Automation for IMS: Why It's Needed, Who Benefits, and What Is the Impact?

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Session 16391

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Agenda

- Better database management through automation

- Simple dynamic batch application optimization

- Summary

Need for Automation - Why

- Growing quantity of IMS data

- Fewer IMS experts

- New engineers supporting IMS
  - Windows fluent
  - Green screen avoiders

- Need to capture 46+ years of IMS knowledge and pass it on quickly

- Constant pressure to reduce cost

DBA Requirements – Maintain Database Health

Take care of the databases

Number of databases to manage

Available window to implement changes

Lead time required to implement changes

Lower cost

Taking care of the databases

COST

Availability   Performance   Recoverability

Fast Path Online Restructure/EP and HALO Minimal outage database change - Availability

The Problem

- Constant pressure to reduce number of outages
- Conflicts with the need to change the database
- Applications want additional availability
- DBA's/Systems want to maintain the change window

- The solution – Online Database Change
  - Minimal outage to the application
  - Change capture and apply technology
  - BMP coexistence
  - Resource management

Fast Path Online Restructure/EP and HALO Minimal outage database change - Availability

Online Database Change integration with other BMC technologies

- Fast Path DEDB's, HALDB, and Full-Function
- Integration with other core technology
  - BMC PAUSE
  - Change Capture and Apply technology
  - Application Restart Control for IMS for Suspend/Resume
  - Secondary Index Utilities for index rebuilds
  - DELTA PLUS for control block management

Existing process for managing databases – metrics based

- Track multiple data points

- Correlate these data points

- Collect data

- Analyze data

Consider policy based database management

- Lead time required to implement a change
  - Database reorg may need 2 week lead time
  - Database change may need a 4 month lead time

- How frequently do you need to monitor databases
  - DEDB's may need to be monitored every hour
  - Database storing historical data once a week monitoring

Taking care of your databases - Space

- My databases should have at least "x" free space
  - As example – all databases should have 20% freespace

- My database VSAM data sets should not be bigger than "Y" GB
  - As example – all data sets should be less than 3.5 GB

- My database data sets should not have more than "Z" extents
  - As example – all data sets should have less than 50 extents

Putting it together

OSAM Extents
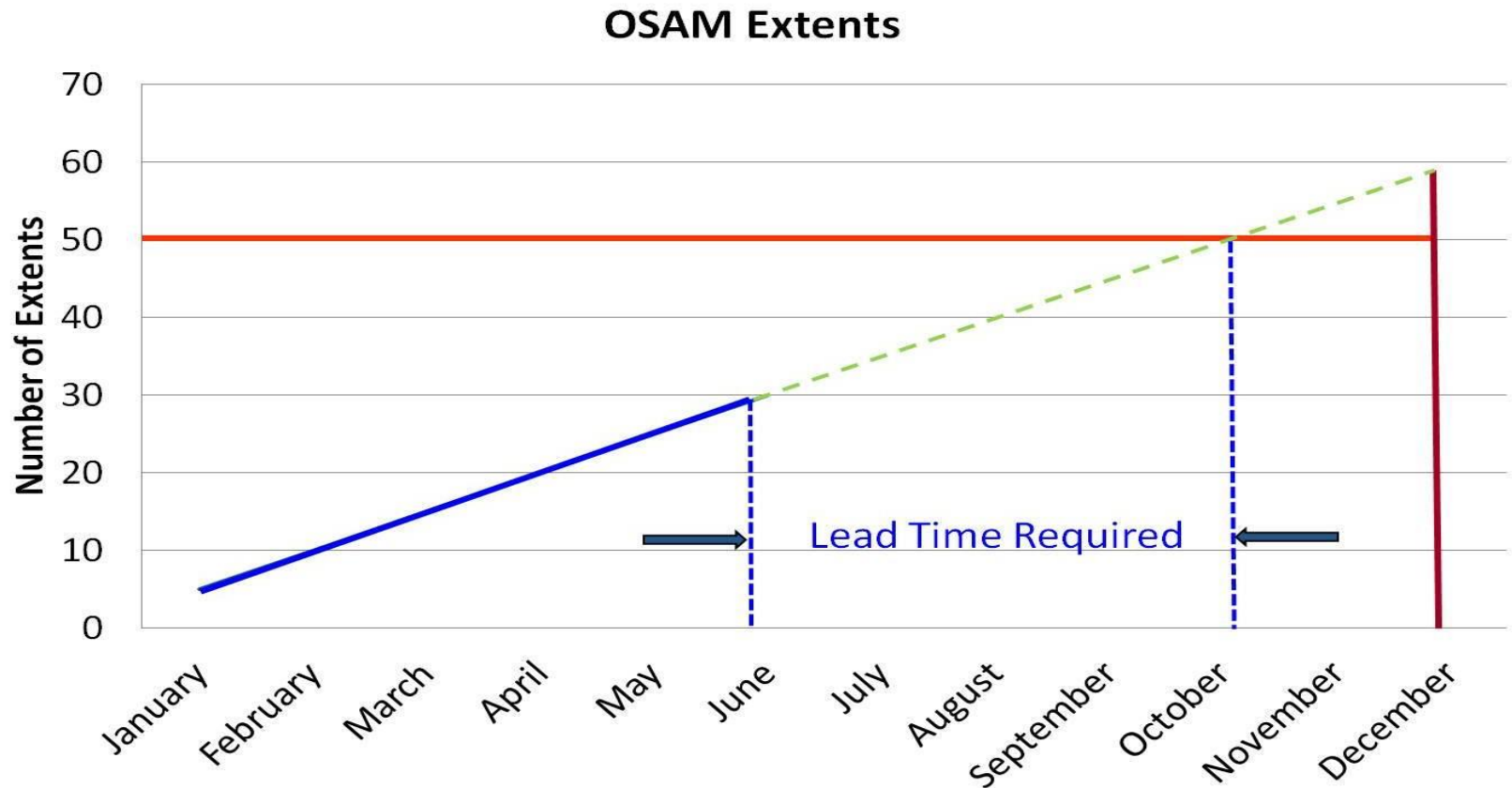
Taking care of your databases - Performance

