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GSE UK Conference 2018
Better, stronger, faster; The Mainframe….. the Machine!

System Automation Update

Dave Swift
IBM

November 2018
Session OI

Agenda

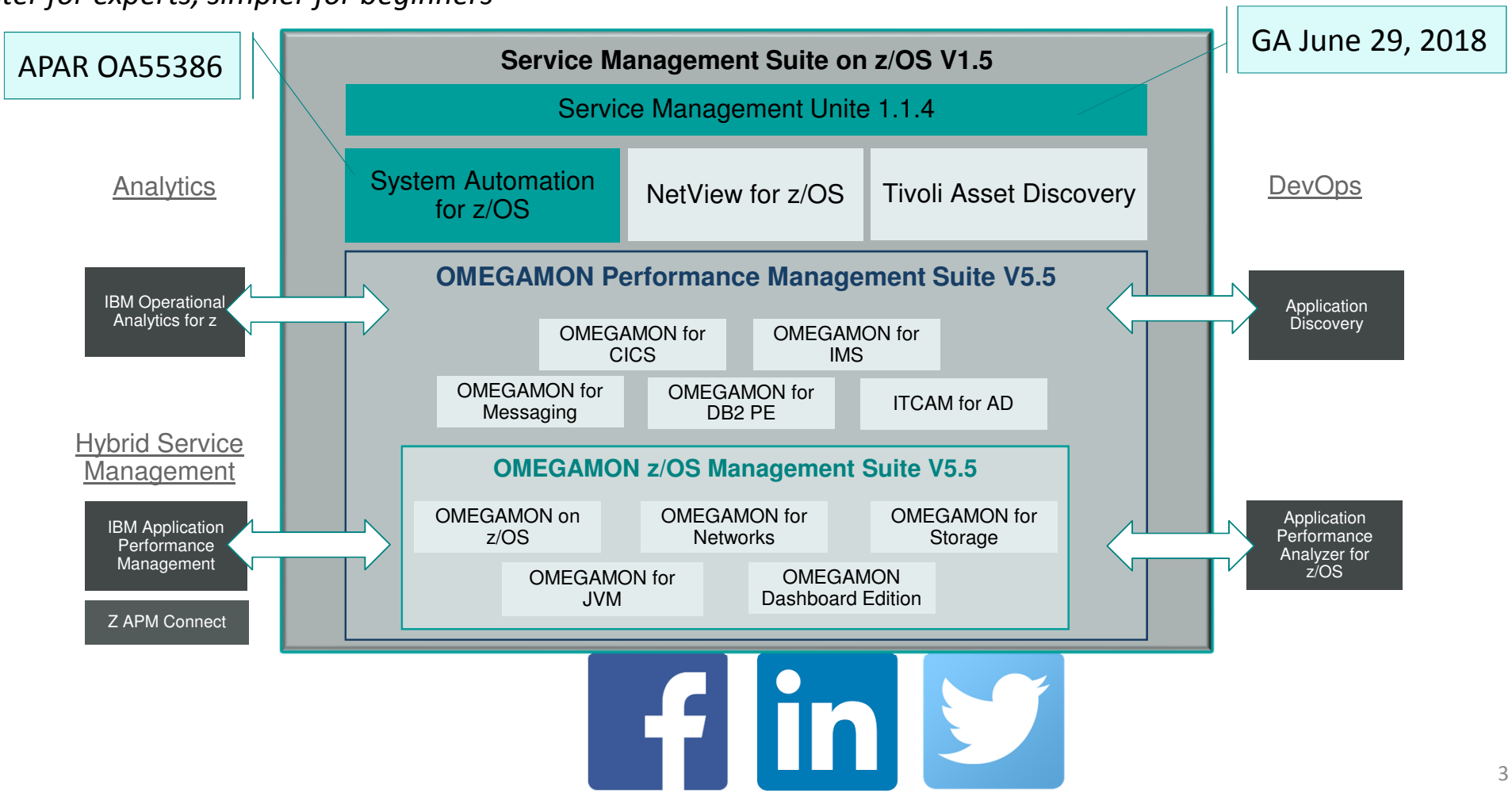
- Service Management Unite
  - Docker
  - High Availability
  - OMEGAMON Storage
  - RFEs

- System Automation for z/OS
  - INGPLEX IPL
  - Parallel SDF Focalpoint Update
  - Processor Operations – Dynamic Target System Names
  - Cross Platform Automation

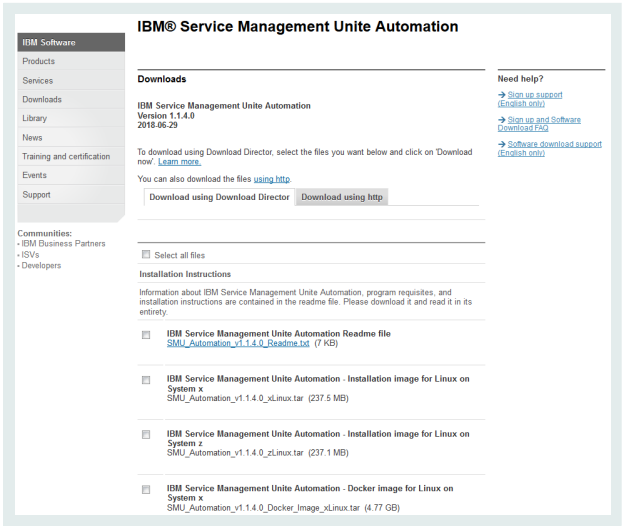
Service Management Suite - Overview

Service Management Suite for z/OS

"Faster for experts, simpler for beginners"



Service Management Unite Download Page



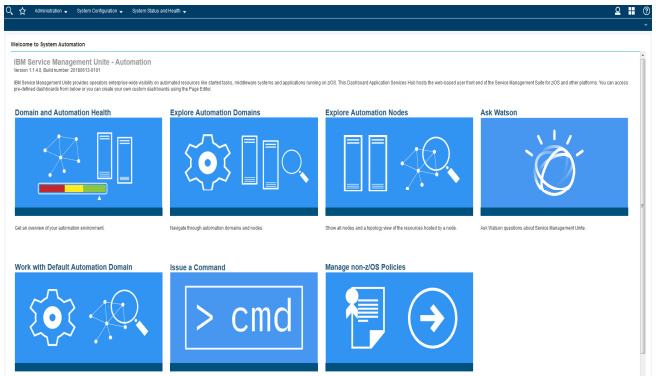
contains

- Readme
- SMU traditional installation file
- Docker image for SMU

- WebSphere Application Server
- Jazz for Service Management

Service Management Unite 1.1.4 available with

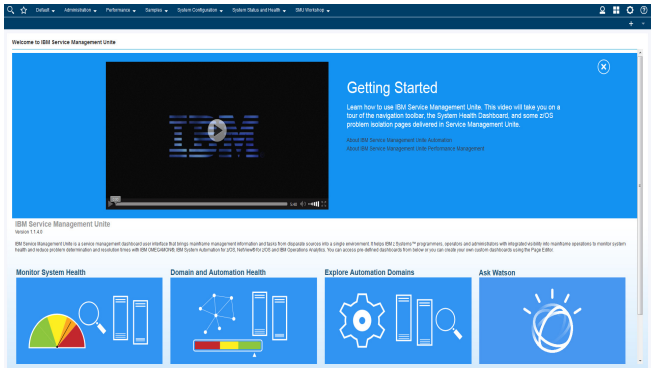
System Automation for z/OS V4.1



SMU Automation

https://www.ibm.com/marketing/iwm/iwm/web/preLogin.do?source=swg-ibmsa

Service Management Suite for z/OS



SMU Service Management Suite for z/OS

https://www.ibm.com/marketing/iwm/iwm/web/preLogin.do?source=swg-ibmsms

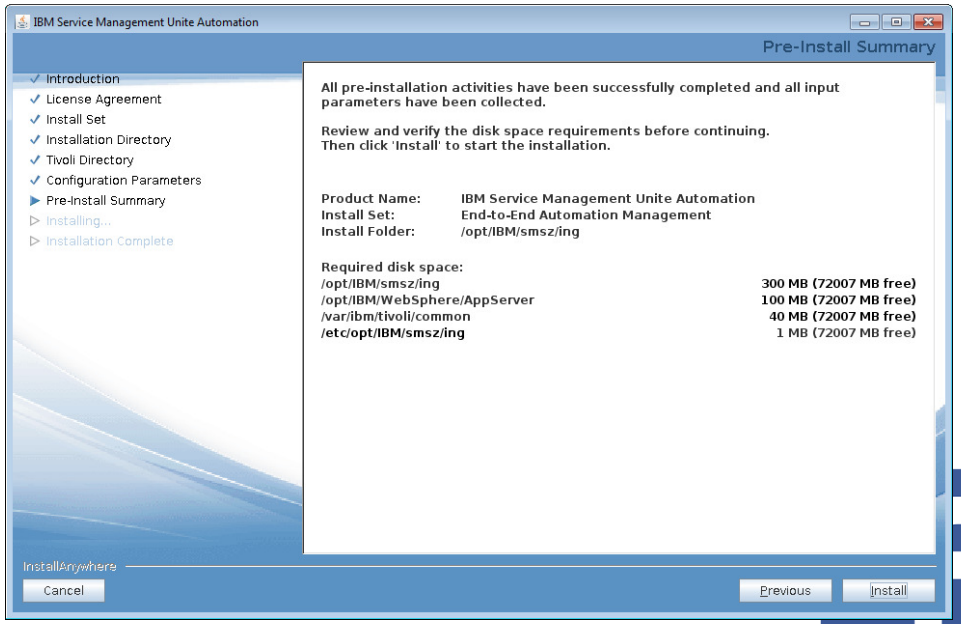
Service Management Unite Installation - traditional

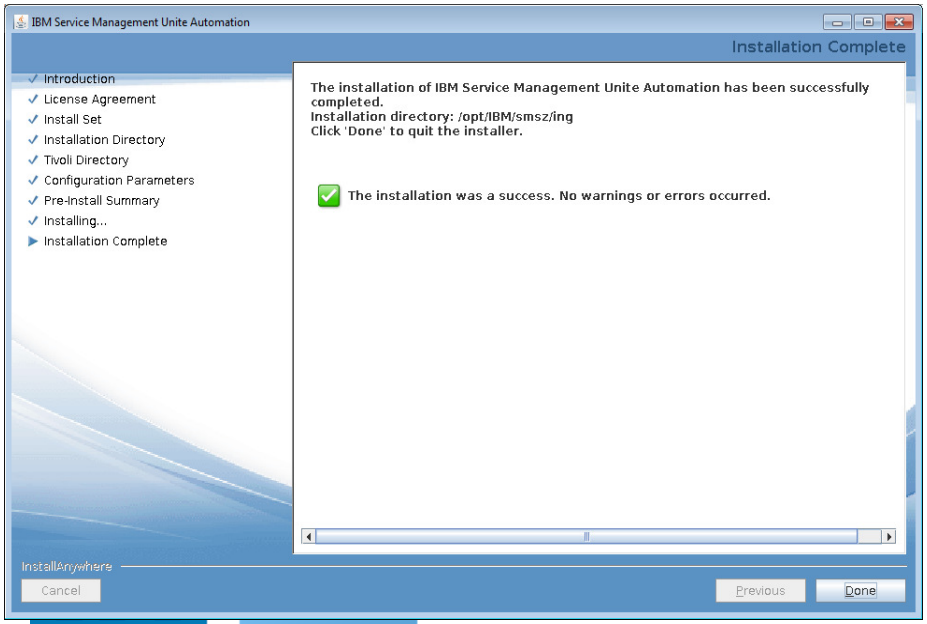
Prerequisite installation

- WebSphere Application Server 8.5.5.9
- Jazz for Service Management 1.1.3
- *IBM Tivoli Directory Integrator 7.1.1*

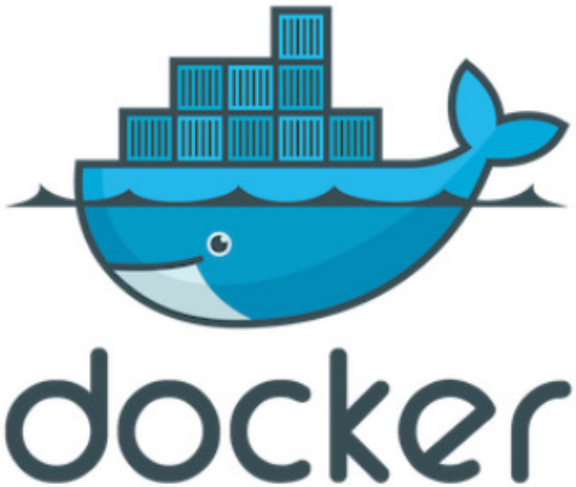
tar -xf SMU_Automation_v1.1.4.0_xLinux.tar

