IBM System z Technology Summit

Simplify your infrastructure

These materials have been prepared by IBM or the session speakers and reflect their own views. They are provided for informational purposes only, and are neither intended to, nor shall have the effect of being, legal or other guidance or advice to any participant. While efforts were made to verify the completeness and accuracy of the information contained in this presentation, it is provided AS IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, this presentation or any other materials. Nothing contained in this presentation is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software.

References in this presentation to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates. Product release dates and/or capabilities referenced in this presentation may change at any time at IBM's sole discretion based on market opportunities or other factors, and are not intended to be a commitment to future product or feature availability in any way. Nothing contained in these materials is intended to, nor shall have the effect of, stating or implying that any activities undertaken by you will result in any specific sales, revenue growth or other results.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries:
ibm.com/legal/copytrade.shtmlAIX, CICS, CICSPlex, DataPower, DB2, DB2 Universal Database, i5/OS, IBM, the IBM logo, IMS/ESA, Power Systems, Lotus, OMEGAMON, OS/390, Parallel Sysplex, pureXML, Rational, Redbooks, Sametime, SMART SOA, System z , Tivoli, WebSphere, and z/OS.

A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office
Intel and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Session 4. Abstract

- **Looking for ways to accelerate the transfer of knowledge, skills, and best practice to the next generation of technical experts? Need to maintain productivity and protect service levels? CICS Explorer and zEnterprise lead the way to infrastructure simplification. In this session, you will learn how to identify and package applications in a more flexible way, increase your utilization of zAAP processors, reduce dependency on SNA, improve the throughput of your CICSplex, and simplify the authentication of distributed CICS users. You will also see how the CICS Explorer offers a much more powerful tooling environment that can improve the productivity with a more intuitive experience.**

Agenda

- IP Connectivity in CICS
- ID Propagation and Pass phrase support
- CICSPlex SM Workload Manager
- JVM Servers
- Threadsafe optimization
- CICS Explorer
- CICS Configuration Manager
- CICS Deployment Assistant

CICS Support for IPv6

- **Allow for IPv4, IPv6 or host names in:**
  - Resource definitions
  - Application Programming Interface
  - Systems Programming Interface
  - User Replaceable Modules
  - Global User Exits
  - Monitoring Records
  - CICS Explorer V1.1

IP Interconnectivity

- **CICS IP interconnectivity strategy**
  - Transactional IP communications protocol for connectivity between and into CICS
  - Long term plan to provide CICS with IP choice for most of the CICS programming model
- **CICS TS V4.2 enhancements**
  - IPIC Function Shipping for File Control, Temporary Storage, Transient Data
- **Prior releases**
  - Distributed Program Link
  - 3270 transaction routing
  - Asynchronous Starts

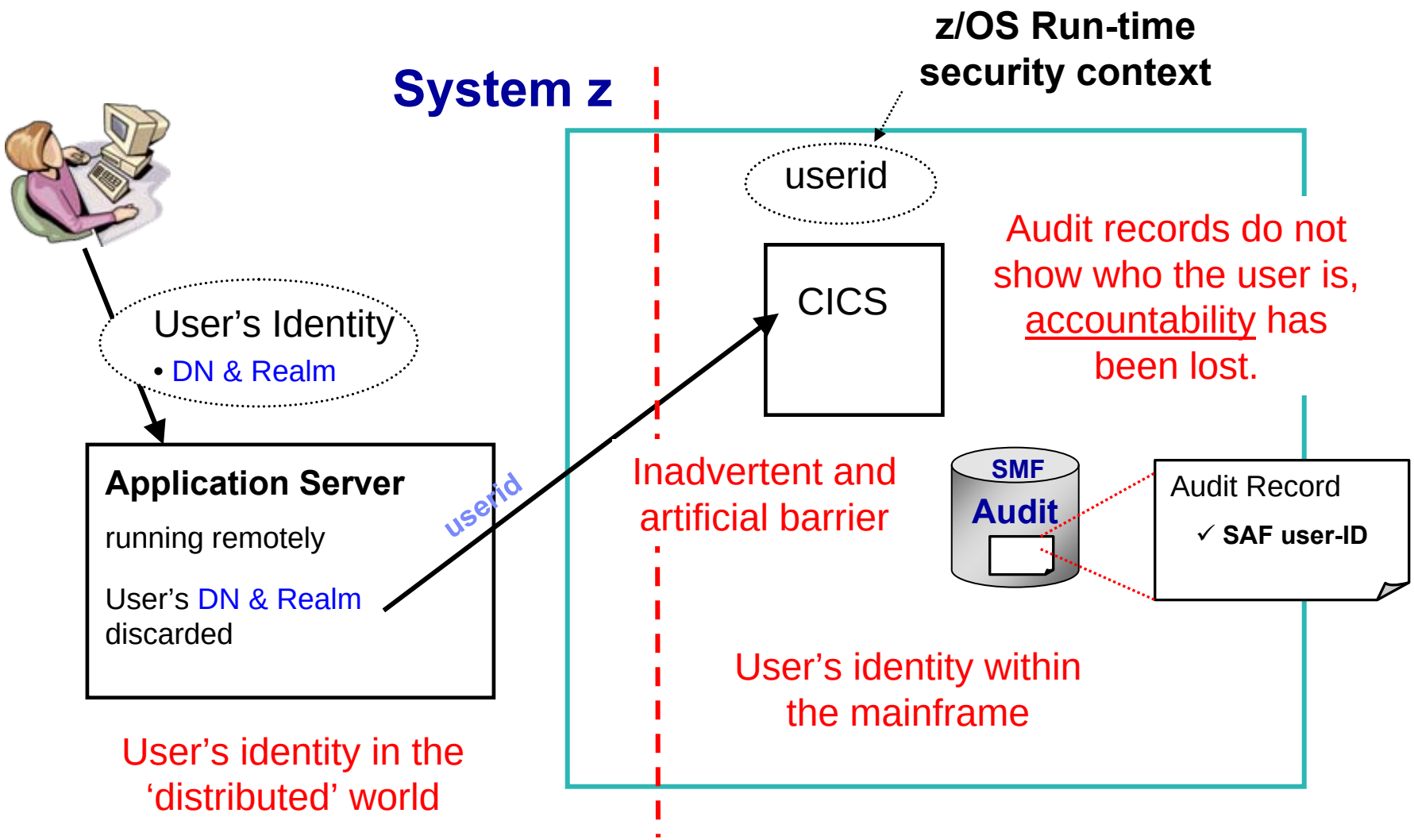
Identity Context Propagation

- **z/OS Identity Propagation initiative to provide asserted identity for end-to-end distributed security**
  - Logically tie together distributed end-user identities with z/OS userids
  - Enhance the ability for z/OS applications to participate centrally in SOA solutions
  - Requires z/OS 1.11
- **ID Context Propagation allows an end user's identity to be propagated through to CICS**
  - Currently, the end users' identity is lost before the request gets to CICS

Identity Context Propagation…scenarios

- **Support for Inbound Web services, propagating on as Web Service provider**
  - Provides support for Web Services callers
- **Support for Inbound over IP Interconnectivity (IPIC)**
  - Used by CICS TG when operating as a WebSphere connector
    - Will require use of JCA resource adapter
- **Sysplex Support**
  - CICS will propagate on over MRO and IPIC Connections only

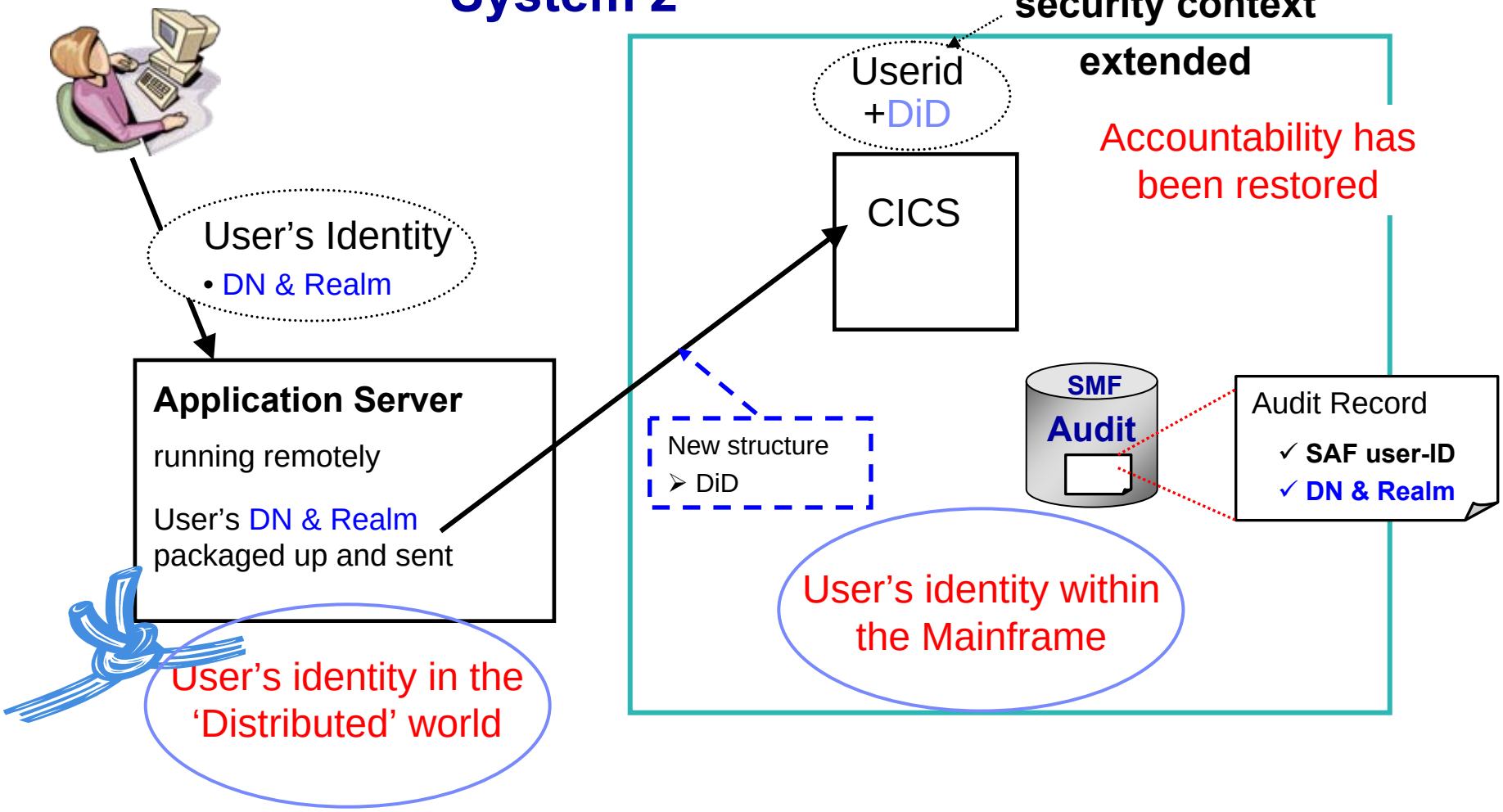
Identity Propagation – current problem



Remedy

- **Platform-architected Distributed Identity solution that subsystems participate in**
- **An asserted identity for end-to-end distributed security**
- **That logically ties together distributed end-user identities with userids on the host**
- **An Identity Context Reference that flows in a trusted way**
  - X.500 distinguished name of end-user
  - X.500 DN of original registry
  - Optional SAF userid

Identity Propagation – solution



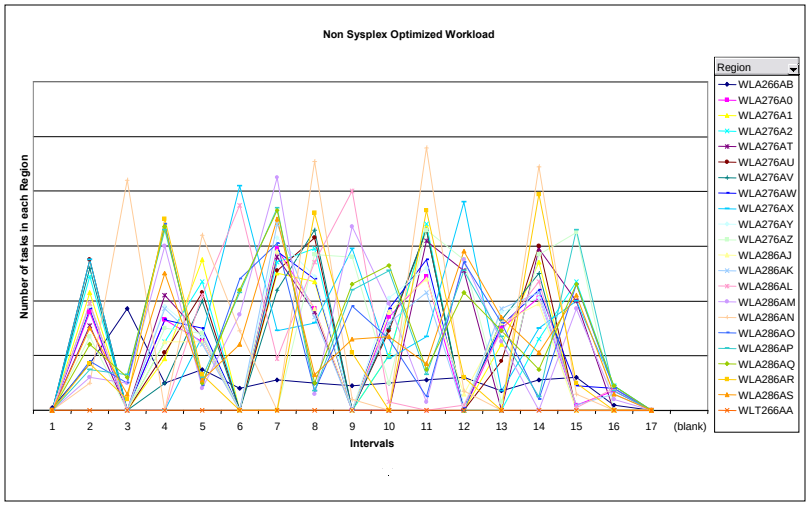
Password Phrase Support

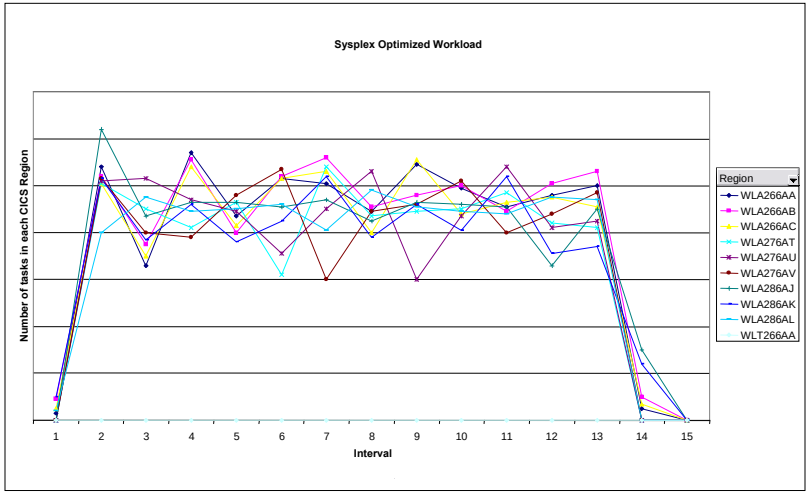
- **Background**
  - Introduced in z/OS 1.8
    - 14-100 character password phrases
  - Updated in z/OS 1.9
    - 9-100 character password phrases if ICHPWX11 installed
  - Alternative to traditional passwords
    - Improved system security - harder to attack, Easier to remember
- **Must be a text string of 9-100 characters**
  - Characters A-Z, a-z, 0-9, special characters, punctuation, blank, any character that can be typed on TSO command
- **Functions that support password phrases**
  - API - EXEC CICS SIGNON, EXEC CICS CHANGE PHRASE, EXEC CICS VERIFY PHRASE, EXEC CICS WEB SEND or CONVERSE
  - Transactions – CESL, CEDF
  - Other - CMCI, CICS Explorer, Web Services, LDAP (supports a long password), CICSPlex SM Web User Interface