- How many I/Os do you need to retrieve a record
  - As example - The growth in I/O should not exceed 20 %

- How many CI/CA splits do I have
  - As example – The % of split CIs should not exceed 20 %

- How are my randomizing parameters
  - As example – The parameters should be within 20% of optimal

Same Concept for Performance Parameters
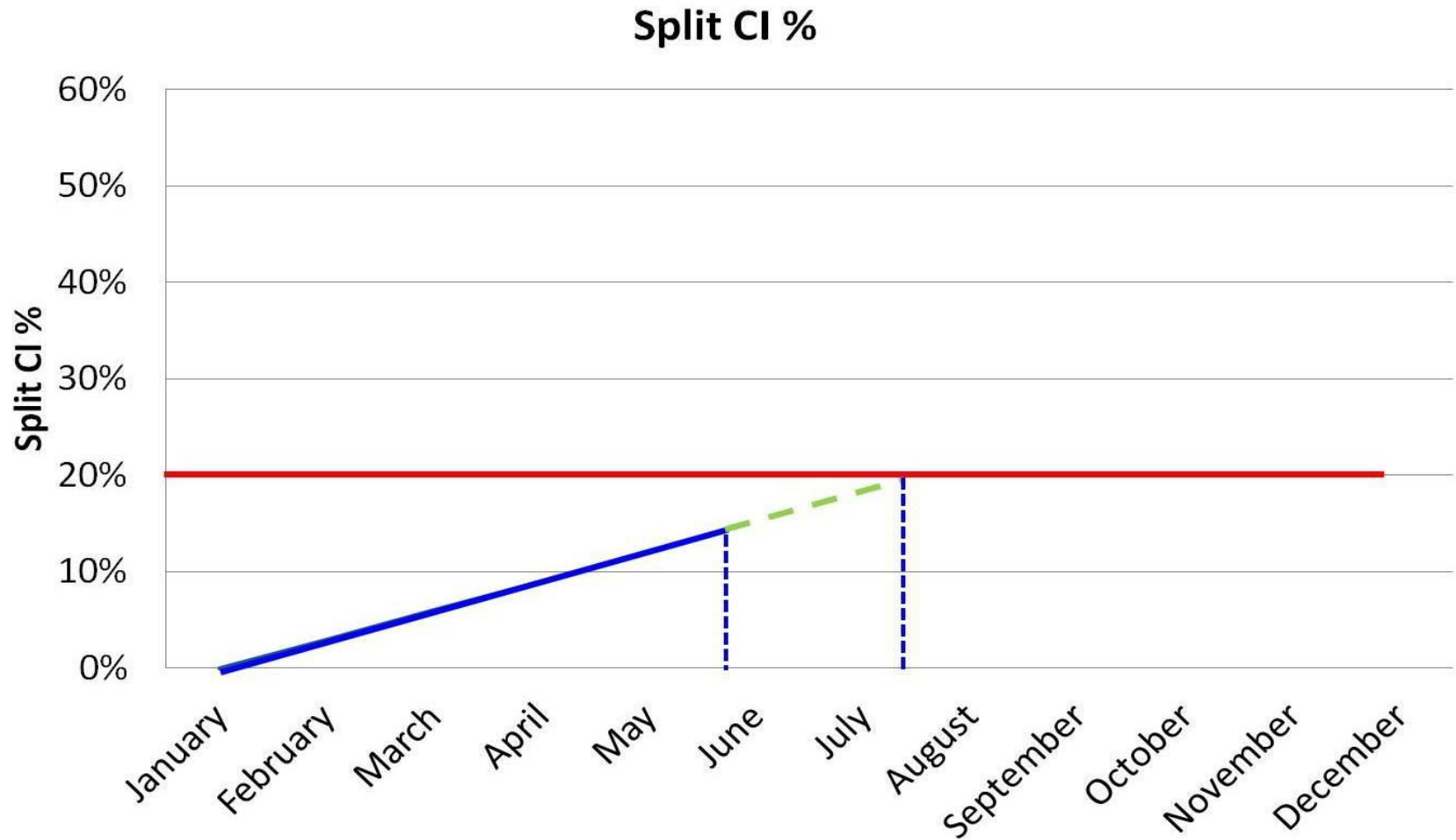
Split CI %

Taking care of your databases - Recoverability

- RECONS – IMS recovery revolves around these datasets
  - Monitor the health of the RECONs

- My RECONs should have less than "X" % CI/CA splits
  - As example – The % of split CIs should not exceed 20 %

