



IBM z/TPF: Purpose-built for the travel industry

Transaction processing reaches new heights

Many millions of times a day, travel reservations are made, tickets bought and hotel rooms booked; flights depart and arrive, credit card purchases are authorized and money is disbursed—all over the world, routinely and without flaw. But none of this just happens by chance. As a rule the airline, railroad, travel agent, hotel, bank or credit card company depends on a supremely fast, reliable and largely unseen system known as IBM® Transaction Processing Facility (TPF) to handle these critical operations. The latest version is named IBM z/TPF.

An often unnoticed back-end function, transaction-processing literally supports entire industries' role in the global economy, from financial services to travel and transportation. And it is clear that transaction-processing systems are poised to continue growing in importance as a critical component of the world's economic engine—handling a staggering number of transactions per year. Over the past 10 years the four largest IBM TPF clients have increased their use of TPF by 175 percent as measured in million service units (MSUs), and they remain the four largest TPF clients today. For all TPF clients, installed MSUs have grown 66 percent over the past five years. This trend is expected to continue, as other industries including telecommunications, healthcare, distribution, government, media and others need the power of TPF today.

IBM TPF soars with the world's top airlines

Sixteen of the largest 25 airlines in the world, or 64 percent, run major portions of their reservation systems on TPF and these workloads are among the most critical to their business (see Figure 1). One more is migrating to a TPF system, and another already uses TPF for its international reservations. Consolidation in the airline and travel distribution industry has led to fewer but significantly larger users.



Table 1. The largest 25 airlines worldwide, and whether their reservation systems run on IBM TPF technology.

Airline	Passengers	Running on TPF technology
Delta Air Lines	162,615,000	Yes
Southwest Airlines	106,307,000	Yes
United Continental	99,452,000	Yes
American Airlines	86,204,000	Yes
China Southern Airlines	76,455,000	No
Ryanair	72,100,000	No
Air France KLM	71,320,000	Yes
China Eastern Airlines	64,878,000	No
Lufthansa	58,916,000	Yes
US Airways	51,853,000	Yes
easyJet	48,800,000	No
Air China	46,241,000	No
All Nippon Airways (ANA)	45,743,000	No (Domestic) Yes (International)
Japan Airlines	34,795,000	Yes
TAM Linhas Aereas	34,553,000	Yes
Air Berlin Group	33,593,000	Yes
Gol Linhas Aereas	32,122,000	No
Emirates Airline	31,422,000	Yes
Turkish Airlines (THY)	29,099,000	Yes
Cathay Pacific	26,796,000	No (Migrating to TPF)
AirTran Airways	24,721,000	No
JetBlue Airways	24,254,000	Yes
SkyWest Airlines	24,218,000	Yes
British Airways	24,088,000	Yes
Air Canada	23,615,000	Yes

Source for passenger numbers: "ATW World Airline Report 2010."
Air Transport World (<http://atwonline.com/war-report/content/atw-world-airline-report-2009-0729>)

IBM z/TPF innovates to keep pace

However, the explosion of online business and the growth of the global economy in recent years are placing ever-increasing demands on transaction-processing systems like TPF. For example, travel reservation systems that once supported only travel professionals are now used by anyone with an Internet connection or a mobile device. The number of users has thus grown from tens of thousands to hundreds of millions in just a few years.



At the same time, market demand for new products and services and rapidly evolving travel distribution ecosystems are pressuring businesses that rely on transaction processing to adopt open systems that can support new requirements more rapidly. These transaction-processing systems perform mission-critical business functions that must be safeguarded. They also help protect the critical data which may be harvested for business intelligence and insight by analytics software.

Reservation and passenger-service systems represent a large investment in development, skilled resources, hardware and software. For most companies building a replacement is unaffordable, the time needed unacceptable and the risk too great.

In 2005 IBM responded to this new business environment by introducing an improved version of TPF for the powerful IBM System z® environment. IBM z/Transaction Processing Facility (z/TPF) is designed to fully protect investments in existing applications, while embracing open standards to reduce the cost and time required to address new business requirements. Businesses that use IBM z/TPF can rapidly bring new products and services to market and deploy new distribution strategies—with minimal risk and incremental investment, rather than completely replacing their heritage applications all at once. IBM z/TPF provides the confidence to offer new products and services to new markets without concern about the increased system workload. New clients in emerging markets are using IBM z/TPF for applications such as payment processing and online sales.

What makes IBM z/TPF special

IBM z/TPF is not just a transaction processor but an operating system, transaction processor and a unique database, all designed to work together as one system. The transaction processor and operating system are specifically designed for high-volume transactions in a real-time environment. IBM z/TPF is optimized for:

- Maximum transaction rates (tens of thousands per second) with minimum response times.
- Maximum networked user communities (hundreds of thousands of concurrent users).
- Fast access to write intensive shared data.
- Superior Reliability, Availability and Serviceability (RAS).

Reservation and passenger service systems can take advantage of the IBM z/TPF system to deliver unmatched capabilities.

