



CICS Transaction Server – CICSplex SM

# CICSplex System Manager (CPSM)

...getting started with dynamic transaction routing

**Steve Fowlkes**

[fowlkes@us.ibm.com](mailto:fowlkes@us.ibm.com)

<http://www.linkedin.com/pub/steve-fowlkes/6/350/b20/>

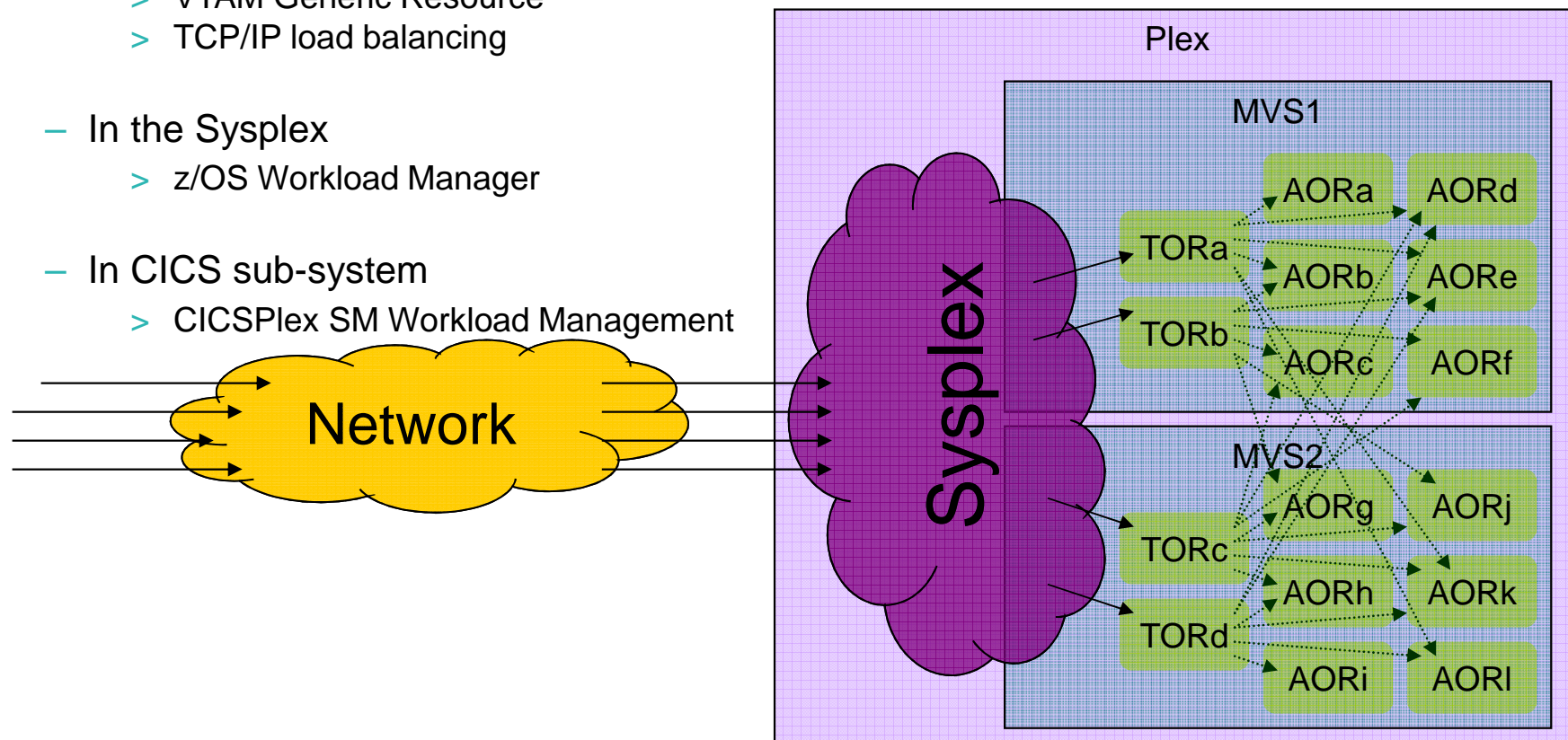
@SAFowlkes

## CPSM can make your environment more simple

- Definitions managed & maintained locally
  - Have to log onto each region to define or change a resource
  - Not easy to disable a program across many CICS regions or across several LPARs
  