- My RECONS should have "Y" % allocated free space
  - As example – The allocated free space should be 15 % or more
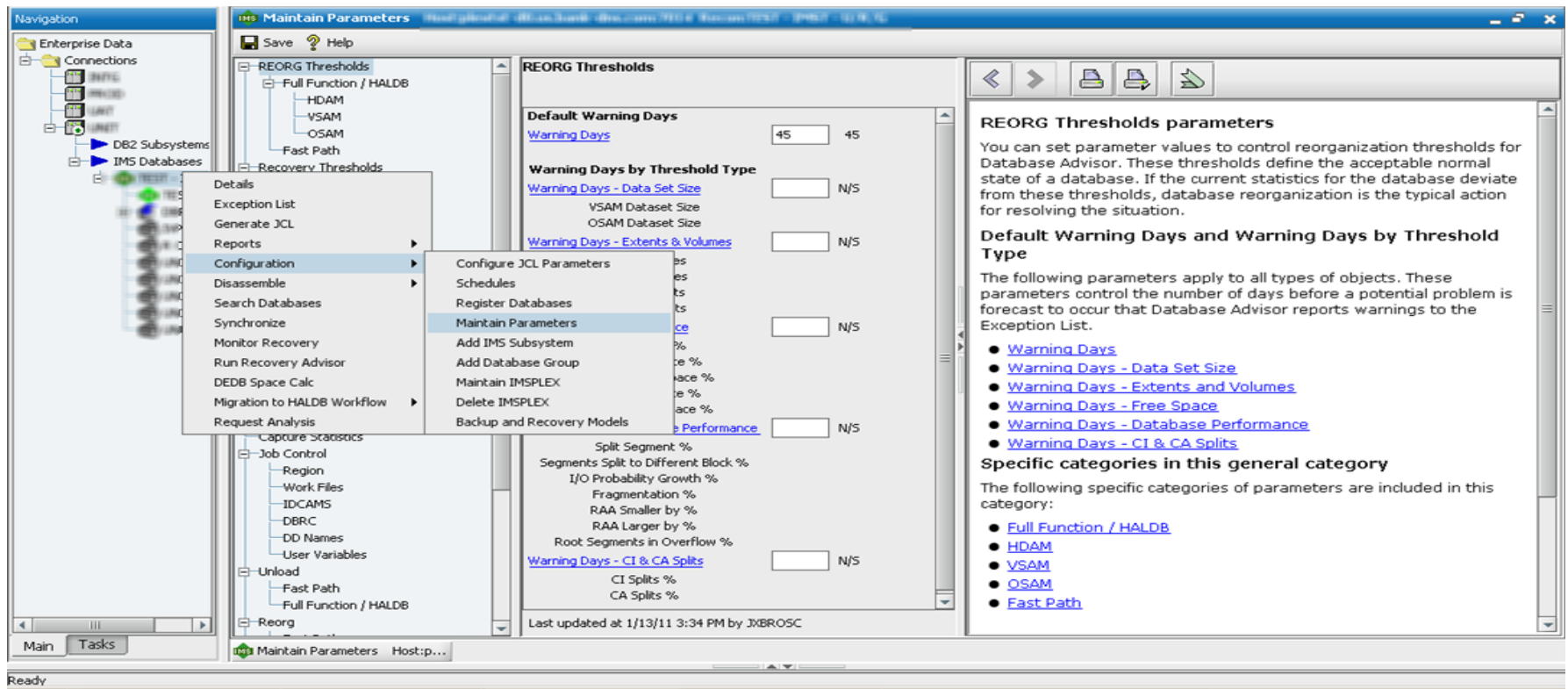
Taking care of your databases - Recoverability

- Recovery Conditions – select the conditions to track from the RECON
  - As example – database marked as IC needed

- Recovery assets - can I perform a successful recovery
  - As example – Are all my image copies, change accum datasets and IMS log datasets cataloged?

- Manage the CA & DBDS groups
  - As example – Take an image copy when CA dataset size is too large

