CICSPlex SM: What is it and Why do I care?

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Glossary of Terms

- **CPSM** - CICSPlex component of the CICS TS Product
- **AOR** - Application Owning Region.
- **API** - Application Programming Interface.
- **BAS** - CICSPlex Business Application Services.
- **CMAS** - CICSPlex SM Address Space.
- **ESM** - External Security Manager (RACF / TopSecret)
- **EXCI** - External CICS Interface.
- **FOR** - File Owning Region.
- **ISPF** - Interactive System Productivity Facility.
- **LPAR** - Logically Partitioned.
- **NEWCOPY** - Load an updated program CICS
- **RDO** - Resource Definition Online.
- **PDS** - Partitioned Data Set.
- **QOR** - Queue Owning Region.
- **SPOC** - Single Point of Control
- **SSI** - Single System Image
- **TOR** - Terminal Owning Region.
- **TSO** - Time Sharing Option.
- **UOW** - Unit of Work
- **WLM** - CICSPlex Workload Management.
- **WUI** - CICSPlex Web User Interface

Session Objectives

- **A Brief History of CPSM**
- **Ease of installation (TS3.2 and Beyond)**
- **Basic Topology**
  - CICS Environment Mapping
- **CPSM User Interfaces**
  - Including CICS Explorer
- **Using CPSM as a Single Point of Control for your Environment**
- **Other CPSM Components you can choose to utilize**

A Brief History of CPSM

- **Mar 1994**
  - First Release of CICSPlex
    - Separate Chargeable Product
    - Worked in conjunction with CICS/ESA
    - Features: SSI, SPOC, RTA, and WLM
    - Interface: TSO/ISPF
- **Dec 1995**
  - Expanded to include CICS OS/2 and CICS/VSE
- **Nov 1996**
  - CICS TS V1 is introduced, **INCLUDING** CICSPlex. Now it's **FREE** to all CICS TS Customers
- **Sep 1997**
  - Expanded to include BAS
- **Nov 1999 (CICS V1.3)**
  - FEPI Support Added
  - WUI interface introduced (Admin functions NOT Included)

A Brief History of CPSM

- **Dec 2001 (CICS TS V2.2)**
  - Ability to launch WUI views from Tivoli
- **Mar 2001**
  - WLM Support for 3270 bridge and EJB
- **Oct 2003 (CICS TS V2.3)**
  - Administration Functions added to the WUI
- **Nov 2004 (CICS TS V3.1)**
  - WUI Enhancements Position it to Replace the TSO Interface
    - User Favorites
    - Result Set Warning Counts
    - Dynamic Selection Lists
    - User Group Profiles
    - Filter Confirmation
  - Quote from the TS3.1 ALET 204-285

"The CICSPlex System Manager is an integrated part of CICS TS Its role is to reduce the complexity of management of CICS systems by presenting them as a simple and integrated whole. It integrates all the major CICS management functions into one interface…."

A Brief History of CPSM

- **Mar 2007 (CICS TS V3.2)**
  - The WUI Replaces the TSO Interface
  - WUI Enhancements Include:
    - Improved Screen Layout
    - Link to the IBM Infocenter
    - Ability to Expand Summary views
    - Map support
    - Field Help information
  - Installation and configuration of CICSPlex is integrated with the installation of CICS.
    - The EYU9XDUT utility can be used to create the required WUI definitions
    - The EYU9XDBT utility can be used to setup the CICSPlex environment and as alternative to the CPSM BATCHREP
- **Nov 2008**
  - CICS Explorer Supportpac available for use with CICS TSV3.2. Capable of connecting to CPSM, CICS IA, CICS PA, and CICS CM

A Brief History of CPSM

- **Apr 2009 (CICS TS V4.1)**
  - Throughput improvements for CPSM WLM
    - Dynamic WLM exploits the Coupling Facility to store current region status information, allowing for more efficient routing decisions.
    - Dynamic WLM provides these benefits:
      - Additional WUI views for problem determination in route selection
      - Exploitation of the z/OS coupling facility to improve cross-sysplex routing of distributed workloads
      - Dynamic tuning of CPSM WLM resource consumption in the coupling facility
      - Improved recognition of CICS region status for more efficient WLM routing decisions
  - Improved efficiency and resilience management
    - Topology changes allow tracking of more resource types, and customizable limits on the number of resources returned.
  - Interfaces include the WUI **AND** CICS Explorer.

