

Five z/OS Resilience Features My Clients Aren't Using



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z/OS Systems Resilience

- In past 24 months, have worked on four resilience-related projects
- Most from systems point of view, one from application point of view
- Have also looked at some resilience issues for other clients in past few years.
- So, what have I found?

z/OS Systems Resilience

- Five areas not used by my clients, or could be used better.
- z/OS systems. CICS, IMS, applications, databases not covered today.
- My personal opinion: how do I think my clients can get better resilience?
- My clients are busy: this isn't a criticism of their work. Just some ideas to improve resilience

First Feature

(you're going to laugh, but humour me)

1. Health Checker

- z/OS Health Checker: free z/OS component to automatically check for problems
- z/OS and other software vendor provide pre-canned checks
- Quick and easy to get going
- Turned off (!) at two sites

NAME	State	Status
ALLOC_ALLC_OFFLN_POLICY	ACTIVE (ENABLED)	SUCCESSFUL
ALLOC_SMSHONOR_STATE	ACTIVE (ENABLED)	SUCCESSFUL
ALLOC_SPEC_WAIT_POLICY	ACTIVE (ENABLED)	SUCCESSFUL
ALLOC_TAPELIB_PREF	ACTIVE (ENABLED)	EXCEPTION-LOW
ALLOC_TIOT_SIZE	ACTIVE (ENABLED)	SUCCESSFUL
ASM_LOCAL_SLOT_USAGE	ACTIVE (ENABLED)	SUCCESSFUL
ASM_NUMBER_LOCAL_DATASETS	ACTIVE (ENABLED)	SUCCESSFUL
ASM_PAGE_ADD	ACTIVE (ENABLED)	SUCCESSFUL
ASM_PLPA_COMMON_SIZE	ACTIVE (ENABLED)	SUCCESSFUL
ASM_PLPA_COMMON_USAGE	ACTIVE (ENABLED)	SUCCESSFUL
CATALOG_ATTRIBUTE_CHECK	ACTIVE (ENABLED)	SUCCESSFUL
CATALOG_IMBED_REPLICATE	ACTIVE (ENABLED)	EXCEPTION-LOW
CATALOG_RNLS	ACTIVE (ENABLED)	EXCEPTION-LOW
CCS_ENF_SCREEN_VALIDITY	ACTIVE (ENABLED)	SUCCESSFUL
CICS_CEDA_ACCESS	ACTIVE (ENABLED)	EXCEPTION-LOW
CICS_JOB SUB_SPOOL	ACTIVE (ENABLED)	EXCEPTION-LOW
CICS_JOB SUB_TDQINTRDR	ACTIVE (ENABLED)	SUCCESSFUL
CNZ_AMRF_EVENTUAL_ACTION_MSGS	ACTIVE (ENABLED)	SUCCESSFUL

1. Health Checker

- Most clients have started z/OS Health Checker
- Few clients have eliminated exceptions
- My recommendation:
 - Resolve all exceptions, or disable check
 - Automation to alert on any exceptions
 - Duty z/OS systems programmer to review exceptions every Monday and fix.

```
CHECK(IBM CNZ,CNZ_SYSCONS_PD_MODE)
SYSPLEX: PPLX      SYSTEM: P001
START TIME: 10/12/2021 22:27:04.040082
CHECK DATE: 20040816  CHECK SEVERITY: MEDIUM

* Medium Severity Exception *

CNZHF0010E system console P001@HMC is running in Problem Determination
mode.

Explanation: The system console should not be running in Problem
Determination mode during normal operations.

System Action: The system continues processing.
```

1. Health Checker

- Few clients have written their own health checks
- **Possible Example:**
 - One client had an outage as their production CICS/VSAM dataset ran out of extents.
 - Possible solutions: create a health check to alert if any production VSAM dataset has more than 100 extents.

