TPF Users Group

Grapevine Texas

IBM Software Group

Ira Witkin

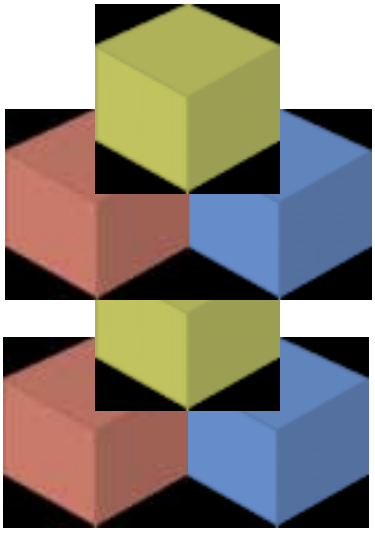
Program Director, HVTP Solutions
Core and Enterprise Solutions (SWG)

AIM Core and Enterprise Solutions
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

z/TPF

Announcing!

- ☑Availability
- ☑Scalability
- ☑Low Latency
- ☑Integration
- ☑Open Development
- ☑Compatibility



World-class computing for the on demand business

TPF Value Proposition

TPF Characteristics	Market Benefit	Market Value
System availability	24 x 7 x 365 with 99.999% availability	Reduced exposure to loss of income or customer satisfaction Dependable service
Extreme transaction rates	500 - 25,000+ transactions per second	On-demand capacity Handle high volume, low margin efficiently
Rapid response time	Averages less than 0.2 seconds (with network 1 -3 seconds)	Increased productivity ▪ People ▪ Systems
Low cost per transaction	Measured at less than two-tenths of a cent per transaction	Lower costs and higher profits for customers charging by transaction
Interoperability	Investment protection	Flexibility and growth
Application enablement tools	Shortened cycle times	Rapid time to market Commodity skills
Single Copy, Contiguous Database	Less complexity, more reliable	Reduce exposure to data corruption or multiple customer views

SPEED

RELIABILITY

AVAILABILITY

SCALABILITY

TPF 64 Bit Strategy

Allow TPF customers to continue incremental growth:

- 64 bit support a key enabling technology
- Continued support of IBM HW offerings to meet customer and market needs
- Large scale memory spaces enabled by 64 bit
- Other capacities will be increased, e.g.,
  - Number of "subsystem Users" (i.e., concurrently hosted enterprises)
  - Number of addressable DASD (~32K units per system)
  - Improvements in reliability (more memory affords better instrumentation, more logging, etc.)
  - High speed POSIX file-handling.

TPF 64 Bit Application Benefits

A new open systems based development environment

- C/C++ programs now built on Linux using the GNU toolchain
- Same compilers and libraries as Linux
  - GCC, glibc, stdlibc++, etc.
- Makefile build process with FTP to TPF for online load

Supported by WebSphere Studio

- Eclipse based toolkit for the TPF editor, debugger and performance analyzer

Addresses the number one concern of customers: development productivity and the future skills pool

- TPF shares with Linux development tooling and skills
- New hires with basic Linux, C/C++ skills can be productive on TPF immediately

TPF 64 Bit Strategy (Continued)

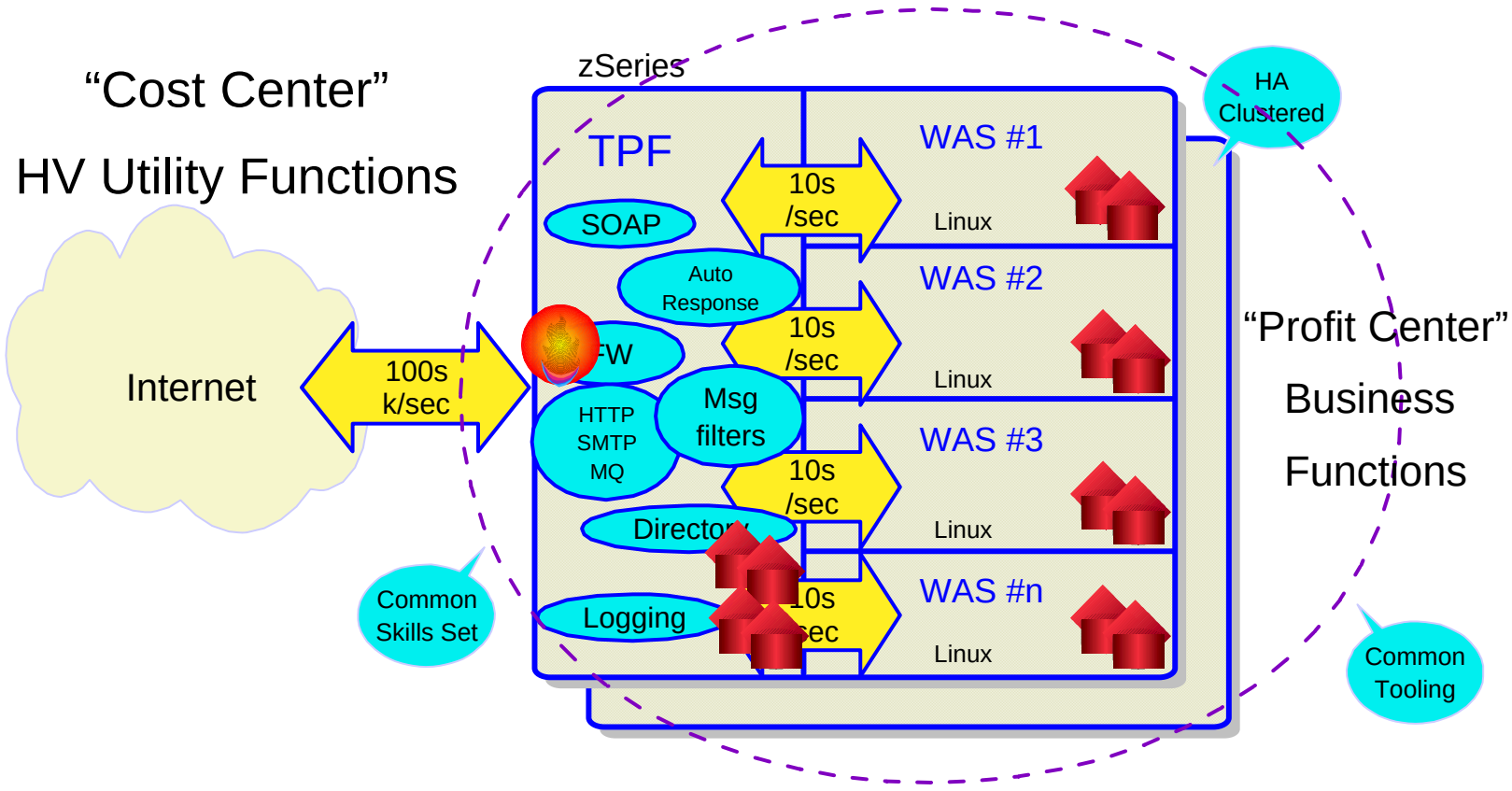
Protect customer's existing investment

- Continued support for assembler programs in 31 bit and the TPF API set
  - –Targeting < 10% of applications need be "touched"
  - –BAL programs can be repackaged into reusable, callable libraries
  - –Allows use of existing function by a new skill set
- Continued support for all current file addressing methods (FARF3, 4, 5 & 6)
- Increased connectivity to web based file systems and protocols
  - –Further leverage existing investment by connecting to advanced function application servers like WebSphere

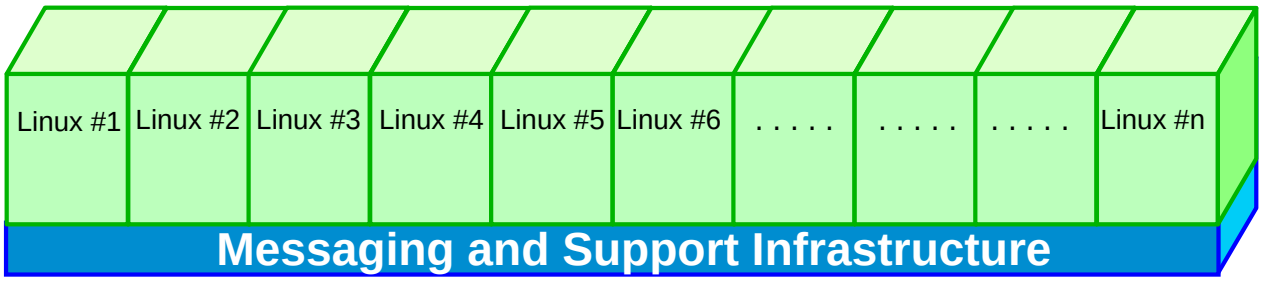
z/TPF EE 1.1 Pricing Directions

- **Standard Pricing (PSLC)**
  - Discontinue HPO pricing model
- **Introduce WorkLoad Charging (WLC)**
  - Very Similar to what is currently offered for z/OS
  - Based upon 4 hour rolling average
    - Acts as a monthly high water mark
  - MIPs in a single LC complex aggregated [Statement of Direction]
  - Sub Capacity Reports (SCRT) to be sent by Customer Monthly
  - eWLC (and zELC) for z800 and z890

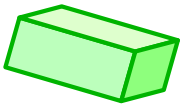
Large Scale Utility Processing to Drive Overall Higher Value



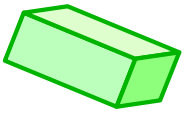
Combining Vertical and Horizontal can keep things manageable!

