

**SOFTWARE AG CICS 3270 ADAPTER  
FOR MICROSOFT HOST  
INTEGRATION SERVER 2000**

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**WHITE PAPER**

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## Overview

Software AG and Microsoft Corp. are cooperating on the implementation and marketing of an adapter for COM Transaction Integrator (COMTI) to terminal-oriented Customer Information Control System (CICS) transactions. COMTI is a component of Microsoft's new Host Integration Server 2000. This new interface is targeted at providing integration between Microsoft® Windows® 2000 and Windows NT® operating system-based applications and OS/390 CICS transactions that perform direct 3270 terminal input/output (I/O).

This new product will be called the Software AG CICS 3270 Adapter for Host Integration Server 2000, and it is based on parts of Software AG's EntireX technology on OS/390. Software AG is developing the CICS 3270 Adapter with Microsoft's assistance in joint testing and other areas. It will be released as a Software AG product. The CICS 3270 Adapter also supports CICS applications written in Natural, Software AG's environment for developing and running business applications.

### CICS 3270 ADAPTER BENEFITS

- It is an easy and low-risk way to integrate new Windows-based and Web technologies with existing host investments.
- It greatly reduces Logical Unit (LU) administration overheads on VTAM compared with other similar solutions.
- It improves performance over other 3270 screen access methods.
- It reduces complexity over EPI, FEPI and High-Level Language Application Program Interface (HLLAPI).
- It encapsulates CICS transactions in a high level of abstraction.
- It utilizes IBM's CICS 3270 Bridge interface for efficient access to 3270 transactions.
- It scales to thousands of concurrent host sessions.

### COM TRANSACTION INTEGRATOR FOR CICS AND IMS

Microsoft's COMTI for CICS and Information Management System (IMS), a feature of Microsoft Host Integration Server 2000, provides applications with access to the two most popular mainframe transaction

processing environments: CICS and Information Management System (IMS/TM). Working in conjunction with Microsoft Transaction Server (MTS) technologies in Windows NT Server or COM+ in Windows 2000 Server, COMTI makes CICS and IMS programs appear as COM components that can be used to build distributed applications. COMTI brings drag-and-drop simplicity to developing sophisticated applications that integrate Web transaction environments with mainframe transaction environments.

The heart of this new technology is the COMTI Component Builder. The Component Builder comes with a COBOL Import/Export Wizard, which generates a component library (TLB file) for deployment in COM+ or MTS directly from the COBOL data definitions found in the source code for the CICS or IMS application. Because of the strong integration with COM+ and MTS, when the component library is dragged and dropped into the Component Explorer (an MMC snap-in), a COM object is created that can be used by a programmer using the Visual

Basic® or Visual C++® development system to invoke a mainframe transaction. This allows developers to build applications using Active Server technologies that can include existing mainframe transaction programs (TP). Similarly, mainframe developers can easily make new mainframe TPs available to Microsoft Windows-based Internet and intranet applications. Developers do not have to learn new APIs nor do they have to program custom interfaces for each application and mainframe platform. Because COM Transaction Integrator for CICS and IMS does all of its processing on the Microsoft Windows 2000 or Windows NT Server, there is no COMTI code required to run on the mainframe, and mainframe developers are not required to rewrite most existing mainframe COBOL programs. Windows-based applications simply make COM/COM+ method calls, and mainframe TPs simply respond as if called by another mainframe program, such as another CICS TP.

### **3270-BASED CICS APPLICATIONS**

While COMTI can integrate with most modern CICS applications in which business and presentation logic are separated from one another using the CICS COMM AREA structure, a problem that has dogged older CICS applications is the inseparability of business logic and presentation logic. For many systems, this has been a stumbling block for integration with new development and Web technologies.

Previously, apart from PC-based screen scraping, there have been few robust, high-performance methods of integrating PC applications with these terminal-oriented CICS applications, which unfortunately still make up the majority of existing CICS transactions.

