# Data Modernization

A Strategic Imperative

# 1 Introduction and Executive Summary

Many organizations are re-examining and evolving their data strategies and systems to further imbue the business with data-derived insights.

Organizations today face exploding volumes of information generated both within and outside their walls. Harnessing the power of data can be critical to business competitiveness, and CIOs frequently receive requests from business-line leaders for faster, timelier, and more complete information that can enable insights and strengthen enterprise-wide decision-making. Many such organizations had adopted Hadoop for processing workloads for insight generation and are now looking for cloud-enabled platforms to reduce infrastructure costs and achieve greater capabilities, flexibility, and collaboration with the move to Cloud.

There are many use-cases that drive the needs for modern cloud-enabled platforms, where clients may want better visibility into spending, pricing, margin erosion, single view of their customers and prospects to better analyze brand sentiment and customer profitability, along with ways to optimize order management and warrant streaming analytics. These factors highlight the need for cohesive strategy and powerful technical capabilities for gathering, storing, and analyzing structured and unstructured data sets. Organizations can reimagine their data futures by developing a data strategy road map that includes an awareness of how external disruptors may affect the organization's existing systems. In doing so, they can consider how next-generation operating models are likely to evolve as technologies are delivered at enterprise scale.

An increasingly attractive option is moving some analytics workloads from legacy systems to the cloud. This approach can increase flexibility and collaboration, providing some quick wins for the organization by enabling scalable compute to drive modern analytics.

**Key Objectives of Data Modernization**

**a.** A strategic pillar of the Digital Transformation

**b.** Building a technology fabric to:
- Operationalize and scale data-driven digital transformation programs
- Support as-a-service solutions that are enabled by modern platform-driven solutions and data products
- Construct a backbone for Advanced Analytics, AI/ML powered innovations

**c.** Shape and accelerate business model innovation to thrive in the new-normal digital ecosystem

**d.** Influence operating models to respond to rapidly changing business dynamics by:
- Enabling personas (with the right data, tools, access) interacting with the enterprise data ecosystem.
- Augmenting the decision-making processes and making business users/analysts/data scientists innovators with the right data, tools, access.
- Driving a culture of innovation

# 2 Modern Data Strategy as an enabler for business-led transformations

Organizations are striving to become more data-driven and gain deep and actionable insights from their data while the pace of data creation is exponentially increasing. Not only the volume of data is exponentially increasing, the variety is also expanding in the form of structured, semi-structured and unstructured data like images, documents, geo-spatial data and much more due to the role of connectivity, mobility, smarter systems in how businesses work to deliver products and services for the end customers. Organizations need new data stores and underlying architectures that scale and grow as business needs change.

While data explosion is under radar, creating value out of it becomes the most critical capability for organizations who must develop a vision and a strategy to walk towards that vision. Working with customers from a wide spectrum of sectors, industries, functions, geographies over the years, AWS has defined three main stages that an organization should go through to form their modern data strategy.

A modern data strategy can be considered a comprehensive plan or blueprint to help organizations manage, access, analyze, and act on data. These stages are not sequential, and customers can start at any stage, depending on where they are in their data journey.

**Stage 1:** Modernizing the data infrastructure from a legacy solution to a scalable, trusted, and secure cloud provider

**Stage 2:** Unifying data by breaking down silos, and putting it to work effectively across databases, data lakes, analytics and ML services

**Stage 3:** Innovating to invent new experiences and to re-imagine old processes with purpose-built databases, advanced analytics and visualization, and machine learning and artificial intelligence

