Introduction and Planning Guide
Fifth Edition (September 2004)


This edition applies to IBM DB2 Content Manager OnDemand for z/OS and OS/390, Version 7 Release 1 (Program Number 5655-H39) and to all subsequent releases and modifications of the product until otherwise indicated in new editions.

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About this publication

This book contains information about IBM® DB2™ Content Manager OnDemand for z/OS™ and OS/390®, Version 7.1 (OnDemand). The database management product used by OnDemand on the OS/390 and z/OS operating systems is IBM DB2. OnDemand can store data by using Virtual Storage Access Method (VSAM) files or an archive storage manager, OAM (Object Access Method).

Who should use this publication

This book is of primary interest to administrators who plan to install, administer, and use OnDemand. It is also intended for people in an organization who plan hardware, software, network, recovery, and applications for business systems.

How this publication is organized

This publication is organized as follows:

- **Part 1, “Introduction,” on page 1** provides an overview of OnDemand and lists the hardware, software, and printing requirements for the system. This part contains the following sections:
  - **Chapter 1, “About OnDemand,” on page 3** provides an overview of the system.
  - **Chapter 2, “Preparing for OnDemand,” on page 15** contains information that can help you prepare your organization for OnDemand. It lists the tasks that system administrators must do to configure and maintain the system. This section also provides an overview about server programs, user exits, and other facilities that can be used to customize the operation of the system.
  - **Chapter 3, “Hardware and software,” on page 25** lists the hardware and software requirements, provides information about the different types of server configurations, and contains information about printing and indexing reports.

- **Part 2, “Planning information,” on page 33** contains information that can help you define reports to OnDemand, indexing, and storage requirements. It helps you plan for backup and recovery of data on the system. This part contains the following sections:
  - **Chapter 4, “Reports and other data,” on page 35** contains information that can help you plan for the reports that you will be storing on the system.
  - **Chapter 5, “OnDemand objects,” on page 45** contains information that can help you plan application groups, applications, and folders for your reports.
  - **Chapter 6, “Storage requirements,” on page 57** provides information that can help you estimate the amount of storage that is required to maintain reports on the system.
  - **Chapter 7, “Backup and recovery,” on page 73** provides information that you can use to develop plans for system backup and recovery.

The **“Glossary” on page 81** contains terms and definitions that you might find helpful as you and others in your organization learn about and use OnDemand.
Where to find more information

Your product package includes a complete set of information to help you plan for, install, administer, and use your system. Product documentation is provided in both BookManager and portable document format (PDF). You can view the PDF files online using the Adobe Acrobat Reader for your operating system. If you do not have the Acrobat Reader installed, you can download it from the Adobe Web site at www.adobe.com.

Product documentation is also available from the OnDemand Web site (www.ibm.com/software/data/ondemand/390) and the IBM Publication Ordering System (www.ibm.com/shop/publications/order).

Table 1 lists the OnDemand for z/OS and OS/390 Version 7 publications.

<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration Guide</td>
<td>GC27-1373</td>
</tr>
<tr>
<td>Administration Guide</td>
<td>SC27-1374</td>
</tr>
<tr>
<td>Indexing Reference</td>
<td>SC27-1375</td>
</tr>
<tr>
<td>Web Enablement Kit Implementation Guide</td>
<td>SC27-1376</td>
</tr>
<tr>
<td>OnDemand Distribution Facility Installation and Reference Guide</td>
<td>SC27-1377</td>
</tr>
<tr>
<td>Messages and Codes</td>
<td>SC27-1379</td>
</tr>
<tr>
<td>Introduction and Planning Guide</td>
<td>GC27-1438</td>
</tr>
<tr>
<td>User’s Guide</td>
<td>SC27-0836</td>
</tr>
<tr>
<td>Windows Client Customization Guide and Reference</td>
<td>SC27-0837</td>
</tr>
<tr>
<td>Migration Guide</td>
<td>LY37-3746</td>
</tr>
</tbody>
</table>

Note: The IBM DB2 Content Manager OnDemand for z/OS: Migration Guide, is a licensed publication. It is available only for customers who are migrating from OnDemand for OS/390 Version 2.1 to OnDemand for z/OS and OS/390, Version 7.1. See your local IBM representative to obtain this publication.

The IBM DB2 Content Manager OnDemand for z/OS: Introduction and Planning Guide contains a glossary of terms for the OnDemand library. The IBM DB2 Content Manager OnDemand: User’s Guide has a smaller glossary selected for OnDemand users rather than administrators. The IBM DB2 Content Manager OnDemand for z/OS: OnDemand Distribution Facility Installation and Reference Guide includes a glossary of terms that are specific to the OnDemand Distribution Facility.

Accessibility information for OnDemand for z/OS and OS/390

For complete information about accessibility features that are supported by this product, see the IBM DB2 Content Manager OnDemand for z/OS: Administration Guide.

Information about other products

You can find current information about z/OS and OS/390 from these Web sites:

OS/390

www.ibm.com/servers/s390/os390
From the above Web sites, follow the links to access the z/OS and OS/390 manuals in BookManager READ and Adobe PDF formats. The manuals are also available in Collections on CD-ROM that can be ordered from the IBM Publications Center on the Web. Use the following links to find current information about these products:

**CICS**  www.ibm.com/software/ts/cics/

**DB2 Universal Database**  
www.ibm.com/software/data/db2/

**TCP/IP**  
To find current information about TCP/IP support, see the z/OS Web site at www.ibm.com/servers/eserver/zseries/zos or the OS/390 Web site at www.ibm.com/servers/s390/os390.

**USS (UNIX System Services)**  
www.ibm.com/servers/eserver/zseries/zos/unix/

OAM (Object Access Method) and VSAM (Virtual Storage Access Method) are documented under DFSMS/MVS system management software. DFSMS/MVS product information is available from the z/OS and OS/390 Web sites listed above. For OAM, see z/OS DFSMS Object Access Method Planning, Installation, and Storage Administration Guide for Object Support, SC35-0426.

**Support available on the Web**

IBM provides updated product information online. Follow the Support link at www.ibm.com/software/data/ondemand/390/ for frequently asked questions, hints and tips, and technical notes.

**Education and training**

IBM offers several classes for OnDemand administrators. Follow the Training and certification link at www.ibm.com/software/data/ondemand/ for course descriptions and prices.

**How to send your comments**

Your feedback helps IBM to provide quality information. Please send any comments that you have about this publication or other OnDemand documentation. You can use either of the following methods to provide comments:

- Send your comments from the Web. Visit the IBM Data Management Online Reader’s Comment Form (RCF) page at: www.ibm.com/software/data/rcf
- Send your comments by e-mail to: ondemand@us.ibm.com

Be sure to include the name of the product, the version number of the product, and the name of the book. If you are commenting on specific text, please include the location of the text (for example, a chapter and section title, a table number, a page number, or a help topic title).
Part 1. Introduction

This section of the book provides an overview of the OnDemand system and contains information that can help you better understand how OnDemand works. This section describes how OnDemand manages reports and index data. It includes important information about how OnDemand, the database manager, and the storage manager work to index, load, and retrieve documents. And it contains a list of the tasks that OnDemand administrators typically perform to manage an OnDemand system.

1. In OnDemand, the term report refers to any type of data that you want to store in the system.
2. In OnDemand, the term document refers to an indexed part of a report, such as a statement, policy, or other logical grouping of pages.
Chapter 1. About OnDemand

Overview

OnDemand supports any organization that can benefit from hard copy or microfiche replacement and instant access to information. An OnDemand system can support small office environments and large enterprise installations with hundreds of system users. OnDemand can dramatically improve productivity and customer service in many businesses by providing fast access to information stored in the system.

OnDemand processes the print output of application programs, extracts index fields from the data, stores the index information in a relational database, and stores one or more copies of the data in the system. With OnDemand, you can archive newly created and frequently accessed reports on high speed, disk storage volumes and automatically migrate them to other types of storage volumes as they age.

OnDemand fully integrates the capabilities of Advanced Function Presentation (AFP), including management of resources, indexes, and annotations, and supports full fidelity reprinting of documents to devices attached to a PC, an OnDemand server, or any other server on the network.

OnDemand provides administrators with tools to manage OnDemand servers and to authorize users to access OnDemand servers and data stored in the system.

OnDemand provides users the ability to view documents, print and send copies of documents, and attach electronic notes to documents.

Some of the advantages that OnDemand offers include:
- Locate data easily without specifying the exact report
- Retrieve the pages of the report that you need without processing the entire report
- View selected data from within a report

OnDemand can provide you with an information management tool that can increase your effectiveness when working with customers.

OnDemand does the following:
- Integrates data created by application programs into an online, electronic information archive and retrieval system
- Provides controlled and reliable access to all of an organization’s reports
- Retrieves the data that you need when you need it
- Provides a standard, intuitive client with features such as thumbnails, bookmarks, notes, and shortcuts

These features mean that OnDemand can help you quickly retrieve the specific page of a report that you need to provide fast customer service.
System overview

An OnDemand system consists of client programs and server programs that communicate over a network running the TCP/IP communications protocol, a database manager that maintains index data and server control information, and storage managers that maintain documents on various types of storage devices. Figure 1 shows an example.

![OnDemand System Diagram](image)

Figure 1. OnDemand system

OnDemand client programs run on PCs and terminals attached to the network and communicate with OnDemand servers. The OnDemand library server manages a database of information about the users of the system and the reports stored on the system. An OnDemand object server manages the reports on disk, optical, and tape storage devices. An OnDemand system has one library server and one or more object servers. An object server can operate on the same system or node as the library server or on a different system or node than the library server.

OnDemand client programs operate on personal computers running Windows³. The client program is the user’s way to search for and retrieve reports stored on the system. Using the client program, users can construct queries and search for reports, retrieve documents from OnDemand, view and print copies or pages of documents, and attach electronic notes to pages of a document.

OnDemand servers manage control information and index data, store and retrieve documents and resource group files, and process query requests from OnDemand client programs. The documents can reside on disk, optical, and tape storage volumes. New reports can be loaded into OnDemand every day. That way, OnDemand can retrieve the latest information generated by application programs.

OnDemand client programs and servers communicate over a computer network supported by TCP/IP. When a user submits a query, the client program sends a search request to the OnDemand library server. The library server returns the list of documents that match the query to the user. When the user selects a document for viewing, the client program retrieves a copy of the document from the object server where the document is stored, opens a viewing window, and displays the document.

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3. OnDemand provides the capability to do most client functions from almost any operating system by using a Web browser. See “OnDemand Web Enablement Kit” on page 12 for information about accessing data stored in OnDemand servers with a Web browser.
Concepts

The terms application, application group, and folder represent how OnDemand stores, manages, retrieves, views, and prints reports and index data. When defining a new report or type of data to OnDemand, an administrator must create an application and assign the application to an application group. (If an application group does not exist, the administrator must create one first.) Before users can search for and retrieve documents, an administrator must create or update a folder to use the application group and application.

Application

An application describes the physical characteristics of a report to OnDemand. Typically you define an application for each program that produces output that will be stored in OnDemand. The application includes information about the format of the data, the orientation of data on the page, the paper size, the record length, and the code page of the data. The application also includes parameters that the indexing program uses to locate and extract index data and processing instructions that OnDemand uses to load index data in the database and documents on storage volumes.

Application Group

An application group contains the storage management attributes of and index fields for the data that you load into in OnDemand. When you load a report into OnDemand, you must identify the application group where OnDemand will load the index data and store the documents. An application group is a collection of one or more OnDemand applications with common indexing and storage management attributes. You typically group several different reports in an application group so that users can access the information contained in the reports with a single query. All of the applications in the application group must be indexed on the same fields, for example, customer name, account number, and date.

Folder

A folder is the user’s way to query and retrieve data stored in OnDemand. A folder provides users with a convenient way to find related information stored in OnDemand, regardless of the source of the information or how the data was prepared. A folder allows an administrator to set up a common query screen for several application groups that may use different indexing schemes, so that a user can retrieve the data with a single query. For example, a folder called Student Information might contain transcripts, bills, and grades, which represents information stored in different application groups, defined in different applications, and created by different programs.

Figure 2 on page 6 illustrates the concepts described in this section.
Indexing methods

OnDemand provides two basic ways to index data:

- Document indexing is used for reports that contain logical items such as policies, and statements. Each of the items in a report can be individually indexed on values such as account number, customer name, and balance. OnDemand supports up to 32 index values per item. With document indexing, the user does not necessarily need to know about reports or report cycles to retrieve a document from OnDemand.

- Report indexing is used for reports that contain many pages of the same kind of data, such as a transaction log. Each line in the report usually identifies a specific transaction, and it would not be cost effective to index each line. OnDemand stores the report as groups of pages and indexes each group. When reports include a sorted transaction value (for example, invoice number), OnDemand can index the data on the transaction value. This is done by

Figure 2. Folders, application groups, and applications (part 1 of 2)

Figure 3. Folders, application groups, and applications (part 2 of 2)
extracting the beginning and ending transaction values for each group of pages and storing the values in the database. This type of indexing lets users retrieve a specific transaction value directly.

**Documents**

OnDemand documents represent indexed groups of pages. Typically an OnDemand document is a logical section of a larger report, such as an individual customer statement within a report of thousands of statements. An OnDemand document can also represent a portion of a larger report. For reports that do not contain logical groups of pages, such as transaction logs, OnDemand can divide the report into groups of pages. The groups of pages are individually indexed and can be retrieved to the client workstation much more efficiently than the entire report. Documents are always identified by date, and usually one or more other ways, such as customer name, customer number, or transaction number.

*Figure 4* illustrates OnDemand applications and documents. An administrator could define the BILLS application for a report that contains logical items, such as customer statements. The BILLS application uses the document indexing method to divide the report into documents. Each statement in the report becomes a document in OnDemand. Users can retrieve a statement by specifying the date and any combination of name and number. An administrator could define the TRANS application for a report that contains lines of sorted transaction data. The TRANS application uses the report indexing method to divide the report into documents. Each group of 100 pages in the report becomes a document in OnDemand. Each group is indexed using the first and last sorted transaction values that occur in the group. Users can retrieve the group of pages that contains a specific transaction number by specifying the date and the transaction number. OnDemand retrieves the group that contains the value entered by the user.

*Figure 4. Applications and documents*

**Servers**

The OnDemand server environment includes a library server and one or more object servers residing on one or more systems connected to a TCP/IP network.

The library server maintains a central database about the reports stored in OnDemand. The database also contains information about the objects defined to the system, such as users, groups, printers, application groups, applications, folders, and storage sets. The database manager provides the database engine and utilities to administer the database. The library server processes client logons,
queries, and print requests and updates to the database. The major functions that run on the library server are the request manager, the database manager, and the server print manager.

An object server maintains documents in cache storage volumes (HFS) in addition to VSAM files or OAM objects. An object server loads data, retrieves documents, and expires documents. The major functions that run on an object server are the cache storage manager, OnDemand data loading and maintenance programs and optionally, the archive storage manager (OAM or VSAM).

The basic OnDemand configuration is a library server and an object server on the same OS/390 or z/OS system. This single library and object server configuration supports the database functions and cache storage on the same system. You can also configure your OnDemand system with the library server on one system and one or more object servers on different systems. This configuration is known as a distributed library and object server system. The distributed library and object server configuration supports caching of documents on different servers.

The OnDemand server environment contains several components:

- A request manager that provides client, network, and operating system services with security and accounting. The request manager resides on the library server.
- A database manager that maintains the index data for the reports you store on the system. The database manager is the relational database management product, DB2 (OnDemand). The database manager resides on the library server.
- Database control information about the users, groups, application groups, applications, folders, storage sets, and printers that you define on the system. The control information determines who can access the system, the folders that a user can open, and the application group data that a user can query and retrieve. The database resides on the library server.
- A cache storage manager that maintains documents in the HFS (Hierarchical File System). Cache storage is for high-speed access to the most frequently used documents.
- An archive storage manager, which is an optional part of the system. The archive storage manager is for the long-term storage of one or more copies of documents on archive media, in the form of either VSAM files or OAM objects.
- Data indexing and conversion programs. These programs extract index data from input files or generate index data and, depending on the indexer, optionally collect resources and transform input data from one format to another.

OnDemand provides several indexing programs:

- The AFP Conversion and Indexing Facility (ACIF) can be used to index line data, ASCII data, and AFP input files. ACIF can collect the resources that are required to view AFP documents and convert line data input into AFP data to be stored on the system.
- The OS/390 Indexer is particularly useful for customers that are migrating from OnDemand for OS/390 Version 2.1, as it supports the Version 2.1 report types of DOC, PAGE, PDOC, NODX and AFP. The OS/390 Indexer also supports the Version 2.1 style of Input, Index and Anystore Exits.
- The OnDemand PDF Indexer can be used to create index data for Adobe Acrobat PDF input files.
- The OnDemand Generic Indexer can be used to create index data for almost any other type of data that you want to store on the system, such as Hypertext Markup Language (HTML) files, Lotus WordPro files, compressed and uncompressed Tagged Image File Format (TIFF) files, and so on.
The indexing programs can run on any OnDemand server, and if necessary, the index data can be transferred to the z/OS or OS/390 system.

- Data loading programs that can be set up to automatically store report data into application groups and update the database. The data loading programs can run on any OnDemand server.
- Archived reports and resources.
- A server print facility that allows users to reprint a large volume of documents at high speed.
- OnDemand management programs to maintain the OnDemand database and documents in cache storage.
- A system logging facility that provides administrators with tools to monitor server activity and respond to specific events as they occur. The interface to the system logging facility is through the System Log folder and the System Log user exit.

The following topics provide additional information:
- The OnDemand request manager
- The OnDemand database manager
- The OnDemand storage manager
- Data indexing and loading
- OnDemand management programs

**Request manager**

The request manager processes search requests from OnDemand client programs. When a user enters a query, the client program sends a request over the network to the request manager. The request manager works with the database manager to compile a list of the items that match the query and returns the list to the client program. When the user selects an item for viewing, the request manager sends a retrieval request to the appropriate storage manager; the cache storage manager, if the document resides in cache storage, or the archive storage manager, if the document resides in archive storage. The appropriate storage manager retrieves the document and, optionally, the resources associated with the item. The OnDemand client program decompresses and displays the document.

OnDemand management programs include utilities that maintain the database and cache storage, with the ability to automatically migrate data from the database and cache storage volumes to archive storage. These programs use the services of the request manager to manage index data, documents, and resource files.

When a user logs on to the system, OnDemand assigns a unique transaction number to that instance of the client program. All activity associated with that instance of the client program contains the same transaction number. The request manager records messages generated by the various OnDemand programs in the System Log, for example, logon, query, print, and so forth. These System Log messages contain the transaction number, userid, time stamp, and other information. Administrators can open the System Log folder and view the messages. OnDemand also provides a System Log user exit so that you can run a user-defined program to process messages. For example, you could design a user-defined program to send an alert to an administrator when certain messages appear in the System Log. The messages in the System Log can also be used to generate usage and billing reports.
Database manager

OnDemand uses a database management product, DB2, to maintain the index data for the reports that you load into the system. The database manager also maintains the OnDemand system tables that describe the applications, application groups, storage sets, folders, groups, users, and printers that you define to the system. You should periodically collect statistics on the tables in the database to optimize the operation of the OnDemand database.

Storage manager

The OnDemand cache storage manager maintains a copy of documents in the HFS and, optionally, the archive storage manager migrates a copy of the documents into VSAM files or OAM objects. Note: SMS is required to maintain VSAM datasets that are used for archive storage of OnDemand documents.

Data indexing and loading

The reports that you store in OnDemand must be indexed. OnDemand supports several types of index data and indexing programs. For example, you can use ACIF to extract index data from the reports that you want to store on the system. An administrator defines the index fields and other processing parameters that ACIF uses to locate and extract index information from reports. OnDemand data loading programs read the index data generated by ACIF and load it into the OnDemand database. The data loading programs obtain other processing parameters from the OnDemand database, such as parameters used to segment, compress, and store report data in cache storage and on archive media. If you plan to index reports on an OnDemand server, you can define the parameters with the administrative client. The administrative client includes a report wizard that lets you create ACIF indexing parameters by visually marking up sample report data. OnDemand also provides indexing programs that can be used to generate index data for Adobe PDF files and other types of source data, such as TIF images. See the IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 for details about the indexing programs that are provided with OnDemand.

Figure 5 shows an overview of the data preparation process.

Figure 5. Data preparation, indexing, and loading

In the picture, user-defined application programs generate printed reports and save report data to disk.

Figure 6 on page 11 shows an overview of the data indexing and loading process.
The OnDemand data loading program first determines whether the report needs to be indexed. If the report needs to be indexed, the data loading program calls the appropriate indexing program. The indexing program uses the indexing parameters from the OnDemand application to process the report data. The indexing program can extract and generate index data, divide the report into indexed groups, and collect the resources required to view and reprint the report. After indexing the report, the data loading program processes the index data, the indexed groups, and the resources using other parameters from the application and application group. The data loading program works with the database manager to update the OnDemand database with index data extracted from the report. The data loading program also works with the cache storage manager to segment, compress, and copy report data to HFS cache storage files.

Management programs

When someone in your organization creates an application group, they specify parameters that OnDemand programs use to maintain the report data that is stored in the application group. For example, when creating an application group, the administrator specifies the length of time that documents should be maintained on the system and whether index data should be migrated from the database to archive storage. OnDemand programs use the information to migrate documents from cache storage to archive storage, delete documents from cache storage, migrate index data from the database to archive storage, and delete index data from the database. These functions are useful because OnDemand can reclaim the database and cache storage space released by expired and migrated data. IBM recommends that you configure your OnDemand system to automatically start these management programs on a regular schedule, usually once every night or once a week, depending on the workload on the system and other installation-dependent requirements.

The archive storage manager deletes data from archive storage when it reaches its storage expiration date. An administrator defines management information to the archive storage manager to support the OnDemand data that it manages. The management information includes the storage libraries and storage volumes that can contain OnDemand data, the number of copies of a report to maintain, and how long to keep data in the archive management system.

OnDemand and the archive storage manager delete data independently of each other. Each uses its own criteria to determine when to remove documents. Each uses its own utilities and schedules to remove documents. However, for final
removal of documents from the system, you should always specify the same
criteria to OnDemand and the archive storage manager.

**OnDemand Web Enablement Kit**

The OnDemand Web Enablement Kit (ODWEK) is an optional feature of
OnDemand that allows users to access data that is stored in an OnDemand server
by using a Web browser. For example, you can provide some users with the
Uniform Resource Locator (URL) of a Web page that permits them to log on to an
OnDemand server; you can provide other users with the URL of a Web page that
permits them to search a specific folder. ODWEK verifies that the user information
is valid on the OnDemand server, such as permission to access the server and data
stored in an application group. After the user submits a search, ODWEK displays a
Web page that contains a list of the documents that match the query. The user
selects a document to view and ODWEK sends the document to the browser.

Figure 7 shows a workstation with a Web browser that is being used to access data
from an OnDemand server.

![Image showing a workstation with a Web browser accessing OnDemand data using ODWEK](image)

**Figure 7. Accessing data stored in OnDemand using ODWEK**

ODWEK can search for and retrieve documents from OnDemand servers that are
running IBM DB2 Content Manager OnDemand for z/OS and OS/390, Version 7,
IBM DB2 Content Manager OnDemand for iSeries Common Server Version 5, and
IBM DB2 Content Manager OnDemand for Multiplatforms Version 7.

