CICS: THE BEST CLIENT/SERVER SOLUTION?

By Stephen Force

INTRODUCTION

Is this "client/server" thing for real or is it just another fad? If you actively follow our industry, the client/server debate runs the gamut from being a vague concept to quickly overtaking "classical" data processing techniques.

CICS analysts and programmers must find this "debate" to be quite amusing, since CICS has inherently been able to support "client/server" implementations for several years.

Anyone who has implemented any of the advanced functions of CICS (ISC, APPC, function-shipping, etc.) has the basic understanding of how CICS might be used in a client/server environment across an SNA network. But what about CICS client/server to other operating system platforms running network topologies such as TCP/IP or Novell's NetWare?

This article will briefly touch upon some of the new possibilities of today's CICS family of products, highlighting CICS OS/2 Version 2's new offerings.

CICS AS THE ENTERPRISE CLIENT/SERVER STANDARD?

Data processing has evolved over the years, and CICS has had a major role in this evolution. Most people know that CICS is available for the IBM mainframe operating systems and have possibly heard that CICS can also run on OS/2.

What you might not know is the CICS developers in Hursley, England have been busy porting CICS to the most popular operating systems platforms. These include:

- CICS/6000: running under AIX on the RS/6000;
- CICS/HP: CICS/6000 ported to Hewlett-Packard UNIX;
- CICS OS/2: running as an OS/2 application;
- CICS/400: running on the AS/400 platform;
- CICS/VSE: runs as a VSE/ESA partition;
- CICS/ESA: runs on MVS/ESA;
- CICS/MVS: runs on MVS/XA; and
- CICS Windows/NT server; and
- CICS/OS2-to-Macintosh link.

These CICS systems can be internetworked, allowing CICS transactions to execute on the desired platform regardless of network topology. This empowers the end user, allowing her/him to use whichever operating system or graphical user interface (GUI) she/he chooses.

This also allows developers the ability to write client/server applications in CICS. Existing CICS experience can be leveraged into the client/server arena, opening a realm of possibilities for the established CICS programmer.

CONNECTING CICS

Opening up CICS to other platforms offers several intriguing possibilities. CICS client/server applications can now be written without having to worry as much about connectivity issues. Developers can choose between several network topologies (SNA, APPN, TCP/IP, OSI, NetBIOS and Novell's IPX).

More interesting to the developer is how to interface the CICS transaction to the network. Here, the future is bright indeed. This interface, which is becoming known as "middleware," allows CICS client/server applications to be developed with little regard to the underlying network.

Middleware familiar to most are TCP/IP's Remote Procedure Calls (RPC) and sockets, and IBM's APPC and CPI-C. These offer powerful internetworking possibilities, but can be difficult to implement. They also do not offer a great deal of inherent reliability, forcing the CICS developer to handle more error recovery then what might be desired.

A promising development to ease client/server development and implementation is IBM's Messaging and Queuing Series (MQSeries). The MQSeries family is the implementation of The Network Blueprint, announced by IBM in March 1992. The Message Queue Interface (MQI) is the main component of MQSeries, and is the interface between the application and the message queues. MQI enables applications to communicate asynchro-

nously via message queues without concern to the underlying network components.

To better understand MQSeries, compare CPI-C and RPC to a telephone conversation. One speaks, the other listens. MQI can be favorably compared to the mail. No synchronization between sending and receiving parties is needed. Indeed, several different messages can be sent without intermediate replies.

The most powerful feature of MQI is how it provides applications the ability to queue messages. Messages are not sent directly to the receiving application—they are queued. The receiving application processes the messages when it desires. If this asynchronous philosophy is implemented by the CICS application developers, then MQI can be a powerful client/server tool.

On March 30, 1993, IBM and Systems Strategies Inc. (SSI), a NYNEX subsidiary based in New York City, announced a suite of networking software products to initiate MQseries. Two weeks prior to this, IBM announced that it would begin marketing Systems Strategies' Inc. ezBRIDGE family of products.

The ezBRIDGE products provide an entry to messaging and queuing prior to the availability of the MQSeries product (available in phases beginning in September 1993). Migration aids to the MQI will also be provided.

TCP/IP "MIDDLEWARE" SOLUTIONS

There are several possibilities to connect CICS transactions to the TCP/IP network:

- CICS/MVS to TCP/IP socket interface. This interface, included with MVS TCP/IP V2R2, provides CICS application programmers the ability to convert a CICS transaction into a TCP/IP socket.

This socket interface offers powerful features. The CICS programmer must have deep knowledge of TCP/IP socket programming and must understand the operation of the MVS Inter-User Communications Vehicle (IUCV) interface.

- Interlink Computer Sciences, Inc's. (Fremont, Calif.) CICS Programmers Toolkit, available since April 1993, reportedly simplifies MVS CICS socket programming. In contrast with IBM's CICS/MVS to TCP/IP socket interface described previously, the CICS transaction programmer needs no knowledge of either TCP/IP or IUCV programming. According to Paul Morse, product manager of the CICS Programmers Toolkit, the CICS shop must first define the provided CICS/Tools product to CICS in the destination control table (DCT). The transaction places data on the CICS transient data queue where CICS/Tools passes it to the TCP/IP started task for transmission.