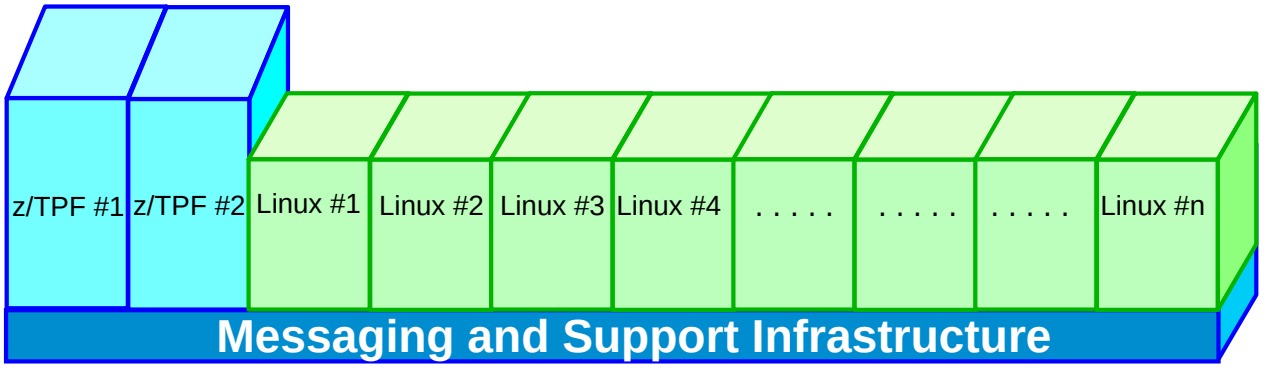


Losing Control!



Integrity Issues





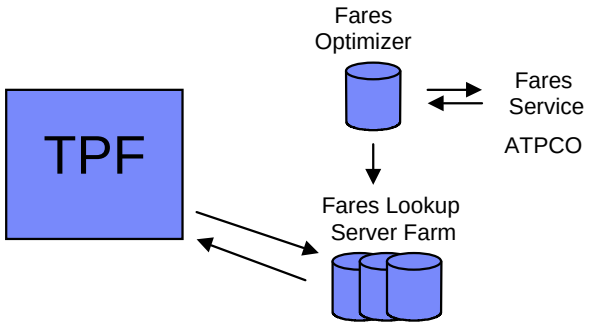
z/TPF adds vertical growth capability consistent with Linux support model

Business Example – Travel Industry
Fare Search

Today's Business Situation – "As Is"

Unable to build large tables that some applications require in 32-bit architecture used in TPF

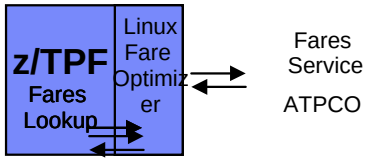
- Tables are loaded into Intel boxes external to TPF, hundreds (even thousands) of servers can be required
- Availability dismal, management difficult, response in seconds (latency)
- Fares cannot be immediately updated when changed (several times a day)
- Does not necessarily provide accurate fare



Tomorrow's Business Situation – "Could Be"

Able to build large tables (e.g., fares) with 64-bit z/TPF

- New fares are formatted immediately when received by Linux optimizer in same complex, loaded into TPF immediately
- High availability, no server farm to manage, response in nanoseconds
- Latest fare in system within seconds

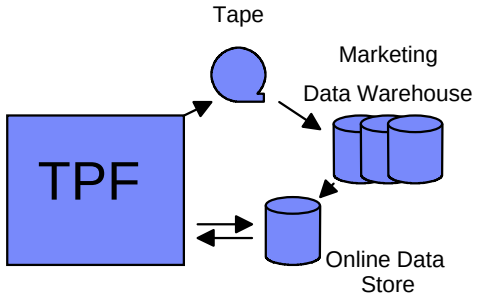


Business Example – Travel Industry
Customer Relationship Management (CRM)

Today's Business Situation – "As Is"

Passenger data is sent to external customer loyalty data warehouse, analyzed and sent to external online data store

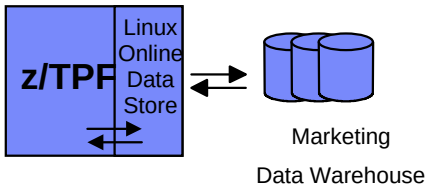
- Using MQ series or tape by "sneakernet", seconds or even days are required for transfer
- TPF uses access to external on-line data store (e.g., MQSeries, TPFAR, etc.) which takes time, measured in seconds or even minutes depending on the external storage, to make external accesses



Tomorrow's Business Situation – "Could Be"

TPF sends data directly to Online Data Store under Linux in same system

- Linux Data Store updated and updates warehouse
- TPF accesses current passenger information in real time on Linux data store
- Response to request is immediate and can be used to manage customer during transaction

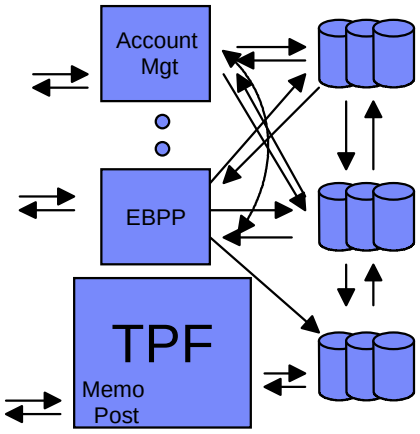


Business Example – Financial Industry
Total Online Banking

Today's Business Situation – "As Is"

Customers pay bills on their bank using internet

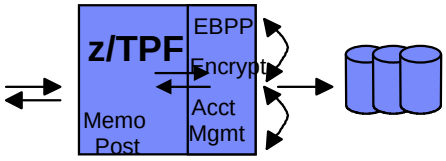
- Bank either has EBPP software themselves or uses outsource
- Applications are independent of themselves and backend DBs
- Uses separate integration from other customer services



Tomorrow's Business Situation – "Could Be"

