CICS TS V5 Technical Update

Jenny He

hejen@uk.ibm.com

CICS development, IBM Hursley Lab, UK

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Session GB

Notes

Every second slide in this presentation is a notes slide like this one and provides a background on the previous slide's content.

Not all main presentation slides require an accompanying notes slide, however one is always provided to maintain the even / odd numbering scheme.

Session abstract

This session is a deeper dive into the capabilities and how to maximize the value of new areas in CICS. In December of 2018, with the availability of CICS TS V5.5, IBM CICS Transaction Server has evolved to become the world's most powerful mixed language application server.

So what does that mean for you?

- CICS TS enables applications that are written in different programming languages to share core programming contexts such as security, transactionality, management, and monitoring.

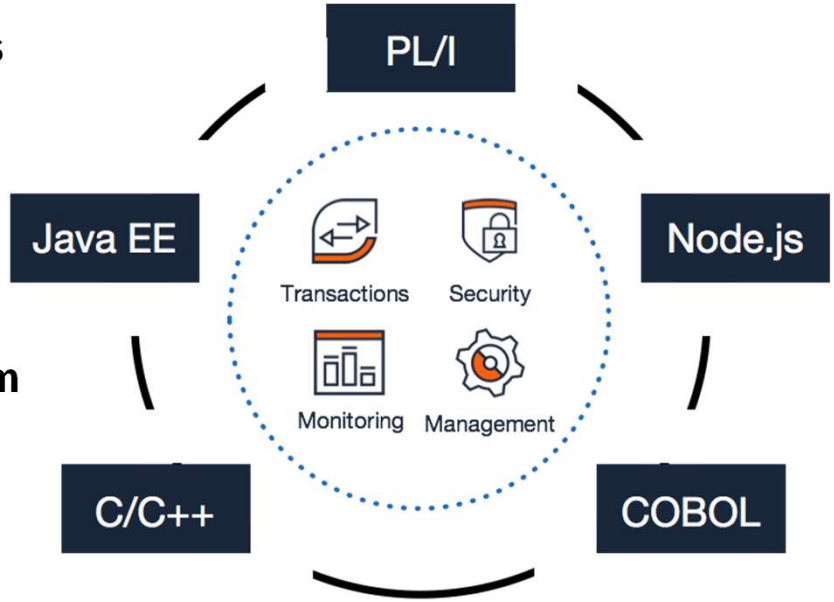
- CICS TS V5.5 builds on the capabilities that are delivered in earlier CICS TS V5 releases, enabling development teams to create powerful applications utilizing whichever programming language is optimal for the task, while allowing operational teams to manage these applications from a single point of control.

- Major new and enhanced capabilities include Node JS support, Java EE Full Platform support, CICS Explorer aggregation with GraphQL, along with usability and automation.

With further technology drop via the CICS Continuous Delivery system find out how CICS is reinventing the mainframe Application Server.

Unparalleled mixed-language application serving

- **IBM CICS Transaction Server** has evolved to become the world's most powerful mixed language application server.
- Applications can share core programming contexts such as **transactionality**, **security**, **monitoring** and **management**, regardless of the language its components are written in, and take full advantage of IBM Z.
- CICS TS V5 allows developers to create incredible mixed-language applications, that include **Java EE 7 Full Platform** capabilities, with first-class interoperability.
- CICS TS V5.5 adds **Node.js** support.



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Major new and enhanced capabilities in V5.5

- Support for Node.js applications
- Enhancements and deliverables for Java

- A simplified & fully capable CICS Explorer aimed at improving customer experience
- A new GraphQL API for querying system configuration and inter-resource relationships

- System management advancements that greatly improve control and ownership
- Enhanced security and resiliency of applications across all languages
- Greater API and SPI control with the use of commands and keywords

Notes

In addition to the new functionality introduced by CICS TS V5.5, any functionality delivered via PTF to V5.4 is also incorporated into the V5.5 release.

The minimum required hardware prerequisite is the IBM System z 196 or subsequent 64-bit IBM z/Architecture processors.

The minimum required level of operating system is IBM z/OS, V2.2 (5650-ZOS).

The minimum required level of Java is IBM 64-bit SDK for z/OS, Java Technology Edition, V8.0.

See the What's New section in the IBM Knowledge Center: ibm.biz/kc-whatsnew-v55

CICS TS for z/OS V5.5 continuous delivery

Java and Liberty

- Support for applications that are written to the Java EE 8 Full Platform specification
- Support for IBM Liberty product extensions and the Liberty Admin Center
- Updated CICS JVM server defaults
- Link to Liberty DPL subset relaxation
- New CICS plug-in for Maven to automate building CICS Java applications

Node.js

- Support for Node.js version 8 applications
- New command-line tool to deploy Node.js applications into CICS
- Node.js scenario for CICS TS in zTrial

Notes

Enhancements to CICS TS for z/OS V5.5 were announced on 2nd July 2019.

https://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/3/897/ENUS219-103/index.html

Further enhancements to CICS TS for z/OS V5.5 were announced on 1st October 2019.

https://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/5/897/ENUS219-465/index.html

All CICS product announcement letters can be found here:

https://www.ibm.com/support/pages/announcement-letters-cics-products

Support for Node.js applications

Notes

CICS TS V5.5 now provides support for running Node.js applications.

Node.js is a server-side runtime for applications that are written in JavaScript. Designed to be lightweight, efficient, and best suited for data-intensive applications, Node.js applications are typically event-driven, single-threaded, and process requests in a non-blocking manner to achieve high throughput.

The Node.js runtime encourages a module-driven, highly scalable approach to application design and development. A large selection of Node.js modules, for many existing tasks, are available on a public package registry, saving considerable time for application developers.

Terminology

JavaScript and TypeScript – programming languages, similar to Java

Node.js – server-side runtime for JavaScript and TypeScript

Node.js Package Manager (NPM) – resolves, downloads & builds dependencies

NPM site – hosts dependencies – public version at https://www.npmjs.com/

C11/C++11 – compiler to build native dependencies

IBM SDK for Node.js – z/OS – product that includes Node.js, NPM, C11/C++11

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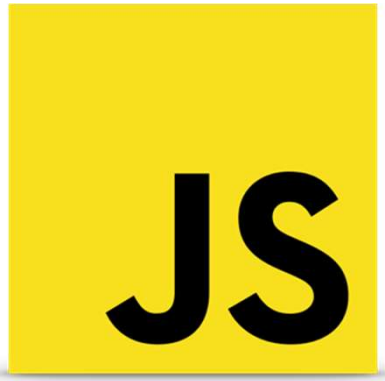
JavaScript™



First released in Netscape Navigator 2.0 in 1995

Scripting programming language for dynamic content

- Typically used with HTML and CSS
- User interactions, asynchronous API calls, …

Designed to complement Java with a similar syntax

Standardised as ECMAScript

- 1st edition 1997, latest 9th edition 2018

Most browsers embed a JavaScript runtime and compete on its performance

Notes

Example JavaScript engines: SpiderMonkey in Firefox, V8 in Google Chrome

Node.js

Server-side JavaScript runtime platform

- Governed by the Node.js Foundation
- Built on Google's V8 JavaScript engine

Designed to build scalable network applications

- Best suited for data and I/O intensive applications

Lightweight and efficient

- Uses an event-driven, single-threaded, non-blocking I/O model
- Leverages the underlying asynchronous I/O support in z/OS

Module-driven approach to application design

- Scalable and encourages agile practices

Notes

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Why use JavaScript and Node.js ?

JavaScript is ubiquitous – client, server, cloud, browsers, embedded systems

Large ecosystem of frameworks and tools for application development

- 750K+ modules available via the Node Package Manager ecosystem

Fast moving, community driven

- High performance runtimes driven by competition in browsers
- 'Battle tested' frameworks

JavaScript on servers

- Leverage huge JavaScript developer ecosystem
- Reuse components, tools, concepts, community

Notes

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IBM SDK for Node.js – z/OS

Compatible with Node.js V8.x

Available from IBM Shopz and installed via SMP/E

- Includes IBM support using standard support processes
- Options for IBM support for popular frameworks

Bundled with C/C++ for compiling native add-ons

No charge evaluation version of Node.js – z/OS available in PAX format and tutorial

Run Node.js applications in z/OS UNIX shell

Container pricing for IBM Z with details in Technote

- Application Development and Test Solution
- New Application Solution

Notes

Summary in IBM Systems Magazine article:
http://ibmsystemsmag.com/mainframe/trends/modernization/ibm-sdk-nodejs/

Why use Node.js in CICS ?

Host APIs and web applications that consume APIs and data on z/OS

- Add logic to existing APIs
- Aggregate APIs and data
- Reuse modules to access external APIs

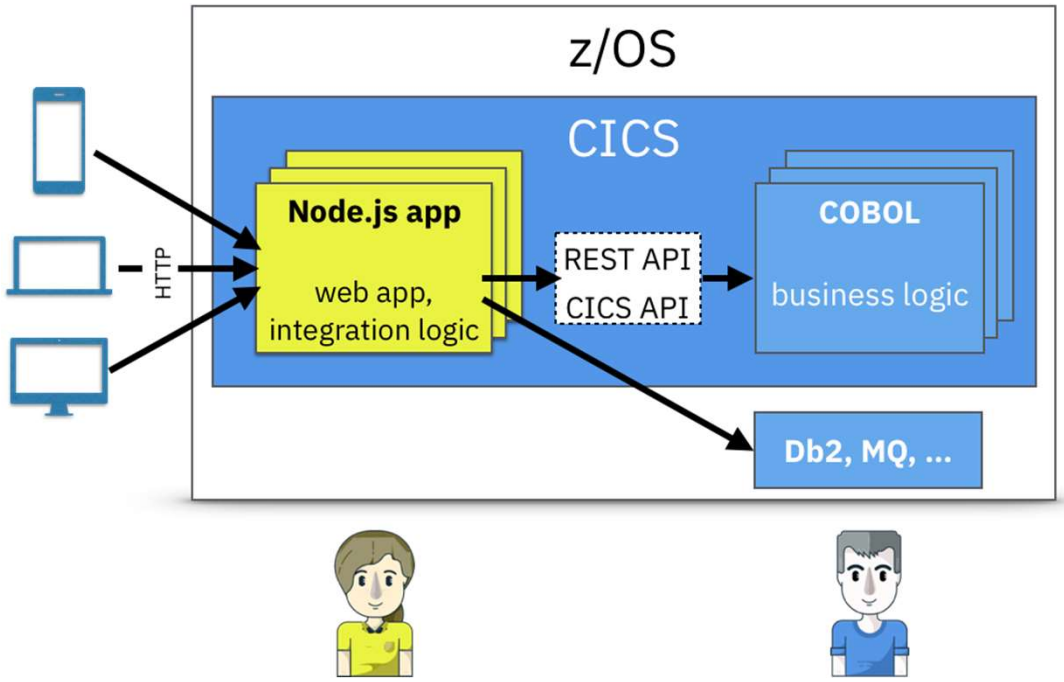
Co-location for optimized response times

Simplified deployment and management with CICS applications

Welcome a new set of API and front-end developers onto z/OS platform

Support for Node.js version 8 applications

[CICS Developer Center](#) for Q&A



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Ways of getting Node.js application into CICS

Add Node.js application to a CICS bundle

1. NODEJSAPP bundle part
2. Profile
3. Node.js application
   - Start script
   - Other application assets

Build CICS bundle from source and deploy to zFS

- CICS build toolkit
  - Tag text files, otherwise EBCDIC assumed
- Run npm to resolve dependencies
- DFHDPLOY, CICS TS plug-in for UCD, …

Zowe command line tool to deploy CICS bundles

- Available by installing Zowe CLI and cics-deploy plugin via NPM with Node.js V8 or above.
- CLI copy the CICS bundle to zFS and deploy into an existing CICS region, e.g. provisioned with z/OS PT
- Copy the CICS bundle in an image, then build and provision the CICS region and the application together
- Requires z/OS MF and SSH

Notes

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Node.js application in CICS

Lifecycle CICS bundle as usual

- CEDA, CEMT, SPI, CICS Explorer, CMCI, …
- Node.js app is running when bundle part enabled
- IBM Node.js SDK is used by CICS to run the application
- Unix signals is used by CICS to end application
- CICS statistics for node.js

Notes

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CICS invoke API - for Node.js

1. **Enable the CICS program to be called via JSON web service**
   - As today, using DFHLS2JS, TCPIPSERVICE, PIPELINE, URIMAP, WEBSERVICE

2. **Invoke API**
   - Uses HTTP if run outside of CICS
   - Uses native CICS JSON pipeline

```
const cics = require('ibm-cics-api');

let uri = "http://winmvs2c.hursley.ibm.com/exampleApp/json_inquireCatalogWrapper";
let requestData = {
    "inquireCatalogRequest": {
      "startItemRef": 10,
      "itemCount": 774
    }
};

cics.invoke(uri,requestData,function(err, data)
{
    if (err) {
        ... do something with error ....
    } else {
        .... do something with response data
    }
});
```

Notes

Use the standard tooling to expose CICS programs as a JSON web service.

