CICS TS V5.3 and continuous delivery

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CICS TS V5.3 and continuous delivery

CICS TS version 5
  Versions, feature packs and editions

CICS TS V5.3 and continuous delivery
  Enhanced support for Java and Liberty
  Performance optimizations, enhanced metrics and additional security
  New cloud and DevOps support to automate CICS deployments

Q&A

Text in Red are links to more information
**CICS TS versions**

CICS TS V3.1 & V3.2 no longer in service as of December 2015

CICS TS V4.1 in service until September 2017
CICS TS V4.2 in service until September 2018

CICS TS V5.1 available December 2012
CICS TS V5.2 available June 2014
CICS TS V5.3 available December 2015
  Continuous delivery of major updates in July 2016 & October 2016 via service
  Recommended, in particular for Java workloads

CICS TS V5.4 open beta available now
  New drop includes V5.3 + service + new features every few months
  Open beta versions of CICS Explorer, build toolkit, provisioning toolkit, etc.
  Documentation in Knowledge Center

Happy 47th CICS
CICS TS feature packs

CICS TS Feature Pack for Mobile Extensions
   Alternative solutions JAX-RS in Liberty, and z/OS Connect EE

CICS TS Feature Pack for Security Token Extensions

CICS TS Feature Pack for Modern Batch
   Strategic solution Java EE Java Batch (JSR-352) standard in Liberty

CICS TS Feature Pack for Dynamic Scripting V1.1

CICS TS Feature Pack for Dynamic Scripting V2
CICS TS V5.3 Developer Trial

Try before you buy
   No charge license, no single version charging period

Feature-rich for evaluation
   Some restrictions such as 30 max tasks, works for 90+ days from download date

Assistance via CICSdev forum, dWAnswers and normal IBM service
   APARs delivered in periodic service refresh
   See technote for details

Order from IBM Shopz with internet or physical delivery options
   Order as often as needed

Evaluate the value  Explore the capability  Create the business case
Mixed Language Applications

made with CICS

IBM CICS Transaction Server is the most advanced mixed language application server in the world.

Thousands of companies run CICS applications, processing more than 100 billion transactions each day.

Applications written in multiple programming languages.
Applications accessed from practically any device.
Applications that power the world economy.
Applications that are made with CICS.
IBM CICS Transaction Server V5

the premier enterprise grade mixed language application server

- Service Agility
- Operational Efficiency
- Cloud Enablement
CICS TS V5.3 – What’s New

Service Agility
Enhanced support for Java and the Liberty

Operational Efficiency
Performance optimizations, enhanced metrics and additional security

Cloud with DevOps
New cloud and DevOps support to automate CICS deployments

- Additional Liberty features
- Enhanced interoperability
- Simplified management
- Enhanced Java SE support

- Web service optimizations
- Performance improvements
- Enhanced metrics
- Additional security options

- Automated builds
- Scripted deployments
- UrbanCode Deploy support
- Enhanced cloud enablement

Satisfies 70+ requirements
**CICS TS V5.3**

*Enhanced support for Java and Liberty*

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### Additional Liberty features

**Enhanced interoperability**

**Simplified management**

**Enhanced Java SE support**

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**Supports a wide range of Java web APIs**

- Java EE 7 Web Profile – PI63877
- Java EE 7 Full Platform in new standard mode – PI58375

**Some Java EE 7 Full Platform in integrated mode** – PI63005

- Java Batch 1.0 provides an API for batch applications and a runtime to run and manage batch jobs
- Batch Management 1.0 - REST management interface, job logging, and command line utility to integrate schedulers
- JavaMail 1.5 - API to work with mail server and send/receive email

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**Improved zIIP offload eligibility for Liberty workloads**

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**Connectors**

- Web
- Restful
- Web Services
- JMS

**Application Frameworks**

- Blueprint
- EJB
- JPA
- CDI
- Managed Beans
- JMX
- JNDI

**Data Access**

- JCA
- Mongodb
- JDBC

**QoS**

- SSL
- WS-security
- Session persistence
- HTTP plugin
- OAuth
- LDAP
**CICS TS V5.3**

