Automating your IMSplex with System Automation for z/OS

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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

• Future Plans

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SA z/OS Product Components

SA z/OS V3.4
✓NetView V5.3
✓z/OS V1.11

✓ Automate applications
✓ Automate repetitive and complex tasks
✓ Monitor applications, messages, and alerts

System (Applications)

IBM Tivoli System Automation

✓ Change Switch configuration on the fly
✓ Management of ESCON and FICON directors

✓ Automate and control hardware operations
✓ Power on/off and reset processors

Processor (Boxes)

I/O (Switches)

✓ Perform system IPL for z/OS, Linux, and VM
✓ Automate LPAR settings, e.g. weights and capping

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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**

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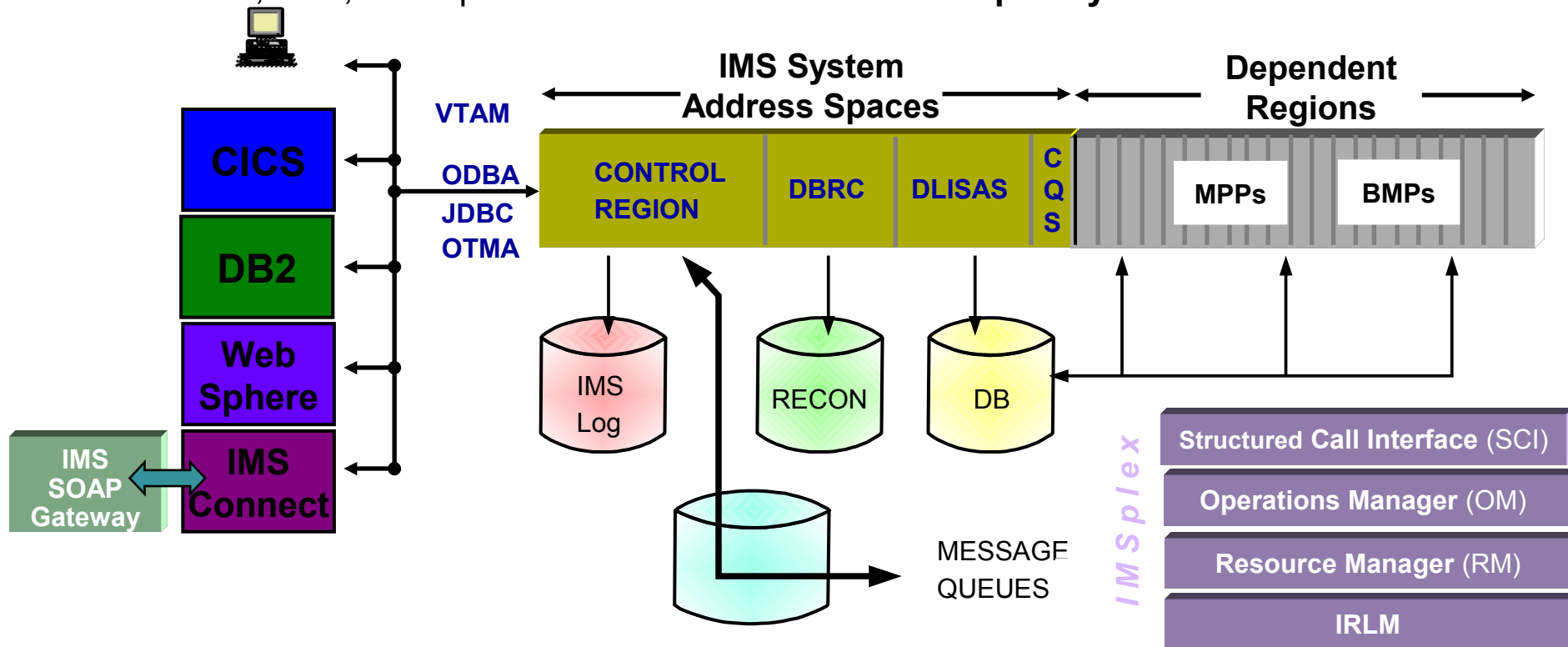
SA z/OS - IMS Automation main topics

- 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 escalation to **TEP** and **OMNIBUS**

- 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*…

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  - IMS commands based on scheduled timer intervals