ODWEK contains several components:

- The OnDemand server interface. The server interface uses standard OnDemand
  interfaces and protocols to access data stored in an OnDemand server. No
  additional code is needed on the OnDemand server to support ODWEK. You
can use one of the following server interfaces with your ODWEK application:
  - CGI program. The CGI program runs on a z/OS or OS/390 system that is
    running an HTTP server, such as the IBM HTTP Server.
  - Java servlet. The servlet runs on a z/OS or OS/390 system that is running a
    Java-enabled HTTP server (running as a Java application server), such as the
    IBM WebSphere Application Server. The servlet requires Java version 1.2.2 or
    later.
  - Java Application Programming Interface (Java API). The Java API requires
    Java version 1.2.2 or later.
- The IBM OnDemand AFP Web Viewer. The AFP Web Viewer lets users search,
  retrieve, view, navigate, and print AFP documents from a Web browser.
- The IBM OnDemand Image Web Viewer. The Image Web Viewer lets users
  search, retrieve, view, navigate, and print BMP, GIF, JPEG, PCX, and TIFF
  documents from a Web browser.
- The Line Data Java applet. The Line Data applet lets users view line data
  documents from a Web browser.
- The AFP2HTML Java applet. The AFP2HTML applet lets users view the output
generated by the IBM AFP2WEB Transform service offering. The AFP2WEB
Transform converts AFP documents and resources into HTML files that can be
displayed with the AFP2HTML applet. After installing and configuring the AFP2WEB Transform, an administrator enables the use of the AFP2HTML applet by configuring the ARSWWW.INI file.

**Viewing and transforming documents**

To view other types of documents that are stored in OnDemand, you must obtain and install the appropriate viewer. For example, to view Adobe Portable Data Format (PDF) documents, IBM recommends that you obtain the Adobe Acrobat viewer for the browsers that are used in your organization.

To use the viewers and applets, the browser must be Netscape Navigator Version 4.06 or later or Internet Explorer Version 4.01 or later.

To convert AFP documents that are stored in OnDemand into PDF documents that you can view with the Adobe Acrobat viewer requires either the AFP2PDF transform or the Xenos transform. See your IBM representative for more information about these optional, separately-priced transforms.

To convert AFP or Metacode documents that are stored in OnDemand into HTML or Extensible Markup Language (XML) files that you can view with a Web browser requires the Xenos transforms. See your IBM representative for more information about the Xenos transforms.

Chapter 2. Preparing for OnDemand

This section contains an outline that you may find helpful as you prepare your organization for the OnDemand environment and perform a pilot roll out of the system.

- Work with a single department or group of end-users. Send a memo to the users to explain how OnDemand will affect their daily work.
- Develop an end-user training course or contact IBM for help with training for OnDemand.
- Establish a support plan for the users. The plan should include the names and phone numbers of persons to contact for assistance and a list of troubleshooting tips.
- Develop a set of evaluation and completion criteria that you can use to compare against the actual performance of the system.
- Choose a report or set of reports for an initial migration to OnDemand. Obtain hardcopy of the reports.
- Review the reports and determine the type of indexing required. Then select the fields from the reports for index, filter, and display fields.
- Review the selections with the users. Verify that the index, search, and display fields allow the users to retrieve the data that they need.
- Determine the viewing requirements of your users.
- Identify the type of data contained in the report and determine how you will create index data.
- If you plan to use ACIF to index the report, you must identify the resources used by the report. Resources are reusable objects found on pages of a report, such as overlays and page segments. Overlays contain constant data that is merged with variable report data during printing and viewing. Page segments are graphics and images that appear on pages of a report file, such as a company logo. Resources can be used by different applications in OnDemand.
- Configure cache storage and archive storage (optical and tape storage devices) on the OnDemand servers. Define and configure archive media devices to OAM and/or VSAM. Define storage management policies to OAM and/or VSAM to support the reports that you plan to store on the system. **Note**: VSAM datasets must be managed by SMS.
- Use the OnDemand administrative client to create the application groups and applications required to support your reports.
- Use the administrative client to define the folders that users open to access data stored on the system.
- Use the administrative client to define users and groups to OnDemand.
- Index the reports.
- Load the report, resources, and index data into the application group.
- Begin end-user testing. Survey the users about initial testing and index, search, and display fields.
- Collect additional information from users, report suppliers, production scheduling, and capacity planning. For example:
  - The frequency with which a report is generated and must be loaded into the system
  - The number of pages in a report
– The number of indexed items, such as statements, contained in a report
– The access frequency and patterns of your users
– The length of time until a version of a report is out of date; the length of time that you want OnDemand to maintain a report on the system
– The number of copies of a report that must be maintained on the system

• Use the administrative client to update OnDemand with the information that you collect.
• Survey users about their satisfaction with OnDemand. Compare the performance of the system with the evaluation and completion criteria that you established. Prepare a list of issues to resolve.
• Update your company’s vital records list to include the hardware and software required by the OnDemand system. Update your company’s operations and recovery manuals with information required to operate, support, and backup the OnDemand system.

Administrative roles and responsibilities

OnDemand administrators assume responsibility for and take care of the OnDemand system. The OnDemand system includes all sorts of things, including hardware, application and system software, reports, and users.

• Hardware includes the OS/390 system, client PC’s, terminals, printers and the networking equipment.
• Software includes the base operating system, prerequisite software, and client and server programs, configuration files and shell scripts.
• Administrators define OnDemand applications and decide how OnDemand will manage data on the servers.
• Administrators define OnDemand groups and users to the system and make sure that the client software is installed and operating properly.

While OnDemand administrators are responsible for this collective environment from the viewpoint of OnDemand users, it is likely the OnDemand administrators are not the only people in an organization working on all these components.

Depending on the size of your organization, there may be one person or many people administering the system. If your organization is large, the administrative tasks may be divided among several people. For example, an OnDemand system administrator could maintain OnDemand storage sets, system printers, groups, and users; an OnDemand application administrator could maintain application groups, applications, and folders; an operating system administrator could apply base operating system upgrades and perform problem determination; and a service administrator could maintain records of system and network hardware and software and make equipment changes.

The following list of items is typical of the tasks required to administer and maintain an OnDemand system. Some of these tasks may be the responsibility of a person other than an OnDemand administrator.

• Installing and upgrading equipment
• Installing and maintaining OnDemand programs and other software
• Defining and labeling storage volumes
• Monitoring the space used by the database and the space available on the system
- Monitoring the space used for cache storage and the space available on the system
- Monitoring the space used for archive storage and the space available on the system
- Scheduling jobs to maintain the database, cache storage, and archive storage
- Working with users to determine report indexing and retrieval requirements
- Defining storage sets and storage nodes
- Defining OnDemand system printers
- Defining reports to the system
- Defining OnDemand groups and users
- Loading reports on the system
- Managing the backup and recovery process for the database and other areas that contain data critical to the operation of the system
- Monitoring server activity and tuning system parameters
- Solving server, network, and application problems
- Answering end-user questions
- Establishing security and audit policies, for example: set and maintain passwords and permissions; use OnDemand’s audit facilities to monitor application group and user activity; develop, document, and maintain change control procedures to prevent unauthorized changes to the system

OnDemand provides an administrative client to allow administrators to maintain OnDemand objects through an easy-to-use, graphical user interface. The administrative client is a 32-bit Windows application. The administrative client allows administrators to define and maintain application groups, storage sets, storage nodes, folders, system printers, applications, groups, and users. The administrative client includes features that allow administrators to process sample report data and create ACIF indexing parameters and logical views by visually marking up a sample of a report.

OnDemand provides a set of administrative commands to help administrators maintain the system. For example, OnDemand provides commands for loading and unloading reports, maintaining the database and cache storage, and querying and retrieving documents. Many of the administrative commands can be configured to run automatically, on a regular schedule.

Applicafion programming interfaces

OnDemand provides several kinds of application programming interfaces that you can use to customize OnDemand clients and work with objects on the server.

Client customization

OnDemand provides information about the Object Linking and Embedding (OLE) control and how to customize the Windows client by specifying command line parameters, by invoking and manipulating OnDemand from other Windows 32-bit applications with the Dynamic Data Exchange (DDE) interface, or by creating a Product Information File (PIF).

For example, you can integrate Monarch 4 Version 5 with the Windows client so that users can load OnDemand documents into Monarch. The user can then do complex data manipulation in Monarch, such as creating derived columns and generating charts and reports. See the IBM DB2 Content Manager OnDemand: Windows Client Customization Guide, SC27-0837 for more information.

Server programs

OnDemand provides programs that you can use to work with objects on the system. For example:

- The ARSADM program is a utility for maintaining users, groups, printers, and storage sets. You can use the ARSADM program to add, delete, and update users, groups, printers, and storage sets. You can run the ARSADM program in a variety of ways under USS and the OS/390 environment; IBM recommends that you run it as a started task.

- The ARSDOC program is a multi-purpose document processing program. You can use the ARSDOC program to query the library server and generate a list of items that match a query; retrieve documents from the system; add, delete, and update documents; and send documents to the server print facility. You can run the ARSDOC program in a variety of ways under USS and the OS/390 environment; IBM recommends that you run it as a started task.

- The ARSEXPIR program can be used to process SMF records that indicate OnDemand objects have expired, and have the associated index entries for those objects removed. The program uses the SMF type 65, type 85, and the user type records written by ARSSMFWR to determine which objects have been deleted. The ARSEXPIR program then has the server remove the index entries.

**Note:** If an installation does not desire to configure their SMS management policies to expire objects in accordance with the values that they have specified in the OnDemand application group, it is possible to have the deletions of the object by the storage manager cause the deletion of the OnDemand indexes.

This requires the use of the ARSEXPIR program and the collection of SMF data that reflects the object deletions. The installation must collect type 65 SMF records if they are using VSAM. If they are using OAM, they must collect type 85 and install ARSSMFWR as the CBRHADUX OAM auto-delete exit.

See “Deleting OAM and VSAM Objects” in the IBM DB2 Content Manager OnDemand for z/OS: Administration Guide, SC27-1374 for more information.

- The ARSTBLSP program can be run to change the table that OnDemand loads data into. During normal operation, OnDemand loads index rows into a table until the Maximum Rows value for the application group has been reached. Such a table is said to be open for loading. When the Maximum Rows value is reached, the table is closed and a new table and table space are created. Under certain circumstances, an installation may desire to close a table to loading before the Maximum Rows value is reached. For example, migration processing (by using arsmaint -e) will not process a table that is open for loading, and the installation may desire to migrate the table earlier than initially anticipated.

The IBM DB2 Content Manager OnDemand for z/OS: Administration Guide, SC27-1374 provides details about these and other server programs.

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4. Monarch is a software program that is available from Datawatch Corporation.
Server logging

System logging facility
OnDemand provides the system logging facility to help an administrator track activity and monitor the system. OnDemand can log messages that are generated by the various client and server programs. For example, you can configure the system to save a message in the system log every time a user logs onto the system; you can configure the system to save a message every time an unsuccessful log on attempt occurs; and so on. When you use the administrative client to add objects to the system and update the database, OnDemand saves information about the actions in the system log. You can use one of the OnDemand client programs to search for and view messages from the system log by time stamp, severity, message number, userid, and other search criteria.

System log user exit
You can configure OnDemand to save information, warning, and error messages in the system logging facility. OnDemand can log messages about system activity, such as when users log on and log off the system and application group activity, such as when clients query and retrieve data. In addition, you can configure OnDemand to send the messages to the ARSLOG installation exit. You can use the ARSLOG installation exit to issue WTOs, compile statistics, and generate accounting information. The ARSLOG installation exit is implemented as an MVS dynamic exit.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the system log user exit.

User security exit

Note: APAR PQ75080 provides the following enhancements to this exit:
- COBOL bindings are provided for the exit. This allows installations to use COBOL as the high-level language interface for exits that previously could only be implemented in C. The COBOL support requires Enterprise COBOL for z/OS and OS/390 V3R1 (program number 5655-G53) or higher. This level is required because the exits can run in a POSIX thread environment and must use the THREAD compiler option.
- The high-level language interfaces can be used to restrict access to specific documents and can control the SQL search criteria used for searching folders.
- Additional components are provided in source form.

The OnDemand user security exit allows an installation to augment the security related processing of the following activities or events:
- Logon
- Change Password
- Add User ID or Delete User ID by using the OnDemand administrative functions
- Access to an OnDemand folder
- Access to an OnDemand application group

When driven for these activities, an installation written exit routine (or set of exit routines) can interact with a security system such as RACF to determine if the given activity is to be allowed or disallowed.
See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the user security exit.

Unified login exit

The OnDemand unified login exit (ARS.PTGN) provides a means for an installation to allow a user to run the OnDemand command line utilities (such as ARSLOAD) without needing to specify a userid and password. When enabled, if the user does not specify an OnDemand userid and password, the current userid as returned by UNIX System Services will be used to log onto OnDemand. If that fails, the user will be prompted for a userid and password.

This facility to logon without a password utilizes the ability to specify a PassTicket as a password when using a RACROUTE REQUEST=VERIFY. Because the function to generate a PassTicket is not a part of the SAF interface, OnDemand implements the call to generate the PassTicket as an MVS dynamic exit. A sample exit (ARSPTGN) is provided that generates a PassTicket in the RACF environment.

Installations that use another external security product will need to evaluate the supplied exit and possibly modify the exit for their environment.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the unified login exit.

Report Specifications Archive Definition exit

Note: APAR PQ75080 provides the following enhancements to this exit:

- COBOL bindings are provided for the exit. This allows installations to use COBOL as the high-level language interface for exits that previously could only be implemented in C. The COBOL support requires Enterprise COBOL for z/OS and OS/390 V3R1 (program number 5655-G53) or higher. This level is required because the exits can run in a POSIX thread environment and must use the THREAD compiler option.
- Additional components are provided in source form.

The Report Specifications Archive Definition exit allows an installation to modify some of the parameters used by OnDemand when document data is being captured (loaded) by the ARSLOAD program. The following parameters can be modified:

- The Application Group name.
- The Application name.
- The name of the Object Server to be used for data storage.
- The name of the Storage Node to be used for data storage.
- The indexer parameters set.
- The input file control character type, logical record length and record format.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the Report Specifications Archive Definition exit.
Client preview exit

The OnDemand client preview exit allows an installation to process document data before the document is presented to the client. The client preview exit can be used to add, remove, or reformat data before the document is presented to the client. For example:

- Remove pages from the document, such as banner pages, title pages, all pages but the summary page, and so on.
- Remove specific words, columns of data, or other information from the document. That is, omit (“white out”) sensitive information such as salaries, social security numbers, and birth dates.
- Add information to the document, for example, a summary page, data analysis information, and Confidential or Copy statements.
- Reformat data contained in the document, for example, reorder the columns of data.

COBOL bindings are provided for the exit. This allows installations to use COBOL as the high-level language interface for the exit. The COBOL support requires Enterprise COBOL for z/OS and OS/390 V3R1 (program number 5655-G53) or higher. This level is required because the exits can run in a POSIX thread environment and must use the THREAD compiler option.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the client preview exit.

Table space creation exit

The table space creation exit allows an installation to take action when OnDemand is going to create a table space, table, or index tables that will be used to store application index data. The table space creation exit is not called for the OnDemand system tables.

For table and index creation, the installation can alter the SQL that will be used to create the table or index.

COBOL bindings are provided for the exit. This allows installations to use COBOL as the high-level language interface for the exit. The COBOL support requires Enterprise COBOL for z/OS and OS/390 V3R1 (program number 5655-G53) or higher. This level is required because the exits can run in a POSIX thread environment and must use the THREAD compiler option.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the table space creation exit.

JES Spool Data Capture facility

The JES Spool Data Capture facility provides a means to collect and consolidate JES Spool (SYSOUT) data sets into one (or more) files so they can be archived by OnDemand.

This facility, known by its program name, ARSYSPIN, executes as a started task in its own address space. A control statement file is used to provide ARSYSPIN parameters. These parameters specify JES Spool file selection criteria (for example, from which SYSOUT classes output is to be selected) as well as other operational characteristics.
ARSYSPIN creates an intermediate output file which contains one or more Spool file(s) from one or more job(s). Each captured spool file is bracketed by a pair of separator records. A "Begin" separator record is written before the first record of the spool file and an "End" separator record is written after the last record of the spool file data. The separator records contain information that can be used to construct index values to facilitate the retrieval and viewing of the captured data sets after they have been stored by OnDemand.

The intermediate output file is indexed and stored in OnDemand using the ARSLOAD program. ARSYSPIN invokes ARSLOAD when sufficient data has been captured in the intermediate output file. ARSLOAD indexes the data by calling an indexer program (usually APKACIF) to extract the index values from the data and store them in an index file. ARSLOAD then adds the indexes to the database and loads the data onto archive media.

A sample APKACIF input exit is provided with ARSYSPIN which illustrates a technique for inserting a data record into the APKACIF input stream for the purpose of providing additional indexing information. This sample exit scans the JES Job Log and System Messages spool files (if they are present) to locate critical system and job processing messages (for example, messages which indicate the execution of job steps which terminated via ABEND or with non-zero completion codes), extract related values and place this information in the inserted record for subsequent indexing. After the captured Spool data has been stored into OnDemand, ARSYSPIN repeats the process of collecting and consolidating other spool files so they too can be archived in OnDemand. The cycle of collecting, consolidating and loading data continues until the program is terminated by the MVS STOP command.

See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1373 for more information about the JES Spool Data Capture facility.

**OS/390 Indexer exits**

The OS/390 Indexer can be used to extract index data from and generate index data about line data and AFP reports. In addition, other data types, such as TIF images, can be captured by using the Anystore Exit.

The OS/390 Indexer provides the following exits to allow you to run a user-written program to process report data before it is stored in the system.

- **Anystore Exit.** The use of an Anystore Exit allows for the capture of any type of data. The exit is responsible for reading the data to be captured, breaking it into documents, and determining the index values. A sample Anystore Exit is provided which captures TIF images using a pre-generated set of indexing instructions read from a separate file.
- **Input Exit.** The Input Exit is provided to allow additional processing of the report input before the report is stored. This exit can only be used when the INDEXSTYLE is not set to AFP and when the ANYEXIT is not specified. The exit is called dynamically during the report capture process. The report capture routine calls the exit when the indexing parameters specify an input exit name in the INPEXIT parameter. The report administrator provides a program name for this parameter. There are no restrictions as to the type of processing that can be performed in an input exit with the exception that the exit must pass the standard parameter list back to the report capture program. Values must be supplied for all parameters.
Index Exit. The Index Exit is provided to allow the report indexes to be modified prior to insertion into the application group data table. This exit can be used with any type of report captured by the OS/390 Indexer. The exit is called dynamically during the capture process. The capture program calls the exit when the indexing instructions for the application include the INDXEXIT parameter. The report administrator provides a program name for the Index Exit. There are no restrictions as to the type of processing that can be performed in an index exit with the exception that the exit must pass the standard parameter list back to the capture program. A sample exit is provided in member ARSEXNDX.

See the IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 for more information about the OS/390 Indexer exits.
Chapter 3. Hardware and software

This section of the book contains information about the hardware, software, networking, and printing requirements for OnDemand servers and clients.

The exact hardware and software configuration that you need for OnDemand to support your organization depends on the volume of data that you plan to maintain on the system, the number of concurrent users that the system must support, the backup and recovery requirements of your organization, and the performance levels that the system must meet. At a minimum, you need one processor for a standard OnDemand library and object server.

z/OS server requirements

The minimum configuration for an OnDemand server requires the following:

- **OS/390 version 2.8 or higher**
- **DB2 for OS/390 version 6 or higher with APAR PQ36584 applied and ODBC support installed, tailored, and operational**
  - DB2 ODBC support requires the installation of a DB2-dependent FMID. For more information, see “Configuring DB2 ODBC and running sample applications” in *DB2 UDB for OS/390 V6 ODBC Guide and Reference,* SC26-9005, which includes instructions for running the samples for installation verification.
- **TCP/IP**
- **Magnetic storage for the database, report data, and temporary work space**
- **USS (UNIX System Services Subsystem) to be in a fully operational mode**

If you plan to use the OnDemand Distribution Facility (ODF) or the OnDemand CICS client, then CICS Transaction Server Version 1.3 or higher is also required and the CICS Sockets Feature must be installed and operational.

Optical and tape storage

Optical and tape storage are supported by their respective SMS components.

- Optical storage is supported only if OAM object storage is being used as archive storage.
- Direct access to tape storage is supported only if OAM object storage is being used as archive storage.
- Although VSAM and HFS never store data to tape, HSM may be used to manage the VSAM files that are being used as archive storage or the datasets in the HFS that are being used as cache storage.

**Note:** VSAM datasets to be used for archive storage of OnDemand documents must be managed by SMS.

Consult the appropriate DFSMS documentation for the applicability of storage media in each environment.

OAM and VSAM are documented under DFSMS/MVS system management software. DFSMS/MVS product information is available from the z/OS and OS/390 Web sites listed in "Information about other products" on page vi. For
Indexing with ACIF

The AFP Conversion and Indexing Facility (ACIF) is a component of OnDemand that lets you index a S/390 line data print file, optionally convert line data input into Advanced Function Presentation (AFP) documents to be stored on the system, and retrieve the AFP resources that are required for archiving and viewing in OnDemand. ACIF can also be used to process input reports that contain AFP data.

The ACIF product and program directory are included with your OnDemand product package. If they are not, contact your IBM representative.

Indexing with the OS/390 Indexer

The OS/390 Indexer can index individual documents, ranges of pages containing a sorted column, ranges of pages containing a sorted column within a higher level grouping value as well as allowing the indexer to generated indexes when the report has no obvious index values.

The OS/390 Indexer is particularly useful for customers migrating from OnDemand for OS/390 Version 2.1, as it supports the Version 2.1 report types of DOC, PAGE, PDOC, NODX, and AFP. The OS/390 Indexer also supports the Version 2.1 style of Input, Index and Anystore Exits.

See the IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 for details about the OS/390 Indexer.

Indexing with the PDF Indexer

The OnDemand PDF Indexer is designed to generate index data for the Adobe PDF input datasets that you want to store in the system.

Although the PDF Indexer is installed as part of the base OnDemand software, customers must configure the PDF Indexer by specifying the Adobe font mapping table, specifying the dataset that is created by the PDF Indexer at run time to hold the names of the fonts that are located in the font path and in the runtime directory, and specifying the dataset that contains the attributes of the temporary working space for the PDF libraries. See the IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1438 for details.

Indexing with Xenos

The Xenos transforms can be used to extract index data from input print datasets that contain AFP, Metacode, or PCL data. The input data can also be converted into PDF datasets and stored in OnDemand. Note: The Xenos transforms can also be integrated with ODWEK so that you can convert AFP or Metacode documents that are stored in OnDemand to HTML or XML files that can be viewed with a Web browser.

To use the Xenos transform on your system, you must obtain the transform program, license, and documentation from your IBM representative. Your IBM representative can also provide information about education that is available and other types of help and support for processing input datasets with the transform program.
OnDemand Distribution Facility

The OnDemand Distribution Facility (ODF) is an optional feature of IBM Content Manager OnDemand z/OS and OS/390, Version 7.1. ODF is designed to group archived report pages or segments into print bundles for distribution.

ODF consists of a started task, the z/OS and OS/390 batch capture interface, and CICS administration and monitoring facilities. ODF obtains information from DB2 tables and collects captured reports for each designated user and puts the reports into a print bundle. ODF can be set up and maintained through an online administration facility.

When you order the ODF feature, a separate tape and program directory should be provided with your OnDemand product package. If they are not, contact your IBM representative. Also see IBM DB2 Content Manager OnDemand for z/OS: OnDemand Distribution Facility Installation and Reference Guide, SC27-1377 for more information on installing, configuring, and using ODF.

Printing

The OnDemand clients let users print directly from the document that they are viewing or print selected items from the document list. Users can print from the clients by using the following methods:

- Print to a local printer. The OnDemand client can reprint all types of documents (AFP, line data, and image file) under Windows. This method is most commonly used to print to PostScript and PCL printers that are already defined and used by other programs on the user’s PC.

  When printing AFP documents to local printers, the fidelity of the output can vary. The best fidelity is achieved when printing AFP documents that have been formatted with the IBM Core Interchange Fonts. If an exact reprint of the document is required, then you must use the OnDemand server print function.

