/390 ignores the output class specified on the DD or OUTPUT JCL statement.

Example:

CLASS=QR

DEST=destination _names

Specifies up to 8 destination names, separated by commas. Each destination name is 1 to 8 characters. Download for OS/390 compares each value specified to the value on the DEST parameter of the DD or OUTPUT JCL statement.

This parameter is optional; however, if you do not specify DEST, you must specify either CLASS or FORMS, or both. If you omit DEST, Download for OS/390 ignores the destination specified on the DD or OUTPUT JCL statement.

Example:

DEST=AIX1,AIX2

FORMS=form_names

Specifies up to 8 form names, separated by commas. Each form name is 1 to 8 alphanumeric characters. Download for OS/390 compares each value specified to the value on the FORMS parameter of the DD or OUTPUT JCL statement.

This parameter is optional; however, if you do not specify FORMS, you must specify either CLASS or DEST, or both. If you omit FORMS, Download for OS/390 ignores the form name specified on the DD or OUTPUT JCL statements.

Example:

FORMS=BILLS,RECEIPTS

IPADDR=_host_address_

Specifies the address of the remote system. Specify either a host name or a dotted-decimal address with the format: _nnn.nnn.nnn.nnn_. The host name has the following restrictions:

- The name can be a maximum of 72 characters long.

- Valid characters are A-Z, a-z, 0–9, and the following special characters: @ $ # ' ( ) * & + – ! %_ > < : " . ¬ \{ } ¢ ` ~

- These characters are not allowed: ,/=?;

This parameter is required.

Example:

IPADDR=denver.mysystem

IPADDR=20.97.8.201

PORTNUM=_port_number_

Specifies the port number of the target server. This port number must not be used by other applications in the target system and must match the port number specified on the command used to start the server. The valid range of port numbers is: 5001 through 64000. Avoid 5001, 8251, and 8253, which PSF for AIX and InfoPrint Manager for AIX use for other purposes.

This parameter is required.

Example:

PORTNUM=6001

RETRYINTV={_retry_interval_ **|** **0}**

Specifies the number of seconds between retries. Specify a number between 0 and 99 999.

This parameter is optional. If you omit it, the default is 0, meaning that Download for OS/390 retries the transmission immediately.

Notes:

1. IBM recommends that you do not specify a long retry interval, because Download for OS/390 does not process another data set until all retries have been attempted.

2. The retry interval can be 30 seconds longer than expected when you use IBM TCP/IP and the CONNECT command fails.

Example:

RETRYINTV=60

RETRYNUM={_number_of_retries_ **|** **0}**

Specifies the maximum number of times Download for OS/390 is to retry a failed transmission. Specify a number between 0 and 999. If, after the specified number of retries, the transmission is still unsuccessful, Download for OS/390 releases the data set to JES to be held by the MVS or OS/390 system.

This parameter is optional. If you omit it, the default is 0, meaning that Download for OS/390 does not retry a failed transmission.

Note: IBM recommends that you do not specify a large number of retries, because Download for OS/390 does not process another data set until all retries have been attempted.

Example:

```
RETRYNUM=3
```

SEND_REC_LENGTH={<u>YES</u> | NO}

Specifies whether or not each record is to be prefixed with a length field.

Specify YES if the target server is a PSF for AIX or InfoPrint Manager for AIX server. Specify NO *only* if MO:DCA-P documents are being transmitted to an OnDemand server, because MO:DCA-P records already contain a record length. The AFP Conversion and Indexing Facility (ACIF), for example, creates MO:DCA-P documents. Specifying NO may improve performance for OnDemand applications.

This parameter is optional. If you omit it, the default is YES.

Example:

```
SEND_REC_LENGTH=NO
```

Note: If you specify more than one of the three routing criteria (that is, CLASS, DEST, or FORM) on one routing statement, data sets must match *all* of the specified criteria to be routed to the associated server.

Syntax Rules

Follow these rules when coding routing-control statements:

- Code all parameters in uppercase. Also, code parameter values, except for the TCP/IP host name, in uppercase. The TCP/IP host name can contain uppercase and lowercase characters.

- Code each parameter on a separate line.

- End each parameter with a comma, unless the parameter is the last in the statement.

- End the last parameter of a routing statement with a semi-colon.

- Do not include blanks in a statement, except for leading and trailing blanks on a line. For example, do not include blanks before or after an equal sign, or before a comma or a semi-colon,

- Begin each comment with: /*

- Comments do not need to end with */

- Code a comment on a separate line or after the parameter.

Carefully review the values you specify. Download for OS/390 checks the parameter names for validity, but does not check the validity of the values specified.

Hierarchy of Statements

A data set to be routed might meet the routing criteria of several control statements in the routing-control data set. In this event, Download for OS/390 selects the routing-control statement to use according to the following hierarchy:

1. The first statement with matching DEST, CLASS, and FORMS values.

2. The first statement with matching DEST and CLASS, but with no FORMS parameter specified.

3. The first statement with matching DEST and FORMS, but with no CLASS parameter specified.

4. The first statement with matching CLASS and FORMS, but with no DEST parameter specified.

5. The first statement with matching DEST, but with no CLASS or FORMS parameter specified.

6. The first statement with matching CLASS, but with no DEST or FORMS parameter specified.

7. The first statement with matching FORMS, but with no DEST or CLASS parameter specified.

Figure 11 illustrates the hierarchy of control statements.

```
/**** Route data sets with destination PSF01 or PSF02 *************
DEST=PSF01,PSF02,      /* Data sets with destination PSF01 or PSF02
CLASS=Q,               /* and class Q
IPADDR=1.2.3.4,        /* Route to remote system with this IP address
PORTNUM=5555;          /* Route to server at this port number
/**** Route data sets with any destination ************************
CLASS=Q,               /* Data sets with class Q
IPADDR=5.6.7.8,        /* Route to remote system with this IP address
PORTNUM=7777;          /* Route to server at this port number
```

Figure 11. Sample Routing-Control Data Set. This example illustrates the hierarchy of control statements.

As seen in Figure 11, Download for OS/390 first uses routing statements with the most criteria:

- If the job submitter specifies destination PSF01 or PSF02 for a data set in class Q, Download for OS/390 transmits the data set to the IP address and port number in the first statement.

  A data set with destination PSF01 or PSF02 and class Q also satisfies the criteria in the second routing statement; however, Download for OS/390 uses the first routing statement because the first statement specifies more matching criteria.

- If the job submitter specifies a destination other than PSF01 or PSF02 or does *not* specify a destination for a data set in class Q, Download for OS/390 transmits the data set to the IP address and port number in the second statement.

Testing the Routing-Control Data Set

After you have created the routing-control data set, start one Download for OS/390 FSA to check the parameter names. The Download for OS/390 FSA checks the parameter names during initialization and sends error messages to the JES console. To check the IP addresses and port numbers, transmit at least one data set to each server.

Figure 12 on page 33 shows a sample routing-control data set and JCL for a job that uses the IEBGENER utility to create an output data set. The SYSUT2 DD statement in the example specifies output class R to transmit the output data set to

the system whose address is specified in the routing-control data set. This example assumes that class R is also defined as a JES work-selection criterion for the Download for OS/390 output writer.

```
/**** Routing-Control Data Set for Download ***********************
TCPNAME=TCPIP;
/**** Route Data Sets with Class R To Remote System *****************
CLASS=R,                /* All data sets with class R
IPADDR=9.99.12.30,      /* Transmit to remote system with this IP address
PORTNUM=5002,           /* Transmit to server at this port number
RETRYNUM=3,             /* Retry 3 times if transmission fails
RETRYINTV=600;          /* Wait 600 seconds between retries
/**** End of Routing-Control Data Set ****************************
//TEST     JOB ...
//STEP1    EXEC  PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
//SYSUT2   DD SYSOUT=R
//SYSUT1   DD *
This is a test of the routing-control data set.
```

Figure 12. Routing-Control Data Set and JCL to Transmit a Data Set to a Remote System

Modifying the Routing-Control Data Set

You can modify the contents of the routing-control data set while Download for OS/390 FSAs are running. However, to use the modified routing-control data set, you must stop the Download for OS/390 FSS and restart each FSA under its control. See Chapter 3, Operating Download for OS/390 for information about how to stop the Download for OS/390 FSS and restart the FSAs.

Writing an Installation Exit

This section contains programming-interface information.

Download for OS/390 provides a Print Parameters exit (APSUX15), which you can use to transmit additional job information to PSF for AIX or InfoPrint Manager for AIX servers. Download for OS/390 transmits the information provided by the exit in the **-opa** parameter, which corresponds to the PSF for AIX **o_Passthru** keyword and the InfoPrint Manager for AIX **printer-pass-through** attribute.

Download for OS/390 calls the Print Parameters (APSUX15) exit once for each data set processed. Upon return from the exit, Download for OS/390 appends the string containing additional job information to the **-opa** parameter.

If no additional job information is provided in an exit, Download for OS/390 transmits only the following fields in the **-opa** parameter: class, destination, forms, and segmentid (if the data set is segmented). The alternate PSF for AIX and InfoPrint Manager for AIX exit programs support these pass through fields.

To receive additional fields in the **-opa** parameter from Download for OS/390, the PSF for AIX or InfoPrint Manager for AIX administrator might need to write a user exit program. Refer to *IBM Print Services Facility for AIX: Print Administration* for information about the PSF for AIX **o_passthru** keyword and how to customize PSF

for AIX with user exit programs. Refer to *IBM InfoPrint Manager for AIX Reference* for information about the InfoPrint **printer-pass-through** attribute, and refer to *IBM InfoPrint Manager for AIX: Administrator's Guide* for information about how to customize InfoPrint Manager for AIX with user exit programs.

Control Blocks

The Print Parameters (APSUX15) exit has access to the PSF for OS/390 control blocks used by all PSF exit routines:

- APSGEXTP Area
- APSUECA - Exit-Communications Area
- APSUECE - Exit-Communications Area Extension
- APSUCOM - Exit Table

DSECTs for these PSF common control blocks are provided in assembler language. Refer to chapter "Using Installation Exits" in *PSF for OS/390: Customization* for an explanation of the fields in these control blocks.

APSUECA - Exit-Communications Area

Two fields in the APSUECE (Exit-Communications Area Extension) contain valid information only when the Download for OS/390 exit is called. The format of these fields is:

Offsets	Type	Length	Name	Description
204 (CC)	Address	4	ECEX15P	Address of exit APSUX15
216 (D8)	Character	12	ECEDSID	FSI GETDS data set ID

Job Separator Page Data Area

The Print Parameters (APSUX15) exit also has access to JES control blocks that contain job and data set information. For example, the JES job separator page data area (IAZJSPA) contains job-level information for a data set that generates JES separator pages.

You can use IAZJSPA to obtain job information to pass to PSF for AIX or InfoPrint Manager for AIX. Refer to *Using the Functional Subsystem Interface* for more information on the contents of the IAZJSPA. *PSF for OS/390: Customization* also contains information about the IAZJSPA.

Input to Print Parameters Exit

At entry to the Print Parameters (APSUX15) exit, the registers contain the following information:

Register 1   Pointer to the address of the APSGEXTP area

Register 13   Pointer to an 18-word save area in field ECAUSAVE for saving the caller's registers

Register 14   Return address

Register 15   Entry-point address

The following fields in APSGEXTP are valid when the Print Parameters (APSUX15) exit is called:

XTPECAP   Address of the exit-communications area (APSUECA)

XTPJSPAP   Address of the job separator page data area for the data set being processed (IAZJSPA)

The following fields in APSUECA are valid when the Print Parameters (APSUX15) exit is called:

ECAUCOMP   Address of the exit table, APSUCOM

ECAECEP   Address of the exit-communications area extension (APSUECE)

ECAUSAVE   The save area for the exit

The following fields in APSUECE are valid when the Download for OS/390 exit is called:

ECEPDEVK   Address of the scheduler work block (SWB) token for the PRINTDEV statement

ECEOUTTK   Address of the scheduler work block (SWB) token for the print data set's OUTPUT JCL statement

ECEJDVTN   Print data set JDVT name

ECETUPTR   Address of the SWBTU for the data set's OUTPUT JCL statement

ECETULEN   Length of the SWBTU

ECEX15P   Address of the Print Parameters (APSUX15) exit routine

ECEDSID   Data set ID assigned by JES. JES provides this ID to Download for OS/390 in the functional subsystem interface (FSI) GETDS parameter list, in field GDSDSID. Refer to *Using the Functional Subsystem Interface* for more information on the GETDS parameter list.

Output from Print Parameters Exit

At return from the Print Parameters (APSUX15) exit, restore the contents of all registers. Do not set a return code in register 15.

Set the following fields in the exit-communications area (ECAUECA):

ECARECAD   Pointer to an EBCDIC string of additional PSF for AIX or InfoPrint Manager for AIX passthru fields in ECAWKBUF.

ECARECLN   Length of the string of additional PSF for AIX or InfoPrint Manager for AIX fields, or zero if no additional fields are to be transmitted.

ECAWKBUF   An EBCDIC string of additional PSF for AIX or InfoPrint Manager for AIX passthru fields

The string of passthru fields might look like the following:

```
devname=prt6000,outgrp_name=2
```

In this example, the final format of the **-opa** parameter might look like:

```
-opa=forms=STD,class=Q,destination=PRT6,devname=PRT6000,outgrp_name=2
```

Note: If you include blanks or nulls (X'00') in the EBCDIC string, Download for OS/390 removes them because blanks and nulls cause PSF for AIX and InfoPrint Manager for AIX to terminate the passthru parameter string. You

can replace blanks and nulls with X'1C'; PSF for AIX and InfoPrint Manager for AIX do not generate a print character for a X'1C'.

Programming Considerations

Consider the following points when coding the Print Parameters (APSUX15) exit:

- You should be an experienced programmer who is aware of overall system implications.

- Do not issue an explicit or implied WAIT in the exit routine, because it puts the Download for OS/390 FSA into a WAIT state.

- Download for OS/390 runs above the 16-megabyte line. The exit can run in either 24-bit or 31-bit addressing mode. However, 31-bit addressing is recommended, to allow more Download for OS/390 FSAs to run in an address space. If the exit is AMODE 24, Download for OS/390 and JES allocate their control blocks, which are passed to the exit, below the 16-megabyte line.

- Use only the control blocks passed to this exit.

- Code references to fields in control blocks using the names associated with each field in the DSECT control block. Do not use absolute displacements, because these displacements can change from one release of PSF for OS/390 to another.

- Code the exit routine to be reentrant.

- The exit routine runs in supervisor state with a protection key of 1. Thus, you can use all system services available in supervisor state.

- Use register 12 as a base register and place the module name (in printable EBCDIC) in the object code, starting at the sixth byte. If you do this, the module name appears in the SDUMP title page if an abend occurs. (ESTAE is in effect during execution of the exit.)

- If the APSUECA work buffer (ECAWKBUF) is too small to contain the EBCDIC string of additional passthru fields, you can expand the buffer as described under Exit Table (APSUCOM) in *PSF for OS/390: Customization*.

Note: PSF program maintenance may require the reassembly of the exit.

Sample Exit

Download for OS/390 provides a sample exit, APSUX15X, written in assembler language, in SYS1.SAMPLIB. You can either view the sample online or print it. You can then modify, assemble, and install the exit routine to provide your own version of the exit. Object code for this sample exit is not provided.

The sample exit returns two pieces of job information to Download for OS/390 for transmission in the **-opa** parameter:

- Download for OS/390 FSA name
- JES output group name

Installing the Exit Routine

To install the Print Parameters (APSUX15) exit, compile and link-edit the exit, as follows:

- Specify APSUX15 as the name.
- Specify the RENT and LET link-edit attributes.
- Link-edit the exit into an authorized library.

Place the APSUX15 exit routine in either:

- A STEPLIB data set identified in the Download for OS/390 startup procedure, if you want to run different versions of the exit routine with each Download for OS/390 FSS.

- A LINKLIST data set, if you want to run the same exit routine with all Download for OS/390 FSSs.

