E44

DBRC Friend or Foe?

Karen Ranson

IMS TECHNICAL CONFERENCE

Anaheim, California October 23 - 27, 2000

RETURN TO INDEX

DBRC: Friend or Foe?

The world depends on it

E44

DBRC -

IMS depends on it

ITSO

Rick Long - ITSO IMS Specialist

Ricklong@us.ibm.com

Impromptu Survey

- Do you have FORCER set in Production RECONS?
- Do you have FORCE set in Test system RECONS?
- Do you use Production databases without them being registered to DBRC?
- CICS/DBCTL customer using Databases not registered to DBRC?

Friend

- Its Sole Purpose is to ensure database integrity
- Reduces operational/human errors
- Allows a data sharing environment

Foe?

- **Enforcement of procedural rules**
  - Forces the order of some processes
  - Forces the sequence/inclusion of some events
- **Changes to operational procedures**
- **Changes to recovery strategy**
- **Differences in test system environment**

What is DBRC?

- In its simplest form it is those IMS functions which provide database integrity
  - Database authorization processing
  - RECON definitions and usage
  - GENJCL functions for IMS recovery utilities

Related Functions

- Functions not part of DBRC which play an integral part of data integrity
  - IMS logging
  - IMS restart/checkpoint restart
  - Dynamic backout
  - Database utilities
  - Database locking
  - Remote Site Recovery (RSR)

Where is DBRC Required?

- In IMS online environments
  - Database usage is still optional
- When databases are used in a data sharing environment database must be registered
- When DPropNR is used to propagate changes to DB2 tables (IMS Data Propagator)
- When Remote Site Recovery (RSR) is used for tracking changes to databases at a remote site.

What Does DBRC Provide?

- **Database integrity by controlling access via database authorization processing**
  - Controls concurrent updates in a data sharing environment
    - ensure data sharing rules are followed
  - Ensures update procedures have log datasets
    - IEFRDER DD card required (log file for DLIBATCH jobs)
    - Can't be DD DUMMY
  - Ensures operational procedures are followed
    - Image copy needed
    - Recovery needed
    - Backout needed

What Does DBRC Provide? (continued)

- **Creates valid inputs to database recovery utilities**
  - Database recovery
  - Change accumulation
  - Image copy
- **Keeps historical record of update allocations**
  - Which subsystems accutally update the databases
  - Can be used to identify when DB is avialable (SLA targets)
- **Groups databases into recovery groups**
  - Ensure a entire group of DB's is recovered together

Where Do I See DBRC?

- Database allocation/OPEN
- Subsystem startup/termination
- IMS emergency restart
- IMS OLDS switching
- Dynamic backout failure
- Database I/O error
- Database recovery/image copy/reorg

Database Authorization Processing

At database allocation time, IMS will check the status of the database in the RECON and either grant or reject the allocation, thus *authorizing* or *not authorizing* the database for use by this subsystem.

Database Authorization Processing

Basic Question answered by database authorization processing for each database to be opened is:

- **Considering**
  - The RECON status flags for this database
  - The HELD AUTHORIZATIONS of subsystems already using this database (who else has authorized the database and at what level)
  - The ACCESS INTENT of the new subsystem
- **Can this database be authorized to the new subsystem while maintaining database integrity**

Database Authorization Processing

- **Status flags/counters**
  - IC needed
    - Reorg
  - Backout needed
    - Dynamic backout failure
  - Recovery needed
    - Recovery started
    - I/O error
  - Read only
    - Command
  - Prohibit AUTH
    - Command

```
DB
  DBD=DBGAMBP                              DMB#=75      TYPE=IMS
  SHARE LEVEL=1            GSGNAME=**NULL**     USID=0000000004
  AUTHORIZED USID=0000000004  RECEIVE USID=0000000004 HARD
 USID=0000000004
  RECEIVE NEEDED USID=0000000000
  FLAGS:                                          COUNTERS:
    BACKOUT NEEDED           =OFF                    RECOVERY NEEDED COUNT    =0
    READ ONLY                 =OFF                   IMAGE COPY NEEDED COUNT =0
    PROHIBIT AUTHORIZATION=OFF                       AUTHORIZED SUBSYSTEMS    =1
    RECOVERABLE               =YES                   HELD AUTHORIZATION STATE  =6
                                                    EEQE COUNT                =0

 DBDS
  DSN=IMS.SJIMSC.DBGAMBP                                      TYPE=IMS
  DBD=DBGAMBP   DDN=DBGAMBP  DSID=001 DBORG=HIDAM  DSORG=VSAM
  CAGRP=**NULL**  GENMAX=10    IC AVAIL=0     IC USED=1     DSSN=00000003
  NOREUSE        RECOVPD=0
  DEFLTJCL=DBGDFLT  ICJCL=SJIMSCC   OICJCL=DBGOIC
   RECOVJCL=DBGRECOV
   RECVJCL=ICRCVJCL
  FLAGS:                          COUNTERS:
    IC NEEDED      =OFF
    RECOV NEEDED   =OFF
    RECEIVE NEEDED =OFF            EEQE COUNT            =0
```

