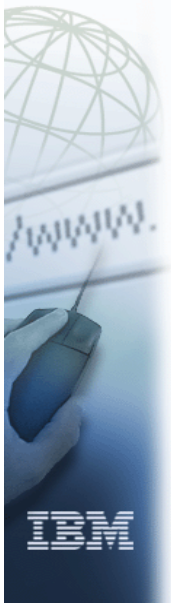


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z/Series Application Assist Processor (zAAP) z/OS V1R6



Redbooks

International Technical Support Organization

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eNetwork	DFSMS/MVS	IMS	RACF
geoManager	DFSMSdfp	IMS/ESA	RMF
AD/Cycle	DFSMSdss	IP PrintWay	RS/6000
ADSTAR	DFSMSshm	IPDS	S/390
AFP	DFSMSrmm	Language Environment	S/390 Parallel Enterprise Server
APL2	DFSORT	Multiprise	SecureWay
APPN	Enterprise System 3090	MQSeries	StorWatch
BookManger	Enterprise System 4381	MVS/ESA	Sysplex Timer
BookMaster	Enterprise System 9000	Network Station	System/390
C/370	ES/3090	NetSpool	SystemView
CallPath	ES/4381	OfficeVision/MVS	SOM
CICS	ES/9000	Open Class	SOMobjects
CICS/ESA	ESA/390	OpenEdition	SP
CICS/MVS	ESCON	OS/2	VisualAge
CICSPlex	First Failure Support Technology	OS/390	VisualGen
COBOL/370	FLowMark	Parallel Sysplex	VisualLift
DataPropagator	FFST	Print Services Facility	VTAM
DisplayWrite	GDDM	PrintWay	WebSphere
DB2	ImagePlus	ProductPac	3090
DB2 Universal Database	Intelligent Miner	PR/SM	3890/XP
DFSMS/MVS	IBM	QMFr	z/OS
			z/OS.e

Domino (Lotus Development Corporation)
DFS (Transarc Corporation)
Java (Sun Microsystems, Inc.)
Lotus (Lotus Development Corporation)

Tivoli (Tivoli Systems Inc.)
Tivoli Management Framework
(Tivoli Systems Inc.)
Tivoli Manger (Tivoli Systems Inc.)

UNIX (X/Open Company Limited)
Windows (Microsoft Corporation)
Windows NT (Microsoft Corporation)

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z/Series Application Assist Processor (zAAP)

SG24-6386

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zSeries Application Assist Processor (zAAP)



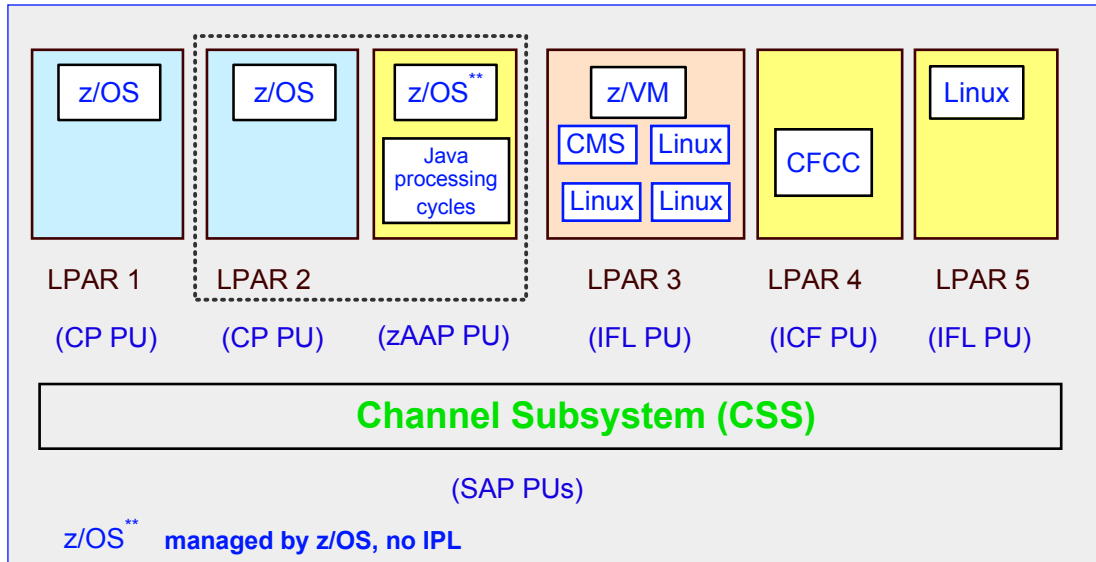
- ❑ Available on the z990 and z890 servers as an attractively priced specialized processor unit that provides an economical Java execution environment
- ❑ zAAPs are configured with general-purpose processors within logical partitions running z/OS
 - zAAPs are designed to operate asynchronously with the general purpose processor to execute Java programming under control of the IBM Java Virtual Machine (JVM)
 - zAAPs only run Java code under control of the IBM JVM
 - On z890, the zAAP is a full speed engine
- ❑ IBM does not impose software charges on zAAP capacity
 - zAAPs brings additional processing power exclusively for Java application execution without affecting the total MSU rating or machine model designation

