

z/TPF EE V1.1

z/TPFDF V1.1

TPF Toolkit for WebSphere® Studio V3

TPF Operations Server V1.2



IBM Software Group

TPF Users Group Spring 2006

Are We Migrating or Upgrading?

Name: Stuart Waldron

Venue: Main Tent

AIM Enterprise Platform Software

IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

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Theme is Migration

- Migration:
 - migrate (vi)
 - 1 to move from one country, place, or locality to another
 - 2 to pass usu. periodically from one region or climate to another for feeding or breeding
 - 3 to change position in an organism or substance
 - migration (n)
 - migrational (aj)
 - migrator (n)
- Upgrade:
 - upgrade 2(vt)
 - to raise the grade of : as
 - 1 to improve (livestock) by use of purebred sires
 - 2 to advance to a job requiring a higher level of skill esp. as part of a training program
 - 3 to substitute (a product of lower quality) for a product of higher quality and value





Reasons to Upgrade

- New and enhanced features
- Solution stability
- Strategic Alignment
- Better Cost Structure



z/TPF Features

- A 64 bit operating system that allows you to move legacy applications into an open development environment, leveraging large scale memory spaces for increased speed, diagnostics and functionality
- The open development environment allows access to commodity skills and enhanced access to open code libraries, both of which can be used to lower development costs
- Large memory spaces can be used to increase both system and application efficiency as I/Os for memory management can be eliminated

z/TPF – IBM's Open Mainframe

Leverage IBM's investment in a world class technology



z/TPF Features:

- 64 Bit, large memory spaces
- Multi engine, clustered servers (32 x 54 CPUs)
- 40,000 disks, single image database
- C/C++ support
- Open Systems development
 - Linux based
 - GCC compiler and open libraries
- Service Oriented Architecture support
 - Integrated with IBM middleware
 - SOAP, XML support

zSeries based:

- Most reliable, scalable, secure and versatile server
- Runs multiple systems, including Linux



Quality of Service:

- ▶ Fault tolerant, customers have gone 10 years with only 10 minutes of total downtime
- ▶ Fast response time even under loads

Synergy with Linux:

- ▶ z/TPF and Linux share the development infrastructure and can run on the same box
- ▶ Run application servers (WebSphere) on Linux with zero latency connection to z/TPF for passenger and inventory data
- ▶ Distributed systems in a box

www.ibm.com/tpf



Solution Stability

- TPF 4.1 became available in June of 1994
 - A product being supported for over 12 years is unheard of in today's IT industry
- 31 bit architecture is too limiting for today's needs driven by open standards, increased productivity and greater security
- The "link edit" linkage mode of TPF 4.1 is not used by z/OS, it was last used by OS/390 which went out of support nearly a decade ago
- The OS/390 development model makes tooling difficult to find and expensive as there is too small a market place for it
 - Most shops use home grown tooling which is very expensive to maintain
- No college or university is training students on OS/390 development models, people don't see learning mainframe programming strategic to their career making recruiting difficult and training expensive
- Attempts at migrating function off have proven to be very difficult and expensive and at times, completely unsuccessful
 - No matter your opinion on this, what is obvious is the timeframe. Any of the even reasonably successful attempts have taken four to five years to accomplish
- Attempts to do anything new outboard of TPF have at time proven to be difficult, expensive and unstable

Example: Limits to Distributing Function

- Traditionally TPF shops used TPF for all OLTP processing and “offline” for all reporting and analysis processing
- Increasingly there have been attempts to introduce other OLTP databases, usually RDBM systems
 - This has met with mixed results as unless they are specifically deigned for high availability, RDBMS solutions cannot match the availability of TPF
 - High Availability RDBMS solutions are possible but expensive as in general there is a complete duplication of the data base
 - This has created difficulties in solution design and systems management as allowances must be made when TPF is up but the RDBMS is down
 - Some companies have resolved the problem by mirroring the RDBMS data on TPF
 - This however raises the question if TPF is the better high availability solution, what value is the RDBMS DB providing?

Solution Stability

- Critical Path systems must be maintained
- No operating system can stay frozen in time
 - HW changes
 - Support infrastructure ages, loss of skills
- Treating TPF as an island (making all modifications outboard) has practical limits
- Bottom Line: Staying with the TPF 4.1, 31 bit infrastructure indefinitely is not feasible, upgrading it is critically important for both customers and IBM to protect irreplaceable assets and critical path functionality for which there is still no equal to TPF





Support Updates

- TPF 4.1 Service beyond end of service date
 - End of Service date 9/07
 - IBM planned commitment to provide defect support only for TPF 4.1 through 9/09
- Migration Offering
 - IBM is offering a migration program
 - It allows a customer to order a z/TPF 1.1 license, paying only the TPF 4.1 license fee to run both z/TPF and TPF 4.1 on the same box for up to 24 months
- z/OS OS390V2R10 support
 - z/OS 1.6, 1.7 and 1.8 will all support compatibility mode
 - Support is available for OS390V2R10 thru z/OS 1.8

Other Migration Updates

- Education and Services
 - Details available on the TPF web site
- A PRPQ for HLASM running on Linux on z is available
- Open Source Compiler Service Offering
 - As many customers have existing agreements with Linux providers such as RedHat and Novell, we will work with them to provide them the support they need for z/TPF
 - Currently talking to RedHat and Novell
- New analysis tools available for C/C++ applications

