

AWS re:Invent

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Gilead Sciences' AWS migration: From VMware to cloud transformation

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Agenda

- 01** Overview of migration to AWS
- 02** Gilead's approach for VMware migration to AWS
- 03** Gilead's AWS migration journey
- 04** AWS migration best practices and getting started



What does migration to AWS and digital transformation mean to you?



Understand your compelling “why?”

Changing business needs



Delivery speed improvement



Acquisition of another business



Divestiture of a line of business

Enabling technology to support business growth



Moving to data-driven business



Scalability improvements



Move to compete globally

Improve operational efficiency



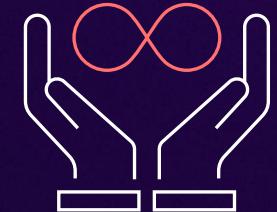
Reduce technical debt



Licensing cost reduction

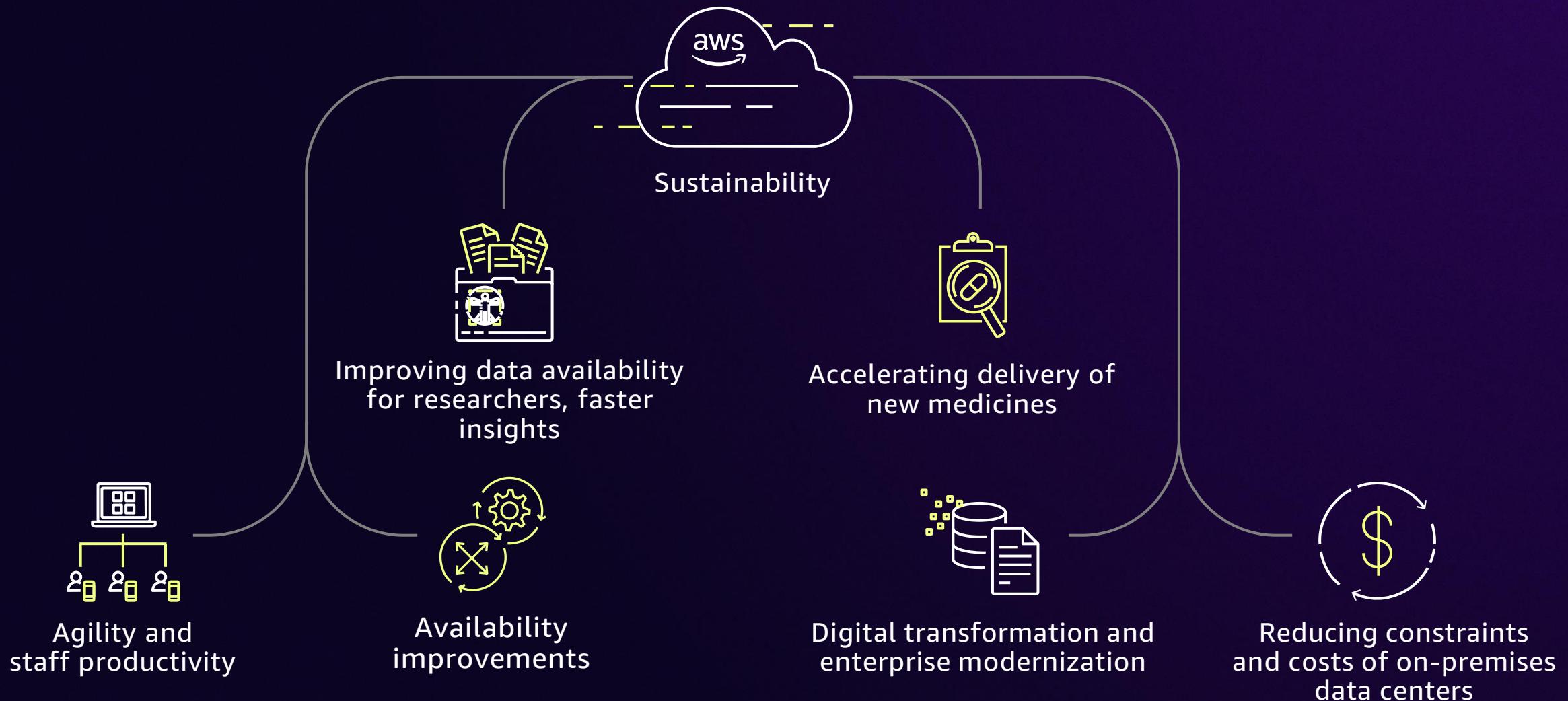


Time-driven data center exit



All of the above

Gilead's business drivers for cloud migration

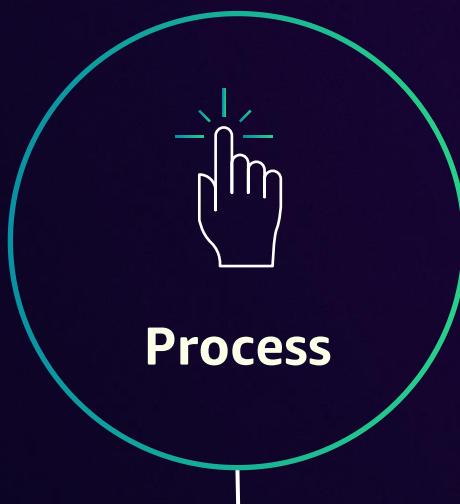


Cloud adoption transforms people, process, and technology

WHILE DISRUPTIONS ARE DAUNTING, THEY PRESENT OPPORTUNITIES



- Upskill for innovation
- Leverage partnerships

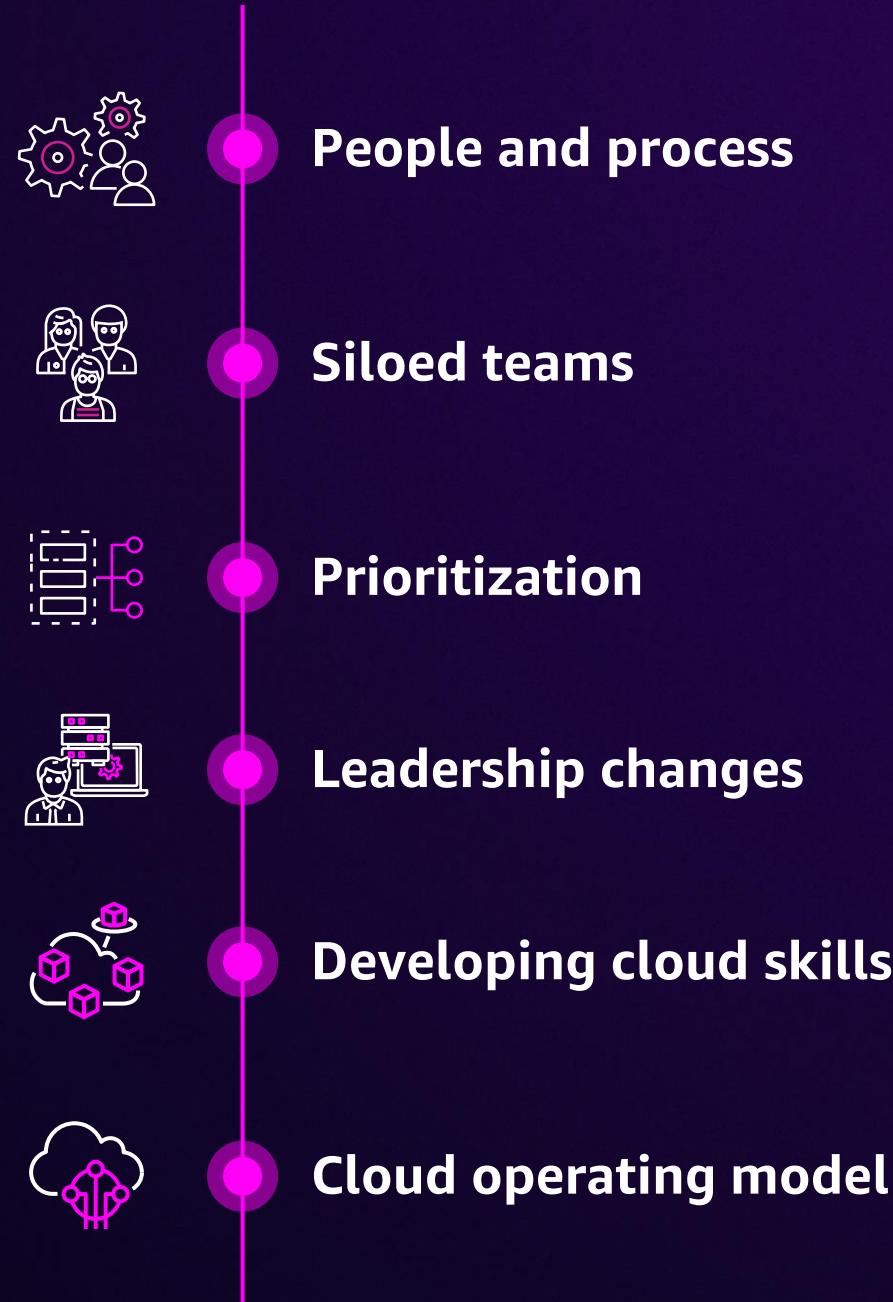