Using Accounting Information

Download for OS/390 writes a System Management Facility (SMF) type 6 record for each data set it processes. Download for OS/390 writes a record even if an error prevents transmission of any data; for example, Download for OS/390 writes a record even if a routing entry cannot be found. If Download for OS/390 releases the data set to the system and then processes the same data set again, Download for OS/390 writes another SMF record for the data set.

The layout of the record is the same as the SMF type 6 record for Print Services Facility (PSF), with an additional file-transfer section that contains the number of bytes transmitted. Note, however, that Download for OS/390 does not provide any information about the number of pages transmitted to or printed on the remote system.

Download for OS/390 writes the following sections:

- Base section, except for the SMF6PGE field
- Common section, except for the SMF6OTOK field
- Enhanced SYSOUT Support (ESS) section
- File-transfer section

Refer to *PSF for OS/390: Customization*, *MVS System Management Facilities*, or *OS/390 MVS System Management Facilities (SMF)* for the format of the SMF type 6 record for PSF.

Note: Download for OS/390 does *not* support a user exit to allow modification of the SMF record.

Field SMF6PAD1 indicates whether the file-transfer section is present, as shown in Table 6.

Table 6. SMF Type 6 Record—Section Indicator Field				
Offsets	**Name**	**Length**	**Format**	**Description**
61 3D	SMFPAD1	1	binary	**Bit** **Meaning** **4** File-transfer section present.

The file-transfer section for Download for OS/390 has the format shown in Table 7 on page 38.

Table 7. SMF Type 6 File-Transfer Section

Offsets	Name	Length	Format	Description
0 0	SMF6LN6	2	binary	Length of file-transfer section, including this field.
2 2	SMF6BYTE	4	binary	This field contains the total number of bytes that Download for OS/390 transmitted or attempted to transmit. If Download for OS/390 retried a transmission attempt, this field contains the total number of bytes in all retries. If Download for OS/390 detected an error and did not attempt to transmit any data, this field contains 0.
6 6	SMF6IP1	1	binary	First segment of IP address of target system
7 7	SMF6IP2	1	binary	Second segment of IP address of target system
8 8	SMF6IP3	1	binary	Third segment of IP address of target system
9 9	SMF6IP4	1	binary	Fourth segment of IP address of target system
10 A		12		Reserved

Updating the Program Properties Table

As part of MVS or OS/390 system configuration, you must define the program properties of Download for OS/390. To do so, update the system Program Properties Table (PPT) by adding the entry shown in Figure 13 on page 39 to the SCHEDxx member of SYS1.PARMLIB and activating it. To activate the SCHEDxx member, either use the MVS SET SCH command or re-IPL your system.

```
/**********************************************************************/
/*    Program Properties Table addition for Download                 */
/*                                                                    */
/*    The following defaults are taken for this entry:               */
/*         NOPRIV              Not a privileged job                  */
/*         CANCEL              Cancellable                           */
/*         PASS                Requires password protection          */
/*         AFF(NONE)           No affinity to a particular processor */
/**********************************************************************/
/*                                                                    */
    PPT     PGMNAME(APSKAFPD) /* Add program name APSKAFPD to the PPT */
            KEY(1)            /* Protection key 1                     */
            NODSI             /* Does not require data set integrity  */
            NOPREF            /* No preferred storage required        */
            NOSWAP            /* Non-swappable                        */
            SYST              /* System task                          */
```

Figure 13. SCHEDxx Entry to Update the Program Properties Table

The values shown for the PPT entry are the recommended values. Modification of these values may result in JES abending; or, other unexpected results may occur. Refer to *MVS/ESA: Initialization and Tuning Reference* or the *OS/390 MVS Initialization and Tuning Reference* for more information about how to update the Program Properties Table.

Chapter 3. Operating Download for OS/390

This chapter describes how to operate the Download for OS/390 functional subsystem (FSS) and the function subsystem applications (FSAs) that are under its control, including how to:

- Start the Download for OS/390 FSS and associated FSAs
- Cancel the current activity on a Download for OS/390 FSA
- Stop the Download for OS/390 FSS and associated FSAs
- Monitor the status of data transmission

You operate a Download for OS/390 FSS and FSA just as you operate a PSF for OS/390 FSS and FSA, or any other JES output writer. For more information about the JES2 and JES3 commands described in this chapter and additional JES commands that you can use to manage an output writer, refer to *JES2 Commands* or *JES3 Commands* for your system. For more information about the MVS commands described in this chapter, refer to *MVS System Commands* or *OS/390 MVS System Commands*.

Although this chapter shows only MVS and JES commands, you can also use System Display and Search Facility (SDSF) commands or the commands of a comparable product to start and stop FSAs and to display and cancel data sets. Refer to *System Display and Search Facility Guide and Reference* for more information about SDSF commands.

Starting the Download for OS/390 Functional Subsystem

Before you start a Download for OS/390 functional subsystem (FSS) and the functional subsystem applications (FSAs) under its control, your installation must:

- Define a Download for OS/390 FSS
- Define one or more Download for OS/390 FSAs under control of the FSS
- Create a cataloged start procedure for each FSS

These tasks are described in Chapter 2, Configuring Download for OS/390.

After these tasks are accomplished, you can enter commands at the operator console to start each Download for OS/390 FSA. You do not need to enter a special command to start the FSS, because JES starts the FSS automatically when you start the first FSA under control of that FSS.

In JES2, if the FSA was defined with the START=YES parameter on the JES2 PRT(*nnnn*) statement, JES2 automatically starts the FSA when you bring up the MVS or OS/390 system. JES3 does not support the automatic start option.

Starting a Download for OS/390 FSA requires some coordination with TCP/IP and the servers on the AIX system. Following are the steps for starting an Download for OS/390 FSA:

1. Verify that TCP/IP is started on the MVS or OS/390 system. You can start TCP/IP by entering the following MVS command:

   S *tcpip_name*

   Replace *tcpip* with the job-name of the TCP/IP address space. The job-name of the address space is TCPIP, unless changed by your installation.

2. Ensure that the communications controller between the MVS or OS/390 system and the AIX system is varied online.

3. Verify that the receiving Download for OS/390 servers on the remote system are started. The commands to start the PSF for AIX, InfoPrint Manager for AIX, and OnDemand servers are described in *IBM Print Services Facility for AIX: Print Administration*, *IBM InfoPrint Manager for AIX: Administrator's Guide*, *EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers*, and *EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers*.

   You can start the server *after* you start the FSA; however, you should start the server before the FSA attempts to transmit any data to that server; otherwise, a TCP/IP error occurs.

   Note: The command used to start a server designates the port number at which the server receives data from Download for OS/390. The port number on the start command must match the port number defined for that server in the routing-control data set. If the port numbers do not match, a TCP/IP error might occur when Download for OS/390 tries to initiate a connection to the server.

4. Start the Download for OS/390 FSA and the FSS by entering the following JES2 or JES3 start command:

   JES2:

   `$S fsa_name [,fsa_name ... ]`

   JES3:

   `*CALL WTR,OUT=fsa_name`

   Replace *fsa_name* with:

   - In JES2, the name of the PRT(*nnnn*) statement, for example, PRT0001
   - In JES3, the JNAME parameter of the DEVICE statement

Cancelling a Data Set Transmission

Use the JES cancel command to stop the transmission of a data set to the remote system. The data set currently being transmitted is removed from the JES spool. If Download for OS/390 is not performing checkpointing, the file is also removed from the file system of the remote system; if Download for OS/390 is checkpointing, the partial file is saved on file system of the remote system.

Enter the following JES2 or JES3 command:

JES2:

`$C fsa_name [,fsa_name ... ]`

JES3:

`*CANCEL fsa_name`

Stopping a Download for OS/390 Functional Subsystem

You need to stop Download for OS/390 FSAs and the FSS that controls them when one of the following situations occurs:

- The system programmer modifies the routing-control data set used by the FSA. If you want an FSA to use the modified data set, you need to stop all FSAs under control of the FSS and also stop the FSS before restarting.

- An error requires that you restart the FSS. You must stop the FSAs and also stop the FSS before restarting.

Before stopping the Download for OS/390 FSS, you need to stop each FSA under its control. You can stop an FSA after it finishes transmitting the current data set to the remote system, or you can stop it immediately.

Stopping an FSA After Current Data Set is Transmitted

Use the following JES2 or JES3 commands to stop the FSA *after* transmission of the current data set is complete:

JES2:

```
$P fsa_name [,fsa_name ... ]
```

JES3:

```
*VARY,fsa_name [,fsa_name ... ],OFFLINE
*CANCEL,fsa_name
```

The *VARY command makes the FSA unavailable for transmitting data sets but allows the current data set to finish. The *CANCEL command stops the FSA.

Stopping an FSA Immediately

Use the following JES2 or JES3 commands to stop a Download for OS/390 FSA immediately:

JES2:

```
$C fsa_name [,fsa_name ... ]
$P fsa_name [,fsa_name ... ]
```

The $C command cancels the current data set. The $P command stops the FSA after the current data set is canceled. If the current data set cannot be canceled, the FSA does not stop. You can use the MVS Cancel command to stop the FSA in this case.

JES3:

```
*CANCEL,fsa_name,T
```

The *CANCEL command cancels the current data set; the T option stops the FSA after the current data set is canceled. If the current data set cannot be canceled, the FSA does not stop. You can use the MVS Cancel command to stop the FSA in this case.

Stopping the FSS

Before stopping an FSS, you should stop all FSAs under its control, as described in the previous sections.

In a JES2 environment, if the FSS was configured with the AUTOSTOP=YES option on the JES2 FSS(*fss_name*) statement, JES2 stops the FSS automatically after you have stopped all FSAs. If AUTOSTOP=YES was not specified, you must stop the FSS with an MVS operator command.

In a JES3 environment, JES automatically stops the FSS after you stop all FSAs under its control; therefore, you should not need to stop the FSS using an MVS operator command.

If JES has not automatically stopped the FSS, use the following MVS operator command to stop the FSS after you have stopped all FSAs under its control.

`C fss_name`

Replace the *fss_name* with:

- In JES2, the name on the FSS(*fss_name*) statement
- In JES3, the name in the FSSNAME parameter of the FSSDEF statement

Monitoring Data-Set Transmission

Download for OS/390 issues messages to the console when errors occur during transmission.

Download for OS/390 also issues a message to the SYSLOG data set when a data set has been transmitted to an AIX system, if the user requested notification on the NOTIFY keyword of the OUTPUT JCL statement.

Displaying Current Activity

In a JES2 environment, you can use the SDSF printer display command to display the total and running record count of the data set currently being transmitted by an Download for OS/390 FSA. Note that SDSF displays the status of the Download for OS/390 FSA only if the Download for OS/390 feature is performing checkpointing. See "Requesting Checkpointing" on page 10 for more information on checkpointing.

Locating Transmitted Files on Remote File Systems

To locate a data set that has been successfully saved on the target system, the user can examine the files on the remote file system designated to receive data sets from Download for OS/390. Note, however, that the server receiving data from Download for OS/390 may have deleted the data set from the file system after processing it.

The filename of each data set successfully saved on a remote file system has the following format:

`MVS_system.jobname[.step_name].form_name.yyyyddd.hhmmsst.ARD|PRD`

where:

system
> Specifies the identifier of the MVS or OS/390 system.

jobname
> Specifies the name of the job on the MVS or OS/390 system.

| *step_name*
| > Specifies the step name of the job on the MVS or OS/390 system. If a step
| > name does not exist, this field does not appear in the data set name.

| *form_name*
| > Specifies the form name specified on the DD or OUTPUT JCL statement, or the
| > form name defined as the JES system default.

| *yyyyddd.hhmmsst*
| > Specifies the year, day, and time of transmission.

ARD | PRD
> Is a suffix identifying the type of server. ARD identifies an OnDemand server;
> PRD identifies a PSF for AIX or InfoPrint Manager for AIX server.

Chapter 4. Using Download for OS/390 for Printing or Archiving

This chapter describes how a job submitter uses Job Control Language (JCL) to transmit a data set to Download for OS/390 servers provided with PSF for AIX, InfoPrint Manager for AIX, and OnDemand. If you are printing with PSF for AIX or InfoPrint Manager for AIX, you should be familiar with concepts of advanced function printing (AFP), such as form definitions, page definitions, and fonts. Refer to *PSF for OS/390: User's Guide* for an introduction to advanced function printing and the JCL used to print with PSF for OS/390.

Understanding Data-Stream Support

Download for OS/390 transmits all types of data streams, performing no modification of the data except to optionally add a record length field if required by the receiving server. You can use Download for OS/390 to transmit any type of data stream that you can print or archive, including:

- MO:DCA-P data
- S/390 line data
- S/390 mixed-mode data
- PostScript data
- TIFF data

Note: To transmit PostScript data, TIFF data, and MO:DCA-P data with inline resources, the administrator must change the IBM-supplied shell script for PSF for AIX or InfoPrint Manager for AIX. See "Identifying the Data Type for Printing with PSF for AIX or InfoPrint Manager for AIX" on page 53 for more information.

Using Job Control Language

In most cases, you can use the same JCL parameters as you do currently, with little or no modification. This section describes considerations in the following areas that might require JCL modification:

- Directing output to a remote system and server
- Directing output to more than one remote system or server
- Specifying a checkpointing interval
- Specifying archiving options to OnDemand
- Specifying printing options to PSF for AIX or InfoPrint Manager for AIX
- Using AFP resources for printing with PSF for AIX or InfoPrint Manager for AIX
- Determining defaults for printing with PSF for AIX or InfoPrint Manager for AIX

Directing Output to a Remote System and Server

To transmit your output to a remote system, you must direct the output to the Download for OS/390 output writer. To do this, you specify the JES work-selection criteria defined by your installation for the Download for OS/390 output writer on either the DD or OUTPUT JCL statements for the data set. For example, you might need to specify a particular output class to direct output to the Download for OS/390 output writer in your installation. Consult your system programmer for the appropriate values to specify.

To direct an output data set to a particular remote system and to a particular PSF for AIX, InfoPrint for AIX, or OnDemand server on that system, you specify the appropriate routing criteria as defined by your installation in the routing-control data set. The routing criteria can include one or more of the following JCL parameters:

- Output class
- Destination name
- Form name

You specify these routing criteria on either the DD or OUTPUT JCL statements for the data set. Consult your system programmer to determine the values to specify.

Each combination of class, destination, and form name you specify can direct the data set to a different remote system and to a different server on that system. See "Directing Output to a Remote System and Server" on page 67 for an example of how to use class, form, or destination to direct output to a remote system.

Directing Output to More Than One AIX System or Server

To transmit an output data set to more than one AIX system or to more than one server on the same system, you can create multiple output data sets. You do this using multiple OUTPUT JCL statements. On each OUTPUT statement, specify the class, form, or destination name that corresponds to the remote system and the PSF for AIX, InfoPrint Manager for AIX, or OnDemand server to which you want that data set transmitted.

See "Directing Output to Multiple Systems or Servers" on page 68 for an example of how to transmit a data set to more than one system or server at the same time.

Specifying a Checkpointing Interval

You can request that Download for OS/390 perform checkpointing of the data set while the data set is transmitted to the remote system. If checkpointing is requested, Download for OS/390 can restart transmission from the checkpoint if an error occurs.

Because Download for OS/390 does not format data into pages, you must specify a checkpointing interval in seconds, not in pages. Specify the CKPTSEC parameter instead of the CKPTPAGE parameter on the OUTPUT JCL statement. Your installation might have defined a default checkpointing interval to be used when you do not request checkpointing.

Specifying Options to OnDemand

Download for OS/390 transmits values you specify in JCL parameters to the OnDemand servers. Download for OS/390 transmits the same parameters to the PSF for AIX, InfoPrint Manager for AIX, and OnDemand servers, even though most of the parameters are printing options. This allows you to pass a parameter required by OnDemand, such as an application group name, with each transmitted data set. For example, your installation might use the FORMS parameter to transmit a parameter to OnDemand. Consult your OnDemand system administrator for more information.

