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IMS Backup & Recovery Insurance – Are you covered?

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Session Number : 10816

Agenda

- Backup and Recovery Solution for IMS from BMC Software
  - Bundling functionality provides complete coverage
    - Image Copy Plus
    - Change Accumulation Plus
    - Recovery Plus
    - Recovery Manager
    - Recovery Advisor
  - Customer recovery situations
    - Remember- 80% of recovery due people & process issues
    - Mayhem is everywhere
    - Mayhem is coming
    - Are you prepared?

Database Backup – Are you covered?

- Typically still taken via an Image Copy
  - Most critical component of a Backup & Recovery
  - Several different types depending on availability requirements
    - Batch, Incremental, Concurrent (Online),Snapshot
- Image Copy is the most frequently run IMS utility
  - Are you SURE it executed successfully?
  - Are you SURE you have a useable backup?

Image Copy – Are you protected against mayhem?

- Client Backup Strategy
  - Online image copies Monday-Friday
  - Weekly Sunday post Reorg image copies
- Scenario
  - Job Scheduler issue-daily image copy jobs not submitting
  - Mayhem strikes & recovery needed
  - Recovery JCL generated & submitted
  - Realized by the amount of log input something wrong
    - Databases already deleted -oops

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Recovery Assets – Ensuring coverage

- How do you REALLY know recovery assets are available?
  - DBRC
    - Register your databases
    - Check RECONS for assets
  - Verify assets are cataloged
    - Just because DBRC knows about it doesn't mean the dataset still exists!
  - Develop procedures which validate in both the DBRC RECONS & MVS Catalog that your recovery assets will be available when/if you need them
  - OR…..

BMC Backup and Recovery Solution for IMS Recovery Advisor component

- Ensures Recovery Assets are available when needed
- Checks for several exceptions such as
  - IC Dataset not cataloged
  - IC Dataset in error
  - Min # of IC's not available
    - GENMAX value or specified parameter value
  - No IC within time range
    - User specified time range of hours or days
- Pro-active notification
  - Recovery Advisor lets you know if there's any problem with image copy so you're better prepared for mayhem

False sense of security -
Do you have enough coverage?

- Problem scenario – Too much log input not enough sort work space
  - Mayhem occurs mid-week
    - Recovery needed
  - Recovery input - weekend image copy + 3 days of log input
    - 700+ logs
    - Recovery failed
      - *Change accumulation of 700+ logs unable to complete*
      - *No method to limit log input*

BMC Software BRI Solution –

- Change Accumulation flexibility
  - Optional SYSIN keywords cards limit log input
    - CATIME
      - *Time after which no logs included in the change accum run*
      - *Includes logs with start time less than or equal to CATIME*
      - *Additional logs may be included if incomplete DB updates*
    - MAXLOGS & MINLOGS
      - *Indicate maximum/minimum number of logs to include*
      - *Additional logs may be included if the specified logs contain incomplete database updates*
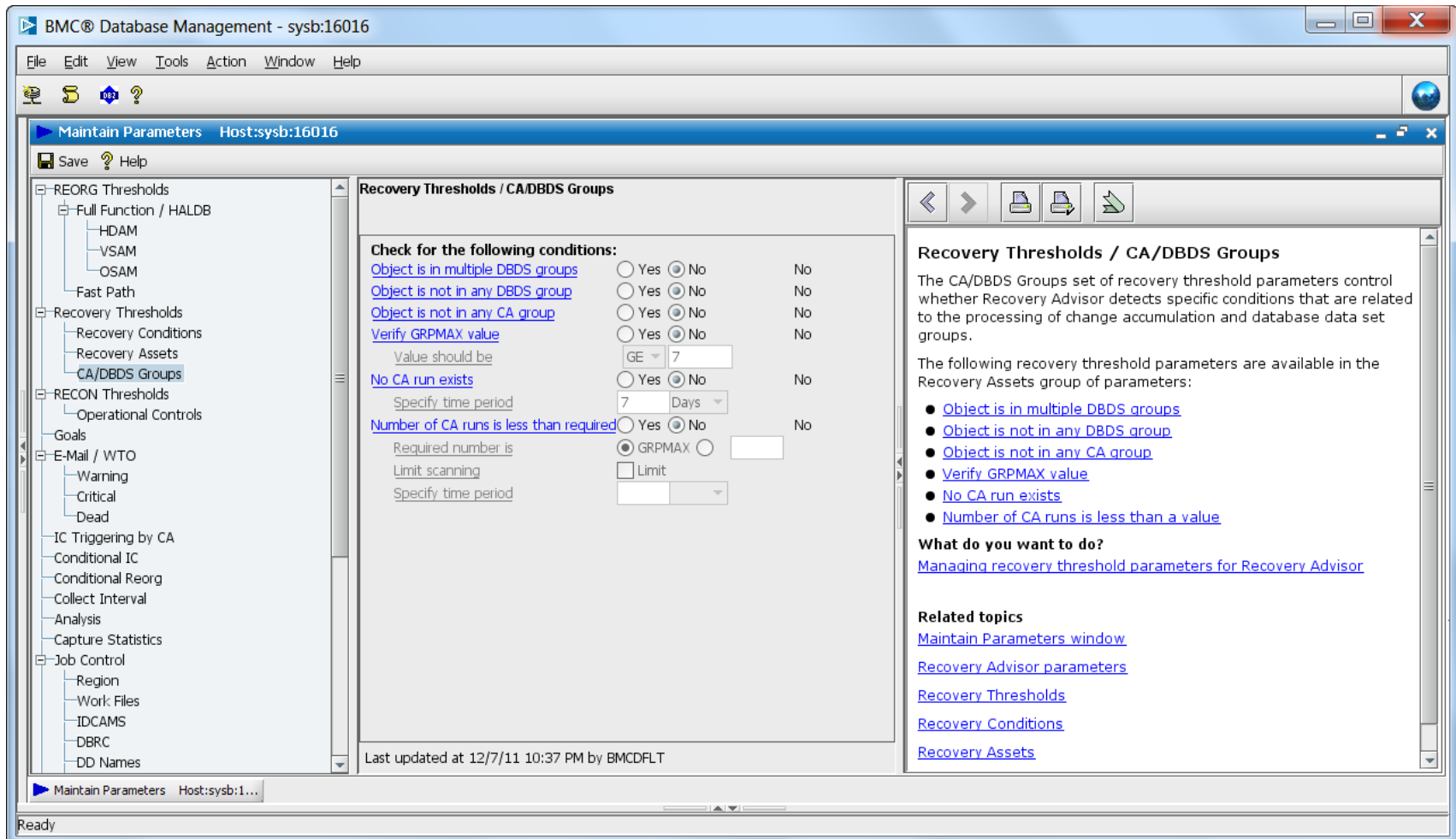
BMC Backup and Recovery Solution for IMS Recovery Advisor component

