

FORUM99



Forté for OS/390 - An Insider's View

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FORTÉ

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Forté for OS/390

- The OS/390 Vision
- Product History
- Product Strengths and Restrictions
- 1999 Projects
- Address Space Overview
- OS/390 Interfaces
- Benchmark Results

The OS/390 Vision

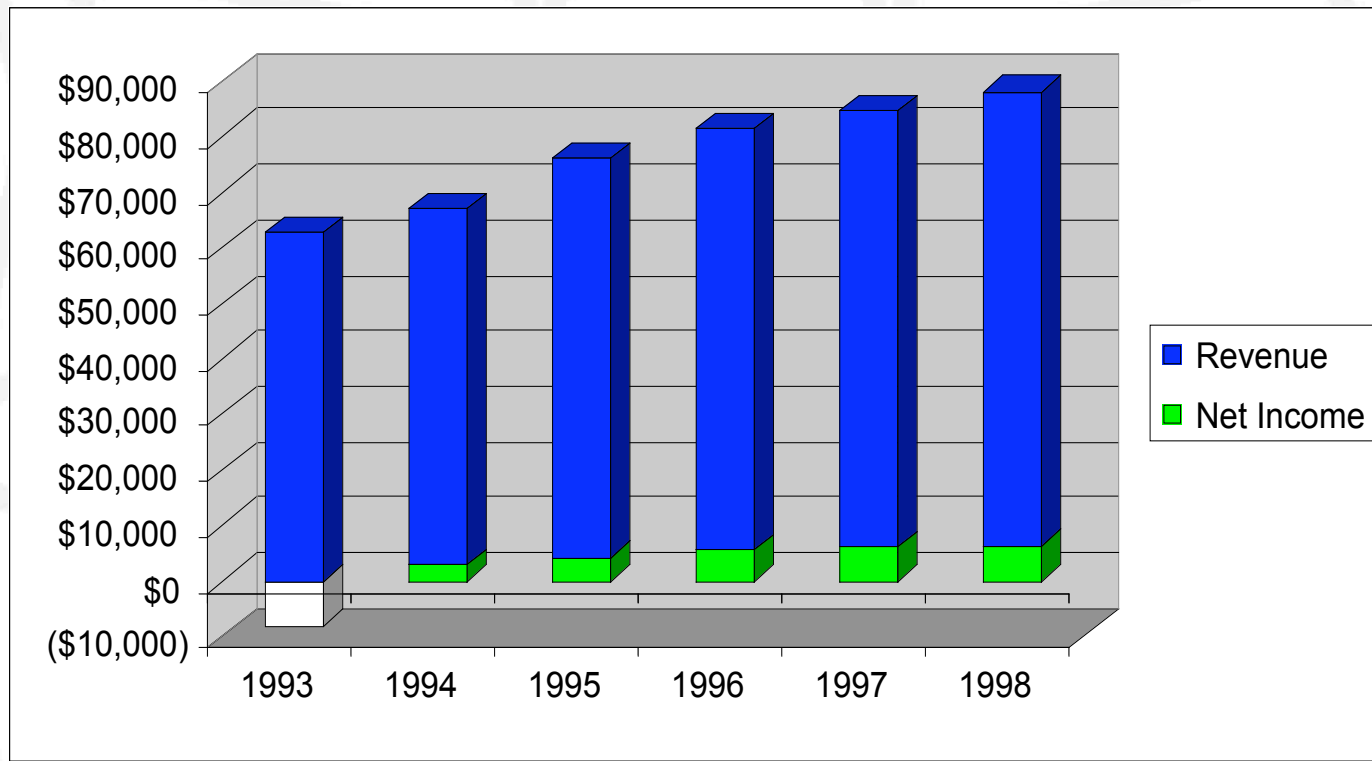
- “Shrink-wrap” a fully-tested set of System/390 MVS operating system components
- Reduce system maintenance costs
- Major releases every six months
- Include UNIX System Services, TCP/IP
- Support hardware clustering for scalable and reliable databases and network services