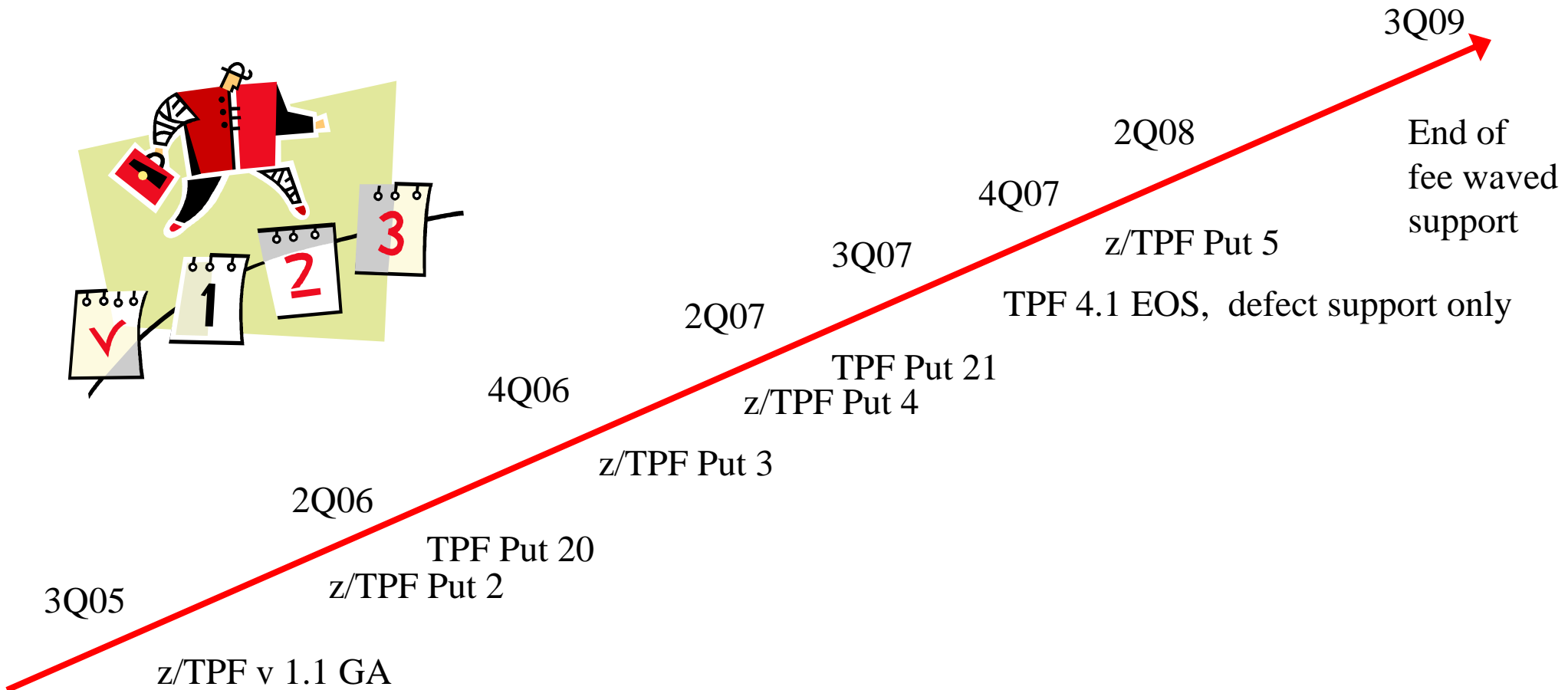


Information

- z/TPF Migration Portal
 - <http://www.ibm.com/tpf/ztpfmigration>
 - z/TPF Migration Manual
 - TPF Users Group Presentations
 - TPF Newsletters
 - z/TPF Frequently Asked Questions
 - Links to related subjects
 - And more !



Migration Timeline



Is there a cost savings by delaying Migration?

- Very large TPF shops may have a migration cost in the \$15 to \$20 million range
- In order to reduce the cost of migration some are proposing to delay the migration as long as possible on the assumption that in the meantime more programs would have been offloaded and therefore reduced the cost
- Using a simple example:
 - A large shop may have 20,000 programs to migrate, the vast majority of them are only a reassemble/recompile and test, some require modifications. This represents the variable portion of the cost
 - Much of the cost is fixed and little affected by the number of application programs such as the development infrastructure, control program retrofits, training, etc..
 - The longest someone may safely put off a migration is around two years. Assuming a large migration may take as much as two more years, this would already be pushing against support dates. In a two year delay, for example, a very finite amount of applications could be offload, even 30% would be very aggressive
 - At two hours per segment (20,000 segments) reducing the number by 30% would only save \$810K, four hours per segment would be \$1.6M
 - \$1.6M is only a 8% savings on \$20M
- 8% does not offset the other potential savings of an immediate migration



Strategic Support

- Focus should not be on why you must migrate but on the advantages of upgrading to support your enterprise strategic plan
- z/TPF supports modernization plans including the effective redistribution of function to take advantage of commodity solutions where applicable
- z/TPF supports SOA
- z/TPF matches the skill base of the application programmers in the job market today

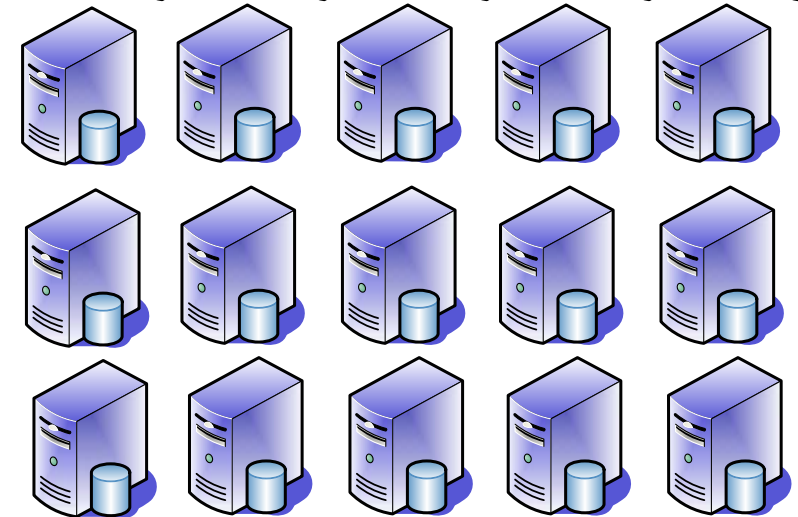
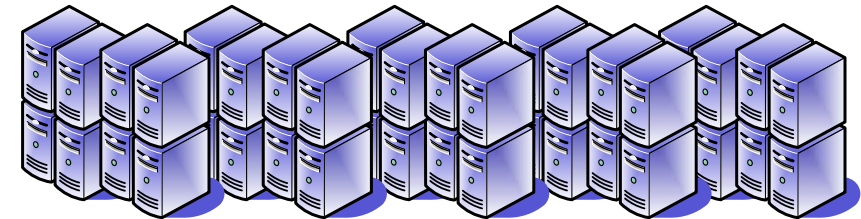
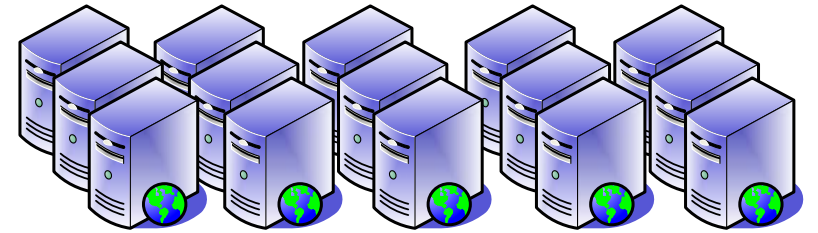


