

IBM IMS Recovery Solution Pack for z/OS
2.1

*IMS High Performance Change
Accumulation Utility User's Guide*



Note:

Before using this information and the product it supports, read the information in [“Notices” on page 189.](#)

Fifth Edition (March 2024)

This edition applies to Version 2.1 of IBM IMS Recovery Solution Pack for z/OS: IMS High Performance Change Accumulation Utility (program number 5655-ISR) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC27-8443-03.

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About this information

IBM® IMS Recovery Solution Pack for z/OS®: IMS High Performance Change Accumulation Utility (also referred to as IMS HP Change Accumulation Utility and IMS HPCA) is an IMS tool that improves the performance of change accumulation merge operations by running multiple change accumulation groups in parallel and streaming the output across all addresses simultaneously.

This user's guide provides instructions for using IMS HP Change Accumulation Utility.

To use the procedures in this user's guide, you must have already installed IBM IMS Recovery Solution Pack for z/OS by completing the SMP/E installation process that is documented in the *Program Directory for IBM IMS Recovery Solution Pack for z/OS*, GI13-4315, which is included with the product. You must also perform the post-installation steps as outlined in the *IMS Recovery Solution Pack: Overview and Customization*, SC27-8440.

These topics are designed to help database administrators, system programmers, application programmers, and system operators perform the following tasks:

- Understand the capabilities of the functions that are associated with IMS HP Change Accumulation Utility
- Install and operate IMS HP Change Accumulation Utility
- Customize your IMS HP Change Accumulation Utility environment
- Diagnose and recover from IMS HP Change Accumulation Utility problems
- Use IMS HP Change Accumulation Utility with other IMS products

To use these topics, you should have a working knowledge of:

- The z/OS operating system
- ISPF
- SMP/E
- IMS

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

- Links to [IBM Documentation](#) for the user guides ("HTML")
- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products
- Technical notes from IBM Software Support, referred to as "Tech notes"
- White papers that describe product business scenarios and solutions

Part 1. IMS HP Change Accumulation Utility overview

IMS HP Change Accumulation Utility is an IMS tool that improves the performance of change accumulation merge operations by running multiple change accumulation groups in parallel and streaming the output to each group simultaneously.

Topics:

- [Chapter 1, “IMS HP Change Accumulation Utility overview,” on page 3](#)

Chapter 1. IMS HP Change Accumulation Utility overview

IMS HP Change Accumulation Utility is an IMS tool that improves the performance of change accumulation merge operations by running multiple change accumulation groups in parallel and streaming the output to each group simultaneously.

IMS HP Change Accumulation Utility is one of several IBM tools that can help you manage backup and recovery operations for your databases in the event of a system outage or application failure.

Topics:

- [“What's new in IMS HP Change Accumulation Utility” on page 3](#)
- [“IMS HP Change Accumulation Utility features and benefits” on page 4](#)
- [“Database recovery and change accumulation overview” on page 5](#)
- [“Change accumulation using IMS HP Change Accumulation Utility” on page 7](#)
- [“IMS HP Change Accumulation Utility architecture and process flow” on page 8](#)
- [“Hardware and software requirements” on page 9](#)
- [“Compatibility with earlier releases” on page 10](#)
- [“Service updates and support information” on page 10](#)
- [“Product documentation and updates” on page 10](#)
- [“Accessibility features” on page 11](#)

What's new in IMS HP Change Accumulation Utility

This topic summarizes the technical changes for this edition.

New and changed information is indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

Revision markers follow these general conventions:

- Only technical changes are marked; style and grammatical changes are not marked.
- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If a topic is changed by more than 50%, the entire topic is marked with revision markers (so it might seem to be a new topic, even though it is not).

Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

SC27-8443-04 - March 2024

Description	Related APARs
Support the record length increase from 7 digits to 9 digits. See Columnar, comma-separated, HTML, and XML reports in Chapter 10, “Reports reference,” on page 101 for more information.	PH59924

SC27-8443-03 - February 2024

Description	Related APARs
Support IMS management of ACBs. See the following topics for more information: <ul style="list-style-type: none">• Two-step batch mode: “Using IMS management of ACBs” on page 33• Extended batch mode: “Using IMS management of ACBs” on page 39• ISPF user interface mode: “Using IMS management of ACBs” on page 57• “Specifying DFSHDBSC DD” on page 75• “JCL conversion for single address space job processing” on page 82	PH59141

SC27-8443-02 - August 2022

- PH42476 (UI78675), PH44043 (UI79490), and PH46276 (UI80771) - New error messages and abend codes are issued when the spill file has been deleted for an unexpected reason and subsequent processing cannot continue.
- Updated information about hardware and software requirements.

SC27-8443-01 - November 2018

- PI92558 (UI53801) - Enable MAXLOGS RC for 2-step batch mode.
- PI86492 (UI52719) - Allow specification of a job RC if DBRC returns a DSP00251 message, and support CA2PITCA on tape.
- PI97776 - update to DSP0025I RC parameter and new message HPC4020W.

SC27-8443-00 - October 2016

- Maintenance updates for IMS Recovery Solution Pack 2.1.
- Global parameters for operation statements: CA2PITCA, LOG TIME, MAXIMUM LOGS, MAXLOGS RC.
- GENJCL definitions: GEN.LIST, GEN.RETRY.
- Limiting input logs: Using the VOLNUM parameter.
- New error messages.

IMS HP Change Accumulation Utility features and benefits

IMS HP Change Accumulation Utility is a high performance tool that can merge the most recent database changes quickly, safely, and accurately while reducing the I/O, CPU time, and elapsed time that is required to build change accumulation data sets.

Jobs that might normally take hours are easier to perform and are processed in a fraction of the time. IMS HP Change Accumulation Utility protects your data, saves database administrator resources, and reduces supplementary software costs. By conducting change accumulation procedures regularly between image copies, you can ensure your ability to restore business-critical data in the event of a disaster.

IMS HP Change Accumulation Utility improves the performance of IMS change accumulation merge operations by running multiple change accumulation groups in parallel rather than in sequence and streaming the output to each group simultaneously.

IMS HP Change Accumulation Utility also enables you to extract database updates with one pass of the data, which minimizes the need for manual intervention. By using your existing DBRC GENJCL statements, IMS HP Change Accumulation Utility can automatically generate the required JCL.

Product features

IMS HP Change Accumulation Utility provides the following features:

- Simplified setup and configuration using a single address space
- Point-in-time change accumulation
- Priority scheduling
- In-memory spill files that use 64-bit addressing
- Cache storage management
- Reduction or elimination of cross-memory data transfers
- All processing to be completed within a single address space
- Additional options that extend IMS/CA functionality

Product benefits

IMS HP Change Accumulation Utility provides the following benefits:

- Provides an easy-to-use interactive system productivity facility interface (ISPF) for setup and operation
Alternative batch and extended batch interfaces are also provided.
- Can use custom or standard JCL procedures for processing job tasks
Manual modification of JCL is not required.
Multiple methods are available for scheduling JCL to be run.
- Provides a single point of control and reporting
- Enables you to quickly perform change accumulation for multiple change accumulation groups
- Reduces the need for manual intervention during the change accumulation process
- Allows you to reuse your existing IMS Database Recovery Control (DBRC) input stream processes to minimize additional setup
- Allows reuse of most DBRC skeletons without modification
- Leverages the latest technology to maximize the number of processes that can run concurrently
- Helps you efficiently manage resource consumption by limiting the number of parallel processes
Performance controls allow some change accumulation groups to be processed serially when you need to allot CPU resources to other projects.
- Using IMS DBRC to determine which log files need to be read, which ensures that no data is omitted from the recovery process

Database recovery and change accumulation overview

Change accumulation is one of several IMS processes that can help you manage the successful backup and recovery of databases in the event of a system outage or application failure.

IMS log information and DBRC

While IMS is running, it records the event information that is necessary to restart the system if a hardware or software failure occurs. IMS activities are recorded in the following IMS logs:

- Write-ahead data set (WADS)

A data set containing log records that reflect completed operations and are not yet written to an online log data set.

- Online log data set (OLDS)

A data set that contains all the log records for IMS restart and recovery. There are many different types of records recorded in the logs so they eventually get archived to a system log data set (SLDS).

- System log data set (SLDS)

This data set can be very large because it holds data from one or more OLDS. The SLDS can be used as input to a number of IMS utilities (for example, change accumulation) and for an emergency restart of IMS.

- Recovery log data set (RLDS)

RLDS is like the SLDS except that it contains only the log records that are needed for a database recovery. The RLDS is mostly used as input to IMS database utilities (for example, change accumulation).

The IMS logs contain information about:

- IMS startups and shutdowns
- Changes made to databases
- Transaction requests received and responses sent
- Application program initializations and terminations
- Application program checkpoints
- IMS system checkpoints

IMS Database Recovery Control (DBRC) is the integral component of IMS that helps ensure IMS system and database integrity by recording and managing information that is associated with the logging process.

Additionally, DBRC facilitates database and log recovery by recording and maintaining information about the database and logs in the Recovery Control (RECON) data set.

As IMS runs, IMS logging records all events into the OLDS. As the OLDS fills, the records are archived to the SLDS and RLDS. These two data sets can be used as input for restart and recovery of a failed IMS or database.

The database recovery process

Recovering a database includes the following basic steps:

1. Restore the database to the most recent image copy
2. Use log data sets and change accumulation data sets to restore changes since the last image copy

An image copy generally refers to a backup of database which is created by IMS utilities or IMS tools that is used as input to a database recovery utility.

3. Back out any incomplete changes

Information for a database recovery can come from any or all of the following sources:

- Image copies of the database
- Log data sets (SLDS and RLDS)
- Change accumulation data sets

The need for change accumulation

One problem with using SLDS and RLDS to recover a database is the large number of records that must be processed. Many system event type records that are contained in SLDS and RLDS are not required for database recovery.

The following characteristics of SLDS and RLDS highlight the difficulties for database recovery:

- Each SLDS or RLDS contains a record of activities of the entire system and all of the data sets within all the databases.

Recovering a database requires only a single data set.

- SLDS and RLDS chronologically notes each change to any single record.

Database recovery requires only the value of the data at the moment the data set was lost.

Change accumulation is the process of creating a compacted version of one or more IMS log data sets by eliminating records that are not related to recovery, and by merging multiple changes to a single segment into a single change.

Change accumulation can be viewed as a condensed version of the SLDS and RLDS. OLDS can also be directly used as input to change accumulation. With change accumulation, only the most recent database change records are collected, merged, and sorted by data set for a given database.

Change accumulation performs the following functions:

- Merges updates from different subsystems
- Selects only those log records that relate to the recovery of database
- Sorts these records by data set within a database
- Saves only the most recent state of each changed part of each data set

IMS provides a change accumulation utility called Database Change Accumulation utility (DFSUCUM0) to perform the change accumulation function.

IMS Database Change Accumulation utility (also known as IMS/CA) uses the concept of change accumulation groups (CAGRP). A CAGRP can be created to represent application specific databases, physically clustered databases, logically clustered databases, or even a single critical data database. The utility ultimately produces a change accumulation data set for each CAGRP.

For further information on database recovery, see the topic "DBRC administration" in *IMS System Administration*.

Change accumulation using IMS HP Change Accumulation Utility

In the IMS world, change accumulation is the process of creating a compacted version of one or more IMS log data sets by eliminating records that are not related to recovery, and by merging multiple changes to a single segment into a single change.

IMS Change Accumulation utility (IMS/CA) has the following limitations:

- IMS/CA is sequential and can process only one CAGRP.
- The input logs (SLDS, RLDS, and OLDS) must be read for each change accumulation operation (repeated I/O).

When you use DFSUCUM0 of IMS/CA to build multiple change accumulation data sets from the same IMS logs, you must process in *sequence* as many jobs or job steps as there are change accumulation data sets.

IMS HP Change Accumulation Utility augments the existing IMS/CA process by providing an environment in which DFSUCUM0 processes run in parallel. IMS HP Change Accumulation Utility creates multiple tasks in a single address space for reading the input log data sets and multiple z/OS address spaces for creating the new change accumulation data sets.

In an IMS environment with multiple systems, you can run IMS HP Change Accumulation Utility simultaneously for all systems.

IMS HP Change Accumulation Utility allows multiple CAGRPs to be processed while reading the input logs in one pass. This capability saves I/O and CPU resources and time.

Additionally, IMS HP Change Accumulation Utility enables multiple CAGRPs to be processed in parallel by submitting subordinate address spaces with each running change accumulation for a single CAGRP.

Optionally, IMS HP Change Accumulation Utility enables multiple CAGRPs to be processed as separate sub-tasks in a single address space.

In summary, IMS HP Change Accumulation Utility provides the following benefits:

- Schedules log and sort tasks
- Reads log files
- Routes log and control information to the started processes

- Reports activity for all tasks in a single consolidated report file

IMS HP Change Accumulation Utility architecture and process flow

IMS HP Change Accumulation Utility can operate in multiple address space mode or single address space mode.

The following diagram illustrates the change accumulation process flow for an IMS HP Change Accumulation Utility environment that includes two parallel log readers and four parallel Sort tasks.

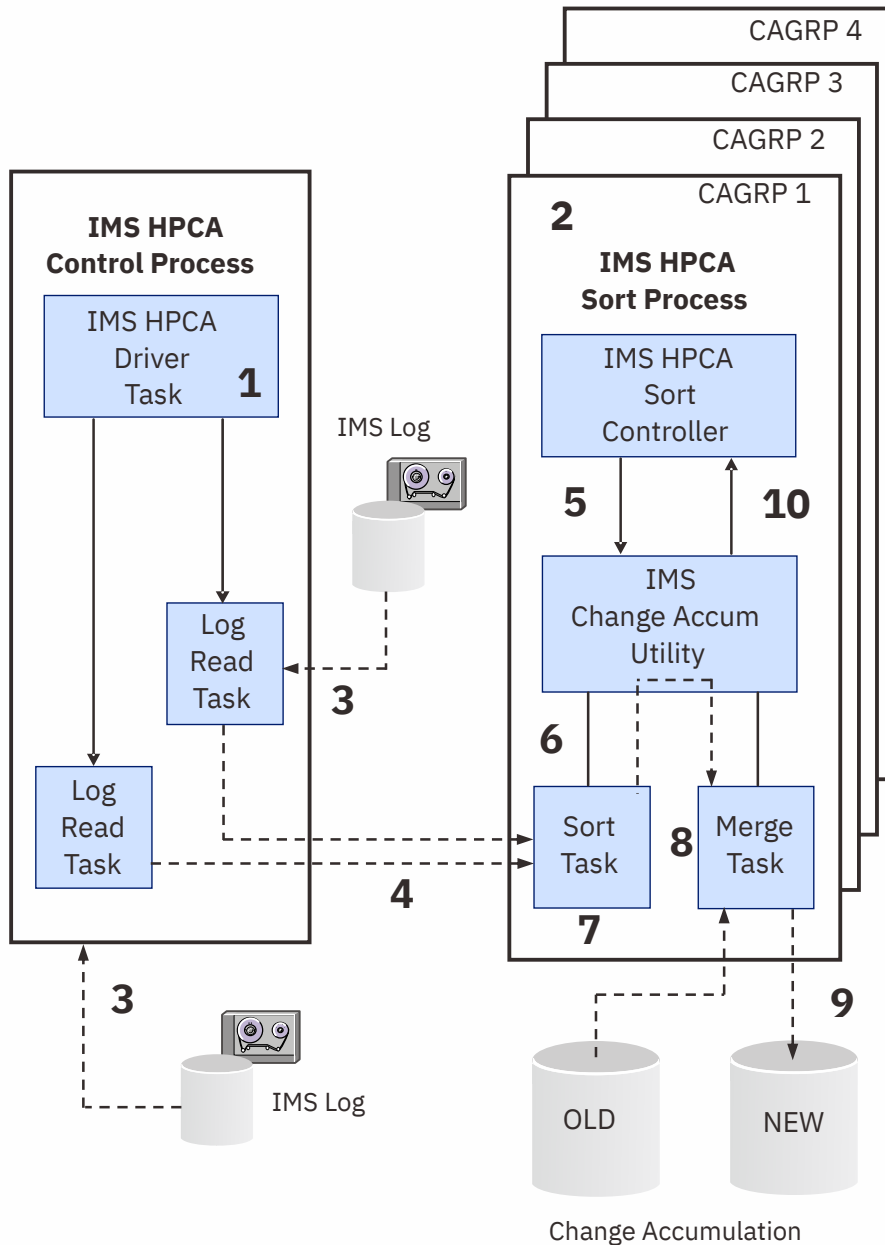


Figure 1. IMS HP Change Accumulation Utility architecture and process flow

In multiple address space mode, change accumulation data sets are built in parallel, and each Sort task resides in a separate address space.

In single address space mode (AS1), change accumulation data sets are built in parallel, and all Sort tasks reside within one control address space.

The following process steps match the numbers in the diagram:

1. The IMS HP Change Accumulation Utility driver retrieves the control and JCL information that was created during IMS HP Change Accumulation Utility setup tasks.
2. The IMS HP Change Accumulation Utility driver establishes the environment for a single copy of the IMS change accumulation utility.

The IMS HP Change Accumulation Utility driver creates (for this example) four parallel subordinate sort processes to handle 4 CAGRPs.

Each Sort process is either a separate task (TCB) when in single address space mode, or a separate address space when in multiple address space mode.

Each Sort process invokes an instance of the IMS change accumulation utility.
3. The IMS HP Change Accumulation Utility driver creates (for this example) two parallel log read tasks that will read n number of logs.

Each log is read just once.
4. All log records are selected according to the appropriate CAGRP and sent to the Sort task.
5. The Sort Controller invokes an instance of the IMS change accumulation utility.
6. IMS change accumulation utility invokes the Sort process.
7. The Sort process selects DB-change type records.
8. Records from the Sort process and old change accumulation data sets are merged.
9. The Merge process ultimately produces a new change accumulation data set.
10. The IMS change accumulation utility report is returned to IMS HP Change Accumulation Utility.

Hardware and software requirements

IMS HP Change Accumulation Utility is installed by using SMP/E and standard RECEIVE, APPLY, and ACCEPT processing.

Complete information about installation requirements, prerequisites, and procedures for IMS Recovery Solution Pack for z/OS is located in the *Program Directory for IBM IMS Recovery Solution Pack for z/OS*, GI13-4315.

Hardware requirements

IMS HP Change Accumulation Utility can run on any z/OS hardware environment that supports the required software.

Installation software requirements

IMS HP Change Accumulation Utility requires z/OS 2.3 (5650-ZOS) or later.

Operational software requirements

An operational requisite is defined as a product that is required and must be present or a product that is not required but should be present on the system in order for this product to operate all or some of its functions.

IMS HP Change Accumulation Utility operates with the following IMS versions:

- IMS 15.1 (5635-A06) or later
- IMS Database Value Unit Edition 15.1 (5655-DS5) or later

IMS HP Change Accumulation Utility requires DFSORT (Data Facility Sort), which is a part of z/OS.

If you process IMS HP Change Accumulation Utility through the Time Sharing Option (TSO), the Interactive System Productivity Facility (ISPF) which is included in z/OS is required.

Compatibility with earlier releases

This version of IMS HP Change Accumulation Utility is compatible with earlier releases.

Extended batch

Existing JCL and command files from previous IMS HP Change Accumulation Utility releases will continue to function without change.

Two-step batch

Existing JCL files from previous IMS HP Change Accumulation Utility releases will continue to function without change.

ISPF

You can reference existing IMS HP Change Accumulation Utility tables and IMS HP Change Accumulation Utility control file data sets with this version of the product. For each IMS ID, the conversion is performed on all field values that change from a previous version to the current version. However, when converted IMS IDs are referenced by the new version, it is not guaranteed that they will function properly if you attempt to roll them back to a prior version.

It is recommended that new IMS IDs be created for the current version and that you do not share them with a prior version.

If you roll forward an IMS ID, it is also recommended that the SETUP-A option be selected once to verify that all field values have been converted correctly.

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

[IBM Support: IMS Recovery Solution Pack for z/OS](#)

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM My Notifications service.

Information on the web

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

- Links to [IBM Documentation](#) for the user guides ("HTML")
- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products
- Technical notes from IBM Software Support, referred to as "Tech notes"
- White papers that describe product business scenarios and solutions

IBM Redbooks® publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The IBM Information Management System website shows how IT organizations can maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<https://www.ibm.com/software/data/ims>

Receiving documentation updates automatically

To automatically receive emails that notify you when new technote documents are released, when existing product documentation is updated, and when new product documentation is available, you can register with the IBM My Notifications service. You can customize the service so that you receive information about only those IBM products that you specify.

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1. Go to <https://www.ibm.com/support/mynotifications>
2. Enter your IBM ID and password, or create one by clicking **register now**.
3. When the My Notifications page is displayed, click **Subscribe** to select those products that you want to receive information updates about. The IMS Tools option is located under **Software > Information Management**.
4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

How to send your comments

Your feedback is important in helping us provide the most accurate and highest quality information. If you have any comments about this or any other IMS Tools information, see [How to provide feedback in IBM Documentation](#).

When you provide feedback, include as much information as you can about the content you are commenting on, where we can find it, and what your suggestions for improvement might be.

Accessibility features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use a software product successfully.

The major accessibility features in this product enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. Refer to the following publications for information about accessing ISPF interfaces:
 - *z/OS ISPF User's Guide, Volume 1*
 - *z/OS TSO/E Primer*
 - *z/OS TSO/E User's Guide*

These guides describe how to use the ISPF interface, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Part 2. Customizing IMS HP Change Accumulation Utility

IMS HP Change Accumulation Utility must be configured to meet the demands of your specific environment. Without configuration and setup, IMS HP Change Accumulation Utility will not be fully operational.

Before continuing, ensure that IMS HP Change Accumulation Utility has been installed as documented in the *Program Directory for IBM IMS Recovery Solution Pack for z/OS*, GI13-4315.

Also, ensure that the post-installation steps have been completed as documented in the *IMS Recovery Solution Pack: Overview and Customization*, SC27-8440.

Topics:

- [Chapter 2, “Completing the product installation,” on page 15](#)
- [Chapter 3, “Product setup and operation,” on page 19](#)

Chapter 2. Completing the product installation

IMS HP Change Accumulation Utility requires you to perform some post-installation procedures before the product is fully operational.

Topics:

- [“Post-installation procedures” on page 15](#)
- [“PROCLIB and JOBLIB requirements and usage” on page 16](#)

Post-installation procedures

IMS HP Change Accumulation Utility requires specific customization procedures following installation.

Before you begin

Review the APF-authorization information in the *IMS Recovery Solution Pack: Overview and Customization*.

About this task

After completing the SMP/E install process, you must:

1. Modify your skeletal JCL, if this member has one or more job steps following the CA step.
2. Ensure that the userid/group that is assigned to the started tasks has ALTER authority to the IMS/CA master data.

This requirement is necessary because the change accumulation address spaces can run as started tasks. The names of the started task procedures are determined by IMS HP Change Accumulation Utility using the HPCA-ID. You can define generic profiles *hpc-id *.** for the RACF® class STARTED.

Alternately, you can define a generic ***** entry for the STARTED class of RACF and the generic *** in the ICHRIN03 started procedures table.

3. Verify that IMS HP Change Accumulation Utility modules are installed in an APF-authorized library.

Note: This step is not necessary if you are using only the single address space mode for invoking IMS HP Change Accumulation Utility.

4. Ensure that the TSO user ID that runs ISPF has CONTROL access to the RECON data sets.

The userid on the batch JOB JCL statement (SET opt 2) also requires ALTER access to the IMS change accumulation data sets and READ access to the IMS log data sets.

5. For IMS HP Change Accumulation Utility in batch mode, the user ID on the batch JOB JCL statement must have the following permissions:

- CONTROL access to the RECON data sets
- ALTER access to the IMS change accumulation data sets
- READ access to the IMS log data sets

6. If the IEFJOBS feature is used, ensure that the user ID that is assigned to the submitted job has the following permissions:

- CONTROL access to the RECON data sets
- ALTER access to the IMS change accumulation data sets
- READ access to the IMS log data sets

If you use the custom procedure method to store and process procedures of JOBS, the following two steps are required:

7. A PROCLIB with a record length of 80 and a fixed block attribute must be defined to either the IEFPSI DD of the master scheduler JCL or to the PROCxx DDs of the started JES procedure.

This PROCLIB is a partitioned data set that IMS HP Change Accumulation Utility allocates for writing members into and for starting IMS HP Change Accumulation Utility and its associated subordinate address spaces.

8. Optionally, add a JCL JOBS library, and make it accessible through the IEFJOBS DD of the master scheduler JCL.

The record length and block size of this partitioned data set must conform to z/OS requirements.

When the IEFJOBS library is used to start IMS HP Change Accumulation Utility address spaces, the PROCLIB data set is not required to be in the IEFPDSI or PROC00 concatenation.

If you use the standard procedure method, complete the following step:

9. The standard procedure or standard JOB JCL must be installed into a procedure library.

For JOB JCL, the library must be in the IEFJOBS DD concatenation of the master scheduler JCL.

PROCEDURE JCL can be in the IEFPDSI DD concatenation of the master scheduler or PROC00 DD of the started JES system.

Users will require READ authority for the library.

The members HPCSPROC and HPCSJOB in the IMS HP Change Accumulation Utility samples library (SHPCSAMP) describe the JCL and necessary modifications.

If you use the started task method, complete the following step:

10. The started task JCL must be installed into a library in the IEFPDSI DD or IEFJOBS DD concatenation of the master scheduler JCL.

The member HPCSSTC in the IMS HP Change Accumulation Utility samples library (SHPCSAMP) describes the JCL and necessary modifications.

Note: Each time IMS HP Change Accumulation Utility is processed, the PROCLIB and the JCL JOBS libraries might be updated. Over time, the libraries will need to be compressed. It is recommended that you define the JCL JOBS and PROCLIB libraries as PDSE data sets. By doing so, you eliminate the need to compress the libraries. If the libraries are not defined as PDSE data sets, then you must include a periodic compress run in your job schedule.

PROCLIB and JOBLIB requirements and usage

IMS HP Change Accumulation Utility has different installation requirements based on the job processing method.

The following table describes the requirements for installing and invoking IMS HP Change Accumulation Utility using custom procedures, standard procedures, started task control (STC), and single address space (AS1).

OMIT means that the parameter must not be specified.

Table 1. PROCLIB and JOBLIB requirements and usage

Requirement	Custom Procedures	Standard Procedures	Started Task Control	Single Address Space
Installation				
IMS HP Change Accumulation Utility member is added to PROCLIB and JOBLIB		YES	YES	
RACF authority required to PROCLIB/ JOBLIB for all IMS HP Change Accumulation Utility users	UPDATE	READ	READ	

Table 1. PROCLIB and JOBLIB requirements and usage (continued)

Requirement	Custom Procedures	Standard Procedures	Started Task Control	Single Address Space
PROCLIB				
PROCLIB in the master scheduler IEFPDSI	YES	YES	YES	
PROCLIB in the JES PROC00 concatenation (Optional)	YES	YES		
JOBLIB				
JOBLIB in the master scheduler IEFJOBS concatenation.	YES	YES	YES	
ISPF				
Invoke Setup Option 1	YES	YES	YES	YES
Member specification =		YES	YES	HPCSTASK
PROCLIB specification =	YES		YES	
JOBLIB specification =	OPTIONAL			
Two-step batch				
PROC= <i>procname</i> (EXEC parameter)	OMIT	INCLUDE		HPCSTASK
STC= <i>procname</i> (EXEC parameter)	OMIT	OMIT	INCLUDE	
DD allocation required	HPCAPROC		HPCAPROC	
DD allocation optional	HPCAJLIB			
Extended batch				
PROC= <i>procname</i> (EXEC parameter)	OMIT	INCLUDE		HPCSTASK
STC= <i>procname</i> (EXEC parameter)	OMIT	OMIT	INCLUDE	
PROCEDURE NAME= <i>procname</i> (command)	OMIT	INCLUDE		HPCSTASK
STC NAME= <i>procname</i> (command)	OMIT	OMIT	INCLUDE	
Procedures/JOBS written to DD	HPCAPROC		HPCAPROC	
Procedures/JOBS written to DD (Optional)	HPCAJLIB			

Chapter 3. Product setup and operation

Setup and operation for IMS HP Change Accumulation Utility consists of creating JCL procedures and the IMS HP Change Accumulation Utility control file.

Topics:

- [“IMS HP Change Accumulation Utility setup overview” on page 19](#)
- [“IMS HP Change Accumulation Utility operation overview” on page 20](#)
- [“Modes for using IMS HP Change Accumulation Utility” on page 21](#)
- [“Setup phase and operation phase summary” on page 22](#)
- [“Methods for processing job tasks” on page 23](#)
- [“DBRC support” on page 24](#)

IMS HP Change Accumulation Utility setup overview

Setup for IMS HP Change Accumulation Utility consists of creating JCL procedures and the IMS HP Change Accumulation Utility control file.

Summary of setup tasks:

- Create a control file member that contains user-provided options for IMS HP Change Accumulation Utility operation
- Create system and user-defined PROCLIB members for JCL

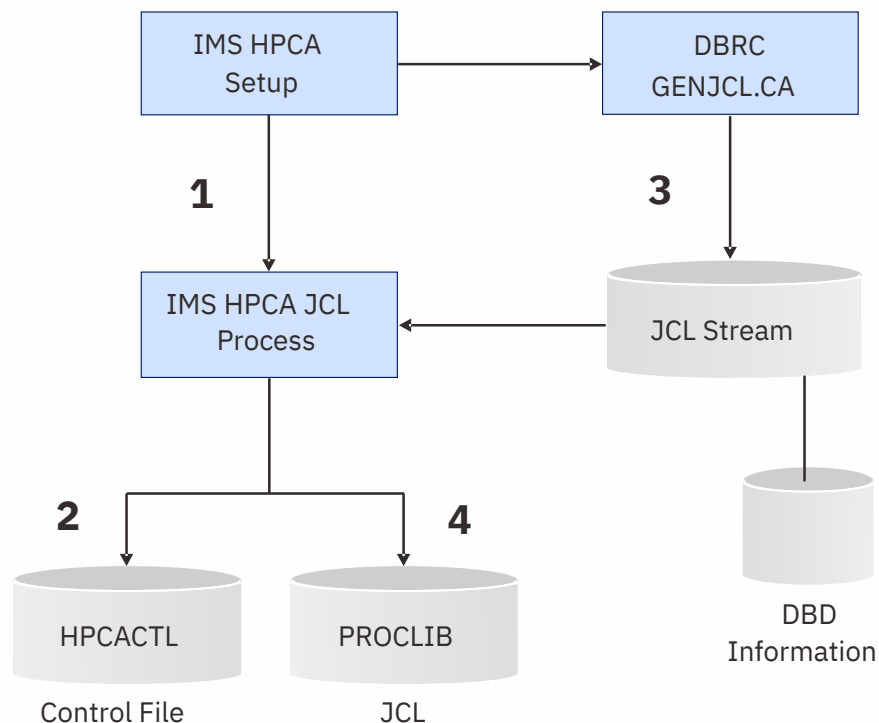


Figure 2. Summary of IMS HP Change Accumulation Utility Setup

The following process steps match the numbers in the diagram:

1. Set options that specify the operation environment.

2. Option values are stored in the control file (HPCACTL) for reference during the IMS HP Change Accumulation Utility operation.
3. Create JCL for executing multiple parallel change accumulation processes.
4. JCL is stored as procedure library members (PROCLIB) or encoded for dynamic allocation.

IMS HP Change Accumulation Utility operation overview

IMS HP Change Accumulation Utility operation consists of using the JCL and control file created during the setup phase to schedule the processing of all input logs and CAGRP sorts.

IMS HP Change Accumulation Utility operation runs the JCL by using the control information to schedule job tasks in parallel:

- Parallel log readers
- Parallel sort tasks

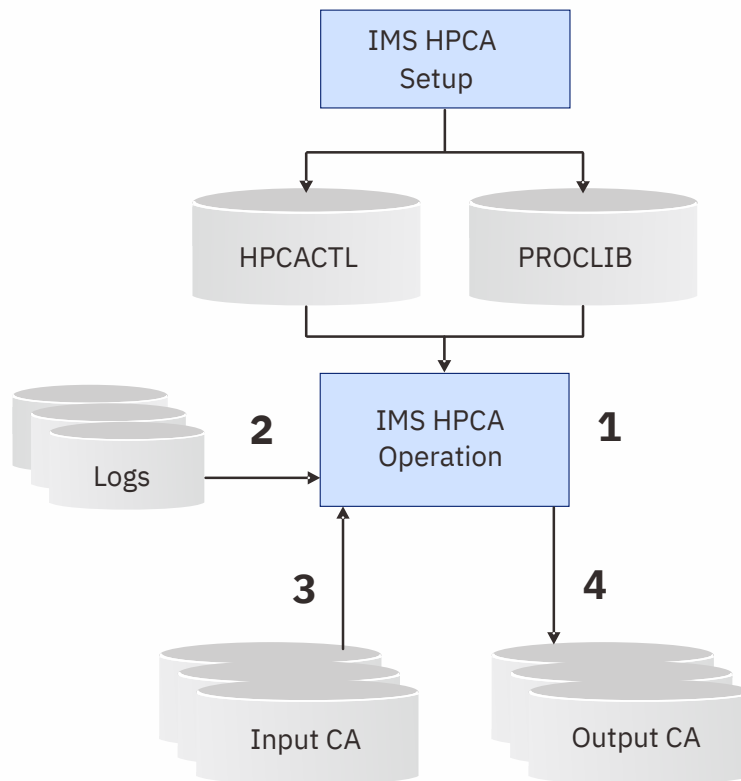


Figure 3. Summary of IMS HP Change Accumulation Utility Operation

The following process steps match the numbers in the diagram:

1. IMS HP Change Accumulation Utility driver retrieves control and JCL information that was created during the setup phase.

IMS HP Change Accumulation Utility driver creates subordinate processes. Each process is an address space or task.

2. IMS HP Change Accumulation Utility driver reads logs in parallel (multiple tasks).

IMS HP Change Accumulation Utility can read up to 99 logs in parallel.

Each log is read just once.

3. Records from the Sort process and old CA data sets are merged.

4. The merge process ultimately produces a new change accumulation data set.

- Multiple parallel processes each running one copy of IMS/CA (sort)
- 64-bit memory capability eliminates spill file
- IMS HP Change Accumulation Utility manages the interface to DBRC

Modes for using IMS HP Change Accumulation Utility

Three modes of operation are available for using the IMS HP Change Accumulation Utility utility.

- ISPF user interface (ISPF/UI) mode
- Two-step batch mode
- Extended batch mode

ISPF user interface (ISPF/UI) mode

The ISPF mode is an interactive method for specifying global and runtime parameters for the IMS HP Change Accumulation Utility environment. ISPF is the easiest mode to use and is useful when processing parameters are frequently changed.

Other information about the ISPF mode includes the following items:

- Parameters are presented as options or selection lists, thereby making it unnecessary to remember parameter settings.
- Full context-sensitive help provides support.
- Settings are remembered across sessions.
- DBRC is required.

Refer to [Chapter 6, “ISPF user interface mode,”](#) on page 41.

Two-step batch mode

The two-step batch mode requires knowledge of DBRC utility control statements and is appropriate if your site uses an automated process to generate DBRC control statements.

Other information about the two-step batch mode includes the following items:

- Two-step batch creates JCL and the control file.
You must then manually submit JCL to run the accumulation process defined by the control file.
- You use the two-step batch mode in combination with the ISPF or extended batch mode.
- An IMS HP Change Accumulation Utility-ID must be created in a permanent IMS HP Change Accumulation Utility control file prior to running two-step batch.
- Thereafter, you need to use ISPF or extended batch only when the setup parameters are changed for the IMS HP Change Accumulation Utility-ID or when a new IMS HP Change Accumulation Utility-ID is created.
- You can use batch JCL and DBRC GENJCL control statements to create new change accumulation JCL procedures to be submitted for processing.

Refer to [Chapter 4, “Two-step batch mode,”](#) on page 29.

Extended batch mode

The extended batch mode combines the setup and accumulation processes.

Other information about the extended batch mode includes the following items:

- Extended batch mode uses a single JCL stream for setup, control, and submission of the subordinate processes.
- This mode is a one-step process that uses JCL and control statements (does not require a SUBMIT).

- You can use this mode to perform most of the functions that are performed by the ISPF and two-step batch modes.
- This mode is appropriate if your site uses an automated JOB scheduling system.
- DDs provide some of the same values that can be set by using ISPF.
- Many DDs are optional - IMS HP Change Accumulation Utility dynamically allocates those that are required.
- The HPCSYSIN DD * provides free form commands to enter most of the values found in ISPF dialogs.
- DBRC is optional.

Extended batch commands:

- Batch mode uses keyword commands to set control file values
- Commands are not case-sensitive
- Free form, not column-restricted
- Order independent (with some exceptions)
- Defaults apply; most commands are never required

Refer to [Chapter 5, “Extended batch mode,”](#) on page 35.

Setup phase and operation phase summary

IMS HP Change Accumulation Utility operates in two phases to create the parallel environment.

- Phase 1 involves the setup and conversion of JCL to prepare the necessary procedures and control blocks.
- Phase 2 uses the output of phase 1 to schedule log files and subtasks or subordinate address spaces for the change accumulation process.

In phase 2, the IMS/CA utility (PGM=DFSUCUM0) is invoked in each subordinate address space to perform the change accumulation process.

The following table summarizes how and when each phase is used:

Table 2. IMS HP Change Accumulation Utility setup and operation summary

Requirement	ISPF	Two-step Batch	Extended Batch
Phase 1 setup			
Panel input fields describe external files, functions to perform, and the target CA groups.	YES		
JCL DD statements describe external files.		YES	YES
Phase 1 output from ISPF or Extended Batch describes functions to perform.		YES	
IMS HP Change Accumulation Utility commands describe the functions to perform and the target CA groups.			YES
User input defines the target CA groups.		YES	OPTIONAL
Phase 1 conversion			

Table 2. IMS HP Change Accumulation Utility setup and operation summary (continued)

Requirement	ISPF	Two-step Batch	Extended Batch
GEN primary command produces and then converts JCL to procedures and control blocks.	YES		
Conversion is automatic.		YES	YES
Phase 2 scheduling			
RUN primary command submits JCL for scheduling of converted procedures.	YES		
Independent processing of the IMS HP Change Accumulation Utility driver program, HPCADRIV, is required.		YES	
PGM=	HPCAE00	HPCABAT0	HPCAMAIN
DBRC interface.	REQUIRED	OPTIONAL	OPTIONAL
Scheduling is automatic.			YES

Methods for processing job tasks

IMS HP Change Accumulation Utility processes the JCL that is produced by the DBRC GENJCL.CA or an equivalent process.

The GENJCL.CA output is a multi-job or multi-step single JOB stream. IMS HP Change Accumulation Utility uses the JCL to create multiple procedures or JOBS, each representing one step of the original JCL.

The following sections describe the four job processing methods and considerations for selecting an appropriate method for your environment:

- [“Custom job processing” on page 23](#)
- [“Standard job processing” on page 23](#)
- [“Started task control job processing” on page 24](#)
- [“Single address space job processing” on page 24](#)
- [“Selecting an appropriate job processing method” on page 24](#)

Custom job processing

The custom job processing method writes each PROC or JOB to a PROCLIB or JOBLIB library.

These libraries must be available to the z/OS master scheduler or to the Job Entry Subsystem (JES). Custom procedures provide the greatest degree of flexibility and security control, but have resource and authority requirements.

Update authority is required for access to the PROCLIB and JOBLIB library.

Standard job processing

For the standard job processing method, an IMS HP Change Accumulation Utility defined member is added to the PROCLIB and JOBLIB libraries during installation.

IMS HP Change Accumulation Utility does not write the procedures into a library. Instead, the definition of each step is recorded in the IMS HP Change Accumulation Utility control file. The control file is merged with the standard JCL using dynamic allocation when each CA sort is initiated.

Standard procedures require fewer resources and less authority for access but are more restricted than custom procedures in accommodating special situations.

UPDATE authority to the procedure library is required only for installation.

Started task control job processing

The started task control (STC) job processing method provides features of both the custom and standard procedure methods.

For STC job processing, procedures are written to a user's PROCLIB, but no special authorization is required for the library.

Like the standard procedure method, a single member must be inserted into a system procedure library during installation. This single member is then used to start all subordinate address spaces by using the JCL that is stored in the user's procedure library.

As a result, this method provides the JCL flexibility that is associated with custom procedures, but has the lesser authority requirements that are associated with standard procedures.

Single address space job processing

The single address space (AS1) job processing method runs each CA group as a subtask within the control address space.

The advantages include a simplified setup, and fewer resource and security considerations. Access to a system PROCLIB is not required.

Some restrictions apply for single address space job processing, and not all environments can be supported.

Selecting an appropriate job processing method

All IMS HP Change Accumulation Utility operation modes (ISPF, two-step, and extended batch) can use any of the four job processing methods.

The mode determines the default job processing method.

- In ISPF mode, the single address space procedure is the default method if no other method is selected.
- For extended batch mode, the single address space procedure is the default method.
- No default is available for two-step batch mode. One of the four procedure methods must be selected.

Guidelines for selecting the appropriate procedure method are given in the following topics:

- [Chapter 6, "ISPF user interface mode," on page 41](#)
- [Chapter 4, "Two-step batch mode," on page 29](#)
- [Chapter 5, "Extended batch mode," on page 35](#)

DBRC support

IMS HP Change Accumulation Utility can use DBRC services to generate JCL for each change accumulation group (CAGROUP).

Secondary logs

The DBRC **GENJCL . CA** command normally selects secondary logs (SECLOG) only if the paired primary logs (PRILOG) are marked in error.

IMS HP Change Accumulation Utility extends the capabilities of DBRC and IMS/CA to allow processing of either the set of primary logs or the set of secondary logs. DBRC is required and dual logging must be active.

When selected, the secondary log feature substitutes each secondary log for its corresponding primary log. Each primary log that is that is selected must be paired with a unique secondary log identified by SSID and Start time.

Two temporary files that are used in the process are dynamically allocated as shown in the following example:

```
HPCLOGIN DD UNIT=SYSDA,SPACE=(TRK,1),RECFM=FB,LRECL=80  
HPCLOGOU DD UNIT=SYSDA,SPACE=(CYL,(50,50)),RECFM=FBA,LRECL=133
```

If the dynamic defaults are not sufficient, then you might want to preallocate these data sets. For example, you might want to use a unit name other than SYSDA, or you might have excessively large RECON data sets that require larger space allocations.

Part 3. Using IMS HP Change Accumulation Utility modes

IMS HP Change Accumulation Utility provides three modes of operation to schedule change accumulation group processing.

Topics:

- [Chapter 4, “Two-step batch mode,” on page 29](#)
- [Chapter 5, “Extended batch mode,” on page 35](#)
- [Chapter 6, “ISPF user interface mode,” on page 41](#)
- [Chapter 7, “Setup Selection Menu,” on page 59](#)

Chapter 4. Two-step batch mode

You can use IMS HP Change Accumulation Utility as a two-step batch operation to run multiple change accumulation groups in parallel.

