Introduction to CICSPlex System Manager

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Redbooks Workshop

IBM ITSO - International Technical Support Organization

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Agenda

- CPSM Benefits and Functions

- CPSM Interfaces
  - WUI
  - API
  - BATCHREP

- Operations

- Business Application Services

- Workload Management

- Real Time Analysis

CICSPlex SM Benefits

- **Provides a Single System Image**
  - Allows data from multiple CICS systems to be viewed in a single view.
  - For instance, all Tasks associated with a unit of work can be displayed on one view.

- **Provides a Single Point of Control**
  - Resources can be installed or modified in multiple CICS systems by performing a single action.
  - CICS systems in the CICSplex can be modified from the one view.

- **Systems management functions via the following interfaces**
  - Web User Interface
  - Batch repository update
  - Application Programming Interface

- **Integrates with Tivoli Business System Manager**
  - Collects and displayed CPSM information
  - Can link to the Web User Interface

CICSPlex SM Functions

- **Operations**
  - Allows modification of managed CICS systems and modification of resources installed on those systems.

- **Business Application Services**
  - Used to create, update, and install resource definitions. Definitions can be installed on multiple systems in a single action.
  - CICS Configuration Manager can assist with migration of definitions from the CSD to CPSM Data Repository and form the data Repository to the CSD, it also provides Configuration Management.

- **Real Time Analysis (Threshold Analysis)**
  - Provides automatic, external notifications when certain conditions occur.
  - Can automatically perform simple modifications a resource when certain conditions occur.

- **Workload Management**
  - Dynamically routes work across CICS systems in the CICSplex to meet defined goals.

- **Monitoring**
  - Can be used to collect performance related data to assist with performance tuning.

CICSPlex SM Interfaces

- Web User Interface
  - View and manipulate CICS and CPSM information through a web browser
  - Views can be customised via the View Editor
  - Interface is NLS enabled
  - Browsers connect to a Web User Interface server (a specialised CICS system).

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CICSPlex SM Web User Interface

Open
Home
Repeat last menu

— General views

CICS regions
Active tasks
ISC and MRO connections
Terminals
Local files
Remote files
Local or dynamic transactions
Remote transactions
Real Time Analysis (RTA) outstanding events

— View menus

CICS operations views
Monitoring views
Real Time Analysis (RTA) views
Active workload views
CICSPlex SM operations views
Administration views

Special
Refresh
View editor
User editor
New window
Close window
Sign off

CICS region

EYUVC1280I 15 records collected at 2004/10/06 15:32:37.

Context: APOLLO
Scope: APOLLO

Automatic refresh: ☐ 60 seconds.

Refresh

15 records on 1 pages.

