

Whitepaper



# A Hyperscaler Agnostic Approach to Core Banking Transformation





## Abstract

The triparty consortium, consisting of Temenos, Tech Mahindra, and Red Hat, have united to support banking organizations in their transition to containerized deployments on cloud/on-premise. Together, they have developed this specialized whitepaper on hyperscaler agnostic migration tailored specifically for core banking clients which can equally be applied for on-premise containerized Transact deployments. This paper is the result of collaboration between TechM's banking products center of excellence (BP COE) group and the Temenos and Red Hat teams. It provides an extensive overview of the primary drivers and challenges encountered during the migration of core banking solutions to the cloud and how they can be addressed by leveraging containerized platforms like the Red Hat OpenShift Container Platform. This collaborative effort aims to facilitate and optimize the cloud-native journey for banking institutions, offering valuable insights and guidance throughout the migration process.

## Key Takeaways

- Executive Summary
- Business Drivers and Challenges
- Maximize Your Cloud Value
- A Cloud Agnostic Approach to Successful Transformation
- Temenos Transact on Red Hat OpenShift
  - Stage 1: Technical Upgrade and Containerized Deployment
  - Stage 2: Functional Upgrade
- Joint Value
- Conclusion



## Executive Summary

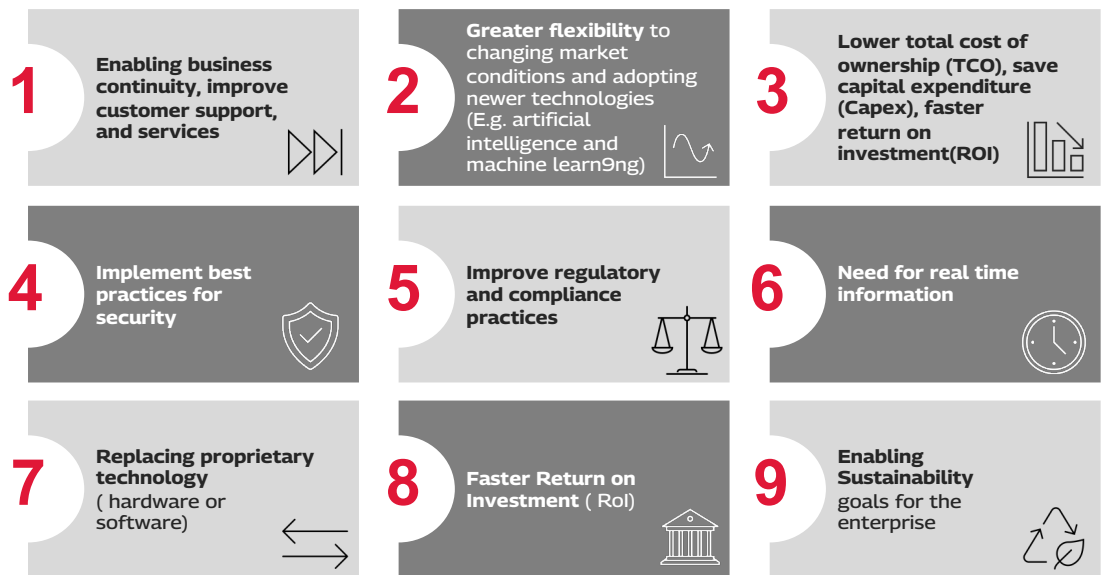
Banking organizations across the globe are actively considering migrating from legacy dedicated on-premise data center infrastructure to secure, modern applications built on the cloud. Key considerations around security, scalability and resiliency are top of mind while considering a move to the cloud for core banking applications, in addition to regulatory requirements (e.g., DORA, APRA etc.).

Amid increasing cloud adoption, the addressable cloud enablement market is forecasted to grow by 20% (CAGR) in absolute dollar value between now and 2026 which is roughly estimated to be of \$23B+.<sup>1</sup>

## Business Drivers and Challenges

There are several common business drivers for banking organizations to embark on a cloud-native core modernization journey, as depicted below.

