Private cloud with IBM® Z® and IBM® LinuxONE

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  - Banking

  - Financial Services

  - Service Provider

  - Insurance

  - IBM hardware development

Emerging adoption patterns for Red Hat OpenShift

Adoption patterns present opportunities for further expansion with clients adopting multiple patterns

Co-location

Co-locate containerized workloads with z/O® and Linux based data to achieve lower response time and meet enterprise SLA

Modernization

Adopt cloud native to achieve consistency across the enterprise and grow benefit of containerized workloads

Platform capabilities

Benefit from high efficiency, high scalability, resiliency, out of the box availability, cryptography hardware*, low latency, and high throughput

Integration

Integration and automation of z/OS and Linux based workloads with hybrid cloud on IBM Z / IBM® LinuxONE

AI and Data

Leverage AI to extract insights and gain trusted, actionable results and move applications close to the data for better throughput and performance

Hyperledger fabric

Hyperledger fabric, the de facto standard for enterprise blockchain platforms, deployed on-premises on IBM Z / IBM® LinuxONE

Use cases Red Hat OpenShift on IBM Z and IBM® LinuxONE

Flexibility with Energy Efficiency	Modernization with high Resiliency	Data Management with high Availability	Enterprise DevOps with increased Security

Flexibility with Energy Efficiency

Business Challenge

The Central Bank developed a national peer-to-peer payment system where every transaction processed by any bank in the country would have to be validated by the central bank. Each bank can develop their own solutions, but they must comply with the **strict low latency requirements** to be compliant with the standards from the Central Bank.

Unique Solution Impact

- High flexibility to update Kafka workloads running on Red Hat OpenShift
- Maintain strict latency requirements
- Used less 1/3 of the hardware requirements from x86
- Less software licenses
- Adhere with sustainability goals

Modernization with high Resiliency

Business Challenge

Client needed to **improve agility and minimize risk** of large monolithic integration broker and MQ components that support critical business applications. They wanted to **modernize** to containerized microservices, still **benefitting from the reliability and scalability** with IBM Z.

Unique Solution Impact

- The client decided to implement Red Hat OpenShift and 'IBM Cloud Pak for Integration' on IBM Z to take advantage of the platform's scalability, reliability, and lower TCO.
- The client is taking advantage of the containerized 'IBM App Connect Enterprise' server and 'IBM MQ' instances to allow for a more agile development and production rollout of various microservices.

Data Management with high Availability
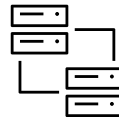
Business Challenge

Client needed to provide compliance with EU regulations – data serving to the Fast Payments application within a regulated timeframe. Client looked to **optimize the data analytics process**, reduce costs and time associated with the data offload.

Unique Solution Impact

- The solution proves that IBM Z always serves the data to the Fast Payments application running in a public cloud, even if the public cloud is experiencing outages.
- The client replicates the Db2® on z/OS® read-only data once with a low-latency / high-throughput mechanism based on Red Hat OpenShift and 'IBM Cloud Pak for Data' - Data Gate technology that feeds multiple data lakes.

Enterprise DevOps with increased Security

Business Challenge

The DevOps team needed to **improve flexibility, security, availability and scalability** of their development process. They needed an efficient way to easily extend the existing Jenkins setups to add new workers, update new service with security requirements and create an environment with high availability.

Unique Solution Impact

- Modernization of DevOps process
- Meet IBM security requirements for developers with control features of Red Hat OpenShift
- Simplified pipeline automation with greater scalability

Use cases Red Hat OpenShift on IBM Z and IBM® LinuxONE

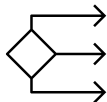| Digital Transformation with Application Portability	CI/CD Integration with Automation	Continuous Availability with high Scalability	Continuous Flexibility with App Modernization

Business Challenge

Client drives digital transformation to cloud and microservices 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

Unique Solution Impact

- CI/CD pipeline integration with Red Hat OpenShift on IBM Z
  - Co-location with existing z/OS assets

- Application portability
  - From IBM WebSphere on x86 to WebSphere Liberty on IBM Z

- Better scalability with Red Hat OpenShift on IBM Z
  - 43x improvement: from 1500 queries/min to 650,000 queries/min
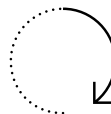
Business Challenge

Digital transformation goal for a cloud delivery service was challenged with disruptive **development for services spanning distributed and IBM Z architectures**.

Highest requirements for reliability, security and performance, as well as an **integrated and standard platform** for digitalization in an agile, flexible and easy way.

Unique Solution Impact

- Single development and CI/CD pipeline integration with Red Hat OpenShift on IBM Z

- Application portability with WebSphere Liberty

- High scalability, automated with Red Hat OpenShift on IBM Z, resulted in a simplified Go-To-Market process
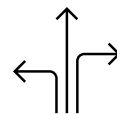
Business Challenge

Client wanted to be prepared when availability problems with the public cloud occur. The client was looking for a **highly resilient** on-premises platform as part of their enterprise hybrid cloud approach to **ensure continuous availability** of the services.

Unique Solution Impact

- Using a Red Hat OpenShift on IBM Z environment, it could be proofed that even a critical high load scenario (100 namespaces serving a total of 800,000 requests) and losing 5 of the 6 infrastructure nodes did not cause any resiliency or scalability problems.

