AWS Migration Readiness, Planning and Execution

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December 2019

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Abstract

Organizations are making decisions to move their applications to the cloud at an accelerating pace.

Amazon Web Services (AWS) is the pioneer of public cloud. It remains the leading public cloud provider at this time. AWS provides a secure, scalable cloud computing platform with high availability where you can run your applications.

This white paper is intended for those considering planning a migration of their applications to the AWS cloud. It presents an overview of best practices and methodologies for migration readiness and moving your applications to AWS, based on real-world learnings.

Introduction

The scale of cloud adoption has been considerable to date and it shows no sign of slowing down. There are several cloud providers in the market offering cloud infrastructure and other services. Here we focus purely on Amazon Web Services.

This whitepaper walks through best practices and methodologies for migrating applications. They are presented in order of migrations lifecycle. The bulk of content covers migration readiness, migration planning and migrating-at-scale. Below are the core sections.

- Cloud adoption (common scenarios)
- Migration readiness
- Migration planning
- The well-architected framework
- Migrating-at-scale

Overview

83% of Enterprise Workloads Will Be In The Cloud By 2020[1]

Enterprises are moving their workloads from on-premise equipment to cloud environments. Moving environments, applications and operations to the cloud requires a consistent focus over time, and unique set of migration skills. Whether you are moving out of a data centre and shifting applications in volume, or moving a smaller set of carefully targeted applications, it is critical to plan for success.

Proper Planning Prevents Poor Performance

Common considerations to think about when planning for a successful cloud migration include security, governance and technology platforms. A migration readiness assessment provides a means to consider organizational strengths and challenges on the path that lays ahead. The AWS Cloud Adoption Framework is a standardized framework developed for this purpose. Using a standardized assessment framework provides a means to utilize leading industry knowledge and baseline the complexity of organizational change.

Migration readiness is not simply a review of technical capability. It covers broader organizational considerations as touched on earlier. The Cloud Adoption Framework covers six broad perspectives that provide outputs for planning organization-wide cloud adoption:

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[1] 83% of Enterprise Workloads Will Be In The Cloud By 2020, January 7 2018, Forbes, https://www.forbes.com/sites/louiscolumbus/2018/01/07/83-of-enterprise-workloads-will-be-in-the-cloud-by-2020/#d18df226261a

- Governance
- People
- Business
- Security
- Platforms
- Operations

> *The cloud is a means, not an end. Success in modernizing IT through the cloud is driven by a complete standardization and automation strategy[2]*

With assessment outputs in hand, there are a number of dimensions to consider when planning migration of applications to the cloud. Some of the dimensions in preparing for migration include areas such as:

- Culture
- People
- Skills
- Business drivers
- Costs
- Operating model
- Security
- Compliance

We work through the planning dimensions during migration planning. They come in to play from early high-level planning and into detailed planning, throughout the migration lifecycle.

Stages of Adoption
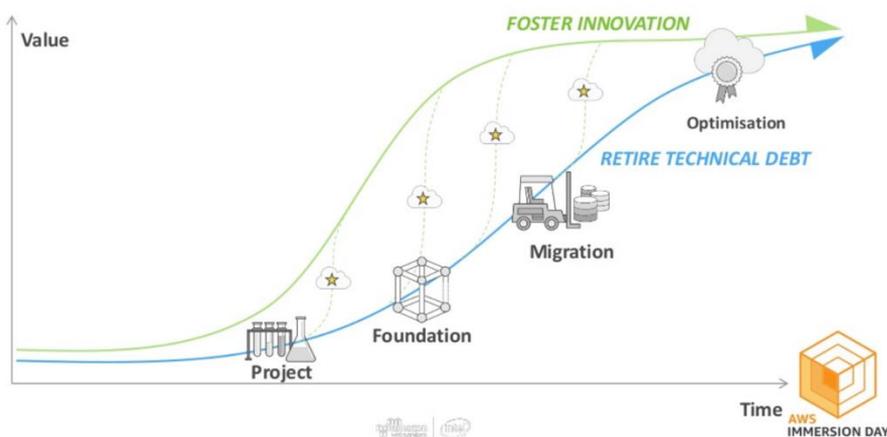
Migrating to the cloud is an iterative piece of work that builds to work at scale. We start to build experience through early projects, setting a foundation and larger migration work. Standardization and automation contribute to a successful outcome.

The AWS Well-Architected Framework provides a standardized approach to managing successful outcomes, with pillars that a focus on operational excellence, security, reliability, performance efficiency and cost optimization.

