



z/TPF – The evolution of transaction processing to open standards

Table of contents

- 2 Introduction**
- 2 The role of transaction processing**
- 3 The changing IT landscape**
- 5 Mainframe advantages**
- 6 z/TPF: Transaction processing for the future**
- 7 Summary**
- 7 Find out more**

Introduction

Transaction processing is a largely invisible back-end business computing function. Yet it is a key enabler of an enormous range of economic activities – from travel reservation and ticketing systems and electronic banking, to financial transactions and e-commerce. Transaction processing is and will remain a critical component of the world's economic engine – responsible for handling trillions of transactions every year. The workload volume managed by major users of transaction-processing systems is enormous. Clients interviewed for a report by the International Technology Group (ITG) reported peak loading of more than 25,000 transactions per second.¹

The majority of transaction processing applications run on mainframes and rely on operating systems such as the IBM Transaction Processing Facility (TPF). With the move toward On Demand Business and open systems, there is a growing need to integrate these proven, reliable assets with new IT architectures that embrace open standards, to provide the best of both worlds. IBM has introduced a significant update to TPF, called z/TPF, to address this need.

Retaining the proven mainframe/TPF architecture for transaction processing carries a number of advantages, including scalability, availability, reliability, manageability – all of which can help lower the total cost of ownership. z/TPF enables businesses to leverage these attributes while also taking advantage of the benefits of open systems.

The role of transaction processing

The world market depends in no small way on the smooth flow of commerce made possible by real-time transaction processing. Entire industries, such as finance and travel, literally owe their current place in the global economy to transaction processing systems, and could not exist in their present form without them. Transaction processing systems have been at the core of these and other industries for decades, and the prevalence of these systems has closely followed the rise of business computing. Because of their proven strengths, many of the same systems that were installed years ago are still in use today.

Highlights

Transaction processing, already a vital economic activity, is becoming more important as new technologies are developed.

The explosion of e-business and Web-based commerce and the continuing growth of the global economy are placing ever-greater demands on transaction processing systems. For example, travel reservation systems that once supported only travel professionals are now directly accessible by anyone with an Internet connection and a Web browser. The number of potential users has gone from tens of thousands to hundreds of millions in only a few years. Similarly, credit card companies that once relied on paper receipts, manual data entry and batch processing are now called upon to authorize billions of dollars in purchases almost instantly by millions of merchants around the world who are directly connected to secure authorization and validation systems.

New trends and emerging technologies, such as the increasing use of mobile messaging technology and the employment of Radio Frequency Identification (RFID) tracking, will generate even more transaction traffic. According to IDC, the potential industry investment in IBM products and services alone related to transaction processing will amount to US\$2.7 billion by 2007²

The changing IT landscape

While existing transaction processing systems are increasing in importance, the face of business is changing as companies move to become an agile, responsive On Demand Business. The key attributes of an On Demand Business are flexibility and responsiveness, achieved through the merging of IT, business processes and strategy. Rigid, strictly defined business models do not have the agility needed to remain competitive in such an environment; rather, the business model must be adaptable, and able to change to meet immediate and evolving market needs. The IT systems on which companies rely must therefore also be flexible and agile. This drives the need to integrate transaction processing systems into the SOA (service-oriented architecture) IT model that lies at the heart of On Demand Business.

The SOA model represents a fundamental shift in the IT landscape – the move toward open systems and away from closed, proprietary architectures. Open systems are far better able to support the end-to-end integration of IT with business processes, and are much more cost-effective. The flexibility and efficiency advantages afforded by On Demand Business can be traced in large part to this trend.

Highlights

z/TPF is the best of both worlds: it combines the advantages of open systems with those of dedicated, mainframe-based transaction processing systems.

Today, new businesses are employing SOA and open standards as a founding principle; meanwhile, established enterprises are redesigning their infrastructures along SOA lines as an important step to becoming an On Demand Business. This represents a considerable challenge for companies with fixed, proprietary applications and business processes.

The need to adopt open systems is placing significant pressure on businesses that rely on transaction processing systems. Mature, proprietary transaction processing solutions can represent an enormous investment in hardware and software, not to mention custom application development and subject matter expertise. They must be protected not only for obvious economic reasons, but also for the business intelligence that is embedded within them. Businesses in this situation can be pulled in two directions at once – torn between the requirement for flexible, open IT solutions that can be integrated and extended throughout the enterprise, and the need to leverage existing, mission-critical systems that have been in place for years, still function very well and cannot be dismantled.

Most existing transaction processing solutions, especially those in the travel and finance industries, are based on the leading transaction processing system: IBM Transaction Processing Facility (TPF). According to ITC, in 2001, TPF-based travel systems processed an estimated 93 percent of world-wide airline bookings. This included more than 87 percent of bookings made via the Web. In the same year, these systems also processed more than 300 million hotel, car rental, railroad and other related reservations.³

IBM has responded to the changing needs of business with z/TPF, a major update to TPF. z/TPF is designed to fully protect investments in existing systems while embracing open standards to support current and future developments. This permits the seamless integration of powerful transaction processing systems into SOA-based IT environments, and opens up the path for companies that rely on transaction processing to become a true On Demand Business.

Highlights

For the special needs of large-scale transaction processing systems, the mainframe platform offers many advantages.

The benefits of z/TPF are not limited to companies with existing transaction processing systems. By basing their transaction processing solutions on z/TPF (rather than a distributed computing model), companies that are new to the transaction processing arena can gain the mainframe advantages of low total cost of ownership, extremely high performance and centralized maintenance, as well as the business resiliency that comes with high availability, security and reliability. They can also benefit from the economies of readily available UNIX®/Linux® development skills, and the ease of integration afforded by open environments.

