

Enhancing the foundation of CICS

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Session **GG**

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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



Security
Robustness
Mission-critical



Speed
Reliability
Trust



Flexibility
Scalability
Growth

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Control and ownership

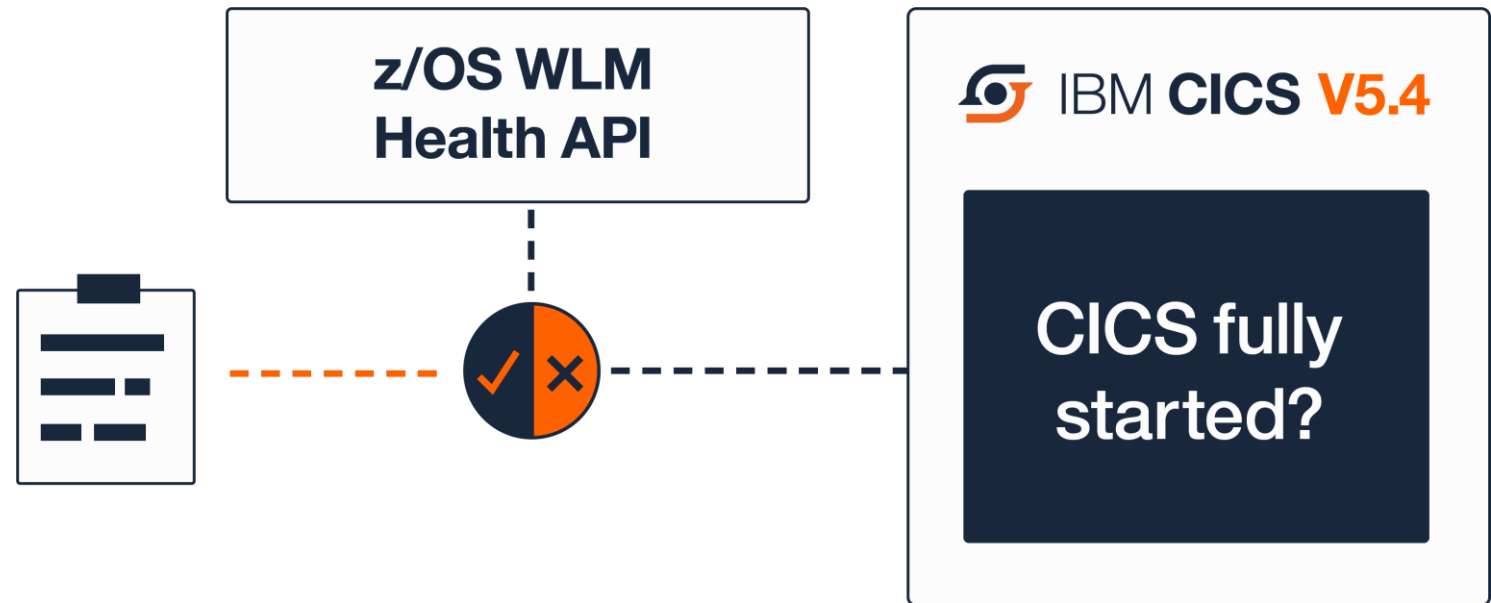


z/OS Workload Manager Health API (CICS TS V5.4)

CICS TS V5.4 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.

Example SIT option:
 WLMHEALTH=(10,20)



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, IPIC
- Allows JVM servers and web service pipelines to fully initialize
- Shutdown of TCP/IP services sends HTTP close headers

CICSplex SM and z/OS WLM health API

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

- High weighting factor applied to make AORs with WLMHEALTH = 0 not good candidates
- 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

CICS-MQ Alert Monitor

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

- MQMONITOR resources not started until health > 0%
- Throttles number of GETs/sec if health < 100%
 - Restricts the number of tasks started
- MQMONITORS stopped if health goes to 0

CICS TS V5.5: CKAM also monitors MXT status

- Throttles number of GETs/sec if MXT limit reached



IBM MQ

AID limiting

Preventing performance degradation with long AID chains

Automatic initiator descriptors (AIDs) are created in a local system when processing EXEC CICS START requests. A slowdown can lead to a build up of AIDs.