A Brief History of CPSM

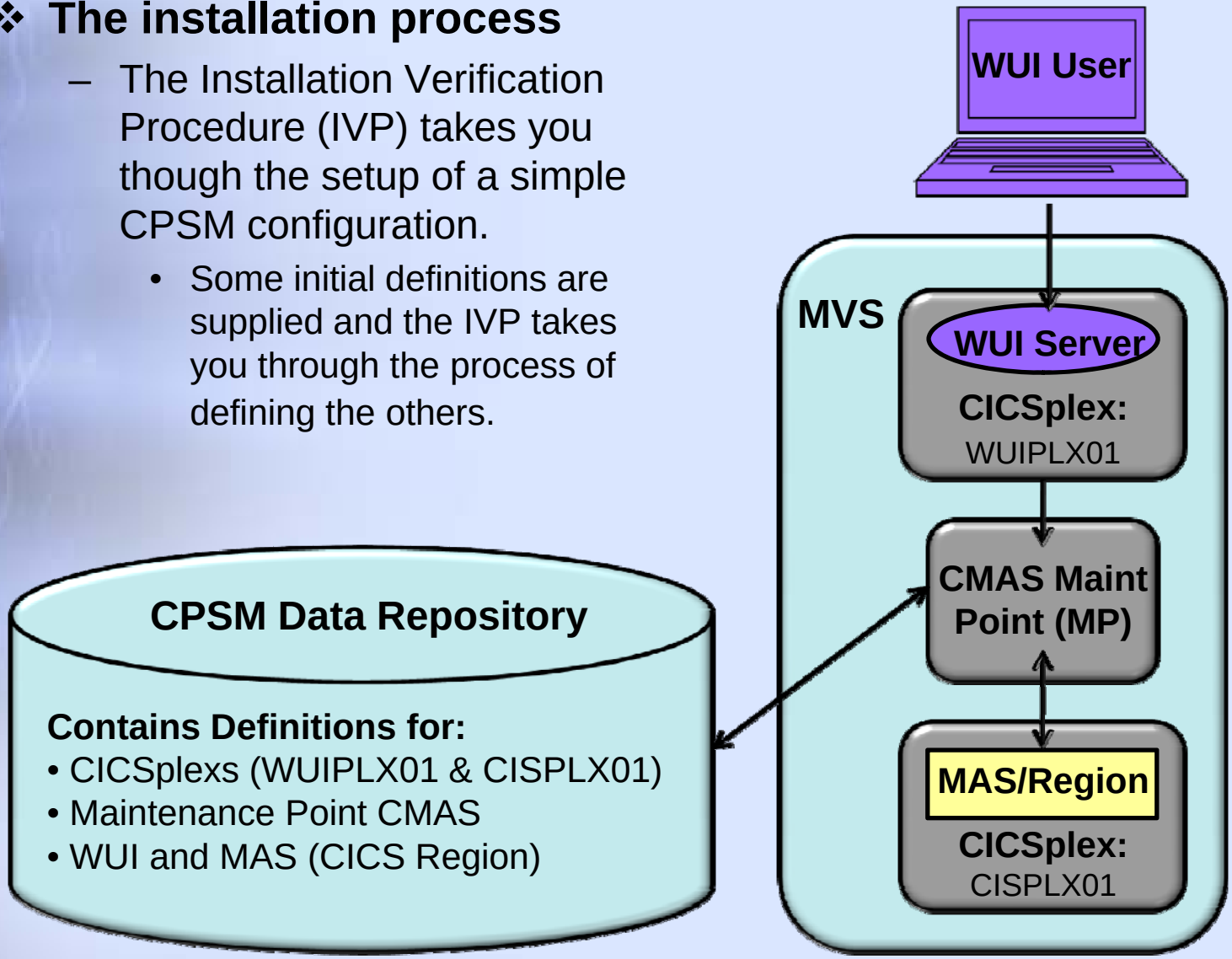
- **June 2011 (CICS TS V4.2)**
  - New LOCKED TRANGRP Affinity
    - Applies only to DPL Requests
    - Programs are routed to the same target region until UOW end.
  - New WLM routing algorithms that exclude link weighting
    - Connection type (between the Router and Target) such as Local, MRO, MRO/XCF, IPIC, LU6.2, and INDIRECT are not factored into routing decisions
    - LNQUEUE (link neutral queue) can be used instead of the standard QUEUE algorithm
      - Selects the target region with the best combination of:
        - Task Queue Depth (or Load) relative to Region MAXTASK
        - Health (not SOS, MAXTASK, Dumping, or Stalled)
        - Least calculated abend probability
    - LNGOAL (link neutral goal) can be used instead of the standard GOAL algorithm
      - LNGOAL selects the target most likely to meet the tran response time goal set in the trans z/OS workload management class.
    - You can specify the new algorithms on the WLMSPEC or TRANGRP Definitions

Ease of Installation TS3.2 and Beyond

- **Software, hardware, and storage requirements**
  - Review Prerequisite software release levels
  - Review Prerequisite hardware
  - Review Storage requirements
- **CICSPlex SM naming conventions**
  - You will need a naming convention for each of the following:
    - CMAS
    - MAS (CICS Region or WUI server)
    - CICS system group (if you choose to use them)
    - Time-period definition.
- **Security planning**
  - Create security profiles for CPSM functions, and resources, within your SAF-Compliant External Security Manager
- **Defining time zones**
  - CPSM can accommodate Regions that run in different Time Periods/Time Zones.

