Delivers highly flexible, security-rich and scalable SOA access to CICS applications

CICS Transaction Gateway, Version 7.1

Highlights

- ***Offers high-performance, as well as secure and scalable access to CICS Transaction Server for z/OS and TXSeries for Multiplatforms, while requiring little or no change to existing CICS applications***
- ***Enables rapid deployment of existing CICS applications into an SOA—while keeping your business logic intact***
- ***Supports the channels and containers programming model in CICS Transaction Server for z/OS, Version 3.2 as well as CICS COMMAREA and 3270 terminal-based applications***
- ***Enables real-time monitoring and problem determination of CICS Transaction Gateway systems, providing the infrastructure for online performance management***
- ***Provides J2EE standards-based connectivity that can use the JCA, Version 1.5 specification to manage connections, transactions and security***

Service oriented architecture (SOA) is a business-centric IT architectural approach that supports integrating your business as linked, repeatable business tasks, or services. Because much of the world's data is processed on mainframes using the qualities of service of proven transaction servers, such as IBM CICS® Transaction Server, delivering access to these CICS applications using standards-based interfaces is a vital and core step in the journey to SOA.

IBM CICS Transaction Gateway—a market-leading Java™ 2 Platform, Enterprise Edition (J2EE) connector—has been proven over many years to provide highly flexible, security-rich and scalable access to CICS applications. It requires minimal changes to CICS systems and usually no changes to existing CICS applications.

With IBM CICS Transaction Gateway, you can use your CICS applications in comprehensive and sophisticated Java and Web services solutions hosted on IBM WebSphere® Application Server, IBM WebSphere Enterprise Service Bus and IBM WebSphere Process Server. Reusing these applications in mixed CICS and WebSphere workloads delivers real business value by supporting reuse, which gives your organization flexibility and helps reduce cost.

CICS Transaction Gateway, Version 7.1, provides interoperation with the channels and containers programming model supported by CICS Transaction Server for z/OS, Version 3.2. This interoperation allows J2EE applications to exchange large amounts of data with CICS programs, far exceeding the 32 KB limit that applies to CICS communication area (COMMAREA)-based interactions.

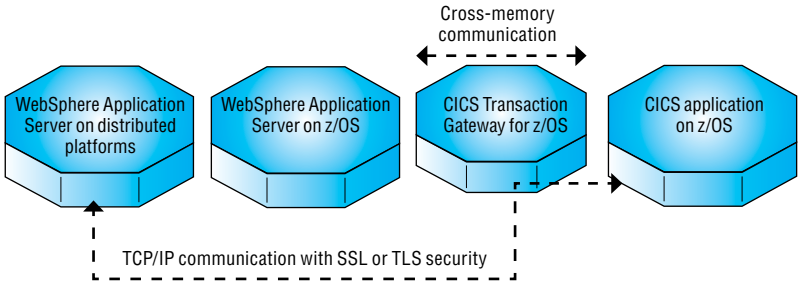

Figure 1. CICS Transaction Gateway, Version 7.1 provides standards-based connectivity from WebSphere to CICS Transaction Server for z/OS or TXSeries for Multiplatforms.

Highly flexible, secure and scalable connectivity

CICS Transaction Gateway uses a multithreading capability to handle high-performance communication with front-end application servers and back-end CICS systems. The multithreaded Gateway daemon code is also optimized, enabling support for large numbers of concurrent requests and subsecond response times to users. The strategic SOA interface within the CICS Transaction Gateway is the J2EE Connector Architecture (JCA) interface. For maximum flexibility, programming interfaces are also provided in Java C, C++, COM (for Microsoft® Visual Basic) and COBOL.

Choosing the right deployment platform for your gateway is important. CICS Transaction Gateway, Version 7.1 supports the following platforms:

- *IBM z/OS®*
- *IBM AIX®*
- *Linux® on Intel®, IBM POWER™ or IBM System z™*
- *Microsoft Windows®*
- *Sun Solaris on the SPARC platform*
- *HP-UX on RISC or Itanium®*

Connectivity is provided on these platforms from all supported WebSphere Application Server environments to all supported CICS servers (see Figure 1). For the highest quality of service, CICS Transaction Gateway can be run on the IBM z/OS operating system. In the z/OS environment, CICS Transaction Gateway takes full advantage of the IBM Parallel Sysplex® and workload management capabilities of the platform. It can support thousands of transactions a second by using multiple gateway regions and by exploiting memory-based external CICS interface (EXCI) pipes or TCP/IP socket connections to CICS systems colocated on the same logical partition (LPAR).