When the Node.js application is hosted inside CICS, it uses cross-memory calls to avoid needing to use the network later and removes the requirement to encrypt traffic between the Node.js engine and the CICS server.

Java

Support latest Java APIs and frameworks with better build and support

Notes

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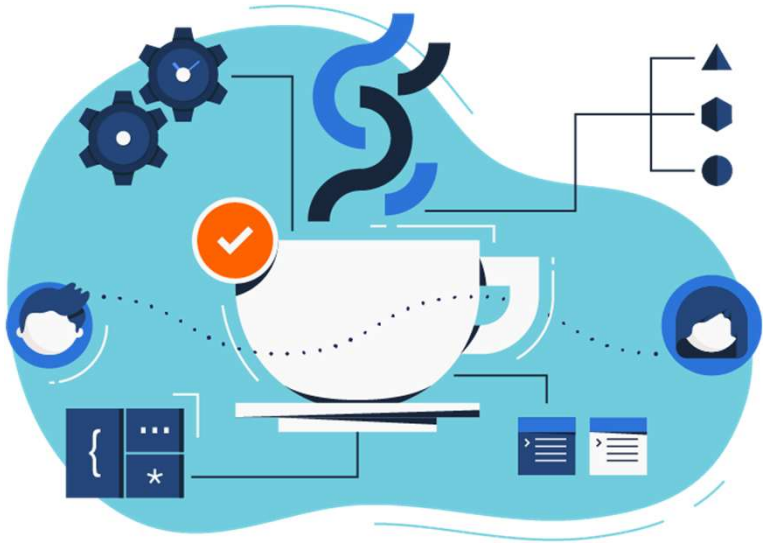
Java EE Full Platform application support

- CICS TS can host Java applications that are written to the Java Enterprise Edition 8 (**Java EE 8**) Full Platform specification, using the embedded version of Liberty.
  - CICS TS V5.5 APAR PH15017 required.
- Java applications are integrated with CICS tasks by default.
  - They provide a simple and powerful mechanism of modernizing CICS applications by using Java EE and Eclipse MicroProfile features.
- Optionally use standard-mode CICS Liberty JVM server and integrate with CICS services via API when required.



CICS_WLP_MODE={INTEGRATED|STANDARD}

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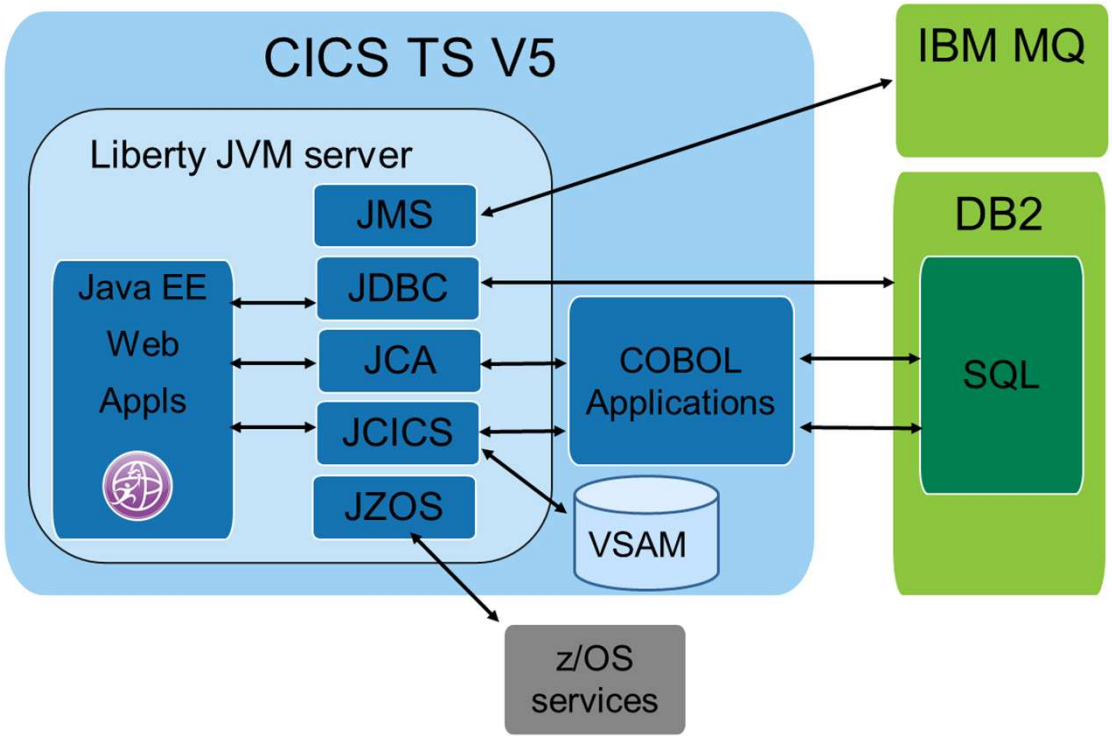
Java EE Full Platform in CICS



- ✓ The full **Java EE 8 profile** supported in an integrated Liberty JVM server
- ✓ **JMS** support for MQ in client mode
- ✓ **JDBC** and **SQLJ** for Db2 data sources and other relational databases
- ✓ **JCICS** to provide access to CICS API including linking to other CICS programs
- ✓ **JCA** local ECI adapter supports porting of CICS TG ECI applications into CICS
- ✓ **JZOS** provides access to z/OS services such as console, files

Notes

A topology diagram showing how a Liberty instance runs inside CICS.

Work is accepted from the network by the Liberty runtime, and then business logic in the application can use a variety of methods to access data and other applications in the CICS server, or use remote resources.

Java 8 recommended for CICS TS V5

IBM 64-bit SDK for z/OS, Java Technology Edition	CICS TS						Liberty		Comments
	V5.1	V5.2	V5.3	V5.4	V5.5	V5.6 open beta	<=19.0.0.2	19.0.0.3+	
V7.0	✔	✔	✔	✔			✔		Out of service 30 Sep 2019
V7. 1	✔	✔	✔	✔			✔		Supported until 2022
V8.0	✔	✔	✔	✔	✔	✔	✔	✔	**Supported until at least 2025**

Java 8 recommended for CICS TS V5 all releases

Also see IBM FAQ to Oracle's Java Products Commercial Licensing

Notes

We have been recommending customers move to Java 8 for a while now.

CICS TS V5.5 no longer supports versions of the Java runtime earlier than Java 8.

https://developer.ibm.com/cics/2018/02/19/cics-support-ibm-sdk-java-technology-edition-version-8-service-refresh-5/

Java support enhancements

Liberty Admin Center for performance and problem diagnosis

- Web-based graphical interface for deploying, monitoring and managing Liberty servers
- Server stop, application stop/start - synchronised to JVM server

JVM server 'ready triggers'

- Mostly fulfilled by CICS bundle application status synchronisation and policies
- Possible need to automate actions based on multiple policies

JCICS and CICS annotation process in Maven central

- Easier to express dependencies in Eclipse, other IDEs, and build systems using Gradle/Maven
- New CICS plug-in for Maven to automate building CICS Java applications

Notes

The state of applications is tracked by Liberty, and the state of bundleparts is tracked by CICS.

Joining of the two so the Liberty status is reflected in the CICS bundlepartstatus.

JSON Web Token

Liberty JWT feature

- Programmatically parse, build and verify JWT tokens in Java applications
- Provides for authentication using digitally signed web tokens

OpenID Connect Client feature

- Configure Liberty server to authenticate a request using a JWT token without writing any code
- Supports identity mapping
  - Map Subject in JWT to local registry user
  - Map distributed identity to SAF registry user via RACMAP

Both also available on CICS TS V5.3 and 5.4 with APAR PI91554

Notes

PI91554 updates the embedded version of Websphere Liberty to fixpack 17.0.0.4

https://www-01.ibm.com/support/docview.wss?uid=swg1PI91554

Liberty angel process

Multiple secure Liberty servers in a CICS region

- Provides improved application isolation or scalability without increasing number of regions
- Each Liberty server can have its own configuration and lifecycle – ideal for developers
- Connected to the same Angel process.

Wait for Liberty angel process

```
-Dcom.ibm.ws.zos.core.angelRequired=true
```

- More robust CICS start-up and IPL procedures
- Integrates with named Liberty angel process `-Dcom.ibm.ws.zos.core.angelName`
- Also in V5.4 with APAR PI92676

Notes

Multiple secure Liberty servers in a CICS region

It is now possible to run multiple secure CICS Liberty JVM servers in the same CICS region and have them connect to a Liberty angel process, for security and other services. This allows applications to be isolated from each other with each Liberty server having its own configuration and lifecycle. It also allows for an application to be hosted in more than one Liberty server in the same CICS region, for improved redundancy and development scenarios.

Wait for Liberty angel process

A new JVM server option is provided to ensure that a Liberty JVM server will connect to a Liberty angel process before reaching the ENABLED state. This results in a more robust startup of CICS systems using Liberty. For example, after a system restart and CICS is started ahead of the angel process.

This support is integrated with the named angel support, allowing each CICS region or Liberty JVM server to use its own dedicated angel process.

https://www-01.ibm.com/support/docview.wss?uid=swg1PI92676

CICS JVM profiles

Include & share common configuration

- For example unique ports, database configuration or log settings

```
%INCLUDE=<file>
```

Reference variables

```
CLONEDIR=&USSHOME;/&JVMSERVER;/bundles
OSGI_BUNDLES=&CLONEDIR;/mybundle.jar
```

Append to variables

```
OSGI_BUNDLES=&CLONEDIR;/mybundle.jar
+OSGI_BUNDLES=/newpath/mybundle2.jar
```

… is equivalent to …

```
OSGI_BUNDLES=&USSHOME;/&JVMSERVER;/bundles/mybundle.jar,/newpath/mybundle2.
jar
```

Notes

Include & share common configuration

The JVM profile is the configuration file for a JVM server that contains Java launcher options, system properties, environment variables, and JVM server options. When cloning JVM servers across multiple CICS regions, JVM profiles can now be shared, and unique values such as HTTP ports or debug options easily overridden.

A new JVM profile directive %INCLUDE is provided that loads additional configuration from another file. This enables configuration that is common to several JVM profiles to be shared between configurations, or overridden using the predefined symbols for APPLID or JVMSERVER as part of the include path.

Reference variables

Custom variables can now be defined in the JVM server and referenced using symbol notation &SYMBOL;

Appending variables

The value of variables that are comma separated can be built up over multiple lines, which allows includes files to incrementally extend specific variables and improves readability

Liberty server.xml

Passing variables into server.xml and <include>

- In JVM profile

```
SERVER_INCLUDE=&USSHOME;/&APPLID;/server.xml
```

- In server.xml

```
<include location="${env.SERVER_INCLUDE}" />
```

Inject Liberty configuration into server.xml

- In JVM profile

```
LIBERTY_INCLUDE_XML=<file>
```

Notes

Passing variables into server.xml includes

Variables defined in the JVM profile can be passed into the Liberty server.xml configuration file for use in includes. This enables shared configurations to be included across cloned Liberty servers, by using zFS paths that are based on the pre-defined variables, USSHOME, APPLID, JVMSERVER, or on custom defined variables.

Inject Liberty configuration into server.xml

A new JVM profile option `LIBERTY_INCLUDE_XML` is provided that enables CICS to autoconfigure the loading of shared configuration into server.xml. Examples of commonly shared configuration.

- Inclusion of shared applications or shared library JARs
- Data sources for IBM Db2 and connection factories for JMS

Management

CICS bundle status reflects Liberty application status

- CICS bundle with Web application bundle part remains in `ENABLING` state until applications are installed in Liberty
- com.ibm.cics.jvmserver.wlp.bundlepart.timeout used between liberty application and bundle status.
- More robust application deployments

Extended CICS JVM server message

```
LOG_LEVEL=INFO | WARNING | ERROR | NONE
```

- New dfhjvmlog zFS file for CICS JVM server information, warnings and errors
- Can be redirected to MVS JES DD

Notes

CICS bundle status reflects Liberty application status

Java EE applications can be packaged and deployed within a CICS bundle. When the CICS bundle is installed, each application is represented by a CICS bundle part. CICS TS V5.5 will now change the state of CICS bundle parts to reflect the state of the associated application in Liberty.