MAXM Database Advisor for IMS – Database Thresholds and Parameters
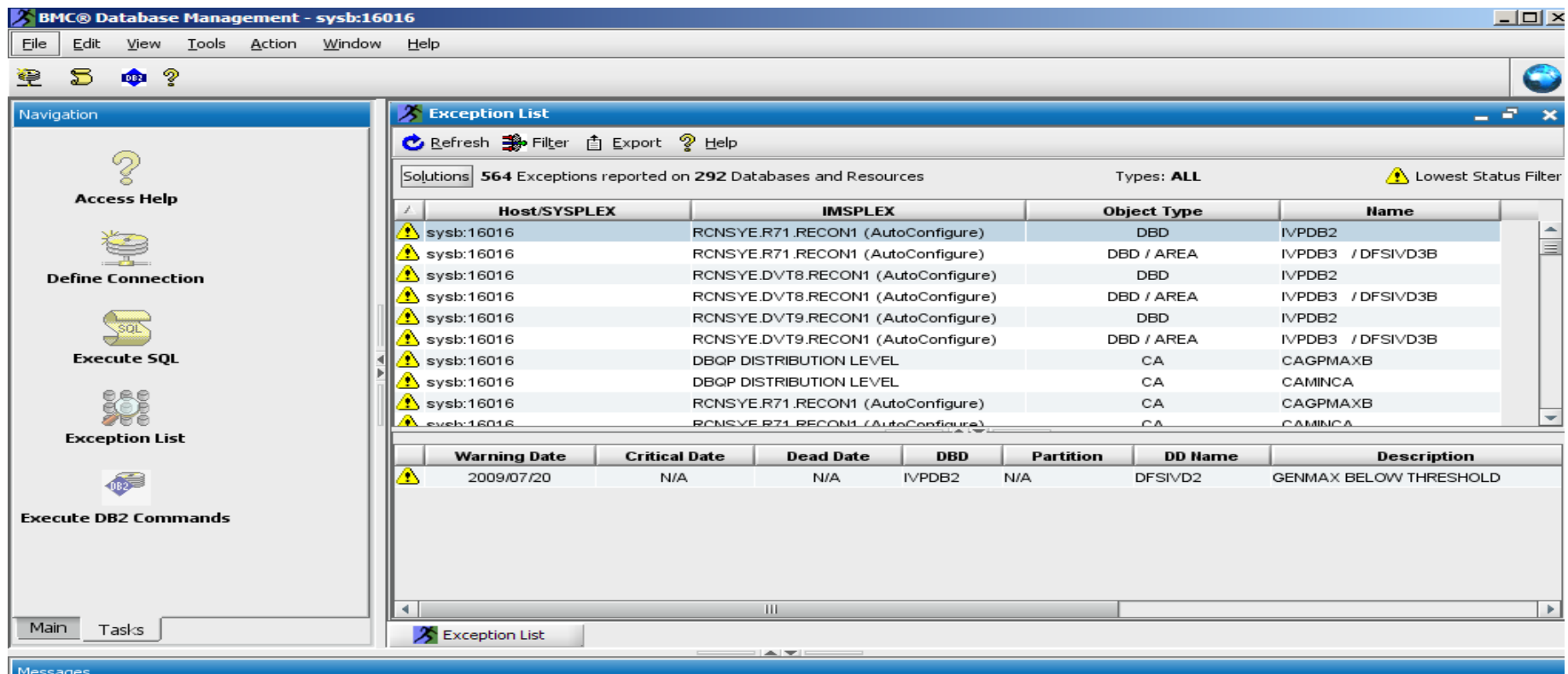
- Defaults are best rules of thumb
- Maintained and applied consistently across the environment
- Increases DBA productivity by 70%

MAXM Database Advisor for IMS – Database Exceptions are the DBA's Work List

- When exceptions exist that becomes the DBA's priority work list
- These are the correlated exceptions
- Increases DBA effectiveness by 50%

MAXM Database Advisor for IMS – Lower Cost - Conditional Reorganization

- The Problem – Database reorganizations that do not need to run
- The Solution – Conditional Reorganization
 - Run time decision as to whether a database needs reorganization
  - No changes to Scheduler or JCL
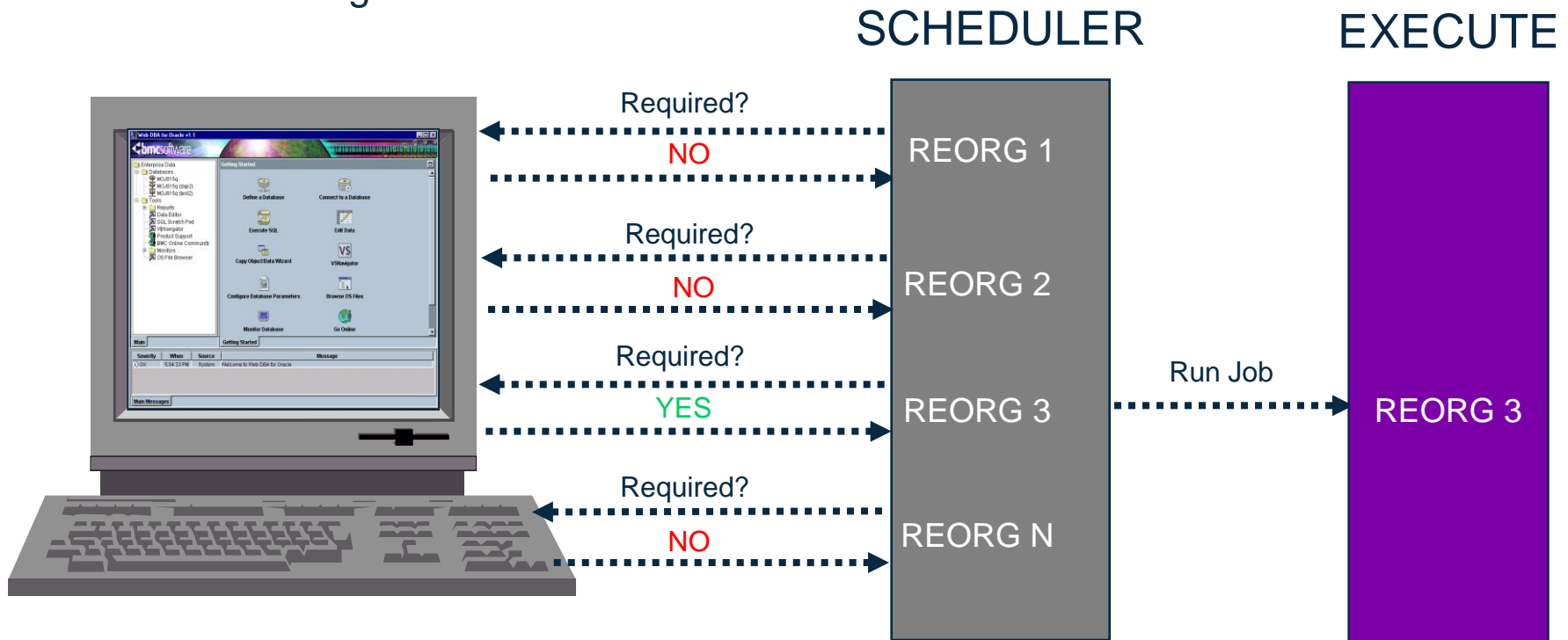
SCHEDULER   EXECUTE

