# System Automation for z/OS V3.1 Overview

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# Focus Areas....

- **Making Policy Definition Easier**

- **Making Operation Easier**

- **Integration with other Tivoli Products**
  - OMEGAMON product suite

# Making Policy Definition Easier

# Making Policy Definition Easier....

- **Multiple Object Deletion**
  - One single confirmation
  - Automatic removal of dangling relationships + links
  - Confirmation can be turned off for follow-on panels
- **PolicyDB Import (stage II)**
  - Import Application Group and all linked Applications
  - In-flight rename of object being imported
  - Partial import of "logical units" eg OMEGAMON product suite
- **Mass Update**
  - Exporting policy data to flat file  (keyword......: value)
    – User selects what to export
    – Easy to manipulate by editor or script
  - Importing flat file  back to PolicyDB
    – Can be used for mass creation

Sample PDB → Customer PDB

Customer PDB ↔
```
Type    - CMD
Code 1  : *
Code 2  : XYZ
```
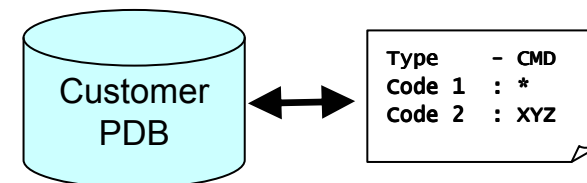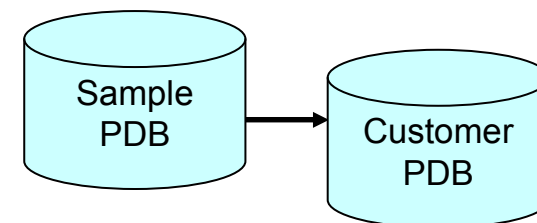
# Making Policy Definition Easier... (2)

- Multi-User support for System Definitions
- Streamlining of Policy Definitions
  - Automation and Application Policy consolidated
  - Report member consolidation
- Sample Policies for most middleware
  - Best Practices

Customization Dialog more intuitive and easier to use....

# Sample Policies...

- **Sample Policies restructured in**
  - •Base Policy
  - •Addons
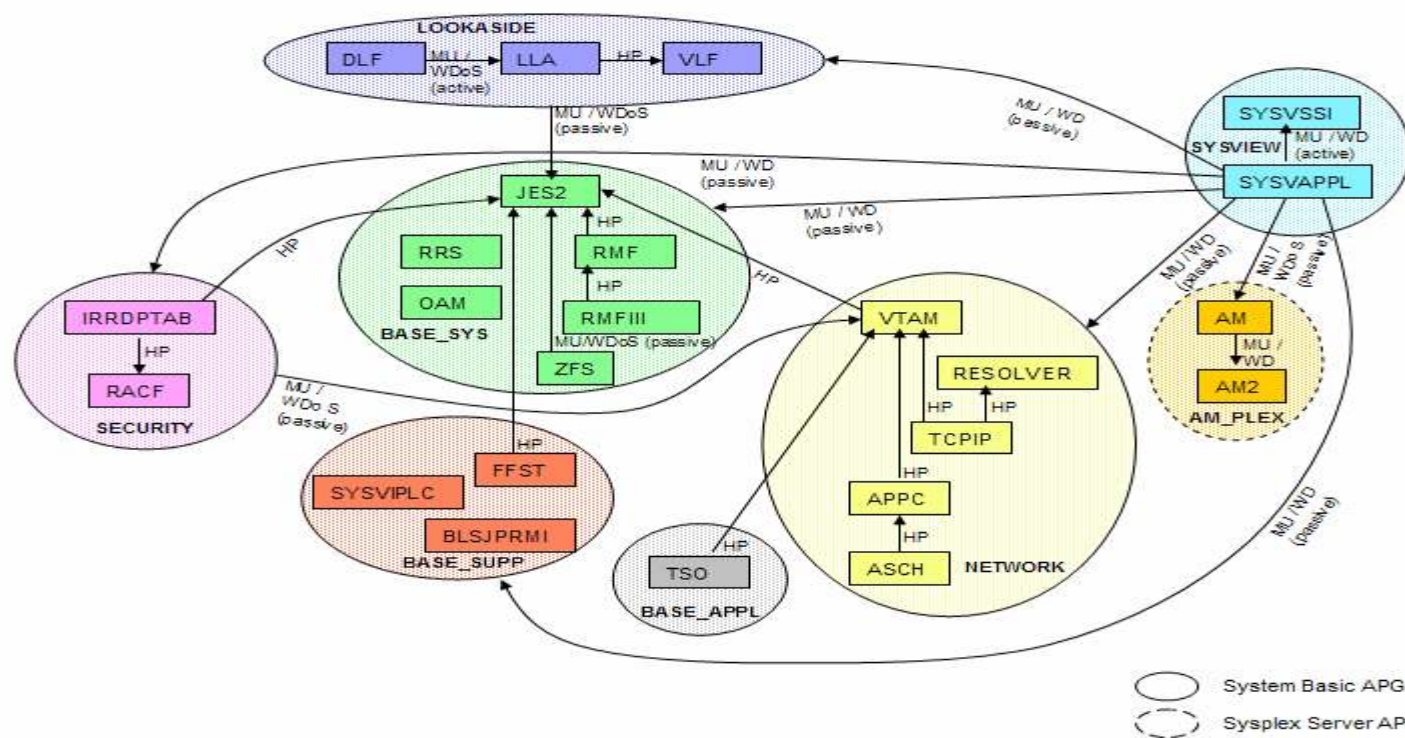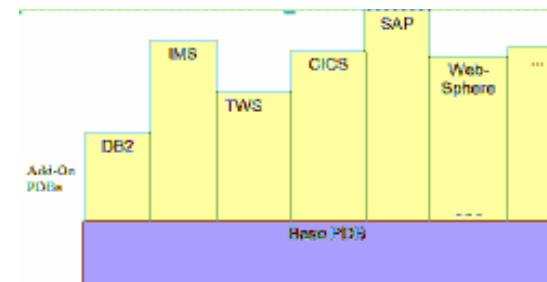


