z/VM, Linux, and z/VSE on IBM System z9

A System z9 for Everyone

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IBM Systems

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Agenda

- z/VM
- Linux on System z
- z/VSE
- Summary

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z/VM Support on System z

		z800 (WDFM)	z900	z890	z990	z9 EC	z9 BC	End of Market	End of Service	Ship Date
z/VM	4.4	x	x	x	x	x	x	3/06	9/06**	8/03
	5.1*	x	x	x	x	x	x	9/06**	9/07**	9/04
	5.2*	x	x	x	x	x	x	TBD	4/09**	12/05

* Releases currently orderable
** Planned

z/VM on System z

Using the System z9 operating systems to help you control your IT infrastructure

§ Unify the infrastructure

- z/VM V5.2 provides enhanced exploitation of large real memory which may provide constraint relief and cost savings and improved memory management (Collaborative Memory Management Assist) between z/VM and Linux on System z *

§ Leverage the mainframe data serving strengths

- z/VM V5.2 provides improved performance of SCSI disk I/O **
- z/VM V5.2 exploitation of the IBM TotalStorage including support for Parallel Access Volumes (PAVs) for z/VM system data and guest data
- Withdrawn support for DS4000

§ A secure and flexible business environment

- z/VM V5.2 supports Crypto Express2 as an accelerator card for Crypto sharing among Linux guests
- z/VM V5.2 improves FCP channel sharing with support for N_Port ID Virtualization ***
- z/VM V5.2 offers enhanced performance assists for guests

§ Leverage strengths across the infrastructure

- z/VM V5.2 simplifies user administration with the coordination of DirMaint™ and RACF changes
- z/VM virtualization technologies host all System z operating systems, including Linux on System z

* Compared to previous releases of z/VM
** Compared to z/VM V5.1
*** Compared to FCP LUN Access Control

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Linux Support on System z

	z800 (WDFM)	z900	z890	z990	z9 EC	z9 BC	Ship Date
SLES9	x	x	x	x	x	x	**08/2004**
RHEL4	x	x	x	x	x	x	**02/2005**

SLES9 support *		
General support	Extended support	Self support
07/30/2009	07/30/2011	07/30/2014

RHEL4 support *		
Full support	Development support	Maintenance support
08/31/2007	02/29/2008	02/29/2012

* Support dates may be changed by Linux distributors

For latest information and details contact your Linux distributor

SLES = SUSE Linux Enterprise Server
RHEL = Red Hat Enterprise Linux

Linux on System z9

Using the System z9 operating systems to help you control your IT infrastructure

- **Enhanced infrastructure simplification capabilities**
  - Replace your SNA-Network Controllers with Linux on System z
    - CDLC-Support for Communication Controller for Linux on System z V1.2 exploitation
  - Enhanced Virtualization of Storage Resources
    - Linux supports the zFCP N_Port ID Virtualization
  - Exploit your Linux investment with z/VM
    - 2 GB constraints for I/O buffers are resolved with z/VM 5.2
- **Additional secure crypto algorithms support**
  - Support for Cryptography co-processor
    - Linux exploitation of cryptographic hardware in user-space for application support
- **Get price/performance benefit from the more powerful IFLs on System z9**
  - More virtual servers *or* more users *or* more throughput for same or less IFL price

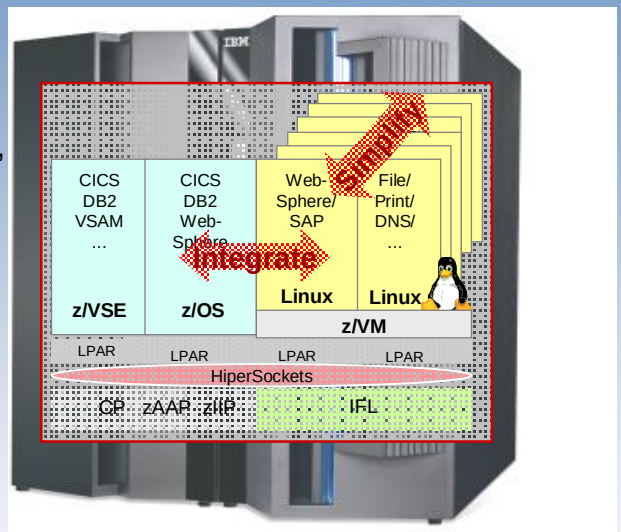
Utilize open & industry standards with System z9