Specifying Printing Parameters to PSF for AIX or InfoPrint Manager for AIX

Along with the output data set, Download for OS/390 transmits (1) values you specify in JCL parameters, (2) information provided by JES about the print job, and (3) other file infomation to the server on the remote system.

The system programmer can specify additional information for Download for OS/390 to transmit to the server. See "Writing an Installation Exit" on page 33 for more information.

Printing Parameters and Corresponding AIX Parameters

The printing parameters transmitted to the server can be used by one or more of the print commands in an AIX system. The AIX system administrator, in the AIX shell script used by the server, determines which command is to print the data set: **psfin**, **enq**, **lp**, or **qprt**. The sample shell script provided by IBM with InfoPrint Manager for AIX invokes the **pdpr** command to print the data; the sample shell script provided by IBM with PSF for AIX invokes the **psfin** job script to print the data.

JCL Parameters and Corresponding AIX Parameters: Table 8 lists JCL parameters that Download for OS/390 processes, the corresponding print options that Download for OS/390 passes to the remote system and corresponding AIX printing parameters. Download for OS/390 does not transmit all JCL parameters; it transmits only those parameters that are supported by PSF for AIX or InfoPrint for AIX. See "Printing Parameters Not Transmitted" on page 50 for a list of some JCL parameters that Download for OS/390 does not pass to the remote server.

Table 8 (Page 1 of 2). JCL Parameters and Corresponding AIX Printing Parameters

JCL Parameter	Option Passed to Shell Script	pdpr Attribute	psfin Keyword	enq, lp, qprt Flag
ADDRESS	-oaddress1 -oaddress2 -oaddress3 -oaddress4	address1-text address2-text address3-text address4-text	N/A	-oaddress1 -oaddress2 -oaddress3 -oaddress4
BUILDING	-obu	building-text	N/A	-obuilding
CHARS	-ochars	chars	a_Chars	-ochars
CKPTSEC	Not transmitted to the AIX system.			
CLASS	-opa class	printer-pass-through -oclass	o_Passthru class	-opassthru class
COPIES	-ocop	copy-count	o_Copies	-ocopies
DATACK	-odatac	data-fidelity- problem-reported	o_DataCk	-odatack
DCB=RECFM	-occ -occtype	carriage-control-type	a_Cc a_Cctype	-occ -occtype
DCB=OPTCD=J	-otrc	table-reference- character	a_Trc	-otrc
DEPT	-ode	department-text	N/A	-odepartment
DEST	-opa destination	printer-pass-through -odestination	o_Passthru dest	-opassthru dest

JCL Parameter	Option Passed to Shell Script	pdpr Attribute	psfin Keyword	enq, lp, qprt Flag
DEST=IP	-oipdest	N/A	N/A	N/A
DUPLEX	-odu	sides and plex	N/A	N/A
FCB	-opagedef	page-definition	a_Pagedef	-opagedef
FORMDEF	-of	form-definition	a_Formdef	-oformdef
FORMS	x-opa forms	printer-pass-through -oforms	o_Passthru forms	-opassthru forms
INTRAY	-oin	printer-pass-through -obin	N/A	N/A
NAME	-ona	name-text	N/A	-oname
NOTIFY	Not transmitted to the remote system.			
OFFSETXB	-ooffxb	x-image-shift-back	N/A	N/A
OFFSETXF	-ooffxf	x-image-shift-front	N/A	N/A
OFFSETYB	-ooffyb	y-image-shift-back	N/A	N/A
OFFSETYF	-ooffyf	y-image-shift-front	N/A	N/A
OUTBIN	-ooutbin	output-bin	o_Outbin	-ooutbin
PAGEDEF	x-opagedef	page-definition	a_Pagedef	-opagedef
PRMODE	-oprmode	shift-out-shift-in	a_Prmode	-oprmode
PRTQUEUE	-oprtqueue	N/A	N/A	N/A
RESFMT	-ore	font-resolution	N/A	N/A
ROOM	-oroom	room-text	N/A	-oroom
SEGMENT	-opa segmentid	printer-pass-through -osegmentid	o_Passthru segmentid	-opassthru segmentid
Note: The SEGMENT value is not transmitted to the remote system. However, a segment identifier is transmitted.				
SYSOUT	-opa class -opa forms	printer-pass-through -oclass printer-pass-through -oforms	o_Passthru class o_Passthru forms	-opassthru class -opassthru forms
TITLE	-oti	title-text	N/A	-otitle
TRC	-otrc	table-reference-characters	a_Trc	-otrc
UCS	-ochars	chars	a_Chars	-ochars
Note: N/A indicates that the command does not have a corresponding attribute, keyword, or flag.				

Table 8 (Page 2 of 2). JCL Parameters and Corresponding AIX Printing Parameters

Printing Parameters Not Transmitted: Download for OS/390 ignores DD and OUTPUT statement parameters other than those described in Table 8 on page 49. Following is a list of some JCL parameters that Download for OS/390 ignores:

- ACCT, which allows you to specify accounting information.

  Download for OS/390 does not have access to the value specified in this EXEC statement parameter.

- BURST, which allows you to request bursting on a continuous-form printer.

Print commands on an AIX system do not have a comparable option.

- COMSETUP, which allows you to specify a microfilm setup resource.

  Download for OS/390 does not support transmitting microfilm data sets.

- COPIES Group Values, which allows you to print multiple copies of selected pages.

  Print commands on an AIX system do not have a comparable option. Instead, specify copy group values in a form definition.

- FLASH, which allows you to request a specific forms flash on a 3800 printer.

  PSF for AIX and InfoPrint Manager for AIX do not support the 3800 printer.

- OVERLAYB and OVERLAYF, which allow you to specify an overlay for the back and front side of all pages.

  Print commands on an AIX system do not have a comparable option. Instead, specify the overlay in a form definition.

- PIMSG, which allows you to request suppression of error messages and also allows you to request termination of processing after a certain number of error messages.

  On the AIX system, all error messages print by default.

- USERLIB, which allows you to use resources located in a PSF for OS/390 user library.

  Either include these resource inline, or request that the AIX system administrator make these resources available for printing on the AIX system.

Job Information and Corresponding AIX Parameters: Download for OS/390 also transmits job information to the remote system. Table 9 lists the job information, the corresponding print options that Download for OS/390 passes to the AIX shell script, and the corresponding AIX printing parameters.

Table 9. Job Information and Corresponding AIX Printing Parameters

Job Information	Option Passed to Shell Script	pdpr Attribute	psfin Keyword	enq, lp, qprt Flag
Job ID	-opa jobid	printer-pass-through -ojobid	o-Passthru jobid	-opassthru jobid
Job Name	-ojobn	job-name	o-JobName	-ojobname
Node ID	-ono	node-id-text	N/A	-onodeid
Programmer Name	-opr	programmer-text	N/A	-oprogrammer
User ID	-ous	user-id-text	N/A	-ouserid
Note: N/A indicates that the command does not have a corresponding attribute, keyword, or flag.				

Data Format and Type Information and Corresponding AIX Parameters:
Table 10 on page 52 lists the data format and data type that Download for OS/390 transmits to the server and the corresponding AIX parameters. Download for OS/390 transmits the same data format and data type values for each data set to the server, regardless of the type of data in the data set. When you transmit data such as PostScript, TIFF, or MO:DCA-P data with inline resources, your administrator needs to change the IBM-supplied shell script on the server. See

| Table 10. File Information and Corresponding AIX Printing Parameters

File Information	Option Passed to Shell Script	pdpr Attribute	psfin Keyword	enq, lp, qprt Flag
File Format	-ofileformat	new-line-option	a-FileFormat	-ofileformat
Data Type	-odatat=line	document-format	JsFileType	-odatatype

Using AFP Resources for Printing with PSF for AIX or InfoPrint Manager for AIX

You can either use default AFP resources or name specific resources in JCL parameters, as you can when printing on an MVS or OS/390 system. If you use resources other than the default resources, consider the following differences:

- The required AFP resources, such as page definitions, form definitions, and
| fonts, must be accessible to the AIX system, or the resources can be
| transmitted with a MO:DCA-P data set. The AIX system administrator can make
| AFP resources on the MVS or OS/390 system accessible to the AIX system
| with the Network File System (NFS) mount command; see your AIX
| administrator for more information. To transmit MO:DCA-P data with inline
| resources, see "Identifying the Data Type for Printing with PSF for AIX or
| InfoPrint Manager for AIX" on page 53 for more information.

- If you specify a form definition or page definition name of DUMMY in the FORMDEF or PAGEDEF parameter, the output data set must contain an inline form definition or page definition. If you specify DUMMY when no inline form definition or page definition exists, PSF for AIX or InfoPrint Manager for AIX tries to find a form or page definition named DUMMY in the AIX resource directories.

  When you print with PSF for OS/390 and specify a name of DUMMY, PSF for OS/390 uses the default form or page definition if no form definition or page definition is sent inline.

- If you specify a font in the UCS or CHARS parameter, and the page definition used to format the data set also specifies a font, PSF for AIX or InfoPrint Manager for AIX uses the font in the page definition, whether or not that page definition is the system default page definition.

  When you print with PSF for OS/390, PSF for OS/390 uses the font you specify in the UCS or CHARS parameter if the page definition used to format the data set is the system default page definition.

- The filenames of page definitions, form definitions, and fonts are case-sensitive on the AIX system. Because values specified in JCL parameters are in upper-case characters, ensure that the filenames on the AIX system are also in upper case.

| PSF for AIX and InfoPrint Manager for AIX *cannot* print data sets that contain
| S/370 line data or S/370 mixed-mode data along with inline resources; the inline
| resources will be lost and not used to print the data set. Therefore, before
| transmitting such data sets to PSF for AIX, consider using either one of the
| following two procedures:

1. Use the ACIF program on the MVS or OS/390 host, and modify the shell script for PSF for AIX or InfoPrint Manager for AIX:

   a. On the MVS or OS/390 system, use the AFP Conversion and Indexing Facility (ACIF) to convert the data stream to MO:DCA-P data streams. Specify the RESTYPE=ALL parameter and a RESOBJDD card in the JCL to create an AFP-only print file and an inline resource file. Concatenate the inline resource file to the beginning of the print file. For more information about ACIF, refer to *AFP Conversion and Indexing Facility: User's Guide*. Use Download for OS/390 to transmit the output from the ACIF program to the server on the AIX system.

   b. In the shell script supplied with PSF for AIX, code the **JsFileType=afpds** keyword and invoke the **psfin** command. Or, in the shell script supplied with InfoPrint Manager for AIX, code the **document-format=afpds** attribute and invoke the **pdpr** command.

2. Modify the shell script supplied with PSF for AIX or InfoPrint Manager for AIX:

   a. Use the **line2afp** program to break the line or mixed mode file into a resource file and an AFP-only file.

   b. Concatenate the resource file to the beginning of the print file.

   c. In the shell script supplied with PSF for AIX, code the **JsFileType=afpds** keyword and invoke the **psfin** command. Or, in the shell script supplied with InfoPrint Manager for AIX, code the **document-format=afpds** attribute and invoke the **pdpr** command.

If you use default AFP resources, see "Determining Defaults for Printing with PSF for AIX or InfoPrint Manager for AIX" on page 54.

Identifying the Data Type for Printing with PSF for AIX or InfoPrint Manager for AIX

Download for OS/390 always passes a data type of line to the shell script in the **-odatat=line** parameter, regardless of the actual data type. The IBM-supplied shell script sets this value in the **JsFileType** parameter of the **psfin** command or in the **data-format** attribute of the **pdpr** command. This data type is correct for MO:DCA-P data without inline resources, S/370 line data, and mixed mode data sets.

When transmitting the following types of data, however, the administrator must modify the shell script to specify the correct data type on the **psfin** or **pdpr** command:

- MO:DCA-P data with inline resources
- Special data types such as PostScript and TIFF data

Consider using the following procedure in your installation to set the correct data type in the shell script:

1. Select a JCL parameter that Download for OS/390 transmits to the server but which is not used by job submitters for any other purpose; for example, you might select the ADDRESS4 JCL parameter. The job submitter specifies the data type in this parameter; for AFPDS data, the job submitter would specify **afpds**.

2. Change the IBM-supplied shell script to set the value of the JsFileType keyword or the data format attribute to the value in the selected JCL parameter, for example, ADDRESS4.

Determining Defaults for Printing with PSF for AIX or InfoPrint Manager for AIX

When you use Download for OS/390 to print on an AIX system, defaults for AFP resources and printing options might be different than the defaults defined for printing with PSF for OS/390. The MVS or OS/390 system programmer, as well as the AIX system administrator, can define defaults for AFP resources and printing options.

The MVS or OS/390 system programmer can also define a default page definition and font for the Download for OS/390 output writer in JES initialization statements and in the Download for OS/390 startup procedure. The system programmer can define a default form definition and data-check option in the Download for OS/390 startup procedure. If the system programmer has not specified a default, the AIX system administrator can specify a default for each PSF for AIX or InfoPrint Manager for AIX server or AIX print queue. Consult your MVS or OS/390 system programmer and AIX system administrator to determine what defaults have been defined.

JCL Parameters

This section describes all of the JCL parameters that you might specify on the DD or OUTPUT JCL statements when you use Download for OS/390.

Note: Some of the JCL parameters described in this section specify printing options for PSF for AIX or InfoPrint Manager for AIX and may have no significance if you are transmitting a data set to an OnDemand server.

Figure 14 on page 55 summarizes the JCL parameters you might consider using when transmitting a data set for printing with PSF for AIX or InfoPrint Manager for AIX.

```
| ADDRESS=(address_lines)
| BUILDING=building
| CHARS=(font_names)
| CKPTSEC=seconds
| CLASS=class
| COPIES=nnn
| DATACK={BLOCK | UNBLOCK | BLKCHAR | BLKPOS }
| DCB=OPTCD=J
| DCB=RECFM={A | M}
| DEST=[node.]name
| DEST='[node.]IP:ip_address'
| DUPLEX={NO | NORMAL | TUMBLE}
| FCB=pagedef_name
| FORMDEF=formdef_name
| FORMS=form_name
| INTRAY=nnn
| NAME=name
| NOTIFY=([node.]userid)
| OFFSETXB=nnnn[.mmm]unit
| OFFSETXF=nnnn[.mmm]unit
| OFFSETYB=nnnn[.mmm]unit
| OFFSETYF=nnnn[.mmm]unit
| OUTBIN=bin_number
| PAGEDEF=pagadef_name
| PRMODE={SOSI1 | SOSI2 | aaaaaaaa}
| PRTQUEUE='print_queue_name'
| RESFMT={P240 | P300}
| ROOM=room
| SEGMENT=page_count
| SYSOUT=(class,,form_name)
| TITLE=title
| UCS=font_name
| TRC={YES | NO}
| NOTIFY=(node.userid)
```

| *Figure 14. JCL Parameters for PSF for AIX or InfoPrint Manager for AIX*

Figure 15 summarizes the JCL parameters you might consider using when transmitting a data set for archiving with OnDemand for AIX.

```
CKPTSEC=seconds
CLASS=class
DEST=[node.]name
FORMS=form_name
NOTIFY=(node.userid)
SEGMENT=page_count
SYSOUT=(class,,form_name)
```

Figure 15. JCL Parameters for OnDemand

Download for OS/390 transmits all of the parameters shown in Figure 14 to each server on the remote system, with the exception of the CKPTSEC, NOTIFY, and SEGMENT parameters.

You specify the JCL parameters described in this section on one or both of the following JCL statements:

- DD statement
- OUTPUT statement

The examples included with each parameter show on which JCL statements you can specify each parameter. If you specify the same parameter on both the DD and the OUTPUT JCL statements, the parameter on the DD statement is used.

For more details about how to code the parameter values, refer to the *JCL Reference* for your operating system.