- Even better, its cloud be proofed that IBM Z provides a high resource utilization level, resulting in a cost-effective solution.

Business Challenge

Client needed **flexibility for new applications** and **faster turnaround** time for inquiries. It was a steady growth over the past few years, adding more service requirements to meet its business demands. The Proof of Technology objective was to verify, which benefits exist, related to performance, portability and low latency of OpenShift in a zCX environment compared to the x86 environment.

Unique Solution Impact

- 100% - Ansible script automated setup, aligned with the x86 procedure. Reused Java & Node.js apps from x86 in zCX environment

- 40x - Faster documents processing in zCX vs same workload on x86

- 50% - Shorter response time to Db2 for z/OS with zCX vs. x86

Client quote

Major FSS client in NA runs containerized services on Red Hat OpenShift, co-located with existing assets on IBM Z, and benefits from low latency, high volume transaction processing, providing better reliable and secured services

"The bank needed to increase their competitive business offerings by extending and modernizing integration with existing assets while optimizing SLAs and minimizing risk."

Major FSS client in NA

Client quote

Sagicor wanted to increase productivity, enhance security, and ultimately, aim to improve on service to its clients

"The technology, IBM® LinuxONE, IBM FlashSystem® 7200, Red Hat OpenShift, and Temenos Transact, when combined will improve Sagicor Group's ability to manage large and complex data and applications from businesses across the group."

Mark Clarke, vice-president,
Infrastructure and Technical Services at Sagicor Group Jamaica

Client quote

IBM Z Firmware development team accelerates the devOps processes with Red Hat OpenShift on IBM Z

"The migration of the DevOps process to Red Hat OpenShift on IBM Z has proved very successful and delivered a more secure and scalable approach."

Edmund Breit, Senior IT Specialist,
IBM Z Firmware Delivery & Support

Use cases - Banking

Large Banks in South America
Modernization from non-container workloads to an agile containerized configuration

Challenge

The Central Bank developed a national peer-to-peer payment system where every transaction processed by any bank in the country would have to be validated by the central bank. Each bank can develop their own solutions, but they must comply with the strict low latency requirements to be compliant with the standards from the Central Bank.

The initial solution was deployed using VMware to host virtual machines running the Kafka workloads. Although the initial solution can meet the latency requirements, it does not offer the flexibility that a true container native solution can deliver, it and requires large amounts of hardware thus software licenses.

Proposed IBM solution to all other banks (PoT)

IBM demonstrated a Proof of Technology (PoT) running a containerized solution for Kafka (Red Hat AMQ Streams) using Red Hat OpenShift Container Platform running on IBM Z leveraging the KVM hypervisor technology.
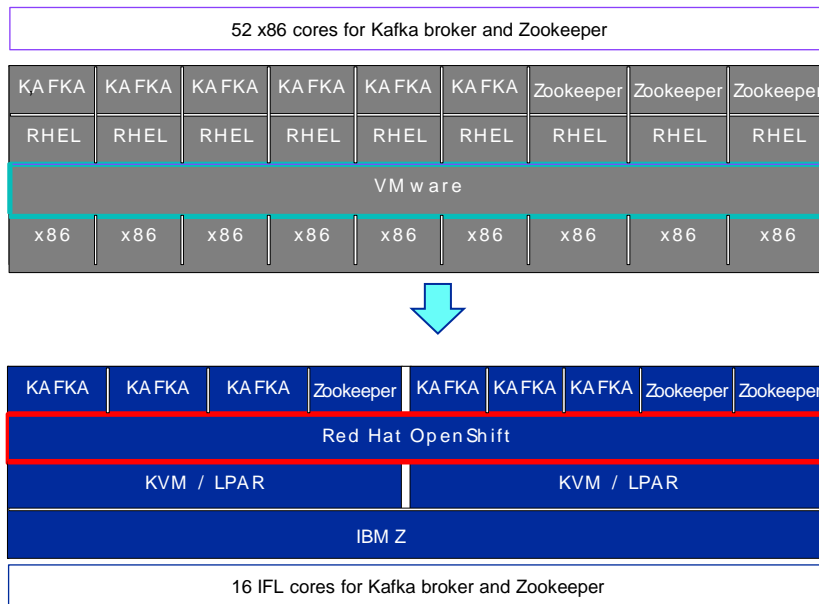
Solution Results

– High flexibility to update Kafka workloads running on Red Hat OpenShift
– Maintain strict latency requirements
– Used less 1/3 of the hardware requirements from x86
– Less software licenses
– Adhere with sustainability goals

Central Bank latency requirements

– ~10 ms per message
– 600 thousand messages

PoT Solution

Large client in NA
MongoDB-as-a-Service

Cloud-native as-a-Service environment that adheres to industry regulation and sustainability business objectives

Business requirements

FFIEC Appendix J compliant technology solution for Franchise Critical applications running MongoDB (cyber resilient)

Sub-second recovery speed for multi-TB instances to meet strict RTO requirements

In Production

33:1 core consolidation vs x86

Cyber-resilient

High Performance

Highly Available

Solution Benefits

50% more efficient in terms of data center space, power, cooling

FFIEC Appendix J support for Franchise Critical Applications

Support for backup and restore via FS

Automate deployments of MongoDB instances at scale using IBM Cloud Infrastructure Center

Solution elements

Function	On IBM Z
Deployment Catalog	Integrated with existing tools
Automation	Provision via Ansible / IBM Cloud Infrastructure Center
Mongo Instance	Mongo Enterprise on IBM Z
OS	RHEL 8 IBM z/VM®
Encrypt Data @ Rest	H/W accelerated on IBM Z + FS9200
Compression	H/W accelerated on IBM Z + FS9200
FFIEC Appendix J	IBM Safeguarded Copy
Logging	Mongo Ops Manager

European Bank
Modernization from large monolithic to an agile configuration

Business Requirements

Client needed to improve agility and minimize risk of large monolithic integration broker and MQ components that support critical business applications.

