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More and more organizations are moving to the cloud to enable innovation, cost savings, scalability, IT transformation, and ease of management. Cloud platforms such as Amazon Web Services (AWS) enable complex business models to achieve their goals with more ease than ever before while also allowing for faster technology development and the creation of competitive advantages.

To realize these benefits, you need to change your operational approach. Monitoring and incident management become paramount with a need for real-time monitoring, a method to create diverse on call teams and escalate based on source, event type, and time. Being able to respond to alerts versus react to problems becomes a standard practice leading to continuous improvement.

The benefit of the cloud is one where the organization is both more efficient while achieving their business growth goals. Business growth is defined differently by many organizations. For some, it may mean increasing profitability and sales volume. For others, it's a faster time to market and better customer experience. No matter the measurement, the speed in which an organization needs innovation is increasing. Cloud adoption has taken effect as even traditionally non-technical organizations are finding themselves using more technology than ever.

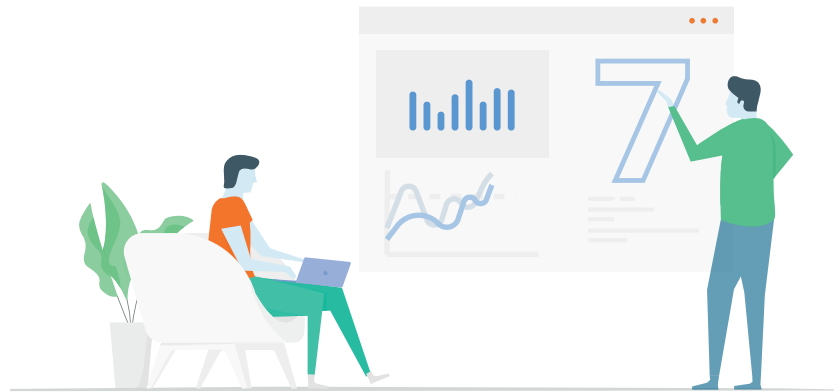
As a result, IT Operations and Development have moved from “the people that keep the computers running for the company” to the epicenter of organizations - the champions of change and the innovators of the business. If the Sales Department asks for a better way of collaborating, IT could explore 5 applications in the AWS marketplace before the end of the week, then bring sales leadership and management into the evaluation process. This new model is faster and more efficient than ever before.

In most organizations, cloud adoption is a company-wide event with a top-down, approach. Executives at the top of an organization are driving to meet business requirements down to their IT teams who then execute on a plan. Once operational, the need for visibility becomes critical. Executives want to see the results of this transformation to the cloud. Is it meeting the business objectives? Are there cost savings and efficiencies? Is everything running as it should without issues? Then, when there is an issue, IT or Development needs to not only resolve the problem, but determine the root cause and eliminate repeat issues. Unanswered alerts and failures create financial, regulatory, and legal liabilities for organizations.

*With change comes great responsibility.* The key question is, how do you keep this new environment running as efficiently as possible? The cloud has great benefits, but without proper management, organizational goals cannot be achieved. The role of IT has shifted. It's less management of physical systems and more responsibility to monitor systems - ensuring uptime, and meeting Service Level Agreements (SLA's). In addition, executive management is constantly faced with new pressures such as regulatory compliance challenges which include everything from data privacy and security to customer satisfaction. The entire organization relies on IT's ability to maintain everything in the AWS Cloud environment.

For most organizations, there is a migration from on-site technology to AWS. For long periods of time (and in many cases indefinitely), IT Operations will need to maintain infrastructure in multiple places. These include: in AWS, corporate data centers, and corporate offices. A holistic approach to monitoring and managing this infrastructure is a critical element to long term success.

When we look at organizations who are successful at adopting the cloud, we find 7 traits towards building a cloud centric operating model within their organizations.



## 7 Successful Traits of Cloud-Centric IT Organizations

### *1. Strive for Complete Coverage – Holistic View*

This includes complete single pane of glass visibility across the entire IT portfolio regardless of where applications and systems live. Monitor, alert, isolate, and resolve network outages and performance issues before they affect service delivery.