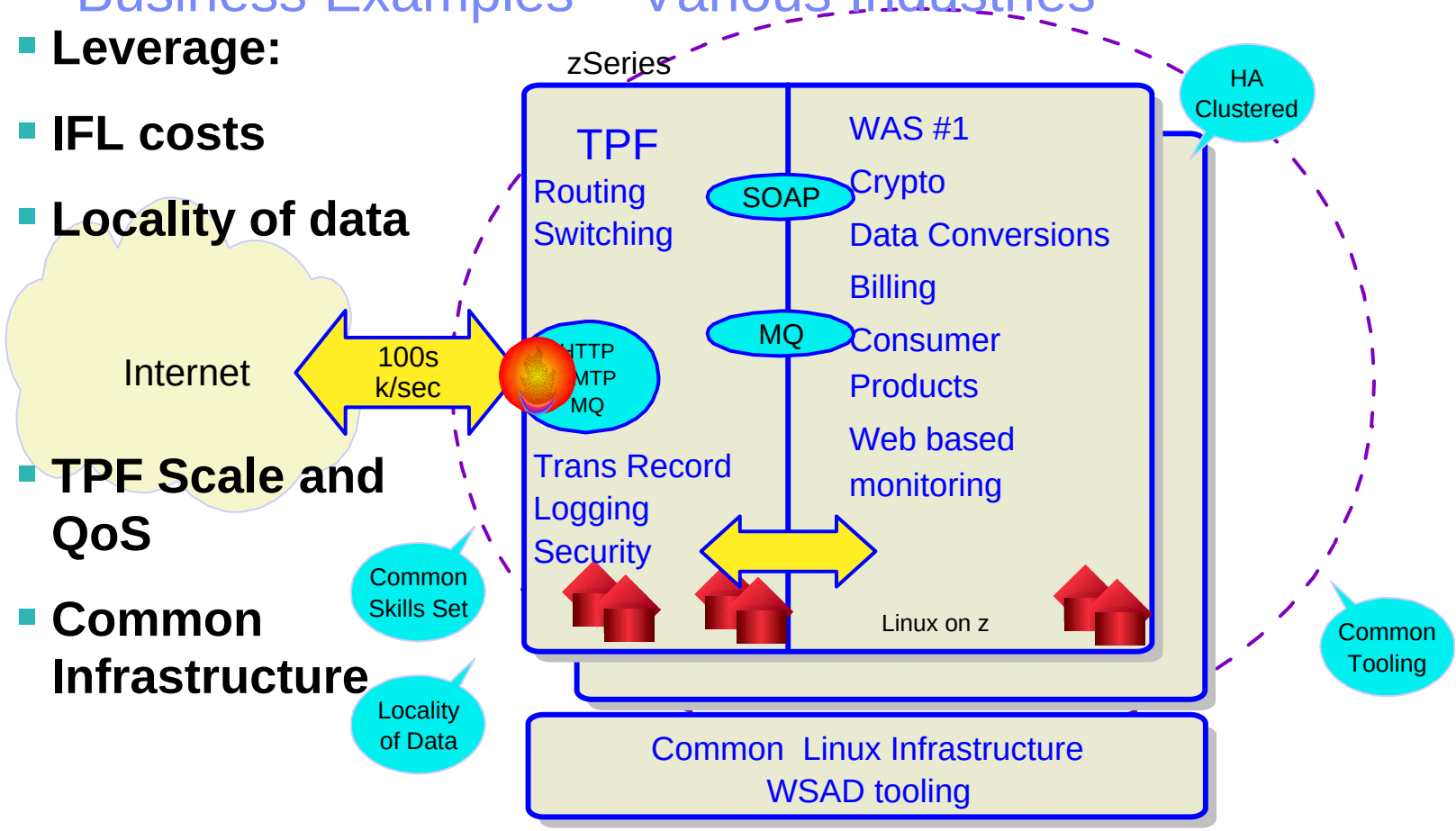
Customer services could be intergrated at the front end

- z/TPF could be the backbone integrator for services
- ALL banking is online
- ATM, POS, EBPP, Acct Management, Loans could all come through same channel
- Closely monitor all transactions in real-time
- Lessens interfaces
- Speeds transactions
- Last transaction availability
- Fraud management



Business Examples – Various Industries

- **Leverage:**
- **IFL costs**
- **Locality of data**
- **TPF Scale and QoS**
- **Common Infrastructure**

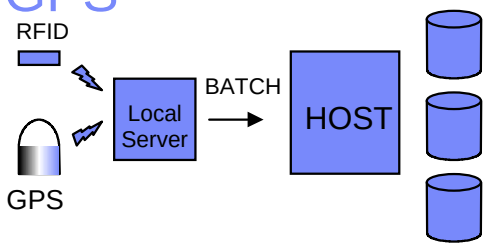


Business Example – Distribution and Transportation Industries

High Value Asset Monitoring, RFID, GPS

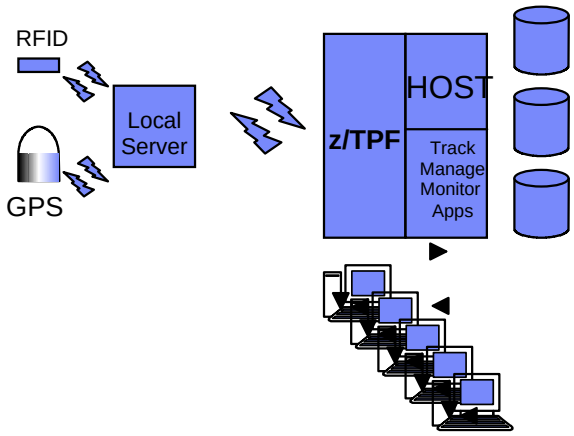
Today's Business Situation – "As Is"

- Assets monitored at various locations
- Local servers batch data to central location or
- On-Board system transmits wireless GPS location
- Frequency of monitoring has to be balanced with volume capability



Tomorrow's Business Situation – "Could Be"

- High volume switch and transaction system
- Ability to monitor at high volume and give immediate location
- Maintain up-to-the-second monitoring of critical assets
- Track/Monitor/Manage anything anywhere in the world using wireless/RFID/GPS
  - Police/ Emergency Services
  - Airport movements
  - Shipping/Cargo containers
  - Trucking
  - Public Transport vehicles
  - Military assets



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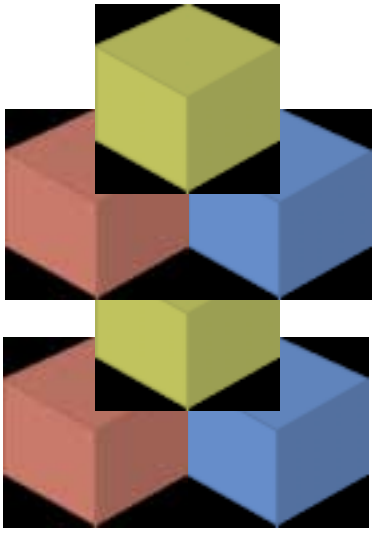

World-class computing for the on demand business

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z/Transaction Processing Facility v1.1.0

Announcement Review
Stu Waldron, STSM

AIM Core and Enterprise Solutions
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

Agenda

- What did IBM Announce?
- What Does it Mean?
- Why did IBM do this?
- z/TPF Provisioning
- Final Notes and Comments
- Questions?

z/TPF

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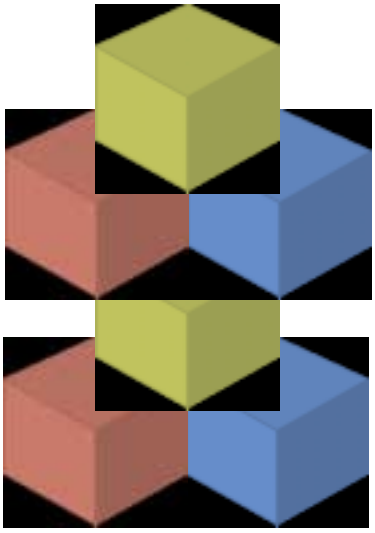

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What Did We Announce?

z/TPF EE v1.1.0

AIM Core and Enterprise Solutions
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

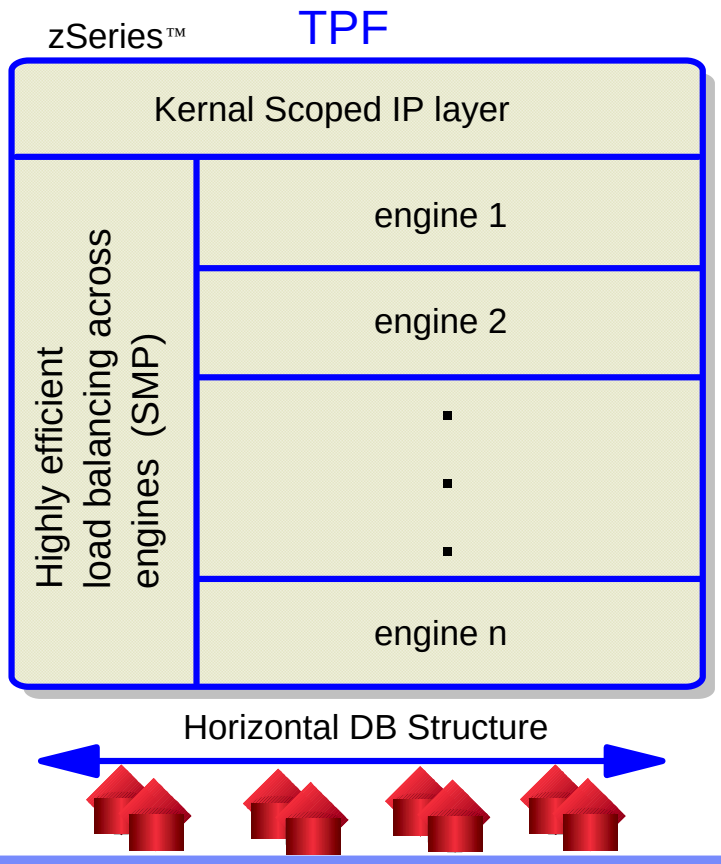
TPF 4.1 Attributes

- **Scale, Speed & Reliability**
  - Architected for 16 engines (SMP) by 32 machines
    - About 100,000 MIPs using 32 16 way machines
    - MQ at thousands per second per queue (persistent)
  - Very low latency
    - 30 milliseconds in banking applications with no degradation at 90% and higher utilization
  - Clustered solution, fault tolerant as well as unique maintenance features
    - Able to load application & system changes while running
    - Able to expand the database while running
    - Able to remove and replace DASD while running

