

CA IDMS™ and Exploitation of the zIIP

Mike Picchioni
CA Technologies

IUA/CA IDMS™ Technical Conference May 7-11, 2018



Abstract

- CA IDMS has the capability to exploit the IBM zIIP specialty engine on the System Z. Attend this session to learn how this feature can be used to offload CA IDMS computing cycles to zIIPs enabling increased workloads on your existing CP.



>Copyright © 2018 CA. All rights reserved.



>2

Agenda

- 1 TERMS AND DEFINITIONS
- 2 BENEFITS
- 3 OPERATIONAL CONSIDERATIONS
- 4 ZIIP EXPLOITATION
- 5 IMPLEMENTING VIA CA IDMS STARTUP PARAMETERS
- 6 ELIGIBILITY AND REQUIREMENTS



>Copyright © 2018 CA. All rights reserved.



Terms and Definitions

- zIIP
 - IBM System z Integrated Information Processor
- CP or GP
 - General Purpose Processor
- TCB
 - Operating System Task Control Block
 - Runs on CP/GP
- SRB
 - Operating System Service Control Block
 - Runs on zIIP



>Copyright © 2018 CA. All rights reserved.



>4

Terms and Definitions

- Enclave
 - An enclave is a representation of a business transaction or unit of work
- TCO
 - Total cost of ownership
- White Space
 - CP CPU cycles made available by moving processing to a zIIP processor



>Copyright © 2018 CA. All rights reserved.



>5

Benefits

- Cost/benefit tradeoff
 - Sites with zIIP capacity
 - Sites nearing CP capacity
 - Cost to add a zIIP versus cost to add a CP
 - Hardware (zIIP is less)
 - Software licensing fees (zIIP is none)
 - Benefit of zIIP versus CP
 - Depends on how much workload can be offloaded to zIIP



>Copyright © 2018 CA. All rights reserved.



>6

Benefits

- Testing has shown benefits for all CA IDMS workloads and environments
 - CICS, CA ADS™, DC COBOL, CA IDMS™ Server, etc
 - As well as varying mixtures of the above workloads and environments



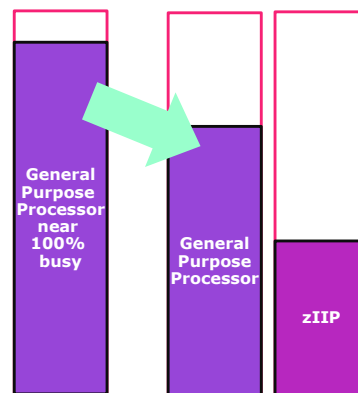
>Copyright © 2018 CA. All rights reserved.



>7

zIIP Exploitation

- Why zIIPs?
 - Cheaper than general purpose processors
 - No software charges for zIIP capacity
 - Offloading cycles to zIIP frees cycles on CP for additional work
 - Defer processor upgrades
 - Increase throughput



Increase White Space on CPs



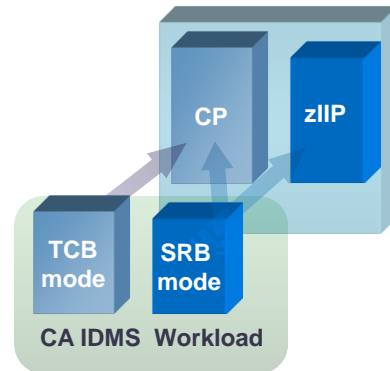
>Copyright © 2018 CA. All rights reserved.



>8

CA IDMS zIIP Exploitation

- 100% of zIIP eligible work is offloaded to zIIP processors
 - 18.0 – RO63129
 - 18.5 – RO63736



Implementing via CA IDMS Startup Parameters

- Startup parameters
 - zIIP=Y
 - Use the zIIP feature
 - zIIP=N
 - Do not use the zIIP feature
 - Default if zIIP parameter is omitted

Impact on Existing Dialogs and Programs

- None
 - All existing dialogs, programs of any language, will run in an environment containing zIIP processors without change or impact
 - Other than an overall reduction in CP CPU usage



>Copyright © 2018 CA. All rights reserved.



>1
1

Eligibility and Requirements

- Loading of nucleus module, line drivers, service drivers, RHDCUXIT from authorized libraries
- Additional authorized libraries
 - Load module executed to start CA IDMS CV must reside in an authorized library
 - CA IDMS nucleus modules must be loaded from an authorized library
 - IBM LE library must be authorized and in the CDMSLIB concatenation
 - z/OS Callable Services library must be in linklist or authorized and included in STEPLIB



>Copyright © 2018 CA. All rights reserved.