Many enterprise workloads will soon be in the cloud. Best practices for migrating applications to the cloud involve starting with a migration readiness assessment, planning for migration, building a foundation, standardizing and automating, and iteratively building migration experience. Using the AWS Well-Architected Framework will provide a standard.

Cloud Adoption (Common Scenarios)

There are many reasons to consider migrations of applications into the cloud. Each organization has its own unique considerations to take into account. However, there are common organizational drivers for cloud adoption across the board, such as:

- Organizational agility, e.g. speed to market and ability to pivot effectively during product development

- Productivity improvements, e.g. automation of repetitive tasks to enable focus on higher value organizational activities

- Cost management through efficiency and avoidance, i.e. improving operational costs and avoiding potential future costs, respectively

- Improving technology platform resilience to increase uptime and availability of services

Common scenarios that create a need or focus for migration include:

- Moving out of a data centre – this may be due to the end of a lease, a desire to leverage modern services such as serverless computing, artificial intelligence etc.

- Implementing data-driven decisions – unlocking data from legacy applications; improving organizational agility using near real-time insights from the data

- Business continuity – regulatory oversight or disaster recovery test findings lead to a demand to improve. For example, the resilience of business platforms must be improved, or the actual time to recover from a disaster is not acceptable.

- Upgrading ERP systems – vendor support may have reached end-of-life or the cost of integration with older ERPs may lead to a decision to upgrade the ERP[3]

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[3] 5 signs it's time to upgrade your ERP system, February 2018, CIO.com, https://www.cio.com/article/3254525/5-signs-its-time-to-upgrade-your-erp-system.html

These drivers and scenarios are seen in trends affecting the IT industry as noted in Gartner's Top 10 Trends Impacting Infrastructure and Operations for 2019[4].

Top 10 Trends Impacting Infrastructure & Operations for 2019

| Serverless Computing | Artificial Intelligence | Network Agility | Death of the Data Center | Edge Computing | Digital Diversity Management | New Roles Within I&O | SaaS Denial | Talent Management | Global Infrastructure |

Migration Readiness

Judging readiness for change is a critical step in the Change Life Cycle Framework presented in PMI's (2013) Managing Change in Organizations: A Practice Guide. It is … the second consideration … in the process of moving a strategic priority to a successfully implemented and well-sustained new operational reality[5]

Overview

Running a readiness assessment is the first step in understanding organizational capability with regard to cloud migrations.

The six perspectives of the AWS Cloud Adoption Framework cover organizational and technology capabilities. Each capability has a varying range of stakeholders that span the breadth of an organization.

BUSINESS	PLATFORM
PEOPLE	SECURITY
GOVERNANCE	OPERATIONS

The AWS Cloud Adoption Framework

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[4] Top 10 trends impacting infrastructure and operations, December 2018, Smarter with Gartner, https://www.gartner.com/smarterwithgartner/top-10-trends-impacting-infrastructure-and-operations-for-2019/

[5] Change Readiness: Focusing Change Management Where It Counts, July 2014, PMI White Paper, https://www.pmi.org/learning/library/change-readiness-11126

Organizational Perspectives

The three organizational perspectives are: business, people and governance.

The business perspective considers value realization with regard to cloud adoption. It identifies alignment of IT with business objectives, with a view to ensuring a sound business case and initiatives are prioritized accordingly, amongst other things. This perspective reviews IT Finance, IT Strategy, Benefits Realization and Business Risk Management capabilities.

The people perspective addresses roles and responsibilities in relation to cloud adoption. It looks at the changing nature of organizational structure, staffing skills mix and change management needs to make the cultural transition. The capabilities assessed in this perspective are Resource Management, Incentive Management, Career Management, Training Management and Organizational Change Management.

The governance perspective has a focus on prioritization and control. This perspective is concerned with effectively managing the organizational value and risk of IT investments via the skills and processes required. For example, providing the greatest value to the organization when investing in migrating applications to the cloud, whilst limiting risk to the organization. The capabilities assessed for governance are Portfolio Management, Progam and Project Management, Business Performance Measurement and License Management.

Technology Perspectives

The three technology perspectives are platform, security and operations.

The platform perspective concentrates on applications and infrastructure. Organizations understand their applications and infrastructure using blueprints provided by their IT architects and designers. Architectural frameworks and models are used as lenses to blueprint IT systems for this purpose. The capabilities of the platform perspective focus on a standard means to communicate cloud architectures. They are Compute Provisioning, Network Provisioning, Storage Provisioning, Database Provisioning, Systems and Solution Architecture, and Application Development.

