AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

ENT230

Executing a large-scale migration & modernization

Jonathan Allen (he/him)
Director, Enterprise Strategy
AWS

Mary McDaniel (she/her)
Global Practice Manager Migrations
AWS

Steve Steuart (he/him)
WW Mainframe Business Development
AWS

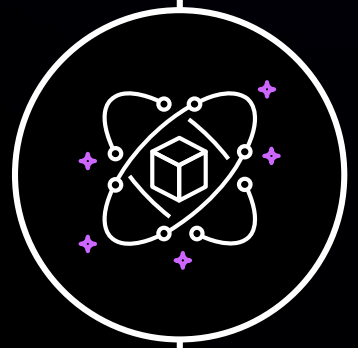
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Avoid the stall



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Lessons learned: Vision phase



Understand and agree on your compelling “why?”

Others have gone before; you have got this!

Be aware of analysis paralysis

Provide path for upskilling and bring the team along

Dedicated CCoE with all technical skills

Momentum and blockage removal is key!

Single-threaded senior leader

AWS can help!

Biggest lesson learned: Cross-business sponsorship is absolutely crucial

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Understand and agree on your compelling “why?”



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Others have gone before; you have got this!



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Game-changing 17-month journey

LIVE NATION

58%

total cost savings – 18% immediate and another 40% after optimizations

50%

reduction in traditional IT operations tasks

99.999%

application availability – up from 99.9%

10x

increase in innovation pipeline

"**Go faster** than what is comfortable."

Michael Rapino
CEO, Live Nation

". . . when you know you have the ability to quickly deprovision, **it makes you bolder to say yes and try new things.**"

Jake Burns
(former) VP of Cloud Services, Live Nation

aws

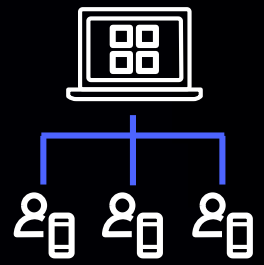
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Average realized benefits



31%

Cost savings over comparable infrastructure



62%

More efficient IT infrastructure staff



75%

Increase in agility in delivering new features

Source: IDC, Document #US43535718, 2018. www.idc.com

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Be aware of analysis paralysis: Use Migration Evaluator

BUILD A DATA-DRIVEN BUSINESS CASE FOR AWS



Accelerate decision-making for migration to AWS at no cost

We enable business and IT leaders to:

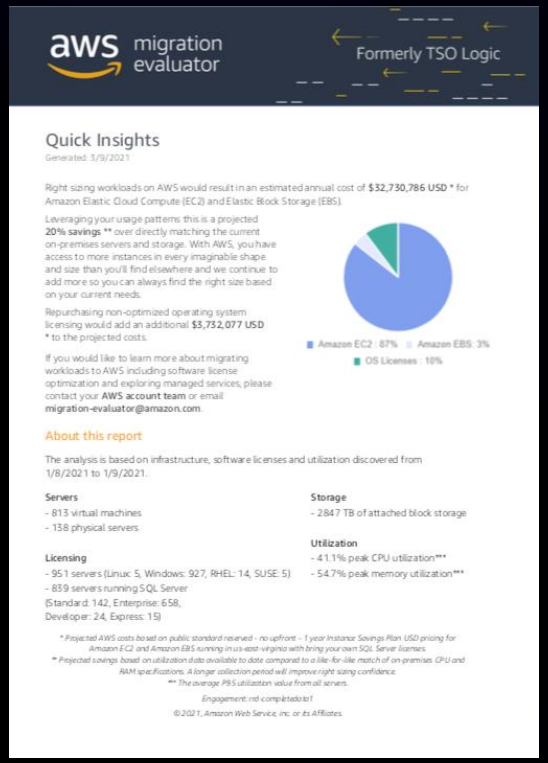
- Discover compute and storage inventory without agents
- Determine the most cost-effective path to cloud in hours
- Maximize Microsoft licenses for even bigger savings
- Make sound AWS planning and migration decisions
- Align stakeholders on the next step in their migration journey
- Get insights from AWS experts

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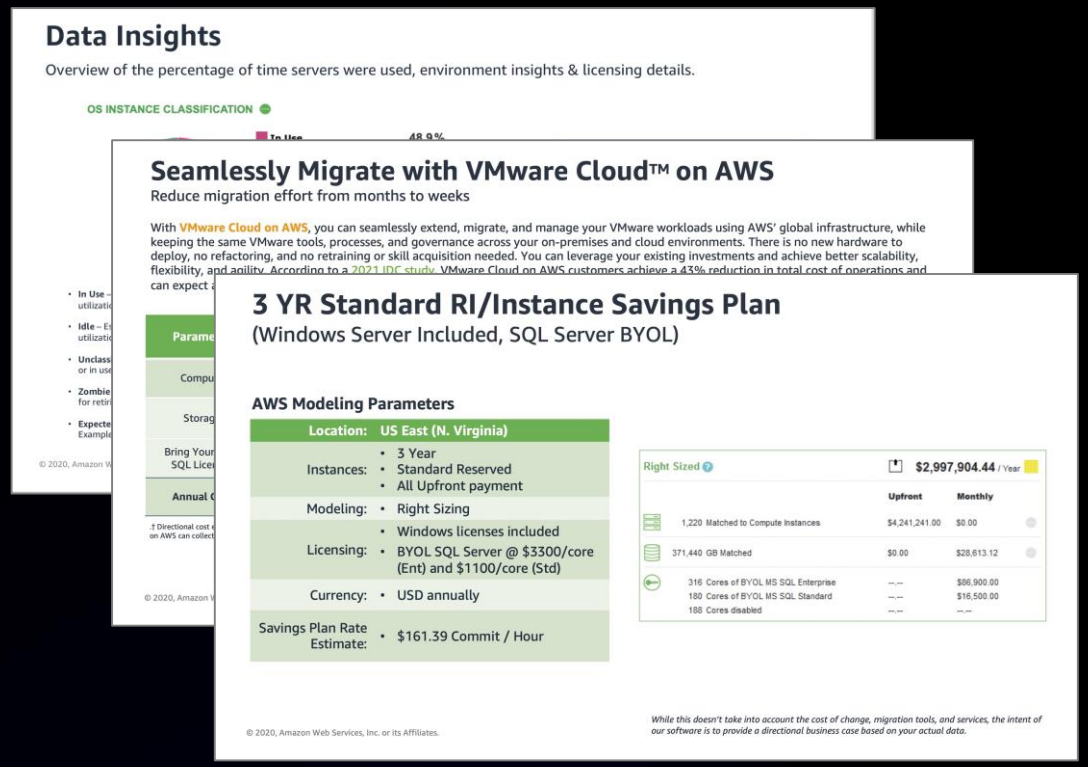
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Migration Evaluator deliverables

Quick insights



Directional business case



https://aws.amazon.com/migration-evaluator/

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Migration Readiness Assessment (MRA): Build and align on a plan for change

KNOW WHERE YOUR PEOPLE ARE STARTING TO ACCELERATE YOUR JOURNEY

Diagnose migration readiness and build a case for change

1-day workshop to align and identify readiness gaps for a large-scale migration

Deliver an action plan proposal to close the gaps (e.g., accelerators, a mobilize project plan by ProServe/partner)

Business capability-focused

Technical capability-focused

Business
Value realization

People
Roles and readiness

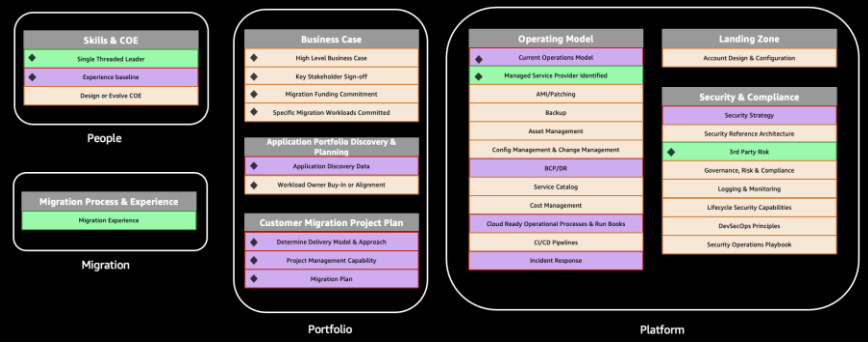
Governance
Prioritization and control

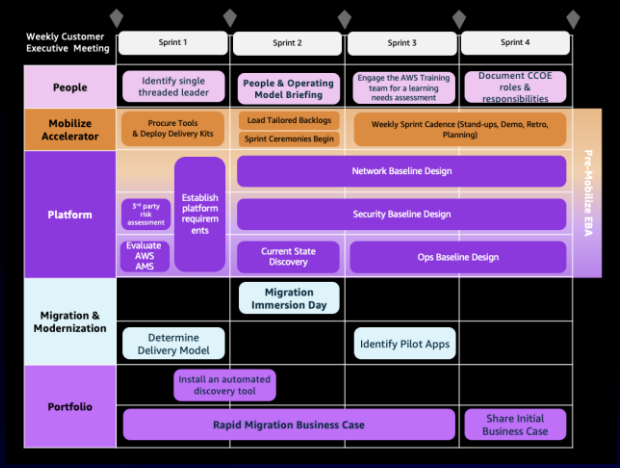
Platform
Applications and infrastructure

Security
Risk and compliance

Operations
Hybrid and dynamic

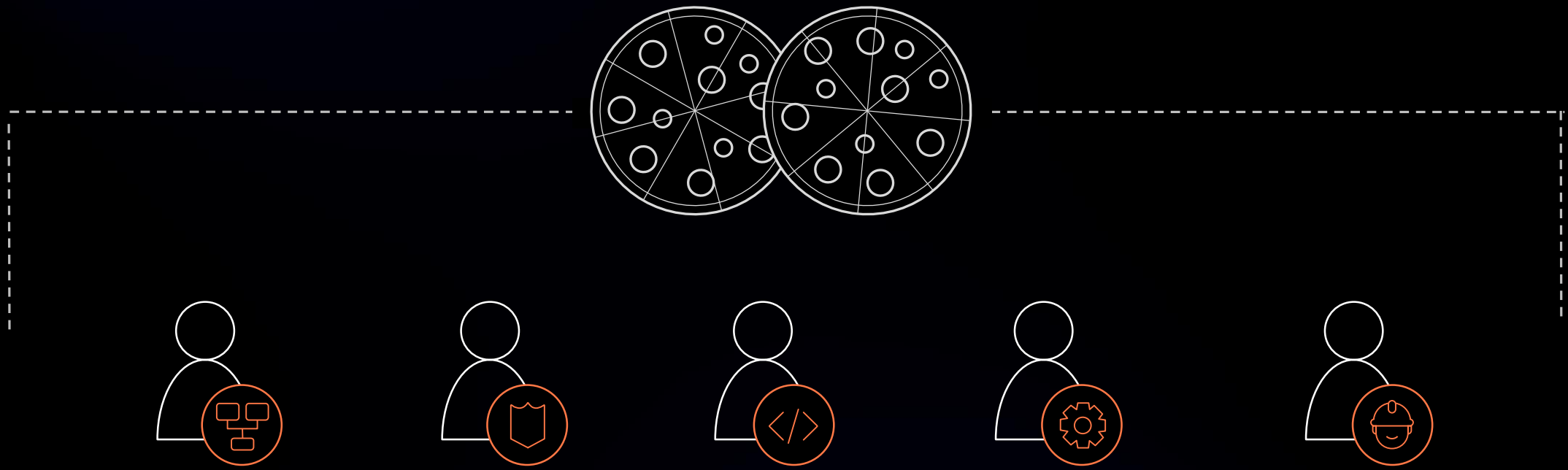
https://aws.amazon.com/professional-services/CAF/





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Cloud Center of Excellence (CCoE)



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Patterns and anti-patterns (CCoE)

Ephemeral team	Immutable team
Understand the new cloud patterns	Use legacy on-premises design patterns
Work to empower other teams	Become a bottleneck
Establish essential patterns first	Try to ”boil the ocean”
Technical, self-sufficient, dedicated resource	Treating it as a “side of desk” of project

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Enable your team to operate in new ways of working



Watch: re:Invent 2019 talk
https://www.youtube.com/watch?v=yHzJw007oO8

Read: AWS blog post
https://amzn.to/36syEg0

Get to 10% certified – this is the tipping point for exponential adoption

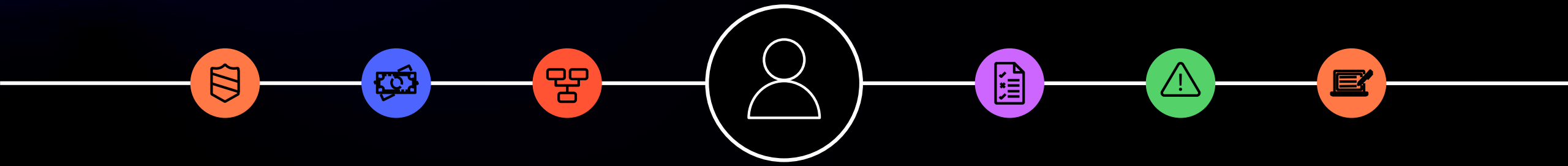
Capital One

National Australia Bank

verizon

aws

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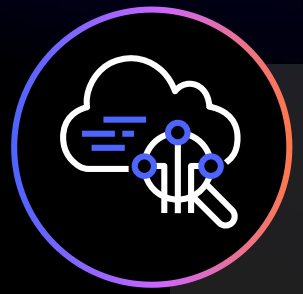


“Single threaded leader who represents the entire business”

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AWS can help!