Customer Enterprise Architecture 5 Year Plan

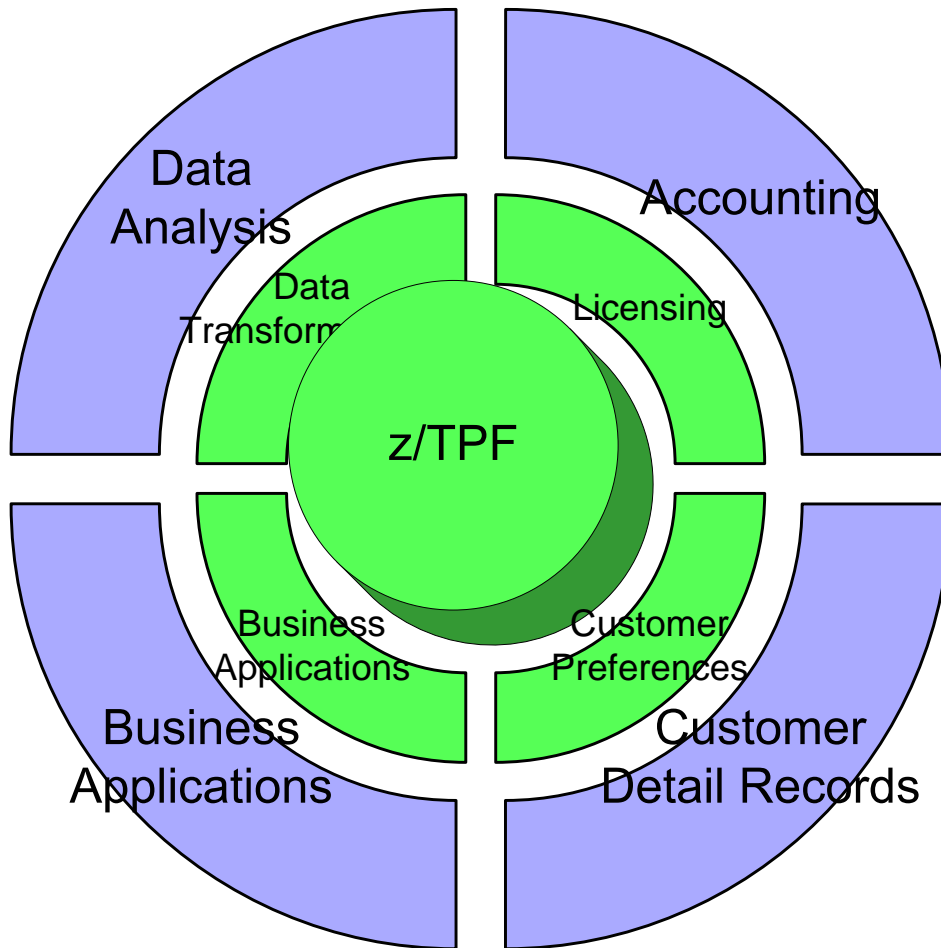
- Use z/TPF for critical record processing, large single image databases, high I/O requirements (DASD or network)
 - Including directory, email and security servers
- Move applicable business logic to application servers
- Establish open access methods for application servers to access data on z/TPF
 - Messaging based such as MQ, SOAP over HTTP or MQ
 - File access based such as Service Data Objects (SDO)
 - SDO represented as “data graphs” in application server
- Modernize solution development
 - WebSphere Studio based platform that can address all development needs
 - With legacy code repackaging, C/C++ development on z/TPF and C/C++/Java development on application servers, the great majority of developers need not know assembler or legacy APIs and structures
- Cost Structure Balanced
 - Composite costs spread over z/TPF and Linux environments, targeting a large amount of application execution on Linux

Mainstream Architectures

- Web Based Distribution
 - Many web based sites today, most connected to mainframes for core transactions
 - Intel servers well suited for delivery of fairly static information, i.e. most web sites
- Application tier
 - Single function servers too numerous and difficult to manage
- DataBase tier
 - Relational DataBase technology struggles to support the size, scale, speed or reliability requirements of a full scale GDS or financial customer record
 - Impossible to insure data consistency across distributed data base servers in DR solution (high risk to PNRs)



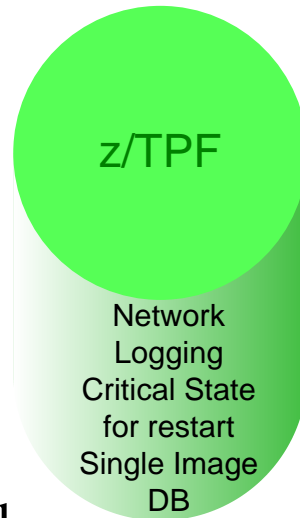
z/TPF / zSeries Strategy



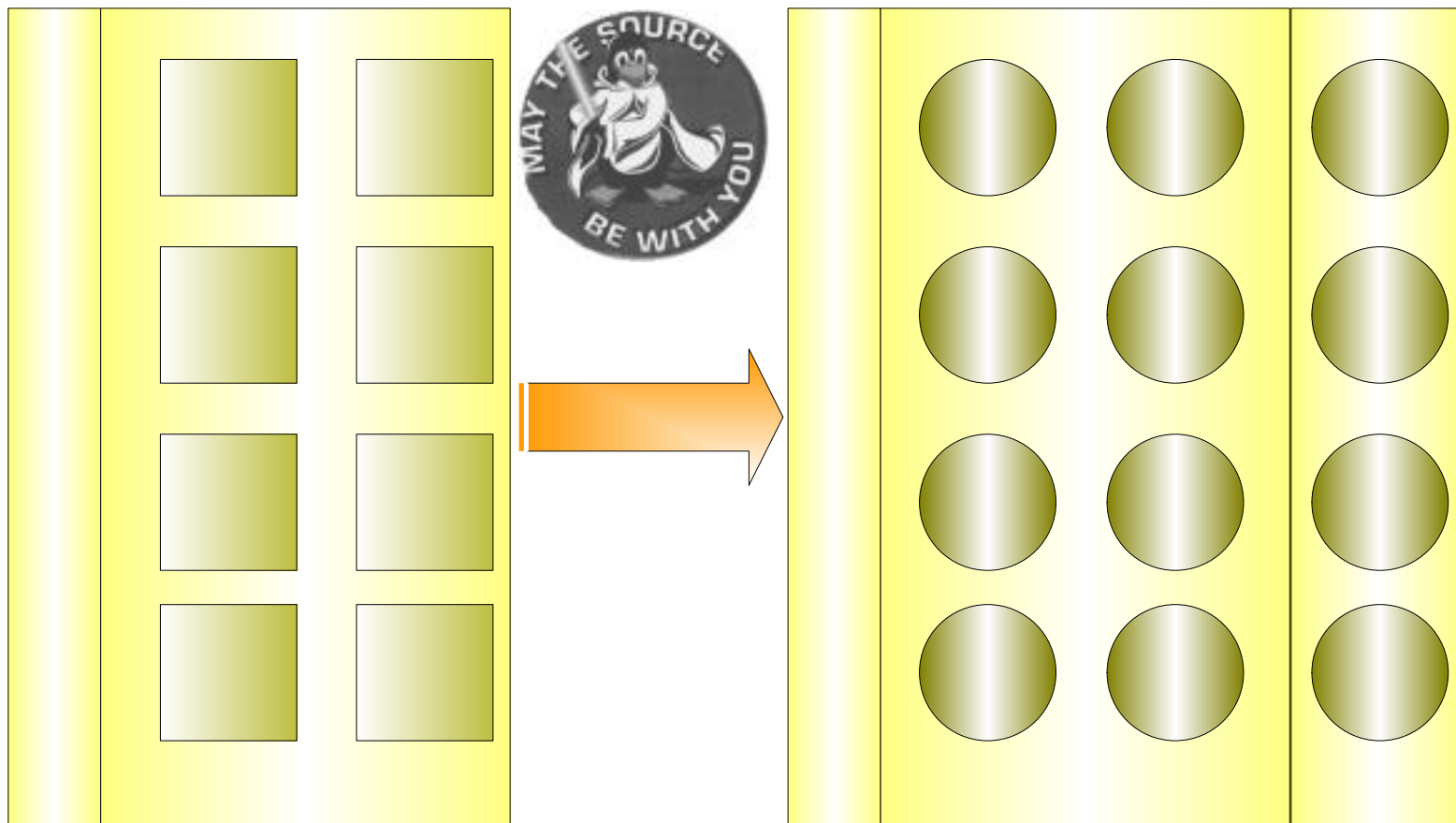
- **z/TPF on zSeries providing vertical scaling for high I/O and critical processing (center, green)**
 - TPF holds single image databases, network processing, logging, etc.
- **Linux on zSeries providing a horizontal sale, commodity cost and processing model (green)**
 - Running most business logic, using z/TPF as a data source for critical records for restart at near zero latency
 - Linux images largely non persistent (stateless) and don't have to be fault tolerant (because TPF is)
- **Outer ring on commodity HW and SW (blue)**
 - Suitable for business processes where latency to z/TPF core is acceptable