Client wanted to modernize to containerized microservices, still benefitting from the reliability and scalability with IBM Z.

In Production

Modernization from large monolithic 'integration broker' to more agile configuration – still using the benefits of co-location on IBM Z.
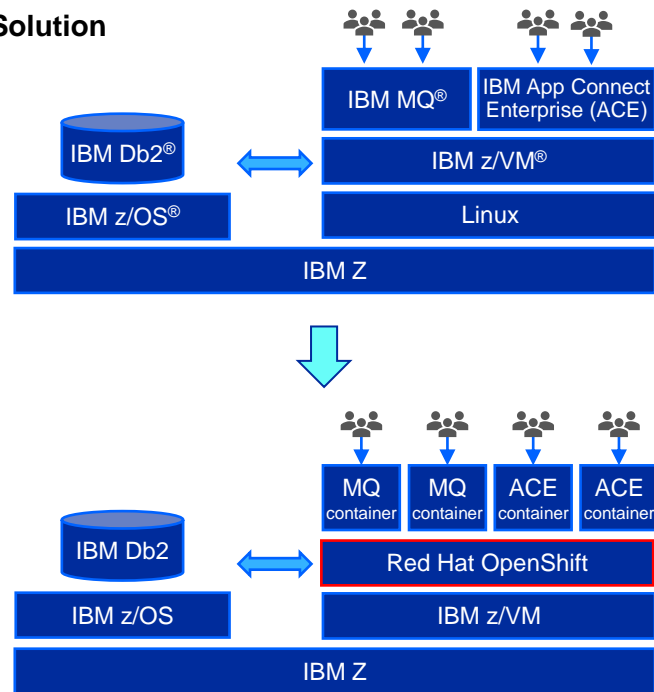
Solution Benefits

The client decided to implement Red Hat OpenShift on IBM Z and 'IBM Cloud Pak® for Integration' to take advantage of the platform's scalability, reliability, and lower TCO.

The client is taking advantage of the containerized 'IBM App Connect Enterprise' server and 'IBM MQ' instances to allow for a more agile development and production rollout of various microservices instead of changing the current large monolithic implementation.

Using Red Hat OpenShift along with pipeline technologies enables the client to be more responsive to business needs.

Solution

Asian Bank
Modernization based on a containerized architecture with scalability, security & performance

Business Requirements

The client had to transform digitally, accelerate its pace of innovation, future-proof its technology, and be prepared for the ever-changing market dynamics.

As well, they want to reduce operational costs, improve customer experience, drive digitization, and allow back-office optimization.

Solution Benefits

The client decided to implement Red Hat OpenShift on IBM® LinuxONE and 'IBM Cloud Pak® for Integration' to take advantage of the platform's scalability, reliability, and lower TCO.

The solution provides horizontal & vertical scalability, reduced latency between DB and apps (collocated on IBM® LinuxONE), reduced floor space and power requirements (sustainable platform), and high availability (up to 99.99999%).
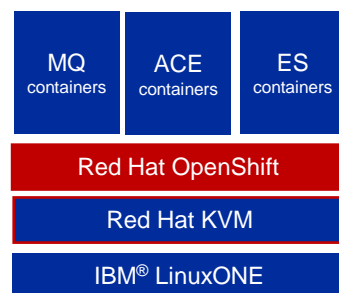
Solution

DMZ Zone   *Trusted Zone*

CP4I   **CP4I**   **CP4I**
API Connect   API Connect   App Connect Enterprise (ACE),
(APIC)   MQ, Event Streams (ES)

| APIC containers | ←→ | APIC containers | | MQ containers | ACE containers | ES containers |

Red Hat OpenShift		Red Hat OpenShift		Red Hat OpenShift
VMware		VMware		Red Hat KVM
Commodity Server(s)		Commodity Server(s)		IBM® LinuxONE