Database Authorization Processing

- **Access Intent**
  - Exclusive (EX)
  - Update (UP)
  - Read with integrity (RD)
  - Read without integrity (RO)
- **Online - DATABASE x,ACCESS=**
- **Batch - PCB DBD=x,PROCOPT=**
  - Exclusive (L or xE)
  - Update (A,I,D,R)
  - Read with integrity (G)
  - Read without integrity (GO)

Database Authorization Processing

Held Authorization

- Highest access intent of "Running" subsystems which have this database authorized
- "Running" subsystems are defined as those subsystems running and any failed subsystems still holding authorizations until the backout/recovery is completed.
- Note: DLIBATCH is considered a subsystem

```
 DB
 DBD=DBGAMBP                                DMB#=75     TYPE=IMS
 SHARE LEVEL=1          GSGNAME=**NULL**    USID=0000000004

  FLAGS:                                      COUNTERS:
  BACKOUT NEEDED          =OFF                  RECOVERY NEEDED COUNT    =0
  READ ONLY               =OFF                  IMAGE COPY NEEDED COUNT =0
  PROHIBIT AUTHORIZATION=OFF                    AUTHORIZED SUBSYSTEMS    =1
  RECOVERABLE             =YES                  HELD AUTHORIZATON STATE  =6
                                              EEQE COUNT                 =0
ASSOCIATED SUBSYSTEM INFORMATION:
                                     ENCODED  B/O NEEDED
    -SSID-      -ACCESS INTENT-      -STATE-     -COUNT-   -SS ROLE-
    IMSC            UPDATE              6           0        ACTIVE



SYS
 SID=IMSC     LOG START=99.148 13:56:20.9
  SYPE=ONLINE  ABNORMAL TERM=OFF  RECOVERY STARTED=NO      BACKUP=NO
 TRACKED=NO    TRACKER TERM=OFF   SHARING COVERED DBS=NO
 IRLMID=**NULL**  IRLM STATUS=NORMAL      GSGNAME=**NULL**

 AUTHORIZED DATA BASES/AREAS=6      VERSION=6.1
                                 ENCODED
  -DBD-      -AREA-   -LEVEL-  -ACCESS INTENT-  -STATE-
  DBGAMBX    **NULL**    1       UPDATE          6
  DBGAMBP    **NULL**    1       UPDATE          6
  DBGAMAP    **NULL**    1       UPDATE          6
  DBGAMBY2   **NULL**    1       UPDATE          6
  DBGAMBY    **NULL**    1       UPDATE          6
  DBGAMAY    **NULL**    1       UPDATE          6
```

Database Authorization Processing

- **If DBRC fails the authorization**
  - DFS047A - UNABLE TO OBTAIN AUTHORIZATION FOR DATA BASE DBGAMAP . REASON CODE = 05.   IMSC
  - The database is marked as needing an IMAGE COPY (message text from the IMS Messages and Codes manual)

LIST.HISTORY (shows allocations in time sequence)

LIST.HISTORY DBD(DBGAMBP)

```
IMAGE
 RUN    = 99.144 23:23:29.5          *  RECORD COUNT =3
 STOP    = 00.000 00:00:00.0            BATCH      USID=0000000001

IC1
 DSN=IMS.SJIMSC.DBGAMBP.BKUP.G0004V00          FILE SEQ=0001
 UNIT=3390                       VOLS DEF=0001 VOLS USED=0001
                         VOLSER=TSMS18
ALLOC
 ALLOC   =99.144 23:27:01.7          *  ALLOC LRID =0000000000000000
 DSSN=0000000001 USID=0000000002 START = 99.144 23:26:57.4

PRILOG
 START = 99.144 23:26:57.4          *   SSID=RLONGLD1 VERSION=6.1
 STOP  = 99.144 23:27:06.1              #DSN=1
 GSGNAME=**NULL**
 FIRST RECORD ID= 0000000000000001      PRILOG TOKEN= 0

 DSN=IMS.SJIMSC.DBGB01.G0146V00                     UNIT=3390
 START = 99.144 23:26:57.4           FIRST DS LSN= 0000000000000001
 STOP  = 99.144 23:27:06.1           LAST  DS LSN= 0000000000001C9B
 FILE SEQ=0001    #VOLUMES=0001

  VOLSER=TOTTSM STOPTIME = 99.144 23:27:06.1
   CKPTCT=0    CHKPT ID = 00.000 00:00:00.0
```