The Forté OS/390 Vision

- Bring state-of-the-art application development and deployment technology to IBM mainframes
- Deliver first-class integration capabilities to mainframe data by providing object-oriented interfaces to MVS facilities, like DB2, CICS, and IMS

The IBM Market

- Installed mainframe MIPS increasing 65+% per year
- Healthy revenue and income growth



FAS/390 Product History

- 2Q/97 Prototype demo at Forum
- 1Q/98 Beta release (no DB2/MVS support)
- 3Q/98 GA release
- 4Q/98 Beta release with DB2/MVS support
- 1Q/99 GA release with DB2/MVS support
- 2Q/99 Transaction Adapter version 1

Current Product Strengths

- First 'drag and drop' interface for mainframe application development and deployment
- Excellent native thread support
- Character set translation and floating point conversion handled automatically
- Highly stable and reliable platform

Current Product Restrictions

- FAS/390 is a server platform
 - GUI clients run on Windows and Motif platforms
 - Script-based deployment and system management facilities (escript, fscript) are available
- Support for Conductor is not yet available
- No support for EBCDIC double-byte character sets

OS/390 Transaction Adapter

- Uses MVS SNA Services to provide LU 6.2 connectivity to CICS, IMS, APPC servers
- Version 1 release this quarter
 - Installs as a “kit”, a Project Export (pex) file
 - Provides basic API for sending and receiving text and binary messages/executing APPC-enabled transactions
 - Supports common APPC conversation security mechanisms provided by the various TP monitors
- Planned future enhancements include
 - Improved installation as part of the System framework
 - Integration with other Forté facilities and products

Transaction Adapter Usage

```
conv : APPCConversation;  
sec : APPCSecurityInfo = new;  
buf : TextData = new;
```

Initialize and open the conversation, using standard SNA identifiers. Security info is optional, and is encrypted 'on the wire'.

```
conv = APPCApiSO.NewConversation();  
sec.SetUserid(source=userid string);  
sec.SetPassword(source=password string);  
conv.Open(dest=destination,tp=tpname,security=sec);
```

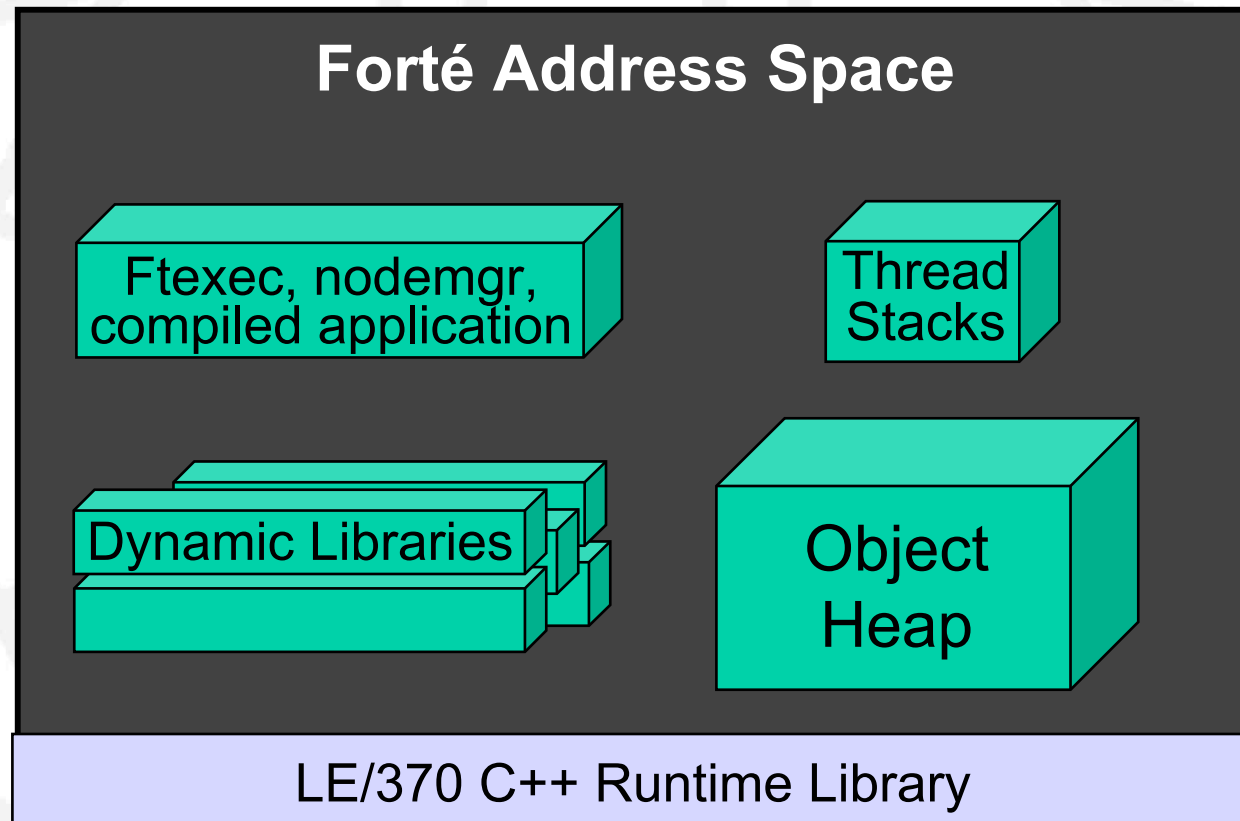
Place parameter data in the TextData buffer, write it to the conversation object, then read the transaction response back into the buffer.

```
// ...additional code to format transaction parameters  
conv.Write(dataBuffer=buf, writeLength=buf.ActualSize);  
conv.Read(dataBuffer=buf, readLength=len);  
// ...additional code to examine transaction results
```