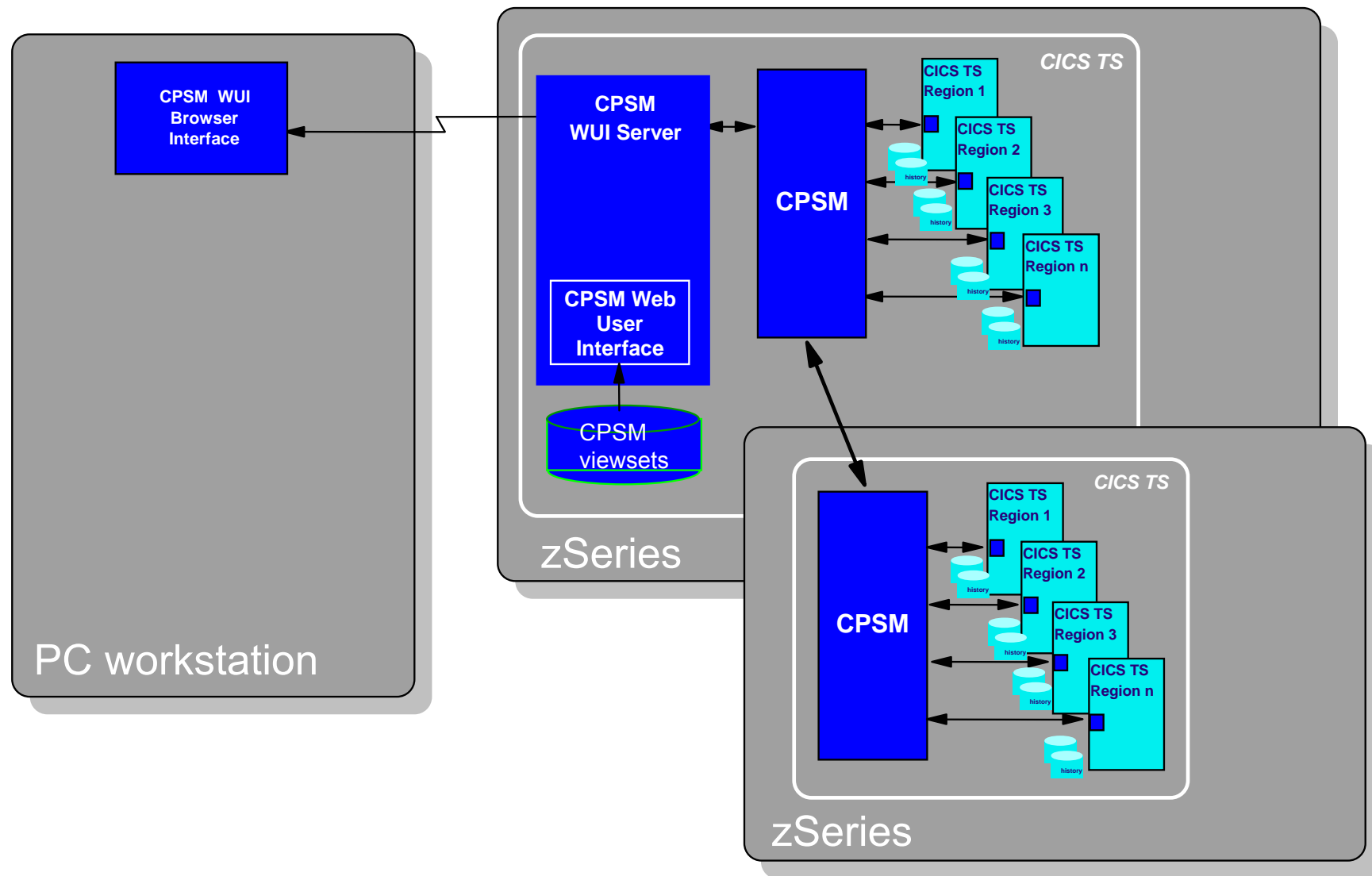| Record	CICS system name	Job name	MVS system ID	Current number of tasks	CICS status	CICS Release	Total CPU time used	Number of page-in requests	Number of page-out requests	Number of I/O requests
1 ☐	IYEMST01	IYEMST01	MV51	4	ACTIVE	0640	0:02:16.6065	0	0	18976
2 ☐	IYEMST02	IYEMST02	MV51	4	ACTIVE	0640	0:00:04.0860	0	0	9130
3 ☐	IYEMST03	IYEMST03	MV51	3	ACTIVE	0640	0:00:04.5808	0	0	10629
4 ☐	IYEMST05	IYEMST05	MV51	4	ACTIVE	0640	0:00:04.2426	0	0	9335
5 ☐	IYEMST07	IYEMST07	MV51	4	ACTIVE	0640	0:00:03.9259	0	0	9364
6 ☐	IYEMST09	IYEMST09	MV51	4	ACTIVE	0640	0:00:03.7781	0	0	9890
7 ☐	IYEMST11	IYEMST11	MV51	3	ACTIVE	0640	0:00:03.3687	0	0	8686
8 ☐	IYEMST12	IYEMST12	MV51	3	ACTIVE	0640	0:00:04.4269	0	0	10643
9 ☐	IYEMST13	IYEMST13	MV51	4	ACTIVE	0640	0:00:04.1407	0	0	10143
10 ☐	IYEMST14	IYEMST14	MV51	5	ACTIVE	0640	0:00:04.2977	0	0	9454
11 ☐	IYEMST15	IYEMST15	MV51	3	ACTIVE	0640	0:00:05.3946	0	0	9799
12 ☐	IYEMST17	IYEMST17	MV51	4	ACTIVE	0640	0:00:04.1048	0	0	9530
13 ☐	IYEMST18	IYEMST18	MV51	3	ACTIVE	0640	0:00:03.7951	0	0	9231
14 ☐	IYEMST19	IYEMST19	MV51	3	ACTIVE	0640	0:00:04.2419	0	0	9713
15 ☐	IYEMSW1W	IYEMSW1W	MV51	10	ACTIVE	0640	0:03:08.1087	0	0	93522

