GS03 – Overview of z/VM, z/VSE, KVM and Linux on IBM z Systems News

European GSE / IBM TU in Hamburg 2017

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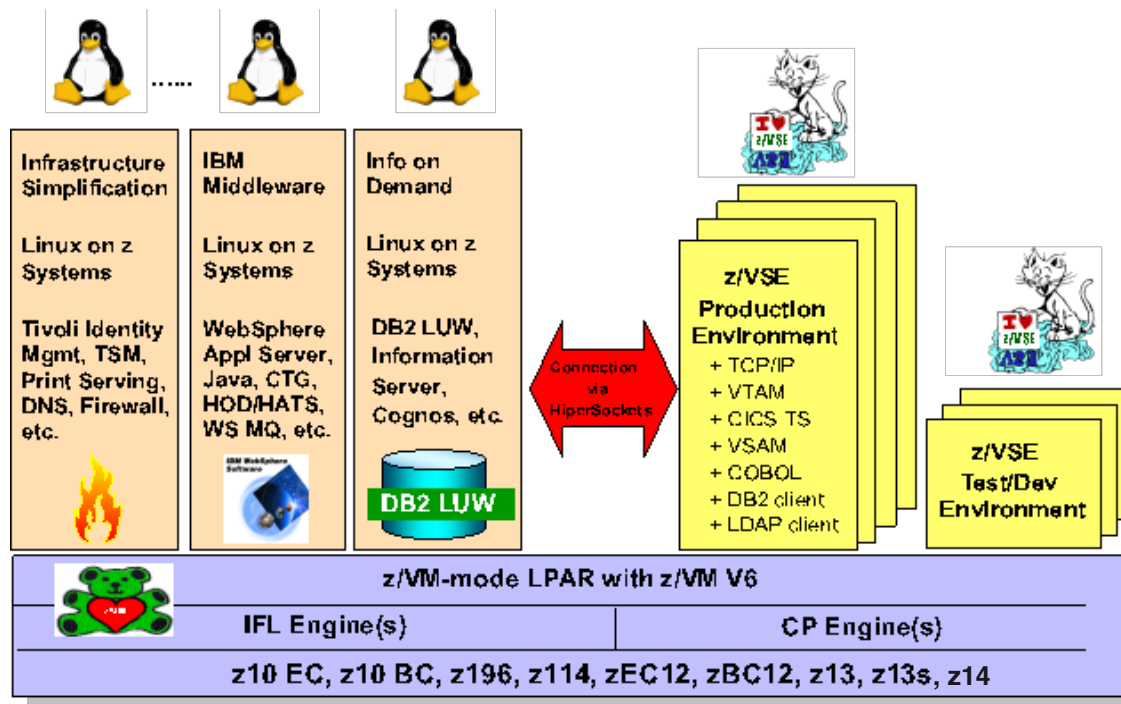
Agenda

- **z/VSE**

- z/VM

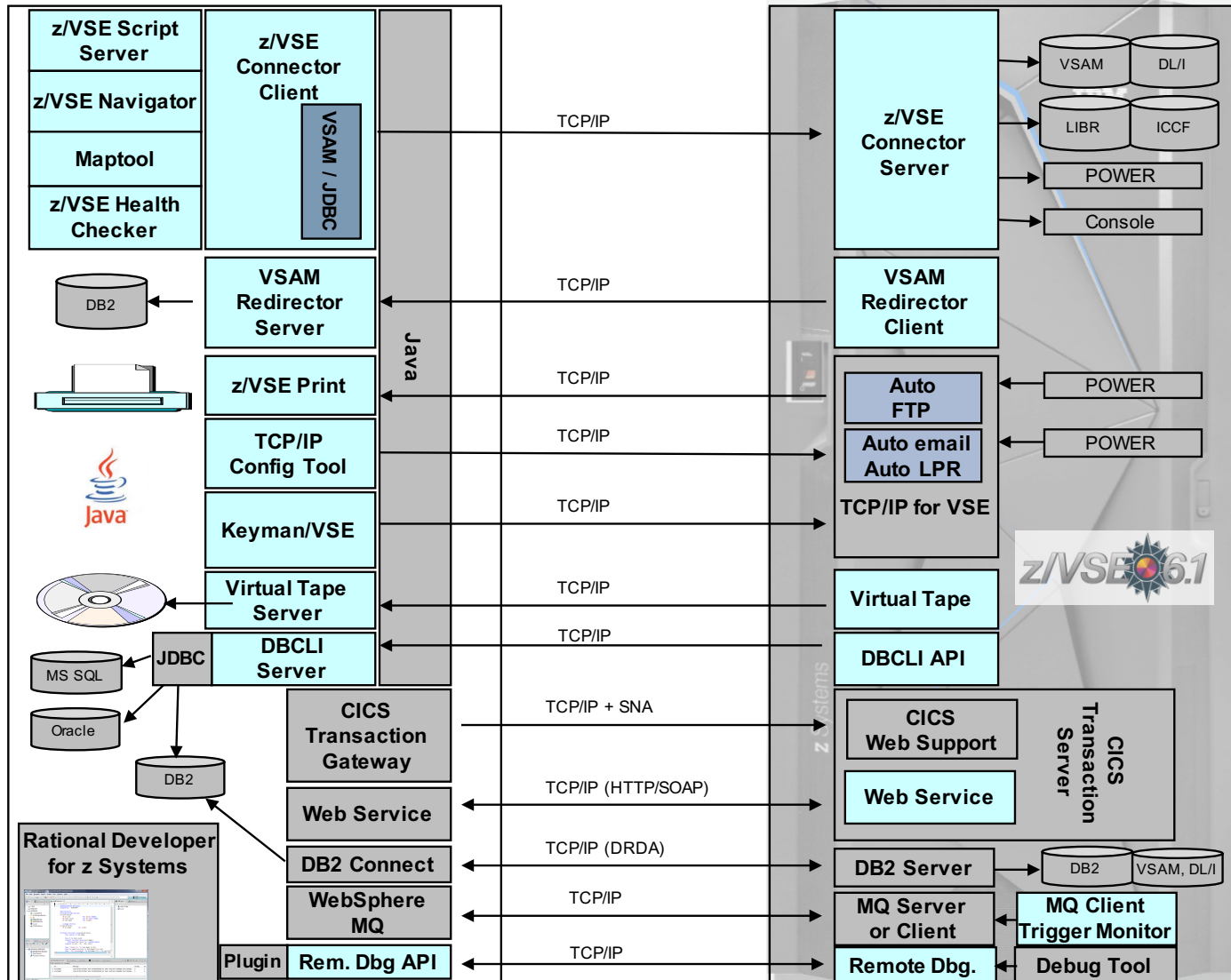- Linux on IBM z Systems

- KVM for IBM z Systems

z/VSE Strategy

- **Hybrid Environment** leveraging z/VSE, z/VM, and Linux on IBM z Systems

Infrastructure Simplification

Linux on z Systems

Tivoli Identity Mgmt, TSM, Print Serving, DNS, Firewall, etc.

IBM Middleware

Linux on z Systems

WebSphere Appl Server, Java, CTG, HOD/HATS, WS MQ, etc.

Info on Demand

Linux on z Systems

DB2 LUW, Information Server, Cognos, etc.

DB2 LUW

Connection via HiperSockets

z/VSE Production Environment
+ TCP/IP
+ VTAM
+ CICS TS
+ VSAM
+ COBOL
+ DB2 client
+ LDAP client

z/VSE Test/Dev Environment

z/VM-mode LPAR with z/VM V6

IFL Engine(s) | CP Engine(s)

z10 EC, z10 BC, z196, z114, zEC12, zBC12, z13, z13s, z14

z/VSE Connectors

z/VSE Roadmap

z/VSE 6.2: **Ann.*: 10.10.2017; *GA: 1.12.2017*
z/VSE Network Appliance, Migration Pricing Option
HW exploitation, CICS TS & CICS Explorer,
Easy of use, Networking and Security enhancements

z/VSE 6.1 GA: 27.11.2015 **end of marketing: 1.12.2017**
CICS TS for z/VSE 2.1: CICS Explorer update,
Channels & Containers; TCP/IP for z/VSE 2.1,
IPv6/VSE 1.2, z10 or higher; z Systems exploitation

z/VSE 5.2 GA: 25.4.2014; **end of marketing: 13.3.2017**
end of service: 31.10.2018
zEnterprise exploitation, device support
Tapeless installation, networking / security enhancements

z/VSE 5.1 GA: 11.2011; **end of service: 30.6.2016**
64 bit virtual, zEnterprise exploitation, z9 or higher
z/VSE 5.1.1 GA: 6.2012: CICS Explorer, LFP in LPAR, database connector
z/VSE 5.1.2 GA: 6.2013: TS1140, 64 bit I/O, openSSL, db connector enhancements

z Systems support (or not)

