

Hybrid Cloud - What, Why, and How

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I Heard it on the Internet

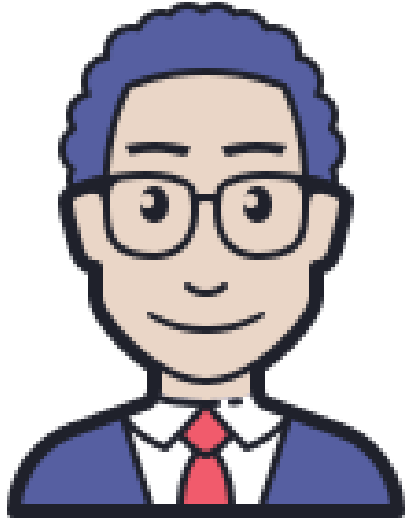
“5G towers can make you sick” → 1 in 4 people actually believe that

“More megapixels guarantees better picture quality” → The camera sensor, quality of the lens, and format the picture is stored in are really the key factors

“My data is safe because the vendor or service provider told me that” →



I Heard it on the Internet



“You should run all workloads on IBM Z”



“You should run all workloads in the cloud”

So Instead We Listened to You, Our Sponsor Users ...

Who

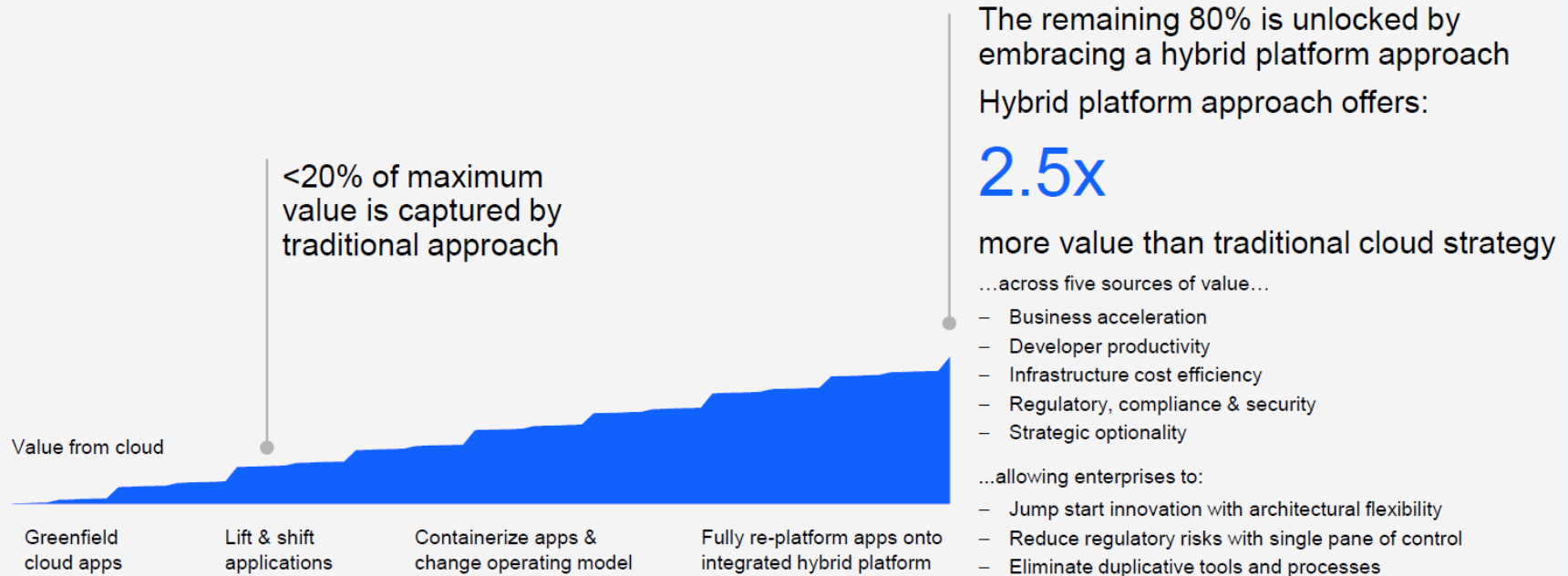
- Business Executive
- Enterprise Architect
- Application Architect
- Application Developer
- Quality Assurance Engineer
- Operations
- Coverage Programmer
- Systems Programmer
- Capacity Planner
- Data Scientist
- Chief Information Security Officer

Areas of Focus

- Services
- Data
- Modernization
- Application Agility
- Availability and SLAs
- Performance and IT costs
- Security and Compliance
- Monitoring
- AI Operations

... And Then Did the Analysis to Prove that Hybrid Cloud is the Solution

Less than 20% of cloud value can be captured with traditional approach to cloud transformation



Pillars for Hybrid Cloud



MODERNIZATION

Maximize your previous investment by leveraging your current infrastructure.

Modernize the critical components that address business challenges today, plan for medium and long term strategies to improve IT efficiency.

FREEDOM and FLEXIBILITY

It's critical to have freedom and flexibility to address current and new business challenges using current and new technologies.

Hybrid is trending to become the new standard, moving workloads to where makes sense is essential to succeed.

SPEED

"It's no longer the big beating the small, but the fast beating the slow."

Indeed, the challenge for many legacy brands is that they struggle to move as rapidly towards the future that digital disruptors have already staked out.

"Each time a consumer is exposed to an improved digital experience, their expectations are immediately reset to a new higher level."

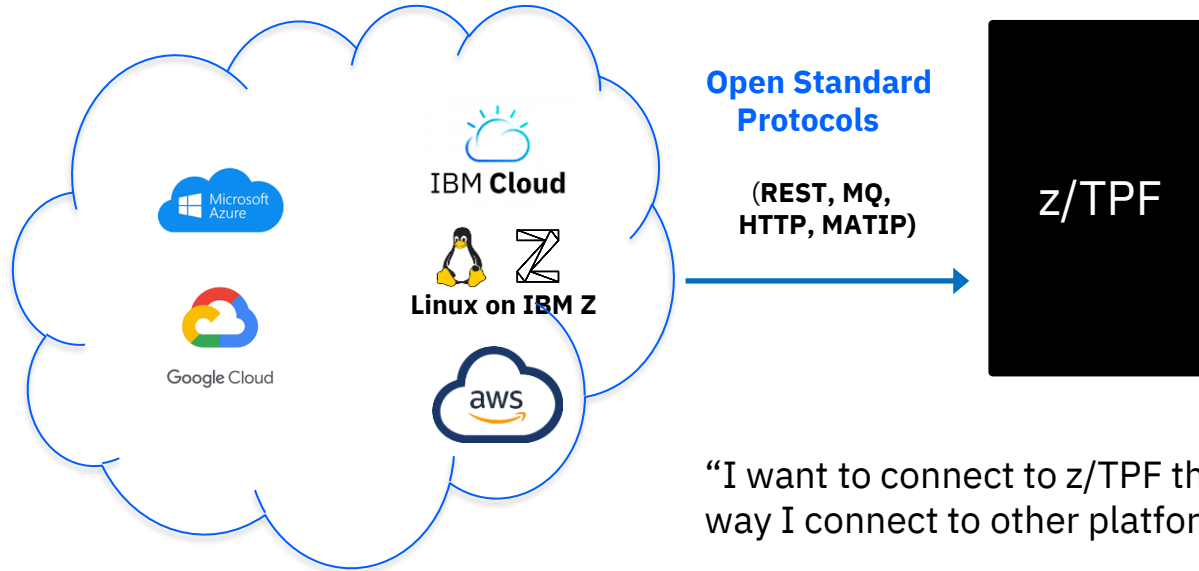
COMPLIANCE and SECURITY

Many laws of data privacy such as GDPR (General Data Protection Regulation), CCPA (California Consumer Privacy Act) as well as HIPAA, FISMA, PCI-DSS and GPG13 exist to improve security, minimize losses, increase control and maintain trust.

