

Treat the Cloud as a Cloud:

Success Stories from beyond the virtual data center

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June 1st, 2022



Industry overview



Key trends & use cases we see worldwide

As financial institutions better understand their ability to meet regulatory compliance obligations when operating in the cloud, they are increasingly focused on leveraging the cloud to transform existing businesses and bring innovative new solutions to market.



Customer
experience & digital
channels



Grid &
high-performance
computing



Data lakes & agile
analytics



Core systems
transformation



AI/Machine
Learning



Blockchain
& DLT

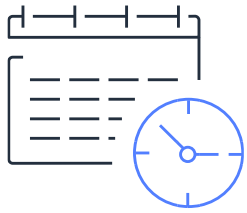
Key challenges affecting the Financial Services Industry

The strategy of running core services entirely on-premises is not viable in an environment where new technologies, and new entrants, are pressuring financial services firms to transform.



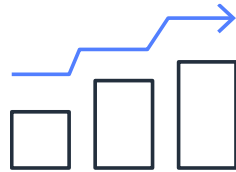
Functionality

Financial Services organizations need more features to keep up with customer demands.



Time to market

There is a growing need to innovate and quickly deploy new products and services.



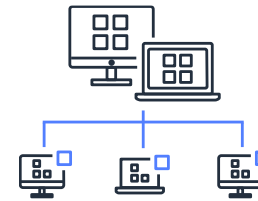
Scalability

There is a need to scale up or down automatically.



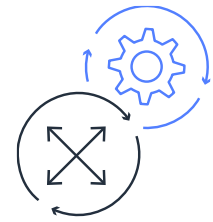
Security

There is a need for security tools that are customizable and meet global standards.



Complexity

There is a need to manage multiple services.



Integration

There is a need to seamlessly integrate with other systems such as Anti-money laundering and Risk Management.

The financial services industry is **evolving**.

Banking



Developed the world's largest independent digital bank serving 48 million customers in Latin America



Runs 1500+ core-banking microservices on the cloud and serves 5 million customers

Capital Markets



Launched a scalable trading app, transacting over \$30B



Became the first ISO 27001 certified and PCI:DSS Level 1 compliant cryptocurrency provider

Payments



Relies on cloud security best practices and auditability to run its PCI-compliant payment platform



Grew from a startup to supporting 90 million customers across 250,000 merchants

Insurance



Uses AI and behavioral economics to provide insurance to 1 million+ customers in the U.S. and Europe.