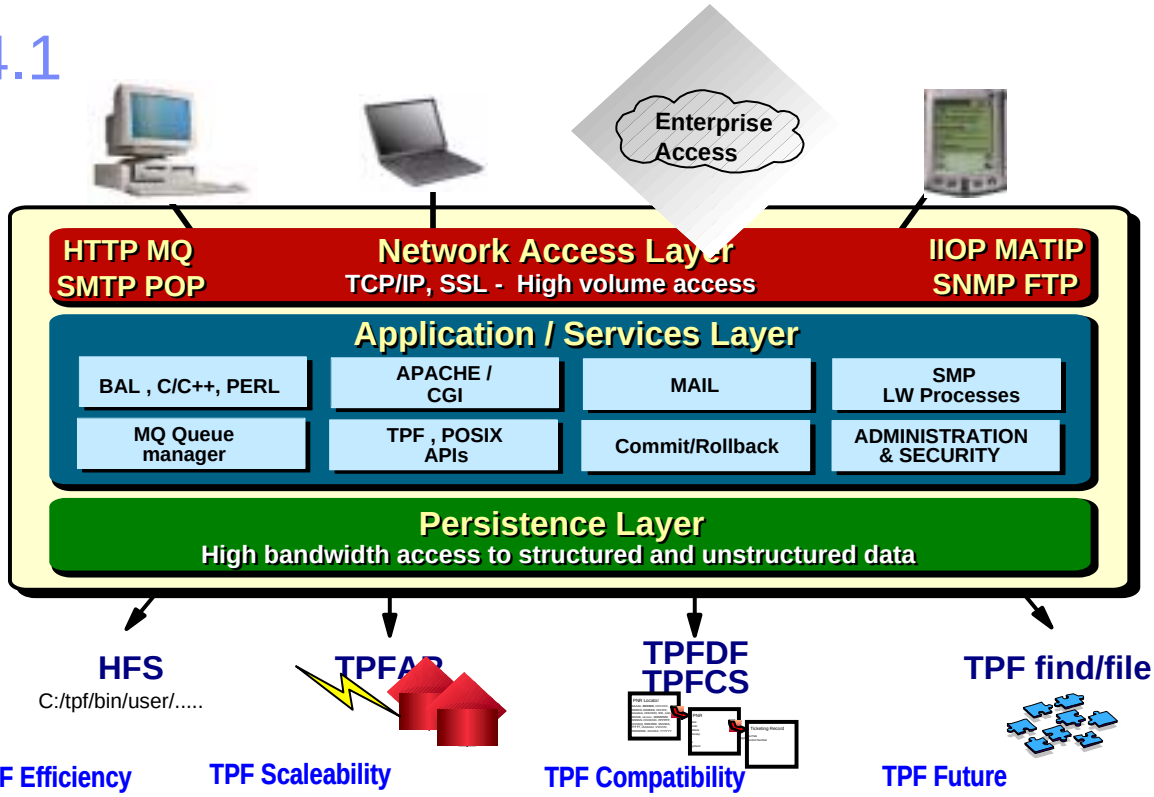
- **Database**
  - Immense scale without resorting to partitioning or replication
  - Single copy (fully duplicated), single image to reduce complexity and points of failure

High End Infrastructure

- **SMP Architecture**
  - –Very efficient for short lived transactions (ex. trading sys = 6 mills)
- **High Speed async I/O model**
  - –Processes can share sockets
  - –Processes in TPF as efficient as threads in UNIX but more secure
- **Horizontal DB model**
  - –Pointer driven, not relational (concurrent I/O)
  - –Can support complex data types and functions
  - –Schema static in nature but orders of magnitude faster than relational



TPF 4.1



TPF Efficiency
- Short pathlengths
- Concise services
- Low Latency

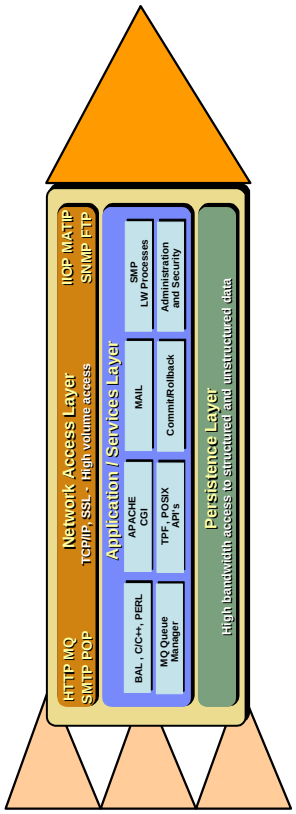
TPF Scaleability
- 32 way horizontal
- 16 way vertical
- 7.2×10^{16} files addresses
- >12K messages a second

TPF Compatibility
- ISO C/C++
- POSIX functions
- Open Connectivity
- Bridges to existing apps

TPF Future
- 64 bit architecture
- GNU tool base
- GNU libraries
- Customization features of Linux; scale and reliability of TPF

We took TPF 4.1 and ….

- **Rewrote the core kernal to 64 bit**
- **Increased capacities**
- **Increased speed by leveraging memory**
- **Increased maintainability and stability by adding more diagnostics**
- **Moved to an open system development**
- **Allowed the repackaging of applications**
- **Changed the cost model**



z/TPF 64 Bit Strategy

- **Allow TPF customers to continue incremental growth:**
  - 64 bit support a key enabling technology
  - Continued support of IBM HW offerings to meet customer and market needs (now 32 x 32)
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  - Other capacities will be increased, e.g.,
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    - Number of addressable DASD (>32K units per system)
    - Improvements in reliability (more memory affords better instrumentation, more logging, etc.)
    - High speed POSIX file-handling.

z/TPF 64 Bit Strategy cont …

- **Protect customer's existing investment**
  - –Continued support for assembler programs in 31 bit and the TPF API set
    - •Targeting < 10% of applications need be "touched"
    - •BAL programs can be repackaged into reusable, callable libraries
    - •Allows use of existing function by a new skill set
  - –Continued support for all current file addressing methods (FARF3, 4, 5 & 6)
  - –Increased connectivity to web based file systems and protocols
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z/TPF 64 Bit Application Benefits

- **A new open systems based development environment**
  - –C/C++ programs now built on Linux using the GNU toolchain
  - –Same compilers and libraries as Linux
    - •GCC, glibc, stdlibc++, etc.
  - –Makefile build process with FTP to TPF for online load

- **Supported by WebSphere® Studio**
  - –Eclipse based toolkit for the TPF editor, debugger and performance analyzer
- **Addresses the number one concern of customers: development productivity and the future skills pool**
  - –TPF shares with Linux development tooling and skills
  - –New hires with basic Linux, C/C++ skills can be productive on TPF immediately

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What does it Mean?

A Solid foundation for growth

AIM Core and Enterprise Solutions
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

Break away from legacy development

IBM Compiler
Proprietary Libraries

GNU ToolChain
Open Libraries

Move to a ubiquitous development model

z/OS® development Model
(JCL, PDS files, Program Objects)

Linux development Model
(Makefiles, Library Managements, Shared Objects)