Protecting the information is key to retain customers as well as the company's reputation on the market. Security walks hand-in-hand with compliance and speed, proving a path to success.

Hybrid Cloud - Provide Easily Consumable Services

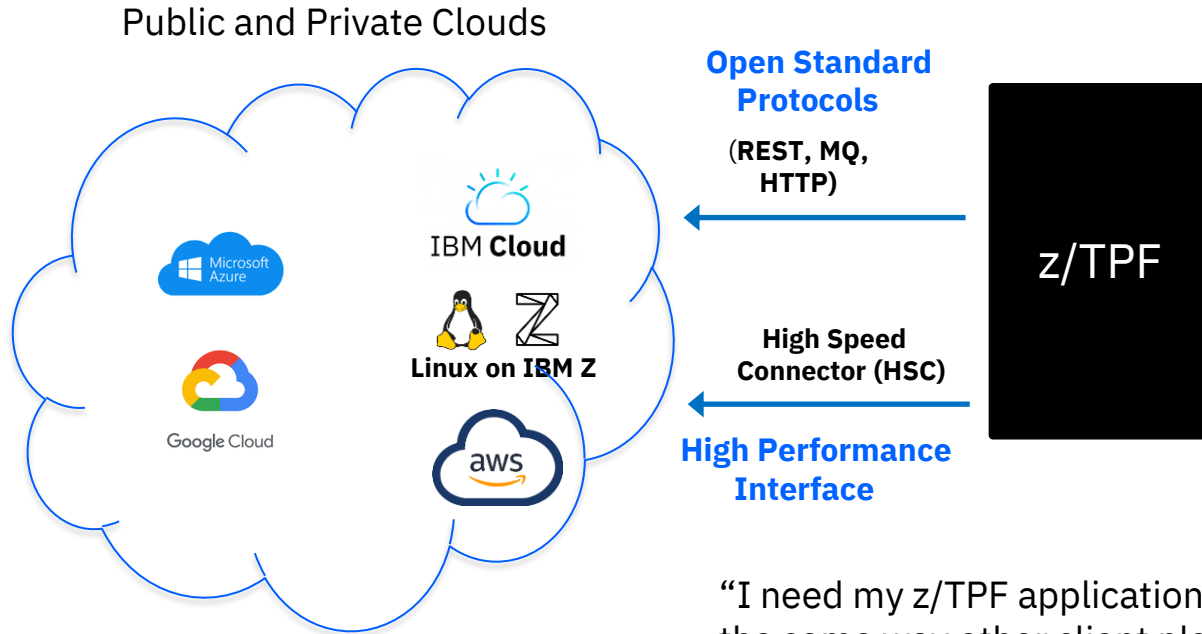
Systems of Engagement (SOE)
Public and Private Clouds



“I want to connect to z/TPF the same way I connect to other platforms”

“Externally, make z/TPF look like just another platform”

Hybrid Cloud – Consume External Services

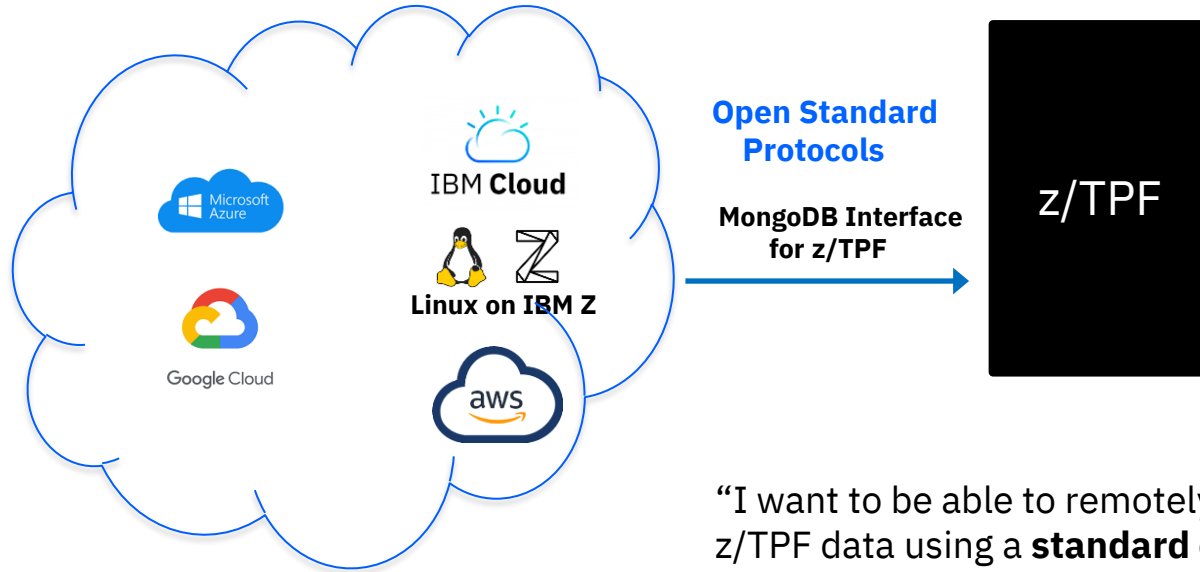


“I need my z/TPF applications to consume services the same way other client platforms do”

“I also want a higher performance interface for high volume in transaction external calls”