- Start / Stop details for IMS applications

- Special IMS management

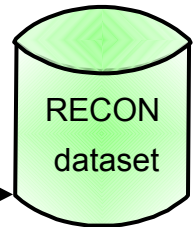- *IMS Best practices

- Future Plans

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'

RECON dataset

- 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 occured
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

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Customization Dialogs Definitions

MTR resource with **"Monitored Object" = RECON**

Monitor command = **"INGRMIRE"**

Relationships :
MTR → IMS_control APG
Rely on all required functions

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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 INGREL      E I
     G Members     H DISPTRG     I INGSCHED    J INGGROUP    M D
CMD Name           Type System   Compound      Desired         Line  1
--- ------------   ---- ------   ----------    ----------      Date = 01/
 _   IMSCTL        APL  KEY4     DEGRADED      AVAILABLE       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

```
INGKYMO1                    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:
 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

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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 started!

OLDS1   OLDS2   OLDS3
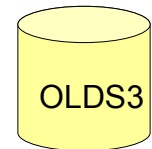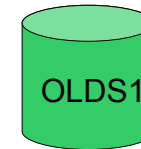
spare OLDS

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 occured: 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

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Define 'OLDS' MTR resource

→ monitoring of the online log data sets of IMS control regions and execution of recovery actions if needed

```
                        Monitor  Resource  Information
Command ===> _

Entry Type : Monitor Resource          PolicyDB Name  .
Entry Name : IMS1OLDS1                  Enterpris    e . KE

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


Deactivate command . . . .


Monitor command.
INGRMIOL

Monitoring Interval. . . .  00:15      d ===> _
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

Msg **DFS3258A** indicates problem → select health status = CRITICAL

```
                                        Name : IMS1OLDS1             3256I

                 Status      Type/Sta   scription
                           NORMAL      esource shows good results
Entry Type  : Monitor Re   WARNING     esource shows degradation
Entry Name  : IMS1OLDS1    MINOR       Same as WARNING, but more seve
                           CRITICA     Same as MINOR, but more severe
Define message IDs and     FATAL       Same as CRITICAL, but more sev
CMD  = Command  REP  = F    UNKNOWN     Healthstate is not available
UTO = AT Actions            INACTI     Monitor is not running
                            FAILED      Monitor failed
Actic        Message ID     SELECTED   Check      Healthstate must be evaluated
             Description
             DFS3256I                                              *
             Evaluate Healthstate
             DFS3257I                                              *
             Evaluate Healthstate
             DFS3258A                                              *
             Last OLDS in use
             DFS3260I                                              *
             Evaluate Healthstate
```

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Define OLDS monitoring

```
                        Message Processing          Line 00000042 Col 001 0
Command ===>  _____  Scroll ===> CS

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.

```
                                           User Defined Data
Command ===>  _

Entry Name : IMS1CTL              Message ID : OLDS

To change keyword-data pair, specify the following:

Keyword
Data
MINIMUM
03


SPARES
(04,05,99)


BACKOUT
1
```
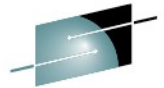
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Define 'IMS OLDS Switch Frequency'

- MTR resource

```
                        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

Notices:

Don't forget to define thresholds levels

for minor resource DFS3257I for IMS control region

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

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

Entry Name : IMS1CTL               Message ID : DFS3257I

Enter commands to be ex  ted when resource issues the selected message
or define this mess      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
LDS 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
TCHING FREQUENCY REACHED)

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

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Spare OLDS required

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

```
INGKYST0                    SA z/OS   - Command Dialogs        1       of 1
Domain ID    = IPXFG        -------- INGLIST  -------        = 01/17/08
Operator ID = HUT                    Sysplex = KEYAPLEX             = 09:54:58
CMD: A Update    B Start       C Stop      D INGRE      E IN        F INGINFO
     G Members   H DISPTRG    I INGSCHED  J IN  ROUP   M DIS       / scroll
CMD Name           Type System       Compound         Desired    erved    Nature
--- ---------      ---- ------        --------         -------    ------   ------
 _   IMS1CTL        APL  KEYA          DEGRADED         AVAILABLE   LABLE
```

```
INGKYST0                    SA z/OS   - Command Dialogs    Line  1     of 1
Domain ID    = IPXFG        -------- INGLIST  --------    Date = 01/17/08
Operator ID = HUT                    Sysplex = KEYAPLEX   Time = 09:55:43
CMD: A Update     B Start       C Stop      D INGRELS   E  NGVOTE    F INGINFO
     G Members    H DISPTRG    I INGSCHED  J INGGROUP   M  ISPMTR   / 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 (contd.)