Internet

CICSPlex SM Interfaces

- **Application Programming Interface**
  - Allows you to write programs to monitor and control resources and CICS systems
  - Allows you to write programs that perform functions on CPSM administrative functions.
  - Can be used with C, PL/I, Cobol, REXX and Assembler via EXEC CPSM verb.
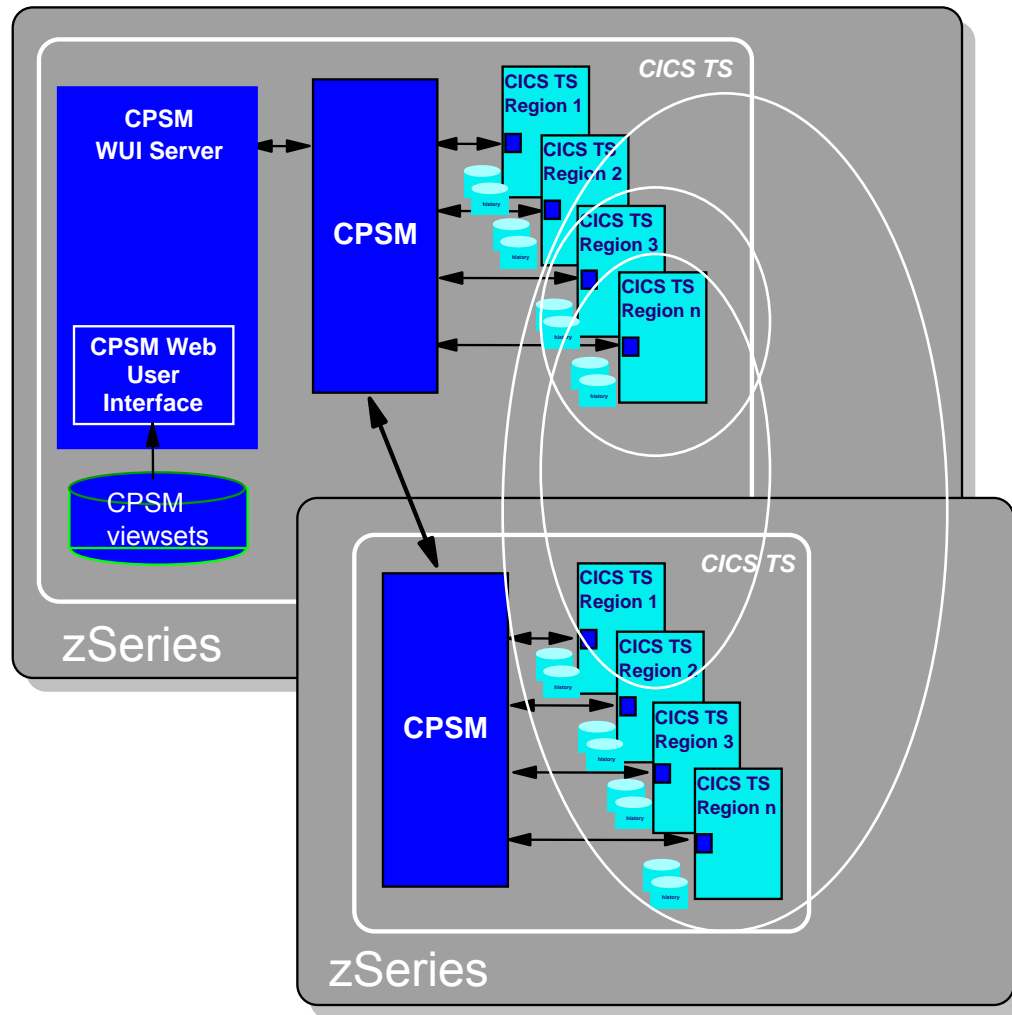   - Programs can run in

