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# Driving an enhanced path to enterprise IT transformation

Cognizant's approach to migrating VMware to AWS Cloud Native services

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## Introduction

As enterprises navigate the complexities and cost of operating modern IT environments, the need for cost-effective and scalable solutions has never been more critical. The recent changes in VMware's licensing models under Broadcom's  ownership have prompted many enterprises to reconsider their virtualization strategies.

With **4 out of 5 companies planning their VMware exit**, the search for viable alternatives is intensifying. The utilization of AWS Cloud Native services and solutions have emerged as a powerful contender, offering unparalleled scalability, flexibility, and cost-efficiency.

This playbook delves into how AWS Cloud Native services can transform enterprise IT costs, providing useful insights and viable strategies to help enterprises make informed decisions in this dynamic landscape.

## Why Exit VMware?

The enterprise IT landscape is in a state of perpetual evolution. The rise of cloud computing, the proliferation of multi-cloud strategies, and the constant pressure to optimize costs and enhance agility have all contributed to a dynamic environment where enterprises must continuously adapt their IT strategies to remain competitive.

In this context, the decision to exit VMware, a long-standing cornerstone of many enterprise IT infrastructures, is a significant one that requires careful consideration and strategic planning.

The decision to exit VMware can be driven by various factors, including:

- **Cost optimization:** VMware licensing and maintenance costs can be substantial, particularly for large-scale deployments. Enterprises may seek to reduce these costs by migrating to alternative virtualization platforms or cloud-native solutions.
- **Vendor lock-In:** Reliance on a single vendor can limit flexibility and innovation. Enterprises may want to diversify their IT infrastructure to avoid vendor lock-in and gain more control over their technology choices.
- **Cloud adoption:** The shift towards cloud computing has prompted many enterprises to re-evaluate their on-premises infrastructure. Exiting VMware can be a strategic step toward embracing cloud-native technologies and accelerating cloud adoption.
- **Agility and innovation:** Legacy virtualization platforms can sometimes hinder agility and innovation. Enterprises may seek to adopt more modern and flexible solutions that enable them to respond quickly to changing business needs.

## Challenges of Exiting VMware

While the potential benefits of exiting VMware are compelling, the migration process itself can be complex and challenging. Some of the key challenges include:

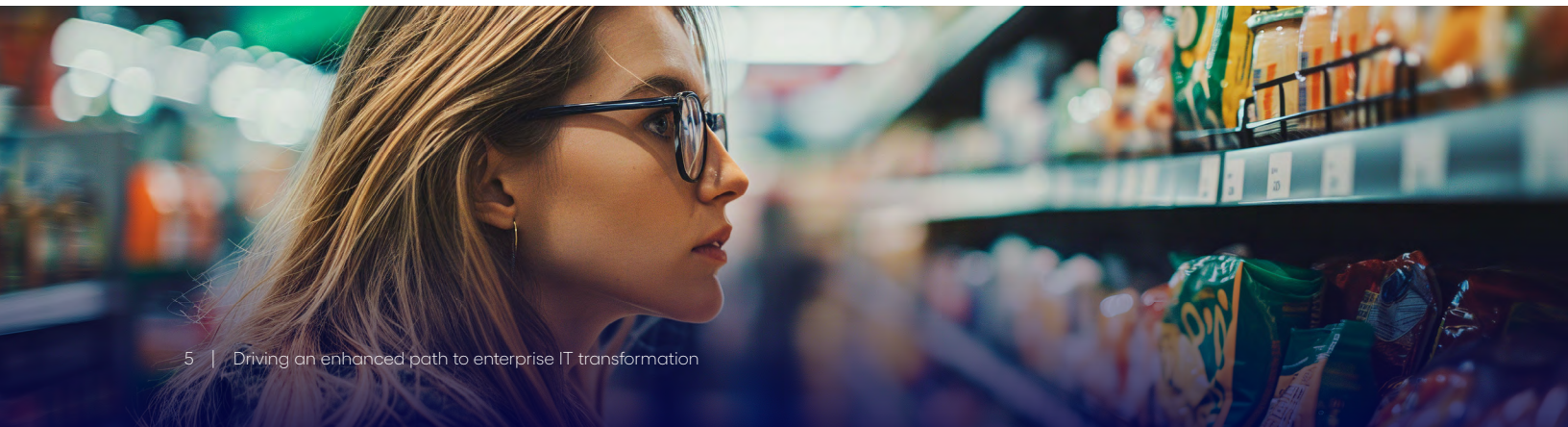
- **Downtime and disruption:** Migrating workloads from VMware to another platform can be disruptive to business operations if not planned and executed carefully. Downtime can lead to lost productivity, revenue impact, and customer dissatisfaction.
- **Data integrity and application consistency:** Ensuring data integrity and application consistency during the migration process is critical. Any data loss or application errors can have serious consequences for business operations.
- **Complexity and skill gaps:** VMware migrations can be technically complex, requiring specialized skills and expertise. Enterprises may need to invest in additional resources or partner with external service providers to ensure a successful migration.
- **Cost and resource management:** Migrations can be resource-intensive and costly. Enterprises need to carefully plan and manage their resources to ensure that the migration stays on track timewise and within the project budget.

