IOF

(Interactive Output Facility)

TSO Installation Guide

Release 8E

Copyrights and Trademarks

Triangle Systems, Inc.
P. O. Box 12752
Research Triangle Park, NC 27709
Telephone: (919) 544-0090 Fax: (919) 942-3665
Tech Support Email Address: IOFTech@Triangle-Systems.com
Web Page: http://www.triangle-systems.com

June 2012

Table of Contents

1. Initial Generation of the Product

This chapter describes the process for the initial installation of IOF/TSO. If you have previously installed IOF/TSO, see Chapter 5 for information about installing and testing subsequent maintenance releases.

Distribution Libraries are Loaded

This chapter assumes that the Mainframe Product Install (MPI) file has been loaded to your system and executed to create the IOF distribution libraries.

If this is not the case, download IOF from the Triangle Systems web site:

- Connect to http://www.triangle-systems.com
- Click on "IOF Technical Support"
- Click on "Order or Download the Latest Release"

Updating System Libraries

None of the tasks described in this chapter update any of your system libraries. The tasks described in Chapter 2 update your system libraries only with specific copy jobs whose sole purpose is to copy IOF components to system libraries.

IOF Options

You have chosen some simplified options to make it easy to generate an initial testing version of IOF. If you wish to review the entire set of IOF options before continuing:

- Select ISPF option 6
- Exec ‘prefix.IOFT8E0.INSTALL(SETIOF)’

Generate the Install Library

Submit the M10INIT job to create the M13GEN job and other IOF INSTALL library jobs:

```
SUBMIT ‘prefix.IOFT8E0.INSTALL(M10INIT)’
```

Assemble and Link the Product

Submit the M13GEN job (generated by M10INIT above) to do the required assemblies and link the product load modules into the distribution library.

If you have any problems with this job, please contact IOF Technical Support at:

Triangle Systems, Inc.
P. O. Box 12752
Research Triangle Park, NC 27709
Telephone: (919) 544-0090   Fax: (919) 942-3665
Tech Support Email Address: IOFTech@Triangle-Systems.com
Web Page: http://www.triangle-systems.com

2. Testing and Installing the Initial Generation

This is a description of the steps necessary to install and test the load modules that were generated by the M13GEN job. This chapter is only applicable to the very first time that you install IOF. See Chapter 5 for information about installing and testing subsequent maintenance releases.

Install IOF SVC Module in Link Pack

Copy the IOFSVC load module from the IOF LOAD library to a system LPA or MLPA library.

Update the appropriate IEASVCxx member of SYS1.PARMLIB. For example, if you specified 235 as the SVC number, add the following statement to your IEASVCxx member:

```
SVCPARM 235,REPLACE,TYPE(3),EPNAME(IOFSVC)
```

Please contact IOF Technical Support if you would prefer to use an ESR for authorization.

IPL to Activate the SVC Module

If you copied the SVC module to an MLPA library you must modify the appropriate IEALPAxx member of SYS1.PARMLIB to include the new module name.

IPL your system to activate the SVC module copied above. If you copied the module to an LPA library, you must specify "CLPA" when you IPL.

Copy Product Load Modules to System Library

Note that only the IOF and IOFSPF load modules can execute from a STEPLIB. The remaining modules must reside in an authorized system link list or LPA library. Submit job M14COPY to copy the IOF load modules to the system library that you specified during the MPI dialog.

Refresh LLA after running the M14COPY job.

See Chapter 17 for recommendations about module placement to improve system performance.

Ready to Test

The IOF8E exec in the IOF CLIST library makes it easy to verify that the initial installation was successful. It allocates the necessary libraries and invokes your test version of IOF. From ISPF option 6, enter:

```
exec 'prefix.IOF8E0.CLIST(IOF8E)'
```

If you copy IOF8E to a system SYSPROC or SYSEXEC library you can invoke it from any ISPF screen by entering:

```
TSO IOF8E
```

Before offering IOF to other users, you may wish to modify a logon procedure and add IOF to an ISPF option menu.

Modify a Logon Proc

Modify a TSO logon procedure to concatenate the following IOF libraries to the indicated DD names:

ISPPLIB	IOF ISPPLIB Library
ISPMLIB	IOF ISPMLIB Library
ISPTLIB	IOF ISPTLIB Library
SYSPROC	IOF CLIST Library
SYSHELP	IOF HELP Library

Add IOF as ISPF Option

On your *ISPF Primary Options Menu* add the following menu option:

```
%   I  +IOF      - Interactive Output Facility
```

and the corresponding select option:

```
I,'PGM(IOFSPF)  PARM(&ZCMD)  NEWAPPL(IOF)  NOCHECK'
```

System Log Access

IOF provides sophisticated features for accessing data in the system log. Although the LOG command will work for basic IOF testing, it is also very simple to activate the IOF system log indexing task.

A tailored cataloged procedure (SLAMRUN) has been stored in the IOF INSTALL library and can be activated as a started task or run as a batch job. The indexing task does require that the invoking address space have security access to the SYSLOG job.

See Chapter 8 for a full description of the powerful IOF system log indexing features.

Sysplex Features

All JES2 resources in your sysplex can be accessed from any IOF session. Activation is required for these features but is not required for basic IOF testing.

See Chapter 2 for a description of IOF features that help you manage your sysplex environment.

Changing Execution Options

If you discover during testing that you want to review or change an IOF option, from any IOF panel enter:

```
SETIOF
```

You can also run SETIOF from ISPF option 6 by entering:

```
exec 'prefix.IOFT8E0.INSTALL(SETIOF)'
```

To install changed options, submit the M13GEN job from the INSTALL library followed by the M32COPY job.

Contact Us

Please contact IOF Technical Support if you have any questions during the testing process. We have a number of optional ways to configure IOF to satisfy the needs of your users. There are also many ways that an individual user can tailor IOF to their own personal tastes.

3. Installing Options Changes

Follow the steps below to incorporate options changes into the IOF load modules.

Generate the New Load Modules

Submit job M13GEN from the IOF Install library to perform the necessary assemblies and produce the product load modules.

Install New Load Modules

Submit job M32COPY to copy the new load modules to your system library. You must refresh LLA after running M32COPY.

4. Options Changes Requiring Abbreviated Generation

All options changes now require the installation process that is described in Chapter 3.

5. Installing a New Release of IOF

This chapter describes how to install a new release of IOF after the product has previously been installed. The new release can be installed and tested in parallel with your production version, and can be made the production version after testing is complete.

To install the new release from our web site, see the instructions at:

- http://www.triangle-systems.com
- Click on "IOF Technical Support"
- Click on "Order or Download the Latest Release"

6. Testing a New Version in Parallel with Production

This is a description of the steps necessary to install a new version of the product for testing in parallel with your existing production version. This procedure assumes that the product load modules have already been generated by the M13GEN job.

Test Environment for Product Load Modules

Submit the M32COPY job to copy the product load modules that must reside in a system link list library into the library specified in your C64LINK options member. These module names will not conflict with the current production module names since these load module names contain the version and level id for this new release of the product.

The IOF and IOFSPF load modules are not copied by the M32COPY job above. If you copied them into a link list library, they would become your current production versions of those modules. Since the IOF and IOFSPF load modules are internally programmed to invoke a specific version and level of IOF, any user who requested IOF from the *ISPF Primary Options Menu* would invoke the new IOFSPF. This would in turn invoke the new load modules copied above with the M32COPY job. In effect you would have installed the new version as your production IOF.

To avoid this conflict you can test the IOF and IOFSPF load modules from a STEPLIB in your TSO session. The logon procedure described below has a STEPLIB DD statement pointing to the new product load module library. When you logon with this procedure, you will invoke the new versions of IOF and IOFSPF which will invoke the new load modules copied by M32COPY above.

It is important to point out that this test procedure will not work if the M32COPY job above is not executed. The load modules copied by M32COPY will not execute from a STEPLIB and must be run from a system link list or LPA library.

Test Using the IOF8E REXX Exec

IOF8E REXX exec resides in the IOF CLIST library. This exec sets up the proper IOF environment of release 8E and initiates a release 8E IOF session. To execute the exec:

- Copy IOF8E to a system SYSPROC or SYSEXEC library and enter from any ISPF panel:

  ```
  "TSO IOF8E"
  ```

- From ISPF Option 6, enter:

  ```
  "ex 'ppp.IOFT8E0.CLIST(IOF8E)'
  ```

  Specify the fully qualified name of the IOF release 8E CLIST library.

Create a Logon Proc for Testing

Create a TSO logon procedure to test the product. Add the following IOF libraries to the front of the concatenation for the indicated DD names:

STEPLIB	New IOF LOAD Library
ISPPLIB	New IOF ISPPLIB Library
ISPMLIB	New IOF ISPMLIB Library
ISPTLIB	New IOF ISPTLIB Library
SYSPROC	New IOF CLIST Library
SYSHELP	New IOF HELP Library

Testing the New Version

To test the new version of the product, logon with the logon procedure created above. When you enter **"I"** on the ISPF panel that invokes your production IOF, the IOFSPF load module will be loaded from the STEPLIB and will in turn invoke the new version of the product.

When you enter **"IOF"** at the TSO READY level (or under Option 6), the IOF command load module will be loaded from the STEPLIB and will, in turn, invoke the new version of the product.

Changing "A" or "B" Options During Testing

If you discover during testing that you need to change one or more "A" or "B" options, you can modify the associated options members and regenerate the load modules. The type of generation needed depends on the options that you changed.

Each "A" and "B" option is labeled as requiring either a "full generation" or an "abbreviated generation". If you have changed any option designated as requiring a full generation, run the M13GEN job to rebuild the load modules.

Then, run M32COPY to copy the load modules into your system libraries. See Chapter 3 for more information about "full generation" options.

If all the options that you changed are "abbreviated generation" options, run job M18NEWOP to perform the abbreviated generation and copy the options load module into your system library. Comments in the options members clearly indicate whether they are "full generation" or "abbreviated generation" options. See Chapter 4 for more information about "abbreviated generation" options.

Changing "C", "D", or "K" Options During Testing

If you discover during testing that you need to change one or more "C", "D", or "K" options, you should modify the associated options members, run the M10INIT job to recreate the install library, and run M13GEN to rebuild the load modules. Then, run M32COPY to copy the new modules into your system library.

Installing the New Load Modules as Production

Submit the M33COPY job to copy the IOF and IOFSPF load modules into your product system link list library. At this time they will replace your previous production versions of those modules and the new modules will become the production versions.

If you want to preserve the old IOF and IOFSPF load modules, you can rename them in your system library before submitting the M33COPY job.

Installing ISPF, HELP, and CLIST Libraries for Production

If you want to install the ISPPLIB, ISPMLIB, ISPTLIB, HELP, and CLIST libraries by copying them into your production libraries, submit the M15COPY job. This job will copy the libraries into the production libraries that you specified in the options members C60PLIB, C61MLIB, C62TLIB, C63HELP, and C65CLIST.

7. JES2 Maintenance Considerations

When You Apply JES2 Maintenance

In most cases JES2 maintenance does not affect the operation of IOF. If you do notice problems after applying JES2 maintenance, run the M13GEN job to pick up the maintenance. Then, run the M32COPY job to copy the updated load modules to your system library.

When You Install a New Version of JES2

If you are installing a new version of JES2 (with a new FMID), you will need to re-install the IOF load modules. First, call IOF Technical Support or check the IOF Technical Support section of our website to determine if a new product version is available that is at a higher level than your current production version. You can download MPI files or maintenance required for new JES2 versions directly from the web site. The IOF Technical Support web address is: http://www.triangle-systems.com.

If a Higher Level Release is Available

If a higher level IOF release is available, order or download the new version and follow the instructions in Chapter 5.

After loading the new distribution libraries, update options member C75ASMJS to reference the source libraries for your new version of JES2 before running the M10INIT job. See Chapter 5 for a more information about this procedure. If you are creating a new target MVS system, you also will need to update options member C64LINK before running M10INIT.

If You are Currently Running the Latest Level

If you are currently running the latest maintenance level of the product, follow the instructions in Chapter 13 to create a new set of libraries that can be used as a base for generating the new IOF load modules.

After completing the procedures described in Chapter 13, submit job M13GEN in the new install library to do the necessary assemblies and generate the product load modules.

If you are creating a new target MVS system, you can copy the product load modules to the target link list by submitting job M14COPY. When you logon to the new target MVS system, you will be using the new version of IOF.

If you are installing a new JES2 on your current production MVS system, you should refer to Chapter 6 for information about testing the new version of IOF in parallel with your production version.

8. System Log Access and Management (IOF/SLAM)

IOF can be used to quickly and easily review the system log and sysplex operlog. In addition to being able to go immediately to the bottom (or to any specific time of day), IOF provides an index to important system events, so you can review an entire day's significant log events in a few seconds. In addition, you can easily add your own significant events to be indexed.

You can also retain an index for yesterday's (or any number of previous days') log. This gives you the same convenient access to previous logs that you have for today's current log.

IOF also provides the optional capability to archive old log data and manage the archived copies. It is easy to test this option in parallel with your current capture if you wish. Optionally, IOF can capture the log data to a data set or leave it on the spool for your normal capture process.

The Log Index

IOF allows you immediate access to the log by maintaining a dynamic index that describes the current contents of the log. This index contains information that allows you to quickly position within the log. It also contains an index of important log events that you can request while reviewing the log.

The Log Indexing Task

The IOF log index is a data set that is periodically updated by the IOF log indexing task. This task is a continuously running batch job (or started task) that wakes up every two minutes and updates the IOF log index to include the log records written since the last update. IOF provides procedures to index both the system log (SYSLOG) and the sysplex operlog (OPERLOG).

The SYSLOG indexing task runs the SLAMRUN clist. The OPERLOG indexing task runs the SLAMOPER clist. Release 8E provides the ability for the LOG command to use the resident index in the SLAMRUN or SLAMOPER task and avoid the overhead of reading the log index when the indexing task and the IOF user are running on the same LPAR. Use of the resident index significantly improves LOG command performance.

Indexing the System Log (SYSLOG)

The procedure below can be used to start the system log indexing task as a started task or to execute it as a batch job:

```
//SLAMRUN  PROC  CLASS=X,OPT=                          <=== Class
//SLAM     EXEC  PGM=IKJEFT1B,PARM='SLAMRUN &OPT'
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name      <=== Clist
//SYSTSPRT DD    SYSOUT=&CLASS                              Library
//SYSTSIN  DD    DUMMY
```

Indexing the Operlog (OLOG)

The procedure below can be used to start the operlog indexing task as a started task or to execute it as a batch job:

```
//SLAMOPER PROC  CLASS=X,OPT=                          <=== Class
//SLAM     EXEC  PGM=IKJEFT1B,PARM='SLAMOPER &OPT'
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name      <=== Clist
//SYSTSPRT DD    SYSOUT=&CLASS                              Library
//SYSTSIN  DD    DUMMY
```

Change the SYSPROC DD statement in both the sample procedures above to point to your distribution IOF CLIST library and select a sysout class for the SYSTSPRT DD statement. After installing the procedure(s) above, the sample job(s) below can be submitted to test the log indexing tasks.

To index SYSLOG:

```
//SLAMLOG JOB  acct,user-name,TIME=5,
//             USERID=authid                  <=== Userid
//             PASSWORD=password              <=== Password
//ACTIVE  EXEC SLAMRUN
```

To index Operlog:

```
//SLAMOPER JOB acct,user-name,TIME=5,
//             USERID=authid,                 <=== Userid
//             PASSWORD=password              <=== Password
//ACTIVE  EXEC SLAMOPER
```

The userid for the jobs must have the authority to browse the system log or operlog. SLAMRUN and SLAMOPER can also be run as started tasks. Started tasks are normally permitted full access to all IOF functions. It is strongly recommended that these tasks be run on the LPAR under which most users will issue the LOG command in order to take full advantage of the new resident index facility described above.

If your site runs a parallel sysplex operlog facility, we recommend that you also run SYSLOG on each system in the sysplex. IBM seems to agree with this recommendation. In addition to the SLAMOPER task to index the common log, you should run the SLAMRUN task on each system in the sysplex. Indexing all system logs and the common operlog provides the ability to browse the common log or the logs of individual systems.

If your site runs the sysplex operlog but does not run the system log, you may want the ability to browse operlog records segmented by system. To do this, you must build a filtered operlog index for each system. In addition to the common SLAMOPER task shown above, you must run a SLAMOPER task as shown below for each system. Specify the system id for each system in the OPT parm.

```
//SLAMOPR1 JOB acct,user-name,TIME=5,
//             USERID=authid,                    <=== Userid
//             PASSWORD=password                 <=== Password
//ACTIVE  EXEC SLAMOPER,OPT='SYSID(sid1)'        <=== Sysid
```

The name of the system log index data set is:

`prefix.logname.$syid.suffix`

prefix	PREFIX = value from options member B32INDEX
logname	LOGNAME = value from options member B30SLAM (normally SYSLOG)
$syid	SYSID=YES in options member B30SLAM, this is a "$" followed by the system id for the system being indexed.
Suffix	SUFFIX = value from options member B32INDEX

The name of the combined operlog index data set is:

`prefix.OPERLOG.suffix`

prefix	PREFIX = value from options member B32INDEX
OPERLOG	Constant
Suffix	SUFFIX = value from options member B32INDEX

The name of the individual system operlog index data sets are:

`prefix.OPERLOG.$syid.suffix`

prefix	PREFIX = value from options member B32INDEX
OPERLOG	Constant
$syid	"$" followed by the system id for the system being indexed.
Suffix	SUFFIX = value from options member B32INDEX

If you start the SLAM task late in the day, it may take several minutes for it to scan and index all of the system log data already written for the day. You should wait for it to finish its initial scan of the log data before trying to use the index. After the initial scan, it will pause for about two minutes, wake up and perform a minor update of the index, and then pause again. This cycle will continue until you stop the indexing task. (See the section below, Controlling the Indexing Task.)

After you see the SLAM job swap out, the index will be ready to use.

Using the Log Index

Enter "**LOG**" on the *IOF Option Menu* (or **"I.LOG**" from anywhere in IOF) to browse the system log and/or operlog. The LOGTYPE parm on the GROUP macro in the B23ALLOW IOF option member defines which type of log is to be displayed by default.

LOGTYPE has three acceptable parms. LOGTYPE=SYSLOG is the default and sets system log as the default log type. LOGTYPE=OPERLOG sets operlog as the default. LOGTYPE=OPERACT sets operlog as default, if it is active, but reverts to the system log if the operlog is not active.

Users can override the default log type by using the LOGTYPE command from any IOF panel. Enter LOGTYPE SYSLOG, LOGTYPE OPERLOG, or LOGTYPE OPERACT to specify the desired default log type. The default log type specified is saved in the user's profile.

The default log type and/or system id can be overridden with a parm on the **LOG** command.

Syntax

```
LOG  [S /SYSLOG /O / OPER/ OLD/ ARCH/ sysid] [sysid]
```

S or SYSLOG. System log

O or OPER. Operlog

OLD. Old logs as described below

ARCH. Archived logs as described below

sysid. System id of operlog or system log

Examples:

LOG S. Displays SYSLOG

LOG S A997. Displays SYSLOG for sysid A997

LOG O. Displays OPERLOG

LOG. Displays OPERLOG or SYSLOG as defined by the LOGTYPE parm

LOG OLD. Displays menu of old system logs if LOGTYPE=SYSLOG. Under ISPF only, if LOGTYPE=OPERLOG displays a table of available old operlogs

LOG -1. If LOGTYPE=OPERLOG, displays the operlog for yesterday (-1 days ago)

LOG O -2. Displays day-before-yesterdays operlog

LOG O 321. Displays operlog for day-of-year number 321 if available

Entering the **LOG** command for either the system log or the operlog will go directly to the bottom of browse for the selected log. Enter "LOC 1539" to position to 15:39 in the log. Enter "LOC 0715" to position to 7:15.

```
------------------------------ IOF DATA INDICES -------------------------------
COMMAND ===>                                              SCROLL ===> CURSOR
---------NAME------COUNT--DESCRIPTION-----------------------------------------
_    1   #             2  Node MIAMI Sysid ESA7 on 97248
_    2   DEVICE        3  Device I/O errors
_    3   ENQ         104  Jobs delayed by enqueued MVS data sets
_    4   ERROR         2  System errors
_    5   JES2         45  JES2 errors and minor events
_    6   MISC          3  Miscellaneous events of interest
_    7   97248       789  Friday in one minute intervals
```

Enter "INDEX" to display the *IOF Data Indices* menu. A sample indices menu for the system log is shown below. The operlog index is similar.

Each item on this menu describes an index that has been built by the indexing task. The count field is the number of log records pointed to by that index. The description field shows the type of log record pointed to by that index.

The first index (#) contains pointers to the first and last records in the current system log. The description field for this index shows the node name, system id, starting date, and starting time for the current log. If you selected this index from the menu (by placing "**S**" beside it), you would see the first and last indexed records in the current log.

