

# z/VM CP Monitor

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“If you can’t Measure it,  
I am Just Not Interested™”

## Objectives

- Monitor overview
- Describe how monitor data is collected
- List the classifications of monitor data
- Estimate DCSS size and Create DCSS
- Set ESAMON settings
- Measure DCSS utilization
- Capture Ratio's

## Methods of Data Acquisition:

- Control block analysis (used when necessary)
- Operating system interface

## Examples:

- Control block analysis: Netstat, RTM, VM/Omegamon
- Operating system interface: CP Monitor (ZMAP, ZMON), SNMP (ZTCP)

## CP Monitor provides defined interface:

- Updated by IBM at release changes
- External programs work release to release

## Documented/Supported interface

## Communication method between application and MONITOR

### CP Monitor

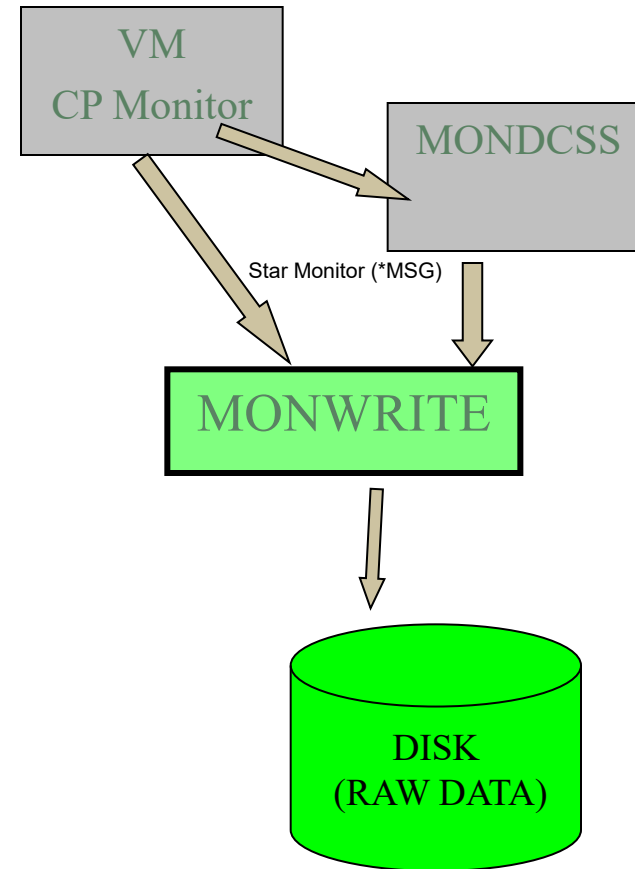
- Writes to DCSS
- Notifies application through \*MONITOR IUCV
- Sample end
- Event block full

### Maintains data in DCSS until

- IUCV REPLY from application
- New sample

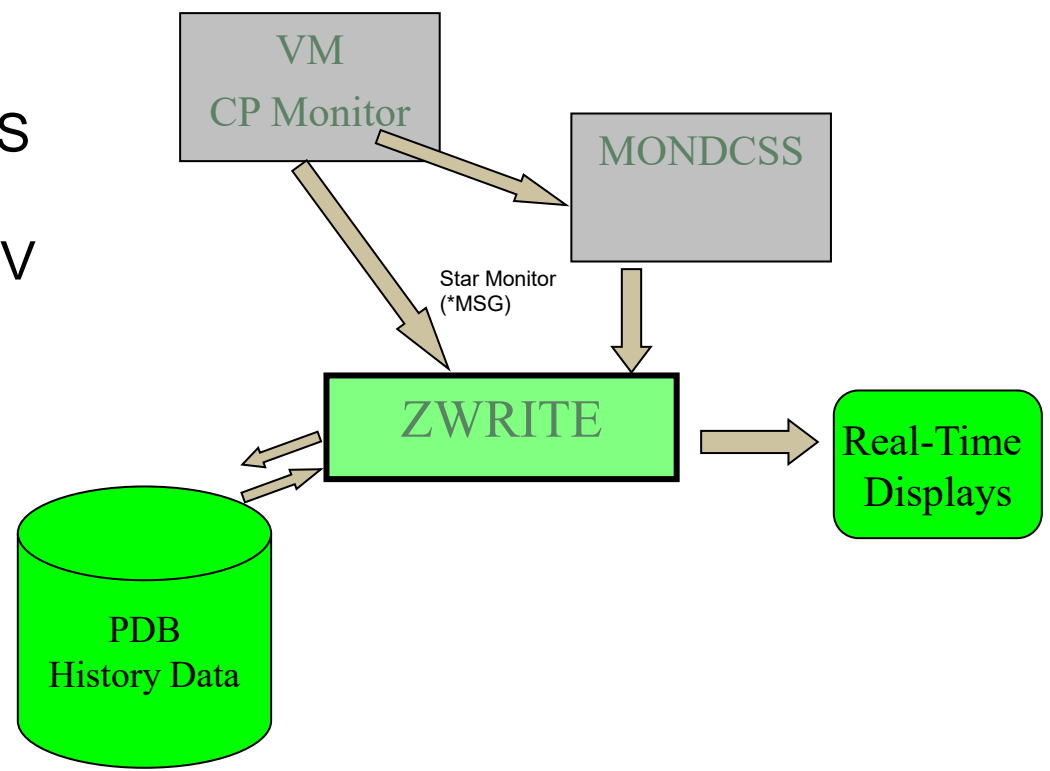
## Star Monitor (\*monitor)