VSE Release	z900 / z800	z990 / z890	z9 EC (eos 10.2017) / z9 BC (eos 1.2019)	z10 EC / z10 BC	z196 / z114 / zEC12 / zBC12 / z13 / z13s	z14
z/VSE 6.2	No	No	No	No	Yes	Yes
z/VSE 6.1 (eom 12.2017)	No	No	No	Yes	Yes	Yes
z/VSE 5.2 (eos 10.2018)	No	No	Yes	Yes	Yes	Yes
z/VSE 5.1 (eos 6.2016)	No	No	Yes	Yes	Yes	Yes restricted
z/VSE 4.3	Yes	Yes	Yes	Yes	Yes	Yes restricted
z/VSE 4.2	Yes	Yes	Yes	Yes	Yes	Yes restricted
z/VSE 4.1	Yes	Yes	Yes	Yes	Yes	Yes restricted
z/VSE 3.1	Yes	Yes	Yes	Yes	Yes	No
VSE/ESA 2.7	Yes	Yes	Yes	Yes	Yes	No
VSE/ESA 2.6	Yes	Yes	Yes	Yes	Yes	No
VSE/ESA 2.5	Yes	Yes	No	No	No	No
VSE/ESA 2.4	Yes	No	No	No	No	No
VSE/ESA 2.3	Yes	No	No	No	No	No

z/VSE release / Hardware status: http://www-03.ibm.com/systems/z/os/zvse/about/status.html
https://www-03.ibm.com/systems/z/os/zvse/about/statusold.html

z/VSE Software Pricing Metrics

Price for typical z/VSE stack

$ (y-axis)

MSU (x-axis)

MP2000, G4, G5, G6, z900, z990

MP3000, z800, z890

z9, z10, z196, zEC12, z13, z14

z890-110

z114, zBC12, z13s (*)

Legend:
- GMLC
- GOLC (MP3000)
- zELC (z800-z13s)
- TWLC (z890-z13s)
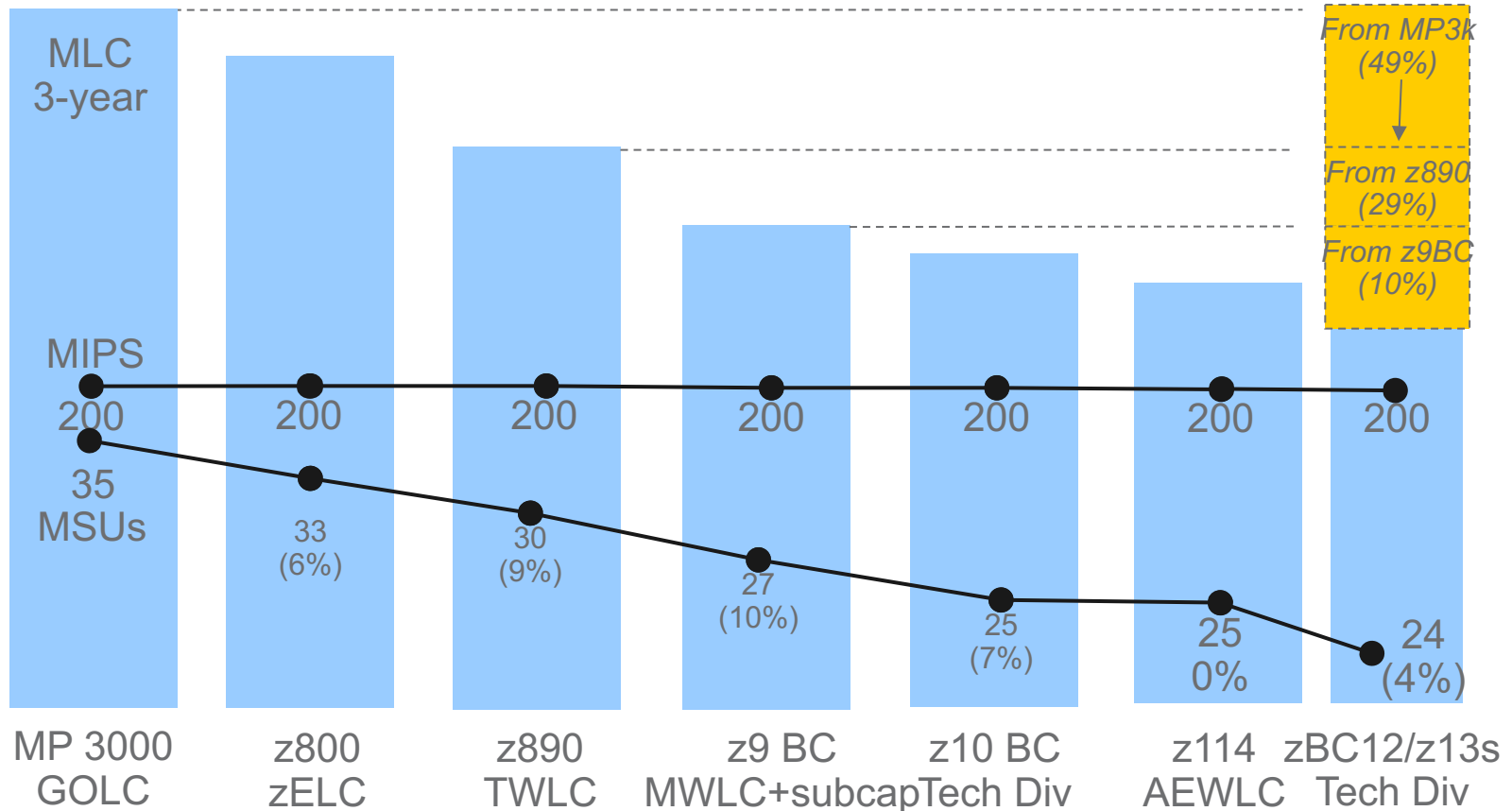- MWLC (z9/10/196) (zEC12/z13)
- AEWLC (z114/zBC12)
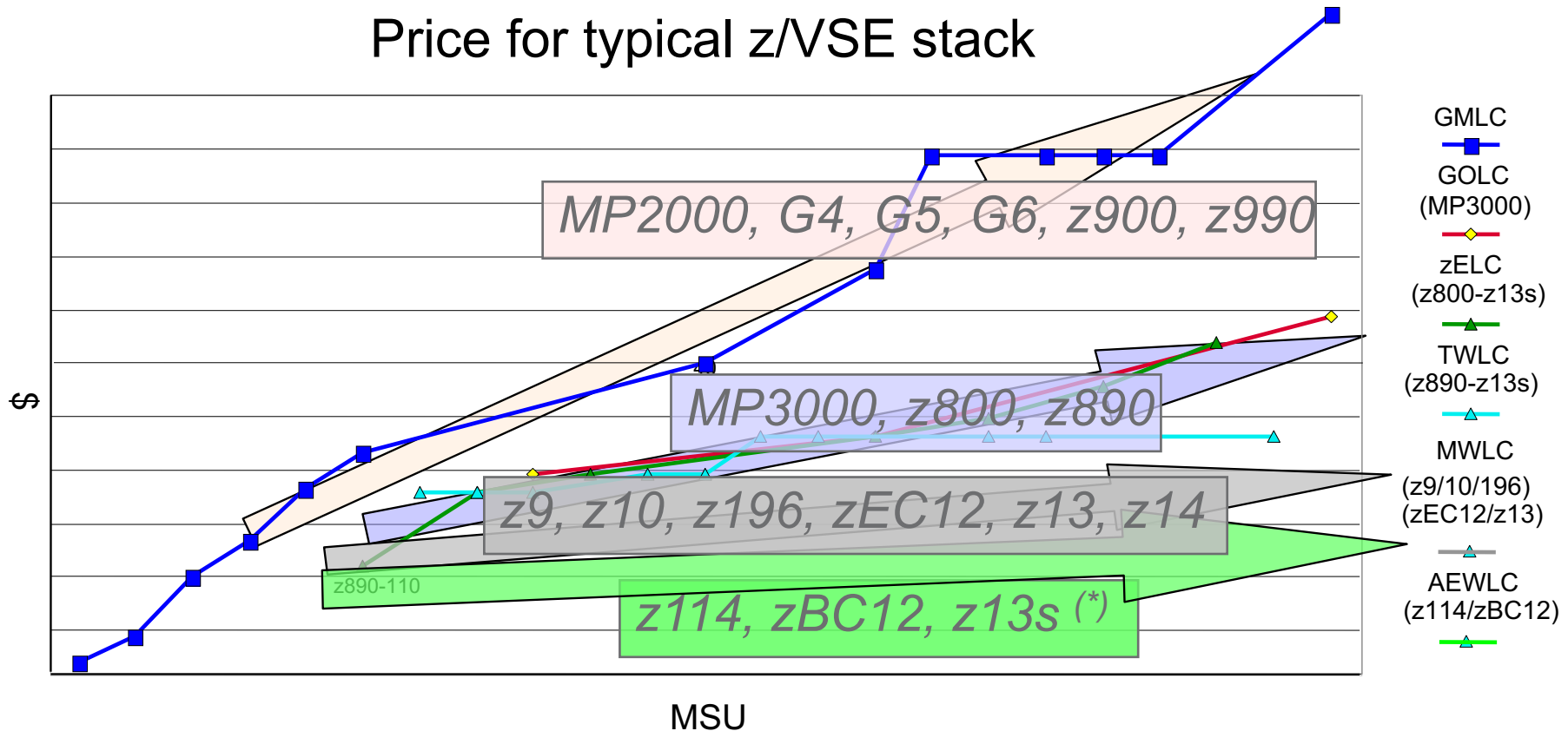
(*) The entry models of these servers, capacity settings A01 or 110, are priced using zELC.

