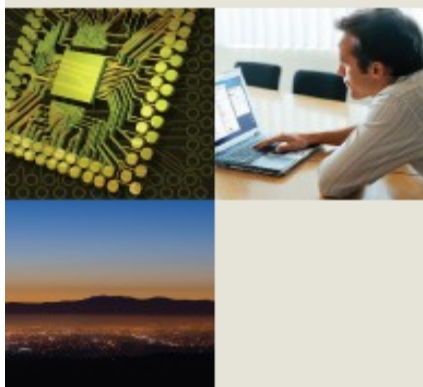


IMS Automation with IBM Tivoli System Automation for z/OS

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08/04/2010



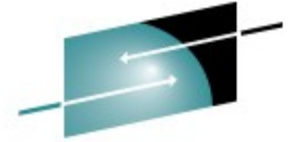
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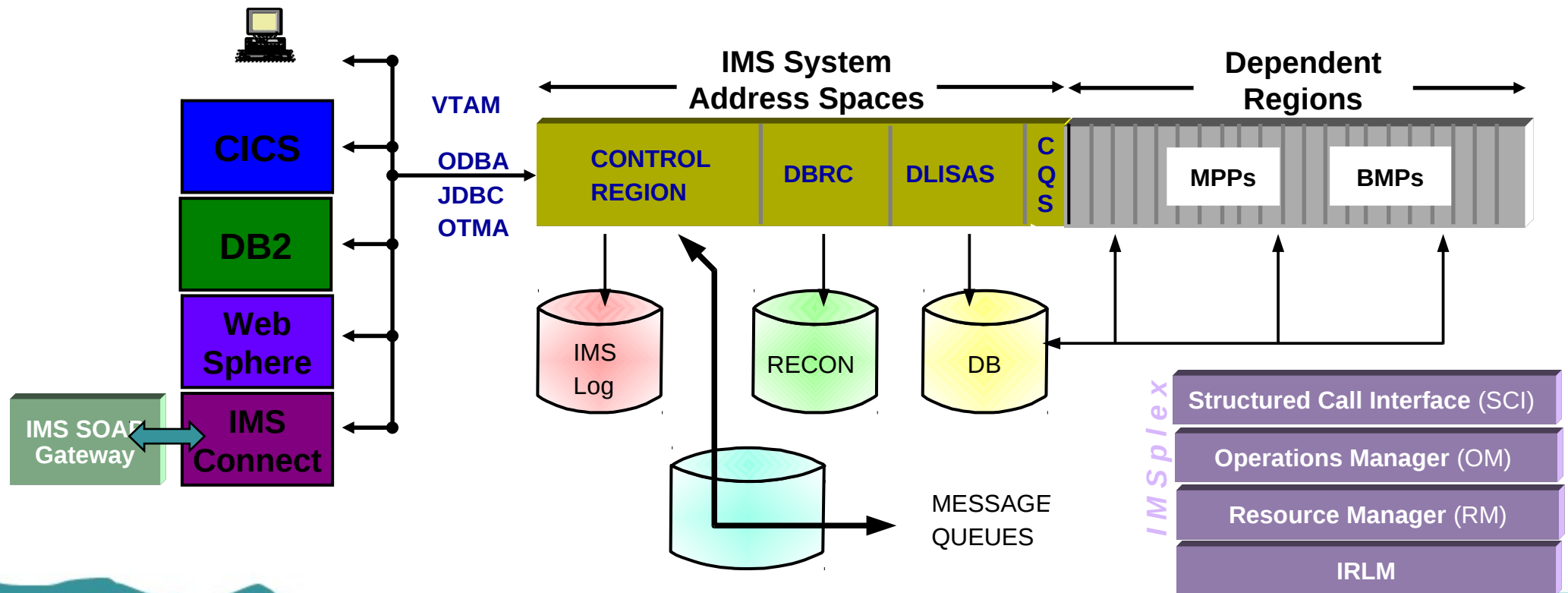
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Technology • Connections • Results

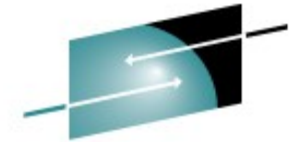
Agenda

- SA z/OS – IMS Automation Overview
- User scenarios – Use cases
 - RECON SPARE dataset for IMS are missing
 - Needed to start spare OLDS to have the minimum in AVAILABLE status
 - IMS users are unable to LOGON to IMS
 - Automatic recovery of 'ABENDING' IMS transactions or programs
 - IMS commands based on scheduled timer intervals
- START / Stop details for IMS applications
- Special IMS management
- *IMS Best practices

IMS Architecture overview

- An IMS system has multiple system address spaces
- Transaction programs (MPPs) are managed by the IMS control region
- Batch programs (called “BMPs”) can also be run concurrently
- CICS, DB2, WebSphere... access IMS and add **complexity**





SHARE

Technology • Connections • Results

SA z/OS - IMS Automation main topics

- Recover IMS components
- Recover transactions and/or programs
- Monitor critical resources
 - Monitors number of available **OLDS** and excessive switching
 - Monitors number of available **RECON** datasets
 - Monitors **VTAM** Application ID availability and the enablement of logons
 - **TCO** (Time Controlled Operation)
- Start/stop fast and reliably
 - Dependencies fulfilled: IMS and all connectivity actually works
- Resolve alert messages or escalate through **SA IOM**
- Proactive automation through **OMEGAMON** integration
- Special IMS start types. Three standard shutdown types
- Internal IMS messages can be automated
- Sysplex-wide automation
- ... and a lot more...



Agenda



- SA z/OS – IMS Automation Overview
 - User scenarios – Use cases
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 - IMS users are unable to LOGON to IMS
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- *IMS Best practices

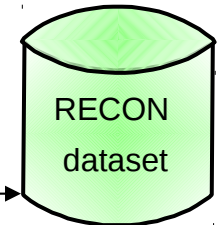
Scenario A : Monitoring of Recovery Control Data Sets (RECON)



Problem: IMS RECON SPARE datasets are missing

Solution: SA z/OS allows the monitoring of recovery control data sets of IMS control regions → add definitions in the SA z/OS Policy database

IMS cmd :
RMLIST DBRC='RECON STATUS'



- Monitoring routine **INGRMIRE** is used to monitor the RECON datasets
→ a **MTR resource** must be defined to monitor number of available RECON data sets
- Relationships have to be defined between MTR resource and IMS control region

Meaning of Return Codes of
INGRMIRE

Return Code	Health Status	Description
1	BROKEN	Severe error occurred
2	FAILED	RMLIST command timeout / no response
3	NORMAL	Everything is just fine (3 RECON DSN found in status COPY1, COPY2 and SPARE)
4	WARNING	RECON COPY2 missing
5	MINOR	RECON SPARE missing
6	CRITICAL	RECON COPY2 and SPARE missing
7	FATAL	RECON COPY1, COPY2 and SPARE missing

Customization Dialogs Definitions

```
Command ==> Monitor Resource I
Entry Type : Monitor Resource
Entry Name : IMS941_REC0
Monitored Object : RECON
Monitored Jobname : IMS941C4
Activate command :
Deactivate command :
Monitor command : ingrmire
Monitoring Interval : 00:15
```

MTR resource with “Monitored Object” = RECON

Monitor command =
“INGRMIRE”

```
Command ==> Relationship Selection List
Entry Type : Monitor Resource
Entry Name : IMS941_REC0
PolicyDB Name : HU
Enterprise Name : ON
Relationship # Type Supporting Resource
1 FORCEDOWN IMS_CONTROL/APG/KEY4
2 WHENOBSERVEDDOWN
3 HASPASSIVEPARENT IMS_CONTROL/APG/KEY4
```