- CP writes data to monitor DCSS - MONDCSS
- CP uses \*monitor IUCV interface
- Notifies application through \*MONITOR IUCV
  - Sample end
  - Event block full
- Application acknowledges data processed



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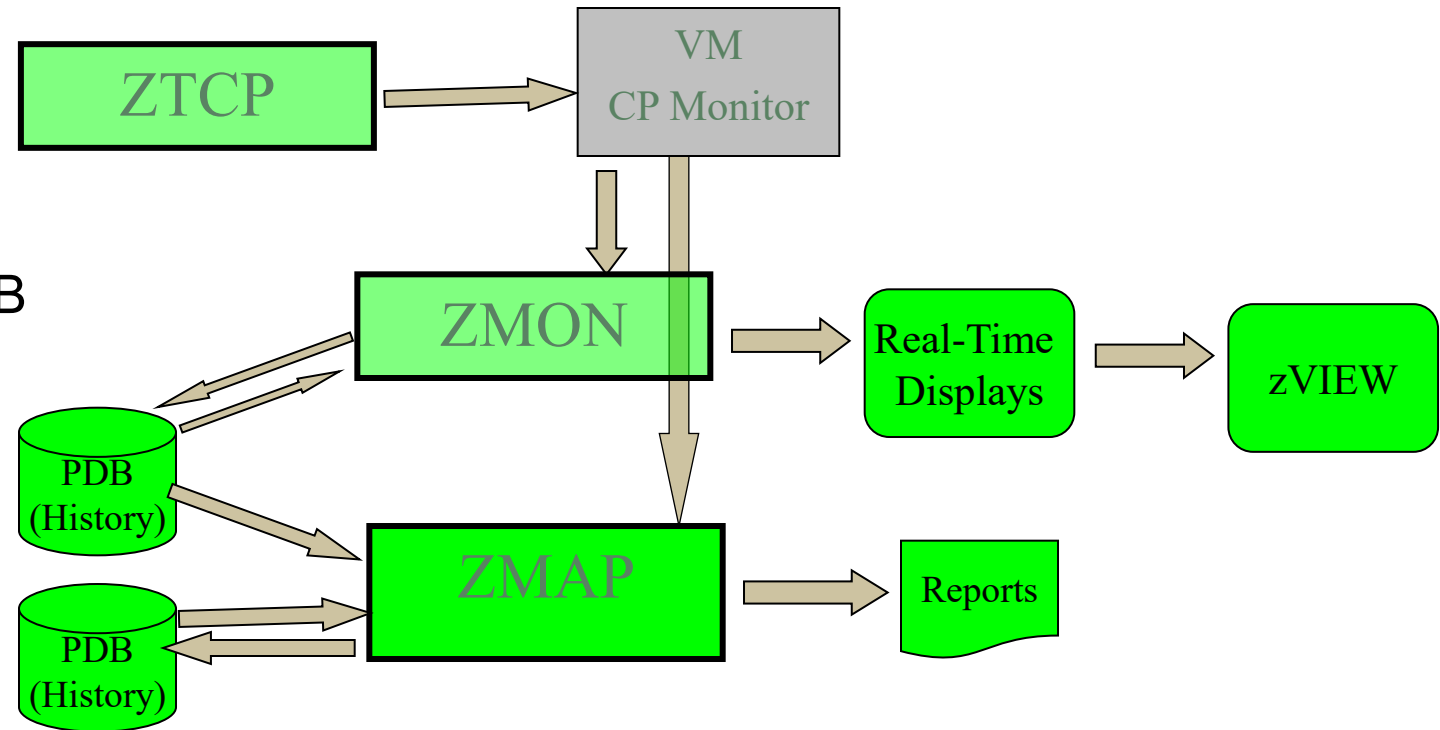


