CA OPS/MVS System State Manager v3

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November 2017



Agenda

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2 RESOURCE DISCOVERY

3 CUSTOMER MODIFICATIONS

4 POLICY BASED RESOURCE MANAGEMENT

5 OPERATIONS

6 ARCHITECTURE





Introduction

The System State Manager (SSM) facility automates and controls the management of system resources, such as started tasks, subsystems, JES initiators, and VTAM nodes. The goal of the SSM engine involves always keeping a resource in its desired state. When the current state differs from the desired state, SSM dispatches an action to restore the resource to its proper state.

General Features			
CA Supplied Resource Policy Definitions	Keeps Current State = Desired State		
Expandable to any Resource with an Up/Down, On/Off, Active/Inactive State	Prerequisite / Subrequisite Relationships		
Single Location for Resource Information	Restart Resource after failure		
Customer Expandable	Restart LPAR after IPL		
Move Resource across LPARs within a SYSPLEX	Control Groups of Resources		
ISPF, Console, or Web Control	Limits Runaway Failure Restarts		



Finding the System State Manager Menu

```
CA OPS/MUS ----- CA11 --- OPSVIEW Primary Options Menu ---- Subsystem OPSL
8 Parms
            Set OPSVIEW and ISPF default values
1 OPSLOG
            Browse OPSLOG
2 Editors AOF Rules, REXX programs, SQL Tables
                                                      Release - 12.3
3 Sys Cntl Display/Modify System Resources
4 Control Control CA OPS/MUS
5 Support Support information
6 Command Enter JES2/MVS/IMS/VM commands directly
7 Utilities Run CA OPS/MUS Utilities
A AutoMate CA AutoMate rules edit and control
            Use ISPF/PDF services
LISPE
S SYSUIEW CA SYSUIEW Performance Management
T Tutorial Display information about OPSVIEW
Control ----- CA11 --- O P S V I E W ----- Subsustem OPSL
1 Parms
                   View/Modify product parameters
2 MSF Control
                   Control Multi-Sustem Facility
3 OSF Information View Operator Server Facility status
4 ECF Information View Enhanced Console Facility status
5 AOF Control
                   Control Automated Operations Facility
6 Start
                   Start the main product address space
7 Stop
                   Stop the main product address space
8 Global Variables Display and Update Global Variables
10 EPI Control Control External Product Interface
11 SSM Control View/Control System State Manager
12 COF Control
                  View/Modify CICS Operations Facility
13 OPSLOG Control View/Modify OPSLOG Definitions
14 WebCenter Control View/Modify WebCenter Facility LU Prefix:
Enter END command to return to primary options.
```

```
System State Manager----- CA11 -- O P S V I E W ------ Subsystem OPSL
Option ===>
Date/Time: 2016/09/07 13:34
  1 Control - Set/Display SSM parameters and resource tables
  2 Status - Set/Display states of SSM controlled local resources
                   - Create/Modify a local SSM started task resource table
  3 Snapshot
  4 Scheduler
                   - Set/Display schedules for SSM controlled resources
  5 Group Manager - Create/Manage groups of SSM resources
  A Action Editor - Create and maintain SSM action tables
  G Global Status
                   - Set/Display states of SSM controlled global resources
  G2 SSMGAU2
                    - Set/Display states of SSMGAV2 moveable resources
  R Resource Edit - Create and maintain SSM resource tables
  W NTOR Replu
                   - Respond to outstanding SSMGA WTORs
  P Policy Manager - SSM Resource Policy Manager
Press END to return
```



Resource Discovery

Resource Discovery

- Quick way to start using System State Manager to monitor resources
 - Builds required infrastructure
 - Discovers resources running on LPAR
 - Identifies what the resource is and sets default values

```
SSM Resource Policy Manager ----- CAll -- O P S V I E W ----- Subsystem OPSL

Option ===>

D Discovery - Populate SSM policy data

R Resources - Define SSM policy by resource

UC User Columns - Select SSM user columns to include in policy

UT User Types - Define custom SSM resource types

Press END to return
```

```
CA11 ----- Resource Discovery ----- OPSL
Command ===>

Add resources to the SSM Policy Manager.
Enter a resource discovery method.

Discovery Method: =

D Run resource discovery utility
S Use existing STC and Action tables

PF3 to exit to SSM Resource List
PF12 to cancel
```



Policy Based Resource Management

Policy Based Resource Management

Overview

- Adds management facilities to standard System State Manager
- Single Location to manage resources
- CA Supplied Best Practices Resource Definitions
 - Users can create or override unique resource definitions
- Ability to Stage and Verify Changes before Product Implementation

```
SSM Resource Policy Manager ----- CA11 -- O P S V I E W ----- Subsystem OPSL

Option ===>

D Discovery - Populate SSM policy data

R Resources - Define SSM policy by resource

UC User Columns - Select SSM user columns to include in policy

UT User Types - Define custom SSM resource types

Press END to return
```