Required?
NO
REORG 1

Required?
NO
REORG 2

Required?   Run Job
YES
REORG 3   REORG 3

Required?
NO
REORG N

Reorganizes only the databases that need to be reorganized

MAXM Database Advisor for IMS – Lower Cost - Conditional Reorganization

- Validation – Everyone wants to know the benefit
- Simulation – Based on collected statistics
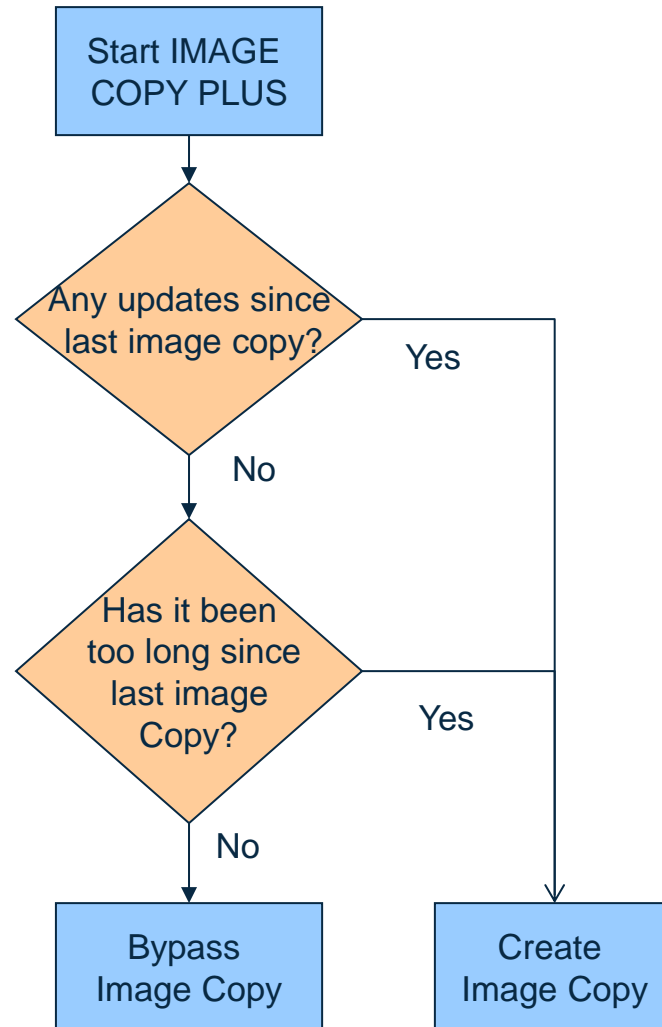 - If you are doing weekly scheduled reorgs
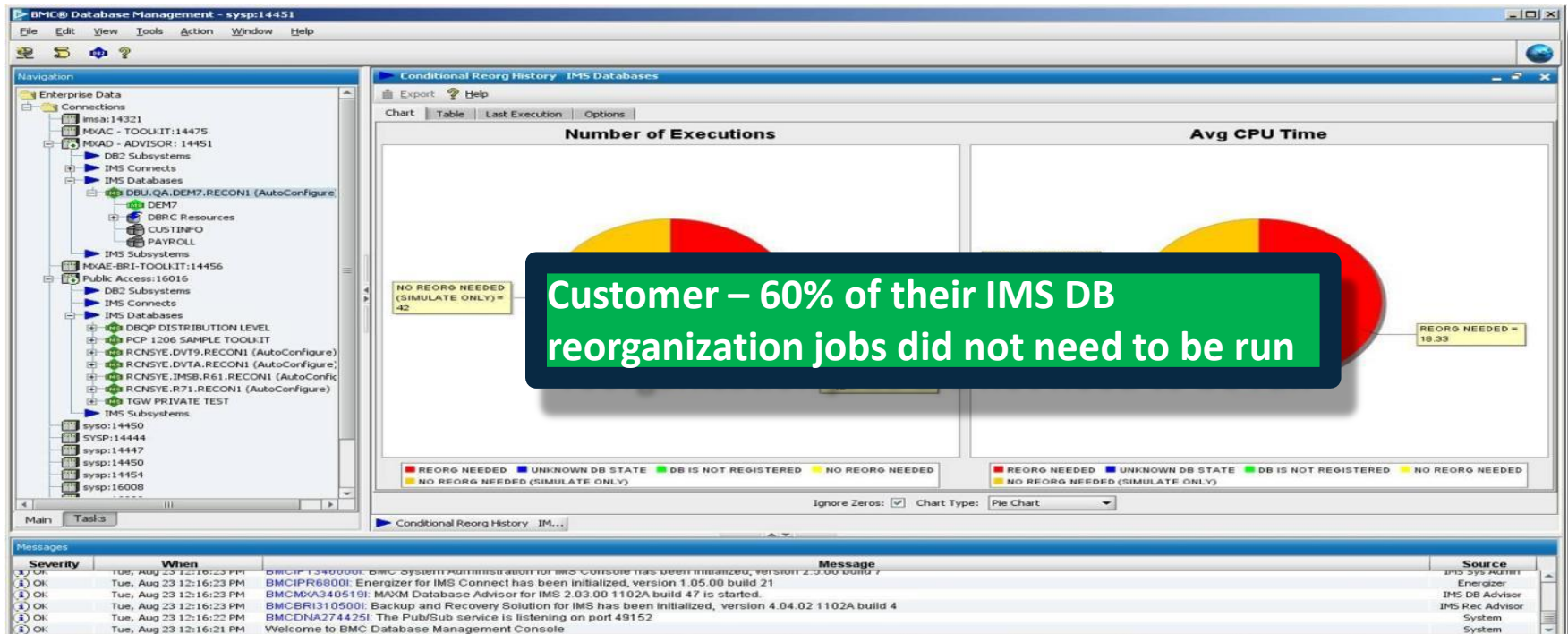
Customer – 60% of their IMS DB reorganization jobs did not need to be run