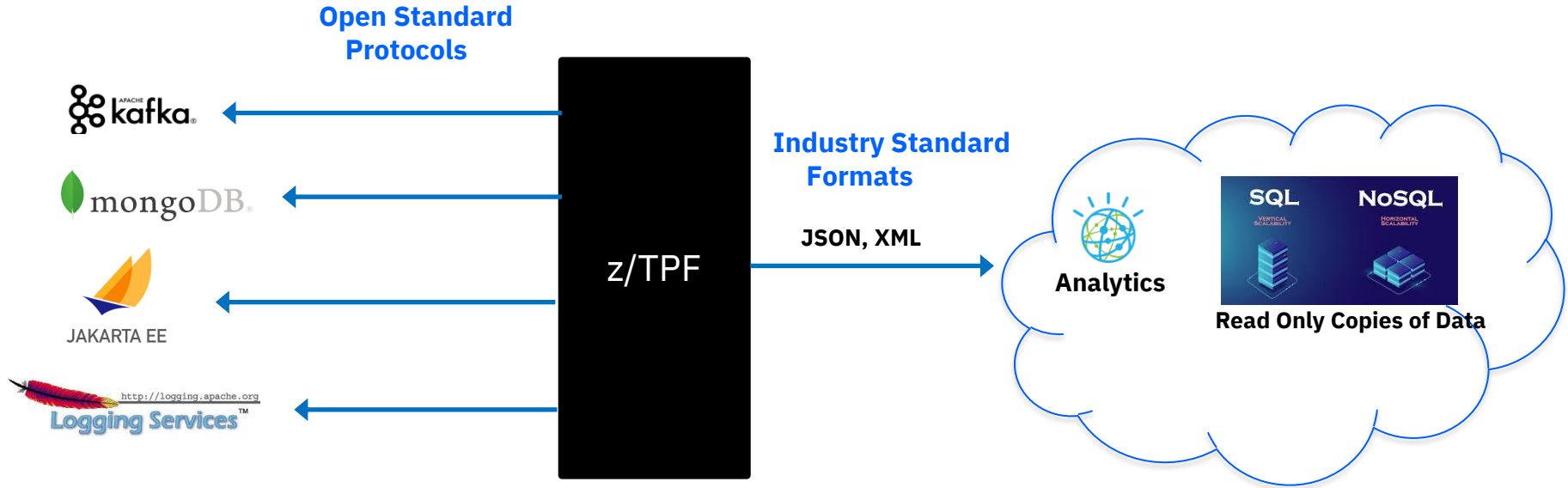
Hybrid Cloud – Make Data Easily Accessible

Systems of Engagement (SOE)
Public and Private Clouds



“I want to be able to remotely access and update z/TPF data using a **standard** client interface, the **same** data that local z/TPF applications are also accessing and updating”

Hybrid Cloud – Make Consumable Data Available in Real-Time



“When my z/TPF application updates a DB, I want a copy of some or all of that data automatically converted and immediately sent to one or more destinations”

“I want to be able to push data to other platforms using open standard protocols”

A Problem Occurs – What is the Cause?



Back in the day, it all ran on IBM Z
so you knew where to look



Nowadays, a workload is distributed across multiple
platforms with multiple connectors making it much more
difficult to identify the cause of the problem

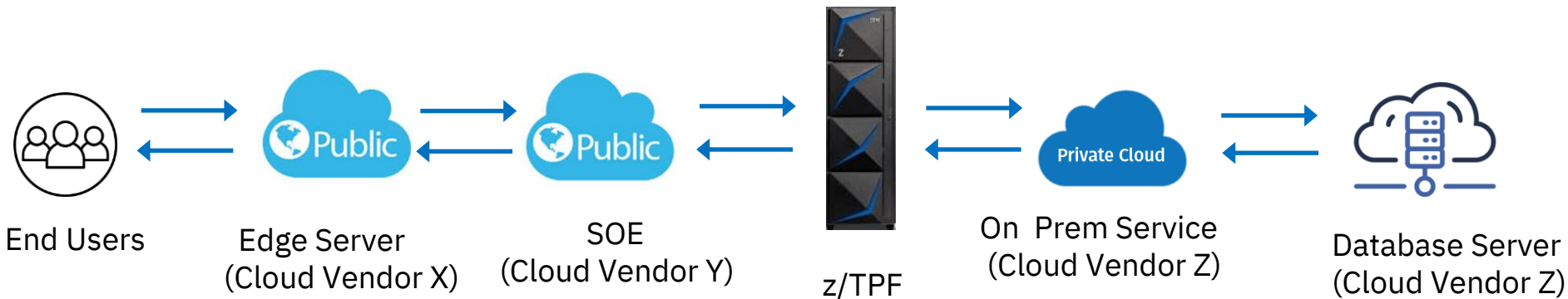
Sample Workload where One Transaction Involves Multiple Platforms

“My company still manages platforms as separate silos”

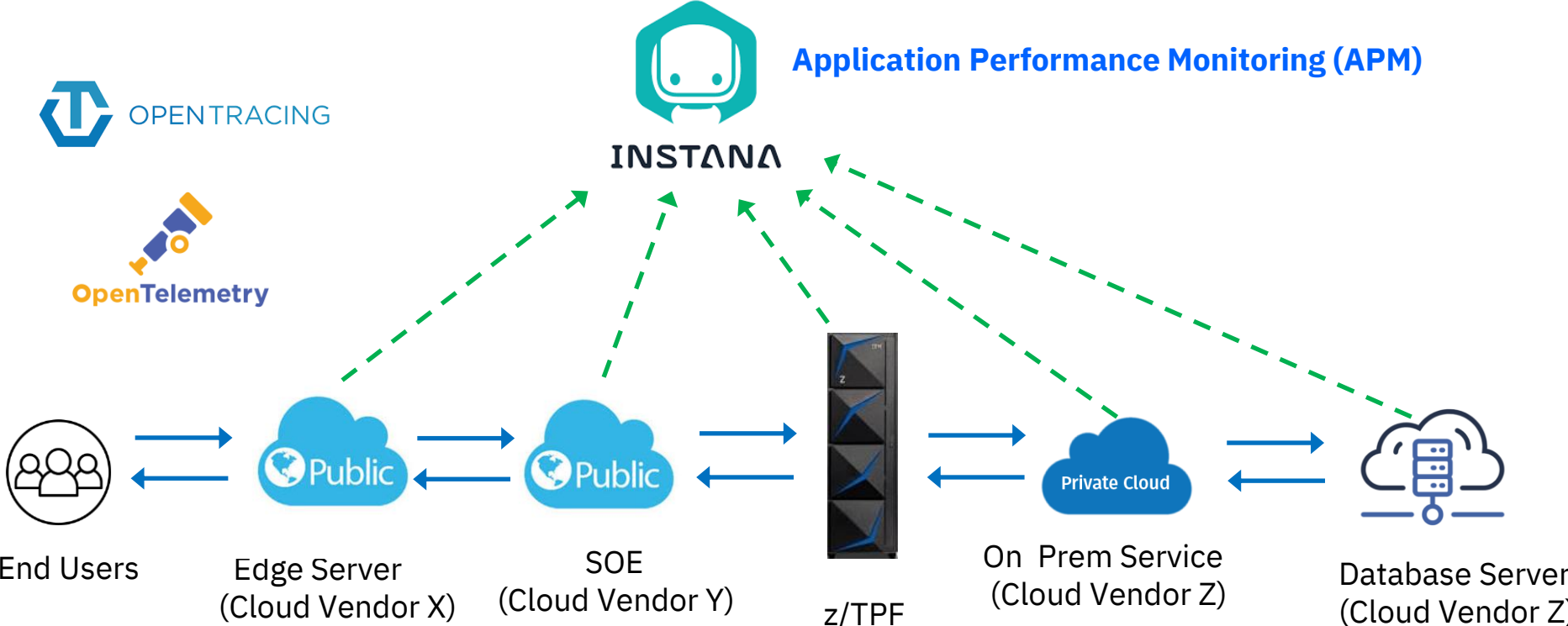
“Whenever there is a problem, it’s an urgent fire drill for each team to prove they are not the cause”

