

CA MIM™ Resource Sharing for z/OS

HYPERSTAR Scenario

Release 12.0



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Chapter 1: CA MIM HYPERSTAR Feature - A Case Study

Introduction

Product: CA MIM™ Resource Sharing for z/OS

Release: 12.0

OS: z/OS

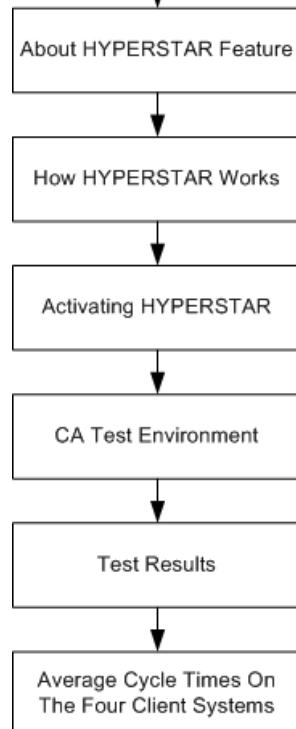
This scenario describes a case study to the administrator using HYPERSTAR.

Chapter 2: How To Read This Case Study

The following instructions show you how to read this case study.



Systems
Programmer



Study the HYPERSTAR feature by reading and reviewing each of the following steps.

1. [About The HYPERSTAR Feature](#) (see page 10)
2. [How HYPERSTAR Works](#) (see page 10)
3. [Activating HYPERSTAR](#) (see page 13)
4. [CA Test Environment](#) (see page 14)
5. [Test Results](#) (see page 14)
6. [Average Cycle Times On The Four Client Systems](#) (see page 24)

About The HYPERSTAR Feature

For a MIMplex that has three or more active systems, performance of Virtual Control Files (VCF) may be improved by activating the HYPERSTAR feature. When this feature is active, a client system does not always transfer the VCF back to the master system after completing its processing. Instead, CA MIM examines a 'look ahead' list of systems waiting for the VCF. When the list is not empty, the client transfers the VCF directly to that system instead of the master. These transfers assume that the client has a CTC or XCF path to the next system in the list. When the 'look ahead' list becomes empty, or when there is no path to the next system in the list, the client transfers the VCF back to the master.

The primary effect of HYPERSTAR is to reduce the amount of VCF I/O performed by the VCF master system, in many cases by more than 50 percent; in turn reduces the amount of CPU time that is used on the master system, and can potentially reduce the control file access times for all systems in MIMplex.

CA performed a benchmark on their test systems to study the impact of the HYPERSTAR feature.

How HYPERSTAR Works

The following diagrams illustrate how CA MIM transfers the Virtual Control File (VCF) with and without HYPERSTAR. This example assumes full connectivity between all systems. This connectivity is referred to as a symmetrical configuration.

GK03 is the VCFMASTER.

These diagrams assume that the VCF reserve requests from the three client systems are all queued simultaneously on the VCFMASTER/GK03.

Without HYPERSTAR

GK03	GK13	GK23	GK49
	Request VCF		
		Request VCF	
			Request VCF
Send VCF to GK13			
	Send VCF back to GK03		
Send VCF to GK23			
		Send VCF back to GK03	
Send VCF to GK49			
			Send VCF back to GK03

Six total I/O operations for the VCF transfers on GK03, that is three sends and three receives.

With HYPERSTAR

GK03	GK13	GK23	GK49
	Request VCF		
		Request VCF	
			Request VCF
Send VCF to GK13			
	Send VCF to GK23		
		Send VCF to GK49	
			Send VCF back to GK03

Two total I/O operations for the VCF Transfers on GK03, that is one send and one receive.

The total number of VCF transfers on GK03 was reduced from 6 to 2, or a 66.6 percent reduction. This reduction translates to reduced CPU usage on the VCFMASTER and improved ENQ response time.

The HYPERSTAR feature can be used with both XCF and CTC communications. In some cases one system may use a CTC path to communicate and others may use XCF signaling. The usage depends on the configuration and the value of SET MIM VCFPREFERENCE.

When any of the statements are true, HYPERSTAR has no effect:

- A DASD control file or list structure is being used
- The MIMplex has fewer than three systems.

Activating HYPERSTAR

The following example shows how to activate the HYPERSTAR feature:

1. Determine if HYPERSTAR is inactive.

```
F MIM,DISPLAY FEATURE
MIM0067I Command DISPLAY 061
MIM0670I Features Display:
  Facility Feature    Status
  MIM  HYPERSTAR    Inactive
```

HYPERSTAR is inactive.