- Applications are statically routed
  - Many PCT/PPT definitions to maintain
  - Have to keep track of local/remote definitions
  
- Which can lead to...
  - Errors
  - Availability problems
  - Lower probability of meeting response time goals

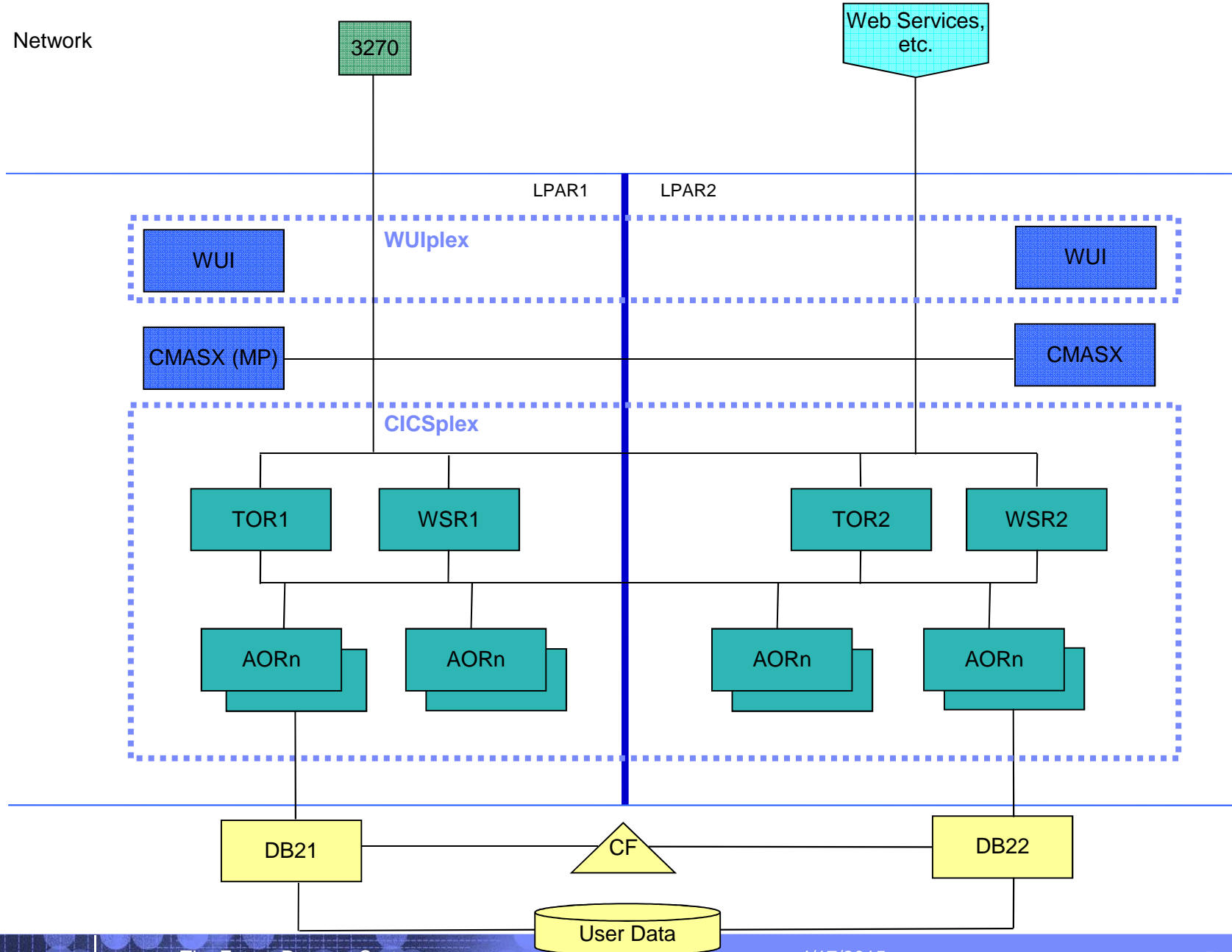
# Managing Workload at various points

- 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



## Overview of Transaction Routing

- Allows “terminals” / Input connected to one CICS region to run with transactions in another connected CICS region
- Can distribute terminals and transactions around your CICS regions
  - **Still have the ability to run any transaction with any terminal**
- The region that owns the terminal is called the Routing Region or TOR
- The region that owns the transaction is called the Target Region or AOR
- The TOR and AOR regions must be connected by MRO, IPIC or APPC links