ADDRESS=(address_lines**)**
> Specifies up to four lines of address information. Each line of address information can contain 1 to 60 characters, separated with commas. PSF for AIX and InfoPrint Manager for AIX can print each address on a separate line of the header, trailer, or separator pages, if the correct user exit is activated.
>
> **Default:** None.
>
> **Example:**
>
> ```
> //OUTDS  OUTPUT ADDRESS=('J. Plant','123 Main St.','BOULDER, CO','80301')
> ```

BUILDING=building
> Specifies 1 to 60 characters of building information. PSF for AIX and InfoPrint Manager for AIX can print the building information on the header, trailer, or separator pages, if the correct user exit is activated.
>
> **Default:** None.
>
> **Example:**
>
> ```
> //OUTDS  OUTPUT BUILDING='920'
> ```

CHARS=(font_names**)**
> Specifies the names of from 1 to 4 coded fonts that PSF for AIX or InfoPrint Manager for AIX is to use to print a data set containing line data. Do not include the 2-character prefix of the coded-font name (X0 through XG).
>
> | The fonts that you specify must be in an AIX directory specified as part of the
> | PSF for AIX or InfoPrint Manager for AIX search path, or be resident in the
> | printer. Because PSF for AIX and InfoPrint Manager for AIX *cannot* print data
> | sets that contain S/370 line data or S/370 mixed-mode data with inline fonts,
> | consider using the AFP Conversion and Indexing Facility (ACIF) on the MVS or
> | OS/390 system or the **line2afp** command in the AIX shell script to convert such
> | a data set to a MO:DCA-P data stream. See "Using AFP Resources for Printing
> | with PSF for AIX or InfoPrint Manager for AIX" on page 52 for more
> | information.
>
> You can specify a font name in either the CHARS parameter or the UCS parameter. If you specify a font in both parameters, the font on the CHARS parameter is used. If the page definition that PSF for AIX or InfoPrint Manager for AIX uses to print a data set specifies a font, then PSF for AIX or InfoPrint Manager for AIX uses that font and ignores the font specified in the CHARS parameter.

Default: If no fonts are specified in the page definition, and if you do not specify either the CHARS or the UCS parameters, the default is the font set during Download for OS/390 configuration. If no default was set, PSF for AIX or InfoPrint Manager for AIX uses the default font defined for the printer.

Examples: You can specify the CHARS parameter on the DD and OUTPUT statements, as shown.

```
//DD1  DD CHARS=(60DB)
```

```
//OUTDS  OUTPUT CHARS=(60DB)
```

CKPTSEC=_seconds_

Specifies the number of seconds to be taken between checkpoints of the data set as it is being transmitted to the remote system; specify a number from 1 to 32 767, inclusive.

Note: Do not specify the CKPTPAGE parameter, because Download for OS/390 does not support checkpointing by page. If you specify both CKPTPAGE and CKPTSEC:

- JES2 ignores the CKPTSEC parameter, unless your installation specified during JES2 initialization that checkpoints are to be based only on time.

- JES3 ignores the CKPTSEC parameter.

Consider the following performance impacts when choosing an interval:

- If the interval number is too low, resulting in many checkpoints, performance may be reduced due to the checkpointing overhead.

- If the number of seconds between intervals is too high, errors that require retransmittal of large amounts of data may reduce performance.

Default: Download for OS/390 uses the default checkpoint interval specified during Download for OS/390 configuration. If no default is specified, no checkpoints are taken.

Example:

```
//OUTDS  OUTPUT CKPTSEC=30
```

CLASS=_class_

Specifies the class of the data set; specify 1 alphanumeric character. PSF for AIX or InfoPrint Manager for AIX can print the class on the header, trailer, or separator pages, if the correct user exit is activated.

Download for OS/390 may use the class you specify, along with the destination and form names, to route the data set to a particular remote system and to a PSF for AIX, InfoPrint Manager for AIX, or OnDemand server. Consult your system programmer to determine the correct class to specify, depending on how Download for OS/390 is configured.

You can specify an output class on two JCL statements:

- The SYSOUT parameter on the DD statement.

- The CLASS parameter on an OUTPUT statement assigned to that DD statement. To specify a class on the OUTPUT statement, you must enter a null class in the DD SYSOUT parameter: SYSOUT=(,).

> **Note:** Although this parameter is optional, you must specify either a class,
> form name, or destination name to direct the output to a remote system
> and server.

Default: If you do not specify a class value in either the OUTPUT or the DD
statement, the default class is A.

Example:

```
//OUTDS   OUTPUT CLASS=C
//DD1     DD SYSOUT=(,),OUTPUT=(*.OUTDS)
```

COPIES=_nnn_

Specifies the number of copies you want to print, from 1 to 255.

Download for OS/390 ignores any group values you specify on this parameter;
instead, specify group values in a form definition.

Default: One copy.

Examples: You can specify the COPIES parameter on the DD and OUTPUT
statements, as shown.

```
//DD1  DD COPIES=14
```

```
//OUTDS   OUTPUT COPIES=14
```

DATACK={<u>BLOCK</u> | UNBLOCK | BLKCHAR | BLKPOS}

Specifies whether you want the printer to block print-positioning and
invalid-character errors.

BLOCK

Specifies that the printer is not to report print-positioning or
invalid-character errors.

UNBLOCK

Specifies that the printer is to report all data-check errors. If a
print-positioning error occurs, the exception is highlighted on the printed
page to help you locate where the attempt to print outside the valid
printable area occurred.

BLKCHAR

Specifies that the printer is not to report invalid-character errors.
Print-positioning errors are reported normally.

BLKPOS

Specifies that the printer is not to report print-positioning errors.
Invalid-character errors are reported normally.

Default: A default can be specified during Download for OS/390 configuration.
If no default was specified, the default is BLOCK.

Example:

```
//OUTDS   OUTPUT DATACK=UNBLOCK
```

DCB=OPTCD=J

Specifies that the print data set contains table reference characters (TRCs).
You can also specify TRCs on the TRC parameter of the OUTPUT statement.

Default: If you omit the TRC parameter as well as this parameter, the default is
TRC=NO.

Example:

```
//DD1    DD DCB=OPTCD=J
```

DCB=RECFM={A | M}

Specifies whether ANSI or Machine carriage-control characters exist in a data set containing line data. If the data set contains AFP resources (such as page segments), specify that either ANSI or Machine carriage controls exist.

Default: None.

Example:

```
//DD1    DD DCB=RECFM=A
```

DEPT=_department_

Specifies a 1 to 60 character department name. PSF for AIX or InfoPrint Manager for AIX can print the department information on the header, trailer, or separator pages, if the correct user exit is activated.

Default: None.

Example:

```
//OUTDS   OUTPUT DEPT='PAYROLL'
```

DEST=[_node._**]**_name_

Specifies a destination name for the print data set. Specify either a 1 to 8 character destination name, or a node and destination name. PSF for AIX or InfoPrint Manager for AIX can print the destination name on the header, trailer, or separator pages, if the correct user exit is activated.

Download for OS/390 may use the destination you specify, along with the class and form names, to route the data set to a particular remote system and to a PSF for AIX, InfoPrint Manager for AIX, or OnDemand server. Consult your system programmer to determine the correct destination to specify, depending on how Download for OS/390 is configured.

Note: Although this parameter is optional, you must specify either a class, form name, or destination name to direct the output to a remote system and server.

If you specify the DEST parameter on the DD statement, you must also specify the SYSOUT parameter; otherwise, the system ignores the DEST parameter after checking it for syntax.

Examples: You can specify the DEST parameter on the DD and OUTPUT statements, as shown.

```
//DD1    DD SYSOUT=R,DEST=PSF6000
```

```
//OUTDS   OUTPUT DEST=PSF6000
```

DEST='[_node._**]IP:**_ipaddr_**'**

Specifies an IP address for the print data set. Specify from 1 to 124 printable characters; the length of the entire parameter list must not exceed 127 characters and must be enclosed in single quotes.

This IP address does not affect the transmission of the data set to a remote system or server; Download for OS/390 always uses the IP address specified in the routing-control data set to transmit a data set to a remote server. This field provides an additional value, which the shell script on the remote server can optionally use to route a file to a particular printer attached to the remote server. The administrator must modify the IBM-supplied shell script to use this field.

| **Note:** If you specify the DEST=IP parameter, you cannot also specify a
| destination name in the DEST JCL parameter. Therefore, if your system
| programmer configured the Download for OS/390 output writer to select
| jobs based on destination name (that is, WS=R is specified as a JES
| work-selection criterion), or if your system programmer defined
| destination name as a routing criterion for the remote server in the
| routing-control data set, you must specify a destination name and
| cannot specify the DEST=IP parameter.

| **Example:**

| `//OUTDS   OUTPUT DEST='IP:PRINTER629'`

| **DUPLEX={NO | NORMAL | TUMBLE}**
| Specifies whether printing is to be done on one or both sides of each sheet.

| **NO**   Requests printing on the front side of each sheet.

| **NORMAL** Requests printing on both sides of the sheet such that the sheets
| can be bound on the long edge of the paper.

| **TUMBLE** Requests printing on both sides of the sheet such that the sheets
| can be bound on the short edge of the paper.

| **Default:** If you omit this parameter, InfoPrint Manager for AIX uses the value in
| the form definition.

| **Example:**

| `//OUTDS   OUTPUT DUPLEX=NORMAL`

FCB=*pagedef_name*
Specifies the 1 to 4 character name of the page definition to format a data set
containing line data. Do not add the P1 prefix to the name of the page
definition, because Download for OS/390 adds the system prefix P1 to the
name.

Because the FCB parameter allows a maximum of only 4 characters, the
PAGEDEF parameter is preferred. See the description of the PAGEDEF
parameter for more information.

FORMDEF=*formdef_name*
Specifies the name of the form definition that you want to use; specify a 1 to 6
character name. Do not add the F1 prefix to the name, because Download for
OS/390 adds F1 to the name specified in this parameter.

If the data set contains a MO:DCA-P data stream, the form definition that you
specify must be in a directory specified in the PSF for AIX or InfoPrint Manager
for AIX search path or can be included inline.

If the data set contains S/370 line data or S/370 mixed-mode data, the form
definition that you specify must be in a directory specified in the PSF for AIX or
InfoPrint Manager for AIX search path. Because PSF for AIX and InfoPrint
Manager for AIX *cannot* print data sets that contain S/370 line data or S/370
mixed-mode data with an inline form definition, consider using the AFP
Conversion and Indexing Facility (ACIF) on the MVS or OS/390 system or the
line2afp command in the AIX shell script to convert such a data set to a
MO:DCA-P data stream. See "Using AFP Resources for Printing with PSF for
AIX or InfoPrint Manager for AIX" on page 52 for more information.

To use an inline form definition, specify the name of the inline form definition or specify DUMMY as the name. If you specify DUMMY, PSF for AIX, InfoPrint Manager for AIX, and the **line2afp** command use the first inline form definition found; however, if no inline form definition is found, PSF for AIX, InfoPrint Manager for AIX, and the **line2afp** command look for a form definition named DUMMY in the AIX resource directories. Also, see "Identifying the Data Type for Printing with PSF for AIX or InfoPrint Manager for AIX" on page 53 for more information.

Default: The default is the form definition name specified during Download for OS/390 configuration. If no default was specified, PSF for AIX or InfoPrint Manager for AIX uses the default established by the AIX system administrator.

Example: This example specifies F1USER10 as the form definition.

```
//OUTDS  OUTPUT FORMDEF=USER10
```

FORMS=*form_name*

Specifies the 1 to 8 character form name. PSF for AIX or InfoPrint Manager for AIX can print the form name on the header, trailer, or separator pages, if the correct user exit is activated.

The form name you specify does not result in any forms setup messages on the MVS, OS/390, or AIX system.

Download for OS/390 may use the form name you specify, along with the class and destination values, to route the data set to a particular remote system and PSF for AIX, InfoPrint Manager for AIX, or OnDemand server. Consult your system programmer to determine the correct form name to specify, depending on how Download for OS/390 is configured.

Note: Although this parameter is optional, you must specify either a class, form name, or destination name to direct the output to a remote system and server.

Default: If you do not specify a form name on either the OUTPUT or the DD statement, JES uses an installation default.

Example:

```
//OUTDS  OUTPUT FORMS=BILLS
```

INTRAY=*nnn*

Specifies a number from 1 to 255, which identifies the tray from which paper is to be selected. To determine the input tray identifiers for your printer, refer to your printer documentation.

Default: If you omit this parameter, InfoPrint Manager for AIX uses the value in the form definition.

Example: This example specifies that paper is to be taken from the side tray of an IBM 3160 printer with the optional side tray installed. The optional side tray of a 3160 printer is identified as tray 4.

```
//OUTDS  OUTPUT INTRAY=4
```

NAME=*name*

Specifies a 1 to 60 character name. PSF for AIX and InfoPrint Manager for AIX can print the name on the header, trailer, or separator pages, if the correct user exit is activated.

Default: None.

Example:

```
//OUTDS   OUTPUT NAME='R. ROPER'
```

NOTIFY=([node.**]**userid **...)**
> Specifies up to 4 userids whom Download for OS/390 is to notify when the data set has been successfully or unsuccessfully transmitted to the AIX system; separate the userids with commas.
>
> Download for OS/390 notifies the userids when the transmission is successful, the data set is held by the system due to an error, or the operator cancels the data set. The notification message is also sent to the SYSLOG data set.
>
> **Default:** None.
>
> **Example:**
>
> ```
> //OUTDS   OUTPUT NOTIFY=(SEATTLE.JOE,SEATTLE.MARY)
> ```

OFFSETXB=nnnn**[.**mmm**]**unit
> Specifies the offset in the x direction of the logical page origin from the media origin for the back side of each sheet. For *unit*, specify one of the following values. Download for OS/390 converts all values to millimeters, which is the unit of measure required by InfoPrint Manager for AIX.
>
> | | |
> |---|---|
> | **IN** | Specifies a unit of inches |
> | **CM** | Specifies a unit of centimeters |
> | **MM** | Specifies a unit of millimeters |
> | **PELS** | Specifies a unit of picture elements (1/240 inch) |
> | **POINTS** | Specifies a unit of points (1/72 inch) |
>
> **Default:** InfoPrint Manager for AIX uses the value in the form definition.
>
> **Example:** This example sets the page origin to .5 inches, 1.1 inches on the front side and 1.5 inches, 1.1 inches on the back side.
>
> ```
> //OUTDS   OUTPUT OFFSETXF=0.5IN,OFFSETYF=1.1IN,OFFSETXB=1.5IN,OFFSETYB=1.1IN
> ```

OFFSETXF=nnnn**[.**mmm**]**unit
> Specifies the offset in the x direction of the logical page origin from the media origin for the front side of each sheet. For *unit*, specify one of the following values. Download for OS/390 converts all values to millimeters, which is the unit of measure required by InfoPrint Manager for AIX.
>
> | | |
> |---|---|
> | **IN** | Specifies a unit of inches |
> | **CM** | Specifies a unit of centimeters |
> | **MM** | Specifies a unit of millimeters |
> | **PELS** | Specifies a unit of picture elements (1/240 inch) |
> | **POINTS** | Specifies a unit of points (1/72 inch) |
>
> **Default:** InfoPrint Manager for AIX uses the value in the form definition.
>
> **Example:** This example sets the page origin to .5 inches, 1.1 inches on the front side and 1.5 inches, 1.1 inches on the back side.
>
> ```
> //OUTDS   OUTPUT OFFSETXF=0.5IN,OFFSETYF=1.1IN,OFFSETXB=1.5IN,OFFSETYB=1.1IN
> ```

OFFSETYB=_nnnn_**[.**_mmm_**]**_unit_
| Specifies the offset in the y direction of the logical page origin from the media
| origin for the back side of each sheet. For _unit_, specify one of the following
| values. Download for OS/390 converts all values to millimeters, which is the
| unit of measure required by InfoPrint Manager for AIX.

| **IN**   Specifies a unit of inches

| **CM**   Specifies a unit of centimeters

| **MM**   Specifies a unit of millimeters

| **PELS**   Specifies a unit of picture elements (1/240 inch)

| **POINTS**   Specifies a unit of points (1/72 inch)

| **Default:** InfoPrint Manager for AIX uses the value in the form definition.

| **Example:** This example sets the page origin to .5 inches, 1.1 inches on the
| front side and 1.5 inches, 1.1 inches on the back side.

| `//OUTDS   OUTPUT OFFSETXF=0.5IN,OFFSETYF=1.1IN,OFFSETXB=1.5IN,OFFSETYB=1.1IN`

OFFSETYF=_nnnn_**[.**_mmm_**]**_unit_
| Specifies the offset in the y direction of the logical page origin from the media
| origin for the front side of each sheet. For _unit_, specify one of the following
| values. Download for OS/390 converts all values to millimeters, which is the
| unit of measure required by InfoPrint Manager for AIX.

| **IN**   Specifies a unit of inches

| **CM**   Specifies a unit of centimeters

| **MM**   Specifies a unit of millimeters

| **PELS**   Specifies a unit of picture elements (1/240 inch)

| **POINTS**   Specifies a unit of points (1/72 inch)

| **Default:** InfoPrint Manager for AIX uses the value in the form definition.

| **Example:** This example sets the page origin to .5 inches, 1.1 inches on the
| front side and 1.5 inches, 1.1 inches on the back side.

| `//OUTDS   OUTPUT OFFSETXF=0.5IN,OFFSETYF=1.1IN,OFFSETXB=1.5IN,OFFSETYB=1.1IN`

OUTBIN=_bin_number_
Specifies the number of the output bin.