- •DB2
- •TWS
- •WebSphere
- •IMS
- •CICS
- •NMC
- •USS
- •ProcOps
- •OMEGAMON
- •GDPS
- •More …

# Importing Addon's

```
 COMMANDS     ACTIONS     HELP
-------------------------------
                        Crea
Command ===>

To define a new policy databas
   PolicyDB Name. . . . . . MY
   Enterprise Name. . . . MY
   Data Set Name. . . . . ──

   Model PolicyDB name. . . *B

Add-On PolicyDBs to be added t
Action      Status      PolicyD
                        *CICS
                        *DB2
                        *E2E
                        *GDPS
                        *IMS
                        *NMC
                        *OMEGAMON
                        *PROCOPS
                        *SAP
                        *TWS
                        *USS
                        *WEBSPHERE
```

Select one or more Addons

```
OMEGAMON AddOn Policy
=====================

A broad range of OMEGAMON monitors exist for a variety of z/OS
products.
These monitors are extremely valuable for checking the health of those
products. This policy provides a sample configuration to keep OMEGAMON
monitors highly available and to easily recycle them after configuration
changes.


Startup and Shutdown Considerations
-----------------------------------


The items in the following list are points that need to be
considered for the start-up and shutdown of various components in the
example configuration.

- OMIIETE - only one instance of the End-to-End reporter needs to be
started per image and it is only required if reporting on SNA response
times.

- The historical and batch reporting tasks (OMIIM2HP, OMIIM2HS and
OMIIM2BA) do not need to be controlled by automation. They are stopped
and started automatically when required by other components.

- The CMS is not required to run AF/OPERATOR or the Classic OMEGAMON
II's, however, it is required if WLM data needs to be collected.
```

# Making Operation Easier

# Making Automation & Operation easier...

- **INGMOVE Command**
  - Frees operator from calculating preference points + rules
- **Easy Message Management**
  - More messages in standard SA automation table
    - IBM products + vendor products
  - Definition of CICS/IMS internal messages that must be passed back to SA via customization dialog
    - Eliminates need of special CICS/IMS customization
    - Eliminates need to recycle CICS

# INGMOVE Command

- Aids operators in moving applications to another system in the sysplex.

  - No longer need to calculate preference value

  - Move now or at next recycle of the application

- Syntax

```
                  <-,----------<    .-WAIT=YES-.
>>--INGMOVE----group_name--+---+---------+------------------------->
                               |-WAIT=NO--|
                               '-WAIT=nnn-'


>--.----------------------------.--.----------------------.--------><
   '-TARGET=-.-system_name--.--'   |-OUTDSN=dsname--------|
            |-domain_id----|       '-OUTMODE=-.-LINE---.--'
            '-sysplex_name-'                  |-AUTO---|
                                              '-NETLOG-'
```

