

WHITEPAPER

Top 3 considerations for integrating hybrid environments



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Data is everywhere

Each year hundreds of new SaaS applications go to market, and millions of new devices come online. Together they're creating billions of interactions, a seemingly infinite loop of data between customers, employees, and systems. For companies, this explosion presents a tremendous opportunity to reduce overhead, expand reach, and better leverage data. Businesses must seize the opportunity to take control of their data; those who don't, make it easier for competitors to win the market.

But the hurdles to using data to achieve a competitive advantage are daunting. Data must be actionable, secure, and relevant. Connections between new SaaS applications and older legacy systems must be streamlined.

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Achieving this is anything but easy. Many legacy systems weren't designed to keep up with changing business and tech challenges — that is, to communicate with current and future SaaS applications. Moreover, the mass adoption of SaaS applications has left companies with a complex mix of in-house and cloud-based infrastructure. The old and new exist side by side, but in separate silos. Of course, to paint existing systems as a hindrance would be to overlook the massive investment in them and their centrality to the business. With so much valuable data stored within the in-house infrastructures, they must be kept up and maintained.

For companies to fully realize the potential of new apps and devices, data must be easily accessible. Devices, apps, and legacy systems must be integrated, and to do this, enterprises must embrace a hybrid world.

In this paper we'll discuss how enterprises can connect legacy systems to the cloud to create a hybrid ecosystem. We'll learn how solutions like enterprise service buses (ESB), integration platforms as a service (iPaaS), and modern middleware can address both the integration challenges of the present and help IT executives future-proof their companies. The best practices covered in this paper will help businesses with both evaluation and implementation of a successful hybrid integration strategy.

The now and the very near future

The world is bursting with connectivity — applications, systems, services, and databases are all waiting to be connected, on-premises and in the cloud. Yet many companies avoid connecting these new apps to their foundational systems, due to concerns ranging from security to lack of modern interfaces. And faced with the reluctance of enterprise IT to deliver the functionality they need, stakeholders are finding workarounds that can make integration even more difficult.

The case of the business user

There are thousands of cloud applications on the market today, and surveys of companies big and small show employee self-serve adoption is at an all-time high. An average enterprise has hundreds of SaaS applications in use across the employee base. From document sharing to webinar management, from sales to social, each app fulfills a need—improving efficiency or driving key initiatives—and often addresses a perceived deficiency in existing systems. And while many IT executives think they can count on one hand the number of systems and applications in their ecosystem, adoption is happening at an exponential rate and companies are running hundreds of SaaS applications without IT involvement.

On the consumer side, companies are encouraging customers to engage with an online corporate presence. Consider the case of Facebook, Twitter, and LinkedIn: These online representations of a company are ubiquitous enough that businesses that fail to use them are at a competitive disadvantage. And this engagement is providing a ton of valuable consumer data, allowing businesses to learn specifics about their customers, from demographics and psychographics, to likes and dislikes, buying preferences, preferred channels of engagements, and more.

In both cases the problems are obvious: siloed data, unapproved or unknown security protocols, unwieldy systems architecture, with no forethought toward integration or scaling. And with data both on-premises and in the cloud, hybrid environments are emerging.

Connected devices and the modern data explosion

Cisco Systems predicts there will be 50 billion digital devices in use by 2020. The huge growth in mobile usage is well documented, but this forecast goes much further than smartphones and tablets. The internet of things, with networked household appliances, biometric trackers, industrial devices, product SKUs, even telematics in cars, is creating another point of entry for customers, employees, and even other systems to interact with brands. These interactions are being captured as digital events—as data—that needs to interact with existing systems of record.

Meanwhile, enterprises with legacy systems foundational to business — whether they were proprietary builds or locally-hosted third-party software — could never have predicted how rapidly the technology landscape would change.

If data is the currency, connectivity is the gold standard. The future of the technology economy will be based on how efficiently companies consume data, and how quickly they can act on it.

The emergence of hybrid

Enterprise architecture has clearly changed. While businesses are shifting to the cloud, not everyone is ready to move the entire enterprise to the cloud. Moreover, valuable data residing in legacy systems cannot be left behind. Hybrid environments are becoming the norm, allowing businesses to integrate systems that reside both on-premises and in the cloud to create connectivity across the enterprise.

Hybrid integration bridges the network divide between your existing enterprise databases, legacy systems, and SaaS applications. It solves the problem of taking existing information from on-premises systems and leverages new systems to make way for innovation, competitive advantage, and new business models. It allows the new enterprise to agilely respond to emerging trends in the market, while leveraging the data and functionality of on-premises legacy applications.