Default: The default is either the value in the form definition or the value
established by the AIX system administrator.

Example:

`//OUTDS   OUTPUT OUTBIN=2`

PAGEDEF=_pagedef_name_
Specifies the name of the page definition to format a data set containing line
data; specify a 1 to 6 character name. Do not specify the P1 prefix to the name
because Download for OS/390 adds P1 to the name specified in this
parameter.

| The page definition that you specify can be in an AIX directory specified as part
| of the PSF for AIX or InfoPrint Manager for AIX search path. Because PSF for
| AIX and InfoPrint Manager for AIX _cannot_ print data sets that contain S/370 line
| data or S/370 mixed-mode data with an inline page definition, consider using

the AFP Conversion and Indexing Facility (ACIF) on the MVS or OS/390 system or the **line2afp** command in the AIX shell script to convert such a data set it to a MO:DCA-P data stream. See "Using AFP Resources for Printing with PSF for AIX or InfoPrint Manager for AIX" on page 52 for more information.

To use an inline page definition, either specify the name of the inline page definition or specify DUMMY as the name. If you specify DUMMY, PSF for AIX, InfoPrint Manager for AIX, and the **line2afp** command use the first inline page definition found; however, if no inline page definition is found, PSF for AIX, InfoPrint Manager for AIX, and the **line2afp** command look for a page definition named DUMMY in the AIX resource directories.

You can also specify a page definition in the FCB parameter. If you specify a page definition in both the PAGEDEF and FCB parameters, the page definition specified in the PAGEDEF parameter is used.

Default: If you omit the FCB parameter as well as the PAGEDEF parameter, the default is the page definition name specified during Download for OS/390 configuration. If no default was specified, PSF for AIX or InfoPrint Manager for AIX uses the default established by the AIX system administrator.

Example: This example specifies P1USER10 as the page definition.

```
//OUTDS  OUTPUT PAGEDEF=USER10
```

PRMODE={SOSI1 | SOSI2 | *aaaaaaaa***}**
Specifies the processing mode of the data set and whether PSF must perform optional processing of the data.

SOSI1
Specifies that each shift out, shift in code be converted to a blank and a Set Coded Font Local text control.

SOSI2
Specifies that each shift out, shift in code be converted to a Set Coded Font Local text control.

aaaaaaaa
Specifies any string defined in the JES initialization parameters for Download for OS/390. **LINE** and **PAGE** are examples of PRMODE values that JES uses for job routing information.

Note: Download for OS/390 transmits only the SOSI1 and SOSI2 values.

Default: JES assigns a value of LINE or PAGE.

Example:

```
//OUTDD  OUTPUT PRMODE=SOSI1
```

PRTQUEUE='_print_queue_name_**'**
Specifies the name of a print queue for printing the data set. Specify any printable character string from 1 to 127 characters enclosed in single quotes. You do not need to specify the DEST=IP parameter with the PRTQUEUE parameter.

Default: None.

Examples: The first example shows the PRTQUEUE parameter in conjunction with the DEST=IP parameter. The second example shows the PRTQUEUE parameter without the DEST=IP parameter.

```
|            //OUTDS  OUTPUT DEST='PSF6000.IP:ATLANTA',PRTQUEUE='PRINTER619'

|            //OUTDS  OUTPUT PRTQUEUE='PRINTER619'
```

| **RESFMT={P240 | P300}**

| Specifies the resolution at which the output was formatted. InfoPrint Manager
| for AIX can use this value to print the data set on a printer that supports the
| specified font resolution.

| **Default:** None. If you omit this parameter and if no font resolution is specified
| in the data stream, then InfoPrint Manager for AIX uses the default font
| resolution defined by the printer.

| **Example:**

```
|            //OUTDS  OUTPUT RESFMT=P240
```

ROOM=*room*

Specifies a 1 to 60 character room name. PSF for AIX and InfoPrint Manager
for AIX can print the room information on the header, trailer, or separator
pages, if the correct user exit is activated.

Default: None.

Example:

```
//OUTDS  OUTPUT ROOM='CONFERENCE ROOM'
```

SEGMENT=*page_count*

Specifies that the output data set is to be segmented into separate data sets,
where *page_count* specifies the number of pages to be included in each data
set. Each data set is transmitted separately to the remote system, along with a
segment ID, a number to indicate the position of the segment in the original
data set.

Use this parameter only with line-mode data; do not use this parameter if you
have requested conditional processing in the form definition because
conditional processing is not supported across data-set boundaries.

Download for OS/390 transmits the segment ID of each segmented data set to
the remote system. PSF for AIX or InfoPrint Manager for AIX can print the
segment ID on the header, trailer, or separator pages, if the correct user exit is
activated.

Default: The data set is not segmented.

Example:

```
//DD1  DD SEGMENT=100
```

SYSOUT=(*class,,form_name***)**

Specifies the class and form name.

class

Specifies a 1 character alphanumeric class.

form_name

Specifies a 1 to 4 character form name.

You can also specify the output class and form name in the CLASS and
FORMS parameters of the OUTPUT statement. To specify a form name longer
than 4 characters, you *must* use the FORMS parameter of an OUTPUT

statement. See the description of the CLASS and FORMS parameters for more detail about these parameters.

Note: Although this parameter is optional, you must specify either a class, form name, or destination name to direct the output to a remote system and server.

Defaults: If you do not specify a class on either the OUTPUT or the DD statement, the default class is A. If you do not specify a form name on either the OUTPUT or the DD statement, JES uses an installation default.

Examples: This example specifies class R and form name BILL.

```
//DD1  DD SYSOUT=(R,,BILL)
```

To specify class in an OUTPUT statement instead of the DD statement, code a null value for the class in the SYSOUT parameter, as shown.

```
//OUTDS  OUTPUT CLASS=R
//DD3    DD     SYSOUT=(,),OUTPUT=(*.OUTDS)
```

TITLE=_title_

Specifies a 1 to 60 character description of the output data set. PSF for AIX and InfoPrint Manager for AIX can print the title on the header, trailer, or separator pages, if the correct user exit is activated.

Default: None.

Example:

```
//OUTDS  OUTPUT TITLE='ANNUAL REPORT'
```

TRC=YES | <u>NO</u>

Specifies whether the print data set contains table reference characters (TRCs). You can also specify TRCs in the DCB parameter of the DD statement.

Default: If you do not specify DCB=OPTCD=J or the TRC parameter, the default is TRC=NO.

Example:

```
//OUTDS  OUTPUT TRC=YES
```

UCS=_font_name_

Specifies the name of one coded font to use for a data set containing line data. Do not include the 2-character prefix of the coded-font name (X0 through XG).

You can specify a font name in either the CHARS parameter or in the UCS parameter. If you specify a font in both parameters, the font on the CHARS parameter is used. If the page definition used to format the data set specifies a font, PSF for AIX and InfoPrint Manager for AIX ignore the font in the UCS parameter.

Default: If no fonts are specified in the page definition, and if you do not specify either the CHARS or UCS parameter, the default is the font specified during Download for OS/390 configuration. If no default was specified, PSF for AIX and InfoPrint Manager for AIX use the default font defined for the printer.

Examples: You can specify the UCS parameter on the DD and OUTPUT statements, as shown.

```
//DD1  DD UCS=60DB
```

```
//OUTDS  OUTPUT UCS=60DB
```

Examples

This section contains examples illustrating tasks specific to Download for OS/390, including:

- How to transmit an output data set to an AIX system and server
- How to transmit an output data set to multiple AIX systems or servers
- How to specify an application group name for OnDemand

The *PSF for OS/390: User's Guide* contains extensive examples showing how to use JCL to perform different printing tasks. Most of these examples apply when printing with PSF for AIX and InfoPrint Manager for AIX; the following examples do not apply:

- Specifying Whether You Want Error Messages to Be Printed.

  Download for OS/390 does not support the PIMSG JCL parameter, which allows you to suppress PSF error messages and request processing to terminate when a certain number of errors occur. Print commands on an AIX system, by default, print all error messages.

- Printing with Resources from a User Library.

  Download for OS/390 does not support the USERLIB JCL parameter, which allows you to use resources located in a user library on an MVS or OS/390 system. Instead, include these resources inline or arrange with the AIX system administrator to make these resources accessible to the AIX system.

- Specifying JCL Parameters for Microfilm Jobs.

  Download for OS/390 does not support the COMSETUP JCL parameter, which allows you to specify a microfilm setup resource. Due to limitations on the size of file systems, Download for OS/390 does not support transmitting microfilm jobs.

Directing Output to a Remote System and Server

These examples show how to specify the class, destination, and form name in JCL statements to direct an output data set to a particular remote system and PSF for AIX, InfoPrint Manager for AIX, or OnDemand server.

Consult your MVS or OS/390 system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation. You may not need to specify all three parameters. For example, by simply specifying a particular class, you could direct the output data set to the Download for OS/390 output writer and also to a particular AIX system and server.

In the first example, assume that the system programmer has defined the following class value:

- Class R is a JES work-selection criterion for the Download for OS/390 output writer.

- Class R is also a routing criterion defined in the routing-control data set. Class R is associated with the address of a particular remote system and server. See Figure 12 on page 33 for an example of a routing-control data set that defines class R as a routing criterion.

In the second and third examples, assume that the system programmer has defined the following class, destination, and form values:

- Class R is a JES work-selection criterion for the Download for OS/390 output writer.

- Destination AIXDEN and form name PSF6 are routing criteria defined in the routing-control data set. The destination and form name are associated with the address of a particular remote system and server.

EXAMPLES

1. This example shows how to direct an output data set to a remote system and server by specifying output class R.

```
//AFPUSERA JOB ...
//STEP1    EXEC PGM=USERA
//DD1      DD SYSOUT=R
```

2. This example shows how to direct an output data set to a remote system and server by specifying output class R, destination AIXDEN, and form name PSF6. This example shows how to specify these values on a DD statement.

```
//AFPUSERA JOB ...
//STEP1    EXEC PGM=USERA
//DD1      DD SYSOUT=(R,,PSF6),DEST=AIXDEN
```

Note: If the form name is more than 4 characters, you must specify the name on the OUTPUT statement, as shown in the third example.

3. This example shows how to direct an output data set to the same system and server as in the second example. However, this example shows how to specify these values on an OUTPUT statement. Note that the DD statement must refer to the OUTPUT statement. Also, the DD statement must include a null class value when you specify the class on the OUTPUT statement.

```
//AFPUSERA JOB ...
//STEP1    EXEC PGM=USERA
//OUTDS    OUTPUT CLASS=R,FORMS=PSF6,DEST=AIXDEN
//DD1      DD SYSOUT=(,),OUTPUT=(*.OUTDS)
```

Directing Output to Multiple Systems or Servers

This example shows how to specify multiple OUTPUT statements to transmit an output data set to different systems or to different servers on one system at the same time.

In this example, assume that the system programmer has defined the following class, destination and form values:

- Class R is a JES work-selection criterion for the Download for OS/390 output writer.

- Destinations AIXDEN, AIXSEAT1, and AIXSEAT2 are routing criteria defined in the routing-control data set. Each destination name is associated with the address of a different AIX system or server.

Note: Consult your system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation.

EXAMPLE

This example shows how to request that Download for OS/390 transmit an output data set three times:

1. The first transmission is to the AIX system and server identified with destination AIXDEN.

2. The second transmission is to the AIX system and server identified with destination AIXSEAT1.

3. The third transmission is to the AIX system and server identified with destination AIXSEAT2.

The OUTPUT parameter on the DD statement references three OUTPUT JCL statements; therefore, Download for OS/390 transmits the data set three times. Because class R is the class for all three transmissions, this example specifies the class in the DD statement. However, because the destination name is different for each transmission, this example specifies the destination on the three OUTPUT statements.

```
//AFPUSERA JOB ...
//STEP1    EXEC PGM=USERA
//OUTDS1   OUTPUT DEST=AIXDEN
//OUTDS2   OUTPUT DEST=AIXSEAT1
//OUTDS3   OUTPUT DEST=AIXSEAT2
//DD1      DD SYSOUT=(R),OUTPUT=(*.OUTDS1,*.OUTDS2,*.OUTDS3)
```

Specifying an Application Group Name to the OnDemand Server

This example shows how you might pass an application group name to the OnDemand server.

Note: Consult the OnDemand system administrator to determine in which parameter to pass an option such as the application group name.

In this example, assume that the system programmer has defined the following class value:

- Class R is a JES work-selection criterion for the Download for OS/390 output writer.
- Class R is also a routing criterion defined in the routing-control data set. Class R is associated with the address of an OnDemand server.

Assume that the application group name you want to pass to OnDemand is STUDENTS.

EXAMPLE

This example shows how to pass the application group name in the FORMS parameter.

```
//AFPUSERA JOB ...
//STEP1    EXEC PGM=USERA
//OUTDS1   OUTPUT FORMS=STUDENTS
//DD1      DD SYSOUT=(R),OUTPUT=(*.OUTDS1)
```

Chapter 5. Diagnosing Errors in Download for OS/390

This chapter contains information to help the diagnostician identify a problem in the Download for OS/390 feature and report it to IBM. This chapter describes:

- How to use the PSF for OS/390 trace facility with Download for OS/390
- How to use the PSF for OS/390 dump facility with Download for OS/390
- A message to module cross-reference table

Before you use the PSF trace and dump facilities, determine whether or not the problem you have encountered is one that other users have reported and that has been fixed. Refer to the *PSF for OS/390: Diagnosis* for information about how to construct a keyword string to search the Information/Systems of Early Warning Systems (EWS) data bases. If you determine that your problem has not already been reported, refer to the *PSF for OS/390: Diagnosis* for information about how to prepare an APAR.

The messages and abend codes issued by Download for OS/390 are described in *PSF for OS/390: Messages and Codes*.

Using the PSF Trace Facility

You can use the same trace facilities as you use with PSF for OS/390. These facilities are described in detail in *PSF for OS/390: Diagnosis*. This section provides an overview of the trace facilities available for Download for OS/390.

You specify trace parameters in the Download for OS/390 startup procedure and on the MODIFY operator command. If you suspect the problem is in the Download for OS/390 feature, IBM recommends that you request an FSA full external trace, tracing all components. An FSA full external trace includes an internal wrap trace and a recording of all events occurring on the functional subsystem interface (FSI). Download for OS/390 does not have a separate component identifier.