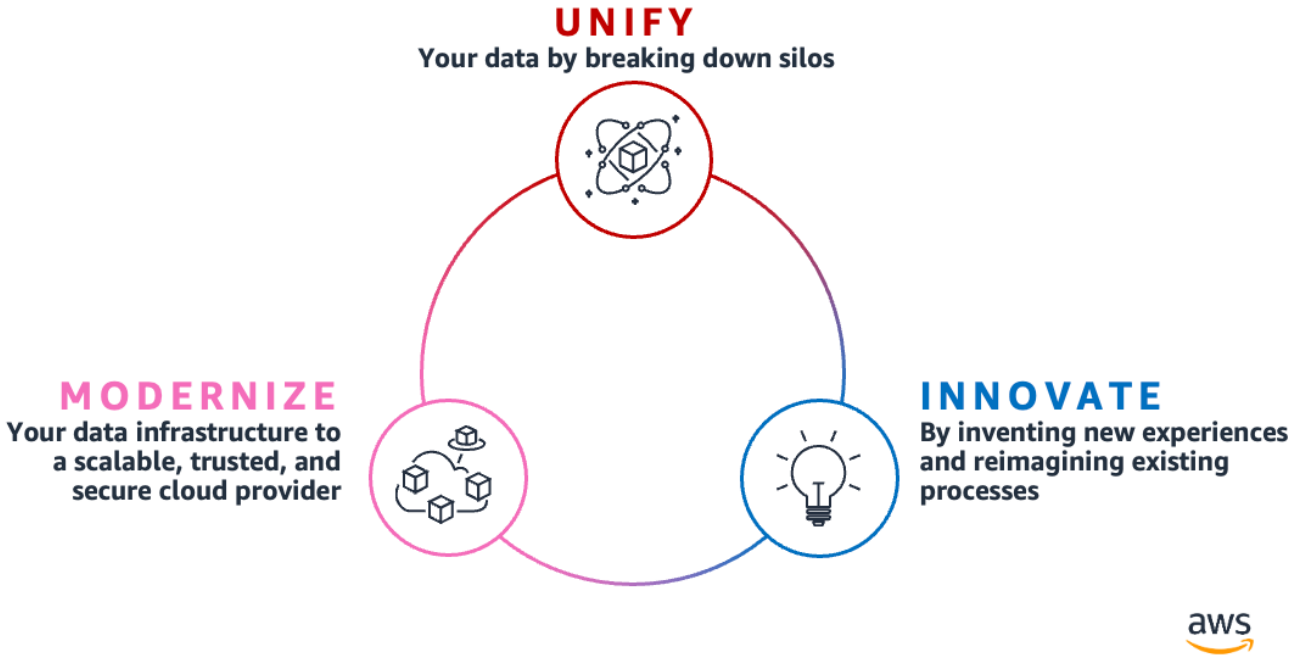



*Figure 2.1: AWS Modern Data Strategy Pillars*

**Bringing it all together**

A modern data strategy allows organizations to solve all their data needs and use cases across sectors, industries, functions and processes. With these three stages of modern data strategy, any amount of data in open standards-based data formats can be moved and stored at scale, could be accessed seamlessly, and could be managed with proper security and data governance controls in place to help ensure optimal price performance. Equipped with the right data and right tools at the right time, customer teams can focus on accelerating innovation with the development of analytics, machine learning and artificial intelligence experiments and applications on their data.

With a disciplined execution of a modern data strategy at organizational scale, companies are be able to reduce operational costs, increase agility, simplify staffing and training with technical expertise on a single platform and build a modern architecture that scales for the future.

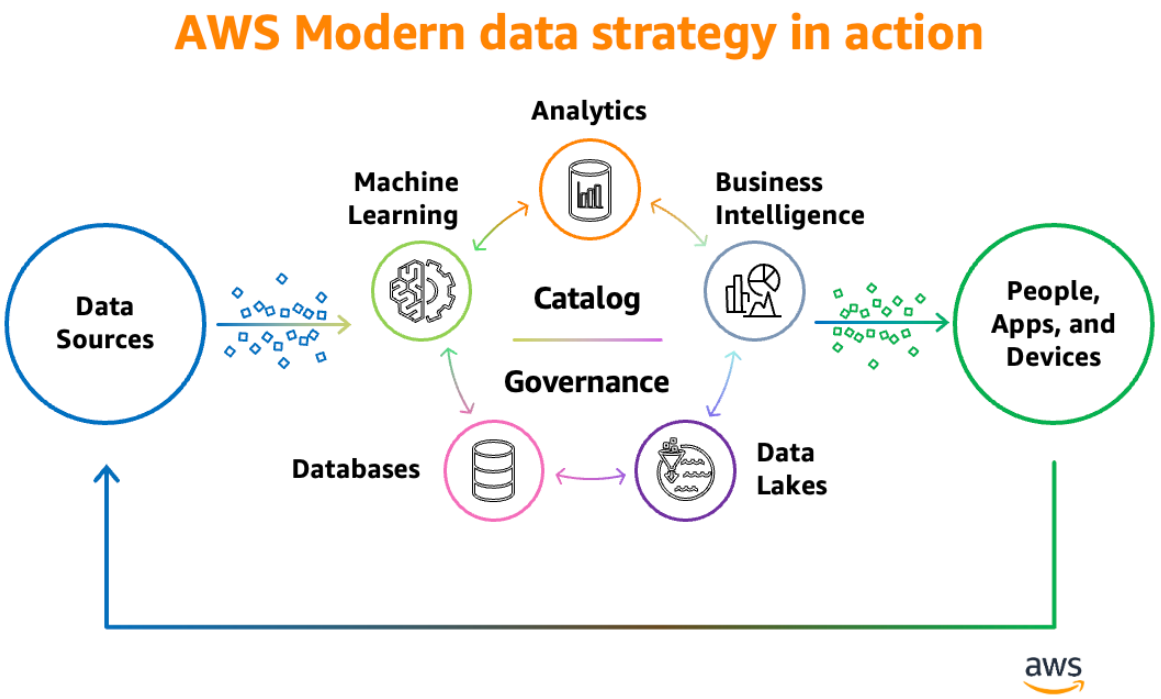



*Figure 2.2: Components of AWS Modern Data Strategy*

**Overview of the core architectural capabilities to build with Modern Data Strategy:**

**a. Resolving first-mile data connection challenges**

While there is a tremendous growth in the variety of data sources from machine data from industrial equipment, digital media, data from social networks, online transactions, financial analysis, there are still major barriers in accessing to these data sources before organizations can run analysis and predictions. This first-mile problem can be broken down to use cases, and respective barriers are eliminated by the service options AWS provides. Starting from connecting to and managing billions of devices, to discovering and using third party data, ability to ingest and store streaming data and transferring data from SaaS applications, to finally moving data between the data lake, data warehouse, and data stores, AWS provides a wide spectrum of service options.