Help meet unified IT infrastructure objectives with System z virtualization technology and Linux

IBM can help you build an optimized, unified IT infrastructure for your applications

Infrastructure Simplification

- Virtual growth instead of physical expansion on Intel or RISC servers
- Consolidation of many physical servers, quickly and easily provisioned and deployed
- Optimal resource utilization through sharing of resources and applications
- Network simplification through highly virtualized internal network
- Easier systems management through Single-Point-of-Control for administration and operation



Business Integration

- New solutions deployed in less time, and with more efficient transaction processing
- Rapid access to enterprise data and applications through the internal network
- Superior performance, simplified management, security rich environment
- Offsite disaster recovery with GDPS
- Integration is supported by IBM middleware from DB2, Lotus®, Rational®, Tivoli® and WebSphere®.

Linux on System z can help to integrate and simplify distributed applications to minimize cost and maximize manageability.

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The z/VSE Evolution continues on System z9

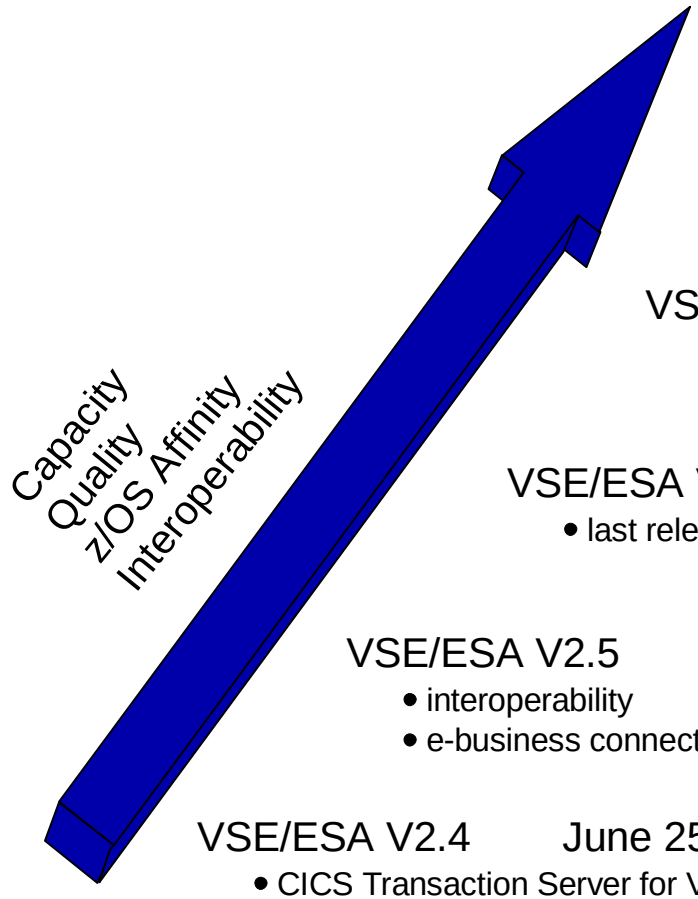
Using the System z9 operating systems to help you control your IT infrastructure

z/VSE V3.1 (*):

- **Selected IBM System z features**
  - SCSI/FCP attached disk
  - N_Port ID Virtualization
  - Crypto Express2 in accelerator mode
  - Enhanced CPACF
  - Basic Security Manager (BSM) enhancements
  - 31-bit VTAM I/O buffers
- **Further exploitation of IBM TotalStorage ESS, DS6000, DS8000, VTS**
  - SCSI/FCP qualification for DS6000 and DS8000
- **Additional selected IBM System z features (also in VSE/ESA V2.7)**
  - FICON Expess4 for additional bandwidth
  - OSA Express2 1000BASE-T Ethernet for additional connectivity options
  - Up to 60 LPARs for more flexibility

(*) z/VSE V3 can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities. z/VSE V3 is designed to exploit selected features of IBM System z hardware.