```
INGKYMO0                            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
--- -----------       --------    ----------        -----------

    IMS1DC            KEYA        ACTIVE            NORMAL
 d  IMS1OLDS1         KEYA        ACTIVE            WARNING
    IMS1OLDS2         KEYA        ACTIVE            NORMAL
```

> Look under DISPMTR →
> details for more
> information

```
NGKYMO1                             SA z/OS  - Command Dialogs      Line  1    of
Domain ID    = IPXFG      --------- DISPMTR  ----------             Date = 01/17/0
Operator ID  = HUT                   Sysplex = KEYAPLEX             Time = 09:56:2

    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**

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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 (DFS2111I) 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

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Define MTR resource

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

MTR resource with **"Monitored Object" = DC**

Jobname of IMS control region

Monitor command = **"INGRMIDC"**
($\rightarrow$ DISPLAY ACTIVE DC)

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

Select appropriated Status **message** for passive monitoring.

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VTAM ACB closed…

IMS control region has Status DEGRADED …

… results from Health status WARNING from MTR resource

Logon enabled again …

Screen content:

```
INGKYMO1                          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
```

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

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Scenario D :

Recovery of IMS transactions and programs

Problem: Automatic <u>recovery</u> 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?

IMS1   SA z/OS

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

   ➢ Issue recovery to restart the program or the transaction

IMS BMP Region
Tran1
Tran2

IMS1 Policy
MSG DFS554A
Tran1 Exclude
Tran2 Include

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IMS1

Tran1
Tran2
DFS554A

IMS BMP Region

SA z/OS

IMS1 Policy
MSG DFS554A
Tran1 Exclude
Tran2 Include

Scenario D :

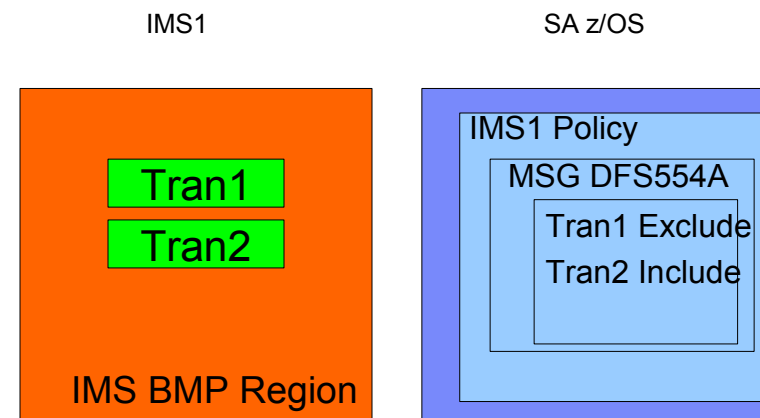## Recovery of IMS transactions and programs

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IMS1

```
Tran1
Tran2
```
IMS BMP Region

SA z/OS

```
IMS1 Policy
  MSG DFS554A
    Tran1 Exclude
    Tran2 Include
```

Scenario D :

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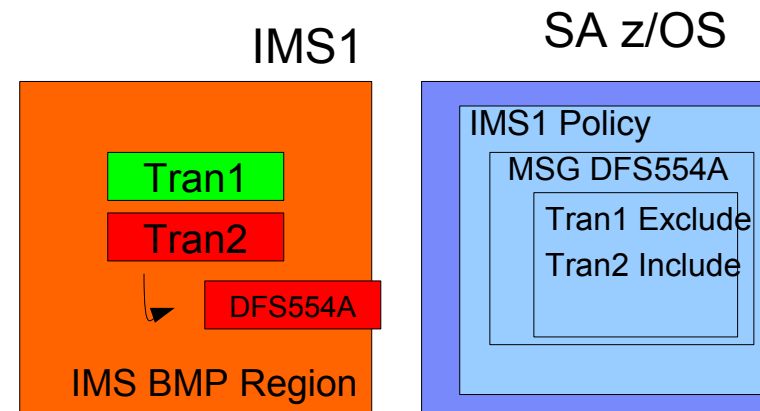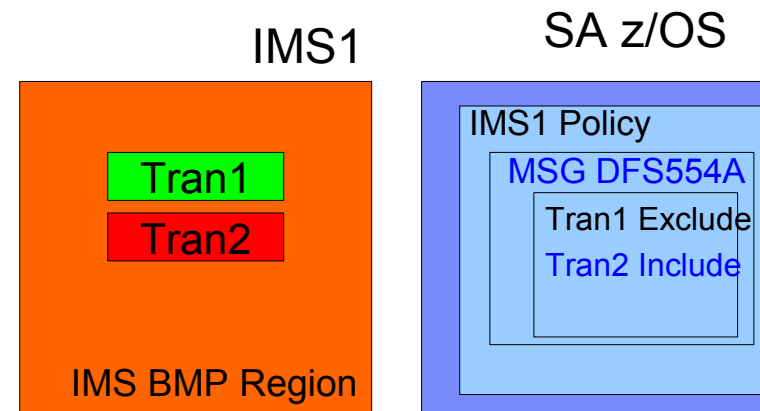**Problem:** Automatic <u>recovery</u> of 'ABENDING' IMS transactions or programs