Workload Management and CICSPlex SM

- **Sysplex-optimization to significantly reduce workload batching effects**
  - Exploitation of z/OS coupling facility
    - “Near real time” Sysplex-wide focus on target region status
    - No impact to “non-optimized” WLM
  - Optimized WLM routing enabled by configuring a Region Status Server
    - Uses CF Data Table to hold Region Status information
      - SOS, MaxTask, System or transaction dump in progress, Current Tasks?
    - Shared by all routing regions (in the Sysplex)
- **Percentile goals**
  - CICSPlex SM WLM support for percentile goals
- **Support in CICSPlex SM for all new resources, statistics, etc**

CICSPlex SM WLM: Optimized versus Non-optimized Routing

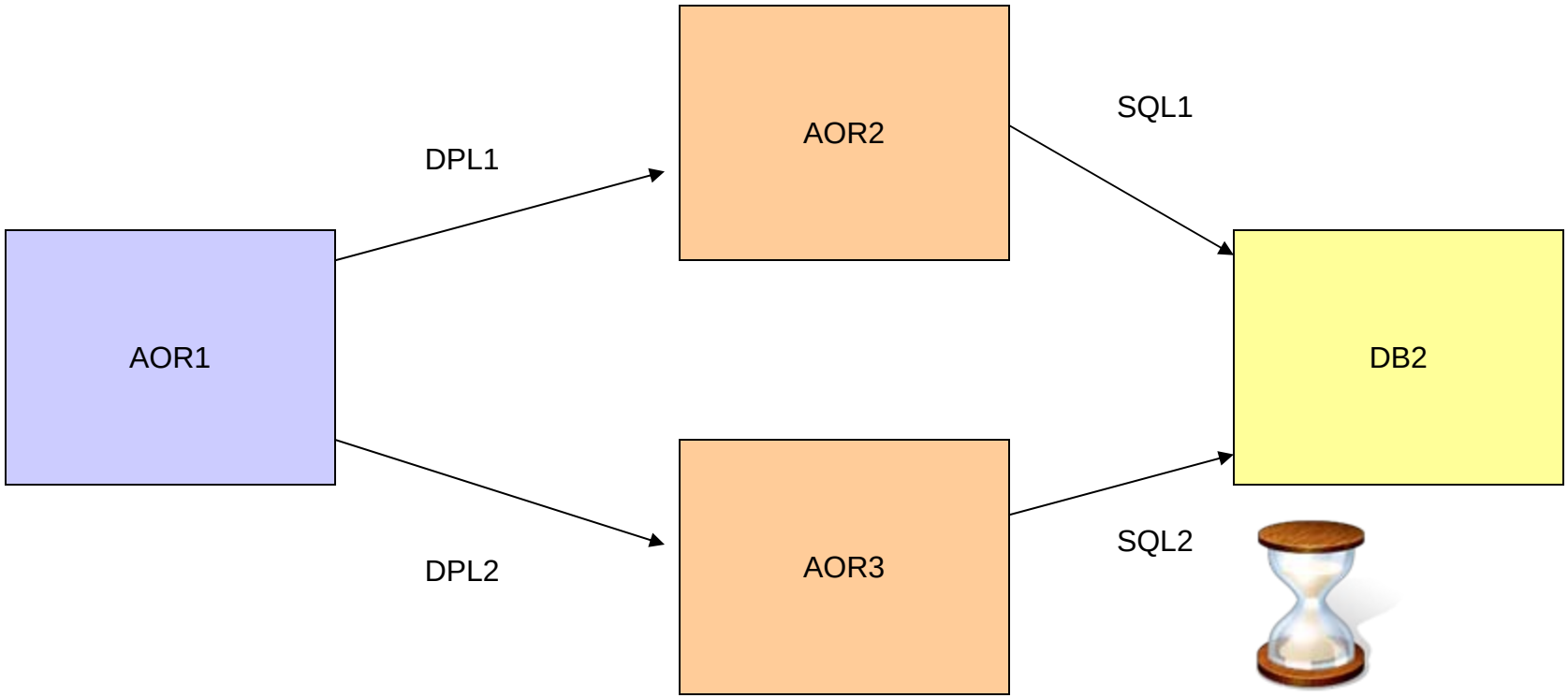




- **Non-optimized Routing**
  - 27 CICS regions on 3 LPARs
- **Optimized Routing**
  - 9 CICS regions on 3 LPARs
- **Comparison**
  - Workload is 10K started transactions
  - Number of tasks in each region measured every 10 second interval
- **Results**
  - Non-optimized environment shows “batching effects
  - Optimized results shows smoother distribution of work and higher throughput

Dynamic WLM improvements in CICS TS V4.2

- **Resolves problems with multiple DPLs in a single UOW**
- **Known as the UOW affinity problem**



Dynamic WLM improvements in CICS TS V4.2 …

- **New CICS affinity relationship**
  - LOCKED
- **New CICS affinity lifetime**
  - UOW
- **Changes to:**
  - Views:
    - WLMSPEC, TRANGRP, WLMAWORK, WLMATGRP, WLMATAFF, WLM AWTOR
  - User Replaceable Modules
    - DFHDYPS, EYURWCOM, EYURWTRA

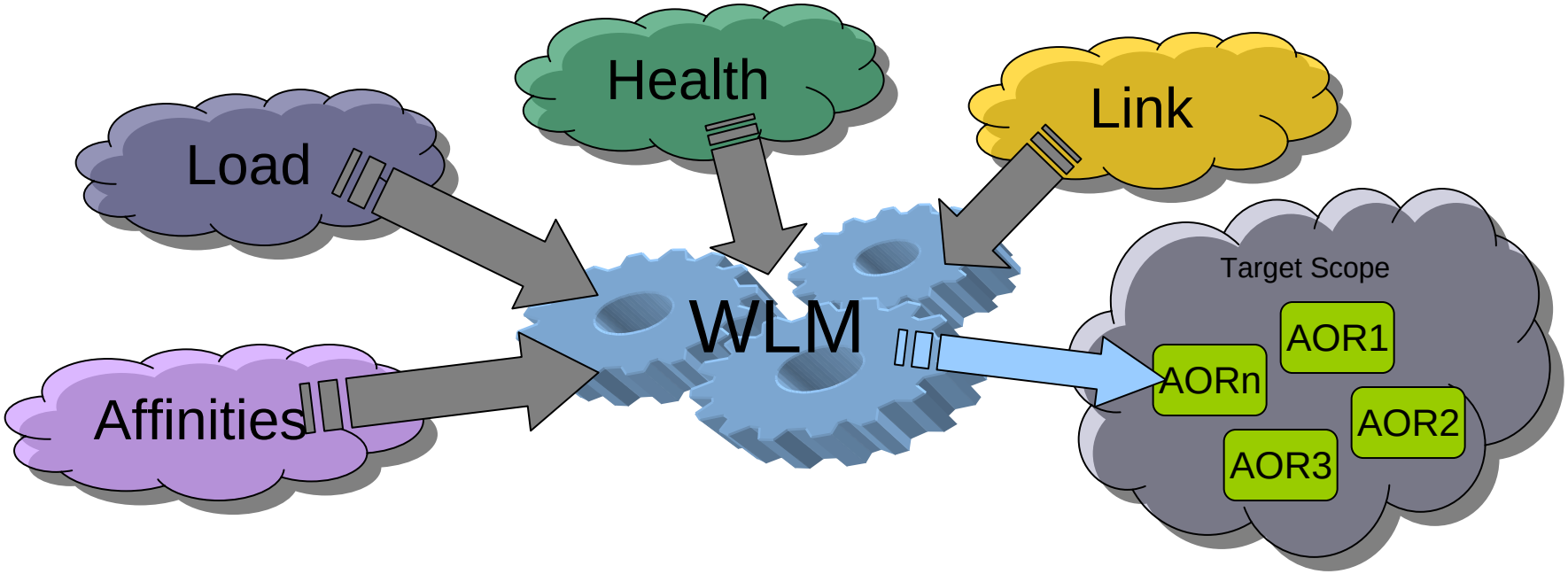
WLM routing change for IPIC connections

- **WLM LINK weighting factor changed for IPIC connections**
  - IPIC weighting moved above LU6.2 and Indirect
- **New LINK weighting order**
  - Local
  - MRO/IRC
  - MRO/XCF
  - ***IPIC***
  - LU6.2
  - Indirect

CPSM Workload Management

- **Workload Management is about providing CICS with the ‘best’ target region at the moment the request is made from all of the possible region candidates.**

It’s NOT about evenly distributing work!



New WLM routing algorithms

- **Exclude LINK weighting in target region selection**
  - LNQUEUE
    - Route the transaction to the target region with best combination of:
      - Health (MaxTask, Short-on-storage, Dumping, Stalled)
      - Task queue depth (or load)
      - Abend probability, when calculated
      - RTA event impact, when defined
  - LNGOAL
    - Route the transaction to the target region that:
      - Is the most likely to allow the transaction to meet its response time goal

Transaction Level Control for Dynamic Routing

- **In CICS TS V4.1 routing behavior is specified on the WLMSPEC**
  - Routing algorithm applies to the entire workload
- **In CICS TS V4.2 routing algorithm can be specified on the TRANGRP**
  - Allows different transaction to have different behaviors
  - New ALGTYPE attribute
    - QUEUE
    - GOAL
    - LNQUEUE
    - LNGOAL
    - INHERIT

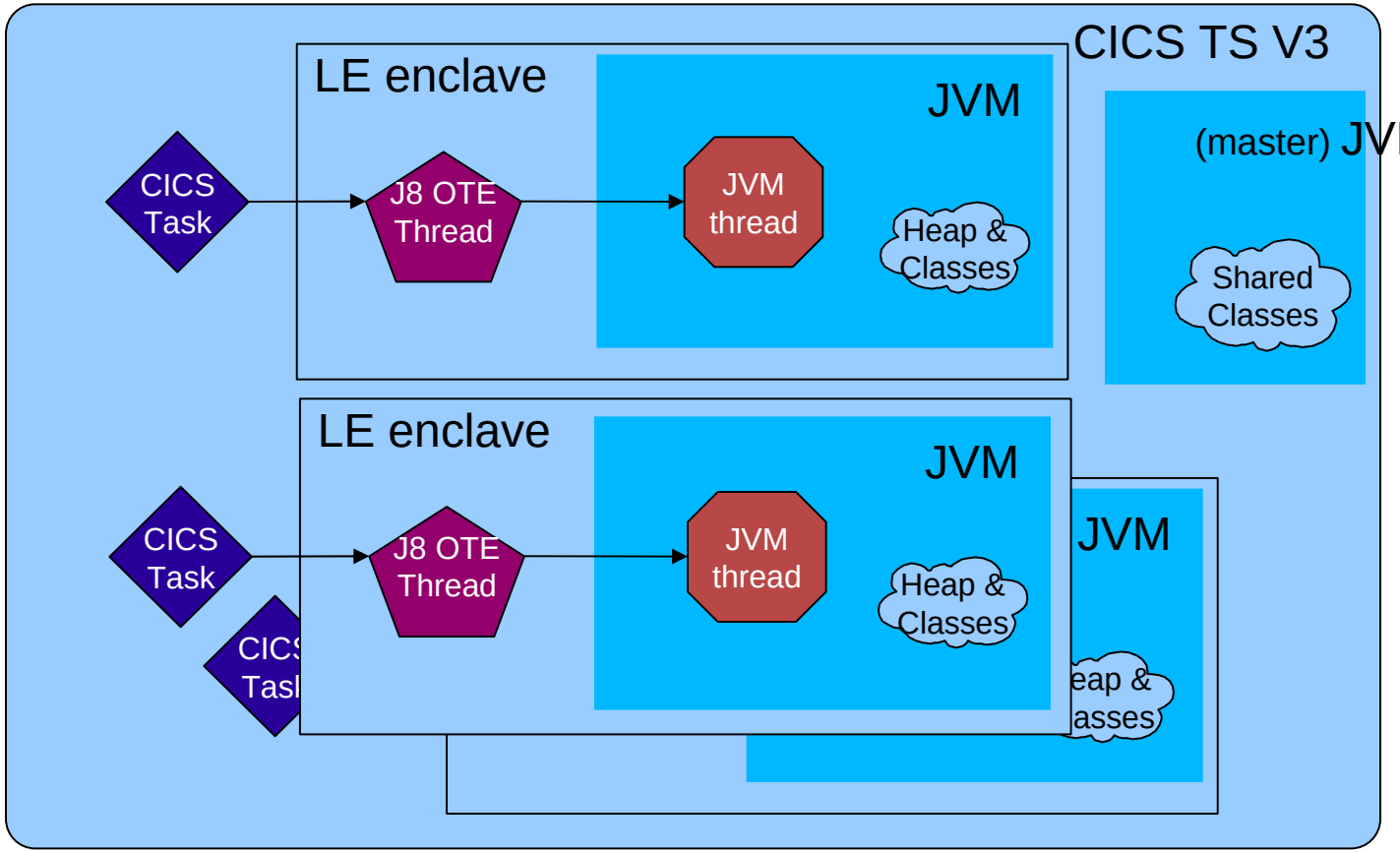
Java and JVMServers

- **JVM implementation in CICS continues to evolve**
  - JDK 1.1.8, HPJ and Hotpooling, IBM Persistent Reusable JVM, Continuous mode, Java 5, Java 6, ...
- **JVMs in CICS TS V2 and V3**
  - Single task, serial reuse
  - Large memory footprint
  - Excellent isolation characteristics
- **JVMServers in CICS TS V4**
  - Multiple tasks (threads) in a JVM concurrently
  - Java 6.0.1 - exploits new z196 instruction set, improved GC, improved JIT, significant performance improvements, 64-bit, larger heaps, stack and heaps allocated above the bar
  - Risk of collateral damage
  - Used by Axis2 web services stack and Dynamic Scripting FP (SOD for CICS TS V4.2)
  - In CICS TS V4.2 - can deploy customer applications as OSGi bundles

JVMPool Architecture - CICS TS V3 (and V2)

Single CICS task dispatched into a JVM in the pool at a time. So concurrent task count limited to the number of JVMs that can fit in the region.