Recent VSE Innovation



???

z/VSE V3.1 *March 4, 2005*
- System z features, FCP/SCSI
- 31-bit mode only

VSE/ESA V2.7 March 14, 2003
- enhanced interoperability
- ALS2 servers only

VSE/ESA V2.6 Dec 14, 2001
- last release to support pre-G5 servers

VSE/ESA V2.5 Sept 29, 2000
- interoperability
- e-business connectors

VSE/ESA V2.4 June 25, 1999
- CICS Transaction Server for VSE/ESA
- e-business

The z/VSE Evolution continues on System z9

Using the System z9 operating systems to help you control your IT infrastructure

z/VSE V4: Preview (*) announcement - April 2006

- **z/Architecture mode only**
  - Runs on IBM System z9 EC, z9 BC and IBM eServer z990, z890, z900, z800
- **64-bit real addressing supports up to 8 GB processor storage**
  - Transparent to user applications
  - Not designed for 64-bit virtual addressing or 64-bit mode for user applications
- **Point-to-point connection for SCSI/FCP attached disks**
  - No external switch required
- **LPAR based sub capacity monitoring tool**
  - Fulfills Statement of Direction July 2005 IBM Systems z9 announcement
- **Statement of Direction on z/VSE V4 software pricing**
  - Better granularity with new sub-capacity pricing
  - On selected processors according to applicable terms and conditions
- **Easy upgradeability**
  - FSU from z/VSE V3.1 and VSE/ESA V2.7
  - Minimum required VM level is z/VM V5.2, if running z/VSE V4 under z/VM
- **No change in z/VSE strategy**
  - Continued focus on interoperability with other IBM platforms based on open and industry standards
  - Continued focus on exploitation of Linux for on demand solutions and infrastructure simplification

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

z/VSE's PIE Strategy

Protect existing VSE investments

Integrate using middleware and VSE connectors

Extend with Linux on IBM System z technology & solutions

IBM TotalStorage

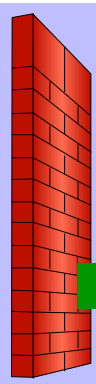
Web

Linux on System z
(IFL engines)

z/VSE
(Standard engines)

HiperSockets

Connectors



CICS Transaction Gateway
DB2 Connect / DB2 UDB DRDA
WebSphere MQ
VSE e-business connectors
VSE Web services

DB2 UDB

z/VM

LPAR or z/VM

IBM System z

Clients

Business Services

Tran/Data Services

z/VSE V4 Statement of Direction

Statement of Direction announced as part of IBM System z9 announcement, July 2005:
"IBM intends to provide a software sub-capacity measurement tool for z/VSE."

§ **Fulfilled with z/VSE V4 Preview Announcement, April 2006:**

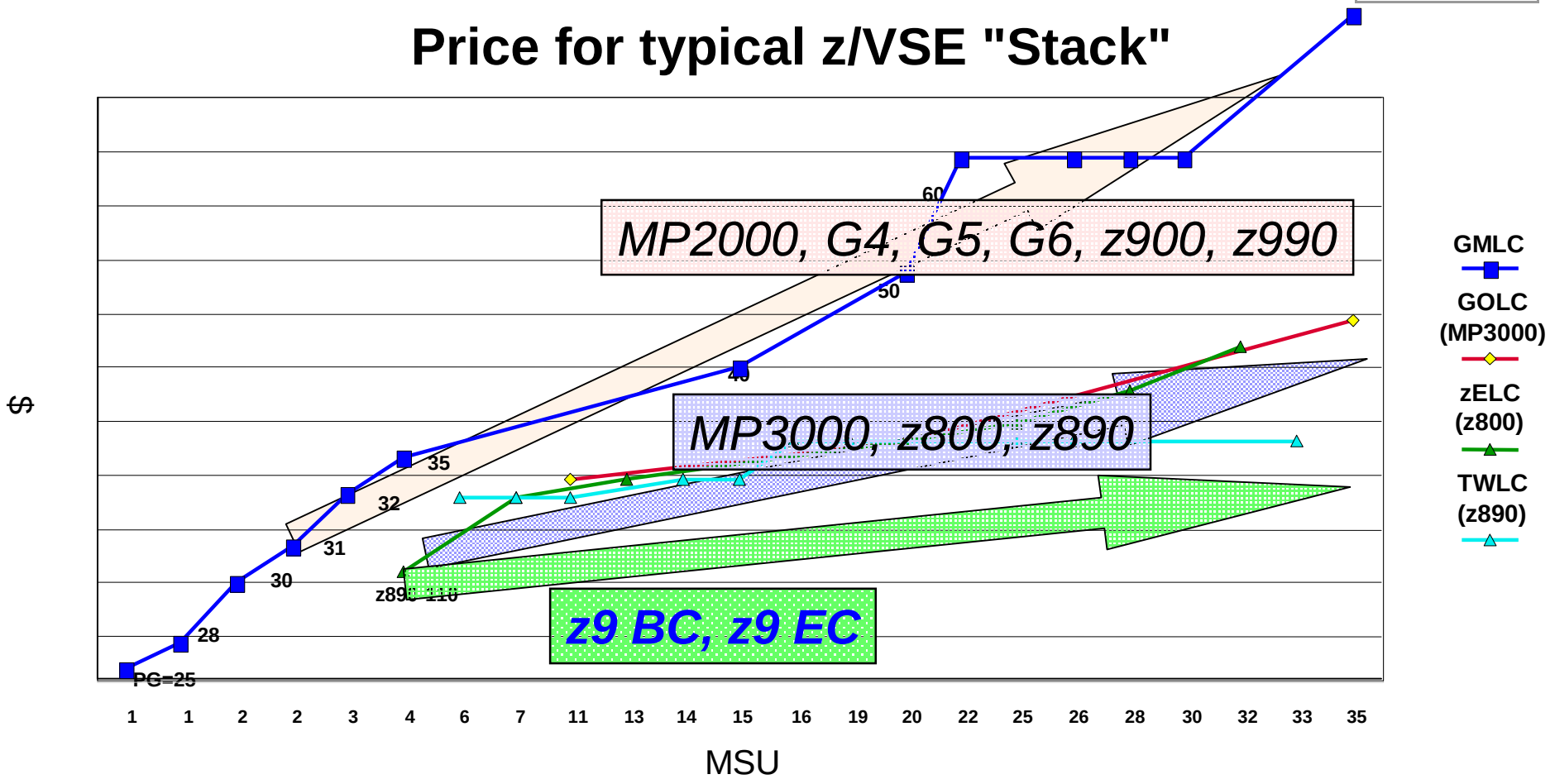
- LPAR based sub capacity monitoring tool