European Bank
Modernize with data virtualization - Replicate once, use many

Business Requirements

Client needed to provide compliance with EU regulations – data serving to the Fast Payments application within a regulated timeframe. Client looked to optimize the data analytics process, reduce costs and time associated with the data offload.
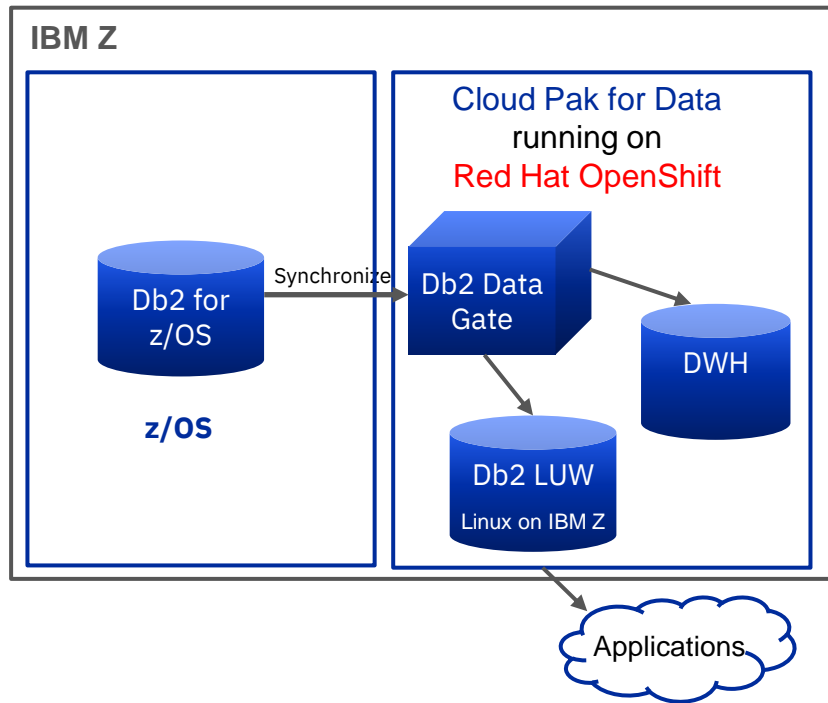
Solution Benefits

The solution proves that IBM Z always serves the data to the Fast Payments application running in a public cloud, even if the public cloud is experiencing outages.

The client replicates the Db2® on z/OS read-only data once with a low-latency / high-throughput mechanism based on Red Hat OpenShift and IBM Cloud Pak for Data – Data Gate technology, which feeds multiple data lakes.

The analytics transactions are being processed with the Cloud Pak for Data – Data Warehouse component, for faster results and optimized deployment.

Solution

IBM Z

Cloud Pak for Data
running on
Red Hat OpenShift

Db2 for z/OS

Synchronize

Db2 Data Gate

DWH

z/OS

Db2 LUW
Linux on IBM Z

Applications

European Bank
Modernize the access to z/OS data

Business Requirements

Client saw an increase in transactions. As a result, the cost of accessing the data in IBM Db2® on z/OS increased, and the client was looking for a solution to optimize the cost, while keeping the same high performance, security & scalability for the workloads.

Solution Benefits

After a successful PoC, the client deployed IBM Cloud Pak for Data – Data Gate on Red Hat OpenShift, running in virtual machines based on IBM z/VM, on IBM LinuxONE.

Db2 Data Gate makes z/OS data available and synchronized for ready access within a data fabric through IBM Cloud Pak for Data.

The client benefits are in the area of cost, security, latency, and resiliency.

Solution

Db2 for z/OS

z/OS

IBM Z

Db2 Data Gate

Cloud Pak for Data
Red Hat OpenShift
IBM z/VM

IBM® LinuxONE

Users
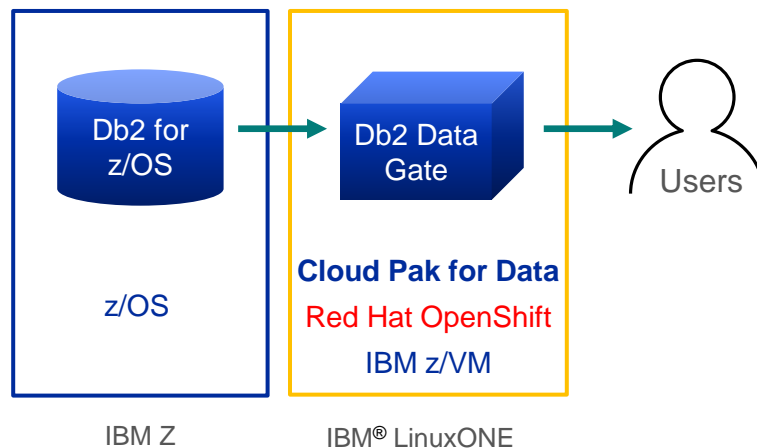
Large client in NA
Co-location with low latency
Multi-arch development & deployment

Business Requirements

– Increase competitive business offerings by extending and modernizing

– Maintain SLAs

– Keep risk and cost low

Solution

Containerized services running in Red Hat OpenShift are co-located to IBM z/OS workloads.

Creating a model, where applications running on Red Hat OpenShift on IBM Z and x86, can share the same processes for development and deployment as multi-arch applications are developed once and deployed where it makes sense.

Solution Benefits

– Red Hat OpenShift deployments on IBM Z and x86 are sharing the same container registry creating a single registry for all architectures

– Developers got platform agnostic development environment

– Modernized development and deployment - all the way - through the usage of containers on IBM Z