The second index above (DEVICE) contains pointers to three log records that describe device I/O errors. If you select that index (by placing an "**S**" beside it), you would see:

```
------------------------------ IOF DATA INDEX ---------------------------------
COMMAND ===>                                              SCROLL ===> CURSOR
-------------------------------------------------------------------------------
_      1   97248 03:17 Disk 37D had IOS000 error 01,DCK
_      2   97248 10:09 Disk 584 had IOS000 error 01,ICC
_      3   97248 10:35 Disk D75 had IOS000 error 01,EQC
```

This index is easy to read and understand. If you select one of these items from the menu, you will enter browse of the system log at that specific record. Once in browse you can use all IOF browse services. "**END**" will return you

to the *IOF Data Index* for device errors. "**END**" again will return you to the *IOF Data Indices* menu.

As illustrated, you can jump into an index and then directly into the system log for a particular index entry. This makes it easy for you to quickly review important system events by simply checking the index.

Controlling the Indexing Task

The indexing task can be controlled with the **MVS STOP** and **MODIFY** commands. If your active indexing task is SLAMRUN:

P	**SLAMRUN**	Causes the indexing task to terminate
F	**SLAMRUN,RESET**	Tells the indexing task that the current log has been captured and that a new index for the new log data should be started. This is the default action when the log is captured; normally this command will not need to be entered.
F	**SLAMRUN,REFRESH**	Tells the indexing task that you changed one or more index definitions and that it should incorporate the new index definitions before continuing to index the log.

The SLAMOPER task accepts the same modify commands as SLAMRUN. Also, SLAMOPER accepts one additional modify command:

F	**SLAMOPER,NEWINDEX**	Tells the indexing task to spin off an index for yesterday.

This command normally does not need to be entered. By default SLAMOPER automatically spins off an index for the previous day and resets the current index at midnight. This allows the "**LOG -1**", "**LOG 321**", and "**LOG OLD**" commands described above to function as designed.

Indexing Your Own Selected Log Records

You can expand the log index for both the system log and the operlog to include index pointers to log records for events that are of special interest to your installation. Modify the SLAMINST clist to add your own index or to add additional events to an existing index. See clist SLAMDEF for examples of defining indices and adding entries to indices.

The HCFORMAT(CENTURY) parm on the HARDCOPY statement in the CONSOLxx member of SYS1.PARMLIB specifies that a 4-digit year should be used in system log date stamps. SLAMRUN automatically detects the number of digits being stored in the log and sets variable YEARSIZE to a value of 2 or 4. YEARSIZE affects the columns where data is saved in the

log. The value can be used in SLAMINST and SLAMDEF to define IOF fields to the proper columns.

IOF formats a 2-digit or 4-digit year when displaying operlog data based upon the HCFORMAT specification in the CONSOLExx member of the system parmlib. This causes the IOF operlog format to be the same as the syslog format.

The indexing task can be told to dynamically include changes to SLAMINST by entering the MVS command "**F SLAMRUN,REFRESH**" (as described in the previous section).

See the ***IOF User's Guide*** for information about the commands used in the SLAMINST clist.

Options for the Indexing Task

There are several options that can be specified in the OPT= parameter when the SLAMRUN or SLAMOPER procedure is invoked. See the SLAMRUN and SLAMOPER clists in the IOF clist library for a complete description of the available options. To specify your desired options, enter them in the OPT= parameter when invoking the SLAMRUN or SLAMOPER procedure. For example:

```
//SLAM   EXEC  SLAMRUN,OPT='USERID(SMITHJ)'
```

Indexing Yesterday's System Log

IOF provides a way for you to save yesterday's system log and index it just as your active log is indexed. To save yesterday's log, run the SLAMMEMO job after you write the log (**WRITE LOG** command) but before you run your capture.

This job will copy the day's system log data to a sysout data set and then index it as it was indexed when it was the active log. It will not affect your production system log data in any way. After SLAMMEMO completes, you can run your normal log capture procedure.

You can then enter "**LOG?**" on the *IOF Option Menu* to display the *IOF System Log Option Menu*. That menu shows how to select and review old system logs. You can also enter "**/LOG OLD**" from any IOF display to go directly to the display of old system logs. Enter the "**V**" line command to browse one of the old logs.

You can keep as many SLAMMEMO jobs as you wish. Each SLAMMEMO job represents one day's system log, and the *IOF System Log Menu* will let you display all of the existing old logs. You may want to keep only yesterday's log, or you may want to keep the logs for the previous week. The MEMODAYS parameter defines the number of old logs you want to keep.

Remember that this process does not affect your normal log capture in any way.

The following procedure can be used to invoke SLAMMEMO:

```
//SLAMMEMO PROC  CLASS=X,OPT=                        <=== Class
//SLAM     EXEC  PGM=IKJEFT1B,PARM='SLAMMEMO &OPT'
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name    <=== Clist
//SYSTSPRT DD    SYSOUT=&CLASS                            Library
//SYSTSIN  DD    DUMMY
```

To save the previous week's system log data for easy review, run the following job after your **WRITE LOG** command but before you run your normal log capture:

```
//SLAMMEMO  JOB  acct,name,TIME=5,
//              USERID=authid,           <=== Authorized userid
//              PASSWORD=password        <=== Password
//COPYLOG  EXEC SLAMMEMO,
//              OPT='LOGCLASS(x),MEMOCLAS(y),MEMODAYS(7)'
//
```

The userid above must be authorized to browse the system log. LOGCLASS is the sysout class where your log is written with the **WRITE LOG** command. MEMOCLAS is the sysout class to be used by the SLAMMEMO job for the copy of the log data. "MEMODAYS(7)" says that you want to keep indices for the previous seven days' log.

The MEMOJOB= parm in options member B30SLAM must match the job name that you use for this job. If you want to name it something other than SLAMMEMO, you must update the B30SLAM options member.

There are several options to the SLAMMEMO procedure that can be specified in the OPT= parameter. These options are documented in the SLAMMEMO clist. To specify options, append them to the values in the OPT= parameter when invoking the SLAMMEMO procedure. For example:

```
//COPYLOG  EXEC SLAMMEMO,
//              OPT='LOGCLASS(L),MEMOCLAS(A),MEMODAYS(7),SYSID(IPO1)'
```

You can start the SLAMMEMO procedure as a started task.

There is no need to write memo copies of the OPERLOG. The NEWINDEX feature of SLAMOPER accomplishes this objective of providing browse access to old operlog data.

Capturing Log Data

You can use IOF to capture the previous day's log data. IOF will allocate and manage the captured data. If you are interested in using this facility, you

should consider running it in parallel with your current capture procedure for a while before converting your production capture to use IOF.

This is easy with IOF because you can capture the data and request that it be left on the spool. The following procedure can be used to archive system log data:

```
//SLAMARCH PROC CLASS=A,OPT=
//SLAM     EXEC PGM=IKJEFT1B,PARM='SLAMARCH &OPT'
//SYSPROC  DD   DISP=SHR,DSN=clist.library.name
//SYSTSPRT DD   SYSOUT=&CLASS
//SYSTSIN  DD   DUMMY
```

SLAMARCH allocates an output data set to which SYSLOG will be copied. The data set name prefix is defined in the B30SLAM member of the IOF OPTIONS data set. The system id and date/time range contained in the captured log is also included in the generated data set name. UNIT, VOLSER, and SMS specifications of the output data set can be specified in the OPT parm. See the clist PROC statement for a detailed description of all the available parms.

The following job will use the SLAMARCH procedure above to capture class "L" system log data without disturbing it on the spool.

```
//LOGARCH  JOB  acct,name,TIME=5,
//              USERID=authid,          <=== Authorized user
//              PASSWORD=password       <=== Password
//SLAMARCH EXEC SLAMARCH,
//  OPT='LOGCLASS(L) LOGDISP(KEEP) VOLSER(AR1911) PACK'
```

The userid above must be authorized to browse the system log. The data will be packed using the ISPF edit/browse pack technique. LOGCLASS is the sysout class where your log is written by the **WRITE LOG** command. The archive data set will be allocated on the AR1911 volume.

This job will copy the log data for you but leave the data on the spool so that your normal capture process, such as the **SLAMWTR** command can dispose of it. To cause the job above to copy the log and then delete the spool data, change "LOGDISP(KEEP)" to "LOGDISP(CANCEL)". The job will then function much like an MVS External Writer. The system log data will be copied and then deleted from the spool.

SLAMARCH has several additional options. These options are described in detail in the SLAMARCH clist PROC statement. Options can be specified in the OPT= parm. For example:

```
//CAPTURE  EXEC SLAMARCH,
//  OPT='LOGCLASS(L) LOGDISP(KEEP) SYSID(IPO1) DATACLAS(ARCH)'
```

Capturing Log Data to Tape or Other User Managed Media

You can also use IOF to capture the previous day's system log data to a data set of your choice. The SLAMWTR procedure can copy log data to tape or other target media. SLAMWTR does not manage the output data for you, however. The following procedure can be used to capture system log data.

```
//SLAMWTR  PROC CLASS=x,OPT=                      <=== Sysout
//SLAM     EXEC PGM=IKJEFT1B,PARM='SLAMWTR &OPT'       class
//SYSPROC  DD   DISP=SHR,DSN=clist.library.name <=== Clist
//SYSTSPRT DD   SYSOUT=&CLASS                         library
//SYSTSIN  DD   DUMMY
```

The following job will use the SLAMWTR procedure above to capture your system log data:

```
//CAPTURE  JOB  acct,name,TIME=5,
//              USERID=authid,           <=== Authorized user
//              PASSWORD=password        <=== Password
//CAPTURE  EXEC SLAMWTR,
//              OPT='LOGCLASS(x),LOGDISP(CANCEL)' <=== Write Log
//CAPTURE  DD   target.data.set.specs                 class
```

The userid above must be authorized to browse the system log. LOGCLASS is the sysout class where your log is written by the **WRITE LOG** command. The CAPTURE DD statement specifies the target data set for capturing the system log data.

There are several options that can be requested in the OPT= parameter of the SLAMWTR procedure. These options are described in the SLAMWTR clist.

9. Access Control Overview

By default IOF allows most users to control only their own jobs, while a user with OPERATOR authority is allowed to control all jobs in the system. You have the ability to change the default rules to match the requirements of your installation.

This section describes some simple procedures that can be used to maintain the access rules for IOF. See Chapter 26 for more detailed information about IOF access control.

SDSF Considerations

This topic should be skipped unless you previously used IBM's SDSF product to view output under TSO. The initial install process, described in Chapter 1, includes the ability to convert your current SDSF ISFPARMS data set to comparable IOF access control rules. If you chose that option, a new B23ALLOW options member was created for you that contains the GROUP, ALLOW, and LIMIT macros necessary to simulate your current SDSF access control environment.

You may wish to review the new B23ALLOW options member:

- One IOF GROUP macro is generated for each ISFGRP macro. Permissions are granted by ALLOW macros that point back to the GROUP macros.
- The default IOF options menu for end users is OPTUS1. This menu is used instead of the system programmer default (OPTOPT) if the SDSF group does not specify either PR, DA, INIT, or LOG in the AUTH= parameter. You can change this by changing the PANEL= parm on the GROUP macro.
- All users are allowed to control the jobs they submitted. To change this, modify the ALLOW macros labeled MY1, MY2, MY3, MY4, and MY5.

If you are using the IBM defined SAF classes JESSPOOL, OPERCMDS, WRITER and SDSF to control access to SDSF resources, IOF can honor your existing SAF rules. Access to IOF functions, commands and displays will be virtually identical to the SDSF access to the same features. To cause IOF to honor the IBM-defined SAF rules, specify "IBMSAF=YES" in the A60ACF option. Note that IOF LIMIT macros will always be strictly enforced, even if IBM SAF rules are being used.

Important note: If you enable the JESSPOOL, OPERCMDS, WRITER and/or SDSF SAF classes without proper rules and profiles in place, you may inadvertently permit access to IOF resources.

Adding New Access Control Rules

If you have only the CICS version of IOF, you must add new access control rules by directly editing the ALLOW and LIMIT macros in options member B23ALLOW. However, IOF/TSO provides a simple ISPF dialogue interface to assist you in building new ALLOW and LIMIT macros. If you have both versions of IOF, you can copy your IOF/TSO access control options into IOF/CICS.

Enter the **ALLOW** command from any IOF panel under ISPF to invoke the dialogue. You will be prompted by a series of ISPF panels for the information necessary to build ALLOW and LIMIT macros. You optionally then can have the new ALLOW/LIMIT macros appended to your production B23ALLOW options member.

Even if you do not use this mechanism to update your B23ALLOW member, it is still a very good way to learn how ALLOW and LIMIT macros are used.

Deleting Access Control Rules

Edit options member B23ALLOW to delete access control rules. You will normally be deleting or modifying an ALLOW or LIMIT macro.

Using RACF, Top Secret, or ACF2 to Control IOF Access

IOF allows you to control access with your external security system:

- Use options member A60ACF to specify which security system you have and whether operators and started tasks should be given access without requiring rules in the security system.
- Use options member B24ACFDF to select the types of access you want to control with your security system.
- If your security system is RACF, enter the ACF command from any IOF panel under ISPF to maintain your security system rules for IOF access. This function is not available in IOF/CICS.
- IOF/CICS users should review Chapter 26, *CICS External Security Considerations*, of the ***IOF/CICS Install Guide*** for important information about IOF security in a CICS environment.

IOF checks the IBM defined JESJOBS class before canceling jobs. **If you enable the JESJOBS class, you should also add rules or profiles to control access to cancel jobs**.

Access Control Trace

To see exactly how IOF validates access to IOF functions, see the section, IOF Trace Facility, in Chapter 15.

10. Attributes and Options for User Groups

Each IOF user is assigned to a group at the start of each IOF session. Options member B23ALLOW defines which users belong to each IOF group. In addition to indicating which jobs, output groups, devices, etc. that the users are allowed to access, group membership also has certain other implications.

You can specify the following attributes for groups of users using GROUP macros in the B23ALLOW options member:

- What jobs are displayed on their default *IOF Job List Menu*.
- Whether the user's TSO session is to be included on their default *Job List Menu*.
- A limit to the number of sysout records that can be scanned in a single **FIND** command.
- A minimum time delay between times that the user can hit **ENTER** to refresh their *IOF Job List Menu*.
- Whether the user is allowed to use the **EXTEND** command for the *IOF Job List Menu*.
- A minimum pause interval for the **EVERY** and **PAUSE** commands. Or, you can disable these commands.
- The WTOR route codes for action messages to be displayed at the bottom of the system log browse.
- Default options for the *IOF Monitor Display*, including the ability to prevent access to the display.
- The default system id for system log browse.
- Alternate display formats, described in Chapter 11, for certain display panels.
- Whether the user is to enter the *IOF Job List Menu* or the *IOF Option Menu* when they invoke IOF with no parms.
- An alternate options menu to display options and accept session parms.
- A special subset of the global commands table that applies only to users in the group.
- Whether the user is allowed to use the DR command.
- Whether the user is allowed to use the INPUT command on the IOF Job Summary.
- The specific options that will be displayed on the *IOF Option Menu* for members of the group.

11. Controlling Display Formats

Users can tailor most IOF display formats to fit their personal needs and preferences using the **CUT**, **PASTE** and **ARRANGE** commands. Panel modifications are saved in the user's profile until deleted. Enter "HELP ARRANGE" for a description of **CUT**, **PASTE** and **ARRANGE**, or see *Chapter 6, Customizing IOF Panels*, of the **IOF User's Guide**.

If you need to globally change the default formats on one or more IOF panels, options member B68FORMT tells you how. By changing B68FORMT you can alter the default display formats for all users. By creating new SECTION macros and pointing to them with the FORMATS= operand of GROUP macros, you can select different display formats for different groups of users.

You can also change the default sort order for specific sections with SECTSORT macros.

See options member B68FORMT for a description of the SECTION macro and its relationship to the GROUP macro. Modifying the B68FORMT options member requires an abbreviated generation as detailed in Chapter 4 of this guide.

12. Installing and Maintaining Source Mods

Before deciding to make a change to one of the product source modules, you should carefully investigate the possibility that your requirement can be met by using some combination of product options. Each release of IOF contains new options that can be used to eliminate user modifications. Please contact IOF Technical Support if you are considering source changes. We will be happy to help you find a way to accomplish your objectives without source modifications.

This is a description of a procedure for modifying the product that makes it possible to carry forward your source modifications to new releases. This procedure is not necessary if you are only changing options in the options library. In that case, you should refer to Chapter 3 or Chapter 4 for instructions.

Before making any source modifications to the product, you should create a new set of libraries. This will enable you to create, test and maintain your modifications independently from the base libraries. See Chapter 13 for the procedure to generate a new set of libraries.

Do not proceed to the steps below until you have followed the instructions in Chapter 13 to generate a new set of libraries. You must follow this procedure in order to receive technical assistance with your modifications. If you choose to skip this step and update the source directly, we cannot assume the responsibility for helping you carry forward your changes to the next release level of IOF. We will not be able to help you because it will be impossible to identify and extract the source changes from the old release in order to apply the same changes to the new release.

Please contact IOF Technical Support if you have any questions about this policy. We will try to help you understand the problems created when modifications are developed that cannot be easily identified and applied to subsequent releases. We will be glad to answer any technical questions about the update procedure itself.

Create Source Updates

Each source update should be created as an IEBUPDTE input data set and stored in the newly created version of the product updates library. The member names in the updates library will be referenced in control statements described below.

Each member of the updates library should only contain source updates for a single source module, and each update member should include exactly one "./ ADD" or "./ CHANGE" statement. However, multiple update members may contain updates to the same source module.

Add a Control Statement for each Update Member

Edit the options library member D55UPSRC to add a %VUPDATE or %VADD statement for each update member that you have added to the updated library. The comments in member D55UPSRC describe the %VUPDATE and %VADD control statements.

Create the Job to Update the Source Library

Submit the M52UPSR# job to generate job M52UPSRC which can be used to apply all of the source updates that were described in options member D55UPSRC. If you need to add other members to the updates library, you should update options member D55UPSRC and rerun M52UPSR# to recreate the M52UPSRC job.

It is not necessary to rerun the M52UPSR# job if you only are changing an existing member of the updates library. You need to rerun M52UPSR# if you have added, deleted, or renamed members in the updates library. Remember that options member D55UPSRC must accurately reflect the contents of the updates library or job M52UPSR# will not generate the correct update steps.

Update the Source Library

Submit job M52UPSRC to apply your updates to the source library. The updates will begin with the source members from the original distribution library and update them into your current source library.

Thus, you can rerun the M52UPSRC job at any time and it will go back to your original distribution source, apply all of your updates, and store the updated modules into your current source library.

Assemble Affected Source Modules

If only the JESCTL or OPTIONS source members are affected, you can submit the M13GEN job to assemble the modified source modules and produce the product load modules. In that case proceed directly to the section below, ***Test the New Product Load Modules***.

If you have made source changes that affect source modules other than JESCTL and OPTIONS, you should submit job M70ASM# to generate an assembly job for each source module in the source library. Refer to install

library member M00INDEX for a list of the names of assembly jobs for the various source members. The member names start with M71JESCA.

Submit the generated assembly jobs for the source members (other than JESCTL and OPTIONS) that you need to assemble. Then, submit job M13GEN to assemble JESCTL, OPTIONS, and generate the product load modules.

Test the New Product Load Modules

See Chapter 6 for information about testing a new version of the product in parallel with your production version.

13. Generating an Installation Version of the Product

This is a description of how to create a new set of product libraries that can be used to apply installation modifications to the product.

Each set of product libraries has a three character version and level identification. The first two characters represent the base. The third character is the level identifier and is always "0" for the libraries that are initially loaded the MPI file.

For example for Release 8E, the base version identifier would be "8E" and the last character would be "0". So, the complete version and level identifier would be "8E0".

The third character, or level identifier, can be used by the installation to indicate local levels of the product that are based on a particular release. Using the above example, an installation could create a set of libraries with a level identifier of "1". In this case the complete version and level identifier would be "8E1".

If you already have the product installed in production with a certain set of changes applied (say at level "8E1") and you want to make some additional changes, you can create another installation level (say "8E2") to begin your new changes.

This mechanism allows you to proceed with modifications in an orderly fashion without impacting your current production product or the libraries from which it was generated.

The steps below describe how to create a new installation level of the product libraries.

Select an Installation Level Identifier

Select the one-character installation level identifier. If this is the first installation level since this version of IOF was installed, it would normally be designated as "1." You can use any alphanumeric character that you wish as long as you have not already used it for this version of IOF.

Create the Job to Generate the New Libraries

Edit job M50DISK# to specify your selected installation level identifier in the LEVEL operand of the %VGENJOB statement (the last record in the job). Save the new M50DISK# job; then, submit it to create the M50DISK job.