Reorganizes only the databases that need to be reorganized

Lower Cost- Conditional Image Copy

- The Problem -
  - Am I taking too many batch image copies
  - Can I save money without changing the scheduler
- The Solution –
  - Conditional Image Copy

Start IMAGE COPY PLUS

Any updates since last image copy? → Yes

No

Has it been too long since last image Copy? → Yes

No

Bypass Image Copy

Create Image Copy

Policy based database management - Summary

- You decide what you need
  - Lead time
  - Monitoring frequency
  - Database Thresholds

- You are presented with a list of objects that violate the policy
  - Smaller number of databases that you need to worry about
  - Enough lead time to implement your changes

- MAXM Database Advisor is a tool that automates this process to ensure:
  - You can manage your databases proactively
  - No database falls through the crack

Application Program Tuning

- Peak usage occurs more and more during batch windows
  - Mobile devices are driving different usage patterns
  - Research shows that the time of day of peak usage has changed

- Volume of data is increasing
  - Amount of data in IMS continues to grow

- You need to improve throughput
  - The time available to process the data is shrinking
  - The amount of data to process is increasing

Requirements for potential solutions

- Changing application programs might not be feasible
  - People familiar with the applications might not be available

- The solution needs to be scalable – lots of application programs
  - Policy based deployment e.g. Optimize all jobs starting with PAY*

- JCL changes will probably be frowned on
  - Dynamic implementation of improvements

Hidden BMP Overhead Costs

- CPU MIPS rates Increase
- Checkpoint intervals decrease
- Excessive checkpoints adds to overhead costs
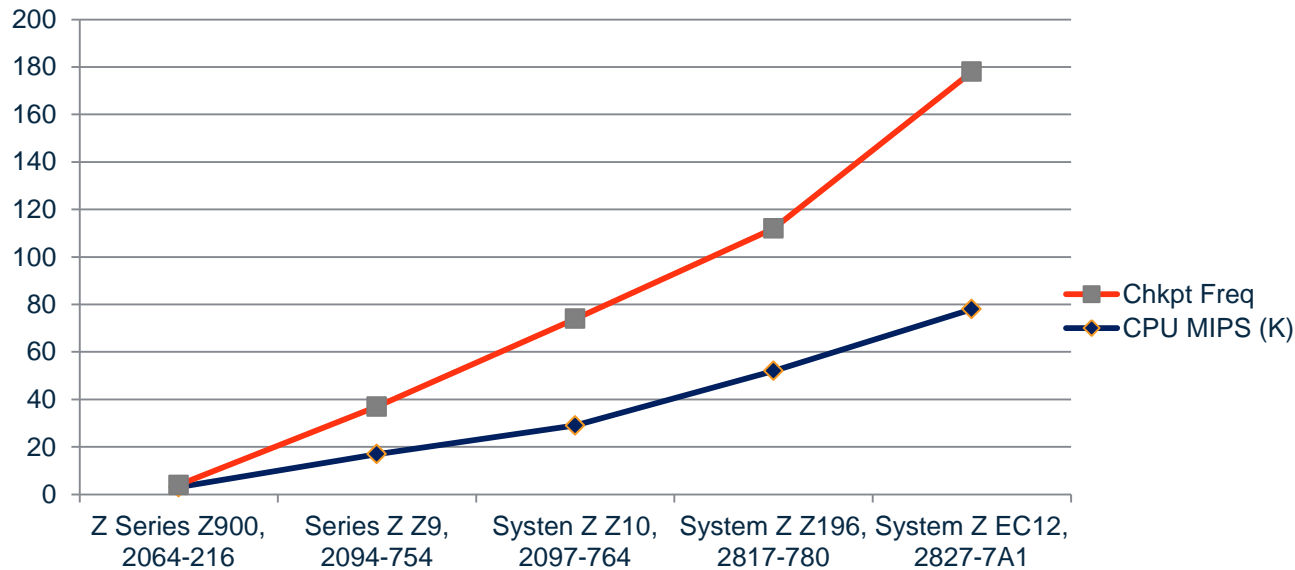
Log Analyzer for IMS
Problem Visibility

- BMP's run to completion
  - Out of Sight, Out of Mind
- BMP's run in the same time frame
- I don't want to change the application