**b. A broad portfolio of databases tailored to the nature of data**

Customers are modernizing to cloud-based databases to accelerate innovation by removing undifferentiated heavy lifting. As the diversification of data in terms of velocity, volume, format, data privacy become more central in building a full picture of the business dynamics, organizations have to create a vision for collecting and storing data in the right database technologies tailored to their specific application needs. AWS has the broadest portfolio of databases in the industry that are purpose-built and support a variety of industry use cases to leverage data models including relational, key-value, document, in-memory, graph, time-series, and ledger databases that have various advantages in scalability, availability, reliability, velocity, flexibility and cost perspectives.

**c. Data lakes are foundational for data unification**
To be able to quickly respond to changing business dynamics, personas across an organization have to be able to make decisions fast. And this is only possible by unifying data, making the data available for consumption broadly across the organization to democratize analytics and machine learning that are essential to create actionable insights. Data lake is the foundational layer of the data unification strategy with their unmatched durability, availability and scalability. With Amazon S3 based data lakes, organizations store all their structured and unstructured, relational and non-relational data cost effectively. Also, being able to store data in open formats allows decoupling storage from compute which gives the analysts, data scientist and developers to be able to choose the best tool for their use cases from a variety of on-demand, pay-as-you-go analytics and ML engines. In practice, companies implement multiple data lakes in multiple accounts across their organization to manage exabytes scale data lakes running on AWS.

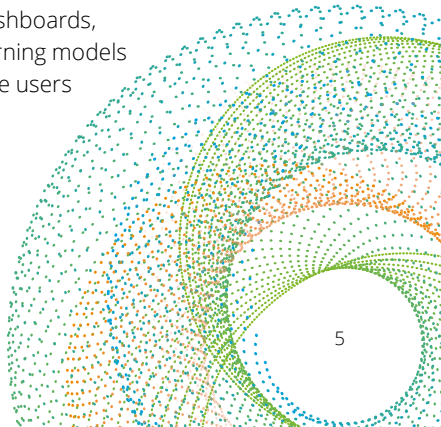
**d. Governance and Catalog**
Making modern data strategy initiatives successful and sustainable requires a governance mechanism in the form of an enterprise framework. This governance framework aligns people, processes and technology to make data an enterprise asset that grows, transforms and is reused to deliver the users full visibility of business dynamics. Through data governance, organizations can manage the availability, usability, integrity, security and lifecycle of the data based on standards and policies. Data cataloging, which is an integral element of the data governance, informs on metadata which is the data about organization's data through its lifecycle. It helps the organization identify data ownership, create data quality standards, apply regulatory compliance and help define data consumption patterns. Data catalog brings together facts, metrics and data to guide business decisions that feed the organization's strategic direction and objectives that translates to tactical initiatives, projects and programs. Governance and catalog, together, are critical for making data lakes successful. AWS Lake Formation streamlines moving, storing, cataloging, cleaning and classifying data with ML, it manages access control from a single location, and helps enforce security policies on sensitive data across multiple services.

**e. Data-as-a-Service API as a key enabler for transformation**
One of the critical components in a modern cloud platform is a scalable and open data API layer that is aware of the underlying data topology, while remaining agnostic about the underlying data layer. The Data API layer becomes the perfect interface for different personas (business users, analytics, data scientists, etc.) engaged in digital transformation journey: it offers a bridge from the cloud engineer's desire for easy cloud persistence, to multiple open cloud technologies that provide unification in an operational distributed consistency. It is also critical in a Lakehouse architecture to abstract the need for point-to-point access and fulfilling the needs of different personas for data discovery to delivering and subscribing to the information that they need in a seamless fashion.

**f. Broad analytics services to create actionable business insights**
Analytics capabilities of an enterprise should span across querying of structured and unstructured data universally, ability to process big data, embracing real-time analytics, and leveraging next-generation data warehousing solutions. AWS provides a broad portfolio of analytics services as well as the most serverless options for data analytics in the cloud.

**g. Broadest and most complete set of ML capabilities**
The impact of innovation achieved by analytics is multiplied by factoring in portfolio of ML services AWS provides to help organizations derive value out of data, help the personas innovate faster, optimize existing processes and invent new customer experiences in return. Machine Learning is a discipline leveraging quantitative methods to make accurate predictions, get deeper insights from data to improve business outcomes such as maximizing operational efficiencies, elevate customer experiences or re-inventing business processes. Organizations usually start with experimenting with developing ML models on a targeted business problem focusing on a process and/or a persona experience, then move to stress-testing the effectiveness of these ML models, then productionize their ML applications for enterprise adoption in long term. AWS helps at every stage of the ML adoption journey with the most comprehensive set of artificial intelligence (AI) and ML services, and infrastructure.