Result is about 20 tasks/JVMs concurrently in each region.

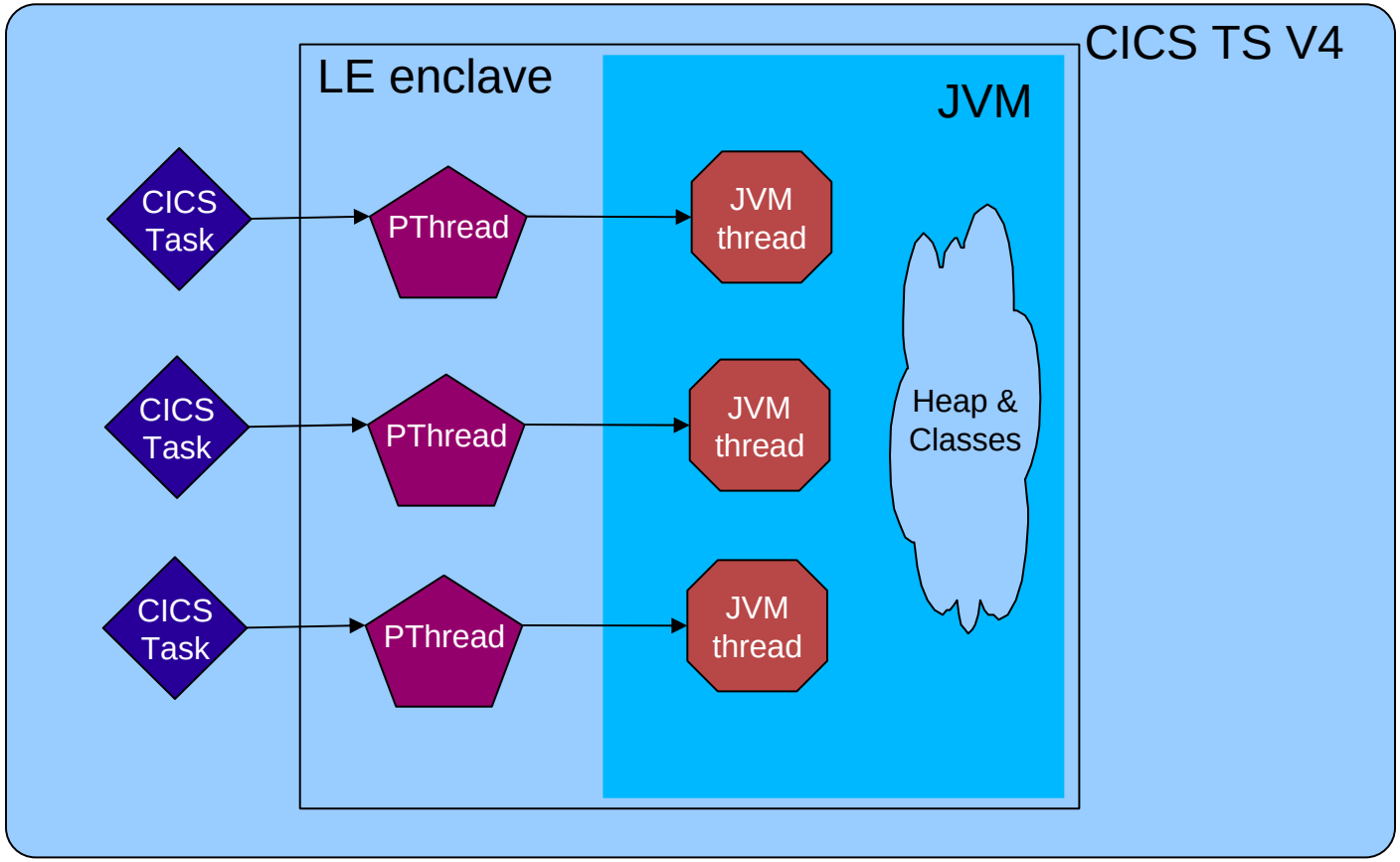


JVMServer Architecture

Can attach multiple pthread/T8/CICS tasks to the JVM at the same time.

Therefore serve more requests using a single JVM.

Result is 100s tasks per region.



CICS and Threadsafe (OTE) – what is it ?

- **Threadsafe allows introduction of extreme parallelism into CICS application serving of legacy workloads**
  - Significant CPU reduction is possible which allows cost reduction for existing applications
  - This cost savings - thru technology - should also be positioned as a means to introduce new workloads onto CICS at reduced TCO
  - These new workloads can be managed more efficiently using tools targeted for both old and new workloads running under CICS
  - These multiple benefits will allow the driving of new workloads to System z leveraging new SOA capabilities of CICS
  - This is part of the overall System z strategy to protect client application assets while improving the operational efficiency of the platform

OTE – Open Transaction Environment

New Threadsafe options in CICS TS 4.2

- **Remote File Control and Temporary Storage requests over IPIC are now threadsafe**
  - No switch to QR in the calling AOR
  - Mirror in the remote region can run on the open TCB
  - IPCONN MIRRORLIFE option controls lifetime of mirror
- **New Program option - CONCURRENCY(REQUIRED)**
  - States that the application **must** run on an open TCB
  - Application **starts** on an open TCB
- **CICS-DBCTL interface will use OTE when connected to IMS 12***
  - At connect time CICS & IMS determine if each other can support OTE
  - With IMS 10 & 11 - CICS-DBCTL TRUE enabled as QUASIRENT
    - Toleration APAR PM31730 (IMS 10), PM31729 (IMS 11)
  - With IMS 12* - CICS-DBCTL TRUE enabled as OPENAPI
    - Exploitation APAR PM31420 is required

- ***At General Availability of CICS TS V4.2, IMS 12 is available through a Quality Partnership Program (QPP).**
  - For more information, visit http://www.ibm.com/software/data/ims/

Other APIs made threadsafe in CICS TS V4.2

- **SYNCPOINT**
- **SYNCPOINT ROLLBACK**
- **RESYNC**

- **QUERY SECURITY**
- **SIGNON, SIGNOFF**
- **VERIFY PASSWORD, VERIFY PHRASE**
- **CHANGE PASSWORD, CHANGE PHRASE**
- **EXTRACT TCPIP, EXTRACT CERTIFICATE**

- **All Call and Exec Level Named Counter Server commands**
- **Built in functions for DIGEST and DEEDIT**

- **Plus all new, and many existing SPI commands**

Customer Threadsafe experiences

- **Danske Bank**
  - Threadsafe conversion MIPS saving of about 300 MIPS during the peak processing period – directly attributed to reduced TCB switching
  - Customer looking forward to CICS Transaction Server Version 3.2 where WMQ, local File Control, and VSAM RLS are threadsafe, promising even greater improvements
- **“Large financial services organization in the US“**
  - Estimated $32M per year in savings based on data canter chargeback reduction
  - Estimated 10-15% of their total available savings
  - Public domain information, delivered at Impact 2008
  - The above is based on 1 non-dedicated systems person for 6-7 months without using tools
  - Can easily cost-justify tools to speed the process
  - Savings may be difficult to quantify beforehand
- **“Major US bank”**
  - Saved 700 MIPs by making one major application threadsafe
- **Saving we have seen with other similar projects**
  - CICS CPU savings of 2-15%
  - Reduced VSAM Transparency product overhead by over 12%

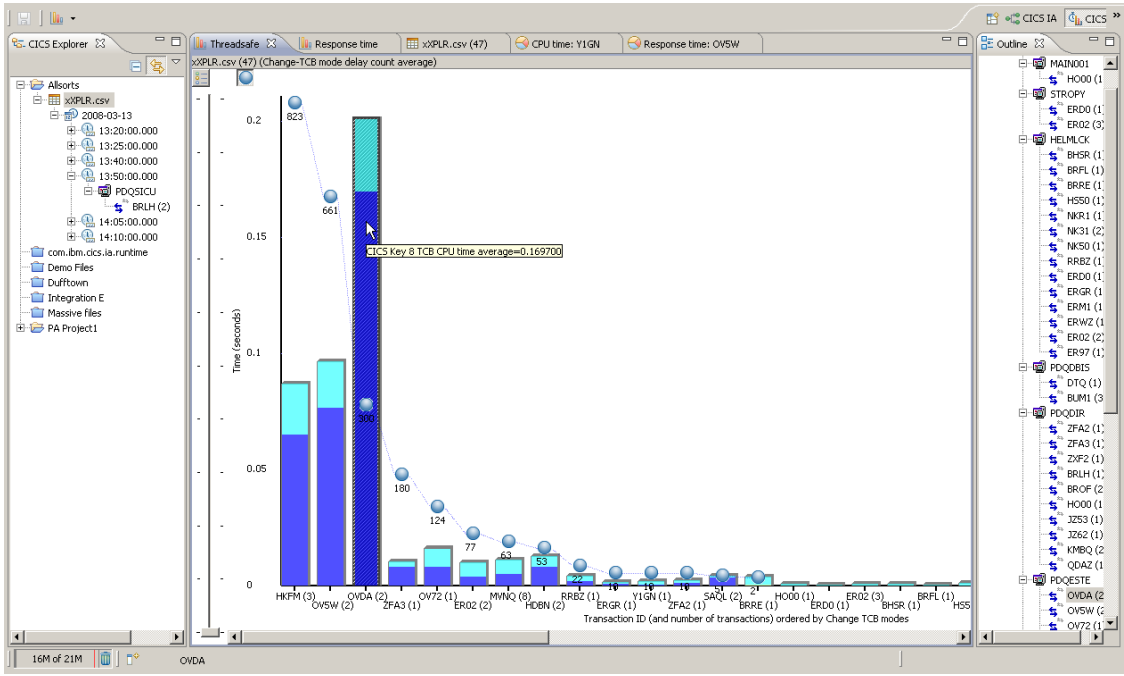
CICS PA finds the best candidates for threadsafe optimization

Problem

- **Identifying the best candidates for threadsafe optimization and knowing when to stop - you've achieved your goals**

Solution

- **Performance summary, list, and list extended reports plus metrics like TCB use by transaction, dispatch and CPU time, number of TCB switches and change mode delay time and Getmain usage help zero-in on the programs with most to gain**



Value

- **CICS PA easily helps improve CICS threadsafe performance, validate savings and track service levels**

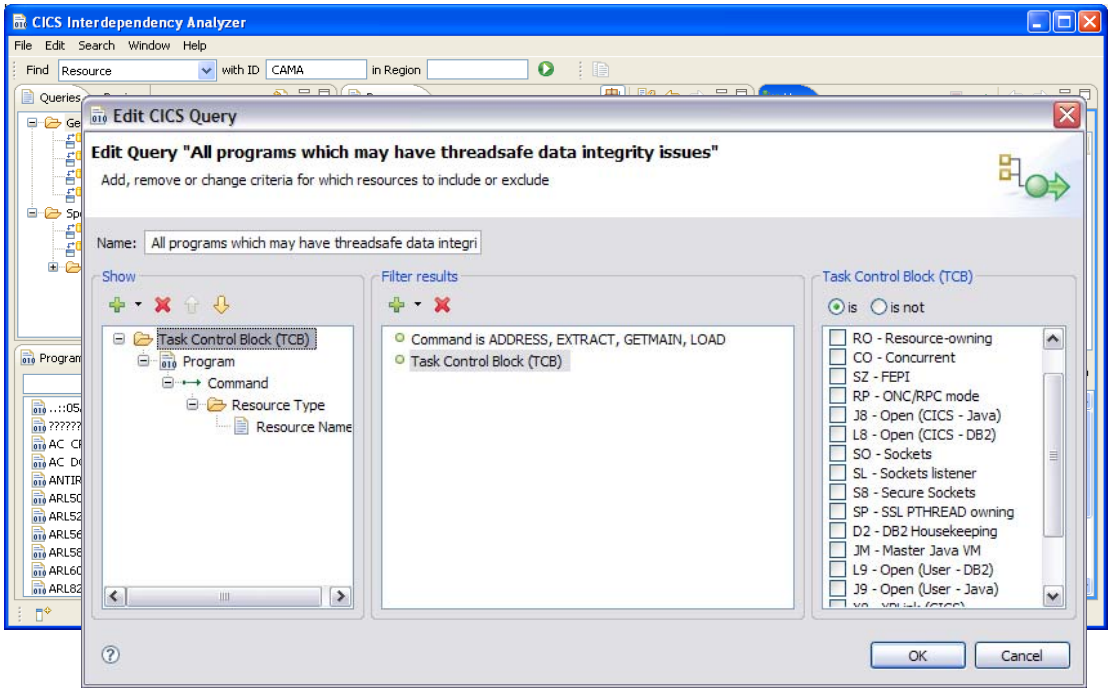
CICS IA helps get the best out of threadsafe CICS TS V4.2

Problem

- Migrating large number of complex CICS applications without retesting entire portfolio
- Identifying suitable candidates for thread-safe optimization

Solution

- CICS IA identifies programs most sensitive to CICS API changes enabling more focussed testing
- CICS IA shows non-threadsafe programs and highlights what's needed to optimize them – including IMS resource access



Value

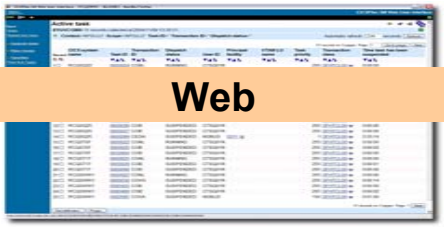
- Helps customers under time pressure to migrate to latest versions with reduced risk
- Even without deep CICS skills, you can optimize your portfolio and benefit from threadsafe