Process returned data, then close the conversation

```
conv.Close(type=CLOSE_NORMAL);
```

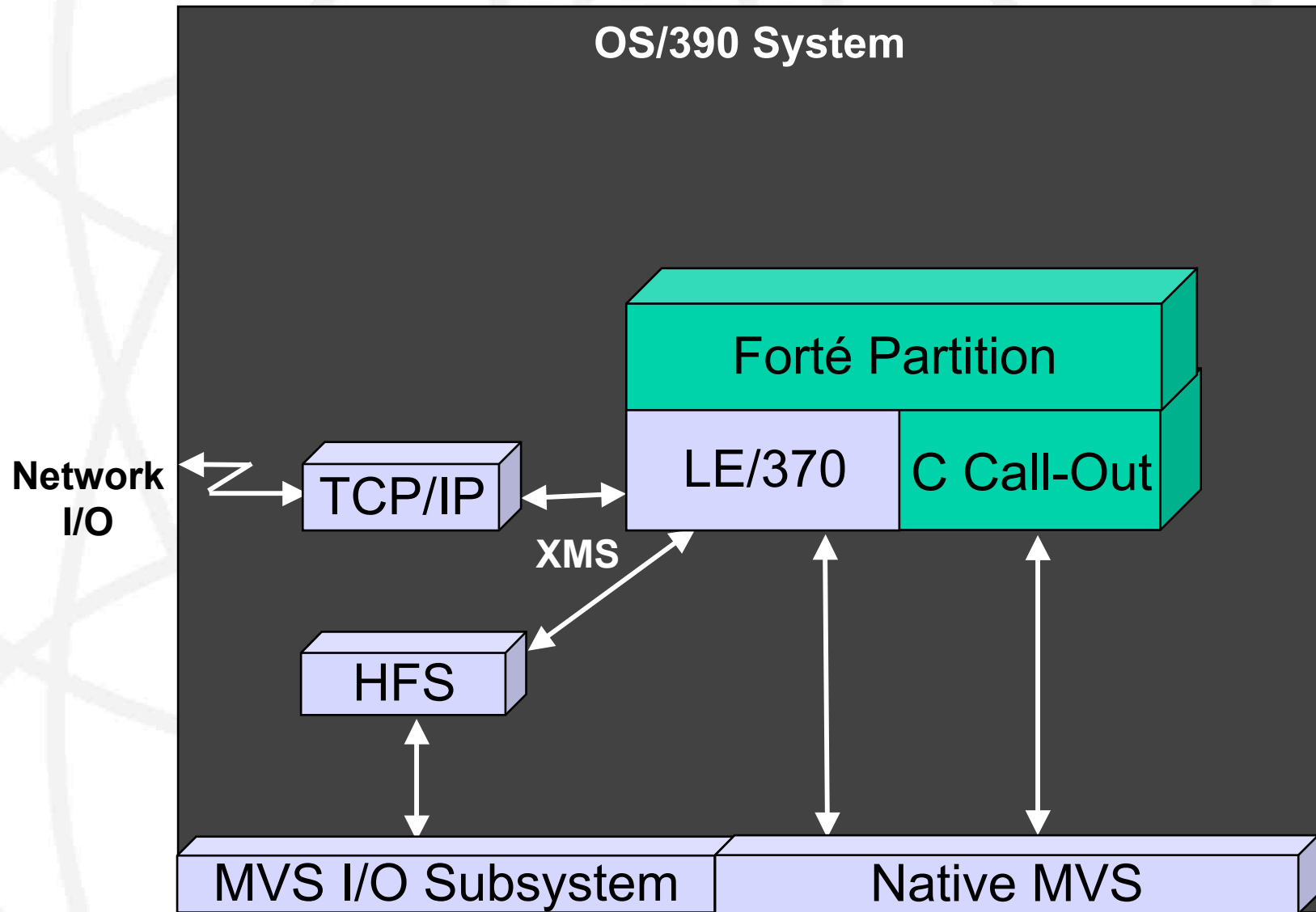
Forté Address Space Overview



Forté Address Space Overview

- Each Forté A/S has the same basic structure
 - Binary executable “main” routine
 - Dynamic libraries: Forté runtime, C Call-out, and/or OS/390 system libraries
 - Stack memory for each thread (48KB default)
 - Heap memory for objects (4MB default)
- Standard POSIX XPG4 interfaces used for almost everything
 - Implemented by LE/370 runtime libraries
 - Usually installed in LPA/shared memory
- Address spaces created on demand by MVS Workload Manager

