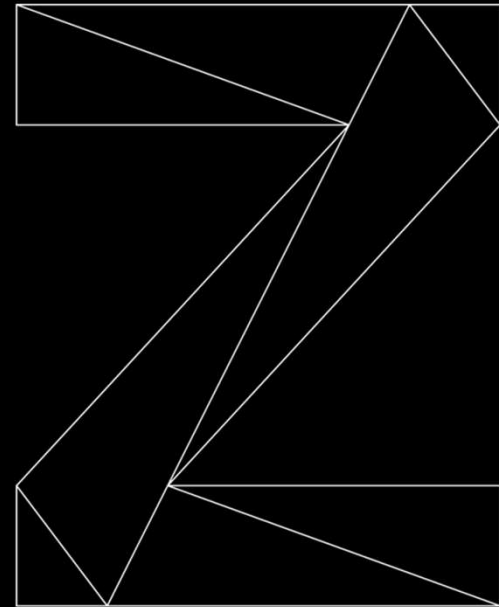


# IMS Backup and Recovery Better, Smarter, Faster

Rick Engel

Technical Team Leader and CTP  
IBM NA Technical Sales



# AGENDA

- Why Backup and Recovery ?
- Better, Faster, Smarter
  - Overview
  - Backup
  - Recovery
  - Change Accumulation
  - Disaster Recovery
  - Recovery Autonomics
- Summary

**Question: What is probably the most important task that you would ever have to perform as an IT person if you were called upon to perform it?**

IT disruptions effect more than just the bottom line

.... They have an enormous impact on the business

**THE WALL STREET JOURNAL.**

September 9, 2008  
**London Stock Exchange**  
*Paralyzed by Glitch (Network Connection)*

**COMPUTERWORLD**

April 21, 2011  
**Amazon Cloud Computing** (Network Maintenance)

**InformationWeek**

September 6, 2010  
**Virginia Grapples with IT Outage** (Memory Board)

**GOVMONITOR**  
Public Sector News & Information

August 4, 2010  
**Singapore Censures DBS Bank For**  
**System Outage On July, 5 2010** (Network Cable)



## Lessons Learned from 9/11

Successful recovery needs more automation

- Critical skilled personnel were not always available
- **IMO: Automation = “Smarter Programmatic” capabilities**

Recovery and Primary sites needed compatible HW

- “Capacity Backup Option” (CBU) useful
- Primary and Remote sites needed same encryption HW

After successful recoveries, secondary DR plan needed

- Without primary site, all data now located in one place
- Solid business continuity plans are built on “redundancy”

End-to-end Business Recovery was not considered

- Successfully completing transactions
  - Required other vendors/BPs



Source: IBM Storage Infrastructure for Business Continuity, White Paper, October 11, 2005, Bob Kern (IBM), Victor Peltz (IBM)



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# Overview

# IBM IMS Recovery Solution Pack

## Delivered Components

### IMS Recovery Solution Pack (HAHM210)

- IMS Database Recovery Facility
  - IMS Database Recovery Facility / Extended Functions
  - IMS High Performance Change Accumulation
- 
- IMS High Performance Image Copy (H1J0420)
  - IMS Index Builder (H22O310)
  - IMS Recovery Expert (HAEP220)

**IMS Tooling Solutions**

**Designed For**

***“Smarter, Better, Faster”***



# IBM IMS Recovery Solution Pack

## Processes Delivered

**IMS Recovery Solution Pack** provides proven solutions to protect your IMS system through intelligent backup and recovery processes

- Backup Solutions
  - Image Copy, System Level Backup (SLB)
- Change Accumulation Solutions
  - Normal CA, Point-in-Time CA (PITCA)
- Recovery Solutions
  - Current, Timestamp, Point-in-Time (PITR), LASTIC, PITCA, LASTPITCA
  - Image copy, change accumulation, point-in-time change accumulation (PITCA), archived logs, SLB
- Disaster Recovery Solutions
  - SLB and/or IC based solution
- Recovery Autonomics Solutions
  - Identify potential problems that can affect recovery



# Backup Solutions



# IBM IMS Recovery Solution Pack

## Backup

### High Performance Image Copy

- Create as-is image copies of one or more database data sets in parallel
  - Batch or concurrent, compressed or uncompressed, stacked or not stacked
- Reduced CPU utilization and elapsed time by using the High Performance I/O (HPIO) function
- Create near instantaneous image copies by invoking Advanced Copy Services which leverages FlashCopy, SnapShot Copy, and Concurrent Copy technologies
  - Do you leverage your organization's investment in modern DASD technology for IMS backup processing ?
- Automatically /DBR and /STA database data sets around the IC process using the IMS Tools Online System Interface
- Perform HASH check function to check database pointers as the image copy is created
- Collect database statistics (sensor data) and store in a central repository for use by autonomies processes



# IBM IMS Recovery Solution Pack

## Backup

### IMS Recovery Expert

- Backup an entire IMS environment (full or data only) using storage-based fast-replication technologies: IBM FlashCopy, EMC TimeFinder, HDS ShadowImage, IBM DFSMSdss
  - Almost instantaneous backup of multiple volumes with little to no impact to the active IMS subsystems
  - Referred to as a System Level Backup (SLB)
  - Can include a single IMS system, multiple IMS systems in a data sharing environment, multiple IMS systems (data sharing or not) or one or more IMS systems (data sharing or not) and one or more DB2 subsystems (data sharing or not)
    - Inclusion of DB2 subsystems requires the companion product IBM DB2 Recovery Expert
- SLB effectively contains image copies (batch or concurrent) for all databases associated with the system at the time the SLB was created
  - Optionally register IC records in DBRC (RECONs) as SLB is taken or create standard ICs from SLB
- Offload SLB to create up to four copies for local recovery and/or DR site recovery
- All information related to SLBs and other IMS RE processes are stored in our Meta Data Repository