For example, CICS bundle parts will remain in the ENABLING state until they are successfully installed in Liberty. In addition, if an application fails to install or is later uninstalled by Liberty, the CICS bundle part will change to a DISABLED state. This provides for more robust deployment and automation procedures, and makes it easier and faster to diagnose application configuration issues.

Enhancements to JVM server messages

Operational messages are now provided by default in a zFS log file and can be directed to JES if required.

Separates logging output from trace required by IBM service personnel.

Removal of restrictions

Removal of DPL subset restrictions for Link to Liberty

- Liberty Java applications invoked via LINK can now issue CICS SYNCPOINT and use JTA
- DPL calls to Java can use SYNCONRETURN option
- Also in V5.4 & 5.3 with APAR PI98229

Removal of SDFJAUTH

- All load modules are now in the SDFHAUTH library to simplify Java setup

Notes

Removal of DPL subset restriction for Link to Liberty

Removes syncpoint architectural restrictions when using Link to Liberty, allowing Java application to perform a CICS syncpoint or to use the Java Transaction API (JTA).

Note, not possible to import a transaction context from a CICS UOW into an XA Java transaction

https://www-01.ibm.com/support/docview.wss?uid=swg1PI98229

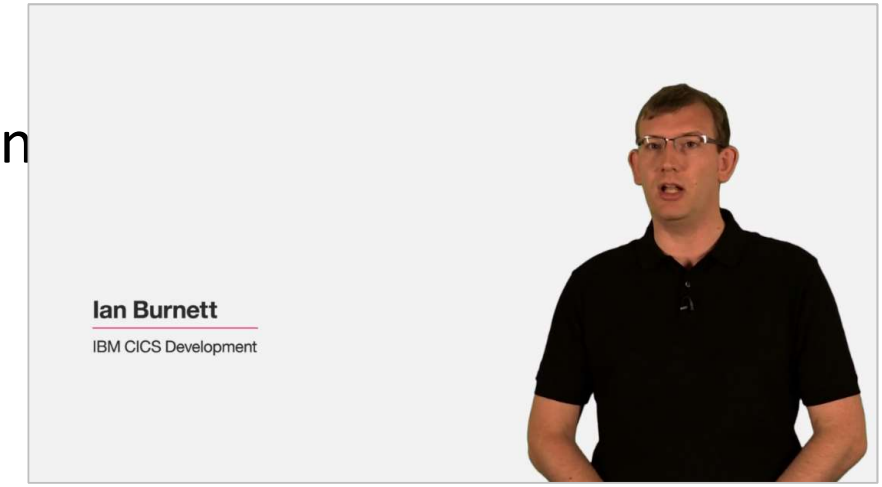
Removal of SDFJAUTH

SDFJAUTH library has been merged with SDFHAUTH library simplifying CICS JCL procedures and reducing number of authorized libraries.

Java in CICS video course series

- IBM Redbooks video course series
  - https://www.redbooks.ibm.com/redbooks.nsf/pages/cicsvideo?Open

1. Architecting Java solutions for CICS
2. Developing a RESTful Web application for Liberty in CICS
3. Extending a CICS web application using JCICS



Notes

We also provide three video courses that provide an introduction to Java in CICS.

CICS explorer

Notes

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Design-led development

- A system programmer no longer needs to configure and deploy the WUI because the capabilities they need are better in Explorer

- Gaps identified:
  - Aggregation (summary, in WUI terms)
  - Mapping WLM and BAS resources
  - A new system management API, alongside our CMCI REST API

Notes

The goal of the V5.5 release is to ensure a CICS system programmer is at least as productive with the CICS Explorer tool as they were with the WUI.

To fulfil this hill, we've concentrated on 'gaps' in the Explorer experience. Particularly, we've focused on:

- Aggregation (summary, in WUI terms)
- Mapping WLM and BAS resources
- A new system management API, alongside our CMCI REST API

Simplified and fully capable CICS Explorer

A new **getting started guide** which gets a system programmer up and running within **10 minutes**

New getting started guide

Visualizing relationships such as transaction groups or workload specifications with the **new map view**

Visualising CPSM Definitions (Map)

Aggregation that allows commonalities and disparities between resources to be **highlighted quickly**

Aggregating Records

Notes

Getting started with IBM CICS Explorer

https://www.ibm.com/support/knowledgecenter/en/SSSQ3W_5.5.0/com.ibm.cics.core.help/topics/gettingstarted/gs_intro.html

Aggregation in CICS Explorer

Large numbers of systems

- Usually clones
- Common standards

Minor differences can cause problems

- Hard to spot

Aggregation highlights the differences

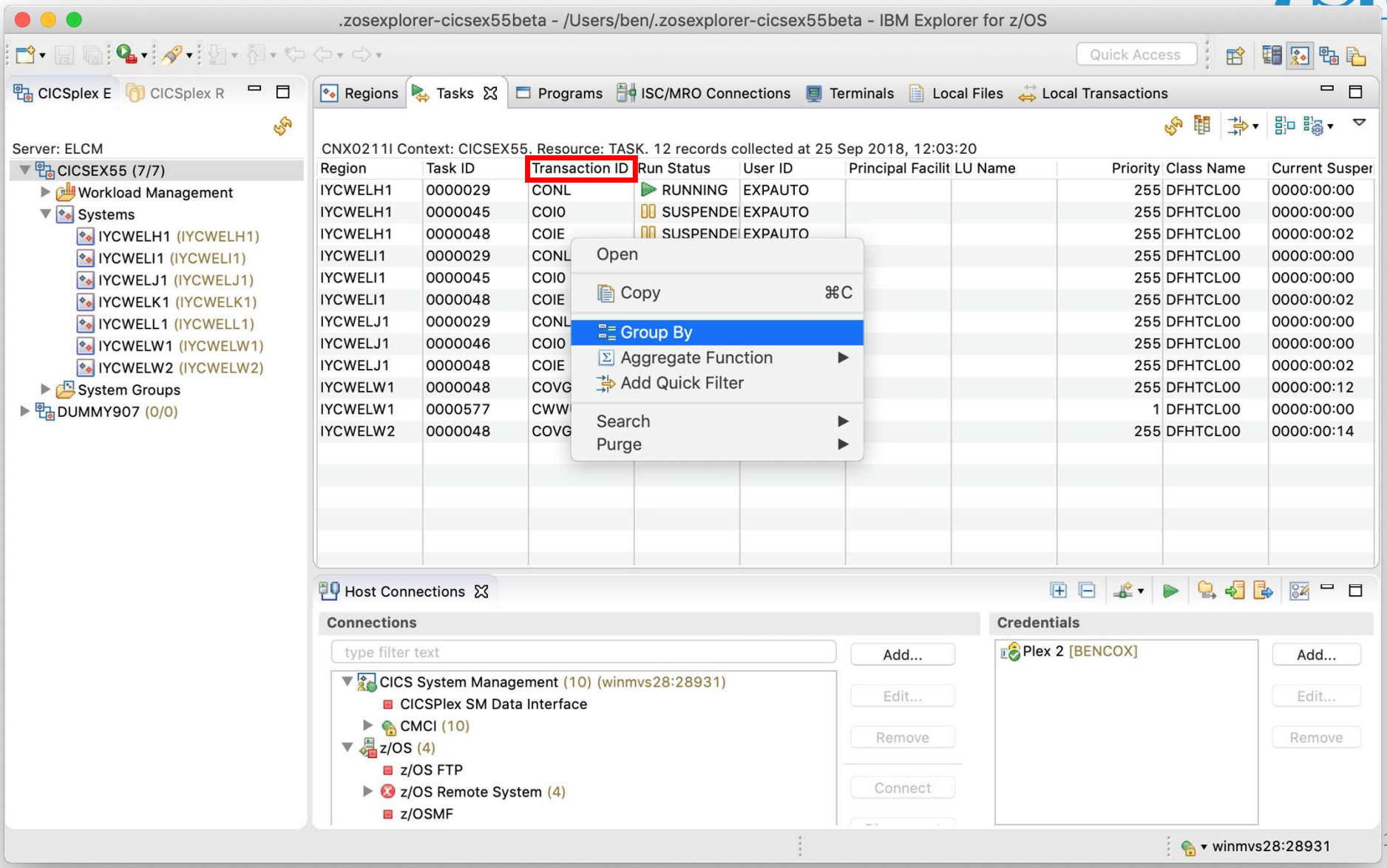
Notes

Often, CICS users have vast systems to manage.

These systems are often clones of one another, and their contents have common standards.

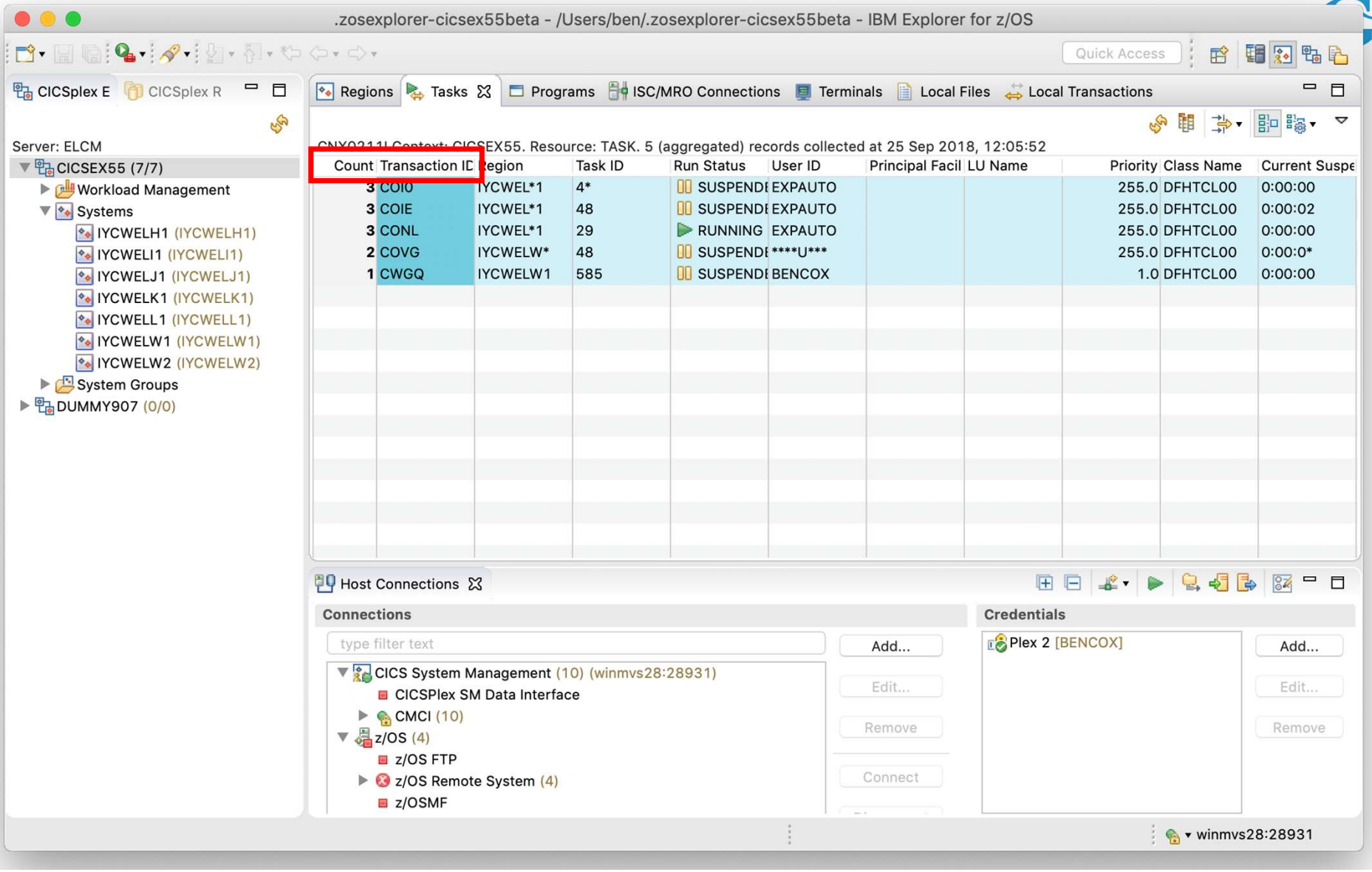
A tiny difference in these large systems can be the explanation behind outages and unexpected behavior.