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zSeries Processing Units (PUs)



zSeries Server (z990 - z890)



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Rules and Restrictions for zAAP Usage



- ☐ Must have at least one standard CP defined for a partition
- ☐ Can set the number of zAAPs for an LPAR
- ☐ Inherited definitions from standard CPs
 - If they are dedicated or shared
 - Hard capping
 - Although zAAPs uses the same weight value you setup for the standard CPs you should be aware that the final weight of the zAAPs can be different
- ☐ There is no support for soft capping
- ☐ zAAPs do not participate in IRD support
- ☐ zAAPs are brought online and offline like standard CPs

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zAAP Exploitation Software Required



- ❑ Subsystems using SDK for z/OS, Java 2 Technology Edition, 1.4 with a PTF for APAR PQ86689 exploit automatically and z/OS V1R6 or z/OS.e V1R6
 - WebSphere Application Server (WAS) 5.1
 - CICS TS 2.3
 - DB2 V7 and V8
 - IMS V7, V8 and V9
 - WebSphere WBI for z/OS
 - Other Software
 - z/OS 1.6 (Required)
 - SDK 1.4 (5655-156) with UQ88783
 - IBM, Vendor and Customer Java applications are expected to run

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Ordering zAAPs



- ❑ You may order zAAPs up to the number of permanently purchased CPs, (including unassigned CPs), on a given machine model
- ❑ The number of zAAPs ordered may not exceed the limit of available engines in the machine model
 - For a z990 D32, for example, the maximum number of zAAPs you can order is 16
- ❑ Using the 1 to 1 ratio for planting zAAP on machine, one CP must be installed with or prior to any zAAPs being installed.

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JVM Options to Handle zAAPs



- ❑ **SDK1.4.1 has new JVM options to handle zAAPs**
 - **-Xifa:on** - Enables Java work to run on a zAAP if a zAAP is available
 - **-Xifa:off** - Disable the use of zAAPs
 - **-Xifa:projectn** - Designed to estimate projected zAAP usage and write this information to STDOUT at intervals of n minutes
 - **-Xifa:force** - Designed to force Java to continue attempting to use zAAPs, even if none are available

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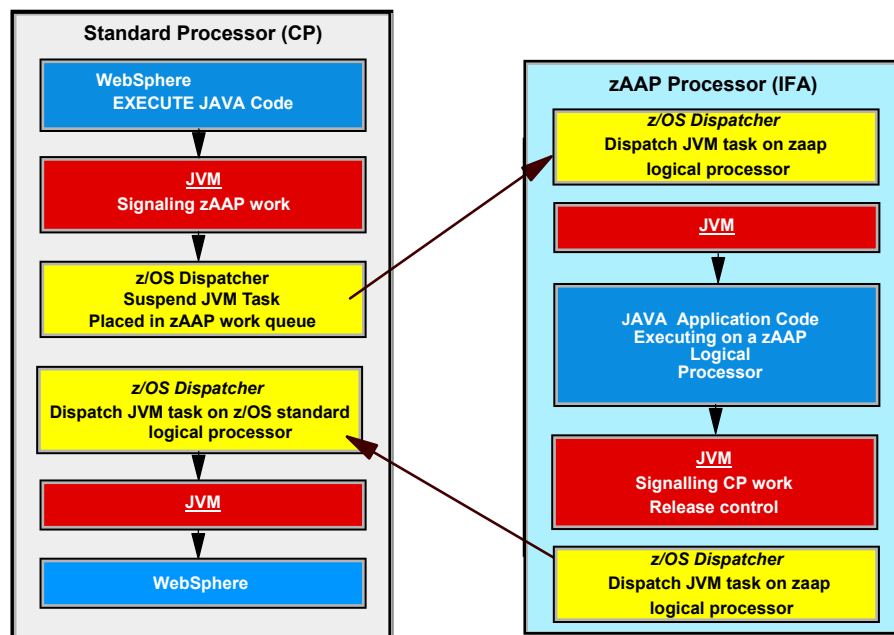
IEAOPTxx Parameters for zAAPs