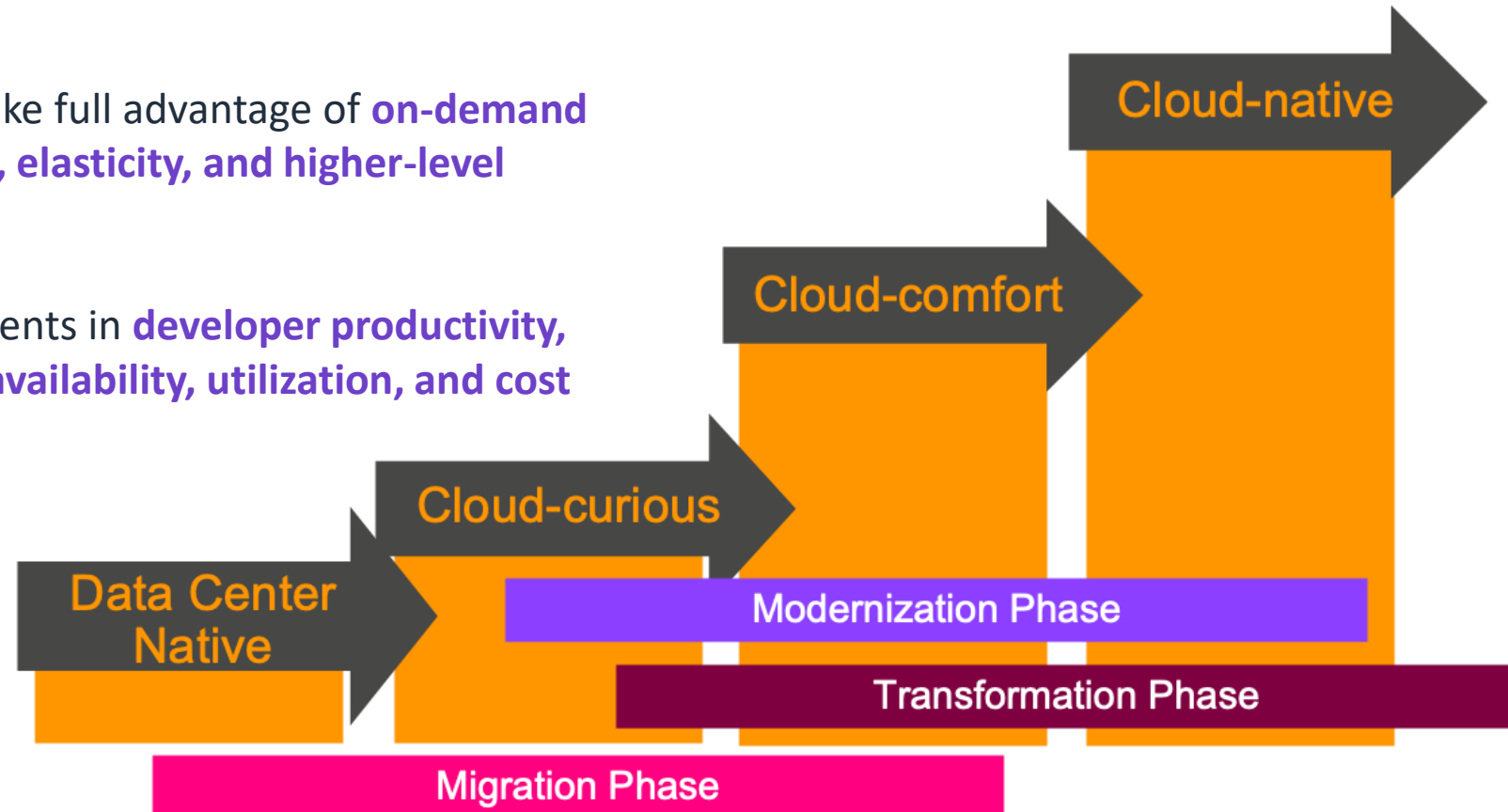
Streamlines commercial insurance workflows that are traditionally manual, costly, and error-prone

What is Cloud-Native?

Cloud-native is an approach to **building and running** applications that exploit the advantages of the **cloud computing** delivery model.

Cloud native architectures take full advantage of **on-demand delivery, global deployment, elasticity, and higher-level services**.

They enable huge improvements in **developer productivity, business agility, scalability, availability, utilization, and cost savings**.



Benefits of Cloud-Native Applications

Cloud-native applications are designed to **take advantage** of the speed and efficiency of the **cloud**. Benefits include the following:

Cost-effective. Computing and storage resources can scale out as needed.

Independently scalable. Each microservice is logically isolated and can scale independently.

Reliable. If a failure occurs in one microservice, there's no effect on adjacent services because these cloud-based applications use containers.

Easy to manage. Cloud-native applications use automation to deploy app features and updates.

Infrastructure as Code (IaC)

Benefits:

- Automate the provisioning process
- Instantiate infrastructure using configuration files
- Treat configuration files as software code
- Eliminate configuration drift through automation

AWS IaC solutions:

- AWS CloudFormation
- AWS Serverless Application Model (AWS SAM)
- AWS Cloud Development Kit (AWS CDK)

Success Stories



FINRA built a cloud data lake to enable markets surveillance at scale



“ We got some huge pleasant surprises out of [going all in on the cloud] that we weren’t expecting at all. First of those is amazing performance improvements. On average, 400 times improvement to interactive queries. The investigative capacity to our surveillance team has expanded dramatically

Steve Randich
CIO, FINRA

”



FINRA needed a platform that could ingest, process, and store 80 billion market events on an average day and dynamically scale up to handle 240 billion events on a peak day.



FINRA built a data lake in the cloud to store and analyze data from 3,000+ broker dealers and 22 exchanges. Cloud enabled fast, interactive data query solution allowing PB-scale analytics.



FINRA’s flexible platform can adapt to changing market dynamics while providing analysts with the tools needed to query the data set.

New capabilities enabled by the cloud include: Better performance, massive storage capacity and processing power, better and faster analytics, market manipulation detection through machine learning, auto scaling of compute resources, use of serverless technologies, and significant cost savings.

