

CICS Workload Management:: A best practice approach

Ian J Mitchell Distinguished Engineer, z Systems Software Application Runtimes

ianj_mitchell@uk.ibm.com





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Agenda



- CICSPlex SM: Start here
- CICSPlex SM and CICS Explorer: Enabling Single System Image
- CICSPlex SM: Workload Management
- CICSPlex SM: Foundation for CICS Platform and Application Deployment





Agenda

- CICSPlex SM: Start here
 - Foundation Concepts
 - Capabilities and Topologies
 - Getting Started
 - What you need to decide
 - Using CICS Deployment Assistant
 - Using CICS Configuration Manager
- CICSPlex SM and CICS Explorer: Enabling Single System Image
- CICSPlex SM: Workload Management
- CICSPlex SM: Foundation for CICS Platform and Application Deployment





CPSM-ite?





From http://www.unilever.co.uk/brands-in-action/detail/Marmite/293688/

Marmite was conceived in 1902 and the Marmite Food Company opened a small factory in Burton-on-Trent where it still resides today. It took a couple of years to perfect the recipe and for the British public to warm to the spread's distinctive taste.

Before Louis Pasteur realised that the cells in yeast were in fact living plants, people simply discarded this by-product of the brewing process. German scientist Liebig then went on to make yeast into a concentrated food product - one that resembled meat extract but was in fact vegetarian.

Today Marmite is a nutritious, black, tasty, savoury spread enjoyable on toast or bread or even as a cooking ingredient. It is made from spent brewer's yeast and comes in a distinctive black jar with a yellow lid.

Following the discovery of vitamins in 1912, yeast was found to be a great source of five important 'B' vitamins. As a result Marmite was included in soldiers' ration packs during World War I. It became a dietary supplement in prisoner-of-war camps in World War II and was sent to British peacekeeping forces in Kosovo to boost morale in 1999.

Limited edition Guinness Marmite was launched in 2007, followed by Marmite champagne, especially for Valentine's Day in 2008 and 2009 saw a cricket-themed Marsden's Marmite. Extra strength Marmite XO was developed in 2010 and to celebrate the Queen's Diamond Jubilee in June 2012, Marmite decided to pay a fitting tribute by launching another limited edition, aptly named 'Ma'amite'.

Marmite has had a number of heart-warming advertising campaigns over the years from 'My Mate Marmite' to Paddington Bear. The most popular 'Love it or Hate it' campaign was born out of talking to people and discovering that most of them really either love or hate Marmite! A bold move for the brand which has coined a well-used phrase today.





CICSPlex SM Features

- A real-time, single-system image (SSI)
- A single point of control
- Management of your business applications
- Operations for the entire CICSplex
- Management of your workloads
- Automated exception reporting for CICS resources
- Monitoring functions for the collection of statistical data for CICS resources
- An application programming interface (API)
- Management of the CICSPlex SM environment
- Management of time-dependent activity





Read my lips...

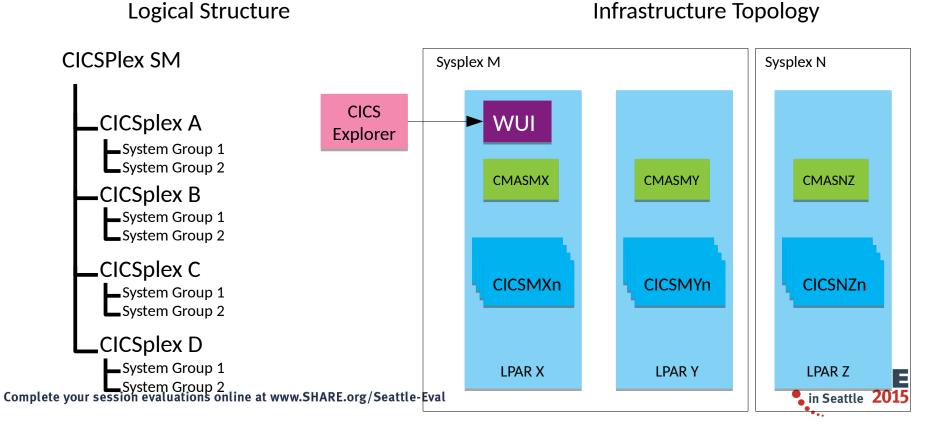
"CICSPlex SM is the foundation for enhancing the User Experience, Productivity, and Agility of running every type, size and complexity of CICS system, period."





CICSPlex SM – Getting Started

- Read the Concepts and Planning documentation
- Some basics...