# CICS Dynamic Transaction Routing

- Dynamic Routing
  - Transactions associated with a terminal
    - Physically 'entered' at a terminal
    - Via an EXEC CICS START TERMID command
  - Distributed Program Link (DPL)
    - EXEC CICS LINK PROGRAM command
  - The location of the remote resource is decided at run time
  - The decision is made by a CICS-supplied user-replaceable **routing program**

# What can CICS do?: Dynamic notes

- **All the following can be dynamically routed:**
  - Transactions started from terminals.
  - Transactions invoked by a subset of EXEC CICS START commands.
  - CICS-to-CICS distributed program link (DPL) requests.
  - Program-link requests received from outside CICS—for example, External Call linterface (ECI) calls received from CICS Clients.
  - CICS business transaction services (BTS) processes and activities. (BTS is described in [Overview of BTS](#) .)
  - Method requests for enterprise beans and CORBA stateless objects. (Enterprise beans are described in the *Java™ Applications in CICS*.)
  - Bridge 3270 transactions.
  
- **Specifying DYNAMIC(YES) means that you want the chance to route the terminal data to an alternative transaction at the time the defined transaction is invoked. CICS manages this by allowing a user-replaceable program, called the dynamic routing program, to intercept the terminal input data and specify that it be redirected to any transaction and system. The default dynamic routing program, supplied with CICS, is named DFHDYP. You can modify the supplied program, or replace it with one that you write yourself. You can also use the DTRPGM system initialization parameter to specify the name of the program that is invoked for dynamic routing, if you want to name your program something other than DFHDYP.**

# CICS Distributed Routing

- Distributed Routing
  - Non-Terminal initiated STARTs (NTIS)
    - i.e. EXEC CICS START with no TERMID
  - Inbound Web Services
    - If modified to make them routable
  - CICS BTS



## How does CICS do this?

- **CICS uses ‘user replaceable’ programs**
  - One for Dynamic Routing
  - One for Distributed Routing
  
- **CICS Then**
  - calls the appropriate program to decide where to route
  - passes the program the DFHDYPDS commarea
  - Routes based on the applid/sysid provided by the URM

