

Managing Multicloud Services to Support Visibility, Automation, and Governance

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Introduction

In a perfect world, an organization would only manage a single unified computing environment. But the real world is complicated. Most businesses have a variety of workloads supported by numerous computing platforms. It is common for one business to support multiple public clouds, several different private cloud services, as well as data center services. In some cases, organizations want to leverage multiple public clouds to avoid reliance on a single vendor. In other situations an organization may need to support specialized services from a particular cloud service. In many organizations different business units or developers have a preference for a particular cloud. The theory is that by working with multiple cloud vendors, a customer has the freedom to move if costs increase unexpectedly. The reality is much more complicated. Meanwhile, other organizations allow teams to select their cloud provider of choice for different projects. Almost all public cloud vendors design their services to lock customers into a proprietary platform. Typically, each cloud vendor offers a set of management tools that are only designed to work within that vendor's cloud ecosystem. While a proprietary management platform solves some problems, it will create new challenges as your multicloud environment grows.

In addition, a vast majority of organizations prefer a hybrid computing environment that enables IT management to place workloads in an environment that matches cost, performance, security, and governance requirements. More than 80% of large enterprises have adopted a multi-cloud and multi-provider strategy (from a recently commissioned IBM study of 122 key decision makers in cloud transformation). As you begin to plan your management approach to a hybrid and multicloud environment you need to consider the needs of the constituents that you support. Ironically, all of your constituents have one similar overriding requirement: they want to have assurance that the services they need are predictable, secure, and can scale with demand. Most constituents don't care where an application or service operates – it just needs to work every time in a secure manner. In this paper we will present the six factors and best practices needed to enable organizations to satisfy the needs of a variety of constituents across business units. The responsibility to keep all these cloud services operating effectively and securely falls to the IT operations team. The operations team must be able to guarantee performance no matter where services resides while also assuring scalability, cost efficiencies, and compliance. Based on these concerns, our research has determined that there are key best practices for managing a cloud environment.

These practices include:

- Planning for multicloud
- Ensuring Governance and Compliance
- Predicting Visibility and Automation
- Managing DevOps in a secure manner across clouds
- Avoiding lock in through open standards
- Understanding and managing costs

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Before we discuss these six imperatives, we will provide an overview of a customer situation that reflects these issues. Throughout the paper we will link this customer's concerns with these imperatives.

An Auto Manufacturer Confronts Multicloud Management Complexity

A U.S. based auto manufacturer needs to efficiently support a network of independently owned and operated dealerships. The manufacturer determined that a cloud services approach was the most cost-effective and scalable way to support both internal and customer needs. Each of the 2,500 US-based dealerships is a large and complex organization responsible for supporting thousands of sales and repair customers. The average dealership has revenue of approximately \$60 million a year. In a competitive market, a dealership has to be creative in how it acquires new customers and how it maintains existing relationships. To successfully compete, dealers must take advantage of cloud-based software applications and invest in web-based marketing and advertising that can target prospective customers. In this type of environment, the manufacturer must be able to offer compelling cloud services to its dealerships that are both effective in bringing in new customers while containing costs. Depending on the individual dealership strategy, along with local legal, governance and security rules, the manufacturer supplies a number of technology services to the dealership. Some example services include:

- Integrating financial records shared with corporate headquarters and local governmental organizations
- Cataloging of vehicles shared with and integrated with other dealership branches and the corporate office
- Managing web traffic and customer engagement
- CRM SaaS solutions with up to date customer records and sales stage information
- Managing performance of the collection of cloud services so that customers are not impacted

Planning for Multicloud Management

Most businesses begin the multicloud journey in an ad-hoc manner. There is a good chance that different teams started to develop projects on various public clouds because of a variety of issues including:

- Cost concerns
- Developers preference and experience with a specific cloud
- Ease of getting started with the cloud for a project

For example, initially the automotive manufacturer was forced to react to dealership needs. While IT operations management was able to help, it came at a cost. The responsibility for keeping dealerships up and running fell to the

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IT operations team. This meant that IT operations professionals were typically fighting fires to keep things from falling apart. It became apparent that IT management would have to establish a three-year plan to both respond quickly while keeping costs under control. At the same time, the team had to be able to predict performance, control both security, and governance no matter what service was used.