**h. Last mile in data lifecycle: Data democratization**
Enabling people to access, understand, and consume data is critical to help them contribute to business continuity and innovation. AWS equips enterprise users with business intelligence services like QuickSight that lets them query data by asking questions in natural language and get accurate results in seconds, as well as visualize and monitor business critical KPIs through embedded analytics in applications. Other prominent capabilities from AWS portfolio include intelligent enterprise search, document, text, cognitive search, log analytics, geospatial search and many more. Besides, sharing data, data insights or data assets such as query results, datasets, dashboards, reports, analytics and machine learning models are instrumental in empowering the users with their specific business needs.



# 3 Paradigm Shift in the Modernization stage:

We have been experiencing a paradigm shift in all business ecosystems towards automation and eliminating operational overhead in order to build better products and services, expedite time-to-market, and win more customers faster rather than investing in infrastructure management. In Information Technology, this vision translates to Infrastructure as Code, CI/CD pipelines with automated security and compliance, and serverless. In every modernization journey, organizations should formulate a way to emerge from the current data estate, skill sets, and organizational structures in support of the business objectives that will be driven by modernization.

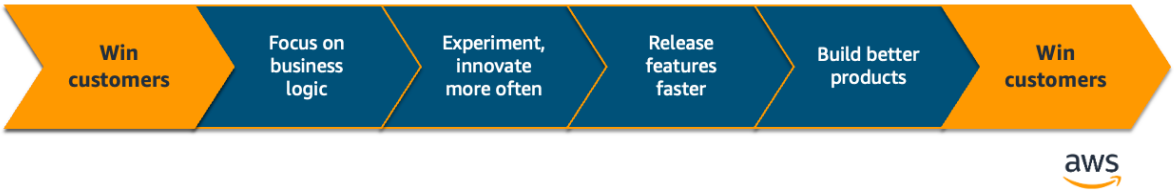



*Figure 3.1: Paradigm shift in the definition of how to win customers*

In this new-normal business dynamics that organizations operate and have to thrive, they have been striving for building modern applications that are characterized with their ability to scale quickly to potentially to millions of users, have global availability, manage exponentially large data volumes, and respond in milliseconds with a lower cost of ownership. These capabilities are materialized in applications such as web and mobile backends, IoT applications, AI/ML workloads, batch processing, Platform as a Service solutions, micro-service backends, and more.

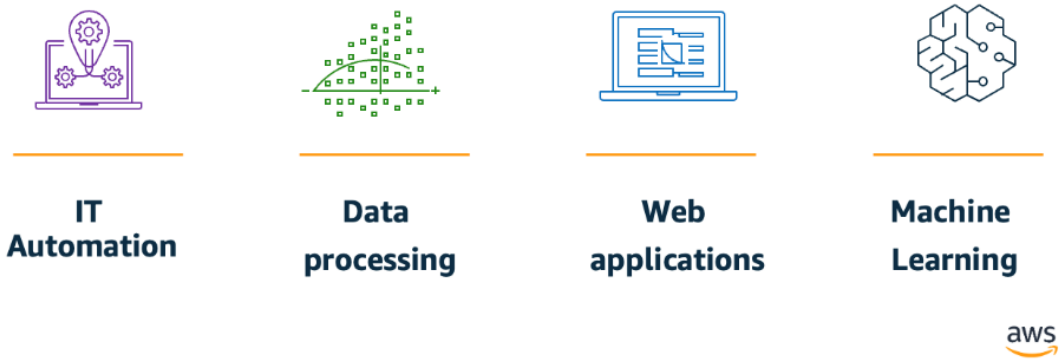



*Figure 3.2: What organizations are building?*

Taking a closer look at how organizations should transform their application portfolio to drive innovation, they usually have three alternative paths they can follow:

**Path 1:** Reducing the IT resources that the enterprise is directly responsible for, which could be accomplished through either by retiring systems or adopting SaaS.

**Path 2:** Migrating to cloud through lift and shift methodology, to move from datacenter management to a common environment.

**Path 3:** Finally, modernizing on the cloud. It could be through re-platforming, that is moving from a service they spare resources to manage themselves, to a service that the cloud provider can manage for them. It could also be through refactoring their business-critical or customer-facing applications that have the potential to yield fastest time-to-market and highest TCO benefit.