# INGMOVE Command (2)

Colors showing state of systems

Shows eligible systems

Move initiated by single key stroke

File  Edit  View  Communication  Actions  Window  ZipPrint  Help

```
INGKYMV0                        SA z/OS  -  Command Dialogs      Group    1      of 21
Domain ID    = IPUFA      ---------     INGMOVE    ---------   Date  =  03/07/05
Operator ID  = WAS                    Sysplex  = AOCAPLEX      Time  =  15:46:50

CMD:  D INGRELS      E INGVOTE    F INGINFO    G Members    I INGSCHED   J INGGROUP
      M Move         P Prepare    R Reset      X Box Group                / scroll
Cmd  Group name      Obs Status      ---- Systems ----                    Move to
---  ----------      ----------      ----------------------------        --------
 _   ARMGROUP        STARTING        AOCA     AOCB     AOCC     AOCD      _____
                                     AOCETST  AOCFTST
 _   HGEMPTY         UNKNOWN
 _   HGHMVPAR        AVAILABLE       AOCA     AOCB     AOCC     AOCD      _____
 m   HGMOVE          AVAILABLE       AOCA     AOCB     AOCC     AOCD      AOCC
                                     AOCETST  AOCFTST
 p   HGMOVEBASE      AVAILABLE       AOCA     AOCD                       AOCD
 _   HGMOVEPSV       AVAILABLE       AOCA     AOCB     AOCC     AOCD      _____
                                     AOCETST  AOCFTST
 _   HGMOVESAPAR     AVAILABLE       AOCA     AOCB     AOCC     AOCD      _____
 _   HGMOVESUBS      AVAILABLE       AOCA     AOCC     AOCD     AOCETST   _____
                                     AOCFTST
 _   HGMOVE01        AVAILABLE       AOCA     AOCB     AOCC     AOCD      _____
                                     AOCETST  AOCFTST
 _   HGMOVE2         AVAILABLE       AOCA     AOCB     AOCC     AOCD      _____
 _   HGMOVP
 _   HGMOVP
 _   HGMOVP
 _   HGNH2A
 _   HGXXMO
 _   MOVDIS
 _   MOVDIS
```

File  Edit  View  Communication  Actions  Window  ZipPrint  Help

```
INGKYMV1                        SA z/OS  -  Command Dialogs      Line    1      of 2
Domain ID    = IPUFA      ---------     INGMOVE    ---------   Date  =  03/07/05
Operator ID  = WAS                                            Time  =  15:49:47

      Verify the Move Group activities

      Group name      Runs on    Move to    Action
      ----------      -------    -------    ------------------
      HGMOVE          AOCA       AOCC       now
      HGMOVEBASE      AOCA       AOCD       at recycle
```

```
Command ===>
 PF1=Help          PF2=End        PF3=Return                PF6=Roll
                                  PF9=Refresh               PF12=Retrieve
```

```
MA          a                                                           15/070
```
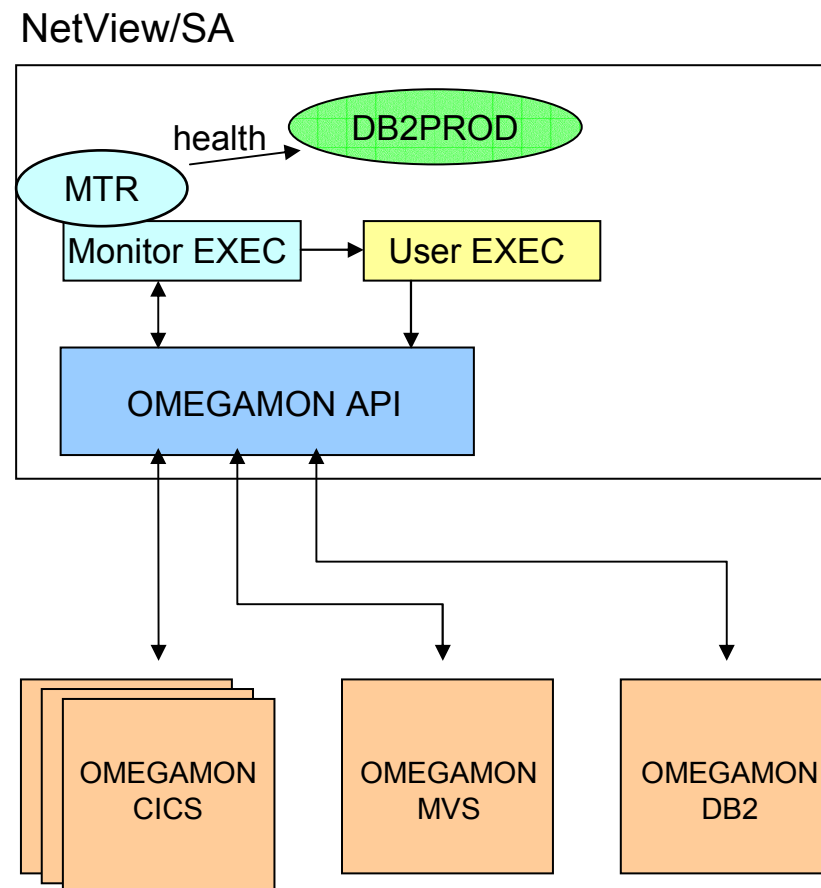
# CICS/IMS Message Exit definitions via Policy DB

- **Definition of CICS/IMS messages exposed to automation via SA customization Dialog**

  - One place to customize the behavior of the CICS/IMS message exit function.