>1
2

Eligibility and Requirements

- Individual nucleus members in a load library do not have to be authorized
 - Not every load library in CA IDMS startup STEPLIB/CDMSLIB needs to be authorized
- To ensure all nucleus modules are loaded from an authorized library
 - Authorize the SMP/E target load library or
 - Manually copy all modules in the SMP/E target load library to an authorized library



>Copyright © 2018 CA. All rights reserved.



>1
3

Eligibility and Requirements

- Detailed messages for errors
 - IDMS DC016106 ZIIP=N forced. Module nnnnnnnn was loaded from an unauthorized library.
 - DDN=ddddddd VOLSER=vvvvvv DSN=dsname
- Linklist and LPA assumed authorized unless coded in JCL



>Copyright © 2018 CA. All rights reserved.



>1
4

Eligibility and Requirements

- All system mode work is eligible except:
 - Physical I/O
 - User-written exits
 - User-written Database procedures
 - IDMSCOMP, IDMSDCOM, PRESSPACK are zIIP eligible
 - SQL-invoked routines
 - SVC Processing
- User mode code is not eligible to run on zIIP
 - ADS, COBOL, User-written HLASM and PL1
 - Causes a 'swap' to TCB mode



>Copyright © 2018 CA. All rights reserved.



>1
5

Swaps

- Swapping uses additional CPU cycles
- Changing from TCB mode to SRB mode
- Changing from SRB mode to TCB mode
- Requires a call to the IBM Workload Manager (WLM)
- IDMS is not allowed to run any user code in SRB mode
 - IDMS keeps track of the mode its currently in
 - Before dispatching in user-mode
 - Call WLM to switch to TCB mode
 - User program completes and requests another IDMS service
 - Call WLM to switch to SRB mode



>Copyright © 2018 CA. All rights reserved.



>16

Reducing Swaps

- All user written exits cause IDMS to swap before and after being invoked
 - Remove any exits that are not required
- Reduce the number of physical I/O
 - Increase size of database buffers



>Copyright © 2018 CA. All rights reserved.



Reducing Swaps

* SYSTEM/USER EXITS *						
EXIT NUMBER	DEFINED	MODE	CALL CONVENTIONS	NEED TO LOAD	AMODE	ENTRY POINT/ MODULE NAME
017	YES	SYSTEM	DC	NO	ANY	003EDEA4
018	YES	SYSTEM	DC	NO	ANY	003EDF00
PAGE 00004 - NEXT PAGE:						



>Copyright © 2018 CA. All rights reserved.



Reducing Swaps

* Named User Exits *					
EXIT NAME	DEFINED	ENTRY POINT	EXIT NAME	DEFINED	ENTRY POINT
BTCIDEXIT	NO	00000000	DBLUEXEX	NO	00000000
IDDEXITB	NO	00000000	IDDEXITO	NO	00000000
IDMSAJNX	NO	00000000	IDMSCLCX	NO	00000000
IDMSDPLX	YES	00020DF0	IDMSIOXT	NO	00000000
IDMSIOX2	NO	00000000	IDMSJNL2	NO	00000000
OLQDMLX	NO	00000000	SCHEXITB	NO	00000000
SCHEXITO	NO	00000000	SGNEXITB	NO	00000000
SGNEXITO	NO	00000000	SUBEXITB	NO	00000000
SUBEXITO	NO	00000000	TCKREXIT	NO	00000000
USRIDXIT	NO	00000000	WAITEXIT	NO	00000000
WTOEXIT	NO	00000000	WTOREXIT	NO	00000000

PAGE 00005 - NEXT PAGE:



>Copyright © 2018 CA. All rights reserved.