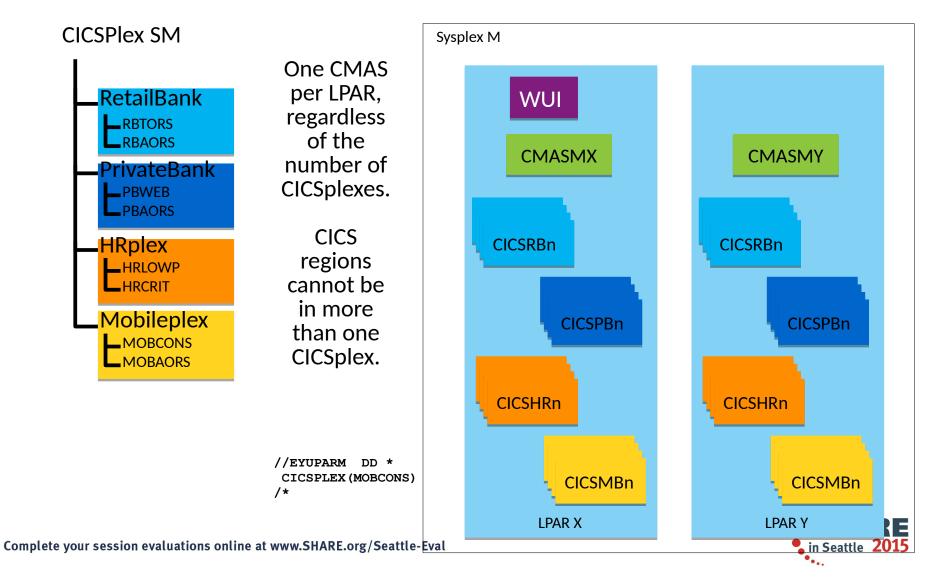


CICSPlex SM – Provisioning Management Resources



Logical Structure

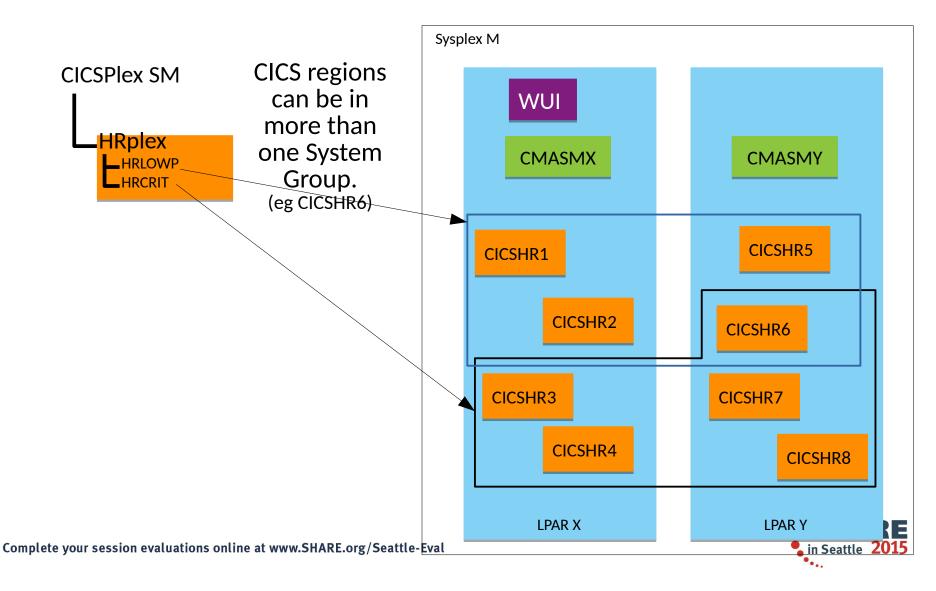
Infrastructure Topology





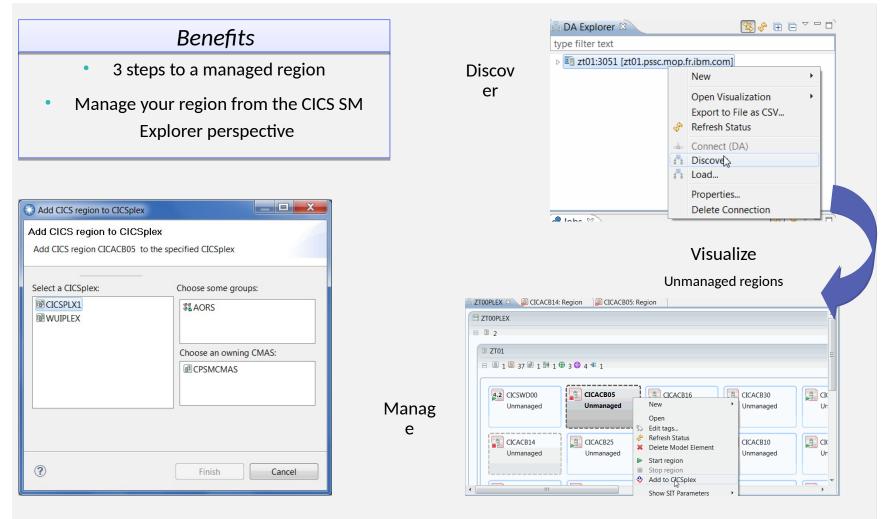
CICSPlex SM – System Groups Logical Structure