### Cloud Enablement - 9 Key Benefits

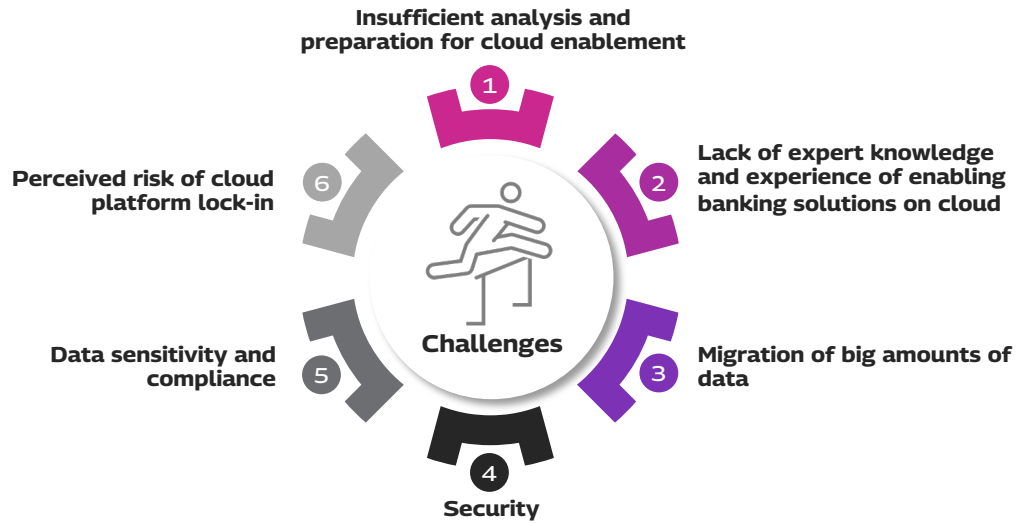


These are the the **primary drivers** behind bank's desire to move applications and data to cloud

Figure 1: Business drivers for cloud enablement of banking platform

Banking organizations have started to realize that the risk of maintaining legacy on-premise infrastructure is outweighing the risk of migrating to the cloud. Key challenges faced by banking organizations which increased risk of cloud migration are depicted here.

## Cloud Enablement - 6 Key Challenges



These challenges results in multi-year enablement projects **without achieving full benefits** of cloud migration. This is discouraging many banks from moving to cloud.

Figure 2: Cloud enablement challenges faced by banking organization

Banks understand that modernizing their infrastructure and core banking platform will reduce IT costs, improve agility and regulatory compliance, and accelerate time-to-market to deliver on customer demands. However, for many, adopting modern cloud-native infrastructure these challenges are discouraging them from moving to the cloud.

Together, Temenos, Red Hat and TechM offer relevant skills and capabilities to address these challenges and enable streamlined migration of the Temenos core banking platforms to the cloud.

## A Cloud Agnostic Approach to Successful Transformation

Core banking modernization is an ongoing journey, rather than a single transformative act. Many banks start their journey by deploying cloud-native, container-based architecture leveraging Red Hat OpenShift.

Temenos Transact is one of the most widely used digital core-banking solutions. Using cloud native and agnostic technology, Transact provides an extensive set of banking functionality across retail, corporate, treasury, wealth and payments. It provides a clear modernization path for banks with complex IT systems that look to extend and adopt a hybrid cloud strategy for their core banking systems and take advantage of new technologies such as Explainable AI.

Red Hat simplifies the modernization journey with enterprise open-source infrastructure that lets banks access modern methodologies and transform their core banking systems more efficiently and with less risk.

### Maximize your cloud value

Red Hat gives you a reliable path to modern, cloud-native architecture and operations. You can use the same technologies, skills, and investments throughout your journey, reducing your risk and providing more value



Red Hat® hybrid cloud solutions provide advanced DevSecOps and cloud-native tools, cross-infrastructure portability and scalability, and the ability to run both existing and cloud-native applications. These modular solutions let banks deploy the components they need, integrate with existing systems, and expand as needs change. Banks can also customize their installation with certified partner products, leading core system solutions, and open-source technologies. Red Hat partners with Temenos to help banks modernize with hybrid cloud.

Tech Mahindra is recognized as a leading systems integrator for next-generation core banking. With extensive experience in Transact, Red Hat® OpenShift® and cloud technology, TechM is the trusted partner of many banks on their core banking transformation. Leveraging its experience in successfully delivering close to 100 upgrade programs including Transact and other Temenos banking products, TechM has designed an efficient approach for migrating on-premise Temenos applications to the cloud. This approach is applicable to both on-premise or a self-hosted cloud deployment and has already been piloted in TechM and Red Hat lab.

