Regional Conference GSE Belux

Application Modernization in a hybrid multi cloud world

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Agenda

- Multi Hybrid Cloud
- Application Modernization
- Enterprise Systems
- Use Case

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Only 20%

Cloud accelerates business transformation

- Innovate with the latest technology from any source
- Access more types of data, analytics & AI, anywhere
- Improve return on existing investments

Yet less than 20% of enterprise workloads have moved to date. Why?

Source: McKinsey research

Emphasis has been on simple migration & innovation…

Unforeseen challenge

Increased TCO / lock-in from lift & shift

Driver

Lower Capex

#1 Priority for enterprise digital transformation

Modernize existing applications

Outcomes

Greater business agility
Access to data for insights

Unforeseen challenge

Integration, security, governance challenges

Driver

Building with new tech

Migrate

Lift & shift applications and workloads

Modernize

Update using containers and microservices

Innovate

Build new cloud native applications

Manage

Integrate and manage, multicloud

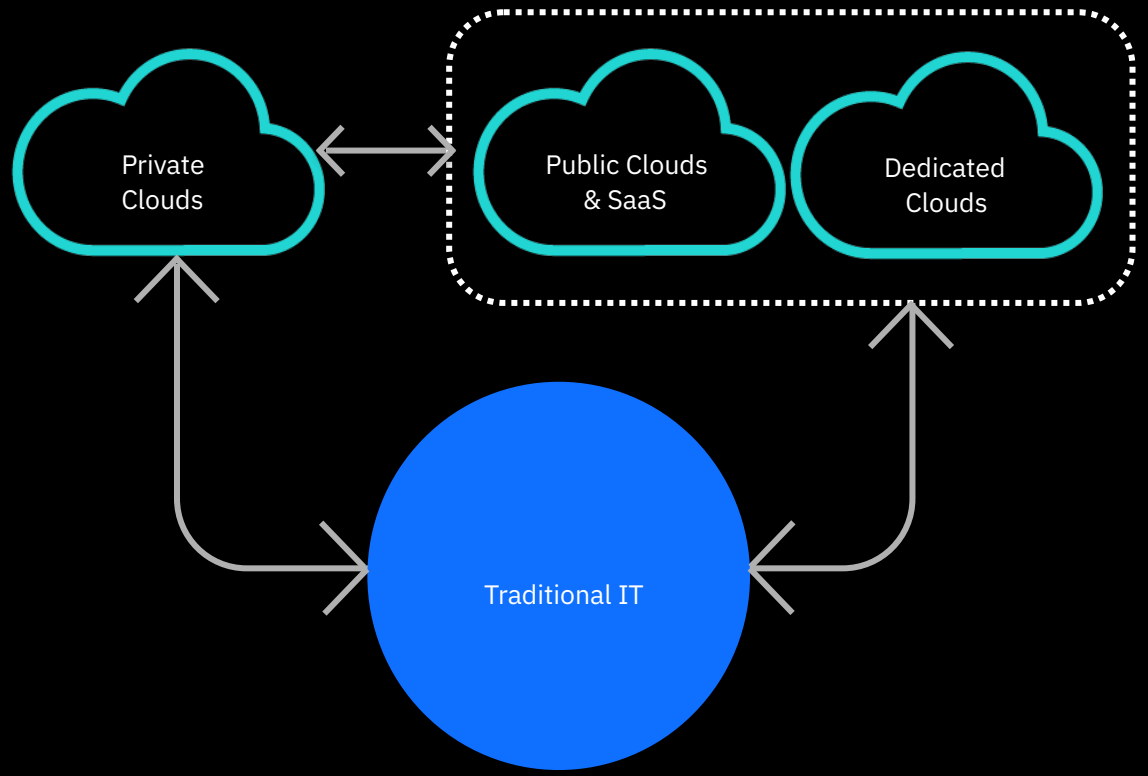
Source: McKinsey study / Forrester Study

What's preventing rapid modernization of the remaining 80%?

Unique workload needs – compliance, security, location - requires more choice

Multiple clouds & vendors – hard to connect / manage across clouds and IT

Lack of necessary skills – how do you prioritize and deliver modernization



Expertise

Cloud
90,000 experts
100,000 migrations
38 global studios

Security
60 Billion security events managed per day

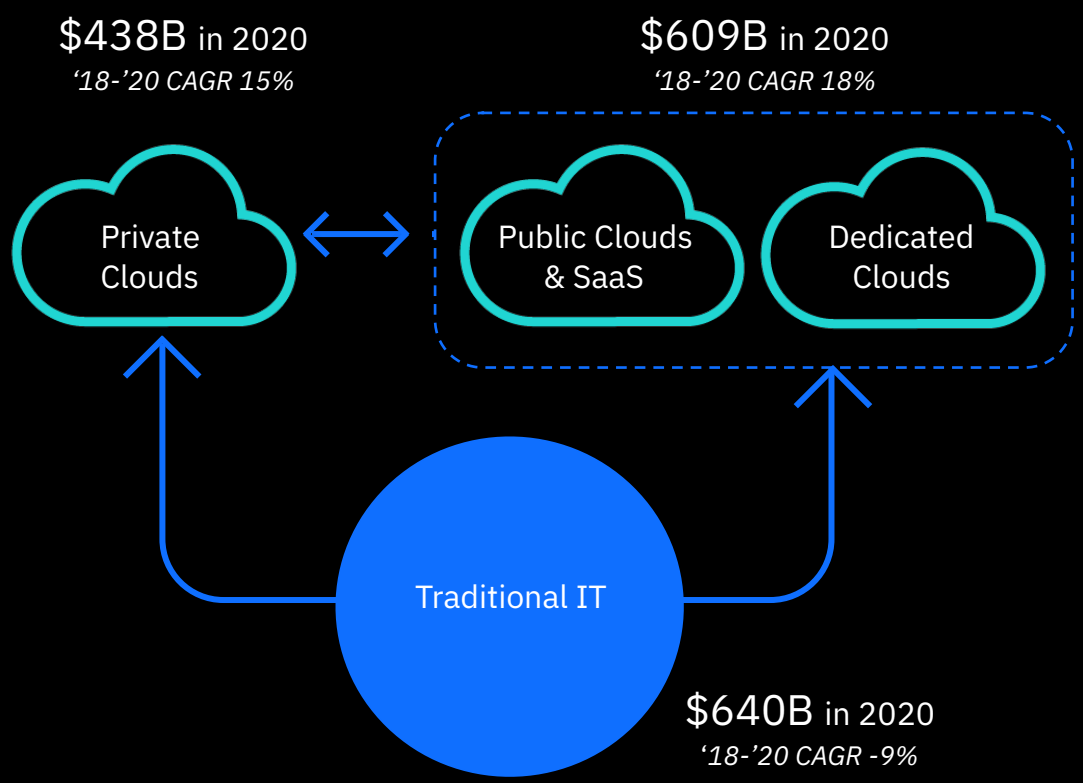
Data
20,000 data scientists, developers, and consultants