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

z/VSE MLC Price Performance across Hardware Generations

- This example shows a typical z/VSE software stack at 200 MIPS

MLC 3-year

From MP3k (49%)

From z890 (29%)

From z9BC (10%)

	MP 3000 GOLC	z800 zELC	z890 TWLC	z9 BC MWLC+subcap	z10 BC Tech Div	z114 AEWLC	zBC12/z13s Tech Div
MIPS	200	200	200	200	200	200	200
MSUs	35	33 (6%)	30 (9%)	27 (10%)	25 (7%)	25 0%	24 (4%)

* MLC savings will vary significantly by customer - actual customer configuration must be priced out to be accurate.
* A typical z/VSE stack includes z/VSE CF, CICS TS, VTAM, TCP/IP, DB2, Ditto, Cobol, HLASM

AEWLC Technology Transition Offerings

- Technology Update Pricing for z13s (TU4)
  - For stand-alone **z13s** servers
  - AEWLC **pricing reduction till 13%**
  - For more details, see announcement link

- Technology Update Pricing for zBC12 (TU2)
  - For stand-alone **zBC12** servers
  - AEWLC **pricing reduction till 5%**
  - For more details, see announcement link

- For more information about AEWLC see this link

Multi-Version Measurement (MVM)

- Multi-Version Measurement (MVM) was [announced](#) Feb. 14th and the earliest billing effective date is June 1st, 2017. See details [here](#)

- MVM allows clients to selectively deploy new software versions for an unlimited duration, providing more flexible control over their program upgrade cycles

- MVM can be use for:
  - Programs reporting **Sub-Capacity**
    - MVM enables the **combining of all the versions MSUs** to calculate the **latest version billable charges on the same machine**
    - **MVM requires SCRT V24.2.0 or SCRT V24.11.0.** Which are planned to be **available April 10th. Report** can be generated **May 2nd and submitted till May 9th.**
  - Programs **not** eligible for **Sub-Capacity**
    - MVM enables to **charge Full Capacity MSUs only** for the **latest** licensed **version** and charges for **any earlier versions** of the program are **waived**

- MVM replaces Single Version Charging (SVC), the Migration Pricing Option (MPO) and the IPLA Migration Grace Period
  - It simply **takes away the time limit**
  - If pre-MVM **time limit expired before May 31st**, 2017, must **request in writing to IBM** that MVM be applied
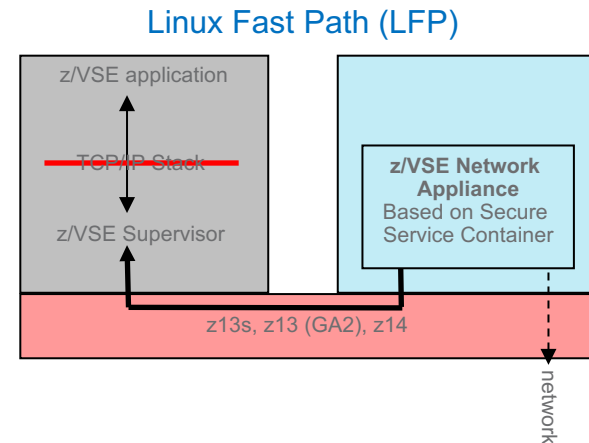
z/VSE 6.1

- **GA since 27-Nov 2015**
  - Latest RSL 31-Dec 2016

- **Hardware Exploitation**
  - Architectural Level Set to IBM System z10 – **runs on z10 or newer**
  - **z13/z13s** exploitation (incl. Crypto Express5S, FICON Express 16S)
  - IBM Storage: Tape: TS11xx, **TS7700**; Disk (DASD,SCSI): **DS88xx, FlashSystem V9000**

- **CICS TS for z/VSE 2.1**
  - **CICS Explorer update** capability
  - **Channel & Container support** – lifts 32K Commarea limitation

- **Networking and Security**
  - **IPv6/VSE 1.2**: with **Firewall**, **failover**, **SSL & TLS 1.2**
  - **TCP/IP for z/VSE 2.1**: with **Firewall**, improved **TN3270** and **TLS/SSL** enh.
  - **MQ Client Trigger Monitor**

z/VSE Network Appliance (VNA)

- z/VSE Network Appliance (VNA) is **available since 30-Jun 2016**

- VNA acts as a **router for z/VSE**:
  - TCP/IP application uses Linux Fast Path (LFP) and connects through HiperSockets to VNA

- **Based and deployed on IBM Secure Service Container** (previously known as z Appliance Container Infrastructure - zACI) delivered **with z13s, z13 GA2 and z14**

- **Advantages:**
  - No Linux license
  - No TCP/IP stack required on z/VSE
  - No z/VM required to connect to the network

- **Supported on z/VSE 6.1, 5.2 and 5.1**

Linux Fast Path (LFP)

z/VSE application

TCP/IP Stack

z/VSE Supervisor

z/VSE Network Appliance
Based on Secure Service Container

z13s, z13 (GA2), z14

network

z/VSE 6.2

- Announcement October 10th, planned GA December 1st 2017

- All previous SoDs are planned to be included, and more features…

- Hardware support
  - Delivery of **future upgrades of z/VSE on DVD and electronically only**
  - Architecture Level Set requiring **z196 / z114 or later**
  - **Latest available z** Systems Server and Storage (Tape, ECKD, SCSI) Server **support**
  - Support for the **IBM z13 Vector Facility (SIMD)** for user applications
  - **High Performance FICON (zHPF)** support
  - **FlashCopy Space Efficient (SE) support for Extent Space Efficient (ESE)** volumes with IBM DS8880 R8.1 Storage Family
  - **Elliptic Curve Cryptography (ECC)** support

- Ease of use functionality for SCSI-only systems
  - **Tapeless initial installation using a SCSI installation disk** added
  - **Standalone dump to SCSI device** added

z/VSE 6.2

- CICS Transaction Server for z/VSE V2.2
  - Upgraded **CICS Web Support (CWS) to HTTP 1.1** for improved performance and security and to support the latest web browsers and applications
    - Features include: **persistent connections, pipelining and chunking**
  - **CICS Explorer** enhancements
  - **Channel and container** enhancements
  - Support for **standard date and time stamp** format
  - Support for Language Environment **(LE) MAIN for Assemble applications**

- Security
  - **OpenSSL** (part of z/VSE Cryptographic Services) upgraded to **v1.0.2h** for newer SSL/TLS functions and **enabled for CICS Web Support and EZA interface**
  - **SSL/TLS** support for **remote VTAPEs**
  - **LDAP sign-on** support for **RESET option** (clearing cached password) and **wildcard** support for **CHANGE and DELETE commands**
  - **Basic Security Manager (BSM) enhancement**

z/VSE 6.2

- z/VSE Connectors enhancements
  - **z/VSE SOAP Engine to exploit Channels and Containers**
  - **z/VSE REST Engine with JSON support**
  - **z/VSE database connector DBCLI** enhanced **providing a batch and an interactive interface to perform queries**, without an application. **CICS REXX support added**

- Networking
  - New release of IBM **IPv6/VSE V1.3** with various enhancements
  - New release of IBM **TCP/IP for z/VSE V2.2** with various enhancements
  - **LFP running as a z/VM** guest **allows also to connect to a TCP/IP Stack in an LPAR or** with the **z/VSE Network Appliance**

Need something else?