Remote communication can be based on either Internet Protocol (IP) or Systems Network Architecture (SNA), providing a considerable amount of flexibility in deployment options. To maintain security across options-based networks, CICS Transaction Gateway provides comprehensive security features for IP-based communication, including support for Secure Sockets Layer (SSL) or Transport Layer Security (TLS) encryption between the supported WebSphere products and CICS Transaction Gateway. An external configuration option that allows you to specify the SSL cipher suite enables you to define the level of security at the application level, and it provides the capability to take advantage of new levels of encryption as they emerge. When used in the z/OS environment, CICS Transaction Gateway integrates with existing CICS security mechanisms and takes full advantage of the advanced security features of the z/OS platform. These features include the offload of encryption to System z hardware cryptographic services and tight integration with an IBM Resource Access Control Facility (IBM RACF®) environment.

J2EE platform, standards-based composite applications

CICS Transaction Gateway supports the standard JCA, Version 1.5 specification as its strategic interface. As a component of the J2EE specification, alongside other standard services, the JCA provides a standard programming interface to all enterprise information systems (EISs). Using JCA offers two significant development advantages. First, it enables J2EE developers to program to a standard interface that is widely supported in education materials and software tooling from IBM and other vendors. Second, JCA provides delegated management of connection pooling, transactional scope and security control, so that J2EE developers don't have to develop these capabilities within the application. Together, these benefits mean better applications can be developed faster and more easily.

A number of complementary tools within the IBM software-development platform support CICS Transaction Gateway and JCA, including the COBOL importer function and the J2EE Connector (J2C) beans in IBM Rational® Application Developer, Version 7. Together these products can deliver a complete, end-to-end IBM solution that can help minimize cost, risk and time to market of new applications.

Rapidly and easily add SOA capabilities to existing CICS applications

CICS Transaction Gateway is designed to enable rapid and easy deployment and provides two JCA resource adapters for the external call interface (ECI) and another for the external presentation interface (EPI), enabling channel and container, COMMAREA or 3270 terminal-based CICS applications to interoperate effectively with WebSphere applications. Channels and containers are a new, improved method of exchanging data between CICS programs in amounts that far exceed the 32 KB limit that applies to COMMAREAs, and provide an optimized and more- structured data interface.

Access to CICS container and channel-based applications is dependent upon the usage of IP interconnectivity (IPIC) connections into CICS Transaction Server, Version 3.2. IPIC is a new CICS intercommunication protocol that is part of a multirelease, cross-product initiative introduced by CICS Transaction Server, Version 3.2, to enable efficient interoperation between CICS family members using TCP/IP network facilities.

Maximum transactional integrity

CICS Transaction Gateway on the z/OS platform fully supports two-phase-commit transactional integration between J2EE application servers and CICS Transaction Server applications running on the z/OS platform. This capability enables CICS Transaction Gateway to fully participate in a global transaction, where units of work can be coordinated across different resource managers (such as IBM DB2®, IBM IMS™ and SAP software). Two-phase commit ensures that the entire transaction can be committed successfully or, if some error condition occurs, be entirely returned to the state that existed before the transaction. With global two-phase commit, you can physically distribute a composite transaction across heterogeneous servers and operating environments, helping to maximize flexibility without compromising data integrity.

Two-phase-commit transactions work by requiring a PREPARE command to be confirmed by each resource manager before a COMMIT command makes all transaction changes permanent. CICS Transaction Gateway makes this possible by providing an XA-capable JCA ECI resource adapter. In the z/OS environment, a J2EE application can invoke a CICS application using a two-phase-commit transaction over an EXCI connection to a CICS Transaction Server release, or an IPIC connection if using CICS Transaction Server V3.2

Support for two-phase-commit transactions is also expanded to distributed systems when CICS Transaction Gateway for Multiplatforms, Version 7.1, is used in local mode.This support exploits the new CICS ECI resource adapter in CICS Transaction Gateway and the XA capabilities of CICS Transaction Server, Version 3.2 to enable a J2EE application to invoke a CICS application through a two-phase- commit transaction.

Systems-monitoring and analysis capability

CICS Transaction Gateway for Multiplatforms, Version 7.1 can perform real-time monitoring of gateway systems (see Figure 2). This important capability delivers a window into CICS Transaction Gateway, enabling its activity to be monitored proactively. This capability enables CICS Transaction Gateway to detect and resolve abnormal occurrences before they cause a problem to production operations. Advanced capacity planning, throughput and availability metrics are provided for the Gateway daemon on all platforms. This function allows systems administrators and capacity planners to analyze system utilization metrics and to perform online problem determination.

