IMS Backup & Recovery Insurance – Are you covered?

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BMC Software

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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
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

IC Triggering by CA

- Analyze CA Group to Trigger ICs: Yes
- CA File Size Threshold: 100 GB
- When CA file size threshold is exceeded:
  - Select top "nn" members of CA group for IC after ranking by size: 10
  - Select top "nn" members of CA group for IC after ranking by # records: 10
  - Select any member of CA group for IC with more than "nn" bytes: 1024 MB

IC Triggering by CA
- Conditional IC
- Conditional Reorg
- Collection
- Analysis
- Capture Statistics
- Job Control
- Region
- Work Files

Last updated at 12/7/11, 10:37 PM by BMCDFLT

IC Triggering by CA parameters
- The following parameters are included in this category:
  - Analyze CA Group to Trigger ICs
  - CA File Size Threshold
  - When CA file size threshold is exceeded
  - Select any member of CA group for IC if "nn" days since last IC
  - Select members of the CA group by DBD or Partition

What do you want to do?
Set IC triggering by CA parameters
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 Display Criteria for IRMQF0

Group name . . . : CGFIM0-ALL Task ID . . . : 0008

Select a reporting option to display data in the log analysis summary file. Optionally modify display criteria. Then press Enter.
  Reporting option . . . . . . . 1. By Transaction
                          2. By Object
                          3. Recovery windows

Original Range
  Start Date: 11 / 03 / 2010 Start Time: 14 : 49 : 00 . 0
  End Date: 11 / 03 / 2010 End Time: 14 : 53 : 00 . 0

Current Range (End Date/Time must be blank if PIT Date/Time requested.)
  Start/PIT Date: 11 / 03 / 2010 Start/PIT Time: 14 : 49 : 00 . 0
  End Date: 11 / 03 / 2010 End Time: 14 : 53 : 00 . 0

Type an action code and transaction names or masks to limit data. (Options 1 and 2 only.)
  Act  I=Include all in row  X=Exclude all in row
  _  Transactions : _______ _______ _______ _______ _______

Command ===> F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE
            F7=UP   F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

07/34
## Log Analysis

```
Log Analysis Object Summary for IRMQFIMO  Row 1 to 5 of 5
Start: 11/03/2010 14:49:00.0  End: 11/03/2010 14:53:00.0  Commands: SORT
          Find
          Locate
Type an action code. Then press Enter.
  T=Transaction subset   R=Related objects

<table>
<thead>
<tr>
<th>Act</th>
<th>DBD</th>
<th>DSG/Area</th>
<th>Data Set Name</th>
<th>Updating Trans</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>DI21PART</td>
<td>DI21PART</td>
<td>BMCIRM.QA.DB.DI21PART.DI21PART</td>
<td>4</td>
</tr>
<tr>
<td>=</td>
<td>IVPDB1</td>
<td>DFSIVD1</td>
<td>BMCIRM.QA.DB.IVPDB1.DFSIVD1</td>
<td>2</td>
</tr>
<tr>
<td>=</td>
<td>IVPDB2</td>
<td>DFSIVD2</td>
<td>BMCIRM.QA.DB.IVPDB2.DFSIVD2</td>
<td>1</td>
</tr>
<tr>
<td>=</td>
<td>IVPDB3</td>
<td>DFSIVD3A</td>
<td>BMCIRM.QA.DB.IVPDB3.DFSIVD31</td>
<td>1</td>
</tr>
<tr>
<td>=</td>
<td>IVPDB3</td>
<td>DFSIVD3B</td>
<td>BMCIRM.QA.DB.IVPDB3.DFSIVD33</td>
<td>1</td>
</tr>
</tbody>
</table>

******************************************************************************
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

(minutes:00.1) 09/03
```
Log Analysis

Log Analysis Transaction Subset for IRMQFIMO 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

<table>
<thead>
<tr>
<th>Act</th>
<th>Transaction</th>
<th>Occurrences</th>
<th>Updated Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>ADDINV</td>
<td>259</td>
<td>1</td>
</tr>
<tr>
<td>_</td>
<td>ADDPART</td>
<td>260</td>
<td>1</td>
</tr>
<tr>
<td>_</td>
<td>DLETPART</td>
<td>259</td>
<td>1</td>
</tr>
<tr>
<td>_</td>
<td>DLETPART</td>
<td>259</td>
<td>1</td>
</tr>
</tbody>
</table>