The security perspective is allied with organizational risk and compliance. Security in the cloud is paramount, as it is on-premise. Highly-sensitive organizations can take advantage of leading cloud data centre and network architectures, which are designed to facilitate security objectives including visibility, auditability and control. AWS meets PCI DSS v3.2, NIST and ISO 27001 standards, amongst many others. The capabilities of the security perspective are Identity and Access Management, Detective Control, Infrastructure Security, Data Protection and Incident Response.

The operations perspective is concerned with managing IT workloads to agreed service levels. IT operations support organizational operations departments that are tasked with running day-to-day management of services. The capabilities in the operations perspective are Service Monitoring, Application Performance Monitoring, Resource Inventory Management, Release Management / Change Management, Reporting and Analytics, Business Continuity / Disaster Recovery and IT Service Catalogue.

A migration readiness assessment reviews stakeholder input on these capabilities defined in the AWS Cloud Adoption Framework. The outcomes of an assessment (such as collated answers to questionnaires and interviews, adoption readiness heatmap) provide information to consider when planning the organizational change areas that set up for a successful migration. The assessment process identifies gaps to address and makes recommendations to fill those gaps in preparation for migration to the cloud.

Migration Planning

Overview

With a readiness assessment in hand, and having considered recommendations to address potential organizational gaps (including technical gaps), it is time to plan applications migration.

There are eight best practice dimensions that are considered when planning for success:
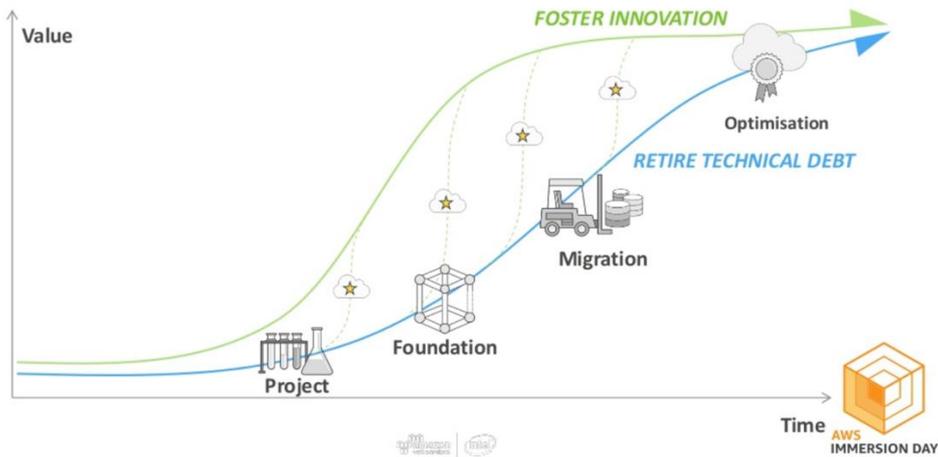
- Applications portfolio
- Business case
- Operating model
- Security, risk and compliance
- Migration experience
- People, skills and culture
- Landing zone
- Migration plan

The planning process is often phased iteratively to first consider a high-level migrations plan, business case, operating model, etc. and then get into detail as required. A high-level business case can provide a total cost of ownership within an order of magnitude that is acceptable to provide seed funding to get into more detail. More detailed migrations plans, business case, operating model etc. can then follow throughout further iterative phases.

Pre-defining an operating model, planning for security, risk and compliance in advance, and preparing a scalable people, skills and culture set up all build organizational capability. Whilst the work involved should not be underestimated, the resulting capability of cloud migration and operational competencies provides a core means to run an organization at internet speed.

Planning in some migration experience helps to prove the promise of a cloud migration and operational competencies, as well as learning experiences for the forming teams and change of culture. A pilot is recommended, for example based on a minimum viable product. This will benchmark performance of workloads moved into the cloud. It will also build skills in migrating and operating in the cloud.

Stages of Adoption

Once the planning stage is completed, an organization is ready to migrate-at-scale and to move towards higher-levels of cloud adoption, such as innovation and optimization (see diagram below).

Application Portfolio

Begin a migration plan by analysing the applications running in your on-premise environment. This involves building an accurate picture of the applications portfolio by cataloguing physical and virtual servers, applications running on them and the current environment. With this catalogue applications can be grouped into categories and patterns.

