Application Storage Manager™ (ASM)

ASM for S/390 NearOAM User Guide

Version 2.3

First Edition

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Introduction

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Introduction

This ASM/OAM User Manual provides all the information required for installation, implementation and operation of the ASM/OAM product for the enabling of ASM for S/390 support for the storage and retrieval of data objects using IBM's Object Access Method (OAM).

ASM/OAM was known in earlier releases as NearOAM. In order to provide continuity with previous releases, the user manual for this release will use the two names interchangeably. In general, references to the product itself will specify “ASM/OAM”; user interfaces supplied by this release of the software will continue to identify the product as “NearOAM”.

The manual assumes some familiarity with OAM concepts and its implementation, and also with storage management using the DFSMS constructs of storage group, storage class and management class. Information on these topics may be obtained from the appropriate IBM manuals where necessary.

Version 2.3 of the product will support all levels of OAM up to that distributed as part of DFSMSdfp V1.5. Section 1.3 of the manual lists all the pre-requisite software and hardware requirements for ASM/OAM implementation.

Implementation of version 2.4 or higher of Storage Technology's ASM for S/390 tape database management product is a pre-requisite for ASM/OAM installation. Users should refer to the ASM for S/390 User Manual for the version of ASM for S/390 installed at their installation for information regarding that product.

Any additional installation or release-dependent information not contained in this manual will be supplied to customers as part of the ASM/OAM distribution package.

New in Version 2.3:

Product changes introduced with ASM/OAM V2.3 consist of the following:

- The restriction on the maximum number of OAM storage groups which may be processed by the product (formerly 100) is removed. This removes restrictions on implementation of ASM/OAM with DFSMSdfp 1.5 (which removed the 100 storage group restrictions in OAM itself).

- As a consequence of the above change, ASM/OAM now executes using a single DB2 plan. The ability to run ASM/OAM with separate plans for each component has been withdrawn.

- The format of the SMF record created by ASM/OAM during object retrieval processing has been modified slightly. The 2-byte storage group identifier field in the storage group section has been replaced by an 8-byte storage group database name field. This has increased the length of the storage group section from 48 bytes to 54 bytes. Refer to section 4.5.3 on page 4.31 for a full description of the modified specification.

- New execution parameters ('LSRPOOL' and 'LEVEL') have been added to the object selection utility OTIMP100 to improve migration performance and allow direct storage of objects in any storage level in the ASM for S/390 database.

New in Version 2.2:

Product changes introduced with NearOAM V2.2 included the following:

- a new ENVCNTL parameter ('PLAN=') has been introduced to allow customers to specify a user-defined plan name to be used by NearOAM when connecting to DB2. This will optionally allow DBRMs shipped with the product to be bound as packages within the user-defined plan, rather than as individual plans as was required for previous releases.

- NearOAM now uses standard IBM-supplied DB2 views in order to access OAM storage group database tables, rather than accessing the tables directly by name.

- V2.2 now supports direct retrieval of an object from a NearOAM database by a calling application, without having to stage the recalled object to disk first. This option is controlled by a new set of parameters (STAGE|NOSTAGE) which have been supplied on the storage group definition in the STRGROUP parameter library member, and the MGMTCLAS parameter in the OBJCNTL parameter library member. Settings of these parameters will control whether an object is staged to disk or not during retrieval processing.

- Tape drive retention is now supported at storage level. The V2.1 RETAINTAPE facility has been extended to support specification at storage group level, in addition to global specification in the TAPECNTL parameter library member.

- SMF recording enhancements have been introduced. The number of timestamps, and range of information in an SMF record has been

extended to enable more detailed analysis to be performed on NEAROAM object retrieval processing.

- An MVS MODIFY command may now optionally be used to communicate with the NearOAM control region, instead of the existing operator reply mechanism.
- A new TAPECNTL parameter ('TAPEWAIT=') is available to control processing when an object retrieval request cannot be satisfied immediately by the NearOAM control region, due to the unavailability of one or more system resources. Use of this parameter will allow retrieval requests to be queued internally by NearOAM (up to a specified maximum time limit) until sufficient resources are available to satisfy the request.
- CSA storage modifications. MVS common system area (CSA) storage used by NearOAM is now allocated above the 16 Mb line.
- Storage class transition support. NearOAM V2.2 will modify an object's storage class during migration processing. Two new ENVCNTL parameters ('TAPECLASS' and 'DISKCLASS') are now provided to support this process.
- Full year-2000 compliance is supplied by this release of NearOAM.
- Initialization of the control region will now wait if DB2 is unavailable during start-up processing. Initialization will automatically continue when DB2 becomes available. A normal shutdown of the control region will be performed automatically if DB2 is stopped while the NearOAM control region is still active.
- support for migration of optical- or tape-resident OAM objects to NearOAM. A new set of EXEC parameters for the object selection utility OTIMP100 (SELDISK, SELOPT and SELTAPE) has been introduced to support this enhancement.
- support for customer-specification of the high-level qualifier used for all NearOAM system datasets. The new 'HLQ' parameter in the ENVCNTL parameter library member is supplied to control this process.

New in version 2.1:

Product changes introduced with NearOAM V2.1 included the following:

- Selection of objects for migration and expiration may now be based on management class transition date, rather than object creation date. The criterion to be used for selection control is specified at the management class level. A modification has been made to the management class parameter in the NearOAM 'MGMTCLAS'

parameter library member to enable creation date **or** management class transition date to be established as the object selection control for each management class.

- An object's management class may now be modified after successful recall from tape. Additional parameters (ORECALL and BRECALL) are provided in the MGMTCLAS member of the NearOAM parameter library to enable an object's management class to be modified after online recall (via an OSREQ macro) and batch recall (via the NearOAM batch pre-fetch utility).
- A new 'housekeeping' facility has been added to NearOAM control region processing. This will allow tapes to be retained on a drive for a user-specified length of time, after all retrievals from that tape have been satisified. The NearOAM control region will automatically release any tape which has been unreferenced during the specified time interval. A new parameter (RETAINTAPE) is provided in the TAPECNTL member of the NearOAM parameter library to control this facility.
- The version 1 batch pre-fetch utility is supplemented with a new CICS pre-fetch utility. This allows CICS applications to issue requests to NearOAM to pre-fetch objects from tape to disk. Prefetch processing is performed by the NearOAM control region, via background CICS tasks, allowing the requesting CICS user to continue with other work while object retrieval is being performed.

How to Update this Manual

Periodically you will receive documentation updates for this manual. Revised material will be indicated by a change bar in the left hand margin of the page.

A page may be revised due to a new software release, a fix to be applied to existing software, or an additional feature added to the software.

Where a documentation update requires insertion of additional pages, each additional page number will be suffixed by an insert number.

When you receive updates to the manual, insert the revised pages, and discard any outdated material. Note that this material is proprietary: please treat it as documentation confidential to your company.

Page Numbering

The page numbering scheme for this publication works as follows.

Document and Chapter Titles appear on every page. The Chapter Title is printed on the Page Header and the Document Title is printed on the Page Footer.

Pages are numbered consecutively within chapters, and each page number is preceded by the chapter e.g. Page 1.1 indicates Chapter 1, Page 1.

Where documentation updates require the insertion of additional pages, the page number will be suffixed by an insert number, for continuity reasons e.g. Page 1.1.1. indicates chapter 1, page 1, Insert 1.

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1 Product Description

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1.1 Introduction.

Storage Technology's ASM/OAM software product is designed to implement ASM for S/390 support for storage of data objects using IBM's Object Access Method (OAM). ASM for S/390 is a Storage Technology archival database management product, which primarily uses tape cartridge media for storage of archived objects. V2.3 onwards of ASM for S/390 also optionally enables disk copies of objects in an ASM for S/390 database to be retained. The product supplies a range of facilities to optimize the storage and retrieval of objects in an archive database. OAM is a component of DFSMSdfp.

Installation of ASM for S/390 on the host system is a pre-requisite for ASM/OAM implementation. Migrated objects are held on a standard ASM for S/390 database, each ASM for S/390 database consisting of a discrete set of tape cartridge volumes (plus optional disk copy datasets). ASM/OAM uses a separate ASM for S/390 database for each OAM storage group.

ASM/OAM enables applications designed to use OAM for storage of objects to store and retrieve objects from an ASM for S/390 database. No application modifications are required for implementation of this support. Version 2.3 of ASM/OAM includes support for all versions of OAM up to and including that supplied with DFSMSdfp version V1.5.

Existing or planned use of optical or tape devices in an OAM storage hierarchy is not affected by the introduction of ASM for S/390 support via implementation of ASM/OAM. Section 5.8 of this manual discusses issues concerning co-existence of OAM and ASM/OAM object management.

OAM objects are unformatted named strings of bytes. Usage and interpretation of the stored bytes is unknown to OAM. The access method is commonly used for storing document images, and is the access method employed by IBM's ImagePlus document image processing product. ASM/OAM will enable ImagePlus document images to be stored and retrieved from an ASM for S/390 database, in addition to storage platforms supported by the base OAM software.

Implementation of the product requires no modifications to applications which invoke OAM functions via the OSREQ macro interface. This means that customer-developed or vendor-supplied OAM applications (including ImagePlus) will be able to store and retrieve data objects in ASM for S/390 without modification.

As is the case for all ASM for S/390 applications, usage of ASM/OAM to access tape-resident objects in an online processing environment requires

the implementation of an automated tape processing facility, using the StorageTek 4400 ACS range of products.

There are no functional limitations in ASM/OAM which would prevent its implementation in a manual tape-processing environment, using free-standing tape cartridge drives. However, the need for manual operator intervention in this environment would mean that OSREQ requests issued from an online processing system (such as ImagePlus) which required access to a tape-resident object, would wait indefinitely for a response (depending on the time taken to manually satisfy the tape-handling request). A guaranteed level of service for processing these requests can only be supplied through the implementation of an automated tape handling strategy.

Note that ASM/OAM interfaces only with the access method OAM. The implementation of ASM for S/390 support for OAM using ASM/OAM requires no modifications to OAM itself. In particular, applications which use OAM via the standard IBM-supplied OSREQ interface to store and retrieve data will automatically be enabled for ASM for S/390 support of objects via ASM/OAM. No modifications to these applications are required.

1.2 Product Functions.

The functions supplied by the ASM/OAM product can be categorized into four main areas:

1. Object management.
2. Recall of migrated objects.
3. Deletion of migrated objects.
4. Object tape database maintenance.

These functions are discussed in the following sections.

1.2.1 Object management.

ASM/OAM provides an object management procedure which is used to migrate objects from OAM-owned disk, optical or tape storage to ASM for S/390, to automatically delete expired objects, and to remove staged recalled objects from disk as required.

The object management procedure is a scheduled batch process. Each procedure will process all objects within one OAM storage group. Multiple batch processes can be initiated concurrently to improve object management throughput.

ASM/OAM uses the management class of an object, as assigned explicitly via user request, or automatically via DFSMS Automatic Class Selection (ACS) routines, to control the management of OAM objects. Parameter members on an ASM/OAM parameter library (a partitioned dataset) are used to enable users to control the object management process, by identifying processing criteria for each active management class used in an installation for OAM object management.

The controls supplied via ASM/OAM parameter settings will govern the following areas of processing:

- Migration of objects from OAM to ASM for S/390, based on the number of days lapsed since date of object creation, number of days since management class transition, or number of days since last reference.
- Deletion of expired objects, based on the number of days lapsed since date of object creation, number of days since management class transition, or number of days since last reference.
- Deletion of staged recalled objects from disk, based on the number of days since the object's last reference.

The object management procedure should be run on a scheduled basis (eg) overnight, weekly etc. The procedure consists of executing three supplied ASM/OAM utilities in sequence. These utilities perform the following functions:

OTIMP100 - the object selection utility. This utility processes all objects in a specified storage group, and uses ASM/OAM parameters to select objects for migration, expiration or recall deletion. Migrated objects are written to an ASM for S/390 database.

OTIMP110 - the tape database backup control utility. This utility optionally creates backups of all primary tape datasets updated or created by ASM for S/390 processing in the object selection utility. Backup processing is performed via calls to the standard ASM for S/390 database backup utility.

OTIMP120 - the database update utility. Having successfully read and copied the ASM for S/390 data created by the object selection utility, the changes identified by OTIMP100 are now committed by the database update utility (ie) the DB2 tables used by OAM are updated to implement the modifications selected by OTIMP100. Migrated objects will now be accessed from ASM for S/390.

ASM/OAM supplies the job control language to execute this procedure for an identified storage group. Full reporting facilities are supplied by the ASM/OAM utilities to enable the external control and verification of the object management procedure. ASM/OAM also supplies automatic restart facilities which allow the object management procedure to be interrupted and restarted as often as required.

1.2.2 Recall of migrated objects.

ASM/OAM will automatically process all requests for access to ASM for S/390-resident objects which are made via the standard OSREQ interface from a batch, TSO or CICS processing environment. No modifications to the OAM application are required.

A ASM/OAM control region is started to enable ASM for S/390 support for OAM retrievals and deletions, via the OSREQ macro. The control region will dynamically interface to OAM during its initialization procedure; no amendment to OAM itself is required. Once initialized, all OSREQ requests for access to ASM for S/390-resident objects will be processed by the ASM/OAM control region.

The ASM/OAM control region will accept a range of operator commands to display information about the OAM ASM for S/390-processing configuration, and to allow control of that configuration. The control region may be terminated by operator command. After termination, ASM for S/390 support for OAM will be disabled.

Requests for retrieval of an ASM for S/390-resident object will be intercepted by ASM/OAM. The control region will locate and retrieve the object from its ASM for S/390 database. A retrieved object may be returned directly to the calling application (non-staged), or may be re-inserted into the OAM DB2 database table for the object's storage group (staged). The staging of objects during retrieval is controlled by ASM/OAM parameter library entries.

The ASM for S/390 copy of a staged recalled object is not deleted. The staged copy of the object will remain on disk until deleted via the ASM/OAM object management procedure. Once deleted, the object will revert to being ASM for S/390-resident, in its original location in the ASM for S/390 database. No re-migration of staged recalled objects is required before deletion.

The following factors will govern the length of time taken to access OAM objects stored on tape in an ASM for S/390 database:

- The time taken to mount a tape. This is dependent on the automatic library robot accessor utilization rate.
- The time taken to locate an object on a tape once mounted. This will depend on the amount of data held per ASM for S/390 tape volume (user-controlled via ASM for S/390 database initialization parameters).
- If objects are to be staged to disk during retrieval, the time taken to re-insert a retrieved object in an OAM DB2 database.
- Tape drive availability. Lack of tape drives will prevent immediate recall of objects from tape.

ASM/OAM provides the following controls to optimize tape recall performance:

- Specification of the maximum number of tape drives to be used by ASM/OAM for object retrieval. These controls are similar to those provided by the online recall component of ASM for S/390 (ie) drives required by ASM/OAM for tape object retrieval will be dynamically allocated and released as required, up to the maximum specified in the ASM/OAM drive control parameters.

- Parameterized controls are provided to allow users to limit the length of queues of retrieval requests for any one specific tape volume. All requests subsequent to the first for a mounted tape will be satisfied by repositioning the tape. However, it may take up to 30 seconds to reposition a tape; in order to provide a control over the length of time taken to retrieve any one object, a limit may be placed on the number of requests queued for an active tape.

If insufficient resources are available to satisfy an object retrieval request, ASM/OAM will reject the request with appropriate OSREQ return and reason codes, or may optionally queue the request internally until sufficient resources become available or until a customer-specified time interval has elapsed.

The above controls are specified using the ASM/OAM parameter library, and are processed during control region initialization. They may be dynamically adjusted during ASM/OAM operation via control region command processing.

ASM/OAM also provides a batch pre-fetch facility for bulk recall of objects from tape in a batch processing environment. This feature does not use the ASM/OAM control region for object recall. It is invoked via an application program interface and is intended to allow applications to identify multiple objects for pre-fetch processing (ie) retrieval prior to online access. Requests are batched by ASM/OAM and executed under control of the calling application. Batches of retrieval requests are processed in the most efficient manner possible in order to minimize the amount of tape handling activity required to satisfy them. All objects pre-fetched in this manner are staged back to disk, as described above. Objects may also optionally be deleted from an ASM for S/390 database after recall in this manner.

1.2.3 Deletion of migrated objects.

ASM/OAM will allow tape-resident objects to be deleted via the following facilities:

- OSREQ DELETE calls. These will be intercepted and deletes for ASM for S/390-resident objects processed by the ASM/OAM control region. Deletes for OAM-owned objects will be processed by OAM as normal.
- The object management procedure. Expiration controls, specified by management class via the ASM/OAM parameter library, will allow ASM/OAM to automatically delete OAM and ASM for S/390-owned objects which are to be expired.

- Automatic deletion of objects after recall using the batch pre-fetch facility. This is an optional feature which is controlled by the application issuing the pre-fetch requests. Recalled objects which have been deleted from ASM for S/390 will be OAM-owned once again, and will be processed by the ASM/OAM object management procedure in an identical manner to those objects which have never been migrated from OAM.

1.2.4 ASM for S/390 database maintenance.

All OAM objects which have been migrated from OAM by ASM/OAM are stored in standard ASM for S/390 databases, one database per OAM storage group. Each of these ASM for S/390 databases consists of one or more storage levels (each storage level containing multiple single-volume datasets, up to a maximum of 65535), and is indexed by a single VSAM KSDS dataset. ASM/OAM does not use the ASM for S/390 secondary indexing facility.

As objects are deleted from an ASM for S/390 database, the space used for storing that object in the database becomes inactive, and its index entry is deleted.

The base ASM for S/390 database maintenance utility must be executed to reclaim inactive space from within a tape cartridge volume. Refer to the ASM for S/390 User Manual for details of this procedure. The database maintenance procedure should be run on a periodic basis, and will reclaim inactive space from within a tape volume, by processing all tape datasets within the database whose level of active objects has fallen below a threshold which has been set by the user via the ASM for S/390 database administration procedure.

Active objects from within a tape dataset that is being recycled will be written forward to another dataset within the same ASM for S/390 database. The recycled dataset may then be released, and its tape volume may be returned to the appropriate scratch pool.

The ASM for S/390 database maintenance procedure makes it possible for tape cartridge volumes used for storage of OAM objects to be reused as often as required, and will minimize the cost of storage of migrated OAM objects on tape.

1.3 Pre-requisites for ASM/OAM implementation

In order to use ASM/OAM V2.3 on a system for implementation of tape support for storage and retrieval of OAM objects, the following software pre-requisites are required:

- OS/390 V1.1 or higher
- DFSMSdfp V1.1 onwards
- DB2 V3 or higher
- A standard implementation of OAM using the above software
- CICS/ESA or CICS/TS (if implementation of the ASM/OAM CICS interface is required)
- ASM for S/390 (formerly known as NearArchive) - V2.4 or higher
- Support for 3480/3490 device types.

The following hardware pre-requisites will be required:

- 3480/3490-compatible cartridge tape devices.
- A correctly sized STK 4400 ACS library configuration.

Sizing of the hardware requirements is dependent on a number of factors relating to the volume and usage of OAM objects which are to be migrated to tape. This may be a complex task, and should be performed in conjunction with the StorageTek customer support representative for your installation.

2 Installation and Implementation

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This section describes the activities required to install and implement ASM/OAM for use in migrating and retrieving OAM objects to and from ASM for S/390 in a host system environment.

After all activities described in this section have been successfully completed, ASM/OAM will be fully installed and ASM for S/390 support for OAM may then be enabled.

2.1 ASM for S/390 implementation.

ASM/OAM uses Storage Technology's archive database management product ASM for S/390 to perform its object migration and retrieval operations. Installation of ASM for S/390 on the same host system is therefore a mandatory pre-requisite for ASM/OAM implementation and use.

Prior to proceeding with ASM/OAM implementation, customers should verify that installation and implementation of ASM for S/390 has been completed successfully. Refer to the ASM for S/390 User Manual for details on implementation of this product. The installation verification procedure (IVP) supplied with the product should be executed to verify that ASM for S/390 has been successfully installed on the system on which ASM/OAM implementation is to be performed.

Note that ASM/OAM does not use CICS support within ASM for S/390. ASM for S/390 implementation and IVP activities relating to CICS need not be undertaken unless this support is needed for other (non-OAM) applications within the organization.

2.2 Initial ASM/OAM implementation procedures.

The following activities are required when installing ASM/OAM for the first time. A full description of each activity is provided in the section indicated in brackets. If upgrading from a previous release of ASM/OAM, skip this section and proceed with upgrade procedures at section 2.3.

__ 1. Install distribution libraries with SMP/E (2.2.1).

__ 2. Update ASM/OAM parameter library (2.2.2).

__ 3. Perform MVS host system modifications (2.2.3).

__ 4. Update ASM/OAM product authorization code (2.2.4).

__ 5. Perform DB2 system modifications (2.2.5).

__ 6. Perform CICS implementation activities (2.2.6).

__ 7. Define and initialize ASM/OAM system datasets (2.2.7).

__ 8. Define ASM for S/390 databases (2.2.8).

2.2.1 Install distribution libraries.

ASM/OAM V2.3 is distributed on a standard-labeled magnetic tape cartridge in SMP/E RELFILE format. The cartridge has a serial number of OTM230.

The distribution tape will contain the following datasets:

File	Dataset name	Contents
1	SMPMCS	SMP/E modification control statements for installation of the product.
2	STK.SOTM230.F1	SMP/E JCLIN file.
3	STK.SOTM230.F2	Partitioned dataset in IEBCOPY UNLOAD format containing JCL for use during product installation.
4	STK.SOTM230.F3	ASM/OAM distribution load library, in SMP/E RELFILE format.
5	STK.SOTM230.F4	ASM/OAM distribution DBRM library, in SMP/E RELFILE format.
6	STK.SOTM230.F5	ASM/OAM sample JCL library, in SMP/E RELFILE format.
7	STK.SOTM230.F6	ASM/OAM sample parameter library, in SMP/E RELFILE format.

To install ASM/OAM, perform the following steps:

1) Copy the installation JCL (file 3) from the distribution tape to disk. The following JCL may be used for this purpose:

```
//S1        EXEC PGM=IEBCOPY
//SYSPRINT    DD SYSOUT=*
//SYSIN       DD DUMMY
//SYSUT1      DD DISP=(OLD,KEEP),UNIT=unit-name,
//              VOL=(,RETAIN,SER=OTM230),
//              LABEL=(3,SL,EXPDT=98000),
//              DSN=STK.SOTM230.F2
//SYSUT2      DD DISP=(NEW,CATLG),
//              DSN=ASM/OAM.install.JCL.library,
//              SPACE=(TRK,(5,5,10)),UNIT=unit-name,
//              VOL=SER=volser
```

On completion of the above step a partitioned dataset containing JCL to be used during the remainder of the installation process will have been created.

2) Edit member SMPEDEF from the installation JCL dataset unloaded in the preceding step, as described within the dataset member itself. This job will define and initialize the SMP/E consolidated software inventory (CSI) dataset and create other SMP/E system datasets and the ASM/OAM target and distribution libraries. If any of these datasets are already in existence, delete them prior to running this job or amend the job to remove dataset creation or initialization processing, as required.

   After editing the member, submit it. Verify that all job steps complete with condition code 0, and that all datasets are created and cataloged successfully.

3) Edit JCL member SMPERCV, as described within the member itself. This job performs SMP/E RECEIVE processing for the ASM/OAM V2.3 function SYSMOD.

   After editing the member, submit it. Verify that SMP/E processing has completed with condition code 0.

4) Edit JCL member SMPEAPP, as described within the member itself. This job performs SMP/E APPLY processing for the ASM/OAM V2.3 function SYSMOD.

   After editing the member, submit it. Verify that SMP/E processing has completed with condition code 0.

5) Optionally edit and submit JCL member SMPEACC. This job performs SMP/E ACCEPT processing for the ASM/OAM V2.3 function SYSMOD. Processing of this job may be deferred until later. However, no service can be applied to the product until SMP/E ACCEPT processing has been performed successfully.

The ASM/OAM product distribution libraries will have been successfully created on completion of the above steps. Continue with product installation processing at section 2.2.2.

2.2.2 Update ASM/OAM parameter library.

The ASM/OAM parameter library unloaded in the previous step will contain sample parameters for the following four ASM/OAM parameter library members:

ENVCNTL	parameters which inform ASM/OAM of its operating environment.
OBJCNTL	parameters which control ASM/OAM processing of objects for deletion and migration.
STRGROUP	parameters which inform ASM/OAM of the OAM storage group configuration in use.
TAPECNTL	parameters which control the ASM/OAM control region configuration and environment.

After unloading the sample parameter library, review all parameter values, and amend as necessary to reflect the host system's operating environment, and your own requirements for ASM/OAM migration and retrieval processing.

Refer to chapter 3 of this manual for a full description of the ASM/OAM parameter library and the format of individual parameters.

2.2.3 Perform MVS host system modifications.

The following MVS system changes will be required in order to implement ASM/OAM:

a. APF-authorize ASM/OAM and ASM for S/390 load libraries.

The ASM/OAM load library (file 1 from the distribution tape) and the ASM for S/390 load library (created during the ASM for S/390 installation process) should both be APF-authorized (APF-authorization is optional for stand-alone ASM for S/390 operation). Refer to IBM system documentation for a description of how to perform this procedure on your system.

b. Create ASM/OAM control region procedure.

The JCL member NEAROAMC from the distributed JCL library (file 3 on the distribution tape) should be copied to a system procedure library and amended as appropriate. Update the procedure with the names of the load and parameter libraries created during the distribution tape unload process. A listing of the distributed NEAROAMC procedure is given in appendix A.

The NEAROAMC procedure must be started in order to initiate ASM/OAM control region processing. Note that the control region started task **must** be called 'NEAROAMC'.

c. Assign ASM/OAM user identification.

A unique system user identification (eg. NEAROAMC) should be assigned for ASM/OAM use, using whatever system security product is installed on the host system.

This user id should be assigned to execution of the ASM/OAM control region, and to all ASM/OAM utility jobs.

The ASM/OAM user id may be used to control access to protected system resources, as determined by the system security administrator. It will also be used by DB2 in controlling access to OAM directory and storage tables (see section 2.2.5 of this chapter).

d. Update the system Program Properties Table (PPT).

The PPT should be updated in order to identify the ASM/OAM control region program OTIMP200 as a non-swappable system task. Refer to IBM system documentation for a description of how to perform this procedure on your system.

The following is an example of how to specify the PPT entry in the appropriate SCHEDxx member of SYS1.PARMLIB:

```
PPT          PGMNAME(OTIMP200)
             NOSWAP
             SYST
```

e. Update FLPA or MLPA definitions.

To allow ASM/OAM OSREQ intercept processing to be enabled, the IBM-supplied OSR interface module CBRINIT0, and its alias CBRIINC2, and the ASM/OAM-supplied modules OTIMP300 and OTIMP310 must be installed in the fixed link pack area (FLPA), or modified link pack area (MLPA).

There are no functional considerations for ASM/OAM between installation of these modules in the FLPA or MLPA, and consequently the choice may be left to the system programmer responsible for the administration of the system on which the installation is being performed.

Using the FLPA will eliminate paging for execution of the modules identified above, but will reduce the total amount of real storage available for system use by about 650k bytes. This may consequently increase overall system paging rates. If the amount of real storage available is limited, allow the above modules to be paged as normal by installing them in the MLPA.

To install in the FLPA, perform the following tasks:

- Add the modules OTIMP300, OTIMP310, CBRINIT0 and CBRIINC2 to the member IEAFIXxx in SYS1.PARMLIB. OTIMP300 and OTIMP310 are on the distributed ASM/OAM load library - these should be moved to an authorized library in the LPALST or LNKLST concatenations. CBRINIT0 and its alias CBRIINC2 should be present in the system LPA library SYS1.LPALIB.
- Add the NOPROT option to the FIX parameter in the IEASYSxx member in SYS1.PARMLIB, as follows:

```
FIX = (xx,NOPROT)
```

To install in the MLPA, perform the following tasks:

- Add the modules OTIMP300, OTIMP310, CBRINIT0 and CBRIINC2 to the member IEALPAxx in SYS1.PARMLIB. OTIMP300 and OTIMP310 are on the distributed ASM/OAM load library - these should be moved to an authorized library in the LPALST or LNKLST concatenations. CBRINIT0 and its alias CBRIINC2 should be present in the system LPA library SYS1.LPALIB.
- Add the NOPROT option to the MLPA parameter in the IEASYSxx member in SYS1.PARMLIB, as follows:

```
MLPA = (xx,NOPROT)
```

f. Add OTIMP055 to the PLPA.

Module OTIMP055 from the distributed ASM/OAM load library must be moved to a library in the system LPALST concatenation, for installation in the pageable link pack area.

Note that it is essential that this module be MOVED from the ASM/OAM load library, and not just copied. Any attempt to execute this module from outside the PLPA may cause a S047 abend during ASM/OAM operation.

Alternatively, copy the module to a LPA library, and then rename it on the ASM/OAM load library.

g. Allocate ASM/OAM SMF record identifier.

The ASM/OAM control region will optionally create SMF records during object retrieval processing. This option is controlled via the SMFRECID parameter in the ENVCNTL parameter library member.

If it is required that ASM/OAM should create SMF records, a unique SMF user record identifier (in the range 128-255) should be assigned for ASM/OAM use. The allocated value should then be identified to ASM/OAM via the ENVCNTL SMFRECID parameter.

h. Perform tape management system changes.

Primary tape datasets created by ASM/OAM will all have a high-level qualifier of

```
'hlq.G*'
```

where ‘hlq’ is the high-level qualifier defined for the ASM for S/390 database for the storage group containing the tape volume (see section 2.2.8).

Backup or duplex tape datasets (as created during object migration) will all have high-level qualifiers of

`'hlq.xn.G*'.`

where ‘hlq’ is the high-level qualifier defined for the ASM for S/390 database for the storage group containing the tape volume (see section 2.2.8), ‘x’ is the copy identifier, and ‘n’ is the ASM for S/390 storage level (‘0’ or ‘1’). The copy identifier ‘x’ may take the following values:

B - indicates the primary backup copy created by the database backup utility OTIMP110. This copy will not be created if ‘BACKUP=NO’ has been specified in the job EXEC parameters used during execution of the database backup utility.

C - indicates the duplex copy created during the object migration process (by object selection utility OTIMP100). This copy will only be created if ASM for S/390 duplexing has been enabled for the storage group.

D - indicates the duplex backup copy created by the database backup utility OTIMP110. This copy will only be created if ASM for S/390 backup duplexing has been enabled for the storage group.

Any tape management software present on the system should be amended as required to establish appropriate scratch pool and retention period controls. If required, the retention period or expiry date of tape volumes created in an ASM for S/390 database may be specified via the ASM for S/390 database administration procedure, in TSO/ISPF.

Where possible, a retention period of ‘CATALOG’ should be established for each ASM/OAM scratch pool. When used with the ASM for S/390 ‘AUTOUNCAT’ facility, this will facilitate automatic return of tape volumes to the scratch pool after release by the ASM for S/390 database maintenance utility. Refer to the ASM for S/390 User Manual for further information about tape scratch pools and the tape database maintenance utility.

Primary or secondary ASM/OAM tape datasets will be released under the following circumstances:

- The ASM for S/390 tape backup utility will automatically uncatalog backup datasets which are being recreated during the migration process (this will occur when objects are added to a partially-used volume during the migration process; the backup of the partially-used volume will be released).
- The ASM for S/390 tape database management utility will release volumes from within a storage group database which contain less than a user-supplied threshold of active objects. Released volumes will be automatically uncataloged by the utility if the AUTOUNCAT option has been specified for that storage group database via the ASM for S/390 database maintenance facility.

i. Perform STK Host Software Component (HSC) changes.

The relevant modifications should be made to the HSC software which controls operation of the StorageTek library configuration and environment, in order to ensure that scratch tapes used during the ASM/OAM object migration process are located within the library configuration. All ASM for S/390 tape datasets will have a high level qualifier as specified during the ASM for S/390 database definition procedure (see section 2.2.8).

It is essential for object retrieval processing that all primary volumes within an ASM for S/390 database can be mounted automatically in response to an object recall request. For this reason, all such cartridges should be located within a StorageTek library configuration.

Appropriate controls should also be established to handle creation of backup and duplex tape datasets as required (eg) use scratch tapes from non-library drives with automatic cartridge loaders (for subsequent storage on library shelving), or use scratch tapes from within a remote library configuration (for automatic offsite storage).

Refer to the relevant StorageTek manual, or contact your StorageTek Software Support Representative (SSR) for details on how to implement the above controls.

j. Update automated reply software controls.

Occasionally, it may happen that there are no tape drives available to satisfy a request from ASM/OAM for object retrieval from a non-mounted tape volume.

When this occurs, normal allocation recovery processing will be performed by the host system control program, resulting in the display of message IEF247I followed by the following message:

```
IEF238D jjj - REPLY DEVICE NAME, 'WAIT' OR CANCEL'
```

While this reply is outstanding, ASM/OAM will be unable to service the request which caused allocation recovery to be entered.

To avoid any unnecessary and unpredictable delays due to this situation, any automated operator reply facility which is present on the host system should be configured to reply 'CANCEL' to the above message for any ASM/OAM retrieval request (ie) a request for retrieval from an ASM for S/390 tape dataset.

ASM/OAM will handle a reply of 'CANCEL' in the following manner:

1. For OSREQ RETRIEVE requests, which will be processed by the ASM/OAM control region, an 'archiving busy' response will be raised by ASM/OAM. Control will then be returned to the caller as OSREQ error return and reason codes (refer to chapter 8 of this manual for a description of these codes), or optionally the request will be held internally in ASM/OAM until a tape drive becomes available or until a customer-specified time interval has elapsed (at which time the request will be rejected as above). For rejected requests, the calling application may be amended to handle this type of error in a special manner (eg) to display a retry message to the end user.

2. For retrievals requested via the ASM/OAM batch pre-fetch utility, ASM/OAM will retry the allocation at one-minute intervals, up to a retry limit of 30. If, after this limit has been reached, allocation has still not been successful, an 'archiving busy' response will be raised by ASM/OAM and returned to the caller in the parameter interface area used by the utility.

k. Define DFSMS storage classes.

The storage class of objects which have been migrated from OAM to ASM/OAM ownership will be modified to that specified (or defaulted) in the TAPECLASS parameter entry in the ENVCNTL parameter library member.

The storage class of migrated objects will not normally be modified following successful migration. An exception to this is when migrated objects are pre-fetched using the ASM/OAM batch pre-fetch utility, and deleted from ASM/OAM (pre-fetch request code ‘02’). During this process the storage class of these objects will be modified to that specified (or defaulted) in the DISKCLASS parameter entry in the ENVCNTL parameter library member.

This processing requires the following DFSMS storage classes to be specified:

- TAPECLASS.

  The storage class specified in the TAPECLASS parameter entry of the ENVCNTL parameter library member (or the default value of NEARTAPE) must be defined via a dummy entry in ISMF. All performance objective fields in this entry should be left blank. All other fields should be set to 'N' (where appropriate) or left blank. ASM/OAM does not use any of these values for performance or storage management purposes; these facilities are supplied by ASM for S/390.

  Note that the storage class specified here is for internal use by ASM/OAM only. External applications should not reference this storage class directly; unpredictable results may occur otherwise.

- DISKCLASS.

  The storage class specified in the DISKCLASS parameter entry of the ENVCNTL parameter library member (or the default value of DB2DASD) must be defined via an entry in ISMF. Fields in this entry should be set as required for standard OAM disk management functions.

l. Define new storage classes in OAM.

After defining new storage classes to DFSMS, as described in the preceding section, it is also necessary to define these storage classes to OAM. This will result in the addition of one new row in the OAMADMIN storage class identifier table for each new storage class. Note that this step is not required if no new storage class was defined in the preceding step.

This may be achieved by one of the following methods:

a) Store a dummy object in any existing OAM object collection using the OSREQ TSO command processor, specifying the new storage class in the STORAGECLASS parameter (eg) the following OSREQ TSO command may be used to add a new entry for storage class NEARTAPE:

```
OSREQ STORE COLLNAME DUMMY.OBJECT MANAGEMENTCLASS(DISK) -
      STORAGECLASS(NEARTAPE) LENGTH(1024)
```

   This will automatically create an entry for NEARTAPE in the OAMADMIN storage class identifier table, if one did not exist already. The dummy object may be deleted after completion of this operation.

b) Use SPUFI to directly add a row to the OAMADMIN storage class identifier table (eg) the following SQL may be used via SPUFI to add an entry for storage class NEARTAPE:

```
INSERT INTO OAMADMIN.CBR_STO_CLASS_TBL
  (ODSCNUM, ODSCNAME) VALUES(n, 'NEARTAPE');
```

where ‘n’ is a numeric value specifying a unique storage class identifier to be associated with storage class NEARTAPE.

2.2.4 Update ASM/OAM product authorization code.

ASM/OAM must be authorized to run on the customer's processor(s). One or more 8-byte authorization codes are supplied with the product in the accompanying documentation. Any update or refresh of these codes may be obtained by contacting ASM/OAM product support.

One authorization code is supplied for each processor on a customer site which requires access to the ASM for S/390 product library. All logical partitions within a partitioned processor will be authorized via a single authorization code.

To authorize the product, IBM utility program AMASPZAP (Superzap) must be run to update the authorization module OTIMP050 in the distributed load library.

Use the following parameters:-

```
NAME OTIMP050 AUTHCODE
REP  nnnn  xxxxxxxx,yyyyyyyy
```

where nn = 0000 for authorization code 1
0008 " " " 2
0010 " " " 3
0018 " " 4 etc.

and 'xxxxxxxxyyyyyyyy' is the supplied authorization code(s).

ASM/OAM will accept a maximum of 10 codes. All processors which have shared access to a single ASM/OAM load library should be authorized in module OTIMP050 in that library.

NOTE: ASM/OAM is authorized for execution on designated processors only. Any planned change or upgrade to a customer's host processor(s) should be communicated in advance to ASM/OAM product support, so that new or additional authorization codes may be supplied.

2.2.5 Perform DB2 system modifications.

The DB2 system which is in use by OAM (for which ASM/OAM is to supply tape support) must be updated with details of the views and plan(s) required by ASM/OAM, and to grant appropriate authority for access to plans and tables. The following activities will need to be performed:

a. Create OAM database views.

V2.3 of ASM/OAM uses the following standard views for accessing each OAM storage group database:

xxxxxxxx.V_OSM_OBJ_DIR for accessing table
xxxxxxxx.OSM_OBJ_DIR;

xxxxxxxx.V_OSM_04K_OBJ_TBL for accessing table
xxxxxxxx.OSM_04K_OBJ_TBL;

xxxxxxxx.V_OSM_32K_OBJ_TBL for accessing table
xxxxxxxx.OSM_32K_OBJ_TBL;

where 'xxxxxxxx' is the DB2 database name qualifier assigned to a storage group ('GROUP00' etc.).

These views are created during initial OAM installation in the IBM-supplied job CBRISQL. Ensure that these views are correctly defined for all storage groups required for standard OAM use. Refer to IBM documentation on OAM installation for additional information on defining these views.

b. Create ASM/OAM application plan.

ASM/OAM requires a single DB2 plan for execution. The plan name is specified via the PLAN keyword parameter of the ENVCNTL parameter library member (see section 3.2.6 on page 3.10). If omitted, a default plan name of 'OTIMPLAN' is used.

It should be noted in this context that DBRMs shipped with the base product or with service packages are created with the VERSION(AUTO) pre-compiler option. This will allow multiple copies of the same package to be bound to a single DB2 plan, to allow different versions of ASM/OAM programs to execute using that plan. Alternatively, separate plans can be created and execution controlled via use of the PLAN keyword parameter in the ENVCNTL parameter library member.

Edit member OTIMPKG in the distributed ASM/OAM JCL library (file 3 on the distribution tape). This contains JCL to create DB2 packages from

DBRMs supplied with the product. The JCL in this member should be executed once for each OAM storage group to be accessed by ASM/OAM. Instructions for editing the JCL are provided at the top of the file.

After executing member OTIMPKG for each OAM storage group to be accessed by ASM/OAM, edit and submit member OTIMBIND in the distributed ASM/OAM JCL library (file 3 on the distribution tape). This contains JCL to create the application plan to be used by ASM/OAM. Again, instructions for editing the JCL are provided at the top of the file.

A copy of the supplied OTIMPKG and OTIMBIND jobs can be found in appendix A of this manual.

c. Grant authorities for ASM/OAM plan access.

Member OTIMGRNT in the distributed ASM/OAM JCL library supplies a job to grant authority for execution of the plan created in the previous step.

Edit this member in order to update:

- The name of the DB2 subsystem in the DSN statement.
- The name of the DB2 runtime load library in your installation in the RUN statement.
- The PLAN name in the RUN statement which matches your installed DB2 system.
- The name of the ASM/OAM PLAN.

After updating this member, submit the job. A copy of the supplied OTIMGRNT job can be found in appendix A of this manual.

d. Grant authorities for ASM/OAM access to OAM administration, directory and object storage databases.

During normal operation, ASM/OAM will need to access and update certain DB2 tables owned by OAM. The following table identifies these database tables and the level of access required to each.

Table name	***Access required***
OAMADMIN.CBR_MGT_CLASS_TBL	SELECT
OAMADMIN.CBR_STO_CLASS_TBL	SELECT
OAMADMIN.CBR_COLLECTION_TBL	SELECT
xxxxxxxx.OSM_OBJ_DIR	SELECT,DELETE, UPDATE
xxxxxxxx.OSM_04K_OBJ_TBL	SELECT,DELETE, INSERT
xxxxxxxx.OSM_32K_OBJ_TBL	SELECT,DELETE, INSERT

Each set of 'xxxxxxxx' tables will occur once for each storage group which is active on the host system for storage of OAM-controlled objects, where 'xxxxxxxx' is the DB2 database name qualifier assigned to each storage group ('GROUP00' etc.). Each of these sets will require authorization for the access levels identified above.

You should grant the above table access authorities to the user identifier assigned to ASM/OAM during system installation (see section 2.2.3 of this manual).

In addition, the above access authorities will also need to be granted to all users who will be invoking the ASM/OAM batch pre-fetch interface. See chapter 6 of this manual for a description of this facility.

2.2.6 Perform CICS implementation activities.

In order to allow ASM/OAM to intercept all OSREQ requests made from CICS applications, the ASM/OAM CICS interface needs to be initialized. The following CICS-related amendments will be required for this purpose:

a. CICS resource definitions.

The following comments should be read carefully before defining the required CICS resources:

- ASM/OAM CICS modules are used to enable (OTIMP230) or disable (OTIMP240) ASM/OAM interception of system-wide CICS OSREQ requests (ie) OSREQ requests issued from any CICS region running on that host system, not just the region from which the initialization request was issued.

- Careful consideration should therefore be given to the manner in which enabling and disabling this facility is performed in situations where multiple CICS regions within a single MVS host have been initialized for OAM access (a CICS region is initialized for OAM access via an entry for program CBRICONN in its startup program list table (PLTPI)).

- For ImagePlus users, the CICS region used by the Object Distribution Manager (ODM) component will have been initialized for OAM access. This region should therefore be included in the list of identified CICS regions within a host system which will be issuing OSREQ calls. If no other CICS region in the system has been initialized for OAM, then the ODM region should be used to enable and disable the ASM/OAM CICS interface.

Use the following guide to determine which region should be used to perform ASM/OAM CICS processing:

(i) Single CICS OAM system

If only one CICS region on an MVS host has been initialized for OAM access, then that region must also be used to enable and disable the ASM/OAM CICS interface. All resource definitions identified below should be made in that CICS system.

(ii) Multiple CICS OAM systems

In situations where more than one CICS system on an MVS host has been initialized for OAM access, the ASM/OAM CICS interface should be enabled in the region which is started first during normal operation (eg) at start-of-day processing. The program definition for OTIMP230 and transaction definition for OM23, and the PLTPI table entry for program OTIMP230 should be made in that CICS system.

Disabling the ASM/OAM CICS interface should be performed in the region which is shutdown last during normal operation (eg) at end-of-day processing. The program definition for OTIMP240 and transaction definition for OM24, and the PLTSD table entry for program OTIMP240 should be made in that CICS system.

Note from the above, that in the case where multiple CICS systems have been initialized for OAM access, it is not necessary for all CICS resource definitions for the ASM/OAM CICS interface to be solely contained within a single CICS system.

After determining the CICS region(s) to be used for enabling and/or disabling the ASM/OAM CICS interface, the following CICS resources should be defined, using the CICS Resource Definition Online (RDO) facility, or via CICS table entries:

Programs (RDO):

```
DEFINE PROGRAM(OTIMP230)
       LANGUAGE(ASSEMBLER)

DEFINE PROGRAM(OTIMP240)
       LANGUAGE(ASSEMBLER)
```

Note: When using CICS V3.3 or higher, the EXECKEY parameter used when defining the above programs via RDO should be set to the value of 'CICS'.

Transactions (RDO):

```
DEFINE TRANSACTION(OM23)
       PROGRAM(OTIMP230)

DEFINE TRANSACTION(OM24)
       PROGRAM(OTIMP240)
```

Program List Table - post-initialization (PLTPI)

```
OTIMP230 DFHPLT TYPE=ENTRY,                                *
               PROGRAM=OTIMP230
```

This entry must be included after the entry for the CICS OAM interface (program CBRICONN).

Program List Table - shut-down (PLTSD)

```
OTIMP240 DFHPLT TYPE=ENTRY,                                *
               PROGRAM=OTIMP240
```

This entry should be made in the first phase of the PLTSD (ie) before the DFHDELIM entry.

b. CICS JCL changes (ASM/OAM initialization region only).

The following CICS JCL change is required for the CICS region(s) in which the ASM/OAM CICS interface will be enabled and/or disabled (ie) the region(s) in which ASM/OAM CICS table entries have been added:

- Add the distributed ASM/OAM load library (file 1 from the product distribution tape) to the CICS DFHRPL concatenation.

c. Resource definitions for the CICS pre-fetch utility.

If the CICS pre-fetch utility is in use, the following CICS resources should be defined (refer to section 6.5 on page 6.22 for a description of the CICS pre-fetch utility and its utilization):

Transactions (RDO):

```
DEFINE TRANSACTION(OM26)
       PROGRAM(OTIMP260)
       TCLASS(n)
```

The TCLASS operand is only required if a limit is to be placed on the number of pre-fetch requests which are to be processed concurrently (see section 6.5 on page 6.22). In this case, use a unique value (in the range 1-10) for this transaction definition.

The above definition should be added to the CICS system in which the background pre-fetch task (OM26) is to execute. If pre-fetch requests are to be issued by applications running in another region (using MRO or ISC facilities), then the following transaction definition should be added in that region:

```
DEFINE TRANSACTION(OM26)
       REMOTESYSTEM(xxxx)
```

where 'xxxx' is the identifier of the CICS system in which the pre-fetch task is to be executed.

Programs (RDO):

```
DEFINE PROGRAM(OTIMP255)
      LANGUAGE(ASSEMBLER)
```

This program must be defined in all CICS systems from which applications will issue pre-fetch requests.

```
DEFINE PROGRAM(OTIMP260)
      LANGUAGE(ASSEMBLER)
```

This program must be defined in the CICS system(s) in which the background pre-fetch task OM26 will execute.

Resource Control Table (RCT) entries.

```
DSNCRCT TYPE=ENTRY,TXID=OM26,PLAN=CBRIDBS,TWAIT=YES
```

This entry must be made in the CICS system in which the background pre-fetch task OM26 will execute. Parameters not specified in the above entry may be set as required. The number of DB2 threads set for this transaction should not be less than the value set for the maximum number of transactions of this class which may execute concurrently.

2.2.7 Define and initialize ASM/OAM system datasets.

ASM/OAM requires a deletion control dataset for each storage group from which OAM objects are to be migrated to ASM for S/390. Each deletion control dataset will have the following name:

```
hlq.xxxxxxxx.OTM.dddd.DELETE.CONTROL
```

where ‘hlq’ is the optional high-level qualifier specified in the HLQ sub-parameter for the storage group entry in the STRGROUP parameter library member, and ‘xxxxxxxx’ is the DB2 database name qualifier assigned to the OAM storage group (‘GROUP00’ etc.). Identifier 'dddd' in each of the dataset names will be set to the name of the DB2 subsystem to be used by ASM/OAM.

The ASM/OAM delete control dataset is a VSAM KSDS which is used to pass information between the steps which are executed during the ASM/OAM migration procedure, and for restarting migration after job failure. It must be allocated via the AMS DEFINE command prior to first migrating objects from the associated storage group. This dataset is automatically deleted and redefined, using user-supplied AMS parameters, at successful completion of an ASM/OAM object migration procedure.

Member GPXXDEF on the distributed JCL library provides a sample job for defining and initializing the deletion control dataset for storage group 'xxxxxxxx'. Amend and submit this job once for each OAM storage group which is to be processed by ASM/OAM. A copy of the supplied GPXXDEF job can be found in appendix A of this manual.

This member should be edited before submitting each job by updating all occurrences of the following character strings:

hlq: the name of the high-level qualifier to be prefixed for all ASM/OAM system datasets, as specified in the ENVCNTL ‘HLQ’ parameter. If no HLQ parameter is specified, omit this value and the trailing period mark(.).

xxxxxxxx: this should be set to the DB2 database name qualifier (‘GROUP00’ etc.) assigned to the storage group for which ASM/OAM is being initialized.

dddd: The name of the DB2 subsystem to be used by ASM/OAM for processing this storage group.

eeee and ffff: the primary and secondary allocation values for the ASM/OAM deletion control dataset for this storage group. This dataset will contain one record for each object that has been selected for processing (ie. migration, expiration or deletion of a recalled object) during execution of the migration utility.

Ensure that these values are sufficient to contain the highest number of objects that are expected to be processed in any one execution of this utility for this storage group.

vvvvvv: The serial number of the disk volume to be used for allocating the ASM/OAM deletion control dataset for this storage group.

2.2.8 Define ASM for S/390 storage group databases.

ASM/OAM uses Storage Technology's ASM for S/390 product for storage and retrieval of objects. Migrated OAM objects are held in one or more ASM for S/390 databases, one ASM for S/390 database being used per OAM storage group (ie) there is a one-for-one correspondence between OAM storage group databases and ASM for S/390 databases in the ASM/OAM configuration.

Each ASM for S/390 database must be defined prior to first migrating objects within a single storage group to ASM/OAM, via the ASM/OAM object management procedure.

Definition of an ASM for S/390 database is performed using the standard ASM for S/390 database administration dialogs under TSO/ISPF. Refer to the ASM for S/390 User Manual for a full description of the ASM for S/390 database definition procedure.

This section summarizes the procedure for the definition of an ASM/OAM storage group database.

1. Logon to the ASM for S/390 database administration dialog in TSO/ISPF. Consult the person(s) responsible for ASM for S/390 database administration in your installation if you are unsure of how to invoke this facility.

2. From the main ASM for S/390 database administration menu, enter the following dataset name in the 'primary index name' field:

   (hlq.)xxxxxxxx.OTM.dddd.INDEX

   where 'hlq' is the optional high-level qualifier as specified on the HLQ sub-parameter for the storage group entry in the STRGROUP parameter library member, 'xxxxxxxx' is the DB2 database name qualifier ('GROUP00' etc.) assigned to the storage group whose ASM for S/390 database is being defined, and 'dddd' is the identifier of the DB2 subsystem used by OAM.

   Select option 3 from this menu, and press ENTER. Panel OTSN4300 (the base database definition panel) will be displayed.

```
OTSN4300                      NEARARCHIVE V2.4                      ENTER VALUES
                           BASE DATABASE DEFINITION
 COMMAND ===>
 ------------------------------------------------------------------------------
          Primary index name ===> (hlq.)xxxxxxxx.OTM.dddd.INDEX

       Length of primary key ===> 48
     ASM for S/390 user SVC no ===> sss
       HLQ for this database ===> (hlq.)xxxxxxxx.OTM.dddd
       Data retention period ===> __ yrs ___ days
     System dataset unitname ===>

   Online processing options:

                   Retain tapes on drive for ===> _____ minutes
   Age range of tapes to be retained on drive ===> _____ to _____ days old

              Audit options:            Retrieval logging options:

            Audit trail on? ===> _                  SMF record id ===> ___
  Journal archiving enabled? ===> _    Batch retrieval logging on? ===> _
                                        CICS retrieval logging on? ===> _
```

Figure 2.1 - base database definition panel OTSN4300

3. Fields on panel OTSN4300 should be entered as follows (see Figure 2.1):

Length of primary key	Enter the value ‘48’.
ASM for S/390 user SVC no	Enter the user SVC number allocated for Near-Archive during the product installation procedure. This must be a numeric value in the range 200-255. Consult the perons(s) responsible for installing ASM for S/390 on your system if you are unsure of this value.
HLQ for this database	Enter the value ‘(hlq.)xxxxxxxx.OTM.dddd’, where ‘hlq’, ‘xxxxxxxx’ and ‘dddd’ are identical to the corresponding entries in the database’s primary index name (as displayed on the panel). Note that ‘hlq’ need only be specified if the HLQ sub-parameter has been defined for the corresponding STRGROUP parameter member entry.

Data retention period This entry should be allowed to default to a value of 0 years and 0 days (ie) no automatic expiry. Expiration of ASM/OAM objects is controlled via the ASM/OAM OBJCNTL parameter library member.

Online processing options These fields should be left blank. Entries in these fields are only used by the CICS retrieval interface in ASM for S/390. This interface is not used by ASM/OAM.

The 'audit options' fields are optional, and may be entered as required. Refer to the ASM for S/390 User Manual for a description of these fields and their usage.