Topics:

- [“Creating the control member” on page 29](#)
- [“Generating JCLPROC” on page 29](#)
- [“Manually submitting JCL for change accumulation” on page 31](#)
- [“Using IMS management of ACBs” on page 33](#)

Creating the control member

When using IMS HP Change Accumulation Utility in two-step batch mode, you must first create the control member for the HPCA-ID that was selected when you started the ISPF dialog.

The control member implements the parameters that were specified for that ID.

Complete the following steps to create the control information required for the two-step batch mode:

1. Use the ISPF user interface to specify the control information.
2. Run the **BAT** command to create the control member.
3. Exit the ISPF user interface.

Setting the control information for two-step batch mode is a one-time operation unless you must change any control parameters in the future.

Generating JCLPROC

If you plan to run IMS HP Change Accumulation Utility as a two-step batch job, you must generate the JCLPROC.

Sample JCL for is shown in the following example:

```
VIEW          IMSTOOL.HPCA13.SHPCSAMP(HPCSBAT0) - 01.00      Columns 00001 00072
Command ==>                                         Scroll ==> PAGE
//Jobname          JOB information
//*
//*
//*
//S1              EXEC PGM=HPCABAT0,PARM='hpca-id'
//STEPLIB         DD DISP=SHR,DSN=smphlq.SHPCLMDO
                  DD DISP=SHR,DSN=ims.reslib
//RECON1         DD DISP=SHR,DSN=ims.recon1
//RECON2         DD DISP=SHR,DSN=ims.recon2
//*
//SYSOUT         DD SYSOUT=*,BLKSIZE=133
//HPCACTL        DD DISP=SHR,DSN=hpchlq.CONTROL
//HPCPRINT       DD SYSOUT=*
//HPCDBPRT       DD SYSOUT=*                               (optional)
//HPCAPROC       DD DSN=user.dsname,DISP=SHR
//HPCAJLIB       DD DSN=user.dsname,DISP=SHR               (optional)
//*
//GENJCLIN       DD DSN=user.dsname,DISP=SHR
//JCLOUT         DD DSN=user.dsname,DISP=SHR               (optional)
//JCLPDS         DD DSN=user.dsname,DISP=SHR
```

Figure 4. Sample JCL for first step

JCL statement definitions for the first step are as follows:

JOB statement

This is the statement you entered in the Current Environment Data panel.

EXEC statement

HPCABAT0 is the main entry program for this step. *hpca-id* is a parameter that identifies the IMS HP Change Accumulation Utility ID associated with the IMS system for which the CA is to run.

LIST=*n* (0,4,8) requests that the DBRC output be included in the IMS HP Change Accumulation Utility report file (HPCDBPRT) for DBRC RC>=*n*.

MAXLOGS=*nnn* specifies the upper limit on the number of log files that will be processed. Because a log file on tape can span multiple volumes, the actual number of mount requests might exceed MAXLOGS. Valid values are 1 to 255.

MAXLGRC=*nn* specifies the final return of the job if log truncation occurs due to the MAXLOGS threshold being met. If MAXLOGS is specified but the MAXLGRC=*nn* parameter is omitted, the default value for MAXLGRC is 1.

PROC=*procname* selects standard procedure or AS1 mode. The reserved name HPCSTASK identifies AS1 mode. For any other name, a corresponding member of a system library (IEFPDS,IEFJOBS,PROC00) will be used by the master scheduler to initiate IMS HP Change Accumulation Utility started tasks. HPCAPROC and HPCAJLIB DD's are optional.

SCAN analyzes setup parameters and JCL. Analysis is presented in the IMS HP Change Accumulation Utility Report file HPCPRINT DD. The SCAN reported information is described in [“SCAN” on page 182](#).

STC=*procname* selects the STC method for JCL processing. The *procname* names a member of IEFPSI or IEFJOBS that will be used by the master scheduler to initiate IMS HP Change Accumulation Utility started tasks. The value STC=*procname* overrides the STC Name= command. STC overrides the standard procedure mode, as well.

STEPLIB DD statement

This DD statement is always included. It defines the IMS HP Change Accumulation Utility program load library. *smphql* is the high-level qualifier for all IMS HP Change Accumulation Utility product libraries and is determined at installation time.

The data set concatenated to the IMS HP Change Accumulation Utility product library is the DBRC utility program load library. If the data set is not provided, IMS HP Change Accumulation Utility expects the module DSPURX00 (DBRC utility program) to be available through the LINKLST data sets or in the LPALIB.

For DBRC API sequencing, the IMS RESLIB must be included in the IMS HP Change Accumulation Utility JCL.

RECON1 DD

RECON2 DD

RECON3 DD statements

These statements are present if they are not to be dynamically allocated. If the RECON data sets are to be dynamically allocated, then members for the RECON data sets that were built using the IMS DFSMDA macro must be present in the STEPLIB or in a library in LINKLST or in the LPALIB.

HPCACTL DD statement

This DD statement defines the IMS HP Change Accumulation Utility control data set. *hpchlq* is the IMS HP Change Accumulation Utility high level qualifier for data sets you provide when invoking ISPF.

HPCPRINT DD statement

This DD statement defines the IMS HP Change Accumulation Utility report data set. This can be SYSOUT or a user-allocated data set. Minimum DCB information is LRECL=133.

HPCDBPRT DD statement

This DD statement defines the IMS HP Change Accumulation Utility data set that will be a copy of the DBRC generated output (SYSPRINT). This can be SYSOUT or a user-allocated data set.

SYSOUT DD statement

This DD statement defines a sequential data set to contain error messages from the HPCABAT0 program. The dsname can be assigned to the JES SPOOL data set and is defined with LRECL=133, blocked or unblocked. You can use any dsname that is approved by your site.

SYSPRINT DD statement

This DD statement defines a sequential data set to contain output listings from the GENJCL procedure. It is defined with LRECL=133, blocked or unblocked. You can use any dsname that is approved by your site.

JCLOUT DD statement

This DD statement defines a sequential data set to contain the generated JCL of the GENJCL procedure. It is defined with LRECL=80, blocked or unblocked. You can use any dsname that is approved by your site.

JCLPDS DD statement

This DD statement defines the skeletal JCL library used by the GENJCL procedure to build the change accumulation JCL. The data set is created when IMS is installed. You should use the data set name that was defined at that time.

(JCLPDS is owned by DBRC and is an integral component of IMS, not IMS HP Change Accumulation Utility.)

GENJCLIN DD statement

This DD statement defines a sequential data set that contains input statements for the GENJCL procedure. This input can contain one or more GENJCL commands. Each command creates the JCL for the change accumulation. IMS HP Change Accumulation Utility processes change accumulation for each CAGROUP in parallel up to the threshold value specified as MAXOUT limit. The remaining are processed after the change accumulation SORT task becomes available.

The order of these commands in the GENJCL in/out stream determines the order in which the CAGROUPS are processed. If you want to process a CAGROUP with the highest priority, then place the GENJCL command for that CAGROUP as the first GENJCL command. It is recommended that CAGROUPS that have a higher number of log records to accumulate be given a higher priority.

HPCAPROC DD statement

This DD statement defines a procedure library that can be used by IMS HP Change Accumulation Utility. If a JOBLIB is not defined through the presence of the HPCAJLIB DD statement, this library must be accessible through the JES startup procedure for starting IMS HP Change Accumulation Utility subordinate address spaces. You can use any dsname that is approved by your site.

HPCAJLIB DD statement

This DD statement defines the JOBLIB into which IMS HP Change Accumulation Utility places the JCL of jobs to start the SORT address spaces.

HPCSYSIN DD statement

This DD statement defines IMS HP Change Accumulation Utility command statements.

DBRC processing for generating JCLPROC

DBRC is optional.

If the DD GENJCLIN is allocated, it must contain the GENJCL.CA command statements which DBRC will use. IMS HP Change Accumulation Utility connects directly to DBRC to process these commands.

If DD GENJCLIN is not allocated, then the DD JCLOUT must contain the JCL stream to be converted. JCLOUT might have been created by DBRC or by some other manual or automated process.

If DBRC is used, the command LISTC.CAGRP ALL should be appended to the GENJCL.CA commands and to the DBRC output file that SYSPRINT made available to IMS HP Change Accumulation Utility. The member HPCSPASS in the IMS HP Change Accumulation Utility samples library (SHPCSAMP) demonstrates a method of independently running DBRC. You can bypass DBRC by replacing the first step with a user-defined process.

Manually submitting JCL for change accumulation

You must manually submit the JCL that you create for change accumulation.

Sample JCL is shown in the following example:

```

//HPCA   JOB (IMSUTIL-HPCA),CLASS=A,MSGCLASS=A.
//      REGION=0M,TIME=NOLIMIT,
//      NOTIFY=&SYSUID
//*
//*
//*
//*
//*
//*MESSAGE ****START OF HPCA UTILITY ***
//  JCLLIB ORDER=(VND400.HPCA.PROCLIB)
//JOBLIB DD DISP=SHR,
//      DSN=VND400.HPCA.SHPCLMD0
//      DD DISP=SHR,
//      DSN=INSVS.181STS27.CRESLIB
//S2    EXEC HPCADRIV
//

```

Figure 5. Sample JCL for second step

JCL statement definitions for the second step are as follows:

JCLLIB

Specifies the procedure library used by IMS HP Change Accumulation Utility.

JOBLIB

JOBLIB is a concatenation of the IMS HP Change Accumulation Utility product library and the DBRC library that contains the DBRC utility program. This is usually the IMS RESLIB.

EXEC statement

Specifies that the HPCADRIV procedure should be processed. The HPCADRIV procedure is created by the BAT command and placed in the IMS HP Change Accumulation Utility procedure library.

Sample HPCADRIV procedure

The JCL in the procedure shown in the following example is essentially the same JCL as that created by the **GEN** command.

The difference is that the **GEN** command creates an IMS HP Change Accumulation Utility job that is submitted by the **RUN** command, and the **BAT** command creates an IMS HP Change Accumulation Utility job that is submitted as part of your job stream.

The job that is created by the **BAT** command invokes IMS HP Change Accumulation Utility as a procedure. Using this indirect method enables you to maintain your batch job stream without making daily changes.

However, input to the DBRC utility program for GENJCL does require change. Each time the GENJCL input changes, a new batch procedure is created by Step 1.

```

//IEFPROC EXEC PGM=HPCADRIV,REGION=&RGN,
//  PARM='&PARM1'
//*
//STEPLIB DD DISP=SHR,
//      DSN=INSVS.I81STS27.CRESLIB
//RECON1 DD DISP=SHR,
//      DSN=HPCA.IMS.RECON1
//RECON2 DD DISP=SHR,
//      DSN=HPCA.IMS.RECON2
//HPCACTL DD DISP=SHR,
//      DSN=VND400.CONTROL(HPCA#CTL)
//HPCMSG00 DD SYSOUT=&SOUT
//SYSSNAP DD SYSOUT=&SOUT
//SYSPRINT DD SYSOUT=&SOUT
//SYSOUT DD SYSOUT=&SOUT
//SYSUDUMP DD SYSOUT=&SOUT

```

Figure 6. Sample HPCADRIV procedure

Two-step batch mode restrictions

IMS HP Change Accumulation Utility is designed to run in multiple address spaces.

Specifying a VOLNUM parameter in the GENJCL input control statement causes a serialization of the change accumulation process when running the standard IMS change accumulation utility. This serialization is necessary if there is a large number of data sets and the number of device units is limited.

IMS HP Change Accumulation Utility resolves this issue by providing the INLIM parameter which restricts the number of log data sets being read in parallel to the number. The higher this number, the more you can achieve parallel processing.

Using IMS management of ACBs

IMS Catalog Definition exit routine (DFS3CDX0) is required when IMS HP Change Accumulation Utility references the database definition in an IMS management of ACBs environment.

When IMS management of ACBs is enabled and IMS catalog data sets are not registered in the DBRC, specify the DFSHDBSC data set to the skeletal JCL. Refer to [“Specifying DFSHDBSC DD”](#) on page 75.

When the single address space job processing method (AS1) is used, you can specify the DFSHDBSC data set to the IMS HP Change Accumulation Utility execution JCL (EXEC PGM=HPCAMAIN). In this case, you do not need to modify the skeletal JCL.

Chapter 5. Extended batch mode

You can use IMS HP Change Accumulation Utility as an extended batch operation to run multiple change accumulation groups in parallel.

Topics:

- [“Extended batch modes of operation” on page 35](#)
- [“Sample extended batch JCL” on page 36](#)
- [“Extended batch control statements” on page 39](#)
- [“Using IMS management of ACBs” on page 39](#)

Extended batch modes of operation

The extended batch mode combines the setup and accumulation processes. Extended batch mode uses a single JCL stream for setup, control, and submission of the subordinate processes.

By performing only one job-step, the extended batch mode can interface with DBRC, create IMS HP Change Accumulation Utility procedures, and process multiple address space SORTS. The one-step process does not require ISPF or DBRC.

The extended batch mode does not support the specification of spill file and sort parameters by individual CA group.

The extended batch mode offers three modes of operation:

Mode 1

This mode is similar to the IMS HP Change Accumulation Utility ISPF user interface. You enter the parameters for DBRC GENJCL as control statements, and IMS HP Change Accumulation Utility interfaces with DBRC to generate the GENJCL input to create and process IMS HP Change Accumulation Utility procedures.

This mode requires DBRC and is selected when one or more GEN.GRPNAME statements are present in the HPCSYSIN control file. Each group is processed using the same DBRC GENJCL.CA parameters.

Mode 2

This mode is similar to the two-step batch process and is used when no GEN.GRPNAME statements are provided, and the GENJCLIN DD name is pre-allocated.

This mode requires DBRC. The GENJCLIN input file must contain DBRC GENJCL.CA input statements that you have either created manually or through a non-IMS automated procedure. GENJCL.CA parameters can vary by group. For example, they can use different skeletal JCL members.

Mode 3

This is the only mode that does not require DBRC to invoke IMS HP Change Accumulation Utility. If no GEN.GRPNAME statements are provided, and the GENJCLIN DD name is omitted, then DBRC is not used to generate IMS HP Change Accumulation Utility JCL.

In this mode, you must preallocate the JCLOUT DD name and create a JCL stream of the form that might be created by DBRC (for example, JCL created by a non-IMS automated procedure). The member HPCSPASS in the IMS HP Change Accumulation Utility samples library (SHPCSAAMP) demonstrates a method of independently running DBRC. DBRC can be bypassed entirely by replacing the first step with a user defined process.

Sample extended batch JCL

Sample JCL for running the extended batch mode is shown in the following example.

```
//JOBNAME job JOB INFORMATION
//*
//*
//*
//S1 EXEC PGM=HPCAMAIN,PARM='hpca-id,LIST'
//STEPLIB DD DISP=SHR,DSN=smp1q.SHPCLMD0
// DD DISP=SHR,DSN=imsvs.17ists27.creslib
//RECON1 DD DISP=SHR,DSN=hpca.ims.recon1
//RECON2 DD DISP=SHR,DSN=hpca.ims.recon2
//*
//HPCACTL DD DISP=SHR,DSN=hpchlq.CONTROL
//HPCPRINT DD SYSOUT=*
//HPCDBPRT DD SYSOUT*
//HPCMSG00 DD SYSOUT=*
//SYSPRINT DD DSN=dsname,DISP=SHR
//JCLOUT DD DSN=dsname,DISP=SHR
//JCLPDS DD DSN=dsname,DISP=SHR
//GENJCLIN DD DSN=dsname,DISP=SHR
//SYSOUT DD DUMMY,LRECL=133
//HPCAPROC DD DSN=dsname,DISP=SHR
//HPCAJLIB DD DSN=dsname,DISP=SHR
//HPCSYSIN DD *

Parallel Logs = 4
Parallel Sorts = 6

Sort.Filasz = 1000000

CA.Space = CYLS
CA.Primary = 100
CA.Secondary = 100
CA.Unit Count = 2

GEN.GENJCL = MEMBER(CAJCLTST)
GEN.GENJCL = DEFAULT(KEYR819C)
GEN.GRPNAME = CAGRP1
GEN.GRPNAME = CAGRP42
GEN.GRPNAME = CAGRP50
GEN.GRPNAME = CAGRP51
GEN.GRPNAME = CAGRP52
GEN.GRPNAME = CAGRP53

/*
```

Figure 7. Sample JCL for running the extended batch mode

where:

JOB statement

Specifies a valid JOB statement

EXEC statement

- HPCAMAIN is the extended batch program name.
- *hpca-id* is the optional 1-to-4 character identifier that IMS HP Change Accumulation Utility uses as the prefix for members of the IMS HP Change Accumulation Utility control file and PROCLIB. This parameter value overrides the *id=* command value from HPCSYSIN. The default is IMS HP Change Accumulation Utility.
- LIST/NOLIST are optional keywords to include or exclude the command lines listing in the IMS HP Change Accumulation Utility report. This parameter value overrides the LIST/NOLIST commands from HPCSYSIN. If both are provided, NOLIST overrides LIST. The default is NOLIST.
- WARN=*action* is described under the GEN.WARN command later in this topic. The WARN= parameter overrides the value specified in GEN.WARN.
- SCAN analyzes setup parameters and JCL. Analysis is presented in the IMS HP Change Accumulation Utility Report file HPCPRINT DD.

- The optional PROC= parameter selects the standard procedure or AS1 method for JCL processing. The reserved name HPCSTASK indicates AS1 mode. For any other name, the name must be a member of the concatenation DD IEFPSI of the master scheduler, DD IEFJOBS of the master scheduler, or DD PROC00 of the active JES.
- The optional STC= parameter selects the STC method for JCL processing. The STC parameter overrides the STC NAME= command and also the standard procedure method.

STEPLIB DD statement

This DD statement is always included. It defines the IMS HP Change Accumulation Utility program load library. *smphql* is the high-level qualifier for all IMS HP Change Accumulation Utility product libraries and is determined at installation time.

The data set concatenated to the IMS HP Change Accumulation Utility product library is the DBRC utility program load library. If the data set is not provided, IMS HP Change Accumulation Utility expects the module DSPURX00 (DBRC utility program) to be available through the LINKLST data sets or in the LPALIB.

For DBRC API sequencing, the IMS RESLIB must be included in the IMS HP Change Accumulation Utility JCL.

RECON1 DD

RECON2 DD

RECON3 DD statements

These statements are present if they are not to be dynamically allocated. If the RECON data sets are to be dynamically allocated, then members for the RECON data sets that were built using the IMS DFSMDA macro must be present in the STEPLIB or in a library in either the LINKLST or in the LPALIB.

HPCACTL DD statement (optional)

This DD statement defines the IMS HP Change Accumulation Utility control data set that is used for communicating between the IMS HP Change Accumulation Utility main task and the IMS HP Change Accumulation Utility SORT address spaces.

Write access is required.

The IMS HP Change Accumulation Utility control data set can be the same data set that is used in the ISPF user interface and two-step processes, in which case the *hpca-id* members of the control file are overwritten. If you omit the HPCACTL DD statement, IMS HP Change Accumulation Utility allocates a temporary file.

HPCPRINT DD statement

This DD statement defines the IMS HP Change Accumulation Utility report file. Write access is required. The report file can be spooled SYSOUT or a user-defined data set. The minimum required DCB is LRECL=133.

HPCDBPRT DD statement

This DD statement defines the IMS HP Change Accumulation Utility data set that is a copy of the DBRC generated output (SYSPRINT). This value can be SYSOUT or a user-allocated data set.

HPCMSG00 DD statement

This DD statement defines a file for selected error messages from the HCADRIV program. Write access is required. The file can be spooled SYSOUT, a user-defined data set, or DUMMY. The minimum required DCB is LRECL=121.

SYSPRINT DD statement (optional)

This DD statement defines a sequential data set to contain output listings from the GENJCL command. It is defined with LRECL=133, blocked or unblocked. You can use any dsname that is approved by your site. Write access is required. If you omit the SYSPRINT DD statement, IMS HP Change Accumulation Utility allocates a temporary data set, when necessary.

JCLOUT DD statement (optional)

This DD statement defines a sequential data set to contain the generated JCL of the GENJCL command. It is defined with LRECL=80, blocked or unblocked. You can use any dsname that is approved by your site. Write access is required for modes 1 and 2. If you omit the JCLOUT DD statement, IMS HP Change Accumulation Utility allocates a temporary data set, when necessary.

JCLPDS DD statement

This DD statement defines the skeletal JCL library that is used by the GENJCL procedure to build the change accumulation JCL. The data set is created when IMS is installed. You can use the data set name that was defined at that time.

(JCLPDS is owned by DBRC and is an integral component of IMS, not IMS HP Change Accumulation Utility.)

GENJCLIN DD statement

This DD statement defines a sequential data set that contains input statements for the GENJCL procedure. Write access is required. This input can contain one or more GENJCL commands. Each command creates the JCL for the change accumulation. IMS HP Change Accumulation Utility processes change accumulation for each CAGROUP in parallel up to the threshold value specified as MAXOUT limit. The remaining CAGROUPS are processed after the change accumulation SORT task becomes available.

The order of these commands in the GENJCL in/out stream determines the order in which the CAGROUPS are processed. If you want to process a CAGROUP with the highest priority, then place the GENJCL command for that CAGROUP as the first GENJCL command. It is recommended that CAGROUPS that have a higher number of log records to accumulate, be given a higher priority.

If you omit the GENJCLIN DD statement, IMS HP Change Accumulation Utility allocates a temporary data set, when necessary.

SYSOUT DD statement

This DD statement defines a sequential data set to contain error messages from the HPCAMAIN program. Write access is required. The dsname can be assigned to the JES SPOOL data set and is defined with LRECL=133, blocked or unblocked. You can use any dsname that is approved by your site. The file can be spooled SYSOUT, a user-defined data set, or DUMMY.

HPCAPROC DD statement

This DD statement defines a procedure library that can be used by IMS HP Change Accumulation Utility. Write access is required. If a JOBLIB is not defined through the presence of the HPCAJLIB DD statement, this library must be accessible through the JES startup procedure for starting IMS HP Change Accumulation Utility subordinate address spaces. You can use any dsname that is approved by your site.

HPCAPROC DD is optional for the standard procedure mode and for the single address space mode (AS1).

HPCAJLIB DD statement (optional)

This DD statement defines the JOBLIB into which IMS HP Change Accumulation Utility places the JCL of jobs to start the SORT address spaces. Write access is required.

HPCSYSIN DD statement

This DD statement defines the control statements that are submitted to HPCAMAIN. The file can be fixed or variable, maximum record length is 254. The file can be spooled SYSIN or a user-defined data set. Concatenation can be used to provide standard parameters that are seldom changed and local one-time overrides. You generally use the HPCSYSIN DD statement if the HPCAMAIN JCL was stored as a PROCLIB member for multiple reuse.

For example, you can use the following setup file to define typical default values and then require for processing only the names of the CA groups:

```
//HPCSYSIN DD DSN=some.set.of.defaults,DISP=SHR
//          DD DDNAME=LCLSYSIN
...
...
...
//LCLSYSIN DD *
GEN.GRPNAME = CAGRP01
GEN.GRPNAME = CAGRP02
GEN.GRPNAME = CAGRP06
/*
```

HPCACOLP, HPCACOLS, HPCACSV, HPCAHTML, HPCAXML DD statements (optional)

Use these DD statements to select optional report outputs.

Extended batch control statements

Control statements used in extended batch are commands that are equivalent to most of the parameters that are entered for ISPF user interface processing.

The HPCSYSIN DD is required and, together with the DD allocations, provides the control functions of IMS HP Change Accumulation Utility.

Commands relevant to extended batch are described in [Chapter 9, “JCL parameter reference,”](#) on page [85](#).

Using IMS management of ACBs

IMS Catalog Definition exit routine (DFS3CDX0) is required when IMS HP Change Accumulation Utility references the database definition in an IMS management of ACBs environment.

When IMS management of ACBs is enabled and IMS catalog data sets are not registered in the DBRC, specify the DFSHDBSC data set to the skeletal JCL. Refer to [“Specifying DFSHDBSC DD”](#) on page [75](#).

When the single address space job processing method (AS1) is used, you can specify the DFSHDBSC data set to the IMS HP Change Accumulation Utility execution JCL (EXEC PGM=HPCADRIV). In this case, you do not need to modify the skeletal JCL.

Chapter 6. ISPF user interface mode

You can use the ISPF user interface mode to specify global and runtime parameters for your IMS HP Change Accumulation Utility environment and run multiple change accumulation groups in parallel.

Topics:

- [“Starting the ISPF user interface” on page 41](#)
- [“Creating the HPCA-ID and profile” on page 45](#)
- [“Defining DBRC utility data sets” on page 46](#)
- [“Displaying CAGROUPs” on page 47](#)
- [“Setting CAGROUP-dependent control parameters” on page 49](#)
- [“Using ISPF line commands” on page 50](#)
- [“Assigning skeletal JCL member names” on page 51](#)
- [“Using ISPF primary commands” on page 52](#)
- [“Displaying current environment data \(ENV command\)” on page 54](#)
- [“Displaying job status \(STAT command\)” on page 55](#)
- [“Submitting JCL for processing \(RUN command\)” on page 56](#)
- [“Using IMS management of ACBs” on page 57](#)

Starting the ISPF user interface

You use the ISPF user interface to specify control information for the IMS HP Change Accumulation Utility environment.

If you encounter problems, enter HELP on any panel for an explanation of what can be entered on the panel.

Required libraries

Before you run the ISPF user interface, ensure that the following libraries exist:

1. *smphlq*.SHPCCEXE (CLISTs)
2. *smphlq*.SHPCPLIB (Panels)
3. *smphlq*.SHPCMLIB (ISPF messages)
4. *smphlq*.SHPCLMDO (Programs)

You do not need to change your TSO logon procedure to include any of the previous libraries.

ISPF data sets

The ISPF user interface uses the following data sets when ISPF is running.

hpchlq.CONTROL

This is a partitioned data set that is created by ISPF to contain control information for the ISPF user interface. If the data set exists, it is reused. This data set is defined with variable length unblocked records. The ISPF user interface generates the following members:

hpca-id#BAT

This member contains global control information records and run-time parameter values for each CAGROUP that is selected for processing. If you plan to run IMS HP Change Accumulation Utility as a batch job using a two-step procedure, this member must contain the CAGROUP-dependent control information for all CAGROUPs that are registered in the RECON data set.

hpca-id#CTL

This member contains records from the HPCA#BAT member and records built from the output of the GENJCL procedure. The information in this member is run dependent. For each selected CAGROUP for which change accumulation occurs, relevant records for that CAGROUP are selected from HPCA#BAT and merged with the records from the output of the GENJCL procedure.

hpca-id#GIN

This member contains input statements to the GENJCL procedure. These statements are built using information you provide through the ISPF user interface. When running IMS HP Change Accumulation Utility as a batch job using a two-step procedure, you provide the input to the GENJCL procedure through the GENJCLIN data set.

hpca-id#DRIV

This member contains the JCL to run IMS HP Change Accumulation Utility for the IMS system that is associated with the IMS HP Change Accumulation Utility ID.

hpchlq.SYSIN

This is a temporary sequential data set that is used by the ISPF user interface to hold the input to the DBRC utility program.

hpchlq.JCLOUT

This is a temporary sequential data set that is used by DBRC to output the JCL it creates.

hpchlq.SYSPRINT

This is a temporary sequential data set that is used by the ISPF user interface to hold the output from the DBRC utility program.

hpchlq.HPCTABLE

This is a partitioned data set created by the ISPF user interface to hold control information. If the data set does not exist, it is created and maintained across ISPF sessions. This data set contains the following ISPF tables:

- HPCTIMS
- HPCTCA
- HPCTENV
- HPCTSRT
- HPCTLOG

This data set is allocated to ISPTLIB and ISPTABL using the LIBDEF facility of ISPF. You do not need to allocate the data set in your LOGON procedure.

hpchlq.SAMPLIB

This library is provided with the product and contains sample JCL.

You do not need to allocate work data sets or an ISPF tables data set because they are allocated by the ISPF user interface.

Information about the ISPF screen display

- If your screen size is 24 X 80 and your screen shows the PFK settings, you might not see all the data IMS HP Change Accumulation Utility displays.
- Use the ISPF command FKA OFF to remove the display of the PFK settings.

Activating the ISPF interface

Perform the following steps to activate the ISPF interface for IMS HP Change Accumulation Utility:

1. From ISPF main menu, select Option 6: Command.

```

Menu Utilities Compilers Options Status Help
-----
                                z/OS Primary Option Menu
Option ==> 6_-----
0 Settings      Terminal and user parameters      User ID . : GCAMA
1 View          Display source data or listings      Time. . . : 06:37
2 Edit          Create or change source data        Terminal. : 3278
3 Utilities     Perform utility functions          Screen. . : 2
4 Foreground   Interactive language processing    Language. : ENGLISH
5 Batch        Submit job for language processing   Appl ID . : ISR
6 Command      Enter TSO or Workstation commands   TSO logon : TPROC02
7 Dialog Test  Perform dialog testing            TSO prefix: GCAMA
8 LM Facility  Library administrator functions    System ID : STLABE2
9 IBM Products IBM program development products  MVS acct. : *
10 SCLM        SW Configuration Library Manager   Release . : ISPF 7.3
11 Workplace   ISPF Object/Action Workplace
12 z/OS system z/OS system programmer applications
13 z/OS user   z/OS user applications
D DB2/DXT/QMF Display DB2/DXT/QMF Selection Panel
G SWG/SVL     Display SWG/SVL Selection Panel

Enter X to Terminate using log/list defaults

```

Figure 8. ISPF Primary Option Menu

The ISPF Command Shell is displayed.

- From the ISPF Command Shell, enter a command string using the following syntax:

```

EX 'smphlq.SHPCCEXE(HPCC000)' 'SMPHLQ(smphlq) HPCHLQ(hpchlq) <VOL(volsr)>
<PDSE>'

```

The following list defines the keywords that are used to run the ISPF user interface:

SMPHLQ

Specify the high-level qualifier of your installation data set.

HPCHLQ

Specify the high-level qualifier for work data sets required by the ISPF user interface.

VOLSER

Specify the volume serial number of the DASD device on which the work data sets are allocated. This parameter is optional.

PDSE

Specify that PDSE data sets are to be used for the IMS HP Change Accumulation Utility work files. The default is to define the data sets as PDS. PDS data sets require periodic compression.

For example:

```

Menu List Mode Functions Utilities Help
-----
                                ISPF Command Shell
Enter TSO or Workstation commands below:

==> ex 'gcama.irs210.shpccexe(hpcc000)' 'smphlq(gcama.irs210) hpchlq(hpca)'

Place cursor on choice and press enter to Retrieve command

```

Figure 9. ISPF Command String

- The IBM copyright screen appears.

Press ENTER to continue.

```
=====  =====  =====  =====  *
=====  =====  =====  =====
   ==    ==   =====  =====
   ==    =====  =====
   ==    =====  =====
   ==    ==   =====
=====  =====  =====  ==  =====
=====  =====  =====  =  =====

IMS Recovery Pack for z/OS Version 1 Release 1
IMS High Performance Change Accumulation for z/OS
-----
| Licensed Materials - Property of IBM      |
| 5655-V86 5655-F59                         |
| Copyright IBM Corp. 2001,2010             |
| All Rights Reserved.                     |
| US Government Users Restricted Rights -   |
| Use, duplication or disclosure restricted |
| by GSA ADP Schedule Contract with IBM Corp. |
-----
* Trademark of International Business Machines
```

Figure 10. ISPF IBM Copyright Screen

4. Press **Enter** to continue.

The HPCA-ID/IMS Profile panel displays:

```

                                HPCA-ID/IMS Profile                                Row 1 of 1
COMMAND ==> _____ SCROLL      ==> PAGE

Enter END (PF3) to exit.

To create a new HPCA-ID/IMS profile, enter an HPCA-ID and its description
HPCA-ID: ____ Profile Description: _____

Enter line command S to select an IMS System for this run
                  T to setup DBRC product datasets
                  D to delete an HPCA-ID profile

CMD HPCA-ID  HPCA-ID/IMS Profile Description
-----
_  IMST      IMS Version n.n Test
```

Figure 11. HPCA-ID/IMS Profile - part 1

```

                                HPCA-ID/IMS Profile                                Row 1 of 2
COMMAND ===> _____ SCROLL ===> PAGE

Enter END (PF3) to exit.

To create a new HPCA-ID/IMS profile, enter an HPCA-ID and its description

HPCA-ID: ____ Profile Description: _____

Enter line command  S  to select an IMS System for this run
                    T  to setup DBRC product datasets
                    D  to delete an HPCA-ID profile

CMD HPCA-ID  HPCA-ID/IMS Profile Description
-----
_  IMST      IMS Version n.n Test
_  IMSP      IMS Version n.n Production

```

Figure 12. HPCA-ID/IMS Profile - part 2

Creating the HPCA-ID and profile

Use the HPCA-ID/IMS Profile panel to specify an HPCA-ID that uniquely identifies an IMS system on which the IMS HP Change Accumulation Utility program runs.

The HPCA-ID/IMS Profile panel in represents the main ISPF panel for IMS HP Change Accumulation Utility.

For example:

```

                                HPCA-ID/IMS Profile                                Row 1 of 2
COMMAND ===> _____ SCROLL ===> PAGE

Enter END (PF3) to exit.

To create a new HPCA-ID/IMS profile, enter an HPCA-ID and its description

HPCA-ID: ____ Profile Description: _____

Enter line command  S  to select an IMS System for this run
                    T  to setup DBRC product datasets
                    D  to delete an HPCA-ID profile

CMD HPCA-ID  HPCA-ID/IMS Profile Description
-----
_  IMST      IMS Version n.n Test
_  IMSP      IMS Version n.n Production

```

Figure 13. HPCA-ID/IMS Profile panel

Specifying the HPCA-ID name and profile

An HPCA-ID profile is an entry in a table that associates an HPCA-ID with its related DBRC utility program data sets.

Each HPCA-ID is associated with data sets that are required by the DBRC utility program.

To create an HPCA-ID profile, enter any 1-4 character string to represent the HPCA-ID name. You can use the IMS System ID for this name.

Enter a 1-30 character string as a short descriptor of the IMS system identified by the HPCA-ID. It is recommended that you include the IMS release level in the descriptor. The HPCA-ID/IMS Profile panel shows a sample list of existing HPCA-ID profiles.

To delete an entry from the table, enter the **D** line command.

Associating DBRC utility data sets

An HPCA-ID profile is not complete until the DBRC utility program data sets have been associated with the HPCA-ID.

To create the association, enter the line command **T**, or wait until prompted by the system. You can also use the **T** line command when you want to change the data sets associated with an HPCA-ID.

To use the ISPF user interface for a specific IMS system, select the HPCA-ID by entering the **S** line command in the table row for that HPCA-ID. If the DBRC data sets for the selected HPCA-ID have not been defined, you are prompted to define them using the DBRC Utility Data Sets panel.

You can also enter line commands on multiple lines. The commands are processed in the sequence of displayed rows.

Defining DBRC utility data sets

Use the DBRC Utility Data Sets panel to define, for an HPCA-ID, the data set names that are required by the DBRC utility program.

If the DBRC data sets for the selected HPCA-ID have not been defined in the HPCA-ID/IMS Profile panel, you are prompted to define them.

You can also display the DBRC Utility Data Sets panel by entering the line command **T** on the HPCA-ID/IMS Profile panel.

For example:

```
SETUP          HPCA DBRC Utility Data Sets
COMMAND ===> _____
Enter END (PF3) to exit. Enter CAN to exit without processing.
HPCA-ID: Q91A
DBRC Utility RESLIB DSname. . . : 'DBGTOOL.QA.Q91A.RESLIB'
. . . : _____
(Leave blank if in LINKLIB)
DBRC Skeletal Library DSname. : 'DBGTOOL.QA.JCLPDS'
Dynamic allocation of RECON Data Sets: N    (Y=yes, N=no)
DFSMDA Library DSname . . . . : _____

For allocation of RECON Data Sets through JCL:
RECON1 Data Set DSname. . . . : 'DBGTOOL.QA.Q91A.RECON1'
RECON2 Data Set DSname. . . . : 'DBGTOOL.QA.Q91A.RECON2'
RECON3 Data Set DSname. . . . : 'DBGTOOL.QA.Q91A.RECON3'
```

Figure 14. DBRC Utility Data Sets panel

To cancel the process and the data entries made on this panel, enter the **CAN/CANCEL** command. The previous ISPF panel is displayed.

To continue processing with the selected HPCA ID enter the **END** command (typically, PF3).

The CA Group Selection panel displays with a table of CAGROUPs that have been defined in the RECON data sets.

Field descriptions for DBRC Utility Data Sets panel

HPCA-ID

Shows the current IMS HP Change Accumulation Utility ID selected.

DBRC Utility RESLIB dsname

Specify the dsname of the library that contains the DBRC utility program DSPURX00. This library is normally the same as the IMS RESLIB. This field can be left blank to indicate that the dsname is in the LINKLST. If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname.

One additional load library is optionally provided for concatenation to the IMS RESLIB. This second library can be used for locating IMS local exit modules that are not in the same library as the DBRC utility (DSURX00).

DBRC Skeletal Library dsname

Specify the dsname of the library that contains the skeletal JCL members for the DBRC utility program. If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname. This entry is required.

Dynamic allocation option of RECON data sets

Specify whether (Y) or not (N) the RECON data sets are dynamically allocated. If the RECON data sets are to be dynamically allocated, the DFSMDA members for RECON1 and RECON2, must have been created and placed in a data set. Typically, this data set is the same data set that contains the DSPURX00 program. If not, then you must specify the name of the data set that contains the DFSMDA modules.

DFSMDA Library dsname

Specify the dsname of the library that contains the dynamic allocation modules for the RECON data sets defined through the IMS macro DFSMDA. This name is required only if the Dynamic Allocation option is Y and the dynamic allocation modules are not in the DBRC utility program load library.

If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname.

RECON1 Data Set dsname

Specify the dsname of the RECON1 data set. If the Dynamic Allocation option is N, enter the dsname of the RECON1 data set. If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname.

RECON2 Data Set dsname

Specify the dsname of the RECON2 data set. If the Dynamic Allocation option is N, enter the dsname of the RECON2 data set. If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname.

If the Dynamic Allocation option is N, both RECON1 and RECON2 dsnames are required.

RECON3 Data Set dsname

Specify the dsname of the RECON3 data set. This entry is optional. If the Dynamic Allocation option is N, enter the dsname of the RECON3 data set. If the dsname is fully qualified, it must be entered in single quotes. If the name is not enclosed in single quotes, the TSO user ID is prefixed to the entered dsname.

Displaying CAGROUPs

The CA Group Selection panel displays all the CAGROUPs that are registered in the RECON data set.

For example:

```

                                HPCA CA Group Selection                                Row 1 of 4
COMMAND ===>                                SCROLL ===> PAGE

Enter one of the Line or Primary commands. Enter END (PF3) to exit.

Line Commands:                                Primary Commands:
  S - Select the CA Group for processing        S *   Select all cagroups
  U - De-select the CA Group                   U *   De-select all cagroups

Enter END (PF3) to exit. Enter CAN to exit without processing.

   CA-GROUP   ACTION
   -----   -
S   CAGRP1
S   CAGRP2
S   CAGRP3
S   CAGRP4

```

Figure 15. CA Group Selection panel: Selecting groups

After group selection example:

```

                                HPCA CA Group Selection                                Row 1 of 4
COMMAND ===>                                SCROLL ===> PAGE

Enter one of the Line or Primary commands. Enter END (PF3) to exit.

Line Commands:                                Primary Commands:
  S - Select the CA Group for processing        S *   Select all cagroups
  U - De-select the CA Group                   U *   De-select all cagroups

Enter END (PF3) to exit. Enter CAN to exit without processing.

   CA-GROUP   ACTION
   -----   -
-   CAGRP1     SELECTED
-   CAGRP2     SELECTED
-   CAGRP3     SELECTED
-   CAGRP4     SELECTED

```

Figure 16. CA Group Selection panel: Selected groups identified

To cancel the process and the data entries made on this panel, enter the **CAN/CANCEL** command. The previous ISPF user interface panel is displayed.

The CA Group Selection panel includes all CAGROUPS in the RECON data set.

Select those CAGROUPS that IMS HP Change Accumulation Utility is to include in its processing. Use the line command **S** to select a CAGROUP and **U** to deselect a CAGROUP.

If you plan to run IMS HP Change Accumulation Utility in batch mode and you are using the ISPF user interface in a one-time effort to build control information, then select all CAGROUPS displayed.

The following items explain panel functions:

- The primary command **S*** or **S All** selects all CAGROUPS.
- Multiple **S** and **U** line commands can be entered.
- Selected CAGROUPS appear with SELECTED in the ACTION column.
- Deselected CAGROUPS appear with a blank in the ACTION column.
- You can scroll up and down the table.

After the selection is complete, enter the **END** command (usually, PF3) to continue processing. The Selected CA Groups panel displays.

Setting CAGROUP-dependent control parameters

You use the Selected CA Groups panel to set CAGROUP-dependent control parameters for each CAGROUP.

The Selected CA Groups panel displays after you select the CAGROUPS to be processed. Each row of the table represents a CAGROUP and its values as recorded in the RECON data set.

Initially, all CAGROUPS have these parameters set to the same default values.

For example:

```

                                HPCA Selected CA Groups                                Row 1 of 1
COMMAND ===>                                SCROLL ===> PAGE

Enter one of the Line or Primary commands. Enter END (PF3) to exit.
Line Commands:                                Primary Commands:
M - Display key defaults member list          SET  Setup run time environment
K - Keywords                                  GEN  Generate CA-JCL
                                              ENV  Show environment parms
L - Allocate Log Spill Data Sets             FAST Execute HPCA
S - Specify SORT Parameters                  RUN  Submit generated CA-JCL
                                              STAT Retrieve status of CA-job
                                              BAT  Create Control parameters
                                              SORT Display by CAGROUP or PRTY
                                              SCAN Validate JCL & environment

HPCA-ID: IMS1   DEFAULT VOLNUM ===>

CMD CAGROUP  PRTY REUSE   SKEL.MBR  VOLNUM  CATIME
-----
_  CAGRP1    01   N      CAJCL

```

Figure 17. Selected CA Groups panel

To cancel the process and the data entries made on this panel, enter the **CAN/CANCEL** command. The previous ISPF user interface panel is displayed.

Use the line commands **L** and **S** to change the CAGROUP-dependent parameter values.

From this panel, you can perform many actions that affect processing of selected CAGROUPS.

- For more information about **line commands** that are available on this panel, see [“Using ISPF line commands”](#) on page 50.
- For more information about **primary commands** that are available on this panel, see [“Using ISPF primary commands”](#) on page 52.

Field descriptions for Selected CA Groups panel

HPCA-ID

Shows the current HPCA-ID selected.

DEFAULT VOLNUM

Provides a default value to be used for the VOLNUM parameter of each CA group when generating the DBRC GENJCL inputs. This default is applied to each selected group unless a group has been assigned an individual VOLNUM value. Providing a default is a convenient way of setting the VOLNUM for all selected groups.

