VM Workshop 2021 Opening

Online around the World

Dianne Griffin, VM Workshop Chairperson

Welcome

"Thanks for inviting us (back) into your home, your office, your home-office."

- Over 200 people registered
- From 19 Countries
- Over 100 Companies

- Hardware, Linux, z/VSE, and z/VM Content
- 2 Days
- 16 Technical Sessions

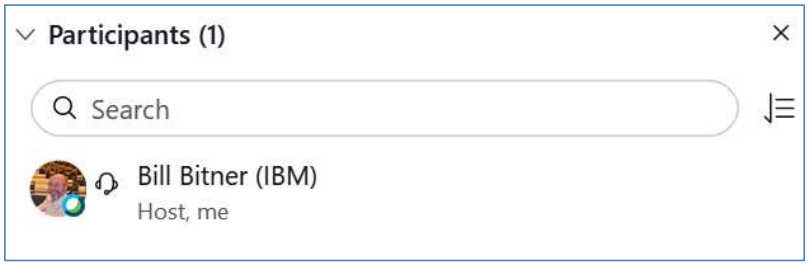
VM Workshop Since 1977*

- Grassroots, non-profit organization
- Professional Volunteers and Proud Sponsors
- Committed to the sustainability of:
  - z/VM
  - Linux on IBM Z and LinuxONE
  - z/VSE
- Cost effective, efficient, fully functional
- Networking, education, and fun

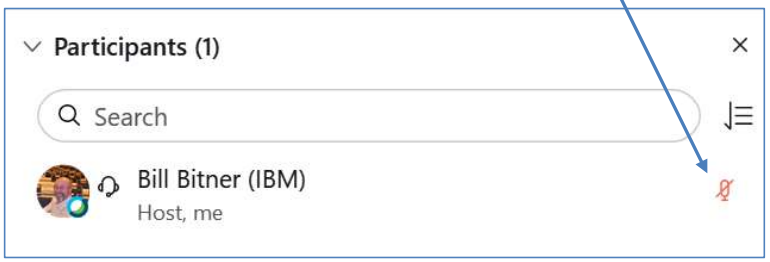
* Except 1999 through 2010

Webex Logistics

Mute is off.



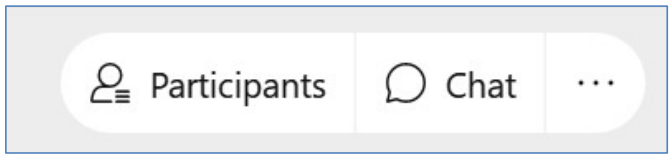
Mute is on.

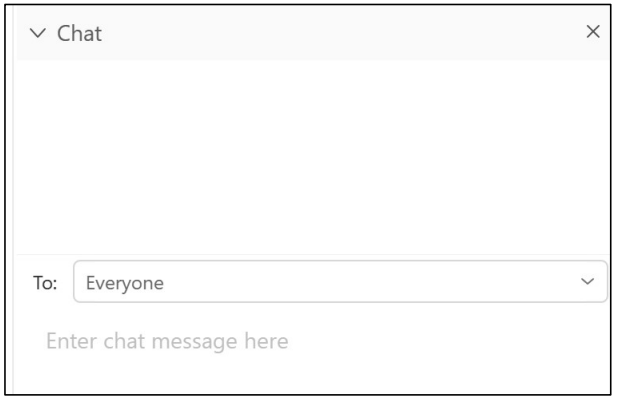


Please stay on mute if not asking a question or presenting.

Interact

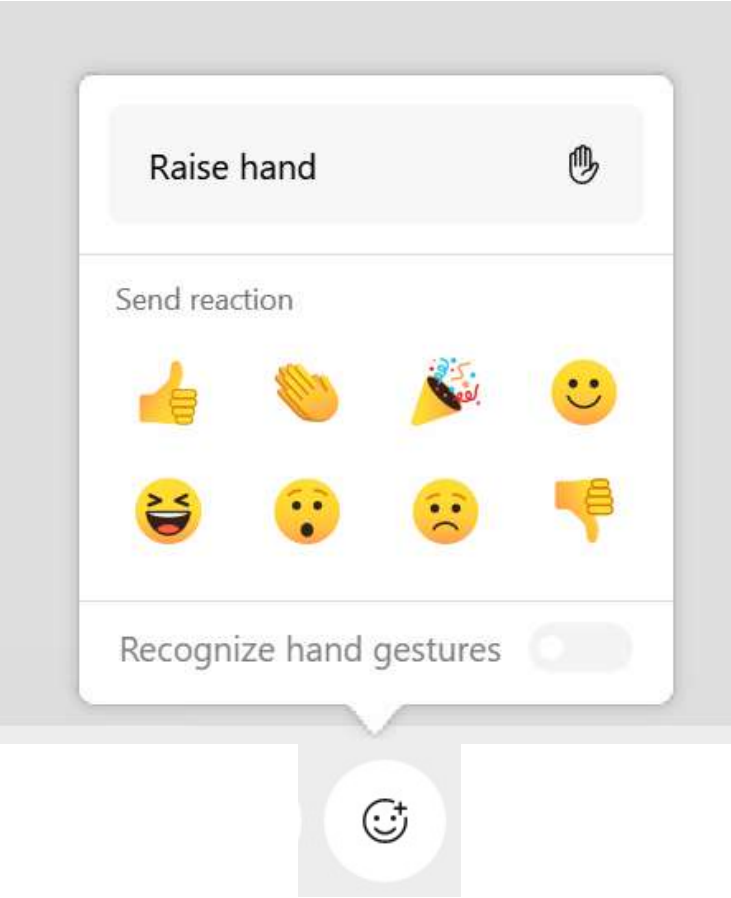
- Webex Chat function – bottom right of screen
  - Participants Icon – clicking brings up the list of participants
  - Chat Icon – clicking brings up window for chatting
    - Chat to “Everyone” or to individuals
    - Ask questions, chat during breaks, make a friend





Reactions

- Reaction allows you to send a temporary emoji or to raise/lower your hand
- Click the smiley face near bottom for menu



Your 2021 VM Workshop Committee

Bill Bitner
Chip Davis
Len Diegel
Glen Doogle
Marianne Eggett
Mike Giglio
Dianne Griffin
Andy Hartman
Gerard Howells
Brian Hugenbruch
Brian Jagos
Dave Jones
Wilhelm Mild
Jim Moling
Chuck Morse
Gonzalo Muelas Serrano
Bill Munson
Tony Noto
Mike Riggs
Len Santalucia
Eric Schuler-Dalverny
Marc Smith
Rich Smrcina
Kate Stringfield
Phil Tully

