Tivoli System Automation for z/OS

System Automation for IBM System z Hardware

Tivoli System Automation for z/OS Processor Operations

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Agenda

- Overview

- Customization

- Sample User Scenarios

- Additional Connections Protocols

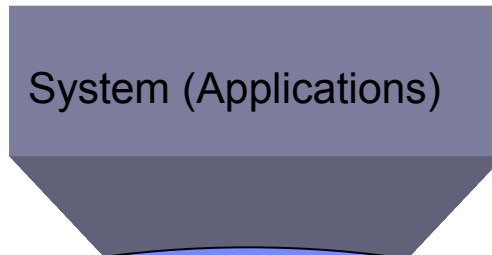- User Extensions for Automation

IBM

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▶ Overview

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- Sample User Scenarios

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- User Extensions for Automation

 JMH - Processor Operations Overview

IBM

SA z/OS Product Components

SA z/OS V3.2

- ✓ NetView 5.1 or higher
- ✓ z/OS V1.7 or higher

- ✓ Automate applications
- ✓ Automate repetitive and complex tasks
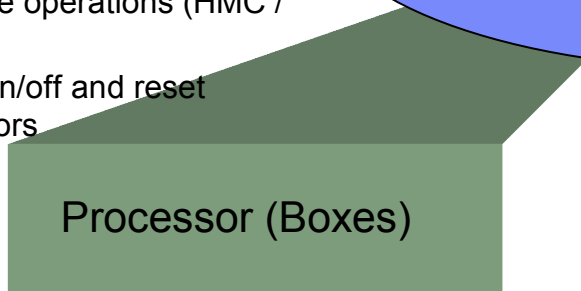- ✓ Monitor applications, messages, and alerts
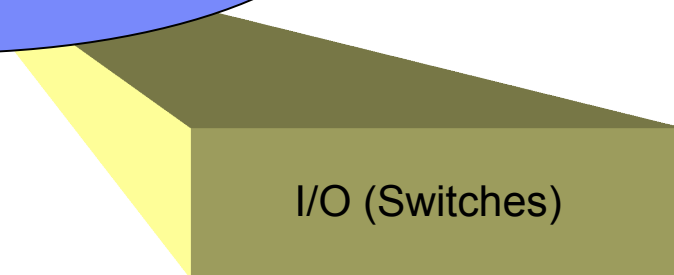
System (Applications)

IBM Tivoli System Automation

- ✓ Change Switch configuration on the fly
- ✓ Safe through system-integrated switching
- ✓ Management of ESCON and FICON directors

- ✓ Automate and control hardware operations (HMC / SE)
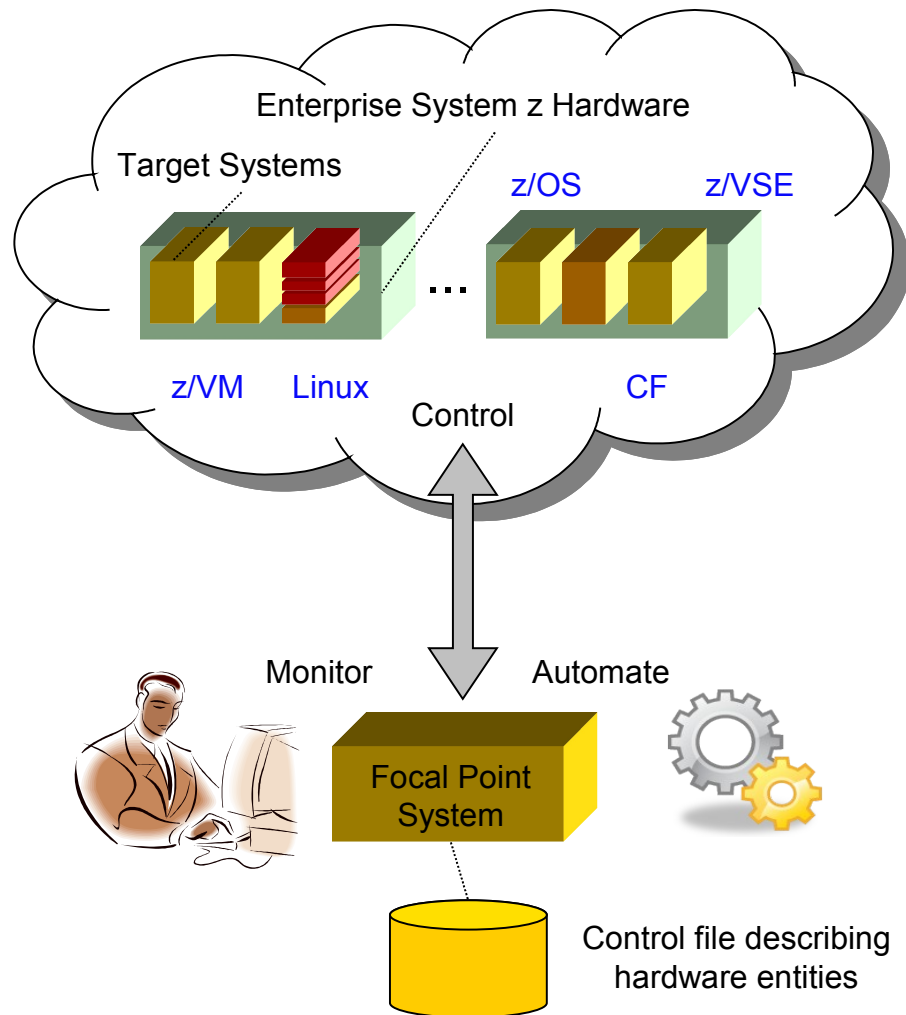- ✓ Power on/off and reset processors
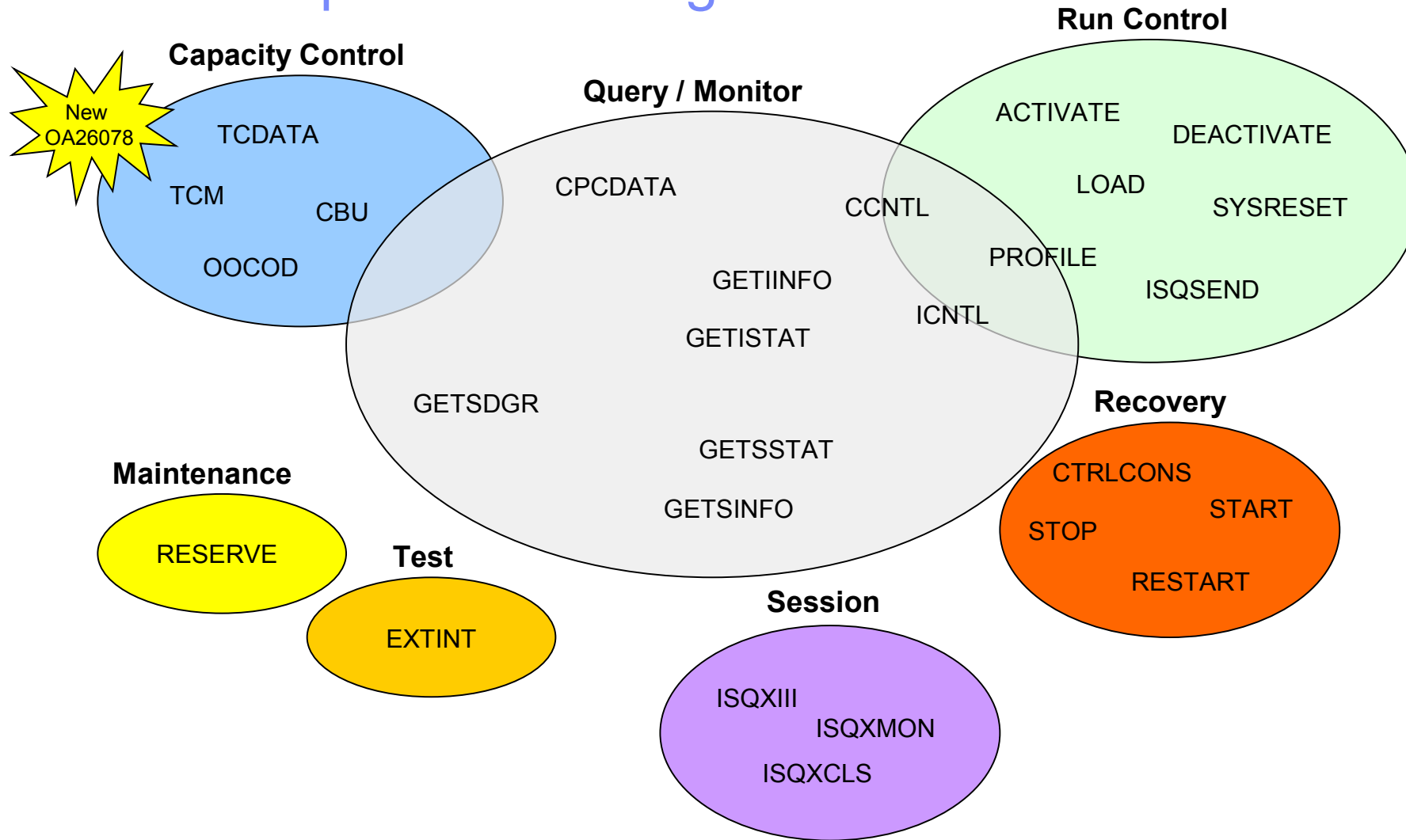
Processor (Boxes)