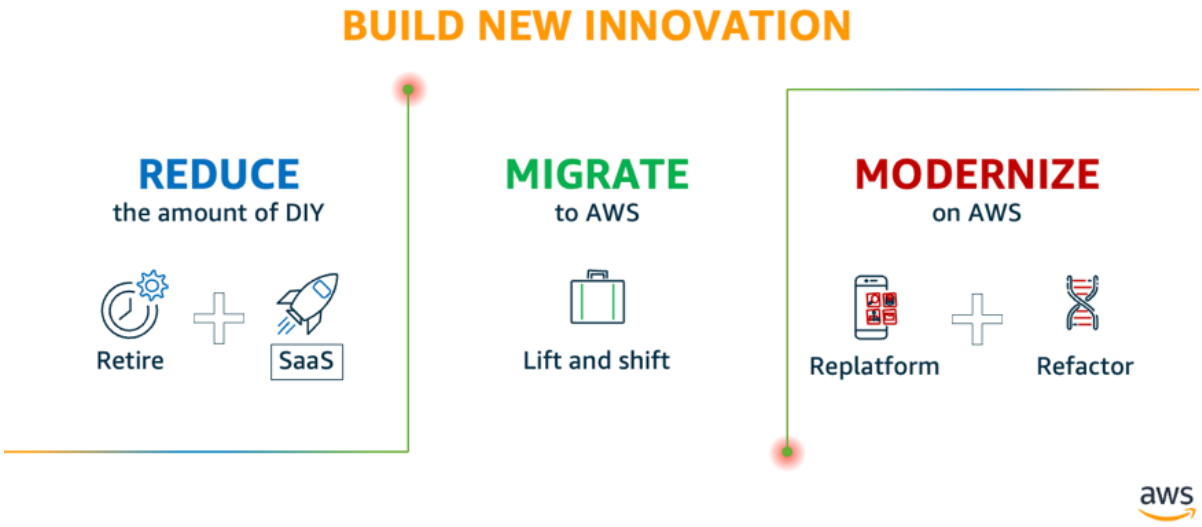



*Figure 3.3: Alternative paths to transform existing application portfolios to build new innovation*

**Modernization, accompanied by migration**, can happen at various stages of the data journey. For any type of workload, organizations should have a north-star agenda to prepare themselves for modernization initiatives. All the organizations have to take care of managing tasks such as database provisioning, patching, configuration, or backups whether they are running legacy, on-premises data stores or they are self-managing in the cloud. AWS offers a robust modernization playbook for any type of data infrastructure with unmatched experience, maturity, reliability, security, and performance that organizations depend upon for their most business-critical applications with the most demanding workloads at a fraction of the cost of old-guard databases. Modernization with AWS benefits organizations with breaking free from legacy databases, moving to fully-managed and purpose-built data services, and layering Machine Learning and Artificial Intelligence onto workloads to build intelligent, modern applications.

# 4 Our Approach to Modernization through the Playbook:

### a. Our Migration Approach

Once you have committed to modernizing your legacy data ecosystem, you will need a migration methodology that has proved effective across many such large and complex migrations. There are several phases in a successful migration plan to execute a large-scale migration, with each step producing an outcome that feeds into subsequent phases.

We have a very well-defined Migration methodology that follows a four-stage approach to re-platforming client's legacy data ecosystem and associated objects – ETL scripts and consuming applications to accelerate delivery and reduce complexity.

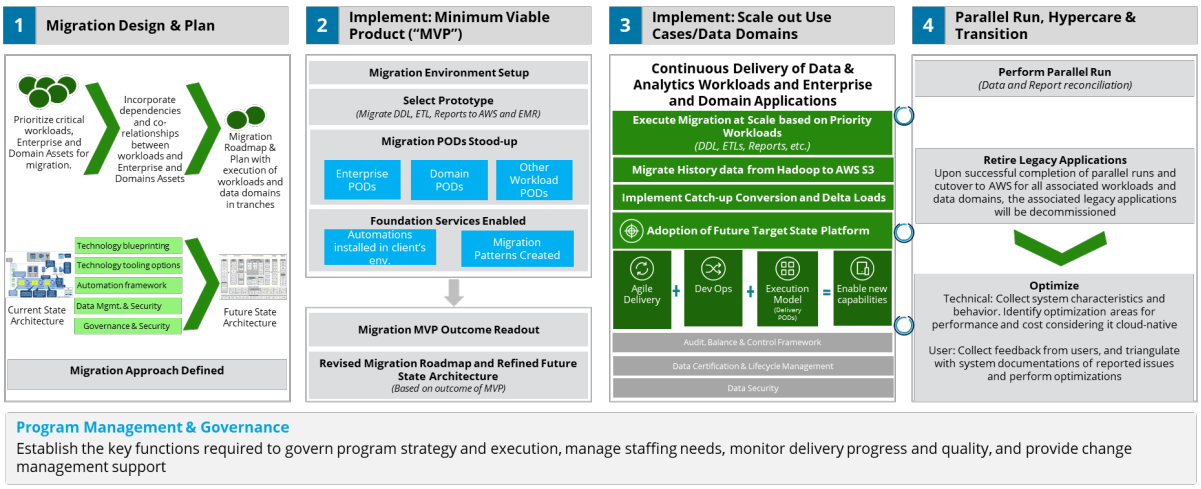



*Figure 4.1: Our Four-Stage Migration Approach*

### Stage 1: Migration Design & Plan

This phase starts with the current state discovery and analysis of existing workloads to reverse engineer and identify dependencies and relationship between workloads and data domains. Then accounting for the dependencies and based on priority of critical workloads, create a migration roadmap and plan to migrate in tranches, each enabling some business capability providing quick wins along the way. This stage also lays out the Future State Architecture by taking into consideration the technology bill-of-material for migration and applicability of different automation frameworks.