z/TPF / zSeries Strategy “The non mainframe”

- Gradually moving most business logic to a highly productive environment such as WebSphere
- Move as much of that logic as possible to cost effective commodity servers running Linux
 - With near zero latency and IFL, Linux on z is also very competitive
- z/TPF provides fault tolerant QoS where needed
 - Linux can now be used for much more than by itself
- z/TPF development and support is Linux based
 - Hence you have mainframe QoS with an all Linux support model with much of the business processing on commodity HW and SW



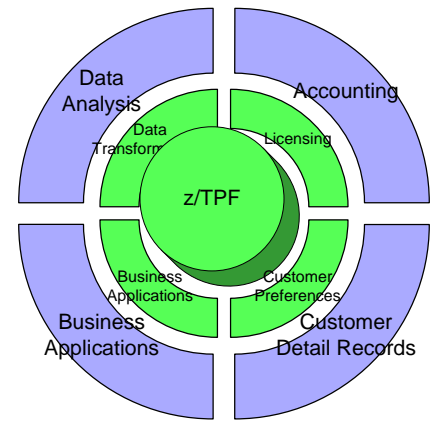
Transformation of Legacy Assets



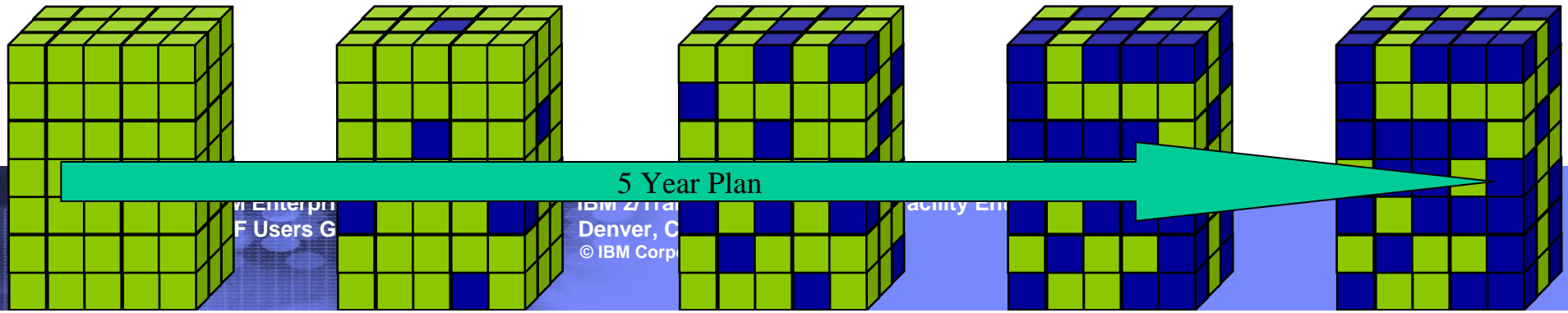
z/TPF

- z/TPF 1.1

- Open development model
 - Commodity skills, commodity tooling
- Componentization of existing code
 - Assembler programs repackaged as reusable objects
 - Breaks monolithic code base into manageable parts
- Inclusive or shared Architecture
 - z/TPF now a vertically scaling part of a distributed system
 - Promotes the componentization and distribution of function



Green – Mainframe
Blue -- Distributed



Enterprise
Users G

IBM z/TPF
Denver, C
© IBM Corp

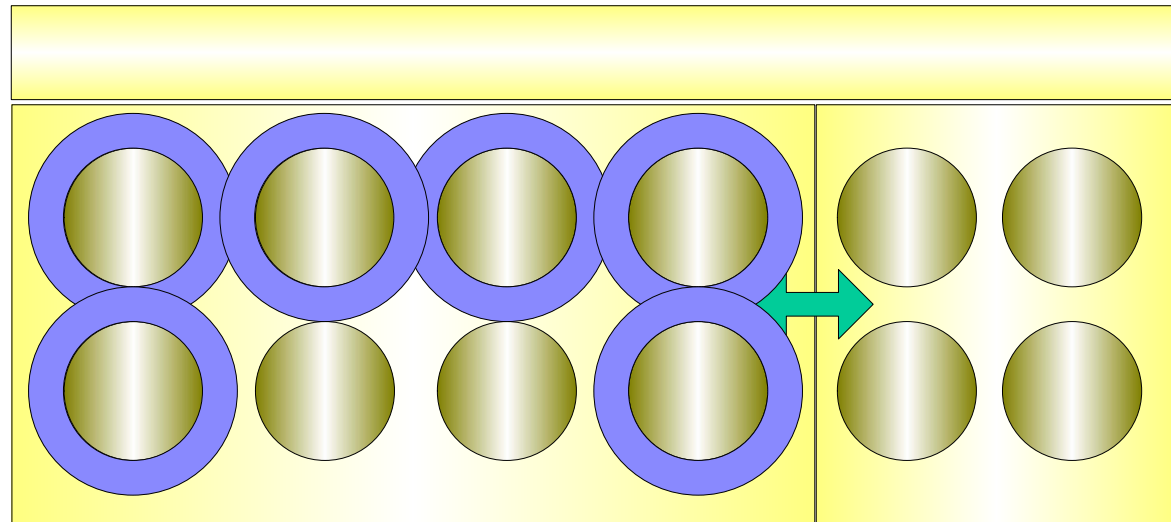
Acuity Ent

Transformation of Legacy Assets

- Legacy assets repackaged to closer match actual usage pattern
- Legacy line mode access methods replaced with a services model