After all required entries have been made, press 'ENTER'. When all entries have been accepted, the storage level definition panel OTSN4301 will be displayed to allow storage level 0 to be defined for the ASM for S/390 database.

```
OTSN4301                      NEARARCHIVE V2.4                    ENTER VALUES
                           STORAGE LEVEL DEFINITION
 COMMAND ===>
 ------------------------------------------------------------------------------
          Primary index name ===> (hlq.)xxxxxxxx.OTM.dddd.INDEX
               Storage level ===> 0
                                                                   More:     +
               Database blocksize ===> 32760
    Maximum blockcount per volume ===> _______
     Unit name for scratch allocn: A ===> uuuuuuuu   B ===> ________
                                   C ===> ________   D ===> ________

   Tape usage options:                     Duplexing options:
                        ICRC ===> _ ______   Duplex during archival ===> _
      Dynamic load balancing ===> _           Duplex during backup ===> _
             Volsafe enabled ===> _

   D/b maintenance options:                Tape retention options:
           Recycle threshold ===> ___%        Retention period ===> ____
     AUTOUNCAT during recycle ===> _            or Expiry date ===> ________
      Disk compress threshold ===> ___%

   Disk copy options:
                 Unit name ===> ________          Primary alloc ===> _________
                 Retention ===> _____ days      Secondary alloc ===> _________
                 Vol count ===> _            Dataset blocksize  ===> _____
      Release unused space ===> _            Maximum blockcount ===> _________
```

Figure 2.2 - storage level definition panel OTSN4301

4. Fields on panel OTSN4301 should be entered as follows (see Figure 2.2):

   Database blocksize Enter the value ‘32760’.

   Unit name for scratch allocation Enter the unit name(s) to be used by ASM for S/390 when dynamically allocating primary and backup copies of new tape datasets in storage level 0 in this ASM for S/390 database. These should be a 1 to 8-character alphanumeric identifier which identify a valid esoteric unit name or device address on the host system control program.

   All other fields on this panel are optional. Refer to the ASM for S/390 User Manual for a description of these fields and their usage.

   After all required entries have been made, press 'ENTER'. When all entries have been accepted, the primary index Access Method Services panel OTSN4302 will be displayed to enable customization of the primary index definition parameters for the ASM for S/390 database being defined.

5. After all database definition and initialization parameters have been accepted, one or more Access Method Services (AMS) control panels will be displayed to allow customization of AMS parameters used by ASM for S/390 when defining system datasets for the database being defined.

   AMS control panels will be displayed in the following sequence:

   1. **OTSN4302** - the primary index AMS control panel. This panel is always displayed. Values entered on this panel will be used when creating the primary index dataset (VSAM KSDS) for the database being defined.

   2. **OTSN4303** - the journal dataset AMS control panel. This panel will only be displayed if the audit control option was enabled on panel OTSN4300. Values entered on this panel will be used during creation of the journal dataset (VSAM ESDS) for the database being defined.

3. **OTSN4304** - the journal archive database AMS control panel. This panel will only be displayed if both the audit control facility and journal archiving were enabled on panel OTSN4300. Values entered on this panel will be used during creation of the journal archive database primary index dataset (VSAM KSDS).

Panel OTSN4302 is illustrated in Figure 2.3. Each of the above panels will contain some or all of the following fields:

Volume serial number Optional entry. Enter the serial number (1-6 alphanumeric, national or special characters) of the disk volume on which the dataset is to be created.

This parameter may be omitted if the volume is to be automatically selected by the operating system.

Unit of allocation For primary index definition (panel OTSN4302) enter a value of 'CYL'. For journal or journal archive definitions (panels OTSN4303 and panel OTSN4304), refer to the ASM for S/390 User Manual for a discussion of sizing of these datasets.

```
OTSN4302                    NEARARCHIVE V2.4

                       ACCESS METHOD SERVICES CONTROL
 COMMAND ===>
-------------------------------------------------------------------------------
--------
          Primary index name ===> (hlq.)xxxxxxxx.OTM.dddd.INDEX

            Primary index control:

                 Volume serial number ===> ________
                   Unit of allocation ===> ________
             Primary allocation value ===> ________
           Secondary allocation value ===> ________
                         Data CI size ===> ________
                        Index CI size ===> ________
                Delete before define? ===> _   (Y/N)

     Press ENTER after all details have been entered correctly.

     After all database definition parameters have been accepted,
     the primary index will be allocated and initialized.
```

Figure 2.3 - Access Method Services control panel OTSN4302

Primary allocation value For primary index definition (panel OTSN4302), enter the number of cylinders to be used for allocation of the primary data extent of the index dataset. Each migrated object will occupy approximately 68 bytes of index storage. Ensure that the primary index allocation value is sufficient to contain the highest number of objects that are expected to be held in the tape database for this storage group.

For journal or journal archive definitions (panels OTSN4303 and panel OTSN4304), refer to the ASM for S/390 User Manual for a discussion of sizing of these datasets.

Secondary allocation value Enter the required secondary allocation value for the index or journal datasets, as appropriate.

Data CI size Enter the control interval (CI) size to be used for allocation of the data component of the dataset. This should be a valid VSAM control interval size. If omitted, a control interval size of 16k is used for the data component.

Index CI size Optional entry. Enter the control interval size to be used for allocation of the index component of the dataset (KSDS only). This should be a valid VSAM control interval size. If omitted, a control interval size of 2k is used for the index component.

Delete before define? Optional entry. Enter the value 'Y' if ASM for S/390 should attempt to delete the dataset before it is defined. Enter 'N' if no deletion request should be issued.

Press 'ENTER' after all required entries have been made on each panel. After all AMS control panel entries have been accepted, the database will be defined and initialized.

The above ASM for S/390 database definition procedure should be executed for each OAM storage group which is to be processed by ASM/OAM.

2.3 Upgrade procedure.

The following activities are required when upgrading ASM/OAM from an earlier release. A description of each activity is provided in the section indicated in brackets.

__ 1. Unload distribution libraries (2.3.1).

__ 2. Update ASM/OAM parameter library (2.3.2).

__ 3. Perform MVS host system modifications (2.3.3).

__ 4. Update ASM/OAM product authorization code (2.3.4).

__ 5. Perform DB2 system modifications (2.3.5).

__ 6. Perform CICS system modifications (2.3.6).

__ 7. Migrate OAM storage group directories when upgrading from ASM/OAM V2.1. (2.3.7).

__ 8. Application migration considerations. (2.3.8).

2.3.1 Install distribution libraries.

ASM/OAM V2.3 is distributed on a standard-labeled magnetic tape cartridge in SMP/E RELFILE format. The cartridge has a serial number of OTM230.

The distribution tape will contain the following datasets:

File	Dataset name	Contents
1	SMPMCS	SMP/E modification control statements for installation of the product.
2	STK.SOTM230.F1	SMP/E JCLIN file.
3	STK.SOTM230.F2	Partitioned dataset in IEBCOPY UNLOAD format containing JCL for use during product installation.
4	STK.SOTM230.F3	ASM/OAM distribution load library, in SMP/E RELFILE format.
5	STK.SOTM230.F4	ASM/OAM distribution DBRM library, in SMP/E RELFILE format.
6	STK.SOTM230.F5	ASM/OAM sample JCL library, in SMP/E RELFILE format.
7	STK.SOTM230.F6	ASM/OAM sample parameter library, in SMP/E RELFILE format.

Refer to section 2.2.1 for details of installing the product using SMP/E. Care should be taken with dataset naming standards to ensure that target and distribution libraries for the existing installed release are not overwritten during the V2.3 install process.

2.3.2 Update ASM/OAM parameter library.

The ASM/OAM parameter library unloaded in the previous step will contain sample parameters for the following four ASM/OAM parameter library members:

ENVCNTL	parameters which inform ASM/OAM of its operating environment.
OBJCNTL	parameters which control ASM/OAM processing of objects for deletion and migration.
STRGROUP	parameters which inform ASM/OAM of the OAM storage group configuration in use.
TAPECNTL	parameters which control the ASM/OAM control region configuration and environment.

After unloading the sample parameter library, review all parameter values, and amend as necessary to reflect the host system's operating environment, and your own requirements for ASM/OAM migration and retrieval processing.

Where necessary, values used for existing parameters may be retained for V2.3 operation. However, if upgrading from V2.1 of the product, the following new parameters introduced with V2.2 (or via service in V2.1) should be reviewed at this stage and set as required:

OBJCNTL member:	STAGE|NOSTAGE
STRGROUP member:	RETAINTAPE BACKUP|NOBACKUP STAGE|NOSTAGE
TAPECNTL member:	TAPEWAIT COMMAND MAXDISK (ASM for S/390 V2.3 onwards)
ENVCNTL member:	PLAN DISKCLASS TAPECLASS

Refer to chapter 3 of this manual for a full description of the ASM/OAM parameter library and the format of individual parameters.

2.3.3 Perform MVS host system modifications.

The following MVS system changes will be required in order to implement ASM/OAM:

a. APF-authorize the ASM/OAM V2.3 load library.

The ASM/OAM V2.3 load library (file 1 from the distribution tape) should be APF-authorized. Refer to IBM system documentation for a description of how to perform this procedure on your system.

b. Update ASM/OAM control region procedure.

The JCL procedure used to execute the ASM/OAM control region should be updated with the names of the V2.3 load and parameter libraries created during the distribution tape unload process. A sample JCL procedure is supplied in member NERAOAMC from the distributed JCL library (file 3 on the distribution tape). A listing of the distributed NEAROAMC procedure is given in appendix A.

The NEAROAMC procedure must be started in order to initiate ASM/OAM control region processing. Note that the control region started task **must** be called 'NEAROAMC'.

c. Verify ASM/OAM user identification.

A unique system user identification (eg. NEAROAMC) should be assigned for ASM/OAM use, using whatever system security product is installed on the host system. Verify that the definition created for the previous release of ASM/OAM is valid for V2.3 use.

d. Verify the system Program Properties Table (PPT) entry.

Verify that the PPT has been updated in order to identify the ASM/OAM control region program OTIMP200 as a non-swappable system task. Refer to IBM system documentation for a description of how to perform this procedure on your system.

The following is an example of how to specify the PPT entry in the appropriate SCHEDxx member of SYS1.PARMLIB:

```
PPT         PGMNAME(OTIMP200)
            NOSWAP
            SYST
```

e. Update FLPA or MLPA definitions.

ASM/OAM requires that distributed modules OTIMP300 and OTIMP310 be installed in the fixed link pack area (FLPA), or modified link pack area (MLPA).

To install the V2.3 modules in the FLPA, perform the following task:

- Copy the modules OTIMP300 and OTIMP310 from the distributed ASM/OAM V2.3 load library to an authorized library in the LPALST or LNKLST concatentations. Add corresponding entries for the modules OTIMP300, OTIMP310 to the member IEAFIXxx in SYS1.PARMLIB. Entries for modules OTIMP300 and OTIMP310 from the previous release may be removed from IEAFIXnn.

To install the V2.3 modules in the MLPA, perform the following tasks:

- Add entries for the V2.3 modules OTIMP300, OTIMP310 to the member IEALPAxx in SYS1.PARMLIB.

Verify that all other FLPA or MLPA modifications made during initial installation of ASM/OAM (as specified in section 2.2.3(e)) remain in effect for V2.3.

f. Update OTIMP055 in the PLPA.

Module OTIMP055 from the V2.3 ASM/OAM load library must be moved to a library in the system LPALST concatenation, for installation in the pageable link pack area. The LPA copy of the existing OTIMP055 module should be replaced.

Note that it is essential that this module be MOVED from the ASM/OAM load library, and not just copied. Any attempt to execute this module from outside the PLPA may cause a S047 abend during ASM/OAM operation.

Alternatively, copy the module to a LPA library, and then rename it on the ASM/OAM load library.

g. Define DFSMS storage classes.

The storage class of objects which have been migrated from OAM to ASM/OAM ownership will be modified to that specified (or defaulted) in the TAPECLASS parameter entry in the ENVCNTL parameter library member.

The storage class of migrated objects will not normally be modified following successful migration. An exception to this is when migrated objects are pre-fetched using the ASM/OAM batch pre-fetch utility, and deleted from ASM/OAM (pre-fetch request code '02'). During this process the storage class of these objects will be modified to that specified (or defaulted) in the DISKCLASS parameter entry in the ENVCNTL parameter library member.

This processing requires the following DFSMS storage classes to be specified:

- TAPECLASS.

  The storage class specified in the TAPECLASS parameter entry of the ENVCNTL parameter library member (or the default value of NEARTAPE) must be defined via a dummy entry in ISMF. All performance objective fields in this entry should be left blank. All other fields should be set to 'N' (where appropriate) or left blank. ASM/OAM does not use any of these values for performance or storage management purposes; these facilities are supplied by ASM for S/390.

  Note that the storage class specified here is for internal use by ASM/OAM only. External applications should not reference this storage class directly; unpredictable results may occur otherwise.

- DISKCLASS.

  The storage class specified in the DISKCLASS parameter entry of the ENVCNTL parameter library member (or the default value of DB2DASD) must be defined via an entry in ISMF. Fields in this entry should be set as required for standard OAM disk management functions.

h. Define new storage classes in OAM.

After defining new storage classes to DFSMS, as described in the preceding section, it is also necessary to define these storage classes to OAM. This will result in the addition of one new row in the OAMADMIN storage class identifier table for each new storage class. Note that this step is not required if no new storage class was defined in the preceding step.

This may be achieved by one of the following methods:

a) Store a dummy object in any existing OAM object collection using the OSREQ TSO command processor, specifying the new storage class in the STORAGECLASS parameter (eg) the following OSREQ TSO

command may be used to add a new entry for storage class NEARTAPE:

```
OSREQ STORE COLLNAME DUMMY.OBJECT MANAGEMENTCLASS(DISK) -
      STORAGECLASS(NEARTAPE) LENGTH(1024)
```

This will automatically create an entry for NEARTAPE in the OAMADMIN storage class identifier table, if one did not exist already. The dummy object may be deleted after completion of this operation.

b) Use SPUFI to directly add a row to the OAMADMIN storage class identifier table (eg) the following SQL may be used via SPUFI to add an entry for storage class NEARTAPE:

```
INSERT INTO OAMADMIN.CBR_STO_CLASS_TBL
  (ODSCNUM, ODSCNAME) VALUES(n, 'NEARTAPE');
```

where ‘n’ is a numeric value specifying a unique storage class identifier to be associated with storage class NEARTAPE.

2.3.4 Update ASM/OAM product authorization code.

ASM/OAM must be authorized to run on the customer's processor(s). One or more 8-byte authorization codes are supplied with the product in the accompanying documentation. Any update or refresh of these codes may be obtained by contacting ASM/OAM product support.

Authorization codes used by V2.3 of ASM/OAM are identical to those used for NearOAM V2.1 and V2.2. To authorize V2.3 of the product, copy module OTIMP050 from the NearOAM V2.1 or V2.2 load library to the V2.3 load library. This will propagate authorization codes for V2.1 or V2.2 to V2.3.

Alternatively IBM utility program AMASPZAP (Superzap) may be run to update the authorization module OTIMP050 in the distributed V2.3 load library.

Use the following parameters:-

```
NAME OTIMP050 AUTHCODE
REP  nnnn  xxxxxxxx,yyyyyyyy
```

where nn = 0000 for authorization code 1
0008 " " " 2
0010 " " " 3
0018 " " 4 etc.

and 'xxxxxxxxyyyyyyyy' is the supplied authorization code(s).

ASM/OAM will accept a maximum of 10 codes. All processors which have shared access to a single ASM/OAM load library should be authorized in module OTIMP050 in that library.

NOTE: ASM/OAM is authorized for execution on designated processors only. Any planned change or upgrade to a customer's host processor(s) should be communicated in advance to ASM/OAM product support, so that new or additional authorization codes may be supplied.

2.3.5 Perform DB2 system modifications.

The DB2 system which is in use by OAM (for which ASM/OAM is to supply tape support) must be updated with details of the views and plan(s) required by ASM/OAM, and to grant appropriate authority for access to plans and tables. The following activities will need to be performed:

a. Create OAM database views.

V2.3 of ASM/OAM uses the following standard views for accessing each OAM storage group database:

xxxxxxxx.V_OSM_OBJ_DIR for accessing table
xxxxxxxx.OSM_OBJ_DIR;

xxxxxxxx.V_OSM_04K_OBJ_TBL for accessing table
xxxxxxxx.OSM_04K_OBJ_TBL;

xxxxxxxx.V_OSM_32K_OBJ_TBL for accessing table
xxxxxxxx.OSM_32K_OBJ_TBL;

where 'xxxxxxxx' is the DB2 database name qualifier assigned to an OAM storage group.

These views are created during initial OAM installation in the IBM-supplied job CBRISQL0. Ensure that these views are correctly defined for all storage groups required for standard OAM use. Refer to IBM documentation on OAM installation for additional information on defining these views.

b. Create ASM/OAM application plan(s).

ASM/OAM V2.3 now requires a single DB2 plan for execution. This is a change from earlier releases, where ASM/OAM could be installed to use multiple plans for different components of the product (using default plan names). Support for this implementation is no longer available. All components of ASM/OAM will now use the same DB2 plan. The plan name is specified via the PLAN keyword parameter of the ENVCNTL parameter library member (see section 3.2.6 on page 3.10). If omitted, a default plan name of 'OTIMPLAN' is used.

It should be noted in this context that DBRMs shipped with the base product or with service packages are created with the VERSION(AUTO) pre-compiler option. This will allow multiple copies of the same package to be bound to a single DB2 plan, to allow different versions of ASM/OAM programs to execute using that plan. Alternatively, separate

plans can be created and execution controlled via use of the PLAN keyword parameter in the ENVCNTL parameter library member.

Edit member OTIMPKG in the distributed ASM/OAM JCL library (file 3 on the distribution tape). This contains JCL to create DB2 packages from DBRMs supplied with the product. The JCL in this member should be executed once for each OAM storage group to be accessed by ASM/OAM. Instructions for editing the JCL are provided at the top of the file.

After executing member OTIMPKG for each OAM storage group to be accessed by ASM/OAM, edit and submit member OTIMBIND in the distributed ASM/OAM JCL library (file 3 on the distribution tape). This contains JCL to create the application plan to be used by ASM/OAM. Again, instructions for editing the JCL are provided at the top of the file.

A copy of the supplied OTIMPKG and OTIMBIND jobs can be found in appendix A of this manual.

c. Grant authorities for ASM/OAM plan access.

Member OTIMGRNT in the distributed ASM/OAM JCL library supplies a job to grant authority for execution of the plan(s) created in the previous step.

Edit this member in order to update:

- The name of the DB2 subsystem in the DSN statement.
- The name of the DB2 runtime load library in your installation in the RUN statement.
- The PLAN name in the RUN statement which matches your installed DB2 system.
- The name of the plan used for ASM/OAM execution.

After updating this member, submit the job. A copy of the supplied OTIMGRNT job can be found in appendix A of this manual.

d. Grant authorities for ASM/OAM access to OAM administration, directory and object storage databases.

During normal operation, ASM/OAM will need to access and update certain DB2 tables owned by OAM. The following table identifies these database tables and the level of access required to each. Verify that the appropriate levels of access have been granted.

Table name	***Access required***
OAMADMIN.CBR_MGT_CLASS_TBL	SELECT
OAMADMIN.CBR_STO_CLASS_TBL	SELECT
OAMADMIN.CBR_COLLECTION_TBL	SELECT
xxxxxxxx.OSM_OBJ_DIR	SELECT,DELETE, UPDATE
xxxxxxxx.OSM_04K_OBJ_TBL	SELECT,DELETE, INSERT
xxxxxxxx.OSM_32K_OBJ_TBL	SELECT,DELETE, INSERT

Note that access to the OAMADMIN storage class identifier table is now required by ASM/OAM.

Each set of 'xxxxxxxx' tables will occur once for each storage group which is active on the host system for storage of OAM-controlled objects, where 'xxxxxxxx' is the DB2 database name qualifier assigned to the storage group. Each of these sets will require authorization for the access levels identified above.

You should grant the above table access authorities to the user identifier assigned to ASM/OAM.

In addition, the above access authorities will also need to be granted to all users who will be invoking the ASM/OAM batch pre-fetch interface. See section 6.6 of this manual for a description of this facility.

2.3.6 Perform CICS implementation activities.

The following CICS JCL change is required for the CICS region(s) in which the ASM/OAM CICS interface will be enabled and/or disabled (ie) the region(s) in which ASM/OAM CICS table entries have been added:

- Replace the existing ASM/OAM load library in the CICS DFHRPL concatenation with the distributed V2.3 ASM/OAM load library (file 1 from the product distribution tape).

No other CICS modifications are required when migrating from an earlier release of ASM/OAM.

2.3.7 Perform OAM storage group directory migration.

The following actions are only required when migrating directly from NearOAM V2.1 to V2.3. If you are migrating from NearOAM V2.2 no further migration procedures are required. Continue the installation procedure at section 2.3.8.

NearOAM V2.2 introduced a modification in the way in which OAM directory entries are updated for migrated objects. OAM directory entries for objects which have been migrated to NearOAM using V2.1 of the product must be migrated for use with V2.3 of the product.

The ASM/OAM V2.3 directory migration utility OTIMP020 is supplied to perform this function. This utility should be executed against each OAM storage group database which contains objects which have been migrated to NearOAM with V2.1 of the product. Refer to section 6.2 of this manual for details regarding the execution of this utility.

OAM directories which have been migrated for use by ASM/OAM V2.3 may be regressed for use with V2.1 of the product at any subsequent time via the ASM/OAM directory regression utility OTIMP010. Details on execution of this utility may be found in section 6.1 of this manual.

2.3.8 SMF processing changes

The format of the SMF record created by ASM/OAM during object retrieval processing has been modified. The 2-byte storage group identifier field in the storage group section has been replaced by an 8-byte storage group database name field. This has increased the length of the storage group section from 48 bytes to 54 bytes. Refer to section 4.5.3 for a full description of the modified specification.

Programs developed by customers to analyze ASM/OAM SMF records may need to be modified to cater for this change in the specification.

2.3.9 Application migration considerations.

The application migration considerations described in this section are only relevant when migrating directly from NearOAM V2.1 to V2.3. If you are migrating from NearOAM V2.2, you may skip this section and continue the installation procedure at section 2.4

a) JCL modifications.

Customers should be aware of the following modifications which may be required to JCL used to execute program OTIMP100 (step 1) in the object management procedure:

- DD entries for OTIMIDCI and OTIMIDCO are required for this job step. Member GPXXMIG in the sample JCL library (listed in appendix A) includes entries for these DD statements.

- Support for the EXEC parameter 'SELNONPEND' was introduced with NearOAM V2.1 in program OTIMP100, to control selection of objects for processing, based on pending action date. The default for this parameter is 'NO' (i.e.) do not consider objects for processing unless their pending action date is less than or equal to the current date. This is a change from the default action for V2.1 of NearOAM, where all objects were considered, irrespective of pending action date.

  Usage of this parameter should be reviewed, and an entry of SELNONPEND=YES explicitly coded in the JCL if V2.1 processing is to be retained.

b) User exit processing.

Any NearOAM object management user exits in use with V2.1 of the product may need modification for execution under V2.3. The following considerations should be reviewed to evaluate whether modifications need to be made to any existing user exit module:

- The format of the parameter block passed by ASM/OAM to the user exit module has been modified. The 44-byte spare field at the end of the V2.1 parameter block has been amended to contain a 4-byte field giving the number of days since the object's current management class was assigned, a 2-byte field giving the object's storage class identifier, and a 38-byte spare field. Note that the overall length of the parameter block has not changed. Refer to section 5.7 for a full description of the user exit parameter block.

- V2.3 of ASM/OAM no longer uses the active volume serial number field in an object's directory entry to denote an object which has been migrated to ASM/OAM. Consequently the volume serial number field at offset +142 in the parameter block will now contain spaces for objects which have been migrated - this field contained the value 'OTAS00' in V2.1.

  Any user exit processing which relies on a non-blank value in this field to denote a migrated object should be modified to check instead for a value in the storage class identifier field which corresponds to the identifier of the storage class specified in the TAPECLASS parameter in the ENVCNTL parameter library member. Refer to section 5.7 for further information on user exit processing.

c) SMF record modifications.

The following modifications have been made to the structure of the SMF record created by ASM/OAM:

- the length of the request section has been increased to 72 bytes. The length and position of existing fields has not been modified, but new fields have been added from offset 22 onwards.

Refer to section 4.5 for a full description of the new SMF record format. Applications which process this information may need to be modified or enhanced to read the new SMF record.

c) Pre-fetch processing modifications.

The format of DD entries used to identify the optional VSAM datasets to be used for pre-fetching of objects has been modified. Refer to section 6.6.2 for a description of the modified specification.

2.4 Verify ASM/OAM installation.

After all ASM/OAM installation and implementation activities, as specified in the preceding sections, have been successfully performed, product implementation may be verified by starting the ASM/OAM control region.

Before doing this, check the following points:

- Ensure that all necessary parameters in the ENVCNTL, STRGROUP and TAPECNTL parameter library members have been coded correctly.
- Ensure that for each storage group present in the STRGROUP parameter library member, an ASM/OAM deletion control dataset and an ASM for S/390 database has been defined, as specified in sections 2.2.7 and 2.2.8.

The ASM/OAM control region may be started by entering the command:

```
START NEAROAMC
```

on the system console.

If 'COMMAND=REPLY' has been specified (or allowed to default) in the ENVCNTL parameter library member, the operator reply message:

```
OTM20000 ENTER NEAROAM REQUEST:
```

will be displayed on the console after successful initialization of the control region. Operator commands may be entered by replying to the outstanding operator reply message.

If 'COMMAND=MODIFY' has been specified in the ENVCNTL parameter library member, operator commands may be entered using the MVS MODIFY command structure.

Refer to chapter 4 of this manual for details of the operator commands available to control and shutdown the ASM/OAM control region.

If any error occurs during control region initialization processing, refer to the description of the displayed message in chapter 8 for details of the initialization error. Perform the appropriate corrective action before restarting the ASM/OAM control region.

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3 ASM/OAM Parameter Specification

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ASM/OAM uses its own parameter library to allow users to control the operation of the product. This parameter library is a partitioned dataset containing the following members:

ENVCNTL - used to specify general parameters relating to the ASM/OAM operating environment.

OBJCNTL - used to control processing of OAM objects by ASM/OAM during its object management procedure.

STRGROUP - used to relate storage group names to storage group identifiers, and to control the ASM/OAM tape database maintenance procedure.

TAPECNTL - used to specify controls relating to object retrieval processing by the ASM/OAM control region.

A sample parameter library containing all of the above members is distributed with the product on file 4 of the distribution tape. This file will provide a sample specification of each of the parameters used by ASM/OAM. The sample parameter library may be used for ASM/OAM operation at your installation after updating the library members as required.

Use ISPF EDIT, or any equivalent editing facility present on your system, to create and/or maintain these parameter library members.

ASM/OAM parameters will be validated as required by each product component. Each component will output a parameter validation report, and any invalid parameter used by that component will be rejected and processing terminated. In this case, the parameter in error should be corrected on the parameter library, and the ASM/OAM procedure restarted.

Note that it is possible that not all parameter members, and not all parameters within a member, will be validated for correct specification by any one ASM/OAM component. It should not be assumed, therefore, that successful validation by one component necessarily indicates that parameter validation will be successful for all components.

3.1 General parameter format.

Each parameter library member will consist of a variable number of 80-byte records, each record containing one or more separate parameter entries. In general, each parameter entry must be completely contained within one record (ie) continuation of any single parameter entry from one record to another is not permitted. A single record may contain multiple parameter entries.

A parameter entry has the general format:

```
keyword = value
```

Each keyword and its associated value are separated by an '=' sign, and optionally one or more spaces. Multiple keyword parameter entries may be specified in each parameter record, each 'keyword=value' string being separated by one or more spaces, and optionally a single comma (',').

The first keyword parameter in a record may begin in any character position from 1 onwards. Parameters may extend up to character position 80 of the record. Individual keyword parameters may not be continued over more than one record.

An asterisk ('*') in character position 1 will indicate a comment record, which will be ignored for parameter validation processing.

Any departure from this general format will be indicated with individual parameter descriptions.

3.2 ENVCNTL parameters.

These parameters are used to pass information to ASM/OAM about its operating environment, and to control certain aspects of ASM/OAM operation which do not fall into the categories controlled by other parameter library members.

Parameters in this member have the general parameter format described in section 3.1.

3.2.1 ENVCNTL: P120COMMITFREQ

```
P120COMMITFREQ = nnnnn
```

Requirement: Optional

Default: 0

Validation: nnnnn = 1-5 digit numeric value in range 0 - 99999

Use: The P120COMMITFREQ parameter is used to specify the frequency at which DB2 COMMIT processing will be performed during execution of the ASM/OAM database update utility OTIMP120. A value of 0 indicates that no commits will be performed. This is the default. A non-zero value indicates that updates will be committed after processing every 'nnnnn' objects.

Notes: See section 5.5.6 on page 5.25 for a discussion of restart considerations for the database update utility.

3.2.2 ENVCNTL: P120DELETE

```
P120DELETE = YES|NO
```

Requirement: Optional

Default: YES

Validation: Parameter value must be either 'YES' or 'NO'.

Use: The P120DELETE parameter is used to specify whether or not the ASM/OAM database update utility OTIMP120 is to delete rows from the OAM object storage tables after migrating objects to ASM for S/390. The default value is 'YES'.

Notes: A value of 'NO' should only be used if migrated objects are to be deleted from an OAM object storage table by some other independent means (eg) re-initializing a DB2 tablespace.

This parameter is supplied to enable implementation of a faster and more efficient data migration process by eliminating delete processing from the OTIMP120 step of the migration procedure. This will substantially reduce the amount of DB2 updates and logging activity that will be required during this process.

However, failure to delete these rows by some other means will cause inconsistencies to be detected during the ASM/OAM object recall procedure and prevent migrated objects from being accessed. Great care should thus be taken when using this parameter, to ensure that no such inconsistencies are likely to occur.

3.2.3 ENVCNTL: SMFRECID

```
SMFRECID = 0|nnn
```

Requirement: Optional

Default: 0

Validation: 'nnn' = 3 numeric digits in the range 128-255.

Use: The SMFRECID parameter is used to control the creation of SMF records by ASM/OAM for the recording of tape object retrieval activities.

A value of 0 indicates that no SMF recording is to be performed by ASM/OAM.

A non-zero value (in the range 128-255) is used to specify the value of the identifier of the SMF records written by ASM/OAM. The default value is 0 (ie) no SMF recording.

Notes: See section 4.5 on page 27 for a discussion of ASM/OAM SMF usage, and for a description of the ASM/OAM SMF record layout.

3.2.4 ENVCNTL: SVCNO

```
SVCNO = nnn
```

Requirement: Mandatory

Default: None

Validation: 'nnn' = 3-digit numeric value in the range 200-255.

Use: The SVCNO parameter is used to identify the user SVC number allocated on the system for ASM for S/390 use.

Notes: A user SVC number is allocated during the ASM for S/390 installation procedure. Contact the person responsible for installing or maintaining ASM for S/390 on your system to obtain this information.

ASM for S/390 is a pre-requisite for implementation of ASM/OAM on a system.

3.2.5 ENVCNTL: SUBSYSTEM

```
SUBSYSTEM = xxxx
```

Requirement: Mandatory

Default: None

Validation: 'xxxx' = 4 alphanumeric characters.

Use: The SUBSYSTEM parameter is used to specify the name of the DB2 subsystem to be used by ASM/OAM.

Notes: The subsystem name entered here must be identical to that used by the OAM system with which ASM/OAM will interface.

3.2.6 ENVCNTL: PLAN

```
PLAN = xxxxxxxx
```

Requirement: Optional

Default: OTIMPLAN.

Validation: 'xxxxxxxx' = 1-8 alphanumeric characters.

Use: This is an optional parameter which is used to specify the single plan name to be used by all ASM/OAM components when issuing a DB2 CAF OPEN request. ‘xxxxxxxx’ must be a valid 1-8 alphanumeric identifier. If omitted, a default plan name of OTIMPLAN is used.

Each DBRM supplied with the product must be bound as a separate DB2 package for each OAM storage group in use by ASM/OAM, and all packages bound to the plan specified in this parameter. Members OTIMPKG and OTIMPLAN in the distributed sample JCL library supply jobs to perform these operations.

3.2.7 ENVCNTL: TAPECLASS

```
TAPECLASS = xxxx....xxxx
```

Requirement: Optional

Default: A default value of NEARTAPE is used for tape storage class if this parameter is not specified.

Validation: 'xxxx….xxxx' = 1-30 alphanumeric characters.

Use: This parameter is used to specify the name of the storage class to be assigned to all objects which have been migrated from OAM to ASM/OAM. The storage class specified (or defaulted) in this parameter must be defined to DFSMS prior to first use of this release of the product.

Refer to sections 2.2.3 or 2.3.3 for additional information on this requirement.

3.2.8 ENVCNTL: DISKCLASS

```
DISKCLASS = xxxx....xxxx
```

Requirement: Optional

Default: A default value of DB2DASD is used for disk storage class if this parameter is not specified.

Validation: 'xxxx….xxxx' = 1-30 alphanumeric characters.

Use: This parameter is used to specify the name of the storage class to be assigned to all objects which have been retrieved to disk storage using the ASM/OAM batch pre-fetch utility and have been deleted from ASM for S/390 after retrieval. These objects will then be OAM-owned and eligible for further migration to ASM/OAM as controlled by the OBJCNTL parameter library member. The storage class specified (or defaulted) in this parameter must be defined to DFSMS prior to first use of this release of the product.

Refer to sections 2.2.3 or 2.3.3 for additional information on this requirement.

3.3 OBJCNTL parameters.

These parameters are used to control processing of objects during the ASM/OAM object management procedure.

ASM/OAM uses an object's current management class (as set via DFSMS) to control object management processing. An object is automatically assigned a management class when it is first created. This management class may subsequently be changed, either explicitly by user request from an OSREQ call, or automatically via a class-transition event.

Note that it is recommended that class-transition events should be eliminated for those management classes assigned for objects which are to be eligible for migration to ASM for S/390 by ASM/OAM - see chapter 5 of this manual for a discussion of this consideration.

Parameters in the OBJCNTL member have the general format:

```
MGMTCLAS = management-class-name
                      (MIGRATE = xaaaaa)
                      (EXPIRE = ybbbbb)
                      (DELETE = ccccc)
                      (BRECALL = new-mgmtclass-name)
                      (ORECALL = new-mgmtclass-name)
                     (STAGE|NOSTAGE)
```

A single management class parameter consists of the MGMTCLAS keyword and the sub-parameter keywords 'MIGRATE', 'EXPIRE', 'DELETE', ‘BRECALL’, ‘ORECALL’ and ‘STAGE’ or ‘NOSTAGE’. For each MGMTCLAS keyword, a valid management class name must be present. Each of the sub-parameters is optional.

A single management class parameter may extend over multiple parameter records, but any 'keyword=value' component must be completely contained within one record.

In all other respects, OBJCNTL parameters adhere to the general parameter format.

3.3.1 OBJCNTL: MGMTCLAS

```
MGMTCLAS = management-class-name
```

Requirement: Mandatory for each active management class.

Default: None

Validation: 'management-class-name' consists of 1-30 alphanumeric characters, giving the name of a valid management class used for OAM objects, as defined via DFSMS.

Use: The MGMTCLAS parameter is used to specify selection criteria for the ASM/OAM migration and expiration utility, for migration of objects from OAM to ASM for S/390 ('MIGRATE'), expiration of OAM and ASM for S/390-owned objects ('EXPIRE') and deletion of objects recalled from ASM for S/390 to OAM ('DELETE').

BRECALL and ORECALL are optional parameters which specify the management class to which an object will be changed during batch (‘BRECALL’) pre-fetch recalls or online (‘ORECALL’) recalls by the ASM/OAM control region.

Notes: One MGMTCLAS parameter should be present for each management class which is in use for OAM object storage.

Any management class which is not known to OAM will be rejected as invalid. Omission of a MGMTCLAS parameter for a valid management class will cause the ASM/OAM object management procedure to fail.

3.3.2 OBJCNTL: MGMTCLAS - MIGRATE

```
MGMTCLAS = management-class-name
                      MIGRATE = xaaaaa
```

Requirement: Optional

Default: C99999

Validation: ‘x’ is an optional alpha character which may take the following values:-

‘C’ - use object creation date to control migration of objects.

‘M’ - use management class transition date to control migration of objects.

‘R’ - use last reference date to control migration of objects.

If omitted a default value of ‘C’ will be used.

aaaaa = 1-5 numeric characters, in the range 0 to 99999.

Use: The MIGRATE sub-parameter of the MGMTCLAS parameter specifies the number of days after which objects with this management class will be migrated from OAM to ASM for S/390. The object creation date (‘C’), management class transition date (‘M’) or last reference date (‘R’) may be used to determine selection.

Notes: If this sub-parameter is not specified, the default value of 99999 days since object creation is used (ie) migrate objects from OAM to ASM for S/390 when they are more than 99,999 days old.

A value of 0 for this parameter indicates that all objects will be migrated from OAM to ASM for S/390.

3.3.3 OBJCNTL: MGMTCLAS - EXPIRE

```
MGMTCLAS = management-class-name
                      EXPIRE = ybbbbb
```

Requirement: Optional

Validation: ‘y’ is an optional alpha character which may take the following values:-

‘C’ - use object creation date to control expiration of objects.

‘M’ - use management class transition date to control expiration of objects.

‘R’ - use last reference date to control migration of objects.

If omitted a default value of ‘C’ will be used.

bbbbb = 1-5 numeric characters, in the range 0 to 99999.

Use: The EXPIRE sub-parameter of the MGMTCLAS parameter specifies the number of days after which objects with this management class will be expired. The object creation date (‘C’), management class transition date (‘M’) or last reference date (‘R’) may be used to determine selection.

Default: C99999

Notes: If this sub-parameter is not specified, the default value of 99999 days since object creation is used (ie) expire objects when they are more than 99,999 days old.

Note that both OAM and ASM for S/390-resident objects will be processed by ASM/OAM for expiration using this sub-parameter.

A value of 0 for this parameter indicates that all objects will be expired.

3.3.4 OBJCNTL: MGMTCLAS - DELETE

```
MGMTCLAS = management-class-name
                      DELETE = ccccc
```

Requirement: Optional

Default: 99999

Validation: ccccc = 1-5 numeric characters, in the range 1 to 99999.

Use: The DELETE sub-parameter of the MGMTCLAS parameter specifies the number of days since an object was last referenced, after which objects with this management class which have been recalled from ASM for S/390 to OAM will be deleted from disk.

Notes: If this sub-parameter is not specified, the default value of 99999 days is used (ie) delete recalled objects from disk to tape when they have not been referenced for more than 99,999 days.

Note that ASM for S/390 copies of objects are not deleted when those objects are recalled to disk. After deletion, recalled objects will become ASM for S/390-resident once again, in their original location - there is no requirement to re-migrate these objects from disk prior to deletion. Subsequent access to these objects will be satisfied from the ASM for S/390 database.

A value of 0 for this parameter indicates that all recalled objects will be deleted from disk.

3.3.5 OBJCNTL: MGMTCLAS - BRECALL

```
MGMTCLAS = management-class-name
           BRECALL = new-management-class-name
```

Requirement: Optional

Default: Do not change management class on batch recall

Validation: 'new-management-class-name' must specify the name of a valid management class.

Use: The BRECALL sub-parameter of the MGMTCLAS parameter is used to change an object's management class after recall using the ASM/OAM batch pre-fetch utility. If specified, the management class of all objects with the associated management class will be changed during batch recall.

Notes: If this sub-parameter is not specified, no transition of management class will occur during batch recall of objects with the associated management class.

3.3.6 OBJCNTL: MGMTCLAS - ORECALL

```
MGMTCLAS = management-class-name
           ORECALL = new-management-class-name
```

Requirement: Optional

Default: Do not change management class during online recall

Validation: 'new-management-class-name' must specify the name of a valid management class.

Use: The ORECALL sub-parameter of the MGMTCLAS parameter is used to change an object's management class after staged recall via ASM/OAM control region processing (ie) via an 'OSREQ RETRIEVE' command. If specified, the management class of all objects with the associated management class will be changed during staged online recall.

Notes: If this sub-parameter is not specified, no transition of management class will occur during staged online recall of objects with the associated management class.

3.3.7 OBJCNTL: MGMTCLAS - STAGE|NOSTAGE

```
MGMTCLAS = management-class-name
           STAGE|NOSTAGE
```

Requirement: Optional

Default: STAGE

Validation: Either (but not both) of the keywords STAGE or NOSTAGE are accepted.

Use: STAGE|NOSTAGE is an optional parameter which is used to determine whether an object is to be staged to disk during retrieval processing. It is used in conjunction with the corresponding parameter in the object's storage group definition in the STRGROUP parameter library member.

If STAGE is specified (or defaulted) for the object's management class or for the object's storage group definition, the object will be staged to disk during recall (as for V2.1). If NOSTAGE is specified on both the management class and storage group definitions pertaining to the object being retrieved, then the object will not be staged to disk, but will be returned directly to the caller's buffer(s) as specified in the OSREQ RETRIEVE macro.

Further retrieval requests for staged objects will be satisfied from OAM disk storage. Disk copies of these objects will subsequently be deleted from OAM disk storage by the ASM/OAM object management procedure, as controlled by the DELETE parameter on the object's management class definition in the ASM/OAM OBJCNTL parameter library member. These objects will then be retrieved from ASM for S/390 by ASM/OAM, on next access.

Further retrieval requests for non-staged objects will always be satisfied by ASM/OAM from ASM for S/390 storage.

If this parameter is omitted, a default value of STAGE is used.

3.4 STRGROUP parameters.

STRGROUP parameters are used to relate OAM storage group names, as specified via DFSMS, to OAM database names.

STRGROUP parameters have the general format:-

```
storage-group-name = aaaaaaaa       (BACKUP|NOBACKUP)
                              (HLQ=xxxxxxxx)
                              (RETAINTAPE=nnnn)
                              (STAGE|NOSTAGE)
```

Each storage group parameter must be completely contained within one parameter record.

In all other respects, STRGROUP parameters adhere to the general parameter format.

3.4.1 STRGROUP: aaaaaaaa

```
storage-group-name = aaaaaaaa
```

Requirement: Mandatory for each OAM storage group.

Default: None

Validation: storage-group-name = 1-30 alphanumeric characters specifying a valid storage group name, as defined via DFSMS.

aaaaaaaa = 1-8 alphanumeric characters, beginning with an alpha character.

Use: Each storage group parameter is used to relate an OAM storage group with the name qualifier of the DB2 database used by OAM for storage of objects in that storage group (e.g 'GROUP00', GROUP01' etc.).

Notes: One storage group parameter should be present for each OAM storage group used for object storage.

Omission of an OAM storage group from this member will cause execution of any ASM/OAM utility for that storage group to fail, and will also cause retrieval of migrated objects within that storage group to fail.

Note that a full set of ASM/OAM storage group datasets (as described in chapter 2) must exist for each storage group in this parameter member.

3.4.2 STRGROUP: BACKUP|NOBACKUP

```
storage-group-name = aaaaaaaa BACKUP|NOBACKUP
```

Requirement: Optional.

Default: NOBACKUP.

Validation: None.

Use: This parameter is used to control ASM/OAM object backup processing (see section 7.1 for a description of object backup processing).

If 'BACKUP' is specified, then all unmigrated disk-resident OAM objects will be written to ASM for S/390 during execution of the object management procedure for this storage group. Objects will not be deleted from OAM disk storage during this process, so that all subsequent retrievals of those objects will be satisfied from disk as normal.

If 'NOBACKUP' is specified (or allowed to default), backup copies of objects will not be taken. Objects will only be written to ASM for S/390 if they are eligible for migration, using standard ASM/OAM migration parameter controls.

Notes: The OAM disk copy of a backed-up object will not be deleted by the object management procedure until that object has become eligible for migration, under control of the ASM/OAM 'MIGRATE' OBJCNTL parameter. At this time, the disk copy of the object will be eligible for deletion, as controlled by the ASM/OAM 'DELETE' OBJCNTL parameter. Note that no physical migration of the object will take place at this time; the backup copy in ASM for S/390 will now be treated as the primary copy of the migrated object.

The object recovery utility OTIMP130 is used to recover backed-up objects from ASM for S/390, after loss of OAM disk-resident copies of objects (see section 6.4 for a description of this utility).

3.4.3 STRGROUP: HLQ

```
storage-group-name = aaaaaaaa HLQ=xxxxxxxx
```

Requirement: Optional.

Default: If the HLQ sub-parameter is omitted from a storage group definition, ASM/OAM will use standard system dataset names (i.e. will not prefix system dataset names with an additional high-level qualifier).

Validation: 'xxxxxxxx' must be a 1-8 character alphanumeric identifier, beginning with an alphabetic character.

Use: This parameter is used to specify the high-level qualifier which is to be used by ASM/OAM to prefix system dataset names generated internally by the product during dynamic allocation processing. System datasets in this category consist of:

a) the ASM for S/390 primary index dataset for the storage group;

b) the deletion control file for the storage group.

These datasets must be created before ASM/OAM is used to process objects in a storage group (see section 2.2.8). If the HLQ parameter has been specified for a storage group, care should be taken to ensure that the high-level qualifier specified in this parameter is used when defining the corresponding system datasets for that storage group.

3.4.4 STRGROUP: RETAINTAPE

```
storage-group-name = aaaaaaaa RETAINTAPE=nnnn
```

Requirement: Optional.

Default: The global RETAINTAPE value from the TAPECNTL parameter library member is used if this parameter is omitted from the storage group definition.

Validation: 'nnnn' must be a 1-4 digit numeric value in the range 0-1440.

Use: RETAINTAPE is an optional STRGROUP parameter which is used to override the global tape drive retention setting from the TAPECNTL parameter library member. If present, 'nnnn' should specify a 1-4 digit numeric value in the range 0-1440.

A value of 0 indicates that tape volumes in this storage group are not to be retained on a drive after all outstanding requests have been completed. A non-zero value specifies the number of minutes for which a tape is to be retained on a drive after use. The tape volume will be automatically dismounted by ASM/OAM when this time interval has elapsed. A dismount of a tape may be forced by ASM/OAM prior to expiration of this time interval if no free tape drive is available for allocation of a new tape volume, and the tape is the least-recently referenced of all currently mounted tape volumes.

A value of 1440 indicates that tapes are held permanently on a drive until a dismount is forced when there are no free tape drives to satisfy a new request (as described above), or until termination of the ASM/OAM control region.

If this parameter is omitted, the global RETAINTAPE value as specified or defaulted in the TAPECNTL parameter library member will be honored for all tape volumes in this storage group

3.4.5 STRGROUP: STAGE|NOSTAGE

```
storage-group-name = aaaaaaaa STAGE|NOSTAGE
```

Requirement: Optional

Default: STAGE

Validation: Either (but not both) of the keywords STAGE or NOSTAGE are accepted.

Use: STAGE|NOSTAGE is an optional parameter which is used to determine whether an object is to be staged to OAM disk during retrieval processing. It is used in conjunction with the corresponding parameter in the object's management class definition in the OBJCNTL parameter library member.

If STAGE is specified (or defaulted) for the object's storage group ***or*** for the object's management class definition, the object will be staged to OAM disk during recall. If NOSTAGE is specified on both the storage group ***and*** management class definitions pertaining to the object being retrieved, then the object will *not* be staged to disk, but will be returned directly to the caller's buffer(s) as specified in the OSREQ RETRIEVE macro.

Further retrieval requests for staged objects will be satisfied from OAM disk storage. Disk copies of these objects will subsequently be deleted from OAM disk storage by the ASM/OAM object management procedure, as controlled by the DELETE parameter on the object's management class definition in the ASM/OAM OBJCNTL parameter library member. These objects will then be retrieved from ASM for S/390 by ASM/OAM, on next access.

Further retrieval requests for non-staged objects will always be satisfied by ASM/OAM from ASM for S/390 storage.

If this parameter is omitted, a default value of STAGE is used.

3.5 TAPECNTL parameters.

These parameters are used to control operation of the ASM/OAM control region.

Parameters in this member have the general parameter format described in section 3.1.

3.5.1 TAPECNTL: MAXDRIVE

```
MAXDRIVE = nnn
```

Requirement: Optional

Default: 4

Validation: nnn = 1-3 digit numeric value in range 1 - 256

Use: The MAXDRIVE parameter specifies the maximum number of tape drives which are to be simultaneously allocated by the ASM/OAM control region for retrieval of tape-resident objects from ASM for S/390.

Notes: Requests which cause this maximum to be exceeded will receive an 'OSR unavailable' condition from ASM/OAM.

This setting may be varied during ASM/OAM operation via the 'SET MAXDRIVE' operator command.

If this parameter is omitted, a default value of MAXDRIVE=4 will be used.

3.5.2 TAPECNTL: MAXQLEN

```
MAXQLEN = nnn
```

Requirement: Optional

Default: 4

Validation: nnn = 1-3 digit numeric value in range 1 - 256

Use: The MAXQLEN parameter specifies the maximum number of retrieval requests which may be simultaneously queued for any one ASM for S/390 tape volume.

Notes: ASM/OAM will queue requests for retrieval from an ASM for S/390 tape volume which is already being processed, on a 'first-in first-out' basis, up to the maximum level specified in this parameter.

Requests which cause this maximum to be exceeded will receive an 'OSR unavailable' condition from ASM/OAM.

This setting may be varied during ASM/OAM operation via the 'SET MAXQLEN' operator command.

If this parameter is omitted, a default value of MAXQLEN=4 will be used.

3.5.3 TAPECNTL: RETAINTAPE

```
RETAINTAPE = nnnn
```

Requirement: Optional

Default: 0

Validation: nnnn = 1-4 digit numeric value in range 0 - 1440

Use: The RETAINTAPE parameter specifies the number of minutes for which a tape is to remain mounted after all outstanding retrieval requests from that tape have been processed by the ASM/OAM control region.

The control region housekeeping task (which is invoked every minute) will automatically dismount a tape which has not been referenced for the specified interval. A dismount of a tape may be forced by ASM/OAM prior to expiration of this time interval if no free tape drive is available for allocation of a new tape volume, and the tape is the least-recently referenced of all currently mounted tape volumes.

A value of 0 indicates that tapes will be dismounted immediately after the last outstanding request for retrieval from each tape has been processed.

A value of 1440 indicates that tapes are held permanently on a drive until a dismount is forced when there are no free tape drives to satisfy a new request (as described above), or until termination of the ASM/OAM control region.

Notes: This setting may be varied during ASM/OAM operation via the 'SET RETAINTAPE' operator command.

If this parameter is omitted, a default value of RETAINTAPE=0 will be used.

3.5.4 TAPECNTL: MAXDISK

```
MAXDISK = nnn
```

Requirement: Optional

Default: 4

Validation: nnn = 1-3 digit numeric value in range 0 - 256

Use: The MAXDISK parameter specifies the maximum number of disk reader tasks which are to be created in the ASM/OAM control region for retrieval of ASM for S/390 objects which have a disk (‘K’) copy.

Notes: A request for the retrieval of an ASM for S/390 object which has a disk copy will be queued on a disk reader task. There is no limit to the length of a disk reader task’s request queue (unlike a tape reader task).

ASM/OAM will attempt to balance queue lengths across all disk reader tasks. Increasing the number of disk reader tasks will reduce average request queue lengths. The default value of 4 is probably sufficient for most operational environments.

This setting may be varied during ASM/OAM operation via the 'SET MAXDISK' operator command.

If this parameter is omitted, a default value of MAXDISK=4 will be used.

3.5.5 TAPECNTL: TAPEWAIT

```
TAPEWAIT = nnnn
```

Requirement: Optional

Default: 0

Validation: nnnn = 1-4 digit numeric value in range 0 - 1440

Use: This is an optional parameter which is used to control whether retrieval requests for tape-resident ASM for S/390 objects which cannot be immediately satisfied are rejected (with a 'resource unavailable' reason code) or queued internally until a tape retrieval resource becomes unavailable, or until a maximum wait limit has been exceeded. 'nnnn' must be a 1-4 digit numeric character string in the range 0-1440, which specifies the maximum number of minutes for which requests are to be queued internally.

If set to 0 (the default), no internal queuing of requests will take place in the above circumstances and the request will be rejected with a 'resource unavailable' reason code.

If the TAPEWAIT parameter value is in the range 1-1439, requests will be queued internally until processed or until the maximum queuing time in minutes (as specified in this parameter) has been exceeded. Requests will then be rejected with a 'resource unavailable' reason code (as above).

If the TAPEWAIT parameter value is 1440, then requests will be held indefinitely in the internal queue until the necessary resources to process the request become available.

Notes: This setting may be varied during ASM/OAM operation via the 'SET RETAINTAPE' operator command.

If this parameter is omitted, a default value of TAPEWAIT=0 will be used.

3.5.6 TAPECNTL: COMMAND

```
COMMAND = REPLY|MODIFY
```

Requirement: Optional

Default: COMMAND=REPLY

Validation: The parameter values REPLY or MODIFY must be specified.

Use: This is an optional parameter which is used to control the method by which operator commands are passed to the ASM/OAM control region. The default value of 'REPLY' will cause the control region to output the operator reply message OTM20000 when it is ready to receive an operator command.

If 'MODIFY' is specified, no operator reply message will be displayed. Operator commands must be entered via an MVS MODIFY command

(eg) `F NEAROAMC,SET MAXDRIVE=2`

The value of this setting cannot be modified during control region operation

4 ASM/OAM Control Region

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In order to enable ASM/OAM support for the retrieval and deletion of ASM for S/390-resident objects via the OSREQ interface, the following activities are required:

- the ASM/OAM control region must be started
- the ASM/OAM CICS interface must be enabled

This section discusses these requirements, and the enabling and disabling of support for ASM for S/390-resident OAM objects using ASM/OAM.

The ASM/OAM control region performs the following functions:

- Enables ASM/OAM for ASM for S/390 database processing.
- Enables interception of all batch OSREQ requests on the system.
- Establishes the environment for object retrieval from ASM for S/390.
- Processes OSREQ DELETE requests for ASM/OAM-owned objects.
- Processes OSREQ RETRIEVE requests for ASM/OAM-owned objects.
- Performs SMF record creation to record ASM/OAM object retrieval activity.
- Processes requests from the operator interface facility.

