

The background of the image features a dark blue gradient on the left, transitioning into a large, vibrant, abstract shape on the right. This shape is composed of overlapping curved segments in shades of orange, pink, and purple, creating a dynamic, modern aesthetic.

AWS re:Invent

NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

ENT203

Modernizing large-scale mainframes with AWS Mainframe Modernization

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Director, WW Sales
AWS Mainframe
Modernization
AWS

KC O'Connor

Sr. Director, Tech Strategy
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The Cigna Group

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Head of Cloud Platform
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Mainframe applications drive core business processes

67

of the
Fortune
100

44

of the
world's top 50
banks

8

of the
top 10
insurers

7

of the
top 10 global
retailers

8

of the
top 10
telcos

4

of the
top 5
airlines

50B

transaction
per
day

29B

ATM
transactions
per year

4B

travel
bookings
per year

87%

of global
credit card
transactions



Modernizing mainframe applications unlocks value

AWS CLOUD SERVICES CAN ACCELERATE MODERNIZATION



Cost savings

Low operating cost for managed runtime

Unified procurement of modern toolchains

Consumption-based, pay-per-use pricing



Agility

Pre-integrated toolchains

Automated code transformation

Access to modern developers and partners



Innovation

Near real-time data replication

Cloud-native access to analytics, ML, AI

DevOps for mainframe apps



Resilience

Automated runtime health monitoring

Centralized security and compliance

Application testing for business continuity

Poll: How are you planning to modernize mainframe applications?

PARTICIPATE IN SESSION POLLS ON YOUR MOBILE DEVICE



prod-livepolling.awseventservices.com

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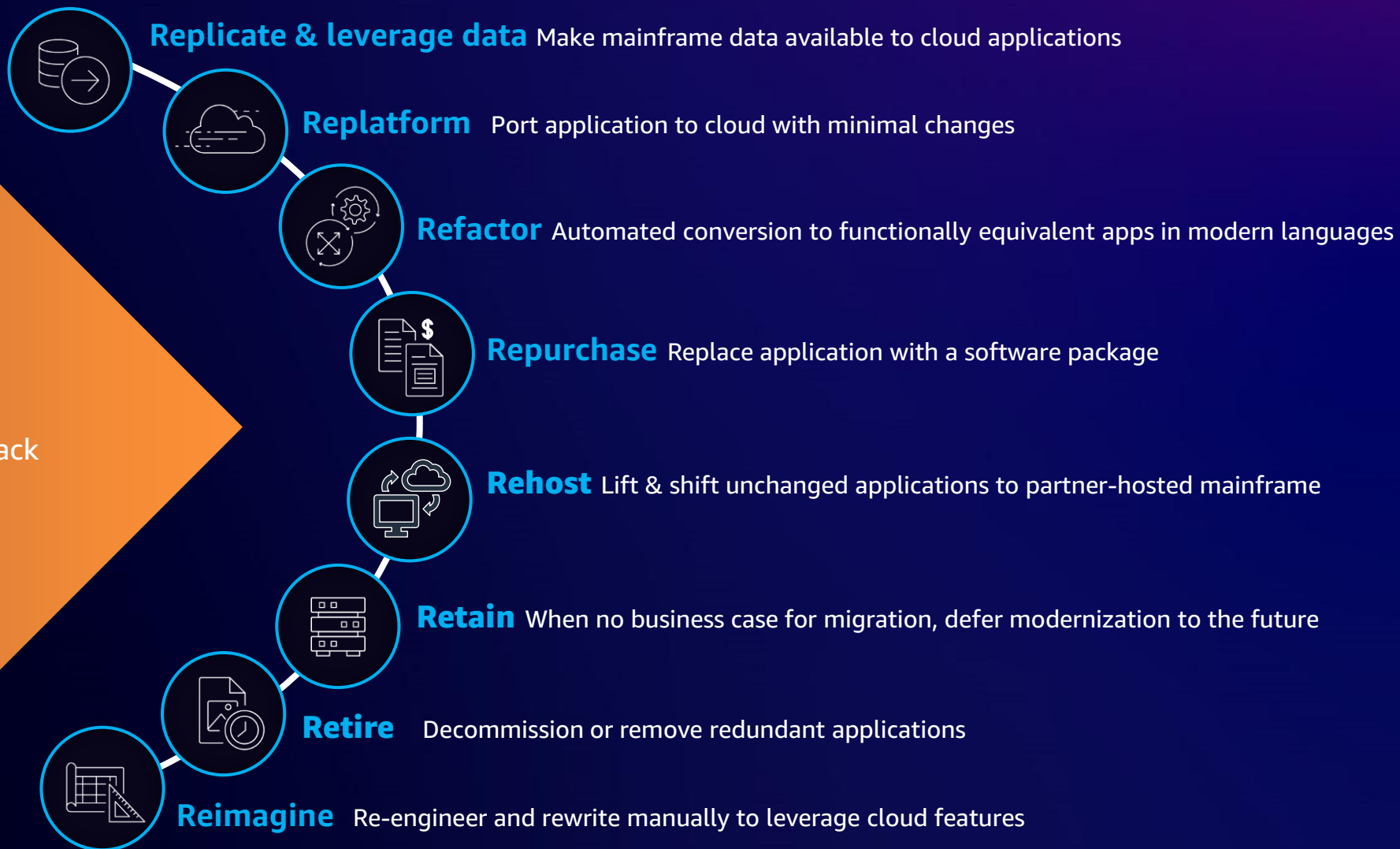


