



IBM System z™ Distributed Licensing for Linux Middleware



Learning Points

- IBM's two Software Categories are System z software and Distributed software and the entitlements are not interchangeable
- Value Units (VUs) are used to license System z IPLA software and Processor Value Units (PVUs) are used to license Distributed Passport Advantage software
- Distributed Sub-Capacity Terms require customers to keep track of the maximum processor capacity available to a program:
 - IBM License Metric Tool calculates this
 - Customers run the tool and retain the reports
- When running z/VM virtual machines and/or LPARs a customer is only required to license for the Real hardware resources actually available to each program, not all the Virtual resources
- Linux for System z Part Numbers are for internal IBM tracking but do not limit the customer's deployment of their license entitlement
- Despite the increase in PVU rating for z10 IFLs, customers were still provided with a significant price-performance benefit!

Software on Linux for System z

- System z hardware supports any operating system which executes on the System z architecture
 - IBM Operating Systems: z/OS, z/VM, z/VSE, z/TPF
 - Open Source operating system: Linux for System z
- Software categories for different OS environments
 - IBM Operating Systems:
IBM Software running on the four IBM operating systems is referred to as System z software licensed via CBS/ESW
 - OS environments other than the 4 IBM operating systems
IBM Software running on the **Linux for System z** operating system is Distributed software licensed via **Passport Advantage**

Two Kinds of Value Units for SW Licensing

Question: When is a Value Unit not a Value Unit?

- System z already had been using the term Value Unit
 - System z IPLA software provides price performance with lower cost of incremental growth for our tools on z/OS and z/VM using Value Units
 - We convert MSUs, Messages, Users, and Engines into a required Value Unit entitlement using our Value Unit Exhibits
- Processors rated on different platforms in different ways:
 - On System z we use MSUs to rate each processor model
 - On Distributed platforms each processor core is rated with a number of Processor Value Units (PVUs)
- So: Processor Value Units on distributed platforms are analogous to MSUs on the System z platform
 - Distributed Processor Value Units for Linux products are unrelated to System z IPLA Value Units used for z/VM program products!
 - These two different kinds of Value Units are not interchangeable!

PVU Table

PVU Website
Link: [click here](http://www-306.ibm.com/software/lotus/passportadvantage/pvu_licensing_for_customers.html)

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System z

Table of Processor Value Units (PVUs) per Core

PVU Table per Core (section 1 of 2 - RISC and System z)											
Processor Technologies											
Processor Vendor	Processor Brand			Processor Type					Processor Model Number	PVUs per Core	
	Processor name	Server model numbers	Maximum number of sockets per server	Cores per socket							
				One-Core (1)	Dual-Core (2)	Quad-Core (4)	Hexa-Core (6)	Octa-Core (8)			IFL Engine
IBM	POWER7	770,780	8			■	■	■		All	120
		750,755	4					■	■	All	100
	POWER6	550,560,570,575,595	All		■					All	120
		520, JS12, JS22, JS23, JS43	All		■					All	80
	POWER5, POWER4	All	All		■				All	100	
	POWER5 QCM	All	All			■			All	50	
	System z10 ¹	All	All					■	All	120	
	System z9, z990, S/390 ^{1,2}	All	All					■	All	100	
	PowerPC 970	All	All		■				All	50	
PowerXCell™, Cell/B.E.™ 8i ³	All	All	■					All	30		
HP / Intel®	Itanium® 1,2	All	All		■				All	100	
	PA-RISC	All	All		■				All	100	
Sun / Fujitsu	SPARC64 VI, VII	All	All		■	■			All	100	
	UltraSPARC IV	All	All		■				All	100	
	UltraSPARC T2	All	All			■	■	■	All	50	
	UltraSPARC T1	All	All			■	■	■	All	30	
Any	Any single-core	All	All	■					All	100	

* Requirements as of Publish Date: Feb 8, 2010

Notes:

- 1) Each Integrated Facility for Linux (IFL) or Central Processor (CP) engine is equivalent to 1 processor core.
- 2) Refers to System z9, eServer zSeries, or System/390 servers.
- 3) Entitlements required for Power Processor Element (PPE) cores only.

Linux Middleware platform comparison

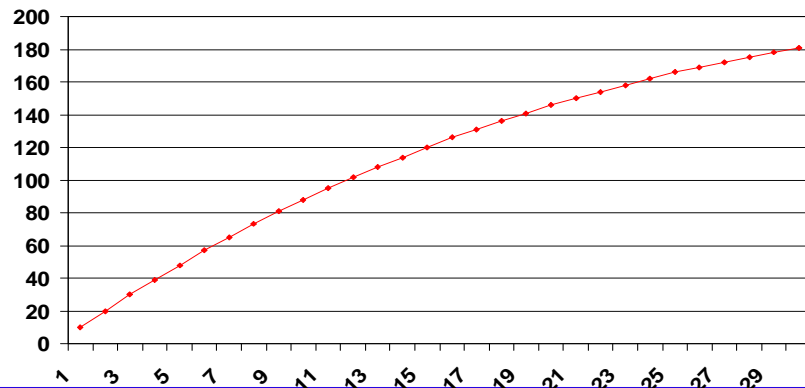
- Linux Middleware pricing determined by:
 - **Processor Value Unit (PVU) rating for each kind of core**
 - Different for different processor technologies (p, i, x, z, Sun, HP, AMD, etc.)
 - System z is just one of many choices, not handled differently from the others
 - **Number of processor cores which must be licensed** (z calls them IFLs)
 - **Price per PVU** (constant per product, not different based upon technology)
- Examples:

Technology	PVUs / core		# cores req'd (e.g.)		Total PVUs required		Price per PVU (e.g.)		Total Price
IBM Power7	120	x	4	=	480 PVUs	x	\$100	=	\$48,000
IBM System z10	120	x	4	=	480 PVUs	x	\$100	=	\$48,000
IBM Power5	100	x	4	=	400 PVUs	x	\$100	=	\$40,000
IBM System z9	100	x	4	=	400 PVUs	x	\$100	=	\$40,000
HP PA-RISC	100	x	4	=	400 PVUs	x	\$100	=	\$40,000
AMD Opteron	50	x	4	=	200 PVUs	x	\$100	=	\$20,000
Sun UltraSparc T1	30	x	4	=	120 PVUs	x	\$100	=	\$12,000

Comparing z IPLA VUs to Distributed PVUs

- System z IPLA Value Units are used for licensing z/VM products on IFL processors
- z IPLA Value Units are calculated from IFL processors according to Value Unit Exhibit 021 in the Workload Pricer
- There is a price performance curve built into the conversion from Engines to VUs
 - 1 IFL requires 10 z IPLA Value Units
 - 4 IFLs require 39 z IPLA Value Units
 - 8 IFLs require 73 z IPLA Value Units

IFL Engines vs zIPLA VUs






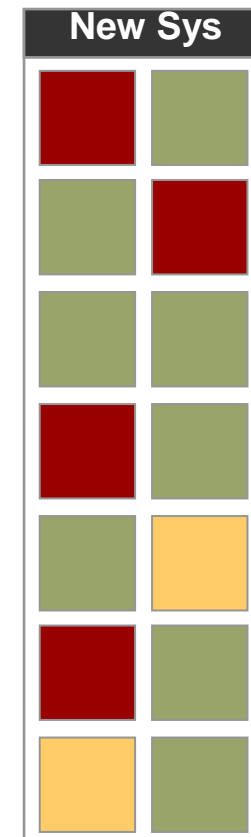
- Distributed Processor Value Units are used for licensing Middleware on IFLs
- Processor Value Units are determined by the type of machine processor,
- z10 processors are rated at 120 PVUs, all other z processors are rated at 100
- The price performance curve is built into the Passport Advantage relationship using discounting of the purchase price, not discounting of the amount of entitlement needed
- So, for any distributed middleware running on Linux for System z:
 - z990: 1 IFL requires 100 Processor VUs
 - z9: 4 IFLs require 400 Processor VUs
 - z10: 8 IFLs require 960 Processor VUs
- No relationship to any z/OS middleware

Distributed Sub-Capacity Licensing

Sub-capacity Licensing For Distributed Systems

- Sub-capacity licensing available for all PVU-priced software offerings that run on:
 - UNIX (AIX, HP-UX, and Sun Solaris)
 - i5/OS, OS/400
 - Linux (System i, System p, System z)
 - x86 (VMware ESX Server, VMware GSX Server, Microsoft Virtual Server)
 - List of participating offerings on Passport Advantage [Website](#)
- Track compliance using IBM License Metric Tool V7.1
 - Announced June 18, 2008
 - Free tool to support IBM software that supports selected partitioning technologies
 - Required to maintain reports generated quarterly

-  Application A – 2 processor licenses
-  Application B – 4 processor licenses
-  Application C – 8 processor licenses



Supported System z virtualization technologies

- Linux for System z runs IBM Distributed Middleware
- The following virtualization technologies are all supported by the distributed Passport Advantage sub-capacity licensing offering:
 - LPAR
 - z/VM in an LPAR
 - Native z/VM (where still supported)

Sub-capacity Licensing – Updated July 1, 2008

Original distributed sub-capacity process is changed!