SMUAUTO1140X/x86_64 # ./setup.bin





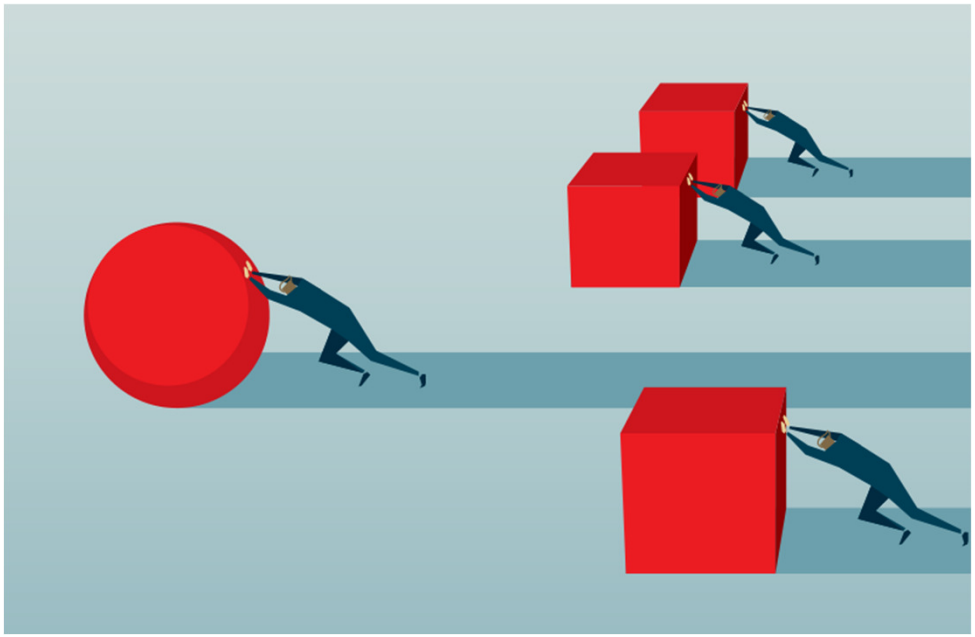
Service Management Unite Installation - Docker



https://youtu.be/oXhYBydZgC4

- Standardized packaging for software and dependencies
- Isolate apps from each other
- Share the same OS kernel
- Works with all major Linux and Windows Server distributions
- A Docker image is a snapshot of a Docker container
- A Docker container is a running instance of an image
- Multiple containers can be started from the same image
- After stopping it, a container is normally thrown away/ deleted (and a new one can be started again from the image)

Service Management Unite Installation - Docker



- Speed
  - No OS to boot = applications online in seconds
  - Effective resource management due to shared kernel
- Portability
  - Less dependencies between process layers= ability to move between infrastructure
- Efficiency/Workload Density
  - Less OS overhead
  - Improved VM density

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Service Management Unite Installation - Docker

SMU Automation Docker Image

- SMU Automation and Universal Automation Adapter
- WAS and JazzSM (DASH)
- Base OS: Ubuntu

Full SMU Docker Image

- SMU Performance Management
- SMU Automation and Universal Automation Adapter
- WAS, JazzSM (DASH) and TDI
- Base OS: Ubuntu

- each image is available for x and z platform
- Docker EE or Docker CE has to be installed
- No special configuration needed

Service Management Unite - Docker

SMU_Automation_v1.1.4.0_Docker_Image_xLinux.tar

readme_smu.txt	Readme file with information about SMU and Docker
eezdocker.sh	IBM provided shell script to handle the SMU Docker image/container. Wraps for example the necessary Docker commands and parameters to start a container etc.
smu_image.tar	The “real” Docker image, that needs to be loaded into the own Docker environment. Can be done with the eezdocker.sh script.
util	Includes additional files like licenses and helper scripts for eezdocker.sh

Service Management Unite - Docker

eezdocker.sh

help	Shows and explains all available options from eezdocker.sh
load	Loads the SMU Docker image into the user's Docker environment.
status	Shows if the SMU Docker image is loaded and if a SMU Docker container is running
start	Starts the SMU Docker container (image must be loaded). Uses Docker's "restart always" parameter to ensure the container will be kept running all the time (and that it will be started automatically after a reboot of the host system).
stop	Stops a running SMU Docker container (and deletes it). Note: Configuration data will be kept persistent in the used Docker volumes.

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Service Management Unite - Docker

eezdocker.sh

cfgsmu	Launches the SMU GUI configuration tool cfgsmu.
restart	Restarts a running Docker container, necessary for example if WAS has to be restarted.
shell	Opens a shell (bash) within a running SMU Docker container. Useful if there is the need to look inside a running container (check log files, do manual configuration etc.)
collect_logs	Launches the SMU log collection tool getsmudata within the running SMU Docker container, collects all important logs and copies them to the host machine. Useful if a customer has opened a PMR and log files are required for further investigation.
uninstall	Removes stale SMU Docker containers and the SMU Docker image from the Docker environment. (eezdocker.sh and its util files need to be deleted manually.)

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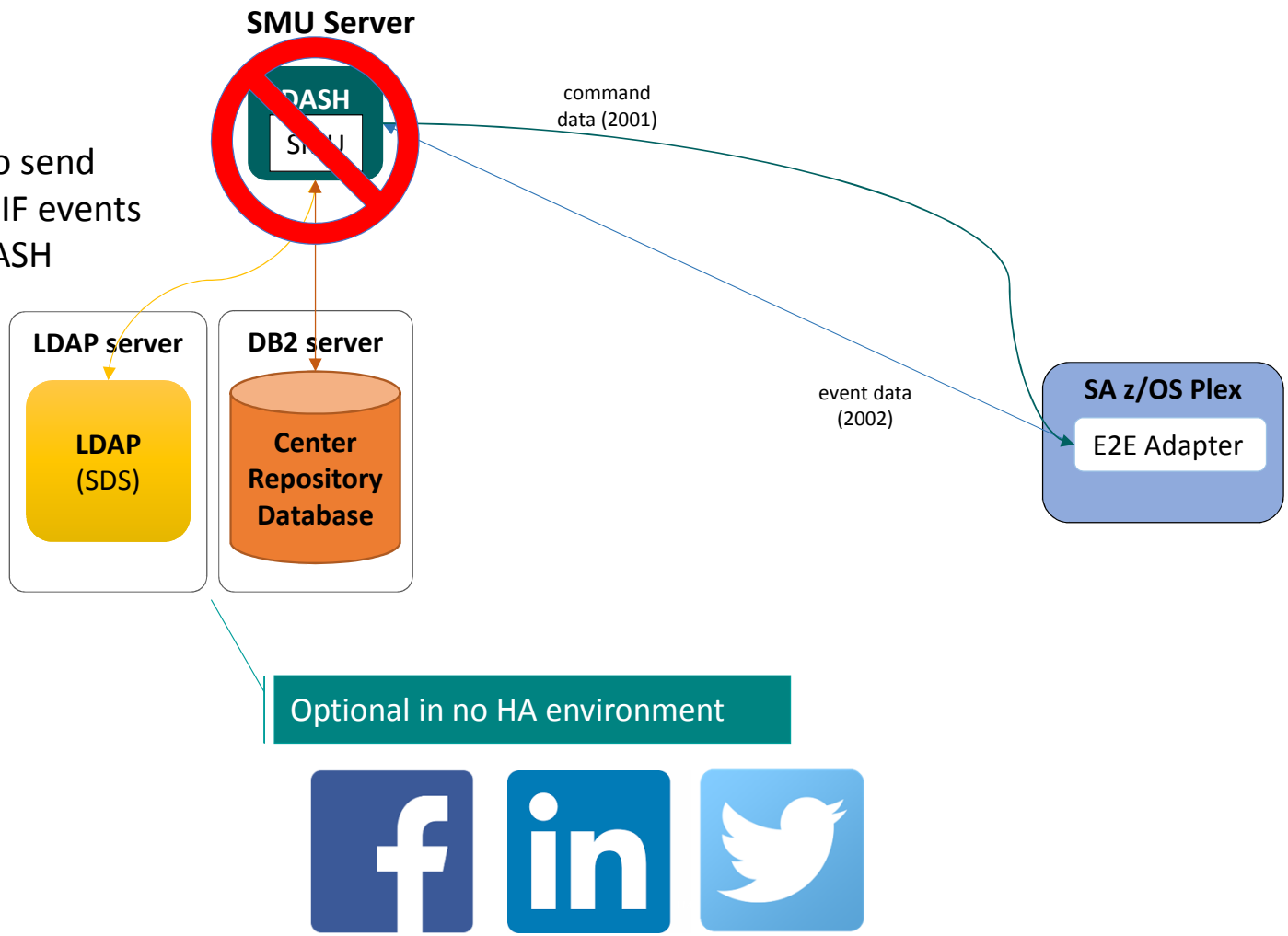
Service Management Unite - Docker

Volume name	Path in Docker container	Description
eez_eautodb	/opt/IBM/WebSphere/AppServer/derby/EAUTODB	The location of the database where SMU Automation domain connection information is stored
eez_restdb	/opt/IBM/JazzSM/ui/db/restdb	The location of the DASH internal database
eez_custdash	/opt/IBM/JazzSM/profile/config/cells/JazzSMNode01Cell	The location where WAS configuration including user registry, DASH customizations, and dashboard definitions are stored
eez_cfg	/etc/opt/IBM/smsz/ing	The location of SMU Automation configuration data and policy pool
eez_prefs	/opt/IBM/JazzSM/profile/Tivoli/EEZ	The location of SMU Automation operator preferences
eez_tdi	/opt/IBM/TDI/V7.1.1/DASH_ITMCollector	The location of the TDI preferences

Automation

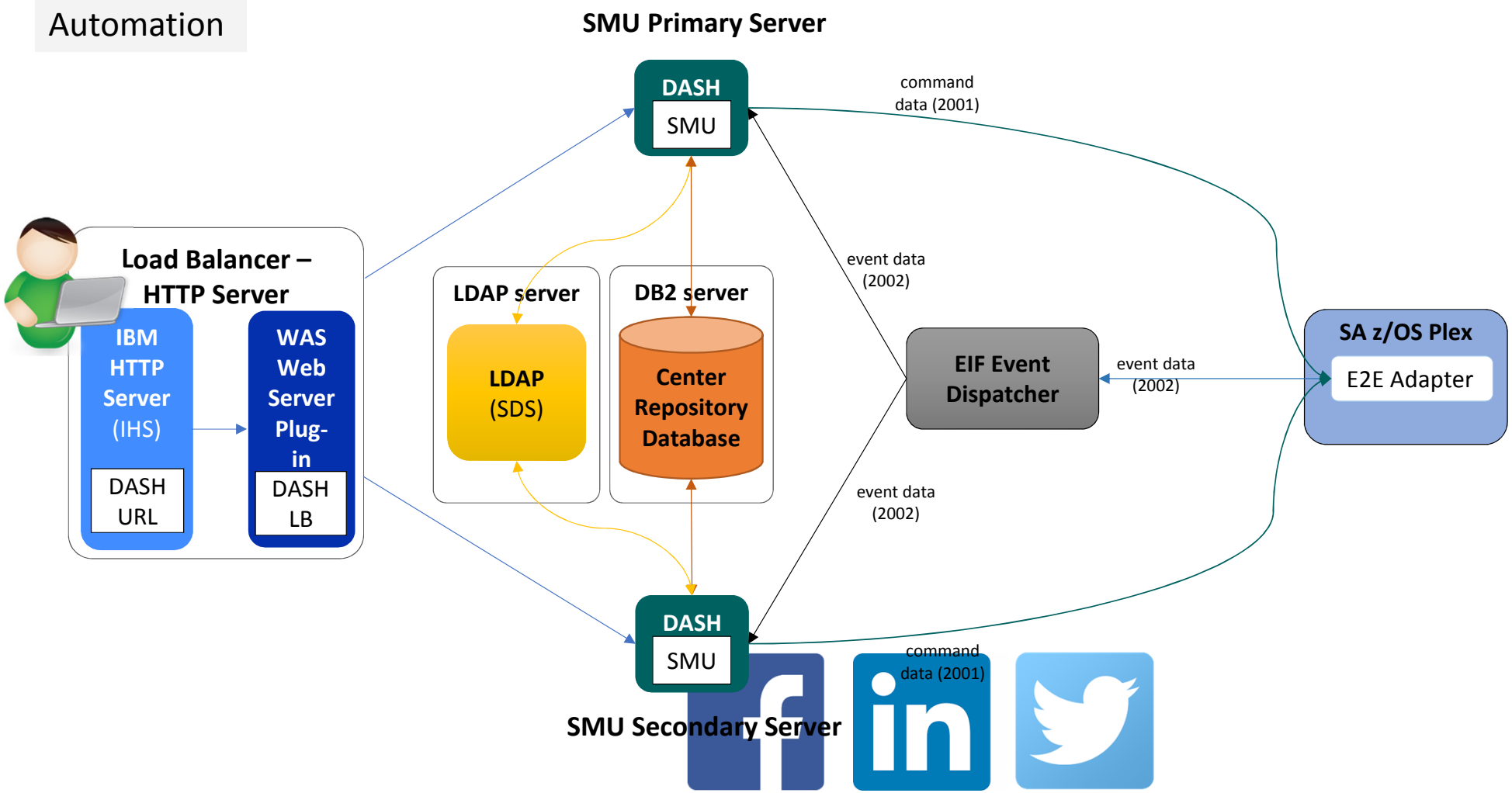
Components to consider

- Connections to SA plex to send commands and receive EIF events
- Credentials to login to DASH
- Automation Repository