IMAGE COPY

DLI BATCH JOB

LIST.HISTORY (shows allocations in time sequence)

```
ALLOC
  ALLOC   =99.145 00:05:38.3           *  ALLOC LRID =0000000000000000
  DSSN=0000000002 USID=0000000003 START = 99.144 22:05:12.1

PRILOG
  START = 99.144 22:05:12.1           *   SSID=IMSC    VERSION=6.1
  STOP  = 99.145 12:07:48.1               #DSN=1
  GSGNAME=**NULL**
  FIRST RECORD ID= 0000000000000ABB     PRILOG TOKEN= 0
  EARLIEST CHECKPOINT = 99.139 19:14:03.4

  DSN=IMS.SJIMSC.SLDSP.IMSC.D99144.T2205121.V0C     UNIT=3390
  START = 99.144 22:05:12.1          FIRST DS LSN= 0000000000000ABB
  STOP  = 99.145 12:07:48.1          LAST  DS LSN= 0000000000001595
  FILE SEQ=0001    #VOLUMES=0001
    VOLSER=TOTTS4 STOPTIME = 99.145 12:07:48.1
      CKPTCT=2    CHKPT ID = 99.145 12:07:47.6

 ALLOC
  ALLOC   =99.145 12:11:38.5           *  ALLOC LRID =0000000000000000
  DSSN=0000000003 USID=0000000004 START = 99.145 12:08:53.8

 PRILOG
  START = 99.145 12:08:53.8           *   SSID=IMSC    VERSION=6.1
  STOP  = 00.000 00:00:00.0               #DSN=0
  GSGNAME=**NULL**
  FIRST RECORD ID= 0000000000001596     PRILOG TOKEN= 0
  EARLIEST CHECKPOINT = 00.000 00:00:00.0
```

IMS TM or DBCTL System

Where Do I Start

- Define backup strategy
- Define recovery strategy
- Modify update procedures
- Register databases
- Replace recovery procedures
- Create change accumulation procedures
- Modify test system procedures

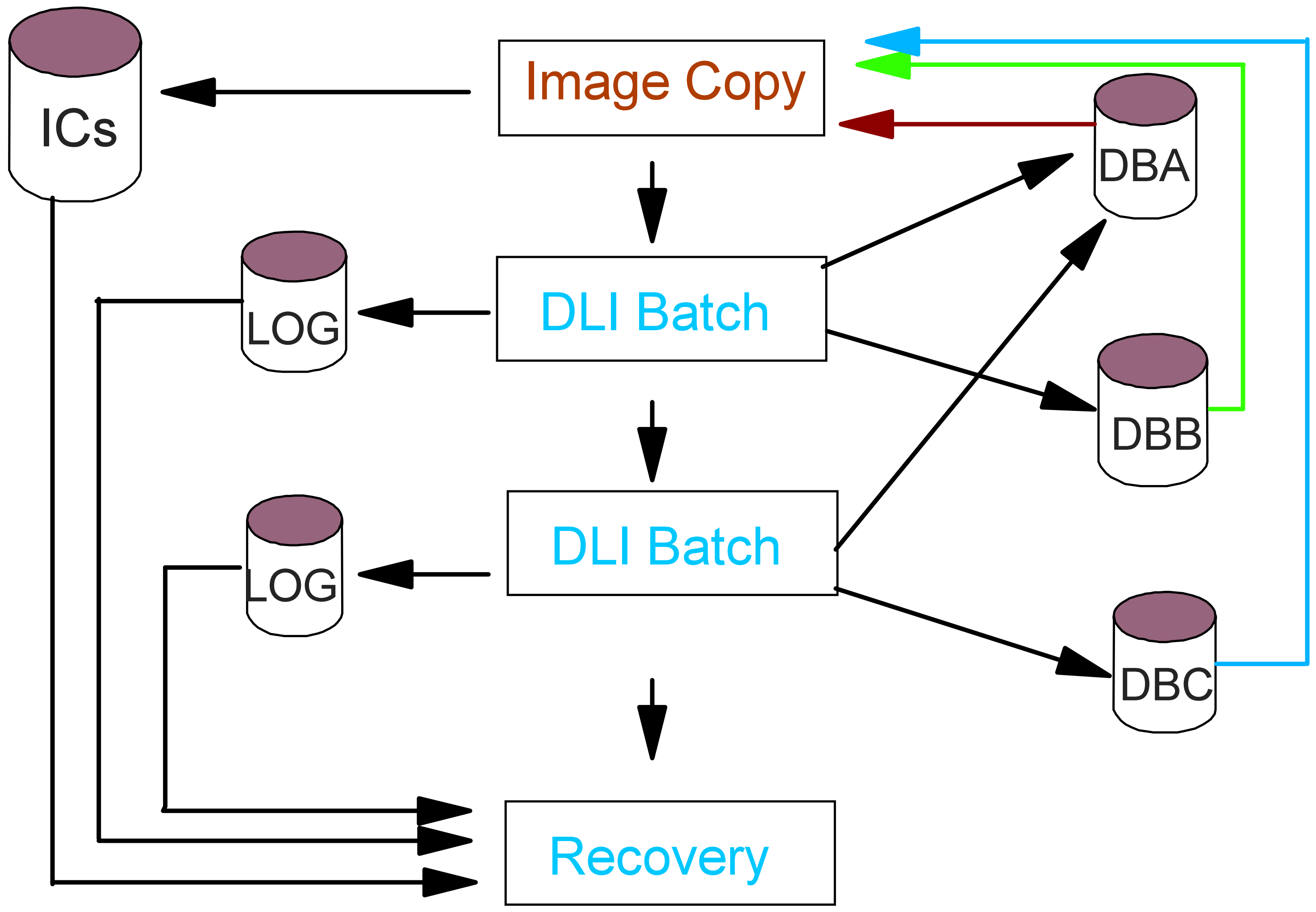
Define Backup Strategy

- **Frequency**
  - Daily/Weekly/Monthly
- **Backup or rebuild secondary indexes**
  - Backup - register as recoverable
  - Rebuild - register as non-recoverable
- **Build JCL or GENJCL**
  - Built JCL can include pointer checker