Regardless of physical, virtual, and logical relationships and dependencies, modern IT organizations employ monitoring platforms so they can immediately begin monitoring across multi-vendor environments to provide complete visibility and a comprehensive picture of the IT health of the organization.

### *2. Maintain Continuous Insight and Response*

Modern IT Operating models have visibility into the real-time health of the IT portfolio. This is a shift from the reactive and chaotic response to issues as they develop to more control and insight into the daily health of systems and effects on the business and customer service. Millions of metrics are being collected in real-time. Filtering through the noise of alerts to the relevant issues, providing visibility into the real-time health and performance of the systems is paramount to IT. This is then mapped to application owners who can respond quickly to any concerns before they become critical issues.

### ***3. Look Towards the Future***

AWS and the cloud offer nearly infinite scalability. As organizations migrate more IT assets to the cloud, they need to be prepared for the challenges of growing an IT environment. Modern IT models consider a full growth model when planning for the future. The ability to monitor every aspect of the portfolio and plan for its growth is a critical component. IT organizations often find themselves monitoring effectively at small scale, but few have implemented solutions with the flexibility and capability to operate in scaling cloud environments, which creates new challenges. These cloud systems include networking systems, storage systems, server environments, databases, and applications.

### ***4. Automate***

It's important for organization to automate whenever and wherever possible to create efficiencies and a competitive edge. Many look towards automation to reduce cycle time in operations, achieve a high degree of accuracy, reduce repetitive work for human operators, and perform tasks that reach beyond human capabilities such as processing speeds. All of these free-up time for team members to take on other roles.

### ***5. Get to the Root Cause Faster***

Modern IT organizations are set up to get to the root cause faster than ever before and accelerate root cause identification. To accomplish this, they use monitoring and alerting tools to help them throughout their problem-solving process. For example, they are able to isolate probable cause sooner, with confidence, and prioritize responses to the right people at the right time. It's not enough to know that something will happen. Modern teams want to know how they can prevent it from happening in the first place and assess the root cause. An example is receiving alerts weeks before of reaching capacity of a system and being prepared to take corrective action.

## **6. *Test your Workflows***

One of the top benefits of going to the cloud is reduced workload for IT staff. Modern IT organizations test their workflows as they look to migrate to the cloud and implement advanced monitoring and alerting tools which eliminate the hierarchy of triaging issues to delivering alerts directly to application or system owners. In most cases, due to the efficiencies monitoring and of the cloud, workflow testing results in freeing up resources for IT organizations. For some businesses, this may result in reducing IT headcount, or reassigning current IT staff to other duties that weren't given as much time and energy before. From a CIO's perspective, migrating off-premise can free up the CIO to spend time on more strategic business matters than the flow of data and information.

## **7. *Use Existing Channels of Communications***

The IT portfolio is spread out in datacenters, offices, AWS and other public and private cloud resources. Some tools may exist to manage each infrastructure independently. When it comes to managing all of the resources, modern organizations want to integrate their alerts and notifications into existing communication channels for efficiencies and to accelerate response times. Whether you prefer SMS, mobile, Slack, or other platforms, communications should be delivered to you in the most convenient way that maps to current communication processes.

## Retooling for Cloud Operations

IT departments are retooling for the cloud as responsibilities change. As applications and processes move to the cloud, trips to the data center to replace a drive or update a server are gone. Amazon has transformed the way we run our IT infrastructure. There's no more messy physical infrastructure to deal with and software vendors are making it simple to test and purchase their applications by making them available in the AWS Marketplace. If you need a database or CRM there are a dozen at your fingertips to choose from. Interested in redundancy? You can replicate to availability zones and regions worldwide. How about tiered storage? You can provision SSD for your fast applications with extra IOPS, S3 for mid-tier, and Glacier for long term storage with cost reductions at each level. All from your desktop, tablet, or even mobile device.

Development teams are also seeing great benefits. Worldwide developers can access secure resources to work faster and smarter than ever before. No longer do they need to call over to IT to order a new server then have it provisioned and networked to be available in a few weeks. Now, development teams create their own test and develop environments in AWS, separated from corporate resources, and turn services up and down as needed. QA teams can create large scale test environments and use the AWS marketplace to easily test compatibility with systems they never had access to before. These systems can be turned off and on as needed and only paid for based on their usage time.