With a complete data set that reflects the current application portfolio and environment, some analysis can be completed. For example: 70% of databases are MySQL and 30% are Microsoft SQL Server; 80% of servers are running windows; 60% of servers are production servers etc. These insights provide a basis for planning migration.
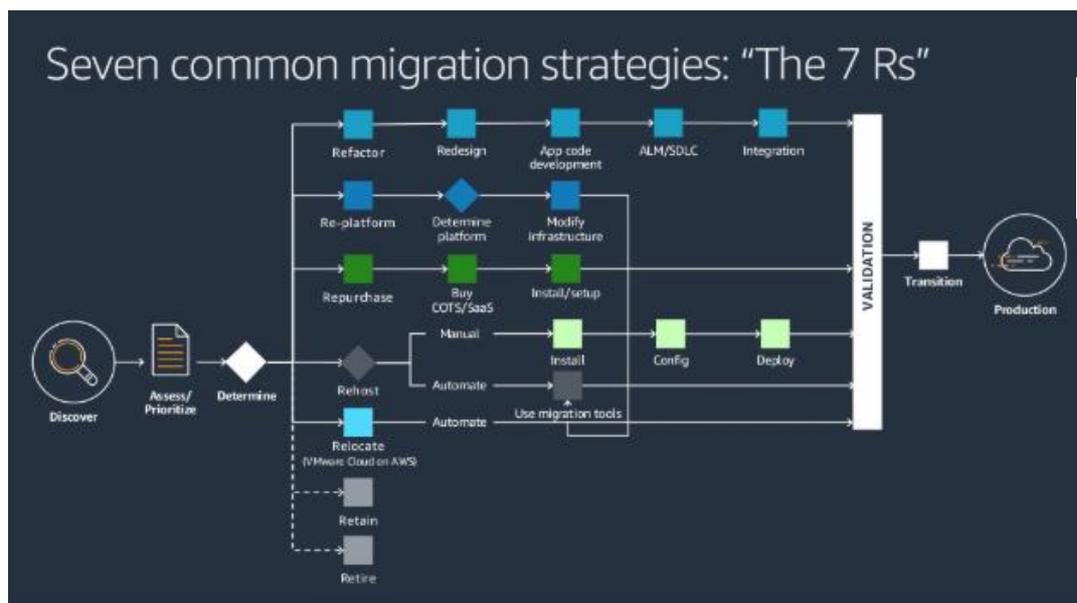
A first pass of deciding how to migrate each application can be started. There are 7 Rs in application migrations that can be applied, as follows (and in no particular order).

- Re-host, or lift-and-shift
- Re-platform, or lift-tinker-and-shift
- Re-factor, or re-architect
- Re-purchase, e.g. moving from perpetual licenses to a software-as-a-service model
- Retire, i.e. remove the application from active service
- Retain, i.e. leave as-is, where it is
- Relocate, similar to lift-and-shift this moves applications virtualized on vSphere

Case Study

An example of re-factoring an application is the Australian Organ Matching System project (AOMS). Datacom was selected to replace and modify the existing National Organ Management Service (NOMS). The new AOMS solution was specifically designed to not only replicate the existing business functionality, but also to significantly remodel the underlying architecture of the solution to be adaptable, flexible and extensible.

Built on AWS (Amazon Web Services) cloud-based platform, Datacom developed, migrated (rewrite) and supported the AOMS application and AWS platform. AOMS integrates multiple 3rd party Independent Software Vendor (ISV) providers with AWS (Octopus, Trend Micro, Sumo Logic, CPM, SonarQube, Dynatrace), for the matching of patients with donors. Medical practitioners interact with the system via a custom UI running in IIS.

Business Case

A sound business case presents a compelling reason to make an investment, with clearly identified benefits, and a cost analysis. With a firm grasp of the applications portfolio, based on organizational evidence (such as data from application portfolio discovery tools), a run cost analysis can be conducted.