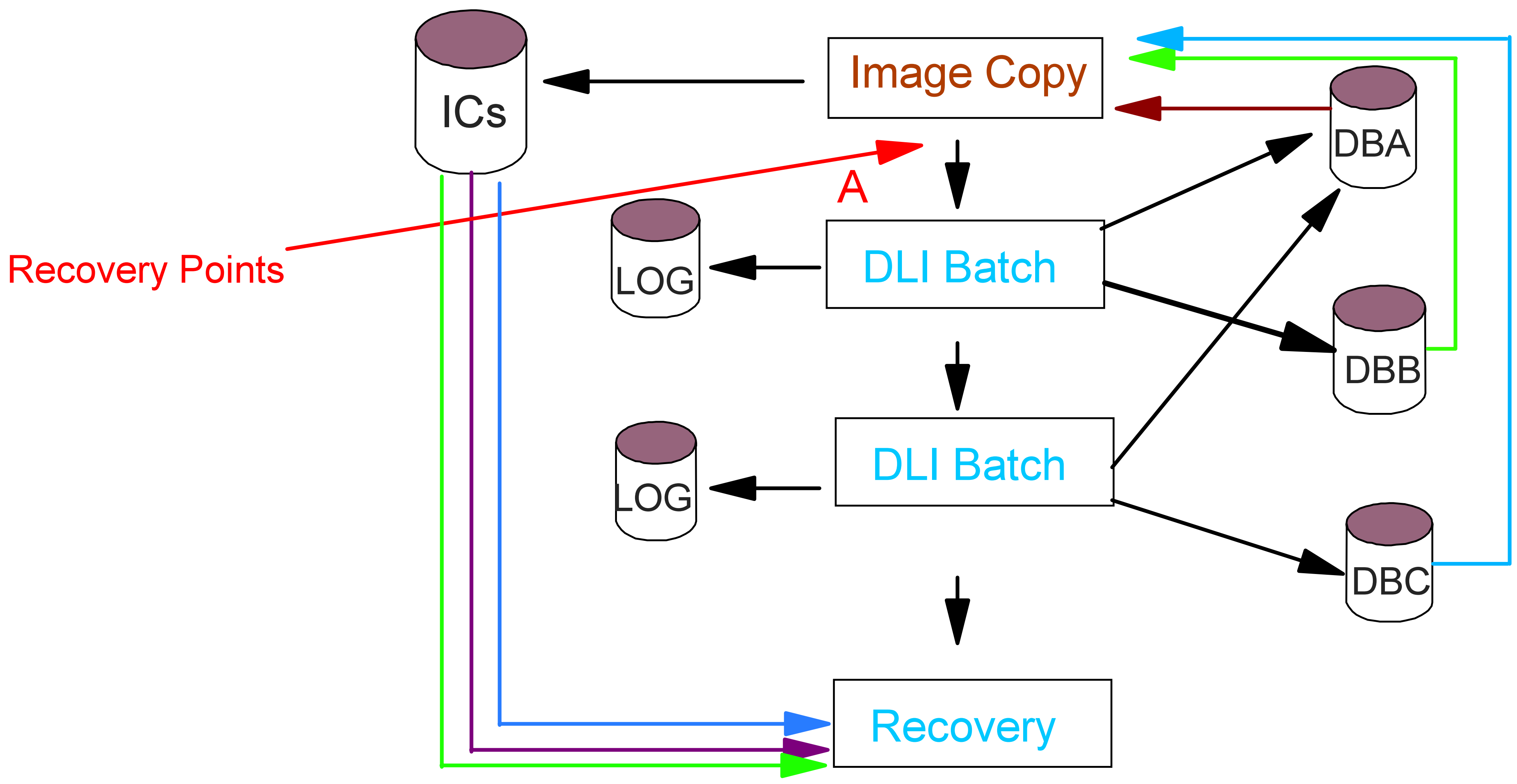
Define Recovery Strategy

- **Database dataset groups**
  - Databases and indexes
  - Logically related databases
  - Application related databases
- **CHANGE ACCUMULATION groups**
  - Fewer groups mean fewer passes of the SLDSs
  - Smaller groups mean quicker recovery time
- **Recovery points**
  - Pre-defined point allows automated recovery jobs