Aggregation allows you to spot the differences.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: CICSEX55. Resource: TASK. 12 records collected at 25 Sep 2018, 12:03:20
Region
Task ID
Transaction ID
Run Status
User ID
Principal Facilit
LU Name
Priority
Class Name
Current Suspe
IYCWELH1 0000029 CONL RUNNING EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELH1 0000045 COI0 SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELH1 0000048 COIE SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:02
IYCWELI1 0000029 CONL 255 DFHTCL00 0000:00:00
IYCWELI1 0000045 COI0 255 DFHTCL00 0000:00:00
IYCWELI1 0000048 COIE 255 DFHTCL00 0000:00:02
IYCWELJ1 0000029 CONL 255 DFHTCL00 0000:00:00
IYCWELJ1 0000046 COI0 255 DFHTCL00 0000:00:00
IYCWELJ1 0000048 COIE 255 DFHTCL00 0000:00:02
IYCWELW1 0000048 COVG 255 DFHTCL00 0000:00:12
IYCWELW1 0000577 CWW 1 DFHTCL00 0000:00:00
IYCWELW2 0000048 COVG 255 DFHTCL00 0000:00:14
Open
Copy ⌘C
Group By
Aggregate Function
Add Quick Filter
Search
Purge
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

Notes

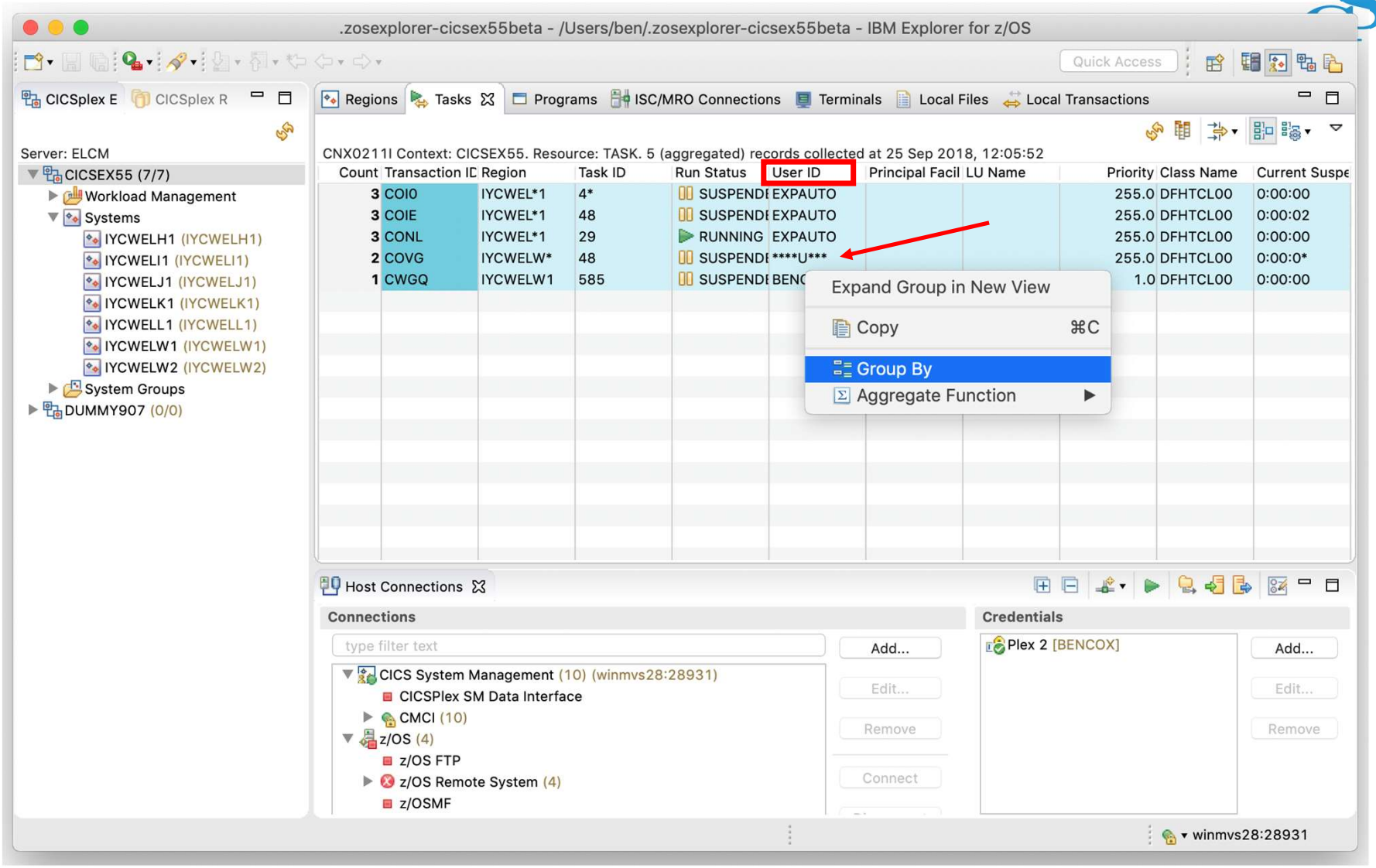
In the **Tasks** view we right-clicked on the *Transaction ID* column and selected **Group By**.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
EX55. Resource: TASK. 5 (aggregated) records collected at 25 Sep 2018, 12:05:52
Count Transaction ID Region Task ID Run Status User ID Principal Facil LU Name Priority Class Name Current Suspe
3 COI0 IYCWEL*1 4* SUSPENDE EXPAUTO 255.0 DFHTCL00 0:00:00
3 COIE IYCWEL*1 48 SUSPENDE EXPAUTO 255.0 DFHTCL00 0:00:02
3 CONL IYCWEL*1 29 RUNNING EXPAUTO 255.0 DFHTCL00 0:00:00
2 COVG IYCWELW* 48 SUSPENDE ****U*** 255.0 DFHTCL00 0:00:0*
1 CWGQ IYCWELW1 585 SUSPENDE BENCOX 1.0 DFHTCL00 0:00:00
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

Notes

The view shows all the currently running tasks, grouped by their transaction IDs.

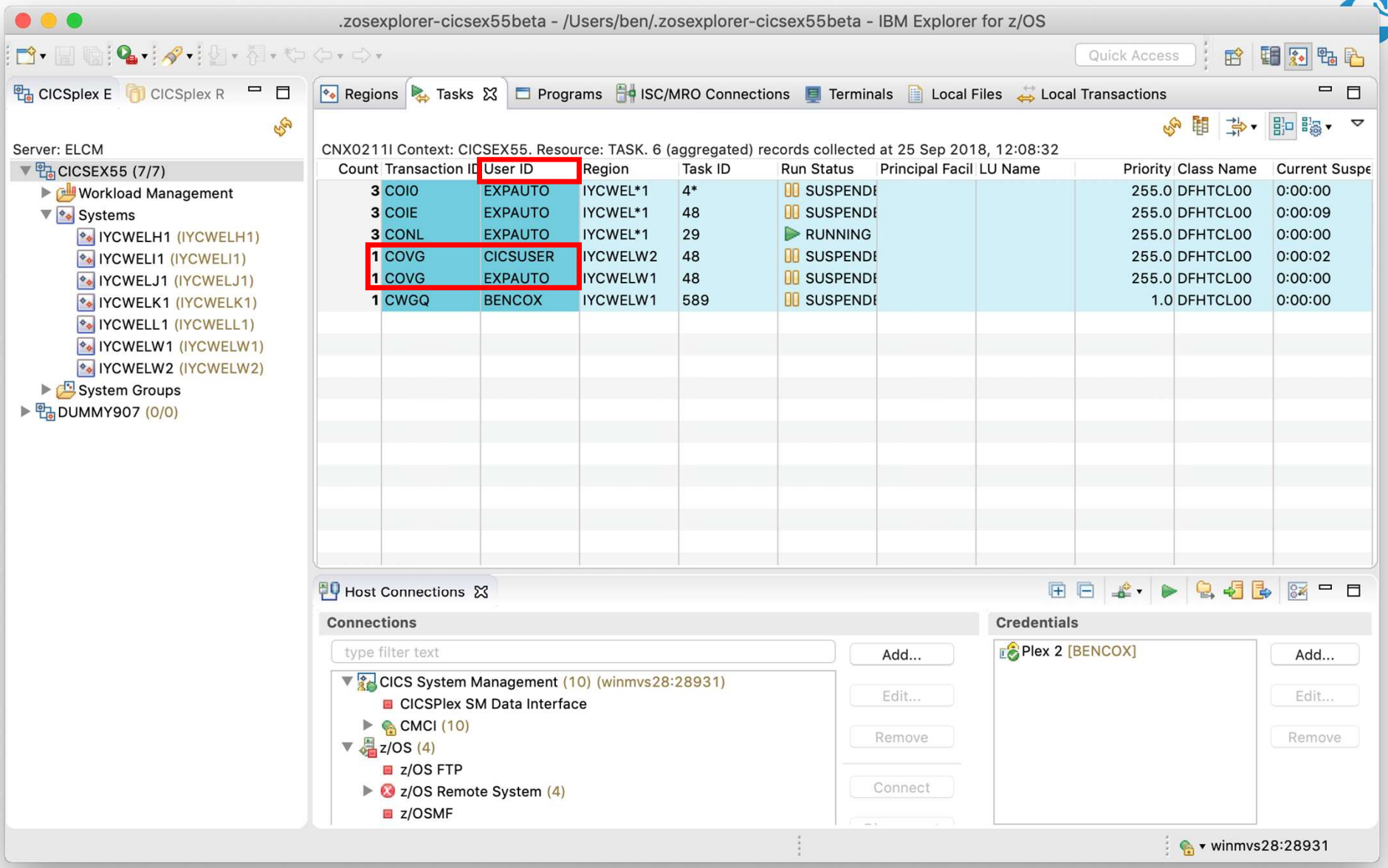
Note how the transaction ID column has moved all the way to the left and a new count column has appeared. The values in all other columns have their values aggregated.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: CICSEX55. Resource: TASK. 5 (aggregated) records collected at 25 Sep 2018, 12:05:52
Count
Transaction ID
Region
Task ID
Run Status
User ID
Principal Facil
LU Name
Priority
Class Name
Current Suspe
3 COIO IYCWEL*1 4* SUSPENDI EXPAUTO 255.0 DFHTCL00 0:00:00
3 COIE IYCWEL*1 48 SUSPENDI EXPAUTO 255.0 DFHTCL00 0:00:02
3 CONL IYCWEL*1 29 RUNNING EXPAUTO 255.0 DFHTCL00 0:00:00
2 COVG IYCWELW* 48 SUSPENDI ****U*** 255.0 DFHTCL00 0:00:0*
1 CWGQ IYCWELW1 585 SUSPENDI BENC 1.0 DFHTCL00 0:00:00
Expand Group in New View
Copy ⌘C
Group By
Aggregate Function
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

Notes

Where possible, we have also tried to exceed the capabilities of the WUI.

