

# Dangerous Silos in Cloud Integration and Intelligent Handling

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**Abstract:** Many consider the cloud computing revolution in the way we do computing. However, we can see that we fall into unproductive and very familiar patterns. Although the clouds can become more effective and efficient to use applications, forms of computing and storage, many clouds become another set of elevators that companies face. But it need not be this way - if you learn to recognize the pattern. As more and more companies are turning to the cloud for applications and enterprise systems, new emerging IT challenges with the advantages that come with using web-based solutions. One such challenge is the proliferation of cloud silos across the enterprise. This paper examines the cloud silos problem more closely and explores different approaches to integration as a cloud solution.

**Index Terms:** Cloud Silo, SaaS, iPaaS, EAI

## 1. CLOUD SILOS-AN INTRODUCTION

In enterprise systems, silos and information processes arise when the data is stored on separate servers or data centers and are not able to interact with other systems. Data centers grow in size with each new application deployment, minimizing resource use and reducing the overall efficiency of the company. Silos are nothing new for administrators and developers who have dealt on the integration of the application of business premises (EAI) projects during the last decade. The growing adoption of software as a service (SaaS) and other cloud offerings means that the silos are once again becoming a problem, resulting in the fragmentation of processes and data. This time, however, the silos are not on the scene, but in the cloud. The final result of these poorly integrated Jealousy is a growing collection of information isolated skewered by contradictory attempts of integration, which in some cases promotes problem. Living with all these silos is difficult, and to keep the information on its current and consistent interior is a constant struggle with important implications when it comes to the precision and efficiency of the data center.

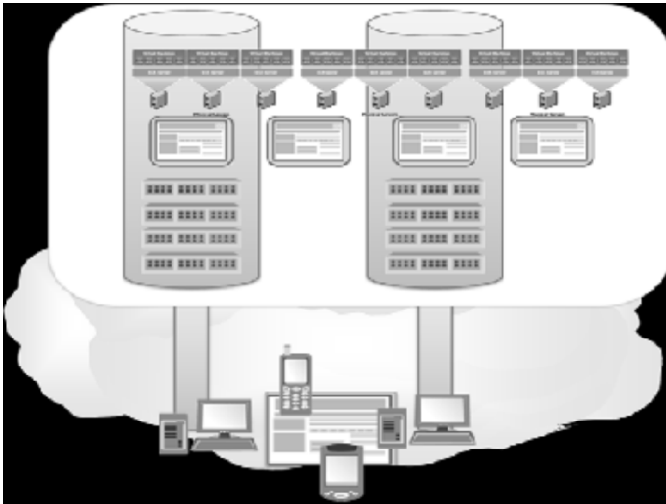
Unfortunately, this practice continued even in the cloud, creating even more silos of information. In addition, the silos in the cloud can be even more difficult to maintain, find, manage, and integrate with other applications. Of particular concern when it comes to applications in the public cloud that find their way into the business. Easy access to public cloud applications provides online business leaders with quick and easy access to a number of unresolved issues involving IT.

Service providers may pay lip service to integration, but their version of integration often means pulling information from other applications instead of working with them. Moreover, in most cases, just think or guidance available on how customers must bridge the physical gap between the cloud and the enterprise datacenter.

Cloud silos are especially prone to proliferation because delivery services based on cloud services, making it easier for businesses to acquire and deploy new applications. Companies can often sign up for a SaaS application with the swipe of a credit card, without thinking much about data synchronization. The flexibility and elasticity of the Platform as a Service (PaaS) offerings make it attractive for developers creating new business applications, but the

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tendency to use regardless of how they will share information with existing legacy applications counteracts the benefits of using this type of cloud services in the first place. The emergence of social networks and social applications based on the Web, on the other hand, means that they are personal IT departments comes as commercialization and communication so feel pressured to take advantage of services based on the cloud, but files less likely a see issues like data sharing, security and integration. The fact that there are more applications and general there are different providers for children of different web-based applications only further contributes to the problem of cloud silos and “SaaS expansion.” While these scenarios can be prevented

by ensuring that IT decisions are made based on how the company as a whole can benefit from cloud notamnent offer (not just non department or group), which can not always be avoided. Cloud silos, Le Peche however, reduce the ability of a company to keep out his business day one day if not soi address. What soi need is a strategy to deal with this problem mondiale: cloud integration.