- You may submit requirements at conferences (GSE, Tech. Univ., VM Workshop, ...)
  - Think 2018, March 19th – 22nd in Las Vegas, US
  - German GSE, April 23rd – 25th in Nürnberg, Germany
  - COURSE, May 27th – 29th in Marburg, Germany
  - VM Workshop, June 21st – 23rd in Greensboro, NC, US
  - International GSE, October, Germany
  - IBM TechU Comes to You, 2018, Worldwide

- z/VSE requirements via the Request for Enhancements (RFE) database:
  - http://www.ibm.com/developerworks/rfe/
  - Please select the following for z/VSE requirements:
    - Brand = Servers and System Software
    - Product = z/VSE

- CICS Transaction Server requirements via the Request for Enhancement (RFE) database:
  - http://www.ibm.com/developerworks/rfe/
  - Please select the following for z/VSE-CICS requirements:
    - Brand = Servers and System Software
    - Product = CICS Transaction Server

z/VSE in the internet

- z/VSE Homepage: www.ibm.com/vse

- Redbook: Introduction to the New Mainframe: IBM z/VSE Basics
    - http://www.redbooks.ibm.com/abstracts/sg247436.html?Open

- NEW - Redbook: Migration to CICS Transaction Server for z/VSE V2.1
    - http://www.redbooks.ibm.com/abstracts/sg248390.html?Open

- z/VSE Knowledge Center:
    - http://www-01.ibm.com/support/knowledgecenter/SSB27H/zvse_welcome.html

- CICS TS for z/VSE Knowledge Center:
    - http://www-01.ibm.com/support/knowledgecenter/SSB2JE_1.1.1/welcome.html

- Ingolf's z/VSE blog:
    - www.ibm.com/developerworks/mydeveloperworks/blogs/vse/
    - Use „Tags" to search for topics

- VSE-L discussion list:
    - https://groups.google.com/forum/?fromgroups#!forum/bit.listserv.vse-l

Agenda

- z/VSE

- **z/VM**

- Linux on IBM z Systems

- KVM for IBM z Systems

z/VM Release Status Summary

z/VM Level	GA	End of Service	End of Marketing	Minimum Processor Level	Maximum Processor Level	Security Level
6.4	11/2016			IBM System z196 & z114®	-	EAL 4+ OSPP-LS [1] FIPS 140-2 [1]
6.3	7/2013	**12/2017**[2]	11/2016	IBM System z10®	-	EAL 4+ OSPP-LS FIPS 140-2
6.2	12/2011	**6/2017**[3]	7/2013	IBM System z10®	z13	-
5.4	9/2008	**12/2017**[4]	3/2012	IBM eServer zSeries 800& 900	zEC12	-

[1] Statements of Direction in the z/VM 6.4 announcement letter; Evaluation work in progress
[2] Announced February 3, 2015
[3] Announced February 2, 2016
[4] Announced August 2, 2016

z/VM 5.4/6.3 End of Service (EoS) Alert

z/VM 5.4/6.3 will achieve End of Service (EoS) on December 31, 2017, leaving only z/VM 6.4 in service. (EoS for z/VM 6.2 is June 30, 2017.) For complete z/VM product life cycle information, see: https://www-01.ibm.com/software/support/lifecycle/

If you have questions or are looking for guidance on migration to z/VM 6.4, please contact Bill Bitner (bitnerb@us.ibm.com).

There are various ways to address migration issues:
- Extended support contracts for z/VM 5.4/6.3
- IBM Lab Services for additional temporary skills

z/VM Version 6 Release 4
Designed for Clients of Today and Tomorrow

Feb 16, 2016
Preview
announcement

Oct 25, 2016
Announcement

Nov 11, 2016
General availability

Jan 20, 2017
Newton-Based
OpenStack Update

See http://www.vm.**ibm.com**/zvm640/

2016   **2017**

z/VM 6.1

z/VM 6.2

z/VM 6.3
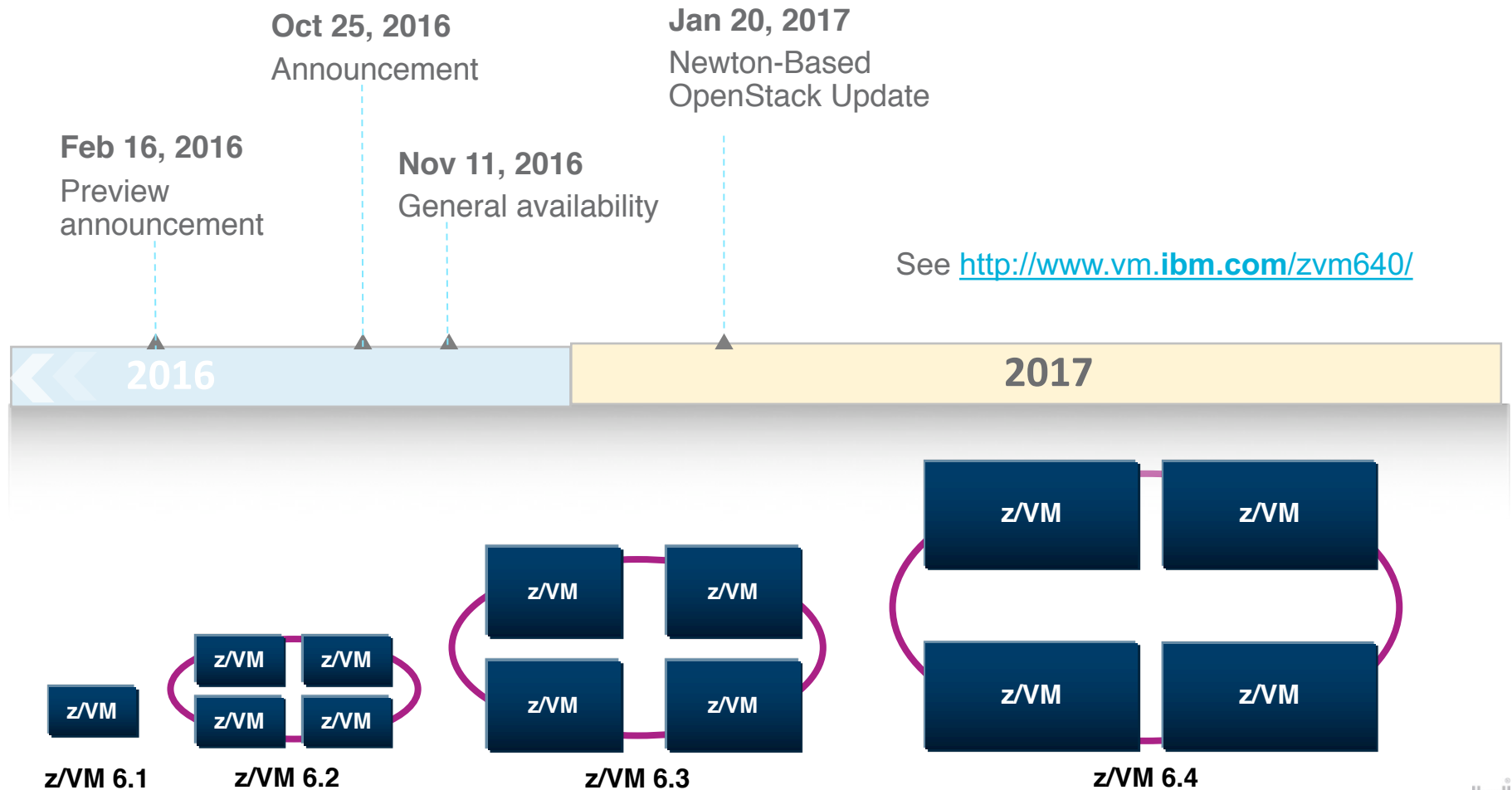
z/VM 6.4

IBM z/VM 6.4

- A release born from customer feedback
  - z Systems Business Leaders Council (zBLC)
  - SHARE, VMWorkshop and GSE dialogues
  - IBM internal T3s (Teach the Teacher)

- Prioritizations set by customers and adjusted by IBM resources and skills

- Two major areas:
  - Technical enhancements that continue to improve TCO and bring direct value
  - Improved quality of life for z/VM system programmers

- New Architecture Level Set (ALS)
  - z196 and z114 or newer
  - Drops z10 EC and BC support