I/O (Switches)

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

Hardware Operations at a Glance

Enterprise System z Hardware

Target Systems

z/OS   z/VSE

...

z/VM   Linux   CF

Control

Monitor   Automate

Focal Point System

Control file describing hardware entities

- **Hardware operations (HMC / SE) and monitoring**
  - Enterprise-wide
  - Central focal point concept
- **Automation**
  - Product provided standard automation
  - Customer extensions
- **Policy**
  - Common SA z/OS automation policy for hardware and applications
  - Central administration
- **SA z/OS provides two hardware interfaces for**
  - Central hardware automation and monitoring
  - Local LPAR management functions
  - Local Coupling Facility operations
  - Geographically Dispersed Parallel Sysplex (GDPS)

Processor Operations Usage Areas

Capacity Control

New OA26078

TCDATA

TCM

CBU

OOCOD

Query / Monitor

CPCDATA

CCNTL

GETIINFO

GETISTAT

ICNTL

GETSDGR

GETSSTAT

GETSINFO

Run Control

ACTIVATE

DEACTIVATE

LOAD

SYSRESET

PROFILE

ISQSEND

Recovery

CTRLCONS

START

STOP

RESTART

Maintenance

RESERVE

Test

EXTINT

Session

ISQXIII

ISQXMON

ISQXCLS

Architecture

Processor Operations Focal Point

External HMC

Target Hardware

z/OS
z/OS
z/VM
Linux

Target Systems

Connection examples

Alternate external HMC

Support Element

Processor LAN

Business Intranet

HMC

Support Element

Target Hardware

Linux
Linux
z/OS
z/VSE

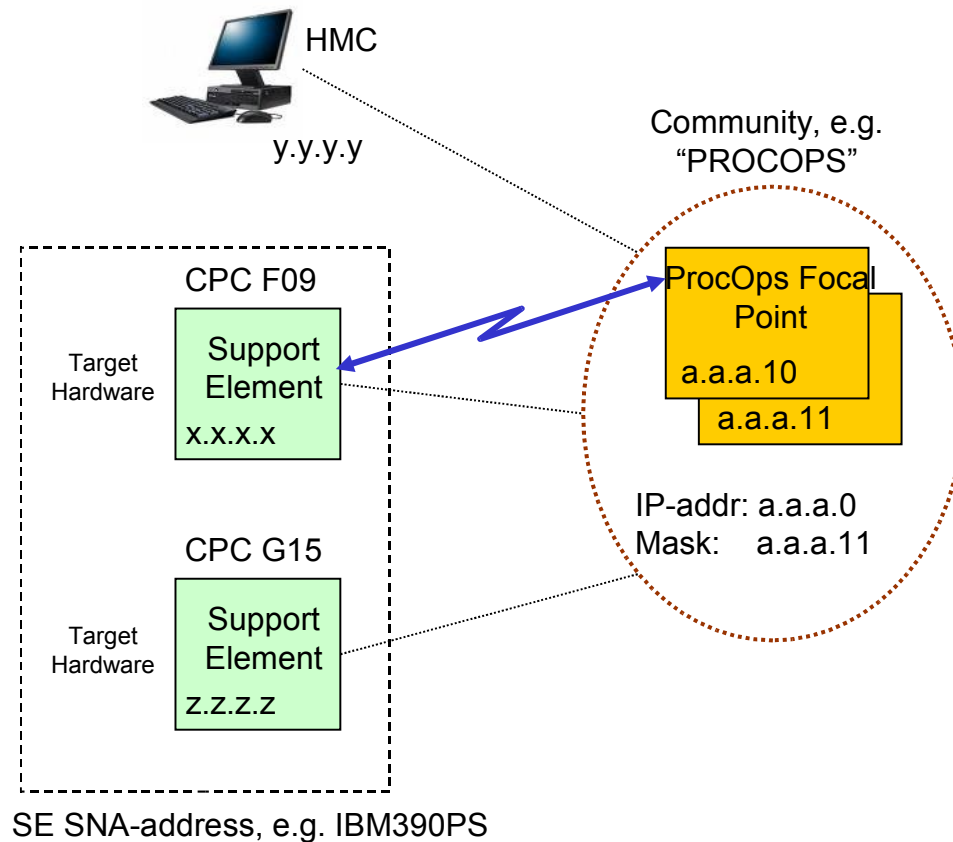**Processor Operations Backup Focal Point**