“I want to be able to monitor and manage workloads, not just silos”

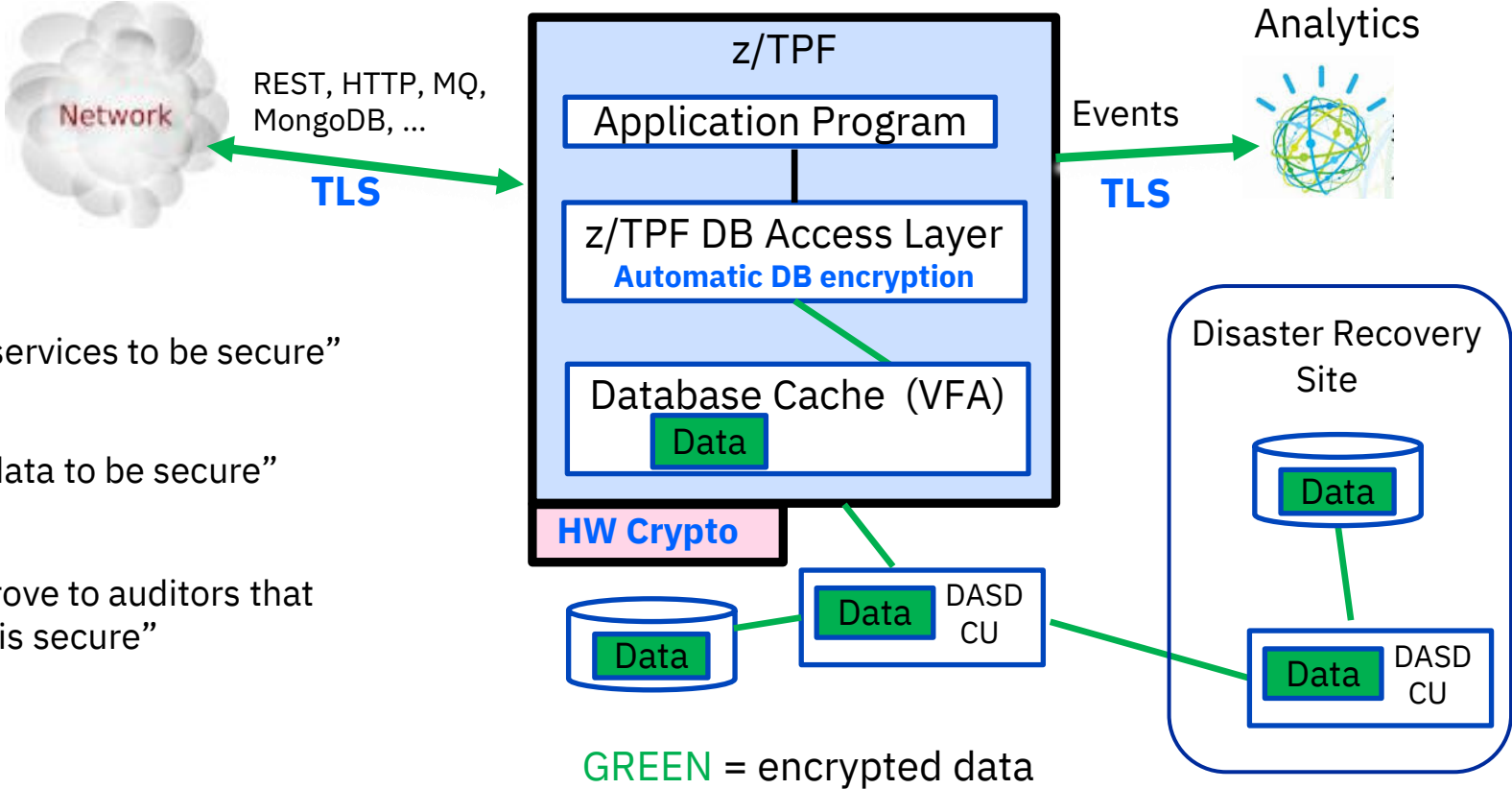
“I want centralized and intelligent application and performance monitoring (APM) for my Enterprise.”



Leverage Instana to Monitor Your Entire Hybrid Cloud Environment



Security: Use Pervasive Encryption to Protect All Your Data

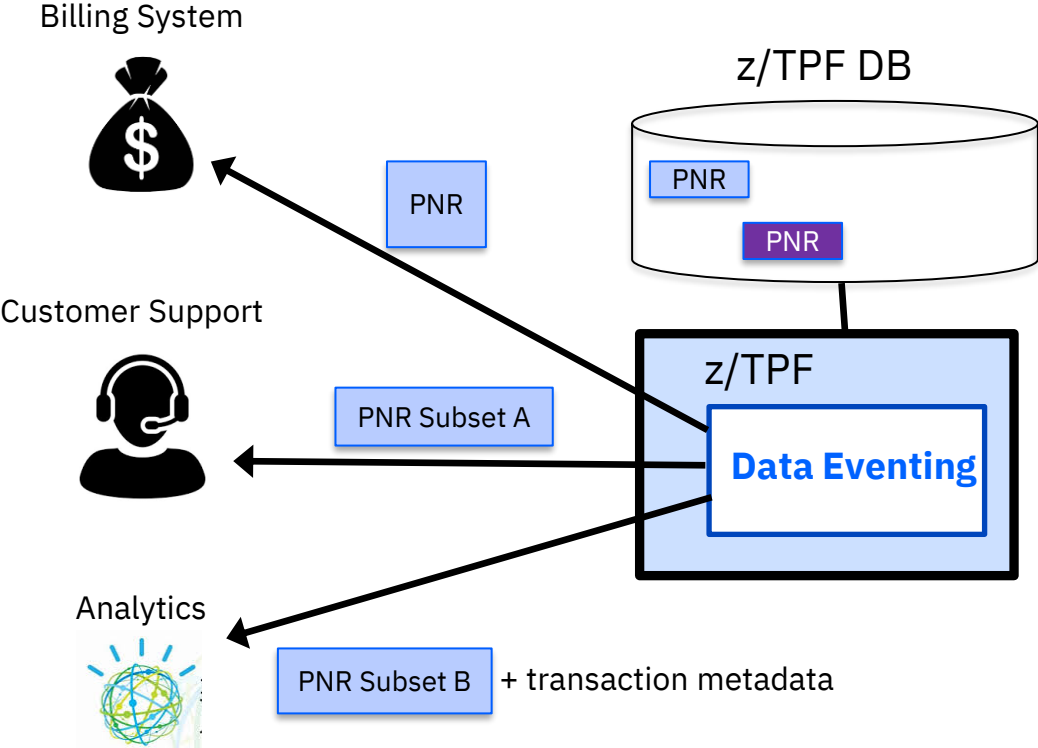


“I need my services to be secure”

“I need my data to be secure”

“I need to prove to auditors that my system is secure”