Although silos and integration in the cloud are familiar problems for managers and IT developers also have qualities that distinguish them from traditional silos and EAI. MuleSoft founder and CTO Ross Mason said, “the principles of the problem [have] changed.” In particular, applications and cloud-based systems communicate via HTTP using SOAP and REST, which puts limits on the types of solutions used to address the cloud computing silos. In addition, the large number of suppliers on the market for cloud computing means there is a great variety in the degree of attention to issues such as security, identity management, repudiation, visibility and control, which further complicates the problem of silos and cloud integration. In the past, managers and IT developers have approached the silos of information and tactical EAI approaches using point to point which usually requires teams of experts and specialists who understand the underlying frameworks of each application to integrate with other enterprise applications. This slow and tedious approach, however, undermines the benefits of cloud computing, that is, flexibility, ease of use, and give it the means experts. As Mason says Ross also point to point integration does not scale well and black box of limited natural results actually take elevators and cloud integration capabilities.

Companies that deal with silos and integration in the cloud need solutions that are low cost, (reusable configurations) effective and manageable, intuitive and easy to use, even for users with limited technical knowledge. In addition, the movement of the company to service-oriented architecture (SOA) means that integration solutions should also facilitate reuse and orchestration of services and data.

## 2. HOW TO GET RID OF CLOUD SILOS?

CloudHub, a coordination platform as a service (iPaaS), capable of handling a variety of integration scenarios by providing a robust and flexible integration solution that meets this need. CloudHub, Anypoint iPaaS part of Platform™, is a hybrid deployment for maximum flexibility of a service, secure SaaS and on-premises applications with the option of mixing (iPaaS) is the only integration platform. Continuing to maintain any hardware and software updates, CloudHub of a secure, multi-tenant platform built-in disaster recovery, high availability and rapid deployment of cloud-based integration with the true benefits. CloudHub a cloud-based integration platform, event-driven, data-processing operation and the timing of events to fire (or near real time) is. Mule ESB is based on an enterprise service bus technology, CloudHub on the premises or in the cloud, whether it is capable of integrating multiple sources of data and applications. Moreover, CloudHub while still being easy to use for those who are less technically inclined, if necessary, to modify the code to allow them to offer flexibility to developers. Companies continue to add to their portfolio, such as SaaS applications and other cloud offerings, they will undoubtedly meet the challenges

of the cloud silos and integration. CloudHub, with the flexibility and ease that they will be ready to meet the challenge.

CloudHub has been built from the ground up to provide enterprises with a multi-tenant, secure, elastic, and highly available integration platform as a service (iPaaS). This document describes how the underlying mechanisms of the CloudHub platform work to achieve these goals. To understand CloudHub's approach to security and availability, it's important to understand the architecture behind CloudHub. CloudHub includes three major components: the management console, the platform services, and the worker cloud. These three components work together to run your integration applications.

## 2.1. Turn Silos of Data Into Operational Insights

Drive critical business decisions, reduce costs and complexity and maximize operational efficiencies by consolidating your silos of machine data into actionable insights.

**Resolve problems faster, reduce downtime and improve user satisfaction and customer retention:** Gain operational end-to-end visibility across their data center and cloud infrastructure from a single place. Solve up to 70% faster without having to search through your systems, servers or virtual machines. Control your infrastructure in real time to prevent problems before they affect critical services to users. Reduce climbs up to 90% in providing role-based, secure access to data to solve problems quickly and efficiently access.

**Correlate events across all layers of your infrastructure for service level visibility:** Find causal links between service degradations and underlying infrastructure elements. Detect patterns, predict events and prevent future service degradations by correlating real-time streaming data with terabytes of historical data. Persist 100% of your machine data from across every tier of your application and infrastructure, within your traditional datacenter or in public, hybrid and private cloud environments. Monitor changes and events to respond instantly to system performance deviations, availability problems or security and compliance issues.