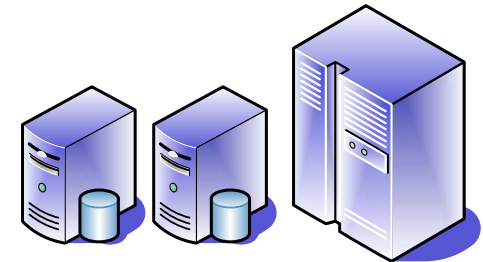
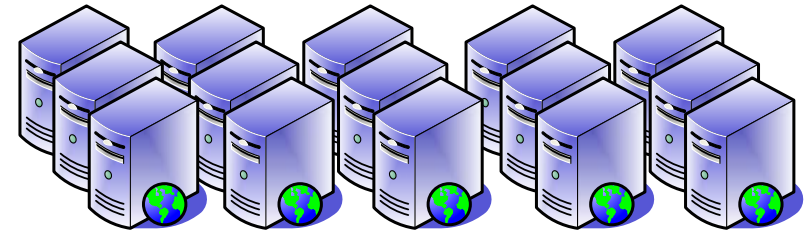


Network of Business Services



IBM Technology Approach

- Reduce Complexity
 - Reduce the number of servers by combining vertical with horizontal technologies
- Application tier
 - Using blade servers for workloads easy to distribute like fare shopping
 - Linux on the mainframe provides virtual open servers easy to manage and easy to provide for DR
- Database tier
 - Use relational servers for data that truly needs to be relational such as data warehousing. Use relational DBs on the mainframe for increased reliability and performance
 - Use z/TPF for OLTP processing, critical data and applications that generate high I/O
 - z/TPF cost competitive with large scale UNIX servers running an RDBMS at equal QoS



z/TPF Features, SOA

- **Architecture:** A blueprint, a guideline to follow
 - **Service Oriented Architecture:** A blueprint that details how to organize functions into callable and therefore reusable services
 - **Service Component Architecture:** A blueprint on how to integrate the services together
- **Web Services:** One of several technologies that can be used to implement a SOA
- **SOAP and XML** are examples of web service technologies
- **Enterprise Service Bus** – IBM's implementation of web service technologies

The Needs of the Business Requires a Flexible Solution

Web User Does Schedule Display on Browser
Network looks for “Schedule Service”

Gets bind information that says “Schedule Service” is native web service and connects directly

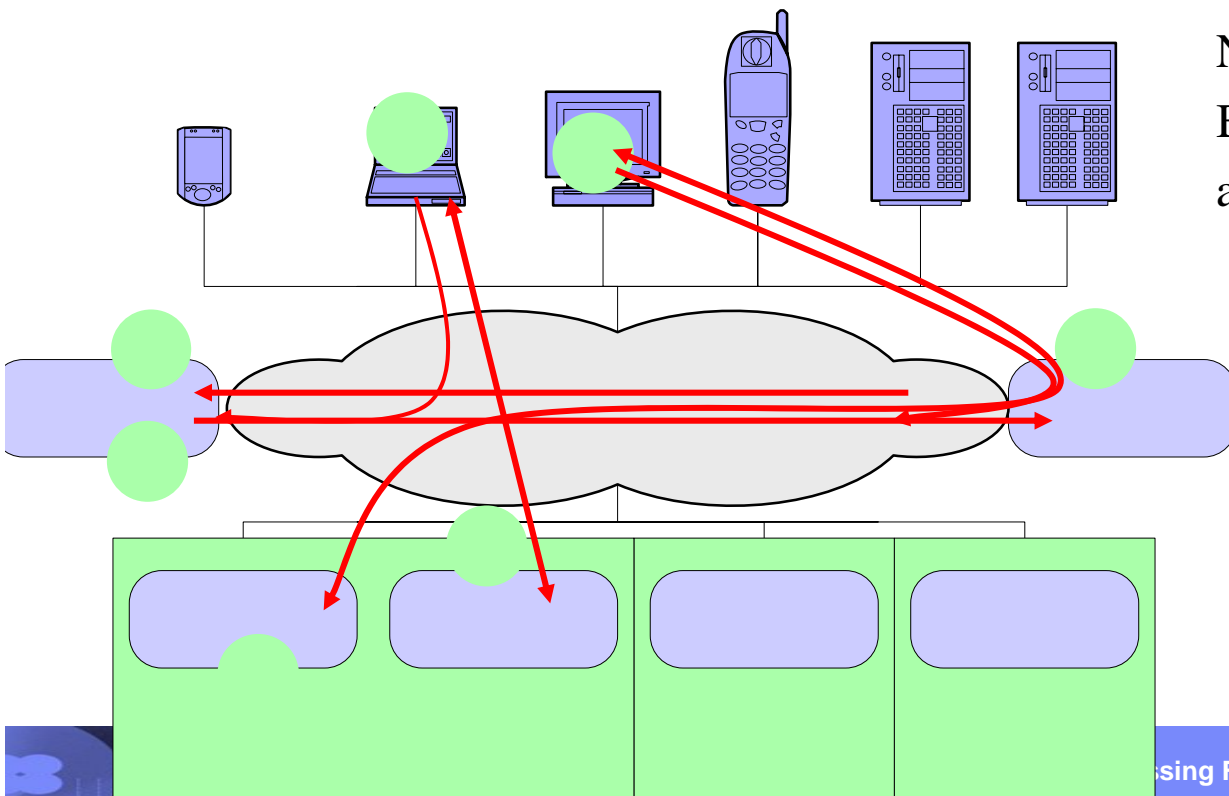
Agent User Does Availability Display on “Green Screen”

“Green Screen” not native Web Service so uses Gateway Service to enter the bus

Network looks for “Availability Service”
Bind information says Availability is not a native web service, use transformation engine

Availability connection made with the help of the gateway and transformation services of the BUS

