

Managing your ICF Catalogs

With Catalog Recovery Plus

Agenda

- Role of ICF Catalogs and Challenges in ICF Catalog Management
- Why You Need Catalog Recovery Plus to assure Data Accessibility

Recognize Your Risks!

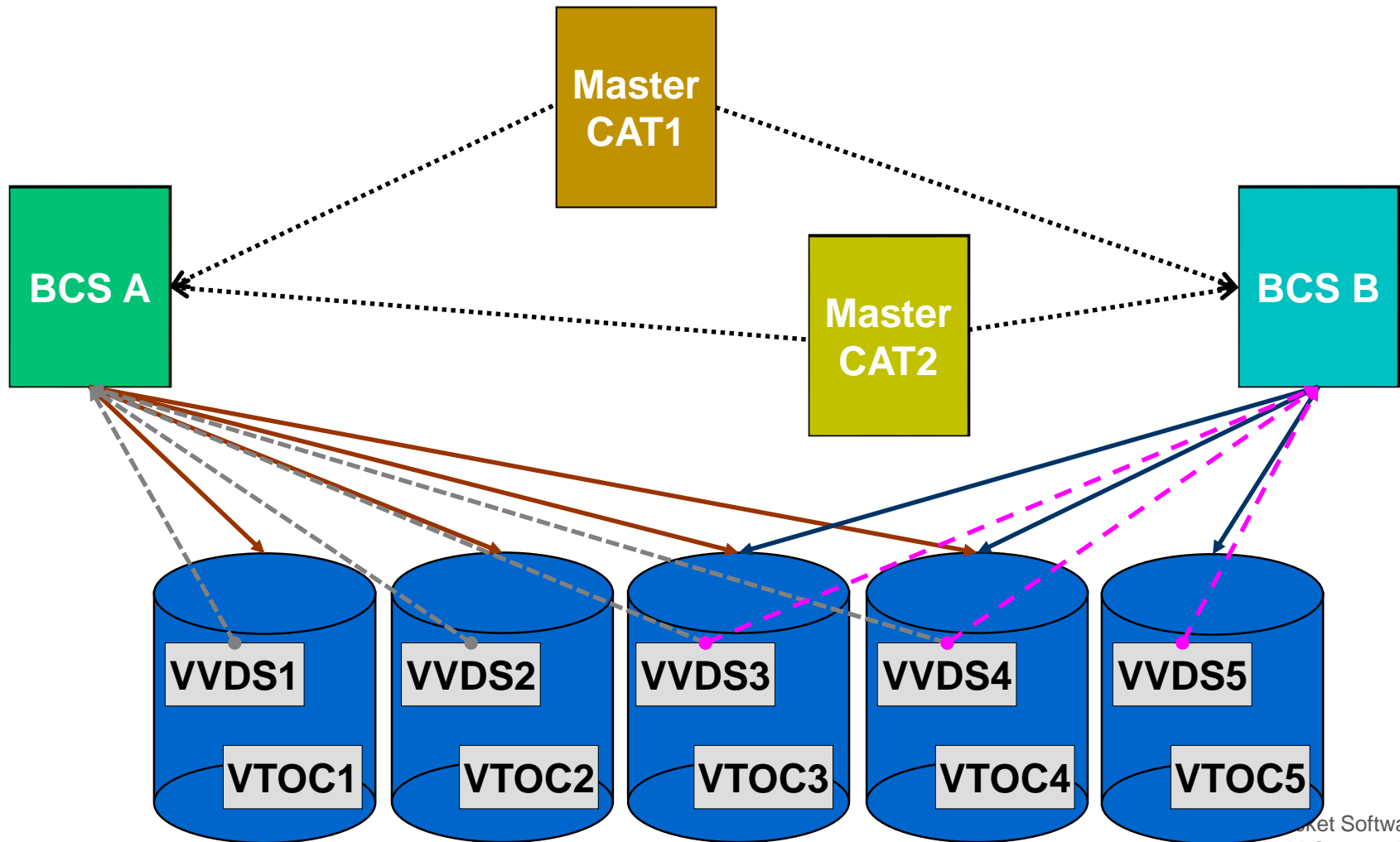
Recognize Your Risks

- ICF Catalogs are extremely critical to z/OS
 - All current and migrated data is cataloged
 - Cataloged data is not accessible if the catalog is not available
- The reason why this is so critical:
 - You probably have a very high number of data sets
 - You probably have a very low number of catalogs

ICF Catalog Structure – to remember:

