IBM.

IBM z/Transaction Processing Facility Enterprise Edition V1.1 — The future of high availability transaction processing

IBM United States Software Announcement 204-250
October 7, 2004

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(Corrected on December 14, 2004)

The Technical features and Software requirements sections are revised.

At a glance

Benefits for z/Transaction Processing Facility Enterprise Edition (z/TPF) V1.1 and z/Transaction Processing Facility Database Facility (z/TPFDF) V1.1 include:

- Ability to handle tens of thousands of transactional messages per second
- High reliability and availability as integral parts of the product
- Fast response times for transactions
- Low cost per transaction
- 64-bit support on zSeries servers to provide for large address space capability
- Large redundant single database capable of addressing up to 32K addressable storage units per system
- C/C++ programs built on Linux using the GNU toolchain
- Support for common, reliable open communications protocols and formats

For ordering, contact:

Your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at **800-IBM-CALL** *(Reference: LE001).*

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Overview

z/Transaction Processing Facility Enterprise Edition (z/TPF) V1.1 (5748-T15) is a high-performance operating system specifically designed to provide high availability for demanding high-volume, real-time transaction processing for mission critical e-business applications. z/TPF runs on and exploits IBM *@server®* zSeries® servers, an infrastructure offering for transaction processing with high quality of service demands.

As the next generation of on demand transaction processing systems, z/TPF has been developed on the architecture of IBM TPF V4.1. TPF V4.1, widely used in the Travel, Banking/Finance, and Public Sector industry segments, is well suited to business computing environments requiring:

- Management of extreme transaction volumes — z/TPF can process tens of thousands of transactions per second from hundreds of thousands of end users. Additionally, a z/TPF loosely coupled complex can scale to as many as 32 zSeries servers.

- High reliability/availability — For mission critical applications, downtime can effect losses of millions of dollars an hour, not only from revenue loss, but also from bad publicity and dissatisfied customers.
- Fast response time — When response time is critical to help lower call center costs or enhance customer satisfaction, z/TPF is designed to provide fast and consistent response across predictable and unpredictable peaks.
- Low cost — z/TPF offers a low cost per transaction for high-volume real-time transactions. This capability alone represents a competitive advantage for delivery of business services in the marketplace.
- Efficiency — z/TPF supports the IBM 64-bit z/Architecture™ with the use of 64-bit real addresses and 64-bit virtual addresses enabling large-scale memory spaces permitting large applications and large memory tables.
- Open development environment — z/TPF also uses the GNU tool chain. z/TPF can share applications, tooling, and development infrastructure with the most common open system available, Linux™.

The z/Transaction Processing Facility Database Facility (z/TPFDF) V1.1 (5748-F15), provides database management functions to z/TPF:

- Can help increase programmer productivity by providing centralized database handling routines so that application programmers only need to understand the logical relationships of data, not the physical characteristics.
- Helps simplify the application programmer's job by allowing high speed access to persistent data on z/TPF while providing a simple application interface.

z/TPFDF also provides the database administrator with the tools to manage the database without necessarily affecting application programs.

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Key prerequisites

z/TPF runs on the following zSeries servers:

- z990
- z900
- z890
- z800

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Planned availability date

September 30, 2005

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Description

z/TPF features and benefits

z/TPF can act as a specialized server for transaction application processing and can play a role in various enterprises as a core infrastructure that provides transaction and database services to outlying applications on numerous and diverse products and platforms.

- Management of extreme transaction volumes — processing peak loads in the tens of thousands of transactional messages per second. Additionally, a z/TPF loosely coupled complex can scale to as many as 32 zSeries servers.
- High reliability/Availability — z/TPF was designed from the start to provide high availability including a redundant database. z/TPF also has the capability of:
  - Adding new applications while the system is running and fall back to prior versions of applications if necessary, also while the system is running.

- Logging system accesses and transactions for security and audit purposes
- Capturing and logging persistent data for data integrity and recovery purposes
- Fast response time -When response time is critical to help lower call center costs or enhance customer satisfaction, z/TPF is designed to provide fast and consistent response performance across predictable and unpredictable peaks.
- Low cost per transaction — This capability alone represents a competitive advantage for delivery of business services in the marketplace.

z/TPFDF (5748-F15) provides database management functions to z/TPF:

- Can help increase programmer productivity by providing centralized database handling routines so that application programmers only need to understand the logical relationships of data, not the physical characteristics. This simplifies the application programmer's job by allowing high speed access to persistent data on z/TPF while providing a simple application interface.
- Provides the database administrator with the tools to manage the database without necessarily affecting application programs.