## How does Cognizant facilitate the migration journey?

This playbook outlines the structured process that Cognizant has created based on lessons learned from some of the largest VMware migrations to AWS Cloud Native engagements that have been executed. We feel that it is critical to share these experiences with our enterprise customers who are planning to transition from VMware to AWS Cloud Native services.

We initially focus on assisting our enterprise customers' shape and create a VMware migration strategy, focusing on three primary factors:

- **Evaluation of AWS alternatives:** We advise our enterprise customers to begin by researching and evaluating potential AWS solutions (Cloud Native, ROSA and Elastic VMware Service (EVS), assessing them for performance, compatibility, features, cost, and support. This phase also includes a cost benefit analysis to compare the AWS alternatives with VMware, including a thorough review of costs and a ROI calculation to estimate the benefits and payback period of migrating to AWS.
- **Assessment and planning the migration:** The next step involves executing an assessment of the existing VMware environment, driving a high-level AWS design and BOM to estimate AWS Migration Acceleration Program (MAP) funding, evaluate application dependencies and identifying move groups and migration waves. This data is used to finalize a detailed migration plan that encompasses timelines, resource allocation, risk management, and stakeholder involvement. Preparation of the future state infrastructure is critical, including ensuring hardware and network compatibility and conducting staff training. We also utilize our relationship with AWS to utilize MAP funding and VMware migration financial incentives to minimize the enterprise customer's investment in the migration effort.
- **Execution of migration and post-migration support:** The execution phase starts with a pilot migration, followed by a full-scale migration scheduled during low-usage periods to minimize business impact. This phase emphasizes the importance of backing up data before migration and thorough post-migration testing to ensure functional and performance standards. The transition phase includes establishing new operational procedures based on the provided runbooks, new support and maintenance procedures, decommissioning the old VMware environment, and optimizing the new setup through continuous monitoring.



## Cognizant's application assessment & validation methodology

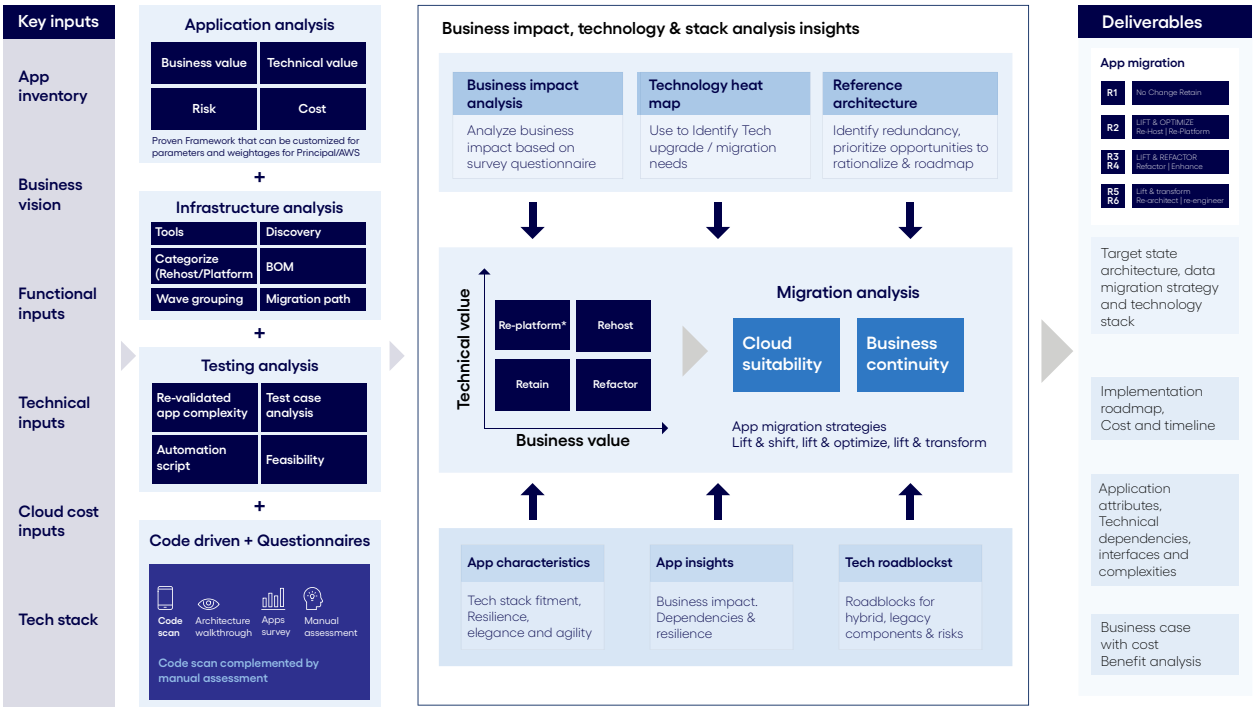



**Figure 1 – The Cognizant assessment process for cloud migration**

## The impact of automation and acceleration on VMware migration

A recent **report** published by Gartner found migration projects could take 18-48 months for large organizations (2,000+ employees) with more than 100 servers. It also found that each virtual machine could cost between $300 and $3,000 to change. Moreover, Gartner indicated that the initial scoping process could cost companies around seven to 10 workers for up to a month