Policy Types

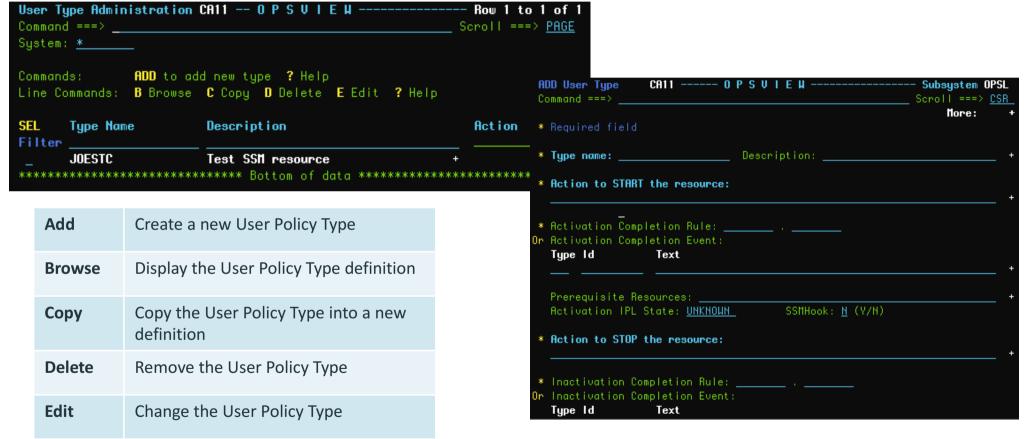
Overview

- Best Practice Resource Definitions
 - Description, Start Command, Activation Complete Message, Stop Command, Inactivation Complete Message, Prerequisite Resources, IPL State, and Hook Flag
- Override CA Supplied Policies
- Create Unique Policies



Policy Types

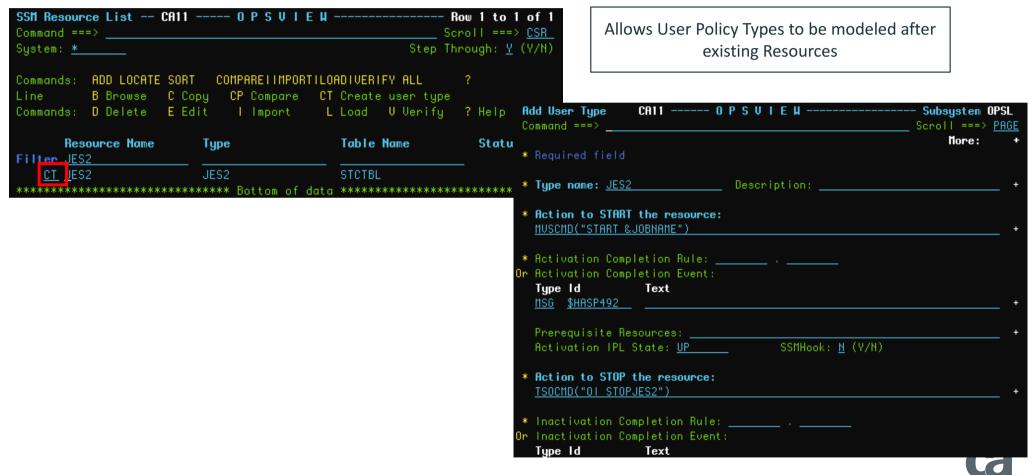
Managing User Policy Types





Policy Types

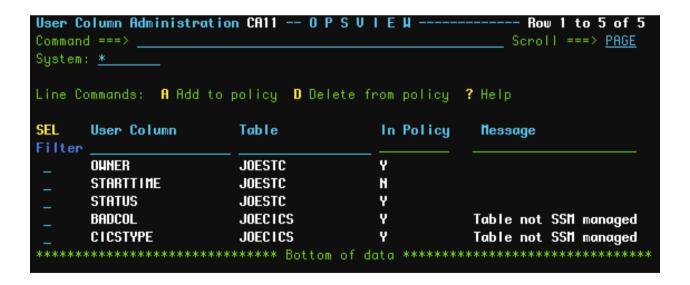
Creating User Policy Type from an Existing Resource



Custom User Columns

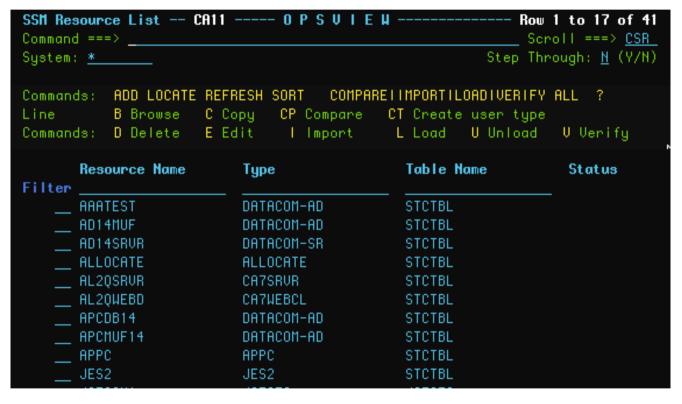
Managing Custom User Columns

- Allows SSM expansion to handle unique business needs while still managing through Policy Manager
- Any non-default columns added to an SSM table