2. Determine if any systems are in a FREED status:

```
F MIM,DISPLAY SYSTEMS
MIM0067I Command DISPLAY 064
MIM0108I SYSTEMS DISPLAY
  INDEX ALIAS SYSTEM  RELATION STATUS  OPSYS  LAST ACCESS
  01  03  GK03  LOCAL  MASTER  zOS  2014.129 08:47:48.37
  02  13  GK13  EXTERNAL FREED
  03  23  GK23  EXTERNAL FREED
  04  49  GK49  EXTERNAL FREED
  05  62  GK62  EXTERNAL FREED
```

The ACTIVATE FEATURE command works similar to ACTIVATE COMPATLEVEL. If there are systems in a FREED status, append the FORCE operand to the command.

Important! Read the *CA MIM Programming Guide* and the *CA MIM Statements and Commands Guide* for detailed information about the ACTIVATE FEATURE command.

```
F MIM,ACTIVATE FEATURE=(HYPERSTAR,FORCE)
MIM0067I Command ACTIVATE 068
MIM0684I ACTIVATE FEATURE=HYPERSTAR has been scheduled
MIM0619I ACTIVATE FEATURE=HYPERSTAR accepted
MIM0620I ACTIVATE FEATURE=HYPERSTAR in progress
MIM0621I ACTIVATE FEATURE=HYPERSTAR complete
```

3. Confirm that the feature is now active:

```
F MIM,DISPLAY FEATURE
MIM0067I Command DISPLAY 075
MIM0670I Features Display:
  Facility Feature    Status
  MIM  HYPERSTAR    Active
```

After activating HYPERSTAR, you may start seeing activity on the paths connecting two client systems. Without HYPERSTAR, you would typically only see activity on paths between the client and the VCFMASTER.

CA Test Environment

- CA MIM Release 12.0 was active on five systems – GK03, GK13, GK23, GK49, and GK62.
- MIMINIT COMPATLEVEL=12.0
- COMMUNICATION=CTONLY
- SET MIM MODE=DEMAND,CYCLE=1,INTERVAL=.1 on all five systems.
- SET MIM VCFPREFERENCE=CTC. This caused MIM to use CTC to transfer the control file rather than XCF.
- There were 2 SYSPLEXES, one with three systems and one with two systems.
- The MIM address space was launched with the ASCRE utility to ensure maximum dispatching priority.
- The CTCPATHS were coded to create a symmetrical configuration. This configuration allows any system to communicate with any external system. The HYPERSTAR feature may perform better with a symmetrical configuration, as the client systems may try to communicate with other client systems.
- MIMINIT VCFBUFFERSIZE=32768
- SET MIM ZIIP=NO (some systems did not have ZIIP processors)
- 4 jobs ran each system simultaneously for a total of 20 jobs across the MIMPLEX. The jobs were very ENQ/DEQ intensive to maximize the number of MIM control file cycles.
- Statistics were reset before the job submission and displayed after the jobs ended. The elapsed run time of the jobs was noted.
- The benchmark was performed three times, with and without FEATURE=HYPERSTAR.

Test Results

See [Statistical Details](#) (see page 15) for details from this study. A [General Summary](#) (see page 15) follows:

General Summary

- The AVERAGE CYCLE time on the VCFMASTER was reduced from 4.3 ms to 3.6 ms.
- The ENQ SERVICE time on the VCFMASTER was reduced from 4.2 ms to 3.7 ms.
- The CPU usage of the MIMDRVFD task on the VCFMASTER was reduced from 9.1 CPU seconds to 6.3 CPU seconds.
- The AVERAGE CYCLE time on the client systems was reduced from 5.6 ms to 4.7 ms.
- The number of “Saved I/Os” on the VCFMASTER averaged 400,000 which represents a 60 percent total reduction. The “Saved I/Os” represent I/O operations that would have occurred if HYPERSTAR were *not* active.
- The average elapsed run time of the ENQ intensive batch job decreased from 8.1 minutes to 7.0 minutes.

Important! The performance gain depends on how many systems are queued for the VCF simultaneously. MIMplexes with more systems may get a larger benefit. MIMPLEXes with busier systems may get a larger benefit. Measure the benefit at your site by reviewing the DISPLAY HYPERSTAR command output and reviewing the number of saved I/O operations on the VCFMASTER system.