Software AG and Microsoft have identified a strong customer need for opening up 3270-based CICS applications to new Windows-based technologies. In cooperation, the companies have developed an adapter for Microsoft COMTI for CICS and IMS that enables seamless access to 3270-based CICS transactions from Windows 2000- and Windows NT-based systems.

The CICS 3270 Adapter uses components from Software AG's EntireX middleware, which takes advantage of the 3270- Bridge feature in IBM's CICS Transaction Server 1.3. The 3270 Bridge provides an interface for 3270-based CICS transactions without the use of a 3270 terminal or a 3270 terminal emulator, making it easy and economical to integrate new technologies into existing 3270-based applications. The applications can still be accessed from 3270 ter-

minals or workstations running 3270 emulation, to allow for coexistence and a phased migration from 3270 screen access to Web-enabled applications.

The Software AG CICS 3270 Adapter supports the IBM CICS 3270 Bridge interface (which is included with CICS TS 1.3) to provide enhanced interoperability with CICS transactions and to facilitate the integration of new technologies with the many CICS transactions that are 3270-based. The reach, lifetime and large investment in existing 3270-based applications can now be extended. Best of all, an existing 3270 application does not have to be altered or recompiled. The bridge takes care of interacting with the 3270 transaction — the programmer does not need to know anything about 3270 data streams.

Applications running on Windows 2000 and Windows NT will now be able to use COMTI to integrate nearly all existing CICS applications with the latest Windows-based applications and technologies, with the least possible change to existing business processes.

### **INTEGRATING 3270-BASED APPLICATIONS**

The IBM CICS 3270 Bridge Exit intercepts commands within a CICS transaction for a 3270 terminal. The Software AG CICS 3270 Adapter uses this Exit to integrate CICS transactions with Windows-based applications. The transactions run unchanged, just as if they were in a 3270 environment, but with fast, direct Web or desktop access into CICS on OS/390.

The CICS 3270 Adapter manages the communications between COMTI and the real 3270 transaction, facilitating the exchange of data through the 3270 Bridge Exit. Developers do not have to develop their own host-based exit routines for their existing applications.

Typically, each CICS transaction for a 3270 terminal handles just one 3270 screen. The CICS 3270 Adapter has the advantage that it can remain active longer than the execution of the real CICS transaction and is able to retain context across a sequence of several screens. Programmers who are developing for Windows can thus work at a higher level of abstraction than with the original screen-oriented CICS application, greatly simplifying client applications development. Even so, the CICS 3270 Adapter allows for full control of the 3270 application, including cursor positioning and program function keys.

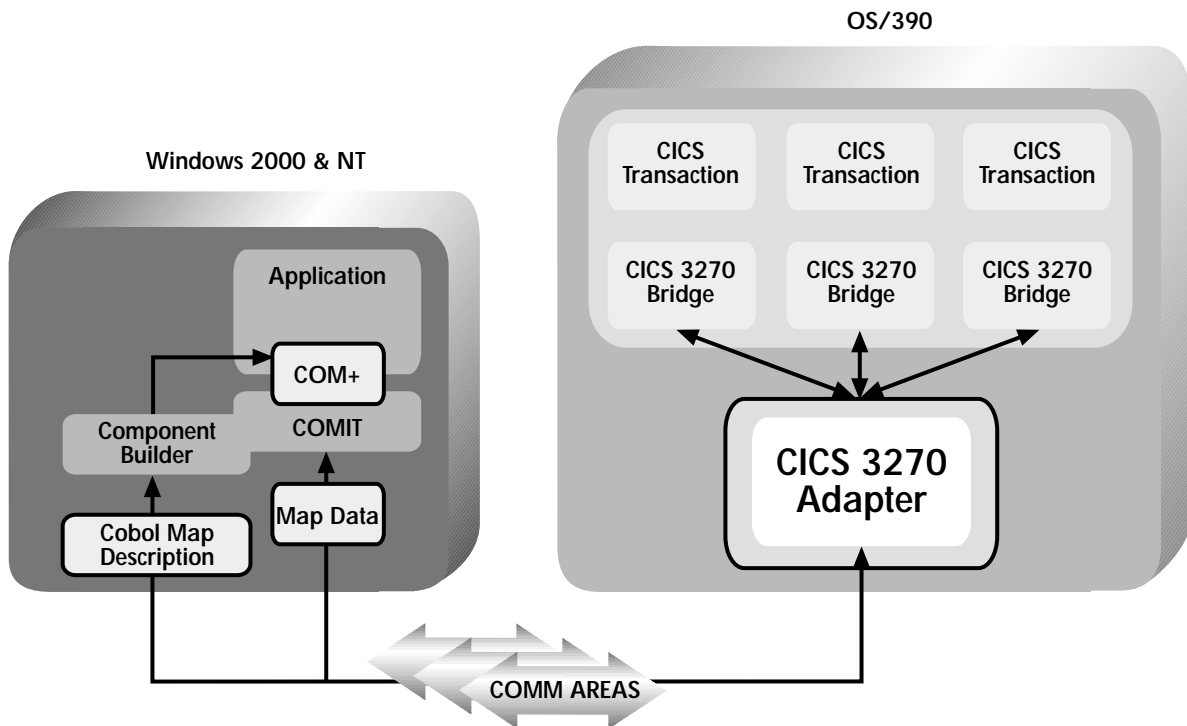
The CICS 3270 Adapter leverages the IBM Resource Access Control Facility (RACF) security system to ensure that all access to host transactions remain secure.