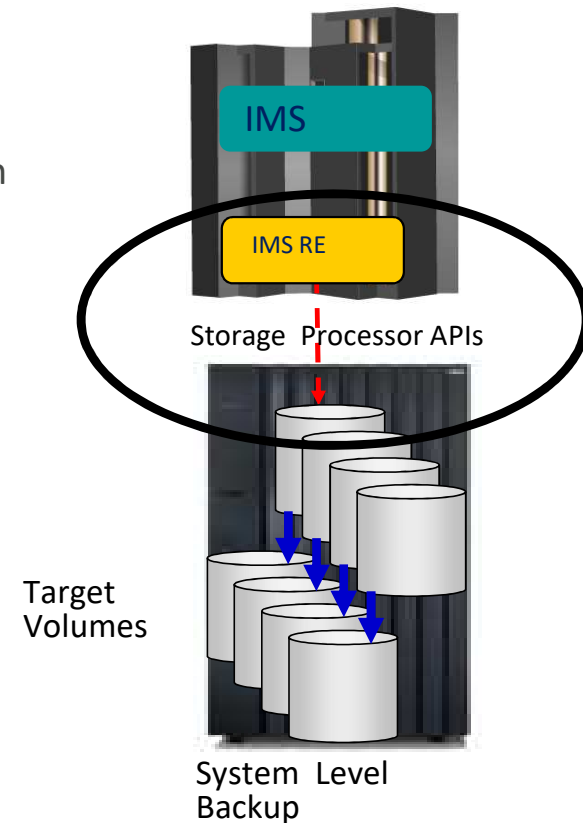


# IBM IMS Recovery Solution Pack

## Backup

### System Level Backup Overview – The “Next Level” of Backup

- System Level Backup is a backup of the entire DBMS environment at a point in time
  - Recorded in IMS Recovery Expert Meta Data repository
- Leverages storage-based fast replication to drive a volume level backup
  - Backup completed in seconds or less
  - Offloading data copy process to the storage processor saves CPU and I/O resources
- Backup DBMS without affecting applications
  - Backup windows can be reduced by replacing image copies
    - Fact: 60% of data management are in ‘backup processing’
  - Extends processing windows
- Data consistency ensures data is dependent-write consistent
  - IMS Log Suspend (optional, not recommended)
  - Storage-based consistency functions
- Image Copies can be created from SLB

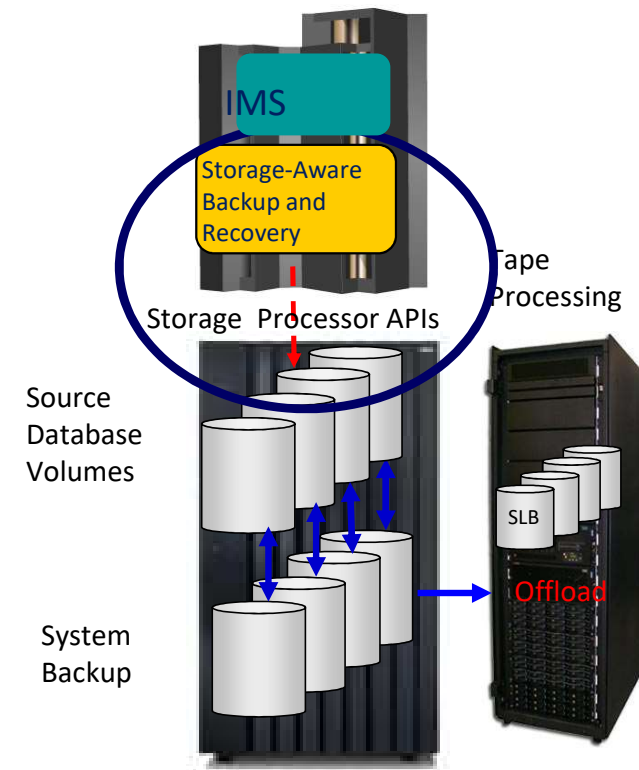


# IBM IMS Recovery Solution Pack

## Backup

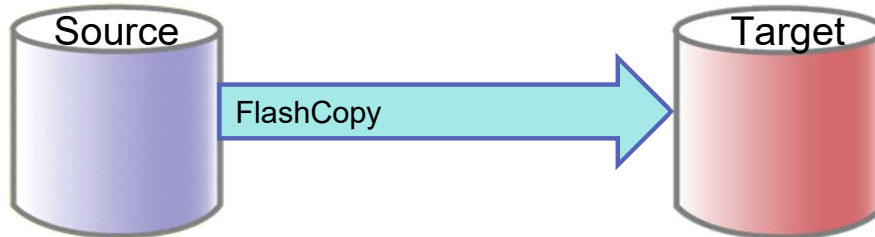
### System Level Backup Overview – The “Next Level” of Backup

- Can automatically offload SLB
  - Copy SLB from fast replication disk to disk or tape for use at either local or DR site (or both)
  - Can create up to 4 copies
    - 1 or 2 for local recovery
    - 1 or 2 for DR
- Fast replication disk can then be freed up and ready for the next SLB to be created



# IBM IMS Recovery Solution Pack

## Backup



### Specifications

- 1) 13 TB of data
- 2) 461 volumes
- 3) DS8300
- 4) 2817-M80 z196
- 5) 4,075.28 trans/second
- 6) Backup Elapsed = 0.37 secs

```
                IMS Recovery Expert for z/OS
                Backup Summary Report
Utility Executed:..... Backup
Profile Name:..... ROCKET1.BKUP1
IMS Subsystem:..... IMSP
IMS Version:..... 12.1
Backup Type:..... Flash Copy
Backup Contains:..... Database, Log Data (Mixed)
Partial Backup:..... No
Nbr of Volumes:..... 0461
Backup Date:..... 02/01/2012
Backup Time:..... 2012-02-01-17.03.20.671934
Consistency Method:..... Flash Consistency Group
Supports Database Restore: No
I/O Suspend Time:..... 2012-02-01-17.03.20.671932
I/O Resume Time:..... 2012-02-01-17.03.21.042397
Backup Elapsed:..... 00.37 Seconds
```

