Making life Easy with EZ-IDMS

Presentation for The IUA/CA-IDMS Technical Conference Plano Texas 2018

May 10th 2018

syncsort

Overview

- **Introduction**
- **Products for 24 x 7 Operation**
  - EZ-REORG /EZ-RSTU
- **Testing Tools**
  - EZ-Image
- **Buffer Synchronisation Products**
- **Other Tools**

Trusted Industry Leadership

>7,000
Customers

syncsort

84
of Fortune 100 are Customers

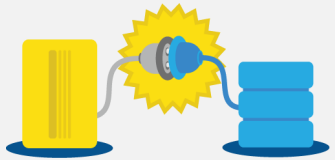
The global leader in Big Iron to Big Data

500+
Experienced & Talented
Data Professionals

1968
50 Years of Market Leadership
& Award-Winning Customer Support

3x
Revenue Growth
In Last 12 Months

Macro Trends Require Big Iron to Big Data Strategies



Big Iron to Big Data

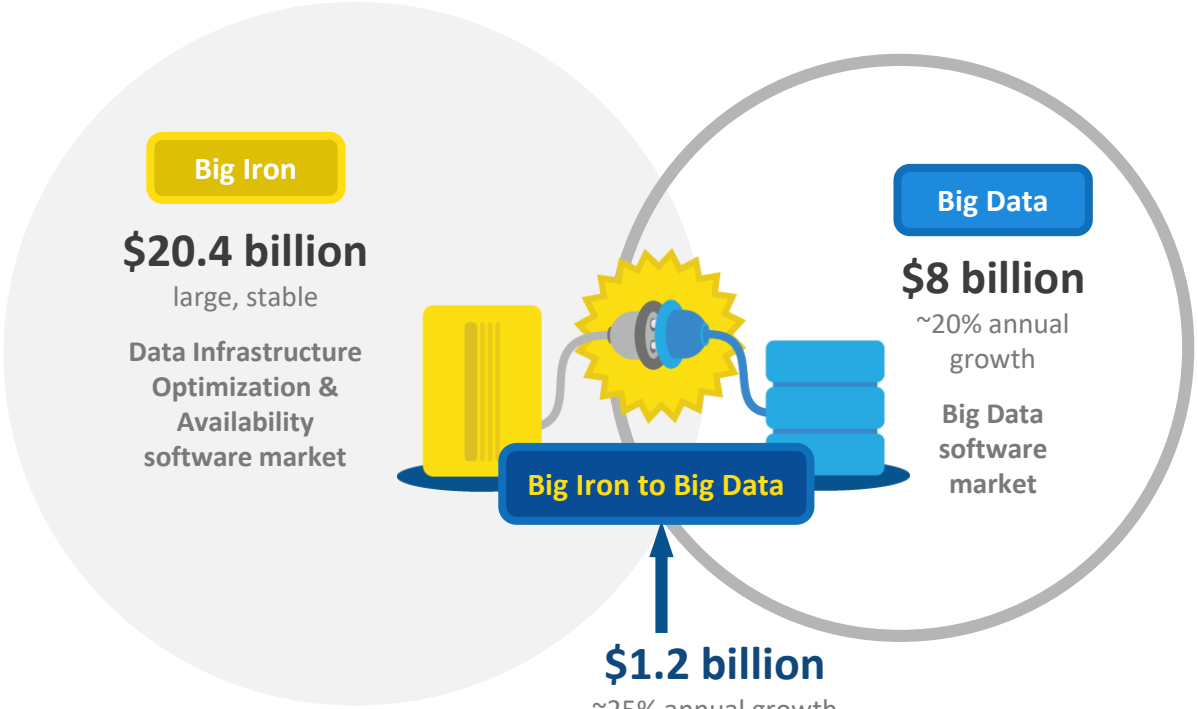
Digital business is driving significant growth in workloads managed by legacy data systems

- IBM i and Mainframes run the core transactional applications of most enterprises
- Growing touchpoints on mobile & online increasing transaction volumes and workload unpredictability
- Critical focus on *data infrastructure optimization & availability* initiatives to meet demand and manage costs

Innovation is enabling analysis of larger, more diverse data

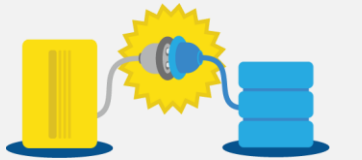
- Enterprises making major investments in new Big Data repositories for greater insights
- Mobile & online data sources must be analyzed quickly & efficiently
- Next-gen analytic environments must contain valuable app & machine data from legacy systems that is *liberated, integrated & trusted*

Big Iron to Big Data Market Size and Forecast



source: Estimates based on 2016 Wikibon study

And These Strategies Must Drive Value Across Multiple Domains



Big Iron to Big Data

Data Infrastructure Optimization & Availability

- Reduce computing costs on legacy data systems including mainframes & IBM i Power Systems
- Improve availability, reliability and integrity
- Meet growing security and compliance requirements

Data Liberation, Integration & Integrity

- Unlock mainframe and IBM i data for machine learning and advanced analytics
- Access, transform, integrate & deliver data to analytic environments
- Ensure data quality, lineage, security
- Enable data consumption on premise and in the cloud

Differentiated Product Portfolio & Technical Expertise

Data Infrastructure Optimization

Best-in-class resource utilization and performance, on premise or in the cloud

- MFX® for z/OS
- ZPSaver Suite
- EZ-DB2
- EZ-IDMS
- DMX & DMX-h
- DMX AppMod
- DL/2
- Zen Suite
- athene®
- athene SaaS®

Data Availability

#1 in high availability for IBM i and AIX Power Systems

- MIMIX Availability & DR
- MIMIX Move
- MIMIX Share
- Quick-EDD/HA
- iTera Availability
- Enforcive, Cilasoft, CSI

Data Integration

Industry-leading mainframe data access and highest performing ETL

- Ironstream®
- Ironstream® Transaction Tracing
- DMX & DMX-h
- DMX Change Data Capture

Data Quality

Market-leading data quality capability

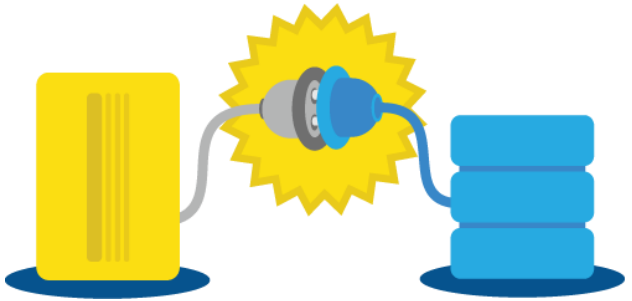
- Trillium Software System
- Trillium Quality for Big Data
- Trillium Precise
- Trillium Cloud
- Trillium Global Locator

Big Iron to Big Data

A fast-growing market segment composed of solutions that optimize traditional data systems and deliver mission-critical data from these systems to next-generation analytic environments.