Bigger, better, faster features

- z/TPF supports IBM 64-bit z/Architecture® with the use of 64-bit real addresses and 64-bit virtual addresses enabling large-scale memory spaces. Applications running in either assembler or C/C++ have access to a 64-bit process address space with necessary system services supporting all address ranges. The utilization of 64-bit architecture allows large applications as well as large memory tables. Basic Assembler Language (BAL)-based applications can also be run in 31-bit mode.
- The z/TPF system includes the base product and the High Performance Option feature. This feature, consisting of the loosely coupled facility and the multiple database function (MDBF), allows the z/TPF system to run in a loosely coupled configuration where each central processing complex (CPC) can share a common database.
- z/TPF supports C and C++ enabling richer applications and application portability. C/C++ programs are supported in 64-bit mode only.
- z/TPF also supports common, reliable communications protocols and formats such as TCP/IP, UDP, HTTP, WebSphere® MQ, SNMP, SMTP, IMAP4, POP3, FTP, SNA, TFTP, SOAP, XML and MATIP.
- WebSphere MQ is available on z/TPF. WebSphere MQ can run as an MQ Client, a Queue Manager or a server on z/TPF allowing messages to be sent between z/TPF applications, or between z/TPF applications and applications residing on other WebSphere MQ platforms.
- z/TPF open_ssl base SSL stack includes management of the SSL socket at the kernel level allowing multiple processes to share sessions. This may allow z/TPF to potentially scale SSL connections to hundreds of thousands of sessions by reducing the required memory footprint for each SSL session.
- A common debugger is provided for both assembler (BAL) programs and C/C++ programs utilizing zSeries trace functions. The result is a "hookless" debugger for C/C++ programs. With this facility, z/TPF allows debugging for the tracing of TPF C/C++ programs, compiled at any optimization level.
- z/TPF provides a POSIX-like flat file system. z/TPF includes a ported virtual file system that allows mounting of other files systems and a new memory file system for transient (temporary) files.
- z/TPF database capabilities include FARF6 and up to 32 loosely coupled systems attached to the same database.

    FARF refers to File Address Reference Format which is used for symbolic addressing of records in a z/TPF database. The FARF6 address format can theoretically address 72 quadrillion records. z/TPF also allows you to attach up to 32,000 addressable storage units.

- Loosely coupled complexes require the following:
    - Channel Redrive, which is activated by IMLing the processor in ESA TPF mode.
    - Sysplex Timer® attachment. For high-availability Sysplex Timers, the dual port Sysplex Timer attachment card is required.
    - DASD control units that require multi-path lock facility (MPLF). If you have a coupling facility (CF), DASD control units do not require MPLF.
- The z/TPF database is designed specifically for extremely high I/O rates. It is not a relational database. The z/TPF Application Requester (z/TPFAR) provides z/TPF application architects and database managers with the ability to store or retrieve data from a relational database which supports DRDA® (Distributed Relational Database Architecture™). By using z/TPFAR, the z/TPF customer can access information stored within a relational database such as DB2®. Pertinent data can also be inserted into a relational database in those cases where the relational storage technique is a better fit to the data than the various standard z/TPF database access methods.
- The standard and widely used Mail protocols of Simple Mail Transport Protocol (SMTP), Post Office

Protocol (POP), and Internet Mail Access Protocol (IMAP) are incorporated into z/TPF to provide the ability to receive and send mail. Customer uses of the z/TPF Internet Mail Server can include; internal mail systems between an enterprise and its employees or business partners, as a relay system or backbone for a large mail serving operation, and as a means for z/TPF applications to send notifications that can be read by 'off-the-shelf' products. With a design point of over 250 million users, utilizing z/TPF as a high end mail server can help reduce worry about performance and peak system loads.

- z/TPF also uses the GNU tool chain. This allows z/TPF to share applications, tooling, and development infrastructure with the most common open system available, Linux. The affinity with GNU allows customers to obtain and use large quantities of easily ported "open" software. The z/TPF user would have the means available to combine the power and value of open software with z/TPF's availability, scalability and reliability

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Product positioning

Many large and fast growing businesses that rely on transaction processing as the backbone of their business are facing difficulty keeping worldwide systems available to their customers and business partners 24 hours a day, seven days a week, 365 days a year. To address these issues and maintain a reasonable response time for each and every transaction as well as maintaining the pace of business growth and keeping costs under control, customers should consider z/TPF.

z/TPF and z/TPFDF are built on the architecture of the TPF 4.1 operating system which has been highly successful in the travel industry as well as the financial industry. The International Technology Group (ITG) estimated that in 2001, TPF-based travel systems, including all major Global Distribution Systems (GDS), processed more than 93 percent of worldwide airline bookings. This included more than 87 percent of Web bookings, along with more than 300 million hotel, car rental, railroad and other reservations.