JOB-----	PSB-----		#CHKPTS/TYPE	JOB DURATION	CHECKPOINT FREQUENCY /MIN	/SEC	-------Exceptions-------
			14323 SIMPLE	01:16:25		3.12	*** More than 1 chkp / sec
			40173 SIMPLE	00:14:49		45.17	*** More than 1 chkp / sec
			39949 SIMPLE	00:14:39		45.44	*** More than 1 chkp / sec
			39900 SIMPLE	00:13:40		48.64	*** More than 1 chkp / sec
			39975 SIMPLE	00:13:26		49.60	*** More than 1 chkp / sec
			39717 SIMPLE	00:14:34		45.43	*** More than 1 chkp / sec
			39900 SIMPLE	00:14:50		44.84	*** More than 1 chkp / sec
			39955 SIMPLE	00:14:39		45.45	*** More than 1 chkp / sec
			39375 SIMPLE	00:13:04		50.21	*** More than 1 chkp / sec
			40100 SIMPLE	00:14:35		45.83	*** More than 1 chkp / sec
			39975 SIMPLE	00:15:00		44.41	*** More than 1 chkp / sec

Application Restart Control for IMS Application Programs - Checkpoint Pacing

- The Problem – IMS checkpoint processing
  - Required, necessary evil
  - Extremely expensive – 100% overhead
  - Removing excessive checkpoint activity can provide significant run time improvements

- The Solution – Checkpoint Pacing functionality
  - CPU Reduction – removes unnecessary checkpoints
  - Elapsed time Reduction – allow increased throughput of data
  - Policy based deployment

Application Restart Control for IMS
Conceptually Checkpoint Pacing
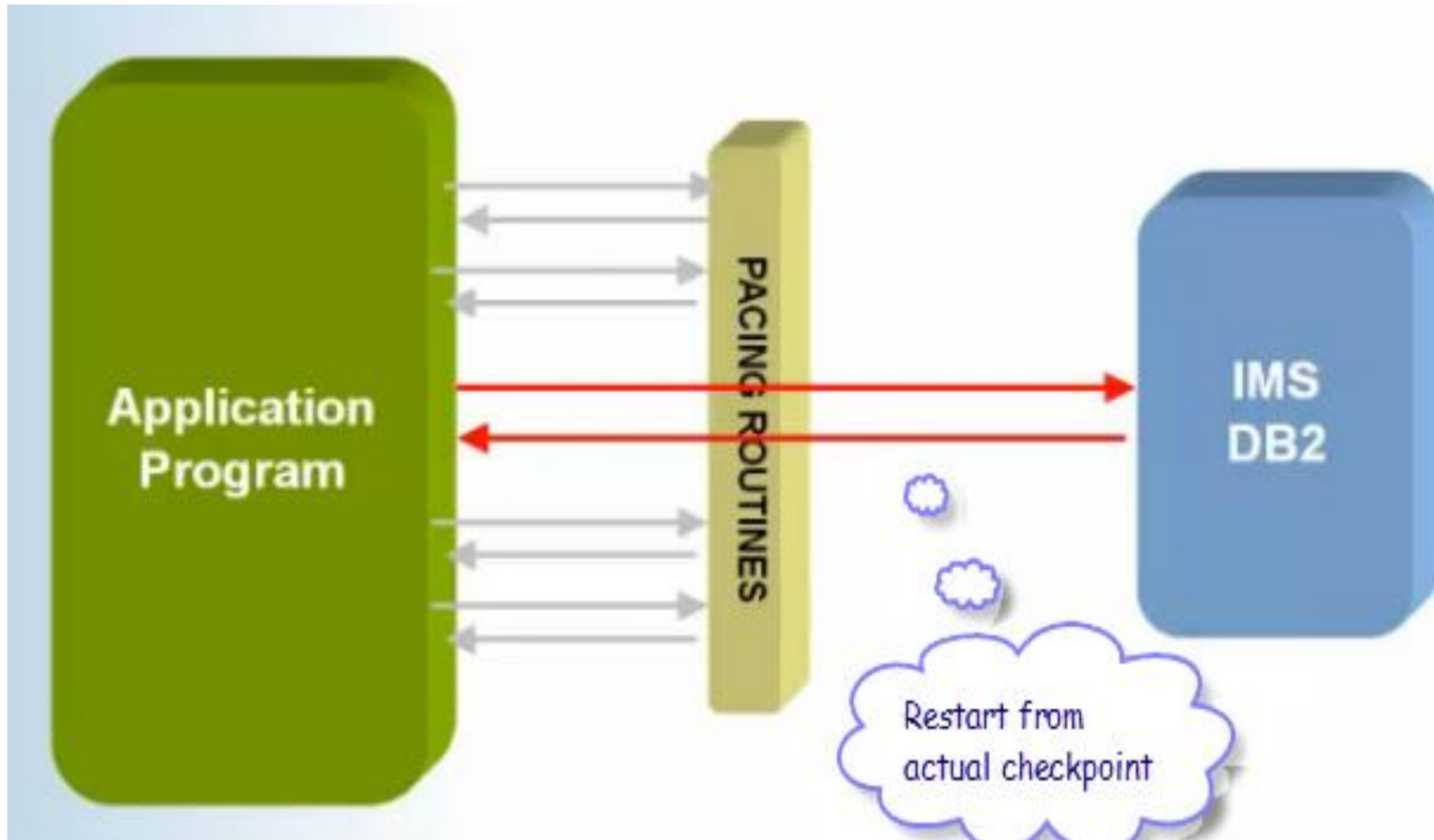
Application Restart Control for IMS
BMP Deadlock Reduction

