Clever Automation with IBM SA z/OS V3.5

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IBM

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15641

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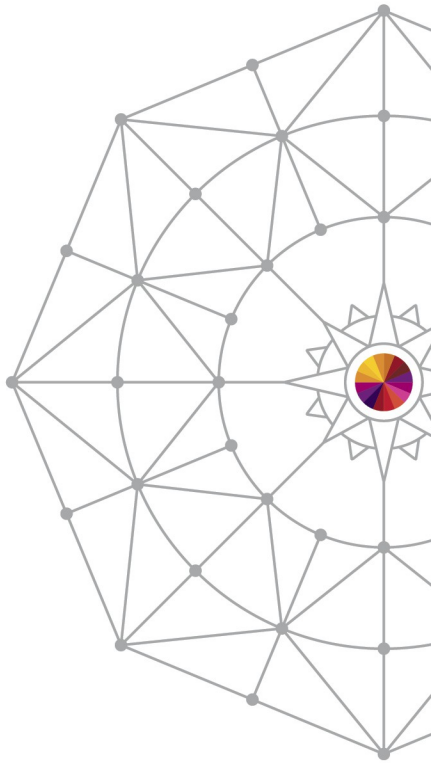

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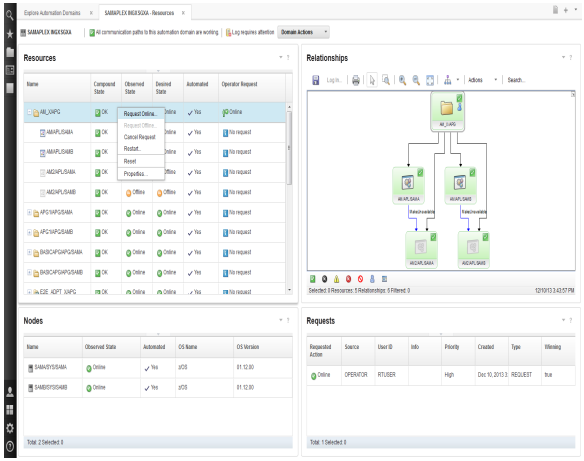
Agenda

- Overview
- Integration with Omegamon
  - Immediate Message reporting on TEP
  - Looping Address Space Suppression
- IPL
  - Staged IPL
  - IPL complete notification
- Manage bulk starts / stops using Pacing Gates
- Configuration Assistant
- Extended XCF communication
- Configuration Refresh Indicator

IBM System Automation family

IBM only vendor to provide end-to-end, cross-platform Automation



System Automation Application Manager V4.1

System Automation for z/OS V3.5

System Automation for Multiplatforms

IBM PowerHA

VCS

MSCS

Unclustered nodes

z/OS

Linux, AIX, Windows

Linux, AIX, Windows

IBM Service Management Suite for z/OS V1.2

new

IBM Tivoli System Automation for z/OS V3.5

IBM Tivoli OMEGAMON Performance Management Suite for z/OS V5.3

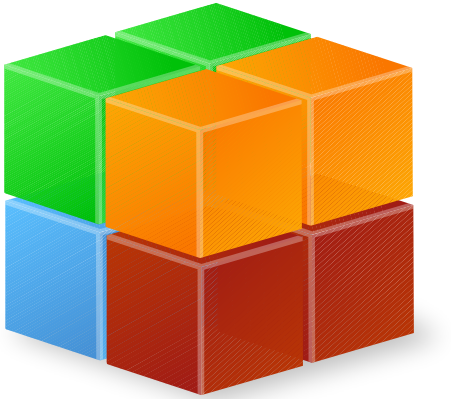
IBM Tivoli NetView for z/OS V6.2.1 *

IBM Tivoli Asset Discovery for z/OS V8.1

trade up considerations for any component products already owned

* OTC

IBM Service Management Suite for z/OS V1.2



- Improving personnel interaction for better synergy and efficiency
- Reducing meantime to correction of complex problems
- Expanding solution throughout IBM z/OS platform.
- Consolidating views that can allow for quick assessment for the health of your business environment
- Providing management capabilities through automation and monitoring integration for business continuity
- Easily and more intuitively install and customize various components

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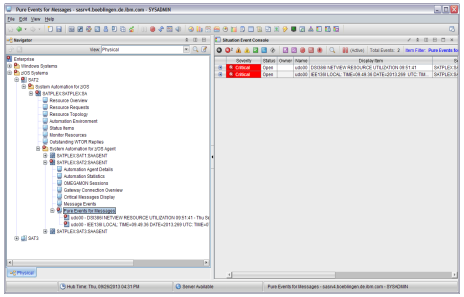
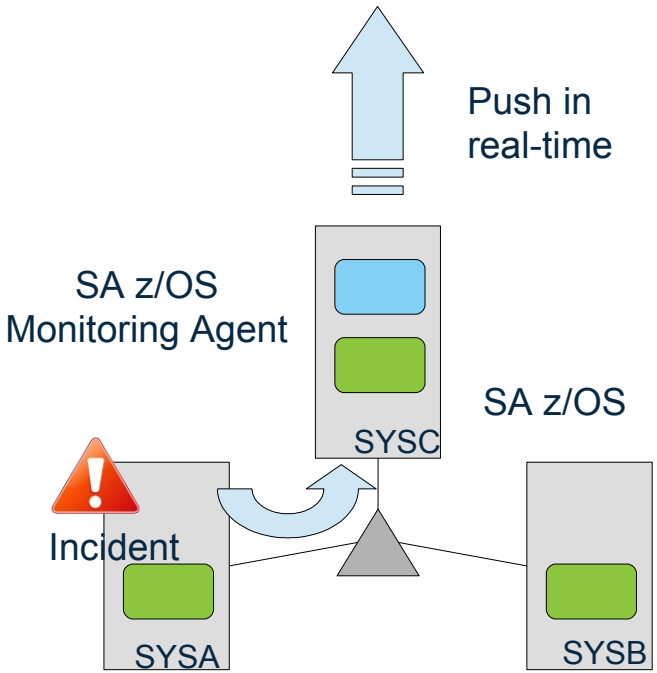
Immediate Message reporting on TEP



TEP

Short-lived incidents may remain undetected by situation sampling routines and hence are invisible to the operations team



- SA z/OS exploits ITM pure event situations

- In combination with its Monitoring Agent, SA z/OS allows to send selected exceptional messages immediately to TEP by means of **policy**

Immediate Message reporting on TEP

SETUP

OA43571

TEP

- Download new System Automation application support CD (Link to ITM support) and install on all ITM components
- Define, deploy and activate situations for the new Message Events attribute group.

SA z/OS

- Install or update SA Monitoring Agent (TEMA) according to Planning and Installation manual
- Have the TEMA in the automation policy with CATEGORY=ITM and SUBCATEGORY=KAHAGENT
- Update configuration to use ITM in the Inform List policy of APLs, MTRs, MVC, or XDF

```
              Application Information

Entry Type : Application
Entry Name : CANSAH

Category                  : ITM

Subcategory  . . . . . . . KAHAGENT
```

```
              Application Information

Entry Type : Application
Entry Name : LOOPSUPP

Inform List  . . . . . . . SDF ITM
```

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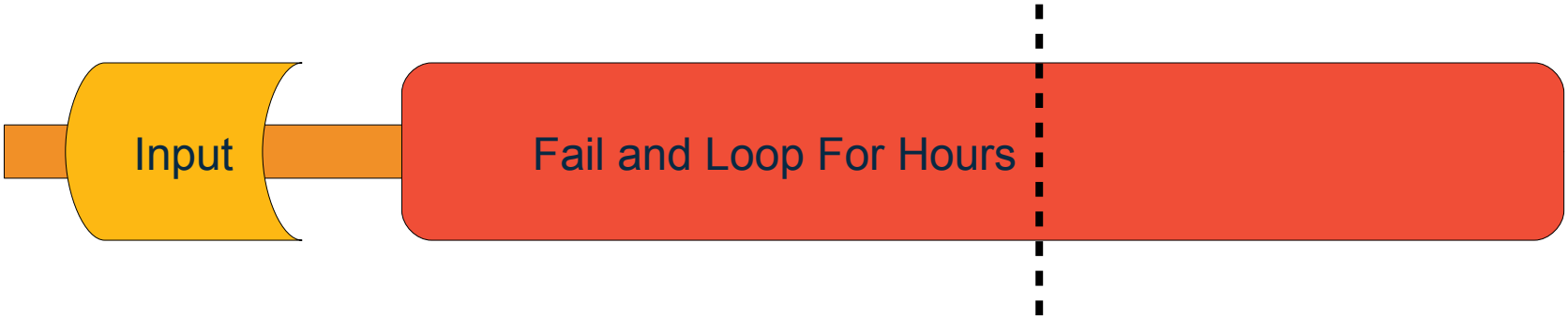
Looping Address Space Suppression

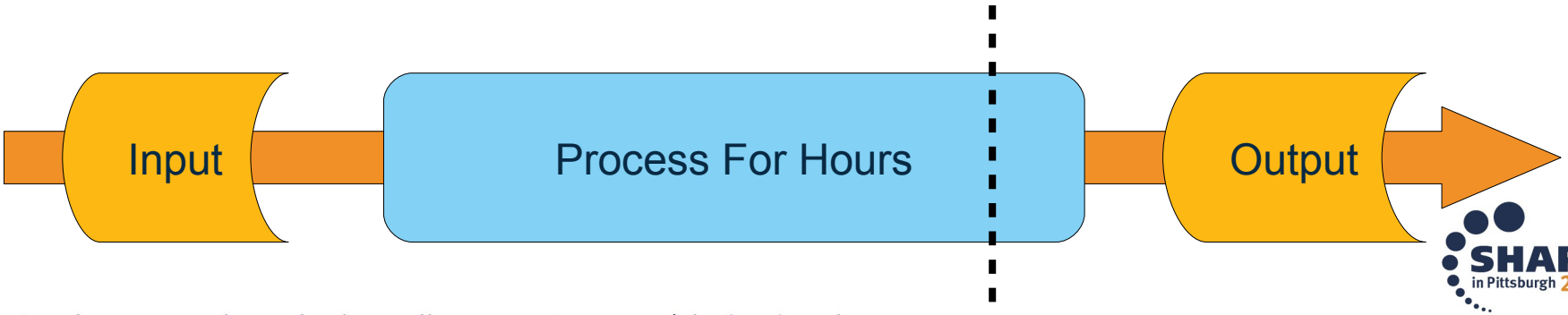
False Positives

Omegamon cannot distinguish!