Industry
Depth in 20 industries
$6 billion in R&D;
Patent Leader 25 yrs

Source: McKinsey study

Today’s hybrid multicloud reality

Presents new opportunities for clients, as well as new challenges



A real world look at multicloud

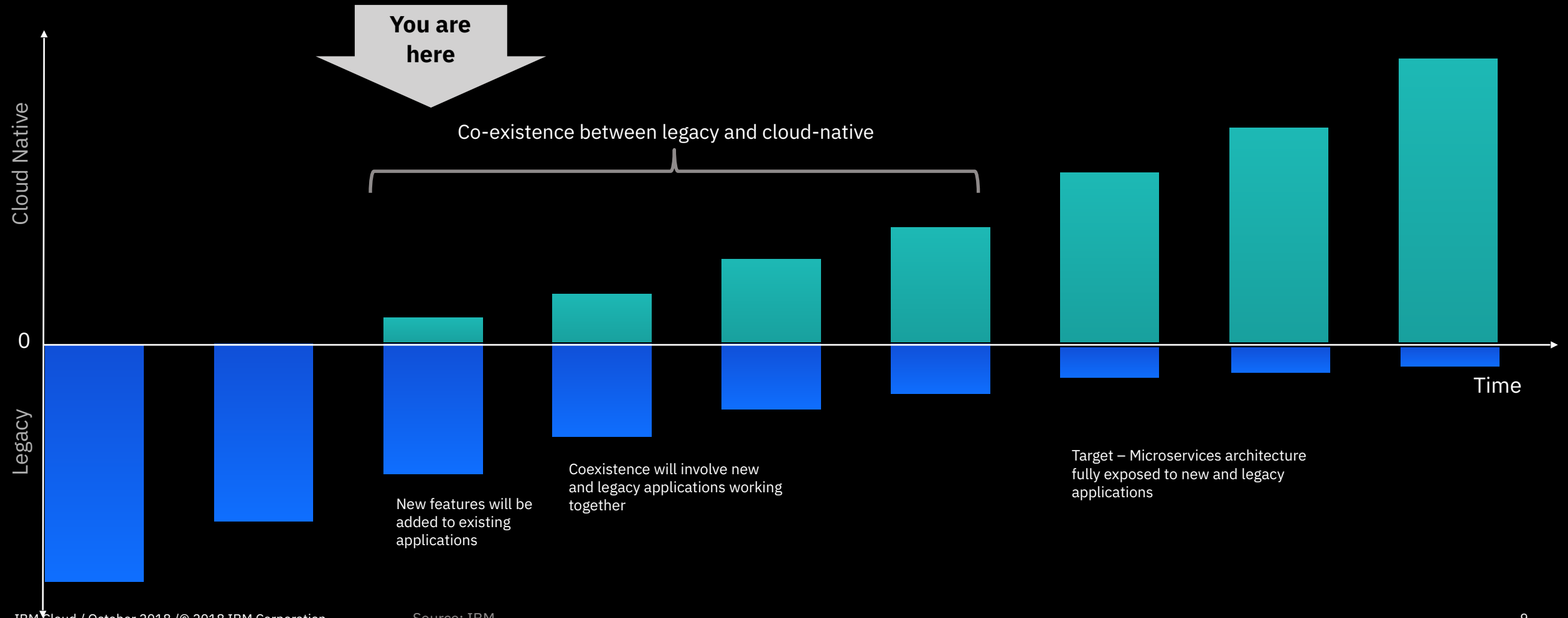
94% of enterprise customers are using multiple cloud environments (public and/or private)

67% of enterprise customers are using more than one public cloud provider (expected to remain constant or increase by 2022)

Movement between clouds	73%	priority concern
Connectivity between clouds	82%	priority concern
Consistency of management	67%	priority concern

Source: IBM MD&I; BCG and McKinsey research

Choice of transformation
Cloud Native & Legacy apps will co-exist for the next 10+ years



Source: IBM

IBM's ***Multi-Cloud Management*** capabilities

Govern & Optimize	**IBM Cloud Cost and Asset Management**	• Asset Discovery and Cost governance across major public clouds, VMWare environments and traditional on-prem
Monitor & Manage	**IBM Cloud App Management**	• Traditional *server and container monitoring*; Failure *prediction and avoidance*
Build & Provision	**IBM Cloud Automation Manager**	• ***Automate service provisioning: any cloud, any architecture; Build services that are easy to consume from the ICP Catalog***
Kubernetes Management	**IBM Multi-Cloud Manager**	• ***Automate application provisioning/management for Kubernetes environments***
Management Control Plane	**CaaS** **Cloud (Public & Private)**	• Common cloud management control and data plane - Secure, highly available, portable, single pane of glass operations, single point of control • Common shared services - IAM, logging, monitoring, etc. • Transformation capabilities, DevOps Capabilities, Data and Analytic Capabilities • Flexible, extensible, adaptable to specific customer requirements