IBM CICS Explorer™ - The New Face of CICS

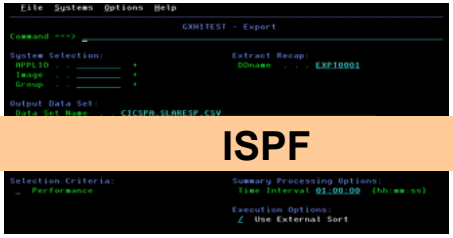
The changing face of CICS tooling

CICS Explorer reduces need for multiple interfaces

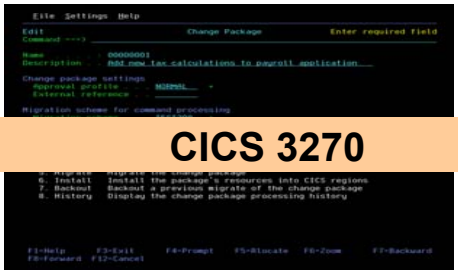
Previously…



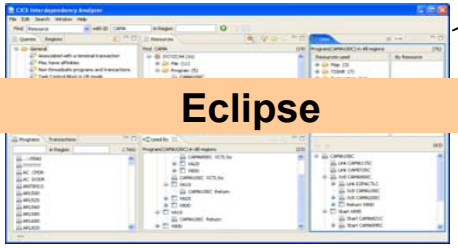
Web



ISPF

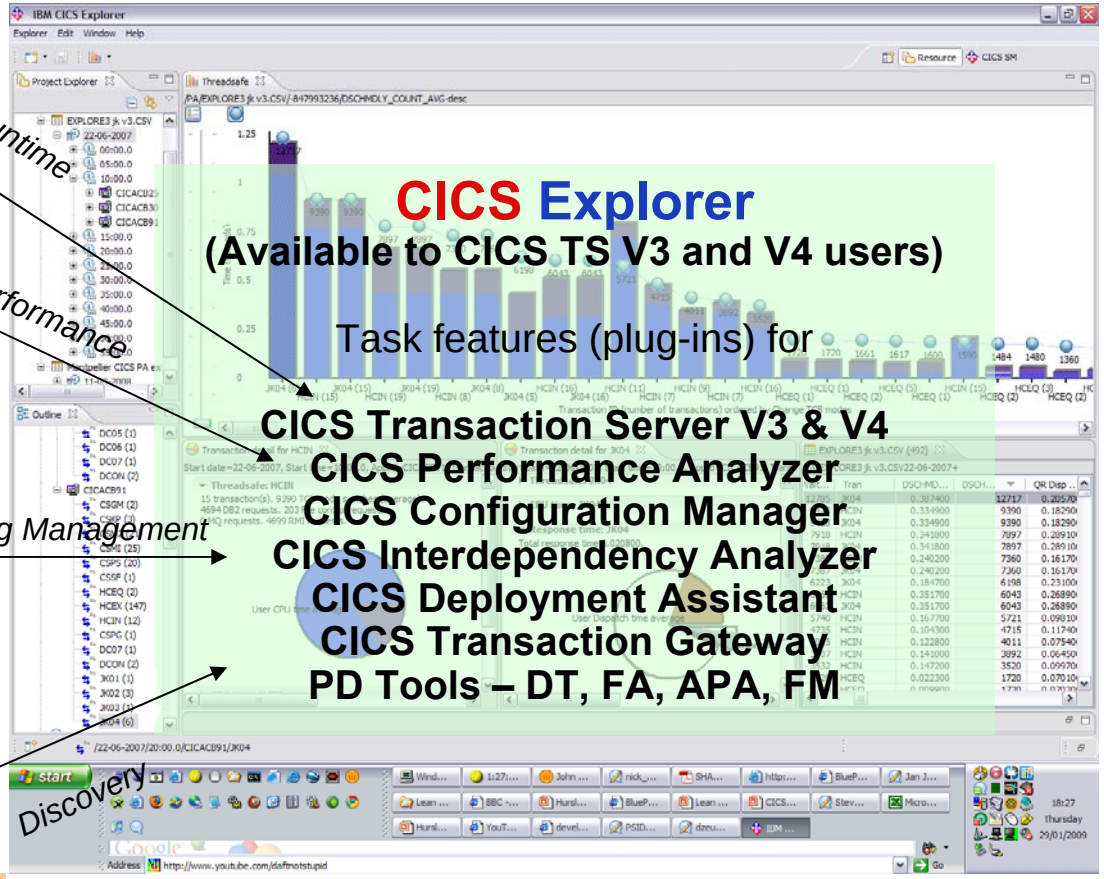


CICS 3270



Eclipse

Now …



IBM CICS Explorer™

New!

Session and user views, Configuration, Broadcast, User and Admin commands
ISM

Daemon & Connection Status & Test
TG

Develop
Test
Etc

RDz

Configuration
Status
Control, Test
MQ

Status
Situations
Topology
XE

New!

Manipulate, browse z/OS data sets, z/FS, MQ
FM

CICS, IMS, DB2, & z/OS Abend Reporting & Diagnosis
FA

Threadsafe, File, CPU, Response Time, Statistics, Alerts, Graphical and Sheet views
PA

New!

Deployment, Discovery, Visualization, Cloning, Automation & Control
DA

CICS, IMS, DB2, & z/OS Application Debugging
DT

CICS, IMS, DB2, & z/OS Observation Requests & Reporting
APA

Execution Tree
Dependencies
Queries
Command Flow
IA

CRUD/Install
History, Audit
Backout
Search, Compare
CM

CRUD/Install, Control, Filter, Sort, Topology, Events, ATOM. Java. z/OS, Txn Tracking, WLM
SM

SM	CICS Transaction Server
IA	CICS Interdependency Analyzer
PA	CICS Performance Analyzer
CM	CICS Configuration Manager
DA	CICS Deployment Assistant
TG	CICS Transaction Gateway
ISM	IBM Session Manager

CICS TS

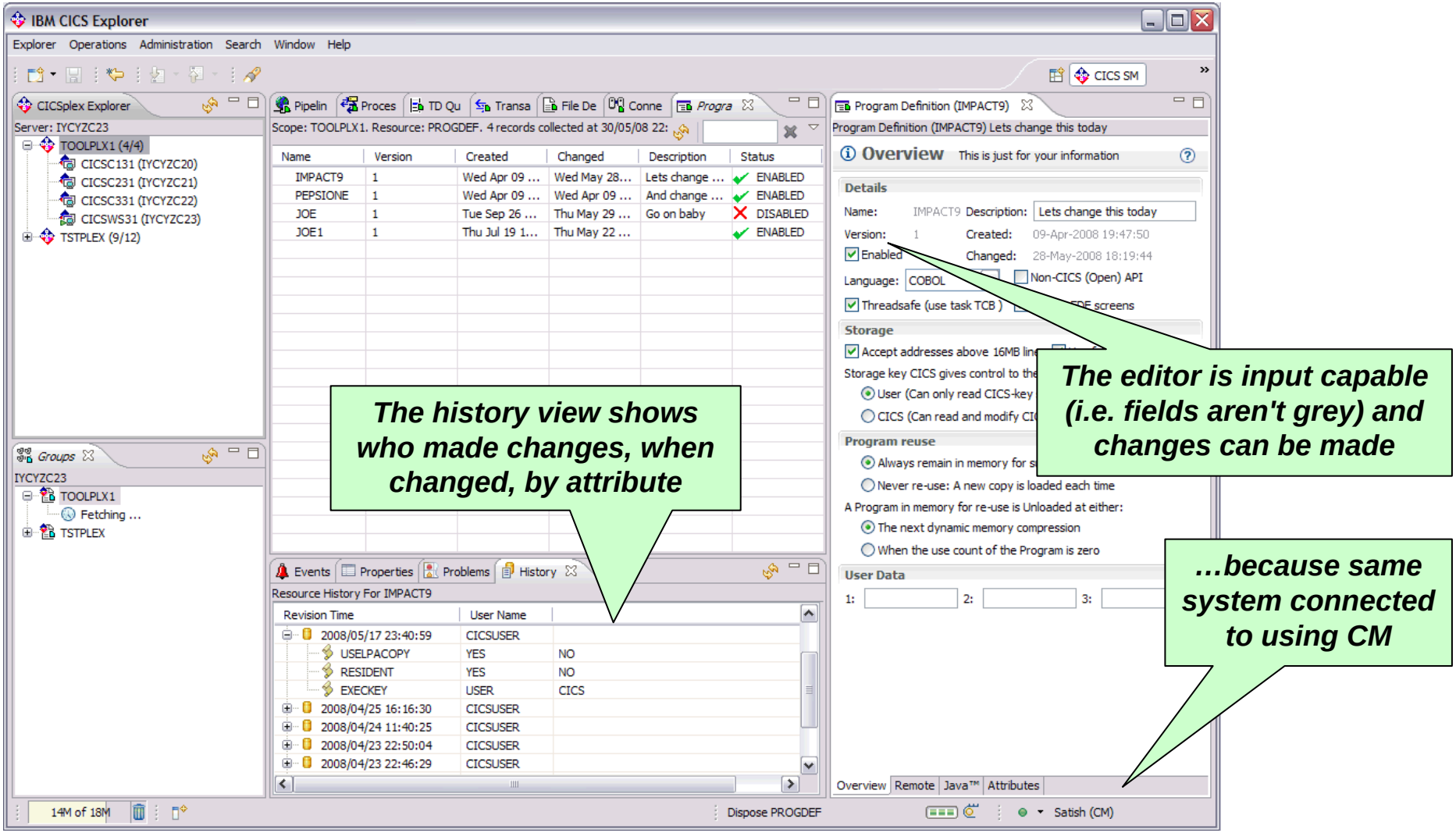
ibm.com/cics
ibm.com/cics/tools
ibm.com/cics/explorer

APA	Application Performance Analyzer
FA	Fault Analyzer
DT	Debug Tool
FM	File Manager
MQ	WebSphere MQ
XE	OMEGAMON XE for CICS
RDz	Rational Developer for System z

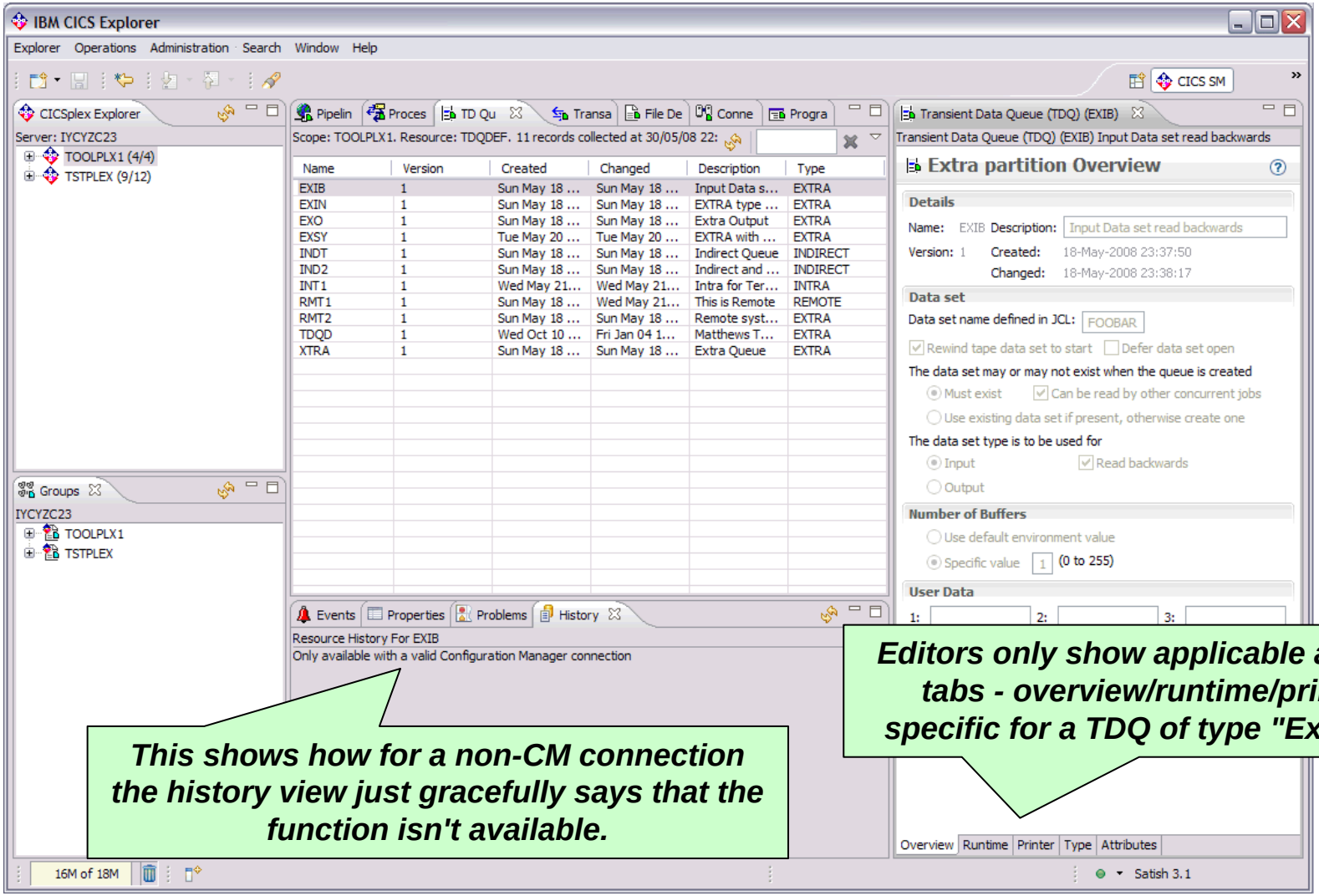
CICS administration problems solved using CICS CM

- **Working with multiple CSDs**
- **Working with CSD files and CICSPlex SM DREPs**
- **Migrating changes between environments**
- **Delegating and approving changes**
- **Changes across LPAR boundaries**
- **Backout**
- **Audit compliance**
- **Cleanup and analysis**
- **Comparisons and exception analysis**
- **Cold start analysis**