- Recovery Advisor verifies change accumulation datasets are available if needed

- Checks for several exceptions such as
  - CA Dataset not cataloged
  - CA run in error
  - Min # of CA's not available
    - GRPMAX value or specified parameter value
  - No CA within time range
    - User specified time range of hours or days
  - DBDS not in a change accum group

BMC Backup and Recovery Solution for IMS Recovery Advisor component

- ## CA/DBDS Thresholds

BMC Backup and Recovery Solution for IMS Recovery Advisor component

- Recovery Advisor IC Trigger by CA Feature
  - Automation to ensure CA data set does not grow too large to be processed effectively during database recovery
  - Manages the size of the CA data set for a CA group through automated IC processing of the objects
  - User defines what "too big" means

Recovery Advisor – IC trigger by CA Feature

Multiple damages under one claim – Recovering several databases in one job

- Typically recovery involves multiple databases
- For Disaster Recovery, it's a set game plan
- For Local Recovery, each situation is unique
- How flexible is your recovery solution in creating recovery groups?
  - BMC Software BRI solution provides
    - Multiple methods to create recovery groups
      - *Adhoc groups*
      - *Groups built from information in DBRC*
      - *Groups built based on how we typically recover*
        - *PSB name, CA Group. DBDS Group, IMS ID, etc.*
    - Provides group validation process

Multiple damages under one claim – Recovering several databases in one job

- Scenario:
  - Entire application must be recovered
  - Attempting to recover large number of databases -a few very large databases along with several small ones
  - Lots of log data
  - Not enough resources to complete recovery – several resubmissions, elongating the outage & wasting processing resources

Don't let recovery of multiple databases be a disaster!

- BMC BRI Solution – Automatic Restart Feature
  - Tracks completed tasks during a utility job step execution
  - If job step fails & is resubmitted, completed tasks not repeated
  - No JCL or control statements changes required prior to resubmitting
  - Saves elapsed time & processing resources by preventing reprocessing of completed work
  - Especially useful in recovery scenarios where large numbers of databases are being recovered
    - Local or disaster recovery

I don't own a lake house –
I don't need flood insurance

- Don't think backup & recovery solutions are needed, think again..
- Scenario:
  - Client has mirrored DASD
  - Application change caused data corruption
  - Point-in-time recovery required
  - IMS recovery utility has no PIT recovery
  - Database was corrected programmatically but with considerable customer impact

When recovery to current is not appropriate- Things to think about

- DB Quiesce
  - Creates a valid timestamp
    - Intended use is to create a coordinated disaster recovery point
  - Needs to be executed
    - When & how often?
    - Will you have the opportunity to obtain as needed?
  - Allows for timestamp recovery NOT point-in-time recovery

When recovery to current is not appropriate- Things to think about

- Point-in-time recovery
  - Does your solution provide PIT recovery capability?
  - How do you identify a common, consistent recovery point for a group of databases?
  - How to you evaluate the impact of any data loss?

BMC Software BRI Solution Recovery Manager – Log Analysis Feature

- Recovery points & windows from IMS SLDSs
  - IMS SLDSs & RECON PRILOG records contain information about
    - Online transactions
    - Batch message processing programs (BMPs)
    - Online reorganization (OLR) BMPs
  - Analysis indicates time ranges when updates were occurring & time ranges when updates *were not occurring*
  - A time range when no updates were occurring indicates the presence of a recovery window
  - Recovery windows can be selected for recovery by the BMC Recovery Utility (PIT recovery)

Recovery Manager – Log Analysis Feature (LGA)

- Finding common database recovery windows
- LGA function is executed for databases A,B,C
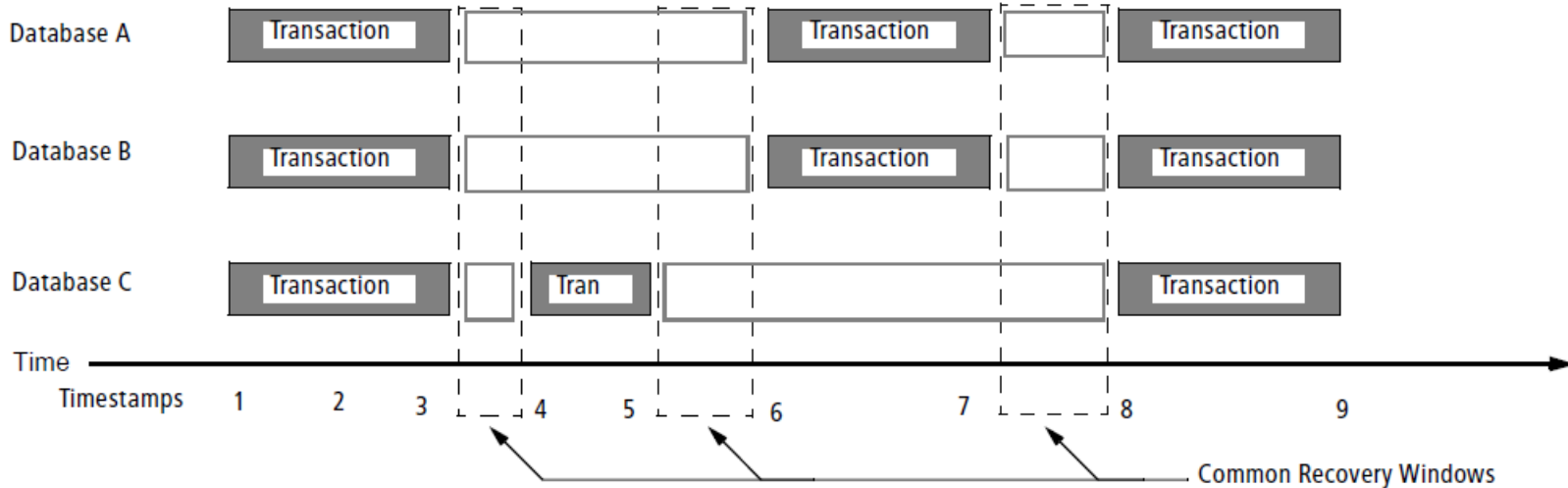
The person who hit you has no insurance – What do you do?