Statistical Details

The following tests show detail test results.

Test 1

DISPLAY IO on GK03/VCFMASTER

WITHOUT HYPERSTAR

LAST RESET AT 11:15:10 ON 2014.126
COUNT: CYC= 102,140 BLOCKS READ= 118,435 WRITTEN= 108,490
XACT READ= 6.110M PROCESSED= 1.849M WRITTEN= 506,806
AVG: CYC= 0.004886 BLOCKS READ= 1.159 WRITTEN= 1.062
XACT READ= 59.827 PROCESSED= 18.111 WRITTEN= 4.961
RATE: CYC= 188.798 BLOCKS READ= 218.918 WRITTEN= 200.536
XACT READ= 1295.393 PROCESSED= 3419.336 WRITTEN= 936.794

WITH HYPERSTAR

LAST RESET AT 11:29:11 ON 2014.126
COUNT: CYC= 102,506 BLOCKS READ= 117,820 WRITTEN= 109,228
XACT READ= 5.702M PROCESSED= 1.635M WRITTEN= 433,166
AVG: CYC= 0.003997 BLOCKS READ= 1.149 WRITTEN= 1.065
XACT READ= 55.630 PROCESSED= 15.953 WRITTEN= 4.225
RATE: CYC= 221.874 BLOCKS READ= 255.021 WRITTEN= 236.424
XACT READ= 2342.987 PROCESSED= 3539.735 WRITTEN= 937.588

DISPLAY SERVICE on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPK1021I GK03 GDIF SERVICE Display:
Requests Time/Request Rate/Second Rate/Cycle Since
253,375 0.004528 388.016 2.487 11:12:46 2014.126
253,375 0.004528 491.036 2.487 11:15:10 2014.126

WITH HYPERSTAR

GPK0067I Command DISPLAY 249
GPK1021I GK03 GDIF SERVICE Display:
Requests Time/Request Rate/Second Rate/Cycle Since
216,515 0.004195 435.643 2.125 11:28:13 2014.126
216,515 0.004195 489.852 2.125 11:29:11 2014.126

DISPLAY CPU=DETAIL on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPK0660I CPU Time:
Last RESET at 11:15:10 on 2014.126
WorkUnit TotalCPU TaskCP zIIPonCP Pct zIIP Pct

MIMDRDRV 11.313037 11.313037 0.000000 0.0 0.000000 0.0
MIMZPXMP 0.000137 0.000137 0.000000 0.0 0.000000 0.0
MIMDRTRC 0.000000 0.000000 0.000000 0.0 0.000000 0.0
MIMDRVFD 9.633515 9.633515 0.000000 0.0 0.000000 0.0
MIMDRLOG 0.000459 0.000459 0.000000 0.0 0.000000 0.0
SRB 2.002170

Total 22.983071 20.980901 0.000000 0.0 0.000000 0.0

Normalized 22.983071 20.980901 0.000000 0.0 0.000000 0.0

WITH HYPERSTAR

Last RESET at 12:00:05 on 2014.126

WorkUnit	TotalCPU	TaskCP	zIIPonCP Pct	zIIP Pct
MIMDRDRV	9.320014	9.320014	0.000000	0.0
MIMZPXMP	0.000101	0.000101	0.000000	0.0
MIMDRTRC	0.000000	0.000000	0.000000	0.0
MIMDRVFD	6.176045	6.176045	0.000000	0.0
MIMDRLOG	0.000792	0.000792	0.000000	0.0
SRB	0.995038			

Total 16.536231 15.541193 0.000000 0.0 0.000000 0.0
 Normalized 16.536231 15.541193 0.000000 0.0 0.000000 0.0

DISPLAY PATH on GK03/VCFMASTER

WITHOUT HYPERSTAR

LAST RESET AT 11:15:10 ON 2014.126

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK62	USABLE	0 0	0				
XCF	GK13	USABLE	0 0	0				
N/A	GK03	LOCAL	0 0	0.004618	102,140			
184A	GK62	USABLE IDLE	80,705	80,712		0		
180A	GK62	USABLE IDLE	0 0	0				
0B4A	GK62	USABLE IDLE	0 0	0				
185A	GK49	USABLE IDLE	80,008	80,031		0		
181A	GK49	USABLE IDLE	0 0	0				
0B5A	GK49	USABLE IDLE	0 0	0				
186A	GK23	USABLE IDLE	80,300	80,335		0		
182A	GK23	USABLE IDLE	0 0	0				
0B6A	GK23	USABLE IDLE	0 0	0				
183A	GK13	USABLE IDLE	79,926	79,931		0		
154A	GK13	USABLE IDLE	0 0	0				
0B3A	GK13	USABLE IDLE	0 0	0				