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The modernization can leverage multiple patterns

THE BUSINESS AND TECHNOLOGY ENVIRONMENTS CAN DICTATE THE CHOICE

- ✓ Business goals and objectives
- ✓ Technical constraints
- ✓ Mainframe/midrange technology stack



Poll: What patterns have you tested/deployed for mainframe modernization? (Select all that apply.)

PARTICIPATE IN SESSION POLLS ON YOUR MOBILE DEVICE



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651944



Large-scale mainframe modernizations are happening



Itaú

Banking
applications



Cigna

Healthcare
applications



**State
Farm**

Insurance
applications



**Fidelity
Investments**

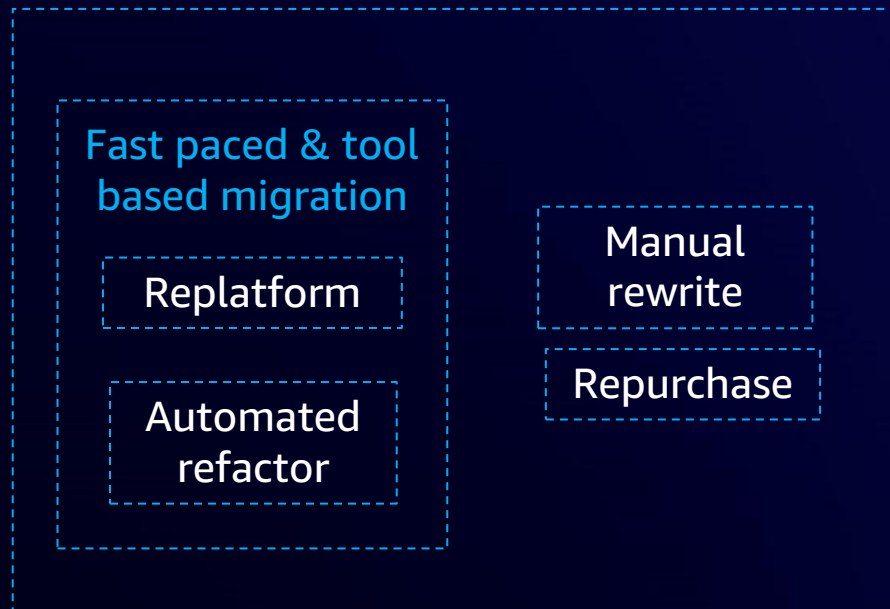
Investment
applications

AWS offers a selection of modernization patterns

AWS MAINFRAME MODERNIZATION OFFERS MIGRATION AS WELL AS AUGMENTATION PATHS

Migration-enabled modernization

Strategic journey to cloud

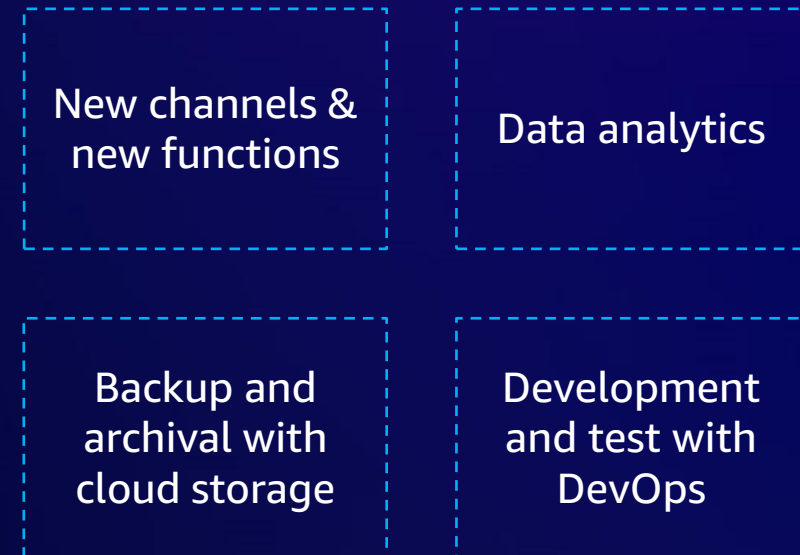


BLU AGE
an AWS Mainframe Migration Service

MICRO FOCUS

Augmentation & integration

Tactical innovations for cloud-driven benefits



precisely

bmc



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This list of partners is current as of November 26, 2023.

Announcements for AWS Mainframe Modernization

Application
Testing



File Transfer
with BMC



Replatform
with NTT DATA



Data Replication
for AS/400



Artificial
Intelligence
Demos



Resource
Manager
for Kyndryl



Virtualization
for
SPARC



Assembler and
Easytrieve
Conversion



AWS enables the journey

Cloud-native fully managed service

Offload routine infrastructure management and operations

AWS Professional Services

Supplement your team with AWS mainframe delivery experts

AWS Partner Network

Tap into a network with more than 100,000 partners from more than 150 countries