CAGROUP

Displays the name of a selected CAGROUP. You cannot change this value.

PRTY

Displays the priority of performing the change accumulation. 01 is the highest priority; 99 is the lowest. You can set the priority for each CAGROUP and then sort the table by priority (see **Sort** command). The output from GENJCL and the processing of the CAGROUP will be in the sorted order.

REUSE

Contains information obtained from the RECON data set. It is the REUSE/NOREUSE option for the CAGROUP when the CAGROUP was registered in the RECON. N indicates that a data set will be allocated to create a new CA data set. Y indicates that the system will use the oldest of the data sets defined for the CAGROUP to create a new CA data set. The line command **C** is not permitted if REUSE is **Y**. In this case, data set allocation parameters for a new CA data set are not relevant. This field cannot be changed.

SKEL.MBR

Specify the name of the skeletal JCL execution member that is to be used by the **GENJCL** command. You can enter a different member name in this field; however, the member must exist in the skeletal JCL library.

VOLNUM

Specify the VOLNUM value to be used for this selected CA group. The value of VOLNUM overrides any setting for DEFAULT VOLNUM. VOLNUM 999 cancels the effect of the DEFAULT VOLNUM.

CATIME

Specify the time after which no log volumes for the selected CAGROUP are to be included. The time stamp need not be the stop time of any log volume. All log volumes that have start times less than or equal to the specified time stamp are included in the CA processing. The time stamp must be in the standard format:

```
yydddhhmssst
```

or

```
[yy]yy|dd|hh|mm|ss|t
```

where:

yy (*yyyy*) is the year 00-99 (0000-9999)

ddd is the day (0000-365)

hh is the hour (00-23)

mm is the minute (00-59)

ss is the second (00-59)

t is the tenth of a second (0-9)

/ is any non-numeric character delimiter including blank but excluding the single quote;

if delimiter is a blank, comma or parentheses, the time stamp must be enclosed in single quotes

Example:

```
CATIME is entered as '21.252 08:23:45.7'
```

Using ISPF line commands

Use the line commands from the Selected CA Groups panel to specify additional information to tailor **GENJCL** command processing or IMS HP Change Accumulation Utility processing.

Additional tailoring of **GENJCL** command processing can be specified for user key resolution and volume specification to hold the new CA data set.

IMS HP Change Accumulation Utility uses a set of default parameter values when processing the IMS Change Accumulation utility program. You can override these values, such as space allocation parameters for SORT work data sets, to accommodate specifics of the CAGROUP. The values you choose for the selected CAGROUP override default settings for that CAGROUP, only.

To override the default settings for a specific CAGROUP, use the following line commands:

- To set space allocation parameters for all SORT work data sets used for the selected CAGROUP during change accumulation, use the **S** line command.

This command is equivalent to using Option 3 from the SET primary command.

- To set space allocation parameters for the log spill data sets, use the **L** line command.

This command is equivalent to using Option 5 from the SET primary command.

If user keys are present in the skeletal JCL for a CAGROUP, the values for these user keys are set through the **M** and **K** line commands .

Using the **END** command (usually, PF3) causes the CA Spill Parameters panel to display.

Assigning skeletal JCL member names

If user keys are present in the skeletal JCL member, you must assign values for them prior to processing the **GEN** command.

You can use either of the following two methods to assign values:

- [“Entering user key values from the skeletal JCL library” on page 51](#)
- [“Entering user key values directly” on page 52](#)

Entering user key values from the skeletal JCL library

You can use the Key Defaults Member List pane to enter the user keys and their values as records of a member in the skeletal JCL library.

When you enter user keys and their values as records of a member in the skeletal JCL library, you should format the records prior to running the ISPF user interface.

Select the line command **M** from the Selected CA Groups panel. The Key Defaults Member List panel displays. Use this panel to enter member names to resolve user keys.

You can enter up to ten skeletal JCL defaults member names. User keys are searched for in the order in which the members are specified.

For example:

```
GENJCL                                HPCA Key Defaults Member List
Command ==> _____

Enter Skeletal member names to resolve userkeys
Press End (PF3) to exit. Enter CAN to exit without processing.
CA-GROUP: CAGRP1
          Defaults skeletal Member-Names
          -----
1. ==> CAJCL
2. ==>
3. ==>
4. ==>
5. ==>
6. ==>
7. ==>
8. ==>
9. ==>
10. ==>
```

Figure 18. Key Defaults Member List panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Entering user key values directly

You can use the User Keys panel to enter the values of the user keys directly.

Select the line command **K** from the Selected CA Groups panel to display the User Keys panel. Use this panel to specify user key values.

User keys in the skeletal JCL member display as rows of a table.

For example:

```
GENJCL                HPCA User Keys                Row 1 of 1
COMMAND ===>                SCROLL ===> PAGE

Enter the values for displayed Userkeys.
Enter END (PF3) to exit. Enter CAN to exit without processing.

CA-GROUP: CAGRP1      Skeletal Member: CAJCL

Userkey  Key value
-----
%CANFSEQ
```

Figure 19. User Keys panel

To cancel the process and the data entries made on this panel, enter the **CAN/CANCEL** command. The previous panel is displayed.

Field descriptions for User Keys panel

Userkey

Displays the user key (non-IBM key) found in the skeletal JCL. This field cannot be changed.

Key value

Specify the value to be assigned to the associated user key. The value can be any character string enclosed in single quotes. The maximum length of the value is 132 characters (excluding the quotes). If the value contains a quote, use two single quotes to represent the quote in the key value. Value can be a null string (' ').

If a keyword is assigned a value here (as well as through a defaults member name), IMS HP Change Accumulation Utility uses the value you specify here.

If a keyword is assigned a value using both the defaults member name and the USER KEY parameters, the value specified in USER KEY is used.

Members that are specified using the defaults member name must exist in the skeletal JCL library.

Using ISPF primary commands

The primary commands available from the Selected CA Groups panel are summarized in this topic.

The following primary commands are used to set default control information values and to build the control parameters that are required by IMS HP Change Accumulation Utility.

SET

Sets the default IMS HP Change Accumulation Utility control parameter values, as well as the space allocation parameters for all log spill data sets. You can override space allocation parameters for any CAGROUP by using the line commands at the CAGROUP level.

The **SET** command and the **L** line commands have similar menus. The SET menu is at the global level, and the **L** line command menu is at the CAGROUP level.

For a description of menu items, see [Chapter 7, “Setup Selection Menu,”](#) on page 59.

GEN

Creates the control information records that are required to run IMS HP Change Accumulation Utility. These records are created from the setup values entered using the **SET** command and the output of the GENJCL procedure for the CAGROUPS selected for the IMS HP Change Accumulation Utility run. In addition, the **GEN** command creates the JCL to run IMS HP Change Accumulation Utility.

ENV

Displays the current settings of the runtime parameters. An example of the panel resulting from the **ENV** command is displayed in [“Displaying current environment data \(ENV command\)”](#) on page 54.

FAST (Create Control and Processing Information)

Combines the processing values of the **GEN** and **RUN** commands.

RUN

Submits the JCL created by the **GEN** command to the z/OS internal reader for processing.

STAT (Display Job Status)

Displays the status of the submitted IMS HP Change Accumulation Utility job. If no IMS HP Change Accumulation Utility job has been submitted, **STAT** displays the status of all jobs for the TSO user ID. An example of the panel that results from the **STAT** command is displayed in [“Displaying job status \(STAT command\)”](#) on page 55.

BAT (Create Control Information for Batch Mode)

Creates control parameters for running batch jobs.

Select the **BAT** command to create control information for all selected CAGROUPS using the parameter values set for each CAGROUP. This command does *not* run the DBRC utility GENJCL procedure. **BAT** also creates JCL to run IMS HP Change Accumulation Utility.

SORT

Sorts the displayed table by PRTY or by CAGROUP. To sort the table by PRTY, enter the **SORT** command without parameters. To sort it by CAGROUP, enter the command **SORT CAG**.

SCAN

Analyzes setup parameters and JCL. Analysis is displayed in Browse format for review. The information reported by SCAN is describe in [Chapter 16, “Using diagnostic resources,”](#) on page 181.

JCL

The JCL command converts the current environment settings to JCL that will process the extended batch function. The JCL is displayed and can be viewed, modified, submitted, or saved.

You can change one or more fields in multiple rows before pressing the **Enter** key, and you can enter multiple line commands. Processing is performed in the sequence of the CAGROUP name.

Changes are applied in two phases:

- In the first phase, fields in selected rows are changed when there is no plausibility check failure.
- In the second phase, rows with plausibility errors are processed again, and an error message is displayed for the field in error.

The row that contains the error displays at the top, and line commands are ignored for rows with errors.

Generally, all row modifications should precede any primary command. However, if a primary command is also entered with line commands and field modifications, then processing depends on the type of primary command that was entered.

The **SET**, **ENV**, **SORT**, **RUN** and **STAT** primary commands are processed immediately and cause line commands and field modifications to be ignored. The **GEN**, **BAT** and **FAST** commands are ignored if any row has a line command or a field modification.

If DBRC returns with a highest return code of 4 during the processing of the **GEN** command, the output in SYSPRINT is displayed, as shown in [Figure 20 on page 54](#). The description explains the cause of the error.

You can either cancel the **GEN** command (by issuing the **CAN** command), or continue by entering the **END** command (usually, PF3).

For example:

```
GENJCL Messages - 'VNDR400.SYSPRINT'      GENJCL returned with err
Enter END (PF3) to exit. Enter CAN to exit without processing.

*****Top of data*****
1      IMS VERSION 15 RELEASE 1  DATA BASE RECOVERY CONTROL  PAGE 000
0 GENJCL.CA  GRPNAME(CAGRP1)-
0 NOLIST NOJOB
0DSP0326I UNDEFINED SIMPLE KEYWORD %USERNAME IN SKELETAL JCL
  DSP0326I MEMBER CAJCL DD NAME JCLPDS RECORD NUMBER 00001
0DSP0326I UNDEFINED SIMPLE KEYWORD %USERID IN SKELETAL JCL
  DSP0326I MEMBER CAJCL DD NAME JCLPDS RECORD NUMBER 00002
0DSP0326I UNDEFINED SIMPLE KEYWORD %PRINT IN SKELETAL JCL
  DSP0326I MEMBER CAJCL DD NAME JCLPDS RECORD NUMBER 00004
0DSP0203I COMMAND COMPLETED WITH CONDITION CODE 04
0DSP0220I COMMAND COMPLETION TIME 21.230 15:09:06.6
1      IMS VERSION 15 RELEASE 1  DATABASE RECOVERY CONTROL  PAGE 000
0 GENJCL.CA  GRPNAME(CAGRP2)-
0 DEFAULTS(MBR1)-
0DSP0203I COMMAND COMPLETED WITH CONDITION CODE 00
0DSP0220I COMMAND COMPLETION TIME 21.230 15:09:06.7
1      IMS VERSION 15 RELEASE 1  DATABASE RECOVERY CONTROL  PAGE 000
0DSP0211I COMMAND PROCESSING COMPLETE
  DSP0211I HIGHEST CONDITION CODE=04
*****Bottom of data*****
```

Figure 20. Sample SYSPRINT output

Displaying current environment data (ENV command)

The Current Environment Data panel displays current runtime parameter settings.

Use the **ENV** command to display the current settings of runtime parameters.

For example:

```

                                HPCA Current Environment data                                Row 1 of 43
COMMAND ===>                                SCROLL ===> PAGE

Enter END (PF3) to exit.

Environment Parameter      : Current Allocation
-----
-----DBRC UTILITY CONTROL DATASETS-----

HPCA-ID                    : Q91A
HPCA-ID DESCRIPTOR        :
HPCA DEFAULT VOLNUM COUNT :
DBRC LOAD LIBRARY         : 'DBGTOOL.QA.Q91A.RESLIB'
SKELETAL LIBRARY          : 'DBGTOOL.QA.JCLPDS'
DYNAMIC ALLOC OF RECONS FLAG : N
DFSMDA LOAD LIBRARY       :
RECON - 1 DATASET         :
RECON - 2 DATASET         : 'DBGTOOL.QA.Q91A.RECON2'
RECON - 3 DATASET         : 'DBGTOOL.QA.Q91A.RECON3'

-----HPCA PRODUCT LIBRARIES-----

HPCA PRODUCT LOADLIB      : 'DBGTOOL.QA.SHPCLMD0'
HPCA CONTROL DATASET      : 'HPCA.CONTROL'

-----JES AND JOBCARDS-----

JOB ENTRY SYSTEM          : JES2
JOB CARD - 1              : //HPCA      JOB (IMSUTIL-HPCA),CLASS=A,MSGCLASS
JOB CARD - 2              : //                REGION=0M,TIME=NOLIMIT,
JOB CARD - 3              : //                NOTIFY=&SYSUID
JOB CARD - 4              : // *
JOB CARD - 5              : // *
JOB CARD - 6              : // *
JOB CARD - 7              : // *
JOB CARD - 8              : /*MESSAGE ** START OF HPCA UTILITY **
STARTED TASK PROCLIB      :
STARTED TASK JCLLIB       :

-----HPCA CONTROL PARAMETERS-----

MAX NUMBER OF LOG READ TASKS : 9
MAX NUMBER OF SORT TASKS     : 9
HPCA TERMINATION METHOD       : R
NUMBER OF INPUT BUFFERS      : 5
NUMBER OF OUTPUT BUFFERS     : 5
SPILL FILES BLKSIZE          : 32760
SORT LOAD LIBRARY            :
WHETHER SMF RECORDS WRITTEN : N

```

Figure 21. Current Environment Data panel

Field descriptions for Current Environment Data panel

Environment Parameter

Specify global parameters for all CAGROUPS. These parameters apply to the current IMS ID. To view values for a specific CAGROUP, see the setup parameters for the CAGROUP.

Current Allocation

Specify the value assigned to the related parameter.

Displaying job status (STAT command)

The Job Status Display panel displays the status of a submitted IMS HP Change Accumulation Utility job.

Use the **STAT** command to display the status of the job submitted through the **RUN** or **FAST** command.

For example:

```

                                HPCA Job Status Display

Command ==>_____SCROLL ==> ____

Press END to exit.

                                JOB Status
-----
                                IKJ56202I JOB HPCA(JOB26691) NOT FOUND

The above status row indicates that IMS HPCA was submitted and is no longer
in the output queue.
The job IMS HPCA must be identifiable by its Job name (in this case HPCA).

                                JOB Status
-----
                                IKJ56197I JOB HPCA(JOB28381) WAITING FOR EXECUTION

The above status row indicates that IMS HPCA was submitted and is waiting
for execution.

                                JOB Status
-----
                                IKJ56192I JOB HPCA(JOB28381) ON OUTPUT QUEUE

The above status row indicates that IMS HPCA has completed and is on the
output queue.

```

Figure 22. Job Status Display panel

Submitting JCL for processing (RUN command)

IMS HP Change Accumulation Utility runs as a batch job submitted through the RUN or FAST command.

The JCL for the batch job is created with the GEN command and placed in member *hpc-a-id#DRIV* JCL of the control data set.

You can also tailor the sample HPCABAT0 job that is provided in the *hpchlq.SAMPLIB* library to the requirements of your site.

The following example shows sample generated JCL:

```

VIEW          USRT004.CONTROL(R81DRIV) - 01.00          Columns 00001 00072
Command ==>
000001 //HPCA      JOB (IMSUTIL-HPCA),CLASS=A,MSGCLASS=H,
000002 //          REGION=0M,TIME=NOLIMIT,
000003 //          NOTIFY=&SYSUID
000004 //*
000005 //*
000006 //*
000007 //*
000008 //*MESSAGE  *** START OF HPCA UTILITY ***
000009 //STEP01   EXEC PGM=HPCDRIV
000010 //STEPLIB  pd DISP=SHR,
000011 //          DSN=VND0459.HPC140.SHPCLMD0
000012 //          pd DISP=SHR,
000013 //          DSN=IMSBLD.I81RTS2A.CRESLIB
000014 //HPCACTL  pd DISP=SHR,
000015 //          DSN=USRT004.CONTROL.(R81#CTL)
000016 //HPCPRINT  pd SYSOUT=*
000017 //SYSUDUMP  pd SYSOUT=*
000018 //HPCAXML   pd SYSOUT=X
***** ***** Bottom of Data *****

```

Figure 23. Sample generated JCL

Field descriptions for sample generated JCL

JOB statement

Specify the statement that you entered in the Current Environment Data panel.

EXEC statement

Specify the main entry program for IMS HP Change Accumulation Utility (HPCADRIV).

STEPLIB DD statement

This DD statement is always included. It defines the IMS HP Change Accumulation Utility program load library. *smphql* is the high-level qualifier for all IMS HP Change Accumulation Utility product libraries and is determined at installation time.

The data set concatenated to the IMS HP Change Accumulation Utility product library is the DBRC utility program load library. If the data set is not provided, IMS HP Change Accumulation Utility expects the module DSPURX00 (DBRC utility program) to be available through the LINKLST data sets or in the LPALIB.

For DBRC API sequencing, the IMS RESLIB must be included in the IMS HP Change Accumulation Utility JCL.

RECON1 DD**RECON2 DD****RECON3 DD statements**

These statements are present if they are *not* to be dynamically allocated. The dsnames are provided on the DBRC Utility Data Sets panel.

HPCACTL DD statement

Specify the IMS HP Change Accumulation Utility control data set. *hpchlq* is the IMS HP Change Accumulation Utility high-level qualifier for data sets you provide when invoking the ISPF user interface.

HPCPRINT DD statement

Defines the IMS HP Change Accumulation Utility report data set. This can be SYSOUT or a user-allocated data set. Minimum DCB information is LRECL=133.

SYSUDUMP, HPCAXML, etc.

Specify IMS HP Change Accumulation Utility spool data sets which are used for *messages and system dumps. You can choose these data sets from the Execution JCL pd Control panel, setup option 9.

Using IMS management of ACBs

IMS Catalog Definition exit routine (DFS3CDX0) is required when IMS HP Change Accumulation Utility references the database definition in an IMS management of ACBs environment.

When IMS management of ACBs is enabled and IMS catalog data sets are not registered in the DBRC, specify the DFSHDBSC data set to the skeletal JCL. Refer to [“Specifying DFSHDBSC DD”](#) on page 75.

Chapter 7. Setup Selection Menu

The ISPF Setup Selection Menu provides options to control the operation of IMS HP Change Accumulation Utility.

Topics:

- [“Setup Selection Menu overview” on page 59](#)
- [“Option 1: JCL Job Statements panel” on page 59](#)
- [“Option 2: Control Parameters panel” on page 62](#)
- [“Option 3: SORT Parameters panel” on page 63](#)
- [“Option 4: \(Reserved\)” on page 65](#)
- [“Option 5: CA Spill Parameters panel” on page 65](#)
- [“Option 6: CA Spill Data Set Allocation Parameters panel” on page 65](#)
- [“Option 7: \(Reserved\)” on page 67](#)
- [“Option 8: Fast Path Spill Allocation Parameters panel” on page 67](#)
- [“Option 9: Execution JCL DD Control panel” on page 68](#)

Setup Selection Menu overview

Setup parameters are those parameters which are the same for all CAGROUPS. All parameters are initially set to their defaults.

Use the SET command from the Selected CA Groups panel to display the Setup Selection Menu.

Use the Setup Selection Menu to proceed directly to a specific set of parameters by entering the number associated with the desired set of parameters. To display all parameters in succession, select option A.

For example:

```
SETUP                                HPCA Setup Selection Menu
COMMAND====>-----
Enter a selection option. Enter END (PF3) to exit.
HPCA-ID: IMS1
Option. . . . _ 1.    - JCL Job Statements
                 2.    - Control Parameters
                 3.    - SORT Parameters
                 4.    - Reserved
                 5.    - CA Spill Parameters
                 6.    - CA Spill Data Set Allocation Parameters
                 7.    - Reserved
                 8.    - Fast Path Spill Parameters
                 9.    - Execution JCL DD Control
                 A.    - ALL of the above in succession
```

Figure 24. Setup Selection Menu

To cancel the process and the data entries that you made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Option 1: JCL Job Statements panel

You use the JCL Job Statements panel to build the JCL JOB statement for the IMS HP Change Accumulation Utility program.

For example (after selection A from the Setup selection menu):

```

SETUP                                HPCA JCL Job Statements                                SETUP required
COMMAND ==>> -----
Enter END (PF3) to exit. Enter CAN to exit without processing.
Enter RESET to restore JOBCARD defaults.
JES: JES2 (JES2 or JES3)

Use JOBCARD from member  JOBJCLR_ in JCLPDS dataset
Key values from member  ----- in JCLPDS dataset
JOBCARD Information:
==> //HPCA      JOB (IMSUTIL-HPCA),CLASS=A,MSGCLASS=A,
==> //          REGION=0M,TIME=NOLIMIT,
==> //          NOTIFY=&SYSUID
==> // *
==> // *
==> // *
==> // *
==> // *
Member HPCSTASK (TASK=HPCSTASK)
PROCLIB to contain PROCS for HPCA subordinate CA address spaces:
DSname..: -----

JOB LIB to contain JOBS for HPCA subordinate CA address spaces:(Optional)
DSname..: -----

```

Figure 25. JCL Job Statements panel

To cancel the process and the data entries that you made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Issue the **RESET** command from this panel to reset all seven JOB JCL statements to the values defined in the JOBCARD member. If this member name is blank, the JOB JCL statements will be reset to the default JOBCARD statements.

Field descriptions for JCL Job Statements panel

JES

Specify JES2 or JES3 depending on the type of job entry subsystem. The eighth JOB statement is inserted based on this selection.

Use JOBCARD from member

Specify the member name from the skeletal JCL library. All eight job statements can be taken from records of a member of the skeletal JCL library. Enter the name of the member in this field.

Enter up to eight statements that will build the JCL JOB statement for the IMS HP Change Accumulation Utility program. All statements must conform to JCL requirements.

Key values from member

Specify the name of a member of the skeletal JCL library that is to be used to resolve user keys present in the JOB statements. The format of the records in this member is the same as the format required to resolve user keys by DBRC.

Resolving user keys can result in job card data being displaced to the left or to the right. Ensure that enough free space is present on the job cards so that after key value substitution, the job card data does not extend beyond column 71.

JOBCARD Information

Information displayed in this panel is the default IMS HP Change Accumulation Utility provides if you do not enter information in the **Use JOBCARD from member** field. You can modify the default information for your own requirements.

Member

Specify the started task, or procedure name to be used. This name might refer to a member created during IMS HP Change Accumulation Utility installation. The default for a new IMS HP Change Accumulation Utility ID will be HPCSTASK (AS1 mode). The default applies if both member name and PROCLIB are omitted.

If member name is blank and PROCLIB is non-blank, the custom procedure method is selected. If both member name and PROCLIB are non-blank, STC mode is selected.

PROCLIB dsname..:

The name of a library used to store the IMS HP Change Accumulation Utility JCL procedures. This library can be a system library or a user library depending on the values for Member and for JOBLIB. System libraries must be defined in the IEFPDSI concatenation of the master scheduler or PROC00 concatenation of the started JES.

JOBLIB dsname..:

Specify the dsname of a jobs library into which IMS HP Change Accumulation Utility places the JCL for jobs to start the SORT subordinate address spaces. This entry is optional.

If JOBLIB is specified, then the PROCLIB defined in this panel is not required to be in the IEFPDSI or PROC00 concatenation. The JOBLIB dsname must be included in the IEFJOBS data set in the z/OS startup member MSTJCLxx in SYS1.PARMLIB.

Sample JCL job statements

Because IMS HP Change Accumulation Utility runs in a multiple address space environment, it generates additional z/OS address spaces called SORT address spaces. Each SORT address space represents a CAGROUP.

The JCL to start each SORT address space is placed in the PROCLIB. The names of these procedures in the PROCLIB are generated internally by IMS HP Change Accumulation Utility using the IMS HP Change Accumulation Utility ID as a prefix and appending to it a number starting from 0000.

If the JOBLIB dsname is not present, the SORT procedures will be accessed from the PROCLIB, which is accessible through the JES procedure.

If the JOBLIB dsname is included, then IMS HP Change Accumulation Utility creates additional jobs for each CAGROUP and place them in the JOBLIB data set. These jobs are stored as members that have the same member names as the procedure member names in the PROCLIB.

Each job processes its corresponding procedure. A //JCLLIB statement in the job references the PROCLIB and, therefore, you do not need to have the PROCLIB in the JES concatenation. Each time the GEN (or FAST) command runs, it creates a new set of PROCLIBs and, optionally, a set of JOBLIB members for each of the CAGROUPS selected for CA processing.

In batch mode, the first step of the two-step batch procedure does the same.

A sample of the procedure for a CAGROUP is shown in the following example:

```

//hpcaid0001 PROC RGN=3000K,SOUT=*,
//PARM1=
//*
//IEFPROC EXEC PGM=hpcadri1,REGION=&RGN,
//PARM='&PARM1'
//*
//*
//THIS JCL ORIGINATES FROM THE USER'S 'JCLPDS' LIBRARY.
//*KEYWORDS ARE REPLACED BY THE GENJCL FUNCTION OF
//*THE IMS DATABASE RECOVERY CONTROL FEATURE.
//*
//*JCL FOR CHANGE ACCUMULATION
//*
//STEPLIB DD DISP=SHR,DSN=IMSSP.IMSB.RESLIB
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//RECON1 DD DSN=HPCA.IMS.RECON1,DISP=SHR
//RECON2 DD DSN=HPCA.IMS.RECON2,DISP=SHR
//IMS DD DISP=SHR,DSN=IMSSP.IMSB.DBDLIB
//SYSOUT DD SYSOUT=*
//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//SORTWK02 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//SORTWK03 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//SORTWK04 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//SORTWK05 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//SORTWK06 DD UNIT=3380,SPACE=(CYL,(5),,CONTIG)
//DFSUCUM0 DD DUMMY,DCB=BLKSIZE=100
//DFSUCUMN DD DSN=imssp.ca.cagrp1.ca134939,
// DISP=(NEW,CATLG),UNIT=3380,VOL=SER=(*****),
// SPACE=(CYL,(1,1)),LABEL=(1,SL)
//DFSUDD1 DD DUMMY
//DFSULOG DD DISP=SHR,
// HPCA.BATCH.LOG1
// DD DISP=SHR,
// HPCA.BATCH.LOG2

```

Figure 26. Sample CAGROUP JCL procedure

To create a second copy of the new change accumulation data set, define the new data set in your skeletal JCL member for the CAGROUP in the skeletal JCL library.

The following example shows JCL that defines a duplicate new CA data set:

```

//ICBUCUMN DD DSN=HPCA.SECONDCA.%CANDSN,
// UNIT=SYSDA,VOL=SER=(ICE000),
//* SPACE=(TRK,(1,1)),
//*
NOTE! The DD name of the data definition statement must be ICBUCUMN

```

Figure 27. Defining a duplicate CA data set

Option 2: Control Parameters panel

You use the Control Parameters panel to specify parameter values that affect all CAGroups.

Select option 2 to display the Control Parameters panel.

For example:

```

SETUP                                HPCA Control Parameters

COMMAND ==>_____
Enter END (PF3) to exit. Enter CAN to exit without processing.

Control Parameters for CA-GROUP: ALL

Max. number of input tasks: 9          (1-99. Default 9)
Max. number of output tasks: 9        (1-19. Default 9)

I/O buffers for input datasets: 5      (1-255. Default 5)
I/O buffers for output datasets: 5     (1-255. Default 5)

Log and FP spill file blksize: 32760  (6K-32K Default 32760)

Write SMF records: N                  (F=FULL,N=NO,S=SHORT,Default N)
Select Logs:_____ (PRILOG,SECL0G Default PRILOG)

```

Figure 28. Control Parameters panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

The parameter values for this panel are valid for all CAGROUPS. They cannot be overridden for a specific CAGROUP.

Field descriptions for Control Parameters panel

Max. number of input tasks

Enter the maximum number of input tasks (log read subtasks) to read log files in parallel. The number must be between 1 and 99. The default is 9.

Max. number of output tasks

Enter the maximum number of output tasks (SORT subtasks) to write CA output files in parallel. The number must be between 1 and 19. The default is 9.

I/O buffers for input datasets

IMS logs and IMS HP Change Accumulation Utility spill files are input data sets. Specify the number of I/O buffers to be used for input data sets. Minimum value is 1; maximum value is 255. The default is 5.

I/O buffers for output datasets

IMS HP Change Accumulation Utility spill files are output data sets. Specify the number of I/O buffers to be used for output data sets. Minimum value is 1; maximum value is 255. The default is 5.

Log and FP Spill Blksize

Specify the block size value for CA and spill file data sets. Minimum value is 6144, maximum value is 32760. The default is 32760.

Write SMF records

Specify whether each SORT instance must write SMF records.

Select logs

Specify primary or secondary log processing. The default value is PRILOG (primary logs).

Option 3: SORT Parameters panel

You use the SORT Parameters panel to specify the parameters for the SORT subtask process.

Select option 3 to display the SORT Parameters panel.

For example:

```

SETUP                      HPCA SORT Parameters
COMMAND ==> -----

Enter END (PF3) to exit. Enter CAN to exit without processing.

SORT Parameters for CA-GROUP: ALL

          SORT filesize: 100000          (5000 thru 10**13-1. Def. 100000)
    Main Storage for SORT: 4             (1-2000. Default 4)
Number of SORT work data sets: 4        (2-255. Default 4)

          SORT Hiperspace usage size: 0   (0,0-9999,0%-100%. Default 0)

Parameters to create DBRC Utility Control ID Statement:

Max. root sequence field len: ___       (1-256. Default blank)
          Maximum lrecl: -----        (1-99999. Default blank)

```

Figure 29. SORT Parameters panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Field descriptions for SORT Parameters panel

SORT Filesize

Specify the estimated number of records to be sorted for the identified CAGROUP. The file size can be specified by a number ranging from 5000 through $(10^{13})-1$. The default is 100000.

Main storage for SORT

Specify the amount of main storage, in megabytes, to be used by SORT. The range is 1-2000. The default is 4 megabytes.

Number of SORT work data sets

Specify the number of SORT work data sets for each CAGROUP. The number can be between 2 and 255. The default is 4.

SORT hiperspace usage size

Specify the size of the hiperspace used by each SORT instance, in megabytes, of configured expanded storage. Optimal (O) lets SORT calculate the maximum size dynamically. 0 prohibits hiperspace usage.

The hiperspace size can be specified as a number from 0 through 9999 or as a percentage from 0% through 100%. The default is Optimal (O).

When Optimal is specified, the following DFSORT performance features can be enabled:

- MOSIZE
 - Can be specified to improve elapsed time and EXCP performance
- DSPSIZE
 - Can be set to limited, versus the installation default of max, to allow DFSORT to optimally determine the best SORT method
- DSA
 - Can be specified to allow DFSORT to tune the right amount of storage for improving performance
- MAINSIZE
 - Can be specified to support dynamic storage adjustments
- SDB
 - Can be specified to allow DFSORT to select optimal block sizes for output data sets

Maximum root sequence field length

Specify the maximum root sequence field length. The default is 10.

Maximum logical record length

Specify the maximum database change log records. The default is 4531. If an ID does not exist in your skeletal JCL member, IMS HP Change Accumulation Utility creates an ID statement as input to the change accumulation process. You can set these values as global parameters or by CAGROUP. If an ID statement already exists in your skeletal JCL member, then these parameters are ignored.

Option 4: (Reserved)

Option 4 is reserved for future use.

Option 5: CA Spill Parameters panel

You use the CA Spill Parameters panel to provide spill file characteristics.

Select option 5 to display the CA Spill Parameters panel.

For example:

```
SETUP                                HPCA CA Spill Parameters
COMMAND  ===> _____ SCROLL  ===>PAGE
Enter END (PF3) to exit. Enter CAN to exit without processing.
  CA Spill data set allocation parameters for CA-GROUP: ALL
    CA Spill DSN prefix: USRT004
```

Figure 30. CA Spill parameters panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Field descriptions for CA Spill Parameters panel

CA Spill DSN Prefix

Specify the prefix of a constructed dsname for the CA spill data set. In the case of normal flat files, IMS HP Change Accumulation Utility appends a generated ddname to create the dsname. The CA spill data set is allocated dynamically.

The user ID of the address spaces running IMS HP Change Accumulation Utility must be authorized to allocate data sets that have the prefix as the high-level qualifier of the data set name of the CA spill data set.

Option 6: CA Spill Data Set Allocation Parameters panel

You use the CA Spill Data Set Allocation Parameters panel to specify the external device characteristics for spill files.

Select option 6 to display the CA Spill Data Set Allocation Parameters panel.

For example:

```

SETUP                HPCA CA Spill Data Set Allocation Parameters      Row 1 of 3
COMMAND ==>_____SCROLL ==>PAGE
Enter END (PF3) to exit. Enter CAN to exit without processing.

CA Spill data set allocation parameters for CA-GROUP: ALL
Max number of Spill volumes: 4          (1-9. Default 4)
Management class . . . . . : _____ (Blank for default management class)
Storage class . . . . . : _____ (Blank for default storage class)
Device type . . . . . : _____ (Generic unit or device address)
Data class . . . . . : _____ (Blank for default data class)
Space units . . . . . :CYLS          (TRKS, CYLS)
  Primary quantity. . . . .:25        (In above units)
  Secondary quantity. . . .:25        (In above units)
Volumes:
==>VOL1 ==>_____==>_____==>_____==>_____==>_____
==>_____==>_____==>_____==>_____==>_____
*****Bottom of data*****

```

Figure 31. CA Spill Data Set Allocation Parameters panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Field descriptions for CA Spill Data Set Allocation Parameters panel

Max Number of Spill Units

Specify the maximum number of device units (1-9) for the Spill data sets. The default is 4.

Management class

Specify the management class that should be used to obtain information that is related to data management (migration, backup and retention criteria) for allocation of the data set.

Storage class

Specify the storage class that should be used to obtain information related to storage for allocation of the data set.

Device type

Specify the generic unit address for the direct access volumes that you want to contain the data set.

Data class

Specify the data class that should be used to obtain the information related to data (for example, space and LRECL) for allocation of the data set.

Space units

Specify either of the following values:

TRKS

If the data set size is expressed in tracks

CYLS

If the data set size is expressed in cylinders

Primary quantity

Specify the primary allocation quantity in tracks or cylinders as indicated in the Space units field.

Secondary quantity

Specify the secondary allocation quantity in tracks or cylinders as indicated in the Space units field.

Note: The maximum value that you can specify in the primary or secondary space field is 16777215. To specify more space, convert to a different space unit. For example, convert TRKS to CYLS.

Volumes

Specify the volume serial numbers of the direct access volumes that are to contain the data set. Specify the numbers in one or more rows of the table at the bottom of the panel. You can specify up to six numbers in each row. Additional rows appear as needed. Leave these fields blank to allow the system to select an eligible volume.

Eligibility is determined from **Device type** or **Space units**.

Option 7: (Reserved)

Option 7 is reserved for future use.

Option 8: Fast Path Spill Allocation Parameters panel

You use the Fast Path Spill Allocation Parameters panel to specify the file characteristics and external device characteristics for Fast Path spill files.

Select option 8 to display the Fast Path Spill Allocation Parameters panel.

For example:

```
SETUP          Fast Path Spill Allocation Parameters      Row 1 of 2
COMMAND ==>_____SCROLL==>PAGE
Enter END (PF3) to exit. Enter CAN to exit without processing.

Spill data set name prefix: USRT015
Number of CA Output units: 2          (1-9. Default 2)

Management class . . . . . : _____ (Blank for default management class)
Storage class . . . . . : _____ (Blank for default storage class)
Device type . . . . . : _____ (Generic unit or device address)
Data class . . . . . : _____ (Blank for default data class)
Space units . . . . . : CYLS (TRKS, CYLS)
Primary quantity . . . . . : 25 (In above units)
Secondary quantity . . . . . : 25 (In above units)

Volumes:
==>_____==>_____==>_____==>_____==>_____
==>_____==>_____==>_____==>_____==>_____
```

Figure 32. Fast Path Spill Allocation Parameters panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Field descriptions for Fast Path Spill Allocation Parameters panel

Spill data set name prefix

Specify a prefix that will be used to create a data set name for allocating the Fast Path Spill data set using the prefix as a high level qualifier. IMS HP Change Accumulation Utility appends an internal CAGROUP name to create a data set name. The length of the prefix cannot be more than 17 characters.

The Fast Path Spill data set is allocated dynamically. The user ID of the address spaces running IMS HP Change Accumulation Utility must be authorized to allocate data sets that have the prefix as the high-level qualifier of the data set name of the work data set.

Number of CA Output units

Specify the number of device units available for the Fast Path Spill data set.

Management class

Specify the management class that should be used to obtain information that is related to data management (migration, backup and retention criteria) for allocation of the data set.

Storage class

Specify the storage class that should be used to obtain information related to storage for allocation of the data set.

Device type

Specify the generic unit address for the direct access volumes that you want to contain the data set.

Data class

Specify the data class that should be used to obtain the information related to data (for example, space and LRECL) for allocation of the data set.

Space units

Specify either of the following values:

TRKS

If the data set size is expressed in tracks

CYLS

If the data set size is expressed in cylinders

Primary quantity

Specify the primary allocation quantity in tracks or cylinders as indicated in the Space units field.

Secondary quantity

Specify the secondary allocation quantity in tracks or cylinders as indicated in the Space units field.

Note: The maximum value that you can specify in the primary or secondary space field is 16777215. To specify more space, convert to a different space unit. For example, convert TRKS to CYLS.

Volumes

Specify the volume serial numbers of the direct access volumes that are to contain the data set. Specify the numbers in one or more rows of the table at the bottom of the panel. You can specify up to six numbers in each row. Additional rows appear as needed. Leave these fields blank to allow the system to select an eligible volume.

Eligibility is determined from Device type or Space units.

Option 9: Execution JCL DD Control panel

You use the definitions on this panel to create DD statements to be included in the IMS HP Change Accumulation Utility driver JCL that is submitted by the RUN or FAST command.

Each DD row consists of a ddname and optional SYSOUT class and dsname. To include a DD statement, either or both the SYSOUT class and DSNAME field must be non-blank.

Select option 9 to display the Execution JCL DD Control panel.

For example:

```

SETUP                                HPCA Execution JCL DD Control
COMMAND ===> _____

Enter END (PF3) to exit. Enter CAN to exit without processing.

For each DDNAME row, enter the SYSOUT class or DSNAME to include the DD
in the generated IMS HPCA driver JCL.

DDNAME   SOUT DSNAME
-----
STEPLIB
HPCSYSIN
HPCPRINT *
SYSUDUMP *
HPCTRACE *
HPCADIAG *
HPCACOLP -
HPCACOLS -
HPCACSV  -
HPCAHTML -
HPCAXML  -
HPCCACHE -
  
```

Figure 33. Execution JCL DD Control panel

To cancel the process and the data entries made on this panel, enter the CAN/CANCEL command. The previous panel is displayed.

Field descriptions for Execution JCL DD Control panel

STEPLIB

Two STEPLIB entries are provided for system or product libraries in addition to the IMS HP Change Accumulation Utility product library which is automatically included.

HPCSYSIN

IMS HP Change Accumulation Utility command statement input to the driver (PGM=HPCADRIV). Enter a cataloged dsname or dsname(member).

HPCPRINT

Generates the IMS HP Change Accumulation Utility Report file. This is a required DD statement. It cannot be deselected. The default SYSOUT class is *.

SYSUDUMP

The abend/dump file. This is a required DD statement. It cannot be deselected. The default SYSOUT class is *.

HPCTRACE

The trace file used for performing diagnostics on the product.

HPCADIAG

The diagnostics file used for performing diagnostics on the product.

Columns Report, CVS, HTML, and XML reports

The following report types are available:

- Columns Report
- Column Report with Page Headings
- CVS
- HTML
- XML

Each report type is individually selectable to SYSOUT, or to a cataloged data set. If both SYSOUT and DSN are entered, SYSOUT is used. Reference to existing data sets must be compatible with RECFM=VB,LRECL=137.

HPCCACHE

IMS HP Change Accumulation Utility input entry for specifying definitions for using an above-the-bar cache in single address space mode. Enter a cataloged dsname or dsname(member).

Part 4. Administering IMS HP Change Accumulation Utility

IMS HP Change Accumulation Utility administration tasks include creating JCL, using JCL parameters in the HPCSYSIN DD statement to control the operation of IMS HP Change Accumulation Utility, and customizing report output.

Topics:

- [Chapter 8, “JCL processing,” on page 73](#)
- [Chapter 9, “JCL parameter reference,” on page 85](#)
- [Chapter 10, “Reports reference,” on page 101](#)

Chapter 8. JCL processing

You must create and convert JCL to process your IMS HP Change Accumulation Utility tasks.

Topics:

- [“JCL processing overview” on page 73](#)
- [“Modifying skeletal JCL members” on page 73](#)
- [“JCL conversion” on page 75](#)
- [“JCL conversion for custom job processing” on page 77](#)
- [“JCL conversion for standard job processing” on page 78](#)
- [“JCL conversion for started task control job processing” on page 82](#)
- [“JCL conversion for single address space job processing” on page 82](#)

JCL processing overview

IMS HP Change Accumulation Utility achieves higher performance through the scheduling of multiple parallel address spaces.

Z/OS requires a JCL procedure in order for the master scheduler to start these address spaces. IMS HP Change Accumulation Utility produces the JCL automatically from a JOB stream in the form of output of the DBRC GENJCL.CA command. You can use a JOB stream that has been created manually or by a process other than DBRC if it is structurally equivalent to JCL generated by DBRC.

Generating JCL through DBRC requires a template called the skeletal JCL. Some skeletal JCL work with CA and with IMS HP Change Accumulation Utility without changes. Others might need modifications for use with IMS HP Change Accumulation Utility.

IMS HP Change Accumulation Utility converts the DBRC JCL to the form necessary to initiate multiple address spaces. At a minimum, this requires a JCL procedure member in a system PROCLIB or IEFJOBS data set.

Optionally, write access to a PROCLIB or IEFJOBS is required to use custom procedures.

Modifying skeletal JCL members

IMS HP Change Accumulation Utility analyzes the output from GENJCL and creates multiple job procedures to run in parallel, one for each selected CA group.

Because multiple tasks are created to read the log data sets, the demand on the number of tape device units can exceed the number of available devices. Unnecessary waits would result until a tape device does become available.

The global parameter INLIM allows you to limit the number of log reader tasks that read log data sets in parallel. This parameter also limits the number of tape devices IMS HP Change Accumulation Utility uses.

However, before starting the change accumulation process, DBRC checks the availability of all log data sets and requires that the data sets and their devices be available even though the log read is done in a different address space.

IMS HP Change Accumulation Utility processing modifies the JCL to defer the mounting of tapes while DBRC is performing its checks. Also, to reduce the requirement for devices, you will need to modify your skeletal JCL member as follows:

- If the log data sets are on permanently mounted devices, no change is required.
- If all log data sets are on tape devices, ensure that your DFSULOG contains both `DISP=SHR` and `UNIT=(%LOGUNIT, , DEFER)`.