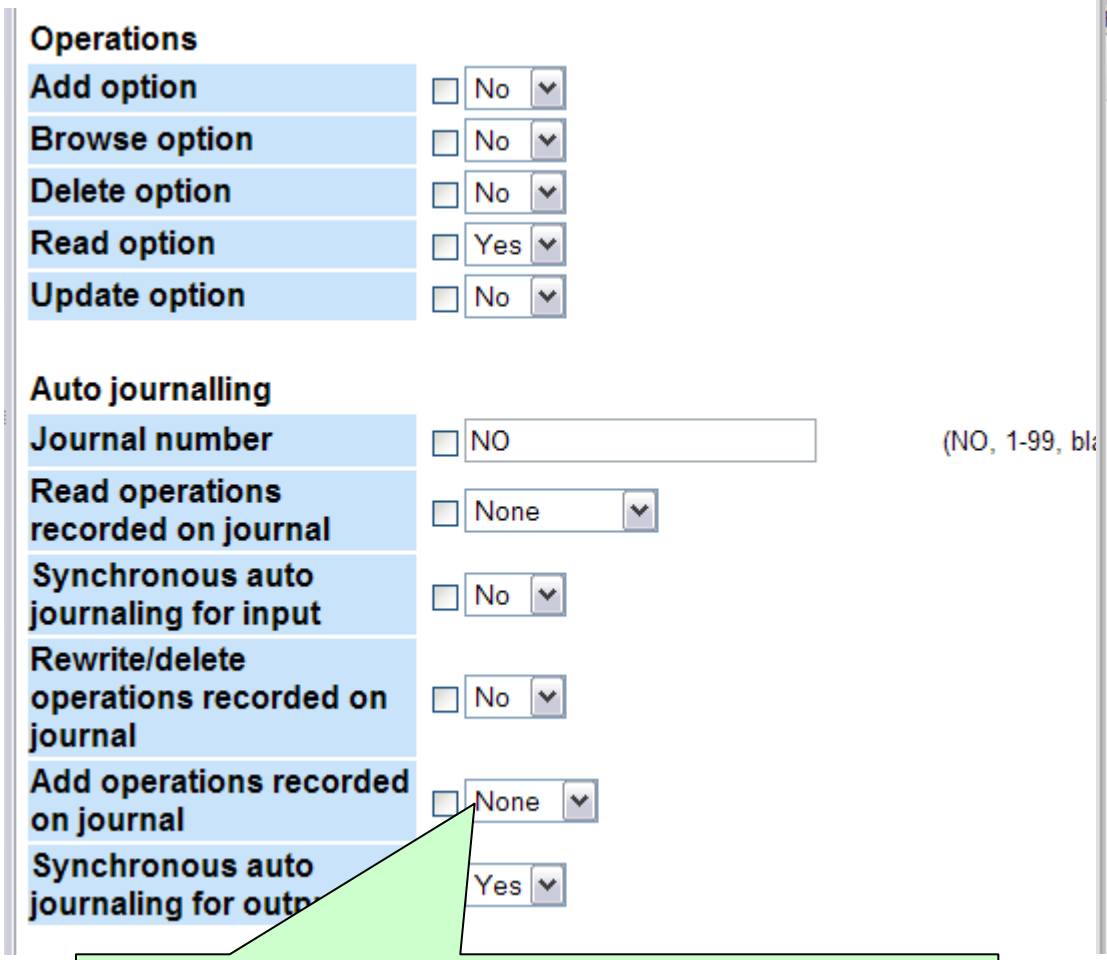
CICS Explorer - Program Definition editor - CICS CM

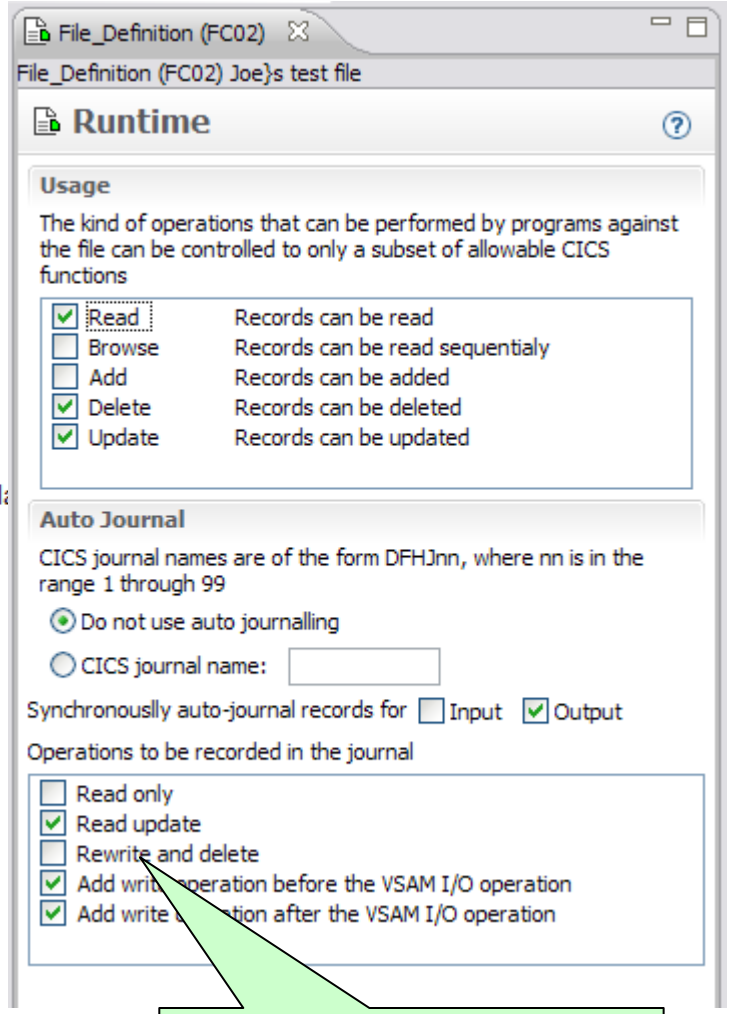


CICS Explorer - Powerful, context-sensitive resource editors



CICS Explorer - No “magic” values - File definition editor

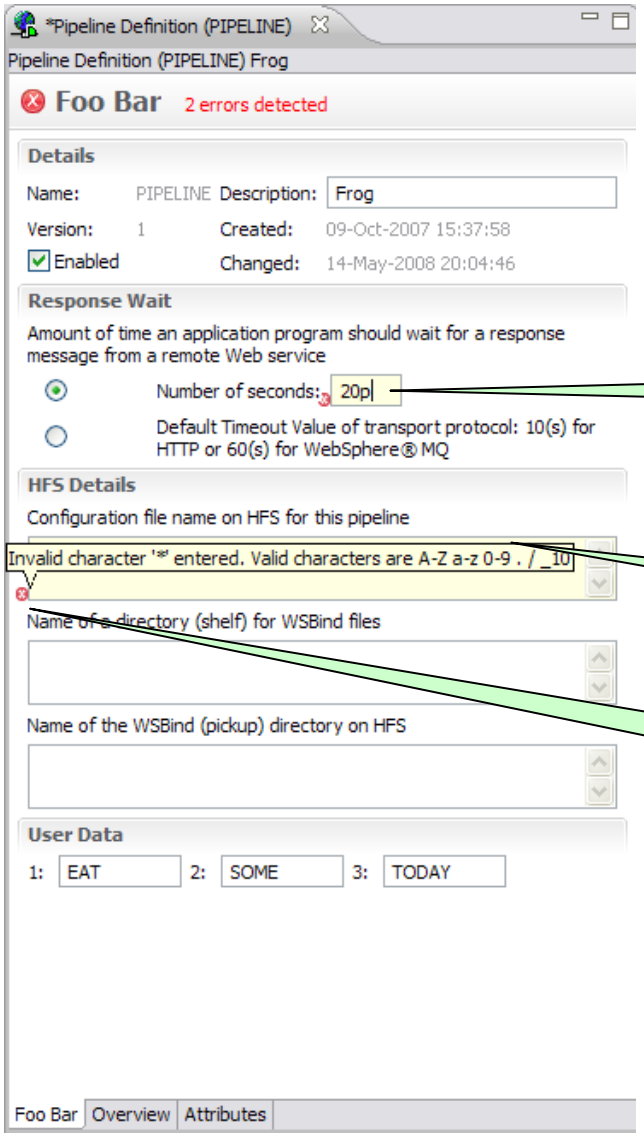




Specifying which attributes to log in a journal for a file is very involved in CEDA and the WUI

Compare again the CICS Explorer with the WUI

CICS Explorer - Editor validation



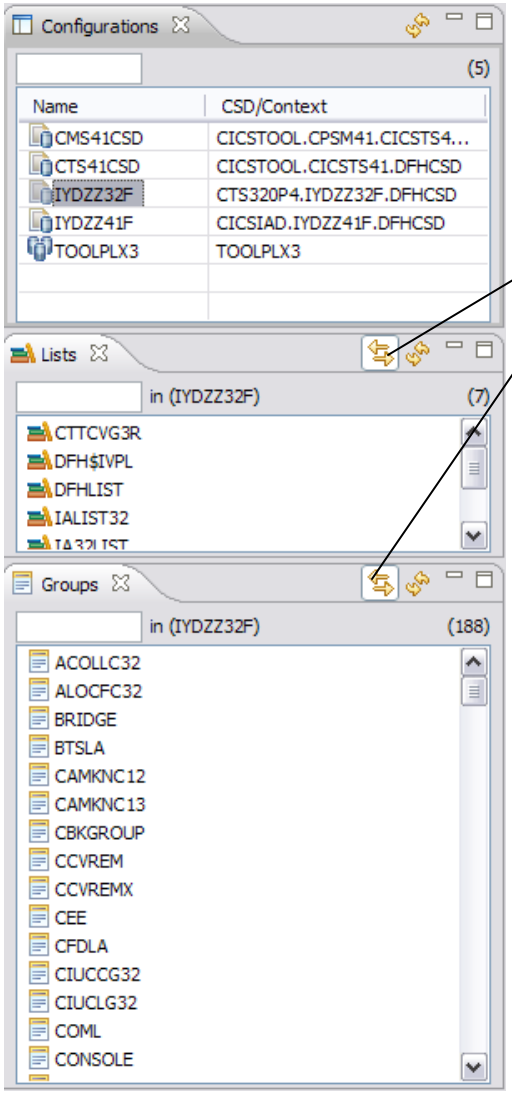
An advantage of an Eclipse client over a browser/TSO/ISPF interface which is that keystroke by keystroke client validation occurs making the GUI more responsive (no server roundtrips) and less errors get sent down the wire to CICS making it faster.

The pipeline definition below has two errors - 20p is not a valid number …

… and the configuration file name has an invalid character entered.

Each error field has a red X next to it to show it's bad, and hovering over the red X bring up a tooltip with the error. All errors can be seen by hovering over the red X at the top of the screen.

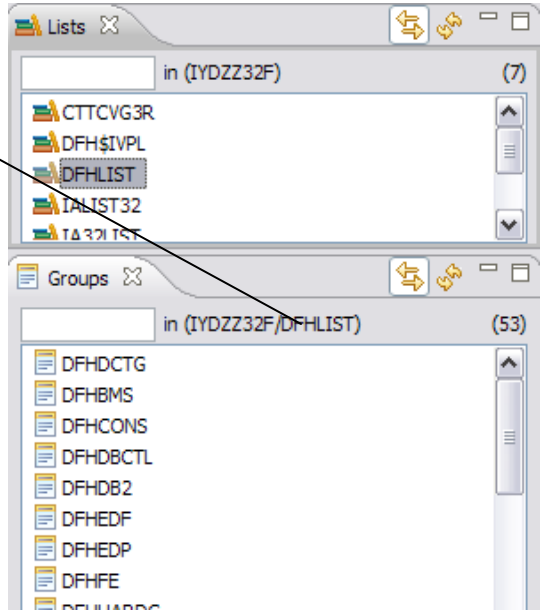
CM - Configurations, Lists, Groups



Views display configurations, lists and groups

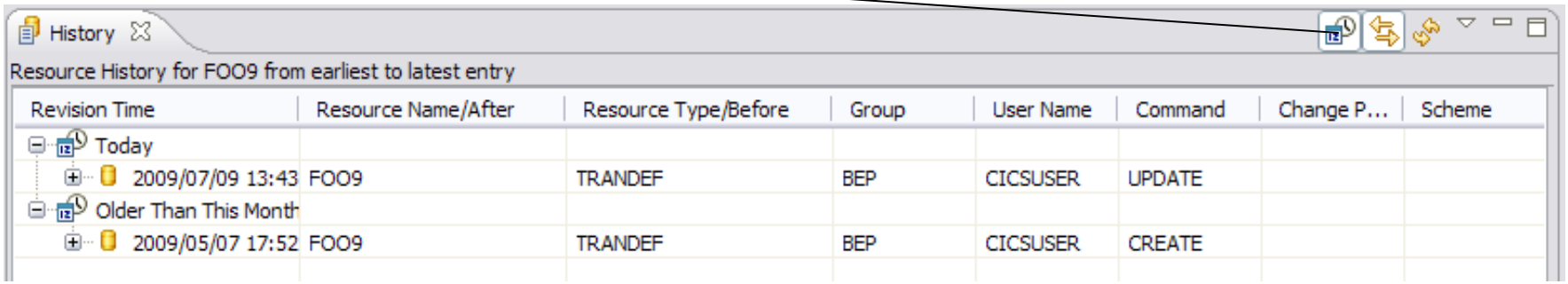
Linked to selection – the lists and groups are displayed for the currently selected configuration. Can be toggled on and off.