Topology





Short-cut to CICSplex... CICS Deployment Assistant

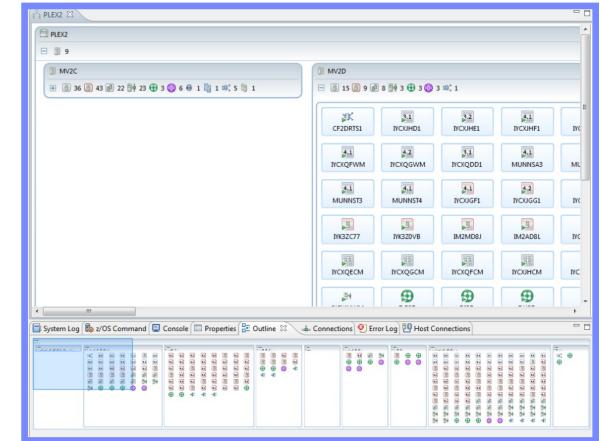




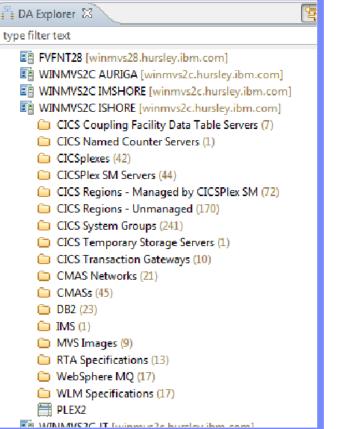


CICS DA – Discover and Visualize

Graphical Visualisation: Sysplex view & Overview



Tree View



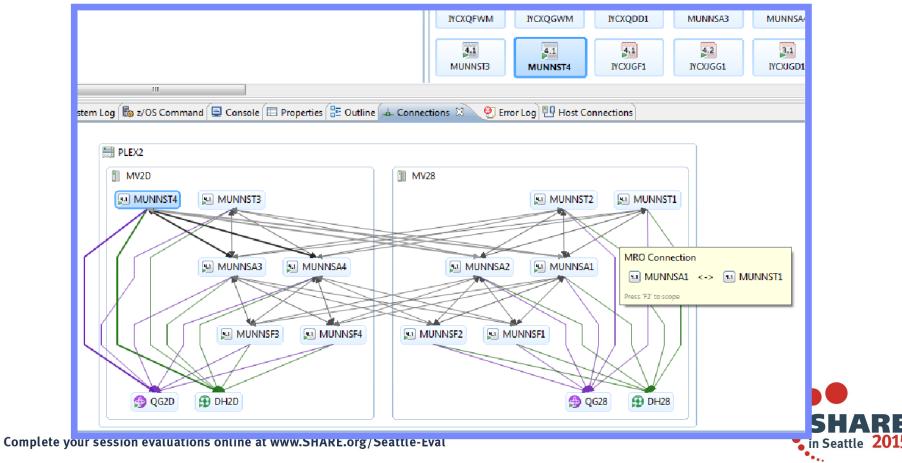




CICS DA – Discover and Visualize



Scoped connections view - in a physical layout





CICS DA - Plexify

Select New->CICSplex management facility

👬 DA Explorer 🛛 🦉 🦑 🕀 🖻 🎽	
type filter text	Create a CICSplex management facility
EB CICSDA [winmvs2f hurslev ibm com] New New EB Server Connection	Create a CICSplex management facility
New Image: Server Connection Open Visualization Image: ClCSplex management facility Export to File as CSV Image: ClCSplex Refresh Status F5 Connect (DA) Image: ClCSplex Discover Image: ClCSplex Properties Delete Connection	Create a CICSplex management facility Specify the details for the CICSplex management facility A CICSplex management facility has a WUI Server which enables CICS Explorer client to access the management services provided by a CMAS. DA Connection: Image: CICSDA Template: CICS TS V5.1.0
	Host name: winmvs2f.hursley.ibm.com CICS Explorer Port: 18005 WUI Port: 08901
	CMAS APPLID: 🛱 IYDZEJ00 Sysid: EJ00
	WUI Server APPLID: 📴 IYDZEJ01 Sysid: EJ01
	z/OS System: MV2F Start regions
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Agenda



- CICSPlex SM: Start here
- CICSPlex SM and CICS Explorer: Enabling Single System Image
 - CICS Explorer the modern face of CICS
 - Operations
 - Definitions
- CICSPlex SM: Workload Management
- CICSPlex SM: Foundation for CICS Platform and Application Deployment





🕆 CICSplex 👌 🗇 CICSplex 📄 🗖	Regions	Tasks 😫	00 ISC/MRO	Connections	E Terminal	B ^o Files	" Transactions		- 0
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0000028	CONL	RUNNING	MQTEST			255	DFHTCL00	00:00:00
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Create

😣 New Program D	efinition
Create Program De	efinition
CICSplex:	CICSEXP3
Resource Group:	ΖΤυ
Name:	ADDER
Description:	
Program Type	
	C++, COBOL, or PL/I
🖲 Java	
	e: com.ibm.cics.Demo
JVM Server:	JVM1
🥑 Open editor	
?	< Back Next > Cancel Finish