- Print through the OnDemand server print function. The OnDemand server print function is the highest performance print option that is available to end-users of the system. The server print function is designed to allow many documents to be selected for reprint from the document list, without retrieving the documents to the user’s PC. The OnDemand server print function supports printing by using the Direct Server printing method, to submit a print job to a JES output class or by using the Infoprint Server printing method, to submit a print job to an IBM Infoprint Server for z/OS (or OS/390) print queue.

  When printing AFP documents to server printers, the resource group that was archived at the time that the document was loaded into the system is put into the print data stream, to make sure that the document prints with the correct resources.

See IBM DB2 Content Manager OnDemand for z/OS and OS/390 Configuration Guide, GC27-1438 for information about configuring server printing on the OnDemand library server.

The OnDemand server print function requires either:

- IBM Print Services Facility for OS/390 and z/OS Version 3.3 or later, if printing AFP documents with the Direct Server printing method or
- IBM Infoprint Server for z/OS Version 1 Release 2 or later or IBM Infoprint Server for OS/390 Version 2 Release 8 or later, for the Infoprint Server printing method.
Web Enablement Kit

The OnDemand Web Enablement Kit (ODWEK) is an optional feature of OnDemand. ODWEK enables an organization to use a Web browser to access data stored in an OnDemand system. Users may search through the folders for reports that are archived into OnDemand and select documents for viewing at the browser (using Netscape Navigator or Internet Explorer on a PC). Customers can integrate transform programs with ODWEK, such as AFP2HTML, AFP2PDF, and Xenos, to transform documents that contain AFP or Metacode data into HTML, PDF, or XML files that can be viewed with a Web browser.

See the IBM DB2 Content Manager OnDemand for z/OS: Web Enablement Kit Implementation Guide, SC27-1376 for more information about requirements and for information about configuring the ODWEK software on the system.

Typical server configurations

**Library and object server**

Figure 8 shows the standard OnDemand library and object server.

![Figure 8. Standard library and object server](image)

The standard library and object server includes the cache storage manager and the programs required to index reports and load data on the system. You can stage reports on temporary storage volumes for the data indexing and loading programs. This environment is ideal for customers who do not require backup copies of reports in archive storage or that need to run OnDemand on a single z/OS or OS/390 system.

Table 2 lists the software requirements for the standard library and object server.

**Table 2. Software for standard library and object server**

<table>
<thead>
<tr>
<th>Function</th>
<th>Req/Opt</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OnDemand base</td>
<td>Required</td>
<td>Base OnDemand functions, such as enhanced ACIF. The cache storage manager maintain reports on disk storage.</td>
</tr>
<tr>
<td>Database manager (DB2)</td>
<td>Required</td>
<td>Database engine and administration</td>
</tr>
<tr>
<td>OnDemand client</td>
<td>Required</td>
<td>Windows client program</td>
</tr>
</tbody>
</table>
Distributed library and object server

Figure 9 shows the distributed OnDemand library and object server system.

OnDemand supports storing data on and retrieving data from more than one server. In the distributed environment, users submit queries to the library server and OnDemand retrieves documents from the object server on which the data is stored. You can load reports on any of the object servers that are part of the system. The index data is always stored on the library server. You can stage reports on temporary storage volumes for the data indexing and loading programs. This environment is ideal for customers who need to distribute the loading and accessing of reports over more than one processor. The servers can reside on LPARs in a single z/OS or OS/390 system, or on separate systems in different physical locations. A distributed object server is also ideal for customers who want to move the archive storage part of the system off of the library server.

Table 3 lists the software requirements for the OnDemand library server.

Table 3. Software for distributed library and object server part 1 of 2

<table>
<thead>
<tr>
<th>Function</th>
<th>Req/Opt</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OnDemand base</td>
<td>Required</td>
<td>Base OnDemand functions, such as enhanced ACIF. The cache storage manager maintains reports on disk storage volumes that are attached to the library server.</td>
</tr>
<tr>
<td>Database manager (DB2)</td>
<td>Required</td>
<td>Database engine and administration</td>
</tr>
<tr>
<td>OnDemand client</td>
<td>Required</td>
<td>Windows client program</td>
</tr>
</tbody>
</table>

Table 4 on page 30 lists the software requirements for the OnDemand object servers.
Table 4. Software for distributed library and object server part 2 of 2

<table>
<thead>
<tr>
<th>Function</th>
<th>Req/Opt</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OnDemand base</td>
<td>Required</td>
<td>Base OnDemand functions, such as enhanced ACIF. The cache storage manager maintains reports on disk storage volumes that are attached to the object server.</td>
</tr>
</tbody>
</table>

Windows client

**Note:** The term *Windows client* refers to the OnDemand end-user client program that runs under Windows NT 4.0, Windows XP, Windows 2000, and Windows 98.

The OnDemand Windows client is used by end-users to search for and retrieve documents and view, print, annotate, and otherwise work with documents. The Windows client runs under Windows 2000, Windows 98, Windows NT 4.0, and Windows XP and requires the following hardware and software:

- Physical connection to the network, such as a Token Ring or Ethernet network adapter
- A minimum of 32 megabytes of memory
- An Intel Pentium 166 MHz or faster processor
- A super-VGA display and adapter with a minimum resolution of 800x600
- A minimum of 100 megabytes of free hard disk space
- The Windows TCP/IP networking protocol

Administrative client

The OnDemand administrative client is used by administrators to maintain users, groups, application groups, applications, folders, storage sets, and printers. The administrative client runs under Windows 2000, Windows 98, Windows NT 4.0, and Windows XP and requires the following hardware and software:

- A minimum of 32 MB of memory
- An Intel Pentium 166 MHz or faster processor
- A super-VGA display and adapter with a minimum resolution of 800x600
- A minimum of 10 MB of free hard disk space
- The Windows TCP/IP networking protocol

Installing and running client software on a network

A personal computer attached to the network can share a single copy of the OnDemand client software. In general, you would install client software on a network file server to save hard disk space on PCs and make it easier to upgrade software later. Alternatively, you would install OnDemand client software on a PC for better performance and to reduce network traffic.

OnDemand provides a network installation procedure to copy OnDemand control files from a network file server to a user’s PC (no program files are copied to the user’s PC). As part of a network installation, the setup program builds a directory structure on the user’s PC and creates folders and icons on the desktop. The OnDemand program icons point to a copy of the software that is installed on the network file server.
When the user runs an OnDemand client program from a network file server, the operating system loads the OnDemand programs from the network file server into memory on the user’s PC. When the user selects items for viewing, OnDemand allocates temporary work space on the user’s PC for documents and resources.

Before you install a client program using the network installation option, you must install the client software on a network file server. See the IBM DB2 Content Manager OnDemand: User’s Guide, SC27-0836 for information about the installation options and an overview of the network installation procedure.

**Parameters for starting the client**

OnDemand provides command line parameters that you can use to customize the operation of the client program. For example, you can automate the logon process so that the user does not have to specify a server, userid, or password. See the IBM DB2 Content Manager OnDemand: Windows Client Customization Guide, SC27-0837 for information about the parameters that you can specify for the Windows client.

**Adobe software**

- **Note:** Adobe software is not provided with OnDemand.

If you wish to use Adobe Acrobat so that users can view PDF documents that are retrieved from OnDemand, your installation will need to obtain the licenses and software from a software vendor. You can find out more from the Adobe Web site at http://www.adobe.com.

To integrate the Adobe Acrobat viewing software with the OnDemand client software requires Adobe Acrobat Approval or the full Adobe Acrobat product.

**CICS client requirements**

The CICS client is a set of transactions that runs in the CICS environment, and provide similar, though not identical function to the Windows client. These transactions utilize the CICS - TCP/IP interface to connect to a server, allowing the end-user to retrieve documents from the server and view and print documents in the CICS environment.

The CICS client requires OS/390 Version 2.8 or higher and the CICS Transaction Server Version 1.3 or higher, and the CICS Sockets Feature must be installed and operational.

The CICS client is currently available as an IBM services offering. Please contact your IBM representative for information about how to obtain the CICS client software, installation instructions, and user’s guide.
Part 2. Planning information

This section of the book is a planning source for the following user groups:
• OnDemand administrators
• Technical support
• Service personnel
• Database administrators
• Network administrators
• Information technology managers
• Facilities managers
• Backup managers and recovery managers

This part of the book describes activities that IBM recommends that OnDemand administrators perform when they plan for installing and operating OnDemand.
Chapter 4. Reports and other data

This section contains information that can help you plan for the reports that you will be storing into OnDemand. You can use the information to help determine the hardware configuration that you need to support your OnDemand system. This section lists questions that you might ask users of the reports, provide information about the types of data that you can store in OnDemand, and provide information about indexing reports.

Collecting requirements

Planning for OnDemand requires that you understand how the system will be deployed, who will use the system and how they will use it, and other end-user requirements. Answers to these questions provide information that allows you to properly configure your OnDemand system, including the storage and network configuration, to support your applications and users:

- Will you operate a single OnDemand server or a network of OnDemand servers?
- What types of print data streams will the system support? Are transforms required to convert input data to other display formats (such as AFP to HTML)?
- What is the logical organization of the print data streams?
  - Page organization: a consistent stream of pages of transaction or ledger data.
  - Logical groups of information, such as statements or policies.
  - Data that may not have a consistent format, such as reference materials or product literature.
- Will OnDemand support short-term report management, long-term archival storage, or both?
- What is the volume of input to process? How large are your reports (in pages and bytes); how many reports; how many versions of reports?
- What index values do the users of a report need to retrieve a specific version of a report (or a document)?
- How much time is available to load reports into OnDemand? Daily? Weekly?
- How long do you plan to maintain report data on the system?
- How many concurrent, logged-on users do you anticipate on average; at peak times?
- How many active users do you anticipate?
- What is the transaction rate of the active users?

Input data formats

Note: The maximum size of the input file is dependent on the indexing program that is being used. ACIF, the PDF Indexer, and the Generic Indexer process files in the HFS, so are limited in size to 2 GB. The OS/390 Indexer does not use the HFS to hold the input file, so the file size is limited only by the source of the input file. (JES Spool files are limited to 2 GB; files on DASD or Tape are limited only by the device type, which typically can support sizes greater than 2 GB.)

OnDemand supports several types of input data:
• AFP print data streams (AFP or MO:DCA-P), including line data mixed with AFP structured fields and line data formatted with a page definition.
• Line data, also known as IBM S/390 line data with ANSI or machine carriage control characters.
• Unformatted ASCII data that is typically generated in the workstation environment.
• Adobe Portable Data Format (PDF) files.
• Image files in the following formats:
  – BMP (Bitmap). A file that contains a bit-mapped graphic.
  – GIF (Graphic Interchange Format). A bit-mapped color graphics file format for IBM-compatible computers. GIF uses an efficient compression technique for high resolution graphics.
  – PCX (Picture Exchange Format). A file that contains a graphic in the PCX file format, widely used by PC applications, such as the PC Paintbrush program. Compressed using PackBytes compression.
  – TIFF (Tagged Image File Format). A bit-mapped graphics image format for scanned images with resolutions up to 300 dots per inch. TIFF simulates gray-scale shading. OnDemand supports single and multipage TIFF images that are uncompressed or are compressed using JPEG, CCITT Group 3, CCITT Group 3/2D, or CCITT Group 4 compression.
• PCL (Printer Control Language). The term PCL refers to the compound data stream that is used by the Hewlett Packard (HP) printers. The input can be most PCL 4 or 5 that is designed for HP desktop printers, but not the HP PCL or HP Deskjet formats. OnDemand supports PCL input files by using the optional Xenos transforms.
• Xerox metacode. A print file designed to print on a Xerox printer can be converted to a fully-composed AFP datastream (MO:DCA-P). The input can be DJDE-Conditioned Line Data, mixed mode and fully composed Xerox metacode files, including FRMs, IMGs and LGOs. OnDemand supports Metacode input files by using the optional Xenos transforms. For example, you can use a Xenos transform to convert a Xerox metacode print file into AFP documents that can be indexed and loaded into the system. Font Correlation Tables give you full control of what AFP fonts are used in the output. Xerox font character bitmaps can selectively be put in the output as images for greater fidelity.

In addition to the types of data listed above, OnDemand allows you to store almost any other type of data on the system. For example, you can define an application for HTML documents. When you define the application, you must identify the file type of the data. The file type determines the program that the client starts when the user retrieves a document. For example, if the file type is HTM, then the client could start Netscape Navigator to view the document.

In the OS/390 environment, OnDemand allows application programs that produce 1403 or 3211 data streams to take advantage of overlays, page segments, and typographic fonts. This is done using a page definition that specifies how data are mapped on the page. The definition allows text to be moved to different positions on the page, fonts to be changed, and conditional processing. When combined with a form definition, the page definition allows sophisticated pages to be produced by existing line data applications without changing the application that generates the data.
You can use ACIF to convert line data to AFP data before loading it into the system. The resulting AFP data could add color or an electronic form to line data, making presentation of the information more effective. However, archiving line data without conversion usually results in much higher compression ratios.

AFP supports graphics, presentation text, image, and bar code objects. Storing AFP data on the system allows full-fidelity viewing of presentation text and image objects. For example, users can retrieve and view customer statements that OnDemand presents using an electronic form, fonts, and images. The user views a copy of the statement that appears the same as the statement the customer received in the mail. AFP also supports navigation within a report file, using a table of contents.

When you load reports that contain AFP data, you must also load the resources into OnDemand. The resources include overlays, page segments, form definitions, and fonts. The resources must be resident on the processor where the data is to be indexed.

**Indexing data**

One of the main operations that you do with OnDemand is to index reports. When you index a report, OnDemand extracts index values from the report and stores them in the database. The database fields that you define for your application groups hold the index values. When a user opens a folder, OnDemand displays a list of search fields, which represent the database fields. To perform a query, the user enters values in the search fields. OnDemand compares the values from the search values with the values in the database fields and retrieves the items that match the query.

Index information can be added to reports at the same time that the application program generates the print data or, more typically, the output print data can be processed by one of the indexing programs that are supported by OnDemand.

When you index a report, you can divide a large report into smaller, uniquely identifiable units of information. For example, when an application program generates customer bills, it may produce a large print stream made up of thousands of individual customer bills. With OnDemand, you can identify the individual customer bills within the report as smaller, separate information units, or logical items (known as documents in OnDemand). Your users can search for and retrieve the logical items using identifiers such as account number, customer name, and date.

OnDemand supports two general methods of indexing:

- **Document Indexing.** For reports made up of logical items, such as statements, bills, policies, and invoices.
- **Report Indexing.** For reports that (typically) contain line data, with sorted values on each page, such as a transaction log or general ledger.

If a report does not contain logical items or sorted line data, it can usually be indexed by using the report indexing method.

See the *IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375* for details about and examples on using the indexing programs that are provided with OnDemand.
Document indexing

Document indexing can be used to index reports that are made up of logical items or to index reports that contain unique values such as an account number or a customer name. When searching and retrieving these types of reports, OnDemand returns a list of the items that match the user’s query and transfers the individual items to the OnDemand client program for viewing and printing. OnDemand supports up to 32 fields as indexes or filters for document-type data. The fields do not have to be sorted and can contain numeric or text information. The fields are stored in the database as indexes or filters. Figure 10 shows an example of a report file and document indexing.

![Figure 10. Document indexing method](image)

Report indexing

Report indexing allows users to search sorted report data and retrieve the first occurrence of the value that they specified in the query. OnDemand divides the report data into groups of pages and stores the first and last index values contained in each group of pages in the database. When the user enters a query, OnDemand returns a list of the items that match the query. When the user selects an item for viewing, OnDemand performs a text search within the item for the value specified by the user. The OnDemand client program displays the first page that contains the value specified by the user. OnDemand uses a single, unique sorted index value for the retrieval of the report data, for example, an invoice number or a transaction identifier. Figure 11 on page 39 shows an example of a report file and report indexing.
Indexing data with ACIF

ACIF is a powerful tool for indexing the print data streams of OS/390 application programs. ACIF indexes reports based on the organization of the data in the report. You can optionally convert line data print streams into AFP data. ACIF processes three input sources:

- Indexing parameters that specify how the data should be indexed. You can create the indexing parameters when you define an OnDemand application.
- AFP resources required to view and print the data, if the data was created by an AFP application.
- The print data stream.

The output of ACIF is either a fully composed AFP data stream or the original line data input. ACIF can convert line data input to AFP data, can produce an index file that OnDemand uses to create index data for the database, and optionally, can collect resources into a resource group file.

ACIF produces a resource group file for AFP data. To create a resource group file, ACIF must have access to the resources required by the input data stream. OnDemand usually stores the resources in cache storage and retrieves the resources associated with a specific document when a user selects the document for viewing.

ACIF can logically divide reports into individual items, such as statements, policies, and bills. You can define up to 32 index fields for each item in a report.

ACIF is designed to index reports that contain line data with a consistent structure and format. You can also use ACIF to index AFP input files that contain indexing controls and information. The following topics provide additional information:

- Generating index data in application programs

Figure 11. Report indexing method
• Generating index data with AFP application programs
• Generating index data with the AFP API
• Inserting AFP records into a data stream

**Generating index data in application programs**
As an alternative to using ACIF to generate the index data, you can create index information in the application program that generates the report and then process the report with ACIF. Some application programs already provide support to add indexing information. However, you may find it necessary to modify your application program to add indexing functions.

**Generating index data with AFP application programs**
The IBM Document Composition Facility (DCF) is a product that can be used to create indexed AFP data. The primary function of DCF is to prepare and format documents for printing. Along with its many other features, DCF provides the ability to add both group-level and page-level indexing tags. DCF allows specific indexing information to be included in the output print data stream. You can process the output file created by DCF with ACIF to create an index file that can be processed with the OnDemand data loading program.

In addition to DCF, there are several popular third-party programs that can produce indexed AFP data.

**Generating index data with the AFP API**
The AFP Application Programming Interface (AFP API) is a product that can be used to index print data. Using the AFP API, a programmer who knows COBOL or PL/1 can format complex output without knowing the syntax and semantics of MO:DCA-P. Using the AFP API, you can index AFP files with both group-level and page-level indexing tags, which allows more specific information to be included in the output file. The indexing information is added at the same time that the application program generates the print data. You then process the output file with an indexing program, such as ACIF, to create the index data that the OnDemand data loading program stores in the database.

**Inserting AFP records in a data stream**
A common way of indexing unstructured, mixed-mode data is to add NOP structured fields to the data stream. ACIF can then be used to process the data stream and locate the NOP fields and extract the index values.

**Using the OnDemand OS/390 Indexer**
The OS/390 Indexer can index individual documents, ranges of pages containing a sorted column, ranges of pages containing a sorted column within a higher level grouping value as well as allowing the indexer to generated indexes when the report has no obvious index values.

The OS/390 Indexer is particularly useful for customers migrating from OnDemand for OS/390 Version 2.1, as it supports the Version 2.1 report types of DOC, PAGE, PDOC, NODX, and AFP. The OS/390 Indexer also supports the Version 2.1 style of Input, Index and Anystore Exits.

The OS/390 Indexer processes two input sources:
• Indexing parameters that specify how the data should be indexed. You can create the indexing parameters when you define an OnDemand application. The parameters are of the same form as used by ACIF, along with some extensions which are unique to the OS/390 Indexer.
• The print data stream

The OS/390 Indexer indexes input data based on the organization of the data:

• Document organization. For reports made up of logical items, such as statements, policies, and invoices. The OS/390 Indexer can generate index data for each logical item in the report.

• Report organization. For reports that contain line data with sorted values on each page, such as a transaction log or general ledger. The OS/390 Indexer can divide the report into groups of pages and generate index data for each group of pages.

• Anystore Exit. This exit point allows for generating your own index values for each document.

• AFP Data Stream. Fully resolved AFP Data Streams are indexed using in-stream TLE or NOP records, for each Page Group.

The OS/390 Indexer can logically divide reports into individual items, such as statements, policies, and bills. You can define up to 32 index fields for each item in a report.

See the IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 for more information about the OS/390 Indexer.

**Using the OnDemand PDF Indexer**

The OnDemand PDF Indexer is a utility that you can use to extract index data from or generate index data about Adobe PDF files. The index data can enhance your ability to store, retrieve, and view PDF documents with OnDemand. The PDF Indexer processes PDF input files. A PDF file is a distilled version of a PostScript file, adding structure and efficiency. A PDF file can be created by Acrobat Distiller or a special printer driver program called a PDFWriter. The PDF Indexer supports PDF Version 1.3 input and output files. See the documentation provided with Acrobat Distiller for more information about preparing input data for the Distiller.

The PDF Indexer can logically divide reports into individual items, such as statements, policies, and bills. You can define up to 32 index fields for each item in a report.

The PDF Indexer uses a coordinate system to locate the text strings that determine the beginning of a group and the index values. The coordinate system uses x and y pairs imposed on a page. For each text string, you identify its upper left and lower right position on the page. The upper left corner and lower right corner form a string box. The string box is the smallest rectangle that completely encloses the text string. The origin is in the upper left hand corner of the page. The x coordinate increases to the right and y increases down the page. You also identify the page on which the text string appears. OnDemand provides the ARSPDUMP program to help you identify the locations of text strings on the page.

The IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 provides details about the PDF Indexer and shows examples about how to use it to process PDF input files.

**Indexing with the Xenos transforms**

The Xenos transforms can be used to extract index data from input print datasets that contain AFP, Metacode, or PCL data. You can use the Xenos transforms to
convert Metacode to AFP and AFP, Metacode, and PCL to PDF. The Xenos transforms enhance your ability to view, archive, or retrieve individual pages or groups of pages from large print files.

The Xenos transform accepts data from application programs in these formats:

- AFP data
- Metacode print files
- PCL print files

The Xenos transform can process application print data and resources to produce and index file and an output document file.

**Note:** When Xenos transforms a data stream with resources, it does not create new resources as separate entities in the output data stream. All of the resources that are required to view and print the document are contained within the generated document. Therefore, no separate resource file is produced.

With the files that the Xenos transform creates, you can store the data into OnDemand and then do the following:

- Use the Windows client to search for and retrieve, view, and print the documents.
- Use the OnDemand Web Enablement Kit feature to search for and retrieve, view, and print the documents.

To use the Xenos transform on your system, you must obtain the transform program, license, and documentation from your IBM representative. Your IBM representative can also provide information about education that is available and other types of help and support for processing input files with the transform programs.

**Using the OnDemand Generic Indexer**

OnDemand provides the Generic Indexer so that you can specify indexing information for input data that you cannot or do not want to index with ACIF or the other indexing programs. For example, suppose that you want to load word processing documents into the system. The documents can be stored in OnDemand in the same format in which they were created. The documents can be retrieved from OnDemand and viewed with the word processor. However, because the documents do not contain AFP data, line data, Metacode, PCL or PDF data, you cannot index them with ACIF, the OS/390 Indexer, the PDF Indexer, or Xenos. However, you can specify index information about the documents to the Generic Indexer and load the documents into the system. Users can then search for and retrieve the documents using one of the OnDemand client programs.

To use the Generic Indexer, you must specify all of the index data for each input data set that you want to store in and retrieve from OnDemand. You specify the index data in a parameter data set. The parameter data set contains the index fields, index values, and information about the input data sets or documents that you want to process. The Generic Indexer retrieves the indexing information from the parameter data set and generates the index data that is loaded into the database. OnDemand creates one index record for each input data set (or document) that you specify in the parameter data set. The index record contains the index values that uniquely identify a data set or document in OnDemand.
The Generic Indexer supports group-level indexes. Group indexes are stored in the database and used to search for documents. You must specify one set of group indexes for each data set or document that you want to process with the Generic Indexer. You can define up to 32 index fields for each data set or document.

See the IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 for more information about the OnDemand Generic Indexer.

Indexing reports using date fields

To store data in the system, each report must be indexed with a date field. When querying the database, OnDemand uses the date in a report to determine one report’s data from another. OnDemand also uses the report date to determine when to remove reports from cache storage and how long to maintain report data (index data and documents) on the system.