Fundamentally BAL
Infrastructure

Fundamentally C/C++
Infrastructure

Open Systems Development

Linux Here

Here

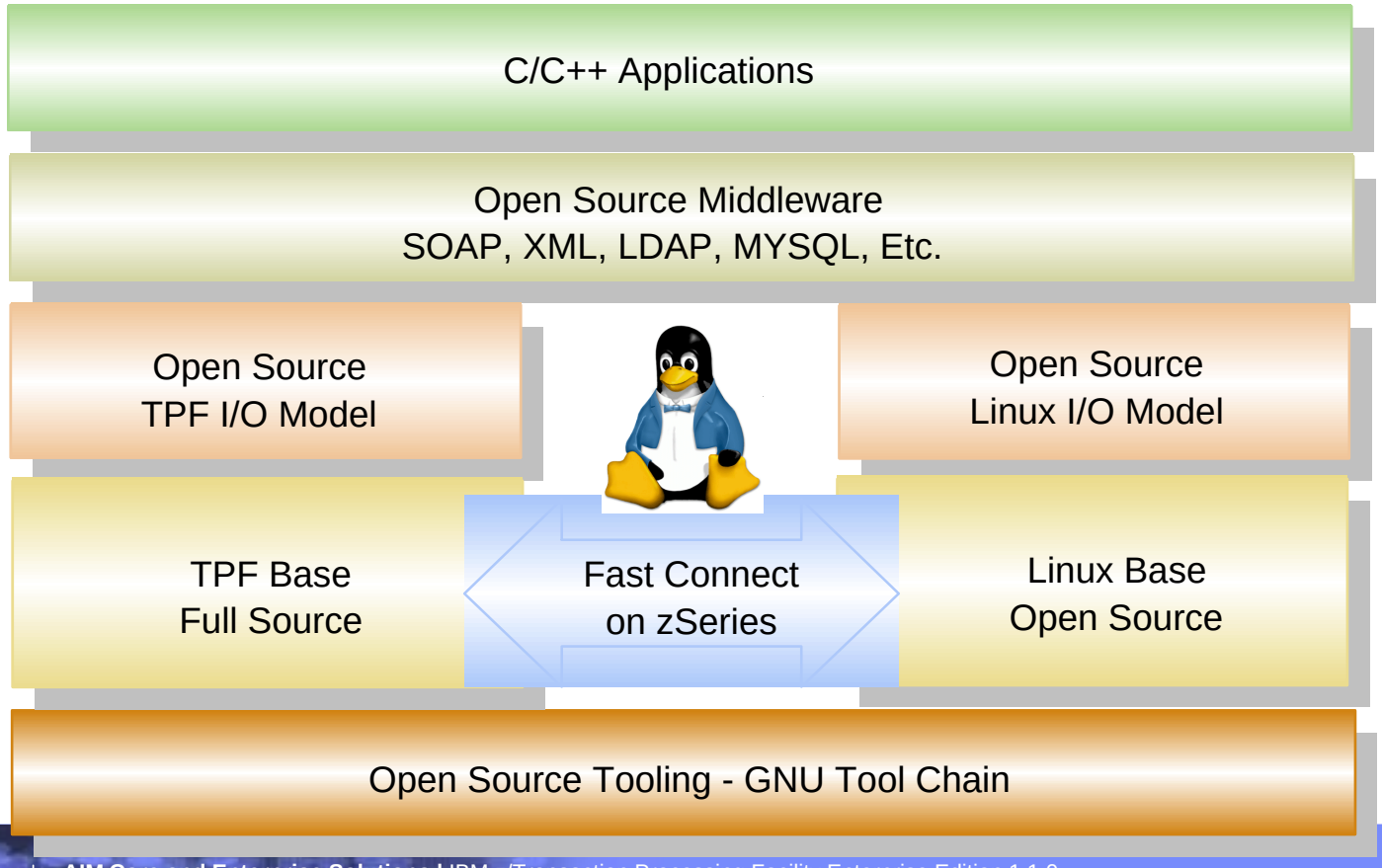
- Develop
- Build (makefile)
- Send (FTP)
- Load (OLD off FTP)
- Run (Linux shared object)

Or Here with
z/VM® Test Systems

Caveats on development servers

- **IBM will be requiring all IBM shipped code to be built on Linux on z (could be under z/VM®)**
  - –This does not affect where application code is built
- **IBM has issued a statement of direction for support of HLASM on Linux on z**
- **OEM assemblers available on the market that can run on the desktop**
  - –IBM has used Dignus® internally to the extent we are comfortable with it's compatibility
  - –For problem reporting, IBM will treat customer code assembled by Dignus the same as HLASM

TPF Relationship with Linux



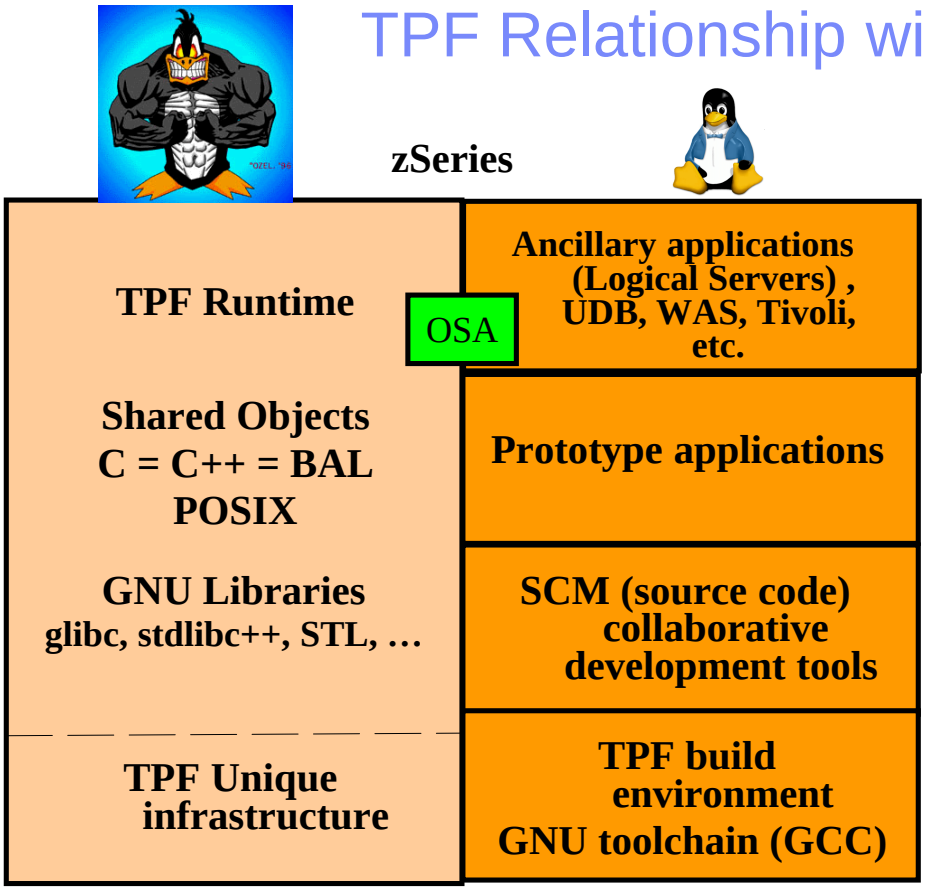
Linux on z Value

- **Hardware**
  - Virtual servers waste no resources, real CPs get fully utilized
- **Software**
  - Licensed by real CPs, shared by many virtual servers
- **Labor**
  - Fewer real boxes and z/VM ® very valuable in the management of virtual servers

Source: CIOView Corp 2003

Software	**44% Reduction**
Storage	**55% Reduction**
Downtime	**55% Reduction**
Facilities	**64% Reduction**
Maintenance	**10% Reduction**
Personnel	**51% Reduction**