Leading the next technology [r]evolution:
Big Iron to Big Data

Big Iron to Big Data: a fast-growing market segment composed of solutions that **optimize** traditional data systems and **deliver** mission-critical data from these systems to **next-generation analytic environments**.



Syncsort - Cogito History

- **Cogito UK Based ISV specializing in CA IDMS and DB2**
  - Founded 1989
- **Ex-Cullinet staff**
- **Software installed worldwide at many of largest CA IDMS sites**
  - Cogito products “mission critical” to these sites
- **Cogito part of Syncsort family of products since 2016**

Premier Solution for 24 x 7 (Continuous Operations)

- **EZ-Reorg**
  - In-Flight reorganisation
- **EZ-RSTU**
  - In-Flight restructure

Cogito EZ-Reorg

- Reorganise or restructure your production database while it remains online and available for update and retrieval
- The #1 DAR from the user community
- Developed with the full cooperation of Computer Associates
- CA have required Cogito to ‘sign off’ that EZ-Reorg functions correctly at new IDMS releases prior to general release

EZ-Reorg / RSTU
Introduction

- **24x7 Operations**
  - CA-IDMS attempting to meet user requirements for non-stop systems
  - CA Express Reorg
  - Database maintenance still problematic
- **Database Reorganization problems…**
  - Planning
  - Overtime
  - System Unavailability
- **Until EZ-Reorg / EZ-RSTU !**
  - 15 minute downtime

How we do it ?

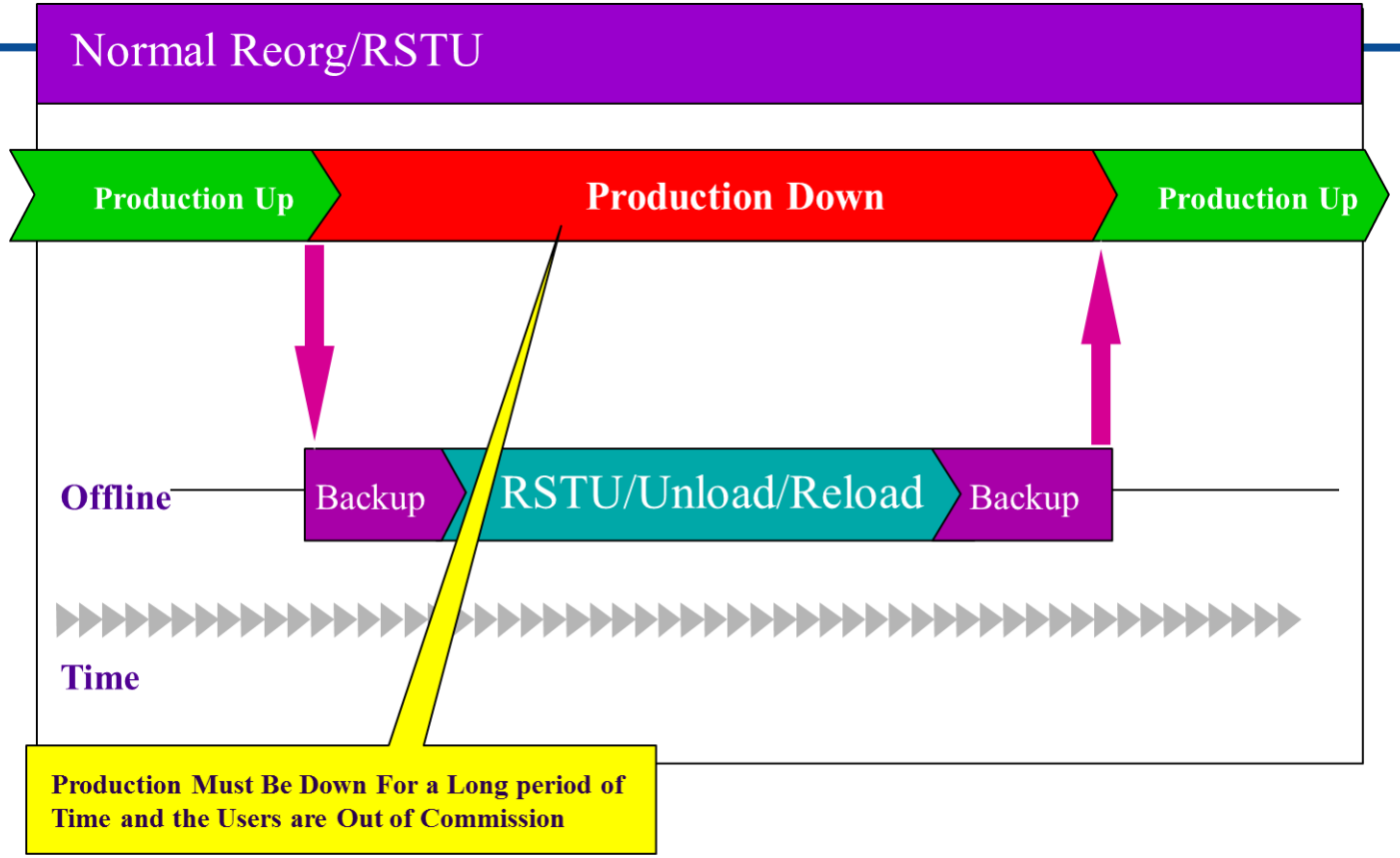
- **Copy Affected areas**
  - In the world of EZ-Reorg, you take a snap-shot copy of the affected areas
    - Copy can be a static or (preferably) in-flight backup to minimize outage
  - The database reorg is performed against the copy while the production system continues to run against the original database