## 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*}

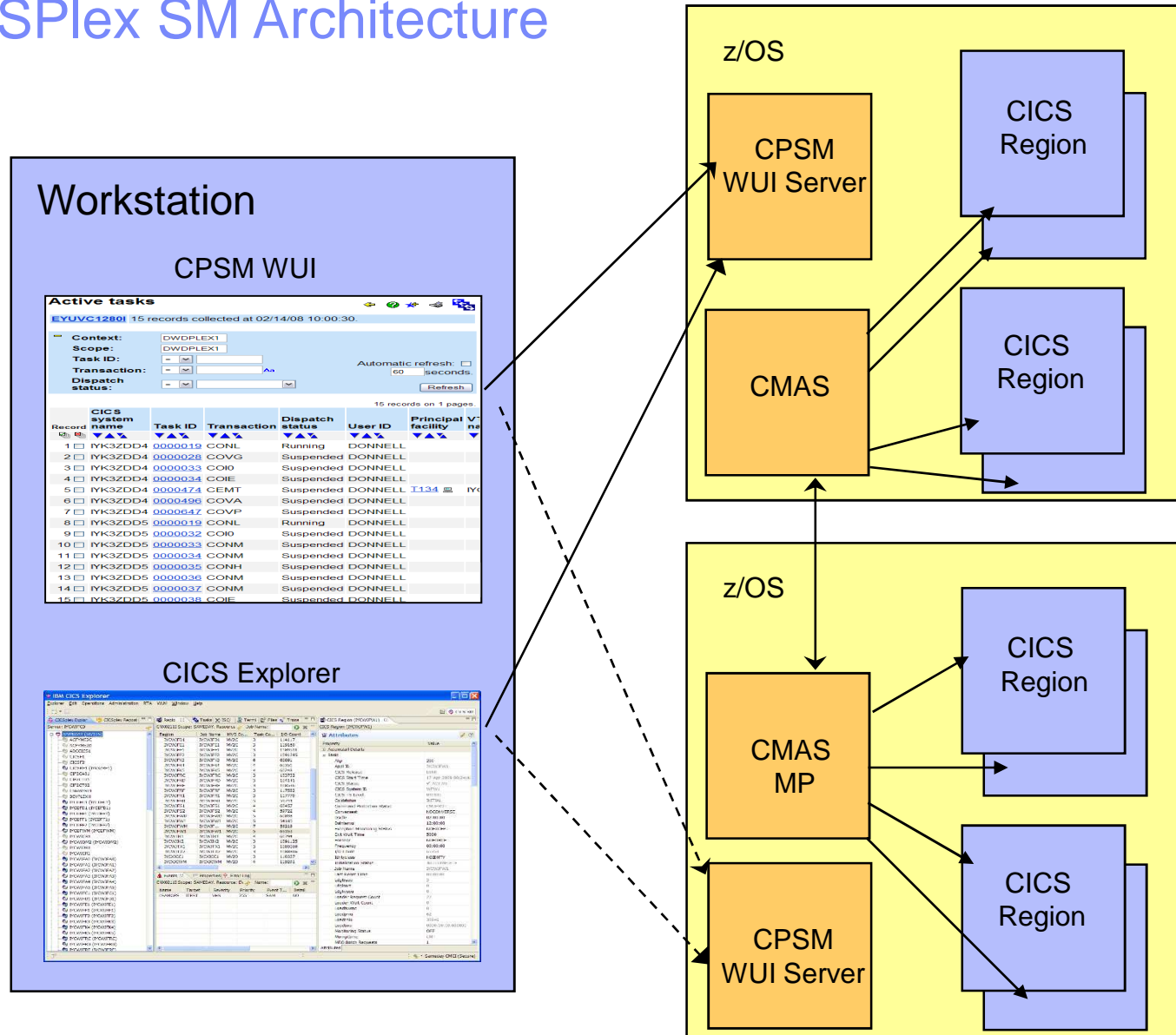
## When is Distributed Routing Program called?

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

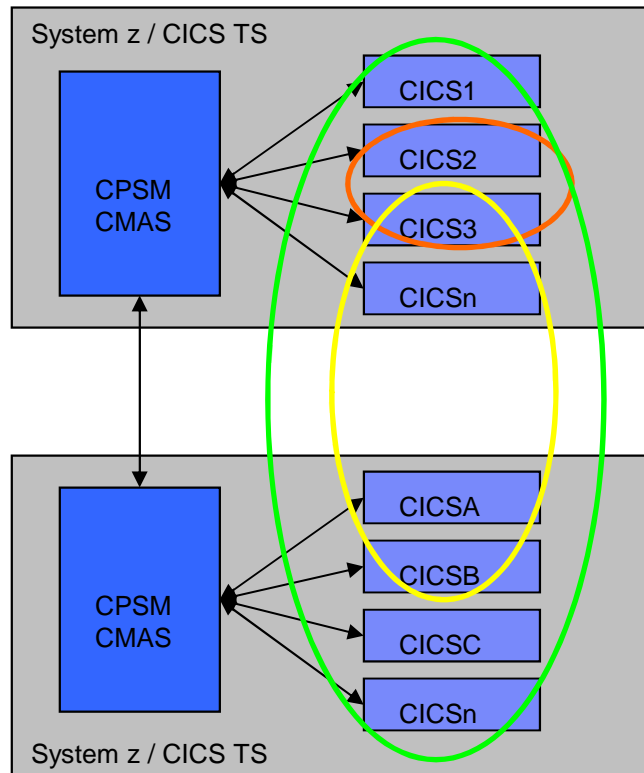
## So what part does CICSplex SM play?