Ease of Installation TS3.2 and Beyond

- **The installation process**
  - The Installation Verification Procedure (IVP) takes you though the setup of a simple CPSM configuration.
    - Some initial definitions are supplied and the IVP takes you through the process of defining the others.



Basic Topology

- **CICSPlex Topology Definitions are used to Map or Describe your CICS Environment to CPSM**
  - CICSSYS Definition (Required)
    - Needed for EACH CICS Region you wish to connect to CPSM
  - CICSGRP Definition (Optional)
    - May be used to view a subset of Regions (EX: View All my FORs)
    - If you choose to use a CPSM Component (ex: CPSM WLM) you may want to establish relationships to subsets of Regions
    - NOTE: CICSGRP's can contain individual regions (CICSSYS's) or other Groups (CICSGRP's)

CPSM User Interfaces

- **TSO/ISPF**

CICS TS 3.1 is the LAST release that includes support for this interface.

- **Web User Interface (WUI)**
  - IBM provides a Starter Set of Views and Menus
  - You can create installation specific, customized screens
  - Major CICS TS 2.3 Enhancements
    - Administration views
    - Audit Trail
  - Major CICS TS 3.1 Enhancements
    - User Favorites
    - User Group Profiles
    - Filter Confirmation Screens
- **Application Programming Interface (API)**
  - Allows access via Batch Programs, Netview Routines, CICS EXCI, etc.

CPSM User Interfaces (CICS Explorer)

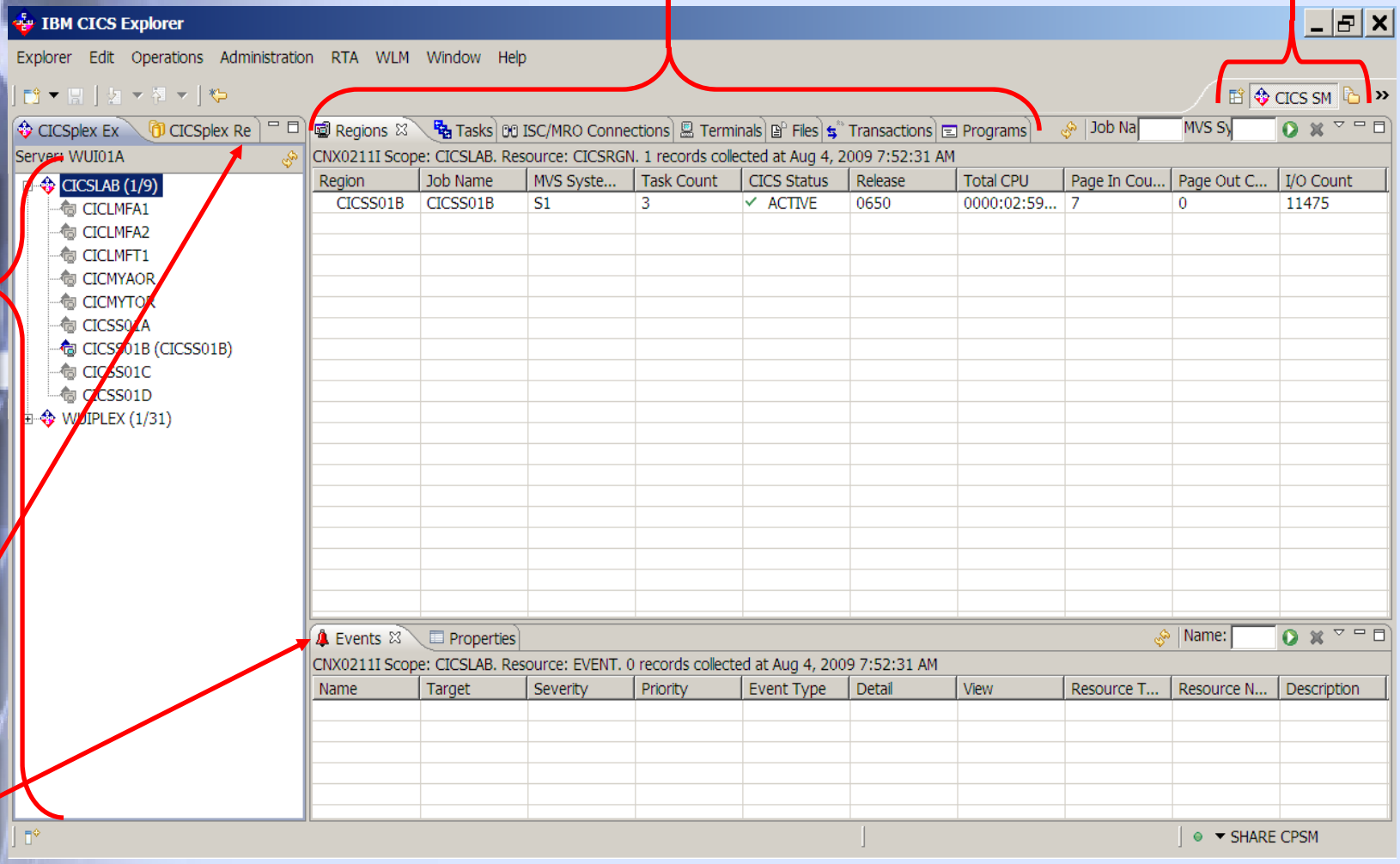
- **CICS Explorer ("The New Face of CICS")**
  - New graphical tooling interface for CICS that Provides
    - Significantly enhanced levels of usability and integration.
    - Ability to create customizable task-oriented views
    - Single view of IBM CICS tools (PA, IA, CM and DA)
      - Explorer provides an integrated view via Tool Specific Plugins
    - Rich set of CICS views
      - Even Shops without CICS Tools can benefit from integrated views of their CICS Environment
  - CICS Releases and Availability
    - CICS TS V3.1 (Free IBM SupportPac PTFs Required)
    - CICS TS V3.2 (Free IBM SupportPac PTF Required)
    - CICS TS V4.1 and Beyond (Free orderable component)
  - Capabilities
    - Depending on CICS TS and Explorer Release levels, Specific Administration functions may not **yet** be available
  - IBM has made a significant commitment to Explorer
    - Explorer Forum: Users can comment & request enhancements
    - From a Changing workforce perspective, IBM feels that Explorer will help shorten the learning curve for new IT Professionals