WITH HYPERSTAR

LAST RESET AT 11:29:11 ON 2014.126

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK13	USABLE	0 0	0				
XCF	GK62	USABLE	0 0	0				
N/A	GK03	LOCAL	0 0	0.003621	102,506			
184A	GK62	USABLE IDLE	35,534	34,128		0		
180A	GK62	USABLE IDLE	0 0	0				
0B4A	GK62	USABLE IDLE	0 0	0				
185A	GK49	USABLE IDLE	31,065	33,048		0		
181A	GK49	USABLE IDLE	0 0	0				
0B5A	GK49	USABLE IDLE	0 0	0				
186A	GK23	USABLE IDLE	34,151	32,713		0		
182A	GK23	USABLE IDLE	0 0	0				

0B6A GK23	USABLE IDLE	0	0	0
183A GK13	USABLE IDLE	31,668	32,607	0
154A GK13	USABLE IDLE	0	0	0
0B3A GK13	USABLE IDLE	0	0	0

DISPLAY HYPERSTAR on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPk0067I Command DISPLAY 652
GPk0951I HYPERSTAR Statistics for VCF Master System:
HYPERSTAR is not active
Last RESET at 11:15:10 on 2014.126
#Reserve #Xfer #I/O #Saved %Saved AvgDepth
319,069 319,067 641,949 0 0.00 1.00

WITH HYPERSTAR

GPk0951I HYPERSTAR Statistics for VCF Master System:
Last RESET at 11:29:11 on 2014.126
#Reserve #Xfer #I/O #Saved %Saved AvgDepth
326,705 129,498 264,914 403,288 60.36 2.52

ELAPSED WALL CLOCK TIME for sample ENQ job

WITHOUT HYPERSTAR

11.15.12 job start time
11.24.11 job end time
8M 59S elapsed job run time

WITH HYPERSTAR

11.29.13 job start time
11.36.54 job end time
7M 41S elapsed job run time

///

Test 2

DISPLAY IO on GK03/VCFMASTER

WITHOUT HYPERSTAR

LAST RESET AT 11:50:53 ON 2014.126
 COUNT: CYC= 102,184 BLOCKS READ= 124,813 WRITTEN= 109,794
 XACT READ= 7.195M PROCESSED= 1.720M WRITTEN= 472,834
 AVG: CYC= 0.003942 BLOCKS READ= 1.221 WRITTEN= 1.074
 XACT READ= 70.418 PROCESSED= 16.832 WRITTEN= 4.627
 RATE: CYC= 234.905 BLOCKS READ= 286.926 WRITTEN= 252.400
 XACT READ= 6541.772 PROCESSED= 3954.156 WRITTEN= 1086.974

WITH HYPERSTAR

LAST RESET AT 12:00:05 ON 2014.126
 COUNT: CYC= 102,248 BLOCKS READ= 110,280 WRITTEN= 106,946
 XACT READ= 4.056M PROCESSED= 1.544M WRITTEN= 410,574
 AVG: CYC= 0.003121 BLOCKS READ= 1.078 WRITTEN= 1.045
 XACT READ= 39.669 PROCESSED= 15.105 WRITTEN= 4.015
 RATE: CYC= 278.604 BLOCKS READ= 300.490 WRITTEN= 291.405
 XACT READ= 1052.084 PROCESSED= 4208.604 WRITTEN= 1118.730

DISPLAY SERVICE on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPK1021I GK03 GDIF SERVICE Display:
 Requests Time/Request Rate/Second Rate/Cycle Since
 236,381 0.003762 528.816 2.320 11:50:19 2014.126
 236,381 0.003762 569.592 2.320 11:50:53 2014.126

WITH HYPERSTAR

GPK1021I GK03 GDIF SERVICE Display:
 Requests Time/Request Rate/Second Rate/Cycle Since
 205,202 0.003297 530.237 2.019 11:59:27 2014.126
 205,202 0.003297 586.291 2.019 12:00:05 2014.126