- IBM's AnyNet/MVS [(previously known as Multiprotocol Transport Networking(MPTN)] provides the ability to run APPC applications over a TCP/IP network and TCP/IP socket applications over an SNA network. AnyNet/MVS can presently only link MVS/ESA (ACF/VTAM 3.4.2) and OS/2 applications.

- Noblenet Inc.'s (Southboro, Mass.) EZ-RPC simplifies TCP/IP Remote Procedure Call (RPC) programming by first determining and then implementing the RPC environment. EZ-RPC reduces the need to have experienced RPC programmers on staff by providing C programmers the necessary tools for RPC programming.

One customer has successfully ported EZ-RPC to MVS. Although not currently available as an MVS product, if made available, EZ-RPC will make tricky RPC client/server programming feasible.

CICS CLIENT/SERVER IMPLEMENTATION C

Implementing CICS client/server on a LAN allows data servicing routines to reside where the data are. For example, CICS OS/2 supports the Novell Btrieve key-indexed record management system. Btrieve data residing on a disk directly accessible by a CICS OS/2 system can be processed much faster than if it were elsewhere on the LAN. For applications with heavy-duty data massaging duties, this could improve transaction throughput considerably.

CICS OS/2 VERSION 2.0

CICS OS/2 Version 2.0, available in September 1993, will provide a powerful means of porting CICS applications to the PC. Available in either a single or multi-user configuration, CICS OS/2 will allow the PC or LAN-based user CICS peer-to-peer connectivity.

CICS running on a LAN-based OS/2 operating system provides users several powerful possibilities. An OS/2-based CICS can connect to another CICS system anywhere on the enterprise internetwork. The target CICS system could be MVS, AS/400, UNIX or another OS/2-based CICS system.

CICS on OS/2 does not require VTAM support. This means that CICS can be used on, for example, an Ethernet LAN in an client/server situation without having to go through the mainframe. Application programs written for CICS can be ported to CICS OS/2 V2 with minimal effort—a recompile and link on the target CICS platform is normally all that is required. However, it has been reported that most applications are being re-written to take advantage of the newer features of compilers, operating systems and networks.

CICS OS/2 features:
- ability to use already written CICS transaction programs;
- minimum re-training of CICS application programmers;
- exploits the advanced GUI capabilities of OS/2 2.1 or Windows/3.1;
- supports 32-bit applications;
- can act as a LAN CICS server, so that only one OS/2-based CICS server can handle all CICS-to-CICS traffic;
- includes Novell's Btrieve technology to use its emulated VSAM management features; and
- offers several network connection possibilities.

Available network connection possibilities:
- MQSeries MQI (described previously);
- Token-Ring;
- Ethernet;
- NetBIOS;
- NetWare; and
- LU6.2 (APPC)

CICS OS/2 SINGLE-USER SYSTEM

The CICS OS/2 single-user configuration offers an OS/2 user the ability to participate in a CICS network. The single-user configuration can support up to eight directly-attached ASCII terminals. The single-user product contains all functions of CICS OS/2 V2 multi-user, except what is required for multiple user support.

CICS OS/2 MULTI-USER SYSTEM

The CICS OS/2 multi-user offers an enterprise a myriad of possibilities:
- CICS OS/2 servers networked together provide powerful symmetrical multi-processing (SMP) possibilities.
- It provides the ability to use a single OS/2 as a LAN-based CICS focal point.
- Cost effective: As LAN-based CICS activity increases, an enterprise needs to upgrade only processors performing CICS server activities.
- It can run OS/2 on the same hardware platform as the data server, minimizing data transfer traffic on the LAN.
- It can place all Btrieve applications on this server.
- It simplifies application transaction updating by needing to update a single server rather than several.
- It empowers the LAN user, giving her/him the feeling that she/he has the say in an enterprise.

POSSIBLE CICS CLIENT/SERVER SCENARIOS

There are several client/server combinations possible using CICS. Some possibilities might be:
- CICS OS/2 user accessing data from CICS MVS;
- CICS OS/2 user accessing data from CICS MVS over an AnyNet/MVS middleware link;
- MVS-based CICS transaction extracting Novell NetWare-managed LAN data via CICS OS/2;
- CICS OS/2-to-CICS OS/2;
- CICS OS/2 server as an LAN gateway for MVS-based CICS applications;
- CICS/400 client accessing UNIX network file server (NFS)-managed data via an CICS/6000 server; or
- CICS/MVS client accessing Hewlett-Packard UNIX data via an CICS/HP server.

SUMMARY

The IBM CICS developers in Hursley have turned CICS into a very powerful, platform- and network-independent, enterprise-wide transaction processing environment. Client/server developers have several possibilities for systems development, with CICS being one of the better ones.
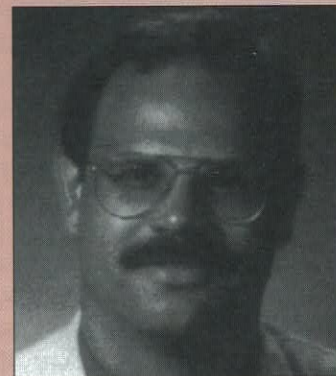
Stephen Force is a contributing editor and technical advisor to *IN-DEPTH* Report and an independant consultant.

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