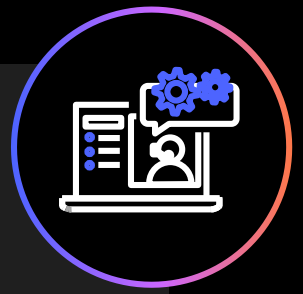
Methodology



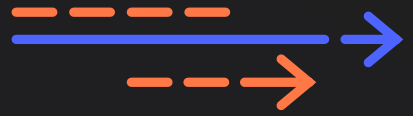
Tools



Partners



Migration acceleration program



Investment



Training



Services



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AWS Prescriptive Guidance (APG)

*"**APG** provides time-tested strategies, guides, and patterns to help accelerate your cloud migration, modernization, and optimization projects"*

300+ guidance resources already published by AWS and certified AWS Partners; incremental guidance published weekly

Time-tested – based on hands-on experience

Innovative, secure, and compliant solutions

Actively used by 1,000s of customers

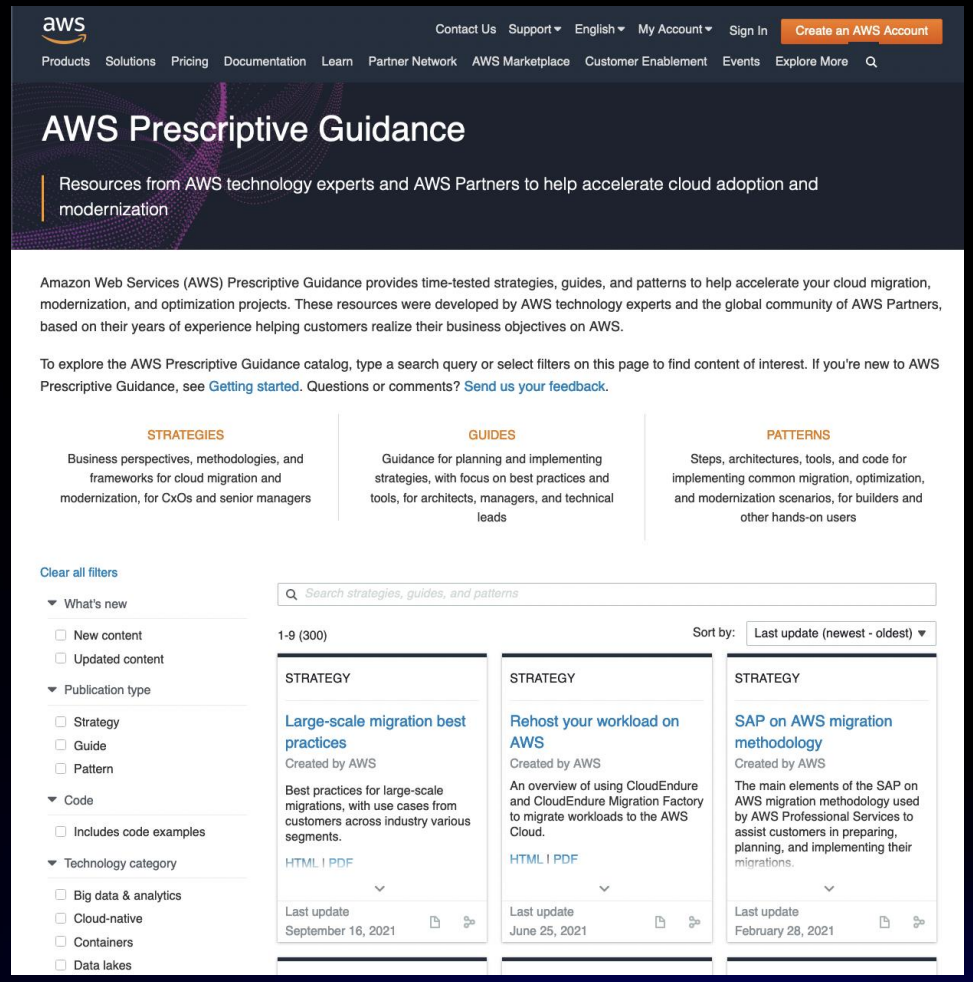
7+ strategies

52+ guides

241+ patterns

Covering multiple use cases, scenarios, and industries

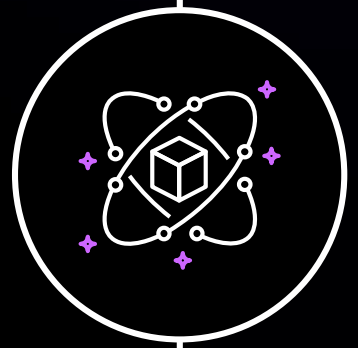
AWS Prescriptive Guidance



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Lessons learned: Assess and mobilize phase

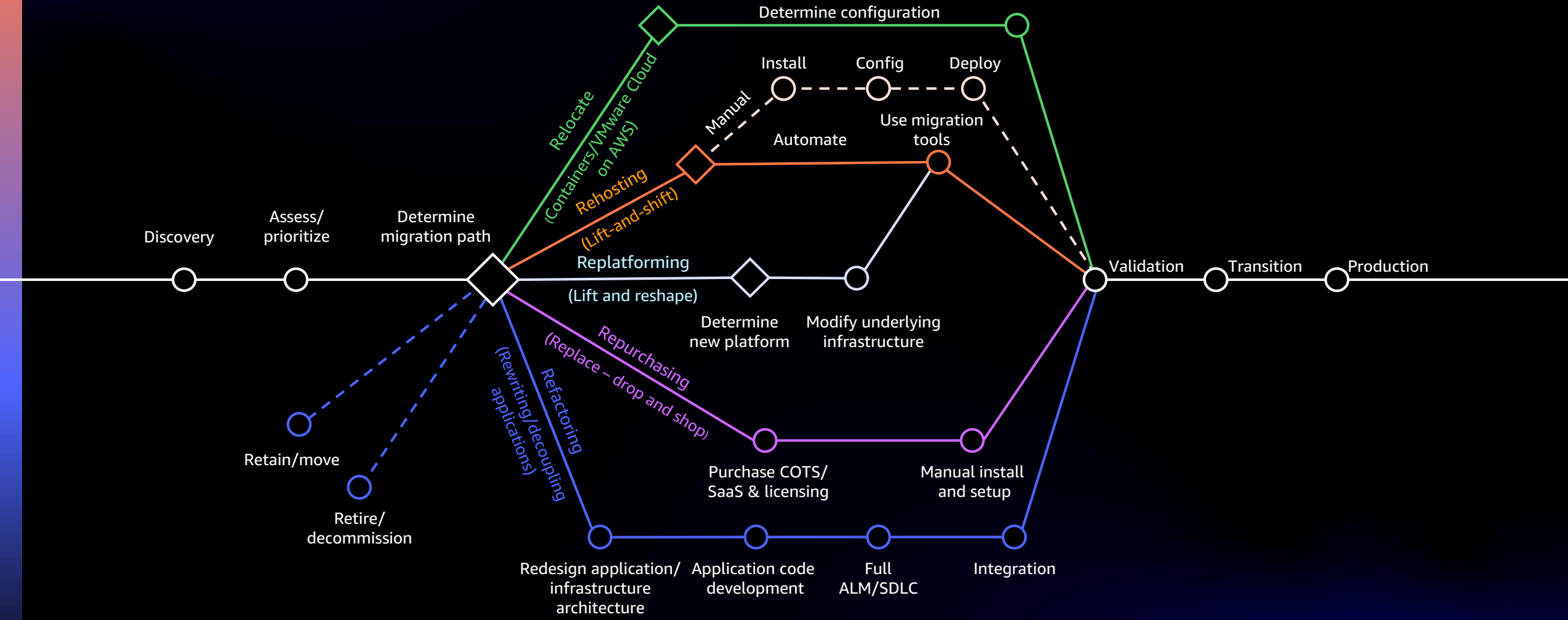


- Portfolio assessment will be continual
- Business priorities will change; expect it
- Full application team inclusion from the start is crucial
- Shortlist tooling early – do not underestimate security approvals
- AWS Control Tower plays a significant role in migrations
- Shortlist migration partners
- Establish management and governance early
- The way you operate today will not be the same in the cloud

Biggest lesson learned: Understand and allowing for dependencies

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Portfolio assessment will be continual

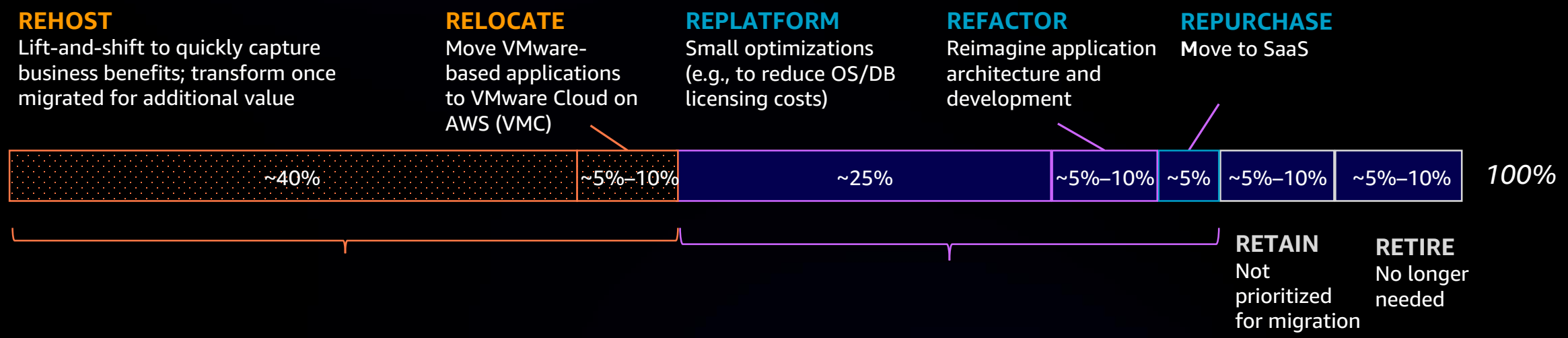


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Portfolio assessment will be continual

AVERAGE CUSTOMER ENVIRONMENT, BY MIGRATION PATTERN

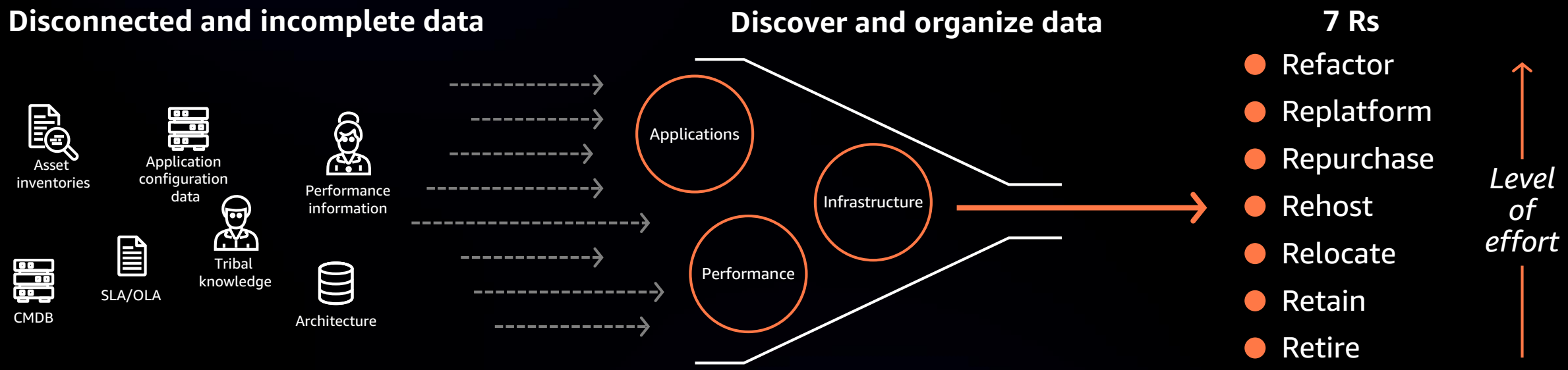
(based on AWS experience)



Full spectrum of patterns is important for transformation – but up to ~50% of typical environment can be *rapidly migrated*, freeing time and budget to focus on modernization

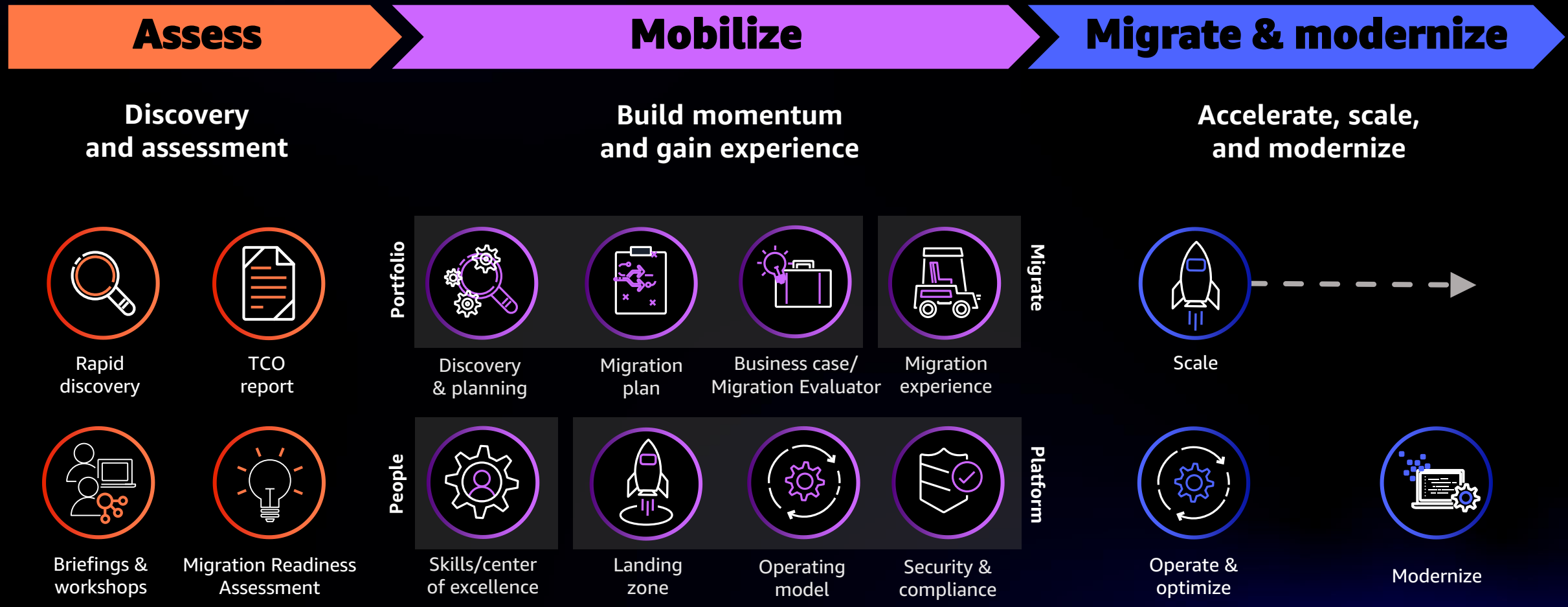
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Migration planning



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AWS uses a structured approach to drive migration success



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Scale up the team as you go

CCoE
(0–6 months)

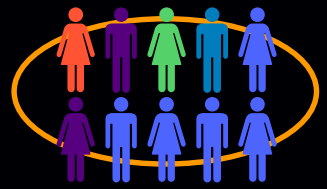


- Cloud leader
- Product owner
- Financial analyst
- OCM/training specialist
- Cloud architect
- Platform engineers

Scaling team
(6–12 months)

Cloud business office

- Architecture alignment
- Product management
- Onboarding
- Financial management
- Training
- Org change management
- Delivery management



Cloud platform engineering

- Platform
- Operations
- Security



Migration at scale
(12+ months)