Other hardware

Target Systems

Agenda

- Overview

- ▶ **Customization**

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- User Extensions for Automation

 JMH - Processor Operations Overview

Defining Target Hardware – Step 1

HMC

y.y.y.y

Community, e.g.
"PROCOPS"

ProcOps Focal Point

a.a.a.10

a.a.a.11

IP-addr: a.a.a.0
Mask: a.a.a.11

Target Hardware (dashed box)

CPC F09

Support Element

x.x.x.x

CPC G15

Support Element

z.z.z.z

Target Hardware

Target Hardware

SE SNA-address, e.g. IBM390PS

- **Establish SNMP connectivity**
  - Start SNMP agent

- **Use of Application Programming Interface must be enabled on**
  - Support Element   and/or
  - Hardware Management Console

- **One or more communities must be defined for ProcOps**
  - Informs SE/HMC who is the requestor
  - Allows it to accept or reject requests

Defining Target Hardware – Step 2

```
COMMANDS   HELP
----------------------------------------------------------------------
                         Processor Information
Command ===>

Entry Type     : Processor          PolicyDB Name   : JHSAPLEX_V320
Entry Name     : F09                Enterprise Name : ACME

  Processor Type . . . . . . . . . eServer    (eServer 9672 9674 3000)
  Mode . . . . . . . . . . . . . . LPAR       (LPAR ESA)
  Connection Protocol . . . . . .  SNMP____   (INTERNAL NVC SNMP)
  CPC Name / NAU . . . . . . . .   F09_____
  Network Name . . . . . . . . .   IBM390PS
  Community Name / Auth Token . .  PROCOPS_
  Activation Reset Profile .  .  . _____

  Path Poll Frequency . . . . . . 30        (0 to 99 minutes)
  Path Poll Retries . . . . . . . 2_        (0 to 99)

For SNMP connection, at least one address must be specified:
  TCP/IP Address or Hostname for Support Element first Adapter
x.x.x.x_____

  TCP/IP Address or Hostname for Support Element second Adapter or a HMC
y.y.y.y_____
```

Use PSM to automate Linux guest systems

ESA may only be used for BASIC mode machines (< z990)

See HCD CPC Name and Network Name

See SE / HMC Settings for SNMP API

Multiple connections for redundancy - no automatic failover, however

Defining Target Hardware – Step 3

```
COMMANDS   ACTIONS   HELP
--------------------------------------------------------------------
                        LPAR Definitions              Row 1 to 27 of 27
Command ===> _____       SCROLL===> PAGE

Entry Type : Processor          PolicyDB Name   : JHSAPLEX_V320
Entry Name : F09                Enterprise Name : ACME

  Action      LPAR Name    Target Mode    Target System Name
  _____    KEYA____     ESA_____       KEYA_____

  _____    KEYB____     ESA_____       KEYB_____

  _____    KEYC____     ESA_____       KEYC_____

  _____    KEY1____     ESA_____       KEY1_____

  _____    KEY1CF1_     CF_____       KEY1CF1

  _____    KEY1CFF_     CF_____

  _____    _____     _____       _____
```
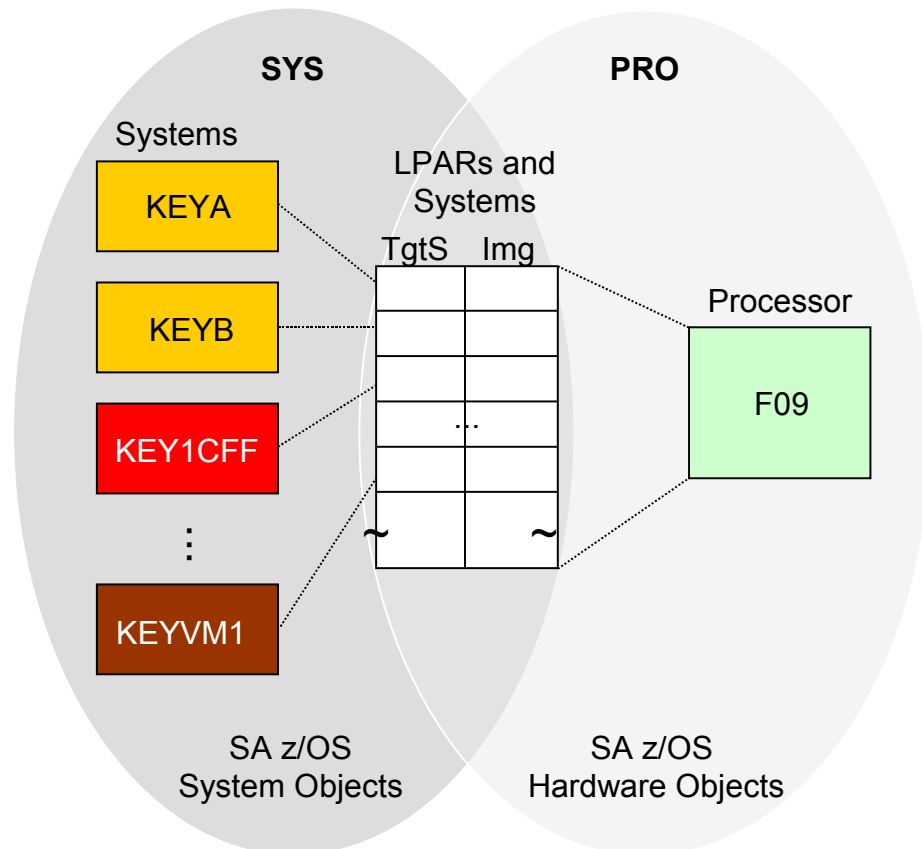
ProcOps target system name

Image / LPAR type ESA, CF, or LINUX

Image / LPAR name as defined by HCD or IOCP

JMH – Processor Operations Overview

Defining Mapping Between Target Hardware and Systems

SYS

PRO

Systems

KEYA

KEYB

KEY1CFF

⋮

KEYVM1

LPARs and
Systems

TgtS   Img

. . .