Example TCO of Migration to Cloud IaaS Over Three Years
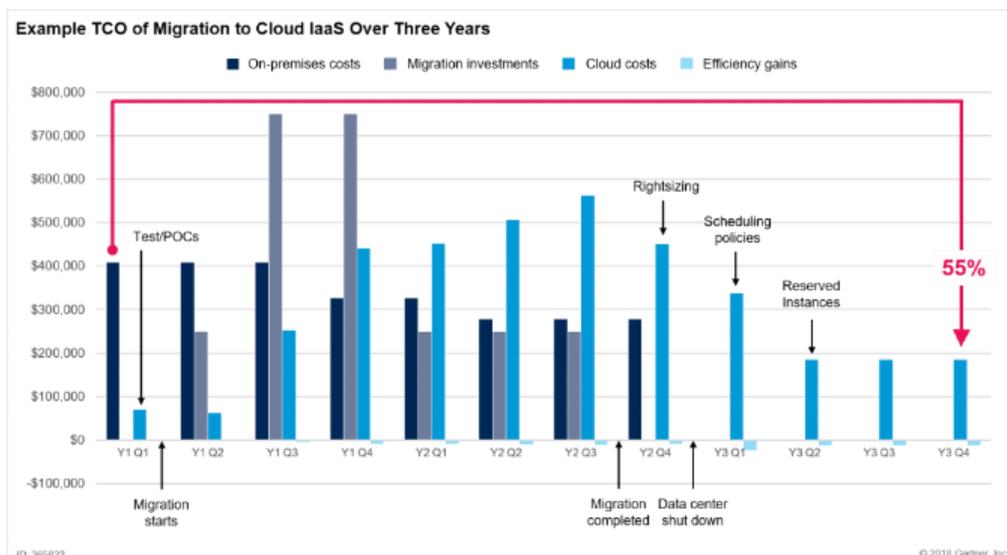
The example diagram above from Gartner Blog Network[6] shows a breakdown of the total cost of ownership of a move to cloud infrastructure over a three year period. This is a powerful visualization that all organizations can use to present projected on-premise costs, migration investments, cloud costs and efficiency gains of a business case to migrate applications to the cloud.

There is of course a cost to adopting cloud infrastructure. The migration investments category as shown in the bar chart represent these costs. How are the costs attributed? Common items in the cost of change include: migration planning / consulting costs; cost of running environments in parallel (until full cutover to cloud infrastructure); cost of changes to applications, licensing, migration tooling etc; and, change management (such as changes to establish a cloud centre of excellence, governance, etc).

On the other hand, there must be some benefit to adopting cloud infrastructure. What is the return on the investment? What value does the organization realise during or after migrating applications and adopting the cloud? There are workforce productivity and efficiency gains such as reductions in provisioning, racking, patching of infrastructure, and improvements to productivity through automation. As organizational skills developer there is also the promise of faster time to market, capability to scale services, improved resilience for disaster recovery, and cost avoidance such as no need to refresh servers on a capital expense basis.

Case Study

An example of the benefits of migrating applications to AWS is the Flood Zoom case study. During a review of the existing environment Datacom helped the Australian Victorian Government Department of Environment, Land, Water and Planning (DELWP) identify a net saving of between $490,000 and $572,000, over three years. This resulted in a business case to migrate the Flood Zoom applications to AWS, with the added benefits of improved uptime and resilience.

The business case is defined at a high-level and refined in further levels of detail, in iterative phases of migration planning.

Operating Model

Defining and planning an operating model to support and maintain cloud infrastructure migrated applications is a fundamental pillar in successfully moving to the cloud. This is closely linked with the people, skills and culture changes that will be needed to operate effectively and successfully realise organizational benefits as touched on above.

A cloud operating model requires a cloud services organization that will centralise and share the expertise essential to realizing organizational value of cloud adoption. Core functions for cloud services are a cloud business office and a cloud engineering and operations team. It is important to understand that there will be different modes of operation to support, because applications, products and services will be used differently across the organization. The core

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[6] Is Public Cloud Cheaper Than Running Your Own Data Center, November 2018, Gartner Blog Network, https://blogs.gartner.com/marco-meinardi/2018/11/30/public-cloud-cheaper-than-running-your-data-center/

functions must be able to support these use cases to attain benefits such as business agility and productivity improvements.

Managed services are a means that can be used to optimize cloud adoption and reduce the organizational time needed to solve common operational problems in early stages of the adoption lifecycle.

Case Study

Relating to a real-world example again, in the case of Flood Zoom (see above case study on business case), to facilitate the transition to a cloud operating model DELWP adopted Datacom Managed Services for Flood Zoom.

Datacom provide a Resource Unit (RU) catalogue for managing AWS infrastructure, along with enabling services including:

- Automated deployment and build from images (infrastructure-as-a-service)
- Network setup and security based on high security reference architecture from vendors
- Configuration management to defined hardening standards

These services enable DELWP teams to focus on managing their applications, whilst Datacom operate and optimise the AWS cloud infrastructure.