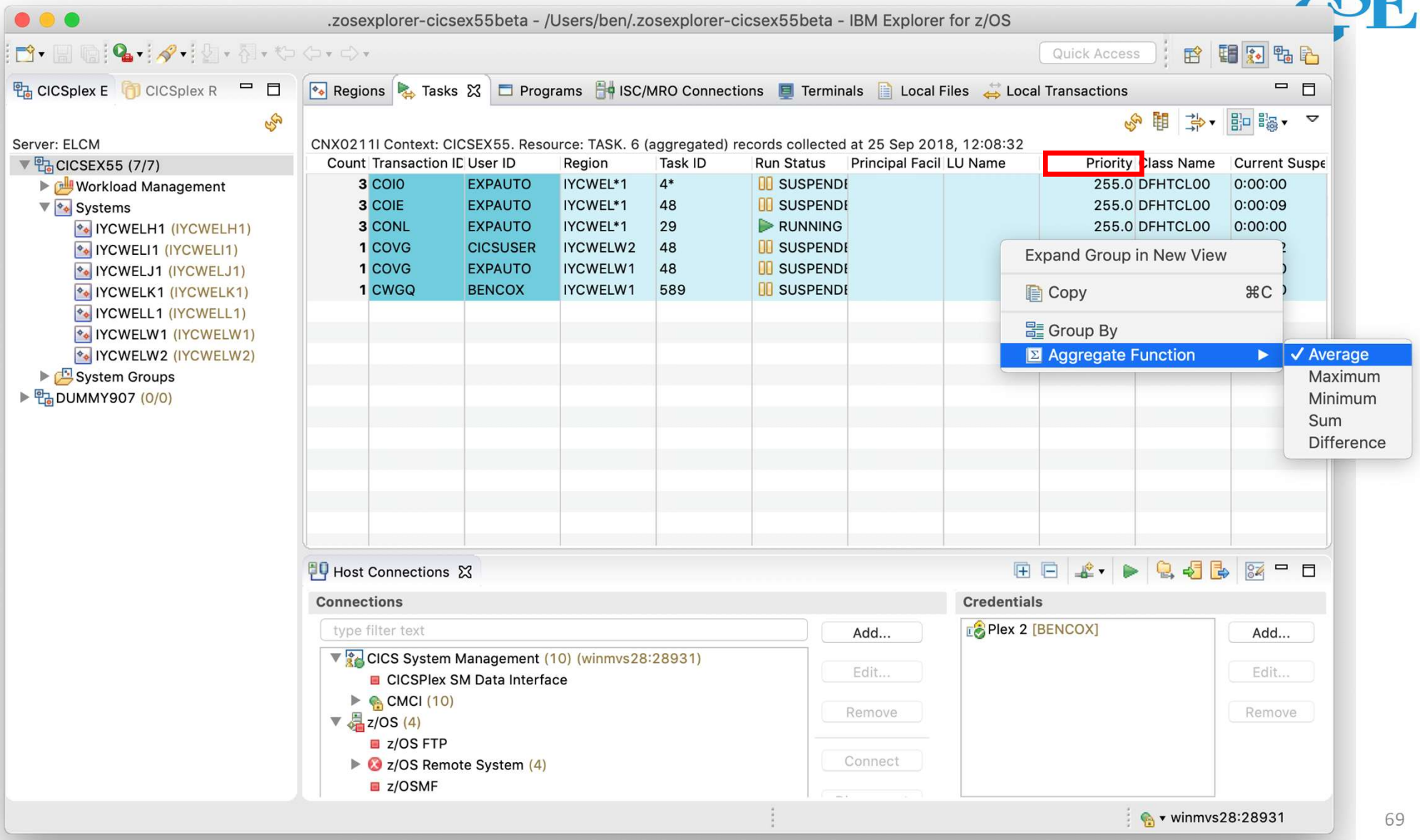
In this screenshot, we notice that the COVG transactions are running with more than one userid. Right click on the *User ID* column and select **Group By**.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: CICSEX55. Resource: TASK. 6 (aggregated) records collected at 25 Sep 2018, 12:08:32
Count Transaction ID User ID Region Task ID Run Status Principal Facil LU Name Priority Class Name Current Suspe
3 COI0 EXPAUTO IYCWEL*1 4* SUSPENDE 255.0 DFHTCL00 0:00:00
3 COIE EXPAUTO IYCWEL*1 48 SUSPENDE 255.0 DFHTCL00 0:00:09
3 CONL EXPAUTO IYCWEL*1 29 RUNNING 255.0 DFHTCL00 0:00:00
1 COVG CICSUSER IYCWELW2 48 SUSPENDE 255.0 DFHTCL00 0:00:02
1 COVG EXPAUTO IYCWELW1 48 SUSPENDE 255.0 DFHTCL00 0:00:00
1 CWGQ BENCOX IYCWELW1 589 SUSPENDE 1.0 DFHTCL00 0:00:00
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

Notes

We are now grouping by both *Transaction ID* and *User ID* columns. Note again the *User ID* column has moved to the left.

We can now see that one `COVG` transaction is running as the userid `CICSUSER`, the other is `EXPAUTO`.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: CICSEX55. Resource: TASK. 6 (aggregated) records collected at 25 Sep 2018, 12:08:32
Count Transaction ID User ID Region Task ID Run Status Principal Facil LU Name Priority Class Name Current Suspe
3 COI0 EXPAUTO IYCWEL*1 4* SUSPENDE 255.0 DFHTCL00 0:00:00
3 COIE EXPAUTO IYCWEL*1 48 SUSPENDE 255.0 DFHTCL00 0:00:09
3 CONL EXPAUTO IYCWEL*1 29 RUNNING 255.0 DFHTCL00 0:00:00
1 COVG CICSUSER IYCWELW2 48 SUSPENDE
1 COVG EXPAUTO IYCWELW1 48 SUSPENDE
1 CWGQ BENCOX IYCWELW1 589 SUSPENDE
Expand Group in New View
Copy ⌘C
Group By
Aggregate Function
Average
Maximum
Minimum
Sum
Difference
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

Notes

The other columns have their values aggregated. This aggregation function can be changed and here we right click on the *Priority* column and choose **Aggregate Function** to change how the values are aggregated.

Mapping in CICS Explorer

Several CICS and CICSPlex SM resources interconnected

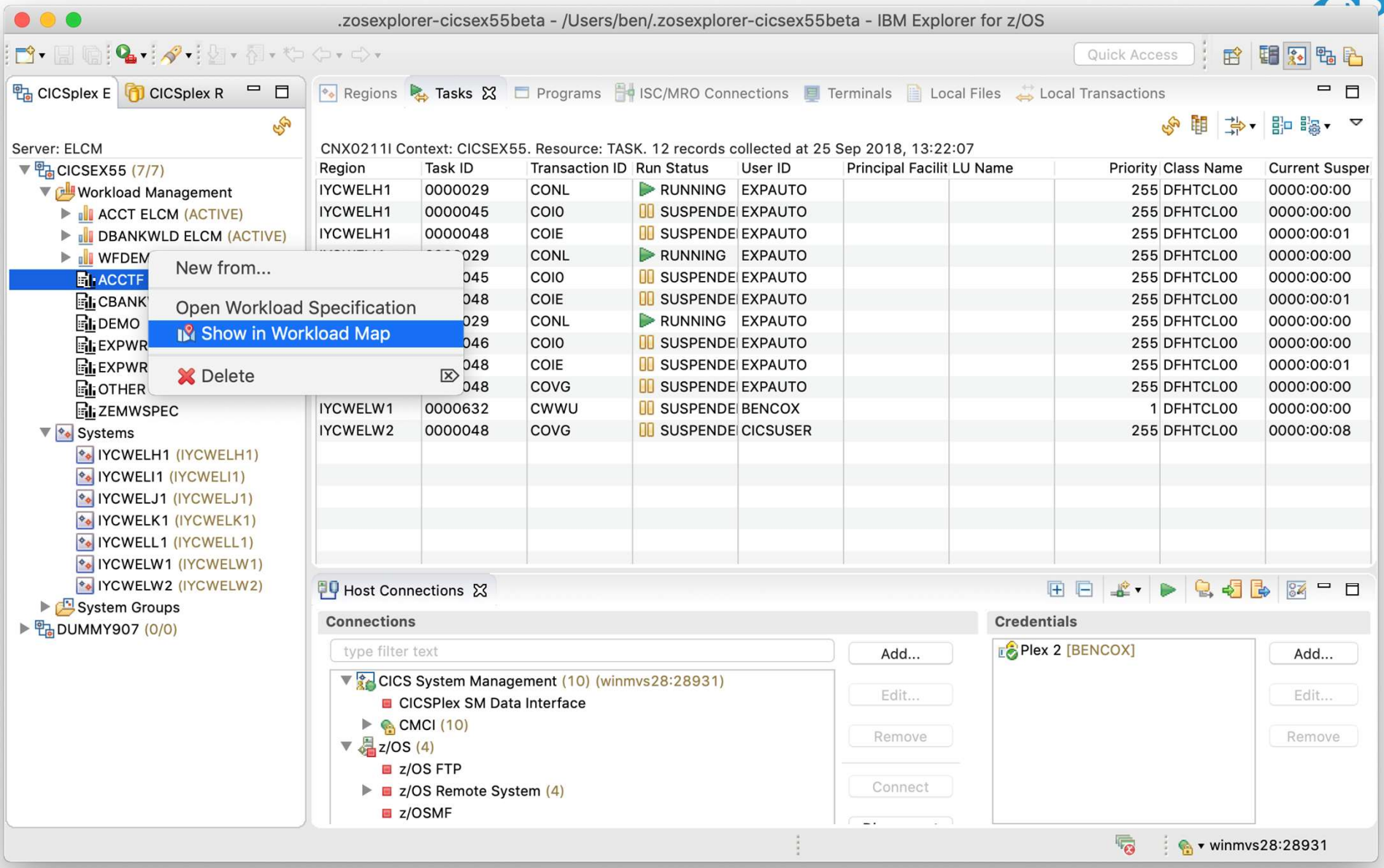
- Frequently in complex ways
- Notably in BAS and CICSPlex SM WLM

Map support presents a much better mental model

Notes

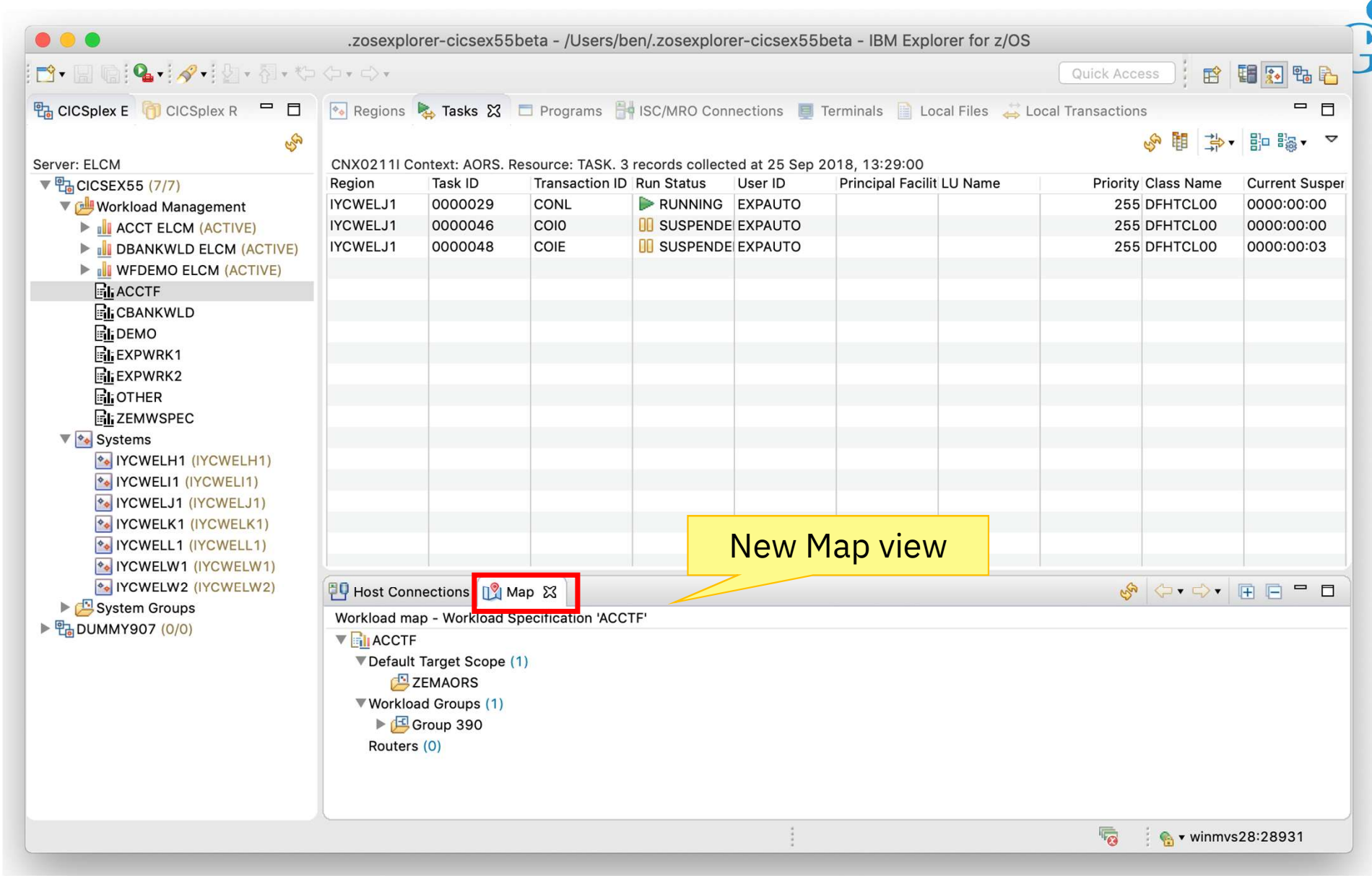
Certain areas of CICS and CPSM — particularly workload management and BAS — involve complicated and interconnected resources.