Carefully Review the Generated M50DISK Job

Review the M50DISK job just created to make sure the data set names of the new libraries to be created match the level identifier you selected. Be very careful here. If you run the M50DISK job with data set names that actually match an existing version of product libraries, it will delete all of the existing libraries.

The M50DISK job first deletes the new library names to make it easy for you to rerun the job if for some reason it fails after partial completion. But, this means it can delete a complete set of existing libraries if you make a mistake here.

Create the New Libraries

Submit the M50DISK job to allocate a new set of libraries with the new installation version identifier and copy the current libraries to the new libraries. When this job completes successfully, you will have a new set of product libraries that match the new installation version identifier.

New Versions of JES2

If the new version of IOF is being generated for a new version of JES2, update options member C75ASMJS in the new options library to reference the macro library for your new version of JES2 (SYS1.SHASMAC).

New Target System

If the new version of IOF is being generated for a new MVS target system, update options member C64LINK in the new options library to point to the linklist library for the new target system.

Generate the New Install Library

Submit job M10INIT from the new install library to build the installation jobs in that library. These jobs will be set up so that you can generate and install the product from the new set of product libraries.

Since all of your previous options will be preserved, you will not need to modify the new options library unless you wish to change an option you had specified previously.

Your new set of product libraries is now allocated and initialized. These libraries can be used to generate a new version of the product without disturbing any previous versions of the product libraries.

Note that a small change has been made to M50DISK beginning with release 7F. Now, M50DISK always copies all IOF data sets from the current level to the new level. In older IOF releases, the SOURCE and OBJ data sets were always copied from level 0. The effect of this change is that IOF maintenance and user mods applied at any level will always be carried forward to new levels.

14. Holding Job Printout for IOF

To review the results of a job with IOF, its output must be prevented from printing before the user has a chance to review it. There are two basic approaches that can be used to accomplish this.

The first approach is to simply hold the sysout data sets for a job. In this case, after reviewing the job with IOF, the user can cancel or release it for print.

As an alternate approach, your installation can add a dummy symbolic destination name (such as "TSO", "FETCH", etc.) to the JES2 initialization parms. This symbolic name can be associated with an unused remote number (Rnn) or with an unused local device (Unn). Users can then route their jobs to this destination (with /*ROUTE statements) to prevent them from being printed.

After reviewing such a job with IOF, users can request that IOF route the job's output to a real JES2 print destination (LOCAL, etc.) with the IOF "PRINT" function. IOF provides a profile option that allows users to supply their default real print destination, eliminating the need to supply the destination each time that they ask IOF to print a job. To set a default print destination, the user enters "P.1" on the *IOF Option Menu*.

If you use this approach to holding jobs, you may need a way to eliminate old jobs from your queue. See Chapter 25 for information about canceling old output from your spool.

15. IOF Diagnostic Aids

IOF Technical Support is available to assist you if you have trouble installing, tailoring, or running IOF. Additional help can be obtained from the IOF virtual help desk on the Internet at http://www.triangle-systems.com. Many common problems can be solved quickly and easily without assistance using the virtual help desk.

IOF Audit

An audit of local options and modifications is very useful to IOF Technical Support. The audit saves both the customer and tech support personnel time by expediting the problem solving process.

To run an audit, go to the *IOF Option Menu*, enter "IOFAUDIT", and follow the prompts to build an audit report. Then, follow the instructions to send a copy of the report via email or FTP to IOF Technical Support.

IOF Abends

You may have to contact IOF Technical Support if you experience an abend situation. IOF normally produces a seven to twelve line diagnostic area whenever it abends. This diagnostic information displays at the terminal and also in SYSLOG. The diagnostic information displayed is often all that is required by IOF Technical Support to diagnose a problem. If you are making modifications to IOF exits or source code, knowledge of the diagnostic area format will also be useful to you.

```
     IOF 8E0 ABEND DIAGNOSTIC AREA                        99200.1423
1 0000   840C1000  001107E2  001D050C  000CFFFF  *d......S........* <--- abend, coded PSW/R14
2 0010   05985DDC  D01407FE  000090EC  D00C0700  *.q) :.......:...* <--- PSW addr, 12 PSW bytes
3 0020   071C0000  85985DE2  00020001  00054F00  *....eq)S......|.* <--- PSW, lng, intcode, xadr
4 0030   00000000  05A6FE66  05A6FE28  05A6FE28  *.....w...w...w..* <--- R0  R3  Regs at time
5 0040   00000001  00000000  05A98250  05A982BC  *.........zb&.zb.* <--- R4  R7  of abend.
6 0050   0598586C  8598CEFC  8598CDCE  05A6EE80  *.q.%eq..eq...w..* <--- R8  R11
7 0060   0598CD08  05A6F50C  8598C214  05985DE0  *.q...w5.eqB..q):* <--- R12 R15
```

Line 1 contains the abend code, the coded PSW and coded R14 at the time of the abend. The PSW and R14 are coded so that they can be used to determine where the abend occurred in IOF without the need of a link edit map. In the first example above, line 1 col 1 contains 840C1000 indicating an S0C1 abend occurred. The coded PSW is 001107E2 which indicates that the

PSW was in the csect GLOBCMND at displacement 7E2 at the time of the abend. The coded R14 is 001D050C which indicates that the contents of R14 is an address that points into the csect EASYINP at displacement 50C.

Line 2 contains the twelve bytes of data surrounding the PSW. Lines 3 through 7 contain the PSW, instruction length, interrupt code, translation exception address, and the 16 registers in effect at the time of the abend. If the abend occurs inside an SVC, there will be 5 additional lines containing another set of PSW and register that look like lines 3 through 7.

The following list provides some of the more common csect codes for user modifiable code:

```
JOBACESS  0704xxxx  JESCTL  0411xxxx  SELSETUP  0420xxxx
```

where xxxx is the displacement inside the csect.

Determining the IOF Version

The **VERSION** command can be entered from any IOF panel to display the version of IOF that is currently being executed in the short error message area at the top of the screen. The **HELP** command will then display a long message which includes the date and time the user options module was link edited.

IOF Trace Facility

IOF has extensive trace facilities to help you determine why specific users are allowed (or not allowed) to perform specific IOF functions. IOF group assignment, function validation, and links to the system security system are examples of important functions that may need to be traced in a specific situation.

IOF trace information is written to an output file with a DD name of $IOFLOG$. This file must be allocated before the trace can be started. The **TSITRACE** command is used to activate tracing and select tracing options.

The **TRACE** command provides a simple way to trace IOF functions. It invokes a clist that automatically allocates a sysout trace data set and then issues a **TSITRACE** command to activate tracing. It also automatically browses the trace data set when you turn off tracing.

The **TSITRACE** and **TRACE** commands are described below. By comparing the examples you can see that **TRACE** is much easier to use.

TSITRACE Command

The **TSITRACE** command is used to start or stop tracing and allows you to select specific types of trace entries:

```
TSITRACE[GROUP/INIT/VALIDATE/ALLOW/ACF]
[/OFF]
```

Specifying one or more of the GROUP, INIT, VALIDATE, ALLOW, and ACF parms activates IOF tracing and selects the type of tracing desired:

GROUP	Traces the assignment of a user to an IOF group. See the below examples.
INIT	Traces global permissions assigned based on session start parms. (JOBNAME, DEVICE, etc.)
VALIDATE	Traces requests to permit specific IOF functions.
ALLOW	Traces evaluation of individual ALLOW macros.
ACF	Traces all calls to external security system (RACF, etc.)

Specifying "OFF" turns off tracing and closes the trace data set.

All examples below assume that a trace data set has been allocated to DD name $IOFLOG$.

Example 1. Trace the assignment of a user to an IOF group.

From any IOF panel enter:

```
TSITRACE GROUP
IOFNEST
END
TSITRACE OFF
```

Example 2. Determine why a user can (or cannot) specify a particular job name.

From the *IOF Option Menu* enter:

```
TSITRACE INIT ALLOW
```

Key the desired job name in the JOBNAME field and press enter.

```
TSITRACE OFF
```

Example 3. Determine why a user can (or cannot) select a particular job for review.

From the *IOF Job List Menu* enter:

```
TSITRACE  VALIDATE ALLOW ACF
```

Select the job in question

```
TSITRACE OFF
```

TRACE Command

The **TRACE** command provides a simplified way to do tracing under IOF. It invokes a clist to automatically allocate a sysout trace data set and activate tracing. The **TRACE** command is not available under CICS.

The **TRACE** command with no parms automatically turns on tracing for GROUP, INIT, VALIDATE, ALLOW, and ACF. It also has a SYSOUT(c) parm to allow you to specify the sysout class for the trace data set (the default is SYSOUT(A)).

When the **TRACE** command is used to turn off tracing, it will automatically browse the trace data set.

The examples below assume that no trace data set has been allocated. In each case the last **TRACE** command will place you in browse for the trace data set.

Example 1. Trace the assignment of a user to an IOF group.

From any IOF panel enter:

```
TRACE GROUP
IOFNEST
END
TRACE
```

Example 2. Determine why a user can (or cannot) specify a particular job name.

From the *IOF Option Menu* enter:

```
TRACE
```

Key the desired job name in the JOBNAME field and press **ENTER**.

```
TRACE
```

Example 3. Determine why a user can (or cannot) select a particular job for review.

From the *IOF Job List Menu* enter:

```
TRACE
```

Select the job in question.

```
TRACE
```

Displaying IOF Options and Variables

IOF has many displayable options and variables. The **DVAR** command lists many of the options that have been selected, and documents the IOF option

library member name in which the option is set. It will be instructive to enter **DVAR** to see the options that have been selected for a user.

Syntax

```
DVAR    /iof-var-name/
```

iof-var-name. Any IOF variable name, including variable names that are defined by the user with **SETPVAR** and **SETLVAR** commands. If no parm is specified, several menus of IOF variables will be displayed.

DVAR displays several columns of information for each variable:

NAME	The IOF variable name
VALUE	The current value of the variable
FROM	The pool from which the variable is fetched
OPTION	The IOF OPTION member in which the variable is set
Description	The description of the variable

Determining Where IOF Modules Reside

For IOF/TSO, the IOF and IOFSPF load modules can reside in a STEPLIB, LINKLIB, or LPALIB. For IOF/CICS, the IOFCIC module must reside in a CICS load library that is part of the CICS DFHRPL concatenation. All other IOF modules must reside in a LINKLIB or LPALIB. IOF modules can sometimes exist in multiple libraries which can be confusing when applying maintenance or updating the product.

The **IOFWHERE** command can be issued from TSO READY or from ISPF Option 6 to list the libraries where all the active IOF load modules reside. From TSO READY or ISPF Option 6 enter:

```
%IOFWHERE
```

IOF/CICS users must invoke IOF with the FINDMOD parameter. From CICS enter:

```
IOF /FINDMOD      or
IOF /FINDMOD(M)   to locate the "main" module
IOF /FINDMOD(A)   to locate the "auxiliary" module.
IOF /FINDMOD(U)   to locate the "user options" module.
IOF /FINDMOD(P)   to locate the "panel" module.
```

File Concatenation Utilities

IOF provides several file utilities for use in displaying and changing the data sets and members concatenated to a DDNAME. These utilities are written in Rexx and can be invoked from TSO READY, from ISPF Option 6, or by using the TSO command.

These utilities can be used to list and update ddname concatentations for SYSPROC, SYSEXEC, ISPLLIB, ISPPLIB, and other ddnames dynamically. When updating ISPF libraries, you must restart ISPF to make the changes effective.

IOFLISTF Command

TSO users often do not know what data sets are currently allocated to a file name (DDNAME) for their TSO sessions. This information may be essential when debugging TSO commands or ISPF dialogs.

IOFLISTF will list all the data sets currently concatenated to a DDNAME in the order of concatenation.

Syntax

```
IOFLISTF   ddname
```

ddname. The DDNAME to be listed.

Examples

From Option 6 or TSO Ready:

```
IOFLISTF SYSPROC
IOFLISTF       (you will be prompted to enter a ddname)
```

From IOF or another ISPF application:

```
TSO IOFLISTF ISPMLIB
```

IOFFINDM Command

When debugging a TSO command or ISPF dialog, it is often necessary to find the data set where a member resides. **IOFFINDM** will check all the data sets concatenated to a ddname and list the names of the data sets that contain the member in question.

Syntax

```
IOFFINDM  ddname  member  /FIRST/
```

ddname. The DDNAME to be checked.

member. The PDS member name to be found.

FIRST. List only the first data set containing the member.

Examples

From Option 6 or TSO Ready:

```
IOFFIND ISPPLIB ISR@PRIM
IOFFIND SYSEXEC     (you will be prompted to enter a member)
```

From IOF or another ISPF application:

```
TSO IOFFIND SYSPROC IOFLISTF
TSO IOFFIND   (you will be prompted for ddname and member)
```

IOFADDC Command

IOFADDC will add a data set to either the front of the concatenation or to the end. If the data set is already in the concatenation, it will be moved either to the first or last.

Syntax

```
IOFADDC   ddname dsname /HEAD/TAIL/DUPLICATES/NL/
```

ddname. The DDNAME to be changed.

Dsname. The data set name to be added. Multiple dsnames can be specified if enclosed within parenthesis.

HEAD. The default; concatenate to the front.

TAIL. Concatenate to the end.

DUPLICATE. Concatenate data set even if already in the list.

NL. Do not list the new concatenation.

Examples

From Option 6 or TSO Ready:

```
IOFADDC SYSPROC 'SYS2.IOFT8E0.CLIST'
IOFADDC ISPLLIB MY.LOADLIB TAIL NL
```

IOFREMC Command

Data sets can be removed from a DDNAME concatenation with the **IOFREMC** command. Either the first data set, last data set, or specific data set name can be removed.

Syntax

```
IOFREMC   ddname  /HEAD/TAIL/DA(dsname)/NL/
```

ddname. The DDNAME to be changed.

HEAD. The default; remove the first data set from the concatenation.

TAIL. Remove the last data set from the concatenation.

DA(dsname). The explicit data set name(s) to be removed.

NL. Do not list the new concatenation.

Examples

From Option 6 or TSO Ready:

```
IOFREMC SYSPROC   (remove first SYSPROC data set)
IOFREMC ISPLLIB DA(MY.LOADLIST) NL
```

16. Dumping the JES2 Control Blocks

The **DUMPCB** line command can be used on the *IOF Job List Menu*, *Output Group Display,* or *IOF Job Summary* to dump the control blocks for a job, output group or data set. Enter the **DUMPCB** primary command on the *IOF Job Summary* to dump the control blocks for that job. You will be placed in IOF browse with the JES2 control blocks displayed. You can use any of the normal IOF browse features to scroll, find character strings, or SNAP information to a printer or external data set.

The following operands are supported on the **DUMPCB** command:

- **DATA(JES2-data-set-number)**. Specifies the internal JES2 sysout (or sysin) data set number for a spool data set whose data blocks are to be displayed in dump format.
- **MTTR(JES2-mttr)**. Specifies the JES2 "MTTR" of a spool block to be dumped. The full eight character JES2 MTTR must be specified.
- **WIDE**. Specifies that wide dump format should be used if IOF is running on a narrow (80 column) terminal. This option is useful if you want to SNAP the data to a wide printer while using a narrow terminal.

For example, to dump the data block at disk MTTR address 01023F07:

```
3 DUMPCB MTTR(01023F07)
```

The **DUMPCB** line command on the *IOF Job Summary* displays the appropriate control blocks for the selected sysout data set. DUMPCB cannot be used from the Job Summary in a CICS environment.

17. Performance Considerations

The suggestions below are optional but are recommended for running IOF in a production environment.

The module IOFTvvvM (where vvv is the version identifier) should be placed in the pageable link pack area.

The modules IOFTvvvU and IOF should not be placed in the link pack area. IOFTvvvU contains most of the product options (including the expiration date). The IOF module will not load properly from the link pack area.

The remaining load modules optionally can be placed in the link pack area. Note that the IOFvvvA module operates in a 24-bit addressing mode and must load below the line.

18. Product Load Module Naming Conventions

There are two categories of load modules used in the IOF product. In the first category are IOF and IOFSPF, load modules whose names must be known by end users. The users must know the name IOF because it is the name of the command that is entered from TSO READY.

The name IOFSPF is exposed to the users because it is the module name that is selected from an ISPF panel to invoke IOF under ISPF. Since these modules represent the user interface to the product, their names should always be IOF and IOFSPF for the current production version of the product.

The IOF load module can be executed from a link list library or from a STEPLIB library in your TSO logon procedure. The IOFSPF load module can be executed from a link list library, from a STEPLIB library in your TSO logon procedure, or from an ISPLLIB library in your TSO logon procedure.

In the second category of modules are IOFTvvvM, IOFTvvvA, IOFTvvvU, and IOFTvvvP, load modules that must be invoked from a link list library (or the link pack area). The "vvv" in the module names represents the version identifier for the modules. End users do not need to know the names of these modules as their names change with each new version of the product.

When a particular version of the product is generated, the IOF and IOFSPF load modules for that version are initialized to invoke the correct IOFTvvvM, IOFTvvvA, IOFTvvvU, and IOFTvvvP modules for that version. This means that even though the load module names will always be IOF and IOFSPF, each of these modules is internally associated with a specific version identifier of the product.

For example, the IOFSPF load module that is generated for version "8E0" will always invoke modules IOFT8E0M, IOFT8E0A, IOFT8E0U, and IOFT8E0P.

This naming convention allows a simple testing procedure for new versions of the product. The IOFTvvvM, IOFTvvvA, IOFTvvvU,and IOFTvvvP modules can safely be copied into the link list, since their names are guaranteed not to conflict with the product load module names for previous versions.

Then, by using a STEPLIB for your new IOF and IOFSPF modules, you can completely test the new version. The install library contains jobs that are specifically designed to install new releases for test in this manner. (See Chapter 6 for more details.)

19. Entering MVS and JES2 Commands

For a user with OPERATOR privileges, to enter a JES2 command from any IOF screen, enter "**$**" followed by the command:

```
$DA
```

To enter an MVS command, enter "#" followed by the command:

```
#D T
```

Entering an MVS or JES2 command under IOF will automatically take you to the IOF Extended MCS console. See Chapter 13 of the ***IOF User's Guide*** for more information about IOF Extended MCS console support. Each user can enter the **AUTOCON OFF** command to disable automatic console. **AUTOCON ON** re-enables automatic console.

You can enter a command and then position automatically to the command in the system log by using the "**<**" command. For example:

```
<$DA
```

or

```
<D T
```

The "**<**" command will issue the desired command and find the command in the system log so you can easily see its output.

To enter a command (with "**<**") that includes single quotes (apostrophes), you must specify two apostrophes for each apostrophe desired in the command:

```
<$D''PAYROLL''
```

Enter "#" with no parameters to display the *MVS and JES Commands* panel. This panel allows long commands and saves the last thirty-two commands issued for reselection.

20. The IOF External Writer

There are a number of applications that require data from the JES2 spool to be read and stored in a non-spool data set. The IBM External Writer provides a primitive ability to copy spool data to a data set. The IOF External Writer overcomes many restrictions imposed by the IBM writer.

You can select data to be copied based on many JES2 sysout data set characteristics (CLASS, FORMS, UCS, FCB, age, generic job name, etc.). You also have the option to copy the spool data without deleting it from the spool. You can leave it on the spool with a different sysout attribute (class, etc.) to prevent it from being re-selected by the writer.

Also, the IOF External Writer produces a complete report of all the data that was copied. This can be useful in tracking the flow of reports through your system.

The following procedure can be used to invoke the IOF Writer:

```
//IOFWTR   PROC  CLASS=x,OPT=                          <=== Sysout
//IOFWTR   EXEC  PGM=IKJEFT1B,PARM='IOFWTR &OPT'             class
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name      <=== Clist
//SYSTSPRT DD    SYSOUT=&CLASS                              library
//SYSTSIN  DD    DUMMY
```

The job below will copy all sysout class X output groups to the data set named by DD OUTPUT and then cancel them:

```
//CLASXWTR JOB  acct,name,TIME=5,
//              USERID=authid,              <=== Authorized userid
//              PASSWORD=password,
//WTR      EXEC IOFWTR,
//         OPT='CLASS(X),DDNAME(OUTPUT),DISP(CANCEL),PAUSE(0)'
//OUTPUT   DD   output.data.set.specs
```

The **PAUSE(0)** above will copy the groups that are on the spool, cancel them, and then terminate. If you request a non-zero PAUSE value, the writer will pause the designated number of seconds and then repeat the process. It will continue its pause/process loop until you cancel it.

The IOFWTR procedure has a number of other options that also can be included in the OPT= parameter. The IOF clist IOFWTR describes these options. IOFWTR can be used by end users to process output of jobs that they own. IOFWTR is subject to the same IOF access control as terminal IOF users.

21. Local Data Set Name Prefixing

If a data set name is specified in the **SD** command (or on the SD interface panel) without enclosing it in apostrophes, IOF will prefix the name with the user's current profile prefix character string. This prefixing is done in the source module DSNQUAL, which is included in the IOF source library.