- How do you analyze the impact of the recovery you are about to perform?
- LGA Function from BMC BRI Solution can help
  - Scans log data sets gathering update activity data
    - Full-function : reports statistics about DL/I call activities, such as the number of insert, delete, and replace operations performed.
    - For Fast Path areas: reports statistics about DEDB control interval (CI) updates.
  - Reports transaction counts for each type of transaction.
    - Use to analyze the impact of the transactions in the recovery window

Log Analysis

Log Analysis

Log Analysis

```
                Log Analysis Transaction Subset for IRMQFIM0 Row 1 to 4 of 4
Start: 11/03/2010 14:49:00.0  End: 11/03/2010 14:53:00.0      Commands: SORT
                                                                       Find, Locate
For Object:  DI21PART DI21PART BMCIRM.QA.DB.DI21PART.DI21PART
Type an action code. Then press Enter.
   T=Transaction occurrence list    O=Object subset


Act     Transaction    Occurrences    Updated Objects
 T       ADDINV         259                1
 _       ADDPART        260                1
 _       DLETINV        259                1
 _       DLETPART       259                1
************************************** Bottom of data ********************************







Command ===> _____  Scroll ===> PAGE
 F1=HELP        F2=SPLIT       F3=END        F4=RETURN      F5=RFIND      F6=RCHANGE
 F7=UP          F8=DOWN        F9=SWAP       F10=LEFT       F11=RIGHT     F12=RETRIEVE
4B                       :00.1                                               02/64
```

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Log Analysis

```
               Log Analysis Transaction Occurrence List for IRM Row 1 to 11 of 259
Start: 11/03/2010 14:49:00.0  End: 11/03/2010 14:53:00.0         Commands: SORT
                                                                           Find
Transaction:   ADDINV                                                      Locate
Select a transaction occurrence to display detail. Then press Enter.
    S=Select


    Start       Start       End         End          DL/I      DEDB       IMS
Sel Date        Time        Date        Time         Calls     Updates    ID
s   11/03/2010 14:49:00.1  11/03/2010 14:49:00.2      1           0       IR2W
=   11/03/2010 14:49:00.1  11/03/2010 14:49:00.1      1           0       IR2V
_   11/03/2010 14:49:00.4  11/03/2010 14:49:00.5      1           0       IR2W
_   11/03/2010 14:49:00.4  11/03/2010 14:49:00.5      1           0       IR2V
_   11/03/2010 14:49:00.8  11/03/2010 14:49:00.9      1           0       IR2W
_   11/03/2010 14:49:00.8  11/03/2010 14:49:00.8      1           0       IR2W
_   11/03/2010 14:49:00.8  11/03/2010 14:49:00.8      1           0       IR2V
_   11/03/2010 14:49:01.2  11/03/2010 14:49:01.2      1           0       IR2V
_   11/03/2010 14:49:01.3  11/03/2010 14:49:01.4      1           0       IR2W
_   11/03/2010 14:49:01.4  11/03/2010 14:49:01.4      1           0       IR2V
_   11/03/2010 14:49:01.7  11/03/2010 14:49:01.8      1           0       IR2W

Command ===> _____  Scroll ===> PAGE
 F1=HELP      F2=SPLIT       F3=END        F4=RETURN     F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN        F9=SWAP       F10=LEFT      F11=RIGHT    F12=RETRIEVE
4B                   :00.3                                                   11/02
```
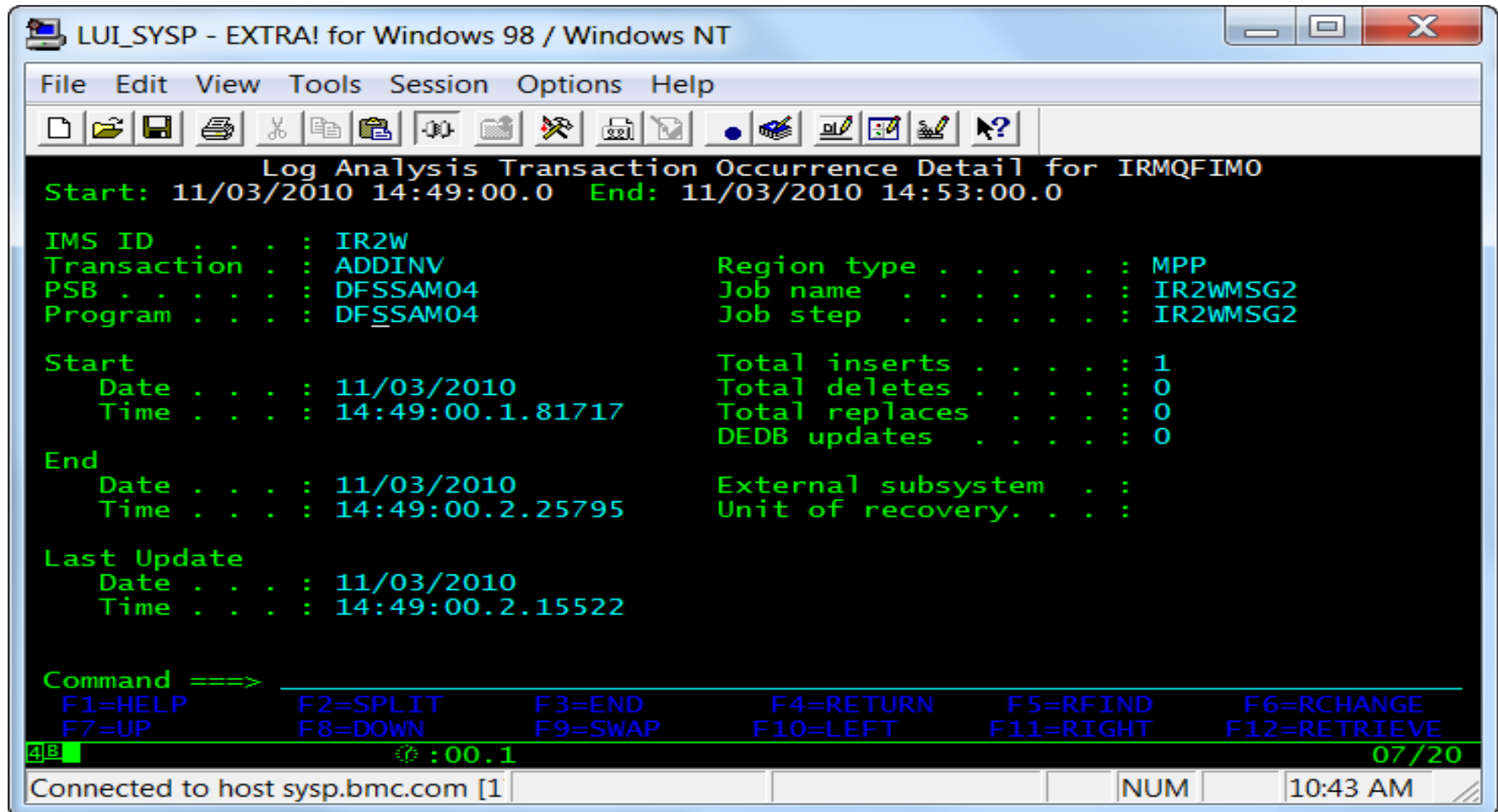
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Log Analysis