## ZVPS:

- ZMON Uses Standard CP Monitor
- ZMAP: Post Processing
- Creates Capacity Planning PDB

## If “zVIEW is broken”:

- Start with ZTCP!
- (smsg ztcp status nodename)
- Check SNMPD
- Check Linux connectivity
- Validate MIBs – VSI, Mongo, K8S



## Monitor provides 4 types of data:

- Sample Configuration
- Sample Data (including 2-speed subinterval data)
- Event Configuration
- Event Data

## Configuration data produced

- When monitor started (every summary interval)
- When a new user attaches to the monitor DCSS
- “SMSG ZSERVE SWCONFIG”
- (Required for MICS, other monitor reduction products)

## Event data collection starts

- When monitor started

## Sample data collection starts

- When monitor started



# DCSS Utilization - Example

## ESAHDR (Part 2):

- Sample partition is 4096K
- Config area is 400K

```

•Monitor Segment Analysis
•Sample Configuration DCSS used:      54 pages,  33792K - 34007K  ( 53%)
•Sample DCSS storage used:           279 pages,  34192K - 35308K  ( 30%)
•Event Configuration DCSS used:       1 pages,   37888K - 37889K
•Event DCSS storage used:             208 pages,  37888K - 38720K
•Times Event storage wrapped:         0
    
```

	Sample		Event	
	Config	Data	Config	Data
Start	33792k	34192k	37888k	37889k
Size	400	3696	1	831
Used	53%	30%	1	?

Event partition probably ok

There is plenty of room to reduce the SAMPLE partition, but don't

## ZWRITE Console Message:

```

VSIMTR001 The sample Configuration monitor segment is too small.
          A partial data buffer has been received at 08:02:38
    
```

- Correct this problem in ESASPARM COPY (happens automagically)

## Address range for EVENT partition

- Low point of EVENT partition = top of SAMPLE partition
- ZWRITE processes event buffer as soon as notified and returns it
- No cost of larger sample DCSS

## ESASPARM COPY

## Do DCSS Sized update from VSIMAIN

```

/*****
/* ESAMON server parameter file: */
/* This file was created to remove the need to modify */
/* the shipped product execs. */
/* This file needs to be located on the ESAMON 191. */
/*****
/* Parameters for ESACPMON execution */
/* Monitor Event Config Size value */
/* specifies the size in 4KB pages to be allocated in the */
/* saved segment for EVENT configuration records. */
EVENTSIZE = 50 /* Changed 27 Feb 2006 18:52:50 by ESAMON */
/* Monitor Sample Config Size value */
/* specifies the size in 4KB pages to be allocated in the */
/* saved segment for SAMPLE configuration records. */
/* Number of users Suggested value */
/* ----- */
/* n <= 500 users 50 */
/* 500 < n <= 5000 users 100 */
/* 5000 < n users 250 */
SAMPLESIZE = 500 /* Changed 27 Feb 2006 18:52:50 by ESAMON */