- Streamline for agility
- Foster data-driven decision-making



- Build more resilient IT infrastructure
- Embrace modernization solutions

Existing challenges customers face before cloud migration



Gilead's approach for VMware migration to AWS



Gilead's mission

To discover, develop, and deliver innovative therapeutics for people with life-threatening diseases

Growing our business for greater impact



PREFERRED PARTNER

Be the biotech employer and partner of choice



PIPELINE

Bring 10+ transformative therapies to patients by 2030

SUSTAINABLE VALUE

Deliver shareholder value in a sustainable, responsible manner

Drivers for migrating from VMware on-premises to AWS



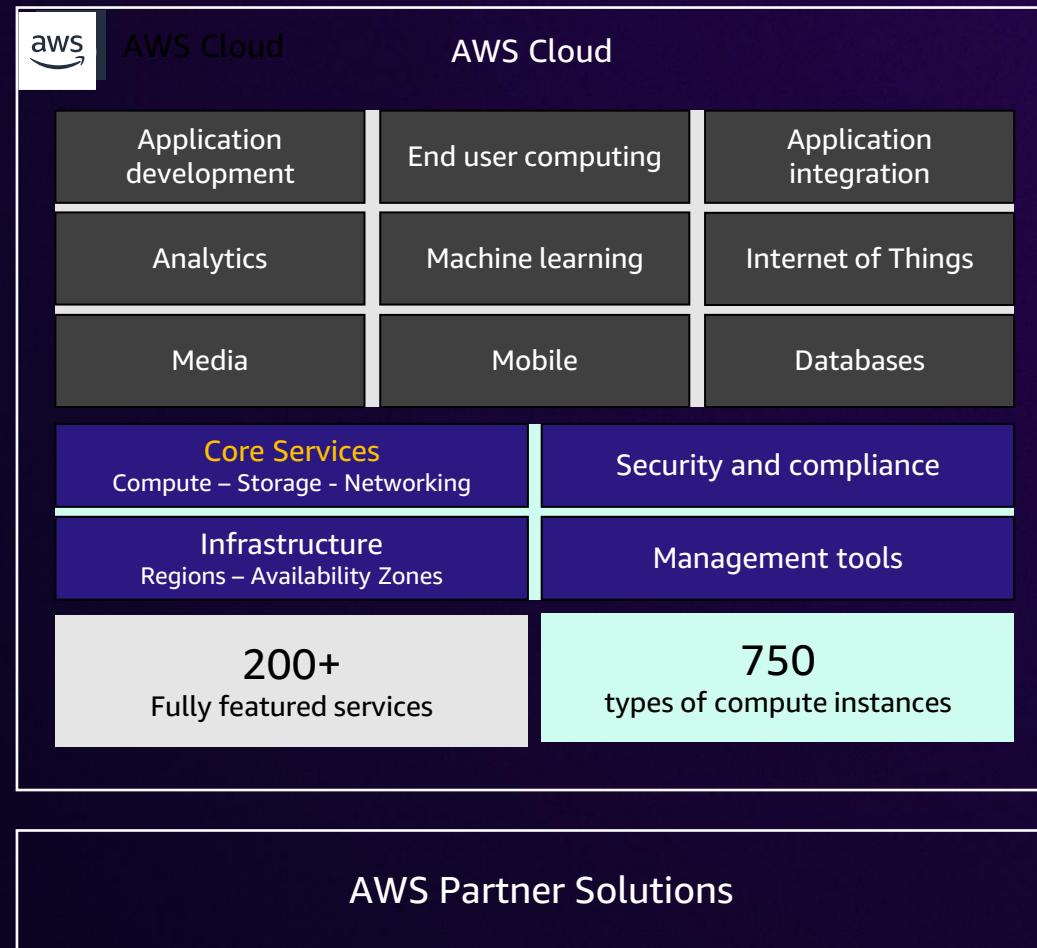
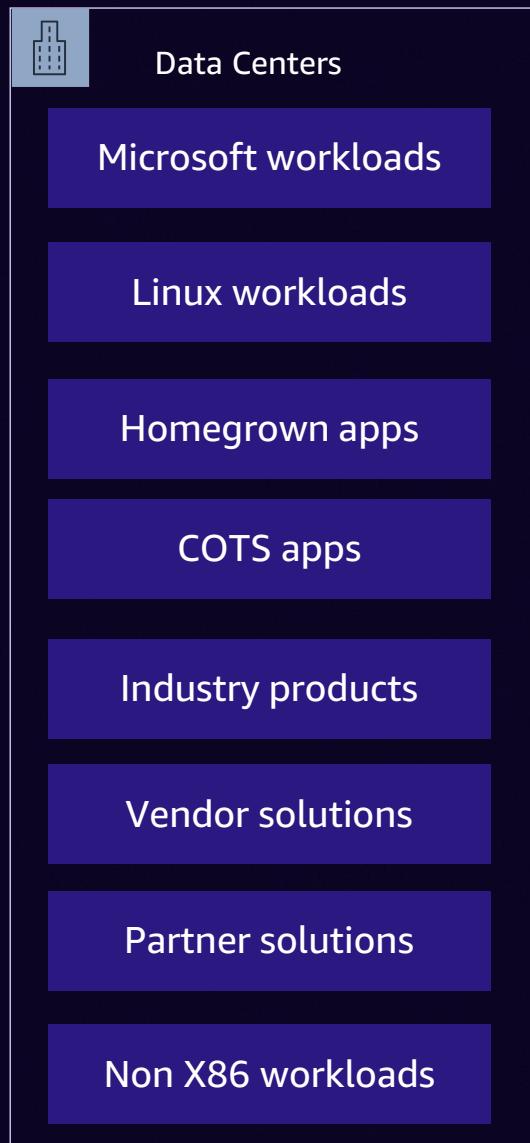
BUSINESS DRIVERS

- Address increases in licensing costs, risks, disruption, complex contracts
- Innovate and modernize processes
- Become a more data-driven organization
- Consolidate systems
- Improve sustainability

TECHNICAL DRIVERS

- Reduce technical debt
- Improve security, scalability, and reliability
- Consolidate and eliminate data centers
- Accelerate cloud adoption while retaining certain workloads on-premises
- Increase IT staff productivity and retention
- Accelerate application delivery