- It supplies a program to act as both... **EYU9XLOP**
  - The Dynamic Routing Program
    - SIT – DTRPGM
    - SPI - SET SYSTEM DTRPROGRAM
  - The Distributed Routing Program
    - In SIT – DSRTPGM
    - SPI - SET SYSTEM DSRTPROGRAM
  - CPSM Workload Management creates a list of candidate target Regions
    - Based on the transaction
    - Based on the terminal id, luname, user id, or process type
  - CICSplex SM does not do the routing... CICS does
  - The list of candidate Target Regions
    - Based upon the Workload to which the Requesting/Routing Region belongs

# CICSplex SM Architecture



## Identifying CICS Systems and Terminology



### The CICS Explorer...

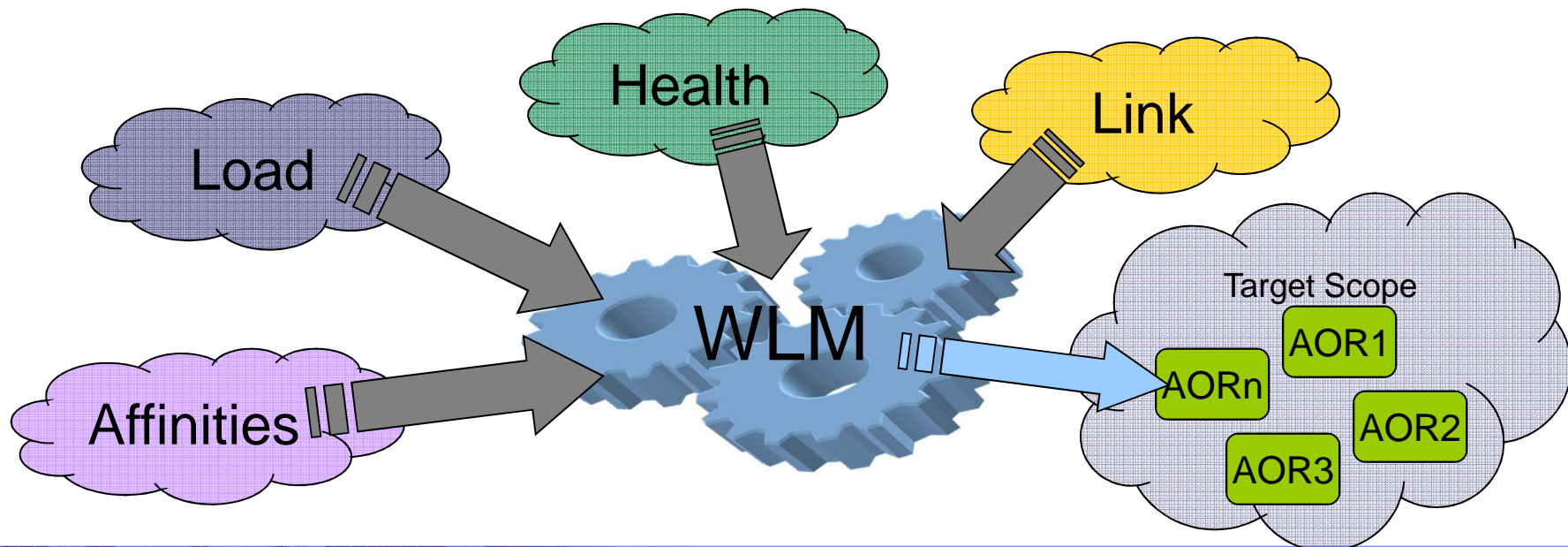
- **CONTEXT** = the primary name of a collection of CICS systems or the CICSplex name
  - e.g. PRODPLEX, QAPLEX, TESTPLEX
  - A CICS system can only reside in one CONTEXT
  
- **SCOPE** = the name of an individual CICS system or group of CICS systems within the CONTEXT
  - e.g. PAYTORS, PAYAORS, PAYROLL
  - A CICS system can be in multiple Scopes
  - Multiple scopes within the context

# CPSM Workload Management Model

- The CICSplex SM Workload Management model can be divided into...
  - Workload Balancing (Placement)
    - > The process which decides which of the Target Regions is considered to be the most suitable 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
  - Affinity management
    - > Routing workloads which have existing affinities declared for them

# Workload Balancing

- 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 ?