- If the log data sets are stored on a combination of both tape devices and DASD, modify the skeletal JCL member so that the DASD log data set UNIT parameter definitions are unchanged and the TAPE log data set UNIT parameter definitions are modified. For example:

```
%DELETE (%LOGUNIT EQ '3400')
//DFSULOG DD DSN=%LOGDSN,
//          DISP=SHR
%ENDDDEL
%DELETE (%LOGUNIT NE '3400')
//DFSULOG DD DSN=%LOGDSN,
//          DISP=SHR,UNIT=(%LOGUNIT , ,DEFER),
//          DCB=(BUFNO=32,RECFM=VB)
%ENDDDEL
```

In this example, if the log unit is 3400, the first DFSULOG DD statement is deleted, and the second one is kept. If the unit is not 3400, the first DFSULOG DD statement is kept, and the second is deleted. The value in the delete expression (3400, in the example) is where the log data resides. This is either the generic device name as registered with DBRC, or it is a name known to you when the log data set was created.

For the specific JCL statements that are required for allocating the DFSULOG on both TAPE and DASD, see the HPCCAJCL sample member.

When the standard procedure method is used for JCL processing, additional skeletal JCL changes must be considered.

1. JES symbols (&name) are not processed.

The JCL is processed to dynamic allocation format which does not accept & symbols. DBRC symbols (%name) are accepted.

2. Only the EXEC PGM=DFSUCUM0 step is merged into the standard procedure.

Other steps from the skeletal JCL are ignored.

3. UNIT=AFF= is processed only for the DFSULOG DD.

Preventing duplicate log DSN error

When OLDS, RLDS, SLDS, or image copy data sets are managed by the Data Facility Storage Management Subsystem (DFSMS), the CATDS parameter must be set for the RECON data set.

In general, the CATDS parameter can be set even when data sets are not managed by DFSMS. DBRC uses the system catalog to find data sets when the CATDS parameter is active.

When submitting HP change accumulation under DFSMS managed systems, there are two methods that can be used to avoid the HPC1103W message (Duplicate log DSN):

- Set CATDS and modify the skeleton JCL
- Set CATDS and add IMS HP Change Accumulation Utility parameter USE CATALOG=YES

Set CATDS and modify the skeleton JCL

The following information explains how to set CATDS and modify the skeleton JCL

1. Change RECON to CATDS=YES

When in a Storage Management Subsystem (SMS) managed environment, you can change RECON to CATDS=YES to specify that the data sets are cataloged and to generate the JCL using the catalog information.

This action ensures that DBRC will not split the multi-volume log data set in the JCL and treat it as one log.

2. Remove VOL=SER=%LOGVOLS parameter in the skeletal JCL

In order for the CATDS option to be effective, the data set must be cataloged and the volume serial information for the data set must be omitted from the JCL.

If the data set is cataloged, CATDS is specified, and volume serial information is included in the JCL, DBRC ignores CATDS and allocates the data set using the JCL. Normal volume serial and file sequence checking occurs.

Set CATDS and add IMS HP Change Accumulation Utility parameter USE CATALOG=YES

The following information explains how to set CATDS and modify the skeleton JCL

1. Change RECON to CATDS=YES
2. Specify USE CATALOG=YES for the HPCSYSIN DD

When specifying USE CATALOG=YES for execution, IMS HP Change Accumulation Utility uses only catalog and SMS information to allocate the logs, so that multi-volume log data sets can be allocated successfully.

Even if you remove the VOL=SER= parameter in the skeletal JCL, IMS HP Change Accumulation Utility forces the catalog and SMS information to be used for log data sets allocation with the same effect as removing the VOL=SER= parameter.

About the Data Facility Storage Management Subsystem (DFSMS)

The Data Facility Storage Management Subsystem (DFSMS) is an operating environment that comprises a suite of related data and storage management products for the z/OS system. DFSMS helps automate and centralize the management of storage based on the policies that your installation defines for availability, performance, space, and security.

The heart of DFSMS is the Storage Management Subsystem (SMS). Using SMS, the storage administrator defines policies that automate the management of storage and hardware devices. These policies describe data allocation characteristics, performance and availability goals, backup and retention requirements, and storage requirements for the system.

Specifying DFSHDBSC DD

When IMS management of ACBs is enabled and IMS catalog data sets are not registered in the DBRC, specify the DFSHDBSC data set generated by IMS Catalog Definition Data Set Utility (DFS3UCD0) to reference IMS catalog data sets.

If the DFSMDA member of DFSHDBSC is defined in the library specified by STEPLIB, you do not need to specify this DD to the skeletal JCL.

JCL conversion

IMS HP Change Accumulation Utility processes an input JCL file to create JCL procedures and IMS HP Change Accumulation Utility control file members.

The source input to this conversion is created by IMS HP Change Accumulation Utility GENJCL.CA commands or by other processes that produce similar JCL structures.

The acceptable form of JCL is a single data set containing one or more JOBS or a single JOB with multiple steps such as that created by the DBRC GENJCL.CA function. At least one step of each JOB must run the IMS/CA utility, PGM=DFSUCUM0.

This section includes the following topics:

- [“Creating the JCLOUT data set” on page 76](#)
- [“Creating IMS HP Change Accumulation Utility procedures” on page 76](#)

Creating the JCLOUT data set

The input JCL is read from the file allocated to JCLOUT.

As indicated in the following table, there are several methods possible for creating the JCLOUT data stream.

Table 3. Methods for creating JCLOUT data stream

JCLOUT produced by:	ISPF	Two-step Batch	Extended Batch
IMS HP Change Accumulation Utility performs the entire process; user describes only the GENJCL.CA formats and the CA groups to process. IMS HP Change Accumulation Utility interfaces directly to DBRC to create and process the JCLOUT.	YES		YES
User provides the complete GENJCL.CA input stream which IMS HP Change Accumulation Utility uses to create and process the JCLOUT. (DD GENJCLIN)		YES	YES
User runs DBRC independently from IMS HP Change Accumulation Utility and provides the JCLOUT file to be processed. (DD JCLOUT, SYSPRINT)		YES	YES
User creates JCLOUT from a manual or automated procedure in a format that is compatible with IMS HP Change Accumulation Utility. (DD JCLOUT, SYSPRINT)		YES	YES

Creating IMS HP Change Accumulation Utility procedures

When the JCL is converted, each IMS/CA step (PGM=DFSUCUM0) becomes a separate procedure for use by IMS HP Change Accumulation Utility.

Procedures are limited to a single process of DFSUCUM0, but any number of other steps created by the DBRC skeletal JCL can be included. Depending on the processing method selected, the procedural JCL is written to one of several destinations, as indicated in the following table.

Table 4. Destinations for procedural JCL

JCLOUT description:	Custom Procedures (Note 1)	Standard Procedures (Note 2, 3)	Started Task Control (Note 4)	Single Address Space (Note 2, 5)
HPCAPROC DD	YES		YES	
A member of a system library in the IEFPSI concatenation.	YES		YES	
A member of a system library in the PROC00 concatenation.	YES			
A user-defined library requiring no special authority.			YES	

Table 4. Destinations for procedural JCL (continued)

JCLOUT description:	Custom Procedures (Note 1)	Standard Procedures (Note 2, 3)	Started Task Control (Note 4)	Single Address Space (Note 2, 5)
In extended batch mode, HPCAPROC can be a temporary data set.			YES	
HPCAJLIB DD	YES			
A member of a system library in the IEFPSI concatenation.	YES			
A member of the system library in the IEFJOBS concatenation.	YES			
HPCACTL DD		YES		YES
Encoded for use in dynamic allocation.		YES		YES

¹UPDATE authority is required to access these system procedure libraries.

²Dynamic allocation does not support all possible DD parameters that can be used in JCL. When present, these parameters are ignored.

³The only step converted is IMS/CA, PGM=DFSUCUM0. Other steps in the JCLOUT file are ignored. To include other steps before or after IMS/CA, the additional steps must be defined in the standard procedure JCL member.

⁴ Update authority is required for the library name in the HPCAPROC DD.

⁵ The only step allowed is IMS/CA, PGM=DFSUCUM0. Other steps in the JCLOUT file are ignored.

JCL conversion for custom job processing

Custom procedures provide flexibility when creating JCL that can be accepted by IMS HP Change Accumulation Utility.

However, additional authority is required because the converted JCL procedures must be written to a system library used by the master scheduler or JES.

The following summary outlines the steps for using custom procedures.

ISPF (Setup option 1, JCL job statements)

1. Remove or leave blank the Member field
2. Enter the name of a system *proclib* into the PROCLIB field
3. Optionally, enter the name of a system *joblib* in the JOBLIB field

Two-step batch

1. Omit both PROC= and STC= from the EXEC PARM value.
2. Allocate HPCAPROC DD to a system PROCLIB.
3. Optionally, allocate HPCAJLIB to a system JOBLIB.

Extended batch

1. Omit both PROC= and STC= from the EXEC PARM value.
2. Omit both PROCEDURE=*name* and STC=*name* commands.
3. Allocate HPCAPROC DD to a system PROCLIB.
4. Optionally, allocate HPCAJLIB to a system JOBLIB.

JCL conversion for standard job processing

Standard job processing procedures remove the requirement for write access to a system PROCLIB or IEFJOBS library.

You can place one or more simple, read-only procedure members into a PROCLIB or JOBLIB during installation to be used by IMS HP Change Accumulation Utility. Special situations might still require the custom procedure method. Limitations of the standard procedure method are explained in the following topics.

The standard procedure method has two components:

- The IMS HP Change Accumulation Utility procedure to be placed into a PROCLIB or the IMS HP Change Accumulation Utility job to be placed into a JOBLIB.

Whichever is chosen, the library must be accessible to JES or MSTRJCL according to the rules for z/OS started tasks. At least one procedure or JOB is required.

You can use more than one standard procedure or JOB to support multiple versions of IMS or IMS HP Change Accumulation Utility.

Write access to the library or libraries is required only when entering or changing the standard procedures as part of the install process.

- The JCL created from the DBRC GENJCL.CA or equivalent process.

Existing skeletal JCL probably requires no changes, but certain information from the generated JCL is processed differently in the standard procedure mode.

Parameter values and DD statements from the skeletal JCL are merged into the IMS HP Change Accumulation Utility standard procedure to complete the definition of the processing environment.

Subtopics:

- [“Using the standard procedure JCL” on page 78](#)
- [“Merging skeletal JCL into standard job processing” on page 80](#)
- [“Standard job processing JCL restrictions” on page 80](#)
- [“Standard job processing JCL tips” on page 81](#)

Using the standard procedure JCL

IMS HP Change Accumulation Utility sample library members (HPCSPROC and HPCSJOB) are provided as the starting point for installation of standard procedures.

These library members are documented to describe the necessary changes for use.

When the sample JCL has been modified to meet your site standards, it can be added to a system PROCLIB or IEFJOBS data set for testing and use.

```

Samplib(HPCSPROC)
//HPCSPROC PROC
//*****
/** Sample HPCA PROC. Edit to suit local JCL standards
/** and then make available to HPCA by copying to any
/** PROCLIB in the IEFPDSI or JES PROC00 concatenation.
/**
/** This PROC is intended for use with the standard
/** PROC invocation method of HPCA. The PARM=value
/** and DDNAMES will be merged from the DBRC GENJCL.CA
/** output produced by HPCA setup.
/** *****
/**
/** *****
/** PGM=HPCADRI1 is required. PARM= (Optional)
/** PARM=not-null-value overrides any PARM value
/** from the DBRC skeleton JCL
/** STEPLIB (Optional if required modules in LINKLIB/LPALIB)
/** All other DD's should be omitted except in the most
/** unusual conditions. HPCA will merge DD's from the
/** GENJCL.CA generated JCL into this procedure. Similar
/** to the parameters field, if a DD is hard coded into
/** this procedure, it will not be overridden.
/** *****
//HPCASTEP EXE PGM=HPCADRI1,REGION=OM
//STEPLIB DD DSN=&HPCSTEPL,DISP=SHR
/**

samplib(HPCSJOB)
//HPCSJOB JOB,
// CLASS=?,MSGCLASS=?,MSGLEVEL=(1,1),
// REGION=OM,TIME=?
//*****
/** Sample HPCA JOB. Edit to suit local JCL standards
/** and then make available to HPCA by copying to any
/** dataset in the IEFJOBS concatenation.
/**
/** Customizing may be done in several ways.
/** 1. recommended, as a complete JOB as in this sample
/** 2. Referencing an external PROC such as HPCSPROC in the
/** system PROCLIBS
/** 3. Referencing an external PROC in any available
/** PROCLIB using a JCLLIB statement
/**
/** This JOB is intended for use with the standard
/** PROC invocation method of HPCA. The PARM=value
/** and DDNAMES will be merged from the DBRC GENJCL.CA
/** output produced by HPCA Setup.
/** *****
/**
/** *****
/** PGM=HPCADRI1 is required. PARM= (Optional)
/** PARM=not-null-value overrides any PARM value
/** from the DBRC skeleton JCL
/** STEPLIB (Optional if required modules in LINKLIB/LPALIB)
/** All other DD's should be omitted except in the most
/** unusual conditions. HPCA will merge DD's from the
/** GENJCL.CA generated JCL into this procedure. Similar
/** to the parameters field, if a DD is hard coded into
/** this procedure, it will not be overridden.
/** *****
//HPCASTEP EXEC PGM=HPCADRI1,REGION=OM
//STEPLIB DD DSN=&HPCSTEPL,DISP=SHR
/**

```

Figure 34. Sample JCL procedure

One or more standard procedure or job members must be placed in a PROCLIB or JOBLIB. The rules for z/OS started tasks apply to each member.

The procedure or job has a minimum of three JCL statements (two without STEPLIB).

1. The PROC header or JOB statement
2. EXEC PGM=HPCADRI1 is required. The PARM= parameter is optional and generally can be omitted.
3. STEPLIB DD to HPCA. Optional only if all required modules are located through LINKLIST/LPALIB

Optional DD statements for HPCPRINT, HPCTRACE, and HPCSYSIN must be in the standard procedure JCL to be processed. These statements are not merged from the skeletal JCL.

There are generally no other DDs in the procedure. However, because of restrictions on the processing of the skeletal JCL, it might be necessary to include additional DDs in the procedure.

The procedure might include other steps before and after the HPCADRI1 step. If these other steps are present, no information from the skeletal JCL is merged into them.

If your skeletal JCL member has one or more job steps following the CA step, include the HPCADLIM DD statement at the end of the skeleton JCL member, as shown in the following figure:

```
/*
//COPY3 EXEC PGM=IEBGENER,COND=(0,LT,CA%STPNO)
//SYSPRINT DD SYSOUT=*
/*
//SYSUT1 DD DISP=OLD,DSN=&hilev.%CAGRP.GDGOUTD1
//SYSUT2 DD DSN=&hilev.%CAGRP.GDGOUTD2(+1),
//          DISP=(NEW,CATLG),
//          UNIT=(,DEFER),
//          VOL=(,99),
//          LABEL=EXPDT=99000,
//          DCB=(&hilev.GDG.MODEL,BUFNO=16),
//          SPACE=(CYL,(40,0)),
//          STORCLAS=GSYES2
//SYSIN DD DUMMY
//HPCADLIM DD DUMMY
```

Figure 35. Skeletal JCL member with one or more job steps

In this example, IEBGENER is used to create a copy the CA output.



Attention: To prevent skeleton JCL parser errors, //HPCADLIM DD DUMMY cannot be followed by a slash-asterisk (/ *).

Merging skeletal JCL into standard job processing

HPCADRI1 performs initiation of the subordinate CA SORT address spaces.

The program name and optional STEPLIB must be in the standard job processing JCL to locate the first module. HPCAPRINT must be allocated in the procedure because the report file is opened prior to dynamic allocation of other files. For the same reason, if HPCTRACE and HPCSYSIN are used, they must be in the procedure.

The CA execution parameter string is merged. If PARM= of the standard procedure is omitted, or if PARM="", then the string is taken instead from the PARM= value of the DFSUCUM0 step of the skeletal JCL.

DD statements are merged. For any DD in the standard procedure, a DD of the same name in the skeletal JCL is ignored.

The following exceptions apply:

1. STEPLIB is renamed and allocated as HPCALIB.
2. HPCPRINT, HPCTRACE, and HPCSYSIN are ignored.
3. SYSIN is freed, if necessary, and reallocated.

Standard job processing JCL restrictions

The standard job processing method has certain restrictions.

The following JCL restrictions apply for the standard job processing method.

- STEPLIB, HPCPRINT, HPCTRACE, and HPCSYSIN are processed only from the standard procedure JCL.
- JES & symbols can be used only for JCL that appears in the standard procedure.
- DBRC % symbols can be used in the skeletal JCL.
- Steps before and after EXEC DFSUCUM0 in the skeletal JCL are ignored.

- UNIT=AFF= is allowed only for DD DFSULOG/HPCADUMY.
- SYSIN defined in the standard procedure are freed and reallocated.
- DD * is allowed only for SYSIN DD and only in the EXEC DFSUCUM0 step of the skeletal JCL.
- The list of processed DD parameters for merged DDs is limited to the following parameters:

```
DUMMY
DSN=dataset and DSN=dataset(member)
FREE=CLOSE
DISP=(stat,norm,cond)
UNIT=(dev,count,DEFER)
UNIT=(AFF=) DFSULOG on1y
VOL=SER=
SPACE=(type,(prim,sec,dir))
DCB=(DSORG=,RECFM=,LRECL=,BLKSIZE=)
SYSOUT=
DATACLAS=
MGMTCLAS=
STORCLAS=
EXPDT=
RETPD=
LIKE=
RECFM=
LRECL=
BLKSIZE=
LABEL=
EXPDT=
```

Standard job processing JCL tips

Because certain DD statements are processed only from the standard job processing JCL, you might want to define more than one member.

For example, you might want members to support multiple versions of IMS HP Change Accumulation Utility, or you might want to have a procedure with predefined parameter values for testing.

If you use the JOBLIB feature, the standard JOB JCL can be a complete JOB, or it can be only a reference to a procedure. The procedure might even be in a library that is referenced by JCLLIB so that the procedure does not need to be directly accessible to JES or to MSTRJCL.

For two-step batch and extended batch, you can choose custom or standard mode by including the PROC= parameter.

If the JCL that you are using has defined HPCAJLIB, HPCAPROC, or both, you can switch modes by changing the parameter value. If you do not have write access to a procedure library and always use the standard procedure mode, you can omit both HPCAJLIB and HPCAPROC.

The following information summarizes the steps for standard procedures:

ISPF (Setup option 1, JCL job statements)

1. Enter the procedure name into the **Member** field.
2. Leave the **PROCLIB** field blank.

Two-step batch

Include the PROC=*name* parameter in the EXEC PARM value.

Extended batch

Use either of the following methods:

- Include the PROC=*name* parameter in the EXEC PARM value.
- or
- Include the command PROCEDURE NAME=*name*.

JCL conversion for started task control job processing

The started task control (STC) job processing method combines the flexibility of custom procedures without the requirement to update a system PROCLIB or JOBLIB.

JCL procedure statements are written to a library, but no special authority is required for the library. In extended batch mode, the HPCAPROC DD is allocated to a temporary library if it is omitted from the JCL.

The IMS HP Change Accumulation Utility sample library member HPCSSTC is provided as the starting point for installing the started task procedure. The changes that you must make to HPCSSTC are documented in the member.

After you modify the sample JCL to meet your site standards, you can add it to the IEFPDS or IEFJOBS data set for testing and use.

The following information summarizes the steps for STC:

ISPF (Setup option 1, JCL job statements)

1. Enter the procedure name in the **Member** field.
2. Enter the procedure library name in the **PROCLIB** field.

Two-step batch

1. Include the `STC=name` parameter in the EXEC PARM value.
2. Allocate HPCAPROC DD to a procedure library data set.

Extended batch

1. Either include the `STC=name` parameter in the EXEC PARM value, or include the command `STC NAME=name`.
2. Optionally, allocate HPCAPROC DD to a procedure library data set.

JCL conversion for single address space job processing

The single address space job processing method (AS1) is similar to the standard procedure method because no JCL procedure member is written to a PROCLIB.

Instead, the information to run each CA group is stored as a member of HPCACTL in a format to be used for dynamic allocation.

Because each CA group is run as a subtask within the IMS HP Change Accumulation Utility control address space, restrictions apply to the format of the JCLOUT, and therefore to the underlying DBRC skeleton JCL.

One-step execution of `PGM=DFSUCUM0` is allowed only for any one CA group. Therefore, the `GENJCL VOLNUM()` cannot be used. All steps other than `PGM=DFSUCUM0` are ignored.

All selected CA groups must have the same EXEC PARM= value and the same allocations for the following DD names:

- STEPLIB
- DFSRESLB
- IMSDALIB
- RECON1
- RECON2
- RECON3
- IMS (see Note 1)
- DFSHDBSC (see Note 2)

Notes:

1. Required when IMS management of ACBs is not enabled.
2. Required when IMS management of ACBs is enabled, IMS catalog data sets are not registered in the DBRC, and DFSMDA member is not present.

These conditions are required because the parameter and DD allocations are performed once for the IMS HP Change Accumulation Utility control address space and reused by each CA subtask.

The DD names SYSIN, SYSPRINT, SORTWKnn, HPCADUMY, HPCMSGDD, ICBUCUMN, DFSUCUMN, DFSUCUMO, and DFSULOG are renamed, and separate copies are allocated for each subtask. All other DD names are ignored. All other JCL restrictions of the standard procedure method apply equally to JCL for AS1 mode.

The number of parallel subtasks is set by using the parallel sort count. Because a single address space is used, contention exists for the limited resources, particularly 24-bit memory. IMS HP Change Accumulation Utility in AS1 mode computes and reports a default value for the number of parallel subtasks that can be supported for a typical environment. When the parallel sorts count is omitted or set to a value that is greater than the calculated default, the default value is used.

The true maximum number of subtasks might be less than the default if, for example, your setup includes a large number of logs, CA groups, and DBDs. Other factors, such as DFSORT replacements, system exits routines, or user exit routines, can also affect how memory is allocated.

Another consideration is the number of DD allocations that can be supported in a single address space. The limiting value depends on the number of DDs and the unit count for each DD. The task input output table (TIOT) size and number of DDs is described in the "ALLOCxx" section in the *z/OS MVS Initialization and Tuning Reference*.

The most critical factor for this condition is the SORTWKnn statements, either coded in the JCL or assumed by dynamic allocation. When work files (limit is 256 per sort) are large, the TIOT can be exceeded in as few as three concurrent sort steps.

The following information summarizes the steps for AS1:

ISPF (Setup option 1, JCL job statements)

Either enter HPCSTASK in the **Member** field, or clear both the **Member** and **PROCLIB**. Clearing both of these fields results in HPCTASK being used.

Two-step batch

Include the PROC=HPCSTASK parameter in the EXEC PARM value.

Extended batch

1. Omit the STC= parameter and command.
2. Do one of the following:
 - Include the PROC=HPCSTASK parameter or the Procedure Name = HPCSTASK command.
 - Omit the STC=, PROC=, and DD HPCAPROC (this will default to PROC=HPCSTASK).

Restriction: When you use single address space job processing, HPCSTASK is a reserved keyword.

Chapter 9. JCL parameter reference

You can use JCL parameters to control the operation of IMS HP Change Accumulation Utility.

Topics:

- “HPCSYSIN DD parameters” on page 85
- “General syntax for HPCSYSIN DD” on page 88
- “Operation statements” on page 88

HPCSYSIN DD parameters

JCL parameters that control the operation of IMS HP Change Accumulation Utility are read from the HPCSYSIN DD statement in all modes.

However, many parameters are processed in specific environments. In addition, command syntax is validated only for the extended batch environment.

The following table lists the parameters that can be used in the HPCSYSIN DD statement to control the operation of IMS HP Change Accumulation Utility.

Table 5. HPCSYSIN DD statement parameters

Parameter	Extended batch	Two-step batch step 1	Two-step batch step 2	ISPF/UI (Note 1)
CA.ALLSPILL	Yes	N/A	Yes	Yes
CA.DATACLAS	Yes	N/A	N/A	Note 2
CA.MGMTCLAS	Yes	N/A	N/A	Note 2
CA.PREFIX	Yes	N/A	N/A	Note 2
CA.PRIMARY	Yes	N/A	N/A	Note 2
CA.SECONDARY	Yes	N/A	N/A	Note 2
CA.SPACE	Yes	N/A	N/A	Note 2
CA.START	Yes	N/A	Yes	Yes
CA.STORCLAS	Yes	N/A	N/A	Note 2
CA.UNIT	Yes	N/A	N/A	Note 2
CA.UNIT COUNT	Yes	N/A	N/A	Note 2
CA2PITCA DSN	Yes	N/A	Yes	Yes
CA2PITCA UNIT	Yes	N/A	N/A	N/A
DSP0025I RC	Yes	N/A	N/A	N/A
DYNMSG	Yes	N/A	Yes	Yes
FP.DATACLAS	Yes	N/A	N/A	Note 2
FP.MGMTCLAS	Yes	N/A	N/A	Note 2

Table 5. HPCSYSIN DD statement parameters (continued)

Parameter	Extended batch	Two-step batch step 1	Two-step batch step 2	ISPF/UI (Note 1)
FP.NOEEQES	Yes	N/A	Yes	Yes
FP.NOSPILL	Yes	N/A	Yes	Yes
FP.PREFIX	Yes	N/A	N/A	Note 2
FP.PRIMARY	Yes	N/A	N/A	Note 2
FP.SECONDARY	Yes	N/A	N/A	Note 2
FP.SPACE	Yes	N/A	N/A	Note 2
FP.STORCLAS	Yes	N/A	N/A	Note 2
FP.UNIT	Yes	N/A	N/A	Note 2
FP.UNIT COUNT	Yes	N/A	N/A	Note 2
GEN.GENJCL	Yes	N/A	N/A	Note 2
GEN.GRPNAME	Yes	N/A	N/A	Note 2
GEN.LIST	Yes	Note 4	N/A	Note 3
GEN.RETRY	Yes	N/A	N/A	N/A
GEN.STOP	Yes	N/A	Yes	N/A
GEN.WARN	Yes	N/A	N/A	N/A
HALDB	Yes	N/A	Yes	Yes
ID	Yes	Note 4	N/A	Note 2
INPUT BUFFERS	Yes	N/A	Yes	Yes
JOB	Yes	N/A	N/A	Note 2
LIST/NOLIST	Yes	N/A	N/A	N/A
LOG TIME	Yes	N/A	Yes	Yes
MAXIMUM LOGS	Yes	Note 4	N/A	N/A
MAXLOGS RC	Yes	Note 4	N/A	N/A
MEMLIMIT	Yes	N/A	Yes	Yes
OUTPUT BUFFERS	Yes	N/A	Yes	Yes
PARALLEL LOGS	Yes	N/A	N/A	Note 2
PDS	Yes	N/A	N/A	N/A
PROCEDURE NAME	Yes	Note 4	N/A	Note 2
QUEUE BUFFERS	Yes	N/A	Yes	Yes
RPT.COLUMNS	Yes	N/A	Yes	Yes
RPT.DATE	Yes	N/A	Yes	Yes

Table 5. HPCSYSIN DD statement parameters (continued)

Parameter	Extended batch	Two-step batch step 1	Two-step batch step 2	ISPF/UI (Note 1)
RPT.ORDER	Yes	N/A	Yes	Yes
RPT.SUMMARY	Yes	N/A	Yes	Yes
SECLOG.UNIT	Yes	Yes	N/A	Yes
SECLOG.VOLSER	Yes	Yes	N/A	Yes
SELECT LOGS	Yes	N/A	Yes	Note 2
SORT.DYNALLOC COUNT	Yes	N/A	N/A	Note 2
SORT.FILSZ	Yes	N/A	N/A	Note 2
SORT.HIPRMAX	Yes	N/A	N/A	Note 2
SORT.MAINSIZE	Yes	N/A	N/A	Note 2
SORT.MSGDDN	Yes	N/A	N/A	Note 2
SORT.SMF	Yes	N/A	N/A	Note 2
SPILL BLKSIZE	Yes	N/A	N/A	Note 2
SUM.FILES	Yes	N/A	Yes	Yes
SUM.REPORT CLASS	Yes	N/A	Yes	Yes
SUM.SORT	Yes	N/A	Yes	Yes
STC NAME	Yes	Note 4	N/A	Note 2
UNIT	Yes	N/A	Yes	N/A
USE CATALOG	Yes	N/A	Yes	Yes
WAIT FOR UNIT	Yes	Yes	Yes	Yes
<<TRACE>>Note 1	Yes	Yes	Yes	Yes
<<DEBUG>>	Yes	Yes	Yes	Yes

Notes:

1. HPCSYSIN DD is allocated when the IMS HP Change Accumulation Utility ISPF user interface starts.
The data set is allocated to HPCSYSIN at setup option 9; JCL DD control is used in the IMS HP Change Accumulation Utility driver step that is submitted by the **RUN** command.
2. These values are entered as ISPF values on setup panels.
3. The DBRC list is displayed if RC>0 is returned.
4. This value is entered in the EXEC PARM, not as a command.

General syntax for HPCSYSIN DD

Extended batch control statements are read from the HPCSYSIN DD file.

The record type can be fixed or variable. The maximum record length is 254. For record type=F and LRECL=80, when columns 73 through 80 are numeric, data is processed from columns 1 through 72.

For all other cases, all columns are processed as data.

The following additional rules apply:

- A statement is contained within the data portion of one record.
- Continuation is not allowed.
- Statements are not case sensitive.
- A space is a statement consisting entirely of blanks.
- A comment is a statement in which the first non-blank column is an character asterisk (*).
- Spaces and comments have no processing significance. You can use them without restriction to enhance the readability of the control statements file.
- An operation statement is a statement that is not a space or a comment.
- Operation statements have the following form: `type` or `type=value`
- Leading and trailing blanks are ignored for both the type and value operands.
- Unless explicitly stated, the ordering of control statements is not significant.

Operation statements

The following topics describe the operation statements that are used by IMS HP Change Accumulation Utility.

- [“Global parameters” on page 88](#)
- [“JOB statement for JCL data sets” on page 94](#)
- [“SORT parameters passed to DFSORT” on page 94](#)
- [“Parameters for CA SORT spill files” on page 95](#)
- [“Parameters for Fast Path spill files” on page 96](#)
- [“Parameters for generating reports” on page 97](#)
- [“Parameters for generating summary reports” on page 98](#)
- [“GENJCL definitions” on page 98](#)

Global parameters

Global parameters are described in this topic.

CA2PITCA DSN=*data-set-name*

The presence of this parameter activates special processing when 1) creating a point-in-time change accumulation (PITCA) and 2) the DSP0712I message is issued indicating there are no changes to accumulate since the last change accumulation (CA) or image copy (IC).

The goal of the special processing is to provide a recovery point for using the IMS Database Recovery Facility LASTPITCA recovery type.

When this parameter is present, one of the following three processes is performed:

Scenario 1:

If a DSP0712I message is issued in response to the GENJCL.CA, the most recent normal CA (non-PITCA) is retrieved from DBRC for the CA group. If there is no prior normal CA, then an empty PITCA record is registered in DBRC for the CA group. Message HPC4058I is issued to HPCPRINT.

The name used for the empty PITCA data set uses the following format:

```
HPCA. EMPTY. Dyyddd. Thhmmss. HPCAP
```

This data set does not exist and no change accumulation processing is performed.

Scenario 2a:

If there is a prior normal CA, then the last IC record for each DBDS in the CA group is retrieved from DBRC. The time of the IC is compared with the time of the CA for each DBDS.

If the IC records for all of the DBDS in the CA group are **after** the CA was created, then there are no log records to accumulate for the CA group. In this case, an empty PITCA record is registered in DBRC for the CA group. Message HPC4058I is issued to HPCPRINT.

The name used for the empty PITCA data set uses the following format:

```
HPCA. EMPTY. Dyyddd. Thhmmss. HPCAP
```

Scenario 2b:

If there is a prior normal CA, then the last IC record for each DBDS in the CA group is retrieved from DBRC. The time of the IC is compared with the time of the CA for each DBDS.

If any of the IC records for any DBDS in the CA group are **before** the CA was created, then a copy of the prior normal CA is created and registered in DBRC as a PITCA. The data set name used for this PITCA data set is derived from the CA2PITCA DSN parameter. Message HPC4010I is issued to HPCPRINT.

To process scenario 2b, this parameter supports four symbolic components for use in the PITCA data set name:

%CAGRP

Resolves to the CA Group name

Can be specified only one time in the parameter

%TIME

Resolves to the run time in HHMMSS format

%DATE

Resolves to the five digit Julian date in YYDDD format

%DATE7

Resolves to the seven digit Julian date in YYYYDDD format

The low level qualifier of the model must be specified as "HPCAP".

The model specified is validated to meet the data set name requirements after resolution of the symbolic components. If the format is not valid, message HPC4020E is issued to HPCPRINT.

Example specification for scenario 2b:

```
CA2PITCA DSN=TS5511. IRS198. %CAGRP. D%DATE. T%TIME. HPCAP
```

Example output for scenario 2b:

```
TS5511. IRS198. GRP0001. D21114. T172318. HPCAP
```

Explanation of the data set name components for this example:

- **TS5511** - the high level qualifier
- **IRS198** - the second level qualifier
- **%CAGRP** - the CA group name (resolved to GRP0001)
- **D%DATE** - the character "D" plus the five digit Julian date in YYDDD format (resolved to D21114)

Note: Data set name components cannot begin with a numeric character. Therefore the letter "D" is used in this example.

- **T%TIME** - the character "T" plus the run time in HHMMSS format (resolved to T172318)

Note: Data set name components cannot begin with a numeric character. Therefore the letter "T" is used in this example.

- **HPCAP** - the low level qualifier - required for the CA2PITCA DSN template format

If the CA2PITCA DSN parameter is specified multiple times, each parameter is validated, but only the last model specified is used.

When the CA2PITCA DSN parameter is not present, there is no DSP0712I message processing.

CA2PITCA UNIT = aaaaaaaaa

This parameter is required if CA2PITCA DSN is specified for a Point In Time Change Accumulation (PITCA) job when:

- No unaccumulated changes exist for a CA Group, and
- An existing CA is used to create a PITCA if the existing CA is not on DASD.

The device types of the existing CA and the created PITCA must be the same.

If the exiting CA is not on DASD and this parameter is omitted or the device type specified on this parameter is not the same as the device type of the existing input CA, message HPC4024W is issued in HPCPRINT and the job return code is set to 8.

Default: SYSDA

DSP0025I RC = nnnn

The presence of this parameter activates special processing when a duplicate key condition is raised during DBRC NOTIFY.CA (message DSP0025I).

If this parameter is specified in HPCSYSIN, the final job return code is *nnnn* if no other errors are encountered. *nnnn* must be a numeric character between 0 and 4095.

The data set being registered in DBRC at the time of DSP0025I is deleted. Message HPC4042I is issued in HPCPRINT.

If this parameter is omitted, the final job return code is 20 and the data set is retained.

This parameter is also used to set the return code when a PITCA is being created, using a prior CA as input, under the following conditions:

- A PITCA was already created, and
- There have been no database updates after the normal CA.

When this condition exists, message HPC4020W is issued and the return code is set according to this parameter.

Message HPC4020W is followed by message HPC0018E, which indicates there were no database updates to accumulate.

DYNMSG=value

Dynamic allocation produces many messages to describe the processing that is performed for each allocation. Dynamic allocation error messages are routed to the system log (WTO) and to the IMS HP Change Accumulation Utility report file (HPCPRINT DD). The DYNMSG setting controls the disposition of all information messages.

Valid values are:

ERRORS

Discard information messages

INFO

Display at system log (WTO).

ALL

Display (WTO) and report (HPCPRINT DD)

Default: ERRORS

HALDB=YES/NO

Specifies whether a database is a HALDB. This parameter is ignored when DBRC information is available to identify database types. If DBRC is not available (message HPC0011W), you must set HALDB=YES for HALDB databases to be processed.

Default: NO

ID=*hpca-id*

Defines the 1- to 4-character prefix that IMS HP Change Accumulation Utility uses for the members of IMS HP Change Accumulation Utility control file and PROCLIB data sets. This command is secondary to the *hpca-id* that is optionally provided in the EXEC parameters.

Default: HPCA

INPUT BUFFERS=*number*

Specifies the number of I/O buffers to be used for input data sets. IMS logs and IMS HP Change Accumulation Utility spill files are input data sets.

Default: 5

Range: 1-255

LIST/NOLIST

Requests that all command input records from HPCSYSIN are included (LIST) or not included (NOLIST) in the IMS HP Change Accumulation Utility report file HPCPRINT. This command is secondary to the LIST and NOLIST parameters that are optionally provided in the EXEC parameters. If both are provided, NOLIST overrides LIST.

Default: NOLIST

LOG TIME=YES|*timestamp*

Requests point-in-time accumulation processing and optionally defines the log-ending time stamp. If a time stamp value is used, it identifies a stopping position within the time period that represents the set of input logs.

To run point-in-time to the last input log, set LOG TIME=YES.

To run point-in-time to a specified time, set LOG TIME=*timestamp*. The *timestamp* value is entered in the standard IMS external timestamp format. Offset labels are not acceptable (for example, PST).

Important: Do not enclose the timestamp in quotes or any other special notation.

LOG TIME timestamp processing depends on the extended batch mode being used. When the LOG TIME timestamp is specified in the extended batch mode 1, IMS HP Change Accumulation Utility passes this timestamp to the GENJCL.CA command in the CATIME() parameter. This allows DBRC to only return those logs that are valid for the time specified.

However, this processing is not available in the extended batch mode 2 and 3. Instead, the CATIME() parameter must be manually added to the GENJCL.CA command. If the CATIME() is not specified, DBRC returns all logs and IMS HP Change Accumulation Utility only processes those logs that are needed for the time specified.

MAXIMUM LOGS=*number*

Specifies the upper limit of logs to be included for processing change accumulation (like CATIME and VOLNUM).

The MAXIMUM LOGS parameter can be specified in combination with the MAXLOGS RC parameter so that if the maximum number of logs to be processed is reached and there are more logs to be processed, the return code specified by MAXLOGS RC is used from the maximum logs processor.

For details, see [“Limiting input logs” on page 141](#).

Range: 1-999

MAXLOGS RC=*nn*

The MAXLOGS RC parameter can be used to set a non-zero return code when MAXIMUM LOGS is specified and when more logs remain to be processed after the MAXIMUM LOGS limit is reached.

The MAXLOGS RC parameter is specified in combination with the MAXIMUM LOGS parameter so that if the maximum number of logs to be processed is reached and there are more logs remaining to be processed, the return code specified by MAXLOGS RC is used from the maximum logs processor.

Range (*nn*): 0-99

If the specified MAXLOGS RC value is 3 or less, that RC value is returned when there are still more logs remaining to be processed. However, the job continues to process for the included logs.

If MAXLOGS RC=4 is specified and you want the job to continue, then GEN.WARN=IGNORE or DEFER must also be specified.

If the specified MAXLOGS RC value is greater than 4, the job terminates when it detects that there are more logs remaining to be processed.

If another error is encountered which sets a RC greater than the MAXLOGS RC value, the higher value is used.

Specifying MAXLOGS RC parameter without specifying the MAXIMUM LOGS parameter has no effect on processing.

When the MAXLOGS RC condition is met, the HPC1310I message is issued.

MEMLIMIT=*number*

The maximum amount of 64-bit storage (in megabytes) that are allocated for IMS HP Change Accumulation Utility buffers. MEMLIMIT is expressed in megabytes, and each 64-bit buffer is 1 MB so the value is both the memory limit and the buffers count limit.

z/OS provides three separate means for limiting the amount of 64-bit storage that an address space is allowed to obtain. The system exit routine IEFUSI can be modified and activated to set a system wide upper limit that individual MEMLIMIT parameters cannot exceed. For values less than the IEFUSI limit, the JCL JOB and JCL EXEC statement parameter MEMLIMIT functions like the REGION parameter, except that the parameter value refers to storage above the bar (64-bit).

When any or all possible limits are specified, the amount of storage used by IMS HP Change Accumulation Utility is limited to the least value given. To reserve some portion of the 64-bit storage for use by other tasks, set the IMS HP Change Accumulation Utility MEMLIMIT command to a value that is less than the system limit (IEFUSI or JCL MEMLIMIT parameter).

Range: 0 - 2147483647 (M)

Default: 0

OUTPUT BUFFERS=*number*

Specifies the number of I/O buffers to be used for output data sets. IMS HP Change Accumulation Utility spill files are output data sets.

Default: 5

Range: 1-255

PARALLEL LOGS=*number*

Limits the number of log reader tasks that can be scheduled in parallel. For tape LOGs, this limit affects the number of units required to satisfy simultaneous MOUNT requests.

Default: 9

Range: 1-99

PARALLEL SORTS=*number*

Limits the number of SORT address spaces that can be scheduled in parallel. This number affects the allocation of spill files when the number of total SORTs exceeds the parallel limit.

For AS1 mode, limits the number of subtasks to be created in the IMS HP Change Accumulation Utility control address space. All CA groups are processed in spill file mode.

Default: 9

Range: 1-19

PDS=*name*

Defines a device name to be used for dynamic allocation of IMS HP Change Accumulation Utility temporary libraries. The PDS= device name defaults to the value specified for the UNIT= global parameter.

Default: global UNIT

Range: any 1 - 8 character device name; excluding VIO

Note: If the value of the global parameter UNIT= is set to VIO (for example, UNIT=VIO), then PDS= must be specified.

PROCEDURE NAME=*name*

Selects the standard procedure method for JCL processing. This keyword is the name of the IMS HP Change Accumulation Utility procedure to be used in PROCLIB or IEFJOBS. You can override Procedure name=*name* by using the HPCAPROC DD and PROC=*value* parameter.

QUEUE BUFFERS=*number*

The specified number is the upper limit in megabytes that are used for buffering SORT input and spill files data. IMS HP Change Accumulation Utility computes a default buffers limit from the number combination of CA groups, sort steps, and logs. The default size is reduced if necessary to the QUEUE BUFFERS value. Each buffer is 32 K bytes irrespective of any spill file or sort file blksize.

Default: n/a

Range: 99 - 16384

SECLOG.UNIT=*name*

Overrides the UNIT value for secondary logs as recorded in the RECON. This action might be necessary when the registered value is not a valid unit name, for example, UNIT=3400. To allocate without a specified unit, omit the *name* value as in SECLOG.UNIT=.

JCL created by the GENJCL.CA command can include the UNIT= parameter, but the UNIT value applies only to the primary log files.

name is one of the following values:

- RECON - Use the unit name as recorded in the RECON
- *unitname* - A valid device identifier is specified; for example, 3490
- omitted - The unit type is unspecified.

Default: RECON

SECLOG.VOLSER=*volser*

Overrides the volume list for secondary logs as recorded in the RECON. To allocate without a volume specification, omit the *volser* value as in SECLOG.VOLSER=.

JCL created by the GENJCL.CA command can include the SECLOG.VOLSER parameter, but this value applies only to the primary log files.

volser is one of the following values:

- RECON - Use the volumes list as recorded in the RECON.
- omitted - The volumes list is unspecified.

