MuleSoft

WHITEPAPER

How APIs power digital transformation for energy and utilities

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Executive summary

The energy and utilities industries are undergoing a dramatic shift driven by rising stakeholder and customer expectations, increasing economic and political uncertainty, and emerging new technologies. Stakeholders demand greater transparency into the supply chain to optimize operations and cut costs. Customers demand easier access to their data as well as digital channels to increase engagement with their energy and utilities providers. Geopolitical activity, coupled with changing governmental policy, drives unparalleled industry uncertainty. Moreover, advancements in technology, such as IoT and renewable energy sources, are opening up new business opportunities, while at the same time increasing competition. Business leadership must prepare their organizations to adapt and evolve with the industry.

To remain competitive and profitable in light of these shifts, energy and utilities firms must transform their operating model, leveraging technology as a change catalyst. Doing so, however, increases demands on IT. In particular, integration has become a bottleneck that slows down digital transformation as it is often delivered in these industries via point-to-point custom code.

MuleSoft's solution to this bottleneck is API-led connectivity, a new way of thinking about integration. With an API-led approach, organizations can launch and scale IT projects up to four times faster due to the reusability of APIs. Within the energy and utilities industries, this means that IT can rapidly launch projects that improve the customer and stakeholder experience, increase employee productivity, and enable new products and services in response to major industry shifts. This whitepaper will provide an overview of API-led connectivity, how it addresses the IT demands of the energy and utilities industries, and provide examples of how industry leaders have effectively implemented this approach.

Case study: Siemens

Siemens is the largest manufacturing and electronics company in Europe with more than 351,000 employees across the world. The company was charged with rolling out 60 million smart meters to accommodate UK climate change regulation; as a result, they needed a more efficient way of managing their complex network of devices, vendors, and suppliers.

With MuleSoft, Siemens leveraged APIs to unlock siloed services and data residing within their legacy IBM mainframes, and to expose this data to their network of service providers. This approach allowed their mobile and web applications to consume this data — contributing to a superior partner and customer experience — while maintaining the downstream integrity of these systems through throttling and rate limiting API policies. Furthermore, Siemens has repurposed these APIs to expose energy consumption data to regulatory authorities in real-time — eliminating the need to manually prepare and submit reports.

With MuleSoft, Siemens has increased project delivery speed by 50%. They've cut down the amount of time required to deliver new project MVPs in half. And in doing so, they've laid a foundation to help the business rapidly innovate and redefine how energy is consumed.

> "With MuleSoft, we're thinking about service-based, API-driven, architecture, allowing us to be more dynamic and have better speed to market."
>
> JEFF HEATHCOTE, GLOBAL HEAD OF IT AND DIGITAL ENABLEMENT, SIEMENS

Evolving customer expectations increase pressure on IT to deliver digital experiences

A central pillar of the world's most successful companies and organizations includes some version of "the customer comes first." This customer-centric philosophy has completely transformed what it means to provide customer service in the last decade. The energy and utilities industries are no exception to this philosophy as customer and stakeholder expectations are rapidly evolving. Customers expect to be heard, understood, and served with phenomenal speed and personalized service.

For example, within the utilities industry, customer satisfaction has taken a much more powerful role in the success of the entire organization compared to years before. According to a Deloitte study[1], customers have a growing appetite and expectation for higher engagement with their utilities providers. One way of delivering such engagement is by sending outage alerts to keep customers updated on restoration time for repairs and planned maintenance. Customer satisfaction is also key to operational well-being within the regulated utilities markets. High customer satisfaction gives utilities the upper hand in rate case negotiations, eliminates the possibility of fines, reduces the threat of deregulation, and builds goodwill among both regulators and consumers. As a result of these changing expectations, leadership has placed increasing pressure on IT to improve the customer journey through easier data access, personalized services, and higher engagement.

Demands on IT include delivering omnichannel experiences where customers can log in through a mobile application or a single sign-on web portal and immediately have access to

1 https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-power-utilities-outlook-2019.pdf

personalized dashboards and tools to manage and view their data. With such capabilities right at their fingertips, consumers can handle billing, monitor consumption, and control usage. Not only does the digital experience drastically improve the customer journey, but it also leads to a reduction of costs through paperless billing, reduced average handling time, and fewer field maintenance calls.