Groups can also be displayed for the currently selected list

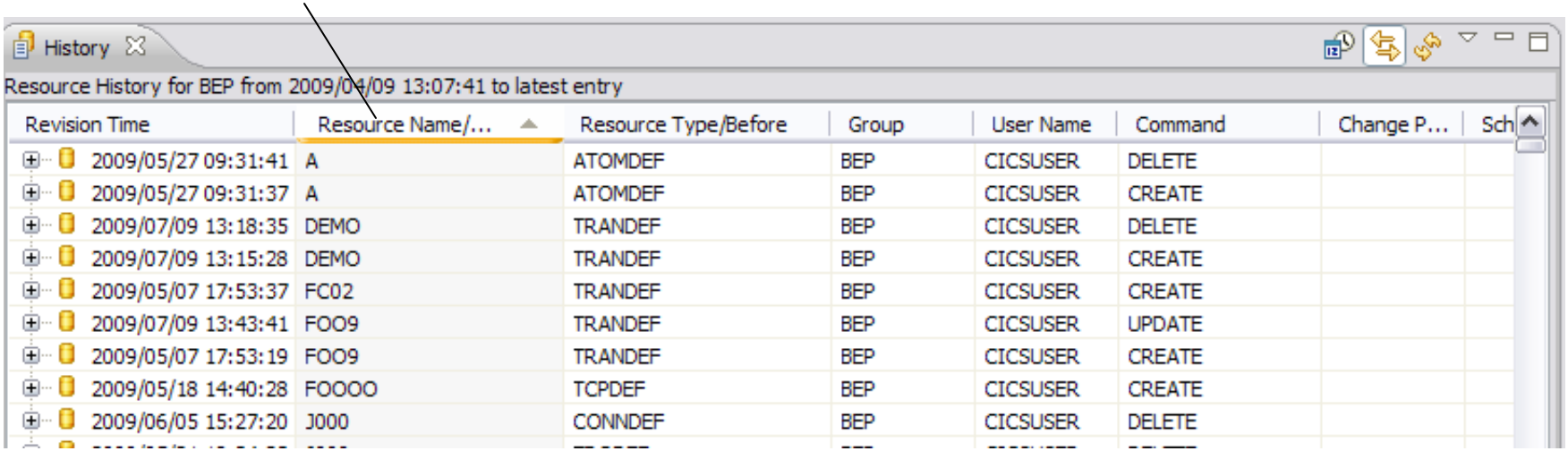


CM - History

Display by date groupings

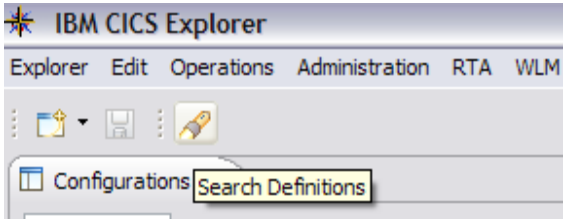


Sort by columns by clicking on column header

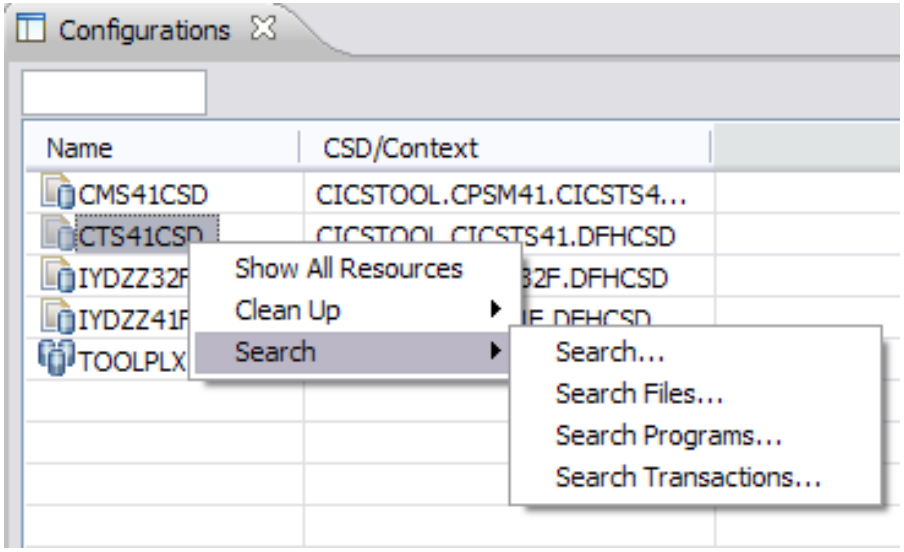


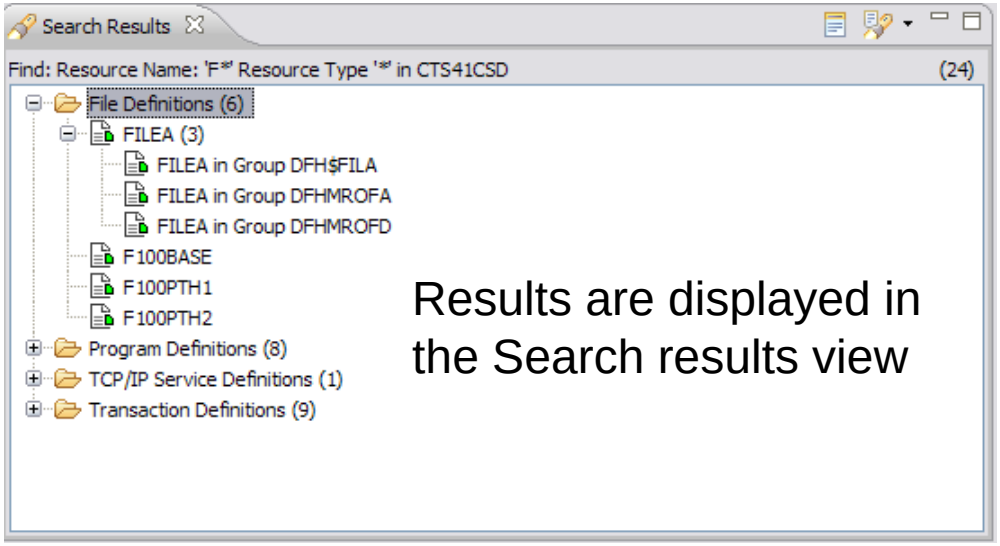
CM - Searching

You can drive the search dialog from the toolbar

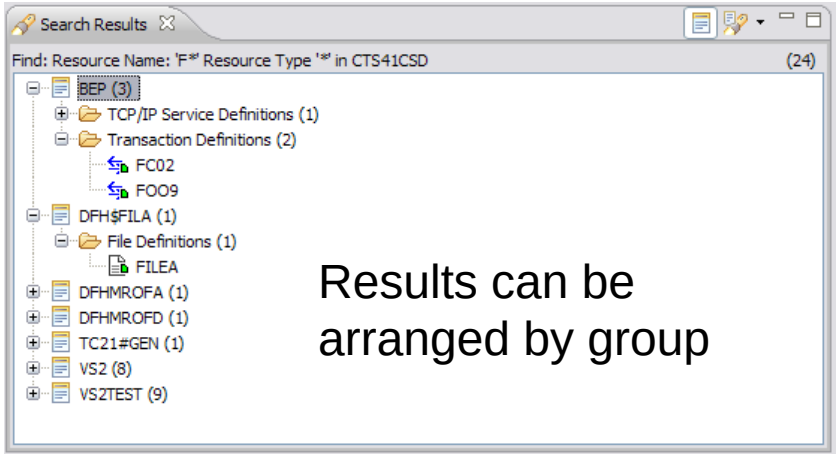


Or from one of the search options on a configuration or group

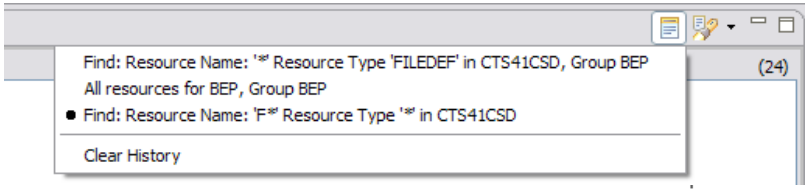




Results are displayed in the Search results view

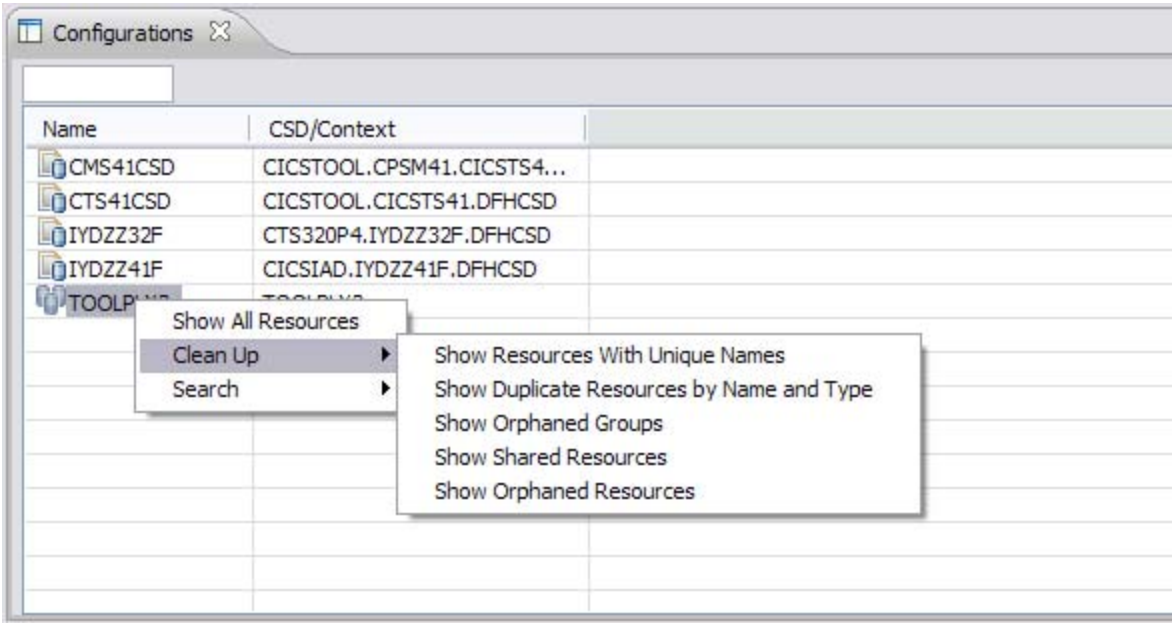


Results can be arranged by group



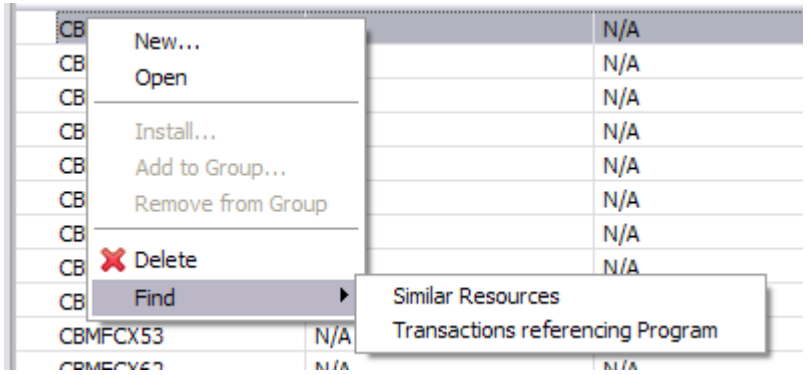
Result history

CM - Clean Up – Specific Searches



Some searches to aid in resource and CSD clean up have been provided

Some specific searches on certain resource types:
LSRPool
Program

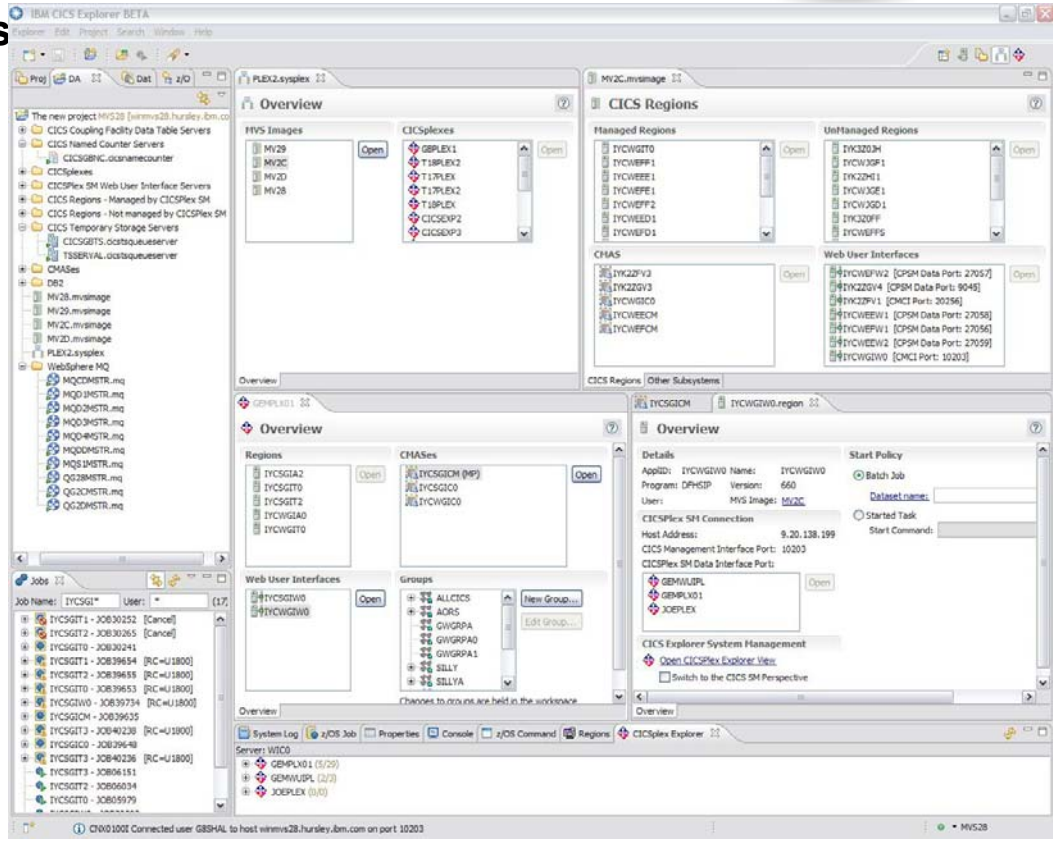


Accelerating return on your CICS investments

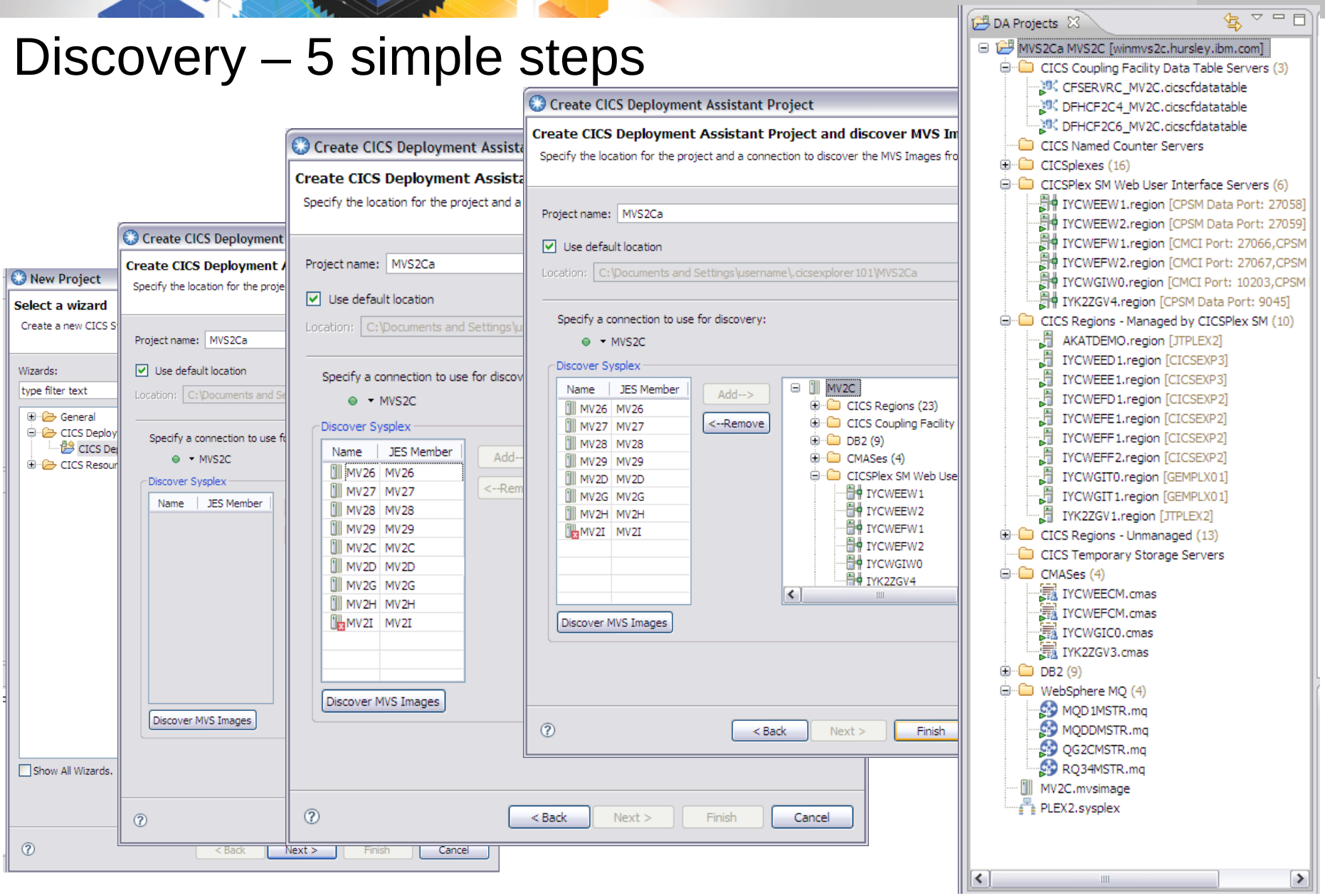
IBM CICS Deployment Assistant for z/OS

New!

- **New Deployment perspective integrates with CICS Explorer**
- **Discovery, Modelling and cloning CICS Systems**
- **Topology Visualization**
- **Automated creation, deployment, customization, and control of CICS regions**
- **Edit files, submit JCL, view output**
- **Simplify tasks, save time, and reduce risk**
- **More info at http: ibm.com/software/htp/cics/deployment/**
  - Features and benefits, data sheet, announcement letter …



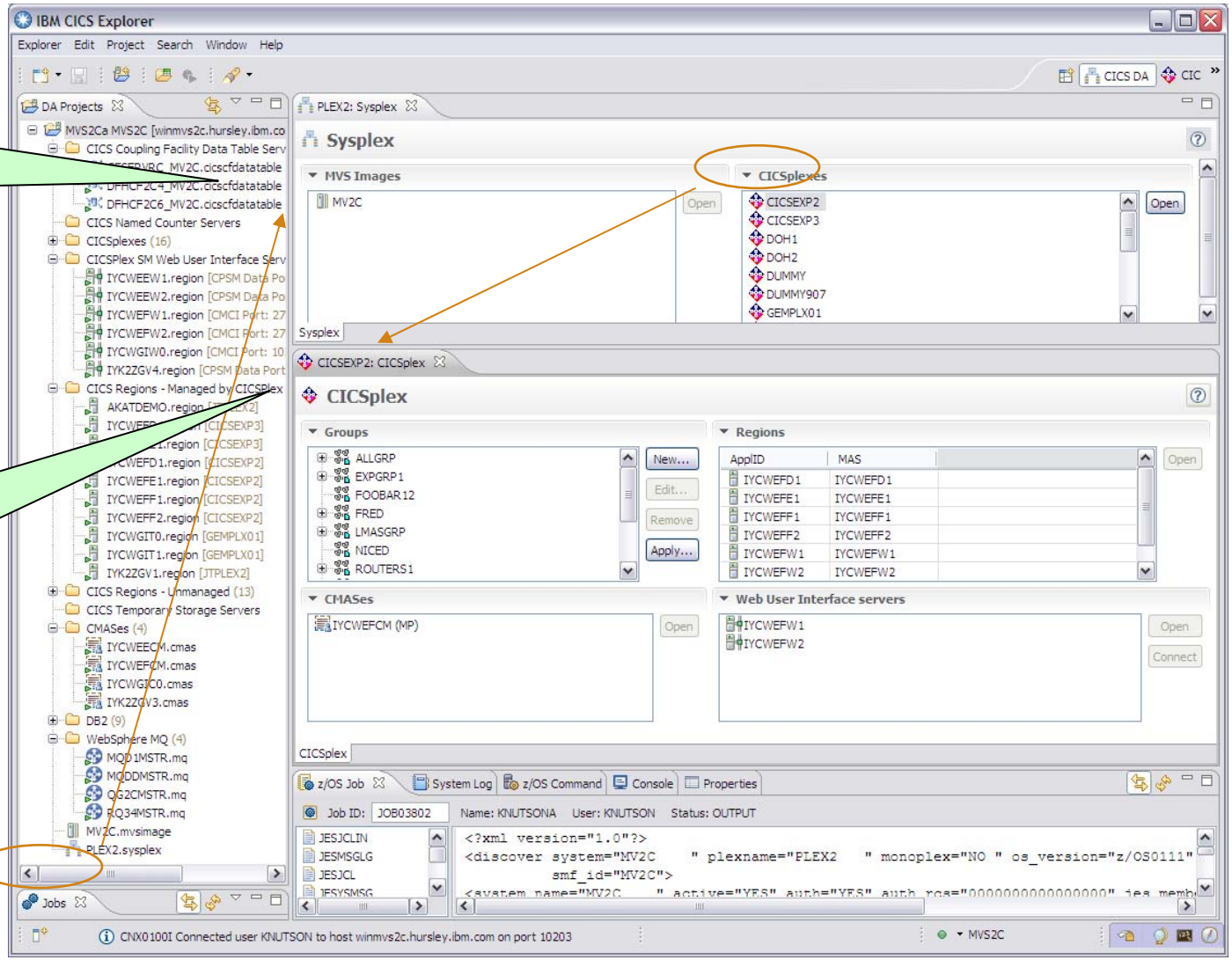
Discovery – 5 simple steps



Visualization - Sysplex

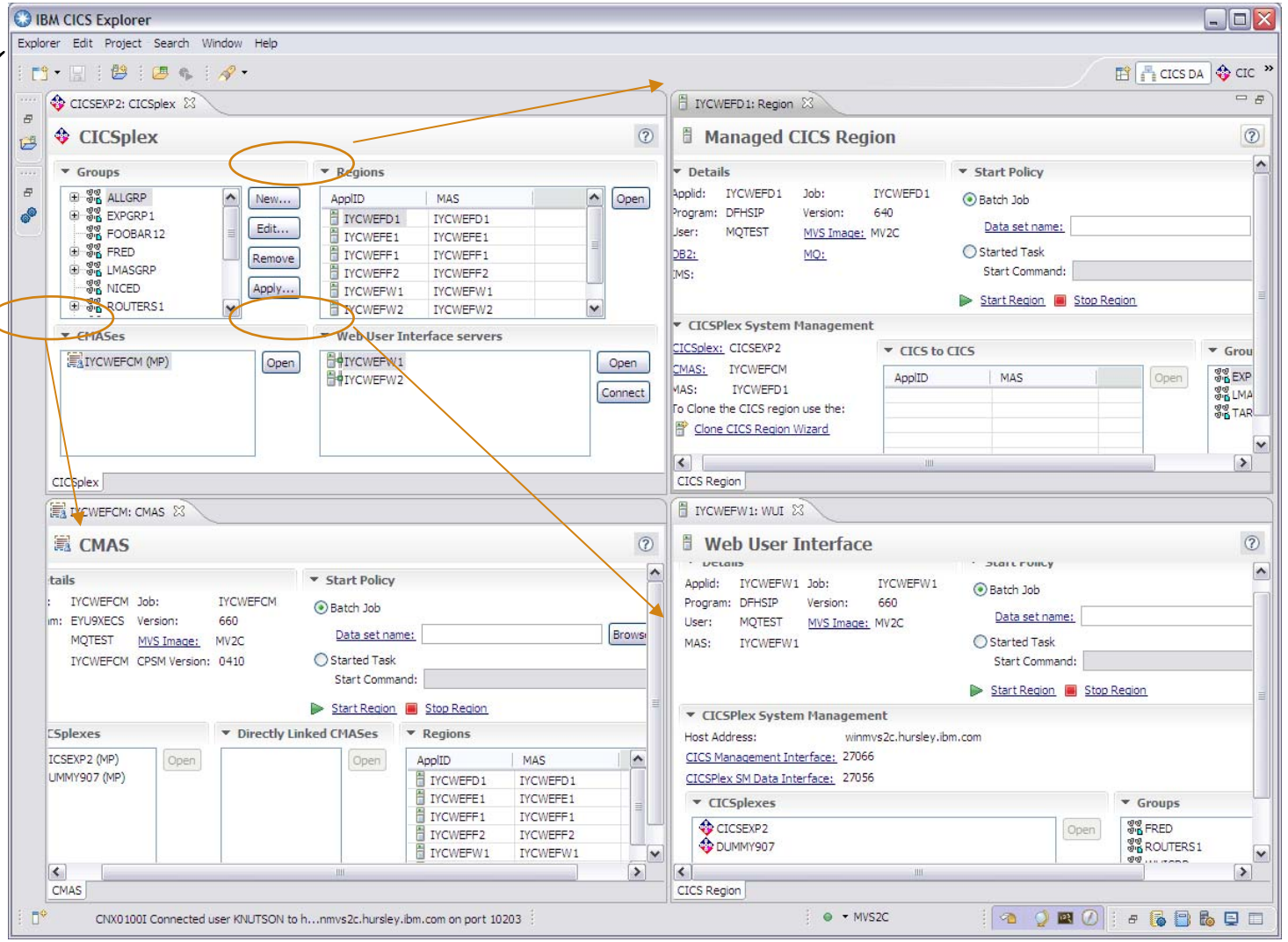
Sysplex view shows all MVS images and CICSplexes in the LPAR