For IT executives the question becomes: How are you preparing for these trends internally? Can you adapt fast enough to be competitive now and in the future? How do you retain legacy systems and increase their value?

To put it another way: How are you adapting to hybrid environments?

Hybrid drivers

We've already seen that new devices and applications are driving the hybrid ecosystem. But why is this a problem for IT?

To name a few issues:

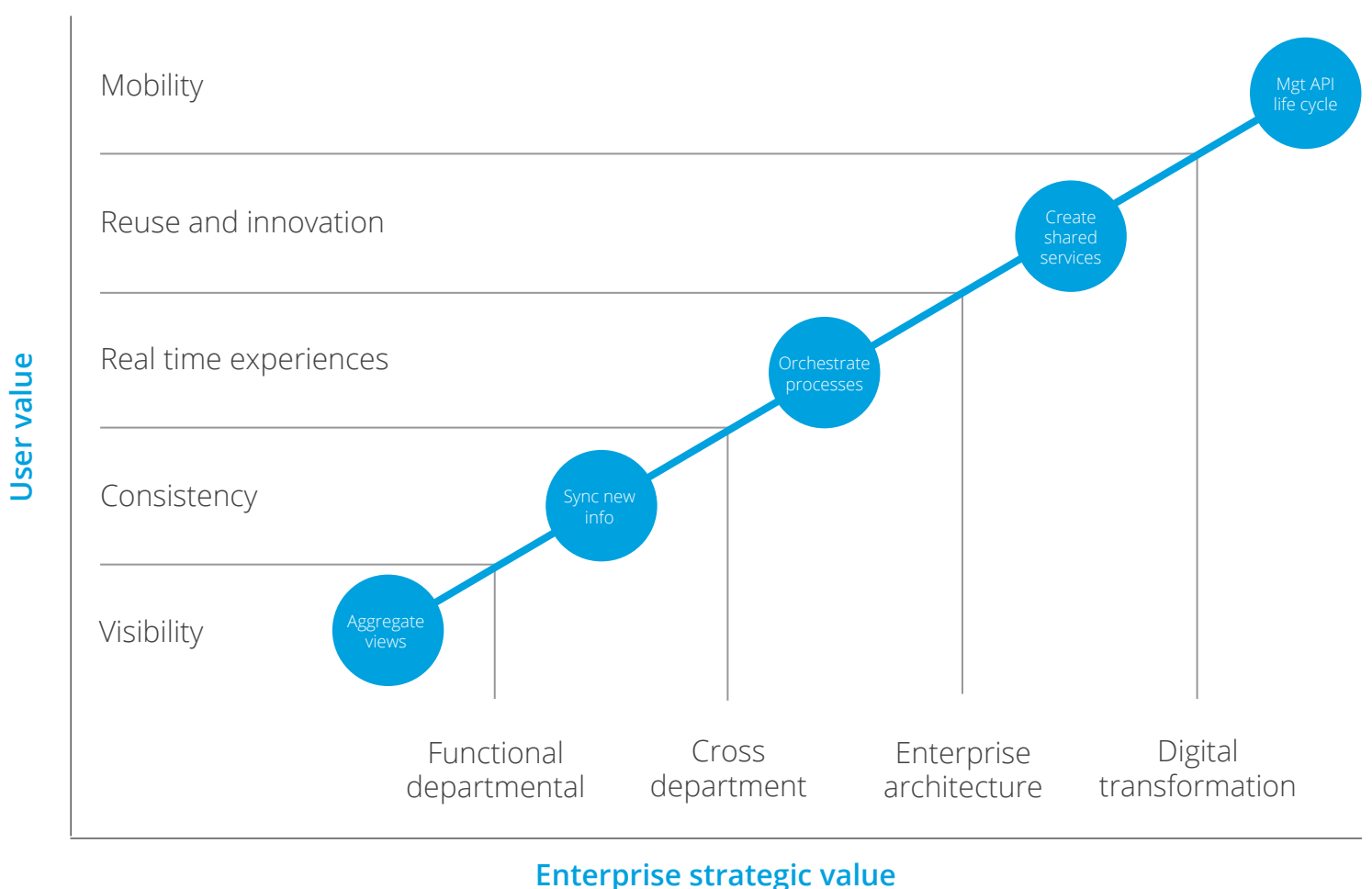
- Internal adoption of line-of-business applications is creating data silos.
- Mobile, web, and even in-store initiatives are creating

events, and every customer interaction is being captured digitally. This data is a corporate asset but has no interaction with systems of record.