- [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
 - Use it on the connection representing this local system
- A new system policy rule can prevent creation of new AIDs by failing the START request

Task management

IBM Db2 threads when CICS task is purged

- **Enhanced EXEC CICS SET TASK PURGE/FORCEPURGE**
 - If task has Db2 thread and the thread is currently active in DB2, then a command thread used to issue IFI request to cancel request before purging the CICS task
 - If Db2 thread is not active in Db2, no change in behavior. Task is purged, Db2 thread will be used to issue backout request to Db2
 - Requires APAR PI92893 on Db2 V11 and above
 - CICS changes backported to all V5 releases (PI98569)

EXEC CICS DELAY requests cancelled by another task

- RESP(NORMAL) but with new RESP2 value of 23
 - Allows application to distinguish between the case where the delay completed as planned versus the delay was cancelled

Policy-based system rules

Monitor state of system resources or CICS system health

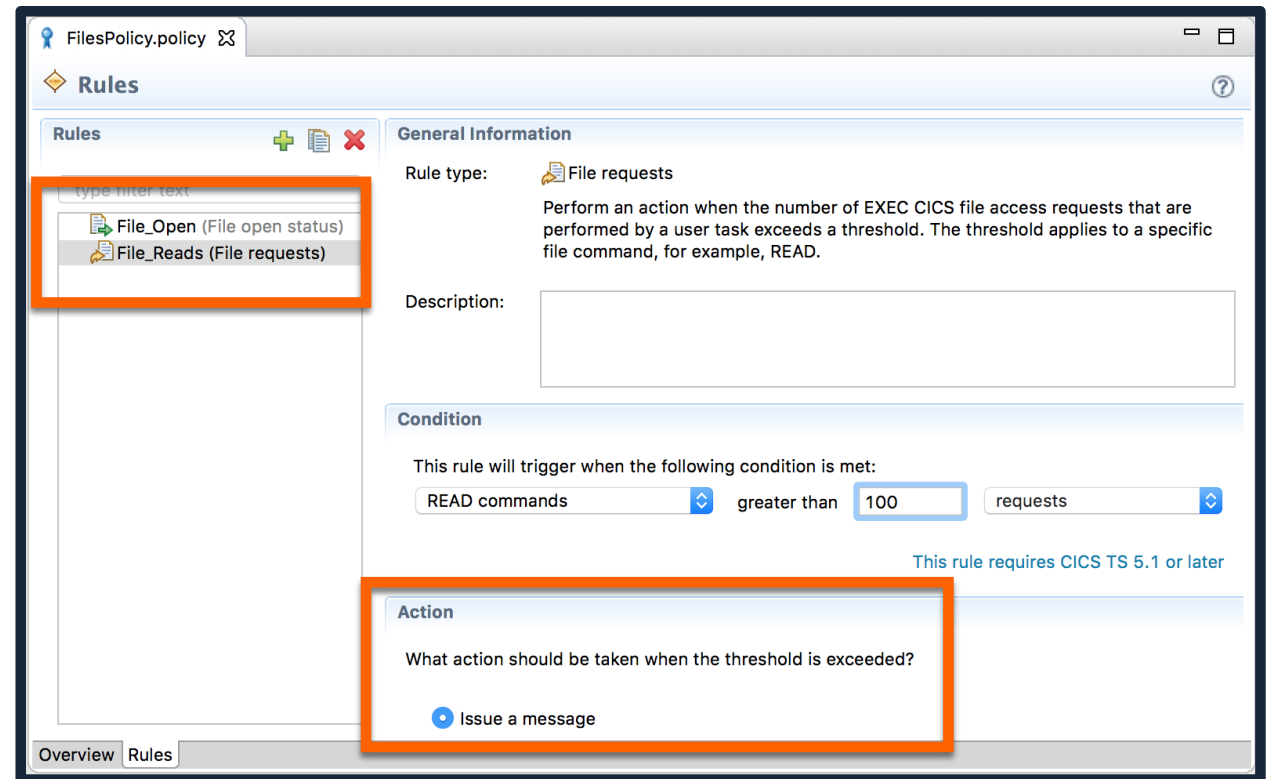
Introduced in CICS TS V5.4, enhanced in CICS TS V5.5

Strategic replacement for CICS system events

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
- Emit static data with policy events with CICS Explorer V5.4.0.6 and later



New policy system rules to monitor

- 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

* (also available in V5.4 via APAR PI92806)

New policy system rules to monitor (V5.5 CD)