§ **New Statement of Direction, announced with z/VSE V4 Preview Announcement:**

SOD: It is IBM's intent to provide new software pricing for z/VSE V4 when running on select processors, subject to applicable terms and conditions. IBM expects this new software pricing metric to provide more granularity and a subcapacity pricing option.

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

SoD: New Software Pricing for z/VSE V4



Typical z/VSE stack consists of z/VSE Operating System, LE, CICS TS, VTAM, TCP/IP, DB2

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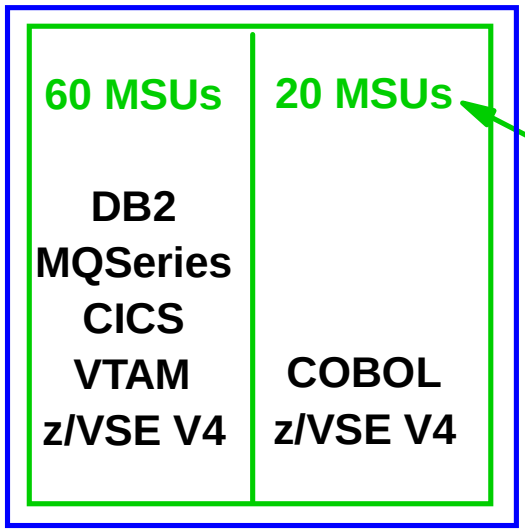
SoD: Sub Capacity Pricing Option for z/VSE V4

§ **What is "Sub-Capacity" ?**



Full-Capacity Pricing Metrics:

Based on total rated capacity of the MACHINE where a product executes.

Ex: zELC, TWLC

Sub-Capacity Pricing Metrics:

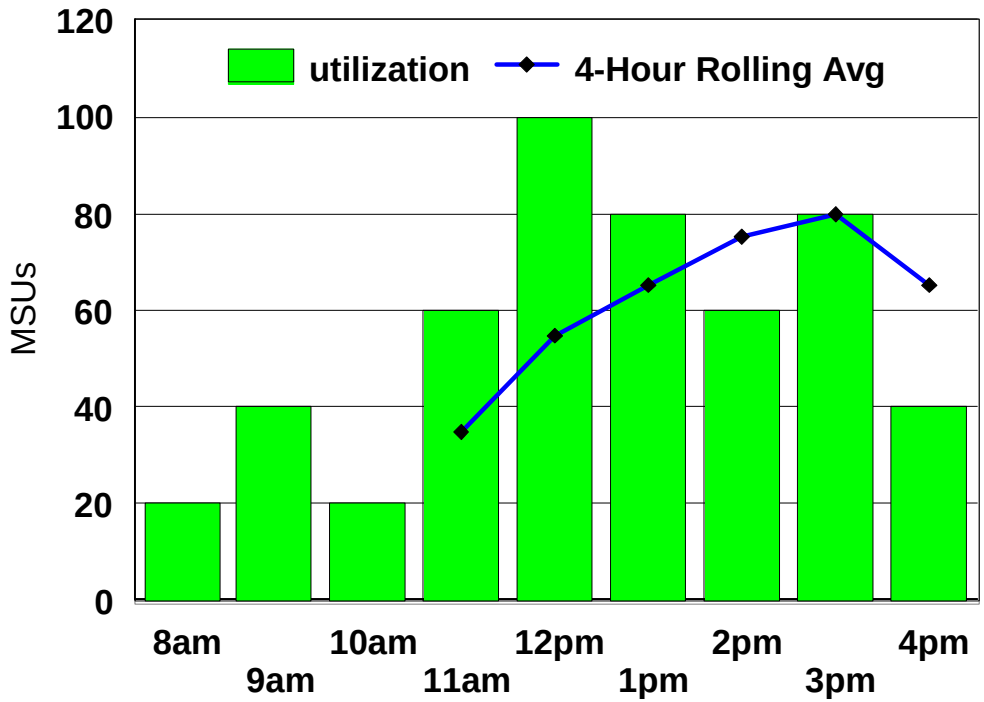
Based on actual monthly utilization of the LPAR(s) where a product executes.

Sub Capacity Concept: Rolling 4-Hour Average

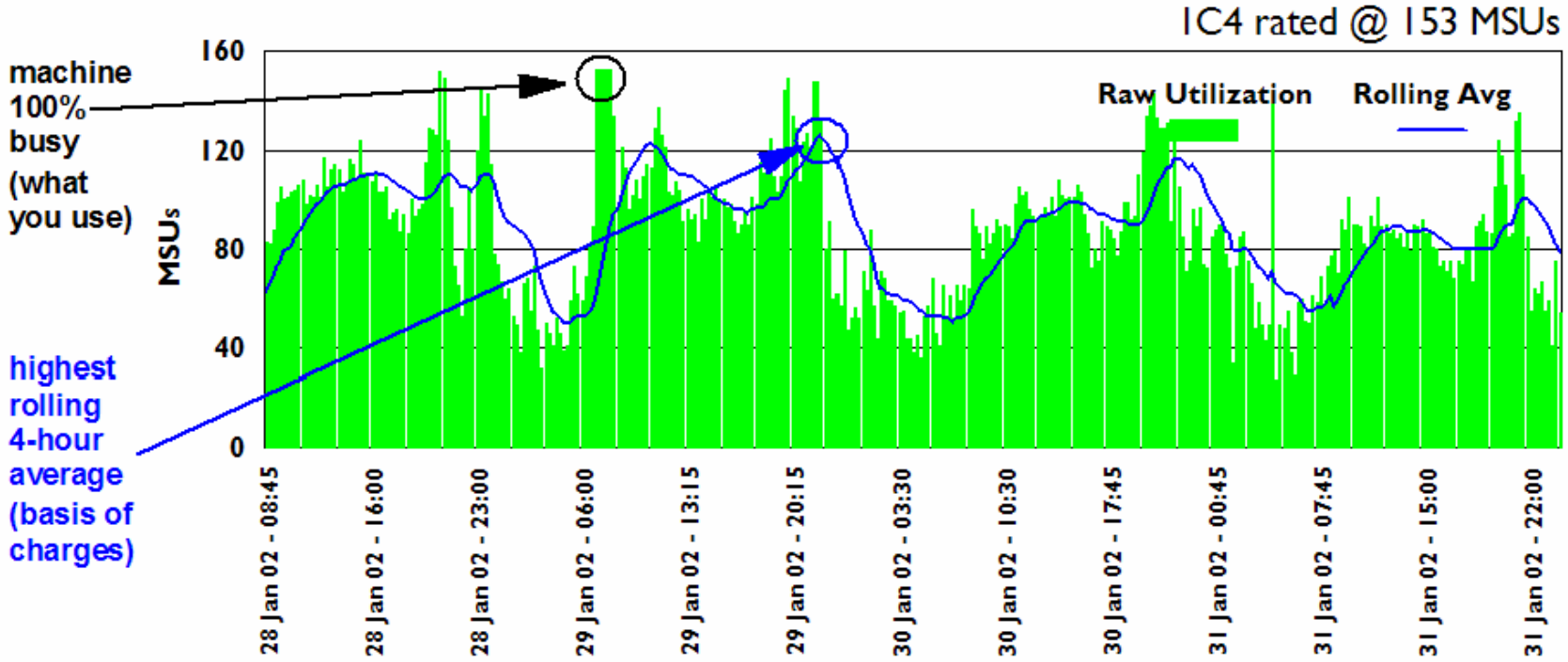
Capture the 4-hour rolling average of utilization for each interval in the month