- Systems of record aren't going away. While "legacy" can have a negative connotation, these
- systems remain critical to business. They represent huge capital investments, as well as investments in employee time and organizational knowledge.
- Without a well-planned approach to hybrid integration—that is, without solid architecture and middleware—problems can quickly arise.

The evolution of integration

Most IT professionals are aware of what's happening with devices, apps, and data, and are on the hunt for a solution. Whether it's a simple point-to-point connection or a complete ESB solution, enterprises are attempting to connect their systems, services, and SaaS applications. And this work often follows a set pattern of development and rising complexity.



At the simplest level, enterprises adopt a new SaaS app and rely on one-time data uploads to populate the blank slate. While this can be cumbersome and time-consuming for staff, it does the job of taking proprietary data and making it available for users on the cloud. The bigger problem is that this is a one-time event. Even regular uploads mean the application is operating without totally accurate data the majority of the time. Recognizing this need for syncing, IT often layers in timed FTP or ETL tools, loading directly from in-house databases. These simple point-to-point connections are convenient for a single integration, yet if your enterprise utilizes multiple cloud applications, you find yourself with multiple, independent point-to-point integrations, which can quickly get out of sync, and heavy throttling that can cause performance issues on the central system.

Businesses must adopt hybrid solutions to help them create connectivity between older legacy systems and newer SaaS applications in the cloud.

As SaaS adoption deepens and the number of systems increases, companies turn to more traditional process orchestration for things that are more automated and event driven, and this is where you begin to see more traditional SOA principles emerge. As services are orchestrated across SaaS and on-premises, they must be shared across various groups across the enterprise. We then begin to see shared services emerge.

Some enterprises orchestrate multiple services between on-premises systems and cloud applications, but these shared services are often complex and brittle, and can present staffing

and skill-set concerns—SOA scripting like SOAP and WSDL is considered archaic by many young developers, who would much rather learn languages like Javascript that will be useful in their future careers. Yet shared services need to be consumed, and they need to be repackaged as APIs.

Although integration complexity has increased, it has also become more important than ever. Businesses must adopt hybrid solutions to help them create connectivity between older legacy systems and newer SaaS applications in the cloud. Enterprises must consider the future of their business and look towards long-term solutions rather than short-term tools, and consider platforms that enable API development and help prepare them for ongoing change.

The top three considerations in connecting hybrid environments

There are three main things to consider when connecting hybrid environments:

- Architecture
- Security and compliance
- Scale and time to value

Each is equally important, and careful thought must be given to both where a company stands today and where it needs to go in the future.

Architecture: finding the enterprise's center of systems gravity

How should an enterprise think about the architecture of a hybrid ecosystem? Most large companies will have data and applications both in the cloud and hosted on-premises, begging the question of where to locate connectivity services. An on-premises ESB? An iPaaS in the cloud? Really, the question to ask is:

Where is your center of gravity?

If a business operates entirely in the cloud or completely free of it, the answer is clear. But the vast majority of companies exist in the grey area between, and it's less obvious where to deploy your integration solution. In a hybrid environment—even if applications are mostly on-premises or mostly in the cloud—it makes sense to co-locate where integrations between apps run. A hybrid SaaS and on-premises business model requires a hybrid solution.

And while this deep analysis of current infrastructure is absolutely necessary, IT must also consider the future. Beginning on-premises integrations is perfectly fine, but the question of how to move to the cloud looms in the background. Integration solutions must evolve as the business does. An integration solution should prepare companies to shift their center of gravity as business requirements change, future-proofing against new trends and allowing the business to scale over time.

But is it secure?

Historically CTOs and CIOs were de facto security officers. Their main job was the protection of corporate data and assets, to safeguard it behind impenetrable walls. The evolution of the role has carried with it the opportunity for CTOs and CIOs to be forward thinking, strategic leaders—to shape and guide the company through technology.

Still, this concern over security and compliance is at the core of IT. Data is a core asset, and it is the job of executive technologists to protect against breaches and ensure systems conform to national and international laws. One false step brings down the business.

In this regard hybrid environments can seem riddled with holes, and scarier than ever.

In fact most companies already have some data in the cloud—whether it's the sales team using Salesforce or HR using SuccessFactors. With enterprise-level tools like these, it's not so much a question of the security of the cloud, but rather of company policy. Perhaps customer financials are never allowed on the cloud. As companies move more data to the cloud, the theme of the integration debate often shifts from prohibition to precaution. Any integration solution should encrypt data in transit and at rest.

What questions should you ask?