New policy system rules

- Status of DBCTL connections *
- Status of IBM MQ connections *
- Enable status of a CICS PIPELINE resource *

- Delivered by CICS TS V5.5 APAR PH07632

- Update to CICS Explorer 5.5.0.3 for editor support

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

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Security and resilience

RFEs on job submission

- [Option to drive additional security check when using EXEC CICS SPOOLWRITE \(133357\)](#)
- [Enhance Security on JCL submit from CICS \(90338\)](#)
- [Define the USERID parameter on a Transient Data Extrapartition queue. \(67854\)](#)

Surrogate checks on SPOOLWRITE & WRITEQ TD

New surrogate check

- Can “signed on” user submit JCL for jobuser?
- Requires XUSER=YES
- NOTAUTH response

```
//jobname JOB USER=jobuser
```

```
//jobname JOB
```

jobuser implied (see next slide)

```
RDEFINE SURROGAT jobuser.SUBMIT UACC(NONE)
PERMIT jobuser.SUBMIT CLASS(SURROGAT)
ID(signed_on_user) ACC(READ)
```

Feature toggled for migration

```
com.ibm.cics.spool.surrogate.check={true|false}
```

Job is still submitted by region userid

- Still requires same ESM definitions
- Checked by z/OS

```
RDEFINE SURROGAT jobuser.SUBMIT UACC(NONE)
PERMIT jobuser.SUBMIT CLASS(SURROGAT)
ID(regionid) ACC(READ)
```

SPOOLWRITE – Change to default job userid

Currently submits a job with region userid

```
//jobname JOB
```

New behaviour

- Submits job with the signed on userid
- Same as TSO
- No CICS surrogate checking required
- Job is still submitted by region userid

```
RDEFINE SURROGAT jobuser.SUBMIT UACC(NONE)
PERMIT jobuser.SUBMIT CLASS(SURROGAT)
ID(regionid) ACC(READ)
```

Will require application change if regionid is required

- Can use &SYSUID which means current region

```
//jobname JOB USER=regionid
```

```
//jobname JOB USER=&SYSUID
```

Feature toggle migration option

```
com.ibm.cics.spool.defaultuser={region|task}
```

WRITEQ TD – Change to default job userid

New parameter on external TDQ

- Defaults to region userid
- Surrogate check on install
- No surrogate check required for WRITEQ TD
- Also included in CPSM and Explorer definitional views

```
EXEC CICS WRITEQ TD QUEUE('JCLF') FROM('//JOBNAME JOB')
```

Jobuserid is not returned on INQUIRE TDQUEUE

```

CEDA  View TDqueue( JCLF )
  TDqueue      : JCLF
  Group        : SPOOL
  DEscription  :
  TYPE         : Extra           Extra | INtra | INDirect
EXTRA PARTITION PARAMETERS
  Databuffers  : 001           1-255
  DDname       : SUBJCL
...
Jobuserid    : CRPTST3
  
```

Security and resilience contd.

Group on VERIFY to improve user authentication

- EXEC CICS VERIFY PASSWORD ... GROUPID
 - No longer necessary to use an additional terminal based task simply to validate that passticket

User terminal access is restricted when using a default user ID

- GMTRAN=(CESN,DISCONNECT)

User terminal access is restricted at signoff

- CICS TS V5.6 Open Beta

Security and resilience contd.

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

QUERY SECURITY – new function

RFE 18027

- Added USERID as an optional parameter
- If USERID specified:
 - Surrogate user check introduced
 - Equivalent to surrogate user check for EXEC CICS START USERID but use of ESM profile userid.DFHQUERY is introduced for EXEC CICS QUERY SECURITY USERID
 - Authority checks can now be made for user ID specified in USERID option

Performance of QUERY SECURITY improved by reducing TCB switching:

- Programs running on QR stay on QR and use RO for SVC call (as before)
- Programs running on an open TCB stay on the open TCB (do not use RO)
- Reduction in number of RACROUTE requests issued

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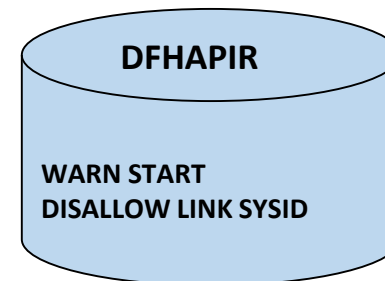
Greater API and SPI control