*Enhanced support for Java and Liberty*

**Additional Liberty features**

Use standard Java EE APIs in Liberty to Invoke CICS programs

- JCA (Java Connector Architecture) for portable Java applications to invoke CICS programs in any supported language

**Enhanced interoperability**

Use CICS commands to invoke Java EE apps in Liberty

- LINK and START commands to invoke Java EE applications
- Simple Java annotations to use
- POJO packaged in WAR or EAR
- PI63005 and CICS Explorer & build toolkit 5.3.0.8

**Simplified management**

**Enhanced Java SE support**

**CICS TS remote development feature for Java**

Install using Liberty tools from Liberty repository

- Developers can test and debug apps in local Eclipse with Liberty
- Connects to CICS using IPIC
- Deploy app in CICS with no code changes

Separately priced z/OS Connect EE can be hosted in Liberty in CICS TS V5.3 – PI59304

- RESTful APIs with JSON payloads to CICS
- Optimised local ECI adapter to call CICS programs
CICS TS V5.3
Enhanced support for Java and Liberty

Add annotation @CICSProgram("DISPATCH")

J2C or JZOS tooling to generate conversion classes

Use Java EE APIs or frameworks, or existing Java
CICS TS V5.3
Enhanced support for Java and Liberty

Additional Liberty features

CICS TS & CICS Explorer updates include Liberty fix packs
  Accumulation of Liberty fixes, typically every quarter

Enhanced interoperability

Simplified process for managing log files
  Control maximum number of zFS logs, redirect log files to the MVS log, standardized timestamps

Java Management Extensions (JMX)
  Monitor and manage Liberty JVM server apps and system objects
  JMX Local Connector to access JMX resources on same server
  Monitoring to enable JMX notifications
  JMX REST connector to enable remote access for JMX clients

Simplified management

Manage and monitor applications and system objects
  Locally using JMX and Health Center APIs or Eclipse client
  Remotely using JConsole monitoring tool

Enhanced Java SE support
IBM Health Center and JConsole

IBM Health Center running inside the CICS Explorer

JConsole, using standard supported JMX APIs
CICS TS V5.3
Enhanced support for Java and Liberty

Additional Liberty features

CICS can use Java SE 7, 7.1, or 8
Adopt new Java releases at a pace suitable to you
Can install and use a mix of releases in a CICS region
V8 uses latest z System hardware for performance improvements

Java Message Service (JMS) in CICS OSGi JVM server
Java SE programs in can use JMS or MQ classes for Java
IBM MQ for z/OS V7.1 PI29770, or V8 PI28482

Enhanced interoperability

Upgrade in place OSGi bundles in CICS OSGi JVM server
Version range in CICS bundle part
CICS bundle phase-in

Simplified management

Enhanced Java SE support
CICS TS V5.3
Performance optimizations, enhanced metrics, and additional security

Web service optimizations

Flow control to prevent HTTP requests flooding a CICS region
  TCP/IP can efficiently route new work elsewhere

Pipeline processing of HTTP requests has been improved
  Removes the need for an intermediate web attach task (CWXN transaction) for most types of SOAP and JSON based HTTP CICS Web services, reducing CPU and memory overhead
  The optimization can also be used for inbound HTTPS requests using AT-TLS for SSL support (by configuring TCPIPSERVICEs as AT-TLS aware)
  Even for HTTPS using CICS-provided SSL, improvements have been made by removing a number of TCB switches

Performance improvements

Enhanced insight

Additional security options

End-to-end non-Java JSON infrastructure - PI56897
  Provides greater throughput with less overall CPU
  TRANSFORM command for JSON - PI54841
CICS TS V5.3
Performance optimizations, enhanced metrics, and additional security