Dedicated mainframe teams

Accelerate success with AWS sales, product, partner, marketing supporting all geographies

Mainframe competency

Leverage validated consulting/technology partner expertise delivered via unique programs

AWS Migration Acceleration Program (MAP)

Deliver transformation faster using guidance, tooling, and annual usage estimation



Customer success story

How The Cigna Group transformed mainframe-based healthcare applications



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About me and my company



Evernorth is a wholly owned subsidiary of The Cigna Group

Offers a portfolio of health services

Provides coordinated and point solution health services and capabilities to health plans, employers, government organizations and healthcare providers

- Pharmacy benefit services
- Specialty pharmacy
- Care services



KC O'Connor

- Sr. Director, Tech Strategy & Modernization
- Responsibilities: Champion Evernorth's mainframe modernization, reducing mainframe utilization by accelerating the path to AWS
- Experience: Software engineering and architecture roles leading vision, strategy & execution of programs across complex ecosystems, driving productivity, reliability, and growth. Prior replatform experience at GE Capital and Refactor experience at Wells Fargo, and years moving workloads from mainframe to distributed environments.

Objectives for mainframe modernization



Reduce mainframe growth

- 13% YoY growth across 3 LPARs
- Dedicated LPAR for digital & customer services
- Efforts to curtail growing MIPS per transaction
- Initiatives including optimization, replatform, refactor, and reimagine



Decouple digital assets

- Volume resulting in significant expense
- More flexible service-level agreements
- Offload transactions to drive costs down