Hybrid / Multicloud Foundational Challenge: Ensure Governance Compliance

Typically the business doesn't pay attention to issues such as security, governance, and compliance until it becomes an issue that impacts the customer or supplier. To avoid potential risks, security services need to be incorporated into the cloud management fabric. In a rapidly changing business climate it is not unusual for policies to change across all services. At the same time, governance and compliance rules have to be implemented in a way that don't disrupt the needs of the development team to meet their objectives. For example, the automobile manufacturer has to ensure that key governmental and business requirements are met. In one situation, the manufacturer had to provide dealerships with the correct number of parts to fix common problems. If the manufacturer failed to deliver, customers would be unhappy and might go to another dealership or a third party repair shop that could deliver needed parts or repairs in a more timely manner. The lack of compliance could seriously hurt the reputation of the manufacturer and the individual dealership. Effective governance policies help keep developers safe by not allowing them to run into problems while at the same time giving them the freedom to use the tools and services they want.

ITOps Role in Multicloud: Visibility & Automation

It is not unusual for a single organization to have a variety of tools and processes to manage computing operations. Many large businesses will leverage an increasing number of applications and services that operate on a variety of public and private clouds. In many situations, a business unit will have a set of services that are focused on the unique services they offer their customers and suppliers. Auto dealerships are an example of a business that has carefully planned promotions for holidays and new releases, but must also quickly respond to unplanned customer demands and local competition. Individual dealerships create their own campaigns and cloud strategies based on internal preferences, local customer trends and cost expectations. However, each dealership heavily relies upon technology services from the manufacturer's dealership support organization. The dealership support organization has developers available to help smaller dealerships that don't have technical expertise. While these services provided a much needed marketing boost to the dealerships they also brought along a set of management and operational headaches. Because each dealer uses a variety of cloud infrastructures the support organization needs tools to help manage applications across different platforms.

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The dealership support team needed to make sure that individual dealerships were receiving the right levels of workload performance. In addition, the manufacturer must make sure that governance and security processes were being followed. If systems are compromised and customer data is stolen, locally owned dealerships will lose the trust of customers. What the auto manufacturer really needed was a control plane that could manage all computing operations across environments. Management needed a centralized view of the entire compute infrastructure. In this way, ITOps management could quickly understand the health of workloads, clusters, and the changing infrastructure requirements as applications scale up or down.

Operations management needs a consistent automation platform to streamline the management and deployment of services. To deliver a consistent level of quality, operations teams need the ability to automate lifecycle management and perform fast root cause analysis. By adding automation throughout the infrastructure layer, teams can focus on more challenging tasks rather than routine infrastructure management. In addition, automation helps to greatly reduce mistakes that occur during routine activities. For example, many security exploits occur because of innocent development and operations mistakes.

Managing and Integrating Security into DevOps Processes

Despite the fact that software development and deployment has changed dramatically with the cloud, the way organizations approach security has often not changed. Security is often implemented a variety of times within the development process rather than systematically embedded in the beginning of the development process. For example, the dealership development team rushing to implement a new innovative cloud native software application does not consider the security requirements that might be demanded by the chief security and compliance officer. The team saw their responsibility as providing the innovative application to attract new customers faster. Had the organization incorporated a security process into the development process, the problem would have been avoided. A discipline known as DevSecOps is the process of integrating security into the software development process.

DevSecOps is built upon a culture of increased security awareness.

Avoiding Vendor Lock-in to Enable Application Portability

Ensure that you are leveraging all emerging de facto standards to protect your strategy from inevitable change. By taking advantage of emerging standards, like Kubernetes you are able to plan for the future and not get locked into a specific cloud implementation. As you plan for change, you must think about what will happen if a cloud provider changes its pricing model and it's no longer cost effective to partner with that vendor. Several different auto dealerships may each use a different public cloud service to implement a new customer-facing application. Likewise, they may store customer data in a variety of cloud and on premises locations. Over time, it may become important to move an application

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or application service to a different cloud – either because of performance, security, or cost. What if you expand to a new geographic area that restricts where data can be stored or where workloads can run? What if your cloud provider emerges as a new competitor and you want to end the relationship?

The manufacturer must provide developers with a consistent and easy to use platform that can enable development, continuous improvement, and manageability across clouds. Developers want to be able to safely take advantage of new open source technologies and libraries in environments with which they are familiar.