The VM Workshop is possible because of the support of our

Sponsors

http://www.vmworkshop.org/2021spon.shtml

http://velocitysoftware.com

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http://www.opticatech.com

http://www.mainline.com

http://www.csi-international.com

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RECOVERYPOINT

http://www.recoverypoint.com

ENTERPRISE SYSTEMS MEDIA
ENTERPRISE Executive
ENTERPRISE Tech JOURNAL

http://www.enterprisesystemsmedia.com

Log-On SOFTWARE

http://www.log-on.com

TechChannel

http://www.techchannel.com

Happy Hour

- At the end of each day
- Join in discussions in the chat or if you can behave, come off mute
- Glen Doogle may make an appearance

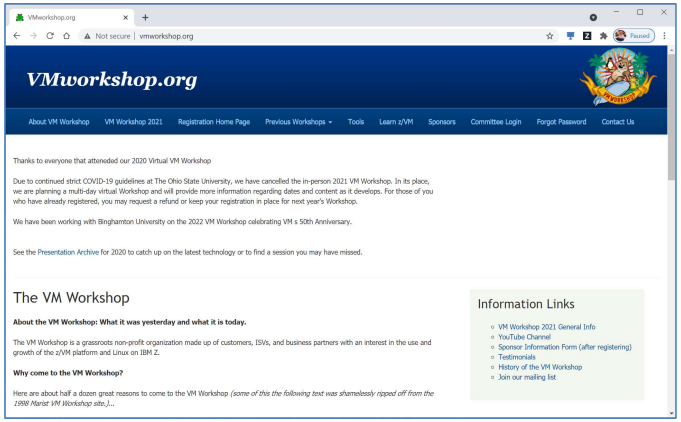
Presentations

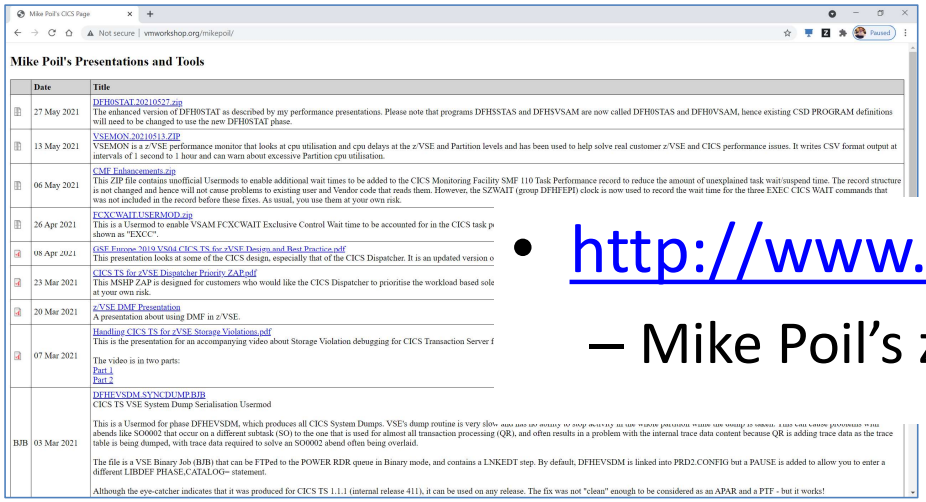
- Charts will be posted by June 14th
  - http://vmworkshop.org/2021pres.shtml

- Recordings will be posted by June 21st
  - https://ibm.biz/vmworkshopyoutube
  - Two other bonus sessions that could not fit in the agenda will be included in those recordings:
    - z/VM Platform Update: VM Workshop Style
    - GDPS Update

VM Workshop Web Site

- http://vmworkshop.org
  - Past archives, tools, etc





- http://www.vmworkshop.org/mikepoil/
  - Mike Poil's z/VSE CICS Page of Tools & Presentations

Z-V-M-G-O

VM Workshop style B-I-N-G-O

Get a standard card at:
http://vmworkshop.org/zvmgo.shtml

Or download the VMARC file to your z/VM system to build a random one
http://vmworkshop.org/2021/present/zvmgo.vmarc

Z	V	M	G	O
Turn it over to "someone"	Someone w/ a British accent	We're short on time	Wilhelm: Lets have a talk	YouTube
Can you see my screen?	Len, are there?	Dog barking in background	Someone w/ German accent	Zed Vee Emm
Rich, turn off your camera	Do you hear an echo?	**FREE**	Chip, was that you?	Brian, we hear you snoring
Could you repeat the question?	zLinux	We'll take questions	It Depends	OpenShift
LinuxONE	Let's wait a minute.	Binghamton University	Are you on Mute?	Glen Doogle

See you in person in 2022!

See you next year, June 15th to 18th

Binghamton, NY

2022 is also the 50th Anniversary of VM

Workshop Chair

- Dianne Griffin
  - Marriott Corporation
  - 2020 and 2021 Chair
  - First female chair in modern era
  - First chair in a pandemic
  - First chair to do 2 Webex Events
  - First chair to not use angry words

- Gerard Howells
  - America First Credit Union
  - 2022 Chair
  - First chair with a British accent and west of the Mississippi River
  - First chair that is as much a Linux person as a z/VM person
  - See 2020 session at: https://youtu.be/Ds4Z4jrcmNs

VM Workshop Committee change - “Company-lift” for Gonzalo Muelas Serrano

June 1st, 2021

Product Manager for Virtualization on IBM Z & LinuxONE

IBM

VP, z/VSE R+D, Center Of Excellence Germany

21ST CENTURY software

GonzaloM@21csw.com

Learn more at 21csw.com

IBM Z and LinuxONE

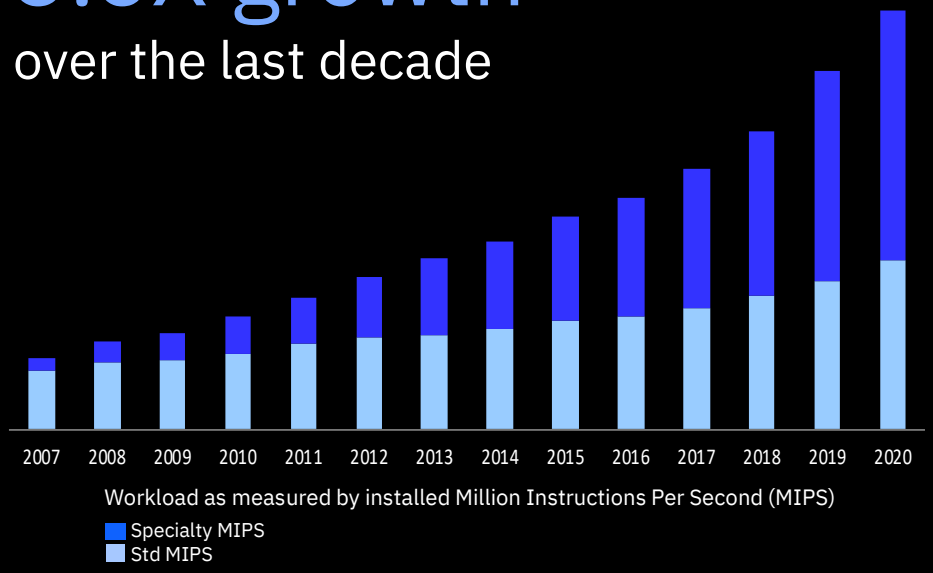
VM Workshop
June 2021

Kara Todd
Director of Linux, IBM Z and LinuxONE
@karamtodd
karam@us.ibm.com

Marcel Mitran
Distinguished Engineer – CTO, IBM Z & LinuxONE
@marcel_mitran
mmitran@us.ibm.com