A job that loops and consumes CPU unnecessarily



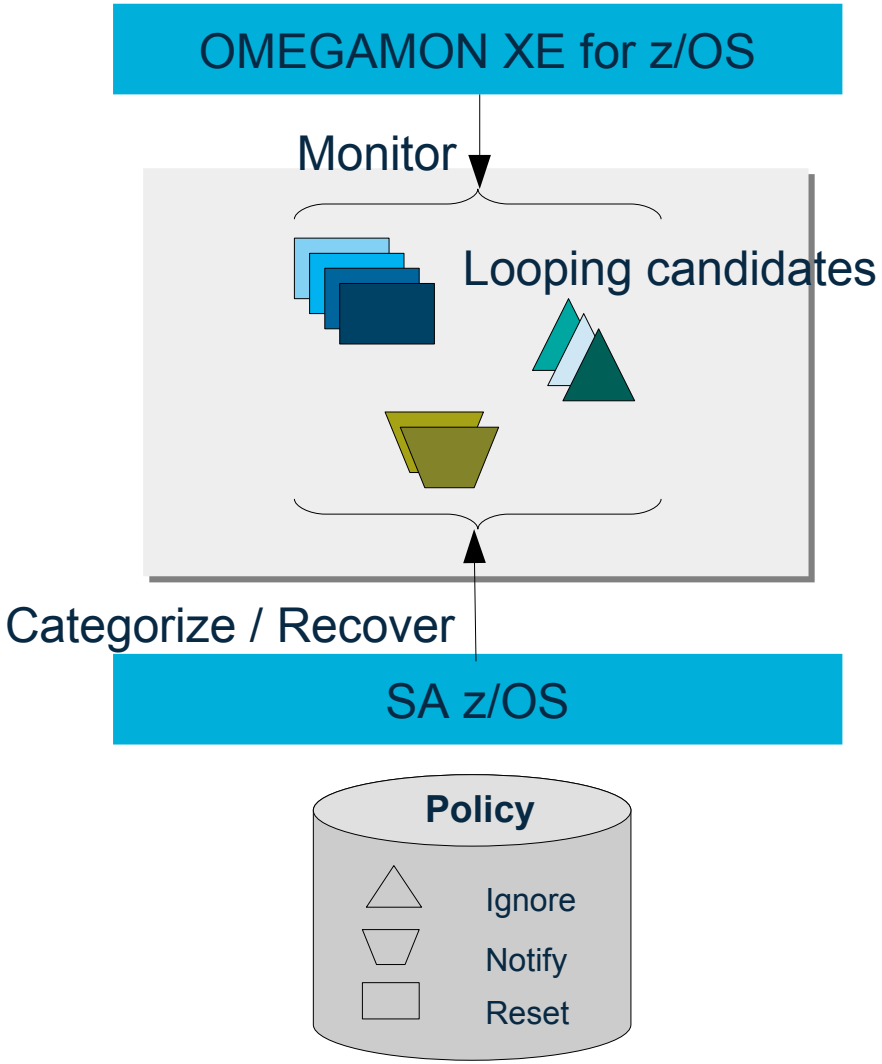
A job that legitimately sits there burning CPU for hours



Looping Address Space Suppression

OA43571
OA44246

Overview



- Detect when started tasks / jobs show abnormally high CPU utilization
- Prevent that these types of work can dominate the system
- SA z/OS can categorize different types of work and allows to define various recovery actions through **policy** – not programming!

Looping Address Space Suppression

Best Practices Policy *ITM

```
                    Select Add-on Policy Components

Components of Add-on Policy : *ITM

Select one or more components to be added to your Policy Database:

Action Status      Component
                   Automation Monitoring Agent (TEMA)
       SELECTED    Monitoring Analytic
```

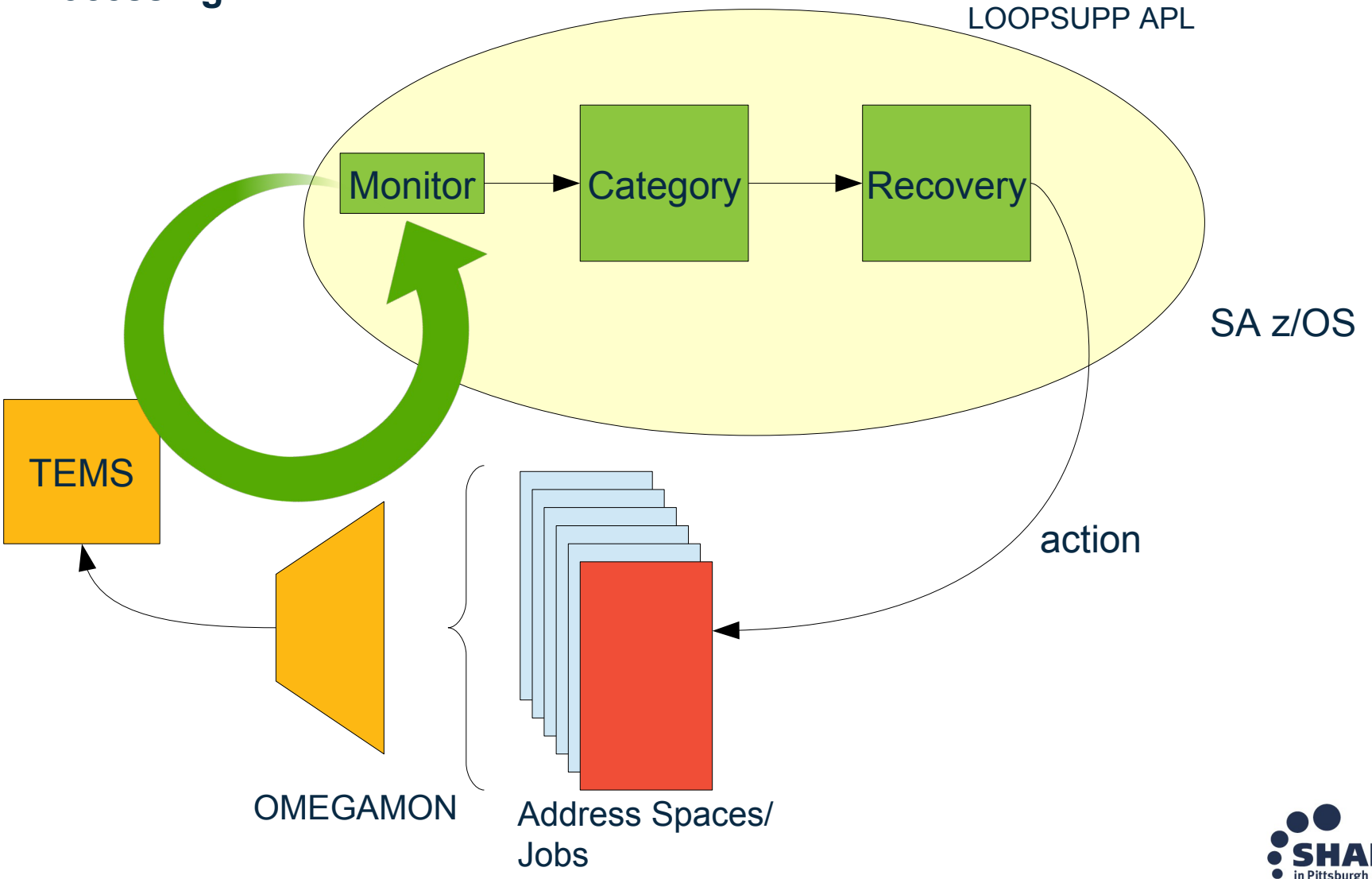
Has been completely modernized in SA 3.5

Besides Omegamon

- ING_ANALYTIC APG
- C_LOOPSUPP APL
- LOOPSUPP APL
- SOAP_SERVERS NTW

Looping Address Space Suppression

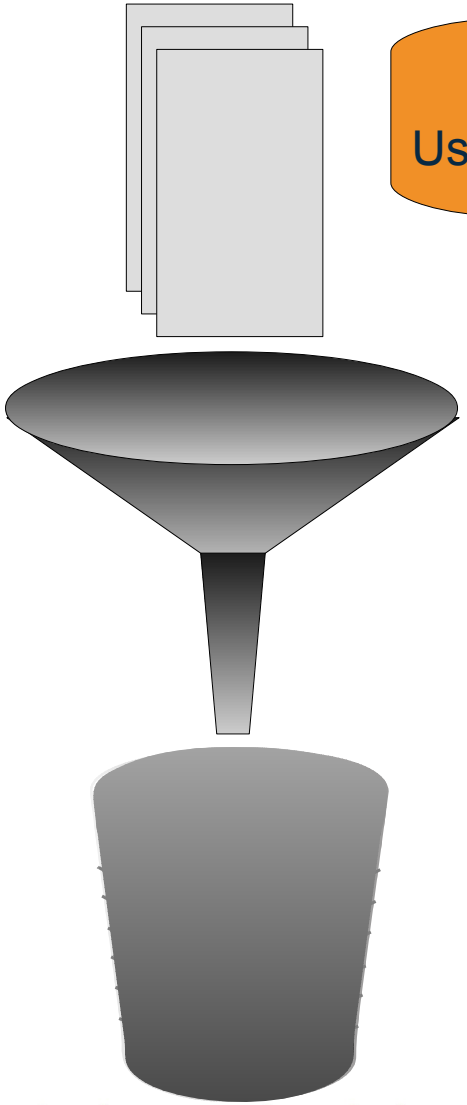
Processing



Looping Address Space Suppression

Categorizing

LOOPSUPP APL **MESSAGES/USER DATA** INGCATEGORY



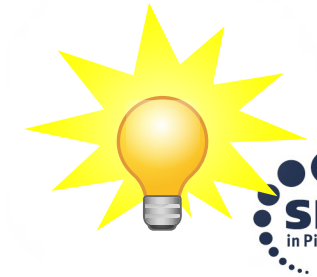
Categorization possible
Using following differentiators

WLM Service Class

Address Space Type
STC / BATCH / TSO

Jobname
Stepname

Managed by SA?



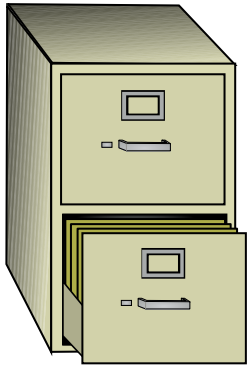
Looping Address Space Suppression

Recovery action example

Different Recovery actions depending on the pass

LOOPSUPP APL

MESSAGES/USER DATA INGRECOVERY



1. pass issue warning message
2. pass get diagnostic data
3. pass suspend

1. pass issue warning message
2. pass get diagnostic data and cancel

Looping Address Space Suppression

Recovery actions

Non disruptive	WLM	User specific	removal
IGNORE WARN DIAG	SUSPEND RESET_*class*	USER_*cmd*	STOP CANCEL FORCE - SHUT_*type*

parameters:
- asid
- jobname
- jobid
- jobstep
- cpuindex

Looping Address Space Suppression

Example DIAG output

```
ING602I DIAGNOSTICS FOR BUMUSL (ASID 00D8)
Messages from Inspect tool:
KM3IN008I GRANULARITY SET TO 0X00000B40
Requested 1000 samples at 5us intervals
Took 1000 samples of which 1000 were valid.
```

```
Program: EXEC
  TCB  :          @ 008E3390 (100.0 JOB)
  LMod : IRXINIT  @ 0C467000 (100.0 JOB, 100.0 TCB)
  CSECT: *-UNKN-* @ 0C467000 (100.0 JOB, 100.0 TCB, 100.0 LMOD)
                    Offset   Percentage
                    -------- ----------
                   +00000B40       73.3
                   +00009240        6.6
                   +00000000        5.1
                   +00009D80        3.4
                   +00006540        3.1
                   +000021C0        2.4
                   +00007080        2.2
                   +00001680        1.7
                   +0000A8C0        1.1
                   +0000B400        0.7
                   +00007BC0        0.1
```

Looping Address Space Suppression

Adjust Monitor to your needs

C_LOOPSUPP APL – **STARTUP** policy

```
            Command Processing : STARTUP

Mixed case . . . NO   (YES NO)

Cmd Type       AutoFn/* Command Text
                        INGROMLS START &SUBSAPPL HUBTEMS 00:05:00
```