- An ICF User Catalog is a KSDS called BCS (Basic Catalog Structure)
 - It contains a list of data set names and the ids of the volumes these data sets reside on
- An ICF User Catalog has an extension on each volume that is referenced in the BCS
 - This extension is called the VVDS
 - There is one VVDS per volume
 - Thus, a VVDS can be used by multiple BCS
- User Catalogs are referenced in the Master Catalog
 - The right User Catalog for a data set is located by the alias of the data set (usually its high level qualifier)
 - The Master Catalog is needed at IPL time
 - Ideally, an alternate Master Catalog should be available

ICF Catalog Structure – to remember:



Why You Need CR+

Catalogs – Questions to ask yourself

- What is your current plan for Backup and Recovery of ICF Catalogs?
 - Do you rely on Full Volume dumps? On IDCAMS REPRO?
- Have you ever tested your catalog recovery procedures?
 - With ICFRU?
 - Have you ever tried to recover a VVDS of a DB2 volume?
- Do you regularly run catalog diagnostics, checking for inconsistencies?
- Would the point-in-time recovery of a catalog make this catalog out-of-sync with the reality on your disk volumes?
- If you had to recover a Production catalog, how long would it take to synchronize with the data on the volumes?
 - And if this is the catalog with your TSO user ids?
- If you were unable to access Production data, how would that effect your Company's business?
 - And if this is the catalog for your DB2 systems?

Catalogs – Questions to ask yourself

- What is your current plan for backup and recovery of ICF Catalogs?
 - Do you rely on Volume dump and PRO?
- Have you ever experienced a catalog failure?
 - With ICEPU2?
 - Have you ever had to restore a catalog?
- Do you regularly check for catalog inconsistencies?
- What happens if you find a catalog out-of-sync?
- If you had a catalog failure, how long would it take to re-synchronize the catalog?
 - And if this is the catalog for your IS user ids?
- If you were unable to access Production data, how long would it take to restore your Company's business?
 - And if this is the catalog for your DB2 systems?

Wouldn't it help you if you could

✓ **Backup,**

✓ **Recover**

✓ **Repair**

✓ **Reorganize**

your ICF catalogs with no outage?

**If yes,
continue reading!!!**

CR+ – Features Overview

- ISPF Interface to generate command syntax and JCL for all catalog management functions
 - Full function and easy to use
 - Build JCL for any CR+ command with ease
 - JCL can be saved to the library of your choice
 - Intuitive, with on-screen messages and help
 - Display catalog and volume environment
 - Issue CAS reporting commands on-screen
- Consistent command structure
 - Syntax based on IDCAMS
- The interface with CAS and the Coupling Facility provides integrity, so catalogs don't have to be quiesced for day-to-day activities
 - Full, shared access integrity, equal to support within CAS
 - Supports VVDS-mode and ECS-mode sharing
- Most commands support **simulation** to verify results in advance

Command simulation support is provided in all major commands of CR+ to enable testing of commands and functions prior to running them "for real". This can save a lot of time and identify possible errors before actual execution. This is particularly useful for forward recovery testing on a regular basis.

CR+ – ISPF Main Menu

```

Menu  Diagnostics  Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER                      45 MERGECAT
   10 BACKUP                    50 RECOVER
   15 CATSCRUB                  55 REORG WHILE OPEN
   20 DIAGNOSE                  60 REPORT
   25 EXPLORE                   65 SUPERCLIP
   30 GENERATE                  70 TAPEAUDIT
   35 LISTSMF                   75 ZAP
   40 MAP
  
```

Because some CR+ operations are potentially dangerous, you can control a user's access to specific CR+ commands through FACILITY class profiles that are recognized by RACF®, ACF2, and Top Secret.

CR+ - CAS Interface

```

Menu  Diagnostics  Preferences
-----
Rev: 9          ACM - Search for Catalog (1 of 4)          Row 1 to 7 of 7
Command ==>>>                                     scroll ==>> PAGE

Primary Commands: B mask,D mask,R mask,          *Alloc to CAS(Y/N),S-SMS, V-VLF
                  REfresh, Prt, Sort aco1 sequ   D-Del, I-ISC, C-Closed, R-Shared
scroll RIGHT or LEFT for more information.      A-ATL, E-ECS, L-Locked

Line Commands: AG,AL,AS,B,D,I,R,S
Catalog Name or Mask                               Volser Ext Alias Strno Catalog
C **                                               Count          Status*
-----
CATALOG.ARPLEX01.DB2.CAT1                          *ERROR          0          N-----
CATALOG.ARPLEX01.MASTER                            MCA100          1          0          2 Y-I-R-
CATALOG.ARPLEX01.TSO.CAT1                          MCA100          1          145         2 Y-V-R-
CATALOG.ARPLEX01.USERCAT                          MCA100          1          21          2 Y-V-R-
CATALOG.RSRTE.CAT1                                R3P201          1          3           2 YSI-R-
PDJSUN.UCAT.CAT.TEST1                             TSA102          1          0           3 YSI-RL
PDJSUN.UCAT.CAT.TEST2                             TSA101          1          0           3 YSI-RL
***** Bottom of data *****

```

The CR+ ISPF interface is a comprehensive, full-function, easy to use interface which can be used by customers with all skill levels and provides a quick "at-a-glance" view of the status of the catalog environment.