CICSplex views shows managed regions and groups, CMASs and WUIs

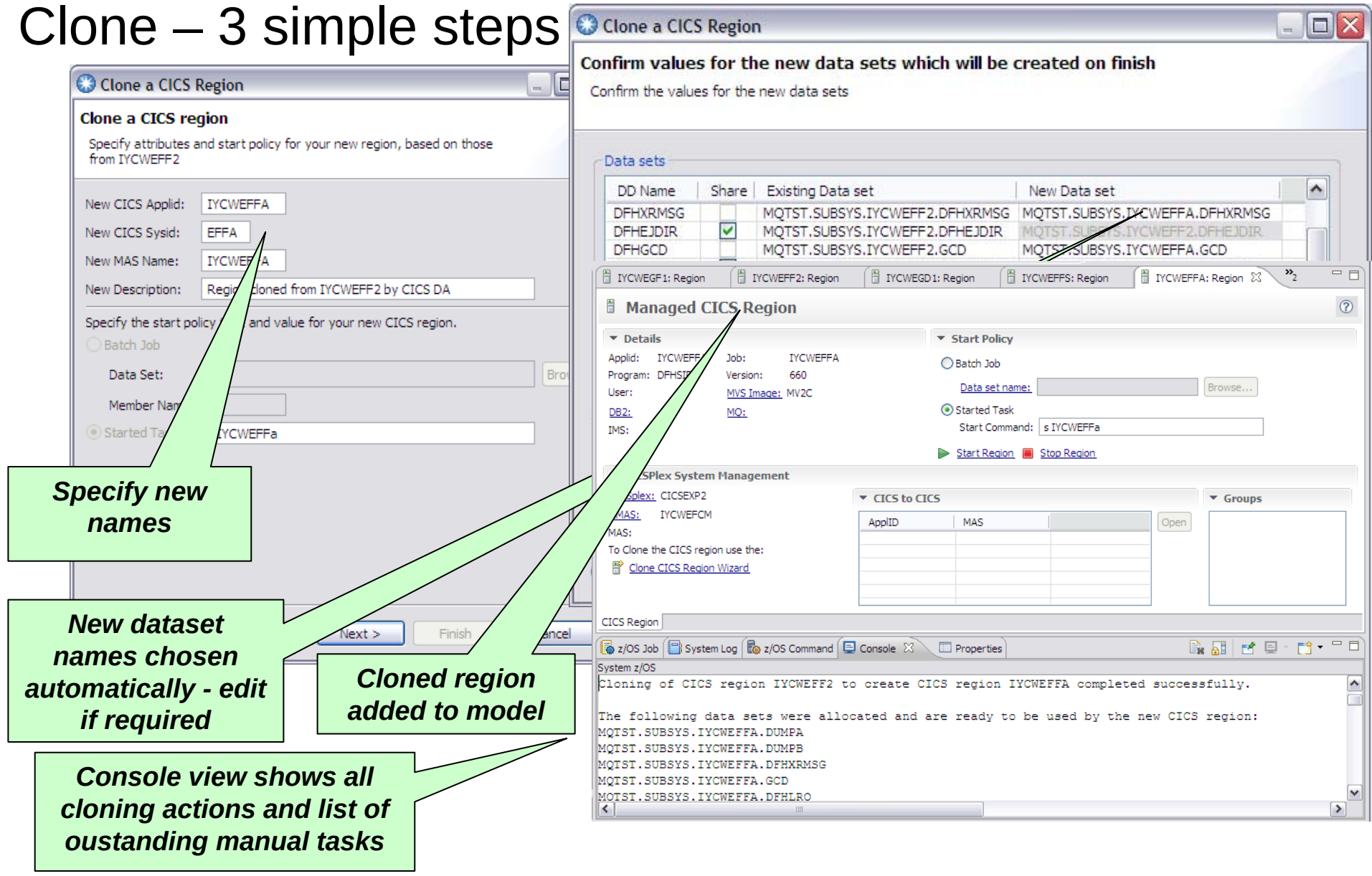


Visualization - CICSPlex

Navigate from CICSplex to Managed region, CMAS, and WUI



Clone – 3 simple steps



Specify new names

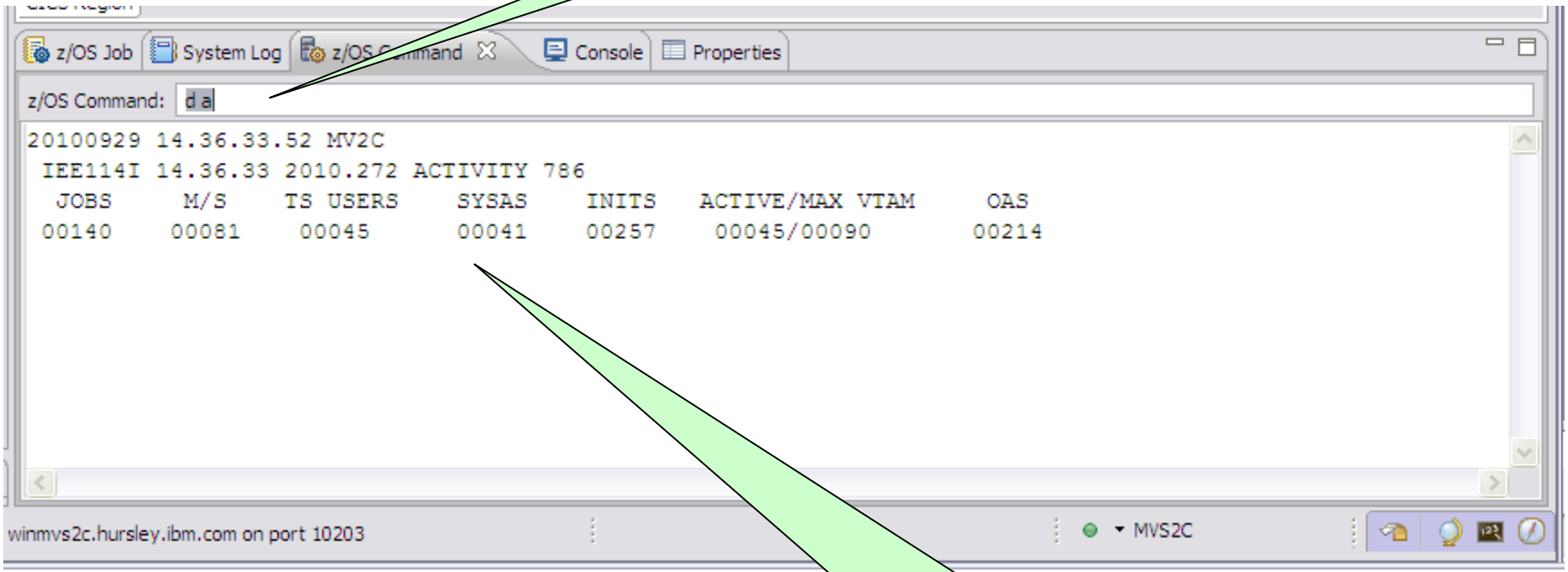
New dataset names chosen automatically - edit if required

Cloned region added to model

Console view shows all cloning actions and list of oustanding manual tasks

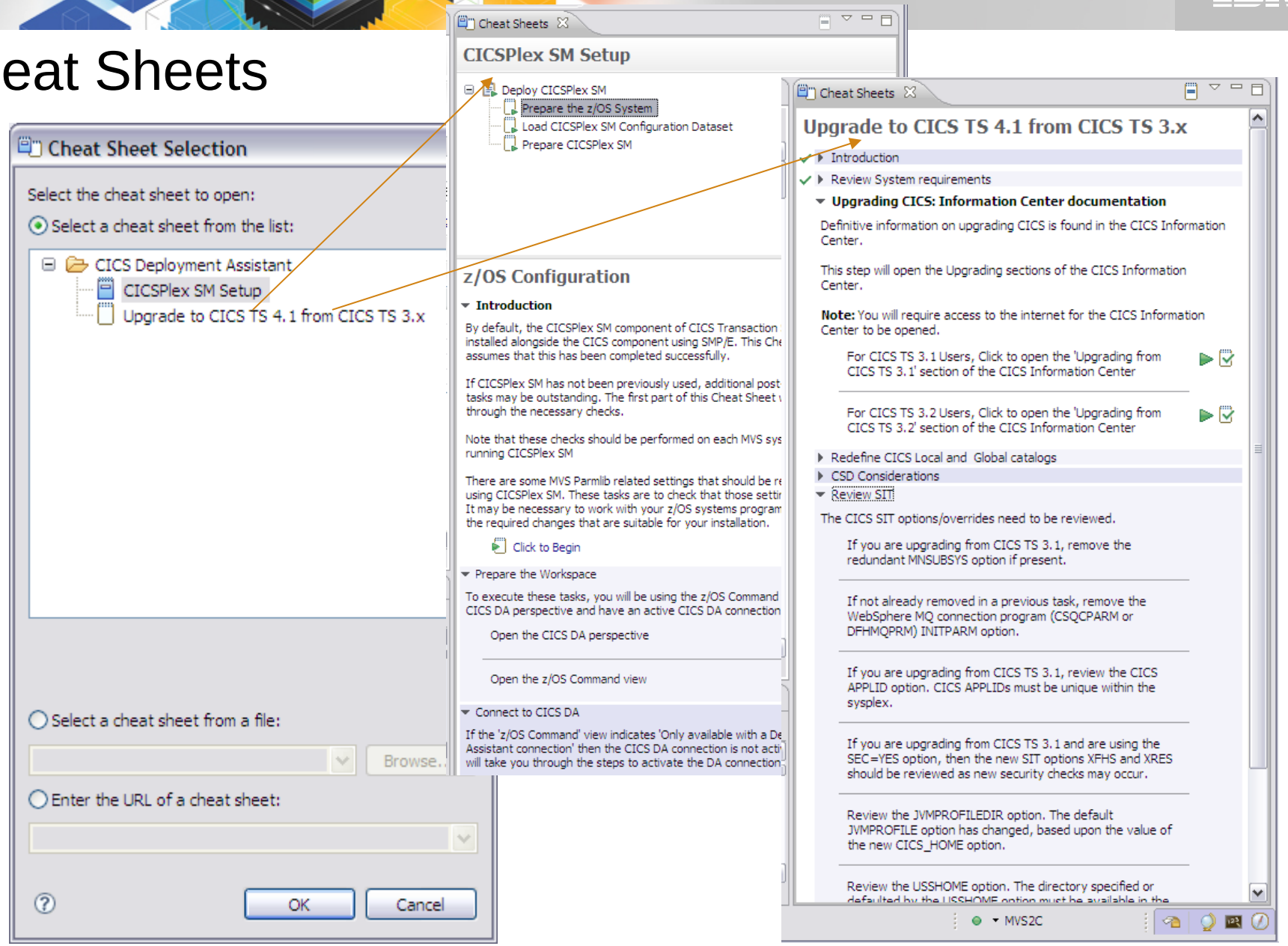
z/OS Command Line

Type in any authorized z/OS command



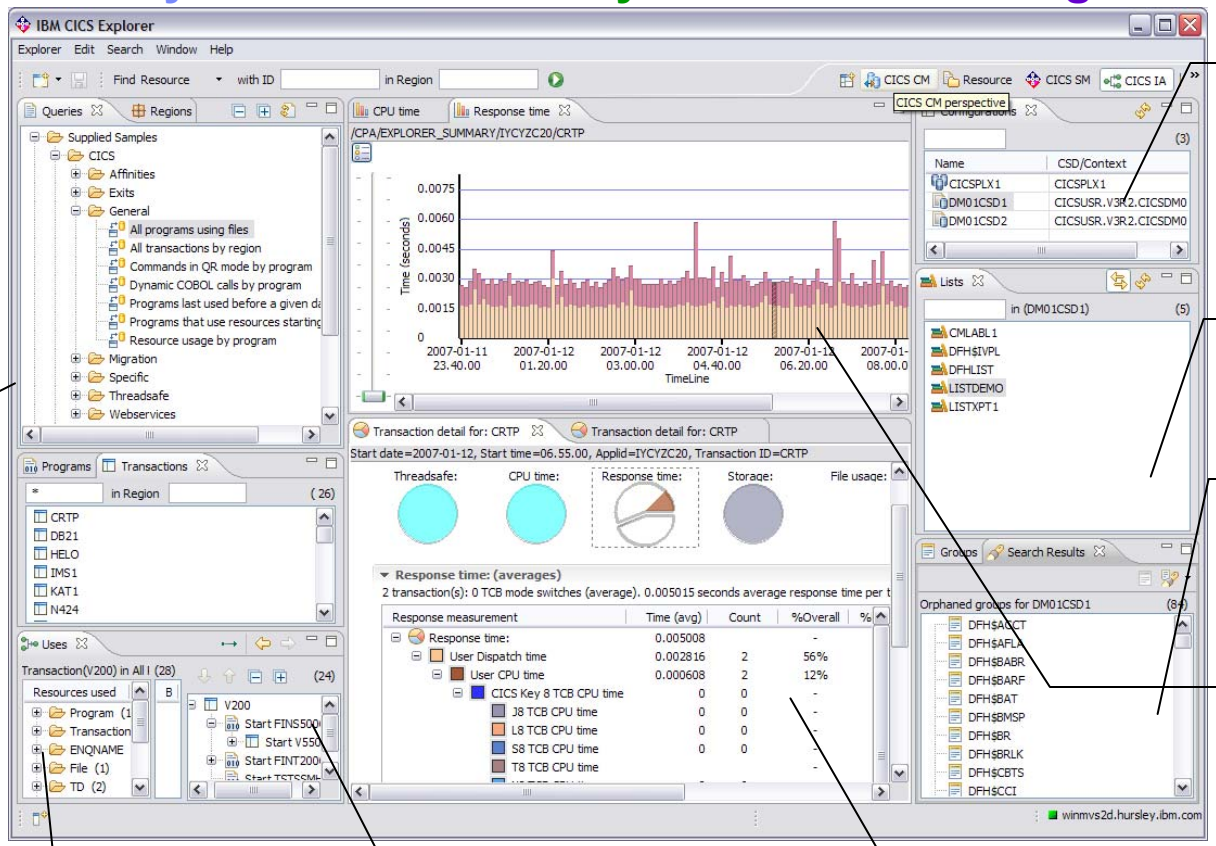
Command output shown below

Cheat Sheets



CICS Explorer & CICS Tools: Putting it all Together

Interdependency Analyzer | **Performance Analyzer** | **Configuration Manager**



Single point of control for CSDs and DREPs

Lists and ResDescs

Search for Orphaned groups

Timeline of response times

Shipped Sample Queries

View tree of resources used

Resources used by a transaction

Drilldown into transaction

Summary

- **Revitalize your infrastructure …**
  - Simplify network set-up moving to IP
  - Manage distributed security with ID Propagation
  - Improve workload balancing with CICSPlex SM
  - Save money with Threadsafe optimization
  - Reduce skills costs with CICS Explorer
  - Ease management burden with CICS Configuration Manager
  - Discover and clone complex environments with CICS Deployment Assistant

Resources

For more information

CICS Development Technical Services

Engage the IBM Hursley CICS development team to ensure that you get the maximum value from your CICS investments.

Consultants are now available via a funded services engagement directly from CICS development providing a complete range of CICS services - no one has more experience!

- **For more information please contact: CICSDTS@uk.ibm.com**

CICS On Demand Seminars

Free customised technical agenda of CICS TS and CICS tools products

- Web Services, Events, Web 2.0, version upgrades, tooling etc.

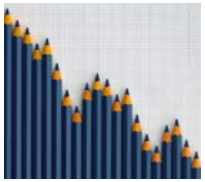
Targeted at AD, System Programmers and Architects at customers' own location

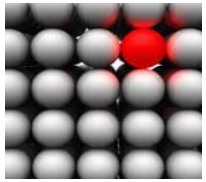
Demonstrates how to use the new features in the latest releases to leverage existing solutions

Can be tailored to customers interests

- **For more information please contact: cicssem@uk.ibm.com**






CICS Communities and Information

- **CICS Transaction Server V4.2**
  - http://ibm.com/cics/tserver/v42
- **CICS Explorer**
  - Home page ibm.com/cics/explorer
- **Twitter**
  - Subscribe to the IBM_System_z channel & CICSfluff channel to get CICS news flashes
- **Facebook I ♥ CICS group**
  - News and views
- **YouTube channels**
  - CICS Explorer - Videos, demos and other cool stuff
  - CICSFluff - Other CICS videos
- **CICS Blog - Comment and opinion**
  - TheMasterTerminal.com
- **CICS eNews**
  - Subscribe for news about CICS and related products
- **CICS Links regular updates all in a single presentation deck**

Thank You !