# Recovery Solutions



# IBM IMS Recovery Solution Pack

## Recovery

### IMS Database Recovery Facility

- Recover multiple database data sets and Fast Path areas simultaneously
  - Highly scalable environment
  - Process up to 14k DBDS per job
  - Recover up to 250 DBDS in parallel
- Integrate recovery related tasks into a single job step:
  - Index rebuild (FF, FP, HALDB)
  - Post-recovery IC
  - HASH check DB pointers
- Automatic /DBR and /STA of database data sets around recovery
- Includes an API to IMS Recovery Expert to support SLB as IC
  - Allows the use of an SLB as an image copy if it is the best fit based on the recovery time



# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Intelligent Recovery Manager determines best possible method for recovery and drives the processes necessary to accomplish recovery
  - SLBs are not a requirement for using IMS Recovery Expert to drive recovery
- Executes and monitors the processes necessary to perform recovery and related tasks
  - Automatic /DBR and /STA of databases and mark DBDS as recovery needed around recovery
  - Recovery using IC or SLB
  - Forward recovery using CA and/or archived logs
  - Rebuild associated indexes (FF, FP, HALDB)
  - Perform post-recovery IC
- JCL to drive the processes needed to perform recovery and related tasks is created dynamically using skeletons you tailor to your environment
  - Sample skeletons are shipped with the product ready to be tailored

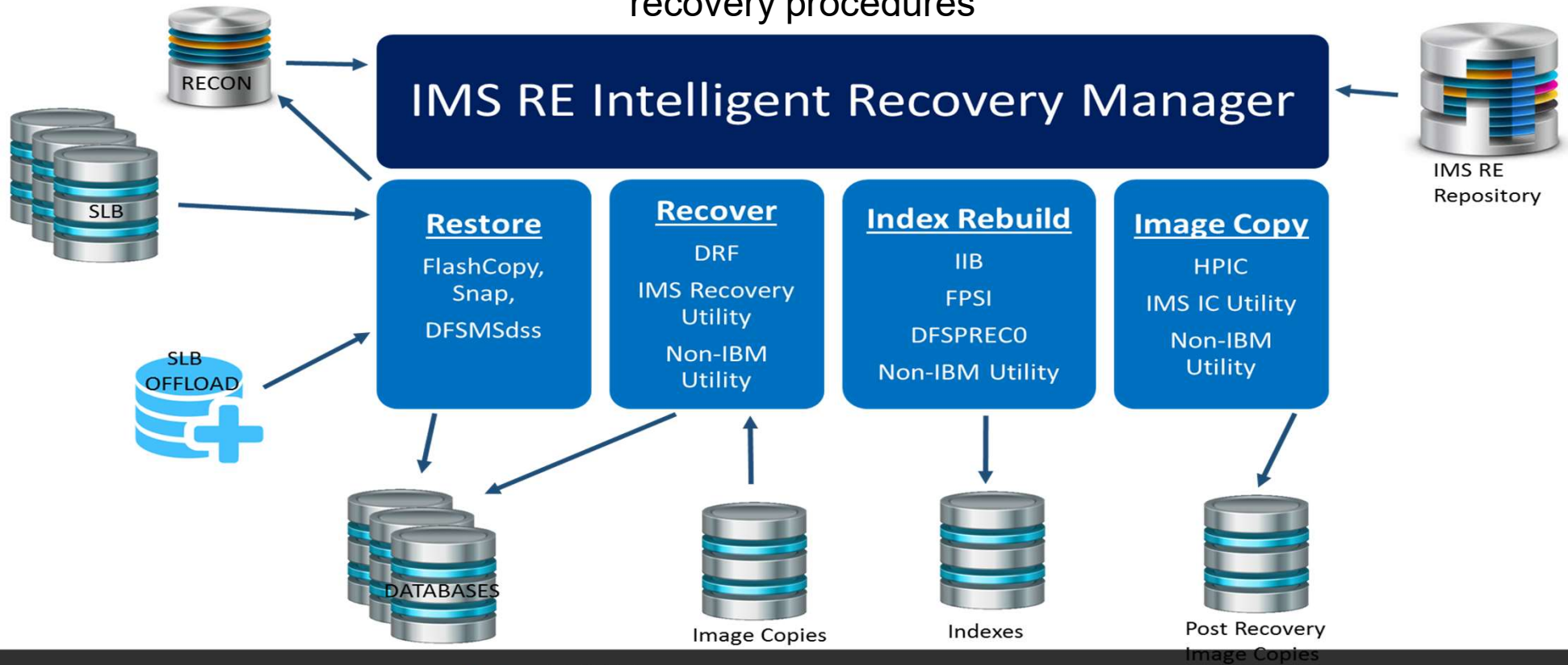




# IBM IMS Recovery Solution Pack

## Recovery

Analyze recovery assets and establish optimal recovery procedures



# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Application Profile specifies IMS objects to be recovered
  - Auto-include indexes and logically related databases

```
IMS RE V2R2 ----- Update Application Profile Display ----- 2017/09/19 11:28:36
Option ==> _____ Scroll ==> PAGE

Line Commands: A - Add E - Explode D - Delete

-----
Creator: TSMXD      Name: MITCH IDA DEMO      User: TSMXD
Share Option: U (Upd,View,No)  Description:
IMS System/Group: IDA      Update Recovery Options: N (Yes/No)
-----
                                         Row 1 of 5
Cmd  Type  Wild Process Process Include/ Group/DB Area/  <----- Last Updated ----->
      Card Indexes Logical Exclude Name Part   DDN      Userid      Timestamp
-----
-    DB   N      Y      Y      INC   DBHD000      TSMXD      09/19/2017 11:26:25
-    DB   N      Y      Y      INC   DBHIO00      TSMXD      03/29/2017 10:41:44
-    DB   N      Y      Y      INC   DBHIO02      TSMXD      03/29/2017 10:41:44
-    DB   N      Y      Y      INC   DBHIV00      TSMXD      03/29/2017 10:41:45
-    DB   N      Y      Y      INC   DBHIV02      TSMXD      03/29/2017 10:41:45
***** Bottom of Data *****
```



# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Recovery options specify processes to be performed with recovery
  - Optionally drive the 4 processes

```
S1 - RS11A - RS11A - BlueZone Mainframe Display
File Edit Session Options Transfer View Script Help
Connections: RS11A
Application Recovery Options 2017/09/19 11:31:2
IMS RE V2R2
Option ==>

Creator: TSMXD Name: MITCH IDA DEMO SSID: IDA
Share Option: U (Upd,View,No) Description:

Enter the Recovery options to associate with this profile:
More: +

SLB Processing Only ==> N (Yes/No)
Execute Recovery ==> Y (Yes) Edit Options N (Yes/No)
Execute Index Rebuild ==> Y (Yes/No) Edit Options N (Yes/No)
Execute Change Accum ==> N (Yes/No) Edit Options N (Yes/No)
Create Post Recovery IC ==> Y (Yes/No) Edit Options N (Yes/No)
Recovery Resources ==> A (All/Slb/Ic)
From Offload ==> N (Yes/No)
Parallel Tasks ==> 04 (01-99)
Number of Tape units ==> 02 (01-99)
Action on Warnings ==> C (Continue/Wtor/Abort)
GENJCL Defaults Member ==> IDA

Datasets for GENJCL ==> IMSQA.BSY220.DATA.DEFAULTS

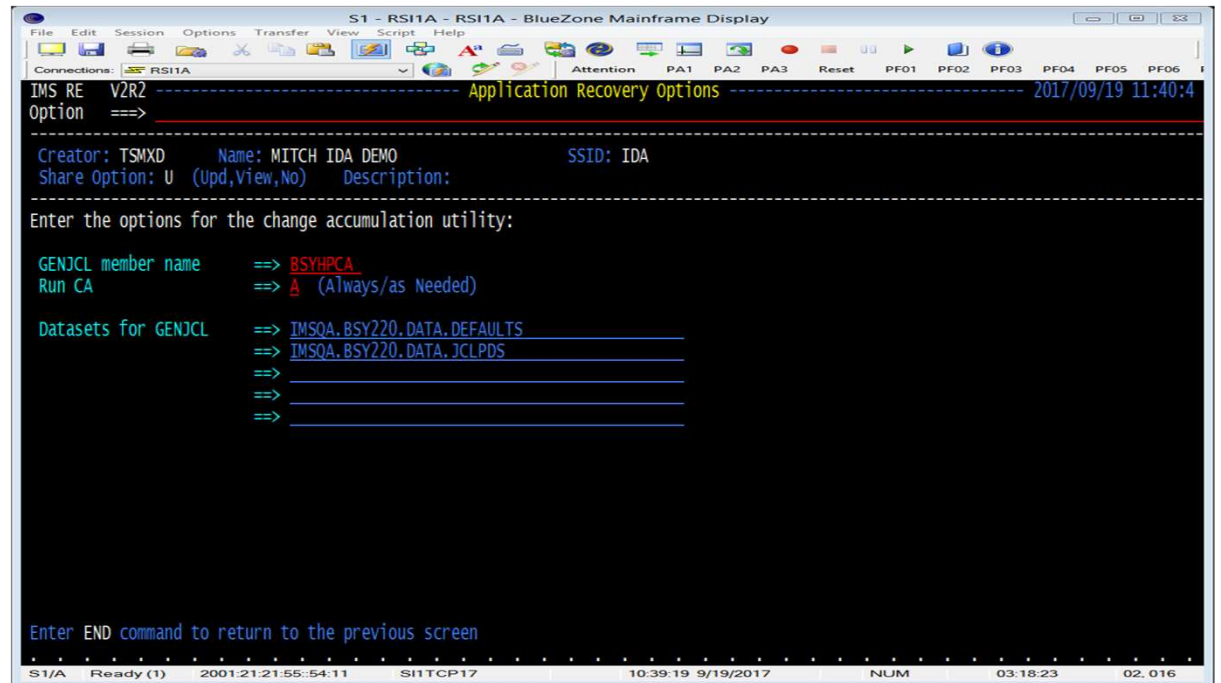
S1/A Ready (1) 2001:21:21:55:54:11 S11TCP17 10:29:26 9/19/2017 NUM 03:08:30 02.016
```

# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Change Accumulation utility options



The screenshot shows a terminal window titled "S1 - RS11A - RS11A - BlueZone Mainframe Display". The main content is a screen for "Application Recovery Options" with the following text:

```
IMS RE V2R2 ----- Application Recovery Options ----- 2017/09/19 11:40:4
Option ==>

Creator: TSMXD      Name: MITCH IDA DEMO          SSID: IDA
Share Option: U (Upd,View,No)  Description:

Enter the options for the change accumulation utility:

GENJCL member name ==> BSYHPCA
Run CA              ==> A (Always/as Needed)

Datasets for GENJCL ==> IMSQA.BSY220.DATA.DEFAULTS
                   ==> IMSQA.BSY220.DATA.JCLPDS
                   ==> _____
                   ==> _____
                   ==> _____

Enter END command to return to the previous screen
```