The problems stem from the need to disentangle VMware services – VMware offers networking, storage and management tools as well as security and disaster recovery solutions that aren't always offered as full ecosystems by other providers.

Cognizant has focused on using automation and processes to change the metrics of VMware migration. The below graphic depicts the measurable results of how the automation of our migration processes have in fact impacted the results that our enterprise customers have achieved by engaging Cognizant to migrate their VMware workloads to AWS.

## How does Cognizant change the metrics of migration?

We deliver measurable results with automated solutions

**5x**

**Reduction in cloud migration cycle time**

**80%**

**Automation in application modernization & workload migration**

**50%**

**Reduction in cloud infrastructure spend**

Based on impact realized by several institutions across industry verticals, geography and size

**Best-in-class automated assessment**

**Quickly scope customer environments**

**Custom detailed migration pathways**

**Figure 2 – How Cognizant Changes the Metrics of Migration**

## Key Benefits of VMware Migration to AWS

### Cost reduction

Migrating to AWS Cloud Native services can significantly reduce IT costs. For example, enterprises can achieve up to a 40% reduction in infrastructure costs and a **76% reduction** in unplanned downtime. AWS also provides financial incentives such as MAP, which offers substantial funding to offset migration costs.

### Enhanced performance

AWS Cloud Native services offer improved application performance, with up to a **37% increase** in efficiency. The infrastructure is designed to be more efficient, providing better resource management and faster deployment times.

### Agility and scalability

AWS Cloud Native services enable enterprises to scale their operations quickly and efficiently. The cloud factory model allows for automated migration processes, reducing the time and effort required for manual migrations. This approach ensures optimal resource allocation and business continuity.

## The migration process utilizing AWS MAP incentives

MAP is designed to help enterprises accelerate their migration to AWS by providing financial incentives, technical expertise, and a structured approach to migration. The program is divided into three phases: assessment, mobilization, and migration.

### Assessment

The migration process begins with a thorough assessment of the existing VMware environment. This includes identifying application dependencies, defining move groups and migration waves, and creating a high-level migration strategy. AWS and Cognizant's third-party ecosystem partners provide tools and services to automate the assessment process.

During this phase, AWS offers MAP funding to cover up to $75,000 of the assessment. The key objectives of the assessment is to document the current infrastructure, identify application dependencies and "orphan" applications (applications which require an OS not currently supported on AWS), finalize a future state design and bill of materials, calculate the Annual Recurring Rate (ARR) of AWS spend for the MAP application and begin to plan the migration effectively.

### Mobilization

Mobilization focuses on the finalization of the move groups and migration waves, as well as the completion of the low-level design for the future state architecture. The project plan and timeline for the migration is reviewed and approved by the enterprise customer. This information is embedded within the migration plan, which is also reviewed and approved by the enterprise customer.

Mobilization is also the point where most of the MAP funding is provided to Cognizant by AWS. Up to **20% of the Av** is funded along with any VMware incentives which may apply to the project.

The below graphic sets forth the funding incentives which are available in the context of a VMware migration and illustrates how this is achieved within the context of one of our recent customer engagements.