Capital One closes all data centers, completes cloud migration



“ We are truly all in on the cloud, it has been instrumental in enabling us to take full advantage of the benefits of being in the cloud. Going all-in on the cloud has enabled both instant provisioning of infrastructure and rapid innovation.

”

Chris Nims

Senior Vice President of Cloud and Productivity Engineering, Capital One



Capital One’s ambition was to become a modern technology company, developing its own applications and leveraging big data and machine learning to enhance the banking experience in real time.



Capital One accelerated its transformation with the cloud, going all-in on migrating and using the cloud to create customer-centric experiences at scale across its mobile app, intelligent assistant, shopping tool, and call center.



In the cloud, Capital One can provision infrastructure almost instantly. Its pace of innovation has increased, releasing new code multiple times per day instead of quarterly or monthly application updates.

New capabilities enabled by the cloud include: Expanded microservices, agile DevOps, enhanced mobile banking apps, ML driven analytics and fraud detection, on-demand infrastructure, new customer services solutions, integrated systems (CRM, Contact Centers, RDBMS), basically all on-premises workloads rearchitected to cloud to establish full service digital banking.

AQR Capital enables developer productivity with cloud services



“What’s really great about it is we have a lot of greenfield apps, people are writing REST APIs, all different kinds of things in here, and we’re growing it somewhere between 5 and 10 per cent a month.”



AQR set out to provide its developers with a secure and scalable platform that would facilitate their use of the cloud to create new applications.



AQR built a container-based platform using **Infrastructure as Code** to reduce the effort required to launch applications while also organizing and automating security measures, such as encryption and authentication.



The platform currently reduced application build and deploy time from 6 weeks to 30 minutes, runs more than 300 applications, and is growing at 5 to 10 percent a month to accommodate AQR’s developer productivity.

New capabilities enabled by the cloud include: Fast, secure application development and deployment of microservices and digital certificates, enhanced logging and alerting. Entire business-critical development process runs in the cloud and empowers teams across the organization to iterate rapidly and securely.

HSBC's digital transformation journey to the cloud



“ When you look at the Wealth and Personal Banking strategy around scale, resiliency, security, and innovation on the cloud; to enable our business objectives, we had to find the right organization that could partner with us, with the scale and global footprint.

Gavin Munroe,

Global CIO, Wealth and Personal Banking, HSBC

”



HSBC was looking to expand its banking services to be more digital. The bank wanted to put the power of HSBC in the "pocket" of every customer and create a highly personalized mobile first experience.



HSBC chose the cloud to develop their service hosting platform. Taking a phased approach to policy definition, procedures, and security, HSBC was able to execute in 47 countries and enable customer interactions on demand.



HSBC has been able to automate key processes, modernize applications, and increase innovation. Now HSBC can onboard new markets in a few weeks and quickly update account and statement info as they learn more about customer requirements and interactions.

New capabilities enabled by the cloud include: Global scalability and improved availability, resiliency, and innovation of Wealth and Personal Banking products. Enabled a “Bank in the Pocket” strategy and work from home development and team collaboration.

DBS migrates core Murex workloads to AWS



“ Murex is at the core of our Treasury & Markets technology platform. We have been reaping the benefits of the cloud’s elasticity for our grid computing infrastructure since 2017.

”

Ling Puay Hwa

Head of Investment and Trading Technology, DBS



DBS relied on a grid made up of hundreds of physical servers to ensure support during peak capacity, so there must be 100% spare capacity in case the data center fails.



The bank migrated workloads to the cloud. Now tasks are monitored, and additional servers are provisioned if the demand for capacity fluctuates.



Moving from on premises to the cloud reduced DBS’s grid consumption by 70% in 2018. By 2019, the bank achieved a more than 90% reduction.

New capabilities enabled by the cloud include: Murex trading and risk management platform now runs completely in the cloud. Auto provisioning of grid computing environments used for risk computations, pricing, and simulations has increased performance and lowered costs.

Why Amazon Web Services?



Large enterprises are choosing AWS to transform their businesses

Major financial institutions are publicly announcing their commitment to AWS as their strategic partner for long-term digital transformation.