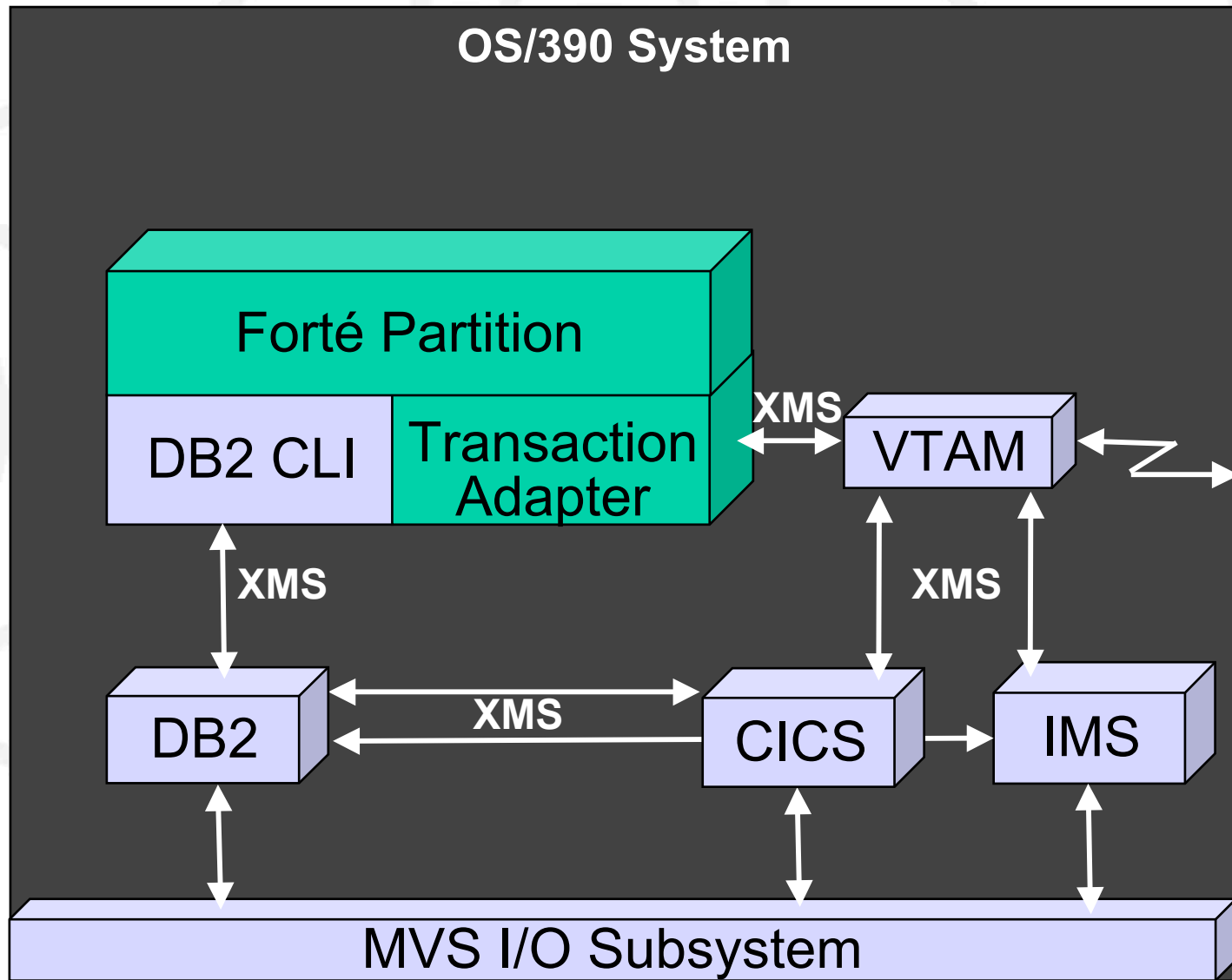
Basic OS/390 Interfaces



Basic OS/390 Interfaces

- MVS cross-memory services (XMS) connect Forté with external address space resources like TCP/IP, UNIX file system
- UNIX LE/370 runtime used for everything
 - built directly on native MVS facilities
 - provides POSIX XPG4 APIs for I/O, threading, TCP/IP sockets, memory management, etc.
- C Call-out libraries can access almost any native MVS interface, including checking security via RACF/SAF, writing SMF records, calling custom/proprietary APIs