Environmental changes –
May require additional coverage

- DR system level sync points
  - BMC Software BRI – DR PIT
    - Created by RECON Cleanup Utility
    - Earliest close time of all open PRILOG records
  - What about IMSPLEX environments?
    - BMC Software BRI – Log Sync Function
      - *Establishes a consistent disaster recovery point by synchronizing log switches for multiple IMS systems*
      - *Issues /SWI OLDS CHKPT to all IMS in the sharegroup*
      - *Checks for DL/I batch updates & you control if you want to start the function*
      - *Specify timeout value which stops function if log archival not completed*

Not filing a claim – just want to review my coverage

- Does your recovery solution allow you to create test database using production assets?
- BMC BRI Recover to Alternate Database Name Feature
  - No need to stop the original databases to build recovery JCL
  - Utility to create AMSPDS members with alternate data set, volume, and SMS class values.
  - Resulting alternate databases used for testing or other purposes.

Are you ready for recovery?

- Disaster Recovery procedures typically tested but how about local recovery?

- Do you have a way to test local recovery procedures?

- BMC Software BRI Solution – Recovery Simulation Function

    - Practice generating recovery JCL

    - No /DBR commands created in simulation JCL

    - All recovery input files read but no output files created

    - Allows verification of recovery results without updating any elements in the environment