COMTI channels all host communications through the CICS 3270 Adapter, which becomes its single logical point of contact with the host. Only one Logical Unit, therefore, is required by COMTI within Virtual Telecommunications Access Method (VTAM). (When using LU 6.2, but note that COMTI can also be configured to communicate with CICS via TCP/IP.) This eliminates the considerable administration overhead of managing LUs and the assignment of many end users within pools of Logical Units.

Whenever a Windows-based application makes a COM/COM+ method call to access a CICS transaction, COMTI calls the CICS 3270 Adapter via the CICS COMM AREA, which then identifies and activates the target CICS transaction.

The CICS 3270 Adapter also provides COMTI's Component Builder with COBOL descriptions of CICS map definitions that can be used by the COBOL Wizard to build COM Wrapper objects. This will allow the PC programmer to remain unconcerned about the 3270 screen layout or parameter representation, isolat-

ing the PC program from changes to 3270 screen layouts. Each 3270 screen will be represented as a separate COM method call by the VB or VC++ application, with relevant input and output parameters as well as the screen-to-screen navigation screen exposed as parameters on the method.



## CUSTOMER BENEFITS

These two powerful technologies — Microsoft COMTI and Software AG's CICS 3270 Adapter — give users a flexible way to integrate existing CICS applications with Windows 2000- and Windows NT-based applications. User applications work at a higher level of abstraction than a low-level screen-scraping approach.

## THE PROBLEMS WITH EPI, FEPI AND HLLAPI

Previously, integrating new front ends with the majority of CICS 3270 applications that have tightly embedded terminal interfaces has only been possible by using one of the following:

- CICS External Presentation Interface (EPI)
- Front-End Programming Interface (FEPI)
- 3270 emulation programs (using HLLAPI), in combination with screen-scraping tools

These solutions, however, are all based on sending and receiving data in 3270 data stream format. This involves a lot of redundant manipulation between CICS Basic Mapping Support (BMS) and the front-end application. When BMS outputs data, it converts a CICS application's symbolic map structure to a 3270 data stream. A new front end, replacing a 3270 terminal, has to reconvert the 3270 stream back into a data format it can understand. Data flowing back to the CICS application has to go through the opposite double conversion process. This is inefficient and results often in unacceptable performance.

3270 emulation programs have a further disadvantage in that client

applications have to be designed to accommodate the random behavior of the remote host application. Any changes in the format or sequence of host screens, such as broadcast operator messages or the discovery of a new host screen, will cause an application to hang or fail. This results in application logic, which is very tightly linked to the communications environment. The nature of the HLLAPI code needed to handle host screens, which can occur in any sequence, is complex, procedural and conditional. Furthermore, HLLAPI code is executed serially and will only interact with one host session at a time. This limitation becomes critical when there is a requirement to access two or three host applications simultaneously.