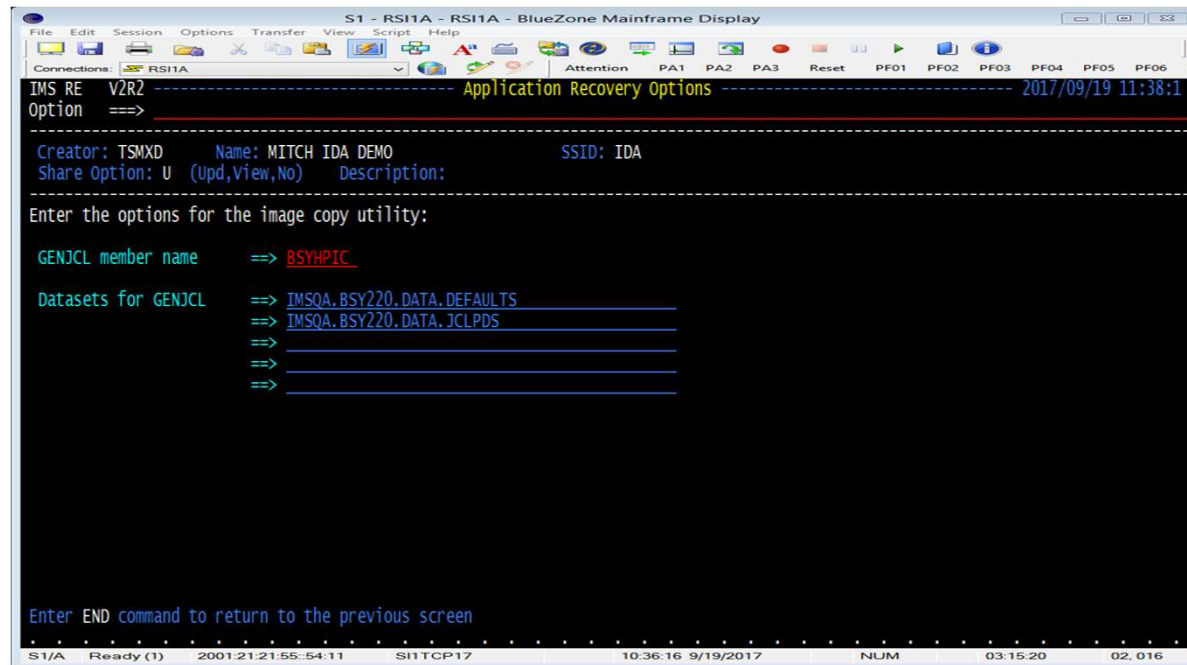
At the bottom of the terminal, there is a status bar with the following information: S1/A Ready (1) 2001.21.21:55:54:11 SIITCP17 10:39:19 9/19/2017 NUM 03:18:23 02.016

# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Post recovery Image Copy utility options



# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Recovery report indicates how each DB / Index will be recovered

The image displays two side-by-side screenshots of the IBM IMS Recovery Expert interface, showing recovery reports for different databases. The interface is titled "S1 - RS11A - RS11A - BlueZone Mainframe Display".

**Left Screenshot:** Shows the recovery report for database DBHDO00. The report includes the following details:

- Database Name : DBHDO00 DSG : DBHDO00 Type: DL/I
- Dataset Name : IMSDA2DB.DBHDO00.DBHDO00
- Recoverable : YES
- Chg Accum Grp : GRHDO00
- Recovery will be attempted using the DB Recovery Utility
- I/C Type : SLB I/C Start Time (UTC) : 2017.258 065610194981016
- User I/C Data Byte 0 - 40 : BSYSLBTSEXGA IDA DEFAULT
- User I/C Data Byte 40 - 80 : 09/15/201702:56:1001
- Database Name : DBHIO02 DSG : DBHIO02 Type: DL/I
- Dataset Name : IMSDA2DB.DBHIO02.DBHIO02
- Recoverable : YES
- Chg Accum Grp : N/A
- \*\*\*\* No recovery needed after SLB restore \*\*\*\*
- Database Name : DBHIO02I DSG : DBHIO02I Type: Primary Index
- Dataset Name : IMSDA2DB.DBHIO02I.DBHIO02I
- Recoverable : YES
- Chg Accum Grp : N/A
- Primary DBD : DBHIO02
- \*\*\*\* No recovery needed after SLB restore \*\*\*\*

**Right Screenshot:** Shows the recovery report for database DBHIV00. The report includes the following details:

- Database Name : DBHIV00 DSG : DBHIV00 Type: DL/I
- Dataset Name : IMSDA2DB.DBHIV00.DBHIV00
- Recoverable : YES
- Chg Accum Grp : N/A
- Recovery will be attempted using the DB Recovery Utility
- I/C Type : SLB I/C Start Time (UTC) : 2017.258 065610194981016
- User I/C Data Byte 0 - 40 : BSYSLBTSEXGA IDA DEFAULT
- User I/C Data Byte 40 - 80 : 09/15/201702:56:1001
- Database Name : DBHIV00I DSG : DBHIV00I Type: Primary Index
- Dataset Name : IMSDA2DB.DBHIV00I.DBHIV00I
- Recoverable : YES
- Chg Accum Grp : N/A
- Primary DBD : DBHIV00
- Recovery will be attempted using the FF Index Rebuild Utility