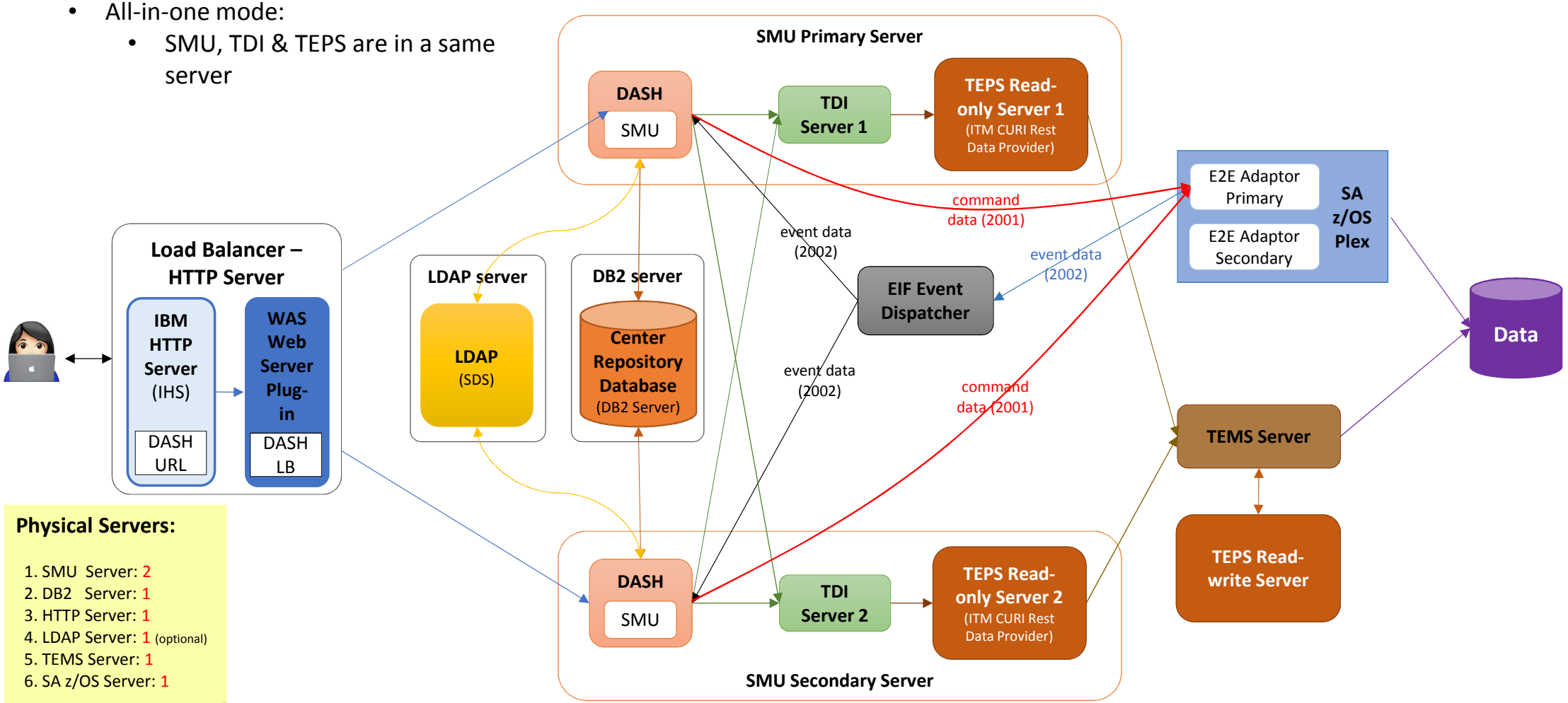
Service Management Unite – High Availability

Automation



Service Management Unite – High Availability

- All-in-one mode:
  - SMU, TDI & TEPS are in a same server

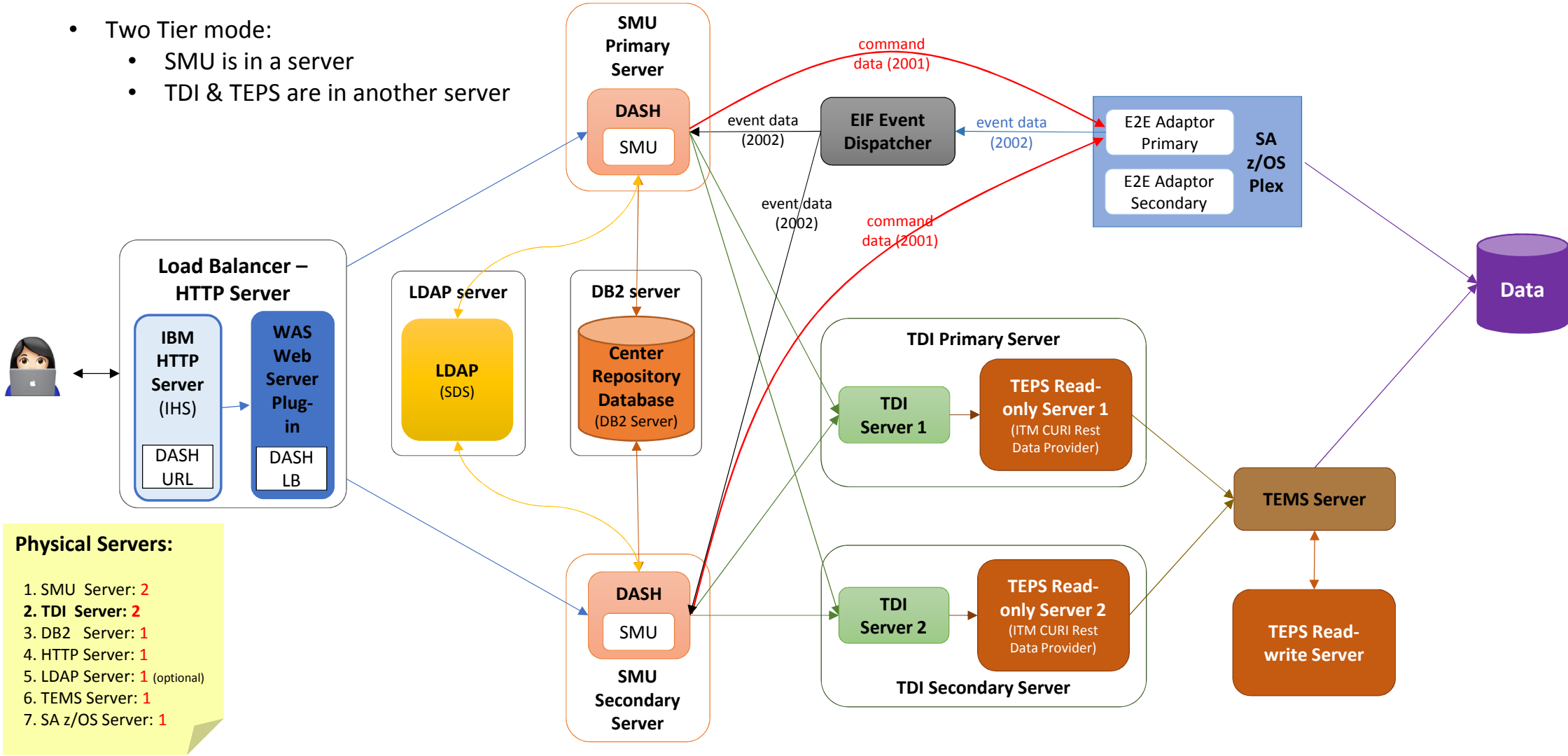


Physical Servers:

1. SMU Server: 2
2. DB2 Server: 1
3. HTTP Server: 1
4. LDAP Server: 1 (optional)
5. TEMS Server: 1
6. SA z/OS Server: 1

Service Management Unite – High Availability

- Two Tier mode:
  - SMU is in a server
  - TDI & TEPS are in another server

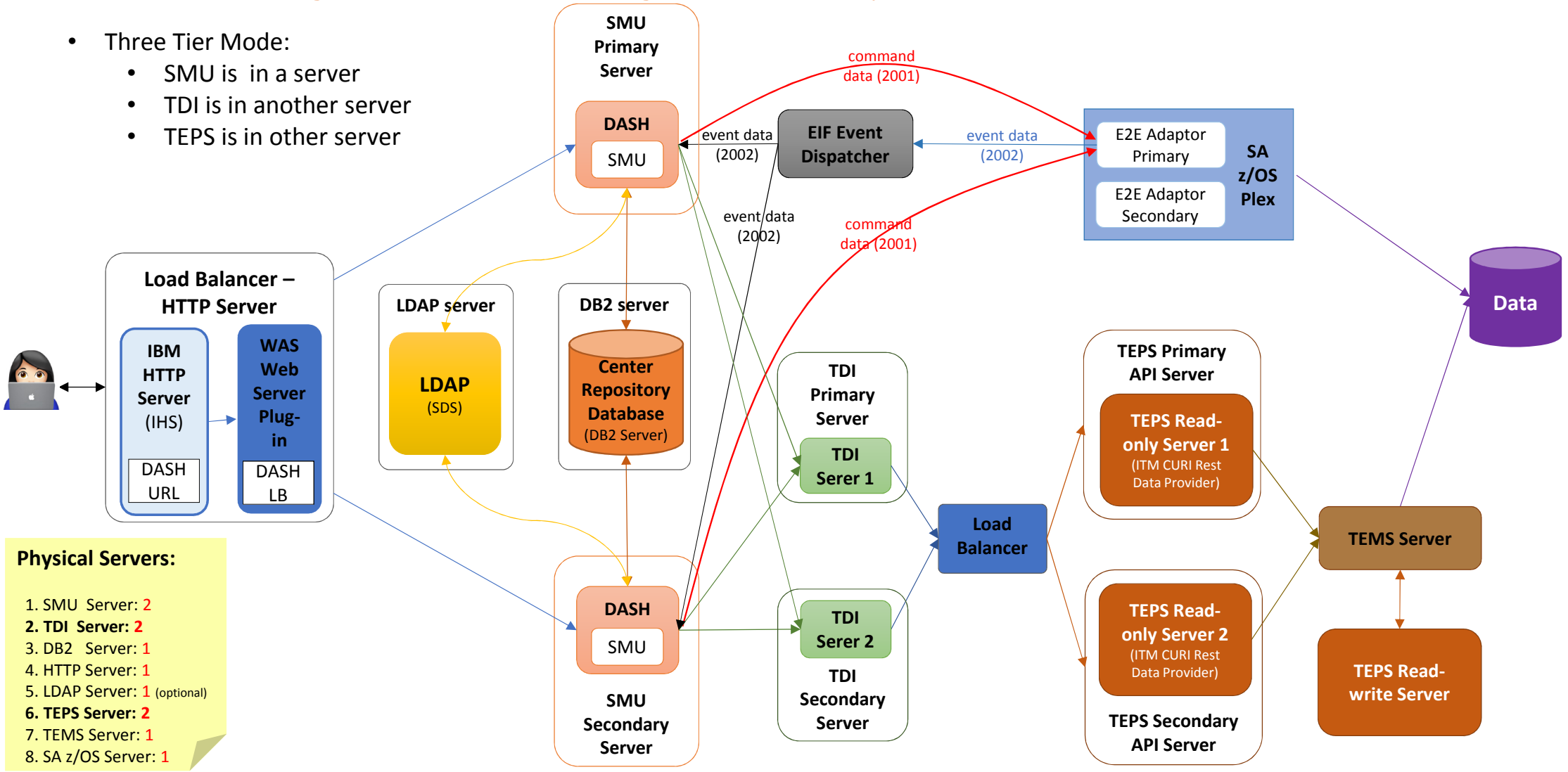


Physical Servers:

1. SMU Server: 2
2. **TDI Server: 2**
3. DB2 Server: 1
4. HTTP Server: 1
5. LDAP Server: 1 (optional)
6. TEMS Server: 1
7. SA z/OS Server: 1

Service Management Unite – High Availability

- Three Tier Mode:
  - SMU is in a server
  - TDI is in another server
  - TEPS is in other server



Physical Servers:

1. SMU Server: 2
2. **TDI Server: 2**
3. DB2 Server: 1
4. HTTP Server: 1
5. LDAP Server: 1 (optional)
6. **TEPS Server: 2**
7. TEMS Server: 1
8. SA z/OS Server: 1

Additional requirements

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Hardware

- At least one more physical machine for SMU server
- One physical machine for HTTP server & IBM WAS web server plugin
- One physical machine for center repository database

Software

- IBM SDK, Java (TIM) Technology Edition, Version 8
- IBM WebSphere Application Server Supplements – IBM HTTP Server
- IBM WebSphere Application Server Supplements – Web Server Plugins
- IBM WebSphere Application Server Supplements – WebSphere Customization Toolkit
- IBM DB2 Enterprise Server Edition (Ignore it if you already have)
- EIF event dispatcher - eezeifeventdispatcher.tar.gz

  (installed along with SMU Automation, usually in the folder /opt/IBM/smsz/ing/EIFEventDispatcher)