SOAP Server Definition of *ITM

Monitor Interval; defaults to 5 min

CPU_Loop_Index; defaults to 99.0

Looping Address Space Suppression

Definition of the SOAP Server

SOAP_SERVERS NTW – **HUBTEMS**

```
Host name. . . . .
hubtems.ibm.com
                              Symbolic host name or IP-address of the SOAP-Server

Port number. . . . 1920       Port number of the SOAP-Server (1-65535)
Protocol . . . . . HTTP       Protocol used for SOAP requests (HTTP or HTTPS)
User ID. . . . . .
                              User ID to log on to SOAP server

Password . . .
                              Password of the logon user or SAFPW

Absolute path. . .
///cms/soap
                              Absolute path of the SOAP-Server on that host
```

User ID and Password fields: SA z/OS 3.5 only

- Need to prime userid

NETVASIS INGPW USER SOAP INIT=*userid*

USER is a constant, userid is not

- Need to prime password

NETVASIS INGPW *userid* SOAP INIT=*password*

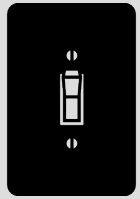
Setup for SA z/OS 3.4

Looping Address Space Suppression

Control Monitor execution

C_LOOPSUPP APL – **Minor Resources** policy

```
                    Minor Resource Definitions

Entry Type : Application              PolicyDB Name   : SHARE
Entry Name : C_LOOPSUPP               Enterprise Name : SHARE

Line Commands: F (Flg), S (Thr), T (Thr), CN (Class Name)
               I, D (insert or delete lines)

                                                - Automation  Flags -
Cmd Minor Resource Name               Thres   A   I   S   R   T  RS
    MONITOR                                               *
```



```
Cmd  Flag                Auto

     Automation (A)
     Initstart  (I)
     Start      (S)
     Recovery   (R)   LOG
     Terminate  (T)
     Restart   (RS)
```

Dynamically changeable via INGAUTO

Default;
write recovery actions in netlog,
but don't execute them
Except nondisruptive ones

Looping Address Space Suppression

Sample Monitoring report: no looping address spaces

```
ING600I LOOPING ADDRESS SPACE SUPPRE
Called at 7 Jul 2014 17:27:11
Commands will be LOGGED;
LOOPSUPP.MONITOR RECOVERY flag set to LOG
Target Network: HUBTEMS
Monitoring -
   address: 9.152.87.246
      port: 1920
      path: ///cms/soap
  protocol: HTTP
Monitoring threshold: 0300
Query Successful
No exceptions found.
Monitor complete
```

Minor Resource Monitor: Recovery flag set to LOG

Used SOAP Server with its definitions

CPU_Loop_Index set to value 30

Looping Address Space Suppression

Sample Monitoring report: looping address space found

```
...
Exceptions found -
-------------------------------------------------
ASID: 0079 Type: STC      CPU Loop Index: 64.7
  Job: YBUMUSL  ID: YBUMUSL  Step: BUMUSL0
  WLM Service Class: STCCMD.1
  SA Subsystem: YBUMUSL Type -> STC_SA
  Categorizing
    Searching: LOOPSUPP INGCATEGORY
    CODE1=STCCMD CODE2=STC_SA CODE3=YBUMUSL.BUMUSL0
  => Found category: BUMUPS
  Checking automation flag: LOOPSUPP.BUMUPS.YBUMUSL RECOVERY
  => Recovery Permitted
  Finding recovery actions for pass: 1
    Searching LOOPSUPP INGRECOVERY
    CODE1=BUMUPS CODE2=1 CODE3=<blank>
  => Found: WARN SHUT_FORCE
  Cmd: WARN - Message issued
ING601E LOOPING ADDRESS SPACE DETECTED: YBUMUSL BUMUSL0 (ASID 0079)
  Cmd: SHUT_FORCE - INGREQ YBUMUSL/APL/AOC4 REQ=STOP,TYPE=FORCE,OUTMODE=LINE
  Issuing
Monitor complete
```

INGCATEGORY match

Recovery flag check

Pass

INGRECOVERY match

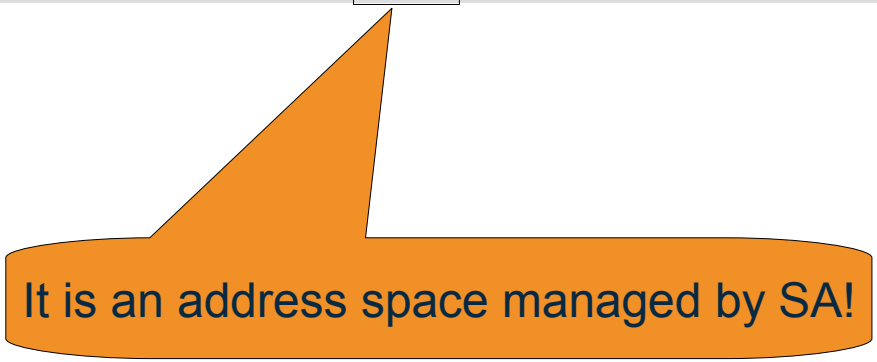
Recovery actions

Looping Address Space Suppression

Sample Monitoring report: looping address space found

1) Address space data

```
ASID: 0079 Type: STC       CPU Loop Index: 64.7

  Job: YBUMUSL  ID: YBUMUSL  Step: BUMUSL0

  WLM Service Class: STCCMD.1

  SA Subsystem: YBUMUSL Type -> STC_SA
```



Looping Address Space Suppression

Sample Monitoring report: looping address space found

2) Categorization

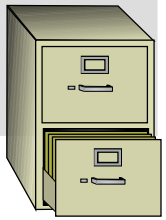
```
Categorizing

    Searching: LOOPSUPP INGCATEGORY
    CODE1=STCCMD CODE2=STC_SA CODE3=YBUMUSL.BUMUSL0

  => Found category: BUMUPS
```

WLM service class

Address space type

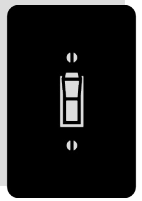
Jobname.stepname

INGCATEGORY result



3) Recovery flag checking

```
Checking automation flag: LOOPSUPP.BUMUPS.YBUMUSL
RECOVERY
  => Recovery Permitted
```

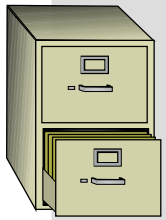


Specific recovery flag check

Looping Address Space Suppression

Sample Monitoring report: looping address space found

4) Recovery Action from policy



```
Finding recovery actions for pass: 1

  Searching LOOPSUPP INGRECOVERY
  CODE1=BUMUPS CODE2=1 CODE3=<blank>

  => Found: WARN SHUT_FORCE
```

Actual Pass

INGCATEGORY result

INGRECOVERY result – action

Looping Address Space Suppression

Sample Monitoring report: looping address space found

5) Recovery Action execution

```
  Cmd: WARN - Message issued
ING601E LOOPING ADDRESS SPACE DETECTED: YBUMUSL
        BUMUSL0 (ASID 0079)
  Cmd: SHUT_FORCE - INGREQ YBUMUSL/APL/AOC4
       REQ=STOP,TYPE=FORCE,OUTMODE=LINE
       Issuing

Monitor complete
```

Executing recovery commands

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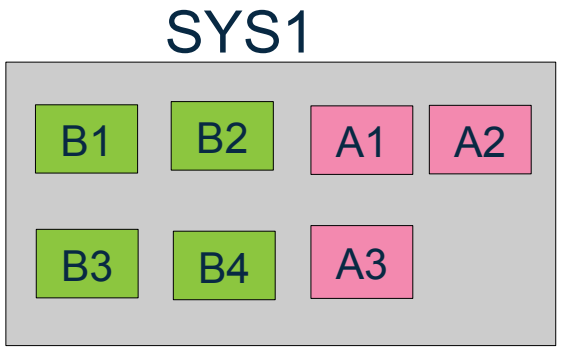
Staged IPL

SA z/OS V3.4



Runmode	Applications
BASE_ELEMENT	B1, B2, B3, B4
BUSINESS	B1, B2, B3, B4, A1, A2, A3

At System Start on SYS1 only z/OS **Base** Elements B1, B2, B3 and B4 should come up

→ Have Runmode set to BASE_ELEMENT

At end of Maintenance all business applications should be started again

→ Set Runmode to BUSINESS via INGRUN

Staged IPL

Runmode and Runtoken Definitions in Policy

SA z/OS V3.4

```
          UET Keyword-Data Specification              Line 00000001 Col 00

Entry: INGRUN                                 Type: MODE
Mixed case . . . NO   (YES NO)                Keyword length. . . 20  (1-64)

Cmd Keyword                Data
___ BASE_ELEMENT           BASIC
___ BUSINESS               'BASIC WEBSPHERE IMS CICS DB2'
```

```
                          Application Information

Entry Type : Application                PolicyDB Name    : BASE_34
Entry Name : TSO                        Enterprise Name  : BASE_34

Runtokens  . . . . . .
BASIC
```

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IPL complete notification

When is an 'IPL' complete?

Mark all applications which should be up to consider 'IPL' complete

Do we need a time limit?

ING313I time: IPL completed within expected time period, elapsed time was duration

ING314I time: IPL not completed within limit: limit. Failing resources: resource

ING315I time: IPL completed after expected time period, elapsed time was duration

AOF_AAO_IPL_COMPLETE_MSG=COND | ALWAYS

IPL complete notification

SA z/OS V3.5

APL – Application Info policy

```
                          Application Information                Line 00000001

Entry Type : Application
Entry Name : TCPIP

Category . . . . . .                  (IBM-defined, user-defined or blank,
                                       see help)
Subcategory  . . . . . .              (IBM-defined, user-defined or blank,
                                       see help)
Subsystem Name . . . . . TCPIP
Job Type . . . . . .                  (MVS NONMVS TRANSIENT)
Job Name . . . . . . . . TCPIP
Transient Rerun  . . . . .            (YES NO)
Scheduling Subsystem . . .            (MSTR, JES Subsystem)
JCL Procedure Name . . . .
Job Log Monitor Interval .            (mm:ss NONE)
Captured Messages Limit  .            (0 to 999)

Desired Available  . . . .            (ALWAYS ONDEMAND ASIS)
Restart after IPL  . . . .            (START NOSTART NONE)
Monitor for IPL complete . YES        (YES NO)
```

Also available for Application Groups and Monitors

IPL complete notification

SDF – System Defaults

```
                          System Automation Options

Entry Type : System Defaults       PolicyDB Name   : SAMPLE_350
Entry Name : SDF_DEFAULTS          Enterprise Name : SHARE

Captured Messages Limit. . . 20          (0 to 999)
Exceptional Messages Limit .             (0 to 1020)
Desired Available. . . . . .             (ALWAYS ONDEMAND ASIS)
Prepare Move . . . . . .                 (YES NO)
Move Mode. . . . . .                     (PARALLEL SERIAL)
Inform List. . . . . . . . . SDF
                                         (SDF NMC IOM SMF EIF TTT ITM USR)
IPL Complete Time Limit. . . 00:30:00    (00:00:00 to 24:00:00)
```