- › What data does my company allow in the cloud and what does it not?
- › What precautions should I take around sensitive or personal data?
- › How do I comply with my local laws? (E.g., the EU Data Protection Directive.)
- › How do I securely access data in my data center from the cloud?

Of course, company policy is only a small piece of the compliance concern. With the ubiquity of the web, most companies will have business transacted across international borders, and invariably these transactions include some amount of sensitive data. Here companies must consider compliance with local laws. For example, the European Union General Data Protection Directive states that personally identifiable data cannot be transferred outside of the EU without a safe-harbor agreement in place. Any integration solution should provide a toolkit for adapting to multiple regulations, and for remaining compliant throughout.

Finally, this hybrid world means any enterprise must determine a secure way to access cloud data from the on-premises data center, and vice versa.

Scale, time to value, and value potential

There is a normal progression for enterprises looking for an integration solution. Typically this starts with simple connections, data sync, and point-to-point. These are reactive solutions—that is, IT is looking to solve a present problem for the business.

What questions should you ask?

- › What's the scope of your project?
- › What are your goals for your organization?
- › What is your geographic scale?
- › Do you have distributed teams?

What are your timelines?

But typically IT will have a larger vision that involves getting data out and getting value from it by enabling field staff or customers to interact with it, or third-party developers to consume and repurpose that data. This leads into the API discussion, and is a key way in which IT can directly drive revenue and growth.

When considering any integration, it is useful to start by considering project scope. Point-to-point connections may solve an immediate problem, but they may also introduce more down the line. To remain poised to reap future success from a solution, a platform is usually the best solution.

“Scale” refers to readiness to adapt and grow in both size and complexity. While a point-to-point integration or an on-premises ESB may work for now, it is likely not robust enough to prepare infrastructure to adapt to new apps, new data sources, and new calls for in-house data.

“Time to value” refers to the time required to manage and maintain any integration solution. With the ubiquity of the cloud, and the low cost of cloud infrastructure solutions like Amazon Web Services, it would put any company at a disadvantage to use a solution that requires server management or brokers for queuing. Integration must scale out of the box. Further, it should be globally available, allow for the creation and management of APIs, and allow the enterprise to realize more value and more revenue from existing purchased applications.

Solution: unified platform

A unified integration platform caters to the challenges of integrating in the cloud, on-premises, or in a hybrid environment. The limited successes of middleware and the ease of the cloud sets the stage for a unified platform, ensuring both sides of the ecosystem are taken care of. Data from on-premises and the cloud must be made accessible and actionable, and increase the utility of apps.

A unified platform should:

- Provide connectivity to and from SaaS apps through APIs.
- Be service-enabled out of the box, regardless of where it's hosted.
- Have interfaces that allow secure, scalable access.
- Allow the combination of SaaS and enterprise data into unified APIs, which third-party developers can consume.
- Have a single IDE for developers, a deployment platform for devops, and provide IT a holistic view of their entire ecosystem.
- Let you deploy both on-premises and in the cloud.

Case study: a large pharmaceutical company

A large pharmaceutical company had separate web and mobile product interfaces in forty-four countries, and each country had multiple brand managers for the different prescription drugs in the company's portfolio. This led to a fragmented web experience for doctors and to the creation of local databases housing valuable but siloed data.

Corporate leaders had a strategy to pull all these pieces together. They wanted to capture doctor experiences and drive the data back into their CRM so that sales and support staff could provide better service. The company also wanted to support a mobile experience, putting a digital-marketing layer in place for the developers of the country-specific websites to consume.

The company already had some of this in place. They had custom mobile apps, some packaged apps that controlled a number of these connectivity functions, and they had an enterprise service bus in place. But the service bus was brittle, the web services complex, and their younger programmers didn't want to learn SOAP or WSDL. The company knew it needed to integrate and utilize a more centralized middleware solution that would help IT modernize and prepare for the future.

The company turned to MuleSoft for help. With MuleSoft as the integration platform, the company added an agility layer, and a new service layer that would sit between the cloud and on-premises architecture, powering the endpoint apps with the key data that sat in the enterprise.