Main Panel



Primary Line Commands

Add	Insert new Resource into Policy.	
Locate	Find an existing Resource in the Policy listing	
Sort	Sort Policy listing by: Name, Type, Table Name, or Status	
Compare	Compare a Resources Policy and Production Entry, then display differences.	
Import	Bring changes from Production back into Policy	
Load	Deploy Policy changes into Production	
Unload	Delete Resource from Production	
Verify All	Checks required Resource data is correct	



Line Commands

```
SSM Resource List -- CA11 ---- O P S V I
                      -- SSM Resource Line Commands
         Command ===>
                                                        More:
         B or BR - Browse the selected resource
         C or CO - Copy the selected resource
                   to create new resource
         D or DE - Delete the selected resource preceded by an
                   optional confirmation dialog, controlled by
                   SSM Verify mode. See menu option 0.1.
         E or ED - Edit the selected resource
         L or LO - Load the selected resource into SSM
         U or UL - Remove the selected resource from SSM
         U or UE - Verify the data for the selected resource
         I or IM - Import the selected resource from SSM preceded
                   by an optional confirmation dialog, controlled
                   by SSM Verify mode. See menu option 0.1.
         CP
                  - Compare the selected resource to SSM
                 - Create a User Type based on the selected
                   resources SSM management events and actions.
                  - Display this panel
```



Editing a Resource Via Step Through

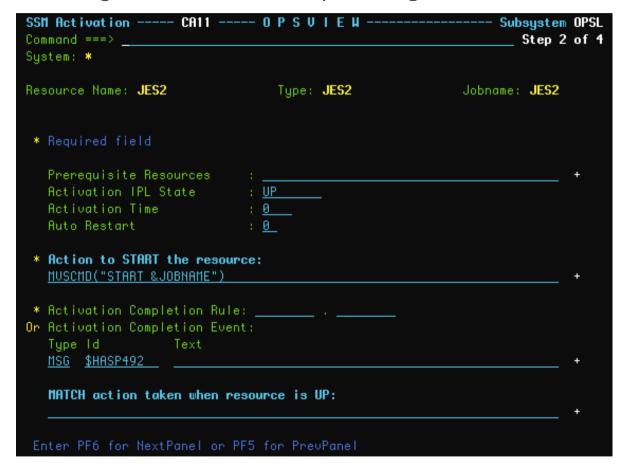
```
SSM Details ----- CA11 ---- O P S V I E W ----- Subsystem OPSL
Command ===>
                                                Step 1 of 4
System: *
Resource Name: JES2
                 Table Name: STCTBL
* Required field
            : JES2
* Jobname
            : JES2
  Type
           : N (Y/N)
  SSMHook
  Control Group:
  Description
Enter PF6 for NextPanel
```



Туре	Allows User to select predefined policies (CA and Customer defined) populating most required fields.
SSMHOOK	Allows for management of transient address spaces.
Control Groups	Define, or select from preexisting list, a group that can start, stop, and display together.
Description	Define the resource.



Editing a Resource Via Step Through



Prerequisite Resources	Define what resources must be UP before this resource can be started. Works in reverse order for shutting down a resource
Activation IPL State	 Define if the Resource should start automatically with an IPL. UP – Start at IPL Time DOWN – Don't start at IPL Time IPL – Allow resource to be started, but don't automatically issue start commands
Activation Time	Number of seconds resource is allowed to be starting before a warning message is issued.
Auto Restart	Number of times a resource will be automatically restarted before it goes UP
Start Command	Define Command required to start resource, use NULL if no command needed
Activation Completion	Define what message indicates a resource is UP User Written Rule Supply Message Id to have rule automatically generated
MATCH Command	Define Command required to be issued after a resource is UP