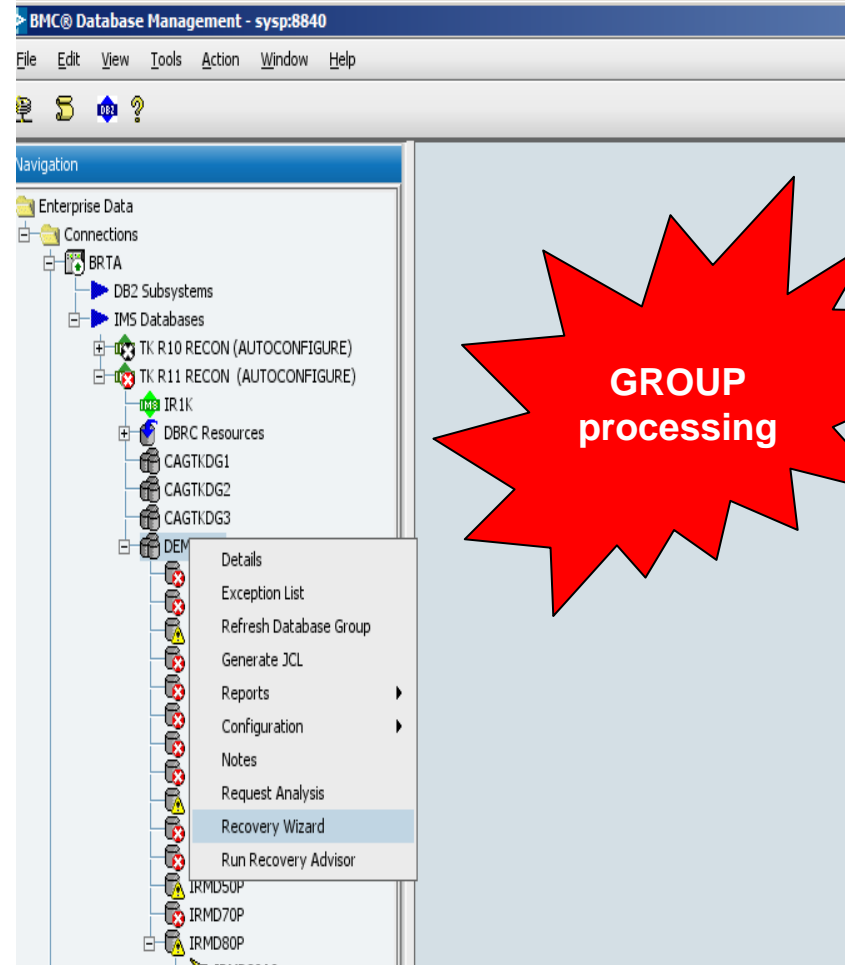
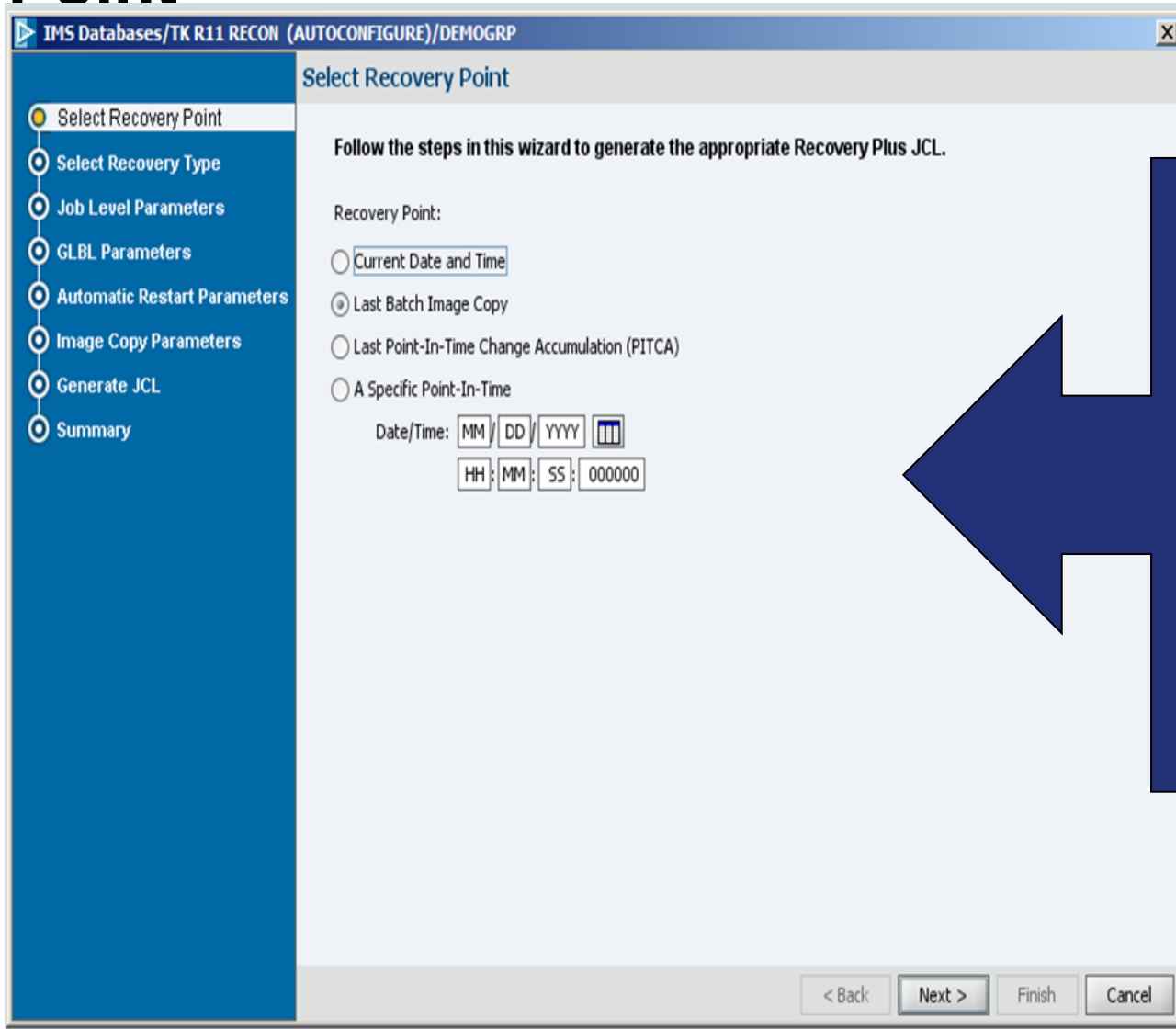# Preparing for Recovery - Recovery Wizard

- BMC BRI Solution – Recovery Wizard

- Purpose:

  - A wizard that not only generates recovery JCL, but also:
    - Asks the right questions
      - *Because each recovery is unique*
    - Allows for overrides
      - *Because each customer environment is unique*
    - Retains JCL
      - *Because each execution is unique*

Recovery Wizard – Action Command

1. **Select or create a group**
2. **Right-click**
3. **Choose "Recovery Wizard"**

BMC® Database Management - sysp:8840

File   Edit   View   Tools   Action   Window   Help

Navigation

- Enterprise Data
  - Connections
    - BRTA
      - DB2 Subsystems
      - IMS Databases
        - TK R10 RECON (AUTOCONFIGURE)
        - TK R11 RECON (AUTOCONFIGURE)
          - IR1K
          - DBRC Resources
          - CAGTKDG1
          - CAGTKDG2
          - CAGTKDG3
          - DEM

Details
Exception List
Refresh Database Group
Generate JCL
Reports   ▶
Configuration   ▶
Notes
Request Analysis
Recovery Wizard
Run Recovery Advisor

- IRMD50P
- IRMD70P
- IRMD80P

GROUP processing

Recovery Wizard – Select a Recovery Point

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Select Recovery Point

- Select Recovery Point
- Select Recovery Type
- Job Level Parameters
- GLBL Parameters
- Automatic Restart Parameters
- Image Copy Parameters
- Generate JCL
- Summary

Follow the steps in this wizard to generate the appropriate Recovery Plus JCL.