Options member B54SNPDS describes other options that can be used to control snap data set names.

22. Sample IOF Modifications

The sample modifications in the IOF sample modifications library were contributed by IOF customers and have not been installed or tested by our technical support staff. They are provided as potentially useful indications of how you might approach the job of modifying IOF to accomplish certain installation objectives.

The member $INDEX contains a list and brief description of the modifications contained in the library.

23. ISPF Command Table Entry for IOF

If you would like your ISPF users to be able to invoke IOF as a nested dialogue under EDIT, BROWSE, or other ISPF applications, you can add the following command table entry to your ISPCMDS command table:

```
VERB   :  IOF
ACTION :  SELECT PGM(IOFSPF) PARM('&ZPARM') NEWAPPL(IOF) NOCHECK
```

24. Managing Output on the Spool

IOF provides a flexible mechanism for analyzing your spool and purging old output. The procedure below can be used to analyze your spool and optionally purge old output jobs:

```
//OUTQUE   PROC  CLASS=x,OPT=                          <=== Sysout
//OUTQUE   EXEC  PGM=IKJEFT1B,PARM='OUTQUE &OPT'             class
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name      <=== Clist
//SYSTSPRT DD    SYSOUT=&CLASS                             library
//SYSTSIN  DD    DUMMY
```

The job below will find all the jobs matching the requested criteria and produce a report of all the matching jobs:

```
//SCAN     JOB  acct,name,TIME=5,
//              USERID=authid,              <=== Authorized userid
//              PASSWORD=password
//SCAN     EXEC OUTQUE,
//         OPT='AGE(10),DEST(LOCAL),JOBNAME(PROD*)'
```

This job will produce a report of all jobs that are 10 days old, have a dest of LOCAL, and whose names begin with "PROD". An output listing produced by OUTQUE for all jobnames beginning "PROD" sorted by destination is shown below.

```
Output Job Queue Utility Listing      Run at 15:40:17 on 07/29/93                        PAGE 1
Run parameters are SYSOUT(X) ACTION(LIST) JOBNAME(PROD*) SORT(DESTDEV) CTLBRK

Jobname   Jobid    Acct    Dest     User name  Time run  Date      Notify  Helds  Inputdev Alloc
PRODNIT   J01970   ISIS    FETCH    SCHUBERT   10:36     7/29/93   ISOFVS         INTRDR       2
PRODEN    J01975   ISIS    FETCH    SCHUBERT   10:41     7/29/93   ISOFVS         INTRDR      43
PROD3245  J01984   ISIS    FETCH    SCHUBERT   10:49     7/29/93   ISOFVS         INTRDR       7
*** 3 Jobs for DESTDEV FETCH                                                      ****** 52

PRODNIT   J05672   JFW     LOCAL    WALKER     17:16     7/03/92   ISIJFW     4   INTRDR       2
PRODEN    J05731   JFW     LOCAL    WALKER     15:31     7/06/92   ISIJFW    16   INTRDR      17
PROD7666  J07230   JFW     LOCAL    WALKER     16:11     7/06/92   ISIJFW     4   INTRDR       2
PRODAN    J07272   JFW     LOCAL    WALKER     16:42     7/06/92   ISIJFW    16   INTRDR      17
*** 4 Jobs for DESTDEV LOCAL                                                      ****** 38
*** 7 Grand Total Jobs ***                                                        ***** 126
```

To purge these jobs, add **CANCEL** to the OPT= parm in the above JCL and re-submit the SCAN job.

The OUTQUE procedure has a number of other options that also can be included in the OPT= parameter. The IOF clist OUTQUE describes these options.

The OUTQUE function displays or cancels entire jobs. The IOFLISTG clist allows you to display or cancel individual output groups. See the comments

in the IOFLISTG clist for more information. The example below cancels all output groups that are more than 4 days old.

```
//CANOLDTS PROC
//LISTG    EXEC  PGM=IKJEFT1B,
//          PARM='IOFLISTG AGE(4) HELD(YES) CANCEL'
//SYSPROC  DD    DISP=SHR,DSN=clist.library.name   <=== Clist
//SYSTSPRT DD    SYSOUT=A                                library
//SYSTSIN  DD    DUMMY
```

25. IOF Job Archival and Retrieval (IOF/JOBARC)

IOF job offload and archival facilities (IOF/JOBARC) provide an easy and inexpensive method of offloading output jobs from the system. Jobs can be selected for offloading based on any job identification or characteristic, including jobname, username, ownerid, age and destination. IOF/JOBARC maintains a detailed catalog of offloaded jobs that can be used for selecting jobs for uploading.

IOF/JOBARC uses the IOF programmable interface to JES2 to drive and control the JES2 offloader devices. JES2 offloader sysout transmitters and sysout receivers execute the physical offload and upload functions. Jobs are offloaded in NJE format, thus all job and sysout characteristics of the data are kept.

The job archival function of IOF/JOBARC runs as a batch job or started task. It can be run on a periodic basis and/or on an emergency basis when the JES2 spool system approaches saturation. The job retrieval function is initiated from a full screen ISPF display that makes it easy to select jobs to be uploaded.

IOF/JOBARC Data Sets

Two types of data sets are maintained by IOF/JOBARC. Each offload run produces one directory and one offload data set.

- **Directory Data Sets** contain one line of detailed information about each offloaded job. The information includes jobname, owner, notify, username, date/time the job was run, date/time the job was offloaded, number of steps, number of lines of output, the highest completion or abend code, and the name of the offload data set.
- **Offload Data Sets** contain the offloaded jobs. They are written by a JES2 offloader in NJE format. Each offload data set usually contains many offloaded jobs.

IOF/JOBARC Installation Considerations

- **B34OFFLD Option**. The major IOF/JOBARC options are defined to the system in the B34OFFLD member of the IOF options library. All options are shipped with default values. An abbreviated IOF generation as defined in Chapter 4 is required to change B34OFFLD options.

- **Clist Library**. IOF/JOBARC commands are implemented as TSO clists. All IOF/JOBARC clist names begin with the characters "JAR".
- **Panel Library**. The job retrieval function of IOF/JOBARC uses 11 ISPF panels with panel names all beginning "VIOFUP".

IOF/JOBARC Cataloged

The JOBARC cataloged procedure shown below can be used by all IOF/JOBARC functions to run as a batch job or started task. You must add this procedure to the proclib data set that will be used to run IOF/JOBARC jobs. Change the SYSPROC statement to point to your IOF clist library.

```
//JOBARC   PROC CLASS=X
//BATCHTSO EXEC PGM=IKJEFT1B,DYNAMNBR=50
//SYSPROC  DD   DISP=SHR,DSN=iof.clist.library    <===clist
//SYSTSPRT DD   SYSOUT=&CLASS
```

Using the OFFLOAD Command to Archive Jobs

The **OFFLOAD** command on the *Job List Menu* causes all the jobs currently listed on the menu to be offloaded. Jobs which have been excluded from the menu with the **EXCL** command will not be offloaded. The **OFFLOAD** command is a good way to initiate special purpose offloading.

Simulating an Archival (Offload) Run

The following JCL will make a report of all jobs with jobnames beginning "TS" that are more than five days old. The offloader is not invoked because the SIMULATE parm is specified.

```
//OFFCHK   JOB  ....
//SIMULATE EXEC JOBARC
//SYSTSIN  DD   *
JAROPEN   SIMULATE  SYSOUT(A)
JAROFFLD  JOBNAME(TS*)    AGE(5)
JARCLOSE
/*
```

The JAROPEN statement specifies that this is a simulated run and allocates the report to sysout class A. The JAROFFLD statement specifies the jobname and age parms. The JARCLOSE statement closes the report and does general cleanup. The full list of IOF/JOBARC commands and parms are described in detail in the section below, ***IOF/JOBARC Command Syntax***.

You might want to make several simulated runs with parms that make sense at your installation at this point before proceeding to do an actual offload run.

Periodic Offloads

IOF/JOBARC can be used to periodically cleanup the spool by offloading old jobs from the system. Periodic offload automatically can be scheduled daily, several times a week, weekly, or at other regular intervals as required.

The following job will offload jobs that are at least 7 days old unless the jobname begins with "PR". The jobs will be offloaded to a 3480 cartridge. The offloader number and data set name prefix to be used are specified in the B34OFFLD IOF options member but could have been overridden on the JAROPEN statement. This job can be automatically submitted on a periodic basis to offload jobs meeting the specified criteria. The offload report is written to the default sysout class defined in the B34OFFLD option.

```
//JOBARC   JOB    ....
//DUMPJOBS EXEC   JOBARC
//SYSTSIN  DD     *
JAROPEN    OFFUNIT(CART)
JAROFFLD   AGE(7)          +
           EXCL1('JOBNAME BG PR')
JARCLOSE
/*
```

We suggest that you dedicate an offloader to IOF/JOBARC. JES2 will offload a job only once on a single offload device. Confusion can result if IOF/JOBARC competes with other offload procedures for a single offloader.

Detailed descriptions of the **JAROPEN**, **JAROFFLD**, and **JARCLOSE** commands are provided in the below section, ***IOF/JOBARC Command Syntax***.

The date and time the job is run are included in the directory and offload data set names that are automatically generated by **JAROPEN**. For example, if the job above were run at 1:30 on September 23, 1993, it would generate the following data set names:

Directory data set 'SYSIOF.OFFDIR.D93267.T0130.SEP23.OFFRUN'

Offload data set 'SYSIOF.OFFLOAD.D93267.T0130.OFFRUN'

A second example demonstrates offloading all started tasks except the SYSLOG task that are at least one day old.

```
//STCARC   JOB  ....
//DUMPSTC  EXEC JOBARC
//SYSTSIN  DD   *
JAROPEN   UNIT(CART)
JAROFFLD  ASIDTYP(STC)  AGE(1)   EXCL1('JOBNAME EQ SYSLOG')
JARCLOSE
/*
```

An archival example with two **JAROFFLD** commands is shown next. The first command offloads all jobs that are routed to "BLDG7A", are ten days old and use at least twelve track groups of spool space. Jobs that contain the

characters "PAYROLL" or "BUDGET" in the username field, and jobs with ownerid's beginning "PD" are excluded from this offload run.

In addition, a second command is used in this example to offload all jobs that are at least three days old and also have "TST" in positions 5-7 of the jobname . The two **JAROFFLD** commands use the same directory and offload data sets.

```
//JOBARC2  JOB  ....
//DUMPJOBS EXEC   JOBARC
//SYSTSIN  DD   *
JAROPEN
JAROFFLD   AGE(10)   DEST(BLDG7A)   SIZE(12)    +
           EXCL1('USERNAME CT PAYROLL')         +
           EXCL2('USERNAME CT BUDGET')          +
           EXCL3('OWNER BG PD')
JAROFFLD   AGE(3)   JOBNAME(++++TST*)
JARCLOSE
/*
```

Emergency Offloads

IOF/JOBARC can also be used to relieve spool saturation conditions. In emergency situations, jobs may have to be offloaded that would not normally be offloaded by the periodic offload job. The specific offload parms for emergency situations usually depend on the severity of the spool saturation.

The SPOOLPC parm allows conditional execution of a **JAROFFLD** command based on the current spool saturation. The JAROFFLD command on which a SPOOLPC parm is coded is executed only if the current spool usage percent is higher than the number specified for the SPOOLPC parm.

The following emergency offload job demonstrates use of the SPOOLPC parm. It offloads jobs that are at least five days old and have jobnames beginning "TES" or having "98" or "99" in the 7th and 8th positions of the jobname. Then if the spool percent is still 85% or higher, all jobs that are ten days old and use ten or more track groups are offloaded. If the spool percent is still not below 85%, all jobs that are eight days old are offloaded.

```
//SPOOLFUL  JOB  ....
//DUMPJOBS  EXEC   JOBARC
//SYSTSIN   DD   *
JAROPEN   OFFUNIT(CART)
JAROFFLD  AGE(5)     JOBNAME('TES*  ++++++98  ++++++99')
JAROFFLD  AGE(10)    SIZE(10)        SPOOLPC(85)
JAROFFLD  AGE(8)                     SPOOLPC(85)
JARCLOSE
/*
```

Archiving Special Applications

There are many requirements for special application offload runs. Copies of jobs from critical applications may need to be archived after printing. Application jobs that do not produce major end-user reports may not need to

be printed at all except for historical purposes. Development teams may need to offload a series of development jobs.

Archiving a copy of all the IOF installation jobs will be used as an example of a special offload. All IOF install jobnames begin with the character "M". The ownerid of the job submitter is maintained independently of the jobname and can be specified in the SCOPE parm. This allows job selection based on both jobname and ownerid. Therefore, the following job can be used to make an archival copy of all the IOF installation jobs submitted by userid "ISIJVR". The suffix "IOFINSTL" is used to clearly distinguish this as a special archival run under the standard prefix.

```
//IOFINST   JOB  ....
//DUMPJOBS  EXEC   JOBARC
//SYSTSIN   DD   *
JAROPEN   PREFIX(SYSIOF)    SUFFIX(IOFINSTL)
JAROFFLD  JOBNAME(M*)   SCOPE(ISIJVR)
JARCLOSE
/*
```

An alternate way to run this same offload is to specify PREFIX(ISIJVR) and take the default suffix. This method requires that user ISIJVR have the authority to control the offloader devices, or that the user who submits the IOFINST job have the authority to create data sets under the level "ISIJVR".

Combining Offload Directories

The directory data sets generated by **JAROFFLD** are clearly named to indicate when the offload run was made. This makes directories easy to identify and use on the *IOF/JOBARC Directory List* panel shown below in the section, ***Uploading Jobs***.

The default suffix for all offload directories and offload data sets is OFFRUN. There can be several OFFRUN directories for a single day; it may be preferable to combine them all into a single daily directory.

The **JARDJOIN** command copies all the offload directory data sets with a specified data set name suffix (last data set name level) to a new suffix. For example, all directories with the default suffix of OFFRUN can be combined into one directory with a suffix of DAILY. Or, all DAILY directories can be combined into a WEEKLY directory. JARDJOIN deletes the old directories after they have been successfully copied.

The following job will combine all the directories with a suffix of OFFRUN into one directory with a suffix of DAILY. The combined directory will contain entries that point to several offload data sets. The format of the combined directory data set name is identical to the original data set name format except that the date and time of the JARDJOIN run is used.

```
//DIRJOIN   JOB  ...
//COMBINE   EXEC   JOBARC
```

```
//SYSTSIN   DD   *
JARDJOIN  OPREFIX(SYSIOF)  OSUFFIX(OFFRUN)      +
          CPREFIX(SYSIOF)  CSUFFIX(DAILY)
```

Deleting Old Directories and Offload Data Sets

The **JARDEL** command deletes old directories and all the offload data sets they reference. Each IOF/JOBARC offload job builds one offload data set and one directory data set. But, **JARDJOIN** commands can combine several directories into one so that combined directories can reference multiple offload data sets. **JARDEL** reads each directory it is deleting in order to also delete all the offload data sets it references.

The sample delete job below keeps 10 weekly directories and deletes older directories and their associated offload data sets.

```
//DIRDEL    JOB  ...
//COMBINE   EXEC   JOBARC
//SYSTSIN   DD   *
JARDEL  PREFIX(SYSIOF)  SUFFIX(WEEKLY)  CYCLES(10)
```

Note that directories can also be deleted manually on the *IOF/JOBARC Directories List* panel shown below in the section, ***Uploading Jobs***. However, this method requires manual intervention and confirmation of each deleted data set.

Uploading Offloaded Jobs

The **UPLOAD** command can be entered on any IOF panel (under ISPF) to invoke a display of offloaded jobs.

Users can select specific jobs for upload from this display. The actual uploading is performed by a batch job, or optionally by a started task. The upload method is specified in the B34OFFLD IOF option. The two methods are:

SERVER=NO.	A batch job is automatically submitted by the upload dialogue to upload one or more offloaded jobs.
SERVER=YES.	Upload transactions are queued to an upload server task. The server task can be started periodically to process all queued transactions. Or, it can be a non-terminating started task that continuously monitors the transaction queue for upload transactions.

The specific method chosen will depend on several factors, including the number of upload transactions that are being processed. It may be best initially to use the batch submit method of uploading and convert to the server as upload activity increases.

Note that the submitted job is run under the userid of the user who executes the **UPLOAD** command. This userid is required to have full update access to the JES2 offloader devices. For this reason, a systems programmer or other authorized person is usually required to upload jobs using the SERVER=NO method.

Upload Server Task

If you select the server option by specifying SERVER=YES in B34OFFLD, you must run the JARSERVR task to process the upload transaction. You can override JARSERVR parms to set your parameters. The JARSERVR clist PROC statement with default parms is shown below.

```
PROC 0          /* --------Parm Description --------------------*/+
  PAUSE(0)      /* Pause seconds when done.  0 means terminate. */+
  OFFNBR()      /* Offloader number.  Which offloader to use.   */+
  WTR()         /* WTRID of transactions.                       */+
  DISP(CANCEL) /* Disposition of processed transactions.       */+
  TEST          /* Trace clist execution.                       */+
                /*----------------------------------------------*/
```

The PAUSE parm value of zero means that JARSERVR will terminate after it has processed all queued upload transactions. A non-zero PAUSE value causes JARSERVR to run continuously. It pauses the specified number of seconds after processing all queued transactions, then searches for new transactions to process. For example, if you specify PAUSE(120), JARSERVR will wait 2 minutes between upload batches.

Parm values for OFFNBR and WTR are not normally required. The values specified for the OFFNBR and WTR parms in B34OFFLD will be used if these clist parms are null.

DISP(CANCEL) causes upload transactions to be deleted after they have been processed. If any value other than CANCEL is specified for DISP, the WTRID of processed transactions will be changed to the DISP value after the transaction has been processed.

When PAUSE(0) is specified, the server task can be started periodically by the JES2 automatic operator commands. The non-terminating task can be started by system fireup procedures. The following JCL can be used to run a non-terminating server started task. Note that the PAUSE value is specified in the EXEC statement PARM.

```
//JARSERVR  PROC
//BATCHTSO  EXEC  PGM=IKJEFT1B,PARM='JARSERVR PAUSE(120)'
//SYSPROC  DD  DISP=SHR,DSN=iof.clist.library
//SYSTSPRT DD  SYSOUT=A
//SYSTSIN  DD  DUMMY
```

End users are not required to have access to the JES2 offloader devices in order to be able to upload jobs using the server. For this reason this method may be required if no operations personnel are available to perform this type of service, or if many upload operations are required.

Uploading Jobs

Job retrieval is initiated by entering the **UPLOAD** command on any IOF panel. Note that IOF must be running under ISPF for this command to work because it utilizes ISPF table services.

```
------------------------ IOF/JOBARC Upload Utility --------------------------
COMMAND ===>

     Enter the IOF/JOBARC Directory Data Set Name level below.
     A list of all data sets beginning with this level will be displayed.
     Normally the second level of the dsname level should be "OFFDIR".

     DSNAME LEVEL ===> SYSIOF.OFFDIR

     If a fully qualified data set name is specified in the dsname level
     above, the list of directories will be skipped and the list of jobs
     stored in the directory will be displayed directly.

     Jobname ===>               Owner ===>

     Enter level and optionally prefixes above and press ENTER
```

The **UPLOAD** command causes the panel above to be displayed. You must enter the data set name prefix for the offload directory data sets you wish to display in the "DSNAME LEVEL" parm field. Since we have been using SYSIOF as the data set name prefix in our examples and the second level of directory data set names is OFFDIR, we enter "SYSIOF.OFFDIR" in this field. Pressing **ENTER** causes the data set names that begin "SYSIOF.OFFDIR" to be displayed.

```
----------------------- IOF/JOBARC Directory List --------------- Row 1 of 11
COMMAND ===>                                          Scroll ===> PAGE

Line Commands: I - Include directory in offloaded jobs list.
               D - Delete directory and all offload data sets it references.
               U - Upload all jobs listed in the directory.

-----Action---Offload Date----Day of Week--Day-Month------Time----Type--------
_              1996/10/10      Thursday     10 October    12:24   OFFRUN
_              1996/08/02      Friday        2 August     13:50   OFFRUN
_              1996/04/12      Friday       12 April      14:36   OFFRUN
_              1995/12/28      Thursday     28 December   16:58   OFFRUN
_              1995/10/12      Thursday     12 October    11:55   OFFRUN
_              1995/09/06      Wednesday     6 September  10:44   OFFRUN
_              1995/06/01      Thursday      1 June       15:50   OFFRUN
_              1995/05/01      Monday        1 May        15:57   OFFRUN
_              1995/03/10      Friday       10 March      15:49   OFFRUN
_              1995/01/25      Wednesday    25 January    14:13   OFFRUN
****************************** Bottom of data ******************************
```

The directory data sets are displayed in inverse chronological order so that the most recent directory is displayed first. Each directory contains a list of jobs that have been offloaded. To display the jobs in a directory enter "**I**" in its line action area. Enter "**I**" in multiple action areas to see a display of jobs from several directories.