Edit



Program Definition (Z1	TU) ZTU	
Attributes	0/210	0
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CICSEXP3 • SZT	U v	
Property	Value	
▼ Basic		
CSDGroup		
Description	ZTU	
Name	ZTU	
Version	1	
 Definition Signature 		
Change Agent	DREPAPI	
Change Release	0680	
Change Time	28-Sep-2012 02:15:31	
Change User ID	CICSUSER	
Create Time	28-Sep-2012 02:15:31	
 Details 		
Api	CICSAPI	
Cedf	YES	
Concurrency	REQUIRED	
Datalocation	BELOW	
Execkey	CICS	
Language	N_A	
Reload	NO	
Resident	NO	
Status	ENABLED	



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Lifecycle

 Perform Operation Perform INSTALL Operation INSTALL operation will be performed on 1 items 	in the execution queue	e e e e e e e e e e e e e e e e e e e		
CICSplex: CICSEXP3 C E ZTU Target CICSEXP3 E ZTU Target CICSEXP3 C E ZTU CICSEXP C E ZTU CICSEXP3	Perform Ope Perform DISABL DISABLE operation		ms in the execution queue	
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ete your session evaluations online at www.S	SHARE.org/Seattle-Eval			SHARI in Seattle 201

z/OS Perspective



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Agenda



- CICSPlex SM: Start here
- CICSPlex SM and CICS Explorer: Enabling Single System Image
- CICSPlex SM: Workload Management
 - Principles of WLM
 - Simplified WLM definition with CICS Explorer v5.2
- CICSPlex SM: Foundation for CICS Platform and Application
 Deployment





What's the problem?

... it all becomes more complicated to manage.

- -Definitions managed & maintained locally
- -Applications are statically routed
- -Which leads to...
 - Availability problems
 - Lower probability of meeting response time goals

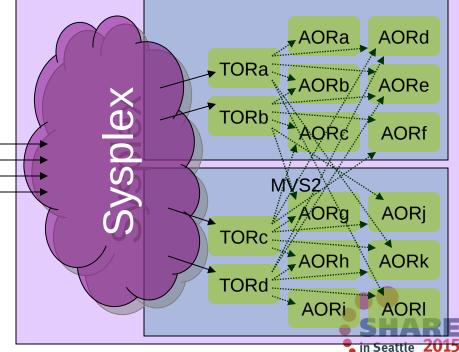




What is the solution?

- Workload Management ...
 - In the Network
 - VTAM Generic Resource
 - TCP/IP load balancing
 - In the Sysplex
 - z/OS Workload Manager
 - In CICS sub-system
 - CICSPlex SM Workload Management





Plex

MVS1



Workload management in the network

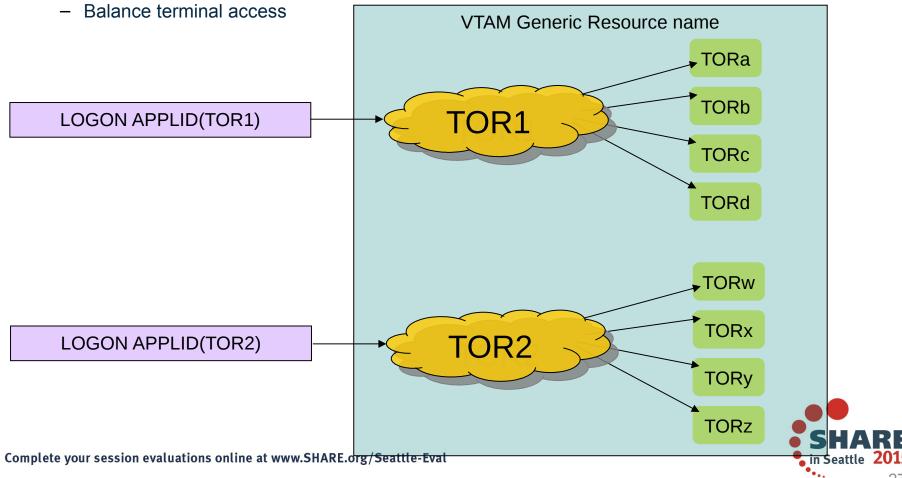
- TCP/IP balancing (balance web-services and CICS WEB clients)
 - Sysplex Distributor
 - Sysplex Distributor provides balancing of IP packets across multiple IP stacks.
 - Virtual IP Addressing (VIPA)
 - Dynamic VIPA provides non-disruptive rerouting around a failing network adapter.
 - DNS approach
 - DNS connection optimization, balances IP connections in a z/OS Sysplex IP domain. This is based on feedback from MVS[™] WLM about the health of the registered applications. It is still supported for CICS use.
 - Port Sharing
 - TCP/IP port sharing provides a simple way of spreading HTTP requests over a group of CICS router regions running in the same z/OS image.