Recovery Point:

- ○ Current Date and Time
- ● Last Batch Image Copy
- ○ Last Point-In-Time Change Accumulation (PITCA)
- ○ A Specific Point-In-Time

    Date/Time: MM / DD / YYYY
    HH : MM : SS : 000000

< Back   Next >   Finish   Cancel

1. Current
2. Batch IC
3. PIT CA
4. Any PIT

Recovery Wizard – Recovery Type

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Select Recovery Type

- ✅ Select Recovery Point
- 🟠 Select Recovery Type
- ⬤ Job Level Parameters
- ⬤ GLBL Parameters
- ⬤ Automatic Restart Parameters
- ⬤ Image Copy Parameters
- ⬤ Generate JCL
- ⬤ Summary
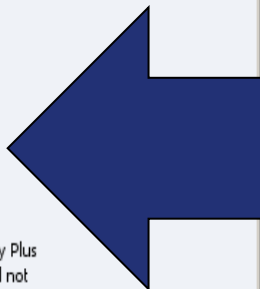
Select the Type of Recovery Job to Create

◉ Create Recovery JCL

◯ Create Simulated Recovery JCL*

* Create Recovery JCL using the TYPERUN(SIMULATE) keyword so that Recovery Plus will read all input data sets (logs, change accumulations, and image copies), but will not write to any database nor obtain authorization for registered databases.

< Back   Next >   Finish   Cancel

1. Recovery JCL
2. Simulate JCL

Recovery Wizard – Job Level Parameters

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Job Level Parameters

- ✓ Select Recovery Point
- ✓ Select Recovery Type
- ● Job Level Parameters
- ◉ GLBL Parameters
- ◉ Automatic Restart Parameters
- ◉ Image Copy Parameters
- ◉ Generate JCL
- ◉ Summary

To override the following Job Level parameters, select the User Profile option.

Inherit value from:

Job Control	Current DBGroup
Job Card 1	//BRTAAUTO JOB (4211),BRTAADV,CLASS=A,REGION=0M
Job Card 2	//*
Job Card 3	//*
Job Card 4	//*
RCUPARMS DSNs	Current DBGroup
	Current DBGroup
	User profile

Add   Edit   Delete   Move Up   Move Down

IDCAMS Define Control Statements	Current DBGroup	BMCIRM.TK.DEFINES
IDCAMS Delete Control Statements	Current DBGroup	BMCIRM.TK.DELETES

< Back   Next >   Finish   Cancel

1. Job Card
2. PARMLIB
3. IDCAMS
   Delete/Define

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Recovery Wizard – GLBL Parameters

Window title: IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

GLBL Parameters

- Select Recovery Point
- Select Recovery Type
- Job Level Parameters
- **GLBL Parameters**
- Automatic Restart Parameters
- Image Copy Parameters
- Generate JCL
- Summary

To override the following GLBL parameters, select the User Profile option.

Inherit value from:

RVP Global Options	User profile	RVP@TEST
Build Index	User profile	
	Rebuild all primary and secondary indexes	
Build ILDS	Current DBGroup	
	Rebuild the ILDS	

< Back   Next >   Finish   Cancel

Callout:
1. Global Options
2. Build Index
3. Build ILDS

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Recovery Wizard – Automatic Restart

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Automatic Restart Parameters

- ✓ Select Recovery Point
- ✓ Select Recovery Type
- ✓ Job Level Parameters
- ✓ GLBL Parameters
- ● Automatic Restart Parameters
- ○ Image Copy Parameters
- ○ Generate JCL
- ○ Summary

To override the following Automatic Restart parameters, select the User Profile option.

Inherit value from:
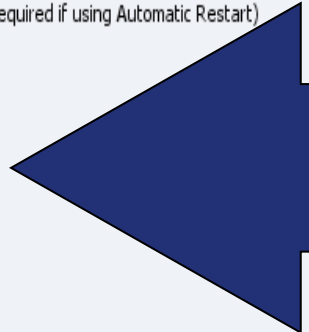
Use Automatic Restart | User profile ▼ | ⦿ Yes ○ No

Checkpoint Model | User profile ▼ | CHKMODL | (Required if using Automatic Restart)

CA Extract Model | Current DBGroup ▼

Log Extract Model | Current DBGroup ▼

< Back | Next > | Finish | Cancel

1. Checkpoint Model
2. CA Extract Model
3. Log Extract Model

Recovery Wizard – Image Copy Parameters

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Image Copy Parameters

- Select Recovery Point
- Select Recovery Type
- Job Level Parameters
- GLBL Parameters
- Automatic Restart Parameters
- **Image Copy Parameters**
- Generate JCL
- Summary

To override the following Image Copy parameters, select the User Profile option.

Inherit value from:

				Current DBGroup Values*
Number of Image Copies	Current DBGroup	○ Single	⦿ Dual	Single
IC1 Model	Current DBGroup			
IC2 Model	Current DBGroup			

* When the owning DBGroup is selected, the Image Copy parameters will be retrieved from the individual DBD-level values.