Relationships :
MTR → IMS_control APG
Rely on all required functions

RECON monitoring



```
INGKYST0      SA z/OS - Command Dialogs
Domain ID     = IPSFP      ----- INGLIST -----
Operator ID   = HUT        Sysplex = KEY1PLEX
CMD: A Update  B Start    C Stop      D INGRELS  E I
      G Members  H DISPTRG I INGSCHED J INGGROUP M D
CMD Name      Type System  Compound      Desired      Line 1
-----
- IMSCTL      APL  KEY4    DEGRADED        AVAILABLE
Date = 01/
Time = 14:
CMD: A Update  B Start    C Stop      D INGRELS  E INGVOTE  F
      G Members  H DISPTRG I INGSCHED J INGGROUP M DISPMTR  /
CMD Name      Type System  Automation Startable  Health
-----
- IMSCTL      APL  KEY4    IDLE          YES       MINOR
```

Health status MINOR results in compound=DEGRADED on IMS Control region

```
INGKYM01      SA z/OS - Command Dialogs
Domain ID     = IPSFP      ----- DISPMTR -----
Operator ID   = HUT        Sysplex = KEY1PLEX

Monitor       : IMS941_RECO/MTR/KEY4
System        : KEY4
Description    : IMS RECON Monitor

Monitored Object : RECON
Monitored Jobname : IMS941C4

Owner         : binz
Inform list    : SDF NMC SMF

Commands...
  Activate     :
  Deactivate   :
  Monitoring    : ingrmire

Interval      : 00:15

Last termination : 18:58:04 on 01/25/08
Last start      : 08:31:28 on 01/29/08

Monitor Status  : ACTIVE at 2008-01-30 13:57:45
Health Status   : MINOR
No SPARE found for RECON
```

Look also at MTR resources on SDF, NMC and TEP

Check for details on DISPMTR details panel

Scenario B : Monitoring of Online Log Data Sets (OLDS)

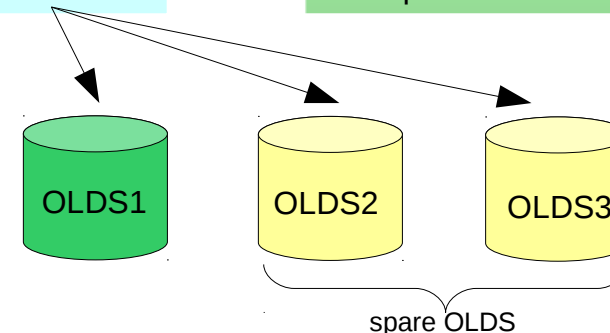
Problem: Need SPARE OLDS

Solution: Add definitions to SA z/OS

- Monitoring routine **INGRMIOL** is used
→ Two **MTR** resources must be defined to monitor
 - number of **available OLDS**
→ Monitored Object = **OLDS**
 - **excessive OLDS switching**
→ Monitored Object = **OLDS_SWITCH**
- Relationships between MTR resources and IMS control region

IMS **display** cmd to
analyze status of OLDS

Health state **WARNING**
→ Spare OLDS start!



Meaning of Return Codes of
INGRMIOL

Return Code	Health Status	Description
1	BROKEN	Monitor encountered a severe error
2	FAILED	DISPLAY OLDS failed
3	NORMAL	No problem found by OLDS monitoring
4	WARNING	One of the following occurred: • Needed to start spare OLDS to have the minimum in AVAILABLE status • AUTOMATIC ARCHIVE is off
5	MINOR	Could not start enough spare OLDS to have the minimum in AVAILABLE status
6	CRITICAL	Number of OLDS in BACKOUT status exceeds maximum limit

Define 'OLDS' MTR resource

```

Command ==> Monitor Resource Information

Entry Type : Monitor Resource      PolicyDB Name
Entry Name : IMS10LDS1            Enterprise Name : KE

Monitored Object . . . . . OLDS
Monitored Jobname . . . . . IMS9&A0CCLONE1.1C4
Activate command . . . . .

Deactivate command . . . . .

Monitor command: INGRMIOL
Monitoring Interval . . . . . 00:15
Captured Messages Limit

```

MTR resource with "Monitored Object" = OLDS

Monitor command = "INGRMIOL"

Status "Check" → Health State must be re-evaluated via INGRMIOL

Status messages for passive monitoring to trigger health status updates and recovery actions

```

Entry Type : Monitor Resource
Entry Name : IMS10LDS1

Define message IDs and (
CMD = Command REP = F
NTO = AT Actions

Active Message ID
Description
DFS3256I
Evaluate Healthstate
DFS3257I
Evaluate Healthstate
DFS3258A
Last OLDS in use
DFS3260I
Evaluate Healthstate

```

Status	Type/State	Description
NORMAL		Resource shows good results
WARNING		Resource shows degradation
MINOR		Same as WARNING, but more severe
CRITICAL		Same as MINOR, but more severe
FATAL		Same as CRITICAL, but more severe
UNKNOWN		Healthstate is not available
INACTIVE		Monitor is not running
FAILED		Monitor failed
BROKEN		Monitor finally failed
SELECTED	Check	Healthstate must be evaluated

Msg DFS3258A indicates problem → select health status = CRITICAL

Define OLDS monitoring

```
Command ==> Message Processing Line 00000042 Col 001 0
Entry Type : Application PolicyDB Name : KEYAPLEX_V320
Entry Name : IMS1CTL Enterprise Name : KEYAPLEX
Line Commands: S (Cmd), C (Cmd), R (Rep), K (Cod), U (Usr), A (Aut), O (Ovr)
                I, D (insert or delete lines)
Message ID field length. . 14 (1 - 32)
Cmd Message id Description Cmd Rep Cod Usr
u_ OLDS Online Log Dataset Recovery 5
```

Special message id : OLDS

Minimum number of
available OLDS

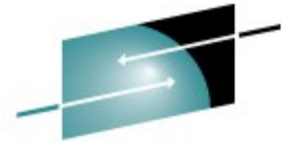
Spares to be activated in case of
too less available OLDS

number of acceptable OLDS data sets
with an OTHER-STs of
BACKOUT.

```
Command ==> User Defined Data
Entry Name : IMS1CTL Message ID : OLDS
To change keyword-data pair, specify the following:
Keyword
Data
MINIMUM
03
SPARES
(04,05,99)
BACKOUT
1
```

Define 'IMS OLDS Switch Frequency'

- MTR resource



Notices:

Don't forget to define thresholds levels

for minor resource
DFS3257I for IMS
control region

```
Monitor Resource Information

Command ==> _

Entry Type : Monitor Resource      PolicyDB Name : KEYAPLEX_V320
Entry Name : IMS1OLDS2             Enterprise Name : KEYAPLEX

Monitored Object : . . . . . OLDS_SWITCH
Monitored Jobname : . . . . . IMS9&AOCCLONE1.1C4
Activate command : . . . . .
```

MTR resource with
"Monitored Object" = OLDS_SWITCH

Command Definitions for the Health Status Update (INGMON →
status change)
related to the **Switch Frequency**

```
CMD P...ng Row 1 to 7 of 24
SCROLL==> CSR

Command ==> _

Entry Name : IMS1CTL Message ID : DFS3257I

Enter commands to be executed when resource issues the selected message
or define this message as status message.

Status . . . . . ('?' for selection list)

Pass/Selection Automated Function/*'
Command Text
INFR
INGMON OLDS_SWITCH,JOBNAME=&SUBSJOB,STATUS=WARNING,INFO=(MSG,INFREQUENT THRESHO
DS LIMIT REACHED FOR OLDS SWITCHING)

FREQ
INGMON OLDS_SWITCH,JOBNAME=&SUBSJOB,STATUS=MINOR,INFO=(MSG,FREQUENT OLDS SWITCH
ING DETECTED)

CRIT
INGMON OLDS_SWITCH,JOBNAME=&SUBSJOB,STATUS=CRITICAL,INFO=(MSG,CRITICAL OLDS SWI
CHING FREQUENCY REACHED)

ALWAYS
INGMON OLDS_SWITCH,JOBNAME=&SUBSJOB,STATUS=NORMAL,INFO=(MSG,OLDS SWITCHING FREQ
UENCY IS NORMAL)
```