CPSM User Interfaces (CICS Explorer)

Explorer View - Only View that can't be moved

Individual Resource Tabs

Perspective Selection

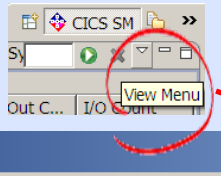


Explorer
Control the Scope of Resources Being Viewed

Repo View
CICSGRP(s) and CICSSYS(s) Def's. Can also be used to Control Scope

Event Tab
View System Events

CPSM User Interfaces (CICS Explorer)

❖ **From the View Menu**  **you can:**

- Refresh the View
- Reset Columns
- Equalize Column Widths

- Customize Columns

- Choose filter attributes

Single Point of Control *(Problem Determination)*

- **CICSPlex Provides a Global view of your Regions.**
  - Dynamic Storage Areas (DSA).
  - Transaction/System dumps.
  - Transaction Classes.
- **You can Identify Active and Installed Resources.**
  - Transactions.
  - Programs.
  - Files.
- **You can Perform most CEMT type functions Across a specified scope of regions.**
  - Reset Transaction/System Dumps.
  - Discard RDO Resources.
  - Change Transaction Class settings.
  - Perform NEWCOPIES

Single Point of Control *(Problem Determination)*

- **Problem:**
  - Application “XX” is WLM across 16 regions. It is reported that the Application is “Dumping”. What regions are experiencing problems?
- **Procedure:**
  - Go to the WUI TRANDUMP view and specify a scope of PXXAOR
  - Click on the Sort Descending key ▼ for the “Number of dump calls since last reset” (CURRDUMPS) Column.

CICS system name	Transaction dump code	System dump option	Number of dump calls since last reset	Maximum number of dump calls	Transaction dump option	Number of transaction dumps taken
AOR1	ASRA	Nosysdump	36487	3	Trandump	0
AOR2	AEIL	Nosysdump	3	3	Trandump	0
AOR3	9059	Nosysdump	3	3	Trandump	0
AOR2	9059	Nosysdump	2	3	Trandump	0
AOR1	9059	Nosysdump	2	3	Trandump	0

Single Point of Control *(Problem Determination)*

- **Problem:**
  - Application YY is Web Based and runs across predefined H* terminals. Slow response time is reported. Is there a bottleneck in CICS or the Network?
- **Procedure:**
  - Go to the WUI TERMINAL view, specify a scope of PYYTOR, and a Terminal filter of H*
  - Click on the Sort Descending key ▼ for the “Current transaction name” (TRANSACTION) Column.