If field is left blank – no IPL completeness check

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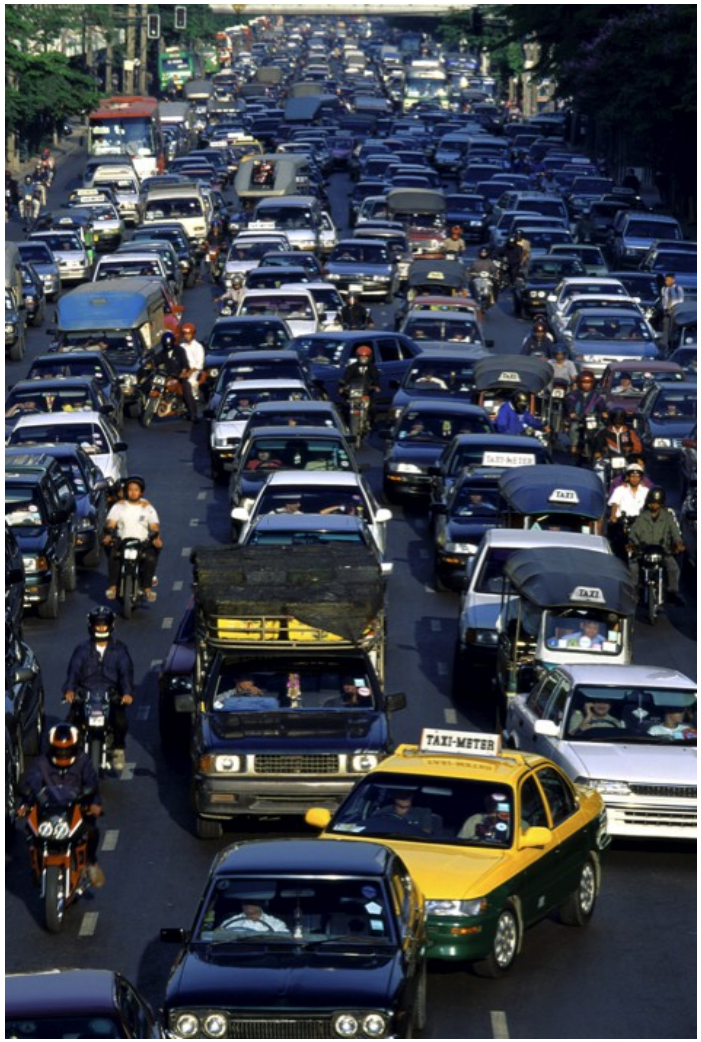
Application Pacing

Problem:

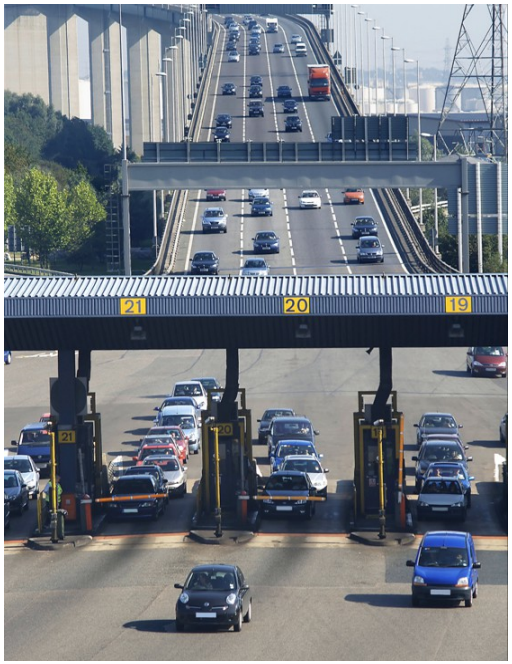
CPU peaks occur
when starting bulk applications e.g. at IPL



Application Pacing

Introduction of Pacing Gate approach to restrain automation resources

Gate front-view



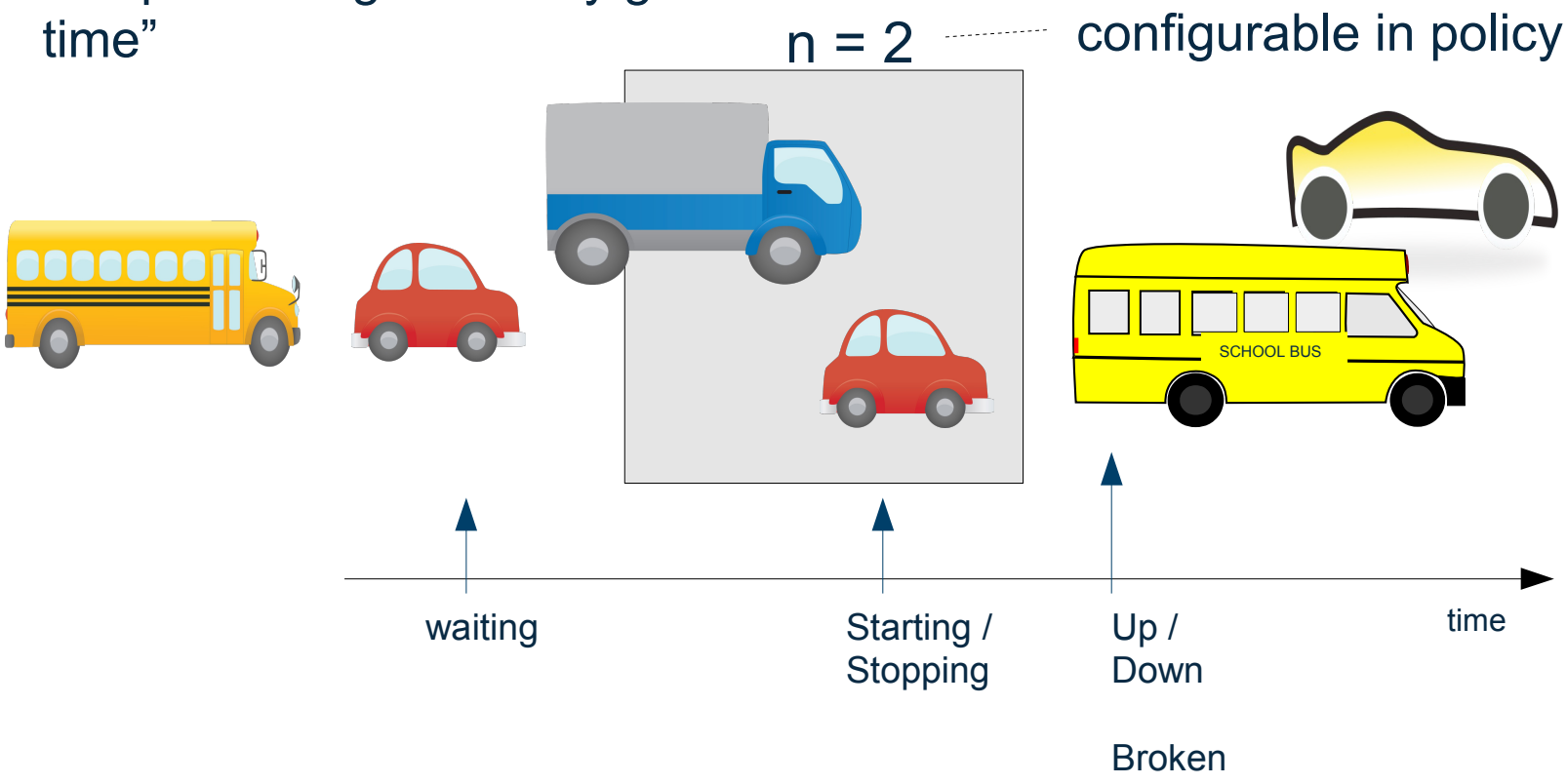
"Only *n* workloads can pass the gate at a time"

"Others have to queue up behind those passing the gate."

Application Pacing

Pacing Gate side-view

"Gate mechanism ensures that only up to *n* automation resources can pass the gate at any given time"



Application Pacing – Customization Dialog

SA z/OS V3.5

New Entry Type

```
 10 PRO    Processors                      40 XDF    Sysplex Defaults
 11 MTR    Monitor Resources               41 RES    Resident CLISTs
 12 ENS    zEnterprise Ensembles           42 SCR    Status Display
 13 PAC    Pacing Gates

 20 PRD    Product Automation              99 UET    User E-T Pairs
 21 MSG    Messages
```

```
                                   Define New Entry

Define new entry of type Pacing Gate

  Entry name . . . . . . . WAS_PAC

  Start Concurrency Limit  . 10          (0-9999 or NOLIMIT)
  Stop  Concurrency Limit  . 5           (0-9999 or NOLIMIT)

  Short Description  . . . Pacing gate for Websphere Applications
```

Application Pacing – Customization Dialog

Linkage

```
                                Entry Name Selection

Entry Type : Pacing Gate              PolicyDB Name   : SAMPLE_350
                                      Enterprise Name : SA_Z_OS_BB_LAB

Action      Entry Name                Short Description
            PAC_AOCCLONE              Pacing definition using AOCCLONEs
            PAC_20                    Pacing definitions of 20
            SHARE_PAC                 Pacing example for Share
```

Linked through APLs and not directly to systems

One Application can only be linked to one Pacing Gate

Application Pacing - Runtime

New command INGPAC

```
INGKYPA0                  SA z/OS - Command Dialogs                6
Domain Id . : IPUFJ   ------------ INGPAC   ------------      D       8  4
Operator Id : BUMU            Sysplex = A                     im     . : 16:27  21

CMD: D Details

CMD Pacing Gate           Type  System    Limit    Num Res  Num Wait Avg Wait
--- -------------------- ----- -------- -------- -------- -------- --------
    PAC_AOCCLONE          Start AOC4          444        0        0        -
    PAC_AOCCLONE          Start AOC5      NOLIMIT        0        0        -
    PAC_AOCCLONE          Stop  AOC4          555        0        0        -
    PAC_AOCCLONE          Stop  AOC5      NOLIMIT        0        0        -
    PAC_20                Start AOC4           20        0        0        -
    PAC_20                Stop  AOC4           20        0        0        -
    SHARE_PAC             Start AOC4            2       18       16       48
    SHARE_PAC             Start AOC5            2        0        0        -
    SHARE_PAC             Stop  AOC4      NOLIMIT        0        0        -
    SHARE_PAC             Stop  AOC5      NOLIMIT        0        0        -
```