- **Batched Repository Update**
  - Can be used to create new definitions
  - Assists with migration from CSD
  - Assist with migration of definitions from one CICSplex to another
  - Jobs can be started via the WUI or via JCL

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CICSPlex SM Architecture

Grouping CICS Systems

- CICS system can only belong to one CICSplex.

- CICS systems can be grouped together.
  - e.g. FORs, TORs, AORs

- A CICS system can belong to more than one group.

Operations

- Similar to CEMT
  - Some views show more information than CEMT (e.g. for CICS regions)

- Can view information on a resources across all CICS systems in a scope

- Can perform action on resources across all systems in a scope in one operation

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CICSPlex SM Web User Interface

Active task

EYUVC1280I 4 records collected at 2004/10/06 15:47:19.

Context='APOLLO' Scope='APOLLO' Task ID=" Transaction ID='CEDA' Dispatch status=" Automatic refresh: ☐ 60 seconds. Refresh

4 records on 1 pages.

Record	CICS system name	Task ID	Transaction ID	Dispatch status	User ID	Principal facility	VTAM LU name	Task priority	Transaction class	Time task has been suspended
1 ☐	IYEMST01	0004470	CEDA	SUSPENDED	CTSQ01D	TC14 🖳	'0000000000000000'X	1	DFHTCL00 ⬅	0:51:19
2 ☐	IYEMST07	0000077	CEDA	SUSPENDED	CTSQ01D	TC02 🖳	'0000000000000000'X	1	DFHTCL00 ⬅	1:09:15
3 ☐	IYEMST11	0000089	CEDA	SUSPENDED	CTSQ01D	TC11 🖳	'0000000000000000'X	1	DFHTCL00 ⬅	0:04:43
4 ☐	IYEMST13	0000091	CEDA	SUSPENDED	CTSQ01D	TC13 🖳	'0000000000000000'X	1	DFHTCL00 ⬅	0:27:02

4 records on 1 pages.

Set attributes...   Purge...

Resource name: TASK. View name: EYUSTARTTASK.TABULAR

General views

CICS regions
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Remote files
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Remote transactions
Real Time Analysis (RTA) outstanding events

View menus

CICS operations views
Monitoring views
Real Time Analysis (RTA) views
Active workload views
CICSPlex SM operations views
Administration views

Favorites

cedaonly

Special
Favorites editor
View editor
User editor
New window
Close window
Sign off

Done   Internet

Business Application Services (BAS) – Defining Resources

- BAS is similar to RDO, except
  - A resource can belong to more than one group
  - Allows creation of resource definitions for all supported releases of CICS
  - Resource Assignments enables flexible resource deployment
  - Logical Scoping, e.g. resources can be grouped according to the application they are used in
  - SYSLINK construct simplifies connection installation