All Infrastructure

Kubernetes

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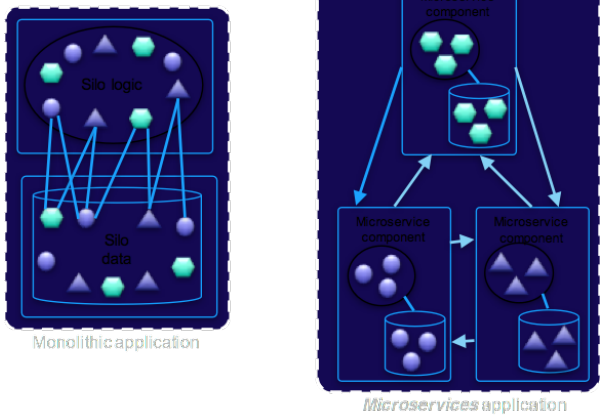
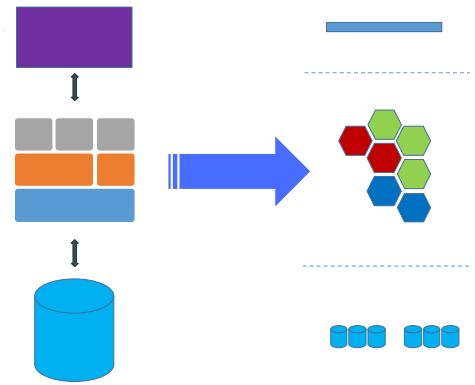
Microservices

Microservices decompose monolithic applications into single-function modules with well defined interfaces which are independently deployed and operated by small teams who own the entire lifecycle of the service

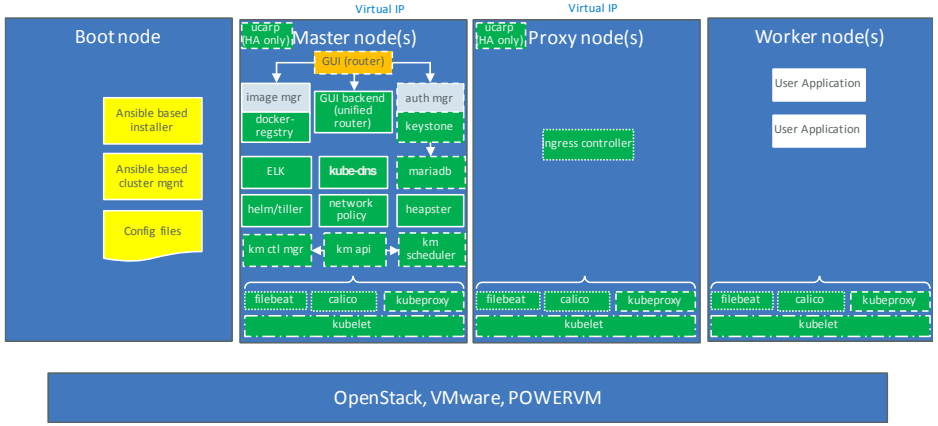


Containers



A standard way to package an application and all its dependencies so that it can be moved between environments and run without change.
Containers work by hiding the differences between applications inside the container so that everything outside the container can be standardized.

Kubernetes



Enterprise Application transformation

1 OPTIMIZE

Reduce cost and improve performance by selecting the right license and deployment model for existing workloads

2 MOVE TO CLOUD

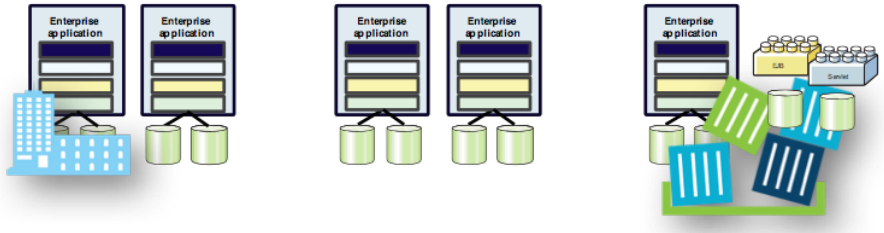
Move workloads to the cloud to **benefit from Cloud economics, scale,** deployment automation, and improved development agility.

3 CONTAINERIZE

Developers are dramatically improving **agility** using containers to **continuously deliver**, leveraging extreme standardisation and **automation.**