Value Areas of z/VM 6.4

- Improves scaling and TCO in a single footprint
  - More virtual machines in a single z/VM system
  - Real memory increased to 2 TB
  - Dynamic SMT
  - HyperPAV and zHPF support for paging
  - FlashSystems Storage Server access for z/VM system volumes without SVC

- Improves the management for large diverse workloads
  - Fair and accurate resource control
  - FCP SCSI with additional path recovery
  - SVC concurrent update support
  - Guest exploitation of z Systems and LinuxONE hardware
    - Large Page support
    - Transactional Execution support
    - SIMD support

Value Areas of z/VM 6.4

- Shortens road to installation and migration
  - New customers - DPM
  - Existing customers – Upgrade in Place from z/VM 6.2/6.3

- Adds capabilities for automation and system programmer effectiveness
  - Scripting and automation frameworks
    - CP environment variables
    - Enhanced information on z/VM Shutdown processing
    - Upgraded CMS Pipelines
  - Problem determination
    - CP command for PTFs/Mods installed query
    - Extended query of ECKD and EDEVs
    - New EXPLORE FCP command

Value Areas of z/VM 6.4

- Enhances security framework
    - ESM does not allow user access to default VLAN ID (unless explicitly granted)
    - TLS 1.2 and 1.1 enabled by default. Older versions disabled
    - Enhanced DirMaint to RACF Connector
    - RSCS TCPNJE traffic can be encrypted

- Many other smaller enhancements to improve various aspects of supporting z/VM
    - Network
    - Performance
    - Systems Management

Stay informed about New Function PTFs

- Off z/VM Service Page http://www.vm.ibm.com/service/ there are two new pages for new function APARs
  - http://www.vm.ibm.com/newfunction/
  - http://www.vm.ibm.com/service/vmnfapar.html

- Applies to z/VM operating system and related products:
  - Operations Manager for z/VM
  - Backup and Restore Manager for z/VM
  - OMEGAMON XE on z/VM and Linux
  - Etc.

- Subscribe to receive notifications automatically when new function APARs close

- Obtain lists of previously shipped new function APARs

New Function PTFs

- z14 support (Crypto Express6S, RoCE Express2) – more in December

- Processor Scalability Efficiency Enhancements

- SSI Distributed IUCV

- EAV Minidisk Support

- SCSI XIV Enhancements

- Dump Processing Enhancements via Service

- NICDEF Security Controls

- RACF Security Policy Enhancements

- Crypto Express APVIRT for TLS/SSL Server

- Firewall Friendly FTP Client

TCO – z/VM Pricing

- New Sub-capacity pricing terms announced
  - July 17, 2017
  - Software Announcement 217-267

- Pay for software at less than full machine capacity
  - Leaves room for native Linux logical partitions or KVM partitions
  - Planned capacity growth without immediate software impact

- Applies to
  - z/VM 6.3 and z/VM 6.4
  - z/VM priced features
  - z/VM based programs
    IBM Wave for z/VM   zSecure   Archive Manager
    Backup & Restore Manager   Tape Manager   Operations Manager
    OMEGAMON XE on z/VM   Infrastructure Suite

- Requires
  - z/VM 6.3 or z/VM 6.4
  - Install and configure the z/VM Hypervisor Proxy in a Linux virtual machine in each logical partition involved
  - Use of IBM License Metric Tool (ILMT) to collect data monthly for audit purposes
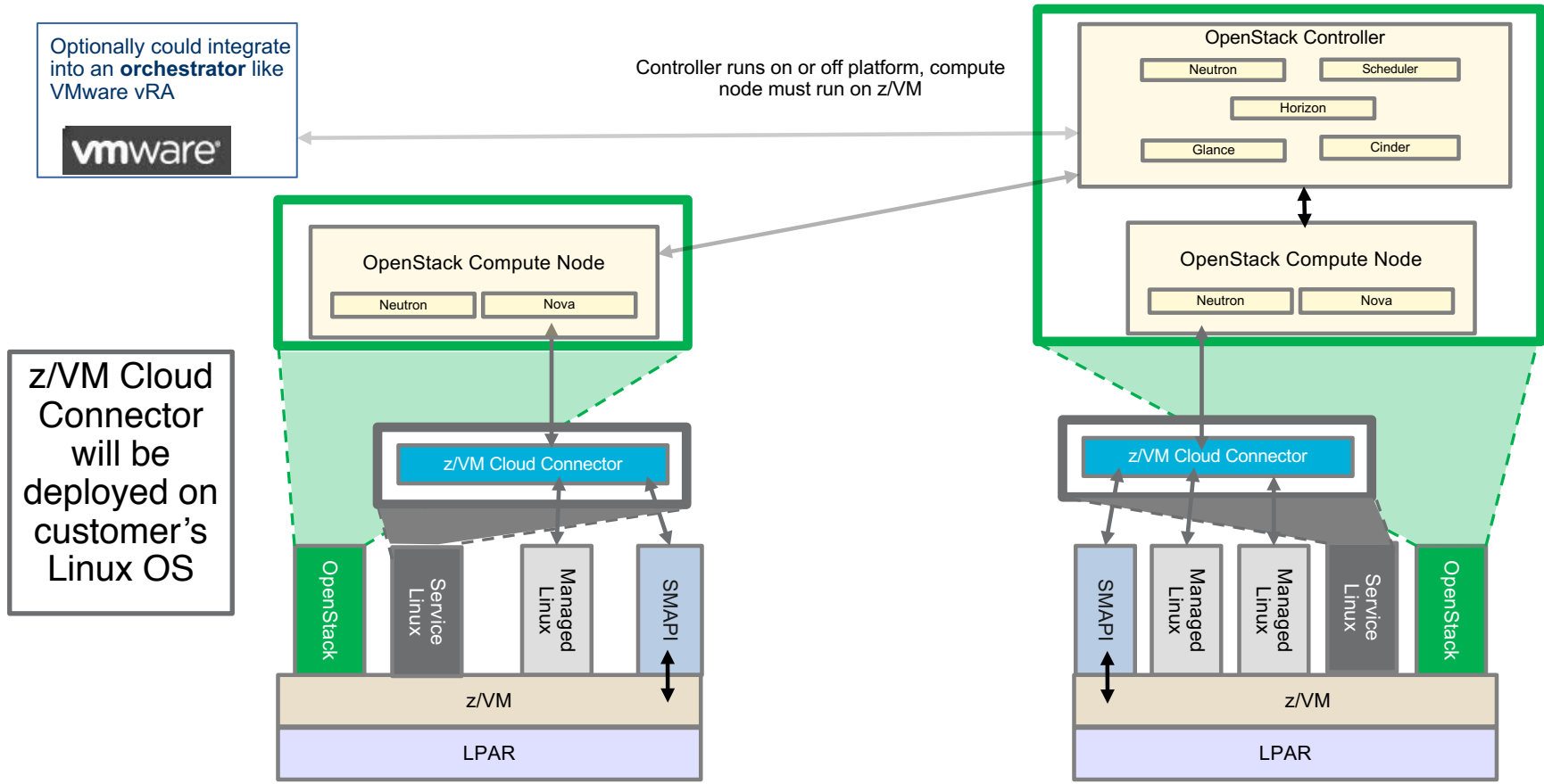
z/VM Cloud Strategy Futures

Under evaluation - We want your feedback!

Allow customers to enjoy a broader set of features, collectively provided by IBM and partner-based solutions as part of their vertically integrated Cloud offerings than we have been able to provide via the z/VM Cloud Management Appliance (CMA)

- Switch from an IBM-provided OpenStack and xCAT solution (CMA) to supporting partner-provided cloud solutions via the new z/VM Cloud Connector

- The new code will be installed on a customer-provided Linux on z guest

- The code is being developed in open source and is enabled for 3rd party contributions, see https://github.com/mfcloud/python-zvm-sdk

- CMA
  - No additional new function
  - Will continue to supply defect and security fixes

z/VM Cloud Connector enabling 3rd party OpenStack

Optionally could integrate into an **orchestrator** like VMware vRA

vmware

z/VM Cloud Connector will be deployed on customer's Linux OS

Controller runs on or off platform, compute node must run on z/VM

OpenStack Controller
Neutron
Scheduler
Horizon
Glance
Cinder

OpenStack Compute Node
Neutron
Nova

OpenStack Compute Node
Neutron
Nova

z/VM Cloud Connector

z/VM Cloud Connector

OpenStack
Service Linux
Managed Linux
SMAPI

SMAPI
Managed Linux
Managed Linux
Service Linux
OpenStack

z/VM

z/VM

LPAR

LPAR

z/VM Continuous Delivery Release Model

Under evaluation - We want your feedback!