HTTP Requests

SOLS
Long running task on its own TCB. Must not be blocked by an individual request.
If CICS SSL* OR Web analyser program OR Static response OR Not enough data => CWXN
Gets tran ID and user ID from URIMAP and/or AT-TLS
Start application transaction with the specific tranid and userid
Process next piece of work

CWXN
Only run when unable to establish context in SOLS

User Transaction i.e. CWBA, CPIH
Synchronously receive body data and pass to next step in application
Application processing run as before

User Transaction
i.e. CWBA, CPIH
CICS TS V5.3
Performance optimizations, enhanced metrics, and additional security

Web service optimizations

Performance improvements

Internal performance improvements in many other areas:
- 30 additional SPI commands have been made threadsafe
- Exploits some of the hardware instructions introduced with IBM z9, such as STCKF
- Cache alignment for key CICS control blocks
- Reduced lock contention within monitoring algorithms
- Improvements to MRO session management algorithms

Enhanced insight

Noticeable improvements
- CICS trace facility
- CICS monitoring facility
- MRO connections with high session counts

Additional security options
**CICS TS V5.3 – Threadsafe roadmap**

- **V1.3 in 1998**
  - CICS OTE

- **V3.1**
  - VM

- **V3.2**
  - VSAM/RLS
  - MQ
  - Journal
  - Document delete

- **V4.1**
  - Web query parm
  - Transform XML
  - Invoke service
  - Signal event
  - WSAContext

- **V4.2**
  - IMS DLI
  - Syncpoint
  - Password, Passphrase
  - BIF digest, deedit
  - Temporary storage
  - Named counter
  - File browsing, deleting, rewriting

- **V5.1**
  - Transient Data
  - Get/Put
  - Container
  - Free/Getmain
  - LOAD

- **V5.2**
  - Inquire/Set stats
  - Invoke application
  - Set program

- **V5.3**
  - Inquire, Discard, Set
  - Perform security
  - Perform SSL rebuild
  - Write operator
**CICS TS V5.3**

*Performance optimizations, enhanced metrics, and additional security*

- **Web service optimizations**
- **Performance improvements**
- **Enhanced insight**
- **Additional security options**

**Transaction tracking supports work started by CICS-MQ bridge**

Transaction tracking identifies relationships between application tasks as they flow across CICS systems

Aids problem determination, reporting and auditing

**Metrics have been added to global CICS statistics**

Transaction CPU time measurements captured without needing CICS monitoring to be active - allows greater insight into CPU resource usage without the overhead of collecting and processing SMF 110 monitoring records

**Emit CICS events to IBM Decision Server Insights (DSI)** - PI55134

DSI is a scalable transactional event processing system that uses correlation, rules, and aggregations to detect situations and perform actions

Article [Integrating CICS events with ODM Decision Server Insights](#)
**CICS TS V5.3**

*Performance optimizations, enhanced metrics, and additional security*

- **Web service optimizations**
  - Support for the Enhanced Password Algorithm
    - Uses RACF APAR OA43999 for stronger encryption

- **Performance improvements**
  - Enhanced support for Kerberos
    - SIGNON TOKEN command: avoids need to flow a password – applications can validate a Kerberos security token and associate a new user ID with the terminal

- **Enhanced insight**
  - New REQUEST PASSTICKET command
    - can be used for outbound requests from the current task where basic authentication is required – requests an external security manager, such as RACF, to build a PassTicket

- **Additional security options**
  - Further off-load of authentication requests to open TCBs
    - reduces contention on RO TCB
**CICS TS V5.3**

New cloud and DevOps support to automate CICS deployments

**Automated builds**

Applications and bundles provide a convenient way to package and manage components, resources, and dependencies in CICS

**CICS build toolkit**

Command-line tool for automating the building of CICS projects from Eclipse source projects created using CICS Explorer

- Cloud platforms, applications, bindings, and bundles
- OSGi Java and Liberty profile components

Runs on z/OS, Linux, and Microsoft Windows

Builds bundles for all in-service CICS releases

**Variables can be used in CICS bundle parts**

Variables substituted using values in properties files by the CICS Build Toolkit or the CICS Explorer when exporting manually