***************************************************************************** Bottom of data*****************************************************************************

Command ===> F1=HELP  F7=UP  F2=SPLIT  F8=DOWN  F3=END  F9=SWAP  F4=RETURN  F10=LEFT  F5=RFIND  F11=RIGHT  F6=RCHANGE  F12=RETRIEVE

Scroll ===> PAGE  02/64
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 Locate
Transaction:  ADDINV
Select a transaction occurrence to display detail. Then press Enter.  
S=Select

<table>
<thead>
<tr>
<th>Sel</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>DL/I Calls</th>
<th>DEDB Updates</th>
<th>IMS ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>s</td>
<td>11/03/2010 14:49:00.1</td>
<td>11/03/2010 14:49:00.2</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.1</td>
<td>11/03/2010 14:49:00.1</td>
<td>1</td>
<td>0</td>
<td>IR2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.4</td>
<td>11/03/2010 14:49:00.5</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.4</td>
<td>11/03/2010 14:49:00.5</td>
<td>1</td>
<td>0</td>
<td>IR2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.8</td>
<td>11/03/2010 14:49:00.9</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.8</td>
<td>11/03/2010 14:49:00.8</td>
<td>1</td>
<td>0</td>
<td>IR2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:00.8</td>
<td>11/03/2010 14:49:00.8</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:01.2</td>
<td>11/03/2010 14:49:01.2</td>
<td>1</td>
<td>0</td>
<td>IR2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:01.3</td>
<td>11/03/2010 14:49:01.4</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:01.4</td>
<td>11/03/2010 14:49:01.4</td>
<td>1</td>
<td>0</td>
<td>IR2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03/2010 14:49:01.7</td>
<td>11/03/2010 14:49:01.8</td>
<td>1</td>
<td>0</td>
<td>IR2W</td>
<td></td>
</tr>
</tbody>
</table>

Command ====> F1=HELP  F2=SPLIT  F3=END  F4=RETURN  F5=RFINDD  F6=RCHANGE  F7=UP  F8=DOWN  F9=SWAP  F10=LEFT  F11=RIGHT  F12=RETRIEVE

Scroll ===> PAGE

11/02
Log Analysis

LUI_SYSP - EXTRA! for Windows 98 / Windows NT

Log Analysis Transaction Occurrence Detail for IRMQFIMO

Start: 11/03/2010 14:49:00.0   End: 11/03/2010 14:53:00.0

IMS ID......: IR2W
Transaction..: ADDINV
PSB.........: DFSSAM04
Program.....: DFSSAM04
Region type ..: MPP
Job name ...: IR2WMSG2
Job step ...: IR2WMSG2

Start
Date ......: 11/03/2010
Time ......: 14:49:00.1.81717
Total inserts .: 1
Total deletes .: 0
Total replaces .: 0
DEDDB updates .: 0

End
Date ......: 11/03/2010
Time ......: 14:49:00.2.25795
External subsystem ..: ...
Unit of recovery ..: ...

Last Update
Date ......: 11/03/2010
Time ......: 14:49:00.2.15522
Command ===>
F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP  F10=LEFT    F11=RIGHT  F12=RETRIEVE

Connected to host sysp.bmc.com [1]
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”
Recovery Wizard – Select a Recovery Point

1. Current
2. Batch IC
3. PIT CA
4. Any PIT
Recovery Wizard – Recovery Type

1. Recovery JCL
2. Simulate JCL
Recovery Wizard – Job Level Parameters

1. Job Card
2. PARMLIB
3. IDCAMS
   Delete/Define
Recovery Wizard – GLBL Parameters

1. Global Options
2. Build Index
3. Build ILDS
Recovery Wizard – Automatic Restart

1. Checkpoint Model
2. CA Extract Model
3. Log Extract Model
Recovery Wizard – Image Copy Parameters

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

Image Copy Parameters

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

- **Number of Copies**
  - Current DBGroup

- **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.*
Recovery Wizard – Generate JCL

1. Output PDS
2. Member name
3. Description
Recovery Wizard - Summary

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

Switch to Horizontal
List History – Horizontal View
List History – Filter Events

Filter out log events
List History – Generate JCL

1. Highlight IC event

2. GENJCL

3. Choose feature
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