Another disadvantage of HLLAPI is its use of synchronous, blocking calls. A client application must wait for the host response which, with HLLAPI, can be several seconds.

This sluggish response forces a developer to compromise on the user interface design and collapse only 2 or 3 mainframe screens for each output window to minimize the perception of a slow performing application.

In the 3270 CICS Adapter there is no concept of keyboard locking or change direction. The only delay between screens is a few hundred milliseconds for host transaction and transmission times. This gives the developer freedom to process perhaps as many as 5 or 6 mainframe screens for each output Window with the added advantage that the user can see and work with the host data almost immediately because the client application is not

blocked. The user can work in parallel, performing tasks that may not require mainframe I/O like scrolling a Window or entering data.

## ENHANCING CICS 3270 BRIDGE IMPROVED PERFORMANCE

The 3270 Bridge feature in CICS Transaction Server 1.3 removes the complexities of the 3270 data stream, the physical terminal and the effort of emulating a 3270. This results in improved performance and reduces the overhead associated with using FEPI and EPI. Client applications do not have to be tightly coupled with the communications environment. Yet the standard CICS 3270 Bridge, used alone, usually requires a user to write a host-based Bridge Exit routine for each application. This presupposes expertise in the CICS Application and System Programming Interfaces. Software AG's CICS 3270 Adapter removes the need to implement user-written exits on the host.

## REDUCED LU ADMINISTRATION

Channeling host communications through the CICS 3270 Adapter eliminates the need to create potentially thousands of LUs for each end user in VTAM. COMTI, which communicates with the CICS 3270 Adapter via LU 6.2 or TCP/IP, becomes the only user as far as VTAM is concerned.

#### **MULTIPLE, CONCURRENT HOST APPLICATIONS AND SESSIONS**

CICS 3270 screens are presented to an application as COM method calls. In CICS, the state is normally lost when each screen's corresponding CICS transaction ends. The CICS 3270 Adapter maintains the state between logical sequences of screens. Each sequence is allocated a unique "handle," which makes it possible for applications to process many sequences in parallel. COMTI can also handle multiple, concurrent host sessions.

#### **PROTECT EXISTING INVESTMENT, INTRODUCE NEW TECHNOLOGIES AT LOW RISK**

The many new features being introduced with Microsoft Host Integration Server 2000 will make interoperation between Windows 2000- and Windows NT-based applications and existing host applications easier than ever before. The CICS 3270 Adapter enables COMTI to extend the type of host application accessible from Windows with no need to modify those applications. Users can migrate at their own pace to new front ends because the applications can still be accessed directly from 3270 terminals. New technologies can be deployed at low risk onto existing, stable business processes thus extending their life and protecting the large investments made over many years.

#### **SYSTEM PREREQUISITES**

The CICS 3270 Adapter runs on IBM OS/390 Version 2, Release 4 or higher and requires CICS Transaction Server 1.3. The COMTI feature shipping as part of SNA Server 4.0 SP3, is compatible with Software AG's CICS 3270 Adapter, although the new Microsoft Host Integration Server 2000 release is recommended, as soon as it will be released (expected around mid-year 2000).

#### **MORE INFORMATION**

The CICS 3270 Adapter incorporates Software AG's proven EntireX middleware technology. EntireX has a global customer base of large enterprises that recognize its high performance, scalability and robustness. EntireX handles hundreds of thousands of concurrent communications and smoothly copes with unexpected peaks in workload. More information can be found on the Web at <http://www.softwareag.com/>.

Microsoft Host Integration Server 2000 is built on the proven Microsoft SNA Server technology, the leading gateway for accessing mainframe and AS/400 applications and data. More information on these Microsoft technologies can be found at <http://www.microsoft.com/sna/>.



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