Normally, you would periodically run the **JARDEL** command to clean up old directories. You also can manually delete a directory and all the offload data sets it references by using the "**D**" line command on this panel. All manual deletes require confirmation.

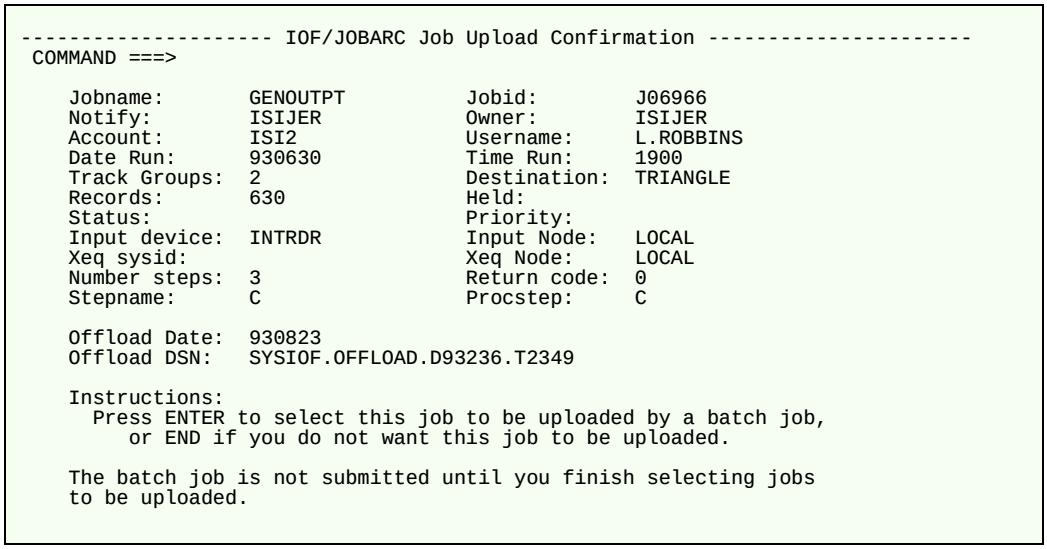
To continue our example, enter "**I**" in the line action area of the AUG23 directory above to cause the panel below to be displayed.

```
------------------- IOF/JOBARC Offloaded Job List --------------- ROW 1 OF 55
COMMAND ===>                                                Scroll ===> CSR

 Specify generic selection field parms below to limit the jobs displayed.
 Line Commands:  S  (Select for upload)   U  (Upload with no confirmation)

 JOBNAME ===>             DATE    ===>             SORT    ===> DATE
 OWNER   ===>             DATEOFF ===>             SORTSEQ ===> D    (A or D)

   Act Jobname  Jobid  Notify  Owner    Username Run-Date  Retn Code Off-Date
_      SLOGSOME J09966 _       ISIJFP   J.PRESTWO 930803      0      930823
_      SLOGALL  J09967 _       ISIJFP   J.PRESTWO 930802      0      930823
_      DUMPT    J08146 ISIJFP  ISIJFP   J.PRESTWO 930802      0      930823
_      CICSDMPA J07167 _       ISIJFP1  PRESTWOOD 930801      0      930823
_      XTESTA   J05990 ISINRM  ISINRM   WALKER    930801     12      930823
_      MODID7B  J05624 _       ISIJFP   PRESTWOOD 930725      8      930823
_      XSIDRACF J04874 _       ISIJFP   J.PRESTWO 930720      0      930823
_      XIT1DFLT J04875 _       ISIJFP   J.PRESTWO 930719      1      930823
_      TESTDEV  J02837 ISIJFP  ISIJFP   J.PRESTWO 930719      0      930823
_      DEVICE   J02869 ISIJFP  ISIJFP   J.PRESTWO 930718      0      930823
_      COMPJ2I  J06268 ISIJFP  ISIJFP   J.PRESTWO 930714     28      930823
_      COMPJ2I  J02216 _       ISIJFP1  J.PRESTWO 930713     28      930823
_      $TEST2   J02235 _       ISIJER   L.ROBBINS 930713      0      930823
_      ASMJES   J01061 _       ISIJFP   PGMRNAME  930710      0      930823
_
```

This panel can be scrolled up and down to search for a specific job. The list of jobs can be refined by specifying generic values in the JOBNAME, OWNER, DATE, and DATEOFF fields. For example, entering "S*" in the JOBNAME field causes only jobnames beginning with the character "S" to be displayed. Entering "ISIJER" in the OWNER field causes only jobs owned by userid ISIJER to be displayed. Entering "9308*" in the DATE field causes only jobs that ran during August 1993 to be displayed. Additional directories can be included on the display by pressing **END** to return to the previous panel. Then, select one or more directories to be added to the display.

The list of jobs can be sorted on any field on the extended display by entering the field name in the SORT field. Some valid sort names are JOBNAME, JOBID, OWNER, NOTIFY, USERNAME, DATERUN, DATEOFF and MRC (maximum return code).

The "**S**" and "**U**" line commands can be entered for one or more jobs. The "**S**" command causes the *IOF/JOBARC Job Upload Confirmation* panel to be displayed. It displays additional information about the job and requests confirmation that the job should be uploaded. The "**U**" command causes the job to be selected for upload without going through the confirmation panel.



Several jobs can be selected for upload, but the upload process is not started until the **END** key is pressed on the *IOF/JOBARC Offloaded Job List* panel. If the SUBMIT upload method was selected, when **END** is pressed, you will be given the opportunity to verify the JCL of the upload job and one last chance to cancel the submit of the upload job. If the SERVER option was selected, the upload transactions will be queued.

IOF/JOBARC Command Syntax

TSO command syntax rules apply to all IOF/JOBARC commands. Commands can be continued to a new line by terminating the continued line with the "+" or "-" character. Most parms are keyword parms. Some parms require values to be entered in parenthesis following the keyword name. The default values for parms are shown in parenthesis in the descriptions below.

JARCLOSE Command

Function: Terminate an archival run. All archival data sets are unallocated and freed. The JES2 offloader devices are reset. Note that this reset function will not be performed by job termination if the **JARCLOSE** command is not executed. It is very important to always end an archival run with JARCLOSE.

Parms: None

JARDEL Command

Function: Delete IOF/JOBARC directories and all the offload data sets referenced based on the directory prefix, suffix, create date and/or on the number of cycles to keep.

Parms:

CYCLES( ). Number of cycles to keep. If specified, that number of directories will be kept. Older directories at the specified level will be deleted. Either **CYCLES** or **DELDATE** should be specified but not both.

DELDATE( ). Delete date. If specified, data sets that were created before the specified date in yyyy.ddd format will be deleted. For example, DELDATE(1993.262) deletes all directories created before September 18, 1993. **DELDATE** should not be specified if **CYCLES** is specified.

PREFIX( ). High level of the offload directory data set names to be deleted. This parm is required.

SIMULATE. If specified, data set deletion is simulated by a message and no data sets are actually deleted.

SUFFIX( ). Bottom level of the directory data set names to be deleted. This parm is required.

JARDJOIN Command

Function: Combine all IOF/JOBARC directories with a specific suffix into a single offload directory with a new suffix.

Parms:

CPREFIX( ). High level of the combined directory data set name. If this parm is not specified, the value specified in the **OPREFIX** parm will be used.

CSUFFIX(DAILY). Bottom level of the combined directory data set name.

OPREFIX( ). High level of the old offload directory data set names. This parm is required.

OSUFFIX(OFFRUN). Bottom level of the old directory data set names.

SYSOUT(X). Sysout class of SYSPRINT sysout data set.

JAROFFLD Command

Function: Select jobs to be offloaded. A **JAROPEN** command must have been issued before using a **JAROFFLD** command in a job step.

Parms:

AGE( ). Job age in days. If an age is specified, only jobs at least that many days old are processed.

ASIDTYP(JOB/STC/TSU). Type of address space. If not specified, all types of address spaces are offloaded. Valid values are JOB, STC, and TSU. If a value is specified, only that type of address space will be offloaded.

DEST( ). Destination. If specified, only jobs with a matching job print route code will be processed. A list of up to 8 destinations can be specified. The list must be enclosed in quotes and the dests must be separated by spaces or commas.

EXCL1( ). Exclude statement 1. If specified, the operands are used in an IOF exclude statement to exclude jobs with the matching characteristics from processing. EXCL2, EXCL3 and EXCL4 are executed in the same way.

```
Example:   EXCL1('INPUTDEV EQ INTRDR')
```

EXCL2( ). Exclude statement 2.

```
Example:   EXCL2('JOBNAME BG PROD')
```

EXCL3( ). Exclude statement 3.

```
Example:   EXCL3('USERNAME EQ BOSS')
```

EXCL4( ). Exclude statement 4. Any field name in the extended IOF Job List can be used in the exclude statements.

```
Example:   EXCL4('ACCOUNT GT 970')
```

JOBNAME( ). Jobname. Any value that can be entered in the IOF jobname selection field, including generic jobnames with "+" and "*" wildcard characters. A maximum of 8 jobnames can be specified. If multiple jobnames are specified, they must be separated by spaces or commas and enclosed in quotes.

```
Example:   JOBNAME('++99*  PAYR*  BUDSTAT')
```

SCOPE(ALL). IOF scope. Any value that can be specified on the IOF scope parameter, including generic userids, groupids, "GROUP" and "ALL".

SIZE( ). Job size in spool track groups. If a value is specified for size, only jobs that have allocated at least this number of spool track groups will be selected.

SPOOLPC(0). Spool usage percent. The **JAROFFLD** command is conditional on the current JES2 spool usage percent. It will not offload any jobs if the JES2 spool utilization is less than the specified per cent.

JAROPEN Command

Function: Initialize an archival run. The report data set is allocated. The directory and offload data sets are allocated and initialized. The selected JES2 offloader is initialized. A **JAROPEN** command must be used prior to using a **JAROFFLD** command in a job step.

Parms:

DISP(DELETE/KEEP/HOLD). Offloader disposition. **DELETE** means that offloaded jobs are deleted after being dumped. **KEEP** and **HOLD** are also valid options.

LNEPGE(55). Print lines per page for report data set.

OFFLABEL(SL). Offload label type.

OFFNBR(1). Offloader number. Which offloader to use.

OFFPROT(N). Offload SAF protection (**Y** or **N**).

OFFRETPD(999). Offloader retention period.

OFFTRKS( ). Number of primary and secondary tracks to allocate for DASD offload data sets. This parm must be left as null for tape offload data sets because specification of a value causes a dasd data set to be allocated.

OFFUNIT(CART). Offload unit type.

OFFVOL( ). Offload volume serial number.

PREFIX( ). Override the high level of the directory and offload data set names that was specified in the B34OFFLD option. This parm is not used if SIMULATE is specified. The value specified in B34OFFLD is used if SIMULATE is not specified and no prefix is specified.

SIMULATE. If specified, a simulated offload run is made. Simulated runs produce the offload report but do not offload any jobs. Note that the PREFIX, SUFFIX, DIRDSN, OFFDSN, OFFUNIT, OFFVOL, OFFTRKS, OFFLABEL, OFFRETPD, OFFPROT, OFFNBR and DISP parms are ignored for simulated runs.

SUFFIX( ). Override the bottom level of the offload directory data set name that was specified in B34OFFLD. Suffixes can be chosen to meet local requirements. It is suggested that the default of OFFRUN be used for both periodic and emergency offload runs. The following additional suffixes are suggested: DAILY (daily JARDJOIN consolidation of offload directories), WEEKLY (weekly consolidation of daily directories), MONTHLY (monthly consolidation of directories), or any 1 to 8 character application name to define special offload runs.

SYSOUT( ). Sysout class for the report data set. The default value is specified in B34OFFLD.

JARUPLOD Command

Function: Upload one job from an offload data set. This command is issued by the UPLOAD dialogue and is normally not issued directly by users.

Parms: The first two parms are positional.

OFFDSN. The offload data set name. This parm is required and is the first positional parm.

JOBID. The job id of the job to be retrieved. This is required and is the second positional parm.

NOTIFY( ). The notify id of the user to be notified when the job has successfully been uploaded. If this parm is not specified, the notify id from the upload job will be used.

OFFNBR( ). Offloader number. The JES2 offloader to use. If not specified, the value specified in B34OFFLD is used.

Automatic Offload When Spool is Full

The SLAMRUN system log indexing task searches the log for errors and exception conditions. It easily can be modified to detect the HASP050 error message that signals spool saturation and to automatically initiate an emergency IOF/JOBARC offload procedure. The SLAMINST clist is used to define local conditions and can be modified for this purpose.

First, generate an emergency job offload catalogued procedure that can be started with an MVS start command. This procedure is identical to the

JOBARC cataloged procedure except that the SYSTSIN DD statement must point to a real online data set. An example is shown below:

```
//EMERGOFF  PROC  CLASS=X
//BATCHTSO  EXEC  PGM=IKJEFT1B
//SYSPROC   DD    DISP=SHR,DSN=iof.clist.library  <=== clist
//SYSTSPRT  DD    SYSOUT=&CLASS
//SYSTSIN   DD    DISP=SHR,DSN=jaroff.cmds        <=== offload
                                                       parms
```

Add the following statements before the EXIT statement in the SLAMINST clist. Either restart SLAMRUN or enter "F SLAMRUN,REFRESH" to enable the new condition.

```
DEFCON JESTGS JESMSG EQ 'HASP050'       +
              AND COLS(92 94) EQ 'TGS'  +
              AND COLS(99 101) GT ' 90'         <=== your percent
ONCOND   *   SETCOND JESTGS INACTIVE
ONCOND   *   SETCOND JESTGON ACTIVE
ONCOND   *   # S EMERGOFF
DEFCON JESTGON COLS(1 31) EQ 'O IOF/JOBARC JARCLOSE COMPLETED'
ONCOND   *   SETCOND JESTGS ACTIVE
```

This will cause SLAMRUN to scan for the HASP050 track groups excession message. When an excession message is found, a start command for the EMERGOFF procedure above is issued. SLAMRUN will not look for the HASP050 message again until the emergency offload has completed.

26. Access Control Reference

Introduction

Chapter 9, ***Access Control Overview***, describes how to use IOF facilities to control access to IOF resources. This chapter contains a more detailed look at the underlying structure of IOF access control.

By default IOF allows most users to control only their own jobs. End users cannot control devices, browse the system log, or use the *IOF System Monitor* unless specifically authorized. Users with TSO operator authority are allowed to browse and control all jobs and devices in the system and to use all IOF facilities.

IOF access control facilities let you change these default rules to meet the requirements of your installation. End users easily can be permitted to browse and control jobs they don't own or to manage specific devices. Operator users can be prevented from browsing sensitive jobs such as the payroll. These changes can be made by parameter changes or by interfacing IOF to your host security system.

IOF allows you to control access to jobs, output groups, sysout data sets, JES2 devices, system commands, and other systems in a sysplex. Access rules are defined through several IOF options which are members of the IOF options library. The detailed description of these options is contained in the options library. This chapter explains how the various options fit together and gives specific access control examples.

Access Control Options Members

The following members of the IOF Options Library are used to define the access control rules for your installation:

- **A40SCOPE**. This member defines the default job ownership rule for your system.
- **A60ACF**. Specifies which security system you have (RACF, ACF2, or Top Secret) and whether operators and started tasks should be allowed access without requiring rules in the security system.
- **B21$DOC**. This member contains the documentation for the B21ACESS member.
- **B21ACESS**. This member describes the level of IOF access required to perform each of the functions defined by IOF.

- **B23$DOC**. This member contains the documentation for the B23ALLOW member.
- **B23ALLOW**. This member allows you to assign IOF users to access control groups. It also allows you to control which users (or groups) are allowed to do which IOF functions.
- **B24ACFDF**. Use this member to select the types of access that you want to protect with your security system. You also specify the high level prefix for all IOF security system resource names.
- **B25DVGRP**. This member groups JES2 device functions and parms together into smaller units that can be referenced more easily in B21ACESS.

Defining Default Job Ownership

The A40SCOPE option defines the default job ownership rule for your site. The selection that you make in this options member will heavily affect all other access control options for IOF.

In A40SCOPE you indicate which jobs are to be associated with an individual user. Jobs can be associated based on job name or based on job owner.

Job owner is much more attractive, since it removes all restrictions on the names that users can assign to their jobs. But, it does require that an owning userid be assigned to each job by JES2 and stored in the JES2 JQE control block for the job.

If you want job ownership to be based on the owning userid, specify:

```
USSCOPE   OWNER,'/U'
```

Otherwise, you would specify A40SCOPE as:

```
USSCOPE   JOBNAME,'/U*'
```

which will cause IOF to assume that a job is associated with a user if the job's name begins with the user's userid.

Read the A40SCOPE options member and be sure you understand the choices you can make. Select your USSCOPE option, and keep it in mind as you continue.

Defining IOF User Groups

IOF is shipped with three groups defined:

- **OPERATOR**. All users with the operator attribute. (UADS=OPE)
- **STCGROUP**. All started tasks. (ASIDTYP=STC)
- **ENDUSER**. All other users. (No qualification parms)

Options member A60ACF controls the functions that are available to members of the default operator and started task groups. End users are allowed to review and control only the jobs they submitted. You easily can change the authority that the default groups have and can define as many IOF groups as you need.

If you have converted the ISFPARMS data set for IBM's SDSF product, you will have one IOF group for each ISFGRP macro in the ISFPARMS data set.

Use GROUP macros in options member B23ALLOW to define your IOF groups. See options member B23$DOC for a complete description of the GROUP macro.

Each user is assigned to the first group for which they qualify, so the order of GROUP macros in B23ALLOW is important. The most restrictive group macros should appear first in B23ALLOW and the least restrictive ones later. Users who do not qualify for any IOF group will not be allowed to use IOF.

One or more of the qualification parms described in the table below can be included on the GROUP macro to define the users that qualify for the group. If there is no qualification parm on a GROUP macro, all users qualify for that group.

Qualify User	Qualify STRLIST	Exclude User	Exclude STRLIST	Description
ID	IDLST	XID	XIDLST	One or more explicit user ids
PROC	PROCLST	XPROC	XPROCLS	One or more TSO logon procedure names
TERM	TERMLST	XTERM	XTERMLS	One or more terminal names
ACCT	ACCTLST	XACCT	XACCTLS	One or more account numbers
ACFGP	ACFGLST	XACFGP	XACFGLS	One or more RACF group names
ACFLG	ACFLGLS	XACFLG	XACFLGL	One or more RACF connect groups
AC2UID	AC2UIDL	XAC2UID	XAC2UIL	One or more ACF2 userid strings
SES1 SES2	SES1LST SES2LST	XSES1 XSES2	XSES1LS XSES2LA	One or more session attributes named in source member ATTRBASE. Specify the parm as shown: SESn=(attrname,(attrval,..))
UADS				UADS attr: OPERATOR, MOUNT, ACCOUNT, JCL
ASIDTYP				Address space type: JOB, TSU, STC

User Qualification Parms

For example, the parm "ID=(HR097A,HR177B,HR9*)" on a GROUP macro qualifies userids "HR097A", "HR177B", and all ids beginning "HR9" for the group. The parm "IDLST=PAYLIST" qualifies all ids listed in the STRLIST macro at label "PAYLIST". The parms "UADS=OPER,XID=OPNEW" qualify all users with operator authority except "OPNEW".

IOF Group Features

Several IOF features are controlled by parameters on the GROUP macro. The table below lists the parm names and describes the group feature each parm controls.

Parm Name	Values	Description
FINDLIM	(max,default)	Maximum allowable and default FINDLIM
EXCLTSO	YES/NO	YES means exclude the active TSO session from display unless it has output. NO means always display active session.
MINPAUS	seconds/NONE	Minimum pause or refresh time allowed in seconds
EXTEND	YES/NO/DEFAULT	EXTEND command is allowed, not allowed, or used by default
INITCMD	INITCMD/INITMENU	*Job List Menu* or *IOF Option Menu* on initial IOF entry
ACTION	route1,route2,ALL/ NONE	WTOR route codes that will be displayed by default at the bottom of the system log display
MONITOR	opt1,opt2.../NONE	System monitor default options or NONE
SYSID	systemid	Default syslog system id
FORMATS	(sect1,sect2...)	Alternate display section format names
CMDTYPE	(type1,type2...)	Global command types
PANEL	OPTOPT/OPTUS1/OPTUS2/ OPTUS3/OPTSDS	*IOF Option Menu* name
ALLOW	(alow1,alow2...)	ALLOW macro names that apply to this group
DFSCOPE	USER/GROUP/ALL	Default scope
MXSCOPE	USER/GROUP/ALL	Maximum allowable scope
USSCOPE	(JOBNAME,str1...str8) (OWNER,str1...str8)	User scope definition. Defaults to the value set in the A40SCOPE option.
GRSCOPE	(JOBNAME,str1...str8) (OWNER,str1...str8)	Group scope definition
INPCMD	YES/NO	Allow use of the Input command to display input data sets on *Job Summary Menu*
QOPT	YES/NO	"Q" option allowed
DISPLAY	(refresh,display)	.01 seconds minimum display refresh/status interval
CONSOLE	YES/NO	CONSOLE command allowed
DRCMD	YES/NO	Display replies (DR) command allowed
STR1,STR2, STR3,STR4	string (string,beg,length)	String 1 through string 4 definitions. "/U" means users userid. "*" is wild card terminator. "+" wild card position.
AUTH	(one or more options)	Specific options to be displayed on the *IOF Option Menu*
DOCLEVL	ENDUSER/OPERATOR/ ADMIN	Level of commands to be documented on the MORE command

Parm Name	Values	Description
AUTHADD	(one or more options)	Specific options to be added to the default options displayed on the *IOF Option Menu*
AUTHREM	(one or more options)	Specific options to be removed from the default options displayed on the *IOF Option Menu*
MENUGLOB	YES/NO	YES means that IOF Options are honored on any IOF panel.
OCMD	GROUPS/JOBS	Defines whether the "O" option should display groups or jobs.