CICS Transaction Gateway provides statistics concerning a number of important metrics, including configurable system limits, internal thread usage, processed transaction requests, network usage statistics for connections to CICS, usage of critical system resources — including region storage and Java virtual machine (JVM) heap — and analysis of response times and data transmitted. You can also access critical information about connection management and transaction throughput, and obtain information about the proximity of the workload to the levels set in the configurable limits. If necessary, you can take action to reduce the need for planned outages or prevent the occurrence of unplanned downtime. These statistics are made available through the extended command-based system administration interface and the external, statistical application-programming interface (API).

A request-monitoring exit infrastructure is provided in CICS Transaction Gateway for use in both local and remote gateway scenarios. This infrastructure enables independent software vendors (ISVs) to develop transaction monitoring solutions for online transaction tracking and offline auditing. The exit infrastructure is provided in both the Java client and the Gateway daemon, and reports response times and additional key information about all ECI-based requests as they flow through the CICS Transaction Gateway components.

When CICS Transaction Gateway is used in the z/OS environment, automation support for monitoring can direct critical CICS Transaction Gateway messages to the z/OS console. This capability provides automated operations when using IBM Tivoli® System Automation for z/OS by increasing the availability of the CICS Transaction Gateway so that the systems can take predefined courses of action when certain conditions occur, without operator intervention.

In addition, IBM Tivoli OMEGAMON® XE for CICS Transaction Gateway on z/OS takes advantage of the monitoring function in CICS Transaction Gateway for z/OS to provide real-time performance management, monitoring and trouble-shooting for CICS Transaction Gateway for z/OS, Version 7. IBM Tivoli OMEGAMON XE for CICS Transaction Gateway on z/OS monitors CICS Transaction Gateway connections and workload on the mainframe, providing you with charts, alerts, advice and automated scripts to increase productivity. Reports on CICS Transaction Gateway servers and Gateway daemon resources help you determine how to allocate and size resources, such as EXCI pipes, and the internal thread pools. Transaction analysis reports show the types of transactions and successes compared to rolled-back percentages. Dynamic tables and graphs can be configured for a custom workspace to speed problem identification and resolution. As a true end-to-end solution, IBM Tivoli OMEGAMON XE for CICS Transaction Gateway on z/OS integrates and correlates data from other Tivoli OMEGAMON performance monitors and IBM Tivoli Monitoring.

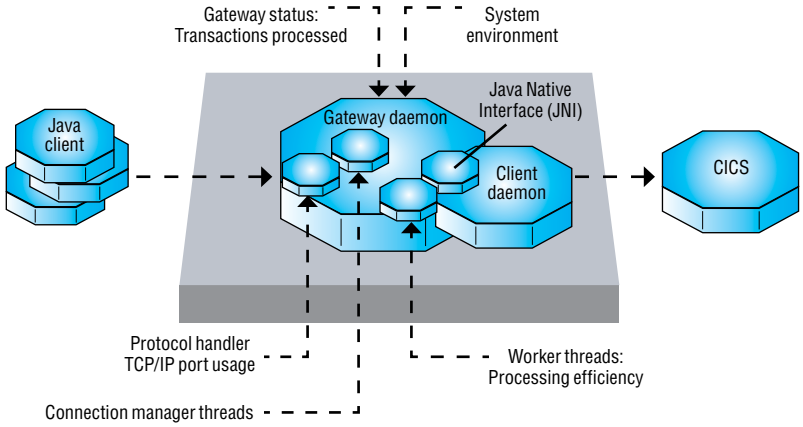

Figure 2. Systems monitoring: A window into the black box

Interval statistics and offline recording

A mechanism is provided to record and reset statistics using a configurable interval. This allows analysis of trends and peak usage, enhancing the ability to perform capacity planning and performance monitoring of the Gateway daemon and providing for integration with the statistical collection policies and procedures used for the monitoring of CICS Transaction Server.

On z/OS, CICS Transaction Gateway for z/OS, Version 7.1 writes these statistics to z/OS System Management Facilities (SMF) using a new SMF type-111 record. Support for these new records has been added to IBM CICS Performance Analyzer for z/OS, Version 2.1 through a program temporary fix (PTF) for authorized program analysis report (APAR) PK53163.