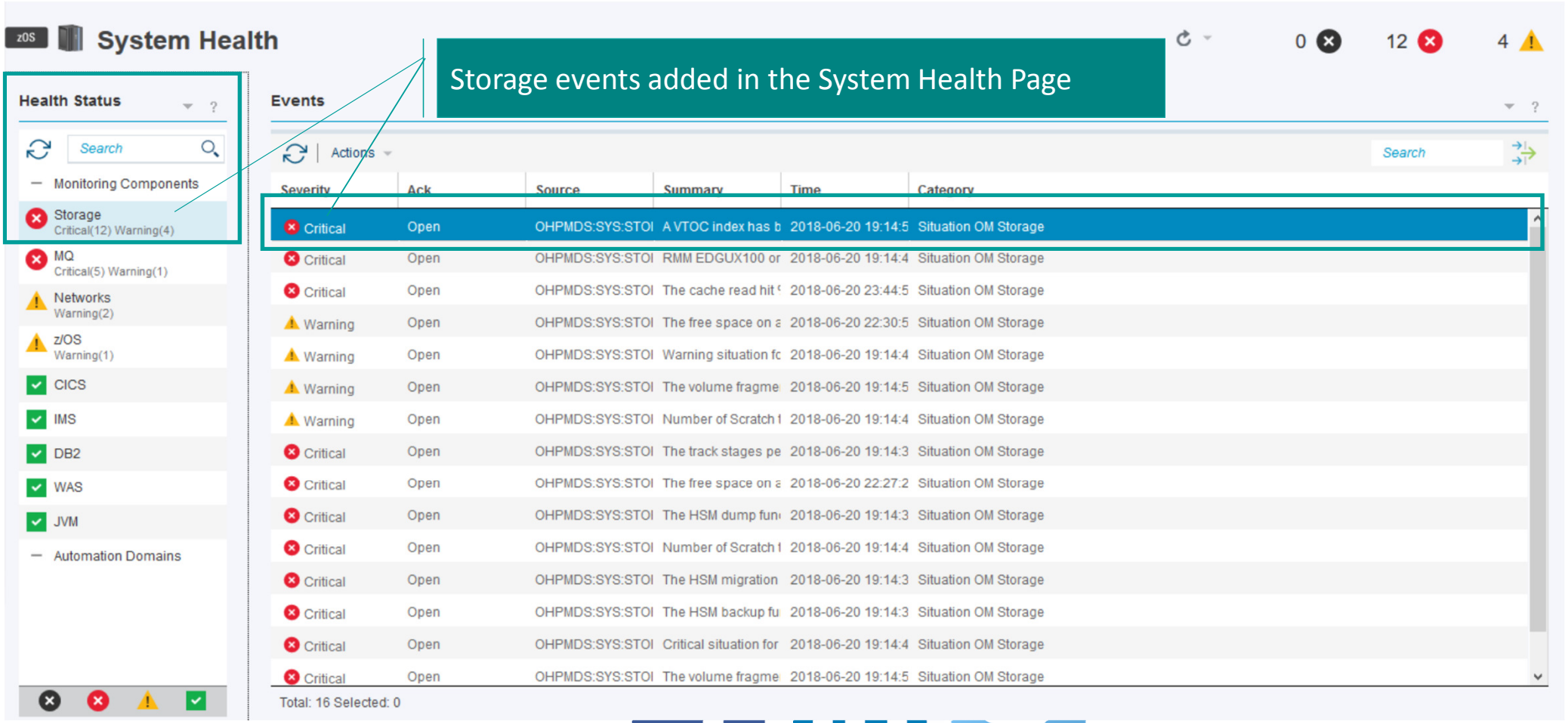
SMU Performance Management - Storage

- Overview of Storage groups and status
- Highlight the records that exceed the threshold for problem diagnosing
- Details of a selected Storage group, including the lowest and highest Volume free space, volume highest response time
- Details of a selected Volume, including the status, the Space trend, the Free/Used ratio and data set information

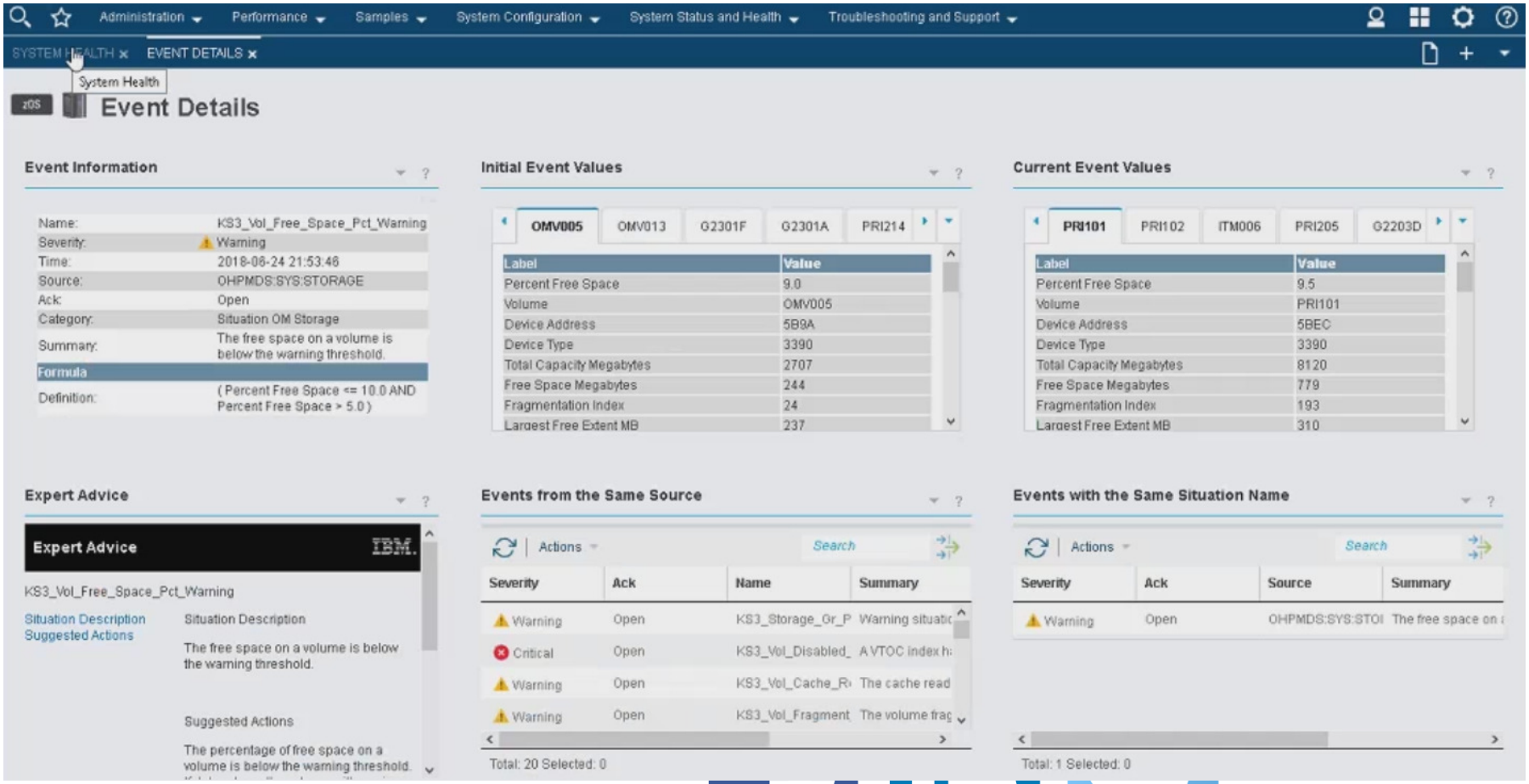
https://d3cy9zhslanhfa.cloudfront.net/media/7B366C30-DDC7-4FF3-98BF4262B7778C9C/11915246-978C-4027-B7AD3ECC98BC4374/webimage-274EB2D3-8383-4B43-8183C06DF515E52C.jpg
https://d3cy9zhslanhfa.cloudfront.net/media/7B366C30-DDC7-4FF3-98BF4262B7778C9C/687F3F9F-6BAE-4E35-B35D0F4FA60CD845/webimage-20599CCE-9D5B-47D0-933F138541CD2023.png