Average time waiting in sec

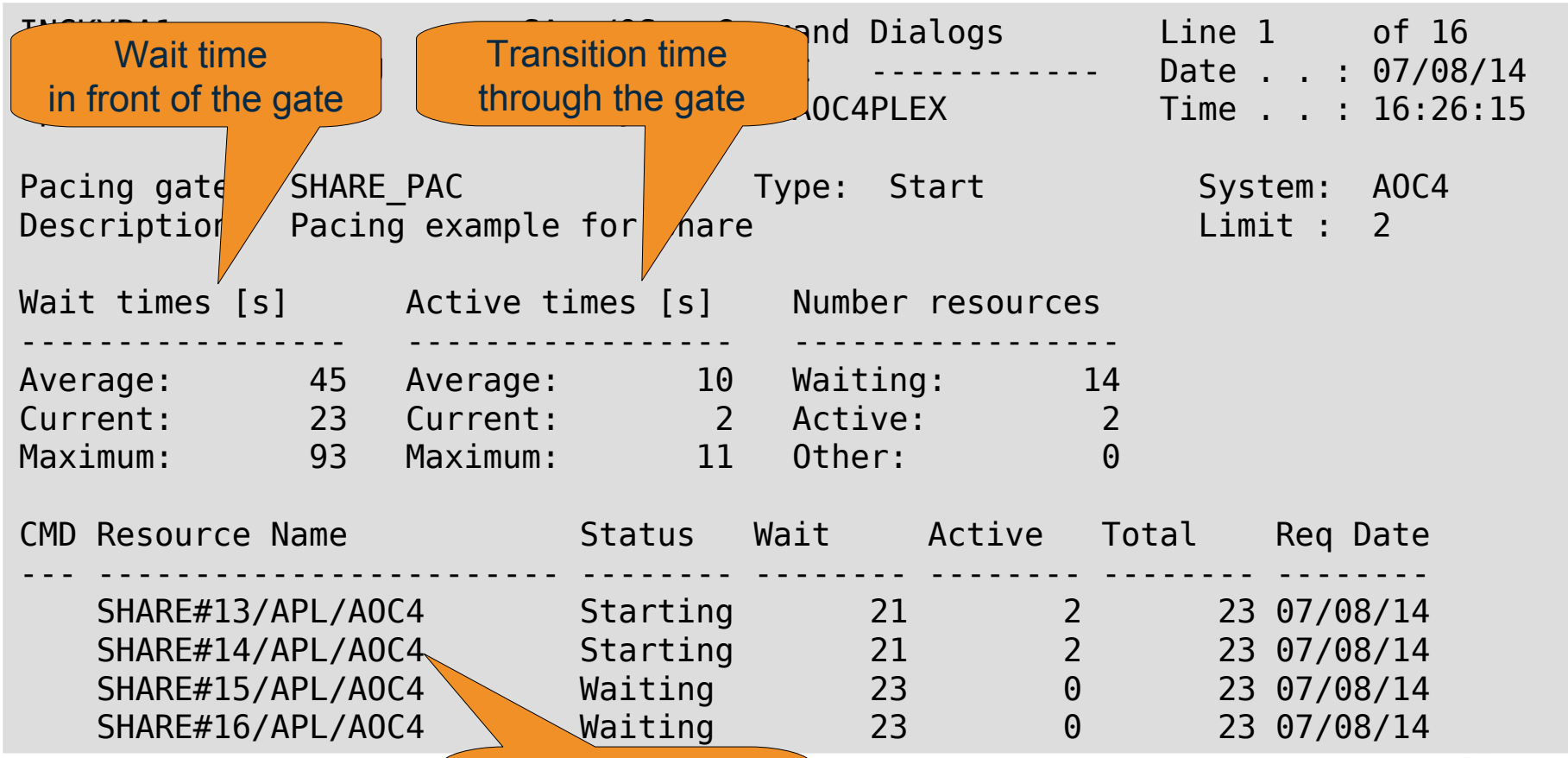
# of applications waiting

# of applications waiting or transmitting

Further data available either with scrolling or showing details

Application Pacing - Runtime

New command INGPAC - detail



Agenda

- Overview
- Integration with Omegamon
  - Immediate Message reporting on TEP
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- IPL
  - Staged IPL
  - IPL complete notification
- Manage bulk starts / stops using Pacing Gates
- Configuration Assistant
- Extended XCF communication
- Configuration Refresh Indicator

Traditional Product Configuration

Chapter 7. Installing SA z/OS on Host Systems

This chapter describes the tasks required to install SA z/OS components on the SA z/OS host systems. This chapter includes information on installing SA z/OS on both focal point and target systems. The target system installation does not require some of the steps used for the focal point installation. Any installation step that does not apply to the target systems is indicated. Many of the installation steps have corresponding planning activities and explanations in chapters 2 through 6 of this book. Chapter 8 describes installation on workstations.

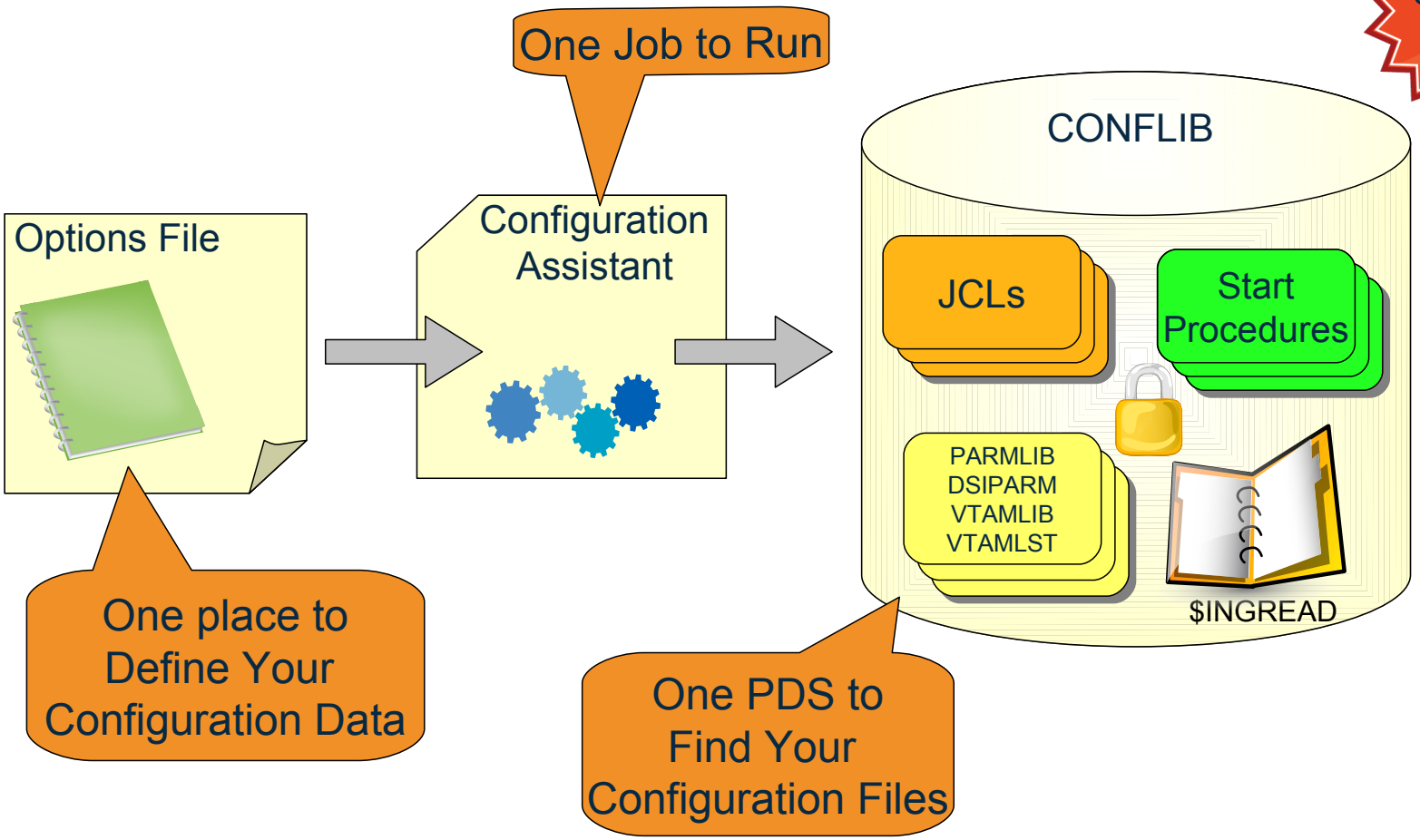
In this chapter, the single installation steps are marked as either being required for all or certain SA z/OS components or as being *optional*. *Optional* denotes steps that may or may not need to be performed based on your environment, your system management procedures, and your use of the SA z/OS product. For each of these steps you need to decide whether it is required for your installation.

Each optional step explains why it is optional and describes the circumstances when you will need to perform it.

- Read the Installation manual ...
  - ... decide which of the many installation steps apply to your z/OS environment.
- Perform those steps by....
  - … adapting all the identified sample files and …
  - … filling in your environmental data at multiple places spread across the sample files.
- And do all this … in a consistent way!

Configuration Assistant

SA z/OS V3.5



Generating Configuration Files for multiple systems

Configuration Assistant

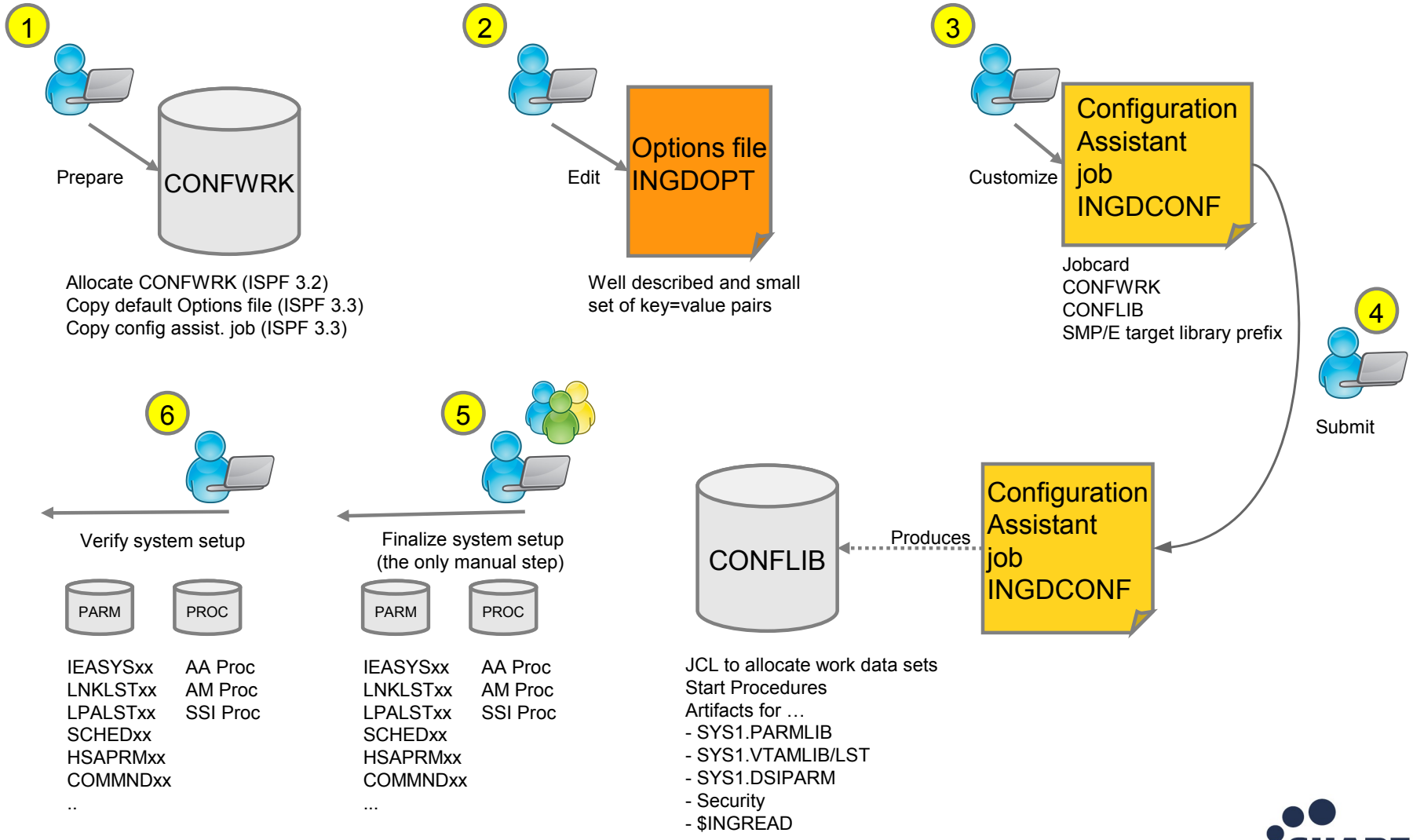
```
*      ... System Name
*
*          Specify the name of the z/OS system where you plan to run
*          your automation environment.
*
*          Option .....: sys_sysname
*          Required ...: Yes
*          Default ....: None
*          Example.....: SYS1
*
 sys_sysname=&SYSNAME
```

Equal processing available for VTAMID and NetView Domain ID

Customer can run the “deploy step” on multiple target systems

- Based on the JCL with the system symbols
- Generated from one Options File

Configuration Assistant



System Authorization Facility (SAF) support

- The configuration assistant creates an SAF configuration:

- User roles (=SAF groups)
  - SuperUser
  - AutoOperator
  - Administrator
  - Operator
  - User
- Command profiles
- User role-to-Command profile correlation
- User-to-User role correlation
- Allows you to review and adapt !!!