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

    ➤ Issue recovery to restart the program or the transaction

IMS1   SA z/OS

```
IMS1
+-----------------+    +-----------------------+
|                 |    | IMS1 Policy           |
|                 |    |  +------------------+ |
|   [Tran1]       |    |  | MSG DFS554A      | |
|   [Tran2]       |    |  | +--------------+ | |
|                 |    |  | | Tran1 Exclude| | |
|                 |    |  | | Tran2 Include| | |
|                 |    |  | +--------------+ | |
|                 |    |  +------------------+ |
| IMS BMP Region  |    +-----------------------+
+-----------------+
```

Customization Dialog Definitions

IMS subsystem ID must be defined under IMS control region specifications

```
Entry Type : Application          PolicyDB Name :
Entry Name : IMSCTL              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 a
_____       TRIGGER              Select trigger
_____       SERVICE PERIOD       Select service peri
_____       RELATIONSHIPS        Define relationships
_____       MESSAGES/USER DATA   Define messages and
_____       STARTUP              Define startup proc
_____       SHUTDOWN             Define shutdown proc
_____       THRESHOLDS
_____       MINOR RESOURCE                                   IMS C    rol Region specifications
_____       MINOR RESOURCE   Command ===> _____
_____       SYSTEM ASSOCIA
_____       -------------    Entry Type : Applicati           PolicyDB Name    : HUT_
_____       GENERATED RESC   Entry Name : IMSCTL              Enterprise Name  : OMEG
_____       MEMBER OF
_____       -------------
s_____        IMS CONTROL      Subsystem  : IMSCTL
                STATE ACTION     Subtype    : CTL          defined in policy APPLICATION INF

                                 IMS subsystem ID . . . .  M941
                                 DBCTL control region . .  ___        (YES NO)
AOFKINFO                 SA z/OS  - Comma . . . . .  ___        (YES NO)
Domain ID    = IPSFP     -------- DISPINFO
Operator ID = HUT

  Subsystem ==>  IMSCTL       System ==>  K

  WLM Resource Name  : None

  Command Prefix     : None

 MVS sub-system ID   : M941
```

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Customization Dialog Definitions (contd.)

a) Which transactions should be recovered?

```
                              Minor Resource Flags
Command ===>  _____

Entry Type : Application                Polic
Entry Name : IMSCTL                     Enterp    Entry Type : Application           Polic
                                                  Entry Name : IMSCTL                 Enter
Major Name : IMSCTL                               Resource   : IMSCTL.PROG.EVIRYPPI

Action    Minor Resource                          Enter level of automation desired.
_____   PROG.DFSIVP4                             Automation Flags:  Y = Yes    N = No    L
          PROG.DFSIVP5
s_____    PROG.EVIRYPPI                            Actions    Flag              Auto     Exits
          TRAN.IVTFD                              _____    Automation .                0
          TRAN.IVTFM                                         Recovery . .    YES         0
                                                             Start. . . .                0
```

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

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

```
--------------------------------------
                    Minor Resource Thresholds
Command ===>  _____

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

Major Name : IMSCTL                               Thresholds Definition

Action    Minor Resource              Command ===>  _____
          DFS3257I
          PROG.DFSIVP34               Entry Type : Application        PolicyDB Name
          PROG.DFSIVP35               Entry Name : IMSCTL             Enterprise Name
s_____    PROG.EVIRYPPI
          TRAN.IVTCB                  Resource   : IMSCTL.PROG.EVIRYPPI
          TRAN.IVTCX
                                      Critical Number  . . . .  3_     (1 to 50)
                                      Critical Interval  . . .  02:00  (hh:mm or hhmm, 00
```

Recovery stopped dependent on THRESHOLDS settings

Reminder:
If NO thresholds defined → RECOVERY forever!!