You can use the date that appears in the report, such as the run date, a transaction date, or the statement date. If the data that you want to store in OnDemand does not contain a date, you can use the date that the report was loaded into the system.

OnDemand supports date values in the range of January 1, 1970 to December 31, 2069. OnDemand also supports a date/time field. A date/time field can contain date values from January 1, 1970 to December 31, 2038.
Chapter 5. OnDemand objects

This chapter contains information that can help you plan application groups, applications, and folders for your reports.

Overview

When you install and configure the OnDemand software, you create and initialize a set of database tables that form the internal framework of the system. When you define reports to the system, OnDemand adds an application group table structure and other control information to the database.

OnDemand uses a set of objects to describe the database tables, fields, and data that make up the system. When you define an object to OnDemand, such as an application group, OnDemand stores the choices that you make and the information that you enter about the application group into the database. Every time that you load a report into an application group, OnDemand updates the database with control information, inserts rows of index data into an application group table, and stores report data and resource files on storage volumes.

Users of the OnDemand system open a folder to query and access reports that are stored on the system. A folder is the primary OnDemand object that users deal with. A folder provides users the means to search for and retrieve data stored in OnDemand. Users open a folder to construct queries and retrieve the reports that are stored in the application groups referenced by the folder. A folder can reference one or more application groups.

An application group represents the index and report data that you load into OnDemand. The OnDemand database contains tables of application group data. Records in an application group table contain index values extracted from reports and pointers to report data (documents) located on storage volumes. An application group can contain one or more applications that have the same storage characteristics and index fields.

An OnDemand application includes a description of the physical characteristics of a report, such as the type of data contained in the report and the record format of the input file, instructions to the indexing and loading programs that process the report, and information that OnDemand uses to display and print pages of the report. Typically, you define an application for each type of report that you plan to store in OnDemand. You can group applications that have the same storage characteristics and index fields into an application group.

You assign a unique name to each object that you define to OnDemand, such as application groups, applications, and folders.

OnDemand uses properties to describe the appearance, behavior, and internal structure of the objects that make up an OnDemand system. For example, Display Format is a property of a folder field that determines how OnDemand client programs display the values of the field in the document list. The properties are grouped in categories. For example, the General category under folders contains properties that describe general information about a folder, such as the name and description of the folder and the application groups contained in the folder.
Folders

A folder provides users the means to search for and retrieve related reports stored on the system. Users open folders, construct queries, and retrieve reports from application groups. (However, it is not necessary that users know about or understand application groups.) When you create a folder, you define the search and display fields that appear when the user opens the folder. You map the folder fields to database fields in the application groups referenced by the folder. The database fields contain index values extracted from the reports that are loaded into the application groups. For example, the folder search field Customer Account Number could be mapped to the acct# application group database field. OnDemand creates database records that include the index values for the acct# field when you load a report into the application group. When the user enters a query, OnDemand retrieves records from the database if the values of the acct# database field match the value that the user typed in the Customer Account Number search field.

When you define a folder to OnDemand, you add one or more application groups to the folder, select index fields from the application groups to appear as search and display fields when the user opens the folder, and specify the properties of the search and display fields. For example, you can determine the layout of the search fields on the screen and specify values that will automatically appear in the search fields when the user opens the folder.

OnDemand maintains information about the name of the folder and its structure in the OnDemand database. For example, the database contains information that describes the search and display fields you defined and the database fields that you selected from application groups referenced by the folder.

You define a folder to OnDemand through properties and values grouped in categories. A category is a set of related properties. OnDemand provides folder categories for general information, permissions, field definitions, field information, and field mapping. The general category is where you specify general properties about the folder, such as the name of the folder and the application groups contained in the folder. The permissions category is where you determine the groups and users that can open the folder. You can assign other types of folder authorities in the permissions category, such as specifying someone to administer the folder. The field definitions category is where you define the search and display fields for the folder. The field information category is where you specify the attributes of the search and display fields. For example, you can specify the search operators available for each field and determine the order that the search fields appear on the screen. The field mapping category is where you map the folder search and display fields to database fields in application groups referenced by the folder.

Application groups

An application group is a collection of one or more applications that have the same index fields and storage characteristics. The application group is the object that OnDemand uses to maintain the reports that you load into the system. The application group holds index data for reports, documents, management information, permissions for the groups and users authorized to access application group, and so forth.

When you define an application group, you specify the name and type of the database fields that will hold the index data extracted from the reports that are loaded into the application group. You specify whether a database field is used to
index or filter data, and specify other characteristics of the fields. When you define an application group, OnDemand creates an application group table structure in the database, with a column for each database field that you defined. When you load a report into the application group, OnDemand inserts rows into an application group table for each indexed item found in the report. An indexed item can be a logical item, such as a policy or statement, or a group of pages, depending on how the report is organized and how you decide to index the report. Users search for reports using one or more of the fields that you defined for the application group.

OnDemand supports up to 32 index and filter fields for each application group:

- Index fields allow fast access to a specific record using a key, but generally require a large amount of disk storage to implement and require longer to load data into the application group. OnDemand uses index fields to locate the records in the database that meet the search criteria entered by the user. The index record contains the physical location of an item on a storage volume.
- Filter fields are used to refine queries, retrieving only a subset of the records found with an index field. Filter fields are generally used with an index field to identify a specific item in the application group. Filter fields can also be used to display additional information in the document list, for example, an address.

OnDemand requires a segment field for each application group that you define. OnDemand uses the segment field to organize and maintain application group data and to locate items that match a query. The segment field must be one of the following date field or a date/time fields:

- Report Date. The date that the application program created the report file. Typically the date found on pages of the report.
- Load Date. The date that you loaded the report into the application group. Use the load date if the report does not contain a date.

Storage requirements and index fields are the primary considerations when you define an application group and identify the applications that you can place in an application group. A third factor is the organization of the information contained in the report. OnDemand can index, store, and retrieve data contained in a report based on the structure of the data that it contains:

- Some reports are made up of logical groups of information, such as statements, invoices, and policies. These groups, or logical items, can contain one or more pages of information. OnDemand can index, store, and retrieve the logical items contained in a report. Each logical item can be indexed on up to 32 values, for example, account number, customer name, and balance. OnDemand creates a row in the database for each logical item it finds in the report.
- Other reports may be organized differently, and may not necessarily contain logical items. For example, a report could contain thousands of pages of transaction or general ledger data. OnDemand can index, store, and retrieve information from these types of reports using index values such as date, page number, and a sorted value, such as transaction number. OnDemand divides these types of reports into groups of pages and indexes each group of pages. While these types of reports may contain logical items, it probably would not be cost effective to index every item in the report. That is, indexing every item in these types of reports would probably result in thousands of index records being added to the database each time a report is loaded into the application group.
When you create an application group, you specify how OnDemand should store the index data for the reports that you load into the application group. OnDemand provides two methods that you can use to determine how index records are loaded into the database and how users can query the application group:

- **Multiple Loads per Database Table**
  With this method, each time that you load a report into the application group, OnDemand inserts the index records into an existing database table. Index records for every report loaded into the application group are stored in the same logical database table. OnDemand maintains the application group data so that, as far as a user querying the application group knows, they appear to reside in one database table. OnDemand automatically segments the application group data when it grows beyond a certain size. OnDemand maintains a segment table for each application group. The segment table provides faster query performance by limiting searches to a specific table of application group data, using a date value to construct the query. IBM recommends that you use this method to organize your database when the users that search for data stored in the application group do not necessarily know or care what version of a report generated the information that they need.

- **Single Load per Database Table**
  With this method, each time that you load a report into the application group, OnDemand stores the index records into a new database table. You can define a report field for the application group so that users can easily search for and retrieve a specific version of a report. IBM recommends that you use this method to organize your database when the users that search for data stored in the application group need to query a specific version of a report.

When you create an application group, you specify the storage characteristics of the report, such as the length of time that OnDemand maintains data stored in the application group and the data caching and migration values. The storage characteristics also determine whether OnDemand stores a copy of the report on archive media, whether OnDemand should create a backup copy of the report, and when OnDemand removes report data when it is no longer needed.

OnDemand can perform three types of processing on application group data:

- **Database expiration processing**
  Index data expires (is eligible for removal from the system) when it reaches its Life of Data and Indexes period. (You specify the Life of Data and Indexes period when you create an application group.) OnDemand provides a utility that you can use to remove index data. You typically set up the utility to run automatically on a regular schedule. Database expiration processing also reclaims the disk space taken by deleted index data.

- **Cache migration processing**
  Cache migration is the process of copying reports from cache storage to archive storage. You specify when a report should be copied from cache storage to archive storage when you create an application group. OnDemand provides a utility that you can use to copy reports to archive storage. You typically set up the utility to run automatically on a regular schedule. Cache migration optimizes the use of cache storage, while providing excellent performance for short-term retrievals of reports. As a report ages, and in all likelihood accesses becomes less frequent, OnDemand can automatically copy the report to long-term (archive) storage. You can also use cache migration to defer the loading of reports to archive storage to a time when there is little or no other system activity.

- **Cache expiration processing**
Cache expiration is the process of deleting reports from cache storage. You specify how long a report should remain in cache storage when you create an application group. OnDemand provides a utility that you can use to delete reports from cache storage. You typically set up the utility to run automatically on a regular schedule. Cache expiration reclaims cache storage space taken by expired reports, so that the system has space for newer versions of reports.

### Applications

An OnDemand application describes the physical characteristics of a report, processing instructions for the indexing and data loading programs, and information about how OnDemand displays and prints pages of a report. You can specify default settings for viewing and printing pages of a report at the OnDemand application level. For example, if you select a default printer for the application, when a user prints a document that is associated with the application, OnDemand sends the document to the printer that you specified. Typically you define an application for each different report that you plan to load into the system.

When you create an application, you specify properties of the input data, such as whether the data contains carriage control characters or table reference characters, and the record format of the input data. OnDemand uses the information that you specify to properly interpret the data for viewing.

The OnDemand application is where you specify information to the indexing and data loading programs, such as the technique that OnDemand uses to compress the report file, the parameter used to index the data, and information that OnDemand uses to process index data before loading index records into the database. OnDemand uses the indexing parameters, options, and data values that you specify to locate index data in and extract index data from the report.

You can set up one or more logical views of a report. A logical view determines how OnDemand displays line data reports and governs other viewing characteristics. For example, you can set up a logical view so that when a user selects a document for viewing, the OnDemand client program automatically locks the heading of the report in place when the user moves up or down lines on a page.

### Users and groups

Each user logs on to OnDemand with a userid. OnDemand authenticates userids and determines the usage and administrative authority available to the user based on the log on userid. An OnDemand userid does not necessarily have to identify an individual user. However, for accounting purposes, you probably want to assign an OnDemand userid to each person that uses the system.

OnDemand automatically creates the ADMIN userid when you initialize the system. The ADMIN userid has system administrator authority. A system administrator can perform the basic user functions, such as logging on the system and opening folders, and administrative functions, such as defining users and groups and creating, updating, and deleting application groups, applications, folders, storage sets, and printers.

OnDemand groups are a means to organize users by function, authorization, or any other purpose you might require. When you define an OnDemand group, you can organize users by department or function and set folder and application group permissions that are common to all of the users assigned to the group. The
permissions determine the types of actions that users assigned to the group can perform. You do not have to assign a user to a group, but doing so can simplify administration of users with similar requirements and capabilities.

## Permissions

### Overview

As both a convenience and security measure, you can assign a user to a group. When you assign a user to a group, the user obtains the permissions of the group. For example, suppose you create a group and authorize the group to open the Student Information folder. Any user that you assign to the group automatically obtains permission to open the Student Information folder.

If you assign a user to more than one group, the user normally obtains the permissions of all of the groups. For example, using the group settings listed in Table 5, a user assigned to both groups can access the Student Bills and Student Transcripts folders.

<table>
<thead>
<tr>
<th>Group</th>
<th>Folders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>Student Bills</td>
</tr>
<tr>
<td>Admissions</td>
<td>Student Transcripts</td>
</tr>
</tbody>
</table>

However, there are exceptions to this rule. See information about permissions in the IBM DB2 Content Manager OnDemand for z/OS: Administration Guide, SC27-1374 for details.

You can set folder and application group permissions for every user and group defined to OnDemand. If you set permissions for a specific group, the group permissions take precedence over the permissions set at the folder level or the application group level. If you set permissions for a specific user, the user permissions take precedence, regardless of any group that includes the user or the permissions set at the folder level or the application group level.

You can set folder and application group permissions when you add or update a folder or application group. You can also set folder and application group permissions when you add or update a user or a group.

### Folder permissions

You can set folder permissions at the folder, group, and user levels. Setting permissions at the folder level provides all OnDemand users and groups that are not otherwise given permissions with the permissions that you define. Setting permissions at the group level provides all of the users that you assign to the group with the permissions that you define. Group level permissions override folder level permissions. Setting permissions at the user level provides a specific user with the permissions that you define. User level permissions override group level permissions and folder level permissions.

By default, only the user that created the folder, users with administrator permission for the folder, application group/folder administrators, and system administrators can access the folder.

You can set the following types of folder permissions:
• Access. Users can open the folder with OnDemand client programs and search for and retrieve data from the application groups referenced in the folder. To search for and retrieve items, users must have access permission for the folder, and access permission to one or more of the application groups referenced in the folder.

• Fields. Users can open the folder with OnDemand client programs and can modify the folder field information with the administrator interface. OnDemand maintains a set of folder fields for each user given fields permission for the folder.

• Named Queries. A named query is a set of search criteria, saved by name, that can be selected and restored into folder search fields. OnDemand supports two types of named queries: public, that is, a named query that is available to all users that can open the folder, and private, that is, a named query available only to the user that created the named query. Users can be given authority to view, create, modify, and delete named queries.

• Administrator. A folder administrator can modify and delete the folder. A folder administrator can change user and group permissions, add and remove users and groups from the folder, and make changes to the folder field information.

Application group permissions

You can set application group permissions at the application group, group, and user levels. Setting permissions at the application group level provides all OnDemand users and groups that are not otherwise given permissions with the permissions that you define. Setting permissions at the group level provides all of the users that you add to the group with the permissions that you define. Group level permissions override application group level permissions. Setting permissions at the user level provides a specific user with the permissions that you define. User level permissions override group level permissions and application group level permissions.

By default, only the user that created the application group, users with administrator permission for the application group, application group/folder administrators, and system administrators can access the application group.

You can set the following types of application group permissions:

• Access. Users can search for and retrieve data stored in the application group using OnDemand client programs.

• Document. Determines the types of document functions users can perform. The default document permissions are view, print, and copy.

• Annotation. Determines the types of annotation functions users can perform. The default annotation permissions are view, print, and copy.

• Logical Views. Logical views determine how OnDemand displays report file pages. Users can define their own logical views with OnDemand client programs.

• Administrator. An application group administrator can modify and delete the application group. An application group administrator can change user and group permissions, add and remove users and groups from the application group, change message logging options, update the storage management settings for the application group, and make changes to the application group field information.

• Query restriction. Limits access to application group data. You typically set up a query restriction to limit the data that a specific user or group of users can access.
Naming rules

When you create objects in OnDemand, you assign names to the various objects.

Note: If you install OnDemand with a language that requires multiple bytes per character (for example, Kanji), the number of characters permitted for a name is less than the number listed in the sections that follow.

When naming a user, the name that you specify:
• Can contain from one to 128 characters (bytes)
• Cannot include the ’ (apostrophe), * (asterisk), % (percentage) + (plus), _ (underscore), [ (left bracket), ] (right bracket), “ (double quote), or blank characters
• Must be unique to the library server
• By default, OnDemand converts lowercase letters in a user name to uppercase (for example, lagarde is stored as LAGUARDE)

Note: If your organization implements the User Security Exit, then you can determine the characteristics of userids on your system.

When creating a password, the value that you specify:
• Can contain from one to 128 characters (bytes)

Notes:
1. OnDemand security verifies only the first eight characters that are entered by the user. The additional characters are provided for customers who choose to implement their own password security by enabling the User Security Exit.
2. If the user types more than eight characters, the client will display an error message unless the SRVR_FLAGS_IGNORE_PASSWD_MAX parameter in the AR5.INI file is set to 1 (one). The default value for the SRVR_FLAGS_IGNORE_PASSWD_MAX parameter is 0 (zero).
3. If your organization enables the User Security Exit, you should set the Minimum Password Length option to Permit Blank Password so that OnDemand security does not validate passwords that are entered by your users (when they set or change a password). Also, OnDemand security ignores the Maximum Password Age option when you enable the User Security Exit.
4. Unless your organization enables the Security User Exit, IBM recommends that you specify a value of 8 (eight) or less for the Minimum Password Length option.
• By default, OnDemand converts lowercase letters in a password to uppercase (for example, lagarde is stored as LAGUARDE)

Note: If your organization implements the User Security Exit, then you can determine the characteristics of passwords on your system.

When naming a group, the name that you specify:
• Can contain from one to 128 characters (bytes)
• Cannot include the ’ (apostrophe), * (asterisk), % (percentage) + (plus), _ (underscore), [ (left bracket), ] (right bracket), “ (double quote), or blank characters
• Must be unique to the library server
Can be mixed case; however, OnDemand ignores the case (for example, LaGuarde is the same as laguarde)

When naming an application group, application, or folder, the name that you specify:
- Can contain from one to sixty characters (bytes), including embedded blanks
- Cannot include the ’ (apostrophe), % (percentage), _ (underscore), [ (left bracket), ] (right bracket), or “ (double quote) characters
- Can be mixed case; however, OnDemand ignores the case (for example, LaGuarde is the same as laguarde)
- An application name must be unique to the application group where you assign the application
- An application group or folder name must be unique to the library server

When naming a database field, the name that you specify:
- Can contain from one to eighteen characters (bytes)
- Must begin with the letter A through Z
- Can include the letters A through Z, the numbers 0 through 9, and the @ (at sign), $ (dollar), _ (underscore), and # (number sign)
- Can be mixed case; however, OnDemand doesn’t create a unique name (for example, rDate is the same as rdate)
- Must be unique to the application group
- Cannot be any of the OnDemand reserved words:
  - annot  doc_off
  - comp_len doc_type
  - comp_off prt_nid
  - comp_type resource
  - doc_len res_comp_type
  - doc_name sec_nid
- Cannot be any of the words reserved by the database manager. (For a list of reserved words, see the documentation provided with your database manager product.)

When naming a logical view, the name that you specify:
- Can contain from one to thirty characters (bytes)
- Can be mixed case
- A public view must be unique to the application
- A private view must be unique to the user

When naming a folder field, the name that you specify:
- Can contain from one to sixty characters (bytes), including embedded blanks
- Cannot include the ’ (apostrophe), % (percentage), _ (underscore) [ (left bracket), ] (right bracket), or “ (double quote) characters
- Can be mixed case
- Must be unique to the folder

When naming a storage set, the name that you specify:
- Can contain from one to sixty characters (bytes)
- Can be mixed case; however, OnDemand ignores the case (for example, LaGuarde is the same as laguarde)
- Must be unique to the library server
When naming a primary storage node, the name that you specify:
• Can contain from one to 128 characters (bytes)
• Can be mixed case; however, OnDemand ignores the case (for example, LaGuarde is the same as laguarde)
• Must be unique to the storage set

When naming a server printer, the name that you specify:
• Can contain from one to sixty characters (bytes)
• Can be mixed case; however, OnDemand ignores the case (for example, LaGuarde is the same as laguarde)
• Must be unique to the library server

When naming a server printer queue, the name that you specify:
• Can contain from one to sixty characters (bytes)
• Must be a valid printer queue name on the library server

### Data types and field types

When you define an application group, OnDemand creates a structure for a database table with the index and filter fields that you define. When you store a report in the application group, OnDemand extracts index data from the report, places the index data into the database fields, and inserts rows into the application group table. The database fields that you define for the application group can contain different types of data. When you define the database fields, you select a data type for each field. The data type tells OnDemand what kind of data can be stored in the field.

When you define a folder to OnDemand, the fields that you define can be used in two ways:
• For search fields, in which users enter values to construct queries
• For display fields, to identify the items in the document list

Table 6 lists the types of application group and folder fields supported by OnDemand.

**Table 6. Application group and folder field types**

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Integer</td>
<td>Contains whole numbers between (-32,767) and (32,767)</td>
</tr>
<tr>
<td>Integer</td>
<td>Contains whole numbers between (-2147483648) and (2147483647)</td>
</tr>
<tr>
<td>Decimal</td>
<td>Contains numbers between (-10^{307}) and (10^{308}) with up to 15 significant digits. You can store currency values in a decimal field, and use the precision attribute to format the decimal places.</td>
</tr>
<tr>
<td>String (Fixed)</td>
<td>Contains letters, numbers, special symbols, such as the % and #, and any other printable character. A fixed length string field requires one byte per character declared; unused characters do consume storage.</td>
</tr>
<tr>
<td>String (Variable)</td>
<td>Contains letters, numbers, special symbols, such as the % and #, and any other printable character. A variable length string field requires one byte per character plus four bytes for overhead; unused characters do not consume storage.</td>
</tr>
</tbody>
</table>
Table 6. Application group and folder field types (continued)

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Contains a valid date from January 1, 1970 to December 31, 2069. If you need to index reports that contain dates that occur before January 1, 1970, you must define the date as a String field. OnDemand checks a date value to make sure it is valid.</td>
</tr>
<tr>
<td>Time</td>
<td>Contains times of day, stored in three-second increments, since midnight, and limited to 24 hours.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Contains both a date and time value. The date can be from January 1, 1970 to December 31, 2038. The time is stored in one-second increments.</td>
</tr>
<tr>
<td>Date/Time (TZ)</td>
<td>Contains both a date and time value. The date can be from January 1, 1970 to December 31, 2038. A Date/Time (TZ) field is exactly like a Date/Time field, but uses the time zone set on the client PC.</td>
</tr>
</tbody>
</table>

Table lists additional types of fields that are supported in folders.

Table 7. Additional folder field types

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annotation Color Search</td>
<td>Use to search annotations to a document by specifying a color. A match occurs and an item is added to the document list if the color of the text in one or more of the annotations to a document is the same as the color that is specified in the search field. A folder can have one annotation text search field.</td>
</tr>
<tr>
<td>Annotation Text Search</td>
<td>Use to search annotations to a document for the specified string. A match occurs and an item is added to the document list if one or more of the annotations to a document contain the text that is specified in the search field. A folder can have one annotation text search field.</td>
</tr>
<tr>
<td>Application Group</td>
<td>For a search field, contains a list of the application groups that can be searched from the folder. When you create a folder that contains more than one application group, you can define an application group field. If enabled for queries, users can select the name of the application group that OnDemand searches, rather than searching all of the application groups contained in the folder (the default). For a display field, lists the name of the application group in which the document was found. A folder can have one application group field.</td>
</tr>
<tr>
<td>Segment</td>
<td>Contains a list of the tables of index data that are stored in the application groups that can be searched from the folder. Each item in the list represents a segment of application group data. OnDemand segments application group data by date. If enabled for queries, users can select a specific segment of application group data to search. A folder can have one segment field. Specifying a search value in the segment field can improve the performance of queries.</td>
</tr>
<tr>
<td>Field Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Text Search</td>
<td>Used to find documents that contain a non-indexed word or phrase. A match occurs and an item is added to the document list when one or more lines in a document contain the word or phrase exactly as specified. The search string can contain letters, numbers, special symbols, such as the % and #, and any other printable character. A folder can have one text search field. <strong>Note:</strong> The (sequential) text search takes place on the server. A text search will delay the generation of the document list. Only documents that meet all of the criteria specified in the other folder fields will be searched for the specified word or phrase. A typical use of a text search field is to provide users an additional search field without incurring database overhead. For example, assume that a report is indexed on date and transaction number. A text search field would allow users to optionally enter a customer's name, phone number, or any other information contained in the document or documents that the user needs to retrieve (the information is not contained in the database). However, a text search field has a direct impact on the generation of the document list and the performance of the server. A large number of users performing text searches at the same time can usually drain the resources of even the most powerful library server.</td>
</tr>
</tbody>
</table>
Chapter 6. Storage requirements

Overview

Estimating storage requirements for an OnDemand system begins with understanding and documenting end-user requirements for storing and accessing data. Chapter 4, “Reports and other data,” on page 35 provides information that can help you gather end-user requirements.