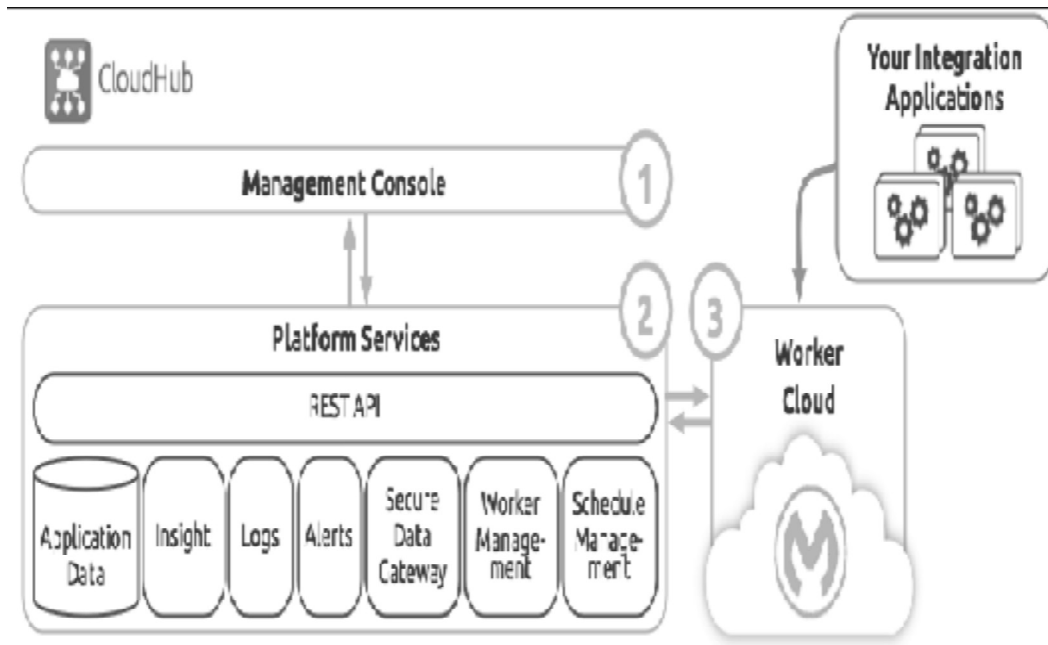
**Reduce costs and improve operational efficiencies:** Use the power and scalability of the platform to support a wide variety of monitoring and analytics use cases: security, compliance, application delivery and business analytics. Reduce the number of tools and skills needed to maintain and monitor complex infrastructures.

**Enable innovation and make better business decisions with IT operational analytics and intelligence:** Improve user satisfaction and customer retention by providing immediate access to role-based, relevant and reliable information. Accurately measure and analyse how service levels are delivering against business objectives. Accelerate growth with real-time insights into product usage, user preferences, capacity constraints, asset inventory, resource allocation and service utilization. Provide transparency for appropriate cost tracking and charge back with detailed analytics on data gathered across several systems. Understand usage patterns and geographical trends; learn about your heaviest users and abusers; track and record web activity and easily identify business impact.

## 3. CLOUDHUB ARCHITECTURE

CloudHub has been built from the ground up to provide enterprises with a multi-tenant, secure, elastic, and highly available integration platform as a service (iPaaS). This document describes how the underlying mechanisms of the CloudHub platform work to achieve these goals. To understand CloudHub's approach to security and availability, it's important to understand the architecture behind CloudHub. CloudHub includes three major components: the management console, the platform services, and the worker cloud. These three components work together to run your integration applications.

**Application Integration:** Application integration is about connecting business applications at a functional level. It's not simply data sharing, but rather, involves triggering some activity in another application by issuing requests or sending "live" business events. These applications can do everything from synchronizing data from Salesforce to a database, to publishing a SOAP or REST API, to creating complex orchestrations of business processes.



**Management Console:** The CloudHub management console is used to upload and manage your integration applications at runtime. The console surfaces useful monitoring information from the platform services and also works as a comprehensive dashboard for both application-level and account-level management. Administrator account holders can use the management console to add and manage other users in the organization, define user roles, and create and manage sandbox environments.

**Platform Services:** CloudHub’s platform services are responsible for coordinating all aspects of the platform. They coordinate deployment of applications, monitor integrations, provide analytics data, store application data, run scheduled jobs, and more. Many of these services are also exposed through RESTful APIs.

**Locality:** Each worker runs in a specific worker cloud, the US, EU, Australia, etc.

Each worker is a dedicated instance which runs your integration application. Workers may have a different memory capacity and processing power depending on how you configure them at application level. Workers can be scaled vertically by selecting one of the available worker sizes. With Cloud Fabric, you can also scale your applications horizontally by adding multiple workers and load distribution over queues.

**Global Worker Clouds:** CloudHub offers different worker clouds in different regions of the world: the United States, the European Union, and Australia. This global distribution allows you to host your integration in a location that is closest to your services, thus reducing latency. It may also allow you to adhere with local laws, such as the EU Data Protection Directive. The management console and platform services are hosted in the United States. When your application is running in the EU, all HTTP services are also available over the eu.cloudhub.io domain. For example, if you created the application “myapp”, then its domain would be “myapp.eu.cloudhub.io.” This load balancer is hosted in the EU, ensuring that your data will never be transferred outside the EU when invoking HTTP services.

### 3.1. Workers and Multi tenancy

Because different levels of security and isolation are needed depending on the service, the platform provides two different levels of multi tenancy.