Compliance – Data Access Based on Business Needs



“Other parts of my business need copies of data in **real-time** that resides on z/TPF”

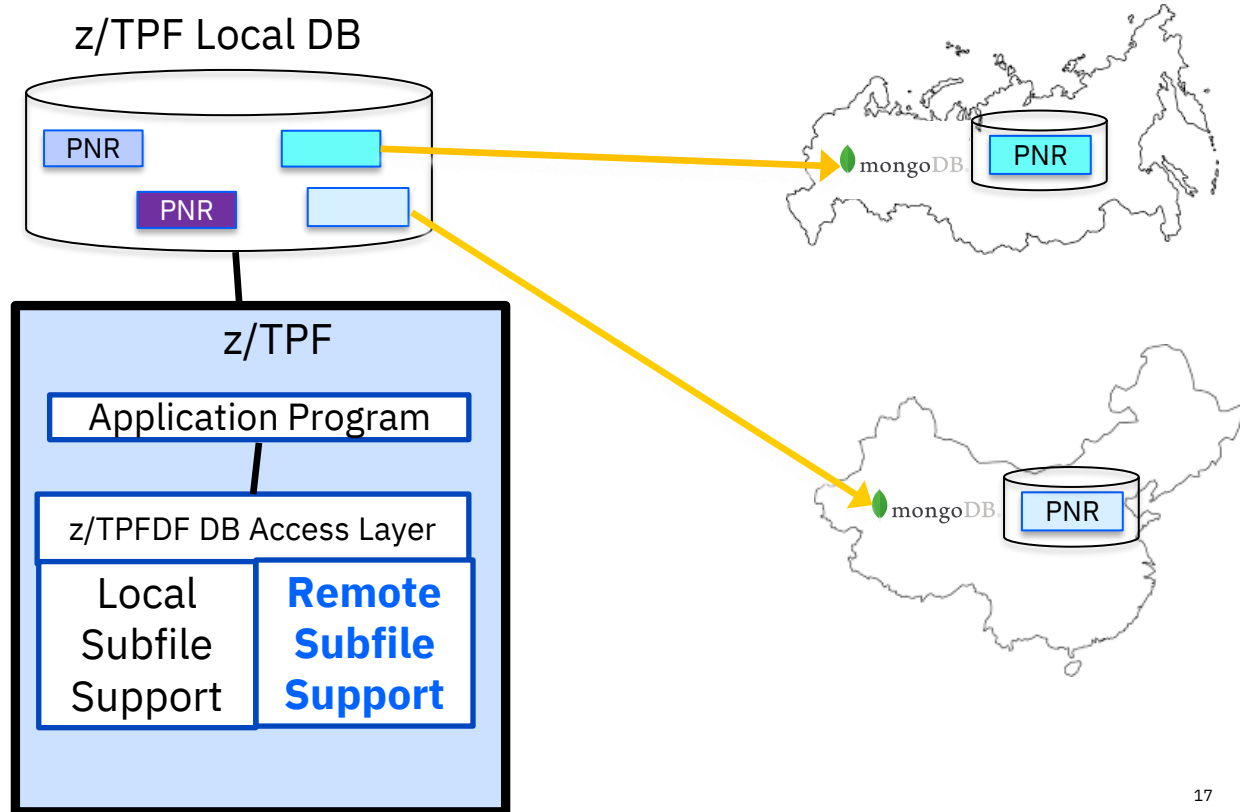
“Various regulations limit who is allowed to see what data”

“To fully enable business analytics, it also needs to know **why** the data was changed”

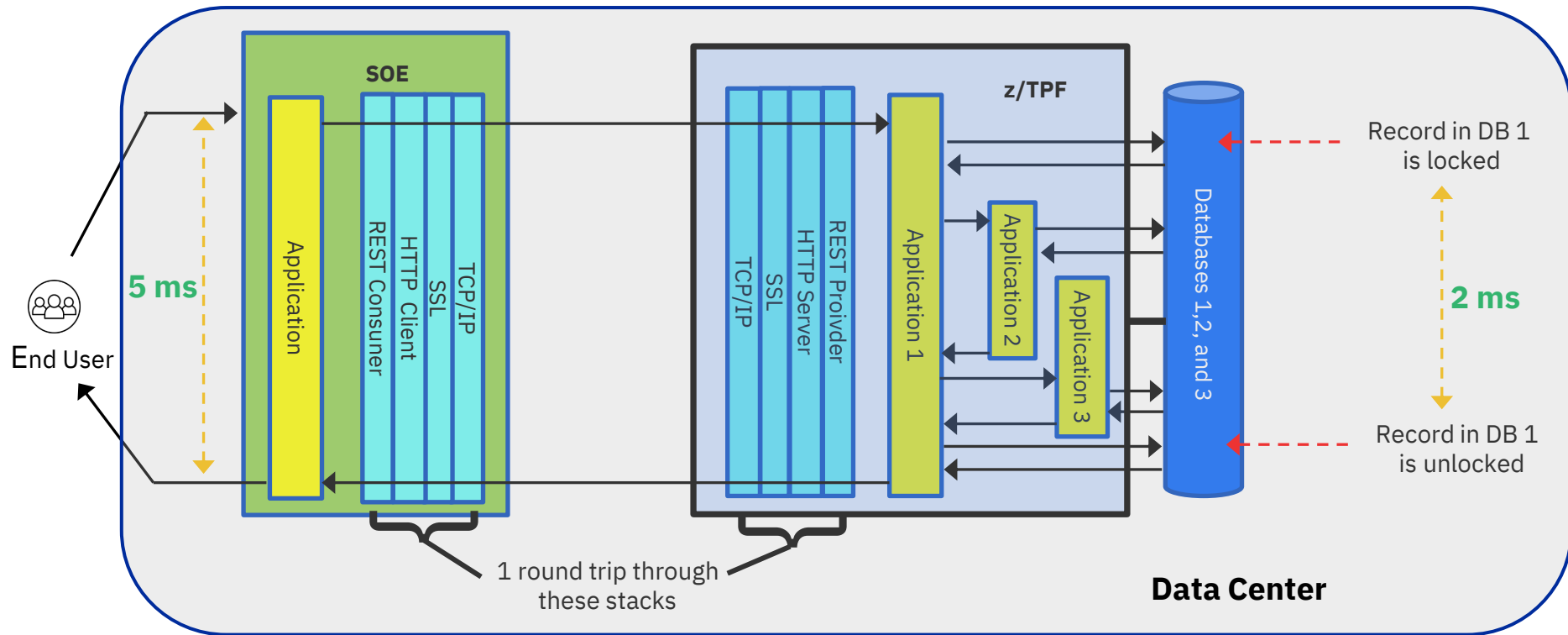
Compliance – Data Localization Requirements

“Certain countries require data for its citizens to be stored in country”

“Updating every z/TPF application to know where data resides and use different access methods to get at the data differently based on location would be a **nightmare!**”