IBM Z: Increasing momentum in the era of cloud

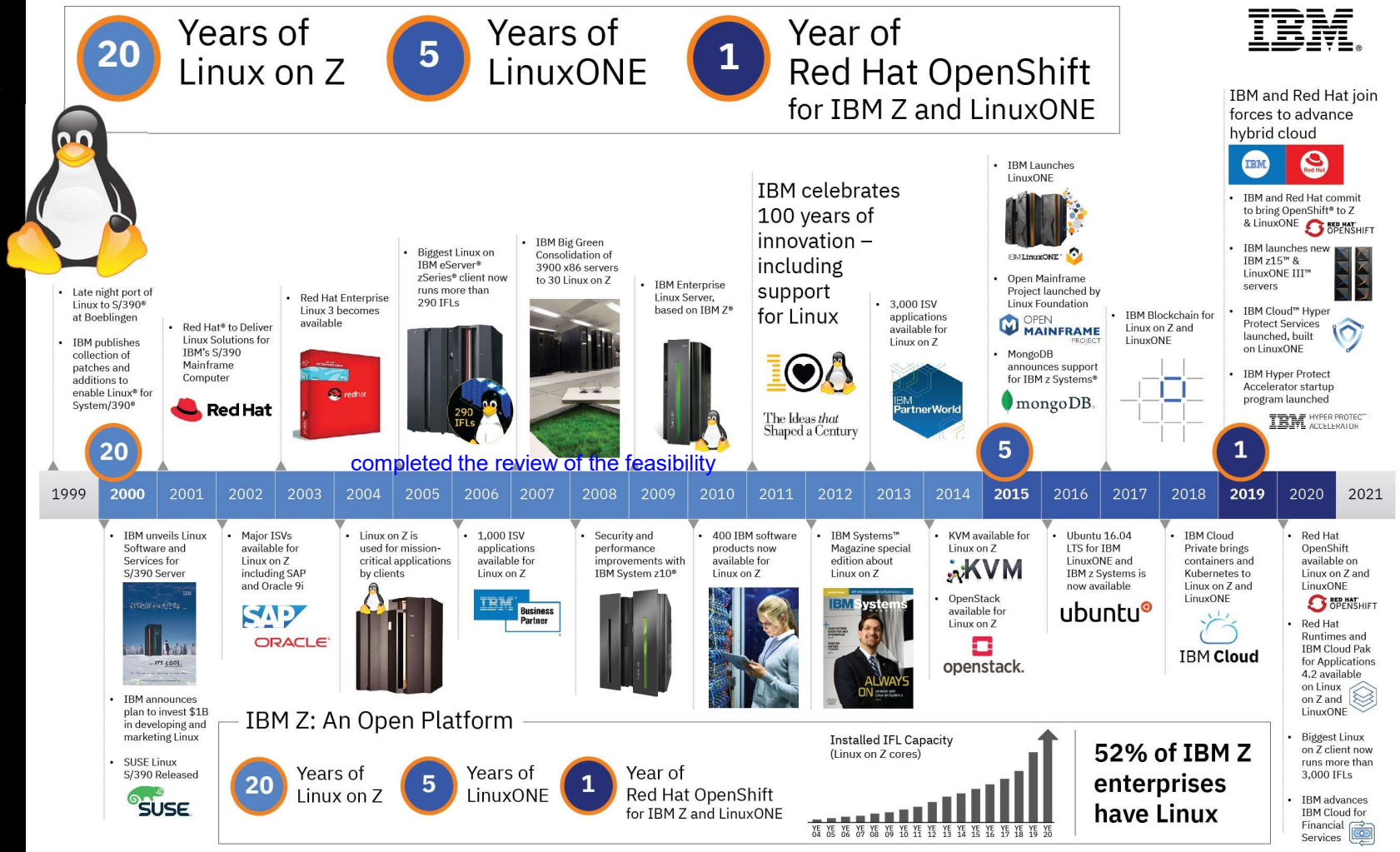
3.5X growth
over the last decade



- **67 of the Fortune 100**
- **45 of the world's top 50 banks**
- **8 of the top 10 insurers**
- **4 of the top 5 airlines**
- **7 of the top 10 global retailers**
- **8 out of the top 10 telcos**
- **18 of the top 20 countries by GDP***

*18 of the top 20 countries by GDP have either national or local government agencies using IBM Z

Linux anniversary



Continuing the momentum in 2021

LinuxONE III Express

GA:
May 25th

LinuxONE III Express simplifies getting started with LinuxONE by providing a pre-configured server with a set numbers of cores, memory, networking cards and other features

Starting at $135K, the single configuration LinuxONE III Express runs your enterprise data for less cost than when running on compared mid-market x86 servers

OpenShift Try & Buy

New deals starting in 2Q

Everything needed to run OpenShift for **90 days**:

- **1 to 6 IFL cores** loaned *via microcode*
- **Activation of memory** that is already installed on the machine
- **OpenShift** 4.5 or newer
- **IBM Cloud Infrastructure Center**
- **z/VM*** 7.2 + key features

Simplicity | **Flexibility** | **Price** | **Route** | **Velocity**

The new normal is hybrid and open

7.9

clouds are being used by an enterprise (on average) (IBV)

92%

of customers have both public and private cloud environments installed (IDC)