Second Feature

(you're going to laugh again)

2. Automation

- All clients have some sort of automation to detect messages, start/stop subsystems.
- Most clients 'miss' a lot of messages.
- How to check you're alerting on all the right messages?
 - Browse message manuals for message IDs ending in an 'E' or similar
 - IBM PARMLIB sample AUTOR00 has some recommended automatic replies
 - Some automation products may provides some assistance, but won't cover everything
 - Watson and Walker Health Check

2. Automation

Message automation ideas my clients aren't using:

- Automate Health Checker messages
- Use z/OS Message Flood Automation (most of my clients don't)
- Trap WTOs issued from applications
- Trap alerts from monitors like Broadcom SYSVIEW

```
SYSVIEW 16.0 MVS1 ----- ALERTS, MVS Exception Alerts ----- 2021/11/01 09:27:38
Command =====> |
----- Lvl 3 Row 1-10/13 Col 1-79/428
(i)  CP%  IIP%  ALL%  -Condition-  ---MSU---  ---Ready---  --Paging--  -Storage-
CPU   63%   3%   39%  NoENQ NoSMF  4H   244  ASIDs   4  Slots  0%  ECSA  35%
LCPU  63%   3%   39%  NoRES NoWTO  4H%  9%   Tasks   6  Rate   0  ESQA  98%
                                           NoDMP NoTAP  4G   0   ----I/O----  AFQA  2.93m  SQA  71%
Spool  46%                               4G%   0%   Rate  12119  UICA  65535  CSA  22%
-----
Formats  DEFAULT  ACK  DIST  NOACK
-----
Cmd  Name      Resource      Alias      Value      Status      Pri  Ack
---  ---      -
___  JOBECSA    DBP1MSTR     0074      9.46M      PROBLEM     0
___  .          NET          007F      11.5M      PROBLEM     0
___  JOBRSTG    DBP1DBM1     00B6      6.89G      PROBLEM     0
___  STGECSAC   .            .          33.5M      PROBLEM     0
___  STGESQA%  .            .          98%        PROBLEM     0
___  STGSQAF   .            .          166K       PROBLEM     0
___  JOBALLT%  PRODCICS     00C1      81.29      WARNING     0
___  JOBCPUT%  PRODCICS     00C1      81.29      WARNING     0
___  JOBESQA   *MASTER*     0001      3.36M      WARNING     0
___  JOBIOR    PRODCICS     00C1      9817       WARNING     0
-----
1=HELP 2=$PLIT 3=RETURN 5=FIN 7=UP 8=DOWN 9=SWAP 10=LEFT 11=RIGHT 12=RECALL
```

2. Automation – AutoIPL Policy

- There's more to automation than message and IPL automation.
- Example: most clients don't have an AutoIPL Policy
- Can be defined to automatically IPL (with optional standalone dump) on unrecoverable disabled wait.

```
D DIAG
IGV007I 23.29.53 DIAG DISPLAY 975
VSM TRACK CSA(ON) SQA(ON)
VSM TRACE GET(OFF) FREE(OFF)
VSM ALLOWUSERKEYCSA(YES)
VSM BESTFITCSA(YES)
VSM USEZOSV1R9RULES(YES)
TRAPS NAME( )
CBLOC
  VIRTUAL24( )
  VIRTUAL31( )
REUSASID(YES)
AUTOIPL SADMP(NONE) MVS(NONE)
FREEMAINEDFRAMES(YES)
FF31HIGH(YES)
```

2. Automation – Other Production Automation

- Many other products have some automation features that clients aren't implementing.
- Examples
 - Compuware Strobe: can automatically start a measurement when criteria is met (Global Monitoring).
 - DTS SRS: alert if a VSAM dataset runs to too many extents

2. Automation – why it's important

- Automation reduces outages
- Although smart automation takes time, it will reduce the impact of problems it 'catches'
- Few clients have implemented sophisticated automation