CICS system name	Terminal ID	Network name	Acquire status	Service status	Automatic transaction initiation (ATI) status	Terminal transaction initiation (TTI) status	Session creation status	User ID	Current transaction name
TOR2	HQ0B	T18303	Acquired	Inservice	Ati	Tti	Nocreate	YYUSR1	YY40
TOR2	HQ0F	T18307	Acquired	Inservice	Ati	Tti	Nocreate	YYUSR1	YY40
TOR1	HT0E	T18806	Acquired	Inservice	Ati	Tti	Nocreate	YYUSR1	YY40
TOR1	HM0A	T18002	Acquired	Inservice	Ati	Tti	Nocreate	YYUSR1	
TOR1	HM0B	T18003	Released	Inservice	Ati	Tti	Nocreate	YYUSR1	
TOR1	HM0F	T18007	Released	Inservice	Ati	Tti	Nocreate	YYUSR1	

Single Point of Control *(Problem Determination)*

- **Problem:**
  - Dataset MY.FILE is only supposed to be used by Region FORJ. The file has been closed but the Nightly batch update job is still abending (File in use). Is another region using it?
- **Procedure:**
  - Go to the WUI DSNAME view, specify a scope of PROD, and a Dataset Name filter of MY.FILE

CICS system name	Data set name	Number of file definitions that reference data set	Backout status
FORJ	MY.FILE	1	Not Applicable
FORX	MY.FILE	1	Not Applicable

  - We do not know from this view that MY.FILE is definitely open in FORX but we now know where to look.
  - We can now go to the WUI LOCFILE view and use a scope filter of FORX to determine the File Definition and see if it is open.

Single Point of Control *(Problem Determination)*

- **Problem:**
  - PROGQQ has to be NEWCOPIED in every region it runs in.
- **Procedure:**
  - Go to the WUI PROGRAM view, specify a scope of PROD, and a Program filter of PROGQQ
  - Press the Summarize key under the “Program name” Column.

Record	Record count	CICS system name	Program name	Enabled status	Total number of times program was executed	Number of times program currently accessed	Language	Share status	CEDF status	New-copy-required status
1 ☑	29	*******	PROGQQ	Enabled	68	68	Assembler	Private	Nocedf	Notrequired

  - Put an ☑ next to the line item and select either NEWCOPY or PHASE IN.
  - Reply appropriately to the command confirmation panel.

No to 29 remaining	No	Yes	Yes to 29 remaining

Single Point of Control *(API)*

- **Invoke CICSPlex services from an external program.**
- **Manuals**
  - CICSPlex SM Application Programming Guide.
  - CICSPlex SM Application Programming Reference.
  - CICSPlex SM Resource Table Reference.
- **Available Interfaces:**
  - Command-level Interface (Assembler H, OS PL/I, VS Cobol II, C/370).
  - Run-time Interface (REXX EXEC's for Batch, TSO, and NetView).
- **Sample Programs:**
  - Application Programming Guide; Appendix B.
  - IBM Supportpac CS13 (http://www.software.ibm.com/ts/cics/txppacs)
  - Libraries shipped with the CICS TS Product
    - Assembler H (SEYUSAMP)
    - C/370 (SEYUC370)
    - VS Cobol II (SEYUCOB)
    - REXX (SEYUCLIB)
    - OS PL/I (SEYUPL1)

The WUI uses API code to retrieve Data.

Single Point of Control *(API)*

- **CMAS Shutdown**
  - WHY is it Important to shut a CMAS down Properly?

From the CICS Installation Guide "Shutting down a CMAS"
"Note: You should not attempt to:
1. Issue the CEMT PERFORM SHUTDOWN command against a CMAS.
2. Cancel the CMAS job from MVS
If you take either of these actions, the CMAS cannot shut itself down properly."

  - Prior to the introduction of the COSD (CMAS Shutdown Transaction), you had to either manually issue a SHUtdown Command, via the CMAS/CMASD View, or Write an API program to do it.
- **Our CMAS Shutdown Solution (at that Time):**
  - Load down IBM Supportpac CS13 CICSPlex SM - Sample API programs.
  - Add CICSPlex API Support to NetView/AOC.
    - See the CICS Installation Guide "Preparing to use the CICSPlex SM API"
  - Modify the REXX CMAS Shutdown Supportpac Sample and incorporate the New CPSM API program into the existing AOC/NetView process.

Single Point of Control *(API)*

❖ Supportpac Sample CMAS Shutdown Code:

```
/* REXX */
Address 'TSO'
Parse Value 0 0 With W_RESPONSE W_REASON .
/*-------------------------------------------------------------------------------------------------------------- */
W_CONTEXT = 'EYUCMAS1'                  /* Change to match your installation CMAS      */
W_SCOPE = 'EYUCMAS1'                    /* Change to match your installation           */
W_CMAS = 'EYUCMAS1'                     /* Change to match your installation           */
/*-------------------------------------------------------------------------------------------------------------- */
/*    OBTAIN A CPSM API CONNECTION.                                                     */
/*-------------------------------------------------------------------------------------------------------------- */
Say 'Initializing API...'
XX = EYUINIT()
If XX <> 0 Then Signal UNEXPECTED
Say 'Establishing connection...'
XX = EYUAPI('CONNECT' ,
          'CONTEXT('W_CONTEXT')' ,
          'SCOPE('W_SCOPE')' ,
          'VERSION(####)' ,             /* Change to your Version of CPSM              */
          'THREAD(W_THREAD)' ,
          'RESPONSE(W_RESPONSE)' ,
          'REASON(W_REASON)')
If XX <> 0 Then Signal UNEXPECTED
If W_RESPONSE <> EYURESP(OK) Then Signal NO_CONNECT
```