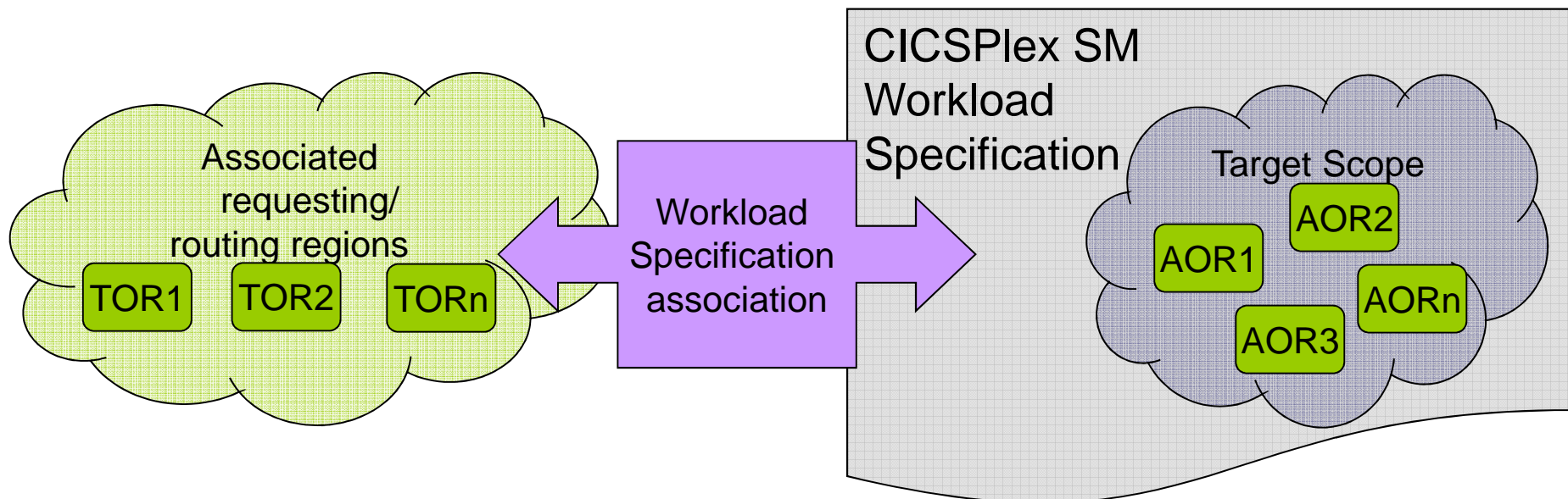