Cloud business office



- Product
- Architecture
- Financial
- Delivery
- Onboarding
- OCM
- Training

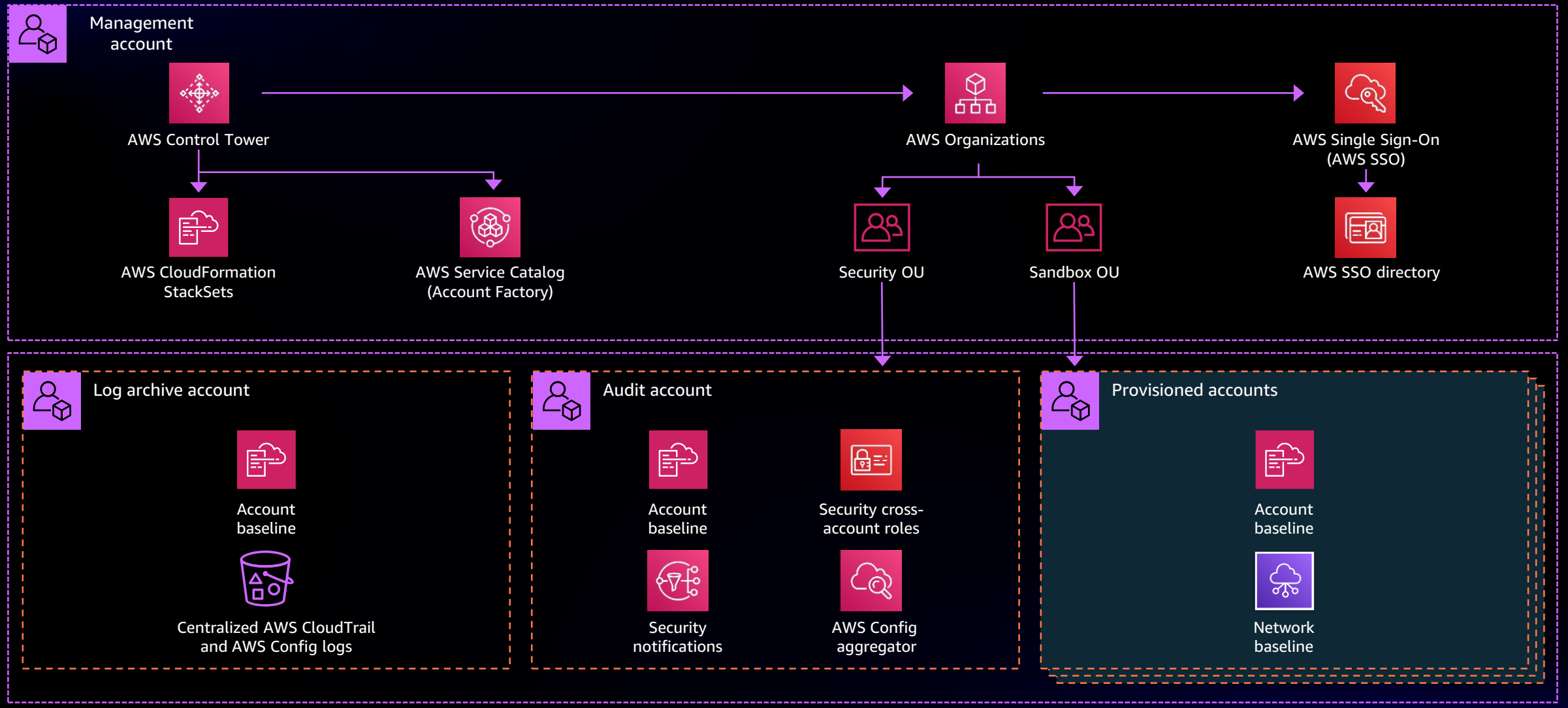
Cloud platform engineering

- Platform
- Operations
- Security



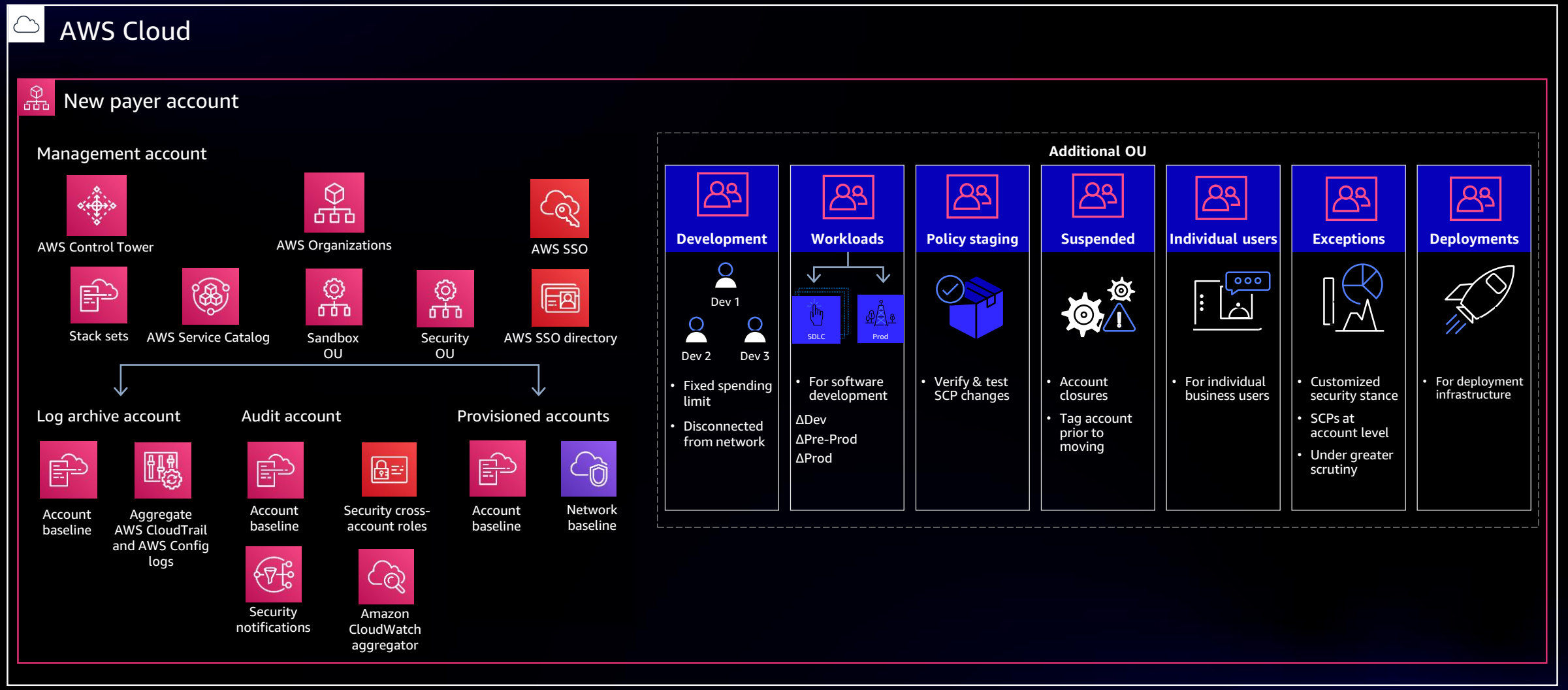
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Landing Zone provisioned by AWS Control Tower



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ENABLE governance



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The way you operate today will not be the same in the cloud



Self-managed	**Full control simplified with AWS tools** • AWS Service Catalog • AWS Systems Manager • AWS management tools & services ○ Modeling and provisioning, automation and operations, monitoring and logging • Third-party tools
AWS Managed Services (AMS)	**We operate your cloud with AWS best practices and compliance standards so you can focus on your business priorities** • Addresses security & compliance • Managed AWS landing zone • Self-service automation • 24/7 worldwide AWS operations support engineers • Month-to-month terms – you can take back control any time
Partner-managed	**Use AWS Certified Managed Service Partners to help operate your cloud** • 100+ Managed Service Partners (MSPs) • Certification program • Third-party audit • Full lifecycle services https://aws.amazon.com/partners/msp/

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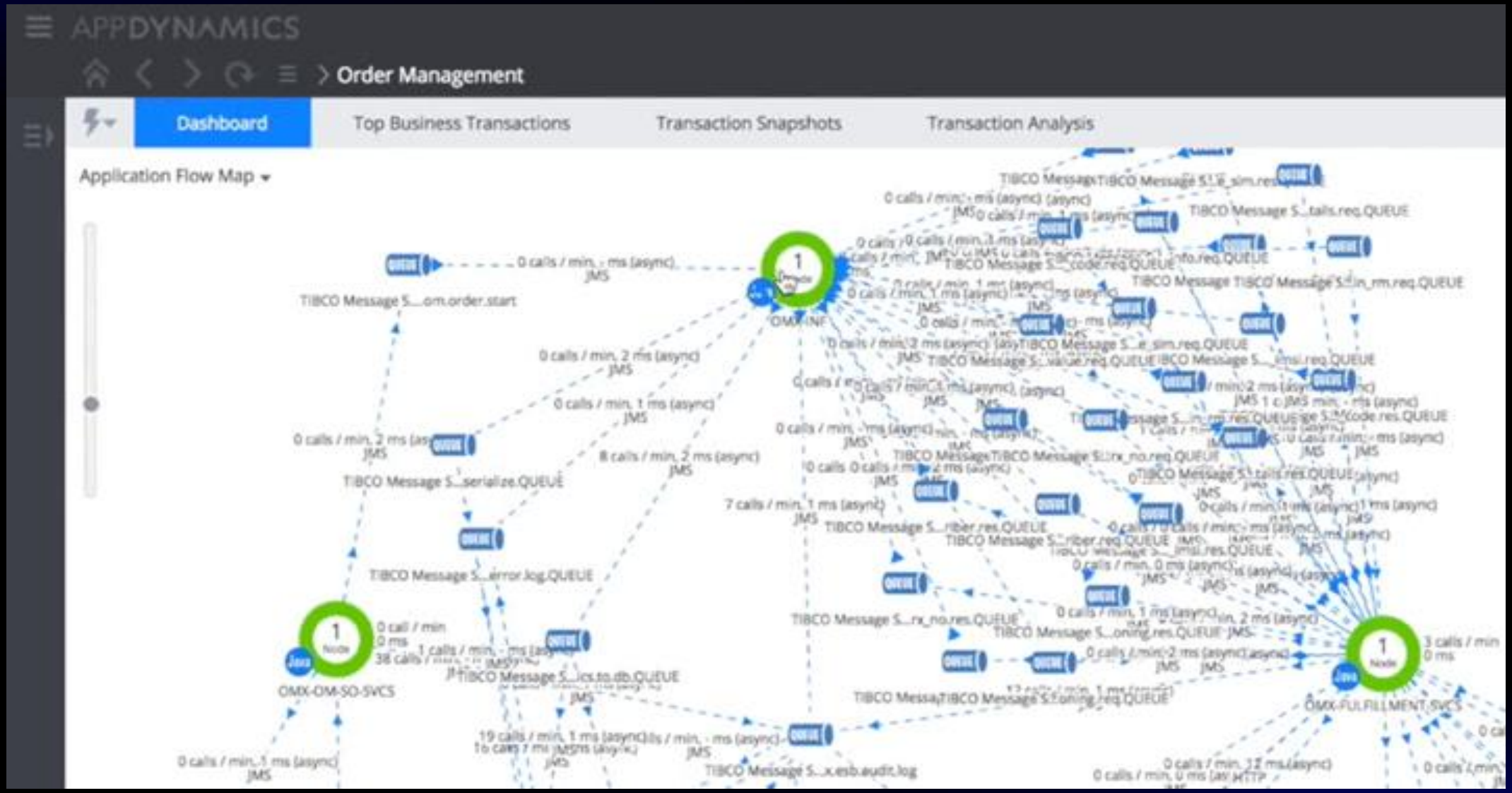
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Partners are key to transformation success



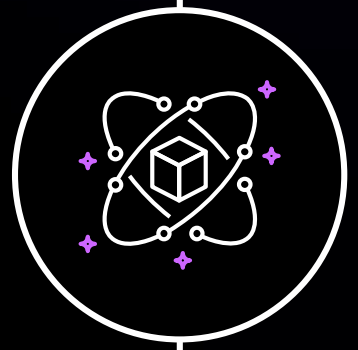
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Application dependency mapping matters



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Lessons learned: Migrate and modernize

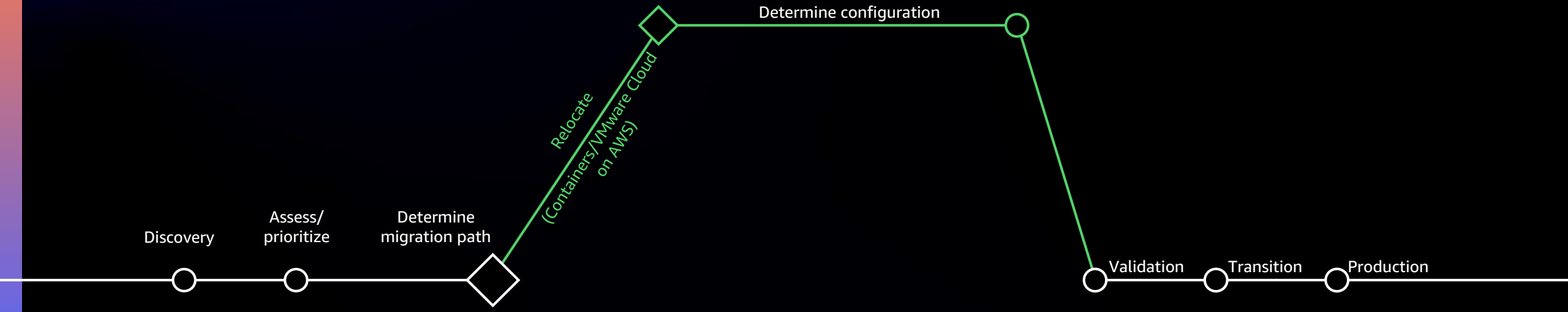


- Rehost and then optimize is a powerful combo
- A reorg is not required
- Dive deep on the options available to you in each R
- Respect Parkinson's Law on migration
- Wave planning and execution should be iterative
- MAP credits can smooth the way
- Momentum and blockage removal is key!
- Don't forget all the data; there's more than apps/databases
- Clean up resources as you go