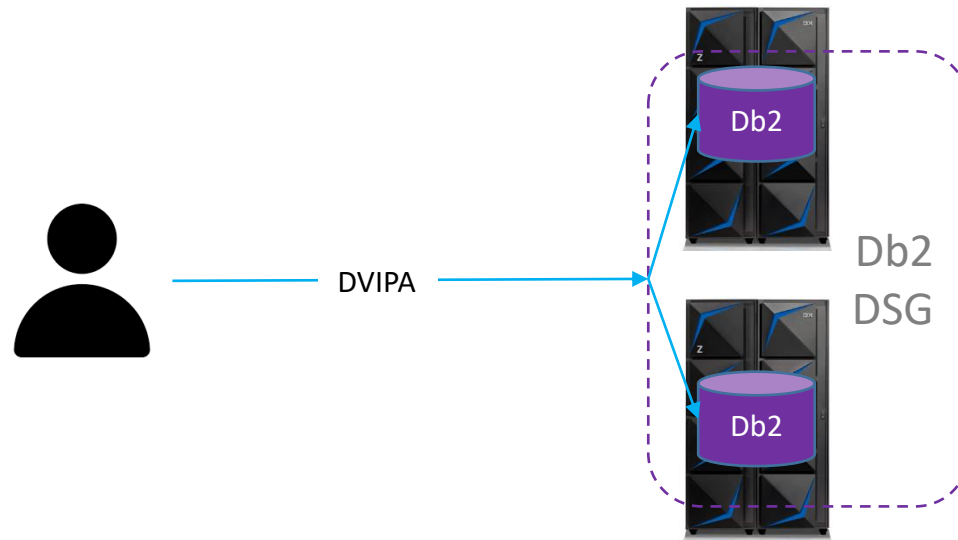
Problem Solved By	Problem Duration
Automation	Seconds
Operation	Tens of Minutes
z/OS Systems Programmer	1 Hour +

Third Feature

(yep, more laughter)

3. Parallel Sysplex

- Sites have a basic Sysplex: GRS, shared DASD, JES MAS
- Many sites don't use it as well as they could
- Example: few sites use a DVIPA address for ALL incoming Db2 DDF (+DSG).



3. Parallel Sysplex

- There are other Sysplex features that aren't that hard to implement
 - Use DVIPA for TN3270 users
 - Use WLM with DVIPA / Sysplex Distributor for workload balancing
 - Do not tie batch to single z/OS systems
 - HSM common recall queue
 - Use generic VTAM resource for TSO/TPX/MAI users
 - Connect:Direct plex

3. Parallel Sysplex

- Some features are harder to implement
 - CICSplex
 - IMSplex
 - MQ queue sharing
 - VSAM RLS
 - Sysplex-based automation
(e.g. if z/OS fails, restart CICS on another z/OS)

4. z/OS Resilience Features

- Sites have not implemented all z/OS resilience features
 - AutoIPL Policy
 - Predictive Failure Analysis (PFA)
 - Runtime Diagnostics
 - Sysplex Failure Management (SFM)
 - System Status Detection (SSD)
 - Message Flood Automation
 - Automated Restart Manager (ARM)
 - REUSEASID

5. DFSMS Resilience Features

- Sites have not implemented all DFSMS resilience features
 - PDSE (V2), Program Objects
 - CA Reclaim
 - System Managed Buffering (SMB)
 - VSAM Extent Constraint Removal
 - Space Constraint Relief
 - VSAM Extended

Squeezing Every Drop of Resilience From z/OS

- z/OS is really resilient out of the box
- For more resilience, must enable and configure features
- Many of these are cheap: free with z/OS, little CPU, not difficult to implement.

Longpela Expertise

- Small z/OS consulting firm based in Perth, Western Australia
- Systems consultants: z/OS, CICS, IMS and more
- Started in 1996
- Behind www.lookupmainframesoftware.com , and the book *“What On Earth is a Mainframe”*.