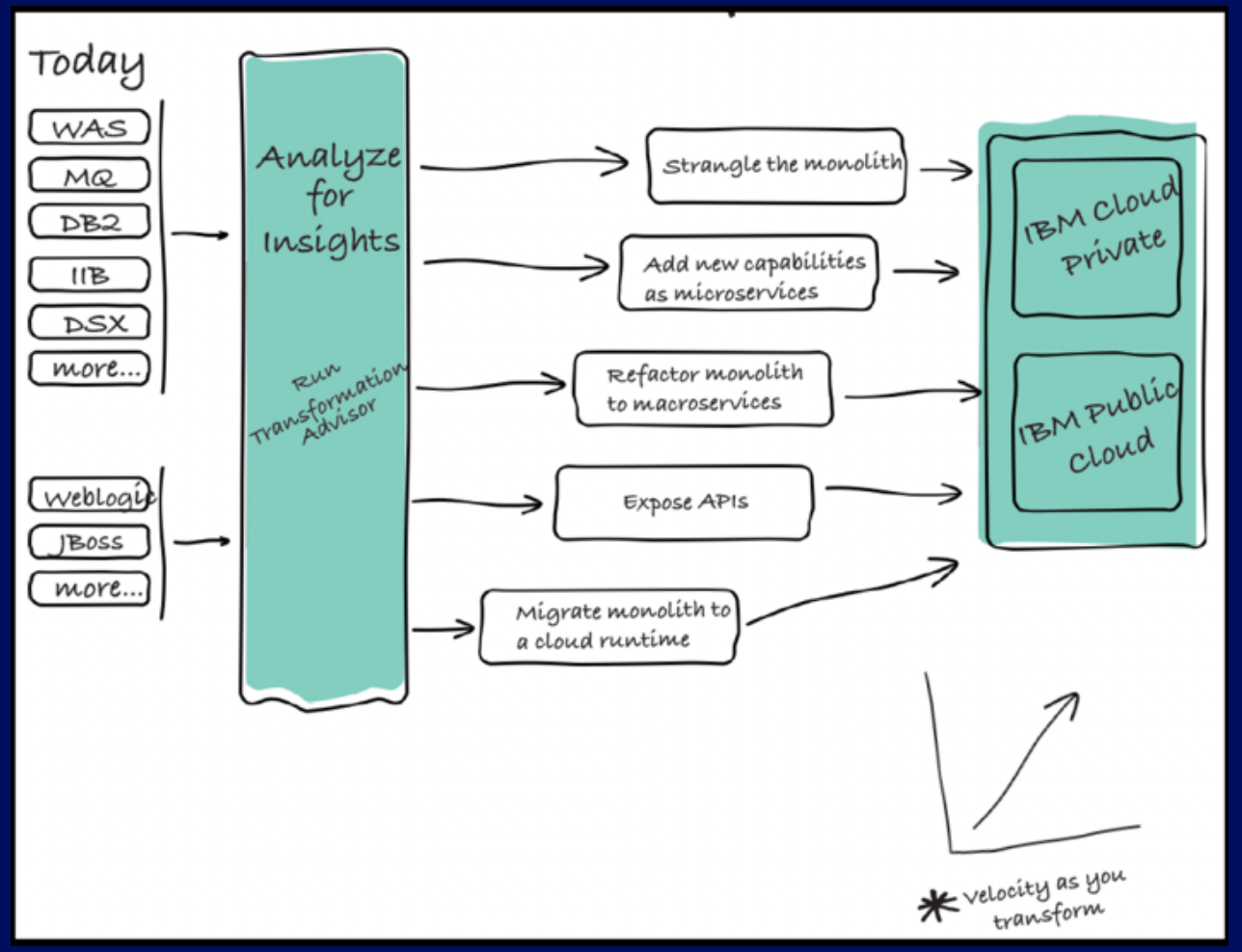
4 REFACTOR

Applications are being refactored to cloud native architectures to encompass APIs, micro-services and cognitive capability for **innovation and disruption.**



What Does App Modernization Mean Anyway ?

- Containerize an Existing Application / Workload ?
- Refactor Applications into Microservices ?
- Strangle Monolith over time with new Microservices ?
- Completely rewrite into new microservices ?
- Automate deployment ?
- Lift and Shift into a Cloud ?
- Expose Applications through API's ?
- Augment Old Code with new microservices ?
  APIs / Services (AI, Data Science) ?
- What About My Data !!!!!!!!



Microservices Fatigue ?

Stats

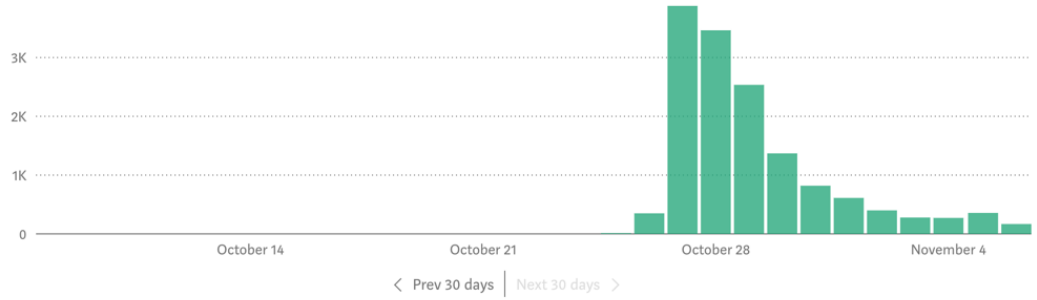
Click story below to view in chart

Learn more about using stats

14,521
Views (30 days)

8,319
Reads (30 days)

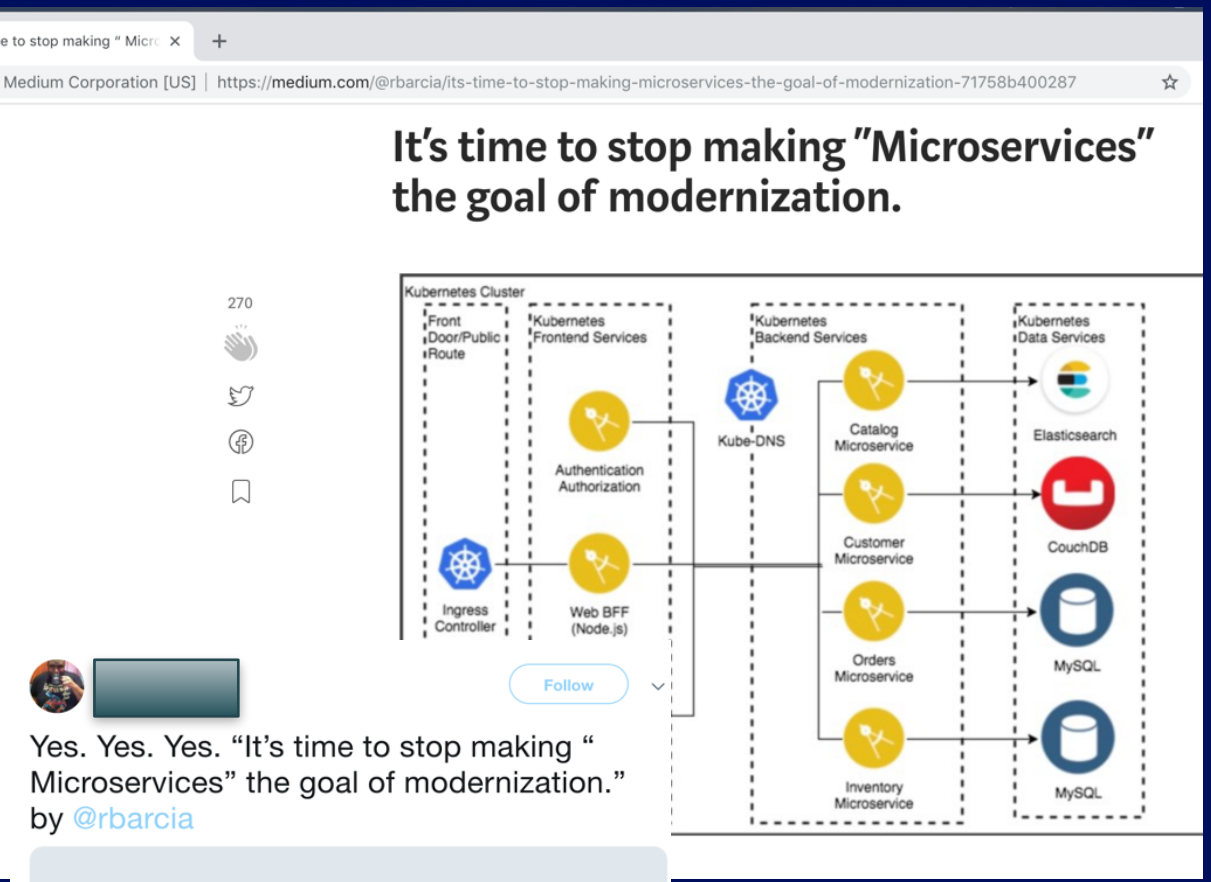
77
Fans (30 days)