Biggest lesson learned: Post-migration cost optimization

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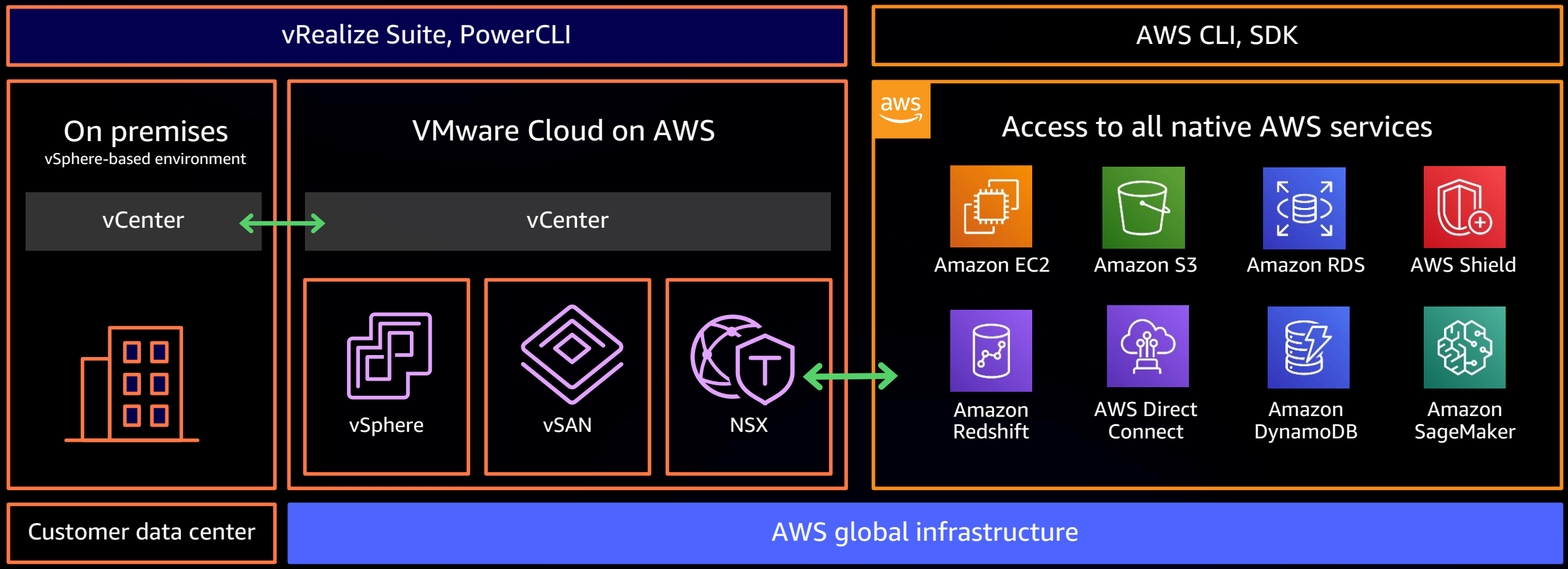
Application migration strategies: Relocate



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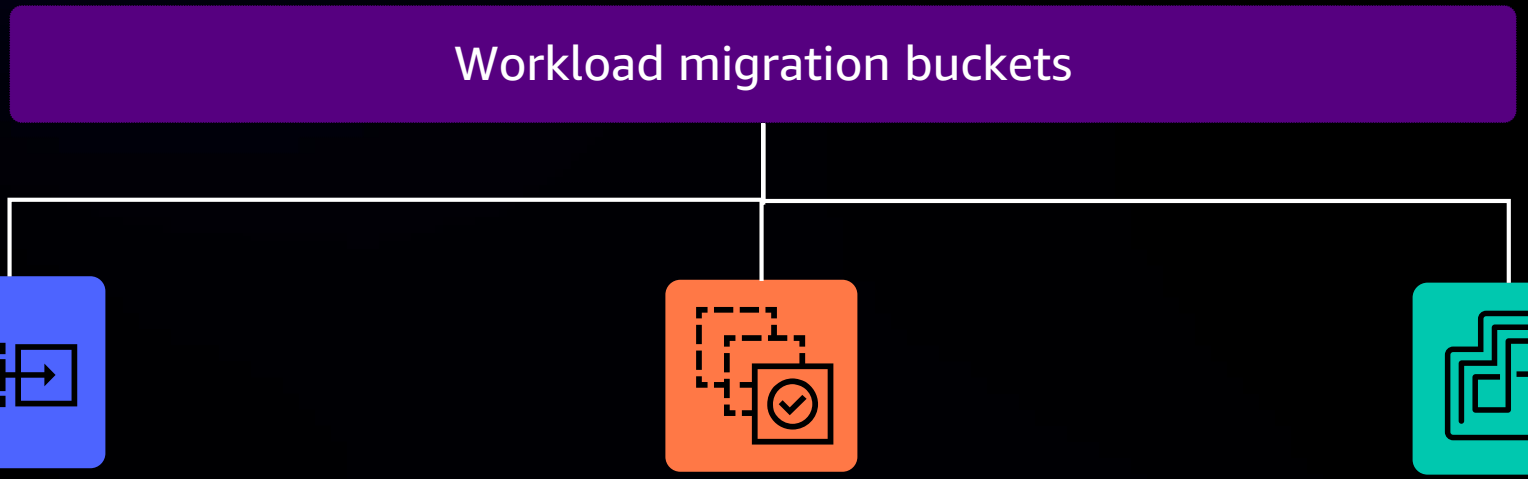
VMware Cloud on AWS

INNOVATION ENGINEERED BY VMWARE AND AWS



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Migration options



Downtime

Cold migration

HCX cold migration

Backup and restore

Minimal downtime

HCX bulk migration

No downtime

vMotion

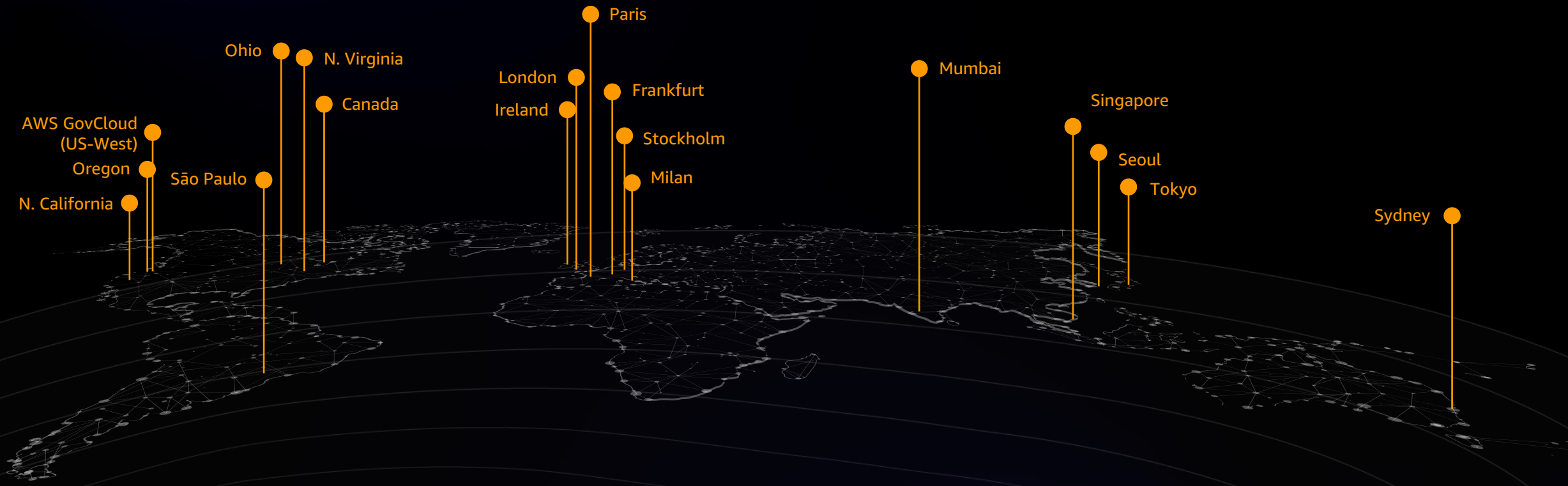
HCX vMotion

HCX Replication-Assisted vMotion

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AWS global infrastructure

VMWARE CLOUD ON AWS IS AVAILABLE IN 18 REGIONS



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Migration and modernization at scale with AWS and VMware

ENT311

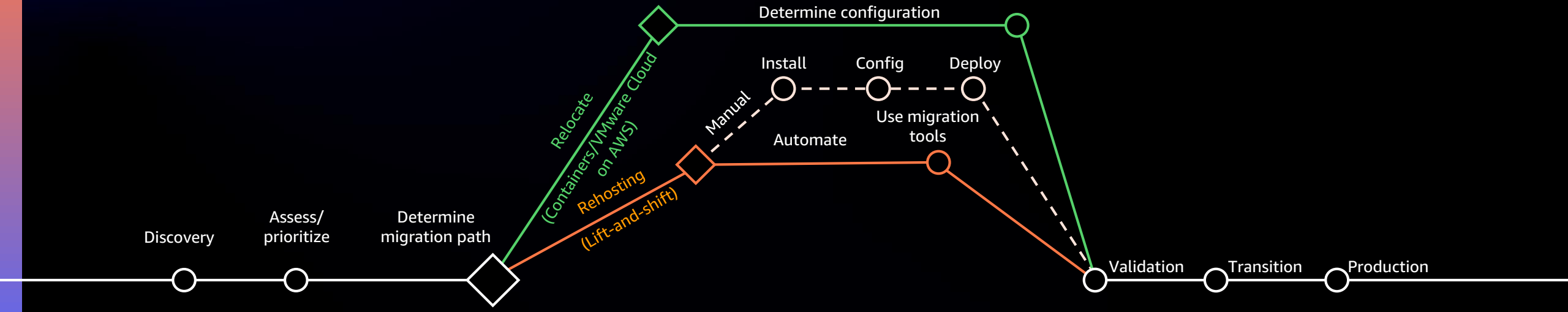
Whether you're just starting out on your hybrid cloud journey or you're well established, there's always something new to explore. For the past five years VMware and AWS have been jointly engineering solutions to support customers' evolving hybrid cloud needs. In this session, focus on best practices for moving your on-premises VMware workloads to AWS with VMware Cloud on AWS. Next, discover options for modernizing these workloads with AWS services. Lastly, dive into AWS and VMware's newest joint offering, VMware Cloud on AWS Outposts, which is designed to support your applications with latency and local data processing requirements.

Session type: Breakout Session
Topics: Enterprise and Migration
Session level: 300 - Advanced
Topic / Industry: Enterprise & Migration

Date: Tuesday, November 30
Time: 1:15 PM - 2:15 PM
Location: Level 4, Lando 4305, Venetian

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Application migration strategies: Rehost



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AWS MGN: A lift-and-shift solution