Before you turn requirements into a storage subsystem to support your system, you must also review the various operational and performance issues. For example, OnDemand supports up to 32 index fields for each report. However, users should not need a lot of indexes to locate a specific version of a report or a document within a report. The number of index fields that you define has a direct impact on the amount of disk space that you will need for your database. In addition, the more indexes that you define for a report, the longer it will take to load the report into the system. It is important to work with users and understand their data retrieval requirements. Define only the number of index fields that they need. You may have to balance end-user requirements with disk space, the amount of time required to load a report, and other performance issues.

Maintaining a copy of reports in cache storage can have a significant impact on the amount of disk storage that you need on your system. Most customers store the latest versions or most frequently accessed reports in cache storage. You should review how users search for and retrieve information from the reports that you plan to store in OnDemand. For example, if most retrievals occur in the first 90 days after a report is generated, then you probably want to store the report in cache storage for at least that length of time. You should choose a time frame to cache each report which meets the requirements of your users and also makes the best use of available cache storage space.

There are several components that you need to measure to determine the amount of disk, optical, and tape storage required to support an OnDemand system. For example, the following components of the system require disk storage:

- Storage space for application programs and system software, including the base operating system, the OnDemand server software, and the database manager and optional components such as the archive storage manager and the server print manager.
- Storage space for configuration files and control files.
- Storage space for the OnDemand system logging facility.
- Temporary storage space for reports received from other systems. In general, you should plan for enough disk space to hold either the largest single report that you will be loading on the system or the total of several reports that may be staged for loading at the same time, whichever requires the most storage space. In many organizations, most versions of a report are similar in size. However, there may be times when a report is much larger than average. For example, a report generated at the end of the month or the end of the quarter may greatly exceed the average report size.
- Temporary storage space for indexing a report on the OnDemand server.
- Temporary storage space for loading a report on the OnDemand server.
• Cache storage. This may be zero, for reports that do not require cache storage. However, a very large amount of disk space may be required for reports that must remain in cache storage for several months or longer.

OnDemand compresses report data before storing it on storage volumes. The compression ratio can have a significant impact on the amount of disk space that you need to store a report in cache storage. OnDemand can achieve up to 30:1 compression on line data reports. However, for reports that contain AFP data or image data that is already compressed, the compression achieved will be much lower.

• Storage space for the database, which includes OnDemand system tables (control information and objects that you define to OnDemand) and application group tables (index data extracted from reports). The amount of database space that you should plan for a report is a factor of the number of items contained in the report, the number of index fields that you define for the report, the number of versions of a report (or the frequency with which you load a report on the system), and how long you need to maintain a report on the system.

For reports that contain sorted transaction data, OnDemand can divide the report into groups of a fixed number of pages and create one index row for each group of pages. For reports that contain logical items, such as statements, and policies, OnDemand can create one index row for each logical item in the report. Typically the database space required for indexing sorted transaction data is much less than the database space required for indexing reports that contain logical items. Also, index fields provide fast lookup, but require a significant amount of database space.

• Storage space for database log files. You should plan for disk space for active or primary log files and for log files that are not active but may still be needed for recovery (sometimes known as archived log files).

• Storage space for the database and logs used by the archive storage manager.

• Temporary storage space for server print.

• Temporary storage space for importing migrated indexes from archive media to the database.

The following components of the system require archive storage (optionally VSAM files or OAM objects):

• Reports that you plan to store on archive media.

• Backup copies of reports stored on archive media. (For critical applications, some customers require that the system maintain two or more copies of a report on archive media.)

When you calculate archive storage requirements, you should also determine the number of storage volumes and libraries that you need to support the data that will be stored on your system. Optical libraries are capable of holding a large amount of data, with the storage capacity usually expressed in amounts of uncompressed data. Depending on the compression ratio achieved for your reports, an optical library may be able to hold more than the stated amount. For example, if OnDemand can achieve a 6:1 compression ratio on the reports that will be stored in an IBM 3995 optical library, then the library could hold multiple terabytes of report data, depending on exact hardware configuration.

---

5. For sorted transaction data, the examples and calculations that follow assume that OnDemand will create one indexed item for each group of 100 pages in a report. The number of pages in a group is a parameter that you can configure when you index a report with ACIF. The IBM DB2 Content Manager OnDemand for z/OS: Indexing Reference, SC27-1375 provides more information.
You can replace full optical storage volumes as needed, if the availability requirements of your system allow you to do so. For example, you may decide to remove full storage volumes from a library one year after the last time that OnDemand wrote report data to the storage volume. You could replace the full storage volumes with newly initialized storage volumes to hold the latest reports stored on the system. That way, the latest versions of a report are always available in the library. However, if you need to keep many years of report data online in the library or you store massive amounts of data in your application groups, then you may need to plan on having several optical libraries for your system.

### Storage hierarchy

There are several different storage management strategies that you can use with OnDemand and most archive storage managers.

OnDemand maintains a cache storage system independently of the archive storage manager. The cache storage system should contain the fastest storage devices, for high-speed access to reports. When you load a report on the system, OnDemand can automatically store one copy of the report in cache storage and another copy of the report in archive storage. OnDemand also supports the option of storing reports in cache storage and then later migrating them to archive storage. However, IBM recommends that you always plan to copy reports to cache storage and archive media at the same time (when you load the report). Doing so usually eliminates the need for you to periodically backup cache storage, because a backup copy of your reports already exists on archive media. Copying reports to cache storage and archive storage at the same time also eliminates the need for you to migrate reports to archive media.

Reports expire (are eligible to be removed) from cache storage when they reach their cache storage expiration date. You specify the cache storage expiration date for a report when you create an application group. For example, you can specify that a report should expire from cache storage after it has been stored there for ninety days. OnDemand provides a utility that you can use to automatically remove expired reports from cache storage on a regular schedule. After you run expiration processing, OnDemand reclaims the space taken by expired documents.

OnDemand and the archive storage manager maintain documents independently of each other. For example, each use their own criteria to determine when data expires and should be removed from the system; each use their own utilities to remove documents. However, for removal of documents from the system, you should specify the same criteria to OnDemand and the archive storage manager. For example, the Life of Data and Indexes, which is used by OnDemand, should specify the same length of time as the retention period for the VSAM or OAM archive file definitions.

### Data compression

OnDemand can compress report data using several different data compression algorithms, before storing the data in cache storage and archive storage. The compression ratio that OnDemand can achieve has a significant impact on the amount of space required to store reports.

The compression ratios that OnDemand can achieve vary widely depending on the type of data and the format of the data. You cannot always accurately estimate the compression ratio by simply examining the data. On average, you can expect to achieve between 2:1 and 15:1 compression for AFP documents and up to 30:1.
compression for line data reports. Compression for AFP documents is based on the output data file produced by ACIF, and not the input file, which could have been line data. When ACIF formats line data with a page definition, it may increase the size of the data by adding AFP controls for positioning text.

To properly estimate the amount of storage space required by a report, IBM recommends that you measure the compression ratio achieved on a sample of the report. You can measure the compression ratio by using the ARSADMIN program. For example:

- For reports that contain logical items, such as statements and policies, use the following example:

  \[
  \text{arsadmin compress -i 200000 -s inputFile -o outputFile}
  \]

  Where inputFile is the report that you want to measure and outputFile is the compressed output.

  To determine the compression ratio, divide the size of outputFile by the length (-i 200000). For example, if the size of outputFile is 66,000 bytes, then the compression ratio is 66000/200000 or 0.33 (3:1 compression).

- For reports that contain line data and include a sorted transaction value, such as a general ledger, first determine the size of an indexed group of pages, for example, 100 pages. Then extract a group of pages from a larger report and process them with the ARSADMIN program. For example:

  \[
  \text{arsadmin compress -s groupPages -o outputFile}
  \]

  Where groupPages is a file that contains a representative group of pages from a larger report and outputFile is the compressed output.

  To determine the compression ratio, divide the size of outputFile by groupPages. For example, if the size of outputFile is 40,000 bytes and the size of the group of pages is 200,000 bytes, then the compression ratio is 40000/200000 or 0.20 (5:1 compression).

In order to run the ARSADMIN program, the input file must exist in HFS; the output file will be written to the directory that contains the input file. See the IBM DB2 Content Manager OnDemand for z/OS: Administration Guide, SC27-1374 for more information about the ARSADMIN program.

---

**Calculating data storage requirements**

**Temporary space for indexing**

OnDemand requires temporary storage space on disk to index reports. The temporary space required by OnDemand is a factor of the largest version of a report and the number of reports that you plan to index at the same time.

Use the following calculation to determine the amount of temporary space required to index reports:

\[
\text{Temporary space} = \text{Largest report size} \times 1.5
\]

*Figure 12. Calculating temporary space for indexing*
Where Largest report file size is the size in bytes of the largest version of a report to be indexed or the total size of all of the reports that the server must index at the same time (if you index more than one report at a time).

For example, if the largest report is 400 MB and the report is indexed on the OnDemand server, then the temporary space required to index the report is:

\[
\text{Temporary space} = 400 \text{ MB} \times 1.5 = 600 \text{ MB}
\]

**Cache storage**

The amount of storage space that you should dedicate to cache storage will vary greatly based on requirements such as the number of reports that you store on the system, the compression ratio that OnDemand can achieve, and the amount of time that you need to store a report in cache storage. Most customers store reports in cache storage for a short period of time, to provide the fastest retrieval for the most frequently used reports. As reports age, and retrieval requests for them are much less frequent, the reports can be retrieved from archive media. Another reason to keep reports in cache storage is if lots of users access them at the same time. Because the archive storage manager may require from six and sixty seconds to mount an optical or tape storage volume and retrieve a report, it is usually not possible to support a high transaction rate for reports stored on archive media.

Another use of cache storage is for reports that have a short life, such as one week or one month. You can store these types of reports in cache storage and the system can be configured to automatically delete them when they reach their expiration date. Cache storage can also be used to hold reports for which you do not need a backup copy.

Use the following calculation to determine the amount of disk space required for cache storage:

\[
\text{Cache Storage} = \text{Size of Data per week} \times \text{Number of Weeks to cache} \times \text{Data Compression ratio} \times 1.1
\]

*Figure 13. Calculating cache storage*

For example, if you plan to load 2 GB of report data on the system each week, the reports must be maintained in cache storage for 26 weeks, and the compression ratio is 8:1 (0.13), then the storage space required for cache storage space can be calculated as follows:

\[
\text{Cache Storage} = 2 \text{ GB} \times 26 \times 0.13 \times 1.1 = 7,436,000,000
\]

**OnDemand database storage**

When you load a report into the system, OnDemand extracts index data from the report and stores it in an application group table in the database. For reports that contain logical items, such as statements and policies, OnDemand can create one database row for every item found in the report. For reports that contain sorted transaction data, OnDemand can create one database row for every indexed group of pages (by default, 100 pages in a group).
A database row contains a fixed amount of information that OnDemand uses to maintain reports (approximately 40 bytes) and any additional index and filter fields that you define for the application group. Index fields, which allow users to locate documents quickly, require significantly more storage space than filter fields. (Index fields also require more time to load into OnDemand.)

There are four major factors that determine the amount of storage space required for the OnDemand database:
1. The number of index and filter fields
2. The size of the index and filter fields
3. The number of indexed items per month
4. The number of months that OnDemand maintains the index data in the database

The types of index fields supported by OnDemand are:
1. Small Integer
2. Integer
3. Decimal
4. String (Fixed)
5. String (Variable)
6. Date
7. Time
8. Date/Time
9. Date/Time (TZ)

Refer to the DB2 Universal Database for information on the field sizes of the supported field types.

Calculating the size of the database
You can use the following calculations to determine the space required in the OnDemand database to hold the index data for a report. In general, IBM recommends that you add 10 to 20 percent to the calculated space requirements. The calculations can be used for reports that contain logical items and reports that contain a sorted transaction value.

Note: The formulas that follow were derived from information provided with the database manager products that work with OnDemand. See the product information for details.

\[
\begin{align*}
\text{TableSize} &= \text{( Sum of column lengths)} \\
\text{IndexSize} &= (\text{Index 1 length } + 8) + (\text{Index 2 length } + 8) + \ldots \\
\text{DatabaseSize} &= \left( (\text{TableSize } + 40) \times 1.5 \right) + (\text{IndexSize } \times 1.5) \\
&\quad \times \text{Number of indexed items per month} \\
&\quad \times \text{Number of months to keep index in database}
\end{align*}
\]

Figure 14. Calculating database storage space for DB2

- Index n length is the size of a database field for which you want OnDemand to build an index. For example, a date field requires 4 bytes to hold the date value. DB2 requires an additional eight bytes for each index that you define.
- OnDemand adds approximately 40 bytes of control information to each row in a table.
- When the report contains logical items, the Number of indexed items per month is the number of statements, policies, and so forth.
- When the report contains a sorted transaction value, the Number of indexed items per month is the number of groups of indexed pages (by default, the system indexes a report in groups of 100 pages). You can specify the size of an indexed group of pages when you index a report with ACIF.

**Examples**

1. The following example illustrates how to calculate the DB2 database storage space required for a report that contains logical items, such as statements. The example is to index one million items per month and keep the index data in the database for 36 months. Table 8 lists information about the database fields.

   **Table 8. Database storage for a report that contains logical items**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Type</th>
<th>Field Size</th>
<th>Index or Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Number</td>
<td>Fixed String</td>
<td>12 bytes</td>
<td>Index</td>
</tr>
<tr>
<td>Report Date</td>
<td>Date</td>
<td>4 bytes</td>
<td>Filter</td>
</tr>
<tr>
<td>Customer Name</td>
<td>Variable String</td>
<td>20+4 bytes</td>
<td>Filter</td>
</tr>
</tbody>
</table>

   \[
   \text{TableSize} = (12 + 4 + (20 + 4)) = 40 \\
   \text{IndexSize} = (12 + 8) = 20 \\
   \text{DatabaseSize} = ( (40 + 40) \times 1.5 ) + (20 \times 1.5) = 150 \\
   \quad \times 1,000,000 = 150000000 \\
   \quad \times 36 = 5400000000 \\
   \]

   OnDemand requires approximately 5.4 GB of storage space to store 36 months of report index data in the database.

2. The following example illustrates how to calculate the database storage space required for a report that contains line data with a sorted transaction value. Because only one database row is generated for each indexed group of pages in the report, in general, significantly less database storage space is required than for reports that contain logical items.

   Reports that contain line data with a sorted transaction value use a fixed type of indexing, where each database row contains the beginning value, the ending value, and the beginning page number for the group of pages. OnDemand maintains the beginning and ending values as indexes and the page number as a filter. The main parameters for the calculation are the length, in bytes, of the sorted transaction value, the number of pages generated in a month, the size of a group of indexed pages, and the number of months that OnDemand maintains the index data in the database.

   The example is to index one million pages per month, in groups of 100 pages, and keep the index in the database for 24 months. Table 9 lists information about the database fields.

   **Table 9. Database storage for a report that contains a sorted transaction value**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Type</th>
<th>Field Size</th>
<th>Index or Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin Transaction Value</td>
<td>Fixed String</td>
<td>10 bytes</td>
<td>Index</td>
</tr>
<tr>
<td>End Transaction Value</td>
<td>Fixed String</td>
<td>10 bytes</td>
<td>Index</td>
</tr>
<tr>
<td>Report Date</td>
<td>Date</td>
<td>4 bytes</td>
<td>Filter</td>
</tr>
</tbody>
</table>
Table 9. Database storage for a report that contains a sorted transaction value (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Type</th>
<th>Field Size</th>
<th>Index or Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Number</td>
<td>Integer</td>
<td>4 bytes</td>
<td>Filter</td>
</tr>
</tbody>
</table>

TableSize = ( 10 + 10 + 4 + 4 ) = 28

IndexSize = ( ( 10 + 8 ) + ( 10 + 8 ) ) = 36

DatabaseSize = ( ( 28 + 40 ) * 1.5 ) + ( 36 * 1.5 ) = 156
  * ( 1,000,000/100 ) = 1560000
  * 24 = 37440000

OnDemand requires 37.44 MB of storage space to store 24 months of report index data in the database.

Database log file storage
The DB2 database requires storage space for recovery logs. Contact your database administrator to make sure that sufficient storage space for primary and secondary log files is defined and that database and log file backup procedures are established for your installation.

Server print storage space
OnDemand requires temporary work space to process requests for the server print manager. You must allocate enough storage space to support the maximum number of concurrent print requests that the server must manage. IBM recommends that you define a dedicated file system on which OnDemand can store the temporary print files. IBM recommends that at least 500 MB of free space be available in this file system at all times. If your storage configuration permits, IBM recommends that you allocate 1 GB or more of free space to this file system.

Calculating archive storage requirements

Report storage space
When you estimate the amount of space required to store a report in archive storage, you must consider the size of the report, the compression ratio achieved, and the length of time that the archive storage manager maintains the report. Archive media can be optical storage or magnetic tape. Use the following calculation to estimate that amount of space required:

\[
\text{ArchiveStorageSpace} = ( \text{Data per month} \times \text{life of data in months} ) 
\times \text{compression ratio} 
\times \text{1.1}
\]

Figure 15. Calculating archive storage space

For example, if you plan to store 8 GB of report data per month, the archive storage manager must maintain the data for 36 months, and OnDemand can achieve a compression ratio of 8:1 (0.13), you would require approximately 41 GB of archive storage space:

\[
\text{OpticalSpace} = ( 8 \text{ GB} \times 36 ) 
\times 0.13 
\times 1.1 = 41184000000
\]
Migrated index storage space

OnDemand supports automatic migration of indexes from the database to archive storage so that you can maintain seldom used indexes for long periods of time. However, migration of indexes should be done only after there is no longer a need to retrieve the reports to which they point. For example, suppose that all of the queries for a report occur in the first 24 months after the report is loaded into the system. After that time, there are no more queries for the report. The indexes could be eligible to be migrated from the database to archive storage. Migration of index data is optional; you can choose to migrate indexes for all, some, or none of the application groups on your system. In addition, you determine the length of time that indexes stay in the database before OnDemand migrates them to archive storage.

You can use the following calculation to determine the archive storage space required to hold migrated indexes:

\[
\text{ArchiveMediaDBSpace} = \left( \text{Database size per month} \times \text{compression ratio} \right) \\
\times \left( \text{life of data} - \text{months before migrating data} \right)
\]

*Figure 16. Calculating migrated index storage space*

For example, if the index data requires 1.5 MB of space in the database per month, you need to maintain the indexes for 84 months, and the indexes remain in the database for 24 months before being migrated, then the archive storage required to hold the migrated indexes is:

\[
\text{ArchiveMediaDBSpace} = \left( 1500000 \times 0.33 \right) \\
\times \left( 60 \right) = 29,700,000
\]

Device storage utilization

OnDemand has the ability to store reports using different storage methods (HFS, VSAM, OAM) and different device types (DASD, Tape, Optical). Depending on the device type and storage method used, the exact amount of space required on the device for storing data will vary. For more accurate estimates of the amount of storage space required in your particular situation, please refer to the appropriate access method and device specification manuals. Alternatively, the above calculated numbers (which represent the amount of data that needs to be stored) can be used as a rough estimate of the amount of storage space required. The current relevant reference publications include:

- OS/390 V2R10.0 DFSMS Access Method Services for Catalogs, SC26-7326
- OS/390 V2R10.0 DFSMS: Managing Catalogs, SC26-7338
- OS/390 V2R10.0 DFSMS: Using Data Sets, SC26-7339
- OS/390 V2R10.0 UNIX System Services Planning, SC28-1890
- OS/390 V2R10.0 DFSMS Object Access Method Planning, Installation and Storage Administration Guide for Object Support, SC35-0391

Storage sizing examples

The following examples illustrate how to estimate storage requirements for two types of reports:

- Report that contains logical items, such as statements or policies
- Report that contains sorted transaction data
Each example contains four parts:
- Database Columns
- Report Profile
- Disk Storage Space
- Archive Storage Space
Report that contains logical items


<table>
<thead>
<tr>
<th>Column Number</th>
<th>Name</th>
<th>Index or Filter</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Account Number</td>
<td>Index</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Report Date</td>
<td>Filter</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Customer Name</td>
<td>Filter</td>
<td>24</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Report Characteristic</th>
<th>Report Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of data per month (bytes)</td>
<td>8,000,000,000</td>
</tr>
<tr>
<td>Average statement size (bytes)</td>
<td>8,000</td>
</tr>
<tr>
<td>Number of statements per month</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Number of cycles per month</td>
<td>20</td>
</tr>
<tr>
<td>Largest cycle data size (bytes)</td>
<td>400,000,000</td>
</tr>
<tr>
<td>Largest single report file size (bytes)</td>
<td>400,000,000</td>
</tr>
<tr>
<td>Largest cycle (number of statements)</td>
<td>50,000</td>
</tr>
<tr>
<td>Number DB columns from Table 10</td>
<td>4</td>
</tr>
<tr>
<td>Life of Data (months)</td>
<td>36</td>
</tr>
<tr>
<td>Number of weeks to cache data</td>
<td>26</td>
</tr>
<tr>
<td>Number of days to keep index in database</td>
<td>1098</td>
</tr>
<tr>
<td>Compression percentage (ratio)</td>
<td>0.13 (8:1) AFP</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Storage</td>
<td>600,000,000</td>
</tr>
<tr>
<td>Cache Storage</td>
<td>7,436,000,000</td>
</tr>
<tr>
<td>OnDemand Database</td>
<td>5,400,000,000</td>
</tr>
<tr>
<td>Total Disk Storage Required (Bytes)</td>
<td>13,436,000,000</td>
</tr>
</tbody>
</table>

Table 13. Report that contains logical items. Part 4 of 4. Archive Storage Requirements in Bytes

<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Data</td>
<td>41,184,000,000</td>
</tr>
<tr>
<td>Total Archive Storage</td>
<td>41,184,000,000</td>
</tr>
</tbody>
</table>
Report that contains transaction data


<table>
<thead>
<tr>
<th>Column Number</th>
<th>Name</th>
<th>Index or Filter</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beginning Invoice Number</td>
<td>Index</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Ending Invoice Number</td>
<td>Index</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Report Date</td>
<td>Filter</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Page Number</td>
<td>Filter</td>
<td>4</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Report Characteristic</th>
<th>Report Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of data per month (bytes)</td>
<td>5,000,000,000</td>
</tr>
<tr>
<td>Average page size (bytes)</td>
<td>5,000</td>
</tr>
<tr>
<td>Number of pages per month</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Number of cycles per month</td>
<td>20</td>
</tr>
<tr>
<td>Largest Cycle (data size in bytes)</td>
<td>200,000,000</td>
</tr>
<tr>
<td>Largest Cycle (number of pages)</td>
<td>50,000</td>
</tr>
<tr>
<td>Largest single report file size (bytes)</td>
<td>200,000,000</td>
</tr>
<tr>
<td>Group of indexed pages</td>
<td>100</td>
</tr>
<tr>
<td>Number DB columns from Table 14</td>
<td>4</td>
</tr>
<tr>
<td>Life of Data (months)</td>
<td>24</td>
</tr>
<tr>
<td>Number of weeks to cache data</td>
<td>0</td>
</tr>
<tr>
<td>Number of days to keep indexes in database</td>
<td>730</td>
</tr>
<tr>
<td>Compression percentage (ratio)</td>
<td>0.05 (20:1)</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Storage</td>
<td>300,000,000</td>
</tr>
<tr>
<td>Cache Storage</td>
<td>0</td>
</tr>
<tr>
<td>OnDemand Database</td>
<td>37,440,000</td>
</tr>
<tr>
<td>Total Disk Storage Required (Bytes)</td>
<td>337,440,000</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Data</td>
<td>6,600,000,000</td>
</tr>
<tr>
<td>Total Archive Storage Required (Bytes)</td>
<td>6,600,000,000</td>
</tr>
</tbody>
</table>
Storage sizing worksheets