  - No Assembler skill necessary to define messages

  - No longer recycle of CICS/IMS required

  - Dynamic Activation of messages via INGAMS Refresh
    - Messages stored in CSA

  - Allows to have a different set of messages for each CICS/IMS

  - Simple way to disable message exit

  - Powerfull filtering function (TDQUEUE name, OFFSET, TOKEN parm)

# OMEGAMON Integration

# Interoperation with OMEGAMON Classic

- Use of performance and availability information for application automation
  - More facts, more accurate decisions
  - Sources: MVS, DB2, CICS, IMS
- Provides API to communicate with OMEGAMON monitors to
  - Obtain and filter installation-defined exceptional conditions
  - Send commands to OMEGAMON, for example to respond to such conditions
- Provides exception monitor based on the Monitor Resource (MTR) concept
  - Monitors „interesting" set of exceptions
  - Sets application health state based on existance of such exceptions
  - Provide means to react and resolve exceptional conditions

NetView/SA

MTR — health → DB2PROD

Monitor EXEC → User EXEC

OMEGAMON API

OMEGAMON CICS | OMEGAMON MVS | OMEGAMON DB2

# Overview

- **OMEGAMON session management to handle local + remote sessions**
  - Session automatically established when needed
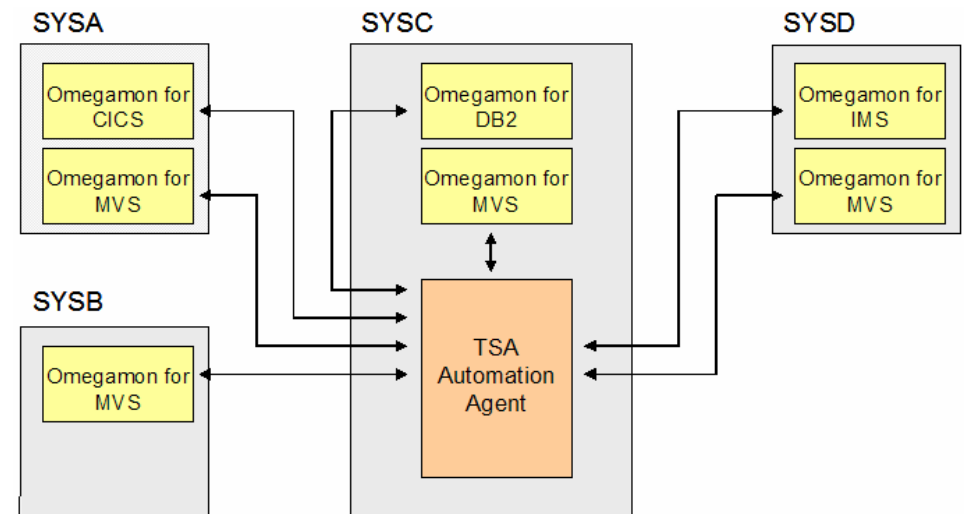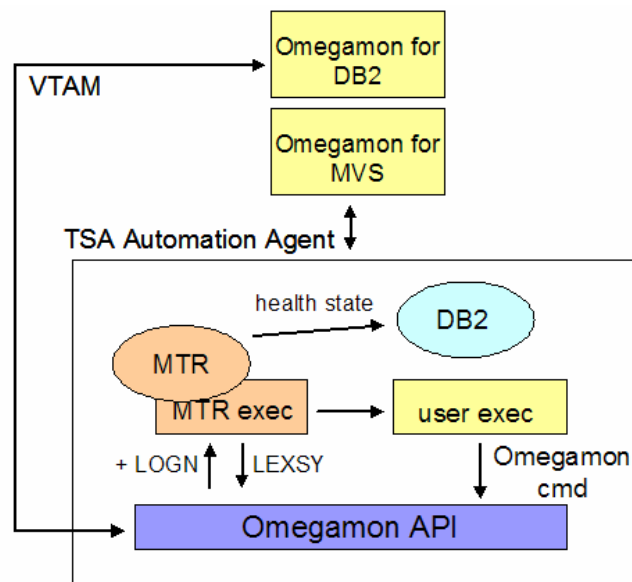


- **API to execute OMEGAMON commands and to return the command's response**
  - OMEGAMON LEXSY command used to obtain exceptions
- **Monitor Resource concept enhanced to perform exception monitoring**