>19

Where are Swaps coming from

D SUBT *** Display all subtasks ***						
Name	Nr	Work type	Status	Task dispatch count	Wakeup count	Total CPU time
MAINTASK	01	IDMS	IDLE	1,998	1,645	00:00.482114
SUBT0001	02	IDMS	IDLE	00	00	00:00.000000
SUBT0002	03	IDMS	IDLE	00	00	00:00.000000
SUBT0003	04	IDMS	IDLE	03	01	00:00.000205
SUBT0004	05	IDMS	BUSY	172	83	00:00.022336

CHGEMODE table display						
Address	Program	Offset	Call cnt	TCB->SRB	SRB->TCB	
408F5ECE	RHDCWAIT	000038CE	1	1	0	
409AA97E	RHDCYSKI	0000057E	16	0	16	
409A295C	RHDCMSTR	0000015C	1	1	0	
4097F35A	RHDCNTL	00001B5A	45	0	45	
4097F486	RHDCNTL	00001C86	45	45	0	
4098374A	RHDCDBRC	0000014A	1	1	0	
00023C86	OCEP2	00000D76	1616	0	1616	
00023D4C	OCEP2	00000E3C	1616	1616	0	
40891E5E	IDMSDBIO	00000E5E	24	0	24	
40891F26	IDMSDBIO	00000F26	24	24	0	
409C0CC2	RHDCMODE	000004C2	37	0	37	
409C0E02	RHDCMODE	00000602	37	37	0	

PAGE 00001 - NEXT PAGE:



>Copyright © 2018 CA. All rights reserved.



>20

Where are Swaps coming from

4097F646	RHDCWTL	00001E46	1	0	1
4097F6D2	RHDCWTL	00001ED2	1	1	0
409AFCFC	IDMSSERV	000010FC	1	0	1
409AFD54	IDMSSERV	00001154	1	1	0
409AFE90	IDMSSERV	00001290	1	0	1
409AFEE4	IDMSSERV	000012E4	1	1	0
0000C3DA	DCBLDL	00000072	24	0	24
0000C91C	DCBLDL	000005B4	24	24	0
0000CA5C	DCLOAD	0000006C	24	0	24
0000D002	DCLOAD	00000612	24	24	0
0001B4AC	PRODCCHK	0000010C	1	0	1
0001B842	PRODCCHK	000004A2	1	1	0
400CD12E	IDMSDBMS	0001912E	74	0	74
400CD19E	IDMSDBMS	0001919E	74	74	0
0000DE40	GETDSNS	00000066	1	0	1
0000DEFA	GETDSNS	00000110	1	1	0
000120B4	HCHECK	00000060	5	0	5
00012270	HCHECK	0000022C	5	5	0
413AB5F0	RHDCRUSD	000001F0	6	6	0
C13ABF54	RHDCLGSD	00000154	3	3	0
400F35AE	RHDCNAIT	00000FAE	406	243	243
0030EF4E	RHDCPCBO	0000034E	1	0	1
0030F240	RHDCPCBO	00000640	1	1	0
40942392	RHDCSNAP	00000192	3	0	3
413B743C	RHDCDEAD	0000043C	1	1	0
409BCD4A	RHDCSTAT	0000014A	1	0	0
PAGE 00002 - NEXT PAGE:					



>Copyright © 2018 CA. All rights reserved.



>21

Informational Messages

- If zIIP processors are present and zIIP=NO is specified or taken as the default
 - Displayed on the JES log very early in the startup process

+IDMS DC016105 02 zIIP processors detected. You should consider using ZIIP=Y.



>Copyright © 2018 CA. All rights reserved.



>2
2

Unitasking or Multitasking

- zIIP feature works with both Unitasking and Multitasking
- Unitasking
 - 1 Enclave started for the single TCB (SCA) to be used
- Multitasking
 - 1 Enclave started for each TCB (SCA) to be used
 - Doesn't depend upon the number of zIIPs installed
 - If 6 subtasks are started for multitasking and only 1 zIIP engine is available on the machine, 6 enclaves are started



>Copyright © 2018 CA. All rights reserved.



>2
3

19.0 Enhancements

- DCMT V ZIIP ONLINE/OFFLINE
 - Can dynamically disable the use of zIIP engines
 - CV must be started with ZIIP=Y
- Re-Enable ZIIP after disabled by a non-authorized Nucleus Module
 - RO93622
 - CV must be started with ZIIP=Y
 - All required Nucleus Modules must have been authorized at startup



>Copyright © 2018 CA. All rights reserved.



>2
4

19.0 Enhancements

- Reduce zIIP overhead for DB exits
 - RO83713
 - New SYSIDMS Parameters
 - EXIT14_BATCH_RU - Restricts the calling of EXIT14 to batch run-units.
 - RETRIEVAL_CV - IDMS will convert READY UPDATE requests to READY RETRIEVAL when accessing an area set to RETRIEVAL mode.
 - SUPPRESS_RECORD_ON_STATUS - When an AFTER GET DB procedure suppresses a record occurrence, the code it returns can now be defined so that IDMS will reissue most verbs so the application program does not have to.