Similar to utilities providers, energy companies have seen an increase in expectations from the various constituents they serve — from customers to regulators to suppliers and distributors. Forward-leaning energy providers have embraced digital transformation as a means of improving the experiences of these constituents that they serve, which improves operational efficiency. For example, by allowing a midstream partner transparency to distributor inventory levels through a mobile application, they can optimize delivery schedules to ensure a continuous supply of resources. As organizations within the industry expand so do their network of stakeholders, increasing the value of such investments in digital capabilities. Increasingly, such digital investments are also used to improve customer engagement within downstream lines of business. In an industry with low switching costs and lack of brand affinity, digital capabilities — from loyalty programs to in-app payments — enable differentiation outside of price.

Economic and political uncertainty increase pressure on IT to improve employee productivity

Increasing customer expectations are but one of a number of reasons why energy and utilities providers have increased their focus on digital transformation. In addition to turning outward to meet the growing expectations of external constituents, these firms face increasing pressure to turn *inward* to improve their own operational efficiency.

Increased price volatility due to geopolitical instability as well as unpredictable regulatory environments have created more uncertainty within the energy and utilities industries than ever before. The guarantee of stable profit margins is at the will of the energy markets, and with new political leadership comes varying approaches to environmental policies and regulations. For example, since 2017, the Trump administration has rolled back more than 80 environmental rules and regulations in a bid to loosen federal oversight within the industry[2]. On the other hand, a majority of the European Union member states are working towards a 2050 target to reduce all carbon emissions to net zero[3]. In response to this increasing economic and political uncertainty, business leadership is looking towards technology to improve employee productivity as a measure to boost operational efficiency. Making data more accessible to employees is at the core of improving productivity out on the field. For example, with such powerful data at their fingertips, rapid response teams will have the ability to optimize maintenance routes, order critical parts, and utilize predictive analytics to mitigate future repairs. By transforming how their

2 https://www.nytimes.com/interactive/2019/climate/trump-environment-rollbacks.html

3 https://www.independent.co.uk/news/world/europe/climate-change-2050-eu-eastern-europe-carbon-neutral-summit-countries-a8968141.html

bottom line operates, companies will be prepared to address increasing unpredictability within the economic and political landscape.

Already bogged down by limited resources and time, IT teams are now tasked with improving employee productivity as a means to increase operational efficiency across the energy and utilities industries. Within the energy industry, projects that encompass this initiative include providing field teams with mobile devices that contain interactive dashboards and tools allowing them to easily access essential operational data from multiple systems. Rig workers can also benefit from mobile access to essential data to continuously monitor resource output, implement preventive maintenance, and ensure optimal operational efficiency. Similarly, within the utilities industry, contractors and field teams can utilize mobile access to data to optimize routes, ensure rapid delivery of critical parts, and provide live updates regarding maintenance and repairs to affected consumers.

Competitive forces increase pressure on IT to launch new services and products

Technological advancements are pushing companies within the energy and utilities industries to expand their product portfolios beyond their traditional offerings. These advancements are fueling competition and opening up new opportunities for revenue. IoT technologies and renewable energy sources are enabling the optimization of current business lines and the development of new ones. Moreover, the energy and utilities industries are continuously expanding into unconquered territory through M&A; with each new expansion comes a multitude of legacy systems and siloed data that must be integrated and unlocked to drive operational efficiency between all entities. Leadership recognizes the massive opportunity for growth as well as the need to remain competitive through technology. They view the expansion of their product and services portfolio as the answer to this fundamental shift. As a result, they are putting increasing pressure on IT to build out new revenue channels and accelerate R&D, as well as provide support after the acquisition of business units.

On top of maintaining current systems, IT is being tasked with building out new lines of business and supporting post-acquisition activity. Within the energy and utilities industries, projects can include new markets, services, and applications that span all three major value chain sectors. Specifically in the energy downstream sector, IT can develop mobile applications that deliver a seamless customer experience by locating nearby gas stations and allowing payments through the app. On the other hand, within the utilities downstream sector, new marketplaces can be established to enable consumers to buy and sell energy from their own distributed energy resources. For example, Strala, a mobile marketplace by BP using blockchain and IoT, allows consumers to buy and sell excess

solar energy to other members of the community. Furthermore, within utilities, the development and installation of smart meters exposes a massive growth opportunity to develop new revenue channels.