- Compliance tool (IBM License Metric Tool V7.1) will report upon all PVU (processor value unit) based software, not only sub-capacity eligible
 - Tool measures the maximum processor core capacity in PVUs available to each software program (not what is used, what is available)
- Previously announced suspension of the use of the tool is now revoked, use of IBM License Metric Tool is required for sub-capacity licensing with some exceptions:
 - Not required for virtualization technologies not yet supported by the tool
 - Not required if customer has less than 1,000 employees and contractors worldwide, unless they are a Service Provider, or have contracted with a Service Provider to manage their sub-capacity server environment
 - Not required if the total physical capacity of customer's servers with sub-capacity licensing is less than 1,000 PVUs, or if licensed at full capacity
- When IBM License Metric Tool is not required, customers must maintain documentation for at least two years, reconciled at least quarterly, to demonstrate on-going compliance with the terms of the sub-capacity offering

Counting Processors on System z

Definitions and “rules”

- Dedicated partition:
 - Processors are always allocated in whole increments
 - Resources are only moved between partitions “explicitly”
(e.g. by an operator or a scheduled job)
- Shared pool:
 - Pool of processors shared by partitions
 - System automatically dispatches processor resources between partitions as needed
- Maximum license requirements:
 - Customer does not have to purchase more licenses for a product than the number of processors on the machine
(e.g. maximum DB2 UDB licenses on a 12-way machine is 12)
 - Customer does not have to purchase more “shared pool” licenses for a product than the number of processors assigned to the shared pool
(e.g. maximum of 7 MQSeries licenses for a shared pool with 7 processors).
Note: This limit does not affect the additional licenses that might be required for dedicated partitions.

Sub-capacity with LPARs and z/VM – example 1

	MQ		MQ
Test		WAS	WAS
Linux1	Linux2	Linux3	
1 2 3 4	1 2 3	1 2	
z/VM			Linux
1 2 3 4 5 6		1 2	



Assumption here is 100 PVUs per IFL on a z9

MQ must be licensed for:
 $3 + 2 = 5$ processors
 = 500 PVUs

WAS must be licensed for:
 $2 + 2 = 4$ processors
 = 400 PVUs

3 Linux Virtual Machines
 with 4, 3 & 2 virtual
 processors respectively

6 logical processors
 assigned to VM LPAR

2 logical processors
 assigned to Linux LPAR

8 processors in the
 shared IFL pool

Sub-capacity with LPARs and z/VM – example 2

Test	MQ	MQ WAS	Test
Linux1	Linux2	Linux3	
1 2 3 4	1 2 3 4 5 6	1 2 3	
z/VM 1			z/VM 2
1 2 3 4 5 6			1 2



Assumption here is 120 PVUs per IFL on a z10

MQ must be licensed for the lower of:

6 + 3 = 9 virtual processors
 or 6 logical processors
 (720 PVUs)

WAS must be licensed for:
 3 processors (360 PVUs)

3 Linux Virtual Machines
 with 4, 6 & 3 virtual
 processors respectively

6 logical processors
 assigned to VM LPAR 1

2 logical processors
 assigned to VM LPAR 2

8 processors in the
 shared IFL pool

PPA Part Numbers for Linux on z

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- Passport Advantage software is licensed and delivered using Part Numbers:
 - Part Numbers for the license entitlement (“D” part numbers)
 - Part Numbers for Subscription and Support (“E” part numbers)
 - Part Numbers for term license entitlement (“A” part numbers)
 - Part Numbers for delivery of the media with the code

- Many Distributed Middleware products have Part Numbers labeled with “Linux for System z”
 - These Part Numbers are used to track PPA software sold by System z sellers for Linux projects which will be deployed on System z hardware
 - The purchase of a “Linux for System z” Part Number does not limit the customer’s use of the license, if they later decide to redeploy on another platform they do not need to purchase another license
 - Similarly, a customer may redeploy a previously-purchased non-z license entitlement from distributed hardware onto System z without needing to purchase another license

Implications of z10 IFLs rated at 120 PVUs compared to older IFLs rated at 100 PVUs

z10 Integrated Facility for Linux (IFL) Highlights

- z10 hardware technology is the next generation of the System z server technology replacing z9 and z990

- Up to 60% performance capacity increase over z9 technology
 - ▶ Up to 100% increase over z990
 - ▶ Fewer IFLs needed for equivalent workload



- Processor Value Unit (PVU) Licensing for Passport Advantage middleware on IFLs
 - ▶ Each z10 IFL requires 120 PVUs
 - Same PVU requirement as for IBM POWER6 processor cores
 - ▶ z9 and prior hardware continues to require 100 PVUs

Price / Performance Comparison*

- Assuming Equivalent Software Workload:

z990 IFL		
System z990	PVUs per IFL	PVU Licenses Required
32 IFLs	100	3,200

Vs.

z10 IFL		
System z10	PVUs per IFL	PVU Licenses Required
16 IFLs	120	1,920

% Software Price / Performance Advantage: (equivalent workload)

+40%

PVUs required for same workload:

- ✓ z10 = 1920 PVUs
- ✓ z990 = 3200 PVUs

z10 has 40% SW price/performance advantage over z990

z9 IFL		
System z9	PVUs per IFL	PVU Licenses Required
26 IFLs	100	2,600

Vs.

z10 IFL		
System z10	PVUs per IFL	PVU Licenses Required
16 IFLs	120	1,920

% Software Price / Performance Advantage: (equivalent workload)

+26%

PVUs required for same workload:

- ✓ z10 = 1920 PVUs
- ✓ z9 = 2600 PVUs

z10 has 26% SW price/performance advantage over z9

*Estimates based on IBM Internal Benchmarks

In Closing...

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The End