- The Problem
  - BMP jobs abending with U0777
  - Issues with scheduler restart

- The solution – Application Restart Control for IMS
  - Implement a reattach solution
  - No scheduler requirements
  - Does not terminate the BMP, but delays reattach until most conflicts are circumvented
  - Operational savings
  - FTE Savings

Application Accelerator for IMS
Application Programs - Dynamic Tuning
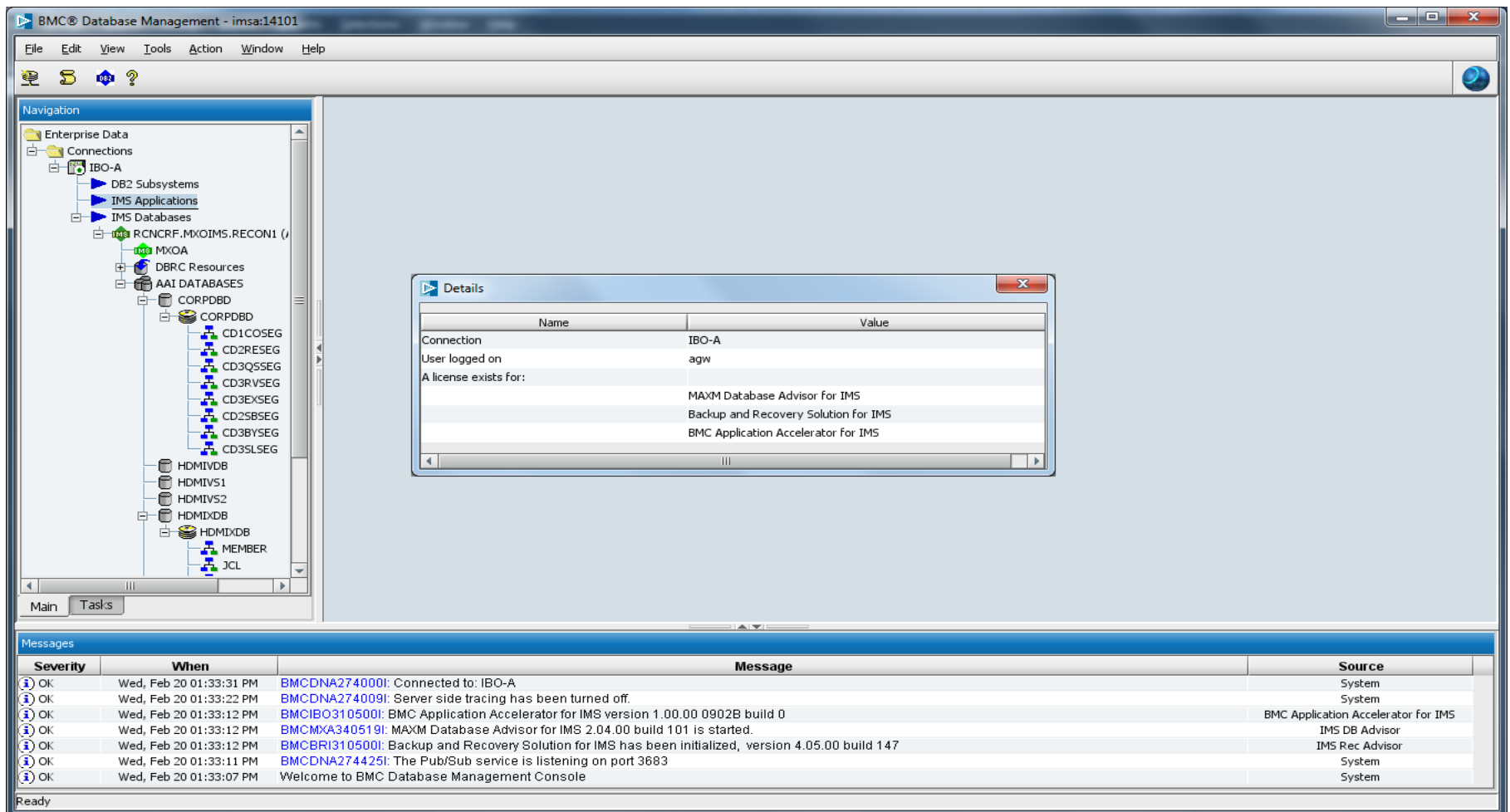
- The Problem
  - DL/I Batch jobs usually run with a one size fits all buffer definition
  - It is not customized to volume of data
  - It is not customized to individual job call patterns

- The solution – Application Accelerator for IMS
  - DLI, DBB, and BMP optimization
  - Implement dynamic buffer tuning based on call volume and call pattern
  - Implement OSAM sequential buffering
  - Implement enhanced I/O techniques where possible
  - Policy based deployment
  - Delivers significant CPU and elapsed time savings

Application Accelerator for IMS
Application Programs - Dynamic Tuning

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Application Accelerator for IMS
Application Programs - Dynamic Tuning

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Summary

- Why? Use policy based database management
  - Consistent - no matter how many databases
  - Effective - "the right work at the right time"

- Who?   DBA's, Applications

- What?
  - Fast Path Online Restructure/EP and HALO for Online Change
  - MAXM Database Advisor for IMS for Database and Recovery Management,
  - Application Restart Control for IMS and Application Accelerator for IMS Batch Optimization

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