Migration options



Considerations

Timelines

Cost savings

Agility

Security

Elasticity

Cloud maturity

DevSecOps maturity

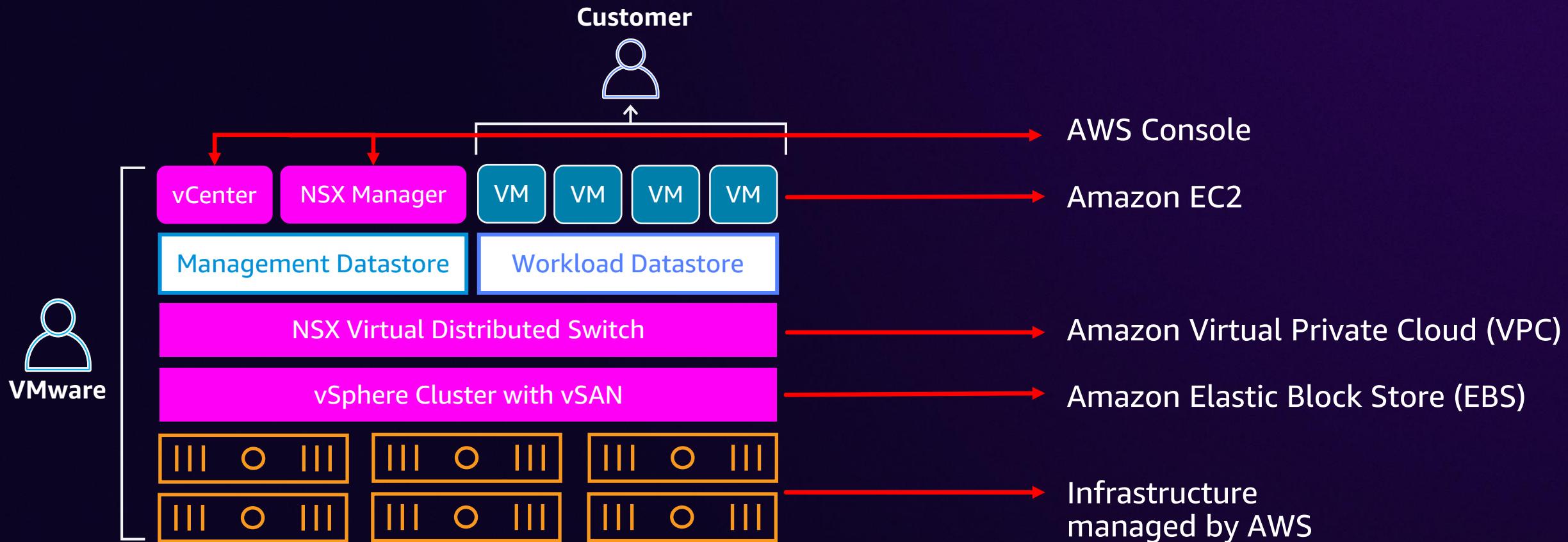
Regulatory

Containerization

DR and HA

Software vendor licensing

VMware to AWS technology mapping



VMware migration checklist

Assess

Mobilize

Migrate & Modernize

Assessment

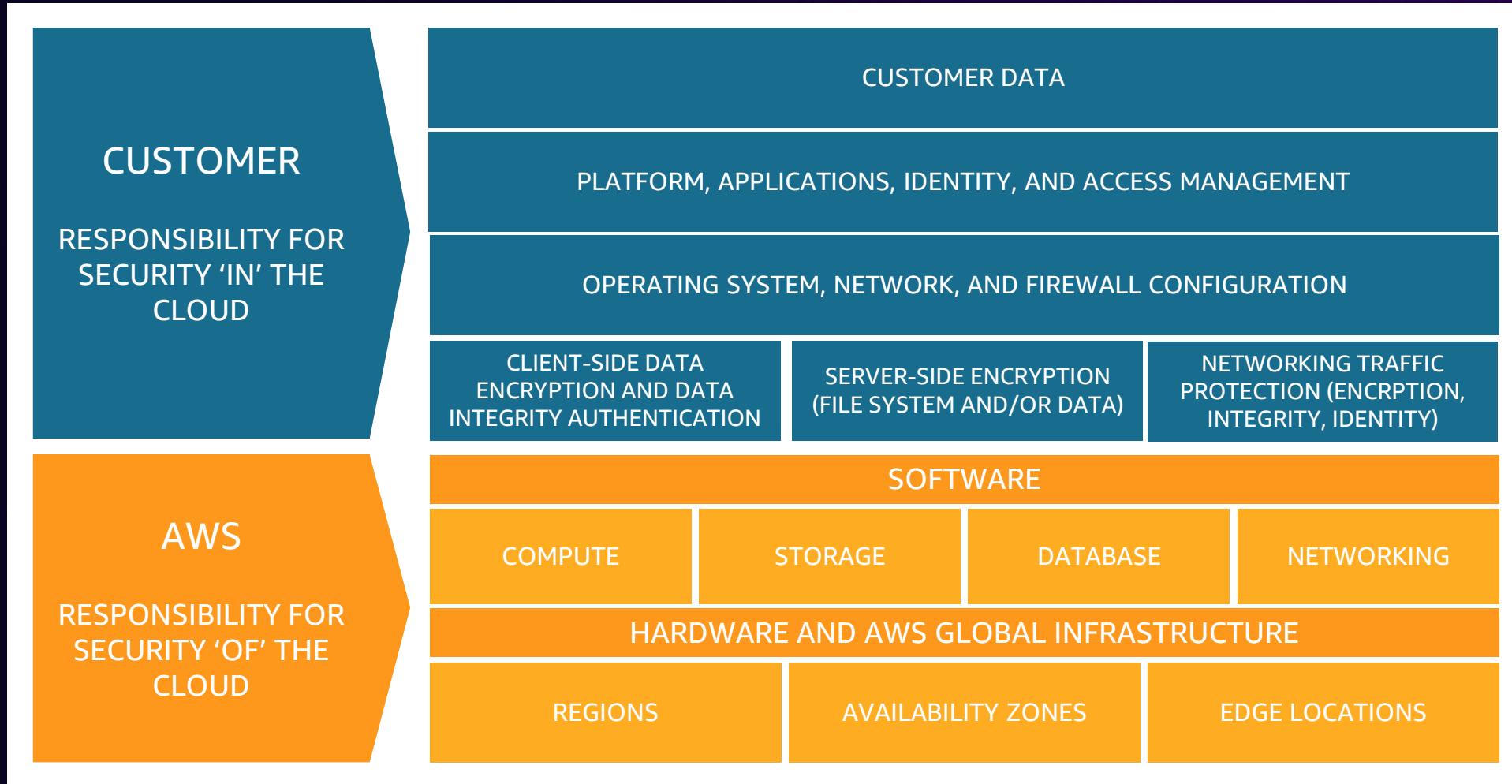
- ✓ Infrastructure discovery
- ✓ Total cost of ownership report or a business case
- ✓ Optimization of Licensing Assessment (OLA)
- ✓ Application discovery
- ✓ Application dependency mapping
- ✓ Initial migration strategy (R-Patterns)
- ✓ Illustrative migration planning (complexity scores and resource estimates)
- ❑ Migration readiness assessment (MRA)

- ✓ Application discovery and dependency mapping
- ✓ Initial migration strategy (R-Patterns)
- ✓ Indicative migration plan (application complexity score, prescriptive initial migration recommendation)
- ✓ Data required for mobilize/migrate engagement
- ❑ Finalize migration strategy and AWS architecture
- ❑ Continuous wave planning
- ❑ Develop and launch landing zone
- ❑ Prepare cloud operating model/security profile
- ❑ Launch cloud center of excellence
- ❑ Install migration software
- ❑ Etc...