### Stage 2: Implement Minimal Viable Product (MVP)

Once Migration Design and Plan has been created, and to prove out the migration architecture, patterns, and to validate the efficacy of the automations in order to further refine the overall migration timeline, we select a workload and migrate it to cloud as part of an MVP. This includes the migration environment setup, performing the migration (ETL, DDL, Data, etc.) and use the learnings from the MVP to revise the migration roadmap and refine the target state architecture.

**Stage 3: Implement to scale-out use cases and Data Domains –**
Post MVP completion and refactoring any learnings in the migration design and architecture, Stage 3 focuses on executing migration at scale based on priority workloads. This includes various aspects of migration, including history data loads, performing any delta conversion for the period where changes would have occurred in the legacy environment prior to implementing a code-freeze, and subsequently onboarding users and testers to perform validation of the new platform.

**Stage 4: Parallel Run, Hypercare, and Transition –**
As functionally independent workloads or data domains are migrated to cloud, parallel run/dual-ops across current legacy data platform and new cloud-based platform is executed for a defined period (a month or a quarter) to ensure data accuracy and certification of the new platform. This builds end-user confidence in data and ensures smooth onboarding and adoption of the new platform. Upon successful completion of Parallel Run and cutover to AWS, the legacy data platform shall be decommissioned.

### b. Framework and Accelerators

Our Automation led approach leverages automation and programmatic approaches at each stage of migration to minimize the risk of human error and bring consistency in mass migration. Additionally, this enables acceleration of delivery in comparison to purely manual approaches.

| PHASE | JOURNEY MILESTONES | AUTOMATION/ DIGITAL ASSETS |
|---|---|---|
| MIGRATION STRATEGY & PLANNING (PHASE 1) | **Plan and Analyze**<br>• Perform Current State analysis and create data migration plan, address legacy challenges etc.<br>**Infra. Setup & End-to-End Migration Prototype**<br>• Setup cloud environment (Infrastructure & tools)<br>• Conduct an end-to-end prototype of ETL, Data structures and Report migration and define migration patterns<br>**Define Migration Architecture and Design**<br>• Based on End-to-End prototype, finalize target state architecture<br>• Setup and configure migration environments (legacy DDLs conversion and setup databases) | Reverse Engineering for dependency and Lineage of ETL Jobs/Scripts<br>AWS Platform Infrastructure Automation |
| IMPLEMENT MVP & SCALE (PHASE 2) | **Convert ETL, Report Objects**<br>• Refactor ETL jobs using automated code conversion utility<br>• Deploy refactored codebase and repoint existing ETL jobs, reports and apps to new target<br>• Execute automated bulk data loads for initial history data migration<br>**Implement catch-up Data loads**<br>• Complete catch up of ETL, Report and Data enhancements since Production snapshot<br>• Turn on incremental Data load on S3/Redshift using converted ETL | SQL/Stored Proc Converter<br>Ingestion Patterns<br>DDL Conversion |
| PARALLEL RUN AND SUPPORT (PHASE 3) | **Parallel Runs**<br>• Execute parallel runs between legacy Hadoop and new AWS Data platforms<br>• Conduct reconciliation testing and certify migrated Data<br>**Post Go Live Support**<br>• Debug and fix issues after go-live<br>• Knowledge transfer and hand-over | Testing Script Automation<br>Table/File Testing Automation<br>Report/ Dashboard Testing |

*Figure 4.2: Assets and Accelerators across the Migration Journey*

# 5 Forward Looking View on Modernization and How Serverless takes it one step further to accelerate innovation

Several business objectives are key for cloud providers like AWS to continue to invest in serverless technology:

1. Agility that enables enterprise personas to innovate and execute business decisions faster
2. Performance that supports all types and amount of workloads
3. Low costs that are controlled by organization's IT resource usage
4. Integrated security that spans across the enterprise data ecosystem

If we double-click on serverless analytics, AWS has the full portfolio of most serverless options for various types of data analytics workload types in the cloud:

**a.** Amazon Redshift Serverless enables running and scaling analytics without having to manage data warehouse infrastructure

**b.** Amazon EMR Serverless is a serverless option in Amazon EMR to run open-source big data analytics frameworks without configuring, managing, and scaling clusters or servers.

**c.** Amazon MSK Serverless cluster supports any Apache Kafka compatible tools to process data and integrates with Amazon Kinesis On-Demand, which together power streaming and real-time analytics workloads.