In order to enable interception of all OSREQ requests from command-level CICS applications within the host processing system, the ASM/OAM CICS interface must be enabled subsequent to ASM/OAM control region startup.

No other system activities are required in order to enable ASM/OAM object retrieval and deletion processing. In particular, no modifications are required to existing application coding to allow ASM for S/390-resident objects to be processed.

4.1 Control region initialization.

The ASM/OAM control region is initiated as an MVS started task called NEAROAMC. The procedure used for this started task was created during the ASM/OAM installation process (see paragraph (b) of section 2.2.3).

The following points should be noted regarding creation and maintenance of the NEAROAMC procedure:

- The distributed ASM/OAM and ASM for S/390 load libraries must be available to this task, either via the system linklist, or from the procedure's STEPLIB concatenation.
- The ASM/OAM control region must run with APF-authorization. Both the ASM/OAM and ASM for S/390 load libraries must therefore be APF-authorized. If these libraries are specified via the STEPLIB concatenation, failure to APF-authorize either of them will result in the loss of APF-authorization for the control region itself. This is likely to cause a system 047 abend during control region processing.
- The installed ASM/OAM parameter library should be specified in the procedure's OTIMS100 DD card. Parameter settings should be reviewed and set as required prior to control region start-up (see chapter 3).

To start ASM/OAM control region initialization, enter the system operator command:

```
START NEAROAMC
```

The ASM/OAM control region will display a number of informational messages during initialization processing. After successful initialization, if ‘COMMAND=REPLY’ was specified (or defaulted) in the TAPECNTL parameter library member the following operator reply message will be displayed:

```
OTM20000 ENTER NEAROAM REQUEST:
```

If ‘COMMAND=MODIFY’ was specified, the following message will be displayed:

```
OTM20030 NEAROAM INITIALIZATION COMPLETED SUCCESSFULLY
```

ASM/OAM has now initialized successfully, and OAM support for ASM for S/390-resident objects has been enabled. All batch OSREQ requests made on the system will be intercepted and processed as normal.

Any errors encountered during the initialization process will be displayed on the system console, and ASM/OAM initialization terminated. The appropriate message in chapter 8 of the user manual should be consulted to identify the cause of the error. Take the recommended action to rectify the problem then restart the control region.

If DB2 is not available during control region initialization processing, message OTM23016 will be displayed and control region initialization will be suspended. Initialization processing will resume automatically after DB2 has been started.

The control region will automatically enter shutdown processing if DB2 is terminated while the control region is still active. A normal ASM/OAM shutdown will be performed if DB2 is terminated normally. An immediate ASM/OAM shutdown will be performed if DB2 is terminated abnormally.

4.2 The ASM/OAM CICS interface.

4.2.1 Enabling the CICS interface.

Starting the ASM/OAM control region will allow ASM/OAM to intercept all batch OSREQ requests made on the system, and enable the processing of ASM for S/390-resident objects via these requests.

In order to enable the ASM/OAM processing of OSREQ requests from command-level CICS programs, the ASM/OAM CICS interface must be initialized subsequent to ASM/OAM control region initialization.

Initialization of the ASM/OAM CICS interface is made by performing either of the following actions from a CICS system in which the CICS-OAM interface has already been enabled:

a. Executing program OTIMP230 during CICS post-initialization processing via inclusion in the start-up program list table (PLTPI). The entry for OTIMP230 in this table must be made after the entry for the CICS-OAM interface module CBRICONN.

or

b. Executing transaction 'OM23' after signing-on to any CICS system which has been enabled for OAM access.

ASM/OAM CICS initialization will not succeed if the ASM/OAM control region (NEAROAMC) is not active. If the ASM/OAM CICS interface is already enabled, then an initialization request will be ignored, and the requestor informed via a terminal or system console display message.

Note carefully that initializing the ASM/OAM CICS interface will enable ASM/OAM processing of all CICS OSREQ requests made on the system (ie) OSREQ requests made from all CICS regions which have been enabled for OAM access on the system, and not just the region from which the ASM/OAM initialization request was made.

This means that for systems which have more than one CICS region initialized for OAM access, the ASM/OAM CICS initialization request need only be made once. This should either be performed automatically (via the PLTPI) in the first region that is initialized during start-of-period processing, or manually via the OM23 transaction before any CICS OSREQ requests are issued on the system. See section 2.2.6 for a full discussion of this issue.

4.2.2 Disabling the CICS interface.

The ASM/OAM CICS interface may be disabled by performing either of the following actions:

a. Executing program OTIMP240 during CICS shutdown processing via inclusion in the shutdown program list table (PLTSD). The entry for OTIMP240 in this table should be in the first phase of the PLTSD (ie) before the DFHDELIM entry.

or

b. Executing transaction 'OM24' after signing-on to any CICS system which has been enabled for OAM access.

Once the ASM/OAM CICS interface is disabled, OSREQ requests issued from command-level CICS programs will no longer be intercepted. Processing of ASM for S/390-resident objects via these calls will therefore no longer be possible.

As was the case with the ASM/OAM CICS interface enabling procedure, disabling the interface need only be performed once for all CICS regions on the system. This should either be performed automatically (via the PLTSD) in the last region that is shutdown during end-of-period processing, or manually via the OM24 transaction when no more CICS OSREQ requests are going to be issued on the system. See section 2.2.6 for a full discussion of this issue.

4.3 Processing OSREQ requests.

Once ASM/OAM initialization has been completed (as outlined in sections 4.1 and 4.2), then OSREQ requests issued from batch, TSO or command-level CICS programs on the system will be able to access ASM for S/390-resident objects.

ASM/OAM implements OAM tape support for OSREQ RETRIEVE and DELETE requests.

4.3.1 RETRIEVE requests.

Any OSREQ request for retrieval of an object will be intercepted by ASM/OAM. If the requested object is resident in an ASM for S/390 database the ASM/OAM control region will perform all the necessary access activities to retrieve the specified object. Control will not be returned to the caller until object retrieval processing has been completed.

If the STAGE parameter is specified (or defaulted) in the OBJCNTL parameter library member entry for the object's management class, ***or*** in the STRGROUP parameter library member entry for the object's storage group, then the recalled object will be inserted by ASM/OAM in the OAM disk database for that storage group, and will now be available for retrieval by OAM from disk. All database changes will be committed at this point. ASM/OAM will then pass control to OAM to perform the object retrieval as normal. All subsequent requests for retrieval of this object will be satisfied by OAM from disk.

Note that a staged retrieved object is not deleted from ASM for S/390; consequently when the recalled object is deleted from disk by the ASM/OAM object management procedure (see chapter 5), the object will once again be available for recall from its original location in ASM for S/390. There is no requirement for re-migration of a staged recalled object.

If the NOSTAGE parameter is specified in the relevant OBJCNTL and STRGROUP entries (as detailed above), then the retrieved object will be stored directly in the calling application's data buffer and control returned to the caller. The object will not be staged back to disk, and no OAM database updates will be performed. All subsequent retrieval requests for that object will once again be satisfied from ASM for S/390.

For both staged and non-staged retrieval, the object's management class may be amended after retrieval via the 'ORECALL' parameter in the MGMTCLAS parameter library member.

Any errors encountered by ASM/OAM during processing of a retrieval request for an ASM for S/390 object will be communicated to the caller

via OSREQ return and reason codes. See chapter 8 for a list of all possible OSREQ return and reason codes which may be set by ASM/OAM. Any OAM database changes made for that request, prior to the error, will be backed out. Figure 4.1 illustrates the processing flow for retrieval of an ASM for S/390 object via an OSREQ request.

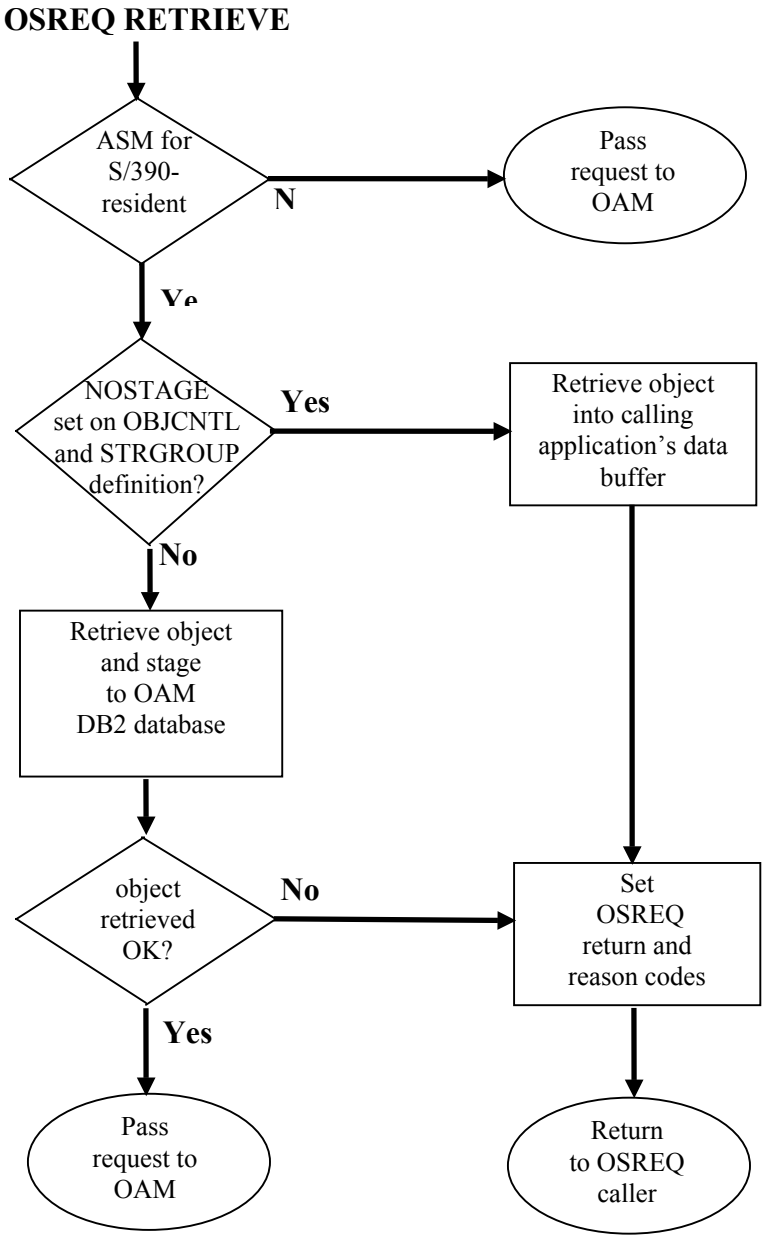

Figure 4.1 - ASM/OAM Object Retrieval Processing

4.3.2 DELETE requests.

Any OSREQ request for deletion of an ASM for S/390-resident object will be processed by the ASM/OAM control region. Deletion of all OAM-owned objects (ie. objects on OAM disk, optical or tape storage) will be processed by OAM as normal.

ASM/OAM will delete the object from the appropriate ASM for S/390 database and also delete the OAM directory entry for the specified object. The object will then no longer be known to OAM.

After processing the request, control will be returned to the OSREQ caller, with the standard OSREQ return and reason code fields being used to indicate its success. OSR (the object storage and retrieval component of OAM) will not be invoked for deletion of ASM for S/390-resident objects.

For successful deletion, all database changes will be committed before returning control to the caller. If any error occurs during the deletion process, return and reason codes will be set as appropriate prior to returning control to the OSREQ caller, and any database changes made prior to the error will be backed out.

Figure 4.2 illustrates the processing flow for deletion of an ASM/OAM-owned object via an OSREQ request.

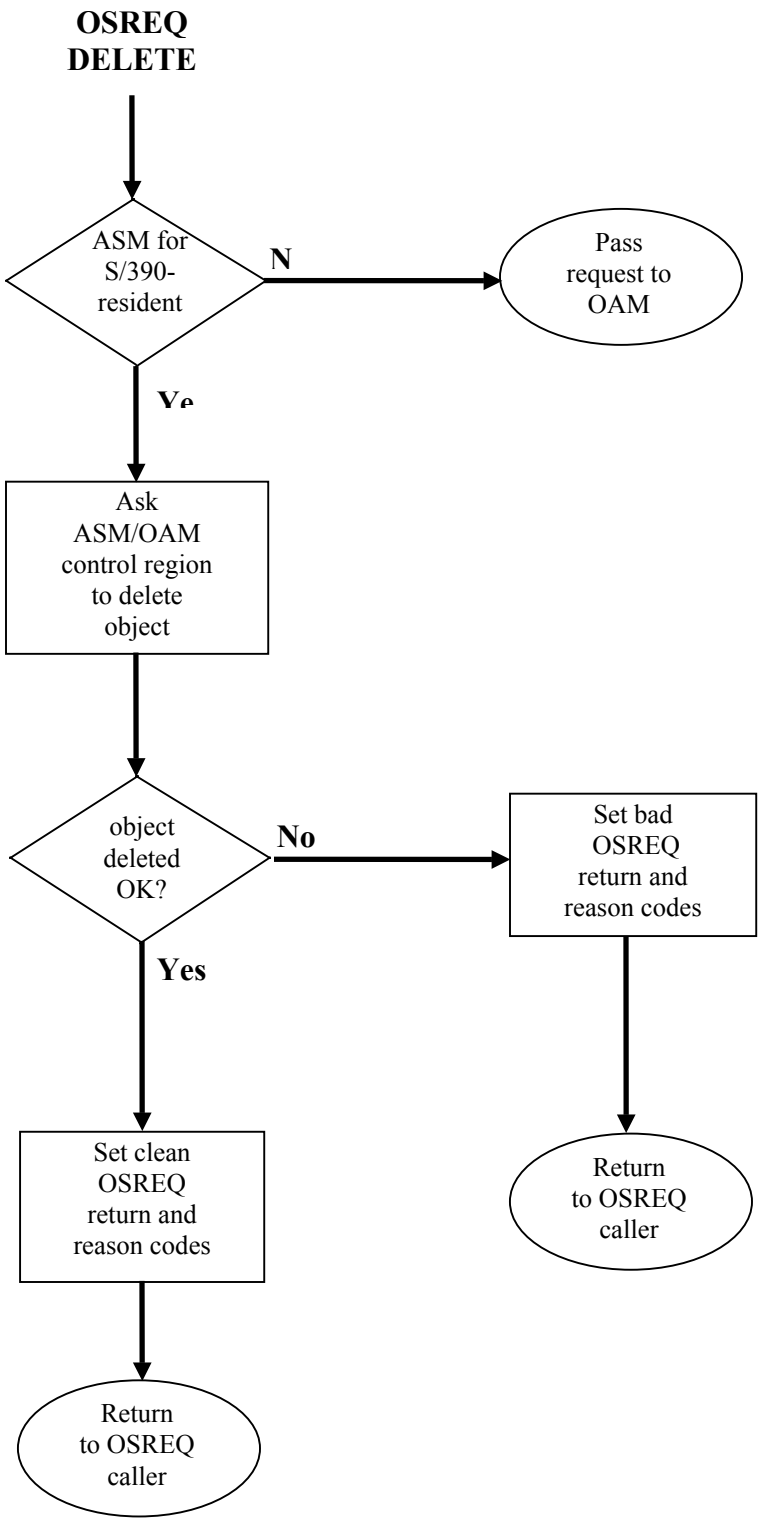

Figure 4.2 – ASM/OAM Object Deletion Processing

4.3.3 OSREQ return and reason codes.

On receiving control after issuing an OSREQ macro call, the calling program will be given return and reason codes from ASM/OAM in an identical manner to those received from OAM (ie) return code in register 15 and RETCODE field, if specified, and reason code in register 0 and REACODE field, if specified.

Return and reason codes for RETRIEVE calls for ASM for S/390 objects may be generated by ASM/OAM or by OAM. Codes for DELETE calls for ASM for S/390 objects are generated by ASM/OAM only.

Refer to chapter 8 of the user manual for a list of all possible return and reason codes generated by ASM/OAM. Return or reason codes not specified here may be found in IBM documentation for OAM return and reason codes.

As a general guide, reason codes generated by ASM/OAM will have the value X'80' as a source identifier in byte 1 of the code (ie. the second byte of the 4-byte field).

4.4 ASM/OAM operator interface.

ASM/OAM operator commands may be entered by replying to the OTM20000 message on the system console (if COMMAND=REPLY has been specified or defaulted in the TAPECNTL parameter library member), or via an MVS MODIFY command (if COMMAND=MODIFY has been specified in the TAPECNTL member). Only one command may be entered and processed at any one time. When ASM/OAM has completed all processing for a command a message will be displayed on the console indicating the result of the request (and the OTM20000 message re-displayed if COMMAND=REPLY is in effect). Further commands may then be entered by the operator.

Commands are available to perform the following functions:

- Display detailed or summary status of ASM/OAM tape and disk retrieval configuration.
- Alter the ASM/OAM tape and disk retrieval configuration.
- Purge or force purge individual tape and disk retrieval tasks.
- Terminate the ASM/OAM control region.

All messages issued by ASM/OAM in response to an operator request are documented in chapter 8 of this manual. This section specifies operator request formats, and gives examples of ASM/OAM responses to these requests.

4.4.1 Display summary status.

```
D(ISPLAY)
```

This request is used to produce a summary display of the status of the ASM/OAM control region processing configuration.

The DISPLAY command may be abbreviated to the single character 'D'.

ASM/OAM creates a number of tape and disk reader tasks in the control region to perform retrieval of objects from ASM for S/390. Each tape reader task is capable of processing one tape volume at any one time. The number of tape reader tasks created is initially equal to the value of the MAXDRIVE parameter at ASM/OAM initialization. Increasing this value during ASM/OAM operation will cause a similar increase in the number of tape reader tasks. ASM/OAM will only be able to process as many tape volumes simultaneously as there are initialized tape reader tasks.

Disk reader tasks are only required if the version of ASM for S/390 used by ASM/OAM includes support for disk (‘K’) copies of archived objects. If ASM for S/390 does not include this support, then disk reader tasks are not required. In this case, set the parameter ‘MAXDISK=0’ in the TAPECNTL parameter library member. When used, each disk reader task may process multiple ASM for S/390 disk (‘K’) copy datasets in one invocation (ie. the task’s request queue may contain requests for retrieval of objects from different disk datasets). ASM/OAM attempts to balance the length of the request queues for the disk reader tasks. Increasing the value of MAXDISK will reduce the average length of the disk reader task request queues. For most operational environments, the default MAXDISK value of 4 will be sufficient. Note that the MAXQLEN parameter is not used to control a disk reader task request queue length; there is no limit to the number of requests which may be queued for each disk reader task.

When using versions of ASM for S/390 which support disk storage of objects, if no disk reader tasks are available (MAXDISK=0), a retrieval request for a disk-resident object will be passed to an ASM/OAM tape reader task, if one is available. This task will issue a standard ASM for S/390 object retrieval request, which will still be satisfied wherever possible by ASM for S/390 from an object’s disk copy. Setting the value of MAXDISK to 0 in these circumstances is not recommended, as it may cause requests for retrieval of disk-resident objects to be rejected because there are no free tape reader tasks.

A summary status request will display the current values of the MAXDRIVE, MAXQLEN, RETAINTAPE, MAXDISK and TAPEWAIT parameters, and the status of the internal scheduler and driver queue locks, in message OTM20062.

In addition, message OTM20063 will be displayed for each tape and disk reader task in the system, giving the following details:

TYPE - this specifies the task type, and can take the following values:

NORM - a normal task. Its current status is displayed in the status field. If busy, a normal task will automatically de-allocate and dismount a tape volume after all outstanding retrievals for that volume have been completed.

SHUT - a task which is being shutdown. This setting indicates that the task is being terminated explicitly via operator request or implicitly via a reduction in the value of the MAXDRIVE or MAXDISK system parameters. The task will terminate when all outstanding requests in the task queue have been processed.

MNTD - a tape reader task which is processing a tape volume which is to be retained on the drive after use. This condition will occur when the active value of the global ASM/OAM RETAINTAPE parameter or the RETAINTAPE parameter for the storage group being processed by the task is non-zero.

If the task is busy, the tape will not be de-allocated and dismounted after all outstanding requests have been completed.

If the task is waiting for work, the tape last accessed by this task has been retained on the drive. This task will be used for any subsequent requests which require access to this tape volume.

The tape volume will be de-allocated and dismounted under the following conditions:

a) when the number of minutes elapsed since the tape was last accessed exceeds the current value of the controlling RETAINTAPE parameter

or

b) no drives are available to satisfy a request for access to another tape volume, and this volume is the least recently referenced volume with this status.

STATUS - this field indicates the current status of the identified task. It can take the following values:

NULL - the task has never been initialized. It is not available for object recall.

WAIT - the task is currently waiting for work. The task type will indicate whether the task currently retains allocation to a tape volume.

BUSY - the task is currently busy performing object retrieval. The task type will indicate whether the tape volume being processed will be retained on the drive after all outstanding requests have been completed, or whether the tape will be de-allocated and dismounted.

TERM - a terminated task. A task may be terminated either explicitly by operator command, or implicitly via a reduction in the system MAXDRIVE or MAXDISK settings. It may be restarted by increasing the value of MAXDRIVE or MAXDISK. A terminated task is not available for object recall.

QLEN - this gives the number of requests queued for processing by this task. All requests will be for retrieval of objects from the tape or disk dataset currently being processed by this task.

The queue length will be non-zero for tasks with status = BUSY. For waiting tasks, this value will always be zero.

UNIT - this field is currently unused.

For tape reader tasks only, message OTM20063 may be accompanied by message OTM20064. This second message gives the following information:

DSN - this gives the identifier of the tape dataset currently being processed (status = BUSY), or tape dataset retained on drive after last use (type = MNTD and status = WAIT). Any subsequent request for retrieval of objects from this tape volume will be satisfied by this task without requiring a tape mount. Note that the identifier in this entry is generated internally to include the storage group identifier, DB2 subsystem identifier and volume sequence number. This identifier is not necessarily the same as the actual dataset name in the header label of the tape.

LASTUSE - for tasks with status = WAIT and type = MNTD, this gives the time (in format HH:MM:SS) that the last request for retrieval from this tape volume was completed. This timestamp is used by ASM/OAM to determine which tape volume will be automatically dismounted to satisfy a request for retrieval from another tape volume, when there are no spare drives on the system. The mounted tape volume which was least recently referenced will be dismounted to allow the new request to be processed.

Example:

```
STC05021*20 OTM20000 ENTER NEAROAM REQUEST:
..........
          R 20,D
STC05021 OTM20062 MAXDRIVE = 004 MAXQLEN = 0012 RETAINTAPE = 00001
          MAXDISK = 002  TAPEWAIT = 00100
STC05021 OTM20063 TASK T001: TYPE=NORM STATUS=TERM QLEN= 0  UNIT=
STC05021 OTM20063 TASK T002: TYPE=NORM STATUS=WAIT QLEN= 0  UNIT=
STC05021 OTM20063 TASK T003: TYPE=NORM STATUS=WAIT QLEN= 0  UNIT=
STC05021 OTM20063 TASK T004: TYPE=NORM STATUS=BUSY QLEN= 2  UNIT=
STC05021 OTM20064 TASK T004: DSN=GROUP90.OTM.DB2I.G00026
          LASTUSE=
STC05021 OTM20063 TASK T005: TYPE=MNTD STATUS=WAIT QLEN= 0  UNIT=
STC05021 OTM20064 TASK T005: DSN=GROUP92.OTM.DB2I.G00012
          LASTUSE=15:10:36
STC05021 OTM20063 TASK D001: TYPE=NORM STATUS=WAIT QLEN= 1  UNIT=
STC05021 OTM20063 TASK D002: TYPE=NORM STATUS=WAIT QLEN= 0  UNIT=
STC05021*21 OTM20000 ENTER NEAROAM REQUEST:
```

4.4.2 Display detail status.

```
D(ISPLAY) T(ASK) = (T|D)nnn
```

This request is used to produce a detailed display of the status of the ASM/OAM control region retrieval configuration. The DISPLAY command may be abbreviated to the single character 'D'. The TASK parameter may be abbreviated to the single character 'T'. 'nnn' is the numeric identifier of the task to be displayed (where 'nnn' consists of 1-3 numeric characters in the range 1-256). This should be preceded by the character 'T' for a tape reader task, and 'D' for a disk reader task. If omitted, a default entry of 'T' will be used. This entry must be a valid task number, as displayed via a summary status display request.

A detail status request will first of all display message OTM20063 for the identified reader task. For tape reader tasks, if the task type is BUSY message OTM20064 is displayed, giving the name of the tape dataset allocated for this task. See section 4.4.1 for a description of the fields in these messages.

For busy tasks with a non-zero queue length, a detail status request will display one set of OTM20066 and OTM20067 messages for each request in the queue. These messages will display the following fields:

REQUEST - the entry number of the request in the queue. The request currently being processed will have an entry number of 1.

Example:

```
STC05021*21 OTM20000 ENTER NEAROAM REQUEST:
..................
                 R 21,D T=4
STC05021 OTM20063 TASK T004: TYPE=NORM STATUS=BUSY QLEN=  2 UNIT=
STC05021 OTM20064 TASK T004: DSN=GROUP90.OTM.DB2I.OBJECTS.G00026
                 LASTUSE=
STC05021 OTM20066 REQUEST   1: COLLECTION=COLL.SG90.TEST.COLLECTN
STC05021 OTM20067 REQUEST   1: OBJECT=OBJECT.SG90.TEST.OBJECT.G12345
STC05021 OTM20066 REQUEST   2: COLLECTION=COLL.SG90.TEST.COLLECTN
STC05021 OTM20067 REQUEST   2: OBJECT=OBJECT.SG90.TEST.OBJECT.G12456
STC05021*22 OTM20000 ENTER NEAROAM REQUEST:
```

4.4.3 Force purge reader task.

```
F(ORCE) T(ASK) = (T|D)nnn
```

The FORCE command is used to immediately terminate a tape or disk reader task in the ASM/OAM control region. Force purging a task does not allow any outstanding requests in the task queue to be completed.

The command may be abbreviated to a single 'F'. The TASK parameter may be abbreviated to a single 'T'. The value 'nnn' must be numeric, and should be preceded by the character ‘T’ for tape reader tasks, and ‘D’ for disk reader tasks. If this character is omitted, a default value of ‘T’ will be used. The task identifier entered here must correspond to a valid reader task number, as displayed by the status summary command.

Both waiting and busy tasks are immediately terminated. For busy tasks, the request currently being processed, and all subsequent requests in the task queue, are abnormally terminated with an 'OSR unavailable' condition. This will generate a return code of 12 and reason code of X'68800100' to the OSREQ caller.

When a tape or disk reader task is force purged, the current value of the MAXDRIVE or MAXDISK parameters is automatically decremented by 1. Once purged, a task will not be available for object recall processing. Its status will appear as 'TERM' in any subsequent status display.

For busy tape reader tasks, the current tape volume in use will be de-allocated. The tape will be rewound and dismounted, and the tape drive freed by ASM/OAM.

Tasks may only be force purged if a normal purge request has already been queued for that task.

Example:

```
STC05021*20 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 20,D
STC05021 OTM20062 MAXDRIVE = 004 MAXQLEN = 012 RETAINTAPE = 00000
         MAXDISK = 002
STC05021 OTM20063 TASK T001: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T003: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T004: TYPE=NORM STATUS=BUSY QLEN=  2 UNIT=
STC05021 OTM20064 TASK T004: DSN=GROUP90.OTM.DB2I.OBJECTS.G00026
         LASTUSE=
STC05021 OTM20063 TASK T005: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D001: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021*21 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 21,P T=4
STC05021 OTM20079 TASK T004 PURGE REQUEST QUEUED
STC05021*22 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 22,F T=4
STC05021 OTM20086 TASK 004 FORCED SUCCESSFULLY
STC05021*23 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 23,D
STC05021 OTM20062 MAXDRIVE = 003 MAXQLEN = 012 RETAINTAPE = 00000
         MAXDISK = 002
STC05021 OTM20063 TASK T001: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T003: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T004: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T005: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D001: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021*24 OTM20000 ENTER NEAROAM REQUEST:
```

4.4.4 Purge reader task.

```
P(URGE) T(ASK) = (T|D)nnn
```

The PURGE command is used to terminate a tape or disk reader task in the ASM/OAM control region. All outstanding requests in the task queue will be allowed to complete normally before task termination.

The command may be abbreviated to a single 'P'. The TASK parameter may be abbreviated to a single 'T'. The value 'nnn' must be numeric and should be preceded by the character ‘T’ for tape reader tasks, and ‘D’ for disk reader tasks. If this character is omitted, a default value of ‘T’ will be used. The task identifier entered here must correspond to a valid reader task number, as displayed by the status summary command.

For waiting reader tasks (status = WAIT), the purge request will be executed immediately. The identified task will be terminated, and will no longer be available for object recall processing. It will appear with a type of TERM in subsequent status display requests. Any tape allocation held by a purged tape reader task will be released - this will cause the allocated tape to be rewound and dismounted, and the tape drive to be freed by ASM/OAM.

For busy reader tasks (status=BUSY), a shutdown request will be added to the task queue. This will allow retrieval requests which were outstanding at the time the purge command was entered to be completed as normal. The task will then be terminated, and will no longer be available for object recall processing. It will appear with a type of TERM in subsequent status display requests. For tape reader tasks, the tape being processed by the identified task will be released, whether it would have normally been retained on the tape drive after use or not.

Requests to purge a busy task for which a purge request has already been queued will be rejected.

When a tape or disk reader task is purged, the current value of the MAXDRIVE or MAXDISK parameters is automatically decremented by 1.

Example:

```
STC05021*20 OTM20000 ENTER NEAROAM REQUEST:
..........
.........R 20,D
STC05021 OTM20062 MAXDRIVE = 004 MAXQLEN = 012 RETAINTAPE = 00000
         MAXDISK = 002
STC05021 OTM20063 TASK T001: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T003: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T004: TYPE=NORM STATUS=BUSY QLEN=  2 UNIT=
STC05021 OTM20064 TASK T004: DSN=GROUP90.OTM.DB2I.OBJECTS.G00026
         LASTUSE=
STC05021 OTM20063 TASK T005: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D001: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D002: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021*21 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 21,P T=D2
STC05021 OTM25009 DISK RDR TASK 002 PURGED SUCCESSFULLY
STC05021*22 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 22,P T=4
STC05021 OTM20079 TASK T004 PURGE REQUEST QUEUED
STC05021*23 OTM20000 ENTER NEAROAM REQUEST:
..........
         R 23,D
STC05021 OTM20062 MAXDRIVE = 004 MAXQLEN = 012 RETAINTAPE = 00000
         MAXDISK = 001
STC05021 OTM20063 TASK T001: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T002: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021 OTM20063 TASK T003: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK T004: TYPE=SHUT STATUS=BUSY QLEN=  2 UNIT=
STC05021 OTM20064 TASK T004: DSN=GROUP90.OTM.DB2I.OBJECTS.G00026
         LASTUSE=
STC05021 OTM20063 TASK T005: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D001: TYPE=NORM STATUS=WAIT QLEN=  0 UNIT=
STC05021 OTM20063 TASK D002: TYPE=NORM STATUS=TERM QLEN=  0 UNIT=
STC05021*24 OTM20000 ENTER NEAROAM REQUEST:
```

4.4.5 Alter ASM/OAM configuration.

```
S(ET)  { MAXDRIVE = nnn
       { MAXQLEN = nnn
       { RETAINTAPE = nnnn
       { MAXDISK = nnn
       { TAPEWAIT = nnnn
```

The SET command is used to alter the current values of the ASM/OAM MAXDRIVE, MAXQLEN, RETAINTAPE, MAXDISK and TAPEWAIT parameters. The command may be abbreviated to the single character 'S'. For the MAXDRIVE and MAXQLEN parameters 'nnn' must consist of 1-3 numeric digits in the range 1-256. For the RETAINTAPE and TAPEWAIT parameters ‘nnnn’ must consist of 1-4 numeric digits in the range 0-1440. For the MAXDISK parameter ‘nnn’ must consist of 1-3 numeric digits in the range 0-256.

The values of MAXDRIVE MAXQLEN, RETAINTAPE, MAXDISK and TAPEWAIT are initially set during ASM/OAM control region initialization from the corresponding parameters in the TAPECNTL member of the ASM/OAM parameter library.

Valid parameters for the SET command are:

MAXDRIVE - ASM/OAM will alter the current setting of the MAXDRIVE parameter to the value specified in the SET command.

If the value of MAXDRIVE is to be increased, ASM/OAM will increase the number of initialized tape reader tasks, by restarting terminated tasks, and/or adding new tasks.

If the value of MAXDRIVE is to be decreased, ASM/OAM will terminate a number of existing tasks equal to the decrease in the value of MAXDRIVE. These tasks will appear with the status TERM in any subsequent status display, and will not be available for object recall processing.

Note that processing of this command may take a little time for significant changes in the value of MAXDRIVE.

MAXQLEN - ASM/OAM will alter the current setting of the MAXQLEN parameter to the value specified in the SET command.

RETAINTAPE - ASM/OAM will alter the current setting of the RETAINTAPE parameter to the value specified in the SET command. This change will take immediate effect.

MAXDISK - ASM/OAM will alter the current setting of the MAXDISK parameter to the value specified in the SET command.

If the value of MAXDISK is to be increased, ASM/OAM will increase the number of initialized disk reader tasks, by restarting terminated tasks, and/or adding new tasks.

If the value of MAXDISK is to be decreased, ASM/OAM will terminate a number of existing tasks equal to the decrease in the value of MAXDISK. These tasks will appear with the status TERM in any subsequent status display, and will not be available for object recall processing.

Note that processing of this command may take a little time for significant changes in the value of MAXDISK.

TAPEWAIT - ASM/OAM will alter the current setting of the TAPEWAIT parameter to the value specified in the SET command. This change will take immediate effect.

Example:

```
         F NEAROAMC,S MAXDRIVE=8
STC06166 OTM20052 NEAROAM CONFIGURATION ALTERED SUCCESSFULLY
..........
         F NEAROAMC,S MAXQLEN=16
STC06166 OTM20052 NEAROAM CONFIGURATION ALTERED SUCCESSFULLY
..........
         F NEAROAMC,S MAXDISK=0
STC06166 OTM20052 NEAROAM CONFIGURATION ALTERED SUCCESSFULLY
..........
         F NEAROAMC,S TAPEWAIT=1440
STC06166 OTM20052 NEAROAM CONFIGURATION ALTERED SUCCESSFULLY
```

4.4.6 Refresh ASM/OAM control region.

```
REFRESH
```

The REFRESH command is used to close and re-open the primary index files for all ASM for S/390 storage group databases used during control region processing. Each primary index is a VSAM key-sequenced dataset (KSDS).

REFRESH processing is required when objects have been migrated to ASM for S/390 (via the ASM/OAM object management procedure) after the ASM/OAM control region has been started. ASM/OAM will not be able to see these objects until the REFRESH command has been successfully issued, or until the control region has been stopped and restarted.

An OSREQ return code of 8 with reason code of X'2C800200' will be issued if an attempt is made to access an object which has been migrated to ASM for S/390 after the ASM/OAM control region was started, if refresh processing has not been performed.

Example:

```
         F NEAROAMC,REFRESH
STC06166 OTM20087 REFRESH PROCESSING COMPLETED SUCCESSFULLY
..................
```

4.4.7 Terminate ASM/OAM control region.

```
SHUTDOWN (IMMED)
```

The SHUTDOWN command is used to terminate the ASM/OAM control region. The optional IMMED parameter is used to control the shutdown procedure.

If IMMED is not specified, ASM/OAM will allow all outstanding requests to be completed normally before terminating the control region. However, no new requests will be serviced by the control region after shutdown has been requested. Any OSREQ calls issued subsequent to entry of the shutdown request will be rejected with an 'OSR unavailable' condition (return code = 12 and reason code = X'68800100').

If IMMED is specified, ASM/OAM will perform an immediate shutdown; all current and outstanding retrieval requests will be terminated with an 'OSR unavailable' condition, and the ASM/OAM control region terminated.

Terminating the control region will disable support for retrieval of ASM for S/390-resident objects via ASM/OAM. The shutdown request should not therefore be performed without first verifying that no recalls of ASM for S/390 objects will be issued while the control region is inactive.

If COMMAND=REPLY has been specified (or defaulted) in the TAPECNTL parameter library member, ASM/OAM will issue message OTM20092 on receiving the SHUTDOWN command:

```
OTM20092 DO YOU WANT TO PROCEED WITH ASM/OAM SHUTDOWN (Y/N)?
```

To continue with shutdown processing, reply 'Y'. Any other reply will abort shutdown processing. ASM/OAM will redisplay the standard operator reply message OTM20000, and control region processing will continue as normal.

If COMMAND=MODIFY has been specified in the TAPECNTL member, ASM/OAM will not issue a confirmation request. Shutdown processing will continue automatically.

Example:

```
STC05021*25 OTM20000 ENTER NEAROAM REQUEST:
....................
         R 25,SHUTDOWN
STC05021*26 OTM20092 DO YOU WANT TO PROCEED WITH NEAROAM SHUTDOWN (Y/N)?
         R 26,Y
STC05021 OTM20093 NEAROAM SHUTDOWN IN PROGRESS
...................
```

4.5 SMF processing.

ASM/OAM provides an option to implement the recording of ASM for S/390 object retrieval statistics by the control region, using the IBM System Management Facility (SMF).

This option is invoked by users via the optional SMFRECID parameter of the ENVCNTL member of the ASM/OAM parameter library.

Omitting this parameter, or specifying an SMFRECID of zero, will suppress creation of SMF records by ASM/OAM.

Specifying a non-zero value, in the range 128 to 255, will cause ASM/OAM to create SMF records with the specified numeric identifier.

If requested, ASM/OAM will create SMF records at the following points:

a. When all requests for retrieval of objects from a single tape cartridge volume have been completed by a tape reader task (ie) immediately before a busy task returns to wait status. The SMF record will contain one request section for each request processed during invocation of that reader task.

b. When the limit of 100 request sections has been created by a tape reader task while processing a request queue. An SMF record will be written by the reader task before continuing to process the request queue. One or more additional SMF records will subsequently be written by the reader task, either when the limit of 100 request sections has again been reached, or after all requests in the queue have been processed.

   Note that there is no direct relationship between the number of requests that may be processed during a single invocation of a tape reader task, and the setting of the MAXQLEN parameter. After processing a request, the queue length will be reduced by one; however, new requests may continue to arrive and be added to the queue while the driver task is busy. New requests will only be rejected if the number of outstanding requests has reached the value of MAXQLEN.

   In this way, there is no limit to the number of requests which may be processed during a single invocation of a tape reader task, and consequently no limit to the number of SMF records which may be written during that invocation.

c. When a request for retrieval of an object has been completed by a disk reader task (ie) immediately before a busy disk reader task processes the next request in its queue, or returns to wait status if there are no more requests in the queue. The SMF record created by a disk reader task will always contain one request section only.

Each request section in an SMF record will contain four timestamps relating to the ASM/OAM retrieval request described by the record. These timestamps are issued at the following points:

1. When the OSREQ RETRIEVE request is intercepted by ASM/OAM.
2. Start of request processing by the control region scheduler.
3. Start of request processing by the reader task in the control region.
4. Termination of request processing by the reader task in the control region.

Analysis of timestamp intervals will provide timings for the following activities:

- 4 - 1 : total time for ASM/OAM to process the request.
- 2 - 1: time spent in control region scheduler queue.
- 3 - 2: time spent in reader task queue.
- 4 - 3: time taken to retrieve object from tape or disk and insert in OAM DB2 table (for staged retrievals) or populate caller's data buffer (for non-staged retrievals).

Careful analysis of this information will assist in identifying possible performance problems during object retrieval processing.

The following sections describe the individual components that constitute the ASM/OAM SMF record.

4.5.1 SMF header section.

Each SMF record will have a standard SMF header section of length 18 bytes.

Offset	*Length*	*Format*	*Description*
0	2	bin	Record length. This is the length of the entire SMF record, including this field.
2	2	bin	Segment descriptor - binary zeroes.
4	1	bin	System indicator (consult SMF documentation for a description of possible flag settings).
5	1	bin	Record type (equal to the value of the SMFRECID parameter from the ENVCNTL parameter library member).
6	4	bin	Time since midnight, in hundredths of a second, that the SMF record was written.
10	4	packed	Date record was written, in the format 0cyydddF, where F is the sign
14	4	char	System identification.

4.5.2 Record descriptor section.

The SMF header section is immediately followed by the ASM/OAM record descriptor section. It has a fixed length of 56 bytes.

Offset	*Length*	*Format*	*Description*
18	6	bin	Reserved.
24	4	bin	Offset of storage group section. This is the offset from the start of the SMF record of the storage group section of the record.
28	2	bin	Length of storage group section. This is the length in bytes of a single storage group section.
30	2	bin	The number of storage group sections present in the record (always = 1).
32	4	bin	Offset of a request section. This is the offset from the start of the SMF record of the request section in the record.
36	2	bin	Length of request section. This is the length in bytes of a single section.
38	2	bin	The number of request sections present in the record (maximum of 100).
40	16	-	Reserved for future use.

4.5.3 Storage group section.

The storage group section starts at the offset specified in the record descriptor section of the ASM/OAM SMF record. It gives information about the storage group being processed during the invocation of a reader task. It has a fixed length of 54 bytes. Only one storage group section will be present per SMF record.

Offset	*Length*	*Format*	*Description*
0	1	bin	Task Number.
1	1	bin	Processing flag. This gives information about the reader task at the time of SMF record creation. Flag — Meaning X'80' — A task purge request has been issued X'20' — Tape to be retained on drive after all outstanding requests processed (tape reader tasks only). X'01' — All requests in this SMF record were processed by a disk reader task.
2	8	char	DB2 database name. This is the name qualifier used for the DB2 database for the OAM storage group ('GROUP00', 'GROUP01' etc.)
10	44	char	Name of tape dataset being processed. This field will be set to spaces if the SMF record was created by a disk reader task (processing flag X'01' set in the storage group section).

4.5.4 Request section.

The request section starts at the offset specified in the record descriptor section of the ASM/OAM SMF record. It gives information about each of the individual requests processed during the invocation of a driver task. It has a fixed length of 128 bytes. A maximum of 100 request sections may be present per SMF record.

Offset	*Length*	*Format*	*Description*
0	8	bin	Reader start timestamp. This gives the date and time that processing for this request was started by the tape/disk reader task (ie) when the request was processed from the reader task queue. It has the format: bytes 0-3: time in hundredths of a second since midnight that request processing started. bytes 4-7: date that request processing started, in packed decimal format 0cyydddF, where F is the sign.
8	8	bin	Request end timestamp. This gives the date and time that processing for this request was completed by the reader task. It has the following format: bytes 0-3: time in hundredths of a second since midnight that request processing ended. bytes 4-7: date that request processing ended, in packed decimal format 0cyydddF, where F is the sign. **N.B.** If the start and end timestamps for an entry are identical and the request return code = '00', then a duplicate request has been logged (ie. retrieval request received for object for which a request is already queued).
16	4	packed	Object migration date. Date that object

Offset	*Length*	*Format*	*Description*
			was first migrated from disk to tape, in packed decimal format 0yymmddF, where F is the sign.
20	2	char	Request return code. The internal code used by the reader task to inform other ASM/OAM components of the outcome of the retrieval requests. This value will be '00' for a successful retrieval request when a retrieved object is being staged to disk, or '60' for a successful retrieval request when the object is not being staged to disk. Refer to section 8.17 for a description of other non-zero return codes.
22	8	bin	Request start timestamp. This gives the date and time that the retrieval request was intercepted by ASM/OAM. It has the format: bytes 0-3: time in hundredths of a second since midnight that the request was intercepted. bytes 4-7: date that the request was intercepted, in packed decimal format 0cyydddF, where F is the sign.
30	8	bin	Scheduler start timestamp. This gives the date and time that the request was first processed by the control region scheduler task. It has the format: bytes 0-3: time in hundredths of a second since midnight that the request was first processed. bytes 4-7: date that the request was first processed, in packed format 0cyydddF, where F is the sign.
38	2	bin	Sequence number with ASM for S/390 database of tape or disk dataset from

Offset	*Length*	*Format*	*Description*
			which object was retrieved.
40	4	bin	Identifier of tape block containing object (tape reader tasks only). This field will contain low-values for disk reader tasks.
44	8	char	Requesting application job name.
52	8	char	Requesting application's user identifier (CICS requests only).
60	4	bin	Collection name identifier.
64	44	char	Object name.
108	20	-	Reserved

4.6 Operational considerations.

This section discusses miscellaneous topics relating to the operation of the ASM/OAM control region and its environment. This includes a discussion of performance considerations for retrieval of objects from tape using ASM/OAM.

4.6.1 Use of the MAXDRIVE parameter.

The MAXDRIVE parameter is used to limit the number of tape cartridge drives that ASM/OAM will allocate concurrently for performing simultaneous access to multiple tape volumes in response to OSREQ retrieval requests. It is intended to enable users to prevent ASM/OAM from depleting the number of available cartridge drives on a system to the extent that other work will be unable to complete.

Once at the MAXDRIVE limit, ASM/OAM will reject any other request which would require an extra tape drive in order for it to be satisfied, with an 'OSR unavailable' condition, or optionally queue the request internally if a non-zero value has been specified for the TAPEWAIT parameter in the TAPECNTL parameter library member. In this latter case ASM/OAM will retry the request at 1-second intervals until a tape drive becomes available or until the TAPEWAIT interval is exceeded.

Rejection of a request due to the MAXDRIVE value having been reached or due to the TAPEWAIT interval having been exceeded will generate a return code of 12 and reason code of X'68800100' to the OSREQ caller. The value chosen for MAXDRIVE should ensure that occurrence of this condition is minimized, while still allowing other work on the system to continue without delay. If necessary, the value of MAXDRIVE may be varied during the day to correspond to variations in the system workload.

In a mixed operating environment which consists of both library and free-standing tape drives, the STK Host Software Component will ensure that all primary ASM/OAM tapes will be located in a library storage module. The value of MAXDRIVE used in this environment should not exceed the total number of drives available in the library configuration, otherwise allocation requests for ASM/OAM tapes may be made to free-standing drives. This will introduce unpredictable delays into the object retrieval process; this is obviously unacceptable in an online processing environment.

In any case, the value of MAXDRIVE should not exceed the overall total number of drives available, as this will cause a significant increase in the incidence of allocation recovery, and consequent rejection of retrieval requests.

4.6.2 Use of the MAXQLEN parameter.

The MAXQLEN parameter places a limit on the number of outstanding requests that may exist for retrieval of objects from any one tape volume. It is intended to allow users to place a limit on the time that any single request will spend in a driver task request queue.

Requests are added to the task request queue as they arrive from other ASM/OAM components (in response to user-generated OSREQ requests) and removed from the queue as they are completed. The request queue may thus be in a state of change while it is being processed. The MAXQLEN parameter places a limit on the number of outstanding requests in the queue, not the total number of requests which may be processed from the queue by the tape reader task.

If a tape needs to be mounted in response to the first request for that tape volume that is received by a reader task, it will take the task an average of 30 seconds to process that request. Subsequent requests in the same queue will take an average of 15 seconds to process by the reader task (for data location and retrieval), and a maximum of 30 seconds (if successive objects are located at opposite ends of a fully-populated tape volume).

If multiple requests for retrieval from the same tape volume arrive within a very short period of time, then the last request to arrive will have to wait for all preceding requests to be processed.

The above figures may be used to select an appropriate value of the MAXQLEN parameter at your installation, in order to limit the length of time that a request must wait in the reader task queue when multiple simultaneous requests have been issued.

Once at the MAXQLEN limit, ASM/OAM will reject any other request which would cause this limit to be exceeded, with an 'OSR unavailable' condition, or optionally queue the request internally (if a non-zero value has been specified for the TAPEWAIT parameter in the TAPECNTL parameter library member). In this latter case ASM/OAM will retry the request at 1-second intervals until a tape drive becomes available or until the TAPEWAIT interval is exceeded.

Rejection of a request due to the MAXDRIVE value having been reached or due to the TAPEWAIT interval having been exceeded will generate a return code of 12 and reason code of X'68800100' to the OSREQ caller.

4.6.3 Use of the MAXDISK parameter.

The MAXDISK parameter is used to control the number of disk reader tasks which are active in the ASM/OAM control region. A disk reader task is used to perform retrieval of an object from an ASM for S/390 database for which a disk ('K') copy exists (where the release of ASM for S/390 in use by ASM/OAM supports disk object copies).

If the value of MAXDISK is greater than 1, ASM/OAM will assign a new disk object retrieval request to the disk reader task with the shortest request queue. In this way, the length of the request queues will be balanced across the allocated disk reader tasks. Increasing the value of MAXDISK will decrease the average disk reader task request queue length. However, there will be a corresponding increase in the amount of virtual storage required by the ASM/OAM control region. For most operational environments, the default MAXDISK value of 4 will be sufficient.

If the value of MAXDISK is 0, then all object retrieval requests, whether objects have a disk copy or not, will be processed by the tape reader tasks currently allocated in the control region. Each tape reader task will issue a standard ASM for S/390 object retrieval request; if a disk copy of an object exists then ASM for S/390 will satisfy the retrieval request from disk (ie. the object will still be retrieved from disk, even though it is being processed by a tape reader task). Setting the MAXDISK value to 0 is not recommended in these circumstances, as it may cause disk object retrievals to be rejected unnecessarily if there are no available tape reader tasks to process the request.

If an error occurs when ASM for S/390 attempts to retrieve the disk copy of an object, ASM for S/390 will automatically re-drive the retrieval attempt from tape. In these circumstances it is possible that a disk reader task will attempt to process a tape dataset. This may cause contention for tape drives, resulting in failure of the retrieval request, if all available drives are currently being processed by the tape reader tasks. Retrieval of the tape copy of an object by a disk reader task will not impact the ability of that task to continue accepting and processing further disk object retrieval requests.

If the version of ASM for S/390 which is in use for ASM/OAM operation does not support disk object copies, then the value of the MAXDISK initialization parameter should be set to zero in the TAPECNTL parameter library member.

4.6.4 Allocation recovery.

Allocation recovery occurs on MVS systems when there are no tape drives available to satisfy an allocation request. In this case, the following message will be output by the system:

```
IEF238D jjj - REPLY DEVICE NAME, 'WAIT' OR 'CANCEL'
```

Normal practice is for an operator (or automated operator facility) to reply WAIT to this request. The job requiring the allocation will then wait until a drive becomes available before being able to continue.

In the ASM/OAM environment, lack of available tape drives will cause the ASM/OAM control region to enter allocation recovery. Issuing a reply of WAIT will now mean that the OSREQ call which caused the tape allocation request will have to wait indefinitely for another job on the system to release a drive, before continuing.

In this case, the end-user response time would be unpredictable. For this reason, it is recommended that a reply of 'CANCEL' be made to the IEF238D message. This will be interpreted by ASM/OAM as a 'drive unavailable' condition, and the retrieval request will be rejected with an 'OSR unavailable' condition or optionally queued internally (if a non-zero value has been specified for the TAPEWAIT parameter in the TAPECNTL parameter library member). In this latter case ASM/OAM will retry the request at 1-second intervals until a tape drive becomes available or until the TAPEWAIT interval is exceeded. .

It is recommended that the reply of 'CANCEL' be performed by an automated operator reply facility, if present on the system, rather than via manual operator entry. In this way, there will be no delay between ASM/OAM receiving the retrieval request, and the rejection of the request with an 'OSR unavailable' condition. This will minimize delays to users in receiving notification of the unavailability of resources in performing the object access.

4.6.5 Shutdown processing.

As an immediate shutdown does not allow outstanding OSREQ tape retrieval and deletion requests to complete, whenever possible the ASM/OAM control region should be shutdown normally (ie) use the SHUTDOWN operator command without the IMMED parameter.

In this context, it is recommended that operators issue a summary status display command before issuing the ASM/OAM shutdown request.

If there are any outstanding requests identified by the summary status display, these should be allowed to complete before issuing a normal ASM/OAM shutdown request. If necessary, an immediate shutdown request may be issued in order to abnormally terminate outstanding requests, and perform ASM/OAM shutdown processing.

Additionally, if either the scheduler or reader queue lock, as displayed from the summary status request, is constantly unavailable (ie. permanent LOCKED status), then an immediate shutdown should be issued, as a normal shutdown attempts to acquire these locks before proceeding. This situation, if it occurs, indicates an internal ASM/OAM error condition, and should be communicated to your ASM/OAM product support representative.

In extreme cases, the ASM/OAM control region may be cancelled if required. Canceling the control region has the following consequences:

- Any outstanding OSREQ requests will be left unsatisfied in a wait state (ie) control will never be returned to the calling application. These applications will have to be abnormally terminated by an external source.
- Extended CSA storage used by ASM/OAM (approximately 212k in extended subpool 241) will not be released, and will be unavailable for use by other jobs in the system until the next IPL.
- The ASM/OAM OSR intercept will be left in place. This will not prevent normal OAM activity from proceeding, as the intercept passes all OSREQ requests on to OAM if the control region is not active. However, retrieval or deletion requests for ASM for S/390-resident objects will now be rejected by OAM, as is normally the case when the ASM/OAM control region is not active.
- The intercept will be refreshed when the ASM/OAM control region is next activated - no special action is required to recover after cancellation or abnormal termination of the control region.

4.6.6 'OSR unavailable' condition.

ASM/OAM will return an 'OSR unavailable' condition to an OSREQ request (OSREQ return code of 12 and reason code of X'68800100') in the following circumstances:

1. an object retrieval request requires a new tape cartridge volume to be mounted, but ASM/OAM is unable to allocate a new drive because the MAXDRIVE limit has already been reached.
2. an object retrieval request requires access to a tape cartridge volume that is already being processed, but the number of requests already queued for that volume is at the limit specified by the MAXQLEN parameter.
3. allocation recovery has occurred due to lack of available tape cartridge drives, and a reply of 'CANCEL' was made to the IEF238D message.
4. a ‘force purge’ command was issued by the operator for the task currently processing the queue containing the tape retrieval request.
5. an immediate ASM/OAM control region shutdown was issued by the operator while the object retrieval request was being processed, or while it was in a task request queue.
6. the ASM/OAM control region is in the process of terminating when the OSREQ request was issued.