Source:

Value Proposition for IBM TPF
Comparing TPF and NonStop for Travel Industry Applications
Management Brief
International Technology Group
Los Altos, California.
July, 2002

This report was developed by ITG with IBM assistance and funding. This report may utilize information, including publicly available data, provided by IBM. Other companies may also have provided information to ITG for inclusion in this report. This report does not necessarily represent IBM's position on these issues.

z/TPF can address transaction system opportunities in two categories:

1. Mature or maturing market segments — Opportunities where a customer's evolved business model is based on investing in the resource and infrastructure necessary to operate at a lowest cost per transaction.
2. Qualified new, emerging or fast growth segments — Opportunities where a customer's (or market segment's) strategic business model is based on investing in the resources and infrastructure necessary to operate at a high speed per transaction or low cost per transaction.

Many enterprises today initially developed their transaction systems on small platforms. What began as a handful of processors for many of these companies has now grown into huge horizontal server farms bringing with them management, database currency, latency, connectivity, maintenance and inevitably, financial problems. Consolidating applications into one system and a single database can help solve most of these problems.

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Statement of direction

It is IBM's intention to provide High Level Assembler (HLASM) capability on Linux for zSeries prior to, or at the time of, the general availability of z/TPF Enterprise Edition V1.1.

This statement represents current intention of IBM. IBM development plans and dates are subject to change or withdrawal without further notice. Any reliance on this statement of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

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Hardware and software support services

SmoothStart™/installation services

Technical support will be provided by z/TPF Client Support. For services contact information, visit the TPF web site

http://www.**ibm.com**/tpf

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Reference information

Refer to Software Announcement 294-282 , dated May 17, 1994.

Refer to Software Announcement 290-064 , dated February 13, 1990.

Business Partner information

Direct Resellers - System Resellers acquiring products from IBM may link directly to Business Partner information for this announcement. PartnerWorld ID and password required (use IBM ID).

BP Attachment for Announcement Letter 204-250

Trademarks

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

Technical features

z/TPF is a significant advance from its predecessor TPF V4.1. Among new features are:

z/TPF virtual address architecture: z/TPF is designed to support:

- Virtual address space exploits 64-bit addresses
- New virtual address areas in both the Entry Control Block (ECB) Virtual Memory (EVM) and System Virtual Memory (SVM) address spaces
- 1 MB frame physical block type back various EVM and SVM addresses
- Permanent, "preallocated" storage for each ECB in several EVM virtual address areas can help improve performance
- Improved detection of core corruption

- ECB Heap (malloc) storage
- ECB Private Area
- ECB Heap (malloc) storage

ECB Heap: 31-bit ECB Heap Storage exists below the 2 GB line and 64-bit Heap Storage is above the 2 GB line. New macro parameters identify 31-bit and 64-bit storage requests for C++ and Assembler programs. There is also enhanced data collection/reduction for ECB heap usage which can:

- Increase storage capacity for application usage
- Improve performance of ECB heap management routines
- Increase amount of ported C language code, which uses malloc( ) and free( ) functions frequently
- Increase use of C++ objects, which use ECB heap via new( ) and delete() functions
- Enhance data integrity
- Provide new ECB heap APIs
- Provide additional diagnostic information

Application stack

- Can help reduce startup cost of C/C++ programs.
  - Application stack is present for all ECBs.
  - A user adjustable number of 4K buffers are preallocated.
  - Provides reduced instructions for linkage between C/C++ functions (using gcc).
  - Application stack grows downward instead of upward.
  - Provides reduced amount of stack overflow processing.
  - The virtual stack area beyond the preallocated section is dynamically backed by 1 MB frames on write.

Program attributes: All z/TPF programs are maintained in two Core Resident Program Areas (CRPA).

- One for 31-bit programs and one for 64-bit programs — They are defined on BEGIN macro by AMODE= parameter.
- Programs are loaded into storage based on new FETCH option:
  - PRELOAD — Early in restart
  - DEMAND — Only when called
  - DEFAULT — During restart or on demand
- Transfer vector definitions are in BEGIN.
- Data only programs must be defined on BEGIN macro.