- ❑ **IFACrossOver=YES | NO**
 - **YES** specifies that zAAP eligible work can run on both zAAPs and standard CP processors
 - **NO** specifies zAAP eligible work executes only on zAAPs unless there are no operational zAAPs in the partition
- ❑ **IFAHonorPriority= YES | NO**
 - **YES** specifies that WLM manages the priority of zAAP eligible work for CPs
 - **NO** specifies that zAAP eligible work can run on CPs but at a priority lower than any non-zAAP work

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Java Application Workflow



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Using the HMC for zAAPs



- ❑ HMC needs Driver Level 55 or above
 - Can use the activation profile Customization function to define these processors to a partition
- ❑ The number of zAAPs can not exceed the number of CPs configured
 - Number of zAAPs you can define to a partition can be greater than the number of CPs

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Select the Processor Panel - Image A13



Customize Image Profiles: SCZP901:A13

Logical processor assignment

☐ Dedicated central processors

☐ Dedicated central processors and integrated facility for applications

☐ Not dedicated central processors

☒ Not dedicated central processors and integrated facility for applications

Not dedicated processor details

Initial processing weight 1 to 999 ☐ Initial capping

☐ Enable WorkLoad Manager

Minimum processing weight

Maximum processing weight

Number of processors - Initial Reserved

Number of integrated facility for application - Initial Reserved

In the panel there is 1 CP and 2 IFAs which are not dedicated

General Processor Security Storage Options Load PCI Crypto

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D M=CPU Command



zAAP

```
D M=CPU
IEE174I 14.24.42 DISPLAY M 657
PROCESSOR STATUS
ID  CPU              SERIAL
00  +                136A3A2084
01  +A               136A3A2084
02  +A               136A3A2084

CPC ND = 002084.B16.IBM.02.0000000026A3A
CPC SI = 2084.310.IBM.02.0000000000026A3A
CPC ID = 00
CPC NAME = SCZP901
LP NAME = A13          LP ID = 13
CSS ID = 1
MIF ID = 3

+ ONLINE  - OFFLINE  . DOES NOT EXIST  W WLM-MANAGED
N NOT AVAILABLE

A          ASSIST PROCESSOR
CPC ND    CENTRAL PROCESSING COMPLEX NODE DESCRIPTOR
CPC SI    SYSTEM INFORMATION FROM STSI INSTRUCTION
```

1 CP and 2 IFAs

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RMF Support for zAAP Processing



- ❑ RMF supports zSeries Application Assist Processors (zAAPs) by extending the following 3 reports:
 - CPU Activity, Partition Data, and Workload Activity
 - In Monitor I and Monitor III
- ❑ Allows you to assess resource consumption on zAAPs and to determine whether additional zAAPs need to be configured or not

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RMF CPU Activity Report



- ❑ The CPU section is grouped per processor type
- ❑ A new TYPE column indicates whether the processor belongs to the pool of regular CPs or IFA(zAAP) processors
- ❑ The last two columns are only available for regular processors, not for zAAPs because zAAPs are disabled for I/O interruption
- ❑ A TOTAL/AVERAGE line is printed per pool

CPU ACTIVITY										PAGE
z/OS V1R6				SYSTEM ID SC70		DATE 07/23/2004		INTERVAL 10.00.033		
				RPT VERSION V1R5 RMF		TIME 08.50.00		CYCLE 1.000 SECONDS		
CPU 2004	MODEL 310									
I---CPU---		ONLINE TIME								
NUM	TYPE	PERCENTAGE	LPAR BUSY	MYS BUSY		CPU SERIAL	I/O TOTAL	% I/O INTERRUPTS		
0	CP	100.00	89.34	98.98		136A3A	244.1	1.80		
CP	TOTAL/AVERAGE		89.34	98.98			244.1	1.80		
I 1	IFA	100.00	98.10	99.40		136A3A				
2	IFA	100.00	98.02	99.36		136A3A				
IFA	AVERAGE		98.06	99.38						