24-Month Release Cycle

Highlights:
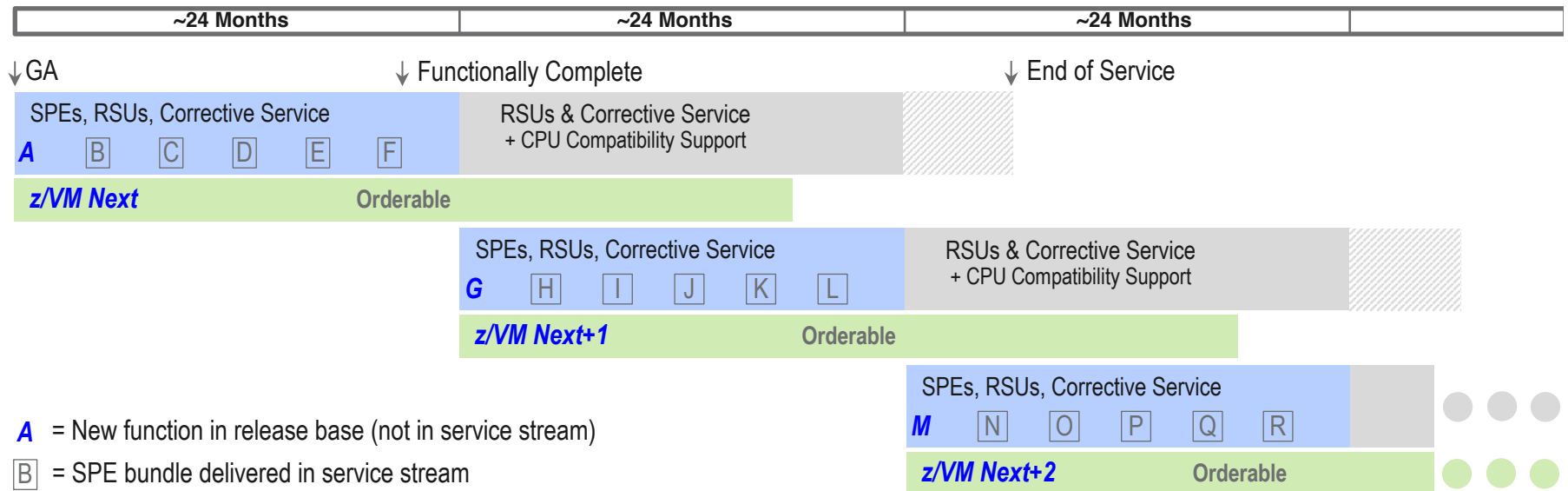Two releases of z/VM Next orderable at the same time | Releases in service for ~**54** months
A new release is generated every ~24 months
Clients are encouraged to "stay current" and move to a new release ASAP
   - Where applicable, product design decisions will favor the client who stays current
Clients can migrate from one "service only" release to another if required
Clients can run new release in test environment on prior release at any time

z/VM V6.4

RSUs & Corrective Service

Orderable

~24 Months	~24 Months	~24 Months	

↓GA   ↓Functionally Complete   ↓End of Service

SPEs, RSUs, Corrective Service	RSUs & Corrective Service + CPU Compatibility Support
A B C D E F	

z/VM Next   Orderable

SPEs, RSUs, Corrective Service	RSUs & Corrective Service + CPU Compatibility Support
G H I J K L	

z/VM Next+1   Orderable

SPEs, RSUs, Corrective Service
M N O P Q R

z/VM Next+2   Orderable

A = New function in release base (not in service stream)

B = SPE bundle delivered in service stream

Need something else?

- You may submit requirements at conferences (SHARE, GSE, Tech. Univ., VM Workshop)

- z/VM requirements via the Request for Enhancements (RFE) database:
  - http://www.ibm.com/developerworks/rfe/
  - Please select the following for z/VM requirements:
    - Brand = Servers and System Software
    - Product = z/VM

- More information about z/VM can be found through the official web site:
  - http://www.vm.ibm.com

Agenda

- z/VSE

- z/VM

- **Linux on IBM z Systems**

- KVM for IBM z Systems

Linux on IBM z Systems Distributions (1/3)

- SUSE:
  - **SUSE Linux Enterprise Server 11**
    - GA 24.3.2009; Kernel 2.6.27 (SP4: 3.0); GCC 4.3.3 (SP4 4.3.4)
    - SLES 11 SP4: GA 15.7.2015; EOS 31.3.2019; LTSS: 31.3.2022
  - **SUSE Linux Enterprise Server 12**
    - GA 27.10.2014; Kernel 3.12; GCC 4.8
    - SLES 12 SP3: GA 7.9.2017; Kernel 4.4; GCC 4.8
      GDB Hardware breakpoint support, z14 exploitation in binutils, z14 exploitation in gcc,
      z14 support in gdb, Ensure stable PCI Identifiers using UIDs, 2GB hugepage support,
      Extend cpu topology to support drawers, Add GPFS partition type to fdasd,
      dasdfmt quick format, DASD channel-path aware error recovery, SMC-R – Tech. Preview,
      Accelerate set_rx_mode implementation in driver qeth, snipl: Hardening,
      s390-tools: util improvements and dbginfo speedup, Prepare libica for FIPS 140-2 certifiability,
      Toleration Support for CEX6S
    - Last SP EOS 31.10.2024; LTSS: 31.10.2027
  - https://www.suse.com/support/policy.html
  - https://www.suse.com/lifecycle/

Linux on IBM z Systems Distributions (2/3)

- Red Hat:
  - **Red Hat Enterprise Linux AS 5**
    - GA 15.3.2007; Kernel 2.6.18; GCC 4.1
    - RHEL 5.11: GA 16.9.2014; EOS 31.3.2017; ELS: 30.11.2020
  - **Red Hat Enterprise Linux AS 6**
    - GA 9.11.2010; Kernel 2.6.32; GCC 4.4
    - RHEL 6.9: GA 21.3.2017
    - Last Update EOS 30.11.2020; ELS: 30.6.2024
  - **Red Hat Enterprise Linux AS 7**
    - GA 9.6.2014; Kernel 3.10; GCC 4.8
    - RHEL 7.4: GA 31.7.2017
      - LLVM Optimization, VMUR print spool options, , Ensure stable PCI Identifiers using UIDs,
      - PCI: Function-Measurement-Block Enhancements for z13, 2GB hugepage support, 8-byte LPAR offset toleration for z14,
      - Extend cpu topology to support drawers, Support for IPL Device in Any Subchannel Set,
      - Query Host Access to Volume support, Increase number of outstanding I/Os for Flash Express, dasdfmt quick format,
      - DASD channel-path aware error recovery, qeth: Bridge HiperSockets to Ethernet, af_iucv: Support Buffer Lists,
      - qeth: Add IPv6 Priority Queuing, qeth: enable default drain, Enable Layer 2 offloads,
      - s390-tools: util improvements and dbginfo speedup, libica: DBRG support, Prepare libica for FIPS 140-2 certifiability,
      - CPACF MSA 4 support for PKCS# 11 v2.4 in openCryptoki ICA token (part 1), Toleration Support for CEX6S,
      - systemd System z bus awareness
    - Last Update EOS 30.6.2024; ELS: tbd
  - https://access.redhat.com/support/policy/updates/errata/
  - https://access.redhat.com/articles/3078

Linux on IBM z Systems Distributions (3/3)

- Ubuntu:
  - **Ubuntu Server 16.04 LTS**
    - GA 21.4.2016; Kernel 4.4; GCC 5.3
    - Ubuntu Server 16.04.3 GA 3.8.2017
    - EOS 4.2021
  - **Ubuntu Server 16.10**
    - GA 13.10.2016; Kernel 4.8; GCC 6.1
    - EOS 7.2017
  - **Ubuntu Server 17.04**
    - GA 13.4.2017; Kernel 4.10; GCC 6.3
    - EOS 1.2018
  - **Ubuntu Server 17.10**
    - GA 19.10.2017; Kernel 4.13; GCC 7.2
    - EOS 7.2018
  - Ubuntu Lifecycle:
    - http://www.ubuntu.com/info/release-end-of-life
    - https://wiki.ubuntu.com/Kernel/LTSEnablementStack?_ga=1.219828057.1549132454.1460845469
- Others:
  - Debian, Slackware
    - Support may be available by some third party

IBM tested and supported Linux distributions

Distribution	LinuxONE Emperor II	LinuxONE Emperor	LinuxONE Rockhopper			
	z14	z13	z13s	zEnterprise - zBC12 and zEC12	zEnterprise - z114 and z196	System z10 and System z9
RHEL 7	✓ (1)	✓ (4)	✓ (4)	✓ (7)	✓ (7)	✗
RHEL 6	✓ (**)	✓ (4)	✓ (4)	✓ (8)	✓	✓
RHEL 5	✗	✓ (4)	✗	✓ (9)	✓	✓
RHEL 4 (*)	✗	✗	✗	✗	✓ (12)	✓
SLES 12	✓ (2)	✓ (5)	✓ (5)	✓	✓	✗
SLES 11	✓ (**)	✓ (5)	✓ (5)	✓ (10)	✓	✓
SLES 10 (*)	✗	✗	✗	✓ (11)	✓	✓
SLES 9 (*)	✗	✗	✗	✗	✓ (13)	✓
Ubuntu 16.04	✓ (3)	✓ (6)	✓ (6)	✓ (6)	✗	✗

See www.ibm.com/systems/z/os/linux/resources/testedplatforms.html for latest updates and details.