‘Map’ support allows you to visualize those interconnections, to gain a mental model of the topology.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
ACCT ELCM (ACTIVE)
DBANKWLD ELCM (ACTIVE)
WFDEM
ACCTF
CBANK
DEMO
EXPWR
EXPWR
OTHER
ZEMWSPEC
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
New from...
Open Workload Specification
Show in Workload Map
Delete
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: CICSEX55. Resource: TASK. 12 records collected at 25 Sep 2018, 13:22:07
Region Task ID Transaction ID Run Status User ID Principal Facilit LU Name Priority Class Name Current Susper
IYCWELH1 0000029 CONL RUNNING EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELH1 0000045 COI0 SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELH1 0000048 COIE SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:01
RUNNING EXPAUTO 255 DFHTCL00 0000:00:00
SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:01
RUNNING EXPAUTO 255 DFHTCL00 0000:00:00
SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:01
SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELW1 0000632 CWWU SUSPENDE BENCOX 1 DFHTCL00 0000:00:00
IYCWELW2 0000048 COVG SUSPENDE CICSUSER 255 DFHTCL00 0000:00:08
Host Connections
Connections
type filter text
Add...
Edit...
Remove
Connect
CICS System Management (10) (winmvs28:28931)
CICSPlex SM Data Interface
CMCI (10)
z/OS (4)
z/OS FTP
z/OS Remote System (4)
z/OSMF
Credentials
Plex 2 [BENCOX]
Add...
Edit...
Remove
winmvs28:28931

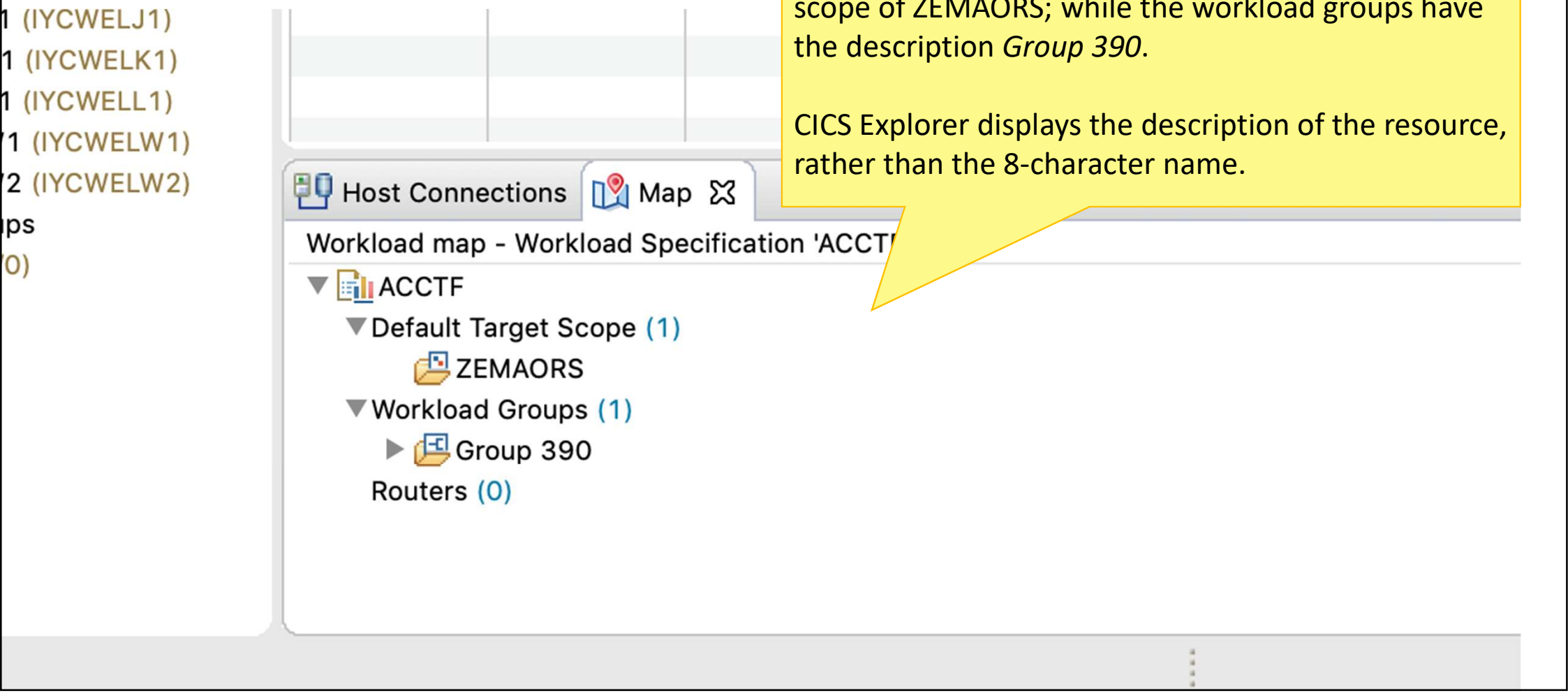
Notes

Here we right click on a workload management specification and open it in the map view.


.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
CICSplex E
CICSplex R
Server: ELCM
CICSEX55 (7/7)
Workload Management
ACCT ELCM (ACTIVE)
DBANKWLD ELCM (ACTIVE)
WFDEMO ELCM (ACTIVE)
ACCTF
CBANKWLD
DEMO
EXPWRK1
EXPWRK2
OTHER
ZEMWSPEC
Systems
IYCWELH1 (IYCWELH1)
IYCWELI1 (IYCWELI1)
IYCWELJ1 (IYCWELJ1)
IYCWELK1 (IYCWELK1)
IYCWELL1 (IYCWELL1)
IYCWELW1 (IYCWELW1)
IYCWELW2 (IYCWELW2)
System Groups
DUMMY907 (0/0)
Regions
Tasks
Programs
ISC/MRO Connections
Terminals
Local Files
Local Transactions
CNX0211I Context: AORS. Resource: TASK. 3 records collected at 25 Sep 2018, 13:29:00
Region Task ID Transaction ID Run Status User ID Principal Facilit LU Name Priority Class Name Current Suspe
IYCWELJ1 0000029 CONL RUNNING EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELJ1 0000046 COI0 SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:00
IYCWELJ1 0000048 COIE SUSPENDE EXPAUTO 255 DFHTCL00 0000:00:03
New Map view
Host Connections
Map
Workload map - Workload Specification 'ACCTF'
ACCTF
Default Target Scope (1)
ZEMAORS
Workload Groups (1)
Group 390
Routers (0)
winmvs28:28931

Notes

Map view is at the bottom of the screen.



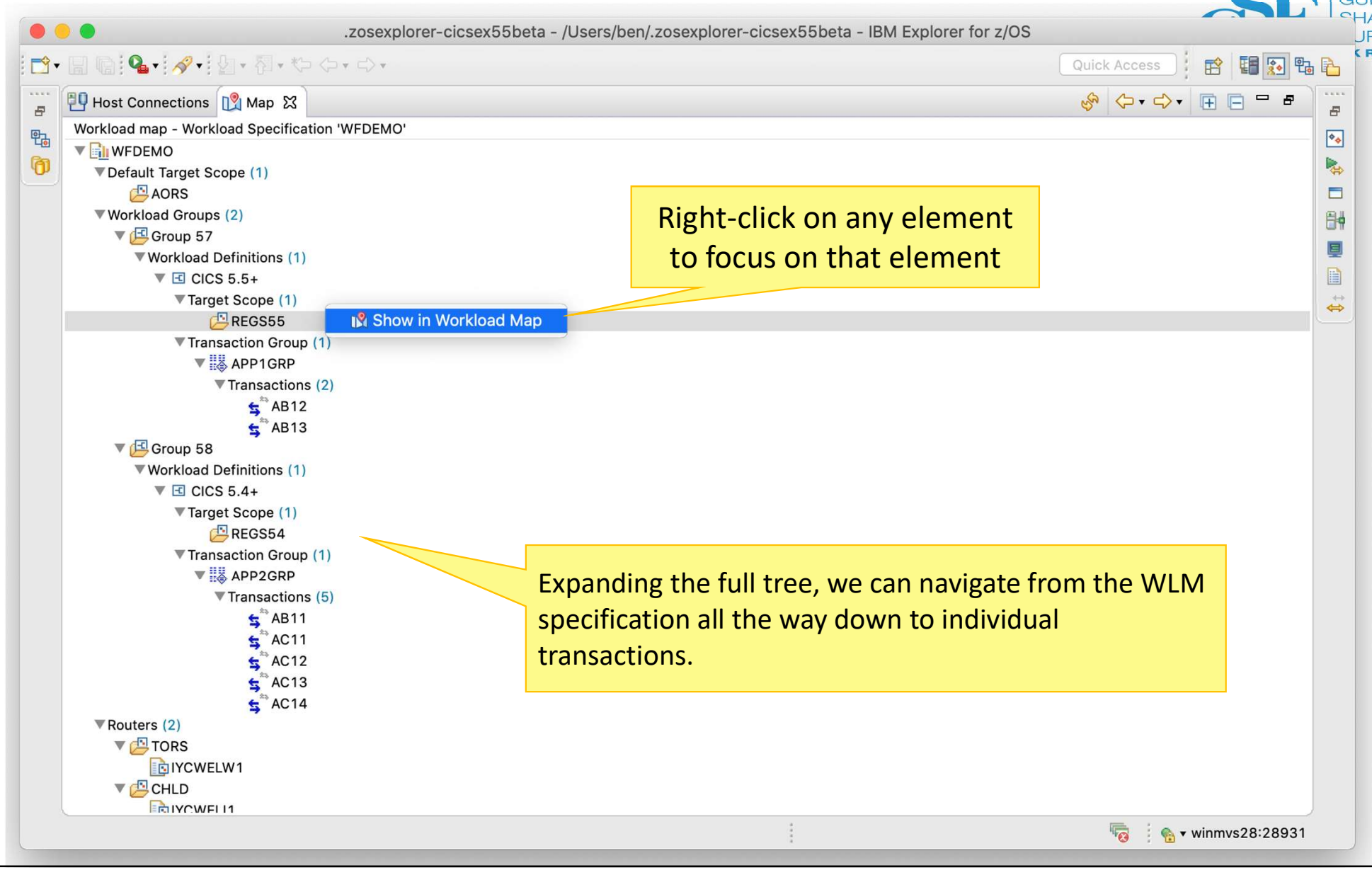
The workload specification ACCTF has a default target scope of ZEMAORS; while the workload groups have the description *Group 390*.

CICS Explorer displays the description of the resource, rather than the 8-character name.

Notes

Zooming in, we can see the workload specification ACCTF has a default target scope of ZEMAORS; while the workload groups have the description *Group 390*.

Note CICS Explorer displays the description of the resource, rather than the 8-character name.

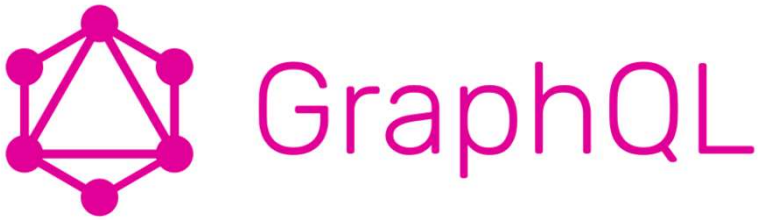

.zosexplorer-cicsex55beta - /Users/ben/.zosexplorer-cicsex55beta - IBM Explorer for z/OS
Quick Access
Host Connections
Map
Workload map - Workload Specification 'WFDEMO'
WFDEMO
Default Target Scope (1)
AORS
Workload Groups (2)
Group 57
Workload Definitions (1)
CICS 5.5+
Target Scope (1)
REGS55
Show in Workload Map
Transaction Group (1)
APP1GRP
Transactions (2)
AB12
AB13
Group 58
Workload Definitions (1)
CICS 5.4+
Target Scope (1)
REGS54
Transaction Group (1)
APP2GRP
Transactions (5)
AB11
AC11
AC12
AC13
AC14
Routers (2)
TORS
IYCWELW1
CHLD
winmvs28:28931
Right-click on any element to focus on that element
Expanding the full tree, we can navigate from the WLM specification all the way down to individual transactions.

Notes

You can right-click at any point in the tree to focus on that specific element. Here we right-click on the REGS55 target scope.

GraphQL API

A new **HTTP API** for CICS TS allows for the querying of **CICSplexes** using the **GraphQL paradigm**.



Customers can use this to develop **their own dashboard** or **automation** for example:

- Dashboard showing CICS layout and status.
- Automation to deploy applications and check their state.

Notes

Some of what we've achieved with aggregation and map would be very painful client-side. Lots of data would be downloaded (expensive on the server and with long response times), only for the data to be summarized in the client.

We've produced a new HTTP system management API, using the GraphQL paradigm (instead of REST).

This new CMCI GraphQL API complements the existing CMCI REST API.

GraphQL overview

- Request describes only the fields you want in the response
- Follow references between resources, in one request
- Endpoint allows full introspection of what's possible

Notes

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GraphQL example

```
{
  hero {
    name
    height
    mass
  }
}
```

```
{
  "hero": {
    "name": "Luke Skywalker",
    "height": 1.72,
    "mass": 77
  }
}
```

Notes

This gives an example of a GraphQL query (left) and the response (right).

Note how the query input defines the output.