Sagicor Bank
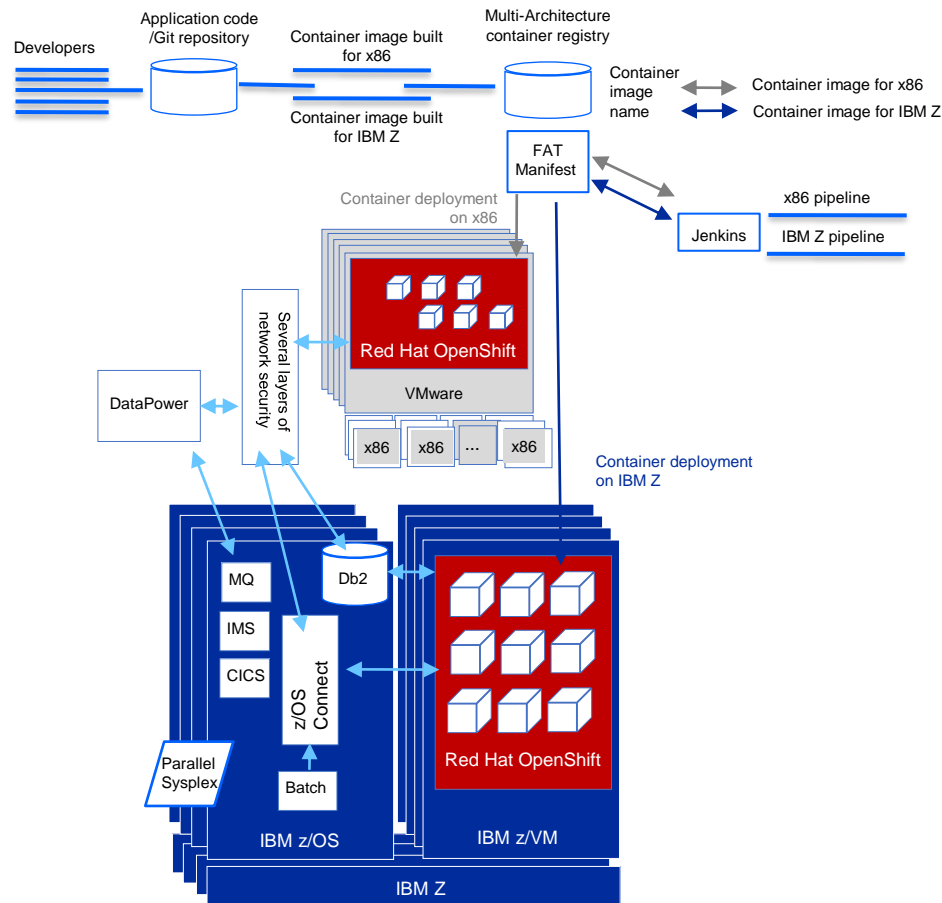
Sagicor

Business Requirements

Sagicor wanted to increase productivity, enhance security, and ultimately, aim to improve on service to its clients

Solution Benefits

The solution will improve Sagicor Group's ability to manage large and complex data and applications from businesses across the group.

With the cutting-edge technologies it is expected to slash Sagicor's operational costs significantly, as well as pay for themselves within three to four years. Sagicor anticipates savings of approximately US$4M, or just under US$1M annually from improved efficiencies.

Sagicor Bank clients can expect to experience reduced wait times and smoother service delivery upon full implementation in 2022.

www.sagicor.com/en-JM/News/sagicor-bank-reduces-wait-time-with-new-technologies

Large client in LA
Accelerate application modernization

Business Requirements

– Modernize and become agile in applications and processes.

– Modernization of native z/OS ecosystem and integration with hybrid cloud and DevOps strategy.

– Usage of open-source software and microservices managed by a Kubernetes platform.

Solution

IBM z16 to maximize investments, optimizing the infrastructure, accelerating IT deliveries and enabling innovation.

IBM zCX Foundation for Red Hat OpenShift for modernized applications and alignment of the enterprise deployment pipeline.
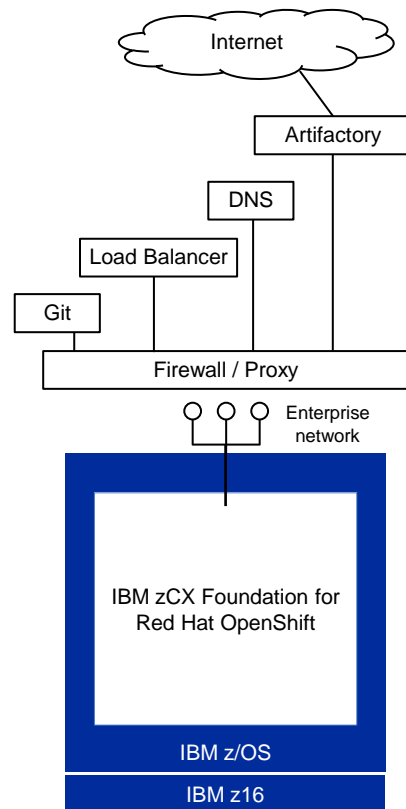
Solution Benefits

IBM zCX Foundation for Red Hat OpenShift offers the option to extend private cloud deployment, while leveraging the concept of hybrid cloud.

z/OS ecosystem modernization using corporate cloud native applications, as well as integration with corporate DevOps framework.

Benefits of IBM z16's quality of service, security, availability, and reliability for running open-source and cloud-native applications.

IBM z16 provides AI and quantum-safe aspects in applications, maximizing security and performance.