# Exception Monitoring

- **New monitoring command INGMTRAP to gather exceptions periodically**
- **Exception passed via message ING080I to NetView AT**
- **Optionally exception mapped into health state**
  - Definitions done via EMM
- **Processes commands defined for exception**
  - Multiple Pass handling
  - Thresholds via AT processing
    - Trap after n occurrences in hh:mm interval
  - Temporarily disable any trapping while performing the exception recovery
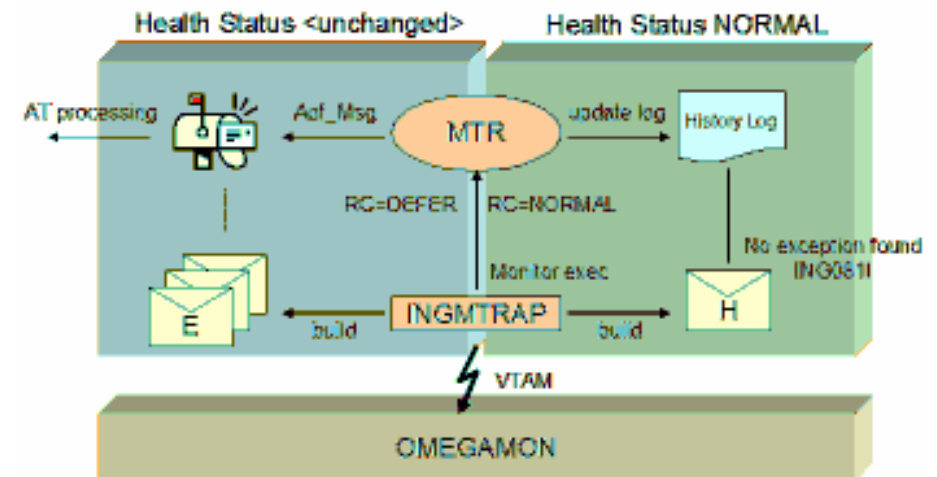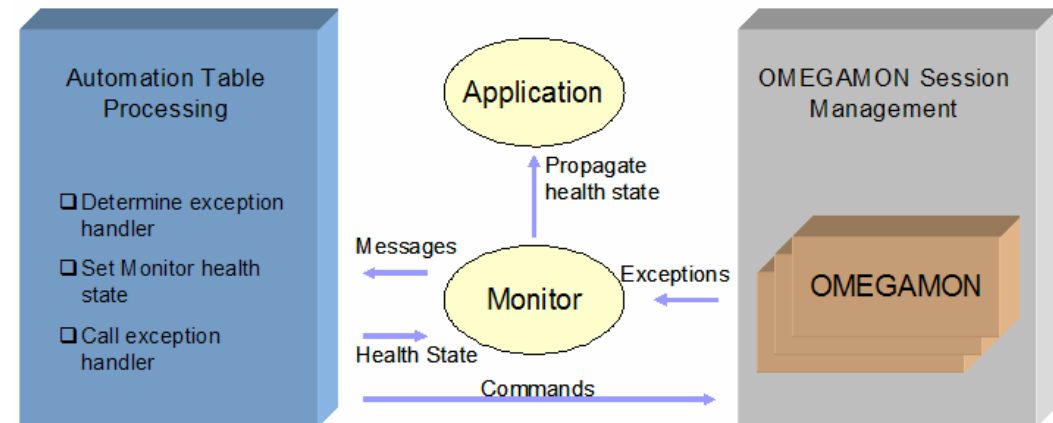
# INGOMX Command

- **Called by scripts to interact with a named OMEGAMON session**

```
>> -- INGOMX ---| Function |---- NAME=session_name ------------->< 


Function:
|--+-- EX --- CMD={command | * }-+--------------+----------+--|
   |                             +-- OMWAIT=nn --+          |
   |                      V-- , --------.                   |
   +-- TRAP -- XTYPE=( -.- exception -+- ) -----------------+
```

# INGSESS Command

```
INGKYSS0                    SA z/OS  - Command Dialogs     Line  1     of 3
Domain ID    = IPUN9       -------- INGSESS  ---------    Date = 12/09/04
Operator ID = BHOL              System  = AOC9            Time = 08:18:49


CMD:  B Start session    C Stop session    D Details


CMD Session        System   Type      Status      Appl-id  User id  SessOper
--- -----------   --------  --------  --------
 _   OMSY4DB       AOC9     OMIIDB2   INACTIV
 _   OMSY4IM       AOC9     OMIIIMS   BROKEN
 _   OMSY4MV       AOC9     OMIIMVS   ACTIVE
```

```
Session           : OMSY4DB
System            : AOC9
Description       : -None-

Status            : INACTIVE
Session Operator: AUTSES01

Application id  : IPSPD2C
User id           : SAOMUSER
Security          :
Timeout           : 20
Logon data        : DB2=SGG4

Statistics
   Total # commands              : _____5
   Total # exception analysis : _____305
   Total # exceptions tripped : _____10
```

Shows statistical data

Shows all OMEGAMON sessions defined and their status

# Miscellaneous

# Message Tracing

- Dumps all relevant information about trapped messages in Netlog
- Activated/Deactivated via AOCTRACE command
- Automation of messages is not affected

Helps you chasing
Message Trap Problems

```
*MESSAGE CHARACTERISTICS FOR IEF403I
*        MSGID            = IEF403I
*        MSGSTR           =
*        HDRMTYPE         = E
*        MCSFLAG          = 00000000
*        MSGAUTH          = 11
*        MSGTYP           = 010
*        ROUTING CODE     = 0000000000000000
*        DESCRIPTOR CODE  = 0000010000000000
*        SYSCONID         = INTERNAL
*        SMSGID           = 1157710131
*        JOBNAME          = TEST1
*        JOBNUM           = STC00736
*        SYSID            = KEY3
*        ASID             = 00C1
*        MSGGDATE         = 2005033
*        MSGGTIME         = 15.24.37.94
*        MSGTSTMP         = 152437
*        CART             =
*        MSGORIGN         = IPSNO
*        AREAID           =
*        ACTIONMG         = 0
*        ACTIONDL         =
*        AUTOTOKEN        =
*        IFRAUIND         = 1101000000000000
*        IFRAUIN3         = 00000000
*        IFRAUSB2         =
```