IBM Z®

fully integrated into a hybrid cloud infrastructure

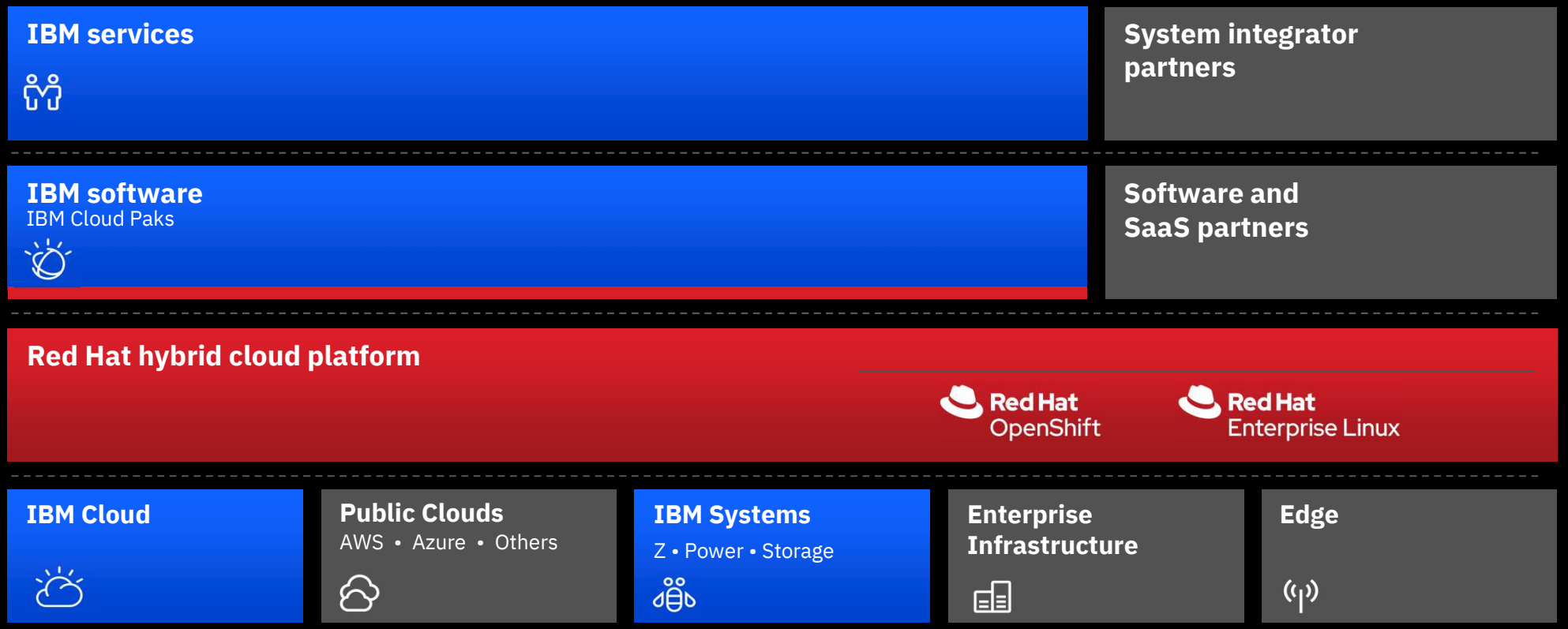
IBM Z Hardware Platform Strategy

Ensure IBM Z remains the premiere data serving and transaction processing platform through:

Acceleration and new capabilities for existing and new workloads via unique features and functions: security, AI, clustering, I/O, etc.	Optimization across the entire stack: from processor and system design, to compilers, virtualization, Operating System and Middleware development.	Continuous performance improvements for workload growth via increased drawer capacity and per-processor speed.	Industry leading resiliency (99.99999%) via constant advances in Reliability, Availability and Serviceability.

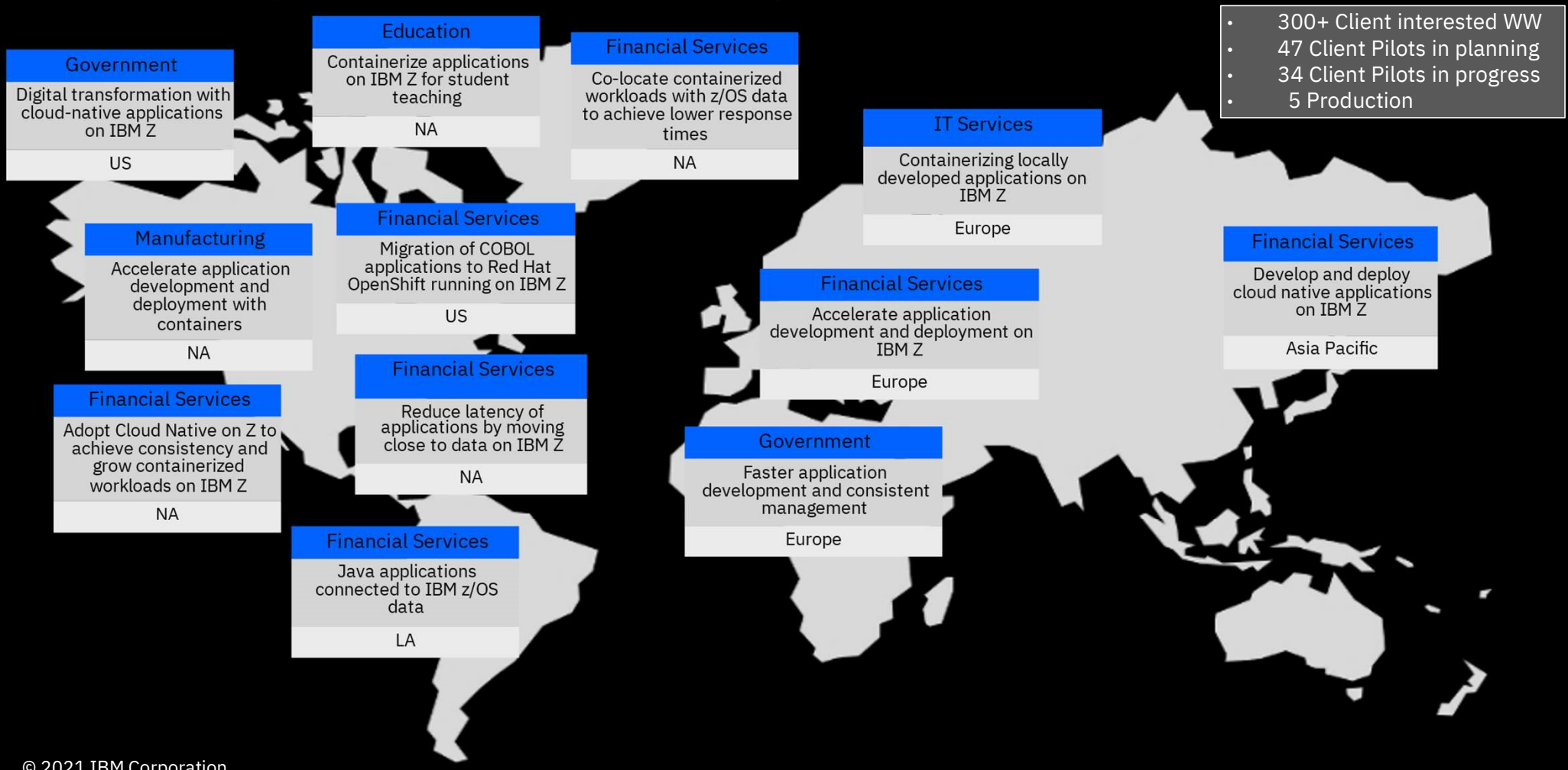
Zero to minimal application changes required!