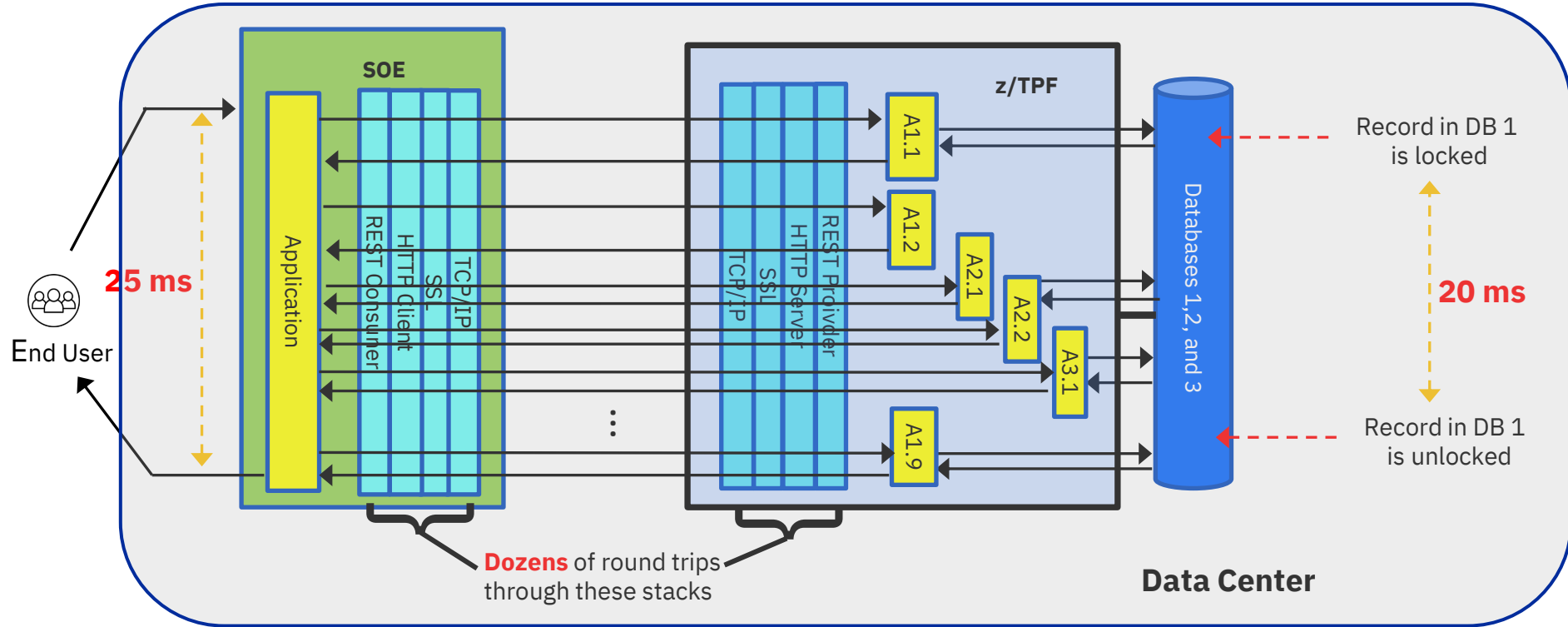


Production Performance, Scale, and Service Level Agreements and Are Good



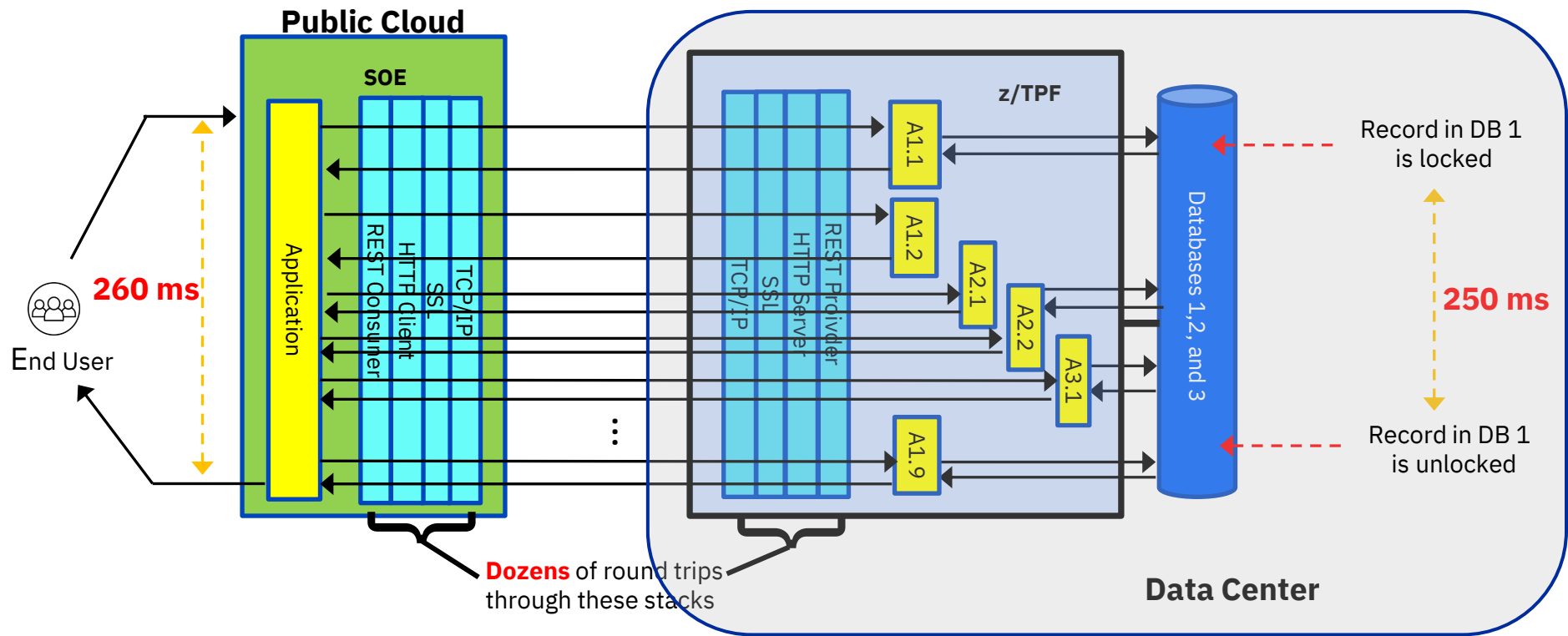
“My current environment has excellent performance, low costs, low latency, and scales up nicely. **However**, monolith applications are difficult to maintain and I want to take advantages of **microservices**”