Default: RECON

SELECT LOGS=*prilog|seclog*

Specifies that the secondary log feature is used only when the SECLOG value is provided.

Default: PRILOG

List: PRILOG/SECLOG

SPILL BLKSIZE=*number*

Defines the block size value used to allocate CA and FP spill files.

Default: 32760

Range: 6144-32760

STC NAME=*name*

Selects the started task control (STC) method for JCL processing. This value is the name of the IMS HP Change Accumulation Utility procedure to be used in IEFPDSI or IEFJOBS. STC overrides the standard procedure mode if both are selected in the same run.

UNIT=*name*

Defines a device name to be used for dynamic allocation of data sets when no specific unit type is otherwise available.

Default: SYSDA

The default, SYSDA, applies to both SAS and MAS.

z/OS provides a standard feature known as virtual input/output (VIO). VIO can improve system performance by eliminating much of the processor usage and time required to allocate a device and move data physically between main storage and an I/O device. The main difference is that paging is used instead of explicit I/O to transfer data (EXCPs).

USE CATALOG=YES/NO

Uses only catalog and SMS information to allocate the LOGS. If set to NO, include UNIT and VOLSER, LOGs might be uncataloged data sets.

Default: NO

Wait for UNIT=YES|NO

Determines whether the S99WTUNT flag is to be set for dynamic allocation, when authorized.

YES causes the flag to be set.

Default: NO

JOB statement for JCL data sets

Reference for IMS HP Change Accumulation Utility JOB statement for JCL data sets.

JOB=...

Provides the JOB JCL statement to be used when creating the members of the JOBS JCL data set. JOB= is not required if the DD HPCAJLIB is omitted.

You can include a maximum of 7 JOB= statements; each statement is concatenated to create a JCL JOB statement.

The order of the JOB= statements determines the order of the continuation lines of the JOB JCL statement.

The JOB name on the first line is replaced to form the IMS HP Change Accumulation Utility assigned member names.

JOB name should be 8 characters.

SORT parameters passed to DFSORT

Reference for IMS HP Change Accumulation Utility SORT parameters.

SORT parameters are passed to DFSORT (5740-SMI) for processing. The specific format of each parameter setting is defined by DFSORT in the *DFSORT Application Programming Guide*.

Specifying the DFSPARM DD statement allows you to override DFSORT control statements.

In multi-address space mode, the specification of DFSPARM parameters in a pre-allocated DFSPARM DD DSN=&dsn(DFSPARM) must be within skeleton JCL.

In single address space mode, the DFSPARM parameters can also be specified directly in the JCL instream via SYSIN (for example, DFSPARM DD *).

SORT.DYNALLOC COUNT=number

Maximum number of requested work data sets

Default: 4

Range: 2-255

SORT.FILSZ=number

Estimate of the number of records to be sorted

Default: 100000

Range: 5000-999999999

SORT.HIPRMAX=value

Maximum amount of hiperspace to be used for hipersorting

When IMS HP Change Accumulation Utility command SORT.HIPRMAX=0 is received, IMS HP Change Accumulation Utility will pass DFSORT parameters to take advantage of optimized sort processing. These options allow DFSORT to take advantage of memory object sorting and internally calculating optimal storage requirements.

The following DFSORT parameters are added:

DSPSIZE=256

MOSIZE=MAX

DSA=64

SDB=LARGE

Default: 0 (Optimal)

SORT.MAINSIZE=number

DFSORT determines how much storage to allocate above and below 16MB virtual; however, the total amount of storage cannot exceed MAINSIZE.

Default: 4

Range: 1-2000 (M)

SORT.SMF=name

Specify whether the sort step should record SMF type-16 records, and which data to include

Default: No

List: FULL/SHORT/NO

Parameters for CA SORT spill files

Reference for IMS HP Change Accumulation Utility CA SORT spill file parameters.

CA.ALLSPILL

This command directs IMS HP Change Accumulation Utility to process all sort address spaces using spill files in place of cross-memory data transfer. This action can be helpful in heavily loaded systems when cross-memory transfers compete for resources.

CA.PREFIX=dsname

The prefix used to create unique data set names for SORT spill files. The prefix value is 1-17 characters and can be multiple nodes.

Default: User ID, 1-17 characters

CA.SPACE=CYLS/TRKS

The unit of allocation for dynamic allocation of SORT spill files

Default: CYLS

CA.START=sequence

IMS HP Change Accumulation Utility constructs a network from the required DBDs, LOGs, and CAGRPs and uses the network to schedule the start and stop of each LOG and CAGRP. The CA.START command allows the user to override the IMS HP Change Accumulation Utility-selected order in which the CAGRPs are started.

The start sequence is as follows:

- ORDERDED - start the CAGRPs in the sequence given for the GENJCL.CA commands
- AUTO - start the CAGRPs in the order selected by IMS HP Change Accumulation Utility

Default: AUTO

CA.PRIMARY=number

The primary allocation count in the units (CA.SPACE) for dynamic allocation of SORT spill files

Default: 0

CA.SECONDARY=number

The secondary allocation count in the units (CA.SPACE) for dynamic allocation of SORT spill files

CA.UNIT=name

The device name for dynamic allocation of a SORT spill file. If CA.UNIT is not provided, the default value is used.

Default: global UNIT

CA.UNIT COUNT=number

Maximum number of devices that are used to satisfy the allocation of a SORT spill file

Default: 4

Range: 1-9

CA.DATACLAS=name

The DATACLAS parameter for dynamic allocation of a SORT spill file

CA.MGMTCLAS=name

The MGMTCLAS parameter for dynamic allocation of a SORT spill file

CA.STORCLAS=name

The STORCLAS parameter for dynamic allocation of a SORT spill file

Parameters for Fast Path spill files

Reference for IMS HP Change Accumulation Utility Fast Path spill file parameters.

FP.DATACLAS=name

The DATACLAS parameter for dynamic allocation of a Fast Path spill file

FP.MGMTCLAS=name

The MGMTCLAS parameter for dynamic allocation of a Fast Path spill file

FP.NOEEQES

The FP.NOEEQES parameter directs IMS HP Change Accumulation Utility to process Fast Path transactions without regard to recovery of indoubt transactions. (Incomplete transactions for non-Fast Path are referred to as *inflight*. Incomplete transactions for Fast Path are called *indoubt*.) IMS HP Change Accumulation Utility cannot resolve indoubt Fast Path transactions if DBRC is not used, or if the input CA files are not registered to DBRC. This option should not be used when DBRC controls the recovery environment.

FP.NOEEQES can safely be used only when the input CA files do not have indoubt transactions. For example, NOEEQES can be used when DBRC processing is not possible and there are no DEDBs, or all DEDBs are known to be without indoubt transactions.

FP.NOSPILL

This processing option forces the serialization of all log data sets for Fast Path data bases. The number of parallel logs is reduced to 1 as applied to all input logs associated with Fast Path databases. The effect is that DASD storage for spill files might be reduced at the cost of increased processing time.

FP.PREFIX=*dsname*

The prefix used to create unique data set names for Fast Path spill files. The prefix value is 1-17 characters and can be multiple nodes.

Default: User ID, 1-17 characters

FP.PRIMARY=*number*

The primary allocation count in the FP.SPACE units for dynamic allocation of Fast Path spill files

FP.SECONDARY=*number*

The secondary allocation count in the FP.SPACE units for dynamic allocation of Fast Path spill files

FP.SPACE=*CYLS|TRKS*

The unit of allocation used for dynamic allocation of Fast Path spill files

Default: CYLS

FP.UNIT=*name*

The device name for dynamic allocation of a Fast Path spill file.

If FP.UNIT is not provided, then the default GLOBAL.UNIT value is used.

FP.UNIT COUNT=*number*

Maximum number of devices that are used to satisfy the allocation of a Fast Path spill file

Default: 4

Range: 1-9

FP.STORCLAS=*name*

The STORCLAS parameter for dynamic allocation of a Fast Path spill file

Parameters for generating reports

Reference for IMS HP Change Accumulation Utility report parameters.

RPT.SUMMARY=*select*

Generates the summary report files.

Default: YES

List: YES/NO

RPT.DATE=*format*

Formats date values in reports.

Default: MDY

List:

- MDY, MM/DD/YYYY
- DMY, DD-MM-YYYY
- YMD, YYYY/MM/DD
- YDM, YYYY.DD.MM

RPT.COLUMNS=*select*

Writes the columnar report to HPCPRINT. You can also direct the columnar report to HPCACOLS.

Default: NO

List: NO/YES

RPT.ORDER=select

Generates columnar, CSV, HTML, and XML report displays and sorts to the named order.

Default: DBD

List:

- DBD, sort by DBD,DDNAME.NUMBER,GROUP,DATE,TIME
- GROUP, sort by GROUP,DATE,TIME,DBD,DDNAME,NUMBER
- CC, sort by CC,GROUP,DATE,TIME,DBD,DDNAME,NUMBER

Parameters for generating summary reports

Reference for IMS HP Change Accumulation Utility parameters for generating reports.

SUM.FILES=select

Includes the list of allocated files in each summary report. Message HPC4040I is generated to precede the list of DD entries.

Default: NO

List: NO/YES

SUM.REPORT CLASS=char

Requests separate SYSOUT data sets for each subordinate address space summary report. The default is to merge all summary reports into the IMS HP Change Accumulation Utility report file (HPCPRINT). The class value, x, is a single character value that is the class to be assigned, or to use the JOB default class, select *. Each SYSOUT DD name is the JOB name of the subordinate space.

Default: none

Value: a single character JES SYSOUT class

SUM.SORT=select

Includes the sort step output in each summary report.

Default: YES

List: YES/NO

GENJCL definitions

Reference for IMS HP Change Accumulation Utility GENJCL definitions.

GEN.GRPNAME=name

Names a change accumulation group for which a DBRC GENJCL.CA command is created. If you provide a GEN.GRPNAME statement, then you must provide at least one GEN.GENJCL statement. You can create as many GEN.GRPNAME statements as necessary to define all groups for processing. GENJCL.CA commands are created in the order in which GEN.GRPNAME statements are processed.

GEN.GENJCL=string

Represents a continued line of a DBRC GENJCL.CA command. The command must not contain the GRPNAME() parameter. If you provide a GEN.GENJCL statement, then you must provide at least one GEN.GRPNAME statement. You can create as many GEN.GENJCL statements as necessary to define all continuation lines for the GENJCL.CA command. The GENJCL.CA command is created in the order in which GEN.GENJCL statements are processed. The continuation indicator for each line is optional.

GEN.LIST=number

If the DBRC completion code (CC) >number, then the SYSPRINT DD output of the GENJCL.CA commands is listed in the HPCDBPRT data set, if allocated. IMS HP Change Accumulation Utility tests for this condition prior to GEN.WARN. The completion codes are:

- 0 = list for all conditions

- 4 = list for warnings or errors
- 8 = list only when errors

GEN.RETRY=*number*

Specifies the number of times IMS HP Change Accumulation Utility will reprocess GENJCL for CAGRPs that cannot be accumulated because of the purge time validation error.

Range: 0 - 3

Default: 0

Valid only for the extended batch environment.

The following restrictions apply:

- Only simple forms of GENJCL definitions in HPCSYSIN are accepted
- VOLNUM is not supported
- Single Address Space (SAS) is not supported
- Point-in-time (PIT) is not supported
- A new delete data set step is added if HPCADRI1 RC=4

GEN.STOP

Directs IMS HP Change Accumulation Utility to bypass processing of the converted CAJCL procedures. This is similar to running PGM=HPCABAT0 (the first step in the 2-step batch process).

GEN.WARN=*action*

Directs IMS HP Change Accumulation Utility to take action if the DBRC GENJCL.CA process completes without error, but with warnings.

Actions are the following:

- STOP - End processing after messages are displayed.
- IGNORE - Attempt to process the JCL that was returned. The warning condition might result in additional errors or abends depending on the conditions of the resulting JCL.
- DEFER - Continue processing the JCL that was returned. Final return code will be RC=0 unless other errors are detected.

Default: STOP

Note: If no CA groups were returned by DBRC, or if error conditions have caused all groups to be bypassed, processing always ends with RC=4. GEN.WARN=IGNORE or DEFER has no effect when there are no CA groups to be processed. This command is secondary to the WARN=*parm* optionally provided in the EXEC parameters.

Condition codes

Termination condition codes for HPCADRIV and HPCAMAIN reflect the combined termination status of the main address space and all subordinate address spaces. The completion codes are:

- CC=00 All selected groups scheduled and completed successfully.
- CC=04 No requested groups have input logs for processing.
- CC=04 At least one scheduled group completed with a warning.
- CC=08 At least one scheduled group completed with an error.
- CC=20 At least one selected group was not scheduled.
- CC=20 At least one scheduled group ended abnormally.
- CC=20 At least one scheduled group ended in an unknown condition.

CC=20 can result from an abend or from a condition that is not identifiable to the IMS HP Change Accumulation Utility main task. For example, a JCL error in the subordinate address space prevents any cross-memory communication and the condition is, therefore, unknown to the main address space.

Chapter 10. Reports reference

You can select and customize reports produced by IMS HP Change Accumulation Utility.

Topics:

- [“Reports summary” on page 101](#)
- [“Primary report \(HPCPRINT\)” on page 102](#)
- [“Summary reports” on page 104](#)
- [“Columnar reports \(HPCACOLP and HPCACOLS\)” on page 106](#)
- [“Comma-separated reports \(HPCACSV\)” on page 108](#)
- [“HTML report \(HPCAHTML\)” on page 108](#)
- [“XML report \(HPCAXML\)” on page 110](#)
- [“DBRC output \(HPCDBPRT\)” on page 112](#)
- [“TRACE report \(HPCATRACE\)” on page 112](#)
- [“Diagnostics report \(HPCADIAG\)” on page 113](#)

Reports summary

IMS HP Change Accumulation Utility produces many reports to display information from multiple sources.

Table 6. IMS HP Change Accumulation Utility reports

Report	Report function and content
HPCPRINT	Primary IMS HP Change Accumulation Utility report. HPCPRINT is a required DD for all batch processing but optional for ISPF. HPCPRINT includes normal and error processing information, status. Optional summary reports and Columnar report for each sort procedure can be included. RECFM=VBA LRECL=137
<i>hpc-a-id nnnn</i>	Summary report by sort procedure. This is a SYSOUT file directed to the class specified in SUM.REPORT= <i>class</i> . A summary report can be directed to either the main HPCPRINT file or to an individual SYSOUT file. RECFM=VBA LRECL=137
HPCACOLP	Columnar report with page headings.
HPCACOLS	Columnar report. This report presents a single line for each database and DDN combination from the summary reports of all sort procedures. The information fields are aligned in columns according to a user defined sequence. RECFM=VB LRECL=137
HPCACSV	Comma-separated values. This report is similar to the columnar report, but each line is a set of comma-separated values. The resulting file can be loaded into a spreadsheet application that accepts input in the CSV format. RECFM=VB LRECL=137
HPCAHTML	HTML. The output file generated for this report is defined as an HTML table for display in a web browser. RECFM=VB LRECL=137
HPCAXML	XML. The XML report includes DTD and XML suitable for transfer to another application. RECFM=VB LRECL=137
HPCDBPRT	DBRC SYSPRINT DD output of the GENJCL.CA. This file is useful when JCL processing completes with RC>0 and the DBRC output is required to resolve the failure. RECFM=VBA LRECL=137

Table 6. IMS HP Change Accumulation Utility reports (continued)

Report	Report function and content
HPCTRACE	Trace output is not normally collected but might be required for certain diagnostic procedures. RECFM=VBA LRECL=137
HPCADIAG	Diagnostic file output is not normally collected but might be required for certain diagnostic procedures. RECFM=VB LRECL=1024

Primary report (HPCPRINT)

The IMS HP Change Accumulation Utility primary report file is defined by HPCPRINT DD.

The format is RECFM=VBA, LRECL=137. This DD is required for all batch environments but is optional for ISPF. During ISPF processing, status and messages are presented in interactive panels.

Sections of the report vary by function.

The following sample report explains how the IMS HP Change Accumulation Utility report file is structured when not in scan mode. The numbers in parentheses do not appear in the actual report. These numbers refer to explanatory notes following the sample report.

```

(1)
5655-V86 HPCPRINT HPCA REPORT FILE
15655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE    1
2021/10/15 14.20.56 HPCA1 (JOB03169) HPCMAIN

(2)
JOB=HPCA1
Parms=CA01,LIST

(3)
...Preparing PROCLIB members
. . .
. . .
. . .

(4)
...Executing PROCLIB members
. . .
. . .
. . .

(5)
Control statement processing information
      CA groups 1
      CA sorts 1
      . . .
      Spill LRECL 32756
      Spill BLKSIZE 32760

(6)
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE    4
2021/10/15 14.20.56 HPCA1 (JOB03169) HPCMAIN
SORT0001 starting, CAGRP(PRSB02Z) PROC(HPCSPROC.CA010001,HPCSTEPL=GCAMA.IRP210.SHPCLMD0)
SORT0001 SORT terminated, status = C COND: S000 U0000 REASON: 00000000x

(7)
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE    5
2021/10/15 14.20.56 HPCA1 (JOB03169) HPCMAIN
HPC9990I SORT0001 PROC(CA010001) CAGRP(PRSB02Z ), completed COND: S000 U0000

(8)
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE    6
2021/10/15 14.20.56 HPCA1 (JOB03169) HPCMAIN
SORT0001 PROC(CA010001) ID(STC03170) CAGRP(PRSB02Z)
JOB=CA010001
. . .
. . .
. . .

(9)
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE   15
2021/10/15 14.20.56 HPCA1 (JOB03169) HPCMAIN
HPCA RUN 10/15/2021 14:20:56
DBDNAME  DDNAME    NUM CA GROUP DATE    TIME          DFSULOG  DFSUCUMO  DFSUCUMN  PURGE          CC    DBRC
-----
. . .
. . .
. . .

(10)
HPC9997I Storage:      Used      Limit
HPC9997I 24_bit:        192K      8168K
HPC9997I 31_bit:        9152K     988160K
HPC9997I 64-Bit:         0M       16383P

(11)
HPC9999I HPCA processing complete, COND: S000 U0000
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE   16
2021/10/15 13.39.35 HPCA1 (JOB03156) HPCMAIN
HPCPRINT ***CLOSED***

```

Figure 36. Sample IMS HP Change Accumulation Utility report listing

Notes:

1. The standard IMS HP Change Accumulation Utility report header identifies the IMS HP Change Accumulation Utility version, date, time, and JOB identification.

2. Batch parameters from EXEC PGM=HPCAMAIN
3. Start of JCL processing. This section includes errors and warnings during JCL conversion.
4. Start of procedure execution. The procedures created in the previous step are scheduled to run.
5. IMS HP Change Accumulation Utility setup parameters and calculated values. These parameters are the settings from ISPF setup panels, or from IMS HP Change Accumulation Utility commands from the HPCSYSIN DD file. Limits and sizes are calculated from the setup and from the processed JCL.
6. Status and error messages. The status of each procedure as it starts and stops is recorded as it happens. Errors are reported as they occur. The sequencing of this section is chronological.
7. Procedure recap. Each procedure is listed with its completion status. Procedures in this section are sequenced according to the GENJCL.CA commands used to generate the JCL. If DBRC was not used, then the sequence is defined by the order in which the CA steps are defined in the JCL.
8. Start of a summary report. Each procedure that is successfully started produces a summary report. The reports are included here unless suppressed by RPT.SUMMARY=NO, or selected to alternate SYSOUT locations by SUM.REPORT CLASS=.
9. The columnar report is included here if RPT.COLUMNS=YES was selected.
10. Lines of informational messages describe the highwater use and limit values for 24-bit, 31-bit, and 64-bit memory allocations.
11. End of processing condition code, and end of IMS HP Change Accumulation Utility report.

Summary reports

Summary reports are produced for each successfully initiated CA address space.

You can direct the report to HPCPRINT, to a SYSOUT, or to neither. The default is to include basic summary report sections in HPCPRINT.

The following table shows the available commands for generating Summary reports.

Table 7. Commands for summary reports

Command	Function
RPT.SUMMARY=YES NO	Specifies whether to allow or suppress all summary reports
SUM.REPORT CLASS=x	CLASS designates a SYSOUT instead of HPCPRINT
SUM.FILES=YES NO	Specifies whether to include or omit file allocation list.
SUM.SORT=YES NO	Specifies whether to include or omit sort SYSOUT content.

For SUM.REPORT CLASS=x, each summary file is written to a separate output of the specified SYSOUT class. The name used for starting the address space is assigned to the DD name of the SYSOUT file.

In the following sample summary report, the numbers in parentheses do not appear in the actual report. These numbers refer to explanatory notes following the sample report.

(1)
5655-V86 HPCPRINT HPCA REPORT FILE
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1
2021/10/15 12.58.42 HPCA1 (JOB03130) HPCMAIN PAGE 1

JOB=HPCA1
Parms=CA01,LIST

. . .
. . .

5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1
2021/10/15 12.58.42 HPCA1 (JOB03130) HPCMAIN PAGE 6
SORT0001 PROC(CA010001) ID(STC03131) CAGRP(PRSB02Z)
JOB=CA010001

HPC9990I SORT0001 PROC(CA010001) CAGRP(PRSB02Z), completed COND: S000 U0000

Execution PARM='CORE=100000,DBRC=N'

(2)
HPC4040I Sum.Files allocation report
//STEPLIB DD DSN=DBGT00L.QA.IRP.SHPCLOAD
//HPCPRINT DD SYSOUT
//SYSUDUMP DD SYSOUT
++HPCALIB DD DSN=IMST00L.I10RTS17.COMRESL3
++SYSPRINT DD SYSOUT
++RECON1 DD DSN=IMT00L1.PM77417.D210721.RECON1
++RECON2 DD DSN=IMT00L1.PM77417.D210721.RECON2
++RECON3 DD DSN=IMT00L1.PM77417.D210721.RECON3
++IMS DD DSN=IMT00L1.PM77417.SIS17782.PRSB02Z.DBDLIB
++SYSOUT DD SYSOUT
++SORTOUT DD SYSOUT
++SORTLIB DD DSN=SYS1.SORTLIB
++SORTWK01 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126894
++SORTWK02 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126895
++SORTWK03 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126896
++SORTWK04 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126897
++SORTWK05 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126898
++SORTWK06 DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126899
++DFSUCUM0 DD DUMMY
++DFSUCUMN DD DSN=IMT00L1.PM77417.CA.D21288.T125842
++DFSUDD1 DD DUMMY
++HPCADUMY DD DUMMY
++SYSIN DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126900
++DFSPARM DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126901
++HPCMSGDD DD DSN=SYS09288.T125846.RA000.HPCSPROC.R0126902
>>DFSULOG DD DSN=IMT00L1.PM77417.D210721.T084347.EXPS.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T090522.EXPT.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T074848.EXP1.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T081848.EXPQ.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T095353.EXPY.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T091351.EXPW.E9720.A
>> DD DSN=IMT00L1.PM77417.D210721.T093852.EXPX.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T101354.EXPZ.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T075346.EXP.N.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T090524.EXP.V.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T074847.EXP1.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T090523.EXPS.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T080847.EXP.N.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T081847.EXPQ.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T090520.EXPT.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T095350.EXPX.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T095352.EXPY.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T101353.EXPZ.E9720.H

Figure 37. Sample summary report - part 1

```

5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1
2021/10/15 12.58.42 HPCA1 (JOB03130) HPCMAIN
SORT0001 PROC(CA010001) ID(STC03131) CAGRP(PRSB02Z)
>> DD DSN=IMT00L1.PM77417.D210721.T091351.EXPW.E9720.B
>> DD DSN=IMT00L1.PM77417.D210721.T075347.EXP1.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T080846.EXP.N.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T095351.EXPX.E9720.H
0>> DD DSN=IMT00L1.PM77417.D210721.T090521.EXPT.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T101355.EXPZ.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T095354.EXPY.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T090525.EXP.V.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T084346.EXPQ.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T075348.EXP1.E9720.H
>> DD DSN=IMT00L1.PM77417.D210721.T093851.EXPW.E9720.H

```

```

(3)
CA Input Master NULLFILE
CA Output Master IMT00L1.PM77417.CA.D21288.T125842

```

```

(4)
RUN-TIME = 21.288 12:58:47.0
1 DATA BASE DATA SET LOG RECORD CHANGE ACCUMULATION UTILITY
0
0 SYSIN CONTROL CARDS CA010001
0ID 32756
. . .
0DFS339I FUNCTION CA HAS COMPLETED NORMALLY RC=0
***

```

```

(5)
1ICE143I 0 BLOCKSET SORT TECHNIQUE SELECTED
ICE250I 0 VISIT http://www.ibm.com/storage/dfsort FOR DFSORT PAPERS, EXAMPLES AND MORE
ICE000I 0 - CONTROL STATEMENTS FOR 5650-Z0S, Z/OS DFSORT V2R3 - 12:58 ON FRI OCT 15, 2021 -
. . .

```

Figure 38. Sample summary report - part 2

Note:

1. Start of summary. Each report is identified by the procedure name, CA group name, date, and time.
2. File allocations. This section appears only when SUM.FILES=YES is specified. Each allocation includes DDname and DSname or SYSOUT. Three types of allocation are described:
 - // - file is allocated from JCL in the executed procedure
 - ++ - HPCA dynamically allocated file
 - >> - log data set, allocated in the IMS HP Change Accumulation Utility main address space, data transferred X-memory
3. File allocations. The CA master input and master output files are always included.
4. CA report. The contents of the CA report SYSPRINT DD are reproduced here.
5. Sort messages. The content of the DFSORT message file SYSOUT DD is reproduced here. Sort messages appear only when SUM.SORT=YES is specified.

Columnar reports (HPCACOLP and HPCACOLS)

You can direct the Columnar report with page headings to HPCPRINT DD or HPCACOLP DD, or both.

The Columnar report (no page headings) is selected by the HPCACOLS DD.

The following table shows the commands available for generating columnar reports:

Table 8. Commands for generating columnar reports

Command	Function
RPT.COLUMNS=YES/NO	Direct the report output to HPCPRINT
RPT.ORDER=DBD/GROUP/CC	Specifies the sort sequence

Table 8. Commands for generating columnar reports (continued)

Command	Function
RPT.DATE=MDY/DMY/YMD/YDM	Specifies the date format for report headers
HPCACOLP DD	Directs output to HPCACOLP
HPCACOLS DD	Directs output to HPCACOLS

Report order determines both the sequence of lines within the report and the sequence of fields within the line. Report order options include the following:

- DBD = DBD,DDN,NUM,GROUP,DATE,TIME ...
- GROUP = GROUP, DATE, TIME,DBD,DDN,NUM ...
- CC = CC,GROUP,DATE,TIME,DBD,DDN,NUM ...

The default order is DBD.

The following example shows a Columnar report with page headings:

```
5655-V86 HPCACOLP HPCA REPORT FILE
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1    PAGE    1
2024/03/14 02.04.04 HPCA1 (JOB03120) HPCMAIN
HPCA RUN 03/14/2024 02:01:45
DBDNAME  DDNAME    NUM CA GROUP  DATE    TIME          DFSULOG  DFSUCUMO  DFSUCUMN  PURGE          CC  DBRC
-----
PRSB02Z  PRSB02VA  47 PRSB02Z  24.074  02:01:47.1  000000230 000000000 000000021 24064022329773762+0000 0000 NO
PRSB02Z  PRSB02VB  48 PRSB02Z  24.074  02:01:47.1  000000237 000000000 000000027 24064022329860327+0000 0000 NO
PRSB02Z  PRSB02V0  37 PRSB02Z  24.074  02:01:47.1  000000254 000000000 000000029 24064022356428184+0000 0000 NO
```

Figure 39. Sample Columnar report with page headings (HPCACOLP)

The following example shows a Columnar report with no page headings:

```
HPCA RUN 03/14/2024 02:01:45
DBDNAME  DDNAME    NUM CA GROUP  DATE    TIME          DFSULOG  DFSUCUMO  DFSUCUMN  PURGE          CC  DBRC
-----
PRSB02Z  PRSB02VA  47 PRSB02Z  24.074  02:01:47.1  000000230 000000000 000000021 24064022329773762+0000 0000 NO
PRSB02Z  PRSB02VB  48 PRSB02Z  24.074  02:01:47.1  000000237 000000000 000000027 24064022329860327+0000 0000 NO
PRSB02Z  PRSB02V0  37 PRSB02Z  24.074  02:01:47.1  000000254 000000000 000000029 24064022356428184+0000 0000 NO
```

Figure 40. Sample Columnar report with no page headings (HPCACOLS)

Field description of the Columnar report:

DBDNAME

DBD name in the CA group. Part name if the database is a HALDB.

DDNAME

DD or area name in the CA group.

NUM

Indicates the data set number

1

Indicates the prime data set

2

Indicates the overflow data set

0

Indicates the VSAM sequence set for KSDS

The value is the relative number of the data set group corresponding to the ddname. If the number is 0, the data set is the index of a VSAM KSDS. Records with relative number 0 are used only for the Track Recovery option of database recovery.

CA GROUP

CA group name

DATE**TIME**

Start time of CA creation in each CA group.

DFSULOG**DFSUCUMO****DFSUCUMN**

Indicates the number of logical records processed for the DBDS or area.

PURGE

Indicates the date and time specified on the SYSIN control statement.

CC

Indicates the return code issued by the change accumulation processing.

DBRC

Indicates whether the RECON data sets were successfully updated to reflect the results.

Comma-separated reports (HPCACSV)

The comma-separated report, which is in CSV format, is similar to the columnar report in content and in sequence.

However, the fields in this report are stripped of trailing blanks and separated by commas. The CSV format can be loaded directly by most commercially available spreadsheet programs and is appropriate for performing additional sorting, totaling, or search analysis.

The following table shows the commands available for generating comma-separated reports:

Table 9. Commands for generating comma-separated reports

Command	Function
RPT.ORDER=DBD/GROUP/CC	Specifies the sort sequence
HPCACSV DD	Specifies that the report output should be directed to HPCACSV

Report order determines both the sequence of lines within the report and the sequence of fields within the line. Report order includes the following options:

- DBD = DBD,DDN,NUM,GROUP,DATE,TIME ...
- GROUP = GROUP,DATE,TIME,DBD,DDN,NUM ...
- CC = CC,GROUP,DATE,TIME,DBD,DDN,NUM ...

The default order is DBD.

The following example shows a comma-separated report:

```
DBDNAME , DDNAME , NUM , CA GROUP , DATE , TIME , DFSULOG , DFSUCUMO , DFSUCUMN , PURGE , CC , DBRC
DBVHDJ05 , CJVHDG1E , 1 , CAGRP1 , 24 . 074 , 02 : 01 : 47 . 1 , 0000000817 , 0000000000 , 0000000010 , 24064022356569701+0000 , 0000 , N
```

Figure 41. Sample comma-separated report (HPCACSV)

See [“Columnar reports \(HPCACOLP and HPCACOLS\)”](#) on page 106 for the description of each field.

HTML report (HPCAHTML)

The HTML report is a table format defined in HTML. It is suitable for display in a Web browser.

The following table shows the commands available for generating HTML reports:

Table 10. Commands for HTML reports

Command	Function
RPT.ORDER=DBD/GROUP/CC	Specifies the sort sequence
RPT.DATE=MDY/DMY/YMD/YDM	Specifies the date format for report headers
HPCAHTML DD	Specifies that the report output be directed to HPCAHTML

Report order determines both the sequence of lines within the report and the sequence of fields within the line. Report order options include the following:

- DBD = DBD,DDN,NUM,GROUP,DATE,TIME ...
- GROUP = GROUP,DATE,TIME,DBD,DDN,NUM ...
- CC = CC,GROUP,DATE,TIME,DBD,DDN,NUM ...

The default order is DBD.

The following example shows an HTML report using DBD report order:

```

<html>
  <head>
    <title>HPCA Process Report 03/14/2024 02:01:45</title>
  </head>
  <body>
    <table border=2>
      <caption>HPCA Process Report 03/14/2024 02:01:45</caption>
      <th>DBDNAME</th>
      <th>DDNAME</th>
      <th>NUM</th>
      <th>CA GROUP</th>
      <th>DATE</th>
      <th>TIME</th>
      <th>DFSULOG</th>
      <th>DFSUCUMO</th>
      <th>DFSUCUMN</th>
      <th>PURGE</th>
      <th>CC</th>
      <th>DBRC</th>

      <tr>
        <td>PRSB02Z</td>
        <td>PRSB02VA</td>
        <td>47</td>
        <td>PRSB02Z</td>
        <td>24.074</td>
        <td>02:01:47.1</td>
        <td>000000230</td>
        <td>000000000</td>
        <td>000000021</td>
        <td>24064022329860327+0000</td>
        <td>0000</td>
        <td>N</td>
      </tr>

      <tr>
        <td>PRSB02Z</td>
        <td>PRSB02Z9</td>
        <td>10</td>
        <td>PRSB02Z</td>
        <td>24.074</td>
        <td>02:01:47.1</td>
        <td>000000189</td>
        <td>000000000</td>
        <td>000000017</td>
        <td>24064022356428184+0000</td>
        <td>0000</td>
        <td>N</td>
      </tr>

    </table>
  </body>
</html>

```

Figure 42. Sample HTML report (HPCAHTML)

See “Columnar reports (HPCACOLP and HPCACOLS)” on page 106 for the description of each field.

XML report (HPCAXML)

The XML report is formatted in XML. It is suitable for transfer to other XML enabled applications.

The report includes the complete DTD necessary for parsing the XML element contents of the report.

The following table shows the commands available for generating XML reports:

Table 11. Commands for XML reports

Command	Function
RPT.ORDER=DBD/GROUP/CC	Specifies the sort sequence
RPT.DATE=MDY/DMY/YMD/YDM	Specifies the date format for report headers

Table 11. Commands for XML reports (continued)

Command	Function
HPCAXML DD	Specifies that the report output be directed to HPCAXML

Report order determines the sequence of CA report content used in creating the XML report. The sequence of the DBD composite elements changes, but the order of elements in the DTD remain constant.

Report order options include the following:

- DBD = DBD,DDN,NUM,GROUP,DATE,TIME ...
- GROUP = GROUP,DATE,TIME,DBD,DDN,NUM ...
- CC = CC,GROUP,DATE,TIME,DBD,DDN,NUM ...

The default order is DBD.

The following example shows an XML report using DBD report order:

```

<?xml version="1.1"?>
<!DOCTYPE hpca Y
<!ELEMENT hpca (date, time, version, dbd+) >
<!ELEMENT date (#PCDATA) >
<!ELEMENT time (#PCDATA) >
<!ELEMENT version (#PCDATA) >
<!ELEMENT dbd (dbdname, ddname, num, cagroup,
dfsulog, dfsucumo, dfsucumn, purge, cc, dbrc, date, time) >
<!ELEMENT dbdname (#PCDATA) >
<!ELEMENT ddname (#PCDATA) >
<!ELEMENT num (#PCDATA) >
<!ELEMENT cagroup (#PCDATA) >
<!ELEMENT dfsulog (#PCDATA) >
<!ELEMENT dfsucumo (#PCDATA) >
<!ELEMENT dfsucumn (#PCDATA) >
<!ELEMENT purge (#PCDATA) >
<!ELEMENT cc (#PCDATA) >
<!ELEMENT dbrc (#PCDATA) >
<!ELEMENT date (#PCDATA) >
<!ELEMENT time (#PCDATA) >
">

<hpca>
<date>03/14/2024</date>
<time>02:01:45</time>
<version>R2.1</version>

<dbd>
<dbdname>PRSB02Z</dbdname>
<ddname>PRSB02VA</ddname>
<num>47</num>
<cagroup>PRSB02Z </cagroup>
<dfsulog>000000230</dfsulog>
<dfsucumo>000000000</dfsucumo>
<dfsucumn>000000021</dfsucumn>
<purge>24064022329773762+0000</purge>
<cc>0000</cc>
<dbrc>N</dbrc>
<date>24.074</date>
<time>02:01:47.1</time>
</dbd>

<dbd>
<dbdname>PRSB02Z</dbdname>
<ddname>PRSB02Z9</ddname>
<num>10</num>
<cagroup>PRSB02Z</cagroup>
<dfsulog>000000189</dfsulog>
<dfsucumo>000000000</dfsucumo>
<dfsucumn>000000017</dfsucumn>
<purge>24064022356428184+0000</purge>
<cc>0000</cc>
<dbrc>N</dbrc>
<date>24.074</date>
<time>02:01:47.1</time>
</dbd>

</hpca>

```

Figure 43. Sample XML report (HPCAXML)

See [“Columnar reports \(HPCACOLP and HPCACOLS\)”](#) on page 106 for the description of each field.

DBRC output (HPCDBPRT)

The DBRC report is a reproduction of the SYSPRINT DD produced by IMS HP Change Accumulation Utility. For descriptions of report features, refer to the DBRC product documentation.

TRACE report (HPCATRACE)

The TRACE report is described in [“Trace”](#) on page 186.

Diagnostics report (HPCADIAG)

The Diagnostics report is described in [“HPCADIAG”](#) on page 185.

Part 5. Performance and usage

You can apply additional performance and usage information to help improve the operation and performance of IMS HP Change Accumulation Utility.

Topics:

- [Chapter 11, “Managing spill files with 64-bit addressing,” on page 117](#)
- [Chapter 12, “Performance and resource utilization,” on page 125](#)
- [Chapter 13, “Supplementary usage topics,” on page 133](#)

Chapter 11. Managing spill files with 64-bit addressing

You can improve IMS HP Change Accumulation Utility performance by taking advantage of 64-bit addressing to handle spill files used during the change accumulation process.

Topics:

- [“Storage use above the bar in z/Architecture” on page 117](#)
- [“Using 64-bit memory to handle spill files” on page 117](#)
- [“Managing 64-bit addressing with MEMLIMIT” on page 118](#)
- [“Managing 64-bit addressing with cache manager” on page 119](#)
- [“Precedence rules for 64-bit memory allocation” on page 120](#)
- [“64-bit addressing examples” on page 121](#)

Storage use above the bar in z/Architecture

The 64-bit address space includes a virtual line at the 16-megabyte address. Additionally, it includes a second virtual line called the bar that marks the 2-gigabyte address. The bar separates storage below the 2-gigabyte address, called **below the bar**, from storage above the 2-gigabyte address, called **above the bar**.

The area above the bar is intended for data; no programs run in the area above the bar. There is no area above the bar that is common to all address spaces, and no system control blocks exist above the bar.

You can set a limit on how much virtual storage above the bar each address space can use. This limit is called the MEMLIMIT.

If you want to use virtual storage above the bar, you need to set the MEMLIMIT explicitly in one of three ways:

- You can set an installation default MEMLIMIT through System Management Facility (SMF).
- You can set a MEMLIMIT for a specific address space in the job control language (JCL) that creates the address space.

For example, the following job card will limit above the bar memory usage to 32GB:

```
//HPCACCUM JOB '&SYSUID',MSGCLASS=H,MSGLEVEL=(1,1),CLASS=A,  
// TIME=1440,NOTIFY=&SYSUID,MEMLIMIT=32G
```

The MEMLIMIT value specified in SMFPRMxx will be used for jobs not establishing a MEMLIMIT in their JCL.

- You can set a MEMLIMIT by using SMF exit IEFUSI.

When the IEFUSI exit receives control, it can change the MEMLIMIT value set by SMF or JCL.

For good background information on 64-bit addressability, refer to the "z/OS concepts" section of the z/OS basic skills information center.

Using 64-bit memory to handle spill files

The purpose of spill files is to buffer log records when there is a requirement to maintain the serialization of log records and when those records cannot be immediately processed.

Fast Path spill files buffer the log input records when parallel log readers are assigned.

Spill files can also be created for CAGRP sort tasks. In single address space mode, each sort task creates a unique spill file. For multiple address space mode, spill files will be used when the number of CAGRP sorts to be processed exceeds the parallel sort count.

Prior to this release of IMS HP Change Accumulation Utility, spill files were always written to DASD or tape. In this release, IMS HP Change Accumulation Utility can take advantage of 64-bit addressing to store and retrieve spill file data in memory, thereby reducing the I/O activity to external storage devices.

Using 64-bit memory can reduce execute channel program (EXCP) count to improve performance. If the 64-bit memory is set large enough, all the spill records will go to 64-bit memory. If the 64-bit memory for the address space becomes full, the remaining spill records will be written to spill files on DASD or tape. As spill records are retrieved and processed, storage will be released to be reused for subsequent spill files.

Two mutually exclusive application methods are available for accessing spill records in 64-bit memory above the bar:

- The IMS HP Change Accumulation Utility MEMLIMIT command specifies the amount of storage above the bar that IMS HP Change Accumulation Utility is allowed to access.

The IMS HP Change Accumulation Utility MEMLIMIT command is an option when IMS HP Change Accumulation Utility runs in either multiple address space mode or single address space mode.

- The IMS HP Change Accumulation Utility cache manager utilizes an external file (HPCCACHE DD) and control statements to define the 64-bit limits.

The cache manager is the preferred method only when IMS HP Change Accumulation Utility runs in single address space mode.

Each method defines an application limit to the amount of storage that can be used above the bar. Both methods are equally restricted such that the application-defined limit is always subject to the system-applied limits.

In addition to IMS HP Change Accumulation Utility, the DFSORT task(s) can also specify the use of storage above the bar for sort work space. The 64-bit storage defined by IMS HP Change Accumulation Utility does not have to encompass all of the available storage. For example, the JOB statement parameter MEMLIMIT=10G will make 10 gigabytes above the bar available to the address space. If the cache manager specifies SPACE=2G, then 8 GB of storage above the bar will be available to DFSORT.

Managing 64-bit addressing with MEMLIMIT

The IMS HP Change Accumulation Utility MEMLIMIT command specifies the upper limit of storage above the bar that will be used by IMS HP Change Accumulation Utility for spill file data in memory. IMS HP Change Accumulation Utility commands are read from the HPCSYSIN DD.

The following conditions apply when using the IMS HP Change Accumulation Utility MEMLIMIT command:

- The limit value is always given in units of 1 megabyte (1024MB = 1GB).
- The limit can be less than the system MEMLIMIT value to reserve memory above the bar.
- The IMS HP Change Accumulation Utility MEMLIMIT command is supported in both multiple address space mode and single address space mode.
- In single address space mode, the IMS HP Change Accumulation Utility cache manager overrides the IMS HP Change Accumulation Utility MEMLIMIT command.

For example, the MEMLIMIT value set in the following HPCSYSIN DD limits IMS HP Change Accumulation Utility use of above the bar memory to 4GB:

```
//HPCSYSIN DD *
   ID                = CA14                00470013
   List              00480013
   Unit              00490013
   MAXIMUM LOGS     = 3390                 00500013
   PARALLEL LOGS    = 118                  00510013
   PARALLEL LOGS    = 5                    00520020
   PARALLEL SORTS   = 7                    00530013
   Procedure Name   = HPCSTASK             00540020
```

Spill BLKSIZE	= 26624	00550013
Select Logs	= PRILOG	00560013
MEMLIMIT	= 4096	00570020

Managing 64-bit addressing with cache manager

The IMS HP Change Accumulation Utility cache manager specifies the upper limit of storage above the bar that will be used by IMS HP Change Accumulation Utility for spill file data in memory.