The following worksheets can help you estimate the storage requirements for two types of reports:

- Report that contains logical items, such as statements or policies
- Report that contains sorted transaction data

Each worksheet contains four parts:

- Database Columns
- Report Profile
- Disk Storage Space
- Archive Storage Space

Make a copy of the worksheets on the following pages for each report that you want to store in OnDemand. Complete the worksheets to calculate the storage requirements for the report. See “Calculating data storage requirements” on page 60 and “Calculating archive storage requirements” on page 64 for the formulas that you can use to calculate the storage requirements.
Report that contains logical items


<table>
<thead>
<tr>
<th>Column Number</th>
<th>Name</th>
<th>Index or Filter</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Report Characteristic</th>
<th>Report Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of data per month (bytes)</td>
<td></td>
</tr>
<tr>
<td>Average item size (bytes)</td>
<td></td>
</tr>
<tr>
<td>Number of items per month</td>
<td></td>
</tr>
<tr>
<td>Number of cycles per month</td>
<td></td>
</tr>
<tr>
<td>Largest cycle data size (bytes)</td>
<td></td>
</tr>
<tr>
<td>Largest single report file size (bytes)</td>
<td></td>
</tr>
<tr>
<td>Largest cycle (number of items)</td>
<td></td>
</tr>
<tr>
<td>Number DB columns from Table [18]</td>
<td></td>
</tr>
<tr>
<td>Life of Data (months)</td>
<td></td>
</tr>
<tr>
<td>Number of weeks to cache data</td>
<td></td>
</tr>
<tr>
<td>Number of days to keep indexes in database (default is Life of Data)</td>
<td></td>
</tr>
<tr>
<td>Compression ratio: image, PDF 1; AFP 8:1 (0.13); Line data 20:1 (0.05)</td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Storage</td>
<td></td>
</tr>
<tr>
<td>Cache Storage</td>
<td></td>
</tr>
<tr>
<td>OnDemand Database</td>
<td></td>
</tr>
<tr>
<td>Total Disk Storage Required (Bytes)</td>
<td></td>
</tr>
</tbody>
</table>

Table 21. Report that contains logical items. Part 4 of 4. Archive Storage Requirements in Bytes

<table>
<thead>
<tr>
<th>Storage Component</th>
<th>Storage Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Data</td>
<td></td>
</tr>
<tr>
<td>Total Archive Storage Required (Bytes)</td>
<td></td>
</tr>
</tbody>
</table>
Report that contains transaction data


<table>
<thead>
<tr>
<th>Column Number</th>
<th>Name</th>
<th>Index or Filter</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Report Characteristic</th>
<th>Report Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of data per month (bytes)</td>
<td></td>
</tr>
<tr>
<td>Average page size (bytes)</td>
<td></td>
</tr>
<tr>
<td>Number of pages per month</td>
<td></td>
</tr>
<tr>
<td>Number of cycles per month</td>
<td></td>
</tr>
<tr>
<td>Size of largest cycle (bytes)</td>
<td></td>
</tr>
<tr>
<td>Size of largest cycle in pages</td>
<td></td>
</tr>
<tr>
<td>Size of largest single report file (bytes)</td>
<td></td>
</tr>
<tr>
<td>Pages in an indexed group (default is 100)</td>
<td></td>
</tr>
<tr>
<td>Number DB columns from Table 22</td>
<td></td>
</tr>
<tr>
<td>Life of Data (months)</td>
<td></td>
</tr>
<tr>
<td>Number of weeks to cache data</td>
<td></td>
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<tr>
<td>Number of days to keep indexes in database (default is Life of Data)</td>
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<tbody>
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<td>Report Data</td>
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</tr>
<tr>
<td>Total Archive Storage Required (Bytes)</td>
<td></td>
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</table>
Chapter 7. Backup and recovery

Overview

This section of the book describes backup and recovery for OnDemand and provides recommendations about methods and procedures that an administrator can use to make sure that the following critical OnDemand components can be recovered when needed:

- OnDemand software
- OnDemand server information, created or modified during installation, configuration, and ongoing operation of OnDemand
- The OnDemand database
- Archived reports

OnDemand supports storing index data in table spaces and the incremental backup of table spaces. Table spaces enhance the management of index data and provide improved performance, especially for database backups. An incremental table space backup completes much quicker than a full database backup, providing you with increased flexibility in scheduling the loading of reports. Incremental backup images also require less storage space than full database backups.

Server software

If a media failure or some other unforeseen event occurs, you may be required to restore the OnDemand software programs, database software, archive manager software, server print manager software, and other application and user-defined software that you use on the system. You can usually use the original product media to restore the software programs.

It is important that you store the original product media in a safe location. IBM recommends that you register OnDemand as part of your business recovery plan and store the original product media in the same place that you store the other programs and files that are vital to the operation of your systems.

Server information

When you installed and configured OnDemand, you specified information that customized OnDemand to operate in your environment. Some OnDemand programs were stored in HFS while others were stored in MVS Libraries, both are managed by SMS.

Also, if you periodically make changes to the system, including the database, archive storage manager, and server print manager, you may find it helpful to backup the control files on a regular basis, perhaps once a week. The OnDemand control and data files are contained in the HFS.

See the operating system and device publications for your server for details about backup and restore concepts and commands for HFS and SMS.
OnDemand database

Database backup
Contact your database administrator to make sure that database backup files are defined and backup procedures are established for your installation. Refer to the Configuration Guide for details about how to configure the system and maintain backup files.

Reports
OnDemand can store copies of reports in cache storage and archive storage:

- The primary purpose of cache storage is short-term, high-speed storage and retrieval of reports. Cache storage consists of disk storage volumes maintained by OnDemand on one or more object servers.

- The primary purpose of archive storage is long-term storage and retrieval of reports. Reports in archive storage can also be used as backup copies, in the event that cache storage becomes corrupted or unavailable. Archive storage consists of optical or tape storage volumes managed by the archive storage manager, optionally VSAM or OAM.

Most customers configure the system to copy reports to cache storage and archive storage at the same time, when they load a report into the system.

OnDemand can retrieve a copy of a report from archive storage after the report has been removed from cache storage or if the copy on cache storage is unavailable. However, you must configure the system to support multiple copies of reports.

You configure OnDemand to use archive storage by defining VSAM files or OAM objects in the administration client.

Note: If you do not plan to copy reports to archive storage, then IBM recommends that you take regular backups of the file systems that comprise cache storage. However, if a media failure occurs or cache storage becomes corrupted, users cannot retrieve reports until the file systems are restored.

Cache storage
Cache storage is the primary, short-term storage location for reports.

If you do not copy reports to archive storage when you store them in OnDemand, then you need to consider how you can recover the reports in the event that you need to do so (for example, if a device fails).

Cache storage can be protected by maintaining it on high-availability storage devices. If no high-availability storage is available, IBM recommends that backups of reports in cache storage (the HFS datasets) be taken on a regular schedule. Consult your storage administrator for procedures to schedule and maintain backups at your installation.

Archive storage
OnDemand retrieves the primary copy of the report from archive storage after the report has been removed from cache storage. Customers with special business, legal, or performance reasons may want the system to maintain a backup copy of their reports in archive storage. The backup copy can be used if the primary copy becomes corrupted or unavailable.
You must configure the archive storage manager to maintain a backup copy of reports in archive storage.

See your storage administrator for details about defining and managing multiple copies of reports, backup and recovery of data, and scheduling operations.
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<td>Enterprise Storage Server</td>
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The following cross references are used in this glossary:

**Contrast with.** This refers to a term that has an opposed or substantively different meaning.

**Synonym for.** This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the dictionary.

**Synonymous with.** This is a backward reference from a defined term to all other terms that have the same meaning.

**See.** This refers the reader to multiple-word terms that have the same last word.

**See also.** This refers the reader to terms that have a related, but not synonymous, meaning.

**A**

**abend.** Abnormal end of task.

**abnormal end of task (abend).** Termination of a task, job, or subsystem because of an error condition that recovery facilities cannot resolve during execution.

**access.** To obtain data from or to put data in storage.

**ACT.** An OnDemand Version 2 database table that is maintained by using the RADM transaction. The characteristics of OnDemand reports are defined to this table. See also OnDemand Version 2.

**ACIF.** Advanced Function Presentation Conversion and Indexing Facility

**Acrobat.** The Adobe viewer for PDF files. Acrobat is similar to the IBM AFP Workbench, that is, a stand-alone viewer. Acrobat also supports a robust set of APIs. It is through these APIs that Acrobat is integrated with the OnDemand client program.

**action options.** In the ODF system CICS panels, there are two types of action options: primary commands and line commands. Primary action options are entered at the top of a panel. Line action options are one character and are entered in the leftmost column of a panel that lists multiple occurrences of detail lines. On all ODF panels, pressing the Enter key executes any action options that are entered.

**active log file.** The subset of files consisting of primary log files and secondary log files that are currently needed by the database manager for rollbacks and recovery.

**active policy set.** In TSM, the policy set within the policy domain that contains the most recently activated policy currently in use by all client nodes that have been assigned to that policy domain. See Policy Set.

**active storage node.** In a storage set, the storage node that is currently being used to load data.

**adapter.** A part that electrically or physically connects a device to a computer or to another device.
addressable point. Any point in a presentation surface that can be identified by a coordinate from the coordinate system of the presentation medium. See also Pel.

ADMIN. An OnDemand Version 7 application that allows maintenance of the OnDemand base system data by using a Windows graphical user interface. The characteristics of OnDemand reports and their data fields are defined to folders, applications and applications groups. See also OnDemand Version 7.

administrative client. (1) In OnDemand, the program that provides administrators with functions to maintain OnDemand groups, users, printers, applications, application groups, storage sets, and folders. (2) In TSM, the program that allows administrators to control and monitor the server through administrator commands.

administrator. In OnDemand, a person authorized to maintain the system. For example, an OnDemand administrator can add, update, and delete users and folders.

ADSM. ADSTAR Distributed Storage Manager

ADSTAR Distributed Storage Manager. A program that provides storage management for archived files. See Tivoli Storage Manager.

Advanced Function Presentation (AFP). A set of licensed programs that use the all-points-addressable concept to print data on a wide variety of printers or display data on a variety of display devices. AFP also includes creating, formatting, archiving, viewing, retrieving, and distributing information.

Advanced Function Presentation Application Programming Interface (AFP API). An AFP program shipped with PSF/MVS 2.1.1 and PSF/VM 2.1.1 that creates the AFP data stream from the COBOL and PL/1 high-level programming languages.

Advanced Function Presentation Conversion and Indexing Facility. A program shipped with OnDemand that you can use to convert a print file into a MO:DCA-P document, to retrieve resources used by the document, and to index the file for later retrieval and viewing.

Advanced Function Presentation data stream (AFP data stream). A presentation data stream that is processed in the AFP environment. MO:DCA-P is the strategic AFP interchange data stream. IPDS is the strategic AFP printer data stream.

AFT. An OnDemand Version 2 database table that is maintained by using the RADM transaction. The characteristics of OnDemand report data fields are defined to this table. The ODF system will access the AFT table when an OnDemand Version 2 report is included in a distribution as a bundle component with a type of Q. The query fields that are displayed on the B3 panel in this case are taken from the AFT. See also OnDemand Version 2.

AFP. Advanced Function Presentation

AFP API. Advanced Function Presentation Application Programming Interface

AFPDS. A term formerly used to identify the composed page, MO:DCA-P-based data stream interchanged in AFP environments.

AIX. (1) Advanced Interactive Executive (2) IBM’s version of the UNIX operating system.


all-points-addressable (APA). The capability to address, reference, and position data elements at any addressable position in a presentation space or on a physical medium. An example of all points addressability is the positioning of text, graphics, and images at any addressable point on the physical medium. See also Picture Element.

all-points-addressable mode. Synonym for Page Mode.

ALLREADY. A distribution method option. Specified by entering the string ALLREADY in the Method data entry field on the DM panel. This option is the default value at the time that a DCT row is created. Note: For this distribution method option, the C (continue) value in the continue/wait indicator is not valid. Specifying ALLREADY in a distribution method field informs the print processor to create a DRT row (the request that an instance of a distribution is be printed) when each of the required bundle components within the distribution are available. Required components are those with the wait/ignore indicator set to W (wait). Availability of a report is indicated by the presence of a DST row for the report and distribution. See also Distribution Method.

alphabetic character. A letter or other symbol, excluding digits, used in a language. Usually the uppercase and lowercase letters A through Z plus other special symbols (such as $ and _) allowed by a particular language. See also Alphanumeric Character.

alphanumeric character. Consisting of letters, numbers, and often other symbols, such as punctuation marks and mathematical symbols. See also Alphabetic Character.

alphanumeric string. A sequence of characters consisting solely of the letters a through z and the numerals 0 through 9.

American National Standards Institute (ANSI). An organization consisting of producers, consumers, and general interest groups, that establishes the procedures
by which accredited organizations create and maintain voluntary industry standards in the United States.

**anchor point.** The point in a document that signals to ACIF the beginning of a group of pages, after which it adds indexing structured fields to delineate this group.

**annotations.** Comments, clarifications, and reminders that can be attached to a document.

**ANSI.** American National Standards Institute.

**ANSI carriage control character.** A character that specifies that a write, space, or skip operation should be performed before printing the line containing the carriage control. ANSI carriage control characters are encoded in ASCII or EBCDIC.

**APA.** All points addressable

**API.** Application programming interface.

**application.** In OnDemand, an object that describes the physical attributes of a report or input file, such as the type of data found in the input file, the code page, and whether the input data contains carriage control characters. An application also contains instructions that the data indexing and loading programs use to process the input data. Most customers define an application for each different output print data stream or source of data that they plan to store in OnDemand.

**application group.** A collection of one or more OnDemand applications that have similar indexing and storage management requirements. For example, two reports that can be retrieved using the same index fields and that are to be maintained by the system in the same storage locations for the same length of time could be placed in the same application group.

**Application Program Interface (API).** A formally defined programming language interface that is between a program and the user of a program.

**archive copy group.** In TSM, a policy object containing attributes that control the generation, destination, and expiration of archive files. An archive copy group belongs to a management class.

**archive log file.** The subject of files consisting of primary log files and secondary log files that are no longer needed for normal database processing.

**archive media.** Devices and volumes on which the long-term or backup copy of a report is stored. For example, an optical storage library is one type of archive media supported by OnDemand.

**archive storage.** The storage in which the long-term or backup copy of a report is maintained. Includes the devices and volumes on which the files are stored and the management policies that determine how long data is maintained in archive storage.

**archive storage manager.** The software product that manages archive media and maintains files in archive storage. See TSM.

**ASCII (American Standard Code for Information Interchange).** The standard code, using a coded character set consisting of 7-bit coded characters (8-bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

**attachment.** A device or feature attached to a processing unit, including required adapters. Contrast with Adapter.

**authentication.** The process of checking a user’s password before allowing the user access to resources or the server.

**authorize.** (1) To grant to a user the right to communicate with or make use of a computer system or display station. (2) To give a user either complete or restricted access to an object, resource, or function.

**B**

**backend.** In the AIX operating system, the program that sends output to a particular device. Synonymous with Backend Program.

**backend program.** Synonym for Backend.

**banner.** A formatted page that will optionally print ahead of a recipient’s copy of a report. The option of whether to produce banners for a specific recipient is controlled by setting a binary indicator in the UOT table by using the Banner data entry field on the UM panel. There are eight header lines for each recipient that will print on a banner page. Header lines are also carried in the UOT table and are maintained by using the UM panel.

**Bar Code Object Content Architecture.** An architected collection of control structures used to interchange and present bar code data.

**base system.** The base system for ODF is OnDemand. See OnDemand Version 2 and OnDemand Version 7.

**batch capture.** A base system batch process executed at the time that a report is loaded into base system storage.

**BCOCA.** Bar Code Object Content Architecture

**bitmap.** A file that contains a bit-mapped graphic.

**BMP.** Bitmap

**bundle.** An instance of the copies of reports for a distribution for one recipient.
**bundle component.** A bundle component may be an entire report, a segment of a report, or multiple segments of a report. Each bundle component for a report is defined by a row in the BDT. A bundle component for a segment of a report may be defined to print an entire report, select the segment by a page range, or select the segment by values found in specified fields in the report. This option is set by using the Report Build data entry field on the BM panel. For bundle components selected by field values, in addition to the BDT, the bundle component will be described by using from one to any number of BQT rows and one PQT row. See BQT and PQT.

For reports that have been stored in the OnDemand Version 2 system, bundle components may be for an entire report, for a report segment selected by field values, or for a report segment selected by page ranges. See OnDemand Version 2.

For reports that have been stored in the OnDemand Version 7 system, bundle components may be for an entire report or for a report segment selected by field values. No selection by page range is available for OnDemand Version 7 reports. See OnDemand Version 7.

**Bundle Definition Table.** An ODF database table that carries information to define the bundle components within a distribution. BDT rows are maintained by using the BL and BM panels.

**Bundle Query Table.** An ODF database table that holds information used by the print processor to select segments of reports for printing. When a bundle component with a type of Q (query) is created, a set of one or more BQT rows must be created to carry the specific information from which a query statement can be constructed for the print processor to execute to select segments of report data that are stored in the OnDemand base system. Each row in the BQT table contains the name of a field, a logical operator and a target value, which are used to build a condition segment of a WHERE clause in a SQL select statement. The data from one or more BQT rows is concatenated to create the complete WHERE clause that is stored in the PQT table. The information in the BQT row is maintained by using the B3 panel.

**BDT.** Bundle Definition Table.

**BQT.** Bundle Query Table.

**browser.** An OnDemand Version 7 application that allows the user to select and view contents of reports that have been stored. See also OnDemand Version 7.

**byte.** The amount of storage required to represent 1 character; a byte is 8 bits.

---

**C**

**cache storage.** The storage in which the primary or short-term copy of a report is stored. Usually disk storage. Most customers configure the system to maintain the most recent and frequently used versions of reports in cache storage.

**carriage control character.** The first character of an output record (line) that is to be printed; it determines how many lines should be skipped before the next line is printed.

**case-sensitive.** Able to distinguish between uppercase and lowercase letters.

**CCITT.** Consultative Committee on International Telegraphy and Telephone

**CD-ROM.** Compact disc read-only memory

**channel.** A device connecting the processor to input and output devices.

**channel adapter.** A communication controller hardware unit used to attach the controller to a System/370 data channel.

**channel-attached.** (1) Pertaining to devices attached to a controlling unit by cables, rather than by telecommunication lines. (2) Synonymous with Local.

**character.** A letter, digit, or other symbol representing, organizing, or controlling data.

**character rotation.** The alignment of a character with respect to its character baseline, measured in degrees in a clockwise direction. Examples are 0°, 90°, 180°, and 270°. Zero-degree character rotation exists when a character is in its customary alignment with the baseline.

**character set.** A group of characters used for a specific reason; for example, the set of characters a printer can print or a keyboard can support.

**client.** (1) In a distributed file system environment, a system that is dependent on a server to provide it with programs or access to programs. (2) A personal computer connected to a network running OnDemand software that can log on and query the library server, retrieve documents from OnDemand, and view and print documents.

**client domain.** The set of optical drives and storage volumes used by TSM to store report files and resources belonging to an application group.

**client node.** An application group that has been registered to the TSM server.
COBOL. Common business-oriented language. A high-level programming language, based on English, that is used primarily for business applications.

code page. An ordered set of up to 256 predefined display symbols. The first 32 code points of each code page are reserved for control codes and are the same for all code pages, leaving up to 224 distinct display symbols per page.

Code Page Global Identifier (CPGID). A unique code page identifier that can be expressed as either a two-byte binary or a five-digit decimal value.

coded font. An AFP font that associates a code page and a font character set.

command. A request to perform an operation or run a program. When parameters values, flags, or other operands are associated with a command, the resulting character string is a single command.

command line. The area of the screen where commands are displayed as they are typed.

communication method. The method used by OnDemand and TSM to exchange information.

communication protocol. A set of defined interfaces that allow computers to communicate with each other.

compact disc read-only memory (CD-ROM). High capacity read-only memory in the form of an optically read compact disk.

composed page. In Advanced Function Presentation, a page that can be printed only on an all-points-addressable output medium. It may contain composed text and raster images.

composed-text data file. A file containing text data and text control information that dictates the format, placement, and appearance of the data to be printed.

completed. A status in the PPT. The completed status indicates that the print processor has completed printing the bundle component described in the PPT row.

compression. A technique for removing strings of duplicate characters, gaps, empty fields, and trailing blanks before transmitting data.

concatenate. (1) To link together. (2) To join two character strings.

concatenated field. Two or more fields from a physical file record format that have been combined to make one field in a logical file record format.

conditional processing. A page definition function that allows input data records to partially control their own formatting.

configuration. The process of describing to a system the devices, optional features, and program products that have been installed so that these features can be used. Contrast with Customization.

configuration file. A file that specifies the characteristics of a system or subsystem; for example, the operating system queueing system.

configure. To describe to a system the devices, optional features, and licensed programs installed on a system.

console. The main operating system display station.

Consultative Committee on International Telegraphy and Telephone (CCITT). A United Nations Specialized Standards group whose membership includes common carriers concerned with devising and proposing recommendations for international telecommunications representing alphabets, graphics, control information, and other fundamental information interchange issues.

Content Manager. A comprehensive set of Web-enabled, integrated software solutions from IBM for managing information and making it available to anyone, anywhere.

continuation max tries. The number of times that the print processor will search for available reports for one instance of a distribution. This value is a specified in a data field at the distribution level in the DCT and is maintained by using the DM panel. At the time that a DRT row is created, the continuation attempts field is initialized with the continuation max tries value from the DCT row. As the print processor executes, it searches for DST rows to match the distribution data in a DRT row and decrements the continuation attempts field.

continuation processor. A set of ODF programs that perform the task of searching the DST for reports that are ready to be handled by the print processor, when the continuation/wait indicator for a distribution is C (continued) or the DRT status has been changed to continued by an initiate transaction from the RL panel. See also Started Task and Wait.

continue. See Wait.

continue/wait. The continue/wait indicator for a distribution controls whether the print processor subtasks will search the DST for reports to print. The initial value of the continue/wait indicator for a distribution is in the DCT and is entered by using the DM panel. The two possible values for the continue/wait indicator are C (continue) and W (wait). See Wait.

control character. A character that is not a graphic character such as a letter, number, or punctuation mark.
Such characters are called control characters because they frequently act to control a peripheral device.

controller. A device that coordinates and controls the operation of one or more input/output devices, such as workstations, and synchronizes the operation of the system as a whole.

conversion. In programming languages, the transformation between values that represent the same data item but belong to different data types.

copies. See Copy Group.

copy group. In TSM, a policy object that contains attributes that control the generation, destination, and expiration of backup and archive files. There are two kinds of copy groups: backup and archive. Copy groups belong to management classes.

copy storage pool. A named collection of storage volumes that contains copies of files that reside in primary storage pools. Copy storage pools are used to back up the data stored in primary storage pools.

CPGID. Code Page Global Identifier

Cross-reference Table (CRT). For access to report data stored in the On Demand Version 7 system. The one to eight character report identifier used by the ODF system is cross referenced to the application group name and application name defined by using the ADMIN application.

CRT. Cross-reference Table.

customization. The process of describing optional changes to defaults of a software program that is already installed on the system and configured so that it can be used. Contrast with Configuration.

customize. To describe the system, the devices, programs, users, and user defaults for a particular data processing system or network. Contrast with Configure.