>Copyright © 2018 CA. All rights reserved.



>2
5

Monitor zIIP Usage and Status

- DCPROFIL – Displays the status of zIIP
 - ZIIP=Y
 - zIIP is enabled and being used
 - ZIIP=N
 - zIIP is disabled. CV started with ZIIP=N or ZIIP could not start
 - ZIIP=S
 - zIIP is stopped. zIIP usage has been varied offline
 - ZIIP=U
 - zIIP has been forced off
 - A nucleus module has been loaded from an unauthorized library



>Copyright © 2018 CA. All rights reserved.



>2
6

Monitor zIIP Usage and Status

TAPE:	GJJ04I	NUMBER OF SCTS:	0004
SYSTEM TRACE:	YES	OPERATING SYSTEM:	z/OS
CHA SIZE:	000000000	zIIP ENGINES:	0008
SCRATCH HWM	000000000	TRACE SAVE:	OFF (DDLOCL06)
SIZE OF XA STORAGE AREA:	0100994560	DMCL TABLE:	R185DMCL
QUEUE AREA		PRIMARY STORAGE	
LOW PAGE:	0000040001	PROTECT KEY:	04
HIGH PAGE:	0000041000	ACTIVE TRANSACTION COUNT:	0009
DC VERSION ID:	0129	SECURITY	
USER TRACE BUFFERS:	0253	SECURITY SYSTEM:	CA TOP SECRET
		SIGNON SECURITY:	OFF
		SVC NUMBER:	172
		GETMAIN SUBPOOL:	001
PAGE 00001 - NEXT PAGE:			



>Copyright © 2018 CA. All rights reserved.



Monitor zIIP Usage and Status

D SUBTASK EFF						
*** Subtask display ***						
Subtask	Elapsed time		Total CPU time		% CPU	
Name	TCB	SRB	TCB	SRB	TCB	SRB
MAINTASK	00:03.046204	00:00.113316	00:00.296251	00:00.063116	09	55 Y
SUBT0001	00:00.009648	00:00.001276	00:00.002721	00:00.000660	28	51 Y
SUBT0002	00:04.968577	00:00.125625	00:00.517187	00:00.066233	10	52 Y
Totals	00:08.024429	00:00.240217	00:00.816160	00:00.130010	10	54
V23 ENTER NEXT TASK CODE: CA IDMS release 18.0 tape GJ100B node SYST0023						



>Copyright © 2018 CA. All rights reserved.



Test without zIIP

D STAT SYS			00:25.614068 Tot System Time		
13:04:04.46 10/120 Current Time			00:00.000078 Tot User Time		
13:02:01.48 10/120 Startup Time					
TASKS:	53464 Processed	34 Abended	73 Max Tasks		
	29 System	0 Runaway	0 Times At Max		
	6 Deadlocks	3 Dead Victims			
TRANS:	53474 Processed	53425 Norm Cmp	54 Max Conc		
	53432 Ext Proc	53398 Ext Norm	20 Ext Conc	25 Max Erus	
	0 Dist Proc	0 Dist Norm	0 Dist Conc		
DATABASE:	656055 Calls	395509 Pages Rqst	647457 Recs Rqst		
	0 Buff Wait	33756 Pages Read	218206 Recs Cur R/U		
	100962 Page Writ	0 Calc Noflo	53413 Via Noflo		
	835102 Tot Locks	0 Calc Ovflo	0 Via Ovflo		
INDEX:	0 SR0 Splits	0 Frag Stord	0 Recs Reloc		
	0 SR0 Spawns	0 SR0 Stores	0 SR7 Stores		
	0 Orph Adopt	0 SR0 Erases	0 SR7 Erases		
SQL:	0 Commands	0 Ix Searches	0 Min Level		
	0 AM Recomp	0 Lvl5 Srchd	0 Max Level		
		0 Tupls Fetched	0 Rows Inserted		
		0 Rows Updated	0 Rows Deleted		
		0 Sorts	0 Sort Min		
		0 Tuples Sorted	0 Sort Max		
PAGE 00001 - NEXT PAGE:					



>Copyright © 2018 CA. All rights reserved.