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# AOCTRACE Command

- Syntax

```
>>-- AOCTRACE---MSG/id--.-OFF-.--- ....
                        '-ON--'
```

- Output

```
AOFKAANL                  SA z/OS  - Command Dialogs    Line  1    of 8
Domain ID   = IPSFP       --------- AOCTRACE ----------  Date = 01/29/05
Operator ID = WAS                                        Time = 18:14:18


Enter ADD in the Command line to create an entry
Cmd:  A Add     C Change     D Turn off Debug    R Reset    T Turn off Trace


Cmd CLIST     System   Debug Trace Subroutines/Messages being traced
--- -------- -------- ----- ----- ---------------------------------------------
 _   *GLOBAL* KEY4       Y
 _   *MSG*    KEY4                 IEF403I
 _   *MSG*    KEY4                 IEF404I
 _   EVJEATDF KEY4       Y     R
```
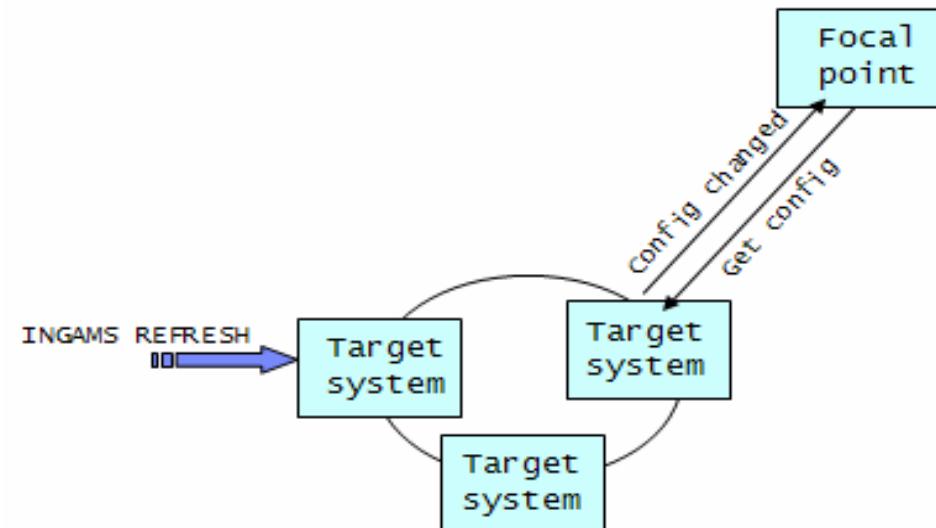
# NMC Enhancements

- Significant performance improvements by performing incremental RODM update rather than doing complete rebuild of RODM objects when doing config refresh (INGAMS Refresh)

  - Only when using SA command handler for status forwarding

INGAMS REFRESH → Target system

Target system ⟷ Focal point

config changed / Get config

Target system

- Support of different colors for satisfactory compound status

  - Available vs Unavailable

```
MAPCOLOR   UNAVAILABLE nnn              in INGTOPOF file
```

- Automatic Distribution of SA profile from NMC server to NMC clients

# Other Command Enhancements

- INGLIST  resource_group  MEMBERS=YES
  to display the members of the group
- INGREQ resource_name REQ=CANCEL
  to cancel a previoulsy made request from the same source

  - No need to worry about type of request

- ASF and ASFUSER are now PIPEable
- Installation exit AOFEXC13 for INGGROUP command
- INGSTR Command supporting XCF REALLOCATE

  - Relocates structures to their desired location

- ISQIPSWT Command

  - Supports the switching of the IP address that ProcOps used for the communication with the service element without the need to recycle ProcOps