If necessary, applications which may issue OSREQ requests for access to ASM for S/390-resident objects should be amended to interpret the 'OSR unavailable' condition as a 'ASM/OAM resource unavailable' condition. In these circumstances, the recommended action is to issue an explanatory message to the end user, requesting that they retry the request at a later time.

Note that the TAPEWAIT parameter of the TAPECNTL parameter library member may be used to internally queue requests which have been rejected in circumstances 1 to 3 above. In this case a request will be retried at 1-second intervals until sufficient resources become available to satisfy it, or until the TAPEWAIT interval has been exceeded, at which time it will be rejected as above. Use of this facility may reduce the likelihood of ‘OSR unavailable’ conditions occurring.

5 Object Management

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5.1 General description.

ASM/OAM provides functions to perform the migration of objects from OAM to ASM for S/390 storage and to automatically remove expired objects from the system.

These functions are provided by the ASM/OAM object management procedure, which executes the following utilities:

- OTIMP100 - the ASM/OAM object selection utility
- OTIMP110 - the ASM/OAM database backup control utility
- OTIMP120 - the ASM/OAM OAM database update utility.

The object management procedure is a batch process, and should be scheduled to run at regular intervals in order to migrate objects from disk, optical or OAM tape storage to an ASM for S/390 database, to remove expired objects from the system, and to delete staged recalled objects from disk.

The frequency of execution of this procedure will be controlled by operational factors, such as the amount of primary disk storage available for holding OAM objects, the rate of creation of new objects, the rate of retrieval of migrated objects etc.

Careful planning is required when implementing an object migration strategy, in order to optimize system performance by migrating objects at the appropriate stage of their existence. Migration should be performed so that primary disk storage requirements may be minimized without introducing performance problems through the creation of an ASM for S/390 tape recall activity rate which exceeds the performance capacity of the installed tape library configuration.

5.1.1 The object management procedure

Processing by each ASM/OAM object management procedure is limited to a single OAM storage group (identified via EXEC parameters to the ASM/OAM utilities).

Each storage group processed by the ASM/OAM procedure uses a discrete set of data (DB2, VSAM and ASM for S/390). This means that multiple object management processes may be performed concurrently for separate storage groups. Running procedures in parallel in this manner will reduce the overall time required to process all objects within an OAM structure.

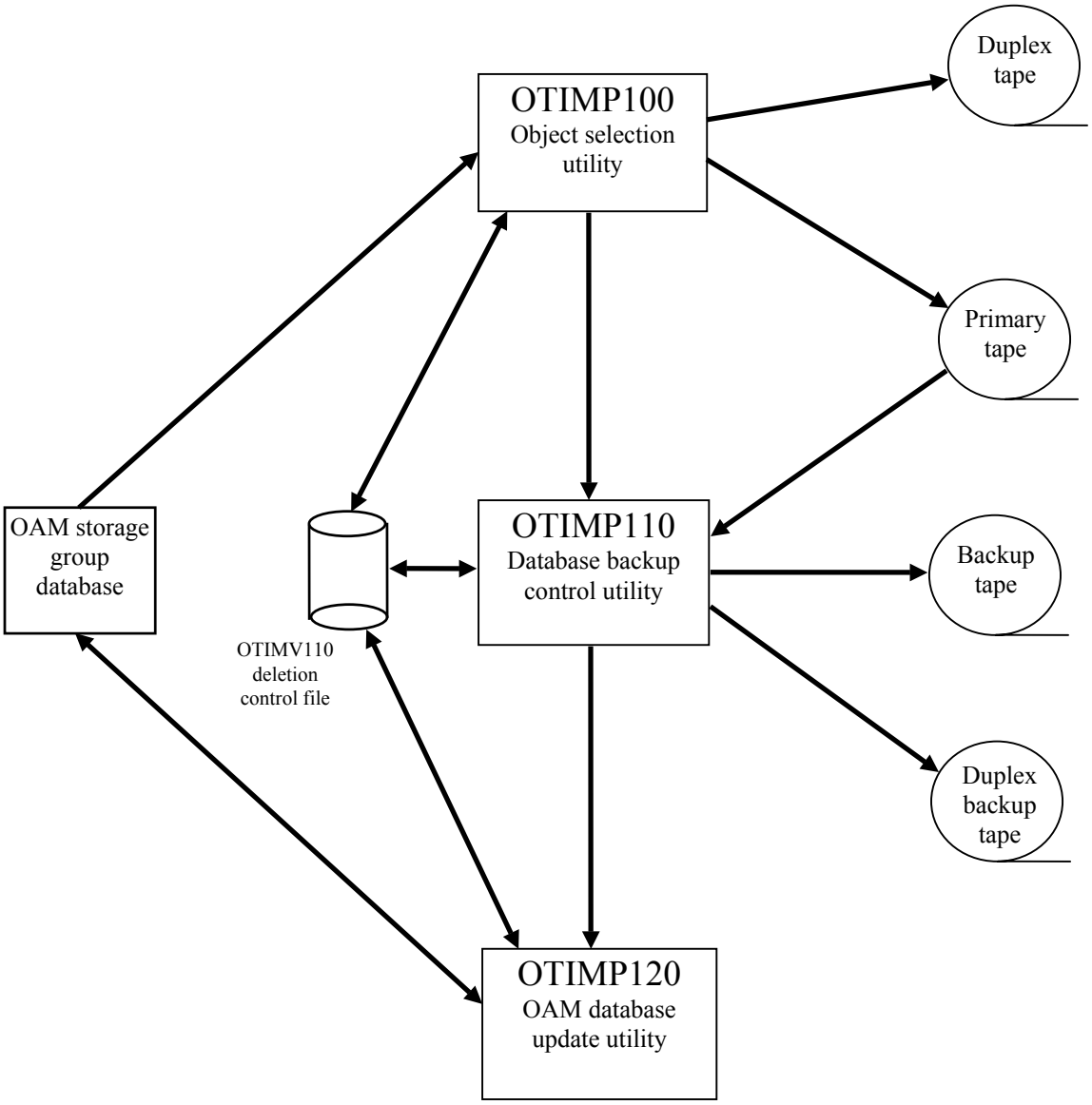

Figure 5.1 – The object management procedure

Figure 5.1 illustrates resources used during the object management procedure. While the procedure is in progress for a particular storage group, no ASM for S/390-resident objects in that storage group may be processed. Execution of the procedure should therefore be scheduled to take place when no object access activity will be performed. However, it is not necessary to stop the ASM/OAM control region while the object management procedure is being performed.

All three utilities identified above must be executed successfully in order to complete the object management process. ASM/OAM provides automated restart and rerun facilities for restarting failed jobs (see section 5.6 for a description of the rerun procedure).

The object management utilities perform the following functions:

OTIMP100.

This utility selects OAM objects from within the appropriate storage group for migration, OAM- and ASM for S/390-owned objects for expiration and staged recalled objects for deletion of the staged disk copy. OAM objects selected for migration will be written to the ASM for S/390 database for that storage group.

OTIMP110.

This utility optionally copies ASM for S/390 tape datasets created or updated by the previous OTIMP100 step. If 'BACKUP=YES' is specified on the EXEC parameter, a primary and backup copy of each volume in the ASM for S/390 database will exist on completion of this utility, and it will have been verified that each primary copy is readable. The changes identified in the OTIMP100 step may now be actioned.

'BACKUP=NO' may be specified if no backup processing is to be performed by OTIMP110 (eg. if duplex tape datasets were created during object migration by OTIMP100).

OTIMP120.

This is the OAM database update utility. It will process all the objects selected in the OTIMP100 step as required. DB2 database updates are committed at user-specified intervals. Once updates are committed, the object management procedure has been completed for those objects. Any subsequent access to migrated objects will be satisfied from tape.

Automated controls are provided within ASM/OAM to ensure that the above utilities are performed in the correct order, and that a utility is not executed until the preceding utility has completed successfully.

5.1.2 Controlling object migration and expiration.

Selection of objects for processing by OTIMP100 is controlled via the OBJCNTL member of the ASM/OAM parameter library. See chapter 3 for a full description of this member and its parameters.

These parameters use the DFSMS-assigned management class of an object to establish controls for migration, expiration or deletion of a recalled object.

An object's management class is automatically assigned by the system when an object is created. The management class may subsequently change via:

- An explicit user request using the OSREQ CHANGE macro.
- An automatic change during an OSMC (the storage management component of OAM) cycle, via a class-transition event.

The management class used by ASM/OAM for determining the processing of an object is the one in effect at the time of execution of the object management procedure.

For each valid object management class, the OBJCNTL member will identify three possible selection criteria:

- MIGRATE - this parameter specifies the number of days since object creation, management class transition or last reference after which objects with this management class are to be migrated from OAM disk, optical or tape storage to an ASM for S/390 database.
- EXPIRE - this parameter specifies the number of days since object creation, management class transition or last reference after which objects (both OAM- and ASM/OAM-owned) are to be expired (ie) completely removed from the system.
- DELETE - this parameter specifies the number of days after the object was last referenced, after which the disk copy of an object which has been recalled from ASM for S/390 will be deleted. The object will then revert to being ASM for S/390-resident.

The ‘SELDISK’, ‘SELOPT’ and ‘SELTAPE’ execution parameters may be used to control selection of OAM-owned objects by storage location (i.e. OAM disk, optical or tape storage).

Figure 5.2 illustrates how these selection criteria are used by the object selection utility to identify the type of processing to be performed on an object.

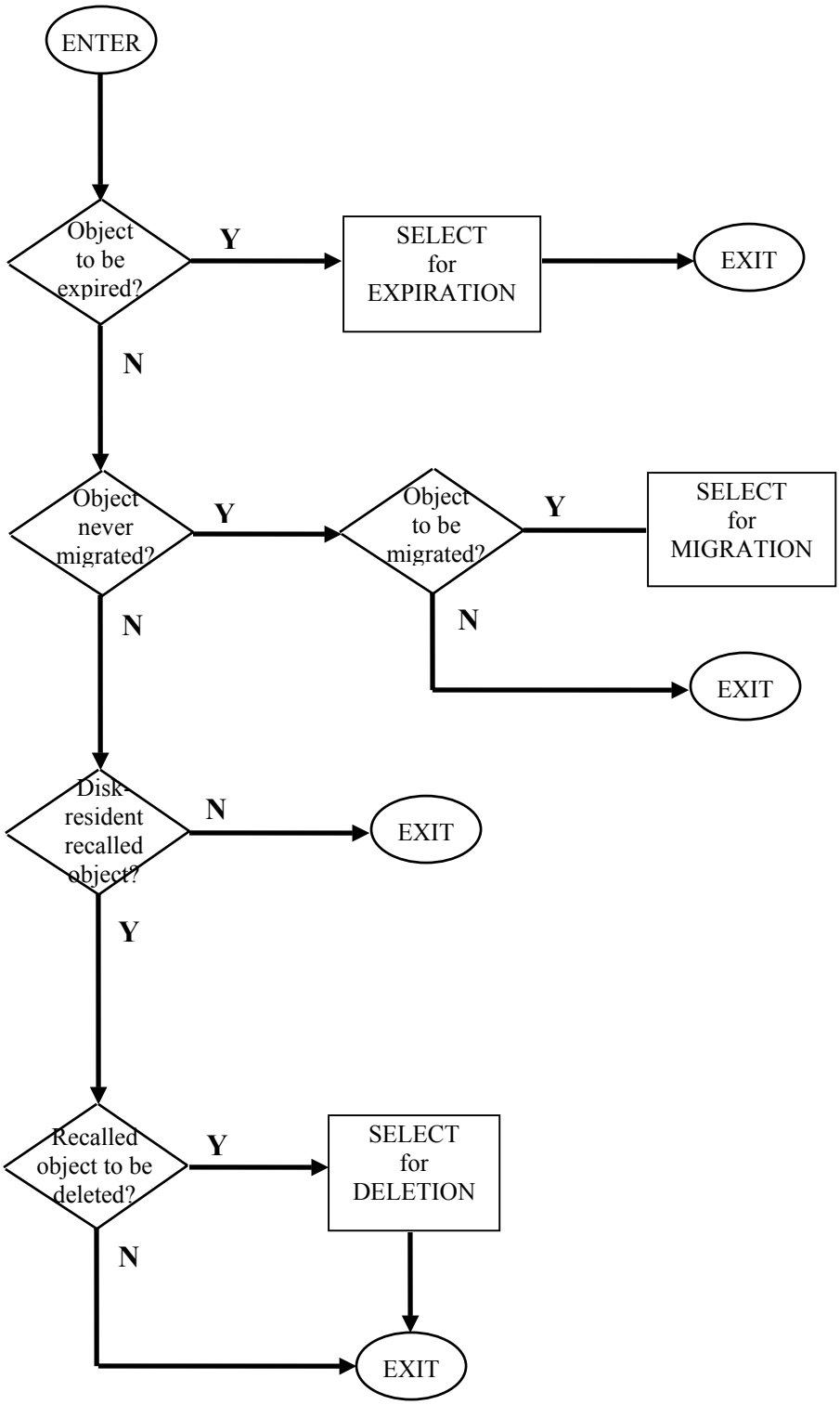

Figure 5.2 – OTIMP100 selection processing

5.2 Executing the object management procedure.

Member GPXXMIG on the supplied ASM/OAM sample JCL library provides a job for executing the ASM/OAM object management procedure. This job may be amended as required and submitted in order to run the object management utilities for an individual storage group. A copy of the supplied GPXXMIG job can be found in appendix A of this manual. Prior to submitting this job, the lines marked '<===' should be updated as follows:

EXEC parameters: replace the string

```
'storage-group-name'
```

with the name of the storage group to be processed. For steps STEP100 and STEP120, include the PRINT and RESTART keyword parameters as required (see the sections on OTIMP100 and OTIMP120 in this chapter for an explanation of the use of these parameters).

STEPLIB DD cards: replace the character strings:

```
'NearOAM.load.library'
'NearArchive.load.library'
'DB2.runtime.library'
```

with the names of the corresponding load libraries in use on your system.

OTIMS100 DD cards: replace the character string:

```
'NearOAM.parameter.library'
```

with the name of the ASM/OAM parameter library on your system.

OTIMIDCI DD cards: replace the character string

```
'NearOAM.JCL.library(DGROUPXX)'
```

with the name of the PDS and member containing DELETE/DEFINE parameters for the ASM/OAM deletion control dataset for the storage group being processed. See sections 5.3.6 and 5.5.4 for a discussion of this requirement.

The supplied job contains all the JCL necessary for execution of the object management procedure. ASM/OAM will dynamically allocate all other disk and tape datasets that are required for execution of the job. Note that jobs to process different storage groups will only differ from each other in the storage group name in the EXEC parameters, and in the OTIMIDCI member name in STEP100 and STEP120.

5.3 OTIMP100 - the object selection utility.

The ASM/OAM object selection utility (OTIMP100) is executed as the first step of the object management procedure.

5.3.1 Functions.

This utility performs the following functions:

- Validates parameters in the ASM/OAM parameter library members ENVCNTL, OBJCNTL and STRGROUP. A parameter validation report is written to the SYSPRINT dataset.
- Processes objects in the storage group identified on the EXEC parameter, and, based on parameter values in the OBJCNTL member of the ASM/OAM parameter library, selects objects for:

  Migration: OAM-owned disk, optical or tape-resident objects which are to be migrated by ASM/OAM. OTIMP100 writes these objects to the ASM for S/390 database for the storage group being processed. ASM/OAM uses the standard ASM for S/390 batch application program interface for all its ASM for S/390 database access functions. Selection of objects for migration may be controlled by the number of days since creation (the default), the number of days since management class transition, or the number of days since last reference. Each object selected for migration will be recorded on the ASM/OAM deletion control file for the storage group being processed.

  Expiration: OAM- and ASM/OAM-owned objects which are to be expired. Selection of objects for expiration may be controlled by either the number of days since creation (the default), the number of days since management class transition, or the number of days since last reference. Deletion of expired objects is not performed by this utility - objects selected for expiration are recorded on the ASM/OAM deletion control file for subsequent action by the database update utility.

  Deletion: Migrated objects which have been staged to disk during retrieval processing, and which are to be deleted from disk. These objects will revert to being ASM for S/390-resident once again. Deletion of the staged copy of objects is not performed by this utility - recalled objects selected for deletion are recorded on the ASM/OAM deletion control file for subsequent action by the database update utility.

- If EXEC parameter 'PRINT=YES' is specified, an object selection report will be written to the SYSPRINT dataset. This will list all objects selected for processing in this run, and the type of processing to be performed for each object.
- An end-of-run control total report will be written to the SYSPRINT dataset. This gives the total number of objects selected for migration, expiration and deletion in this run.

5.3.2 EXEC parameters.

OTIMP100 accepts the following EXEC parameters:

```
PARM=('storage-group-name,PRINT=YES|NO,RESTART=YES|NO',
      'TIME=nnnn,NEWTAPE=YES|NO',
      'SELDISK=YES|NO,SELOPT=YES|NO,SELTAPE=YES|NO',
      'SELNONPEND=YES|NO,LEVEL=n|0,LSRPOOL=nn|1')
```

a. 'storage-group-name' - this is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member.

b. 'PRINT=YES|NO' - this is an optional keyword parameter and may appear in any position in the EXEC parameter list after storage-group-name. The default value is 'YES'. It is used to control the production of the object selection report on the SYSPRINT dataset.

   'PRINT=YES' requests that the object selection report is to be printed (this is the default).

   'PRINT=NO' requests that the object selection report is to be suppressed.

c. 'RESTART=YES|NO' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'NO'. It is used to indicate whether the current execution of the utility is a normal or restart run.

   'RESTART=NO' indicates a normal run (this is the default).

   'RESTART=YES' indicates a restart run.

d. ‘TIME=nnnn’ - this is an optional keyword parameter which restricts the length of time for which the utility is to execute. ‘nnnn’ is a 1-4 digit value in the range 0 to 1439 giving the elapsed number of minutes since the start of utility execution after which object selection processing is to be terminated.

   When the time interval specified in this parameter has been exceeded, the utility will terminate normally with a condition code of 4. Execution of the object management procedure may then continue normally from the next step (database backup control processing).

   A value of 0 for this parameter indicates that no execution time limit is to be implemented. This is the default value.

e. ‘NEWTAPE=YES|NO' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'NO'. It is used to control tape volume usage during object migration processing.

‘NEWTAPE=NO'	indicates that objects being migrated during execution of the utility are to be added to the end of the last existing tape volume in the ASM for S/390 database for the storage group being processed.
‘NEWTAPE=YES'	indicates that a new tape volume is to be used to hold objects migrated during execution of the utility.

f. ‘SELDISK=YES|NO’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘YES’. It is used to control whether disk-resident OAM-owned objects are eligible for selection by the object management utility for migration and expiration processing. The parameter may take the value ‘YES’ (select disk-resident OAM-owned objects) or ‘NO’ (ignore disk-resident OAM-owned objects).

g. ‘SELOPT=YES|NO’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘NO’. It is used to control whether optical-resident OAM-owned objects are eligible for selection by the object management utility for migration and expiration processing. The parameter may take the value ‘YES’ (select optical-resident OAM-owned objects) or ‘NO’ (ignore optical-resident OAM-owned objects).

h. ‘SELTAPE=YES|NO’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘NO’. It is used to control whether tape-resident OAM-owned objects are eligible for selection by the object management utility for migration and expiration processing. The parameter may take the value ‘YES’ (select tape-resident OAM-owned objects) or ‘NO’ (ignore tape-resident OAM-owned objects).

i. ‘SELNONPEND=YES|NO’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘NO’. If set to ‘YES’, the object selection utility will consider all entries from the OAM directory table to be eligible for processing by the utility. If set to ‘NO’, the utility will only consider entries in the directory table whose ‘pending action date’ is less than or equal to the run date.

   A SELNONPEND parameter value of ‘NO’ may improve performance of the object selection utility and reduce the amount of temporary DB2 disk space required for execution of the utility. However, care should be taken to ensure that pending action dates for objects which are to be processed by the utility are correctly set. This value is set to the current date when an object is first created, and may be updated thereafter in one of the following ways:

   a) by OSMC - controlled by the object’s management class definition

   b) by ASM/OAM - controlled by the OBJCNTL parameter library definition for the object’s management class

   c) by OAM - set to current date on reading an object.

j. ‘LEVEL=n|0’ – this is an optional keyword parameter which is used to set the storage level of the ASM for S/390 storage group database in which objects migrated by the utility are to be stored. The value ‘n’ must be a numeric digit in the range 0 to 7. If this parameter is omitted, a default value of 0 will be used, causing migrated objects to be stored in storage level 0 of the ASM for S/390 database. Note that this parameter is only effective for use with ASM for S/390 v2.5 or higher. Specification of this parameter with earlier releases of ASM for S/390 will have no effect - storage level 0 will always be used for storage of migrated objects with these earlier releases.

k. ‘LSRPOOL=nn|1’ – this is an optional keyword parameter which is used to establish the VSAM LSR pool to be used for processing of the deletion control file. The value ‘nn’ must be a 1- or 2-digit numeric value in the range 1-15. If omitted, a default value of 1 is used.

5.3.3 Condition codes.

OTIMP100 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

12 - a serious error has occurred establishing the runtime environment for the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

5.3.4 Utility failure and restart considerations.

If the utility fails to execute successfully (return code greater than 4), the cause of the error should be identified from the SYSPRINT error report and rectified. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the object management procedure should be rerun from the first step (program OTIMP100). The only restart requirement is that the RESTART EXEC parameter for OTIMP100 should be set to 'YES' (the OTIMP120 RESTART parameter should remain set to 'NO').

The utility will reject an attempt to perform a normal run ('RESTART=NO') following unsuccessful execution of the utility for the identified storage group.

Conversely, an attempt to perform a restart run when there has been no prior job failure will be rejected by the utility.

Execution of the utility for other storage groups is not affected by failure of the procedure for one particular storage group.

5.3.5 Operator commands.

Execution of the utility may be terminated at any point by entering the following command through the system console:

```
(STO)P jobname
```

where 'jobname' is the name of the job used to execute the object management procedure.

The utility will acknowledge receipt of this command via message OTM10050, and perform normal termination processing. All database updates performed by the utility prior to termination will be committed, and the utility will terminate with a condition code of 4.

Execution of the object management procedure may continue normally from the next step (the database backup control step).

5.3.6 OTIMIDCI/OTIMIDCO DD entries.

During restart processing OTIMP100 will automatically delete and redefine the deletion control dataset for the storage group being processed, prior to selection of objects from the OAM storage group directory.

To allow user control of this function, the AMS DELETE/DEFINE parameters used by OTIMP100 are supplied to the utility via file OTIMIDCI. This should be a sequential dataset, or a member of a partitioned dataset, with fixed-length 80 byte records. The member DGROUPXX supplied on the ASM/OAM sample JCL library may be used for this purpose after amendment. The DEFINE parameters specified here should be identical to those used for initial allocation of the deletion control dataset for the storage group during the ASM/OAM product implementation procedure. Note that if the HLQ sub-parameter has been specified for the storage group entry in the STRGROUP parameter library member, then the high-level qualifier specified in this entry should be used to prefix the deletion control filename in the DGROUPXX member.

The AMS print report will be written to file OTIMIDCO. This may be a SYSOUT dataset (as supplied in the sample GPXXMIG job), or a sequential dataset with logical record length of 133 bytes and RECFM=FBA.

The OTIMIDCI and OTIMIDCO DD entries for program OTIMP100 should be identical to those supplied for program OTIMP120.

5.4 OTIMP110 - the database backup control utility.

The ASM/OAM database backup control utility (OTIMP110) is executed as the second step of the object management procedure, after successful completion of the object selection utility (OTIMP100).

5.4.1 Functions.

The database backup control utility performs the following functions:

- Validates parameters in the ASM/OAM parameter library members ENVCNTL and STRGROUP. A parameter validation report is written to the SYSPRINT dataset.
- Ensures that backup processing is being performed in the correct sequence in the object management procedure.
- If ‘BACKUP=YES’ has been specified in the EXEC parameters, invokes the ASM for S/390 database backup utility OTASP110. This utility will perform the following functions:

  - For each tape dataset marked for backup, the utility will construct the name(s) of the backup dataset(s) to be created. This is done by inserting the qualifier 'B0’ (for primary backup copies) and ‘D0’(for duplex backup copies) after the high level qualifier of the primary dataset name.

  - Uncatalogs any existing backup copies of a primary tape dataset. This condition will occur when the last tape volume in an ASM for S/390 storage group database was partially filled at the end of the previous migration procedure. The next execution of the procedure will continue writing to the partially-used volume until the maximum block count (as specified by the user during database initialization) has been exceeded. This tape volume will be backed up in both executions of the procedure. The first of the backups will be superseded by the second, and will be uncataloged and may be returned to scratch status.

  - Creates and catalogs a backup tape dataset, and optionally a duplex backup tape dataset for each primary tape dataset updated or created by the object selection utility OTIMP100.

  - A processing report will be written to the SYSPRINT dataset, giving details of all backup tape datasets uncataloged or created during this run.

- If ‘BACKUP=NO’ has been specified in the EXEC parameters, no tape backup processing will be performed. This option will normally be selected if tape duplexing has been enabled for the ASM for S/390

database for the storage group being processed, or if additional facilities supplied by the ASM for S/390 backup utility (e.g. incremental backup) which are not supported by the ASM/OAM backup control utility are required. If duplexing has been enabled for the storage group database, a duplex ('C') copy of each primary tape dataset will be automatically created by the object selection utility (OTIMP100) during object migration processing.

Refer to chapter 7 for a full discussion of ASM/OAM database backup and recovery issues.

5.4.2 EXEC parameters.

OTIMP110 accepts the following EXEC parameters:

```
PARM='storage-group-name(,BACKUP=YES|NO)'
```

a. 'storage-group-name' is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member. The storage group name specified in this parameter must match that specified in the EXEC parameter for the object selection utility OTIMP100.

b. 'BACKUP=YES|NO' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'YES'. It is used to indicate whether backup copies of the tape dataset(s) created or updated during object migration should be created.

'BACKUP=YES'	indicates that a backup ('B') copy of the tape dataset(s) will be created. A duplex backup ('D') copy will also be created if duplex during backup has been specified during the definition of the ASM for S/390 database.
'BACKUP=NO'	indicates that backup copies of the tape datasets will not be created. This option will normally be used if tape duplexing has been enabled for the ASM for S/390 database for the storage group being processed (refer to the ASM for S/390 User Manual for a description of the ASM for S/390 tape duplexing facility).

5.4.3 Condition codes.

OTIMP110 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

12 - a serious error has occurred establishing the runtime environment for the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

5.4.4 Utility failure and restart considerations.

If the database backup utility fails to complete successfully (return code greater than 4), consult the error report in the SYSPRINT dataset to identify the cause of the problem. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the utility may be rerun. There are no special restart requirements. Any backup tape datasets created during the failing run will be automatically uncataloged by the utility and recreated during the rerun.

In general, the object selection utility (OTIMP100) will not need to be rerun - processing of the migration and execution procedure may therefore be restarted at the OTIMP110 step. However, if the failure was due to a media problem with the primary tape dataset, it may be necessary to rerun OTIMP100 in order to recreate the dataset using a different tape cartridge volume. In this case, the ASM/OAM deletion control dataset for the storage group being processed must be deleted and re-defined, and the ASM for S/390 database primary index and space management datasets should be restored to their status prior to the start of the failed object management procedure (these datasets are called `xxxxxxxx.OTM.dddd.INDEX` and `xxxxxxxx.OTM.dddd.SPACEML0`, where 'xxxxxxxx' is the name qualifier for the DB2 storage group database, and 'dddd' the DB2 subsystem identifier).

The object management procedure may then be run normally. OTIMP100 will recreate the primary tape datasets (the previous copies will be automatically uncataloged by ASM for S/390), and OTIMP110 may then be executed as normal in order to backup the new primary tape dataset volumes. Again there are no special requirements for rerunning OTIMP110 in this manner.

If a duplex tape ('C') copy was created during execution of OTIMP100, this may be used to re-create the primary tape dataset, using the ASM for S/390 database recovery utility OTASP130. Refer to the ASM for S/390 User Manual for information about this utility.

Once OTIMP110 has executed successfully, it will not be possible to rerun this step until after the next successful execution of the object selection utility OTIMP100.

In addition, it will not be possible to run OTIMP100 (normal or restart run) once the tape backup control utility has been run successfully, until after successful completion of the database update utility OTIMP120.

ASM/OAM will reject any attempt to run either utility in this circumstance.

5.5 OTIMP120 - the database update utility.

The ASM/OAM database update utility (OTIMP120) is executed as the final step in the object management procedure, after successful completion of the tape database backup control utility (OTIMP110).

5.5.1 Functions.

After successfully running the tape database backup control utility (OTIMP110) to optionally create backup copies of all objects migrated to tape by the object selection utility (OTIMP100), OTIMP120 is executed as the final step in the object management procedure. It performs all the OAM database updates required to complete the migration, expiration and deletion processes.

OTIMP120 performs the following functions:

- Validates parameters in the ASM/OAM parameter library members ENVCNTL and STRGROUP. A parameter validation report is written to the SYSPRINT dataset.
- Processes the deletion control file produced by OTIMP100. The three types of selection entries in this dataset are treated as follows:

  MIGRATE - The OAM directory entry for the selected object is updated to indicate that the object has been migrated to ASM for S/390. Object rows are deleted from the appropriate OAM object storage table if P120DELETE=YES has been specified in the ENVCNTL member of the ASM/OAM parameter library.

  EXPIRE - For disk objects, the object rows are deleted from the OAM object storage table, if P120DELETE=YES has been specified in the ENVCNTL member of the ASM/OAM parameter library. For ASM for S/390 objects, the object is deleted from the ASM for S/390 database. In both cases, the OAM directory entry for the object is deleted.

  DELETE - The OAM directory entry for the selected object is updated to indicate that the object is once again resident in ASM for S/390 only. Object rows are deleted from the appropriate OAM object storage table if 'P120DELETE=YES' has been specified in the ENVCNTL member of the ASM/OAM parameter library.

- If EXEC parameter 'PRINT=YES' is specified, an object processing report will be written to the SYSPRINT dataset. This will list all objects processed in this run, and the type of processing performed for each object.
- An end-of-run control total report will be written to the SYSPRINT dataset. This gives the total number of objects processed for migration, expiration and deletion in this run. If the total number of objects processed in each category differs from the numbers selected by OTIMP100, an error message is issued and the utility will terminate with condition code 8.

5.5.2 EXEC parameters.

OTIMP120 accepts the following EXEC parameters:

```
PARM='storage-group-name(,PRINT=YES|NO,RESTART=YES|NO,
      DELETEWARN=YES|NO)'
```

a. 'storage-group-name' - this is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member. The storage group name specified in this parameter must match that specified in the corresponding EXEC parameters for the object selection utility OTIMP100 and the database backup control utility OTIMP110.

b. 'PRINT=YES|NO' - this is an optional keyword parameter and may appear in any position in the EXEC parameter list after storage-group-name. The default value is 'YES'. It is used to control the production of the object processing report on the SYSPRINT dataset.

   'PRINT=YES' requests that the object processing report is to be printed (this is the default).

   'PRINT=NO' requests that the object processing report is to be suppressed.

c. ’RESTART=YES|NO' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'NO'. It is used to indicate whether the current execution of the utility is a normal or restart run.

   'RESTART=NO' indicates a normal run (this is the default).

   'RESTART=YES' indicates a restart run.

d. ‘DELETEWARN=YES|NO’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘NO’. It is used to control processing of the utility when a ‘not found’ condition is received when attempting to delete a row from a DB2 table.

‘DELETEWARN=NO’. This is the default value. If OTIMP120 gets a ‘not found’ condition when attempting to delete a row from a DB2 table, then an error condition will be generated, and the utility will terminate with a condition code 8.

‘DELETEWARN=YES’. If OTIMP120 gets a ‘not found’ condition in the above circumstances, and ‘RESTART=YES’ is also specified, then a warning message will be issued to the utility report, but execution of the utility will continue normally. Warning processing will be disabled when the first successful delete has been performed. Any ‘not found’ conditions detected thereafter will generate an error condition, as for ‘DELETEWARN=NO’. If ‘RESTART=YES’ is not specified for this execution of the utility, then processing will be performed as for ‘DELETEWARN=NO’ above. A condition code of 4 will be generated on completion of the utility if any warning messages have been issued in the above circumstances.

5.5.3 ENVCNTL parameters.

OTIMP120 makes exclusive use of the following two parameters in the ENVCNTL member of the ASM/OAM parameter library:

P120COMMITFREQ - this parameter specifies the frequency at which DB2 commit processing is performed during execution of the utility. The parameter value can be in the range 0-99999. A value of 0 indicates that no commit processing is to be performed. A non-zero value ('n') indicates that DB2 commit processing is to be performed after every 'n' objects have been processed.

The commit frequency is of relevance during job failure and restart processing. An infrequent level of commit processing (P120COMMITFREQ high) may mean that a substantial amount of backout processing will be required in the event of failure of the utility, and that a greater amount of processing will be required after restarting the utility. (OTIMP120 will automatically restart from the last commit point during restart processing).

Frequent commit processing (P120COMMIT-FREQ low) will reduce the amount of processing required for backout and restart after job failure, but will increase DB2 logging overhead.

P120DELETE - this parameter controls whether rows containing data for migrated, expired or recalled objects are to be deleted from the appropriate OAM object storage table. It is provided in order to improve utility performance by reducing DB2 logging activity.

The default value of 'YES' should be used in normal circumstances. A value of 'NO' should only be used if object rows are to be deleted by some other independent means (eg) reinitializing the tablespace which contains the object storage table.

Careful thought should be given before using a value of 'NO' for this parameter. Failure to delete object storage table rows after processing an object with this utility will cause errors when attempting to recall migrated objects.

5.5.4 OTIMIDCI/OTIMIDCO DD entries.

After successful execution, OTIMP120 will automatically delete and redefine the ASM/OAM deletion control dataset for the storage group being processed. At this point, all changes processed during execution of the object management procedure are committed, and no automated rerun processing will be allowed.

To allow user control of this function, the AMS DELETE/DEFINE parameters used by OTIMP120 are supplied to the utility via file OTIMIDCI. This should be a sequential dataset, or a member of a partitioned dataset, with fixed-length 80 byte records. The member DGROUPXX supplied on the ASM/OAM sample JCL library may be used for this purpose after amendment. The DEFINE parameters specified here should be identical to those used for initial allocation of the deletion control dataset for the storage group during the ASM/OAM product implementation procedure. Note that if the HLQ sub-parameter has been specified for the storage group entry in the STRGROUP parameter library member, then the high-level qualifier specified in this entry should be used to prefix the deletion control filename in the DGROUPXX member.

The AMS print report will be written to file OTIMIDCO. This may be a SYSOUT dataset (as supplied in the sample GPXXMIG job), or a

sequential dataset with logical record length of 133 bytes and RECFM=FBA.

The OTIMIDCI and OTIMIDCO DD entries for program OTIMP120 should be identical to those supplied for program OTIMP100.

5.5.5 Condition codes.

OTIMP120 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

12 - a serious error has occurred establishing the runtime environment for the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

5.5.6 Utility failure and restart considerations.

If the database update utility fails to complete successfully (return code greater than 4), consult the error report in the SYSPRINT dataset to identify the cause of the problem. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the utility may be rerun. The only restart requirement is that the ‘RESTART’ EXEC parameter for OTIMP120 should be set to 'YES'. There is no need to rerun the first two steps of the object management procedure (OTIMP100 and OTIMP110); ASM/OAM will actually reject execution of these utilities in this circumstance.

OTIMP120 will automatically restart from the point where the last commit processing was performed during the failed run (as controlled by the ENVCNTL parameter ‘P120COMMITFREQ’). After failure of the utility, the object management procedure will have been completed for all objects processed up to the last commit point; migrated objects in this category will now be recalled from ASM for S/390 on next access (whether this is done before or after rerunning the utility). These objects will not be reprocessed during rerun of the utility.

The utility will reject an attempt to perform a normal run ('RESTART=NO') following unsuccessful execution of the utility for the identified storage group.

Conversely, an attempt to perform a restart run when there has been no prior job failure will be rejected by the utility.

In addition, ASM/OAM will reject an attempt to run the utility if either of the preceding OTIMP100 or OTIMP110 steps has not completed successfully.

5.6 Restart requirements summary.

This section summarizes requirements for restarting the object management procedure, after failure of one of its constituent utilities.

If any step in the object management job should not complete successfully, the job should be restarted as follows, after correcting the error which caused the failure:

(a) OTIMP100 does not complete successfully.

Rerun the entire job, specifying the 'RESTART=YES' EXEC parameter for OTIMP100. All other EXEC parameters should remain unchanged. No other recovery action is required.

(b) OTIMP110 does not complete successfully.

If failure is due to the inability to read an ASM for S/390 tape volume created in the previous step, the job must be rerun from the first step. Specify the 'RESTART=YES' EXEC parameter for OTIMP100. No other recovery action is required.

In the above circumstances, if tape duplexing has been enabled for the ASM for S/390 database being processed, then the primary (‘A’) copy dataset should be re-created from the duplex (‘C’) copy, using the standard ASM for S/390 database recovery utility OTASP130. Refer to the ASM for S/390 User Manual for details regarding execution of the ASM for S/390 database recovery procedure. After re-creating the primary copy, restart the job from the OTIMP110 job step.

For any other cause of failure, restart the job from the OTIMP110 job step. No other recovery action is required.

(c) OTIMP120 does not complete successfully.

Restart the job at the OTIMP120 job step, specifying the 'RESTART=YES' EXEC parameter for OTIMP120. No other recovery action is required. OTIMP120 will continue processing from the last commit point (as specified via the P120COMMITFREQ parameter in the ENVCNTL parameter library member).

If required, the object management process can be interrupted at any point (by canceling the job), and restarted using the above guidelines.

Note that there is little to gain by interrupting the procedure in the first step (OTIMP100), as this will require the entire job to be rerun.

However, interrupting the procedure in the second or third steps will only require the job to be restarted from the step which was in progress at the time of the interruption.

5.7 User exits.

ASM/OAM provides exit points during the object management selection process (in utility OTIMP100) to allow users to override ASM/OAM's selection of objects for migration, expiry or deletion from disk.

The following exits are provided:

Exit #01 - invoked immediately prior to selecting an object for migration from OAM to ASM for S/390.

Exit #02 - invoked immediately prior to selecting an object (OAM or ASM for S/390-resident) for expiry.

Exit #03 - invoked immediately prior to selecting a recalled object for deletion from disk.

Each exit will allow the user exit routine to specify that the identified object should be ignored for the type of processing selected by ASM/OAM.

5.7.1 Enabling user exit processing.

To enable any of the above user exits, user module OTIMUXnn must be available for loading by ASM/OAM, via the job-pack, link-pack or system linklist concatenations (where 'nn' is the exit number as described above). Dummy modules for each of the user exits are supplied on the ASM/OAM distribution load library. These should be replaced/renamed when a user exit routine is to be enabled.

User exit routines may be written in any language. A 192- byte parameter block is used to communicate between ASM/OAM and the user exit routine. This is passed as a call parameter area, and may be accessed from the user exit routine using the standard call parameter linkage procedures appropriate to the language used to develop the exit routine.

A 2-byte return code field in the parameter block is set by the user exit routine prior to returning control to ASM/OAM to identify the action that should be taken by ASM/OAM for the selected object.

5.7.2 Parameter block specification.

The parameter block used for communication between ASM/OAM and a user exit routine is 192 bytes in length and has the following format:

Offset	Length	Type	Field
0	2	char	User exit number.
2	2	char	Return code. '00' - continue processing selected object as identified. '08' - ignore selected object for identified processing.
4	4	bin	Collection name identifier.
8	44	char	Collection name (with trailing spaces if necessary).
52	44	char	Object name (with trailing spaces if necessary).
96	2	bin	Management class identifier.
98	30	char	Management class name (with trailing spaces if necessary).
128	4	bin	Days since object was last referenced.
132	4	bin	Days since object was created.
136	4	bin	Object size(bytes).
140	1	char	Object location flag: 'D' - disk copy ' ' - no disk copy
141	1	-	Unused.
142	6	char	Active volume serial number for migrated object: blank - no migrated copy exists non blank - object has been migrated

Offset	Length	Type	Field
148	4	bin	Days since object's current management class was assigned
152	2	bin	Storage class identifier.
154	38	-	Unused.

The object location flag and storage class identifier fields in combination may be used to identify the status of the selected objects on entry to the exit routine, as follows:

Loc Flag	Storage class id	Status
blank	not = 'tapeclass'	Non-migrated object on OAM optical storage
blank	= 'tapeclass'	Migrated object in ASM for S/390 storage only.
D	not = 'tapeclass'	Non-migrated object on OAM disk storage
D	= 'tapeclass'	Migrated object with staged copy of retrieved object on disk.
T	not = 'tapeclass'	Non-migrated object on OAM tape storage
T	= 'tapeclass'	Invalid combination

'tapeclass' in the above table is used to represent the identifier of the storage class specified (or defaulted) in the TAPECLASS parameter of the ENVCNTL parameter library member.

5.7.3 Result of user exit processing.

On receiving control back from the user exit routine, ASM/OAM will use the return code set in the exit parameter block to control processing. Return codes may be set as follows:

00 - Continue processing selected object as identified.

08 - Ignore selected object for identified processing.

Any other value - continue processing selected object as identified.

A user exit will receive control for each object which has been selected for the appropriate type of processing.

Note that suppressing selection of an object for a particular type of processing may cause that object to then be selected for another type of processing.

The following hierarchy of selection exists within ASM/OAM for selecting an object for processing:

1. Select for expiration (ASM for S/390 or OAM resident)

if not selected

2. Select for migration from OAM (non-migrated object)

or

3. Select for deletion of staged object from disk (staged recalled object).

Suppression of object selection for criterion 1 (by user exit #02) may cause the same object to be selected for criterion 2 or 3. Users should therefore be aware that it is possible for one object to be processed by more than one user exit routine during execution of the ASM/OAM object selection utility.

5.8 ASM/OAM and OAM optical and tape storage

Implementation of ASM/OAM for migration and retrieval of OAM objects which have been migrated to ASM for S/390 will not prevent existing or planned access to objects which have been or will be migrated from disk to optical or tape storage using the OAM Storage Management Component (OSMC). ASM/OAM will pass any OSREQ request for retrieval of an object from OAM optical or tape storage to OAM, in an identical manner to that used for disk-resident objects. Retrieval from optical or tape storage will then be performed by OSMC as normal.

OSMC will be unable to manage ASM for S/390-resident objects during its normal storage management cycle. If OSMC storage management cycles are used to manage OAM disk, optical or tape-resident objects, the following actions should be followed in order to prevent OSMC attempting to manage ASM/OAM-owned objects:

- Assign dedicated management classes during creation of all objects which are designated for eventual migration to tape. These management classes should not be assigned to objects which are to be managed by OSMC.
- Define these management classes (via ISMF) such that there will be no class-transition or expiration controls for associated objects. OSMC will only attempt to change an object's status after such an event has occurred. Suppressing class-transition and expiration will prevent OSMC from attempting to manage an ASM for S/390-resident object.
- Use ASM/OAM to manage all objects with these dedicated management classes, via the ASM/OAM object management procedure. Use the OBJCNTL member of the ASM/OAM parameter library to control the object management process.
- Dedicated storage groups are not required for objects which are to be managed by ASM/OAM.

From the above points, it can be seen that when implementing an ASM for S/390 storage strategy for OAM objects using ASM/OAM, it is advisable to implement a new set of management classes for objects which are to be migrated to ASM for S/390. This will prevent any conflict with management of OAM optical or tape-resident objects (existing or planned), which should be performed using OSMC as for a standard OAM implementation.

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6 ASM/OAM Utilities

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A number of batch utility programs are supplied with ASM/OAM, for provision of a range of facilities for supporting the ASM/OAM operational environment, and for extending functional capabilities supplied with other components of the product.

These utilities consist of:

1. **OTIMP010** - the OAM directory regression utility.

   This utility is used to convert an OAM directory which has been migrated for use with V2.3 of ASM/OAM back into a format which is capable of being processed by V2.1 of NearOAM.

2. **OTIMP020** - the OAM directory conversion utility.

   This utility is required during the upgrade of a NearOAM V2.1 system to ASM/OAM V2.3. It processes the OAM directory database for a storage group and converts directory entries to allow correct processing by ASM/OAM V2.3.

3. **OTIMP080** - the Visual Info object clustering utility.

   Program OTIMP080 may be utilized when ASM/OAM is used for storage and retrieval of objects created by IBM's Visual Info document management product. The utility will allow objects to be clustered by folder on migration to ASM/OAM. This will ensure that all documents in a Visual Info folder will be stored contiguously in an ASM for S/390 database on migration, enabling the entire folder to be retrieved in one tape operation.

4. **OTIMP130** - the ASM/OAM object recovery utility.

   The ASM/OAM object recovery utility is used to recover unmigrated objects from backup copies which have been created in ASM for S/390, after loss of one or more objects from a primary OAM storage location.

5. **OTIMP255** - the ASM/OAM CICS pre-fetch utility.

   The ASM/OAM CICS pre-fetch utility is invoked from a CICS program in order to stage a migrated object back to OAM disk storage, prior to a retrieval request being issued for that object.

6. **OTIMP35x** - the ASM/OAM batch pre-fetch utility.

   The ASM/OAM batch pre-fetch utility is invoked from a batch program in order to stage one or more migrated objects back to OAM disk storage. This is intended to eliminate tape access requirements for subsequent retrieval requests for these objects.

6.1 OTIMP010 - the OAM directory regression utility

OTIMP010 is used to regress the DB2 directory table for an OAM storage group database which has been converted for use with ASM/OAM V2.3. Regression of the directory table is required to enable NearOAM V2.1 to successfully access OAM objects which have been migrated to ASM/OAM.

Note that no regression is required to enable NearOAM V2.2 to process a directory table which has been converted for use with ASM/OAM V2.3.

6.1.1 Functions.

The OAM directory regression utility performs the following functions:

- Accesses all rows in the DB2 directory table for an OAM storage group database which have a storage class identifier equal to that of the storage class specified (or defaulted) in the TAPECLASS parameter of the ENVCNTL parameter library member.
- Each row accessed above will be updated as follows:
  - the storage class identifier will be modified to that of the storage class specified (or defaulted) in the DISKCLASS parameter of the ENVCNTL parameter library member.
  - field ODLSLOC will be updated with the value ‘OTAS00’.
- The utility will optionally commit all DB2 updates during execution, at a frequency set by the user via an EXEC parameter. Restart of the utility after a failure will be automatically performed from the last successful commit point.
- A processing report will be written to the SYSPRINT dataset, giving a detailed or summary report of directory entries updated during this run.

On successful completion of processing, the OAM storage group processed by the utility may now be accessed for processing by NearOAM V2.1.

6.1.2 EXEC parameters.

OTIMP010 accepts the following EXEC parameters:

```
PARM=('storage-group-name',
      'PRINT=SUMMARY|DETAIL,COMMIT=nnnnnnn')
```

a. 'storage-group-name' is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member.

b. 'PRINT=SUMMARY|DETAIL' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'SUMMARY'. It is used to control production of the object processing report by the utility.

   The object processing report identifies all object directory entries which have been updated during execution of the utility.

   'PRINT=SUMMARY' indicates that the object processing report is not to be produced.

   'PRINT=DETAIL' indicates that the object processing report is to be produced.

   The utility will always produce the following additional reports, irrespective of the setting of the 'PRINT' parameter:

   - a parameter validation and summary report.
   - an end-of-run summary report.

c. 'COMMIT=nnnnnnn' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 0. It is used to control the frequency of DB2 commit processing during execution of the utility, where 'nnnnnnn' is a 1-7 digit numeric value in the range 0 to 9999999.

   The directory regression utility will automatically commit all DB2 updates after each 'nnnnnnn' selected rows have been processed. A value of 0 for this parameter indicates that no commit processing is to be performed during execution of the utility. All DB2 updates are automatically committed at successful end of processing, irrespective of the setting of this parameter.

Restart of the utility after abnormal termination will automatically start at the last successful commit point (or beginning of run if COMMIT=0 was specified or defaulted).

6.1.3 PARMLIB requirements.

Prior to execution of the utility, the following ENVCNTL parameter library entries should be correctly specified:

TAPECLASS This parameter should be set (or defaulted) to the value of the storage class used when migrating objects to ASM for S/390 using ASM/OAM V2.3. A default value of NEARTAPE is used for this parameter.

DISKCLASS This parameter should be set (or defaulted) to the storage class assigned to objects on initial storage on OAM disk. A default value of DB2DASD is used for this parameter.

6.1.4 JCL requirements.

The following JCL may be used to execute the utility:

```
//*
//STEP010  EXEC PGM=OTIMP010,REGION=4096K,
//         PARM=('storage-group-name',
//               'PRINT=DETAIL|SUMMARY',
//               'COMMIT=nnnnnnn')
//*
//STEPLIB   DD  DSN=NearOAM.load.library,DISP=SHR
//          DD  DSN=DB2.runtime.library,DISP=SHR
//*
//OTIMS100  DD  DSN=NearOAM.parameter.library,DISP=SHR
//SYSPRINT  DD  SYSOUT=*
//*
```

DD entries should be specified as follows:

STEPLIB: Enter the names of the ASM/OAM product load libraries and the DB2 runtime execution library.

OTIMS100: Enter the name of the ASM/OAM parameter library.

SYSPRINT: This entry is used for all print reports created during utility execution.

6.1.5 Condition codes.

OTIMP010 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has continued.

12 - a serious error has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

6.1.6 Utility failure and restart considerations.

If the directory regression utility fails to complete successfully (return code greater than 8), consult the error report in the SYSPRINT dataset to identify the cause of the problem. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the utility may be rerun. There are no special restart requirements. The utility will automatically restart processing from the last successful commit point during the failed execution. If no explicit commit processing was performed during that execution (COMMIT=0) processing will restart from the beginning of the run.

6.2 OTIMP020 - the OAM directory conversion utility

OTIMP020 is used to convert a DB2 directory table for an OAM storage group database which has been processed by NearOAM V2.1 into a format which may be processed by ASM/OAM V2.3. Conversion of the directory table is required to enable V2.3 of the product to successfully access OAM objects which have been migrated to ASM/OAM. This utility should be executed during product release upgrade processing (see section 2.3.7).

Note that no directory conversion needs to be performed when upgrading from NearOAM V2.2 to ASM/OAM V2.3.

6.2.1 Functions.

The OAM directory conversion utility performs the following functions:

- Accesses all rows in the DB2 directory table for an OAM storage group database which have field ODLSLOC set to the value 'OTAS00'. This entry was used with NearOAM V2.1 to indicate an object which had been migrated to ASM for S/390.
- Each row accessed above will be updated as follows:
  - the storage class identifier will be modified to that of the storage class specified (or defaulted) in the TAPECLASS parameter of the ENVCNTL parameter library member.
  - field ODLSLOC will be set to spaces.
- The utility will optionally commit all DB2 updates during execution, at a frequency set by the user via an EXEC parameter. Restart of the utility after a failure will be automatically performed from the last successful commit point.
- A processing report will be written to the SYSPRINT dataset, giving a detailed or summary report of directory entries updated during this run.

On successful completion of processing, the OAM storage group processed by the utility may now be accessed for processing by V2.3 of ASM/OAM.

6.2.2 EXEC parameters.

OTIMP020 accepts the following EXEC parameters:

```
PARM=('storage-group-name',
      'PRINT=SUMMARY|DETAIL,COMMIT=nnnnnnn')
```

a. 'storage-group-name' is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member.

b. 'PRINT=SUMMARY|DETAIL' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'SUMMARY'. It is used to control production of the object processing report by the utility.

   The object processing report identifies all objects directory entries which have been updated during execution of the utility.

   'PRINT=SUMMARY' indicates that the object processing report is not to be produced.

   'PRINT=DETAIL' indicates that the object processing report is to be produced.

   The utility will always produce the following additional reports, irrespective of the setting of the 'PRINT' parameter:

   - a parameter validation and summary report.
   - an end-of-run summary report.

c. 'COMMIT=nnnnnnn' - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 0. It is used to control the frequency of DB2 commit processing during execution of the utility, where 'nnnnnnn' is a 1-7 digit numeric value in the range 0 to 9999999.

   The directory regression utility will automatically commit all DB2 updates after each 'nnnnnnn' selected rows have been processed. A value of 0 for this parameter indicates that no commit processing is to be performed during execution of the utility. All DB2 updates are automatically committed at successful end of processing, irrespective of the setting of this parameter.

Restart of the utility after abnormal termination will automatically start at the last successful commit point (or beginning of run if COMMIT=0 was specified or defaulted).

6.2.3 PARMLIB requirements.

Prior to execution of the utility, the following ENVCNTL parameter library entries should be correctly specified:

TAPECLASS This parameter should be set (or defaulted) to the value of the storage class to be used when migrating objects to ASM for S/390 using ASM/OAM V2.3. A default value of NEARTAPE is used for this parameter.

6.2.4 JCL requirements.

The following JCL may be used to execute the utility:

```
//*
//STEP010  EXEC PGM=OTIMP020,REGION=4096K,
//         PARM=('storage-group-name',
//               'PRINT=DETAIL|SUMMARY',
//               'COMMIT=nnnnnnn')
//*
//STEPLIB   DD  DSN=NearOAM.load.library,DISP=SHR
//          DD  DSN=DB2.runtime.library,DISP=SHR
//*
//OTIMS100  DD  DSN=NearOAM.parameter.library,DISP=SHR
//SYSPRINT  DD  SYSOUT=*
//*
```

DD entries should be specified as follows:

STEPLIB: Enter the names of the ASM/OAM product load libraries and the DB2 runtime execution library.

OTIMS100: Enter the name of the ASM/OAM parameter library.