IBM CICS Performance Analyzer for z/OS, Version 2.1 is a powerful offline reporting tool that analyzes the SMF records created by the CICS monitoring facility (CMF), CICS statistics, CICS server statistics and SMF data from the related subsystems (DB2 and IBM WebSphere MQ) to produce a wide range of reports and extracts that can help you tune and manage your CICS systems. CICS Performance Analyzer provides a level of detail and flexibility that can easily help you find new ways to improve CICS system performance, lower maintenance costs and strategically plan IT investments.

CICS Transaction Gateway reporting is integrated into the existing CICS Performance Analyzer statistics reporting functions, including:

- *Online dialog reporting through the CICS statistics-reporting facility. All CICS-related statistics can be viewed from the Interactive System Productivity Facility (ISPF) interface in CICS Performance Analyzer.*
- *Long-term historical collection for capacity planning and trend-analysis purposes using the historical database (HDB) facility in CICS Performance Analyzer.*

Advanced workload monitoring

As part of the support for IPIC connection to CICS Transaction Server, Version 3.2, support is provided for IBM Enterprise Workload Manager (EWLM) when using IPIC connections to CICS Transaction Server for z/OS, Version 3.2. EWLM is the IBM implementation of the Application Response Measurement (ARM) standard from The Open Group. EWLM extends the capabilities of IBM z/OS Workload Manager services to all IBM servers, making end-to-end workload monitoring possible in heterogeneous environments, such as a WebSphere Application Server and CICS Transaction Server for z/OS environment. Additionally, for all IPIC requests, the CICS Transaction Gateway automatically generates point-of-origin information, enabling IBM CICSPlex® System Manager (or equivalent CICS monitoring tools) to perform problem determination and offline analysis of requests as they enter and flow across a CICSplex.

Networking support

CICS Transaction Gateway continues to provide optimized interconnectivity from a wide variety of clients into all CICS systems supported by IBM.

Integration with IBM z/OS Workload Manager enables intelligent distribution of workload across a sysplex, providing increased system availability. This capability enables CICS Transaction Gateway to provide dynamic feedback on CICS region availability to the TCP/IP load-balancing mechanisms on the z/OS platform through the facilities of the z/OS Workload Manager component. These server-specific Workload Manager recommendations can be used by Sysplex Distributor, TCP/IP port sharing or the z/OS Load Balancing Advisor to determine which individual Gateway daemon will have priority when any new TCP/IP, SSL or TLS connections are established. This capability can increase the availability of applications and help reduce the likelihood of any one CICS region being overloaded.

SNA compatibility includes support for IBM Communications Server for Linux on IBM POWER, System z and Intel systems, and for SNAP-IX, Version 7 for Sun Solaris Operating Environment. Support is extended to allow the use of fully qualified partner logical unit (LU) names, providing for easier configuration of SNA clients in an Advanced Peer-to-Peer Networking (APPN) network, simplifying the migration of TCP62 connections to Enterprise Extender for customers who continue to require Advanced Program-to-Program Communication (APPC) interconnectivity in a TCP/IP network.

CICS Transaction Gateway includes the ability to process Internet Protocol, Version 6 (IPv6) connections from remote Java clients, providing for better routing, enhanced security and global scalability. TCP/IP, SSL and TLS connections into the Gateway daemon from remote Java clients can use IPv6 connections along with IPv4 connections. Using IPv6 delivers interoperability with CICS applications and enables the enhanced routing and autoconfiguration capabilities of IPv6 networks to be used within the enterprise.

In addition, extended interoperability is provided through CICS Transaction Gateway for Multiplatforms support for the following 64-bit runtime operating environments:

- *Windows 2003 and Vista 64-bit operating systems*
- *Linux on Intel with 64-bit kernels*
- *HP-UX on Itanium IA64 hardware*

In addition, CICS Transaction Gateway now provides support on all platforms for changing the system time, providing for improved interoperability with third-party, time-synchronization software.

Advanced security enablement

Support for the TLS, Version 1.0 protocol enables stringent encryption capabilities and better interoperation with a variety of secure clients. Along with support for SSL, Version 3.0, support includes the TLS 1.0 protocol for security-rich connections into the Gateway daemon.

Options for secure intercommunication are enhanced through CICS Transaction Server, Version 3.2 support for SSL and TLS, when using a local CICS Transaction Gateway on any supported platform. This feature enables Java clients to use an encrypted connection to a CICS Transaction Server, Version 3.2 system, providing for secure transmission of data and optionally for authentication using X509 certificates.