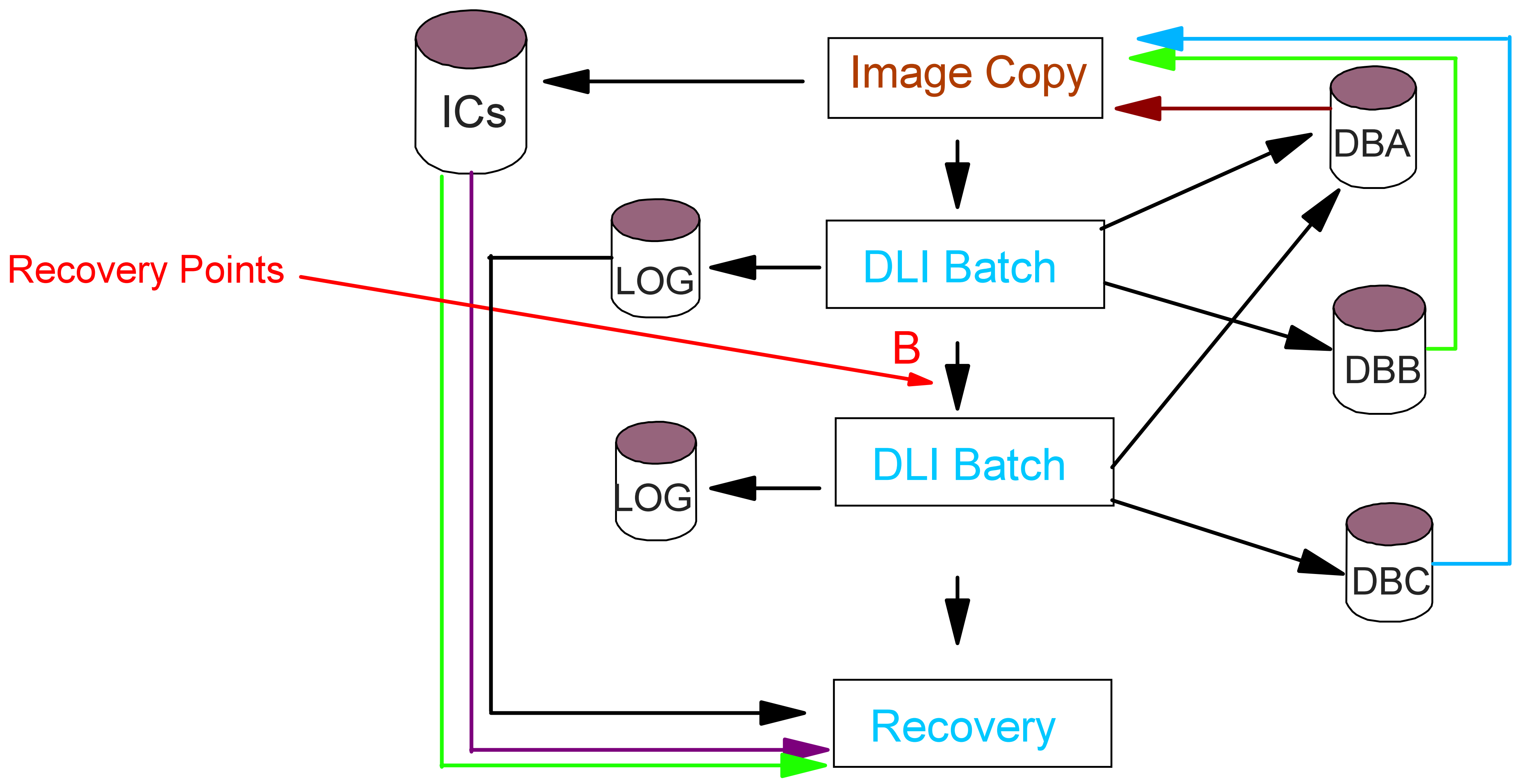
Define Recovery Points



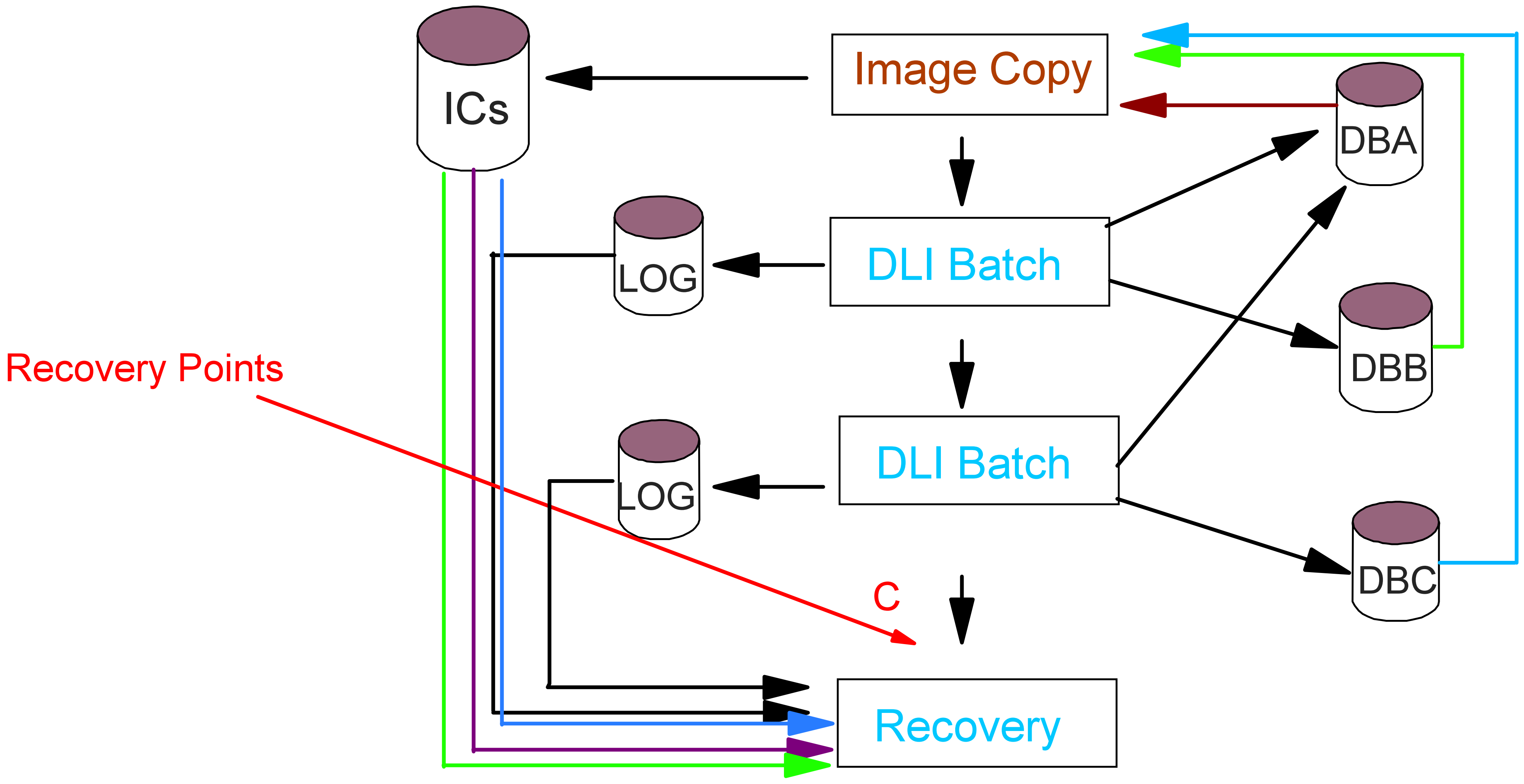
Define Recovery Strategy



Define Recovery Strategy



Define Recovery Strategy



Recovery Points - Students Notes

1. Recovery Point A - recover a group which contains all three databases.

2. Recovery Point B - recover a group which has DBA and DBB only.

3. Recovery Point C - recover a group which has all three databases.

Modify Update Procedures

- JOB PARM needs to have Y in the DBRC Parm
- IEFRDER DD card must be added
  - DSN can not be DUMMY
  - Should be unique DSN
- If IRLM is used
  - IRLMNM=irlmname
  - IRLM=Y
- Dynamic backout can be used to avoid some batch backout requirements
  - BKO=Y

Register Databases

- Running registration requires the DBDLIB
- Sets DEFAULTS skeletal recovery member
- Defines number of IMAGE COPY tracked for a database which defines the recovery window
- Defines database SHARELVL
- Can define a database as NONRECOV
  - Reduces the log records available (used only for backout)
  - Can recover to IMAGE COPY only

Database Registration

```
INIT.DB   DBD(DBGAMAP) -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMAP) -
        DDN(DBGAMAP1) -
        DSN(IMS.SJIMSC.DBGAMAP1) -
        GENMAX(10) -
        DEFLTJCL(DBGDFLT) -
         RECOVJCL(DBGRECOV)
 INIT.DBDS DBD(DBGAMAP) -
        DDN(DBGAMAP2) -
        DSN(IMS.SJIMSC.DBGAMAP2) -
        GENMAX(10) -
        DEFLTJCL(DBGDFLT)  -