SIMPLIFY, EXPEDITE, AND REDUCE THE COST OF MIGRATING YOUR APPLICATIONS TO AWS

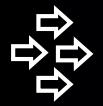
Flexible



Migrate from any source



Wide range of OS, application, and database support



Suitable for large-scale migrations

Reliable



Robust, predictable, non-disruptive continuous replication



Short cutover windows with minimal downtime



Highly secure

Highly automated



Minimal skill set required to operate



Easy, non-disruptive tests prior to cutover



Easily plugs into migration factories and cloud COEs

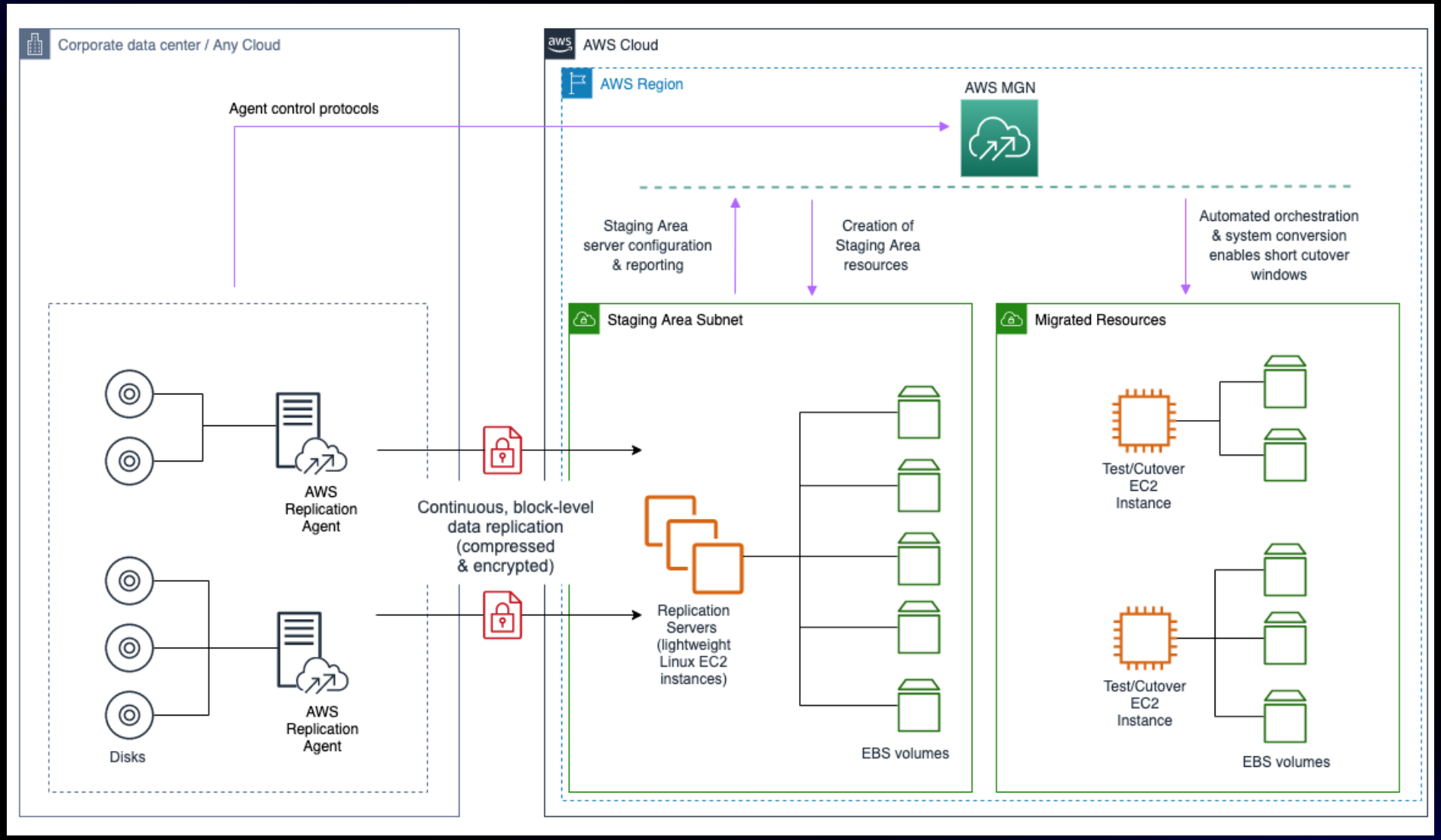


https://aws.amazon.com/application-migration-service/

aws

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How AWS MGN works



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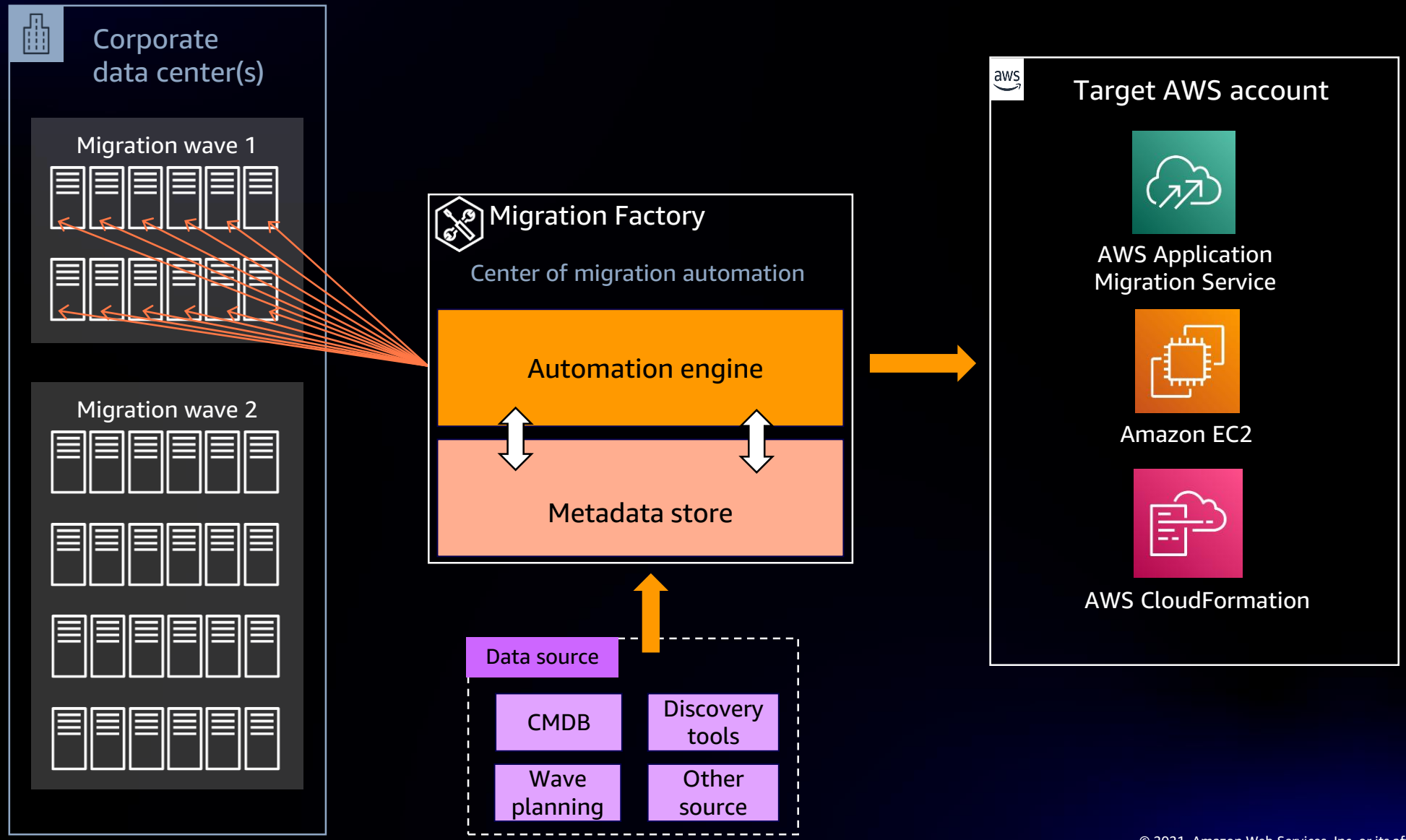
Wide platform support*

Any application	Oracle E-Business Suite, Oracle Peoplesoft, SAP CRP, SAP Hybris, SAP ERP, Apache, SugarCRM, Microsoft IIS, SharePoint, Active Directory, Exchange, Microsoft Dynamics CRM
Any database	SQL Server, Oracle Database, SAP HANA MySQL, Cassandra, MongoDB
x86 operating systems	Red Hat, CentOS, Linux, Ubuntu, Debian, SUSE, Windows Workstations, Windows Server 2008, 2012, 2016, 2019
Source infrastructure	Physical data centers, VMware, Azure, GCP, AWS, VMware Cloud on AWS, Hyper-V, OpenStack, Oracle Cloud, IBM Cloud

*See documentation for a complete list and supported versions

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CloudEndure Migration Factory (CEMF)



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Discover, plan, and migrate at scale

ENT301-R2 Repeat

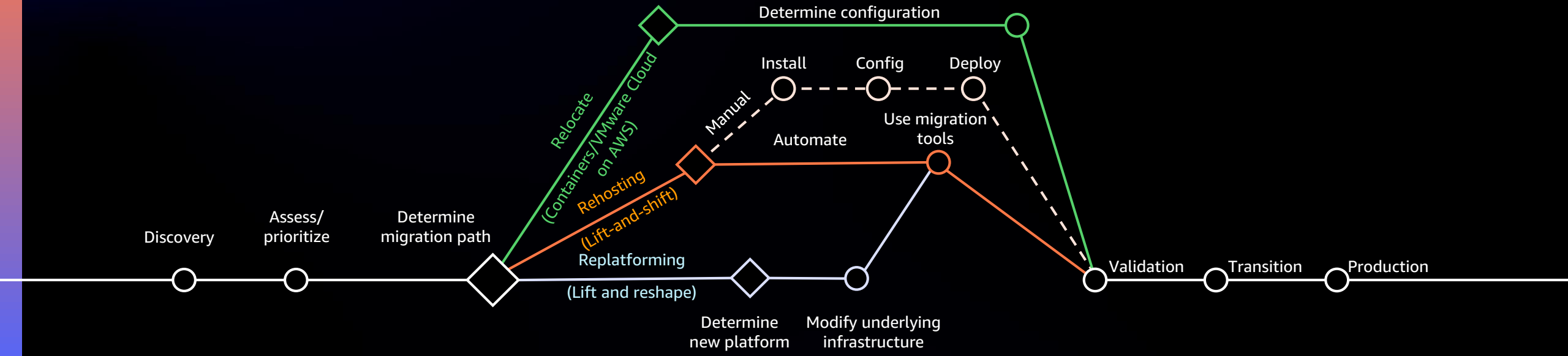
Large-scale migrations require meticulous planning, which makes it very important to get discovery efforts right early in the journey. This workshop dives deep into how you can discover, plan, and learn how to execute your migration at scale using a factory approach.

Session type: Workshop
Topics: Enterprise and Migration
Session level: 300 - Advanced
Topic / Industry: Enterprise & Migration

Date: Thursday, December 2
Time: 12:15 PM - 2:30 PM
Location: Lafleur 2, Wynn

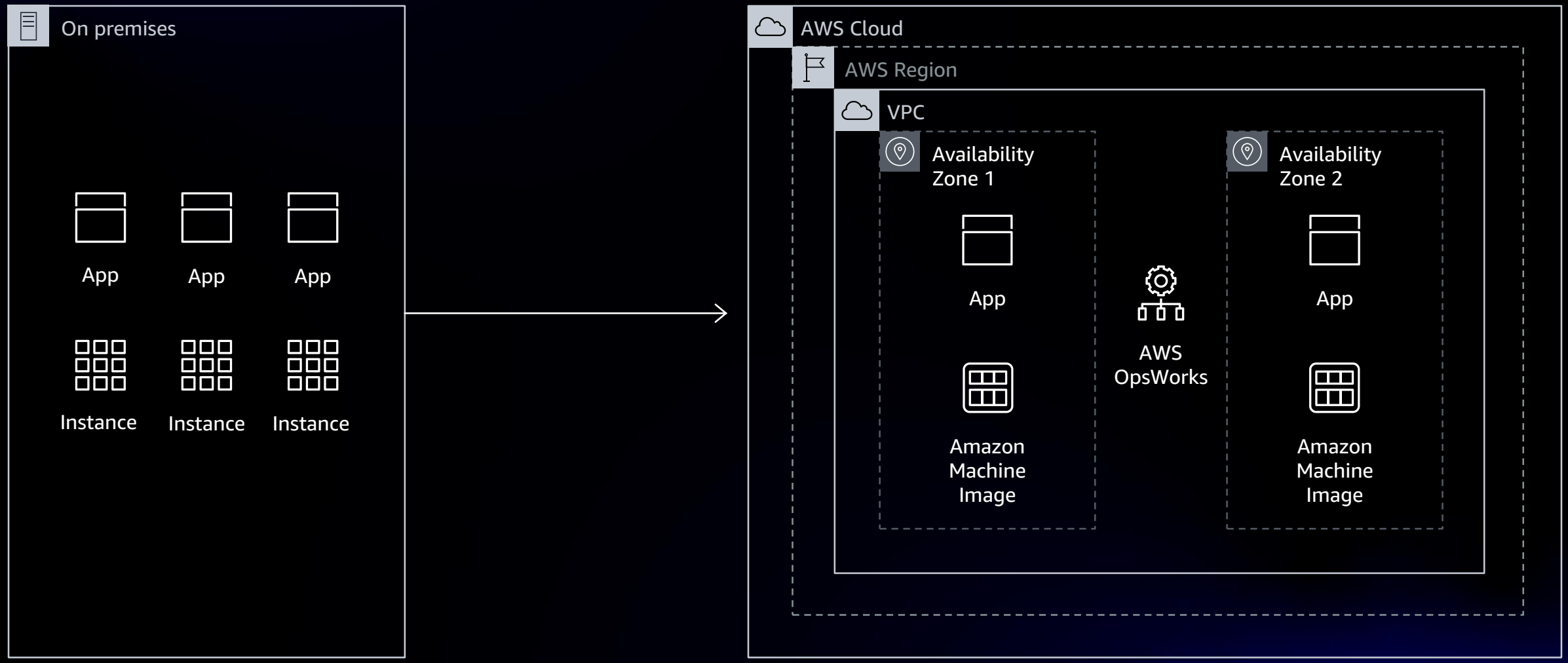
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Application migration strategies: Replatform



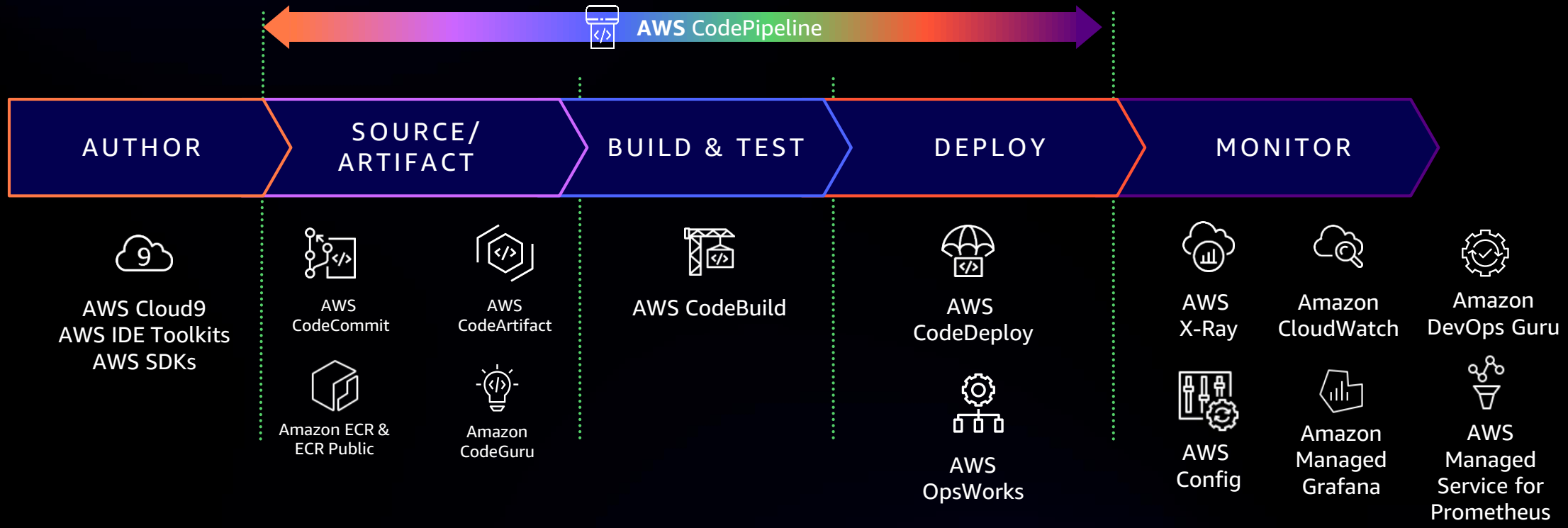
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Replatform applications



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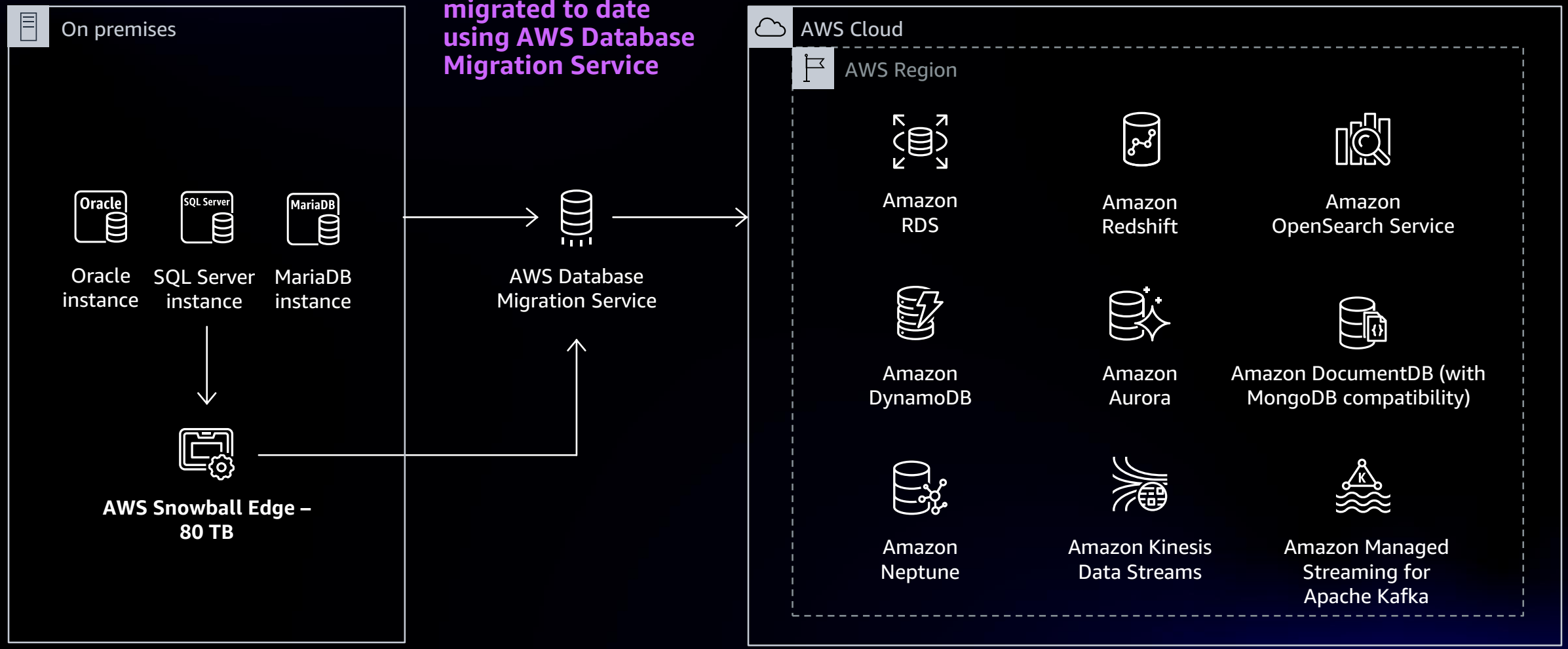
Reduce technical debt through replatforming