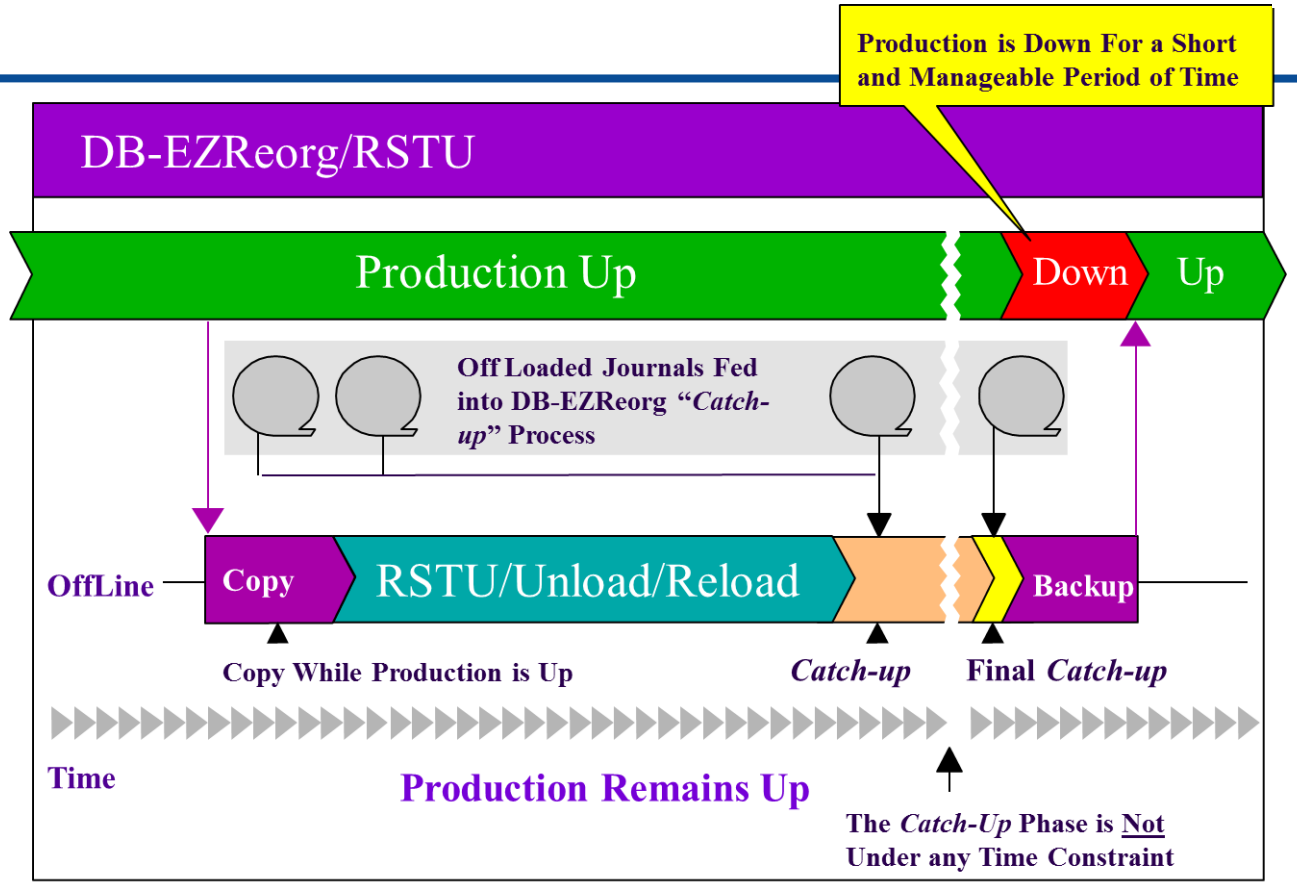
How we do it (cont.)

- **EZ-Reorg "*Catch-up*" process**
  - Analyses the off-loaded journal records from the old database (since the snap-shot was taken), and generates the required DML to apply the corresponding changes to the new reorganized database
  - "*Catch-up*" is an iterative process

How Do We Do It (cont.)

- **Final "*catch-up*"**
  - Vary area(s) offline and offload active journal
  - "Catch-up" final journal(s)
- **Implementation**
  - Once final journals are applied, implement new areas
  - Overall outage can be less than 15 minutes


Normal Reorg/RSTU
Production Up
Production Down
Production Up
Offline
Backup
RSTU/Unload/Reload
Backup
Time
Production Must Be Down For a Long period of Time and the Users are Out of Commission


Production is Down For a Short and Manageable Period of Time
DB-EZReorg/RSTU
Production Up
Down
Up
Off Loaded Journals Fed into DB-EZReorg "Catch-up" Process
OffLine
Copy
RSTU/Unload/Reload
Backup
Copy While Production is Up
Catch-up
Final Catch-up
Time
Production Remains Up
The Catch-Up Phase is Not Under any Time Constraint

EZ-Reorg v Express Reorg

- **UK Telephone Company**
  - Their test showed CA Express Reorg can reduce elapsed time to 1/5th Unload/Reload
  - If Unload/Reload greater than150 minutes then EZ-Reorg still required
  - 150 minute UNLOAD/RELOAD is a really small one for this site