This transformation is bringing IT Operations and Development closer together and changing IT's role from managing infrastructure to provisioning and monitoring infrastructure in the AWS Cloud. That's the power and the challenge of the new Cloud Culture.



## The Convergence of IT Operations and Development

Organizations that have both a Development Team and IT Operations, who have also moved to the Cloud, have found that these two groups have become closer than ever before. In many organizations, they've become one "DevOps" team.

By collaborating across teams, you can automate many elements of the software delivery process and infrastructure changes to make your organization more agile and efficient. It's a more collaborative operation where IT operations allow developers to have more control through AWS service catalogs. This allows IT administrators to create, manage, and distribute catalogs of approved products to developers, who can then access the products they need in a personalized portal. Administrators control which users have access to each product to enforce compliance with organizational business policies. Developers can deploy and manage their own environments without any help.

The DevOps environment presents an increased need and importance for monitoring. Multiple alerts from multiple sources creates alert fatigue. IT needs to be able to efficiently monitor systems and stay on top of issues as they come in.



## Distributed Accountability

Cloud computing has shifted IT Operations responsibility to one of overseeing the Cloud infrastructure, not dealing with physical systems. As a result, AWS has taken a lot of the workload off of IT and shifted the responsibility to one of accountability.

Cloud adoption frees up IT/Dev teams to be more proactive and focus on strategy rather than IT Operations in order to focus on: operational efficiencies, delegation of responsibilities such as leveraging the AWS Services Catalog to allow development to manage their own environments, managing SLA's, and servicing other parts of the organization with IT related services.

A higher level of visibility has also been created within the organization with more levels of management involved in technology decision making based on their specific needs. IT Operations, with the “right” tools, can extend this accountability out to other parts of the organization. For example- a company launches a new online application for their ecommerce site which was created by the development team and there's a critical issue which is affecting the operations of the site. Custom role-based alerts can be set up to notify the developer directly to address the issue. If the developer does not respond within a set time, then escalations will push the alert to the appropriate parties.

This eliminates the need for IT to be the front line of all issues and puts responsibility in the hands of the main stakeholder, which in this case is the development team.

OpsGenie centralizes alerts, notifies the right people reliably, and enables them to collaborate and take rapid action with features including on-call scheduling, ability to consolidate alerts, and auto-close alerts. This allows Dev and Ops teams to plan for service disruptions and stay in control during incidents. It even extends incident

management to mobile devices, which empowers operations staff to stay connected, react quickly, and solve or prevent problems wherever they may be. By employing OpsGenie's escalation policies, users can be notified in the escalation order until the alert is acknowledged or closed. Throughout the entire incident lifecycle, OpsGenie tracks all activity and provides actionable insights to improve productivity and drive continuous operational efficiencies.

## Faster Root Cause Analysis

Cloud adoption and AWS deployment changes the way incident management workflows are handled. Cloud systems are complex and interdependent, which makes analysis of every incident important.

Incident management workflows don't end once the dust has settled and systems have been restored. Now begins one of the most important phases of the incident management lifecycle: Analysis. The intent of a "postmortem" analysis is to clearly understand both the systemic causes of an incident along with the steps taken to respond to it. From there, teams work to identify improvement opportunities around the systems and the processes defined to maintain them. By evaluating this information, teams can develop new workflows that support higher system resilience and faster incident response.

Event data can assist with root cause analysis (RCA), helping to prevent problems from recurring. The quicker an incident is recognized and fixed the sooner investigations can start into what caused it in the first place. RCA is essential to improve the ongoing management of IT infrastructure and avoid repeat incidents.

From notifications and Alerts to Heartbeat Monitoring and detailed tracking, OpsGenie keeps track of incidents, consolidate alerts, and keeps you organized and ready for incident analysis.



## Challenges and Solutions

Modern IT environments are far too complex and dynamic for traditional tools. Successful IT organizations have figured out that before, during, and after a migration to AWS, OpsGenie is a critical tool to monitor and alert on concerns for on-premise, hybrid solutions (on-premise with some part in the cloud), or in fully in AWS.