DISPLAY CPU=DETAIL on GK03/VCFMASTER

WITHOUT HYPERSTAR

RESET at 11:50:53 on 2014.126
 WorkUnit TotalCPU TaskCP zIIPonCP Pct zIIP Pct

 MIMDRDRV 10.169810 10.169810 0.000000 0.0 0.000000 0.0
 MIMZPXMP 0.000127 0.000127 0.000000 0.0 0.000000 0.0
 MIMDRTRC 0.000000 0.000000 0.000000 0.0 0.000000 0.0
 MIMDRVFD 8.823135 8.823135 0.000000 0.0 0.000000 0.0
 MIMDRLOG 0.001597 0.001597 0.000000 0.0 0.000000 0.0
 SRB 1.642828

 Total 20.714091 19.071263 0.000000 0.0 0.000000 0.0
 Normalized 20.714091 19.071263 0.000000 0.0 0.000000 0.0

WITH HYPERSTAR

RESET at 12:00:05 on 2014.126

WorkUnit	TotalCPU	TaskCP	zIIPonCP	Pct	zIIP	Pct
MIMDRDRV	9.320014	9.320014	0.000000	0.0	0.000000	0.0
MIMZPXMP	0.000101	0.000101	0.000000	0.0	0.000000	0.0
MIMDRTRC	0.000000	0.000000	0.000000	0.0	0.000000	0.0
MIMDRVFD	6.176045	6.176045	0.000000	0.0	0.000000	0.0
MIMDRLOG	0.000792	0.000792	0.000000	0.0	0.000000	0.0
SRB	0.995038					

Total 16.536231 15.541193 0.000000 0.0 0.000000 0.0
Normalized 16.536231 15.541193 0.000000 0.0 0.000000 0.0

DISPLAY PATH on GK03/VCFMASTER

WITHOUT HYPERSTAR

LAST RESET AT 11:50:53 ON 2014.126

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK13	USABLE		0	0	0		
XCF	GK62	USABLE		0	0	0		
N/A	GK03	LOCAL		0	0	0.003734	102,184	
184A	GK62	USABLE	BUSY	80,444	80,465			0
WRITVCF								
180A	GK62	USABLE	IDLE	0	0			0
0B4A	GK62	USABLE	IDLE	0	0			0
185A	GK49	USABLE	IDLE	80,082	80,090			0
181A	GK49	USABLE	IDLE	0	0			0
0B5A	GK49	USABLE	IDLE	0	0			0
186A	GK23	USABLE	IDLE	79,883	79,948			0
182A	GK23	USABLE	IDLE	0	0			0
0B6A	GK23	USABLE	IDLE	0	0			0
183A	GK13	USABLE	IDLE	79,178	79,186			0
154A	GK13	USABLE	IDLE	0	0			0
0B3A	GK13	USABLE	IDLE	0	0			0

WITH HYPERSTAR

LAST RESET AT 12:00:05 ON 2014.126

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK62	USABLE		0	0	0		
XCF	GK13	USABLE		0	0	0		
N/A	GK03	LOCAL		0	0	0.002817	102,247	
184A	GK62	USABLE	BUSY	36,771	34,986			0
WRITVCF								
180A	GK62	USABLE	IDLE	0	0			0
0B4A	GK62	USABLE	IDLE	0	0			0
185A	GK49	USABLE	IDLE	32,364	34,452			0
181A	GK49	USABLE	IDLE	0	0			0
0B5A	GK49	USABLE	IDLE	0	0			0
186A	GK23	USABLE	IDLE	36,699	34,556			0
182A	GK23	USABLE	IDLE	0	0			0

0B6A GK23	USABLE IDLE	0	0	0
183A GK13	USABLE IDLE	31,342	33,227	0
154A GK13	USABLE IDLE	0	0	0
0B3A GK13	USABLE IDLE	0	0	0

DISPLAY HYPERSTAR on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPK0067I Command DISPLAY 681
 GPK0951I HYPERSTAR Statistics for VCF Master System:
 HYPERSTAR is not active
 Last RESET at 11:50:53 on 2014.126
 #Reserve #Xfer #I/O #Saved %Saved AvgDepth
 316,673 316,671 639,277 4 0.00 1.00

WITH HYPERSTAR

GPK0951I HYPERSTAR Statistics for VCF Master System:
 Last RESET at 12:00:05 on 2014.126
 #Reserve #Xfer #I/O #Saved %Saved AvgDepth
 334,086 133,480 274,397 412,245 60.04 2.50