>29

Test With zIIP

D STAT SYS			00:25.248251 Tot System Time		
13:07:20.29 10/120 Current Time			00:00.000165 Tot User Time		
13:06:06.27 10/120 Startup Time			00:13.035569 zIIP on zIIP Time		
			00:00.063047 zIIP on CP Time		
			617,096 Number of Swaps		
TASKS:	47922 Processed	46 Abended	73 Max Tasks		
	27 System	0 Runaway	0 Times At Max		
	6 Deadlocks	3 Dead Victims			
TRANS:	47936 Processed	47872 Norm Cmp	54 Max Conc		
	47893 Ext Proc	47847 Ext Norm	20 Ext Conc	25 Max Erus	
	0 Dist Proc	0 Dist Norm	0 Dist Conc		
DATABASE:	570112 Calls	347795 Pages Rqst	559667 Recs Rqst		
	0 Buff Wait	32285 Pages Read	192726 Recs Cur R/U		
	97626 Page Writ	0 Calc Noflo	47860 Via Noflo		
	746480 Tot Locks	0 Calc Ovflo	0 Via Ovflo		
INDEX:	0 SR0 Splits	0 Frag Stord	0 Recs Reloc		
	0 SR0 Spawns	0 SR0 Stores	0 SR7 Stores		
	0 Orph Adopt	0 SR0 Erases	0 SR7 Erases		
SQL:	0 Commands	0 Ix Searches	0 Min Level		
	0 AM Recomp	0 Lvl5 Srchd	0 Max Level		
		0 Tupls Fetched	0 Rows Inserted		
		0 Rows Updated	0 Rows Deleted		
PAGE 00001 - NEXT PAGE:					



>Copyright © 2018 CA. All rights reserved.



>30

Feedback From Clients

- Reported offloading over 90% of GP CPU cycles to the zIIP
 - CICS frontend to IDMS backend
- Clients have supported reductions in CPU using ADS/COBOL under DC



>Copyright © 2018 CA. All rights reserved.



>31

Summary

- One time cost
- Creates 'white space' on the GP
- Must meet authorization requirements
- Avoid swaps where possible



>Copyright © 2018 CA. All rights reserved.



>32

FOR INFORMATION PURPOSES ONLY

Terms of this Presentation

This presentation was based on current information and resource allocations as of May 2018 and is subject to change or withdrawal by CA at any time without notice. Notwithstanding anything in this presentation to the contrary, this presentation shall not serve to (i) affect the rights and/or obligations of CA or its licensees under any existing or future written license agreement or services agreement relating to any CA software product; or (ii) amend any product documentation or specifications for any CA software product. The development, release and timing of any features or functionality described

in this presentation remain at CA's sole discretion. Notwithstanding anything in this presentation to the contrary, upon the general availability of any future CA product release referenced in this presentation, CA will make such release available (i)

for sale to new licensees of such product; and (ii) to existing licensees of such product on a when and if-available basis as part of CA maintenance and support, and in the form of a regularly scheduled major product release. Such releases may be made available to current licensees of such product who are current subscribers to CA maintenance and support on a when and

if-available basis. In the event of a conflict between the terms of this paragraph and any other information contained in this presentation, the terms of this paragraph shall govern.

Certain information in this presentation may outline CA's general product direction. All information in this presentation is for your informational purposes only and may not be incorporated into any contract. CA assumes no responsibility for the accuracy or completeness of the information. To the extent permitted by applicable law, CA provides this presentation "as is" without warranty of any kind, including without limitation, any implied warranties or merchantability, fitness for a particular purpose, or non-infringement. In no event will CA be liable for any loss or damage, direct or indirect, from the use of this document, including, without limitation, lost profits, lost investment, business interruption, goodwill, or lost data, even if CA is expressly advised in advance of the possibility of such damages. CA confidential and proprietary. No unauthorized copying or distribution permitted.



>Copyright © 2018 CA. All rights reserved.



Questions & Answers



>Copyright © 2018 CA. All rights reserved.



Please Complete a Session Evaluation Form

- The number for this session is **D06**
- After completing your session evaluation form, place it in the envelope at the front of the room



IUA / CA IDMS Technical Conference Session Evaluation Form

Session Number: _____ Name (Optional): _____

Session Title: _____

Rate this overall session:

	Poor	Good	Excellent
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The speaker was prepared and knowledgeable of the subjects covered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
The session met my expectations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
The material is relevant to my current job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
I would recommend this session to a colleague	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
The session length was appropriate for the content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
This session could be used as a reference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments: _____					
General Comments:	_____ _____ _____ _____ _____				