In addition to new products and services, heavy merger and acquisition activity places an increasingly massive burden on IT to address the multiple redundancies of HR, ERP, and billing systems. IT projects play a critical role in the consolidation and rationalization of all these systems to cut costs, improve efficiency, and mitigate complications. With the right resources, IT can ensure a smooth and swift migration of employee, customer, and financial data between old and new systems.

Every single shift or trend within the energy and utilities industries is leading towards the same thing — more IT projects. IT teams are already bogged down by requests from leadership. Additional pressures from major shifts in these industries are only further impeding IT's ability to deliver projects on time and within budget. However, every project has one thing in common: they all require integration between numerous systems, applications, and devices. It is clear that current methods of integration are not effective in scaling projects or delivering quickly. As a result, leadership must rethink their integration strategy.

Case study: British Petroleum

2x
faster app development

90k
BPme transactions daily

100+
APIs available in C4E

Challenge

Meeting the digital demands of the energy business at speed

BP is one of the largest energy companies in the world, producing 18.4M tonnes of oil per year and powering economic growth with 74,000 employees in over 70 countries.

As the world demands more energy, it also demands that it be produced and delivered in new ways with fewer emissions. BP is embracing this dual challenge and making bold changes to modernize its business.

The key to BP achieving these business goals is to unleash the potential of digital solutions, big data, and advanced technologies. The BP information technology and services (IT&S) team is increasing the pace of technology delivery and securing data access, while reducing dependencies on costly and time-consuming legacy systems.

Objectives

Building a foundation for the future

BP IT&S needed to evolve by:

- Modernizing legacy systems to speed up access to applications and data, while also supporting the adoption of new technologies (e.g. mobile, cloud, blockchain, and IoT).
- Shifting the role of IT from simply delivering technology solutions to enable the business to take advantage of digital technology.
- Developing a Center for Enablement (C4E) to evangelize BP's API strategy and drive adoption.

Solution

Accelerating IT development speed with an application network

BP has adopted an API strategy with MuleSoft to accelerate IT delivery. By unlocking key systems, applications, and data with APIs, central IT can empower the business to self-serve and develop their own

technology solutions — speeding up project delivery and supercharging innovation.

"Our API strategy is right at the heart of our application ambition and technology transformation," says Diana Kennedy, VP, IT&S Strategy, Architecture and Planning, BP. "We can now embed digital in everything that we do."

BP established a C4E central incubation team to evangelize APIs the business can self-serve to deliver technology initiatives faster. Today, the C4E serves more than 20 product teams and over 100 APIs are available.

BP delivered innovative products and services with Anypoint Platform™, including:

- **BPme:** A mobile app that provides consumers with a frictionless fueling experience, enabling them to easily locate the nearest gas station, pay for fuel, earn rewards, and more.
- **Air BP:** A solution to speed up partner onboarding for Air BP, a program that supplies over 6.5B gallons of aviation fuel annually.
- **Strala:** A mobile marketplace using blockchain and the IoT to enable consumers to buy and sell solar energy.
- **Operator workbench:** A tablet app where employees can easily document maintenance data, log hours, and more — driving safety and productivity for workers.

"Before we had an API strategy, it would have required complex planning and specialist developer skills to deliver new products and services to market," says Paul Schuster, Chief Architect, Digital Platforms, BP. "It would have taken us months to build just one solution. Now, with the Mulesoft Anypoint Platform in place, we can integrate SaaS systems and on-premises applications rapidly."

BP's API strategy continues to accelerate IT delivery speed, while maintaining central governance — enabling the IT&S team to deliver on the digital needs of a global energy business. Over a third of the APIs and integrations built are reused. For example, the team initially released the BPme app in specific regions and, after witnessing great success, the team launched the app in new markets twice as fast by simply reusing the same APIs.

"The success of BPme in the smaller geographies meant that we could roll this out really fast for a lot of countries." says Karthik Kesavan,

Service Owner, C4E, BP. “Within just one year of launching, over one million users have downloaded the BPme app.”

Results

Increasing the pace of technology delivery

BP’s application network, underpinned by APIs, drives faster project delivery and ensures application reliability and scalability. A great example of this is the BPme app, which now allows BP to process over 290,000 transactions daily.

Looking ahead, BP hopes to continue its digital transformation with a modern application architecture.