Editing a Resource's Start Command

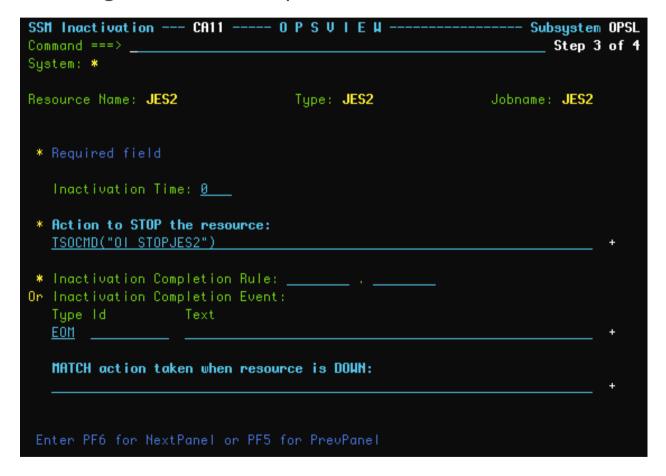
```
Resource Name: JES2 Type: JES2
                                                                                            Jobname: JES2
OPS/NUS Action Edit----- CA11 -- O P S V I E W ----- Sub:
                                                      Current Action Text: MUSCHD("START &JOBNAME")
Option ===> 1
                                                      Enter a new command or modify the existing command
 Current Action Text: MUSCHD("START &JOBNAME")
                                                       z/OS command: START JES2
  HUSCHD
            Issue a z/OS command with no response
  RULE
           Invoke a synchronous request rule
           Same as rule but RC>500 stops further actions
 EVRULE
  REXX
           Invoke an asynchronous REXX on an OSF server
                                                     SSMCMDS Action Edit----- CA11 -- 0 P S V I E W ----- Subsystem OPSL
  TSOCHD
           Issue an asynchronous TSOCMD on an OSF server
                                                     Command ===>
  SETCOL
           Update a column of the current resource
            Issue multiple z/OS commands with no response
 SSHCHDS
                                                                        Tupe: JES2
                                                                                               Jobname: JES2
                                                     Resource Name: JES2
                                                     Current Action Text:
                                                     * Required field
                                                     Enter or update z/OS commands and interval values
                                                     * z/0S command 1: ______
                                                     * interval 1: ____
                                                     * z/OS command 2:
                                                       interval 2: ___
ress END to return
                                                       z/OS command 3:
```

MUSCMD Action Edit----- CAll -- 0 P S V I E W ----- Subsystem OPSL

Command ===>



Editing a Resource Stop Command

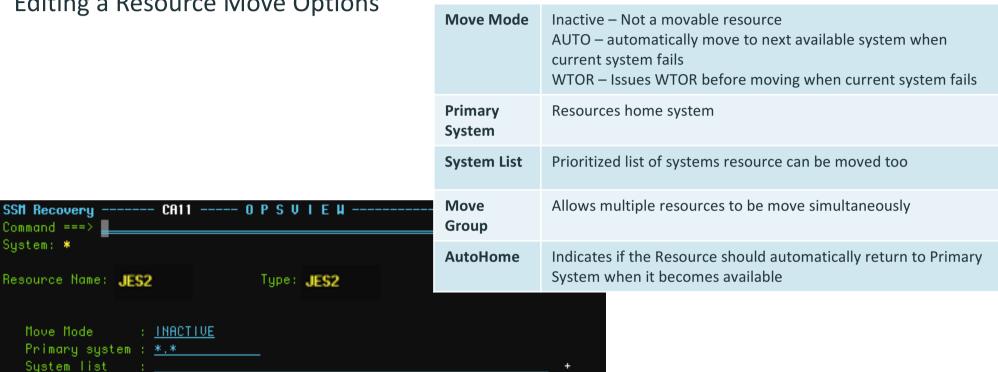


Inactivation Time	Number of seconds resource is allowed to be stopping before a warning message is issued.
Stop Command	Define Command required to stop resource, use NULL if no command needed
Inactivation Completion	Define what message indicates a resource is DOWN User Written Rule Supply Message Id to have rule automatically generated Default entry is EOM (End of Memory)
MATCH Command	Define Command required to be issued after a resource is DOWN



Editing a Resource Move Options

: N (Y/N)





Move group

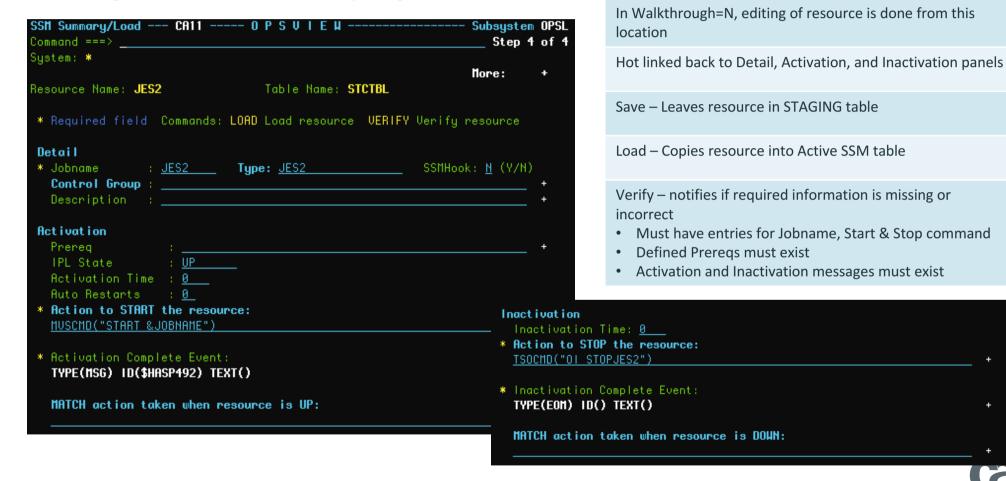
AutoHome

Editing Custom User Columns

Lists any non-default columns found in SSM Tables
Indicates type of data required