ELAPSED WALL CLOCK TIME for sample ENQ job

WITHOUT HYPERSTAR

11.50.53 job start time
 11.58.08 job end time
 7M 15S elapsed job run time

WITH HYPERSTAR

12.00.09 job start time
 12.06.13 job end time
 6M 4S elapsed job run time

///

Test 3

DISPLAY IO on GK03/VCFMASTER

WITHOUT HYPERSTAR

LAST RESET AT 09:51:26 ON 2014.127
COUNT: CYC= 102,160 BLOCKS READ= 114,758 WRITTEN= 107,763
XACT READ= 5.267M PROCESSED= 1.759M WRITTEN= 483,200
AVG: CYC= 0.004302 BLOCKS READ= 1.123 WRITTEN= 1.054
XACT READ= 51.561 PROCESSED= 17.219 WRITTEN= 4.729
RATE: CYC= 215.527 BLOCKS READ= 242.105 WRITTEN= 227.348
XACT READ= 1112.886 PROCESSED= 3711.191 WRITTEN= 1019.409

WITH HYPERSTAR

LAST RESET AT 10:02:26 ON 2014.127
COUNT: CYC= 102,593 BLOCKS READ= 123,386 WRITTEN= 109,813
XACT READ= 6.836M PROCESSED= 1.564M WRITTEN= 425,431
AVG: CYC= 0.003722 BLOCKS READ= 1.202 WRITTEN= 1.070
XACT READ= 66.632 PROCESSED= 15.246 WRITTEN= 4.146
RATE: CYC= 238.034 BLOCKS READ= 286.278 WRITTEN= 254.786
XACT READ= 5860.814 PROCESSED= 3629.211 WRITTEN= 987.078

DISPLAY SERVICE on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPK1021I GK03 GDIF SERVICE Display:
Requests Time/Request Rate/Second Rate/Cycle Since
241,557 0.004040 486.030 2.371 09:50:39 2014.127
241,557 0.004040 533.238 2.371 09:51:26 2014.127

WITH HYPERSTAR

GPK1021I GK03 GDIF SERVICE Display:
Requests Time/Request Rate/Second Rate/Cycle Since
212,591 0.003925 482.065 2.084 10:01:55 2014.127
212,591 0.003925 517.253 2.084 10:02:26 2014.127

DISPLAY CPU=DETAIL on GK03/VCFMASTER

WITHOUT HYPERSTAR

Last RESET at 09:51:26 on 2014.127
WorkUnit TotalCPU TaskCP zIIPonCP Pct zIIP Pct

MIMDRDRV 10.352334 10.352334 0.000000 0.0 0.000000 0.0
MIMZPXMP 0.000115 0.000115 0.000000 0.0 0.000000 0.0
MIMDRTRC 0.000000 0.000000 0.000000 0.0 0.000000 0.0
MIMDRVFD 8.955743 8.955743 0.000000 0.0 0.000000 0.0
MIMDRLOG 0.000643 0.000643 0.000000 0.0 0.000000 0.0
SRB 1.665057

Total 21.013705 19.348648 0.000000 0.0 0.000000 0.0
Normalized 21.013705 19.348648 0.000000 0.0 0.000000 0.0

WITH HYPERSTAR

Last RESET at 10:02:26 on 2014.127

WorkUnit	TotalCPU	TaskCP	zIIPonCP	Pct	zIIP	Pct
MIMDRDRV	10.037426	10.037426	0.000000	0.0	0.000000	0.0
MIMZPXMP	0.000116	0.000116	0.000000	0.0	0.000000	0.0
MIMDRTRC	0.000000	0.000000	0.000000	0.0	0.000000	0.0
MIMDRVFD	6.663939	6.663939	0.000000	0.0	0.000000	0.0
MIMDRLOG	0.001196	0.001196	0.000000	0.0	0.000000	0.0
SRB	1.011495					

Total	17.775529	16.764034	0.000000	0.0	0.000000	0.0
-------	-----------	-----------	----------	-----	----------	-----

Normalized	17.775529	16.764034	0.000000	0.0	0.000000	0.0
------------	-----------	-----------	----------	-----	----------	-----