- ❑ Replicate and cutover applications and servers

Illustrative and not exhaustive

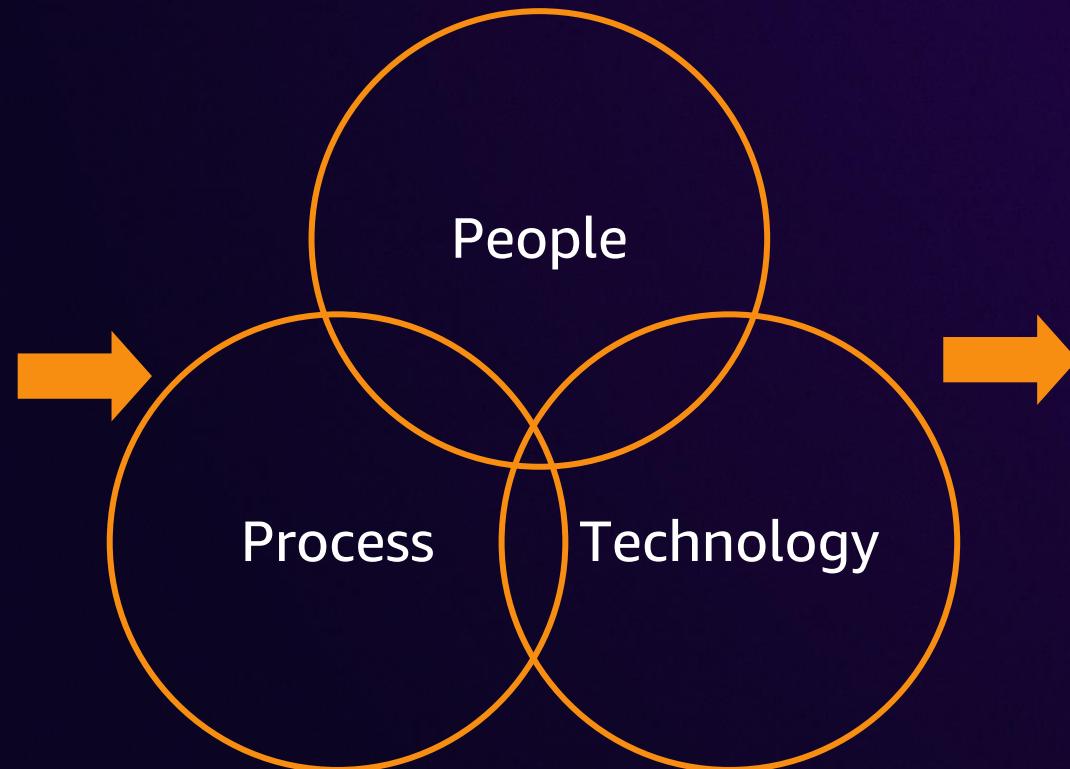
Shared responsibility model – Security and compliance



Security built into the foundation

AWS CLOUD ADOPTION FRAMEWORK (AWS CAF)

Business capability focused	Business Value realization
	People Roles and readiness
	Governance Prioritization and control
Technical capability focused	Security Risk and compliance
	Platform Applications and infrastructure
	Operations Hybrid and dynamic



Outcomes

- Defined requirements
- Access control
- Monitoring and detective capabilities
- Secure infrastructure
- Data protection
- Encryption
- Cloud incident response & investigative maturity
- Security automation
- Consistency & repeatability
- Governance
- Compliance & policies
- Risk management

*not an exhaustive list

Reference: "The Security Perspective of the AWS Cloud Adoption Framework" Whitepaper https://d0.awsstatic.com/whitepapers/AWS_CAF_Security_Perspective.pdf