< Back   Next >   Finish   Cancel

1. Number of copies
2. IC1 Model
3. IC2 Model

Recovery Wizard – Generate JCL

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Generate JCL

- ✓ Select Recovery Point
- ✓ Select Recovery Type
- ✓ Job Level Parameters
- ✓ GLBL Parameters
- ✓ Automatic Restart Parameters
- ✓ Image Copy Parameters
- ● Generate JCL
- ◉ Summary

Press Next to generate Recovery JCL

Output Data Set Name:

`RRS.JCL.CNTL`   [List Members]
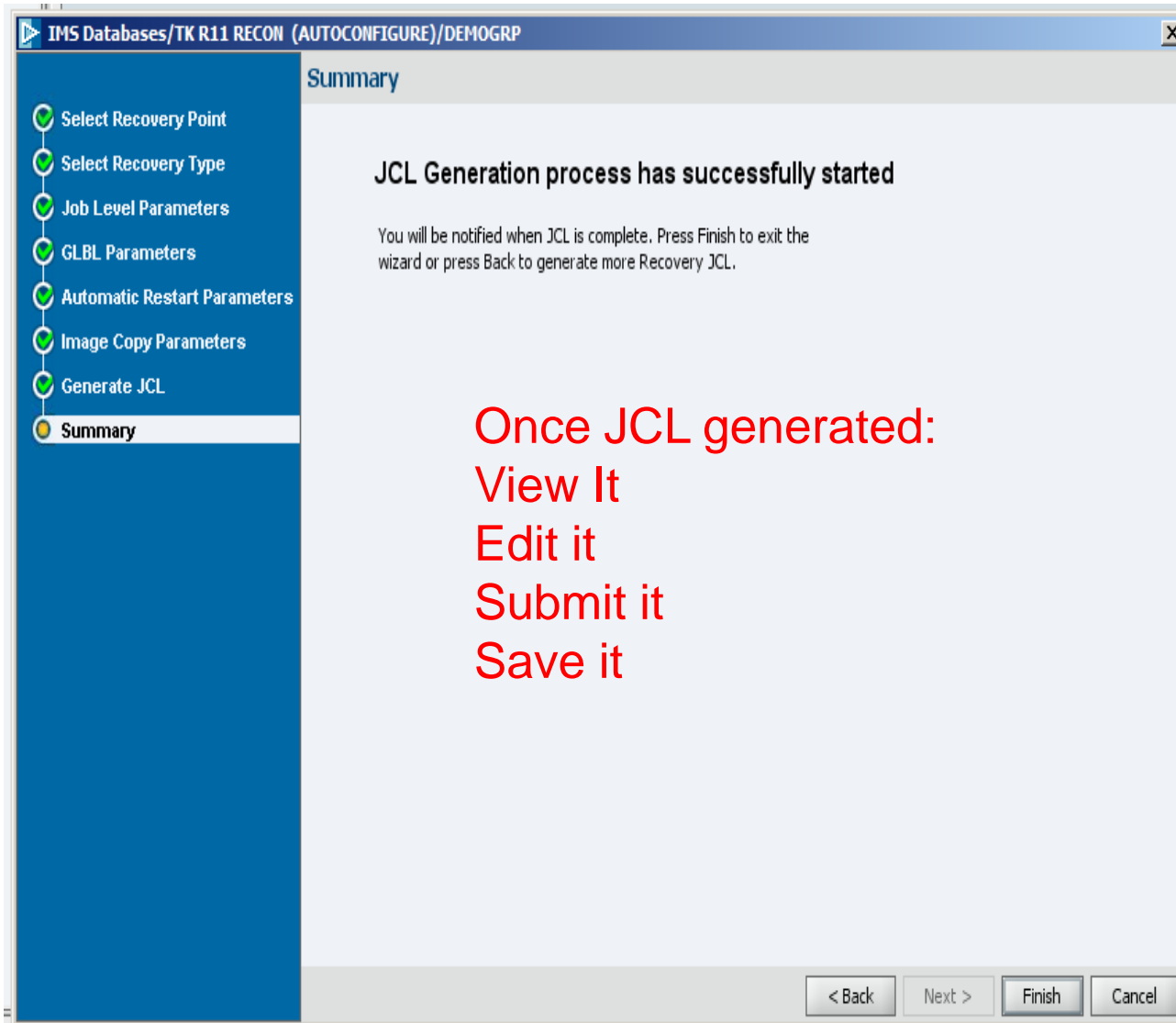
Member Name:

`ZZRECWIZ` ☑ Overwrite

Optional Description:

[   ]

[< Back] [Next >] [Finish] [Cancel]

1. Output PDS
2. Member name
3. Description

Recovery Wizard - Summary

IMS Databases/TK R11 RECON (AUTOCONFIGURE)/DEMOGRP

Summary

- Select Recovery Point
- Select Recovery Type
- Job Level Parameters
- GLBL Parameters
- Automatic Restart Parameters
- Image Copy Parameters
- Generate JCL
- Summary

JCL Generation process has successfully started

You will be notified when JCL is complete. Press Finish to exit the
wizard or press Back to generate more Recovery JCL.

Once JCL generated:
View It
Edit it
Submit it
Save it

< Back   Next >   Finish   Cancel

Simplifying access to useful RECON information

- Using DBRC in recovery can be challenging but it increases reliability of recovery