Use the command GENERATE BCS-LIST to obtain this list in a batch sysout

CR+ - BCS Backup

- You can back up one, many or every BCS on the system, with a single CR+ command, including the master catalog, without ever forgetting a new BCS!
- Powerful ACS masking identifies those BCSs to back up, with a single CR+ command, in a single output file
 - Including VSAM DIAGNOSE, INDEXTEST/DATATEST, VERIFY etc
- ALIAS definitions are also backed up upon request
- A fuzzy backup or a clean backup
- You can backup multiple catalogs in parallel
- You can also backup the VVDS or any other VSAM file
- You can take multiple (duplex) backups

CR+ - BCS Backup in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 3          ACM - Submit BACKUP BCS
Command ==>>> █

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

More: +

Required keywords:
_ (s)elect from list... 1 Catalog(s) selected
OUTPUT Data Set Name => 'CSCORN.ODS.CATALOG.BACKUP.DSN'
OUTFILE (DDName)     => DD1      OUTPUT data set must not exist

Optional keywords:
ALIAS                 => Y       Y or N
DIAGNOSE-BCS         => N       Y or N
- ACCEPT-DIAGNOSE    => W       I -Informational, W -Warnings, E -Errors
- DIAGNOSE-ERROR-LIMIT => 16      0-2147483647
- IGNORE-DIAGNOSE-WARN => N       Y or N
DISPOSITION          => O       0 -OLD, S -SHR
EXAMINE
- ACCEPT-EXAMINE     => W       I -Informational, W -Warnings, E -Errors,
D -Disaster
- DATATEST           => N       Y or N
- INDEXTEST          => Y       Y or N
- EXAMINE-ERROR-LIMIT => 16      0-2147483647
- IGNORE-EXAMINE-WARN => N       Y or N

```

Normally a GDG

CR+ - BCS Backup in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 3          ACM - Submit BACKUP BCS
Command ==>

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

More: -
- ACCEPT-EXAMINE      => W      I -Informational, W -Warnings, E -Errors,
                        D -Disaster
- DATATEST            => N      Y or N
- INDEXTEST           => Y      Y or N
- EXAMINE-ERROR-LIMIT => 16     0-2147483647
- IGNORE-EXAMINE-WARN => N      Y or N
EXCLUDE-BCS(..)      => N      Y or N
EXCP-MODE             => N      Y or N - SPAN only valid when EXCPMODE=Y
- SPAN-DATASET Name   => _____
- SPAN-FILE           => _____ SPAN-DATASET data set must not exist
EXPLICIT-VERIFY       => N      Y or N
FATAL-CATALOG-ERROR   => _____ W -Warning, or E -Error
MASTERCATALOG         => CATALOG.ARPLEX01.MASTER'
MESSAGE-TEXT          => F      N -None, F -Full
PARALLEL              => _____ 1-16
PRINT                 => N      N -None, D -Data, K -Key
RESERVE               => N      Y or N
SIMULATE              => N      Y or N
VERBOSE               => Y      Y or N
  
```

An option to run a multi-threaded parallel backup can reduce the time required to complete backup processing, thus enabling the opportunity to make backups more frequently.

Running the BACKUP command in simulation mode with all diagnostics turned on simplifies the execution of the diagnostics and provides the same detailed summary report to facilitate error identification.

CR+ - BCS Backup Report

Display Filter View Print Options Search Help

SDSF OUTPUT DISPLAY CSCORNA JOB07614 DSID 103 LINE 47 COLUMNS 02- 133
 COMMAND INPUT ==> █ SCROLL ==> CSR

Backup Summary Report

Started Backup on: 20 Mar 2013 at: 06:18:28.92
 Ended Backup on: 20 Mar 2013 at: 06:18:29.23

BCS name	-----R e t u r n C o d e s-----				Backed Up?	Total Records
	Diagnose	Examine	Verify	Backup		
PDJSUN.UCAT.CAT.TEST1	n/a	0	n/a	0	Yes	4
Number of BCS selected:	1					
Number of BCS backed up:	1	Total records:	4	Total bytes:		
Number of BCS not backed up:	0					

Backup processing provides a simulation capability and produces a detailed summary report at the end of the sysout. No other product provides a summary report which minimizes the time required to identify errors.