OpsGenie helps keep everything working efficiently. Infrastructure issues will happen, and OpsGenie's modern incident management platform is there to help. It provides the necessary platform to monitor and alert all IT systems. Regardless of whether an organization is migrating to AWS or already managing its infrastructure there, OpsGenie creates a single console to help meet the organization's business goals, service level agreements, maintain accountability, and reduce Mean Time to Repair (MTTR).

OpsGenie eliminates the challenges presented in this AWS migration discussion. It adds an important layer of alerting and incident management to both IT and Development teams. Here's how:

### Define On-call Schedules and Escalations Policies

OpsGenie routes critical alerts to the right people with on-call schedules and escalates until the alert is acknowledged to reduce MTTR.

## **Notifications via Email, SMS, Mobile Push, and Phone Calls to Consolidate IT Alerts**

OpsGenie has ready-to-use integrations with AWS monitoring tools, such as CloudWatch and Datadog, and many other leading monitoring tools to manage systems whether they are in the Cloud, a local network, or another data center anywhere in the world.

OpsGenie easily integrates all your tools using email-based integrations, command line utilities, simple Web API (HTTPS/JSON), and libraries.

OpsGenie sends alert notifications through multiple channels until you see the alert. You can use notification rules to control how you want to be notified for different alerts based on alert data such as severity, tags, and time of day.

## **View and Respond to Alerts via OpsGenie Apps**

OpsGenie alerts are not limited to a couple hundred characters of text and support many fields, tags, and attached files. Use OpsGenie apps or web UI to view alert details, the status of each of the recipients, and an activity log detailing all alert activity. OpsGenie apps support two-way communications-communicate with team members and initiate investigative actions directly from OpsGenie apps.

## **OpsGenie Reporting**

OpsGenie provides robust reporting features which tracks all actions and alerts and then gives you actionable reports you can use to refine and improve your processes. The reporting function is designed to assist with any post-incident reviews, reports to customers on Service Level Agreements, and help the organization improve on response times and other performance measures.

## AWS Monitoring Tools and OpsGenie

AWS provides management and monitoring tools that provide visibility into the Cloud environment. CloudWatch and Datadog are two popular tools that monitor EC2 servers, DynamoDB tables, RDS DB instances, as well as other applications. These tools are effective, but tend to provide a high volume of alerts that aren't classified by roles, deduplicated, or consolidated. They are also limited to working in the AWS environment and don't extend out to an organization's entire network. These are strong monitoring tools, but they are also siloed, making them weak in the area of effective incident management workflows.

OpsGenie consolidates alerts from AWS Cloud monitoring systems with other systems being managed for infrastructure. *They also do this live.* This allows users to maintain their contact details and preferences in one place which eliminates duplication of data and reduces administrative overhead.

CloudWatch and Datadog are great tools, but the volume of alerts generated by them can be overwhelming. Monitoring systems are also prone to errors and outages and if they go down, you have no way of knowing. OpsGenie consolidates and manages your alerts from the Cloud as well as your other systems to provide relevant alerting. With native, bidirectional integrations, OpsGenie eliminates the burden administrators face of maintaining the same information in multiple, disparate systems.

## Summary

With Amazon Web Services, organizations can scale up their framework on an as-required, pay-as-you-go model and have access to the profoundly secure, solid, and fast foundation that Amazon uses to run its worldwide network of web properties. AWS also offers the flexibility to swiftly change and optimize assets amid a DR event, which can bring huge savings. However, a critical element to success with Amazon Web Services is the ability to maintain systems and the right information at the right time can be the difference between success a failure in meeting business objectives.

The average organization is dealing with hundreds of alerts every week which can result in annual costs running into millions of dollars, distractions for IT staff from other activities, and an overall impact to business productivity and the customer experience.