Workload management in the network

VTAM Generic Resource





- Works with z/OS System Resource Manager (SRM)
- Dynamically allocates resources
 - Processor Storage, IO Priority
- Service Definition
 - Contains 1 or more Service Policies
- Policy defined in terms of "Goals", not resources
 - Service Policy
 - One per Sysplex
 - Can switch Policy when required
 - Service Class
 - Describes performance objectives for part of workload
- Report Class





- Goals
 - Response time How quick to run work
 - Average Response Time
 - E.g. Average transaction response should be 2 seconds
 - Percentile Response Time
 - E.g. 95% of transactions should complete in 3 seconds
 - Velocity
 - How fast work should run as a % of the time it's ready
 - High Value When work is ready, run it quickly
 - Low Value When work is ready, can wait to run
 - Used to get CICS active
 - Discretionary Work with no goals





- Report Class
- Classification Rules
 - How work get classified to Service Class
 - Some Classification Rules available for CICS:
 - SI SubSystem (Applid)
 - UI Userid
 - TN Transaction Name
 - LU LUName





- Goal Importance
 - Associated with Service Class
 - -1-5:1 =Very important, 5 =Not important
- Performance Index (PI)
 - Used to compare Goals
 - How well is work meeting it's Goal
 - PI = 1 : Meeting the Goal
 - PI < 1 : Over-achiever (beating the goal)
 - PI > 1 : Under-achiever (Not meeting the goal)





z/OS WLM and CICS : 1

- When CICS starts, as job or Started Task,
 - uses JES or STC classifications
- Once CICS is active,
 - CICS connects to z/WLM
 - CICS Sub-System related Service Classes are used
- At CICS startup, CICS will allocate a Pool of Performance blocks based on MAXTASKS
 - Sampled at regular intervals, e.g. every 250ms
 - Communicates transaction state to z/OS WLM





z/OS WLM and CICS : 2

- When a Task starts:
 - Performance block associated with Transaction
 - Transaction Classified (New, or passed via MRO)
 - Set-up Performance Block
- A Task executes
 - Dispatcher updates Performance Block
- Task ends:
 - Report transaction Complete or ...
 - Notify of partial transaction complete (e.g. in AOR via MRO)





z/OS WLM and CICS : 3

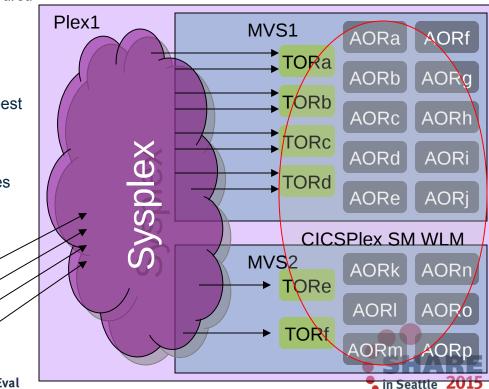
- Using z/OS WLM and CICS
 - Work distributed to the CICS System 'best' able to perform the work within the Sysplex
 - Based on z/OS WLM goals
 - z/OS WLM controls which Requesting/Routing (TOR) CICS Regions receive the work to be routed under CICSPlex SM criteria
 - Regions in bigger/more powerful LPARs may be favoured
 - CICSPlex SM will favour local routing





z/OS WLM: Deciding how the work reaches CICS

- z/OS WLM controls which Requesting (TOR) CICS Regions receive the work
- z/OS WLM can also affect which AOR is chosen when using CICSPlex SM
- Once in CICS routed under CICSPlex SM criteria
 - Regions in bigger/more powerful LPARs may be favoured
 - CICSPlex SM will favour local routing
 - Can give the impression of an "Unbalanced" Workload
 - In reality more work goes to the System(s) best able to deal with the work
 - An uneven distribution may be an accurate reflection of the capabilities of the environment



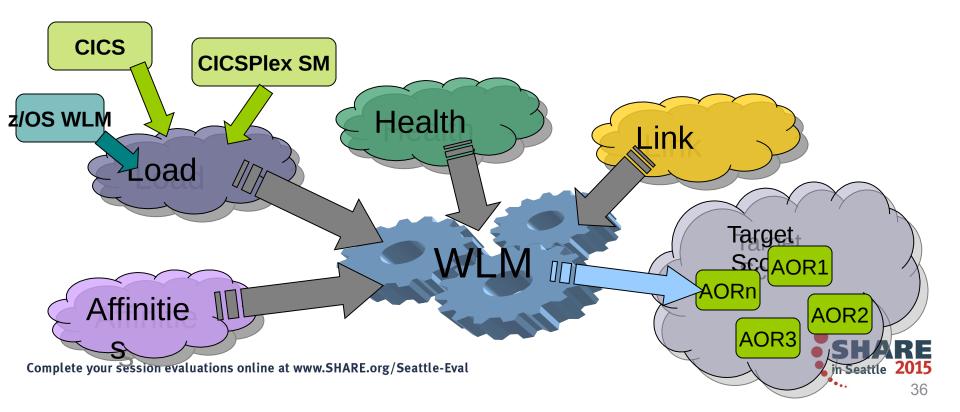
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Network



zWLM & CICSPlex SM Workload Management

 Uses z/OS WLM 'Average Transaction Response Times' to influence the 'LOAD'





What can CICS do?: Dynamic

• Dynamic Routing

- Transactions associated with a terminal

- Physically 'entered' at a terminal
 Via an EXEC CICS START TERMID command
- Dynamic Program Link (DPL)
 - EXEC CICS LINK PROGRAM command





What can CICS do?: Distributed

• Distributed Routing

- Non-Terminal initiated STARTs (NTIS)

- i.e. EXEC CICS START with no TERMID

- CICS BTS
- Enterprise Java Beans (EJBs) & IIOP
- Inbound WebServices

- if modified to make them routable



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How does CICS do this?