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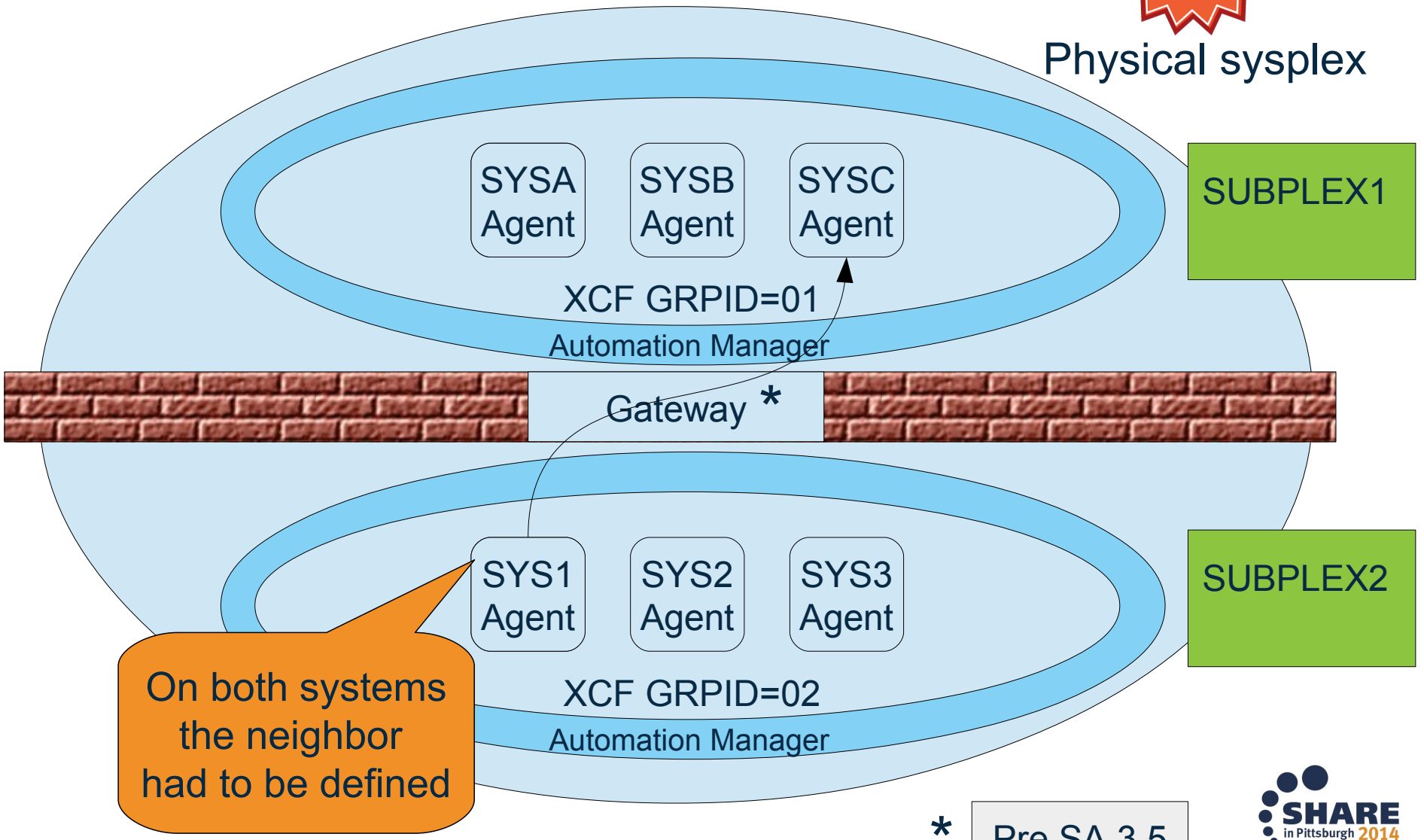
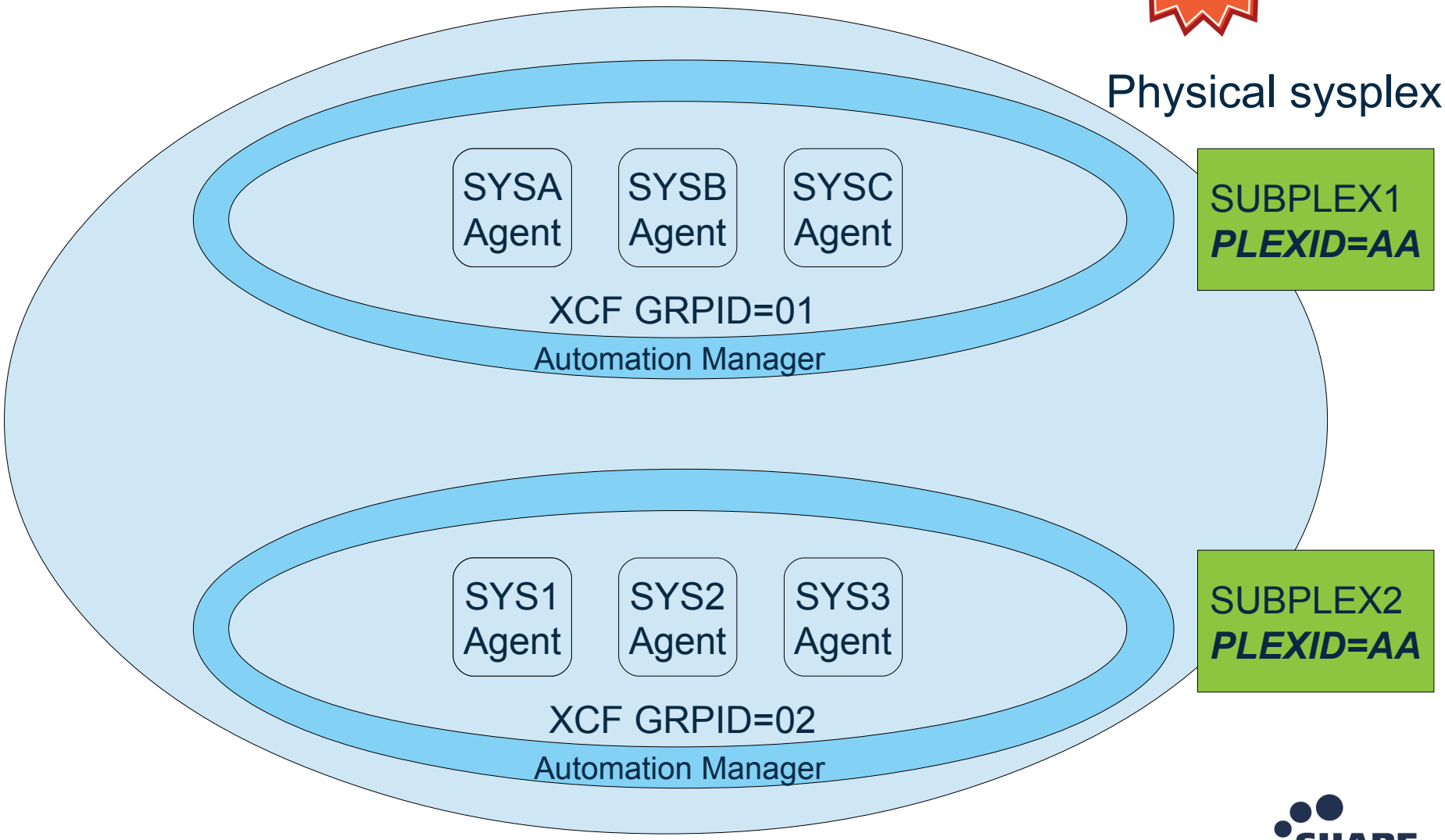
Extended XCF Communication