**First,** the worker cloud is a multi tenant cloud of virtual machines. These VMs provide the security and isolation needed for your integrations to run custom code without affecting others.

**Second**, the management console and the platform services have a “shared everything” architecture—all tenants share the same web UI, monitoring services, load balancers, etc. These services do not process or transmit your data.

### 3.2. Redundant Platform

All of CloudHub’s platform services, from load balancing to the API layer, have at least one, built-in layer of redundancy and are available in at least two data centers at all times. All data centers are at least 60 miles apart. This redundancy ensures that even if there is a data center outage, the platform remains available.

### 3.3. Intelligent Healing

CloudHub monitors the worker clouds for any type of problems and provides a self-healing mechanism to recover from problems. If the underlying hardware suffers a failure, the platform migrates your application to a new worker automatically. In the case of an application crash – whether due to a problem with custom code or a bug in the underlying stack – the platform recognizes the crash and can restart the worker automatically.

### 3.4. Zero Downtime Updates

CloudHub supports updating your applications at runtime so end users of your HTTP APIs experience zero downtime. While your application update is deploying, Cloud Hub keeps the old version of your application running. Your domain points to the old version of your application until the newly uploaded version is fully started. This allows you to keep servicing requests from your old application while the new version of your application is starting.

### 3.5. CloudHub Fabric

Cloud Hub Fabric provides scalability, workload distribution, and added reliability to CloudHub applications on a per-application basis. These capabilities are powered by CloudHub’s scalable load-balancing service, worker-scaleout and persistent queuing features.

### 3.6. Worker Scale-Out and Data Center Redundancy

With CloudHub Fabric, you can add multiple workers to your application to make it horizontally scale. This also adds additional reliability. CloudHub automatically distributes multiple workers for the same application across two or more datacenters for maximum reliability. Doing extract-transform-load (ETL) processes in the cloud introduces a few new considerations. While latency may not be as big of a factor for batch processes, bandwidth will be. Moving petabytes of data over an Internet connection is still not a speedy endeavor. Where possible, consider a Cross Connect architecture to maximize bandwidth while minimizing latency. Data integration solutions frequently include staging databases where data is manipulated or standardized as part of the processing pipeline. Depending on where the data is coming from, you may choose to stage sensitive data on your internal network instead of storing it temporarily on public cloud-based servers.

When deploying your application to two or more workers, the HTTP load balancing service distributes requests across these workers, allowing you to scale your services horizontally. Requests are distributed on a round-robin basis.

### 3.7. Persistent Queues

Persistent queues ensure zero message loss and allow you to distribute non-HTTP workloads across a set of workers. For example, if your application is deployed to more than one worker, persistent queues allow inter

worker communication and workload distribution. If a large file is placed in the queue, your workers can divide it up and process it in parallel.

Persistent queues also guarantee delivery of your messages; even if one or more workers or data centers go down, persistent queues facilitate disaster recovery and provide resilience to hardware or application failures.

For more details about worker scale-out and persistent queues, refer to CloudHub Fabric.

### 3.8. Security

CloudHub architecture provides a secure platform for your integrations. Securing your payload data is critically important. To this end, CloudHub does not inspect, store, or otherwise interact directly with payload data. CloudHub workers provide a secure facility for transmitting and processing data by giving each application its own virtual machine. This ensures complete isolation between tenants for payload security, and isolation from other tenants' code. CloudHub collects monitoring, analytics, and log data from CloudHub workers and may perform actions on behalf of the user on CloudHub workers. All communication between CloudHub platform services and the worker cloud is secured using SSL with client certificate authentication. This ensures that unauthorized parties cannot read data and that they cannot initiate unauthorized actions. It's an important consideration when working with distributed systems, and identity management is an oft overlooked area. We've all become accustomed to countless credentials for the variety of business systems (on-premises and off-premises) that we use every day. Whether accessing cloud systems, integrating with partner systems, or enabling a remote workforce, a strong identity management strategy is key.

## 4. CONCLUSION

In this paper we proposed the solution using CloudHub Architectural design for information silos which emerge when processes and data are kept in separate servers or data centers and are unable to interact with other systems. Data centers grow in size with the deployment of each new application, minimizing resource utilization and reducing the overall efficiency of the enterprise. CloudHub, an Integration Platform as a Service (iPaaS), meets this need by offering a robust and flexible integration solution capable of handling different integration scenarios. CloudHub, the iPaaS component of Anypoint Platform™, is the only integration platform as a service (iPaaS) that securely connects SaaS and on-premises applications with a hybrid deployment option for maximum flexibility.

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