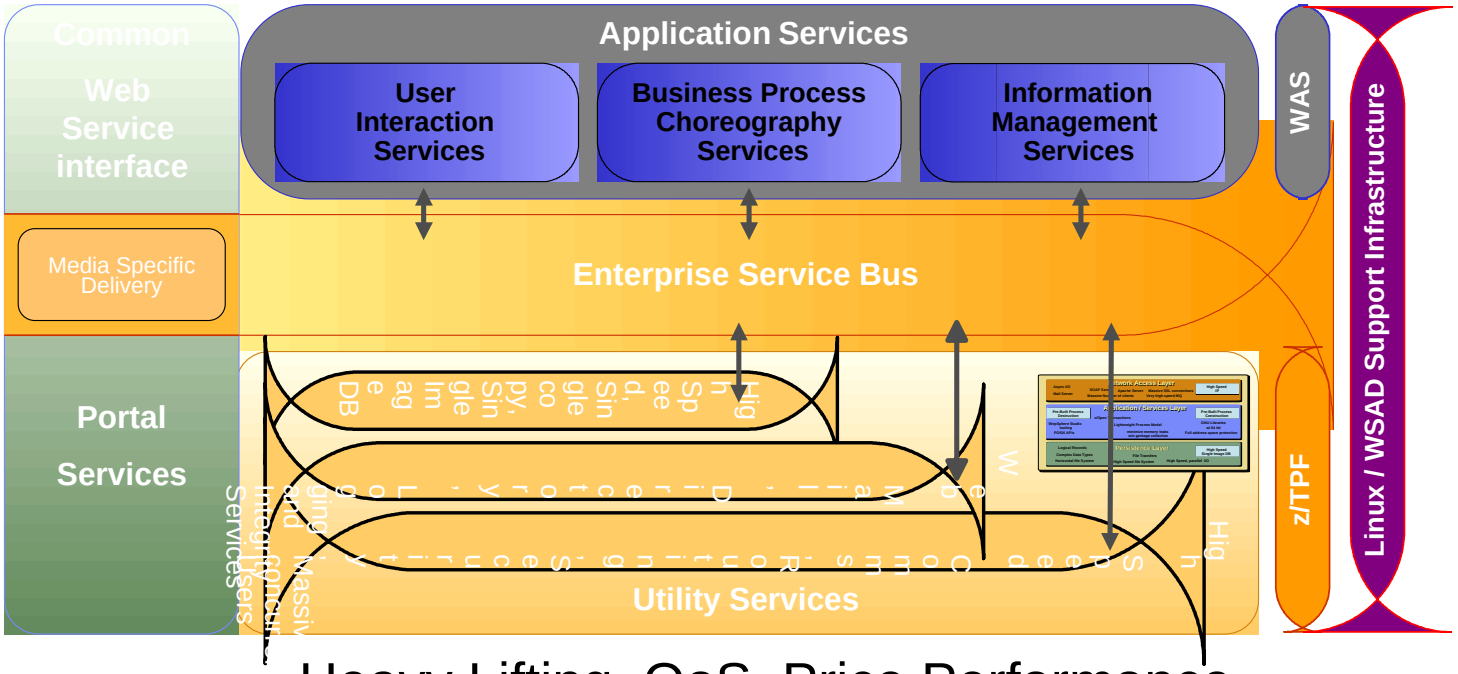
TPF Relationship with Linux



- **Application runtime environment**
  - –Compatible with Linux
- **Development environment**
  - –Same as Linux
- **Distributed processing efficiency**
  - –Via gigabit Ethernet or LPAR to LPAR (under z)
- **TPF positioned to provide heavy lift capability**
  - –Still unbeatable in I/O capacity, speed and availability