CKM02139I Close complete for OUTPUT DDNAME=DD1
 CKM01001I IBM Tivoli Advanced Catalog Management for z/OS
 CKM02009I BACKUP function complete. Return code 0

20 MAR 2013 06.18.28 PAGE: 2

CKM01008I Commands processed: 1
 CKM01009I Program execution complete. Highest return code was 0

***** BOTTOM OF DATA *****

CR+ - BCS (Forward) Recovery

- You can recover a BCS from a backup taken with CR+ (or IDCAMS EXPORT) in a simple one-step process
 - You can update the alias definitions in multiple master catalogs if this was a shared catalog
 - You can reallocate the catalog, even with a new name
 - But then you must allow the tool to update the VVDS backpointers
- If you have to recover a BCS (or a VVDS) to a specific point in time beyond the backup time, SMF records are the only practical way
 - This is called Forward Recovery
 - If you don't have SMF records, you can only recover to the backup time and all subsequent catalog changes are lost
 - You can concatenate multiple SMF data sets, they don't have to be synchronized with the recovery point-in-time and they don't have to be sorted
- For forward recovery, these SMF record types are required:
 - Type 61 – Data set define / Type 65 – Data set delete / Type 66 – Data set alter
 - Type 60 – VVDS update
- BACKUP and RECOVER provide error messages if this SMF data is not being collected by your system

CR+ - BCS (Forward) Recovery in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 4          ACM - Submit RECOVER BCS          Top of data
Command ==>>>

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

Required keywords:
BCS Name          => 'PDJSUN.UCAT.CAT.TEST1'
INFILE (DDName)   => DD1
INDATASET         => 'CSCORN.ODS.CATALOG.BACKUP.DSN'
ALIAS             => A  A -ALIAS, N -NOALIAS, O -ALIASONLY

Optional keywords - General:
ECSHARING         => _  A -Add, R -Remove, or blank
EXCLUDE-BCS      => N  Y or N
INTO-EMPTY       => N  Y or N
NODEFINE         => N  Y or N
LOCK             => Y  Y -LOCK, N -NOLOCK, L -LEAVE-LOCKED
MASTER-CATALOG   => N  Y or N
  (s) select from list... No Master Catalogs selected
PRINT            => N  N -None, D -Data, K -Key
SIMULATE         => _  D -DEFINE, R -RESTORE, or blank
Add GENDEFCC     => N  Y or N  Delete and Define commands
Assign to SYSOUT? => N  Y or N
GENDEFCC DSNName =>

```

RECOVER provides a **simulation** option which allows testing of the entire recovery process in advance of execution.

INTOEMPTY Y means that we will recover into an existing empty BCS

NODEFINE Y means that we will recover into an existing BCS

Simulate the actual BCS redefinition or the actual recovery

CR+ - BCS (Forward) Recovery in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 4          ACM - Submit RECOVER BCS
Command ==>>>

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

Optional keywords - FORWARD recovery:
Recover FORWARD      => N      Y or N
SMF Data Set         =>
FROM Date/Time       => 20000101 000000  yyyyymmdd hhmmss
TO Date/Time         => 20130320 062555  yyyyymmdd hhmmss
SMFERR Data Set      =>

Optional keywords - DASD management:
EXTENT-CONSOLIDATION => N      Y or N
NEW-DATA-PRIMARY     => _____ or Increase/Decrease by => _____ %
NEW-DATA-SECONDARY   => _____ or Increase/Decrease by => _____ %
NEW-INDEX-PRIMARY    => _____ or Increase/Decrease by => _____ %
NEW-INDEX-SECONDARY  => _____ or Increase/Decrease by => _____ %
NEW-VOLSER           => _____

Optional keywords - renaming BCS:
DELETE-OLD-BCS       => N      Y or N
JOURNAL Data Set     => _____
Generate DEFINE      => Y      Y or N
  
```

RECOVER also allows the changing of many allocation attributes during recovery processing and will automatically remove IMBED and REPLICATE if they are found to be present.

CR+ - BCS (Forward) Recovery in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 4          ACM - Submit RECOVER BCS
Command ==>>> _____

(S) SELECT AN OPTION:
_ Build JCL/Edit for submit

Optional keywords - renaming BCS:
DELETE-OLD-BCS    => N   Y or N
JOURNAL Data Set => _____
Generate DEFINE  => Y   Y or N
NEW-NAME Data Set => _____
VVDS-UPDATE      => Y   Y or N

Optional keywords - SMS management (do not enter class for default):
NEW-DATACLAS     => N   C or N   Class: _____
NEW-MGMTCLAS     => N   C or N   Class: _____
NEW-STORCLAS     => N   C or N   Class: _____