Spare OLDS required

```
INGKYST0      SA z/OS - Command Dialogs
Domain ID    = IPXFG      ----- INGLIST -----
Operator ID  = HUT        Sysplex = KEYAPLEX
CMD: A Update      B Start      C Stop      D INGRES      E INGRES      F INGINFO
      G Members      H DISPTRG      I INGSCHED      J INGROUP      M DIS
CMD Name      Type System      Compound      Desired      erved      Nature
-----
- IMS1CTL      APL KEYA      DEGRADED      AVAILABLE      LABLE
```

Compound status : **DEGRADED**
Results from health status **WARNING**

```
INGKYST0      SA z/OS - Command Dialogs
Domain ID    = IPXFG      ----- INGLIST -----
Operator ID  = HUT        Sysplex = KEYAPLEX
CMD: A Update      B Start      C Stop      D INGRES      E INGRES      F INGINFO
      G Members      H DISPTRG      I INGSCHED      J INGROUP      M DISPMTR      / scroll
CMD Name      Type System      Automation      Startable      Health      Auto Hold
-----
M IMS1CTL      APL KEYA      IDLE      YES      WARNING      YES      NO
```

Invoke DISPMTR for further details

Spare OLDS required

```
INGKYM00          SA z/OS - Command Dialogs
Domain ID   = IPXFG      ----- DISPMTR -----
Operator ID = HUT        Sysplex = KEYAPLEX

CMD: A Reset   B Start   C Stop   D Details   E INGVO

CMD Monitor      System      Status      Health
-----
d  IMS1DC         KEYA        ACTIVE      NORMAL
   IMS1OLDS1     KEYA        ACTIVE      WARNING
   IMS1OLDS2     KEYA        ACTIVE      NORMAL
```

Look under DISPMTR → details
for more information

```
INGKYM01          SA z/OS - Command Dialogs          Line 1 of 2
Domain ID   = IPXFG      ----- DISPMTR -----      Date = 01/17/08
Operator ID = HUT        Sysplex = KEYAPLEX            Time = 09:56:23

Monitor      : IMS1OLDS1/MTR/KEYA
System       : KEYA
Description  : IMS1 OLDS Monitor

Monitored Object : OLDS
Monitored Jobname : IMS9A1C4
Inform list  : SDF

Commands...
  Activate    :
  Deactivate  :
  Monitoring  : INGRMIOL

Interval     : 00:15

Last termination : 18:38:26 on 01/16/08
Last start      : 18:46:14 on 01/16/08

Monitor Status : ACTIVE at 2008-01-17 09:51:23
Health Status  : WARNING
                Needed to start spare OLDS to have the minimum in
                AVAILABLE status
```

Detailed infos for Health state
WARNING

Scenario C :

Monitoring of VTAM ACB

Problem: IMS users are unable to LOGON to IMS (VTAM ACB has been closed)

Solution: Add definitions in the SA z/OS Policy database



- Monitor routine **INGRMIDC** is used
 - Define **MTR** resource to monitor
 - the status of the VTAM ACB
 - status message (DFS211I) for passive DC monitoring
- Define relationships between MTR resources and IMS Control region

IMS cmd ,**DISPLAY ACTIVE DC**'

... analyzes the status of the
VTAM ACB and the
LOGONS enablement

Meaning of Return Codes for
INGRMIDC

Return Code	Health Status	Description
1	BROKEN	Monitor encountered a severe error
2	FAILED	DISPLAY ACTIVE DC failed
3	NORMAL	VTAM ACB is OPEN and LOGONS enabled
4	WARNING	LOGONS are not enabled

Define MTR resource

a) **ACTIVE** monitoring in a defined time interval

b) **PASSIVE** monitoring via message
"DFS2111I VTAM ACB
CLOSED."

```

Monitor Resource
Command ==>
Entry Type : Monitor Resource
Entry Name : IMS2DC
Monitored Object : DC
Monitored Jobname : IMS9B1C4
Activate command :
Deactivate command :
Monitor command : INGRMIDC
Monitoring Interval : 00:30
    
```

MTR resource with "Monitored Object" = DC

Jobname of IMS control region

Monitor command = "INGRMIDC"
(→ DISPLAY ACTIVE DC)

```

Entry Type : Monitor Resource      PolicyDB Name :
Entry Name : IMS2DC               Enterprise Name :

Define message IDs and their automation actions.
CMD = Command  REP = Reply  CODE = CODE  USER = User
AUTO = AT Actions      OVR = AT Override

Action      Message ID      Description      Cmd
auto_      DFS2111I      VTAM ACB Closed
    
```

Select appropriated Status message for passive monitoring.

```

Message Type Selection
Command ==>
Entry Name : IMS2DC      Message ID : DFS2111I

Action      Status      Type/Status      Description
          _____
          SELECTED      WARNING      Resource shows degradation
          _____      MINOR      Same as WARNING but more s
    
```

VTAM ACB closed...

```
INGKYST0 SA z/OS - Command Dialogs
Domain ID = IPXFG ----- INGLIST -----
Operator ID = HUT Sysplex = KEYAPLEX Time = 01/25/08 09:39:22
CMD: A Update B Start C Stop D INGRMID E INGVOTE F INGINF
G Members H DISPMTR I INGSCHED J INGROUP M DISPMTR / scroll
CMD Name Type System Compound Desired Observed Na
-----
IMS1CTL APL KEYA DEGRADED AVAILABLE AVAILABLE
```

IMS control region has
Status
DEGRADED ...

```
INGKYM00 SA z/OS - Command Dialogs Line 1 of 5
Domain ID = IPXFG ----- DISPMTR ----- Date = 01/25/08
Operator ID = HUT Sysplex = KEYAPLEX Time = 09:38:56
CMD: A Reset B Start C Stop D Details E INGVOTE F INGINFO I INGS
CMD Monitor System Status Health Last monitored
-----
IMS1DC KEYA ACTIVE WARNING 2008-01-25 09:38:12
```

... results from Health status
WARNING from MTR
resource

```
INGKYM01 SA z/OS - Command Dialogs
Domain ID = IPXFG ----- DISPMTR -----
Operator ID = HUT Sysplex = KEYAPLEX
Monitor : IMS1DC/MTR/KEYA
System : KEYA
Description : IMS1 DC Monitor
Monitored Object : DC
Monitored Jobname : IMS9A1C4
Inform list : SDF
Commands...
Activate :
Deactivate :
Monitoring : INGRMIDC
Interval : 00:30
Last start : 09:31:28 on 01/25/08
Monitor Status : ACTIVE at 2008-01-25 09:38:12
Health Status : WARNING
DFS2111I 9:38:12 VTAM ACB CLOSED M9A1
History (maximum is 20) ...
2008-01-25 09:31:28 - ACTIVE HEALTH=NORMAL
VTAM ACB is OPEN and LOGONS enabled
```

Logon enabled again ...

```
INGKYM01      SA z/OS      Command Dialogs
Domain ID     = IPXFG      ----- DISPMTR -----
Operator ID   = HUT        Sysplex = KEYAPLEX

Monitor       : IMS1DC/MTR/KEYA
System        : KEYA
Description    : IMS1 DC Monitor

Monitored Object : DC
Monitored Jobname : IMS9A1C4
Inform list     : SDF

Commands...
  Activate      :
  Deactivate    :
  Monitoring     : INGRMIDC

Interval      : 00:30
Last start    : 09:31:28 on 01/25/08

Monitor Status : ACTIVE at 2008-01-25 09:41:46
Health Status  : NORMAL
                VTAM ACB is OPEN and LOGONS enabled

History (maximum is 20) ...
2008-01-25 09:31:28 - ACTIVE HEALTH=NORMAL
VTAM ACB is OPEN and LOGONS enabled
```