Performance, Scale, and Service Level Agreements Still Matter



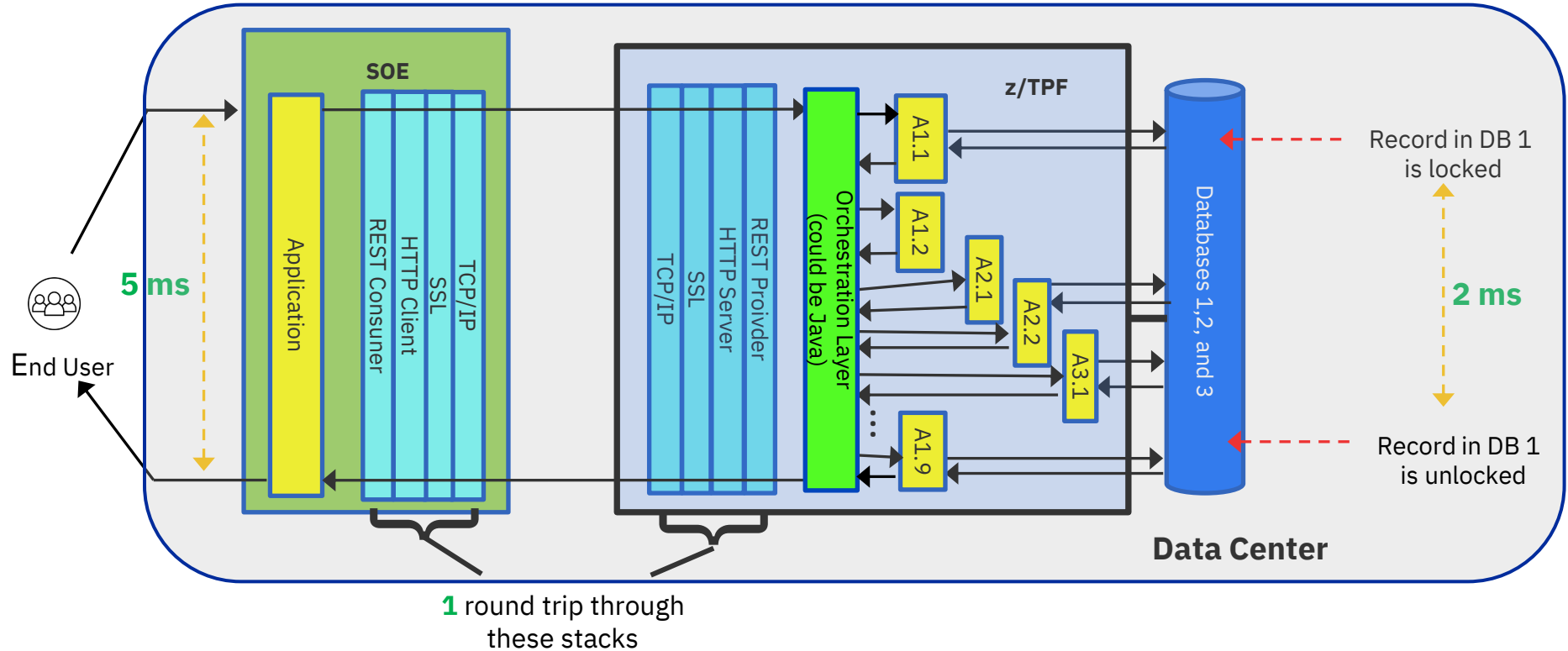
“I broke up my applications into microservices and exposed them to the outside world. My **IT costs went up**, response times went up **impacting SLAs**, and lock hold times and contention went up **preventing the workload from scaling!**”

And If That's Not Bad Enough...



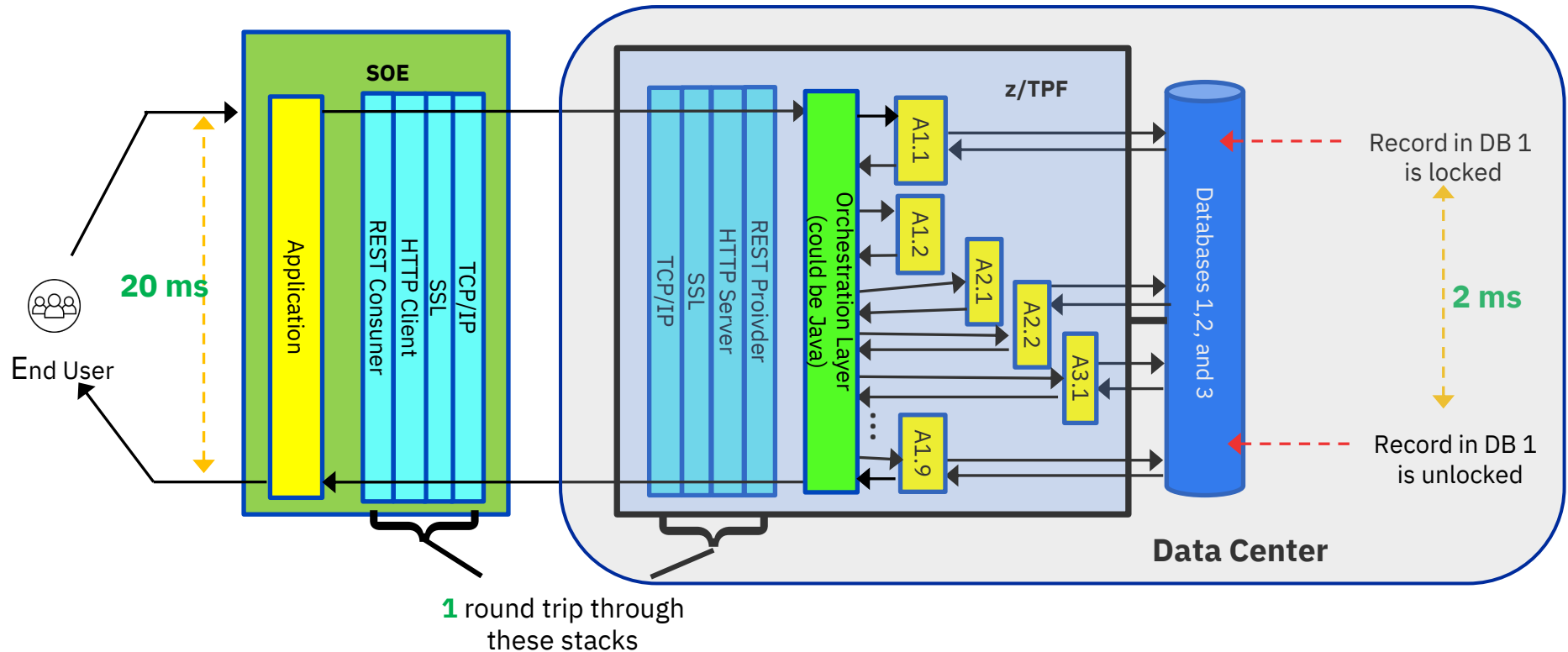
“Now my organization wants to move the SOE to public cloud(s). Over distance, **all the problems become much worse!** Can I open an RFE to increase the speed of light?”