Note: We Created a CPSM API Routine that can be called to Determine the CPSM Version

Single Point of Control *(API)*

❖ **Supportpac Sample CMAS Shutdown Code *(continued)*:**

```
/*-------------------------------------------------------------------------------------------------------------- */
/*    SHUTDOWN THE LOCAL CMAS.                                                                                  */
/*-------------------------------------------------------------------------------------------------------------- */
Say 'Shutting the local CMAS...'
W_CRITERIA = 'CMASNAME='||W_CMAS||'.'          /* Period MUST be used as a Delimiter   */
W_CRITERIALEN = 'LENGTH'(W_CRITERIA)
XX = EYUAPI('PERFORM OBJECT(CMAS)' ,           /* See  Resource Table Reference for    */
            'ACTION(SHUTDOWN)' ,               /* available OBJECTs and ACTIONs        */
            'CRITERIA(W_CRITERIA)' ,
            'LENGTH('W_CRITERIALEN')' ,
            'RESULT(W_RESULT)' ,
            'THREAD(W_THREAD)' ,
            'RESPONSE(W_RESPONSE)' ,
            'REASON(W_REASON)')
If XX <> 0 Then Signal UNEXPECTED
If W_RESPONSE <> EYURESP(OK) Then Signal NO_PERFORM
Say 'Shutdown issued successfully'
Signal ENDIT
```

Single Point of Control *(API)*

❖ **Supportpac Sample CMAS Shutdown Code *(continued)*:**

```
/*-------------------------------------------------------------------------------------------------------------- */
/*    PROCESSING FOR API FAILURES.                                                                               */
/*-------------------------------------------------------------------------------------------------------------- */
NO_CONNECT:
    W_MSG_TEXT = 'ERROR CONNECTING TO API.'
    Signal SCRNLOG
NO_PERFORM:
    W_MSG_TEXT = 'ERROR SHUTTING CMAS.'
    Signal SCRNLOG
UNEXPECTED:
    W_MSG_TEXT = 'UNEXPECTED ERROR.'
SCRNLOG:
    Say W_MSG_TEXT
    Say 'RESPONSE='||W_RESPONSE ,
       'REASON='||W_REASON 'RESULT='XX
ENDIT:
/*-------------------------------------------------------------------------------------------------------------- */
/*    TERMINATE API CONNECTION.                                                                                  */
/*-------------------------------------------------------------------------------------------------------------- */
Say 'Terminating API...'
XX = EYUAPI('TERMINATE RESPONSE(W_RESPONSE) REASON(W_REASON)')
XX = EYUTERM()
Exit
```

Single Point of Control *(API – Data Tables)*

- **Problem:** Determine when a CMDT or UMDT is more than 90% full.
- **Current Process:** None.
- **Solution:**
  - Created a REXX API Routine.
    - Runs via an AOC timer; once per shift.
    - Uses Current Record Count and Max Number Records to Calculate the % full.
    - If a table is over 90% full it sends a WTO (Write to Operator) to the Master Console.

Result *(AOC/NetView Log)*:

INITIALIZING API...
ESTABLISHING CONNECTION...
Get the CMDT resource table PLEX = PROD
Fetching 187 CMDT entries....

TABLE1	REGION1	128	66	51%
TABLE2	REGION2	27500	21546	78%
TABLE3	REGION3	27500	25141	91%

Writing TABLE3 in REGION3 is 91% Full to console

TABLE4	REGION4	300000	152862	50%
TABLE5	REGION5	360000	145879	40%
TABLE6	REGION6	16	2	12%

……...

Single Point of Control *(API – Modify Cmd)*

- **Problem:** We wanted a way to dynamically issue modify commands against varying CICS regions scopes.
- **What Type of Modify Commands?**
  - Scheduled CEMT Commands
    - Reset Time of Day on Time change weekends
    - Modify Monitoring to gather additional information once a month
  - Dynamic CEDA Commands
    - Weekly Manipulation of RDO resources without the need to recycle the regions.
    - Example: I have an application running in 16 regions and I need to install a new transaction
  - Dynamic Modify Commands needed to address issues that arise
    - Example: I need to increase MAXTASKS in 12 regions.
- **Why Use the CICSPlex API?**
  - CICSPlex can be setup so that it's aware of ALL your ACTIVE Regions and what LPAR they run on.
  - Flexibility: Based on your Topology, CICSPlex is aware of Region Additions, Deletions, etc.
  - Accountability: The API offered an easy way to generate messages detailing commands issued

Single Point of Control *(API – Modify Cmd)*

- **Solution:**
  - We used an Object Oriented Approach, to create components that could be reused for Scheduled and Dynamic tasks.
    - The component programs could be run on their own or as part of a larger process.