IBM Hybrid Cloud and AI Solutions



A hybrid cloud transformation that integrates IBM Z can drive **2.5X the value** of a public-only approach

Proof-of-Concept Momentum for Red Hat OpenShift and IBM Cloud Paks on LinuxONE



- 300+ Client interested WW
- 47 Client Pilots in planning
- 34 Client Pilots in progress
- 5 Production

OpenShift & CloudPaks with IBM Z & LinuxONE

Benefits on Z

Low Latency and Large Volume **Data Serving** and **Transaction processing**

Enterprise class infrastructure **– Elastic, Scalable, Available and Resilient**

Highest levels of **Security and Compliance**

Adoption Patterns

Enterprise scale **Private Cloud-in-a-Box**
2.4M containers-per-box

Digital Transformation and Modernization for z/OS
7x shorter batch windows
5x better transaction response times

Extreme Consolidation and scalable **Data Serving**
75% lower Op-Ex

99.99999% *system availability*	***4:1*** *better data-center footprint* ***2:1*** *lower power envelope*	***3.8x better*** *Java throughput,* ***24x faster*** *Java Garbage Collection*

Enterprise grade. **Open** by design. **Secured** by IBM Z.

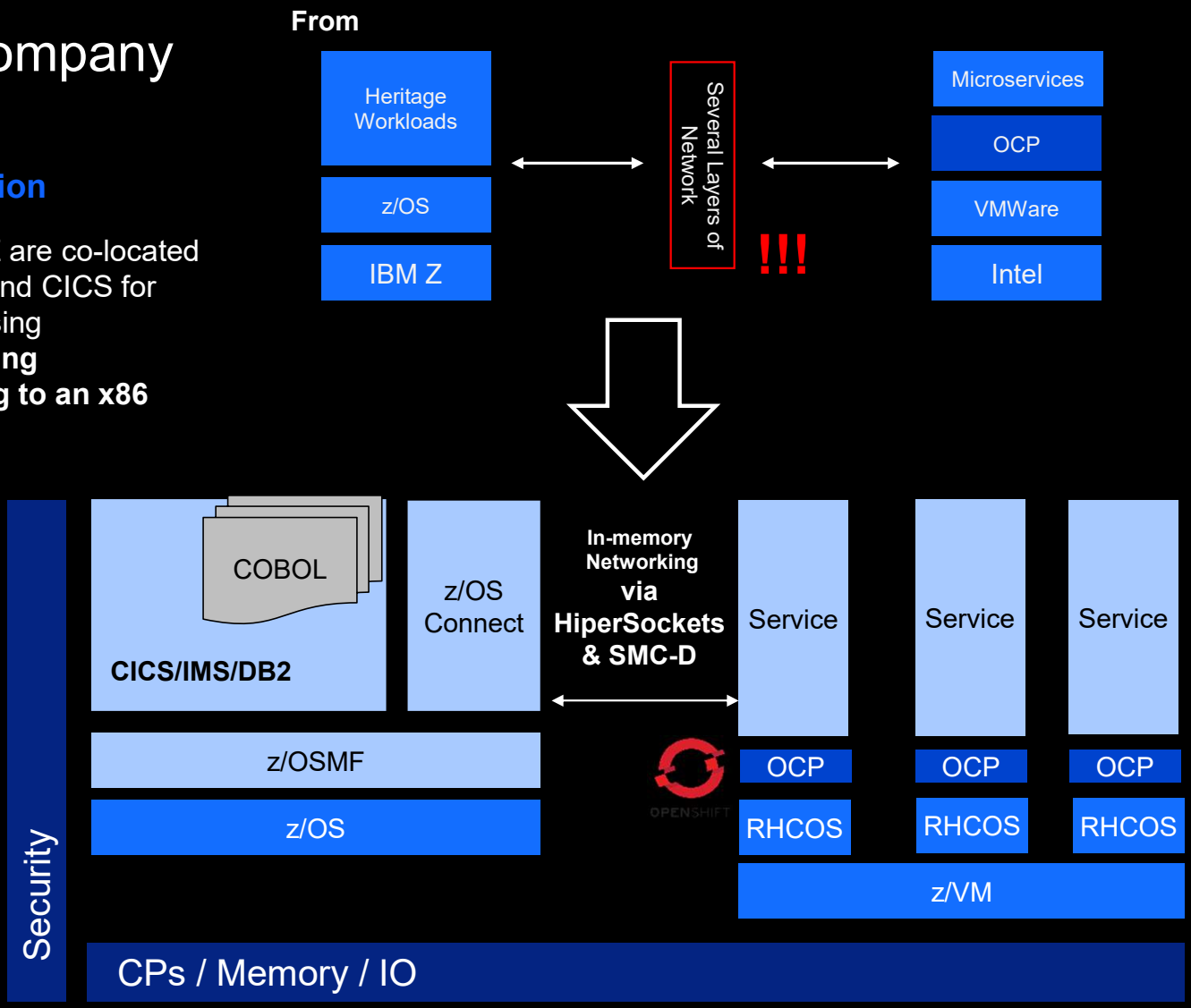
Example : Large NA FSS Company

Accelerate enterprise digital transformation

- Containerized services running in Linux on Z are co-located on the same hardware with z/OS Db2 data and CICS for low latency, high volume transaction processing
- **Achieve up to 7.3x lower latency co-locating applications on Z compared to connecting to an x86 server**

Modernize and digitally transform

- Modernize and extend mission-critical legacy assets incrementally while maintaining enterprise SLAs and keeping risk and cost low