Nasdaq and AWS Partner to Transform Capital Markets, Begins Migration of Markets to AWS in 2022



Goldman Sachs and AWS Collaborate to Create New Data Management and Analytics Solutions for Financial Services



Standard Chartered Selects AWS to Power Its Strategic Banking Systems and Workloads



Itaú Unibanco Selects AWS as Its Long-Term Strategic Cloud Provider to Accelerate Digital Transformation



AIG Selects AWS as Its Preferred Public Cloud Provider to Drive Business Transformation



Nationwide Selects AWS as Its Preferred Cloud Provider to Deliver Digital Experiences to Customers



Global Payments Joins Forces with AWS to Deliver the Future of Payments



Sun Life Taps AWS as Its Long-Term Strategic Cloud Provider to Transform Digital Services

Temenos and AWS bring scalability for banks of any size

In 2022, Temenos benchmarked its software on **AWS** and proved its ability to handle **100K transactions per second** on a single cloud environment.

The benchmark of 100 million customers and 200 million deposit accounts with 100,000 transactions per second. The benchmark breaks every scale record, helping banks scale efficiently and lower carbon emissions.*

<https://www.temenos.com/news/2022/05/18/temenos-banking-cloud-scales-to-record-high-transaction-volumes-and-achieves-world-class-efficiency/>

* NOT A STAC BENCHMARK

What sets Amazon Web Services apart?

✓ Security and Compliance	More security standards and compliance certifications than any other offering
✓ Breadth & Depth; Pace of Innovation	200+ fully featured services to support any cloud workload; rapid customer driven releases
✓ Most Experience	Helping millions of customers since 2006
✓ Global Reach and High Availability	84 Availability Zones within 26 geographic Regions, 17 Local Zones, 24 Wavelength Zones, 310+ Points of Presence
✓ Improve TCO	111 Price reductions since 2006
✓ Machine Learning	More machine learning happens on AWS than anywhere else. Machine learning in the hands of every developer and data scientist.
✓ Largest community of customers/partners	AWS has millions of active customers every month. The AWS Partner Network has more than 100,000 Partners from more than 150 countries, with almost 70% headquartered outside of the United States.
✓ Enterprise leader	AWS positioned as a Leader in the Gartner Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

AWS Recognized as a **Leader** in 2021 Gartner Magic Quadrant for Cloud Infrastructure and Platform Services for the 11th Consecutive Year



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AWS Recognized as a Leader in 2021 Gartner Magic Quadrant for Cloud Database Management Systems for the 7th Consecutive Year.