VTAM ACB is OPEN again – interval
important to reflect actual status

Scenario D :

Recovery of IMS transactions and programs

Problem: Automatic recovery of 'ABENDING' IMS transactions or programs

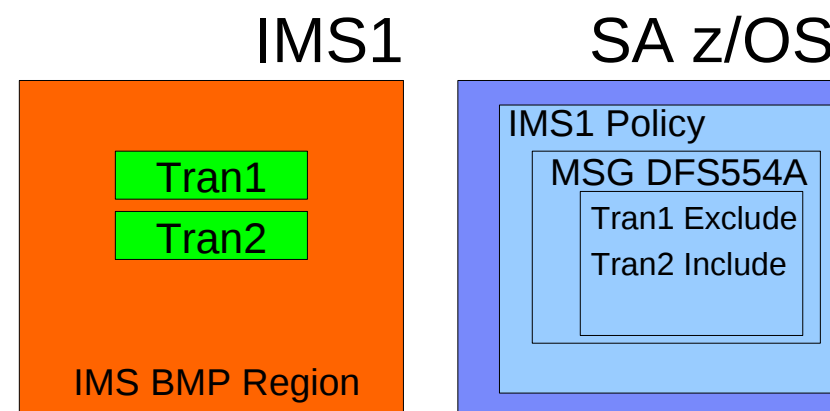
Solution: Add definitions in the SA z/OS Policy database

What has to be considered....

- a) Which transactions should be recovered?
- b) At which error threshold level should recovery be stopped?
- c) Which ABEND codes needs special handling?
- d) Which recovery procedure (command, routine, notifications to operators) should be done?

➤ Example:
Application program or transaction abends → IMS issues message DFS554A to the master terminal

➤ Issue recovery to restart the program or the transaction



Scenario D :

Recovery of IMS transactions and programs

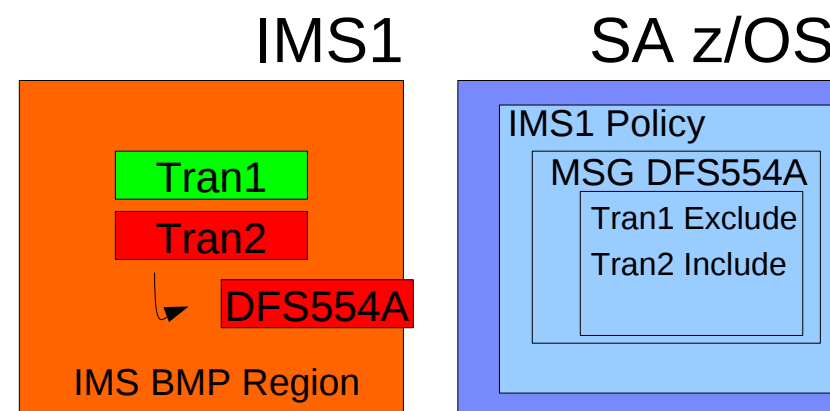
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- Example:
Application program or transaction abends → IMS issues message DFS554A to the master terminal
 - Issue recovery to restart the program or the transaction



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Recovery of IMS transactions and programs

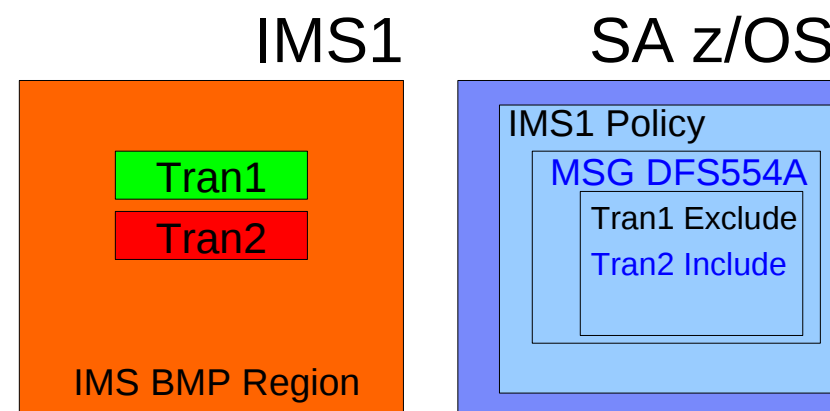
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What has to be considered....

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- b) At which error threshold level should recovery be stopped?
- c) Which ABEND codes needs special handling?
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- Example:
Application program or transaction abends → IMS issues message DFS554A to the master terminal
 - Issue recovery to restart the program or the transaction



Scenario D :

Recovery of IMS transactions and programs

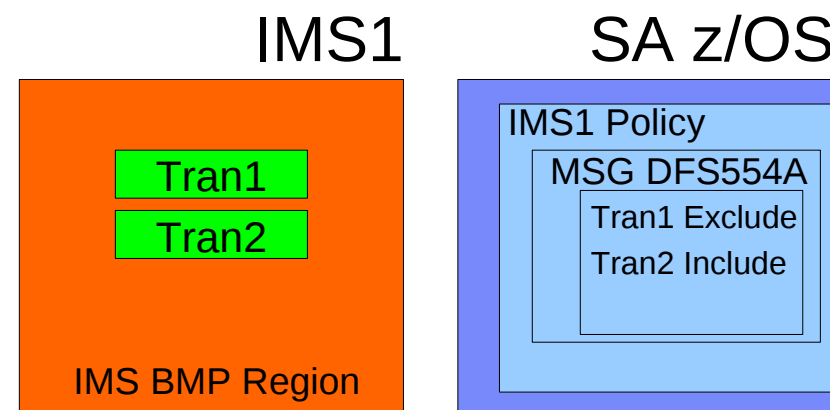
Problem: Automatic recovery of 'ABENDING' IMS transactions or programs

Solution: Add definitions in the SA z/OS Policy database

What has to be considered....

- a) Which transactions should be recovered?
- b) At which error threshold level should recovery be stopped?
- c) Which ABEND codes needs special handling?
- d) Which recovery procedure (command, routine, notifications to operators) should be done?

- Example:
Application program or transaction abends → IMS issues message DFS554A to the master terminal
 - Issue recovery to restart the program or the transaction



Customization Dialog Definitions

```

Entry Type : Application
Entry Name : IMSCTL

PolicyDB Name :
Enterprise Name :

Action      Policy Name      Policy Description
-----
DESCRIPTION Enter description
UPWARD CLASS Select a class to i
APPLICATION INFO Define application
AUTOMATION FLAGS Define application
TRIGGER      Select trigger
SERVICE PERIOD Select service perio
RELATIONSHIPS Define relationships
MESSAGES/USER DATA Define messages and
STARTUP       Define startup proced
SHUTDOWN      Define shutdown proc
THRESHOLDS
MINOR RESOURCE
MINOR RESOURCE
SYSTEM ASSOCI
-----
GENERATED RESO
MEMBER OF
-----
s_          IMS CONTROL
STATE ACTION
    
```

IMS subsystem ID must be defined under IMS control region specifications

```

Command ==> _____ IMS Control Region specifications

Entry Type : Application      PolicyDB Name : HUT_
Entry Name : IMSCTL           Enterprise Name : OMEG

Subsystem : IMSCTL
Subtype   : CTL               defined in policy APPLICATION INF

IMS subsystem ID . . . . . M941
DBCTL control region . . . . . (YES NO)
                               (YES NO)
    
```

```

AOFKINFO      SA z/OS - Command
Domain ID    = IPSFP      ----- DISPINFO
Operator ID  = HUT

Subsystem ==> _IMSCTL      System ==> K

WLM Resource Name : None
Command Prefix    : None
MVS sub-system ID : M941
    
```

Customization Dialog Definitions



a) Which transactions should be recovered?