Internet

Artifactory

DNS

Load Balancer

Git

Firewall / Proxy

Enterprise network

IBM zCX Foundation for Red Hat OpenShift

IBM z/OS

IBM z16

Use cases – Financial Services

Large client in NA
Co-location with low latency on IBM Z

Solution Benefits

7.3x lower transaction latency compared to the equivalent distributed systems architecture

Developers got a platform agnostic development environment

Extend the container platform all the way to IBM Z

Exploiting co-location on IBM Z, the clients benefits from lower transaction latency compared to the equivalent distributed architecture, offering a more competitive and efficient service to its customers.
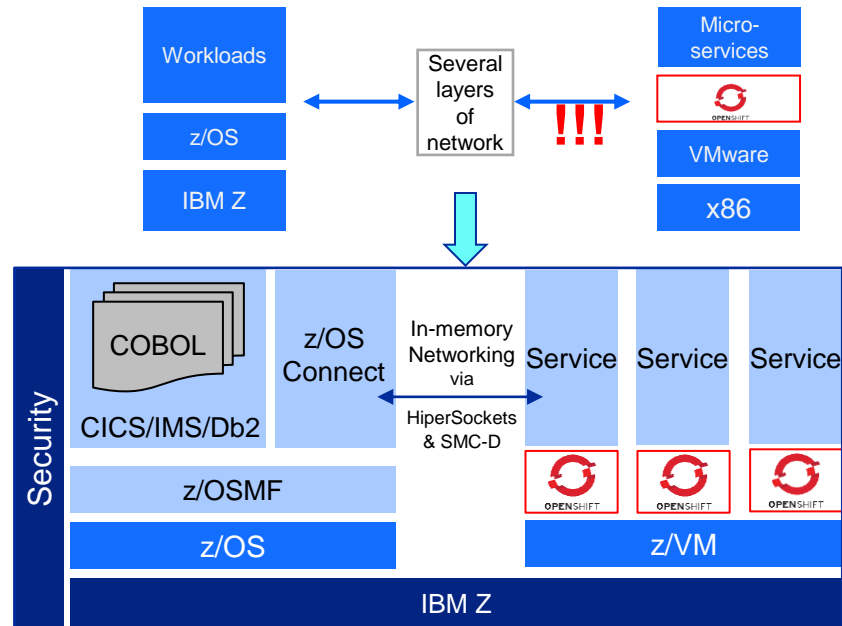
Business Requirements

Increase competitive business offerings by extending and modernizing the integration with existing assets while maintaining SLAs and keeping risk and cost low.

In Production

Containerized services running in OpenShift are co-located on the same IBM Z system with z/OS Db2 data and CICS for low latency, high volume transaction processing

Solution Elements

Client in LA
Accelerate enterprise digital transformation

Business Requirement

Client drives digital transformation to cloud and microservices 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
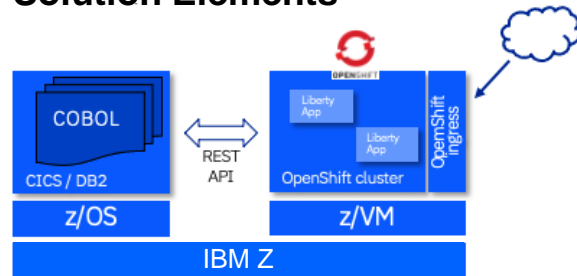
Solution Benefits

Red Hat OpenShift based services run co-located with existing z/OS assets on the same IBM Z system, benefiting from low latency and high scalability.

Client started its transformation by using Java, now using Liberty on Red Hat OpenShift in z/VM based virtual machines on IBM Z.

In Production

– CI/CD pipeline integration with OpenShift on IBM Z
– Application portability
  • IBM WebSphere® (x86) to Liberty (s390x)
– Better scalability with Red Hat OpenShift on
– IBM Z
– From 1500 queries/min to 650,000 queries/min
  • 43x improvement

Solution Elements

Large client in NA
Recovery time reduction to ensure SLAs

Solution Benefits

By leveraging the DR capabilities of IBM® LinuxONE and IBM Storage, the customer was able to achieve over 8x reduction in recovery time while achieve 20-30x improvement in system throughput*.
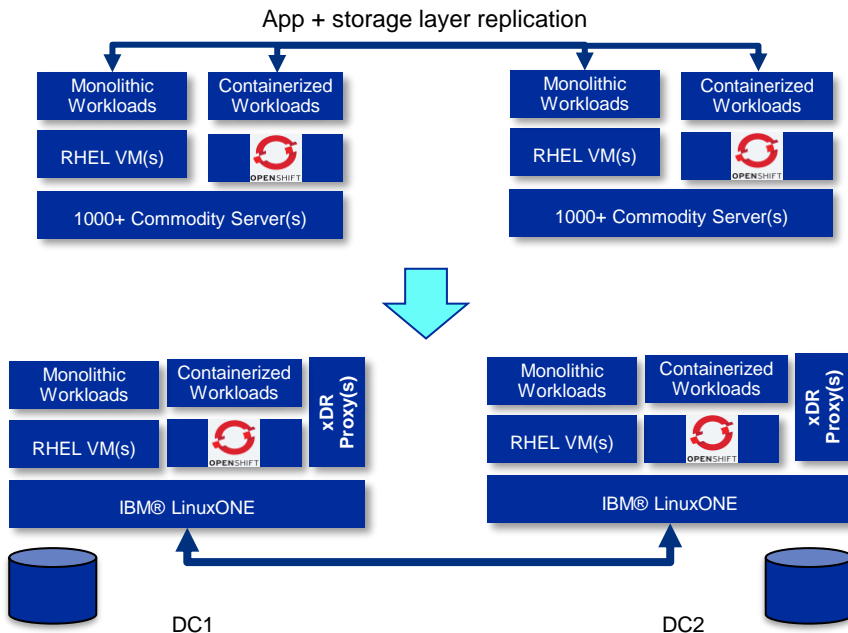
Additionally, new Kafka broker deployment took < 10 minutes vs several months improving scalability.