Open source services and tools can help create a consistent and predictable infrastructure model that integrates existing services and modular microservices-based platform. Important open source services include:

- Container services based on Kubernetes container orchestration enables microservices to be linked together.
- The Istio service mesh allows organizations to connect, secure, control, and observe services.
- Calico enables networking and network policy in Kubernetes clusters across the cloud.
- Helm, an open source platform, is a packaged manager for Kubernetes that enables developers and operational staff to package, configure, and deploy applications and services onto Kubernetes clusters.
- Knative is a pure Kubernetes universal resource model that provides a consistent API-based wrapper for legacy workloads.

The combination of these open source capabilities is the only answer to creating the type of modularity and flexibility needed for rapid change.

Optimize & Right Size Cost and Cloud Asset Usage

One of the greatest challenges in this era of increasingly distributed services is to be able to plan for the cost of cloud services. Before cloud computing became ubiquitous it was much easier for management to perform capacity planning and understand what services would cost. The auto manufacturer often offers incentives as well as paying for cloud services for dealerships. Given the tight margins in this organization it is imperative that the manufacturer be able to anticipate costs. The CFO will expect the CIO to be able to accurately budget for computing services. However, it is common that a public cloud vendor will either change prices at will. In other situations, the vendor might introduce a variety of packaging options that make it difficult to determine the best way to estimate costs. This leaves the IT organization at risk of not being able to create a budget that is in line with expectations. As organizations scale their use of cloud services it is more important than ever to be able to understand the best and most cost effective services to support the organizational goals.

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In addition, dealers create their own applications, websites and other services. As the manufacturer moved to the cloud it became apparent that the IT operations team must be able to provide continuous delivery of new or improved application services across a variety of cloud providers. Each dealership often acted independently, selecting a cloud platform that the internal IT team was most comfortable with. For example, the development of local promotional email offers would require development and deployment using a unique application and compute architecture. While each dealership often created new customer-facing services to drive customer satisfaction, IT management across all dealerships was the responsibility of the corporate manufacturer IT operations team. The dealerships are primarily focused on selling and servicing vehicles and keeping customers happy. However, managing all cloud services had to be flawless. Failure was not an option. The corporate ITOps team, must be able to provide the right level of manageability, security, and visibility to protect thousands of independently owned dealerships across the United States.

The Business Requirements

From a business perspective, the requirements are straight forward – the corporate entity must be able to manage a variety of on premises data center services, multiple cloud services, as well as cloud application services. Increasingly, there is a mandate to move to cloud native workloads. At the same time management anticipates an increasingly hybrid computing environment that meets the needs of independently minded dealerships while providing them with an agile and continuous delivery environment. No matter what services or platform is being used, the operations must be consistent and predictable to meet all the needs of this vast network of dealers.

Learning More about IBM Cloud Pak for Multicloud Management

IBM is helping clients manage, control and gain visibility into their multicloud environments through its IBM Cloud Pak for Multicloud Management offering. IBM Cloud Pak for Multicloud Management, running on Red Hat OpenShift, is a control plane designed to provide management teams with consistent insight into all of their containers and virtual machines across any on premises or cloud environment. Organizations can achieve business continuity, and quickly adapt to changing demand by using the offering's built-in automation technology.

IBM Cloud Pak for Multicloud Management provides the following:

- Application management service is designed to manage and monitor the health of both traditional and containerized application components. The application topology provides a business contextual view of the infrastructure, middleware, and enterprise policies which comprise an application. It provides notifications based on key issues such as latency, errors, traffic and saturation. The service abstracts the results so that management can easily identify and isolate application problems.

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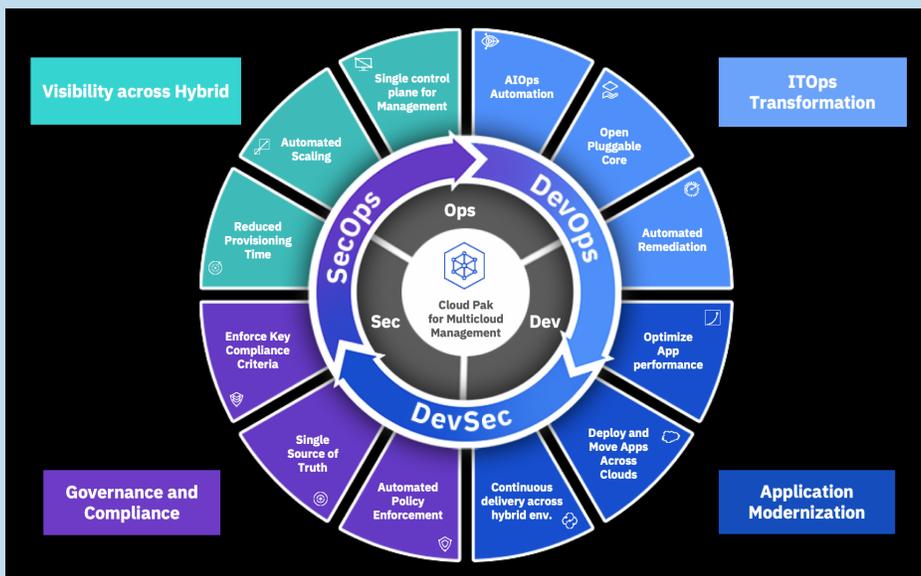