VMware migration outcomes

2,200

Servers migrated from
VMware to AWS

340

Applications
migrated to
AWS

1.2 PB

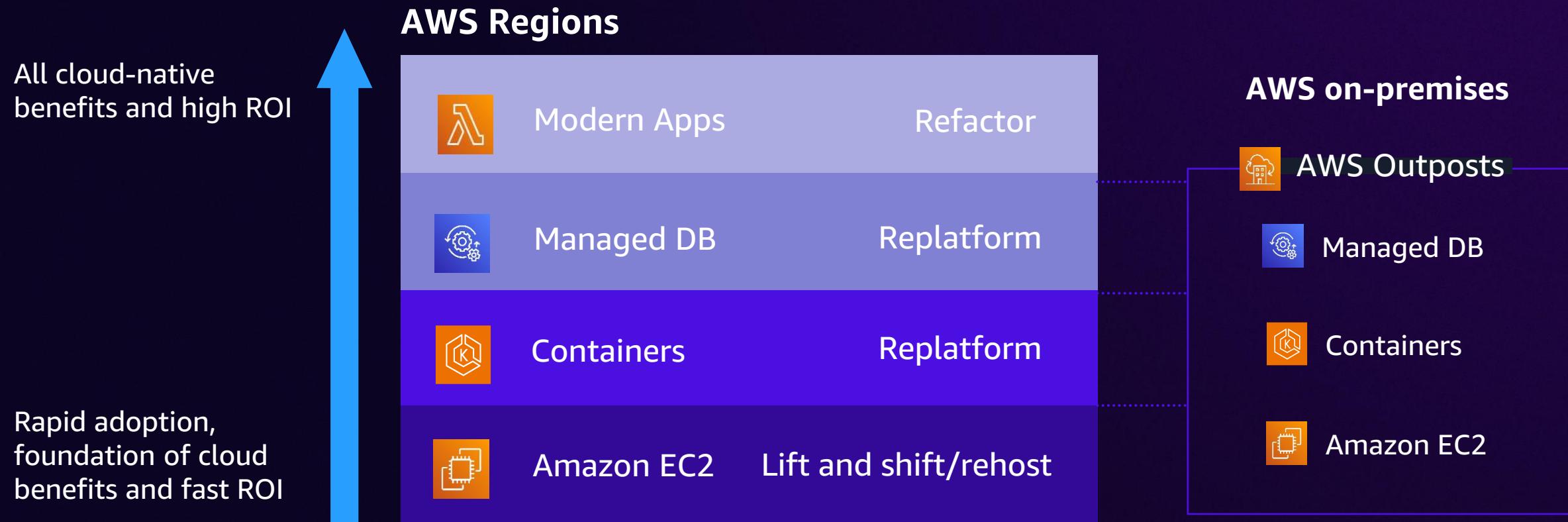
Migrated shared file
storage to FSxN

1,400

VMware servers
decommissioned

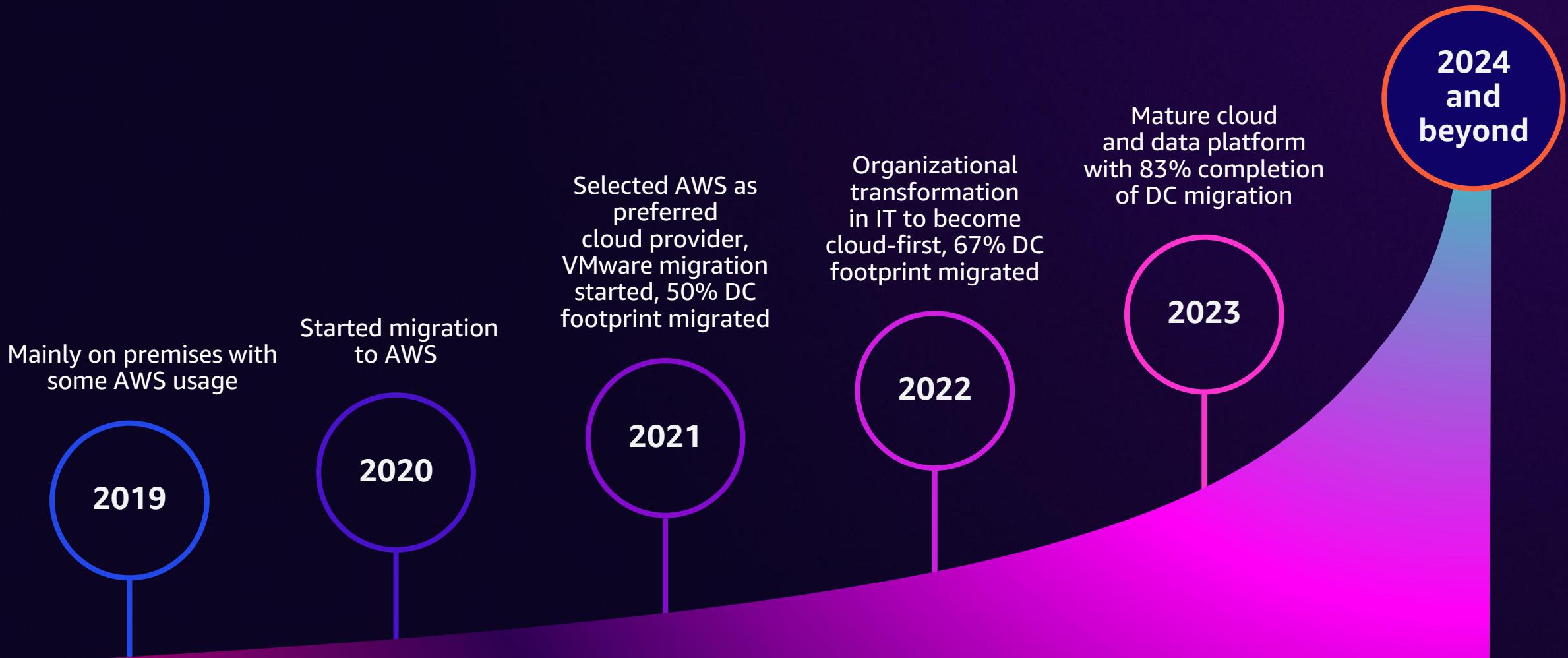
Future state of our VMware workloads

OUR MODERNIZATION JOURNEY

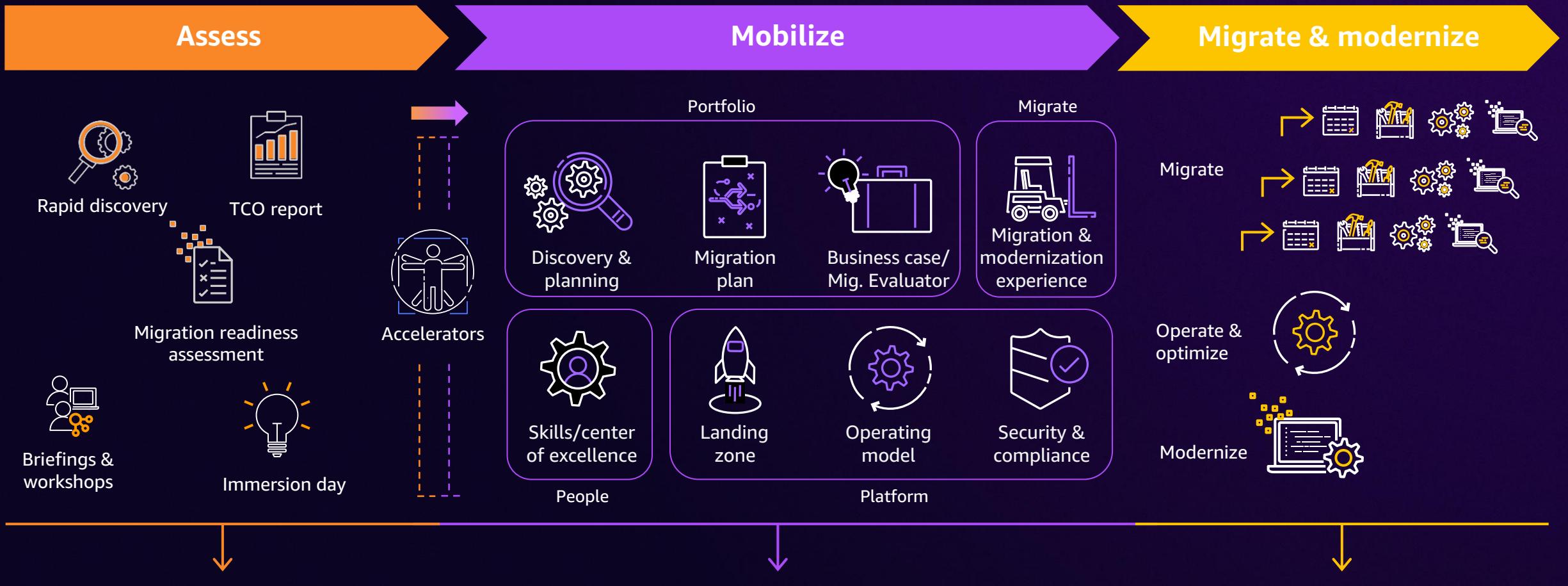


Gilead's AWS migration journey

Gilead's migration journey with AWS



Gilead's approach to AWS migration



AWS Professional Services

AWS Application Migration Service (MGN)

SIMPLIFY AND REDUCE THE COST OF MIGRATING YOUR APPLICATIONS TO AWS



Automate the conversion of your source servers to run natively on AWS with AWS MGN. Simplify application modernization with built-in and custom optimization options.

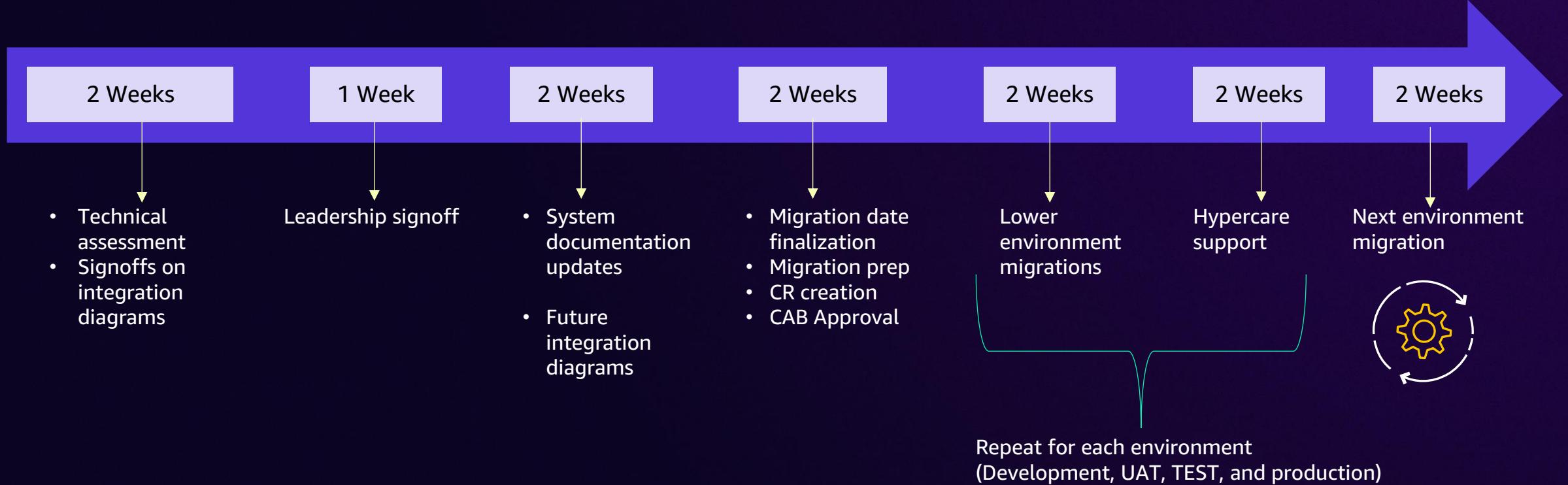
- Migrate applications to AWS with or without changes to applications or workflows
- AWS MGN automates migration of VMware-based VMs to AWS
- Modernize using AWS MGN preconfigured or custom actions during cutover
- Access the full range of AWS capabilities to modernize applications running on AWS

Automated Continuous Compliance (ACC) for GXP workloads

Technology modernization	Operating model	Technology accelerator	Cultural transformation
<p>1 Modernized technology and application landscape</p> <p>Consolidated and Automated, reducing IT operational costs, increased speed to market and ability to react rapidly.</p> <p>Modernized landscape and re-invest cost savings to drive new innovations.</p>	<p>2 Evolved model to support new ways of working</p> <p>Adopted new requirements of cloud operations to support the cloud.</p>	<p>3 Enabled agility of development environment</p> <p>Gilead can focus on innovation rather than spending manual effort on qualification and testing</p> <p>Extensible to enterprise software such as ERP, MES, and LIMS</p>	<p>4 Drive innovation</p> <p>Built an Innovation culture leveraging Amazon's culture and mechanisms.</p> <p>Embraced customer obsession and rapid experimentation and enabled teams with coaching and co-delivery</p>