* PoC in-progress

Business Requirements

Time of datacenter recovery was too high during a DR exercise (Recovery Time Objective > 4 hours), which was insufficient to meet SLAs and was impacting business continuity.

Solution

App + storage layer replication

| Monolithic Workloads | Containerized Workloads | | Monolithic Workloads | Containerized Workloads |

RHEL VM(s) | OPENSHIFT | | RHEL VM(s) | OPENSHIFT

1000+ Commodity Server(s) | | 1000+ Commodity Server(s)

| Monolithic Workloads | Containerized Workloads | xDR Proxy(s) | Monolithic Workloads | Containerized Workloads | xDR Proxy(s) |

RHEL VM(s) | OPENSHIFT | | RHEL VM(s) | OPENSHIFT

IBM® LinuxONE | IBM® LinuxONE

DC1   DC2

Use cases – Service provider

Large Financial services provider (EU)
Co-location & CI/CD with IBM Z

Challenge

- Digital transformation goal for a cloud delivery service was challenged with disruptive development for services spanning distributed and IBM Z architecture.

- Highest requirements for reliability, security and performance, as well as an integrated and standard platform for digitalization in an agile, flexible and easy way.

Solution characteristics

- Single development and CI/CD pipeline integration with Red Hat OpenShift on IBM Z & application portability

- WebSphere Liberty with Java services across x86 and IBM Z

- The high scalability, automated with Red Hat OpenShift on IBM Z, and the simplified Go-To-Market process, led to the decision to go productive

  - Planning for next application move to Red Hat OpenShift on IBM Z

Public Sector service provider (EU)
Cloud services development and AI with easy move from x86 to IBM Z

I'm a bot: Which city service can I help with ?

Real Estate Tax calculations for buildings or ground developments, based on satellite picture analysis & compares with help of ML and AI routines on Red Hat OpenShift and IBM Watson on IBM Z

Challenge

- Prove of viability of Red Hat OpenShift on IBM Z as easy development platform for public services

- Red Hat OpenShift, a solid platform for scalable selected vendor applications and services not designed for IBM Z

- AI enabled verification for Geo changes and real estate
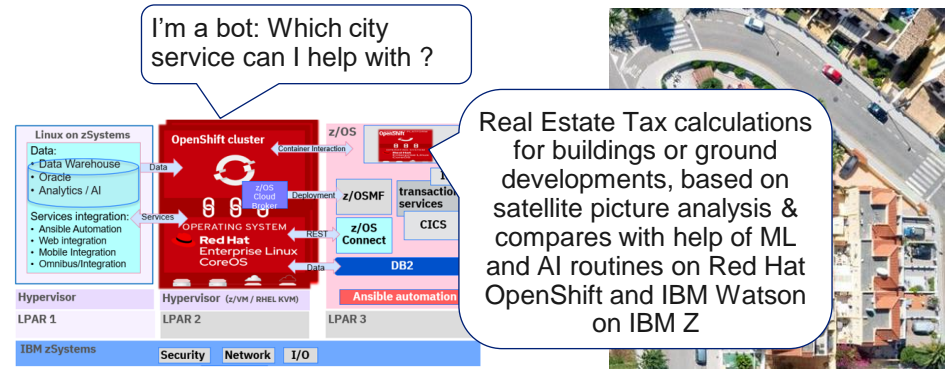
Solution advantage: RHOCP availability and scalability for SaaS

– Door opener: a communication bot for public services that could be replicated and extended with new functions and AI intelligence with guidance for public city services

– Second wow effect: a vendor application that needed more scalability was turned from x86 to IBM Z in 2 weeks and delivered highest reliability, security and robustness

– The solution was implemented as a converged HA & DR solution with Db2 for z/OS as backend data

– Ultimate use case implemented was to fulfill the requirement for an automatic real estate change control for taxes that can be replicated to other object change detection.

  • Implementation uses ML scoring in IBM z16^{TM} with Telum and AI algorithms

Use cases – Insurance

Large insurance client
Faster turnaround time with IBM zCX Foundation for Red Hat OpenShift

Challenge

Client needed flexibility for new applications and faster turnaround time for inquiries. It was a steady growth over the past few years, adding more service requirements to meet its business demands.

Based on these requirements, the client ran a Proof of Technology (PoT) to find the benefits of a Red Hat OpenShift in an IBM z/OS zCX environment on the IBM Z platform.

The PoT objective was to verify, which benefits exist, related to performance, portability and low latency of OpenShift in a zCX environment compared to the x86 environment.