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Customization Dialog Definitions (contd.)

c) Which ABEND codes needs special handling?

```
                         Message Processing          Line 00000001 Col 0
Command ===>                                                Scroll ===

Entry Type : Applicatio                    Name   : HUT_OMEGAMON_V320
Entry Name : IMSCTL                     se Name : OMEGAMON_SA_V320

Line Commands: S (Cmd)                 (Cod), U (Usr), A (Aut), O (
              I, D (inse     delete lines)
Message ID field leng    . . 14     (1 - 32)

Cmd Message id          Description                        Cmd Rep Cod
cod ABCODEPROG          BMP Region Abends *only program-driven*    4
    ABCODES*BI          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 : A

Enter the value to be passed to the calli       when this resource
issues the selected message and the f    wing codes are contained in
the message.

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

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Customization Dialog Definitions (contd.)

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

```
Entry Type : Application          PolicyDB Name    : HUT_OMEGAMO
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 mes

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

IMS subsystem ID followed by IMS master terminal command

Program name

Transaction id

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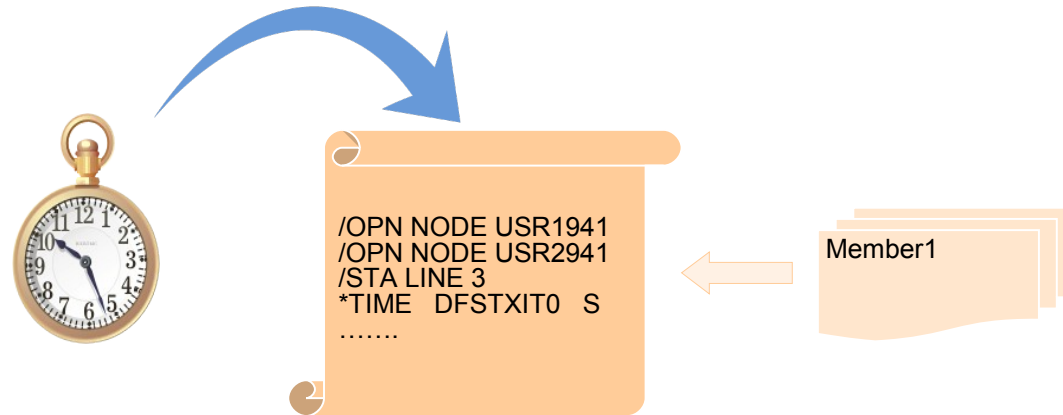
...Transaction restarted due to PDB definitions

Scenario E :

Time Controlled Operations (TCO)

Problem: Several IMS commands should be issued based on <u>scheduled timer</u> intervals

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

/OPN NODE USR1941
/OPN NODE USR2941
/STA LINE 3
*TIME   DFSTXIT0   S
…….

Member1

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

Complete your sessions evaluation online at SHARE.org/AnaheimEval

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Customization Dialog 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
    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 lis

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

Specify that the logical terminal **DFSTCF** is used

```
Entry Name : IMSCTL                     Message ID : TCO

To change keyword-data pair, specify the following:

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

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

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Customization Dialog Definitions (contd.)

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), V (Vsr), 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

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TCO handling with IMS command interface

```
EVIK0000                    SA z/OS  - Command Dialogs
Domain ID   = IPZFA     ---------- IMS      ----------   Date = 12/06/11
Operator ID = HUT              System  = SAT1            Time = 15:01:46

Resource   =>  _____   Format: name/type/system
Target     =>  _____         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. SDF              Display IMS automation SDF panel
                 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
```

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TCO handling with IMS command interface

Load TCO member

Start / Stop the logical terminal

```
EVIK TC0                        SA z/OS  - Comma   Dialogs      Line   1
Doma   ID    = IPSFP              ------ IMS TCO S atus ------    Date = 01/
Opera or 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

```
 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 ***********
```