~   ~

Processor

F09

SA z/OS
System Objects

SA z/OS
Hardware Objects

- Define images / LPARs and their mode on the target hardware
  - Logical partitions, mode ESA
  - IFL-partitions, mode LINUX
  - Coupling facilities, mode CF

- Use image / LPAR names as defined within HCD or by IOCP

- Define SA z/OS system resources and map each to a unique ProcOps target system
  - z/OS, z/VM, and z/VSE are mapped to target system with mode ESA
  - Linux is mapped to target system with mode LINUX
  - Coupling facility is mapped to target system with mode CF

TgtS: ProcOps target system name
Img: Image / LPAR name

Defining Target Systems

```
COMMANDS   HELP
------------------------------------------------------------------
                          System Information
Command ===> _____

Entry Type : System                PolicyDB Name    : JHSAPLEX_V320
Entry Name : KEYA                  Enterprise Name : ACME


Operating system . . . . MVS__       (MVS VM VSE LINUX CF)
MVS System name. . . . . KEYA_____   (MVS systems only)
Image/ProcOps name . . . KEYA____
```

```
                    MVS Target System IPL Information
    Command ===> _____

    Entry Type : System                PolicyDB Name    : JHSAPLEX_V320
    Entry Name : KEYA                  Enterprise Name : ACME


    Enter responses to the following messages for the target system.
    IEA101A specify system parameters
    R 00,101A_____
    IEA347A specify master catalog parameter
    R 00,347A_____
    IEA213A or IEA214A DUPLICATE VOLUME
    1111  2222  ____  ____  ____  ____  ____  ____  ____  ____  ____  ____

    Provide default response when neither device is specified . . . YES
```
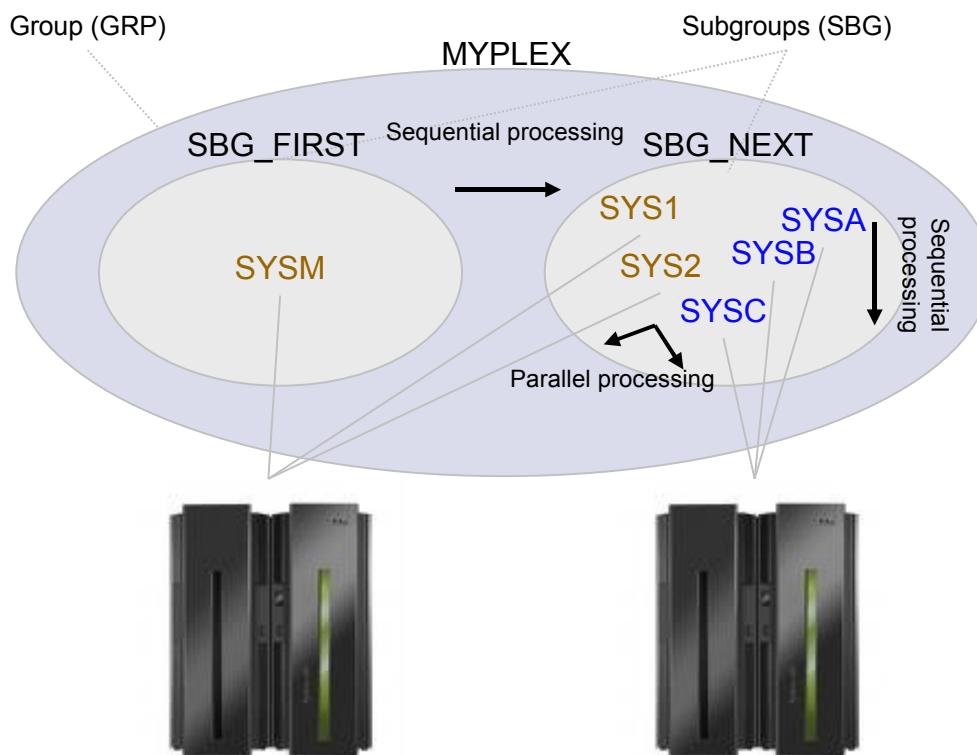
Type of "Operating System"

System Operations system name, e.g.
KEYA/SYS/KEYA

ProcOps target system name

Built-in automation provided by SA z/OS

Target System Grouping

Example: Force IPL/Shutdown Sequence

Group (GRP)

Subgroups (SBG)