<https://pages.awscloud.com/GLOBAL-multi-GC-gartner-cdbms-mq-2021-learn.htm>

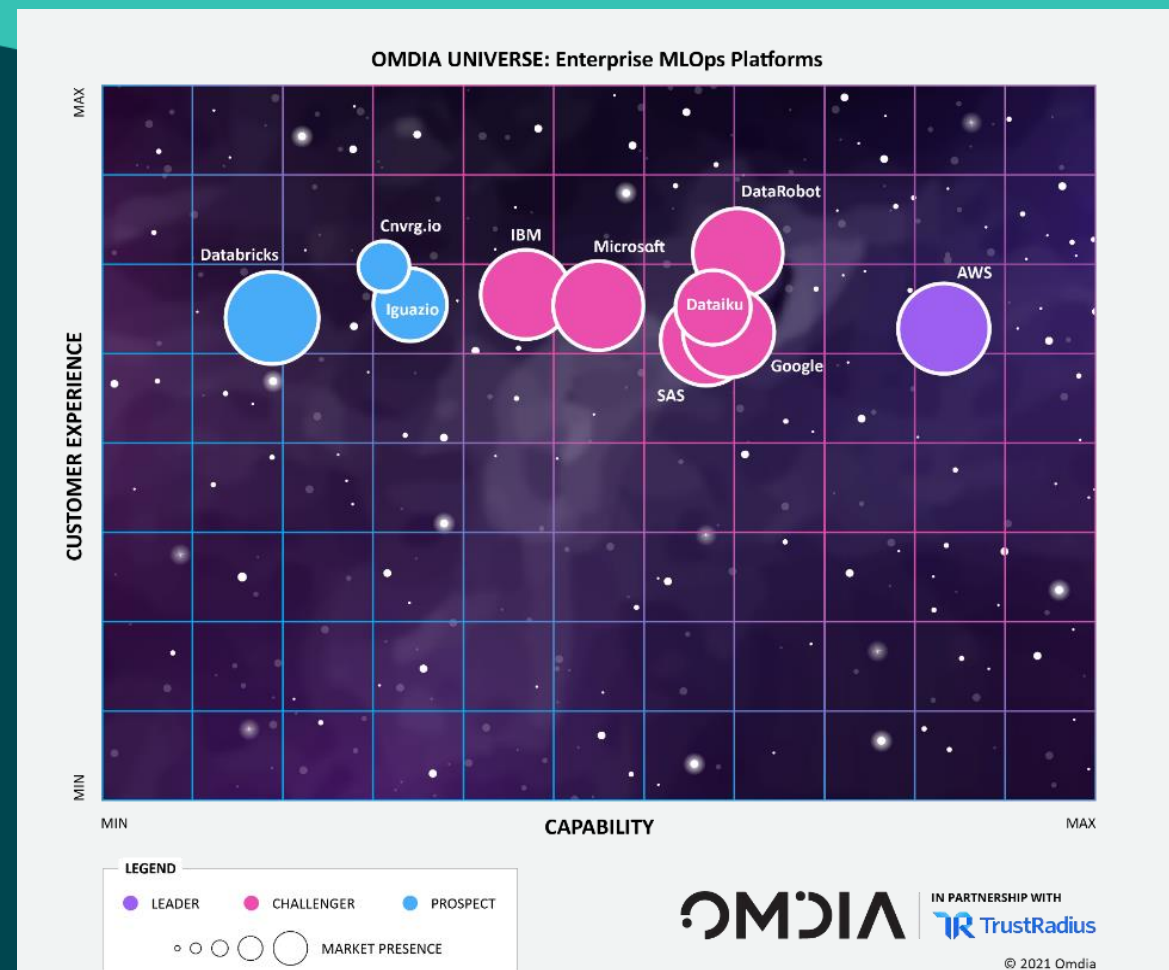


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AWS recognized as the MLOps Leader

Scan the QR code to read the report:





Worldwide | N. America | LATAM | UK/IR | EMEA | APAC | Japan | China

Appendix

Customers rely on AWS's compliance with global standards

Certifications & Attestations

✦	Cloud Computing Compliance Controls Catalogue (C5)
✦	CSA - STAR Level 2
	Cyber Essentials Plus
	DoD SRG
	ENS High
	Fed Ramp (Med & High)
✦	FINMA ISAE 3000
	FIPS
	HDS
	ISMAP
	IRAP
	ISO 9001
✦	ISO 27001
✦	ISO 27017
✦	ISO 27018
	K-ISMS
	MTCS – Tier 3
✦	OSPAR
✦	PCI-DSS Level 1
✦	PCI-3DS
✦	SEC Rule 17-a-4(f)
✦	SOC 1, SOC 2, SOC 3

DE	✦ CLOUD Act
🌐	✦ CISPE
GB	GDPR
US	✦ FERPA
ES	GLBA
US	HIPAA
CH	HITECH
US	IRS 1075
FR	ITAR
JP	My Number Act
AU	Data Protection Act – 1988
🌐	VPAT / Section 508
🌐	PoPIA – South Africa
🌐	Privacy Act - Australia
🌐	Privacy Act - New Zealand
KR	PDPA: 2010 - Malaysia
SG	PDPA: 2012 – Singapore
SG	PIPEDA - Canada
📄	PDPL – Argentina
📄	LGPD – Brazil
US	PDPA - Taiwan
🌐	AAPI – Japan

Laws, Regulations and Privacy

US	✦ CIS (Center for Internet Security)	🌐
EU	CJIS (US FBI)	US
EU	✦ Cloud Security Principles	GB
US	✦ CSA (Cloud Security Alliance)	🌐
US	FISC	JP
US	FISMA	US
🌐	G-Cloud	GB
US	GxP (US FDA CFR 21 Part 11)	US
US	HIPPA Quick Start Guide	US
JP	HITRUST	US
GB	IT Grundschutz	DE
US	✦ MITA 3.0 (US Medicaid)	US
ZA	✦ NIST 800-53 (Via FedRAMP ATO)	US
AU	✦ NIST Cybersecurity Framework (CSF)	US
NZ	PCI-DSS Quick Start Guide	📄
MY	SWIFT Client Connectivity Guide	🌐
SG	Uptime Institute Tiers	🌐
CA		
AR		
BR		
TW		
JP		

Alignments & Frameworks

✦ = Financial Services Industry
 DE = Country of origin of compliance regime
 🌐 = industry or global standard