Security, Risk and Compliance

Managing security, risk and compliance of cloud infrastructure and services is well-documented. The levels of compliance provided by AWS are second to none of the leading cloud providers. Common frameworks used by organizations include ISO27001, NIST, PCI DSS, SOC1 and FIPS 140-2 and these frameworks are covered along with many others[7].

Fives core themes from the AWS Cloud Adoption Framework provide a foundation for securing AWS cloud infrastructure and managing risk. These security themes are applied using the concept of a virtual data centre. The five core themes are: identity and access management, logging and monitoring, infrastructure security, data protection and incident response.

There is an addition set of themes that extend the core set to provide a mature set of organizational security capabilities. The additional themes are: resilience, compliance validation, secure continuous integration / continuous deployment, configuration and vulnerability analysis, and security big data analytics.

Specialist cybersecurity expertise is required to understand and model the right environment for security, risk and compliance in the virtual data centre and integrate this into the organization.

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[7] https://aws.amazon.com/compliance/programs/

Migration Pilot / Experience

Through the planning states of a migration, demonstrating the abilities of new organizational capabilities (such as cloud security, engineering and operations, etc) will build confidence in the changes taking place. The teams involved will gain valuable experience and expertise that can be codified and shared. Using this knowledge is a foundation to work successfully at scale.

Based on common application patterns as evidenced in the applications portfolio, it is possible to trial a migration of common application pattern. For example, re-hosting a LAMP stack application using CloudEndure. Another option is to re-platform an application, by replacing a database component, such as MySQL from a LAMP stack, to use Amazon RDS.

Choosing the right applications to pilot in the experience building exercise is important to ensure the teams build confidence ins successful migrations. The first migrations should be based on common patterns in the applications portfolio.

Case Study

Datacom were engaged by OZ Minerals to supply a hosting service for SAP / HANA solution. Datacom recommended to host and manage the new SAP / HANA solution within AWS Sydney region. The key deliverable from this project was the new AWS environment that comprises the Enterprise VPC, infrastructure resources for the new SAP / HANA landscape and the relevant lifecycle management tools to provide 24 x 7 support for this environment. These included:

- Multi-account, AWS VPC and AZ architecture for HA, DR and high level of resiliency
- AWS network and security design based on AWS PCI-DSS reference architecture
- Security and compliance capabilities presented through mix of native and 3rd party technologies
- On-premise system integration through Telstra Cloud Gateway services
- Automated SAP HANA build and deployment services
- Integrated service management

As a result of this project, OZ Minerals are now able to run non-disruptive disaster recovery tests, i.e. alongside their production environment, within their stated recovery objectives.

A learning from this migration experience was that licensing limitations did not allow for multi-AZ design, causing a variation to the project.

People, Skills and Culture

Establish a dedicated cloud services organization to drive cloud adoption, the migration of applications and to build the requisite skills and expertise to be successful. This organization will support the cloud operating model, as covered earlier in this paper. It will establish operational processes, standardization, automation and governance.

Functional Organization of a Cloud Centre of Excellence (CCoE)[8]

Start with a small, informal team of people with a common interest and some experience in experimenting with cloud implementations. Let it build over time to a more structured approach that supports codification of best practices, methods and governance. Using experience, case studies and the developing body of knowledge, widely communicate the organizational benefits and value of cloud adoption. Form smaller teams, guided by the core cloud services organization, that will build specialisms in the common application patterns for migration. Integrate feedback from the specialist teams into the cloud services organization as a whole.

Some guiding principles for the cloud services organization are to: ensure diverse, cross-functional representation; drive enablement, not command and control; use intentional and targeted organizational change management to change company culture and norms; build company culture into everything you do.

The cloud services organization will evolve over time from a small, informal group to a broader, more formal group of like-minded experts. The teams will build and share expertise across the group, creating a body of knowledge on how to migrate to and operate in the cloud efficiently and effectively.

Landing Zone

The landing zone is the realisation of the public / hybrid cloud platform, designed during the planning phase using the Platform perspective of the Cloud Adoption Framework. This perspective looks into compute, network, storage, database, solution architecture and application development capabilities to design an environment to meet the specific needs of the organization.

The landing zone is an initial structure with pre-defined configurations for AWS accounts, networks, identity and billing frameworks, and optional customer-selectable packages. It forms the foundation for the migration of applications and will expand over time as new services are provisioned to meet organizational needs.

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[8] AWS Migration Whitepaper, March 2018, AWS Whitepapers & Guides, https://d1.awsstatic.com/whitepapers/Migration/aws-migration-whitepaper.pdf

The account structure provides a multi-account structure with a pre-configured security baseline that aligns to the cloud operating model. The security baseline includes logs for security and auditing purposes.

