An Overview of the AWS Cloud Adoption Framework

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Abstract

For your organization to benefit fully from adopting the AWS Cloud, your staff needs to acquire new skills and the organization needs to implement new business processes, or modify existing ones, that make work practices more efficient and agile.

We have created guidance to support successful adoption of the AWS Cloud in organizations of different types and sizes: The AWS Cloud Adoption Framework (AWS CAF). The AWS CAF is based on our experience gained in assisting many organizations to successfully adopt AWS. Additionally, the AWS CAF references industry-wide best practices and frameworks and methodologies such as COBIT, TOGAF, and ITIL, and shows how they can support cloud adoption.

Introduction

Cloud-based computing introduces a radical shift in how technology is obtained, used, and managed, as well as how organizations budget and pay for technology services. The key advantages of cloud computing are described in the Overview of Amazon Web Services white paper[1].

Without cloud-based computing, a new project typically requires a project team to initiate the procurement process to obtain the computing hardware they will need for their solution. When the computing hardware arrives, the infrastructure team prepares it and makes it available to the project team. The hardware will typically be configured for different environments needed by the solution, e.g., development, testing, quality assurance, and production.

With cloud computing, when AWS services are introduced, a project team uses their AWS account, the virtual network is configured in the cloud, and computing environments are launched in a matter of minutes and ready for use by the project team. The environments can be reconfigured easily, scaled up or down automatically to meet usage patterns and optimize spending, or shut down temporarily or permanently. The billing for AWS services becomes an operational expense rather than a capital expense.

To get the full benefit of adopting the AWS Cloud, changes need to be discussed and considered across the entire organization, and not just within the IT division.

The AWS CAF provides guidance that supports all of the different parts of the organization so that each area of expertise understands how to adapt existing practices, or introduce new practices, for cloud computing. At the highest level, the AWS CAF organizes its guidance into a number of different areas of focus, termed Perspectives. Figure 1 shows the seven Perspectives of the AWS CAF.

Figure 1: The AWS CAF Perspectives

An AWS CAF *Perspective* represents an area of focus relevant to implementing cloud-based IT systems in organizations. For instance, when a cloud solution is to be implemented, the People Perspective provides guidance on setting up or enhancing organizational structures and providing the necessary training to the people who implement and operate the cloud environment as well as the cloud-based solutions.

Each AWS CAF Perspective is made up of components and activities. A *component* is a sub-area of a Perspective that represents a specific aspect that needs attention. An *activity* provides more prescriptive guidance for creating actionable plans that the organization uses to move to the cloud and to operate cloud-based solutions on an ongoing basis.

For example, *Organizational Structure* is one component of the People Perspective and creating a DevOps team structure may be an activity within that component.

A brief description of each AWS CAF Perspective is provided here, with more detailed descriptions later in the paper:

- **Business Perspective** – Provides guidance to help you focus on areas where you want to ensure that technology services are utilized in an optimum way to deliver maximum value.
- **Platform Perspective** – Provides guidance to help you focus on architecting and designing optimum solutions so you can achieve the levels of functionality and quality that you want while balancing the cost of building and operating the solution.
- **Maturity Perspective** – Provides guidance to help you focus on ensuring that an accurate initial assessment of the current state of the organization is carried out, the desired target state is defined, and a viable roadmap is created to move the organization forward.
- **People Perspective** – Provides guidance to help you ensure that the organizational structures and competencies exist to successfully implement, operate, and manage an AWS Cloud environment.
- **Process Perspective** – Provides guidance to help you ensure business processes are in place to plan, implement, and operate a cloud-based IT environment.
- **Operations Perspective** – Provides guidance to help you ensure the AWS environment can be efficiently operated to meet or exceed the service levels that have been agreed upon, with effective use of automation to minimize manual effort.
- **Security Perspective** – Provides guidance to help you adopt a comprehensive approach to implementing security within the AWS environment and software solutions that it supports.