Prev 30 days | Next 30 days

Stories Responses Series

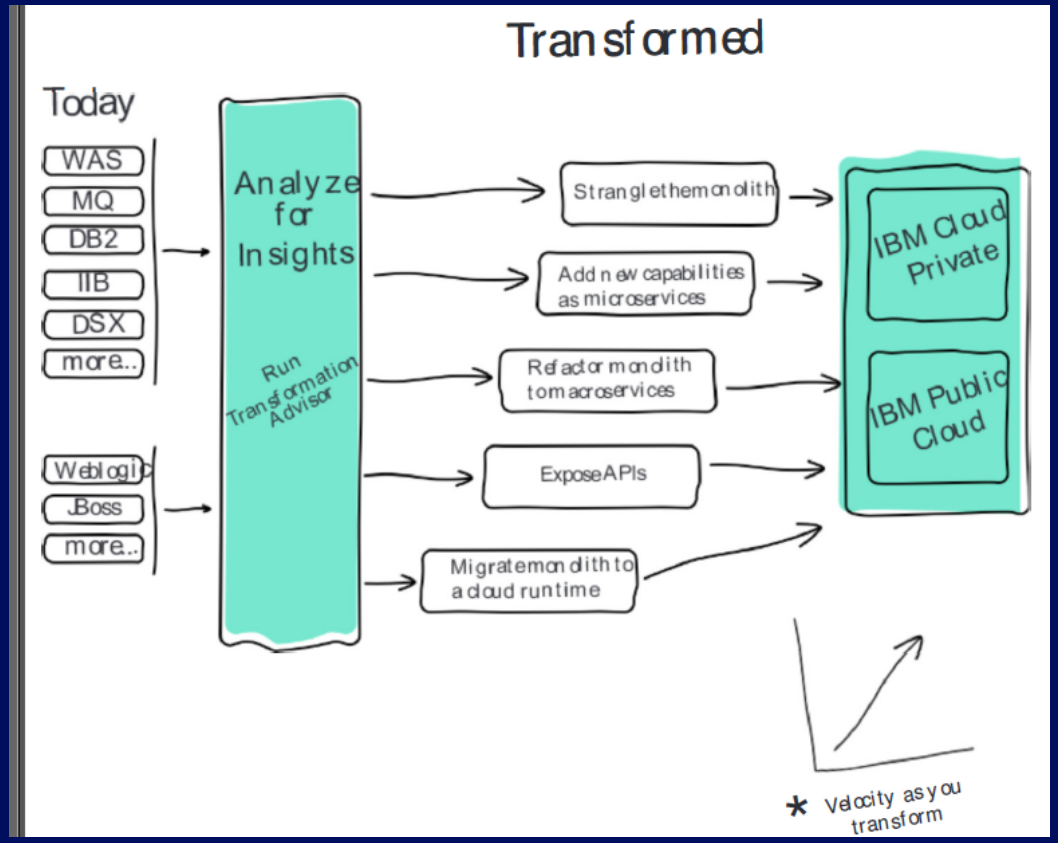
Date ↑	Views	Reads	Read ratio	Fans
It's time to stop making " Microservices" the goal of... 2 min read · View story · Details	14.5K	8.3K	57%	77



IBM’s approach to App Modernization

CHOOSE THE APPROACH THAT BEST FI TS YOUR NEEDS

- Containerize the monolith:
  - Reduce costs and simplify operations
- Expose on-prem assets with APIs:
  - APIs enable legacy assets that are difficult to cloud enable
- Refactor into macroservices:
  - Break down monoliths into deployable components
- Add new microservices:
  - Innovate incrementally and establish success early
- Strangle the monolith:
  - Incrementally sunset the monolith