Command ==> _____ Minor Resource Flags

Entry Type : Application PolicyDB Name
Entry Name : IMSCTL Enterprise Name
Major Name : IMSCTL

Action Minor Resource

_____	PROG.DFSIVP4
_____	PROG.DFSIVP5
<u>s</u> _____	PROG.EVIRYPPI
_____	TRAN.IVTFD
_____	TRAN.IVTFM

Enter level of automation desired.
Automation Flags: Y = Yes N = No L

Actions	Flag	Auto	Exits
_____	Automation	_____	0
_____	Recovery	<u>YES</u>	0
_____	Start	_____	0

Specify Transactions and/or Programs to be recovered
→ Recovery Automation flag

b) At which error threshold level should recovery be stopped?

Command ==> _____ Minor Resource Thresholds

Entry Type : Application PolicyDB Name
Entry Name : IMSCTL Enterprise Name
Major Name : IMSCTL

Action Minor Resource

_____	DFS3257I
_____	PROG.DFSIVP34
_____	PROG.DFSIVP35
<u>s</u> _____	PROG.EVIRYPPI
_____	TRAN.IVTGB
_____	TRAN.IVTGX

Recovery stopped dependent on THRESHOLDS settings

Command ==> _____ Thresholds Definition

Entry Type : Application PolicyDB Name
Entry Name : IMSCTL Enterprise Name
Resource : IMSCTL.PROG.EVIRYPPI

Critical Number 3 (1 to 50)
Critical Interval 02:00 (hh:mm or hhmm, 00)

Reminder:
If NO thresholds defined → RECOVERY forever!!



Customization Dialog Definitions

c) Which ABEND codes needs special handling?

```
Message Processing Line 00000001 Col 0
Command ==> Scroll ==
Entry Type : Application Name : HUT_OMEGAMON_V320
Entry Name : IMSCTL Base Name : OMEGAMON_SA_V320
Line Commands: S (Cmd), I (Ins), D (Delete), U (Usr), A (Aut), O (
Message ID field length : 14 (1 - 32)

Cmd Message id Description Cmd Rep Cod
cod ABCODEPROG BMP Region Abends *only program-driven* 4
ABCODES*HI Specifications for ABCODES ** SA 3 2 ** 6
```

Special Messages
"ABCODEPROG"
and "ABCODETRAN"

Filter criteria for ABEND codes:

- Recovery done for all ABEND codes except U0452 and U0456
-

Entry Name : IMSCTL Message ID : AB

Enter the value to be passed to the calling program when this resource issues the selected message and the following codes are contained in the message.

Code 1	Code 2	Code 3	Value Returned
*	U0452	*	EXCLUDE
*	U0456	*	EXCLUDE
*	*	*	INCLUDE



Customization Dialog Definitions

d) Which recovery procedure (command, routine, notifications to operators) ?

```
Entry Type : Application          PolicyDB Name   : HUT_OMEGAMON
Entry Name  : IMSCTL             Enterprise Name : OMEGAMON_SA

Line Commands: S (Cmd), C (Cmd), R (Rep), K (Cod), U (Usr), A (A)
               I, D (insert or delete lines)
Message ID field length. . 14    (1 - 32)

Cmd Message id      Description                                Cmd
cmd DFS554A         Specifications for DFS554A                  3
```

```
Entry Name : IMSCTL             Message ID : DFS554A

Enter commands to be executed when resource issues the selected message
or define this message as status message

Status . . .

Pass/Selection Automated Function/'*'
Command Text
PROG
MVS &SUBSSUBIDSTA PGM &EHKVAR2

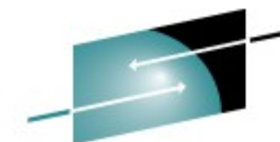
TRAN
MVS &SUBSSUBIDSTA TRAN &EHKVAR1

MSG BINZ,IMS ABEND JOB-ID: &EHKVAR3 | REGION-ID: &EHKVAR4 | USER ABEND-CODE: &
EHKVAR5 SYSTEM ABEND-CODE: &EHKVAR6 | TRANSACTION: &EHKVAR1 | PROGRAM: &EHKVAR2
```

Commands to be issued for
Program recovery

...send msgs to operator

DFS554A msg -> SA z/OS actions



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IMS subsystem ID followed by IMS master terminal command

Program name

Transaction id

```
M941STO REG 2 ABNDUMP M941
DFS4445I CMD FROM MCS/E-MCS CONSOLE USERID=HUT: STO REG 2 ABDUMP M941
DFS058I 10:10:59 STOP COMMAND IN PROGRESS M941
DFS554A IMS941PP 00002 IMS941PP EVIRYPPI(2) EVITPPI1 000,0474 PSB SMB
        2008/023 10:10:59 M941
DFS552I BATCH REGION IMS941PP STOPPED ID=00002 TIME=1010 M941
AOF502I 10:10 : RECOVERY FOR PROG IMSCTL.PROG.EVIRYPPI CONTINUING 308
- 01 ERRORS SINCE 10:10 ON 01/23/2008 - FREQUENT ERROR THRESHOLD
EXCEEDED
```

...now SA z/OS compares contents of DFS554A msg with recovery definitions in PDB

...Transaction restarted due to PDB definitions

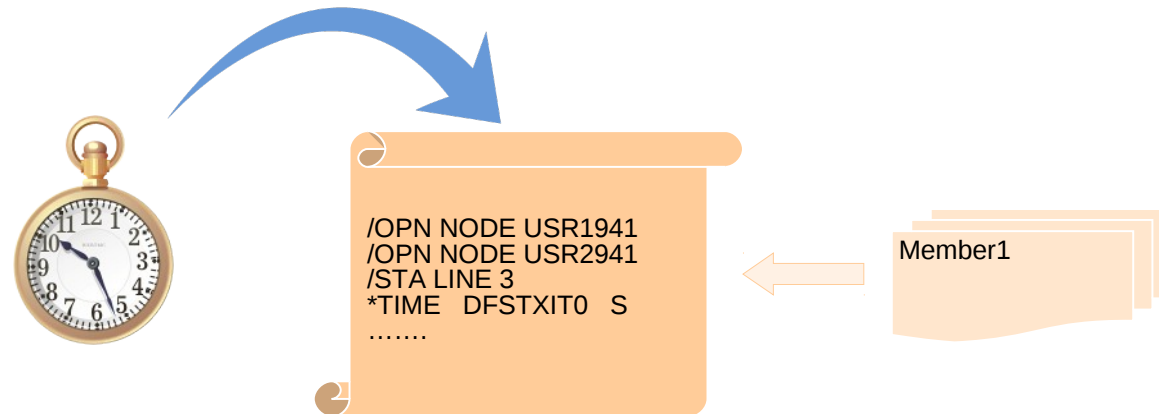
```
END OF SYMPTOM DUMP
AOF502I 10:11 : RECOVERY FOR TR IMSCTL.TRAN.EVITPPI1 CONTINUING 315
- 01 ERRORS SINCE 10:11 ON 01/23/2008 - FREQUENT ERROR THRESHOLD
EXCEEDED
$HASP395 IMS941PP ENDED
IEA989I SLIP TRAP ID=X53E MATCHED. JOBNAME=*UNAVAIL, ASID=01E3.
M941STA TRAN EVITPPI1
DFS4445I CMD FROM MCS/E-MCS CONSOLE USERID=AWRK08Y4: STA TRAN EVITPPI1
M941
DFS058I 10:11:00 START COMMAND COMPLETED M941
AOF570I 10:11 : ISSUED "MVS M941STA TRAN EVITPPI1" FOR SUBSYSTEM 323
IMSCTL - MSGTYPE IS DFS554A
AOF570I 10:11 : ISSUED "MSG BINZ ,IMS ABEND JOB-ID: IMS941PP | 324
REGION-ID: 00002 | USER ABEND-CODE: 0474 SYSTEM ABEND-CODE: 000 |
TRANSACTION: EVITPPI1 | PROGRAM: EVIRYPPI" FOR SUBSYSTEM IMSCTL -
MSGTYPE IS DFS554A
S IMS941PP
```