Extended XCF Communication

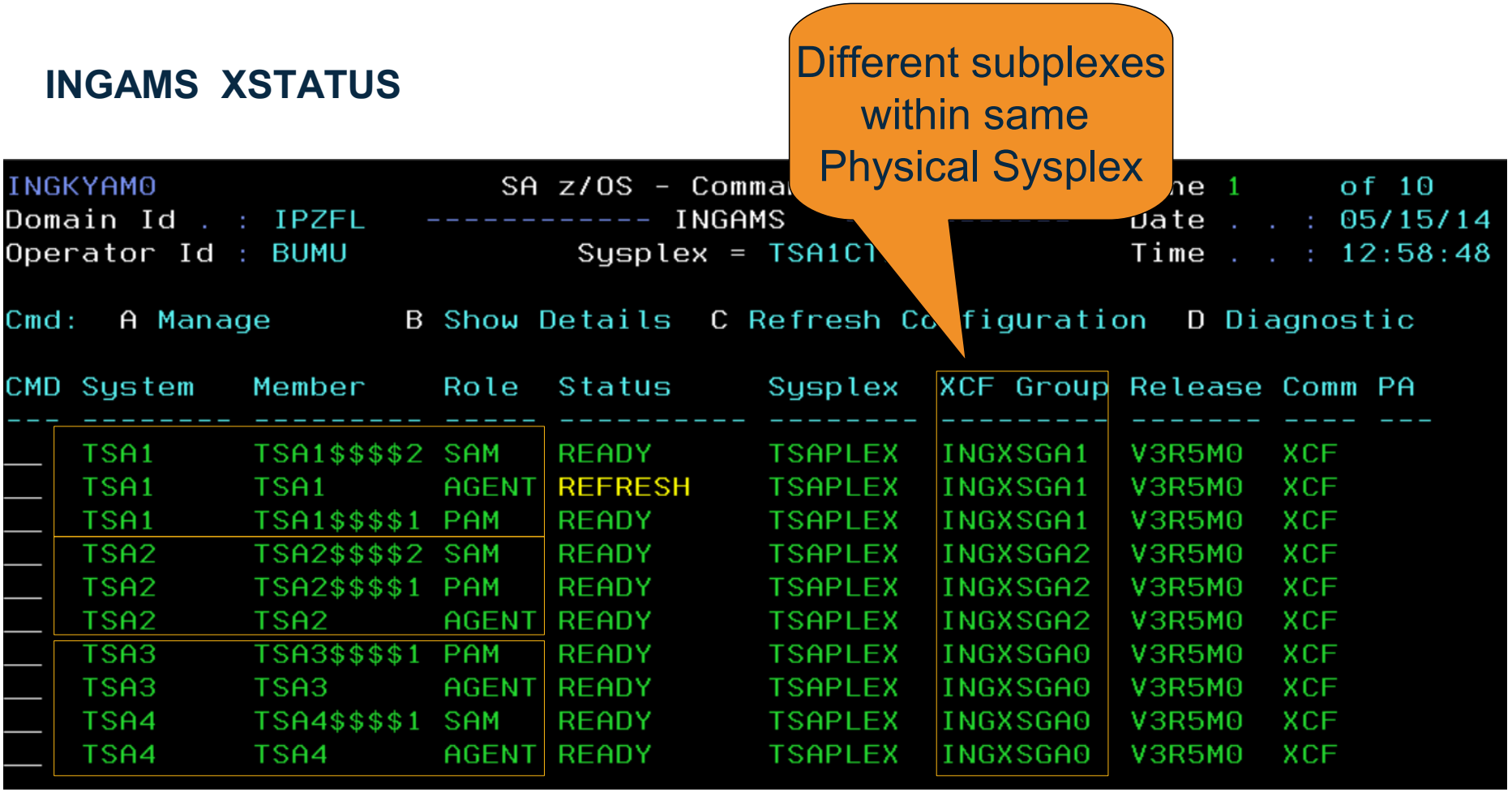
SA z/OS V3.5



PLEXID is a definition to be made in INGXINIT

Extended XCF Communication

INGAMS XSTATUS



Agenda

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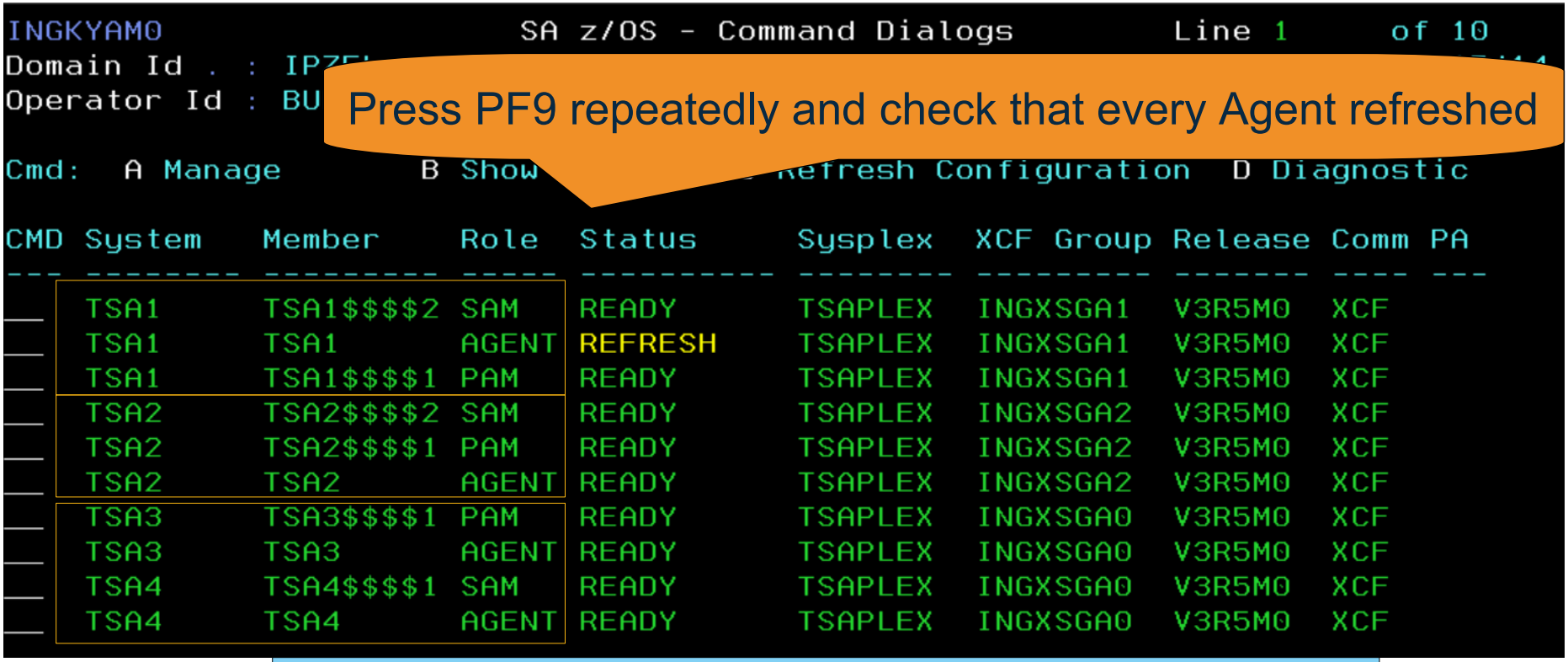
Configuration Refresh Indication

Problem: how do I know the configuration refresh is performed on each system?

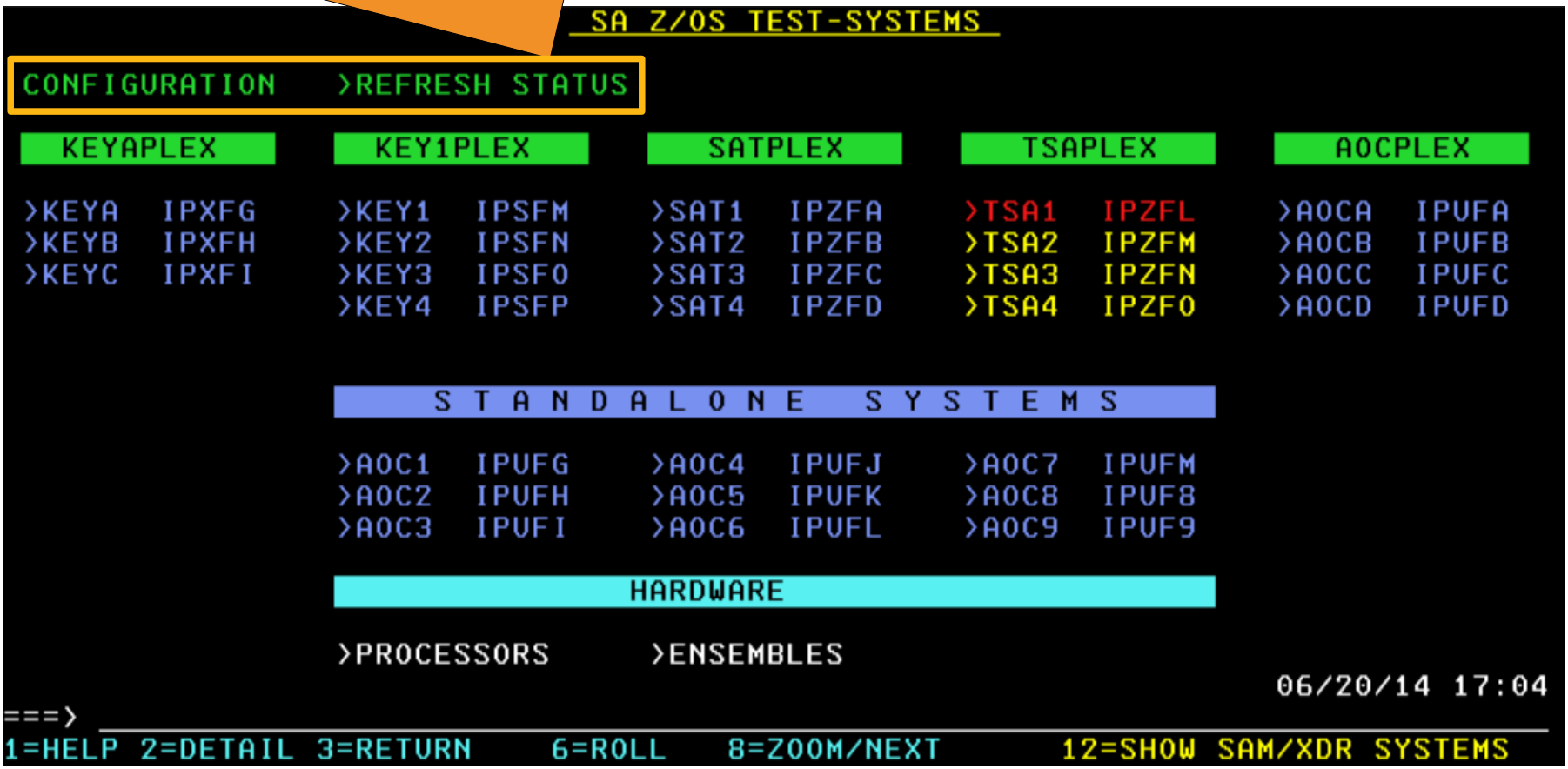


Or check in every Netlog for completion message
Or check on every agent with command ACF status