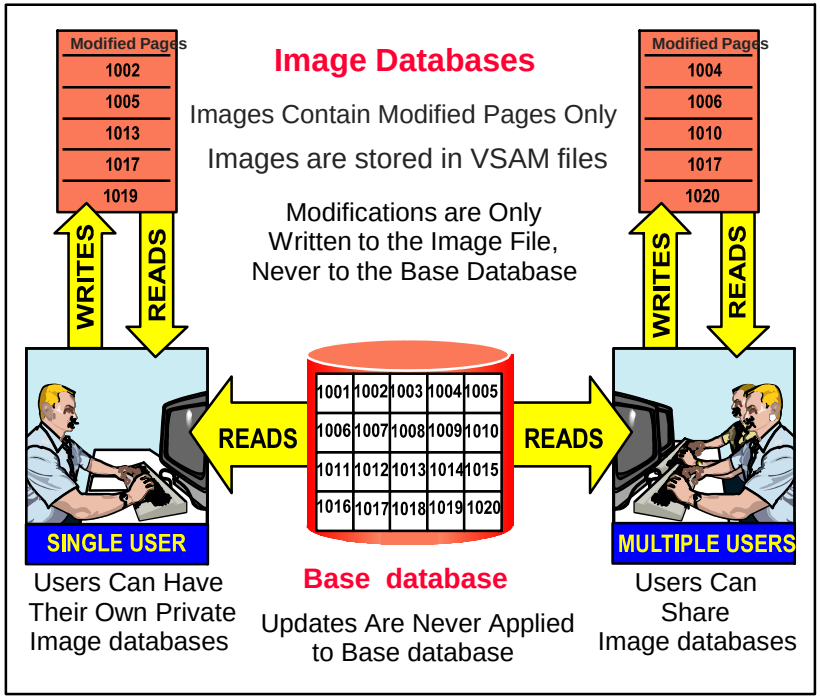
Benefits Summary

- **EZ-Reorg / EZ-RSTU**
  - Minimize down-time
  - Planning / scheduling considerations
    - Reduced overtime
    - Missed opportunities – what happens when things go wrong ?
    - More ‘forgiving’

Testing Tools - Resolving Test Database & Resource Problems

- **EZ-Image**
  - Operate as if you have *multiple copies* of a CA-IDMS database while in reality there is *only one physical* copy
  - All CA-IDMS environments supported -
    - CICS-IDMS, DC/UCF, ADS/O, batch etc.

EZ-Image How it Works



EZ-Image How it works

- *Images* are implemented by simple definition in COIMAGE table or DBIMCTL control file
- As many image databases as you want, each new image database is just one entry in control file
- A user selects an *image* by setting applicable DBNAME
- No need for *schema*, *subschema* or *DMCL* changes
- DMCL control structures needed to support *images added dynamically* by *EZ-Image* at system initialization

EZ-Image Benefits

- **Simple online controls to**
  - *Initialize image*
  - *Copy image* to *image*
  - *Copy image* to IDMS
- **Reduced DBA involvement in maintaining multiple test databases**

EZ-Image Benefits

- **Substantial DASD savings**
  - Telco have over 340 test databases of which 70 are now images
  - Saving 750 cylinders per test database or 17x 3390 drives (25% of total DASD used for test databases)
- **With private test databases DBAs can provide *hassle free*, realistic test environments**
- **Application developers no longer need to backup/restore the test database before/after every test**

Buffer Synchronisation

- **We also do Buffer Synchronization…**
  - Prevent “old’ pages in Retrieval CV systems
  - Eliminate spurious IDMS Status Codes – e.g. 0361

- **If you would like to find out more please talk to either Don or myself any time you catch us or by email/phone.**

  - EZ-Synchro
  - EZ-Share
  - EZ-XMVS

Other Tools

- **EZ-Megabuf Sequential**
  - Full Cylinder Reads/ Writes
  - Backwards sequential
  - Dynamic detection and storage management
- **EZ-Alloc8**
  - Online
  - Local mode and CV start-up
- **EZ-Peek**
  - Display load module information including APARs
  - Display DSN from where a module was loaded

Martin Cox
Donald J. Marcotte

MCox@syncsort.com

DMarcotte@syncsort.com

Appendix

Presentation for The IUA/CA-IDMS Technical Conference Plano Texas 2018

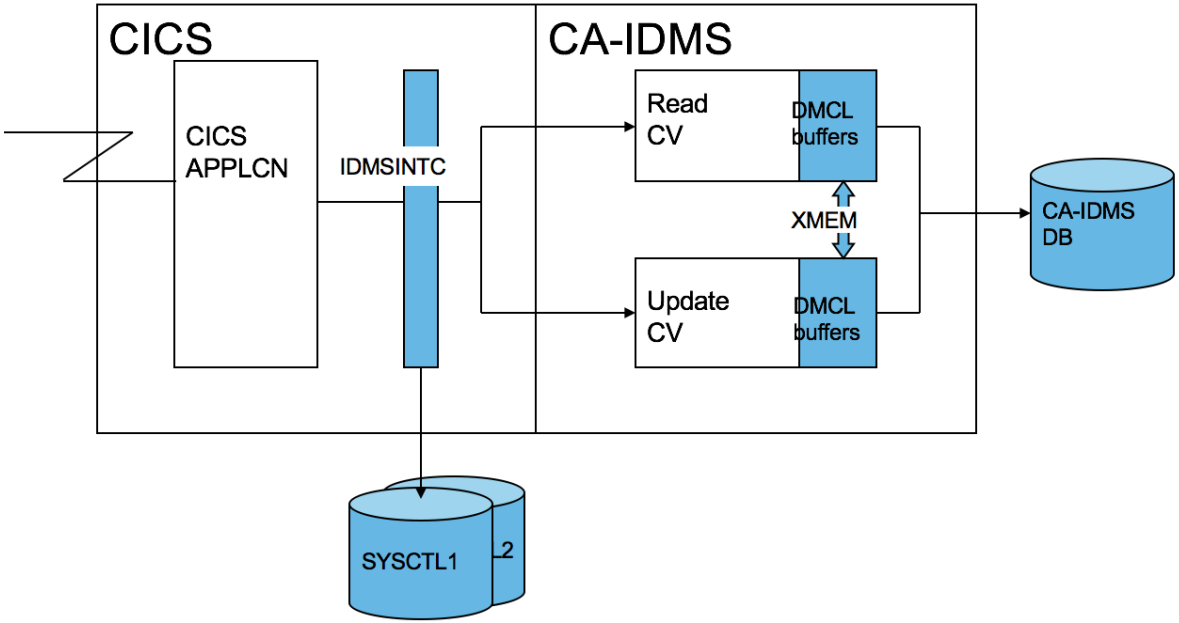
May 10th 2018

syncsort

UK Telephone co.