Restricting CICS API and SPI commands and keywords

- It is possible to control use of API and SPI and generate either warning or error messages for commands
- A new member, called DFHAPIR needs to be defined in a PARMLIB which is part of the loadlib concatenation used at IPL time
 - default is SYS1.PARMLIB
 - can have up to 16, depending on z/OS level, others defined
- The translator checks the application source against the “restricted” commands in DFHAPIR and issues an appropriate message



- Can code either WARN or DISALLOW followed by the command to be checked for (without EXEC CICS)
 - WARN START
 - DISALLOW LINK SYSID
 - Comment lines can be coded and must have an asterisk in column 1
- Member read automatically by translator
 - no need to edit JCL to pick it up
- No runtime checks
 - no performance hit at run time
 - but no checking of existing applications



At the top of the output you see where DFHAPIR was found

```
14.28.59 JOB28139 ---- THURSDAY, 01 FEB 2018 ----
14.28.59 JOB28139 IRR010I USERID DBEARD1 IS ASSIGNED TO THIS JOB.
14.28.59 JOB28139 ICH70001I DBEARD1 LAST ACCESS AT 14:26:39 ON THURSDAY, FEBRUARY 1, 2018
14.28.59 JOB28139 $HASP373 STALSIM2 STARTED - INIT 76 - CLASS M - SYS MV2C
14.28.59 JOB28139 IEFUSI HAS SET MEMLIMIT TO SMF DEFAULT VALUE
14.28.59 JOB28139 IEE402I STALSIM2 - STARTED
14.28.59 JOB28139 IEE252I MEMBER DFHAPIR FOUND IN USER.PARMLIB
14.28.59 JOB28139 IEE252I MEMBER DFHAPIR FOUND IN USER.PARMLIB
14.28.59 JOB28139 -
14.28.59 JOB28139 - --TIMINGS (MINS.)--
14.28.59 JOB28139 -JOBNAME STEPNAME PROCSTEP RC EXCP CPU SRB CLOCK SERV PG PAGE SWAP VIO SWAPS STEPNO
14.28.59 JOB28139 -STALSIM2 DRBEBIN TRN 08 204 .00 .00 .00 831 0 0 0 0 0 1
14.28.59 JOB28139 IEFUSI HAS SET MEMLIMIT TO SMF DEFAULT VALUE
14.28.59 JOB28139 -STALSIM2 DRBEBIN COB FLUSH 0 .00 .00 .00 0 0 0 0 0 2
14.28.59 JOB28139 IEFUSI HAS SET MEMLIMIT TO SMF DEFAULT VALUE
14.28.59 JOB28139 -STALSIM2 DRBEBIN PRINT FLUSH 0 .00 .00 .00 0 0 0 0 0 3
14.28.59 JOB28139 IEFUSI HAS SET MEMLIMIT TO SMF DEFAULT VALUE
```

At the bottom of the listing, you see the error message

```
00036
00037 EXEC CICS LINK PROGRAM('FRED') COMMAREA(CNAME) SYSID('SYS1')
00038 END-EXEC.
00039
00040 EXEC CICS RETURN END-EXEC.
00041
00042 exit.
CICS 7.2.0 COMMAND LANGUAGE TRANSLATOR TIME 14.28 DATE 1 FEB 18 PAGE 3
TRANSLATOR DIAGNOSTIC MESSAGES OF SEVERITY W AND ABOVE
MESSAGE NUMBER SEVERITY LINE NUMBER MESSAGE
DFH7283I C 00037 SYSID KEYWORD FOUND WHICH IS DISALLOWED BY A TRANSLATOR RULE. COMMAND NOT
TRANSLATED.
```

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Performance and monitoring

Improved performance for large number of containers on a channel

RFE 92351

- This RFE has been raised by a customer who wants to create thousands of containers on a single channel.
 - You can do this, however GETs can be a performance challenge
 - GET CONTAINER(NAME) searches a linked list for the container
- The solution – multiple shorter lists
 - Uses a simple hash of the container name to select a list

Threadsafe Coupling Facility data tables

Access CFDTs from Open TCB applications without TCB switch

- READ, REWRITE, DELETE, WRITE, STARTBR, READNEXT, READPREV, ENDBR, RESETBR, UNLOCK commands for CFDTs can run on an open TCB as well as QR
- Syncpoint processing for CFDTs can run on an open TCB as well as QR
- SPI – INQUIRE CFDTPOOL has been made threadsafe