Organizations can use the AWS CAF perspectives, components, and activities like building blocks to develop a plan and a roadmap to move from their current IT environment to an environment based on AWS Cloud services, or to implement a new cloud-based IT environment. The organization's leaders can then use the plan and roadmap to provide guidance to their teams on changes they need to make to successfully adopt AWS.

The AWS CAF is not a prescriptive methodology with a sequential process. Review each perspective and the associated components (see Figure 2) and select those that are important to your organization's journey to the AWS Cloud. This way, you can assess the changes you want to make to ensure a successful integration of the cloud with your environment. Prioritize and

weight the efforts and then build a roadmap. The roadmap is used to sequence what you do and when you do it.

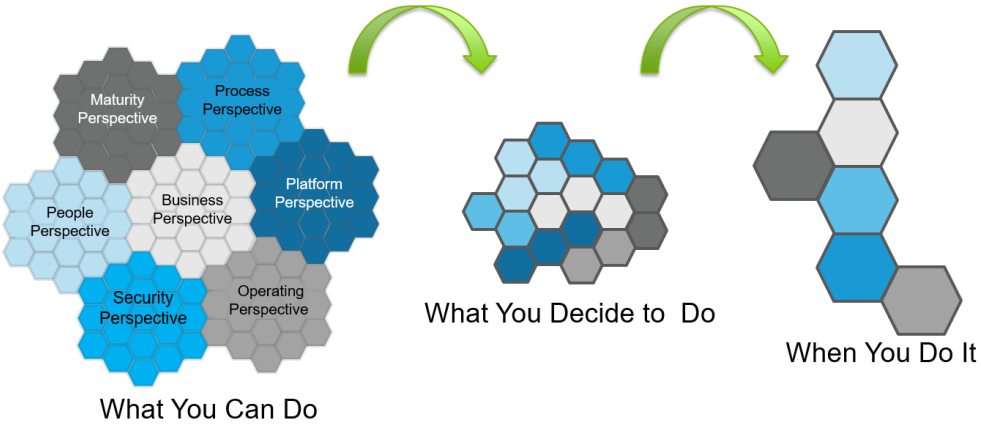

Figure 2: Using the AWS CAF

The AWS Professional Services group has created service offerings called Accelerators[2] that address some of the more common customer scenarios for cloud adoption.

Mapping the Journey to the Cloud

Your organization's cloud adoption journey will be unique. An understanding of your current state, your target state, and the transition required to achieve the target state will help you determine the goals that you set and the path that you take. Figure 3, *Mapping the Journey to the Cloud*, shows you two types of paths for moving to the cloud from traditional IT environment with an on-premises data center. If you are concerned with reducing cost and complexity, you will have a different journey to the cloud than if you are focused on driving growth or diversifying your business.