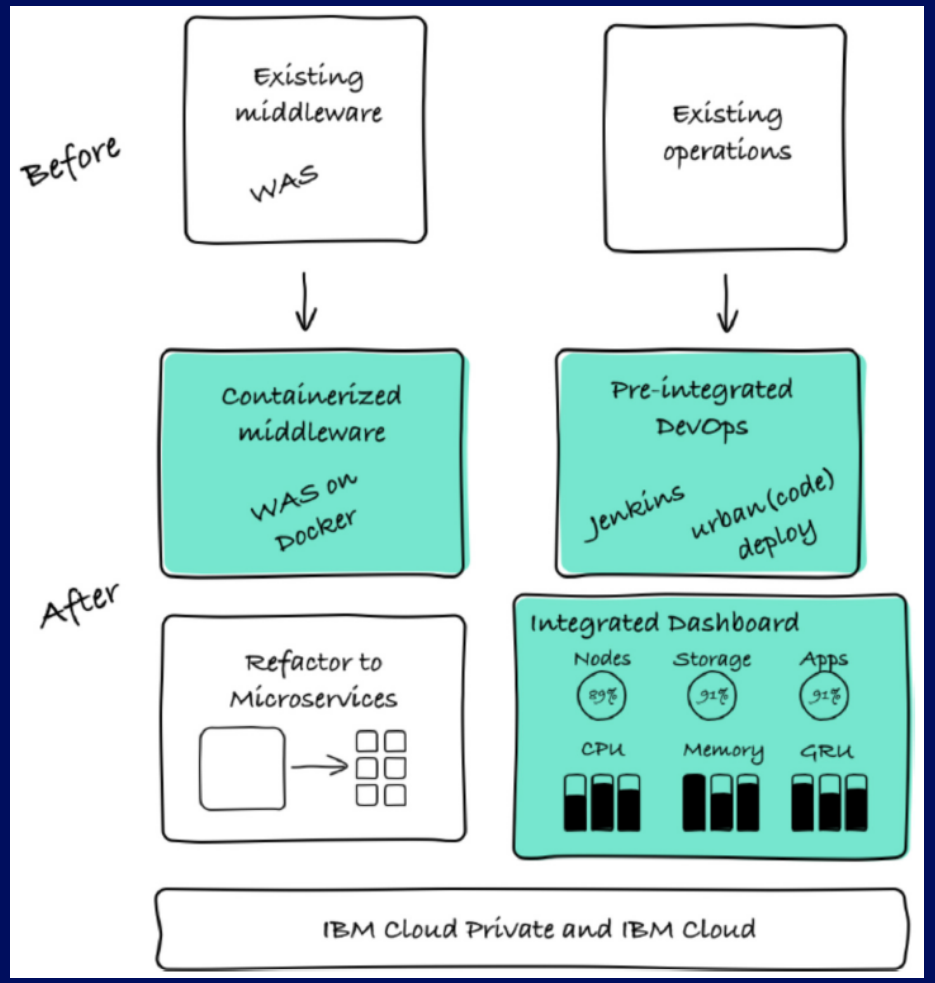


Containerize your apps

- Containerized middleware and apps are key to modernization
  - Leverage IBM provided prebuilt containerized middleware
- An integrated, container-native operations and DevOps platform is a requirement (ICP / IKS)
- Wrapping an application in container image is a good 1st step, but many applications are not optimized for containers
  - Load balancing, application state handling, and monitoring are different in containerized applications
  - You might need to rewrite portions of your applications

YOU WRAPPED YOUR APP IN A DOCKERIMAGE- NOW WHAT?

- Adapt your applications to the container environment
- Modernize your DevOps and Configuration
- Modern your Operations

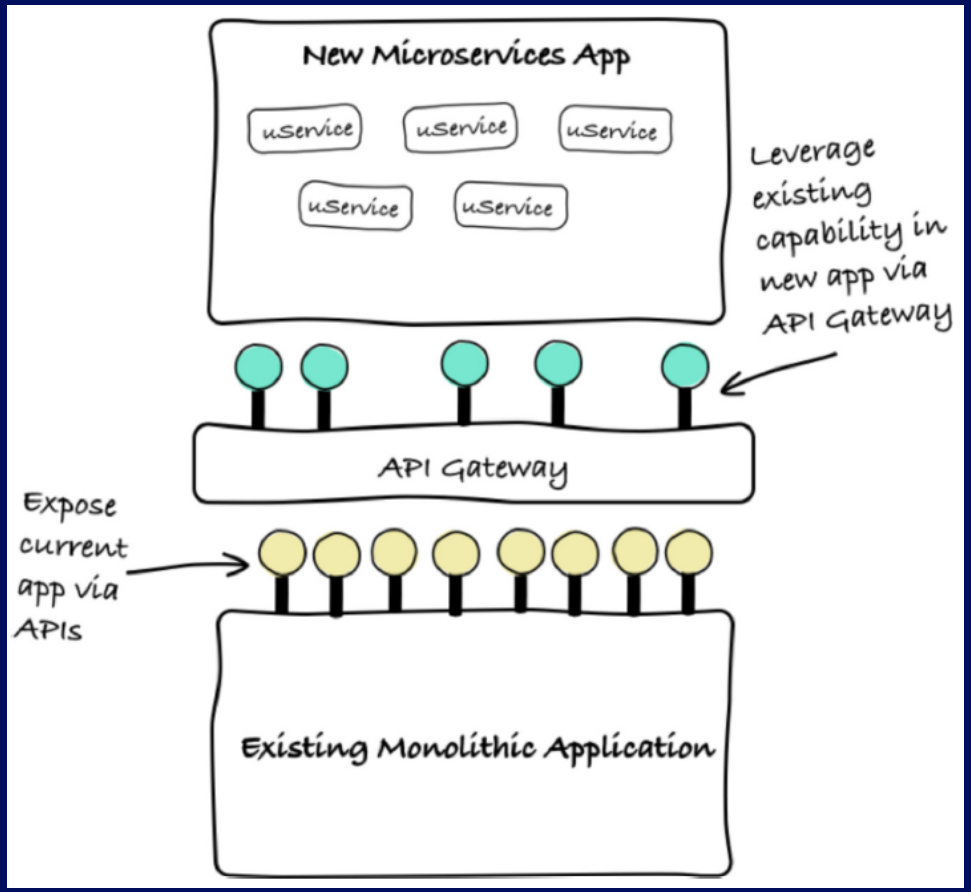


Expose and Integrate

- Some existing applications are best exposed as APIs.
  - They then become reusable assets that are easily leveraged for building new capabilities that augment the existing application

UNLOCK BUSINESS VALUEFROM EXISTING SYSTEMS

- Expose existing value as REST APIs for easy access
- Place APIs under management control to improve security,
  performance and visibility.
- New applications can leverage API ’s from existing applications without requiring changes to existing applications