Virtual File Access (VFA): VFA is a DASD I/O cache unique to TPF that can help reduce the numbers of physical I/O executed, potentially reducing the existence time of a request in the TPF system. After tables are carved, all remaining storage is designed to be allocated to VFA. With larger processors, VFA has the potential to be large. For example, a 128 GB processor can carve 3GB of tables, resulting in a 125 GB VFA:

- VFA — Uses 4K buffers to hold 381, 1055 and 4K byte records
- No configuration of buffer ratios
- One aging list

Globals: z/TPF provides two Global areas:

1. Format-1 Globals — Essentially the same as TPF 4.1 globals
2. Format-2 Globals
   - New globals support
   - Independent of Format-1 Globals
   - 64-bit architecture allows extremely large main storage tables to be created.

Communications: z/TPF supports a wide variety of common and reliable open communications protocols and formats such as:

- TCP/IP. UDP, HTTP, SNMP, FTP, TFTP SOAP, XML
- SMTP, IMAP4, POP3
- MATIP
- WebSphere® MQ

z/TPF provides full 64-bit support for TPF TCP/IP. In addition there are

enhanced Quality of Service features for TCP/IP including:

- Different priority values assigned to Open Systems Adapter (OSA) input messages
    - Priority values are 1 (highest) to 9 (lowest).
    - Priority 1 messages go on ready list (high priority).
    - Priority 2-9 messages go on input list.
    - The only difference between these is the likelihood of a message being discarded.
    - Defined on a per application basis in the Network Services Database (NSD) — Default value is priority 5.
- OSA input messages now queued in IPMT blocks rather than 4K frames
- If system runs out of IPMT blocks, some OSA input messages are discarded based on priority
- New OSA polling features

z/TPF also has enhanced diagnostic features in TCP/IP processing.

- Tracing socket API calls:
    - Trace at a per-socket level
    - Trace at a per-ECB level
    - Count TCP/IP exception conditions on a per socket basis, including:
    - Messages retransmitted and received out of order
    - Fragments sent and received
- Updated and new ZSOCK commands

Systems Network Architecture (SNA) communication and Console.

- SNA communication and Console supports the new z/Architecture™.
- SNA tables remain below the 2-GB bar.
- E-type SNA system programs continue to run in 31-bit mode.
- Parameters on SNA macros that point to memory must be addresses below the 2-GB bar.

New development environment: z/TPF also uses the GNU tool chain. This allows z/TPF to share applications, tooling, and development infrastructure with the most common open system available, Linux™. The affinity with GNU allows customers to obtain and use large quantities of easily ported "open" software.

- Other open source software applications
- GCC/G++ can be built as cross compiler
- Compiler can drive open standards
    - Executable and Link Format (ELF)
    - Standard Application Binary Interface (ABI)
- Number of extensions available — Ability to imbed assembler within C code

C++ Library Support

- Standard C library
    - Porting GNU C Library (GLIBC)
    - C++ Library (libstdc++)
    - Open source code
- Additional libraries
    - Standard Streams
    - The Standard Template Library (STL)
- C/C++ programs running 64-bit mode
    - All existing programs need to be recompiled / linked.
    - Loaded into 31-bit or 64-bit CRPA based on a link option set in the program's makefile.

Assembler programs

- Program size can be greater than 4K.
- Realtime programs are built in the executable and link format (ELF).
- All existing programs need to be reassembled / linked.
- Multiple base registers defined with BEGIN.

New debugger functions

- View OPR dump with Debugger GUI
- Attach debugger to long running ECB
- View snapshot of running ECB
- Trigger trace log facility
- Support for z/TPF Toolkit for WebSphere Studio front end only

z/TPFDF

As a follow-on to TPFDF, z/TPFDF has the following enhancements:

- Support for z/TPFDF applications running in 64-bit mode.
- Support for z/TPFDF assembler applications running with multiple or no base registers.
- Can use the GCC compiler.
- Fully Integrated into the TPF HFS directory structure and build procedures.
- Use of standard "enter/back" linkage allowing better use of z/TPF functions.
- MLS data — No longer created offline and loaded from tape. Information is now derived from ADATA files.

The z/TPFDF product is a co-requisite necessary for z/TPF functions.