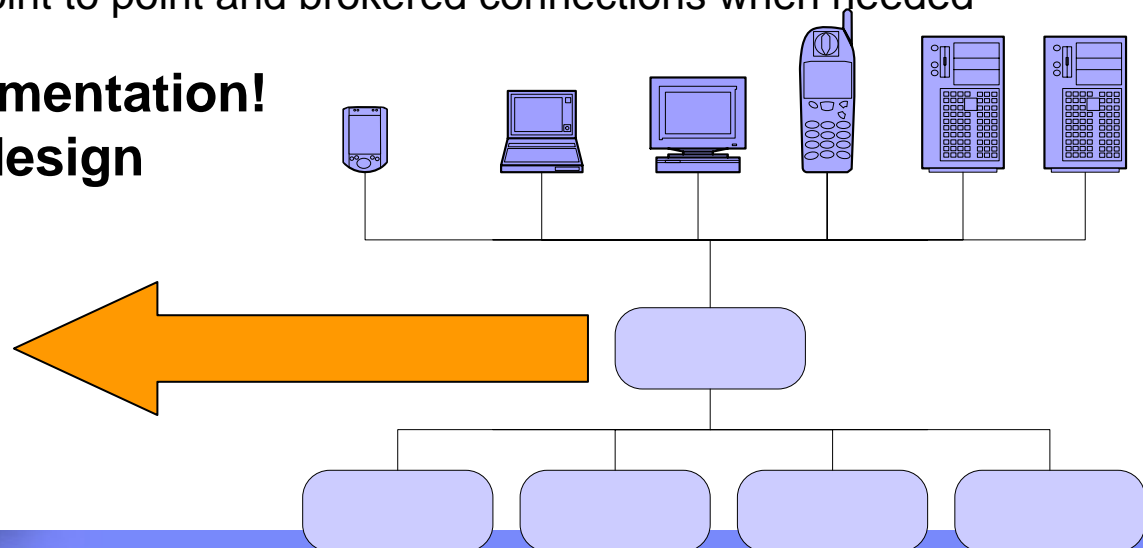
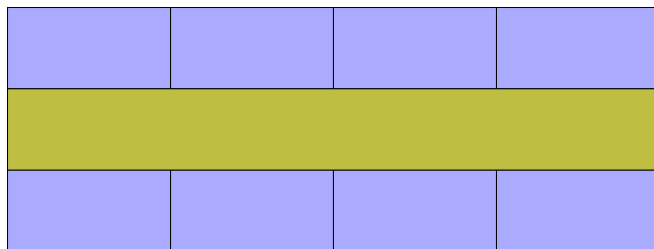
Note* The directory is not accessed on every message. Bind information can be built in an build time!



Messaging Oriented Middleware (MOM) is not Web Services

- It is important to understand the difference between MOM and Web Services
 - MOM implies a broker that acts as a central point of control to route all messages
 - Can be used to implement a service architecture, but is not web services
 - Brokers become bottlenecks and cause the duplication of business logic (needed for routing)
- Web Services is different
 - There is no central router or middleware, an intelligent network routes messages point to point when they support the same data and protocol formats
 - Conversion services are only called when needed and business logic is not duplicated
 - The bus (ESB) concept allows for point to point and brokered connections when needed

This is not a Web Services Implementation!
This is a middleware/MOM design

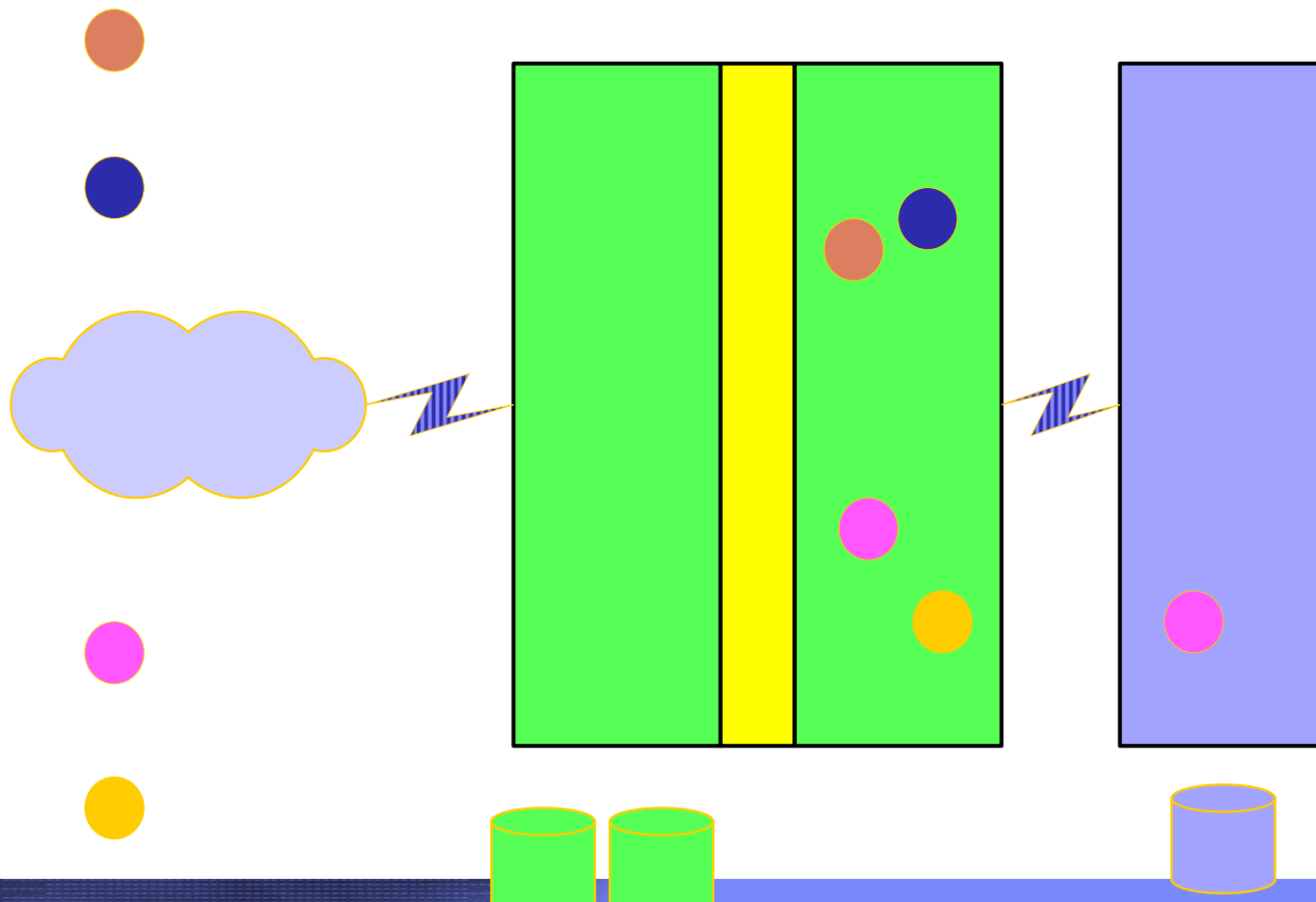


Service Data Objects

- Thus far in web services we had several means for messaging between systems but no common means for simply accessing data remotely, hence: SDOs
- SDO is a framework for data application development, which includes an architecture and API. SDO does the following:
 - Simplifies the J2EE data programming model
 - Abstracts data in a service oriented architecture (SOA)
 - Unifies data application development
 - Supports and integrates XML
- Data Objects: The data itself
- Data Graphs: A container for a tree of data objects
- Data Access Service (DAS): The service that can interact with the local data store

SDO Example

- Critical data represented as data graphs on Linux based application servers



Have I Told You About Our Redbook ?