MYPLEX

SBG_FIRST   Sequential processing   SBG_NEXT

SYS1   SYSA

SYSM   SYS2   SYSB
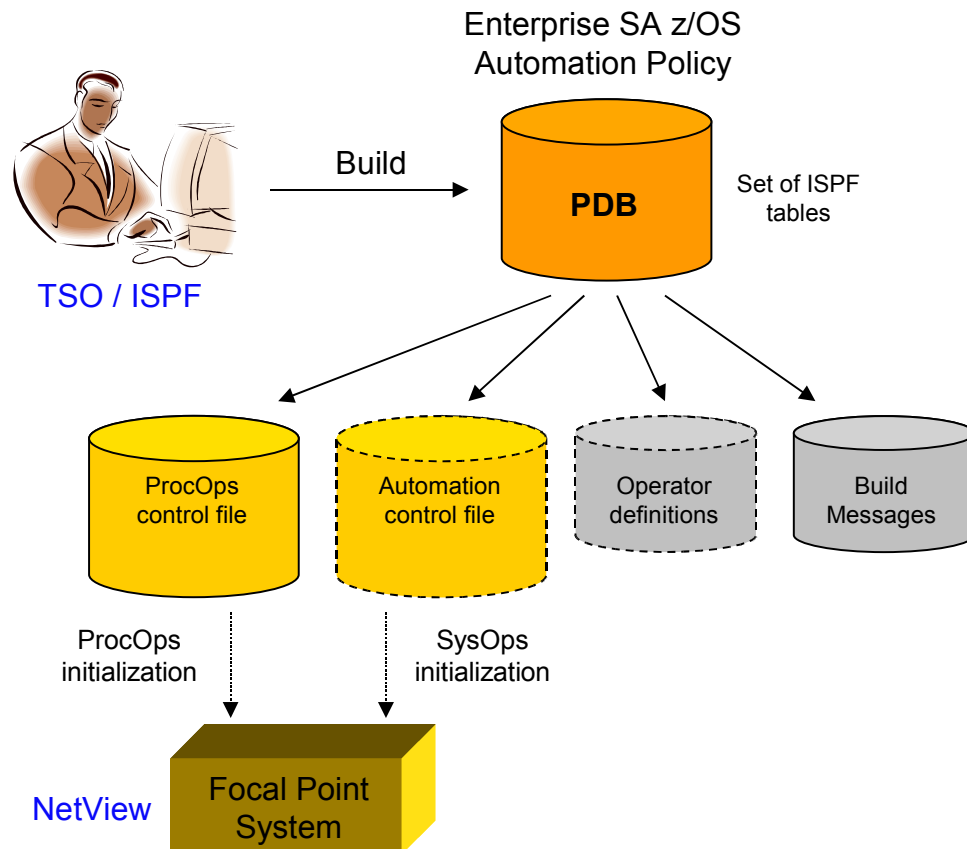
SYSC

Parallel processing

Sequential processing

- Groups and subgroups are a means to order target systems
  - Groups and subgroups are specified in the automation policy
  - A group may contain target systems and/or subgroups
  - A subgroup may contain target systems on the same or different hardware

- Some operations can be done for multiple target systems at once
  - Sequentially (if ordered or same CPC)
  - Parallel (different CPCs)
  - Examples: ACTIVATE, DEACTIVATE

- Typical scenario
  - IPL or shutdown a specific target system at first
  - Subsequently, IPL or shutdown all other target systems

Processor Operations Control File

Enterprise SA z/OS
Automation Policy

TSO / ISPF

Build

PDB

Set of ISPF
tables

ProcOps
control file

Automation
control file

Operator
definitions

Build
Messages

ProcOps
initialization

SysOps
initialization

NetView

Focal Point
System

- Target hardware and target systems are defined within the SA z/OS automation policy

- Build required to produce control file(s) for NetView-based focal point
  – ProcOps control file (POCNTL)
  – Optional: NetView operator definitions
  – Optional: SysOps control file (ACF)
    – Only required when exploiting internal HW connections (see later)

- Processor Operations is initialized by referring to the ProcOps control file

Agenda

- Overview

- Customization

- ▶ **Sample User Scenarios**

- Additional Connections Protocols

- User Extensions for Automation

 JMH - Processor Operations Overview

Getting Started

- **Processor Operations is started on the focal point system**
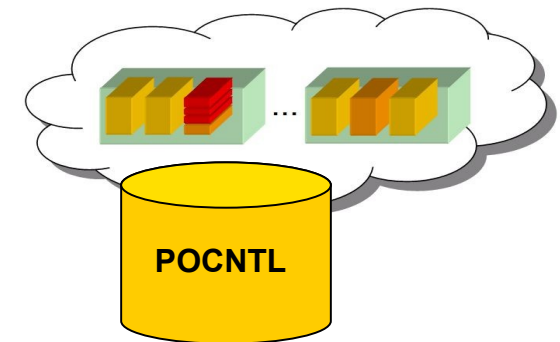
    - Syntax: ISQSTART *control_dataset_name*

- **Stop ProcOps**

    - Syntax: ISQSTOP

- **Restart ProcOps to activate configuration changes**

    - Syntax: ISQSTOP
                       ISQSTART *control_dataset_name*

POCNTL

Target System Overview – ISQXDST

Starts session	Closes session	Displays target system IPL-options

```
ISQESUM          SA z/OS  - Proc-Ops Target Status Summary    Updates: Dynamic
    Control file in use: BHOL.JHSAPLEX.V320.POCNTL
                                                            NMC Bridge: INACTIVE
I isqxiii C isqxcls O isqxopt  A,B view netlogs E events    Debug Mode: OFF

Cmd      Target System   Status          Focal Points - Primary: IPXNG Backup:
___      BOEVMTSA (*)    INITIALIZED
___      KEYA            INITIALIZED
___      KEYB            INITIALIZED
___      KEY1            INITIALIZED
___      KEY1CFF         INITIALIZED
___      KEY1CF1         INITIALIZED
___      KEY2            SNMP SESSION PROBLEM
___      KEY6            INITIALIZED
___      KEY6CFF         CLOSED
___      KEY6CF1         INITIALIZED
___      KEY7            IPL COMPLETE
___      LNXT1           UNKNOWN




Enter=Static  PF1=Help PF3=Exit PF4=Tgt Sys Summary PF5=Debug On/Off
PF6=Roll      PF7=Up   PF8=Down PF9=Tgt HW Summary  PF11=PATH Details PF12=Quit
```

Retired – was used for NVC connections

Displays netlog filtered to only display ProcOps information

Hardware Communication Sessions

- The ISQXIII-command initializes a target system and establishes a hardware connection (if required) between
  - Processor Operations focal point system and
  - Target hardware

- Hardware sessions are monitored as specified in the automation policy
  - Processor Operations automatically recovers (# of retries times) sessions that do not respond to the path polling request

```
Path Poll Frequency . . . . . . 30       (0 to 99 minutes)
Path Poll Retries . . . . . . . 2_       (0 to 99)
```

- Hardware sessions remain up until Processor Operations terminates

Sample Task – Issue Operating System Commands

- **Supporting operating systems**
  - All control programs with console integration facility enabled
  - z/OS, z/VM, z/VSE, Linux on System z, and Coupling Facility Control Code
  - Some standalone utilities such as SADMP

  - Syntax: ISQSEND *target_system* OC *command*

- **Example**

```
ISQSEND KEY6 OC D IPLINFO
```

```
ISQ901I SA02.KEY6 SC AOFA0200 BCPCMD CC(00000000)
ISQ901I SA02.KEY6 OC IEE254I  17.14.58 IPLINFO DISPLAY 111
ISQ901I SA02.KEY6 OC  SYSTEM IPLED AT 19.56.56 ON 01/07/2009
ISQ901I SA02.KEY6 OC  RELEASE z/OS 01.09.00    LICENSE = z/OS
...
ISQ901I KEY6     SC  ISQ417I BCPCMD STATUS(SUCCESS)
ISQ017I ISQSEND completed successfully.
```

Sample Task – Query / Update LPAR Settings...