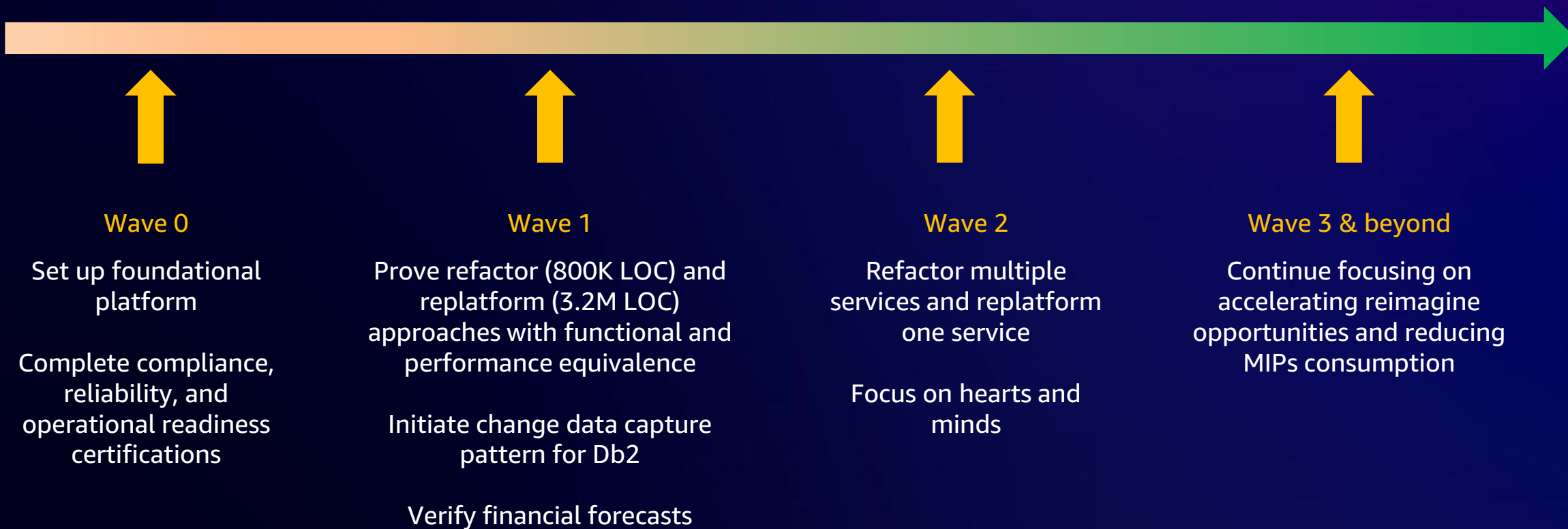


Enhance sustainable resiliency

- Remediate known resiliency gaps

Deliver a secure and scalable cloud environment that accelerates innovation, enhances operational agility, and ensures the utmost in data security and patient care

Cigna's mainframe application modernization journey



Decision process

EVALUATION OF REFACTOR AND REPLATFOM PATTERNS

Wave 1 validation

Viability

- ✓ Refactoring of COBOL application to Java/Spring on AWS
- ✓ Replatforming of COBOL application to Micro Focus on AWS

Equivalence

- ✓ Functional equivalence after migration
- ✓ Performance equivalence after migration

Wave 1 insights

Observations

- ✓ Refactoring using AWS Blu Age offers cost-effective runtime using open-source Apache Tomcat instances
- ✓ Best to reimagine use cases in AWS, using services and data migrated

Learnings

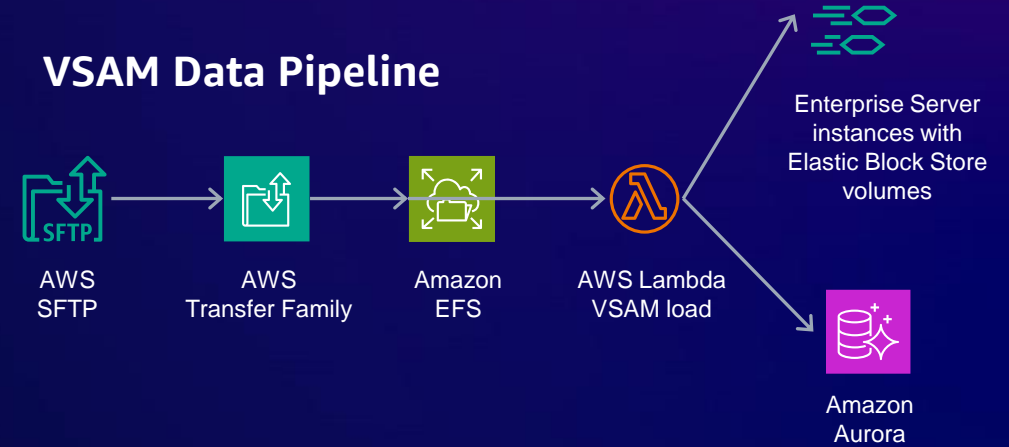
- ✓ Developers need to learn new technologies and frameworks to work with Java
- ✓ Refactoring to Java uncovers tool-related learnings