OpsGenie is a modern incident management platform for operating always-on services, empowering Dev & Ops teams to plan for service disruptions and stay in control during incidents. With over 200 deep integrations and a highly flexible rules engine, OpsGenie centralizes alerts, notifies the right people reliably, and enables them to collaborate and take rapid action. In AWS environments, OpsGenie reduces Mean Time to Repair by integrating with AWS tools, eliminating administrative overhead with a single location to manage notification preferences, and expands incident management to include mobile devices to empower the operations to stay connected from wherever they are.

OpsGenie allows for a holistic approach which integrates incident management into all of your on-premise and cloud systems into a single view and response system. All of your disparate system, can be brought together in one place. Throughout the entire incident lifecycle, OpsGenie tracks all activity and provides actionable insights to improve productivity and drive continuous operational efficiencies.

OpsGenie is the platform of choice for teams using AWS deployments to centralize alerting and incident management workflows. Using OpsGenie helps teams maintain clean line of sight into how systems are operating and enables them to better prepare for and react to incidents wherever they may happen.

# Appendix A

## Why Organizations are Migrating Systems to the AWS Cloud

Some companies, such as ecommerce businesses, are built from the ground up on the cloud, while others have a more traditional operating model, but all can benefit from using the cloud in their operations. Some of the primary reasons include:

### *Achieve Business Growth*

Business growth is one of the top benefits organizations have realized as a result of cloud adoption. Cloud gives you the power to expand infrastructure quickly, test innovations faster, and accelerate technology driven go-to-market plans and potentially accelerate business growth.

### *Increase Efficiency*

Efficiency is a top area organizations strive to improve by going to the cloud. At its core, efficiency is about removing unnecessary steps to streamline processes in order to increase productivity or deliver on customer requirements faster. As a result, increasing efficiency also supports business growth.

### *Improve Customer and User Experience*

Organizations are looking to the cloud to improve the quality of the customer experience. Customers expect and demand that the applications they use are always up and available no matter where the user is trying to access them from. Cloud adoption delivers on this promise while also allowing new channels of engagement and improved workplace productivity which all adds up to more satisfied, repeat customers who will promote your service to others.

### ***IT Agility***

Cloud technologies improve IT agility and enable IT to be more responsive to business needs and react faster to market changes. It makes responding to down services and alerting customers faster, easier, and cheaper, which leads to happy and engaged users. The user is no longer in the dark and IT is no longer consumed with traditional application and hardware management tasks. In addition, cloud technologies are easy to enhance and adapt to accommodate changing business needs.

### ***Faster Development and QA***

For organizations with developers, the cloud offers on-demand test and development environments which streamlines the development cycle into a more agile environment where changes happen faster.

### ***Cost Management***

The cost driver has two sides: reducing IT expenses and restructuring these expenses to spread them out over time. Expenses shift from upfront Capital Expenses to monthly Operating Expenses.

### ***Assurance and Reliability***

Assurance is the idea that data is more secure in the Cloud and that organizations will attain better uptime because its solutions are maintained by AWS, which has built its business around these competencies and has shown proven success.



# Appendix B

## Steps to a Cloud Migration

### Strategy

Organizations must have a clear strategy, map out a realistic project timeline, and limit the number of variables and dependencies for transitioning on-premises applications to the cloud.

### Planning Steps

To ensure a smooth transition, several points should be taken into consideration including implementing a comprehensive alert management system as early in the process as possible.

Here are the five planning steps which should be in every cloud migration plan:

#### 1. Plan your Migration

- Assess your current cloud operational maturity including people, process, and technology
- Validate business cases for applications and services that can provide financial and operational benefits from migrating to AWS
- Develop a cloud planning roadmap for getting to your desired state including procurement strategies, capacity planning, vendor management, and cloud operating models

## 2. Discover your Assets

- Build a holistic view of all your data center assets, IT portfolio, and their relationship to AWS assets and services
- Take inventory of all of your assets before deciding what to migrate to the cloud
- Define all dependencies to ensure that nothing breaks during or after a migration
- Visualize assets and dependencies in a single view, whether on premises or in existing public or private cloud

## 3. Forecast Your Cloud Costs

- Understand the cost of migrating to AWS before you make the move
- Simulate migrations to AWS services and deploy the right resources at the right cost
- Align cloud expenses with business needs and resource costs
- Leverage the move to find efficiencies and reduce costs
- Review your workflows (systems and people) to determine what resources may be eliminated or repurposed

## 4. Development a Monitoring and Alert Plan

- Take a holistic approach to monitoring and managing on-premise and cloud solutions through a single pane of glass
- Map your assets to their ideal teams and implement appropriate control and alerting
  - Implement a company-wide monitoring and alerting process – sending the right alerts to the right people at the right time
  - Include: multiple communications channels, rich Notifications, on-call schedules, detailed tracking, escalations.