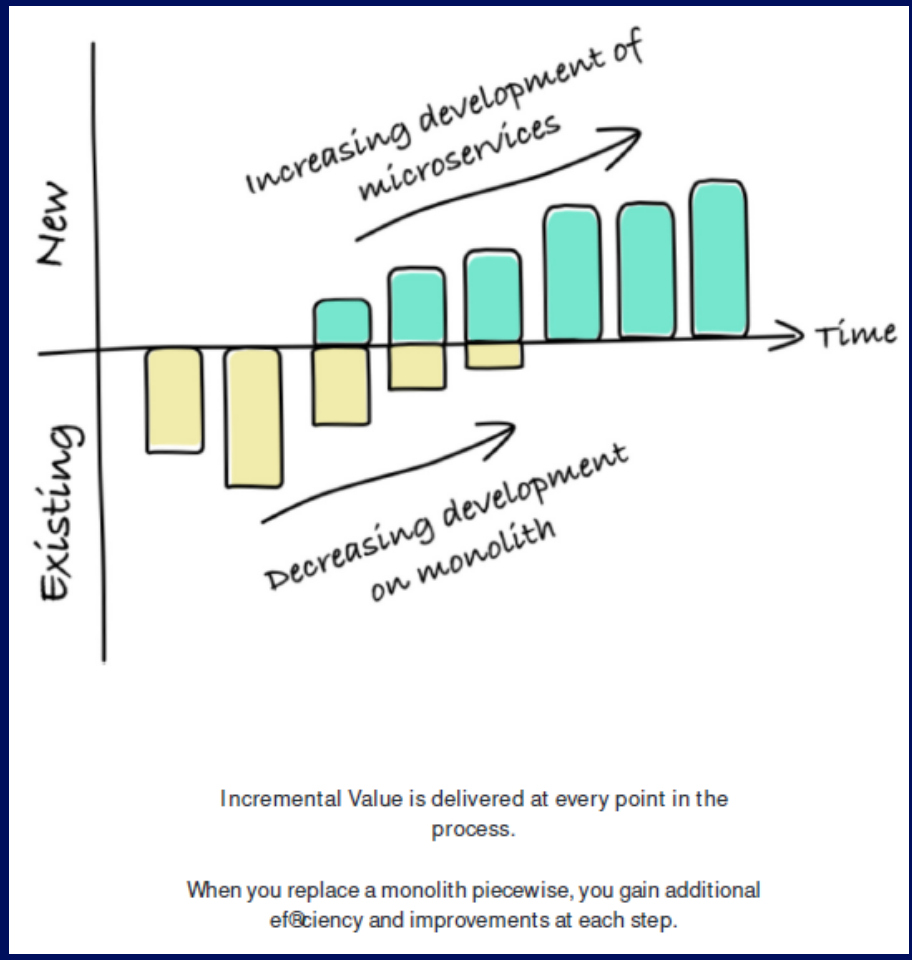


Refactor

- Refactoring is the process of replacing existing, hard to maintain
  code with new, better code in a piecewise way
- You “ **strangle**” the old monolith by replacing each business function incrementally

MODERNIZE INTELLIGENTLY

- Refactoring an application to microservices improves developer productivity
- You can begin with repackaging your monolith as a container with Liberty
  - Then, add new containers to your solution as you separate business functions into new microservices



Transformation uses multiple concurrent approaches

… to minimize risk & cost while leveraging new & existing investments to innovate & differentiate

Application Portfolio

- Customer Information
- Payment Systems
- Business Process
- New Applications

Lift-*Standardize-Consolidate-Automate*-Shift

Bare metal, VMs, **Containers**, Automation - SDDC

Contain-*Expose*-Extend

API Creation & Management, Connectivity & Integration, **Containers**

Refactor/Create as Cloud-Native/Microservices

Event-Driven, aPaas, **Containers**, Microservices

Data Classification, Movement & Governance

Cognitive Data Classification, High-volume data transfer, Metadata Management

Evolution to Cloud-based Application

- Base Virtualization with Standardization & Automation

- Cloud native
- Loosely-Coupled
- 12-factor
- Horizontal Scaling
- Eventually consistent
- Microservices
- Auto-scaling
- DevOps & CI
- Self-recovering

VMs | Containers | aPaaS | iPaaS
Event Driven

On-premises | Off-premises

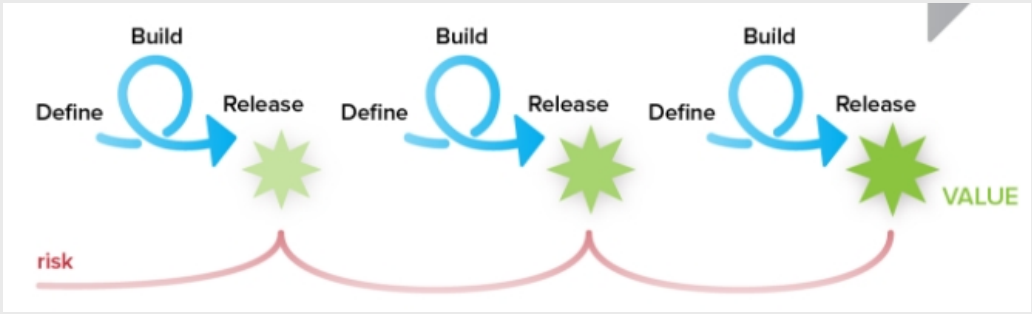
Modernization is difficult without Some Culture Change

Traditional IT

- Planned, process-oriented
- Goal to look good - „it‘s not me“
- Saviour syndrom, „heros“
- Goals per business unit
- Expertise
- Be protective of information
- Be comfortable in static environment
- Risk-averse
- Reaction to challenge : helplessness
- Default attitude is „no“
- Silos (Dev -> Admins)

Cloud

- Iterative, agile
- Goal to learn - blame-free, no finger-pointing
- Learning organization
- Common goals across all units
- Collaboration, Sharing
- Transparency
- Be comfortable with changes and dynamics
- Risk-receptive
- Reaction to challenge : resilience
- Default attitude is „yes“
- Squads



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IBM Cloud Private and IBM Z / LinuxONE are the perfect combination