Editing a Resource Summary Page



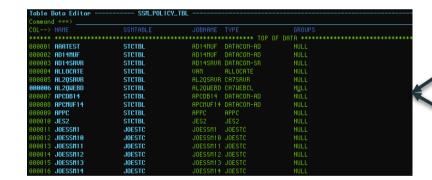
In Walkthrough=Y, serves as a validation and summary

screen

LOAD, UNLOAD, IMPORT, and COMPARE

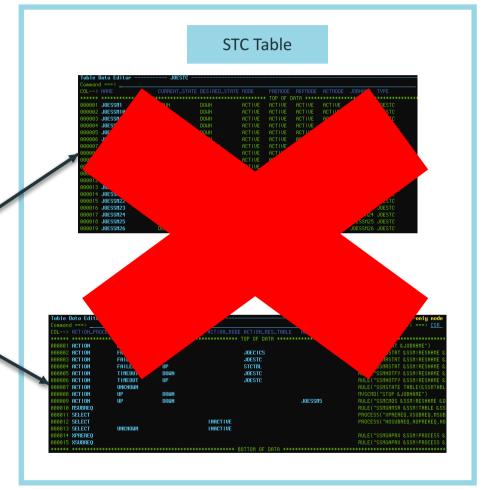
COMPARE – Displays a Resources differences between the STC & ACTION Tables and the STAGING Table

STAGING Table



LOA IMPO UNLOAD – Removes Resource from STC and ACTION table, not touching STAGING table

System State Manager Active Tables





Overview

- Ability to Start, Stop, Move Resources
- Multiple Options
 - ISPF Panel
 - Console Command
 - Web Page

```
System State Manager-
                            CA11 -- O P S V I E W
Option ===>
Date/Time: 2016/09/22 10:42
  1 Control - Set/Display SSM parameters and resource tables
                - Set/Display states of SSM controlled local resources
  3 Snapshot - Create/Modify a local SSM started task resource table
    Scheduler
                    - Set/Display schedules for SSM controlled resources
  5 Group Manager - Create/Manage groups of SSM resources
  A Action Editor - Create and maintain SSM action tables
  G Global Status - Set/Display states of SSM controlled alobal resources
                    - Set/Display states of SSMGAV2 moveable resources
  R Resource Edit - Create and maintain SSM resource tables
  W WTOR Reply
                    - Respond to outstanding SSMGA WTORs
  P Policy Manager - SSM Resource Policy Manager
Press END to return
```



Status Panel

SSM Re	source Status	CA1	1 O P	SU	ΙEΙ	I	Ro	w 1 to 17 of 76
Comman	d ===>						S	croll ===> <u>CSR</u>
Date/T	ime: 2016/09/22 10	1:27			F	ilte	red: Y	View ===> <u>ALL</u>
System	: <u>*</u> SSM Mod	le: ACTIVE						Wait ===> <u>30</u>
Disp:	<u>E</u> (B/V/E)	Sto	ites			lode:	3	
Cm Sta	Resource Name	Current	Desired	Res	Pre	Ref	Action	Message
			un				0071115	
_	APPC	<u>UP</u>	. <u>UP</u>	. <u>А</u>	<u>A</u>	<u>A</u>	ACTIVE	_
_	ASCH	<u>UP</u>	<u>UP</u>	<u>.</u>	<u>A</u>	<u>A</u>	ACTIVE	_
_	CALDAP	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>8</u>	<u>8</u>	<u>ACTIVE</u>	_
	CAS9	<u>UP</u>	<u>UP</u>	<u> </u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CAS9DEV	<u>UP</u>	<u>UP</u>	<u>8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CAS911P1	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CAW1 SNMP	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CHORSTRT	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CHORTSFR	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CMGRMUF	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CMGRSRUR	<u>UP</u>	<u>UP</u>	<u>8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CSF	<u>UP</u>	<u>UP</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CSSMTP	<u>UP</u>	<u>UP</u>	<u>8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
_	CTS	<u>UP</u>	<u>UP</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
	DFHSM	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_
	DMSARH	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>A</u>	<u>A</u>	<u>ACTIVE</u>	_
_	DSPCMGR	<u>UP</u>	<u>UP</u>	<u> 8</u>	<u>8</u>	<u>A</u>	<u>ACTIVE</u>	_