IMS HP Change Accumulation Utility obtains cache manager control statements from the HPCCACHE DD statement. This optional cache is created by the IMS HP Change Accumulation Utility job during initialization and is dedicated to this job while IMS HP Change Accumulation Utility is running. The HPCCACHE DD statement must be provided in the JCL and the associated cache manager control statements must be correct. The cache is freed when the job terminates.

The following conditions govern the use of the IMS HP Change Accumulation Utility cache manager:

- The cache manager is only available when the HPCCACHE DD is present in single address space mode.
- IMS HP Change Accumulation Utility initialization checks for the HPCCACHE DD statement and will attempt to initialize the cache manager if the statement is present.

If successful, the IMS HP Change Accumulation Utility cache manager is in use and is dedicated to IMS HP Change Accumulation Utility.

If the HPCCACHE DD statement is not present, no cache will be used.

- The cache manager use 64-bit addressing.
- The maximum size of the 64-bit above the bar memory that the cache is allowed to use is defined by the SPACE control in the HPCCACHE DD statement.

IMS HP Change Accumulation Utility cache manager will not go beyond the limit set for above the bar memory allocations.

- If the IMS HP Change Accumulation Utility cache manager is not initialized, then the IMS HP Change Accumulation Utility MEMLIMIT command will control the memory above the bar.

Space above the bar is allocated by the IMS HP Change Accumulation Utility cache manager in 64MB increments as needed for the run. For example, when cache is used with a maximum setting of SPACE=2GB, and spill record processing needs only 1GB during this run, the total cache memory use above the bar will be 1GB for the run.

For example, the value set in the following HPCCACHE DD limits IMS HP Change Accumulation Utility use of above the bar memory to 4GB:

```
HPCCACHE DD *  
CACHE LEVEL=1,TYPE=64BIT,SPACE=4GB
```

HPCCACHE DD control statements

The IMS HP Change Accumulation Utility cache manager control statements are read from HPCCACHE DD, which must be a sequential data set or PDS member with DCB options RECFM FB or VB and LRECL <=255.

HPCCACHE DD control statements must adhere to the following conditions:

- All keywords are required.
- A "*" in first column makes the statement a comment.
- CACHE LEVEL=*level*

level is a numeric value (1-*n*).

For this release of IMS HP Change Accumulation Utility, *level* is restricted to 1.

For example:

```
LEVEL=1
```

- CACHE TYPE=*type*

type is the name of a storage class.

For this release of IMS HP Change Accumulation Utility, *type* is restricted to 64BIT.

For example:

```
TYPE=64BIT
```

- CACHE SPACE=*n*MB|GB

The SPACE *n* is the maximum above the bar memory allocated for use by IMS HP Change Accumulation Utility.

For this release of IMS HP Change Accumulation Utility, *n* is restricted to *n*MB (megabytes) or *n*GB (gigabytes).

The cache manager cannot go beyond that limit in above the bar allocations.

For example, the following setting limits the cache manager to use up to 512MB of above the bar memory.

```
SPACE=512MB
```

The cache manager only uses memory when it needs it. IMS HP Change Accumulation Utility can use less memory than specified, but not more.

The memory size is rounded up to the 64MB boundary (the unit of allocation for the IMS HP Change Accumulation Utility cache manager).

- Control statements must *not* be sequenced numbered.

For example, a control statement specified as:

```
HPCCACHE DD *  
CACHE LEVEL=1,TYPE=64BIT,SPACE=2GB                00412020
```

receives the following error message:

```
BPE0003E AN ERROR OCCURRED PARSING CACHE CONTROL STATEMENT  
BPE0003E AT CHARACTER 73  
BPE0003E FAILING TEXT: "00412020          "  
BPE0003E UNKNOWN POSITIONAL PARAMETER
```

Precedence rules for 64-bit memory allocation

Precedence rules govern the two IMS HP Change Accumulation Utility methods for using 64-bit memory.

- In single address space mode, the presence of HPCCACHE DD will take priority and 64-bit memory will be managed by the cache manager.
- IMS HP Change Accumulation Utility cache manager will indicate an out-of-memory condition to IMS HP Change Accumulation Utility when the lower of the two limits (HPCCACHE DD or MEMLIMIT in JCL) is reached.
- The MEMLIMIT control in the z/OS JCL job card statement always takes precedence over any above the bar address space limit defined for IMS HP Change Accumulation Utility.
- If no MEMLIMIT is set at the system level (by whatever means), the system default is 0, meaning that this address space cannot use virtual storage above the bar.

64-bit addressing examples

Examples in this topic illustrate the different methods for allocating 64-bit memory in the IMS HP Change Accumulation Utility environment. Comment lines in each example explain the details of the methods.

Example 1: Using IMS HP Change Accumulation Utility MEMLIMIT in multiple address space mode

In this example, SMF MEMLIMIT=2G (specified in JCL) and HPCSYSIN MEMLIMIT = 2048 is specified for multiple address space.

```
//HPCACCUM JOB '&SYSUID',MSGCLASS=H,MSGLEVEL=(1,1),CLASS=A,
// TIME=1440,NOTIFY=&SYSUID,MEMLIMIT=2G
...
//HPCSYSIN DD *
ID = CA14
List
Unit = 3390
PARALLEL LOGS = 5
PARALLEL SORTS = 7
Select Logs = PRILOG
MEMLIMIT = 2048
...
* SMF MEMLIMIT makes a maximum of 2GB available to this address space.
* HPCA MEMLIMIT=2048 limits IMS HPCA use above the bar to 2GB.
* 2GB are reserved for use by other tasks only if IMS HPCA does not use
  any 64-bit memory. For example, if IMS HPCA used 1024MB, then other
  tasks in the address space would be allowed up to 1024MB
  (for a total of SMF MEMLIMIT=2G).
/*
```

In the HPC9997I informational message (HPCPRINT), the 64-bit value reveals a high-water mark of 2048MB for the address space. Because HPCSYSIN MEMLIMIT is specified, the 64-IMS HP Change Accumulation Utility value is output to represent the memory allocation internally managed by IMS HP Change Accumulation Utility.

HPC9997I	Storage:	Used	Limit
HPC9997I	24_bit:	176K	8168K
HPC9997I	31_bit:	67576K	1004544K
HPC9997I	64-bit:	2048M	0M
HPC9997I	64-HPCA	2048M	2048M

Example 2: Using IMS HP Change Accumulation Utility cache manager in single address space mode

In this example, SMF MEMLIMIT=1G (specified in JCL), the IMS HP Change Accumulation Utility cache manager (HPCCACHE) is configured for 8GB, and single address space mode (HPCSTASK) is specified.

```
//HPCACCUM JOB '&SYSUID',MSGCLASS=H,MSGLEVEL=(1,1),CLASS=A,
// TIME=1440,NOTIFY=&SYSUID,MEMLIMIT=1G
...
//HPCCACHE DD *
  CACHE LEVEL=1,TYPE=64BIT,SPACE=8GB
//HPCSYSIN DD *
ID = CA14
List
Unit = 3390
PARALLEL LOGS = 5
PARALLEL SORTS = 7
PROCEDURE NAME = HPCSTASK
...
* SMF MEMLIMIT makes a maximum of 1GB available to this address space.
* SPACE=8GB attempts to set the limit above this 1GB limit; however,
  only a maximum of 1GB is allowed by the SMF MEMLIMIT specification.
* 0GB are reserved for use by other tasks if IMS HPCA used 1024MB.
  If IMS HPCA used 512MB, then other tasks in the address space would
  be allowed up to 512MB (for a total of SMF MEMLIMIT=1G).
/*
```

In the HPC9997I informational message (HPCPRINT), the 64-bit value reveals a high-water mark of 1024MB for the address space. The 64-IMS HP Change Accumulation Utility value is not output when the IMS HP Change Accumulation Utility cache manager is used for managing 64-bit memory.

HPC9997I	Storage:	Used	Limit
HPC9997I	24_bit:	4748K	8168K
HPC9997I	31_bit:	71844K	1004544K
HPC9997I	64-bit:	1024M	0M

Example 3: Using IMS HP Change Accumulation Utility cache manager or IMS HP Change Accumulation Utility MEMLIMIT command

In this example, SMF MEMLIMIT=6G (specified in JCL), the IMS HP Change Accumulation Utility cache manager (HPCCACHE) is configured for 4GB, and single address space mode (HPCSTASK) is specified.

```
//HPCACCU JOB '&SYSUID',MSGCLASS=H,MSGLEVEL=(1,1),CLASS=A,
// TIME=1440,NOTIFY=&SYSUID,MEMLIMIT=6G
...
//HPCCACHE DD *
CACHE LEVEL=1,TYPE=64BIT,SPACE=4GB
//HPCSYSIN DD *
ID = CA14
List
Unit = 3390
PARALLEL LOGS = 5
PARALLEL SORTS = 7
MEMLIMIT=4096
PROCEDURE NAME = HPCSTASK
...
* SMF MEMLIMIT makes a maximum of 6GB available to this address space.
* SPACE=4GB sets the cache manager to 4GB.
* HPCA MEMLIMIT=4096 limits IMS HPCA use above the bar to 4GB (but this
method will not be used because HPCCACHE is specified and therefore
takes precedence).
* 2GB is reserved for other tasks in this address space. SMF MEMLIMIT =6G
and IMS HPCA MEMLIMIT=4G, so a minimum of 2GB is reserved for other tasks
in this address space. If IMS HPCA used only 1GB, then other tasks in
the address space can use up to 5GB.
* HPCSTASK is single address space (SAS); cache manager is the only IMS HPCA
method for managing 64-bit memory allocations in single address space.
* If the procedure name is not HPCSTASK, then cache manager is bypassed.
/*
```

In the HPC9997I informational message (HPCPRINT), the 64-bit value reveals a high-water mark of 4096MB for the address space. This example is trying to show that although the SMF MEMLIMIT is 6G (6144MB), the HPCCACHE limit restricts the usage to 4GB (4096MB).

HPC9997I	Storage:	Used	Limit
HPC9997I	24_bit:	4748K	8168K
HPC9997I	31_bit:	71844K	1004544K
HPC9997I	64-bit:	4096M	0M

Example 4: Using IMS HP Change Accumulation Utility MEMLIMIT in single address space mode

In this example, SMF MEMLIMIT=3G (specified in JCL) and HPCSYSIN MEMLIMIT = 2048 is specified for single address space.

```
//HPCACCU JOB '&SYSUID',MSGCLASS=H,MSGLEVEL=(1,1),CLASS=A,
// TIME=1440,NOTIFY=&SYSUID,MEMLIMIT=3G
...
//HPCSYSIN DD *
ID = CA14
List
Unit = 3390
PARALLEL LOGS = 5
PARALLEL SORTS = 7
Select Logs = PRILOG
MEMLIMIT = 2048
PROCEDURE NAME = HPCSTASK
...
* SMF MEMLIMIT makes a maximum of 3GB available to this address space
* IMS HPCA MEMLIMIT=2048 limits IMS HPCA use above the bar to 2GB
```

```
* 1GB is reserved for use by other tasks. If IMS HPCA used only 1GB, then
  other tasks in the address space would be allowed up to 2GB (for a
  total of SMF MEMLIMIT=3G).
/*
```

In the HPC9997I informational message (HPCPRINT), the 64-bit value reveals a high-water mark of 2349MB for the address space. This example shows that although there are differences in high-water marks for 64-bit and 64-HPCA, the values indicated are accurate.

HPC9997I	Storage:	Used	Limit
HPC9997I	24_bit:	4716K	8168K
HPC9997I	31_bit:	71868K	1004544K
HPC9997I	64-bit:	2349M	0M
HPC9997I	64-HPCA	2048M	2048M

In this scenario, 64-bit differs from 64-HPCA because IMS HP Change Accumulation Utility used 2048MB but other tasks in the address space used 301MB for a total of 2349MB. IMS HP Change Accumulation Utility MEMLIMIT will track 64-IMS HP Change Accumulation Utility usage and will limit allocations accordingly.

In this example, IMS HP Change Accumulation Utility is allowed 2048MB and the address space is entitled up to 3072MB (for example, 3GB). The additional 301MB can be attributed to other tasks in the address space.

In single address space, all tasks that use 64-bit memory allocations will be reflected in the 64-bit output line.

Chapter 12. Performance and resource utilization

The way you use system and product resources has an impact on the speed and efficiency of various IMS HP Change Accumulation Utility processes.

Topics:

- [“Diagnostic facilities” on page 125](#)
- [“Tape files” on page 125](#)
- [“Spill files” on page 126](#)
- [“Temporary files” on page 129](#)

Diagnostic facilities

Unrestricted use of the diagnostic facilities (HPCADIAG and HPCTRACE) can significantly increase resource use and degrade performance.

These functions require additional memory and external storage, such as DASD JES queue.

Diagnostic tools are designed to gather information for problem resolution.

Normal production runs achieve better performance if diagnostics are off.

Tape files

Restrictions might be necessary when input log files and IMS/CA master files are recorded to tape files.

The number of physical drives might not be enough to support the multiple instances of IMS/CA processing in multiple address spaces. Even if there are sufficient physical drives, site limitations might restrict the number of drives that can be assigned to IMS HP Change Accumulation Utility JOBS.

The total number of required drives includes logs and CA master files allocated to each active dependent address space and the number of logs allocated to log readers in the IMS HP Change Accumulation Utility control address space.

IMS HP Change Accumulation Utility implements the PARALLEL LOGS command and PARALLEL SORTS command to control the required number of drives.

This section contains the following additional topics:

- [“Tape log files” on page 125](#)
- [“Tape IMS/CA master files” on page 126](#)

Tape log files

You can allocate log files to multiple address spaces, but you cannot allocate them simultaneously.

For dependent SORT address spaces, you should modify the DBRC skeletal JCL to use the DEFER parameter.

Using the DEFER parameter limits the number of drives required for starting each dependent address space. Because only one address space at a time obtains a tape volume, a single drive satisfies all dependent address spaces.

The PARALLEL LOGS command limits the number of reader tasks to be started in the IMS HP Change Accumulation Utility control address space.

For each parallel reader, there must be a physical drive available to mount each log.

Tape IMS/CA master files

Each dependent SORT address space requires an output master and optional input master.

The total number of drives required is 1 (or 2) times the number of parallel sorts requested.

This number of drives is in addition to the log readers processed by the IMS HP Change Accumulation Utility control address space.

Spill files

Spill files buffer log records when there is a requirement to maintain the serialization of log records and records cannot be immediately processed.

Input logs contain many record types that are not relevant to change accumulation, such as checkpoint records and DB status records. Because these record types are not carried on the spill files, the definition for "log unit of measure" does not include them.

A log data set, particularly tape logs, can reside on multiple volumes. Estimating the percentage of update records for the logs requires site specific knowledge of the database and transaction types that are typically being processed.

When converting estimates of spill file size to actual space values, the spill file BLKSIZE must also be considered. The default block size of 32760 might not be optimal for some DASD devices. Using a smaller but more track efficient size can affect the number of tracks required for spill files.

Examples in the following topics illustrate required work file sizes using input log data sets as the unit of measure:

- [“CA spill files” on page 126](#)
- [“Fast Path spill files” on page 128](#)

CA spill files

CA spill files buffer the log input records when there are more CA groups to process than there are parallel address spaces that can be started.

The number of spill files generally is the total number of CA groups to be processed minus the number of parallel sorts assigned. Sort address spaces start when the first processed log is opened and end with the closing of the final input log.

If the distribution of log input data sets is not common to all the groups being processed, the number of spill files might be reduced. This happens when two or more groups process disconnected sets of logs. Because these groups do not share log inputs, they are not scheduled for processing in parallel, thus making the spill files unnecessary.

Examples:

- [“Example 1: 4 CA groups” on page 126](#)
- [“Example 2: 2 CA groups” on page 127](#)
- [“Example 3: 5 total CA groups, 4 selected for processing” on page 127](#)
- [“Example 4: 5 total CA groups, 4 selected for processing” on page 127](#)

Example 1: 4 CA groups

CA spill file example 1.

- 10 input logs
- 4 CA groups
- 3 parallel sort address spaces

Assume the log distribution is common to all groups. Each group processes logs 1 through 10. When log 1 is opened, all 4 CA groups must be started. Groups 1, 2, and 3 are started as address spaces and receive

the log input directly using cross-memory data transfer. Because group 4 cannot use cross-memory, it will be directed to a spill file.

The DBRC VOLNUM parameter also affects the scheduling of address spaces and use of spill files. When a CA group requires more log files than the VOLNUM limit, DBRC creates multiple CA utility processing steps. These steps cannot be run in parallel because, after the first step, the input to each step is the output of the preceding step.

Example 2: 2 CA groups

CA spill file example 2.

- 10 input logs
- 2 CA groups
- 3 parallel sort address spaces
- VOLNUM=5

Assume the log distribution is common to all groups. Each group processes logs 1 through 10. The VOLNUM parameter causes four processing steps to be created and, therefore, four address spaces to be started. However, steps 1 and 2 cannot be run in parallel, nor can steps 3 and 4. When log 1 is opened, only step 1 (group 1) and step 3 (group 2) are started. The third possible address is not used.

The next step depends on the size of the CA groups and processing speed of the processors. When log 5 is closed, the 2 active steps (1 and 3) enter the sort completion and ending phase of processing.

This is overlapped with the opening of log 6. Log 6 schedules the start of the remaining steps (2 and 4). If step 1 ends before the opening of log 6 completes, then step 3 (group 1) is eligible for scheduling directly and uses cross-memory transfer. The same rule applies to steps 2 and 4 (group 2). However, the volume of data for either step 1 or step 2 might cause the sort completion and ending to take longer than the time required to complete the opening of log 6. The input log reader is not delayed by waiting for completion, therefore spill files are assigned.

The size of a spill file depends on the number of logs, databases, and distribution of log records. As in estimating sort work space, the ultimate factor is the number and size of records to be processed. A spill file must be large enough to hold all log records for a complete CA group. Records from each log are selected to include only those records for DBs and DEDBs that are included in the CA group.

Example 3: 5 total CA groups, 4 selected for processing

CA spill file example 3.

- 10 input logs
- 5 total CA groups
- 4 CA groups selected for processing
- 2 parallel sort address spaces

Assuming that log records are evenly distributed across all groups, then each group represents 20% memory, and the remaining 2 groups use spill files.

Each spill file contains approximately the volume of 2 input logs (.2 * 10). Therefore, the total spill file requirement would be twice that value.

Example 4: 5 total CA groups, 4 selected for processing

CA spill file example 4.

- 10 input logs
- 5 total CA groups
- 4 CA groups selected for processing
- 2 parallel sort address spaces

Assume that log records are not evenly distributed across all groups and that the fifth (unprocessed) group is the group with the high volume of databases that represent approximately 70% of total transactions.

Therefore, the 4 groups to be processed represent approximately 30% of the total. If these are evenly distributed within the 4 groups, each represents 7.5% of the total volume (.30 / 4).

Each spill file is approximately 75% of the volume of one log. Therefore, the total spill file requirement would be twice that value.

Fast Path spill files

Fast Path spill files buffer the log input records when parallel log readers are assigned and Fast Path input is processed.

You can avoid Fast Path spill files by setting the number of parallel log readers to 1 or by using the **FP.NOSPILL** command.

The maximum number of spill files is the total number of log files minus 1. Fast Path spill files are processed and released in sequence as the log files are read. Thus, the number of spill files that exist at any time is different from the total number of spill files.

Because each log starts and stops independently, you cannot be certain when each Fast Path spill file will be released. The working set of spill files can range from 0 to number of logs minus 1, but is generally the number of parallel log readers when parallel logs is greater than 1.

The size of a spill file depends on the size of the largest input log, the DEDBs to be processed, and the distribution of log records. Each spill file is created from a single input log.

The spill file must be large enough to hold all Fast Path log records for all DEDBs to be processed. A Fast Path spill file is, generally, not larger than the largest log and is frequently much smaller.

However, because IMS HP Change Accumulation Utility keeps additional information about each log record, if every record of a log file is a Fast Path record for a DEDB to be processed, then the spill file might be slightly larger than the input log file.

Examples:

- [“Example 1: 20 total DEDBs, 10 selected for processing” on page 128](#)
- [“Example 2: 20 total DEDBs, 10 selected for processing” on page 128](#)

Example 1: 20 total DEDBs, 10 selected for processing

Fast Path spill file example 1.

- 10 input logs
- 20 total DEDBs
- 10 DEDBs selected for processing (number of groups is not a consideration)
- 4 parallel log readers

Assume that log records are evenly distributed across all DEDBs, then 50% of each log will be processed (10 of 20 DEDBs).

Each spill file is approximately 50% of the volume of one input log.

The maximum number of spill files is 9 (10-1 logs).

Therefore, the average working set size is 4 spill files, and the working set volume is 2 times the volume of 1 log (4 x .50).

Example 2: 20 total DEDBs, 10 selected for processing

Fast Path spill file example 2.

- 10 input logs

- 20 total DEDBs
- 10 DEDBs selected for processing (number of groups is not a consideration)
- 4 parallel log readers

Assume that log records are not evenly distributed across all DEDBs. Let the unprocessed DEDBs be the groups with the high volume databases that represent approximately 70% of total transactions.

The 10 DEDBs to be processed are then 30% of the total.

Therefore, each spill file is approximately 30% of the volume of 1 input log.

The maximum number of spill files is 9 (10-1 logs).

The average working set size is 4 spill files.

The working set volume is 120% of the volume of 1 log (4 x .30).

Temporary files

IMS HP Change Accumulation Utility dynamically allocates many temporary files that are necessary for processing JCL and control information.

These files each have default values that control allocation. The defaults are appropriate for most typical environments.

Occasionally, very large files are required (for example, RECON data sets and skeletal JCL). If the space or other allocation default parameters are not adequate for processing, then each temporary file can be pre-allocated by the user.

For batch executions, DD statements can be defined in the JCL.

For ISPF, the user can preallocate files using TSO ALLOC either directly or with the command file CLIST,REXX.

Subtopics:

- [“Temporary files used in HPCA/ISPF HPCAE000” on page 129](#)
- [“Temporary files used in HPCA/ISPF HPCAMAIN” on page 130](#)
- [“Temporary files used in batch HPCA/ISPF HPCABAT0” on page 132](#)
- [“Temporary files used in subordinate address spaces, HPCADRI1” on page 132](#)

Temporary files used in HPCA/ISPF HPCAE000

The table in this topic identifies the temporary files used in HPCA/ISPF HPCAE000.

<i>Table 12. Temporary files used in HPCA/ISPF HPCAE000</i>		
ddname	Used for	Defaults
SYSIN	DBRC inputs (GENJCL,LISTDB)	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 BLKSIZE=6160 SPACE=(TRK,(2,2))
SYSPRINT	DBRC output listings	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=133 BLKSIZE=2660 SPACE=(CYL,(10,10))

Table 12. Temporary files used in HPCA/ISPF HPCA000 (continued)

ddname	Used for	Defaults
JCLOUT	DBRC output JCL	UNIT= <i>name</i> RECFM=FBA LRECL=133 BLKSIZE=2660 SPACE=(CYL,(2,2))
HPCASCAN	IMS HP Change Accumulation Utility SCAN command output	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=133 BLKSIZE=2660 SPACE=(CYL,(1,10))
HPCATABL	ISPF table members	UNIT=SYSDA RECFM=FBL RECL=80 BLKSIZE=6160 SPACE=(TRK,(2,2,10))
HPCACTL	IMS HP Change Accumulation Utility control file members	UNIT=SYSDA RECFM=V LRECL=1024 BLKSIZE=1028 SPACE=(TRK,(20,20,5))
HPCALOGIN	DBRC input (LIST.LOG) for secondary logs	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 SPACE=(TRK,(1))
HPCLOGOU	DBRC output listing for secondary logs	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=133 SPACE=(CYL,(50,50))

¹Name is the value assigned to the IMS HP Change Accumulation Utility command UNIT=*name*.

If no value is assigned, SYSDA is used.

Temporary files used in HPCA/ISPF HPCAMAIN

The table in this topic identifies the temporary files used in HPCA/ISPF HPCAMAIN.

Table 13. Temporary files used in HPCA/ISPF HPCAMAIN

ddname	Used for	Defaults
SYSIN	DBRC inputs (GENJCL,LISTDB)	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 BLKSIZE=80 SPACE=(TRK,(2,2))

Table 13. Temporary files used in HPCA/ISPF HPCAMAIN (continued)

ddname	Used for	Defaults
SYSPRINT	DBRC output listings	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=133 BLKSIZE=133 SPACE=(TRK,(20,20))
JCLOUT	DBRC output JCL	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=80 BLKSIZE=80 SPACE=(TRK,(2,2))
HPCACTL	IMS HP Change Accumulation Utility control file members	UNIT= <i>name</i> ¹ RECFM=V LRECL=1024 BLKSIZE=1028 SPACE=(TRK,(10,10,5))
HPCAPROC	IMS HP Change Accumulation Utility procedure lib members	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 SPACE=(TRK,(10,10,5))
HPCLOGIN	DBRC input (LIST.LOG) for secondary logs	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 SPACE=(TRK,(1))
HPCLOGOU	DBRC output listing for secondary logs	UNIT= <i>name</i> ¹ RECFM=FBA LRECL=133 SPACE=(CYL,(50,50))
GENJCLIN	DBRC input reformatted	UNIT= <i>name</i> ¹ RECFM=FB LRECL=80 SPACE=(TRKL,(10,10))

¹Name is the value assigned to the IMS HP Change Accumulation Utility command UNIT=*name*.

If no value is assigned, SYSDA is used.

Temporary files used in batch HPCA/ISPF HPCABAT0

The table in this topic identifies the temporary files used in HPCA/ISPF HPCABAT0.

Table 14. Temporary files used in batch HPCA/ISPF HPCABAT0

ddname	Used for	Defaults
SYSIN	DBRC inputs (GENJCL,LISTDB)	UNIT=SYSDA RECFM=FB LRECL=80 BLKSIZE=80 SPACE=(TRK,(2,2))
SYSPRINT	DBRC output listings	UNIT=SYSDA RECFM=FBA LRECL=133 BLKSIZE=133 SPACE=(TRK,(20,20))
JCLOUT	DBRC output JCL	UNIT=SYSDA RECFM=FBA LRECL=80 BLKSIZE=808 SPACE=(TRK,(2,2))

Temporary files used in subordinate address spaces, HPCADRI1

The table in this topic identifies the temporary files used in subordinate address spaces, HPCADRI1.

Table 15. Temporary files used in subordinate address spaces, HPCADRI1

ddname	Used for	Defaults
DFSPARM	SORT control statements	UNIT= <i>name</i> ² RECFM=FB LRECL=80 BLKSIZE=400 SPACE=(TRK,(1,10))
HPCPITIN	DBRC inputs	UNIT= <i>name</i> ² LIST.CAGRP RECFM=FB LRECL=80 SPACE=(TRK,(1,1))
HPCPITOU	DBRC output	UNIT= <i>name</i> ² RECFM=FBA LRECL=133 SPACE=(CYL,(10,10))

¹These DD definitions can be generated from the DBRC GENJCL.CA skeleton member or defined in the standard proc or standard JOB member of proclib/joblib..

²Name is the value assigned by the IMS HP Change Accumulation Utility command UNIT=*name*. If no value is assigned, SYSDA is used.

Chapter 13. Supplementary usage topics

The topics in this section address supplementary usage topics that can affect the operation of IMS HP Change Accumulation Utility.

Topics:

- [“Reprocessing change accumulation groups” on page 133](#)
- [“Point-in-time change accumulation and database recovery” on page 136](#)
- [“Using secondary logs” on page 141](#)
- [“Limiting input logs” on page 141](#)
- [“Failure to start SORT subordinate address spaces” on page 143](#)
- [“Diagnosing ISPF errors” on page 144](#)

Reprocessing change accumulation groups

After a validation error, the IMS HP Change Accumulation Utility process stops. You can automatically reprocess change accumulation groups after a validation error by using the GEN.RETRY extended batch control statement.

This control statement also preserves the integrity of the recovery environment that is maintained by DBRC and works within the boundaries of the IMS HP Change Accumulation Utility architecture.

Topics:

- [“Understanding the validation error” on page 133](#)
- [“GEN.RETRY extended batch control statement” on page 134](#)
- [“GEN.RETRY process flow” on page 135](#)

Understanding the validation error

If DBRC cannot validate the purge time or the input logs that are specified in the JCL, which is created during the IMS HP Change Accumulation Utility setup phase, an IMS error condition occurs.

If an IMS error condition occurs (DSP0711I, DSP0712I, or DSP0715E), the specified change accumulation process is not performed and must be resubmitted.

During IMS HP Change Accumulation Utility setup, the GENJCL.CA command creates the correct JCL, which includes all of the unprocessed log data sets that are registered in the RECON.

More specifically, DBRC analyzes information in the RECON to determine which changes need to be accumulated and reverts back to an earlier point to determine an effective purge time. The purge time is effective after analyzing the contents of the RECON at that specific point in time.

However, after you run the GENJCL command, the environment continues to be set up to support parallel processing of reading multiple input logs and scheduling multiple IMS/CA processes.

During the IMS HP Change Accumulation Utility operation phase, the JCL that is created during setup is used to schedule parallel processes that will each run a single copy of the DFSUCUM0 utility. The scheduled processes begin running when log input or spill file input is ready, and an address space or subtask is available for the scheduling of DFSUCUM0.

When DFSUCUM0 runs, it invokes DBRC to validate that the input JCL is correct according to the current information in the RECON data set. Because processing still continues after IMS HP Change Accumulation Utility setup, the JCL will not pass DBRC validation and returns an IMS DSP error message (DSP0711I, DSP0712I, or DSP0715E).

```
DSP0711I SPECIFIED PURGETIME IS NOT THE CURRENT IMAGE COPY TIME
```

```
DSP0712I NO INPUT TO PROCESS FOR CHANGE ACCUMULATION GROUP
```

```
DSP0715E SPECIFIED PURGETIME IS LATER THAN THE CURRENT PURGETIME  
FOR DBDNAME=dbdname DDNAME=ddname  
CURRENT PURGETIME = time stamp
```

Important: IMS HP Change Accumulation Utility normally returns the information and does not handle the error.

GEN.RETRY extended batch control statement

The IMS HP Change Accumulation Utility command GEN.RETRY is used to automatically reprocess change accumulation groups after a validation error that occurs when DBRC cannot validate the change accumulation purge time or input logs with a concurrent image copy.

The GEN.RETRY command is read from the HPCSYSIN DD and is validated only for the extended batch environment.

The GEN.RETRY command is enabled only when the GEN.GENJCL and GEN.GRPNAME commands are specified via HPCSYSIN. When the GEN.RETRY command is enabled, it allows IMS HP Change Accumulation Utility to reprocess the CAGRP when the IMS change accumulation utility (IMS/CA) returns the purge time validation error.

The following sections discuss other conditions that affect the use of the GEN.RETRY command:

VOLNUM parameter support

The VOLNUM parameter is not supported with the GEN.RETRY command because a series of job steps is created for each CAGRP.

The GEN.RETRY command requires each CAGRP to get a single JCL procedure.

Point-In-Time change accumulation support

Point-in-time change accumulation is not supported with the GEN.RETRY command because of unanticipated results.

The purpose of the GEN.RETRY command is to capture a new purge time and archived logs. However, outside processes such as image copy or reorganization might result in all log records being discarded. In this case, the change accumulation will result with `No input to process`.

Skeletal JCL modification

If your skeletal JCL member allocates a new change accumulation master using `DISP=(NEW,CATLG,DELETE)`, you might need to add a conditional step to the skeletal JCL to delete the data set when an error is encountered.

When the change accumulation is initially processed, the change accumulation master is created. If the purge time validation condition is experienced, the data set is never deleted. When the reprocessing of the change accumulation is performed, an error might be encountered because the change accumulation cannot be created.

For example:

```
//DSP07XX EXEC PGM=IEFBR14,COND=(8,LT,CA%STPN0)  
//DFSUCMN DD DISP=(OLD,DELETE,DELETE),DSN=(&HILEV.....)
```

IMS HP Change Accumulation Utility Reports

The IMS HP Change Accumulation Utility reporting interface remains intact. If the first change accumulation process is successful, then reporting occurs as normal.

If the first change accumulation process fails, a message is sent indicating that IMS HP Change Accumulation Utility will reprocess change accumulation. If reprocessing change accumulation is successful, the reporting will be produced as if everything was successful the first time.

Performance considerations

IMS HP Change Accumulation Utility might run for an extended period of time when reprocessing change accumulation for a group. IMS HP Change Accumulation Utility will reperform the GENJCL.CA, read new input logs, and schedule and run new IMS/CA tasks for each iteration of GEN.RETRY.

The recommendation is to specify GEN . RETRY=1 to enable some investigation for unsuccessful change accumulation after the first iteration of reprocessing.

GEN.RETRY process flow

The following process flow describes the IMS HP Change Accumulation Utility environment when using GEN.RETRY to automatically reprocess change accumulation that was stopped by the purge time or input log validation error

During IMS HP Change Accumulation Utility setup phase, the run environment is determined and JCL is created. IMS HP Change Accumulation Utility then reads all input logs in parallel. The scheduled processes normally begin running when log input or spill file input is ready and an address space or subtask is available for scheduling of DFSUCUM0.

However, the GEN.RETRY solution adds another process after IMS/CA processing. If the GEN.RETRY command is enabled in HPCSYSIN, IMS HP Change Accumulation Utility will analyze the completion of the IMS/CA task to detect the IMS DSP message (DSP0711I, DSP0712I, or DSP0715E) and reprocess the CAGRP.

For the following process flow description, IMS HP Change Accumulation Utility is started for 10 CA groups with 5 parallel sorts:

1. JCL is created and stored as result of IMS HP Change Accumulation Utility setup processing.
2. IMS HP Change Accumulation Utility generates a network of CAGRPs and required input logs, and begins reading input logs.
3. A subordinate address space is created (IMS/CA).
4. DBRC is invoked to validate the input.
Processing continues or fails with a non-zero return code and a corresponding message.
5. After IMS/CA processing, subsequent processing continues based on the following circumstances:
 - If GEN.RETRY is not specified, processing continues normally.
 - If GEN.RETRY is specified and no purge time or input log validation error condition occurs, processing continues normally.
 - If GEN.RETRY is specified and there is a purge time or input log validation error condition, the CAGRP is added to a list for reprocessing.
6. If a GEN.RETRY list is returned, IMS HP Change Accumulation Utility outputs a message that indicates that the CAGRPs are being reprocessed.
7. IMS HP Change Accumulation Utility reprocesses the GENJCL.CA command, rereads the input logs, and reschedules the IMS/CA task (essentially returning to step 1 of this process flow).
8. IMS HP Change Accumulation Utility repeats the process up to a possible three iterations (GEN . RETRY = 3).
9. IMS HP Change Accumulation Utility ends successfully with either a change accumulation recorded in the RECON, or ends unsuccessfully with errors returned during processing.

Point-in-time change accumulation and database recovery

Point-in-time change accumulation (PITCA) and database recovery restores a database to a specific date and time. A point-in-time change accumulation is useful for contingency planning and for disaster recovery planning.

When you use IMS Database Recovery Facility to restore a database to a point in time, only committed updates up to and including the point in time are selected from the change accumulation input. A point-in-time recovery is useful when a database is corrupted.

Topics:

- [“Point-in-time change accumulation overview” on page 136](#)
- [“Database transactions” on page 136](#)
- [“Enabling point-in-time change accumulation” on page 137](#)
- [“PITCA set up” on page 137](#)
- [“PITCA time stamps” on page 138](#)
- [“PITCA UTC time stamps” on page 138](#)
- [“PITCA time stamp adjustments for leap seconds” on page 139](#)
- [“PITCA file processing” on page 139](#)
- [“PITCA spill file allocation” on page 140](#)
- [“Change accumulation data sets for future use” on page 140](#)
- [“PITCA and time stamp recovery” on page 140](#)

Point-in-time change accumulation overview

Point-in-time change accumulation (PITCA) merges all available updates from different systems into a single file.

The PITCA file contains all completed transactions up to the specified point in time. For example, if two systems are sharing a database, logs for both systems must be archived for the specified point in time. The PITCA file will be within the time stamp range of the input logs.

Because PITCA files contain only complete transactions, the accumulation process cannot continue beyond the PITCA end time. When you use PITCA for recovery purposes, you must perform and record an image copy in the RECON to create a valid starting point for subsequent change accumulation processing.

Important: PITCA does additional checking to track the inflight and indoubt status of every input log record. This checking can cause a negative influence on performance.

Differences with standard change accumulation

The standard change accumulation process maintains a transitional view of a database that is represented in the IMS log data. The accumulation file that is generated by standard change accumulation processing includes records of completed transactions. The accumulation file also includes partially completed transactions and a subset of records of the complete update. These partially completed transactions and subsets of records are recorded in the change accumulation file as spill records.

Database transactions

A transaction for a database is a group of log records that share a common recovery token. Recovery tokens are tracked only for input logs.

A transaction group can have many update records and one or more commit records. If one or more records from the transaction group are not available, then the transaction is considered incomplete.

For example, an incomplete transaction either does not include a commit record or is missing a log record from the transaction group.

Incomplete non-Fast Path transactions are referred to as *inflight*. Incomplete Fast Path transactions are referred to as *indoubt*. Such transactions are fully resolved by the application of additional log files in subsequent change accumulation processing.

Enabling point-in-time change accumulation

You enable point-in-time change accumulation (PITCA) by using the LOG TIME command.

Procedure

To enable PITCA, set the LOG TIME command and specify the appropriate parameter.

- Set LOG TIME=YES to use the final time stamp of the final input log for the point in time.
- Set LOG TIME=time stamp to use the time stamp that you specify.

The time stamp value must be a time value later than the first archived input log and not later than the stop time of the last input log.

All sharing IMS systems must have at least one archived log.

Requirement: For a point-in-time change accumulation time stamp, you must select a time stamp that is within the range of the input logs. A time stamp that is earlier than the first input log causes all input records to be truncated. A time stamp that is later than the STOP time of the final log is the same as LOG TIME=YES.

Using the LOG TIME command in ISPF

The LOG TIME command does not have a panel entry field in ISPF. Therefore, before using the LOG TIME command, you need to create a HPCSYSIN file to include the LOG TIME parameter.

Procedure

1. Edit a sequential or PDS member file with the file type F(80).
2. Include the LOG TIME command in the file with the file type F(80).

Tip: You can also place other IMS HP Change Accumulation Utility commands into the same file or member and use the file or member for other IMS HP Change Accumulation Utility sessions. Enter the data set name for the HPCSYSIN file on the IMS HP Change Accumulation Utility Execution JCL DD control panel (Setup option 9).

PITCA set up

After enabling point-in-time change accumulation (PITCA), IMS HP Change Accumulation Utility PITCA might require additional set up to run properly in your environment.

IMS RESLIB requirement

The LOG TIME command requires IMS RESLIB. If you specify LOG TIME=time stamp, an IMS time management function is loaded. Therefore, the IMS RESLIB data set must be available in LINKLIST or in STEPLIB.

If you specify LOG TIME=time stamp and if the IMS RESLIB data set is not available, IMS HP Change Accumulation Utility processing will not process PITCA.

If IMS RESLIB is unavailable, use STEPLIB DD to make it available.

To make IMS RESLIB available, enter the data set name for the IMS HP Change Accumulation Utility Execution JCL DD control panel (Setup option 9) on one of the two lines in ISPF STEPLIB.

Remember: Configuring STEPLIB DD is not required for LOG TIME=YES.

HPCPITIN DD and HPCPITOU DD allocation

The system automatically sets the default allocations for HPCPITIN DD and HPCPITOU DD. These temporary DDs are allocated for each subordinate address space.

If you receive an error message against the data set for HPCPITIN or HPCPITOU, the default allocations are insufficient and must be reallocated.

HPCPITIN DD and HPCPITOU DD allocation is done in the skeleton JCL member.

This JCL member must be referenced in the GENJCL.CA command if you have performed the GENJCL.CA command independently.

If you want IMS HP Change Accumulation Utility to run the GENJCL.CA command, you must specify `GEN.GENJCL=MEMBER(skeletonjcl)`.

File naming convention with DFSUCUMN DD

DFSUCUMN DD controls the naming of PITCA output master files.

The output files need to be created with the suffix of HPCAP for IMS Database Recovery Facility to recognize those files.

The naming convention for the PITCA file is controlled in the skeleton JCL.

In the following example, the DFSUCUMN DD of the skeleton JCL that is used for PITCA has been modified to include a suffix of HPCAP for the new output data set.

```
//DFSUCUMN DD DSNAME=IMS.CUM1.HPCAP,DISP=(NEW,KEEP),  
//UNIT=TAPE,VOL=SER=CUMTAP
```

PITCA time stamps

All events are recorded in the RECON with a time stamp. The time stamp is used for command processing, database utility processing, and recovery processing that references the RECON.

The standard punctuated time stamp format is described in detail in *IMS System Administration*. The punctuated forms are supported but exclude labeled offset values.

The following examples show the formats that you can use.

- `YYYY.DDD HH:MM:SS.T`

```
2021.260 08:24:45.7
```

- `YY.DDD HH:MM:SS.T`

```
21.260 08:24:45.7
```

You can identify the log record time stamp to the microsecond for the IMS Record Format and Print Module (DFSERA30) or for any utility that enables log record analysis.

Important:

- Do not enclose the timestamp in quotes or any other special notation.
- PITCA filtering is based on the converted UTC time stamp and not the local time stamp.

PITCA UTC time stamps

Coordinate universal time (UTC) time stamps are used to synchronize time stamps for logs that come from multiple systems. IMS time stamps are converted to UTC time stamps that are used for filtering.

UTC time stamps are not the same as local time stamps. UTC time stamps are converted for both the `LOG TIME=input value` and for time stamps that are stored in log records.

PITCA processing converts a time stamp that is specified as LOG TIME= into a UTC time stamp and compares that UTC time stamp to the STCK time stamp in the log record suffix.

If the STCK time is less than or equal to the LOG TIME, the log record is included.

Time zone considerations

You must understand time zone differences when you create a change accumulation to a specified point in time because UTC time stamps might differ from your local timezone.

In the following example, the UTC time stamp for PST has an offset of 8 hours, and the time stamp is saved to the HPCPRINT report file for reference. The time stamps are precise to the microsecond.

```
HPCSYSIN:      Log Time      = 2021.260 17:47:50.8
HPCPRINT:      Log Time      21.260 17:47:50.8
                UTC Log Time  21.261/00:47:50.800000
```

PITCA time stamp adjustments for leap seconds

On some systems, the time stamp for which a log record is created might be different from the time stamp that is reported by the operating system. This difference occurs because the IMS and RECON time stamps are adjusted for leap seconds, but the STCK time stamp in the log records are not.

The IMS subsystem tracks events by writing a log record. When a log record is created, a time stamp from the system's hardware clock is stored in the log record.

