### FOGHORN WHITEPAPER SERIES

A Resource Guide For Navigating The Cloud



# ARM Strategy for Optimized AWS Migration

Framework to Maximize Value and Minimize Costs Before, During and After Migrating to the Cloud



Premier Consulting Partner

DevOps Competency Security Competency Solution Provider

foghornconsulting.com

# Framework to Maximize Value and Minimize Costs Before, During and After Migrating to the Cloud

## INTRODUCTION

With a depth and breadth of tools and offerings, migrating applications, workloads and storage to Amazon Web Services (AWS) has never been easier. With the correct know-how and planning migrating to AWS need not be a stressful experience. For many organizations migration is a transcendent opportunity to take stock of existing successes and areas for improvement, evolve current technology best practices forward, and push development further, faster while harnessing the power and potential of AWS's ecosystem.

Over the past ten years Foghorn Consulting has filled the gaps of knowledge and experience within the internal teams, from future forward start-ups to the Fortune 500. Foghorn's seasoned full-stack AWS professionals have over 100 certifications. They are a Premier Partner of AWS, with DevOps Competency and Security Competency. Foghorn has achieved a level of distinction with AWS by assisting enterprise with all aspects of cloud optimization.

By migrating applications to AWS utilizing a holistic approach, Foghorn advocates for the client's best interest. They bring counsel into greater focus through a deeper understanding of existing infrastructure investments, operational costs, workforce productivity, cost avoidance, operational resilience, and business agility. In this whitepaper we will discuss their approach to migrating workloads to AWS.

Rehosting, refactoring, rearchitecting, rebuilding and replacing are all valuable categories to further the migration conversation. The 5 Rs have become the defacto analytical framework to assist in deciding if and how applications should be migrated to the cloud. But before the 5 Rs it is valuable for an organization to put into practice the 3 As - Analyze, Augment, Align. After the 5 Rs it is also imperative for teams to do the actual migration using best-in-class AWS tools and practice the 3 Ms- Migrate, Monitor, Motivate.

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Each organization's migration to AWS warrants a custom approach to minimize costs and disruption to existing operations, and maximize uptime and the transformative capabilities of the cloud. Knowledge is power, and Foghorn's Helping A-R-M strategy inspires a deeper understanding of business drivers, legacy investments and gives greater context to decisions to rehost, refactor, architect, rebuild or replace applications.

This Whitepaper will explore approaches to migrations before, during and after migrating to AWS. Using the 5 Rs as the filter through which all applications will flow, we will also share best practices before migration (3 As) and best practices during and post migration (3 Ms).



### **CLOUD STAGES OF ADOPTION**

Courtesy of AWS

# BEFORE MIGRATION **>** ANALYZE, AUGMENT, ALIGN

Migration exercises are an amazing opportunity to gain a bird's eye view of application and infrastructure architecture to better understand what is going well and what could use improvement. A phased approach to migrating applications prioritizes business functionality. Future phases of migration can then identify low hanging application migration fruit, that can realize the cost savings and elasticity that AWS can provide and increase performance, productivity, or security.

The questions asked in this phase help design a more comprehensive AWS migration strategy.

- > Which apps can benefit from AWS the most?
- > Can existing resource management and configuration tools be utilized?
- > What legacy hardware investments can still be utilized?
- > Can we get contracts for hardware, software, and network off our balance sheet?
- > Do we have all of the engineers in house to accomplish our goals?

# ANALYZE

Understanding your organization, business drivers and application portfolio is an important step for building a business case to move to AWS. To gain organizational wide enthusiasm for moving to AWS, IT teams must show how this move will increase performance and efficiency and reduce costs. Data showing operational improvements and cost savings are great tools to break down misconceptions about migrating to the cloud and increase momentum for cloud adoption.

**Operational Costs** – Operational costs are the costs of running your infrastructure. Cost analysis of current data center investments include staff, licenses, rents, hardware and software licensing. By migrating to the cloud clients only pay for the infrastructure they use. This makes it easier to fore-cast costs accurately and perfectly match supply and demand. Understanding cost and building

transparency into the IT operating model is essential for a smooth transition to AWS.