From HMC: Select CPC, then open "Change LPAR Controls"

Sample Task – Query / Update LPAR Settings *(cont.)*

- Or using the Processor Operations common command ICNTL

    - Syntax: ISQCCMD *target_object* ICNTL [*parameter ...*]

- Example:

```
ISQCCMD KEY6 ICNTL
ISQ901I KEY6      SC  ISQ417I ICNTL STATUS(SUCCESS)
ISQ901I SA02.KEY6 SC AOFA0007 ICNTL SA02.KEY6 STATUS(ACCEPTED)
CPCSNAME(DEIBMIP1.IP3TKY60) PT(GPP) TSTIME(090116124025)
ISQ901I SA02.KEY6 SC AOFA0007 CLUSTR(KEY6PLEX)
ISQ901I SA02.KEY6 SC AOFA0007 DEFCAP(88)
ISQ901I SA02.KEY6 SC AOFA0007 GRPPRF()
ISQ901I SA02.KEY6 SC AOFA0007 PWI(100)
ISQ901I SA02.KEY6 SC AOFA0007 PWIC(NO)
ISQ901I SA02.KEY6 SC AOFA0007 PWMN(0)
ISQ901I SA02.KEY6 SC AOFA0007 PWMX(0)
ISQ901I SA02.KEY6 SC AOFA0007 PWC(100)
ISQ901I SA02.KEY6 SC AOFA0007 PWCC(NO)
ISQ901I SA02.KEY6 SC AOFA0007 WLME(NO)
ISQ901I SA02.KEY6 SC AOFA0007 ICNTL REPORT COMPLETE
ISQ419I ISQCCMD ICNTL processing on KEY6 is complete.
```

Image control command (default is to merely list current settings)

Defined Capacity

Initial Capping = NO

Weights (current, initial, minimum and maximum)

Machine not capped, WLM CPU mgmt = NO

Sample Task – Query Target Image Information...

- Command syntax for programming / automation:

  – Example: ISQCCMD *target_system* GETIINFO

  Target system as defined by ProcOps

  – Yields:

  Current status

  Image / Partition number

  Image / Partition name as defined by HW

  ```
  AOFA0017 GETIINFO F09.KEYA STATUS(OPERATING) CPCINAME(KEYA)
  INUMBER(0A)
  IDATA(OSNAME(KEYA),OSTYPE(MVS),OSLEVEL(z/OS_V1R10),SYSPLEX(KEYAPLEX))
  MODE(ESA390) CPCSNAME(IBM390PS.F09) BUSY(NO) TSTIME(090114174505)
  ```

  Operating System specific information

  Containing CPC

  BUSY(YES) indicates that HW-request would not succeed at this point in time (not returned by older HW)

Sample Task – Display Target Image Information *(cont.)*

- ISQXDST > Target System Summary (PF4)

```
ISQETARG          SA z/OS  - Proc-Ops  Target System Summary  Updates: Dynamic


Target System
  Name          : KEYA
  Description   : Primary system in JHSAPLEX
  O.S.          : MVS
  Load Profile  : LAST
  Status        : INITIALIZED
  Attention     :


Target Hardware
  Name          : F09          Mode :  LPAR
  Status        : SERVICE REQUIRED
  Path Status   : ACTIVE


Target Hardware LPAR
  Name          : KEYA         Mode :  ESA
  Image Profile: KEYA


Last Significant Message:
ISQ417I GETIINFO STATUS(SUCCESS)


Enter=Static  PF1=Help PF3=Exit  PF6=Roll PF7=Oper List  PF8=Guests
PF9=Target Hardware   PF11=Path Detail   PF12=Quit
```
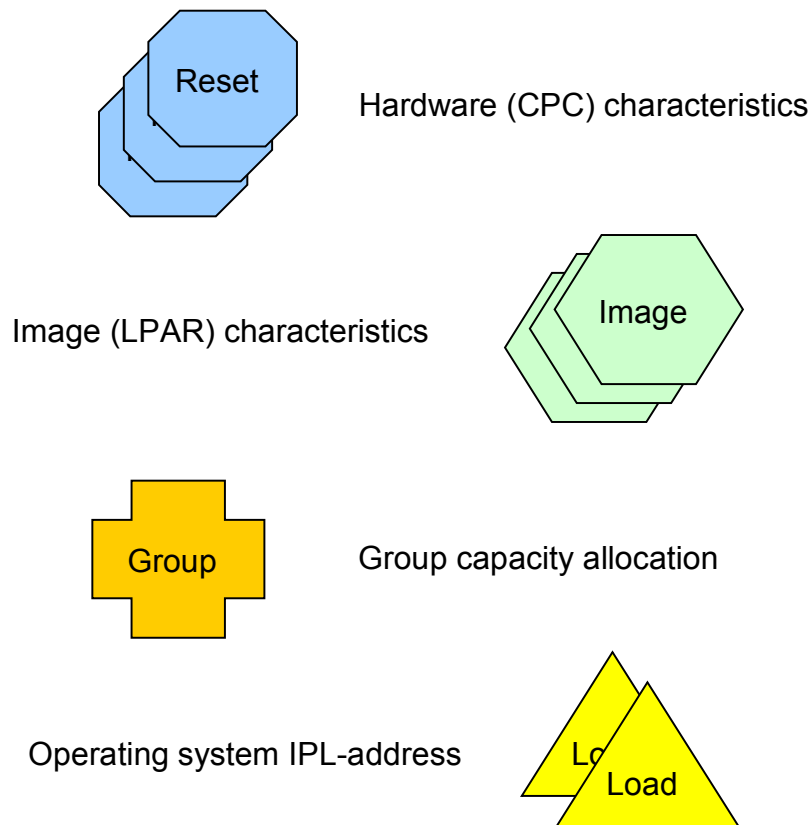
Sample Task – Activation Profile Management...