New upstream features

- **Drawer scheduling domain level (kernel 4.8)**

- **SMC-R (kernel 4.11)**
  - Basic code accepted upstream!
  - Not yet production ready and only Linux-Linux communication
  - Continue working on community feedback and on rest features to get it production ready

- **DASD channel path aware error recovery (kernel v4.10)**

- **zcrypt workload balancing (kernel 4.10)**

- **zcrypt multi-domain support (kernel 4.10)**

- **Vector optimization for CRC32 (kernel 4.8)**

- **Protected key encryption for dm-crypt (kernel 4.11)**
  - Consists of the protected key AES module and the secure key API module
  - Allows to encrypt block devices without a clear text key anywhere in memory
  - Userspace tooling for LUKS1 / LUKS2 needs more work, cryptsetup plain works

z14 New upstream features

- **z14 exploitation CPU (gcc 7.1)**

- **Toleration for Crypto Express 6 cards (kernel 4.10)**

- **Report new vector facilities (kernel 4.11)**

- **Instruction execution protection (kernel 4.11)**

- **Support for the Guarded Storage Facility (kernel 4.12)**

- **True random number generator (kernel 4.12)**

- **TOD-Clock Extensions for Multiple Epochs (> kernel 4.13)**

- **Single-Increment-Assignment Control for memory hotplug (> k. 4.13)**

- **Optimized spinlocks with NIAI (> kernel 4.13)**

- **TLB flushing improvements (> kernel 4.13)**

- **IBM z14 base kernel support (> kernel 4.13)**

Announcements

- [IBM Db2 V11.1.2.2](#)

- [IBM Spectrum Scale 4.2.2](#)

- [IBM Spectrum Scale 4.2.3](#)

- [Docker Enterprise Edition for Linux on z Systems and LinuxONE](#)

Linux on IBM z Systems resources

- Official IBM website: http://www-03.ibm.com/systems/z/os/linux/index.html

- Technical references: http://www.ibm.com/developerworks/linux/linux390/

- Linux on IBM z Systems **Knowledge Center**:
  - **The central location for finding and organizing information about IBM products**
  - **How to get there:**
    - Search for "IBM Knowledge Center"
    - or go directly to https://www.ibm.com/support/knowledgecenter/
  - **How to get to Linux on IBM z Systems stuff:**
    - Search for "Linux z" within IBM Knowledge Center
    - or go directly to https://www.ibm.com/support/knowledgecenter/linuxonibm/liaaf/lnz_r_main.html
  - **Highlights**:
    - Mobile enabled
    - Not only pdf, but also full text view and search
    - Classified by topics
    - Direct links to related information like Redbooks, Whitepapers,…

Agenda

- z/VSE

- z/VM

- Linux on IBM z Systems

- **KVM for IBM z Systems**

z Systems and LinuxONE Virtualization Options

IBM z Systems now has three strategic virtualization platforms

KVM

KVM for IBM z provides an open source choice for IBM z Systems and LinuxONE virtualization for Linux workloads. Best for clients that are not familiar with z/VM and are Linux centric admins.

z/VM

Proprietary Server Virtualization that is completely integrated into the full stack. Complete hardware awareness. Supported on all IBM z Systems and LinuxONE servers. z/VM will continue to be enhanced to support Linux Workloads.

PR/SM & DPM

Divide one physical server into up to 85 logical partitions (LPAR) running a mix of multiple z/OS, z/VM, Linux, KVM for IBM z, Transaction Processing Facility (TPF) and z/VSE instances isolated and secured in parallel. Share resources across LPARs or dedicated to a particular LPAR. Running a mix of multiple z/OS, z/VM, Linux, TPF, KVM for IBM z and z/VSE instances isolated and secured in parallel.

What have we learned since GA in 2015?

- There is a need for an OpenSource based alternative Hypervisor for the z Systems and LinuxONE platform

- Clients want to use KVM as part of their Linux distribution of choice from a single source with the same tooling and interfaces

- Cloud technology is getting important at Enterprise data centers

- Clients are looking for more solution and value driven fullstack offerings and expect infrastructure including virtualization and container enabled for z Systems and LinuxONE

- The market is shifting towards integrated and tested open source components, for example, to build a cloud infrastructure.
    - Clients want to have access to latest open source technology
    - Clients want integrated and tested open source components
    - Clients want to simplify their experience: one stop purchase, deploy and support – all from one source

New delivery Strategy

IBM is changing how KVM is delivered. Instead of IBM offering our KVM product, the Linux distros can offer a KVM hypervisor integrated into their Linux distribution

IBM is committed to the KVM hypervisor and is responsible for the architecture and exploitation of the z Systems and LinuxONE hardware in the Linux upstream code

- Delivery of KVM hypervisor and Linux operating system can be done more efficiently through our Linux distribution partners
    - Helps to simplify delivery of open source infrastructure
    - Linux and KVM now provided from a single source
    - Easier obtaining and installing of KVM
    - Distributions include open source cloud infrastructure components
    - Simplifies enabling of other technologies, such as container management and cloud management.

# New delivery Strategy - Dates

- **Key Dates**
  - **Announcement Date**   **March 7, 2017**
  - **Last Date to Order**   **August 28, 2017**
  - **End of Support**   **March 31, 2018**

- KVM for IBM z Systems Version 1.1.2 will be the last release delivered by IBM

- KVM for IBM z Systems version 1.1.2 has a Support Lifecycle through March 31, 2018 but no new feature function additions.

- Todays options for Linux Distros
  - SUSE Linux Enterprise Server (SLES) 12 SP2 and later releases
  - Canonical Ubuntu 16.04 LTS and later releases

KVM Upstream enablement for z Systems and LinuxONE
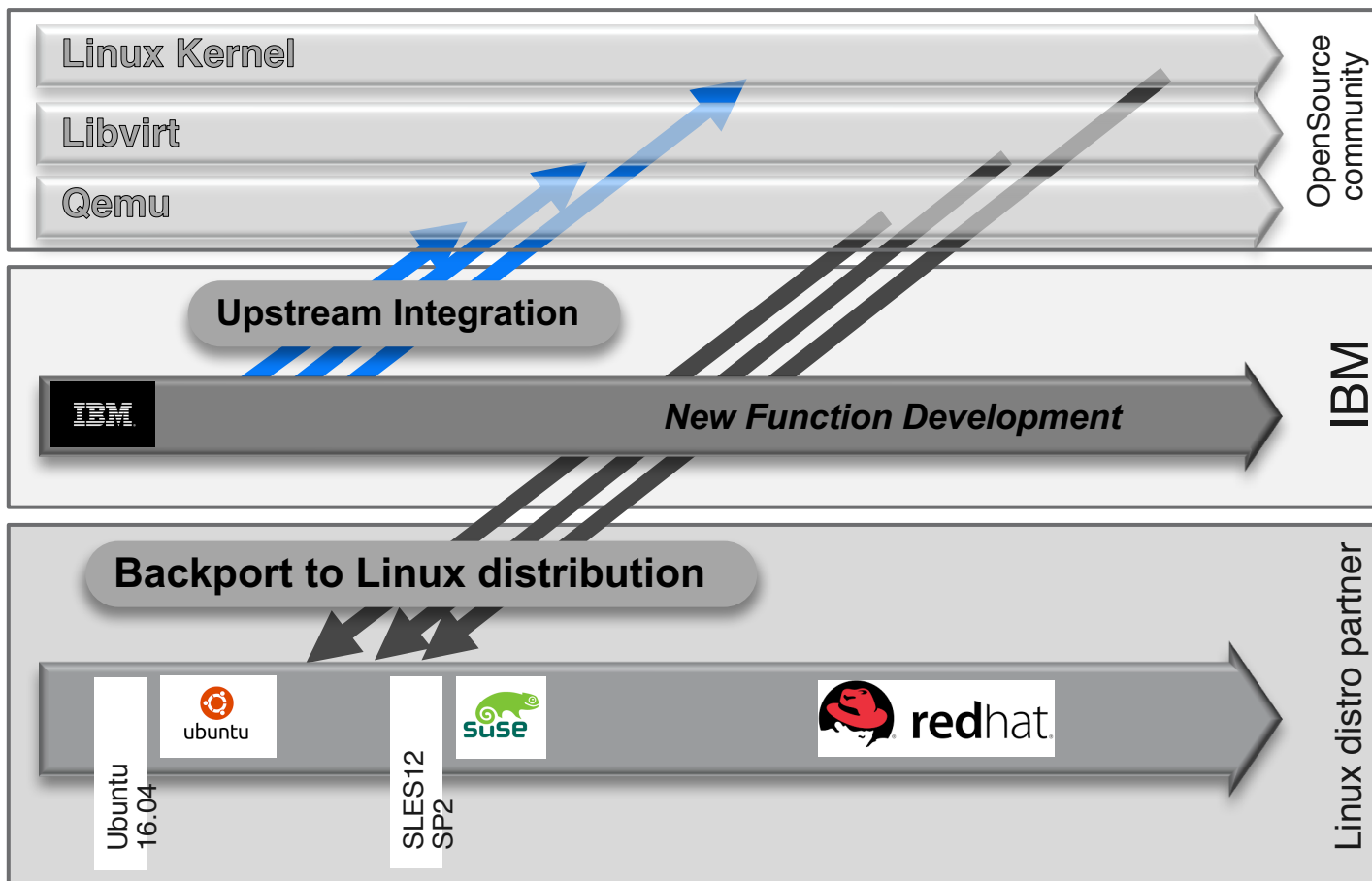
KVM as part of SUSE Linux Enterprise