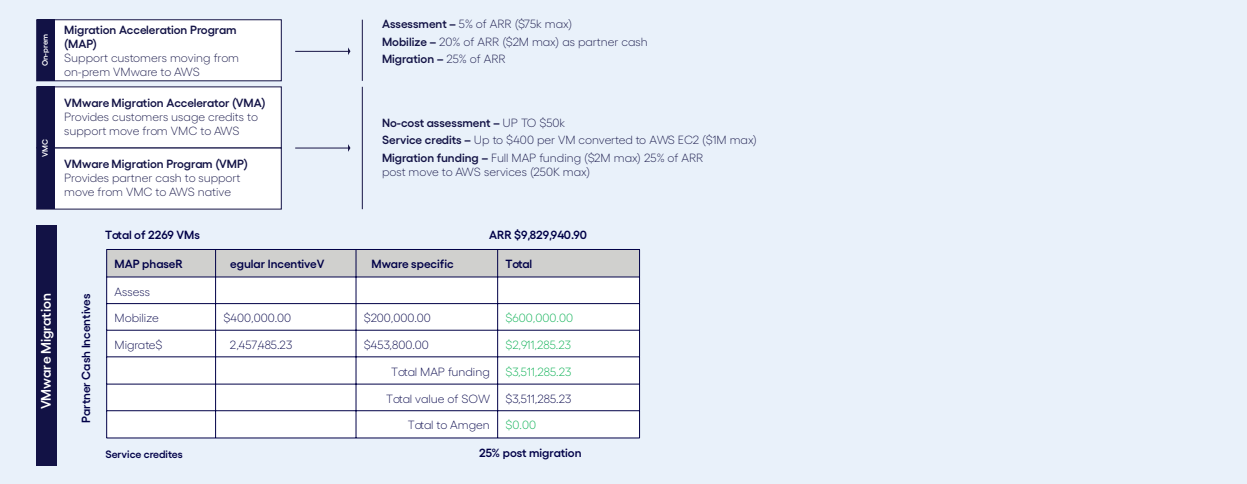



**Figure 3 – Impact of MAP/VMA/VMP Funding Incentives on VMware Migration Efforts**

## Automated migration

Utilizing automated tools, enterprises can accelerate the migration process. Cognizant provides a Unified Cloud Factory (UCF) process for migration, which includes multiple production lines (to facilitate multiple migration approaches utilizing multiple tool sets), executes cloud landing zone creation and implements infrastructure as code (IaC) generation for the target state architecture. This approach minimizes risks, accelerates migration efforts and ensures policy compliance in the build out. The goal is to migrate applications and data to AWS quickly, efficiently and effectively, while removing VMware components and agents from the workloads.

The primary approach we utilize is to build our migration cloud factory is based on AWS Application Migration Services (MGN) to facilitate VMware migration. We have also used Matilda and River Meadow to execute VMware migration as well, depending on the specific requirements of the enterprise customer.