Enables deployment of the same bundle to target systems that require different resource attributes
CICS TS V5.3
New cloud and DevOps support to automate CICS deployments

Automated builds

Scripted deployments

UrbanCode Deploy support

Enhanced cloud enablement

DFHDPLOY batch utility can provision CICS bundles and applications across many CICS systems

- Scripting commands to deploy, undeploy, and set
- Defines necessary resources in CSD or BAS
- Will wait for bundles and applications to reach req. state
- Will wait for application workload to complete during undeployment
- Easy to automate
- Requires CPSM
CICS TS V5.3
New cloud and DevOps support to automate CICS deployments

IBM UrbanCode Deploy (UCD) orchestrates and automates deployment of applications, configurations, and database changes.

CICS TS plug-in for UCD supports CICS applications in these orchestrations:
- CICS applications and bundles:
  - Deploy, undeploy
  - Enable, disable, un/available
  - Check status
- CSD and BAS resources:
  - Install resources, resources descriptions, groups, and lists
  - Enable, disable, un/available, discard
  - Open, close
  - New copy, phase in, pipeline scan
  - Check status

Requires CPSM
Works with all in-service CICS releases.
**CICS TS V5.3**

*New cloud and DevOps support to automate CICS deployments*

Automated builds

New threshold policies
Number of MQ requests, DL/I requests, named counter requests, and shared temporary storage requests issued by a CICS task
Total number of policy types is now 14, containing more than 40 items that triggers can be set against

Scripted deployments

A transaction ID can be set as an application entry point
Differentiate and control users by tranid, program, or urimap
Use to **Restrict CICS policies to specific CICS user tasks**

UrbanCode Deploy support

A transaction ID can be set as the scope for a policy

Enhanced cloud enablement

Recovery of the application infrastructure enhanced
The available or unavailable state of an application is automatically recovered across CICS restarts
CICS Explorer 5.3.0.x

Quick filters and <>! operators for numerics

Create, manage and share views
  Compound filters
  Columns headings and sorting
  Quick access icons

Performance improvements
  CICSPlex Explorer
  WLM Specification editor

New SYSLINK system links view

Easier to export bundles to z/OS
  Choices are remembered

Discard can automatically disable first
CICS Explorer & all latest z/OS plug-ins for Eclipse
developer.ibm.com/mainframe

Eclipse Tools for Mainframe Development

IBM Explorer for z/OS Aqua offers an integration platform and a single common way to obtain a compatible and integrated set of Eclipse tools to allow system programmers and developers to be productive. Platforms and plug-ins based on IBM Explorer for z/OS Aqua have been built and tested to install side by side taking the guesswork out of choosing which plug-in will install into which platform. Hover over a platform to learn which plug-ins can be installed into which platforms. Click any offering to learn more and see additional download options.

Click on Download Eclipse Tools below and follow the installation instructions once you are sure all the prerequisites are met.

Plug-ins

- Deployment Assistant
- Performance Analyzer
- Configuration Manager
- Application Performance Analyzer
- Fault Analyzer
- File Manager
- Rational Team Concert
- Data Studio
- Transaction Gateway
- Interdependency Analyzer
- z/OS Connect EE

Platforms

IBM Developer for z Systems - Enterprise Edition
- CICS Explorer
- z/OS Explorer
- Eclipse

IBM z Systems
CICS Transaction Server V5
the premier enterprise grade mixed language application server

Service Agility
Runtime support for production ready web applications.
Integration with mobile applications.

Operational Efficiency
Increased system capacity and capability to achieve more with less.
Automatic control of critical resources using policies.

Cloud Enablement
Simplified system management and rapid application deployment.
On premise pattern based cloud deployment.
CICS TS V5.4 open beta

... as of 4 October 2016
Please Note

• IBM’s statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM’s sole discretion.

• Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.

• The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract.