Reset

Hardware (CPC) characteristics

Image

Image (LPAR) characteristics

Group

Group capacity allocation

Load

Load

Operating system IPL-address

- **Common command PROFILE can be used to**
  - List all activation profiles known on a CPC
  - Browse the contents of a particular activation profile
  - Read or update a single activation profile attribute

- **Usage**
  - Centralized activation profile management
  - Automatic activation profile compliance checking
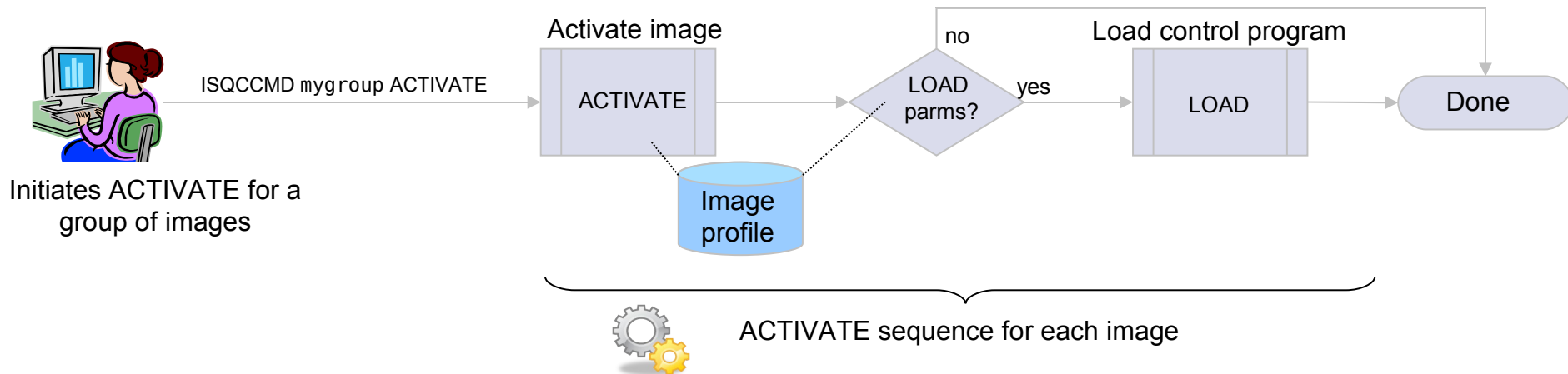 - Avoidance of cumbersome manual work at the GUI

Sample Task – Activation Profile Management *(cont.)*

- Access all activation profiles on a given CPC
  - Example: `ISQCCMD SA02 PROFILE CMD(OPEN)`

- Get a list of activation profiles for a given type
  - Example: `ISQCCMD SA02 PROFILE CMD(LIST) TYPE(LOAD)`

  ```
  ISQ901I SA02.KEY6 SC AOFA0020 APROF SA02 STATUS(ACCEPTED) CPCSNAME...
  ISQ901I SA02.KEY6 SC AOFA0020 LOAD(DEFAULTLOAD)
  ...
  ISQ901I SA02.KEY6 SC AOFA0020 LOAD(ISQ0IPUFM)
  ISQ901I SA02.KEY6 SC AOFA0020 APROF REPORT COMPLETE
  ```

- Update single activation profile attribute
  - Example: `ISQCCMD SA02 PROFILE CMD(UPDATE) TYPE(LOAD)`
    `NAME(DEFAULTLOAD) VAR(IPLADR) VAL(881D)`

- Finish work with activation profiles
  - Example: `ISQCCMD SA02 PROFILE CMD(CLOSE)`

Sample Task – Activate Images and IPL Control Program

- Processor Operations can activate one or more images at once
  - Single target systems, a subgroup, or a group of target systems
  - Each target system's activation image profile can optionally indicate LOAD parameters for a control program, for example z/OS

ISQCCMD mygroup ACTIVATE

Initiates ACTIVATE for a group of images

Activate image

ACTIVATE

Image profile

LOAD parms?

no

yes

Load control program

LOAD

Done

ACTIVATE sequence for each image

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▶ **Additional Connections Protocols**

- User Extensions for Automation

Internal Connections (aka BCPii)

- **Target hardware defined with connection protocol INTERNAL**
  - Direct (internal) communication path to the local Support Element (SE)
  - A target system can only be associated to one hardware
    - For parallel exploitation, another target hardware entry with its own unique set of target systems has to be created

```
Entry Type      : Processor        PolicyDB Name   : JHSAPLEX_V320
Entry Name      : F09II            Enterprise Name : ACME

  Processor Type . . . . . . . .  eServer   (eServer 9672 9674 3000)
  Mode . . . . . . . . . . . . .  LPAR      (LPAR ESA)
  Connection Protocol . . . . . . INTERNAL  (INTERNAL NVC SNMP)
  CPC Name / NAU . . . . . . . .  F09_____
  Network Name . . . . . . . . .  IBM390PS
```

> Direct communication with SE, IP-addresses are irrelevant!

> Network name and CPC name are required to address this image!
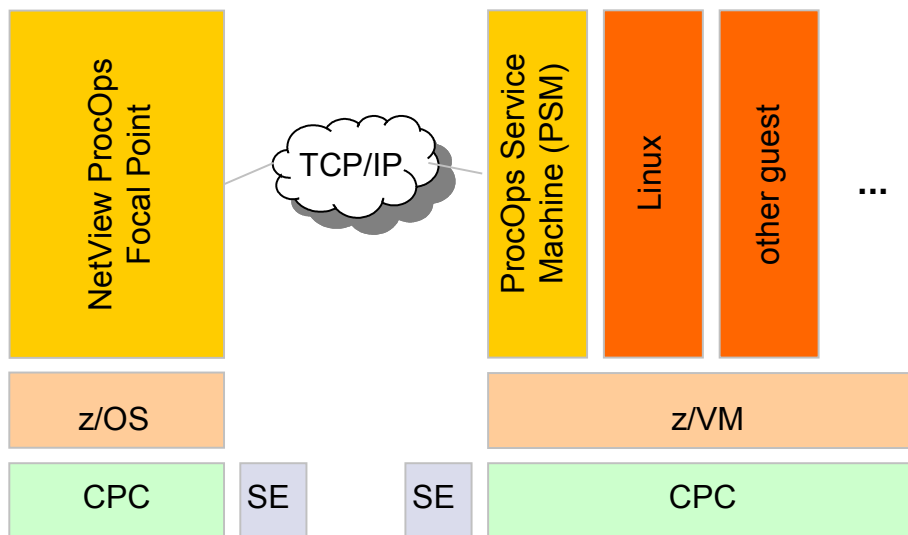
- **Exploiters**
  - Geographically Dispersed Parallel Sysplex (GDPS) *
  - SA z/OS Coupling Facility operations *
  - SA z/OS LPAR management functions **

*   No TOWER SA.PROCOPS required
**   TOWER SA.PROCOPS required, but Processor Operations initialization necessary

z/VM Guest System Operations

- The ProcOps Service Machine (PSM) acts as a proxy target system for all z/VM guests
  - Monitors messages issued by the guests
  - Forwards messages to the ProcOps focal point
  - Receives commands from the ProcOps focal point

- The PSM allows you to
  - Map guest systems to ProcOps target systems
  - Operate guest systems similar to native target systems