CICS, IMS and DB2 Interfaces



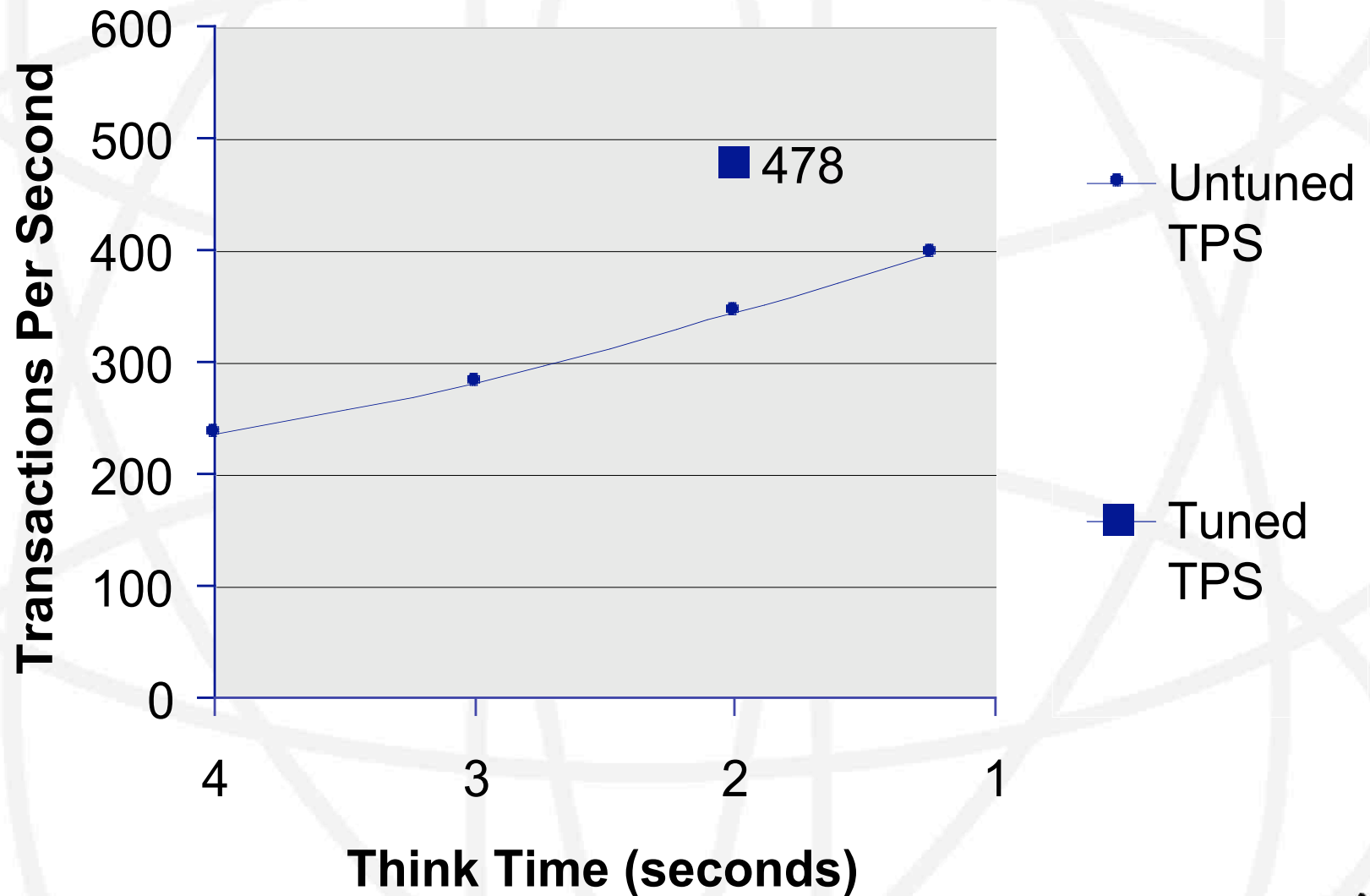
CICS, IMS and DB2 Interfaces

- The DB2 Call-Level Interface is used to support DBSession objects
 - Cross-memory access to DB2
 - Dynamic SQL is prepared once, cached and reused by Forté to optimize performance
- The Transaction Adapter uses callable SNA services to directly access LU 6.2 sessions
 - Local CICS and IMS communication is cross-memory via the VTAM address space
 - Remote CICS and IMS communication is via the SNA network