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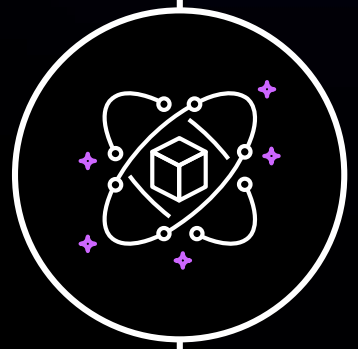
Replatform databases

450,000 databases migrated to date using AWS Database Migration Service



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Lessons learned: Database migrations

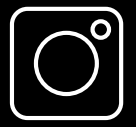


- Migrating off licensed databases is possible
- Get the code out of the database
- One size does not fit all
- Conduct dry runs
- Measure performance
- Find the right partner

Biggest lesson learned: Implement purpose-built databases

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Supported source and targets



Relational

NoSQL

Analytics

Data warehouse*

Sources

Oracle
MySQL
PostgreSQL
SQL Server
MariaDB
Amazon Aurora
SAP ASE
Db2 LUW
SQL Azure

MongoDB
Cassandra

Amazon S3
AWS Snowball

Oracle
SQL Server
Netezza
Greenplum
Teradata
Vertica

Targets

Oracle
MySQL
PostgreSQL
SQL Server
MariaDB
Amazon Aurora
SAP ASE

Amazon DynamoDB
Amazon DocumentDB
Amazon OpenSearch Service
Amazon Kinesis Data Streams
Amazon ElastiCache for Redis
Amazon Neptune
Amazon S3
Amazon Managed Streaming for Kafka

Amazon Redshift

Consult QR code links above for latest DMS sources and targets

** Supported via AWS SCT data extractors*

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AWS Schema Conversion Tool (AWS SCT)

The AWS Schema Conversion Tool helps automate many database schema and code conversion tasks when migrating from source to target database engines

Features

Create assessment reports for homogeneous/heterogeneous migrations

Convert database schema

Convert data warehouse schema

Convert embedded application code

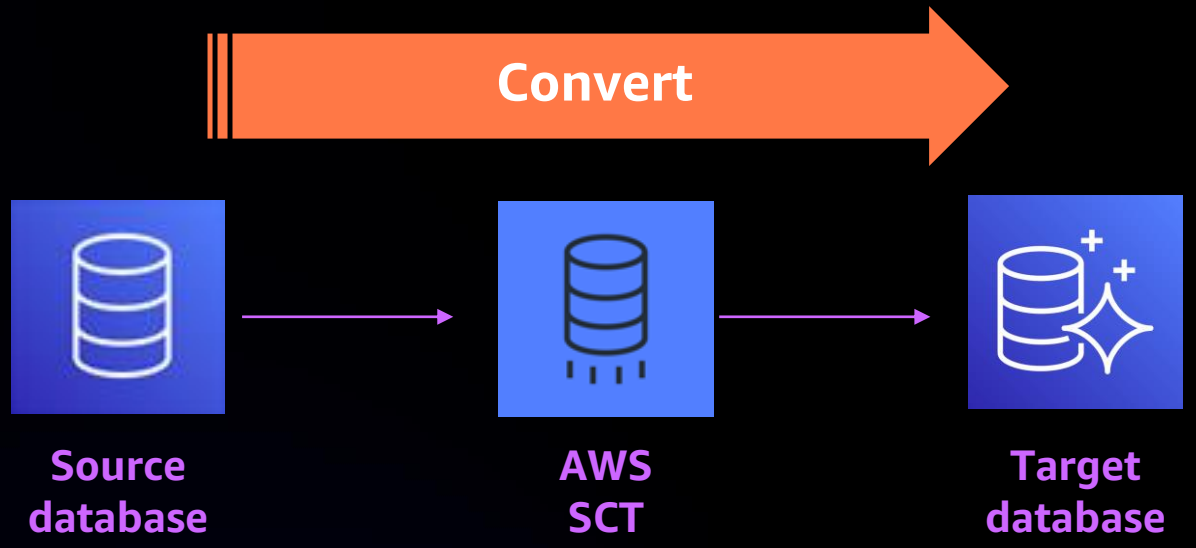
Code browser that highlights places where manual edits are required

Secure connections to your databases with SSL

Service substitutions/ETL modernization to AWS Glue

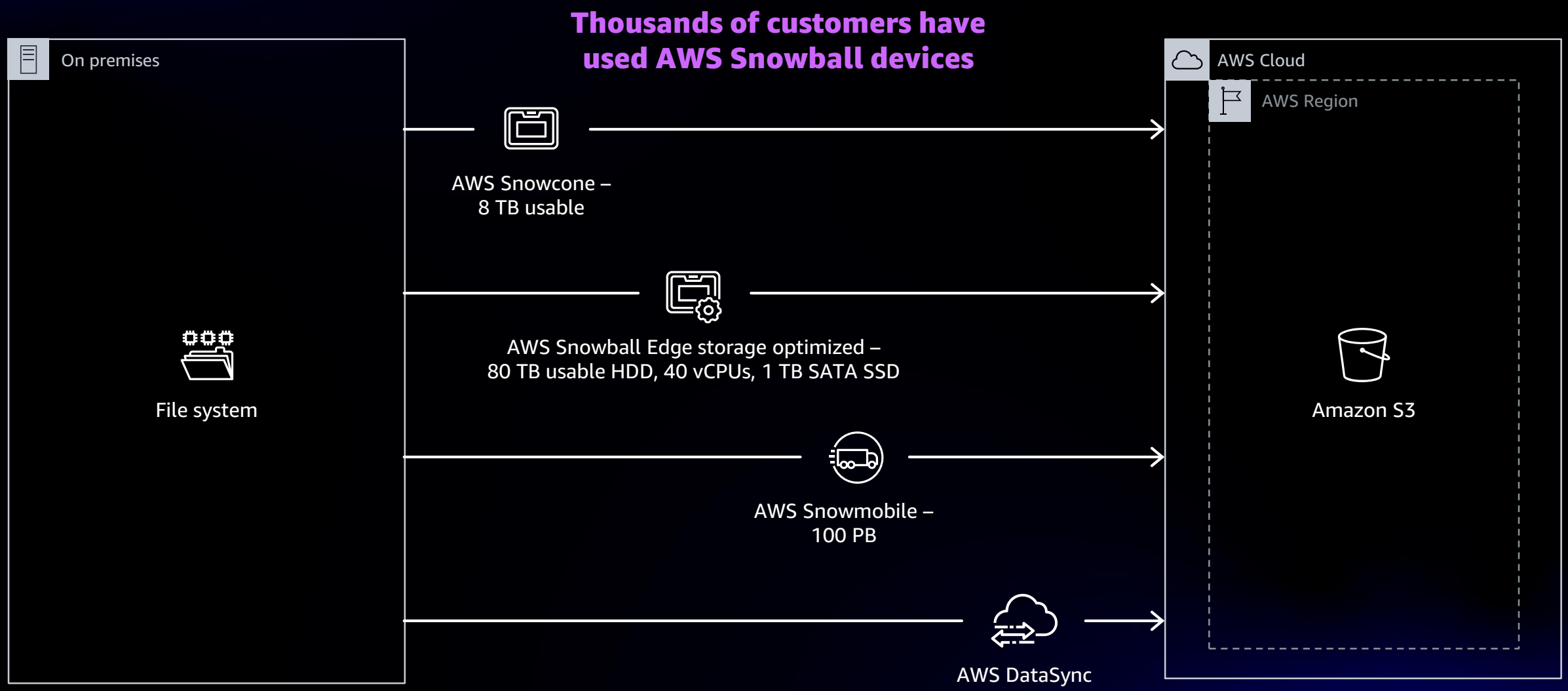
Migrate data to data warehouses using AWS SCT data extractors

Optimize schemas in Amazon Redshift



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Moving vast amounts of data



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Samsung migrates 1.1 billion users across three continents from Oracle to Amazon Aurora with AWS Database Migration Service

SAMSUNG

60 ms latency
or less for 90% of the time

44%
reduced monthly database costs

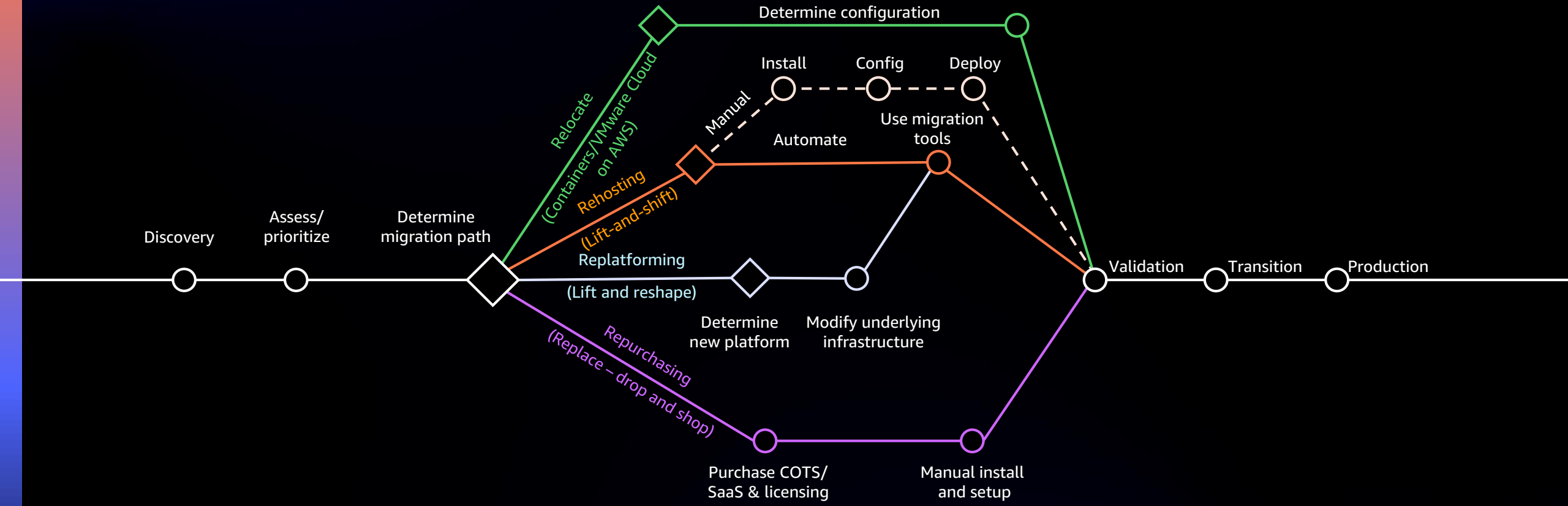
"The scalability of Amazon Aurora is the best benefit – especially if we focus on the cost."

Salva Jung
Principal Architect and Engineering Manager

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Application migration strategies: Repurchase



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Broadest and deepest cloud infrastructure marketplace

A curated digital catalog helping customers find, subscribe to, deploy, and govern third-party software, data, and services

Over **12,000** transactable listings

Deployed in **25** Regions

2,000+ ISVs, **280+** data providers, **500+** consulting partners

65+ categories (business applications, monitoring, security, databases, etc.)

2M+ active subscriptions

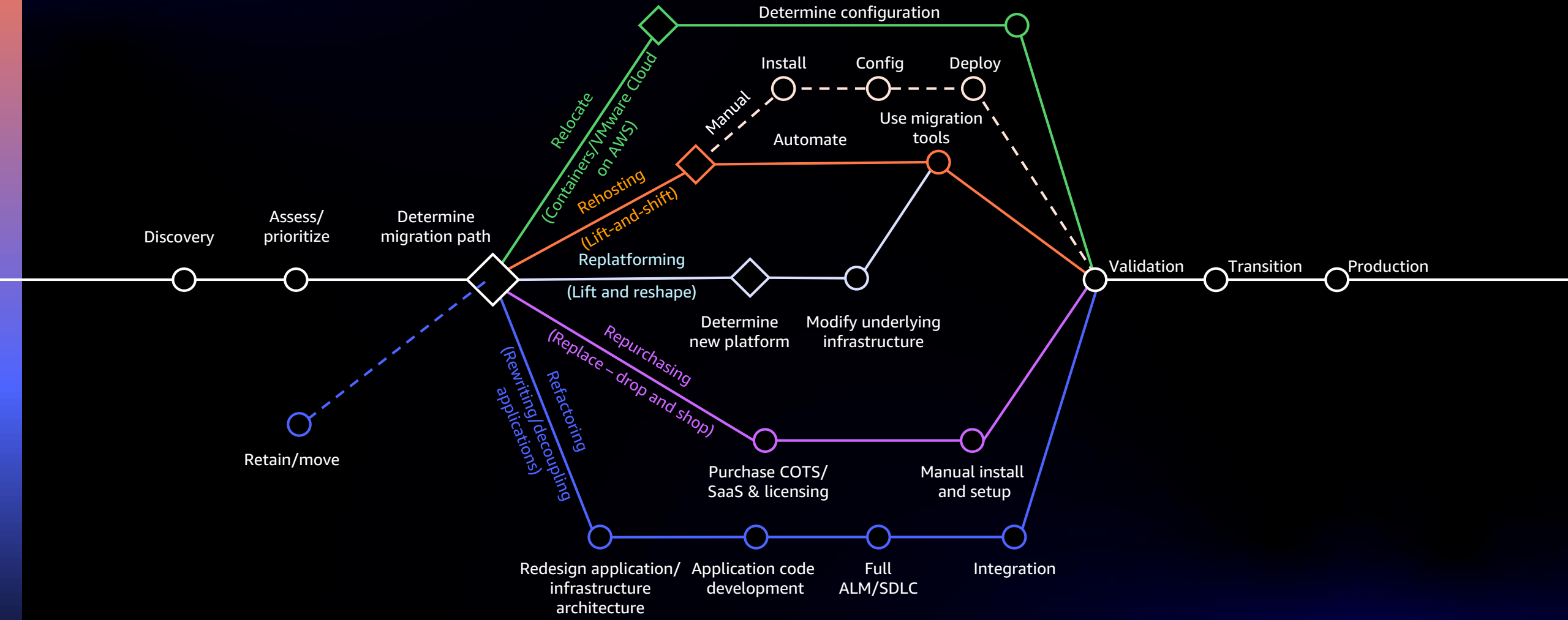
More than **325,000** active customers



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Application migration strategies: Refactoring