SYSPRINT: This entry is used for all print reports created during utility execution.

6.2.5 Condition codes.

OTIMP020 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has continued.

12 - a serious error has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

6.2.6 Utility failure and restart considerations.

If the directory conversion utility fails to complete successfully (return code greater than 8), consult the error report in the SYSPRINT dataset to identify the cause of the problem. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the utility may be rerun. There are no special restart requirements. The utility will automatically restart processing from the last successful commit point during the failed execution. If no explicit commit processing was performed during that execution (COMMIT=0) processing will restart from the beginning of the run.

6.3 OTIMP080 - the Visual Info object clustering utility

The Visual Info object clustering utility is intended for use by customers who have implemented IBM's Visual Info document management product in MVS. It is used to 'tag' OAM objects, which are used in MVS for storage of Visual Info documents, with Visual Info folder identifiers prior to ASM/OAM migration processing. Once tagged, all objects within a single folder will then be processed sequentially for migration to ASM for S/390, and held in a contiguous area of storage in the ASM for S/390 database. This will greatly improve efficiency of operation and performance for retrieval from ASM for S/390 (in particular from tape storage) of all documents within a single Visual Info folder.

The utility is executed as an additional step prior to the first step in the standard ASM/OAM object management procedure. The utility uses a parameter-driven process to allow customer control of the folder identification and tagging process (as described below). This uses the standard Visual Info document storage structure to tag OAM objects with folder identifiers. The folder tagging process can be modified at any time.

6.3.1 Installation and implementation.

In order to prepare the Visual Info object clustering utility for execution, one or more DB2 plans will need to be created, as follows:

- If Visual Info is implemented to use the same DB2 subsystem as OAM, a single plan will need to be created in that DB2 subsystem.
- If Visual Info is implemented to use a different DB2 subsystem from that used by OAM, a DB2 plan will need to be created in each of those DB2 subsystems. The plan name must be identical for each DB2 subsystem.

For either of the above cases, OTIMP080 will use the plan name specified (or defaulted) in the PLAN keyword parameter of the ASM/OAM ENVCNTL parameter library member. DBRM OTIML080 (from the distributed ASM/OAM DBRM library) should be bound as a package for each storage group to be used by ASM/OAM. The list of packages may then be bound to the required DB2 plan.

The following sample control statements may be used to bind DBRM OTIML080 as a DB2 package:

```
BIND PACKAGE(xxxxxxxx) -
        QUALIFIER(xxxxxxxx) -
        MEMBER(OTIML080) -
        ACTION(REPLACE) -
        VALIDATE(BIND) -
        ISOLATION(CS) -
```

```
FLAG(E) -
RELEASE(COMMIT) -
SQLERROR(CONTINUE) -
EXPLAIN(NO)
```

where ‘xxxxxxxx’ is the name qualifier of the DB2 database for the storage group. One package should be bound for each storage group to be used by ASM/OAM.

Member OTIMBIND from the distributed sample JCL library may then be executed to bind the generated packages to the required DB2 plan. Refer to section 2.3.5 for additional information about this process.

Following successful plan creation, the following SQL Data Definition Language (DDL) statements should be executed to create the folder identification table required for execution of the utility:

```
CREATE DATABASE   xxxxxxxx;
 COMMIT;
 CREATE TABLESPACE yyyyyyyy
        IN         xxxxxxxx
        USING      VCAT ddddddd
        LOCKSIZE   ANY
        CLOSE      NO
        BUFFERPOOL BP0;
 COMMIT;
  CREATE TABLE zzzzzzzz
         (
          FDITEM   CHAR(16)    NOT NULL,
          FDNAME   VARCHAR(50) NOT NULL,
          FDITEM   INTEGER     NOT NULL
         )
         IN xxxxxxxx.yyyyyyyy;
  CREATE UNIQUE INDEX wwwwwwww
         ON zzzzzzzz
         (
          FDITEM  ASC
         )
         USING      VCAT ddddddd
         CLOSE      NO
         SUBPAGES   1
         BUFFERPOOL BP1
         PCTFREE    10;
```

where ‘xxxxxxxx’, ‘yyyyyyyy’ and ‘zzzzzzzz’ are the folder identification database, tablespace and table names, ‘wwwwwwww’ is the index name, and ‘ddddddd’ is the catalog identifier. All these values may be assigned as required by the customer.

Create a synonym for ‘OTIMFOLD’, using the following DDL:

```
CREATE SYNONYM OTIMFOLD
       FOR xxxxxxxx.zzzzzzzz
```

where 'xxxxxxxx.zzzzzzzz' is the fully-qualified name of the database table created in the previous step. Program OTIMP080 uses the synonym OTIMFOLD to access this table.

6.3.2 EXEC parameters.

OTIMP080 will accept the following EXEC parameters:

```
//        PARM=('storage_group_name',
//              'INDEX=(aaaaa,bbbbb,ccccc,ddddd,eeeee)',
//              'VISUBSYS=dddd',
//              'PRINT=DETAIL|SUMMARY',
//             'MAXREC=nnnnnn',
//              'COMMITFREQ=xxxxx')
```

a. 'storage_group_name' - this is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter library member.

b. INDEX=(aaaaa,bbbbb,ccccc,ddddd,eeeee) - this is a mandatory keyword parameter.

   (aaaaa,bbbbb,ccccc,ddddd,eeeee) specifies from 1 to 5 numeric Visual Info index class codes (each consisting of 1 to 5 numeric characters) associated with the folder identifier by which documents are to be tagged by the utility. At least one index class code must be specified; the maximum number which may be specified is 5. If only one index class code is present, the start and end bracket may be omitted. Each index class code contains from 1 to 5 numeric digits.

   These codes are used to control the folder by which a document is tagged, in cases where a document may belong to more than one folder. The program will always attempt to tag a document using the first index class code specified in this parameter (ie. it will tag a document with the identifier of the first folder holding this document which has a matching index class code). If the document is not contained in a folder with this code, the program will then attempt to tag a document using the second index class code specified here. Processing will continue in this manner until a document has been successfully tagged, or until all specified index class codes have been processed. In this latter case, a warning message is issued to the SYSPRINT report file, indicating that a document has not been tagged.

c. VISUBSYS - this is an optional keyword parameter which identifies the DB2 subsystem containing the Visual Info library server database. If this parameter is omitted the OAM DB2 subsystem id (as

established from the ASM/OAM parameter library) will be used for this value.

d. ‘PRINT=DETAIL|SUMMARY’ - this is an optional keyword parameter and may appear in any position in the EXEC parameter list after storage_group_name. The default value is ‘SUMMARY’. It is used to control the production of the object processing report on the SYSPRINT dataset.

   ‘PRINT=SUMMARY’ requests that printing of the object processing report be suppressed. (this is the default). ‘PRINT=DETAIL’ requests that the object processing report is to be printed.

e. ‘MAXREC=nnnnnn’ - this is an optional keyword parameter which controls the maximum number of OAM objects to be processed during this execution of the utility. ‘nnnnnn’ must be a 1-6 digit numeric value in the range 0-999999. When this number of objects has been processed by the utility, execution will end normally. If a value of 0 is specified, no limit is placed on the number of objects to be processed during utility execution. If this parameter is omitted, a default value of 0 is used.

f. ‘COMMITFREQ=nnnnn’ - this is an optional keyword parameter which controls how frequently the utility commits all updates to the OAM object directory table. ‘nnnnn’ is a 1-5 digit numeric value in the range 0-99999, which indicates the number of OAM directory table entries which should be processed between commit requests. If a value of 0 is specified, no explicit commit processing will be performed by the utility. If this parameter is omitted, a default value of 0 is used.

6.3.3 JCL requirements.

To execute the ASM/OAM Visual Info object clustering utility, an additional step should be performed prior to the existing first step (program OTIMP100) in the standard ASM/OAM object management procedure. The following JCL may be used to execute this step:

```
//RUNP080  EXEC   PGM=OTIMP080,REGION=4M,
//       PARM=('storage_group_name',
//             'INDEX=(aaaaa,bbbbb,ccccc,ddddd,eeeee)',
//             'VISUBSYS=dddd',
//             'PRINT=DETAIL|SUMMARY',
//            'MAXREC=nnnnnn',
//             'COMMITFREQ=xxxxx')
//OTIMS100 DD  DSN=NearOAM.parameter.libary,DISP=SHR
//OTIMWK01 DD  DSN=&OTIM,DISP=(NEW,DELETE),UNIT=SYSDA
//OTIMWK02 DD  DSN=&OTIM,DISP=(NEW,DELETE),UNIT=SYSDA
//SYSPRINT DD  SYSOUT=*
```

DD entries should be specified as follows:

OTIMS100 Enter the name of the ASM/OAM parameter library.

OTIMWK01 & OTIMWK02 These are temporary disk files, which may be entered as specified above.

6.3.4 Condition codes.

The following condition codes will be set by the program prior to termination:

0 the utility has executed successfully. There were no warning or error conditions.

4 the utility has completed successfully, but one or more warning conditions were encountered. These conditions will be identified in the SYSPRINT report file.

8 the utility has completed successfully, but one or more error conditions were encountered. These conditions will be identified in the SYSPRINT report file.

12 a serious error has occurred. Execution of the program is terminated, and the cause of the error identified in the SYSPRINT report file.

6.3.5 Restart requirements.

There are no special requirements for restart of the procedure after abnormal termination of the procedure. After correcting the error, the Visual Info object clustering procedure should be rerun as normal.

The COMMITFREQ EXEC parameter will control the frequency of DB2 COMMIT processing when tagging objects. Any objects which have been successfully tagged and committed will not require processing during rerun of a failed procedure. Tagged objects which have not been committed will be processed as normal during rerun processing. An appropriate value for the COMMITFREQ parameter (eg. COMMITFREQ=1000) should be used to reduce the amount of processing required when rerunning a failed procedure.

6.4 OTIMP130 - the object recovery utility

The ASM/OAM object utility (OTIMP130) is used to recover disk copies of unmigrated objects which have been previously backed up using the ASM/OAM object backup facility (as discussed in section 7.1). This utility should be executed after the disk copy of one or more unmigrated objects in an OAM storage group has been lost (due to hardware/media failure etc.).

6.4.1 Functions.

The object recovery utility performs the following functions:

- Validates parameters in the ASM/OAM parameter library members ENVCNTL and STRGROUP. A parameter validation report is written to the SYSPRINT dataset.
- Processes the directory of the OAM storage group identified in the utility execution parameters, and automatically identifies all unmigrated objects which have been previously backed up and which are eligible for recovery.
- The utility will perform object recovery in one of the following two modes (as controlled by the 'TYPE' execution parameter):

  - Full recovery mode ('TYPE=FULL'). When executing in this mode, the utility will restore all unmigrated objects which have been previously backed up by ASM/OAM, by copying these objects from ASM for S/390 to OAM disk storage during utility execution. Processing of the utility is optimized to reduce tape handling requirements to a minimum.

    Restoring objects from ASM for S/390 to OAM disk will mean that execution of the recovery utility may take some time. However, subsequent access to recovered objects will be satisfied from OAM disk; this will eliminate the delays which will occur at this stage after execution of the utility in speed recovery mode.

  - Speed recovery mode ('TYPE=SPEED'). In this mode, all directory entries for unmigrated objects which have been previously backed up by ASM/OAM will be modified to mark these objects as being ASM for S/390-resident only. The next retrieval request for any one of these objects will then be satisfied from ASM for S/390. An object may be staged back to OAM disk during this process.

With this mode of recovery, the restore of OAM disk-resident objects is only performed when an object is retrieved for viewing purposes. Execution of the recovery utility itself will not require any tape access, and will complete in the fastest possible time. However, subsequent access to a recovered object may experience some delay while the object is restored from ASM for S/390 tape to OAM disk storage.

- A processing report will be written to the SYSPRINT dataset, giving details of all backup tape datasets uncataloged or created during this run.

6.4.2 EXEC parameters.

OTIMP130 accepts up to 4 EXEC parameters, as follows:

```
PARM='storage-group-name(,TYPE=FULL|SPEED),
      (PRINT=SUMMARY|DETAIL)(,BATCH=nnnnnnn)'
```

a. 'storage-group-name' is a mandatory positional parameter, and must appear in the first parameter position. It is used to identify the 1-30 character name of the storage group to be processed by the utility during this run. This storage group name must be present in the ASM/OAM STRGROUP parameter member.

b. ‘TYPE=FULL|SPEED’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 'FULL'. It is used to indicate the type of recovery to be performed by the utility.

‘TYPE=FULL’ indicates that the utility is to execute in full recovery mode. When executing in this mode, the utility will restore all unmigrated objects which have been previously backed up by ASM/OAM, by copying these objects from ASM for S/390 to OAM disk during utility execution.

‘TYPE=SPEED’ indicates that the utility is to execute in speed recovery mode. In this mode, all directory entries for unmigrated objects which have been previously backed up by ASM/OAM will be modified to mark these objects as being ASM for S/390-resident. No physical recovery of objects from ASM for S/390 to OAM disk will be performed when executing in speed recovery mode.

c. ‘PRINT=SUMMARY|DETAIL’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is ‘SUMMARY'. It is used to control production of the object processing report by the utility. The object processing report identifies all objects which have been recovered during execution of the utility.

‘PRINT=SUMMARY’ indicates that the object processing report is not to be produced.

‘PRINT=DETAIL’ indicates that the object processing report is to be produced.

The utility will always produce the following additional reports, irrespective of the setting of the ‘PRINT’ parameter:

- a parameter validation and summary report.
- an end-of-run summary report.

d. ‘BATCH=nnnnnnn’ - this is an optional keyword parameter which may appear in any position in the EXEC parameter list after the storage group name parameter. The default value is 0. It is used to control the number of objects which are processed in each recovery batch during execution of the utility, where ‘nnnnnnn’ is a 1-7 digit numeric value in the range 0 to 9999999. This parameter is only valid if ‘TYPE=FULL’ is also specified.

Objects to be recovered when executing in full recovery mode may be processed in one or more ‘recovery batches’, as controlled by this parameter. All objects in each recovery batch are sorted to improve efficiency of processing when recovery objects from ASM for S/390. In addition, all DB2 updates relating to recovered objects are committed after successfully processing each recovery batch.

Increasing the number of recovery batches (by reducing the size of the BATCH parameter) may increase the overall number of ASM for S/390 tape mounts required to recover all objects (as a tape volume may need to be mounted more than once if objects from different batches are to be retrieved from that volume), but will reduce the amount of processing required when rerunning the utility after failure of an earlier execution (see section 6.4.5).

If a value of 0 is specified (or defaulted) for this parameter, then all selected objects from the storage group being processed will be recovered in a single batch.

6.4.3 JCL requirements.

The following JCL may be used to execute the utility:

```
//*
//STEP130   EXEC PGM=OTIMP130,REGION=4096K,
//         PARM=('storage-group-name',
//               'TYPE=FULL|SPEED',
//               'PRINT=DETAIL|SUMMARY',
//               'BATCH=nnnnnnn')
//*
//STEPLIB   DD  DSN=NearOAM.load.library,DISP=SHR
//          DD  DSN=NearArchive.load.library,DISP=SHR
//          DD  DSN=DB2.runtime.library,DISP=SHR
//*
//OTIMS100  DD  DSN=NearOAM.parameter.library,DISP=SHR
//SYSPRINT  DD  SYSOUT=*
//*
```

DD entries should be specified as follows:

STEPLIB: Enter the names of the ASM/OAM and ASM for S/390 product load libraries, and the DB2 runtime execution library.

OTIMS100: Enter the name of the ASM/OAM parameter library.

SYSPRINT: This entry is used for all print reports created during utility execution.

6.4.4 Condition codes.

OTIMP130 will set a condition code on completion. This code may take the following values:

0 - the utility has been executed successfully.

4 - a warning condition has been encountered during processing of the utility. A warning message will have been written to the SYSPRINT dataset. The utility has been executed successfully.

8 - an error condition has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has continued.

12 - a serious error has been encountered during processing of the utility. An error message will have been written to the SYSPRINT dataset. Execution of the utility has been terminated.

6.4.5 Utility failure and restart considerations.

If the object recovery utility fails to complete successfully (return code greater than 8), consult the error report in the SYSPRINT dataset to identify the cause of the problem. Refer to chapter 8 for a description of the message(s) appearing in the error report.

After correcting the error, the utility may be rerun. There are no special restart requirements.

If the failure occurred when running in speed recovery mode, all OAM directory updates made prior to the failure will be backed out; no objects will have been recovered during utility execution. Rerun of the utility will re-process all objects.

If the failure occurred when running in full recovery mode, all objects in each recovery batch which had been fully processed prior to the failure will have been successfully recovered, and all DB2 updates committed. Rerun of the utility will automatically restart object recovery from the beginning of the recovery batch being processed when the error occurred.

Control of recovery batch processing is performed via the 'BATCH' execution parameter. This parameter limits the number of objects which are placed in each recovery batch. If a value of zero is specified for this parameter (or allowed to default), there is no limit to the size of the recovery batch (ie. only one batch will be created during execution of the utility).

A low (or zero) value for the 'BATCH' parameter may mean that a substantial amount of re-processing will be required during rerun of the utility after a prior failure. However, increasing the size of the 'BATCH' parameter may also increase the total number of tape mounts required to recover all objects during successful execution of the utility (as a tape volume may be mounted once per batch).

6.5 OTIMP255 - the CICS pre-fetch utility.

6.5.1 Description.

The ASM/OAM CICS pre-fetch utility OTIMP255 enables CICS applications to issue requests to ASM/OAM to pre-fetch identified objects from ASM for S/390 to OAM disk storage. This facility is invoked from a CICS application program (via a CICS 'LINK' command to program OTIMP255) in order to pre-fetch objects for subsequent display processing.

Pre-fetching of objects is performed asynchronously via one or more background CICS tasks (transaction OM26), executing in the same CICS region as the application which issued the request, or in any other CICS region which is connected via CICS MRO or ISC facilities. The ASM/OAM control region is invoked to perform object retrieval processing. No delay is experienced by the foreground applications task which issues the pre-fetch retrieval request.

Multiple objects may be pre-fetched via a single request to the ASM/OAM CICS pre-fetch utility. Each object to be processed is identified (by OAM collection and object names) in a CICS temporary storage queue entry (TSQ) whose identifier is passed to OTIMP255 on invocation of the pre-fetch request. This TSQ may contain up to 32767 entries. Note that a unique temporary storage queue identifier should be generated by the calling application program, in order to avoid contention with any other CICS task which may be performing ASM/OAM pre-fetch processing concurrently.

OTIMP255 will start one background CICS task (via transaction identifier OM26) for each entry in the TSQ. When all TSQ entries have been processed, the temporary storage queue will be deleted by OTIMP255, and control returned to the calling program. At this stage, the calling program may continue with other processing, while the identified objects are being pre-fetched from ASM for S/390 to OAM disk by the ASM/OAM background CICS tasks.

Each background task will fetch the object identified in the associated TSQ entry from ASM for S/390 to OAM disk. Any errors encountered during this processing will be logged via an ASM/OAM error message to the CICS transient data queue 'CSMT'. The background task will cater for 'retrieval busy' conditions (when all ASM/OAM retrieval resources are currently in use), and re-try the pre-fetch request at 15-second intervals. Alternatively, the 'TAPEWAIT' entry in the 'TAPECNTL' parameter library member may be used to internally queue requests when there are insufficient ASM/OAM resources available to retrieve an object.

A unique CICS transaction class may be associated with transaction OM26, and a limit placed on the number of transactions of this class which may be active at any one time. This mechanism may be used to prevent an excessive number of background retrieval requests being dispatched concurrently by CICS. If this limit is set lower than the current value of the ASM/OAM 'MAXDRIVE' parameter, then it will be possible to ensure that all ASM/OAM retrieval resources are not used satisfying background pre-fetch requests, at the expense of foreground object display requests.

(eg) if a transaction class of '9' has been assigned to transaction OM26. and a maximum active task value of 3 set for class '9', then a maximum of 3 objects will be pre-fetched concurrently. This means that the maximum number of drives used for pre-fetching objects from CICS will be 3. If the current value of the ASM/OAM 'MAXDRIVE' parameter is 4, then there will be at least one tape drive always available for satisfying foreground retrieval requests. Implementation in this manner will help prevent the occurrence of situations when foreground retrieval requests are waiting for background pre-fetch retrieval to complete.

The background pre-fetch task (OM26) must run in a CICS region which has been initialized for OAM access (via an entry for program CBRICONN in the CICS PLTPI table). If CICS MRO or ISC facilities are available, then this need not necessarily be the same region from which the pre-fetch request was issued.

In addition, ASM/OAM CICS processing must have been enabled for the host system prior to an application issuing a pre-fetch request (see sections 2.2.6 and 2.3.6).

Note that the setting of the STAGE|NOSTAGE parameter in the STRGROUP and OBJCNTL parameter library members has no effect on operation of the CICS pre-fetch utility. All objects identified for recall by the utility will be staged to OAM disk storage, regardless of the STRGROUP or OBJCNTL parameter library entries.

6.5.2 Application program interface.

The ASM/OAM CICS pre-fetch function is invoked from an application program via a CICS 'LINK' command to program OTIMP255 (eg)

```
EXEC CICS LINK PROGRAM(OTIMP255)
           COMMAREA(P255COMM)
           LENGTH(16)
           END-EXEC.
```

The parameter area passed to the pre-fetch module in the communication area must have the following format:

Offset	Length	Type	Description
0	2	char	Request code: '01' - perform pre-fetch processing. This is the only request code currently allowed.
2	2	char	Return code. Indicates the result of the request. '00' - pre-fetch requests queued successfully. '98' - CICS abend or error condition intercepted. Refer to the CICS CSMT TD queue for more information regarding the error. '99' - invalid request code.
4	2	bin	Supplementary code 1. This field may contain additional information for an invalid request.
6	2	bin	Supplementary code 2. This field may contain additional information for an invalid request.
8	8	char	TSQ name. This field gives the name of the temporary storage queue which identifies the objects to be pre-fetched.

The temporary storage queue identified in the CICS communication area should contain one item for each object to be pre-fetched. Each item must be 88 bytes in length, and should have the following format:

Offset	Length	Type	Description
0	44	char	Name of OAM collection containing object to be pre-fetched.
44	44	char	Name of OAM object to be pre-fetched.

The collection and object names specified in the above TSQ entry should be as specified in the OAM directory entry for the object to be pre-fetched.

The temporary storage queue identified in the caller's communication area must be created prior to the pre-fetch request being issued by the application. This queue will be automatically deleted by ASM/OAM before control is returned to the calling application program. A maximum of 32767 entries may be present in any one temporary storage queue.

6.5.3 CICS resource definitions.

The following CICS resources must be defined prior to invocation of the ASM/OAM CICS pre-fetch utility:

- Programs OTIMP255 and OTIMP260
- Transaction OM26
- Resource Control Table entry for OM26.

Refer to section 2.2.6(c) or 2.3.6(c) for a full description of the CICS resource definitions required for execution of the CICS pre-fetch utility.

6.6 OTIMP35x - the batch pre-fetch utility.

ASM/OAM provides facilities for batch and CICS programs to issue requests to pre-fetch objects from ASM for S/390 to OAM disk storage. These requests are issued via the appropriate application program interface.

Pre-fetching objects to OAM disk will ensure that those objects are available for immediate access when required, without the possible delays experienced when accessing objects directly from ASM for S/390 tape. Note that pre-fetch processing may not be required when executing with a version of ASM for S/390 which supports storage of objects on disk.

Pre-fetch processing is always performed asynchronously (ie) there will be no operation waiting for completion of the pre-fetch process before being able to continue.

The ASM/OAM batch pre-fetch utility enables ASM for S/390-resident objects to be staged back on OAM disk storage via a batch application program interface. This utility accepts calls from a user application to add recall requests to a batch, and to process the batched requests.

The utility does not use the OSREQ interface, and consequently does not invoke the ASM/OAM control region processing to recall objects; it is not necessary for the control region to be active in order to recall objects using the batch pre-fetch utility.

The user application passes the following information for each item to be batched:

- collection name of object to be recalled.
- object name of object to be recalled.
- whether or not the object is to be deleted from ASM for S/390 after recall.

The pre-fetch utility is invoked via a standard program CALL interface. Information is passed with each call via a call parameter block.

Other features of the utility include:

- Sorting of batch entries prior to processing in order to optimize the ASM for S/390 access requirements needed for recall of all batched objects.
- The ability to stage objects directly in the OAM databases from which they were migrated, or to one or more VSAM KSDS files which may be used for subsequent loading of the OAM databases.

- Dynamic allocation of datasets required by the pre-fetch utility (apart from the ASM/OAM parameter library).
- Formatted ASM/OAM parameter validation report.
- Reporting of all error/warning conditions encountered during retrieval processing.
- No intervention required for restart/rerun of calling application after failure. The pre-fetch utility will automatically commit all changes after each individual ASM for S/390 tape volume has been processed. Re-running the retrieval job will then automatically restart recall activity from the tape volume being processed at the time of failure.
- Optional update of an object's management class after recall. This facility is controlled via the 'BRECALL' parameter in the object's management class entry in the ASM/OAM 'OBJCNTL' parameter library member. Refer to section 3.3.5 for a description of the 'BRECALL' parameter.
- Note that the setting of the STAGE|NOSTAGE parameter in the STRGROUP and OBJCNTL parameter library members has no effect on operation of the batch pre-fetch utility. All objects identified for recall by the utility will be staged to OAM disk storage, regardless of the STRGROUP or OBJCNTL parameter library entries.

6.6.1 CALL interface requirements.

The batch pre-fetch utility is invoked from an application program via a call to module 'OTIMP350' or 'OTIMP355'. The module to be called is determined as follows:

- Applications which do not issue their own SQL commands (ie. non-DB2 applications) must call module **OTIMP350**.
- Applications which **do** issue their own SQL commands must call module **OTIMP355**.

(eg) for COBOL use the following statement:

```
CALL 'OTIMP350' USING OTIM-PARAMETER-BLOCK.
```

or:

```
CALL 'OTIMP355' USING OTIM-PARAMETER-BLOCK.
```

OTIMP350 and OTIMP355 are ASM/OAM interface stubs which will be linked into the calling program. Their function is to invoke the appropriate ASM/OAM utility modules corresponding to the type of call issued by the invoking application program.

The calling program must pass a 96-byte parameter block to ASM/OAM with each call. This parameter block is identical for both OTIMP350 and OTIMP355, and has the following format:

Offset	Length	Type	Field
0	2	char	Request code: '01' - add object to batch (do not delete from ASM for S/390 after recall) '02' - add object to batch (delete from ASM for S/390 after recall – do not honor management class transition for unmigrated objects) '03' - add object to batch (delete from ASM for S/390 after recall – honor management class transition for unmigrated objects) '10' - process batch '20' - end processing.
2	2	char	Return code
4	2	bin	Reason code 1
6	2	bin	Reason code 2
8	44	char	Collection name
52	44	char	Object name

Fields in the parameter block are used as follows:

Request code: This field consists of two numeric digits which specify the function to be performed. The request code can take the following values:

01 - add an object to the batch to be processed. The migrated object is not to be deleted from ASM for S/390 after recall.

02 - add an object to the batch to be processed. Delete the migrated object from the ASM for S/390 database after recall. If the object identified in the request is unmigrated, a return code of '04' with reason code 1 value of 3 will be returned to the caller. Any management class transition request (specified via the BRECALL parameter on the object's management class entry in the ASM/OAM OBJCNTL parameter library member) will **not** be processed. Request code '03' should be used if

management class transition processing is to be honored for unmigrated objects.

03 - add an object to the batch to be processed. Delete the migrated object from the ASM for S/390 database after recall. If the object identified in the request is unmigrated, a return code of ‘04’ with reason code 1 value of 3 will be returned to the caller. Any management class transition request (specified via the BRECALL parameter on the object’s management class entry in the ASM/OAM OBJCNTL parameter library member) will be processed.

10 - process all entries in the current batch.

20 - end of job.

Return code: This is a 2-digit numeric code set by ASM/OAM prior to returning control to the calling application. It is used to indicate the result of the request.

Reason codes: These are two 2-byte binary fields, which may contain further information when a non-zero return code is received.

Collection name: A 44-character field which identifies the name of the collection to which the object be recalled belongs. It must contain trailing spaces if necessary.

Object name: A 44-character field which identifies the name of the object to be recalled. It must also contain trailing spaces if necessary.

The normal sequence of calls issued by the program will be a series of type '01' and/or type '02' calls to add objects to the batch to be processed, followed by a single type '10' call. The type '10' call will cause ASM/OAM to sort the batched requests into the most efficient order for tape retrieval, and to recall the identified objects.

The '01'/'02' and '10' sequence may be repeated as often as required. However, object retrieval from ASM for S/390 will be most efficient if the number of batches is kept to a minimum (optimally 1). There is a limit of 1,029,200 to the number of entries per batch.

After all objects have been processed, a type '20' call should be issued to perform all dataset close and cleanup operations.

6.6.2 JCL requirements.

The following JCL entries will be required for any job invoking the ASM/OAM batch pre-fetch utility. These JCL entries are in addition to any which are required for running of the calling application program itself.

Mandatory JCL requirements.

(a) STEPLIB/JOBLIB changes.

Add the following datasets to the STEPLIB or JOBLIB concatenations for the calling application program or ensure that these libraries are available from the system linklist concatenation.

- ASM/OAM distribution library
- ASM for S/390 distribution library
- DB2 runtime library

(b) OTIMS100.

A DD card for file OTIMS100 is required in order to allocate the ASM/OAM parameter library. Code the card as follows:

```
//OTIMS100 DD DSN=NearOAM.parameter.libname,DISP=SHR
```

Valid STRGROUP and ENVCNTL members must be present in this library. The utility will give an error condition if either of these members is missing or invalid.

Optional JCL requirements.

(a) OTIMS350.

This is the dataset which is used by the utility for the parameter validation report, and for reporting any error or warning conditions encountered during execution of the utility. If not present, a SYSOUT dataset with the default class will be dynamically allocated.

If it is required to retain this information for subsequent access, a DD card may be placed in the JCL to override the default allocation. If a non-SYSOUT dataset is specified in this DD card, it should have the following attributes:

```
DCB=(RECFM=FBA,LRECL=133,BLKSIZE=n)
```

where 'n' is set as determined by the user.

(b) OT04nnnn/OT32nnnn.

These entries are used when it is required to write recalled objects to a VSAM dataset, rather than staging them directly in an OAM database.

These DD names should be used as follows:

- Specify DD name 'OT32nnnn' if all objects belonging to a storage group which are larger than 3980 bytes in size, are to be written to a VSAM KSDS instead of being staged in the OAM object storage table for that storage group.

  The storage group to be processed is identified via the name of the VSAM dataset in the DD entry. This name should have the following format:

  ```
  (hlq).xxxxxxxx.VSAM.OBJ32K
  ```

  where:

  'hlq' is the optional high-level qualifier to be used for the storage group (as specified in the HLQ keyword parameter in the STRGROUP parameter library member)

  'xxxxxxxx' is the name qualifier of the DB2 database for the storage group (eg. 'GROUP00', GROUP01' etc.)

  One 'OT32nnnn' DD entry should be present for each storage group for which objects larger than 3980 bytes in size are to be written to a VSAM file, instead of being staged directly to an OAM database. 'nnnn' should be a unique alphanumeric character string of 1-4 characters in length. This character string can take any unique value, and is used to allow multiple DD entries to be present in the JCL when pre-fetching to VSAM is to be performed for more than one OAM storage group.

- Specify DD name 'OT04nnnn' if all objects belonging to a storage group which are less than or equal to 3980 bytes in size, are to be written to a VSAM KSDS instead of being staged in the OAM object storage table for that storage group.

  The storage group to be processed is identified via the name of the VSAM dataset in the DD entry. This name should have the following format:

  ```
  (hlq).xxxxxxxx.VSAM.OBJ04K
  ```

  where:

'hlq' is the optional high-level qualifier to be used for the storage group (as specified in the HLQ keyword parameter in the STRGROUP parameter library member)

'xxxxxxxx' is the name qualifier of the DB2 database for the storage group (eg. 'GROUP00', GROUP01' etc.)

One 'OT04nnnn' DD entry should be present for each storage group for which objects less than or equal to 3980 bytes in size are to be written to a VSAM file, instead of being staged directly to an OAM database. 'nnnn' should be a unique alphanumeric character string of 1-4 characters in length. This character string can take any unique value, and is used to allow multiple DD entries to be present in the JCL when pre-fetching to VSAM is to be performed for more than one OAM storage group.

For example, specifying the following JCL cards:

```
//OT320001  DD DSN=GROUP90.VSAM.OBJ32K,DISP=SHR
//OT040002  DD DSN=GROUP90.VSAM.OBJ04K,DISP=SHR
//OT320003  DD DSN=GROUP93.VSAM.OBJ32K,DISP=SHR
```

will cause the utility to write to the identified VSAM datasets all recalled objects for storage group 90, and all objects > 3980 bytes for storage group 93. All other objects will be staged in the OAM DB2 database(s) for the appropriate storage group.

Note that update of OAM object directory entries will not be affected by these DD cards (ie) directory entries will be updated identically to indicate that an object has been staged from ASM for S/390 to OAM disk (and deleted from ASM for S/390 where appropriate), irrespective of whether they have been recalled to VSAM or DB2.

To receive recalled objects, each VSAM KSDS dataset should be defined as below. To receive objects less than or equal to 3980 bytes, use the following AMS parameters:

```
DEFINE CLUSTER -
        (NAME(xxxxxxxx) -
         SHR(2 3) -
         REC(aaaaa bbbbb) -
         RECSZ(2016 4032) -
         INDEXED -
         KEYS(50 0) -
         FPSC(5 5) -
         VOL(vvvvvv)) -
         DATA -
         (NAME(xxxxxxxx.data.name) -
          CISZ(4096)) -
         INDEX -
         (NAME(xxxxxxxx.index.name) -
          CISZ(2048))
```

To receive objects greater than 3980 bytes, use the following AMS parameters:

```
DEFINE CLUSTER -
       (NAME(xxxxxxxx) -
        SHR(2 3) -
        REC(aaaaa bbbbb) -
        RECSZ(16380 32760) -
        INDEXED -
        KEYS(50 0) -
        FPSC(5 5) -
        VOL(vvvvvv)) -
       DATA -
       (NAME(xxxxxxxx.data.name) -
        CISZ(32768)) -
       INDEX -
       (NAME(xxxxxxxx.index.name) -
        CISZ(8192))
```

where:

- ‘xxxxxxxx’ is the name of the VSAM cluster to be defined
- 'aaaaa' and 'bbbbb' are primary and secondary allocation values (one record will be created for each object segment being retrieved).
- 'vvvvvv' is the volume on which the dataset is to be defined.

Each record in these datasets will have the following format:

Offset	Length	Type	Field	
0	4	bin	Collection name identifier	record key
4	44	char	Object name	record key
48	2	bin	Segment number	record key
50	1	char	Data format version	
51	1	-	not used	
52	2	bin	Object length (= n)	
54	n	bin	Object data segment	

Records will be sequenced by segment number within object name within collection name identifier.

(c) SORTWKnn.

One or more SORTWKnn cards may be included in the JCL. They are used to identify auxiliary work files to be used during the internal sort process. If no SORTWKnn cards are present, virtual storage from within the job address space will be used by the sort procedure. Refer to documentation accompanying the sort product used at the host installation for details on specifying these cards.

(d) SYSOUT.

This is the dataset used by the internal sort procedure for producing the sort report. If not present in the JCL, the ASM/OAM batch pre-fetch utility will dynamically allocate a SYSOUT dataset with a default class specification.

6.6.3 DB2 plan creation

The DB2 plan for execution of the pre-fetch application must be created prior to initial use. The plan creation process is dependent on the ASM/OAM module invoked for batch pre-fetch processing, as follows:

a. OTIMP350.

OTIMP350 is called for invocation of ASM/OAM batch pre-fetch processing by applications which do not issue their own SQL commands.

When executing in this mode, the standard ASM/OAM plan (as identified or defaulted via the PLAN keyword parameter of the ENVCNTL parameter library member) needs to be bound prior to use. This plan is automatically bound via execution of jobs OTIMPKG and OTIMBIND during ASM/OAM installation processing (see sections 2.2.5 and 2.3.5). No other DB2 plan creation activities are required for this mode of invocation.

b. OTIMP355.

Calling applications which issue their own SQL commands must issue a call to module OTIMP355 to invoke the ASM/OAM batch pre-fetch facility.

For this mode of invocation, a single plan must be bound from the DBRM created by the calling application's DB2 pre-processing procedure, and from DBRM OTIML365 on the distributed ASM/OAM DBRM library (file 2 on the product distribution tape). The identifier of this plan should be specified in the 'PLAN' operand of the DB2 'RUN' statement used to execute the pre-fetch application.

The following 'BIND' statement may be used to create this plan:

```
BIND PLAN(XXXXXXXX)                -
     MEMBER(YYYYYYYY,OTIML365)     -
     ACTION(REPLACE)               -
     RETAIN                        -
     VALIDATE(BIND)                -
     ISOLATION(CS)                 -
     FLAG(E)                       -
     ACQUIRE(USE)                  -
     LIB('DBRM.library.name')      -
     RELEASE(COMMIT)               -
     EXPLAIN(NO)
```

where 'XXXXXXXX' is the name of the generated plan, and 'YYYYYYYY' is the name of the DBRM generated during DB2 pre-processing of the calling application program code.

6.6.4 Return codes.

The following return codes will be set by the utility on returning control to the calling application. Note that on receipt of any return code greater than 8, a calling application should terminate processing to allow the serious error condition to be resolved before rerunning the job.

Code	Description
00	Request processed successfully.
04	Request processed but a warning condition has been encountered. For request codes 01 and 02, reason codes 1 and 2 will be set to identify the warning condition, as follows:

RC1	RC2	Error
1	-	The identified object has already been staged to disk. No action has been taken.
2	-	The identified object has been migrated to OAM optical or tape storage. No action has been taken.
3	-	The identified object has not been migrated from OAM disk to ASM/OAM tape storage. For request codes '01' and '02', no action has been taken. For request code '03', any management class transition request (specified via the BRECALL parameter on the object's management class entry in the ASM/OAM OBJCNTL parameter library member) will be honored.

For request code 10, a warning message will have been written to the OTIMS350 dataset. Batch processing continues normally.

08	Request processed but an error condition has been encountered.

For request codes 01 and 02, reason codes 1 and 2 will be set to identify the error condition, as follows:

RC1	RC2	Error
1	-	The identified collection was not found in the OAM collection name table. No action was taken.
2	-	The identified object did not exist in the specified collection. No action was taken.
3	-	The identified object has been migrated to ASM for S/390, but ASM/OAM was unable to locate the data in the appropriate ASM for S/390 database. No further action was taken. This is an error condition - check that there is no inconsistency between the ASM for S/390 database index and tape datasets for the identified storage group.

For request code 10, an error message will have been written to the OTIMS350 dataset. Batch processing continues normally.

12 Request not processed due to serious error condition. An error message will have been written to the OTIMS350 dataset. For request code '10', processing of the batch will have been terminated at the point of the error.

Code	Description
16	Processing terminated due to failure when allocating or opening the OTIMS350 message dataset. Reason codes 1 and 2 are set to high-values if an open error was received. For an allocation error, reason codes 1 and 2 give the error and information codes returned from the dynamic allocation SVC (SVC99).

6.6.5 Rerun after job failure.

Should a return code greater than 08 be returned from the ASM/OAM utility, then the calling application should terminate processing so that the cause of the serious error may be investigated.

After rectifying the problem which caused the initial error, the calling application job may be rerun. There are no restore or recovery activities required prior to rerunning the job.

The batch pre-fetch utility automatically commits all DB2 and VSAM changes made during the object recall process (ie. OAM directory and object storage table updates and ASM for S/390 object deletions) when processing has been completed for each ASM for S/390 tape volume (ie.

after retrieving all objects from a volume). If an error occurs during the processing of a tape volume, all prior changes made while processing that volume will be backed out.

On rerun, the ASM/OAM pre-fetch utility will now identify objects which were recalled and committed during the initial failed job as having being staged to disk. These will not therefore be batched for subsequent retrieval. Retrieval will thus begin with the first object from the ASM for S/390 tape volume in use when the original failure occurred.

Note that when retrieving objects to a VSAM dataset instead of to DB2, the VSAM dataset should not be amended in any way prior to rerunning. ASM/OAM will automatically identify that a rerun is in progress and ensure that data integrity is maintained across reruns. Any amendment to this dataset prior to rerun may mean that objects will be lost.

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7 Data Management

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Storage and retrieval of migrated OAM objects by ASM/OAM is performed using Storage Technology's ASM for S/390 database management product. Migrated objects are stored in standard ASM for S/390 databases. This chapter provides information on using ASM/OAM and ASM for S/390 for management of data prior to migration from OAM and after objects have been migrated to ASM for S/390.

ASM/OAM uses one ASM for S/390 database per OAM storage group. Each is a standard ASM for S/390 database, consisting of multiple single-volume datasets (up to a maximum of 65535 per storage group). During migration, objects are written sequentially to a tape volume until the amount of data held on the volume exceeds the limit specified during the ASM for S/390 database initialization procedure for that storage group, or until the volume is full if no limit has been specified (see the description of maximum blockcount processing in the ASM for S/390 User Manual and in section 2.2.8 of this manual).

Over a period of time, space within an ASM for S/390 database will be freed due to:

- expiration of migrated objects by the ASM/OAM object management procedure.
- deletion of migrated objects via OSREQ DELETE requests.
- deletion of migrated objects after recall using the batch pre-fetch utility.

ASM for S/390 provides a database maintenance utility which allows users to reclaim space from within an ASM for S/390 database that has been freed due to object deletion or expiration.

In addition, the ASM/OAM object management procedure incorporates an ASM for S/390 database backup process which produces one or more backup copies of every primary tape volume in an ASM for S/390 database. These backup copies may be used to recover data lost from a database due to media failure (loss of individual volume(s)) or loss of a data center (loss of entire database).

Full details on the ASM for S/390 database maintenance utility and on standard ASM for S/390 backup and recovery procedures may be obtained from the ASM for S/390 User Manual.

OAM objects may also be backed up by ASM/OAM prior to migration, through use of the BACKUP|NOBACKUP parameter in the STRGROUP parameter library member. Refer to section 3.4.2 for a description of this parameter and its usage. Section 7.1 discusses usage of this backup facility.

7.1 Backup and recovery of disk-resident objects using ASM/OAM.

ASM/OAM may be used to take tape backups of unmigrated disk-resident OAM objects (prior to standard migration from OAM to ASM for S/390). The following functionality is available for this purpose:

- Backup of all OAM disk-resident objects (prior to their selection for normal migration from OAM to ASM for S/390) may be invoked at the OAM storage group level, via the ASM/OAM STRGRP sub-parameter 'BACKUP|NOBACKUP'.
- When the BACKUP option has been set for a storage group, the ASM/OAM object management procedure will copy all OAM disk-resident objects from OAM to ASM for S/390 storage, whether they have become eligible from migration or not (via the MIGRATE sub-parameter of the ASM/OAM OBJCNTL parameter library member). The OAM disk copy of objects which have not yet become eligible for migration will be retained, and the objects marked by ASM/OAM as 'staged recalled'. Subsequent retrieval requests for any such object will be satisfied from the OAM disk copy.
- The OAM disk copy of these objects will be ultimately deleted by standard ASM/OAM object management processing, using the DELETE sub-parameter of the OBJCNTL parameter library member (based on days since last reference). However, OAM disk copies of backed-up objects will not be available for deletion until those objects have become eligible for migration from OAM to ASM for S/390.

The overall effect of the above processing is that all objects will be 'migrated' from OAM to ASM for S/390 after initial storage on the OAM storage group database. OAM disk copies of these objects will not be deleted until the objects have become eligible for migration by ASM/OAM (as controlled by the object's management class definition in the ASM/OAM parameter library). At this time, the OAM disk copy will be deleted if the number of days since last reference exceeds that specified in the DELETE sub-parameter of the appropriate ASM/OAM MGMTCLAS parameter.

Note carefully that backup procedures for migrated objects, as discussed earlier in this chapter, are not affected by backup requirements for OAM disk-resident (ie. unmigrated) objects, as discussed in this section.

7.1.1 OAM disk-resident object backup procedure.

The following procedure should be implemented for backup of OAM disk-resident (unmigrated) objects:

- The directory table of each OAM storage group database should be backed up on a regular basis, using standard DB2 image copy processing. Note that the object storage tables for the OAM database do not need to be backed up using this option. The directory table should be backed up at the same frequency as execution of the ASM/OAM object management procedure.
- DB2 logs will need to be retained for at least as long as the frequency of execution of the ASM/OAM object management procedure for each storage group, so that all updates to an OAM database since the last execution of the object management procedure may be recovered by rolling-forward from the logs. DB2 log files should be archived to tape when filled.
- The BACKUP parameter should be set for each storage group in the ASM/OAM STRGROUP parameter library member. This will cause ASM/OAM to copy all OAM disk-resident (ie. unmigrated) objects from OAM to ASM for S/390 during the next execution of the ASM/OAM object management procedure. This means that all objects newly created since the last execution of the object management procedure for a storage group will be copied from OAM to ASM for S/390. Note that OAM disk copies of objects will not be deleted at this time.
- Standard ASM for S/390 backup processing should be implemented so that at least two copies of an object will exist in the ASM for S/390 database, in addition to the disk copy in the OAM DB2 database.
- The ASM/OAM OBJCNTL parameter library member should be coded as normal, irrespective of whether BACKUP or NOBACKUP has been set in the STRGROUP parameter library member. The DELETE sub-parameter of the ASM/OAM MGMTCLAS parameter will then take control, and delete the OAM disk copy of an object when it has been unreferenced for longer than the value specified in the DELETE sub-parameter. This deletion will not take place until the object would have been eligible for migration processing in the standard way (via the ASM/OAM MIGRATE sub-parameter).

7.1.2 OAM disk-resident object recovery procedure.

To recover objects after the loss of one or more OAM storage group databases, the following actions will be required:

- Redefine and initialize all tables in the lost OAM storage group database.
- Restore the directory table of the OAM database, from the last image-copy.
- Roll forward all subsequent updates to the database from the DB2 logs. This will include all updates to the directory table, and all insertions and updates to the object storage tables.
- Execute the ASM/OAM recovery OTIMP130. This utility can be run in either of the following modes:

  1. Speed recovery mode. In this mode, the utility will modify the OAM object directory for the storage group being recovered, but will not recover any objects from tape to disk. Recovery of a disk-resident object will be automatically performed when that object is next retrieved in response to a user access request (using standard ASM/OAM processing).
  2. Full recovery mode. This will process the restored OAM directory, and restore the disk copies of lost objects from the migrated/backed-up copies on tape. This recovery process will take longer to execute than that for speed recovery, but will reduce the amount of tape activity created due to subsequent retrieval of objects via user access requests.

  Refer to section 6.4 for a full description of the ASM/OAM object recovery utility OTIMP130.

7.2 ASM for S/390 database backup and recovery.

7.2.1 ASM for S/390 database backup procedure.

Standard ASM for S/390 archival and backup processing enables the creation of up to 4 copies of each tape volume in an ASM for S/390 database. The copies are identified as follows:

'A' copy - this is the primary copy created when writing objects to an ASM for S/390 tape database. The primary copy will always exist.

'B' copy - this is a backup copy of the primary ('A') volume, created via execution of the ASM for S/390 backup utility (OTASP110).

'C' copy - this is a duplex copy of the primary ('A') volume. The 'C' copy is automatically created when writing objects to an ASM for S/390 database, for which the duplexing facility has been enabled via the ASM for S/390 database administration facility. The duplex copy is created at the same time as the primary copy (ie) two tape drives will be allocated concurrently by ASM for S/390.

'D' copy - this is a duplex copy of the backup ('B') volume. The 'D' copy is automatically created by the ASM for S/390 backup utility, when backing up a database for which the 'duplex during backup' facility has been enabled via the ASM for S/390 database administration facility. The backup duplex copy is created at the same time as the backup copy.

Each copy will contain a single standard-labeled dataset. The contents of each copy will be identical. The following dataset naming standards are used by ASM for S/390 to identify each copy in an ASM/OAM tape database:

'A' copy: '(hlq.)xxxxxxxx.OTM.dddd.Gnnnnn'

'B' copy: '(hlq.)xxxxxxxx.OTM.dddd.Bs.Gnnnnn'

'C' copy: '(hlq.)xxxxxxxx.OTM.dddd.Cs.Gnnnnn'

'D' copy: '(hlq.)xxxxxxxx.OTM.dddd.Ds.Gnnnnn'

where 'hlq' is the optional high-level qualifier for system datasets, as specified in the HLQ sub-parameter entry for the storage group definition in the STRGROUP parameter library member

'xxxxxxxx' is the name qualifier of the DB2 storage group database (eg. 'GROUP00', 'GROUP01' etc.)

‘dddd’ is the DB2 subsystem identifier

‘s’ is the storage level (0-9)

and ‘nnnnn’ is the sequence number of the dataset within the ASM for S/390 database.

Objects are always written to storage level 0 when first migrated to tape. They may subsequently be moved to other storage levels via execution of the ASM for S/390 object management utility.

ASM for S/390 also provides a facility (via its database administration process) to automatically control the tape cartridge devices to be used to create each copy during the object migration or backup process

(eg) ‘A’ copy to primary library location. This copy of the database will be used for normal production access.

‘B’ copy to offsite location. This copy of the database will be used for disaster recovery purposes.

‘C’ copy to alternate onsite location. This copy of the database will be used for recovery after loss of an individual volume. This location may be in another library storage module, for automated recovery access, or on a free-standing device for eventual shelf storage.

Refer to the ASM for S/390 User Manual for a fuller description of the standard ASM for S/390 database backup procedure.

ASM/OAM provides a database backup control utility which is executed as part of the object management procedure. This utility will control backup of all tape datasets created or updated by the object selection utility. The object management procedure will not be allowed to proceed until the backup control utility has successfully executed.

Execution of the ASM/OAM backup control utility is a mandatory step in the object management procedure. However, actual backup of tape datasets via this utility is optional. This option is controlled by the utility’s ‘BACKUP’ EXEC parameter, as follows:

‘BACKUP=YES’- the ASM/OAM backup control utility will create backups of all tape volumes updated during the preceding object selection step. The standard ASM for S/390 backup utility OTASP110 is invoked from OTIMP110 to perform all backup processing.

The backup process will always create a primary backup ('B') copy. If duplexing during backup has been enabled for this storage group database via the ASM for S/390 database administration procedure, a duplex backup ('D') copy will also be created.

The ASM for S/390 backup utility will issue its standard backup processing report to the SYSPRINT file specified in the ASM/OAM JCL.

'BACKUP=NO' - the ASM/OAM backup control utility will perform its standard control functions to enable the object management procedure to continue normally, but will not perform any backup processing.

This option may be used, for example, if a duplex ('C') copy was created during the preceding object migration processing by the object selection utility, and no additional backup copies are required.

Use of this option enables suppression of tape backup processing, and will allow object management processing to continue normally.

7.2.2 ASM for S/390 database recovery.

ASM for S/390 database recovery may be required in the following circumstances:

1. loss of an individual tape volume from with an ASM/OAM tape database (eg) due to media failure
2. loss of an entire ASM for S/390 database (eg) due to loss of data center.

In both the above cases, standard ASM for S/390 database recovery procedures should be followed. A full description of these procedures may be found in the 'Recovery Control Processing' section in the ASM for S/390 User Manual.

The procedure in each case is summarized below:

1. Loss of individual tape volume(s)

   Identify the dataset sequence number(s) of the tape volume(s) which have become unavailable. A tape volume's dataset sequence number may be obtained from the name of the dataset contained on that volume. Refer to section 7.2.1 for a description of ASM/OAM dataset naming standards.

Set each sequence number (or range of sequence numbers) in recovery status, using the standard ASM for S/390 database administration dialog for the database containing the unavailable volumes. The copy to be used for recovery ('B', 'C' or 'D') is established during this process. ASM for S/390 will automatically access the appropriate backup copy when retrieving objects from all volumes which have been placed in recovery status.

The primary copy of all volumes which are in recovery status should be re-created at a subsequent time using the ASM for S/390 database recovery utility OTASP130. This utility will automatically remove a volume from recovery status after its primary copy has been re-created. Volumes may be manually removed from recovery status at any time via the ASM for S/390 database administration dialog.

2. Loss of entire database

If an entire database has been lost (due to hardware malfunction or loss of data center), the database must be placed in 'disaster recovery' status via the standard ASM for S/390 database administration dialog. The copy to be used for disaster recovery ('B', 'C' or 'D') is specified during this procedure.

When a database is in disaster recovery status, all retrievals by ASM for S/390 from that database will be performed from the appropriate backup copy. In order to guarantee the continuance of established service levels for OAM applications, all volumes in that copy of the database should be available for automated processing.
If disaster recovery is being performed on another processor, all disk datasets used by ASM/OAM and ASM for S/390, and all user catalog entries from the primary facility, must be restored for use on the disaster recovery facility. There is no requirement for physical recovery of any tape dataset prior to disaster recovery usage.

If necessary, the primary copy of the database may be re-created using the standard ASM for S/390 database recovery utility (OTASP130). After a primary volume has been re-created, it will be removed from recovery status, and will be used thereafter to satisfy accesses to objects on that volume, as normal.

7.3 The ASM for S/390 database maintenance procedure.

Maintenance of an ASM for S/390 database is performed via the ASM for S/390 database maintenance procedure, using the database maintenance utility OTASP030. Refer to the ASM for S/390 User Manual for a full description of this utility and of its use in the ASM for S/390 database maintenance procedure.

The database maintenance procedure should be performed at regular intervals for each storage group, in order to recover unused space from within an ASM for S/390 database which has been freed due to object deletion. The frequency at which the procedure needs to be performed will depend on the rate of object deletion, and the level of requirement for reclaiming tapes from the database in order to replenish scratch pools.