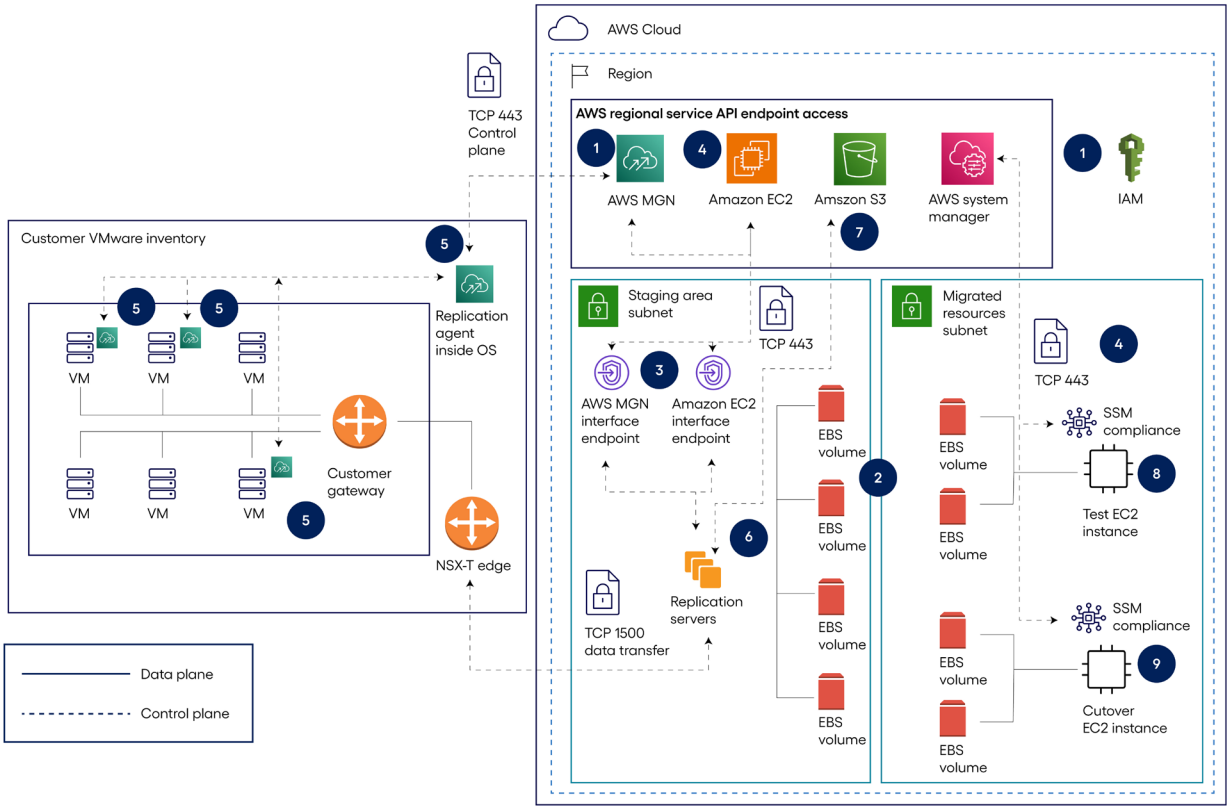



**Figure 4 – MGN Migration Process for VMware**

**The following illustrates how MGN drives the migration process for a VMware workload.**

1. Initialize AWS Application Migration Service (AWS MGN) with the required AWS Identity and Access Management (IAM) permissions.
2. Follow network settings preparations to create Amazon Virtual Private Cloud (Amazon VPC) subnets to use for your replicated test, and cutover Amazon Elastic Compute Cloud (Amazon EC2) instances along with the respective security groups.
3. Create Amazon VPC interface endpoints to connect privately to the Amazon EC2 and AWS MGN APIs. Confirm that the security group attached to the VPC endpoints allows ingress traffic on port 443.
4. Create post-launch actions in AWS MGN to install the AWS Systems Manager (SSM) agent and uninstall no longer needed VMware tools from Windows and Linux EC2 instances.
5. Add source servers to AWS MGN by installing the AWS Replication Agent over TCP port 443 on each individual VM to begin the initial synchronization process.
6. The AWS replication agents open an outbound connection over TCP port 1500 from the source servers to the replication servers. These communications must be allowed by the customer gateway and VMWare NSX-T edge gateway. The replication servers copy the source volumes into Amazon Elastic Block Store (Amazon EBS) volumes.
7. The replication servers call the Amazon Simple Storage Service (Amazon S3) API to retrieve software component and configuration.
8. Launch a test EC2 instance for each source server that is “ready for testing” in the AWS MGN console.
9. Validate and test the EC2 instances and verify the post-launch actions. After testing and validation completion, launch cutover instances and finalize the migration.

With respect to data migration, there are several different approaches that we currently support.

**AWS DMS** – AWS Database Migration Service automates data migration from DB2 databases to AWS Amazon RDS quickly and securely. The DB2 database remains fully operational during migration, minimizing downtime to applications that rely on the database.

- DMS traditionally moves smaller relational workloads
- Supports one-time full-data migration, as well as CDC

**AWS SCT** – The AWS Schema Conversion Tool automates conversion of database objects between heterogeneous databases (DB2/SQL/MySQL) to Amazon RDS

- Free tool available with AWS DMS
- Production of assessment report highlighting objects requires manual conversion

SCT normally converts up to 70% of PL/SQL code to equivalent PL/pgSQL code.

Figure 5 depicts how DMS and SCT address source database migration to AWS as part of a VMware migration process.