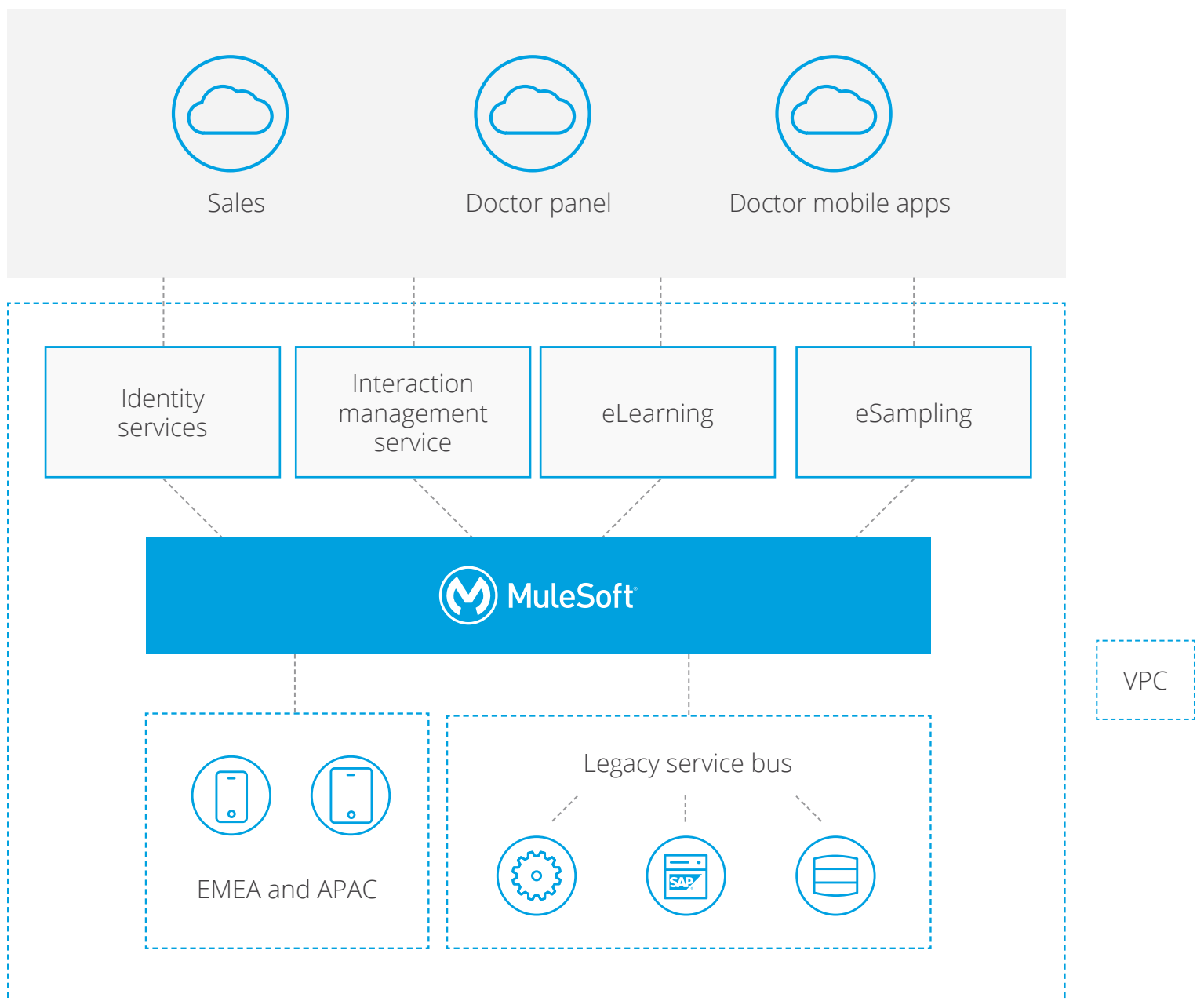
A new SaaS application became a cloud-based system of record with APIs that called each country's physician registration service to verify doctor identity.

An interaction service captured social and cookie interactions, feeding big data and the customer master system, automating marketing campaigns, and providing a more customized experience for doctors.

An eLearning component offered doctors a place to learn about new drugs, and data on physician browsing history was captured for sales and service consumption.

An eSampling component made mobile order sampling easy.

Finally, the company packaged the existing system and new apps with MuleSoft's Anypoint Platform™ to securely connect to on-premises systems from the cloud.



Learn more about [Anypoint Platform](#) and how it can help your business with your hybrid integration needs.

About MuleSoft

MuleSoft, a Salesforce company

MuleSoft's mission is to help organizations change and innovate faster by making it easy to connect the world's applications, [data](#), and [devices](#). With its API-led approach to connectivity, MuleSoft's market-leading Anypoint Platform™ empowers over 1,600 organizations in approximately 60 countries to build application networks. By unlocking data across the enterprise with application networks, organizations can easily deliver new revenue channels, increase operational efficiency, and create differentiated customer experiences.

For more information, visit mulesoft.com

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