- LOTS of useful information in List.History but difficult to interpret

- BMC Software BRI Solution provides access to List.History data from a Graphical User Interface (GUI)
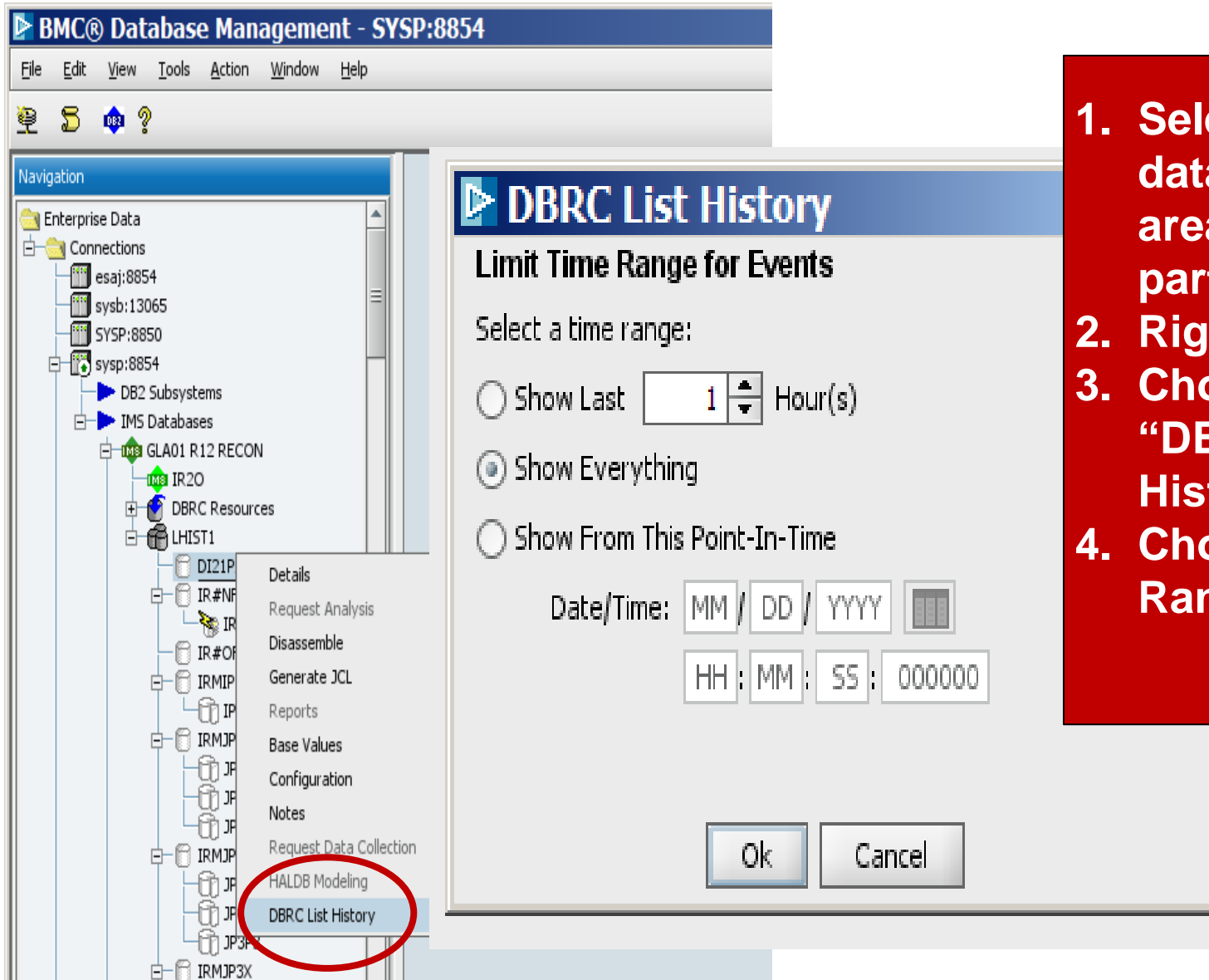
Why improve on List History?

- Graphical User Interface (GUI) allows for:
  - Enlightening timeline display
  - Filtering of pertinent events
    - Image copy and Change accum
    - Recovery and Reorgs
    - Prilogs and Allocs
- Event command processing allows for:
  - Easy manipulation of database, image copy, and change accum status
- Event JCL generation allows for:
  - Duplication of image copies
  - Point-in-time recovery
  - Pointer verification

List History - Views

- Event driven
  - Database alloc/dealloc
  - IC and Change Accum
  - Reorg and Recov
  - Prilog open, switch, and close
- Horizontal or Vertical
- Local or GMT timestamps
- Event filtering

List History – Action Command

1. **Select a database, area, or partition**
2. **Right-click**
3. **Choose "DBRC List History"**
4. **Choose Time Range**

List History – Vertical View

List History – Horizontal View

List History – Filter Events

List History – Generate JCL
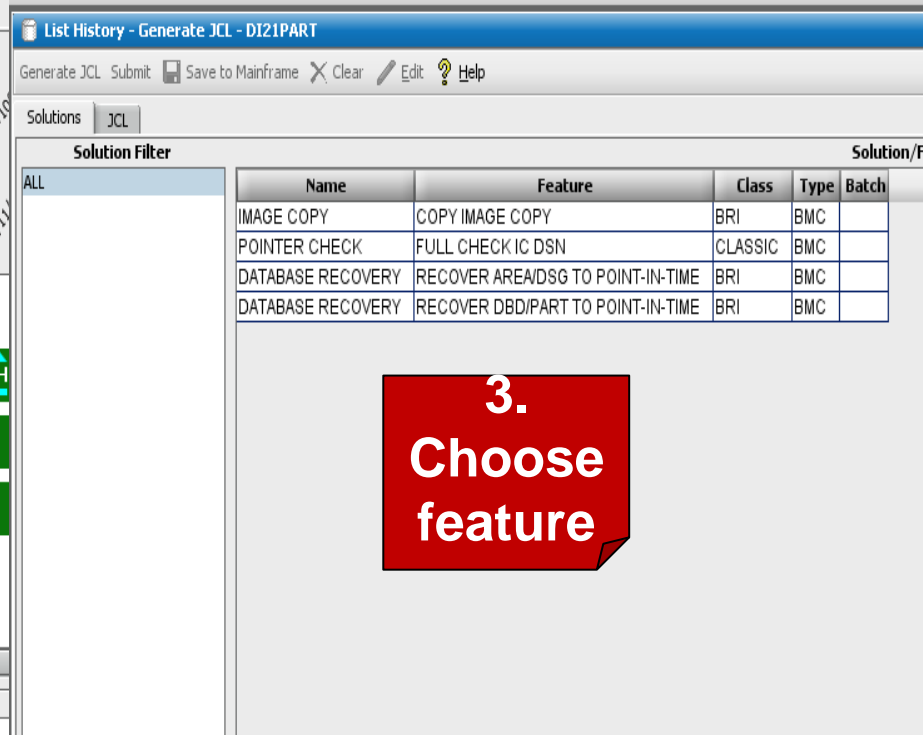
Summary

- Recovery
  - Plan for it
  - Hope you never need to perform it
  - Be better prepared for it with

Backup and Recovery Solution for IMS from BMC Software