Following are some examples of traces you can perform:

Example: Starting a trace while Download for OS/390 is running

To obtain a full external trace and direct the trace data to a Generalized Trace Facility (GTF) data set, follow this procedure:

1. Start GTF, requesting USR records of type FD0 and FD4.

2. In the Download for OS/390 startup procedure, specify PARM=(,INTR) on the EXEC statement and TRACE=YES on the PRINTDEV statement for the FSA you want to trace, so that you obtain an internal trace starting at FSS initialization. These are the default values, so you can omit the PARM parameter and the TRACE parameter. For information about tracing parameters in the startup procedure, see "Startup Procedure JCL Statements" on page 23.

3. Start the Download for OS/390 FSA.

4. Enter the following PSF operator interface command to start a full external trace:

```
MODIFY FSSname,TRACEON,FSAname,FORMAT=GTF,MODE=FULL
```

where *FSSname* is the name of the Download for OS/390 FSS, and *FSAname* is the name of the FSA you want to trace.

5. Run the failing job.

6. Enter the following PSF operator interface command to end the trace:

   `MODIFY FSSname,TRACEOFF,FSAname`

   where *FSSname* is the name of the Download for OS/390 FSS, and *FSAname* is the name of the FSA.

7. Stop GTF.

Example: Starting a trace at initialization of Download for OS/390

To obtain a full external trace that begins during the startup procedure for Download for OS/390 and direct the trace output to a PSF trace data set, follow this procedure:

1. In the Download for OS/390 startup procedure, specify TRACE=YES on the PRINTDEV statement for the FSA you want to trace, so that tracing starts during FSS initialization. TRACE=YES is the default, so you can omit the TRACE parameter. For information about tracing parameters in the startup procedure, see "Startup Procedure JCL Statements" on page 23.

2. In the startup procedure, include a DD statement to allocate a PSF trace data set. The name of the DD statement must match the name of the FSA to be traced. See "Allocating a PSF Trace Data Set" on page 73 for more information.

3. For some problems, IBM support might ask you to also include a DD statement to allocate an FSS trace data set (also called an NST trace data set). Specify the name of the DD statement in the PARM parameter, as shown in the next step. See "Allocating an FSS Trace Data Set" on page 73 for more information.

4. In the startup procedure, specify the PARM=(,FULL) parameter on the EXEC statement:

   `//stepname EXEC PGM=APSKAFPD,PARM=(,FULL)`

   If you have allocated an FSS trace data set, also specify the name of the DD statement for the data set:

   `//stepname EXEC PGM=APSKAFPD,PARM=(FSSddname,FULL)`

   where *FSS_ddname* is the name of the DD statement for the FSS trace data set.

5. Run the failing job.

6. Enter the following PSF operator interface command to end the trace:

   `MODIFY FSSname,TRACEOFF,FSAname`

   where *FSSname* is the name of the Download for OS/390 FSS, and *FSAname* is the name of the FSA.

Allocating a PSF Trace Data Set

You can direct trace output either to a GTF data set or to a PSF trace data set; however, you must direct trace output to a PSF trace data set if you start tracing during initialization of PSF. To direct the trace to a PSF trace data set, specify a DD statement for the PSF trace data set in the Download for OS/390 startup procedure. The name of this DD statement must be the name of the FSA you want to trace; that is, the name must match the name on the PRINTDEV statement. Include a DD statement for each FSA you want to trace.

When you allocate a PSF trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80
- Record format of either F, U, or FB
- Sequential organization (PS)

The size of the trace data set depends on the size of the data sets being transmitted because the transmitted data is part of the trace. You need to allocate larger trace data sets for larger data sets. Following is an example of allocating a trace data set on a tape device:

```
//ddname  DD  DSNAME=DOWNLOAD.TRACE,UNIT=TAPE,VOL=SER=TAPE01,DISP=(NEW,KEEP),
//              SPACE=(CYL,(5,10),RLSE),DCB=(BLKSIZE=1120,RECFM=U)
```

where:

ddname is the name of the FSA you want to trace.

Allocating an FSS Trace Data Set

Download for OS/390 makes more trace entries during the initialization of the FSS than PSF does, and Download for OS/390 directs these trace entries to an FSS trace data set (also called an NST trace data set). This means that to trace some problems, you might need to allocate an FSS trace data set as well as a PSF trace data set.

Specify the name of the DD statement for the FSS trace data set in the EXEC statement of the Download for OS/390 startup procedure. For example:

```
//stepname EXEC PGM=APSKAFPD,PARM=(FSSddname,FULL)
```

where:

FSSddname is the name of the DD statement that allocates the FSS trace data set

When you allocate an FSS trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80
- Record format of either F, U, or FB
- Sequential organization (PS)

Formatting Trace Data in a PSF Trace Data Set

The trace output contains unformatted data. You can format the PSF trace data set using the PSF trace post formatter program, APSTRFMT, which is shipped in SYS1.SAMPLIB. You must stop Download for OS/390 before formatting the trace data. Following is sample JCL to start the PSF trace post formatter.

```
//APSWTRCF JOB 'ACCOUNT #','NAME',MSGLEVEL=(1,1)
//***************************************************************
//* PSF TRACE FORMATTER INVOCATION JCL
//***************************************************************
//STEP01   EXEC PGM=APSTRFMT,REGION=100K
//*                         /* REGION = (3 * BLKSIZE) + 20K
//SYSUDUMP DD SYSOUT=*      /* BLKSIZE = TRACEIN BLOCKSIZE
//TRACEIN  DD UNIT=unit,    /* UNIT CAN BE TAPE OR DASD
//            DSN=tracein,   /* SET TO PSF TRACE DATA SET NAME
//            DISP=SHR,
//            VOL=SER=volser /* SERIAL NUMBER OF VOLUME
//TRACEOUT DD UNIT=unit,    /* UNIT MIGHT BE TAPE OR DASD
//            DSN=traceout,  /* SET TO DATA SET NAME WHERE
//*                             FORMATTED RECORDS ARE PLACED
//            DISP=disp,    /* DISPOSITION OF TRACE OUT
//            VOL=SER=volser /* SERIAL NUMBER OF VOLUME
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
     TYPE=SHORT
/*
//
```

Figure 16. JCL to Invoke the PSF Trace Formatter

The TRACEIN DD statement identifies the trace data set that contains the trace data; therefore, specify the attributes of that data set in the DD statement.

The TRACEOUT DD statement identifies the data set into which the formatted trace output is stored. The parameters specified on the DD statement are device-dependent. Specify these DCB parameters:

- Record length of 117, which is the default.
- Block size that is a multiple of 117. If it is not specified, or is not a multiple of 117, it defaults to 1287.
- Record format of FBA, U, or FB. The default is FBA.
- Sequential organization (PS).

You can specify three TYPE options on the SYSIN DD statement:

SHORT Excludes some PSF data, specifically PPCC trace entries. For some entries, only the first 32 bytes of data are traced. In a truncated entry, a '<' is placed in the space between the address and the start of the data in the trace output data set. This is the default.

TITLES Only headers are printed for the trace entry being formatted.

LONG All data is included in the trace data set.

| # Formatting and Printing GTF Trace Data

| You can print GTF trace data sets using the Interactive Problem Control System
| (IPCS). You can also use IPCS with the COMMANDS parameter GTF USR(FD1) to
| view the data at a display terminal. For more information about using IPCS, refer to
| *MVS/ESA IPCS User's Guide* or *OS/390 MVS IPCS User's Guide*.

| # Using the PSF Dump Facility

| You can use the same dump facilities as you use with PSF for OS/390. These
| facilities are described in detail in *PSF for OS/390: Diagnosis*.

| As with PSF for OS/390, you can request a conditional dump of PSF control blocks
| by specifying the DUMP parameter on the PRINTDEV statement in the Download
| for OS/390 startup procedure. See "PRINTDEV Parameters" on page 24 for more
| information about the PRINTDEV statement.

| You can request that a conditional dump occur when or (1) a PSF return reason
| code or restartable abend reason code occurs or (2) a specific PSF or Download
| message is issued. When a conditional dump occurs, Download for OS/390
| abends. The dump goes directly to SYS1.DUMPxx; you can print or view it using
| IPCS.

| In the following example, a dump occurs the second time message APS986I is
| issued:

| ```
| DUMP=(,APS986I,2)
| ```

Message-to-Module Cross-Reference

Table 11 lists the messages issued by Download for OS/390 and the modules that
produce each message.

Table 11 (Page 1 of 2). Message-to-Module Cross-Reference	
Message	**Module**
APS022I	APSKAFPD
APS023I	APSKFSA
APS024I	APSKODR
APS031I	APSKDSP
APS032I	APSKDSP
APS033I	APSKDSP
APS034I	APSKDSP
APS035I	APSKDSP
APS041I	APSKODR
APS042I	APSKODR
APS043I	APSKODR
APS046I	APSKAFPD
APS047I	APSKSMF

Table 11 (Page 2 of 2). Message-to-Module Cross-Reference	
Message	**Module**
APS048I	APSKAFPD
APS049I	APSKSMF
APS057I	APSKDVP
APS062I	APSKNTFY
APS068I	APSKNTFY
APS069I	APSKNTFY
APS070I	APSKNTFY
APS071I	APSKNTFY
APS072I	APSKNTFY
APS095I	APSUEXTI
APS986I	APSKDVP
APS987I	APSKDSP
APS988I	APSKNTFY
APS989I	APSKDSP, APSKDVP
APS990I	APSKROUT
APS991I	APSKROUT
APS992I	APSKFSA
APS993I	APSKNTFY
APS994I	APSKNTFY
APS995I	APSKAFPD, APSKDVP
APS996I	APSKROUT
APS997I	APSKDVP

Appendix A. Checklist of Download for OS/390 Configuration Tasks

This checklist summarizes the tasks involved in configuring the Download for OS/390 feature for your installation, along with the number of the page that describes the task.

__ 1. Verify that the software prerequisites are met, page 7.

__ 2. Install the Download for OS/390 program; refer to the *Download for OS/390 Program Directory*.

__ 3. Plan the Download for OS/390 functional subsystem.

    __ a. Decide how many functional subsystems (FSS) and functional subsystem applications (FSAs) to create, page 9.

    __ b. Determine the region size for each FSS, page 9.

    __ c. Decide on the JES work-selection criteria for each FSA, page 10.

    __ d. Decide on a default checkpointing interval for each FSA, page 10.

    __ e. Decide on default printing options, if any, for each FSA, page 11.

__ 4. Define the Download for OS/390 functional subsystem.

    • JES2

      __ a. Create an FSS(*fss_name*) statement for each FSS, page 14.

      __ b. Create a PRT(*nnnn*) statement for each FSA, page 15.

    • JES3

      __ a. Create an FSSDEF statement for each FSS, page 18.

      __ b. Create a DEVICE statement for each FSA, page 19.

__ 5. Create a startup procedure for each Download for OS/390 FSS, page 22.

__ 6. Create a routing-control data set.

    __ a. Decide on routing criteria to use for each server, page 26.

    __ b. Determine the socket address of each associated server, page 27.

    __ c. Allocate the routing-control data set, page 27.

    __ d. Specify the routing-control statements, page 28.

    __ e. Test the routing-control data set, page 32.

__ 7. Write an exit routine to pass additional job information to PSF for AIX or InfoPrint Manager for AIX, if necessary, page 33.

__ 8. Modify installation accounting routines, if necessary, page 37.

__ 9. Update the Program Properties Table (PPT), page 38.

__ 10. Activate the Download for OS/390 code in SYS1.LINKLIB by either IPLing the OS/390 or MVS system, or by using system commands to pick up the changes to SYS1.LINKLIB and the program properties table.

__ 11. Start the servers and Download for OS/390, page 41.

Glossary

Source Identifiers

This publication includes terms and definitions from the *IBM Dictionary of Computing,* ZC20-1699.

Definitions reprinted from the *American National Dictionary for Information Processing Systems* are identified by the symbol (A) following the definition.

References

The following cross-references are used in this glossary:

Contrast with.   This refers to a term that has an opposite or substantively different meaning.

Synonymous with.   This appears in the commentary of a preferred term and identifies less desirable or less specific terms that have the same meaning.

A

ACIF.   (1) AFP conversion and indexing facility. (2) A PSF utility program that converts a print file into AFP, MO:DCA-P, creates an index file for input data, and collects resources used by an AFP document into a separate file.

Advanced Function Presentation (AFP).   A set of licensed programs, together with user applications, that use the all-points-addressable concept to print on presentation devices. AFP includes creating, formatting, archiving, retrieving, viewing, distributing, and printing information.

AFP.   Advanced Function Presentation.

AIX operating system.   IBM's implementation of the UNIX operating system. The RISC System/6000 system, among others, runs the AIX operating system.

API.   (1) Application program interface. (2) Application programming interface.

B

burst.   To separate continuous-forms paper into single sheets.

C

carriage control character.   An optional character in an input data record that specifies a write, space, or skip operation.

case-sensitive.   Able to distinguish between uppercase and lowercase letters.

checkpoint.   A point at which information about the status of a job and the system can be recorded so that the job step can be restarted later. The user can specify that Download for OS/390 take checkpoints based on the number of processing seconds elapsed.

client.   In a distributed file system environment, a system that is dependent on a server to provide it with programs or access to programs.

client/server.   In communications, the model of interaction in distributed data processing in which a program at one site sends a request to a program at another site and awaits a response. The requesting program is called a client; the answering program is called a server.

conditional processing.   A page-definition function that allows input data records to partially control their own formatting.

connection.   In TCP/IP, the path between two protocol applications that provides reliable data stream delivery service. In Internet communications, a connection extends from a TCP application on one system to a TCP application on another system.

copy group.   One or more copies of a page of paper. Each copy can have modifications, such as text suppression, page position, forms flash, and overlays.

D

daemon.   In a UNIX operating system, a process begun by the root user or by the root shell that can be stopped only by the root user. Daemon processes generally provide services that must be available at all times, such as sending data to the printer. A daemon runs continuously, looking for work to do, performing that work, and waiting for more work. A daemon does not have a controlling terminal associated with it.

data check.   A synchronous indication of a condition caused by invalid data or incorrect positioning of data. Reporting of some data checks can be suppressed.

data stream. A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form using a defined format.

default. A value, attribute, or option that is assumed when no alternative is specified by the user.

dotted decimal notation. The syntactical representation for a 32-bit integer that consists of four 8-bit numbers written in base 10 with periods (dots) separating them. It is used to represent IP addresses.

double-byte coded font. A font in which the characters are defined by 2 bytes; the first defining a coded font section, and the second defining a code point. Double-byte coded fonts are required to support languages requiring more than 256 graphic characters. Two bytes are required to identify each graphic character. Kanji is printed using a double-byte font. Contrast with *single-byte coded font*.

download. To transfer data from one computer for use on another one. Typically, users download from a larger computer to a diskette or fixed disk on a smaller computer or from a system unit to an adapter.

Download for OS/390. A feature of PSF for OS/390 that allows the PSF program to automatically send data sets from the JES spool, without formatting them, directly to a PSF for AIX, InfoPrint Manager for AIX, or OnDemand server, using the TCP/IP protocol. The PSF for AIX, InfoPrint Manager for AIX, and OnDemand servers receive the data sets into files, which can be automatically formatted and printed by PSF for AIX or InfoPrint Manager for AIX or loaded into OnDemand.

drain. An operator action to halt the flow of jobs to a printer, usually to stop the printer or to change print options.

exception highlighting. The markings placed on the printed page to indicate the location of a data-stream error.

F

font. (1) A family or assortment of characters of a given size and style; for example, 9 point Bodoni Modern. (A)   (2) One size and one typeface in a particular type family, including letters, numerals, punctuation marks, special characters, and ligatures. (3) A paired character set and code page that can be used together for printing a string of text characters. A double-byte font can consist of multiple pairs of character sets and code pages.

form definition. A resource used by PSF that defines the characteristics of the form, which includes such functions as overlays to be used (if any), paper source (for cut-sheet printers), duplex printing, text

suppression, the position of MO:DCA-P data on the form, and the number and modifications of a page.

FSA. Functional subsystem application.

FSS. Functional subsystem.

functional subsystem (FSS). The Download for OS/390 address space created by JES.

functional subsystem application (FSA). An area within the Download for OS/390 functional subsystem that transmits data sets to remote systems.