# Co-existence

# Co-existence

- ACF built by V3.1 cust. dialog can be used by downlevel agents
  - APAR OA10946 required
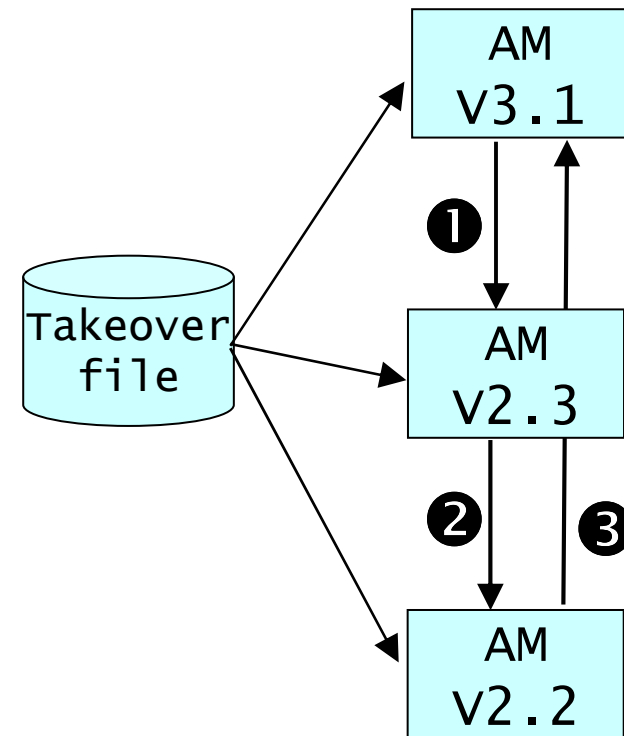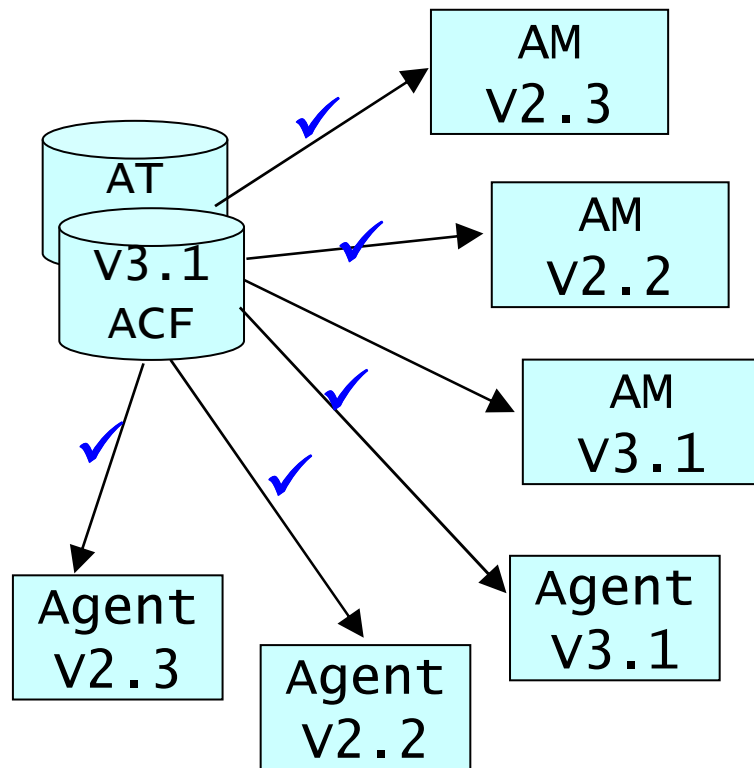


- Format of Takeover file compatible by all Automation manager versions
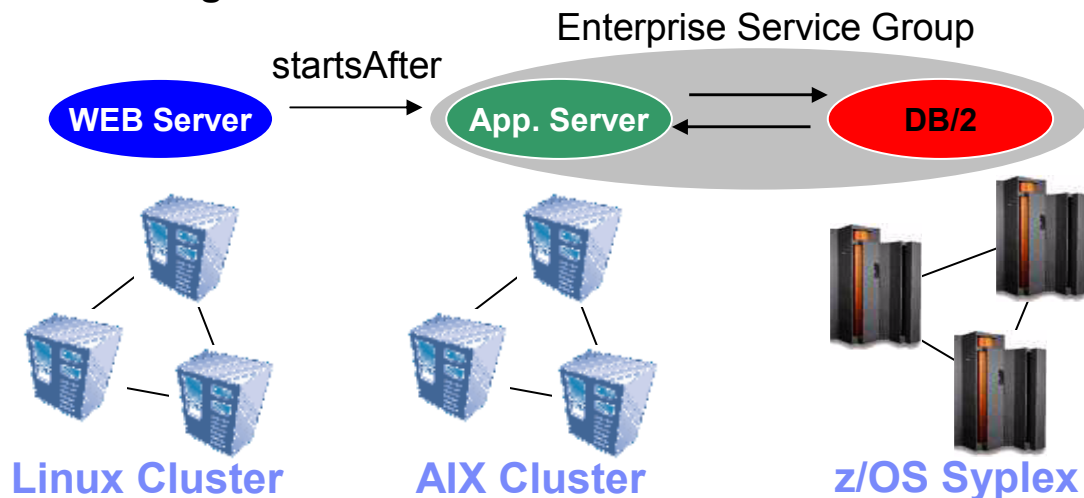
# System Automation Family

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# SA Automation Family

- **SA z/OS provides automation and high availability for z/OS applications**
- **SA Multiplatforms component provides availability automation (stop, start, move/failover, restart in place) within a homogeneous SA/MP cluster (on Linux and AIX)**

- **SA for Multiplatforms end-to-end capability provides coordinated, cross-cluster/resource automation and high availability for applications**

SA for Multiplatforms
(End-to-End)

In plan

SA z/OS

AF/OPER

SAfMP
(Base)

SAfMP
(Base)