Evernorth mainframe modernization platform with AWS Mainframe Modernization

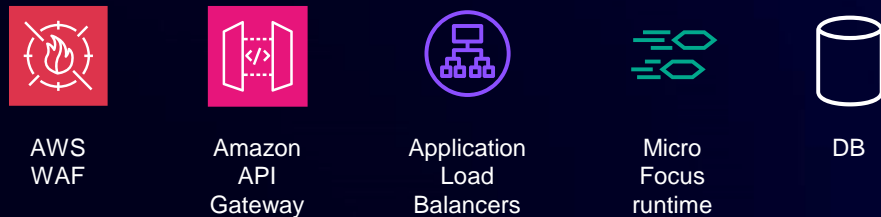
Developer Release Pipelines



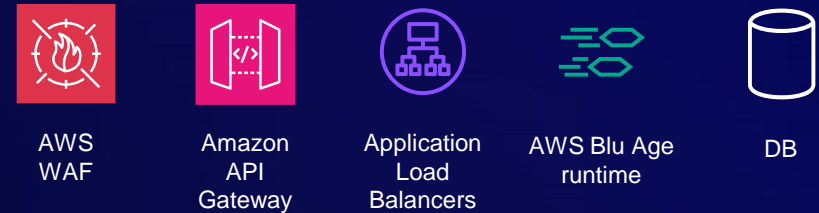
VSAM Data Pipeline



AWS Mainframe Modernization Replatform (Micro Focus)



AWS Mainframe Modernization Refactor (AWS Blu Age)



AWS Mainframe Modernization: Toolset lessons

Refactor

AWS Mainframe Modernization
Blu Age Refactor
modernizes with automation the complete application software stack, infrastructure, and processes



Replatform

AWS Mainframe Modernization
Micro Focus Replatform
preserves application assets with minimal changes while modernizing the infrastructure and processes



Assessment identified and documented portability gaps and the modules impacted

Lessons learned include

1. the need to analyze startup transactions
2. to perform dynamic code analysis in addition to static analysis

Migration lessons learned

1. POC vs. pilot mindsets

Keep the “this will run in production” attitude from the beginning

2. Data migration in parallel

Start getting the data to AWS in a repeatable fashion from the start

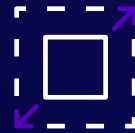
3. Developer impact

Use multiple communication channels to keep dev teams engaged

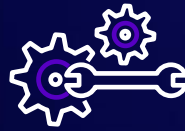
4. Operational excellence

Technical excellence is non-negotiable
No shortcuts acceptable

Outcomes



Reduce mainframe services consumption by 25% in 2024 and by 90% in 2026



Address risk-based failure modes with a tested, secure, and scalable platform



Accelerate re-imagine roadmap leveraging refactored services

Customer success story

How Itaú transformed mainframe-based banking applications



Thiago Morais

Head of the Cloud Platform & cCTO
Itaú Unibanco



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Itaú Unibanco



**With 99 years
of history,
we are a
full-service
bank**

Market Value¹

US\$ 55.1 bn

Total Assets²

BRL 2,679 bn

Recurring ROE³

21.1%

The most valuable⁴ Latin American brand

US\$ 8.7 bn

97.5k employees

In Brazil and overseas

**Great
Place
To
Work®**



The best bank to work for in Brazil and
winner of LinkedIn's Diversity award

How we evolved the way that we operate



To achieve our goals, we defined a structured Operating Model focused on meeting our customer's needs