# IBM IMS Recovery Solution Pack

## Recovery

### IMS Recovery Expert

- Post-Recovery Image Copy Utility Options

```
S1 - RS11A - RS11A - BlueZone Mainframe Display
File Edit Session Options Transfer View Script Help
Connections: RS11A Attention PA1 PA2 PA3 Reset PF01 PF02 PF03 PF04 PF05 PF06
Display Filter View Print Options Search Help
SDSF OUTPUT DISPLAY TSMXDXL J0001245 DSID 106 LINE 86 COLUMNS 02-133
COMMAND INPUT ==> SCROLL ==> CSR
11:57:37 BSY0004I - BSY#V08J - Validating recovery
11:57:37 BSY0004I - Object validation completed successfully
11:57:37 BSY0004I - Generating recovery report into BSYRVRPT
11:57:37 BSY0004I - Recovery report created successfully
11:57:37 BSY0004I - BSY#GRCV - Generating Recovery jobs
11:57:37 BSY0004I - Building JCL to perform /DBR commands
11:57:37 BSY0004I - Submitting job
11:57:42 BSY0004I - (BSYI430I)- JOB TSMXDA (J0001246) Spawnd to perform IMS Database Recoveries on z/OS Image RS11
11:57:42 BSY0004I - (BSYI421I)- JOB TSMXDA (J0001246) Spawnd to z/OS Image RS11 completed with a RC 0000
11:57:42 BSY0004I - Job TSMXDA completed successfully
11:57:42 BSY0004I - Building JCL to restore from SLB
11:57:42 BSY0004I - Submitting job
11:57:54 BSY0004I - (BSYI430I)- JOB TSMXDB (J0001249) Spawnd to perform IMS Database Recoveries on z/OS Image RS11
11:57:54 BSY0004I - (BSYI421I)- JOB TSMXDB (J0001249) Spawnd to z/OS Image RS11 completed with a RC 0000
11:57:54 BSY0004I - Job TSMXDB completed successfully
11:57:54 BSY0004I - Building JCL to create CA files
11:57:58 BSY0004I - CA job generation completed successfully
11:57:58 BSY0004I - Submitting job
11:58:05 BSY0004I - (BSYI430I)- JOB TSMXDC (J0001250) Spawnd to perform IMS Database Recoveries on z/OS Image RS11
11:58:05 BSY0004I - (BSYI421I)- JOB TSMXDC (J0001250) Spawnd to z/OS Image RS11 completed with a RC 0000
11:58:05 BSY0004I - Job TSMXDC completed successfully
11:58:05 BSY0004I - Building JCL to perform IMS recoveries
S1/A Ready (1) 2001.21.21.55-54.11 S1ITCP17 10:57:49 9/19/2017 NUM 03:36:53 05.021
```

```
S1 - RS11A - RS11A - BlueZone Mainframe Display
File Edit Session Options Transfer View Script Help
Connections: RS11A Attention PA1 PA2 PA3 Reset PF01 PF02 PF03 PF04 PF05 PF06
Display Filter View Print Options Search Help
SDSF OUTPUT DISPLAY TSMXDXL J0001245 DSID 106 LINE 108 COLUMNS 02-133
COMMAND INPUT ==> SCROLL ==> CSR
11:58:15 BSY0004I - Recovery job generation completed successfully
11:58:15 BSY0004I - Submitting job
11:58:26 BSY0004I - (BSYI430I)- JOB TSMXDD (J0001252) Spawnd to perform IMS Database Recoveries on z/OS Image RS11
11:58:26 BSY0004I - (BSYI421I)- JOB TSMXDD (J0001252) Spawnd to z/OS Image RS11 completed with a RC 0000
11:58:26 BSY0004I - Job TSMXDD completed successfully
11:58:26 BSY0004I - Building JCL to perform Image Copies
11:58:56 BSY0004I - Building JCL to perform /STA commands
11:58:56 BSY0004I - Submitting job
11:59:02 BSY0004I - (BSYI430I)- JOB TSMXDE (J0001257) Spawnd to perform IMS Database Recoveries on z/OS Image RS11
11:59:02 BSY0004I - (BSYI421I)- JOB TSMXDE (J0001257) Spawnd to z/OS Image RS11 completed with a RC 0000
11:59:02 BSY0004I - Job TSMXDE completed successfully
***** BOTTOM OF DATA *****
S1/A Ready (1) 2001.21.21.55-54.11 S1ITCP17 10:58:06 9/19/2017 NUM 03:37:10 05.021
```



# Change Accumulation Solutions



# IBM IMS Recovery Solution Pack

## IMS Change Accumulation

### High Performance Change Accumulation

- High-speed creation of change accumulation data sets
- Multiple change accumulation groups processed in parallel
  - Multiple address space architecture provides better throughput
  - Single read of log data sets
- Reduces the number of archived logs needed for recovery
- Create point-in-time change accumulation (PITCA) which contains only committed changes to the specified point in time
  - Beneficial for disaster recovery or cloned system recovery

# Disaster Recovery Solutions



# IBM IMS Recovery Solution Pack

## Disaster Recovery

### IMS Recovery Expert

- Reduce **recovery time objectives** by transforming disaster recovery into a disaster restart process
  - Highly tailorable process which runs on the local site, at any user defined time and as frequently as needed, to identify recover assets, prepare the resources and jobs needed at the DR site to perform disaster recovery
    - Conditions a copy of the RECON data sets based on the most current recovery assets available
    - System Level Backup or Image Copy (or mixed) based DR
    - Creates a DR PDS which contains a series of jobs which restore the IMS RE repositories, IMS system, and IMS database data sets
    - Works well with VTAPE technology to allow resources to be immediately available at the DR site
  - Integrates with DRF/XF HCHECK function at the local site to identify problems which could affect DR
  - Coordinated IMS and DB2 DR when paired with the IBM DB2 Recovery Expert product



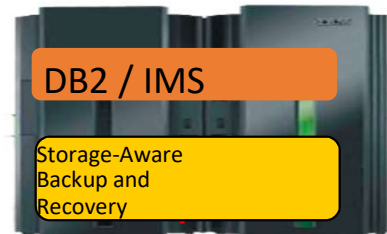
# IBM IMS Recovery Solution Pack

## Disaster Recovery

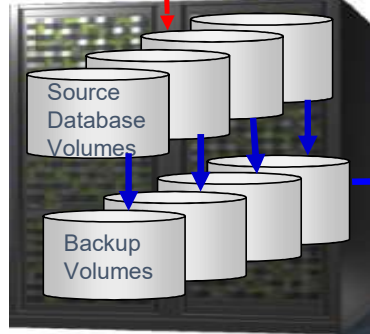
### Virtual Tape and Replication – Used by Many Customers

- Initially designed to improve backup processing speed
- Through replication, 'Tape' becomes available at remote site
- Secure data transfer with encryption over IP link