GROUP Macro Feature Parms

The default GROUP macros in options member B23ALLOW are surrounded by comments that describe the functions being defined for each group.

IOF Resources

IOF controls access to jobs, output groups, sysout data sets, commands, systems and devices. Specific users or groups of users can be allowed to look at or modify any of these five basic resource types. The names of these resource types are:

- JOBS
- GROUPS
- SYSOUTS
- DEVICES
- COMMANDS
- SYSTEMS
- PROCESS
- THREADS
- ENCLAVES
- SCHENV
- SCHRES
- CHECKS
- JOBCLASS
- VOLUMES
- NODES

You will use these resource names when permitting users access to IOF resources.

IOF Resource Attributes

Each type of IOF resource has a set of attributes or characteristics. Access to a resource can be granted based on any one of these attributes. For

example, each job has a name and a print destination, and may have an owner, a notify id, and other characteristics.

IOF resource attributes are defined in source member ATTRBASE. You can define your own resource attributes by modifying options member B63ATTR. The following table lists many of the attributes that have already been defined. It shows both primitive and combined attributes. Combined attributes are simply a combination of two or more primitive attributes.

Resource Type	Attribute Name	Attribute Type	Description
JOBS	JOBCOMBO	Combined	OWNER.JOBNAME
	JOBNAME	Primitive	Name of the job
	OWNER	Primitive	Userid of the job owner
	NOTIFY	Primitive	Notify userid
	DEST	Primitive	Job level destination
	CLASS	Primitive	Job class
	JOBID	Primitive	Job id
	ACFGROUP	Primitive	RACF group of owner
	ACF2UID	Primitive	ACF2 userid string
	SUBUSER	Primitive	Submitter’s userid
	SUBGROUP	Primitive	Submitter’s group
	A19JBTYP	Primitive	Job type (BAT, STC, TSU)
	ACCT	Primitive	Account number
GROUPS	DEST	Primitive	Destination of group
	CLASS	Primitive	Class of group
	FORMS	Primitive	Forms of group
	WTRID	Primitive	External writer name of group
	MAILED	Primitive	Mail id of the group
	USC, FCB, …	Primitive	Other group parms
SYSOUTS	DEST	Primitive	Destination of the data set
	CLASS	Primitive	Sysout class of the data set
	FORMS	Primitive	Forms of the data set
	WTRID, FCB,USC, …	Primitive	Other sysout characteristics
	PDVDSKEY	Primitive	Data set key
	PDVDDNAM	Primitive	DDNAME
DEVICES	DEVCOMBO	Combined	DEVTYPE.DEVNAME

Resource Type	Attribute Name	Attribute Type	Description
	DEVNAME	Primitive	Device name
	DEVTYPE	Primitive	Generic device type
	DEST	Primitive	Devices associated with the destination
COMMANDS	CMDCOMBO	Combined	CMDTYPE.CMDNAME.CMDPARM1
	CMDTYPE	Primitive	Command type (MVS or JES)
	CMDNAME	Primitive	Command name
	CMDPARM1	Primitive	First positional parm
	COMMAND	Primitive	(for compatibility with prior releases)
SYSTEMS	SYSID	Primitive	System id (SYSID or Service name)
PROCESS	JOBNAME	Primitive	Process Jobname
	OWNER	Primitive	Process OWNER
	TYPE	Primitive	TSU, STC, BAT
THREADS	Currently none		
ENCLAVES	SSTYPE	Primitive	Subsystem type
	SUBSYS	Primitive	Subsystem name
	OWNERJOB	Primitive	Enclave owner jobname
SCHENV	NAME	Primitive	Environment name
SCHRES	NAME	Primitive	Resource name
CHECKS	OWNER	Primitive	Owner of check
	NAME	Primitive	Check name
	SYSNAME	Primitive	System name for check
	PROCNAME	Primitive	Procedure name for checker
	STCID	Primitive	Started task ID for checker
JOBCLASS	CLASS	Primitive	One character job class
VOLUMES	VOLUME	Primitive	Volume serial number (name) of the spool volume
NAME	NODES	Primitive	Node name

Resource Attributes by Resource Type

Session Attributes

The current IOF user's session has certain attributes that can be used for access control. When the user tries to access a job, these session attributes can be matched against the same (or different) attributes of job.

Attributes	Description
USERID	User's userid
ASCBTYP	Type of address space, JOB, STC or TSU
ACCT	User's account number
XEQSYSID	Execution system id of the JES2 system
ACFGROUP	RACF group name
ACF2UID	ACF2 UID String

Session Attributes

Session attributes can be specified in the STR1, ..., STR8 parms of ALLOW macros to set up comparisons between an attribute of a job and the same attribute of the IOF user's session. See examples 7 and 8 in the ***Allow Macro Examples*** section below for more details.

IOF Access Levels

IOF defines four levels of display access and four independent levels of update access for each of the six resource types. Display access is required to see, browse or copy an IOF resource. Update access is required to modify an IOF resource.

Because display access is completely independent of update access, it is possible to permit users to "look but not touch". For example, you may wish to let users browse certain jobs without granting permission to cancel or modify the jobs. Conversely, you may want to let some operators route and cancel certain jobs under their control without granting them permission to browse the output. Both these requirements are easy to implement because IOF provides independent display and update access.

Options member B21ACESS defines which IOF functions are available at each level of access. Options member B21$DOC describes the macros that are used in B21ACESS. The table below shows the major IOF functions associated with each of the levels of IOF access in the default B21ACESS options member, and is somewhat easier to read than the B21ACESS member.

Resource Type	Level	Display Functions	Update Functions
Jobs	1	Display job on *Job List Menu*	
	2	Select job for review	Cancel, route, release held ds, modify dest/class/sysid
	3		Hold/release/restart job, modify class/priority
	4	Dump job control blocks	Set independent mods, modify performance group

Resource Type	Level	Display Functions	Update Functions
Groups	1	Display on Menu	
	2	Select group for review	Cancel, modify class/dest/forms/ pagedef/address…
	3		Hold/release group, modify wtrid/ priority/prmode
	4		
Sysouts	1	Display on *IOF Job Summary*	
	2		Cancel, modify class/dest/forms/ pagedef/address/wtrid/linect/prmode/ notify/usrlib …
	3	Browse and snap all data sets	
	4		
Devices	1	Display on *Device List Menu*	Start/drain/interrupt/restart/ backspace/set forms/ucs/fcb …
	2		Cancel, set class/flash/spacing/xeq node/sysid … Set offload dsname, unit, volser and type …
	3		Set dest/prmode/command authority, trace, disc intvl …
	4		Set wtrid/work select, initiator class, FSS name, autologon …
Commands	1		
	2		Issue DR command
	3		
	4		Issue JES2 and MVS commands
Systems	1	Display MAS on menu	Invoke server (functions on server are controlled by the server CPU's IOF)
	2	Select detail MAS display	
	3	Display Operlog	
	4		Start, stop, restart, reset, modify MAS parms Delete Operlog data
Enclaves	1	Display Enclaves on the menu	
	2		
	3		
	4		Quiese, resume, reset, set Service Class
Process	1	Display Process on the menu	
	2		
	3		
	4		Kill Process
Schenv	1	Display environment on the menu	

Resource Type	Level	Display Functions	Update Functions
	2		
	3		
	4	Display jobs and resources using the environment	
Schres	1	Display resource on the menu	
	2		
	3		
	4		Set the state and systems of the resource
Checks	1	Display check on the menu	
	2	Display check detail information	
	3		
	4	Browse and edit a check report	Activate, refresh, deactivate, delete, force, run, update and set check characteristics
Jobclass	1	Display class on menu	
	2	Select detailed display	
	3	Display JOBS on class	
	4		Modify all class attributes
Volumes	1	Display volume on men	
	2	Select detail display, DL	
	3	Display JOBS on volume	
	4		Set, drain, start, halt, sysaff
Nodes	1	Display node on menu	
	2	Select detailed display, DL, DC, DP	
	3		
	4		Set, start, all attributes

Standard Access Control Table

Granting a particular level of access will allow all functions with level numbers less than or equal to the granted level. So, granting level 3 display access also allows the display functions defined at level 1 and level 2.

A missing level number in the table above means that no new functions are introduced at that level. For example, no level 1 update functions are defined for jobs.

You can move functions and/or operands from one level of access to another by modifying options member B21ACESS. Member B21EX01 in the sample mods (SAMPMOD) data set shows an example of moving the input class and priority operands from level 3 update access to level 2. It is also possible to define additional access control tables if four levels of access are not sufficient.

Granting Access to IOF Functions

ALLOW macros in options member B23ALLOW define exactly which level of access is permitted to which type of resource under what conditions. No IOF function can be done unless it is permitted by an ALLOW macro.

Each ALLOW macro can apply to one or more specific users or groups of users. There are several ways of defining who is granted access by an ALLOW macro. The ALLOW and ALOWLST parameters on a GROUP macro point to ALLOW macros that are to apply to the group. Any of the user qualification parms described below can be specified on ALLOW macros to indicate which users are being permitted access. The ACF parameter on an ALLOW macro specifies that access is being granted through your security system.

Qualify User	Qualify STRLIST	Exclude User	Exclude STRLIST	Description
ID	IDLST	XID	XIDLST	One or more explicit user ids
GROUP	GRPLST	XGROUP	XGRLST	One or more IOF group names
PROC	PROCLST	XPROC	XPROCLS	One or more TSO logon procedure names
TERM	TERMLST	XTERM	XTERMLS	One or more terminal names
ACCT	ACCTLST	XACCT	XACCTLS	One or more account numbers
ACFGP	ACFGLST	XACFGP	XACFGLS	One or more RACF group names
ACFLG	ACFLGLS	XACFLG	XACFLGL	One or more RACF connect groups
AC2UID	AC2UIDL	XAC2UID	XAC2UIL	One or more ACF2 userid strings
SES1 SES2	SES1LST SES2LST	XSES1 XSES2	XSES1LS XSES2LA	One or more session attributes named in source member ATTRBASE. Specify the parm as shown: SESn=(attrname,(attrval,..))
UADS				UADS attr: OPERATOR, MOUNT, ACCOUNT, JCL
ASIDTYP				Address space type: JOB, TSU, STC

User Qualification Parms

For example, an ALLOW macro that has the parm "ID=('SYS*','OPR*') applies to all userids that begin "SYS" or "OPR". The parm "ACFLG=PAYCHECK" causes the ALLOW macro to apply to users that can connect to the "PAYCHECK" RACF group. "XGROUP=ENDUSER" means that the ALLOW macro applies to all IOF groups except the ENDUSER group.

Now, consider the following example ALLOW macro:

```
ALLOW  3,2,JOBS,JOBNAME,'ABC*',ID=('ABCX*','ABCY*')
```

Each ALLOW macro reads like a sentence. This one says "allow level 3 display and level 2 update access to all jobs with a job name beginning with ABC to all users whose userids begin with ABCX or ABCY".

The “ID=” parm of this ALLOW macro indicates to whom access is being granted. You also can specify that an ALLOW macro applies to every member of an IOF group by pointing to the ALLOW macro directly from a GROUP macro:

```
DEVGROUP  GROUP  ID=('ABCX*','ABCY*'),ALLOW=DEVJOBS
DEVJOBS   ALLOW  3,2,JOBS,JOBNAME,'ABC*'
```

All IOF access is defined through ALLOW macros in the B23ALLOW options member. More information about ALLOW macro features is contained in options member B23$DOC.

ALLOW Macro Description

Syntax

```
label  ALLOW
         dlev                    display level
         ,ulev                   update level
         ,res-type               resource type
         ,res-attr[(col,len)]    resource attribute
         ,| match-str         |  match strings
          | STRLST=listname    |  lists of strings
          | NOT=match-str      |  match strings
          | NOTLST=listname    |  lists of strings
         ,| [user-qual]        |  user qualifier
          | [ACF=| GLOBAL |] |  security system
          |      | USER   |  |  global/user levels
         [,TABLE=access-tbl]     access table name
         [,STR1,...,STR8=(session-attr[,(col,len)])]
         [,IFALSO=(atrc-nam#1,...,atrc-nam#n)]
```

label. The name of the ALLOW macro. This name can be used in the ALLOW operand of a GROUP macro to associate this ALLOW macro with the group. A label is useful for tracing purposes even if you do not reference it.

dlev. The level of display access being allowed, with a value from 0 to 4. If the ACF parameter is specified, this is the maximum display level that can be granted by your security system.

ulev. The level of update access being allowed, with a value of 0 to 4. If the ACF parameter is specified, this is the maximum update level that can be granted by your security system.

res-type. The type of resource to which access is being allowed. Valid resource types are JOBS, GROUPS, SYSOUTS, DEVICES, COMMANDS, SYSTEMS, PROCESS, THREADS, AND ENCLAVES.

res-attr. The resource attribute name. This specifies the characteristic of the resource that is to be compared against the match-strings to determine if this ALLOW macro is applicable. For example, if res-type were JOBS, res-attr might be JOBNAME or OWNER. For valid resource attributes for each resource type, see the table in the above section, ***IOF Access Levels***.

Note that a value of an asterisk (*****) can be specified for the resource attribute name to indicate that this ALLOW macro is applicable to all resources of the type named in res-type. When this form is used, the res-attr and match-str parameters are not used.

res-attr(col,len). Specifies a substring of the resource attribute. This would normally only be used in conjunction with the STR1, ..., STR8 parms. See Example 8 in the section below, ***ALLOW Macro Examples***.

match-str. The set of pattern match strings that are to be compared against the resource characteristic named in res-attr above to determine if this ALLOW macro is applicable. If an asterisk (*****) is specified for res-attr, this parameter should be omitted. Generic names can be specified using the plus (**+**) as a one character wild card, and the asterisk (*****) as a wild card terminator. More than one name can be specified if enclosed within parentheses.

STRLST=listname. An alternate way to specify the match-strings. "listname" is the name of a STRLIST macro that describes a list of match strings.

NOT=match-str. A set of pattern match strings that must not match the resource attribute in order for the ALLOW macro to be applicable.

NOTLST=listname. An alternate way to specify the NOT= strings. "listname" is the name of a STRLIST macro that describes a list of match strings.

user-qual. Specifies which users this ALLOW macro applies to. See the table in the below section, ***Granting Access to IOF Functions***,

for a description of all the user qualification parms that can be used on an ALLOW macro.

ACF=GLOBAL. Specifies that this is a pattern ALLOW macro that describes a profile (rule) defined to your security system that should be checked to determine if this user should be allowed to perform the function they are attempting. GLOBAL implies that the rule is defined at the system level and has the prefix specified in the B24ACFDF options member. System level rules are controlled by the system security administrator and not by individual users. See the below section, ***Using Your Security System to Control IOF Access***, for more information about defining security system rules that correspond to IOF ALLOW macros.

ACF=USER. Specifies that this is a pattern ALLOW macro that describes a profile (rule) defined to your security system that should be checked to determine if this user should be allowed to perform the function they are attempting. USER implies that the rule is defined at the user level and has a user's userid as a prefix. User level rules are controlled by individual users. See the below section, ***Using Your Security System to Control IOF Access***, for more information about defining security system rules that correspond to IOF ALLOW macros.

TABLE=access-table. Specifies the name of an access table in options member B21ACESS. This would never need to be specified unless you have defined additional access tables in B21ACESS. The name of the default access table is STANDARD.

STR1=session-attr. Defines the /1 insertion string to be the value of the named session attribute. See Example 7 in the section below, ***ALLOW Macro Examples***..

STR1=(session-attr,col,len). Defines the /1 insertion string to be a substring of the named session attribute. See Example 8 in the section below, ***ALLOW Macro Examples***..

STR2=, ..., STR8=. Define the /2, ..., /8 insertion strings.

IFALSO=(atrc-nam#1, ..., atrc-nam#n). Names one or more ATTRCHK macros that define additional conditions that must be met in order for the ALLOW (or LIMIT) macro to be honored.

ALLOW Macro Examples

Example 1. Let all users browse the system log by granting level 3 display access to jobname "SYSLOG" to all userids.

```
ALLOW  3,0,JOBS,JOBNAME,'SYSLOG',ID=*
```

Example 2. Let userids that begin "OPER" have "SYS" in positions 3 through 5, or begin "PR" and have "CL" in positions 4 and 5 browse the log, jcl and messages data sets of all jobs in the system based on any selection criteria. Also, let them cancel all jobs and modify all job attributes. Do not permit browsing the regular sysout data sets of the jobs.

```
ALLOW  2,4,JOBS,*,ID=('OPER*','++SYS*','PR+CL*')
```

This can also be accomplished by:

```
       ALLOW    2,4,JOBS,*,IDLST=LN1
LN1    STRLIST  'OPER*','++SYS*','PR+CL*'
```

Example 3. Define userid "RSAM" as the operator of remote 18. Do not allow RSAM to modify the destination, work select, and other systems type parameters of the printer.

```
ALLOW  2,2,DEVICES,DEVNAME,'R18.*',ID='RSAM'
```

Example 4. Allow everyone in the 'OPERATOR' and 'SYSPGMR' groups to fully control all devices.

```
ALLOW  4,4,DEVICES,*,GROUP=(OPERATOR,SYSPGMR)
```

Example 5. Allow all users connected to the MSTRCTL RACF group to browse and modify most characteristics of all jobs with a notify id of 'SYSCTL'.

```
ALLOW  3,2,JOBS,NOTIFY,'SYSCTL',ACFGP=MSTRCTL
```

Example 6. Allow all users who are connected to the "LOCOPER" RACF group to control all sysout groups and devices that are routed to or associated with the "LOCAL" destination.

```
ALLOW  4,4,GROUPS,DEST,'LOCAL',ACFLG=LOCOPER
ALLOW  4,4,DEVICES,DEST,'LOCAL',ACFLG=LOCOPER
```

Example 7. Allow all users to control jobs in their own RACF group.

```
ALLOW  3,2,JOBS,ACFGROUP,'/1',ID=*,STR1=ACFGROUP
```

Example 8. Allow all users to control a job if the seventh and eighth characters of the job's ACF UID string match the seventh and eighth characters of the IOF user's ACF2 UID string.

```
       ALLOW  3,2,JOBS,ACF2UID(7,2),'/1',ID=*,STR1=
  (ACF2UID,7,2)
```

Example 9. Allow everyone except the IOF ENDUSER group to display the MAS and invoke the AT command on all systems.

```
ALLOW  2,1,SYSTEMS,SYSID,*,XGROUP=ENDUSER
```

Example 10. Allow ENDUSER group members to invoke the AT command for sysid IPO2. Functions available during the server session are controlled by the IOF on the server CPU.

```
ALLOW  0,1,SYSTEM,SYSID,IPO2,GROUP=ENDUSER
```

Example 11. Allow all users to browse all sysout data sets with a ddname of SYSPRINT and sysout class of "J".

```
ALLOW  2,0,JOBS,*,ID=*
ALLOW  3,0,SYSOUTS,DDNAME,SYSPRINT,ID=*,
IFALSO=SOCLASSJ SOCLASSJ  ATTRCHK  SYSOUTS,CLASS,J
```

Example 12. Prevent all access to sysout classes "C" and "R" for jobnames beginning "HR" to everyone except userids beginning "HRM".

```
LIMIT 1,0,SYSOUTS,JOBNAME,HR*,XID=HRM*,IFALSO=
PAYCLASS   PAYCLAS  ATTRCHK  SYSOUTS,CLASS,(C,R)
```

See SAMPMOD library members B23EX02 and B23EXSES for additional examples of ALLOW macros.

Limiting Access with LIMIT Macros

The LIMIT macro has exactly the same parms as the ALLOW macro but limits access rather than allowing access. The level numbers on a LIMIT macro indicate the highest possible access that will be granted to the resource. For example:

```
LIMIT  2,2,JOBS,JOBNAME,'PAY*',ID=*
```

This macro sets a limit on the level of IOF access that can be allowed to any job whose name begins with "PAY". Since ID=* is specified, this limitation applies to all IOF users. This macro prevents all users from browsing any sysouts other than the log, JCL, and messages for all jobs with jobnames beginning "PAY".