100%

– Ansible script automated setup, aligned with the x86 procedure
– Reused Java & Node.js apps from x86 in zCX environment

40x

– Faster documents processing in zCX vs same workload on x86

50%

– Shorter response time from apps with zCX Foundation vs. x86 to Db2 for z/OS
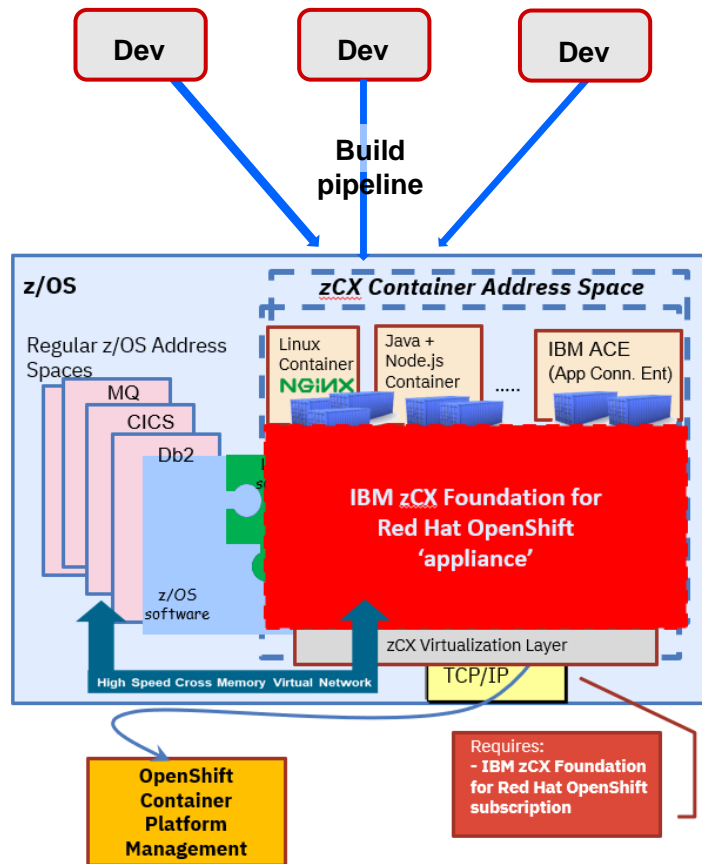
Use cases – Healthcare

US health organization

Modernization with hybrid cloud for AI applications

Challenge

The client provides data, analytics, research, consulting, and technology to hospitals, physicians, and health plans.

The client datacenters were full and power usage at maximum, they needed to find a solution to scale the applications.

They were encountering scalability issues on their x86 environment, especially for the new AI applications.

Solution

A hybrid cloud solution was developed between the client and IBM using a combination of PaaS and IaaS models, offering options for the AI application teams for either self management or managed services.

VMs are configured on IBM® LinuxONE 4 to service multiple workload types, including Red Hat OpenShift as the foundation for PaaS and IBM Cloud Infrastructure Center for IaaS.

Solution benefits

The client is now able to dynamically scale its AI application. Leveraging the new IBM Telum® processor with an AI app is up to 75% faster compared to their x86 servers with GPUs.

The new hybrid cloud datacenter options, including PaaS and IaaS, give the client's application teams flexibility and cost efficiency for the service management models.

With the IBM® LinuxONE 4 server the client is able to consolidate the application workloads, while reducing the datacenter space and energy compared to the x86 environment.

Use cases – IBM hardware development

IBM Z Firmware
Modernization of DevOps with Red Hat OpenShift on IBM Z

Solution Benefits

"The first use case we implemented was to migrate their multi-user development server to 'interactive containers' running on Red Hat OpenShift on IBM Z", said Edmund Breit, Senior IT Specialist, IBM Z Firmware Delivery & Support.

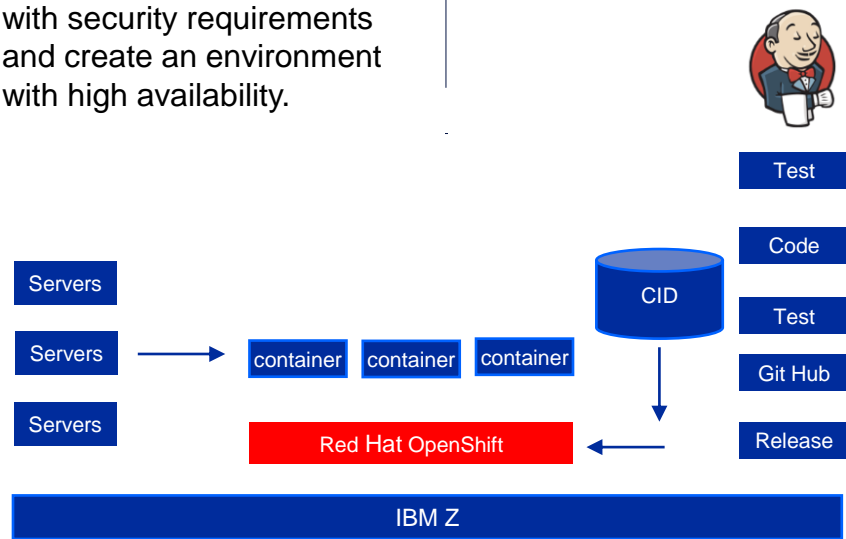"This enabled us to use the access control features of OpenShift and meet the IBM security requirements for developers."

The next use case they deployed was to use Jenkins for the Continuous Integration and Development (CID) pipeline within Red Hat OpenShift, supporting greater scalability and enabling updates to be packaged and then included in the next driver update. This simplified the pipeline automation and can also potentially enable future multi-arch support for both s390x and x86 firmware production in the future.

Challenge

The DevOps team needed to improve flexibility, security, availability and scalability of their development process. They needed an efficient way to easily extend the existing Jenkins setups to add new workers, update new service with security requirements and create an environment with high availability.

In Production

Modernization of DevOps process on Red Hat OpenShift and IBM Z

Thank you