        RECOVJCL(DBGRECOV)

INIT.DB   DBD(DBGAMAY) -
        NONRECOV -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMAY) -
        DDN(DBGAMAY) -
        DSN(IMS.SJIMSC.DBGAMAY)  -
        GENMAX(10)  -
        DEFLTJCL(DBGDFLT)  -
        RECOVJCL(DBGRECOV)
```

```
INIT.DB   DBD(DBGAMBP)  -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMBP)  -
        DDN(DBGAMBP)  -
        DSN(IMS.SJIMSC.DBGAMBP)  -
        GENMAX(10)  -
        DEFLTJCL(DBGDFLT)  -
        RECOVJCL(DBGRECOV)

 INIT.DB   DBD(DBGAMBX) -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMBX)  -
        DDN(DBGAMBX) -
        DSN(IMS.SJIMSC.DBGAMBX) -
        GENMAX(10)  -
        DEFLTJCL(DBGDFLT)  -

INIT.DB   DBD(DBGAMBY) -
        NONRECOV  -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMBY) -
        DDN(DBGAMBY) -
        DSN(IMS.SJIMSC.DBGAMBY) -
        GENMAX(10)  -
        DEFLTJCL(DBGDFLT) -
        RECOVJCL(DBGRECOV)
```

```
INIT.DB   DBD(DBGAMBY2 -
        NONRECOV -
        SHARELVL(1)
 INIT.DBDS DBD(DBGAMBY2) -
        DDN(DBGAMBY2)  -
        DSN(IMS.SJIMSC.DBGAMBY2)  -
        GENMAX(10)  -
        DEFLTJCL(DBGDFLT)  -
        RECOVJCL(DBGRECOV)

INIT.DBDSGRP GRPNAME(DBGGRP1 )
MEMBERS(  -
          (DBGAMAP ,DBGAMAP1),  -
          (DBGAMAP ,DBGAMAP2),  -
          (DBGAMAY ,DBGAMAY) ,  -
          (DBGAMBP ,DBGAMBP) ,  -
          (DBGAMBX ,DBGAMBX) ,  -
          (DBGAMBY ,DBGAMBY) ,  -
          (DBGAMBY2,DBGAMBY2))
```