D

data set. Synonym for File.

data stream. A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form using a defined format.

data transfer. The movement, or copying, of data from one location and the storage of the data at another location.

data type. The type, format, or classification of a data object.

database. (1) The collection of information about all objects managed by OnDemand, including reports, groups, users, printers, application groups, storage sets, applications, and folders. (2) The collection of information about all objects managed by TSM, including policy management objects, administrators, and client nodes.

Database Managed Space (DMS). A type of DB2 table space. A DSM table space is managed by the database manager.

date/time. ODF panels use the term date/time to describe various fields that carry datetime stamps from the CPU to record events in the ODF and base systems.

DCT. Distribution Control Table.

DCF. Document Composition Facility

decimal. Pertaining to a system of numbers to the base 10. The decimal digits range from 0 through 9.

decompression. A function that expands data to the length that preceded data compression. See also Compression.

default. A value, attribute, or option that is assumed when no alternative is specified by the user.

default directory. The directory name supplied by the operating system if none is specified.

default printer. A printer that accepts all the printed output from a display station assigned to it.

default value. A predetermined value, attribute, or option that is assumed when no other is explicitly specified.

desktop printer. In this publication, an IBM LaserPrinter 4019 or 4029, or compatible printer.

destination. The name of a printer. This value is used in the DEST parameter of the print job JCL. The destination is defined at a distribution level in the Destination data entry field on the DM panel. The destination is defined at the bundle component level on the BM panel. SYSOUTs that are queued to a destination may be displayed on the DQ panel and the destination of a reprint may be changed on the P3 panel.

device class. A named group of TSM storage devices. Each device class has a unique name and represents a device type of disk, tape, or optical disk.

device driver. A program that operates a specific device, such as a printer, disk drive, or display.

device type. A type of TSM storage device. Each device class must be categorized with one of the following devices types: disk, tape, or optical disk.

device-independent. Pertaining to a function that can be accomplished without regard for the characteristics of particular types of devices.
**dialog box.** An application window on the display that requests information from the user.

**directory.** (1) A type of file containing the names and controlling information for other files or directories. (2) A listing of related files arranged in a useful hierarchy.

**disk operating system (DOS).** An operating system for computer systems that use disks and diskettes for auxiliary storage of programs and data.

**Distiller.** A batch utility that converts PostScript files to Adobe PDF files. The distiller runs under AIX, HP-UX, Sun Solaris, and Windows servers.

**distribution.** A set of reports that have the same recipient or recipients.

**Distribution Control Table (DCT).** An ODF database table that carries information defining ODF distributions.

**distribution ID.** Each distribution ID must be unique. A distribution ID has 2 components: the distribution name, a one to eight character alphanumeric string and the distribution description, a one to 55 character string. The distribution name is optionally a recipient identifier, which must be a userid, or the name of a list from the LIS table. The description may be used to give characteristics of the distribution, such as what its component reports have in common, the frequency of distribution, and who the recipients are.

**distribution method.** The way that a distribution is requested and how it is handled by the print processor.

**distribution processor.** A set of ODF programs that perform the task of initiating print processing based on the criteria of the distribution method and the settings of the Wait/ignore indicator for bundle components, when the Continuation/wait indicator is set to W and the status of the DRT has not changed to continue. See also Started Task and Wait.

**DMS.** Database Managed Space

**document.** (1) In OnDemand, a logical section of a larger file, such as an individual invoice within a report of thousands of invoices. A document can also represent an indexed group of pages from a report. (2) A file containing an AFP data stream document. An AFP data stream document is bounded by Begin Document and End Document structured fields and can be created using a text formatter such as Document Composition Facility (DCF).

**Document Composition Facility.** An IBM licensed program used to prepare printed documents.

**domain.** See Policy Domain or Client Domain.

**DOS.** Disk operating system

**double-click.** To rapidly press the left mouse button twice while pointing to an object.

**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.

**drag.** To hold down the left mouse button while moving the mouse.

**driver.** The end of a stream closest to an external interface. The principal functions of the driver are handling any associated device, and transforming data and information between the external device and stream.

**DRT (Distribution Request Table).** An ODF database table. A row in the DRT represents one instance of a distribution.

**DST (Distribution Status Table).** An ODF database table that carries information about reports that are loaded into the OnDemand base system. A DST row is at the bundle component level. The row indicates the availability of the report described on a bundle component BDT row.

**DRT.** Distribution Request Table.

**DST.** Distribution Status Table.

**E**

**EBCDIC.** Extended Binary-Coded Decimal Interchange Code. This is the default type of data encoding in an MVS environment. Contrast with ASCII.

**EIP.** Enterprise Information Portal

**enqueue.** To place items in a queue.

**enter.** (1) An instruction to type specific information using the keyboard. (2) A keyboard key that, when pressed, confirms or initiates the selected command.

**Enterprise Information Portal.** An IBM software product that provides a coordinated, Web-enabled entry point to what would otherwise be disconnected, incompatible data scattered across an enterprise.

**Enterprise Storage Server.** An IBM disk storage system that provides industry-leading availability, performance, manageability, and scalability. Virtually all types of servers can concurrently attach to the Enterprise Storage Server, including S/390, UNIX servers, and Windows servers. As a result, the Enterprise Storage Server is ideal for organizations with growing e-business operations that are being handled by multiple heterogeneous servers.
entry field. The place in a dialog box where you type text and numbers. Use entry fields in OnDemand to type search criteria.

environment variable. A variable that is included in the current software environment and is therefore available to any called program that requests it.

error condition. The state that results from an attempt to run instructions in a computer program that are not valid or that operate on data that is not valid.

error log. A file in a product or system where error information is stored for later access.

error log entry. In AIX, a record in the system error log describing a hardware or software failure and containing failure data captured at the time of the failure.

error message. An indication that an error has been detected. (A)

error recovery. The process of correcting or bypassing the effects of a fault to restore a computer system to a prescribed condition. (T)

error type. Identifies whether an error log entry is for a permanent failure, temporary failure, performance degradation, impending loss of availability, or undetermined failure.

ESS. Enterprise Storage Server

Ethernet. A 10-megabit baseband local area network using CSMA/CD (carrier sense multiple access with collision detection). The network allows multiple stations to access the medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission.

exception. An error or other unusual event noted by the print processor. Exceptions are listed in IBM DB2 Content Manager OnDemand: Messages and Codes. Exceptions noted on PPT rows are listed on the P2, P4 and DQ panels.

exit program. A user-written program that is given control during operation of a system function.

exit routine. A routine that receives control when a specified event occurs, such as an error.

expiration. The process of deleting index data and reports based on storage management information. The OnDemand database manager and the storage managers run expiration processing to remove data that is no longer needed from storage volumes and reclaim the space.

Extended Binary-Coded Decimal Interchange Code (EBCDIC). A coded character set consisting of eight-bit coded characters.

EXTERNAL. A distribution method option. This distribution method is specified by entering the string EXTERNAL in the Method data entry field on the DM panel. The EXTERNAL distribution method informs the print processor not to create any DRT row for the distribution. The DRT for an EXTERNAL distribution will be created from outside of the ODF system. Note: A print transaction from the SL panel may optionally be used to initiate print processing for an EXTERNAL distribution. See Distribution Method.

external library resource (member). Objects that can be used by other program products while running print jobs; for example, coded fonts, code pages, font character sets, form definitions, page definitions, and page segments. Synonym for Resource Object.

external object. Synonym for Resource Object.

F

FCB. Forms control buffer

field. A specified area in a record used for a particular type of data; for example, a group of characters that represent a customer’s name.

file. (1) A named set of records stored or processed as a unit. (T) (2) The major unit of data storage and retrieval. A file consists of a collection of data in one of several prescribed arrangements and described by control information to which the operating system has access.

file system. The collection of files and file management structures on a physical or logical mass storage device, such as a diskette or a minidisk.

file transfer. In remote communications, the transfer of a file or files from one system to another over a communications link.

File Transfer Protocol (FTP). In TCP/IP, the protocol that makes it possible to transfer data among hosts and to use foreign hosts indirectly.

fixed disk. A flat, circular, nonremovable plate with a magnetizable surface layer on which data can be stored by magnetic recording. A rigid magnetic disk.

fixed-disk drive. The mechanism used to read and write information on a fixed disk.

folder. A container for related information, such as statements, invoices, or correspondence, regardless of the source of the information or where the data is stored. When you open a folder, you have access to all of the information that it contains. For example, a billing folder might contain all of the reports for all customer transactions over the past two years.
font. (1) A family of characters of a given size and style, for example 9-point Helvetica. (2) A set of characters in a particular style. See Raster Font.

font character set. Part of an AFP font that contains the raster patterns, identifiers, and descriptions of characters. Often synonymous with Character Set. See also Coded Font.

form definition (FORMDEF). A form definition is a resource used by OnDemand. A form definition specifies the number of copies to be printed, whether the sheet should be printed on both sides, the position of a page of data on the sheet, text suppression, and overlays to be used (if any). Synonymous with FORMDEF.

FORMDEF. Form Definition

FSA. Functional SubSystem Application. A collection of programs residing in the FSS address space that control a device.

FSI. Functional SubSystem Interface. An MVS or OS/390 interface that allows communication between JES and a FSS and FSS applications. Download uses an FSI to communicate with the operating system and JES to process spool data sets created by application programs.

FSS. Functional SubSystem. An MVS or OS/390 subsystem comprised of programs residing in the same address space that provide JES-related functions. For example, a print programs that extend the scope of JES processing could be defined as a FSS.

FTP. File Transfer Protocol

G

GB. Gigabyte

GIF. Graphic Interchange Format

gigabyte. A unit of memory or space measurement equal to approximately one billion bytes. One gigabyte equals 1,000 megabytes.

GOCA. Graphic Object Content Architecture

graphic. A symbol produced by a process such as handwriting, drawing, or printing. (I) (A)

graphic character. A character that can be displayed or printed.

Graphic Object Content Architecture. An architecture that provides a collection of graphics values and control structures used to interchange and present graphics data.

Graphical User Interface. A type of user interface that takes advantage of a high-resolution monitor, including some combination of graphics, the use of pointing devices, menu bars, overlapping windows, and icons.

graphics. A type of data created from such fundamental drawing units such as lines, curves, polygons, and so forth.

Graphic Interchange Format (GIF). A bit-mapped color graphics file format for IBM and IBM-compatible computers. GIF employs an efficient compression technique for high resolution graphics.

group. (1) A named collection of sequential pages that form a logical subset of a document. (2) A named collection of users assigned a specific role on the system or belonging to a specific department.

GUI. Graphical user interface

H

hardware. The physical equipment of computing and computer-directed activities. The physical components of a computer system. Contrast with Software.

help. One or more files of information that describe how to use application software or how to perform a system function.

hex. Hexadecimal

hexadecimal (hex). Pertaining to a system of numbers in the base sixteen; hexadecimal digits range from 0 (zero) through 9 (nine) and A (ten) through F (fifteen).

host. (1) The primary or controlling computer in the communications network. (2) See Host System.

host-based computer. (1) In a computer network a computer that provides end users with services such as computation and data bases and that usually performs network control functions. (T) (2) The primary or controlling computer in a multiple-computer installation.

host system. (1) The controlling or highest level system in a data communication configuration, for example, an OS/390 system is the host system for the terminals connected to it. (2) In TCP/IP, a computer that is a peer system in a network.

I

icon. A 32 by 32 pixel bitmap used by the windows manager to represent an application or other window.

ignore. An option of the wait/ignore indicator, which is a data field at the bundle component level in the BDT and is maintained by using the BM panel. The wait/ignore indicator is only significant if the distribution’s continue/wait indicator is set to W (wait). An Ignore bundle component is one that is not
required to be available for the distribution to process, but that will be included in an instance of a distribution whenever it is available and a distribution is being processed. See Wait.

**image.** (1) An electronic representation of a picture produced by means of sensing light, sound, electron radiation, or other emanations coming from the picture or reflected by the picture. An image can also be generated directly by software without reference to an existing picture. (2) An electronic representation of an original document recorded by a scanning device.

**Image Object Content Architecture.** An architected collection of constructs used to interchange and present images.

**index.** (1) A process of segmenting a print file into uniquely identifiable groups of pages (a named collection of sequential pages) for later retrieval. (2) A process of matching reference points within a file and creating structured field tags within the MO:DCA-P document and the separate index object file.

**index object file.** An index-information file created by ACIF that contains the Index Element (IEL) structured fields, which identify the location of tagged groups in the AFP file. The indexing tags are contained in the Tagged Logical Element (TLE) structured fields.

**indexing.** (1) A process of segmenting a print file into uniquely identifiable groups of pages (a named collection of sequential pages) for later retrieval. (2) In ACIF, a process of matching reference points within a file and creating structured field tags within the MO:DCA-P document and the separate index object file.

**indexing with data values.** Adding indexing tags to a MO:DCA-P document using data that is already in the document and that is consistently located in the same place in each group of pages.

**indexing with literal values.** Adding indexing tags to a MO:DCA-P document by assigning literal values as indexing tags, because the document is not organized such that common data is located consistently throughout the document.

**Infoprint Manager.** A sophisticated IBM print subsystem that drives AFP printers, PostScript printers, and PCL printers. Infoprint Manager is supported under AIX, OS/390, Windows NT, and Windows 2000. Infoprint Manager manages printer resources such as fonts, images, electronic forms, form definitions, and page definitions, and provides error recovery for print jobs.

When printing line data, Infoprint Manager supports external formatting using page definitions and form definitions. This external formatting extends page printer functions such as electronic forms and use of typographic fonts without any change to applications that generate the data.

**informational message.** (1) A message that provides information to the end-user or system administrator but does not require a response. (2) A message that is not the result of an error condition.

**initiate.** To initiate a distribution is to change the status of the DRT for an instance of a distribution from a value that tells the print processor to bypass the distribution to a value that tells the print processor to search for available reports requested for the distribution and print them. The initiation is performed on the RL panel.

**input file.** A file opened in order to allow records to be read.

**install.** (1) To add a program, program option, or software program to the system in a manner such that it may be executed and will interact properly with all affected programs in the system. (2) To connect a piece of hardware to the processor.

**intelligent printer data stream (IPDS).** An all-points-addressable data stream that allows users to position text, images, and graphics at any defined point on a printed page.

**interface.** Hardware, software, or both, that links systems, programs, or devices.

**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).** In TCP/IP, a protocol that routes data from its source to its destination in an Internet environment.

**IOCA.** Image Object Content Architecture

**IP.** Internet Protocol

**IPDS.** Intelligent printer data stream

**J**

**job.** One or more related procedures or programs grouped into a procedure, identified by appropriate job control statements.

**job queue.** A list of jobs waiting to be processed by the system.

**Joint Photographic Experts Group (JPEG).** An image compression standard developed to handle larger images with many colors. JPEG uses a lossy algorithm, which means there is some loss of detail when saving
and viewing images in this format. However, JPEG files can offer as much as 35% improvement in file size and compression.

**JPEG.** See Joint Photographic Experts Group

**K**

**kernel.** The part of an operating system that performs basic functions such as allocating hardware resources.

**kernel extension.** A program that modifies parts of the kernel that can be customized to provide additional services and calls. See Kernel.

**K-byte.** Kilobyte

**keyword.** Part of a command operand that consists of a specific character string.

**kilobyte (K-byte).** 1024 bytes in decimal notation when referring to memory capacity; in all other cases, it is defined as 1000.

**L**

**LAN.** Local area network

**LAN server.** A data station that provides services to other data stations on a local area network; for example, file server, print server, mail server.

**laser printer.** A nonimpact printer that creates, by means of a laser beam directed on a photosensitive surface, a latent image which is then made visible by toner and transferred and fixed on paper. (T)

**Lempel Ziv Welsh (LZW).** A data compression algorithm. OnDemand uses the 16-bit version of LZW to compress data.

**library.** System storage for generated form definitions and page definitions.

**library resource (member).** A named collection of records or statements in a library.

**library resource name.** A name by which an object may be called from a library by AFP as part of a print job. Includes the 2-character prefix for the type of object, such as P1 for page definitions, F1 for form definitions, or O1 for overlays (also known as resource name).

**library server.** In OnDemand, the workstation or node that users must go through to access the system. The library server controls the OnDemand database.

**licensed program.** A separately priced program and its associated materials that bear a copyright and are offered to customers under the terms and conditions of a licensing agreement.

**line data.** Data prepared for printing on a line printer, such as an IBM 3800 Model 1 Printing Subsystem. Line data is usually characterized by carriage-control characters and table reference characters.

**line-data print file.** A file that consists of line data, optionally supplemented by a limited set of structured fields.

**line printer.** A device that prints a line of characters as a unit. (I) (A) Contrast with Page Printer.

**LIS (List Table).** An ODF database table that holds information on lists that are used to receive distributions.

**list.** A set of recipient userids that are grouped together to receive one or more distributions. A list name may be used in the distribution name in the following tables: DRT, BDT, BQT, PQT, DRT, DST, and PPT.

**literal.** (1) A symbol or a quantity in a source program that is itself data, rather than a reference to data. (2) A character string whose value is given by the characters themselves; for example, the numeric literal 7 has the value 7, and the character literal CHARACTERS has the value CHARACTERS.

**loaded.** A distribution method option. Specified by entering the string LOADED in the Method data entry field on the DM panel. The TOP in a distribution method field informs the batch capture exist to build a DRT, the request that an instance of a distribution is to be printed, when the report is posted to the base system. See Distribution Method.

**loading.** The logical process of archiving reports in OnDemand. During the loading process, OnDemand processes reports, creates index data, and copies report data and resources to cache storage and archive storage.

**local.** Pertaining to a device accessed directly without use of a telecommunication line.

**local area network (LAN).** (1) A computer network located on a user’s premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (2) A network in which a set of devices is connected to one another for communication and that can be connected to a larger network. See also Token-Ring Network.

**logical volume.** The combined space from all volumes defined to either the TSM database or recovery log. The database resides on one logical volume and the recovery log resides on a different logical volume.

**log file.** A fixed-length file used to record changes to a database.
LPD. Line Printer Daemon. In TCP/IP, the command responsible for sending data from the spooling directory to a printer.

LPR. Line Printer Requestor. In TCP/IP, a client command that allows the local host to submit a file to be printed on a remote print server.

LZW. See Lempel Ziv Welch

M

M byte. Megabyte

max tries. See Continuation max tries.

MB. Megabyte

machine carriage control character. A character that specifies that a write, space, or skip operation should be performed either immediately or after printing the line containing the carriage control.

mainframe. A large computer, particularly one to which other computers can be connected so that they can share facilities the mainframe provides. The term usually refers to hardware only.

management class. A logical area of storage that is managed by TSM. A management class is a policy object that is a named collection of copy groups. A management class can contain one backup copy group, one archive copy group, a backup and archive copy group, or zero copy groups. Users can bind each file to a management class to specify how the server should manage backup versions or archive copies of files. See Copy Group.

mapping. (1) A list that establishes a correspondence between items in two groups. (2) The process of linking database fields in an application group to folder search and display fields.

megabyte (MB). When used with hard drive, diskette, or removable media storage capacity, 1,000,000 bytes. When referring to system memory capacity, 1,048,576 bytes.

memory. Program-addressable memory from which instructions and other data can be loaded directly into registers for subsequent running or processing. Memory is sometimes referred to as “storage”.

menu bar. The area at the top of a window that contains choices that give a user access to actions available in that window.

message. Information from the system that informs the user of a condition that may affect further processing of a current program.

method. See Distribution Method.

migration. (1) The process of moving data from one computer system to another without converting the data. (2) The process of moving report files, resources, and index data from cache storage to long-term (optical or tape) storage.

mirroring. In TSM, a feature that protects against data loss with the database or recovery log by writing the same data to multiple disks at the same time. Mirroring supports up to three exact copies of each database or recovery log.


MO:DCA-P. Mixed Object: Document Content Architecture for Presentation

mount. To make a file system accessible.

mouse. A hand-held locator that a user operates by moving it on a flat surface. It allows the user to select objects and scroll the display screen by pressing buttons.

N

named query. A set of entry field values on the Search Criteria and Document List dialog box that a user has named and saved for selection as search criteria at a future time.

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

node. A workstation that operates as an OnDemand library server or object server and is connected to a TCP/IP network.

notes. Electronic comments, clarifications, and reminders that can be attached to an OnDemand document.

non-IPDS printer. In this publication, a printer that is not channel-attached and which does not accept the Intelligent Printer Data Stream.

numeric. Pertaining to any of the digits 0 through 9.
object. (1) A collection of structured fields. The first structured field provides a begin-object function and the last structured field provides an end-object function. The object may contain one or more other structured fields whose content consists of one or more data elements of a particular data type. An object may be assigned a name, which may be used to reference the object. Examples of objects are text, graphics, and image objects. (2) A resource or a sequence of structured fields contained within a larger entity, such as a page segment or a composed page. (3) A collection of data referred to by a single name.

object server. In OnDemand, a workstation or node controlled by a storage manager to maintain reports in cache storage, and optionally, archive storage.

offset. The number of measuring units from an arbitrary starting point in a record, area, or control block to some other point.

OnDemand Version 2. The OnDemand Version 2 base system runs on an OS/390 or z/OS system. The databases for the system are maintained by using CICS panels that are initiated by the RADM transaction. Reports that are stored in the system may be requested for print by using the RADM transaction, however, there is no online capability to view the reports. The loading program for the system is IODDBSTOR. The user exit for DST builds and optional DRT builds is ARSRIDST.

OnDemand Version 7. The OnDemand Version 7 base system is a UNIX application. Report definition information is maintained by using the administrative client (see ADMIN). Reports that have been loaded into an OnDemand Version 7 system may be viewed online by using the OnDemand Version 7 browser application (see Browser). The loading program for OnDemand Version 7 is ARSLOAD. The ODF user exit for OnDemand Version 7 is ARSULOAD. OnDemand Version 7 includes the ARSRIDST and ARSULOAD programs in the ARSRSAM5 library as user exits that can be customized.

online. Being controlled directly by or directly communicating with the computer.

operating environment. (1) The physical environment; for example, temperature, humidity, and layout. (2) All of the basic functions and the user programs that can be executed by a store controller to enable the devices in the system to perform specific operations. (3) The collection of store controller data, user programs, lists, tables, control blocks, and files that reside in a subsystem store controller and control its operation.

operating system. Software that controls the running of programs and that also can provide such services as resource allocation, scheduling, input and output control, and data management.

optical library. A storage device that houses optical disk drives and optical disks, and contains a mechanism for moving optical disks between a storage area and optical disk drives.

optimize. To improve the speed of a program or to reduce the use of storage during processing.

origin. The creator of a DRT row. The origin may be ARSRSCCHD (the DRT row is created by an ODF program), a string prefixed by UR- (the DRT row is created by an ODF CICS transaction) or any other string (the DRT is created by a source that is external to the ODF system). Note: On the RL panel, SCHEDULE is displayed rather than ARSRSCCHD. All other origin values are displayed as they are in the DRT row.

outline fonts. (1) Fonts whose graphic character shapes are defined as mathematical equations rather than by raster patterns. (2) Fonts created in the format described in Adobe Type 1 Font Format , a publication available from Adobe Systems, Inc. Synonymous with Type 1 fonts.

overlay. A collection of predefined, constant data such as lines, shading, text, boxes, or logos, that is electronically composed and stored as an AFP resource file that can be merged with variable data on a page while printing or viewing.

P

page. (1) A collection of data that can be printed on one side of a sheet of paper or a form. (2) The boundary for determining the limits of printing. See also Logical Page and Physical Page. (3) Part of an AFP document bracketed by a pair of Begin Page and End Page structured fields.

page definition. A resource used by OnDemand that defines the rules of transforming line data into composed pages and text controls.

page printer. A device that prints one page as a unit. (1) (A) Contrast with Line Printer.

page segment. In Advanced Function Presentation, a resource that can contain text and images and can be positioned on any addressable point on a page or an electronic overlay.