Use z/TPF to Supercharge Web Services Technology

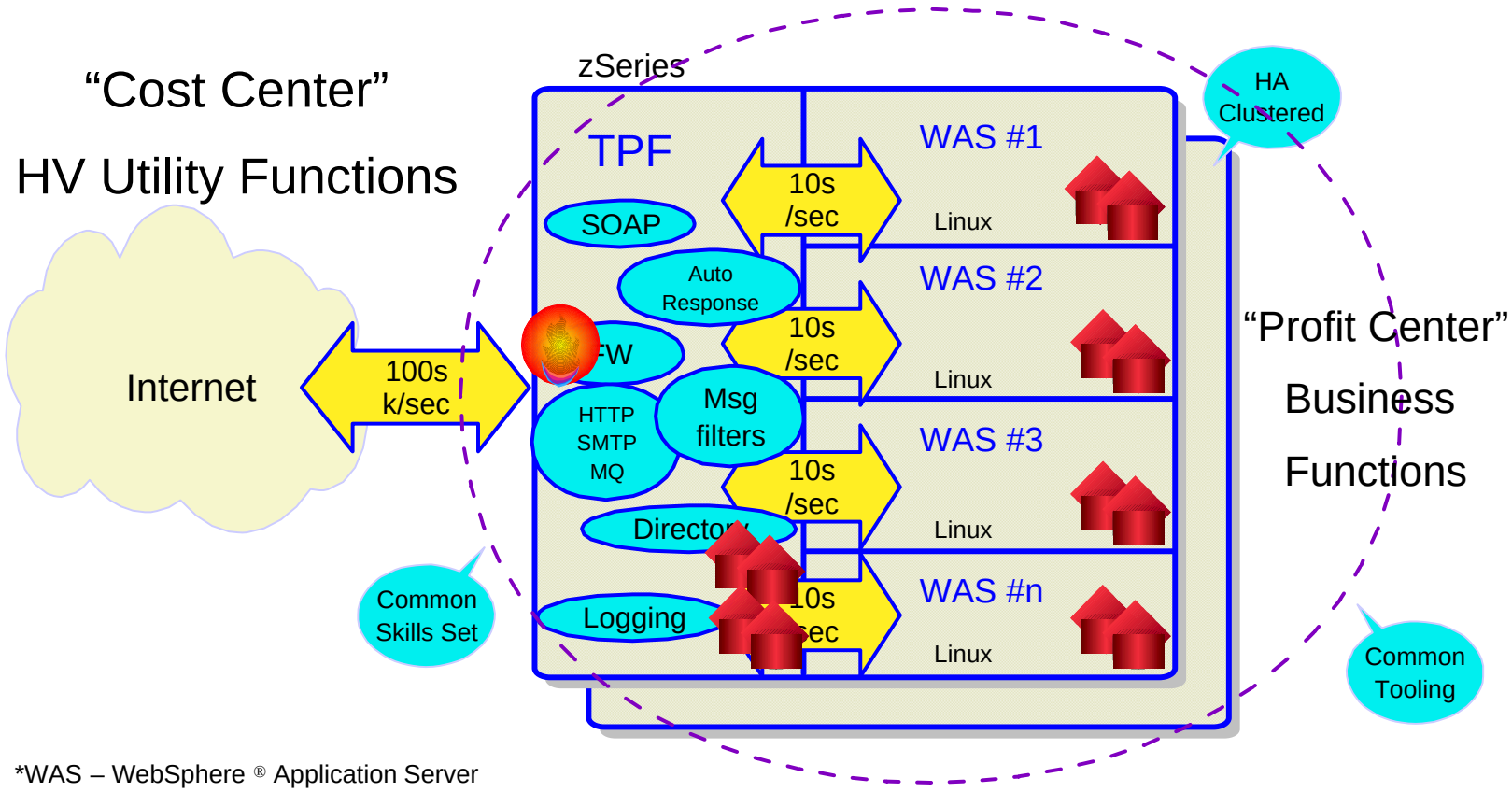
Sophisticated Business Logic



Heavy Lifting, QoS, Price Performance

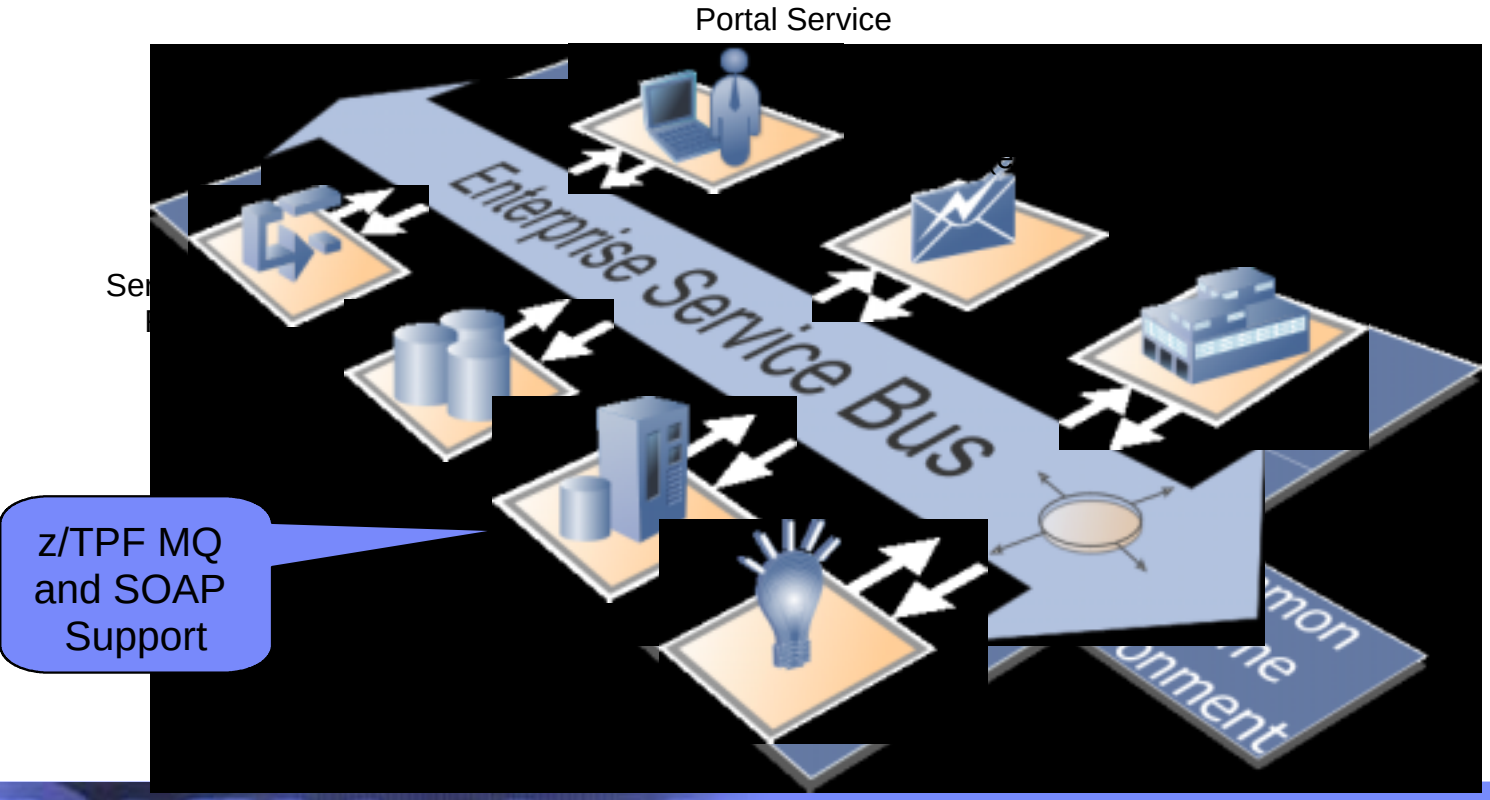
*WAS – WebSphere ® Application Server

Large Scale Utility Processing to Drive Overall Higher Value



*WAS – WebSphere ® Application Server

z/TPF rides the Bus !!! (the Enterprise Service Bus)



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Why did we do it?

Responding to Customer Needs

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IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

Pain Points in the existing Systems

- **Skill pool: Where are the TPF programmers of tomorrow coming from?**
  - Also can't afford to lose the business knowledge in the existing staff
- **Investment Protection: Existing system contain as many as 10 million lines of application code performing critical functions**
  - There is no magic solution to recreate all that function fast enough, cheap enough, or at low enough risk
- **Innovation: Companies must innovate to survive**
  - Existing systems are too fragile, complicated and expensive to modify

Pain Points in the existing Systems

- **Skill pool: Where are the TPF programmers of tomorrow coming from?**
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- **Investment Protection: Existing system**
  - **10 [illegible]es of application code perl**
  - **[illegible]**
  - **[illegible]luti [illegible]al**
  - **[illegible]gh or at low enough**
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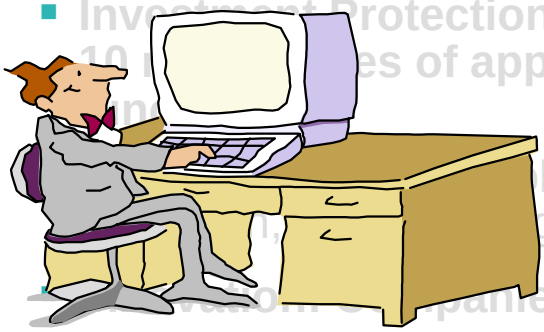
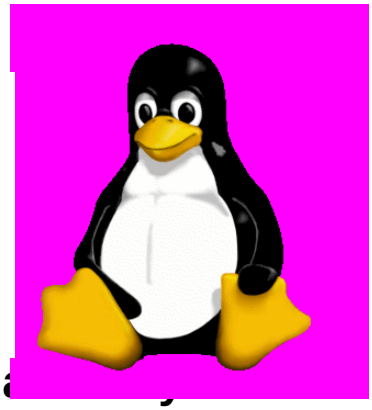


- WebSphere Studio allows your existing staff and your "GNU" staff to work side by side

Pain Points in the existing Systems

- Existing code (BAL) is repackaged into reusable libraries, just like C/C++
- BAL programs have stacks and can call C function calls



- **Investment Protection: Existing system contain a[illegible] 10 million lines of application code performing critical functions**
  - There is no magic solution to recreate all that function fast enough, cheap enough or at low enough risk
- [illegible]
- The open system development environment allows rapid development of new function to enhance the value of the solution
- Standard open protocols and SOAP support allow for the direct web enablement of core business functions

Pain Points in the existing Systems

- The open system development environment enhances the ab
modernize and web enable core business functions
  - Web enablement is key to exploiting the value or your existing application investment
- High volume functions like directory services, security, logging can be ported into TPF with existing solutions like web mail to drive costs down
- Use the new functions and openness of the system to leverage application servers like WebSphere
- **Innovation: Companies must innovate to survive**
  - Existing systems are too fragile, complicated and expensive to modify

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z/TPF Provisioning

Innovate the business offering

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IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

z/TPF EE 1.1 Pricing Directions

- **Adopt mainstream pricing models**
  - Discontinue Model Group, ELC and HPO pricing (PRPQ)
- **Parallel Sysplex License Charge (PSLC)**
  - MSUs in a single LC complex aggregated*
- **WorkLoad Charging (WLC)**
  - Very Similar to what is currently offered for z/OS®
  - Based upon 4 hour rolling average
    - Acts as a monthly high water mark
  - MSUs in a single LC complex aggregated*
  - Sub Capacity Reports (SCRT) to be sent by Customer Monthly
  - eWLC (and zELC) for z800 and z890

* Statement of Direction

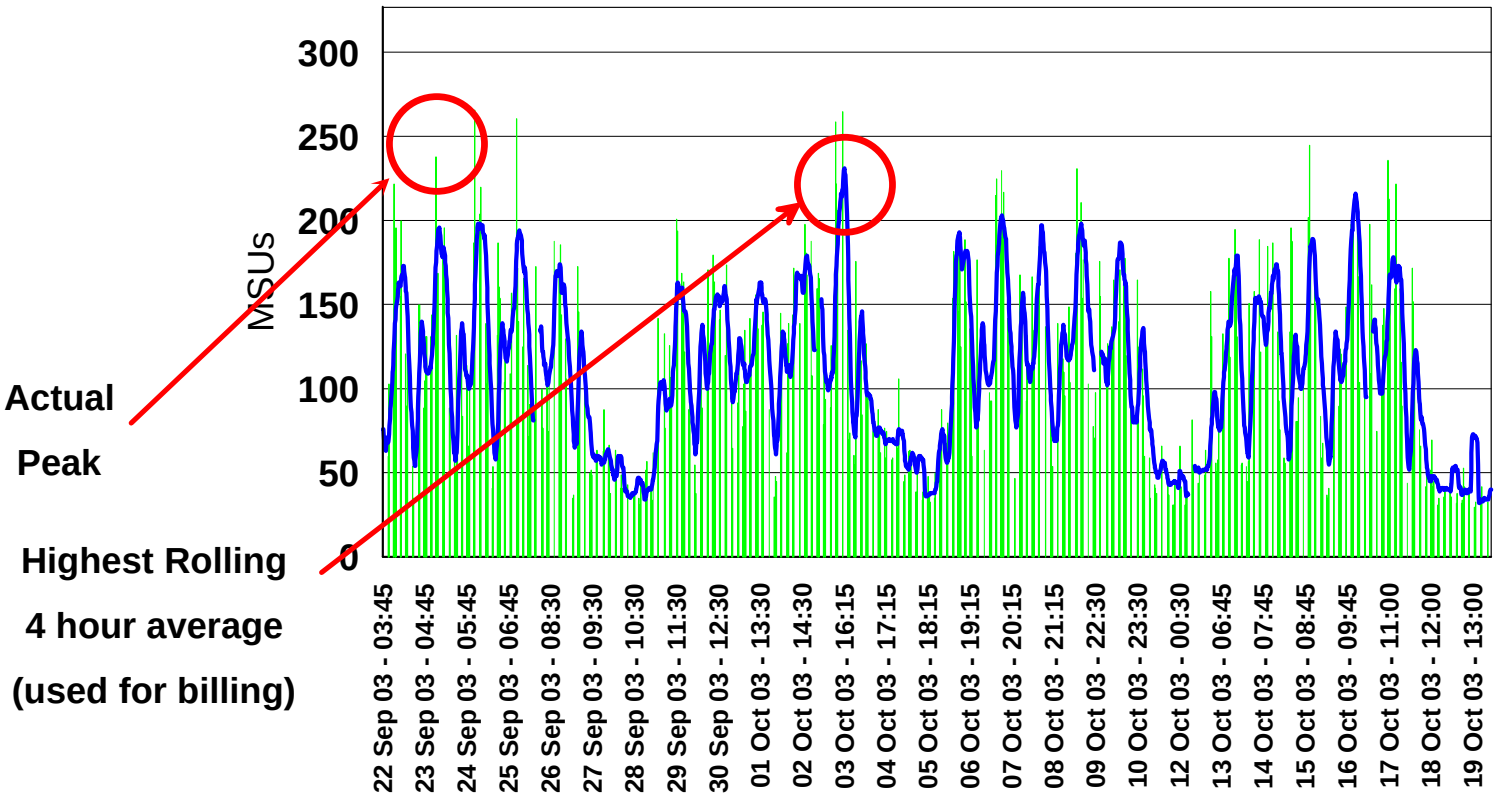
z/TPF EE 1.1 Pricing Directions

- **PSLC**
  - –Parallel Sysplex License Charges is a monthly license charge pricing metric designed to support the high availability design of a Parallel Sysplex cluster
  - –Loosely Coupled cluster in the case of z/TPF
  - –Applies to a uni as well
  - –Base (3 MSUs) and 4 levels
    - •4-45, 46-175,176-315, 316+
  - –http://www.ibm.com/servers/eserver/zseries/swprice/