Replace Recovery Procedures

- **Update Skeletal Members**
  - Application based RECOV members
  - Make use of DEFAULTS member for system defaults
    - Library names
    - Change accumulation key size
- **Create GENJCL JOBs**
- **Update OPCA (JOB Scheduler) to track both generating and generated JOBs**

Test System Differences

- **Production systems**
  - Scheduled image copies for all databases
  - Managed SLDS/RLDS datasets
  - Scheduled DB reorgs or DB Loads
  - RECON status of FORCER
  - Unique JOB names
  - One DSN for a DBDNAME

- **Test systems**
  - Infrequent image copies if at all
  - Unmanaged and fewer SLDS/RLDS data sets
  - Unscheduled DB Reorgs or DB loads
  - RECON status of NOFORCER
  - Duplicate JOB names
  - Unit testing DSNs

Image Copies and SLDSs

- **Infrequent image copies and unmanaged SLDS/RLDS data sets**
  - Not all SLDS/RLDS datasets available to do database recovery
    - Create RLDS GDGs with high limits and SMS migrate to cartridge
    - Force recoveries to IC timestamps
  - Large PRILOG records
    - Cycle the IMS system more frequently (daily/weekly)

Unscheduled DB Reorgs or DB Loads

The world depends on it

Unscheduled DB Reorgs or DB loads

- IC needed flag gets set
  - Force the image copy to be run
  - Use the CHANGE.DBDS ICOFF
- IC GENMAX reached if too many DB loads
  - Increase GENMAX to 30 or so
  - Run DELETE.LOG INACTIVE to reduce PRILOG record size

NOFORCER/Unit Testing DSNs

- **Can not use unregistered databases**
  - Use CHANGE.RECON NOFORCER
    - Allows all DBs to be used
    - Warning messages produced
- **More than one DSN for a DBD name**
  - Create recovery jobs to image copies only
    - GENJCL - JCLOUT to library member
    - After creating recovery jobs unregister all databases
  - Make use of Batch Backout jobs to avoid recoveries

Non-Unique JOB Names

- **Unrelated JOBs may have same JOB name**
  - Can not solve this JOB names must be unique
- **Failed DLI JOBs still in RECON**
  - Delete subsystem record
    - CHANGE.SUBSYS SSID(jobname) STARTRCV
    - CHANGE.SUBSYS SSID(jobname) ENDRECOV
    - DELETE.SUBSYS SSID(jobname)

FRIEND

- Provides database integrity
- Provides additional report functions (history)
- Simplifies Recovery

Appendix

APPENDIX

Appendix - Student Notes

These examples in the appendix are intended to give you some examples of how the information in DBRC can be used. They are meant as examples only and may or may not be useful in your installation.

1. The first one is a LIST.HISTORY for a DBDSGRP when you don't want to hard code the members of the group in the command.

2. The second is extracting the DB registration information in the RECON in a form which can be used to re-register that information into another RECON.

3. The third is to just retrieve the IC time and DSN of the databases in a DBDSGRP. This can be useful when you need to create a time stamp recovery and find the time closest to the IC time for a recovery of the group.

Generate LIST.HISTORY - Student Notes

To run a LIST.HISTORY for all the databases in a group without having to look up the group information, this job will create the required job and submit it.

To be sure you get the last IC time for the group, ensure that the members of the group are registered in the order in which they are imaged copied. Use the last DB of the group to get the IC time.

Generate LIST.HISTORY for DBDSGRP

- This JOB will generate another JOB to do a LIST.HISTORY for every database in the DBDSGRP

```
//RLONGHST JOB (@TS1,FA33),'RICKLONG ITSO',
//  NOTIFY=&SYSUID,CLASS=A,MSGCLASS=U
//*
//DBRC      EXEC PGM=DSPURX00,COND=(0,NE)
//STEPLIB    DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
//IMS        DD  DSN=IMS.SJIMSC.DBDLIB,DISP=SHR
//JCLPDS     DD  DSN=IMS.SJIMSC.JCLLIB,DISP=SHR
//JCLOUT     DD  SYSOUT=(*,INTRDR)
//SYSPRINT DD  SYSOUT=*
//SYSIN      DD  *
 GENJCL.USER GROUP(DBGPRIM) MEMBER(LISTGHST)  -
JOB(DBGLJOB) ONEJOB LIST
/*
//
```

Generate LIST.HISTORY for DBDSGRP

- This is the skeletal member named in the MEMBER parm of the GENJCL command

```
LIST.HISTORY  DBD(%DBNAME)
```

- This is the skeletal MEMBER named in the JOB parm of the GENJCL command

```
//RLONLGHT  JOB (999,POK),'RLONG ITSO SJ',
//          CLASS=A,MSGCLASS=U,
//          REGION=6M
//*
//DBRC     EXEC PGM=DSPURX00,COND=(0,NE)
//STEPLIB    DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
//IMS        DD  DSN=IMS.SJIMSC.DBDLIB,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSIN      DD  *
```