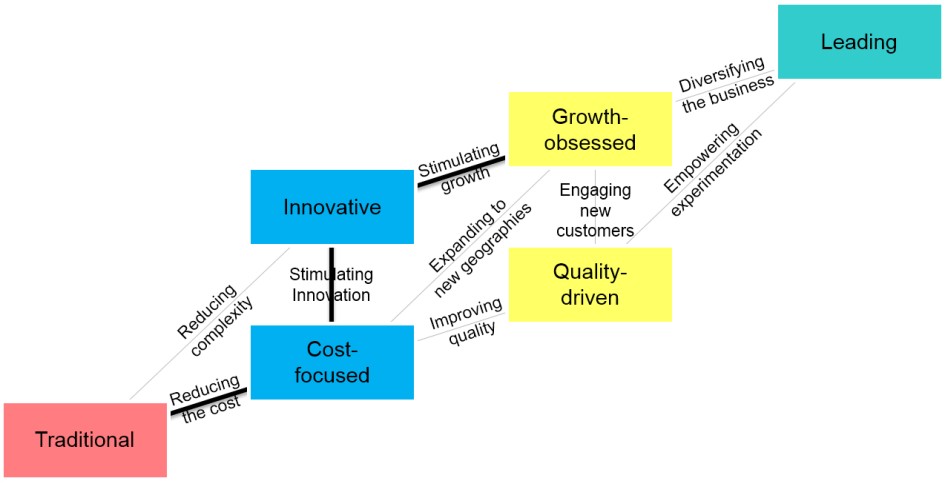

Figure 3: Mapping the Journey to the Cloud

You can use the AWS CAF to validate your understanding of the goals for your business and create a technology strategy that helps you achieve your goals. By using the AWS CAF, you can align initiatives for business groups and IT groups so they can jointly pursue programs and projects that provide the highest overall value to the organization.

During the journey, you might find that organizational competencies need to evolve, existing processes need to be modified or new ones introduced, and development and operations teams need to become more closely integrated. In a transition to the cloud, different groups will be responsible for the process in their area of the organization. Figure 4, *Perspectives and the IT Lifecycle*, shows a process that includes some form of portfolio, program, and project planning (the value-based planning cycle); delivery of a technical capability into operations (the iterative development cycle); and a process to manage and maintain the solutions (the automated operations cycle).

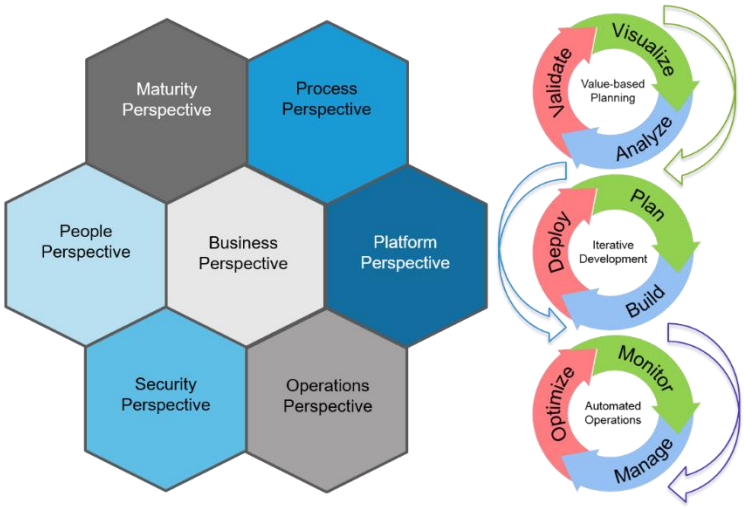

Figure 4: AWS CAF Perspectives and the IT Lifecycle

As you go through these cycles in the overall IT lifecycle, you should consider the different AWS CAF Perspectives and how they can help the organization to bridge communication gaps and ensure that the strategies and plans across the organization are complete and aligned.

Figure 5, *Sample Roadmap for Cloud Adoption*, shows the activities (read from left to right) that could be carried out by one organization's cloud adoption leadership team.