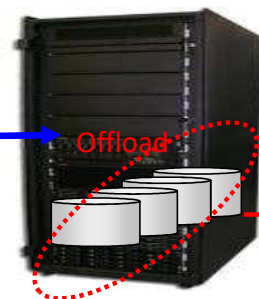
Primary Production Site



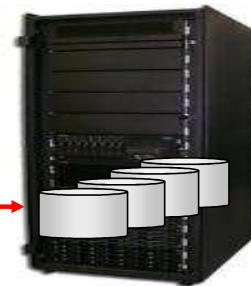
Storage Processor APIs



Tape Processing



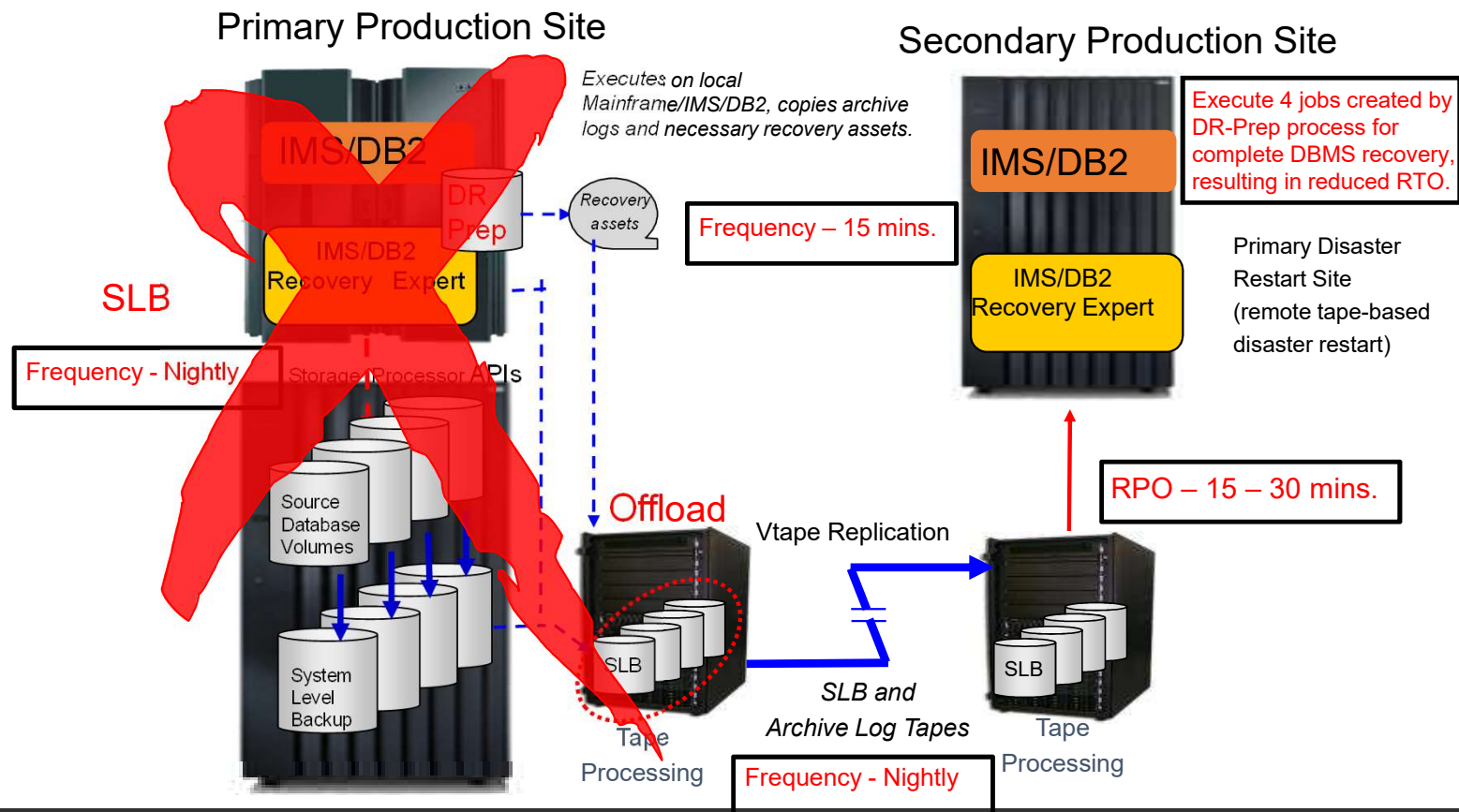
V-Tape Replication  
IP Link



Disaster Recovery Site or Secondary Production Site



# Tape Based Disaster Recovery Process



# Recovery Autonomics Solutions



# IBM IMS Recovery Solution Pack

## Recovery Autonomics

- Benefits
  - Save time/work for DBAs, IMS Systems Programmers
  - Automated detection of issues effecting database recovery
  - Present a clear global view of all issues in all RECONS
  - Provide easily accessible views to focus on problem details
  - Recommend appropriate actions
  - Passive autonomics support at this time – no actions taken
- Components
  - Recovery Sensor, Autonomics Director, Policy Services, ITKB Repository
- IMS Recovery Autonomics is implemented by the following products
  - IMS Recovery Solution Pack
  - IMS Tools Base



# IBM IMS Recovery Solution Pack

## Recovery Sensor: Data Elements

- Some data elements associated with Recovery Autonomics collected by Recovery Sensor
- Split into four new categories
  - Image copy
  - Recovery
  - Database backout
  - Change accumulation
- Source for data elements
  - RECON Flags
  - Elapsed times since last IC/CA
    - Timestamp of last IC/CA collected to calculate elapsed times at evaluation
- Recovery Sensor is a batch job that can be scheduled through any job scheduler or the Autonomics Director