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• 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.
Engagement programs

CICS Design Partnership and Business Partnership programs
Early access to IBM Design Thinking ideas and proposals
Live weekly playbacks, IBM InterConnect playbacks, yearly get together in Hursley
Additional feedback via 1-1 interviews, surveys, Slack channel, pre-beta code drops
Requires a non-disclosure agreement - contact your IBM representative

CICS beta and early test
Early access to CICS and other products and tools, documentation, education
Learn about and try / test new features in your environment with your apps
Development team assistance
Requires a non-disclosure agreement
Asked give feedback and be a customer reference :-)

CICS open beta
Self-sign license agreement to download code
Read documentation anytime without signing license
CICSDev articles

All betas for non-production use and require full installation
**CICS TS V5.4 open beta**

**New commands to issue run asynchronous transactions in CICS**

RUN TRANSID to run a child transaction
- Optionally provide data in a channel

Child
- Inherits parents’ security context
- Runs and completes independent to outcome of parent
- Return data in default channel

Optionally, parent issues FETCH to wait for a child transaction
- Use loop to wait on all / several
- Correlates responses if necessary

Transaction tracking used to understand parent / child relationships
Async API - parent and child patterns

As the application developer I want to specify which Child transaction to wait for.

“I cannot continue processing the parent coordinator, until I have received confirmation from child program PROGC3”

Further patterns, such as FETCH … ANY and timeouts being considered
Async API - perfect case

EXEC CICS RUN TRANSID

EXEC CICS FETCH

Child responds before the FETCH
Async API - good case

Child responds in a timely manner

EXEC CICS RUN TRANSID

EXEC CICS FETCH

FETCH COMPSTATUS(NORMAL)
**CICS TS V5.4 open beta**

New z/OS provisioning toolkit command-line utility to provision environments

- Uses z/OSMF REST API to rapidly provision and deprovision CICS environments
- Build and run images (binary packages)
- z/OSMF workflows allocate, initialize, and manage pools of system resources
  - Data sets, log streams, TCP/IP ports, ...

Sample images

- Provision a CICS region with Liberty
- Provision a CICS region with web services
- Provision a CICS region with embedded z/OS Connect

Workflows customised with a variables .properties file

Use in conjunction with other tools like the CICS TS build toolkit to build an automated deployment pipeline

Also compatible with CICS TS V5.2 and CICS TS V5.3
z/OS provisioning toolkit - help

Usage: zospt [OPTIONS] COMMAND [arg...]

Options:
  --version : Displays the command line version
  -h (--help) : Displays the command line help

Commands:
  build       PATH [--help] -t (--tag) <image-name>
  images      [--help]
  inspect     <image-name> [--help]
  rm          <containerId> [--help] [-f (--force)]
  run         <image-name> [--help]
  start       <containerId> [--help]
  stop        <containerId> [--help]
  ps          [--help] [-a (--all)]

Run 'zospt COMMAND --help' for more information on a command.
z/OS provisioning toolkit - build