IBM continues to invest in enhancements to its z/TPF platform because usage continues to grow. IBM invested over USD100 million in 2005 to develop the initial release of z/TPF to support existing clients' growth, and to deliver a platform that can support new workloads driven by the web, mobile applications and changing distribution models. IBM continues to deliver new updates to its z/TPF platform every year. Over the past five years, each of these updates has contained more than 80 new capabilities. These enhancements are driven by the user community, and the pace of new requirements is not slowing.

No TPF client has ever been unable to scale their system to meet their performance objectives and no client has ever been forced to invest in a drastic overhaul of their TPF applications to meet increasing transaction volumes.

IBM extended its commitment to its z/TPF platform in 2010 with the release of the IBM Passenger Rail Reservation Service, a portfolio of core passenger rail reservation system capabilities optimized for z/TPF.

A myth dispelled

TPF is sometimes disingenuously referred to as a “legacy” system by IBM competitors and others seeking to gain market share in the high-volume transaction-processing space. Nothing could be farther from the truth. IBM z/TPF is now an open platform like Linux and UNIX. IBM 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 Linux programming skills which are widely available and

normally less expensive. As a result, you can seamlessly integrate robust transaction-processing systems into service-oriented IT environments.

IBM z/TPF continues to be the only high-performance, purpose-built system designed from the ground up to support the unique transaction-workload characteristics found in reservation systems.

An industry-standard-based system

IBM z/TPF runs on System z mainframe hardware, the industry-standard mainframe platform, and z/TPF does not require the added expense of an underlying operating system. For the special needs of large-scale transaction processing, the System z mainframe platform offers many advantages, including:

- **Extreme virtualization.** It is used for large-scale consolidations, which reduce operating costs dramatically.
- **Highest levels of availability.** System z offers more availability than any other platform.
- **Unsurpassed scalability.** It can respond to the increasing and changing demands of today's business world.
- **Unparalleled security.** System z is the only platform with an EAL5 certification—the highest security certification achieved by any hardware platform.
- **Massive costs savings.** The costs of acquiring and operating System z technology can be as much as 70 percent lower than the costs of acquiring and operating non-mainframe systems.¹

These advantages also strengthen the case for centralization of core systems for businesses driven by extraordinary budget pressures and a continuing need for innovation. IBM z/TPF lends itself to centralization as it was designed for workloads that require a globally consistent view of the business's critical data that is subject to near-constant change, while providing extremely high levels of availability and continuous operation.

Offering the best of both worlds

IBM z/TPF combines the flexibility of an open system with the advantages of a dedicated, mainframe-based transaction-processing system. It uses an open-standards-based Linux development environment, helping to minimize the need for multiple tools and make the most of common skill sets. It is also service-oriented architecture (SOA) enabled, so that all TPF assets can be reused with all other applications in your systems environment. The de facto industry standard for building robust, flexible IT infrastructures, SOA breaks complex business functions into smaller, individual services independent of a particular network protocol or operating system—creating a more-flexible application which can react more quickly to changing market conditions.

Furthermore, it exploits the System z architecture, which aids in the enablement of SOA, and provides the maximum level of security available—there are no reports of an IBM z/TPF system ever being compromised by hacking.



Mapping an easy path to modernization

Once the reservation applications are running on z/TPF, IBM recommends a phased modernization of the applications, as opposed to building a new solution from nothing. Building a new solution requires a significant initial investment, can take many years to accomplish and can be risky because of the size, complexity and mission-critical nature of these systems. Over the years, a number of businesses have attempted to develop a TPF replacement, with little or no success to date. A phased modernization using open systems leverages existing assets and employs a low-risk incremental investment approach. The phased steps are defined to align with specific business objectives, priorities and milestones.

IBM z/TPF is indisputably the best platform for large-scale reservation systems and is a prudent investment from both a business and technology perspective.

Conclusion

The IBM z/TPF platform exists to deal with the rapid growth of high-volume, high-throughput transaction processing. IBM z/TPF expertly and efficiently handles large, continuous loads of essentially simple transactions across large, geographically dispersed networks with many concurrent users who expect very fast response time—all typical in the travel and financial services industries. For example, IBM z/TPF can handle Visa's credit card transactions during peak holiday season. The world's largest TPF-based systems are easily capable of processing tens of thousands of transactions per second. It is not uncommon for clients to measure the time between unplanned outages in years, a cost-saving benefit directly attributed to the TPF and System z platforms' numerous high-availability capabilities. IBM z/TPF combines the flexibility of an open system with the advantages of a dedicated, mainframe-based transaction-processing system, and is optimized to deliver the lowest total cost of ownership and yield the lowest cost per transaction.

For more information

To learn more about IBM z/TPF or the phased approach to modernizing your current TPF system, please contact your IBM client executive, email tpfqa@us.ibm.com or visit the following website: ibm.com/software/http/tpf/



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¹ Based on IBM cost modeling of Linux on IBM zEnterprise™ versus alternative distributed servers. Given there are multiple factors in this analysis, such as utilization rates, application type and local pricing, savings may vary by user. (ibm.com/systems/info/z/zenterprise/newacct.html)



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