- CICS uses 'user replaceable' programs
 - One for Dynamic Routing
 - One for Distributed Routing
 - CICS ...
 - ... calls the appropriate program to decide where to route to
 - ... passes the program the DFHDYPDS commarea





When is the Dynamic Routing Program called?

- Program
 - If defined:
 - DYNAMIC(YES)
 - If not defined:
 - Program not defined and the program is not autoinstalled
- Transaction
 - If defined:
 - DYNAMIC(YES)
 - If not defined:
 - SIT DTRTRAN={CRTX|name}





When is Distributed Routing Program called?

- Transaction Starts (Non-Terminal Initiated)
 - TRANSACTION defined ROUTABLE(YES)
- CICS BTS
 - PROCESS or ACTIVITY started by RUN ASYNCHRONOUS
 - TRANSACTION associated with PROCESS or ACTIVITY has DYNAMIC(YES) and REMOTESYSTEM is blank
- Inbound WebServices
 - Target program defined DYNAMIC(YES)
 - A program in the PIPELINE changes contents of
 - Container DFHWS-USERID
 - Container DFHWS-TRANID & referenced TRANID defined DYNAMIC(YES)





So what part does CICSPlex SM play?

- It supplies a program to act as both...
 - ... the Dynamic Routing Program
 - SIT DTRPGM
 - SPI SET SYSTEM DTRPROGRAM
 - ... the Distributed Routing Program
 - In SIT DSRTPGM
 - SPI SET SYSTEM DSRTPROGRAM
 - EYU9XLOP





What does CICSPlex SM do when it's called ?

- Once called...
 - CICSPlex SM Workload Management facilities create a list of suitable, candidate, target CICS Regions, based on:
 - the transaction
 - the terminal id, luname, user id, or process type.
 - Note:
 - CICSPlex SM does not do the routing,
 - CICS does
 - The list of candidate Target Regions is based upon the Workload to which the Requesting/Routing Region belongs.





What model does it use?

- The CICSPlex SM Workload Management model can be divided into 2 parts:
 - Workload Balancing
 - The process which decides which of the Target Regions is considered to be the most suitable, the 'best', candidate to route to, assuming:
 - Work 'could' be sent to any of the Target Regions
 - Work does not have an 'affinity' with a specific Region
 - Workload Separation
 - How CICSPlex SM Workload Management allocates specific work
 - to specific set(s) of Target Regions
 - for specific reasons





Workload Balancing 1

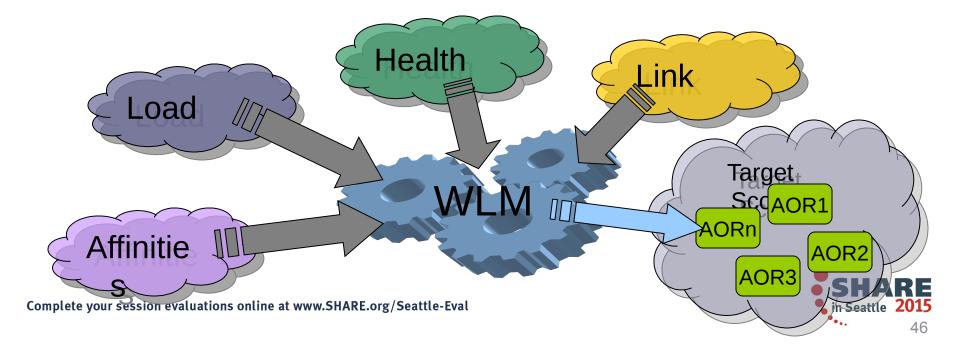
- What Workload Balancing is NOT!
 - It is NOT a means of EVENLY distributing work
 - It is NOT a way to CONSISTENTLY distribute work