## Progressive modernization approaches to core banking<sup>2</sup>

A hybrid approach — distributing workloads across on-premises, public, and private clouds, enables banks to progressively renovate and take advantage of the cloud benefits to accelerate and scale digital transformation.

There are three main approaches for modernizing core banking services: extend, renew, and reinvent. Many banks deploy a combination of these approaches during their modernization journey.

Extend	Renew	Reinvent
The “extend” approach adds new interface layers to existing core banking services, making them easily accessible to other cloud- and microservices-based applications through APIs. The architecture of the existing service remains largely unchanged, allowing you to protect your existing investments while applying new innovation and methodologies to your data	The “renew” approach incrementally replaces existing core banking services with new, software-based versions from independent software vendors (ISVs). The new version of the service is deployed on cloud-based infrastructure and may also use a microservices architecture. Over time, these new services will completely take the place of your traditional core systems.	The “reinvent” approach incrementally replaces existing core banking services with cloud-native, microservices-based versions running in an agile service mesh. Over time, cloud-native services will completely replace your traditional core banking systems, allowing you to take full advantage of the flexibility, control, and efficiency of containers, Kubernetes orchestration, and microservices.

Answering the need of a progressive cloud transformation, Red Hat partners with Temenos to help banks modernize with hybrid cloud. Red Hat’s hybrid cloud solutions provide a consistent, adaptable foundation for all three approaches, whether used separately or together

## Temenos Transact on Red Hat OpenShift

Red Hat provides enterprise-grade hybrid cloud infrastructure to banks as they modernize their Temenos Transact based core banking workloads utilizing Red Hat OpenShift. Red Hat OpenShift Container Platform provides a consistent, secure, and managed enterprise container orchestration platform based on Kubernetes for on-premise and cloud-based deployments. It empowers enterprises to accelerate and automate the development, deployment, and management of innovative applications. By taking full advantage of containers, without having to completely re-architect enterprise applications, application-development and IT operations teams gain the agility needed to develop and deploy applications features more frequently. They can also create and deploy apps with the speed and consistency that the business needs to stay ahead of the competition and drive new and increased revenue streams. Additionally, Red Hat also incorporates sustainability related metrics which are embedded into its product portfolio (e.g., power monitoring for Red Hat OpenShift as part of the Observability stack).

The figure below depicts the approach for cloud migration along with technical upgrade and/or functional upgrade or re-implementation of legacy versions of the Temenos product suite.

TechM's two staged solution approach for the upgrade includes:

Stage 1 - Execution of technical upgrade and containerized deployment

Stage 2 - Functional upgrade

### Two stage approach

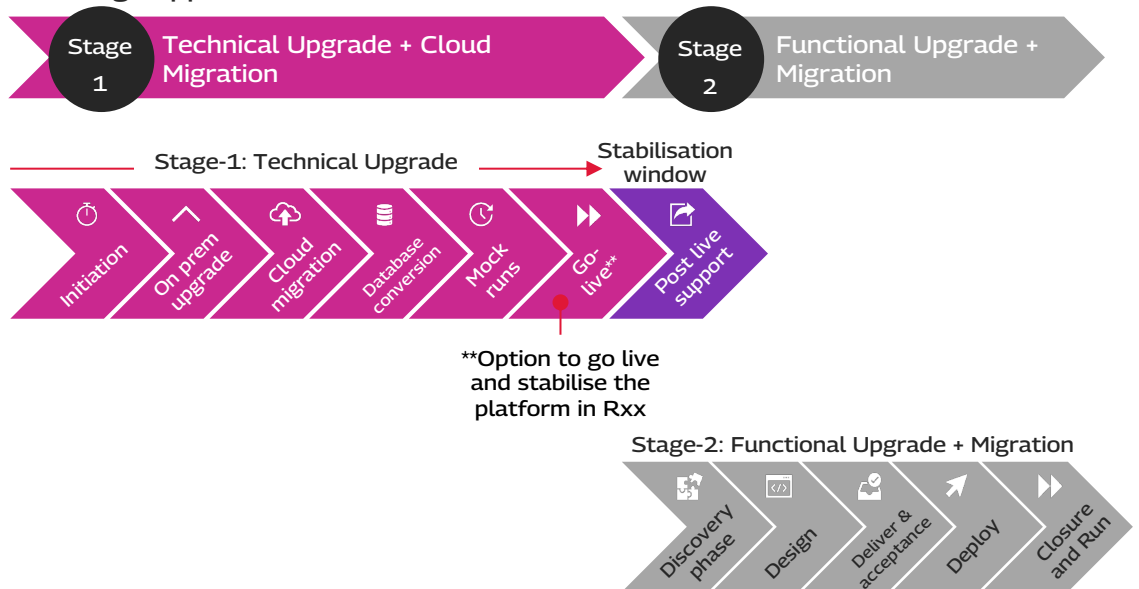


Figure 3: - Two staged solution approach for upgrade



## Stage 1: Technical Upgrade + Containerized Deployment

- Follow the standard upgrade methodology to upgrade Temenos from RX to R23 (latest Temenos release). Also, if required, perform TAFJ to TAFJ conversion on-premise.
- Customized code conversion analysis and conversion activity to be initiated in parallel
- Set up Red Hat OCP Environment including observability capabilities (logging, monitoring, alerting), enable code deployment using CI/CD. Various cloud providers (E.g., AWS/Azure) also provides Red Hat OpenShift platform as a service capability as well. Post cloud environment setup, migrate Transact R23 to the OCP - containerized deployment.
- Finalize database conversion and data migration approach.
- Prepare the standard runbook for upgrade and fine-tune it through the mock runs and dress rehearsals for upgrade and data migration.
- All integrations are validated and updated.
- Testing is performed to validate functional and technical consistency of the platform.
- The required training will be provided to the bank's IT team to highlight the new technical features available as part of R23.
- On completion of the mock upgrades and testing, the bank has the option to go live with the stable cloud platform where Temenos products are upgraded to the latest release (R23).
- For the Temenos SaaS option, the Temenos SaaS operational readiness board (ORB) will validate the implementation and offer any necessary recommendations for adjustments to ensure alignment with Temenos' SaaS controls and procedures.

A stable target platform, resulting from this stage will be used for the design and build stage of the functional upgrade (Stage 2).

## Stage 2: Functional Upgrade

Functional upgrade stage leverages all new functional capabilities which are offered by the latest Temenos release. It offers new functionalities or reduces technical debt by replacing customized functions by using out of the box functionality where possible. Discovery (analysis) phase for functional upgrade needs to be started in parallel with the technical upgrade stage (Stage-1), to carry out functional as well as technical analysis. Standard design, development and testing cycles aligned to Temenos implementation methodology (TIM) - best practice for implementing Temenos products follow the functional upgrade phase.

### Observability and Monitoring

As is the case with most industries, more so in the financial service sector, observability - as a measure of a system's current state based on the data it generates, such as logs, metrics, traces - is extremely important. Observability can also be used as a critical component of AIOps to help implement anomaly detection and self-healing constructs.



<b>Alerts are only actionable if the right people see them</b>	<b>Support for observability at multiple levels</b>	<b>Observability with certified APM tools from the partner ecosystem</b>
<p><b>Push alerts directly to your existing platforms.</b> E.g., Alerts from Red Hat Insights associated with inventory, advisor, vulnerability, and compliance can be pushed to observability and ITSM tools such as Splunk, ServiceNow, Ansible and Slack among other tools, using webhooks and APIs</p>	<p><b>Implement cross-cluster observability for application workload management</b></p> <ul style="list-style-type: none"> <li>• Cluster discovery</li> <li>• Policy enforcement</li> <li>• Compliance automation</li> <li>• Configuration drifts</li> <li>• Workload deployment and management</li> </ul>	<p><b>OpenShift logging and monitoring</b> for basic needs such as out of the box monitoring (for compute, storage, and network at the pod level), collection, and forwarding of log records, supported by a rich set of dashboards.</p> <p>Support for deployment from a vast ecosystem of partner APM tools that are certified to run on Red Hat OpenShift</p> <p>The telemetry and instrumentation implemented from such a stack allows for implementation of a robust AIOps driven automation, driving needs of anomaly detection and self-healing</p>

### **Considerations for HA and DR as regards Temenos Transact on Red Hat OpenShift**

Considering that high availability (HA) is described as having the ability to fail over, obviously Transact will be expected to continue performing with minimal impact on failover on all the different layers.

Disaster recovery (DR), on the other hand implies that the Transact workload (and all downstream components) can be “brought up” and “executed” in an alternate site if a disaster occurs in the primary site. Depending on underlying implementation strategies, the recovery time and effort will vary accordingly.