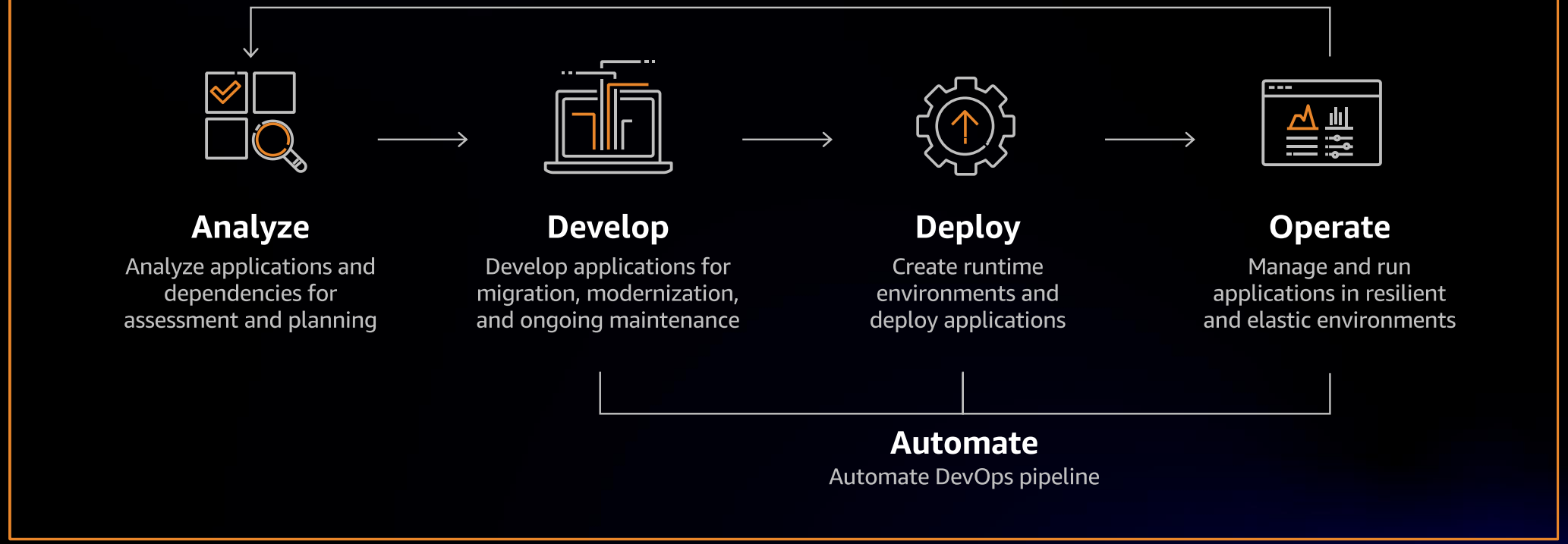
MONOLITH AND MAINFRAME



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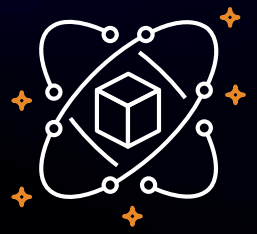
Introducing AWS Mainframe Modernization service

"AWS Mainframe Modernization service is a platform for migration, modernization, execution, and operation of mainframe applications."



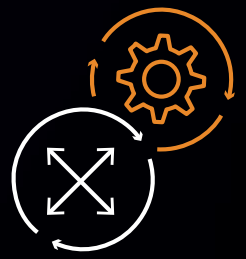
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AWS Mainframe Modernization service key benefits



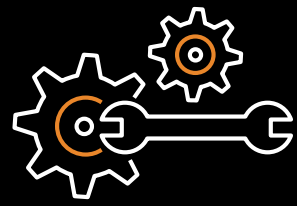
Agility

- DevOps
- On-demand
- Managed



Managed service

- Fewer simpler interfaces
- Automation for resiliency
- Automation for operations



Proven toolchains

- Replatforming
- Refactoring



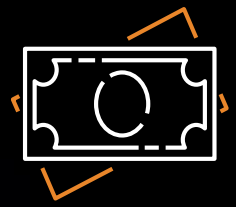
Quality of service

- Security
- High availability
- Elasticity



Fast modernization

- Incremental changes
- Efficient toolchains
- Quick benefits



Cost efficiency

- Pay-as-you-go
- Elastic infrastructure
- Low cost of entry

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Challenge: Refactoring legacy applications



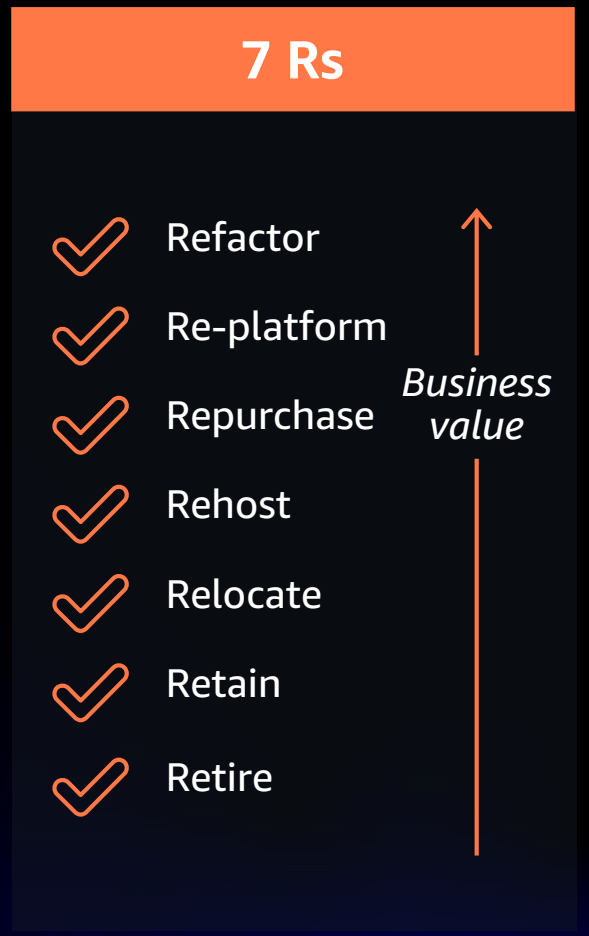
Business

- Slow product innovation
- Decreased time to market
- Drive unclear team ownership boundaries
- Changes have unforeseen side effects



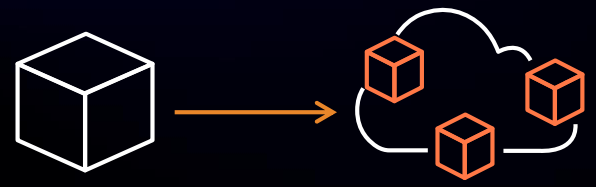
Technical

- High coupling and low cohesion
- Difficult and infrequent deployments
- Apps are brittle and difficult to understand
- Often lack of effective testing



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Multiple refactor patterns for app transformation



Launch a new feature, fast

Leave and layer offers an alternative starting point

- Enhance or extend the app with new features in microservices without touching the old application
- Launch a new capability or expand your business fast and with minimal risk



Refactor incrementally

Use the **Strangler-fig** to achieve team independence and a modern app architecture

- Define the interface to the first piece to be refactored
- Design, implement, and test the new capability
- Redirect old to new
- Turn off old code or service

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Delivering customer choice

Using Migration Hub Refactor Spaces you can define the right approach for each application:



Choose how fast you want to transform an app

Choose how much app transformation to do



Launch new features in microservices with minimal risk to the existing app



Partial app transformation running old and new together



Complete app transformation eliminating the existing app

Leave and layer

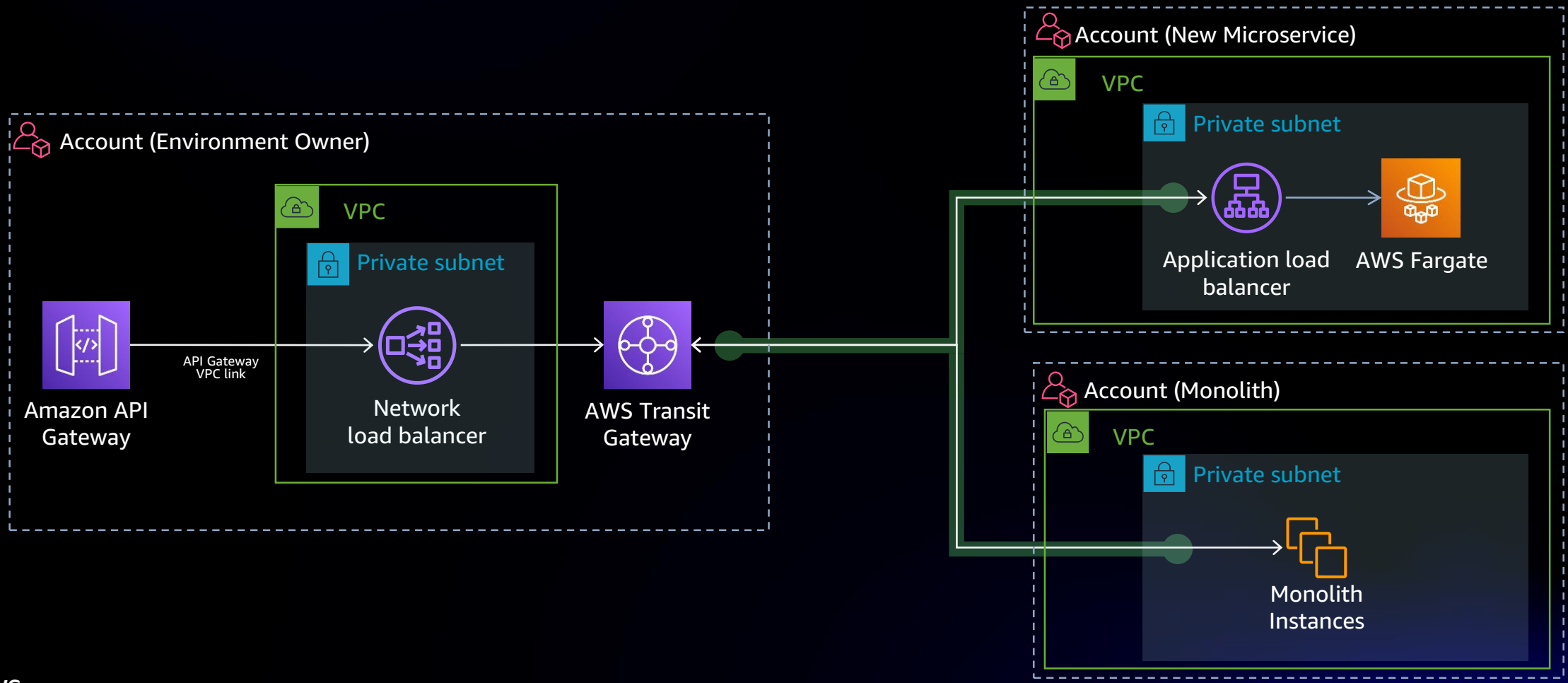
Strangler-fig

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App refactor with Refactor Spaces

Create environment → Add accounts → Create application → Create services w/ VPC → Add routes



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Learn more about accelerating application refactor with Migration Hub Refactor Spaces

Sessions

ENT321: Incremental application refactoring to increase business agility

ENT401: Modernize faster using the Strangler Fig pattern on AWS

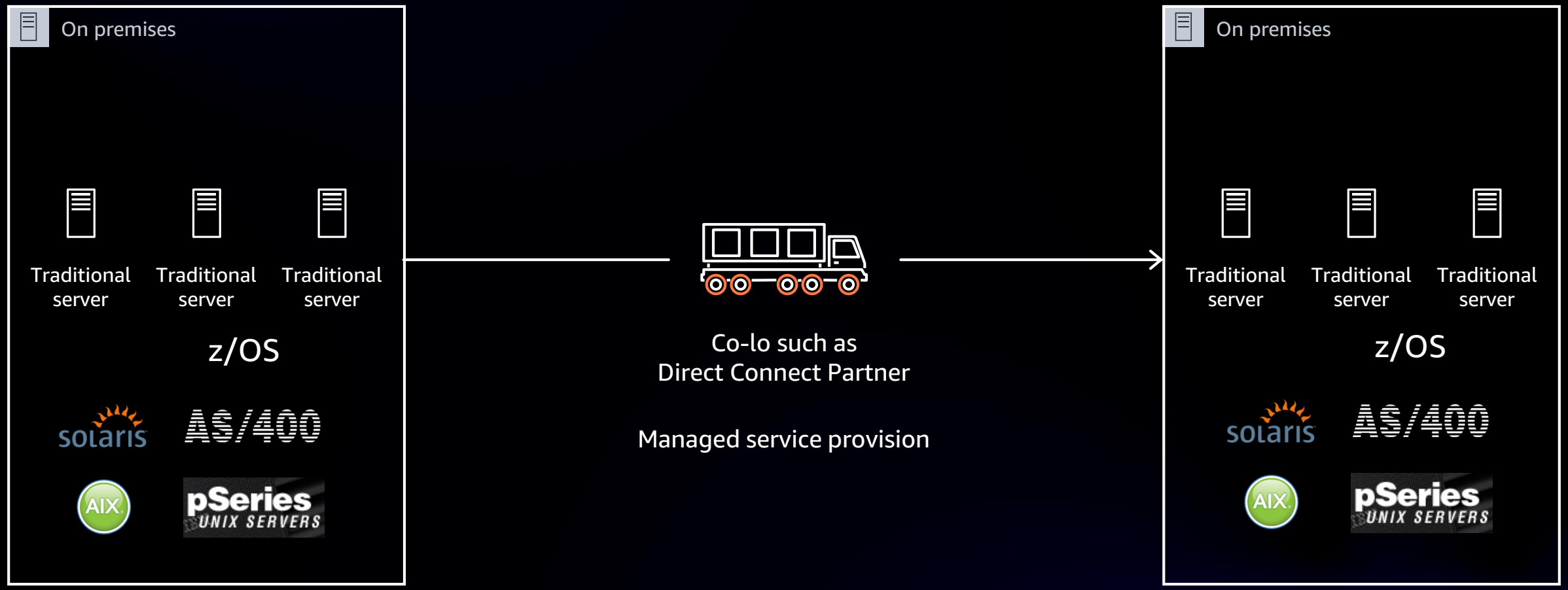
ENT402: Stay decoupled when refactoring using multiple AWS accounts