- **Using z/TPF for Critical Persistence from a WebSphere Application Server, SA-Z013-R01**
 - Open to TPF Customers and Business Partners
 - Residency in Poughkeepsie NY
 - Some Remote Positions Available
 - Register by June 9
 - <http://www.ibm.com/redbooks> and search on TPF in the residencies section
 - For more information see Stu Waldron, Takao Inouye, or Bill Supon during the TPFUG



Cost Structure

- There are many features of z/TPF that can lead to a better cost structure such as:
 - Workload based license charges
 - Commodity or open development tooling
 - Supporting the use of commodity skills
 - Rebalancing workloads to the appropriate technologies



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Linux and z/TPF

- Cost Savings

- Lower Direct Development Costs

- Commodity skills

- Higher productivity

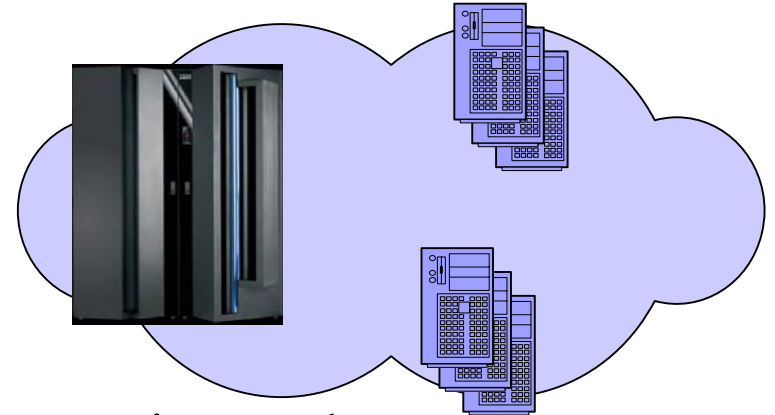
- Higher level languages, better tooling, porting code

- High utilization of components

- z/TPF and virtual Linux servers connected with zero latency

- Better composite cost model of Linux on IFLs, Blade servers and z/TPF on workload charging

- z/TPF for low pathlength applications with high I/O
- Linux as an application server
- Linked in a SOA infrastructure



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

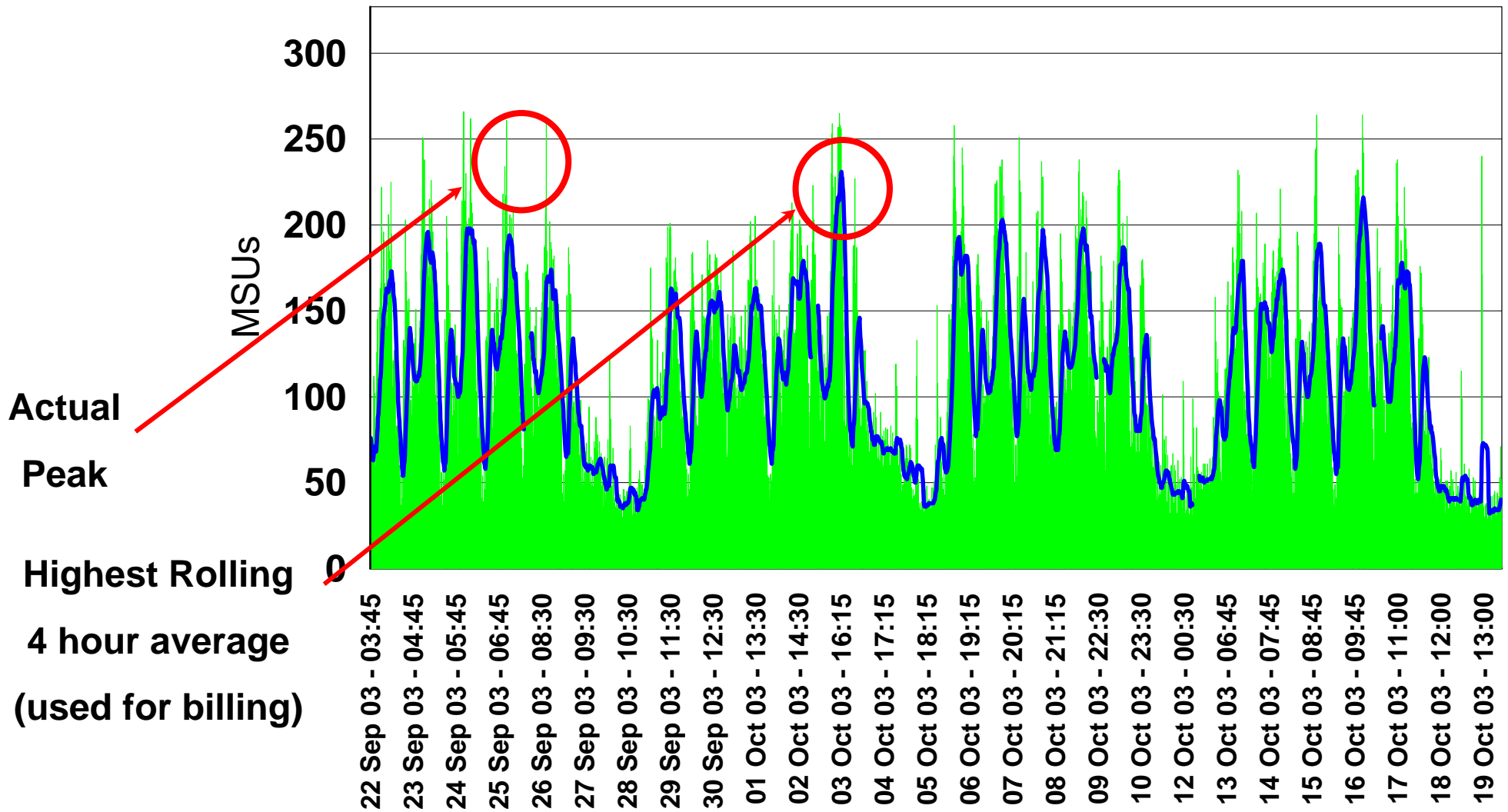


* Statement of
Direction

z/TPF EE 1.1 Pricing Directions

- 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
 - To qualify the customer must follow a LPAR naming convention and produce a valid SCRT report