GraphQL CICS example

```
query allLocalTransactions {
  cicsplex(name: "CICSEX55") {
    loctran {
      records {
        regionName
        CICSRelease
        name
        commandSecurity
        deadlockTimeout
        dumping
        priority
        program
        purgeability
        readTimeout
        screenSize
        status
        tracing
        TWASize
      }
    }
  }
}
```

Notes

This query retrieves selected information about local transactions defined in all members of the CICSEX55 CICSplex.

GraphQL API – aggregation

```
query aggregatedLocalTransactions {
  cicsplex(name: "CICSEX55") {
    loctran {
      aggregateRecord {
        name {
          value
          distinctValues
        }
        program {
          value
          distinctValues
        }
      }
    }
  }
}
```

Notes

This query will return an aggregation of the program names of all local transactions defined in all members of the CICSEX55 CICSplex.

GraphQL API – map

```
query workloadMapFromSpecification {
  cicsplex(name: "CICSEX55") {
    wlmspec {
      records {
        name
        from_wlminspc_specification {
          records {
            to_group {
              name
              from_wlmingrp_group {
                records {
                  to_definition {
                    name
                    to_transactionGroup {
                      name
                      from_dtringrp_transactionGroup {
                        records {
                          transactionID
} } } } } } } } } } } } } }
```

Notes

This is an example of a GraphQL request that will produce a map of transaction IDs, originating from the root WLM specification instance.

The long line of curly braces is purely there to keep everything on one screen, while retaining syntactic correctness.

CICS Foundation

Notes

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Foundation

Ensuring CICS delivers its core capabilities

- System management advancements that greatly improve control and ownership
- Enhanced security and resiliency of applications across all languages
- Greater API and SPI control with the use of commands and key words

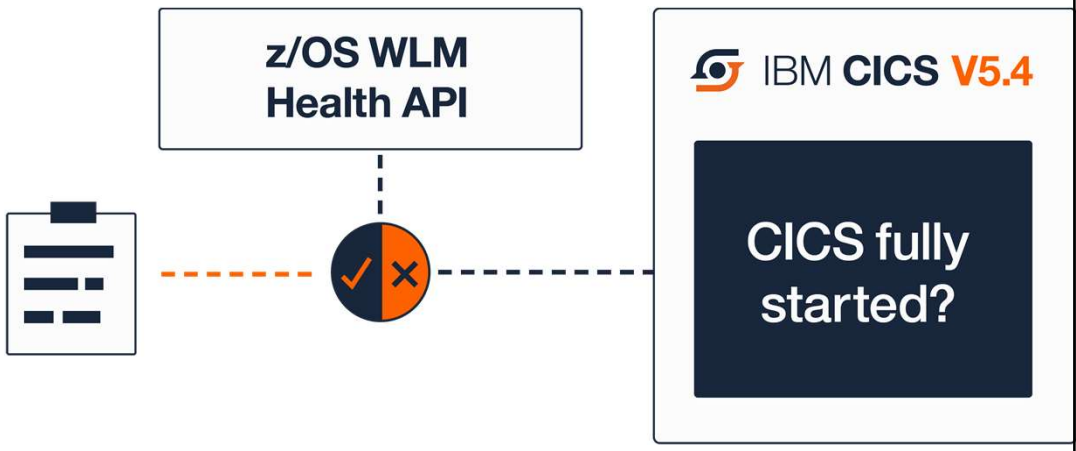
Notes

Alongside the two main hills of the CICS TS V5.5 release is the foundation work which ensures that CICS continues to deliver its core capabilities. This foundation work can be split into three main areas.

z/OS Workload Manager Health API (CICS V5.4)

CICS TS can utilize the z/OS Workload Manager Health API as a means of controlling the flow of work into a CICS region.

This can allow a CICS region to have a warm-up process after system initialization, to help to ensure that the CICS region is ready to receive work.



Notes

Provision to notify the z/OS Workload Manager Health API of CICS status was introduced in CICS TS V5.4.

The SIT parameter `WLMHEALTH` can be set to `OFF` or a pair of values – default is `(20,25)`.

The first value specifies the increment amount, and the second value specifies the frequency with which CICS increments the health status of the region.

An SPI also exists to allow applications to specify WLM Health status values themselves. For example, an in-memory table may need to be initialized before work starts to flow into CICS. The initial load program can call the `EXEC CICS SET WLMHEALTH` command on completion.

z/OS WLM Health Effects (CICS TS V5.4)

TCP/IP Sysplex Distributor & port sharing

- Avoids new TCP/IP connections being sent to CICS regions that are not ready
- Works with all TCP/IP listeners, CICS Web support, EZA sockets, Liberty, …
- Allows JVM servers and web service pipelines to fully initialize
- Shutdown of TCP/IP services sends HTTP close headers

Notes

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CICSPlex SM and z/OS WLM health API

Target region z/OS WLM health status when using CICS TS V5.4:

- 0% → no work routed to target
- 1%-99% → same as 100%
- 100% → no restrictions on workload routing

Target region z/OS WLM health status when using CICS TS V5.5:

- 0% → no work routed to target
- 1%-99% → work scaled according to health status
- 100% → no restrictions on workload routing

Notes

When CICS TS V5.4 was announced, it provided support for the z/OS workload manager (WLM) health API. CICSPlex System Manager (SM) exploited this API by using changes to its routing algorithm. For a zero health value, CICSPlex SM applied a high-penalty-weighting factor to discourage work from being routed there. All non-zero values were treated the same as a health value of 100%.

The CICSPlex SM exploitation of the WLM API is changed in CICS TS V5.5. A zero health value now means that the application-owning region (AOR) becomes non-selectable as a routing target. Therefore, work will not be routed there. In addition, CICSPlex SM now reacts to target region health values between 1% and 99%.

The value CICSPlex SM uses as maximum task (MXT) in its routing calculations now scales up in proportion to the target region's health value. This allows regions to gradually accept more work as their health value increases.

This new behavior is also being made available on CICS TS V5.4 via APAR PI90147.

CICS-MQ Alert Monitor

CICS TS V5.4: CKAM monitors z/OS WLM health status

- MQMONITOR resources not started until health > 0%
- Throttle connection if health < 100%

CICS TS V5.5: CKAM also monitors MXT status

- Throttle connection if MXT limit reached

Notes

The CKAM transaction is the CICS-MQ alert monitor.

In CICS TS V5.4 CKAM provided the mechanism to monitor the z/OS WLM health status of the local region and throttle any MQMONITOR resources accordingly.

In CICS TS V5.5 this transaction has been extended to also monitor if CICS has reached a MXT condition. If CICS encounters an MXT condition, CKAM calculates the maximum number of MQGET calls that an MQMONITOR can issue per second when this condition exists (=MXT+10%), effectively imposing a restriction on the number of tasks being started by MQMONITOR resources while CICS is at MXT.

AID limiting

Preventing performance degradation with long AID chains

- EXEC CICS INQUIRE CONNECTION or INQUIRE SYSTEM now report on the size of the AID chain
- CONNECTION statistics also report on the AID chain length
- SET CONNECTION SYSID() CANCEL will purge AID chain

Notes

CICS provides enhanced management capabilities for controlling automatic initiator descriptors (AIDs) in the AID chain for the local system, resulting from large number of EXEC CICS STARTs queued in the local system

You can now use these capabilities to prevent the occurrence of inordinately high number of AIDs chained from the local system's TCSE, and minimize chances of high CPU usage that might arise under such circumstances and subsequent degradation in task response times.

Task management

IBM Db2 threads when CICS task is purged

- Instrumentation facility interface (IFI) request to cancel request is issued if thread is in Db2
- Requires APAR PI92893 on Db2 V11

DELAY requests cancelled by another task

- New RESP2 value of 23.

Notes

Enhanced management of IBM Db2 threads that are used by CICS TS tasks

The management of Db2 threads that are used by CICS tasks and subject to PURGE or FORCEPURGE requests, is enhanced.

The SET TASK command is enhanced, such that CICS processing of task PURGE or FORCEPURGE requests will attempt to cancel active Db2 threads, which are used by CICS tasks, that are purged. If CICS detects that the task to be purged has a thread active in Db2, then it issues an instrumentation facility interface (IFI) Db2 cancel thread command to cancel the request in Db2 before it initiates the purging of the CICS task.

This enhancement ensures that the purge does not cause problems for Db2 and that the Db2 updates are safely backed out.

This capability requires APAR PI92893 on Db2 V11, or later.

Enhanced management of requests that are cancelled by another task

The CICS command DELAY is enhanced so that a user can distinguish between a delay completing successfully and a delay completing because of a cancel request. If a DELAY command is cancelled by command CANCEL REQID from another task, the DELAY completes with RESP(NORMAL) and a RESP2 value of 23.

Policy-based system rules

- Monitor state of system resources or CICS system health
- Introduced in CICS TS V5.4, enhanced in CICS TS V5.5
- Strategic replacement for CICS system events

Notes

Policy system rules were introduced in CICS TS V5.4 and were also made available via PTF for all previous V5 releases.

Policy system rules have been enhanced in CICS TS V5.5.

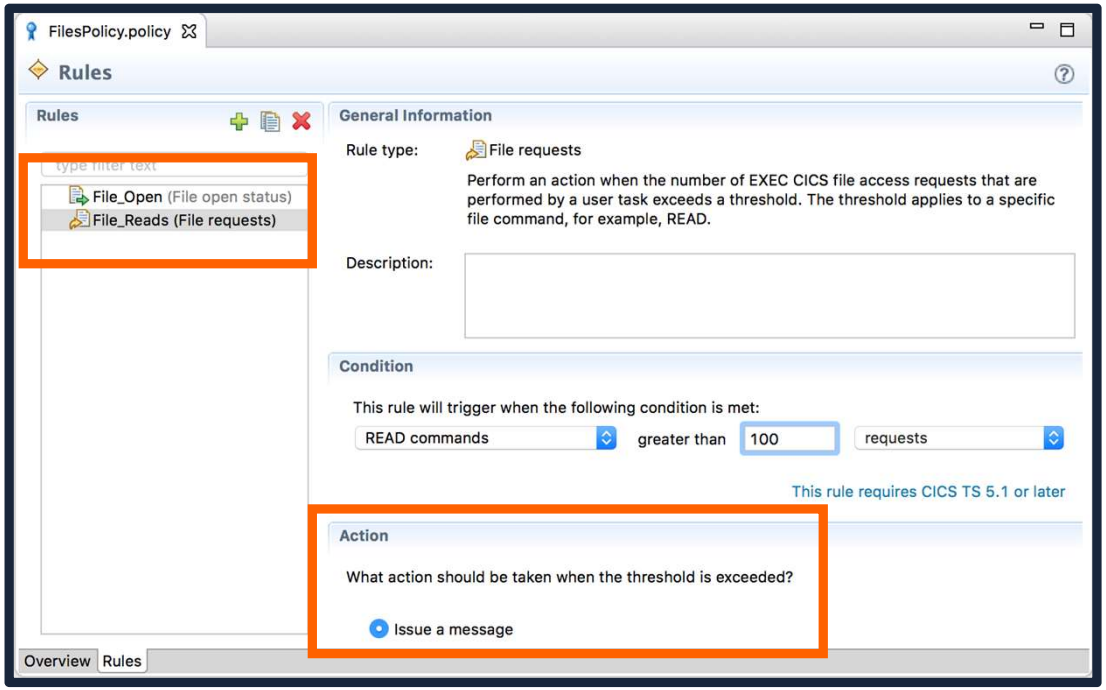
Important

- CICS system events are now deprecated and may be removed in a future release of CICS.
- CICS policies are the strategic replacement for the CICS system events technology.
- All events emitted by policy make use of the existing CICS events infrastructure.
- The underlying CICS events infrastructure and CICS application events remain strategic.

Policy editor and actions

Policies provide the **same capabilities as CICS system events** and with a **number of additional advantages**. These include:

- Combining multiple rules in a single policy
- Writing a message to the CICS log in addition to emitting an event
- Removing the requirement to define a capture specification for each event



Notes

The policy editor in the CICS Explorer allows you to configure multiple rules within in a single policy.

These rules can be task rules, system rules, or a combination. Note the editor will provide an indication of the minimum level of CICS required to support the created definition.

New policy system rules to monitor (V5.5)

- Enable status and available status of a BUNDLE resource
- Status of MRO and IPIC CONNECTION resources
- Enable status of a PROGRAM resource
- Total number of AIDs in the local CICS system

Notes

CICS TS V5.4 provided the ability to use system rules to monitor the following :

- Db2 connection status
- File enable status and open status
- CICS DFHxxnnnn and EYUxxnnnn messages
- Transaction class task counts
- Transaction abend
- User task counts

The following system rules are also available in CICS TS V5.4 with APAR PI92806

- Enable status and available status of a BUNDLE resource
- Status of MRO and IPIC CONNECTION resources
- Enable status of a PROGRAM resource

Total number of AIDs in the local CICS system is CICS TS V5.5 only

Statistics for CICS policy rules

Resource statistics collected for each rule:

- Policy and bundle names
- Rule name and type
- Action type, count, and last time occurred

Data collected for both task and system rules

Notes

Statistics are now available for CICS policy rules.