SMU Performance Management - Storage

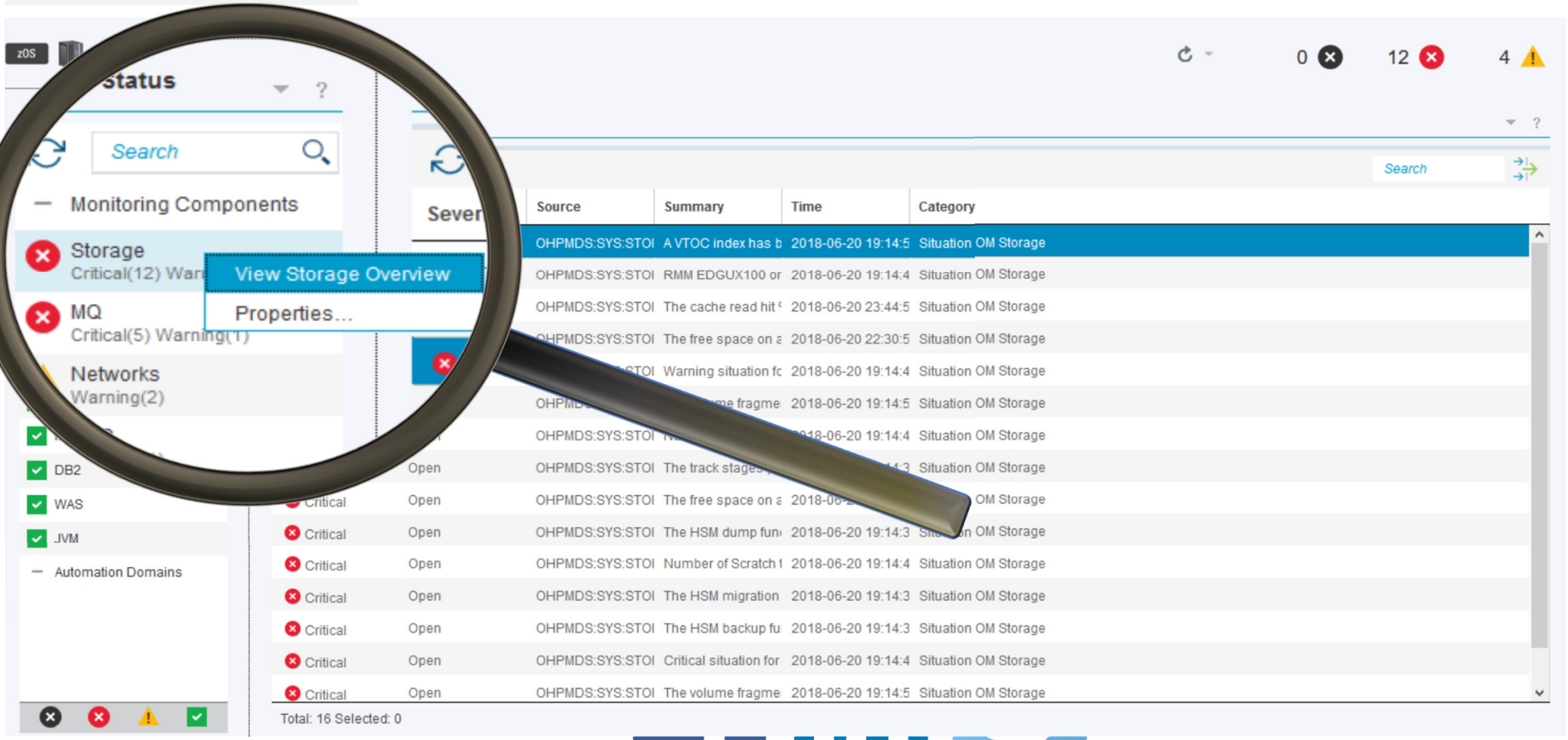
System Health Page



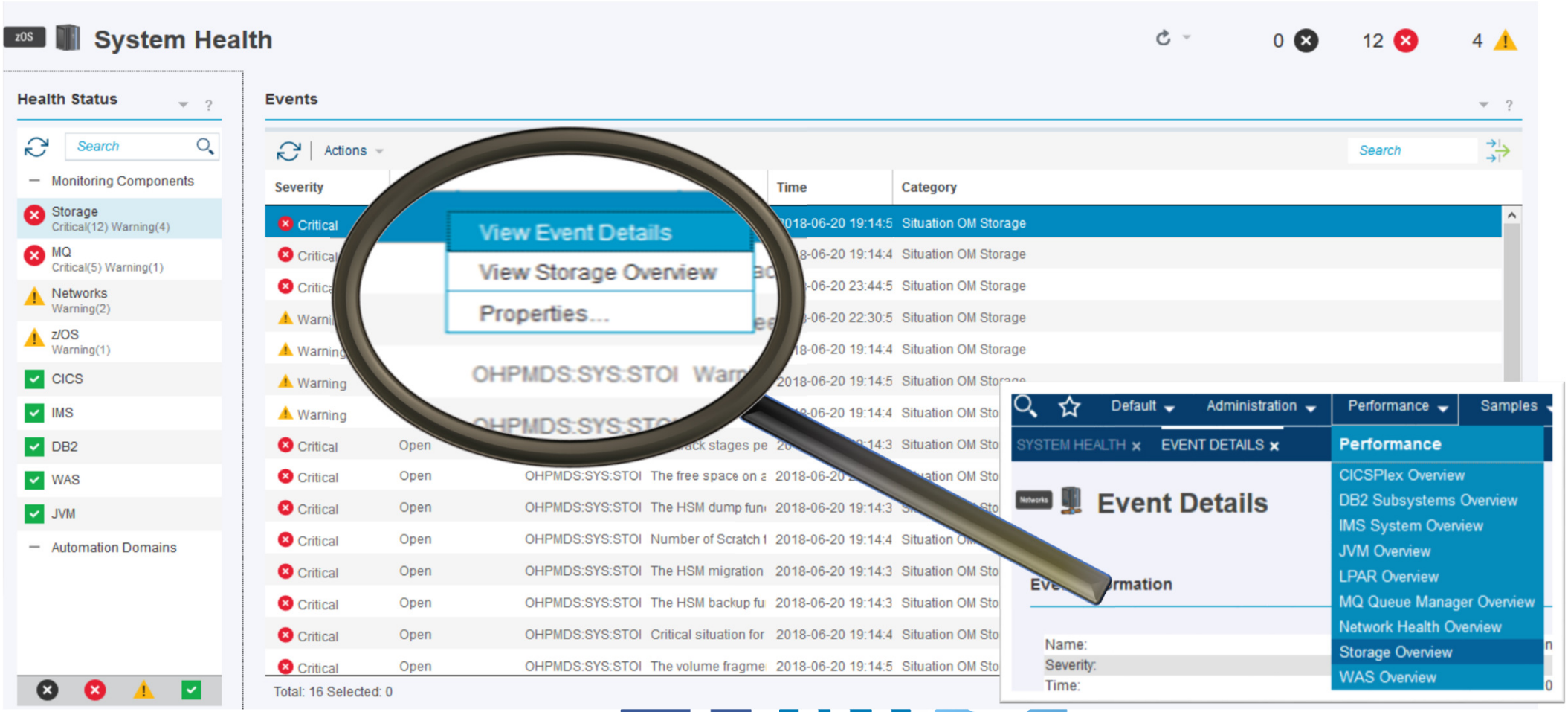
Event Details



System Health Page

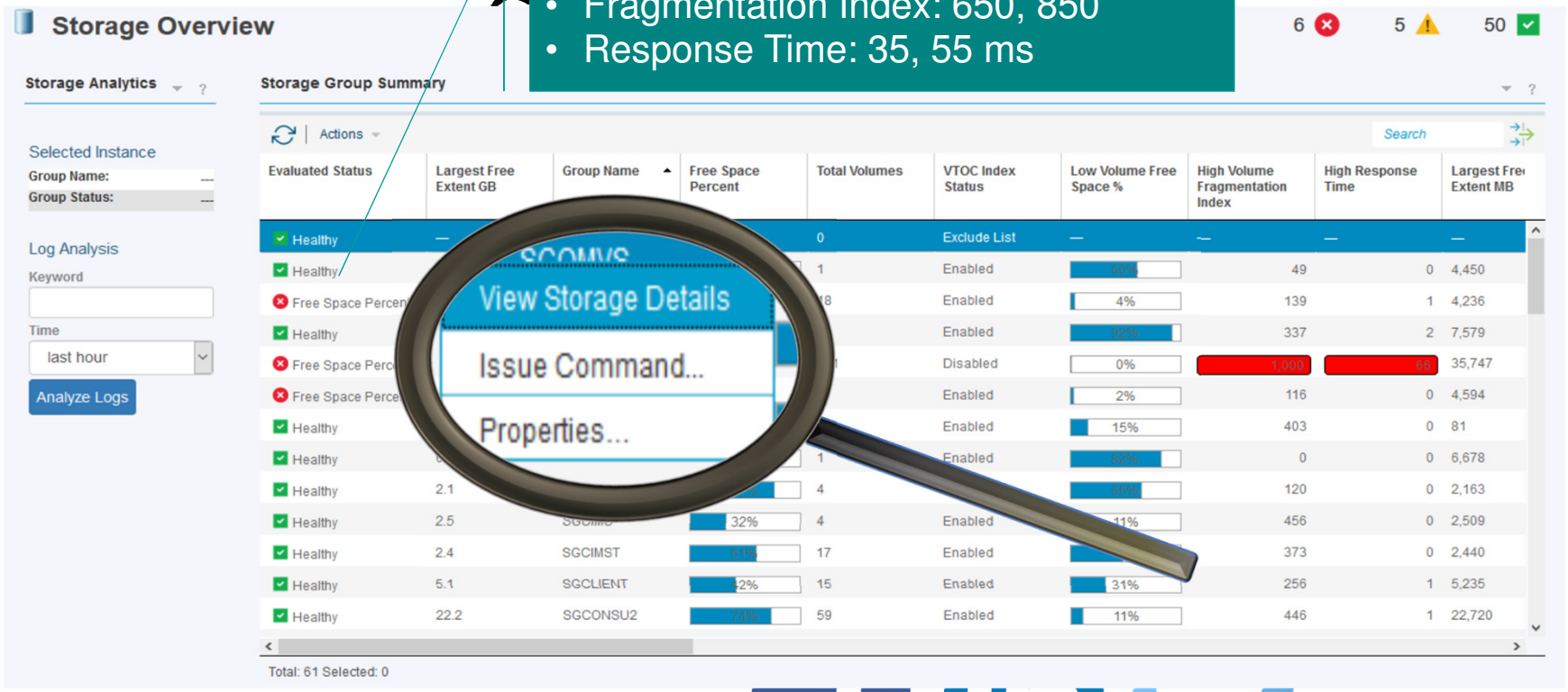


System Health Page



Storage Overview Page

Evaluated Status criteria
- Lowest Volume Free Space:10%, 5%
- Fragmentation Index: 650, 850
- Response Time: 35, 55 ms

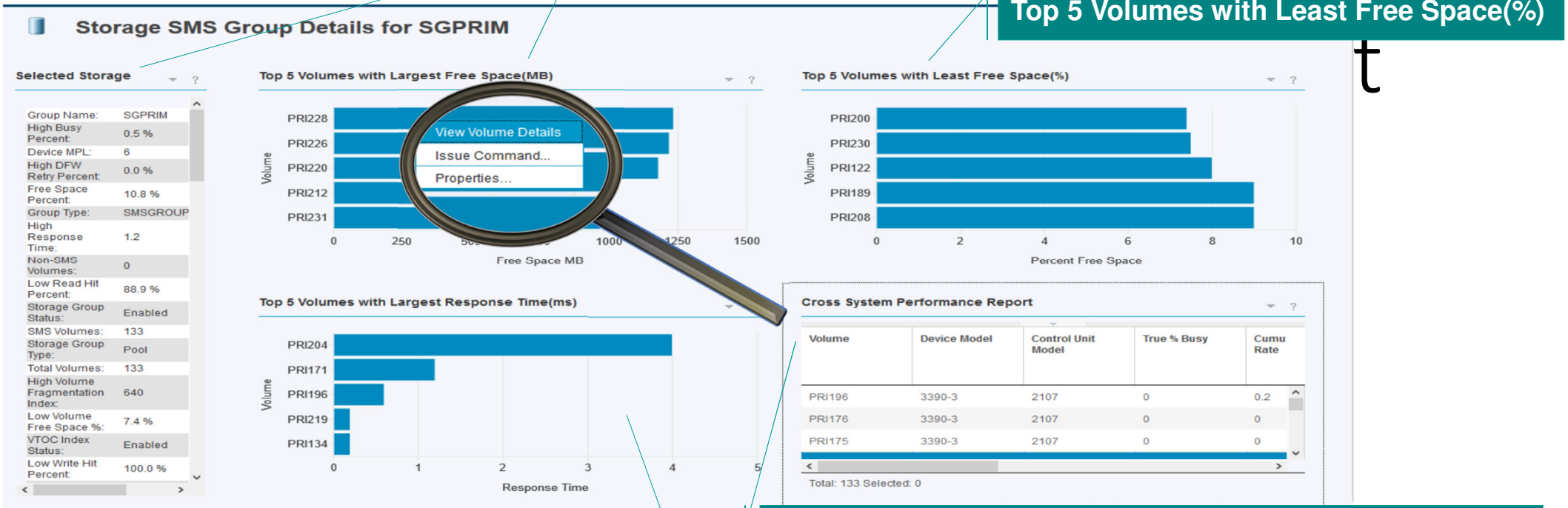


Storage Group Details

Selected Storage
current monitoring key identifier values

Top 5 Volumes with Largest Free Space(MB)

Top 5 Volumes with Least Free Space(%)



Top 5 Volumes with Largest Response Time(ms)

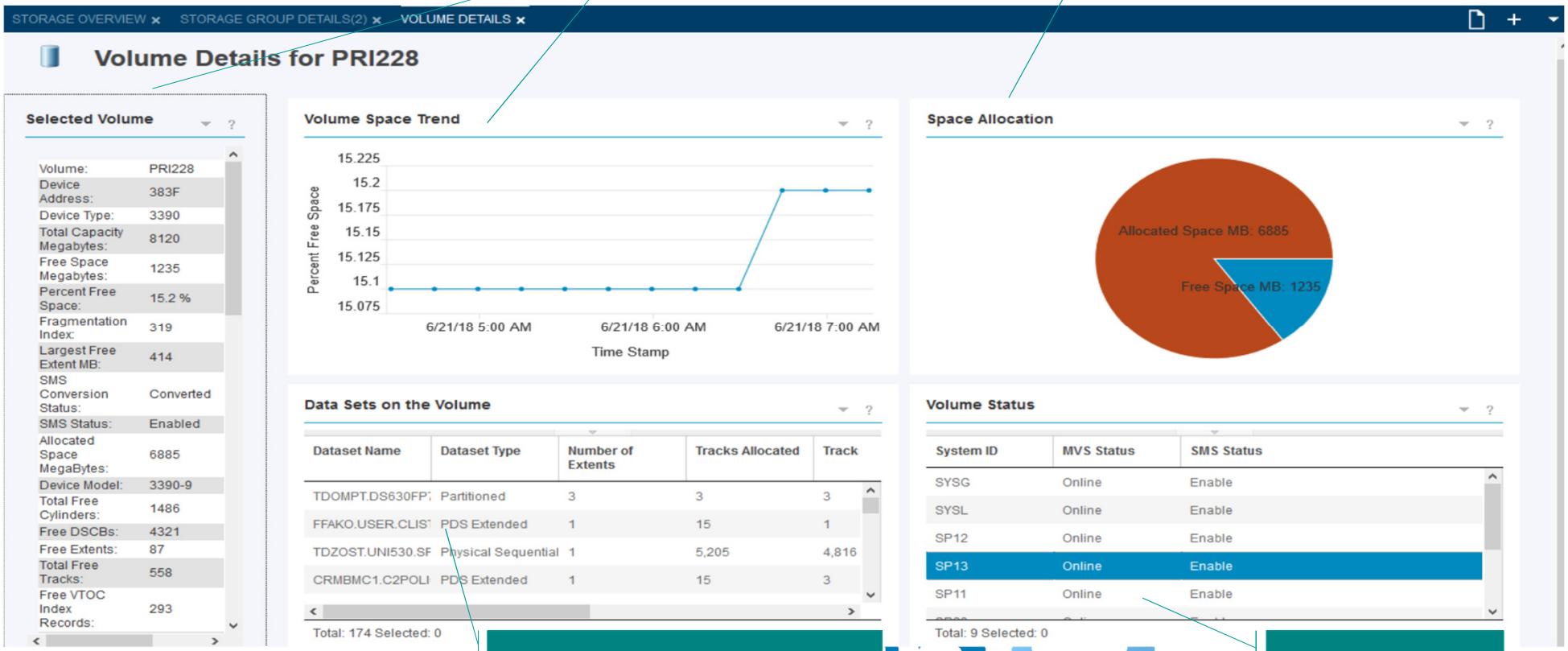
Cross System Performance Report
all sharing systems information of the selected storage group

Volume Details Page

Selected Volume
current monitoring key identifier values

Volume Space Trend

Space Allocation



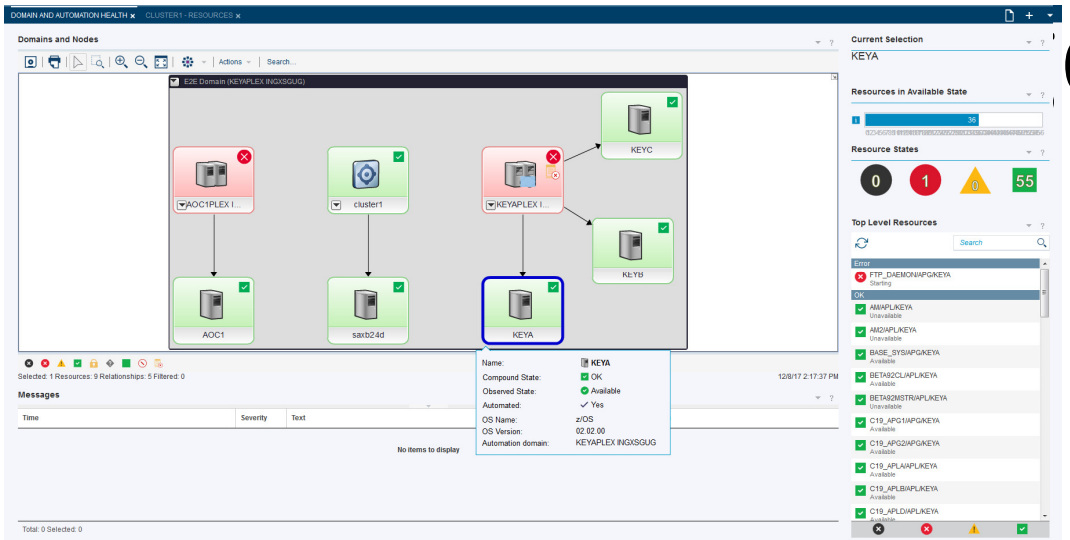
Data Sets on the Volume

Volume Status

RFE 112705 – Node-Status in Widget System Automation Topology

Old SMU 1.1.3 behavior of SA domain topology view

SMU 1.1.4
Show „Worst Resource State“ like in SDF



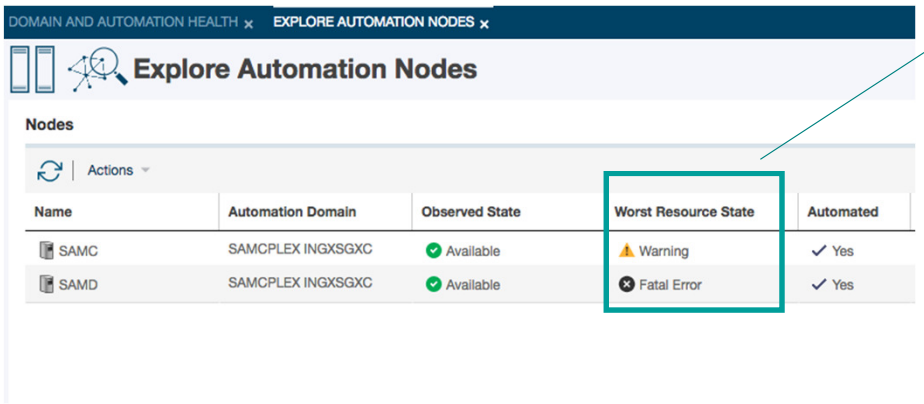
Customization possibilities added:

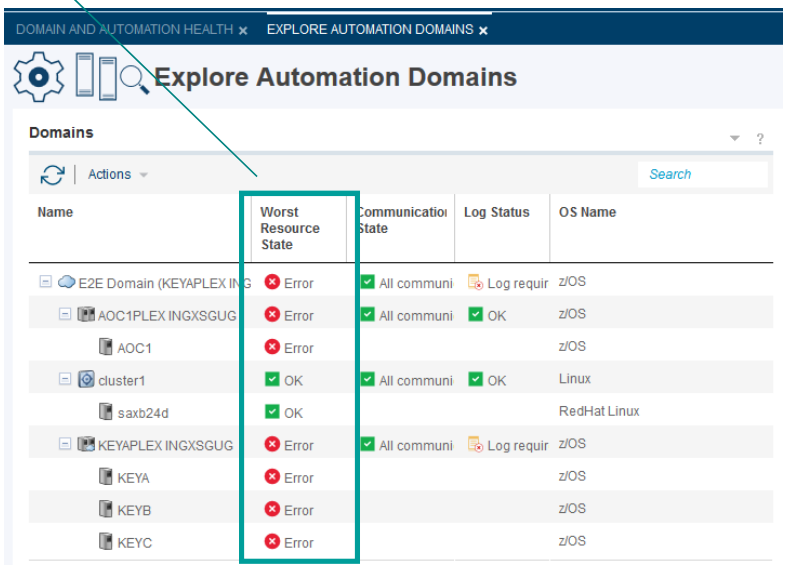
- should the nodes be displayed at all?
- automatic expansion to show nodes

Service Management Unite – RFEs

Other Examples of Node Views with new “Worst Resource State“ display

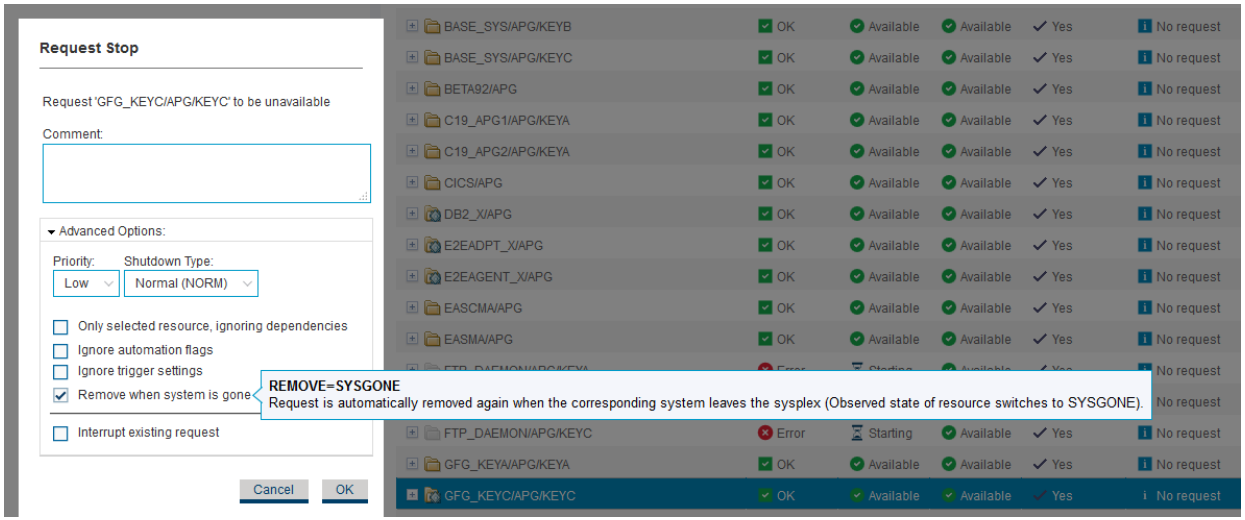
„Worst Resource State“ column added





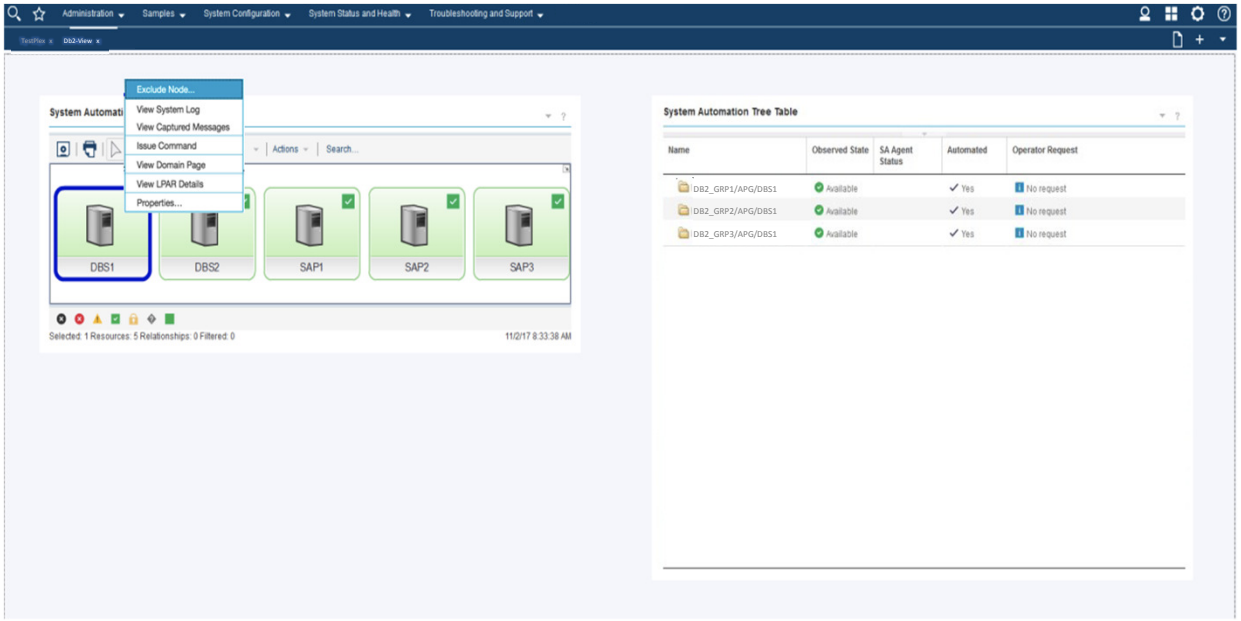
Service Management Unite – RFEs

RFE 107933 – Add REMOVE=SYSGONE option to requests



- New option added to Advanced Options for...
  - ... Stop requests
  - ... Start requests
  - ... Suspend requests
- Only available for resources linked to a system (not for sysplex groups)

RFE 112706 – Allow to hide operational tasks for systems



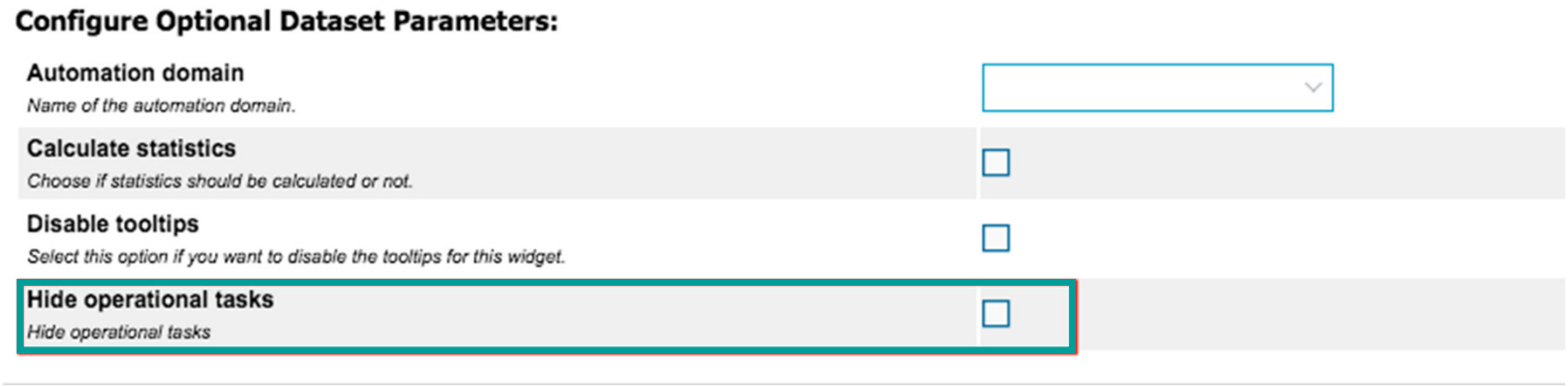
Use Case:

- Customer has created a specific dashboard for the Db2 application owner.
- Dashboard shows all systems on which Db2‘s are installed
- Selecting a system shows Db2 instances on this system
- User can start/stop/suspend, etc. these Db2 instances
- User should NOT be able to stop the whole system or launch a different command on the system

→ Added option to hide operational tasks

Service Management Unite – RFEs

RFE 112706 – Allow to hide operational tasks for systems ...

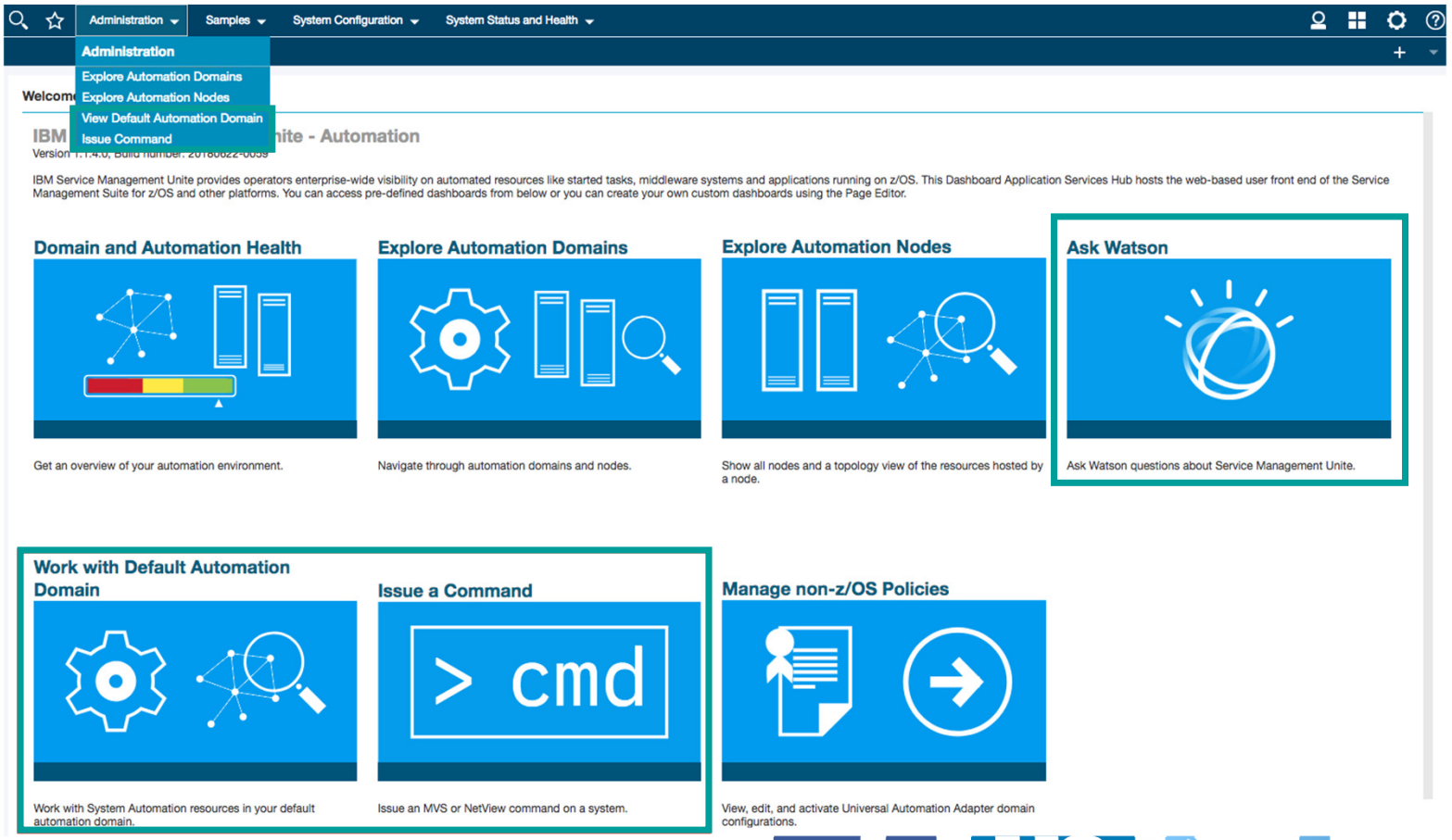


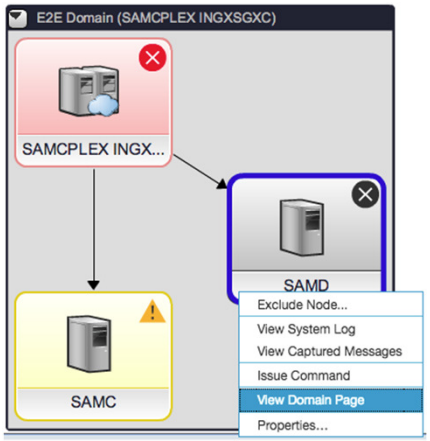
Dataset Parameter „Hide operational tasks“, can be configured when editing widget settings.
Available for the following datasets:

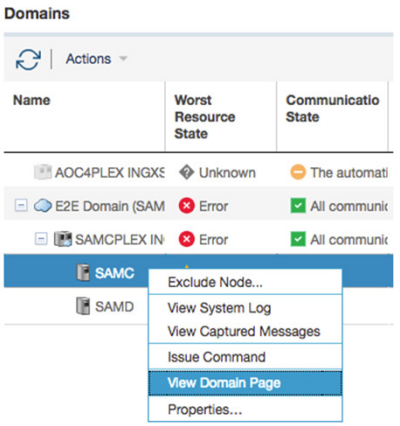
- Automation node list
- Automation domain topology
- Resource relationships
- Resource topology

SMU – other enhancements

Quick access to “Domain page“ and “Issue Command“ + Ask Watson







SA z/OS new Functions
APAR OA55386

System Automation for z/OS – INGPLEX IPL

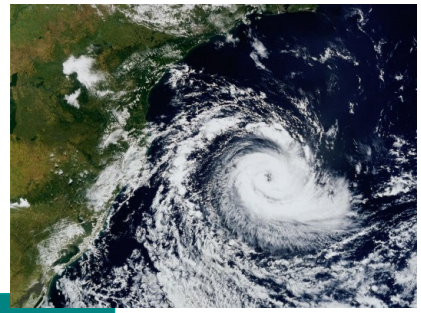
RFE 112938

INGPLEX IPL

- Shows PARMLIB members used by an IPL of a specified system at a specified timestamp
- Compares PARMLIB members used by different IPLs of a specified system

```
CNMKWIND OUTPUT FROM  AOC.TEMP.IPUFJ.BUMU.INGPIPLL          LINE 934 OF 1695
D - LPARNAME DWP1
D - SYSPARM  (00,22,S0,01,L)
D - IEASYM   (ZF,DP,N0,00,S0,01,L)
D - SYSPLEX  DWP1PLEX
D - SYSCAT   DWPLIB12  SYS1.CATALOG.VDWPLIB
    INITSQA  0128K 0128K
    ********************************************************************************
    LPARNAME HCD4
```

```
INGPLEX IPL-.-------------------------------------.-.---------.-
           |--DEL=-| IPLRECD |-----------------| '-DSN=dsn-'
           |-SHOW=-| IPLRECD |-----------------|
           |-DISP=-| IPLREC |------------------|
           |-COMP=-| IPLREC |-WITH=-| IPLREC |-|
           '-LIST=sysname---------------------'
```



https://dam.ibm.com/l/4023a5f777426c24/

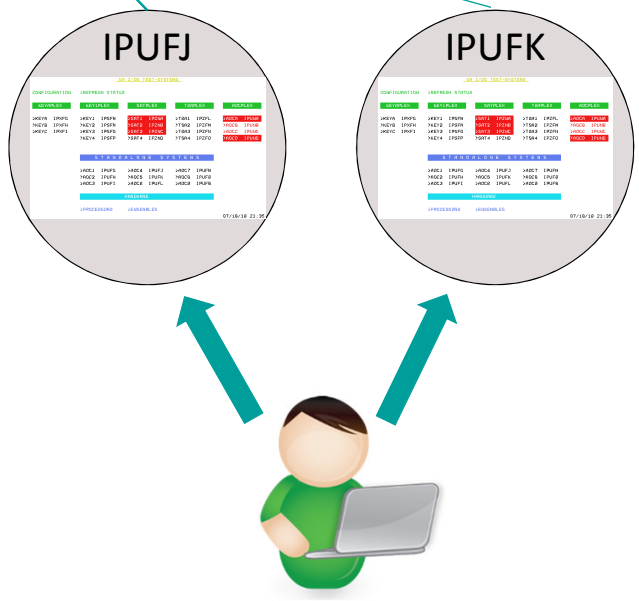
- Default: ddname assigned to HSAIPL
- Display / compare IPL records from **another** system in case of a disaster recovery situation

System Automation for z/OS – Parallel Focal Point update update

RFE 95352

```
AOFPINE2                    SDF Focal Point Definition
Command ===>

Entry Type : Network                PolicyDB Name    : E2E_V410
Entry Name : GATEWAY                Enterprise Name  : E2E_V410

Enter the Netview domains for notification forwarding to the Status Display
Facility (SDF).

Primary Domain. . . IPUFJ___        Domain ID of the primary focal point
Backup Domain . . . IPUFK___        Domain ID of the backup focal point

Parallel Update . . YES             (YES NO, Default NO)
```

User data support via
AOF_AAO_SDFPFP_ROOT.*
AOF_AAO_SDFBFP_ROOT.*



- Increased Reliability:
  Avoids the dependency on the availability of the single connection between a target system and the primary focal point
- Sustained SDF view during maintenance:
  When primary focal point is stopped for maintenance backup focal point has already the data

Turn parallel update on and off via refreshing the configuration

Processor Operations – Dynamic Target System Names

RFE 101712

LPAR Definitions Policy

Entry Type : Processor PolicyDB Name : PROCOPS_410
Entry Name : HEL2 Enterprise Name : ISQ_LTD

Action	LPAR Name	Target Mode	Target System Name
	KEY1	ESA	KEY1
	LNXSA01	LINUX	LNXT0
	SAT4	ESA	SAT4
	SAV1	ESA	SAV1
	SYSC	ESA	
	SYSD	ESA	
	TSA4	ESA	TSA4
	VM9	ESA	BOEVM9

Prior to APAR **OA55386:**
Target System Name required
→ SYSC and SYSD would not be considered for Processor Operations other than INTERNAL

- 'Target System Name' must be unique.
- 'Target System Name' must match one of the defined systems in PDB

'Backup' LPAR for High Availability

Processor Operations – Dynamic Target System Names

Examples:

LPAR Name **SYSC** Processor Name **HEL2**	
AOF_AAO_ISQ_DYNTGT	Dynamic Target System Name
L8	SYSC
L7#	SYSC#
L4C3@	SYSCHEL@

New AAO variable AOF_AAO_ISQ_DYNTGT to define dynamic name pattern.

AOF_AAO_ISQ_DYNTGT 3 building blocks:

1. Lx: take LPAR Name from 1 to x
2. Cy: take Processor Name from 1 to y
3. Special characters #, $ and @ (only one)

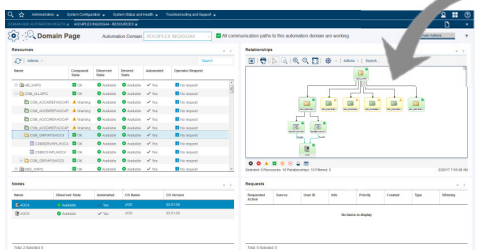
maximum
Target System Name length
is 8 characters

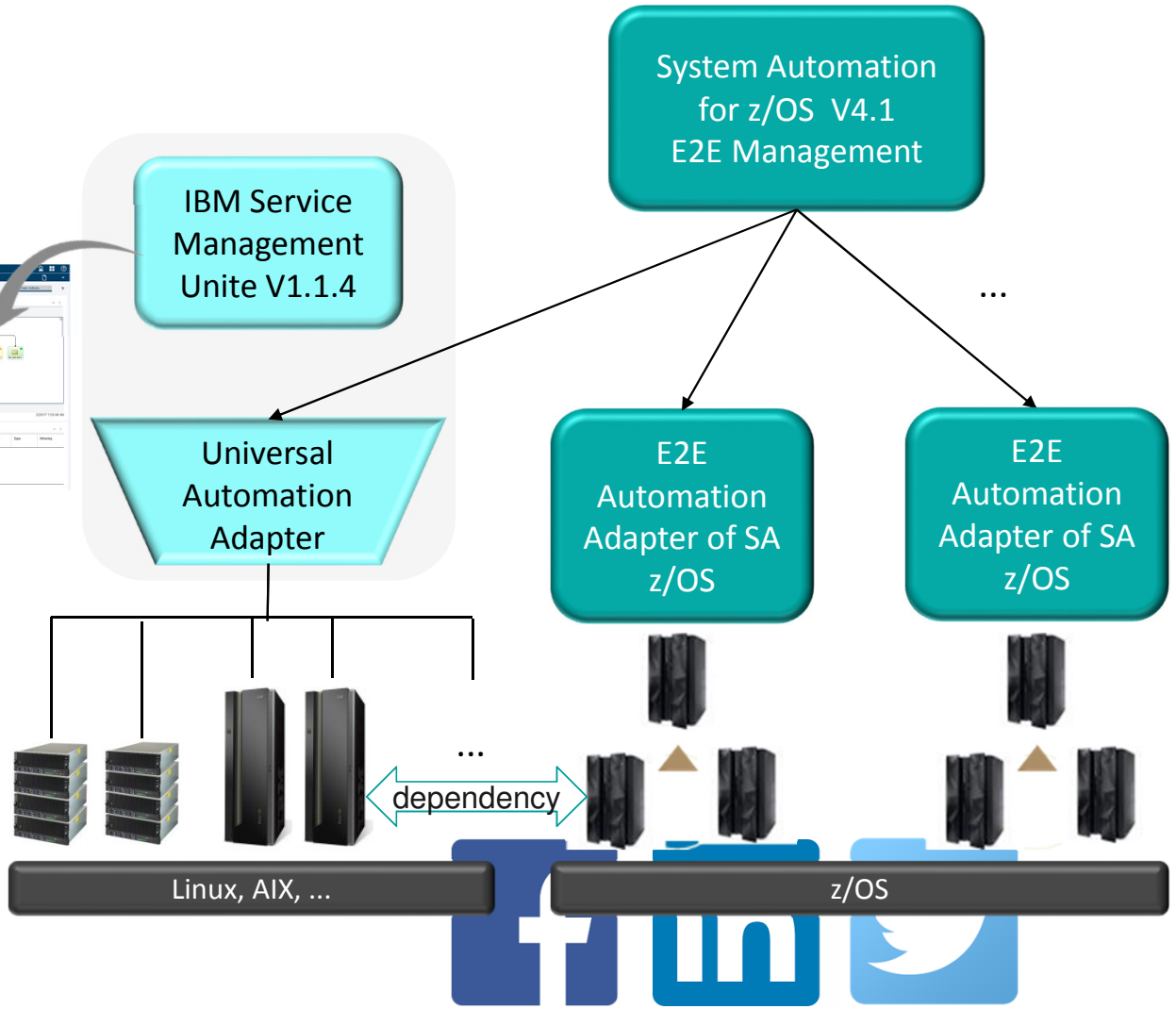
Assumed settings:

Operating System Type = MVS
Initialize target system = BYPASS
Default Response to IEA213A/IEA214A = YES
Target time zone = 0 (same as host)

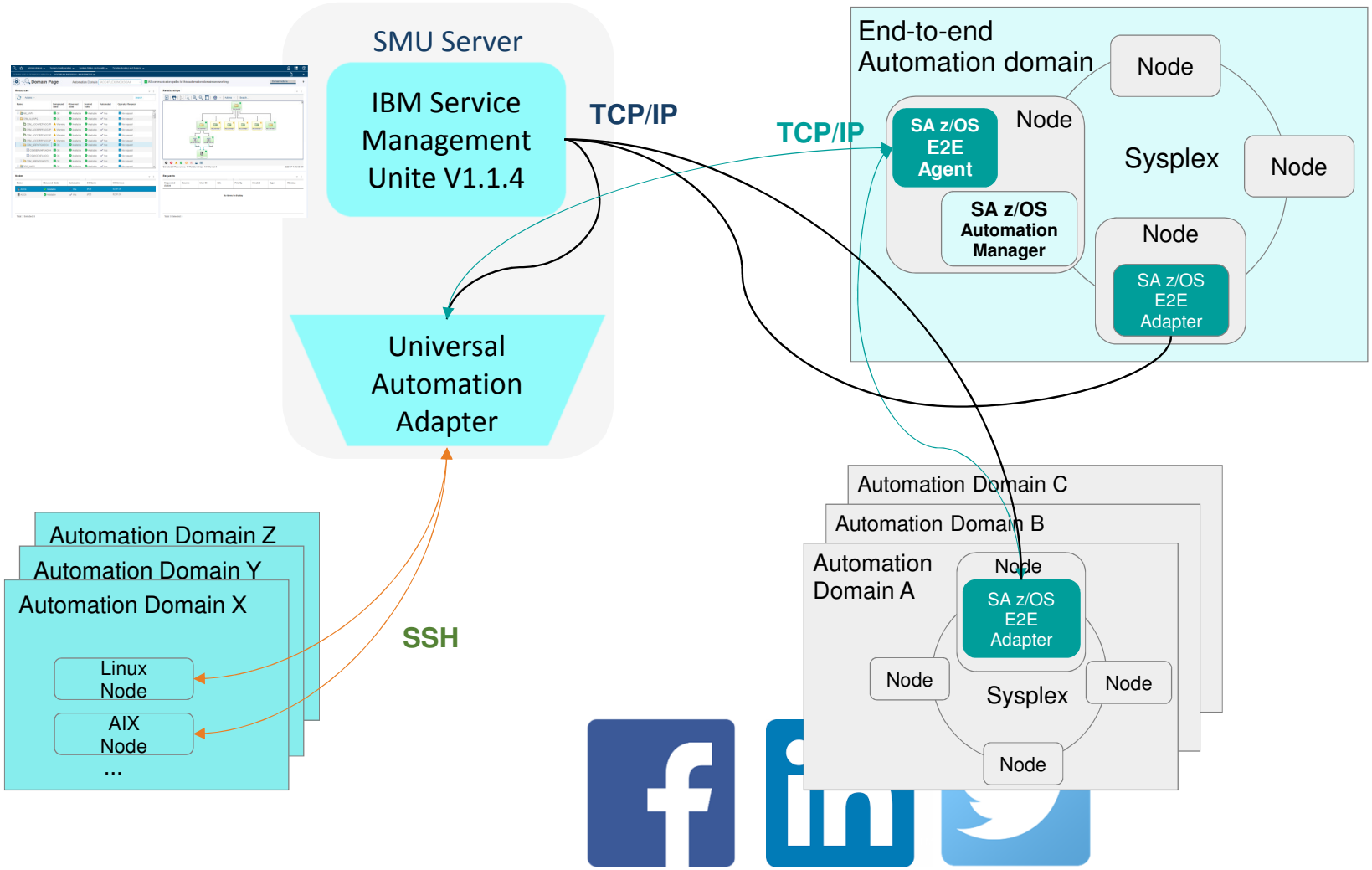
ISQ144: Dynamic target system setup skipped due to invalid pattern &1.
ISQ145: Dynamic target system &1 skipped - duplicate entry.