4-Hour Rolling Average

11 am (8,9,10,11): 35 MSUs
12 pm (9,10,11,12): 55 MSUs
1 pm (10,11,12,1): 65 MSUs
2 pm (11,12,1,2): 75 MSUs
3 pm (12, 1, 2, 3): 80 MSUs
4 pm (1, 2, 3, 4): 65 MSUs



Example: Rolling 4-Hour Average

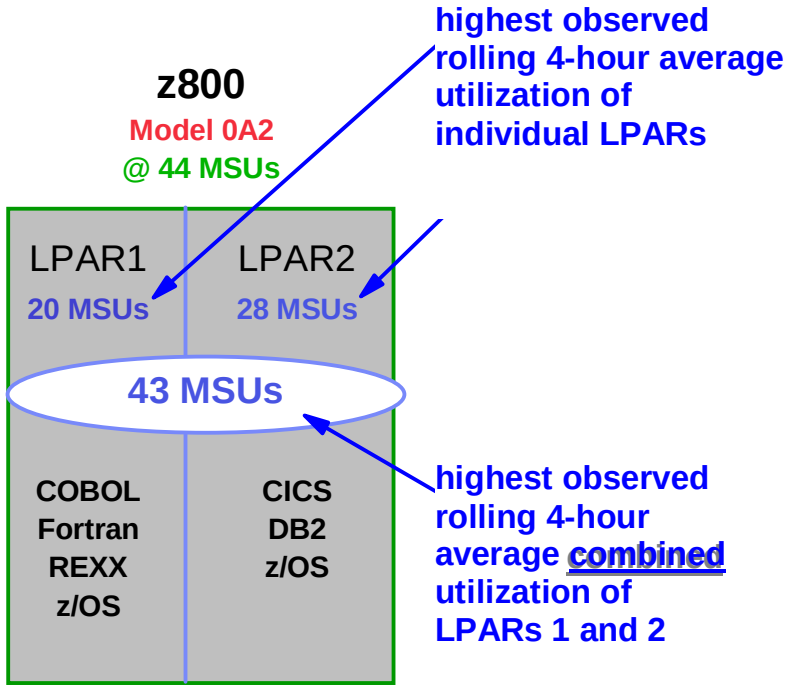


Rolling 4-Hour Average utilization smoothes out peaks in raw utilization.
Allows for varied peaks & bases Software charges on more moderate measure.

z/OS Sub Capacity Example using z800

Product	EWLC Sub-Cap	EWLC Full-Cap	zELC 0A2
COBOL 5648A25	**$1129** 20 MSUs	**$2459** 44 MSUs	**$2286** zELC 0A2
Fortran 5668805	**477** zELC 0A2	**477** zELC 0A2	**477** zELC 0A2
REXX 5695013	**1335** zELC 0A2	**1335** zELC 0A2	**1335** zELC 0A2
CICS TS 5655147	**7209** 28 MSUs	**12513** 44 MSUs	**11193** zELC 0A2
DB2 V7 5675DB2	**6908** 28 MSUs	**11616** 44 MSUs	**11448** zELC 0A2
z/OS 5694A01	**16735** 43 MSUs	**17060** 44 MSUs	**18935** zELC 0A2
Monthly TOTAL	**$33,793**	**$45,460**	**$45,674**