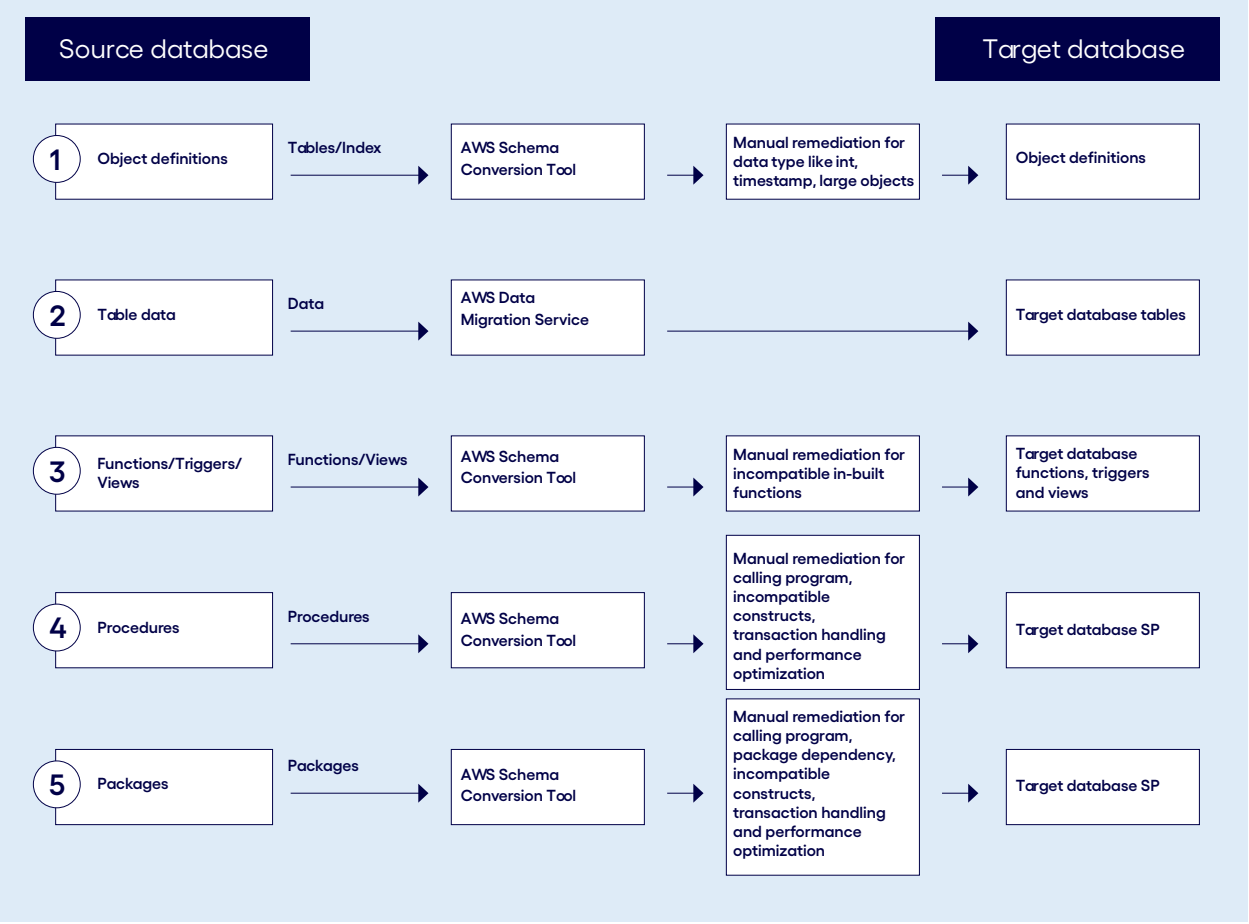



**Figure 5 – VMware DB migration process**

## Test and validation process

Cloud migration requires key focus on certain areas of application testing, such as functional validation, integration testing, security testing, scalability and performance testing.

However, cloud hosting adds new dimensions to application validation when it is compared to conventional testing. The table below depicts QA focus areas of application testing in support of cloud migration, compared to conventional testing.

### Conventional testing vs cloud testing

| Testing areas | Conventional testing | Cloud testing |
|---|---|---|
| **Functional testing** | 1. Performs validation of component functions, system functions and service features | 1. Performs validation of Saas/cloud service functions and end-to-end functionalities of an application |
| **Integration testing** | 1. Function based integration<br>2. Component based integration<br>3. Interface/connection based integration<br>4. Architecture based integration | 1. Saas based integration in the Cloud<br>2. Enterprise level application integration between SaaS/cloud and legacy systems |
| **Security testing** | 1. Function based security testing on application features<br>2. User privacy and security<br>3. Data integrity and protection<br>4. Client/server access control | 1. Monitoring and measurement as part of Saas/cloud security features<br>2. User privacy and security across a diverse range of clients<br>3. Data integrity and protection even during transit and at rest<br>4. Saas/cloud application program interface and connectivity security<br>5. Protection from DDoS attacks and more |
| **Scalable & performance testing** | 1. Performed in a fixed test environment<br>2. Customized or off the shelf monitoring solutions<br>3. Monitoring and evaluation | 1. Performed in a scalable test environment<br>2. Inbuilt monitoring solution<br>3. Monitoring, validation and measurement |

## Addressing key challenges that arise while validating applications

Cloud migration throws in certain challenges while validating applications. Some of the instances and how to validate them at various stages are discussed here.

### Functional validation

Functional validation or cloud-ready validation assesses production readiness of migrated applications. It is fundamental to verify if various aspects of the migrated applications are performing as per SLAs. For an effective cloud migration, we recommend the validation of SaaS/Cloud services functions, and we perform an end-to-end functional validation of a migrated application.

Cloud migration is not just moving data, but it is managing a range of variables – security, authentication, integration, compatibility, testing and monitoring the environment over time.

### Security testing

One of the main deterrents to migrating to the cloud is Security. Keeing the data secure in the cloud requires a whole new level of security procedures and strategies. These procedures must be tested and validated before the cloud-based workloads can be placed into production.  Key tests include the following:

- User validation: Ensure the applications are accessible only by authorized users and are available only to them
- Protective measures against Distributed Denial of Service (DDoS) attacks
- Validation of data security at rest, in use and during transit

### Performance testing

Assessing performance and response time requirements of applications and workloads while migrating to the cloud is a significant factor determining cloud migration success.

There are areas that affect moving an application to a cloud service, some of them include response time implications and scalability factors. It is important during the assessment and testing phases to evaluate and establish the following baselines to validate a migrated workload:

- Identify and document the application's end-to-end flow.
- Identify business SLAs for all business transactions.
- Examine if the application as currently deployed displays limited internet bandwidth or intensive CPU and input-output capacity requirements.
- Address any application's architecture that is not appropriate with the cloud.  Look to replace or rewrite.
- Identify monitoring requirements and setup tools.
- Validate response times as per SLAs – perform Load Testing in parallel and validate that the migrated applications under various loads are meeting the required SLAs.