AS	Invoke the action selection simulation facility
С	Stop resource by setting desired state to CANCEL
MG	Move a Move Group of resources to an alternate system
МО	Move resource to an alternate system
ОВ	Invoke OPSLOG browse with jobname profile
Р	Display prerequisite status
Q	Start resource and all dependent resources by setting desired states to UP
R	Start resource and all prerequisite resources by setting desired states to UP
S	Start resource by setting desired state to UP
SC	Start a Control Group of resources
U	Determine status by setting current state to UNKNOWN
W	Stop resource and all dependent resources by setting desired states to DOWN
Z	Stop resource by setting desired state to DOWN
ZC	Stop a Control Group of resources



Action Simulation Facility

```
SSM Resources -- CA11 ----- O P S V I E W -
                                                         Row 1 to 1 of 1
Command ===>
                                                        Scroll ===> CSR
       VIEW Resource Action Selection on System: * Wait: 30
           Resource Table: STCTBL
           Action Table : STCTBL_ACT
           State Names Up: UP Down: DOWN Unknown: UNKNOWN
           Resource Name : APPC
                                _____ Type: _____
Sel Process Current Desired Actmode Resource Table Resource Name/Type
                   DOUN
                            ACTIVE STOTBL
   ACTION
   ACTION
                   DOWN
                                                   APPC
==> EURULE("SSMDOWN &JOBNAME &TYPE"); MUSCMD("CANCEL &JOBNAME")
******************************* Bottom of data ********************
```



Prerequisite Status

```
Row 1 to 2 of 2
Command ===>
                                                        Scroll ===> CSR
Date/Time: 2016/09/22 11:23
System: *
               SSM Mode: ACTIVE
                                                         Wait ===> 30
            States
                            Modes
Prereg
       /Current Desired Res Pre Ref Action Comments and Warnings
Name
        Preregs for STCTBL.APPC
                                A ACTIVE Selected resource
STCTBL.NET
        UP
                UP
                                A ACTIVE
****** Bottom of data *******
```



Console Commands

- SSMCNTL
 - Mimics commands available in ISPF Interface
- SSMBEGIN
 - Allows for custom system start up options
 - Start resources based upon IPL_STATE or PREVIOUS_STATE
 - Set SSM Active, Passive, or Inactive



SSMCNTL commands

Command	Description	Command	Description
SSM CANSHUT	Cancel a system shutdown request.	SSM PREQS JOB=job	Enable prerequisite and subrequisite checking by setting job MODE=ACTIVE
SSM DISPLAY	Display all SSM entries	SSM PT TYPE=type	Set DESIRED_STATE to DOWN for specific SSM type
SSM DISPLAY EXC	Display all SSM exceptions	SSM READD ALL	Actively monitor resources by setting job MODE=ACTIVE for all resources
SSM DISPLAY GROUPS TBL=table	Display all groups for a specific table. TBL= is optional and defaults to STCTBL.	SSM READD JOB=job	Actively monitor this job by setting job MODE=ACTIVE for this job.
SSM DISPLAY GRP=group TBL=table	Display a specific group of resources for a specific table. TBL= is optional and defaults to STCTBL.	SSM REMOVE ALL	Passively monitor resources by setting MODE=PASSIVE for all resources
SSM DISPLAY JOB=job	Display a specific job	SSM REMOVE JOB=job	Passively monitor this job by setting job MODE=PASSIVE for this job.
SSM DISPLAY TYPE=type	Display specific SSM type	SSM SG GRP=group	Set DESIRED_STATE to UP for a specific group and table. TBL= is optional and defaults to STCTBL.