The Solution – Implement Microservices Internally and Expose Macroservices Externally



“My application as microservices is easier to maintain and enhance. Exposing macroservices to external users allows me to maintain performance and SLA requirements. It’s the best of both worlds. Java support on z/TPF makes it much easier to implement the orchestration layer”

The Solution Also Makes Public Cloud Feasible



“Public cloud is an option now. Longer distance means more concurrently active SOE processes compared to private cloud for the same workload volume; therefore, I need to understand the potential higher cloud costs if I go with public cloud over distance”

All Clouds Are Not the Same

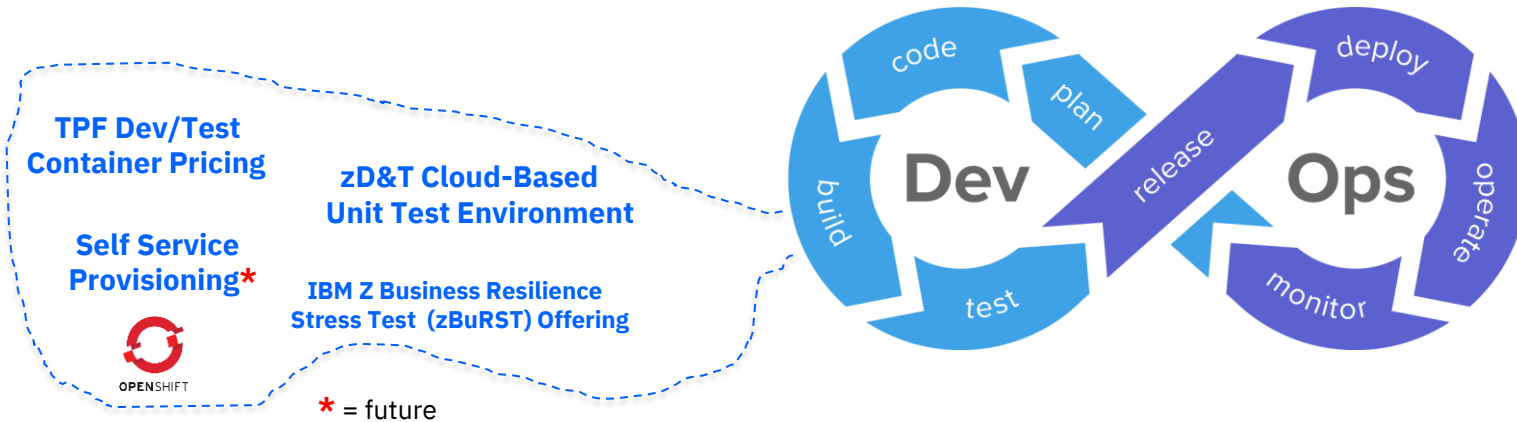
Linux on Z

- High-volume transaction processing requires **hundreds if not thousands** of virtual servers on x86
 - Can consolidate that to a handful of Linux on Z partitions to **lower costs**
- Leverage **terabytes of memory** to improve performance of data rich workloads
- z/TPF customers already have the IBM Z infrastructure to easily add Linux on Z
- IBM Z remains the most reliable and secure solution for mission-critical workloads
- Perform analytics and AI such that **data never leaves the platform!**
- Hyper Protect Virtual Server (HPVS) and IBM Secure Service Container (SSC) technology use the FIPS 140-2 Level 4 security technology as their foundation
 - Even your service provider **admins cannot access your data!**

IBM Cloud

- Industry leading RedHat OpenShift capabilities
- Also supports IBM Cloud® Hyper Protect Virtual Servers

Hybrid Cloud – Making Test Environments More Accessible and Affordable



“SW/HW for testing on IBM Z is too expensive”

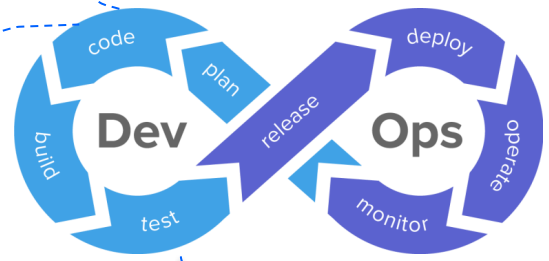
“My developers need isolated test environments to do error and destructive testing”

“My developers need to test a workload that involves multiple platforms”

“Offshore developers have bad testing experiences having to connect to an IBM Z box that is thousands of miles away”

“Currently I am only able to test at 10-20% scale of production workload”

z/TPF Developer Experience - Modern DevOps Pipeline Exists Today



Write test cases, then write code (TDD)

TPF Automated Test Framework
 Jenkins
 JUnit

Code Coverage
 sonarqube

Real-Time Runtime Metrics Collection
 Grafana Spark jupyter
TPF SW Profiler

TPF Trace Log
TPF Debugger

z/TPF Message Analysis Tool*

* = future

“I need to reduce dev/test costs”

“I want to do test driven development (TDD)”

“I need to be able to do better capacity planning”

“I want a cloud native developer experience”

“I need to produce higher quality code”

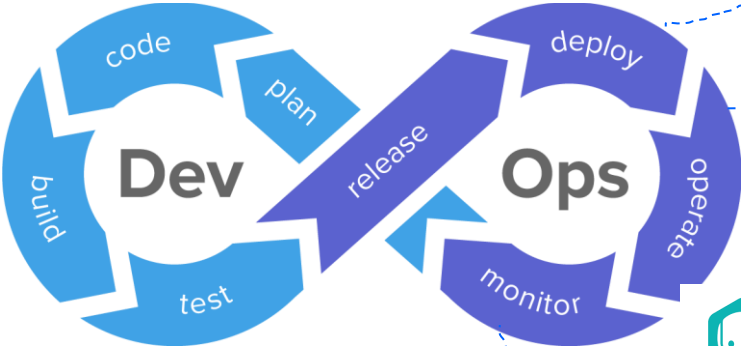
“We need automated testing because manual testing stinks!”

“We have to leave new code in a shared test system for months hoping free by use testing will find the bugs”

“I need to be able to get to Continuous Integration”

“It takes too long to react to new business requirements”

Smarter and More Efficient Operations



Non-Disruptive Program Loader



Cross-Platform Deployment and Automation*

TPF Operations Server (TOS) Console Automation

Dynamic CPU Support

z15 System Recovery Boost (SRB)

Faster Recovery from DASD Failure

IBM Java Health Center

System Wide JVM Monitoring

AIops

Real-Time Runtime Metrics Collection

Continuous Data Collection (CDC)

INSTANA End-to-End Monitoring*



* = future

“It takes too long to identify the cause of a problem”

“I need to be able to get to Continuous Delivery”

“I want you to reduce the need for scheduled outages”

“I cannot rely on staff with +20 years of experience to solve every problem”

“There’s too much information to process manually”

“I need integrated workload views”

“I want to automate as much as possible”

Hybrid Cloud Conclusion

- Leverage **combined strengths** of IBM Z, private cloud, and public cloud
 - IBM Z remains the most reliable and secure solution for mission-critical transaction workloads
- Hybrid Cloud **drives** business acceleration, developer productivity, and infrastructure cost efficiency while **maintaining** security and performance targets
- Control **your data** to meet business, security, and regulatory needs
- Non-functional requirements will dictate what architectures are **viable**
 - Availability, scalability, security, regulatory, data integrity, performance, data consistency, response time, and so on
- Leverage both microservices **and** macroservices
- Leverage **z/TPF** and **Linux on Z** where scale, performance, security, and latency are critical success factors
- Let us know how we can help you on your hybrid cloud journey

Thank you

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