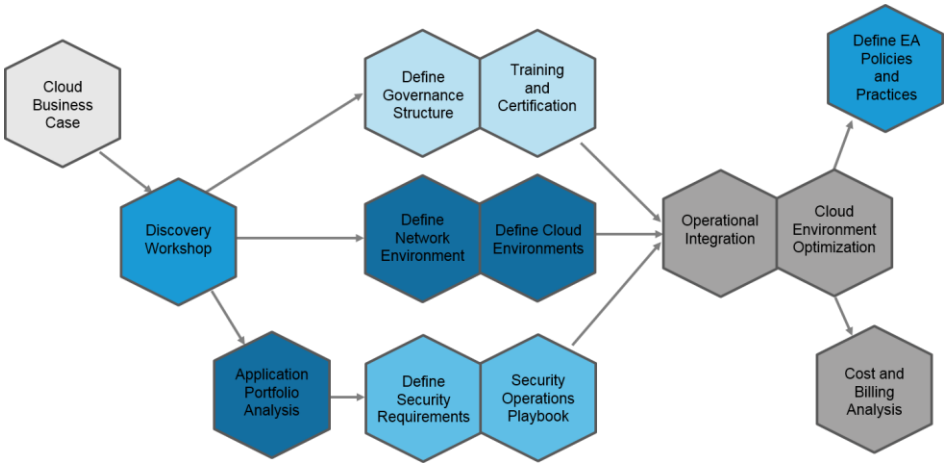

Figure 5: Sample Roadmap for Cloud Adoption

The leadership team first reviews the seven perspectives of the AWS CAF and creates a plan of action that spans a variety of perspectives and

involves multiple teams. The adoption journey shown here starts with preparing a cloud business case, and then moves to a conducting a discovery workshop to understand the opportunity and level of effort and resources required.

After the information has been gathered and strategies and plans have been defined in the discovery workshop, the leadership team is able to work on different aspects of the adoption effort. In this example they focus on portfolio planning, design of the technology environment, and changes needed to the current organizational structures. The leadership team meets regularly to provide updates to each other and determine (or adjust) priorities based on what is learned.

After the team leaders complete their efforts, they create a plan to integrate the cloud environment and cloud solutions into the overall operating environment. The plan addresses how the cloud environment and cloud solutions will be implemented, maintained, monitored, and optimized. A member of the core leadership team works with finance and procurement teams on integration with financial and procurement processes, while another team member focuses on updating organizational policies and practices.

AWS CAF Perspectives: Additional Detail

Each of the seven Perspectives that make up the AWS CAF is described in more detail in following sections.

Business Perspective: Obtaining Value from the AWS Cloud

The Business Perspective of the AWS CAF identifies areas that IT leaders should focus on to ensure the delivery of innovative high-value-add products and services that can transform conventional ways of doing business.

Figure 6 Business Perspective

When you have a thorough understanding of the components and activities of the Business Perspective you create a business-case using financial and strategic analysis techniques. Then you can use the Portfolio Management Component to help you to prioritize initiatives in your portfolio and create an IT strategy, which would include the cloud adoption strategy.

The following is a brief explanation of each component of the Business Perspective:

- **IT Strategy** – Derived from and aligned with the strategy of the overall business for the short, medium, and long term. You can create a strategy for cloud computing as either part of the overall IT strategy or as a standalone effort. Whichever approach you take, the strategy serves as the roadmap for successfully adopting cloud computing.
- **Value Management** – Covers the financial aspects of IT, including budgeting, cost management, prioritization of IT spending, and a system of allocating costs to the business. You create a partnership between business and IT stakeholders to enable the optimum use of IT investments.
- **Cost Management** – Considers all costs associated with delivering IT capability. Examples include staffing costs, facilities costs, and supplier costs.

- **Risk Management** – Describes the level of risk that the organization is willing or able to accept and manage. Risk management should be understood, documented, and communicated at an organization-wide level. Align capturing and managing the risk to the organization from the use of IT with overall risk management. This minimizes the potential for compliance failures, so it should be in place for all IT-related risks.
- **Portfolio Management** – Determines practices for the governance of IT in partnership with the rest of the organization. Requires clear roles, responsibilities, and authority to achieve the objectives that have been defined within the IT strategy. You integrate the practices for IT governance with the practices for overall governance of the organization. This ensures that there is compliance with legal and regulatory requirements.

Platform Perspective: Architecting and Designing for the Cloud

IT architects and designers use a variety of architectural dimensions and models to understand and communicate the nature of IT systems and their relationships. You can use the components of the Platform Perspective to describe the structure and design of a cloud-based IT system, or a hybrid IT system that spans both cloud and non-cloud environments.