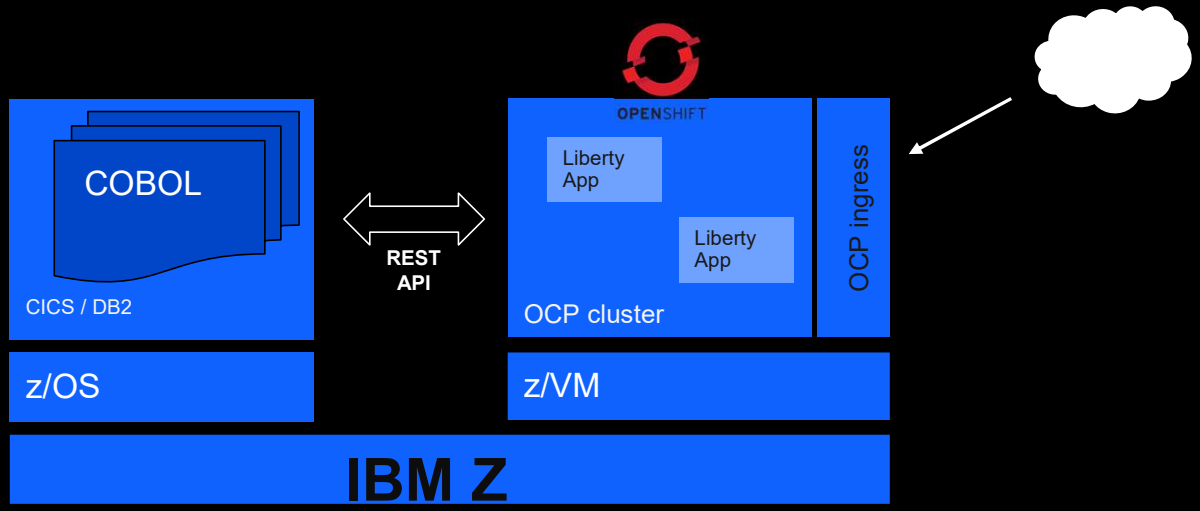


Example : Large Credit Bureau in Latin America

Accelerate Enterprise Digital Transformation

- *CI/CD Pipeline Integration With OpenShift on Z*
- *Application Portability*
  - *WebSphere (x86) to Liberty (s390x)*
- *Better Scalability With OpenShift On Z*
- *From 1500 Queries/Min to 650,000 Queries/Min*
  - *43X improvement*

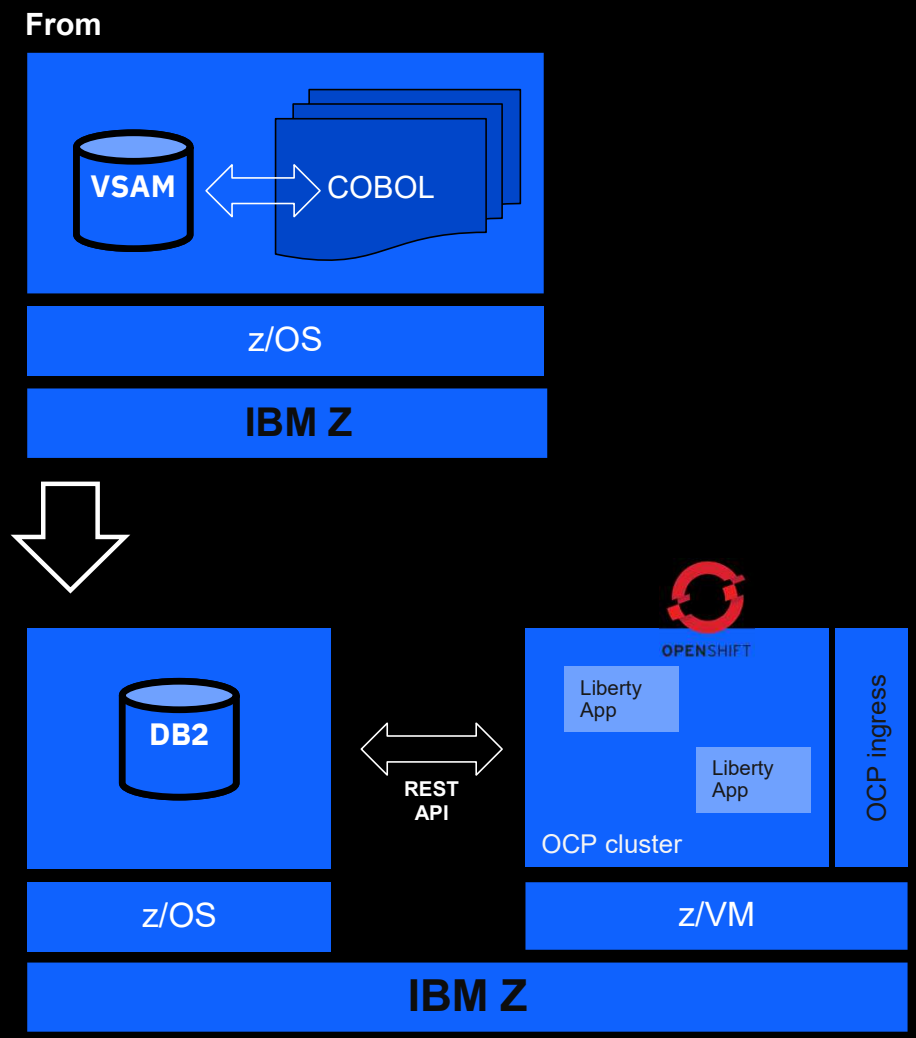
Customer driving digital transformation to a cloud and microservices world and needs reliability, security and performance, as well as an integrated and standard platform that allows software transformation and migration in an agile, flexible and easy way



Example: Large FSS client (NA)

Customer wanted **COBOL → Java modernization** to improve their developer velocity and time to market as well as VSAM → DB2 z/OS migration to improve data integration and **simplify their data model** while ensuring they meet SLAs.

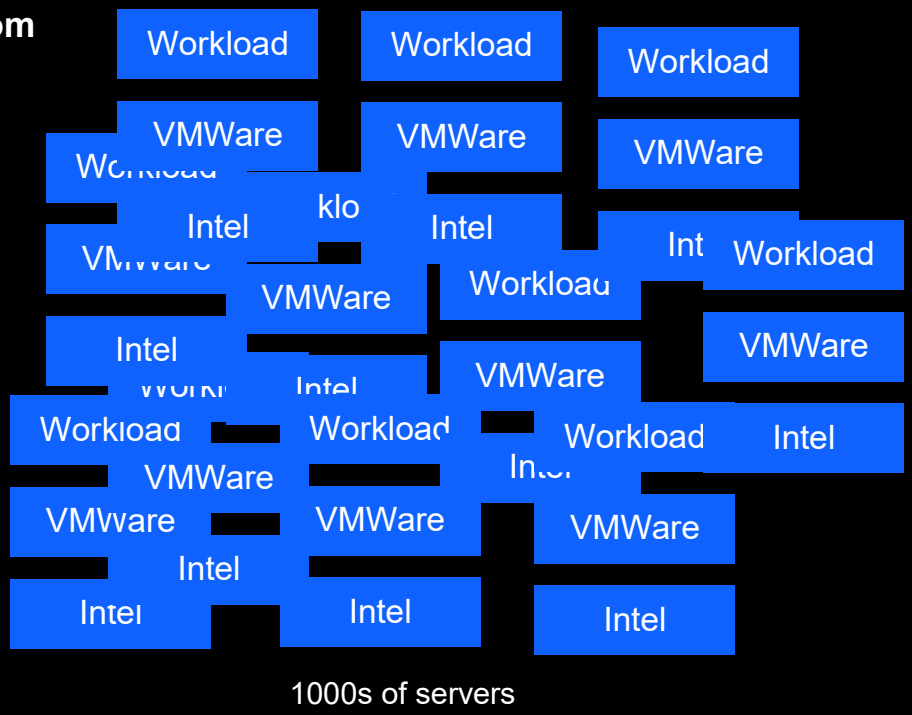
The Java (Liberty) microservices had **3x higher throughput per node** running on OpenShift on Z vs Intel.