**d.** Amazon Athena is an interactive querying and analytics service that enables analyzing data in Amazon S3 using standard SQL.

**e.** AWS Glue is a serverless data integration service to discover, prepare, and combine data for analytics, machine learning, and application development purposes.

**f.** AWS Lake Formation is a serverless service to set up data lakes, establish security management, and governance controls.

**g.** Amazon QuickSight is a cloud-native, serverless, business intelligence service with native ML integrations and usage-based pricing, allowing insights for all users

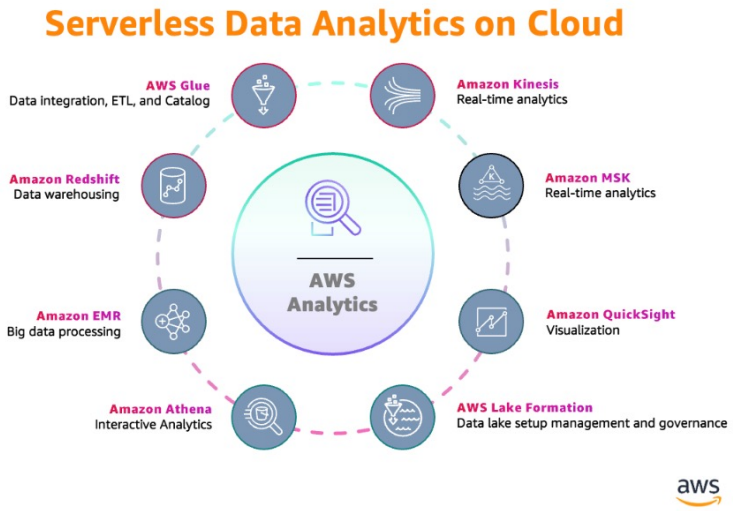



*Figure 5.1: AWS Serverless Analytics portfolio*

Once the organizations establish the architectural foundation with the data lakes and purpose-built analytics services to solve business problems and drive their business-critical operations, it becomes critical to access the data, secure the data, and govern the data with proper security standards and compliance controls through its lifecycle in the data ecosystem.

# 6 Data Modernization Case Studies:

**Migration of Hadoop to Amazon EMR for a large NA Asset Management Company**
Executive Summary: Client is the world's fourth largest asset management firm and had a high on-premise infrastructure spend, with significant share on large cluster nodes and Cloudera software licensing cost. With Deloitte's help, the client was able to successfully migrate to Amazon EMR cluster that contains big data software and tools to increase agility and reduce cost through cloud architecture and new technology adoption

**There were 3 main challenges driving the Modernization use case:**
**Challenge 1:** Decrease the overall hardware and software cost of the data analytics platform with significant spend on large cluster nodes and Cloudera software licensing

**Challenge 2:** Reduce management support overhead of a centralized platform and enable their team with a self-service model

**Challenge 3:** Rigid Architecture and long lead times for executing POCs and new solution build with higher costs

**The Solution:**
Deloitte achieved the migration in stages, based on the following approach –

1. Conducted an initial assessment of all workloads that needed to be migrated and prioritized them in order of business criticality based on our prioritization framework
2. Created a target state reference architecture with AWS native services for migration of different workloads
3. Configured a test Amazon EMR cluster to validate against reference architecture
4. Loaded fully functioning Amazon EMR cluster with test data initially stored in Cloudera
5. Set up the deployment infrastructure
6. Created pipelines for automated nightly data ingestion into the production infrastructure
7. Conducted performance testing and optimization of the environments
8. Completed and validated migration of all workloads from Hadoop to AWS

The overall solution included the AWS native data platform with S3 being the data lake store, EMR as the compute engine, Lambda and Step Function for orchestration. Other AWS services, such as DMS, Kinesis and Lambda was used for building ingestion patterns along with CloudWatch, CloudTrail, GuardDuty, and others for ongoing monitoring and health-check of the overall cloud Data Platform.

**Results and Benefits:**
With Deloitte's help, the client was able to successfully migrate to an Amazon EMR cluster that contains big data software and tools and is functionally equivalent to a Cloudera cluster and realized other benefits through this migration:

1. Built a modern cloud-based Data & Analytics platform on AWS:
2. Enabled real-time client interaction and decision-making through the use of business real-time data and analytics
3. Empowered the business with access to all their data with minimal IT involvement
4. Reduced Infrastructure spend by 60% as compared to on-prem Hadoop
5. Increased agility and reduced cost through cloud architecture and new technology adoption
6. Increased use-case realization time to hours and days as compared to weeks and months earlier

**A Healthcare Data Lake on AWS for a leading Hospital in Canada**

Executive Summary: Client is one of Canada's leading community hospitals, and collaborated with Amazon Web Services to modernize their data ecosystem by building the first AWS healthcare data lake in Canada, along with Deloitte as the implementation partner.

The healthcare data lake was built to centralize sensitive patient and hospital administrative data while retiring the legacy on-premises information systems.