System Automation for z/OS – Cross platform automation





- Control applications running on z/OS sysplexes and on distributed servers
- Manage cross platform automation environment regarding dependencies between them


SMU Server
IBM Service Management Unite V1.1.4
TCP/IP
TCP/IP
Universal Automation Adapter
SSH
End-to-end Automation domain
Node
SA z/OS E2E Agent
Node
Sysplex
Node
SA z/OS Automation Manager
Node
SA z/OS E2E Adapter
Automation Domain Z
Automation Domain Y
Automation Domain X
Linux Node
AIX Node
...
Automation Domain C
Automation Domain B
Automation Domain A
Node
SA z/OS E2E Adapter
Node
Sysplex
Node
Node

Customization Dialog Definitions

```
                              Entry Type Selection
Option ===> ____________________________________________________________________
                                                                   More:      +
 Enter number or entry type or use "BR <entry type>" for browse

  1 ENT    Enterprise                    30 TMR    Timers
  2 GRP    Groups                        32 TPA    Tape Attendance
  3 SBG    SubGroups                     33 MVC    MVS Components
  4 SYS    Systems                       34 MDF    MVSCOMP Defaults
  5 APG    ApplicationGroups             35 SDF    System Defaults
  6 APL    Applications                  36 ADF    Application Defaults
  7 EVT    Events                        37 AOP    Automation Operators
  8 SVP    Service Periods               38 NFY    Notify Operators
  9 TRG    Triggers                      39 NTW    Networks
 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                  50 DMN    Remote Domains
                                         51 REF    Resource References
 20 PRD    Product Automation
```

References to remote resources and their automation domains

Customization Dialog Definitions – remote Domains

Domain Name as to be seen in INGLIST

```
                              Entry Name Selection                Row 1 to 8 of 8
Command ===> ____________________________________________________ Scroll ===> PAGE

Entry Type : Remote Domain          PolicyDB Name    : E2E_V410
                                    Enterprise Name  : E2E_V410

Action       Entry Name             Short Description
__________   AOCAPLEX               remote Domain for AOCAPLEX
__________   AOC4PLEX               Test of remote SAPlex
__________   LINUXENV               distributed environment managed via UAA
```

```
                              Domain Information
Command ===> ____________________________________________________________

Entry Type : Remote Domain          PolicyDB Name    : E2E_V410
Entry Name : LINUXENV               Enterprise Name  : E2E_V410

Domain Name  . . . . . .
               MyLinuxEnvironment
```

Actual Remote Domain Name

Add credentials in ~/adapter/config/inge2eagt.credentials.properties

Customization Dialog Definitions – Remote Resource Reference

Reference to remote Resource as to be seen in INGLIST

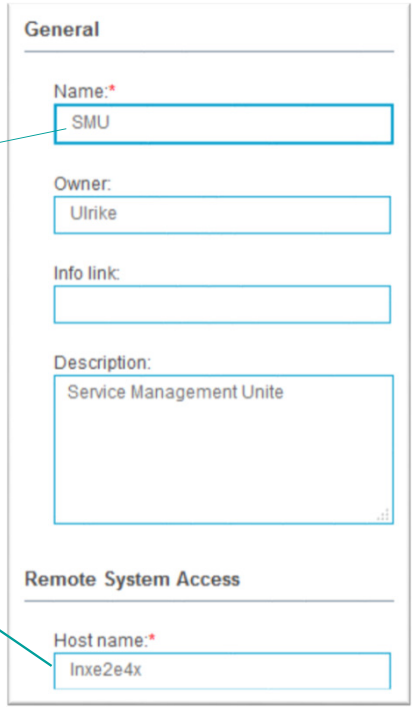
```
                                Entry Name Selection                Row 6 to 8 of 8
Command ===> _____________________________________________________  Scroll ===> PAGE

Entry Type : Resource Reference     PolicyDB Name    : OA55386
                                    Enterprise Name  : E2E_V410

Action      Entry Name              Short Description
_________   SMU                     SMU server
_________   VNC                     VNC server
_________   WEB_SRV                 WebServer running on lnxe2e4x
```

Customization Dialog Definitions – Remote Resource

```
                                Remote Resource
Command ===>

Entry Type : Resource Reference     PolicyDB Name    : E2E_V410
Entry Name : SMU                    Enterprise Name  : E2E_V410

Inform List . . . . . . . . .                        (E2E)
Owner . . . . . . . . . . . . Ulrike Münch
Info Link . . . . . . . . . .

Specify the remote resource:
Name. . . . . . . . . . . . .
             SMU

Type. . . . . . . . . . . . . IBM.RemoteApplication   (APG APL MTR REF
                                                      IBM.RemoteApplication)
System/Node . . . . . . . . .
             lnxe2e4x
```

To match UAA definitions

Universal Automation Adapter Policy:



Customization Dialog Definitions – Remote Resource dependency and linkage

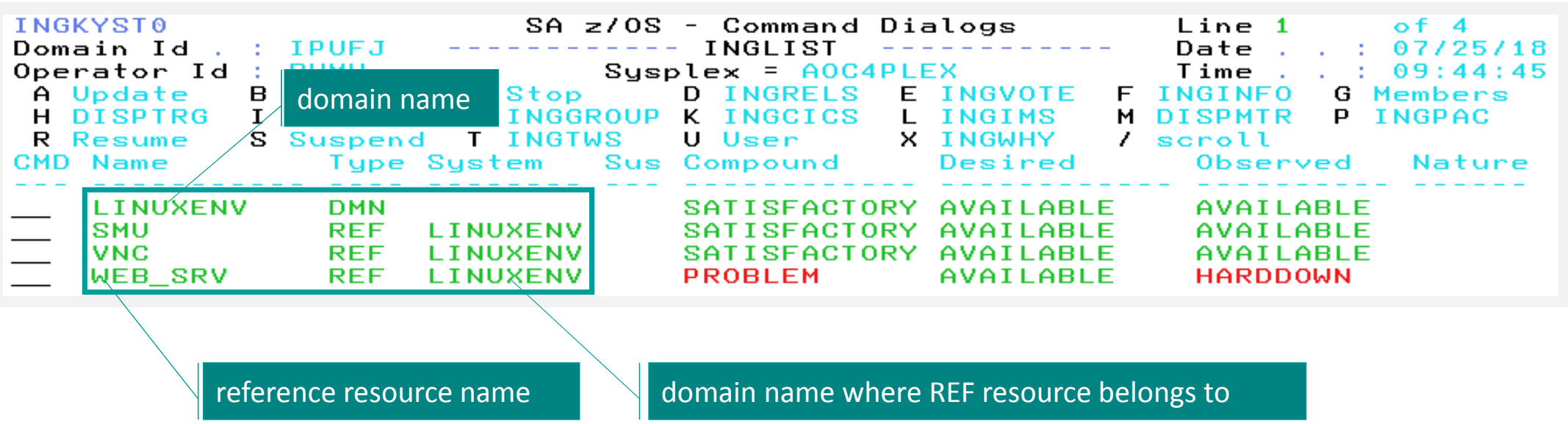
Definition of Relationships

```
                                  Policy Selection                    Row 1 to 6 of 6
Command ===> ____________________________________________________ Scroll ===> PAGE

Entry Type : Resource Reference      PolicyDB Name    : E2E_V410
Entry Name : SMU                     Enterprise Name  : E2E_V410

Action      Policy Name          Policy Description
__________  DESCRIPTION          Enter description
__________  REMOTE RESOURCE      Define remote resource
__________  RELATIONSHIPS        Define relationships
__________  -------------------- ----------------------------------------------
__________  WHERE USED           List domain linked to this entry
__________  COPY                 Copy data from an existing entry
```

Linkage to remote Domain

```
                      Where Used                                  Row 1 to 8 of 8
Command ===> ____________________________________________________ SCROLL===> PAGE

Entry Type : Resource Reference    PolicyDB Name    : E2E_V410
Entry Name : SMU                   Enterprise Name  : E2E_V410

Action      Status            Name                        Type
__________                    AOCAPLEX                    DMN
__________                    AOC4PLEX                    DMN
__________  SELECTED          LINUXENV                    DMN
```

Runtime – INGLIST



Runtime – INGINFO for Domain

```
INGKYIN0                      SA z/OS - Command Dialogs          Line 1      of 213
Domain Id . : IPUFJ     ------------ INGINFO ------------        Date . . . : 07/25/18
Operator Id : BUMU              Sysplex = AOC4PLEX               Time . . . : 09:46:00

 Resource     =>  LINUXENV/DMN                          format: name/type/system
 Target       =>  _________     System name, domain ID or sysplex name

 Resource       : LINUXENV/DMN
 Description    : distributed environment managed via UAA

 Status...
    Observed            : AVAILABLE
    Desired             : AVAILABLE
    Automation          : IDLE
    Startability        : YES
    Compound            : SATISFACTORY      Last changed : 2018-07-25 09:30:14
    Health Status       : N/A

 E2E Agent...
    Runs on             : AOC4

 Remote Domain...
    Name                : MyLinuxEnvironment
    Operational Info    : OK - The connection to the domain was successfully
                          established.
    Adapter OS          : Linux
    Adapter Hostname    : lnxe2e4x
    Adapter Port        : 2005
    Adapter SSL         : false
    Adapter Security    : false
```

actual remote domain name

information about the status

actual remote node

Runtime – INGDMN

```
INGKE2E1                      SA z/OS - Command Dialogs          Line 1       of 4
Domain Id . : IPUFJ    ------------ INGDMN    ------------      Date . . . : 07/25/18
Operator Id : BUMU               System  = AOC4                 Time . . . : 09:53:57
                                 Group ID= INGXSGA4
Resource             : LINUXENV/DMN
Automation Domain    : MyLinuxEnvironment

   Additional Domain Properties

   plugin-policy-pool                 /etc/opt/IBM/smsz/ing/UAadapterPolicyPool
   E2EManagementHost                  lnxe2e4x:2002
   Policy Activation Time             Wed Jul 25 08:29:46 GMT+01:00 2018
   Policy Filename                    /etc/opt/IBM/smsz/ing/UAadapterPolicyPool/UA
```

location of the UAA policies

SMU IP address and port

policy activation time

policy filename

Runtime – INGINFO for Reference Resource

```
INGKYIN0                      SA z/OS - Command Dialogs          Line 1      of 229
Domain Id . : IPUFJ     ------------ INGINFO ------------        Date . . : 07/25/18
Operator Id : BUMU              Sysplex = AOC4PLEX               Time . . : 09:56:23

 Resource     =>  SMU/REF/LINUXENV                      format: name/type/system
 Target       =>  _________     System name, domain ID or sysplex name

 Resource       : SMU/REF/LINUXENV
 Description    : SMU server
 Owner          : Ulrike Münch

 Status...
    Observed            : AVAILABLE
    Desired             : AVAILABLE
    Automation          : IDLE
    Startability        : YES
    Compound            : SATISFACTORY      Last changed : 2018-07-25 09:30:23
    Health Status       : N/A

 E2E Agent...
    Runs on System      : AOC4

 Remote Domain...
    Domain Name         : MyLinuxEnvironment
    Remote Resource     : SMU/IBM.RemoteApplication/lnxe2e4x
    Operational Info    : E2EVNT_ONLINE_OK - Resource is up and ready for use.
```

actual remote domain name

actual remote resource name

operational information

Runtime – INGINFO for Reference Resource

```
INGKYIN0                      SA z/OS - Command Dialogs          Line 1      of 135
Domain Id . : IPUFJ     ------------ INGINFO ------------        Date . . . : 07/25/18
Operator Id : BUMU              Sysplex = AOC4PLEX               Time . . . : 09:57:53

 Resource     =>  WEB_SRV/REF/LINUXENV                  format: name/type/system
 Target       =>  _________     System name, domain ID or sysplex name

 Resource       : WEB_SRV/REF/LINUXENV
 Description    : WebServer running on lnxe2e4x
 Owner          : Ulrike Münch

 Status...
    Observed            : HARDDOWN
    Desired             : AVAILABLE
    Automation          : PROBLEM
    Startability        : NO
    Compound            : PROBLEM      Last changed : 2018-07-25 09:43:53
    Health Status       : N/A

 E2E Agent...
    Runs on System      : AOC4

 Remote Domain...
    Domain Name         : MyLinuxEnvironment
    Remote Resource     : WEBSrv1/IBM/lnxe2e4x
    Operational Info    : E2EREQ_FAILED_RESOURCE_UNKNOWN - Resource is not
                          defined on the remote domain.
```

operational information giving explanation about the bad status

Thank
You

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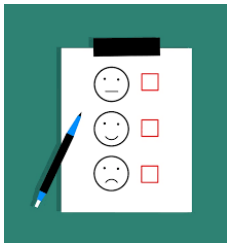
- This session is OI