CICS collects resource statistics for each rule that is defined in a policy, and supplies a summary report. Policy rule statistics are retrieved by using the EXEC CICS PERFORM STATISTICS RECORD POLICY system command.

https://www.ibm.com/support/knowledgecenter/SSGMCP_5.5.0/reference/statistics/policy-statistics.html

Static data capture items

Emit static data with policy events

CICS Explorer V5.4.0.6 and later

Notes

If you use CICS Explorer Version 5.4.0.6 or later and you use the policy definition editor to work with policy rules, you can now define items of static data to be emitted with policy events and specify a user-defined name for the event.

This capability is also available on CICS TS 5.1, 5.2, 5.3, and 5.4 with APAR PI88500.

Other enhancements

Simplified upgrading

- No requirement to assemble and linkedit PLTs for each release

Multi-factor authentication for CMCI enhancements

- Use named Liberty angel and wait for initialization

Real-time monitoring of outbound web requests

- New URIMAP and WEBSERVICE resource monitoring records

Notes

Simplified upgrading

Upgrading has been simplified by removing the requirement to assemble and linkedit program list tables (PLTs) for each release. CICS will now read the PLT source from either PARMLIB or the new DFHTABLE DD statement in the JCL.

Support for multi-factor authentication for CMCI enhancements

New configuration options in CICS TS V5.5 simplify installation and implementation of the CMCI JVM server. The CMCI JVM server runs in the CICSPlex SM Web User Interface (WUI) region and handles CMCI requests when multi-factor authentication (MFA) is required. These new options include allowing a named Liberty angel to be used for the CMCI JVM server. The CMCI will wait for the Liberty angel initialization, rather than failing CMCI initialization.

Real-time monitoring of outbound web requests

Clients may now monitor, in real time, the URIMAPs and WEBSERVICEs that are opened or invoked by CICS TS as a web client. CICS TS monitoring is enhanced with new monitoring records URIMAP and WEBSERVICE in the resource monitoring class. Multiple URIMAP or WEBSERVICE records can be monitored for one task.

A URIMAP record monitors the completion of WEB OPEN URIMAP, WEB RECEIVE, WEB SEND, and WEB CONVERSE requests that are issued by the user task for a URIMAP.

A WEBSERVICE record monitors the completion of INVOKE SERVICE requests that are issued by the user task for a WEBSERVICE, and tracks the name of the PIPELINE resource definition that was used.

This enhancement makes it easier to identify the URIMAPs or WEBSERVICEs associated with prolonged socket wait time and diagnose troublesome destinations.

Security and resilience

Security checks on submitting jobs by using the CICS spool

- Feature toggle `com.ibm.cics.spool.surrogate.check`

Improved security for JCL job submissions to the JES internal reader

- Surrogate user checking

Group on VERIFY to improve authentication

- EXEC CICS VERIFY PASSWORD … GROUPID

Notes

Security checks on submitting jobs by using the CICS spool

A new surrogate security check restricts the ability of users to submit jobs using the EXEC CICS SPOOLWRITE command. The new command is available by using feature toggle com.ibm.cics.spool.surrogate.check.

Improved security for JCL job submissions to the JES internal reader

For JCL jobs that are submitted to the JES internal reader by using spool commands, CICS TS now performs surrogate user checking to verify if the user is authorized to submit a job with the user ID specified on the job card.

To support this verification, the following new toggle-enabled features are introduced:

1. Surrogate user checking for spool commands
2. User ID that is used for JCL job submission when no job user ID is specified on the job card

This enhancement makes job submissions from CICS TS to the JES internal reader more secure.

Group on VERIFY to improve authentication

With the new parameter GROUPID in VERIFY PASSWORD and VERIFY PHRASE, CICS TS can perform password or password phrase verification against the group ID in addition to a user ID and password or password phrase that is recorded in the external security manager.

Security and resilience contd.

User terminal access is restricted when using a default user ID

- `GMTRAN=(CESN,DISCONNECT)`

Increased minimum Transport Layer Security (TLS) level

- `MINTLSLEVEL=TLS12`

User ID changes for use with Kerberos service principle for a CICS region

- SIT parameter KERBEROSUSER

Notes

User terminal access is restricted when using a default user ID

New options, EXIT or DISCONNECT, on the GMTRAN system initialization parameter, are provided for users who use the CICS-supplied sign-on transaction CESL or CESN for log-on. These new options allow users to control what happens if the sign-on fails to complete.

Increased minimum Transport Layer Security (TLS) level

The default value for the MINTLSLEVEL system initialization parameter, which specifies the minimum TLS protocol that CICS uses for secure TCP/IP connections, is changed to TLS12.

User ID changes for use with Kerberos service principle for a CICS region

The new KERBEROSUSER system initialization parameter can be used to specify a user ID other than the CICS region user ID, to be associated with the Kerberos service principal for the CICS region.

Restricting CICS API and SPI commands and keywords

Enhanced CICS translator checks for restricted commands or keywords

- Warning or error messages issued

Translation time only

- Runtime unaffected

Does not apply to GDS, DLI, FEPI, or CPSM commands

Notes

You can now define a restricted commands parmlib member DFHAPIR, to impose rules on the use of specific CICS API and SPI commands.

The CICS translator has been enhanced to process the restricted commands parmlib member. During translation, the CICS translator checks a source file against the specified restricted commands or keywords, and will generate warning or error messages in case of violation.

The check is performed only when a program is being translated, and does not affect translated programs.

You can use this capability to prevent the use of specific commands and keywords in application programs.

This capability is applicable only to CICS API and SPI commands. It is not applicable to EXEC CICS GDS, EXEC DLI, EXEC CICS FEPI, and EXEC CPSM commands.

New EXCI commands for containers

EXCI provides four new commands:

- QUERY CHANNEL
- STARTBROWSE CONTAINER
- GETNEXT CONTAINER
- ENDBROWSE CONTAINER

Notes

The EXCI interface enables standalone applications that run on z/OS to programmatically interoperate with CICS-hosted applications and APIs.

CICS TS V5.4 introduced support for CICS channels and containers. It provides a mechanism to exchange large volumes of structured parameter data between batch applications and CICS applications.

Any CICS applications coded to the channel and containers API and invoked using Distributed Program Link (DPL) can also be invoked unchanged from an EXCI client, **including CICS applications that run on earlier CICS TS releases** that support channels and containers.

This new API can also be used as a way to pass data between programs that run outside CICS, such as programs that make up a batch application, even if the application does not communicate with CICS.

CICS TS V5.5 adds four new commands: QUERY CHANNEL, STARTBROWSE CONTAINER, GETNEXT CONTAINER, ENDBROWSE CONTAINER.

These new commands enable EXCI users to query the number of containers on a channel and to browse the names of the containers on a channel.

These new commands are also available regardless of the CICS TS server version. Only the client libraries need to be updated (use the latest SDFHEXCI library).

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CICS V5.6 open beta

Notes

CICS TS V5.6 open beta

- ✓ **Available 31 October 2019**
  - Announcement in 1st Oct. 2019

- ✓ **Minimum Requirements**
  - IBM zEnterprise 196 or subsequent 64-bit IBM z/Architecture processors.
  - IBM z/OS, V2.2 (5650-ZOS)
  - IBM 64-bit SDK for z/OS, Java Technology Edition, V8.0.

Notes

CICS TS V5.6 Open Beta was announced 1st October 2019 and has a planned availability date of 31st October 2019.

https://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/5/897/ENUS219-465/index.html

The CICS TS V5.6 open beta offering is introduced to allow clients to assess and provide feedback on potential future CICS TS capabilities.

What's in CICS TS V5.6 open beta

✓ Application development

- **A new REST API to simplify bundle development** during development
- **LINK with COMMAREA via DPLs now supports up to 32kB (was ~24kB)**
- **VERIFY TOKEN support for JWT**
  - Users' basic authentication credentials can be converted to a time-limited secure token

✓ Systems management

- **New policy system rule types**
  - DBCTL connection status, IBM MQ connection status, PIPELINE enable status
- **New policy z/OS WLM health policy action**
  - Increase or decrease the z/OS WLM health value of a CICS region
- **RDO definition of DUMPCODEs**
  - Removes the need to write a program list table (PLT) program
- **GMTRAN option DISCONNECT extended to sign-off transaction CESF**

Notes

Bundle development API is a REST API that receives a CICS bundle as a zip file over HTTP.

CICS unzip the bundle, install into, and enable in the CICS region automatically.

What's in CICS TS V5.6 open beta

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✓ Operational support

- **New monitoring and stats for security domain**
  - Performance data in group DFHTASK provides two new fields that indicate the total elapsed time that a user task spent verifying authentication credentials
  - User domain statistics provide global statistics giving a comprehensive view of user instances
  - CICS collects global statistics on the security domain, providing a view of authentication requests
- **Limit concurrent RACF requests so reduce the likelihood of SOS.**
  - Limit L8 TCBs acquired for security calls, and free when possible
- **Store and format recent trace entries for all user tasks**
  - For diagnosing problems with stalled tasks (in addition to AUX and internal)
- **CICS-MQ Bridge can now write SMF 110 records for the number to MQGET requests**
  - Specify SMFMQGET

Notes

TRS KE_NUM can format out the most recent trace entries information for the specified task.

e.g. IPCS VERBEXIT CICS730 'DEF=1,DLI=1,KE=3,TR=2,TRS=<TRANID=CSSC,KE_NUM=12,LAST_BLOCKS=500>'

End of support dates

- CICS TS for z/OS V4.2
  - 30th September 2018
- CICS TS for z/OS V5.1
  - 1st July 2019
- CICS TS for z/OS V5.2
  - 31st December 2020

Notes

Details of end of service dates for all IBM CICS products can be found at this website:

https://www.ibm.com/support/pages/end-service-dates-cics-products

Getting started

Notes

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Introduction to CICS video course

- IBM Redbooks video course
  - http://www.redbooks.ibm.com/redbooks.nsf/redbookabstracts/crse0303.html?Open

- What is CICS?
- CICS as an application server
- Configuring an application in CICS
- Scaling a CICS application

Notes

We also provide a video course that gives an introduction to CICS as an application server.

Availability and documentation

Was generally available 14th December 2018

- CICS TS for z/OS, V5.5
- CICS TS for z/OS VUE V5.5
- CICS TS for z/OS Developer Trial V5.5

Documentation

- Announce letter
- What's new
- Changes between releases

Notes

https://www.ibm.com/support/knowledgecenter/SSGMCP_5.5.0/whats-new/intro.html

https://www.ibm.com/support/knowledgecenter/SSGMCP_5.5.0/upgrading/changes/version_intro.html

CICS TS V5.5 Developer Trial

Try before you buy

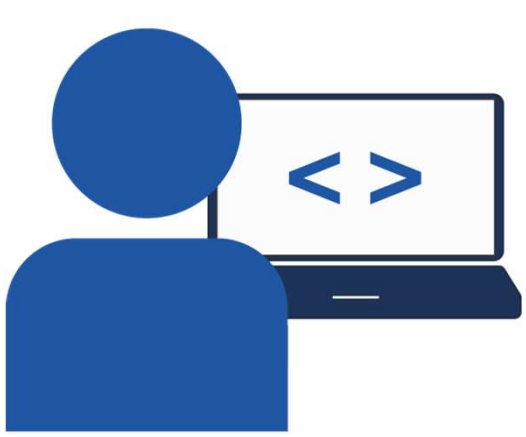
- No charge license, no single version charging period

Feature rich for evaluation

- Some restrictions – 30 max tasks, works for 90+ days from download date

Supported

- Assistance via dwAnswers and normal IBM service
- APARs delivered in periodic service refresh
- See technote for details



Evaluate the value

Explore the capability

Create the business case

Order from IBM Shopz (as often as needed)

Notes

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1. What is your conference registration number?

This is the three digit number on the bottom of your delegate badge

2. Was the length of this presention correct?

1 to 4 = "Too Short" 5 = "OK" 6-9 = "Too Long"

1 2 3 4 5 6 7 8 9

3. Did this presention meet your requirements?

1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1 2 3 4 5 6 7 8 9

4. Was the session content what you expected?

1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1 2 3 4 5 6 7 8 9

Thank you!

Jenny He
hejen@uk.ibm.com
CICS development, IBM Hursley Lab, UK