However, the hardware clock does not include any leap second adjustments that might be present on the system.

If you set the SYSPLEX timer with leap seconds, the time stamps for any event that is recorded in the RECON data sets will be adjusted to include leap seconds.

As a result, if a listing from RECON data sets is used to derive the LOG TIME time stamp, the LOG TIME time stamp might have a time difference that is equal to the leap second value.

For example, if leap seconds are implemented, a DBRC listing will show a time stamp of 12:00:25. However, the LOG record time stamp will reflect a STCK time stamp of 12:00:00.

PITCA file processing

When the IMS/CA process initially creates the PITCA file, the file is recorded in the RECON as a standard CA file and is marked as invalid and as PITCA (that is, the ERR and PITCA flags are set).

A CA RECON record marked ERR normally has the Run Time and the Stop Time transposed, but this is not the case for a PITCA record created by IMS HPCA.

PITCA entries are ignored in subsequent recovery processes by DBRC.

The PITCA entry is listed in the RECON with an ERR indicator and will not be included in any database utility or recovery processing.

Restrictions:

- PITCA file processing is not compatible with the DBRC GENJCL VOLNUM() parameter.

If multiple JCL steps for a CA group are found, IMS HP Change Accumulation Utility cancels each step after the first step.

- You cannot keep a registered PITCA file if a subsequent non-PITCA file is registered for the same set of input logs.

In the same manner, if a PITCA file is registered after a normal CA with the same log inputs, only the final CA is retained.

PITCA spill file allocation

IMS HP Change Accumulation Utility allocates a temporary spill file to serve as a holding place for log records to facilitate PITCA processing. As input files are read, the log records are written to the temporary spill file.

In PITCA mode, IMS HP Change Accumulation Utility uses spill processing for each CA group.

The standard spill formats are 64-bit, Cache Manager, tape, and DASD files, which are the same formats that are used in non-PITCA processing.

The allocation values for the SORT spill values and Fast Path spill files must be sufficient. Insufficient allocation values will prevent change accumulation processing from completing (ending with allocation errors), and the IMS HP Change Accumulation Utility job will need to be resubmitted.

If the allocation values are insufficient, set the allocation values to contain all of the log records that are used for change accumulation. Additionally, make the allocations available for processing.

In the following example, every spill file that is allocated has a primary allocation count of 400 cylinders and a secondary allocation count of 100 cylinders, for a maximum of 9 devices.

CA.SPACE	=	CYLS	unit allocations
CA.PRIMARY	=	400	Allocation units
CA.SECONDARY	=	100	Allocation units
CA.UNIT COUNT	=	9	max devices to satisfy the spill file allocation
FP.SPACE	=	CYLS	unit allocation
FP.PRIMARY	=	400	allocation units
FP.SECONDARY	=	100	allocation units
FP.UNIT COUNT	=	9	max devices to satisfy the spile file allocation

Change accumulation data sets for future use

You must review and set the parameters for managing the change accumulation output data sets.

DBRC records the standard change accumulation in the RECON based on values of the INIT.CAGRP command. The rules for CA and PITCA also apply to REUSE and GRPMAX definitions.

Review the definition for using the CA data sets for future use so that stability is maintained in the recovery environment.

When you specify the REUSE parameter and the maximum number of change accumulation data sets has been reached, the PITCA replaces the change accumulation data set with the oldest change records.

When you specify the NOREUSE parameter, the record of the change accumulation event with the oldest change records is deleted from the RECON.

The physical data set remains intact, but DBRC does not consider the data set for future recovery processing.

PITCA and time stamp recovery

Time stamp recovery is the recovery of full-function databases, HALDB partitions, and DEDB areas to a specified time stamp or recovery time. IMS Recovery Solution Pack supports time stamp recovery to database allocation boundaries or to any prior point-in-time recovery.

In the point-in-time recovery process, only committed updates up to and including the specified recovery time are applied to a change accumulation data set. This process ensures that a change accumulation data set that contains uncommitted data is not used.

IMS Recovery Solution Pack recognizes only a change accumulation data set that contains a suffix of HPCAP for use in time stamp recovery with point-in-time recovery.

The change accumulation output that is created by IMS HP Change Accumulation Utility point-in-time change accumulation is recorded in the RECON with status INVALID (*ERR), which makes it unavailable to normal utility processes.

You request a PITCA recovery by specifying the PITCA parameter on the RCVTIME keyword.

For example:

```
RCVTIME('2021.105 10:57:21.8 -07:00', PITCA)
```

When you specify the PITCA parameter, the time stamp must be the run time of the PITCA that was created by the IMS HP Change Accumulation Utility utility. The time stamp is recorded in the RECON.

The CA must be marked in ERR status. The CA can either be complete or incomplete (the RECON listing shows COMPLETE CA= YES|NO). The CA data set name must have a suffix of HPCAP.

Only an image copy and the CA are used for the recovery, and no logs are used.

The recovery is recorded in the RECON by DBRC as a POINT-IN-TIME (PITR). The recover to time, which is the run time of the CA, is the time stamp in RCVTIME. Because the recovery is a point-in-time recovery, the Image Copy Needed flag is set to ON in the RECON after recovery. Therefore, an image copy is required.

See the *IMS Recovery Solution Pack: IMS Database Recovery Facility User's Guide* for more information about IMS Recovery Solution Pack time stamp recovery management.

Using secondary logs

The IMS dual logging feature records logs in duplicate. The copy of each primary log is called the secondary log.

This redundancy is important if a primary log becomes damaged or lost. Secondary logs are also useful for offsite backup and recovery.

DBRC maintains the register of primary and secondary logs, but does not normally generate secondary logs (GENJCL.CA) unless the primary logs are marked invalid. However, IMS HP Change Accumulation Utility can make adjustments to the JCL procedures to facilitate the use of secondary logs.

DBRC is required when the SELECT LOGS=*seclog* command is used. IMS HP Change Accumulation Utility performs the following steps:

1. Requests primary and secondary log definitions from DBRC.
2. Computes the set of primary-secondary log combinations.

Each is registered in the RECON with an IMS ID and a start time.

Each primary log must be paired with its corresponding secondary log which has the same IMS ID and start time.

If any primary log selected by GENJCL.CA is found to not have a secondary log, IMS HP Change Accumulation Utility identifies the log data set name and then stops processing.

3. Dynamically allocates the secondary logs to the log readers in the IMS HP Change Accumulation Utility control address space.
4. Dynamically allocates the primary logs in the sort address spaces.

This allocation is necessary because DBRC validates the DD DFSULOG allocation using the primary log data sets named in the RECONS.

When allocated and validated by DBRC, the DFSULOG DD is released.

The secondary logs read by IMS HP Change Accumulation Utility control address space are sent by cross-memory or through spill files to be accumulated in each sort address space.

Limiting input logs

It is sometimes necessary to limit the number of log data sets that are processed.

For example, if there is an exceptionally large number of logs, it might be helpful to run IMS HP Change Accumulation Utility with several smaller sets of logs rather than one huge process.

The smaller IMS HP Change Accumulation Utility runs can then be checkpoints if any unusual conditions occur. IMS HP Change Accumulation Utility provides options for controlling the GENJCL.CA selection of log data sets.

Using the CATIME parameter

The DBRC parameter CATIME selects the input logs limited by the specified time.

The time value represents a point within the start/stop times of a log file.

The identified log file and all logs that chronologically precede it are included in DFSULOG. Logs that follow the selected log in chronological order are excluded.

The disadvantages of using CATIME are that selection is only at a log boundary and the CATIME value must be calculated on the log times each time it is used. .

Using the VOLNUM parameter

The DBRC parameter VOLNUM restricts the number of log data sets that are generated for a single DFSULOG.

This parameter does not affect the total number of or last log to be processed.

Instead, if more than the VOLNUM number of logs exists to be processed.

Multiple IMS CA steps are created. Each step has no more than the VOLNUM number of logs to be processed.

The CA output master of step n is the CA input master for step $n+1$.

Note: VOLNUM is ignored when creating a PITCA.

Using MAXIMUM LOGS and MAXLOGS

The IMS HP Change Accumulation Utility parameter MAXIMUM LOGS (or MAXLOGS) operates in a way similar to both CATIME and VOLNUM.

MAXIMUM LOGS / MAXLOGS should not be used with either CATIME or VOLNUM.

The list of logs for processing is generated according to DBRC rules. IMS HP Change Accumulation Utility determines the complete set of logs defined for processing across all selected CA groups. This single list is then truncated, if necessary, to the number specified and the JCL is regenerated using only the logs that remain after truncation.

MAXIMUM LOGS / MAXLOGS operates in a way similar to CATIME because it truncates the list of logs to be processed.

MAXIMUM LOGS / MAXLOGS functions in a way similar to VOLNUM because the logs to be processed are identified by count rather than a time stamp that must be recalculated each time it is used.

- For two-step batch processing, the MAXLOGS parameter is specified in the HPCABAT0 EXEC statement.
- For extended batch processing, the MAXIMUM LOGS parameter is specified in the HPCSYSIN DD statement.
- For the ISPF user interface, the MAXLOGS parameter must be entered into a sequential data set or a partitioned data set member that is named in the HPCSYSIN field of the setup panel, HPCPS09.

If MAXIMUM LOGS= nnn is specified, then MAXLOGS RC= nn should also be specified.

MAXLOGS RC indicates the final return code of the job if the MAXIMUM LOGS threshold is met and no greater return codes are encountered during processing. If MAXIMUM LOGS is specified and MAXLOGS RC is omitted, the default return code 1 is used for MAXLOG RC.

If MAXLOGS= nnn is specified then MAXLGRC= nn should also be specified.

MAXLGRC indicates the final return code of the job if the MAXLOGS threshold is met and no greater return codes are encountered during processing. If MAXLOGS is specified and MAXLGRC is omitted, the default return code 1 is used for MAXLGRC.

Failure to start SORT subordinate address spaces

It is possible to receive an error message indicating a failure in starting the SORT subordinate address spaces.

The following error message text is followed by an abend:

```
HPC991E Procedure failed
```

Usually, this happens during initial testing following installation of IMS HP Change Accumulation Utility.

The most common causes of this failure are:

- The procedure library referenced by HPCAPROC is not a library in the concatenation of IEFPPDSI (MSTRJCL) or PROC00 (JES).
- The JCL generated by DBRC or modified by IMS HP Change Accumulation Utility has a JCL error that prevents processing.

The difficulty in diagnosing this failure is often compounded by the fact that the JES output of started tasks is not immediately available for analyzing the failure. You can perform the following steps (listed in order of increasing difficulty) to obtain the necessary additional information:

1. Use SDSF to find available JES output.

Ensure that you set the OWNER() and PREFIX() filters to include the subordinate address space JOB names.

The owner is assigned by your ICHRIN03 started procedures table or by the STARTED class of RACF. JOB names are prefixed with the IMS HP Change Accumulation Utility ID assigned during JCL generation. The suffixes will be 0001, 0002, and so forth.

2. If JOB outputs are not found and you have proper authority, consider changing your JES defaults to allow viewing, and then rerun the test.

For example, to set the output class to H and retain for viewing, specify these parameters:

- \$t jobclass(stc),msgclass=h
- \$t stcclass,outdisp=(keep,leave)

3. Review the system log for evident errors, such as:

- IEF452I xxxxxxxx - JOB NOT RUN - JCL ERRORProcedure might not have been found because the user PROCLIB is not in MSTRJCL or JES concatenations
- IEE132I START COMMAND ALLOCATION ERRORJOB step could not start because a data set is not available, possibly misspelled DSN or RACF restricted.
- IEF450I xxxxxxxx - ABEND=S806 U0000 REASON=0000004HPCA module not found, possibly because STEPLIB is wrong.

4. If the error is still not evident, then ensure that you are using the custom procedure method of IMS HP Change Accumulation Utility.

This method places the JCL procedures into the library named by DD HPCAPROC, or the ISPF setup panel HPCPS03, "JCL JOB statements". The members created will be HPCA-*id*0001-*nnnn*.

Edit any of the failing members (0001 is easiest), and add or edit the JOB statement for the member.

The JOB should choose a MSGCLASS that will be HELD or kept and MSGLEVEL (1,1).

SUBMIT the JCL for processing and examine the result which should now be available in SDSF under the assigned JOB name and owner.

Diagnosing ISPF errors

You can make use of the JOBLOG and DBRC information to diagnose errors that might occur while using various ISPF applications.

Topics:

- [“Accessing the JOBLOG for system abend information” on page 144](#)
- [“Viewing DBRC input and output information” on page 144](#)

Accessing the JOBLOG for system abend information

For ISPF applications, such as HPCA (HPCA000), abends are trapped and reported by ISPF.

System abends such as SE37, SD37, and S213 usually require a DD or DSN for problem resolution.

The required DD/DSN information can be located in the JES JOBLOG of the current TSO session in which the abend was found. The Spool Display and Search Facility (SDSF), can provide access to the JOBLOG.

To start SDSF, you must know your local site procedure. Generally, a menu option is used; however, your location might use an ISPF or TSO command.

To access the JOBLOG, perform the following steps:

1. Start the SDSF session.
2. Select the active (DA) or status (ST) panel display.
3. If necessary, set the PREFIX and OWNER filters to allow inclusion of your active TSO session.
4. Note that the session name is the userid that you used for TSO signon.
5. Browse (S) the entry of your session to find relevant error entries, usually messages ICEnnnn.

Viewing DBRC input and output information

IMS HP Change Accumulation Utility runs DBRC multiple times to obtain information about change accumulation (CA) groups, log data sets, and change accumulation data sets.

The DBRC result is generally displayed for any RC>0. However, even when RC=0, processing results might not be what you expect.

You can view input and output information for the last DBRC request by browsing the SYSIN or SYSOUT data sets allocated to your session. These ddnames are established when the IMS HP Change Accumulation Utility ISPF session starts (PGM=HPCA000).

To view the DBRC commands and results that were last used, use the **HPCC** command. The **HPCC** command can browse any sequential file that is currently allocated and available as input.

For example: enter any of the following **HPCC** command statements into the command field of any IMS HP Change Accumulation Utility panel:

```
TSO HPCC VIEW SYSIN
TSO HPCC VIEW SYSPRINT
TSO HPCC VIEW JCLOUT
```

Part 6. Troubleshooting

Use these topics to diagnose and correct problems that you experience with IMS HP Change Accumulation Utility.

Topics:

- [Chapter 14, “Runtime messages \(HPC\),” on page 147](#)
- [Chapter 15, “Abend codes,” on page 169](#)
- [Chapter 16, “Using diagnostic resources,” on page 181](#)
- [Chapter 17, “Gathering diagnostic information,” on page 187](#)

Chapter 14. Runtime messages (HPC)

Detailed information about IMS HP Change Accumulation Utility messages is described in this reference section.

Message format

The explanations and user responses provided in this reference can help you diagnose, troubleshoot, and solve IMS HP Change Accumulation Utility problems.

IMS HP Change Accumulation Utility messages adhere to the following format:

```
HPCnnnnx
```

where:

HPC

Indicates that the message was issued by IMS HP Change Accumulation Utility

nnnn

Indicates the message identification number

x

Indicates the severity of the message:

A

Indicates that operator intervention is required before processing can continue.

E

Indicates that an error occurred, which might or might not require operator intervention.

I

Indicates that the message is informational only.

W

Indicates that the message is a warning to alert you to a possible error condition.

Each message also includes the following information:

Explanation:

The Explanation section explains what the message text means, why it occurred, and what its variables represent.

System action:

The System action section explains what the system will do in response to the event that triggered this message.

User response:

The User response section describes whether a response is necessary, what the appropriate response is, and how the response will affect the system or program.

Module

The Module section indicates which module or modules are affected.

HPC0001E **Open failed for SYSIN data set.**

Explanation

A SYSIN DD statement might have been omitted from the HPCABAT0 job stream, or the data set might have been created with a logical record length other than 80 bytes.

User response

If a SYSIN DD statement is included in the HPCABAT0 job stream, ensure that the data set exists and has a logical record length of 80 bytes. Resubmit the job.

HPC0002E **Open failed for the GENJCLIN data set.**

Explanation

The GENJCLIN data set might have been omitted from the HPCABAT0 job stream.

User response

Ensure that the GENJCLIN data set is included in the HPCABAT0 job stream.

**HPC0003E Open failed for member HPCA-ID|
#BAT in the CONTROL data set.**

Explanation

The program failed while opening the member named HPCA-ID/#BAT.

User response

Check the HPCACTL data set. Ensure that the member name created by appending the HPCA-ID in the parm field of the EXEC statement to #BAT exists in the CONTROL data set identified by the HPCACTL DD statement. If the member does not exist, run the ISPF/UI and process the BAT command to create the member.

**HPC0004E Build of control records from
GENJCL failed.**

Explanation

The GENJCL for the SYSPRINT and JCLOUT data sets might not have completed.

User response

Check the SYSPRINT and JCLOUT data sets to ensure that the GENJCL completed successfully. Correct the problem, and resubmit the job.

HPC0005E Open failed for CONTROL data set.

Explanation

The CONTROL data set defined by the HPCACTL DD statement could not be opened.

User response

Ensure that the data set exists.

**HPC0006E Merge of HPCA-ID|#BAT and
GENJCL failed.**

Explanation

The records in the member named HPCA-ID|#BAT and the output of the GENJCL process could not be merged.

User response

Ensure that the HPCA-ID specified in the EXEC statement is correct.

**HPC0007E GENJCL failed. DBRC returned
with a return code of 8 or higher.**

Explanation

The GENJCL input stream contains errors.

User response

Check the SYSPRINT data set for the reason for the failure. Correct the GENJCL input stream, and resubmit the job.

HPC0008E DSPURX00 not found.

Explanation

The DBRC Utility program could not be found.

User response

Ensure that the data set pointed to by the STEPLIB DD statement is correct or, if no STEPLIB DD is included in the JCL, that the program DSPURX00 is in the LINKLIB.

HPC0010E ATTACH failed for DSPURX00.

Explanation

The DBRC Utility program could not be attached.

User response

Report the problem to your system programmer.

**HPC0011W Set DSIDs in DB0 records failed.
reason**

Explanation

Reason: DBRC is bypassed.

IMS HP Change Accumulation Utility could not identify all databases named in DB0 records. Processing continues without the missing DBRC information. IMS HP Change Accumulation Utility might select log records with redundancy to allow for unidentifiable destination address spaces.

Performance might be adversely affected by increased spill file use and data replication.

Reason: SYSIN open error.

The data set containing DBRC LIST commands could not be opened.

User response

Reason: DBRC is bypassed.

The DBRC output listing, if available, might further describe the cause of this error. DBRC output is directed to HPCPRINT by the GEN.LIST command, or to the HPCDBPRT file, if allocated.

Reason: SYSIN open error.

IMS HP Change Accumulation Utility could not determine the proper association of CA groups and databases. The GEN.WARN command allows IMS HP Change Accumulation Utility to continue with additional resource requirements and degraded performance. The cause of the failure can be found in the DBRC listing file available from the HPCDBPRT DD and/or the GEN.LIST command.

HPC0013E WRITE/STOW error.

Explanation

The IMS HP Change Accumulation Utility PROCLIB data set is incorrectly allocated.

User response

Reallocate the IMS HP Change Accumulation Utility PROCLIB data set and resubmit the job.

HPC0014E Out of space D37.

Explanation

The size of the IMS HP Change Accumulation Utility PROCLIB has caused an *out of space* condition.

User response

Compress the IMS HP Change Accumulation Utility PROCLIB, and resubmit the job.

HPC0015E Out of space E37.

Explanation

The size of the IMS HP Change Accumulation Utility PROCLIB has caused an *out of space* condition.

User response

Compress the IMS HP Change Accumulation Utility PROCLIB, and resubmit the job.

HPC0016E Directory full.

Explanation

The size of the IMS HP Change Accumulation Utility PROCLIB has caused a *directory full* condition.

User response

Compress the IMS HP Change Accumulation Utility PROCLIB and resubmit the job.

HPC0017E Creation of HPCADRIV procedure failed.

Explanation

The JCL for the HPCADRIV procedure could not be written because the library identified by the HPCAPROC DD statement could not be opened or the member could not be stowed.

User response

Ensure that the HPCAPROC data set exists and is a PDS or PDSE. Also, make sure that there is enough space to contain the newly created member. A compress of the data set might be necessary. After correcting the error, retry the job.

HPC0018W Nothing to accumulate in this run.

Explanation

DBRC returned with a Return Code of 04 with the indication that there was nothing to accumulate.

User response

Skip the HPCA run of your job scheduling procedure.

HPC0019E Control records could not be built from JCLOUT.

Explanation

The member HPCA-ID|#CTL in the control data set could not be created because one of the following conditions has occurred:

- The JCLOUT data set could not be opened.
- The HPCAPROC data set could not be opened.
- The HPCAJLIB data set could not be opened.
- An error occurred while attempting to stow a procedure in the HPCAPROC or HPCAJLIB data set.

User response

Ensure that the data sets JCLOUT, HPCAPROC, and HPCAJLIB exist. The JCLOUT data set must be a sequential data set, and the HPCAPROC and HPCAJLIB data sets are PDS or PDSE. Also, make sure that HPCAPROC and HPCAJLIB have enough space for stowing the newly created members. A compress of these data sets might be necessary. After correcting the error, retry the job.

HPC0024I **Log or DB conflict has cancelled SORT steps.**

Explanation

The SORT JCL has failed one or more validation steps, and one or more SORT procedures has been marked as not executable.

User response

The cause of the conflict is identified by the previous informational messages. Correct the error and rerun HPCA. If the generated procedures are processed without rerunning, some steps will be omitted.

HPC0025W/E **DBRC GENJCL.CA RC=nn.**

Explanation

DBRC was invoked for GENJCL . CA to create JCL for IMS HP Change Accumulation Utility processing. The DBRC return code was non-zero.

User response

For RC=4, the warning may be bypassed using the GEN . WARN command or EXEC parameter.

For RC=4 and no valid logs exist for any selected CA group, GEN . WARN has no effect.

For RC other than 4, processing terminates and the error must be corrected before rerunning HPCA.

The error can be found in the DBRC output available in DD HPCDBPRT and/or in the HPCA report file if GEN . LIST is set to at least 4.

HPC0040E **No SECLOG for PRILOG(dsn).**

Explanation

A valid secondary log could not be found for the named primary log. Primary and secondary log pairs are determined by matching SSID and start time of each log. Processing is prevented until all secondary logs are available.

User response

The DBRC LIST . LOG command can be used to display the current primary and secondary logs of the RECON. The secondary log(s) may not have been registered in DBRC, or they may have been registered but marked with error status.

HPC0100E **Invalid control card sequence.**

Explanation

The IMS HP Change Accumulation Utility control file member (HPCACTL DD) is constructed with an invalid sequence of control statements.

User response

The control file may have become corrupted by editing or incorrect use by processes other than HPCA. Rerun the steps to create the IMS HP Change Accumulation Utility control member being referenced. Control file members are generated by the IMS HP Change Accumulation Utility ISPF UI, two-step batch, and extended batch procedures.

If the problem persists, collect all IMS HP Change Accumulation Utility output, the IMS HP Change Accumulation Utility control file, and the JCLOUT from DBRC, if applicable.

HPC0101E **Unsupported use of JESIN DD *.**

Explanation

The use of DD *, or of DD DATA is supported only for the SYSIN DD statement of the CA step, DFSUCUM0/ HPCADRI1. The location of the incorrect JCL is defined by the following // EXEC and // DD statements.

User response

The JCL must be changed to remove the use of JESIN for the IMS HP Change Accumulation Utility procedures. Alternative uses may include referencing the input data as pre-allocated sequential or PDS files.

HPC0102E **SYSIN DD * is required.**

Explanation

The CA step, DFSUCUM0/HPCADRI1, must include the SYSIN DD in the JESIN format: DD * or DD DATA. The location of the incorrect JCL is defined by the following // EXEC and // DD statements.

User response

The JCL must be changed to include the CA input data through the JESIN statement format //SYSIN DD *.

HPC0274I SWITCH OLDS NEEDED FOR CA GROUP *grpname***Explanation**

IMS HP Change Accumulation Utility was run to create a point in time change accumulation (PITCA) for change accumulation group *grpname*. During processing, at least one DBDS was found updated under the current online log data set (OLDS).

System action

The IMS HP Change Accumulation Utility job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with return code 4.

No PITCA is created for CA Group *grpname*.

User response

Issue a /SWITCH OLDS command to switch the OLDS, and then re-submit the IMS HP Change Accumulation Utility job.

HPC0303I BATCH LOGGING JOB ACTIVE AGAINST CA GROUP *grpname***Explanation**

IMS HP Change Accumulation Utility was run to create a point in time change accumulation (PITCA) for change accumulation group *grpname*. During processing, an active job using batch logging was found updating at least one DBDS in CA group *grpname*.

System action

The IMS HP Change Accumulation Utility job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with return code 4.

No PITCA is created for CA Group *grpname*.

User response

Wait for the batch logging job to terminate, and then re-submit the IMS HP Change Accumulation Utility job.

HPC0999E Invalid message #: Not defined.**Explanation**

An internal error has occurred.

User response

Report the problem to your system programmer.

HPC1100I Sort step suppressed for MAXLOGS.**Explanation**

When a scheduled change accumulation group is processed, the MAXLOGS parameter can cause it to be nullified if none of the logs assigned to the group are within the MAXLOGS limit. The group is marked as neither selected nor scheduled.

User response

This is an informational message and does not affect the final condition code setting of HPCADRIV or HPCAMAIN.

HPC1101W No (DFSULOG) log data sets defined.**Explanation**

The JCL presented for processing has defined a SORT step without a DFSULOG DD input file. The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If the JCL was produced by a non-IMS process, change the process to properly generate the DFSULOG DD statement into the JCL for each SORT step.

HPC1102W No DBD selectors defined.**Explanation**

The JCL presented for processing has defined a SORT step with no DBD selector statements in the SYSIN DD file. This error might also indicate that SYSIN DD is not in-stream (DD *). The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If the JCL was produced by a non-IMS process, change the process to properly generate the SYSIN DD statement and DBD selectors into the JCL for each SORT step.

HPC1103W Duplicate log DSN.

Explanation

The JCL presented for processing has defined a SORT step with a log data set repeated with the DD DFSULOG concatenation. The SORT step is marked not executable.

User response

If the JCL was created by the DBRC GENJCL.CA process, check the skeletal JCL member and variable settings that were used. If the JCL was produced by a non-IMS process, change the process to properly generate the DFSULOG DD concatenation into the JCL for each SORT step.

If the IMS data sets are managed by DFSMS, refer to “Preventing duplicate log DSN error” on page 74.

HPC1104W **DB0 * ALL database selectors are not supported.**

Explanation

IMS HP Change Accumulation Utility does not allow the use of the * ALL option to select databases. The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If the JCL was produced by a non-IMS process, change the process to properly generate the DB0 selectors into the JCL for each SORT step.

HPC1105W **DB1 database selectors are not supported.**

Explanation

IMS HP Change Accumulation Utility does not allow the use of the DB1 database selectors. The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If the JCL was produced by a non-IMS process, change the process to properly generate the database selectors into the JCL for each SORT step.

HPC1106W **DB0 name selected in more than one CA group.**

Explanation

Two SORT steps for different CA groups have named the same database in the DB0 selectors. The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If JCL was produced by a non-IMS process, change the process to properly generate the database selectors into the JCL for each SORT step.

HPC1107W **LOG descriptions differ.**

Explanation

Two SORT steps have defined the same input log DSNAME but with different UNIT or VOLSER designations. The second SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If JCL was produced by a non-IMS process, change the process to properly generate the correct DFSULOG DD statements into the JCL for each SORT step.

HPC1108E **Log sequence validation failed**

Explanation

The DFSULOG DD input statements for all CAGRPs are merged to a common input stream for the log read function. DBRC API services were unavailable for sorting the input statements. The validation for a common chronological sequence of DFSULOG DD input statements failed for the SORT step. The SORT step is marked not executable.

User response

To use DBRC API sequencing, include the IMS RESLIB in the IMS HP Change Accumulation Utility JCL. DBRC API sorts the input statements in chronological order. If the input was created manually, verify that the DFSULOG DD statements in the JCL for the SORT step are in accordance with the DBRC GENJCL.CA output. The job may be resubmitted for the CAGRPs in error.

HPC1109W **Propagated step cancellation.**

Explanation

The VOLNUM option has produced multiple SORT steps for a CA group. The previous step for this same CA group was marked *not executable*. The SORT step is marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If JCL was produced by a non-IMS process, change the process to properly generate the correct JCL into the JCL for each SORT step.

HPC1109E **All SORT steps have been eliminated.**

Explanation

The JCL for all SORT steps has been marked *not executable*.

User response

If the JCL was created by the DBRC GENJCL . CA process, check the skeletal JCL member and variable settings that were used. If JCL was produced by a non-IMS process, change the process to properly generate the correct JCL into the JCL for each SORT step.

HPC1110W *typ txt nnn jcl*

Explanation

A suspicious condition was found during conversion of JCL to IMS HP Change Accumulation Utility procedures. In standard procedure mode, only a single step (PGM=DFSUCUM0) will be converted for IMS HP Change Accumulation Utility use.

typ

- **JCL**, an unsupported statement type is found
- **EXE**, the EXEC statement names a PROC or PGM that is not DFSUCUM0
- **DD**, unsupported DD option is found
- **SYM**, a JCL symbolic parameter is found
- **LOG**, unsupported DD option is found for DFSULOG

txt

The beginning text at the exception location. This text may have been found on a continuation line of the statement.

nnnn

The relative record number of the statement within the JCLOUT file.

jcl

The first line of the statement. Continuation lines are not displayed.

User response

All exceptions should be resolved through modification of the DBRC skeletal JCL or other process by which JCL is produced. If the exceptions are minor, you can attempt to process by using the GEN . WARN command.

HPC1111E **SORT() PROC() CAGRP() point-in-time sequence truncated.**

Explanation

There is more than one sort step defined for the named CA group and point-in-time processing. This may be the result of the GENJCL VOLNUM parameter, duplication of the GENJCL input records, or from other manual editing of the GENJCL output stream. Only the first sort step of each CA group is allowed for PITCA.

User response

Verify that the first sort step for the named CA group successfully completed. If the JCL is to be reprocessed, correct any GENJCL inputs to remove the VOLNUM() parameter or duplicated CA group requests before submitting.

HPC1112E **UNIT=VIO is not valid except in AS1 mode.**

Explanation

The unit designation of the CA spill file has been set to or defaulted to VIO when the IMS HP Change Accumulation Utility processing mode is multiple address space.

User response

Change to use AS1 (PROC=HPCSTASK), or change the designated CA.UNIT to be not VIO. Resubmit the JCL.

HPC1113E **DBRC API sequence error encountered**

Explanation

The DFSULOG DD input statements for all CAGRPs are merged into a common chronological input stream for the log read function. The merge function invoked the DBRC API services to collect log data set statistics for sort processing. However, an error was encountered during processing which prevented successful completion. The SORT step is marked not executable.

User response

Capture the problem documentation at the time of the original error and provide to IBM Software Support. The IMS HP Change Accumulation Utility job may be resubmitted for the CAGRPs receiving the error.

HPC1114E DBRC API log sequence validation failed

Explanation

The DFSULOG DD input statements for all CAGRPs are merged into a common input stream for the log read function. A DBRC API service was invoked to sequence the logs but the validation for a common chronological sequence of DFSULOG DD input statements failed for the SORT step.

User response

Capture the problem documentation at the time of the original error and provide to IMS HP Change Accumulation Utility support. The IMS HP Change Accumulation Utility JCL, IMS HP Change Accumulation Utility job log, and LIST.RECON output should be provided for troubleshooting.

Add the HPCTRACE and HPCADIAG DD statements and resubmit the job and save the output.

For more information, see “Option 9: Execution JCL DD Control panel” on page 68.

HPC1140W Multiple JCL steps skipped for Standard Procedure Mode

Explanation

In AS1 mode, not more than one step will be executed for each CA group. This message can result from using the GENJCL VOLNUM() parameter. RC=4 is set to indicate the condition.

User response

Verify that the expected CA groups were processed. Steps after the first for each CA group have been canceled.

HPC1142W CAGRP() PROC() PARM= values differ

Explanation

In AS1 mode, all CA groups must use the same EXEC PARM= value. This is normally ensured by using the same DBRC GENJCL skeleton member for all CA groups. A mismatch has been found between the 1st

CA group and the named CA group. The named group has been canceled.

User response

If the named CA group must be processed, regenerate the JCLOUT using a correct DBRC GENJCL skeleton, run in non-AS1 mode, or run the canceled group by itself without other groups.

HPC1143W CAGRP() PROC() DD() allocations differ

Explanation

In AS1 mode, all CA groups must use the same DD definitions for the following ddnames: STEPLIB, DFSRESLB, IMSDALIB, RECON1, RECON2, RECON3, and IMS. This condition is normally ensured by using the same DBRC GENJCL skeleton member for all CA groups. A mismatch has been found between the 1st CA group and the named CA group. The named group has been canceled.

User response

If the named CA group must be processed, regenerate the JCLOUT using a correct DBRC GENJCL skeleton, run in non-AS1 mode, or run the canceled group by itself without other groups.

HPC1149I Default number of parallel sort steps (n) action

Explanation

The expected number of parallel sort subtasks that can be supported has been computed to be "n" given the current memory allocation and IMS HP Change Accumulation Utility setup. The value *n* can be assigned to override the user specification of PARALLEL SORTS.

User response

None required. If the parallel sort count was given and does not agree with the computed value, it might be necessary to decrease the number if the IMS HP Change Accumulation Utility address space subsequently runs out of memory (ABEND 80A).

HPC1150W RECON not allocated. Parallel sorts (1) assigned.

Explanation

Parallel processing and dynamic allocation of the RECON in single address space is technically restricted. Sort processing is serialized to prevent

abnormal conflicts. The change accumulation output is correct; however, large mass change accumulation processing might experience a performance degradation.

User response

If dynamic allocation must be used in single address space mode, then change `Parallel Sorts = 1` to prevent this message. If performance degradation is a concern, then either remove dynamic allocation of the RECON in single address space mode, or run the process in multiple address space mode.

HPC1201E Value must be omitted.

Explanation

The previous control statement does not accept a value clause (=).

User response

Correct the statement format and rerun HPCA.

HPC1202E Required value cannot be blank.

Explanation

The previous control statement requires a non-null value clause (=).

User response

Correct the statement format and rerun HPCA.

HPC1203E Value is not a valid name format.

Explanation

The previous control statement requires a NAME format value.

User response

Correct the statement format and rerun HPCA.

HPC1204E Value is not a valid dataset name format.

Explanation

The previous control statement requires a DATASET format value.

User response

Correct the statement format and rerun HPCA.

HPC1205E Value is not alphabetic.

Explanation

The previous control statement requires an ALPHA format value.

User response

Correct the statement format and rerun HPCA.

HPC1206E Value is not numeric.

Explanation

The previous control statement requires a NUMBER format value.

User response

Correct the statement format and rerun HPCA.

HPC1207E Value is not within range.

Explanation

The previous control statement requires a NUMBER format value that falls within the designated lower and upper limits.

User response

Correct the statement format and rerun HPCA.

HPC1208E Value is not a valid selection list choice.

Explanation

The previous control statement requires a specific value selected from a list of valid choices.

User response

Correct the statement format and rerun HPCA.

HPC1209E Timestamp invalid. Reason code *diagcd*.

Explanation

The format of the point-in-time timestamp is not a valid IMS external timestamp. Timestamp formats are described in *IMS System Administration*. Message DSP0304I in the *IMS Messages and Codes* manual describes the values for *diagcd*.

User response

Correct the timestamp value and rerun the job.

Important: When specifying the LOG TIME parameter, do not enclose the timestamp in quotes.

HPC1219E **Parameter value HPCAID is required.**

Explanation

The EXEC JCL that initiated this process did not define the PARM value to include a 1-to 4-character IMS HP Change Accumulation Utility id.

User response

Correct the JCL EXEC statement PARM parameter and rerun HPCA.

HPC1220E **Undefined keyword.**

Explanation

The previous control statement was not recognized.

User response

Correct the statement format and rerun HPCA.

HPC1221E **Operand value not accepted.**

Explanation

The user-entered value is not valid for this command.

User response

Refer to command descriptions.

Correct the parameter value and resubmit the JCL.

HPC1230E **Cannot allocate ddname temporary file.**

Explanation

Dynamic allocation has failed for the named file.

User response

Previous informational messages in the JOB log or IMS HP Change Accumulation Utility report file identify the cause of the failure. Correct the parameters for allocation and rerun HPCA.

HPC1231E **HPCSYSIN LRECL exceeds 254.**

Explanation

The HPCSYSIN DD references a file with LRECL greater than 254.

User response

HPCSYSIN must be allocated with RECFM F or V and LRECL less than or equal to 254. Correct the HPCSYSIN DD, and rerun HPCA.

HPC1232E **Size of the operand value is invalid.**

Explanation

The previous control statement defines a value clause that exceeds the length of the intended target for the statement.

User response

Correct the statement format and rerun HPCA.

HPC1233E **JOB statement exceeds 7 continuation lines.**

Explanation

More than 7 JOB= control statements have been defined.

User response

Remove lines 8 and above for the JOB= control statements and rerun HPCA.

HPC1240E **DD HPCAJLIB requires JOB statement definition.**

Explanation

The HPCAJLIB DD is allocated in the current JOB indicating started task JOB support, but no JOB= control statements were found to provide the JOB JCL.

User response

Remove the HPCAJLIB DD to use only the procedure support for started tasks, or include one or more lines of JOB= definition.

HPC1241E **At least one GRPNAME and one GENJCL is required.**

Explanation

Either one or more GEN . GENJCL commands were entered, but no GEN . GRPNAME commands were found, or one or more GEN . GRPNAME commands were entered, but no GEN . GENJCL commands were found.

User response

Use of either GEN . GENJCL or GEN . GRPNAME requires use of both. Correct the commands and rerun HPCA.

HPC1242E HPCAPROC DD or standard PROC name is required.

Explanation

Neither the custom procedure method nor a standard procedure method is indicated. The DD HPCAPROC, commands PROCEDURE NAME= , STC NAME= , and parameters PROC= and STC= , are all omitted or invalid.

User response

If you are using the custom procedure method, then the HPCAPROC DD and optional HPCAJLIB DD must reference a library with WRITE authority to be used for the HPCA procedures. For standard procedure modes, the procedure name must be entered with one of the following:

- PROCEDURE NAME=*procname* (command)
- STC NAME=*procname* (command)
- PROC=*procname* (EXEC parameter)
- STC=*procname* (EXEC parameter)

HPC1243E ddname DD DUMMY detected.

Explanation

The named file is defined DD DUMMY or DSN=NULLFILE.

User response

Change the definition to reference a real data set of the correct type. Alternatively, remove the DD in error if it is for a file that can be dynamically allocated by HPCA.

HPC1280I Obsolete command.

Explanation

The HPCA command used has become obsolete.

User response

Replace with the new command, or commands. The obsolete command form will be withdrawn in a future release.

HPC1281I Command Authorization is required.

Explanation

The requested function is restricted. The correct authorization code is required in order to use this command.

User response

Contact IBM Software Support to request authorization.

HPC1290I Process Debug.Stop.On...

Explanation

The DEBUG . STOP . ON command has been reached. Processing ends.

User response

None. This message is informational.

HPC1300E HPCAID=name, lock was not obtained.

Explanation

The HPCAID that was entered for this process in currently being used by another process or another user.

User response

Select a different ID, or wait until the ID is released when the other process completes.

HPC1301E All sort steps have completed, unprocessed logs remain.

Explanation

Input log files remain to be processed, but all sort steps have ended. An abend or RC=20 indicates that one or more sort steps did not reach successful conclusion.

User response

Correct the causes for failures in the CA groups identified in the IMS HP Change Accumulation Utility report file (HPCPRINT) before rerunning HPCA.

HPC1310I Maximum Logs specified and there are more logs to be processed

Explanation

The IMS HP Change Accumulation Utility job ran with both the MAXIMUM LOGS parameter and the

MAXLOGS RC parameter specified, and there were more logs remaining to be processed.

System action

Remaining logs are not processed by the job.

User response

Re-submit the job to process the next set of unprocessed logs.

HPC1350I	GEN.RETRY Status: Enabled Disabled
-----------------	---

Explanation

IMS HP Change Accumulation Utility has detected the GEN.RETRY command and the current status is returned.

User response

For disabled status, ensure the GEN.GRPNAME and GEN.GENJCL statements have been provided in HPCSYSIN.

HPC1351I	Reprocessing failed groups
-----------------	-----------------------------------

Explanation

IMS HP Change Accumulation Utility has detected the DSP0711I, DSP0712I, or DSP0715E message for one or more change accumulation groups. The failed groups will be reprocessed based on the status of GEN.RETRY command processing.

User response

None. This message is informational.

HPC1352E	GEN.RETRY Status: Reset – VOLNUM SAS PIT
-----------------	---

Explanation

IMS HP Change Accumulation Utility has detected a restriction for the GEN.RETRY command and the current status has been reset to disabled. Refer to “GENJCL definitions” on page 98 for more details on the restrictions for GEN.RETRY: VOLNUM | SAS (single address space) | PIT (point-in-time).

User response

Remove the restriction and resubmit.

HPC1501E	HPCA product LOADLIB must be APF authorized
-----------------	--

Explanation

APF authorization is required for execution. Abend 3400-011 will follow.

User response

Add the IMS HP Change Accumulation Utility load library to the APF authorized library list.

HPC3400E	jobname abending, PROC(...) CAGRP(...)
-----------------	---

Explanation

The named JOB or started task is being abnormally ended by the IMS HP Change Accumulation Utility main task. The CA sort address space is scheduled to abend U3400-EOA.

User response

This message should always be produced after a detailed description of the cause for abending the named JOB or started task. Correct the identified problem and rerun HPCA.

HPC3401E	FP log sequence internal error.
-----------------	--

Explanation

IMS HP Change Accumulation Utility has determined that the sequence of Fast Path Log records cannot properly be processed with current ordering of the DFSULOG data set concatenation list.

User response

This message should always be produced after a detailed description of the cause for abending the named JOB or started task. Correct the identified problem and rerun HPCA.

HPC3417E	Spill record LRECL nnnnn exceeds maximum allowed of nnnnn
-----------------	--

Explanation

A log record was read that exceeds the maximum record length defined for any CA group. Correct the DBRC GENJCL skeletal JCL to identify the correct record size.

User response

Correct the DBRC GENJCL skeletal JCL to identify the correct record size.

HPC3418E	The buffer LRECL size exceeds the ID card LRECL size
-----------------	---

Explanation

A log record was read that exceeds the maximum record length that is defined in the ID card control statement. Abend 3400-1A follows.

User response

Correct the DBRC GENJCL skeletal JCL to identify a LRECL that is greater than the size of the log record.

HPC3419E **The spill work file LRECL of *nnnnn* is too large to fit in the BLKSIZE of *nnnnn***

Explanation

The ID card maximum LRECL exceeds the BLKSIZE length minus 4 bytes that are specified for IMS HP Change Accumulation Utility.