Component One: PLEXCOMD Program

Input: CICSPlex Region Scope
Modify Command

Process Flow:

- Translate the CICSPlex Region Scope to a list of Active CICS Applids
- Call the PLEXWHER Program for each region
- Use the Region Applid, LPAR Location, and Modify Command to create the proper syntex and route the command to the Region.
- Create a Log Entry for Each Command

Component Two: PLEXWHER Program

Input: CICS Region Applid

Output: LPAR Location

Note: For Scheduled processes (like Reset Time of Day) PLEXCOMD was called by additional front end components that could pass static commands/scopes.

Single Point of Control *(API – PGM Newcopy)*

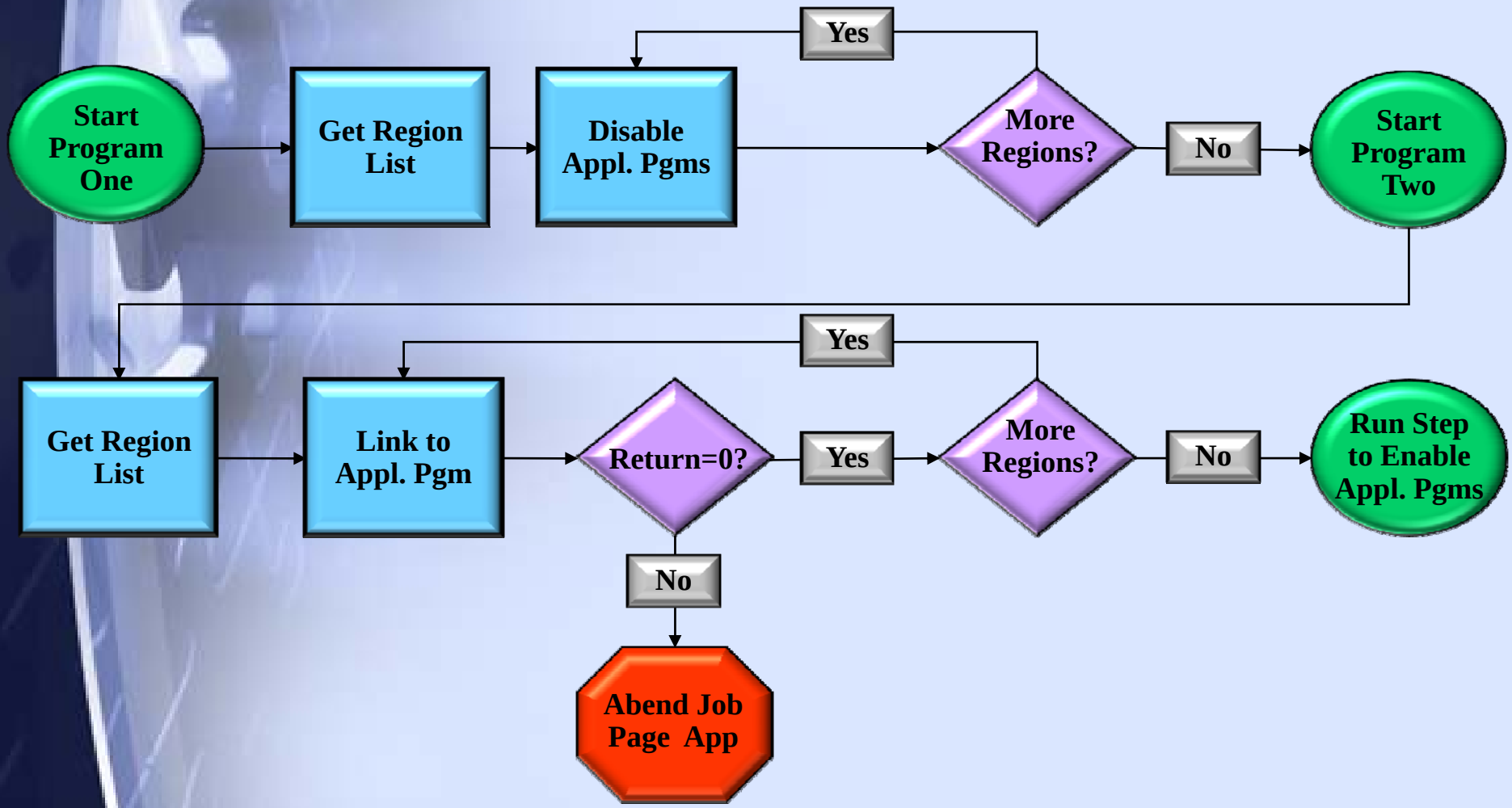
- **Problem:** We wanted to schedule Newcopies via Batch.
- **The Current Process:**
  - The Turnover group sent a list of Newcopy Requests to Operations each night
  - The Developer was responsible for including the Module Names and a complete list of regions where the Newcopy should occur.
  - At the Time; Operations used the CPSM ISPF interface to Newcopy the Programs.
- **Objectives:**
  - Incorporate the Batch Newcopy into the existing Turnover Process
  - Produce a log to serve as an Audit Trail for the change.
- **Solution:**
  - We wrote a Batch API program to perform the Newcopy and produce a detailed log.
  - When Creating a ChangeMan package our Developers can indicate that a Newcopy is needed. Based on that indicator, ChangeMan will execute the CPSM API Batch Newcopy, as soon as the New Version of the Program is Moved into the Loadlib.
  - The O/P from the Batch job was available online, so that Operations and the Developers can verify that the change took place.