The right technology

- ✓ Open, standards-based
- ✓ Enterprise Linux
- ✓ Highly integrated, hybrid focused
- ✓ Uniquely cognitive

The right infrastructure

- ✓ Best scalability and elasticity
- ✓ Most resilient
- ✓ Highest security
- ✓ Best performance and lowest cost

+

Summary

IBM Cloud Private on IBM Z or LinuxONE is a *Perfect Combination!*

4.6x more throughput

IBM Z / LinuxONE delivers 4.6x more throughput per ICP instance than x86 at constant SLA

50% less cost

When driving equivalent throughput at constant SLA, IBM Z / LinuxONE costs 50% less than x86

IBM Z / LinuxONE is better than x86

More scalable, more elastic

Better resiliency, higher availability

More securable

Minimized latency

Architecture Overview Diagram

Payment Fraud Detection Engine & Alert Management
Safer Payment

Banking APIs
API Connect

Branch Apps
Sopra Banking WebSphere Application Server Linux on z

Internet Apps
WebSphere Application Server Linux on z

Microservices Apps
Node.js
Liberty
Linux on Z

Customer Management
MDM server Linux on z

Payment Hub
FTM + Instant Payment z/OS

Banking services
CICS TG

Banking services (API)
z/OS Connect

Decision Server
ODM

MDM
DB2 z/OS

Payment
DB2 z/OS

Account Management, Loans
Sopra Banking
CICS, z/OS

Machine Learning
Machine Learning for z/OS

Predictive Modeler
SPSS Modeler Server

Business Intelligence
Cognos BI & SPSS

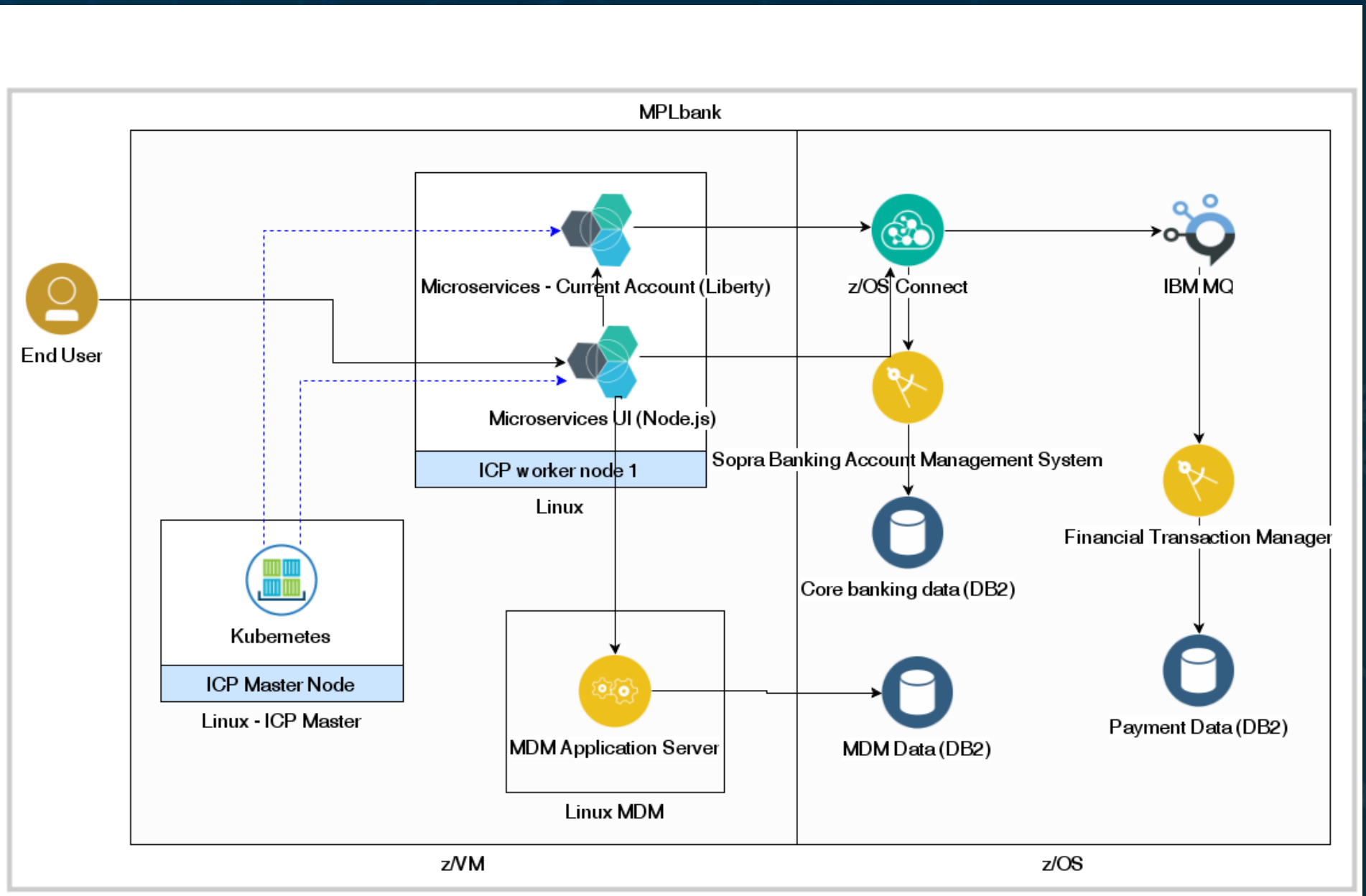
DW
DB2 z/OS

Core AMS Data
DB2 z/OS

Payment History
DB2 Accelerator

IBM Z

Microservice application hosted on ICP, integrated with z/OS Core Banking - Architecture Overview Diagram



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IBM has helped thousands of enterprises, across 20 industries realize a faster, more secure journey to cloud

American Airlines

Shift AA.com & VMware apps to cloud in 4 mo.

Westpac

Modernize apps 10x faster, 3x cheaper

Bradesco

3K new clients per day with new AI + mobile bank

Hertz

Consistency & control across IBM & AWS clouds

IBM Cloud


IBM