SAMPLE contents of TCO member containing IMS commands

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Agenda

- SA z/OS – IMS Automation Overview

- User scenarios – Use cases
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- ➢ Start / Stop details for IMS applications

- Special IMS management

- *IMS Best practices

- Future Plans

Automation Flags During Lifecycle of a Resource
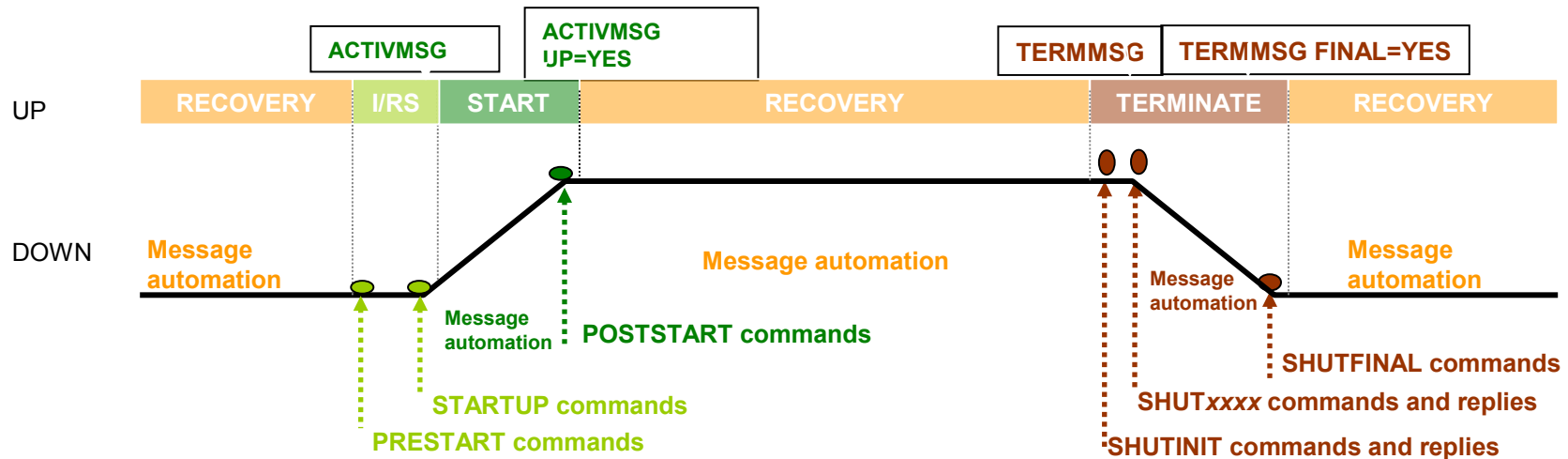
- InitStart flag (I): Checked after IPL only, when application has a true DOWN status.

- 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.**

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
```

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

- ## Can reply to outstanding WTOR's
- ## Policy based start up

Starting of IMS control region

```
AOFKINFO                  SA z/OS  - Command Dialogs      Line  72    of
Domain ID    = IPSFP         -------- DISPINFO ---------  Date = 01/24/0
Operator ID = HVT                                         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

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

 Subsystem ==>  IMS1CTL        System ==>  KEY4        Syste
                                                       or sys

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

> Defined **REPLYs** in PDB for message DFS810A

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Stop IMS Address spaces

- **Supported stop types**
  - **NORM**
    - → *Issue checkpoint, <u>orderly shutdown</u>. Cancellation of message regions and control region after predetermined time delay.*

  - **IMMED**
    - → Issue checkpoint. <u>Immediate cancellation of message regions</u>. Cancellation control region after predetermined time delay.

  - **FORCE**
    - → <u>*Immediate flushing*</u> *of all regions*

Stopping of IMS control region

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

Complete your sessions evaluation online at SHARE.org/AnaheimEval

Agenda

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- Start / Stop details for IMS applications

- ➢ Special IMS management

- *IMS Best practices

- Future Plans

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
  - Send commands to one / more / all members of an IMSPlex
  - Auditing of IMS commands
- 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 Operator command

- ## 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

- ## Benefits

  - ### No SYSLOG flooding

  - ### Slight performance improvements compared to previous SA z/OS releases

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IMS Dependent regions (contd.)

```
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
```

Additional function added by SYSPROG during installation

```
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
```