Generate LIST.HISTORY for DBDSGRP

- If the DBDSGRP consisted of the following DBS

```
INIT.DBDSGRP GRPNAME(DBGPRIM ) -
 MEMBERS(  -
                  (DBGAMBP ,DBGAMBP),  -
                  (DBGAMBX ,DBGAMBX),  -
                  (DBGAMAP ,DBGAMAP1) ,  -
                  (DBGAMAP,DBGAMAP2), -
                  )
```

- This is the output of the GENJCL command

```
//RLONLGHT  JOB (999,POK),'RLONG ITSO SJ',
//          CLASS=A,MSGCLASS=U,
//          REGION=6M
//*
//DBRC      EXEC PGM=DSPURX00,COND=(0,NE)
//STEPLIB    DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
//IMS        DD  DSN=IMS.SJIMSC.DBDLIB,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSIN      DD  *
LIST.HISTORY  DBD(DBGAMBP)
LIST.HISTORY  DBD(DBGAMBX)
LIST.HISTORY  DBD(DBGAMAP)
```

Extracting Registration Information

This JOB will extract the registration information into a form which can be used to re-register the information. It is effective for copying the information from a test system to a production one.

When would you use this?

1. When creating a test system and you want to test the DBRC functions. To accomplish this you copy the production system registration information to the test system.

2. When upgrading the IMS release and you don't want to use the RECON upgrade utility.

3. When, having tested the DBRC functions in the test system, you want to delete the registration information to either reproduce the same test results or leave the database unregistered during unit testing. You could then recreate the DBRC test case at a later time.

Extracting registration information

- To extract the registration information for a database group the following job can be used

```
//RL0NGCRN JOB (@TS3,FA33),'RICKLONG ITSOSJ
//   CLASS=A,NOTIFY=&SYSUID,MSGCLASS=U
//*
//* GENERATE DB REGISTRATION EXTRACT JOB
//*
//DBRC      EXEC PGM=DSPURX00
//STEPLIB   DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
//JCLPDS    DD  DSN=IMS.SJIMSC.JCLLIB,DISP=SHR
//IMS       DD  DSN=IMS.SJIMSC.DBDLIB,DISP=SHR
//JCLOUT    DD  DSN=IMS.SJIMSC.RUN(REGOUT),DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSIN     DD  *
GENJCL.USER GROUP(DBGPRIM) MEMBER(DBDSREG) -
 LIST  ONEJOB DEFAULTS(DBGGDFLT)
//
```

Extracting registration information

- This is the skeletal member used in the extract registration information
- **Note:** it is a JOB ready to be submitted to re-register that information into a new RECON

```
%DELETE (%STPNO NE '00000')
 //RLONGREG JOB (@TS1,FA-C),'RICK LONG - ITSOSJ',
 //  CLASS=A,NOTIFY=&SYSUID,MSGCLASS=U
 //S%STPNO  EXEC PGM=DSPURX00,COND=(0,NE)
 //STEPLIB    DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
 //IMS        DD  DSN=IMS.SJIMSC.DBDLIB,DISP=SHR
 //JCLPDS     DD  DSN=IMS.SJIMSC.JCLLIB,DISP=SHR
 //JCLOUT     DD  DSN=IMS.SJIMSC.RUN(REGOUT),DISP=SHR
 //SYSPRINT  DD  SYSOUT=*
 //SYSIN      DD  *
 %ENDDEL
 %SELECT DBDS((%DBNAME,%DDNAME))
  INIT.DB DBD(%DBNAME) SHARELVL(1)
  INIT.DBDS DBD(%DBNAME)  -
  DDN(%DBDDN) -
  GENMAX(%MAXGEN) DSN(%DBDSN) -
  ICJCL(%JCLIC) -
  RECOVJCL(%JCLRECV) -
  DEFAULTS(%JCLDFLT)
 %ENDSEL
```

RETURN TO INDEX

Extract DB IC times from DBDSGRP

- **Extract the list IC Time for a DBDSGRP**
  - This can be used to obtain an IC time to perform a recovery.
  - Must use the last IC time for the group to get the correct recovery results
  - Getting the DSN helps to verify the results

```
//RLONGICX JOB (@IMS,FA-C),'RICK LONG - DBG',MSGCLASS=V
//DBRC    EXEC PGM=DSPURX00,COND=(0,NE)
//STEPLIB  DD  DSN=IMS.SJIMSC.RESLIB,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
GENJCL.USER GROUP(DBGPRIM) MEMBER(ICTIME) LIST -
NOJOB  USERKEYS(%WHICHIC,'LAST')
/*
```

```
%SET TIMEFMT(,N)
%SELECT IC ((%DBNAME,%DDNAME),%WHICHIC)
%DBNAME  %ICTIME      %ICDSN
%ENDSELECT
```

```
DBGAMAP  991581400049     IMS.SJIMSC.DBGAMAP1.BKUP.G0012V00
DBGAMAP  991581400064     IMS.SJIMSC.DBGAMAP2.BKUP.G0012V00
DBGAMBP  991581400074     IMS.SJIMSC.DBGAMBP.BKUP.G0012V00
DBGAMBX  991581400085     IMS.SJIMSC.DBGAMBX.BKUP.G0012V00
```