Scenario E :

Time Controlled Operations (TCO)

Problem: Several IMS commands should be issued based on scheduled timer intervals

Solution: Add definitions in the SA z/OS Policy database



- Commands issued under logical terminal DFSTCF
- Several different members could be defined and loaded

Customization Dialogs Definitions

```
Message Processing                               Line 00000079 Col 001 0
Command ==>                                     Scroll ==> CS
Entry Type : Application                        PolicyDB Name   : HUT_OMEGAMON_V320
Entry Name  : IMSCTL                           Enterprise Name : OMEGAMON_SA_V320
Line Commands: S (Cmd), C (Cmd), R (Rep), K (Cod), U (Usr), A (Aut), O (Ovr)
I, D (insert or delete lines)
Message ID field length. . 14 (1 - 32)

Cmd Message id Description                               Cmd Rep Cod Usr
rep TCO TCO Load command                               1 1 1
TCOMEMBERS IMS TCO members in TCFSLIB                    5
```

Reserved message ids "TCO" and "TCOMEMBERS"

```
Entry Name : IMSCTL                               Message ID : TCO
Enter replies to be issued when this resource issue
or define this message as status message.
Status . . .                                     ('?' for selection list)

Pass/      Retry Reply Text
Selection Count
SPEC      DFSTCF LOAD &EHKVAR1 .
```

Specify that the logical terminal
DFSTCF is used

Under "USR" the dataset containing the TCO
members is defined

```
Entry Name : IMSCTL                               Message ID : TCO
To change keyword-data pair, specify the following:

Keyword
Data
DSN
SYS1.IMS.M941.TCFSLIB
```

Customization Dialogs Definitions

Definitions of the member names
under message
"TCOMEMBERS"

```
Entry Type : Application      PolicyDB Name   : HUT_OMEGAMON_V320
Entry Name  : IMSCTL          Enterprise Name  : OMEGAMON_SA_V320

Line Commands: S (Cmd), C (Cmd), R (Rep), K (Cod), U (Usr), A (Aut), O (Ovr)
               I, D (insert or delete lines)
Message ID field length. . 14   (1 - 32)

Cmd Message id      Description                                Cmd Rep Cod Usr
usr TCOMEMBERS      IMS TCO members in TCFSLIB                5
```

```
Entry Name : IMSCTL          Message ID : TCOMEMBERS

To change keyword-data pair, specify the following:

Keyword
Data
NAME
(BITEST1,'D MESSAGE QUEUE *QBUF* / USER AL')

NAME
(BITEST2,'DISPLAY MESSAGE QUEUE *QBUF*')

NAME
(BITEST3,'D MESSAGE QUEUE *QBUF* PLUS ACTI')

NAME
(DFSTCF,'DEFAULT MEMBER *DFSTCF* IN TCFSL')

NAME
(DISPROG,'DISPLAY PROG ALL AND LTERM DFS*')

NAME
(SVDFSTCF,'OLD DFSTCF WITH STA DC & STA REG')
```

Member name and
descriptive text for it

TCO handling with IMS command interface

```
SA z/OS - Command Dialogs
Domain ID   = IPSFP      ----- IMS -----      Date = 01/29/08
Operator ID = HUT        System = KEY4              Time = 13:02:14

Resource    =>  IMSCTL/APL/KEY4      Format: name/type/system
System      =>                      System name, domain ID or sysplex name

Action =>  9_  1. Inquire           Display an IMS control reg.
            2. Start              Start an IMS subsystem
            3. Shutdown           Shutdown an IMS subsystem
            4. Triggers           Display trigger conditions
            5. Service Periods    Perform scheduling functions
            6. Master Terminal    Perform Master Terminal Commands
            7. Critical messages  Display critical messages
            8. Broadcast          Send message to users
            9. TCO Management     Load/Start/Stop TCO
```

TCO handling with IMS command interface

Load TCO member

Start / Stop the logical terminal

```
SVIKY SA z/OS - Command Dialogs Line 1
Domain = IPSFP ----- IMS TCO Status ----- Date = 01/
Operat ID = HUT Time = 13:
Control Reg. = IMSCTL/APL/KEY4
CMD: A Load B Start C Stop

CMD Name Type Status Description
-----
C DFSTCF LTERM STOP
BITEST1 MEMBER D MESSAGE QUEUE *QBUF* / USER AL
BITEST2 MEMBER DISPLAY MESSAGE QUEUE *QBUF*
BITEST3 MEMBER D MESSAGE QUEUE *QBUF* PLUS ACTI
DFSTCF MEMBER DEFAULT MEMBER *DFSTCF* IN TCFSL
DISPROG MEMBER DISPLAY PROG ALL AND LTERM DFS*
SVDFSTCF MEMBER OLD DFSTCF WITH STA DC & STA REG
```

Status changed
to STOP

SAMPLE contents of TCO member
containing IMS commands

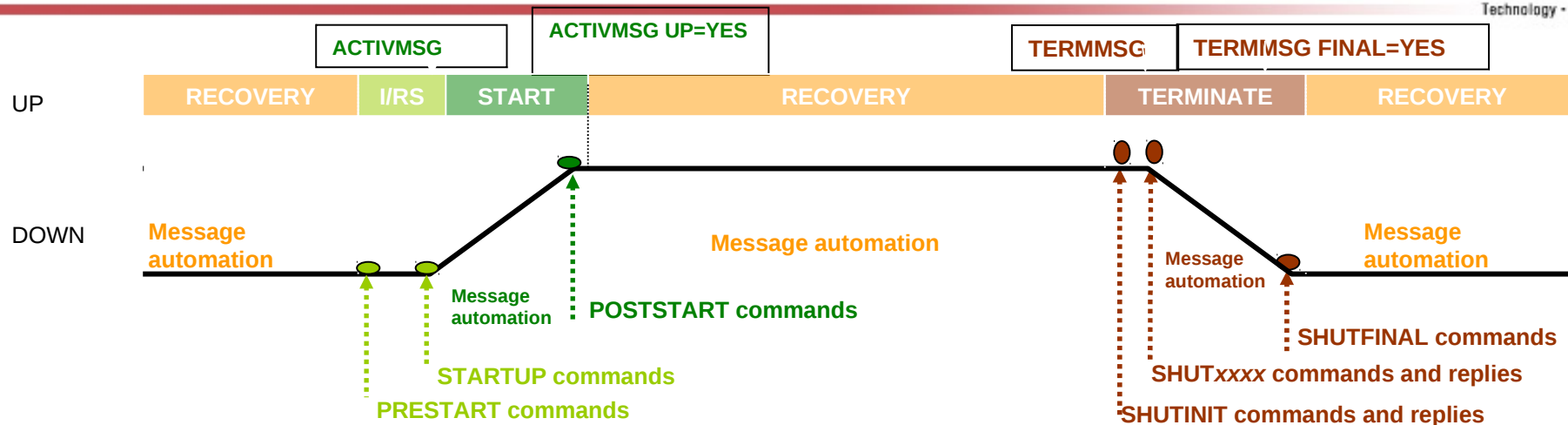
```
BROWSE SYS1.IMS.M941.TCFSLIB(DFSTCF) - 01.01 Line
Command ==>
***** Top of Data *****
/OPN NODE USR1941
/OPN NODE USR2941
/STA LINE 3
*TIME DFSTXIT0 S ****
***** Bottom of Data *****
```