About Temenos on AWS

6,000+

Loan & deposit products

55+

Countries of operation

17M+

API transactions per day

140+

Clients globally

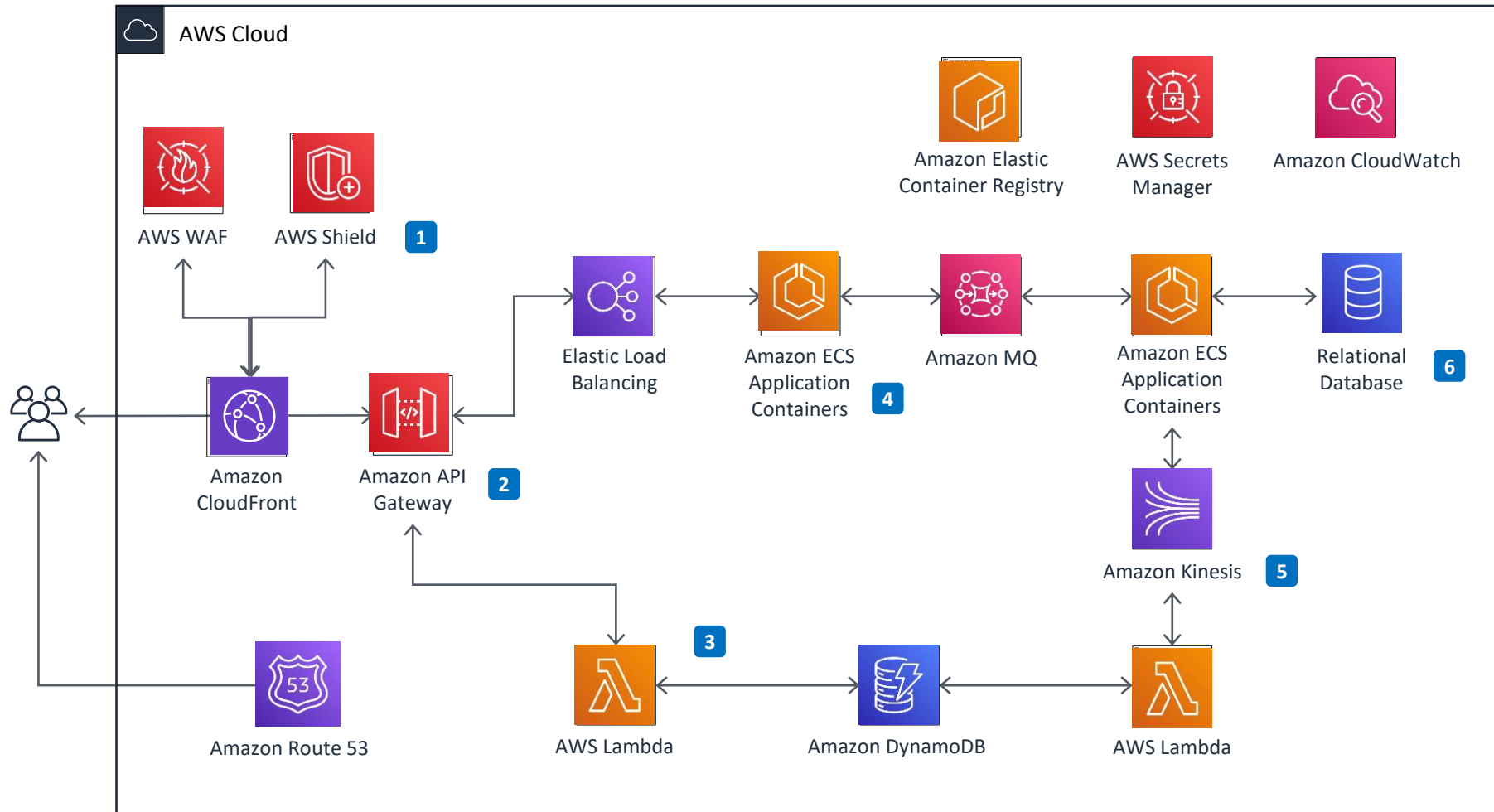
9.1M+

End customers

\$4.1B+

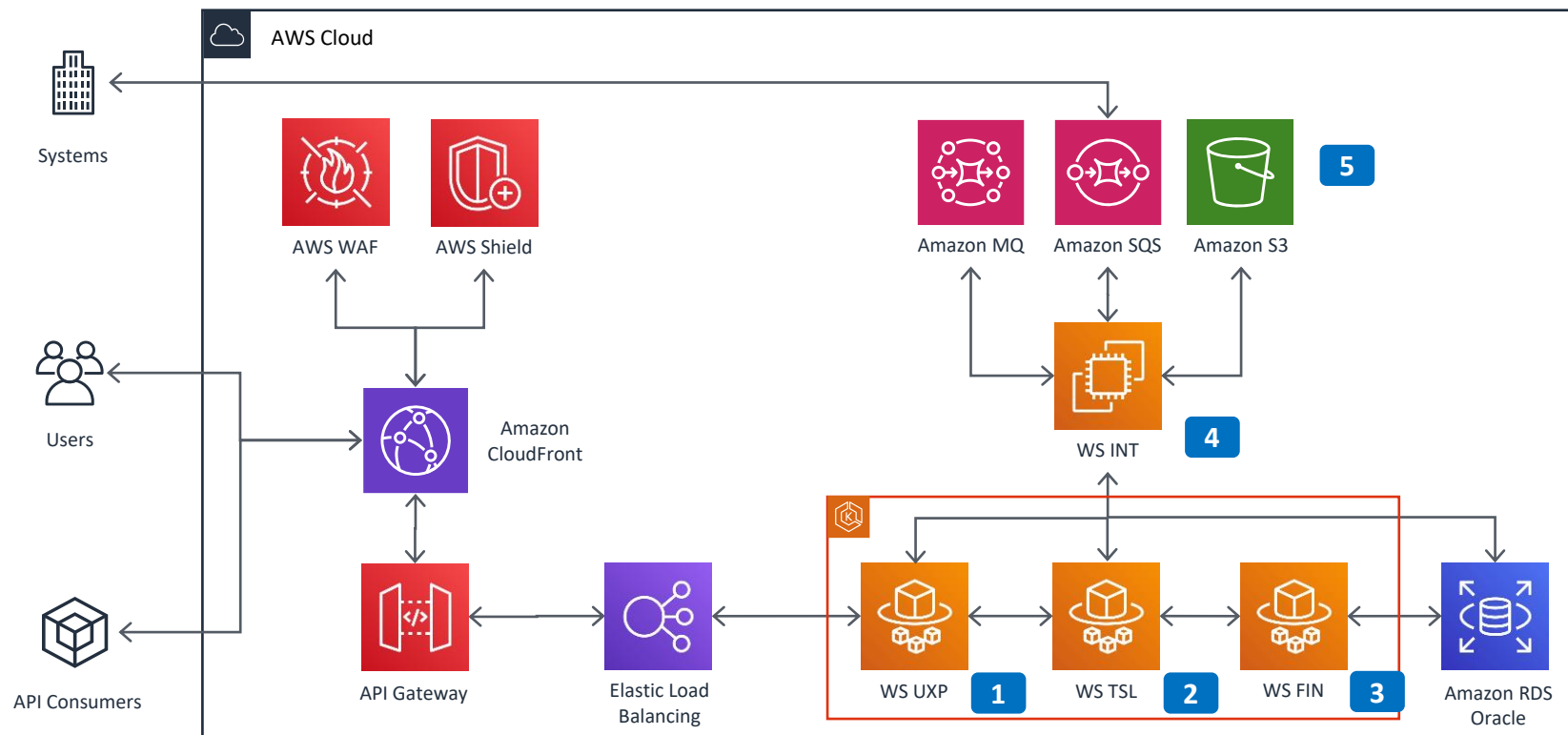
Portfolio under management

Reference Architecture: Transact

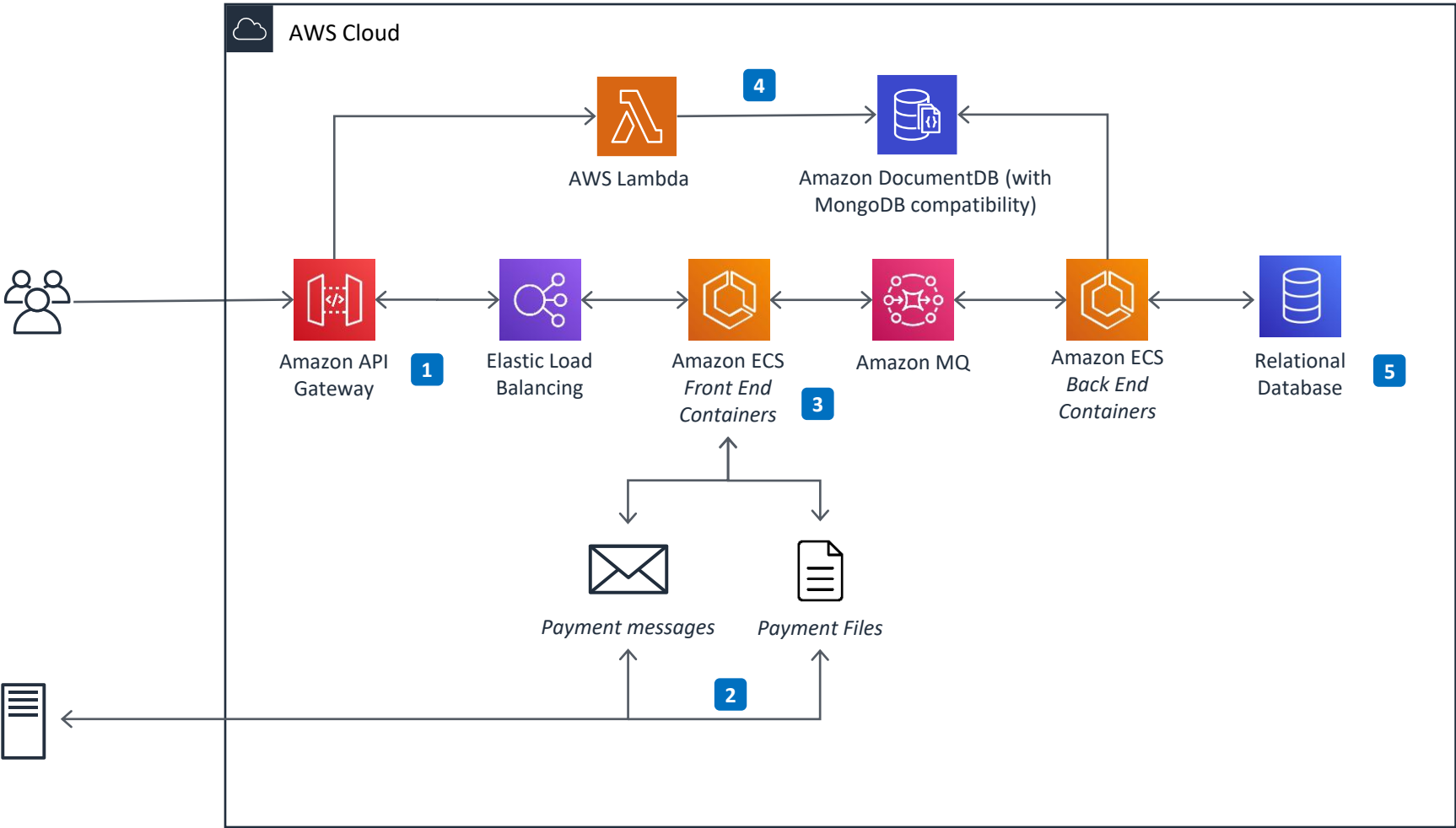


- 1 AWS Security services such as **AWS WAF** (web application firewall) and **AWS Shield** provide security at the perimeter.
- 2 Access to T24 is controlled and monitored through the **Amazon API Gateway**.
- 3 Read-only query activity is handled by **AWS Lambda** processing and query-optimized **Amazon DynamoDB** storage.
- 4 OLTP transactions are handled in scalable, containerized application processes running in **Amazon ECS**.
- 5 Events from selected topics of **Amazon Kinesis Data Streams** are ingested into **Amazon DynamoDB** tables using **AWS Lambda**.
- 6 Relational database options include **Amazon RDS for Oracle**, **Amazon Aurora**, or **NuoDB**.

Reference Architecture: WealthSuite



Reference Architecture: Payments



- 1** Access to the application and its APIs is controlled and monitored through the **Amazon API Gateway**.
- 2** Input Payment files and messages for processing can be delivered via Amazon S3 object storage or MQ messaging
- 3** OLTP transactions are handled in scalable, containerized application processes running in **Amazon ECS**.
Xxxxx [serverless microservices]
- 4** Relational database options include **Amazon RDS for Oracle, Amazon Aurora, or NuoDB**.
- 5**