



## Key Industries Reshaped by the Cloud

Cloud enables the connected world, transforming industries at speeds without historical precedent and in ways once deemed science fiction. Cloud data centers filled with inexpensive and rapidly scalable computing equipment (millions of virtual servers accommodate increased computing demands without extra physical space, cooling or electrical power), entire industries are or will experience growth unattainable from technology available just 10 years ago. That's because cloud computing is changing the way many industries conduct business, making them more agile, mobile and competitive.

### ABOUT JABIL

Built on a foundation of empowered employees in over 90 plants in 23 countries, Jabil strives to be the world's leading global manufacturing solutions partner.

Jabil's unique combination of global expertise, ingenuity, analytics and financial performance has contributed to the success of the world's most well known brands.

Most obviously, cloud computing has allowed cloud-based companies to grow revenues and profits well above those in traditional businesses. A McKinsey report really articulates the situation well.

Today, Amazon.com is a \$74 billion business, most of which is still retail sales. However, Amazon Web Services (AWS) Chief Andy Jassy notes that AWS could eventually be Amazon's biggest business. He also said Amazon would spend what it takes to continue to grow the AWS business.

Amazon Web Services is Amazon's market leading hyperscale computing platform. It offers customers a growing list of IT infrastructure and services hosted in the Amazon cloud. In 2012, an analyst worked out that AWS includes almost a half million Linux servers running a modified version of Red Hat. In 2014, a Gartner analyst estimates that AWS now runs between one and two million servers and services a million customers.<sup>2</sup>

Over the long haul, Amazon believes the massive scale<sup>3</sup> of the public cloud will mean that very few organizations will operate their own data centers. Even more telling, as fast as Amazon Web Services is growing, some of its competitors are growing even faster. AWS is growing at a rate of 67 percent year on year. But rivals Microsoft and IBM registered stronger growth: 154 and 84 percent, respectively. In fact, industry analyst firm IDC predicts that by 2018, the cloud will grow by one server every 9 seconds (IDC Worldwide Cloud Server Forecast 2014-2018, IDC #252796, Nov 2014).

However, the growth of cloud computing isn't just benefitting hyperscale cloud computing companies like Amazon, Google and Microsoft. Technology convergence, plummeting costs and increased consumer demand signal significant changes in several other key industries.

**"In 1990, the top three automakers in Detroit had among them nominal revenues of \$250 billion, a market capitalization of \$36 billion, and 1.2 million employees. The top three companies in Silicon Valley in 2014 had nominal revenues of \$247 billion, a market capitalization of over \$1 trillion, and only 137,000 employees."**<sup>1</sup>



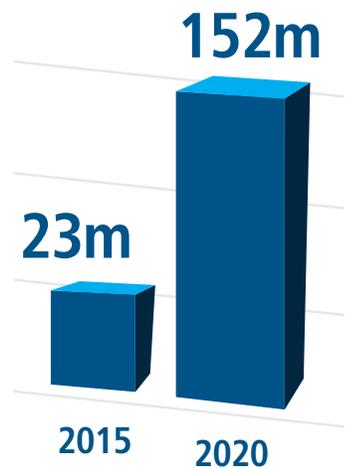
# The Automotive Industry

Our roads may not be quite ready for autonomous vehicles yet, but technology innovations to make autonomous driving possible are finding their way into our automobiles right now. Telematics, infotainment, navigation and even braking, parking and steering continue to rely on data to control everything going on within the car. That means, at some point, most of our cars are going to be connected to the cloud in a very big way.

Research firm IHS Automotive estimates that globally, 23 million cars are already connected to the Internet in some capacity. By 2020 that figure is expected to rise to 152 million.<sup>4</sup>



Cars Connected to the Internet



As cars eventually connect to each other -- and to buildings, fuel dispensers and even road signs -- the data that is shared, secured, transmitted and stored must have a robust enough infrastructure to manage these transactions. With the sheer amount of data, consumer demand and expectations for ever-available, seamless Wi-Fi connectivity, the auto industry will continue to transform from a mechanically centered industry into one centered around high-tech communications.

Tesla is an important leader of this trend. Back in September 2014, Tesla did something more akin to a smartphone company than a car company. It released a major software update directly over-the-air to its Model S customers. Tesla is the first automobile manufacturer to push updates to customers in this manner. Now many other automobile manufacturers are developing their own systems for doing the same thing.

Sure enough, software companies are stepping up to fill the demand, too. For example, Redbend recently announced Redbend 10, a software platform with an automotive component made specifically for over-the-air updates to vehicles.