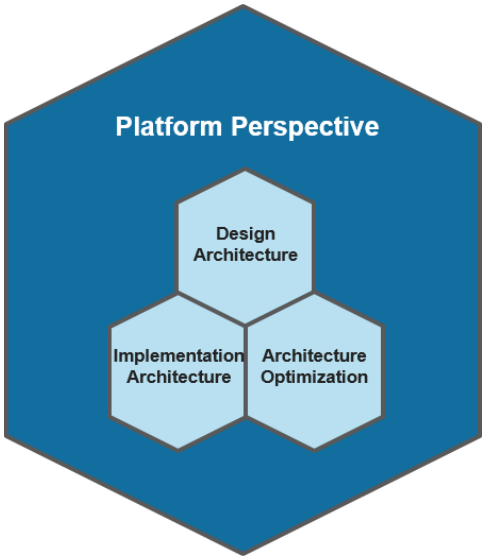

Figure 7 Platform Perspective

With the information derived from using the Platform Perspective, you can describe the architecture of the target state environment in detail. The Platform Perspective includes principles and patterns for implementing new solutions on the cloud, or migrating existing non-cloud solutions to the cloud. The following is a brief explanation of each component of the Platform Perspective:

- **Design Architecture** – In your cloud adoption scenario, you need to provide different views of your architecture to each stakeholder. The design architecture should capture business vision, goals, and objectives, as well as conceptual and logical (or functional) design diagrams. It is primarily used to communicate your architecture to business-focused stakeholders.
- **Implementation Architecture** – This describes the physical views within the IT system and the specific implementation components and their relationships. The Implementation Architecture also defines how the system's building blocks will be implemented by software or hardware elements. These views are primarily used with technical stakeholders.

- **Architecture Optimization** – Periodic reviews of architectural descriptions and implementations should be carried out to support continuous optimization of the cloud environment and cloud solutions. The speed of development and deployment in the cloud encourages an iterative approach. Functionality that is quickly delivered to customers can continue to evolve based on their feedback. .

Maturity Perspective: Assessment of Cloud Maturity and Readiness

The IT operating environment in an organization might contain a mix of older and newer solutions developed at different times. Use the Maturity Perspective to determine the level of maturity of the organization's IT environment and its readiness to move to the cloud. Use this perspective as you define the roadmap for moving technology solutions to the cloud and the sequence in which this should be done. The focus of this perspective is on progressive implementation of cloud-based IT capabilities in line with organizational maturity and goals.

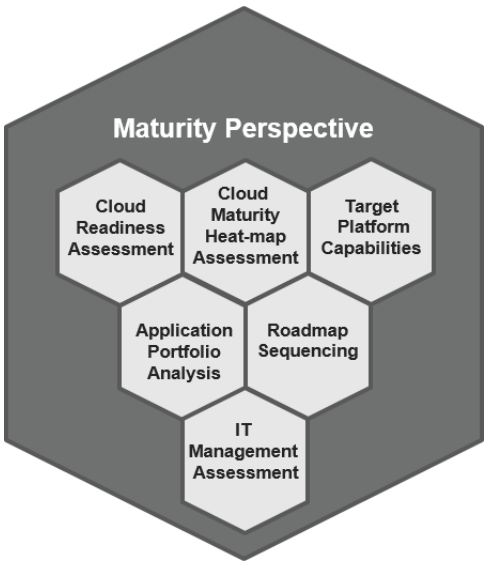

Figure 8 Maturity Perspective

The following is a brief explanation of each component of the Maturity Perspective:

- **Cloud Readiness Assessment** – Do this assessment to obtain information and determine the readiness of the organization to move to the cloud, focusing on technology infrastructure, software applications, and data. You should also capture information on existing governance, risk management, and compliance processes to determine how much change is needed across the organization.
- **Cloud Maturity Heat Map** – The maturity heat map consolidates the information gathered in the Maturity Perspective and provides a summary of the analysis and recommendations. Use the heat map to determine the high-level prioritization of cloud adoption initiatives and their cost and organizational impact.
- **Target Platform Capabilities** – Define the capabilities of the target cloud platform, and how it should be implemented in stages in line with current readiness and strategic goals. Organizations

having existing IT capabilities need to determine how their platform will evolve for cloud adoption, and whether existing technology systems and services will be leveraged in a hybrid environment or replaced.