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Education support

IBM expects to announce education classes for z/TPF Introduction, Systems, Applications, and Operations and Coverage prior to general availability. IBM will also provide services and training offerings for pre-migration, migration, and post-migration support. For more information, visit

http://www.**ibm.com**/tpf

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Technical information

Hardware requirements

z/TPF and z/TPFDF run on the following IBM servers (or equivalent):

- zSeries® z990
- zSeries z900
- zSeries z800
- zSeries z890

Software requirements

The following are prerequisite products for z/TPF and z/TPFDF:

- IBM z/OS® 1.03.0 (5694-A01) or later release (including HLASM Release 5) is required to build z/TPF and z/TPFDF
- IBM Enterprise PL/1 for z/OS, V3.3 (5655-H31)
- Linux for zSeries (64-bit with 32-bit "compatibility mode") is required to build z/TPF and z/TPFDF

There are multiple ways to get Linux on zSeries:

Commercial distributions: Available from IBM Linux Distribution Partners Red Hat (www.redhat.com), SUSE

LINUX (www.suse.com), and Turbolinux (www.turbolinux.com). Commercially available Linux distributions can include the Linux operating system enabled for specific hardware platforms, an assortment of device drivers, routines for installation, and value add programs like Web servers and shells. Typically these distributions are delivered over the Internet or packaged on a physical deliverable. IBM suggests that these distributions be your first choice for production environments because of their availability of service and support from the Linux Distributor, or IBM Support Line.

Build your own: IBM provides patches on developerWorks™ that are meant to be applied to the vanilla versions of the kernel, gcc, gdb, etc.

> http://**ibm.com**/developerworks/opensource/linux390/index.shtml

You can get these packages from the official places on the Web where they are hosted

> http://www.kernel.org

> http://www.gnu.org

- GNU Toolchain components:
  http://gcc.gnu.org

z/TPF uses the GNU GCC complier for building programs and the open source libraries at run time which you may obtain from http://gcc.gnu.org. These open source components are not part of z/TPF and therefore are not supported by IBM as part of the normal z/TPF support customer agreement. Please contact your IBM service representative for alternative arrangements.

- gcc 3.4.1 (or later) — built in cross-compiler mode to run on z/TPF
- g++ 3.4.1 (or later) — built in cross-compiler mode to run on z/TPF
- binutils 2.15 (or later)
- Korn Shell: pdksh (http://www.kornshell.com)

z/VM® is not a requirement to run z/TPF, however, to run z/TPF guests, IBM z/VM V4.04.0 (5739-A03) or later is required

Additional notes:

The z/TPF base is a system that can be IPLed. There are no software prerequisites in order to IPL.

The IBM z/TPFDF product is a prerequisite for z/TPF functions.

For z/TPF Application Requester (z/TPFAR) functions, a DRDA® compliant database such as DB2® is required.

IBM z/OS, IBM High Level Assembler (HLASM) and Linux are required to build z/TPF and z/TPFDF

It is IBM's intention to provide High Level Assembler (HLASM) capability on Linux for zSeries prior to, or at the time of, the general availability of z/Transaction Processing Facility Enterprise Edition V1.1.

This statement represents current intention of IBM. IBM development plans and dates are subject to change or withdrawal without further notice. Any reliance on this statement of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.

Compatibility: The following TPF V4.1 functions will not be supported in z/TPF:

- 24-bit addressing mode
- 24-bit Global support
- Fallback extents
- File resident programs
- Program Test Vehicle (PTV)
- Real Time Trace (RTT)
- Target(TPF) C

- Virtual Equals Real (VEQR) operating mode
- Synchronous Link and Binary Synchronous communications protocols
- CLAW offload support for TCP/IP
- SNA PU2.1 logon manager

The following TPF V4.1 supported IBM devices or their equivalent will not be supported in z/TPF:

- All processors that do not support IBM's z/Architecture
- 3350, 3375, 3380, 3390, 9345, RAMAC® DASD
- 3880, 3990-2, 3990-3, 3990-6 DASD CU
- 3480, 3495 tape
- 3705, 3725 CCU
- 3172, 3174 Terminal CU
- 3088 CTC
- 3505 card reader
- LLF, ELLF
- STR subset
- 1403 printer

Performance considerations: Based on preliminary modeling and analysis, we anticipate a 10% increase in processor execution time for a typical TPF V4.1 workload. Individual customer results could vary depending on their workload. Final performance projections are planned to be made available prior to z/TPF general availability.

Planning information

Installability: z/TPF (5748-T15) replaces the TPF V4.1 (5748-T14) product. Users requiring the new functions of z/TPF must migrate to the new system. The IBM z/TPFDF product is a corequisite for z/TPF functions. z/TPFDF (5748-F15) replaces the TPFDF (5706-196) product.

z/TPF will support all current processors listed in the Hardware requirements section.