The following summarizes the HA/DR features of Red Hat OpenShift platform plus that can prove to be complementary to a workload such as Transact in terms of enabling Transact to meet requisite SLAs:

## HA strategies:

OpenShift clusters can be deployed over multiple AZs in a single region. Enterprise grade options for clustering such as using a global load balancer, MetalLB and/or using a global DNS are well supported to deploy highly available OpenShift clusters.

## DR strategies:

**Metro DR** (RTO and RPO SLAs in minutes) - supported by synchronous mirroring. Typically, a strategy to recover from hardware system failures.

**Regional DR** (RTO and RPO SLAs in hours) - supported by asynchronous replication. Typically, a strategy to recover from site disasters.

**Cluster Backups** ((RTO and RPO SLAs in the order of a couple of days) - supported by snapshot-based replication. Typically, a relatively low-cost strategy to recover from site disasters (and relaxed SLAs for RTO/RPO).

The DR capabilities of Red Hat OpenShift Platform Plus provide

- comprehensive protection solutions against wide spectrum of failures
- opportunities beyond data Protection, including full application protection (stateful and stateless)
- resiliency built into the platform - available to all stateful and stateless applications on OpenShift

Topologically, OpenShift clusters can be deployed using an Open hybrid cloud model driven approach that can leverage the public cloud for DR deployment considerations. The OpenShift Platform Plus integrated stack lends towards automated and simplified application granular protection

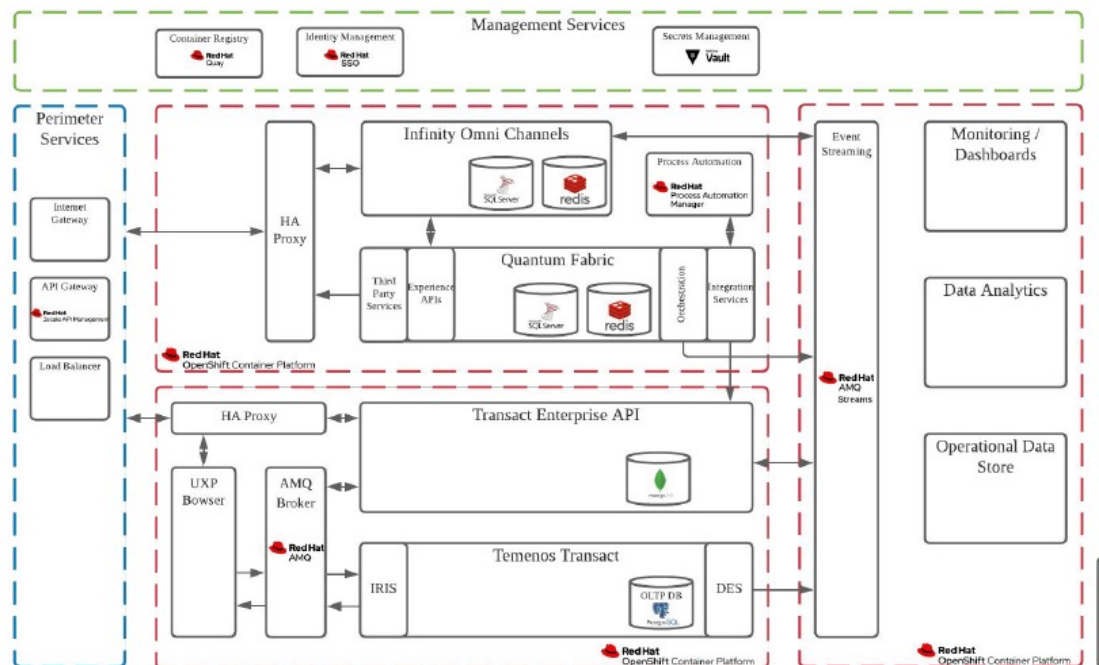


Figure 4: - Reference architecture to deploy Temenos Transact containers using OCP<sup>3</sup>



The following table depicts all the stack components mapped to Red Hat product offerings and other alternatives available on popular cloud platforms or on premise deployments.