- **The need for multiple CVs**
  - It was predicted that with addition of planned new functionality system would run out of MIPs on single CPU
  - Analysis of transactions showed a 50/50 split between “read-only” and update transactions
  - MP Mode and Data Sharing overhead and management

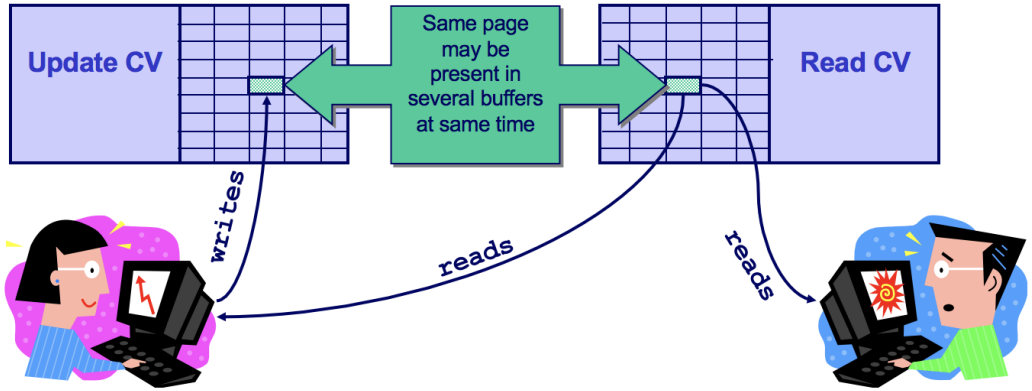
UK Telephone co.



Buffer Coherency

EZ-Synchro - Update Synchronization

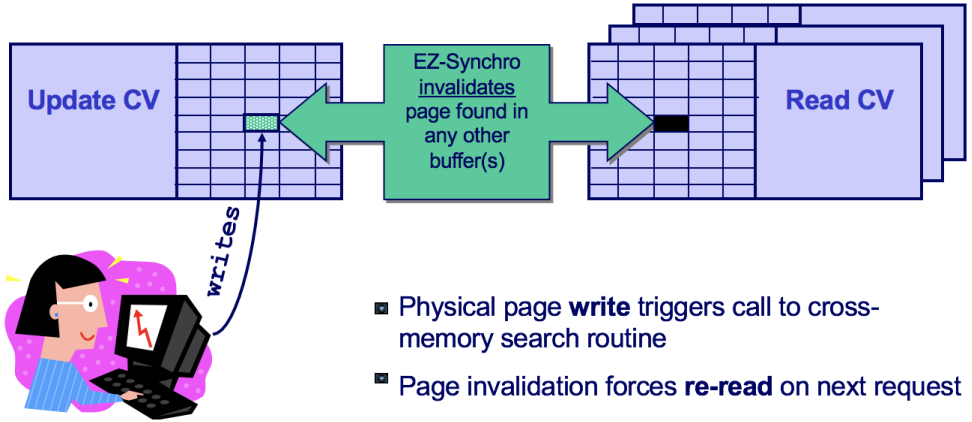
- **Prevents inconsistent presentation of data and “perceived” broken chains**



Buffer Coherency

EZ-Synchro - Update Synchronization

- **Uses MVS Cross-memory Services**

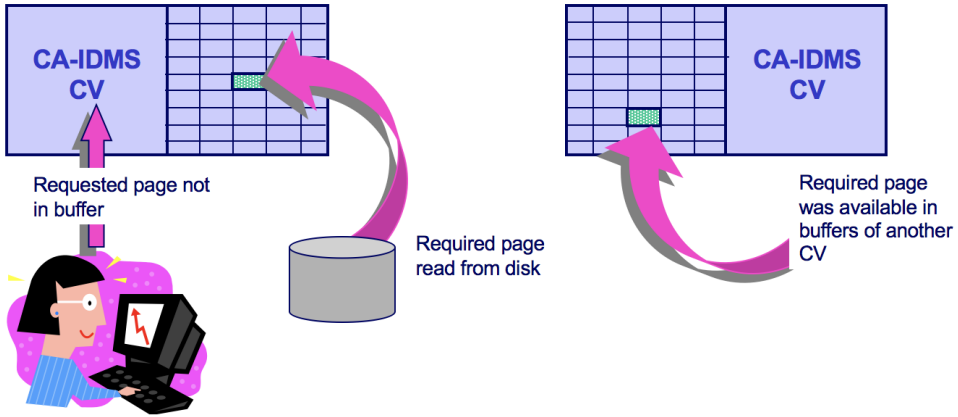


- Physical page **write** triggers call to cross-memory search routine
- Page invalidation forces **re-read** on next request