Optional keywords - VSAM management:
NEW-BUFND        => _____ 3 - 255
NEW-BUFNI        => _____ 2 - 255
NEW-CA-FSPC      => _____ 0 - 100
NEW-CI-FSPC      => _____ 0 - 100
NEW-DATA-CISZ    => _____ Numeric and valid CI size
NEW-INDEX-CISZ   => _____ Numeric and valid CI size
  
```

CR+ - Reorganisation While Open

- Works on shared, open, and active BCS's, if so desired (in-place)
 - CR+ synchronizes between LPARS in the case of shared catalog
 - For a shared catalog, an CR+ job is started manually or by the CR+ started task on all LPARs that share the catalog
 - Only 1 job is the real reorg job
 - The other jobs are notification jobs that aid in the synchronization
 - The duration of the synchronization attempt is a parameter
 - A console reply is also optional (WTOR instead of WTO)
- Unloads and reloads "in-place" or to another volume
- Optionally creates standard CR+ BACKUP(s)
- REPAIR corrects for any index or data structural errors found during unload

CR+ - Reorganisation While Open in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 2          ACM - submit REORG while open          Top of data
Command ==>>> _____

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

User comments:
_____  

_____  

_____

Required keywords:
BCS              (?) => 'PDJSUN.UCAT.CAT.TEST1'

Optional keywords - General:
BACKUP           => N          Y or N
- OUTPUT Data Set Name => _____
- OUTFILE (DDName)  => _____ OUTPUT dataset must not exist
EXTENT-RELEASE   => N          Y or N
NEW-VOLSER       => _____
NO-REPLY         => N          Y or N
REPAIR           => N          Y or N
SIMULATE         => Y          Y or N
SYSTEM           => Y          Y or N
  
```

Reorganization and repair while open with CR+ operates on BCSs in-place in most cases.

Simulation capability is available for advance testing.

CR+ - Reorganisation While Open in ISPF

```

Menu  _Diagnostics  _Preferences
-----
Rev: 2          ACM - Submit REORG while Open          No primary selected
Command ==>>> _____

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

User comments:
_____  

_____  

_____

More:  - +

SYSTEM dialog    => Y          Y or N
WAIT             => 5          1 - 99
WHILE-OPEN       => Y          Y or N
Optional keywords - Data Component Attributes:
NEW-BUFND        => _____ 3 - 255
NEW-CA-FSPC      => _____ 0 - 100
NEW-CI-FSPC      => _____ 0 - 100
NEW-DATA-CISZ    => _____ 512 - 8192, multiples of 512
                                     8192 - 32768, multiples of 2048
NEW-DATA-PRIMARY => _____ 1 - 9999999
NEW-DATA-SECONDARY => _____ 0 - 9999999
NEW-DATA-SPACETYPE => _____ CYL TRK KB MB
NEW-STRNO        => _____ 2 - 255
  
```

Many allocation attributes can be changed during REORG processing and structural errors can be repaired.

CR+ - Reorganisation While Open in ISPF

```

Menu Diagnostics Preferences
-----
Re Co      Select System Names
(S)        Rev: 0                               Row 1 to 2 of 2
          Command ==> _____ Scroll ==> PAGE
          Primary Commands: A(dd) xxxxx, D(elete) xxxxx
          Line Commands: P(rietary), S(econdary), c(lear)
US
          C System Name                          Status
          -----
          | AR07                                Primary
          | AR08                                Secondary
          | ***** Bottom of data *****
          | More: +
Re BC
Op BA
-
- OUTFILE (DDName) =>          OUTPUT dataset must not exist
EXTENT-RELEASE     => N        Y or N
NEW-VOLSER         =>
NO-REPLY           => N        Y or N
REPAIR             => N        Y or N
SIMULATE           => Y        Y or N
SYSTEM             => Y        Y or N
  
```

CR+ detects that 2 systems can be impacted. One of them will be the primary system where the reorg will be executed, and the other ones are secondary systems that must be monitored.

Exception: reorganization of a non ECS managed catalog can be simulated in a single CR+ job (i.e. a primary job only).

CR+ - Reorganisation While Open in ISPF

```

Menu Diagnostics Preferences
-----
Re      Build JCL Warning
CO
(S)     The JCL to be displayed was built from the options specified
S       on the previous panel. Verify all JCL statements are correct,
        then type 'SUB' on the command line to submit the JCL.
US      Press ENTER to continue

        This job will be executed on: AR08. Job 1 of 2

More:   +

Required keywords:
BCS      (?) => 'PDJSUN.UCAT.CAT.TEST1'

Optional keywords - General:
BACKUP   => N           Y or N
- OUTPUT Data Set Name =>
- OUTFILE (DDName)    =>          OUTPUT dataset must not exist
EXTENT-RELEASE => N           Y or N
NEW-VOLSER   =>
NO-REPLY    => N           Y or N
REPAIR      => N           Y or N
SIMULATE    => Y           Y or N
SYSTEM      => Y           Y or N
    
```

CR+ generates 2 JCLs that must be executed on the right system. The JCL for the primary system is the last one.