> “When we look for a strategic partner, we are not only looking for a technology, we are looking at the roadmap, team, and vision, of that company. MuleSoft’s culture and the caliber of the team we worked with made a profound impression on us.”
>
> DIANA KENNEDY, VP, IT&S STRATEGY, ARCHITECTURE AND PLANNING, BP

“MuleSoft has been really great to work with us to evangelize API-led thinking throughout our organization,” said Schuster. “The fundamental challenge we have in BP is how do you democratize that thinking and get that thinking into thousands of people? That is where we will really begin to see the benefits.”

Integration: The defining challenge to achieve digital transformation

In light of the digital transformation imperative, IT has taken center stage as a key enabling function supporting the survival and growth of the modern energy and utilities provider. New technologies and tools support anytime, anywhere access of data, real-time processing, and increasingly rich analytics functionality. As executives and line-of-business owners increase the pressure on IT teams to deliver these new capabilities to support strategic business objectives, demands on IT have exceeded IT delivery capacity.

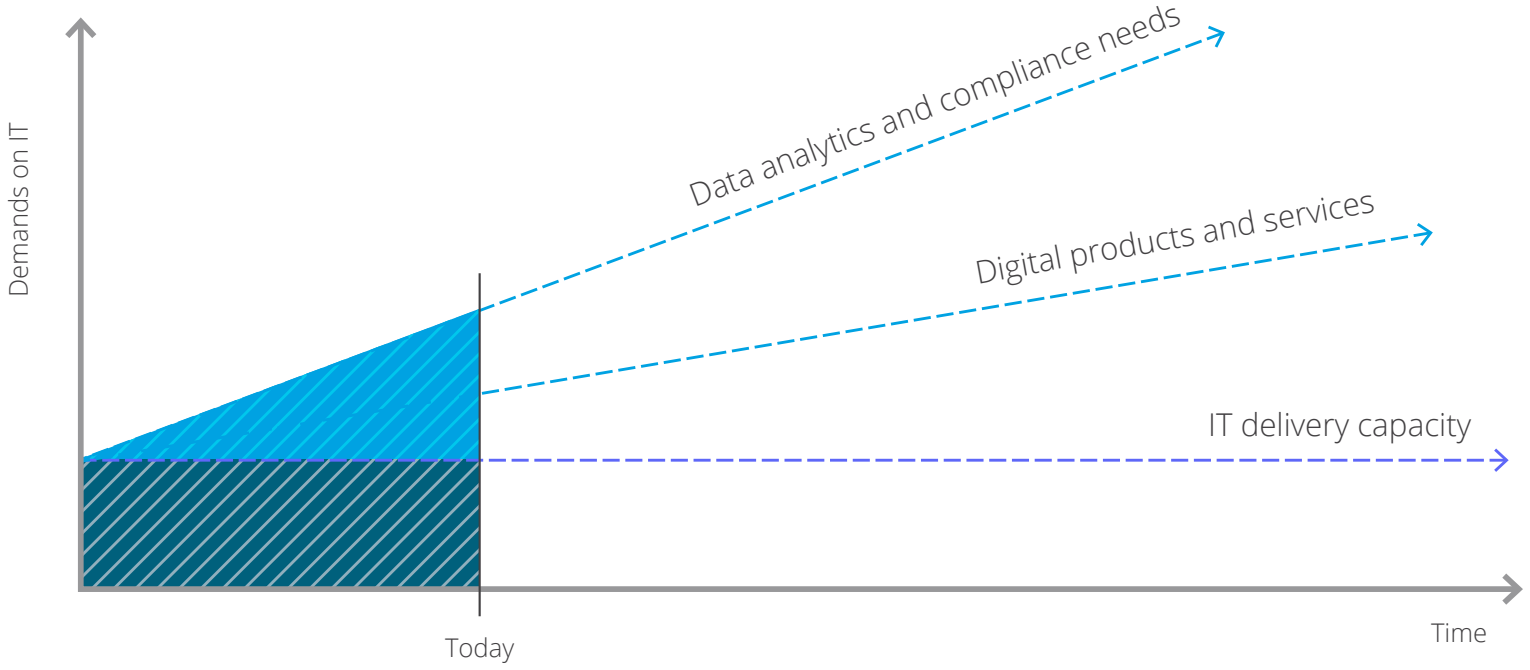

Figure 1: As digital transformation grows, increasingly, business-critical demands on IT outpace IT delivery capacity.