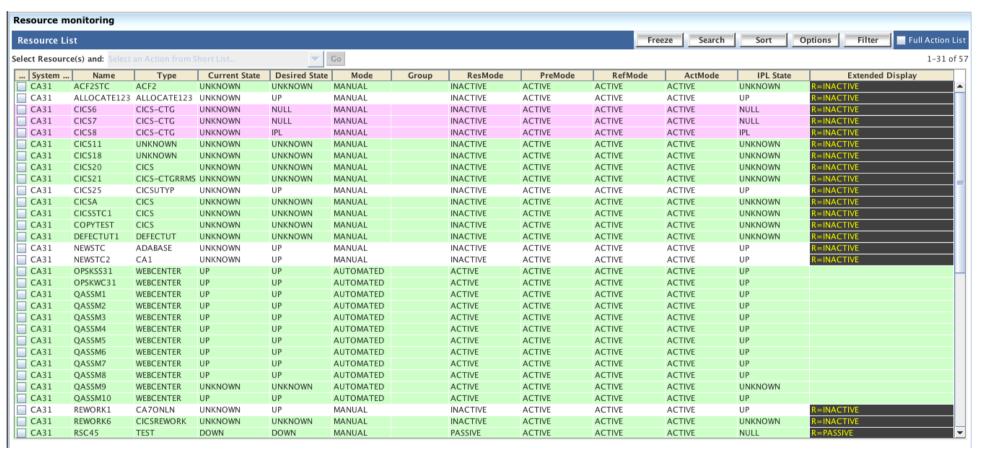


SSMCNTL commands

Command	Description	Command	Description
SSM HELP	Display list of options	SSM SHUTMAINT	Initiate a partial system shutdown leaving resources active needed for performing maintenance.
SSM FCYCLE	Initiate a force cycle of of a job.	SSM SHUTSYS	Initiate complete system shutdown procedures.
SSM NOPREQS JOB=job	Disable prerequisite and subrequisite checking by setting job MODE=NOPREREQ	SSM SHUTSSM	Initiate shutdown of SSM managed resources only.
SSM PG GRP=group TBL=table	Set DESIRED_STATE to DOWN for a specific group and table. TBL= is optional and defaults to STCTBL.	SSM SJ JOB=job	Set DESIRED_STATE to UP for specific job
SSM PJ JOB=job	Set DESIRED_STATE to DOWN for specific job	SSM ST TYPE=type	Set DESIRED_STATE to UP for specific SSM type

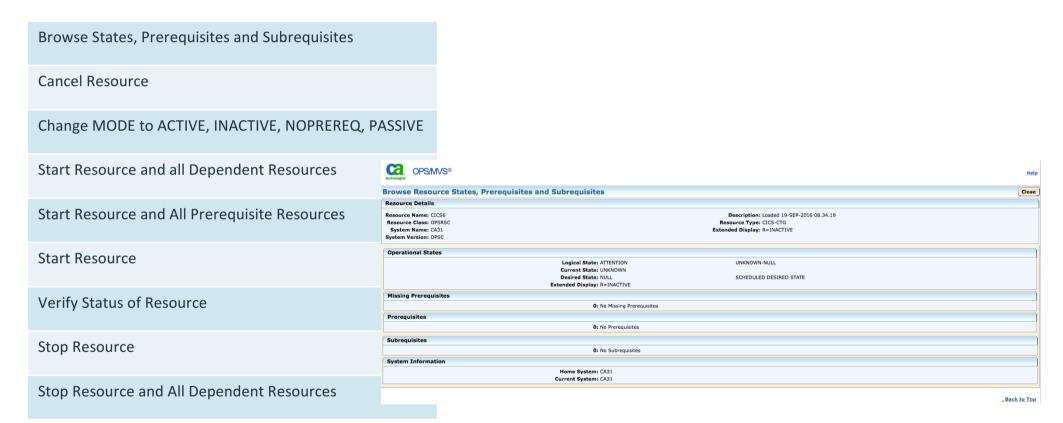


Web Interface

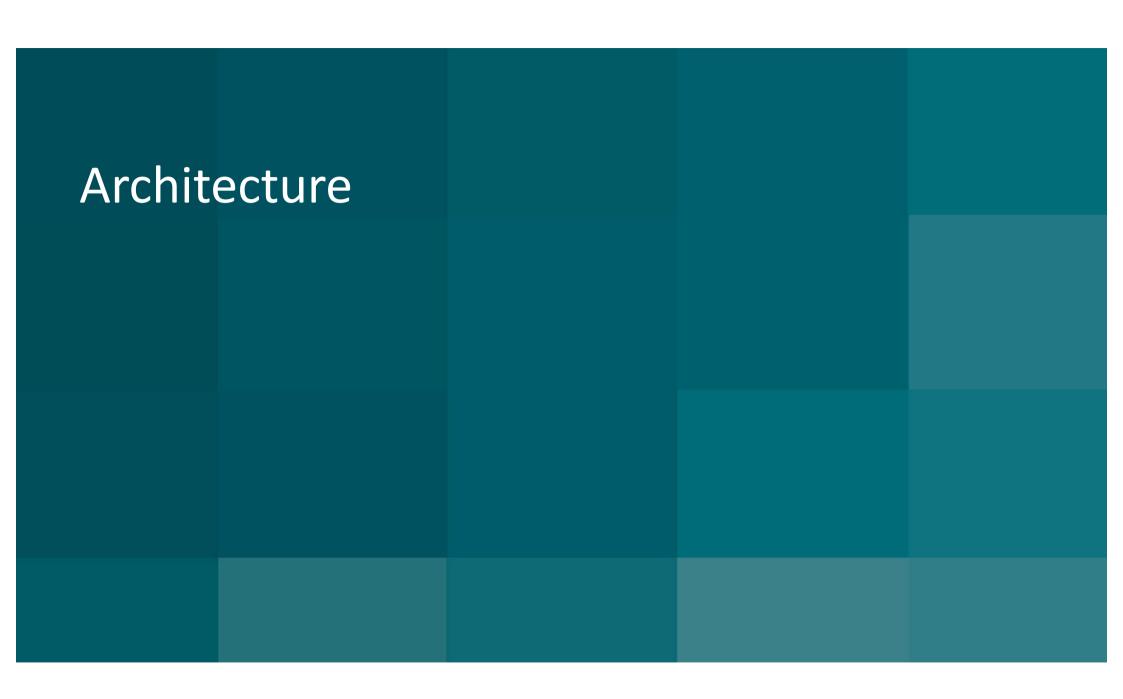




Web Interface







Required Tables

Resource table

 Stores info about the status of each managed resource such as NAME, JOBNAME, CURRENT & DESIRED STATES, PREREQ list