Hint: use the parameter JECL_STATEMENT in MCRINI

CR+ - Diagnostics

- BCS-VVDS compares one or more BCSs to all related VVDSs, e.g. looking for cataloged data sets that don't exist
 - Output is a problem description report and a fix file with all necessary IDCAMS commands.
 - Review the fix file and submit
 - Standard IBM IDCAMS Diagnose is 1-to-1
- VOLUME-BCS compares one or more VVDSs and VTOCs to all related BCSs, e.g. looking for data sets that exist but aren't cataloged
 - Output is a problem description report and a fix file with all necessary IDCAMS commands.
 - Review the fix file and submit
 - Standard IBM IDCAMS Diagnose is 1-to-1
- VVDS-VTOC compares each specified VVDS to its associated VTOC, looking for volume allocation inconsistencies (especially VSAM!)

CR+ - Diagnostics in ISPF

```

Menu  Diagnostics  Preferences
-----
Rev: 7                      CR+ - Select DIAGNOSE Function
Command ==> _____

Select the Type of DIAGNOSE to Perform:

1  DIAGNOSE ALIAS
2  DIAGNOSE BCS
3  DIAGNOSE BCS-VVDS
4  DIAGNOSE VVDS-VTOC
5  DIAGNOSE VOLUME-BCS
6  DIAGNOSE MCAT-MCAT

11 DIAGNOSE ICFCAT (AMS Command)
12 DIAGNOSE VVDS   (AMS Command)
13 EXAMINE  BCS   (AMS Command)
    
```

DIAGNOSE BCS
looks only inside a
BCS

**DIAGNOSE MCAT-
MCAT**
compares non
alias entries in 2
master catalogs

CR+ – MergeCat While Open

- Moves [or copies] all or selected entries from one BCS to another BCS quickly, easily and completely:
 - Moves aliases if LEVEL specified
 - Updates ALIAS associations in the current and / or in an alternative master catalog
 - Updates backpointers in VVDS
 - CR+ synchronizes between LPARS for shared catalogs, also while open (TCP/IP between STC's to synchronize)

- Safe:
 - Uses a journal file for backout and restart capabilities



CR+ – MergeCat in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 11          ACM - Submit MERGECAT
Command ==>>> █

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

Required keywords:
INBCS          (?) => 'CATALOG.RSRTE.CAT1'
OUTBCS         (?) => 'PDJSUN.UCAT.CAT.TEST1'
JOURNAL Data Set => 'CSCORN.MY.JOURNAL'
- Generate DEFINE => Y   Y or N

Optional keywords:
Mode           =>     R -RESTART, B -BACKOUT
COPY-ONLY      => N   Y or N
- Generate OUTBCS DEFINE => Y   Y or N
DIAGNOSE-BCS   => N   Y or N
- ACCEPT-DIAGNOSE => W   I -Informational, W -Warnings, E -Errors
EXAMINE
- DATATEST     => N   Y or N
- INDEXTEST    => Y   Y or N
- ACCEPT-EXAMINE => W   I -Info, W -Warn, E -Error, D -Disaster
FATAL-CATALOG-ERROR =>     W -Warning, E -Error
LOCK           => Y   Y or N
MASTERCATALOG  =>  
  
```

More: +

Standard MERGECAT processing (while the data sets are not in use for the entries being moved) provides a unique backout and restart capability as well as much faster execution time than other options.

CR+ – MergeCat in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 11          ACM - Submit MERGECAT
Command ==>>> _____

(S) SELECT AN OPTION:
  _ Build JCL/Edit for submit

More:  - +

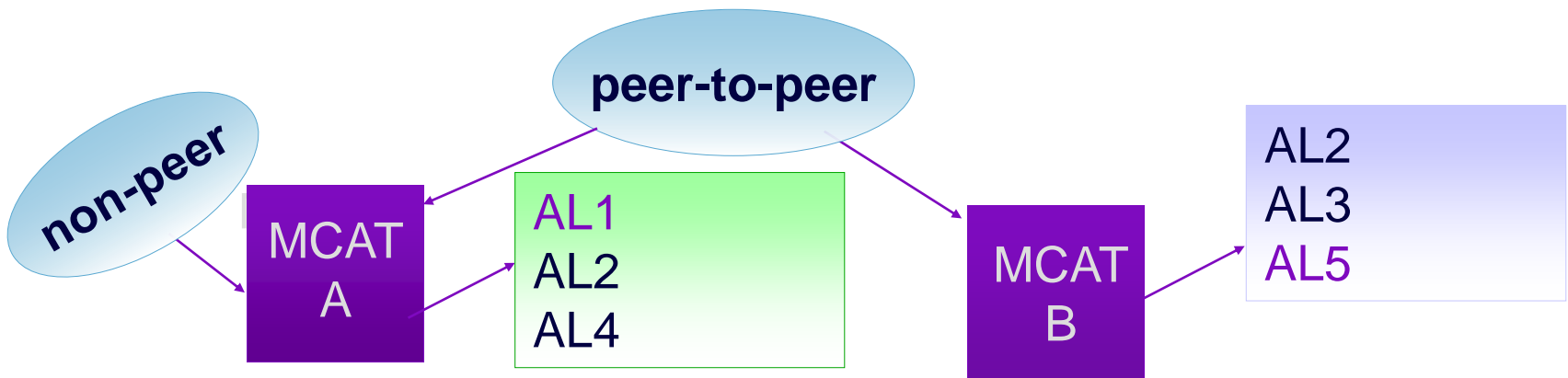
MASTERCATALOG      => _____
  FROM-MASTER-CATALOG => _ Y or N
  TO-MASTER-CATALOG  => _ Y or N
MAXDUPS            => 0 # of Duplicates Allowed (0 - 99999)
MOVE-ALIAS         => N Y or N  _ (S) CAT ==>>> None Selected
MOVE-IN-USE        => _ Y or N
SHORT-ENQ         => NONE NONE, INBCS, OUTBCS, BOTH
SIMULATE          => Y Y or N  Required
TERSE             => N Y or N
VVDS-UPDATE       => Y Y or N
WHILE-OPEN        => N Y or N
- SINGLE          => N Y or N
- EXCLUDE-SYSTEMS => N Y or N
- WAIT            => 05 # of HLQ block retry minutes (0 - 99)

Data Set options: (Use either LEVEL or ENTRIES selection Mode)
LEVEL (Aliases)   => Y Y or N  _ (S) Alias ==>>> 01 Selected
EXCLUDE-LEVEL     => _ Y or N
ENTRIES (DSNs)    => _ Y or N  S (S) DSN ==>>> None Selected
  