 Cost savings (TCO)	 Staff productivity	 Operational resilience
Infrastructure cost savings/avoidance from moving to the cloud	Efficiency improvement by function on a task by task basis	Improved qualification and reduction in defect

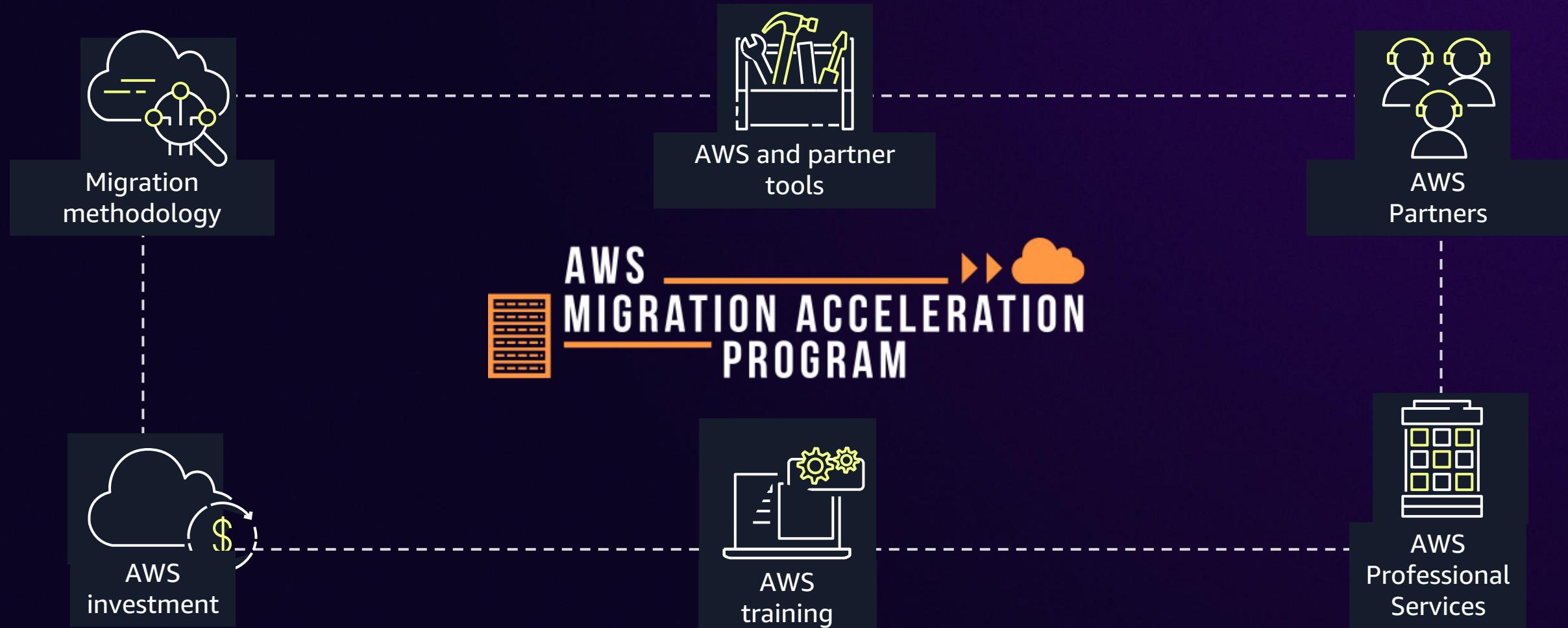
High-level approach with timelines



- The development environment was migrated first
- After each environment migration, there was a two-week period for hyper care support and preparation for the next environment migration
- Upon completion of all lower environment migrations, the production environment was migrated

Migration Acceleration Program (MAP)

FLAGSHIP AWS PROGRAM TO HELP CUSTOMERS MIGRATE AND MODERNIZE TO AWS USING A PROVEN APPROACH



AWS Migration: Process and methodologies



Leadership support



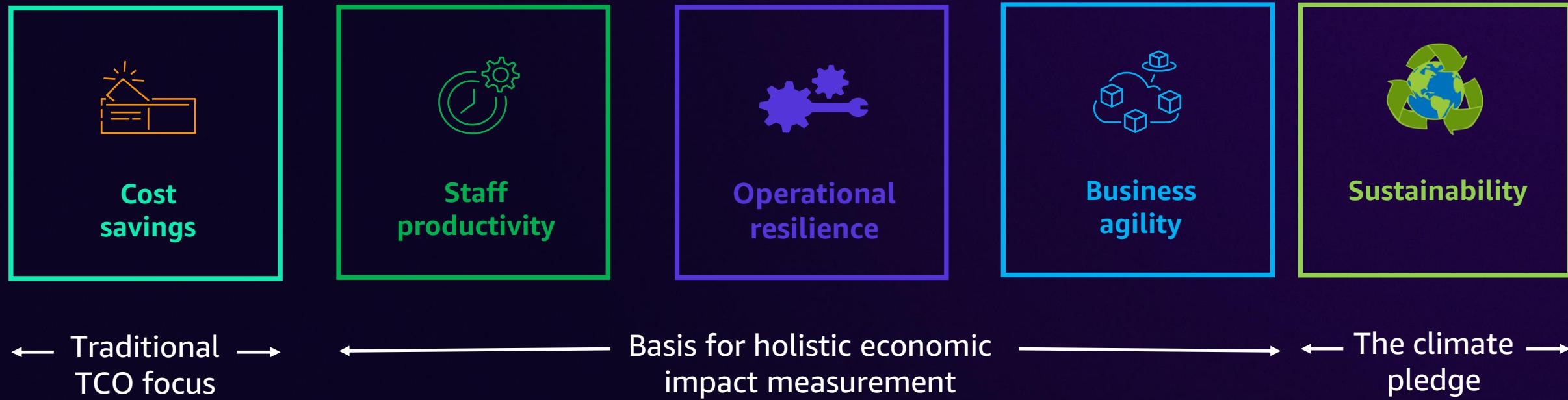
Agile model



AWS training

- ✓ Official communication sent from CIO office to application owners & end-user community to support cloud migration
- ✓ Kickoff meeting with the application owners was hosted by the head of cloud infrastructure
- ✓ Aligned with business leads & application owners on overall migration strategy and timelines
- ✓ Bidirectional conversations between migration team and application owners to finalize migration roadmap
- ✓ Coordinated IT and the applications changes via weekly forums and office hours
- ✓ Divided applications into migration waves as per the business need and technical feasibility
- ✓ Collaborated closely with application owners & third-party vendors for architectural decisions
- ✓ Conducted AWS Training program concurrently to upskill application teams