- PSM communicates with known ProcOps focal points directly via TCP/IP

PSM Definition

```
COMMANDS   HELP
-------------------------------------------------------------------------
                    ProcOps Service Machine Information
Command ===>  _____

Entry Type      : Processor        PolicyDB Name   : JHSAPLEX_V320
Entry Name      : PSM1             Enterprise Name : ACME

  TCP/IP Address or Hostname  . .
9.152.85.104_____
  Message Server Port . . . . . . 2001_      (0 - 65535)
  Command Server Port . . . . . . 2002_      (0 - 65535)
  IP Stack  . . . . . . . . . . . _____
  Security Resource Name  . . . . PSM1____
  Security Network Name . . . . . DEIBMIP1
  Community Name / Auth Token . . PROCOPS_
  Path Poll Frequency . . . . . . 30         (0 to 99 minutes)
  Path Poll Retries . . . . . . . 2_         (0 to 99)
  VM Host Target System Name  . . BOEVMTSA
  Service Machine Name  . . . . . PSM1____
```

Address of PSM

Connection parameters, see PSM parameter file ISQPARM DATA

Information that must match a RACF profile name of form *NETID.NAU*

Authorization token, see PSM parameter file ISQPARM DATA

Optional, only necessary to manage the PSM itself

Sample Task – Boot / Shutdown Linux System

- **Boot Linux system**
  - Syntax: ISQCCMD *linux_target* ACTIVATE

```
ISQCCMD LNXT1 ACTIVATE
...
ISQ900I PSM1.LNXT1 OC
ISQ900I PSM1.LNXT1 OC  Welcome to SUSE LINUX Enterprise Server 9 (s390) - Kernel 2.6.5-7.282-s390
ISQ900I PSM1.LNXT1 OC
ISQ900I PSM1.LNXT1 OC
ISQ900I PSM1.LNXT1 OC  lnxct11 login:
```

- **Shutdown Linux system**
  - Syntax: ISQCCMD *linux_target* DEACTIVATE

```
ISQCCMD LNXT1 DEACTIVATE
ISQ402I LNXT1 DEACTIVATE TSTIME(090209171004) STATUS(ACCEPTED)
ISQ700I PSM1 SC  ISQCS0207I Command Server has accepted new session. Socket id is 4.
ISQ700I PSM1 SC ISQCS0216I Command CP FORCE LNXT1 executed. Return code = 0
ISQ700I PSM1 SC  ISQCS0251I Request <CP FORCE LNXT1> received from remote NetView
ISQ700I PSM1 SC HCPSIG2114I User LNXT1 termination may be delayed for up to 60 seconds
ISQ700I PSM1 SC  ISQCS0217I Main response is <ISQCS0216I Command CP FORCE LNXT1 executed. Return
ISQ700I PSM1 SC  code = 0>
ISQ900I PSM1.LNXT1 OC   INIT: Switching to runlevel: 6
ISQ900I PSM1.LNXT1 OC   INIT: Sending processes the TERM signal
...
```

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- Additional Connections Protocols

▶ User Extensions for Automation

REXX-Example to automate Message IEE357A...

- Processor Operations has an own NetView automation table loaded automatically upon startup → ISQMSG01

- The automation table defines rules how to react on individual messages

- Messages considered are related to
  - Processor Operations hardware session status model
  - z/OS, z/VM, z/VSE and Linux operator systems
  - Product provided samples (deactivated initially)

- All messages are contained within generic ISQ900I message
  - ISQ900I *tgtsys* OC **nn* IEE357A REPLY WITH SMF VALUES OR U
  - To trap IEE357A, the following rule is required

```
IF TEXT = . ' IEE357A ' .
THEN EXEC ( CMD ('ISQI357 ' ) ROUTE (ONE *) )
     NETLOG(Y) DISPLAY(N) ;
```

REXX-Example to automate Message IEE357A *(cont.)*

```
ISQ357I:
CURMSG.0=0
/*------------------------------------------------------------*
/* Get current message  (from IEE357I entry in ISQMSG01)      */
/*------------------------------------------------------------*/
'PIPE SAFE * | STEM CURMSG.'

If CURMSG.0>0 Then Do

  Parse Var CURMSG.1 'ISQ900I' TGT 'OC' '*'RPN MID .

  If Datatype(RPN,'N') Then NOP
  Else Do
    MID=RPN; RPN='00'
  End
  /*------------------------------------------------------------*
  /* IEE357A REPLY WITH SMF VALUE OR U                          *
  /*------------------------------------------------------------*
  If MID='IEE357A' Then Do
    'ISQSEND 'TGT' OC R '||RPN||',U'
    ISQrc = RC;
    If ISQrc Then Say 'ISQSEND failed, RC='ISQrc
  End

End
Exit 0
```

Loads the current message from NetView's default SAVE into local stem

Extract target system and reply ID from the message

Handle NIP-messages correctly, i.e. no reply ID is passed

Sanity check: was it really IEE357A?

Send "R nn,U" back to target system where the message occurred originally

Bibliography

- **Related System Automation Documentation**
  - SA z/OS V3.2 Planning and Installation (SC33-8261)
  - SA z/OS V3.2 User's Guide (SC33-8263)
  - SA z/OS V3.2 Operator's Commands (SC33-8265)
  - SA z/OS V3.2 Defining Automation Policy (SC33-8262)
  - SA z/OS V3.2 Customizing and Programming (SC33-8260)

- **Related Hardware Documentation**
  - System z Application Programming Interfaces (SB10-7030-11)
  - Hardware Management Console Operations Guide Version 2.10.0 (SC28-6867)
  - Support Element Operations Guide Version 2.10.0 (SC28-6868)

End of Presentation

Thank you very much for your attention

Tivoli System Automation Web References

SA z/OS	http://www.ibm.com/software/tivoli/products/system-automation-390/
	http://www-03.ibm.com/servers/eserver/zseries/software/sa/
SA MP	http://www-01.ibm.com/software/tivoli/products/sys-auto-multi/
SA AM	http://www-01.ibm.com/software/tivoli/products/sys-auto-app-mgr/
SA IOM	http://www-306.ibm.com/software/tivoli/products/sys-auto-iom/

User Forums

SA z/OS	http://groups.yahoo.com/group/SAUSERS/
SA MP	http://www.ibm.com/developerworks/forums/forum.jspa?forumID=1175
SA AM	http://www.ibm.com/developerworks/forums/forum.jspa?forumID=1304
SA IOM	http://tech.groups.yahoo.com/group/SA_IOM/