A LIMIT macro that absolutely applies to all users is somewhat unusual in practical situations. Normally there are a few users for whom the limit should not be applied. The following LIMIT macro is an example:

```
LIMIT 1,0,SYSOUTS,CLASS,'P',XACFLG=PAYROLL
```

This macro prevents browse or modify of class "P" sysout data sets except by users who are connected to the PAYROLL RACF group. Class "P" data sets are only allowed to be displayed on the Job Summary display for all other users.

See SAMPMOD library member B23EXLIM for several additional examples of LIMIT macros.

Defining Multiple Attributes with the ATTRCHK Macro

The ATTRCHK macro is used to define additional criteria that must be satisfied in order for an ALLOW or LIMIT macro to be honored. ALLOW and LIMIT macros can point to one or more ATTRCHK macros with the IFALSO parm.

When the IFALSO parm is specified, the ALLOW/LIMIT macro will be used only if all of the specified ATTRCHK macros are satisfied.

Syntax

```
name     ATTRCHK      res-type
                      ,res-attr
                      ,|match-str      |
                       |STRLST=listname|
                       |NOT=match-str  |
                       |NOTLST=listname|
```

name. The name specified in the IFALSO parm of an ALLOW or LIMIT macro.

res-type, res-attr, match-str and listname. These have the same meanings as on the ALLOW and LIMIT macros. These parms define additional conditions that must be met. Note that the res-type for the ATTRCHK macro must match the res-type parm on the ALLOW or LIMIT macro that points to the ATTRCHK.

Special "CONTROL" Limit Attribute

A special "CONTROL" attribute for "JOBS", "GROUPS" and "SYSOUTS" combines several key attributes of these resources. The "CONTROL" attribute is built by combining the following attributes separated by a period (`.`).

Attribute	Length	Description
JOBID	8 characters	Jobid of the job
OWNER	1 to 7 characters	Owner of the job
JOBNAME	1 to 8 characters	Jobname of the job
JOBSTATE	5 to 7 characters	Job state: INPUT, RUNNING, OUTPUT
FUNCTION	4 to 7 characters	IOF validation function: MENU, SELECT, CANCEL, MODIFY, ROUTE, JRELEASE, DRELEASE, HOLD, DUMPCB, PRINT, RESTART, SNAP

The "CONTROL" attribute is especially useful in the LIMIT macro. For example, the following LIMIT macro prevents anyone except userids beginning "CO" from canceling any running started task with a jobname beginning "CICS":

```
LIMIT  0,0,JOBS,CONTROL,'S*.*.CICS*.RUNNING.CANCEL',XID=CO*
```

The LIMIT macro above only applies to running CICS jobs. It does not restrict cancel of CICS jobs on the output queue.

Building ALLOW and LIMIT Macros Using the ALLOW Command

The easiest way to build ALLOW and LIMIT macros is to use the IOF **ALLOW** command. From any IOF panel when running under ISPF, enter the ALLOW command to initiate a dialogue that takes you step-by-step through the process of building specific ALLOW and LIMIT macros.

You can save the new ALLOW and LIMIT macros if you wish, or you can simply review the macros that the dialogue builds in order to get a better understanding of how the generated macros work. No IOF options members are ever updated by the dialogue unless you explicitly specify the member name and verify the update.

If you have only the CICS version of IOF, you will have to edit the B23ALLOW options member to specify your ALLOW and LIMIT macros.

If you have both the TSO and CICS versions of IOF and you want to use the same access rules for both products, you can copy your IOF/TSO access control options members to your IOF/CICS options library. Make sure that both products are at the same release level, and then review options members A40SCOPE, A60ACF, B21ACESS, B23ALLOW, B24ACFDF, and B25DVGRP in your IOF/TSO options library. Copy the desired options members to your IOF/CICS options library and make whatever changes, if any, are required.

STRLIST and ADRLIST Macros

Both the GROUP and ALLOW macros have parms for which you may wish to specify lists of names, ids, or addresses. Sometimes, the same list needs to be specified several times.

The STRLIST macro allows you to define a list of match strings that can be referenced by ALLOW and GROUP macros.

Syntax

```
label   STRLIST 'str1','str2',...
```

label. The name used to point to this STRLIST macro.

'str1','str2',... The list of generic match strings.

The ADRLIST macro allows you to define a list of address pointers that can be referenced by GROUP and ALLOW macros.

Syntax

```
label   ADRLIST addr1,addr2,...
```

label. The name used to point to this ADRLIST macro.

addr1,addr2,... The list of address pointers.

Access to Sysout Data Sets

You will notice that the default B23ALLOW options member does not contain any ALLOW macros for the SYSOUTS resource type. This is because granting access to a job or output group also grants the same level of access to any sysouts in the job or output group.

You will need ALLOW macros for the SYSOUTS resource type only if you need to grant a higher level of access to some sysout data sets of a job than you grant to the job as a whole. For example, consider the following ALLOW macros:

```
ALLOW  2,2,JOBS,JOBNAME,'PAY*',ID='HR*'
ALLOW  3,0,SYSOUTS,CLASS,'P',ID='HR*'
```

The first ALLOW macro permits userids beginning "HR*" to select jobnames beginning "PAY" and browse the log, messages, and JCL data sets. Level 3 display access is required to browse other data sets of the job.

The second ALLOW macro says that any "HR*" user can browse but not modify any sysout data set with sysout class "P" for any job that they are able to select. This SYSOUTS ALLOW macro is required because it grants a higher level of display access to some data sets than the JOBS macro granted.

It is important to point out that granting access with a SYSOUTS ALLOW macro only affects jobs or groups that the user is able to select. Sysout functions are never attempted until after a job or group has been selected.

Using Your Security System to Control IOF Access

You can see that IOF ALLOW macros provide very powerful features for controlling access to IOF resources. However, these macros must be regenerated each time that you need to make a change. This problem can be avoided by using your host security system to control some IOF access

decisions. IOF provides interfaces to RACF, Top Secret, and ACF2 for this purpose.

See Chapter 9 for a description of how to control access to IOF resources with your security system. The discussion which follows is a description of the basic IOF facilities that are involved with providing this support.

You specify which types of resources are to be controlled by your security system by coding ALLOW macros with the ACF parameter. For example, you can request that access to jobs be controlled by your security system but not access to JES2 devices.

For most installations, some reasonable combination of IOF access table control and security system control seems to work best. For example, it usually makes sense to allow users to look at and control their own jobs without checking with the security system. But for looking at other users' jobs, it is often easier to let the security system contain the rules.

To use your security system to control IOF access:

- Define your security system to IOF in options member A60ACF.
- Select the resources to be controlled by modifying options member B24ACFDF.
- Use the ACF command under IOF (while under ISPF) to manage resource names in your security system that correspond to IOF resources that you wish to control.

Each of these topics will be discussed in some detail below.

Defining Your Security System to IOF

To use a security system interface for IOF you must first designate your security system to IOF in the A60ACF options member.

ALLOW Macros to Activate Security System Checks

The ALLOW macros to activate security system checks are automatically generated by choices that you make in options member B24ACFDF. The description below explains how those ALLOW macros relate to your security system.

No security system check will be made unless specifically requested by an ALLOW macro in options member B23ALLOW. Coding the ACF parameter on an ALLOW macro means that the ALLOW macro is actually just a pattern for a rule (profile) that is defined to your security system. The corresponding rule in your security system will be checked to determine if the function requested by the user should be allowed.

For example, consider the following ALLOW macro:

```
ALLOW 3,2,JOBS,JOBNAME,*,ACF=GLOBAL
```

This macro tells IOF to check your security system for rules that control access to jobs based on job name. If a user attempts a job function (like CANCEL or PRINT) and no non-ACF ALLOW macros in B23ALLOW permit the function, a security system check will be made to see if a rule grants the level of access necessary to perform the requested function.

The display and update access levels ("3,2" in our example above) for an ACF ALLOW macro have completely different meanings than for non-ACF ALLOW macros. For ACF ALLOW macros the access levels specify the maximum level of access that can be granted through the security system. Using our example macro above, IOF would never grant more than level 3 display or level 2 update access to a job based on job name rules stored in the security system.

The third parameter of an ACF ALLOW macro ("JOBS" in our example above) must specify a valid IOF resource type (JOBS, GROUPS, DEVICES, SYSOUTS, COMMANDS, or SYSTEMS).

The fourth parameter ("JOBNAME" in our example above) must specify the name of an IOF resource attribute. See the table in the section above, ***IOF Resource Attributes***, for a list of valid resource attributes.

The fifth parameter (the asterisk, *****, in our example above) allows you to restrict security system checks to certain job names. In the example we specified the generic asterisk which means that the security system should be checked for all job names. You could specify instead a list of generic job names and the security system would be checked only if the name of the job being accessed matched one of the generic job names.

ACF=GLOBAL in our example above means that only rules controlled by the system security administrator should be checked. ACF=USER means that rules that can be controlled by individual users should be checked.

The ID, IDLST, GROUP, GRPLST, and other user qualification parms can be specified on an ACF ALLOW macro to limit ACF control to specific groups of users. An ACF ALLOW macro should never be pointed to by the ALLOW or ALOWLST parameters of a GROUP macro.

ALLOW macros with the ACF parameter are checked last, so most common types of access can be granted without a security system call. The default B23ALLOW option contains several ALLOW macros that permit all users to access the jobs they submitted. For efficiency these macros normally should not be removed even when some access control decisions will be made by the security system.

Adding Security System Resource Names

To grant access to an IOF resource you must first add a resource name to your security system that corresponds to the IOF resource. Each ACF

ALLOW macro indicates that there are security system resource names that correspond to the resources described in that ALLOW macro.

For the TSO version of IOF you would normally use the ACF command from any IOF panel (while under ISPF) to add security system resource names. If you have both the TSO and the CICS versions of IOF and your A60ACF and B24ACFDF options members are compatible, you can define your IOF/CICS resource names using IOF/TSO. If you have only the CICS version, you will have to use your security system to manually add resource names. The description below explains the structure of these resource names.

Syntax

```
prefix.table.D/U.resource.attribute.value
```

prefix. The PREFIX= value from options member B24ACFDF. The default value is IOFACF.

table. Specifies the first 3 characters of the access table name from options member B21ACESS that will be used to control this access attempt. The default table name is STANDARD, so this level will normally be "STA".

D/U. "D" means that this resource name will be used to control only display access to the resource. "U" means that this resource name will be used to control only update access to the resource. If a display function (like browse or snap) is being attempted by the user, the resource name that is checked will have "D" in this position. For update functions (like cancel of modify) this level will be "U".

resource. Specifies the first 4 characters of an IOF resource type (JOBS, GROU, DEVI, SYSO, COMM, SYST). This is the type of IOF resource that this security system resource name can be used to control.

attribute. Specifies the first 4 characters of an IOF resource attribute name from the table in "IOF Resource Attributes". Access will be granted based on this attribute (JOBNAME, DEST, etc.).

value. Specifies a specific value for the attribute above. For example, if attribute were "JOBN", this would be a specific (or generic) job name to which permissions are to be granted.

The resource class for IOF resource names is defined by the CLASS= parameter in the A60ACF options member. The default class is DATASET.

The table below describes a few examples of GLOBAL resource names that could be used to grant access to IOF resources.

Resource Name	Access Controlled

Resource Name	Access Controlled
IOFACF.STA.D.JOBS.JOBN.PROD*	Display functions for jobs with job name beginning PROD
IOFACF.STA.D.JOBS.JOBC.PAYCL.P*	Display functions for all jobs owned by "PAYCL" with jobnames beginning "P"
IOFACF.STA.U.JOBS.JOBC.PAYCL.*	Update functions for all jobs owned by "PAYCL"
IOFACF.STA.*.JOBS.*	Display and update functions for all jobs in the system
IOFACF.STA.*.GROU.DEST.ATLANTA	Display and update functions for output groups routed to ATLANTA
IOFACF.STA.U.COMM.CMDC.*	Issuing all MVS and JES2 commands from IOF
IOFACF.STA.U.COMM.CMDC.MVS.C.CICS*	Issuing the MVS Cancel command for all jobnames beginning "CICS"
IOFACF.STA.U.COMM.CMDC.JES.*.*	Issuing all JES2 commands and all operands
IOFACF.STA.*.DEVI.DEVN.PRINTER3	Display and update functions for the device named PRINTER3
IOFACF.STA.D.DEVI.*	Display functions for all JES2 devices
IOFACF.STA.*.SYST.SYSI.PROD	Sysplex display and update for system PROD

Global Resource Names Examples

Remember that an ALLOW macro in the B23ALLOW options member is required to activate each of the resource name checks described above.

Now, look at the resource name for output groups above and notice how the resource name reads like a sentence. You would use this resource name to grant "standard display and update functions to all groups with a dest of ATLANTA".

See the table in the section above, ***IOF Resource Attributes***, for a description of all the possible combinations of resources and attributes that can be used in IOF ALLOW macros and security system resource names. In practice, most installations use only a small subset of these combinations. But, it is clear from the table that IOF is extremely flexible in allowing you to define the access rules for your users.

The access control system rule to be checked is completely controlled by the ALLOW macro. For example, assume that the following ALLOW macro is present in B23ALLOW:

```
ALLOW  3,2,JOBS,JOBNAME,'*',ACF=GLOBAL
```

Now, assume that a user attempts to cancel job PAYEDIT. Assume further that no non-ACF ALLOW macros in B23ALLOW permit the user to perform the cancel function, and that no LIMIT macros absolutely prevent the access. IOF will request access from the security system to the following GLOBAL resource name to determine if the user is permitted to cancel PAYEDIT:

```
IOFACF.STA.U.JOBS.JOBN.PAYEDIT
```

The level of access to be checked is discussed in the next section, ***Granting Access to IOF Resources***. If access is allowed, PAYEDIT will be canceled.

You completely control which types of resources are checked by selecting options on the activating ALLOW macros.

If the user had attempted to select job PAYEDIT for display, the resource name checked would be exactly like the one above, with the exception that the "U" level would be "D". We will see below that this allows you four levels of display access and four independent levels of update access to each type of IOF resource.

Granting Access to IOF Resources

For the TSO version of IOF you would normally use the ACF command from any IOF panel (while under ISPF) to grant access to IOF resources. If you have both the TSO and the CICS versions of IOF and your A60ACF and B24ACFDF options members are compatible, you can grant access using IOF/TSO. If you have only the CICS version, you will have to use your security system to manually grant access to IOF resources. The description below provides more detailed information about how access is granted to IOF resource names.

To grant a user access to an IOF resource you permit them access to the security system resource name that corresponds to that IOF resource. The level of IOF access granted is determined by the level of security system access that is granted. For each security system there is a direct correlation between the four levels of IOF access and specific levels of security system access. This correlation is described in the table below.

IOF Level	RACF Access Type	TSS Access Type	ACF Access Type
1	Read	Read	Execute
2	Update	Update	Read
3	Control	Update, Control	Write
4	After	All	Allocate

ACF Access Levels Table

It is important to remember that an IOF access level has no meaning without also indicating whether it is display or update access. For example, the term "level 2 IOF access" has no meaning. You need to say "level 2 display access" or "level 2 update access". This is because there are four independent levels of IOF display and update access, each numbered 1 to 4. For more information, see the table in the section above, ***IOF Access Levels***.

This means that the IOF access levels in the table above do not indicate whether they are for display or update access. From the previous section you will remember that if a user is attempting a display function, a level of ".D." will be included in the security system resource name to be checked. For an update function a level of ".U." will be included.

The presence of the ".D." or ".U." level in the resource name is what controls whether display or update access is being granted. To grant a particular level of display access to a user, you grant him the corresponding security system access level to a resource name with the ".D." level included.

For example, assume that a user attempts to select job PAYEDIT for review and that no non-ACF macros in B23ALLOW permit the access. From the table in the section above, ***IOF Access Levels***, you can see that IOF level 2 display access to job PAYEDIT is required to select it for review. Since a display function is being attempted, the security system resource name to be checked would be:

```
IOFACF.STA.D.JOBS.JOBN.PAYEDIT
```

To check for level 2 access to this resource name, we go to the ***ACF Access Levels Table*** above and find that level 2 IOF access corresponds to RACF update (or ACF2 read) access. So, IOF would check to see if the current user has RACF update (or ACF2 read) access to the resource above. If so, the user would be allowed to select PAYEDIT for review.

Notice that the normal interpretations of the RACF and ACF2 access level names have no meaning at all for IOF. RACF update access is simply used to correspond to IOF level 2 access. The resource name itself actually indicates whether display or update access is being granted. Another example will help to demonstrate this.

Assume that a user attempts to modify the input class of job PAYEDIT. From the table in the section above, ***IOF Access Levels***, you can see that level 3 IOF update access to PAYEDIT is required to modify its input class. Since an update function is being attempted, the security system resource name to be checked would be:

```
IOFACF.STA.U.JOBS.JOBN.PAYEDIT
```

To check for level 3 update to this resource name, we go to ***ACF Access Levels Table*** above and find that level 3 IOF access corresponds to RACF control (or ACF2 write) access. So, IOF would check to see if the current user has RACF control (or ACF2 write) access to the resource. If so, the user would be allowed to change the input class of PAYEDIT.

Security System Access Control Examples

Each example assumes that the user has not been granted access through non-ACF ALLOW macros. The standard B21ACESS option is assumed. It is also assumed that the A60ACF option specifies RACF and the B24ACFDF option specifies a PREFIX=IOFACF and CLASS=DATASET.

Example 1. Let the system security administrator use the security system to control access to all jobs in the system based on job name. The following ALLOW macro will cause the security system to be called when an

attempt is made to access a job by job name and access has not been granted by another ALLOW macro:

```
ALLOW 4,4,JOBS,JOBNAME,*,ACF=GLOBAL
```

Assume that a job with a job name of WEEKLY is selected for review. Job select requires IOF level 2 display access. To get IOF level 2 display access, RACF "update" access is required to the resource name:

```
IOFACF.STA.D.JOBS.JOBN.WEEKLY
```

The user attempting to select WEEKLY for review needs at least "update" RACF access to this resource name or to a generic RACF resource name that includes this name.

If the user wanted to cancel the WEEKLY job, IOF level 2 update access is required. To get IOF level 2 update access, RACF "update" access is required to the resource name:

```
IOFACF.STA.U.JOBS.JOBN.WEEKLY
```

To change the performance group of WEEKLY, IOF level 4 update access is required. Therefore, RACF "alter" access is required to the resource name shown above.

Note how the third level of the resource name changed from "D" to "U" in the examples above to indicate the change from "display" to "update" access. Both examples above required "update" access to the resource name, because IOF level 2 access was needed in both cases.

Now, let's examine the flexibility the ALLOW macro above gives to the security administrator.

- Resource name 'IOFACF.STA.D.JOBS.JOBN.*' can be used to control display access to all jobs.
  - Users permitted RACF "update" access to this resource have level 2 IOF display access to all jobs in the system. They can select any job for review and browse the log, JCL and messages data sets.
  - Users permitted RACF "control" access to this resource have level 3 display access to all jobs. They can browse all data sets of all jobs.
  - No update access to jobs can be granted using this resource name.
- Resource name 'IOFACF.STA.U.JOBS.JOBN.PAY*' can be used to control update access to all jobnames beginning 'PAY'.
  - Users permitted RACF "update" access to this resource have IOF level 2 update access. They can cancel jobs, route them, or release their held data sets. They can also modify several job and data set characteristics. See B21ACESS for a complete description of all functions and parameters allowed with level 2 update access.
  - Users permitted RACF "control" access to this resource have IOF level 3 update access. They can hold jobs, release jobs, restart jobs, and change their input class and priority.

    - Users permitted RACF "alter" access to this resource have IOF level 4 update access. They can set independent mode and performance group.
    - No display access can be granted using this resource name.
- Resource name 'IOFACF.STA.*.JOBS.JOBN.PROD*' can be used to control both display and update access to all jobnames beginning 'PROD'.
    - Users permitted RACF "update" access to this resource have IOF level 2 display and update access. They can browse the log, jcl and messages data sets of jobs, cancel jobs, route jobs, and release their held data sets.
    - Users permitted RACF "alter" access to this resource have IOF level 4 display and update access. They can do anything to 'PROD' jobs.

Example 2. Let all users permit access to their own jobs.

```
ALLOW  3,2,JOBS,JOBNAME,*,ACF=USER
```

This macro lets individual users define security system rules that grant access to their own jobs. Note, however, that users are not permitted to grant display access higher than level 3, nor update access higher than level 2. This restriction prevents end users from permitting themselves to modify priority, class, and performance group of their own jobs.