Integration consistently proves to be the most critical bottleneck to delivering an increasing number of IT projects as the number of technologies required to support the digital experiences and functionality needed to remain competitive continues to grow. The challenges of integrating stakeholder data, supply chain information, and contractor records can drastically bog down IT from focusing on more important initiatives.

Digitally transform energy and utilities with APIs

Energy and utilities companies have typically followed a point-to-point approach or service oriented architecture (SOA) approach to integration. Point-to-point approaches appear attractive for quick delivery of a single given project or when there are a limited number of endpoints and a slower pace of change. However, this approach is increasingly untenable when used for field enablement or customer experience, which must manage an explosion of endpoints and increasing demands from internal stakeholders for location, customer, or infrastructure data access. Designing with the consumption of data as the primary objective, APIs are the instruments that provide both a consumable and controlled means of accessing connectivity.

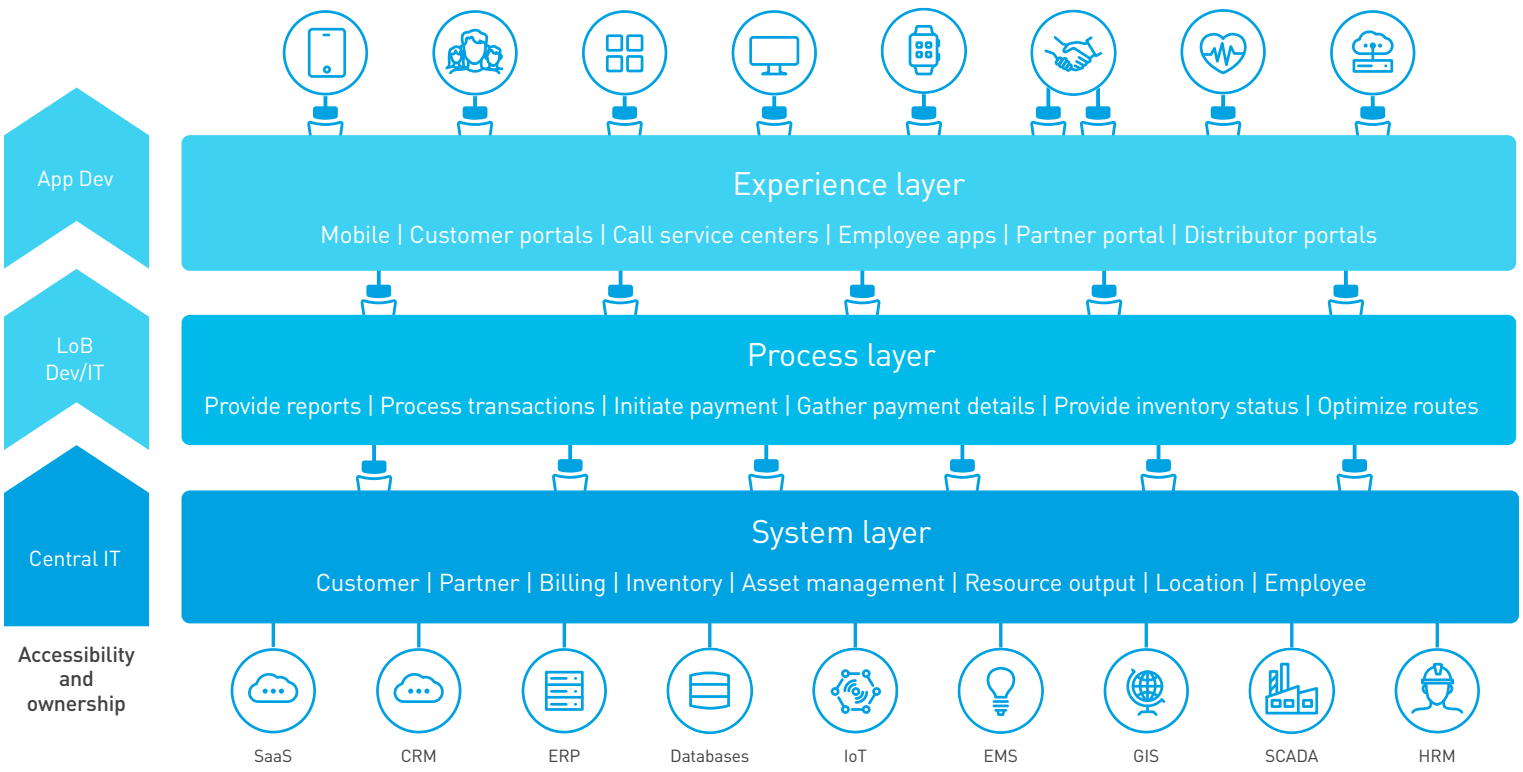

Figure 2: Three-layered reference architecture for API-led connectivity.