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- *IMS Best practices

Automation Flags During Lifecycle of a Resource



- InitStart flag (I): Checked after IPL only, when application has a true DOWN status.
- Restart flag (RS): Tested in all other DOWN states.
- Start flag (S): Checked for automation after STARTUP command issued and for POSTSTART commands.
- Terminate flag (T): Controls all shutdown commands and automation during shutdown.
- Recovery flag (R): Controls automation when application is UP or DOWN.
- Automation flag (A): Global automation flag for the resource. **If NO, all flags are NO.**

Notices:

Special 'feature' code replaced by generic routines

ACTIVMSG / TERMMSG

→ **NO** differences to any other application

Start IMS address spaces

- Start types

- COLD → restart command in response to DFS810A
- AUTO → use restart dataset to determine startup type
- NORM → DEFAULT start type
- WARMSDBL → restart command in response to DFS810A (load Main Storage Data Base MSDB)
- BUILDQ → restart command in response to DFS810A (queues are build new)
- MANUAL → reply to DFS810A with values from INGREQ panel

```
Entry Name : IMS1CTL      Message ID : DFS810A
Enter replies to be issued when this resource issues the
or define this message as status message.
Status . . . _____ ('?' for selection list)
Pass/      Retry  Reply Text
Selection  Count
COLD _____ /NRE CHKPT 0 FORMAT ALL
MANUAL _____ &APPLPARMS
NORM _____ /NRE
WARMSDBL _____ /NRE MSDBLOAD
```

- Can reply to outstanding WTOR's
- Policy based startup

REPLY with values entered on INGREQ panel
→ under "Appl Parms"

Starting of IMS control region

```
AOFKINFO          SA z/OS - Command Dialogs          Line 72 of
Domain ID   = IPSFP          ----- DISPINFO -----   Date = 01/24/0
Operator ID = HUT              Time = 14:46:2

Subsystem ==> IMS1CTL      System ==> KEY4      System name, domain ID
                                         or sysplex name

Start Up Process -
  Prestart :
    None

  Startup :

    User Start Up Commands :
      CMD=(AUTO,, 'MVS S &SUBSJOB,PARM1=' 'AUTO=Y' '')
      CMD=(COLD,, 'MVS S &SUBSJOB,PARM1=' 'AUTO=N' '')
      CMD=(NORM,, 'MVS S &SUBSJOB,PARM1=' 'AUTO=Y' '')
      CMD=(WARMSDBL,, 'MVS S &SUBSJOB,PARM1=' 'AUTO=N' '')
      CMD=(MANUAL,, 'MVS S &SUBSJOB,PARM1=' 'AUTO=N' '')

  Poststart :
    CMD=(,, 'MVS &SUBSSUBIDCQSET SHUTDOWN SHAREDQ ON STRUCTURE ALL')
    CMD=(,, 'MVS &SUBSSUBIDSTA DC')
    CMD=(,, 'MVS &SUBSSUBIDCHE')
```

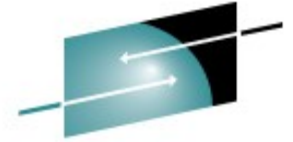
Variable **&SUBSSUBID** contains subsystem ID of IMS control region

Defined **REPLYs** in PDB for message DFS810A

```
AOFKINFO          SA z/OS - Command Dialogs          System or sys
Domain ID   = IPSFP          ----- DISPINFO -----
Operator ID = HUT

Subsystem ==> IMS1CTL      System ==> KEY4

DFS810A :
  REPLY=(COLD,, '/NRE CHKPT 0 FORMAT ALL')
  REPLY=(MANUAL,, '&APPLPARMS')
  REPLY=(NORM,, '/NRE')
  REPLY=(WARMSDBL,, '/NRE MSDBLOAD')
```



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Stop IMS Address spaces

■ Supported stop types

■ NORM

- Issue checkpoint, orderly shutdown. Cancellation of message regions and control region after predetermined time delay.

■ IMMED

- Issue checkpoint. Immediate cancellation of message regions. Cancellation control region after predetermined time delay.

■ FORCE

- Immediate flushing of all regions

Stopping of IMS control region

```
AOFKINFO                      SA z/OS  - Command Dialogs
Domain ID   = IPSFP           ----- DISPINFO -----
Operator ID = HUT

Subsystem ==>  IMS1CTL        System ==>  KEY4          System r
                                         or syspl

Shutdown Initialization :
None

Normal Shutdown :
CMD=(PASS1,, 'MVS &SUBSSUBIDCHE DUMPQ NOCQSSHUT')
CMD=(PASS2,, 'MVS &SUBSSUBIDCHE DUMPQ NOCQSSHUT')
CMD=(PASS3,, 'MVS &SUBSSUBIDCHE DUMPQ NOCQSSHUT')

Immediate Shutdown :
CMD=(PASS1,, 'MVS &SUBSSUBIDCHE FREEZE NOCQSSHUT')
CMD=(PASS2,, 'MVS &SUBSSUBIDCHE FREEZE NOCQSSHUT')
CMD=(PASS3,, 'MVS &SUBSSUBIDCHE FREEZE NOCQSSHUT')

Force Shutdown :
CMD=(PASS1,, 'MVS F &SUBSJOB,STOP')

Shutfinal :
None
```

Several retries, because IMS not always accept cmd at the first try!



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INGIMS Operator Command



- Allows operators or automation tasks to issue IMS console commands
 - Any console-enabled IMS type-1 command
 - Any IMS type-2 command if an IMSplex name is provided (V3.3 only)
 - Send commands to one / more / all members of an IMSplex (V3.3 only)
 - Auditing of IMS commands (V3.3 only)
- Multiple commands can be issued with a single invocation
- To broadcast messages to all or selected IMS users
- To issue a list of pre-defined transactions and view the output
- Usage: As fullscreen operator dialog or programmable API

INGIMS in SA z/OS V3.3



- Implementation

- Specification of IMSplex name in policy
- Uses Common Service Layer (CSL) of IMSplex
- Provides new request types for plex-wide requests
 - Uses Operations Manager (OM) API to issue commands if IMSplex name is given, else uses the console interface
 - Consolidates responses of multiple IMSplex members
 - Generates tabular output in the same format for type-1 and type-2 commands, no matter whether the OM API was used or not
 - Displays responses in scrollable window when invoked in fullscreen mode

```
COMMANDS  HELP
-----
IMS Control Region specifications      Line 00000001
Command ==> _____ Scroll ==> PAGE
Entry Type : Application              PolicyDB Name : X
Entry Name : IMS1CTL                 Enterprise Name : X

Subsystem : IMS1CTL
Subtype   : CTL      defined in policy APPLICATION INFO

Subsystem ID . . . . . IMS1
IMSplex name . . . . . IMSA
```

- Benefits

- No SYSLOG flooding
- Slight performance improvements compared to previous SA z/OS releases

IMS Dependent Region

```

EVIK0000      SA z/OS - Command Dialogs
Domain ID    = IPSFP      ----- IMS -----      Date = 01/25/08
Operator ID  = HUT        System = KEY4              Time = 15:13:36

Resource    =>  IMS1CTL/APL/KEY4      Format: name/type/system
System      =>                      System name, domain ID or sysplex name

Action =>  10  1. Inquire           Display an IMS control reg.
              2. Start             Start an IMS subsystem
              3. Shutdown          Shutdown an IMS subsystem
              4. Triggers           Display trigger conditions
              5. Service Periods    Perform scheduling functions
              6. Master Terminal    Perform Master Terminal Commands
              7. Critical messages  Display critical messages
              8. Broadcast          Send message to users
              9. TCO Management     Load/Start/Stop TCO
             10. Dependent Regions  Manage Dependent Regions
             99. Local functions    Provide access to user defined local
                                   functions
  