Buffer Coherency

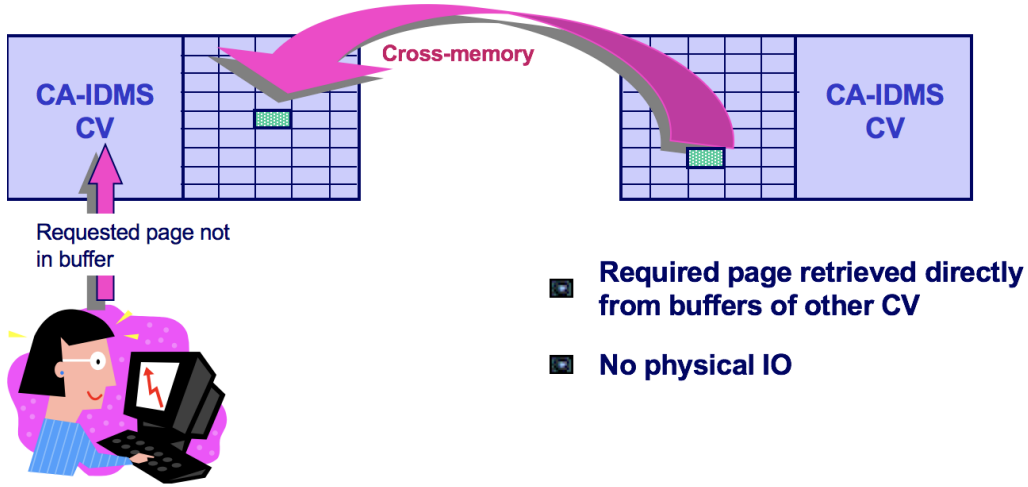
EZ-Share – Shared Buffer Reads

- **Multiple CV implementation gives possibility of reducing I/Os**



Buffer Coherency

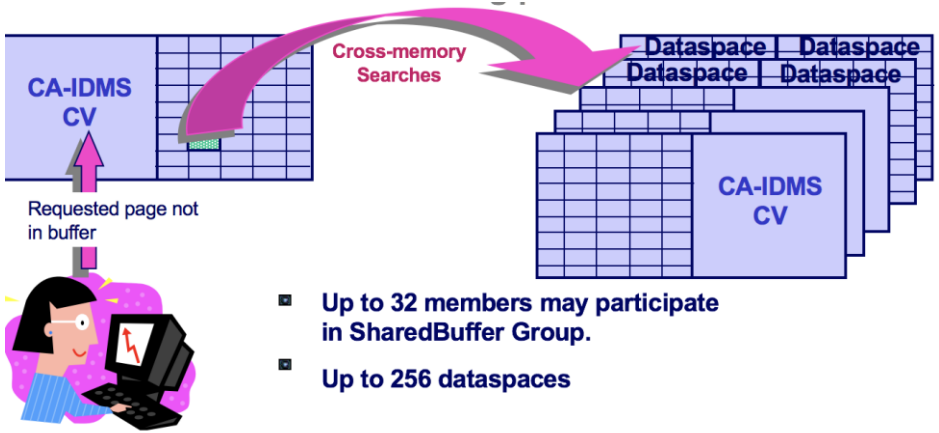
EZ-Share – accesses pages in other buffers using cross-memory services



- **Required page retrieved directly from buffers of other CV**
- **No physical IO**

Buffer Coherency

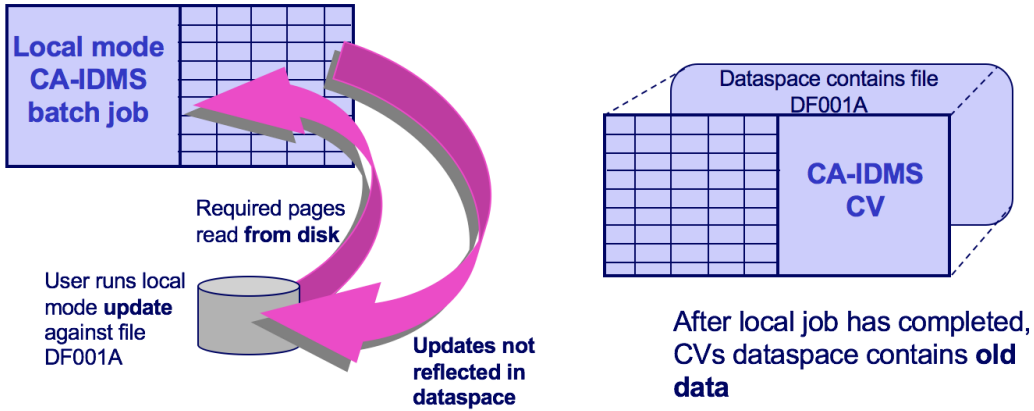
Logically treat all buffer pools and dataspaces as **if they were one big pool**



- **Up to 32 members may participate in SharedBuffer Group.**
- **Up to 256 dataspaces**

Buffer Coherency

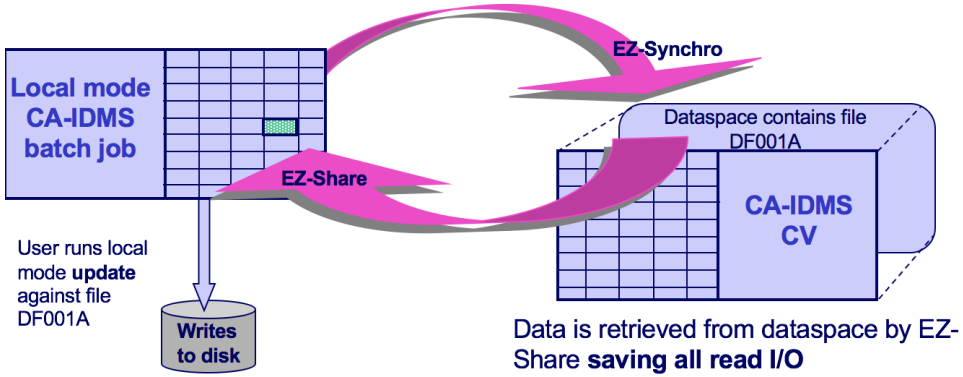
Problems of **non-shared** dataspace



After local job has completed, CVs dataspace contains **old data**

Buffer Coherency

Advantages of **Shared** dataspace



Data is retrieved from dataspace by EZ-Share **saving all read I/O**

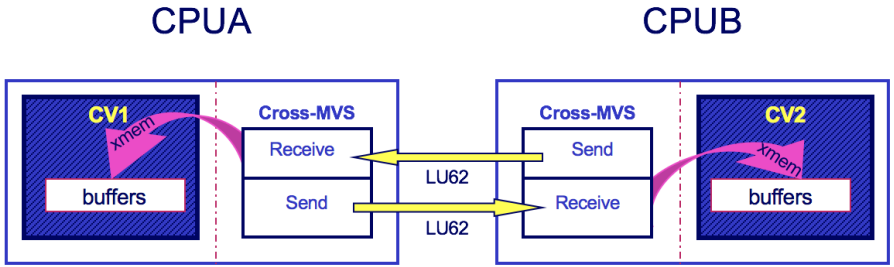
Updated pages are **invalidated** in dataspace by EZ-Synchro

Cross MVS Option

- **CrossMVS option allows definition of “partner” SharedBuffer group(s) which execute on another MVS**
- **Permits synchronisation to occur between CA-IDMS jobs on**
  - Multiple CPUs
  - Multiple LPARS
  - Sysplex

SharedBuffer Group

Cross-MVS option



- Synchronize up to 32 SharedBuffer groups on same or different CPUs
- Each SharedBuffer group may contain up to 32 members

SharedBuffer Group

- **CrossMVS option**
  - Provides *cross system buffer invalidation* across multiple MVS systems in sysplex and non-sysplex environment
  - Does **not** require any sysplex services or resources

Buffer Synchronisation

- **Benefits**
  - Easily set up multiple CV configurations on same or different LPARS or CPUs
  - Synchronize CVs with Local Jobs
  - Share and Synchronize DMCL buffers, Sequential Buffers, dataspaces and above-the-Bar storage.
  - Lower overhead than SYSPLEX or IDMS data sharing
    - Locking etc.
  - Much cheaper and simpler way of managing synchronisation of data across multiple CVs