Over-the-air updates not only provide tremendous convenience for the consumer, they reduce maintenance costs, manufacturer recalls, liability and increase safety (immediate fix).

Redbend claims that all of the components in vehicles needing an update, including those with infotainment systems, electronic control units and telematics control units running various OSs, with different levels of resources, from different suppliers and connected via different network types (Wi-Fi, cellular, USB, ODB2 and in-vehicle busses), can be updated with one campaign.<sup>5</sup>

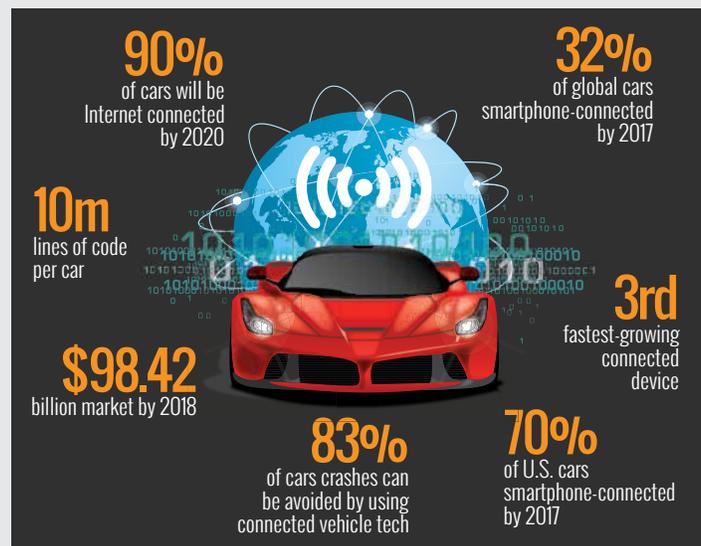
Egil Juliussen, director of research for automotive electronic technology for IHS Automotive, notes that about 30,000 vehicles have been updated over the air in 2014. In 2015, over-the-air software upgrades will expand to 230,000 and reach one million in 2016. By 2020, about 22 million new vehicles globally will accept software upgrades over-the-air.<sup>6</sup>

Year	Over-the-air automobile updates
2014	30,000
2015	230,000
2016	1 million
2020	22 million

As car-to-car, connected car, infotainment and telematics take a bigger piece of the car purchase price, car companies will step-up the competition to offer increasingly better device and service integrations.

Nevertheless, over the air updates for our vehicles tell just part of the story around how cloud services are reshaping the automobile industry. Already, our cars are the third fastest growing connected devices and it is estimated that by 2020, 90 percent of cars will be connected to the Internet. So, our cars (and car manufacturers) will become more like smartphones and smartphone companies.

## The Connected Car



As consumers demand increasingly sophisticated and seamlessly connected vehicles, auto manufacturers are already adding cloud-friendly features. With the connected car market estimated to reach over \$98 billion by 2018, cloud-connectivity is definitely reshaping the automobile industry.

# Healthcare

Think about it. It seems like everything we own either is or will soon be connected to the cloud. For sure, everything wearable will be connected. Eventually, our wearables will monitor, detect and inform with increased sophistication, our health vitals.

Traditionally categorized as leaders in mobile and communications technologies, several large technology companies are seriously investing in connected, sensor-laden medical devices. In fact, many of them offer cloud solutions that are HIPPA-approved to store all the data wearables produce.

In 2014, the healthcare cloud computing market was valued around \$4 billion. By 2020, the market will have grown to over \$12 billion..<sup>7</sup>



**“Qualcomm is one of the most vocal players about using data for using wearables for medical purposes ... They’re convinced that that’s where a lot of the revenue’s going to come from.” -James Moar of Juniper Research**

On January 12, 2015, Novartis Pharmaceuticals announced plans to establish a \$100 million joint investment company with Qualcomm Ventures, the investment arm of Qualcomm Incorporated, to target early stage companies with technologies, products or services that “go beyond the pill.”

Additionally, Qualcomm Life partnered with Walgreens to provide its 2net platform to connect Walgreen devices like a wrist-worn blood pressure cuff, a traditional blood pressure cuff and even a blood glucose meter.

Qualcomm is definitely one of the tech companies leading the way in wearable health technologies and cloud data management. In fact, Qualcomm was the largest corporate investor in digital health in 2014, according to both Rock Health and StartUp Health. Its portfolio includes digital health players like Fitbit, Practice Fusion, AliveCor, Telcare, Welltok, Sotera Wireless, AirStrip and Noom.