- **Application Portfolio Analysis** – First, capture information on the portfolio of applications that are used by the organization. Then, use this information to assess each application against pre-defined factors business value, functional fit, conformance to principles and standards, quality, risk, etc. After this, you can decide what should be done for each application in the cloud adoption journey.
- **Roadmap Sequencing** – Here you define the ordering of all the required initiatives, and any dependencies between them, to achieve the goals of cloud adoption. This information is used to create the roadmap for cloud adoption.
- **IT Management Assessment** – Existing IT management structures, practices, and processes might need to change for cloud adoption. Here you capture the relevant information on IT management and determine what changes will be required for cloud adoption.

People Perspective: Staffing of Cloud IT Teams

The People Perspective covers organizational staff capability and change management functions that are required for efficient cloud adoption. Activities include definition of organizational structures and roles, competencies required, identification of competency gaps, training, staffing, and organizational changes required to build an agile IT organization that is capable of effective cloud adoption.

Figure 9 People Perspective

The People Perspective supports the development of an organization-wide change management strategy for successful cloud adoption.

The following is a brief explanation of each component of the People Perspective:

- **Organizational Structures** – An organizational model that is optimized for cloud adoption should be established for the delivery and operation of cloud-based solutions. The IT organization might need to extend or modify its structure in order to adopt cloud computing, and changes must be carefully managed in partnership with the rest of the business.
- **Roles and Job Descriptions** – IT roles that are required to support the adoption of cloud computing should be clearly defined as part of the staffing framework. Each role should have a job description that specifies the qualifications, knowledge, and experience that is required to carry out the role effectively.
- **Skills and Competencies** – Use to define the skills and competencies that are required by both internal and external staff to achieve the goals of cloud adoption. Discuss career planning and development of competencies with staff.
- **Training and Readiness** – Use to identify gaps between the required skills and competencies and what is presently available in the

organization. For existing staff, provide access to training courses of different types (both classroom-based and online courses). Encourage staff to obtain certification on cloud competencies to validate their knowledge.

- **Manage staffing** – Evaluate the IT staffing (internal and external) that is needed for cloud adoption to ensure that the enterprise has sufficient expertise to support business goals, and periodically revisit. Where needed, set up partnerships to gain access to the required expertise in a timely manner.
- **Organizational Change Management** – The changes for people in your organization need to be managed by providing communication and support, for example, you need to communication clearly how to adjust to new business processes and new IT solutions.

Process Perspective: IT Lifecycle for the Cloud

In the AWS CAF we define a process as a set of interrelated actions and activities that are performed to achieve a specified set of results, outcomes, or services.

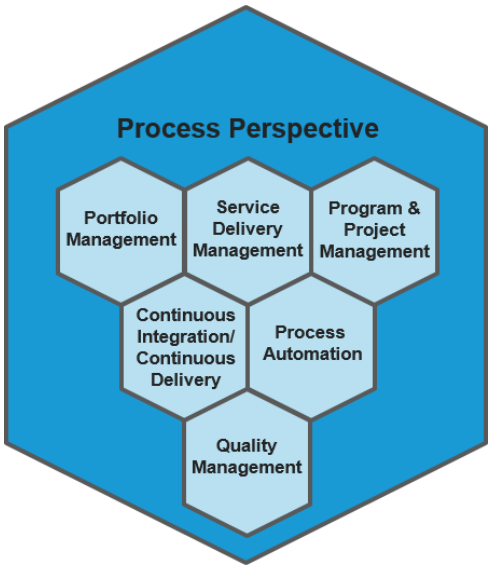

Figure 10 Process Perspective

The Process Perspective covers activities across the complete IT lifecycle for cloud adoption. The focus is on managing IT initiatives as a portfolio to optimize investments, delivering services that meet quality objectives and carrying out work in well-defined programs and projects. For cloud-based software development, agile and iterative lifecycles are used to deliver functionality incrementally and catch and fix defects early. Continuous Integration/Continuous Delivery (CI/CD) practices are used to automate building, testing, and deploying software. Operational processes can be automated to improve resilience of the solutions and reduce manual effort.