The customer should use the *Migration Guide* , a new publication which will be included in the IBM TPF Product Information Center (SK2T-8062) and will be available at general availability.

z/TPF systems will coexist with prior TPF V4.1 systems in a loosely-coupled environment. PUT 15 or higher must be installed on the TPF V4.1 system.

For TPF V4.1 users: All TPF V4.1 programs must be recompiled before use with z/TPF.

Security, auditability, and control

z/TPF uses the security and auditability features of the host hardware and the operating software where applicable.

User management is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

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Ordering information

New licensees

Automated configurator and pricing support will be available for z/TPF and z/TPFDF on August 30, 2005.

Registered customers can access IBMLink™ for ordering information and charges.

Shipment will not occur before the availability date.

Unless a later date is specified, orders entered before the planned availability date will be assigned a schedule date of one week following availability.

- Orders entered with a scheduled date before the planned availability date will be shipped 5748-T14 — TPF 4.1 or 5706-196 — TPFDF
- Orders entered with a scheduled shipment date after planned availability will be shipped 5748-T15 — z/TPF V1.1 or 5748-F15 — TPFDF V1.1 Unless a later date is specified, an order is scheduled for the week following order entry.

Shipment will begin on the planned availability date.

- Orders that ship before the planned availability will receive 5748-T14 — TPF 4.1 or 5706-196 — TPFDF
- Orders that ship after the planned availability date will receive 5748-T15 — z/TPF V1.1 or 5748-F15 — TPFDF V1.1

New users of z/TPF V1.1 should specify:

- Type: 5748
- Model: T15

New users of z/TPFDF V1.1 should specify:

- Type: 5748
- Model: F15

Basic license: To order a basic license, specify the program number and feature number 9001 for asset registration. Specify the feature number of the desired distribution medium shown below.

Parallel Sysplex® license charge (PSLC) basic license:

To order a basic license, specify the program number and quantity of MSU.

z/TPF does not meet the current requirements for aggregation as defined in the applicable WLC and PSLC contracts. Therefore if there is more than one program copy in a Parallel Sysplex,the charge for each license copy is determined by specifying the applicable 1 PSLC license options and quantity represented by the sum of the Service Units in Millions (MSUs) for each machine, on a machine by machine basis.

```
Entitlement                          License option/
identifier           Description     pricing metric

S011DWN              z/TPF Base      Basic MLC, PSLC
                     (5748-T15)      below 3 MSU
                                     Basic MLC, PSLC AD
                                     SYSUSGREG NC, PSLC AD
S011DWM              z/TPF HPO       Basic MLC, PSLC
                     (5748-T15)      below 3 MSU
                                     Basic MLC, PSLC AD
                                     SYSUSGREG NC, PSLC AD
S011DWP              z/TPFDF Base    Basic MLC, PSLC
                     (5748-F15)      below 3 MSU
                                     Basic MLC, PSLC AD
                                     SYSUSGREG NC, PSLC AD
```

Example: For a single machine with 11 MSUs, the PSLC features would be:

    xxx1 — quantity 1
    xxx2 — quantity 8

Workload License Charge (WLC) Basic License: z/TPF does not meet the current requirements for aggregation as defined in the applicable WLC and PSLC contracts. Therefore if there is more than one program copy in a Parallel Sysplex,the charge for each license copy is determined by specifying the applicable 1 VWLC license options and quantity represented by the sum of the Service Units in Millions (MSUs) for each machine, on a machine by machine basis.

```
Entitlement                             License option/
identifier              Description     pricing metric

S011DWN                 z/TPF Base      Basic MLC, Variable  WLC
                        (5748-T15)      Workload Registration,
                                        Variable  WLC
S011DWM                 z/TPF HPO       Basic MLC, Variable  WLC
                        (5748-T15)      Workload Registration,
                                        Variable  WLC
S011DWP                 z/TPFDF         Basic MLC, Variable  WLC
                        (5748-F15)      Workload Registration,
                                        Variable  WLC
```

Entry Workload License Charge (EWLC) Basic License: To order a basic license, specify the program number and the quantity of MSUs.

```
Entitlement                             License option/
identifier              Description     pricing metric

S011DWN                 z/TPF Base      Basic MLC, Entry WLC
                        (5748-T15)
S011DWM                 z/TPF HPO       Basic MLC, Entry WLC
                        (5748-T15)
S011DWP                 z/TPFDF         Basic MLC, Entry WLC
                        (5748-F15)
```

zSeries entry license charge (zELC): To order zELC software, specify the program number and z800 model.