```

The CR+ MERGECAT command supports moving entries from one catalog to another while the data sets are open and in use. No other catalog product provides this support.

CR+ - Master Cat Synchronization

- Diagnosis of the alias definitions in two master catalogs with a 'fix' capability to synchronize the two master catalogs
- Three modes of support:
 - Peer-to-peer
 - The lists of alias entries in the two master catalogs must be identical (i.e. both master catalogs will have the 5 aliases AL1, AL2, AL3, AL4 and AL5)
 - Non-peer
 - The alias entries in the first master catalog must be present in the second master catalog (i.e. MCAT B will also have AL1 and AL4, but MCAT A is not changed)



CR+ - Master Cat Synchronization in ISPF

```

Menu Diagnostics Preferences
-----
Rev: 2          ACM - Submit DIAGNOSE ALIAS
Command ==>>> _____

(S) SELECT AN OPTION:
 s Build JCL/Edit for submit

Required keywords:
COMPARE
  (S)elect from list... 2 Catalog(s) selected
PEER                => N      P -Peer, N -NonPeer, U -NonPeer-Unconditional

Optional keywords:
DEFINE-ALIAS        => N      Y or N
DELETE-ALIAS        => N      Y or N
EMPTY-ALIAS         => N      Y or N
EXCLUDE-ALIAS(..)   => N      Y or N
EXCLUDE-BCS(..)     => N      Y or N
FIXDATASET          => JC01.SYNC.FIX'
FIXFILE             => SYNCDD
INCLUDE-ALIAS(..)   => N      Y or N
INCLUDE-BCS(..)     => N      Y or N
LIST-ALIAS          => N      Y or N
- COUNT            => N      Y or N
  
```


More Power for You ...!

CR+ – More power for you ...

```

Menu  D_iagnostics  P_references
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER                      45 MERGE
   10 BACKUP                     50 RECOV
   15 CATSCRUB                    55 REORG
   20 DIAGNOSE                    60 REPOR
   25 EXPLORE                     65 SUPER
   30 GENERATE                    70 TAPEAU
   35 LISTSMF                     75 ZAP
   40 MAP

X Exit
  
```

CR+ provides a facility to map the internal structure of a VSAM KSDS or BCS. The command allows you to see where CA splits have occurred and the record insertion patterns for a file.

A recommendation report is produced for improvements to CI size and buffer values to improve performance.

CR+ – More power for you ...

```

Menu  D_iagnostics  P_references
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER                      45 MERGECAT
   10 BACKUP                     50 RECOVER
   15 CATSCRUB                   55 REORG WHILE OPEN
   20 DIAGNOSE                   60 REPORT
   25 EXPLORE                    65 SUPERCLIP
   30 GENERATE                   70 TAPEAUDIT
   35 LISTSMF                    75 ZAP
   40 MAP

    X Exit
  
```

CR+ provides a diagnostic feature which will compare the contents of a BCS against the RMM, TLMS or CA-1 tape management system database to identify uncataloged data sets on tape, or catalog entries for tape data sets which no longer exist.