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- Cluster management service makes it possible to manage both cloud native and virtualized environments together. This service simplifies the way clusters are managed.
- Security and governance services ensure that corporate policies are enforced across clouds, clusters, applications, and infrastructure.
- Event management services help organizations automate the management of millions of events through a single dashboard to resolve complex faults. Ansible and Terraform are included to provide this automation.
- Automate application service provisioning in a consistent way across public, private and hybrid clouds. It automatically generates Terraform infrastructure definitions rapidly.
- Integration with third party tools. This service enables an organization to continue using tools and processes within the IBM Cloud Pak for Multicloud Management. In addition, the service provides deep integration with Red Hat Ansible Tower and Cloud Forms.

The diagram below illustrates IBM's approach to the cycle of management across a hybrid and multicloud environment. The inner cycle demonstrates that there is a continuous cycle from DevOps to DevSec to SecOps. As you can see, development, security, and operations are integrated throughout the entire process. The diagram shows that there are four fundamental goals of multicloud management. They are:

- ITOps Transformation
- Application modernization
- Governance and compliance
- Visibility across the cloud



To learn more about IBM Cloud Pak for Multicloud Management, visit: <https://www.ibm.com/cloud/cloud-pak-for-management>

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Getting to a solution

Management tasked the IT operations managers to come up with a solution that would provide consistent and predictable hybrid cloud management across all computing services. Given this mandate from management, the IT operations leadership team began to evaluate a variety of offerings. Many of the offerings they evaluated seemed to be well designed. However, many had drawbacks. For example, some of the offerings helped with a single aspect of multi-cloud and hybrid management such as workload optimization. Other offerings worked well for a specific cloud but lacked the ability to support multiple clouds. Many offerings lacked the flexibility to support and ensure compliance of the auto manufacturer's growing business. Those that could support a variety of clouds required that IT implement a full proprietary cloud stack on each platform, which increased the complexity of getting to a seamless multicloud platform. In the end, the auto company selected IBM's Cloud Pak for Multicloud Management because it provided a management platform based on standards. It could also operate on any public or private cloud while enabling the organization to leverage the native Infrastructure services of the specific cloud platform. The IBM approach allowed the organization to integrate its existing management tools such as ServiceNow, Slack, and Sysdig.

One of the most important benefits for both the ITOps team and each dealership is the inclusion of a visual management dashboard that enabled both groups to visually understand exactly what was going on and what needed to be fixed to ensure that continuous integration and delivery was consistent and predictable. The solution enabled the automation of routine tasks and changes could be quickly implemented across a variety of public, private and data center services.

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Best Practices for Organizations that are Developing a Multicloud Strategy

1. Open source and adhering to standards and de facto standards must be at the heart of your multicloud strategy so that you can quickly adapt, innovate and avoid vendor lock-in.
2. The operations team must be able to guarantee performance no matter where services reside.
3. Organizations must be able to predict costs as their requirements increase.
4. Security services along with governance and compliance policies must be incorporated into the cloud fabric – they cannot be an afterthought.
5. Security and governance teams must have tools to set policies once and enforce them across clouds.
6. Operations management must be able to quickly analyze and manage the health of all workloads, clusters, and infrastructure requirements as applications scale up and down.
7. Full application lifecycle management, including development, deployment, and ongoing analysis and updates must be built into the environment.



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Hurwitz & Associates is a strategy consulting, market research and analyst firm that focuses on how technology solutions solve real world customer problems. Hurwitz research concentrates on disruptive technologies, such as Cloud and Multicloud Management, Big Data and Analytics, Machine Learning and Artificial Intelligence, Information Security, DevOps, and emerging infrastructure platforms that are defining the future of business agility. Their experienced team merges deep technical and business expertise to deliver the actionable, strategic advice clients demand. Additional information on Hurwitz & Associates can be found at www.hurwitz.com.



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