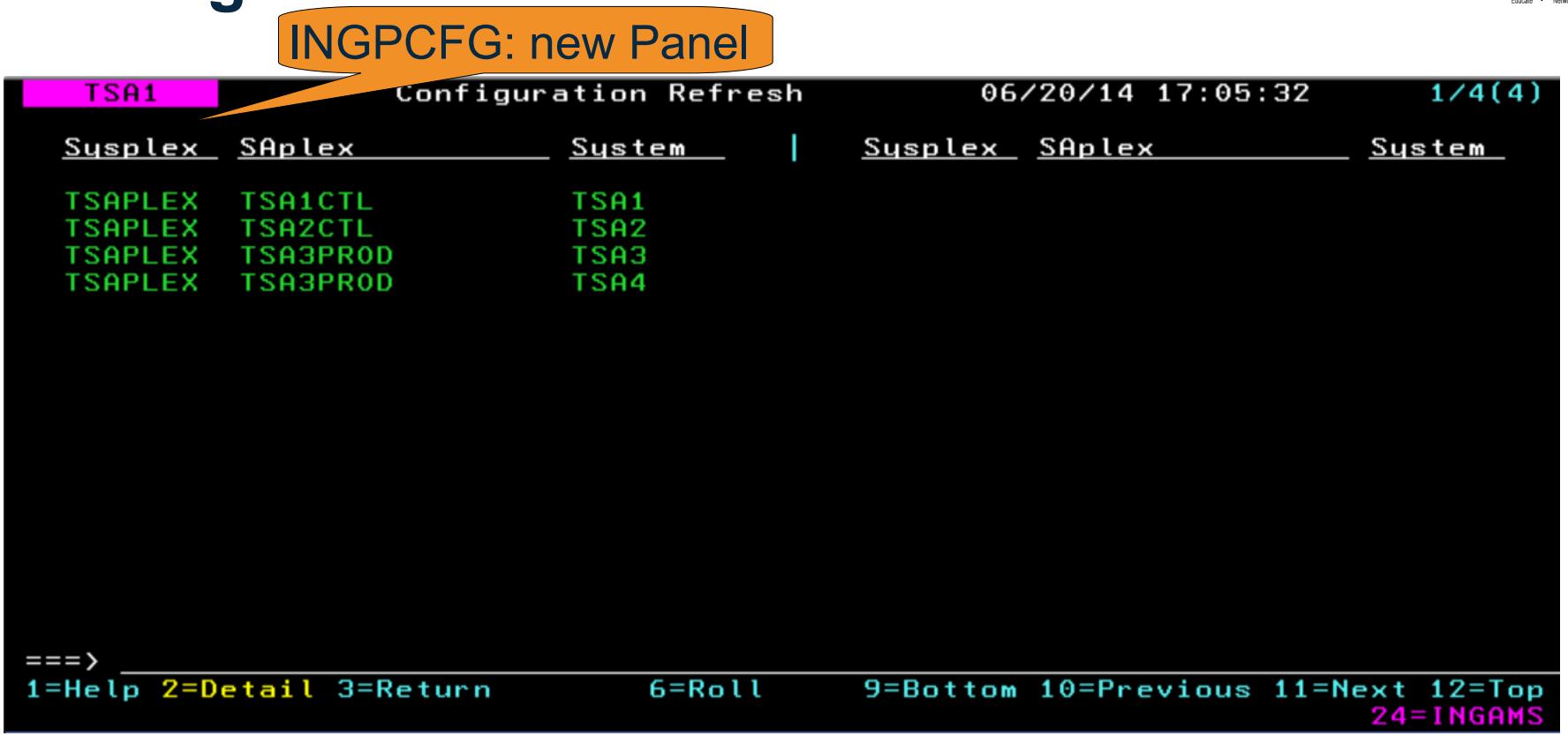
Configuration Refresh Indication

SA z/OS V3.5

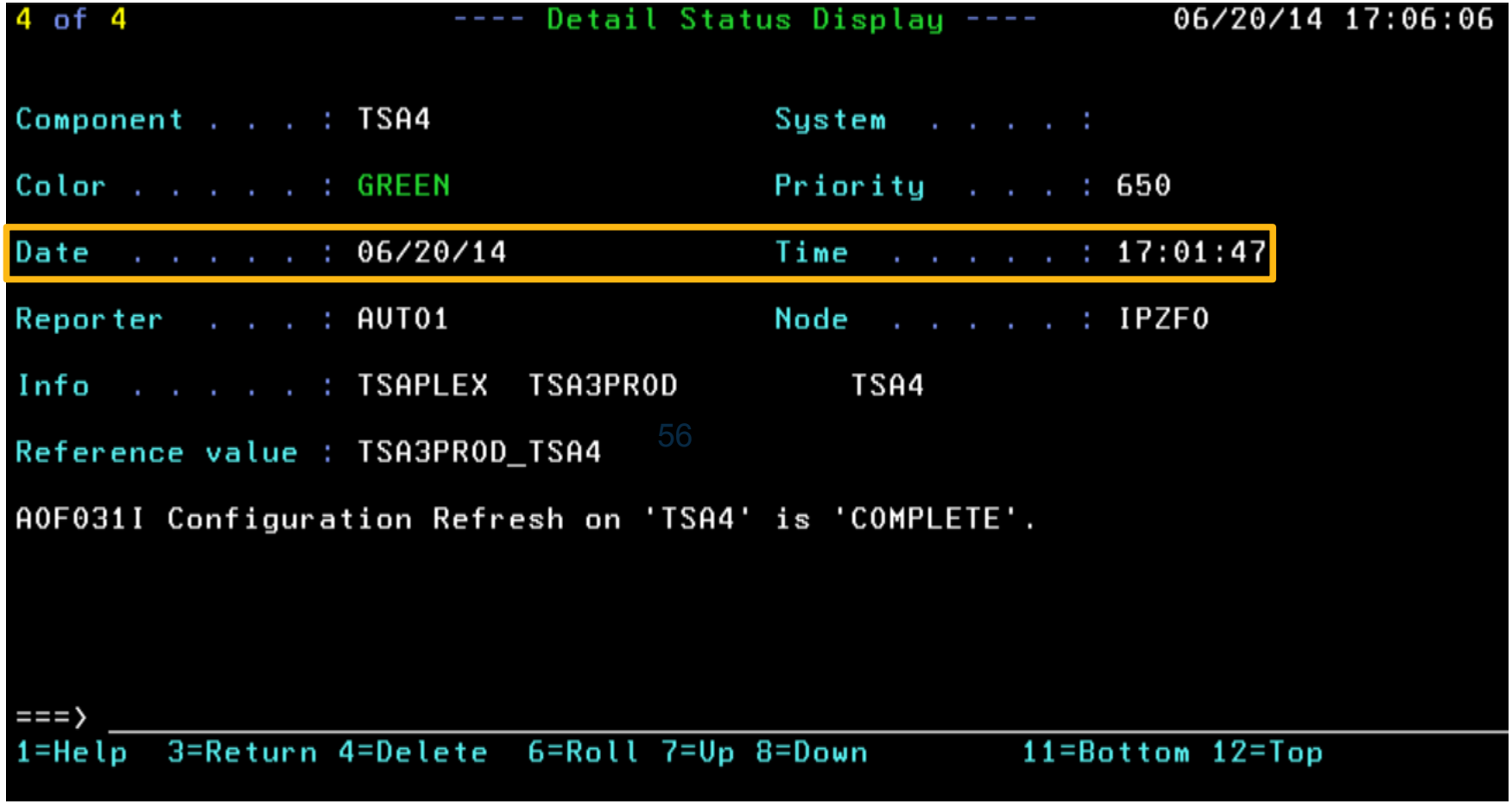
INGPTOP: added status field with new status component INGCFG



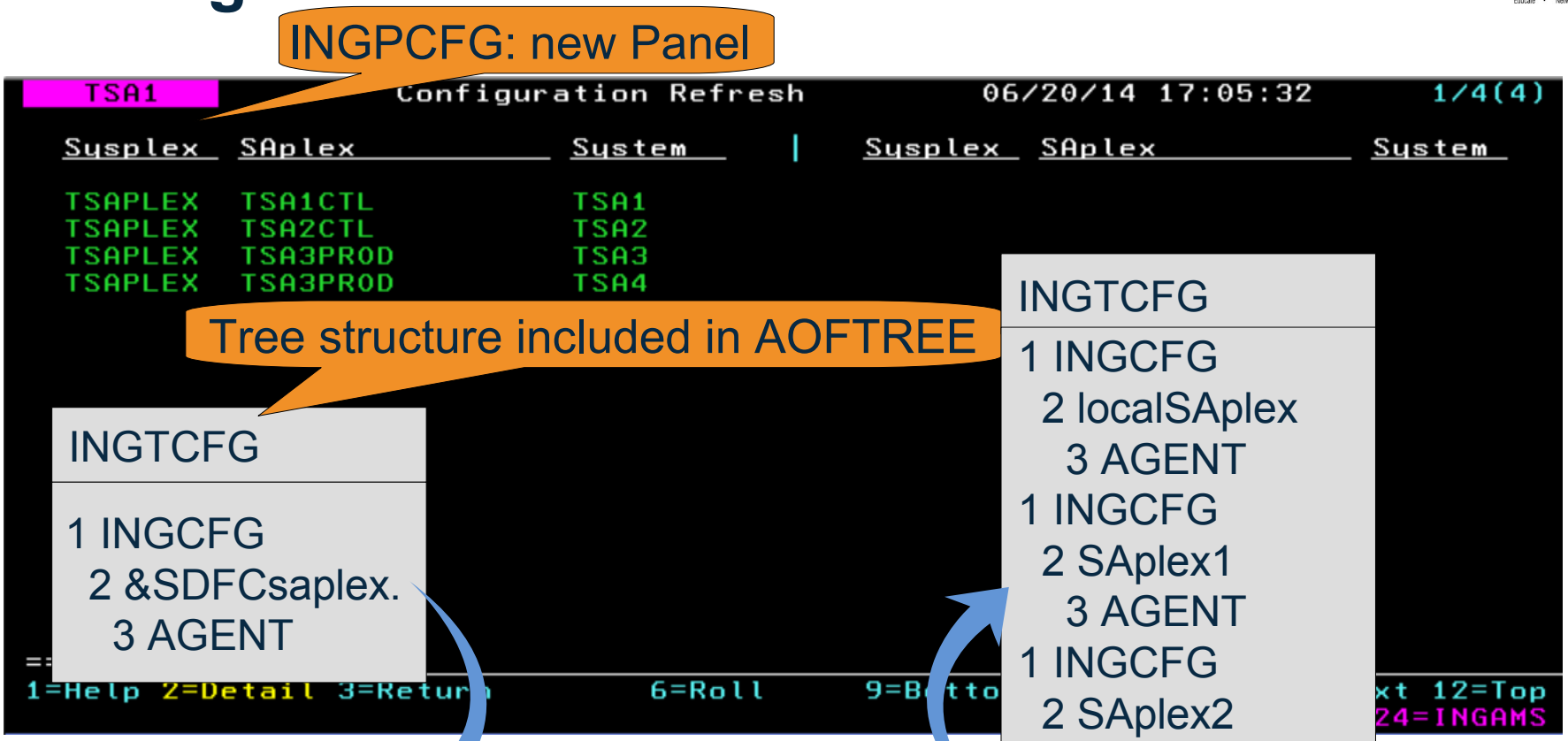
Configuration Refresh Indication



Configuration Refresh Indication



Configuration Refresh Indication



CNMSTYLE

COMMON.AOF_AAO_SDFCSAPLEX.0=2
COMMON.AOF_AAO_SDFCSAPLEX.1=*localSAplex*
COMMON.AOF_AAO_SDFCSAPLEX.2=*SAplex1 SAplex2 ...*


Thank
You

IBM System z Service Management critical for moving to Mobile, Big Data and Cloud

IBM continues to improve z/OS environment to support new technologies

- IBM SmartCloud Analytics – Log Analysis z/OS Insight Packs 1.1.0.1
- IBM Service Management Suite for z/OS V1.2
- IBM Tivoli OMEGAMON Performance Management Suite for z/OS V5.3.0
- IBM Tivoli OMEGAMON XE on z/OS 5.3.0, IBM Tivoli OMEGAMON Dashboard Edition on z/OS 5.3.0, IBM Tivoli OMEGAMON XE for Messaging for z/OS 7.3.0, IBM Tivoli OMEGAMON XE for CICS on z/OS 5.3.0, IBM Tivoli OMEGAMON XE for Storage on z/OS 5.3.0
- IBM Tivoli System Automation for z/OS V3.5
- IBM Automation Control for z/OS V1.1.1
- IBM Tivoli NetView for z/OS V6.2.1
- IBM Tivoli NetView Monitoring for GDPS V6.2.1
- IBM Tivoli Workload Scheduler for z/OS V9.2

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IBM Knowledge Center	Community
Product documentation	Service Management Community

	Wiki	Homepage	Forum
Tivoli System Automation for z/OS	Wiki SA z/OS	Homepage SA z/OS	Forum SA z/OS on developerWorks Forum SA z/OS on Yahoo
Service Management Suite for z/OS New	Wiki SMSz	Announcement SMSz	Forum SMSz on developerWorks

Customization Dialog

- PDB Browse
- Activity log
- Startup Policy
  - Refreshstart
  - Anystart
- Shutdown Pass Interval
- Command fields 227
- Mixed case for cmds in Startup and Shutdown
- AT Definitions for every Begin / End block
- Option to add REVISE('Y' AUTOMATE) generally in MRT
- Option to get informed for not automated WTORs
- Support for export and import of Processor data (PRO)

ProcOps

- zAware support
- SNMPv3 support

SysOps

- Support of Job Log Monitoring now also for JES3
- INGRDS improvements
- Tailorable 3270 panels which are scrollable
- SDF: support for alphabetical sort order in a body
- Exit AOFEXC25 informs about changes at policy activation