The hospital's vision was to build a modern data ecosystem where the hospital could capitalize on their data to innovate by creating actionable insights toward advancing the population health, patient experience, integrated care and transforming hospital operations, while maintaining accessibility, compliance, and data security.

**The main objectives of this long-term vision towards healthcare innovation were:**

Challenge 1: Build a modern data architecture that is designed to centralize, store, process, secure and use sensitive patient and administrative data to unlock future possibilities to accelerate innovation with greater visibility to enterprise data that would allow optimization of processes, business decisions and creation of new value streams.

Challenge 2: Migrate from legacy hospital information systems to a modern data infrastructure

Challenge 3: Democratize the access and use of information for workforce, patients and other healthcare system personas along with overlaying appropriate governance controls on Cloud as legacy on-premises information system was not presenting reliable accessibility and useability for those personas.

**The Solution:**

Working with the implementation alliance Deloitte, AWS legal and other AWS teams the hospital built a secure healthcare data lake on AWS Cloud. Main milestones included:

1. Migration of terabytes of patient and administrative data, while retiring dozens of legacy applications
2. Implementation with AWS Services to build the hospital's data lake. Key services were:
   - **a.** Amazon Simple Storage Service (Amazon S3) as the foundational element of the data lake offering industry-leading scalability, data availability, security, and performance
   - **b.** Amazon S3 Glacier for archival with most retrieval flexibility and the lowest-cost archive storage
   - **c.** AWS Glue for data cataloging, transformation and integration
   - **d.** AWS Database Migration Service (AWS DMS) for migrating data from legacy commercial databases
3. PHIPA compliance: PHIPA is a privacy legislation in Ontario that applies to the collection, use, and disclosure of personal health information (PHI) in the course of providing or facilitating healthcare services. https://aws.amazon.com/compliance/phipa/

**Results and Benefits:**

Collaborating with Deloitte and AWS, client was able to experience the benefits of the Cloud, starting as early as the migration initiatives, then the modernization of workloads paving the path to a data and insights-driven healthcare enterprise.

1. New data-lake based healthcare platform allowed centralization and housing de siloed legacy data and also new data ingestion from multiple internal and external systems and data sources, which brought enhanced visibility to hospital operations, patient experience and overall health ecosystem data.
2. Migrated terabytes of patient and administrative data securely while minimizing application downtime.
3. With Deloitte's implementation experience, the delivery deadline was met on a tight budget.
4. Maintained legal and ethical obligations with regards to the context of the data that was ingested, stored, transformed and consumed on Cloud.

# 7 Conclusion

Modernizing enterprise's legacy data platform that has been built over the years seems difficult; but if it is done with the right approach and technology platform, the rewards could be enormous.

The abundance of choice for a legacy to cloud-native modernization in today's market make this modernization more complex, but also represents a great opportunity for our clients to maximize the benefits for such migrations. Successfully completing a strategic modernization requires a methodical analysis of the benefits and risk for each workload, with a forensic plan for modernization as described in this paper. It is also critical to choose technology partners that offer both proprietary capabilities as well as a strong embrace of the ecosystem. AWS offers a large and growing catalog of services to meets the modernization goal with broad support for other ecosystem alliance partners. That said, the cloud-native race is far from over, a fact that promises increased innovation from AWS and its competition to meet customer needs.

We suggest the following guidance when embarking on a data modernization journey:

- Perform an inventory and of all existing workloads to determine which level of modernization is appropriate for each (Reduce, Migrate, Modernize)
- Elevate the strategic importance of modernization to the organization, helping to ensure that the appropriate resources, schedule, and executive sponsorship are in place for value realization to business
- Acknowledge that modernization is not just about new technology, but rather a shift in the organization culture that may require upskilling and training
- Choose a cloud provider that supports a wide range of data workloads and data management technologies, and with a forward-looking view to unlock massive present as well as unrealized business potential in the future.

# The strength of the Deloitte/AWS relationship

To help organizations scale for the future, AWS has built a broad range of data management and data analytics capabilities that can help clients deploy scalable, secure, and cost efficient big data solutions. Leveraging AWS's scalable cloud platform, Deloitte is helping organizations across a variety of industries choose the right cloud analytics and big data strategy to maximize the value they can derive from their data.

**Uncovering amplified value together.**

Deloitte and AWS bring a holistic approach to our clients' business transformations. Before we design and orchestrate innovative solutions that leverage AWS technologies, our first step is to understand what our clients are confronting, along with the compliance, governance, data analytics, cyber risk, and regulatory issues that may be pertinent to not only meeting but exceeding customer expectations.

Our AWS-based business solutions, built on top of a scalable analytics platform, provide data-driven insights for our clients' leadership, help reinforce their key decisions on future opportunities, and identify actionable improvement areas to rapidly capture meaningful, measurable value for their businesses. That's why many organizations turn to Deloitte for help defining and executing cloud strategies on AWS.

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