CR+ – More power for you ...

```

Menu  _Diagnostics  _Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER                      45 MERGECAT
   10 BACKUP                    50 RECOVER
   15 CATSCRUB                  55 REORG WHILE OPEN
   20 DIAGNOSE                  60 REPORT
   25 EXPLORE                   65 SUPERCLIP
   30 GENERATE                  70 TAPEAUDIT
   35 LISTSMF                   75 ZAP
   40 MAP

X Exit
  
```

CR+ provides a function to create IDCAMS commands for symbolically cataloged data sets to reduce the effort and potential errors involved in preparation for an IPL with a new SYSRES volume.

CR+ – More power for you ...

```

Menu  _Diagnostics  _Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER                      45 MERGECAT
   10 BACKUP                    50 RECOVER
   15 CATSCRUB                  55 REORG WHILE OPEN
   20 DIAGNOSE                  60 REPORT
   25 EXPLORE
   30 GENERATE                  70 TAPE
   35 LISTSMF                   75 ZAP
   40 MAP

X Exit
  
```

Catalog synchronization at disaster recovery: CR+ provides deletion ("scrubbing") of entries from fully populated catalogs. Other products have recently begun to develop similar commands which do not match the capability and performance of the CR+ CATSCRUB command. CATSCRUB provides control to keep or delete entries based on type, data set name or volume serial.

CR+ – More power for you ...

```

Menu  _Diagnostics  _Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

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    0 Issue CAS Commands          2 Search for DASD Volume
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Commands:
    5 ALTER                      45 MERGECAT
   10 BACKUP                    50 RECOVER
   15 CATSCRUB                  55 REORG WHILE OPEN
   20 DIAGNOSE                  60 REPORT
   25 EXPLORE                   65 SUPERCLIP
   30 GENERATE                  70 TAPEAUDIT
   35 LISTSMF                   75 ZAP
   40 MAP

    X Exit
  
```

ZAP any BCS, VVDS, VTOC or VSAM data set (and with a Simulate or Execute Option)

CR+ – More power for you ...

```

Menu  _Diagnostics  _Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

      0 Issue CAS Commands          2 Search for DASD Volume
      1 Search for Catalog          3 Search for Storage Group

Commands:
      5 ALTER                      45 MERGECAT
     10 BACKUP                    50 RECOVER
     15 CATSCRUB                  55 REORG WHILE OPEN
     20 DIAGNOSE                  60 REPORT
     25 EXPLORE                   65 SUPERCLIP
     30 GENERATE                  70 TAPEAUDIT
     35 LISTSMF                   75 ZAP
     40 MAP

      X Exit
  
```

Explore your ICF catalogs or VOLCATS

Use Report to make nice reports of the output of Explore

Use the MQFL language to do additional processing like generating IDCAMS or HSM or Tape Management commands

CR+ – More power for you ...

```

Menu  _Diagnostics  _Preferences
-----
      IBM Tivoli Advanced Catalog Management for z/OS v2.4
Command ==> _____

Enter an option from the list below:

    0 Issue CAS Commands          2 Search for DASD Volume
    1 Search for Catalog          3 Search for Storage Group

Commands:
    5 ALTER
   10 BACKUP
   15 CATSCRUB
   20 DIAGNOSE
   25 EXPLORE
   30 GENERATE
   35 LISTSMF
   40 MAP

    X Exit
  
```

CR+ provides a capability to allow you to rename or delete a non-VSAM data set where there is a similarly named data set on another volume that is enqueued. It also provides the ability to rebuild and resynchronize the NVR for SMS-managed non-VSAM data sets. No other product provides this feature.

Summary

CR+ - Summary

- Catalog Recovery Plus offers:
 - ICF catalog backup and forward recovery
 - Extensive diagnosis and repair facilities
 - Reorganize and repair catalogs while open
 - High speed split/merge/copy utility
 - VSAM data set backup and recovery
 - Comprehensive disaster recovery support
 - VSAM KSDS and BCS internal mapping for improved performance
 - Audit and synchronization of master catalog aliases
 - Validation of BCS and tape management system pointers
 - And more!

CR+ - Summary

- Catalog Recovery Services:

- ICF catalog recovery

- Extensive

There is no more pain to

- ✓ **Backup**

- R...

- ✓ **Recover**

- High

- ✓ **Repair**

- C...

- ✓ **Reorganize**

- Year...

- Audit and synchronization of master

- Validation of BCS and tape management

- And more!

**Your business data is
always accessible**