Business value: Cloud value framework



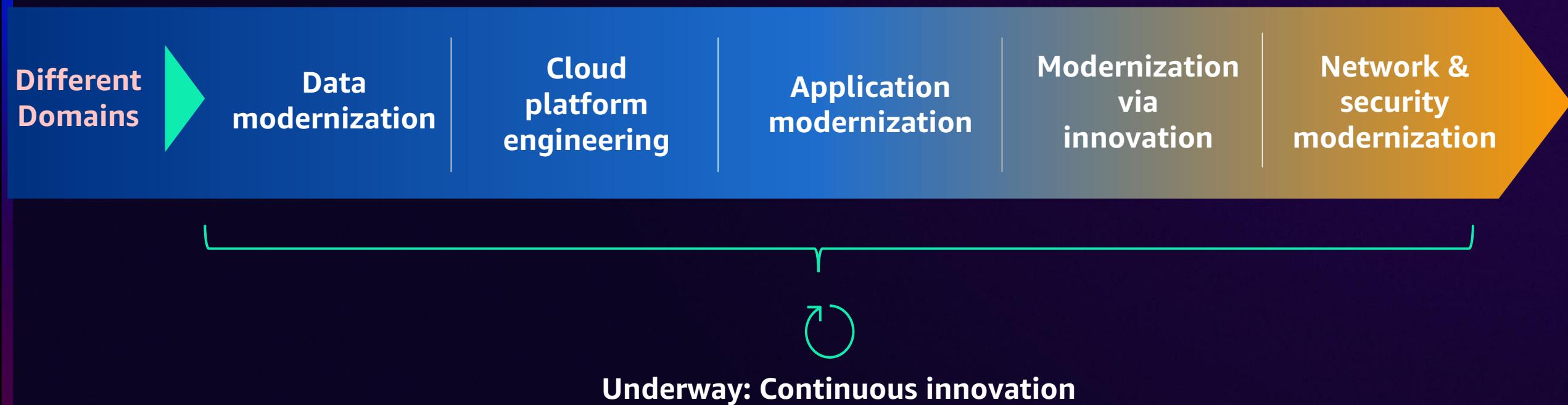
AWS Migration: Lessons learned

- ✓ Reduced cost and increased application control and autonomy by creating dedicated accounts
- ✓ AWS Professional Services leading the overall migration program ensured continuous progress with experienced professionals
- ✓ Migration Acceleration Program (MAP) credits helped save on migration cost effective
- ✓ Define roadmap for decommissioning and potential hardware consolidation during the lift and shift process (compute and storage)
- ✓ Improved forecasting and hygiene on shared migration cost by creating a chargeback model to application teams
- ✓ Develop standard operating procedure for customized configuration settings in AWS, especially in re-platform scenarios
- ✓ Cloud fluency model, training, and upskilling the application community

Modernization and innovation at Gilead



Modernization is a **culture** of relentless pursuit of **IT Transformation** for adding more value and advancing Gilead further towards our goal to discover, develop, and deliver innovative therapeutics



AWS migration best practices and getting started

Create a case for change

Assess



Rapid discovery



TCO Report



Migration Readiness Assessment



Briefings & workshops



Immersion day

- Establishing data requirements and collecting data
- Evaluating potential third-party license cost savings
- Aligning on an understanding of the capabilities required
- Establishing a roadmap for the activities to come
- Agreeing to a prioritized list of actions
- Gaining organizational commitment to the journey ahead
- Develop a business case

AWS tools and mechanisms:

- AWS Optimization and License Assessment
- AWS Migration Evaluator
- AWS Migration Readiness Assessment

AWS Optimization and License Assessment (OLA)

- Assess your environment and get recommendations to optimize compute, storage, licensing
- Build a migration and licensing strategy to unlock cost savings as you transition to AWS



36% average compute cost savings versus on premises¹



33.83% faster migrations¹



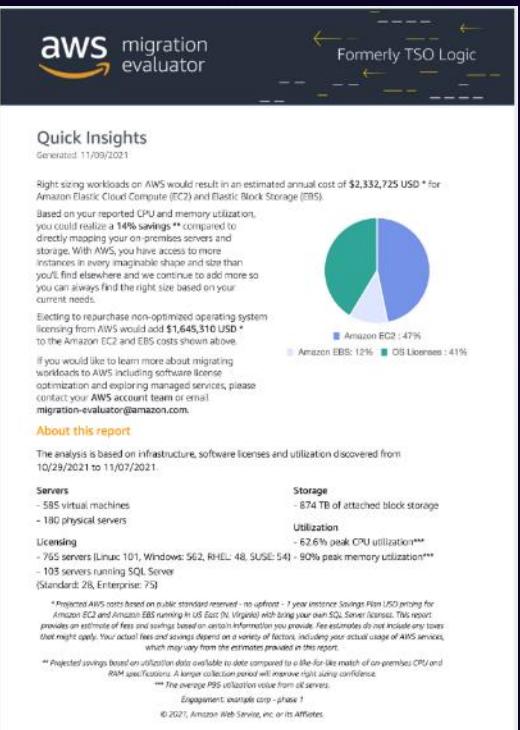
58% more migrations¹

¹ AWS Finance, AWS benchmark data of customers who have run an optimization and licensing assessment compared to customers who have not

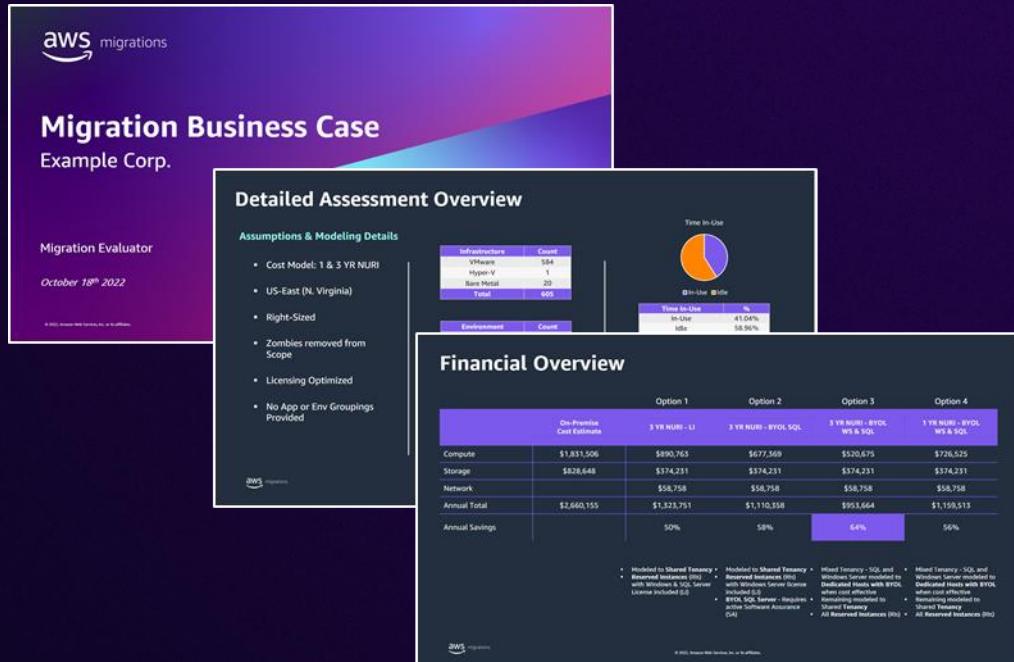
² Minimal customer requirements

Business case with Migration Evaluator

Quick Insights report



Directional business case



Automated PDF and Excel export available within 48 hours of data collection

Available 5 days after data collection ends (upon request)

The AWS Cloud Economics team can help

Remove financial blockers by building a comprehensive business cases that highlight the value of migrating to, and building on, AWS, and assists customers with managing, optimizing, and predicting their AWS cost and usage

[CUSTOMER] DIRECTIONAL BUSINESS CASE

Business Case Executive Summary

Background

- Directional business case which estimate value differences between rapidly-driven on-premises environments and consumption-driven AWS environments have historically been difficult to complete due to differences in cost-drivers, fixed and variable and, among other factors.
- AWS Cloud Economics has developed an established methodology for evaluating migration value. [Stakeholder] at [Company] requested assistance with creating a directional business case to demonstrate the potential value created by migrating core services from on-premises to AWS.