Other Tools

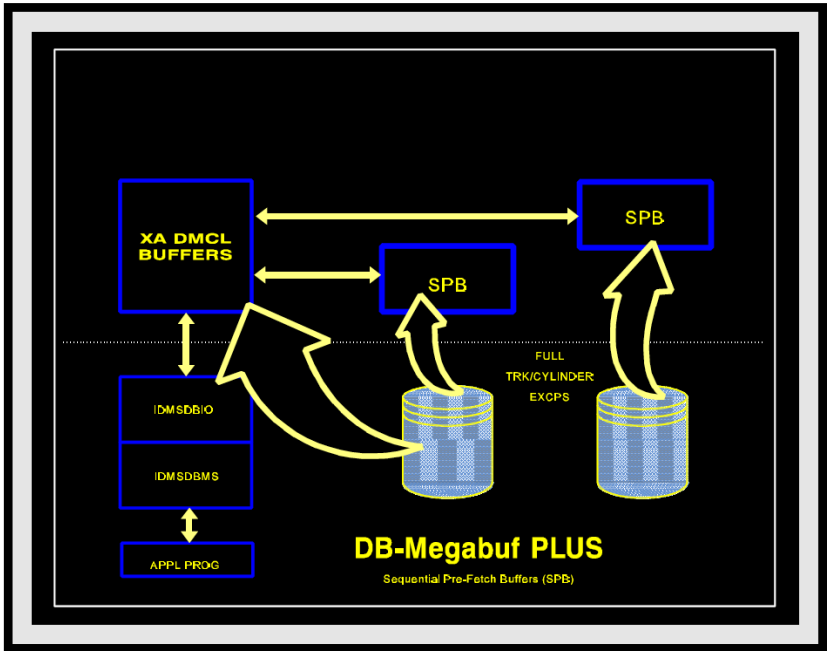
- **EZ-Megabuf Sequential**
  - Full Cylinder Reads/ Writes
  - Backwards sequential
  - Dynamic detection and storage management
  - Competes against ASG FAST ACCESS
- **EZ-Alloc8**
  - Online
  - Local mode and CV start-up
- **EZ-Peek**
  - Display load module information including APARs
  - Display DSN from where a module was loaded

Megabuf Sequential

- **EZ-Megabuf Sequential**
  - Full Track / Full Cylinder Reads
  - Combined Random and Sequential Processing
  - Dynamic PreFetch buffer storage management
  - Multiple PreFetch buffers
  - Databases in memory
  - Full Track Writes
  - Backwards Sequential Processing
  - Reduced Io and Elapsed times

Megabuf Sequential

- EZ-Megabuf Sequential PreFetch operation



Megabuf Sequential

- PFB Online Display Program

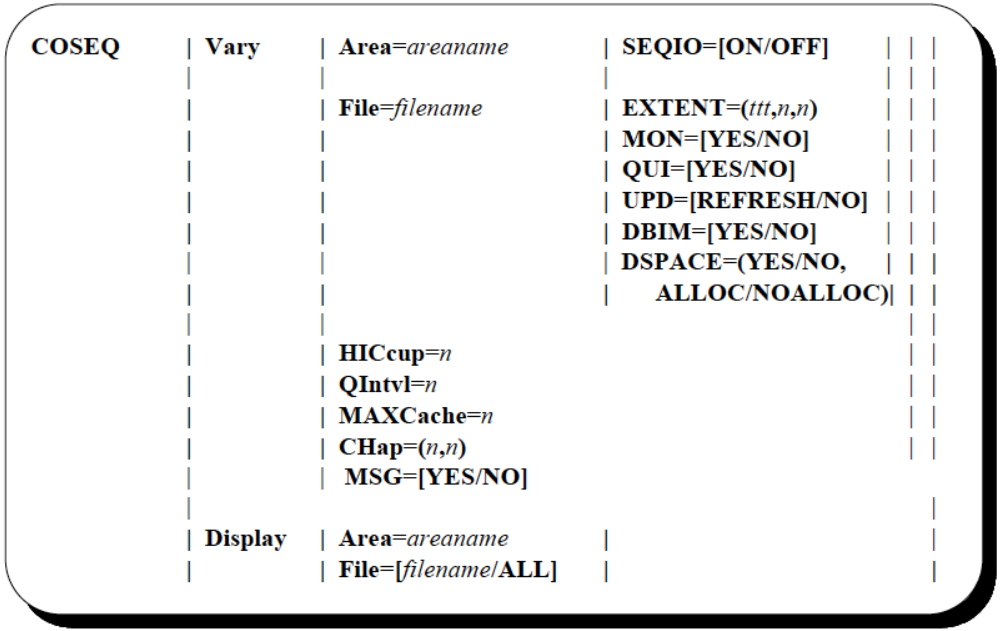
```
COGITO DB-MEGABUF+ R5.7                                    V0100  15:37:02 17.346
                *** SEQUENTIAL PRE-FETCH BUFFER STATISTICS   ***
 COXS Name: SEQUPP1   Hiccup      0 Chap   0    0 MaxCache  90000 HWM    33302
 DMCL Name: GLBLDMCL                            InUseCache     43 Qintvl     1

File-Name                   SeqIO     PFB#     PFB  Read-IO  Read-IO  PFB     Excps
                                     Pages Size-k Requests    EXCPs Hit%     Saved
-------------------------------------------------------------------------------------
DB050B01                     QSCE        0      0  3074773   491789  84%  2582984
DB050B02                     QSCE        0      0  3076450   493463  84%  2582987
DB050B03                     QSCE        0      0  3075931   492934  84%  2582997
DB050B04                     QSCE        0      0  3075928   492935  84%  2582993
DB050B05                     QSCE        0      0  3076213   493224  84%  2582989
DB050B06                     QSCE        0      0  3077199   494207  84%  2582992
DB050B07                     QSCE        0      0  3077859   494861  84%  2582998
DB050B08                     QSCE        0      0  3075747   492749  84%  2582998
DB050B09                     QSCE        0      0  3075597   492607  84%  2582990
-------------------------------------------------------------------------------------
TOTALS                                   0      0 86226122 29952747  12% 56273375

<CLEAR> EXIT   <PF7> UP   <PF8> DOWN   <PF12> SWITCH
ENTER COMMAND BELOW>
```