Linux,
AIX
Cluster
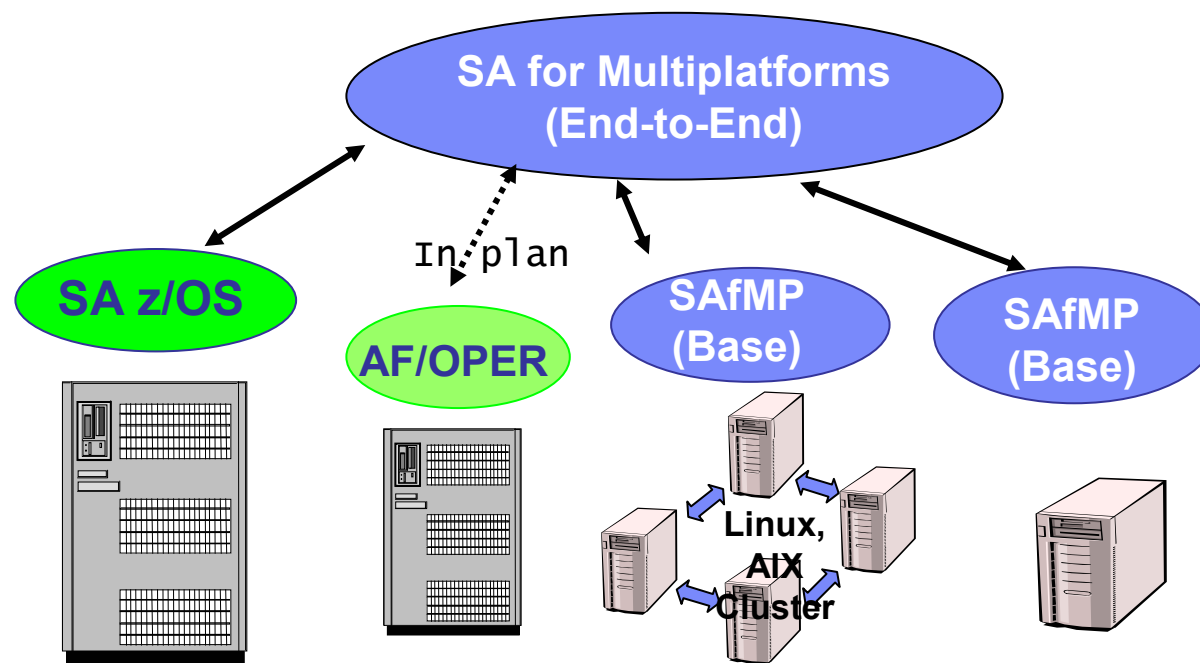
# IBM Tivoli System Automation for Multiplatforms / Enterprise Solution

- A single solution to monitor and operate all applications of your Enterprise
  - Start/Stop an application – observe its current state
- Cross-cluster, Cross-sysplex „End-to-End" automation capabilities
  - Integrates exisiting Tivoli System Automation Product
    - TSA for Multiplatforms on AIX, Linux (x,p,z)
    - TSA for z/OS

- Simple Configuration
  - Define resources, relationships and groups
  - **No scripting ! No programming ! → XML based configuration**

Enterprise Service Group

WEB Server  →startsAfter→  App. Server ⇄ DB/2

**Linux Cluster**      **AIX Cluster**      **z/OS Syplex**

## Web-based Operations Console

- No client installation required
- Integrated in IBM Solution Console

# Summary

- **Automated management of heterogeneous business applications**
  - SA provides high availability for Linux/AIX and z/OS applications
- **Fast automation setup by import of predefined SA policy samples**
  - More "ready to use" Policies
  - More messages handled automatically without specific customization
- **Reduced automation implementation time, coding and support effort**
- **Quick & fast manipulation of Policy Data**
- **Full integration of performance + exception data into automation model**

# **Where to find more ...**

# Getting more Infos....

- IBM Tivoli System Automation for z/OS:
  http://www.ibm.com/software/tivoli/products/system-automation-390/
  http://www-03.ibm.com/servers/eserver/zseries/software/sa/

- IBM Tivoli System Automation for Multiplatforms:
  http://www-306.ibm.com/software/tivoli/products/sys-auto-linux/

- User Forum

  - http://groups.yahoo.com/group/SAUSERS/
    *The purpose of this group is to discuss technical issues related to the*
    ***IBM Tivoli System Automation for z/OS*** *product with your peers.*
    *Members should be interested in how Tivoli System Automation*
    *is implemented or used to automate z/OS.*

  - http://groups.yahoo.com/group/SA4DIST/
    *The purpose of this group is to discuss technical issues related to the*
    ***IBM Tivoli System Automation*** *product with your peers.*
    *This group is for distributed platforms like Linux and others, but not z/OS.*
    *Members should be interested in how Tivoli System Automation*
    *is implemented or used for application high availability.*

 Roland Haibl

# Thank You Very Much for Attending This Presentation !

# Feel Free to Contact Me in Case of Questions !

(… and don't forget to fill out the evaluation sheets …)

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