**Workforce Productivity** – How efficiently can your organization get your services to market? Another driver to migrate to AWS is the depth and breadth of tools that DevSecOps teams can utilize to quickly provision AWS services. Many organizations appreciate that their team can increase productivity by focusing on initiatives that make their business different; rather than spending resources on initiatives that don't, like managing data centers. AWS's team of thousands of engineers have built tools and services that eliminate the need to build and maintain these independently. Following a large migration, workforce productivity has seen increases of 30-50%.

**Operational Resilience** – The AWS Cloud spans more than 69 Availability Zones within 22 geographic Regions around the world. With economies of scale organizations migrating to AWS realize increased operational resilience and reduce their organization's risk profile and the cost of risk mitigation. Applications can be deployed in multiple regions around the world, which improves your uptime and reduces your risk-related costs. After migrating to AWS, Foghorn customers have

seen improvements in application performance and security.

**Business Agility** – DevSecOps, containers, and market leading AWS infrastructure increases security, business agility and enhances competitiveness by helping organizations quickly respond to and define evolving market conditions. Migrating to the AWS Cloud helps increases operational agility by enabling easy expansion to new markets. By adopting a DevOps models, automating previously error prone manual tasks, utilizing monitoring, and auto-recovery tools enterprise can greatly benefit from the high-availability capabilities of AWS.

### OUT OF THE FOG STATS

By migrating, deploying and delivering workloads on AWS enterprises realized:

**51%** LOWER 5 YEAR COST OF OPERATIONS

**62%** MORE EFFICIENT IT INFRASTRUCTURE STAFF

**90%** LESS STAFF TIME TO DEPLOY NEW STORAGE

# **AUGMENT**

A trusted partner can help fill in internal gaps of knowledge and provide sage counsel as they sit on the same side of the table of clients when designing and deploying applications that will thrive on AWS. AWS Premier Partners like Foghorn have proven a fluency with the platform, shown evolving literacy by continuing to earn the latest certifications and have documented numerous successful outcomes on the platform.

Many organizations have benefited from an internal team, that owns the cloud migration project. Organized around a set of operational procedures called a Cloud Center of Excellence (CCoE) this team can help prevent organization-

### GUIDING PRINCIPLES FOR SUCCESSFUL CLOUD CENTER OF EXCELLENCE



al confusion and deliver business transformations over the course of the migration effort. A CCoE provices best practices, governance standards, automation and inspire a cultural shift to innovation and a change-is-normal mindset.

United by a shared interest in cloud technology these teams often begin as small informal groups who like to experiment with the innovation that AWS enables. These groups evolve and are instrumental in spreading their enthusiasm for AWS within the greater organization. These teams develop migration waves that prioritize and organize application groupings. Through hands on experience confidence is enhanced In the early stages of cloud adoption, lessons are learned and documented and efficiency improved.

# ALIGN

Developing a critical mass of people who share the desire to evolve on AWS and building a culture of innovation and over-communication insures a strong use of AWS and smoother transition. Foghorn advocates for and delivers workshops based upon the AWS Cloud Adoption Framework (AWS CAF). The CAF provides guidance and best practices provided to help build a comprehensive approach to cloud computing across your organization.

Any blueprint for migration success, aligns teams sharing a vision of efficiency, security and innovation. Alignment means that all decisions must be clearly documented and signed off on by all teams across the organization. Even third parties that have access to your systems must be kept in the loop.

To measure the success of a migration project, prove performance, and validate security and cost metrics, it is essential to have a baseline. The goal of the migration is first to minimize disruption to existing business. Baseline analysis enables the establishment of and celebration of benchmarks, as enterprises plants new flags in the cloudscape.

Teams who are empowered to move quickly and independently achieve the best results, and are more likely to deliver quick wins during AWS migration. By employing project management best practices with clear budgets and timelines teams will deliver business outcomes that enable next level migration. Migration patterns will emerge and re-usable blueprints will increase the velocity of the workloads being migrated. By sharing blueprints with the larger organization parallel teams can focus on speed and efficiency without having to reinvent the wheel and make decisions that have already been vetted.



Migration is an opportunity of renewal. While moving complex interwoven applications that are currently in production seems daunting, when it comes down to it there are typically only five options for the application's future.



## REHOSTING **(**)

If the application allows the "lift and shift" approach is typically the cleanest approach to migrate to AWS. Legacy applications can then be optimised once running on AWS. Low hanging migration fruit can show cost savings and build confidence within the greater organization. CRM, Ecommerce, and collaboration tools like IM, web conferencing, file sharing, project management and email application typically allow for straightforward rehosting.