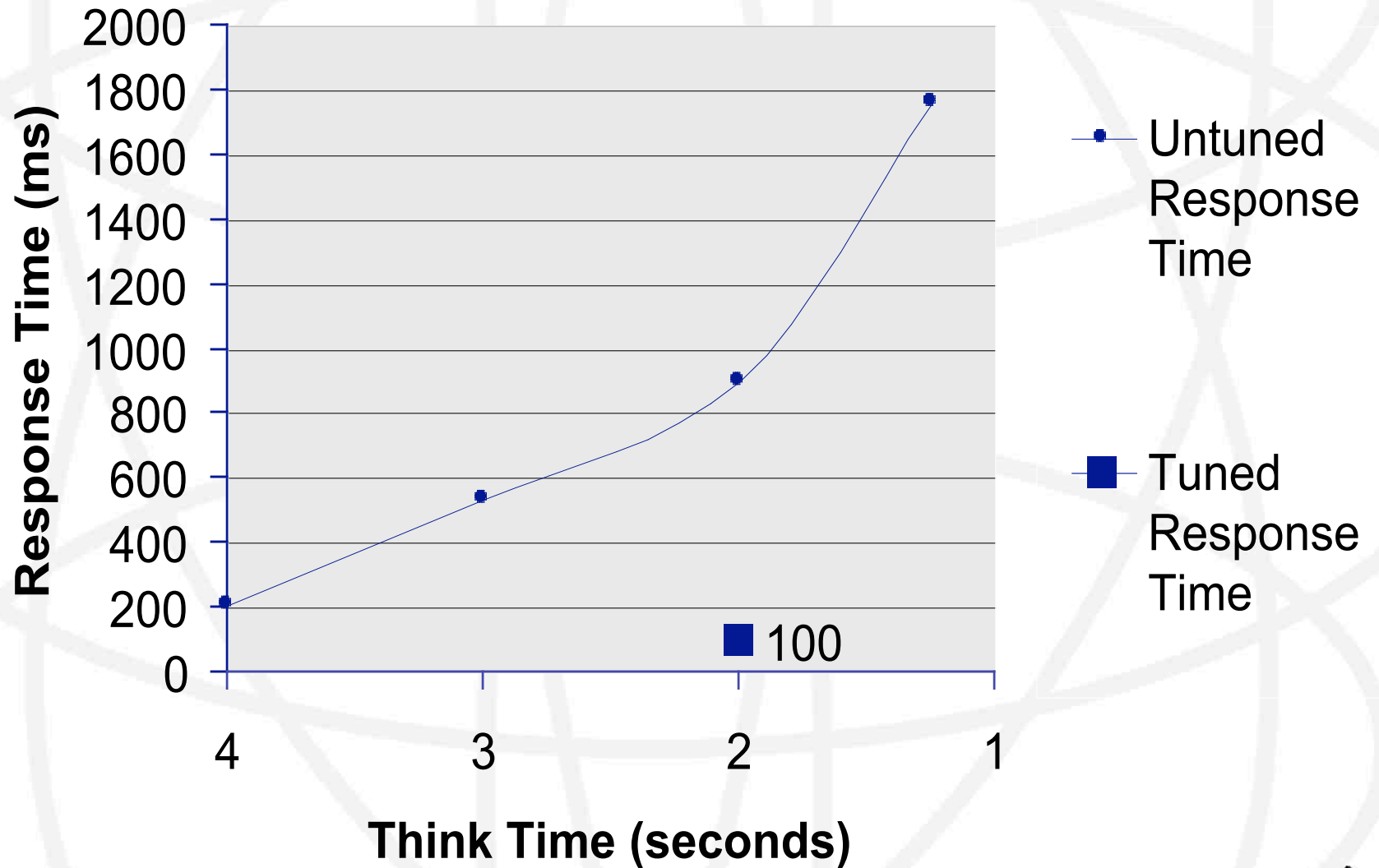
Forté Benchmark on OS/390

- Synthetic client/server benchmark at IBM
- 5 RS/6000 7025-F50, running a total of 1000 Forté client partitions, 100MB Ethernet LAN
- 9672-RX4 running OS/390 v2.5, 50 Forté server partitions, 10-20 POSIX threads per partition
- Forté server partitions invoked cross-memory interface to native MVS customer subsystem, emulating transactions and database access
- 1 Forté transaction = 1 native MVS transaction