2017

Sustain
**Private
Cloud**



2018 - 2019

Sustain
**Public
Cloud**



2020 - 2022

Grow
**Cloud Operating
Model (COM)**



2023

Optimize
**Platform and Product
Operating Model**



Results

+5.9K

AWS Certifications, the
largest certification
program in the world

-98%

reduction of Incidents
that impact the customer

+13x

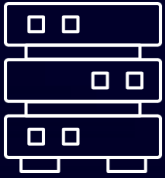
more deployments,
than in 2018¹

+50%

of our platform modernized,
which represents approximately
**70% of the services with the
greatest competitive impact**



Role of mainframe in modernization

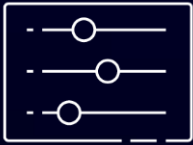


Mainframe supports

+1.3k Business services

3 Transaction monitors
IMS, CICS, and GRBE

+9b Transactions per day



Mainframe strategy

Business service quality

Business competitiveness



Mainframe goals

Reduced Complexity

Reduced coupling

Faster time to market

Integration & coexistence

Observability & analytics

Strangler approach for mainframe modernization

WHY WE CHOSE REWRITE AND REPLATFORM PATTERNS

HOW WE DECIDED WHICH APPLICATIONS TO REWRITE OR REPLATFORM

HOW ARE WE ENABLING A HYBRID MODEL

REWRITE

- ✓ Transformation of user journey and experience

- ✓ Business services were prioritized according to business criticality and impact

- ✓ Mainframe inbound and outbound models allow the mainframe to consume cloud, while the cloud consumes the mainframe

REPLATFORM

- ✓ No functional changes in medium term or plans to retire

- ✓ Use cases needing scalability and with replicable patterns

Itaú mainframe modernization strategies: Rewrite

Itaú rethought business services for reduced dependencies, higher agility/autonomy, adaptable platforms



Decoupled

Loosely coupled architecture



Data driven

Data democratization



Scale

Faster feature release



Designed to evolve

Easy to change functionalities



55,4%

Business services modernized



27%

Faster feature release



44%

Faster history release



-4.2%

H/BCP reduction



Foundation

Self service engineering reusable pattern

Lessons learned

Prioritization
Coexistence
Deprecation



Itaú's rewrite portfolio roadmap



Seamless infrastructure and application pipeline



Analytics by design



Security by design



Management by design



Reduce cognitive load for engineering teams



Knowledge

Tools



IU Confia

Itaú's platform to ensure guardrail adoption
(AWS Config, AWS Lambda, AWS Well-Architected Tool)



Cloud4You

Account and application creation front-end
(AWS Control Tower, AWS Organizations)

Integration & design authority



Amazon API Gateway

Data



Pipeline data mesh

Infra as a code for data
(AWS Glue, Amazon S3, AWS CloudFormation, Amazon API Gateway)

Development



Stack

Java, Kotlin, Angular

Itaú mainframe modernization strategies: Replatform

Comprehensive strategy with AWS Mainframe Modernization was established to address business services classified as retain or retire



Zero functional changes



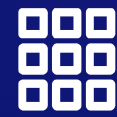
Native data integration with data mesh



Zero dev experience changes



Scalability, observability, and self-service



+27.5%
Platform modernization of our home loan services



12 months
From scratch to production



16 patterns
Developed to scale



+10k
MIPS candidates



Foundation

Mainframe Ops Landing Zone

AWS Mainframe Modernization to Vault

AWS Mainframe Modernization- IMS Runtime Observability

AWS Mainframe Modernization- IMS Transaction Observability

Lessons learned

Discovery
Data decoupling
Migration at scale



Itaú's replatform portfolio roadmap



Infrastructure for COBOL execution on AWS



Observability



Security



Integration with DB2 and MQ



Fluid dev experience with modern IDE and pipeline



Training (Micro Focus)