The network structure implements connectivity between AWS and on-premise networks and provides the foundational network configuration that supports network isolation and segmentation requirements.

The identity and billing frameworks provide federated user identity and access management and centralized cost management and reporting.

The customer-selectable packages provide a set of selectable packages to integrate AWS-related logs into popular reporting tools, integrate with the AWS Service Catalog, and automate infrastructure.

Case Study

DELWP Near Real-Time Data (NRTD) is a case where Datacom were engaged to provide migration services, including an AWS Landing Zone for applications migration. NRTD provides near real-time data flows for monitoring water flows in the Victorian state. Datacom provided a flexible, secure and compliant cloud environment based on our managed services for the migration.

Migration Plan

Bringing everything together is the migration plan, which forms the spearhead for driving the migration and delivering the organizational benefits in the business case. This includes managing scope, schedule, resource plan, issues and risks, coordination and communication to stakeholders. It is recommended that agile delivery practices are utilised, amongst other things standard best practices for projects.

The technical planning required is another stream of work in migration planning and requires expertise in the enterprise solutions architecture capability of the cloud services organization. Architectural diagrams of applications to be migrated will be required to hep inform decisions for transition architectures during application migrations. The amount of work should not be underestimated as the scale of the project will be apparent in the technical details. An iterative process is a commonly adopted approach to help manage the scale.

Case Study

Working with OZ Minerals to implement SAP / HANA, Datacom provided a Project Manager and Cloud Architect to work in conjunction with OZ Minerals stakeholders and internal Datacom teams to commission the new environment.

The Cloud Architect was responsible to lead the engagement from both the technical delivery and quality assurance perspectives.

The Project Manager was responsible to:

- Develop and maintain the Project Management Plan, Work Breakdown Structure, agreed timelines and deliverables
- Ensure the engagement scope was managed from business and technical perspectives
- Work with OZ Minerals assigned PM to coordinate 3rd party provider activity / tasks essential to project success and outcome within allocated scope of effort

This involved working through all project phases for migration, including kick-off, planning, project setup, design, implementation, QA and testing, handover and go-live, and project close.

The AWS Well-Architected Framework

Overview

When planning migration to the cloud, how can you ensure a consistent approach to technical planning and design throughout the volume of work? This is where a cloud architecture framework comes into play. Founded on core organizational capabilities, it will ask how these are addressed with a view on common design principles and best practices.

The Well-Architected Framework has been developed by AWS based on lessons learned from observing customers deploying systems into live environments, how well these systems perform, and the consequences of architectural trade-offs. AWS provide expert assistance to these customers in architecting the systems to take advantage of best practices in the cloud, prior to deployment.

Based on the expert assistance in architecting systems for the cloud and the learnings in operational environments, the Well-Architected Framework is distillation of many real-world use cases. It lays down a consistent approach for AWS customers and partners to evaluate architectures and implement designs that will scale over time. It helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for their applications.

Design Principles

The well-architected framework identifies a set of general design principles to facilitate good design in the cloud:

- Stop guessing your capacity needs
- Test systems at production scale
- Automate to make architectural experimentation easier
- Allow for evolutionary architectures
- Drive architectures using data
- Improve through game days

These design principles are described in further detail in the AWS Well-Architected Framework whitepaper. (The paper also provides information on the approach AWS takes to distribute architectural decision-making into delivery teams. This is a valuable take-away on

how a demonstrably successful company running at scale enables teams to work at speed with a consistently high level of quality).

Pillars

There are five pillars of the well-architected framework: operational excellence, security, reliability, performance efficiency and cost optimization. Each of the pillars has a whitepaper of its own that covers it in detail. Below is a summary of each pillar.

Operational Excellence

Operational excellence considers the ability to run and monitor systems to deliver business value and to continually improve supporting processes and procedures. The design principles of the operational excellence pillar are: perform operations as code; annotate documentation; make frequent, small, reversible changes; refine operations procedures frequently; anticipate failure; and, learn from all operational failures. There are three best practice areas for operational excellence in the cloud: prepare; operate; and, evolve.

Security

Security takes into account the ability to protect information systems, and assets while delivering business value through risk assessments and mitigation strategies. The design principles of the security pillar are: implement a strong identity foundation; enable traceability; apply security at all layers; automate security best practices; protect data in transit and at rest; keep people away from data; and, prepare for security events. There are five best practice areas for security in the cloud: identity and access management; detective controls; infrastructure protection; data protection; and, incident response.