SCRT 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/>

SCRT Example, 2086-470 rated at 208 MSUs

Two Sources of data:

z/TPF itself (1st priority data, usually what production will report)

PR/SM (2nd priority data, what test systems will report)

Rolling four
hour average

Partitions

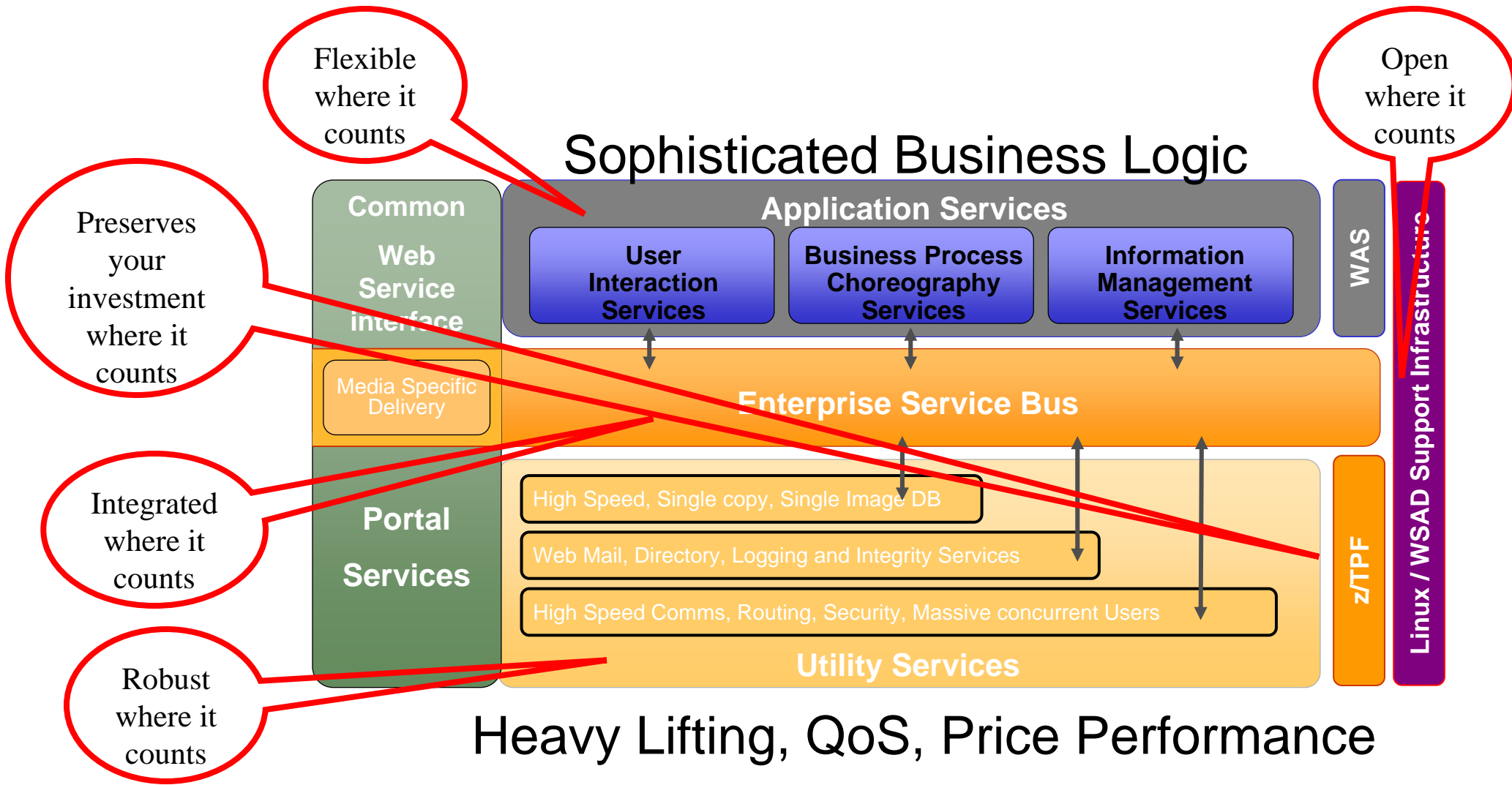
Real CPUs

LPAR1	LPAR 2	LPAR 3	LPAR 4
85%	80%		
z/OS	z/TPF	z/TPF	Linux
DB2	z/TPFDF	z/TPFDF	
CICS			
CP1	CP2	CP3	CP4
			IFL

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 file, to be processed by z/OS®
 - SCRT support is targeted for PUT2
 - z/OS® could be used to support z/TPF
- IBM plans to use SCRT to introduce a variety of initiatives for z/TPF aimed at reducing the total cost of ownership when running new workloads
- A Service Oriented Architecture (SOA) may help to enhance a customer's ability to bring high value functionality to market by enabling the reuse of existing functions. This solution typically works best when existing solutions are directly enabled for SOA, not through proxies. IBM plans to implement technical solutions aimed at demonstrating the value proposition of direct enablement of the existing TPF based customer solutions

High Value Infrastructure



Top Ten Reasons to Upgrade

1. Do it now cause we're all getting tired of these presentations
2. You can implement the distributed architecture your CIO thinks he/she wants but in a way that actually works!
3. A reason to keep coming to the TPFUG!
4. You can take advantage of transitional technology like SDOs
5. You'll get to ask Gambino more questions
6. You won't have to deal with LE anymore, enough said
7. There's a world of open source code out there to reuse and you won't spend your time dealing with LE naming collisions
8. Using GCC finally gives you and the geek you hired something in common to talk about
9. Large memory spaces means you don't have to do application level paging in short term pool records
10. 64 Bit is a technology enabler

What Else Does IBM Have In Store for You During This Conference ?

- Monday Morning
 - Updates to our SOA, Networking and Security function by Mark Gambino
 - Base System Updates : including SCRT, Norm State Pool reallocation, I/O Measurements, and more, by Mike Shershin
- Monday Afternoon
 - Keynote Presentation : SOA, what does it mean to you by Jim Rhyne

What Else Does IBM Have In Store for You During This Conference (part 2) ?

- Updates on SDO, TPFDF, Recoup, Posix File System, SOA, XML, TPF Toolkit, IOMeasurements, Loaders, TPF Operations Server, Apache, and Requirements
- A Two Part Presentation that will present information on migrating your applications from TPF4 to z/TPF, with a focus on C and C++



Find out more about new
z/TPF Products & Services

AT THE IBM RECEPTION

MONDAY, May 15

7:00 PM - 10:00 PM

Grand Ballroom

Fun...Food...Gifts



And Don't Forget



- The IBM Hospitality Suite Tonight at 7pm
 - Demos ranging from [Apache](#) to [z/TPF](#)
 - A chance to talk to all the folks who make it happen
- And don't forget the TPFUG Vendor Hospitality Suite, held at the same time