# REPLATFORMING



Ideal for automation, cost savings and getting off expensive software licenses, AWS has built tools to make moving workloads to AWS easy. For example, AWS Database Migration Service helps you migrate databases to Amazon Aurora quickly and securely. During migration the original database remains fully operational to minimize downtime. With AWS Database Migration Service, you can continuously replicate your data with high availability, while consolidating databases into a petabyte-scale data warehouse.



# REPURCHASING 🛠

Migration analysis may identify an opportunity to move to SaaS or change from one SaaS to another. Internal CRM or HR Systems can benefit from cloud ready SaaS, such as Salesforce.com, HubSpot, or HR system Workday.

# REFACTORING / RE-ARCHITECTING 🗘

Perhaps a monolithic application can be modernized to boost agility and improve business continuity. Cloud native features are attractive when the competition is already there. With added features, the increased ability to scale and performance enhancements this can be a good investment. For example companies can realize huge cost and performance efficiencies by migrating from shared file systems to AWS's cloud native Simple Storage Service (S3). Although refactoring or reachrictecting an application has more upfront costs, by realizing greater market conditions it can be the most effective and can dramatically lower ongoing operating costs.



If it's not broke, don't fix it. Could be a low priority application, maybe it has been recently upgraded or perhaps is still realizing some depreciation, it may be most beneficial to do nothing with an application and leave it as is. Organizations should only migrate application that create a strategic advantage and makes sense for the business. The cloud is not going anywhere, and you can always revisit in the future as needed.

# MIGRATION & BEYOND: MIGRATE, MONITOR, MOTIVATE

With blueprint created and AWS migration strategy solidified migration to AWS can begin. Tools to migrate the actual bits and bytes, the mission critical elements of your organization are important to understand. And a post migration plan to monitor your new infrastructure, and motivate teams to excel by building upon phase 1 migration success on AWS in the future is imperative.



#### Example of migration bridge from client's data center to AWS

### MIGRATION

Depending on the type of date, network speeds and the amount of data needing to migrate teams will need to consider the best tools to utilize for migration. Foghorn and AWS both have solid strategies in place, backed by proven methodologies. The following tools will help you move data through roads, networks, and technology partners.

### Amazon Managed Cloud Data Migration tools. AWS has built a depth a breadth of migration tools for one time migrations and ongoing transfers of data for hybrid environments.



#### AWS Direct Connect

Customers can establish a dedicated network connection between their network and one of the AWS Direct Connect locations. Using industry standard 802.1q VLANs, this dedicated connection can be partitioned into multiple virtual interfaces. Network separation between public and private environments can be maintained and virtual interfaces can be reconfigured at any time to meet changing needs.



#### **AWS Kinesis Firehose**

Amazon Kinesis Data Firehose can capture and automatically load streaming data into Amazon S3 and Amazon Redshift. The speed allows for near real-time analytics and the use of existing business intelligence tools and dashboards. This fully managed service automatically scales to match the throughput of your data and requires no ongoing administration. By batching, compressing, and encrypting the data before loading it security is enhanced and the minimum amount of storage is procured at the destination.



#### AWS Snowball

For petabyte-scale data transfers, a secure appliance transfers large amounts of data into and out of AWS. Using Snowball addresses common challenges with large-scale data transfers including limited network bandwidth, long transfer times, and security concerns.



#### AWS Snowmobile

In the interest of speed and to avoid network costs for exabyte-scale migrations snowmobile will deploy a 40 foot secure container to a clients on premise data center. These custom engagements address the concerns of large-scale data transfers and can be done as little as one-fifth the cost of high speed internet.

### MONITOR

From costs to performance, a monitoring strategy ensures that everything in your data center and/ or AWS environment are optimized. Data-driven insights empower organizations to make smart business decisions when considering tradeoffs between performance and cost.

AWS can integrate with your existing monitoring tools and dashboards. There are also many cloud native solutions that provide granular application level insights and control over your new AWS environment. New Relic, APPDYNAMICS, AWS CloudWatch all are excellent tools.