Prices in US$ as of March 2005



Benefits of Sub Capacity Pricing

- **Disconnect Hardware Growth from Software Charges for SubCap Products**
  - Allows you to grow hardware capacity independently of software capacity

    e.g. upgrade server and pay for software based on the utilized portion of the server
  - Grow into excess hardware capacity gradually as needed with a 1 MSU level of granularity
  - Spike into "spare" capacity without incurring software charges
  - Manage utilization without having to turn engines on and off
- **Grow an LPAR without affecting Software in other LPARs**
  - Isolate products in certain LPARs to reduce software costs (optional)
  - Reduce LPAR utilization to reduce software costs (optional)
  - Add capacity to grow your production LPARs without impacting your test and/or development LPARs
- **Align Software Charges with Utilization**
  - Pay based on highest rolling 4-hour average utilization each month, not peak utilization
  - Sub Capacity Monitoring Tool manages measurement and reporting
  - Software charges increased/decreased based on variations in utilization

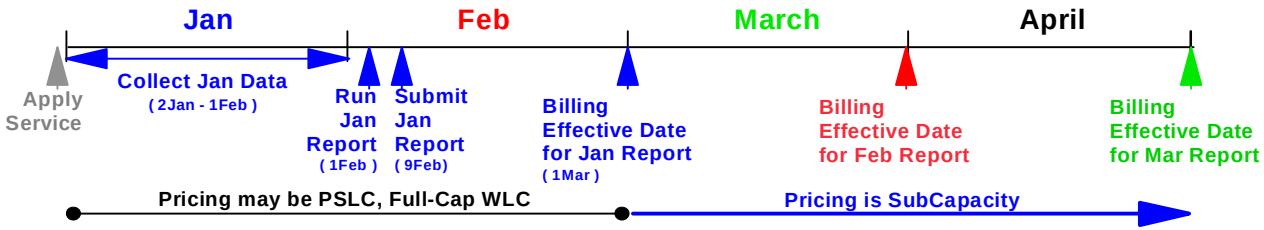
Sub Cap Pricing Option with z/VSE V4

§ Basic Requirements

- z9 BC or z9 EC
- z/VSE V4 (no older VSE version allowed on the processor, ie. no VSE/ESA V2, no z/VSE V3)
- If running under VM: z/VM 5.2 is required
- If running z/OS on the same processor: no OS/390 LPARs allowed

§ Timing Requirements

- Sub Cap Pricing begins with the submission of 1st full month report
- Data collection period: 2nd of the previous month - 1st of the current month
- Data submission period: 2nd - 9th following data collection



§ Reporting Requirements

- Must report on ALL LPARs (production, test, development, etc.)
- 95% data collection

§ z/VSE V4 Sub Capacity Pilot Program planned to begin in 2H06

- If interested to sign up, touch base with the Lab via **zvse@de.ibm.com**

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z/VSE Support on System z

		z800 (WDFM)	z900	z890	z990	z9 EC	z9 BC	End of Market	End of Service	Ship Date
VSE/ESA	2.7	x	x	x	x	x	x	9/05	2/07	3/03
z/VSE***	3.1*	x	x	x	x	x	x	TBD	TBD	3/05
	4.1**	x	x	x	x	x	x	TBD	TBD	TBD

* Releases currently orderable
** Planned
*** z/VSE V3 can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities. z/VSE V3 is designed to exploit select features of IBM System z9 and zSeries hardware.
Note: z/VSE V4 is designed to exploit 64 bit real memory addressing, but will not support 64 bit virtual memory addressing.

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Now there is a System z9 for everyone . . .

. . . which one is right for you?

A System z9 for everyone

If you ...

... need an entry size mainframe

... have smaller I/O attachment requirements

... want IFL options without making a big CPU requirement

... are smaller, but still growing - just in small increments

... don't have a large support staff

... use z/VSE to run your business.

If you ...

...want to replace your server with one that has the same number of engines – but would like more IFLs, zAAPs or zIIPs

... want to replace your standalone coupling facility or Linux only server with a machine that has more capacity per engine and better I/O bandwidth

... like to grow in smaller increments but want help with investment protection, or need a larger server

... agree that availability is important – but one book is enough.

If you ...

... have a large disk installment so in turn have large I/O requirements

... need a current mainframe that can replace your z900 ... with more and smaller processors

... require maximum availability, with things like advanced book availability

... have a CBU farm – and like the control of having your disaster recover site right in your own shop.

The System z9 offers management capabilities, security and scalability - to help you stay competitive.

The z9 BC R07 may be the perfect option.

The z9 BC S07 is just what you asked for.

The enhanced z9 EC is for you.