Single Point of Control *(API – App Issue)*

- **Problem:**
  - An application that is WLM across 16 CICS Regions has to clear shared storage each night.
  - The Application Program that clears the storage must run in each region while no other Application Transactions are running.
  - We have to verify that the Application Program worked, or page Development.
- **Solution:**
  - I modified the Batch NEWCOPY program so that it could also do a DISABLE or ENABLE. We run this program to Disable the main application program and lock the users out of the application.
  - Created a 2nd Batch API Program.
    - Gets a List of Application Regions from CICSPlex.
    - Uses the CICS EXCI Interface to link to the Application Program that Frees the storage.
    - Checks the return code contained in the COMMAREA Passed back from the Application Program.
      - If a Bad return code is found the batch job is abended and Development is paged.
      - If All of the return codes in All of the regions are good: We use the NEWCOPY API Program to ENABLE the Main Application Programs. Letting users back into the Application.

Single Point of Control *(API – App Issue)*

❖ **Solution Flow:**

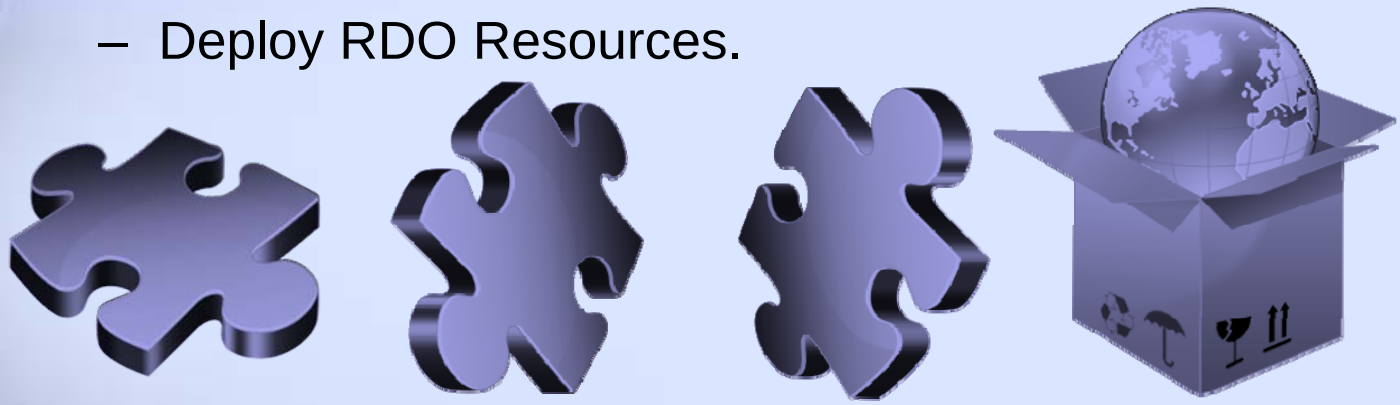


Single Point of Control *(API – Other Solutions)*

- **Doctemplate Newcopy and Pipeline Scan**
  - Both have been incorporated into our ChangeMan Processes
- **Temp Storage Clear**
  - Periodically delete Temporary Storage Queues that had not been accessed in over a specified amount of time.
- **Region Connections**
  - In problem situations region connections could be taken OUTSERVICE or put back INSERVICE.
- **Dump Reset**
  - Periodically reset Trandump and Sysdump counts.
  - Works in conjunction with an RTA definition to identify regions that experience excessive abends.
- **API Programs written to refresh CICS resources without the need to recycle**
  - DB2 Disconnect and Reconnect
  - CICSPlex Workload Management (WLM) Refresh

Other CPSM Components

- **WLM (Workload Manager)**
  - Manage Workloads via Dynamic Routing.
- **MON (Resource Monitoring)**
  - Request additional Monitoring of CICS Resources.
  - Warning: Can “add significant overhead to your environment”.
- **RTA (Real Time Analysis)**
  - Threshold Analysis of CICS and Non CICS Resources.
- **BAS (Business Application Services)**
  - Deploy RDO Resources.



Summary

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- **Basic Topology**
  - CICS Environment Mapping
- **CPSM User Interfaces**
  - Including CICS Explorer
- **Using CPSM as a Single Point of Control for your Environment**
- **Other CPSM Components you can choose to utilize**