```

Domain	Sample/ Event	Associated Data
System	S	High-level, system-wide data about processor utilization, central and expanded storage activity, auxiliary storage activity, spooling, shared storage, logged-on users, and transactions.
Monitor	S, E	Monitor control information, Configuration data for System, users, devices, etc
<b>Scheduler</b>	<b>E</b>	Information related to scheduler events such as terminal input completion and queue add and drop decisions; changes to scheduling parameters
Storage	S, E	Detailed data concerning central, expanded, shared, and auxiliary storage activity.
User	S, E	Detailed sample data for logged-on user resource consumption and state sampling; event data reporting user configuration changes such as logon, logoff, virtual processor definition, and transaction activity.
Processor	S, E	Detailed sample data regarding processor utilization and queue lengths; event data recording configuration changes such as varying a processor offline.
I/O	S, E	Sample data reporting device activity; event data indicating configuration changes such as attaching devices and varying a device offline
<b>Seek</b>	<b>E</b>	Event data concerning direct access device seeks.
<b>Appldata</b>	S, E	Application data (e.g. Shared File System, ZVWS, <b>ZTCP, Linux, ZLMD</b> )
VND	S	New with z/VM 5.3, Virtual Network Device (Domain 8)
SSI	S, E	New with z/VM 6.2 Single System Image (Domain 11)

## Event Block Size, Partition Size

- Partition size is number of pages, defaults to half of DCSS size
- Block is number of pages of data per Event Interrupt
- BLOCK defaults to 4, setting to 10 reduces monitor IUCV events 30%

```
MONITOR SAMPLE ENABLE ALL
MONITOR SAMPLE INTERVAL 1 MINUTE
MONITOR SAMPLE RATE 1 SECOND

MONITOR EVENT ENABLE STORAGE
MONITOR EVENT ENABLE USER ALL
MONITOR EVENT ENABLE PROCESSOR
MONITOR EVENT ENABLE I/O ALL
MONITOR EVENT ENABLE APPLDATA ALL
MONITOR EVENT ENABLE SCHEDULER USERID
$PAGE$

MONITOR SAMPLE CONFIG SIZE pages LIMIT 1
MONITOR EVENT CONFIG SIZE pages LIMIT 1

MONITOR START BLOCK block PARTITION epart
```

## The DCSS is divided into **SAMPLE** and **EVENT** 'partitions'

- Each partition sets aside configuration area

### Sizing the partitions (pages)

- Number of users logged on (Sample)
- 150 pages for sample for 1000 logged users
- Number of devices (Sample)
- 25 pages for 200 devices
- Transaction rate (Event)
- Seek rate (Event)
- ZTCP/Linux data increases for each server (Sample)
- 20-30 pages per Linux server

**Event should wrap some number of times per minute**

**Or just make it big enough, it is no cost**

## Determine where the DCSS should go in virtual storage

- It must not overlap CMS, ZWRITE
- It should not overlap PIPES, CMSVMLIB, or INSTSEG
- ZMON Installation process asks for locations of MONDCSS and ZMON DCSS: "60" and "A0" are good locations

```
DEFSEG MONDCSS 6000-9FFF SC RSTD
SAVESEG MONDCSS
```

## To determine current DCSS location: (Use VSIMAIN)

```
q nss map name mondcss
```

FILE	FILENAME	FILETYPE	MINSIZE	BEGPAG	ENDPAG	TYPE	CL	#USERS	PARMREGS	VMGROUP
0072	MONDCSS	CPDCSS	N/A	06000	09FFF	SC	R	00002	N/A	N/A

## ESAHDR displays enabled classes

### New information for Sub-Interval

		System	Monitor	Scheduler	Storage	User	Processor	I/O	Seek
EVENT classes:	07:08:09	-	on	on	on	off	on	on	off
SAMPLE classes:	07:08:09	on	on	-	on	on	on	on	-
SAMPLE high-freq classes:		on	-	-	-	on	on	on	-