### Disaster recovery and business continuity plan

Be prepared for the worst-case scenarios in the cloud, from simple data recovery and disaster recovery practice to a plan addressing unique incidents of attack. Validate all your disaster recovery plans in the event of cloud outages.  Follow the following processes to validate BC/DR processes:

- Test, measure and update business continuity processes periodically
- Perform tests to run simulations and evaluate your Operations team's readiness to respond to unplanned outages
- Consider the test results to change or update your business continuity plan over time
- Validate your processes and mechanisms used to facilitate the restoration of application instances during hardware failures

## Post-migration phase

During the post-migration phase, we normally work with our enterprise customers to complete the following tasks:

- Establish new support and maintenance agreements
- Implement new maintenance procedures
- Decommission the old VMware environment and cancel related contracts
- Conduct a post-migration review to identify improvement areas in cloud operations
- Continuously monitor and optimize the new cloud environment
- Update all relevant documentation and runbooks to reflect the new setup
- Communicate the changes to all end-users and stakeholders

## Case studies

### Independent Biotechnology Company

Cognizant completed two major VMware migrations to AWS in 2024, moving over 2200 virtual machines using a $0 statement of work due to MAP funding.

### Multinational Pharmaceutical Company

Cognizant migrated this company to AWS, reducing infrastructure costs by 40% and speeding up the migration process by 46%, resulting in enhanced application performance and reduced downtime.

Both migrations led to significant cost savings and improved workload performance.

### Multinational Conglomerate

A multinational conglomerate exited a data center with over 12,000 virtual machines, reducing total cost of ownership on AWS by 30% and saving over $2 million annually in database licensing costs. The migration took about 27 months.