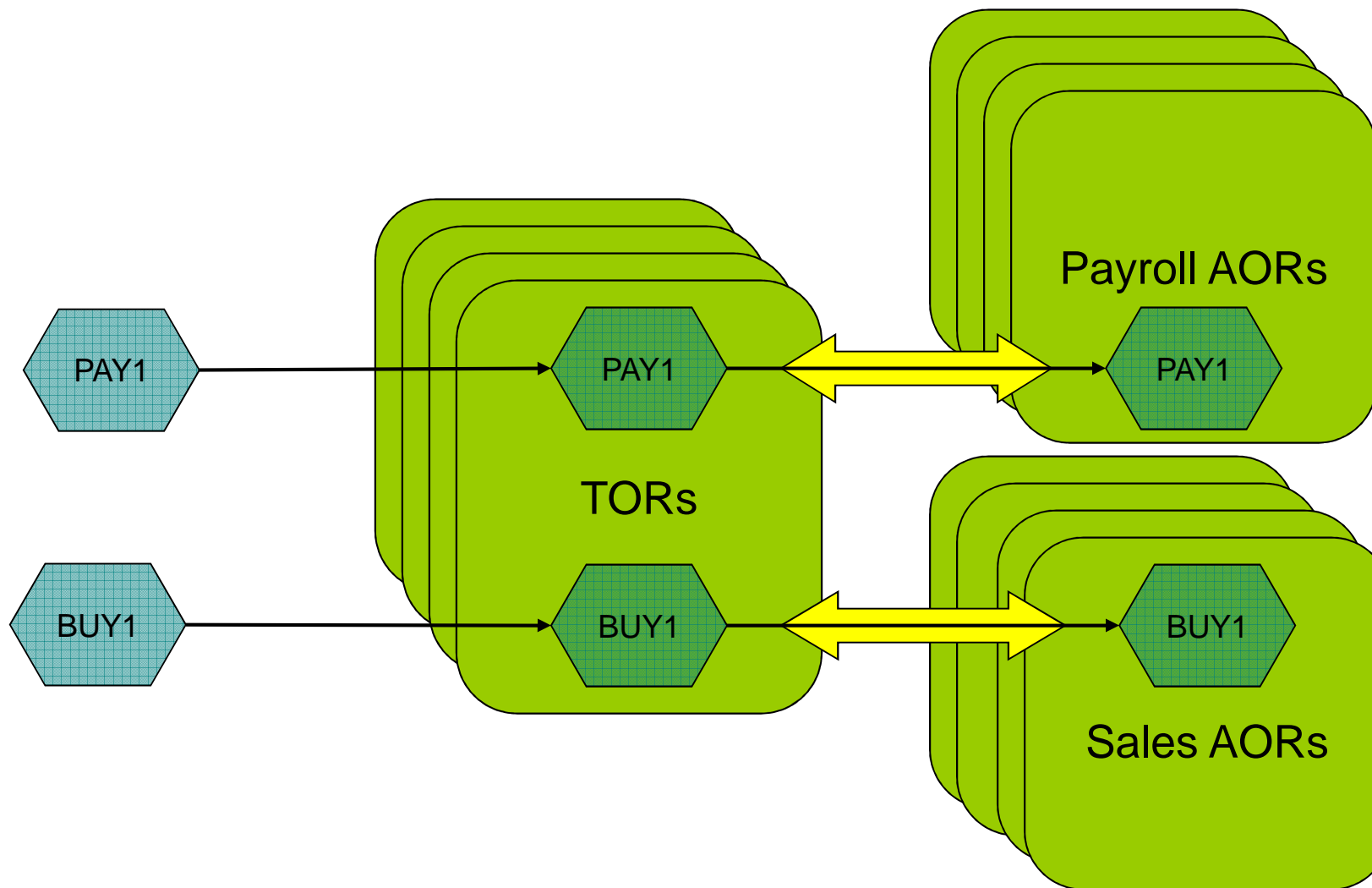
# What is a CICSplex SM Workload?