A user can allow all users to browse the log, JCL, and messages data sets of all his jobs by entering the following RACF command:

```
ADDDSD IOFACF.STA.D.JOBS.JOBN.*   UACC(UPDATE)
```

The user's userid becomes the prefix because the resource name is not enclosed in quotes.

The user can then allow specific users to browse all the sysouts of his jobs by entering the following RACF command:

```
      PERMIT IOFACF.STA.D.JOBS.JOBN.*
ACC(CONTROL) ID(......)
```

The user can also control access to specific jobs he owns by defining and controlling resource names for the specific names of the jobs to be controlled.

Example 3. Let the system security administrator define operators of all devices by device name.

```
ALLOW  4,4,DEVICES,DEVNAME,*,ACF=GLOBAL
```

This ALLOW macro allows the system security administrator to define resource names that can be used to control all devices by device name. Users can be permitted to display all devices and initiators by permitting RACF read (IOF level 1) access to the resource name below. No device control commands or modifications can be permitted by this resource name:

```
IOFACF.STA.D.DEVI.DEVN.*
```

Operators can be allowed to display and update all attributes of all devices and initiators by permitting RACF alter (IOF level 4) access to the resource name below. Note that the third level of the resource name is generic, meaning that both display and update access are being granted.

```
IOFACF.STA.*.DEVI.DEVN.*
```

The remote 35 operator can be permitted to display all attributes of remote 35 devices, to issue most device commands and to alter many device attributes by permitting RACF read (IOF level 1) access to the resource:

```
IOFACF.STA.*.DEVI.DEVN.R35.*
```

The main console operator can be permitted to control all initiators by permitting RACF alter (IOF level 4) access to the resource:

```
IOFACF.STA.*.DEVI.DEVN.INIT*
```

27. Using IOF to Manage a Sysplex Environment

Introduction

IOF provides several functions that allow you to control all your JES2 systems from a single IOF session:

- **MAS** Command. Display basic JES2 information about all systems and easily start or stop any JES2 in the sysplex.
- **AT** Command. Activate an IOF server session on any system in your VTAM network. Access to IOF functions on the server session is carefully controlled. Some of the more useful functions are to:
  - Control JES2 devices defined on another CPU
  - Display CPU and I/O time for jobs running on another CPU
  - Browse sysout data not yet written to spool for jobs running on another CPU

Controlling Access to Sysplex Functions

You have complete control over which users are allowed to use the **MAS** and **AT** commands. By default, all users with TSO operator authority and all started tasks have the authority to use these commands. To change this, remove "SYSTEMS" from the STC= and/or OPER= parms of the SETACF macro in options member A60ACF.

Giving a user access to an IOF server on another machine in the sysplex (with the **AT** command) does not grant the user any privileges on that system. The user will only be allowed to do the IOF functions specifically permitted by the IOF on that system.

The examples below show how to selectively allow specific users to use these commands by adding ALLOW macros to options member B23ALLOW.

Example 1. Allow all users to use the **AT** command for any system in the sysplex, but do not allow them to use the **MAS** command:

```
ALLOW  0,1,SYSTEMS,SYSID,*,ID=*
```

Example 2. Allow selected users to use the **AT** command for the IPO3 system:

```
ALLOW  0,1,SYSTEMS,SYSID,IPO3,ID=(ABC*,XYZ*)
```

Example 3. Absolutely prevent any user except MSTROPER from using the **AT** command or displaying the JES2 system for system IPO2:

```
LIMIT  0,0,SYSTEMS,SYSID,IPO2,XID=MSTROPER
```

Example 4. Allow users with operator authority to use the **MAS** command but not overtype any display fields:

```
ALLOW  4,0,SYSTEMS,SYSID,*,UADS=OPERATOR
```

Example 5. Allow the same access as the macro above, but add permission to use the **AT** command:

```
ALLOW  4,1,SYSTEMS,SYSID,*,UADS=OPERATOR
```

Configuring Your Communications Protocol to Support the AT Command

See Chapter 28 for information about configuring APPC to support the IOF **AT** command. The IOF **AT** command may support additional protocols in the future.

Testing the AT Command

From the *IOF Option Menu*, enter "AT?" to view a menu containing these options:

Option 1. Displays the names and aliases from the B67SERV Option member. If no names are displayed or if changes need to be made, update B67SERV and run an abbreviated IOF generation as described in Chapter 4.

Option 2. Displays the names of systems that have printers and lines attached.

Option 3. **HELP** for the **AT** command. Command syntax and examples are given.

Option 4. **HELP** for the **AT** line command (*Job List Menu* for running jobs, MAS display).

Assuming you are running on system "1" and system "2" has an IOF server defined, enter:

```
AT 2
```

This will start an IOF server session and display the *IOF Option Menu* on system "2". The top left corner of the display will show that the display was built with data from system "2". Note that the first time IOF is initialized on a server from a client IOF session, a server "logon" must be done so a noticeable delay will be seen. The server session is kept active as long as

the client IOF session is active so that subsequent **AT** commands can be executed immediately.

From the server *IOF Option Menu*, you can issue any IOF options for which you are authorized. For example, entering the "PR" option will display the IOF printer panel for printers attached to system "2".

Terminate the remote IOF session exactly like you would terminate any IOF session, by successive **END** commands, **X** on the *IOF Option Menu*, etc. When the remote session terminates, the original IOF panel from which the **AT** command was issued will be redisplayed.

Optionally, you can enter IOF options on the **AT** command. For example, if you enter:

```
AT 2 M
```

the system monitor will be displayed on system "2". See Chapter 21 of the ***IOF User's Guide***,or enter "AT?" for a more complete description of using the **AT** command.

IOF SERVER Command

The IOF **SERVER** command is the base command used for establishing a server connection. The higher level **AT** command uses **SERVER**. When writing REXX execs or clists, it may be necessary to use the base SERVER function. In addition, the **SERVER** command can be used to establish communications with a server that has not been defined in the B67SERV option.

Syntax

```
SERVER  [protocol ADDR(net-address)] /[servname]
        [USER(userid password)]
        [CMD(initcmd)]
        [CLIST/Rexx]
```

---

protocol. The protocol to be used. APPC is currently the only supported protocol.

net-address. The network address. See the SERVER macro in Chapter 28 for a description of APPC network addresses.

servname. A server name or alias defined in the B67SERV option. Either a protocol and net-address, or a servname must be specified, but not both.

userid. The optional userid for the server session. The client's userid will be used if this parm is not specified.

password. The password associated with the userid above.

initcmd. The optional input parms that are passed to the server application when it starts. See the IOF command syntax for a description of the parms that can be specified. Any parm that can be specified on the IOF command can be passed.

CLIST/REXX. Specifies that this **SERVER** command came from a running client clist or REXX exec and that the server session should continue to fetch its input commands from the client clist. **TSICOPY** commands on the server automatically operate against the client clist unless there is also a nested clist started on the server. In this case **TSICOPY** will work by default against the local clist. You can specify TO(CLIENT) on **TSICOPY** commands to set clist variables back on the client from a local clist on the server.

28. Configuring APPC to Support the AT Command

APPC Programming Terms

Programming terms that apply to the IOF APPC server implementation include:

- Transaction Program (TP). An application program that uses APPC communications is a transaction program (TP). IOF becomes a client TP when it communicates with an IOF server TP on a remote machine. The client IOF session and the remote server IOF session are considered to be a single cooperative processing application that resides on two different systems.
- Conversation. The communication between the client IOF session and the remote IOF server is called a conversation. The client TSO or CICS IOF session initiates the conversation by "calling" the remote IOF server. Several MVS and VTAM parms are required on both the local and remote system to provide sufficient information to permit the conversation to be started.
- Logical Unit Type 6.2. Logical unit type 6.2 is the SNA addressable unit that manages the exchange of data between the client IOF session and the remote server IOF session. Logical units are defined to VTAM by APPL statements in SYS1.VTAMLST. LUs managed by MVS/APPC must also be defined by a LUADD statement in the APPCPMxx member of SYS1.PARMLIB.

Defining IOF APPC to MVS and VTAM

Several steps are required to define the IOF transaction processor to MVS and VTAM. This section describes each requirement and specifies the action that you should take for the requirement.

SYS1.PARMLIB(ASCHPMxx). The ASCHPMxx member of SYS1.PARMLIB defines scheduling characteristics of the APPC/MVS transaction scheduler. Section 4.1 of IBM Manual GC28-1807 (GC28-1503 pre-OS/390) provides a detailed description of this member. No default member is provided with MVS, but the IOF SAMPMOD data set includes sample ASCHPM00 which can be used to run the IOF APPC server.

***ACTION*: If you currently do not have any APPC running, copy ASCHPM00 from the IOF SAMPMOD data set to SYS1.PARMLIB. If you are currently running APPC, append ASCHPM00 from the IOF SAMPMOD data set to your existing ASCHPMxx member to add the IOFCLASS**.

```
CLASSADD
  CLASSNAME(IOFCLASS)
  MAX(99)         /*  maximum number of IOF servers  */
  MIN(1)
  RESPGOAL(1)
  MSGLIMIT(500)
```

SYS1.PARMLIB(APPCPMxx). The APPCPMxx member of SYS1.PARMLIB describes the VTAM LU names that APPC will use for communications between TPs. These names also must be defined to VTAM. (See Defining APPC Logical Units (LU) to VTAM below.)

No default member is shipped with MVS. Section 9.1 of IBM Manual GC28-1807 provides a detailed description of APPCPM00. IOF SAMPMOD data set member APPCPM00 defines a sample logical unit named IOFLU01.

You will need a unique VTAM LU name for each system where an IOF server is to execute. We recommend that these LU names contain (or imply) the name of the system that they represent.

***ACTION*: Use member APPCPM00 of the IOF SAMPMOD data set as a model to create member APPCM00 of SYS1.PARMLIB (or update your existing APPCPMxx member). Create one LUADD statement for each system where you will run an IOF server.**

```
LUADD
  ACBNAME(IOFLU01)     /*  unique name for each system  */
  SCHED(ASCH)
  BASE
  TPDATA(SYS1.APPCTP)
  TPLEVEL(SYSTEM)
```

Transaction Program Definition. Transaction programs (TP) are defined as TP profiles which are stored in a KSDS VSAM data set. The name of the data set is specified in the TPDATA parm of member APPCPMxx of SYS1.PARMLIB. The default data set name is SYS1.APPCTP. Secion 5.2.2.2 of IBM Manual GC28-1907 describes how to define SYS1.APPCTP.

***Action*: Define SYS1.APPCTP if you do not already have a TP Profile KSDS data set defined.**

ATBSDFMU Utility. Utility program ATBSDFMU is used to add and maintain TP profiles. TP profiles contain the transaction scheduling characteristics and the JCL to initiate the transaction. ATBSDFMU has several major commands:

- TPADD. Add a new TP
- TPALIAS. Create an alias for a TP name
- TPDELETE. Delete a TP or alias
- TPKEYS. List names of existing TPs (that the user is permitted to use).
- TPMODIFY. Modify an existing TP
- TPRETRIEVE. Retrieve existing TP definition

The M21APPC member in the IOF INSTALL library contains a sample job to run ATBSDFMU to add the IOF transaction program definition. This job assumes that SYS1.APPCTP is specified in the TPDATA parm of your APPCPMxx member of SYS1.PARMLIB. It adds the IOFAPPC transaction program (TP) to the system. You may want to define multiple transaction programs on some systems. Each TP can have unique JCL to provide special production and testing environments.

***ACTION*: Run the M21APPC job from the IOF INSTALL library on each machine that will support an IOF server. Check the JCL to insure that the SYSSDLIB DD statement points to the system APPCTP library for that system**. Define one or more IOF transaction programs on each system in the complex.

Defining a Logon Mode (LOGMODE) to VTAM. A VTAM logon mode contains the parameters and protocols that determine the communication characteristics of a session. The compiled version of logmode tables are in SYS1.VTAMLIB. APPC Logical Units (LU) require a LOGMODE entry in SYS1.VTAMLIB. ISTINCLM is the default LOGMODE table supplied with VTAM. It normally contains the #INTER logmode which is suitable for use with the IOF APPC transaction. See Section 8.4.1 of IBM Manual GC28-1807 (GC28-1503 pre-OS/390) for more information.

***ACTION*: If your installation is using the default VTAM log mode table, you already have the #INTER log mode defined and can use it in the SERVER macro below. Otherwise, define and install a suitable LU 6.2 log mode and specify its name instead. You can use the #INTER member of the IOF SAMPMOD data set as a guide. Add the definition to your SYS1.VTAMLST and assemble into SYS1.VTAMLIB**.

Defining APPC Logical Units (LU) to VTAM. You must define a logical unit to VTAM for each LUADD statement that was added to member APPCPMxx of the above SYS1.PARMLIB. Member ATBAPPL of the IOF SAMPMOD data set defines a sample VTAM logical unit named IOFLU01.

***ACTION*: Using the ATBAPPL member of the IOF SAMPMOD data set as a model, add an APPL statement to member ATBAPPL of SYS1.VTAMLST for each LUADD statement added to the above member APPCPMxx. The names of the APPL statements must match the ACBNAME parms of the LUADD statements**.

IOF B67SERV Option. Servers are defined to IOF in the B67SERV member of the IOF options library. One SERVER macro is included for each local and remote system that will have the ability to run an IOF server. SERVER macro syntax is defined in B67SERV.

The first positional parm of the SERVER macro must specify "APPC" to indicate the APPC protocol is to be used. Currently, APPC is the only supported protocol.

The second positional parm of the SERVER macro defines the network address for that server. The network address contains the APPC LU name, IOF transaction program name and logmode of the IOF server. The APPC LU name optionally can be prefixed by the VTAM network name when this is required to define a unique LU name.

Examples:

```
IPO1    SERVER APPC,'IOFLU01 IOFAPPC #INTER',                +
               ALIAS=(1,BATCH),PRINTERS=YES,LINES=YES,       +
               DESC='BATCH'
IPO2    SERVER APPC,'LOCNET.IOFLUO2 IOFAPPC #INTER',         +
               ALIAS=(2,TSO),                                +
               DESC='LOCAL TSO'
IPO3    SERVER APPC,'RMNET.IOFLUO2 IOFAPPC #INTER',          +
               ALIAS=(3,CICS),DESC='RMT CICS'
```

***ACTION*: Add one SERVER macro to B67SERV for each system that will run an IOF server. It is suggested that you use simple alias names to make IOF servers easier to use. Run an abbreviated IOF generation (see *Chapter 4*) to install the new B67SERV.**

Initializing APPC

The following commands are required to initialize APPC on each system:

```
S   ASCH,SUB=MSTR          (start scheduler)
S   APPC,SUB=MSTR          (start APPC)
V   NET,ACT,ID=ATBAPPL     (activate LU)
```

The **AT** command then can be used to access IOF APPC servers. See *Chapter 27* for information on testing the **AT** command.

29. IOF Mail and IOF Send

IOF Mail

In addition to providing email support for the IOF send commands, the IOF email interface also provides a simple but powerful interface for sending emails and downloading z/OS data sets to an email address.

To see a complete description of the IOF mail features, enter **IOFMAIL** on any IOF panel (under ISPF) and press the **HELP** key.

The IOF mail interface uses the z/OS SMTP interface to ship data in email format. All of the configuration options for the IOF Mail facility are found in the IOF options library member B95MAIL.

You can disable the mail facility completely (in B95MAIL) or allow it for only certain IOF groups. You can also control a number of other mail options at the IOF group level by specifying the MAIL... parms on GROUP macros in options member B23ALLOW. See options member B23$DOC for details.

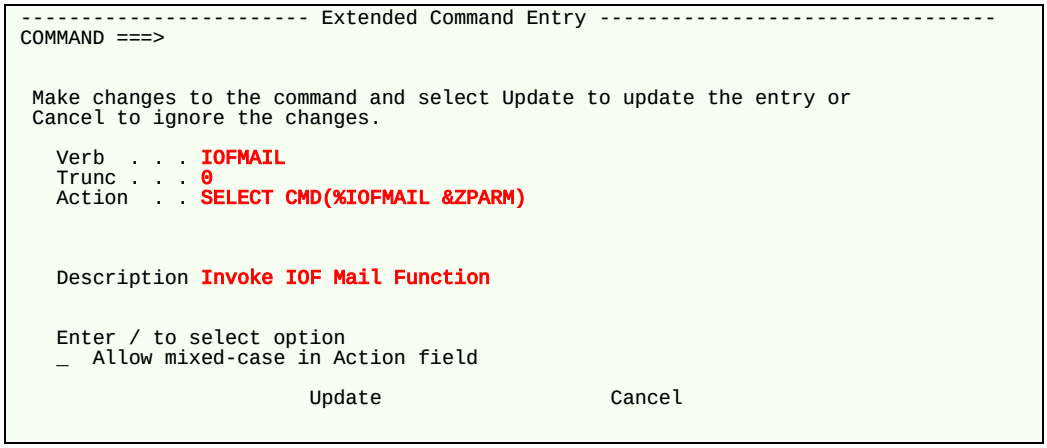
The email interface supports multiple zip products, and the desired zip product is specified in options library member B96SEND.

The IOFMAIL function can be invoked by entering the IOFMAIL command or by calling the IOFMAIL exec from another exec. Most users will access the IOFMAIL features from the IOFMAIL prompt panel, which is only available under ISPF. This panel is displayed in response to the IOFMAIL command.

There are several ways that the IOFMAIL command can be invoked under ISPF. When under IOF under ISPF, the user can always specify the IOFMAIL command to display the prompt panel.

To display the prompt panel when under ISPF (but not IOF) a user can specify “TSO IOFMAIL”. However, this will not work if your installation invokes IOF under ISPF with an interface exec that uses ALTLIBs to set up the IOF libraries. In this case users will only be able to enter the IOFMAIL command if they are already under IOF under ISPF.

To make the **IOFMAIL** command work from any ISPF panel without requiring the “TSO” prefix, an ISPF command table entry is required. Enter the items in **red** as shown below into the ISPF *Extended Command Entry* panel.



The IOF mail facility can also be invoked from a batch job. The HELP information gives several examples demonstrating this useful feature. To invoke IOFMAIL in batch you will need an IOFMAIL cataloged procedure. A sample is provided below:

```
//IOFMAIL  PROC DSNDS='your.iof.library.prefix'
//*
//*   Send an email
//*
//*   Enter HELP on IOFMAIL panel for complete details.
//*
//*
//IOFMAIL  EXEC PGM=IKJEFT1B,PARM='IOFMAIL *'
//STEPLIB   DD  DISP=SHR,DSN=&DSNDS..LOAD
//SYSTSPRT  DD  SYSOUT=*
//SYSPROC   DD  DISP=SHR,DSN=&DSNDS..CLIST
//SYSHELP   DD  DISP=SHR,DSN=&DSNDS..HELP
//SYSTSIN   DD  DUMMY
```

To see a complete description of the IOF mail features, enter **IOFMAIL** on any IOF panel (under ISPF) and press the **HELP** key.

IOF Send Interface

The IOF Send interface can be used to:

- Email a job's output from an IOF display in HTML format
- Include a selectable *IOF Job Summary* in the HTML output
- Email selected sysouts from an IOF display
- Allow a job to email a notice of its own completion
- Allow a job to email its complete return code summary
- Allow a job to email some of its own reports

To see a complete description of the IOF Send features, enter the **SEND** command on any IOF panel (under ISPF) and then press the **HELP** key.

All of the configuration options for the IOF Send facility are found in the IOF options library member B96SEND. You can disable the send facility completely (in B96SEND) or allow it only for certain IOF groups. You can also control other send options at the IOF group level by specifying the SEND... parms on GROUP macros in options member B23ALLOW. See options member B23$DOC for details.

The IOF Send interface supports multiple email interfaces. See options member B96SEND to select the desired email interface.

The IOF Send interface also supports multiple zip interfaces. See options member B96SEND to select the desired zip interface.

An IOFSEND cataloged procedure is required for the SEND functions that are invoked in a batch job. A sample is provided below:

```
//IOFSEND  PROC TO=,FROM=,DATA=,DSNDS='your.iof.library.prefix'
//*
//*   Send current job results using email. For simple
//*   applications you can use the TO=, FROM=, and DATA= parms.
//*   For more complex applications you should specify the parms
//*   in a SYSIN DD.
//*
//*      DATA=       Send just the IOF Job Summary
//*      DATA=JESDS  Add LOG, JCL and MESSAGES data sets
//*      DATA=ALL    Add all sysout data sets
//*
//*   Enter HELP on the IOF SEND panel for complete details.
//*
//SEND EXEC PGM=IKJEFT1B,
// PARM='IOFSNDME TO(&TO) &DATA FROM(&FROM)'
//STEPLIB  DD  DISP=SHR,DSN=&DSNDS..LOAD
//SYSTSPRT DD  SYSOUT=*
//SYSPROC  DD  DISP=SHR,DSN=&DSNDS..CLIST
//SYSHELP  DD  DISP=SHR,DSN=&DSNDS..HELP
//SYSTSIN  DD  DUMMY
```