The following is a brief explanation of each Component of the Process Perspective:

- **Portfolio Management** – IT products and services are managed as a portfolio of assets by the business. You use this to create an inventory of existing assets and prioritize new products and services.
- **Service Delivery Management** – Organizes and executes activities required to deliver IT products and services. Standard operating procedures should be in place to provide consistency. You use this area to enforce service-level agreement (SLA) and operational-level agreement (OLA) standards.
- **Program and Project Management** – Programs (, groups of related projects) and individual projects selected for cloud adoption from the investment portfolio must be managed in a systematic and

well-coordinated manner. You define suitable metrics to capture and communicate the effectiveness of lifecycle processes and activities.

- **Continuous Integration and Continuous Delivery (CI/CD)** – As part of a focus on agility, businesses are increasingly adopting iterative lifecycles that deliver functionality incrementally. You leverage CI and CD practices and tools to automate the software delivery lifecycle through automated builds and testing.
- **Process Automation** – Repeated service delivery management processes should be automated to improve efficiency and accuracy and reduce cost. IT infrastructure definitions should be captured in industry-standard notation and stored in configuration management tools, just like code. You use these definitions to automatically re-create the IT infrastructure when needed.
- **Quality Management** – The quality expectations and standards of the business should cover IT processes and procedures. After quality standards, practices and procedures are defined, you set a goal of focusing on quality at all stages of the lifecycle.

Operations Perspective: Efficient IT Operations on the Cloud

Every organization has an operations group that defines how day-to-day, quarter-to-quarter, and year-to-year business will be conducted. IT operations must align with and support the operations of the business. Operations Perspective Components describe the focus areas that are used to enable, run, use, operate, and recover IT workloads to the level that is agreed upon with business stakeholders.

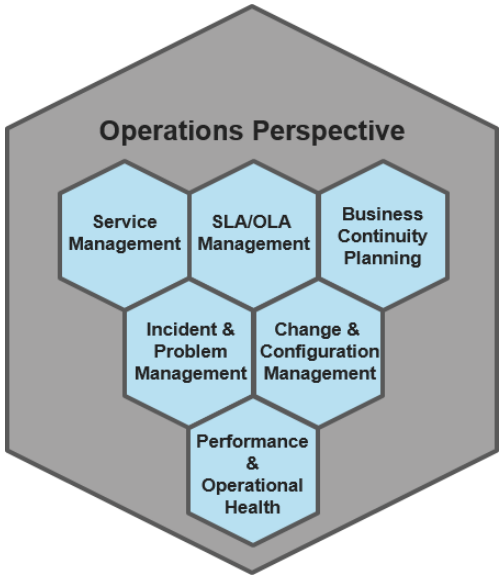

Figure 11 Operations Perspective

The Operations Perspective provides assessments to determine current operating procedures and identification of process changes and training that will be needed to allow successful cloud adoption.

The following is a brief explanation of each Component of the Operations Perspective:

- **Service Management** – Service management on the cloud should be automated and proactive, with actions taken automatically in response to potential issues. Repetitive manual tasks should be minimized to allow people to focus on value-add work. The AWS Cloud provides comprehensive automation capabilities which can save cost and time and improve service quality.
- **SLA/OLA Management** – Defines the service-level agreement (SLA) and operational-level agreement (OLA) standards for the delivery of IT services. The SLA would be approved by the customers or users of IT services. Based on the SLA and OLA you would formulate policies to ensure that the levels were met by monitoring and reviewing the metrics.
- **Business Continuity Planning** – The organization should ensure that it can continue to operate if it is affected by a disaster. Disaster Recovery plans and processes must be in place to allow IT to recover

from a disaster and support business operations. Operations management on the cloud focuses on proactive, end-to-end and automated management. The Information Technology Infrastructure Library (ITIL) provides valuable guidance on IT Service Management (ITSM) that can be applied to the cloud environment.