The Qualcomm Life 2net platform is a great example of how a technology company has taken a shot at the entire healthcare wearable ecosystem. The Life 2net platform is a wireless health network that connects medical devices and cloud-based data centers to interfaces (apps, websites, etc.) Best of all, the platform meets HIPAA privacy regulations for data storage, bringing it a step closer to wider adoption. But Qualcomm owns just part of the solution. Although it may be driving healthcare change through its enabling technology, it definitely relies on healthcare partnerships to succeed.

**“This collaboration is a powerful demonstration of how the 2net Platform can amplify proven tools and solutions to enhance a patient’s health and experience,” - Rick Valencia, senior vice president and general manager, Qualcomm Life, Inc.<sup>8</sup>**

On March 9, 2015, Apple announced ResearchKit,<sup>9</sup> a software framework made specifically for medical research that lets researchers easily create apps for iPhones and the Apple watch to literally funnel data from hundreds of millions of customers into health research databases. By partnering with numerous prestigious international health research institutions, including the University of Oxford and the University of Rochester, Apple is poised to make a significant impact on medical research. The apps collect data from customers who want to share information through surveys but also collect activity and heartbeat information.

Coupled with cloud computing, vast amounts of health data can be continuously collected and mined at scale without users ever having to step foot into a medical laboratory.

**“Although mobile health efforts have been tried before, such things can only work in our current society, in which nearly everyone has a smartphone and the devices are a normal part of daily life. This is the beginning.” - Patricia Ganz, Fielding School of Public Health at the University of California, Los Angeles**

Through these mobile apps and platforms, cloud computing takes center stage in redefining how medical research data is collected and leveraged. With connected health monitoring devices, right now patients can benefit from remote monitoring, transitional care support and chronic care management.

Does Qualcomm ramping up its investment in digital healthcare signal a trend in the industry? Is Apple’s HealthKit a healthcare research gamechanger? While wearables certainly gain the media’s attention, there’s finally a shift toward the cloud from healthcare companies, too.<sup>10</sup>

## Benefits of Cloud Computing for Healthcare<sup>10</sup>



For example, Amazon Web Services (AWS) healthcare customers can now leverage secure AWS services to process, maintain, and store protected health information in accordance with the U.S. Health Insurance Portability and Accountability Act (HIPAA). In 2013, Amazon agreed to sign as a Business Associate with customers subject to HIPAA.

This is a big deal for a few reasons. First, according to analyst firm Forrester, AWS has about 71 percent of the cloud market, so its expertise is unquestionable. Amazon understands what's at stake. The U.S. Health and Human Services strongly recommends insisting on a Business Associate Agreement (BAA) with a cloud provider. After all, there are huge security breach risks, both financial and privacy-based.

**"If you use a cloud service, it should be your Business Associate. If they refuse to sign a Business Associate Agreement, don't use the cloud service."**  
**David Holtzman, Information Privacy Division, Office for Civil Rights**

Getting healthcare data into the cloud makes sense because it is our best hope for making sense of huge stores of data. So, the fact that Amazon has agreed to take on this responsibility means that others will, too.<sup>11</sup>

In fact, Box, Microsoft and Verizon support Business Associate Agreements as well. Dell offers a BAA for its Private Cloud service.

Tom Sullivan, Executive Editor of HIMSS Media, predicted this trend back in 2012. In an interview with IHS, he noted that cloud services mitigate technology and

corporate cost challenges by moving services from capital expenditures to operational expenditures. In other words, companies don't have to purchase and implement electronic healthcare record (EHR) systems. Instead, they can subscribe to an EHR as a service in the cloud.



Once healthcare fully embraces cloud services, a whole other level of opportunity arises. Residing in the cloud, managed through hyperscale computing systems, aggregations of millions of anonymous health and genomic data could be mined for the next step in healthcare -- personalized medicine. And that's where companies like Google are investing.

With some of the largest hyperscale computing interests in the world devoted to building just such systems, the cloud will truly disrupt the healthcare industry as we think of it today. Google's Calico project is a startup that leverages Google data centers to help researchers unlock cures for the most dreaded human diseases. Best of all, these cloud-based systems are aimed at uncovering cures that can be completely personalized to our individual genomes. However, this isn't just a tech company playing with data. Recently, Google announced a partnership with pharmaceutical company, AbbVie, to create and market new drugs for diseases like cancer and Alzheimer's. Ultimately, the ambitious project aims to extend human life by up to 100 years.