I

InfoPrint. A solution of software and hardware products that can supplement or replace the offset presses and copiers in print shops with high-quality, non-impact, black and white or process color printers. InfoPrint takes documents from creation to the final product.

InfoPrint Manager for AIX. A software component of IBM InfoPrint. IBM InfoPrint Manager for AIX handles the scheduling, archiving, retrieving, and assembly of a print job and its related resource files. It also tracks the finishing and packaging of the printed product.

inline resource. A resource contained in the print data set.

Internet. A wide area network connecting thousands of disparate networks in industry, education, government, and research. The Internet network uses TCP/IP as the protocol for transmitting information.

Internet Protocol (IP). A protocol used to route data from its source to its destination in an Internet environment.

IP. Internet Protocol.

J

JCL. Job control language.

JES. Job entry subsystem.

JES2. An MVS or OS/390 subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing.

JES3. An MVS or OS/390 subsystem that receives jobs into the system, converts them to internal format,

selects them for execution, processes their output, and purges them from the system. In complexes that have several loosely coupled processing units, the JES3 program manages processors so that the global processor exercises centralized control over the local processors and distributes jobs to them via a common job queue.

job control language (JCL).   A language of control statements used to identify a computer job or describe its requirements to an operating system.

job entry subsystem (JES).   An MVS or OS/390 subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system.

job script.   A pre-defined file similar to a shell script that contains the options required to run a print job.

L

line data.   Data prepared for printing on a line printer such as a 3800 Model 1 Printing Subsystem. Line data is usually characterized by carriage-control characters and table reference characters. Contrast with MO:DCA-P data.

line printer daemon (LPD).   The printer server that allows other hosts to access its printer.

LPD.   Line Printer Daemon

M

MO:DCA-P data.   Print data that has been composed into pages. Text formatting programs can produce composed text data consisting entirely of structured fields.

mount.   To make a file system accessible.

MVS/ESA.   Multiple Virtual Storage/Enterprise System Architecture.

N

NetSpool.   A feature of PSF for OS/390 and a component of the OS/390 Print Server that allows an installation to automatically direct VTAM application data targeted for a network printer to the JES spool, without changing the VTAM applications. From the JES spool, the data set can be printed on a JES or PSF printer or sent to another location for printing.

network.   A collection of data processing products that are connected by communication lines for information exchange between locations.

Network File System (NFS).   A protocol developed by Sun Microsystems that uses Internet Protocol to allow a set of cooperating computers to access each other's file system as if they were local.

NFS.   Network File System.

Network Print Facility (NPF).   In IBM TCP/IP, a feature that routes VTAM, JES2, or JES3 printer output to printers in a TCP/IP network.

NPF.   Network Print Facility

O

OnDemand.   A client/server application that you can use to replace hard copy reports and microfiche, and provide fast, online access to information. An OnDemand server manages electronic archives of reports and documents. You can use an OnDemand client program to search for information and view, print, and FAX copies of reports and documents.

OnDemand server.   The server that is part of OnDemand and receives files from Download for OS/390.

output writer.   A part of the job entry subsystem that receives job output from the system spool.

P

page definition.   A resource used by PSF that defines the rules of transforming line data into MO:DCA-P data and text controls.

parameter.   Information that the user supplies to a panel, command, or function.

pdpr.   In InfoPrint for AIX, the command used to create and submit a job, consisting of one or more documents, to a server for printing or transmission.

port.   (1) A part of the system unit or remote controller to which cables for external devices (display stations, terminals, or printers) are attached. The port is an access point for data entry or exit. (2) A specific communications end point within a host. A port is identified by a port number.

PostScript.   A page description language with graphics capabilities that was developed by Adobe Systems, Incorporated.

print queue. A file containing a list of the names of files waiting to be printed.

Print Services Facility (PSF). A licensed program that manages and controls the input data stream and output data stream required by supported IBM page printers. PSF combines print data with other resources and printing controls to produce AFP output.

protocol. A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication.

PSF. Print Services Facility.

psfin. A PSF for AIX print command that allows you to submit jobs:

- Stored on tape as well as files
- Enabled for all PSF/6000 job-management functions
- Using all PSF/6000 print options in a job script file

PSF for AIX. An intelligent printer driver that provides AFP capabilities for the AIX operating system on the RISC System/6000. AFP capabilities include electronic forms, images, graphics, and typographical fonts.

PSF for AIX printer. A printer supported by the PSF for AIX licensed program.

PSF for AIX server. The server that is part of PSF for AIX and receives files from Download for OS/390.

R

resource. A collection of printing instructions used by Print Services Facility in addition to the print data set, to produce the printed output. PSF resources include coded fonts, font character sets, code pages, page segments, overlays, form definitions, and page definitions.

RISC System/6000. A family of workstations and servers based on IBM's POWER architecture. They are primarily designed for running multi-user numerical computing applications that use the AIX operating system.

routing-control data set. In Download for OS/390, a data set containing routing statements that associate routing criteria of class, destination, and form name with the socket addresses of PSF for AIX, InfoPrint Manager for AIX, or OnDemand servers.

S

SDSF. System Display and Search Facility

server. (1) On a network, the computer that contains the data or provides the facilities to be accessed by other computers on the network. (2) A program that handles protocol, queuing, routing, and other tasks necessary for data transfer between devices in a computer system.

shell script. In a UNIX operating system, a series of commands, combined in a file, that carry out a particular function.

shift-out, shift-in (SOSI). Special EBCDIC control codes that exist in the data stream to indicate the switches between double-byte and single-byte fonts.

single-byte coded font. A font in which the characters are defined by a 1-byte code point. A single-byte coded font has only one coded font section. Contrast with *double-byte coded font*.

SMF. System management facilites.

SNA. Systems Network Architecture

socket address. In a UNIX operating system, a data structure that uniquely identifies a specific communications end point. A socket address consists of a port number and an IP address.

spool. Simultaneous peripheral operation online.

startup procedure. A procedure used to start Download for OS/390 and to specify initialization parameters and the routing-control data set.

syntax. The grammatical rules for constructing a command,

System Display and Search Facility (SDSF). An IBM-licensed program that provides a menu-driven full screen interface to obtain detailed information about the jobs and resources in an MVS or OS/390 JES2 system.

System management facilities (SMF). An optional control program feature of OS/VS that provides the means for gathering and recording information that can be used to evaluate system usage.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

T

table reference character (TRC).   An optional control character in an input record that identifies the font to be used to print the record. The table reference character corresponds to a font number defined in a page definition font list or to the order of font names listed in the job control CHARS parameter.

TCP.   Transmission Control Protocol.

TCP/IP.   Transmission Control Protocol/Internet Protocol.

trace.   A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (A)

Transmission Control Protocol (TCP).   A communications protocol used in Internet and in any network that follows the U.S. Department of Defense standards for inter-network protocol.   TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It assumes that the Internet protocol is the underlying protocol.

TRC.   Table reference character.

U

UCS.   Universal character set.

universal character set (UCS).   A printer feature that permits the use of a variety of character arrays. Synonymous with *font*.

V

Virtual Telecommunications Access Method (VTAM).   An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability.

VTAM.   Virtual Telecommunications Access Method.

Bibliography

This bibliography lists the titles of publications containing additional information about PSF, Advanced Function Presentation, the MVS and OS/390 operating systems, and related products.

The titles and order numbers may change from time to time. To verify the current title or order number, consult your IBM marketing representative.

Print Services Facility (PSF) for OS/390

Publication	Order Number
IBM IP PrintWay Guide	S544-5379
IBM NetSpool Guide	G544-5301
PSF for AIX: Upload Configuration Guide for SNA	S544-5422
PSF for AIX: Upload Configuration Guide for TCP/IP	S544-5423
PSF for OS/390 Collection Kit CD-ROM	SK2T-9267
PSF for OS/390: Customization	S544-5622
PSF for OS/390: Diagnosis	G544-5623
PSF for OS/390: Download for OS/390	G544-5624
PSF for OS/390: Introduction	G544-5625
PSF for OS/390: Licensed Program Specifications	G544-5626
PSF for OS/390: Messages and Codes	G544-5627
PSF for OS/390: Program Directory	None
PSF for OS/390: User's Guide	S544-5630
AFP Conversion and Indexing Facility: User's Guide	S544-5285
PSF: Security Guide	S544-3291
Program Directory for IP PrintWay Feature of PSF for OS/390	None
Program Directory for NetSpool Feature of PSF for OS/390	None

Advanced Function Presentation (AFP)

Publication	Order Number
Advanced Function Presentation: Printer Information	G544-3290
Advanced Function Presentation: Printer Summary	G544-3135
Advanced Function Printing: Host Font Data Stream Reference	S544-3289
AFP Toolbox for Multiple Operating Systems User's Guide	G544-5292
AFP Workbench for Windows and OS/2: Using the Viewer Application	G544-3813
Guide to Advanced Function Presentation	G544-3876
Overlay Generation Language/370 User's Guide and Reference	S544-3700
IBM Page Printer Formatting Aid: User's Guide	S544-5284
Printing and Publishing Cluster Collection CD-ROM	SK2T-2921

Advanced Function Presentation (AFP) Architecture

Publication	Order Number
Advanced Function Presentation: Programming Guide and Line Data Reference	S544-3884
Bar Code Object Content Architecture Reference	S544-3766
Font Object Content Architecture Reference	S544-3285
Graphics Object Content Architecture Reference	SC31-6804
Image Object Content Architecture Reference	SC31-6805
Intelligent Printer Data Stream Reference	S544-3417
Mixed Object Document Content Architecture Reference	SC31-6802
Presentation Text Object Content Architecture Reference	SC31-6803

Advanced Function Presentation for Microfilm

To order any of the following microfilm publications, see your representative for Anacomp, Inc.

Publication	Order Number
DataMASTER II for XFP2000-Linked Systems Operator Guide	DMIIR21
XFP2000 Bit-Mapped Imaging User's Guide	NW-04-9403
XFP2000 COM System Operator Guide	8000R21
XFP2000 Message Guide	8KMSGR11
XFP2000 Reference	XF-07-9201, XF-07-9302
XFP2000 Software Release Notes	XF-14-9301
XFP2000 User's Guide	XF-04-9302
XFP2000 Workstation Executive Installation and Operations Guide	XF-12-9201

Fonts

Publication	Order Number
ABOUT TYPE: IBM's Technical Reference for 240-pel Digitized Type	S544-3516
IBM AFP Fonts: Font Samples	S544-3792
IBM AFP Fonts: Font Summary	G544-3810
IBM AFP Fonts: Font Summary for AFP Font Collection	S544-5633
IBM AFP Fonts: IBM's Typographic Primer for Digitized Type	G544-3183
IBM AFP Fonts: Introduction to Typography	G544-3122
IBM AFP Fonts: Technical Reference for Code Pages	S544-3802
IBM AFP Fonts: Technical Reference for IBM Chinese, Japanese, and Korean Fonts	S544-5330
IBM AFP Fonts: Technical Reference for IBM Expanded Core Fonts	S544-5228
IBM AFP Fonts: Type Transformer User's Guide	G544-3796

Text Processing

Publication	Order number
DCF/DLF General Information	GH20-9158
Document Composition Facility: Bar Code User's Guide	S544-3115
Document Composition Facility: SCRIPT/VS Text Programmer's Guide	SH35-0069
Publishing Systems BookMaster General Information	GC34-5006
Publishing Systems BookMaster User's Guide	SC34-5009
Using DisplayWrite/370	SH12-5172

InfoPrint Manager for AIX

Publication	Order Number
IBM InfoPrint Manager for AIX: Administrator's Guide	S544-5595
IBM InfoPrint Manager for AIX: User's and Operator's Guide	S544-5596

Print Services Facility (PSF) for AIX

Publication	Order Number
AIX and Related Products Documentation	SC23-2456
Facts About PSF for AIX	G544-5305
IBM Page Printer Formatting Aid/6000: User's Guide Version 2.1	S544-3918
IBM Print Services Facility for AIX: AIX for Print Services Facility Users	G544-3766
IBM Print Services Facility for AIX: AFP Conversion and Indexing Facility Version 2.1	G544-3930
IBM Print Services Facility for AIX: Guide for Printer and COM Operators	S544-5286
IBM Print Services Facility for AIX: Licensed Program Specifications	G544-3815
IBM Print Services Facility for AIX: Print Administration	S544-3817
IBM Print Services Facility for AIX: Print Services Facility for AIX Users	G544-3814
IBM Print Services Facility for AIX: Print Submission	S544-3878

Print Services Facility for OS/2 (PSF/2)

Publication	Order Number
IBM Print Services Facility for OS/2: A Guide to Using PSF/2	G544-5225
IBM Print Services Facility for OS/2: An Installation Cookbook for AS/400 and Token Ring Networks	G544-3966
IBM Print Services Facility for OS/2: An Installation Cookbook for System/370 and Token Ring Networks	G544-3965
IBM Print Services Facility for OS/2: Facts about PSF/2	G544-3890
IBM Print Services Facility for OS/2: Network Configuration Guide for System/370 and Communication Manager/2	S544-3911
IBM Print Services Facility for OS/2: Printer Attachments Guide	G544-5215

EDMSuite OnDemand

Publication	Order Number
EDMSuite OnDemand: Administrator's Reference	G544-5293
EDMSuite OnDemand: Installation and Configuration Guide for UNIX Servers	G544-5598
EDMSuite OnDemand: Installation and Configuration Guide for Windows NT Servers	G544-5526
EDMSuite OnDemand: Introduction and Planning Guide	G544-5281

Printers

Publication	Order Number
Reference Manual for the IBM 3800 Printing Subsystem Models 3 and 6	GA32-0050
IBM PagePrinter 3812 Introduction and Planning Guide	G544-3265
IBM 3816 Page Printer Operating Instructions	GA34-2075
IBM 3825 Page Printer Product Description	G544-3482
IBM 3827 Page Printer Product Description	G544-3194
IBM 3828 Advanced Function MICR Printer Product Description	G544-3361
IBM 3900 Advanced Function Printer Product Description	GA32-0135
IBM 3912 and 3916 Page Printer Getting Started	S544-3898
IBM LaserPrinter 4028 Introduction and Planning Guide	S544-4258
User's Guide for the IBM LaserPrinter 4029 Series	ZA40-0542
IBM 4224 Printer Models 1xx and 2xx Product and Programming Description Manual	GC31-2551
IBM 4230 Printer Product and Programming Description Models 102 and 202	GC40-1701
IBM 4234 Printer Models 007, 008, 011, and 012 Product and Programming Description	GC31-3879
Attachment Configuration Handbook for Printers that Use the Advanced Function Common Control Unit	S544-3977
InfoPrint 60 Finisher Application Design Guide	S544-5643
InfoPrint 62 Introduction and Planning Guide	G544-5384
InfoPrint 3000 Introduction and Planning Guide	G544-5563
InfoPrint 4000 and 3900 Advanced Function Printers Introduction and Planning Guide	G544-5427
InfoPrint Color 100 Introduction and Planning Guide	G544-5612
InfoPrint Hi-Lite Color Introduction and Planning Guide	G544-5420
IOCP and ESCON Reference	GC38-0401

i-data

Publication	Order Number
i-data 7913 IPDS Printer LAN Attachment for Ethernet Installation Guide	none
i-data 7913 IPDS Printer LAN Attachment for Token Ring Installation Guide	none