Stack Component	Product Depicted	Other Alternatives	Azure Alternatives	AWS Alternatives
Message Queue	Red Hat AMQ Broker	Apache ActiveMQ Broker	IBM MQ	Amazon MQ
Transact DB	Oracle DB	<ul style="list-style-type: none"> <li>NuoDB, PostgreSQL</li> </ul>	<ul style="list-style-type: none"> <li>Azure SQL Database</li> <li>Azure SQL MI</li> <li>Azure Database for PostgreSQL</li> </ul>	<ul style="list-style-type: none"> <li>Amazon RDS (Relational Database Service) for Oracle</li> <li>Amazon Aurora (PostgreSQL)</li> <li>Amazon RDS for PostgreSQL</li> <li>Amazon RDS for MS SQL</li> </ul>
Event Streaming	Red Hat AMQ Streams	<ul style="list-style-type: none"> <li>Apache Kafka</li> </ul>	<ul style="list-style-type: none"> <li>Azure Event Hub</li> </ul>	<ul style="list-style-type: none"> <li>AWS Kinesis</li> </ul>
Microservice DB	PostgreSQL	<ul style="list-style-type: none"> <li>MS SQL</li> <li>MySQL</li> </ul>	<ul style="list-style-type: none"> <li>Azure MySQL</li> </ul>	<ul style="list-style-type: none"> <li>Amazon RDS for MySQL</li> </ul>
API Gateway / Management	Red Hat 3scale	<ul style="list-style-type: none"> <li>Any</li> </ul>	<ul style="list-style-type: none"> <li>Azure API Management</li> </ul>	<ul style="list-style-type: none"> <li>Amazon API Gateway</li> </ul>
Load Balancer	Any	<ul style="list-style-type: none"> <li>Any</li> </ul>	<ul style="list-style-type: none"> <li>Azure load balancers</li> </ul>	<ul style="list-style-type: none"> <li>AWS Elastic load balancers</li> </ul>
Container Platform	Red Hat OpenShift Container Platform		<ul style="list-style-type: none"> <li>Azure AKS</li> <li>Azure Red Hat OpenShift</li> </ul>	<ul style="list-style-type: none"> <li>AWS EKS</li> <li>AWS Fargate</li> <li>Red Hat OpenShift Service on AWS (ROSA)</li> </ul>
Container Storage	Red Hat OpenShift Container Storage		<ul style="list-style-type: none"> <li>Azure Container Storage</li> </ul>	<ul style="list-style-type: none"> <li>AWS Storage services</li> </ul>
Container Registry	OpenShift Container Platform Registry or Quay		<ul style="list-style-type: none"> <li>Azure Container Registry</li> </ul>	<ul style="list-style-type: none"> <li>Amazon Elastic Container Registry (ECR)</li> </ul>

These references can be used for deploying Temenos Transact core banking platform either on cloud or on-premise datacenter.



## Joint Value

Tech Mahindra's broad experience of supporting a variety of Temenos deployment topologies, combined with Red Hat's open hybrid cloud strategy provides improved customer experience, total cost optimization and provides a model for scalable deployment of Temenos workloads across complex heterogeneous architectures.

Joint value delivered by considering factors such as cost of operations and timelines site reliability engineering (SRE) include:

- Rethinking TCO as total cost of optimization as against total cost of ownership alone.
- Automating operations through IaC and operators
- GitOps for improved predictability across lifecycle environments

Timelines	Operations	SRE/ Engineering
<ul style="list-style-type: none"> <li>• Reduced timelines for provisioning through IaC automation</li> <li>• Operator lifecycle-based frameworks for deploying functional, stable environments</li> </ul>	<ul style="list-style-type: none"> <li>• Simplified deployment and minimal downtime</li> <li>• Ability to scale on-demand based on auto scaled containers</li> <li>• Improved observability and resilience supported with an enterprise grade service mesh</li> </ul>	<ul style="list-style-type: none"> <li>• Bringing down provisioning cycles down by orders of magnitude</li> <li>• On-demand provisioning for multiple lifecycle environments</li> <li>• A GitOps based approach to improved predictability and repeatability in environments.</li> </ul>

[1] Operators - Bringing automation and consistency to Kubernetes in the world of operations lifecycle management.

[2] Understanding the business value of Red Hat OpenShift

## Conclusion

Over time, cloud-native capabilities will replace traditional core banking platforms to take full advantage of microservices and modern infrastructure capabilities. The three-way collaboration between TechM, Temenos and Red Hat helps clients to become cloud-native quickly with greater optionality, flexibility, and controls to accelerate core banking innovation.

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