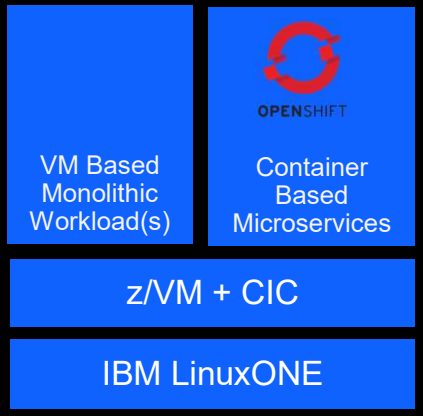
Example: Large FSS Client (NA)

Customer wanted to **consolidate** 1000's of Intel cores worth of workload to **reduce OpEx and datacenter sprawl**
With IBM LinuxONE, the client consolidated and workloads and saw a large TCO reduction. Other customers have seen up-to a 22:1 consolidation.

From

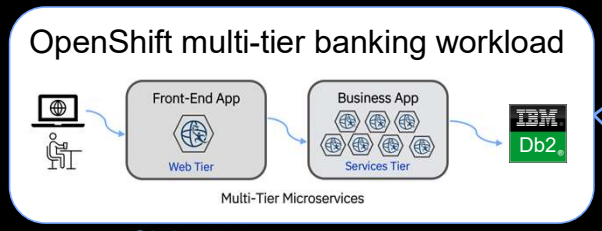


1000s of servers



Multi-tier Java microservices running in OpenShift on IBM LinuxONE III LT2 deliver 4x better per core performance and cost 34% less than x86

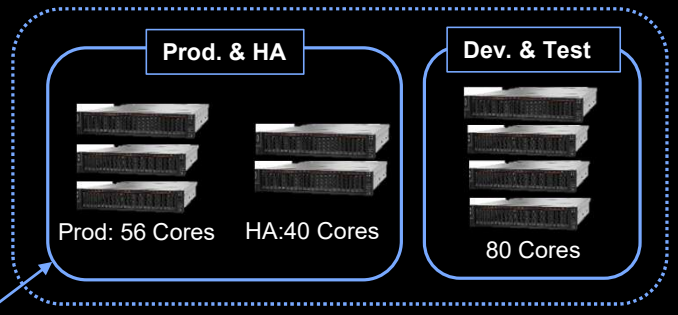
*When driving **throughput based on an SLA,** which platform delivers the best performance and lower cost?*



SLA: 236 ms Response Time @ 95% Percentile

Cost analysis assumptions:

- For a new LinuxONE III LT2 system with 17 IFLs to run OpenShift on Linux
- Includes high availability, development & test environments on both x86 and LinuxONE III LT2
- VMWare ESXi virtualization used on x86 and z/VM used on LinuxONE III LT2
- High Availability is included both x86 and LinuxONE cases



Total 176 cores (56+40+80) across 9 new x86 servers

Prod. & HA: 14 IFLs
Dev & Test: 3 IFLS

New LinuxONE III LT2

Incremental IFLs 17 (14 + 3) across 5 logical partitions

$2,054,786
(3-year TCO)
RPS per core meeting SLA: 281
Cost per request meeting SLA: $129
Year 2 and Year 3 OPEX: $507,407

34% Lower TCO

$1,363,069
(3-year TCO)
RPS per core meeting SLA: 1122
Cost per request meeting SLA: $100
Year 2 and Year 3 OPEX: $125,131

4x Better Throughput per Core

75% Lower OPEX

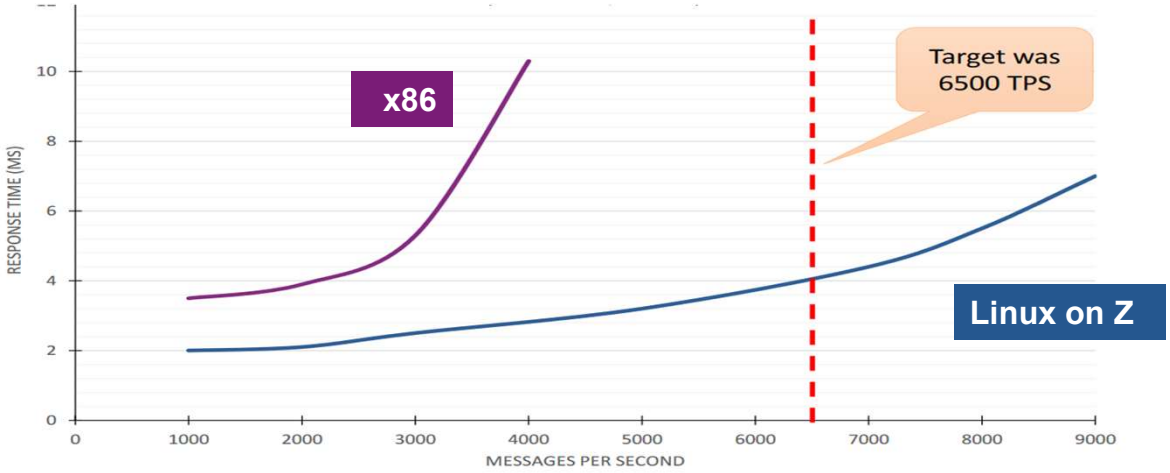
Disclaimer: This is an IBM internal study designed to replicate multi-tier banking OLTP workload usage in the marketplace on an IBM LinuxONE III LT2 using 14 4.7 GHz IFLs across three LPARs. Seven IFLs and a total of 320 GB memory were allocated to one LPAR for two OpenShift masters and two worker nodes. Another six IFLs and a total of 320 GB memory were allocated to a second LPAR for one OpenShift master and two workers. One IFL and a total of 128 GB memory were allocated to a third LPAR for the OpenShift load balancer. IBM Storage DS8886 was used to create four 100 GB minidisks for four zVM guest and four 250 GB DASD minidisks for another 4 z/VM guests running in the LPARs. The OpenShift cluster version 4.5.5, using Red Hat Enterprise Linux CoreOS (RHCOS) for IBM LinuxONE, was running across seven z/VM guests and the remaining eighth z/VM guest was running the OpenShift load balancer. SMT was enabled across all IFLs. The x86 configuration was comprised of two servers running VMWare ESXi 6.7 with 7 guests (three masters and four workers) for the OpenShift cluster version 4.5.6 with RHCOS and a third server was used for the load balancer on RHEL 8. For x86 storage each guest operating system was configured with a 120 GB of virtual disk. Each guest had access to all vCPUs of the physical server on which it was running. Compared x86 models for the cluster were all 2-socket servers containing a mix of 8-core Sandy Bridge, 12-core Haswell, 8-core Skylake x86 processors using a total of 56 cores with a total of 1,280 GB memory. The load balancer was a 2-socket 8-core Sandy Bridge server with a total of 384 GB memory. Both environments used JMeter to drive maximum throughput against four OLTP workload instances and were sized to deliver maximum throughput of 15,786 responses per second (RPS) with IBM LinuxONE III LT2 and 15,744 RPS with x86 at a service level agreement response time of 236 milliseconds. The results were obtained under laboratory conditions, not in an actual customer environment. IBM's internal workload studies are not benchmark applications. Prices, where applicable, are based on U.S. prices as of 09/20/2020 from our website and x86 hardware pricing is based on IBM analysis of U.S. prices as of 09/20/2020 from IDC. Price comparison is based on a three-year total cost of ownership including HW, SW, networking, floor space, people, energy/cooling costs and three years of service & support for production and non-production (devtest and high availability) environments.