Action table

 Identifies the actions that SSM is to take to get a resource to its DESIRED state and can also optionally contain user exit points to override default SSM internal logic

Directory table

 Searched by SSM to determine what Resource tables are to be managed and what associated Action tables are to be used for its resource tables

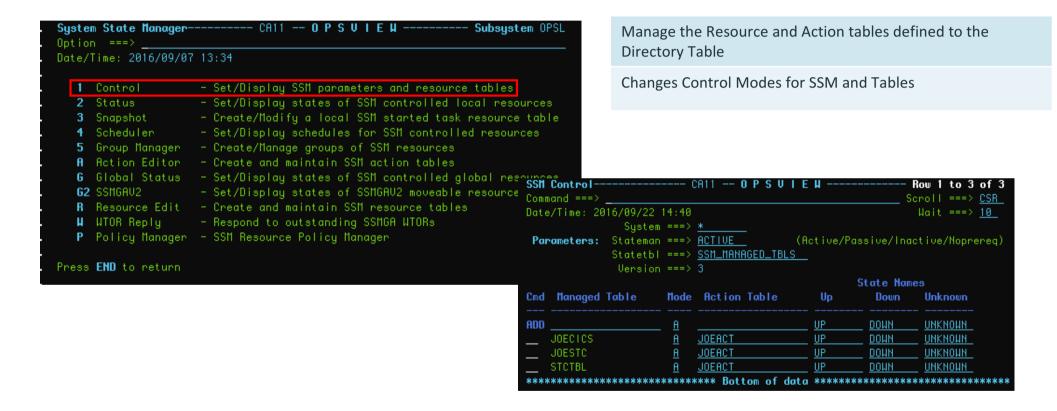


Policy Manager Tables

- Policy Manager Table
 - Used to store changes before being loaded into the Resource and Action tables
- Type Table
 - Stores the CA Best Practice Resource Definitions. Contents in this table should not be changed
- User Type Table
 - Store the User Defined Resource Definitions



Managing Tables





Control Modes

Four SSM management Modes			
ACTIVE	Performs all actions where C_S <> D_S		
INACTIVE	No actions taken where C_S <> D_S		
PASSIVE	No actions taken but D_S is set to C_S		
NOPREREQ	Same as ACTIVE mode but no prereq checking is performed		

Mode is controlled:

- Globally via the STATEMAN parameter
- At the table level via the TABLE_MODE column
- At the resource level via the MODE column



PREMODE and REFMODE

PREMODE - Controls whether prerequisite and subrequisite processing is performed for a resource, when DOWN to UP or UP to DOWN transitions occur.

PreMode	Description
Active	Performs both prerequisite and subrequisite processing according to the standard method that SSM uses.
Inactive	Performs neither prerequisite or subrequisite processing. *This is the same as setting MODE=NOPREREQ
PREREQ	Performs only prerequisite processing for this resource. Subrequisite processing is bypassed.
SUBREQ	Performs only subrequisite processing for this resource. Prerequisite processing is bypassed.

REFMODE - Controls whether other resources process this resource when testing their prerequisite or subrequisite references.

PreMode	Description
Active	Performs both prerequisite and subrequisite references according to the standard method that SSM uses.
Inactive	Evaluates neither prerequisite or subrequisite references to this resource.
PREREQ	Evaluates only prerequisite processing references to this resource. Subrequisite references to this resource are ignored.
SUBREQ	Evaluates only subrequisite processing references to this resource are evaluated. Prerequisite references to this resource are ignored.



System Start-Up Process

- 1. SSM engine initializes setting C_S & D_S to 'UNKNOWN' for all resource tables defined in the SSM directory table
- 2. SSM engine internally invokes the SSMBEGIN Request rule passing IPL, old mode, and new mode values and processes any user defined logic within SSMBEGUX that configures the D_S column, and/or produces a WTOR to force manual setting of the D_S column. This causes C_S = 'UNKNOWN' and D_S='UP/DOWN'.
- 3. The UNKNOWN action triggers for each resource and sets the C_S accordingly
- 4. PREREQ checking is performed for any C_S = 'DOWN', D_S = 'UP' mismatch. User exits defined via ACTION_PROCESS=XPREREQ are triggered if they exist, otherwise default prereq checking is performed (determine if resources in PREREQ column have C_S = 'UP')
- 5. The UP_DOWN action (usually the START command) is performed for those resources with satisfied PREREQs
- 6. Enabled AOF rules trap the start-up messages produced by the SSM resources and update the C_S accordingly (STARTING, UP, ACTIVE, ONLINE...)
- 7. SSM sweeps the resource table until C_S=D_S