## ESAHDR (part two) - example

Domain	Record	Description	<Records>		Size	
			Processed	Total	Bytes	Avg Pct
System	1	SYTSYP: System	106	9328	88	0%
System	2	SYTPRP: Processor	106	9752	92	0%
System	3	SYTRSG: Real Storage (Global)	53	4452	84	0%
System	4	SYTRSP: Real Storage (Processor)	106	4664	44	0%
System	5	SYTXSP: Expanded Storage	106	3816	36	0%
System	6	SYTASG: Auxiliary Storage	53	3180	60	0%
System	7	SYTSHS: Shared Storage	53	1696	32	0%
System	8	SYTUSR: User	53	4664	88	0%
System	9	SYTCPC: Channel Path Contention	53	66356	1252	0%
System	10	SYTSCG: Scheduler Activity (Global)	53	3604	68	0%
System	11	SYTCOM: Communication Activity	106	15264	144	0%
System	12	SYTUWT: User Wait States	53	3816	72	0%
System	13	SYTSCP: Scheduler Activity (Proc)	106	3392	32	0%
System	14	SYTXSG: Expanded Storage	53	7208	136	0%
Monitor	1	MTRPRP: Event Profile	1	24	24	0%
Monitor	4	MTRSYS: System Configuration	1	88	88	0%
Monitor	5	MTRPRP: Processor Configuration	2	56	28	0%
Monitor	6	MTRDEV: Device Configuration	960	42240	44	0%
Monitor	7	MTRMEM: Memory Configuration	1	64	64	0%
Monitor	8	MTRPAG: Paging Configuration	19	760	40	0%
Monitor	9	MTRSPR: Sample Profile	1	32	32	0%
Monitor	11	MTREND: Interval End	106	2120	20	0%
Monitor	13	MTR EOF: End Of Frame	27932	536760	20	0%
Monitor	14	MTRDDR: Domain Detail	6	168	28	0%
Monitor	15	MTRUSR: Logged-On User	790	34760	44	0%
Monitor	16	MTRSCH: Scheduler Settings	1	72	72	0%
Monitor	17	MTRXSG: Expanded Storage	1	36	36	0%

## ESAHDR (part two) - example

Domain	Record	Description	<Records>		Size	
			Processed	Total	Bytes	Avg Pct
Scheduler	1	SCLRDB: Begin Read	1652		59472	36 0%
Scheduler	2	SCLRDC: Read Complete	1246		49840	40 0%
Scheduler	3	SCLWRR: Write Response	1754		70160	40 0%
Scheduler	4	SCLADL: Add User To Dispatch List	140822		23658096	168 18%
Scheduler	5	SCLDDL: Drop User From Dispatch List	140832		16899840	120 13%
Scheduler	6	SCLAEL: Add User To Eligible List	140822		14082200	100 11%
Scheduler	8	SCLSTP: System Timer Pop	104		8400	80 0%
.						
User	1	USELON: Logon	353		14120	40 0%
User	2	USELOF: Logoff	354		11328	32 0%
User	3	USEACT: Activity	41055		8375220	204 6%
User	4	USEINT: Interaction	41054		8703448	212 7%
User	8	USETRE: Transaction End	80963		4533928	56 3%
User	9	USEATE: Transaction End Activity	80963		14249488	176 11%
User	10	USEITE: Transaction End Interaction	80963		14897192	184 11%
Processor	3	PRCPRP: Processor Data	104		11232	108 0%
.						
Seek 1	SEKSEK:	Seek	741940		32033680	40 24%

## User Event required for:

- User/class transaction information
- User/Class workload analysis
- Service level agreements

## HIGH CAPTURE RATIO

## Scheduler for user '\$PAGE\$' provides:

- Timer Pop, SET SRM changes

**SEEKS VERY voluminous (especially for TPF)**

- DASD may be monitored selectively

**Use ZWRITE to avoid collecting raw data at all**

**DIAGNOSE X'DC' to start/stop monitoring by App**

**Applications provide sample data to defined interface**

**Requires directory option APPLMON**

**Used by:**

- **SFS / BFS** (ESASFSx, ESABFSx)
- ZVWS, ZWEB0x
- **TCPIP (ESATCPx)**
- **ZTCP** (ESATCPx, ESAUCDx, ESAHSTx, ESALNXx)
- Multitasking (ESAMTSK)
- **LINUX (ZLMD)**

## Create extract of specific records:

- `smsg zserve trace 6 3`
- `smsg zserve trace 1 6`
- `smsg zserve trace on`
- `smsg zserve trace off`

## Create raw monitor data as MONWRITE does

- `smsg zserve record disk config`
- `smsg zserve record none`

**Subinterval broken as delivered**

**zVPS depends on 1 minute boundary**

**Subinterval starts the monitor 1 subinterval late**

- ZSERVE modified to start monitor correctly

**Processing of subinterval data a “future” project**

**Size the Monitor DCSS large in an exclusive location**

**Ensure the sample configuration area is sufficient**

**Disable seeks if there is high volume I/O (TPF)**

**Let ZSERVE start the monitor**

**ZVPS operation is 24x7, the monitor is never stopped**

**ZWRITE has options for collecting data for MICS (MXG takes ZMAP history)**

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