From March 1

SUSE will provide **FULL SUPPORT** for KVM as part of SLES starting with SLES12 SP2 for z Systems and LinuxONE on March 1, 2017

- Support is part of existing and new SUSE Linux Enterprise Server for z Systems and LinuxONE subscriptions with no additional charge for KVM

Today

- KVM is available **NOW** as part of SUSE Linux Enterprise Server for z Systems and LinuxONE in **Technology Preview**

- SUSE has **certified** and **supports** SLES12 SP1 for IBM KVM for IBM z Systems and will continue until the IBM product will EOS March 2018

SUSE KVM Support: *http://www.suse.com/KVM*

SUSE®
We adapt. You succeed.

KVM and LXD as part of Ubuntu

Ubuntu Server 16.04 for IBM z Systems and LinuxONE already includes fully supported KVM hypervisor and LXD "Container Hypervisor" *Released April 2016*

- **All clients deploying Ubuntu on z Systems and LinuxONE MUST purchase a support contract**
  - http://www.ubuntu.com/download/server/linuxone
  - Support contracts renewed annually by service provider

- **Clients can try Ubuntu on LinuxONE and z Systems**
  - No support contracts are necessary for POC activities mutually agreed upon by IBM and Canonical
    - IBM World Benchmark Centers – Worldwide IBM Benchmark Center Request Form, IBM Systems Worldwide Centers Community, Business Partners will go through their IBM Rep
    - Evaluate through in house Proof of Concepts - no support contract is necessary for PoC activities mutually agreed upon by Canonical and IBM
    - IBM Contact for PoC Requests: Henry D. (Davis) Ward - warddav@us.ibm.com

- **How to engage for support**
  - Directly from Canonical - IBM@ubuntu.com
  - IBM TSS Support Line via Special Bid – Camilla Sharpe csharpe@ca.ibm.com

- **IBM-Ubuntu Tiger Team at Canonical to Contact**
  - General inquiries: ibm@ubuntu.com
  - Solution Architects: **christian.deyoung@canonical.com, ivan.dobos@canonical.com**

- **LXD information:** https://linuxcontainers.org

Submit requirements !

KVM as well as LinuxONE is now part of the " Request for Enhancement (RFE) Community". To do this open the community start page and then select the "Submit" tab. After entering in your IBM ID, you can fill in your requirement. In the product pull down please select one of:

- Linux on z Systems

- IBM LinuxONE

- KVM for IBM z Systems

- z/VM & IBM Wave

- Fill in the other fields as good as you can and then click on submit

Canonical is handling requirements for the Ubuntu distribution through Launchpad. Open a bug there, put requirement in the title and tag it with s390x.

Red Hat has a defined RFE process for their customers. So after logging into RHN follow the instructions to submit a request.

SUSE requirements can be submitted to their sales reps as well as using the "feedback" button at the bottom of the SUSE Linux Enterprise Server for System z web site.

https://linuxmain.blogspot.co.uk/2016/06/how-to-submit-requirements-for-linux.html

One more thing …

- I present you an instrument for the customers to make your opinion heard at IBM…

IBM will measure client experience with NPS, an industry-wide accepted metric

Net Promoter Score (NPS) calculation

- NPS is based on client responses to a simple question: **"How likely are you to recommend [IBM/Offering] to a colleague or business partner?"**
- Respondents answer on a scale of 0-10, which sorts them into 3 categories that serve as early predictors of churn and lifetime value:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Detractors   Passives   Promoters

NPS **=** **% of promoters** **-** **% of detractors**
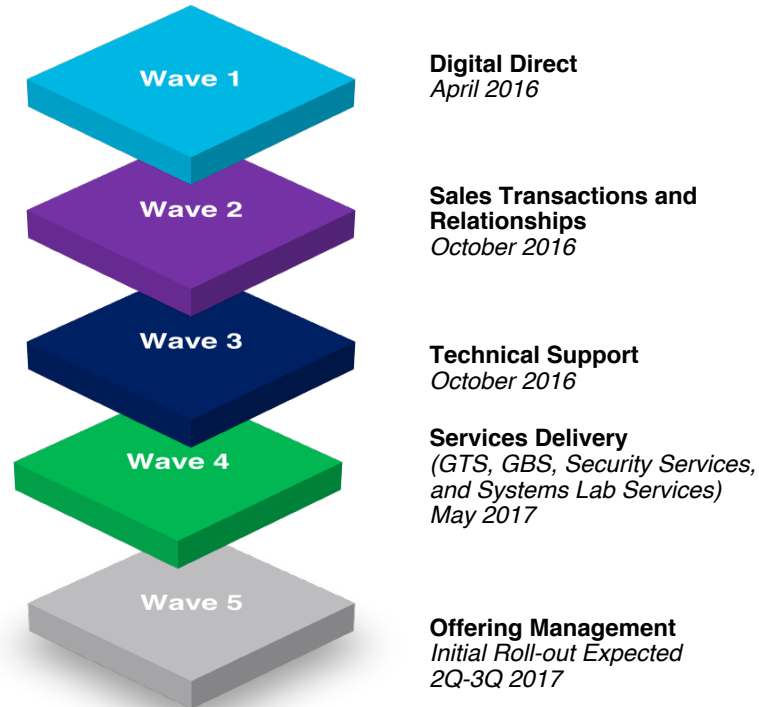
Key benefits of NPS

1 Endorsed by external subject matter experts and internal stakeholders

2 Strong indicator of future growth and competitive standing

3 Relationship NPS (rNPS) provides a comprehensive, long-term assessment of all touchpoints

CX Transformation will provide a Comprehensive View of IBM Client Experience

Wave 1

Digital Direct
April 2016

Wave 2

Sales Transactions and Relationships
October 2016

Wave 3

Technical Support
October 2016

Wave 4

Services Delivery
(GTS, GBS, Security Services, and Systems Lab Services)
May 2017

Wave 5

Offering Management
Initial Roll-out Expected 2Q-3Q 2017

Example Email

Dear Tina (offering_use),

We recently sent you an email about your experience with IBM z13s and noticed that you have not yet shared your feedback. At IBM, we make it a priority to listen to our clients and want to continuously improve our offerings. So, we would love your candid feedback on how we are doing. Please take a moment to answer a few short questions about your experience.

You can begin the survey by answering this question:

How likely are you to recommend IBM z13s to a colleague or business partner?

Not at all Likely   Extremely Likely

0	1	2	3	4	5	6	7	8	9	10

Carolyn Maher
IBM Client Advocacy Officer

Questions

THANK YOU!

Gonzalo Muelas Serrano

Computer Science Engineer
Offering Manager for z/VSE
 and z/VM

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