Megabuf Sequential

- Online Command Svntax



Megabuf Sequential

- **Defining the Sequential Environment**
  - Generate #COXAMEG table
  - Generate #COXASEQ table
    - Can be used to define DEFAULTS
  - Instream COSEQCTL statements
    - Can define ALL parameters for job
    - Can specify overrides for defaults
  - Instream COSEQLOG File
    - Report dataset
  - Instream COSNAP file (optional)
    - Diagnostic dataset

Megabuf Sequential

- **Generating the COXASEQ Table**
  - COXASEQ ENTRY=DMCL

```
#COXASEQ    ENTRY=DMCL,
      TYPE=CACHE,          ( CACHE )
      NAME=                ( DMCL NAME )
      DEFAULTS=NO,         ( YES | NO )
      LOC=ANY,             ( ANY | BELOW )
      MODE=SYSTEM,         ( CV | LOCAL | SYSTEM )
      MAXCACHE=,           ( # KBYTES )
      QINTVL=1             ( 0 -> 60 MINUTES )
      SEQMSG=NO,           ( YES | NO )
      MONITOR=,            ( YES | NO )
      QUIESCE=,            ( YES | NO )
      UPDATE=,             ( REFRESH | SEQ | NO )
      EXTENTS=,            ( TRK | CYL , #, #)
      DBINMEM=,            ( YES | NO )
      DSPACE=              ( YES | NO , ALLOC | NOALLOC )
```

Megabuf Sequential

- **Generating the COXASEQ Table**
  - COXASEQ ENTRY=JOURNAL | FILE | AREA

```
#COXASEQ ENTRY=JOURNAL/AREA/FILE,
      TYPE=CACHE,          ( CACHE )
      NAME=,               ( DMCL FILE/AREA NAME )
      MONITOR=,            ( YES | NO)
      DBINMEM=NO,          ( NO | YES )
      QUIESCE=YES,         ( YES | NO)
      EXTENTS=,            ( TRK/CYL,#,# )
      UPDATE=,             ( NO | REFRESH | SEQ )
      DSPACE=              ( YES|NO,ALLOC|NOALLOC )
```

Megabuf Sequential

- COSEQCTL examples

Example 1
Sequential processing support is provided for two files only. File 2 is allocated to a data space.

```
FILE=DEFAULTS SEQIO=OFF
FILE=DB00100 SEQIO=ON EXTENT=(TRK,5,3) MON=NO
FILE=DB00200 DSPACE=(YES,ALLOC)            (Note Seqio=ON is the default)
```

Example 2
Sequential processing support is provided for all files except file 2. File 1 is allocated a larger **extent** size.

```
FILE=DEFAULTS SEQIO=ON
FILE=DB00100 EXTENT=(TRK,5,3) MON=NO
FILE=DB00200 SEQIO=OFF
```

Megabuf Sequential

- COSEQCTL examples

Example 3
Using abbreviated keywords. Five files only get sequential processing support. The first is allocated to a **data space.** The second has a smaller **extent** size than the default specified and has **monitor** and **quiesce** active. The third is **database-in-memory.** The fourth and fifth take the defaults specified in the first input card.

```
F=DEFAULTS S=OFF E=(TRK,3,2) M=NO Q=NO U=REFRESH D=NO
F=DB00100 S=ON DS=(YES,ALLOC)
F=DB00200 S=ON E=(TRK,1,2) M=YES Q=YES
F=DB00300 S=ON E=(TRK,1,2) D=YES
F=DB00400 S=ON
F=DB00500 S=ON
```

Megabuf Sequential

- **COSEQLOG file**

DB-Megabuf PreFetch will write a shutdown or job termination report to the COSEQLOG file if present. If included, the COSEQLOG file should be specified as follows:

```
//COSEQLOG      DD    SYSOUT=sysout-class
or
//COSEQLOG      DD    DSN=dataset-name
```

where *dataset-name* is defined with DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3990)

- **COSNAP file**

The COSNAP file is used for diagnostics purposes only. If included, the COSNAP file should be specified as follows:

```
//COSNAP      DD    SYSOUT=sysout-class
or
//COSNAP      DD    DSN=dataset-name
```

where *dataset-name* is defined with DCB=(RECFM=VBA,LRECL=125,BLKSIZE=1632)

Megabuf Sequential

- COSEQLOG File output

30 APR 93 19:27 DB-MEGABUF SEQUENTIAL PROCESSING PAGE 1

JOB: IDMSCVT1 DMCL: GLBLDMCL COXATAB: COXATB1

I/O STATISTICS AT FILE CLOSE

FILE NAME	BLOCKS ALLOCATED	SEQ-BUFFER-ALLOCATION C/T	SZ	#	MAX SIZE	I/O TYPE	IDMS I/O REQUESTS	SEQ I/O EXCPS	HIT%	EXCPS SAVED	QSCE	DBIN MEM	MNTR Y/N	UPD TYPE
DB226A01	2790	CYL	1	4	2631K	READ	2790	38	99%	2752	Y	N	Y	NO
DB226A02	2790	CYL	1	4	2631K	READ	2789	37	99%	2752	Y	N	Y	NO
DB226A03	2790	CYL	1	4	2631K	READ	2789	37	99%	2752	Y	N	Y	NO
DB226A04	2790	CYL	1	4	2631K	READ	2790	37	99%	2753	Y	N	Y	NO
DB226A05	2880	CYL	1	4	2716K	READ	2879	44	99%	2835	Y	N	Y	NO
DMSGDB	2200	CYL	1	2	1255K	READ	32	32	0%	0	Y	N	Y	NO
DRUNDB	30150	CYL	1	2	1179K	READ	30131	152	99%	29979	Y	N	Y	NO
TOTALS					15674K	READ	44200	377	99%	43823				

IDMSCVT1 STARTUP: 29 AUG 93 14:23 SHUTDOWN: 29 AUG 93 16:57

Martin Cox
Donald J. Marcotte

MCox@syncsort.com

DMarcotte@syncsort.com