So, as tech industry giants address technology, cost and security concerns with big healthcare partners, the cloud promises to unlock almost unfathomable value as researchers mine it for clues that lead to cures for just about any disease afflicting humans.

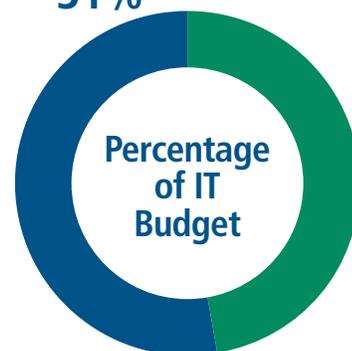
# Financial/Payments

When you think of banking in the traditional sense, is the first thing that comes to mind a large brick building with formally dressed tellers or a drive-through self-service machine? Maybe. That's changing however, and, when you think of payments, you might think of something like PayPal instead. PayPal is an online payment company that makes it easy for busy consumers to use mobile devices and computers to manage online purchasing, receive payments for freelance work and even conduct money transfers to relatives.



## Financial Services Cloud Spending<sup>13</sup>

Software as a Service  
31%



28%

Infrastructure as a Service +  
Platform as a Service

PayPal and other online payment options have fundamentally changed how consumers think about managing money. They embrace cloud services to make payment services ridiculously convenient. As digital payment options mature and proliferate, they're posing real risks to established financial institutions.

**"As many more tech companies begin offering bank-like services, mainstream banks are searching for ways they can fight back." - Martin Cooper, Technical Director at SolidFire**

Traditional banking can no longer afford to ignore the opportunities cloud services present. As a result, financial institutions are steadily investing in cloud services. According to Gartner, by 2016, more than 60% of the world's banks will process the majority of their transactions in the cloud.<sup>12</sup>

Of course, financial organizations see the cloud as a means for reducing internal IT costs, but because of the upstart payment companies success in changing the way consumers think about money management, the cloud now represents the best way to transform the organization to drive business growth.

## Opportunities in the Cloud for Financial Institutions



Financial Services: Navigating the next generation of cloud ERP  
Source: PWC

**“There’s a new maturity for cloud computing in the financial services industry. [It] is now a growth driver for banks and insurers, rather than a medium just for bringing costs down”**  
-Chief Analyst Daniel Mayo at Ovum



Then, of course, there are the opportunities buried in all that customer data. Borrowing from data-driven companies like Amazon and Google, financial institutions are mining their massive consumer data to make predictions, hone in on customer behavior and even to get insights into what personalized solutions might resonate with customers.<sup>14</sup>

# Cable TV Industry

Major Internet, software and high-tech companies like YouTube, Netflix, Amazon and a host of other cloud-based companies are now significant content platforms, integrating multiple digital capabilities that were formerly separate components of the value chain. As a result, consumers can now gain access to quality on-demand content through multiple devices, anywhere and at any time without having to pay a pricey cable subscription. As a result, these new entries are rapidly changing the way we consume Internet media. In fact, video is now the vast majority of content we check out online.<sup>15</sup>



All of this leaves the standard cable industry offerings in the dust. Because, for now, cable customers are still stuck paying for nearly 200 channels while watching less than 10 percent of them.<sup>16</sup>

So naturally, with options like the Roku and an over-the-top (OTT) service like Netflix, customers are abandoning cable offerings altogether.

Between 2010 and 2014, the number of people who canceled their cable subscriptions in favor of TV and news over the Internet increased by 44 percent.<sup>17</sup>