How BAS and RDO are related

Production

grplist=grplist=grplist=grplist=grplist=

list
list

Group
Group
Group
Program

Description
Description
Description

Group
Group
Group

Program Program Program

Program

CSD

DREP

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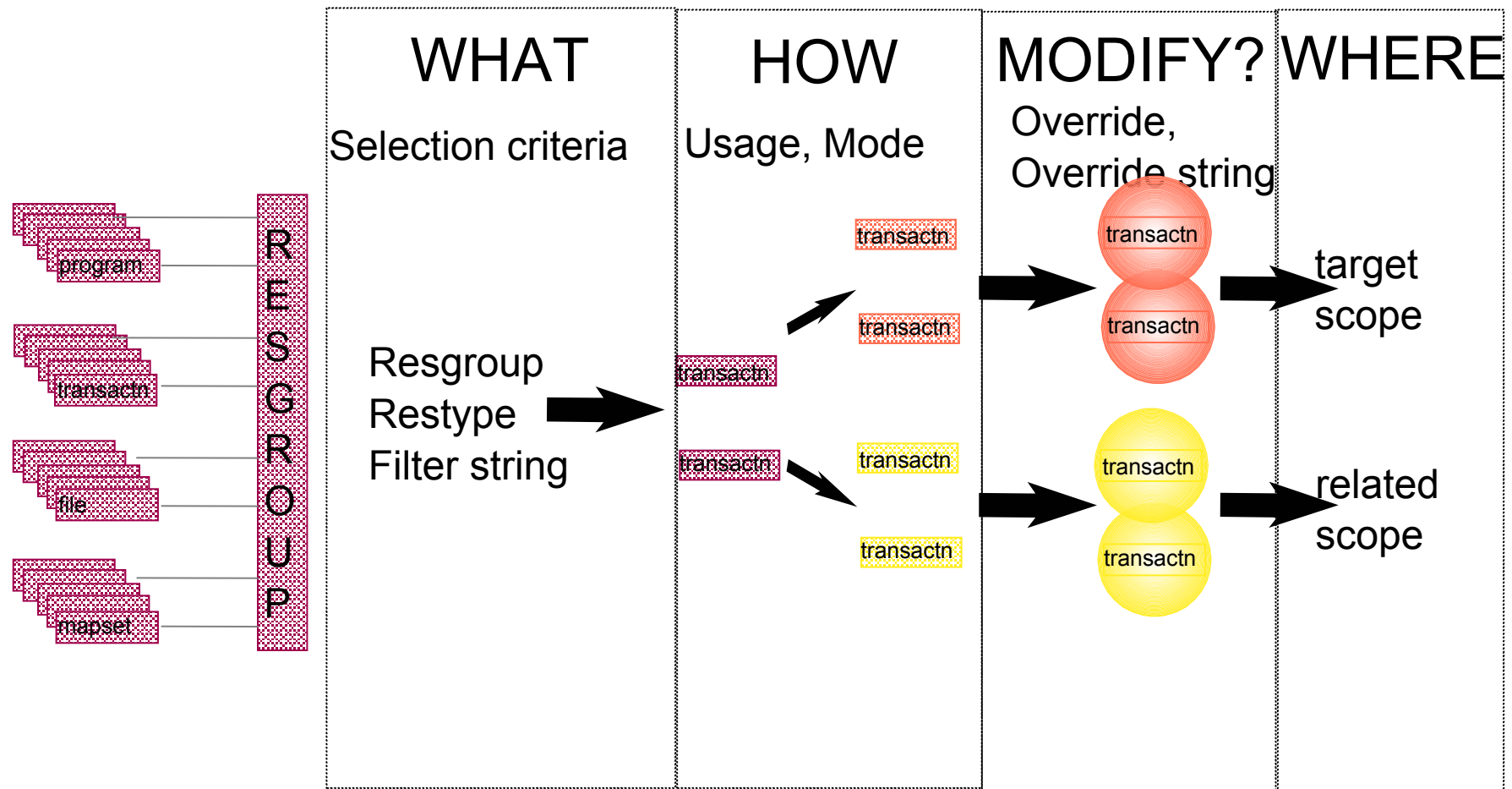# BAS and RDO comparison

- **RDO**
  - Repository
    - Sysplex shared
    - Discrete - need copies
  - Data
    - control - full access
    - volume - baseline
    - consistency - CHECK cmd
  - Access control
    - dataset RACF
    - records LOCK/UNLOCK
  - Install span of control
    - Coldstart
    - region -> Sysplex
  - Runtime
    - Single system
  - API access
    - No access to CSD data
    - EXEC CICS CREATE
  - Integration into runtime
    - None
  - Interface
    - 3270 from within CICS