```

```

EVIKYDP0      SA z/OS - Command Dialogs      Line 1 of 4
Domain ID    = IPSFP      ---- Dependent Regions ----      Date = 01/25/08
Operator ID  = HUT        Time = 15:16:27
Control Reg.= IMS1CTL/APL/KEY4
CMD: A Update      B Start      C Stop      D INGRELS      E INGVOTE      F INGINFO
      H DISPTRG     I INGSCHED   N /ASSIGN   P /PSTOP      / scroll
CMD Name          Type System Reg.Id Type Trans/Step Program  IMS Status
-----
-  IMS1DBRC        APL  KEY4          DBRC
-  IMS1DLS         APL  KEY4          DLS
-  IMS1FP          APL  KEY4      1    FPME NO MSG.  DFSIVP4
-  IMS1MP          APL  KEY4      2    TP              WAITING
  
```


IMS Dependent Region

```

EVIKYDP0          SA z/OS - Command Dialogs          Line 1
Domain ID   = IPSFP          --- Dependent Regions ---   Date =
Operator ID = HUT                               Time =
Control Reg.= IMS1CTL/APL/KEY4
CMD: A Update      B Start      C Stop      D INGRELS      E INGVOTE
      H DISPTRG      I INGSCHED      N /ASSIGN      P /PSTOP
CMD Name      Type System  IMS Classes      Compound
-----
--  IMS1DBRC      APL  KEY4                      SATISFACTORY
--  IMS1DLS      APL  KEY4                      SATISFACTORY
--  IMS1FP       APL  KEY4                      SATISFACTORY
--  IMS1MP       APL  KEY4                      SATISFACTORY
  
```

IMS dependent region number

```

EVIKYDP0          SA z/OS - Command Dialogs          Line 1 of 4
Domain ID   = IPSFP          --- Dependent Regions ---   Date = 01/25/08
Operator ID = HUT                               Time = 15:18:05
Control Reg.= IMS1CTL/APL/KEY4
CMD: A Update      B Start      C Stop      D INGRELS      E INGVOTE      F INGINFO
      H DISPTRG      I INGSCHED      N /ASSIGN      P /PSTOP
CMD Name      Type System  Reg.Id  Type  Trans/Step  Program  IMS Status
-----
--  IMS1DBRC      APL  KEY4                      DBRC
--  IMS1DLS      APL  KEY4                      DLS
--  IMS1FP       APL  KEY4                      1      FPME      NO MSG.      DFSIVP4
--  IMS1MP       APL  KEY4                      2      TP
  
```

IMS region id number of the region

Type of IMS resource

transaction or step running on the appropriate region type

name of the program running in the region.

IMS status of the region e.g. SCHEDULED, AVAILABLE, TERMINATING, WAIT_SPOOLSPACE,



IMS Dependent Region

➤ “/ASSIGN”

- assign additional classes to the region

```
EVIKYCMD                      SA z/OS  - Command Dialogs
Domain ID   = IPSFP           ----- INGIMS -----
Operator ID = HUT

Resource    => IMS1CTL/APL/KEY4
System      =>
Request     => CMD             System name, domain
IMS Command => ASSIGN CLASS 1 REGION 2
IMS Route   =>
IMS Message =>
```

➤ “/PSTOP”

- Stop a transaction

```
EVIKYCMD                      SA z/OS  - Command Dialogs
Domain ID   = IPXFG           ----- INGIMS -----
Operator ID = HUT

Resource    => IMS1CTL/APL/KEYA
System      =>
Request     => CMD             System name, domain
IMS Command => PSTOP REGION 2 TRANSACTION TRANS32
IMS Route   =>
IMS Message =>
```

IMSINFO: Display Information

→ Define your own commands which should be executed under **DISPINFO**

```
Entry Type : Application      PolicyDB Name  : HUT_OMEGAMON_V320
Entry Name  : C_IMS_CONTROL   Enterprise Name: OMEGAMON_SA_V320

Line Commands: S (Cmd), C (Cmd), R (Rep), K (Cod), U (Usr), A (Aut), O (Ovr)
               I, D (insert or delete lines)
Message ID field length. . 14 (1 - 32)

Cmd Message id Description Cmd Rep Cod Usr
u_  IMSINFO Get IMS Information for DISPINFO cmd 1
```

Define for reserved msg
IMSINFO cmds

```
Command ==> User Defined Data

Entry Name : C_IMS_CONTROL      Message ID : IMSINFO

To change keyword-data pair, specify the following:

Keyword
Data
IMSCMD
('ACTIVE STATE DC','DIS A DC')
```

```
AOFKINFO      SA z/OS - Command Dialogs
Domain ID     = IPSFP          ----- DISPINFO -----
Operator ID   = HUT

Subsystem ==> _IMSCTL      System ==> KEY4      System
                                           or sysp
```

```
IMSINFO :
IMSCMD=('ACTIVE STATE DC','DIS A DC')

Command ==>
PF1=Help    PF2=End    PF3=Return    PF4=INGINFO
PF7=Back    PF8=Forward PF9=Refresh   PF10=IMS Info
```

Available under **DISPINFO** →
PF10



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- ✓ Exploit SA z/OS base code
- ✓ Support FDR (Fast Database Recovery)
- ✓ Monitor capabilities
 - ✓ DC
 - ✓ OLDS
 - ✓ OLDS switch
 - ✓ RECON
- ✓ Diagrams in PDF format available
→ /usr/lpp/ing/doc/policies



References



- **Related SA z/OS V3.3 Documentation**
 - [Defining Automation Policy \(SC34-2572\)](#)
 - [Product Automation Programmer's Reference and Operator Guide \(SC34-2569\)](#)
 - Customizing and Programming (SC34-2570)
 - User's Guide (SC34-2573)
 - Programmer's Reference (SC34-2576)



End of Presentation



Questions

Thank you very much for your attention

Visit our home page at

IBM Tivoli System Automation for z/OS:

<http://www-01.ibm.com/software/tivoli/products/system-automation-zos/index.html>

<http://www-03.ibm.com/servers/eserver/zseries/software/sa/>

IBM Tivoli System Automation for Multiplatforms:

<http://www-01.ibm.com/software/tivoli/products/sys-auto-multi/>

IBM Tivoli System Automation Application Manager:

<http://www-01.ibm.com/software/tivoli/products/sys-auto-app-mgr/>

IBM Tivoli System Automation for Integrated Operations Management:

http://www-01.ibm.com/software/tivoli/products/sys-auto-iom/features.html?S_CMP=wspace

User forums

<http://groups.yahoo.com/group/SAUSERS/>

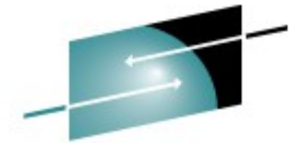
*The purpose of this group is to discuss technical issues related to **IBM Tivoli System Automation for z/OS** with your peers.*

<http://groups.yahoo.com/group/SA4DIST/>

*The purpose of this group is to discuss technical issues related to **IBM Tivoli System Automation** with your peers.*

This group is for distributed platforms like Linux and others, but not z/OS.

Thank You ...



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धन्यवाद

Hind Hindi

多謝

Traditional Chinese

ขอบคุณ

Thai

Спасибо

Russian

Gracias

Spanish

شكراً

Arabic

Thank You

English

Obrigado

Brazilian Portuguese

Grazie

Italian

多谢

Simplified Chinese

Danke

German

Merci

French

நன்றி

Tam i Tamil

ありがとうございました

Japanese

감사합니다

Korean