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

## The CICS Explorer...



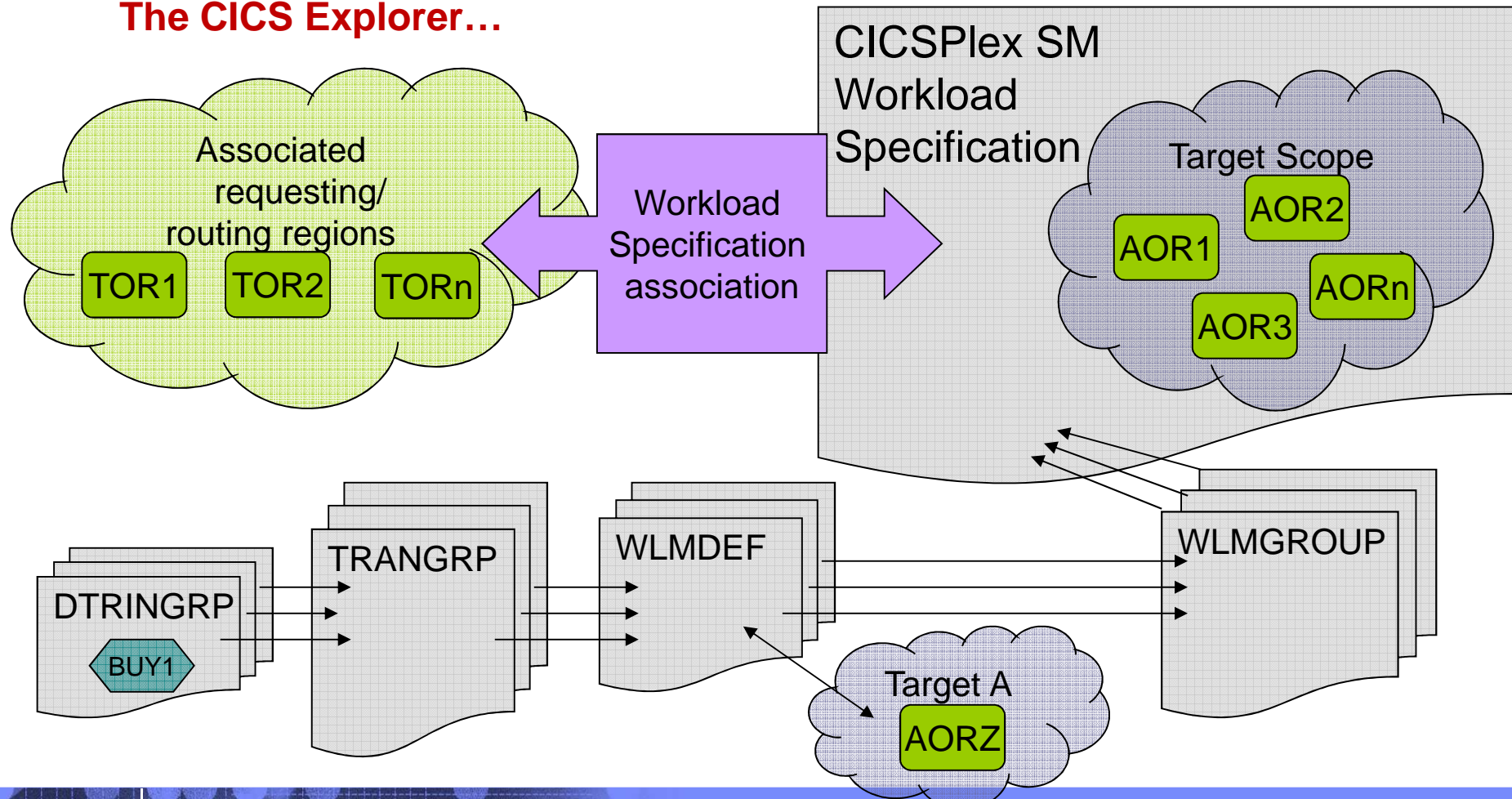
# Workload Separation



# Workload Balancing / Workload Separation

- Routing specific parts of the work to different systems

## The CICS Explorer...



# Managing a Workload - Activating

- Activating Workload Management in CICS Regions
  - Routing/Requester Region
    - Must be 'associated' with a Workload Specification (WLMSPEC)
      - Explicitly : By directly associating the CICS Region with a Workload Specification
      - Implicitly : By associating the Workload Specification with a CICS Group the CICS Region belongs to
    - Must specify WLMSTATUS(YES).
      - CSYSDEF : Definition of a CICS Region to CICSplex SM
      - MAS: Operational state of a CICS Region to CICSplex SM
  - Target Region
    - Must be included in Target Scope of Workload Specification (WLMSPEC)
      - Explicitly : By directly associating the CICS Region with a Workload Specification
      - Implicitly : By associating Workload Specification with a CICS Group the CICS Region belongs to
- Workload Created & becomes 'Active' when first Routing/Requester Region associated with the Workload Specification becomes 'Active'

# IBM developerWorks

- **Chris Hodgins (part 1 of 3)**

- [https://www.ibm.com/developerworks/community/blogs/ChrisHodgins/entry/cicsplexed and confused part 1 understanding your cicsplex 1?lang=en](https://www.ibm.com/developerworks/community/blogs/ChrisHodgins/entry/cicsplexed_and_confused_part_1_understanding_your_cicsplex_1?lang=en)

- **Greg Todaro**

- [https://www.ibm.com/developerworks/community/blogs/aimsupport/entry/creating a basic cpsm cicsplex environment?lang=en](https://www.ibm.com/developerworks/community/blogs/aimsupport/entry/creating_a_basic_cpsm_cicsplex_environment?lang=en)

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 [twitter.com/IBM\\_System\\_z](https://twitter.com/IBM_System_z)

 CICS Explorer Forum  
[ibm.com/developerworks/forums/forum.jspa?forumID=1475&start=0](http://ibm.com/developerworks/forums/forum.jspa?forumID=1475&start=0)

 CICS-L list Forum  
[listserv.uga.edu/archives/cics-l.html](http://listserv.uga.edu/archives/cics-l.html)



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