- **BAS**
  - Repository
    - Globally shared
    - No need to copy things around
  - Data
    - control - full access
    - volume - less due to sharability
    - consistency - increased
  - Access control
    - dataset RACF
    - records RACF
  - Install span of control
    - Coldstart
    - Global
  - Runtime
    - Global
  - API Access
    - Full access from CICS, batch, TSO, NetView
  - Integration into runtime
    - enables subset resource management
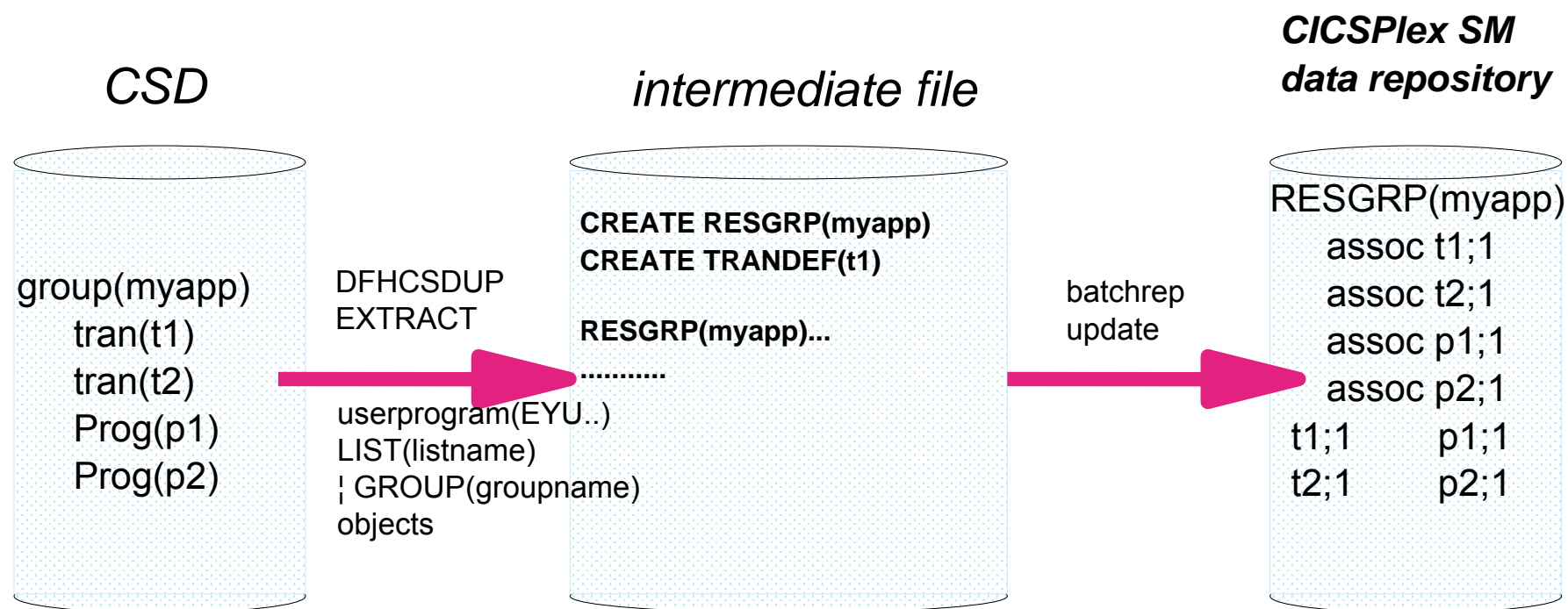 - Interface
    - Web Browser via WUI

Advanced BAS

Resource Assignment Advantages

- Easier to see where resources are assigned and how

- Can share resources across multiple environments

- Easier to do global change

- Increased consistency - no mismatches

- Movement from test; QA; production

- No need to edit resource definitions to adapt to topology change

- New application version becomes Resource Description, Resource assignments and changed definitions

Resource definition migration

CSD

group(myapp)
  tran(t1)
  tran(t2)
  Prog(p1)
  Prog(p2)

DFHCSDUP
EXTRACT

userprogram(EYU..)
LIST(listname)
¦ GROUP(groupname)
objects

intermediate file

CREATE RESGRP(myapp)
CREATE TRANDEF(t1)

RESGRP(myapp)...
....