OS/390 Version 2 Release 6

Publication	Order Number
IBM Online Library Omnibus Edition OS/390 Collection	SK2T-6700
OS/390 HCD Planning	GC28-1750
OS/390 HCD User's Guide	SC28-1848
OS/390 JES2 Commands	GC28-1790
OS/390 JES2 Initialization and Tuning Guide	SC28-1791
OS/390 JES2 Initialization and Tuning Reference	SC28-1792
OS/390 JES2 Messages	GC28-1796
OS/390 JES3 Commands	GC28-1798
OS/390 JES3 Initialization and Tuning Guide	SC28-1802
OS/390 JES3 Initialization and Tuning Reference	SC28-1803
OS/390 JES3 Messages	GC28-1804
OS/390 MVS Authorized Assembler Services Guide	GC28-1763
OS/390 MVS Authorized Assembler Services Reference ALE-DYN	GC28-1764
OS/390 MVS Authorized Assembler Services Reference ENF-IXG	GC28-1765
OS/390 MVS Authorized Assembler Services Reference LLA-SDU	GC28-1766
OS/390 MVS Authorized Assembler Services Reference SET-WTO	GC28-1767
OS/390 MVS Diagnosis: Tools and Service Aids	SY28-1085
OS/390 MVS Initialization and Tuning Reference	SC28-1752
OS/390 MVS IPCS User's Guide	GC28-1756
OS/390 MVS IPCS Commands	GC28-1754
OS/390 MVS JCL Reference	GC28-1757
OS/390 MVS JCL User's Guide	GC28-1758
OS/390 MVS Recovery and Reconfiguration Guide	GC28-1777
OS/390 MVS System Codes	GC28-1780
OS/390 MVS System Commands	GC28-1781
OS/390 MVS System Management Facilities (SMF)	GC28-1783
OS/390 MVS System Messages, Vol 1 (ABA-ASA)	GC28-1784
OS/390 MVS System Messages, Vol 2 (ASB-EWX)	GC28-1785
OS/390 MVS System Messages, Vol 3 (GDE-IEB)	GC28-1786
OS/390 MVS System Messages, Vol 4 (IEC-IFD)	GC28-1787
OS/390 MVS System Messages, Vol 5 (IGD-IZP)	GC28-1788
OS/390 MVS Using the Functional Subsystem Interface	SC28-1911
OS/390 Printing Softcopy BOOKs	S544-5354
OS/390 Security Server (RACF) General User's Guide	SC28-1917
OS/390 Security Server (RACF) Security Administrator's Guide	SC28-1915
OS/390 Security Server (RACF) System Programmer's Guide	SC28-1913
OS/390 SDSF Guide and Reference	SC28-1622
OS/390 SMP/E User's Guide	SC28-1740
OS/390 V2R6 PDF Library Collection CD-ROM	SK2T-6718

eNetwork Communications Server

Publication	Order Number
OS/390 eNetwork Communications Server: IP Application Programming Interface Guide	SC31-8516
OS/390 eNetwork Communications Server: IP Configuration Guide	SC31-8513
OS/390 eNetwork Communications Server: IP Network Print Facility	SC31-8522
OS/390 eNetwork Communications Server: IP Programmer's Reference	SC31-8515
OS/390 eNetwork Communications Server: SNA Resource Definition Reference	SC31-8565

MVS/Enterprise Systems Architecture (ESA) Version 5

Publication	Order Number
MVS/ESA SP V5 Authorized Assembler Services Guide	GC28-1467
MVS/ESA SP V5 Diagnosis: Tools and Service Aids	LY28-1845
MVS/ESA SP V5 Hardware Configuration Definition: User's Guide	SC33-6468
MVS/ESA SP V5 Initialization and Tuning Reference	GC28-1452
MVS/ESA SP V5 IPCS Commands	GC28–1491
MVS/ESA SP V5 IPCS User's Guide	GC28-1490
MVS/ESA SP V5 JCL Reference	GC28-1479
MVS/ESA SP V5 JCL User's Guide	GC28-1473
MVS/ESA SP V5 JES2 Commands	GC23-1443
MVS/ESA SP V5 JES2 Initialization and Tuning Guide	SC23-1453
MVS/ESA SP V5 JES2 Initialization and Tuning Reference	SC23-1454
MVS/ESA SP V5 JES2 Messages	GC28-1488
MVS/ESA SP V5 JES3 Commands	GC23-1444
MVS/ESA SP V5 JES3 Initialization and Tuning Guide	SC23-1455
MVS/ESA SP V5 JES3 Initialization and Tuning Reference	SC23-1456
MVS/ESA SP V5 JES3 Messages	GC28-1489
MVS/ESA SP V5 Planning: B1 Security	GC28-1440
MVS/ESA SP V5 Planning: Operations	GC28-1441
MVS/ESA SP V5 Programming: Authorized Assembler Services Reference, Volume 1 (ALESERV-DNALLOC)	GC28-1475
MVS/ESA SP V5 Programming: Authorized Assembler Services Reference, Volume 2 (ENFREQ-ITTFMTB)	GC28-1476
MVS/ESA SP V5 Programming: Authorized Assembler Services Reference, Volume 3 (LLACOPY-SDUMPX)	GC28-1477
MVS/ESA SP V5 Programming: Authorized Assembler Services Reference, Volume 4 (SETFRR-WTOR)	GC28-1478
MVS/ESA SP V5 System Codes	GC28-1486
MVS/ESA SP V5 System Commands	GC28-1442
MVS/ESA SP V5 System Management Facilities	GC28-1457
MVS/ESA SP V5 System Messages, Volume 1	GC28-1480
MVS/ESA SP V5 System Messages, Volume 2	GC28-1481
MVS/ESA SP V5 System Messages, Volume 3	GC28-1482

Publication	Order Number
MVS/ESA SP V5 System Messages, Volume 4	GC28-1483
MVS/ESA SP V5 System Messages, Volume 5	GC28-1484
MVS/ESA SP V5 Using the Functional Subsystem Interface	SC28-1505
RACF V2 General User's Guide	SC23-3728
RACF V2 Security Administrator's Guide	SC23-3726
RACF V2 System Programmer's Guide	SC23-3725
SMP/E R8 User's Guide	SC28-1302
System Display and Search Facility Guide and Reference	SC23-0408

TCP/IP

Publication	Order Number
Internetworking with TCP/IP, Principles, Protocols, and Architecture	SC31-6144
TCP/IP Tutorial and Technical Reference	GG24-3376

TCP/IP for MVS

Publication	Order Number
TCP/IP for MVS: Customization and Administration Guide	SC31-7134
TCP/IP for MVS: Application Programming Interface Reference	SC31-7187
TCP/IP for MVS: Programmer's Reference	SC31-7135

VTAM and NCP

Publication	Order Number
ACF/INCP/SSP Version 3 Resource Definition Reference	SC30-3254
Advanced Communications Function for VTAM, Version 3, Programming	SC23-0115
Advanced Communications Function for VTAM, Version 2, Programming	SC27-0611
Advanced Communications Function for VTAM, Version 3, Customization	SC23-0112
NCP Resource Definition Guide	SC30-3449
NCP: Resource Definition Reference	SC30-3254
NCP: System Support	SC30-3447
Network Program Products: Bibliography and Master Index	GC30-3353
Network Program Products: General Information	GC23-0108
VTAM Resource Definition Reference	SC31-6552
VTAM Version 3 Diagnosis Reference	LY30-5582
VTAM Version 3 Messages and Codes	SC31-6433
VTAM Version 3 Operation	SC23-0113
VTAM Version 4 Diagnosis Guide	LX75-0204
VTAM Version 4 Diagnosis Quick Reference	LX75-0203
VTAM Version 4 Messages and Codes	SC31-6418

Systems Network Architecture

Publication	Order Number
SNA Customization	LY43-0110
SNA Formats (SNA Reference Summary)	GA27-3136
SNA Resource Definition Reference	SC31-8565
SNA Technical Overview	GC30-3073
SNA Transaction Programmer's Reference Manual for LU Type 6.2	GC30-3084
Systems Network Architecture Formats	GA27-3136

AS/400

Publication	Order Number
AS/400 Data Description Specifications	SC41-962
AS/400 Command Language Reference	SC41-3722
AS/400 Printer Device Programming	SC41-3713

Information/System

Publication	Order Number
Introducing the Information/Family	GC34-4045

Index

A

accounting record   37
address
   IP   30
   socket   7, 27
ADDRESS parameter (JCL)   49, 50, 56
APSGEXTP control block   34
APSUCOM control block   34
APSUECA control block   34, 35
APSUECE control block   34, 35
APSUX15 exit routine   33, 37
AUTOSTOP parameter (JES2)   14

B

bibliography   85
broadcasting data sets to multilple systems   68
broadcasting data to multiple servers   48
BUILDING parameter (JCL)   49, 50, 56
BURST parameter (JCL)   50

C

cancelling
   data set being transmitted   42
   Download for OS/390 FSA   43
   Download for OS/390 FSS   44
carriage control parameter   49, 50
CARRIAGE parameter (JES3)   19
case-sensitivity   52
CC parameter (JCL)   49, 50
CHARS parameter
   in DEVICE statement (JES3)   19
   in JCL statement   49, 50, 56
   in OUTSERV statement (JES3)   19
   in PRINTDEV statement   24
checklist of configuration tasks   77
checkpointing data
   CKPNTSEC parameter (JES3)   19
   CKPTMODE parameter (JES2)   15
   CKPTSEC parameter (JCL)   57
   CKPTSEC parameter (JES2)   15
   explanation of   10
   recommended default   11
   specifying an interval in JCL   48, 49, 50, 57
   specifying default in JES2   15
   specifying default in JES3   19
CKPNTSEC parameter (JES3)   19
CKPTMODE parameter (JES2)   15
CKPTSEC parameter (JCL)   49, 50, 57
CKPTSEC parameter (JES2)   15

class
   CLASS parameter (JCL)   49, 50, 57
   CLASS parameter (JES2)   15
   CLASS parameter (routing-control data set)   29
   QUEUE parameter (JES2)   15
   specifying as JES2 work-selection criteria   15, 17
   specifying as JES3 work-selection criteria   21
   SYSOUT parameter (JCL)   65
   WC parameter (JES3)   21
client/server model   6
completion message   44, 62
COMSETUP parameter (JCL)   51, 67
configuring Download for OS/390   5
configuring Download for OS/390, checklist   77
control blocks for the APSUX15 exit   34
COPIES parameter (JCL)   49, 50, 51, 58
cross-reference table
   message-to-module   75

D

data checks
   specifying blocking options for   58
   specifying default blocking option for   25
data streams, types supported   47
data type   52
data type, specifying in shell script   53
data-set name of transmitted data sets   44
DATACK parameter
   in JCL statement   49, 50, 58
   in PRINTDEV statement   25
DCB parameter (JCL)   49, 50, 58
DD JCL statement   56
defaults, specifying   11
DEPT parameter (JCL)   49, 50, 59
DEST parameter
   in JCL   49, 50, 59
   in routing-control data set   29
destination
   DEST parameter (JCL)   49, 50, 59
   DEST parameter (routing-control data set)   29
   DGROUP parameter (JES3)   19
   ROUTECDE parameter (JES2)   16
   specifying as JES2 work-selection criteria   17
   specifying as JES3 work-selection criteria   22
DEVICE statement (JES3)   19
DGROUP parameter (JES3)   19
diagnosing errors   71, 76
DTYPE parameter (JES3)   19
DUMP parameter (PRINTDEV)   25
dump, conditional   75

DUPLEX parameter (JCL)   49, 50, 60
DYNAMIC parameter (JES3)   19

E

enq command   49
errors, diagnosing   71, 76
examples
   JCL   33, 67, 69
   JES2 initialization   14
   JES3 initialization   17
   PRINTDEV statement   22
   routing-control data set   28, 32, 33
   startup procedure JCL   22
exit routine APSUX15   33, 37

F

FCB parameter
   in JCL statement   49, 50, 60
   in PRTnnnn statement (JES2)   15
file format   52
filename of transmitted data sets   44
FLASH parameter (JCL)   51
font
   CHARS parameter (JCL)   56
   CHARS parameter (JES3)   19
   PRINTDEV statement   24
   specified in page definition   52
   specifying default in JES   11
   specifying default in JES2   17, 24
   specifying default in JES3   19
   UCS parameter (JCL)   66
   UCS parameter (JES2)   17
form definition
   FORMDEF parameter (JCL)   60
   FORMDEF parameter (PRINTDEV)   25
   specifying default in JES   11, 25
form name
   FORMS parameter (JCL)   61
   FORMS parameter (JES2)   15
   FORMS parameter (JES3)   20
   FORMS parameter (routing-control data set)   29
   specifying as JES2 work-selection criteria   17
   specifying as JES3 work-selection criteria   22
   SYSOUT parameter (JCL)   65
FORMDEF parameter
   in JCL statement   49, 50, 60
   in PRINTDEV statement   25
FORMS parameter
   in DEVICE statement (JES3)   20
   in JCL statement   49, 50, 61
   in PRTnnnn statement (JES2)   17
   in routing-control data set   29
FSA
   See functional subsystem application (FSA)

FSS
   See functional subsystem (FSS)
FSS initialization statement (JES2)   14
FSSDEF statement (JES3)   18
FSSNAME parameter (JES3)   18, 20
functional subsystem (FSS)
   defining multiple FSSs   9
   differences between PSF/MVS   12
   name, specifying in JES2   14
   name, specifying in JES3   18
   planning tasks   8
   relationship to PSF for OS/390 FSS   8
   starting   41
   stopping   44
functional subsystem application (FSA)
   defining multiple FSAs   9
   name, specifying in JES2   15
   name, specifying in JES3   20
   starting   41
   stopping   43

G

GTF trace   71

H

HASPFSSM parameter (JES2)   14
hierarchy of statements in routing-control data set   31
host name in routing-control data set   30

I

IAZJSPA control block   34
InfoPrint Manager for AIX
   JCL parameters for use with   54
   passing additional parameters in an exit routine   33
   specifying options for   49
inline resources
   fonts   56
   form definition   52, 61
   in line data   52
   in mixed-mode data   52
   page definition   52, 64
installing Download for OS/390   7
installing the APSUX15 exit   37
interval
   checkpoint, recommended default   11
   checkpoint, specifying default in JES2   15
   checkpoint, specifying default in JES3   19
   checkpoint, specifying in JCL   48, 57
   retry   30
INTRAY parameter (JCL)   49, 50, 61
IP address in routing-control data set   30
IPADDR parameter (routing-control data set)   30

Communicating Your Comments to IBM

Print Services Facility for OS/390
Download for OS/390
Version 3, Release 1.0

Publication No. S544-5624-00

If you especially like or dislike anything about this book, please use one of the methods listed below to send your comments to IBM. Whichever method you choose, make sure you send your name, address, and telephone number if you would like a reply.

Feel free to comment on specific errors or omissions, accuracy, organization, subject matter, or completeness of this book. However, the comments you send should pertain to only the information in this manual and the way in which the information is presented. To request additional publications, or to ask questions or make comments about the functions of IBM products or systems, you should talk to your IBM representative or to your IBM authorized remarketer.

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

If you are mailing a readers' comment form (RCF) from a country other than the United States, you can give the RCF to the local IBM branch office or IBM representative for postage-paid mailing.

- If you prefer to send comments by mail, use the RCF at the back of this book.
- If you prefer to send comments by FAX, use this number:

  1-800-524-1519

- If you prefer to send comments electronically, use this network ID:

  printpub@us.ibm.com

Make sure to include the following in your note:

- Title and publication number of this book
- Page number or topic to which your comment applies.

Readers' Comments — We'd Like to Hear from You

Print Services Facility for OS/390
Download for OS/390
Version 3, Release 1.0

Publication No. S544-5624-00

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	□	□	□	□	□

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	□	□	□	□	□
Complete	□	□	□	□	□
Easy to find	□	□	□	□	□
Easy to understand	□	□	□	□	□
Well organized	□	□	□	□	□
Applicable to your tasks	□	□	□	□	□

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? □ Yes □ No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

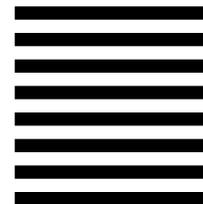Address

Company or Organization

Phone No.

Readers' Comments — We'd Like to Hear from You
S544-5624-00

Fold and Tape   **Please do not staple**   Fold and Tape

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL   PERMIT NO. 40   ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

IBM Corporation
Information Development
IBM Printing Systems Company
Department H7FE Building 003G
Boulder, CO 80301-9817

Fold and Tape   **Please do not staple**   Fold and Tape

S544-5624-00

IBM®