PAGEDEF. Page definition

parallel device. A device that can perform two or more concurrent activities. Contrast with Serial Device.

parameter. (1) Information that the user supplies to a panel, command, or function. (2) In the AIX operating system, a keyword-value pair.
partitioned data set. A data set in direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

path. In a network, any route between any two nodes.

path name. A name that specifies the location of a directory within a file system. Path names are used to locate and reference directories and their contents.

PC. Personal Computer

PCL. Printer control language

PCX. Picture Exchange Format

PDF. Portable Document Format

permissions. Codes that determine the users that can access a system, that determine how data can be used by any users who can access the system, and that determine other types of tasks users of the system can perform.

personal computer. A microcomputer primarily intended for stand-alone use by an individual. (T)

Picture Exchange Format (PCX). A file that contains a graphic in the PCX graphics file format, which was originally developed for the PC Paintbrush program, but is now widely used by other programs.

piobe. The printer input/output back end program used by AIX for printing tasks.

pipe. To direct the data so that the output from one process becomes the input to another process. The standard output of one command can be connected to the standard input of another with the pipe operator (|). Two commands connected in this way constitute a pipeline.

point. (1) To move the mouse pointer to a specific object. (2) A unit of typesetting measure equal to 0.01384 inch (0.35054 mm), or about 1/72 of an inch. There are 12 points per pica.

point size. The height of a font in points. See also Point.

policy domain. In TSM, a policy object that contains policy sets, management classes, and copy groups that is used by a group of client nodes. See Policy Set, Management Class, Copy Group, and Client Node.

policy set. In TSM, a policy object that contains a group of management class definitions that exist for a policy domain. At any one time, there can be many policy sets within a policy domain but only one policy set can be active. See Management Class and Active Policy Set.

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.

Portable Document Format. A distilled version of PostScript data that adds structure and efficiency. PDF data has the same imaging model as PostScript but does not have its programmability. PDF also provides direct access to pages and allows hypertext links, bookmarks, and other navigational aids required for viewing. The text in a PDF file is usually compressed using LZW methods. The images in a PDF file are usually compressed using CCITT or JPEG methods.

posted. Indicates that an instance of a report was loaded to the OnDemand base system. The Report Posted Date/Time field on the SL panel is a date/time stamp from the OnDemand base system that contains the time that a report was loaded into the system. For OnDemand Version 2, the date/time stamp is from the SRT and is available for viewing by using the RADM application. For OnDemand Version 7, the date/time of a report instance is available for viewing by using the browser.

PostScript. Adobe’s page description language used for printing. PostScript is a very flexible programming language and imaging model but is not as structured as AFP. PostScript cannot be parsed to determine page boundaries, it must be interpreted. Because of this limitation, PostScript is not practical for archiving and viewing, Adobe created PDF for archiving and viewing.

PPT. Print Processor Table.

PQT. Print Query Table.

press. To touch a specific key on the keyboard.

primary log file. A set of one or more log files used to record changes to a database. Storage for these files is allocated in advance.

primary storage pool. A named collection of storage volumes in which TSM stores archive copies of files.

print file. (1) The output of a user-defined program that is to be indexed and loaded into the system. (2) A file that a user wants to print.

print job. A series of print files scheduled for printing. At print submission time, the user can request one or more files to be printed; therefore, a print job consists of one or more print files.

print processor. A set of ODF programs that perform the tasks of fetching report text from the OnDemand base system, formatting it as specified in the PPT row, and outputting it to the appropriate device with the appropriate delivery information. Parameters for
formatting and outputting are maintained by using the DM, BM, and B3 panels. Delivery information is maintained by using the UM panel. See also Started Task.

Print Processor Table. An ODF database table. Each row in the table is at bundle component level. A row is created by the print processor when a match is found between the DRT and the DST. A row in the PPT carries information from the DCT, BDT and DST that the print processor needs to locate and a copy of the report in the OnDemand base system and print the report.

Print Query Table. An ODF database table that carries the complete WHERE clauses for bundle components with a type of Q (query). Each row in the PQT contains a single WHERE clause with all of the conditions that are defined to the BQT rows for that bundle component. The information in the PQT row is displayed on the B4 panel.

print queue. A file containing a list of the names of files waiting to be printed.

Print Services Facility (PSF). A sophisticated IBM print subsystem that drives IPDS page printers. PSF is supported under MVS, VSE, VM, OS/2, AIX, and is a standard part of the operating system under OS/400. PSF manages printer resources such as fonts, images, electronic forms, form definitions, and page definitions, and provides error recovery for print jobs. When printing line data, PSF supports external formatting using page definitions and form definitions. This external formatting extends page printer functions such as electronic forms and use of typographic fonts without any change to applications that generate the data.

Print Services Facility/2 (PSF/2). PSF/2 is an OS/2-based print server that drives IPDS page printers, as well as IBM PPDS and HP-PCL compatible printers. PSF/2 manages printer resources and provides error recovery for print jobs. PSF/2 supports distributed printing of AFP print jobs from PSF for AIX, PSF/MVS, PSF/VSE, PSF/VM, and OS/400. PSF/2 also supports printing from a wide range of workstation applications, including Microsoft Windows and OS/2 Presentation Manager, as well as the ASCII, PostScript, and AFP data streams.

Print Services Facility for AIX (PSF for AIX). An IBM licensed program that produces printer commands from the data sent to it and it runs on the AIX/6000 operating system.

print spooler. The print spooler directs the printing of data from different applications. It temporarily stores information in separate files until they are printed.

Printer Control Language (PCL). The data stream used by Hewlett-Packard LaserJet II and III and other compatible printers.

process. An activity within the system that is started, such as a command, a shell program, or another process.

profile. (1) A file containing customized settings for a system or user. (2) Data describing the significant features of a user, program, or device.

program level. The version, release, modification, and fix levels of a program.

prompt. A displayed symbol or message that requests information or operator action.

protocol. A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication.

PSF. Print Services Facility
PSF/2. Print Services Facility/2
PSF for AIX. Print Services Facility for AIX
PTF. Program temporary fix

Q

qdaemon. The daemon process that maintains a list of outstanding jobs and sends them to the specified device at the appropriate time.

qualified name. (1) A data name explicitly accompanied by a specification of the class to which it belongs in a specified classification system. (2) A name that has been made unique by the addition of one or more qualifiers.

queue. (1) A line or list formed by items waiting to be processed. (2) To form or arrange in a queue.

queue device. A logical device defining characteristics of a physical device attached to a queue.

queued. Report output that the ODF print processor has retrieved, formatted, and routed to the appropriate device for output.

R

radio button. Round option buttons grouped in dialog boxes; one is preselected. Like a radio in an automobile, select only one button (“station”) at a time.

RAM. Random access memory. Specifically, the memory used for system memory. Sometimes this memory is referred to as main storage.
raster. In Advanced Function Presentation, an on/off pattern of electrostatic images produced by the laser print head under control of the character generator.

raster font. A font in which the characters are defined directly by the raster bit map. See Font. Contrast with Outline Font.

raster graphics. Computer graphics in which a display image is composed of an array of pixels arranged in rows and columns.

read access. In computer security, permission to read information.

ready. Reports that are loaded in the OnDemand base system. Synonymous with Posted.

recipient. An individual who receives output from the ODF system.

recipient ID. A userid which may be used in the distribution name in the following tables: DCT, BDT, BQT, PQT, DRT, DST, and PPT. Recipient userids may be grouped together under a list name in the LIS table. The user name field in the UOT table entered by using the UM screen must be filled by recipient identifiers.

recipient/list. The term recipient/list is used on some ODF panels for the distribution name component of the distribution identifier data entry and display fields. When recipient/list is displayed, it indicates that the field value may optionally be an individual userid or the name of a list that is defined in the LIS table. The ODF database tables on which the id field may be either a userid or a list name are: DCT, BDT, BQT, PQT, DRT, DST, and PPT.

record. (1) In programming languages, an aggregate that consists of data objects, possibly with different attributes, that usually have identifiers attached to them. (2) A set of data treated as a unit. (3) A collection of fields treated as a unit.

recovery log. In TSM, a log of updates that are about to be written to the database. The log can be used to recover from system and media failures.

recovery procedure. (1) An action performed by the operator when an error message appears on the display screen. This action usually permits the program to run the next job. (2) The method of returning the system to the point where a major system error occurred and running the recent critical jobs again.

register. To define a client node to TSM.

remote. Pertaining to a system or device that is accessed through a communications line. Contrast with Local.

remote print. Issuing print jobs to one machine (client) to print on another machine (server) on a network.

remote system. A system that is connected to your system through a communication line.

report. A print data stream produced by a user-defined program or other software program that can contains hundreds or thousands of pages of related information. Most reports can be logically divided and indexed into single and multiple page objects called documents.

report ID. For OnDemand Version 2 reports, the report identifier value defined to the ODF system will match the report ID defined in the base system ACT. For OnDemand Version 7 reports, the report identifier is internal to the ODF system and is cross-referenced to the ADMIN application data in the CRT.

report segment. The portion of a report that is selected for printing by a page number range or SQL select statements built from the selection criteria that is entered by using the B3 panel.

report/version. For the OnDemand Version 2 base system ACT, the combination of the report identifier value and the version value must be unique. At points in this publication and on the ODF panels, when the term report/version appears, it is referring to this unique combination. See Also Version.

reprint. A request may be created to print a bundle component SYSOUT that has already completed processing. The reprint is requested by selecting one or more PPT rows for the target output by using the PL, P2, P3, P4 or Q3 panels.

resolution. (1) In computer graphics, a measure of the sharpness of an image, expressed as the number of lines and columns on the display screen. (2) The number of pels per unit of linear measure.

resource. A collection of printing instructions, and sometimes data to be printed, that consists entirely of structured fields. A resource can be stored as a member of a directory and can be called for by the Print Services Facility when needed. The different resources are: coded font, character set, code page, page segment, overlay, and form definition.

resource directory. A place in which resource files are stored.

resource management. The function that protects serially accessed resources from concurrent access by computing tasks.

restarted. A distribution initiated from the RL panel after it did not complete as a result of its first
processing. Typically a distribution is restarted only after correcting any conditions that caused exceptions during the prior processing.

**retention.** The amount of time, in days, that archived files will be retained in TSM before they are deleted.

**retry.** To try the operation that caused the device error message again.

**return code.** (1) A value that is returned to a program to indicate the results of an operation issued by that program. (2) A code used to influence the running of succeeding instructions.

**root.** On UNIX servers, the user name for the system user with the most authority.

**root file system.** In UNIX environments, the file system that contains all of the default installation and program directories in the system.

**root user.** In UNIX environments, an expert user who can log in and execute restricted commands, shut down the system, and edit or delete protected files.

**root volume group.** In UNIX environments, the volume group, identified with a single / (forward slash) that contains all the directories in the root file system.

**rotation.** (1) The alignment of a character with respect to its character baseline, measured in degrees in a clockwise rotation. Examples are 0°, 90°, 180°, and 270°. Zero-degree character rotation exists when a character is in its customary alignment with the baseline. Synonymous with Character Rotation. (2) The number of degrees a character is turned relative to the page coordinates. (3) The orientation of the characters of a font with respect to the baseline.

**routing.** The assignment of the path by which a message will reach its destination.

**S**

**scheduler.** A set of ODF programs that perform the task of determining when and whether to create a request for a distribution by using the various ODF distribution methods. See also Distribution Method and Started Task.

**SDT.** System Default Table.

**secondary log file.** A set of one or more log files used to record changes to a database. Storage for these files is allocated as needed when the primary log fills up.

**segment.** (1) A collection of composed text and images, prepared before formatting and included in a document when it is printed. See Page Segment. (2) The resource that contains the structured-field definition of a page segment. (3) A 100 page portion of a report file. OnDemand divides report files into segments to provide enhanced performance and maintenance.

**segment table.** A high-level index to index data stored in an application group. Each row in the segment table identifies a table of application group index data. OnDemand uses the segment table to limit a query to a specific table of application group index data.

**select.** To pick a menu command or other object with a single click of the mouse.

**sequence.** There are various sequence fields in the ODF database tables. The sequence fields keep the rows unique in cases of multiple iterations of other key data fields.

**serial device.** A device that performs functions sequentially, such as a serial printer that prints one byte at a time. Contrast with Parallel Device.

**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. (3) A workstation connected to a TCP/IP network that runs the OnDemand programs that store, retrieve, and maintain report files. OnDemand supports two types of servers: a library server an object server.

**server options file.** The TSM file that specifies processing options for communication methods, tape handling, pool sizes, language, and date, time, and number formats.

**server printer.** A printer that is attached to a network server and is managed by a server print manager, such as IBM Infoprint Manager.

**shell.** In UNIX environments, a software interface between a user and the operating system of a computer. Shell programs interpret commands and user interactions on devices such as keyboards and pointing devices and communicate them to the operating system.

**skip-to-channel control.** A line printer control appearing in line data. Allows space to be left between print lines. Compatible with page printers when the data is formatted by page definitions.

**SMIT.** System Management Interface Tool

**SMS.** System Managed Space

**software.** Programs, procedures, rules, and any associated documentation pertaining to the operating of a system. Contrast with Hardware.
spool file. (1) A disk file containing output that has been saved for later printing. (2) Files used in the transmission of data among devices.

spooling (simultaneous peripheral operation online). Performing a peripheral operation such as printing while the computer is busy with other work.

spooling subsystem. A synonym for the queuing system that pertains to its use for queuing print jobs.

SRT. An OnDemand Version 2 database table, which can be viewed by using the RADM transaction. A row in the SRT contains information about an instance of a report that is saved at the time that the report is loaded into the OnDemand Version 2 system. References made to the information in the SRT by the ODF system panels use the term posted.

stand-alone workstation. A workstation that can perform tasks without being connected to other resources such as servers or host systems.

standard input. The primary source of data going into a command. Standard input comes from the keyboard unless redirection or piping is used, in which case standard input can be from a file or the output from another command.

standard output. The primary destination of data coming from a command. Standard output goes to the display unless redirection or piping is used, in which case standard output can be to a file or another command.

started task. A set of ODF programs

status. (1) The current condition or state of a program or device. For example, the status of a printer. (2) The condition of the hardware or software, usually represented in a status code. In ODF, there are various status fields defined in the ODF database tables. In the BDT, the status indicates whether the BDT row is active or inactive. In the DRT and DST, the status indicates whether the distribution request is requested, continued, completed, restarted, queued, or in error. In the PPT, the status indicates whether the output is continued, completed, restarted, queued, or in error.

storage. (1) The location of saved information. (2) In contrast to memory, the saving of information on physical devices such as disk or tape.

storage device. A functional unit for storing and retrieving data.

storage hierarchy. A logical ordering of storage devices. Generally, the ordering is based on the speed and capacity of the devices.

storage node. A named object that identifies the locations used to hold report data. A storage node can identify cache storage and a TSM domain on an OnDemand object server.

storage object. A portion of a storage volume managed as a single entity. A storage object can contain many segments of report data.

storage pool. In TSM, a named collection of storage volumes that is the destination for archived files.

storage pool volume. In TSM, a volume that has been assigned to a storage pool to store archived files.

storage set. A named collection of storage nodes that determines the locations that can hold report data.

storage volume. A volume that has been assigned to hold report data on an OnDemand server.

string. A series or set of alphabetic or numeric characters. A string can be composed of letters, numbers, and special characters.

structure. A variable that contains an ordered group of data objects. Unlike an array, the data objects within a structure can have varied data types.

structured field. (1) A self-identifying, variable-length, bounded record that can have a content portion that provides control information, data, or both. (2) A mechanism that permits variable length data to be encoded for transmission in the data stream. See Field.

subdirectory. In the file system hierarchy, a directory contained within another directory.

subroutine. (1) A sequenced set of statements or coded instructions that can be used in one or more computer programs and at one or more points in a computer program. (2) A routine that can be part of another routine.

syntax. The grammatical rules for constructing a command, statement, or program.

syntax diagram. A diagram for a command that displays how to enter the command on the command line.

system console. A console, usually equipped with a keyboard and display screen, that is used by an operator to control and communicate with a system. Synonymous with Console.

system customization. Specifying the devices, programs, and users for a particular data processing system. See also Configuration.

System Default Table. An ODF database table.
Note: The SDT that is defined and used for ODF is a
different from the SDT that is defined and used
for the OnDemand base system.

**system integrity.** In computer security, the quality of a
system that can perform its intended function in an
unimpaired manner, free from deliberate or inadvertent
unauthorized manipulation of the system.

**System Managed Space (SMS).** A type of DB2 table
space. An SMS table space is managed by the
filesystem manager.

**system management.** The tasks involved in
maintaining the system in good working order and
modifying the system to meet changing requirements.

**System Management Interface Tool (SMIT).** In the
AIX operating system, a series of panels that allow you
to perform system functions without directly issuing
any commands.

**system memory.** Synonymous with Main Storage, but
used in hardware to refer to semiconductor memory
(modules).

**system prompt.** Synonym for command line. The
system prompt is the symbol that appears at the
command line of an operating system. The system
prompt indicates that the operating system is ready for
the user to enter a command.

**T**

table. A named collection of data consisting of rows
and columns.

table reference character (TRC). (1) Usually, the
second byte on a line in the user’s data. This byte
contains a value (0–126) that is used to select a font to
be used to print that line. (2) In the 3800 Printing
Subsystem, a numeric character (0, 1, 2, or 3)
corresponding to the order in which the character
arrangement table names have been specified with the
CHARS keyword. It is used for selection of a character
arrangement table during printing.

table space. An abstraction of a collection of
containers into which database objects are stored. A
table space provides a level of indirection between a
database and the tables stored within the database. A
table space:

- Has space on media storage devices assigned to it.
- Has tables created within it.

tag. (1) A type of structured field used for indexing in
an AFP document. Tags associate an index
attribute-value pair with a specific page or group of
pages in a document. (2) In text formatting markup
language, a name for a type of document element that
is entered in the source document to identify it.

**Tagged Image File Format (TIFF).** A bit-mapped
graphics format for scanned images with resolutions of
up to 300 dpi. TIFF simulates gray scale shading.

**TB.** Terabyte

**TCP.** Transmission Control Protocol

**TCP/IP.** Transmission Control Protocol/Internet
Protocol

**terabyte.** A unit of memory or space measurement
capacity equal to approximately one trillion bytes. One
terabyte is equal to 1,000 gigabytes, or one million
megabytes.

**text.** (1) A type of data consisting of a set of linguistic
characters (letters, numbers, and symbols) and
formatting controls. (2) In word processing, information
intended for human viewing that is presented in a
two-dimensional form, such as data printed on paper
or displayed on a screen.

**throughput.** A measure of the amount of work
performed by a computer system over a period of time,
for example, the number of jobs per day. (1)

**TIFF.** Tagged Image File Format

**Tivoli Storage Manager.** An IBM software program
that provides archive storage management of data
stored in an OnDemand system.

**TOD (Time of Day).** A distribution method option.
Specified by entering the string TODhh:mm in the
Method data entry field on the DM panel, where hh:mm
is a valid hour and minute combination from 00:00 to
23:59. The time of day in a distribution method field
informs the print processor to create a row in the DRT
to request that an instance of a distribution be printed
at the specified hour and minute. See also Distribution
Method.

**token name.** An eight-byte name that can be given to
all data stream objects.

**token-ring network.** A ring network that allows
unidirectional data transmission between data stations,
by a token passing procedure, such that the transmitted
data return to the transmitting station. (T)

**TOP (Time of Print).** A distribution method option.
Specified by entering the string TOP in the Method
data entry field on the DM panel. The time of print in a
distribution method field informs the batch capture exit
to build a row in the DRT to request that an instance of
a distribution be printed when the report is posted to
the base system. See also Distribution Method.

**toolbar.** The region directly beneath the menu bar of
the main window in OnDemand client programs that
support a graphical user interface.
toolbar button. A small bitmap on the toolbar that represents a command in OnDemand client programs that support a graphical user interface. Click a toolbar button to quickly access a command.

transfer. To send data to one place and to receive data at another place.

transform. To change the form of data according to specified rules without significantly changing the meaning of the data. (1) (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 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

trigger. Data values that ACIF searches for in the input data stream, to delineate the beginning of a new group of pages. The first trigger is then the anchor point that ACIF uses to locate index values.

TSM. Tivoli Storage Manager

type. To enter specific information using the keyboard, typing characters exactly as given.

unformatted print data. Data that is not formatted for printing. A page definition can contain controls that map unformatted print data to its output format.

UNIX operating system. An operating system developed by Bell Laboratories that features multiprogramming in a multi-user environment. The UNIX operating system was originally developed for use on minicomputers but has been adapted for mainframes and microcomputers.

upload. To transfer data from one computer to another. Typically, users upload from a small computer to a large one.

unready. Not posted or loaded.

UOT. User Option Table.

user. A person authorized to logon to an OnDemand server. In ODF, a recipient is sometimes referred to as a user. In this publication, the term user may also refer to the administrator who is entering data into the ODF CICS panels or to the programmer installing and using the ODF system and its components, JCL, and so forth, depending on the context.

user exit. (1) A point in an IBM-supplied program at which a user-defined program may be given control. (2) A programming service provided by an IBM software product that may be requested during the execution of an application program for the service of transferring control back to the application program upon the later occurrence of a user-specified event.

user interface. The hardware, software, or both that implements a user interface, allowing the user to interact with and perform operations on a system, program, or device. Examples are a keyboard, mouse, command language, or windowing subsystem.

User Option Table. An ODF database table that holds the user information for individual recipients. The information includes where to route printed copies of reports and header lines to print on banner pages.

V

V2. See also OnDemand Version 2.

V7. See also OnDemand Version 7.

value. (1) A set of characters or a quantity associated with a parameter or name. (2) A quantity assigned to a constant, variable, parameter, or symbol.

variable. (1) A name used to represent a data item whose value can change while the program is running. (2) In programming languages, a language object that can take different values at different times. (3) A quantity that can assume any of a given set of values.

version. For OnDemand Version 2 reports, the version value defined to the ODF system will match the version defined in the base system ACT as part of the report definition. For OnDemand Version 7 reports, the version is not a significant value; it is internal to the ODF system and the version fields will carry a default value. See also Report/version.

version number. The version level of a program, which is an indicator of the hardware and basic operating system upon which the program operates. The version, release, modification, and fix levels together comprise the program level or version of a program.

viewing window. The window in OnDemand where you look at or browse documents.

virtual printer. A view of a printer that refers only to the high-level data stream, such as ASCII or PostScript, that the printer understands. It does not include any information about how the printer hardware is attached
to the host computer or the protocol used for transferring data to and from the printer.

**volume.** The basic unit of storage for a database, log file, or a storage pool. A volume can be an LVM logical volume, a standard file system file, a tape cartridge, or an optical platter. Each volume is identified by a unique volume identifier.

W

**wait.** There are two binary indicators in the ODF system that control aspects of print processing. The indicators are:

- The continue/wait indicator, which is a distribution-level value defined in the DCT by using the DM panel. The two possible values for the continue/wait indicator are C for continue and W for wait.
- The wait/ignore indicator, which is defined at the bundle component level in the BDT by using the BM panel. The two possible values for the wait/ignore indicator are I for ignore and W for wait.

In the process of printing a distribution, the print processor interrogates these indicators and acts accordingly.

**wait/continue.** See also Continue/wait.

**wait/ignore.** The wait/ignore indicator is significant when the value of the continue/wait indicator is C for a distribution. In this case, the wait/ignore indicator controls whether the print processor subtasks will search the DST for reports to print. The initial value of the wait/ignore indicator for a bundle component is in the BDT and is entered by a user by using the BM panel. The two possible values for the wait/ignore indicator are W (wait) and I (ignore). See also Wait.

**waiting.** See also Wait.

**wake-up.** When the started task is called to perform.

**wildcard.** Search characters that represent other letters, numbers, or special characters. In OnDemand, the % (percentage) and the _ (underscore) are wildcard characters.

**window.** A part of a display screen with visible boundaries in which information is presented.

**workstation.** A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

**write access.** In computer security, permission to write to an object.

**writer.** A JES function that processes print output.
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