2019 MongoDB Innovation Awards Winners

Marriott INTERNATIONAL

With over 7,000 properties and a new hotel opening every 14 hours, Marriott is the leading hospitality provider in the world today. Marriott turned to MongoDB to assist with sprawling reservation shopping demand. By using MongoDB in conjunction with Linux on Z, Marriott architected a reservation shopping platform that will allow for future scale and quicker time to market for new capabilities. Marriott also plans to use MongoDB for placing data geographically close to users for better performance and to meet the needs of GDPR.

4 Core PoC
A Cloud Service (ACS) x86 vs. Linux on Z



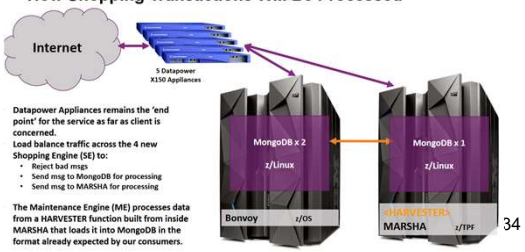
1 MongoDB instance on Z can handle our required load creating easy failover for HA

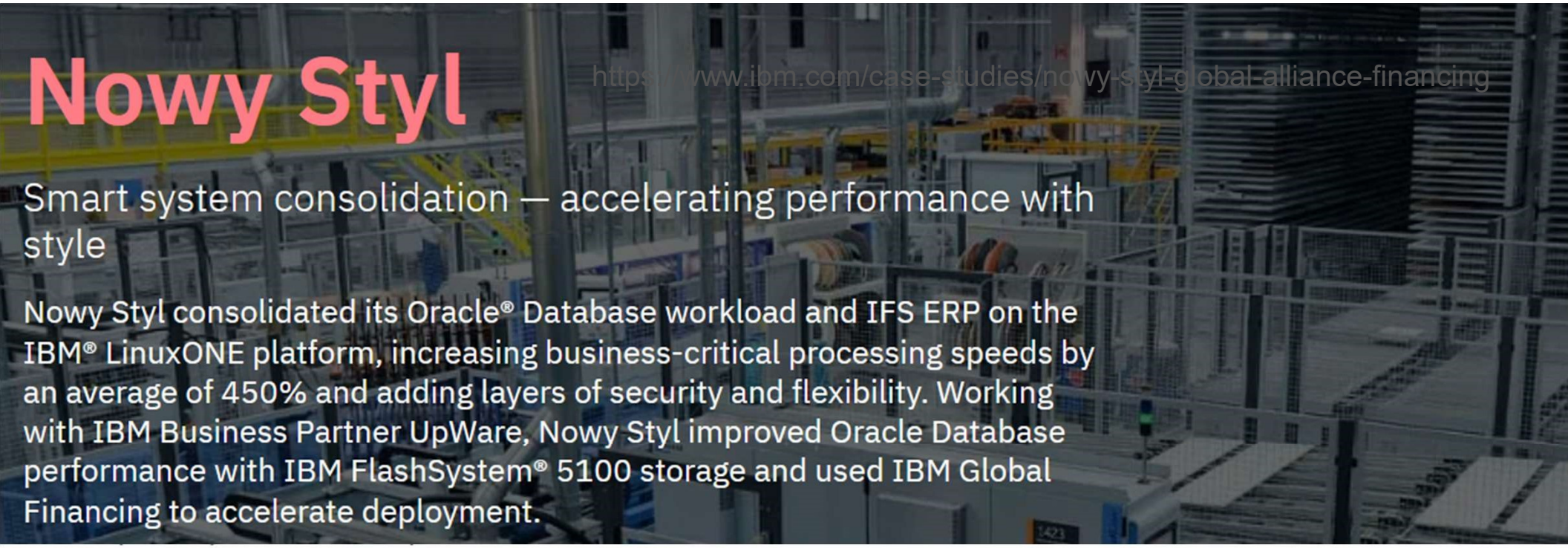
Linux on Z was ~40% faster
Linux on Z provided ~66% more TPS, bound by 1Gb OSA card not CPU

Linux on Z degraded gracefully (no errors)
ACS streamed errors at 3000 TPS

http://www.tpfug.org/pdf/2019/2019_MongoDB_for_Marriott.pdf

How Shopping Transactions Will Be Processed





Nowy Styl

https://www.ibm.com/case-studies/nowy-styl-global-alliance-financing

Smart system consolidation — accelerating performance with style

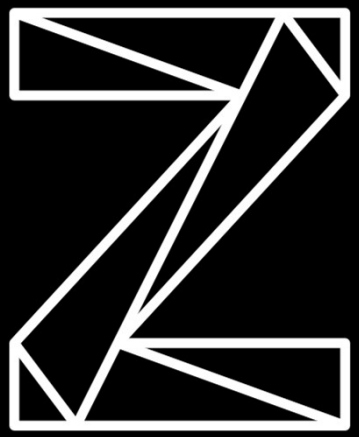
Nowy Styl consolidated its Oracle® Database workload and IFS ERP on the IBM® LinuxONE platform, increasing business-critical processing speeds by an average of 450% and adding layers of security and flexibility. Working with IBM Business Partner UpWare, Nowy Styl improved Oracle Database performance with IBM FlashSystem® 5100 storage and used IBM Global Financing to accelerate deployment.

- A shop material planning report that used to take 187 minutes to process is now completed in 60 minutes — a 68% shorter time.
- A key process replication report that used to take 62 minutes to prepare is now completed in 16 minutes — a 74% shorter time.
- A key production scheduling planning report that used to require 111 minutes to prepare is now available in 24 minutes — a 78% shorter time.

IBM Z: designed for the future of digital business

Confidential Computing
Designed with the world top banks to meet the most rigorous security, data protection and privacy requirements

Always on resiliency
The only platform with 7X9s availability and self learning based on AI to pro-actively avoid future failures



Targeted performance
Powerful high performance processors augmented by workload accelerators for massive transaction throughput

Accelerated agility
The best platform for modernizing core applications as part of your business transformation

Thank you!