2016-11-11 11:16:49 z/OS provisioning toolkit Beta Version 3.31
2016-11-11 11:16:50 Step 0 : FROM cics_53
2016-11-11 11:16:50 Step 1 : ENV DFH_REGION_JVMSERVER=Liberty
2016-11-11 11:16:50 Step 3 : COPY imageApps.xml ${LIBERTY_DIR}/imageApps.xml
2016-11-11 11:16:50 File name=imageApps.xml, path=rootfs/workdir/DFHWLP/wlp/usr/servers/defaultServer/imageApps.xml
/u/cockern/zospt/zospt:
z/OS provisioning toolkit - run

```bash
/u/cockerm/zospt/zospt:>bin/zospt run cics_53_liberty
2016-11-11 11:17:31 z/OS provisioning toolkit Beta Version 3.31
Enter your password:
2016-11-11 11:17:35 The z/OSMF template used is cics_53.
2016-11-11 11:17:35 The z/OSMF domain is default.
2016-11-11 11:17:35 The z/OSMF tenant is default.
2016-11-11 11:17:43 Creating container 08f0f328-acdb-460c-b222-1ac5b4b7d334 with name CICS_CICPP005.
2016-11-11 11:17:46 Getting dynamic applid
2016-11-11 11:17:50 Validating access to CICS data sets
2016-11-11 11:18:01 Validating access to zFS directories
2016-11-11 11:18:06 Allocating dynamic ports
2016-11-11 11:18:20 Creating CICS security configuration
2016-11-11 11:18:49 Creating the CICS region data sets
2016-11-11 11:19:19 Creating CICS CSD definitions
2016-11-11 11:19:22 Adding the image into the provisioned file system
2016-11-11 11:19:26 Creating the CICS region JCL
2016-11-11 11:19:41 Starting the CICS region and waiting until it starts
2016-11-11 11:19:46 The APPLID of the provisioned CICS region is CICPP005.
2016-11-11 11:19:46 The provisioned port(s) will be:
2016-11-11 11:19:46 CICS CMCI = 28542
2016-11-11 11:19:46 CICS http = 28543
2016-11-11 11:19:46 CICS https = 28544
2016-11-11 11:19:46 Created container 08f0f328-acdb-460c-b222-1ac5b4b7d334 with name CICS_CICPP005.
/u/cockerm/zospt/zospt:>
```
Welcome to Liberty

WebSphere Application Server V16.0.0.2

How to Setup Admin Center

Additional Resources

WASdev Community
Liberty Documentation
WASdev Forum
z/OS provisioning toolkit – stop and start

```
cockerma@w530:~
/u/cockerma/zospt/zospt:>bin/zospt stop CICS_CICPP005
2016-11-11 11:24:03  z/OS provisioning toolkit Beta Version 3.31
Enter your password:
2016-11-11 11:24:18  Performing stop on container 08f0f328-acdb-460c-b222-1ac5b4b7d334.
2016-11-11 11:24:31  Stopping the CICS region and waiting for it to stop
```

```
cockerma@w530:~
/u/cockerma/zospt/zospt:>bin/zospt start CICS_CICPP005
2016-11-11 11:25:20  z/OS provisioning toolkit Beta Version 3.31
Enter your password:
2016-11-11 11:25:26  Performing start on container 08f0f328-acdb-460c-b222-1ac5b4b7d334.
2016-11-11 11:25:27  Check if CICS is already active
2016-11-11 11:26:02  Starting the CICS region and waiting until it starts
2016-11-11 11:26:03  Started container CICS_CICPP005.
```

z/OS provisioning toolkit – rm
CICS TS V5.4 open beta

New resource MQMONITOR to control MQ trigger and bridge monitors
Complements existing MQCONN resource
Any number of MQMONITORs can be defined and installed
Removes the need to use the CKQC transaction to start and stop monitors manually

MQMONITOR attributes
- Transaction ID used by a monitor
- Userid under which a monitor task runs
- Userid under which user tasks started by a monitor run
- Automatically start/stop monitors with CICS-MQ connection

Support for channels and containers over EXCI
MVS batch programs can now easily call CICS programs with large and better structured data
Can be used to invoke Java EE application in Liberty
- Great solution to integrate Java with MVS batch with least disruption
- Good performance as Liberty server and application likely ready to go
New CEDG and CEDY transactions are read-only equivalents of CEDF and CEDX
   More suitable to examine application programs safely when debugging in a production environment

System autoinstall of program definitions for Language Environment
   Removes the need to maintain definitions in the CEE CSD group

A new transient data queue (TDQ) event processing adapter
   Write CICS events to a TDQ
   Useful for auditing

New fields added to TCP/IP Statistics
   How well connections are reused, show the effects of performance tuning for HTTP connections, socket backlog and details of dropped connections

New options to dump non-CICS address spaces and data spaces
   JOBLIST and DSPLIST added to INQUIRE/SET SYSDUMPCODE
   Wild cards supported

Restart CICS region using MVS ARM after normal shutdown
   PERFORM SHUTDOWN … RESTART