### Image Copy

- DB\_DBRC\_IC\_NEEDED
- DB\_DBRC\_IC\_RECOMMENDED
- DB\_IS\_IN\_A\_DBRC\_CAGRP
- DB\_HOURS\_SINCE\_LASTIC

### Recovery

- DB\_DBRC\_EEQE\_COUNT
- DB\_DBRC\_RECOV\_NEEDED

### Database Backout

- DB\_DBRC\_BACKOUT\_NEEDED

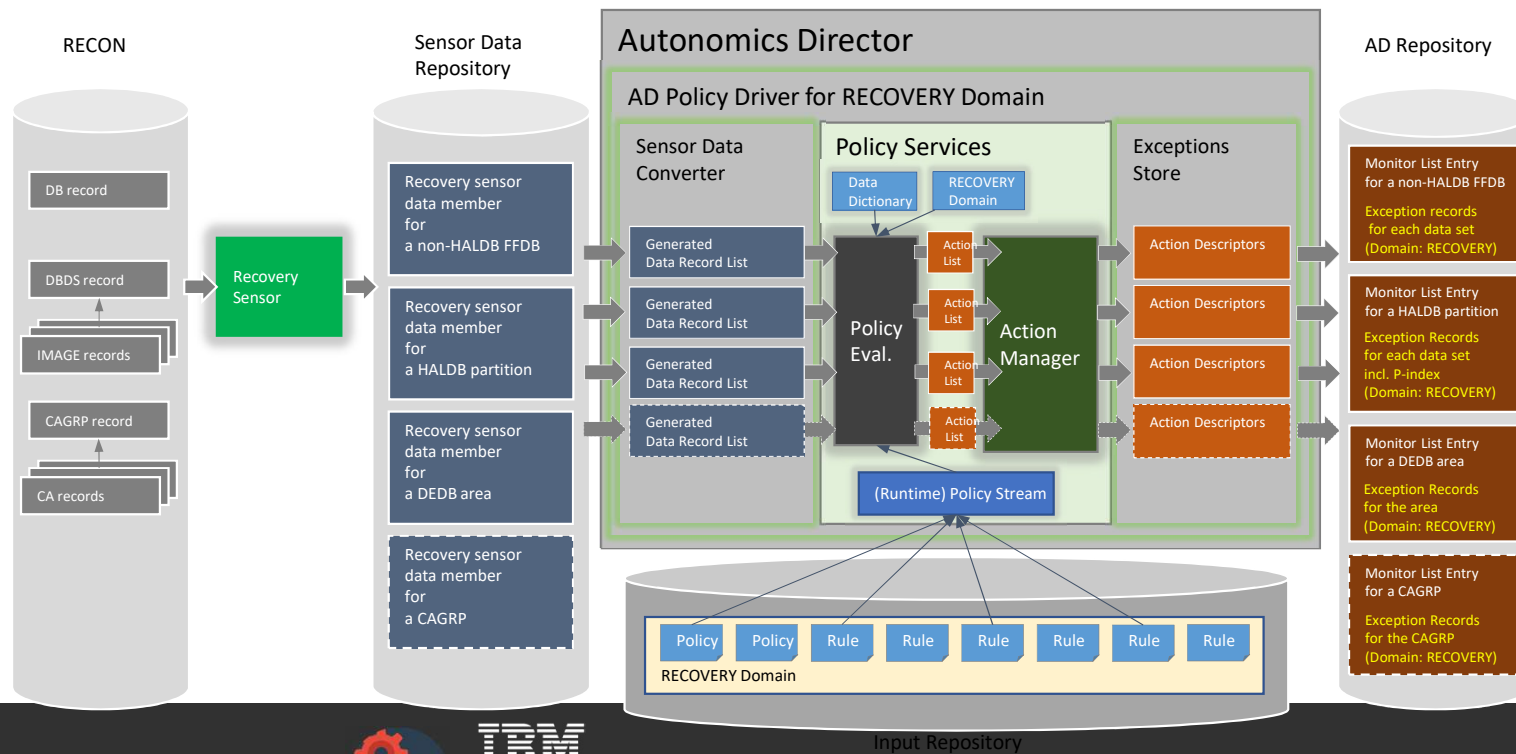
### Change Accumulation

- DB\_HOURS\_SINCE\_LASTCA



# Autonomics Components: Data Flow

- An action list is created only when an exception is detected by Policy Service



# IBM Management Console for IMS and DB2

- Management Console (MC) integrates with Autonomics Director to provide comprehensive and customizable views of all IMS environments across your enterprise
- You can view statistics for IMS databases from any of your IMS environments within a single MC session
- **Exceptions widget** on MC
  - Shows exceptions that are generated when database states cross thresholds that are specified in policies that you define in Policy Services
  - Helps you to focus on those databases that need your attention and eliminate unnecessary manual analysis and routine preemptive tuning
  - Provides recommendations to help you address certain types of exceptions
    - This reduces DBA's data analysis work and help DBA move more quickly from a potential problem to a resolution.



## Exceptions Widget Enhancement for Recovery Exceptions

- Support for exceptions detected in RECOVERY policy domain
  - This enhancement was provided as APAR PI72225 (PTF UI44512) for IBM Management Console for IMS and DB2 for z/OS V1.1 (5655-TAC)

RECOVERY-related exception and associated action recommendation

A brief exception description in balloon help.

REORG-related Exceptions

RSIC / IVPDB / Databases (DBD) / CLASSRDB

Properties

Environment Name: RSIC  
Locale Alias: IVPDB  
Database Name: CLASSRDB  
Database Type: HDAM  
Access Method: VSAM  
External Databases: 1  
Segment Levels: 2  
Logical Children: 1  
Segment Types: 2

Exceptions 4

- Actions (1)
  - Image copy is recommended
- Critical (3)
  - Imbalanced randomizing and inefficient use of RAPs
  - Excessive number of synonyms on RAPs
  - At least one data set needs an image copy
- Severe (0)
- Warning (1)
  - Excessive number of variable-length split segments

Reports 12

2016-03-16 (12)

**At least one data set needs an image copy**  
2016-10-06 11:29:04+09:00

Status:  
Hours since the last IC has reached or exceeded a threshold for the following data sets or area of CLASSRDB: CLASRDS1, CLASRDS3.

Severity: 70  
Source: IMS Tools Autonomics Director

# Summary and Wrap Up

# THANK YOU

Your IBM IMS Customer Facing Team for North America

## IMS/IMS Tools – Technical Sales

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