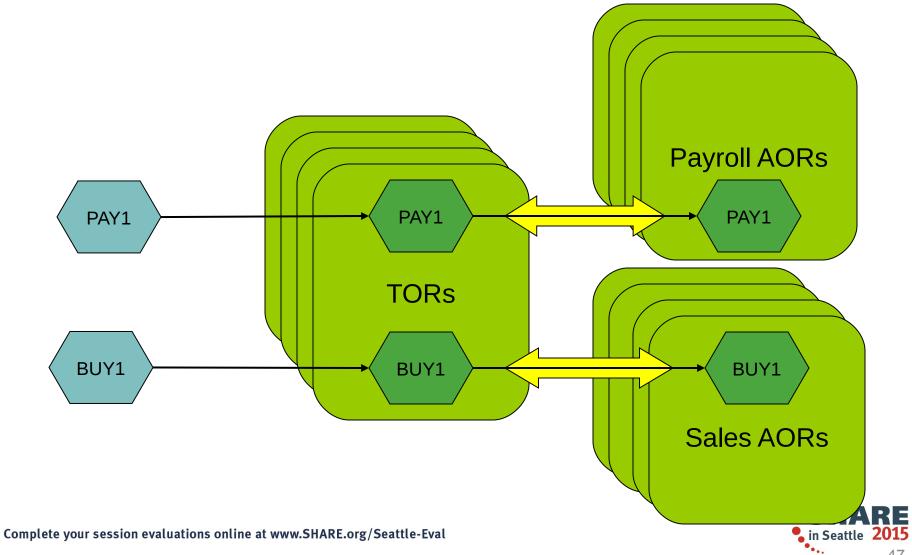
Workload Balancing 2

- Workload Balancing is ...
 - Providing CICS with the 'best' Target Region, at the moment the request was made, from all of the possible candidates.
- How does it know which the 'best' is ?





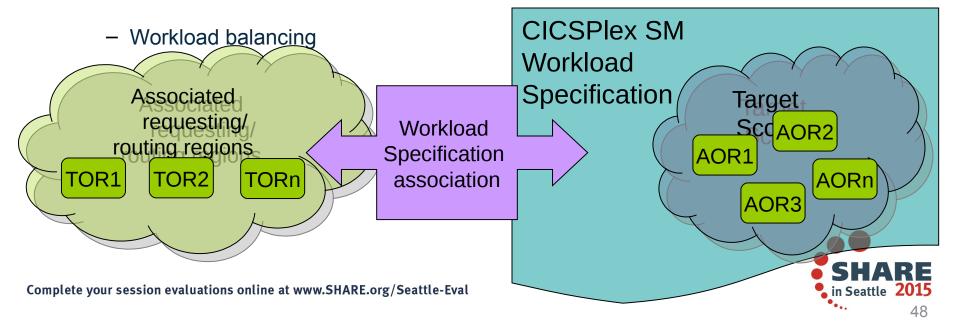
Workload Separation





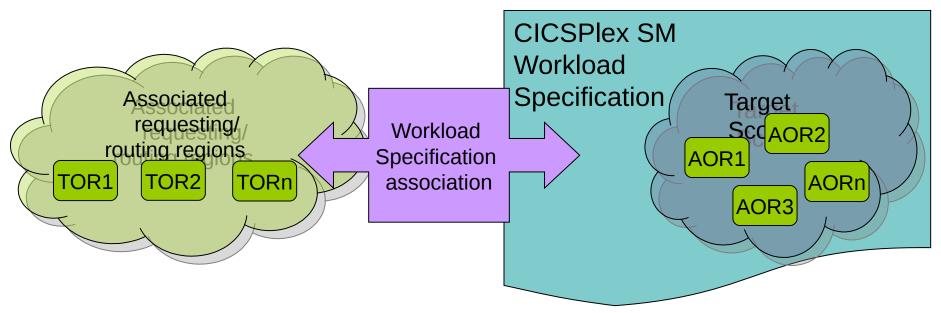
What is a CICSPlex SM Workload?

- At its most basic
 - One or more Requesting/Routing Regions
 - One or more Target Regions
 - One Workload Specification





Workload Balancing – Workload Specification 1

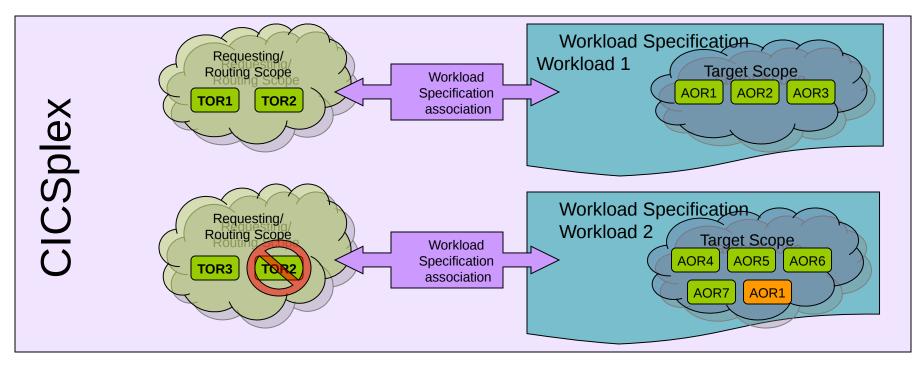


- Workload Specification resource (WLMSPEC)...
 - Defines a Workload
 - The Workload must be "associated" with ...
 - ... Requesting/Routing Region(s) (Dynamic & Distributed)
 - Target Region(s) (Distributed only)





Workload Balancing – Workload Specification 2

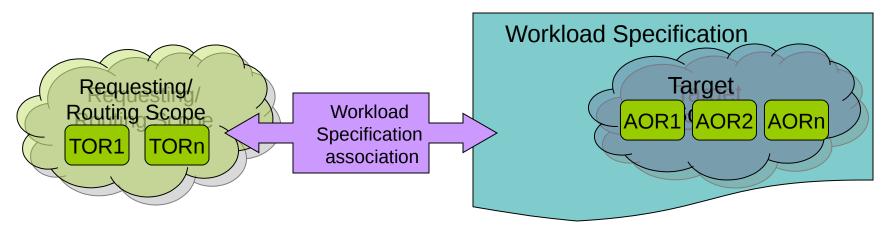


- There can be multiple Workloads within a CICSplex
- A Region can be a Target for multiple Workloads
- A Region can be BOTH a Requesting and a Target Region
- But... Requesting/Routing Region can ONLY be associated with **1** Workload
- While you might not be using distributed today, don't have your target regions as target scopes in more than one workload