Reliability

Reliability includes the ability of a system to recover from infrastructure or service disruptions, dynamically acquire computing resources to meet demand, and mitigate disruptions such as misconfigurations or transient network issues. The design principles of the reliability pillar are: test recovery procedures; automatically recover from failure; scale horizontally to increase aggregate system availability; stop guessing capacity; and, manage change in automation. There are three best practice areas for reliability in the cloud: foundations; change management; and, failure management.

Performance Efficiency

Performance efficiency considers the ability to use computing resources efficiently to meet system requirements, and to maintain that efficiency as demand changes and technologies evolve. The design principles of the performance efficiency pillar are: democratize advanced technologies; go global in minutes; use serverless architectures; experiment more often; and, mechanical sympathy. There are four best practice areas for performance efficiency in the cloud: selection, review, monitoring and trade-offs.

Cost Optimization

Cost optimization includes the ability to run systems to deliver business value at the lowest price point. The design principles of the cost optimization pillar are: adopt a consumption model; measure overall efficiency; stop sending money on data centre operations; analyse and attribute expenditure; and, use managed and application level services to reduce cost of ownership. There are four best practices for cost optimization in the cloud: expenditure awareness, cost-effective resources; matching supply and demand; and, optimizing over time.

Summary

Using the AWS Well-Architected Framework provides a basis for consistent evaluation of architectural designs for the cloud, based on best practice developed through real-world use cases. Use a framework such as this to ensure a migration standardized on common design principles and best practices is planned for and takes place.

Migration At Scale

Codifying Experience

With some early success at migrations during the planning phase, the cloud services organization has built some experience and now it is time to scale. The core teams expand to form migration sprint teams that operate in parallel. This is useful for re-host and re-platforming patterns that can use automation and tooling to accelerate application migration.

The teams will work through the same six step process for each application they migrate: discover, design, build, integrate, validate and cutover. Some patterns are more automatable than others, such as re-hosting, which has a number of methods and tools available.

Discovery

The discovery step analyses current and future architectures, fills gaps in information as needed to support decision making (such as operation runbooks, connectivity, data flow) and a migration plan for the application is agreed with the sprint team and the application owner.

Design

The design step develops and documents the target state, including AWS architecture, application architecture, and supporting operational components and processes. A member of the sprint team and the engineering team design the application for the targeted AWS environment, using information from the discovery step. Infrastructure architecture is considered here to provide an outline of what services to use.

Build

The build step is where the migration team joins with required people, tools and reusable templates to execute the migration plan. The team will use pre-defined methods and tools to follow standard migration patterns, where possible.

Integrate

The integrate step is where the migration team works with external service providers and consumers of the application to make external connections or service calls to the application. The team then run the application to demonstrate functionality and operation before the application is ready for validation.

Validate

The validate step is where the application is tested to validate is has been successfully migrated and is ready for cutover. Tests may include verification, functional, performance, disaster recovery, etc. The migration teams will evaluate release management, verify rollout and rollback plans and evaluate performance baselines. Business acceptance is prepared for cutover.

Cutover

The cutover step is the ultimate step where the cutover plan previously agreed with application owner is executed. A user acceptance test here supports a successful cutover.

Core Cloud Services Teams

Whilst migration teams may form and disassemble to support the overall migration effort, core services teams will form the backbone throughout. They are a part of the new IT operating model and will have their own areas of expertise.

The core cloud teams work across the migration teams, acting as a central hub for managing projects, sharing lessons learned, coordinating resources and building common solutions.

Cloud Business Office

This team are the PMO of the cloud services organization. They manage resources and budgets, risk, communication, change management etc.

Cloud Engineering & Operations

The cloud engineering & operations team build and validate the fundamental components that ensure development, test and production environments are scalable, automated, maintained and monitored. This team also prepares landing zones as needed for migrations.

Research and Innovation

This team develops repeatable solutions that will expedite migrations in coordination with the engineering and migration teams. They work on larger or more complex technical issues for the migration teams.

Portfolio Discovery & Planning

The portfolio discovery & planning team accelerates activities through refining the application portfolio, running discovery processes and optimizing application backlogs. They work to eliminate objections and minimize wasted effort.

Summary

These core teams build a centre of excellence that will spread knowledge and expertise throughout the migration teams, whilst managing resources, communications and suchlike to coordinate the overall migration effort.

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Further Reading

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