Control of the database maintenance process for any storage group is via the 'recycle threshold' entry set during the ASM for S/390 database definition process (see section 2.2.8). This process must be executed for each storage group to be processed by ASM/OAM.

The recycle threshold specifies a numeric value in the range 00-99, which represents a percentage of active objects for any volume in the database. A tape volume becomes eligible for recycling by the ASM for S/390 database maintenance utility if the level of active objects on that volume falls below this threshold. If this entry is omitted during the database definition process, a default value of '0' is used; this indicates that no recycling is to be performed on this database.

When a tape volume becomes eligible for recycling, the ASM for S/390 database maintenance utility will write all active objects contained within it to a new tape volume at the end of the database. The recycled volume will then be released from the database and may be returned to the appropriate scratch pool.

If the 'autouncat during recycle' entry has been set during the database definition process, released volumes will be automatically uncataloged after being released from the database. This facility may be used in conjunction with an installed tape management system to automatically return uncataloged volumes to the correct scratch pool.

The ASM for S/390 database maintenance utility processes a single database (ie. single storage group) for each execution. Any tape volume being used by the database maintenance utility will be unavailable for allocation for object recall or migration processing. It is recommended therefore that database maintenance for a storage group be scheduled for execution when there is no object recall or migration activity for that storage group. It is not necessary to terminate the ASM/OAM control region while ASM for S/390 database maintenance is being performed.

An ASM for S/390 database's recycle threshold may be altered at any time, via the supplied ASM for S/390 database administration dialogs. Note also that where multiple storage levels are in use for an ASM for S/390 database, a different recycle threshold may be supplied for each storage level.

As ASM for S/390 uses a discrete set of tape cartridge volumes and disk datasets for each database (ie. each storage group), it is possible to perform the ASM for S/390 database maintenance procedure on multiple ASM/OAM storage group databases concurrently. Each procedure will require a minimum of two tape cartridge drives.

The following sample JCL may be used to execute the ASM for S/390 database maintenance procedure for storage group 'xx':

```
//STEP1    EXEC PGM=OTASP030,REGION=4M
//*
//STEPLIB    DD DSN=ASM for S/390.load.library,DISP=SHR
//*
//OTASV100   DD DSN=(hlq.)xxxxxxxx.OTM.dddd.INDEX,DISP=SHR
//SYSPRINT   DD SYSOUT=*
```

DD entries should be set as follows:

STEPLIB: Enter the name of the ASM for S/390 load library.

OTASV100: Enter the name of the ASM for S/390 database index for the storage group to be processed. This will have the format shown, where 'hlq' is the optional high-level qualifier used for system datasets (as specified in the storage group's HLQ parameter in the STRGROUP parameter library member), 'xxxxxxxx' is the name qualifier of the DB2 storage group database (eg. 'GROUP00', 'GROUP01' etc.), and 'dddd' is the DB2 subsystem identifier.

Refer to the ASM for S/390 User Manual for a complete description of the ASM for S/390 database maintenance utility and procedure.

8 Messages and codes

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ASM/OAM components communicate with the user through informational, warning and error messages. All ASM/OAM messages begin with the characters 'OTM', followed by a 5-character numeric identifier. ASM/OAM messages may be displayed on the system log, in an ASM/OAM print report or on a CICS display terminal.

ASM/OAM OSREQ interface processing (for retrieval and deletion of migrated objects) sets return and reason codes, using the standard OSREQ return and reason code mechanism, before passing control back to the OSREQ caller.

This chapter documents all messages, categorized by ASM/OAM component, and all OSREQ return and reason codes issued by ASM/OAM.

8.1 OAM directory regression utility messages.

Messages from the OAM directory regression utility will be written to the SYSPRINT dataset.

OTM01000 NEAROAM V2.3 REGRESSION UTILITY TERMINATED WITH CONDITION CODE xx

Explanation: This message is issued at termination of utility processing. 'xx' identifies the highest condition code encountered during utility execution.

Action: No action.

OTM01001 ERROR OPENING xxxxxxxx DATASET

Explanation: An error occurred attempting to open the sequential file 'xxxxxxxx'. Processing has been terminated abnormally.

Action: Examine other system messages to discover the reason for the error. Take the appropriate corrective action and restart the job.

OTM01002 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A virtual storage request has been rejected by the operating system. Processing has been terminated abnormally.

Action: Allocate more virtual storage to the job via the SIZE parameter on the JOB or EXEC JCL entries. Restart the job.

OTM01003 NO OBJECTS SELECTED FOR REGRESSION FOR STORAGE GROUP = nnnn….nnnn

Explanation: The OAM directory regression utility has processed the directory for the identified storage group, but selected no objects for regression to NearOAM V2.1 format.

Action: None. This is an informational message.

OTM01004 UNIDENTIFIED EXEC PARAMETER

Explanation: An invalid keyword has been encountered during EXEC parameter validation. Processing of the utility is terminated.

Action: Correct the invalid EXEC parameter and restart the job.

OTM01006 INVALID VALUE FOR 'PRINT' EXEC PARAMETER

Explanation: The operand of the 'PRINT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.1.2 for a description of EXEC parameters for the OAM directory regression utility. Correct the invalid operand and restart the job.

OTM01007 STORAGE CLASS SPECIFIED IN 'TAPECLASS|DISKCLASS' PARAMETER IN 'ENVCNTL' MEMBER DOES NOT EXIST IN OAM STORAGE CLASS IDENTIFIER TABLE

Explanation: The storage class specified in the identified parameter in the ENVCNTL parameter library member has not been defined via DFSMS. Processing of the utility is terminated.

Action: Verify that the TAPECLASS or DISKCLASS parameter in the ENVCNTL parameter library member has been correctly specified. If it has, ensure that the storage class identified in this parameter is defined to the system via DFSMS. Rerun the job after making the appropriate corrections.

OTM01010 NO EXEC PARAMETER(S) SPECIFIED

Explanation: The mandatory storage-name parameter was missing or invalid in the JCL EXEC parameters. Processing has been terminated.

Action: Enter a valid JCL EXEC parameter and restart the job.

OTM01011 DUPLICATE EXEC PARAMETER SPECIFIED

Explanation: An EXEC keyword parameter has been specified more than once. Processing of the utility has been terminated.

Action: Remove the duplicate keyword from the EXEC parameters and restart the job.

OTM01012 INVALID SPECIFICATION OF STORAGE GROUP NAME POSITIONAL EXEC PARAMETER

Explanation: The storage group name positional EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.1.2 for a description of EXEC parameters for the OAM directory regression utility. Correct the invalid parameter and restart the job.

OTM01013 INVALID SPECIFICATION OF 'COMMIT' EXEC PARAMETER

Explanation: The operand of the 'COMMIT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.1.2 for a description of EXEC parameters for the OAM directory regression utility. Correct the invalid operand and restart the job.

OTM01018 SQL ERROR -nnn RECEIVED DURING COMMIT PROCESSING

Explanation: The SQL error -nnn was received issuing an SQL COMMIT request to commit updates to the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM01019 CAF OPEN/CLOSE ERROR xxxxxxxx

Explanation: An error has been encountered opening or closing a DB2 plan using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM01020 MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: The member 'xxxxxxxx' was not present on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Add the missing member to the ASM/OAM parameter library and rerun the job. Refer to chapter 3 for a description of parameter library setup.

OTM01021 ERROR xxxx LOCATING MEMBER IN NEAROAM PARAMETER LIBRARY

Explanation: Error code 'xxxx' has been received attempting to locate a member on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Refer to IBM documentation of the LOCATE macro for a description of the error code. Take the appropriate corrective action and rerun the job.

OTM01022 ERROR(S) PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Errors were detected during validation of parameters from the ASM/OAM parameter library. Processing was terminated abnormally.

Action: Consult the parameter validation report written by the utility to the SYSPRINT file for a description of the individual parameter errors. Correct the invalid parameter(s) and restart the job.

OTM01023 STORAGE GROUP SPECIFIED IN EXEC PARAMETERS DOES NOT EXIST IN NEAROAM 'STRGROUP' PARAMETER LIBRARY MEMBER

Explanation: The storage group name specified as the first positional EXEC parameter has not been defined in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Verify that the correct storage group name has been specified in the EXEC parameters. If it has, ensure that an entry for this storage group is present in the STRGROUP member of the ASM/OAM parameter library. Make the appropriate correction and rerun the job.

OTM01024 ERROR LOADING CAF INTERFACE MODULE

Explanation: An error has occurred dynamically loading the DB2 Call Attach Facility (CAF) interface module. Processing of the utility is terminated.

Action: Consult other available system messages for additional information on the load error. Take the appropriate corrective action and rerun the job.

OTM01028 MANDATORY xxxxxxxx PARAMETER MISSING

Explanation: The mandatory parameter identified in the message was not found in the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Add the missing parameter to the parameter library then rerun the job.

OTM01032 CAF CONNECT/DISCONNECT ERROR xxxxxxxx

Explanation: An error has been encountered connecting or disconnecting to DB2 using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM01039 SQL ERROR -nnn ACCESSING OAM DIRECTORY TABLE

Explanation: SQL error -nnn was received accessing the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM01042 SQL ERROR -nnn ACCESSING STORAGE CLASS IDENTIFIER TABLE

Explanation: SQL error -nnn was received accessing the OAM administration database storage class identifier table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM01044 OBJECT xxxx IN COLLECTION ID nnnnnnn NOT FOUND DURING UPDATE OF OAM DIRECTORY

Explanation: An entry for an object which has been selected for regression processing was not found in the OAM directory during object update processing. Processing of the utility is terminated.

Action: This message is likely to indicate an internal ASM/OAM processing error. Report the error to your ASM/OAM product support representative.

OTM01045 SQL ERROR -nnn UPDATING OAM DIRECTORY ENTRY FOR OBJECT xxxx; COLLECTION ID = nnnnnnn

Explanation: SQL error -nnn was received updating the OAM object directory table entry for the identified object. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM01051 UNABLE TO OPEN SYSPRINT DATASET

Explanation: The utility was unable to successfully open the SYSPRINT dataset, as assigned in the JCL. Processing of the utility is terminated.

Action: Ensure that a SYSPRINT DD card is present in the JCL. If it is, consult other available system messages for additional information concerning the error. Take the appropriate corrective action and restart the job.

8.2 OAM directory conversion utility messages.

Messages from the OAM directory conversion utility will be written to the SYSPRINT dataset.

OTM02000 NEAROAM V2.3 CONVERSION UTILITY TERMINATED WITH CONDITION CODE xx

Explanation: This message is issued at termination of utility processing. 'xx' identifies the highest condition code encountered during utility execution.

Action: No action.

OTM02001 ERROR OPENING xxxxxxxx DATASET

Explanation: An error occurred attempting to open the sequential file 'xxxxxxxx'. Processing has been terminated abnormally.

Action: Examine other system messages to discover the reason for the error. Take the appropriate corrective action and restart the job.

OTM02002 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A virtual storage request has been rejected by the operating system. Processing has been terminated abnormally.

Action: Allocate more virtual storage to the job via the SIZE parameter on the JOB or EXEC JCL entries. Restart the job.

OTM02003 NO OBJECTS SELECTED FOR CONVERSION FOR STORAGE GROUP = nnnn…..nnnn

Explanation: The OAM directory conversion utility has processed the directory for the identified storage group, but selected no objects for conversion from ASM/OAM V2.1 format.

Action: None. This is an informational message.

OTM02004 UNIDENTIFIED EXEC PARAMETER

Explanation: An invalid keyword has been encountered during EXEC parameter validation. Processing of the utility is terminated.

Action: Correct the invalid EXEC parameter and restart the job.

OTM02006 INVALID VALUE FOR 'PRINT' EXEC PARAMETER

Explanation: The operand of the 'PRINT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.2.2 for a description of EXEC parameters for the OAM directory conversion utility. Correct the invalid operand and restart the job.

OTM02007 STORAGE CLASS SPECIFIED IN 'TAPECLASS|DISKCLASS' PARAMETER IN 'ENVCNTL' MEMBER DOES NOT EXIST IN OAM STORAGE CLASS IDENTIFIER TABLE

Explanation: The storage class specified in the identified parameter in the ENVCNTL parameter library member has not been defined via DFSMS. Processing of the utility is terminated.

Action: Verify that the TAPECLASS or DISKCLASS parameter in the ENVCNTL parameter library member has been correctly specified. If it has, ensure that the storage class identified in this parameter is defined to the system via DFSMS. Rerun the job after making the appropriate corrections.

OTM02010 NO EXEC PARAMETER(S) SPECIFIED

Explanation: The mandatory storage-name parameter was missing or invalid in the JCL EXEC parameters. Processing has been terminated.

Action: Enter a valid JCL EXEC parameter and restart the job.

OTM02011 DUPLICATE EXEC PARAMETER SPECIFIED

Explanation: An EXEC keyword parameter has been specified more than once. Processing of the utility has been terminated.

Action: Remove the duplicate keyword from the EXEC parameters and restart the job.

OTM02012 INVALID SPECIFICATION OF STORAGE GROUP NAME POSITIONAL EXEC PARAMETER

Explanation: The storage group name positional EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.2.2 for a description of EXEC parameters for the OAM directory conversion utility. Correct the invalid parameter and restart the job.

OTM02013 INVALID SPECIFICATION OF 'COMMIT' EXEC PARAMETER

Explanation: The operand of the 'COMMIT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.2.2 for a description of EXEC parameters for the OAM directory conversion utility. Correct the invalid operand and restart the job.

OTM02018 SQL ERROR -nnn RECEIVED DURING COMMIT PROCESSING

Explanation: The SQL error -nnn was received issuing an SQL COMMIT request to commit updates to the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM02019 CAF OPEN/CLOSE ERROR xxxxxxxx

Explanation: An error has been encountered opening or closing a DB2 plan using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM02020 MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: The member 'xxxxxxxx' was not present on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Add the missing member to the ASM/OAM parameter library and rerun the job. Refer to chapter 3 for a description of parameter library setup.

OTM02021 ERROR xxxx LOCATING MEMBER IN NEAROAM PARAMETER LIBRARY

Explanation: Error code 'xxxx' has been received attempting to locate a member on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Refer to IBM documentation of the LOCATE macro for a description of the error code. Take the appropriate corrective action and rerun the job.

OTM02022 ERROR(S) PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Errors were detected during validation of parameters from the ASM/OAM parameter library. Processing was terminated abnormally.

Action: Consult the parameter validation report written by the utility to the SYSPRINT file for a description of the individual parameter errors. Correct the invalid parameter(s) and restart the job.

OTM02023 STORAGE GROUP SPECIFIED IN EXEC PARAMETERS DOES NOT EXIST IN NEAROAM 'STRGROUP' PARAMETER LIBRARY MEMBER

Explanation: The storage group name specified as the first positional EXEC parameter has not been defined in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Verify that the correct storage group name has been specified in the EXEC parameters. If it has, ensure that an entry for this storage group is present in the STRGROUP member of the ASM/OAM parameter library. Make the appropriate correction and rerun the job.

OTM02024 ERROR LOADING CAF INTERFACE MODULE

Explanation: An error has occurred dynamically loading the DB2 Call Attach Facility (CAF) interface module. Processing of the utility is terminated.

Action: Consult other available system messages for additional information on the load error. Take the appropriate corrective action and rerun the job.

OTM02028 MANDATORY xxxxxxxx PARAMETER MISSING

Explanation: The mandatory parameter identified in the message was not found in the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Add the missing parameter to the parameter library then rerun the job.

OTM02032 CAF CONNECT/DISCONNECT ERROR xxxxxxxx

Explanation: An error has been encountered connecting or disconnecting to DB2 using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM02039 SQL ERROR -nnn ACCESSING OAM DIRECTORY TABLE

Explanation: SQL error -nnn was received accessing the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM02042 SQL ERROR -nnn ACCESSING STORAGE CLASS IDENTIFIER TABLE

Explanation: SQL error -nnn was received accessing the OAM administration database storage class identifier table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM02044 OBJECT xxxx IN COLLECTION ID nnnnnnn NOT FOUND DURING UPDATE OF OAM DIRECTORY

Explanation: An entry for an object which has been selected for regression processing was not found in the OAM directory during object update processing. Processing of the utility is terminated.

Action: This message is likely to indicate an internal ASM/OAM processing error. Report the error to your ASM/OAM product support representative.

OTM02045 SQL ERROR -nnn UPDATING OAM DIRECTORY ENTRY FOR OBJECT xxxx; COLLECTION ID = nnnnnnn

Explanation: SQL error -nnn was received updating the OAM object directory table entry for the identified object. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM02051 UNABLE TO OPEN SYSPRINT DATASET

Explanation: The utility was unable to successfully open the SYSPRINT dataset, as assigned in the JCL. Processing of the utility is terminated.

Action: Ensure that a SYSPRINT DD card is present in the JCL. If it is, consult other available system messages for additional information concerning the error. Take the appropriate corrective action and restart the job.

8.3 CICS intercept messages.

Messages from CICS intercept processing will be displayed on the system console.

OTM05500 NEAROAM CICS INTERCEPT ESTABLISHED

Explanation: ASM/OAM CICS initialization processing has successfully established the OSREQ intercept.

Action: None.

OTM05501 OTIMP310 NOT IN LINK PACK AREA

Explanation: ASM/OAM module OTIMP310 was not found in either the fixed link pack area (FLPA) or modified link pack area (MLPA) during CICS initialization processing

Action: Ensure that OTIMP310 is available in the FLPA or MLPA. Refer to section 2.2.3 or 2.3.3 for details on implementing this requirement.

OTM05503 BAD INTERCEPT ALREADY IN PLACE AFTER PREVIOUS ABEND

Explanation: During CICS initialization processing, ASM/OAM has detected an invalid intercept in existence from a previous ASM/OAM CICS initialization request.

Action: Verify that no unauthorized FLPA or MLPA updates to the ASM/OAM module OTIMP310, or the OSR interface module CBRINIT0 have been executed since the previous initialization of the ASM/OAM CICS interface.

If this is the case, a re-IPL will be required to reset the FLPA or MLPA.

If this is not the case, contact your ASM/OAM product support representative.

OTM05504 OAM INTERCEPT ALREADY ESTABLISHED - INFORMATION UPDATED

Explanation: An existing intercept was already in place during CICS initialization processing. The information in this intercept has been updated, and CICS initialization will continue as normal.

Action: None.

OTM05506 INVALID REQUEST CODE RECEIVED BY OTIMP055

Explanation: The CICS intercept module OTIMP055 has received an invalid request from another ASM/OAM component.

Action: This is an internal error condition, and should be communicated to your ASM/OAM product support representative.

OTM05507 INSUFFICIENT STORAGE AVAILABLE FOR WORKAREAS

Explanation: A request for main storage above the 16Mb line has been denied by the operating system.

Action: Increase the size of the CICS region in which ASM/OAM initialization is being performed, or increase the value of the OSCOR parameter in that region.

OTM05508 ERROR xx PERFORMING PAGEFIX

Explanation: An error has occurred during page fix processing while establishing the CICS intercept. 'xx' gives the decimal error code returned in register 15 from the PGSER macro.

Action: Consult IBM documentation on the PGSER macro for an explanation of the error code. If there is no apparent cause for the error, consult your ASM/OAM product support representative.

OTM05509 NULL OMCT ENTRY IN OTIMP310 WORKAREA

Explanation: Although the ASM/OAM control region is active, an internal workarea has not been initialized correctly.

Action: This is an internal error. Contact your ASM/OAM product support representative.

OTM05510 ERROR RECEIVED POSTING SCHEDULER ECB

Explanation: An error has occurred when the CICS intercept module attempted to communicate with the scheduler in the ASM/OAM control region.

Action: Examine other system messages for extra information on the error condition. Contact your ASM/OAM product support representative if the cause of the error is not apparent.

OTM05511 ABEND INTERCEPTED DURING NEAROAM PROCESSING

Explanation: The ASM/OAM intercept module has trapped a system abend condition during initialization or normal OSREQ intercept processing. Processing will be terminated.

Action: Examine other system messages for extra information on the system abend condition.

In particular, if an S047 abend has been detected, ensure that the CICS intercept module OTIMP055 has been moved from the ASM/OAM distribution load library, and is only available from the PLPA (see paragraph (f) of section 2.2.3 for a discussion of this issue).

For any other abend code, contact your ASM/OAM product support representative.

8.4 Visual Info object clustering utility messages.

Messages from the Visual Info object clustering utility will be written to the SYSPRINT dataset.

OTM08000 NEAROAM-VISUALINFO EXTENSION PROCESS TERMINATED WITH CONDITION CODE xx

Explanation: This message is issued at termination of utility processing. 'xx' identifies the highest condition code encountered during utility execution.

Action: No action.

OTM08001 ERROR OPENING xxxxxxxx DATASET

Explanation: An error occurred attempting to open the sequential file 'xxxxxxxx'. Processing has been terminated abnormally.

Action: Examine other system messages to discover the reason for the error. Take the appropriate corrective action and restart the job.

OTM08002 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A virtual storage request has been rejected by the operating system. Processing has been terminated abnormally.

Action: Allocate more virtual storage to the job via the SIZE parameter on the JOB or EXEC JCL entries. Restart the job.

OTM08003 NO UNTAGGED OBJECTS IN OAM DIRECTORY FOR STORAGE GROUP = xxxxxxxx

Explanation: Execution of the utility has completed normally, but no untagged objects were found in the OAM directory for the storage group being processed.

Action: None. This is an informational message.

OTM08004 UNIDENTIFIED EXEC PARAMETER

Explanation: An invalid keyword has been encountered during EXEC parameter validation. Processing of the utility is terminated.

Action: Correct the invalid EXEC parameter and restart the job.

OTM08006 INVALID VALUE FOR 'PRINT' PARAMETER

Explanation: The operand of the 'PRINT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Correct the invalid operand and restart the job.

OTM08010 NO EXEC PARAMETER(S) SPECIFIED

Explanation: The mandatory storage-name parameter was missing or invalid in the JCL EXEC parameters. Processing has been terminated.

Action: Enter a valid JCL EXEC parameter and restart the job.

OTM08011 DUPLICATE EXEC PARAMETER SPECIFIED

Explanation: An EXEC keyword parameter has been specified more than once. Processing of the utility has been terminated.

Action: Remove the duplicate keyword from the EXEC parameters and restart the job.

OTM08012 INVALID SPECIFICATION OF STORAGE GROUP NAME POSITIONAL EXEC PARAMETER

Explanation: The storage group name positional EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Correct the invalid parameter and restart the job.

OTM08013 INVALID SPECIFICATION OF 'COMMITFREQ' EXEC PARAMETER

Explanation: The operand of the 'COMMITFREQ' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Correct the invalid operand and restart the job.

OTM08014 INVALID SPECIFICATION OF 'VISUBSYS' EXEC PARAMETER

Explanation: The operand of the 'VISUBSYS' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Correct the invalid operand and restart the job.

OTM08015 INVALID SPECIFICATION OF 'INDEX' EXEC PARAMETER

Explanation: The operand of the 'INDEX' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Correct the invalid operand and restart the job.

OTM08016 MANDATORY 'INDEX' KEYWORD NOT SPECIFIED IN EXEC PARAMETERS

Explanation: An 'INDEX' keyword EXEC parameter was not present for execution of the utility. Processing is terminated.

Action: The 'INDEX' keyword parameter is mandatory for each execution of the utility. Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering utility. Specify the 'INDEX' parameter as required and restart the job.

OTM08018 SQL ERROR -nnn RECEIVED DURING COMMIT PROCESSING

Explanation: The SQL error -nnn was received issuing an SQL COMMIT request to commit updates to the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM08019 CAF OPEN/CLOSE ERROR xxxxxxxx

Explanation: An error has been encountered opening or closing a DB2 plan using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM08020 MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: The member 'xxxxxxxx' was not present on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Add the missing member to the ASM/OAM parameter library and rerun the job. Refer to chapter 3 for a description of parameter library setup.

OTM08021 ERROR xxxx LOCATING MEMBER IN NEAROAM PARAMETER LIBRARY

Explanation: Error code 'xxxx' has been received attempting to locate a member on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Refer to IBM documentation of the LOCATE macro for a description of the error code. Take the appropriate corrective action and rerun the job.

OTM08022 ERROR(S) PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Errors were detected during validation of parameters from the ASM/OAM parameter library. Processing was terminated abnormally.

Action: Consult the parameter validation report written by the utility to the SYSPRINT file for a description of the individual parameter errors. Correct the invalid parameter(s) and restart the job.

OTM08023 STORAGE GROUP SPECIFIED IN EXEC PARAMETERS DOES NOT EXIST IN NEAROAM 'STRGROUP' PARAMETER LIBRARY MEMBER

Explanation: The storage group name specified as the first positional EXEC parameter has not been defined in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Verify that the correct storage group name has been specified in the EXEC parameters. If it has, ensure that an entry for this storage group is present in the STRGROUP member of the ASM/OAM parameter library. Make the appropriate correction and rerun the job.

OTM08024 ERROR LOADING CAF INTERFACE MODULE

Explanation: An error has occurred dynamically loading the DB2 Call Attach Facility (CAF) interface module. Processing of the utility is terminated.

Action: Consult other available system messages for additional information on the load error. Take the appropriate corrective action and rerun the job.

OTM08028 MANDATORY xxxxxxxx PARAMETER MISSING

Explanation: The mandatory parameter identified in the message was not found in the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Add the missing parameter to the parameter library then rerun the job.

OTM08032 CAF CONNECT/DISCONNECT ERROR xxxxxxxx

Explanation: An error has been encountered connecting or disconnecting to DB2 using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM08038 SQL ERROR -nnn INSERTING|UPDATING CONTROL ROW IN OTIMFOLD TABLE

Explanation: SQL error -nnn was received updating control information in the OTIMP080 DB2 table 'OTIMFOLD'. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job. If no apparent cause for the failure can be determined, contact your Storage Technology product support representative.

OTM08039 SQL ERROR -nnn ACCESSING OAM DIRECTORY TABLE

Explanation: SQL error -nnn was received accessing the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM08040 NO ENTRY IN SBTLINKS TABLE FOR CHILD ITEM ID 'nnnn….nnnn'

Explanation: An untagged object containing Visual Info item number 'nnnn….nnnn' has been selected for processing from the OAM storage group directory table, but the item does not have an entry in the Visual Info SBTLINKS DB2 table. A parent for this item cannot be identified. Processing of the utility continue normally, but a warning condition 4 is generated.

Action: Verify the status of the identified item, and take appropriate corrective action if any error condition is indicated. The OAM object containing this item remains untagged, so will be selected for processing during the next execution of the utility.

OTM08041 SQL ERROR -nnn ACCESSING DB2 TABLE xxxxxxxx

Explanation: SQL error -nnn was received accessing the identified Visual Info DB2 table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM08042 NO ENTRY IN SBTITEMS TABLE FOR PARENT ITEM ID 'nnnn….nnnn'

Explanation: The parent Visual Info item number 'nnnn….nnnn' has been identified for an untagged child time, but the parent item does not have an entry in the Visual Info SBTITEMS DB2 table. Processing of the utility continue normally, but a warning condition 4 is generated.

Action: Verify the status of the identified item, and take appropriate corrective action if any error condition is indicated. The OAM object containing the child item remains untagged, so will be selected for processing during the next execution of the utility.

OTM08043 NO MATCHING INDEX CLASS CODE FOR ITEM ID 'nnnn….nnnn'

Explanation: An untagged OAM object containing Visual Info item number 'nnnn….nnnn' has been selected for processing by the utility, but the index class code of any parent items does not match any of those supplied in the EXEC parameter used for utility execution . Processing of the utility continue normally, but a warning condition 4 is generated.

Action: Verify the status of the identified item, and take appropriate corrective action if any error condition is indicated. The OAM object containing the child item remains untagged, so will be selected for processing during the next execution of the utility.

OTM08044 OBJECT xxxx IN COLLECTION ID nnnnnnn NOT FOUND DURING UPDATE OF OAM DIRECTORY

Explanation: An entry for an object which has been selected for processing by the utility was not found in the OAM directory during object update processing. Processing of the utility is terminated.

Action: This message is likely to indicate an internal ASM/OAM processing error. Report the error to your ASM/OAM product support representative.

OTM08045 SQL ERROR -nnn UPDATING OAM DIRECTORY ENTRY FOR OBJECT xxxx; COLLECTION ID = nnnnnnn

Explanation: SQL error -nnn was received updating the OAM object directory table entry for the identified object. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM08046 INVALID SPECIFICATION OF 'MAXREC' EXEC PARAMETER

Explanation: The operand of the 'MAXREC' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.3.2 for a description of EXEC parameters for the Visual Info object clustering conversion utility. Correct the invalid operand and restart the job.

OTM08051 UNABLE TO OPEN SYSPRINT DATASET

Explanation: The utility was unable to successfully open the SYSPRINT datasets, as assigned in the JCL. Processing of the utility is terminated.

Action: Ensure that a SYSPRINT DD card is present in the JCL. If it is, consult other available system messages for additional information concerning the error. Take the appropriate corrective action and restart the job.

8.5 Object selection utility messages.

Messages from the object selection utility will be written to the SYSPRINT dataset.

OTM10001 - STORAGE GROUP NAME NOT FOUND IN EXEC PARAMETER

Explanation: The name of the storage group to be processed in an execution of the object selection utility was not present as the first positional parameter in the JCL EXEC parameters. Processing of the utility was terminated.

Action: Correct the EXEC parameters in the JCL used to execute the object selection utility, by entering a valid storage group name as the first positional parameter.

OTM10002 - OPEN FAILED FOR FILE xxxxxxxx

Explanation: An error occurred attempting to open sequential file 'xxxxxxxx'. Processing of the utility was terminated.

Action: Consult other system messages for extra information on the cause of the open error. Correct the error and restart the job.

OTM10003 - MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: Member 'xxxxxxxx' was not found in the ASM/OAM parameter library during parameter validation processing. The utility has been terminated abnormally.

Action: Add the missing member to the ASM/OAM parameter library and restart the job.

OTM10004 - DB2 SUBSYSTEM NAME NOT FOUND IN ENVCNTL MEMBER

Explanation: The mandatory SUBSYSTEM parameter was not found in the ENVCNTL member of the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Edit the ENVCNTL member to enter a valid SUBSYSTEM parameter then restart the job.

OTM10005 - OPEN FAILED FOR NEAROAM DATABASE, RETURN CODE = xx, REASON CODES = X'yyyyzzzz'

Explanation: An error occurred attempting to open the ASM for S/390 database for output during object migration processing. The utility has been terminated abnormally.

Action: Consult the batch archival section of the ASM for S/390 User Manual for a description of the return and reason codes displayed in the message.

Take the appropriate corrective action and restart the job.

OTM10006 - DB2 ERROR, TABLE NAME = xxxx SQLCODE = -yyy

Explanation: An SQL error has been detected while accessing the identified DB2 table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the associated SQL error code.

Take the appropriate corrective action and restart the job.

OTM10007 - WRITE FAILED FOR NEAROAM TAPE DATABASE, RETURN CODE = xx, REASON CODES = X'yyyyzzzz'

Explanation: An error has occurred attempting to write an object to the ASM for S/390 database. Processing of the utility has been abandoned.

Action: Consult the batch archival section of the ASM for S/390 User Manual for a description of the return and reason codes displayed in the message.

Take the appropriate corrective action and restart the job.

OTM10008 - NORMAL RUN REQUESTED BUT RESTART REQUIRED

Explanation: A 'RESTART=NO' parameter was specified in the JCL EXEC parameters for this step, or was used by default, but the previous execution of the utility did not complete successfully.

Action: Enter the 'RESTART=YES' parameter on the EXEC card in the JCL and resubmit the job.

OTM10009 - RESTART REQUESTED BUT NORMAL RUN REQUIRED

Explanation: A 'RESTART=YES' parameter was specified in the JCL EXEC parameters for this step, but the previous execution of the utility completed successfully.

Action: Change the EXEC parameter to 'RESTART=NO' or allow this value to default, and resubmit the job.

OTM10010 - ALLOCATE FAILED FOR DATASET xxxx ERROR = X'yyyyzzzz'

Explanation: An attempt to dynamically allocate file 'xxxx' failed with reason code 'yyyy' and information code 'zzzz'. Processing of the utility has been abandoned.

Action: Consult IBM documentation on SVC99 processing for a description of the reason and information codes displayed.

Take the appropriate corrective action and restart the job.

OTM10011 - CLOSE FAILED FOR NEAROAM DATABASE, RETURN CODE = xx, REASON CODES = X'yyyyzzzz'

Explanation: An error occurred attempting to close the ASM for S/390 database during object migration processing. The utility has been terminated abnormally.

Action: Consult the batch archival section of the ASM for S/390 User Manual for a description of the return and reason codes displayed in the message.

Take the appropriate corrective action and restart the job.

OTM10012 - CONNECT TO DB2 SUBSYSTEM dddd FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to connect the job to the DB2 subsystem 'dddd' using the Call Attach Facility has failed. Processing of the utility has been terminated.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes.

Take the appropriate corrective action and restart the job.

OTM10013 - OPEN OF DB2 PLAN NAME aaaaaaaa FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to open plan 'aaaaaaaa' using the DB2 Call Attach Facility has failed. Processing of the utility has been abandoned.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes.

Take the appropriate corrective action and restart the job.

OTM10014 - CLOSE OF DB2 PLAN NAME aaaaaaaa FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: A failure occurred closing plan 'aaaaaaaa' using the DB2 Call Attach Facility. Processing of the utility has been abandoned.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes.

Take the appropriate corrective action and restart the job.

OTM10015 - DISCONNECT FROM DB2 SUBSYSTEM dddd FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to disconnect the job from DB2 subsystem 'dddd' using the Call Attach Facility has failed. Processing of the utility has been terminated.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes.

Take the appropriate corrective action and restart the job.

OTM10016 - I/O FAILED, FILE = aaaaaaaa KEY = bbbb RETURN/REASON CODES = xxxxyyyy'

Explanation: An I/O operation to the identified record on VSAM file 'aaaaaaaa' has failed. 'xxxx' gives the hexadecimal return and reason code bytes from the RPL feedback area. Execution of the utility has been terminated.

Action: Consult IBM VSAM macro documentation for a description of the displayed return and reason codes.

Take appropriate corrective action and restart the job.

OTM10017 - OPEN FAILED FOR FILE xxxxxxxx, REASON CODE = X'yyyyyyyy'

Explanation: An error has been detected attempting to open VSAM file 'xxxxxxxx'. Execution of the utility has been abandoned.

Action: Consult IBM VSAM macro documentation for a description of the displayed hexadecimal reason code.

Take appropriate corrective action and restart the job.

OTM10018 - NO STORAGE GROUP IN STRGROUP MEMBER TO MATCH EXEC PARAMETER

Explanation: The storage group name specified in the JCL EXEC parameter does not have a corresponding entry in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility has been terminated.

Action: Ensure that there are corresponding entries for the storage group to be processed in this execution of the utility in the JCL EXEC parameter, and the ASM/OAM STRGROUP member. Restart the job.

OTM10019 - NEAROAM OBJECT SELECTION UTILITY COMPLETED SUCCESSFULLY

Explanation: The object selection utility has completed its processing successfully.

Action: No action is required. The object management procedure may continue with execution of the tape backup utility.

OTM10020 - INVALID EXEC PARAMETER, PLEASE REFER TO THE NEAROAM USER MANUAL FOR VALID SPECIFICATIONS

Explanation: An invalid keyword has been found on the JCL EXEC parameter for execution of the utility. Processing of the utility has been abandoned.

Action: Check the JCL EXEC parameters to identify the invalid keyword. Correct the parameters and restart the job.

OTM10021 - STORAGE GROUP NAME IN EXEC PARAMETER IS TOO LONG

Explanation: The first positional parameter in the JCL EXEC parameter exceeds 30 characters in length. Processing of the utility has been abandoned.

Action: Update the JCL EXEC parameter with a valid storage group name and restart the job.

OTM10022 - LOAD FAILED FOR DSNALI

Explanation: Loading of the DB2 module DSNALI failed during Call Attach Facility processing. Execution of the utility has been terminated abnormally.

Action: Ensure that the DB2 runtime library is available to the object management procedure via the system linklist or STEPLIB/JOBLIB concatenation, then restart the job.

OTM10023 - LOAD FAILED FOR DSNHLI2

Explanation: Loading of the DB2 module DSNHLI2 failed during Call Attach Facility processing. Execution of the utility has been terminated abnormally.

Action: Ensure that the DB2 runtime library is available to the object management procedure via the system linklist or STEPLIB/JOBLIB concatenation, then restart the job.

OTM10024 - PARAMETER PROCESSING FAILED

Explanation: The utility has detected one or more errors on the ASM/OAM parameter library during parameter validation processing. Execution of the utility has been terminated abnormally.

Action: Consult the parameter validation report in the SYSPRINT dataset for details of the parameter validation errors. Correct the invalid parameters, and restart the job.

OTM10025 - INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A request for virtual storage has been rejected by the operating system. Processing of the utility has been terminated.

Action: Allocate more virtual storage to the object management job, via the SIZE parameter of the JOB or EXEC card then restart the job.

OTM10026 - NEAROAM OBJECT SELECTION PARAMETERS FOR THIS RUN ARE AS FOLLOWS -

Explanation: This is an informational message which precedes a summary report of the migration and expiration parameters active for this execution of the utility.

Action: No action.

OTM10028 - INTERNAL ERROR, STORAGE NOT FREED

Explanation: An attempt to free virtual storage has been rejected by the operating system. This message is for informational purposes, and the utility will continue processing normally; a return code of 4 will be set on completion of utility processing.

Action: No action. If this message appears consistently during successive executions of the utility, inform your ASM/OAM product support representative.

OTM10029 - COLLECTION NAME ID xxxx DOES NOT EXIST IN THE COLLECTION NAME TABLE

Explanation: An object with collection name identifier 'xxxx' has been encountered in the OAM directory for the storage group being processed, but the identifier does not exist in the OAM collection name identifier table. Processing of the utility has been terminated.

Action: This error indicates an inconsistency of information held within the OAM tables for the storage group being processed. Inform the person responsible for OAM implementation and maintenance at your installation of this error. After correcting the condition which caused the error, restart the job.

OTM10030 - NEAROAM OBJECT SELECTION UTILITY ENDED WITH COMPLETION CODE xxx

Explanation: This is an informational message which is displayed at the end of utility processing. The utility has ended with completion code 'xxx'.

Action: No action

OTM10031 - OBJECT MANAGEMENT UTILITY HAS BEEN RUN SUCCESSFULLY; RERUN OF OTIMP100 REJECTED

Explanation: Execution of the object selection utility has been attempted, but the utility has already been executed successfully as part of a currently incomplete object management procedure for this storage group.

Action: Restart of the object selection utility is not permitted after successful execution. The object selection utility will not be allowed to execute (normal or restart run) until the database update utility OTIMP120 has been run successfully. Ensure that utilities are submitted in the correct sequence.

OTM10032 - DATA FOR OBJECT xxxx NOT FOUND ON TABLE yyyy

Explanation: A disk-resident OAM object has been selected from the OAM directory for migration to ASM for S/390, but rows for the object did not exist in the corresponding OAM object storage table. The object is ignored and processing of the utility will continue with the next object. A condition code of 8 will be generated on completion of utility execution.

Action: This error indicates an inconsistency of information held within the OAM tables for the storage group being processed. Inform the person responsible for OAM implementation and maintenance at your installation of this error.

OTM10033 - NO VALID SVCNO PARAMETER FOUND IN ENVCNTL PARAMETER

Explanation: The mandatory SVCNO parameter was not found in the ENVCNTL member of the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Edit the ENVCNTL member to enter a valid SVCNO parameter then restart the job.

OTM10034 - **WARNING - NEAROAM AUTHORIZATION EXPIRES IN xxx DAYS**

Explanation: This is a warning message, indicating that ASM/OAM product authorization is about to expire. Utility processing continues normally.

Action: Contact your ASM/OAM product support representative for an update of the product authorization codes for your installation.

OTM10035 - NEAROAM NOT AUTHORIZED FOR EXECUTION ON THIS PROCESSOR

Explanation: No valid authorization code was found in the ASM/OAM authorization table OTIMP050 for the CPU identifier on which the job is being run. Processing is abandoned.

Action: Ensure that the supplied ASM/OAM authorization code(s) have been applied correctly, using the procedure described in the ASM/OAM User Manual. If this procedure has been executed correctly, report the problem to your ASM/OAM product support representative.

OTM10036 - NEAROAM AUTHORIZATION HAS EXPIRED

Explanation: ASM/OAM product authorization has expired. Processing of the utility has terminated abnormally.

Action: Contact your ASM/OAM product support representative for an update of the product authorization code(s) for your installation. ASM/OAM will not be available for migration or retrieval of tape objects until the authorization codes(s) have been updated.

OTM10037 - ERROR xx REASON CODE yyyyyyyy RECEIVED DURING AUTHORIZATION CHECKING

Explanation: ASM/OAM has detected the displayed error and reason codes during product authorization code checking. Processing of the utility has been abandoned.

Action: This is an internal ASM/OAM error. Report the problem to your ASM/OAM product support representative.

OTM10038 - MANAGEMENT CLASS xxxx FOR OBJECT yyyy NOT IN OBJCNTL

Explanation: The identified object is being processed from the OAM directory, but its management class ('xxxx') has not been defined in the ASM/OAM 'OBJCNTL' parameter library member.

Action: Add an entry for the identified management class to the ASM/OAM 'OBJCNTL' parameter library member, and rerun the job.

OTM10039 - IDCAMS PROCESSING FAILED, CHECK OTIMIDCO DATASET

Explanation: The automatic DELETE/DEFINE of the ASM/OAM deletion control dataset during restart processing has failed. Processing has been terminated.

Action: Check the Access Method Services print report in the OTIMIDCO file for information on the failure. Take the appropriate corrective action and restart the job.

OTM10040 - INTERNAL ERROR, LOCATION - xxxxxxxx

Explanation: An internal error has occurred during execution of the object selection utility. Processing has been terminated abnormally.

Action: Report the problem to your ASM/OAM product support representative.

OTM10041 - EXECUTION TERMINATED EARLY BECAUSE TIME LIMIT HAS BEEN EXCEEDED

Explanation: Execution of the utility has been terminated because the elapsed run time (in minutes) exceeds the value specified in the 'TIME' execution parameter.

Action: None. Execution of the object management procedure may continue normally from the next job step. All objects successfully processed prior to termination of the utility will have been selected for object management processing.

OTM10042 - EXECUTION TERMINATED EARLY VIA OPERATOR REQUEST

Explanation: Execution of the utility has been terminated after receipt of an operator 'STOP' command.

Action: None. Execution of the object management procedure may continue normally from the next job step. All objects successfully processed prior to termination of the utility will have been selected for object management processing.

OTM10043 - DE-ALLOCATE FAILED FOR FILE aaaaaaaa RETURN CODE = xx ERROR = yyyy INFO = zzzz

Explanation: Dynamic de-allocation of the identified file has failed. 'xx', 'yyyy' and 'zzzz' are the return, error and information codes from the de-allocation request. Processing has been terminated abnormally.

Action: Refer to IBM documentation on SVC99 for a description of the codes. Take the appropriate corrective action and restart the job.

OTM10044 ERROR X'nn' RECEIVED ATTACHING/DETACHING SUBTASK OTIMP105

Explanation: An error has been received attaching or detaching an MVS subtask for issuing OAM OSREQ retrieval requests. 'nn' gives the hexadecimal return code from the MVS ATTACH macro. Processing has been terminated abnormally.

Action: Refer to IBM documentation on ATTACH macro processing for a description of the code. Take the appropriate corrective action and restart the job.

OTM10045 - RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED DURING SUBTASK PROCESSING

Explanation: An error has been occurred during OSREQ retrieval subtask processing. 'xx' gives the return code and 'yyyyyyyy' the supplementary error codes from the subtask. Processing has been terminated abnormally.

Action: This message indicates an internal error has occurred during subtask processing. Report the error to your Storage Technology product support representative.

OTM10046 - INVALID LOCATION FLAG 'x' FOR OBJECT yyyy….yyyy

Explanation: Field ODLSLOC in the OAM directory table entry for object 'yyyy….yyyy' contains a value of 'x'. This is not a valid entry. An error condition code 8 is generated, but processing continues.

Action: Check the directory entry for the identified object, and make any appropriate corrections. The object has not been selected for processing during the current execution of the utility, but will be eligible for selection during the next execution.

OTM10047 - OSREQ ACCESS ERROR: RETURN CODE = xx, REASON CODE = X'yyyyyyyy'

Explanation: An error has occurred establishing a connection to OAM. 'xx' gives the return code and 'yyyyyyyy' the reason code issued by the OSREQ ACCESS call. Processing has been terminated abnormally.

Action: Consult IBM documentation on OSREQ macro processing for a description of the error. Make the appropriate corrections and rerun the job.

OTM10048 - OSREQ RETRIEVE ERROR: RETURN CODE = xx, REASON CODE = X'yyyyyyyy' FOR OBJECT zzzz….zzzz

Explanation: An error has occurred retrieving an optical or tape-resident OAM object for migration to ASM for S/390. 'xx' gives the return code and 'yyyyyyyy' the reason code issued by the OSREQ RETRIEVE call. 'zzzz….zzzz' identifies the object for which the error occurred. Processing has been terminated abnormally.

Action: Consult IBM documentation on OSREQ macro processing for a description of the error. Make the appropriate corrections and rerun the job.

OTM10049 – BLDVRP|DLVRP ERROR: RETURN CODE = X'nn'

Explanation: An error has occurred building or deleting the VSAM LSR pool buffers. 'xx' gives the hexadecimal error code.

Action: Refer to IBM VSAM macro documentation for a description of the error. Take the appropriate corrective action and rerun the job.

OTM10050 - OBJECT SELECTION PROCESSING TERMINATING IN RESPONSE TO OPERATOR REQUEST

Explanation: An operator 'STOP' command has been entered to terminate object selection utility processing.

Action: None. This is an informational message.

8.6 Database backup control utility messages.

Messages from the database backup control utility will be written to the SYSPRINT dataset.

OTM11000 - NEAROAM BACKUP UTILITY SUCCESSFULLY COMPLETED

Explanation: The ASM/OAM database backup utility has completed processing successfully.

Action: No action.

OTM11001 - PROCESSING COMPLETED - RETURN CODE = xxx

Explanation: The ASM/OAM database backup control utility has completed processing with completion code 'xxx'.

Action: For non-zero return code value, examine other messages for an explanation of the reason for the non-zero value.

OTM11002 - UNABLE TO OPEN xxxxxxxx DATASET

Explanation: An error occurred attempting to open the sequential file 'xxxxxxxx'. Processing has been terminated abnormally.

Action: Examine other system messages to discover the reason for the error. Take the appropriate corrective action and restart the job.

OTM11003 - ERROR X'xxxx' OPENING OTIMV110 DATASET

Explanation: An error occurred opening the ASM/OAM deletion control file for the storage group being processed. 'xxxx' is the hexadecimal code returned by the VSAM OPEN macro. Processing is abandoned.

Action: Consult IBM VSAM macro documentation for a description of the error code. Take the appropriate corrective action and restart the job.

OTM11004 - ERROR X'xxyy' READING OTIMV110 CONTROL RECORD

Explanation: An error occurred reading the control record from the ASM/OAM deletion control file for the storage group being processed. 'xx' and 'yy' are the VSAM return and reason codes. Processing of the utility has been terminated abnormally.

Action: Consult IBM VSAM macro documentation for a description of the return and reason codes. Take the appropriate corrective action and restart the job.

OTM11005 - OTIMV110 STATUS INDICATES BACKUP PROCESSING OUT OF SEQUENCE

Explanation: ASM/OAM has detected that the database backup control utility is not being run immediately after successful execution of the object selection utility. Processing is abandoned.

Action: Ensure that utilities in the object management procedure are executed in the correct sequence. If the preceding object selection utility has not run successfully, restart the procedure after taking the appropriate corrective action.

OTM11010 - ERROR X'xxyy' REWRITING OTIMV110 CONTROL RECORD

Explanation: An error has occurred updating the control record on the ASM/OAM deletion control file for the storage group being processed. 'xx' and 'yy' are the return and reason codes from the VSAM update request.

Action: Refer to IBM VSAM macro documentation for a description of the error and reason codes. Take the appropriate corrective action and restart the job.

OTM11015 - INSUFFICIENT STORAGE FOR DATA BUFFERS

Explanation: A virtual storage request has been rejected by the operating system. Processing has been terminated abnormally.

Action: Allocate more virtual storage to the job via the SIZE parameter on the JOB or EXEC JCL entries. Restart the job.

OTM11016 - ERROR X'xxxxyyyy' DURING DYNAMIC DELETE OF OTASBKUP DATASET

Explanation: An attempt to delete the OTASBKUP dataset which was created by the object selection utility has failed. 'xxxx' and 'yyyy' give the hexadecimal error and information codes returned from the delete request. Processing of the utility continues. A condition code of 4 will be generated.

Action: Refer to IBM SVC99 documentation for a description of the error and information codes. Take any corrective action necessary to ensure that the error does not re-occur.

The OTASBKUP dataset will be automatically re-used by the object selection utility when next executed.

OTM11017 - MISSING/INVALID EXEC PARAMETERS

Explanation: The mandatory storage-name parameter was missing or invalid in the JCL EXEC parameters. Processing has been terminated.

Action: Enter a valid JCL EXEC parameter and restart the job.

OTM11018 - xxxxxxxx MEMBER NOT FOUND ON OTIMS100 PARAMETER LIBRARY

Explanation: The member 'xxxxxxxx' was not found on the ASM/OAM parameterlibrary. Processing has been abandoned.

Action: Edit the parameter library to create a valid 'xxxxxxxx' member. Restart the job.

OTM11019 - ERROR X'xxxx' LOCATING yyyyyyyy MEMBER ON PARAMETER LIBRARY

Explanation: Hexadecimal error code 'xxxx' was returned from the FIND request for the identified member on the ASM/OAM parameter library. Processing has been abandoned.

Action: Consult IBM documentation for the FIND macro for a description of the error code. Take the appropriate corrective action and restart the job.

OTM11020 - ERROR X'xxxxyyyy' ALLOCATING *zzzzzzzz* DATASET

Explanation: Dynamic allocation of file 'zzzzzzzz' has failed with hexadecimal error code 'xxxx' and information code 'yyyy'. Processing has been terminated abnormally.

Action: Refer to IBM documentation on SVC99 processing for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM11021 - STORAGE GROUP FROM EXEC PARMS NOT IN STRGROUP PARAMETERS

Explanation: The storage group identified in the JCL EXEC parameters for execution of the utility was not found in the STRGROUP member on the ASM/OAM parameter library. Processing has been abandoned.

Action: Ensure that the storage group specified in the EXEC parameters has a matching entry in the STRGROUP member on the ASM/OAM parameter library. Restart the job.

OTM11022 - PARAMETER ERRORS PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Errors were detected during validation of parameters from the ASM/OAM parameter library. Processing was terminated abnormally.

Action: Consult the parameter validation report written by the utility to the SYSPRINT file for a description of the individual parameter errors. Correct the invalid parameter(s) and restart the job.

OTM11023 - OTIMP100 HAS NOT YET RUN SUCCESSFULLY; PROCESSING TERMINATED

Explanation: ASM/OAM has detected that the database backup utility is being executed following an unsuccessful execution of the object selection utility. Processing is abandoned.

Action: Ensure that the object selection utility has run successfully before executing the tape backup utility.

OTM11024 - SUBSYSTEM NOT PRESENT IN ENVCNTL PARAMETERS

Explanation: The mandatory SUBSYSTEM parameter was not found in the ENVCNTL member of the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Edit the ENVCNTL member to enter a valid SUBSYSTEM parameter then restart the job.

8.7 Database update utility messages.

Messages from the database update utility are written to the SYSPRINT dataset.

OTM12001 - ALLOCATE FAILED FOR DATASET aaaa ERROR = X'xxxx' INFO =X'yyyy'

Explanation: A dynamic allocation for the identified dataset failed with hexadecimal error code 'xxxx' and information code 'yyyy'. Processing of the utility is terminated abnormally.

Action: Refer to IBM documentation on SVC99 processing for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM12002 - OPEN FAILED FOR FILE xxxxxxxx

Explanation: An OPEN request for sequential file 'xxxxxxxx' has failed. Utility processing is terminated abnormally.

Action: Consult other available system messages for more information on the reason for the open error. Take the appropriate corrective action and restart the job.

OTM12003 - CONTROL RECORD NOT FOUND FOR NEAROAM DELETION CONTROL DATASET

Explanation: The control record was not present on the ASM/OAM deletion control file at the start of utility processing. This indicates that the utility is not being run after a valid object selection process. Processing of the utility is terminated.

Action: Ensure that each step in the object management procedure is run in the correct sequence, and resubmit the job.

OTM12004 - MISSING OBJECT xxxx IN DB2 TABLE yyyy

Explanation: An entry for the selected object did not exist in the identified table during database maintenance processing for a migrated or expired object. Processing of the utility is terminated.

Action: This condition indicates an inconsistency between OAM directory and object storage entries for the identified object. Refer the problem to your DB2 administrator for resolution. Restart the job after taking the appropriate corrective action.

If no inconsistency can be found with DB2 entries, contact your ASM/OAM product support representative.

OTM12006 - MISSING OBJECT xxxx ON NEAROAM DATABASE DURING RESTART RUN

Explanation: An attempt has been made by the utility to delete an expired object from the ASM for S/390 database for the storage group being processed. The object was not found in the database. Processing continues normally.

Action: This is an informational message and can be ignored. This condition may occur when restarting the utility after a failure. All expired ASM for S/390-resident objects which were deleted after the last commit point in the failed run will not exist during rerun processing, but the utility will reprocess all objects from the last commit point onwards, giving rise to this condition.

A condition code of 4 will be set by the utility at end of processing.

OTM12007 - MISSING OBJECT xxxx ON NEAROAM DATABASE DURING NORMAL RUN

Explanation: An attempt has been made by the utility to delete an expired object from the ASM for S/390 database for the storage group being processed, but the object did not exist in the database. Processing is terminated abnormally.