- **Incident and Problem Management** – The goal is to resolve incidents and problems and restore normal service operation as quickly as possible and minimize the impact on business operations. The root cause is identified and the defect fixed. The root cause should be removed from the environment to prevent a recurrence. ITIL provides guidance here also.
- **Change and Configuration Management** - The AWS Cloud provides capabilities for easily managing and monitoring the environment. You can obtain a resource inventory, configuration history and configuration change notifications. You can monitor a variety of metrics, collect log files and set alarms. You can have system-wide visibility into resource utilization, application performance and operational health. ITIL provides guidance here also.
- **Performance and Operational Health** – Organizations need to monitor cloud assets to ensure that a desired level of performance is being reached. AWS provides a monitoring service for AWS Cloud resources and the applications you run on AWS. The Amazon CloudWatch service monitors metrics and log files and can trigger alarms. In addition to AWS resources it can monitor custom metrics generated by your applications and log files from your applications.

Security Perspective: Achieving Risk, Security, and Compliance Goals

Security at AWS is job zero. All AWS customers benefit from a data center and network architecture built to satisfy the requirements of the most security-sensitive organizations. AWS and its partners offer hundreds of tools and features to help you meet your security objectives around visibility, auditability, controllability, and agility. This means that you can have the security you need, but without the capital outlay, and with much lower operational overhead than in an on-premises environment.

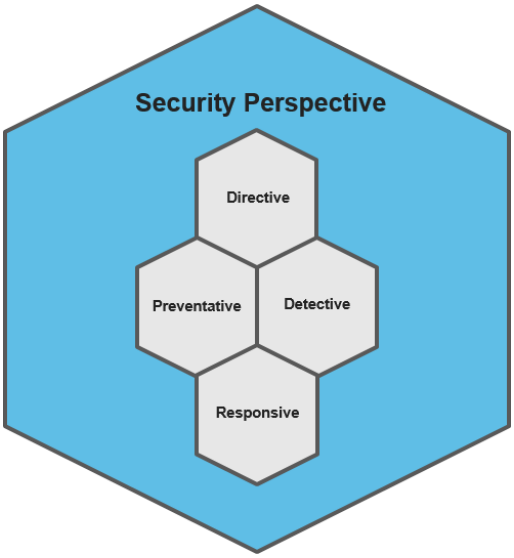

Figure 12 Security Perspective

The Security Perspective (Figure 12) organizes the principles that will help drive the transformation of your organization's security culture. The following is a brief explanation of each component of the Security Perspective:

- **Directive** – controls establish the governance, risk, and compliance models the environment will operate within.
- **Preventative** – controls protect your workloads and mitigate threats and vulnerabilities.
- **Detective** - controls provide full visibility and transparency over the operation of your deployments in AWS.
- **Responsive** - controls drive remediation of potential deviations from your security baselines.

Conclusion

This overview of the AWS Cloud Adoption Framework (AWS CAF) introduces you to the assistance AWS can provide to organizations of different types and sizes that want to adopt AWS Cloud-based services. The AWS CAF is based on our experience gained in assisting many organizations to successfully adopt AWS. Additionally, the AWS CAF references industry-wide best practices and frameworks and methodologies.

You can use the AWS CAF guidance for each part of your organization, so that people in each functional area understand how to adapt existing practices, or introduce new practices, as you journey to the cloud.

Notes

[1] https://aws.amazon.com/whitepapers/overview-of-amazon-web-services/

[2] https://aws.amazon.com/professional-services/enterprise-accelerators/