Specify the zELC monthly license option.

```
Entitlement                             License option/
identifier              Description     pricing metric

S011DWN                 z/TPF Base      Basic MLC, zELC
                        (5748-T15)
S011DWM                 z/TPF HPO       Basic MLC, zELC
                        (5748-T15)
S011DWP                 z/TPFDF         Basic MLC, zELC
                        (5748-F15)
```

Basic machine-readable material

```
Feature                                 Feature
description                             number

z/TPF Base -- IBM 3480 Cartridge        5802
z/TPF Base -- 4MM                       6001
z/TPF HPO -- IBM 3480 Cartridge         5812
z/TPF HPO -- 4MM                        6002
z/TPFDF Base -- IBM 3480 Cartridge      5802
z/TPFDF Base -- 4MM                     6000
```

Customization options: Select the appropriate feature numbers to customize your order with delivery options desired. These features can be specified on the initial or MES orders.

Example: If publications are not desired for the initial order, specify feature number 3470 to ship media only. For future updates, specify feature number 3480 to ship media updates only. If, in the future, publication updates are

required, order an MES to remove feature number 3480; then, the publications will ship with the next release of the program.

Initial shipments

```
Feature                              Feature
description                          number

Serial Number Only                   3444
 (suppresses shipment of
 media and documentation)
Ship Media Only                      3470
 (suppresses initial
 shipment of documentation)
Ship Documentation Only              3471
 (suppresses initial
 shipment of media)
```

Update shipments

```
Feature                              Feature
description                          number

Ship Media Updates Only              3480
 (suppresses update
 shipment of documentation)
Ship Documentation Only              3481
 (suppresses update
 shipment of media)
Suppress Updates                     3482
 (suppresses update
 shipment of media and
 documentation)
```

Expedite shipments

```
Feature                              Feature
description                          number

Local IBM Office Expedite            3445
 (for IBM use only)
Customer Expedite Process Charge     3446
 ($30 charge for each product)
```

Expedite shipments will be processed to receive 72-hour delivery from the time IBM Software Delivery and Fulfillment (SDF) receives the order. SDF will then ship the order via overnight air transportation.

Optional machine-readable material: To order, select the feature number for the desired distribution medium:

Contains " *RESTRICTED MATERIAL OF IBM* "

Unlicensed documentation: One copy of CD-ROM *IBM TPF Product Information Center* (SK2T-8062), which contains all production information, is supplied automatically with the base machine-readable material.

Additional copies of the information center CD-ROM are available for a fee after availability.

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Terms and conditions

Agreement: IBM Customer Agreement

Variable charges apply: No

Indexed monthly license charge (IMLC) applies: No

Location license applies: No

Use limitation applies: No

Educational allowance available: Yes, 15% education allowance applies to qualified education institution customers.

Volume orders: Not applicable.

Warranty applies: Yes

Licensed program materials availability

- Restricted Materials of IBM: Some
- Non-Restricted Source Materials: Some
- Object Code Only (OCO): Some
- Publication that identifies OCO components: Sxx-xxxx
- Availability date: September 30, 2005

IBM Operational Support Services — SoftwareXcel: No

Entry Workload License Charge (EWLC): A revised contract (Attachment for zSeries z800 Software License Charges, Z125-6587-06) is in place for Entry Workload License Charge (EWLC). This revised contract must be signed by the customer.

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The IBM Electronic Service Agent is no-additional-charge software that resides on your IBM eServer system that is designed to proactively monitor events and transmit system inventory information to IBM on a periodic customer-defined timetable. The IBM Electronic Service Agent tracks system inventory, hardware error logs, and performance information. If the server is under a current IBM maintenance service agreement or within the IBM warranty period, the Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to provide proactive service that maintains higher system availability and performance. In addition, information collected through the Service Agent will be made available to IBM service support representatives when they are helping answer your questions or diagnosing problems.

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Prices

Entitlement identifier	Description	License option/ pricing metric
S011DWN	z/TPF Base (5748-T15)	Basic MLC, zELC
S011DWM	z/TPF HPO (5748-T15)	Basic MLC, zELC
S011DWP	z/TPFDF (5748-F15)	Basic MLC, zELC

z800 models

- 110
- 0E1
- 0A1
- 0B1
- 0C1
- 0X2
- 001
- 0A2
- 002
- 003
- 004

Entitlement identifier	Description	License option/ pricing metric
S011DWN	z/TPF Base (5748-T15)	Basic MLC, PSLC below 3 MSU Basic MLC, PSLC AD SYSUSGREG NC, PSLC AD
S011DWM	z/TPF HPO (5748-T15)	Basic MLC, PSCL below 3 MSU Basic MLC, PSLC AD SYSUSGREG NC, PSLC AD
S011DWP	z/TPFDF Base (5748-F15)	Basic MLC, PSLC below 3 MSU Basic MLC, PSLC AD SYSUSGREG NC, PSLC AD