Mainframe advantages

Transaction processing systems have historically relied on mainframe computing platforms for their high performance, capacity, availability and security. Typical total availability rates for existing TPF systems exceed 99.99 percent, with response times of less than one second, and peak capacities of 25,000 transactions per second. In a survey of 14 companies using TPF, there was an average annual availability of 99.998 percent, which increased to 99.999 percent if planned, routine outages are excluded.⁴

These attributes reflect the robust nature of transaction processing. Yet some businesses are choosing to migrate to distributed systems that are based entirely on UNIX/Linux, or even Microsoft® Windows®. While these platforms may have a lower initial cost in some instances, the combination of a mainframe and a dedicated operating system designed specifically for transaction processing can provide a number of cost and efficiency benefits, especially in larger implementations, over the long term.

Under the distributed model, large-scale deployments capable of handling tens of thousands of transactions per second require sizeable server farms, which carry with them additional points of failure and extra maintenance requirements. On the other hand, the total cost of ownership of a mainframe-based solution is relatively low in the large-scale, high-transaction environments typical of businesses that rely on transaction processing. This is due to centralized maintenance, plus lower support costs and the superior reliability and availability attributes of the IBM @server® zSeries® mainframe platform.

Highlights

Investment protection is a key aspect of z/TPF. Existing code and expertise is retained, while leveraging the benefits of open systems.

An important aspect of the mainframe-based z/TPF system is its efficiency. This arises from the method it uses to process data, which focuses on message-driven processing for short, small, simple and rapid data interactions. This stands in stark contrast to other operating systems, which rely on relational databases designed for complex queries. The benefit of this architecture is much greater efficiency at high transaction volumes. Unlike other operating systems, z/TPF is designed for a single purpose – transaction processing.

z/TPF: Transaction processing for the future

With the release of z/TPF – a major update to TPF that has been three years in the making – IBM has addressed the need for a balance between open systems and legacy protection. z/TPF is the latest version of an established, proven and reliable system that leverages the advantages of zSeries mainframes, such as the new IBM System z9™ and IBM TotalStorage® products. The result is extremely high performance (tens of thousands of transactions per second simultaneously supporting hundreds of thousands of end users) with fast and consistent response times, along with superior reliability, availability and scalability (RAS).

z/TPF directly supports open systems – enabling the development of applications under Linux using high-level languages such as C/C++ and common GNU tools. This not only simplifies development and enables ready porting of UNIX/Linux functions, it also allows companies to take advantage of more readily available (and less expensive) development skills – thereby reducing costs and shortening time to market.

The new z/TPF supports open communications protocols, enabling rapid integration into an SOA. It can also be utilized as the transaction processing facility for an extended IT infrastructure containing numerous applications based on other operating systems. Although this was possible under earlier versions of TPF, z/TPF makes this level of integration much easier.

While it embraces open systems, z/TPF retains support for assembly language coding, and in fact has introduced some enhancements to this programming method. This provides investment protection for businesses that have invested heavily in existing applications. Existing code will continue to function, with minor changes in some cases. Enterprises with existing TPF applications

(many of which contain considerable intelligence and represent enormous investments) can readily port them to z/TPF without extensive rework, thanks to High Level Assembler capability on Linux for zSeries. This allows them to utilize existing code and avoid the costly migration that would be required in moving to a new platform. For these companies, z/TPF represents the new capabilities required by SOA and On Demand Business, while simultaneously offering total investment protection for existing IT investments.

Along with z/TPF, IBM has introduced supporting software and tools, such as z/TPF Database Facility and the IBM TPF Toolkit for IBM WebSphere® Studio Version 3 to provide a total solution. These supplementary offerings enhance management and development capabilities – boosting productivity and shortening time to market.

Summary

Businesses that rely on transaction processing face a unique dilemma: the critical technology that enables them to function offers numerous advantages over less centralized, less specialized systems. At the same time, it needs to be integrated into new, open systems-based IT models if these businesses are to remain competitive. z/TPF is an important development in this arena.

z/TPF provides existing TPF users with total investment protection – supporting existing programming languages and methods while simultaneously enabling development under open systems using common tools and more readily available, less expensive programming skills.

New businesses moving into transaction processing also benefit from z/TPF because of its fundamentally superior architecture (which drives high transaction processing efficiency), its proven nature, and the reliability, availability and lower total cost of ownership afforded by the IBM @server zSeries main-frame platform.

Find out more

For more information about how IBM can help you take advantage of the performance, reliability, low total cost of ownership and openness provided by z/TPF, contact your IBM representative, or go to:

ibm.com/tpf



© Copyright IBM Corporation 2005

IBM Corporation
New Orchard Road
Armonk, NY 10604
U.S.A.

Produced in the United States of America
10-05
All Rights Reserved

IBM, the IBM logo, ibm.com, the On Demand Business logo, the eServer logo, System z9, TotalStorage, WebSphere and zSeries are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both.

Linux is a trademark of Linus Torvalds in the United States, other countries or both.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product or service names may be trademarks or service marks of others.

References in this publication to IBM products or services do not imply that IBM intends to make them available in all countries in which IBM operates.

¹ "Value Proposition for TPF Mail and Web Serving". International Technology Group. 2001.

² Lohr, Steve. "IBM Updates Old Workhorse to Use Linux". New York Times. October 4, 2004.

³ "Value Proposition for TPF: Comparing TPF and NonStop for Travel Industry Applications". International Technology Group. July 2002.

⁴ Ibid.