Workshops

ENT302: Incremental refactoring: Evolve existing apps with microservices

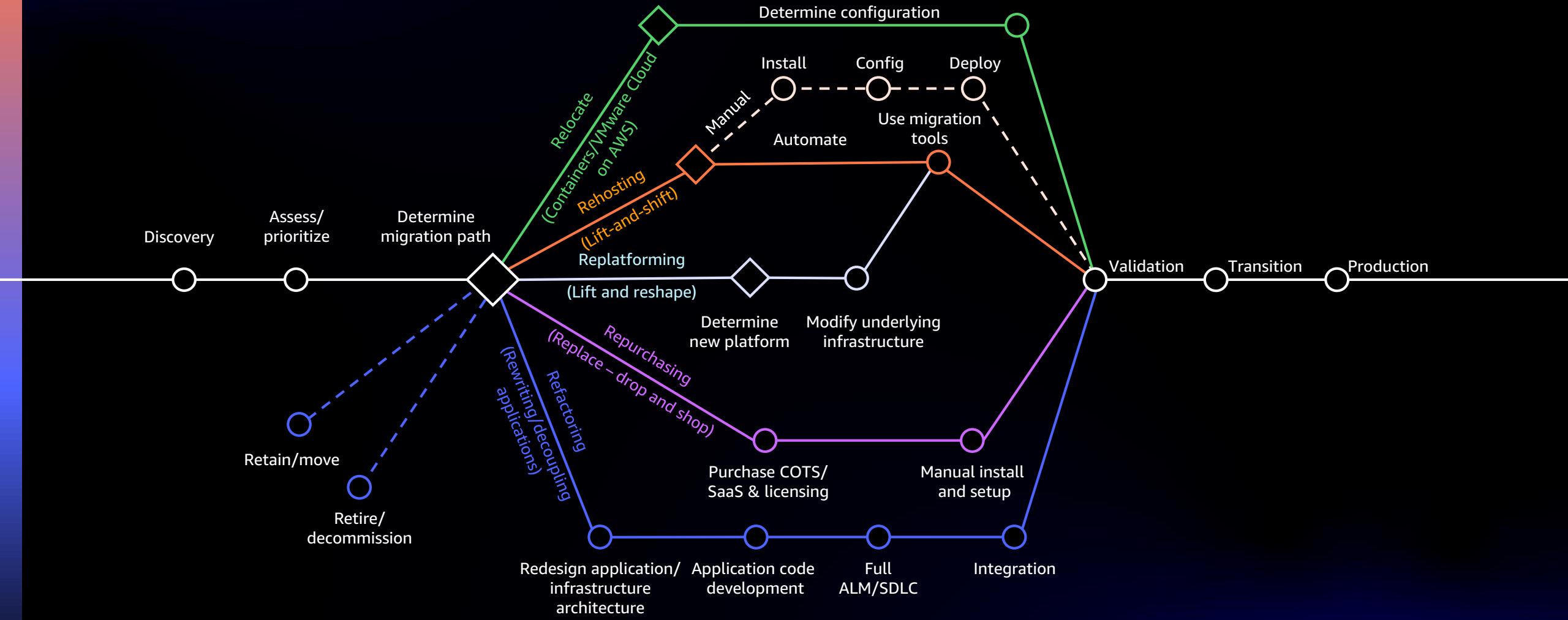
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Retain



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Use all the strategies as you plan and execute

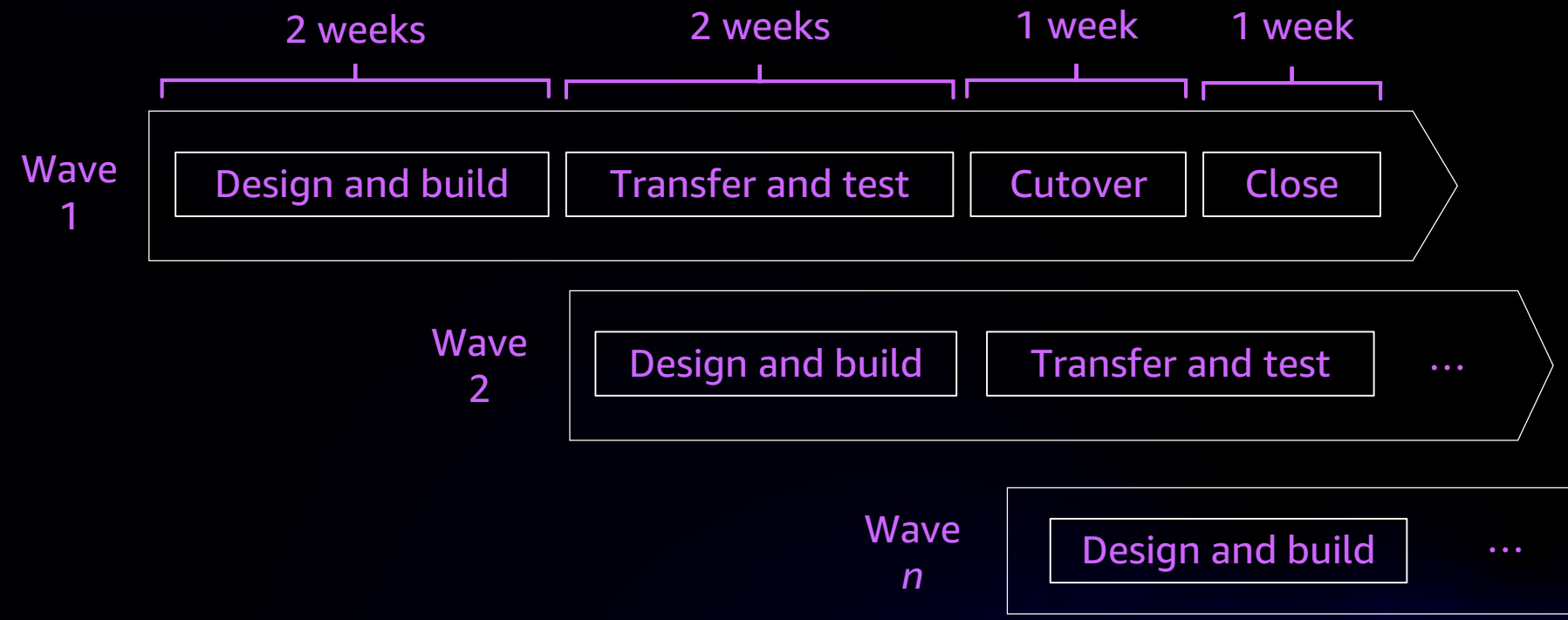


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Wave planning

Prioritization, strategy, and dependency analysis → Compelling events and available dates → Effort and resource availability → Create plan

App 1 (Rehost)
App 2 (Replatform)
App 3 (Retire)
App 4 (Refactor)
App 5 (Rehost)
App 6 (Rehost)
App 7 (Refactor)
App 8 (Retain)
App *n*



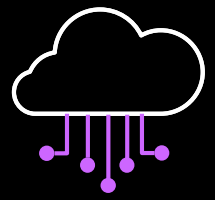
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Skyscanner

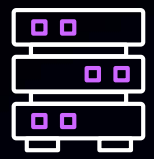
“Using a traditional data center, it used to take us 6 to 7 weeks to launch a service; on AWS, it can take us 15 minutes. We have thousands of services running in AWS versus a few hundred in our previous data center, and that means more products and new features for travelers. Migrating to AWS has enabled Skyscanner to focus on innovating for the traveler rather than managing IT infrastructure.”

Ashley Sole
Senior Engineering Manager

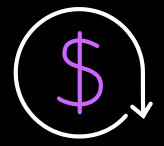
Skyscanner used MAP to accelerate the migration of their entire infrastructure operation into the cloud



Increased agility and scalability



Migrated thousands of VMs and thousands of microservices and closed 5 data centers in 3 years

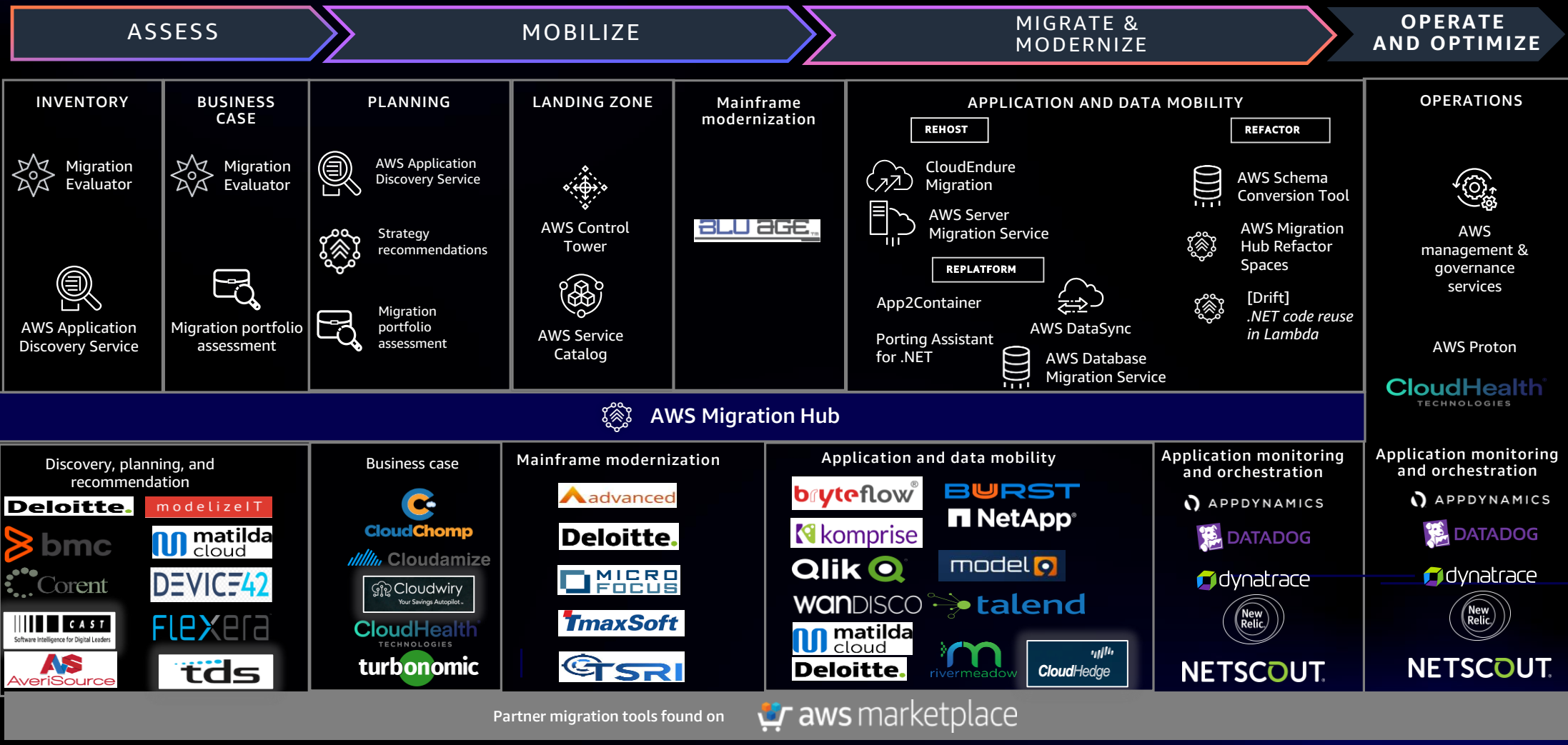


Reduced costs up to 70% due to platform optimization

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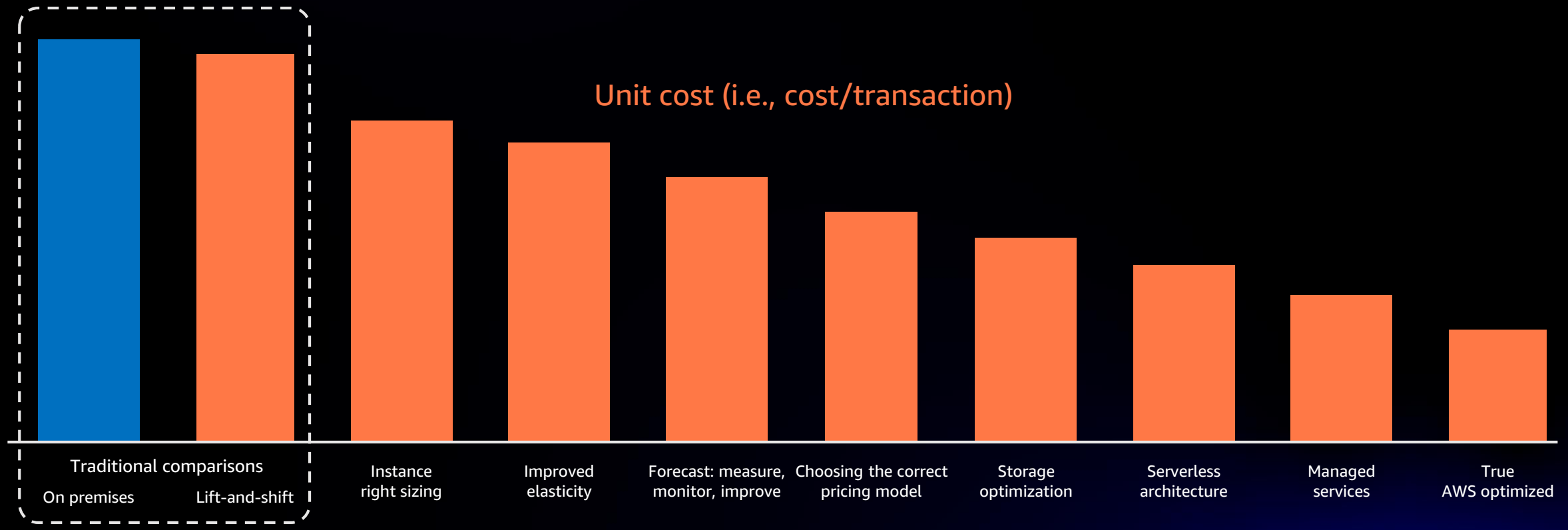
Migration and modernization software by AWS and Competency Partners



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Rehost and then optimize is a powerful combo

Initial benefits case for cost reduction → **Optimization post migration enables cost reduction and innovation**



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“Don’t let perfect be the enemy of good enough.”

Voltaire

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Thank you!

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