Action: This condition indicates an inconsistency between the OAM directory entry for the object and the ASM for S/390 database for the storage group.

Check that the correct version of the OAM directory entry and ASM for S/390 database index are in use, and that no unauthorized update of either has occurred.

If no reason can be found for the inconsistency, contact your ASM/OAM product support representative.

OTM12008 - MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: Member 'xxxxxxxx' was not found in the ASM/OAM parameter library during parameter validation processing. The utility has been terminated abnormally.

Action: Add the missing member to the ASM/OAM parameter library and restart the job.

OTM12009 - CONNECT TO DB2 SUBSYSTEM FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to connect the job to the DB2 subsystem 'dddd' using the Call Attach Facility has failed. Processing of the utility has been terminated.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes. Take the appropriate corrective action and restart the job.

OTM12010 - OPEN OF DB2 PLAN NAME aaaaaaaa FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to open plan 'aaaaaaaa' using the DB2 Call Attach Facility has failed. Processing of the utility has been abandoned.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes. Take the appropriate corrective action and restart the job.

OTM12011 - CLOSE OF DB2 PLAN NAME aaaaaaaa FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: A failure occurred closing plan 'aaaaaaaa' using the DB2 Call Attach Facility. Processing of the utility has been abandoned.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes. Take the appropriate corrective action and restart the job.

OTM12012 - DISCONNECT FROM DB2 SUBSYSTEM dddd FAILED, RETURN CODE = xxx, REASON CODE = X'yyyyyyyy'

Explanation: An attempt to disconnect the job from DB2 subsystem 'dddd' using the Call Attach Facility has failed. Processing of the utility has been terminated.

Action: Consult IBM documentation on the DB2 Call Attach Facility for a description of the displayed return and reason codes. Take the appropriate corrective action and restart the job.

OTM12013 - INVALID EXEC PARAMETER, VALID VALUES ARE RESTART=YES/NO,PRINT=YES/NO OR DELETEWARN=YES/NO

Explanation: An invalid keyword has been found on the JCL EXEC parameter for execution of the utility. Processing of the utility has been abandoned.

Action: Check the JCL EXEC parameters to identify the invalid keyword.

Correct the parameters and restart the job.

OTM12014 - NEAROAM DATABASE UPDATE UTILITY PARAMETERS FOR THIS RUN ARE AS FOLLOWS -

Explanation: This is an informational message which precedes a summary report of the parameters active for this execution of the database update facility.

Action: No action.

OTM12015 - PARAMETER PROCESSING FAILED

Explanation: The utility has detected one or more errors on the ASM/OAM parameter library during parameter validation processing. Execution of the utility has been terminated abnormally.

Action: Consult the parameter validation report in the SYSPRINT dataset for details of the parameter validation errors. Correct the invalid parameters, and restart the job.

OTM12016 - INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A request for virtual storage has been rejected by the operating system. Processing of the utility has been terminated.

Action: Allocate more virtual storage to the object management job, via the SIZE parameter of the JOB or EXEC card then restart the job.

OTM12017 - OPEN FAILED FOR FILE xxxxxxxx, REASON CODE = X'yyyyyyyy'

Explanation: An error has been detected attempting to open VSAM file 'xxxxxxxx'. Execution of the utility has been abandoned.

Action: Consult IBM VSAM macro documentation for a description of the displayed hexadecimal reason code. Take appropriate corrective action and restart the job.

OTM12018 - NO STORAGE GROUP IN STRGROUP MEMBER TO MATCH EXEC PARAMETER

Explanation: The storage group name specified in the JCL EXEC parameter does not have a corresponding entry in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility has been terminated.

Action: Ensure that there are corresponding entries for the storage group to be processed in this execution of the utility in the JCL EXEC parameter, and the ASM/OAM STRGROUP member. Restart the job.

OTM12019 - NEAROAM DATABASE UPDATE UTILITY SUCCESSFULLY COMPLETED

Explanation: The database update utility has completed its processing successfully.

Action: No action is required. The object management procedure for the selected storage group has now been completed.

OTM12020 - STORAGE GROUP NAME NOT FOUND IN EXEC PARAMETER

Explanation: The name of the storage group to be processed in an execution of the database update utility was not present as the first positional parameter in the JCL EXEC parameters. Processing of the utility was terminated.

Action: Correct the EXEC parameters in the JCL used to execute the object selection utility, by entering a valid storage group name as the first positional parameter.

OTM12021 - STORAGE GROUP NAME IN EXEC PARAMETER IS TOO LONG

Explanation: The first positional parameter in the JCL EXEC parameter exceeds 30 characters in length. Processing of the utility has been abandoned.

Action: Update the JCL EXEC parameter with a valid storage group name and restart the job.

OTM12022 - LOAD FAILED FOR DSNALI

Explanation: Loading of the DB2 module DSNALI failed during Call Attach Facility processing. Execution of the utility has been terminated abnormally.

Action: Ensure that the DB2 runtime library is available to the object management procedure via the system linklist or STEPLIB/JOBLIB concatenation, then restart the job.

OTM12023 - LOAD FAILED FOR DSNHLI2

Explanation: Loading of the DB2 module DSNHLI2 failed during Call Attach Facility processing. Execution of the utility has been terminated abnormally.

Action: Ensure that the DB2 runtime library is available to the object management procedure via the system linklist or STEPLIB/JOBLIB concatenation, then restart the job.

OTM12024 - I/O FAILED, FILE = aaaaaaaa KEY = bbbb RETURN/REASON CODES = 'xxxxyyyy'

Explanation: An I/O operation to the identified record on VSAM file 'aaaaaaaa' has failed. 'xxxx' gives the heaxdecimal return and reason code bytes from the RPL feedback area. Execution of the utility has been terminated.

Action: Consult IBM VSAM macro documentation for a description of the displayed return and reason codes. Take appropriate corrective action and restart the job.

OTM12025 - DB2 ERROR, TABLE NAME = xxxx SQLCODE = -yyy

Explanation: An SQL error has been detected while accessing the identified DB2 table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the associated SQL error code. Take the appropriate corrective action and restart the job.

OTM12027 - I/O FAILED ON SEQUENTIAL GET, FILE = xxxxxxxx, RETURN/REASON CODES = X'yyyy'

Explanation: An attempt to read a record sequentially from the identified VSAM file has failed. 'yyyy' gives the return and reason codes from the RPL feedback area. Processing has been terminated abnormally.

Action: Refer to IBM VSAM macro documentation for a description of the error. Take the appropriate corrective action and restart the job.

If no apparent cause for the error can be identified, contact your ASM/OAM product support representative.

OTM12028 - SQL ERROR PROCESSING COMMIT

Explanation: An error has occurred during DB2 COMMIT processing. Execution of the utility has been terminated.

Action: Check DB2 messages for more information concerning the error. Take the appropriate corrective action and restart the job.

OTM12029 - NORMAL RUN REQUESTED BUT RESTART RUN REQUIRED

Explanation: A 'RESTART=NO' parameter was specified in the JCL EXEC parameters for this step, or was used by default, but the previous execution of the utility did not complete successfully.

Action: Enter the 'RESTART=YES' parameter on the EXEC card in the and resubmit the job.

OTM12030 - RESTART RUN REQUESTED BUT NORMAL RUN REQUIRED

Explanation: A 'RESTART=YES' parameter was specified in the JCL EXEC parameters for this step, but no previous unsuccessful execution of the utility has been recorded during the current object management procedure.

Action: Change the EXEC parameter to 'RESTART=NO' or allow this value to default, and resubmit the job.

OTM12031 - COLLECTION NAME ID xxxxxxxx DOES NOT EXIST IN COLLECTION NAME TABLE

Explanation: An object with collection name identifier 'xxxxxxxx' has been encountered in the OAM directory for the storage group being processed, but the identifier does not exist in the OAM collection name identifier table. Processing of the utility has been terminated.

Action: This error indicates an inconsistency of information held within the OAM tables for the storage group being processed. Inform the person responsible for OAM implementation and maintenance at your installation of this error. After correcting the condition which caused the error, restart the job.

OTM12032 - MIGRATE, EXPIRE, DELETE TOTALS DO NOT MATCH THOSE FROM PREVIOUS OTIMP100 RUN

Explanation: Object totals in the three selection categories that were processed by the database update utility do not exactly match the totals selected by the object selection utility during the same object management procedure. Processing is terminated.

Action: Check that the object management procedure has been run correctly, including all restart processing. In particular, check that the ASM/OAM deletion control file for the storage group being processed was not updated or amended in any way between execution of the object selection utility and the database update utility.

If none of the above conditions can be identified, contact your ASM/OAM product support representative.

In any case, the object management procedure should be completely rerun. Prior to rerunning the job, the OAM directory and object storage databases and the ASM/OAM deletion control dataset for the storage group being processed should be restored to their condition prior to the failed object management procedure.

OTM12033 - IDCAMS PROCESSING FAILED, CHECK OTIMIDCO DATASET

Explanation: The automatic DELETE/DEFINE of the ASM/OAM deletion control dataset for the storage group being processed has failed. Processing has been terminated.

Action: Check the Access Method Services print report in the OTIMIDCO file for information on the failure. Take the appropriate corrective action and restart the job.

OTM12034 - DE-ALLOCATE FAILED FOR FILE aaaaaaaa RETURN CODE = xx ERROR = yyyy INFO = zzzz

Explanation: Dynamic de-allocation of the identified file has failed. 'xx', 'yyyy' and 'zzzz' are the return, error and information codes from the de-allocation request. Processing has been terminated abnormally.

Action: Refer to IBM documentation on SVC99 for a description of the codes. Take the appropriate corrective action and restart the job.

OTM12035 - TAPE DATASET BACKUP HAS NOT COMPLETED SUCCESSFULLY

Explanation: An attempt has been made to execute the database update utility, but the database backup control utility (OTIMP110) has not yet been successfully run in this object management procedure. Processing is abandoned.

Action: Ensure that the database backup control utility has completed successfully before running the database update utility.

OTM12036 - NEAROAM OBJECT SELECTION UTILITY (OTIMP100) HAS NOT COMPLETED SUCCESSFULLY

Explanation: An attempt has been made to execute the database update utility, but the object selection utility has not yet been successfully run in this object management procedure. Processing is abandoned.

Action: Ensure that the object selection and tape database backup utilities have completed successfully before running the database update utility.

OTM12037 - NEAROAM DATABASE UPDATE UTILITY ENDED WITH COMPLETION CODE xxx

Explanation: This is an informational message which is displayed at the end of utility processing. The utility has ended with completion code 'xxx'.

Action: No action necessary.

OTM12038 - RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED OPENING NEARARCHIVE DATABASE FOR STORAGE GROUP aaaaaaaa

Explanation: An error has occurred when opening the ASM for S/390 database for the OAM storage group with DB2 name qualifier 'aaaaaaaa'. 'xx' contains the ASM for S/390 return code. The supp code fields contain additional information on the error. Processing of the utility has been terminated.

Action: Refer to the ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and restart the job.

OTM12039 - RET CODE xx SUPP CODES X'yyyyyyyy' RECEIVED DELETING NEARARCHIVE OBJECT bbbb

Explanation: An error has occurred when deleting the identified object from the ASM for S/390 database. 'xx' contains the ASM for S/390 return code, The supplementary codes contain additional information on the error. Processing of the utility has been terminated.

Action: Refer to ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and restart the job.

OTM12040 - INTERNAL ERROR, LOCATION - xxxxxxxx

Explanation: An internal error has occurred during execution of the database update utility. Processing has been terminated abnormally.

Action: Report the problem to your ASM/OAM product support representative.

OTM12041 - RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED ISSUING NEARARCHIVE COMMIT REQUEST

Explanation: An error has occurred while performing an ASM for S/390 'commit' request. 'xx' contains the ASM for S/390 return code. The supplementary codes contain additional information on the error. Processing of the utility has been terminated.

Action: Refer to ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and restart the job.

8.8 Object recovery utility messages.

Messages from the object recovery utility will be written to the SYSPRINT dataset.

OTM13000 NEAROAM OBJECT RECOVERY UTILITY TERMINATED WITH CONDITION CODE xx

Explanation: This message is issued at termination of utility processing. 'xx' identifies the highest condition code encountered during utility execution.

Action: No action.

OTM13001 ERROR OPENING xxxxxxxx DATASET

Explanation: An error occurred attempting to open the sequential file 'xxxxxxxx'. Processing has been terminated abnormally.

Action: Examine other system messages to discover the reason for the error. Take the appropriate corrective action and restart the job.

OTM13002 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A virtual storage request has been rejected by the operating system. Processing has been terminated abnormally.

Action: Allocate more virtual storage to the job via the SIZE parameter on the JOB or EXEC JCL entries. Restart the job.

OTM13003 NO OBJECTS ELIGIBLE FOR RECOVERY FOR STORAGE GROUP = xx

Explanation: The object recovery utility has processed the OAM directory for the identified storage group, but found no disk-resident objects which required recovery from ASM for S/390.

Action: None. This is an informational message.

OTM13004 UNIDENTIFIED EXEC PARAMETER

Explanation: An invalid keyword has been encountered during EXEC parameter validation. Processing of the utility is terminated.

Action: Correct the invalid EXEC parameter and restart the job.

OTM13006 INVALID VALUE FOR 'PRINT' PARAMETER

Explanation: The operand of the 'PRINT' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.4.2 for a description of EXEC parameters for the object recovery utility. Correct the invalid operand and restart the job.

OTM13010 NO EXEC PARAMETER(S) SPECIFIED

Explanation: The mandatory storage-name parameter was missing or invalid in the JCL EXEC parameters. Processing has been terminated.

Action: Enter a valid JCL EXEC parameter and restart the job.

OTM13011 DUPLICATE EXEC PARAMETER SPECIFIED

Explanation: An EXEC keyword parameter has been specified more than once. Processing of the utility has been terminated.

Action: Remove the duplicate keyword from the EXEC parameters and restart the job.

OTM13012 INVALID SPECIFICATION OF STORAGE GROUP NAME POSITIONAL EXEC PARAMETER

Explanation: The storage group name positional EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.4.2 for a description of EXEC parameters for the object recovery utility. Correct the invalid parameter and restart the job.

OTM13013 INVALID SPECIFICATION OF 'BATCH' EXEC PARAMETER

Explanation: The operand of the 'BATCH' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.4.2 for a description of EXEC parameters for the object recovery utility. Correct the invalid operand and restart the job.

OTM13014 INVALID SPECIFICATION OF 'TYPE' EXEC PARAMETER

Explanation: The operand of the 'TYPE' keyword EXEC parameter contained an invalid value. Processing of the utility is terminated.

Action: Refer to section 6.4.2 for a description of EXEC parameters for the object recovery utility. Correct the invalid operand and restart the job.

OTM13016 RETURN CODE xx REASON CODES X'yyyyyyyy' RECEIVED FROM TYPE nn CALL TO BATCH PRE-FETCH UTILITY

Explanation: The object recovery utility has issued a request to the ASM/OAM batch pre-fetch utility to perform object recovery, but the request failed with return code 'xx' and hexadecimal reason codes 'yyyyyyyy'. Processing of the utility has been terminated.

Action: Refer to section 6.6 for a description of batch pre-fetch request, return and reason codes. Take the appropriate corrective action and rerun the job.

OTM13018 SQL ERROR -nnn RECEIVED DURING COMMIT PROCESSING

Explanation: The SQL error -nnn was received issuing an SQL COMMIT request to commit updates to the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM13019 CAF OPEN/CLOSE ERROR xxxxxxxx

Explanation: An error has been encountered opening or closing a DB2 plan using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM13020 MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: The member 'xxxxxxxx' was not present on the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Add the missing member to the ASM/OAM parameter library and rerun the job. Refer to chapter 3 for a description of parameter library setup.

OTM13021 ERROR xxxx LOCATING MEMBER yyyyyyyy IN NEAROAM PARAMETER LIBRARY

Explanation: Error code 'xxxx' has been received attempting to locate the identified member from the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Refer to IBM documentation of the LOCATE macro for a description of the error code. Take the appropriate corrective action and rerun the job.

OTM13022 ERROR(S) PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Errors were detected during validation of parameters from the ASM/OAM parameter library. Processing was terminated abnormally.

Action: Consult the parameter validation report written by the utility to the SYSPRINT file for a description of the individual parameter errors. Correct the invalid parameter(s) and restart the job.

OTM13023 STORAGE GROUP SPECIFIED IN EXEC PARAMETERS DOES NOT EXIST IN NEAROAM 'STRGROUP' PARAMETER LIBRARY MEMBER

Explanation: The storage group name specified as the first positional EXEC parameter has not been defined in the STRGROUP member of the ASM/OAM parameter library. Processing of the utility is terminated.

Action: Verify that the correct storage group name has been specified in the EXEC parameters. If it has, ensure that an entry for this storage group is present in the STRGROUP member of the ASM/OAM parameter library. Make the appropriate correction and rerun the job.

OTM13024 ERROR LOADING CAF INTERFACE MODULE

Explanation: An error has occurred dynamically loading the DB2 Call Attach Facility (CAF) interface module. Processing of the utility is terminated.

Action: Consult other available system messages for additional information on the load error. Take the appropriate corrective action and rerun the job.

OTM13028 MANDATORY xxxxxxxx PARAMETER MISSING

Explanation: The mandatory parameter identified in the message was not found in the ASM/OAM parameter library. Processing of the utility was terminated abnormally.

Action: Add the missing parameter to the parameter library then rerun the job.

OTM13032 CAF CONNECT/DISCONNECT ERROR xxxxxxxx

Explanation: An error has been encountered connecting or disconnecting to DB2 using the DB2 Call Attach Facility (CAF). Processing of the utility is terminated.

Action: Refer to IBM documentation on the Call Attach Facility for a description of the error and information codes. Take the appropriate corrective action and restart the job.

OTM13038 COLLECTION NAME ID nnnnnnn NOT FOUND IN OAMADMIN DATABASE FOR OBJECT xxxx

Explanation: An object in a collection with identifier 'nnnnnnn' has been selected for recovery processing by the utility, but the specified collection name identifier does not exist in the OAMADMIN database collection name identifier table. Processing of the utility is terminated.

Action: This condition indicates an inconsistency in the contents of the OAM database for the storage group being processed by the utility, and the OAM administration database. Refer this problem to your DB2 database administrator. If no reason can be found for the inconsistency, contact your ASM/OAM product support representative.

OTM13039 SQL ERROR -nnn ACCESSING OAM DIRECTORY TABLE

Explanation: SQL error -nnn was received accessing the OAM object directory table. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM13041 SQL ERROR -nnn TABLE NAME = xxxx….xxxx

Explanation: SQL error -nnn was received accessing the DB2 table identified in the message. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM13044 OBJECT xxxx IN COLLECTION ID nnnnnnn NOT FOUND DURING UPDATE OF OAM DIRECTORY

Explanation: An entry for an object which has been selected for recovery processing was not found in the OAM directory during object update processing. Processing of the utility is terminated.

Action: This message is likely to indicate an internal ASM/OAM processing error. Report the error to your ASM/OAM product support representative.

OTM13045 SQL ERROR -nnn UPDATING OAM DIRECTORY ENTRY FOR OBJECT xxxx; COLLECTION ID = nnnnnnn

Explanation: SQL error -nnn was received updating the OAM object directory table entry for the identified object. Processing of the utility has been terminated.

Action: Consult IBM documentation for a description of the SQL error condition. Take the appropriate corrective action and restart the job.

OTM13051 UNABLE TO OPEN SYSPRINT DATASET

Explanation: The utility was unable to successfully open the SYSPRINT dataset, as assigned in the JCL. Processing of the utility is terminated.

Action: Ensure that a SYSPRINT DD card is present in the JCL. If it is, consult other available system messages for additional information concerning the error. Take the appropriate corrective action and restart the job.

8.9 Control region messages.

Messages from the ASM/OAM control region master task will be displayed on the system console.

OTM20000 ENTER NEAROAM REQUEST:

Explanation: This is the operator reply message displayed by the control region after successful initialization.

Action: All ASM/OAM operator commands are entered as responses to this message. After processing a command, the control region will redisplay this message.

OTM20001 ERROR OPENING NEAROAM PARAMETER FILE

Explanation: An error has occurred opening the ASM/OAM parameter library during initialization processing. Initialization is terminated.

Action: Examine other system messages for more information on the open error. Take the appropriate corrective action and restart the control region.

OTM20002 NEAROAM INITIALIZATION PROCESSING ABORTED

Explanation: An error has occurred during ASM/OAM control region initialization processing. Initialization has been terminated.

Action: Examine other messages displayed by the control region during the initialization process for details of the error. Take the appropriate corrective action and restart the control region.

OTM20004 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Explanation: This message is used to display a record from an ASM/OAM parameter library member which contains an invalid parameter, and a message explaining the nature of the error.

Two OTM20004 messages are used to display the record - the first message displays characters 1-40 of the record, and the second message displays characters 41-80.

These will be followed by one OTM20004 message for each parameter error type encountered in the record, explaining the detected error(s).

Action: Correct the identified parameter error before restarting the control region.

OTM20005 xxxxxxxx PARAMETER VALIDATION ERRORS

Explanation: Errors were detected during validation of parameters in member 'xxxxxxxx' from the ASM/OAM parameter library during control region initialization processing. The control region has been terminated.

Action: Refer to the prior OTM20004 messages for details of the individual parameter validation errors. Correct the invalid parameters and restart the control region.

OTM20006 xxxxxxxx PARAMETERS SUCCESSFULLY PROCESSED

Explanation: Validation of parameters in member 'xxxxxxxx' from the ASM/OAM parameter library has completed successfully. Control region initialization processing continues.

Action: None. This is an informational message.

OTM20008 OMCT GETMAIN FAILURE X'xx'

Explanation: A request for virtual storage in subpool 241 of the MVS CSA has been denied by the operating system with return code 'xx'. Initialization of the control region is aborted.

Action: Refer to IBM documentation on the GETMAIN macro for an explanation of the return code. Take the appropriate corrective action and restart the control region.

OTM20009 COMMUNICATIONS TABLE INITIALIZED

Explanation: The ASM/OAM communications table has been successfully initialized during control region initialization. Processing continues.

Action: None. This is an informational message.

OTM20010 xxxxxxxx MEMBER NOT FOUND IN PARAMETER FILE

Explanation: The member 'xxxxxxxx' was not present on the ASM/OAM parameter library during control region initialization. Processing is aborted.

Action: Add the missing member to the ASM/OAM parameter library. Refer to chapter 3 for a description of parameter library setup.

OTM20011 ERROR X'xx' DURING SCHEDULER INTIALIZATION

Explanation: Error code 'xx' was returned by the scheduler task during ASM/OAM initialization processing. Control region initialization has been aborted.

Action: Consult other messages displayed during control region initialization for a description of the scheduler error (scheduler messages will have the format OTM220nn). Take the action specified for the error message, and restart the control region.

If the cause of the error is not apparent from any displayed message, contact your ASM/OAM product support representative.

OTM20012 SCHEDULER TASK INITIALIZED SUCCESSFULLY

Explanation: The scheduler task has been successfully initialized during control region initialization processing.

Action: None. This is an informational message.

OTM20013 ERROR X'xx' RECEIVED ATTACHING SCHEDULER TASK

Explanation: Hexadecimal error code 'xx' was received from the ATTACH macro that was used to initiate the scheduler task during ASM/OAM control region initialization processing. The control region is terminated.

Action: Refer to IBM documentation on the ATTACH macro for a description of the error code. Take the appropriate corrective action and restart the control region.

If no apparent cause for the failure can be identified, contact your ASM/OAM product support representative.

OTM20014 GETMAIN FAILURE X'xx' ALLOCATING OMRH

Explanation: A request for virtual storage in the ASM/OAM control region has been rejected by the operating system. Control region initialization processing is aborted.

Action: Refer to IBM documentation on the GETMAIN macro for a description of hexadecimal error code 'xx'. Take the appropriate corrective action and restart the control region. If there was insufficient storage in the region to satisfy the request, increase the virtual storage available by changing the SIZE parameter of the ASM/OAM procedure. Restart the control region.

OTM20015 ERROR X'xx' RECEIVED ATTACHING TAPE|DISK READER TASK nn

Explanation: Hexadecimal error code 'xx' was received from the ATTACH macro that was used to initiate the specified tape or disk reader task during ASM/OAM control region initialization processing. The control region is terminated.

Action: Refer to IBM documentation on the ATTACH macro for a description of the error code. Take the appropriate corrective action and restart the control region.

If no apparent cause for the failure can be identified, contact your ASM/OAM product support representative.

OTM20016 nnn TAPE|DISK READER TASKS INITIALIZED SUCCESSFULLY

Explanation: A total of 'nnn' tape or disk reader tasks have been successfully initialized during control region initialization processing. The value of 'nnn' should be equal to the value of the MAXDRIVE parameter (for tape reader tasks) or MAXDISK parameter (for disk reader tasks) in the TAPECNTL member of the ASM/OAM parameter library.

Action: None. This is an informational message.

OTM20017 OAM INTERCEPT ALREADY ESTABLISHED - INFORMATION UPDATED

Explanation: A previous intercept was already in place during establishment of the ASM/OAM OSREQ intercept during initialization processing. Processing continues normally.

Action: Information in the intercept is updated to reflect the current operating environment of the ASM/OAM control region.

If an intercept is already in place, it is probable that the previous execution of the ASM/OAM control region terminated abnormally (eg) due to operator cancellation.

If this is not the case, report the message to your ASM/OAM product support representative.

OTM20018 RETCODE X'xx' REASCODE X'yyyyyyyy' RECEIVED FROM OAM ACCESS REQUEST

Explanation: Return code 'xx' and reason code 'yyyyyyyy' were received from an OSREQ ACCESS request during control region initialization processing. The control region is terminated.

Action: Refer to IBM documentation on the OSREQ macro for a description of the return and reason codes. Take the appropriate corrective action and restart the control region.

OTM20019 OTIMP300 NOT IN LINK PACK AREA

Explanation: The ASM/OAM intercept module OTIMP300 was not found in the FLPA or MLPA during control region initialization processing. The control region is terminated.

Action: Ensure that module OTIMP300 is installed in the FLPA or MLPA before restarting the control region (see section 2.2.3 or section 2.3.3 for a discussion of this requirement).

OTM20020 BAD INTERCEPT ALREADY IN PLACE AFTER PREVIOUS ABEND

Explanation: An intercept was already in place during ASM/OAM control region initialization processing, but the information contained in it does not match the existing LPA configuration. The control region is terminated.

Action: Ensure that no changes have been made to the FLPA or MLPA since the last execution of the ASM/OAM control region. If no changes have taken place, contact your ASM/OAM product support representative.

In any case, a re-IPL of the system will be required to reset the FLPA or MLPA before the ASM/OAM control region will be able to be initialized successfully.

OTM20021 OAM INTERCEPT SUCCESSFULLY ESTABLISHED

Explanation: The ASM/OAM OSREQ intercept has been successfully established during control region initialization processing.

Action: None. This is an informational message.

OTM20023 INSUFFICIENT STORAGE AVAILABLE FOR WORKAREAS

Explanation: A request for virtual storage in the ASM/OAM control region has been rejected by the operating system. Control region initialization processing is aborted.

Action: Allocate more virtual storage to the control region, by increasing the value of the SIZE parameter in the NEAROAMC procedure. Restart the control region.

OTM20024 ERROR X'xxxx' LOCATING MEMBER ON OTIMS100

Explanation: Hexadecimal error code 'xxxx' has been received attempting to locate a member on the ASM/OAM parameter library. Control region initialization processing is aborted.

Action: Refer to IBM documentation of the LOCATE macro for a description of the error code. Take the appropriate corrective action and restart the control region.

OTM20025 I/O ERROR X'xxxx' PROCESSING yyyyyyyy PARAMETER MEMBER

Explanation: An I/O error has occurred processing member 'yyyyyyyy' from the ASM/OAM parameter library during control region initialization processing. 'xxxx' gives the first two sense bytes from the IOB at the time of the error. Control region initialization is aborted.

Action: Refer to IBM documentation for a description of the error code. Take the appropriate corrective action and restart the control region.

If no apparent cause for the error can be detected, contact your ASM/OAM product support representative.

OTM20026 ERROR LOCATING NEAROAMC ASCB

Explanation: An error has been encountered attempting to access the Address Space Control Block (ASCB) for the ASM/OAM control region. Control region initialization is aborted.

Action: This problem should be reported to your ASM/OAM product support representative before attempting to restart the control region.

OTM20027 ERROR xx PERFORMING PAGEFIX

Explanation: Error code 'xx' was received from a page fix request during ASM/OAM initialization processing. The control region is terminated.

Action: Refer to IBM documentation on the PGSER macro for a description of the error. Take the appropriate corrective action and restart the control region.

If no apparent cause for the error can be identified, contact your ASM/OAM product support representative.

OTM20028 NEAROAM V2.3 INITIALIZATION STARTING

Explanation: This is a version identifier message which is displayed at start of control region initialization processing.

Action: None. This is an informational message.

OTM20029 MANDATORY xxxxxxxxxxx PARAMETER MISSING OR INVALID

Explanation: The identified parameter is mandatory but did not have a valid entry in the ASM/OAM parameter library. Normal parameter error processing will be undertaken by the control region.

Action: Edit the relevant member of the parameter library to ensure that a valid parameter is present. Then restart the control region.

OTM20030 NEAROAM INITIALIZATION COMPLETED SUCCESSFULLY

Explanation: All control region initialization processing has been performed successfully.

Action: None. This is an informational message. It will be accompanied by message OTM20000.

OTM20031 **WARNING - NEAROAM AUTHORIZATION EXPIRES IN nnn DAYS**

Explanation: ASM/OAM product authorization is due to expire after 'nnn' days. Control region initialization processing continues normally.

Action: Contact your ASM/OAM product support representative for an update of your product authorization code(s).

OTM20032 NEAROAM AUTHORIZATION HAS EXPIRED

Explanation: ASM/OAM authorization has expired on your processor. Control region initialization processing is aborted.

Action: Contact your ASM/OAM product support representative for an update to your product authorization code(s).

OTM20033 NEAROAM NOT AUTHORIZED FOR EXECUTION ON THIS PROCESSOR

Explanation: A valid product authorization code was not found in the ASM/OAM authorization module OTIMP050. Control region initialization processing is aborted.

Action: Check that the supplied product authorization code(s) has been applied correctly, using the procedure specified in section 2.2.4 of this manual. If the code(s) has been applied correctly, report the problem to your ASM/OAM product support representative.

OTM20034 ERROR xx REASON yyyyyyyy RECEIVED DURING AUTHORIZATION CODE CHECKING

Explanation: An internal error has occurred during authorization code checking. Control region initialization processing is aborted.

Action: This is an internal error. Report the problem to your ASM/OAM product support representative.

OTM20035 ERROR X'xx' DURING HOUSEKEEPING INTIALIZATION

Explanation: Error code ‘xx’ was returned by the housekeeping task during ASM/OAM initialization processing. Control region initialization has been aborted.

Action: Consult other messages displayed during control region initialization for a description of the housekeeping error. Take the action specified for the error message, and restart the control region.

If the cause of the error is not apparent from any displayed message, contact your ASM/OAM product support representative.

OTM20036 HOUSEKEEPING TASK INITIALIZED SUCCESSFULLY

Explanation: The housekeeping task has been successfully initialized during control region initialization processing.

Action: None. This is an informational message.

OTM20037 ERROR X'xx' RECEIVED ATTACHING HOUSEKEEPING TASK

Explanation: Hexadecimal error code 'xx' was received from the ATTACH macro that was used to initiate the housekeeping task during ASM/OAM control region initialization processing. The control region is terminated.

Action: Refer to IBM documentation on the ATTACH macro for a description of the error code. Take the appropriate corrective action and restart the control region.

If no apparent cause for the failure can be identified, contact your ASM/OAM product support representative.

OTM20038 NEAROAM CONTROL REGION ALREADY INITIALIZED IN THIS OAM ENVIRONMENT

Explanation: An attempt has been made to start the ASM/OAM control region, but a control region is already active in the same OAM configuration. Initialization of the second control region is terminated.

Action: Ensure that any existing control region execution is terminated before attempting to start the control region.

OTM20039 DB2 SUBSYSTEM xxxx TERMINATING - ABNORMAL|NORMAL SHUTDOWN OF NEAROAM INITIATED

Explanation: The DB2 subsystem ‘xxxx’ which is used by the ASM/OAM control region is terminating normally or abnormally. Automatic shutdown of the ASM/OAM control region has been initiated. A normal ASM/OAM shutdown is initiated when DB2 is being terminated normally; an immediate ASM/OAM shutdown is initiated when DB2 is being terminated abnormally.

Action: Restart the ASM/OAM control region when the DB2 subsystem has been restarted.

OTM20040 SYSTEM ABEND 'xxx' INTERCEPTED - NEAROAM WILL ATTEMPT TO CONTINUE

Explanation: A system abend has been intercepted during control region operation. The system abend code is 'xxx'. Control region processing will continue.

Action: A system abend has been trapped during processing of an operator request. If possible, ASM/OAM will recover from the abend and re-display the OTM20000 message. Operator requests may continue to be entered as normal.

If it is not possible for ASM/OAM to recover from the abend, control region processing will be terminated abnormally.

The problem should be reported to your ASM/OAM product support representative.

OTM20041 NEAROAM UNABLE TO CONTINUE AFTER ABEND - JOB TERMINATING

Explanation: The ASM/OAM control region was unable to recover after trapping an abend condition. The control region will be terminated abnormally.

Action: Report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM20042 RECURSIVE ABENDS INTERCEPTED - JOB TERMINATING

Explanation: A recursive abend has occurred after the ASM/OAM control region trapped a system abend condition. The control region will be terminated abnormally.

Action: Report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM20043 CNTL REGN RECEIVED ERROR POSTING REQUESTOR ECB

Explanation: An error occurred posting an outstanding OSREQ request from another application. The ASM/OAM control region will attempt to recover from this error condition and continue processing.

Action: Consult other available system messages for additional information regarding the error. If no apparent cause for the failure can be determined, report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM20044 COMMAND REJECTED - ENTER REQUEST VIA 'MODIFY' COMMAND

Explanation: ‘COMMAND=MODIFY’ is set in the ASM/OAM TAPECNTL parameter library member, but an MVS command other than ‘MODIFY’ has been issued to the ASM/OAM control region.

Action: Re-enter the ASM/OAM command using the standard MVS MODIFY command structure. Refer to section 4.4 for more information on entering ASM/OAM control region commands.

OTM20050 REQUEST NOT RECOGNIZED

Explanation: An invalid operator command has been entered in response to the ASM/OAM OTM20000 message. The OTM20000 message will be redisplayed.

Action: Re-enter the correct operator command in response to the OTM20000 message.

OTM20051 INVALID SET OPERAND(S) - REQUEST IGNORED

Explanation: An invalid operand has been entered with the SET operator command.

Action: Ensure that the SET command is specified correctly and re-enter the command. Refer to section 4.4 for details on operator command formats.

OTM20052 NEAROAM CONFIGURATION ALTERED SUCCESSFULLY

Explanation: The operator SET command has been processed successfully to alter the current MAXDRIVE, MAXQLEN, MAXDISK, RETAINTAPE or TAPEWAIT values.

Action: The OTM20000 operator reply message will be redisplayed.

OTM20053 UNABLE TO REDUCE VALUE OF MAXDRIVE AS REQUESTED

Explanation: All available tasks have been examined but the control region has been unable to reduce the value of MAXDRIVE to that requested.

Action: This is an ASM/OAM error condition. Report the message to your ASM/OAM product support representative. Obtain as much information as you can about the status of the ASM/OAM control region at the time of the message display.

OTM20054 UNABLE TO REDUCE VALUE OF MAXDISK AS REQUESTED

Explanation: All available tasks have been examined but the control region has been unable to reduce the value of MAXDISK to that requested.

Action: This is an ASM/OAM error condition. Report the message to your ASM/OAM product support representative. Obtain as much information as you can about the status of the ASM/OAM control region at the time of the message display.

OTM20058 MISSING/INVALID OPERAND - REQUEST REJECTED

Explanation: A mandatory operand is missing from an ASM/OAM operator command.

Action: Re-enter the command with the correct syntax. Refer to section 4.4 for a description of operator command formats.

OTM20059 ERRORS ALTERING NEAROAM CONFIGURATION - CHECK SYSTEM STATUS

Explanation: Errors have been detected attempting to alter the current ASM/OAM configuration using the operator SET command. Other messages will give details of the error encountered.

Action: Check the system status via the operator DISPLAY command to verify that the system configuration has not been altered erroneously.

OTM20061 INVALID DISPLAY OPERAND(S) - REQUEST IGNORED

Explanation: An invalid operand has been entered with the DISPLAY operator command.

Action: Ensure that the DISPLAY command is specified correctly and re-enter the command. Refer to section 4.4 for details on operator command formats.

OTM20062 MAXDRIVE = aaa MAXQLEN = bbb RETAINTAPE = ccccc MAXDISK = ddd TAPEWAIT = eeee

OTM20062 SCHEDULER QUEUE IS LOCKED|UNLOCKED ;READER QUEUE IS LOCKED|UNLOCKED

Explanation: This pair of messages is displayed in response to an operator DISPLAY command. 'aaa', 'bbb', 'ccccc', 'ddd' and 'eeee' are the current settings of the system MAXDRIVE, MAXQLEN, RETAINTAPE, MAXDISK and TAPEWAIT parameters.

Action: This is an information message only.

OTM20063 TASK Tnnn|Dnnn: TYPE=aaaa STATUS=bbbb QLEN=ccc UNIT=dddddddd

Explanation: This message is displayed in response to an operator DISPLAY command. Refer to section 4.4 of this manual for a description of the display field content.

Action: This is an information message only.

OTM20064 TASK Tnnn DSN=xxxx….xxxx LASTUSE=hh:mm:ss

Explanation: This message is displayed in response to an operator DISPLAY command. Refer to section 4.4 of this manual for a description of the display field contents.

Action: This is an information message only.

OTM20065 SPECIFIED READER TASK NOT FOUND

Explanation: The reader task number specified in an operator command does not exist. The request is ignored.

Action: Issue the operator DISPLAY command to identify the correct task number. Then re-enter the command.

OTM20066 REQUEST nnn: COLLECTION=xxxx

Explanation: This message is displayed in response to an operator DISPLAY TASK command. Refer to section 4.4 of this manual for a description of the display field contents.

Action: This is an information message only.

OTM20067 REQUEST nnn: OBJECT=xxxx

Explanation: This message is displayed in response to an operator DISPLAY TASK command. Refer to section 4.4 of this manual for a description of the display field contents.

Action: This is an information message only.

OTM20068 NEAROAM DISPLAY PROCESSING COMPLETED

Explanation: All messages issued in response to an operator DISPLAY command have been issued.

Action: The operator reply message OTM20000 will be redisplayed.

OTM20071 INVALID PURGE OPERAND(S) - REQUEST IGNORED

Explanation: An invalid operand has been entered with the PURGE operator command.

Action: Ensure that the PURGE command is specified correctly and re-enter the command. Refer to section 4.4 for details on operator command formats.

OTM20072 SPECIFIED TASK DOES NOT EXIST - REQUEST IGNORED

Explanation: The task number specified in the PURGE command does not exist.

Action: Issue the operator DISPLAY command to identify the correct task number. Then re-enter the command.

OTM20073 TASK Tnnn|Dnnn NOT ACTIVE - REQUEST IGNORED

Explanation: A PURGE request has been entered for tape reader task 'Tnnn' or disk reader task 'Dnnn', but the task is already terminated. Only active tasks (status= WAIT or BUSY) are eligible for purge processing. The request is ignored.

Action: Ensure that the correct task number has been specified on the operator command.

OTM20074 TASK Tnnn|Dnnn ALREADY BEING PURGED - REQUEST IGNORED

Explanation: A second PURGE request has been entered for the busy tape reader task 'Tnnn' or disk reader task 'Dnnn' before the first PURGE request has been processed. The request is ignored..

Action: Wait for the queued PURGE command to be processed after all outstanding retrieval requests have been completed. To immediately terminate the reader task, enter the FORCE command.

OTM20075 TASK Tnnn|Dnnn PURGE FAILED - RESPONSE CODE xx

Explanation: An operator request to purge the identified task has failed with error code 'xx'.

Action: This is an ASM/OAM error condition. Report the message to your ASM/OAM product support representative. Obtain as much information as you can about the status of the ASM/OAM control region at the time of the message display.

OTM20077 SCHEDULER PURGE FAILED - RESPONSE CODE xxxx

Explanation: A request to purge the scheduler task during ASM/OAM control region shutdown has failed with response code 'xxxx'. Shutdown processing continues. The control region may terminate with an SA03 abend.

Action: This is an internal ASM/OAM error. Report the problem to your ASM/OAM product support representative.

OTM20078 TASK Tnnn|Dnnn FORCED SUCCESSFULLY

Explanation: A FORCE command for tape reader task 'Tnnn' or disk reader task ‘Dnnn’ has been processed successfully.

Action: This is an information message only.

OTM20079 TASK Tnnn|Dnnn PURGE REQUEST QUEUED

Explanation: The PURGE request for tape reader task 'Tnnn' or disk reader task ‘Dnnn’ has been accepted and queued.

Action: The task will be purged when all retrieval requests that were outstanding for that task when the PURGE command was entered have been completed.

OTM20081 INVALID FORCE OPERAND(S) - REQUEST IGNORED

Explanation: An invalid operand has been entered with the FORCE operator command.

Action: Ensure that the FORCE command is specified correctly and re-enter the command. Refer to section 4.4 for details on operator command formats.

OTM20082 SPECIFIED TASK DOES NOT EXIST - REQUEST IGNORED

Explanation: The task number specified in the force command does not exist.

Action: Issue the operator DISPLAY command to identify the correct task number. Then re-enter the command.

OTM20083 TASK Tnnn|Dnnn NOT ACTIVE - REQUEST IGNORED

Explanation: A FORCE request has been entered for tape reader task ‘Tnnn’ or disk reader task 'Dnnn', but the task is already terminated. Only active tasks (status = WAIT or BUSY) are eligible for force processing. The request is ignored.

Action: Ensure that the correct task number has been specified on the operator command.

OTM20084 TASK Tnnn|Dnnn NOT BEING PURGED - REQUEST IGNORED

Explanation: A FORCE request has been entered for the busy tape reader task 'Tnnn' or disk reader task ‘Dnnn’ but no prior PURGE request has been entered. A PURGE request must already have been enter for a task before a FORCE request is accepted. The request is ignored.

Action: Enter a PURGE request for the task. All outstanding retrieval requests will be completed before the specified task is terminated.

OTM20085 TASK Tnnn|Dnnn FORCE FAILED - ERROR X'xx'

Explanation: A request to DETACH the identified reader task has failed, with return code 'xx'.

Action: Refer to IBM documentation for the DETACH macro for a description of the displayed error code. Take the appropriate action to resolved the problem.

If the cause of the problem is not apparent, contact your ASM/OAM product support representative.

OTM20086 TASK nnn FORCED SUCCESSFULLY

Explanation: An operator FORCE request for the identified task has been processed successfully.

Action: The operator reply message OTM20000 will be redisplayed.

OTM20087 REFRESH PROCESSING COMPLETED SUCCESSFULLY

Explanation: An operator REFRESH request has been processed successfully.

Action: The operator reply message OTM20000 will be redisplayed.

OTM20088 REFRESH FAILED – EXAMINE LOG FOR DETAILS

Explanation: An operator REFRESH request has failed to complete successfully.

Action: Refer to other messages displayed by ASM/OAM for the reasons for the processing failure. Take the corrective action recommended for the failure and repeat the REFRESH request.

OTM20089 REFRESH NOT POSSIBLE DUE TO RESOURCE SATURATION

Explanation: An operator refresh request has not been actioned because the number of simultaneous ASM/OAM requests currently being processed is at its limit of 1024.

Action: Retry the request at a later time.

OTM20090 HOUSKEEPING TASK SHUTDOWN SUCCESSFULLY

Explanation: The ASM/OAM control region housekeeping task has been successfully stopped during shutdown processing. Processing continues.

Action: This is an informational message only.

OTM20091 INVALID SHUTDOWN OPERAND(S)

Explanation: An invalid operand has been entered with the operator SHUTDOWN commands.

Action: Re-enter the command, specifying a valid operand. Refer to section 4.4 for details of operator command formats.

OTM20092 DO YOU WANT TO PROCEED WITH NEAROAM SHUTDOWN(Y/N)?

Explanation: An operator SHUTDOWN request has been entered on the console via the operator reply facility. This message is displayed to ask for confirmation of the shutdown request.

Action: To proceed with ASM/OAM control region shutdown processing, enter 'Y'.

To abort the shutdown request, enter 'N'. The operator reply message OTM20000 will then be redisplayed.

OTM20093 NEAROAM SHUTDOWN IN PROGRESS

Explanation: The operator has replied 'Y' to the shutdown confirmation message OTM20092. Shutdown processing will proceed.

Action: This is an informational message only.

OTM20094 SCHEDULER TASK SHUTDOWN SUCCESSFULLY

Explanation: The ASM/OAM control region scheduler task has been successfully stopped during shutdown processing. Processing continues.

Action: This is an informational message only.

OTM20095 SCHEDULER FORCE FAILED - ERROR X'xx'

Explanation: A request to terminate the scheduler task during an immediate ASM/OAM control region shutdown has failed with error code 'xx'. Shutdown processing continues. The control may terminate with an SA03 abend.

Action: This is an internal ASM/OAM error. Report the problem to your ASM/OAM product support representative.

OTM20096 ERROR FREEING COMMUNICATIONS TABLE STORAGE

Explanation: The storage area allocated in subpool 241 in the MVS CSA during control region initialization processing for the ASM/OAM communications table was not freed successfully during control region shutdown. Termination processing continues.

Action: Refer to other available system messages for more information regarding the error. When the cause has been identified, take the appropriate corrective action to ensure that the error does not re-occur during future shutdown of the control region.

If no apparent cause of the error can be identified, contact your ASM/OAM product support representative.

The CSA storage used for the ASM/OAM communications table in this invocation of the control region will be unavailable for allocation until after the next IPL of the system. Approximately 210k bytes of storage are used for the communications table in extended CSA storage.

OTM20097 COMMUNICATIONS TABLE STORAGE AREA FREED

Explanation: The storage area obtained from subpool 241 in extended CSA during control region initialization processing has been successfully released during control region shutdown. Processing continues.

Action: This is an informational message only.

OTM20098 TASK SHUTDOWN NOT POSSIBLE DUE TO RESOURCE SATURATION

Explanation: A request to purge a tape driver task has not been actioned because the number of simultaneous ASM/OAM requests currently being processed is at its limit of 1024.

Action: Retry the request at a later time.

OTM20099 NEAROAM SHUTDOWN PROCESSING COMPLETE

Explanation: ASM/OAM shutdown processing has been completed successfully.

Action: The control region will terminate normally.

8.10 Control region scheduler task messages.

Messages from the ASM/OAM control region scheduler task will be displayed on the system console.

OTM22001 ERROR X'xxxx' ALLOCATING INDEX FOR D/B zzzzzzzz

Explanation: Dynamic allocation of the ASM for S/390 database index for the OAM storage group with DB2 name qualifier 'zzzzzzzz' has failed with hexadecimal error code 'xxxx'. ASM/OAM initialization processing is aborted.

Action: Refer to IBM documentation for SVC99 processing for a description of the error code. Take the appropriate corrective action to ensure that the ASM for S/390 database index for the storage group is available, and restart the control region.

OTM22002 ERROR X'xxxx' OPENING INDEX FOR D/B zzzzzzzz

Explanation: Opening of the ASM for S/390 database index for the OAM storage group with DB2 name qualifier 'zzzzzzzz' has failed with hexadecimal error code 'xxxx'. ASM/OAM initialization processing is aborted.

Action: Refer to IBM documentation for VSAM macro processing for a description of the error code. Take the appropriate corrective action to ensure that the ASM for S/390 database index for the storage group is available, and restart the control region.

OTM22003 ERROR X'xxyy' READING INDEX FOR D/B zzzzzzzz

Explanation: An error has occurred during object retrieval processing, when reading an object entry from the primary index file for the ASM for S/390 database for the OAM storage group with DB2 name qualifier 'zzzzzzzz'. 'xx' gives the error code, and 'yy' the reason code (both in hexadecimal) returned from the VSAM GET request. This message is followed by an accompanying message identifying the object being retrieved.

Action: Refer to IBM documentation for VSAM macro processing for a description of the error and reason codes. Take the appropriate corrective action to allow the index entry to be read, and resubmit the object retrieval request.

OTM22004 INSUFFICIENT STORAGE AVAILABLE FOR WORKAREAS

Explanation: A request for virtual storage in the ASM/OAM control region has been rejected by the operating system. Control region initialization processing is aborted.

Action: Allocate more virtual storage to the control region, by increasing the value of the SIZE parameter in the NEAROAMC procedure. Restart the control region.

OTM22005 SCHEDULER UNABLE TO LOAD CAF INTERFACE

Explanation: The module DB2 modules DSNALI and/or DSNHLI2 were unavailable to the control region during initialization processing. The control region is terminated.

Action: Make sure that the DB2 runtime library at your installation is available to the ASM/OAM procedure via the system linklist or STEPLIB concatenations. Restart the control region.

OTM22006 - CAF aaaaaaaa ERROR xxxx REASON yyyyyyyy

Explanation: A DB2 Call Attach Facility error has occurred performing operation 'aaaaaaaa'. 'xxxx' and 'yyyyyyyy' are the error and reason codes return from CAF. Control region initialization is terminated.

Action: Refer to IBM document for the DB2 Call Attach Facility for a description of the displayed error and reason codes. Take the appropriate corrective action and restart the control region.

OTM22007 - SCHEDULER PROCESSING EMPTY QUEUE

Explanation: The control region scheduler has been invoked, but there are no entries in its request queue. The scheduler task will return to a wait status.

Action: This is an internal error condition and should be reported to your ASM/OAM product support representative.

OTM22008 ERROR X'xxxx' GENERATING ACB FOR D/B zzzzzzzz

Explanation: An error has occurred during ASM/OAM control region initialization processing generating an ACB for accessing the ASM for S/390 database primary index file for the OAM storage group with DB2 name qualifier ‘zzzzzzz’. 'xxxx' gives the hexadecimal error code. ASM/OAM initialization processing is aborted.

Action: Refer to IBM documentation for VSAM macro processing for a description of the error code. Take the appropriate corrective action and restart the control region.

OTM22009 SCHEDULER RECEIVED ERROR -xxx ACCESSING COLLECTION NAME TABLE

Explanation: SQL returned error '-xxx' when ASM/OAM attempted to access the OAM collection name table during control region initialization processing. The control region is terminated.

Action: Refer to IBM DB2 documentation for a description of the SQL error. Take the appropriate corrective action and restart the control region. If no apparent cause of the error can be identified, contact your ASM/OAM product support representative.

OTM22010 SCHEDULER RECEIVED ERROR POSTING REQUESTOR ECB

Explanation: An error occurred posting an outstanding OSREQ request from another application. The ASM/OAM control region will attempt to recover from this error condition and continue processing.

Action: Consult other available system messages for additional information regarding the error. If no apparent cause for the failure can be determined, report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM22012 SCHEDULER RECEIVED ERROR -xxx ACCESSING MGMT CLASS NAME TABLE

Explanation: SQL returned error '-xxx' when ASM/OAM attempted to access the OAM management class identifier table during control region initialization processing. The control region is terminated.

Action: Refer to IBM DB2 documentation for a description of the SQL error. Take the appropriate corrective action and restart the control region. If no apparent cause of the error can be identified, contact your ASM/OAM product support representative.

OTM22013 FOLLOWING MGMT CLASS FROM NEAROAM OBJCNTL MEMBER NOT FOUND IN MGMT CLASS ID TABLE:

OTM22013 xxxxxxxx

Explanation: This pair of messages is issued when a management class whose name has been specified in the OBJCNTL member of the ASM/OAM parameter library is not present in the OAM management class identifier table. The second message in the pair identifies the invalid management class name. The control region is terminated.

Action: Correct the invalid management class name entry in the ASM/OAM OBJCNTL parameter library member, and restart the control region.

OTM22014 RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED READING NEARARCHIVE D/B FOR D/B zzzzzzzz

Explanation: An error has occurred attempting to open an ASM for S/390 database during OAM object retrieval or deletion processing. 'xx' and 'yyyyyyyy' identify the return code and hexadecimal supplementary codes received from ASM for S/390, and 'zzzzzzzz' is the DB2 name qualifier of the OAM storage group database.

Action: Refer to ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and repeat the OAM retrieval/deletion request. The ASM/OAM control region may need to be stopped and restarted in order to rectify the error condition.

OTM22015 SQL ERROR -nnn RECEIVED DURING OBJECT DELETION PROCESSING
OTM22015 xxxx….xxxx

Explanation: An SQL error condition has been encountered by the ASM/OAM control region during object deletion processing. '-nnn' gives the SQL error code. This initial message is always accompanied by a second message giving the variable identifiers from the SQL error message associated with this error code. The OSREQ DELETE request will be rejected with a return code of 12, and a reason code of X'7480xxxx'.

Action: Refer to IBM SQL error message documentation for a description of the error code. Take the appropriate corrective action and repeat the OAM deletion request.

OTM22016 NEAROAM CONTROL REGION INITIALIZATION WAITING FOR DB2 SUBSYSTEM xxxx TO START

Explanation: The ASM/OAM control region has been started but DB2 subsystem 'xxxx' has not yet initialized. Control region initialization is suspended until DB2 subsystem 'xxxx' is available.

Action: Start DB2 subsystem processing, or wait for DB2 initialization to complete. The ASM/OAM control region will resume normal initialization processing when the DB2 subsystem is available.

OTM22017 SCHEDULER RECEIVED ERROR -nnn ACCESSING STRG CLASS NAME TABLE
OTM22017 xxxx….xxxx

Explanation: An SQL error condition has been encountered by the ASM/OAM control region accessing the OAMADMIN storage class identifier table. This initial message is always accompanied by a second message giving the variable identifiers from the SQL error message associated with this error code. Control region initialization is terminated.