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IMS Dependent regions (contd.)


```
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        1                  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                    / 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 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, ...

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IMS Dependent regions (contd.)

➢ "/ASSIGN"

- assign additional classes to the region

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

Resource              => IMS1CTL/APL/KEY4                    F
System                => _____              System name, do
Request               => CMD_____              CMD, BROADCAST
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                    Fo
System                => _____              System name, dom
Request               => CMD_____              CMD, BROADCAST o
IMS Command           => PSTOP REGION 2 TRANSACTION TRANS32
IMS Route             => _____
IMS Message           => _____
```

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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
```

```
                                          User Defined Data
Command ===>  _

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')
```

Define for reserved <u>msg</u> **IMSINFO** cmds

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

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

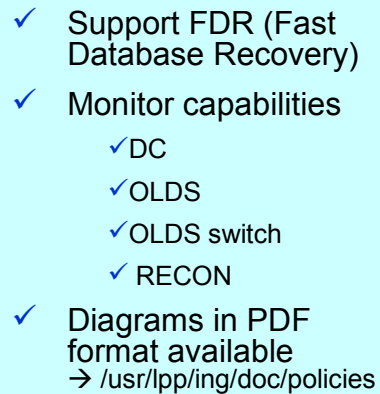```
  IMSINFO :
    IMSCMD=('ACTIVE STATE DC','DIS A DC')

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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# Agenda

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Complete your sessions evaluation online at SHARE.org/AnaheimEval

# *IMS  Best Practice Policy

✓ Support FDR (Fast Database Recovery)

✓ Monitor capabilities
  - ✓ DC
  - ✓ OLDS
  - ✓ OLDS switch
  - ✓ RECON

✓ Diagrams in PDF format available
  → /usr/lpp/ing/doc/policies



*IMS - Best Practice Policy

# References

- **Related SA z/OS V3.4 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)

# Agenda

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- ## User scenarios – Use cases
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  - IMS commands based on scheduled timer intervals

- ## Start / Stop details for IMS applications

- ## Special IMS management

- ## *IMS Best practices

- ## ➤ Future Plans

# Future Plans

- Support IMS Connect
- Support IMS Master repository server (IMSRS)
- Remove the need to define all dependent regions for DFS554A automation & recovery actions
- Anything else needed?

# End of Presentation

**Questions**

Thank you very much for your attention

**Visit our <u>home pages</u> 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/

**our <u>Community</u> at**

IBM Service Management Connect

https://www.ibm.com/developerworks/servicemanagement/z/index.html

**or our <u>User forums at</u>**

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.*

# Tivoli System z Session at SHARE

**Want to see me again?**

**Monday**
- 11:00     11207: Automating your IMSplex with System Automation for z/OS     Platinum 7
- 1:30     11832: What's New with Tivoli System Automation for z/OS     Elite 1
- 3:00     11886: Improve Service Levels with Enhanced Data Analysis     Elite 1

**Tuesday**
- 9:30     11792: What's New with System z Monitoring with OMEGAMON     Elite 1
- 11:00     11791: Tuning Tips To Lower Costs with OMEGAMON Monitoring     Platinum 8
- 1:30     11900: Understanding Impact of Network on z/OS Performance     Grand Salon A

**Wednesday**
- 9:30     11835: Automated Shutdowns using either SA for z/OS or GDPS     Elite 1
- 1:30     11479: Predictive Analytics and IT Service Management     Grand Salon E/F
- 1:30     11899: Top 10 Tips for Network Perf. Monitoring w/ OMEGAMON     Platinum 9
- 4:30     11836: Save z/OS Software License Costs with TADz     Elite 1

**Thursday**
- 9:30     11905: Using NetView for z/OS for Enterprise-Wide Mgmt and Auto     Grand Salon A
- 11:00     11909: Get up and running with NetView IP Management     Grand Salon A
- 11:00     11887: Learn How To Implement Cloud on System z     Grand Salon E/F

**Friday**
- 9:30     11630: Getting Started with URM APIs for Monitoring & Discovery     Elite 1

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धन्यवाद
Hindi Hindi

多謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Thank You
English

Gracias
Spanish

شكراً
Arabic

Obrigado
Brazilian Portuguese

多谢
Simplified Chinese

Danke
German

Grazie
Italian

Merci
French

நன்றி
Tamil Tamil

ありがとうございました
Japanese

감사합니다
Korean

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