## 5. *Ensure Compliance and Security*

- Find and fix security risks and compliance gaps
- Verify security and policy-based compliance across AWS production environments
- Enhance visibility of security and compliance posture within your monitoring platform

Next, look deeper into how you want to move your applications. Below are six strategies to move your applications:

**1. Rehost** - A common approach of preparing AWS resources for an application, then migrating the application, data, and traffic to the new application. The application is basically unchanged. This is the most common application migration strategy.

**2. Replatform** - Make a few cloud optimization changes during the migration in order to achieve some tangible benefit without changing the core architecture of the application. For example, migrating from an on-premise database to an AWS managed database such as Amazon Relational Database Service (RDS).

**3. Repurchase** - A decision to move to a different product, which likely means the organization is willing to change the existing licensing model it has been using. An example is a move from a home-grown CRM to one hosted in the cloud.

**4. Refactor / Re-architect** - Driven by a strong business need to add features, scale, or performance that would otherwise be difficult to achieve in the application's existing environment. This tends to be the most expensive migration solution.

**5. Retire** - Identify IT assets that are no longer useful and can be turned off- helping boost your business case and direct your attention towards more widely used applications.

**6. Retain** - Retain portions of your IT portfolio on-premise because there are some applications that: are not ready to migrate, you feel more comfortable keeping on-premises, or you are not ready to prioritize.

Next, create a system mapping such as the example below. In this map, you can identify all of your on-premise resources, how they will map to AWS resource if moved, what strategy to use, who the ideal team is to be managing them once they are operational, and how everything ties into one monitoring and alert system that ties to all on-premise and off-premise systems.

An example of the system mapping and planning done for a migration:

On-premise system	AWS Resources	Migration Strategy	Ideal Team*	OpsGenie Monitoring/Alert Preferences
CRM Application on VM in SAN Storage	AWS EC2 Server, S3 storage	Rehost	CRM Application Development Team	Slack and SMS
Oracle Database	AWS Rational Database Services (RDS)	Replatform	SysAdmin Database Team	HipChat, text
FTP Server	N/A	Retire	IT	N/A
Payroll Application	N/A	Remain	HR Department and IT	Slack and SMS

# Appendix C

## Additional AWS Tools Available for Migrations

### Discovery and Migration Tracking

**AWS Migration Hub** - AWS Migration Hub provides a single location to track the progress of application migrations across multiple AWS and partner solutions.

**AWS Application Discovery Service** - AWS Application Discovery Service helps you plan migration projects by gathering information about on-premises IT assets.

### Server & Database Migration

**AWS Server Migration Service** - AWS Server Migration Service (SMS) is an agentless service which makes it easier and faster for you to migrate thousands of on-premises workloads to AWS.

**AWS Database Migration Service** - AWS Database Migration Service (DMS) helps you migrate databases to AWS easily and securely.

### Data Migration

**Amazon S3 Transfer Acceleration** - Amazon S3 Transfer Acceleration makes public Internet transfers to Amazon S3 faster.

**AWS Snowball** - AWS Snowball is a petabyte-scale data transport solution that uses secure appliances to transfer large amounts of data into and out of AWS.

**AWS Snowmobile** - AWS Snowmobile is an exabyte-scale data transfer service used to move extremely large amounts of data to AWS. You can transfer up to 100PB per Snowmobile.

**AWS Direct Connect** - AWS Direct Connect lets you establish a dedicated network connection between your network and one of the AWS Direct Connect locations.

**Amazon Kinesis Firehose** - Amazon Kinesis Firehose is the easiest way to load streaming data into AWS.