Processing that still occurs on QR TCB

- Open/Close of CFDTs is not threadsafe enabled so will always run on QR
- Connect & Disconnect from CFDT server and resync with the CFDT server will always run on QR
- Implicit open of a CFDT will force a switch to QR

Load of CFDTs is not threadsafe enabled – will always run on QR

Monitoring of outbound webservices

Monitoring of outbound web requests

- New URIMAP and WEBSERVICE resource monitoring records

New resource monitoring record - URIMAP

New URIMAP record

- Since one task may issue multiple WEB OPEN URIMAP commands, we need a new record called URIMAP in the resource monitoring class.
 - Multiple URIMAP records can be monitored for one task. (same as File, TS queue)
 - Default of 0 for customer to opt in and maximum of 64 number of such record the same as other records.
 - Only created for the URIMAP resource that is opened using:
 - WEB OPEN URIMAP with URIMAP configured with USAGE(CLIENT)
 - The record has monitoring fields for:
 - WEB OPEN, WEB SEND, WEB RECEIVE, WEB CONVERSE commands
 - WEB CONVERSE is separated into send and receive sides

New resource monitoring record - WEBSERVICE

New WEBSERVICE record

- One task may issue multiple INVOKE SERVICE commands, we need a new record called WEBSERVICE in the resource monitoring class.
 - Multiple WEBSERVICE records can be monitored for one task.
 - Default of 0 for customer to opt in and maximum of 64 number of such record the same as other records.
 - Only created for WEBSERVICE resource invoked via INVOKE SERVICE command.
 - INVOKE SERVICE may specify URIMAP, but no URIMAP record in resource class will be created for this case nor the URIMAP name will be recorded in the WEBSERVICE record as we don't yet to see a need for this.

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Other enhancements



CICS upgrading enhancement

Removed requirement to assemble and linkedit PLTs for each release

CICS has been changed so as to read in the source of PLTs

PLT source can be:

- In a member of PARMLIB which is part of the IPL concatenation
 - No change to CICS JCL required to pick this up
- In a member of a PDS named specified by a new DFHTABLE DD card
 - Probable use case for test regions

```
//DFHTABLE DD DISP=SHR,DSN=pds_name
```

Currently only used for PLTs but could be used for other tables in the future

CICS upgrading enhancement contd.

DFHPLT macro has been changed

- Gives an MNOTE 8 with a message stating that PLTs no longer need to be assembled

```
** ASMA254I *** MNOTE *** 95+ 8,It is not necessary to assemble PLT tables. Use the source files
```

CICS will not load and process assembled PLTPI nor PLTSD tables

Load locations:

- PLTPI=JT or PLTSD=JT
 - CICS will look for the PLT source in member DFHPLTJT of PARMLIB or PDS referred to by DFHTABLE
- PLTPI=TILLING or PLTSD=TILLING
 - Parameter now supports up to eight characters
 - Will look for member TILLING in PARMLIB or DFHTABLE

Managing USS processes (RFE 107246)

- CICS now manages releasing USS processes used by open TCBs
 - A process is associated with an open TCB if USS are used, for example EZAsockets or access to zFS file
 - Note: Db2 use of an L8 TCB does not involve use of a USS process
- The process is removed when the open TCB is freed from the CICS task and returned to the dispatcher pool
 - For L8 and L9 TCBs that is at CICS end of task
 - For X8 and X9 TCBs that is at program link level
 - T8 behaviour is unchanged
- Previously for L8, L9, X8 and X9 TCBs the process remained with the TCB until the TCB terminated

New EXCI SPI commands for containers

EXCI provides four new commands:

- QUERY CHANNEL – find out how many containers are on a channel
- STARTBROWSE CONTAINER – browse the names of the containers on a channel
- GETNEXT CONTAINER
- ENDBROWSE CONTAINER
- For QUERY CHANNEL and STARTBROWSE CONTAINER:
 - CHANNEL keyword is mandatory – there is no concept of a current channel
 - DFHTRANSACTION as a channel name is allowed. It has a lifetime of the EXCI job.
- These commands do not interact with CICS. They execute entirely in the EXCI client address space

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Questions?



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