Select consulting partners, like Foghorn that have the ability to carry out a Well Architected review on your infrastructure to make sure it is highly secure, optimized for performance and cost and future forward. Their methodology guides organizations through the 5 pillars of performance- operational excellence, security, reliability, performance efficiency, and cost optimization.

### MOTIVATE

When initially migrating to AWS many enterprise IT teams are heavily weighted in traditional enterprise skill sets such as compute, networking and storage. With approximately 3/3 of AWS being "up the stack", roles will need to evolve. Trainings and AWS certifications are great investments and pays dividends for enterprises looking to win the market with new innovations.

Cloud Center of Excellence (CCoE) Teams may also feel inundated with requests from applications teams to do more and more to take advantage of AWS deep set of tools and services. Without an Agile methodology in place and operations and security aligned, a backlog of projects can easily begin. Traditional waterfall planning and ticketing systems are moving the way of the mainframe, and a more decentralized approach can produce exciting results.

Empowering teams to experiment in a sandbox environment (where teams can play with any AWS service) encourages exploration and experimentation. By leveraging Infrastructure as Code (IaC), sandbox environments can be turned off at any point to ensure there are no run-away costs. For many clients, Foghorn advocates for an automated 5pm on Friday shut down of all sandbox environments. If a sandbox project is successful, the application team can work with the CCoE to share their learnings and push project into production. Once a team starts a pilot, they own the project through production.



An experienced cloud consultant with the AWS DevOps Competency and AWS Security Competency can provide valuable assistance for companies who have chosen to pursue a DevSecOps methodology. By working with a seasoned Agile shop, IT teams can empower greater cooperation between development, security and operations teams and quickly integrate DevSecOps into the DNA of their cloud and organization. Foghorn's FogOps Team helps bridge the knowledge gaps until internal teams can get up to speed. It does not take long for mindsets and organizations to migrate to this innovation enhancing new paradigm. Even after just a few sprints, IT teams notice that the flow of work enhanced, team satisfaction increases, and customers are delighted with new and improved products and services.

### **MIGRATING TO THE FUTURE**

With the power of AWS and it's global reach and elasticity, IT teams are at an exciting crossroads. It's tempting to think of a migration like planning a new community from a green field, and create 100% cloud native applications. With legacy applications and infrastructure investments this may not be the

wisest approach. Patience, a measured migration and working with a certified AWS cloud consultant can be the most prudent way to migrate applications as your teams work together to analyze, augment, align, to rehost, refactor, rearchitect, rebuild, replace, to migrate, monitor and motivate.



### FOGHORN DELIVERS BUSINESS TRANSFORMATIONS ON AWS

Whether you are new to AWS or have an existing AWS environment you are looking to optimize, Foghorn can help. For over 10 years we have delivered outstanding results for clients on AWS. From DevOps in the Cloud to Security in theCloud, Foghorn has the talent, experience and credentials to deliver a velocityof innovation designed to increase performance while optimizing costs.



DevOps Competency Security Competency Solution Provider

### AWS DEVOPS COMPETENCY

When the silos are knocked down and development and operations can collaborate in a cycle of continuous improvement and continuous development in the cloud amazing things happen. Foghorn has been at the forefront of the DevOps revolution and are proud to have earned AWS DevOps Competency. When DevOps meets Foghorn, you have FogOps® and the promise of the cloud- Delivered.

### AWS SECURITY COMPETENCY

Foghorn knows cloud security and DevSecOps in the cloud. In 2017 AWS launched a security competency to highlight their partners who satisfy and exceed AWS Cloud security best practices. The framework for this certification covers incident response, logging and monitoring, security, access management and data protection. Foghorn delivers DevSecOps results for customers from HIPPA/HITECH to PCI.

# LET FOGHORN ACCELERATE YOUR CLOUD MIGRATION

SCHEDULE A CALL

Foghorn Consulting was founded in 2008 with a mission to ensure that cloud computing initiatives deliver maximum value for its customers. Based in the Silicon Valley, Foghorn provides domain expertise in strategy, planning, execution and managed cloud services to high-growth and enterprise companies seeking a cloud partner. Our team of DevOps engineers, SRE's and certified cloud architects bring over 20 years of domain expertise to ensure your cloud initiatives are a success.



330 Townsend St, Suite 202 San Francisco, CA 94107 foghornconsulting.com info@foghornconsulting.com 650-963-0980