Large enterprises have complex interwoven connectivity needs that require multiple API building blocks. In this context, putting in a framework for ordering and structuring these building blocks is crucial. Agility and flexibility can only come from a multi-tier architecture containing three distinct layers.

- **System Layer:** Underlying all IT architectures are core systems of record (such as ERP, CRM, EMS, SCADA). Often, these systems are not easily accessible due to a lack of connectivity between systems. APIs provide a means of accessing underlying systems of record and exposing that data, often in a canonical format, while providing downstream insulation from any interface changes or rationalization of those systems.

- **Process Layer:** The underlying business processes that interact with and shape this data should be strictly encapsulated independent of the source systems from which that data originates, as well as the target channels through which that data is to be delivered. For example, in the employee enablement process, there is some logic, such as resource inventory and reporting data, that is common across all issues, geographies, and channels that can and should be distilled into a single service that can then be called by issue/geography/channel-specific parent services. These APIs perform specific functions and provide access to non-central data.

- **Experience Layer:** Data is now consumed across a broad set of channels, each of which requires access to the same data but in a variety of different forms. For example, a customer service representative, a web portal, and a mobile application may all need to access the same customer information fields, but be presented in different formats. Experience APIs are the means by which data can be reconfigured so that it is most easily consumed by its intended audience, all from a shared data source, rather than setting up separate point-to-point integrations for each channel.

The three-tiered reference architecture of system, process, and experience layers APIs maintains critical governance while enabling a bottom-up agile IT infrastructure to meet the speed and innovation demands of both energy and utilities customers and employees.

Six benefits of API-led connectivity

- **IT as a platform for innovation:** By exposing data assets as a service to a broader audience, IT can be a platform that allows lines of business to self-serve and accelerate innovation. To learn more, see the above case study on BP.
- **Increased developer productivity:** Realizing an API-led connectivity approach is consistent with a service oriented approach, whereby logic is distilled to its constituent parts and reused across different applications. This approach prevents duplication of efforts and allows developers to build on each other's efforts.
- **Predictable and controllable change:** By ensuring modularization of integration logic and by providing a logical separation between modules, IT leaders can better estimate, plan, and ensure the delivery of changes to the code with minimal testing and downstream impact.
- **Distributed and tailored approach:** An API-led connectivity approach recognizes that there is no one-size-fits-all architecture. This helps address connectivity in small pieces and exposes capability through APIs or microservices.
- **Greater agility through loose coupling of systems:** Within an organization's IT architecture, there are different levels of governance that are appropriate. The so-called bimodal IT or two-speed IT approach makes this dichotomy explicit. API-led connectivity supports the ability to carefully manage and gate changes to the core systems of records,

while retaining the flexibility to iterate quickly for user-facing edge systems, such as web and mobile applications.

- **Deeper operational visibility:** Approaching connectivity holistically allows greater operational insight that goes beyond whether an API or a particular interface is working or not. It provides end-to-end insight from the receipt of an initial API request call to the fulfillment of that request, based on an underlying database query. At each step, a fine grained analysis is possible that cannot be easily realized when considering connectivity in a piecemeal fashion.

MuleSoft: The API-led connectivity platform for energy and utilities

The energy and utilities industries are in the early stages of digital transformation, providing a massive opportunity for leadership to enable IT to reimagine and re-engineer traditional business models. In an increasingly volatile and competitive market, effective digital transformation will be a key competitive differentiator between companies that thrive and companies that falter.

Integration is the anchor powering the type of digital transformation required to succeed. By enabling organizations to enhance the customer experience, empower employees, and build out new services and products, MuleSoft will be the key to surviving and thriving within an industry fraught with market volatility, environmental pressures, and disruptive technologies. MuleSoft's Anypoint Platform allows enterprises to deliver on their digital transformation initiatives through API-led connectivity. The platform allows developers to connect rapidly, orchestrate, and enable any internal or external endpoint — giving energy and utilities providers a decisive competitive advantage in today's and tomorrow's market.

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**