batchrep
update

CICSPlex SM
data repository

RESGRP(myapp)
  assoc t1;1
  assoc t2;1
  assoc p1;1
  assoc p2;1
t1;1   p1;1
t2;1   p2;1

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BAS Administration Views

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CICSPlex SM Web User Interface

Transaction Definition

Transaction definition name	✓ [ ]	Aa
Definition version	✓ [0]	
Definition description	☐ [ ]	Aa
Resource group name	☐ [ ] ✏	
User data area 1	☐ [ ]	Aa
User data area 2	☐ [ ]	Aa
User data area 3	☐ [ ]	Aa
First program name	☐ [ ]	
Size in bytes of transaction work area (TWA)	☐ [0]	(0-32767, blank)
Transaction profile	☐ [DFHCICST]	Aa
Default application partition set	☐ [ ]	
Enabled status	✓ [ENABLED ▾]	
Primed storage allocation	☐ [0]	(0-65520, blank)
Task data location	✓ [BELOW ▾]	
Task data key	✓ [USER ▾]	
Storage clearance status	✓ [NO ▾]	
Runaway timeout value	☐ [SYSTEM]	(SYSTEM, 0-2700000, blank)
Shutdown run status	✓ [DISABLED ▾]	
Transaction isolation option	✓ [YES ▾]	

Done   Internet

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CICSPlex SM Web User Interface

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cedaonly

Special

Favorites editor

View editor

User editor

New window

Close window

Sign off

CICS resource definitions in resource group

EYUVC1280I 2 records collected at 2004/10/06 15:45:57.

Context: APOLLO

Resource group name: `=` [ ]

Resource definition name: `=` [ ] **Aa**

Resource definition version: `=` [ ]

Resource definition type: `=` [ ]

Automatic refresh: ☐ 60 seconds.

[Refresh]

2 records on 1 pages.

Record	Resource group name	Resource definition name	Resource definition version	Resource definition type	Last time definition changed
1 ☐	PJGROUP	PJPROG	1	PROGDEF	2004/10/06 15:45:30
2 ☐	PJGROUP	ABCD	1	TRANDEF	2004/10/06 15:45:04

2 records on 1 pages.

[Remove...]

Resource name: RESINGRP. View name: EYUSTARTRESINGRP.TABULAR

Done   Internet

Workload Management

- Balances work from multiple routing regions across multiple target regions

- Target region selected using one of two methods:
  - Queue.
  - MVS Goal.

- Workload Separation
  - Work can be balanced across a sub-set of target regions.

- Affinity Handling
  - e.g. if all transactions must run in same system

- The following work can be routed:
  - Transactions, Dynamic program link requests, EXEC CICS START TRANSID TERMID requests, BTS processes and activities, 3270 bridge requests, EJB requests, non-terminal STARTs.
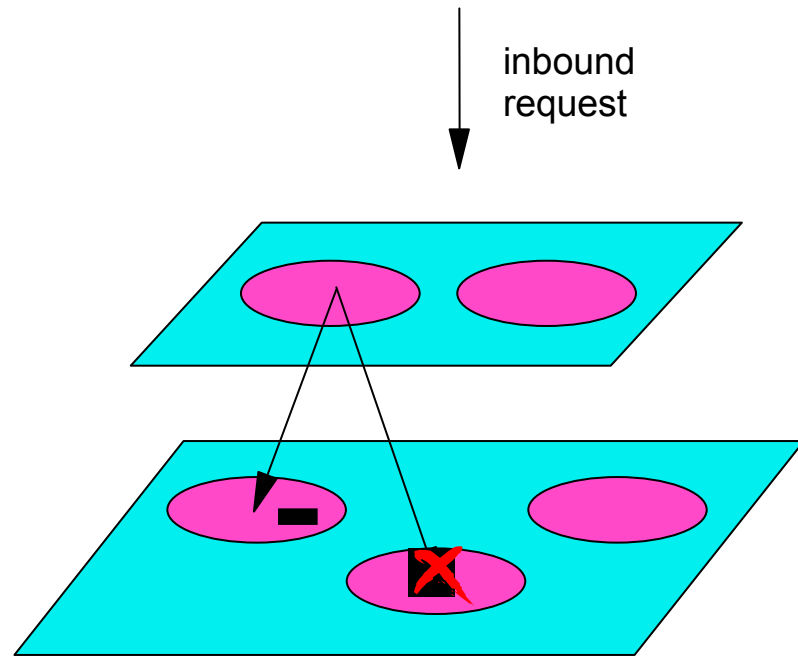
Workload Management Algorithms