Approach

- Leverage the AWS Cloud Value Framework to develop an apples to apples comparison of the total cost of ownership on-premises and AWS
- Data used in generating these estimates was sourced from [Migration Evaluator]
- The AWS and on-premises estimated spend is based industry averages and assumptions
- This business case includes right-sizing CPU/RAM utilization and time-in-use, based on industry standards

Outcome

- The preliminary analysis indicates TCO savings of 34% over a period of 5 years. This does not include an EDP discount or MAP credits

Total Business Value Created	\$26,479,025	Cost Savings %	34%	Annual Savings	\$1,295,805	5-Year Savings	\$6,479,025
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Next Steps

- Discuss assumptions with the customer to identify additional optimization areas
- Conduct a business case deep dive, as needed
- Refine business case with AWS Investments

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Executive summary

[CUSTOMER] DIRECTIONAL BUSINESS CASE

Business Value Savings Summary

Below is a 5-year summary of business value savings estimated based on data provided by the customer and industry benchmarks

Description	Cost Savings (TCO)	IT Staff Productivity	Operational Resilience	Business Agility
Infrastructure cost savings / avoidance from moving to the cloud	\$XX.XM	Efficiency improvement by function on a task-by-task basis	Benefit of improving SLAs and reducing unplanned outages	Deploying new features applications faster and reducing errors
Savings	\$XX.XM	\$XX.XM	\$XX.XM	\$XX.XM

Annual Savings Opportunity is \$XX.XM

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Financial impact results

Customer Carbon Reduction Benefit

KPI	% Improvement	Annual Benefit	Value Driver / Details
Estimated Carbon Reduction (Metric tons of Carbon)	89%	216.6	Total Carbon Reduction Estimate
	72%	175.2	Benefit from Higher Server Utilization
	17%	41.4	Benefit from Higher Renewable Energy Mix
		1082.92 Metric tons of Carbon	5 Year Benefit

aws

Carbon reduction benefit results

[CUSTOMER] DIRECTIONAL BUSINESS CASE

5 Year Infrastructure Savings Summary

Cost Savings %	34%
Annual Savings	\$1,295,805
5-Year Savings	\$6,479,025

Compute and Storage data has been obtained from Migration Evaluator while Networking is representative for on-premises.

This view reflects a steady state comparison of on-premises to AWS migration. It does not capture Migration Costs or Migration ramp.

The cost represent ~80% of the estimated spend. Customers spend an additional 10–20% of the total on services (Monitoring, Advance security, Marketplace etc.) in both on-premises and AWS environment

Compute	Colo	AWS
\$7,574,138	\$2,844,739	
Storage	\$10,557,213	\$8,337,408
Network	\$892,111	\$266,377
AWS Support	\$1,098,415	
Total Costs	\$19,023,962	\$12,544,939

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Infrastructure savings summary

[CUSTOMER] DIRECTIONAL BUSINESS CASE

5 Year Steady State Cash Flow Summary

On-Premises	AWS					
Compute	\$5,849,688	\$1,013,502	\$1,013,502	\$1,315,549	\$1,315,502	\$10,207,736
Storage	\$693,020	\$316,768	\$316,768	\$693,020	\$693,020	\$52,713,345
Networking	\$693,159	\$96,000	\$96,000	\$693,061	\$96,000	\$5,311,120
On-Premises Total	\$6,541,867	\$1,239,370	\$1,239,370	\$4,992,645	\$1,239,370	\$14,642,192
Year 1						
Year 2						
Year 3						
Year 4						
Year 5						

On-Premises

Compute	\$3,857,274	\$146,644	\$148,444	\$3,357,274	\$148,644	\$7,380,480
Storage	\$154,509	\$154,509	\$154,509	\$154,509	\$154,509	\$772,543
Networking	\$56,923	\$56,923	\$56,923	\$56,923	\$56,923	\$286,415
AWS Support	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$900,000
On-Premises Total	\$5,748,706	\$540,076	\$540,076	\$5,748,706	\$540,076	\$17,177,639
Year 1						
Year 2						
Year 3						
Year 4						
Year 5						

AWS

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Cashflow summary

Scope and Assumptions for TCO

Item	Scope
Scope	<ul style="list-style-type: none">Analysis based on customer provided VM list from April 4, 2022Compute and storage data are obtained from the VM inventory. Network estimates are based on customer provided system requirements documentation
AWS Region	<ul style="list-style-type: none">Region: US West (Oregon)DR: Asia Pacific (Tokyo)
Business case and Hardware refresh timeline	<ul style="list-style-type: none">5 year business case with 5 year refresh timelines
Pricing Instruments	<ul style="list-style-type: none">3 year instance savings plan with all upfront pricingSpot instances for DB DR services20% discount on Compute and storage spend8% EDP discount on server and storage spend
Co-location estimated cost	<ul style="list-style-type: none">Estimated rates based on Industry + OEM + Analytic Data applied to Renesas inventory data
Compute Utilization	<ul style="list-style-type: none">Estimated CPU 2021 Migration Evaluator scoreAverage CPU 2021 migration utilization was 32%
Physical hosts	<ul style="list-style-type: none">Host type was based on the Hitachi B550 model indicated in customer provided system requirements with the following configuration
Licensing	<ul style="list-style-type: none">Hitachi leases Windows, and RHEL licensesCustomer owns SQL licenses
Storage	<ul style="list-style-type: none">On-premises data disk storage required is 1TB volumes, system disk storage part of EC2 mapping. Disk and storage capacity for data and system disks respectively for the primary environment
Networking	<ul style="list-style-type: none">Includes VPN tunnel for connection and monthly data usageData obtained from customer provided system requirements documents
Support	<ul style="list-style-type: none">Business level support had been estimated

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All assumptions used



AWS Professional Services rapid migration for VMware

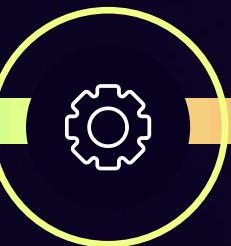
END-TO-END SOLUTION TO AUTOMATE, DE-RISK, AND ACCELERATE YOUR MIGRATION

Assess

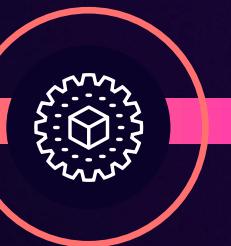


Detailed AWS-led assessment

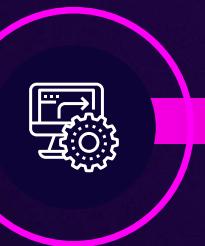
Mobilize and migrate



Prescriptive framework and tools



Fully automated AWS foundation



Plan and automate migration tasks



Cloud ops and specialist support

Informs the migration scope, timeline, and cost

De-risk the migration with comprehensive delivery kit artifacts

Start migrations weeks sooner with a pre-designed landing zone

Maximize migration velocity with hyper-automation

De-risk with enhanced operating capabilities

AWS Funded



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AWS migration incentives and support

MIGRATE WITH SPECIALIZED PROGRAMS, PEOPLE & TECHNOLOGY

For on-premises
VMware customers



TRAINING AND SUPPORT

- AWS-funded support with 460+ migration competency partners
- Upskill with migration and cloud skills courses
- Hands-on for rapid VMware migration from AWS Professional Services
- Guided VMware to AWS Immersion Days

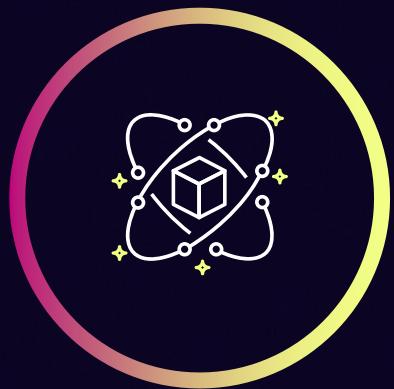
TECHNOLOGY

- Expedite lift and shift AWS Application Migration Service
- End-to-end planning with AWS Migration Hub Journey
- Automate processes with AWS Professional Services

FUNDING AND INCENTIVES

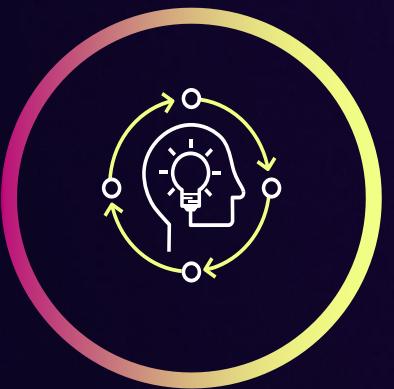
- Increased AWS Migration Acceleration Program (MAP) Partner Funding to support VMware to AWS migration
- Lead with no-cost assessment

Getting started



Create a case for change

Assess your VMware estate by request an AWS assessment for cost savings on licensing, business case and migration planning



Leverage AWS Professional Services or Partners

Engage with AWS migration experts or large network of AWS VMware and migration competency partners



Decide on approach and strategy

Determine on your migration approach and timelines



Begin migration by utilizing incentive programs

Take advantage of our incentive programs designed specifically for VMware migrations



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