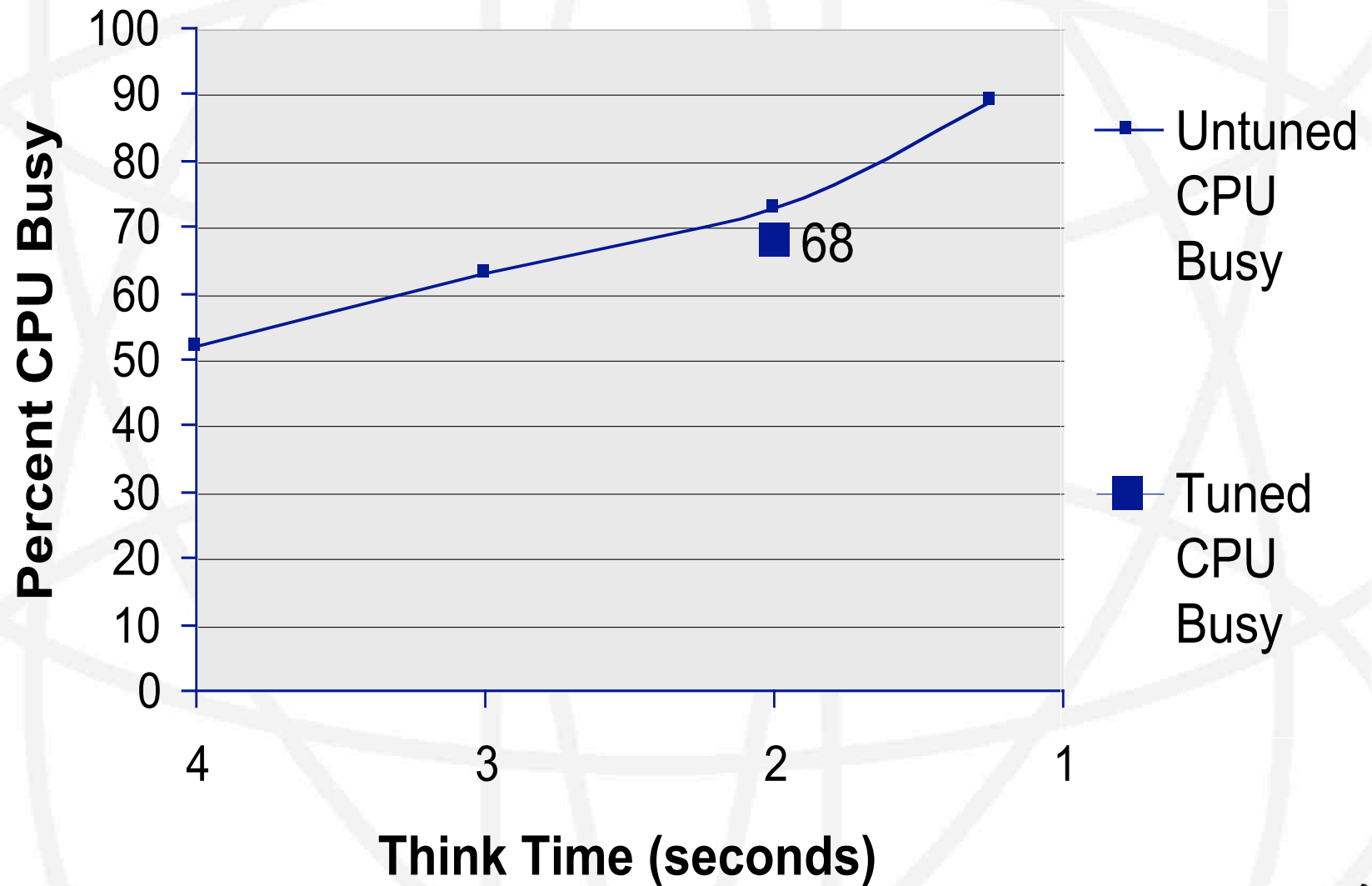
Throughput Results



Response Time Measurements



“CPU Busy” Calculations



Benchmark Results

- Untuned test series was used to dial in the benchmark, and find the “knee of the curve”
- Untuned test results show linear performance as transaction rate from users increases
- Untuned response times ranged up to 4.8 sec.
- MVS transaction emulation subsystem was consuming most of the CPU, and was running at a higher priority than UNIX address spaces

Benchmark Results (cont'd)

- Tuned the benchmark by dropping the dispatching priority of the MVS transaction subsystem below UNIX address spaces
- Delivered steady-state 478 TPS at 0.100 second end-to-end response time, 68% CPU busy
- Reduced OS/390 configuration to 10 partitions (50-100 threads each), and got similar results
 - 477 TPS, 0.101 second response time
 - 78% CPU busy
 - 15% CPU increase due to POSIX threading overhead

Summary

- Forté has delivered state-of-the-art application development and deployment technology for IBM mainframes
- Early user experiences have been very positive, with excellent benchmark performance and few problems reported
- Custom database gateways and transaction monitor gateways are not required - the architecture is elegant and straightforward
- Forté is committed to expanding and refining the OS/390 product line