z/TPF EE 1.1 Pricing Directions

- **WLC**
  - –Workload License Charges is a monthly license pricing metric designed to support today's on demand business requirements
    - •Grow hardware capacity without necessarily increasing your software charges
    - •LPAR-level granularity
    - •Experience a low cost of incremental growth
    - •Manage software cost by managing workload utilization
  - –Base (3 MSUs) and 5 levels
    - •4-45, 46-175,176-315, 316-575, 576+
  - –To qualify the customer must follow a LPAR naming convention and produce a valid SCRT report

Example, 2064-110 rated at 327 MSUs



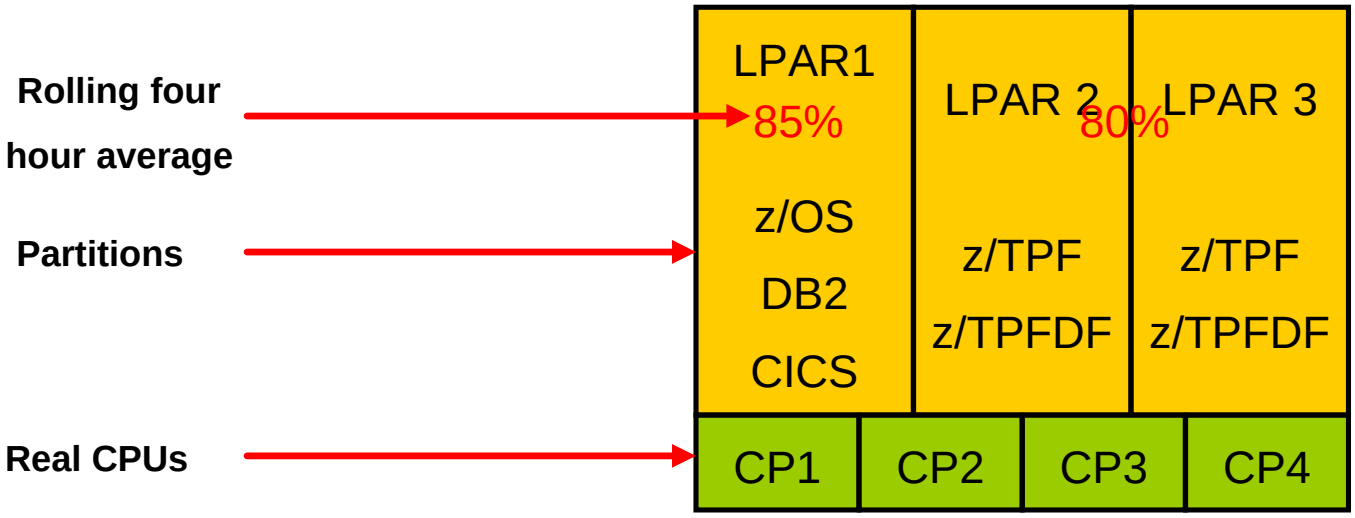
z/TPF EE 1.1 Pricing Directions

- **EWLC**
  - Entry Workload License Charges, In support of an on demand operating environment, IBM offers Entry Workload License Charges (EWLC) for z800 and z890 customers
    - EWLC enables qualifying z800 and z890 customers to pay for sub-capacity eligible IBM software based on the utilization of the LPAR or LPARs where that product executes
    - z800 standalone customers may choose to adopt EWLC pricing. The other option for z800 standalone customers is zSeries Entry License Charges (zELC).
  - http://www.ibm.com/servers/eserver/zseries/swprice/

z/TPF EE 1.1 Pricing Directions

- **SCRT**
  - –Sub-Capacity pricing, for either EWLC or WLC, requires the customers fully migrate all z/OS® and z/TPF licenses to utilize the Sub-Capacity Reporting Tool to generate Sub-Capacity Reports. These Sub-Capacity Reports must be generated and sent via e-mail to IBM each month
  - –IBM must receive the report by the 9th or full capacity is assumed
  - –You must report for 95% of the period
  - –z/TPF will write SMF 72 and 89 records to tape, to be processed by z/OS®
  - –SCRT support is targeted for PUT2
    - •z/OS® could be used to support z/TPF

Example, 2086-470 rated at 208 MSUs

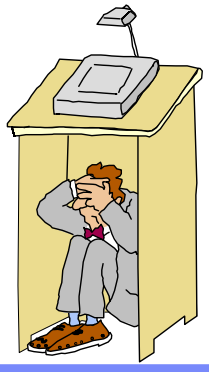


TPF Users Group

Grapevine Texas

IBM Software Group

z/TPF, Final Notes and Comments



According to my calculations, the problem doesn't exist.

AIM Core and Enterprise Solutions
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

z/TPF Timeline

3Q04
Beta Customers receive code for testing

z/TPF Announce

2Q05
"Fast" Beta Customers (few local mods) receive code

3Q05
z/TPF GA
Announce 24 month support period for TPF 4.1

1Q06
Early date for some "fast" cutovers

2Q06
Early date for some large customer cutovers

3Q07
Target to have moved remaining customers

Tale of Two Compilers

- **IBM C Compilers**
  - Link Edit mode versus XPLink
  - OS/390® 2.10 Link Edit stabilized
  - z/OS ® 1.6 the last z/OS to support 2.10 compatibility
  - z/OS ® 1.6 targeted for end of service 9/2007
- **GNU ToolChain (GCC)**
  - Best strategic direction to move to open development
  - The base on which the vast majority of all code is developed for today
- **Pick One**
  - Effort to support both was unfeasible

Support Model

- **Business as usual for all IBM warranted code**
  - Normal support terms and conditions apply
- **Support for Open Source Code will be offered via a service contract**
  - At a minimum, the GCC compiler and the functions IBM ported in the glibc and stdlibc++ libraries
  - Details and possible extended support options will follow (before GA)
- **Other support arrangements should be made for the Linux servers themselves**

Items of Note

- **z/TPF EE v1.1.0 is product 5748-T15**
  - There is an HPO feature, only
    - TPFAR is now part of the base
    - The MPIF feature has also been subsumed
- **z/TPFDF is now product 5748-F15**
  - z/TPFDF is a co-req of z/TPF
- **z/TPF requires a zSeries™ machine**
  - Z800, z890, z900 or z990
- **IBM will not be offering Single Version Charging**
  - Evaluation agreements will be offered for z/TPF

Items of Note

- **Required for build**
  - z/OS® 1.03 or later with HLASM release 5
    - However a SOD to provide on Linux on z
  - Linux for z Series (32 bit with 64 bit compatibility mode)
  - gcc 3.4.1 (or later) built in cross compiler mode
  - g++ 3.4.1 (or later) built in cross compiler mode
  - binutils 2.15 (or later)
  - Korn Shell: pdksh
- **z/VM® 4.04 or later for running z/TPF tests**

IBM Presentations

- **Monday night hospitality suite**
  - 7 stations showing z/TPF, makefiles, debuggers, TPFIC, CDC, problem reporting on the TPF website, TOS, TPF Toolkit for WebSphere Studio
- **Monday and Tuesday Main Tent Presentations**
- **Subcommittees**
  - Languages – GCC, single source, coding in C today
  - Applications – Single source for BAL, Debugger
  - SCP – TPF Scheduler
  - DB – TPFDF update
  - Ops – TOS update, CDC update
  - Comms TCP/IP update
- **Education**
  - Thursday – makefiles on TPF4.1 and z/TPF – **don't miss class !**

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