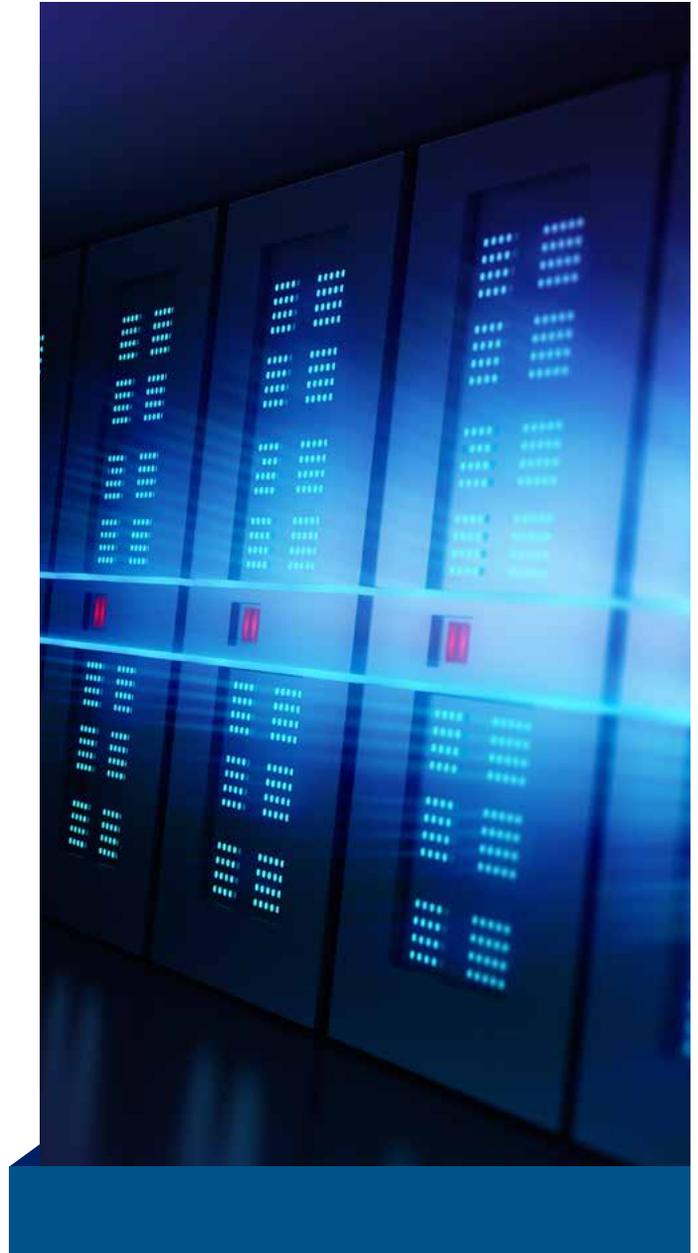
To stem the tide of “cable-cutters,” cable companies are starting to offer packages that compete with the on-demand and mobile cloud-based services. Through apps, some providers now offer solutions that allow customers to enjoy programs on their mobile devices.

Charter Communications, the fourth largest cable operator in the U.S., is putting its faith in a cloud user interface.<sup>18</sup>

Now, television companies are racing to invest in new OTT services. NBCUniversal is developing a streaming video service and NBC is looking at the horror genre and may even feature full episodes of the network’s comedy and original programming for a small subscription fee.

HBO and CBS are both working on streaming services. CBS is also working on a Showtime service and Viacom is building Noggin, a streaming service just for kids.

Yes, cloud-based streaming services have definitely changed the way viewers consume content. Cable companies are slowly adapting and still hold solid market share. In fact, although more people are choosing to cancel cable television subscriptions, the number of individuals adding broadband subscriptions is increasing. The vast majority of broadband service is provided by cable companies. In fact, there is a larger transformation here. Growth in content, cloud, Internet and Wi-Fi is shifting away from telecom companies and toward cloud-based service companies, including cable companies.<sup>19</sup> Cloud-based services are changing the face of the cable industry, but not in a completely negative way.



# Enabling the Cloud

The connected world continues to drive cloud adoption in profound ways for many industries. We see a transformation in everything, from clothing and cars to healthcare and entertainment.