Complete your session evaluations online at www.SHARE.org/Seattle-Eval



Workload Balancing – Workload Specification 3



- Associated with your requesting/routing regions
 - systems (CSYSDEF) and system groups (CSYSGRP)
- Specifies default target scope
 - a CICS Region (CSYSDEF)
 - a Group of CICS Regions (CSYSGRP)
- Specifies the algorithm type
 QUEUE or GOAL

SHARE in Seattle 2015



New Face of WLM

- IBM CICS Explorer - /nome/scewarc/workspaces/runcim	ne-com.ibm.cics.explorer.productolympia 🗧 😒 🕏 🕇	(× 15:0
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Targets (1)		
II Transaction group 7 (\$CE71560)		
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	i CNX0621I: Create Workload Specification "ACCT" in "CICSEX52" succeeded com.ibm.cics.core.ui. 11/04/2014 14:59	
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New Face of WI M

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CICSplex:*	CICSEX52	
Name:*	ACCT	
Description:		
Target Scope:*	ZEMAORS Browse	
Primary Criterion:*	LUNAME 2	
Algorithm:*	QUEUE ‡	
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Description: ACCT	Rules	Targets		
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	Transactions		0
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	- Details		
	Transaction group status: ACTIVE	Acceptable target region load level:	98
	Default algorithm:	Acceptable abend level:	99
	Active transaction count: 3	Default affinity relation:	LUNAME
	Primary search criterion: LUNAME	Default affinity lifetime:	PCONV
	/	Automatic affinity creation:	NO
	Transactions		
	CNX0211I Context: CICSEXP3. Resource: WLMA 15:02:40 Transaction ID	ATRAN. 3 records collected at 11-Ap	r-2014
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n	s online at www.SHARE.org/Seattle-Eval		



Agenda



- CICSPlex SM: Start here
- CICSPlex SM and CICS Explorer: Enabling Single System Image
- CICSPlex SM: Workload Management
- CICSPlex SM: Foundation for CICS Platform and Application Deployment
 - Creating and deploying CICS Platforms
 - Deploying CICS Applications

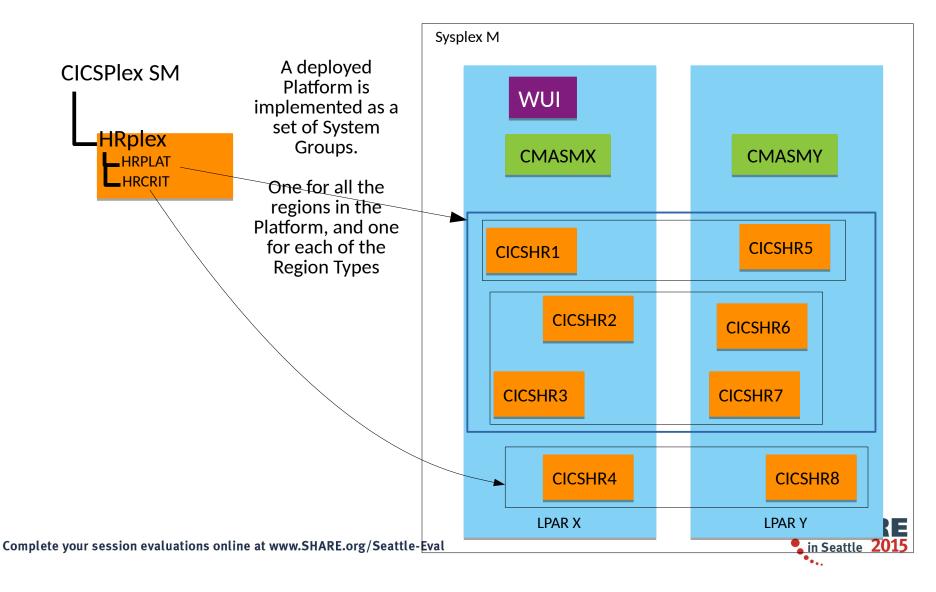


CICSPIEX SM - System Groups Platforms & Region Types



Logical Structure

Topology



Platforms & Region Type – CICS Explorer Cloud Perspective



A dedicated perspective for Platforms in the CICS Explorer shows both Applications and Region Types which comprise a Platform.

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Summary



- CICSPlex SM: Start here
 What are you waiting for?
- CICSPlex SM and CICS Explorer: Enabling Single System Image
 - Quick and easy adminstration and operations
- CICSPlex SM: Workload Management
 - Efficient and resilient
- CICSPlex SM: Foundation for CICS Platform and Application Deployment
 - Confident, repeatable, agile