The ability of CICS Transaction Gateway on z/OS to offload encryption to the cryptographic services of System z hardware enables increased throughput of SSL and TLS requests. This capability is provided through support for IBM's implementation of Java Secure Socket Extension (IBMJSSE2) security provider in the software development kit (SDK) for z/OS. Using IBMJSSE2 can lead to reduced processor usage and increased system throughput through the hardware cryptographic support for the Data Encryption Standard (DES), Triple DES (TDES), Rivest, Shamir and Adelman (RSA) and Secure Hash Algorithm (SHA) algorithms, and also provides the option for protection of encryption key values through support for highly secure, cryptographic coprocessors.

CICS Universal Client for Multiplatforms, Version 7.1

CICS Universal Client, Version 7.1 delivers simple and low-cost integration with CICS from Microsoft Windows, Linux, and UNIX® systems. It provides access from a single user workstation to the tried and trusted transactional capabilities of CICS Transaction Server and IBM TXSeries® CICS servers.

CICS Universal Client communicates with CICS servers through the ECI, EPI, and external security interface (ESI). ECI helps optimize client and server operation and improve programmer flexibility by keeping business logic on the server and presentation logic on the client. EPI enables the client to programmatically interact with transactions based on 3270 data streams. The EPI also supports 3270 emulation, enabling a workstation to function as a 3270 display or printer for CICS applications. ESI enables appropriate user applications to verify that a password corresponds to an existing user ID, and allows passwords to be changed to facilitate better user ID and password management. CICS Universal Client provides programming interfaces in C and C++, COM (for Visual Basic or Visual Basic Script support), and COBOL. It also delivers TCP/IP, and SNA LU 6.2 networking options to connect to your CICS systems.

For more information

CICS Transaction Gateway is a highly flexible, security-rich and scalable method of SOA access to CICS Transaction Server. It delivers J2EE standards-based access to CICS applications, while requiring minimal changes to CICS and usually no changes to existing CICS applications. To learn more about IBM CICS Transaction Gateway, contact your IBM representative or IBM Business Partner, or visit:

ibm.com/cics/ctg

IBM CICS Transaction Gateway, Version 7.1 at a glance

Hardware requirements

CICS Transaction Gateway, V7.1 runs on the following hardware supported by an operating system listed in the "Software requirements" section.

- IBM System z server supported by Linux or z/OS
- 32-bit or 64-bit IBM System p™ server supported by AIX or Linux
- 32- or 64-bit Sun SPARC system supported by Sun Solaris
- 32-bit or 64-bit HP PA-RISC 1.1 or 2.0 system supported by HP-UX
- 64-bit HP Itanium system supported by HP-UX
- Intel Pentium®, AMD Opteron or Intel EM64T system supported by Microsoft Windows or Linux

Software requirements

One of the following operating systems:

- AIX, V5.3 or AIX, V6.1 (with 32-bit or 64-bit kernels)
- Linux on System z: Red Hat Enterprise Linux (RHEL) 4, RHEL 5, SUSE Linux Enterprise Server (SLES) 9, SLES 10 (with 64-bit kernels)
- Linux on Intel: RHEL 4, RHEL 5, SLES 9, SLES 10 (with 32-bit or 64-bit kernels)
- Linux on POWER RHEL 4, RHEL 5, SLES 9, or SLES 10 (with 64-bit kernels)
- Solaris V9 or Solaris V10 (with 32-bit or 64-bit kernels)
- HP-UX11i V2 or V3 (with 32-bit or 64-bit kernels)
- Microsoft Windows 2000, 2003, Windows XP, or Windows Vista (with 32-bit or 64 bit kernels)
- z/OS V1R7 or later

Note: CICS Transaction Gateway, Version 7.1 requires use of the 32-bit IBM Java SDK, Java 2 Technology Edition, Version 5.

Note: WebSphere Enterprise Service Bus and WebSphere Process Server are built on WebSphere Application Server. You can use the CICS Transaction Gateway V7.1 resource adapter with any J2EE server based on WebSphere Application Server, V6.1. Earlier versions of WebSphere Application Server can still be used with CICS Transaction Gateway V7.1 but will need to use an earlier version of the CICS Transaction Gateway resource adapter. Licensed CICS Transaction Gateway users can obtain these JCA resource adapters using IBM SupportPac™ software CC03 available at **ibm.com**/support/docview.wss?uid=swg24008817.

For detailed and up-to-date software and hardware requirements, visit **ibm.com**/cics/ctg/reqs

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