Variable workload license

Entitlement identifier	Description	License option/ pricing metric
S011DWN	z/TPF Base (5748-T15)	Basic MLC, Variable WLC Workload Registration, Variable WLC
S011DWM	z/TPF HPO (5748-T15)	Basic MLC, Variable WLC

```
                              Workload
                              Registration,
                              Variable  WLC
S011DWP        z/TPFDF        Basic MLC,
               (5748-F15)     Variable  WLC
                              Workload
                              Registration,
                              Variable  WLC
```

Sub-capacity charges for VWLC products: Sub-capacity charges for VWLC products are based on product LPAR utilization capacity. Product LPAR utilization capacity for a VWLC product is the highest number of MSUs utilized by the combined LPARs in which a VWLC product runs concurrently during a reporting period. The number of MSUs is based on the highest observed rolling 4-hour average utilization used by the combination of the relevant LPARs during the reporting period. Refer to Software Announcement 200-354 , dated October 3, 2000, Software Announcement 201-258 , dated September 11, 2001, and Software Announcement 202-105 , dated April 30, 2002, for additional details on IBM Workload License Charges.

Sub-capacity charges terms and conditions: zSeries software charges at less than full machine capacity for eligible VWLC products apply when z/OS or z/TPF is running in z/Architecture (64 bit) mode on a zSeries 900, no other MVS™-based operating system is licensed to that server and the required information is provided by the customer in accordance with the applicable terms.

Sub-capacity charges for a VWLC product is based on the utilization of the LPARs where/when the product executes . To obtain charges at less than full machine capacity for VWLC products the customer is required to:

- Sign and abide by the terms of the Attachment for zSeries Workload License Charges (Z125-6516).
- Obtain the latest version of the Sub-Capacity Reporting Tool
- Install any VWLC product and zSeries 900 Licensed Internal Code (LIC) service required for sub-capacity charging. Required service will be listed on the WLC web site,
    http://www.**ibm.com**/zseries/swprice

    IBM requires all z/TPF customers to use a naming convention for any LPAR running z/TPF. Failure to use the naming convention may result in an invalid Sub-Capacity Reporting Tool (SCRT) report and WLC FMC billing. The SCRT must be able to recognize a z/TPF LPAR and produce the necessary report for VWLC billing. A z/TPF LPAR name must be expressed as: "TPFxnnnn" — where 'x' is "P" or "T" for production or test and "nnnn" for customer use.

- Collect SMF data as required by the Sub-Capacity Reporting Tool. Retain the collected SMF data for a period of not less than 6 months.
- Use the IBM provided Sub-Capacity Reporting Tool to process the collected SMF data. The Sub-Capacity Report produced by the tool is used to determine required license capacity for the VWLC products. Required license capacity is determined based on the largest MSU value of a VWLC product running concurrently in all LPARs during the reporting period. IBM reserves the right to request the system data that supports these product defined capacity values for a period of up to six months after the data was collected.
- Provide an initial Sub-Capacity Report to begin to receive the benefits of less than full machine capacity charges. Sub-capacity charging will follow submission of a Sub-Capacity Report. There will be no retroactive application of sub-capacity charges.
- Submit Sub-Capacity Reports monthly
- Submit Sub-Capacity Reports for all VWLC products with complete data for the entire reporting period to the e-mail address and by the date, specified on the zSeries Software Pricing Web site (http://www.ibm.com/zseries/swprice) and in the current Workload License Charge Exhibit (Z125-6324). Sub-Capacity Reports that reflect a changed product defined capacity will be considered to be orders placed by the customer without further action on the customer's part and IBM is authorized to make any resulting billing increase or decrease. To place an order for a new license or to discontinue licenses, move licenses between machines, report a hardware model upgrade or enable or disable product features, the customer must contact IBM or their IBM Business Partner

Entry Workload License Charge (EWLC)

```
                              License
                              option/
Entitlement                   pricing
identifier     Description    metric
```

```
S011DWN          z/TPF Base        Basic MLC,
                 (5748-T15)        Entry WLC
S011DWM          z/TPF HPO         Basic MLC,
                 (5748-T15)        Entry WLC
S011DWP          z/TPFDF           Basic MLC,
                 (5748-F15)        Entry WLC
```

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