DISPLAY PATH on GK03/VCFMASTER**WITHOUT HYPERSTAR**

LAST RESET AT 09:51:26 ON 2014.127

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK62	USABLE		0	0	0		
XCF	GK13	USABLE		0	0	0		
N/A	GK03	LOCAL		0	0	0.004076	102,171	
184A	GK62	USABLE	IDLE	80,645	80,688		0	
180A	GK62	USABLE	IDLE	0	0		0	
0B4A	GK62	USABLE	IDLE	0	0		0	
185A	GK49	USABLE	IDLE	80,315	80,339		0	
181A	GK49	USABLE	IDLE	0	0		0	
0B5A	GK49	USABLE	IDLE	0	0		0	
186A	GK23	USABLE	BUSY	80,948	80,977		0	
			WRITVCF					
182A	GK23	USABLE	IDLE	0	0		0	
0B6A	GK23	USABLE	IDLE	0	0		0	
183A	GK13	USABLE	IDLE	79,610	79,615		0	
154A	GK13	USABLE	IDLE	0	0		0	
0B3A	GK13	USABLE	IDLE	0	0		0	

WITH HYPERSTAR

LAST RESET AT 10:02:26 ON 2014.127

DEV	SYSTEM	STATE	IO-STAT	READS	WRITES	ERR	TIME/RSV	CYCLES
XCF	GK62	USABLE		0	0	0		
XCF	GK13	USABLE		0	0	0		
N/A	GK03	LOCAL		0	0	0.003377	102,594	
184A	GK62	USABLE	IDLE	34,449	32,001		0	
180A	GK62	USABLE	IDLE	0	0		0	
0B4A	GK62	USABLE	IDLE	0	0		0	
185A	GK49	USABLE	IDLE	31,572	33,021		0	
181A	GK49	USABLE	IDLE	0	0		0	
0B5A	GK49	USABLE	IDLE	0	0		0	
186A	GK23	USABLE	IDLE	33,225	32,020		0	
182A	GK23	USABLE	IDLE	0	0		0	

Average Cycle Times On The Four Client Systems

```

0B6A GK23  USABLE IDLE      0  0      0
183A GK13  USABLE IDLE    29,356 31,665      0
154A GK13  USABLE IDLE      0  0      0
0B3A GK13  USABLE IDLE      0  0      0
    
```

DISPLAY HYPERSTAR on GK03/VCFMASTER

WITHOUT HYPERSTAR

GPk0951I HYPERSTAR Statistics for VCF Master System:

HYPERSTAR is not active

Last RESET at 09:51:26 on 2014.127

```

#Reserve #Xfer #I/O #Saved %Saved AvgDepth
319,064 319,061 643,148 6 0.00 1.00
    
```

WITH HYPERSTAR

Last RESET at 10:02:26 on 2014.127

```

#Reserve #Xfer #I/O #Saved %Saved AvgDepth
317,171 126,101 257,309 389,782 60.24 2.51
    
```

ELAPSED WALL CLOCK TIME for sample ENQ job

WITHOUT HYPERSTAR

```

09.51.26  job start time
09.59.20  job end time
7M 54S    elapsed job run time
    
```

WITH HYPERSTAR

```

10.02.26  job start time
10.09.37  job end time
7M 11S    elapsed job run time
    
```

///

Average Cycle Times On The Four Client Systems

This table shows the average cycle times on the four client systems that are used in this case study.

	Without Hyperstar	With Hyperstar
Test 1		
GK13	AVG: CYC= 0.006395	AVG: CYC= 0.005377
GK23	AVG: CYC= 0.006347	AVG: CYC= 0.005210
GK49	AVG: CYC= 0.006347	AVG: CYC= 0.005180
GK62	AVG: CYC= 0.006391	AVG: CYC= 0.005154

	Without Hyperstar	With Hyperstar
Test 2		
GK13	AVG: CYC= 0.005203	AVG: CYC= 0.004230
GK23	AVG: CYC= 0.005158	AVG: CYC= 0.004033
GK49	AVG: CYC= 0.005087	AVG: CYC= 0.003981
GK62	AVG: CYC= 0.005131	AVG: CYC= 0.004001
Test 3		
GK13	AVG: CYC= 0.005633	AVG: CYC= 0.005230
GK23	AVG: CYC= 0.005535	AVG: CYC= 0.004994
GK49	AVG: CYC= 0.005535	AVG: CYC= 0.004984
GK62	AVG: CYC= 0.005581	AVG: CYC= 0.004990

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