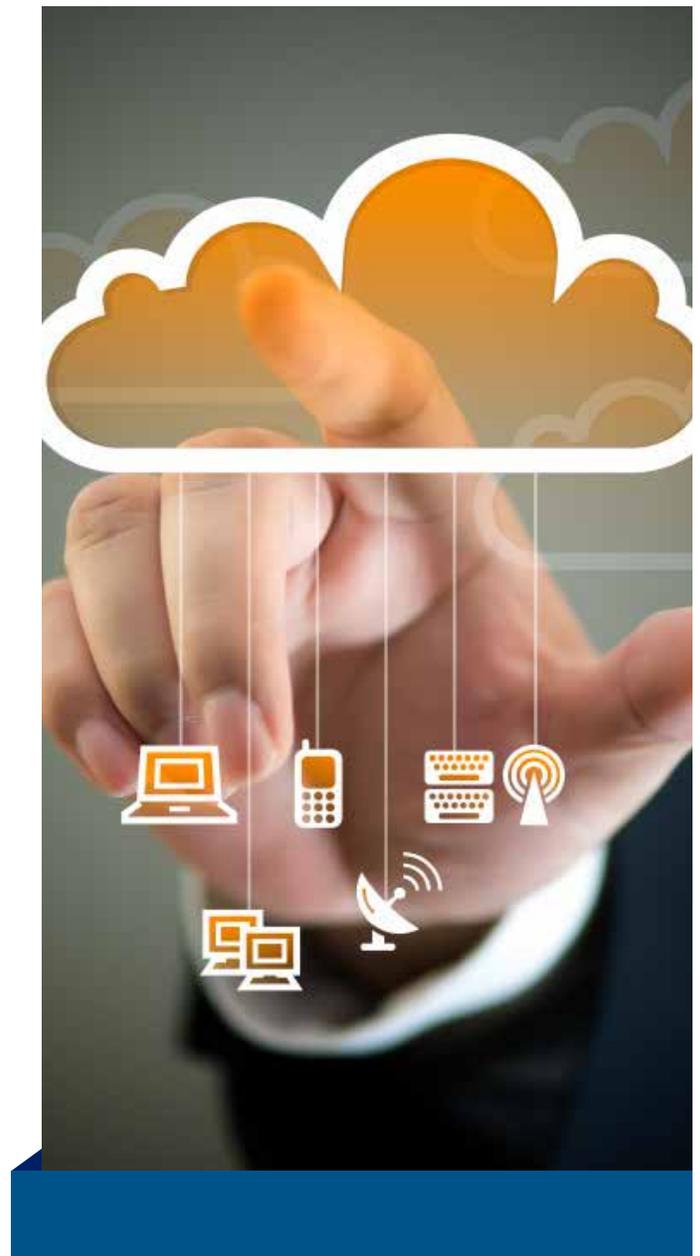
Even as this cloud transformation occurs, one thing remains constant – there is still a physical component in the system. Hardware has to be designed, built, delivered and serviced.

So, no matter which industry you can imagine, it all comes down to manufacturing. Global manufacturing partners like Jabil build literally everything in the cloud ecosystem. From hyperscale servers that run services like streaming video and processing 200,000 Cassini images from Mars,<sup>19</sup> to the set-top boxes and streaming sticks we use to view our favorite programs... Jabil builds them.

We make the smart wearable technology that talks to the cloud through a dizzying array of sensors so that the device that sits on your wrist; nose or even your shirt can relay important health-related information to your phone or healthcare provider.

Jabil's design engineering capabilities dovetail seamlessly with our customer's experts, putting our design for manufacturing expertise to work to improve quality, speed-to-market and of course, customer satisfaction. So, the next time you sit in your cloud-connected car, you'll appreciate that a manufacturing partner like Jabil had lots to do with building things like its infotainment system, head-up display, electric charging station and even the advanced optics.

The vast, intelligent digital supply chain capabilities of partners like Jabil means that the cloud and its connected devices can scale smartly, securely, rapidly and cost-effectively. That way, industries can focus on what they do best while Jabil takes care of the rest.



**Gina Clifford**  
Corporate Communications  
Jabil

# What Jabil Brings

Flexibility and cost avoidance are keystones of Jabil's Value Engineering Team. In fact, value engineering drives 40 percent of active design. That's how we play an integral role in intelligently designed and engineered products that improve the value, speed and long-term success of customers across multiple industries.

With deep expertise and global partner relationships, Jabil supply chain experts utilize best practices and regional know-how to partner with some of

the world's most notable brands. One of the most comprehensive examples of how Jabil manages complexity lies with its homegrown business intelligence tools and entrepreneurial [engineers who build innovative, sophisticated, business intelligence tools](#) for the entire supply chain. These tools provide real-time, actionable insights to customers and business managers throughout the entire supply chain organization.



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We help companies design, build and take their products to market quickly, affordably and efficiently. But more than that, Jabil helps customers intelligently design their supply chains to be agile, economical and effective even in uncertain times.



# JABIL

- <sup>1</sup> - [http://www.mckinsey.com/insights/high\\_tech\\_telecoms\\_internet/competition\\_at\\_the\\_digital\\_edge\\_hyperscale\\_businesses](http://www.mckinsey.com/insights/high_tech_telecoms_internet/competition_at_the_digital_edge_hyperscale_businesses)
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- <sup>18</sup> - <http://www.v-net.tv/charter-moves-device-intelligence-from-edge-to-the-cloud>
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- <sup>20</sup> - <http://aws.amazon.com/solutions/case-studies/nasa-jpl/>



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