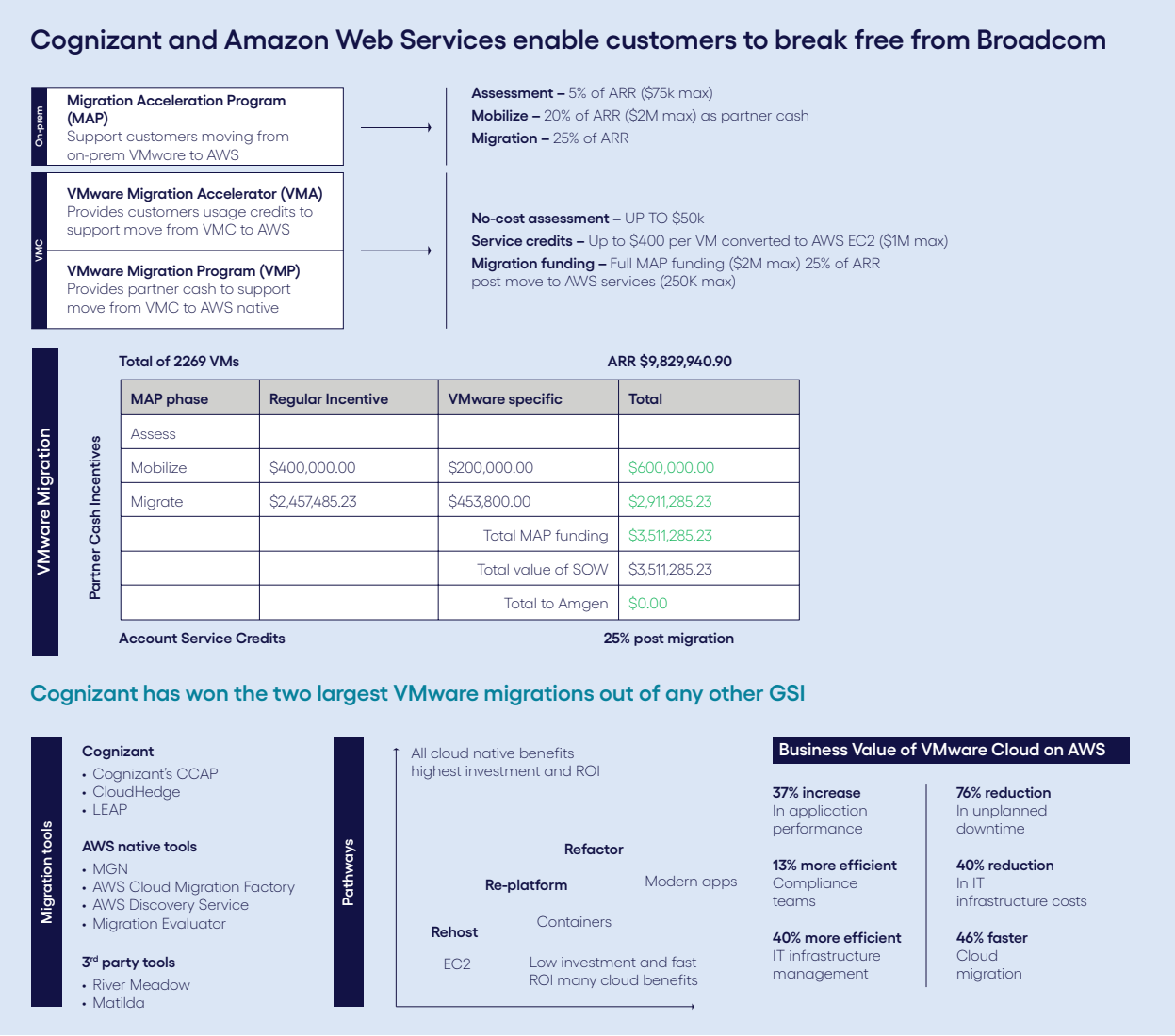



**Figure 6 – Case Studies for Independent Bio and Multinational Pharma Companies**

## Agile, scalable and robust AWS Cloud-based DC exit to AWS

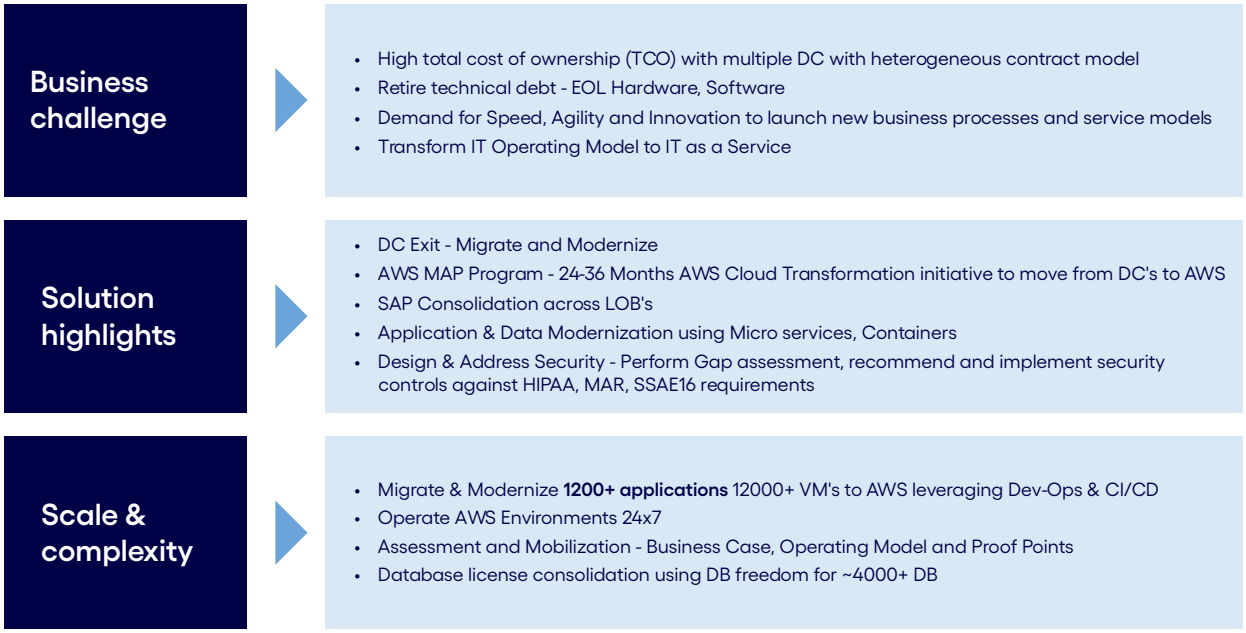



**Figure 7 - Multi-national conglomerate**

## Conclusion

Exiting VMware can be a complex undertaking, but through the engagement of Cognizant, an enterprise can make this decision a transformative step towards a more agile, cost-effective, and innovative IT environment.

Cognizant provides a well-documented and comprehensive migration solution to AWS that simplifies the migration process, minimizes disruption, and empowers our enterprise customers to achieve their long-term IT goals.

We have demonstrated through our case studies what we can deliver to our enterprise customers. These examples depict the significant benefits that enterprises can achieve through migration to AWS, including but not limited to the use of the Migration Acceleration Program, improved performance, and accelerated migration processes.

With the expertise and tools of Cognizant and the comprehensive support from AWS, enterprises can achieve significant scalability and operational agility in **2025 .**

## About the author

**Dr. John Cupit,**
Global Technical Leader,
AWS Business Group at Cognizant

John has over 40+ years' experience in providing solutions to multiple industry verticals, most recently delivering a complex Mainframe Migration effort for a Fortune 200 Insurance Company in the US and a very large VMware Migration effort for a Global Life Sciences Company. He has previously worked for leading companies such as Cisco Systems, IBM, AT&T, Huawei and AWS.

He served as the Global CTO at Huawei for three years and was directly responsible for creating a $1.5 Billion Cloud Product business for Huawei during his tenure. He was named "CTO of the Year for Cloud and Data Services" in 2016 by Softech International based on his accomplishments at Huawei.



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