Action: Refer to IBM SQL error message documentation for a description of the error code. Take the appropriate corrective action and restart the control region.

OTM22018 FOLLOWING STRG CLASS FROM NEAROAM ENVCNTL MEMBER NOT FOUND IN STRG CLASS ID TABLE
OTM22018 xxxx….xxxx

Explanation: The storage class identified in the second message has been specified in the TAPECLASS or DISKCLASS parameter in the ASM/OAM parameter library member 'TAPECNTL', but does not exist in the OAMADMIN storage class identifier table. Control region initialization processing is terminated.

Action: Check that the correct values for the TAPECLASS and DISKCLASS parameters have been specified in the TAPECNTL member of the ASM/OAM parameter library. If they have, or have been omitted, ensure that the specified or defaulted storage class names have been defined via DFSMS.

Restart the control region after making the appropriate changes.

8.11 CICS initialization messages.

Messages produced while enabling the ASM/OAM CICS interface will be written to the system transient data queue 'CSMT', and will also be displayed on the requester's display terminal, if the function was explicitly invoked via transaction 'OM23'.

OTM23000 NEAROAM CICS INITIALIZATION SUCCESSFULLY COMPLETED

Explanation: The ASM/OAM CICS interface has been successfully established. ASM/OAM is now enabled for processing of CICS OSREQ calls.

Action: This is an information message.

OTM23001 NEAROAM CICS INITIALIZATION FAILED

Explanation: An error has occurred during initialization of the ASM/OAM CICS interface. An accompanying message will give details of the error condition.

Action: Refer to the accompanying message for a description of the failure.

OTM23002 NEAROAM CONTROL REGION IS NOT ACTIVE

Explanation: An attempt to initialize the ASM/OAM CICS interface has been made, but the ASM/OAM control region is not active. The request is rejected.

Action: Start the ASM/OAM control region before resubmitting the CICS initialization request.

OTM23004 ERROR ESTABLISHING NEAROAM INTERCEPT - SEE CONSOLE LOG FOR DETAILS

Explanation: An error has been encountered during CICS initialization processing while attempting to establish the ASM/OAM OSREQ interface. The initialization request is terminated unsuccessfully.

Action: Refer to the message(s) from the ASM/OAM CICS intercept module on the console log for details of the error condition. These will have the format OTM055nn. Take the appropriate corrective action and resubmit the initialization request.

OTM23005 EIBRESP 'nnn' RECEIVED FOR FUNCTION X'xxxx'

Explanation: A CICS error condition has been intercepted during initialization of the ASM/OAM CICS interface. The initialization request is rejected. 'nnn' gives the value of the EIBRESP field from the Execute Interface Block, and 'xxxx' gives the CICS function code which caused the error.

Action: Refer to IBM CICS documentation for an explanation of the codes. If no apparent reason for the error can be identified, contact your ASM/OAM product support representative.

OTM23006 ERROR ATTACHING SUB-TASK

Explanation: An error has been encountered invoking CICS intercept processing. The CICS initialization request is terminated.

Action: Refer to other available system messages for more information about the error. If no apparent cause for the error can be identified, contact your ASM/OAM product support representative.

OTM23007 ERROR X'xx' REASON X'yyyyyyyy' ISSUING OAM ACCESS REQUEST

Explanation: An error has been returned from an OSREQ ACCESS request. 'xx' and 'yyyyyyyy' give the return and reason codes received from OAM. The CICS initialization request is terminated.

Action: Refer to IBM documentation on the OSREQ macro for a description of the displayed return and reason codes. Take the appropriate corrective action and resubmit the request.

OTM23008 NULL ENTRY FOR OMCT ADDRESS IN OTIMP310

Explanation: An error was found in an internal storage area during initialization of the ASM/OAM CICS interface. The initialization request is rejected.

Action: This is an internal error condition. Report the problem to your ASM/OAM product support representative.

8.12 CICS quiesce messages.

Messages produced while disabling the ASM/OAM CICS interface will be written to the system transient data queue 'CSMT', and will also be displayed on the requester's display terminal, if the function was explicitly invoked via transaction 'OM24'.

OTM24000 NEAROAM CICS INTERFACE QUIESCED

Explanation: The request to disable the ASM/OAM CICS interface has been successfully processed.

Action: This is an informational message.

OTM24001 NEAROAM CICS QUIESCE REQUEST FAILED

Explanation: An error has occurred during quiesce of the ASM/OAM CICS interface. An accompanying message will give details of the error condition.

Action: Refer to the accompanying message for a description of the failure.

OTM24003 ERROR REMOVING NEAROAM INTERCEPT - SEE CONSOLE LOG FOR DETAILS

Explanation: An error has been encountered during CICS quiesce processing while attempting to remove the ASM/OAM OSREQ interface. The quiesce request is terminated unsuccessfully.

Action: Refer to the message(s) from the ASM/OAM CICS intercept module on the console log for details of the error condition. These will have the format OTM055nn. Take the appropriate corrective action and resubmit the initialization request.

OTM24004 NEAROAM CICS INTERFACE NOT ACTIVE

Explanation: A request to disable the ASM/OAM CICS interface has been submitted, but the interface is not currently active.

Action: The request is ignored.

OTM24005 EIBRESP 'nnn' RECEIVED FOR FUNCTION X'xxxx'

Explanation: A CICS error condition has been intercepted during quiescing of the ASM/OAM CICS interface. The quiesce request is rejected. 'nnn' gives the value of the EIBRESP field from the Execute Interface Block, and 'xxxx' gives the CICS function code which caused the error.

Action: Refer to IBM CICS documentation for an explanation of the codes. If no apparent reason for the error can be identified, contact your ASM/OAM product support representative.

OTM24006 ERROR ATTACHING SUB-TASK

Explanation: An error has been encountered invoking CICS intercept processing. The CICS quiesce request is terminated.

Action: Refer to other available system messages for more information about the error. If no apparent cause for the error can be identified, contact your ASM/OAM product support representative.

OTM24007 ERROR X'xx' REASON X'yyyyyyyy' ISSUING OAM ACCESS REQUEST

Explanation: An error has been returned from an OSREQ ACCESS request. 'xx' and 'yyyyyyyy' give the return and reason codes received from OAM. The CICS quiesce request is terminated.

Action: Refer to IBM documentation on the OSREQ macro for a description of the displayed return and reason codes. Take the appropriate corrective action and resubmit the request.

8.13 Control region reader task messages.

Messages issued by tape and disk reader tasks in the ASM/OAM control region are displayed on the system console.

OTM25001 UNABLE TO LOAD CAF INTERFACE MODULE

Explanation: A tape reader task was unable to load the DB2 Call Attach Facility modules DSNALI or DSNHLI2. Tape reader task initialization processing has been terminated.

Action: Ensure that the DB2 runtime library at your installation is available to the ASM/OAM control region procedure via the system linklist or STEPLIB concatenations. Restart the control region.

OTM25002 CAF CONNECT ERROR xxx REASON yyyyyyyy

Explanation: Return code 'xxx' and reason code 'yyyyyyyy' have been received from a DB2 Call Attach Facility CONNECT request. Tape reader task initialization processing has been terminated.

Action: Refer to IBM CAF documentation for a description of the return and reason codes. Take the appropriate corrective action and restart the control region.

OTM25003 NULL REQUEST POINTER RECEIVED ON POSTING

Explanation: A tape reader task was invoked by the ASM/OAM scheduler, but its request queue was empty. The tape reader task will return to a wait status.

Action: This is an internal ASM/OAM error. Report the problem to your ASM/OAM product support representative.

OTM25004 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A request for virtual storage in the ASM/OAM control region by a tape reader task has been denied by the operating system. The task is terminated.

Action: Increase the amount of storage available for allocation in the ASM/OAM control region by increasing the value of the SIZE parameter in the NEAROAMC procedure. Restart the control region.

OTM25005 TAPE RDR TASK nnn INITIALIZATION FAILED

Explanation: An error has occurred during initialization of tape reader task 'nnn'. An accompanying message will give details of the error condition.

Action: Refer to the accompanying message for a description of the error which gave rise to the initialization failure. Take the action identified for this message, and restart the control region.

OTM25006 TAPE RDR TASK nnn NEARARCHIVE CLOSE ERROR xx

Explanation: Error 'xx' was returned from ASM for S/390 from a close database request from tape reader task 'nnn'. The reader task will continue to process the request queue. If all requests have been processed, the task will return to a wait status, but the last tape processed will remain allocated.

Action: Refer to the batch retrieval section of the ASM for S/390 User Manual for a description the error code. Take the appropriate action to correct the error. The reader task may need to be force purged in order to recover from the error.

OTM25007 CAF DISCONN ERROR xxx REASON yyyyyyyy

Explanation: Return code 'xxx' and reason code 'yyyyyyyy' have been received from a DB2 Call Attach Facility DISCONNECT request. Tape reader task termination processing continues.

Action: Refer to IBM CAF documentation for a description of the return and reason codes. Take the appropriate corrective action prior to restarting the control region.

OTM25008 TAPE RDR TASK nnn TERMINATION ERROR

Explanation: An error was encountered during tape reader task termination processing. An accompanying message will gives details of the error.

Action: Refer to the accompanying message for a description of the termination error condition. Take the specified action to avoid a re-occurrence of the problem.

OTM25009 TAPE RDR TASK nnn PURGED SUCCESSFULLY

Explanation: Tape reader task 'nnn' has terminated successfully, in response to a PURGE, SHUTDOWN or SET MAXDRIVE operator command.

Action: This is an informational message only.

OTM25010 TAPE RDR TASK RECEIVED ERROR POSTING REQUESTOR ECB

Explanation: An error occurred posting an outstanding OSREQ request from another application. The ASM/OAM control region will attempt to recover from this error condition and continue processing.

Action: Consult other available system messages for additional information regarding the error. If no apparent cause for the failure can be determined, report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM25011 RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED OPENING|READING NEARARCHIVE D/B FOR D/B zzzzzzzz
OTM25011 COLLECTION NAME ID = aaaaaaaaa OBJECT NAME = bbbb….bbbb

Explanation: An error has occurred opening an ASM for S/390 database or retrieving an object from an ASM for S/390 database during OAM object retrieval processing by a tape reader task. 'xx' and 'yyyyyyyy' identify the return code and hexadecimal supplementary codes received from ASM for S/390, and 'zzzzzzzz' identifies the DB2 name qualifier of the OAM storage group. The second message in the pair identifies the object for which the error occurred. 'aaaaaaaa' is the collection name identifier and 'bbbb….bbbb' the object name.

Action: Refer to ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and repeat the OAM retrieval request. The ASM/OAM control region may need to be stopped and restarted in order to rectify the error condition.

OTM25012 SQL ERROR -nnn RECEIVED DURING OBJECT RETRIEVAL PROCESSING FOR D/B zzzzzzzz
OTM25012 xxxx….xxxx

Explanation: An SQL error condition has been encountered by a tape reader task during object retrieval processing. '-nnn' gives the SQL error code, and 'zzzzzzzz' gives the DB2 name qualifier of the OAM storage group. This initial message is always accompanied by a second message giving the variable identifiers from the SQL error message associated with this error code. The OSREQ RETRIEVE request will be rejected with a return code of 12, and a reason code of X'7480xxxx'.

Action: Refer to IBM SQL error message documentation for a description of the error code. Take the appropriate corrective action and repeat the OAM retrieval request.

OTM25013 UNRECOVERABLE ERROR CONDITION - TAPE READER TASK xxx TERMINATING

Explanation: A serious error condition has occurred during tape reader task operation, and the task is unable to recover. The task will automatically terminate, and the current MAXDRIVE value decremented by 1.

Action: Refer to other ASM/OAM and/or system messages for information about the original error condition(s), and take the appropriate corrective action. The tape reader task may be manually restarted by increasing the value of MAXDRIVE by 1 (via the SET MAXDRIVE operator command).

OTM25401 UNABLE TO LOAD CAF INTERFACE MODULE

Explanation: A disk reader task was unable to load the DB2 Call Attach Facility modules DSNALI or DSNHLI2. Disk reader task initialization processing has been terminated.

Action: Ensure that the DB2 runtime library at your installation is available to the ASM/OAM control region procedure via the system linklist or STEPLIB concatenations. Restart the control region.

OTM25402 CAF CONNECT ERROR xxx REASON yyyyyyyy

Explanation: Return code 'xxx' and reason code 'yyyyyyyy' have been received from a DB2 Call Attach Facility CONNECT request. Disk reader task initialization processing has been terminated.

Action: Refer to IBM CAF documentation for a description of the return and reason codes. Take the appropriate corrective action and restart the control region.

OTM25403 NULL REQUEST POINTER RECEIVED ON POSTING

Explanation: A disk reader task was invoked by the ASM/OAM scheduler, but its request queue was empty. The disk reader task will return to a wait status.

Action: This is an internal ASM/OAM error. Report the problem to your ASM/OAM product support representative.

OTM25404 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: A request for virtual storage in the ASM/OAM control region by a disk reader task has been denied by the operating system. The task is terminated.

Action: Increase the amount of storage available for allocation in the ASM/OAM control region by increasing the value of the SIZE parameter in the NEAROAMC procedure. Restart the control region.

OTM25405 DISK RDR TASK nnn INITIALIZATION FAILED

Explanation: An error has occurred during initialization of disk reader task 'nnn'. An accompanying message will give details of the error condition.

Action: Refer to the accompanying message for a description of the error which gave rise to the initialization failure. Take the action identified for this message, and restart the control region.

OTM25406 DISK RDR TASK nnn NEARARCHIVE CLOSE ERROR xx

Explanation: Error 'xx' was returned from ASM for S/390 from a close database request from disk reader task 'nnn'. The reader task will continue to process the request queue. If all requests have been processed, the task will return to a wait status.

Action: Refer to the batch retrieval section of the ASM for S/390 User Manual for a description the error code. Take the appropriate action to correct the error. The reader task may need to be force purged in order to recover from the error.

OTM25407 CAF DISCONN ERROR xxx REASON yyyyyyyy

Explanation: Return code 'xxx' and reason code 'yyyyyyyy' have been received from a DB2 Call Attach Facility DISCONNECT request. Disk reader task termination processing continues.

Action: Refer to IBM CAF documentation for a description of the return and reason codes. Take the appropriate corrective action prior to restarting the control region.

OTM25408 DISK RDR TASK nnn TERMINATION ERROR

Explanation: An error was encountered during disk reader task termination processing. An accompanying message will gives details of the error.

Action: Refer to the accompanying message for a description of the termination error condition. Take the specified action to avoid a re-occurrence of the problem.

OTM25409 DISK RDR TASK nnn PURGED SUCCESSFULLY

Explanation: Disk reader task 'nnn' has terminated successfully, in response to a PURGE, SHUTDOWN or SET MAXDISK operator command.

Action: This is an informational message only.

OTM25410 DISK RDR TASK RECEIVED ERROR POSTING REQUESTOR ECB

Explanation: An error occurred posting an outstanding OSREQ request from another application. The ASM/OAM control region will attempt to recover from this error condition and continue processing.

Action: Consult other available system messages for additional information regarding the error. If no apparent cause for the failure can be determined, report the problem to your ASM/OAM product support representative. Preserve all diagnostic information and system dumps for further analysis.

OTM25411 RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED OPENING|READING NEARARCHIVE D/B FOR D/B zzzzzzzz

OTM25411 COLLECTION NAME ID = aaaaaaaaa OBJECT NAME = bbbb….bbbb

Explanation: An error has occurred opening an ASM for S/390 database or retrieving an object from an ASM for S/390 database during OAM object retrieval processing by a disk reader task. 'xx' and 'yyyyyyyy' identify the return code and hexadecimal supplementary codes received from ASM for S/390, and 'zz' identifies the DB2 name qualifier of the storage group database. The second message in the pair identifies the object for which the error occurred. 'aaaaaaaa' is the collection name identifier and 'bbbb….bbbb' the object name.

Action: Refer to ASM for S/390 documentation for a description of the return and supplementary codes. Take the appropriate corrective action and repeat the OAM retrieval request. The ASM/OAM control region may need to be stopped and restarted in order to rectify the error condition.

OTM25412 SQL ERROR -nnn RECEIVED DURING OBJECT RETRIEVAL PROCESSING FOR D/B zzzzzzzz
OTM25412 xxxx….xxxx

Explanation: An SQL error condition has been encountered by a disk reader task during object retrieval processing. '-nnn' gives the SQL error code and 'zzzzzzzz' gives the DB2 name qualifier of the OAM storage group database. This initial message is always accompanied by a second message giving the variable identifiers from the SQL error message associated with this error code. The OSREQ RETRIEVE request will be rejected with a return code of 12, and a reason code of X'7480xxxx'.

Action: Refer to IBM SQL error message documentation for a description of the error code. Take the appropriate corrective action and repeat the OAM retrieval request.

OTM25413 UNRECOVERABLE ERROR CONDITION - DISK READER TASK xxx TERMINATING

Explanation: A serious error condition has occurred during disk reader task operation, and the task is unable to recover. The task will automatically terminate, and the current MAXDISK value decremented by 1.

Action: Refer to other ASM/OAM and/or system messages for information about the original error condition(s), and take the appropriate corrective action. The disk reader task may be manually restarted by

increasing the value of MAXDISK by 1 (via the SET MAXDISK operator command).

8.14 CICS pre-fetch utility messages.

Messages issued by the CICS pre-fetch utility are written to the 'CSMT' transient data queue in the CICS region in which the error occurred.

OTM25502 EIBRESP 'xxx' RECEIVED FOR FUNCTION X'yyy'

Explanation: A CICS command failure occurred in a foreground application task during CICS pre-fetch processing. The response 'xxx' and function codes 'yyy' are as specified in the Exec Interface Block (EIB).

Action: Refer to CICS documentation for details of the function and response codes. Take the appropriate corrective action. Contact your ASM/OAM support representative if there is no apparent reason for the error.

OTM25503 ABEND xxxx RECEIVED DURING NEAROAM CICS PRE-FETCH PROCESSING

Explanation: An abend with code 'xxxx' has occurred in a foreground application task during CICS pre-fetch processing.

Action: Refer to CICS documentation for details of the abend code and the corrective action. Contact your ASM/OAM support representative if there is no apparent reason for the error.

OTM26001 OAM RETURN CODE xxx REASON CODE yyyyyyyy RECEIVED PRE-FETCHING:

OTM26001 COLL NAME: aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

OTM26001 OBJ NAME: bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb

Explanation: An error has been returned by OAM during pre-fetch retrieval processing for an object. Two supplementary OTM26001 messages will always accompany the first message to identify the object by collection and object name.

Action: Refer to OAM documentation for details of the return and reason codes. If the identified codes do not appear in standard OAM documentation, refer to section 8.16 of this manual for details of supplementary codes issued by ASM/OAM. Take the appropriate corrective action. Contact your ASM/OAM support representative if there is no apparent reason for the error.

OTM26002 EIBRESP 'xxx' RECEIVED FOR FUNCTION X'yyy'

Explanation: A CICS command failure occurred in background task (OM26) execution during CICS pre-fetch processing. The response 'xxx' and function codes 'yyy' are as specified in the Exec Interface Block (EIB).

Action: Refer to CICS documentation for details of the function and response codes. Take the appropriate corrective action. Contact your ASM/OAM support representative if there is no apparent reason for the error.

OTM26003 ABEND xxxx RECEIVED DURING NEAROAM CICS PRE-FETCH PROCESSING

Explanation: An abend with code 'xxxx' has occurred in background task (OM26) execution during CICS pre-fetch processing.

Action: Refer to CICS documentation for details of the abend code and the corrective action. Contact your ASM/OAM support representative if there is no apparent reason for the error.

8.15 Batch pre-fetch utility messages.

Messages from the batch pre-fetch utility are written to the OTIMS350 dataset. This dataset may be pre-allocated by the job which issues calls to the utility, or else will be dynamically allocated by the utility to a SYSOUT spool dataset.

OTM36001 ERROR OPENING xxxxxxxx DATASET

Explanation: An error was detected opening sequential dataset 'xxxxxxxx'.

Action: Refer to other available IBM system messages for more information on the open error. Take the appropriate corrective action and resubmit the job.

OTM36002 SQL ERROR -nnn ACCESSING TABLE xxxxxxxx

Explanation: SQL error '-nnn' was received accessing DB2 table 'xxxxxxxx'.

Action: Refer to DB2 message and code documentation for an explanation of the error. Take the appropriate corrective action and resubmit the job.

OTM36004 NO BATCHED ENTRIES RECEIVED PRIOR TO PROCESS BATCH REQUEST

Explanation: A request type '10' was received but there are no entries in the batchto be processed. This may be because of an error in program logic, or because all prior batch entry requests have been rejected. A return code '04' is set in the ASM/OAM parameter area.

Action: Determine which of the above conditions is true. For a program logic error, correct the program before the job is next submitted.

OTM36005 ERROR nnnnnnnn CLOSING FILE xxxxxxxx

Explanation: An error has occurred closing VSAM file 'xxxxxxxx'. 'nnnnnnnn' gives the hexadecimal contents of register 15 after failure of the close request.

Action: Refer to IBM VSAM documentation for a description of the error code. Take the appropriate corrective action before the job is next run.

OTM36006 SORT ERROR - SEE SYSOUT REPORT FOR DETAILS

Explanation: A non-zero return code was returned from the internal sort procedure.

Action: Refer to the SYSOUT dataset (allocated dynamically if not in the JCL) for details of the error. Take the appropriate corrective action and resubmit the job.

OTM36007 SQL ERROR -nnn RECEIVED DURING COMMIT PROCESSING

Explanation: SQL error '-nnn' was received during the automatic commit processing performed after completing retrieval from each ASM for S/390 tape volume.

Action: Refer to DB2 message and code documentation for an explanation of the error. Take the appropriate corrective action and resubmit the job.

OTM36009 ERROR nn RECEIVED CLOSING NEARARCHIVE DATABASE

Explanation: An error was received after issuing a ASM for S/390 close database request.

Action: Refer to the batch retrieval documentation in the ASM for S/390 User Manual for an explanation of the error code 'nn'. Take the appropriate corrective action and resubmit the job.

OTM36010 ERROR mmmmnnnn RECEIVED ALLOCATING xxxxxxxx

Explanation: An error was encountered dynamically allocating file 'xxxxxxxx'. 'mmmm' and 'nnnn' are the hexadecimal error and information codes returned from SVC99 processing.

Action: Refer to IBM documentation on the dynamic allocation SVC for an explanation of these codes. Take the appropriate corrective action and resubmit the job.

OTM36011 ERROR nnnnnnnn RECEIVED OPENING xxxxxxxx

Explanation: An error was encountered opening VSAM dataset 'xxxxxxxx'. 'nnnnnnnn' gives the hexadecimal reason code associated with the error.

Action: Refer to VSAM documentation for an explanation of this code. Take the appropriate corrective action and resubmit the job.

OTM36014 ERROR mm SUPP CODES X'nnnnnnnn' RECEIVED RETRIEVING OBJECT xxxx….xxxx

Explanation: An error was received after issuing an ASM for S/390 data retrieval request for object 'xxxx….xxxx'.

Action: Refer to the ASM for S/390 User Manual for an explanation of the return code 'mm', and the hexadecimal supplementary code 'nnnnnnnn'. Take the appropriate corrective action and resubmit the job.

OTM36015 ERROR mmmmnnnn RECEIVED WRITING OBJECT xxxx….xxxx TO FILE yyyyyyyy

Explanation: An error was encountered attempting to add object 'xxxx….xxxx' to VSAM dataset 'yyyyyyyy' after retrieval from ASM for S/390. 'mmmm' and 'nnnn' are the hexadecimal return and reason codes from the RPL
feedback area.

Action Refer to VSAM documentation for a description of these codes.
Take the appropriate corrective action and resubmit the job.

OTM36016 SQL ERROR -nnn INSERTING OBJECT xxxx….xxxx IN TABLE yyyy….yyyy

Explanation: SQL error '-nnn' was received inserting object 'xxxx….xxxx' in DB2 table 'yyyy….yyyy' after recall from ASM for S/390.

Action: Refer to DB2 message and code documentation for an explanation of the error. Take the appropriate corrective action and resubmit the job.

OTM36017 SQL ERROR -nnn UPDATING OBJECT xxxx….xxxx IN TABLE yyyy….yyyy

Explanation: SQL error '-nnn' was received updating object entry 'xxxx….xxxx' in OAM directory table 'yyyy….yyyy'.

Action: Refer to DB2 message and code documentation for an explanation of the error. Take the appropriate corrective action and resubmit the job.

OTM36018 INSUFFICIENT STORAGE FOR WORKAREAS

Explanation: Insufficient virtual storage was available for allocation of ASM/OAM workareas.

Action: Increase the step or job region size and rerun the job.

OTM36019 CAF OPEN ERROR nnnnnnnn

Explanation: Hexadecimal error 'nnnnnnnn' has been encountered when issuing a DB2 Call Attachment Facility open request.

Action: Refer to IBM CAF documentation for an explanation of the code. Take the appropriate corrective action and resubmit the job.

OTM36020 MEMBER xxxxxxxx NOT FOUND IN NEAROAM PARAMETER LIBRARY

Explanation: Mandatory member 'xxxxxxxx' was not present on the ASM/OAM parameter library OTIMS100 during ASM/OAM initialization processing.

Action: Ensure that the parameter library is correctly set up before rerunning the job.

OTM36021 ERROR nnnnnnnn LOCATING MEMBER xxxxxxxx IN NEAROAM PARAMETER LIBRARY

Explanation: An error has been encountered attempting to locate member 'xxxxxxxx' on the ASM/OAM parameter library. 'nnnnnnnn' gives the hexadecimal contents of register 15 on return from the FIND macro.

Action: Refer to IBM DFP documentation for an explanation of this code.

OTM36022 ERROR(S) PROCESSING NEAROAM PARAMETER LIBRARY

Explanation: Validation errors have been detected processing the ASM/OAM parameter library file OTIMS100.

Action: Refer to the parameter validation report in file OTIMS350 for details of the errors. Correct the invalid parameters and resubmit the job.

OTM36024 ERROR LOADING CAF INTERFACE MODULE

Explanation: A failure occurred attempting to load CAF interface module DSNALI or DSNHLI2.

Action: Ensure that the library containing these modules is available to the job via the JOBLIB or STEPLIB concatenation, or from the system linklist.

OTM36025 CAF CONNECT ERROR nnnnnnnn

Explanation: Hexadecimal error 'nnnnnnnn' has been encountered when issuing a DB2 Call Attachment Facility CONNECT request.

Action: Refer to IBM CAF documentation for an explanation of the code. Take the appropriate corrective action and resubmit the job.

OTM36026 STORAGE GROUP xxxxxxxx NOT IN STRGROUP PARAMETER MEMBER

Explanation: A retrieval request has been received for an object in storage group 'xxxxxxxx' but this storage group was not present in member STRGROUP on the ASM/OAM parameter library.

Action: Correct the STRGROUP parameter specification and rerun the job.

OTM36027 I/O ERROR nnnnnnnn RECEIVED PROCESSING FILE xxxxxxxx

Explanation: An I/O error has been encountered accessing file 'xxxxxxxx'. 'nnnnnnnn' gives the hexadecimal value of the first 4 bytes of the IOB after the error.

Action: Refer to IBM system documentation for an explanation of this value. Take the appropriate corrective action and resubmit the job.

OTM36028 MANDATORY xxxxxxxx PARAMETER MISSING

Explanation: Mandatory parameter 'xxxxxxxx' was not present in an ASM/OAM parameter library member.

Action: Add the missing parameter to the ASM/OAM parameter library member and rerun the job.

OTM36029 ERROR mmmmnnnn RECEIVED ALLOCATING SORT PRINTFILE

Explanation: An error was encountered dynamically allocating file SYSOUT for the internal sort. 'mmmm' and 'nnnn' are the hexadecimal error and information codes returned from SVC99 processing.

Action: Refer to IBM documentation on the dynamic allocation SVC for an explanation of these codes. Take the appropriate corrective action and resubmit the job.

OTM36030 ERROR nnnnnnnn RECEIVED MODIFYING xxxxxxxx RPL

Explanation: A modification request for VSAM RPL 'xxxxxxxx' has failed with hexadecimal error 'nnnnnnnn'.

Action: This is an internal programming error and should be reported to your ASM/OAM product support representative.

OTM36031 RETURN CODE xx SUPP CODES X'yyyyyyyy' RECEIVED ACCESSING NEARARCHIVE DATABASE FOR D/B zzzzzzzz

Explanation: An error has occurred while attempting to access the ASM for S/390 database for the OAM storage group with DB2 name qualifier 'zzzzzzzz' for input/output processing. The utility has been terminated abnormally.

Action: Consult the ASM for S/390 User Manual for a description of the return and supplementary codes displayed in the message.

Take the appropriate corrective action and restart the job.

OTM36032 RET CODE xx SUPP CODES X'yyyyyyyy' RECEIVED DELETING bbbb….bbbb IN D/B zzzzzzzz

Explanation: An error has occurred while attempting to delete the identified object from the ASM for S/390 database for the OAM storage group with DB2 name qualifier 'zzzzzzzz'. The utility has been terminated abnormally.

Action: Consult the ASM for S/390 User Manual for a description of the return and supplementary codes displayed in the message.

Take the appropriate corrective action and restart the job.

OTM36033 INVALID MGMT CLASS NAME SPECIFIED IN OBJCNTL : bbbb….bbbb

Explanation: An invalid management class has been specified in the OBJCNTL member of the ASM/OAM parameter library. 'bbbb….bbbb' identifies the invalid management class name. Processing of the utility has been abandoned.

Action: Correct the invalid entry in the OBJCNTL parameter library member, and rerun the job.

OTM36034 CLASS 'xxxx….xxxx' IS NOT IN STORAGE CLASS TABLE

Explanation: Storage class ‘xxxx….xxxx’ has been specified in the TAPECLASS or DISKCLASS parameter of the ENVCNTL parameter library member, but the specified class name does not exist in the OAMADMIN storage class identifier table. A return code of 12 is passed back to the calling application.

Action: Check that the correct class name has been specified in the TAPECLASS and/or disk class parameter of the ENVCNTL parameter library member, and that the specified (or defaulted) classes for these parameters have been defined to DFSMS.

8.16 OSREQ return and reason codes.

Any error condition encountered by ASM/OAM during processing of an OSREQ request will be communicated to the caller via OSREQ return and reason codes in the standard manner. In general, reason codes generated by ASM/OAM will have the value X'80' as a source identifier in byte 1 (the second byte of the code).

This section lists OSREQ return and reason codes generated by ASM/OAM only. All other OSREQ codes may be found in the appropriate IBM documentation.

Return code	**Reason code**
8	X'24800801'

Description: No buffer address supplied in the OSREQ parameter list for a non-staged object retrieval request.

Action: Check the appropriate OSREQ macro in the failing program to ensure that a correct buffer address has been supplied in the call parameters.

8	X'24800802'

Description: A buffer count of zero was supplied in the OSREQ parameter list for a non-staged object retrieval request.

Action: Check the appropriate OSREQ macro in the failing program to ensure that a correct buffer count has been supplied in the call parameters.

8	X'24800804'

Description: A total buffer length of zero bytes was supplied in the OSREQ parameters for a non-staged object retrieval request.

Action: Check the appropriate OSREQ macro in the failing program to ensure that a correct buffer length has been supplied in the call parameters.

Return code	Reason code	
8	X'24800808'	
		Description: The buffer supplied in the OSREQ parameters for a non-staged object retrieval request was not large enough to hold the retrieved object.
		Action: Modify the appropriate OSREQ macro in the failing program to ensure that a sufficient large buffer length has been supplied in the call parameters.
8	X'24800C02'	
		Description: The 'offset' value supplied in the OSREQ parameter list for a non-staged object retrieval request was greater than the total object length.
		Action: Modify the appropriate OSREQ macro in the failing program to ensure that a correct value for the 'offset' parameter has been supplied.
8	X'24800C03'	
		Description: An invalid 'offset' value was supplied in the OSREQ parameter list for a non-staged object retrieval request.
		Action: Check the appropriate OSREQ macro in the failing program to ensure that a correct value for the 'offset' parameter has been supplied.
8	X'24800D02'	
		Description: The sum of the 'offset' and 'length' values supplied in the OSREQ parameter list for a non-staged object retrieval request exceeded the total length of the object.
		Action: Modify the appropriate OSREQ macro in the failing program to ensure that correct values for the 'offset' and 'length' parameters have been supplied.

Return code	Reason code
8	X'24800D03'

Description: An invalid ‘length’ value was supplied in the OSREQ parameter list for a non-staged object retrieval request.

Action: Check the appropriate OSREQ macro in the failing program to ensure that a correct value for the ‘length’ parameter has been supplied.

8	X'2C800200'

Description: An object was not present in an ASM for S/390 database.

Action: Issue an operator REFRESH command in the ASM/OAM control region, to close and re-open all ASM for S/390 primary index files and repeat the request.

If the error still occurs, ensure consistency between the OAM directory and the ASM for S/390 database index for the storage group being processed. If no inconsistency can be found, contact your ASM/OAM product support representative.

8	X'34xxxxxx'

Description: A program abend has been intercepted during ASM/OAM processing of the request. 'xxx' gives the system abend code.

Action: Refer to IBM documentation for a description of the abend code. If the reason for the failure is not apparent, contact your ASM/OAM product support representative.

Return code	Reason code	
12	X'68800100'	
		Description: Object processing cannot be performed due to the unavailability of one or more ASM/OAM resources.
		Action: Retry the request at a later time.
12	X'6C030800'	
		Description: ASM/OAM OSREQ intercept processing has not been enabled.
		Action: Ensure that the ASM/OAM control region is active. If the error has been received during execution of a CICS program, ensure that the ASM/OAM CICS interface has also been enabled successfully (see section 4.2 of this manual for a discussion of this requirement).
12	X'7480xxxx'	
		Description: An SQL error occurred trying to access a DB2 table. 'xxxx' gives the hexadecimal value of the SQL code.
		Action: Refer to DB2 documentation for a description of the error. Take the appropriate corrective action to ensure that the problem does not re- occur.
12	X'B0800300'	
		Description: The storage group containing the object collection was not in the ASM/OAM parameter library STRGROUP member.
		Action: Add the storage group containing the object collection to the STRGROUP member.

Return code	Reason code
12	X'B4800100'

Description: Object collection name is not in the OAM collection name table

Action: Ensure consistency of OAM DB2 table information. If no inconsistency can be found, contact your ASM/OAM product support representative.

16	X'CC80xxyy'

Description: An error has been returned by ASM for S/390 during object retrieval or deletion processing. 'xx' is the two-character code returned from the ASM for S/390 batch retrieval function. 'yy' is the second byte of the reason code 1 field returned by ASM for S/390.

Action: Refer to the batch retrieval section of the ASM for S/390 User Manual for a description of the two-character return code and the reason code.

Take the appropriate action to ensure the problem does not re-occur.

If the reason for the failure is not apparent, contact your ASM for S/390 product support representative.

16	X'D080xxxy'

Description: A program abend has been intercepted during ASM/OAM processing of the request. 'xxx' gives the system abend code.

Action: Refer to IBM documentation for a description of the abend code. If the reason for the failure is not apparent, contact your ASM/OAM product support representative.

Return code	Reason code
16	X'D081xxxx'

Description: An error has occurred retrieving an address space token using the ALESERV macro. ‘xxxx’ gives the hexadecimal error code returned from the macro call.

Action: Refer to IBM documentation on the ALESERV macro for a description of the error code. Take the appropriate corrective action before retrying the request. If no apparent cause for the failure can be detected, contact your Storage Technology product support representative.

16	X'DCxxxxxx'

Description: A Call Attach Facility error was encountered during processing of the request. 'xxxxxx' gives the last 3 bytes of the reason code generated by CAF.

Action: Refer to CAF documentation for a description of the reason code. Take the appropriate action to ensure the problem does not re-occur.

8.17 Reader task return codes.

On completion of an object retrieval request, the ASM/OAM tape or disk reader task issues a two-character internal return code to other ASM/OAM components, indicating the result of the request. Unsuccessful return codes will result in bad return and/or reason codes being issued to the OSREQ caller by ASM/OAM.

The internal reader task return code is included in the corresponding entry in the request section of the SMF record created during object retrieval processing. The value of the return code may be used by the customer's own SMF record processing for an analysis of successful and unsuccessful ASM/OAM retrieval requests.

A return code value of '00' indicates successful retrieval of an object from ASM for S/390. Non-zero return codes indicate that an abnormal condition was encountered during retrieval processing. This section lists all possible non-zero values of the reader task return code.

RC	Description
04	Logical record length exceeds the maximum set by the calling program.
13	Error occurred retrieving the identifier of a data block from the ASM for S/390 tape or disk dataset.
16	Error occurred locating a block on an ASM for S/390 tape or disk dataset.
30	Last logical record in ASM for S/390 object already retrieved.
31	Identified object is not on ASM for S/390 database.
50	DB2 Call Attach Facility open error.
51	SQL error reading OAM directory entry.
52	SQL error received updating OAM data storage database.
53	ASM/OAM program abend intercepted.
60	Non-staged object retrieval requested completed successfully.
61	Supplied OSREQ buffer not large enough to hold retrieved object.
62	'Offset' parameter in OSREQ retrieval request greater than object size.
63	Sum of 'offset' and 'length' parameters in OSREQ retrieval request greater than object size.
64	Error from ALESERV macro during retrieval processing.
86	Internal ASM for S/390 index error - object not in block identified.
87	ASM for S/390 database has not been opened prior to access.
88	ASM for S/390 database has already been opened.
89	ASM for S/390 system file has not been opened for input-output processing.
90	A error has occurred while dynamically allocating an ASM for S/390 system dataset.
91	ASM for S/390 database not correctly initialized.
92	Failure trying to acquire virtual storage.
93	Fatal error already received - ASM for S/390 cannot continue processing.
94	Error accessing ASM for S/390 system dataset.

RC	Description
95	ASM for S/390 product not authorized.
96	ASM for S/390 load module not found.
97	Open error on ASM for S/390 system file.
98	Internal ASM for S/390 processing error.
99	Invalid ASM for S/390 request code.

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Appendices

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Appendix A: Sample JCL members

Appendix A gives listings of members on the distributed ASM/OAM sample JCL library.

GPXXDEF

Member GPXXDEF defines and initializes the deletion control dataset used by ASM/OAM for migration and storage of OAM objects from storage group XX.

```
//GPXXDEF  JOB
//*
//*  NearOAM delete control dataset creation job
//*
//*  Change history:
//*   GW  09/07/93 V1.1 created
//*   GW  19/01/95 V2.1 NearArchive database creation
//*                     and initialization steps removed
//*   GW  24/10/97 V2.2 'hlq' qualifier added
//*   GW  20/07/00 V2.3 GROUPxx qualifier modified to xxxxxxxx
//*
//*  This job creates the NearOAM delete control dataset
//*  for a NearOAM storage group
//*
//*  Before submitting the job, alter the lines marked
//*  "/* <== */" as follows:
//*
//*       xxxxxxxx: should be set to the name of the DB2 database
//*                 qualifier assigned to the storage group
//*                 (e.g. GROUP00, GROUP01 etc.)
//*
//*           dddd: the name of the DB2 subsystem used by
//*                 NearOAM for processing this storage
//*                 group.
//*
//*  eeee and ffff: the primary and secondary allocation
//*                 values for the NearOAM delete control
//*                 dataset.  This dataset will contain one
//*                 record for each object that has been
//*                 selected for processing during execution
//*                 of the migration utility.  Ensure that
//*                 these values are sufficient to contain
//*                 the highest number of objects that are
//*                 expected to be processed in any one
//*                 execution of this utility for this
//*                 storage group.
//*
//*          vvvvv: the serial number of the disk volume to
//*                 be used for allocating NearOAM
//*                 datasets for this storage group.
//*
//*            hlq: the value of the HLQ parameter from the STRGROUP
//*                 parameter library member.  If no HLQ parameter
//*                 has been specified, remove the 'hlq' qualifier
//*                 from the data set name.
//*
```

```
//STEP100  EXEC PGM=IDCAMS
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSIN    DD   *
   DELETE hlq.xxxxxxxx.OTM.dddd.DELETE.CONTROL             /* <=== */
   DEFINE CLUSTER -
            (NAME(hlq.xxxxxxxx.OTM.dddd.DELETE.CONTROL) -  /* <=== */
             SHR(2 3) -
             REC(eeee ffff) -                              /* <=== */
             RECSZ(52 132) -
             INDEXED -
             KEYS(48 0) -
             FSPC(20 10) -
             BUFFERSPACE(737280) -
             VOL(vvvvvv)) -                                   /*<===*/
         DATA -
            (NAME(hlq.xxxxxxxx.OTM.dddd.DELETE.CONTROL.DATA) - /*<===*/
             CISZ(16384)) -
         INDEX -
            (NAME(hlq.xxxxxxxx.OTM.dddd.DELETE.CONTROL.IX) -   /*<===*/
             CISZ(4096))
/*
```

GPXXMIG

Member GPXXMIG executes the ASM/OAM object management procedure for storage group XX.

```
//GPXXMIG  JOB
//*
//*  NearOAM object management job
//*
//*  Change history:
//*   GW  09/07/93 V1.1 created
//*   GW  19/01/95 V2.1 STEP110 EXEC parm description updated
//*   GW  09/08/95 REGION parameter added to STEP110
//*   GW  13/03/96 OM210011 - NearArchive load libraries added to
//*                STEPLIB concatenations in STEP110 and STEP120
//*   GW  24/10/97 V2.2 OTIMIDCI and OTIMIDCO DD cards added to
//*                STEP100
//*   GW  20/07/00 V2.3 No modifications required
//*
//*  This job migrates and expires objects
//*  for storage group 'storage-group-name' (identifier XX)
//*
//*  Before submitting the job, alter the lines marked <===
//*  as follows:
//*
//*     EXEC PARM: replace the string 'storage-group-name' with
//*                the name of the storage group to be
//*                processed.  For steps STEP100 and STEP120
//*                add the PRINT and RESTART keyword parameters
//*                where necessary (see chapter 5 of the
//*                NearOAM user manual for an explanation of
//*                these parameters).
//*
//*    NearOAM.load.library: replace this string with the
//*                          name of the NearOAM product
//*                          load library on your system.
//*
//*  NearArchive.load.library: replace this string with the
//*                            name of the NearArchive product
//*                            load library on your system.
//*
//*       DB2.runtime.library: replace this string with the
//*                            name of the DB2 runtime library
//*                            on your system.
//*
//* NearOAM.parameter.library: replace this string with
//*                              the name of the NearOAM
//*                              parameter library on your
//*                              system.
//*
//*     NearOAM.JCL.library: replace this string with the
//*                          name of the PDS holding the
//*                          member DGROUPXX which contains
//*                          the delete/define parameters
//*                          for the NearOAM deletion
//*                          control dataset for this storage
//*                          group.  Change the member name
//*                          DGROUPXX to the name of the
//*                          member to be used.
//*
```

```
//STEP100 EXEC PGM=OTIMP100,REGION=4096K,
//             PARM='storage-group-name'                        <===
//*            PARM='storage-group-name,RESTART=YES'            <===
//STEPLIB  DD  DSN=NearOAM.load.library,DISP=SHR                <===
//         DD  DSN=NearArchive.load.library,DISP=SHR            <===
//         DD  DSN=DB2.runtime.library,DISP=SHR                 <===
//OTIMS100 DD  DSN=NearOAM.parameter.library,DISP=SHR           <===
//OTIMIDCI DD  DSN=NearOAM.JCL.library(DGROUPXX),               <===
//            DISP=SHR
//OTIMIDCO DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//*
//STEP110  EXEC PGM=OTIMP110,REGION=4096K,
//             PARM='storage-group-name,BACKUP=YES|NO'          <===
//STEPLIB  DD  DSN=NearOAM.load.library,DISP=SHR                <===
//         DD  DSN=NearArchive.load.library,DISP=SHR            <===
//OTIMS100 DD  DSN=NearOAM.parameter.library,DISP=SHR           <===
//SYSPRINT DD SYSOUT=*
//*
//STEP120  EXEC PGM=OTIMP120,REGION=4096K,
//             PARM='storage-group-name'                        <===
//*            PARM='storage-group-name,RESTART=YES'            <===
//STEPLIB  DD  DSN=NearOAM.load.library,DISP=SHR                <===
//         DD  DSN=NearArchive.load.library,DISP=SHR            <===
//         DD  DSN=DB2.runtime.library,DISP=SHR                 <===
//OTIMS100 DD  DSN=NearOAM.parameter.library,DISP=SHR           <===
//SYSPRINT DD  SYSOUT=*
//OTIMIDCI DD  DSN=NearOAM.JCL.library(DGROUPXX),               <===
//            DISP=SHR
//OTIMIDCO DD  SYSOUT=*
//*
```

NEAROAMC

Member NEAROAMC is a sample procedure for execution of the ASM/OAM control region started task.

```
//*
//*   NearOAM started task procedure.
//*
//*  Change history:
//*   GW  09/07/93 V1.1 created
//*   GW  19/01/95 V2.1 procedure name amended to NEAROAMC
//*   GW  24/10/97 V2.2 no modifications
//*   GW  20/07/00 V2.3 no modifications
//*
//*   Edit each of the lines marked "<===" to update:
//*
//*     1. Name of installed NearOAM load library.
//*
//*     2. Name of installed NearArchive load library.
//*
//*     3. Name of DB2 runtime load library.
//*
//*     4. Name of NearOAM parameter library.
//*
//*   If any of the above load libraries are present in the
//*   system linklist, they may be omitted from the STEPLIB
//*   concatenation in this procedure.
//*
//NEAROAMC PROC SIZE=6192K
//*
//NEAROAMC EXEC PGM=OTIMP200,REGION=&SIZE
//STEPLIB  DD  DSN=NearOAM.load.library,DISP=SHR         <===
//         DD  DSN=NearArchive.load.library,DISP=SHR     <===
//         DD  DSN=DB2.runtime.load.library,DISP=SHR     <===
//OTIMS100 DD  DSN=NearOAM.parameter.library,            <===
//            DISP=SHR
//*
```

OTIMBIND

Member OTIMBIND creates the DB2 application plan required for execution of ASM/OAM.

```
//OTIMBIND JOB
//*
//*  NearOAM DB2 plan creation job.
//*
//*  Change history:
//*   GW  09/07/93 V1.1 created
//*   GW  19/01/95 V2.1 no changes
//*   GW  28/03/96 OM210005: OTIML130 BIND parameters added
//*   GW  11/04/97 OM210034: OTIML254 BIND parameters added
//*   GW  24/10/97 V2.2 OTIML010 and OTIML020 added
//*                VALIDATE(RUN) changed to VALIDATE(BIND)
//*   GW  20/07/00 V2.3 changed to bind from package list
//*
//*  This job creates the DB2 application plan
//*  required for NearOAM implementation.
//*
//*  Amend the job as follows before submitting:
//*
//*  1.  Alter the STEPLIB DD card to specify name of the
//*      DB2 runtime load library on the host system.
//*
//*  2.  Change the dataset name on the DBRMLIB DD card
//*      to specify the name of the NearOAM DBRM library
//*      unloaded from file 2 of the distribution tape.
//*
//*  3.  Change the name of the DB2 subsystem (DB2) in
//*      the DSN statement to match the subsystem name
//*      in use on the host system.
//*
//*  4.  Replace the character string 'pppppppp' with
//*      the name of the DB2 plan to be generated.
//*
//*  5.  Replace the character strings 'aaaaaaaa', 'bbbbbbbb'
//*      etc. in the PKLIST parameter with the DB2 database name
//*      qualifiers of each OAM storage group to be accessed by
//*      NearOAM ('GROUP00', 'GROUP01' etc.).  There should be
//*      one entry in the PKLIST parameter for each OAM storage
//*      group.
//*
//BIND     EXEC PGM=IKJEFT01,DYNAMNBR=20
//STEPLIB  DD   DSN=DB2.runtime.library,DISP=SHR
//DBRMLIB  DD   DSN=NearOAM.DBRM.library,DISP=SHR
//SYSTSPRT DD   SYSOUT=*
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSTSIN  DD   *

   DSN SYSTEM(DB2)

   BIND PLAN(pppppppp)                  -
        PKLIST(aaaaaaaa.*,              -
               bbbbbbbb.*,              -
               cccccccc.*)              -
        ACTION(REPLACE)                 -
        RETAIN                          -
```

```
        VALIDATE(BIND)                    -
        ISOLATION(CS)                     -
        FLAG(E)                           -
        ACQUIRE(USE)                      -
        RELEASE(COMMIT)                   -
        EXPLAIN(NO)
/*
```

OTIMGRNT

Member OTIMGRNT grants DB2 authorities for ASM/OAM plan access.

```
//OTIMGRNT JOB
//*
//*  NearOAM OAM table authorization job.
//*
//*  Change history:
//*   GW  09/07/93 V1.1 created
//*   GW  19/01/95 V2.1 no changes
//*   GW  28/03/96 OM210005: OTIML130 PLAN ADDED
//*   GW  11/04/97 OM210034: OTIML254 PLAN ADDED
//*   GW  24/10/97 V2.2 OTIML010 and OTIML020 added
//*   GW  20/07/00 V2.3 no changes
//*
//*  This job grants DB2 authorities for
//*  NearOAM plan access.
//*
//*  Amend the job as follows before submitting:
//*
//*  1.  Change the name of the DB2 subsystem (DB2) in
//*      the DSN statement to match the subsystem name
//*      in use on the host system.
//*
//*  2.  Change the dataset name on the LIB keyword of
//*      the RUN statement to specify the name of the
//*      DB2 run time library in use on the host system.
//*
//*  3.  Change the plan name in the RUN statement (DSNTIA21)
//*      to match the version of DB2 in use on the host
//*      system.
//*
//*  4.  Change the plan name in the GRANT command (pppppppp)
//*      to match the name of the plan to be used for NearOAM
//*      execution.
//*
//GRNT     EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD   SYSOUT=*
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSTSIN  DD   *
   DSN SYSTEM(DB2)
   RUN PROGRAM(DSNTIAD) PLAN(DSNTIA21)   -
        LIB('DB2.run.time.library')
//SYSIN    DD   *
   GRANT EXECUTE
         ON PLAN pppppppp
         TO PUBLIC;
   COMMIT;
/*
```

OTIMPKG

Member OTIMPKG creates the ASM/OAM DB2 application packages.

```
//OTIMBIND JOB
//*
//*  NearOAM DB2 package creation job.
//*
//*  Change history:
//*   GW  24/10/97 V2.2 created
//*   GW  20/07/00 V2.3 added support for >100 storage groups
//*
//*  This job creates the DB2 application packages
//*  required for NearOAM implementation.
//*
//*  Amend the job as follows before submitting:
//*
//*  1.  Alter the STEPLIB DD card to specify name of the
//*      DB2 runtime load library on the host system.
//*
//*  2.  Change the name of the DB2 subsystem (DB2) in
//*      the DSN statement to match the subsystem name
//*      in use on the host system.
//*
//*  3.  Change the dataset name on the DBRMLIB card
//*      to specify the name of the NearOAM DBRM library
//*      unloaded from file 2 of the distribution tape.
//*
//*  4.  This job should be run once for each OAM storage group to be
//*      accessed by NearOAM.  Each occurrence of the character string
//*      'xxxxxxxx' should be modified to the DB2 database name
//*      qualifier assigned to the OAM storage group ('GROUP00',
//*      'GROUP01' etc.).
//*
//BIND     EXEC PGM=IKJEFT01,DYNAMNBR=20
//STEPLIB  DD   DSN=DB2.runtime.library,DISP=SHR
//DBRMLIB  DD   DSN=NearOAM.DBRM.library,DISP=SHR
//SYSTSPRT DD   SYSOUT=*
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSTSIN  DD   *
   DSN SYSTEM(DB2)
   BIND PACKAGE(xxxxxxxx)                -
        QUALIFIER(xxxxxxxx)              -
        MEMBER(OTIML010)                 -
        ACTION(REPLACE)                  -
        VALIDATE(BIND)                   -
        ISOLATION(CS)                    -
        FLAG(E)                          -
        SQLERROR(CONTINUE)               -
        RELEASE(COMMIT)                  -
        EXPLAIN(NO)
   BIND PACKAGE(xxxxxxxx)                -
        QUALIFIER(xxxxxxxx)              -
        MEMBER(OTIML020)                 -
        ACTION(REPLACE)                  -
        VALIDATE(BIND)                   -
        ISOLATION(CS)                    -
        FLAG(E)                          -
```

```
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML100)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML120)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML130)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML220)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML250)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
     SQLERROR(CONTINUE)              -
     RELEASE(COMMIT)                 -
     EXPLAIN(NO)
BIND PACKAGE(xxxxxxxx)               -
     QUALIFIER(xxxxxxxx)             -
     MEMBER(OTIML254)                -
     ACTION(REPLACE)                 -
     VALIDATE(BIND)                  -
     ISOLATION(CS)                   -
     FLAG(E)                         -
```

```
        SQLERROR(CONTINUE)                -
        RELEASE(COMMIT)                   -
        EXPLAIN(NO)
   BIND PACKAGE(xxxxxxxx)                 -
        QUALIFIER(xxxxxxxx)               -
        MEMBER(OTIML360)                  -
        ACTION(REPLACE)                   -
        VALIDATE(BIND)                    -
        ISOLATION(CS)                     -
        FLAG(E)                           -
        SQLERROR(CONTINUE)                -
        RELEASE(COMMIT)                   -
        EXPLAIN(NO)
   BIND PACKAGE(xxxxxxxx)                 -
        QUALIFIER(xxxxxxxx)               -
        MEMBER(OTIML368)                  -
        ACTION(REPLACE)                   -
        VALIDATE(BIND)                    -
        ISOLATION(CS)                     -
        FLAG(E)                           -
        SQLERROR(CONTINUE)                -
        RELEASE(COMMIT)                   -
        EXPLAIN(NO)
/*
```

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