Tools

- IMD - Itaú Mainframe Discovery
- Mainframe DevX to Cloud
- AWS Mainframe Modernization-Microfocus Enterprise Analyzer
- AWS Mainframe Modernization-Microfocus Enterprise Developer

Integration

- AWS Mainframe Modernization-IMS 2 API Integration on AWS
- Corp. HLASM Components to COBOL
- MQ to AWS Mainframe Modernization-IMS Runtime on AWS
- Control-M to AWS Mainframe Modernization-Batch Runtime on AWS

Data

- AWS to Mainframe
- Mainframe Database on Cloud

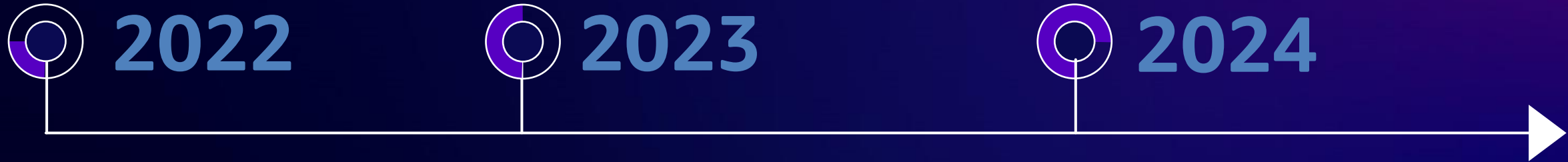
Middleware

- AWS Mainframe Modernization-IMS Runtime on AWS
- AWS Mainframe Modernization-Batch Runtime on AWS

Infrastructure

- Mainframe Ops Landing Zone
- AWS Mainframe Modernization to Vault
- AWS Mainframe Modernization-IMS Runtime Observability
- AWS Mainframe Modernization-IMS Transaction Observability

Itaú mainframe roadmap



Replatform

Home loan pilot successfully executed for functional validation

Home loan business services launched in production with AWS Mainframe Modernization on Amazon EC2

Next steps preparing to scale

Rewrite

+1.5K business services modernized through the rewrite portfolio

Continued modernization of business services, reaching core components with discovery tools support

Embed generative AI into the daily lives of software engineers to accelerate modernization

AWS
re:Invent

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AWS Mainframe Modernization Automated Refactor Transformation Center

Xavier Plot, Principal Tech Business Developer
AWS Blu Age Qualification & Expertise Team Lead
AWS Mainframe Modernization

[Lightning talk ENT234](#)

Nov 29, 1:30-1:50pm

Venetian L2 | Hall B Expo Theater 1, Booth 422



AWS Mainframe Modernization

Learn from the experts

AWS
re:Invent

NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

Modernizing
large-scale
mainframes
with AWS
Mainframe
Modernization

Breakout
Session
ENT203

Nov 29, 10:00-11:00am
MGM Grand |
Premier 318

AWS Mainframe
Modernization
Automated
Refactor
Transformation
Center

Lightning talk
ENT234

Nov 29, 1:30-1:50pm
Venetian L2 | Hall B
Expo Theater 1,
Booth 422

Drive innovation
with AWS
Mainframe
Modernization
Data Replication

Breakout
Session
ENT204

Nov 30, 12:30-1:30pm
MGM Grand |
Premier 318

Build well-
architected
refactored
mainframe AWS
Blu Age
applications

Workshop
ENT308

Nov 27, 2:30-4:30pm
MGM Grand |
Grand 118

Seamless,
automated
testing to
accelerate AWS
Mainframe
Modernization

Workshop
ENT310

Nov 27, 5:00-7:00pm
Mandalay Bay | S Pacific F
Nov 29, 8:30-10:30am
MGM Grand | Grand 117

Mainframe
DevOps and
testing with
AWS Cloud

Chalk Talk
ENT205

Nov 27, 4:30-5:30pm
Caesars Forum/
Forum 126
Nov 28, 2:00-3:00pm
Caesars Forum /
Forum 104

Meet Mainframe Experts at the Enterprise Workloads Kiosk
Kiosk #35, AWS Village at the Venetian, Monday 4 pm to Thursday 4pm



Thank you!



Please complete the session survey in the mobile app

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