RMF Partition Data Report



NAME	S	----MSU----			--CAPPING--			PROCESSOR-- NUM	TYPE	----DISPATCH TIME DATA----		LOGICAL PROCESSORS		-- PHYSICAL PROCESSORS --		
		WGT	DEF	ACT	NO	WLM%	EFFECTIVE			TOTAL	EFFECTIVE	TOTAL	LPAR	MGMT	EFFECTIVE	TOTAL
A13	A	10	0	48	NO	0.0	1	CP	00.08.54.615	00.08.56.060	89.10	89.34	0.02	8.91	8.93	
A0A	A	50	0	4	NO	0.0	3	CP	00.00.44.170	00.00.48.094	2.45	2.67	0.07	0.74	0.80	
A0B	A	10	0	2	NO	0.0	2	CP	00.00.22.254	00.00.23.289	1.85	1.94	0.02	0.37	0.39	
A0C	A	20	0	6	NO	0.0	2	CP	00.00.58.939	00.01.02.378	4.91	5.20	0.06	0.98	1.04	
A01	A	20	0	4	NO	0.0	1	CP	00.00.37.954	00.00.41.062	6.33	6.84	0.05	0.63	0.68	
A02	A	20	0	5	NO	0.0	2	CP	00.00.50.430	00.00.53.987	4.20	4.50	0.06	0.84	0.90	
A03	A	50	0	4	NO	0.0	2	CP	00.00.42.443	00.00.45.864	3.54	3.82	0.06	0.71	0.76	
A04	A	40	0	3	NO	0.0	1	CP	00.00.33.901	00.00.36.931	5.65	6.15	0.05	0.56	0.62	
A05	A	40	0	3	NO	0.0	1	CP	00.00.35.040	00.00.38.020	5.84	6.34	0.05	0.58	0.63	
A06	A	40	0	2	NO	0.0	1	CP	00.00.22.220	00.00.25.336	3.70	4.22	0.05	0.37	0.42	
A07	A	10	0	5	NO	0.0	2	CP	00.00.54.206	00.00.57.886	4.52	4.82	0.06	0.90	0.96	
A08	A	10	0	5	NO	0.0	2	CP	00.00.52.586	00.00.56.247	4.38	4.69	0.06	0.88	0.94	
A09	A	50	0	6	NO	0.0	2	CP	00.01.01.440	00.01.05.100	5.12	5.42	0.06	1.02	1.08	
A1A	A	20	0	2	NO	0.0	2	CP	00.00.19.575	00.00.21.796	1.63	1.82	0.04	0.33	0.36	
A1B	A	20	0	3	NO	0.0	2	CP	00.00.35.672	00.00.37.606	2.97	3.13	0.03	0.59	0.63	
A11	A	20	0	5	NO	0.0	2	CP	00.00.52.038	00.00.55.537	4.34	4.63	0.06	0.87	0.93	
A12	A	20	0	6	NO	0.0	2	CP	00.01.00.163	00.01.03.636	5.01	5.30	0.06	1.00	1.06	
A14	A	20	0	2	NO	0.0	2	CP	00.00.18.895	00.00.19.893	1.57	1.66	0.02	0.31	0.33	
A17	A	40	0	0	NO	0.0	1	CP	00.00.00.715	00.00.00.719	0.12	0.12	0.00	0.01	0.01	
A18	A	40	0	0	NO	0.0	1	CP	00.00.00.246	00.00.00.247	0.04	0.04	0.00	0.00	0.00	
A19	A	20	10	0	NO	0.0	2	CP	00.00.03.577	00.00.03.881	0.30	0.32	0.01	0.06	0.06	
PHYSICAL										00.08.05.524			8.09		8.09	
TOTAL									00.20.41.089	00.29.39.103			8.97	20.68	29.65	
A13	A	10					2	ICF	00.19.36.580	00.19.36.808	98.04	98.06	0.01	32.68	32.69	
A0D	A	10					1	ICF	00.00.16.110	00.00.16.554	2.68	2.76	0.01	0.45	0.46	
A0E	A	10					1	ICF	00.00.15.929	00.00.16.403	2.85	2.73	0.01	0.44	0.46	
A0F	A	10					1	ICF	00.00.04.779	00.00.05.146	0.80	0.86	0.01	0.13	0.14	
A1D	A	10					1	ICF	00.09.57.993	00.09.58.040	99.66	99.67	0.00	16.61	16.61	
A1E	A	10					1	ICF	00.01.53.680	00.01.54.403	18.95	19.07	0.02	3.16	3.18	
A1F	A	10					1	ICF	00.00.31.863	00.00.32.387	5.31	5.40	0.01	0.89	0.90	
PHYSICAL										00.00.45.265			1.26		1.26	
TOTAL									00.32.36.938	00.33.25.009			1.34	54.36	55.69	

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zAAP Projection Tool for Java 2 Technology Edition, SDK 1.3.1



- Excel Workbook tool for reading, organizing and analyzing data
- Allows customers who are considering zAAPs to learn the potential for Java execution on zAAPs inherent in their existing applications
- Tool gathers usage information about how much CPU time is spent executing Java code which could potentially execute on zAAPs
- Reports, via the Java log, how much of that workload could be eligible for execution on zAAPs
- Useful in predicting the number of zAAPs that might be necessary in order to provide an optimum zAAP configuration

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