- **Work is not balanced in a round-robin fashion**
  - WLM selects the system most likely to meet specified criteria (mentioned below).
  - If all target regions can handle the work within a specified criteria then a system is selected at random.

- **Queue algorithm**
  - Selects the system with shortest queue of work (load count) relative to system MAXTASKS
  - The system least likely to be affected by SOS, SYSDUMP and TRANDUMP conditions
  - The system least likely to cause the transaction to abend
  - Standardizes response times across a CICSplex
    - Accommodates differences in processor power and MAXTASK values, asymmetric region configuration and unpredictable workloads

- **Goal algorithm**
  - Selects system least likely to be affected by SOS, SYSDUMP and TRANDUMP conditions
  - The system least likely to cause the transaction to abend
  - Is most likely to meet average MVS WLM response time goals

Workload Management Affinities

- Inbound request routed

- Creates data in a region

- Next part routed to different region

- At best request fails

- WLM will honor such affinities to prevent failure.

inbound
request

Real Time Analysis

- Can send notifications about any aspect of a resource's state in which you express an interest – not just error conditions.

- Notification take two forms
  - Console messages
  - SNA Generic alerts (can be used by NetView)
  - …or both

- When a condition is triggered, an EVENT also appears in the EVENT view.

- CPSM can also perform simple modifications to resource when a notification is sent.
  - You can create CPSM API applications to listen for RTA events and take actions accordingly.

Real Time Analysis

- RTA is divided into two main areas
  - System Availability Monitoring (SAM)
  - RTA resource monitoring

- RTA resource monitoring divided into two further areas
  - MAS Resource Monitoring (MRM)
  - Analysis Point Monitoring (APM)

RTA System Availability Monitoring

- In a basic setup detects the following conditions
  - Short on Storage
  - System dump in progress
  - Transaction dump in progress
  - System has reached MAXTASKS limit
  - Tasks stalling because of resource contention

- If time period for a CICS system being active is given, a message is sent if the system is not active during this time.

- Messages produced can be customised

RTA MAS Resource Monitoring

- Able to send notifications when the status of a specific (or generic) resource reaches a certain threshold.

- Threshold can be simple
  - e.g. status of Connection SYS1 is RELEASED

- Threshold can be made more sophisticated by combining simple thresholds with logical operators
  - e.g. Use Count of transaction ABCD is greater than 50 OR less than 5

- Possible to specify a number of times the threshold much be breached before CPSM will issue an alert.

RTA MAS Resource Monitoring

- When generic resource being analysed an aggregation of the status can be tested
  - e.g. average Use Count across all transactions matching M*

- MRM allows the use of user-written status programs to monitor resources not managed by CPSM.

- A threshold can apply to an individual system or groups of systems. Each system in the group will issue a notification when required.

RTA Analysis Point Monitoring

- Thresholds can be set in the same way as MRM.

- In a group of systems, one notification is issued when a threshold is reached.

- Useful when there is a group of cloned systems.

RTA – Performing Actions

- RTA can perform SET actions on resources when a threshold is reached.

- Products such as NetView can be set to listen for SNA Generic alerts and run REXX API scripts as required.

- A CPSM API application can use the LISTEN verb to wait for notifications and then take appropriate action.

CPSM Summary

- Fully functional Single System Image System Management tool

- Provided as part of CICS Transaction Server

- Providing
  - Resource definition
  - Operations
  - Thresholding
  - Automation
  - Dynamic workload management
  - Modern Browser interface
  - Scripting APIs
  - Integration with IBM System Management tooling