User response

Correct the DBRC GENJCL skeletal JCL to identify a maximum LRECL that is less than the BLKSIZE value minus 4 bytes that is specified in the IMS HP Change Accumulation Utility SPILL BLKSIZE = parameter.

HPC3800E **Spill file for *cagprname* was deleted. *reason***

Explanation

Because the spill file has been deleted for an unexpected reason, subsequent processing cannot continue. ABEND 3800 will follow.

System action

The IMS HP Change Accumulation Utility job fails with RC=20.

User response

Contact IBM Software Support.

reason

- FREE=CLOSE: Spill file was deleted by the CLOSE macro.
- Incorrect DYNALLOC parameter: The DYNALLOC parameter was overwritten during processing for unknown reason.
- Deletion request: Spill file deletion was requested unexpectedly.

HPC3801E **DFSULOG DD was not allocated**

Explanation

The DFSULOG DD could not be allocated during the change accumulation creation process. ABEND 3801 will follow.

System action

The IMS HP Change Accumulation Utility job fails with RC=20.

User response

Contact IBM Software Support.

HPC4000E **Identification failed for Change Accum module DFSUCUM0.**

Explanation

The IMS Change Accumulation Utility module (DFSCUCM0) was not recognized by HPCA.

User response

If the module is loaded from JOBLIB/STEPLIB, verify that the IMS library is supported by HPCA.

HPC4001E **DFSULOG allocation validation failed.**

Explanation

Dynamic allocation of DFSULOG DD has failed.

User response

Previous informational messages in the JOB log or IMS HP Change Accumulation Utility report file identify the cause of the failure. Correct the parameters for allocation and rerun HPCA.

HPC4002E **DynAlloc failed DD(...) DSN(...).**

Explanation

Dynamic allocation failed for the file with the DDN/DSN combination. This message precedes ABEND U3400-5DD.

User response

Correct the cause of the allocation failure. Additional information describing the error is generally found in the JESYSMSG data set or JOB log.

HPC4010I **NOTIFY.CA processing completed successfully for *grpname* Input CA data set *cadsname***

PITCA data set created
pitcadsname

Explanation

IMS HP Change Accumulation Utility found no log records for the change accumulation group *grpname*. The parameter CA2PITCA DSN was configured in HPCSYSIN which triggers a process to replicate and register a non-PITCA (point in time change accumulation) as a PITCA.

A PITCA was created in data set *pitcadsname* using input CA data set *cadname* for the CA group *grpname* and registered as a PITCA in the DBRC.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=4.

User response

None. This message is informational.

HPC4011W	PITCA processing failed for <i>grpname</i> DSPAPI FUNC=QUERY,TYPE=DBDS RC=rc RSN=rsn
-----------------	--

Explanation

IMS HP Change Accumulation Utility attempted to create a point in time change accumulation (PITCA) for change accumulation group *grpname*. The DBRC interface macro DSPAPI was issued with FUNC=QUERY,TYPE=DBDS to retrieve recovery information from DBRC for change accumulation group *grpname*.

The DBRC request failed with *rc* and *rsn*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Reference the *IMS System Programming APIs* manual, chapter "DBRC query request (QUERY)", section "Return and reason codes for the TYPE=DBDS query request" to determine the cause of failure and contact IBM Software Support as needed.

HPC4012W	PITCA processing failed for <i>grpname</i> DSPAPI FUNC=QUERY,TYPE=CAGROUP RC=rc RSN=rsn
-----------------	---

Explanation

IMS HP Change Accumulation Utility attempted to create a point in time change accumulation (PITCA) for change accumulation group *grpname*. The DBRC interface macro DSPAPI was issued with FUNC=QUERY,TYPE=CAGROUP to retrieve existing change accumulation information and CA Group member information from DBRC for change accumulation group *grpname*.

The DBRC request failed with *rc* and *rsn*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Reference the *IMS System Programming APIs* manual, chapter "DBRC query request (QUERY)", section "Return and reason codes for the TYPE=GROUP query request" to determine the cause of failure and contact IBM Software Support as needed.

HPC4014W	PITCA processing failed for <i>grpname</i> STORAGE OBTAIN failed for CA/ PITCA DCBs RC=rc
-----------------	---

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed when a request was issued for storage to build the input CA and output PITCA data set DCB structures.

This request is made for storage below the 16M line and is likely caused by storage constraints on the system.

The return code for the STORAGE OBTAIN request was *rc*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Reference the *z/OS MVS Programming: Authorized Assembler Services Reference*, chapter "STORAGE — Obtain and release storage", section "Return and reason codes" to determine the cause of the failure.

Contact your MVS™ Systems Programmers and IBM Software Support as needed.

HPC4015W	PITCA processing failed for <i>grpname</i> Dynamic Allocation failed with RC=<i>rc</i> [Input CA] [PITCA] dataset <i>dsname</i>
-----------------	--

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed while dynamically allocating either the input CA data set or the new PITCA data set identified by *dsname*.

The DYNALLOC macro return code was *rc*.

The most likely cause of this error is the Input CA data set being allocated to another job or user.

System action

The SVC 99 issues IKJ messages to the job log identifying the problem.

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Inspect the job log for IKJ messages. Then, if needed, reference the *z/OS TSO/E Messages* manual for the cause of the message.

Contact your MVS Systems Programmers and IBM Software Support as needed.

HPC4016W	PITCA processing failed for <i>grpname</i> Open dataset failed with RC=<i>rc</i> [Input CA] [PITCA] dataset <i>dsname</i>
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Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed opening either the input CA data set or the new PITCA data set identified by *dsname*.

The OPEN macro return code was *rc*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

None. This is an internal error which should be reported to IBM Software Support.

HPC4017W	PITCA processing failed for <i>grpname</i> Close dataset failed with RC=<i>rc</i> [Input CA] [PITCA] dataset <i>dsname</i>
-----------------	---

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed closing either the input CA data set or the new PITCA data set identified by *dsname*.

The CLOSE macro return code was *rc*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

None. This is an internal error which should be reported to IBM Software Support.

HPC4018W **PITCA processing failed for
grpname
Inconsistent GET(*getcount*)
PUT(*putcount*) Counts**

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed because the number of GETs (*getcount*) was not equal to the number of PUTs (*putcount*).

The new PITCA must be an exact copy of the input CA, so the unequal input and output counts causes the process to fail for CA Group *grpname*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

None. This is an internal error which should be reported to IBM Software Support.

HPC4019W **PITCA processing failed for
grpname
[GET] | [PUT] failed with RC=*rc*
[Input CA] | [PITCA] dataset
*dsname***

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed during the

reading of the input CA (*GET*) or writing of the new PITCA (*PUT*) with return code=*rc*.

The data set is identified as *dsname*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

None. This is an internal error which should be reported to IBM Software Support.

HPC4020E **Invalid Dataset Name, *dsname*
Error Reason**

Explanation

The CA2PITCA DSN parameter was specified in HPCSYSIN and the data set name template value was invalid.

System action

The IMS HP Change Accumulation Utility job fails with RC=12.

User response

Use the appropriate *error reason* to determine the reason why the data set name template value was invalid. Then correct the template value and re-submit the job.

Error reason:

- Length is or will expand to be more than 44 characters
 - Low level qualifier must be **HPCAP**
 - Symbolic variable %CAGRP can appear only once in the CA2PITCA DSN parameter
 - Unsupported symbolic variable was used
- Only %CAGRP, %DATE, %DATE7, and %TIME are supported.

HPC4020W **PITCA processing failed for
grpname
PITCA *pitcadsn*
No updates after prior CA.**

Explanation

A PITCA was being created from a prior CA under the following conditions:

- A PITCA was already created, and
- There were no databases in the CA group updated since the CA was created.

System action

No PITCA is created and the return code is set according to the DSP0025I RC=*nnnn* parameter.

User response

Set a different timestamp on the LOG TIME = *timestamp* parameter.

Note: If parameter DSP0025I RC=*nnnn* has been specified, then that return code is set at the end of processing.

HPC4021E Processing error during CA2PITCA DSN validation

Explanation

The CA2PITCA DSN parameter was specified in HPCSYSIN and an error was encountered by the IMS HP Change Accumulation Utility during validation of the template value.

System action

The IMS HP Change Accumulation Utility job fails with RC=12.

User response

This is an internal error and should be reported to IMS Software Support.

HPC4022W PITCA processing failed for *grpname* STORAGE OBTAIN for NOTIFY.CA failed RC=*rc*

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed when a request was issued for storage to build the NOTIFY.CA command.

This request is made for storage above the 16M line and is likely caused by storage constraints on the system.

The return code for the STORAGE OBTAIN request was *rc*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Reference the *z/OS MVS Programming: Authorized Assembler Services Reference*, chapter "STORAGE — Obtain and release storage", section "Return and reason codes" to determine the cause of the failure.

Contact your MVS Systems Programmers and IBM Software Support as needed.

HPC4023W PITCA processing failed for *grpname* NOTIFY.CA command failed with RC=*rc* RSN=*rsn* Notify.CA Cmd Response Text

Explanation

After determining a change accumulation (CA) could be used to establish a point in time change accumulation (PITCA), the process failed when the NOTIFY.CA command request was passed to IMS DBRC.

The NOTIFY.CA command request failed with return code *rc* and reason code *rsn*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Examine the *Notify.CA Cmd Response Text* to determine the cause of the failure.

This response text was returned by IMS DBRC to IMS HP Change Accumulation Utility and contains one or more DSPxxxxx messages.

Refer to *IMS Messages and Codes, Volume 2, "Non-DFS Messages"*, for an explanation of the DSPxxxxx message(s).

Correct the condition identified by the DSPxxxxx message(s) and re-submit the job.

HPC4024W **PITCA processing failed for**
grpname
CA data set is not on DASD and
a valid CA2PITCA UNIT was not
specified.
Input CA data set *cadname*

Explanation

IMS HP Change Accumulation Utility (HPCA) was run to create a point in time change accumulation (PITCA) using the CA2PITCA DSN parameter to create PITCA from an existing CA when no unaccumulated changes exist.

The PITCA data set created by this process must be on the same device type as the existing input CA data set. The existing input CA data set is not on DASD and the user did not specify a valid unit for the output PITCA data set.

grpname is the name of the change accumulation job being processed.

cadname is the name of the existing input change accumulation data set.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

User response

Specify the CA2PITCA UNIT parameter to identify a unit of the same device type as the existing input CA data set, and resubmit the job.

HPC4025W **PITCA processing failed for**
grpname
DSPAPI FUNC=STARTDBRC RC=*rc*
RSN=*rsn*

Explanation

IMS HP Change Accumulation Utility was run with the CA2PITCA DSN parameter specified in HPCSYSIN. This triggers additional processing when no log records are found for a CA Group. This process accessed IMS DBRC to determine if a point in time change

accumulation (PITCA) can be created from a non-PITCA, or if an EMPTY PITCA place-holder can be created for the CA Group.

When the attempt was made to establish a connection with IMS DBRC, the connection failed with return code *rc* and reason code *rsn*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=8.

No PITCA is created for CA Group *grpname*.

User response

Ensure the IMS and IMS DBRC tasks are available and reference the *IMS System Programming APIs* manual, "Return and reason codes for STARTDBRC".

Contact IBM Software Support as needed.

HPC4040I **Sum.Files allocation report.**

Explanation

The SUM.FILES command has requested the list of files allocated in the subordinate CA address space. This message precedes the pseudo JCL list of allocations.

User response

None. This message is informational.

HPC4041I **global allocation report**

Explanation

This message precedes any dynamic allocations for the IMS HP Change Accumulation Utility control address space when running in AS1 mode.

User response

None. This message is informational.

HPC4042I **DBRC Returned duplicate key**
message.
[CA|PITCA] DSN=*data set name*
[DELETED|RETAINED]
UNDETERMINED]

Explanation

IMS HP Change Accumulation Utility (HPCA) was run to create a change accumulation (CA) or point in time change accumulation (PITCA).

During DBRC NOTIFY.CA processing, an existing PITCA with the same STOPTIME was found in the DBRC.

System action

The IMS HP Change Accumulation job completes with the value specified on the DSP0025I RC parameter in HPCSYSIN unless another error sets a higher RC.

The CA or PITCA data set *data set name* is DELETED if possible. Otherwise it is RETAINED.

If the data set is RETAINED, check the messages in the job log for IKJxxxxI messages to determine why the data set could not be deleted.

data set name is the string "**** CA OUTPUT MASTER ***" if the CA/PITCA data set name could not be determined. This indicates an internal HPCA error and should be reported to IBM Software Support. Scan the corresponding sort address space output for "CA Output Master" to determine the CA/PITCA data set name.

User response

If the data set identified by *data set name* or "CA Output Master" is not deleted, delete it.

The existing CA/PITCA record in the DBRC can be deleted if necessary using DELETE.CA command as discussed in the *IMS Commands: IMS Component and z/OS Commands* manual in the "Database Recovery Control commands" section.

The time stamp for the RECTIME parameter can be found in a DSP0020I message in HPCPRINT or in the sort address space (SAS).

HPC4043E	DSP0025I RC : value must be numeric between 0 and 4095.
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Explanation

IMS HP Change Accumulation Utility (HPCA) was run to create a change accumulation (CA) or point in time change accumulation (PITCA) using the DSP0025I RC parameter, but the value specified was invalid.

System action

The IMS HP Change Accumulation job completes with RC=12.

User response

Specify a number value between 0 and 4095, and resubmit the job.

HPC4050I	New (PIT) CA master was not invalidated.
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Explanation

The output of the point-in-time accumulation was not registered to DBRC and was subsequently not invalidated.

User response

The PITCA file cannot be used as input to subsequent IMS HP Change Accumulation Utility or IMS/CA processing.

HPC4051E	New (PIT) CA master was not invalidated.
-----------------	---

Explanation

The output of the point-in-time accumulation could not be invalidated to DBRC. The PITCA is registered and should be marked invalid, but is not.

User response

Examine the RECON contents for the affected CAGRP for possible causes of this failure. The PITCA file cannot be used as input to subsequent IMS HP Change Accumulation Utility or IMS/CA processing. DBRC CHANGE.CA commands should be used to invalidate or remove the affected CA files from selection by GENJCL.

HPC4052I	New (PIT) CA master was invalidated.
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Explanation

The output of the point-in-time accumulation was invalidated by HPCA. The PITCA is registered to DBRC but marked in ERR and INCOMPLETE to prevent it from being selected for input to subsequent GENJCL processing.

User response

None. This message is informational.

HPC4053E	CA Output Master suffix .HPCAP RESERVED for PIT
-----------------	--

Explanation

The suffix of the output change accumulation data set that is specified by the DFSUCUMN DD statement in the skeletal JCL is .HPCAP. However, a point-in-time change accumulation is not performed. A suffix of HPCAP is only valid when the LOG TIME command is specified to indicate that a point-in-time change accumulation should be created.

System action

The change accumulation job fails.

User response

Change the data set name for the DFSUCUMN DD statement in the skeletal JCL so that it does not use the .HPCAP suffix, unless a point-in-time change accumulation is being created.

HPC4054E CA Output Master suffix .HPCAP REQUIRED for PIT

Explanation

The LOG TIME command was specified, indicating that a point-in-time change accumulation should be created. However, the suffix of the output change accumulation file is not .HPCAP. When a point-in-time change accumulation is created, the output data set name must end with .HPCAP so that IMS Database Recovery Facility recognizes it.

System action

The change accumulation job fails.

User response

Change the data set name for the DFSUCUMN DD in the skeletal JCL so that it has the .HPCAP suffix.

HPC4058I PITCA EMPTY CAGRP = *grpname*

Explanation

IMS HP Change Accumulation Utility found no log records for the change accumulation group *grpname*.

A placeholder change accumulation data set entry was created in Database Recovery Control (DBRC) with the name HPCA .EMPTY .*Dyymmdd* .*Thhmmss* .HPCAP where *yymmdd* represents the date and *hhmmss* represents the time the entry was created.

The process of creating the placeholder PITCA data set is triggered by the HPCSYSIN parameter CA2PITCA DSN and the occurrence of a DSP0712I message for *grpname*.

System action

The IMS HP Change Accumulation job completes with the highest return code issued for all CA Groups being processed.

If this is the only CA Group being processed, the job completes with RC=4.

User response

None. This message is informational.

HPC4099I DBRC RC=*value*.

Explanation

DBRC has returned a non-zero return code. This message is informational and provides the RC value for analysis. If the non-zero return code is critical to the function that requested DBRC, then additional detailed error messages will follow.

User response

If user action is required, subsequent error messages are issued. Refer to those messages for instructions.

HPC9900I CC=4 is reset by WARN=0.

Explanation

Warnings have been issued from the DBRC task or the HPCA JCL procedure process. The GEN .WARN=0 option has changed the completion code from 4 (warnings) to 0 (no error).

User response

None. This message is informational.

HPC9990I PROC(...) CAGRP(...), completed COND:

Explanation

The named SORT step has completed with the indicated condition.

User response

None. This message is informational.

HPC9991E PROC(...) CAGRP(...), not started.

Explanation

The named SORT step was not started because it was previously marked *not executable*.

User response

Correct the cause of the error and rerun HPCA.

HPC9992E PROC(...) CAGRP(...), failed COND:

Explanation

The named SORT step has ended unsuccessfully with the indicated condition.

User response

Correct the cause of the error and rerun HPCA.

HPC9997I Storage: Used Limit

Explanation

Lines of informational messages describe the high-water use and limit values for 24-bit, 31-bit, and 64-bit memory allocations. The values for 24-bit and 31-bit will always be output.

Output values obtained from the RSM Address Space Block Extension will be displayed with the line heading "64-bit".

If the IMS HP Change Accumulation Utility MEMLIMIT parameter is in effect, then output values for IMS HP Change Accumulation Utility managed storage will be displayed with the line heading "64-HPCA".

User response

None. This message is informational.

HPC9999I HPCA processing complete, CC=

Explanation

HPCA processing has ended. The condition code is set at the highest return value of any subordinate process.

User response

None. This message is informational.

Chapter 15. Abend codes

Detailed information about IMS HP Change Accumulation Utility abend codes is provided in this reference section.

IMS HP Change Accumulation Utility uses the following abend codes:

- 3400
- 3800
- 3801

For each abend code, the following information is provided where applicable:

Explanation:

The Explanation section explains what the abend code means, why it occurred, and what its variable entry fields are (if any)

System Action:

The System Action section explains what the system will do next

User Response:

The User Response section describes whether a response is necessary, what the appropriate response is, and how the response will effect the system or program

During IMS HP Change Accumulation Utility processing, you might encounter abend codes that are issued by IMS or DFS.

ABEND 3400

IMS HP Change Accumulation Utility detected an error. Reason codes further identify the type of error.

x'02'

Explanation

Reason 002: Load module attribute extraction failed or invalid load option.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOAD

x'03'

Explanation

Reason 003: OPEN for control card failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult

your system programmer for a possible cause of the error.

Module

HPCACARD

x'04'

Explanation

Reason 004: GET for next sequential control card failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCACARD

x'05'

Explanation

Reason 005: Empty control card file.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'06'

Explanation

Reason 006:

One of the following conditions has occurred:

- Invalid first control card(s)
- Number of logs exceeds maximum
- CAGROUPs exceed maximum

Load module attribute extraction failed or invalid load option.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'07'

Explanation

Reason 007: Requested 31-bit storage could not be obtained.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCABUFF

x'08'

Explanation

Reason 008: Requested 24-bit storage could not be obtained.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCABUFF

x'09'

Explanation

Reason 009: Internal authorization failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCABUFF

x'0A'

Explanation

Reason 010: Requested 31-bit ECSA storage could not be obtained.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCABUFF

x'0B'

Explanation

Reason 011: Product library not APF authorized

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOAD

x'0C'

Explanation

Reason 012: Home address space information extraction failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'0D'

Explanation

Reason 013:

One of the following conditions has occurred:

- Data space creation failed
- Invalid processing option

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'0E'

Explanation

Reason 014: SORT TBLK no longer exists.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOGR

x'0F'

Explanation

Reason 015: Not enough storage for buffer addresses.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOGR

x'10'

Explanation

Reason 016: No SORT TBLK found for CAGROUP.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOGR

x'11'

Explanation

Reason 017:

One of the following has occurred:

- OPEN/CLOSE for data set failed.
- Invalid file management processing option.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult

your system programmer for a possible cause of the error.

Module

HPCADRIV

x'12'

Explanation

Reason 018: Spawning and initialization of all SORT address spaces failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCASTA0

x'13'

Explanation

Reason 019: Spawning of subtask failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'14'

Explanation

Reason 020: SORT address space cross memory.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRI1

x'15'

Explanation

Reason 021: SORT address space CA application initialization failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRI1

x'16'

Explanation

Reason 022: SORT task status not known.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALAGR

x'17'

Explanation

Reason 023: BAT command not done. Record 01 in HPCA#BAT missing.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCABAT0

x'18'

Explanation

Reason 024: BAT command not done. Record 02 in HPCA#BAT missing.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOGR

x'19'

Explanation

Reason 025: SORT task for FP not initialized.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCALOGR

x'1A'

Explanation

Reason 026: LOG task record handling error.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Refer to HPC3418E for corrective action.

Module

HPCALOGR

x'1B'

Explanation

Reason 027: No sort tasks remain to be processed, but there remain unprocessed input logs. This condition is raised when the last (or only) sort to be processed ends abnormally before EOF of the final input log.

User response

Correct the condition that caused the termination of the sort (or sorts) and rerun HPCA.

Module

HPCASTA2

x'1F'

Explanation

Reason 031: Cross-memory linkage has broken.

User response

Examine results from all associated address spaces for additional information that might explain the reason for the failure. Consult your system programmer for a possible cause for the error.

Module

HPCAMEM, HPCATEST, HPCAVS

x'20'

Explanation

Reason 032: Request to HPCUCMN0 is not I, R or T.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCUCMN0

x'21'

Explanation

Reason 033: Request to HPCUCRD0 is not 0 or 4 (EOF).

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCUCCT0

x'22'

Explanation

Reason 034: Return code from HPCAE150 is not 0 or 4 (EOD).

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCUC150

x'23'

Explanation

Reason 035: Unable to get dynamic storage in LOGR ETXR. R2 is return code from STORAGE OBTAIN.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAEXTR

x'24'

Explanation

Reason 036: CSVQUERY failed for HPCAMBLK in LOGR ETXR. R2 is return code from CSVQUERY.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAEXTR

x'25'

Explanation

Reason 037: Unable to locate TBLK for ending TCB in TCB ETXR routine.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAEXTR

x'26'

Explanation

Reason 038: Invalid TQE in chain.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'27'

Explanation

Reason 039: Log reader task failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'28'

Explanation

Reason 040: Unable to get storage for a DECB in spill task. R2 is the return code from STORAGE OBTAIN.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCASPIL

x'29'**Explanation***Reason 041:* SYNAD exit driven for spill data set writer.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCASPIL

x'2A'**Explanation***Reason 042:* Unable to get storage for a local buffer in Fast Path sort E15 exit.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAE15F

x'2B'**Explanation***Reason 043:* Dynamic allocation unsuccessful.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV, HPCADRI1, HPCADRI2

x'2C'**Explanation***Reason 044:* Unable to start Fast Path sort task.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCASTA0

x'2D'**Explanation***Reason 045:* Fast Path sort task failure.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAPRO3

x'2E'**Explanation***Reason 046:* Fast Path log reader failure.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCAPRO4

x'2F'**Explanation***Reason 047:* SORT subtask in Fast Path sort space returned non-zero return code.**User response**

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult

your system programmer for a possible cause of the error.

Module

HPCADRI2

x'30'

Explanation

Reason 048: Messaging module failed.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult your system programmer for a possible cause of the error.

Module

HPCADRIV

x'46'

Explanation

Reason 070: Severe error encountered during execution.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Review error messages issued by the job to determine the cause of the error.

Module

HPCAMAIN

x'70'

Explanation

Reason 112: The REGISTER call to the Cache Manager for reading from or writing to a Spill File has failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACMIL, HPCACM15

x'71'

Explanation

Reason 113: The CREATE call to the Cache Manager for writing to a Spill File failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACMIL

x'72'

Explanation

Reason 114: The ACCESS call to the Cache Manager for writing to a Spill File failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACMIL, HPCACM15

x'73'

Explanation

Reason 115: The ACCESS call to the Cache Manager for reading a Spill File failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the

Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACM15

X'74'

Explanation

Reason 116: The WRITE call to the Cache Manager for writing to a Spill File failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACMIL

X'75'

Explanation

Reason 117: The READ call to the Cache Manager for reading a Spill File failed.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR, HPCACM15

X'77'

Explanation

Reason 116: The WRITE call to the Cache Manager for writing to a Spill File failed during CLOSE processing.

User response

This is an internal error. The CM Manager has failed after successfully being initialized. Report this problem to your System Programmer. IMS HP Change Accumulation Utility cannot proceed with using the Cache Manager. IMS HP Change Accumulation Utility can be started without the Cache Manager by removing the HPCCACHE DD statement.

Module

HPCACMGR

X'DD'

Explanation

Reason 221: DD name HPCPRINT is not allocated.

User response

The IMS HP Change Accumulation Utility report file DD HPCPRINT is not allocated or not usable. This file is required for IMS HP Change Accumulation Utility to process successfully.

Module

HPCAMAIN, HPCABATO, HPCADRIV

X'DE'

Explanation

Reason 222: Debug requestedabend.

User response

Correct or remove the debug commands, and rerun IMS HP Change Accumulation Utility. Debug commands were ended unsuccessfully. Messages preceding thisabend appear in the HPCPRINT report file to describe the cause in detail.

Module

HPCAZAPR

X'EE'

Explanation

Reason 238: Internal table error.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Consult

your system programmer for a possible cause of the error.

Module

N/A

X'1DD'

Explanation

Reason 477: Spill file allocation failed.

User response

Dynamic allocation of a Sort spill file has failed. Specifics of the failure were previously written to the JOB log or the IMS HP Change Accumulation Utility report file. Correct the indicated cause of failure and rerun HPCA.

Module

HPCAALLO

X'2DD'

Explanation

Reason 733: Fast Path spill file allocation failed.

User response

Dynamic allocation of a Fast Path spill file has failed. Specifics of the failure were previously written to the JOB log or the IMS HP Change Accumulation Utility report file. Correct the indicated cause of failure and rerun HPCA.

Module

HPCALOGR

X'3DD'

Explanation

Reason 989: DFSULOG file allocation failed.

User response

Dynamic allocation of the DD DFSULOG has failed. Specifics of the failure were previously written to the JOB log or the IMS HP Change Accumulation Utility report file. Correct the indicated cause of failure and rerun HPCA.

Module

HPCAULOG

X'4DD'

Explanation

Reason 1245: DD name DFSULOG does not match control.

User response

The DFSULOG DD name in the Sort JCL step specifies a sequence of log files that is different from that found in the IMS HP Change Accumulation Utility control table. The JCL procedure or the IMS HP Change Accumulation Utility control table has been modified subsequent to initialization by HPCA.

Recreate the JCL and the control table by rerunning the appropriate preparation step: IMS HP Change Accumulation Utility, two-step batch or extended batch.

Module

HPCAULOG

X'5DD'

Explanation

Reason 1501: Dynamic allocation failed for a file in the CA SORT address space. This abend is preceded by the message HPC4002E in the IMS HP Change Accumulation Utility report file.

User response

Correct the cause of the allocation failure. Additional information describing the error is generally found in the JESYSMSG data set or JOB log.

Module

HPCAULOG

X'E0A'

Explanation

Reason 3594: CA SORT ended abnormally. The IMS HP Change Accumulation Utility main task scheduled this CA SORT address for abend. The cause of the abend will be reported in the HPCA report file of the main task.

User response

None required

Module

N/A

ABEND 3800

ABEND 3800**Explanation**

Unexpected spill file deletion occurred. Message HPC3800E was issued before this user ABEND.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Contact IBM Software Support.

Module

HPCASPIL, HPCADYNA

ABEND 3801

ABEND 3801**Explanation**

The change accumulation creation process could not be continued because the DFSULOG DD could not be allocated. Message HPC3801E was issued before this user ABEND.

User response

IMS HP Change Accumulation Utility encountered a condition that prevented further processing. Contact IBM Software Support.

Module

HPCACUM0

Chapter 16. Using diagnostic resources

There are several resources available to help you diagnose and troubleshoot IMS HP Change Accumulation Utility problems.

Some resources, such as messages and SCAN, are always available to assist with interpreting processing results. Other resources focus on debugging and are normally used by or with direction from IMS HP Change Accumulation Utility support personnel.

Topics:

- [“Error messages and abend codes” on page 181](#)
- [“Other messages” on page 181](#)
- [“SCAN” on page 182](#)
- [“HPCADIAG” on page 185](#)
- [“Trace” on page 186](#)
- [“DEBUG” on page 186](#)

Error messages and abend codes

Messages are the first source for diagnostic information. Refer to the Abend Codes and Error Messages reference sections of this user's guide for detailed IMS HP Change Accumulation Utility abend code and error message information.

Abend 3400, 3800, and 3801 are controlled by IMS HP Change Accumulation Utility. Other abend codes indicate a failure of setup, environment, or system.

Abend 3400 always includes the reason code to indicate cause of failure. IMS HP Change Accumulation Utility uses this abend when processing cannot continue because of the conditions indicated in the reason code.

All messages generated by IMS HP Change Accumulation Utility have the prefix HPC and trailing character I, W, or E.

- Informational (I) messages indicate specific information conveying status or the possibility of an unusual situation. (I) messages do not affect processing.
- Warning (W) messages identify unusual situations which might create invalid results if processing continues.
- Error (E) messages cause termination.

Other messages

Messages from other applications might be included in IMS HP Change Accumulation Utility reports and displays.

These messages are captured during the IMS HP Change Accumulation Utility process and merged with IMS HP Change Accumulation Utility for reporting.

For descriptions and interpretations for these messages, see the appropriate documentation for the application which produces the message, as follows:

- Messages prefixed with DFS are produced by IMS Change Accumulation Utility.
- Messages prefixed with DSP are produced by IMS Data Base Recovery Control.
- Messages prefixed with ICE are produced by IBM DFSORT.

SCAN

Messages might not always explain an error sufficiently or, in the absence of an error, the results of a certain process might not be as expected. The SCAN function provides additional diagnostic information and is useful for validating setup and resource requirements.

In scan mode, JCL processing is performed according to the setup parameters. However, no PROCLIB members or IMS HP Change Accumulation Utility control file members are produced as output.

Instead, the setup parameters and JCL are analyzed to produce a SCAN report. In ISPF, the report is displayed in a browse window. For batch processing, the report is directed to the IMS HP Change Accumulation Utility Report defined by HPCPRINT DD.

The scan report consists of several sections starting with DBRC messages and status and ending with extracted JCL parameters. The following example shows a sample report structure with descriptions for each section. The numbers in parentheses do not appear in the report. The numbers refer to notes which are explained after the report.

```

(1)
5655-V86 HPCPRINT HPCA REPORT FILE
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE 1
2021/10/15 11.39.16 HPCA91D (JOB03099) HPCMAIN

```

```

(2)
JOB=HPCA91D
Parms=CA14,SCAN
 1      ID              = CA14
 2      List
 3      PROCEDURE NAME  = HPCSPROC
 4
 5 *    Gen.Warn        = (Stop/Ignore/Defer)
 6      GEN.LIST        = 4
 7      GEN.Warn        = Stop
 8 *    *****
 9 *    ***              Gen Groups go here      ***
10 *    *****
11 *

```

```

(3)
...Preparing PROCLIB members
0DSP0211I  COMMAND PROCESSING COMPLETE
DSP0211I   HIGHEST CONDITION CODE = 00

```

```

(4)
Control statement processing information
  CA groups 1
  CA sorts 1
  LOG datasets 54
  Scheduled LOGs 54
  Data Bases 100
  FastPath Yes
  Full Function No
  HALDB No
  DBRC Loadlib IMSBLD.I91RTS14.COMRESL3
  RECON1 IMTOOL1.HPCA300.RCNGDG91
  RECON2 IMTOOL1.HPCA300.RCNGDG92
  RECON3
  HPCA Loadlib IMSTOOL.HPCA14.HPC.SHPCLMD0
  HPCACTL dsname IMTOOL1.HPCA300.CONTROL
  Procedure name PROC=HPCSPROC
  PROC library
  JOB library
  SMF No
  Concurrent LOGs 9
  Parallel SORTs 9
  Input buffers 5
  Output buffers 5
  Spill LRECL 4351
  Spill BLKSIZE 32760
  (max) Spill count 0
  (max) FP spill count 104

```

```

5655-V86 HPCPRINT HPCA REPORT FILE
5655 -V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE 2
2021/10/15 11.39.16 HPCA91D (JOB03099) HPCMAIN

```

```

(5)
Sort Procedures
PROCNAME GRP / DD Message / DSN,VOL
-----
CA140001 CAGRP001
DFSUCUMO NODLET1.HPCA300.CAGRP001.CA0, (IMT116),
DFSUCUMN IMTOOL1.HPCA14.GDG.CAGRP001.D21288.T113917, IMSTL4,

```

Figure 44. Sample SCAN report - part 1

(6) LOG datasets DSN	VOLSERs
NODLET1.RLDPHPCA.IMXA.D21216.T2225226.V01	(IMT212)
NODLET1.RLDPHPCA.IMXB.D21216.T2225317.V01	(IMT043)
NODLET1.RLDPHPCA.IMXB.D21216.T2234247.V01	(IMT020)
NODLET1.RLDPHPCA.IMXA.D21216.T2234506.V01	(IMT187)
NODLET1.RLDPHPCA.IMXB.D21216.T2236390.V00	(IMT041)
NODLET1.RLDPHPCA.IMXA.D21216.T2236549.V00	(IMT172)
NODLET1.RLDPHPCA.IMXB.D21216.T2239049.V00	(IMT050)
NODLET1.RLDPHPCA.IMXA.D21216.T2239183.V00	(IMT172)
NODLET1.RLDPHPCA.IMXB.D21216.T2241250.V00	(IMT198)
NODLET1.RLDPHPCA.IMXA.D21216.T2241370.V00	(IMT065)
NODLET1.RLDPHPCA.IMXB.D21216.T2243421.V00	(IMT211)
NODLET1.RLDPHPCA.IMXA.D21216.T2243522.V00	(IMF022)
NODLET1.RLDPHPCA.IMXB.D21216.T2245556.V02	(IMT213)
NODLET1.RLDPHPCA.IMXA.D21216.T2246049.V02	(IMT008)
NODLET1.RLDPHPCA.IMXB.D21216.T2248060.V02	(IMT006)
NODLET1.RLDPHPCA.IMXA.D21216.T2248108.V02	(IMT037)
NODLET1.RLDPHPCA.IMXB.D21216.T2250110.V01	(IMT188)
NODLET1.RLDPHPCA.IMXA.D21216.T2250111.V01	(IMT119)
NODLET1.RLDPHPCA.IMXB.D21216.T2252164.V01	(IMT075)
NODLET1.RLDPHPCA.IMXA.D21216.T2252165.V01	(IMT053)
NODLET1.RLDPHPCA.IMXB.D21216.T2254198.V01	(IMF005)
NODLET1.RLDPHPCA.IMXA.D21216.T2254199.V01	(IMT109)
NODLET1.RLDPHPCA.IMXB.D21216.T2256224.V01	(IMT173)
NODLET1.RLDPHPCA.IMXA.D21216.T2256225.V01	(IMT123)
NODLET1.RLDPHPCA.IMXB.D21216.T2258251.V03	(IMT007)
NODLET1.RLDPHPCA.IMXA.D21216.T2258253.V03	(IMT100)
NODLET1.RLDPHPCA.IMXB.D21216.T2300282.V03	(IMT011)
NODLET1.RLDPHPCA.IMXA.D21216.T2300285.V03	(IMT182)
NODLET1.RLDPHPCA.IMXB.D21216.T2302298.V02	(IMT072)
NODLET1.RLDPHPCA.IMXA.D21216.T2302301.V02	(IMT032)
NODLET1.RLDPHPCA.IMXB.D21216.T2304307.V02	(IMT154)
NODLET1.RLDPHPCA.IMXA.D21216.T2304308.V02	(IMT089)
NODLET1.RLDPHPCA.IMXB.D21216.T2306314.V02	(IMT015)
NODLET1.RLDPHPCA.IMXA.D21216.T2306315.V02	(IMT301)
NODLET1.RLDPHPCA.IMXB.D21216.T2308314.V02	(IMT011)
NODLET1.RLDPHPCA.IMXA.D21216.T2308316.V02	(IMF008)
NODLET1.RLDPHPCA.IMXB.D21216.T2310309.V04	(IMF008)
NODLET1.RLDPHPCA.IMXA.D21216.T2310310.V04	(IMT108)
5655-V86 HPCPRINT HPCA REPORT FILE	
655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1	
2021/10/15 11.39.16 HPCA91D (JOB03099) HPCMAIN	
PAGE 3	
NODLET1.RLDPHPCA.IMXA.D21217.T0032517.V07	(IMT067)
NODLET1.RLDPHPCA.IMXB.D21217.T0033596.V07	(IMT031)
NODLET1.RLDPHPCA.IMXA.D21217.T0034531.V07	(IMT162)
NODLET1.RLDPHPCA.IMXB.D21217.T0036010.V07	(IMT207)
NODLET1.RLDPHPCA.IMXA.D21217.T0036543.V07	(IMT153)
NODLET1.RLDPHPCA.IMXB.D21217.T0037572.V07	(IMT178)
NODLET1.RLDPHPCA.IMXA.D21217.T0039079.V07	(IMT174)
NODLET1.RLDPHPCA.IMXB.D21217.T0040017.V09	(IMT046)
NODLET1.RLDPHPCA.IMXA.D21217.T0041084.V09	(IMT127)
NODLET1.RLDPHPCA.IMXB.D21217.T0042031.V09	(IMT020)
NODLET1.RLDPHPCA.IMXA.D21217.T0043123.V09	(IMF000)
NODLET1.RLDPHPCA.IMXB.D21217.T0044044.V08	(IMT176)
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NODLET1.RLDPHPCA.IMXB.D21217.T0047121.V08	(IMT159)
NODLET1.RLDPHPCA.IMXA.D21217.T0053368.V08	(IMT210)
NODLET1.RLDPHPCA.IMXB.D21217.T0055235.V08	(IMT162)

Figure 45. Sample SCAN report - part 2


```

(7)
VOLSER  L/N/O = Log, New master, Old master
-----
IMF000 L  IMT006 L  IMT031 L  IMT050 L
IMF005 L  IMT007 L  IMT032 L  IMT052 L
IMF006 L  IMT008 L  IMT033 L  IMT053 L
IMF007 L  IMT011 L  IMT035 L  IMT058 L
IMF008 L  IMT014 L  IMT037 L  IMT065 L
IMF013 L  IMT015 L  IMT039 L  IMT067 L
IMF016 L  IMT016 L  IMT041 L  IMT072 L
IMF022 L  IMT020 L  IMT043 L  IMT075 L
IMSTL4 N  IMT022 L  IMT045 L  IMT080 L
IMT003 L  IMT028 L  IMT046 L  IMT089 L

HPCABAT0 COND: S000 U0000

HPC9999I HPCA processing complete, COND: S000 U0004
5655-V86 HPCPRINT HPCA REPORT FILE
5655-V86 IMS Recovery Solution Pack for z/OS Version 2 Release 1      PAGE 4
2021/10/15 11.39.16 HPCA91D (JOB03099) HPCMAIN
HPCPRINT ***CLOSED***

```

Figure 46. Sample SCAN report - part 3

Note:

1. The standard IMS HP Change Accumulation Utility report header identifies the IMS HP Change Accumulation Utility version, date, time, and JOB identification.
2. Batch parameters showing the SCAN options.
3. DBRC section. This section includes specific DBRC messages, IMS HP Change Accumulation Utility messages, and condition code for the JCL preparation.
4. IMS HP Change Accumulation Utility setup parameters and calculated values. These parameters are the settings from ISPF setup panels, or from IMS HP Change Accumulation Utility commands from the HPCSYSIN DD file. Limits and sizes are calculated from the setup and from the processed JCL.
5. Each sort procedure is shown with its associated CA group name and the input and output CA master files. Master files display DSN and VOLSER information.
6. The set of logs to be processed in the order shown. Log files display DSN and VOLSER information.
7. Volume serial number list. Each unique VOLSER collected from items 5 and 6 is listed. Each VOLSER is described as L=log, N=new master, or O=old master.

HPCADIAG

The diagnostic file is created when the HPCADIAG DD is allocated. This file is defined with RECFM=VB and LRECL=1024.

The diagnostic file captures a snapshot of IMS HP Change Accumulation Utility processing that includes significant inputs, outputs, intermediate tables, and status. Diagnostics are available in all environments:

- HPCAMAIN
- HPCABAT0
- HPCAE000

The diagnostic file can always be produced. However, this file is intended for use by support personnel in troubleshooting IMS HP Change Accumulation Utility failures.

The file can be very large and the processing necessary to capture the information can have a negative affect on performance. Normally, it is not expected that diagnostics will be captured from production runs of IMS HP Change Accumulation Utility.

Trace

The trace file is created when HPCTRACE DD is allocated. This file is defined with RECFM=VBA and LRECL=137.

Trace commands are used to limit what is included in the trace file. In the absence of trace commands, minimal informational messages and all error messages are traced.

The amount of trace output can be very large. You should not use the **ALL** command unless the session to be traced is relatively small. When used for troubleshooting, trace commands are selectively applied to isolate specific points within an IMS HP Change Accumulation Utility session, thereby limiting the amount of output to be analyzed.

Trace commands are defined in the TRACE section of the command file HPCSYSIN DD. The TRACE section must be located following all IMS HP Change Accumulation Utility commands in the file.

The sample library member HPCADIAG describes several trace commands as an aid to understanding the syntax.

DEBUG

Many debug commands are available to assist IBM support personnel in diagnosing or reproducing IMS HP Change Accumulation Utility failures caused by environmental conditions.

Normally, you would use these commands only when instructed to do so by IBM support personnel.

Debug commands are defined in the DEBUG section of the command file HPCSYSIN DD. The DEBUG section must be located following all IMS HP Change Accumulation Utility commands in the file.

The sample library member HPCADIAG describes several debug commands as an aid to understanding the syntax in case you are instructed by IBM support personnel to use debug commands.

Chapter 17. Gathering diagnostic information

Before you report a problem with IMS HP Change Accumulation Utility to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all IMS HP Change Accumulation Utility problems:

- A clear description of the problem and the steps that are required to re-create the problem
- All messages that were issued as a result of the problem
- Product release number and the number of the last program temporary fix (PTF) that was installed
- The version of IMS that you are using and the type and version of the operating system that you are using

Provide additional information based on the type of problem that you experienced:

For online abends, provide the following information:

- A screen capture of the panel that you were using when the abend occurred
- The job log from the TSO session that encountered the abend
- The job log from the server
- A description of the task that you were doing before the abend occurred

For errors in batch processing, provide the following information:

- The complete job log
- Print output
- Contents of the data sets that were used during the processing

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